March 11, 2025

AFFILIATED AGENCIES

Orange County Transit District

Local Transportation Authority

Service Authority for Freeway Emergencies

Consolidated Transporation Service Agency

Congestion Management Agency

SUBJECT: Invitation for Bids (IFB) 5-3922
"Installation of Battery Electric Bus Chargers and Electrical Infrastructure at Santa Ana Bus Base"

Ladies/Gentlemen:

This letter and its attachment comprise **Addendum No. 1** to the above captioned Invitation for Bids issued by the Orange County Transportation Authority ("Authority").

1. Bidders are advised that due to technical issues, several documents were omitted from the original release of the IFB. The Authority is re-issuing the IFB in its entirety, which is presented as Attachment A to this Addendum No. 1. Bidders are to submit their bids utilizing the forms from this Addendum No. 1.

Bidders are reminded to acknowledge receipt of this **Addendum No. 1** in their "Bid Form". Bidders are advised that all changes addressed in this **Addendum No. 1** shall be incorporated into the final Agreement.

Questions regarding this Addendum No. 1 should be directed to the undersigned at 714-560-5314 or mle1@octa.net.

Sincerely,

Michael Le
Senior Contract Administrator
Contracts Administration and Materials Management

Attachment:
Attachment A: IFB 5-3922 "Installation of Battery Electric Bus Chargers and Electrical Infrastructure at Santa Ana Bus Base"

INVITATION FOR BIDS (IFB) 5-3922
BOOK 1 OF 2

INSTALLATION OF BATTERY ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE

ORANGE COUNTY TRANSPORTATION AUTHORITY
550 South Main Street
P.O. Box 14184
Orange, CA 92863-1584
(714) 560-6282

Key IFB Dates

Issue Date:	**March 10, 2025**
Pre-Bid Conference/Site Visit:	**March 18, 2025**
Questions/Approved Equal Submittal:	**March 20, 2025**
Bid Submittal Date:	**April 8, 2025**

TABLE OF CONTENTS

SECTION I: INSTRUCTIONS TO BIDDERS 1

SECTION II: INSTRUCTIONS TO BIDDING FORMS 13

SECTION III: ADDITIONAL CONTRACTUAL EXHIBITS 34

SECTION IV: AGREEMENT 42

SECTION V: GENERAL PROVISIONS - EXHIBIT A 43

SECTION VI: PROJECT SPECIFICATIONS - EXHIBIT B 44

SECTION VII: LIST OF DRAWINGS - EXHIBIT C 45

SECTION VIII: LEVEL 3 HEALTH, SAFETY AND ENVIRONMENTAL SPECIFICATIONS – EXHIBIT H 47

BID BOOKLET 48

March 10, 2025

SUBJECT: NOTICE INVITING SEALED BIDS
IFB 5-3922, "INSTALLATION OF BATTERY ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE"

TO: ALL BIDDERS

FROM: ORANGE COUNTY TRANSPORTATION AUTHORITY

The Orange County Transportation Authority (Authority) invites sealed bids for **INSTALLATION OF BATTERY ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE**.

Please note that by submitting a Bid, Bidder certifies that it is not subject to any Ukraine/Russia-related economic sanctions imposed by the State of California or the United States Government including, but not limited to, Presidential Executive Order Nos. 13660, 13661, 13662, 13685, and 14065. Any individual or entity that is the subject of any Ukraine/Russia-related economic sanction is not eligible to submit a Bid. In submitting a Bid, all Bidders agree to comply with all economic sanctions imposed by the State or U.S. Government.

The description of this project is installation of electrical service infrastructure and equipment, emergency stand-by generator, Authority furnished battery-electric bus chargers, and related work at Santa Ana Bus Base.

The estimated cost for this project is $3,600,000.00. Bidders will be required to hold a valid State of California C-10 specialty contractor license or hold a valid State of California A general engineering contractor license and subcontract to valid State of California C-10 specialty contractor licensee.

Bids must be submitted at or before 11:00 a.m., April 8, 2025.

Bids delivered in person or by a means other than the U.S. Postal Service shall be submitted to the following:

Orange County Transportation Authority
Contracts Administration and Materials Management
600 South Main Street, (Lobby Receptionist)
Orange, California 92868
Attention: Michael Le, Senior Contract Administrator

Or bids delivered using the U.S. Postal Service shall be addressed as follows:

Orange County Transportation Authority
Contracts Administration and Materials Management
550 South Main Street
P.O. Box 14184
Orange, California 92863-1584
Attention: Michael Le, Senior Contract Administrator

Bids and amendments to bids received after the date and time specified above will be returned to the bidders unopened.

Bidders interested in obtaining a copy of this Invitation for Bids (IFB) may do so by downloading the IFB from CAMM NET the Authority's on-line website at https://cammnet.octa.net.

All bidders and subcontractors interested in doing business with the Authority are required to register their business on-line at CAMM NET. The website can be found at https://cammnet.octa.net. From the site menu, click on CAMM NET to register.

To receive all further information regarding this IFB, bidders and sub-contractors must be registered on CAMM NET with at least one of the following commodity codes for this solicitation selected as part of the vendor's on-line registration profile:

Category:	Commodity:
Construction	Electrical Contractor Concrete Construction - Electrical Installation Construction (General) General Contractor

An on-site/in-person pre-bid conference will be held on March 18, 2025, at 09:00 a.m. at the Authority's Administrative Office, 550 South Main Street, Orange, CA 92868 in Conference Room 07.

Participation via teleconference will also be available. Prospective bidders may join or call-in using the following credentials:

- Click here to join the meeting
- OR Call-in Number: +1 916-550-9867
- Conference ID: 895 461 094#

A copy of the pre-bid conference presentation slides and registration sheet(s) will be issued via addendum prior to the date of the pre-bid conference.

Immediately following the pre-bid conference, a job walk will be conducted at Santa Ana Bus Base, located at 4301 West MacArthur Boulevard, Santa Ana, CA 92706.

All prospective bidders are encouraged to attend the pre-bid conference, and the job walk.

Please review "Bus Base Visit Protocol" following this notice.

Bidders will be required to submit the name, business address, and California contractor license number of each subcontractor who will perform work or labor or render service to the bidder in or about the work in an amount in excess of one-half of one percent (1/2 of 1 %) of the bidder's total bid. If a subcontractor's California contractor license number is submitted incorrectly, it will not be grounds for filing a bid protest or grounds for considering the bid nonresponsive if the corrected subcontractor's California contractor license number is submitted to the Authority within 24 hours after the bid opening.

All bidders are encouraged to subcontract with small businesses to the maximum extent possible.

The successful Bidder will be required to comply with all applicable equal opportunity laws and regulations.

All bidders must register with the Department of Industrial Relations pursuant to Labor Code Section 1725.5. A bidder is exempt from this requirement pursuant to Labor Code Section 1771.1(a) if the bidder submits a bid authorized by Section 7029.1 of the Business and Professions Code or by Section 10164 or 20103.5 of the Public Contract Code, provided the bidder is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded.

A bid submitted by a contractor or subcontractor will not be accepted or entered into without proof of the contractor or subcontractor's current registration to perform public work pursuant to Labor Code Section 1725.5.

Award of this contract is subject to receipt of federal, state and/or local funds adequate to carry out the provisions of the agreement including the project specification.

Bus Base Visit Protocol

OCTA has a core value of Safety for all employees, visitors, and the public for all transit related operations, therefore Bus Base Rules are established to prevent incidents and injury.

OCTA Maintenance bases require proper personal protective equipment (PPE) while at the bus base maintenance areas.
Basic PPE includes;

1. ANSI Class 2 Reflective Vest
2. Proper clothing foot ware (i.e., no open toe shoes, sandals, high heel shoes, etc.)
3. Proper eye protection as required

All Contractors (proposed bidders, visitors, etc.) upon arrival shall report into the base Maintenance Shift Supervisor, with the appropriate OCTA employee escort.

Each person shall:

1. Sign in
2. Obtain a briefing of potential hazards and emergency procedures
3. Cell Phones are only allowed inside a building

All job walk visitors shall stay within the group and be attentive to instructions for a safe visit.

Upon completion of the visit each person shall sign out with the Maintenance Shift Supervisor prior to leaving the property.

SECTION I: INSTRUCTIONS TO BIDDERS

SECTION I. INSTRUCTIONS TO BIDDERS

A. PRE-BID CONFERENCE/SITE VISIT

An on-site/in-person pre-bid conference will be held on March 18, 2025, at 09:00 a.m. at the Authority's Administrative Office, 550 South Main Street, Orange, CA 92868 in Conference Room 07.

Participation via teleconference will also be available. Prospective bidders may join or call-in using the following credentials:

- Click here to join the meeting
- OR Call-in Number: +1 916-550-9867
- Conference ID: 895 461 094#

A copy of the pre-bid conference presentation slides and registration sheet(s) will be issued via addendum prior to the date of the pre-bid conference.

Immediately following the pre-bid conference, a job walk will be conducted at Santa Ana Bus Base, located at 4301 West MacArthur Boulevard, Santa Ana, CA 92706. All prospective bidders are strongly encouraged to attend the pre-bid conference and the site visit.

By investigation of the work site, bidder shall be satisfied as to the nature and location of the work and shall be fully informed as to the conditions and matters, which can in any way affect the work or the cost thereof. Prospective bidders should familiarize themselves with Authority safety rules that pedestrians must wear approved safety vests.

Please bring a safety vest for the job walk.

B. EXAMINATION OF DOCUMENTS

By submitting a bid, the bidder represents that it has thoroughly examined and become familiar with the work required under this IFB and that it is capable of performing quality work to achieve the authority's objective.

A Bid Booklet has been furnished as Book 2 of this IFB.

C. ADDENDA

The Authority reserves the right to revise the IFB documents. Such, if any, will be made by written addendum to this IFB. Any written addenda issued pertaining to this IFB shall be incorporated into the terms and conditions of any resulting Agreement. The Authority will not be bound to any modifications to or deviations from the requirements set forth in this IFB as the result of oral instructions. Bidders shall acknowledge receipt of Addenda in their bids. Failure to acknowledge receipt

of Addenda may cause the bid to be deemed non-responsive to this IFB and be rejected.

D. AUTHORITY CONTACT

All communication and/or contacts with Authority staff regarding this IFB are to be directed to the following Contract Administrator:

Michael Le, Senior Contract Administrator
Contracts Administration and Materials Management Department
600 South Main Street
P.O. Box 14184
Orange, CA 92863-1584
Phone: 714.560. 5314, Fax: 888.404.6282
Email: mle1@octa.net

Commencing on the date of the issuance of this IFB and continuing until award of the contract or cancellation of this IFB, no bidder, subcontractor, lobbyist or agent hired by the proposer shall have any contact or communications regarding this IFB with any Authority's staff; member of the evaluation committee for this IFB; or any contractor or consultant involved with the procurement, other than the Contract Administrator named above or unless expressly permitted by this IFB. Contact includes face-to-face, telephone, electronic mail (e-mail) or formal written communication. Any bidder, subcontractor, lobbyist or agent hired by the bidder that engages in such prohibited communications may result in disqualification of the proposer at the sole discretion of the Authority.

E. CLARIFICATIONS OF SPECIFICATIONS AND APPROVED EQUALS

1. Specifications Review

Should a bidder find discrepancies in, or omissions from, the drawings or specifications, or be in doubt as to their meaning, the bidder shall notify the Authority in writing in accordance with item 3 ("Submitting Requests"), below. Should it be found that the point in question is not clearly and fully set forth; a written addendum clarifying the matter will be sent to all firms registered on CAMM NET under the commodity codes specified in the IFB.

2. Preference for Materials

In accordance with the California Public Contract Code Section 3400, reference to any equipment, material, article or patented process, by trade name, make, or catalog number, shall not be construed as limiting competition. In those cases where the specifications call for a designated material, product, or service by specific brand or trade name and there is only one brand or trade name listed, the item involves a unique or novel product application required to be used in the public interest or is the only brand or trade name known to the Authority.

Where the specifications or drawings identify any material, product or service by one or more brand names, whether or not “or equal” is added, and the bidder wishes to propose the use of another item as being equal, approval shall be requested as set forth in below.

3. Submitting Requests

a. All requests for approved equals, clarification of specifications, or questions must be put in writing and must be received by the Authority no later than 5:00 p.m., on March 20, 2025.

b. Requests for approved equals, clarifications, questions must be clearly labeled, "Written Questions". The Authority is not responsible for failure to respond to a request that has not been labeled as such.

c. Any of the following methods of delivering written questions are acceptable as long as the questions are received no later than the date and time specified above:

1. U.S. Mail: Orange County Transportation Authority, P.O. Box 14184, Orange, California 92863-1584.

2. Courier/Overnight: Orange County Transportation Authority, 600 South Main Street, Lobby Receptionist, Orange, California 92868

3. Facsimile: (888) 404-6282.

4. E-Mail: mle1@octa.net

d. Any request for an approved equal or clarification of the specifications must be fully supported with technical data, test results, or other pertinent information as evidence that the substitute offered is equal to or better than the specification requirements. The burden of proof as to the equality, substitutability, and the compatibility of proposed alternates or equals shall be upon the bidder, who shall furnish all necessary information at no cost to the Authority. The Authority shall be the sole judge as to the equality, substitutability and compatibility of the proposed alternatives or equals.

4. Authority Responses

Responses from the Authority will be posted on CAMM NET, no later than five (5) calendar days before the scheduled date of bid opening. Bidders may download responses from CAMM NET at *https://cammnet.octa.net*, or

request responses may be sent via U.S. Mail by e-mailing or faxing the request to Michael Le, Senior Contract Administrator.

To receive e-mail notification of Authority responses when they are posted on CAMM NET, bidders and their subcontractors must be registered on CAMM NET with at least one of the following commodity codes for this solicitation selected as part of the vendor's on-line registration profile:

Category:	Commodity:
Construction	Electrical Contractor Concrete Construction - Electrical Installation Construction (General) General Contractor

Inquiries received after 5:00 p.m. on March 20, 2025, will not be responded to.

F. SUBMISSION OF BIDS

1. Date and Time

Bids must be submitted at or before 11:00 a.m., April 8, 2025.

Bids received after the time due will be rejected without consideration or evaluation.

Bids will be publicly opened in Conference Room 101 at the Authority's Administration Office, 600 South Main Street, Orange, California 92863 at the submission time indicated above. Participation via teleconference will also be available. Bidders may join or call-in using the following credentials:

- Click here to join the meeting
- OR Call-in Number: +1 916-550-9867
- Conference ID: 594 839 053#

2. Address

Bids delivered in person or by a means other than the U.S. Postal Service shall be submitted to the following:

Orange County Transportation Authority
Contracts Administration and Materials Management (CAMM)
600 South Main Street, (Lobby Receptionist)
Orange, California 92868
Attention: Michael Le, Senior Contract Administrator

Or bids delivered using the U.S. Postal Services shall be addressed as follows:

Orange County Transportation Authority
Contracts Administration and Materials Management (CAMM)
P.O. Box 14184
Orange, California 92863-1584
Attention: Michael Le, Senior Contract Administrator

3. Bid Booklet and Identification of Bids

Bids must be submitted on the forms provided in the Bid Booklet (Book 2 of 2) that accompanies this IFB. Bids shall include properly completed bidding forms. The bid forms must be enclosed in a sealed package clearly marked as follows:

IFB 5-3922, "INSTALLATION OF BATTERY ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE"

Bidder shall be entirely responsible for any consequences, including disqualification of the bid, resulting from any inadvertent opening of unsealed or improperly identified packages. It is the bidder's sole responsibility to see that its bid is received as required.

G. PRE-CONTRACTUAL EXPENSES

The Authority shall not, in any event, be liable for any pre-contractual expenses incurred by bidder in the preparation of its bid. Bidder shall not include any such expenses as part of its bid.

Pre-contractual expenses are defined as expenses incurred by bidder in:

1. Preparing a bid in response to this IFB;
2. Submitting that bid to the Authority;
3. Negotiating with the Authority any matter related to this bid; and
4. Any other expenses incurred by bidder prior to date of award, if any, of the Agreement.

H. JOINT BIDS

Where two or more firms desire to submit a single bid in response to this IFB, they should do so on a prime-subcontractor basis rather than as a joint venture. The Authority intends to contract with a single firm and not with multiple firms doing business as a joint venture.

I. TAXES

Bids are subject to State and Local sales taxes. However, the Authority is exempt from the payment of Federal Excise and Transportation Taxes. Contractor is responsible for payment of all taxes for any goods, services, processes, and operations incidental to or involved in the contract.

J. BID SECURITY FORMS

Bids shall be accompanied by a certified or cashier's check, or an acceptable bid bond for an amount not less than ten percent (10%) of the bid, made payable to the order of the Orange County Transportation Authority. A corporate surety (not an individual surety), registered in the state of California and registered to do business in the county of Orange must issue bid bonds. Said check or bond shall be given as a guarantee that the bidder will enter into a contract if awarded the work and in case of refusal or failure to enter into said contract, the check or bond, as the case may be, shall be forfeited to the Authority.

K. WITHDRAWAL OF BIDS

Bidders may withdraw its bid at any time prior to the time set for opening of bids by means of written request signed by the bidder or its proper authorized representative. Such written request shall be delivered to the Contracts Administrator at the address noted in the cover notice of this IFB.

L. PREVAILING WAGES

This project is funded under a financial assistance contract by the U.S. Department of Transportation and is subject to all conditions of the Davis-Bacon Act (40 U.S.C. 3141–48), as supplemented by the Department of Labor regulations 29 CFR part 5, and the Labor Code of the State of California commencing in Section 1770 et. seq. It is required that all mechanics and laborers employed or working at the site be paid not less than the current basic hourly rates of pay and fringe benefits. Wage schedules are available at the Authority's Offices or on the internet at:

http://www.dir.ca.gov/OPRL/statistics_research.html and
http://www.access.gpo.gov/davisbacon/.

Bidders shall utilize the relevant prevailing wage determinations in effect on the first advertisement date of the Notice Inviting Sealed Bids. In the event there are any differences between the minimum wage rates as determined by the United States Secretary of Labor and those determined by the State of California, the highest rate must be paid.

This Agreement is subject to compliance monitoring and enforcement by the Department of Industrial Relations. The Department of Industrial Relations shall monitor and enforce compliance with applicable prevailing wage requirements for this Agreement. The reporting requirements may be found at https://www.dir.ca.gov/Public-Works/Contractors.html. Bidder is responsible for complying with all requirements of the Department of Industrial Relations, including filing electronic payroll reports.

A contractor or subcontractor will not be qualified to bid on, be listed in a bid proposal, or engage in the performance of any contract for public work on a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code Section 1725.5. A contractor or subcontractor will be exempt from this requirement pursuant to Labor Code Section 1771.1(a) if it submits a bid authorized by Section 7029.1 of the Business and Professions Code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded.

A contractor or subcontractor will not be awarded a contract for public work on a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code Section 1725.5.

A bid submitted by a contractor or subcontractor will not be accepted or entered into without proof of the contractor or subcontractor's current registration to perform public work pursuant to Labor Code Section 1725.5.

M. SUBCONTRACTORS AND ASSIGNMENTS

The successful bidder shall perform work equivalent to **at least ten percent (10%) of the total amount of the construction work** at the site; and, perform the work on the site with its own staff.

Pursuant to the provisions of the California Public Contract Code Section 4104, every bidder shall in the bid set forth:

1. The name, business address, and California contractor license number of each subcontractor who will perform work or labor or render service to the bidder in or about the work in an amount in excess of one-half of one percent (1/2 of 1 %) of the bidder's total bid; and

2. The portion of the work that will be done by each subcontractor. The bidder shall list only one subcontractor for each portion of work as defined by the bidder in its bid.

3. The dollar amount of the work, which will be done by each such subcontractor.

Bidder shall complete Exhibit D "List of Subcontractors" with the above requested information.

If a subcontractor's California contractor license number is submitted incorrectly in the bid, it will not be grounds for filing a bid protest or grounds for considering the bid nonresponsive if the corrected subcontractor's California contractor license number is submitted to the Authority within 24 hours after the bid opening.

If the bidder fails to specify a subcontractor for any portion of the work to be performed under the contract in excess of one-half of one percent (1/2 of 1 %) of the bidder's total bid, or if the bidder specifies more than one (1) subcontractor for the same portion of the work to be performed under the contract in excess of one-half of one percent (1/2 of 1 %) of the bidder's total bid, the bidder agrees to perform that portion. **The successful bidder shall not, without the express written consent of the Authority, either:**

1. Substitute any person, firm, or corporation as subcontractor in place of the subcontractor designed in the original bid; or

2. Permit any subcontract to be assigned or transferred; or

3. Allow it to be performed by anyone other than the original subcontractor listed in the bid.

Each Bidder shall set forth in its bid the name and location of the place of business address of each subcontractor who will perform work or labor or render service to the prime contractor in connection with the performance of the contract.

Bidder shall not assign any interest it may have in any Agreement with the Authority, nor shall bidder assign any portion of the work under any such Agreement with a value in excess of one-half of one percent (1/2 of 1%) of Agreement price to be sub-contracted to any one other than these subcontractors listed in Exhibit D in the "List of Subcontractors," except by prior written consent of Authority. Authority's consent to any assignment shall not be deemed to relieve bidder of its obligations to fully comply with its obligations under its Agreement with the Authority. Bidder with its own forces shall perform minimum of ten percent (10%) calculated as a percentage of the total cost of the project under this Agreement. Bidder shall also include in its subcontract agreements the provisions of its Agreement with Authority including the stipulation that each subcontractor

shall maintain adequate insurance coverage compatible to the insurance coverage required of the bidder.

N. BIDDER'S LICENSING REQUIREMENTS

In conformance with the current statutory requirements of Section 7028.15 of the Business and Professions Code of the State of California, regarding submission of a bid without a license, the bidder shall provide as part of the bid a valid State of California license number, class or type and date of expiration.

Furthermore, the bidder shall ensure that all subcontractors fully comply with the appropriate licensing requirements. The bidder shall also certify that all information provided and representations made in the bid are true and correct, and made under penalty of perjury. Bidders shall provide this information on Exhibit D, "List of Subcontractors" presented in the IFB. Failure to provide the information on the certification form or elsewhere as part of the bid shall render the bidder nonresponsive to this solicitation and will result in the rejection of the bid.

O. PERMITS AND INSPECTION COSTS

Successful bidder shall procure all permits and licenses; pay all charges, assessments and fees, as may be required by the ordinances and regulations of the public agencies having jurisdiction over the areas in which the work is located, and shall comply with all the terms and conditions thereof and with all lawful orders and regulations of each such public agency relating to construction operations under the jurisdiction of such agency.

P. LIQUIDATED DAMAGES

In the event bidder, after entering into an Agreement with the Authority, fails to complete the work within the time specified in the Agreement, the bidder will be required to pay the Authority the amount of **$300.00 per calendar day** of delay as agreed to liquidated damages.

Q. PROTEST PROCEDURES

The Authority has on file a set of written protest procedures applicable to this solicitation that may be obtained by contacting the Contract Administrator responsible for this procurement. Any protest filed by a bidder in connection with this IFB must be submitted in accordance with the Authority's written procedures.

R. CONTRACT AWARD

Any contract awarded as a result of this IFB, will be awarded to the lowest responsive and responsible bidder and shall be on a lump sum basis, in accordance with the requirements of this IFB. The contract to be awarded is the Agreement presented in Section VI of this IFB.

S. EXECUTION OF CONTRACT

The successful bidder shall submit to the Authority the required contract bonds, "Guaranty" and acceptable insurance certificates within ten (10) calendar days after notification of contract award from the Authority. Failure to sign the contract and submit applicable bonds, "Guaranty", and acceptable insurance certificates within the specified time shall be cause to cancel the award and the forfeiture of the Bid Bond. Transfers of contract, or of interest in contracts, are prohibited.

T. AUTHORITY'S RIGHTS

1. The Authority reserves the right to accept or reject any and all bids, or any item or part thereof, or to waive any informalities or irregularities in bids.

2. The Authority reserves the right to withdraw or cancel this IFB at any time without prior notice. The Authority makes no representations that any contract will be awarded to any bidder responding to this IFB.

3. The Authority reserves the right to issue a new IFB for the project.

4. The Authority reserves the right to postpone the bid opening for its own convenience.

5. Each bid will be received with the understanding that acceptance by the Authority of the bid to provide the goods and services described herein shall constitute a contract between the bidder and Authority which shall bind the bidder on its part to furnish and deliver at the prices given and in accordance with conditions of said accepted bid and specifications.

6. The Authority reserves the right to investigate the qualifications of any bidder, and/or require additional evidence of qualifications to perform the work.

7. Submitted IFBs are not to be copyrighted.

U. PUBLIC RECORDS AND INFORMATION

Bids received by Authority are considered public information and will be made available to the public if requested to do so.

V. CONFLICT OF INTEREST

All bidders responding to this IFB must avoid organizational conflicts of interest, which would restrict full and open competition in this procurement. An organizational conflict of interest means that due to other activities, relationships or contracts, a bidder is unable, or potentially unable to render impartial assistance or advice to the Authority; a bidder's objectivity in performing the work identified in

the Project Specifications is or might be otherwise impaired; or a bidder has an unfair competitive advantage. Conflict of Interest issues must be fully disclosed in the bidder's bid.

W. CODE OF CONDUCT

Bidders agree to comply with the Authority's Code of Conduct as it relates to Third-Party contracts, which is hereby referenced and by this reference is incorporated herein. Bidders agree to include these requirements in all of its subcontracts.

X. SAFETY

The complete safety requirements for this IFB are included in Section IV: Agreement Exhibit H. The Contractor will be required to demonstrate compliance with all requirements of the Safety Specifications after Notice to Proceed but prior to mobilization. These requirements include, but are not limited to, an onsite Health Safety and Environmental (HSE) representative to be present at all times during construction. The representative must have a current Board of Certified Safety Professionals (BCSP) certification and a minimum of five years of experience enforcing HSE compliance. BCSP certification requirements may be found at: https://www.bcsp.org/Safety-Certifications .

SECTION II: INSTRUCTIONS TO BIDDING FORMS

SECTION II. INSTRUCTIONS TO BIDDING FORMS

The Bidder shall complete all the forms identified below, and contained in the Bid Booklet Book 2 of this IFB. The bid may not contain exceptions to or deviations from the requirements of this IFB.

A. BID FORM

The bidder must complete the Bid Form which must be submitted in its entirety. Failure to submit the Bid Form in its entirety will result in the bid being non-responsive. In addition to providing the lump sum bid, the bidder affirms the Bid Form statements.

B. BID SECURITY FORM - BID BOND

The bidder shall include the Bid Security Form and include the appropriate bid bond or cashier check with the bid.

C. INFORMATION REQUIRED OF BIDDER

Bidder must provide all the information requested in this form.

D. NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246) (NO FORM REQUIRED)

The bidder shall include the Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity provides notice to Bidder regarding the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications".

E. BIDDER'S CERTIFICATE OF COMPLIANCE - WORKERS' COMPENSATION INSURANCE

In conformance with current statutory requirements of Section 1860, et. seq., of the Labor Code of the State of California, bidder shall execute the bidder's Certificate of Compliance Regarding Workers' Compensation Insurance.

F. BIDDER'S CERTIFICATE OF COMPLIANCE - BUSINESS AND PROFESSIONS CODE SECTION 7028

Bidder shall execute the Bidder's Certificate of Compliance Regarding State of California Business and Professions Code Section 7028.15.

G. LIST OF SUBCONTRACTORS FORM

Bidder shall complete Exhibit D, which lists all subcontractors performing work in excess of one-half of one percent (½ of 1%) of the bid amount per the instructions set forth in Section I "Instructions to Bidders".

H. STATUS OF PAST AND PRESENT CONTRACTS FORM

Bidder is required to complete and sign the form entitled “Status of Past and Present Contracts” provided in this IFB and submit as part of the bid. Bidder shall identify the status of past and present contracts where the firm has either provided services as a prime vendor or a subcontractor during the past five (5) years in which the contract has been the subject of or may be involved in litigation with the contracting authority. This includes, but is not limited to, claims, settlement agreements, arbitrations, administrative proceedings, and investigations arising out of the contract. Bidder shall have an ongoing obligation to update the Authority with any changes to the identified contracts and any new litigation, claims, settlement agreements, arbitrations, administrative proceedings, or investigations that arise subsequent to the submission of the bid.

A separate form must be completed for each identified contract. Each form must be signed by the Bidder confirming that the information provided is true and accurate. Bidder is required to submit one copy of the completed form(s) as part of its bid.

I. CERTIFICATION OF NON-COLLUSION

This form requires the Bidder to certify that the bid is not collusive or a sham. This form is to be signed, dated and is part of the bid package in Book 2 of 2.

J. IRAN CONTRACTING ACT CERTIFICATION

This form requires the Bidder to certify that the Bidder is not engaged in specified investment activities in the energy sector of Iran. (Required if the bid is equal to or greater than $1,000,000).

OCTA

BID FORM

The undersigned hereby proposes to perform all work for which a contract may be awarded and to furnish any and all plant, labor, services, material, tools, equipment, supplies, transportation, utilities, and all other items and facilities necessary therefore as required in the **IFB 5-3922**, **"INSTALLATION OF BATTERY ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE"**, and to do everything required therein; and further proposes that, if this bid is accepted, will contract in the form and manner stipulated to perform all the work in strict conformity therewith within the time limits set forth therein, and will accept as full payment therefore, the following price:

Description	**Total Lump Sum Bid Amount**
_____	$ _____

A cashier's check/certified check/bid bond (circle applicable term) properly made payable to Orange County Transportation Authority, hereinafter designated as the Owner, for the sum of _____
Dollars
($ _____)
which amount is not less than ten percent (10%) of the total amount of this bid, is attached hereto and is given as a guarantee that the undersigned will execute the Agreement and furnish the required bonds, "Guaranty" and "Certificate of Insurance", if awarded the contract, and in case of failure to do so within the time provided, (a) the proceeds of said check shall be forfeited to the Authority; or (b) surety's liability to the Authority for forfeiture of the face amount of the bond shall be considered as established [circle (a) or (b)].

The undersigned hereby represents that:

BID FORM, PAGE 2

1. Bidder has thoroughly examined and become familiar with the work required and documents included under this IFB. The bidder understands that the award of the contract, if it is awarded, will be based on the lowest total bid submitted by a responsive and responsible bidder, and further, that the amounts and the total on the Bid Form will be subject to verification by the Authority.

2. By investigation at the site of the work and otherwise, it is satisfied as to the nature and location of the work and is fully informed as to all conditions and matters, which can in any way affect the work or the cost thereof.

3. Bidder fully understands the scope of the work/specifications and has checked carefully all words and figures inserted in said Invitation For Bids (IFB) and further understands that the Authority will in no way be responsible for any errors or omissions in the preparation of this bid. Bidder further asserts that it is capable of performing quality work to meet Authority's requirements.

4. Bidder will execute the Agreement and furnish the required Performance and Payment Bonds, Guaranty and proof of insurance coverage within ten (10) calendar days after notice of acceptance of bid by the Authority; and further, that this bid may not be withdrawn for a period of 120 calendar days after the date set for the opening thereof, unless otherwise required by law. If any bidder shall withdraw its bid within said period, the bidder shall be liable under the provisions of the Bid Security, or the bidder and the surety shall be liable under the Bid Bond, as the case may be.

5. Bidder hereby certifies that this bid is genuine and not a sham or collusive or made in the interest or on behalf of any person not herein named, and the undersigned has not directly or indirectly induced or solicited any other bidder to put in a sham bid, or any other person, firm, or corporation to refrain from bidding; the undersigned has not in any manner sought by collusion to secure for himself an advantage over any other bidder.

6. In conformance with current statutory requirements of Section 1860, et. seq., of the Labor Code of the State of California, the Bidder shall execute the document included in this IFB entitled "Bidder's Certificate of Compliance Regarding Workers' Compensation Insurance."

7. Bidder hereby further certifies that each, and every representation made in this bid are true and correct and made under penalty of perjury.

BID FORM, PAGE 3

8. Bidder shall permit the authorized representative of the Authority to inspect and audit all data and records of bidder relating to this bid, and if awarded a contract resulting from this bid, shall permit such inspection and audit of all data and records of bidder related to bidder's performance of such contract.

9. Bidder does not employ anyone who is now, or for one (1) year immediately prior to the date of this offer was, a director, officer, member, or employee of the Orange County Transportation Authority. The undersigned has not agreed to pay a fee contingent upon the award of a contract resulting from this bid to anyone who is now, or for one (1) year immediately prior to the date of this bid was, a director, officer, member, or employee of the Orange County Transportation Authority. No member of or delegate to the Congress of the United States shall be admitted to any share of the contract or to any benefit arising therefrom.

10. If awarded a contract resulting from this bid, bidder shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, age or national origin. The bidder shall take affirmative action to ensure that applicants are employed, and that employees are treated during their employment, without regard to their race, religion, color, sex, age or national origin. Such actions shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship.

11. Bid will be in effect for 120 calendar days after the bid closing date.

BID FORM, PAGE 4

Now: In compliance with the **Invitation For Bids 5-3922**, **"INSTALLATION OF BATTERY ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE"**, the undersigned, with full cognizance thereof, hereby proposes to perform the entire work in strict compliance with all of the said requirements and provisions for the prices set forth herein upon which award of contract is made. The undersigned affirms that the information provided herein is true and accurate and that any misrepresentations are made under penalty of perjury.

Dated _____ , 202_ Bidder _____

The above bid includes Signature _____

Addenda Nos. _____ Name _____

Title _____

Bidder's Authorized Representative _____

Title _____

Telephone # _____

Fax # _____

Email Address _____

Bidders post office address _____

_____

_____

Corporation organized under the laws of the State of _____

Contractor's License No. _____

Expiration Date of License _____

Surety or sureties _____

_____

(CORPORATE SEAL)

BID SECURITY FORM
BID BOND

KNOW ALL MEN BY THESE PRESENTS:

That, _____ as principal and Bidder and _____ as Surety, are held and firmly bound unto the Orange County Transportation Authority, of State of California, hereinafter referred to as "Authority," in the sum of _____ Dollars ($_____), to be paid to the Authority, its successors, and assigns; for which payment, well and truly to be made, bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents, this amount being ten percent (10%) of the total amount of the Bid.

THE CONDITION OF THIS OBLIGATION IS SUCH, that if the certain bid of the above named bounden principal _____ _____ for_____ at the Orange County Transportation Authority's _____ as specifically set forth in documents entitled **IFB 5-3922**, **"INSTALLATION OF BATTERY ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE"**, shall not be withdrawn within a period of 120 calendar days after the date set for the opening of bids, (unless otherwise required by law, and notwithstanding the award of the contract to another Bidder), and that if said bid is accepted by the Authority through action of its legally constituted contracting authorities and if the above bounden_____ its heirs, executors, administrators, successors and assigns, shall execute a contract for such construction and deliver the required Performance and Payment Bonds, "Guaranty," and proof of insurance coverage within ten (10) calendar days after notification of contract award from the Authority, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect.

IN WITNESS WHEREOF, we hereunto set our hands and seals this _____ day of _____, 202_.

_____
_____

NOTE: The standard printed bond form of any bonding company acceptable to the Authority may be used in lieu of the foregoing approved sample bond form provided the security stipulations protecting the Authority are not in any way reduced by use of the security company's printed standard form.

BID SECURITY FORM
CHECK TO ACCOMPANY BID

(NOTE: The following form shall be used in case check accompanies bid)

Accompanying this bid is a Certified or Cashiers check (circle the appropriate one) payable to the order of Orange County Transportation Authority, hereinafter referred to As "Authority" for_____ dollars ($_____), this amount being ten percent (10%) of the total amount of the Bid submitted in response to **IFB 5-3922, "INSTALLATION OF BATTERY ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE"**. The proceeds of this check shall become the property of Authority provided this bid shall be accepted by Authority through action of its legally constituted contracting authorities and the undersigned shall fail to execute a contract and furnish the required Guaranty Form, Performance and Payment Bonds and proof of insurance coverage within ten (10) calendar days after date of notification of contract award from the Authority. The proceeds of this check shall also become the property of the Authority if the undersigned bidder withdraws the bid within the period of 120 days after the date set for the opening thereof, unless otherwise required by law, and notwithstanding the award of the contract to another bidder. Otherwise, the check shall be returned to the undersigned.

Bidder: _____

Signature: _____

Date: _____

NOTE: If the bidder desires to use a bond instead of check, the Bid Bond form shall be executed and the sum of this bond shall be ten percent [10%] of the total amount of the bid.

INFORMATION REQUIRED OF BIDDER

The bidder is required to supply the following information. Additional sheets may be attached if necessary.

1. Name of Bidder: _____
2. Business Address: _____
3. Telephone ( )_____ Fax ( )_____E-Mail_____
4. Type of Firm - Individual, Partnership or Corporation: _____
5. Corporation organized under the laws of state of: _____
6. Contractor's License No.: Class_____Years of Experience: _____
7. Expiration Date of License: _____
8. Is your firm a certified small business in California? Yes____ No____
9. List the names and addresses of all owners of the firm or names and titles of all officers of the corporation:

_____

_____

INFORMATION REQUIRED OF BIDDER, PAGE 2

10. Please list the following: a) All prior and current license numbers that the current owner(s) or officers possess or have possessed in the last five years and the current status of those license; b) any prior company names that the owner(s) had in operation during the previous five years.

Current Officers or Owners Name	Prior Company Names (During the last 5 years)	Prior and Current License Numbers	Status of License

Note: If additional space is required to detail the information requested, please attach another page. All information requested must be included. Failure to identify all of the information may result in your bid being found non-responsive and your bid being rejected.

11. List all construction projects (public and private) for which Bidder has provided general contractor services for the past three years:

Contract Type (Public or Private)	Project Description	Dates of Service	Total Cost	Name and Address of Owner	Contact Name and Phone Number

Note: If additional space is required to detail the information requested, please attach another page. All information requested must be included. Failure to identify all of the information, may result in your bid being found non-responsive and your bid being rejected.

12. List the name, address and phone number of Superintendent for this project:

_____

13. List all construction projects (public and private) for which Superintendent has provided services as a Superintendent for the past three years.

Contract Type (Public or Private)	Project Description	Dates of Service	Total Cost	Name and Address of Owner	Contact Name and Phone Number

Bidder hereby certifies that it:

_____ is a certified Disadvantaged Business Enterprise as defined herein.

_____ is not a Disadvantaged Business Enterprise as defined herein.

NOTE: If requested by the Authority, bidder shall furnish a certified financial statement, financial data, or other information and references sufficiently comprehensive to permit an appraisal of its current financial condition.

I hereby certify the above is true and correct to the best of my belief.

_____
Signature

_____
Name

_____
Title

_____
Company Name

_____
Telephone Number

_____
Fax Number

_____
Email Address

NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246)

1. The Bidders' attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.

2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate work force in each trade on all construction work in the covered area, are as follows:

   Timetable Goals for Minority Participation for Each Trade (11.9)

   Goals for Female Participation in Each Trade (6.9)

   These goals are applicable to all the Contractor's construction work (whether or not it is federal or federally assisted) performed in the covered area.

   The Contractor's compliance with the Executive Order and the regulations in 41 C.F.R. Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 C.F.R. 60-4.3 (a), and its efforts to meet the goals established for the geographical area where the contract resulting from this solicitation is to be performed. The hours of minority and female employment and training must be uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from contractor to contractor or from project to project for the sole purpose of meeting the contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 C.F.R. Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within ten (10) working days of award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor; employer identification number; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.

4. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" includes the County of Orange, California.

BIDDER'S CERTIFICATE OF COMPLIANCE REGARDING WORKERS' COMPENSATION INSURANCE

In conformance with current statutory requirements of Section 1860, et. seq., of the Labor Code of the State of California, the undersigned confirms the following certification:

> "I am aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for Workers' Compensation or to undertake self-insurance in accordance with the provisions of that code and I will comply with such provisions before commencing the performance of the work of this Contract."

Name of Bidder/Contractor: _____

Signature: _____

Title: _____

Date: _____

BIDDER'S CERTIFICATE OF COMPLIANCE
REGARDING
STATE OF CALIFORNIA
BUSINESS AND PROFESSIONS CODE SECTION 7028.15

Contractor License Number: _____

Expiration Date of Contractor's License: _____

Each, every and all of the representations made by Bidder in the attached bid are true and correct.

Name of Bidder/Contractor: _____

Signed: _____

Title: _____

Subscribed to and sworn before me, a Notary Public in and for the State of California, on _____, 202___.

_____
Notary Public

My commission expires on:

_____, 202_
(NOTARY SEAL)

LIST OF SUBCONTRACTORS (EXHIBIT D)

List only the subcontractors, which will perform work or labor or render services to the bidder in excess of one-half of one percent (1/2 of 1%) of the bidder's total bid amount. Do not list alternative subcontractors for the same work. (Use additional sheets if necessary.)

Name & Address Under Which Subcontractor is Licensed	License Number	DIR Registration No.	Specific Description of Work to be Rendered	Small Business Y/N	Type	Dollar Amount
						$
						$
						$
						$
						$
						$
TOTAL VALUE OF SUBCONTRACTED WORK						$

Bidder's Name _____

STATUS OF PAST AND PRESENT CONTRACTS FORM

On the form provided below, Offeror/Bidder shall list the status of past and present contracts where the firm has either provided services as a prime vendor or a subcontractor during the past five (5) years in which the contract has been the subject of or may be involved in litigation with the contracting authority. This includes, but is not limited to, claims, settlement agreements, arbitrations, administrative proceedings, and investigations arising out of the contract.

A separate form must be completed for each contract. Offeror/Bidder shall provide an accurate contact name and telephone number for each contract and indicate the term of the contract and the original contract value. Offeror/Bidder shall also provide a brief summary and the current status of the litigation, claims, settlement agreements, arbitrations, administrative proceedings, or investigations. If the contract was terminated, list the reason for termination.

Offeror/Bidder shall have an ongoing obligation to update the Authority with any changes to the identified contracts and any new litigation, claims, settlement agreements, arbitrations, administrative proceedings, or investigations that arise subsequent to the submission of the bid. Each form must be signed by an officer of the Offeror/Bidder confirming that the information provided is true and accurate.

Project city/agency/other:
Contact Name: **Phone:**
Project Award Date: **Original Contract Value:**
Term of Contract:
(1) Litigation, claims, settlements, arbitrations, or investigations associated with contract:
(2) Summary and Status of contract:
(3) Summary and Status of action identified in (1):
(4) Reason for termination, if applicable:

By signing this Form entitled “Status of Past and Present Contracts,” I am affirming that all of the information provided is true and accurate.

_____ _____

Name Signature

_____ _____

Title Date

Revised. 03/16/2018

Non-Collusion Affidavit

To the Orange County Transportation Authority

In accordance with Title 23 United States Code Section 112 and Public Contract Code 7106 the bidder declares that the bid is not made in the interest of, or on the behalf of, any undisclosed person, partnership, company, association, organization or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and, further, that the bidder has not, directly, or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

Name of Bidder:_____

Signature: _____

Date:_____

IRAN CONTRACTING ACT CERTIFICATION

(California Public Contract Code Sections 2200, *et seq.*)

The Iran Contracting Act of 2010 (PCC Sections 2200-2208), prohibits bidders who are engaged in investment activities in the energy sector of Iran from bidding on, submitting proposals for, or entering into or renewing contracts with public entities for goods or services of one million dollars ($1,000,000) or more. At the time of submitting a bid, each bidder must certify that the bidder is not identified on the Department of General Services list of ineligible persons pursuant to PCC Section 2203(b). Each bidder is also required to certify that the bidder is not engaged in investment activities in violation of the Iran Contracting Act of 2010.

A bidder who is engaged in investment activities in the energy sector of Iran is defined as:

1. A person providing goods or services of twenty million dollars ($20,000,000) or more in the energy sector of Iran, including a person that provides oil or liquefied natural gas tankers, or products used to construct or maintain pipelines used to transport oil or liquefied natural gas, for the energy sector of Iran; or
2. A person that is a financial institution that extends twenty million dollars ($20,000,000) or more in credit to another person, for 45 days or more, if that person will use the credit to provide goods or services in the energy sector in Iran and is identified on a list created pursuant to PCC Section 2203(b).

A bidder is not required to certify that it is engaged in investment activities in the energy sector of Iran if the bidder is exempt from the certification under PCC Section 2203(c) or (d). If the bidder is exempt from the certification requirement, the bidder will be required to provide documentation demonstrating the exemption.

To comply with the Iran Contracting Act of 2010, the bidder shall complete **one** of the options below. Please note: under PCC Section 2205, false certification of this form may result in civil penalties of $250,000 or twice the amount of the contract for which false certification was made, termination of the contract, and/or ineligibility to bid on contracts for a period of three years.

Option No. 1: Certification

I, the official named below, certify I am duly authorized to execute this certification on behalf of the vendor/financial institution identified below, and the vendor/financial institution identified below, and any subcontractor who will perform work or labor or render services to the vendor identified below, is not on the current Department of General Services list identifying persons engaged in investment activities in the energy sector of Iran, and is not a financial institution extending twenty million dollars ($20,000,000) or more in credit to another person/vendor, for 45 days or more, if that other person/vendor will use the credit to provide goods or services in the energy sector in Iran and is identified on the current Department of General Services list identifying persons engaged in investment activities in the energy sector of Iran.

Vendor/Financial Institution: _____

Signature: _____

Name and Title: _____

Date: _____

Option No. 2: Exemption

Pursuant to PCC Section 2203(c) and (d), a public entity may permit a bidder or financial institution engaged in investment activities in Iran, on a case-by-case basis, to be eligible for, or to bid on, submit proposals for, or enter into or renew a contract with a public entity for goods or services of one million dollars ($1,000,000) or more. If the bidder, financial institution, or any subcontractor who will perform work or labor or render services to the bidder has obtained an exemption from the certification requirement, please complete and sign below and attach the documentation demonstrating the exemption approval.

Vendor/Financial Institution: _____

Signature: _____

Name and Title: _____

Date: _____

Option No. 3: Non-Applicability

Pursuant to PCC Section 2203(b), a bidder or financial institution engaged in investment activities in Iran may not be eligible for, or to bid on, submit proposals for, or enter into or renew a contract with a public entity for goods or services of one million dollars ($1,000,000) or more. If the contract is not for goods or services of one million dollars ($1,000,000) or more, please sign below indicating that the contract is not for goods or services of one million dollars ($1,000,000) or more and thus bidder is not required to certify and does not meet the exemption.

Vendor/Financial Institution: _____

Signature: _____

Name and Title: _____

Date: _____

SECTION III: ADDITIONAL CONTRACTUAL EXHIBITS

SECTION III. ADDITIONAL CONTRACTUAL EXHIBITS

The following Exhibits will be attached to and incorporated into the signed Agreement resulting from this IFB.

A. PERFORMANCE BOND

The successful bidder shall furnish at its own expense a Performance Bond (Exhibit E) satisfactory to the Authority in the amount of one hundred percent (100%) of the full amount of the contract as a guarantee of good faith on behalf of the Contractor that the terms of the contract, including all warranty provisions, shall be complied with in every particular. The bond shall be in effect during the entire term of the contract and warranty and shall be issued by a corporation surety (not an individual surety) required in the state of California and registered to do business in the county of Orange. The bond shall not be issued from a corporation surety that requires a funds control, funds disbursement, or funds administration company for the issuance of the performance bond.

The bond shall specifically provide that if the Contractor, or its subcontractor, fails to fully perform that the surety or sureties will pay for the same in an amount not exceeding the amount specified in the bond and in case suit is brought against the Authority, that the surety will undertake the defense of same.

B. PAYMENT BOND

The successful bidder shall furnish a Payment Bond (Exhibit F) satisfactory to the Authority in the amount of one hundred percent (100%) of the full amount of the contract. Such bonds shall be in effect during the entire term of the contract and warranty and shall be issued directly by a corporate surety (not an individual surety) registered in the state of California and registered to do business in the county of Orange. The bond shall not be issued from a corporation surety that requires a funds control, funds disbursement, or funds administration company for the issuance of the performance bond.

The bond shall specifically provide that if the Contractor fails to pay for amounts due under the Employment Insurance Act that the surety or sureties will pay for the same in an amount not exceeding the amount specified in the bond and in case suit is brought against the Authority, that the surety will undertake the defense of same.

Pursuant to California Civil Code sections 9550 through 9554, in conjunction with the Bond and Undertaking Law (Code of Civil Procedure sections 995.010, et. seq.), Bidders must provide the following information as part of their payment bond; a certificate of Authority from the Orange County Clerks Office indicating that the insurer has not been surrendered, revoked, canceled, annulled, or suspended or, in the event that it has, that renewed Authority has been granted.

C. GUARANTY

The successful bidder shall also submit to the Authority the executed and notarized Guaranty form (Exhibit G) in this IFB.

All forms must be completed and submitted to the Contract Administrator responsible for this procurement within ten (10) calendar days of award notice by the Authority. Failure to submit the completed and signed forms will result in cancellation of the award.

D. CONTRACT CHANGE ORDER

The Authority's Contract Change Order form (Exhibit I) will be attached to and incorporated into the signed Agreement resulting from this IFB.

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS:

That we, _____
hereinafter referred to as "Contractor", as principal, and _____
as surety, are held and firmly bound unto the Orange County Transportation Authority, State of California, in the sum _____
Dollars, ($_____), lawful money of the United States of America, for the payment of which sum, well and truly to be made, we bind ourselves, jointly and severally, firmly by these presents.

The condition of the foregoing obligation is such that,

WHEREAS, said Contractor has been awarded and is about to enter into the annexed Agreement with the Orange County Transportation Authority for the **IFB 5-3922, "INSTALLATION OF BATTERY ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE,"** as specified in said Agreement, which is incorporated herein to this bond by reference, and is required under the terms of said Agreement to give this bond in connection with the execution thereof;

NOW THEREFORE, if the said Contractor shall well and truly do and perform all of the covenants and obligations of said Agreement on his part to be done and performed at the times and in the manner specified herein, then this obligation shall be null and void, otherwise it shall be and remain in full force and effect; and in the event said Contractor fails to fully perform all requirements in accordance with the terms and conditions of said Agreement, including warranty obligations, then surety shall enforce performance by the Contractor or shall pay the Orange County Transportation Authority for the same in an amount not exceeding the amount specified in this bond; and, further, if in the event suit is brought upon this bond then said surety shall pay the Orange County Transportation Authority for reasonable attorneys' fees to be fixed by the court;

PROVIDED, that any changes in the work to be done, or the material to be furnished, whether or not made pursuant to the terms of said contract, shall not in any way release either the Contractor or the surety there under, nor shall any extensions of time granted under the provisions of said contract release either the Contractor or the surety, and notice of such changes or extensions of the contract is hereby waived by the surety.

WITNESS our hands this _____ day of _____, 202_.

(SEAL)

_____
(Contractor)

By _____

Approved:

_____
(Title)

_____
(SEAL)

_____
(Surety)

By _____

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS:

That we, _____
hereinafter referred to as "Contractor", as principal, and _____
as surety, are held and firmly bound unto the Orange County Transportation Authority, State of California, in the sum _____
Dollars, ($_____), lawful money of the United States of America, for the payment of which sum, well and truly to be made, we bind ourselves, jointly and severally, firmly by these presents.

The Condition of the foregoing obligation is such that,

WHEREAS, said Contractor has been awarded and is about to enter into the annexed Agreement with the ORANGE COUNTY TRANSPORTATION AUTHORITY for the **IFB 5-3922, "INSTALLATION OF BATTERY ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE,"** as specified in said Agreement, which is incorporated herein to this bond by reference, and is required under the terms of said Agreement to give this bond in connection with the execution thereof;

NOW, THEREFORE, if said Contractor or a subcontractor fails to pay any of the persons named in Section 9100 of the Civil Code of the State of California, or amounts due under the Unemployment Insurance Code with respect to work or labor performed under the contract, or for any amounts required to be deducted, withheld and paid over to the Employment Development Department from the wages of employees of said Contractor and subcontractors pursuant to Section 13020 of the Unemployment Insurance Code with respect to such work and labor, then said surety will pay for the same, in an amount not exceeding the sum specified in this bond, and also, in case suit is brought upon this bond, a reasonable attorney's fee, to be fixed by the court. This bond shall inure to the benefit of all persons named in Section 9100 of the Civil Code of the State of California so as to give a right of action to such persons or their assigns in any suit brought upon this bond. This bond shall be subject to and include all of the provisions of Title 3 of Part 64 of Division 4 of the Civil Code of California relating to Payment Bond for Public Works, including but not confined to, Civil Code Sections 8150 – 8154, inclusive and Sections 9550 - 9566, inclusive.

PROVIDED, that any changes in the work to be done or the material to be furnished, whether or not made pursuant to the terms of said contract, shall not in any way release either the Contractor or the surety thereunder, nor shall any extensions of time granted under the provisions of said contract release either the Contractor or the surety, and notice of such alterations or extensions of the contract is hereby waived by the surety.

PAYMENT BOND, PAGE 2

WITNESS our hands this _____ day of _____, 202_.

(SEAL)

_____
(Contractor)

By _____

_____
(Title)

Approved:

_____
(Surety)

_____ By _____
(SEAL)

GUARANTY

The undersigned, as "Contractor," guarantees to the Orange County Transportation Authority that the materials furnished and the completed installation work, and the related work performed by the Contractor pursuant to Agreement No. **C-5-3922, "INSTALLATION OF BATTERY ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE".**

A. For a period of one (1) year from the date of completion, as evidenced by the date of final acceptance of the work by the Authority, the Contractor warrants to the Authority that work performed and materials furnished under this Contract conforms to the Contract requirements and shall be free from any defect in design, material or workmanship performed by the Contractor or its subcontractors or suppliers. Notwithstanding the foregoing, Contractor shall not be liable for any defects of design, material or equipment provided by Authority.

B. Under this guaranty, the Contractor shall remedy at its own expense any such failure to conform or any such defect.

C. Nothing in the above intends or implies that this warranty shall apply to work, which has been abused or neglected by the Authority.

D. This guaranty shall be in addition to the other guarantees and warranties specified in the Agreement and shall be enforceable concurrently with, or in lieu of, said other guarantees.

Should any of the materials or equipment prove defective or should the work as a whole prove defective, due to faulty workmanship, material furnished or methods of installation, or should the work or any part thereof fail to operate properly as originally intended and in accordance with the plans and specifications, due to any of the above causes, all within twelve (12) months after the date on which the work is accepted by the Authority, the undersigned agrees to reimburse the Authority, upon demand, for its expenses incurred in restoring any such equipment or materials replaced and the cost of removing and replacing any other work without cost to the Authority so that said work will function correctly as originally contemplated.

The Authority shall have the unqualified option to make any needed replacements or repairs itself or to have such replacements or repairs done by the undersigned. In the event the Authority elects to have said work performed by the undersigned, the undersigned agrees that the repairs shall be made and such materials as are necessary shall be furnished and installed within a reasonable time after the receipt of demand from the Authority. If the undersigned shall fail or refuse to comply with its obligations under this guaranty, the Authority shall be entitled to all costs and expenses, including attorneys' fees, reasonably incurred by reasons of the said failure or refusal.

GUARANTY, PAGE 2

Subscribed and sworn to before me

this ___ day of _____, 202_

Seal of Notary

_____
Notary Public

_____
Name

_____
Title

_____
Signature

_____
Date

SECTION IV: AGREEMENT

AGREEMENT NO. C-5-3922

BETWEEN

ORANGE COUNTY TRANSPORTATION AUTHORITY

AND

_____

THIS AGREEMENT is effective this _____ day of _____, 2025 ("Effective Date"), by and between the Orange County Transportation Authority, 550 South Main Street, P.O. Box 14184, Orange, CA 92863-1584, a public corporation of the State of California (hereinafter referred to as "AUTHORITY"), and _____ (hereinafter referred to as "CONTRACTOR").

WITNESSETH:

WHEREAS, AUTHORITY has determined that it requires installation of battery electric bus chargers and electrical infrastructure at the AUTHORITY's Santa Ana Bus Base; and

WHEREAS, said work cannot be performed by the regular employees of AUTHORITY; and

WHEREAS, CONTRACTOR has represented that it has the requisite personnel, experience, material, and equipment and is otherwise qualified to perform such services; and

WHEREAS, CONTRACTOR wishes to perform these services; and

WHEREAS, the AUTHORITY's Board of Directors authorized this Agreement on _____.

NOW, THEREFORE, it is mutually understood and agreed by AUTHORITY and CONTRACTOR as follows:

ARTICLE 1. COMPLETE AGREEMENT

A. This Agreement, including all exhibits and other documents incorporated herein and made applicable by reference, constitutes the complete and exclusive statement of the terms and conditions of the agreement between AUTHORITY and CONTRACTOR and it supersedes all prior representations, understandings and communications. The invalidity in whole or in part of any term or condition of this Agreement shall not affect the validity of other terms or conditions.

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B. AUTHORITY's failure to insist in any one or more instances upon the performance of any terms or conditions of this Agreement shall not be construed as a waiver or relinquishment of AUTHORITY's right to such performance by CONTRACTOR or to future performance of such terms or conditions and CONTRACTOR's obligation in respect thereto shall continue in full force and effect. CONTRACTOR shall be responsible for having taken steps reasonably necessary to ascertain the nature and location of the work, and the general and local conditions, which can affect the work or the cost thereof. Any failure by CONTRACTOR to do so will not relieve it from responsibility for successfully performing the work without additional expense to AUTHORITY.

C. AUTHORITY assumes no responsibility for any understanding or representations concerning conditions made by any of its officers, employees or agents prior to the execution of this Agreement, unless such understanding or representations by AUTHORITY are expressly stated in this Agreement.

D. Time shall be of the essence hereunder; but CONTRACTOR shall perform work hereunder only to the minimum extent consistent with requirements herein.

E. Changes to any portion of this Agreement shall not be binding upon AUTHORITY except when specifically confirmed in writing by an authorized representative of AUTHORITY and issued in accordance with the provisions of this Agreement.

ARTICLE 2. AUTHORITY DESIGNEE

The Chief Executive Officer of AUTHORITY, or designee, shall have the authority to act for and exercise any of the rights of AUTHORITY as set forth in this Agreement.

ARTICLE 3. SCOPE OF WORK

CONTRACTOR shall provide all labor, equipment, materials and facilities necessary for all work related to Michael Le at the AUTHORITY's Santa Ana Bus Base in strict compliance with all the requirements specified herein and in:

Exhibit A, entitled "General Provisions";

Addendum No's __;

Exhibit B, entitled "Specifications";

Exhibit C, entitled "List of Drawings";

Exhibit D, entitled "List of Subcontractors";

Exhibit E, entitled "Performance Bond";

Exhibit F, entitled "Payment Bond";

Exhibit G, entitled "Guaranty";

Exhibit H, entitled “Safety Specifications” and

Exhibit I, entitled “Contract Change Order”;

all of which documents are attached to and, by this reference, incorporated in and made a part of this Agreement. By this reference, also incorporated in and made a part of this Agreement are all applicable provisions of IFB and all representations made by CONTRACTOR in its original bid to AUTHORITY, including, but not limited to, CONTRACTOR's certifications relative to Workers' Compensation Insurance, and compliance with Section 7028.15 of the State of California Business and Professions Code.

ARTICLE 4. DELIVERY / RECOVERY SCHEDULE

A. CONTRACTOR shall fully complete the herein above described work within (300) calendar days from the effective date of written Notice to Proceed (NTP) issued by AUTHORITY. CONTRACTOR shall give AUTHORITY not less than seventy-two (72) hours advance notice of the start of any work. Within five (5) calendar days after said notice, CONTRACTOR shall provide any construction schedules as may be requested by AUTHORITY.

B. If at any time, the critical path schedule reflects -30 or a greater negative number of days of total float, then CONTRACTOR, within ten days after CONTRACTOR first becomes aware of such schedule delay, shall prepare and submit to AUTHORITY for review and approval a Recovery Schedule demonstrating CONTRACTOR’s proposed plan to regain lost schedule progress and to achieve the original contractual milestones in accordance with the Contract. AUTHORITY shall notify CONTRACTOR within ten days after receipt of each such Recovery Schedule whether the schedule is deemed accepted or rejected. Within five days after AUTHORITY’s rejection of the schedule, CONTRACTOR will resubmit a revised Recovery Schedule incorporating AUTHORITY’s comments.

When AUTHORITY accepts CONTRACTOR's Recovery Schedule, CONTRACTOR shall, within five days after AUTHORITY's acceptance, incorporate and fully include such schedule into the Project Schedule and deliver it to AUTHORITY.

C. All costs incurred by CONTRACTOR in preparing, implementing and achieving the Recovery Schedule shall be borne by CONTRACTOR and shall not result in a change to the contract price.

D. In the event that CONTRACTOR fails to provide an acceptable Recovery Schedule within 30 days of CONTRACTOR's receipt of a notice to do so, CONTRACTOR shall have no right to receive progress payments until CONTRACTOR has prepared and AUTHORITY has approved such Recovery Schedule.

ARTICLE 5. START OF WORK

CONTRACTOR shall incur no costs, and shall not perform or furnish any work, services, materials or equipment under this Agreement, unless and until a written Notice to Proceed has been given to CONTRACTOR by AUTHORITY. Conditions precedent to AUTHORITY issuing said Notice to Proceed are CONTRACTOR furnishing the Exhibit E "Performance Bond," Exhibit F "Payment Bond," Exhibit G "Guaranty," and certificates of insurance as set forth in Article 10 hereunder. CONTRACTOR shall furnish said documents within ten (10) calendar days after notification of contract award from AUTHORITY. Upon receipt of acceptable bonds, guaranty, and insurance certificates, AUTHORITY will within ten (10) working days thereafter issue the written Notice to Proceed.

ARTICLE 6. PAYMENT

A. For CONTRACTOR's full and complete performance of its obligations under this Agreement, and subject to the maximum cumulative payment obligation provision set forth in Article 7, AUTHORITY shall pay CONTRACTOR the firm fixed sum of _____Dollars ($ ____.00).

B. Progress payments and the final payment will be made by AUTHORITY to CONTRACTOR in accordance with the terms as set forth in Exhibit A, "General Provisions," under the "Progress Payments" and "Final Payment and Claims" sections therein. The acceptance by CONTRACTOR of

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AUTHORITY's final payment hereunder shall constitute a waiver of all claims against AUTHORITY under or arising out of this herein Agreement, as such may from time to time be amended.

C. Failure by AUTHORITY to pay amount in dispute shall not alleviate, diminish or modify in any respect the CONTRACTOR's obligation to achieve final acceptance of and all work in accordance with the contract documents, and CONTRACTOR shall not cease or slow down its performance under this Agreement on account of any such amount in dispute. CONTRACTOR shall proceed as directed by AUTHORITY pending resolution of dispute. Upon resolution of dispute, each party shall promptly pay any amount owing.

ARTICLE 7. MAXIMUM OBLIGATION

Notwithstanding any provisions of this Agreement to the contrary, AUTHORITY and CONTRACTOR mutually agree that AUTHORITY's maximum cumulative payment obligation hereunder (including obligation for CONTRACTOR 's profit), shall be _____Dollars ($____.00), which shall include all amounts payable to CONTRACTOR for its subcontracts, leases, materials and costs arising from, or due to termination of, this Agreement.

ARTICLE 8. NOTICES

All notices hereunder and communications regarding the interpretation of the terms of this Agreement, or changes thereto, shall be effected by delivery of said notices in person or by depositing said notices in the U.S. mail, registered or certified mail, returned receipt requested, postage prepaid and addressed as follows:

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To CONTRACTOR:		To AUTHORITY:	
		Orange County Transportation Authority	
		550 South Main Street	
		P.O. Box 14184	
		Orange, CA 92863-1584	
ATTENTION: Title:		ATTENTION: Title:	Michael Le Senior Contract Administrator
Phone: Email:		Phone: (714) 560 - 5314 Email: mle1@octa.net	

ARTICLE 9. INDEPENDENT CONTRACTOR

A. CONTRACTOR's relationship to AUTHORITY in the performance of this Agreement is that of an independent contractor. CONTRACTOR's personnel performing work under this Agreement shall at all times be under CONTRACTOR's exclusive direction and control and shall be employees of CONTRACTOR and not employees of AUTHORITY. CONTRACTOR shall pay all wages, salaries and other amounts due its employees in connection with this Agreement and shall be responsible for all reports and obligations respecting them, such as social security, income tax withholding, unemployment compensation, workers' compensation and similar matters.

B. Should CONTRACTOR's personnel or a state or federal agency allege claims against AUTHORITY involving the status of AUTHORITY as employer, joint or otherwise, of said personnel, or allegations involving any other independent contractor misclassification issues, CONTRACTOR shall defend and indemnify AUTHORITY in relation to any allegations made.

ARTICLE 10. INSURANCE

A. CONTRACTOR shall procure and continuously maintain in full force and effect through contract completion, insurance coverages specified herein. Coverages shall not be subject to self-insurance provisions. CONTRACTOR shall provide the following insurance coverage:

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1. Commercial General Liability, to include Products/Completed Operations, Independent Contractors', Contractual Liability, and Personal Injury, and Property Damage with a minimum limit of $2,000,000 per occurrence and $5,000,000 general aggregate.

2. Automobile Liability to include owned, hired and non-owned autos with a combined single limit of $1,000,000 each accident;

3. Workers' Compensation with limits as required by the State of California, including waiver of subrogation, in favor of AUTHORITY, its officers, directors, employees and agents.

4. Builders All Risk policy or course of construction including earthquake and flood coverage with minimum limits of $*(project amount)*.

5. Employers' Liability with minimum limits of $1,000,000.

6. Pollution Liability with minimum limits of $2,000,000 per occurrence and $4,000,000 general aggregate;

7. Professional Liability with minimum limits of $2,000,000 per occurrence and $4,000,000 general aggregate;

B. Prior to commencement of any work hereof, CONTRACTOR shall furnish to AUTHORITY's Contract Administrator broker-issued insurance certificate showing the required insurance coverages and further providing that:

1. AUTHORITY, its officers, directors, employees and agents must be named as additional insured on Commercial General Liability and Automobile Liability policy with respect to performance hereunder; and

2. The coverage shall be primary and noncontributory as to any other insurance with respect to performance hereunder; and

3. Thirty (30) days prior written notice of cancellation or material change be given to AUTHORITY.

In addition, CONTRACTOR shall provide insurance policy blanket endorsement.

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C. "Occurrence," as used herein, means any event or related exposure to conditions, which result in bodily injury or property damage.

D. Upon AUTHORITY's request, certified, true and exact copies of each of the insurance policies shall be provided to AUTHORITY.

E. AUTHORITY shall notify CONTRACTOR in writing of any changes in the requirements to insurance required to be provided by CONTRACTOR. Except as set forth in this Article, any additional cost from such change shall be paid by AUTHORITY and any reduction in cost shall reduce the contract price pursuant to a change order.

F. CONTRACTOR shall also include in each subcontract the stipulation that subcontractors shall maintain coverage in the amounts required as provided in this Agreement.

G. CONTRACTOR shall be required to immediately notify AUTHORITY of any modifications or cancellation of any required insurance policies.

H. CONTRACTOR shall submit required insurance certificates to AUTHORITY's insurance tracking contractor, InsureTrack. CONTRACTOR shall respond directly to InsureTrack's request for updated insurance certificates and other insurance-related matters by email to octa@instracking.com.

I. CONTRACTOR shall include on the face of the certificate of insurance, the following information:

1. The Agreement Number C-5-3922 and, the Contract Administrator's Name, Michael Le.

2. For Certificate Holder: The Orange County Transportation Authority, its officers, directors, employers and agents, c/o InsureTrack, P.O. Box 60840 Las Vegas, NV 89160.

ARTICLE 11. BONDS

A. By submitting Exhibit E, entitled "Performance Bond," and Exhibit F, entitled "Payment Bond," CONTRACTOR shall satisfy AUTHORITY's requirements that CONTRACTOR deposit with AUTHORITY bonds with values in the sum of 100 percent of this Agreement's price to cover CONTRACTOR's failure to fully perform hereunder and CONTRACTOR's failure to pay its labor, material or failure to comply with

Article 32 of this Agreement, in performing hereunder. If the contract price is increased in connection with a Change Order, the AUTHORITY may, in its sole discretion, require a corresponding increase in the amount of the Performance and Payment bonds or new bonds covering the Change Order work.

B. Notwithstanding any other provision set forth in this Agreement, performance by a Surety or Guarantor of any obligations of CONTRACTOR shall not relieve CONTRACTOR of any of its obligations thereunder.

ARTICLE 12. ORDER OF PRECEDENCE

Conflicting provisions hereof, if any, shall prevail in the following descending order of precedence: (1) the provisions of this Agreement, including its exhibits; (2) the provisions of IFB including all Addendums; (3) the bid submitted to AUTHORITY by CONTRACTOR in response to said IFB; and (4) any other documents, cited herein or incorporated by reference. In the event of conflicting provisions of Exhibit B ("Specifications"), and Exhibit C ("List of Drawings"), Project Specifications shall take precedence.

ARTICLE 13. CHANGES

A. By written notice or order, AUTHORITY may, from time to time, order work suspension and/or make any change in the general scope of this Agreement, including, but not limited to, changes in the drawings, specifications, schedules (either deceleratory or acceleratory) or any other particular of the specifications or provisions of this Agreement. If any such work suspension or change causes an increase or decrease in the price or time required for performance, CONTRACTOR shall promptly notify AUTHORITY thereof and assert its claim for adjustment within ten (10) calendar days after the change or work suspension is ordered, and an equitable adjustment shall be negotiated. However, nothing in this clause shall excuse CONTRACTOR from proceeding immediately with the Agreement as changed. Changes will be made in accordance with the terms as set forth in Exhibit A, "General Provisions," paragraph F, Extra Work and Changes, by written Change Order.

B. No claims by CONTRACTOR for equitable adjustment hereunder shall be allowed if asserted after final payment under this Agreement.

C. Any work done beyond the technical provisions specified in this Agreement, or any extra work done without AUTHORITY's written authority, will be considered unauthorized work and will not be paid for. Upon order of AUTHORITY's Engineer or its designee, unauthorized work shall be remedied, removed or replaced at CONTRACTOR's expense.

ARTICLE 14. MODIFICATION PROPOSALS-PRICE BREAKDOWN

CONTRACTOR, in connection with any proposal it makes for an agreement modification, shall furnish a price breakdown, itemized as required by AUTHORITY. Unless otherwise directed, the breakdown shall be in sufficient detail to permit an analysis of all material, labor, equipment, subcontract and overhead costs, as well as profit, and shall cover all work involved in the modification, whether such work was deleted, added or changed. Any amount claimed for subcontracts shall be supported by a similar price breakdown. In addition, if the proposal includes a time extension, a justification therefore shall also be furnished. The proposal, together with the price breakdown and time extension justification, shall be furnished by the date specified by AUTHORITY.

ARTICLE 15. DISPUTES

A. Except as otherwise provided in this Agreement, when a dispute arises between CONTRACTOR and AUTHORITY, the project managers shall meet to resolve the issue. If project managers do not reach a resolution, the dispute will be decided by AUTHORITY's Director of Contracts Administration and Materials Management (CAMM), who shall reduce the decision to writing and mail or otherwise furnish a copy thereof to CONTRACTOR. The decision of the Director, CAMM, shall be the final and conclusive administrative decision.

B. Pending final decision of a dispute hereunder, CONTRACTOR shall proceed diligently with the performance of this Agreement and in accordance with the decision of AUTHORITY's Director, CAMM. Nothing in this Agreement, however, shall be construed as making final the decision of any AUTHORITY official or representative on a question of law, which questions shall be settled in accordance with the laws of the State of California.

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ARTICLE 16. TERMINATION FOR CONVENIENCE

A. AUTHORITY may terminate this Agreement for its convenience at any time in whole or in part, by giving CONTRACTOR written notice thereof. AUTHORITY shall terminate by delivering to CONTRACTOR a written Notice of Termination for Convenience specifying the extent of termination and its effective date. Upon termination, AUTHORITY shall pay CONTRACTOR its allowable costs incurred to date of that portion terminated. The rights, duties and obligations of the parties shall be construed in accordance with the applicable provisions of CFR Title 48, Chapter 1, Part 49, of the Federal Acquisition Regulation (FAR) and specific subparts and other provisions thereof applicable to termination for convenience. If AUTHORITY sees fit to terminate this Agreement for convenience, said notice shall be given to CONTRACTOR in accordance with the provisions of the FAR referenced above and Article 8, herein. Upon receipt of said notification, CONTRACTOR shall immediately proceed with all obligations, regardless of any delay in determining or adjusting any amounts due under this Article, and agrees to comply with all applicable provisions of the FAR pertaining to termination for convenience.

ARTICLE 17. TERMINATION FOR DEFAULT-DAMAGES FOR DELAY-TIME EXTENSIONS

A. If CONTRACTOR refuses or fails to prosecute the work, or any separable part thereof, with such diligence as will ensure its completion within the time specified in this Agreement, or any extension thereof, or fails to complete said work within such time, AUTHORITY may, by written notice to CONTRACTOR, terminate CONTRACTOR's right to proceed with the work or such part of the work as to which there has been delay. In such event, AUTHORITY may take over the work and prosecute the same to completion, by Agreement or otherwise, and may take possession of and utilize in completing the work such materials, appliances and plant as may be on the site of the work and necessary therefore. Whether or not CONTRACTOR's right to proceed with the work is terminated, it and its sureties shall be liable for any damage to AUTHORITY resulting from its refusal or failure to complete the work within the specified time.

B. If AUTHORITY so terminates CONTRACTOR's right to proceed, the resulting damage will consist of such liquidated damages as set forth in the Article 31 in this Agreement entitled "Liquidated

Damages," until such reasonable time as may be required for final completion of the work together with any increased costs occasioned AUTHORITY in completing the work. If AUTHORITY does not so terminate CONTRACTOR's right to proceed, the resulting damage will consist of such liquidated damages until the work is completed or accepted.

C. CONTRACTOR's right to proceed shall not be so terminated nor the CONTRACTOR charged with resulting damage if:

1. The delay in completing the work arises from unforeseeable causes beyond the control and without the fault or negligence of CONTRACTOR, including but not restricted to, acts of God, acts of the public enemy, acts or omissions of AUTHORITY, acts of another CONTRACTOR in the performance of an Agreement with AUTHORITY, fires, floods, epidemics, quarantine restrictions, freight embargoes, unusually severe weather, or delays of subcontractors or suppliers arising from unforeseeable causes beyond the control and without the fault or negligence of both CONTRACTOR and such subcontractors or suppliers; and

2. CONTRACTOR, within ten (10) calendar days from the beginning of any such delay, notifies AUTHORITY in writing of the causes of delay. AUTHORITY shall ascertain the facts and the extent of the delay and extend the time for completing the work when, in its judgment, the findings of fact justify such an extension, and its findings of fact shall be final and conclusive on the parties, subject only to appeal as provided in the "Disputes" clause of this Agreement. Any such time extensions will not become effective until approved by AUTHORITY's Engineer in writing. AUTHORITY's Engineer will furnish CONTRACTOR a weekly statement showing the number of calendar days charged to the Agreement for the preceding week, the number of calendar days of time extensions being considered or approved, the number of calendar days originally specified for the completion of this Agreement and the number of calendar days remaining to complete this Agreement, and the extended date for completion thereof.

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3. Should at any time extensions be included by AUTHORITY's Engineer on the Weekly Statement of Contract Calendar Days, a change order covering the sum total of the time extensions will be issued to CONTRACTOR at periodic intervals during the project.

D. If, after notice of termination of CONTRACTOR's right to proceed under the provisions of this clause, it is determined for any reason that CONTRACTOR was not in default under the provisions of this clause, or that the delay was excusable under the provisions of this clause, the rights and obligations of the parties shall be the same as if the notice of termination had been issued pursuant to Article 16, entitled "Termination for Convenience."

E. The rights and remedies of AUTHORITY provided in this clause are in addition to any other rights and remedies provided by law or under this Agreement.

F. As used in paragraph C.1 of this Article, the term "subcontractors or suppliers," means subcontractors or suppliers at any tier.

ARTICLE 18. INDEMNIFICATION

CONTRACTOR shall indemnify, defend, and hold harmless AUTHORITY, its officers, directors, employees and agents from and against any and all claims (including attorneys' fees and reasonable expenses for litigation or settlement) for any loss, costs, penalties, fines, damages, bodily injuries, including death, damage to or loss of use of property, arising out of, resulting from, or in connection with the performance of CONTRACTOR, its officers, directors, employees, agents, subcontractors or suppliers under the Agreement. Notwithstanding the foregoing, such obligation to defend, hold harmless, and indemnify AUTHORITY, its officers, directors, employees and agents shall not apply to such claims or liabilities arising from the sole or active negligence or willful misconduct of AUTHORITY.

ARTICLE 19. ASSIGNMENTS AND SUBCONTRACTS

A. Neither this Agreement nor any interest herein nor claim hereunder may be assigned by CONTRACTOR either voluntarily or by operation of law. CONTRACTOR shall not have the right to make any substitutions of any subcontractor listed in Exhibit D, entitled "List of Subcontractors," except in accordance with the provisions of the Subletting and Subcontractors Fair Practices Act, Public Contract

Code section 4100 et. seq. AUTHORITY's consent shall not be deemed to relieve CONTRACTOR of its obligation to fully comply with the requirements of this Agreement.

B. CONTRACTOR shall be fully responsible to AUTHORITY for all acts and omissions of its own employees, and of subcontractors and their employees. CONTRACTOR shall coordinate the work performed by subcontractor.

C. AUTHORITY shall have the right, but not the obligation, to review the form of subcontract used by CONTRACTOR for the project and to require modifications thereto to conform to the requirements set forth herein.

ARTICLE 20. AUDIT AND INSPECTION OF RECORDS

CONTRACTOR shall provide AUTHORITY, or other agents of the AUTHORITY, such access to CONTRACTOR's accounting books, records, payroll documents and facilities of the CONTRACTOR which are directly pertinent to this Agreement for the purposes of examining, auditing and inspecting all accounting books, records, work data, documents and activities related hereto. CONTRACTOR shall maintain such books, records, data and documents in accordance with generally accepted accounting principles and shall clearly identify and make such items readily accessible to such parties during CONTRACTOR's performance hereunder and for a period of four (4) years from the date of final payment by AUTHORITY, except in the event of litigation or settlement of claims arising from the performance of this Agreement, in which case CONTRACTOR agrees to maintain same until AUTHORITY, or any of their duly authorized representatives, have disposed of all such litigation, appeals, claims or exceptions related thereto. AUTHORITY's right to audit books and records directly related to this Agreement shall also extend to all first-tier subcontractors. CONTRACTOR shall permit any of the foregoing parties to reproduce documents by any means whatsoever or to copy excerpts and transcriptions as reasonably necessary.

ARTICLE 21. CONFLICT OF INTEREST

CONTRACTOR agrees to avoid organizational conflicts of interest. An organizational conflict of interest means that due to other activities, relationships or contracts, the CONTRACTOR is unable, or

potentially unable to render impartial assistance or advice to the AUTHORITY; CONTRACTOR's objectivity in performing the work identified in the Scope of Work is or might be otherwise impaired; or the CONTRACTOR has an unfair competitive advantage. CONTRACTOR is obligated to fully disclose to the AUTHORITY in writing Conflict of Interest issues as soon as they are known to the CONTRACTOR. All disclosures must be submitted in writing to AUTHORITY pursuant to the Notice provision herein. This disclosure requirement is for the entire term of this Agreement.

ARTICLE 22. CODE OF CONDUCT

CONTRACTOR agrees to comply with the AUTHORITY's Code of Conduct as it relates to Third-Party contracts which is hereby referenced and by this reference is incorporated herein. CONTRACTOR agrees to include these requirements in all of its subcontracts.

ARTICLE 23. PROHIBITION ON PROVIDING ADVOCACY SERVICES

CONTRACTOR and all subcontractors performing work under this Agreement, shall be prohibited from concurrently representing or lobbying for any other party competing for a contract with AUTHORITY, either as a prime contractor or subcontractor. Failure to refrain from such representation may result in termination of this Agreement.

ARTICLE 24. FEDERAL, STATE AND LOCAL LAWS

CONTRACTOR warrants that in the performance of this Agreement it shall comply with all applicable federal, state and local laws, statutes and ordinances and all lawful orders, rules and regulations promulgated thereunder.

ARTICLE 25. EQUAL EMPLOYMENT OPPORTUNITY

In connection with its performance under this Agreement, CONTRACTOR agrees that it shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, age or national origin. CONTRACTOR shall take affirmative action to ensure that applicants are employed, and that employees are treated during their employment, without regard to their race, religion, color, sex, age or national origin. Such actions shall include, but not be limited to, the following: employment,

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upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship.

ARTICLE 26. FINISHED AND PRELIMINARY DATA

A. All of CONTRACTOR's finished technical data, including but not limited to illustrations, photographs, tapes, software, software design documents, including without limitation source code, binary code, all media, technical documentation and user documentation, photoprints and other graphic information required to be furnished under this Agreement, shall be AUTHORITY's property upon payment and shall be furnished with unlimited rights and, as such, shall be free from proprietary restriction except as elsewhere authorized in this Agreement. CONTRACTOR further agrees that it shall have no interest or claim to such finished, AUTHORITY-owned, technical data; furthermore, said data is subject to the provisions of the Public Records Act.

B. It is expressly understood that any title to preliminary technical data is not passed to AUTHORITY but is retained by CONTRACTOR. Preliminary data includes roughs, visualizations, software design documents, layouts and comprehensives prepared by CONTRACTOR solely for the purpose of demonstrating an idea or message for AUTHORITY's acceptance before approval is given for preparation of finished artwork. Preliminary data title and right thereto shall be made available to AUTHORITY if CONTRACTOR causes AUTHORITY to exercise Article 17, and a price shall be negotiated for all preliminary data.

ARTICLE 27. PRIVACY ACT

CONTRACTOR shall comply with, and assures the compliance of its employees with, the information restrictions and other applicable requirements of the Privacy Act of 1974, 5 U.S.C. §552a. Among other things, CONTRACTOR agrees to obtain the express consent of the Federal Government before CONTRACTOR or its employees operate a system of records on behalf of the Federal Government. CONTRACTOR understands the requirements of the Privacy Act, including the civil and criminal penalties for violation of that Act, apply to those individuals involved, and that failure to comply with the terms of the Privacy Act may result in termination of the underlying Agreement.

ARTICLE 28. OWNERSHIP OF REPORTS AND DOCUMENTS

A. The originals of all letters, documents, reports and other products and data produced under this Agreement shall be delivered to, and become the property of AUTHORITY. Copies may be made for CONTRACTOR'S records but shall not be furnished to others without written authorization from AUTHORITY. Such deliverables shall be deemed works made for hire and all rights in copyright therein shall be retained by AUTHORITY.

B. All ideas, memoranda, specifications, plans, manufacturing, procedures, drawings, descriptions, and all other written information submitted to CONTRACTOR in connection with the performance of this Agreement shall not, without prior written approval of AUTHORITY, be used for any purposes other than the performance under this Agreement, nor be disclosed to an entity not connected with the performance of the project. CONTRACTOR shall comply with AUTHORITY's policies regarding such material. Nothing furnished to CONTRACTOR, which is otherwise known to CONTRACTOR or is or becomes generally known to the related industry shall be deemed confidential. CONTRACTOR shall not use AUTHORITY's name, photographs of the project, or any other publicity pertaining to the project in any professional publication, magazine, trade paper, newspaper, seminar or other medium without the express written consent of AUTHORITY.

C. No copies, sketches, computer graphics or graphs, including graphic artwork, are to be released by CONTRACTOR to any other person or agency except after prior written approval by AUTHORITY, except as necessary for the performance of services under this Agreement. All press releases, including graphic display information to be published in newspapers, magazines, etc., are to be handled only by AUTHORITY unless otherwise agreed to by CONTRACTOR and AUTHORITY.

ARTICLE 29. CONVICT LABOR

In connection with the performance of work under this Agreement, CONTRACTOR agrees not to employ any person undergoing sentence of imprisonment at hard labor. This does not include convicts who are on parole or probation.

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ARTICLE 30. NOTICE OF LABOR DISPUTE

Whenever CONTRACTOR has knowledge that any actual or potential labor dispute may delay its performance under this Agreement, CONTRACTOR shall immediately notify and submit all relevant information to AUTHORITY. CONTRACTOR shall insert the substance of this entire clause in any subcontract hereunder as to which a labor dispute may delay performance under this Agreement. However, any subcontractor need give notice and information only to its next higher-tier subcontractor.

ARTICLE 31. LIQUIDATED DAMAGES

If CONTRACTOR fails to complete the work within the time specified in Article 4 of this Agreement, or any AUTHORITY authorized extension thereof, the actual damage to AUTHORITY for the delay will be difficult or impossible to determine. Therefore, in lieu of actual damages, CONTRACTOR shall pay to AUTHORITY as fixed, agreed-to liquidated damages for each calendar day of delay the sum of Three Hundred Dollars ($300.00). Alternatively, AUTHORITY may terminate this Agreement in whole or in part as provided in Article 16 of this Agreement, and in that event, CONTRACTOR shall be liable, in addition to the excess costs provided in Article 16 of this Agreement, for such liquidated damages accruing until such time as AUTHORITY may reasonably obtain delivery or performance of similar supplies or services from a different source. CONTRACTOR shall not be charged with liquidated damages when the delay is determined to be excusable in accordance with Article 45 hereunder. AUTHORITY shall ascertain the facts and extent of the delay and shall extend the time for performance of the Agreement when in its judgment, the findings of fact justify an extension.

ARTICLE 32. WARRANTY

A. In addition to any other warranties set forth in this Agreement, whether expressed or implied, CONTRACTOR warrants that (1) all work performed and all equipment and material provided under this Agreement by CONTRACTOR or any of its subcontractors or suppliers at any tier, conforms to the requirements herein and is free of any defects; (2) equipment furnished by CONTRACTOR or any of its subcontractors or suppliers at any tier, shall be of modern design, in good working condition and fit for use of its intended purpose; and (3) all work shall meet all of the requirements of this Agreement. Such

warranty shall continue for a period of one (1) year from AUTHORITY's acceptance as shown in Article 34 hereunder. Under this warranty, CONTRACTOR shall remedy at its own expense any such failure to conform or correct any such defect. In addition, CONTRACTOR shall remedy at its own expense any damage to AUTHORITY owned or controlled real or personal property, when that damage is the result of CONTRACTOR's failure to conform to Agreement requirements or any such defect of equipment, material, workmanship or design. CONTRACTOR shall also restore any work damaged in fulfilling the terms of this clause. CONTRACTOR's warranty with respect to work repaired or replaced hereunder will run for one year from the date of such repair or replacement.

B. AUTHORITY shall notify CONTRACTOR in writing within a reasonable time after the discovery of any failure, defect or damage. CONTRACTOR has seven days from receipt of notice from AUTHORITY to respond to AUTHORITY's notification and indicate how CONTRACTOR will remedy the failure, defect, or damage. If AUTHORITY is not satisfied with the remedy proposed by CONTRACTOR, CONTRACTOR and AUTHORITY shall meet and mutually agree when and how CONTRACTOR shall remedy such violation. In the case of an emergency requiring immediate corrective action, CONTRACTOR shall implement such action, as it deems necessary and shall notify AUTHORITY in writing of the urgency of a decision and action taken. CONTRACTOR and AUTHORITY shall, then promptly meet in order to agree on a remedy. If CONTRACTOR and AUTHORITY fail to agree on the remedy within a five-day period, AUTHORITY, after notice to CONTRACTOR, shall have the right to perform or have performed by third parties the necessary remedy, and the costs thereof shall be borne by CONTRACTOR.

C. Should CONTRACTOR fail to remedy any failure, defect or damage described in paragraph A above within a reasonable time after receipt of notice thereof, AUTHORITY shall have the right to replace, repair or otherwise remedy such failure, defect or damage at CONTRACTOR's expense and CONTRACTOR shall be liable for all damages, including, but not limited to, actual or consequential damages and cost of any suit to enforce AUTHORITY's rights hereunder, including reasonable attorney's fees.

D. In addition to the other rights and remedies provided by this clause, all subcontractors, manufacturers, and suppliers' warranties, expressed or implied, respecting any work and materials furnished hereunder, shall, at the direction of AUTHORITY, be enforced by CONTRACTOR for the benefit of AUTHORITY. In such case if CONTRACTOR's warranty under paragraph A above has expired, any suit directed by AUTHORITY shall be at the expense of AUTHORITY. CONTRACTOR shall obtain any warranties, which the subcontractors, manufacturers or suppliers would give in normal commercial practice and shall cause all subcontractor or supplier warranties to be extend to AUTHORITY.

E. If directed by AUTHORITY, CONTRACTOR shall require any such warranties to be executed in writing to AUTHORITY.

F. Notwithstanding any other provision of this clause, unless such a defect is caused by the negligence of CONTRACTOR or its subcontractors or suppliers at any tier, CONTRACTOR shall not be liable for the repair of any defects of material or design furnished by AUTHORITY nor for the repair of any damage which results from any such defect in AUTHORITY furnished material or design.

G. The warranty specified herein shall not limit AUTHORITY's rights under the Inspection and Acceptance clause of this Agreement with respect to latent defects, gross mistakes or fraud.

H. Defects in design or manufacture of equipment specified by AUTHORITY on a "brand name and model" basis shall not be included in this warranty. CONTRACTOR shall require any subcontractors, manufacturers or suppliers thereof to execute their warranties in writing directly to AUTHORITY.

I. Any disagreement between AUTHORITY and CONTRACTOR relating to this section shall be subject to dispute resolution in accordance with Article 15.

ARTICLE 33. GENERAL WAGE RATES

A. All laborers and mechanics employed by CONTRACTOR or subcontractor at any tier working on the construction site, will be paid unconditionally and not less often than once a week and without any subsequent deduction or rebate on any account (except such payroll deductions as are permitted or required by federal, state or local law, regulation or ordinance), the full amounts due at the time of payment computed at wage rates and per diem rate not less than the aggregate of the highest of the two basic

hourly rates and rates of payments, contributions or costs for any fringe benefits contained in the current general prevailing wage rate(s) and per diem rate(s), established by the Director of the Department of Industrial Relations of the State of California, (as set forth in the Labor Code of the State of California, commencing at Section 1770 et. seq.), regardless of any contractual relationship which may be alleged to exist between CONTRACTOR or subcontractor and their respective mechanics, laborers, journeypersons, workpersons, craftspersons or apprentices. Copies of the current General Prevailing Wage Determinations and Per Diem Rates are on file at AUTHORITY's offices and will be made available to CONTRACTOR upon request. CONTRACTOR shall post a copy thereof at each job site at which work hereunder is performed.

B. In addition to the foregoing, CONTRACTOR agrees to comply with all other provisions of the Labor Code of the State of California, which are incorporated herein by reference, pertaining to workers performing work hereunder including, but not limited to, those provisions for work hours, payroll records and apprenticeship employment and regulation program. CONTRACTOR agrees to insert or cause to be inserted the preceding clause in all subcontracts, which provide for workers to perform work hereunder regardless of the subcontractor tier.

ARTICLE 34. INSPECTION AND ACCEPTANCE

A. All work (which term includes but is not restricted to materials, equipment, workmanship, and manufacture and fabrication of components) shall be subject to inspection and test by AUTHORITY at all reasonable times and at all places prior to acceptance. Any such inspection and test is for the sole benefit of AUTHORITY and shall not relieve CONTRACTOR of the responsibility of providing quality control measures to assure that the work strictly complies with requirements of this Agreement. No inspection or test by AUTHORITY or its representative shall be construed as constituting or implying acceptance. Inspection or test shall not relieve CONTRACTOR of responsibility for damage to or loss of the material prior to acceptance, nor in any way affect the continuing rights of AUTHORITY after acceptance of the completed work under the terms of paragraph F of this Article, except as herein above provided.

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B. CONTRACTOR shall, without charge, replace any material or correct any workmanship found by AUTHORITY not to conform to the requirements of this Agreement, unless in the public interest AUTHORITY consents to accept such material or workmanship with an appropriate adjustment in the price of this Agreement. CONTRACTOR shall promptly segregate and remove rejected material from the premises.

C. CONTRACTOR shall furnish promptly, without additional charge, all facilities, labor, equipment and material reasonably needed for performing such safe and convenient inspection and test as may be required by AUTHORITY. All inspections and tests by AUTHORITY shall be performed in such manner as to not unnecessarily delay the work. AUTHORITY reserves the right to charge to CONTRACTOR any additional cost of inspection or test when material or workmanship is not ready at the time specified by CONTRACTOR for inspection or test or when reinspection or retest is necessitated by prior rejection.

D. If CONTRACTOR does not promptly replace rejected material or correct rejected workmanship, AUTHORITY (1) may, by Agreement or otherwise, replace such material or correct such workmanship and charge the cost thereof to CONTRACTOR, or (2) may terminate CONTRACTOR's right to proceed in accordance with the clause of this Agreement entitled "Termination for Default."

E. Should it be considered necessary or advisable by AUTHORITY at any time before acceptance of the entire work to make an examination of work already completed, by removing or tearing out same, CONTRACTOR shall, on request, promptly furnish all necessary facilities, labor and material. If such work is found to be defective or nonconforming in any material respect, due to the fault of CONTRACTOR or its subcontractors, CONTRACTOR shall pay all costs of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of this Agreement, an equitable adjustment shall be made in the Agreement price to compensate CONTRACTOR for the additional services involved in such examination and reconstruction and, if completion of the work has been delayed thereby, it shall in addition, be granted a suitable extension of time.

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F. Unless otherwise provided in this Agreement, acceptance by AUTHORITY shall be made as promptly as practicable after completion and inspection of all work required by this Agreement, or that portion of the work that AUTHORITY determines can be accepted separately. Acceptance shall be final and conclusive except as regards latent defects, fraud, or such gross mistakes as may amount to fraud or as regards AUTHORITY's rights under the warranty provisions set forth herein.

ARTICLE 35. MATERIAL AND WORKMANSHIP

A. Unless otherwise specifically provided in this Agreement, all equipment, material, and articles incorporated in the work covered by this Agreement are to be new and of the most suitable grade for the purpose intended. Unless otherwise specifically provided in this Agreement, reference to any equipment, material, article or patented process, by trade name, make or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition, and CONTRACTOR may, at its option, use any equipment, material, article or process which, in the judgment of AUTHORITY, is equal to that named. CONTRACTOR shall furnish to AUTHORITY for its approval the name of the manufacturer, the model number and other identifying data and information respecting the performance, capacity, nature and rating of the machinery and mechanical and other equipment, which CONTRACTOR contemplates incorporating in the work. When required by this Agreement or when called for by AUTHORITY, CONTRACTOR shall furnish AUTHORITY, for approval, full information concerning the material or articles, which it contemplates incorporating in the work. When so directed, samples shall be submitted for approval at CONTRACTOR's expense, with all shipping charges prepaid. Machinery, equipment, material and articles installed or used without required approval shall be at the risk of subsequent rejection.

B. All work under this Agreement shall be performed in a skillful and workmanlike manner. Notwithstanding the provisions of Article 3 hereof, AUTHORITY may, in writing, require CONTRACTOR to remove from the work any employee AUTHORITY deems incompetent, careless or otherwise objectionable.

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ARTICLE 36. NON-CONFORMING WORK

A. Nonconforming work rejected by AUTHORITY shall be removed and replaced so as to conform to the requirements of this Agreement, at CONTRACTOR's cost and without a time extension; and CONTRACTOR shall promptly take all action necessary to prevent similar deficiencies from occurring in the future. The fact that AUTHORITY may not have discovered the nonconforming Work shall not constitute an acceptance of such nonconforming Work. If CONTRACTOR fails to correct any nonconforming work within ten days of receipt of notice from AUTHORITY requesting correction, or if such nonconforming work cannot be corrected within ten days, and CONTRACTOR fails to (1) provide to AUTHORITY a schedule for correcting any such nonconforming work acceptable to AUTHORITY within such ten-day period, (2) commence such corrective work within such ten-day period and (3) thereafter diligently prosecute such correction in accordance with such approved schedule to completion, then AUTHORITY may cause the nonconforming work to be remedied or removed and replaced and may deduct the cost of doing so from any moneys due or to become due CONTRACTOR and/or obtain reimbursement from CONTRACTOR for such cost.

B. If AUTHORITY agrees to accept any Nonconforming Work without requiring it to be fully corrected, AUTHORITY shall be entitled to reimbursement of a portion of the Contract Price in an amount equal to the greater of the amount deemed appropriate by AUTHORITY to provide compensation for future maintenance and/or other costs relating to the Nonconforming Work, or 100% of CONTRACTOR's cost savings associated with its failure to perform the Work in accordance with Contract requirements. Such reimbursement shall be payable to AUTHORITY within ten days after CONTRACTOR's receipt of an invoice thereof. CONTRACTOR acknowledges and agrees that AUTHORITY shall have sole discretion regarding acceptance or rejection of Nonconforming Work and that AUTHORITY shall have sole discretion with regard to the amount payable in connection therewith.

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ARTICLE 37. CONTRACTOR INSPECTION SYSTEM

CONTRACTOR shall maintain an adequate inspection system and perform such inspections as will assure that the work performed under this Agreement conforms to the specified requirements, and shall maintain and make available to AUTHORITY adequate records of such inspections.

ARTICLE 38. SUPERINTENDENCE BY CONTRACTOR

CONTRACTOR, at all times during performance and until the work is completed and accepted, shall give its personal superintendence to the work or have on the work a competent superintendent, satisfactory to AUTHORITY and with authority to act for and on behalf of CONTRACTOR.

ARTICLE 39. OTHER CONTRACTS

AUTHORITY may undertake or award other agreements for additional work, and CONTRACTOR shall fully cooperate with such other CONTRACTOR's and AUTHORITY's employees and carefully fit its own work to such additional work as may be directed by AUTHORITY. CONTRACTOR shall not commit or permit any act, which will interfere with the performance of work by any other CONTRACTOR or by AUTHORITY.

ARTICLE 40. INSPECTION OF SITE

CONTRACTOR acknowledges that it has investigated and satisfied itself as to the conditions affecting the work including, but not restricted to, those bearing upon transportation, disposal, handling and storage of materials, availability of labor, water, electric power and roads and uncertainties of weather, river stages, tides or similar physical conditions at the site, the conformation and conditions of the ground, the character of equipment and facilities needed preliminary to and during prosecution of the work. CONTRACTOR further acknowledges that it has satisfied itself as to the character, quality and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done by AUTHORITY, as well as from information presented by the drawings and specifications made a part of this Agreement. Any failure by CONTRACTOR to acquaint itself with the available information will not relieve it from responsibility for the difficulty or cost of successfully performing the work. AUTHORITY

assumes no responsibility for any conclusions or interpretations made by CONTRACTOR on the basis of the information made available by AUTHORITY.

ARTICLE 41. DIFFERING SITE CONDITIONS

A. CONTRACTOR shall immediately, and before such conditions are disturbed, notify AUTHORITY in writing of: (1) subsurface or latent physical conditions at the site which differ materially from those indicated in this Agreement, or (2) unknown physical conditions at the site, of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this Agreement. AUTHORITY will investigate the conditions within three business days of receipt of notification, and if it finds that such conditions do materially so differ and cause an increase or decrease in CONTRACTOR's cost of, or the time required for, performance of any part of the work under this Agreement, whether or not changed as a result of such conditions, an equitable adjustment shall be made and the Agreement modified in writing accordingly.

B. No claim of CONTRACTOR under this Article shall be allowed unless CONTRACTOR has given the written notice required above; no claim by CONTRACTOR for an equitable adjustment hereunder shall be allowed if asserted after final payment under this Agreement.

ARTICLE 42. OPERATIONS AND STORAGE AREAS

A. All operations of CONTRACTOR (including storage of materials and equipment) on AUTHORITY owned premises shall be confined to areas authorized or approved by AUTHORITY. CONTRACTOR shall hold AUTHORITY and its officers and agents free and harmless from liability of any nature occasioned by CONTRACTOR's operations.

B. Temporary building (storage sheds, shops, offices, etc.) may be erected by CONTRACTOR with the written consent of AUTHORITY, and shall be built with labor and materials furnished by CONTRACTOR without expense to AUTHORITY. Such temporary buildings and utilities shall remain the property of CONTRACTOR and shall be removed by CONTRACTOR at its expense upon the completion of the work. With the written consent of AUTHORITY, such buildings and utilities may be abandoned and need not be removed.

C. CONTRACTOR shall, under regulations prescribed by AUTHORITY, use only established roadways or construct and use such temporary roadways as may be authorized by AUTHORITY. Where materials are transported in the prosecution of work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any federal, state or local law or regulation. When it is necessary to cross curbing or sidewalks, protection against damage shall be provided by CONTRACTOR and any damaged roads, curbing or sidewalks shall be repaired by, or at the expense of, CONTRACTOR.

ARTICLE 43. PROTECTION OF VEGETATION, UTILITIES, IMPROVEMENTS

A. CONTRACTOR shall preserve and protect all existing vegetation such as trees, shrubs and grass on or adjacent to the site of work which is not to be removed and which does not unreasonably interfere with the construction work. Care will be taken in removing trees authorized for removal to avoid damage to vegetation to remain in place. Any limbs or branches of trees broken during such operations or by the careless operation of equipment, or by workmen, shall be trimmed with a clean cut and painted with an approved tree pruning compound as directed by AUTHORITY.

B. CONTRACTOR shall protect from damage all existing improvements or utilities at or near the site of the work, the location of which is made known to it, and will repair or restore any damage to such facilities resulting from failure to comply with the requirements of this Agreement or the failure to exercise reasonable care in the performance of the work. If CONTRACTOR fails or refuses to repair any such damage promptly, AUTHORITY may have the necessary work performed and charge the cost to CONTRACTOR.

ARTICLE 44. CLEANING UP

A. CONTRACTOR shall at all times keep the construction area, including storage areas used by it, free from accumulations of waste material or rubbish, and prior to completion of the work remove any rubbish from AUTHORITY owned premises and all tools, scaffolding, equipment and materials not the property of AUTHORITY. Upon completion of the construction, CONTRACTOR shall leave the work and premises in a clean, neat and workmanlike condition satisfactory to AUTHORITY.

B. After completion of all work on the project, and before making application for acceptance of the work, CONTRACTOR shall clean the construction site, including all areas under the control of AUTHORITY, that have been used by CONTRACTOR in connection with the work on the project and remove all debris, surplus material and equipment, and all temporary construction or facilities of whatever nature, unless otherwise approved by AUTHORITY. Final acceptance of the work by AUTHORITY will be withheld until CONTRACTOR has satisfactorily complied with the foregoing requirements for final cleanup of the project site.

C. Full compensation for conforming to the provisions in this Article, not otherwise provided for, shall be considered as included in price of this Agreement and no additional compensation will be allowed therefore.

ARTICLE 45. USE AND POSSESSION TO COMPLETION

AUTHORITY shall have the right to take possession of or use any completed or partially completed part of the work. Prior to such possession or use, AUTHORITY shall furnish CONTRACTOR an itemized list of work remaining to be performed or corrected on such portions of the project as are to be possessed or used by AUTHORITY, provided that failure to list any item of work shall not relieve CONTRACTOR of responsibility for compliance with the terms of this Agreement. Such possession or use shall not be deemed an acceptance of any work under this Agreement. While AUTHORITY has such possession or use, CONTRACTOR shall be relieved of the responsibility for the loss or damage to the work resulting from AUTHORITY's possession or use. If such prior possession or use by AUTHORITY delays the progress of the work or causes additional expense to CONTRACTOR, an equitable adjustment in the Agreement price or the time of completion will be made and the Agreement shall be modified in writing accordingly.

ARTICLE 46. PROHIBITED INTERESTS

CONTRACTOR covenants that, for the term of this Agreement, no director, officer or employee of AUTHORITY, during his/her tenure in office or for one (1) year thereafter, shall have any interest, direct or indirect, in this Agreement or the proceeds thereof.

ARTICLE 47. CONTRACTOR PURCHASED EQUIPMENT

A. If during the course of this Agreement, additional equipment is required, which will be paid for by the AUTHORITY, CONTRACTOR must request prior written authorization from the AUTHORITY's project manager before making any purchase. As part of this purchase request, CONTRACTOR shall provide a justification for the necessity of the equipment or supply and submit copies of three (3) competitive quotations. If competitive quotations are not obtained, CONTRACTOR must provide the justification for the sole source.

B. CONTRACTOR shall maintain an inventory record for each piece of equipment purchased that will be paid for by the AUTHORITY. The inventory record shall include the date acquired, total cost, serial number, model identification, and any other information or description necessary to identify said equipment or supply. A copy of the inventory record shall be submitted to the AUTHORITY upon request.

C. At the expiration or termination of this Agreement, CONTRACTOR may keep the equipment and credit AUTHORITY in an amount equal to its fair market value. Fair market value shall be determined, at CONTRACTOR's expense, on the basis of an independent appraisal. CONTRACTOR may sell the equipment at the best price obtainable and credit AUTHORITY in an amount equal to the sales price. If the equipment is to be sold, then the terms and conditions of the sale must be approved in advance by AUTHORITY's project manager.

D. Any subcontractor agreement entered into as a result of this Agreement shall contain all provisions of this clause.

ARTICLE 48. HEALTH AND SAFETY SPECIFICATIONS

CONTRACTOR shall comply with all requirements set forth in Exhibit H, Level 3 Safety Specifications.

ARTICLE 49. FORCE MAJEURE

Either party shall be excused from performing its obligations under this Agreement during the time and to the extent that it is prevented from performing by an unforeseeable cause beyond its control, including but not limited to: any incidence of fire, flood; acts of God; commandeering of material, products,

plants or facilities by the federal, state or local government; national fuel shortage; or a material act or omission by the other party; when satisfactory evidence of such cause is presented to the other party, and provided further that such nonperformance is unforeseeable, beyond the control and is not due to the fault or negligence of the party not performing.

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AGREEMENT NO. C-5-3922

IN WITNESS WHEREOF, the parties hereto have caused this Agreement No. C-5-3922 to be executed as of the date of the last signature below.

CONTRACTOR

By: _____

License No:

ORANGE COUNTY TRANSPORTATION AUTHORITY

By: _____
Darrell E. Johnson
Chief Executive Officer

APPROVED AS TO FORM:

By: _____
James M. Donich
General Counsel

APPROVED:

By: _____
James G. Beil, P.E.
Executive Director, Capital Programs

SECTION V: GENERAL PROVISIONS - EXHIBIT A

SECTION V: GENERAL PROVISIONS

A. COST BREAKDOWN

Within 15 calendar days after "Notice to Proceed," the Contractor shall, upon request by the Authority, submit a cost breakdown of the lump sum Bid entered on the Bid Form for all construction work. This cost breakdown will form the basis for progress payments in accordance with these Specifications and shall show all of the major categories and subcategories of work and equipment requested by the Authority. Additionally, all cost shall be segregated between off-site and on-site costs. Mobilization costs shall not exceed 10% of total construction costs. Bonds and insurance costs will be identified as a separate line item. Such cost breakdown shall not be required if the Authority, at its sole discretion, elects to pay the Contractor in lump sum within thirty (30) calendar days of receipt of proper invoice following the Contractor's satisfactory completion and the Authority's acceptance of all work.

B. PROGRESS PAYMENTS

1. The Authority, no later than the 25th day of each month, shall prepare a progress payment estimate based on the estimated percentage of completion of each Bid Item and on the Contractor's actually incurred allowable expenses on such Bid Items. The Authority will issue the progress payment, in the amount it deems appropriate, by approximately the 15th day of the following month.

2. For purposes of calculating the progress payments, Authority will use the cost breakdown submitted by the Contractor for each Bid Item at the start of this Agreement. In no event will the Authority make a progress payment that, when added to the prior progress payments, amounts to a sum more than the Contractor's actual aggregate incurred expenses, adjusted to include Contractor's overhead and profit as allocated to such incurred expenses.

3. The Authority will pay only 95% of each progress payment amount as determined above, retaining 5% as part security for the fulfillment of this Agreement by the Contractor.

4. No progress payments will be made for materials not installed.

5. Progress payments made by Authority in no way shall be deemed or construed as acceptance by the Authority of work or waiver by the Authority of any rights hereunder.

6. The Contractor shall pay subcontractors, promptly upon receipt of each Authority progress payment; the respective amounts allowed the Contractor on account of the work performed by subcontractors, to the extent of each such subcontractor's interest therein. Such payments to subcontractors shall be

based on estimates made pursuant to this Agreement. Any diversion by the Contractor of payments received for prosecution of a contract, or failure to reasonably account for the application or use of such payments, constitutes ground for termination of the Contractor's control over the work and for taking over the work, in addition to disciplinary action by the Contractor's State License Board. The subcontractor shall notify, in writing, the Contractor's State License Board and the Authority of any payment less than the amount or percentage approved for the class or item of work as set forth in this Agreement.

7. In addition to other amounts properly withheld under this Agreement, the Authority shall withhold all legally required sums for, but not necessarily limited to, stop notices, labor and tax liens, etc.

C. FINAL INSPECTION AND ACCEPTANCE

Promptly after Substantial Completion has occurred, Contractor shall perform all Punch List Work, if any, which was deferred for purposes of Project Completion, and shall satisfy all of its other contractual obligations under the contract documents.

When the Contractor determines that the work is fully completed, including satisfactory completion of all inspections, tests, and required documentation, Punch List and clean-up items, Contractor shall give the Authority a written request for Final Acceptance within ten (10) days thereafter, specifying that the work is completed and the date on which it was completed.

Within thirty (30) days after receipt of the request for Final Acceptance from Contractor, Authority will make a final inspection of the work and will either:

1. Reject the request for Final Acceptance, specifying the defective or uncompleted work; or

2. Issue a written Final Acceptance and record Notice of Completion with County Recorder.

Substantial Completion is defined herein as; In the opinion of the Authority, that Work or portion thereof that is sufficiently complete and in accordance with the Contract, that it can be utilized by the Authority for the purpose for which it was intended. A determination of Substantial Completion does not waive, but may not require the prior completion of minor items, which do not impair the Authority's ability to safely occupy and utilize the Work for its intended purpose.

D. CLAIMS

Contractor is required to submit a written claim within ten (10) days after the event or occurrence first giving rise to the potential claim, or in the event of a denial of a request for change by the Authority. All claims shall include a detailed factual statement; including names, dates and specific events that took place. In addition, all claims shall include supporting documents in support of the claim, a detailed analysis of a request for a time extension, if applicable, and a detailed breakdown of a request for additional compensation. A revised construction schedule shall also be included identifying the impact of the delays, including proposals to minimize any of the impacts.

Authority shall respond in writing to a claim within forty-five (45) days of receipt of claim. Within thirty (30) days of receipt of claim, Authority, if necessary, may request additional documentation in support of said claim. If additional documentation is requested, Authority shall respond in writing to the claim within fifteen (15) days after receipt of additional documentation.

Claims filed by the Contractor shall be in sufficient detail to enable the Authority to ascertain the basis and amount of said claims. The Authority will consider and determine the Contractor's claims, and it will be the responsibility of the Contractor to furnish within a reasonable time such further information and details as may be required by the Authority to determine the facts or contentions involved in its claims. Failure to submit such information and details will be sufficient cause for denying the claim.

Claims submitted by the Contractor shall be accompanied by a notarized certificate containing the language listed below. Failure to submit the notarized certificate will be cause for denying the claim.

Certificate

Under the penalty of law for perjury or falsification with specific reference to the California False Claims Act, Government Code Section 12650 et. Seq., the undersigned,

_____
(Name)

_____
(Title)

_____
(Company)

herby certifies that the claim for the additional compensation and time, if any, made herein for the work on this Contract is a true statement of the actual cost incurred and time sough, and is fully documented and supported under the Contract between the parties

Dated: _____

Signature: _____

Subscribed and sworn before this _____ day of _____ , 202__
_____ .

_____
Notary Public

My Commission Expires: _____

E. FINAL PAYMENT

1. After the filing of the Notice of Completion, the Authority will make a proposed final estimate, in writing, of the total amount payable to the Contractor, including therein an itemization of said amount, segregated as to contract item quantities, extra work and any other basis for payment, and shall also show therein all deductions made or to be made for prior payments and amounts to be kept or retained under the provisions of the contract. All prior estimates and payments shall be subject to correction in the proposed final estimate. Within 15 days after proposed final estimate has been submitted, Contractor shall submit to the Authority written approval of proposed final estimate and/or a written statement of all claims of the contract. No claim will be considered that was not included in written statement of claims, nor will any claim be allowed unless the Contractor has previously complied with the notice and protest requirements.

2. On the Contractor's approval, or if he files no claim within stated period, Authority will issue a final written estimate, in accordance with the proposed final estimate submitted to the Contractor; and 35 days after the date of filing the Notice of Completion Authority will pay the entire sum found to be due. Such final estimate and payment thereon shall be conclusive and binding against the Contractor on all questions relating to the amount of work done and the compensation payable therefore, except as otherwise provided.

3. If the Contractor within said period of 15 days files claims, Authority will issue a semi-final estimate in lieu of the final estimate submitted to the Contractor; and 35 days after the date of filing of the Notice of Completion, the Authority will pay the sum found to be due. Such semi-final estimate and payment thereon shall be conclusive and binding against the Contractor on all questions relating to the amount of work done and the compensation payable therefore, except insofar as affected by the claims filed within the time and in the manner required hereunder and except as otherwise provided.

4. Upon final determination of any outstanding claims, the Authority shall then make and issue a final estimate in writing and within 30 days thereafter, the Authority will pay the entire sum, if any, found due. Such final estimate shall be conclusive and binding against the Contractor on all questions relating to the amount of work done and the compensation payable therefore, except as otherwise provided.

F. EXTRA WORK AND CHANGES

1. New and unforeseen work, which in the judgment of the Authority is found necessary or desirable for the satisfactory completion of the work, will be classified as extra work, as well as work specifically designated as such in the plans or specifications. The Contractor shall do such extra work and furnish material and equipment therefore as directed by the Engineer in writing by a change order. No extra work will be paid for or allowed unless the same was done upon written change order of the Engineer and after all legal requirements have been complied with.

   The Contractor agrees that he will accept as full compensation for any extra work or changes in the work, so ordered, an amount to be determined by one of the following methods:

   a. A price mutually agreed upon in writing by the Engineer and Contractor (hereafter Agreed Price).

   b. Force Account as hereafter provided.

   All compensation for extra work or changes in the work will be provided through a written change order. Nothing herein shall excuse the Contractor from proceeding with the work as otherwise directed by the Agreement.

2. It is mutually agreed that on the agreed price, the Contractor and subcontractor(s) shall add not more than a total markup of 20% to be divided between the Contractor and subcontractor(s) as full compensation for all other expenses including overhead, profit, bond, superintendence, insurance and small tools.

3. When extra work is to be paid for on a force account basis, compensation will be determined as follows:

   a. Materials

      A sum equal to the actual cost to the Contractor of the materials furnished by him, as shown by paid receipts, plus not more than fifteen percent (15%). Only installed materials shall be paid for.

   b. Labor

      1. The actual wages paid as shown on the certified copies of Contractor's payroll, for all labor directly engaged in the work and including the cost of any compensation insurance paid for by the Contractor, subsistence and travel allowance aid to such workmen as required by collective bargaining agreements plus not more than twenty percent (20%).

      2. To the actual wages as described in 1 above will be added a labor surcharge of not more than seventeen percent (17%), and shall constitute full compensation for all other payments, including payments imposed by State and Federal laws.

   c. Equipment

      1. Equipment will be paid for as a rental charge whether owned by the Contractor or not, and said rental rates prevailing in the area for comparable equipment will be paid. To the direct costs of "Equipment Rental" will be added a not more than fifteen percent (15%) markup.

      2. All extra work at Force Account shall be adjusted daily upon report sheets prepared by the Engineer, furnished to the Contractor and signed by both parties. Said daily reports shall thereafter be considered the true record of all extra work done. The decision of the Engineer as to whether extra work has in fact been performed shall be conclusive and binding upon both parties to the contract.

4. A contract change order approved by Authority may be issued to the Contractor at any time. Should the Contractor disagree with any terms or conditions set

forth in the contract change order, the Contractor shall submit a written protest to the Authority within 15 days after the receipt of the contract change order. The protest shall state the points of disagreement and, if possible, the contract specification references, quantities and costs involved. If a written protest is not submitted within the above period, payment will be made as set forth in the approved contract change order and such payment shall constitute full compensation for all work included therein or required thereby. Such unprotested approved contract change orders will be considered as executed contract change orders.

5. Contractor shall promptly notify the Authority in writing when it receives direction, instruction, interpretation or determination from any source other than the Authority or its designated representatives that may lead to or cause change in the work. Such written notification shall be given to the Authority before the Contractor acts on said direction, instruction, interpretation or determination.

G. EXTENDED FIELD OFFICE OVERHEAD COSTS

1. Within thirty (30) days after receipt of the Notice to Proceed, the Contractor shall submit a written statement to the Authority detailing its field office overhead costs which are time related. The Authority will review this cost submittal and reach a written agreement with the Contractor on a daily field office overhead cost rate which shall be issued as an agreed upon Change Order. The daily rate agreed to in this Change Order will be applicable throughout the duration of the Contract. No field office costs will be paid until such agreement is reached between the Authority and the Contractor and the Change Order concerning this daily rate is executed by both parties.

2. The individual cost components of the daily field office overhead rate shall represent costs which increase as a direct result of any time extension caused solely and exclusively by an act of the Authority. This listing may include such cost items as on-site project management, supervision, engineering and clerical salaries; on-site office utilities and rent; on-site company vehicles and their operating expenses; and site maintenance and security expenses. Field office overhead costs which are unaffected by increased time shall not be allowable costs in calculating the daily field office overhead rate. These non-time related costs include, but are not limited to, acquisition and installation of stationary equipment; temporary construction facilities; utilities and office furnishings (unless such items are rented or leased); the preparation of the site including clearing, grubbing, grading and fencing; mobilization and demobilization costs; and the costs of permits, bonds and insurance coverage for the project.

3. The individual wage cost components used to calculate the daily field office overhead rate shall be supported by actual employee payroll records, not salary ranges or estimates. Hourly rates for management, supervisory, engineering and clerical employees shall be based upon 2,080 work hours per year and shall not include allowances for holidays, vacation or sick time. However, the daily field office overhead rate shall only reflect the actual on-site time required in the field office. All other field office overhead cost components shall be evidenced by records demonstrating actual field office costs incurred by the Contractor.

4. The daily field office overhead rate shall be multiplied by the number of days the Contract is delayed or extended by Change Order and shall be added to the agreed upon Change Order cost. The days of delay shall be those caused solely by action of the Authority and documented by a time impact analysis prepared and submitted by the Contractor. In the event of a deductive Change Order is issued which reduces time under the Contract, the daily field office overhead rate shall be added to the deductive amount. No allowance for overhead costs and no profit allowance shall be added to the extended field office overhead cost.

H. ACCELERATION

1. Authority reserves the right to accelerate the work of the Contract at any time during its performance. In the event that the Authority directs acceleration, such directive will be given to the Contractor in writing. The Contractor shall keep cost and other Project records related to the acceleration directive separately from normal Project cost records and shall provide a written record of acceleration costs to the Authority on a daily basis.

2. In the event that the Contractor believes that some action or inaction on the part of the Authority constitutes an acceleration directive, the Contractor shall immediately notify the Authority in writing that the Contractor considers the actions or inactions an acceleration directive. This written notification shall detail the circumstances of the acceleration directive. The Contractor shall not accelerate their work efforts until the Authority responds to the written notification. If acceleration is then directed or required by the Authority, all cost records referred to in section (1) shall be maintained by the Contractor and provided to the Authority on a daily basis.

3. In order to recover additional costs due to acceleration, the Contractor must document that additional expenses were incurred and paid by the Contractor. Labor costs recoverable will only be overtime or shift premium costs or the cost of additional laborers brought to the site to accomplish the accelerated work effort. Equipment costs recoverable will only be the cost of added equipment mobilized to the site to accomplish the accelerated work effort.

I. VALUE ENGINEERING

Authority encourages the Contractor to submit Value Engineering Proposals (VEP's) whenever it identifies areas and/or instances in which improvements can be made, in order to avail the Authority of potential cost savings. Contractor and the Authority will share any savings in the manner described below.

A VEP applies to a Contractor developed and documented VEP that:

1. Requires a change to the contract.

2. Reduces the total contract price without impairing essential functions or characteristics of the work.

3. Results in an estimated total net savings to the Authority equal to or greater than $1,000.

At a minimum, a VEP should include the following information:

1. A description of the existing contract requirements that are involved in the proposed change.

2. A description of the proposed change, and all specifications and/or plans necessary for the complete evaluation of the proposed change. Include a discussion of the differences between existing requirements and the proposed change, together with advantages and disadvantages of each changed item. All relevant back up documentation needs to be included to support proposed changes.

3. Cost estimate for existing contract requirements correlated to the Contractors lump sum breakdown and the proposed changes in those requirements, including costs of development and implementation by the Contractor.

Contractor shall submit the VEP to the Authority. At its sole discretion, Authority may accept, in whole or in part and by change order, any VEP submitted pursuant to this section. Until a change order is issued on a VEP, Contractor shall remain obligated to perform in accordance with the contract. The decision of the Authority as to the rejection or acceptance of a VEP shall be at the sole discretion of the Authority.

If a VEP, submitted by the Contractor pursuant to this section is accepted by the Authority, the total contract price shall be adjusted based upon a sharing of the net savings by the Contractor and the Authority (50% Authority, 50% Contactor). Contractor's profit shall not be reduced by application of the VEP.

Net savings are defined as gross savings less the Contractor's costs and less the Authority's costs.

1. Contractors cost means reasonable costs incurred by the Contractor in preparing the VEP and making the change.

2. Authority's costs means reasonable costs incurred by the Authority for evaluating and implementing the VEP.

3. Contractor is not entitled to share in either concurrent, collateral or future contract savings. Collateral savings are those measurable net reductions in the Authority's costs of operation that result from the VEP. Concurrent savings cover the reductions in the cost of performance of other contracts.

Contractor shall include appropriate VEP provisions in all subcontracts greater than $25,000.

J. STOP NOTICES

The Authority, at its sole discretion, may, at any time, retain out of any amounts due the Contractor, sums sufficient to cover claims filed pursuant to Section 9358 et. seq. of the California Civil Code.

K. ORDER OF WORK

Contractor shall perform work hereunder at such places, and in such order or precedence, as may be determined necessary by the Engineer to expedite completion of the required work.

L. LABOR PROVISIONS

1. Prevailing Wages

   Contractor shall comply with all applicable requirements of Division 2, Part 7, Chapter 1 of the Labor Code and all applicable federal requirements respecting prevailing wages. If there is a difference between the minimum wage rates predetermined by the Secretary of Labor and the wage rates determined by the Director of the Department of Industrial Relations (DIR) for similar classifications of labor, the Contractor and subcontractors shall not pay less than the higher wage rate. The DIR will not accept lower state wage rates not specifically included in the Federal minimum wage determination.

2. Minimum Wages

   a. All mechanics and laborers employed or working upon the site of the work will be paid unconditionally, and not less often than once a week and without subsequent deduction or rebate on any account, the full amounts due at time of payment computed at wage rates not less than those specified in the General Wage Determinations referenced in this section regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics; and the wage determination

decision shall be posted by the Contractor at the site of the work in a prominent place where it can be easily seen by the workers. For the purpose of this clause, contributions made or cost reasonably anticipated under the Labor Code of the State of California on behalf of laborers or mechanics are considered wages paid by such Laborers or mechanics. Also for the purpose of this clause, regular contributions made or costs incurred for more than a weekly period under plans, funds or programs, but covering the particular weekly period, are deemed to be constructively made or incurred during such weekly period.

b. Authority shall require that any class of laborers or mechanics, including apprentices and trainees, which is not listed in the General Wage Determinations and which is to be employed under this Contract, shall be classified conformably to such wage determinations. In the event the Authority does not concur in the Contractor's proposed classification or reclassification of a particular class of laborers and mechanics (including apprentices and trainees) to be used, the question, accompanied by the recommendation of the Authority, shall be referred to the State Director of Industrial Relations for determination.

c. Authority shall require, whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly wage and the Contractor is obligated to pay a cash equivalent of such a fringe benefit, an hourly cash equivalent thereof to be established. In the event the interested parties cannot agree upon cash equivalent of the fringe benefit, the questions, accompanied by the recommendation of the Authority, shall be referred to the State Director of Industrial Relations for determination.

d. All disputes concerning the payment of wages or the classification of workers under this Agreement shall be promptly reported to the Authority.

3. Deductions

Authority may deduct from each progress payment and the Final Payment the following:

a. Any Authority or third party claims or losses for which Contractor is responsible hereunder or any Liquidated Damages which have accrued as of the date of the application for payment;

b. If a notice to stop payment is filed with Authority, due to the Contractor’s failure to pay for labor or materials used in the work, money due for such labor or materials, plus the 25% prescribed by law, will be withheld from payment to the Contractor. In accordance with Section 9358 of the Civil Code, Authority may accept a bond by a corporate surety in lieu of

withholding payment;

c. Any sums expended by or owing to Authority as a result of Contractor's failure to maintain the as-built drawings;

d. Any sums expended by Authority in performing any of the Contractor's obligations under the Contract which Contractor has failed to perform; and

e. Any other sums which Authority is entitled to recover from Contractor under the terms of the Contract.

The failure by Authority to deduct any of these sums from a progress payment shall not constitute a waiver of Authority's right to such sums.

All amounts owing by Contractor to Authority under the Contract shall earn interest from the date on which such amount is owing at the lesser of (i) 10% per annum or (ii) the maximum rate allowable under applicable Governmental Rules.

4. Payrolls and Basic Records

a. Payrolls and basic records relating thereto will be maintained during the course of the work and preserved for a period of three (3) years thereafter for all laborers and mechanics working at the site of the work. Such records will contain the name, address and social security number of each such worker, the correct classification, rates of pay, daily and weekly number of hours worked, deductions made and actual wages paid.

b. Contractor will submit weekly a copy of all payrolls to the Authority as required in these "Labor Provisions." The copy shall be accompanied by a statement signed by the employer or its agent indicating that the payrolls are correct and complete, that the wage rates contained therein are not less than those determined by the State Director of Industrial Relations and that the classifications as set forth for each laborer or mechanic conform to the work performed. A submission of the "Weekly Statement of Compliance," which is required under this Contract, shall satisfy this requirement. The prime Contractor shall be responsible for the submission of copies of payrolls of all subcontractors. The Contractor will make the records required under the labor standard clauses of the contract available for the inspection by authorized representatives of the Authority, and will permit such representatives to interview employees during working hours on the job.

5. Apprentices and Trainees

   a. Apprentices: Apprentices will be permitted to work at less than the predetermined rate for the work they perform when they are employed and individually registered in a bona fide apprenticeship program as defined in section 1777.5 of the Labor Code of the State of California. The allowable ratio of apprentices to journeymen in any craft classification shall not be greater than the ratio permitted to the Contractor as to his entire work force under the registered program. Any employee listed on a payroll at an apprentice wage rate who is not registered or otherwise employed as stated above, shall be paid the wage rate determined by the State Director of Industrial Relations for the classification of work he actually performed. The Contractor or subcontractor will be required to furnish to the Authority or the State Director of Industrial Relations written evidence of the registration of his program and apprentices as well as the appropriate ratios and wage rates (expressed in percentages of the journeyman's rate contained in the applicable wage determination).

   b. Trainees: Except as provided in 29 CFR 5.15, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to or individually registered in a program which has received prior approval, evidenced by formal certification, by the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training. The ratio of trainees to journeymen shall not be greater than that permitted under the plan approved by the Bureau of Apprenticeship and Training. Every trainee must be paid at not less than the rate specified in the approved program for his level of progress. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Bureau of Apprenticeship and Training shall be paid not less than the wage rate determined by the Secretary of Labor for the classification of work he actually performed. The Contractor or subcontractor will be required to furnish the contracting officer or a representative of the Wage-Hour Division of the U.S. Department of Labor written evidence of the certification of his program, the registration of the trainees, and the ratios and wage rates prescribed in that program. In the event the Bureau of Apprenticeship and Training withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

   c. Equal Employment Opportunity: The utilization of apprentices and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, 29 CFR Part 30, and 41 CFR Part 60.

6. Compliance With Copeland Regulations (29 CFR Part 3)

   The Contractor shall comply with the Copeland "Anti-Kickback" Act (18 U.S.C. 874 and 40 U.S.C. 276c). The Contractor shall also comply with the Copeland Regulations (29 CFR Part 3) of the Secretary or Labor which are herein incorporated by reference.

7. Contract Termination; Debarment

   A breach of item 1 through 6 may be grounds for termination of the contract, and for debarment as provided in 29 CFR Section 5.6.

8. Overtime Requirements

   No Contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any laborer or mechanic in any work week in which he is employed on such work to work in excess of 8 hours a day or 40 hours in such work week unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 8 hours a day or 40 hours in such work week.

9. Violation; Liability for Unpaid Wages

   Pursuant to section 1775 of the Labor Code of the State of California, in the event that any workman employed on this public works project is paid less than the amount specified in the General Prevailing Wage Determinations or less than is required, relative to overtime, the Contractor and any subcontractor responsible therefore shall be liable to the affected workman for the unpaid wages. In addition, such Contractor and subcontractor shall be liable to the State of California or the Authority for liquidated damages. Such liquidated damages shall be computed with respect to each individual workman found to be underpaid and shall be in the amount of $50 per calendar day that a workman was underpaid.

10. Withholding for Liquidated Damages

    The Authority may withhold or cause to be withheld, from any monies payable on account of work performed by the Contractor or subcontractor, such sums as may administratively be determined to be necessary to satisfy any liabilities of such Contractor or subcontractor for liquidated damages as provided in this section.

11. Final Labor Summary

    The Contractor and each subcontractor shall furnish to the Authority, upon the completion of the contract, a summary of all employment, indicating for

the completed project, the total hours worked and the total amount earned.

12. Final Certificate

Upon completion of the contract, the Contractor shall submit to the Authority, with the voucher for a final payment for any work performed under the contract, a concerning wages and classifications for laborers and mechanics, including apprentices and trainees employed on the project, in the following form:

The undersigned, Contractor on

_____
(Contract No.)

hereby certifies that all laborers, mechanics, apprentices and trainees employed by the Contractor or by a subcontractor performing work under the contract on the project have been paid wages at rates not less than those required by the contract provisions, and that the work performed by each such laborer, mechanic, apprentice or trainee conformed to the classifications set forth in the contract or training program provisions applicable to the wage rate paid.

_____
Signature and Title

13. Notice to the Authority of Labor Dispute

Whenever the Contractor has knowledge that any actual or potential labor dispute is delaying or threatens to delay the timely performance of this contract, the Contractor shall immediately give notice thereof, including all relevant information with respect thereto, to the Authority.

14. Disputes Clause

a. All disputes concerning the payment of prevailing wage rates or classifications shall be promptly reported to the Authority for its referral to DOT for decision or, at the option of the Authority, DOT referral to the Secretary of Labor. The decision of DOT or the Secretary of Labor, as the case may be, shall be final.

b. All questions relating to the application or interpretation of the Copeland Act, the Contract Work Hours Standards Act, the Davis-Bacon Act, or Section 13 of the Act shall be sent to the Federal Transit Administration (FTA) for referral to the Secretary of Labor for ruling or interpretation, and such ruling or interpretation shall be final.

15. Convict Labor

In connection with the performance of work under this Contract, the Contractor agrees not to employ any person-undergoing sentence of imprisonment at hard labor. This does not include convicts who are on parole or probation.

16. Insertion in Subcontracts

The Contractor shall set forth in item 1 through 15 of this Section so that all of the provisions of this section will be inserted in all construction subcontracts of any tier, and such other clauses as the Government may by appropriate instructions require.

17. Certified Payrolls

a. The Authority shall obtain from the Contractor and each subcontractor a certified copy of each weekly payroll within seven (7) days after the regular payroll date. Following a review by the Authority for compliance with State and Federal labor laws, the payroll copy shall be retained at the project site for later review by FTA.

b. Contractor may use the Department of Labor Form WH-347, "Optional Payroll Form," which provides for all the necessary payroll information and certifications.

c. If, on or before the 20th of the month, the Contractor has not submitted satisfactory payrolls covering its work and the work of all subcontractors for all payroll periods ending on or before the 6th of that month, such payrolls will be considered to be delinquent. Regardless of the number of delinquent payrolls, an amount equal to 10% (but not less than $1,000 or more than $10,000) shall be deducted from the estimate. Deductions will be made separately for each estimate period in which a new delinquency appears and will be continued until payrolls have been submitted.

d. Contractors employing apprentices or trainees under approved programs shall include a notation on the first weekly certified payrolls submitted to the Authority that their employment is pursuant to an approved program and shall identify the program.

M. TIME EXTENSION/DELAYS

a. Contractor may be granted an extension of time for any portion of a delay in completion of the work due to acts of God, the public enemy, wars, civil unrest, fires, quarantine restrictions, or weather more severe than normal,

providing that (1) the aforesaid causes were not foreseeable and did not result from an act or omission by the Contractor, (2) Contractor has taken reasonable precautions to prevent further delays owing to such causes, and (3) Contractor notifies Authority in writing of the cause(s) for the delay within ten (10) days from the beginning of any such delay. No claims for additional compensation or damages for the foregoing delays shall be allowed to the Contractor, and the extension of time provided for herein shall be the sole remedy of the Contractor on account of any such delays.

b. An extension of time will not be granted for a delay described in the above paragraph(s) caused by a shortage of materials, except if materials are furnished by Authority, unless the Contractor supplies the Authority with documented proof that every effort to obtain the materials from all known sources that (a) such materials could have been obtained only at exorbitant prices or (b) the prices were entirely inconsistent with current rates, taking into account the quantities; and (c) such facts could not have been known or anticipated at the time the Notice To Proceed was issued. Contractor shall also submit proof, that the inability to obtain such materials when originally planned, did in fact, cause a delay in completion of the work that could not be compensated for by revising the sequence of its operations. Only the physical shortage of material will be considered as a basis for an extension of time.

c. An extension of time for weather more severe than normal shall be granted only to the extent the work is actually delayed as determined by the Authority. Normal is defined as the monthly average of the temperature and rainfall wherein the work was performed for the prior 20 years before the execution of the contract.

d. In the event Contractor is actually and necessarily delayed by an act or omission on the part of the Authority, as determined by the Authority, the Contractor shall notify the Authority in writing within five (5) days from the beginning of any such delay. The time for completion of the work may be extended at the sole discretion of the Authority.

e. Within 30 days after the last day of delay, Contractor shall provide Authority with detailed information concerning the circumstances of the delay, the number of days actually delayed, and the measures taken to minimize or prevent the delay. Failure to submit information shall be sufficient reason to deny the claim. Authority shall ascertain the facts and the extent of the delay; and provide the Contractor its written findings, which will be final and conclusive. Except for the additional compensation for herein and except as provided in Public Contract Code Section 7102, Contractor shall have no claim for damages or compensation for any delay or hindrance.

f. No extension of time will be granted for any Authority caused delay or delay

as defined in which (a) the performance of work would have been concurrently delayed by Contractor induced causes, including but not limited to an act or omission of the Contractor, or (b) remedies are included or excluded by any other contract provision. Only the actual delay necessarily resulting from the causes specified in this Article shall be grounds for extension of time. Should the Contractor be delayed at any time for any period by two or more of the causes specified in this article, Contractor shall only be entitled to one time extension for the entire delay.

g. Any time extension granted to Contractor shall not release the Contractor or surety from its obligations. Work shall continue and be carried on in accordance with the contract provisions, unless formally suspended or terminated by the Authority.

N. NONDISCRIMINATION

During the performance of this Contract, the Contractor agrees as follows:

1. The Contractor will not discriminate against any employee or applicant for employment because of race, creed, color or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex or national origin. Such action shall include, but not be limited to employment; upgrading; demotion; transfer; recruitment or recruitment advertising; layoff; termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post, in conspicuous places available to the employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

2. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex or national origin.

3. The Contractor will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the Contractor's commitments under this Section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

4. The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations and relevant orders of the Secretary of Labor. The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations and orders of the Secretary of Labor, or pursuant

thereto, and will permit access to his books, records and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations and orders.

5. In the event of the Contractor's noncompliance with the nondiscrimination clauses of this Contract or with any of the said rules, regulations or orders, this Contract may be canceled, terminated or suspended in whole or in part, and the Contractor may be declared ineligible for further Government contracts or Federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation or order, of the Secretary of Labor, or as otherwise provided by law.

6. The Contractor will include the provisions of this Paragraph ("Nondiscrimination") in every subcontract or purchase order entered into under this Agreement unless exempted by rules, regulations or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance provided, however, that in the event a Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

7. No person employed on the work covered by this Agreement shall be discharged or in any way discriminated against because he has filed any complaints or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding under or relating to the labor standards applicable hereunder to his employer.

O. TITLE VI OF THE CIVIL RIGHTS ACT OF 1964

Contractor agrees to comply with and ensure compliance by all subcontractors with all requirements of Title VI of the Civil Rights Act of 1964, as amended, 42 U.S.C. §2000d; 49 U.S.C. §5332 and Department of Transportation Regulations, “Nondiscrimination in Federally-Assisted Programs of the Department of Transportation-Effectuation of Title VI of the Civil Rights Act,” 49 CFR Part 21.

P. AFFIRMATIVE ACTION

Contractors and subcontractors holding a value of work of $10,000 or more must

submit a Monthly Employment Utilization Report (Form 257) to the Authority Engineer by the 5th of each month or sanctions shall be applied for late submittal, non-submittal and incomplete forms returned to the Contractor and resubmitted after the due date.

The reporting period shall be for each calendar month.

The report shall include the information requested for each Contractor's aggregate work force (for all workers on all projects within Orange County) and not just for workers on this project.

If the form is not received by the 5th of the month, a deduction of 10% (with a minimum of $1,000 and a maximum of $10,000) will be withheld from the monthly estimate at the option of the Authority.

The Contractor shall designate an Equal Employment Officer for the project and notify the Authority in writing whom that person is prior to beginning of work. All workers shall also be informed who the EEO Officer is.

Q. STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS (EXECUTIVE ORDER 11246)

1. As used in these specifications:

    a. "Covered area" means the geographical area described in the solicitation from which this Contract resulted;

    b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates Authority;

    c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941;

    d. "Minority" includes persons who are citizens or lawful permanent residents of the United States and are one of the following:

        1) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);

        2) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American, Portuguese American or other Spanish culture or origin, regardless of race);

        3) Asian and Pacific Islanders (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent or the Pacific Islands);

4) American Indians and Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification);

5) Women regardless of ethnicity.

2. In order for the nonworking training hours of apprentices to be counted in meeting the goals, such apprentices must be employed by the Contractor during the apprenticeship period, and the Contractor must have made a commitment to employ the apprentices at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

3. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

   a. Ensure and maintain a working environment free of harassment, intimidation and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

   b. Establish and maintain a current list of disadvantaged and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organization's responses.

   c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and disadvantaged or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefore, along with whatever additional actions the Contractor may have taken.

d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a disadvantaged person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

e. Develop on-the-site-training opportunities and/or participate in training programs for the area which expressly include minority and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 3.b. above.

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, General Foreman, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training

organizations serving the Contractors' recruitment area and employment needs. Not later than one month prior to the date of the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the opening, screening, procedures and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of Contractor's work force.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 C.F.R., Part 60-3.

l. Conduct, at least annually, an inventory and evaluation of all minority and female personnel for promotional opportunities, and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, working assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are non-segregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations or offers for subcontracts from disadvantaged and female construction Contractors and suppliers, including circulation of solicitations, to disadvantaged and female Contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

4. Contractors are encouraged to participate in voluntary associations, which assist in fulfilling one or more of their affirmative action obligations (3. (a) through (p)). The efforts of a Contractor association, joint Contractor-union, Contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 3. (a) through (p) of these

specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female work force participation, make a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's failure if such a group to fulfill an obligation, shall not be a defense for the Contractor's noncompliance.

5. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, male and female, and all women, both minority and nonminority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order 11246 if a specific minority group of women is underutilized.)

6. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex or national origin.

7. The Contractor shall not enter into any subcontract with a person or firm debarred from Government contracts pursuant to Executive Order 11246.

8. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

9. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in item 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 C.F.R. 60-4.8.

10. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is

being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation, if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree of existing records satisfy this requirement; Contractor shall not be required to maintain separate records.

11. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

R. CONFLICT OF INTEREST

All Contractors responding to this Invitation For Bids must avoid organizational conflicts of interest which would restrict full and open competition in this procurement. An organizational conflict of interest means that due to other activities, relationships or contracts, a Contractor is unable, or potentially unable to render impartial assistance or advice to the Authority; a Contractor's objectivity in performing the work identified in the specifications is or might be otherwise impaired; or a Contractor has an unfair competitive advantage. Contractor is obligated to fully disclose to the Authority in writing any conflict of interest issues as soon as they are known. All disclosures must be disclosed at the time of bid submittal.

S. CODE OF CONDUCT

Contractor agrees to comply with the Authority's Code of Conduct as it related to Third-Party contracts, which is hereby referenced and by this reference is incorporated herein. Contractor agrees to include these requirements in all of it's subcontracts.

T. GOVERNMENT INSPECTIONS

The Authority or Federal Government representatives shall have access to the construction site and shall have the right to inspect all project works.

U. LICENSING, PERMITS AND INSPECTION COSTS

1. The Contractor warrants that it has all necessary licenses and permits required by the laws of the United States, State of California, the County of Orange, the Local Jurisdictions, and all other appropriate governmental agencies, and

agrees to maintains these licenses and permits in effect for the duration of the Agreement. Further, Contractor warrants that its employees, agents, and Contractors and subcontractors shall conduct themselves in compliance with such laws and licensure requirements including, without limitation, compliance with laws applicable to nondiscrimination, sexual harassment and ethical behavior throughout the duration of this Agreement. Contractor further warrants that it shall not retain or employ an unlicensed subcontractor to perform work on this Project. Contractor shall notify the Authority immediately and in writing of its employees', agents', Contractors' or subcontractors' inability to obtain or maintain, irrespective of the pendency of any appeal, any such licenses, permits, approvals, certificates, waivers, and exemptions. Such inability shall be cause for termination of this Agreement.

2. Contractor shall procure all permits and licenses; pay all charges, assessments and fees, as may be required by the ordinances and regulations of the public agencies having jurisdiction over the areas in which the work is located, and shall comply with all the terms and conditions thereof and with all lawful orders and regulations of each such public agency relating to construction operations under the jurisdiction of such agency.

V. HAZARDOUS SUBSTANCES

1. CAL-OSHA Requirements

   All flammable, corrosive, toxic, or reactive materials being bid must have a complete CAL-OSHA Safety Data Sheet (SDS) accompanying the submitted bid.

2. South Coast Air Quality Management District (SCAQMD)

   All materials (paints, coatings, inks, solvents, and adhesives) shall comply with the volatile organic compounds (VOC) content requirements of the applicable SCAQMD rules.

3. Notice of Hazardous Substances

   Title 8, California Code of Regulations, Section 5194 (e) (c), states that the employer must inform any Contractor employers with employees working in the employer's workplace of the hazardous substances to which their employees may be exposed while performing their work. In compliance with this requirement, the Authority hereby gives notice to all bidders that the following general categories of hazardous substances are present on the Authority's premises:

   - Adhesives, sealant, patching, and coating products
   - Antifreezes, coolants
   - Cleaners, detergents
   - Paints, thinners, solvents

- Pesticides, Petroleum products (diesel and unleaded fuel, oil products)
- Printing, photocopying materials
- Propane Welding materials/compressed gases (e.g., acetylene, oxygen, nitrogen)

More specific information may be obtained from the Authority's Safety and Benefits office at (714) 560-5854, and from Safety Data Sheets (SDS) for individual products.

4. Hazardous Waste Labels

Containers containing hazardous substances must be labeled with the following information:

- Identity of hazardous substance-chemical name, not manufacturer or trade name;
- Appropriate health warning relative to health and physical hazard; and

- Name and address of manufacturer or other responsible party.

All containers containing hazardous substances may be rejected unless containers are properly labeled. Containers of 55 gallons or larger must have either weather resistant labels or the information should be painted directly on the containers.

W. CHANGES IN LAWS AND REGULATIONS

CONTRACTOR shall at all times comply with all applicable state and local regulations, policies, procedures and directives, including without limitation those listed directly or by reference in this Agreement. CONTRACTOR's failure to so comply shall constitute a material breach of contract.

X. MEDIA AND THE PUBLIC

Contractor shall immediately refer all inquires from the news media or other public sources to the Authority's Project Manager, or designated representative, relating to this project.

Y. COORDINATION AND ACCESS

Authority may undertake or award other contracts for additional work at the project site. Contractor is responsible for coordinating its work with the work of other Contractors as appropriate. The Contractor acknowledges that they do not have any exclusive access to the site or other work areas Authority may require that certain facilities and areas be used concurrently by the Contractors and others. Contractor shall cooperate fully with Authority Contractors/consultants that may be performing work in the construction area.

Z. UTILITIES RELATED DELAYS

If, due to interruptions caused by the undocumented utilities, Contractor sustains loss which could not have been avoided by the judicious handling of forces, equipment and plant, there shall be paid to the Contractor that amount that the Authority may find to be a fair and reasonable compensation for the part of the Contractor's actual loss, that, in the opinion of Authority was unavoidable, determined as follow: Compensation for idle time of equipment will be determined in the same manner as determinations are made for equipment used in the performance of extra work paid for on a force account basis, as provided in Section F. Extra Work and Changes, Item 3,c. Equipment with the following exceptions:

1. The utility related delay factor for each classification of equipment shown in the Department of Transportation publication entitled Labor Surcharge And Equipment Rental Rates will be applied to that equipment rental rate.

2. The time for which the compensation will be paid will be the actual normal working time during which the delay condition exists, but in no case will exceed 8 hours in any one day.

3. The days for which compensation will be paid will be the calendar days, excluding Saturdays, Sundays and legal holidays, during the existence of the delay, except that when the rented equipment can be returned or used elsewhere on the project, then no payment will be made for utilities related delays.

Actual loss shall be understood to include no items of expense other than idle time of equipment and necessary payments for idle time of workers, and cost of extra moving of equipment. Compensation for idle time of equipment will be determined as provided in this Section and compensation for idle time of workers will be determined as provided in Section F. Extra Work and Changes, Item 3, b. "Labor," and no markup will be added in either case for overhead and profit. The cost of extra moving of equipment will be paid for as extra work and changes as provided in Section F of General Provisions.

If performance of the Contractor's work is delayed as the result of the Utilities Related Delays, an extension of time determined pursuant to the provisions in Article 18. Termination for Default – Damages for Delay – Time Extensions will be granted.

AA. UTILITIES AND SUBSURFACE STRUCTURES

Contractor shall protect from damage utility and other subsurface structures that are to remain in place, be installed, relocated or otherwise rearranged (as used herein, rearranged includes installation, relocation, alteration or removal).

The right is reserved to the Authority, or their authorized agents, to enter upon the site for the purpose of making those changes that are necessary for the rearrangement of their facilities or for making necessary connections or repairs to their properties. Contractor shall cooperate with forces engaged in this work and

shall conduct operations in such a manner as to avoid any unnecessary delay or hindrance to the work being performed by the other forces. Wherever necessary, the work of Contractor shall be coordinated with the rearrangement of utility or other non-highway facilities, and Contractor shall make arrangements with the owner of those facilities for the coordination of the work.

Attention is directed to the possible existence of underground main or trunk line facilities not indicated on the plans or in the special provisions and to the possibility that underground main or trunk lines may be in a location different from that which is indicated on the plans or in the special provisions. Contractor shall ascertain the exact location of underground main or trunk lines whose presence is indicated on the plans or in the special provisions, the location of their service laterals or other appurtenances, and of existing service lateral or appurtenances of any other underground facilities which can be inferred from the presence of visible facilities such as buildings, meters and junction boxes prior to doing work that may damage any of the facilities or interfere with their service.

If Contractor cannot locate an underground facility whose presence is indicated on the plans or in the special provisions, the Contractor shall so notify the Authority in writing. If the facility for which the notice is given is in a substantially different location from that indicated on the plans or in the special provisions, the additional cost of locating the facility will be paid for as extra work as provided in Section F.

If Contractor discovers underground main, trunk lines or other structures and utilities not indicated on the plans or in the special provisions, Contractor shall immediately give the Authority and the Utility Company written notification of the existence of those facilities. Such facilities shall be located and protected from damage as directed by the Authority, and the cost of that work will be paid for as extra work as provided in Section F. Contractor shall, if directed by the Authority repair any damage which may occur to the main or trunk lines. The cost of that repair work, not due to the failure of the Contractor to exercise reasonable care, will be paid for as extra work as provided in Section F. Damage due to Contractor's failure to exercise reasonable care shall be repaired at the Contractor's cost and expense.

Where it is determined by the Authority that the rearrangement of an underground facility is essential in order to accommodate the project work and the plans and specifications do not provide that the facility is to be rearranged, AuthorityY will provide for the rearrangement of the facility by other forces or the rearrangement shall be performed by Contractor and will be paid for as extra work as provided in Section F.

When ordered by the Authority in writing, Contractor shall rearrange any utility or other subsurface structures necessary to be rearranged as a part of the project work and that work will be paid for as extra work as provided in Section F.

Should Contractor desire to have any rearrangement made in any utility facility, or

other improvement, for the Contractor's convenience in order to facilitate the Contractor's construction operations, which rearrangement is in addition to, or different from, the rearrangements indicated on the plans or in the special provisions, the Contractor shall make whatever arrangements are necessary with the owners of the utility or other subsurface structure for the rearrangement and bear all expenses in connection therewith.

Contractor shall immediately notify the Authority of any delays to the Contractor's operations as a direct result of underground utilities or other structures which were not indicated on the plans or in the special provisions or were located in a position substantially different from that indicated on the plans or in the special provisions, (other than delays in connection with rearrangements made to facilitate the Contractor's construction operations or delays due to a strike or labor dispute). These delays will be considered utilities related delays within the meaning of Section X., Utilities Related Delays and compensation for the delay will be determined in conformance with the provisions in Section M. Contractor shall be entitled to no other compensation for that delay.

BB. LOCATION OF UNDERGROUND FACILITIES (OFFSITE WORK ONLY)

Contractor is required to obtain digging permits prior to start of excavation by contacting the appropriate permitting agencies 15 calendar days in advance. For the Offsite work scan the construction site with electromagnetic or sonic equipment, and mark the surface of the ground where existing underground utilities are discovered. Verify the elevations of existing piping, utilities, and any type of underground obstruction not indicated or specified to be removed but indicated or discovered during scanning in locations to be traversed by piping, ducts, and other work to be installed. Verify elevations before installing new work closer than nearest manhole or other structure at which an adjustment in grade can be made. Perform potholing to confirm location of all the utilities along the construction alignment prior to start of the construction. The Contractor is responsible for all costs associated with these investigations including the cost of equipment, labor and materials required for any confined space entry.

CC. UNFORESEEN HAZARDOUS OR REGULATED MATERIALS

All known hazardous or regulated materials are indicated in the contract documents. If material that is not indicated in the contract documents is encountered that may be dangerous to human health upon disturbance during construction operations, stop that portion of work and notify Authority immediately. Intent is to identify materials such as PCB, lead paint, mercury, petroleum products, and friable and non-friable asbestos. Within 14 calendar days, the Authority will determine if the material is hazardous. If the material is not hazardous or poses no danger, the Authority will direct Contractor to proceed without change. If the material is hazardous and handling of the material is necessary to accomplish the work, Authority will contract with a qualified environmental remediation/hazardous materials removal Contractor for such

remediation or removal as may be necessary. The remediation or removal will be performed in compliance with applicable State, Federal, and local environmental laws and regulations.

Contractor shall immediately notify the Authority of any delays to the Contractor's operations as a direct result of Unforeseen Hazardous and Regulated Materials These delays will be considered utilities related delays within the meaning of Section X., Utilities Related Delays and compensation for the delay will be determined in conformance with the provisions in Section M. Contractor shall be entitled to no other compensation for that delay.

SECTION VI: PROJECT SPECIFICATIONS - EXHIBIT B

ORANGE COUNTY TRANSPORTATION AUTHORITY

INSTALLATION OF BATTERY-ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCUTRE AT SANTA ANA BUS BASE

PROJECT SPECIFICATIONS

C-5-3922

March 2025

ORANGE COUNTY TRANSPORTATION AUTHORITY

INSTALLATION OF BATTERY-ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE

TABLE OF CONTENTS

Division 01 General Requirements

Summary

01 11 00 Summary of Work ..... 5 pages
01 14 22 Rules and Hours of Operation ..... 4 pages
01 14 23 Coordination with OCTA and Local Agencies……..... 2 pages
01 14 25 Procedures in Construction ..... 4 pages
01 14 27 Legal Relations and Responsibility..... 5 pages
01 14 43 Environmental Resources Protection ..... 8 pages

Price and Payment Procedures

01 25 00 Substitution Procedures ..... 5 pages
01 26 00 Contract Modification Procedures ..... 5 pages
01 26 13 Requests for Information ..... 3 pages
01 29 00 Payment Procedures..... 3 pages

Administrative Requirements

01 31 00 Project Management and Coordination ..... 9 pages
01 32 00 Construction Progress Documentation ..... 6 pages
01 33 00 Submittal Procedures..... 10 pages
01 35 13 Special Project Procedures…….5 pages
01 35 23 Owner Safety Requirements……..3 pages

Quality Requirements

01 41 00 Regulatory Requirements..... 4 pages
01 42 00 References..... 10 pages
01 42 16 Definitions ..... 2 pages
01 43 00 Quality Assurance ..... 5 pages
01 43 01 Contractor Qualifications and Requirements ..... 3 pages
01 45 00 Quality Control ..... 8 pages

Temporary Facilities and Controls

01 50 00 Temporary Facilities and Controls..... 5 pages
01 57 13 Temporary Erosion and Sedimentation Control..... 5 pages

Product Requirements

01 60 00 Product Requirements..... 7 pages

INSTALLATION OF BATTERY-ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE

Execution and Closeout Requirements

01 71 13	Mobilization and Demobilization	2 pages
01 71 23	Field Engineering	4 pages
01 73 29	Cutting and Patching	3 pages
01 74 19	Construction Waste Management and Disposal	5 pages
01 74 23	Cleaning	4 pages
01 77 00	Closeout Procedures	4 pages
01 78 00	Closeout Submittals	15 pages
01 78 36	Warranties, Guarantees, and Bonds	8 pages
01 79 00	Demonstration and Training	6 pages

Division 02 Existing Conditions

02 41 00	Demolition	5 pages

Division 03 Concrete

03 11 00	Concrete Formwork	4 pages
03 21 13	Concrete Reinforcement	2 pages
03 30 00	Cast-in-Place Concrete	6 pages
03 35 23	Concrete Finishing and Sealing	6 pages

Division 09 Finishes

09 91 13	Exterior Painting	11 pages

Division 26 Electrical

26 01 20	General Electrical Provisions	13 pages
26 05 19	Conductors	4 pages
26 05 26	Grounding	3 pages
26 05 29	Support Devices and Seismic Restraints	3 pages
26 05 33.13	Conduits	5 pages
26 05 33.16	Boxes	3 pages
26 05 53	Electrical Identification	4 pages
26 22 13	Dry Type Pad Mounted Distribution Transformers	7 pages
26 24 13	Switchboards	4 pages
26 24 16	Panelboards	3 pages
26 27 26	Wiring Devices + Receptacles + Switches	4 pages
26 28 16.13	Enclosed Circuit Breakers	4 pages
26 32 13.13	Standby Power Diesel Engine Driven Generator Set	21 pages
26 33 44	Battery-Electric Bus Chargers	5 pages
26 33 44	Battery-Electric Bus Chargers – Appendix A	483 pages
26 36 23	Automatic Transfer Switches	10 pages

Division 31 Earthwork

31 20 00	Earthwork	6 pages
31 23 26	Base Course	2 pages

Division 32 Paving Specialties

32 17 23 Pavement Striping and Markings..... 5 pages

SECTION 01 11 00
SUMMARY OF WORK

PART 1 - GENERAL

1.01 DESCRIPTION

A. Contract documents: The Contractor shall obtain all copies of the Contract Drawings and Specifications including all addenda through the OCTA CAMMNET website, as required to perform the work. The cost for obtaining any additional documents required for the contractor should be included in the bid price and no additional compensation will be allowed.

B. All drawings, specifications, and other contract documents, and copies furnished by the Authority are its property. They are not to be used on other work and except for signed contract sets are to be returned to the Authority upon request at the completion of the work. The location of the work, its general nature and extent, and the form and general dimensions of the project and appurtenant works are shown on the contract drawings which are hereby made a part of these specifications as listed herein.

C. The general intent of the contract, specifications, drawings, and other contract documents is that the Contractor shall:

1. Furnish tools, qualified labor, material, equipment, qualified superintendence, and services, assurances and guarantees, and assumptions of risk and responsibility, necessary for the performance of the Work as set forth in the contract documents unless otherwise specifically provided.

2. Begin work promptly and proceed expeditiously and continuously without cessation or shutdown of Work unless otherwise specifically approved in writing by the OCTA Project Manager or directed by the contract documents.

3. Perform, complete, and make ready for its intended purpose, within the times specified, including additional times provided for certain conditions, the work or parts thereof covered by the contract, all in accordance with drawings, specifications, and modifications thereto and directions or instructions the OCTA Project Manager may give to supplement the drawings and specifications. The Contractor shall retain sole responsibility and expense for quality control of the work.

D. Words and abbreviations which have well-known technical, or trade meanings are used in the contract documents in accordance with such recognized meanings.

E. The organization of the specifications into divisions, sections, parts, and paragraphs, and the arrangement of the drawings, should not control the Contractor in dividing the work among subcontractors or in establishing the extent of work to be performed by any trade. Study and compare the contract documents and immediately report to the OCTA Project Manager any error, inconsistency, or omission that may be discovered. The Contractor shall be liable to OCTA for damage resulting from unreported errors, inconsistencies, or omissions in the contract documents.

F. It will be the responsibility of the Contractor to stage the construction activities at the project site, using the Site-Specific Work Plan process (SSWP)

G. Ownership of Materials:

1. Materials furnished by the Contractor under this contract shall become the property of the OCTA.

H. General Summary of Work:

1. This project is classified as “Facility Modification Project” and Contractor is required to meet all Facility Modification Project safety requirements specified in OCTA’s Level 3 Health Safety and Environmental Specifications.

2. Work to be performed by Contractor shall consist of the construction of the work shown on the drawings and detailed in the specifications.

3. The descriptions provided in this section are general in nature and are not meant to detail all work required by the contract documents.

4. The work under this contract generally includes installation of electrical service infrastructure and equipment, emergency standby-generator, OCTA-furnished battery-electric bus chargers, and related work at Santa Ana Bus Base located at 4301 West MacArthur Boulevard, Santa Ana, CA 92706. The work under this contract is further described below.

a. Demolition related work to facilitate new construction, which includes saw-cutting, removal, and disposal of materials related to existing concrete and exposed soil/landscape areas.

b. Relocation of existing site electrical and irrigation lines, and related work, to facilitate new construction.

c. Earthwork related work, which includes trenching/excavation, disposal of excess soil, subgrade preparation, backfill, and compaction.

d. Concrete related work, which includes construction of reinforced concrete equipment pads, foundations, and pavements.

e. Installation of electrical service infrastructure and equipment, which includes main meter switchboard and ancillary switchboards, circuit breakers, automatic transfer switch, transformers, panelboards, lockable hinged door stainless steel cabinets, receptacles, support frames, conduits, ethernet cables and switches, control wiring, power wiring, standalone programmable load management controllers, emergency power generator, and related work.

f. Installation of OCTA-furnished battery-electric bus (BEB) chargers, which includes ChargePoint Power Blocks with Power Modules, ChargePoint Power Links, ChargePoint Pantograph Down 2000, conduits, wiring, ethernet cabling, and related work.

g. Installation of data receivers (Fleetwatch FR200), which includes conduits, wiring, ethernet cabling, supports, and related work.

h. Placement of surface gravel and related work in areas adjacent to BEB chargers.

i. Installation of bollards, wheel stops, and related work. Application of pavement striping and markings.

j. Coordination with Southern California Edison (SCE) regarding installation of a medium voltage (MV) switch cabinet, a utility transformer, and MV cables and termination of 480V utility feeders for the new electrical service, and related work.

k. Coordination with equipment manufacturers regarding any pre-commissioning and other related requirements.

l. Energize, startup testing, and commissioning related work of installed equipment.

m. And all other related work.

I. Other features of the work include, but are not limited to, the following:

1. Complete mobilization and demobilization.

2. Obtaining necessary construction and related permits from various jurisdictional agencies. The contractor shall be responsible for all related fees from various jurisdictional agencies.

3. Obtain and pay for all licenses required by all jurisdictions associated with the approval and requirements of the project.

1.02 INTENT OF DRAWINGS AND SPECIFICATIONS

A. The intent of the drawings and specifications is to prescribe the details for construction and completion of the work that the Contractor undertakes to perform in accordance with the terms of the Contract. Where the drawings or specifications describe portions of the work in general terms, but not complete detail, it is understood that only the best industry practice is to prevail and that only materials and workmanship of the first quality are to be used. Unless otherwise specified, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals, and perform all the work involved in executing the contract in a satisfactory and workmanlike manner.

B. Drawings and specifications are essential parts of the Contract, and a requirement indicated in one is binding as though indicated in all. They are intended to be complementary and to describe and provide for the complete work.

C. Summaries or introductory descriptions of the work of individual sections do not limit requirements. The Contractor's responsibilities include all requirements for proper execution of the work.

D. Division 01 of the specifications governs all divisions. Comply with Division 01 requirements whether referenced in individual sections in Divisions 02-49.

E. References to the singular include the plural and do not imply that only one unit of a product is required.

F. Unless an object or activity is specified to be less than the total, the quantity or amount is all the object or activity.

G. Unless a requirement is specified to apply for a limited time, it applies for the duration of the work.

H. "Including," "such as," "as follows," and similar terms do not limit the meaning to only items listed. The phrase "but not limited to" is understood to follow these expressions.

I. All items in a list apply unless the items are specified as choices.

1.03 REFERENCE MATERIAL

A. Reference specifications or standards referred to in the plans or specifications shall be the most recent version developed as of Contract award. Where referenced standards refer to the "specifications" or the "special conditions," this shall be understood by Contractor to mean the drawings and specifications of this contract. The Contractor is responsible for obtaining all reference material at its own expense and making itself familiar with the requirements therein.

1.04 PROJECT ACCESS AND CONTRACT LIMITS

A. The Contractor shall submit a Traffic Management Plan as required on Section 01 14 43 Environment Resource Protection, outlining access to the job site and always maintaining the facility operational.

B. Construction activity shall be within the normal work hours between 7:00 am to 3:30 pm Monday through Friday. Construction area shall be cordoned off using temporary chain link fencing or other measures approved in writing by OCTA Project Manager, unless otherwise noted on Contract Drawings. See project plans for additional information on phasing and working windows.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

PART 4 – MEASUREMENT AND PAYMENT

No separate measurements or payment shall be made under this section.

END OF SECTION

SECTION 01 14 22

RULES AND HOURS OF OPERATION

PART 1 – GENERAL

1.01 SUMMARY

A. This section outlines rules and hours of operation to which Contractor shall conform during the execution of the work under this contract. It is Contractor's responsibility to ensure that these rules are acceptable to OCTA.

1.02 REFERENCE STANDARDS

A. Comply with the provisions of applicable local, State, and Federal codes, standard plans and specifications, and recommended practices, and with OCTA policy, including:

1. SSPWC: Public Works Standards, Inc., Standard Specifications for Public Works Construction.

2. Caltrans: California Department of Transportation, Trenching and Shoring Manual.

3. Cal/OSHA: California Department of Industrial Relations, Division of Occupational Safety and Health (Cal/OSHA) regulations.

4. OSHA: Federal Occupational Safety and Health Administration regulations.

1.03 SUBMITTALS

A. Site Specific Work Plan (SSWP) containing the information specified herein.

1.04 PROJECT COORDINATION

A. Cooperate with the OCTA Project Manager in all matters requiring coordination.

B. Coordinate execution of the work with the OCTA Project Manager to eliminate or minimize to the greatest extent possible interference with bus operations.

C. Keep OCTA Project Manager fully informed regarding all work.

1.05 CONTRACTOR'S RESPONSIBILITY

A. Perform work in accordance with the contract and all applicable codes, ordinances, rules, regulations, orders, and other legal requirements of governmental bodies and public agencies having jurisdiction, including the OCTA.

B. Damage caused by Contractor to third-party property, signal and communications equipment, or other facilities shall be repaired at Contractor's expense to a condition equal or better than the condition prior to Contractor entry and as accepted by the OCTA Project Manager. At the sole discretion of the OCTA Project Manager, the OCTA Project Manager may direct repairs to be performed by other contractors. Charges for those repairs shall be deducted from Contractor's payment due under this Contract.

C. Items shown on the drawings to be protected in place, or not identified as part of demolitions, removals, or modifications, shall be protected in place in accordance with SSPWC Section 7-9, Protection and Restoration of Existing Improvements, at no additional cost to the OCTA.

D. Perform work within the operating envelope or which affects the operating system only after submitting a Site Specific Work Plan (SSWP) and receiving written approval of the SSWP from the OCTA Project Manager.

E. Furnish all labor, materials, and equipment as required to perform and complete the work within the work windows in accordance with the approved schedule in the SSWP.

1.06 SSWP – GENERAL CONTRACTOR REQUIREMENTS

A. SSWPs with potential to impact normal functioning of any part of the operating system shall include a detailed schedule of events indicating the expected hourly progress of each activity that has duration of one hour or longer. The schedule shall include a time at which each activity planned under the SSWP and the requested work window will be completed. The total duration of the construction activities shall be less than the approved work window. Contractor's failure to complete scheduled activities by the planned time or to put in place an approved contingency plan may adversely impact the operations of the bus base.

B. The SSWP shall be prepared by the Contractor and shall include the following information:

1. All activities necessary to perform construction activities.

2. Conformance with all other requirements applicable under the contract documents.

3. A schedule for the work showing each activity and where and how it affects normal operation. Each activity in the plan shall include all labor, materials, and equipment required to complete the activity within the OCTA allotted time period.

4. List of approved proposed work plans to be performed under the SSWP, with names and phone numbers of Contractor's supervisors in charge of SSWP tasks.

C. SSWPs must be of sufficient details, clarity, and organization to permit easy review and approval by the OCTA Project Manager before the proposed work is performed. SSWPs shall be submitted to the OCTA Project Manager as follows:

1. At least 14 calendar days prior to start of work.

D. The OCTA Project Manager may request explanations and changes to the SSWP to conform the SSWP to the requirements of the contract documents. If the SSWP is not acceptable, Contractor shall revise the SSWP to make it acceptable. Contractor is responsible for submitting a revised SSWP that can be reviewed and approved by the OCTA at least seven days in advance of any work.

E. Contractor will be informed if the SSWP is acceptable not less than seven calendar days prior to the scheduled start of work within the operating envelope. Once the SSWP is accepted, Contractor shall assemble the resources necessary to perform the work represented by the SSWP, so that necessary resources are available one day before the work is to be accomplished. At that time, the OCTA Project Manager will make a final decision as to whether or not the work is to proceed as planned or will be canceled. The prime consideration will be the stage of readiness of Contractor, which Contractor shall demonstrate to the OCTA Project Manager.

1.07 SSWP – SPECIAL CONTRACTOR REQUIREMENTS

A. Contractor shall provide sufficient personnel, equipment, materials, and all other resources necessary to return impacted facilities to full service upon the conclusion of the approved work window.

B. Contractor shall perform the work expeditiously and continuously with no gaps or breaks in work activities or substantive reductions in the labor force, equipment, and materials necessary to construct, reconstruct, or repair the impacted facility to full service upon conclusion of the approved work window.

C. In general, open excavation areas shall be protected per OSHA regulations.

1.08 WORK WINDOWS - GENERAL

A. Site-specific available work windows shall be as approved by the OCTA Project Manager under established procedures.

B. Construction hours shall be limited to 7:00 am to 3:30 pm Monday through Friday unless approved in writing in advance by OCTA and appropriate regulatory agencies.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

PART 4 – MEASUREMENT AND PAYMENT

No payment will be made to Contractor for work of this section.

END OF SECTION

SECTION 01 14 23

COORDINATION WITH OCTA AND LOCAL AGENCIES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Requirements for coordination with OCTA and Local Agencies.

1.02 REGULATIONS

A. If additional work is being performed by others, on or adjacent to the work site for this Contract, coordinate work with other activities in order to avoid conflicts.

1.03 COORDINATION

A. Coordination: Contractor shall coordinate the Work as stated in the Conditions of the Contract.

B. Relationship of Contract Documents: Drawings, Specifications and other Contract Documents are intended to be complementary. What is required by one shall be as if required by all. What is shown or required, or may be reasonably inferred to be required, or which is usually and customarily provided for similar work, shall be included in the Work.

C. Discrepancies in Contract Documents: In the event of error, omission, ambiguity or conflict in the Drawings or Specifications, Contractor shall bring the matter to the OCTA's attention in timely manner, for the OCTA's determination and direction in accordance with provisions of the Conditions of the Contract.

D. Construction Interfacing and Coordination: Layout, Phasing, and Sequencing of Work shall be solely the Contractor's responsibility. Contractor shall bring together the various parts, components, systems and assemblies as required for the correct interfacing and integration of all elements of Work. Contractor shall coordinate Work to correctly and accurately connect abutting, adjoining, overlapping and related elements, including utilities, for a complete operational system to the satisfaction of the OCTA, agencies, and companies. Provide adequate access for OCTA buses to pass through all areas at all times. Do not block non-construction areas.

E. Contractor shall notify OCTA a minimum of three (3) working days before excavation begin. The work shall be construction in phases where indicated on the contract drawings or specifications. A phase shall be completed and operational before proceeding to the next phase.

F. The Contractor shall cooperate fully with all forces of the Authority. Contractor should note that additional work is being conducted on site with other construction contracts and work of this contract must be coordinated amounts the trades and not additional compensation will be allowed for this coordination work.

G. Unless otherwise directed, provide five (5) day notice of all utility outages and shutdowns. Duration of outages and shutdowns shall not hinder normal operations and maintenance of the facility. In case of accidental damage to power or utility lines, repair power or utility line immediately, provide alternate source of power to keep facility operation during the repair period.

1.04 GENERAL REQUIREMENTS

A. Adhere to work window rules detailed in the approved SSWP under Section 01 14 22, Rules and Hours of Operation and the specifications.

B. See Section 01 14 22, Rules and Hours of Operation

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

PART 4 – MEASUREMENT AND PAYMENT

No separate measurement or payment shall be made under this section.

END OF SECTION

SECTION 01 14 25

PROCEDURES IN CONSTRUCTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Procedures used in performance of work of a general nature, including work by Contractor, Contractor use of work site, work zone limitations of site, and pollution controls.

B. Related Sections:

1. Section 01 14 23, Rules and Hour of Operation.

2. Section 01 14 27, Legal Relations and Responsibility.

1.02 WORK BY CONTRACTOR

A. Provide work reasonably inferred from the drawings and specifications as being required to produce the intended result whether or not specifically called for.

B. Work, materials, or equipment described in words which have known technical or trade meaning shall be deemed to carry the accepted meaning of recognized standards.

C. Complete all work enumerated under the contract including but not limited to the following:

1. Perform work set forth in the contract documents, including the drawings and specifications.

2. Obtain required permits, inspections, and certifications for material compliance.

1.03 SUBMITTALS

A. All required submittals per OCTA Level 3 Health, Safety and Environmental Specification.

B. Material Safety Data Sheets (MSDSs).

1.04 STORM WATER MANAGEMENT

A. Contractor is responsible for preventing and/or mitigating potential chemical releases erosion and sedimentation impacts associated with storm water runoff. Contractor shall comply with OCTA's bus base industrial SWPPP and implement BMP's during work. See Section 01 57 13, Temporary Erosion and Sedimentation Control, for additional requirements.

B. Use best management practices (BMPs) Contractor proposes in connection with the execution of construction activity at the project site. Use applicable BMPs included in the Construction Site Best Management Practices (BMPs) Manual prepared by the California Stormwater Quality Association, *www.cabmphandbooks.com* .

C. Provide copies of the approved

D. SWPPP and BMP to subcontractors and keep a copy available onsite at the project office. Provide amendments to the plan when there is a change in construction or operations, or where storm water runoff conditions may affect the discharge of significant quantities of pollutants to surface waters, groundwater, or separate municipal storm sewer systems. Submit the amended plan to the OCTA for review and approval as soon as practicable, and retain the amended plan on site.

E. Preparation and implementation of an OCTA-approved plan does not relieve the Contractor or subcontractors of their responsibilities to comply with state, county, and local governmental requirements, including those for storm water management and non-point source runoff controls.

1.05 MATERIAL SAFETY DATA SHEETS (MSDS)

A. Material Safety Data Sheets (MSDSs) are prepared by manufacturers and suppliers of products that contain hazardous materials. Hazardous material is defined as any substance which is a physical or health hazard, or is included in the Cal/OSHA Director's List of Hazardous Substances, or is listed by the California EPA Office of Environmental Health Hazard Assessment under Title 27 of the California Code of Regulations, Section 27001, Chemicals Known to the State to Cause Cancer or Reproductive Toxicity.

B. No hazardous materials shall be delivered, stored, or used at any work site or facility unless they are properly labeled, tagged, or marked and a copy of the MSDS has been provided to the OCTA. Provide a copy of any updated MSDS to the Engineer immediately.

C. Maintain a file of MSDSs at the work site. Keep MSDS files current; add new or updated MSDSs immediately and provide a copy to the OCTA.

D. See Contract Documents for OCTA Level 3 Health, Safety, and Environmental Specifications for additional requirements.

1.06 CONTRACTOR USE OF WORK SITE

A. Coordinate access, use, and preparation of facilities adjacent to project areas with owners and agencies. Coordination shall include but not be limited to the following:

1. Staging and laydown areas for use under this Contract are as specified or shown on the Drawings. Staging and laydown areas not covered in the Contract Documents shall be requested in writing and approved by the OCTA. The OCTA may or may not grant approval. No equipment may be operated or materials stored or placed for any period of time in unfenced areas. Provide a fence to enclose each laydown or staging area within the right-of-way. Furnish the OCTA with photographs of all staging and laydown areas to document their condition prior to start of work.

2. Contractor shall submit construction staging plan as a part of SSWP for review and approval by OCTA. The staging plan must be accepted by the OCTA prior to undertaking work in accordance with the staging plan.

3. Prior to demobilization, restore to full serviceability fences, walls, signs, and gates affected by Contractor's access to the right-of-way.

B. Confine work site operations to areas permitted by law, ordinances, permits, and the contract.

C. Consider the safety of the work, OCTA patrons and property on and adjacent to the work site when determining amount, location, movement, and use of materials and equipment on work site.

D. Do not load work site with excessive amounts of material, equipment, or other items which have the potential to interfere with the work or with bus base operations.

E. Protect products, equipment, and materials stored on work site.

F. Coordinate operations and secure from property owners at no cost to OCTA additional storage or work areas as needed for proper execution of the work. Adhere to the noise levels and work hours of local ordinances.

G. Protect the general public from work-related activities, and do not unnecessarily inconvenience those persons by work activities.

H. Submit proposed locations of staging areas for OCTA’s approval.

I. Preserve drainage facilities throughout the duration of the work so that there is no ponding or accumulation of water in any work site area, there is no flow of water diverted out of normal drainage channels. Maintain culvert inlets and outlets free of debris.

J. Preserve existing right-of-way fences and walls, and replace any fences or walls damaged during the work to the satisfaction of the owner(s) of the fences or walls.

K. Provide and maintain barriers and chain link fence around the work area as shown on the contract drawings.

1.07 WORK ZONE LIMITATIONS OF SITE

A. In addition to site utilization limitations and requirements indicated in contract documents, divide available space equitably among subcontractors and other entities needing access and space so as to provide best overall efficiency in performance of total work of the project.

B. Schedule deliveries so as to minimize space and time requirements for storage of materials and equipment on site, with minimal disruption to adjoining property owners and operations. Pick-up and delivery shall be conducted only during normal working hours and as approved by OCTA. Contractor shall give OCTA 48 hours notice prior to delivery of equipment or materials to the project site.

1.08 POLLUTION CONTROLS

A. Conduct operations for the execution of the project in compliance with applicable Federal, State, and local regulations controlling pollution and noise levels related to construction work, in accordance with Section 01 14 27, Legal Relations and Responsibility.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

PART 4 – MEASUREMENT AND PAYMENT

No separate measurement or payment shall be made under this section.

END OF SECTION

SECTION 01 14 27

LEGAL RELATIONS AND RESPONSIBILITY

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Laws to be observed, fire prevention, protection of premises, use of explosives, access roads, construction roads, waste control, public relations, and pollution controls.

2. This section complements requirements in other sections.

1.02 LAWS TO BE OBSERVED

A. Keep fully informed of State and Federal laws; county, municipal, and other local ordinances; regulations; and orders of authorities having jurisdiction that affect those engaged in the work, materials used in the work, or conduct of the work.

B. Observe and comply with laws, ordinances, regulations, and orders of authorities having jurisdiction over the work. Contractor's responsibilities include causing Contractor's agents, employees, subcontractors, and visitors to observe and comply with these laws, ordinances, regulations, and orders.

C. Protect and indemnify OCTA and its officers and employees against claims and liabilities arising from or based on Contractor's violation of a law, ordinance, regulation, or order.

D. Report to the OCTA, in writing within two days of discovery, discrepancies or inconsistencies discovered in the drawings, specifications, or contract documents in relation to laws, ordinances, regulations, or orders.

1.03 COORDINATION WITH UTILITIES

A. Coordinate with utility companies to ensure that utility locations are clearly marked for the duration of construction activities.

1.04 FIRE PROTECTION

A. Comply with Federal, State, county, municipal, and other laws and regulations pertaining to the prevention, control, and fighting of fire and to the conduct of welding and burning operations. Procure all related permits and licenses.

B. Supply fire-fighting equipment, supplies, and personnel and perform work required by laws and regulations pertaining to fire protection. If loss or damage results from fire or other cause, promptly repair loss or damage at no expense to OCTA.

1.05 PROTECTION OF PREMISES

A. Take precautions necessary and be responsible for maintaining lights, guards, signs, temporary passages, or other protection.

B. Restore loss or damage to materials, tools, or other articles used or held for use in connection with the work at no expense to OCTA.

C. Restore loss or damage as a result of fire or other cause attributable to Contractor or subcontractors at no expense to OCTA. Promptly repair damage and restore loss to materials, tools, or other articles used or held for use in connection with the work. Carry the work to completion without damage to or interference with other work or contiguous property.

1.06 USE OF EXPLOSIVES

A. Use of explosives is not permitted unless specifically detailed in the specifications or approved in advance in writing by OCTA.

1.07 WORK SITES AND WASTE MATERIAL

A. Obtain required approvals and bear costs of location, construction, maintenance, operation, removal, and transportation of sanitation facilities and waste material from work sites. Sanitation shall conform to local, State, and Federal requirements. Maintain work sites in a neat and orderly condition.

B. Before starting work, submit to OCTA a contingency plan for cleanup of accidental spillage of toxic or detrimental materials and for restoration of soil damaged thereby to near-natural conditions. Conduct the handling, storage, and disposal of waste material so as to avoid pollution of rivers, streams, ponds, or wells, and in compliance with local, State, and Federal environmental laws and regulations

C. OCTA shall acquire all applicable permits. These permits include, but would not be limited to, a Section 404 Wetlands Fill Permit from the USACE, or a Report of Waste Discharge from the Regional Water Quality Control Board (RWQCB), and a Section 401 Water Quality Certification from the RWCQB. Additionally, a Section 1602 Streambed Alteration Agreement from the California Department of Fish and Wildlife (CDFW) would be required for development that would cross or affect any stream course.

1.08 PUBLIC RELATIONS, CONVENIENCE, AND NOTICE OF DAMAGE

A. Conduct operations so as to offer the least possible obstruction and inconvenience to the public. Have under construction no greater length or amount of work than can be prosecuted properly with due regard to the rights of the public. Control temporary noise from construction equipment by using work hour controls and maintenance of muffler systems on machinery as necessary.

B. Provide, at Contractor's expense, adequate safeguards, safety devices, and protective equipment, and take other needed action, both at Contractor's own volition and as the OCTA may determine reasonably necessary, to protect property, life, health, and public safety in connection with the performance of the work covered by the contract.

C. Notify the OCTA in writing within 24 hours after causing injury to persons or damage to public or private property, including above and below ground structures. Contractor shall be responsible and liable for all damages and injuries.

1.09 ENVIRONMENTAL AND ANTI-POLLUTION

A. Comply with Federal, State, county, municipal, and other local laws and regulations pertaining to the environment, including noise, aesthetics, air quality, water quality, and resources of archaeological significance. Refer also to Section 01 14 43 Environmental Resource Protection for additional requirements. Expense of compliance with these laws and regulations is included in the lump sum and unit prices. Provide water used for dust control, or for pre-wetting areas to be paved, as required; no payment will be made by OCTA for this water.

B. Carry out grading and other work in a manner which will not create a pollution problem. Temporary construction roads, haul roads, and work areas shall be maintained free from excessive dust by an approved program of sprinkling, graveling, chemical treatment, temporary asphalt pavement, or combination thereof for the duration of the work.

C. Give attention to the effect of work operations upon the landscape, and take care to maintain natural surroundings undamaged. Disturbances of land or waters outside the limits of construction shall be rehabilitated by Contractor at its expense, when and as directed by the OCTA.

D. Prevent pollution of storm drains, rivers, streams, irrigation ditches, and reservoirs with sediment or other harmful materials. Fuels, oils, bitumen, calcium chloride, cement, or other contaminants that would contribute to water pollution shall not be dumped into or placed where they will leach into storm drains, rivers, streams, irrigation ditches, or reservoirs. If operating equipment in streambeds or in and around open waters, protect the quality of ground water, wetlands, and surface waters.

E. Protect adjacent properties and water resources from erosion and sediment damage throughout the duration of the contract. Comply with applicable NPDES permits and Storm Water Pollution Prevention Plan (SWPPP) requirements. See Section 01 14 25, Procedures in Construction, and Section 01 57 13, Temporary Erosion and Sedimentation Control.

F. Do not conduct construction activities outside the right-of-way during muddy or wet ground conditions.

G. If archaeological remains are uncovered during construction, stop grading operations in the vicinity of the find and immediately notify the OCTA. Refer to Section 01 14 43, Environmental and Resource protection for additional requirements.

H. Costs associated with environmental and pollution control measures are considered incidental to the contract work, at no additional cost to OCTA.

I. Take the following actions and others as necessary to control environmental pollution:

1. Reduce air pollution by minimizing dust, containing chemical vapors, and controlling engine exhaust gases. Limit idling of machinery as directed by the OCTA.

2. Reduce water pollution by control of sanitary facilities and proper storage of fuel and other contaminants.

3. Reduce turbidity and siltation by controlling erosion and sedimentation.

4. Minimize noise levels.

5. Dispose of waste and spoil properly.

6. Prevent landscape defacement and damage.

J. Comply with South Coast Air Quality Management District (SCAQMD) Rule 403 to control fugitive dust emissions. In addition to the requirements contained therein, comply with the following:

1. Water all land clearing/earth moving activity areas to control dust as required by the OCTA. Areas shall remain visibly moist during active operations.

2. Visually inspect construction equipment prior to leaving work sites. Wash off any loose dirt with wheel washers as necessary.

3. Properly tune and maintain all construction equipment in accordance with manufacturer’s specifications.

4. Maintain and operate construction equipment so as to minimize exhaust emissions. During construction activities, trucks and vehicles in loading and unloading queues shall have their engines turned off when not in use to reduce noise and exhaust emissions.

5. Establish on-site construction equipment staging areas and construction worker parking lots on either paved surfaces or unpaved surfaces treated with soil stabilization materials.

6. Use electricity from power poles where feasible, rather than temporary diesel or gasoline powered generators. Muffle noise from generators to the extent practical.

7. Use on-site mobile equipment powered by alternative fuel sources, such as ultra-low sulfur diesel, methanol, natural gas, propane or butane.

8. Construction grading or earth moving on days when wind gusts exceed or are forecast to exceed 25 mph is prohibited.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

PART 4 – MEASUREMENT AND PAYMENT

A. There will be no separate measurement for work of this section.

B. Full compensation for all work involved shall be included in the various items of work, and no separate payment shall be allowed therefor.

END OF SECTION

SECTION 01 14 43

ENVIRONMENTAL RESOURCE PROTECTION

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Protection of species habitat.
2. Protection of archaeological resources.
3. Protection of paleontological resources (fossils).
4. Protection of human remains.
5. Protection from previously existing contamination.
6. Prevention of fuel spills and hazardous material spills.
7. Prevention of stored fuel leaks.
8. Protection of stormwater quality and control of stormwater quantity.
9. Prevention of traffic impacts.
10. Prevention of road damage.
11. Prevention of fugitive dust.
12. SCAQMD requirements.
13. Disposal of refuse.

B. Related Sections:

1. Section 01 14 25, Procedures in Construction.
2. Section 01 14 27, Legal Relations and Responsibility.

1.02 SUBMITTALS

A. Submit under Section 01 33 00, Submittal Procedures.

B. Written commitment to clean up leaks of fuel or hazardous materials.

C. Traffic Management plan.

1.03 GENERAL

A. Provisions of this section are required to reduce or avoid potential environmental impacts of the project, in accordance with environmental mitigation measures imposed by the OCTA and other responsible agencies.

B. This section summarizes required mitigation. Proceed with mitigation only after consultation with OCTA and Contractor's biological, archaeological, and geological consultants.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

3.01 PROTECTION OF SPECIES HABITAT

A. Avoid placement of construction equipment and personnel within environmentally sensitive habitat areas used by target species of concern. Activities that cannot be conducted without placement of construction equipment and personnel within sensitive habitats shall be timed to avoid the breeding season of the target species of concern. Coordinate such activities and their timing with the OCTA.

B. Locate equipment storage, fueling and staging areas to minimize risks of direct drainage or runoff into riparian areas or other environmentally sensitive habitats. Take every precaution to prevent the release of toxic substances into surface waters. Report immediately all project spills of hazardous materials to the OCTA, OCTA, US Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife (CDFW), and Regional Water Quality Control Board (RWQCB). Immediately clean up hazardous materials and remove all contaminated soils; dispose of only at approved disposal sites.

C. Stockpiling and staging of materials shall be limited to disturbed areas without native vegetation, areas to be impacted by the project or in non-sensitive habitats.

D. Establish No-Fueling zones within a minimum of 33 feet from all drainages and fire-sensitive areas.

E. Maintain project areas clean of debris to avoid attracting predators of the target species of concern. Enclose all food related trash in sealed containers and regularly remove from site. Pets of construction personnel shall not be allowed on site where they may come into contact with any listed species.

F. If dead or injured listed species are located, biologist, in consultation with the OCTA, will notify the USFWS and the CDFG according to required protocols. Obtain instructions form the OCTA on how to proceed following such discovery.

G. Nesting avian species protected by the Migratory Bird Treaty Act (MBTA):

1. For any construction activities or vegetation removal between February 15 and August 31, a nesting bird survey shall be conducted by contractor's qualified biologist of all habitats within 250 feet of the construction area. Surveys shall be conducted no less than 14 days and no more than 30 days prior to commencement of construction activities and vegetation removal. The nesting bird surveys will be conducted in accordance with CDFG protocol as applicable. If no active nests are identified on or within 250 feet of the construction site, no further mitigation is necessary. A copy of the pre-construction survey shall be submitted to the local agencies jurisdiction. If an active nest of a MBTA protected species is identified onsite (per established thresholds) a 100-foot no-work buffer shall be maintained between the nest and construction activity. This buffer can be reduced in consultation with CDFW and/or USFWS.

2. Completion of the nesting cycle shall be determined by qualified ornithologist or biologist.

3.02 PROTECTION OF ARCHAEOLOGICAL RESOURCES

A. If evidence of an archaeological site or other suspected historical resource as defined by CEQA Guidelines Section 15064.5, including darkened soil representing past human activity, that could conceal material remains (e.g., worked stone, fired clay vessels, faunal bone, hearths, storage pits, or burials) are discovered during any project-related earth-disturbing activities (including projects that would not encounter undisturbed soils), all earth-disturbing activity within 100 feet of the find shall be halted and OCTA shall be notified.

3.03 PROTECTION OF PALEONTOLOGICAL RESOURCES (FOSSILS)

A. Should paleontological resources (i.e., fossil remains) be identified at a particular site during project construction, the construction foreman shall cease construction within 100 feet of the find until a qualified professional can provide an evaluation.

3.04 PROTECTION OF HUMAN REMAINS

A. In the event of the discovery of human remains during construction, procedures outlined in Section 15064.5(e) of the CEQA Guidelines shall be strictly followed. Upon discovery all excavation at the site or any nearby area reasonably suspected to overlie human remains shall cease immediately. Notify OCTA immediately. OCTA will notify County Coroner who will determine if remains are Native American. If the remains are determined to be Native American, the coroner will contact the Native

American Heritage OCTA (NAHC). The NAHC will identify the Most Likely Descendent (MLD). The MLD will make recommendations for the appropriate treatment and disposition of the remains and any associated artifacts in accordance with Public Resources Code (PRC), Section 5097.98. Do not commence construction in the area until notified to do so by the OCTA.

3.05 PROTECTION FROM PREVIOUSLY EXISTING CONTAMINATION

A. In the event that previously unknown or unidentified soil and/or groundwater contamination that could present a threat to human health or the environment is encountered during construction of the proposed project, construction activities in the immediate vicinity of the contamination shall cease immediately. If contamination is encountered, a Risk Management Plan shall be prepared and implemented that (1) identifies the contaminants of concern and the potential risk each contaminant would pose to human health and the environment during construction and post development and (2) describes measures to be taken to protect workers, and the public from exposure to potential site hazards. Such measures could include a range of options, including, but not limited to, physical site controls during construction, remediation, long-term monitoring, post development maintenance or access limitations, or some combination thereof. Depending on the nature of contamination, if any, appropriate agencies shall be notified. If needed, a Site Health and Safety Plan that meets Occupational Safety and Health Administration requirements shall be prepared and in place prior to commencement of work in any contaminated area.

3.06 PREVENTION OF FUEL SPILLS AND HAZARDOUS MATERIAL SPILLS

A. Store fuel, hazardous materials, and chemicals of all types in a contained staging area.

B. Conduct equipment refueling and maintenance in the contained staging area.

C. Check vehicles daily for leaks.

3.07 PREVENTION OF STORED FUEL LEAKS

A. Provide berms or other secondary containment at fuel/chemical storage areas.

B. Test storage tanks, valves, etc., for leaks.

C. Submit a written commitment to provide labor, equipment, and materials to promptly clean up any leakage.

3.08 PROTECTION OF STORMWATER QUALITY AND CONTROL OF QUANTITY

A. Comply with the storm water quality plan prepared before issuance of construction permits. The plan will incorporate the state's industrial best management practices and other techniques if more effective. Refer to Section 01 14 25 Procedures in Construction for additional requirements.

B. Runoff from impervious areas is to be detained, treated to industrial standards, and released under control.

3.09 PREVENTION OF TRAFFIC IMPACTS

A. The Contractor shall prepare and submit a Traffic Management Plan in conjunction with local jurisdictions addressing the following:

1. Detours.

2. Coordination with any other construction projects.

3. Length and timing of street closures.

4. Coordination with police and fire departments regarding changes in emergency access routes.

5. Temporary access routes and signage for any affected commercial property.

6. Contact information for OCTA, contractors and their personnel.

B. Conform to all conditions required therein. Notify Resident Inspector in advance of any constructions activities that could potentially violate the requirements and conditions set forth in the plan.

C. Construction parking shall be configured to minimize traffic interference during the construction period and, therefore, reduce idling of traffic.

D. Temporary traffic controls are provided, such as a flag person, during all phases of construction to facilitate smooth traffic flow.

E. Construction activities that affect traffic flow on the arterial system be scheduled to off-peak hours (10:00 A.M. to 4:00 P.M.).

F. Dedicated on-site and off-site left-turn lanes on truck hauling routes be utilized for movement of construction trucks and equipment on site and off site to the extent feasible during construction activities.

G. To ensure adequate access for emergency vehicles when construction activities would result in temporary lane or roadway closures, the contractor shall consult with the local agencies, Police and Fire Departments to disclose temporary lane or

roadway closures and alternative travel routes. The contractor shall be required to keep a minimum of one lane in each direction free from encumbrances at all times on perimeter streets accessing the project site. If construction activities require the complete closure of a roadway segment, the Contractor shall coordinate with the local agencies, Police and Fire Departments to designate proper detour routes and signage indicating alternative routes.

3.10 PREVENTION OF ROAD DAMAGE

A. Before and after offsite road and utility construction, videotape the affected roadway and its access roads.

B. Temporarily repair roadway damage caused during construction.

C. Permanently restore damaged roadway to its original condition immediately after offsite improvements are completed.

D. Establish construction truck routes with local jurisdictions before beginning offsite work. Refer to Section 01 14 27 Legal Relations and Responsibility for additional requirements.

E. Consult with local jurisdictions to coordinate offsite work with other projects in the vicinity.

3.11 SCAQMD REQUIREMENTS

A. Refer to Section 01 14 27 Legal Relations and Responsibility for these requirements.

B. All diesel-powered equipment used will be retrofitted with after-treatment products (e.g., engine catalysts).

C. All heavy-duty diesel-powered equipment operating and refueling at the project site use low-NOX diesel fuel to the extent that it is readily available and cost effective (up to 125 percent of the cost of California Air Resources Board diesel) in the South Coast Air Basin (this does not apply to diesel powered trucks traveling to and from the project site).

D. Construction equipment engines be maintained in good condition and in proper tune per manufacturer’s specification for the duration of construction.

E. Construction operations rely on the electricity infrastructure surrounding the construction site rather than electrical generators powered by internal combustion engines.

F. As required by South Coast Air Quality Management District Rule 403—Fugitive Dust, all construction activities that are capable of generating fugitive dust are required to implement dust control measures during each phase of project

development to reduce the amount of particulate matter entrained in the ambient air. These measures include the following:

1. Application of soil stabilizers to inactive construction areas.

2. Quick replacement of ground cover in disturbed areas.

3. Watering of exposed surfaces three times daily.

4. Watering of all unpaved haul roads three times daily.

5. Covering all stock piles with tarp.

6. Reduction of vehicle speed on unpaved roads.

7. Post signs on-site limiting traffic to 15 miles per hour or less.

8. Sweep streets adjacent to the project site at the end of the day or hourly per Section 01 14 27, 1.10 J if visible soil material is carried over to adjacent roads.

9. Cover or have water applied to the exposed surface of all trucks hauling dirt, sand, soil, or other loose materials prior to leaving the site to prevent dust from impacting the surrounding areas.

3.12 PREVENTION OF NOISE IMPACTS

A. Limit noise-producing activities to hours required by the local jurisdictions for construction activities.

B. Construction-related equipment, including heavy-duty equipment, motor vehicles, and portable equipment, shall be turned off when not in use for more than 30 minutes. Diesel-fueled commercial motor vehicles with gross vehicular weight ratings of greater than 10,000 pounds shall be turned off when not in use for more than 5 minutes.

C. Contractor shall require by contract specifications that the following construction best management practices (BMPs) be implemented by contractors to reduce construction noise levels:

1. As requested by the OCTA's Project Manager and/or specified in Contract Document, two weeks prior to the commencement of construction, the Contractor shall provide notification to surrounding land uses within 300 feet of the project site disclosing the construction schedule, including the various types of activities that would be occurring throughout the duration of the construction period.

2. Ensure that construction equipment is properly muffled according to industry standards and be in good working condition.

3. Place noise-generating construction equipment and locate construction staging areas away from sensitive uses, where feasible.

4. Schedule high noise-producing activities between the hours of 8:00 A.M. and 3:30 P.M. to minimize disruption on sensitive uses, Monday through Friday.

5. Implement noise attenuation measures, which may include, but are not limited to, temporary noise barriers or noise blankets around stationary construction noise sources.

6. Use electric air compressors and similar power tools rather than diesel equipment, where feasible.

7. Construction-related equipment, including heavy-duty equipment, motor vehicles, and portable equipment, shall be turned off when not in use for more than 10 minutes.

8. Construction hours, allowable workdays, and the phone number of the job superintendent shall be clearly posted at all construction entrances to allow for surrounding owners and residents to contact the job superintendent. If the City or the job superintendent receives a complaint, the superintendent shall investigate, take appropriate corrective action, and report the action taken to the reporting party.

D. Construction staging areas along with the operation of earthmoving equipment within the project area would be located as far away from vibration and noise sensitive sites as possible.

E. Heavily loaded trucks used during construction would be routed away from residential streets.

3.13 DISPOSAL OF REFUSE

The Contractor shall establish a construction management plan with Disposal Company to divert a target of 50 percent of construction, demolition, and site clearing waste.

PART 4 – MEASUREMENT AND PAYMENT

No separate measurement or payment will be made for the work of this section.

END OF SECTION

SECTION 01 25 00

SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Administrative and procedural requirements for requesting substitutions.

B. Definitions:

1. Substitutions: Requests by the Contractor to deviate from specified requirements for products, material, equipment, and methods, or to provide products other than those specified, shall be considered requests for substitutions, limited to the following conditions:

a. Substitutions requested during the bidding period and accepted prior to the execution of the Contract.

b. Substitutions requested after execution of the Contract.

C. Substitution Provisions: Refer to substitution provisions of the Instructions to Bidders, in addition to the following specific requirements.

D. Substitution Request Submittal Period:

1. Time Limit:

a. Substitutions requested during Bidding Period: OCTA will consider requests for substitutions if received during bidding. Request permission for substitutions from the OCTA per provisions of the Instructions to Bidders. If approved, OCTA will issue an addendum allowing all bidders to incorporate the request substitution.

b. Substitutions requested after execution of Contract: Only within 14 calendar days of the Notice to Proceed will the Authority and the Engineer consider requests for substitutions, requests submitted after this will be denied.

2. Product Availability Waiver: Substitutions will be considered 21 calendar days of execution of the Agreement only when a product becomes unavailable due to no fault of the Contractor. Failure to place orders for specified products sufficiently in advance of required date for incorporation into the Work will not be considered as a valid reason for which Contractor may request a substitution or deviation from requirements of the Drawings and Specifications.

1.02 SUBMITTAL REQUIREMENTS

A. Substitution Requests: Submit three copies of each request for consideration to the OCTA. Identify product or fabrication or installation method proposed for substitution. Include specification section number and title and drawing numbers and titles.

1. Substitution Request Form: Use form acceptable to OCTA Project Manager.

2. Documentation: Substitutions will not be considered when they are indicated or implied on shop drawings, product data or sample submittals without a separate written request, or when acceptance will required substantial revision of the Contract Documents. Show compliance with requirements and the following, as applicable:

a. Statement indicating why specified material or product cannot be provided.

b. Coordination information, including a list of changes or modifications needed to other parts of the work and to construction performed by OCTA and separate contractors, which will be necessary to accommodate proposed substitution.

c. Detailed comparison of significant qualities of proposed substitution with those of the work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated or specified.

d. Product data, including drawings and descriptions of products and fabrication and installation procedures.

e. Samples, where applicable or requested.

f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.

g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated or specified.

h. Research/evaluation reports evidencing compliance with building code in effect for project, from a model code organization acceptable to Inspector and authorities having jurisdiction.

i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the work, including effect on the overall contract time. If specified product or method of construction cannot be provided within the contract time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.

j. Cost information, including a proposal of change, if any, in the contract sum.

k. Contractor's certification that Contractor has investigated proposed substitution and that it complies with requirements in the contract documents and is appropriate for applications indicated. Contractor further certifies that Contractor will provide the same or better guarantee or warranty as for specified product or method of construction. Contractor shall also certify that Contractor will coordinate installation of accepted substitution into work, making any changes as may be required for work to be complete in all respects as specified.

l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

m. Only one request for substitution will be considered for each product.

n. If the proposed substitution is not accepted, provide the specified product.

3. OCTA Project Manager's Action: If necessary, OCTA Project Manager will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. OCTA Project Manager will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.

   a. Form of Acceptance: Change Order, if costs involved; otherwise written approval.

   b. Use product specified if OCTA Project Manager is unable to make a decision on proposed substitution within time allocated.

1.03 COMPARABLE PRODUCTS

A. See Section 01 60 00, Product Requirements, for discussion of comparable products.

1.04 PRODUCT SUBSTITUTIONS

A. OCTA Project Manager will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, OCTA Project Manager will return requests without action, except to record noncompliance with these requirements:

1. Requested substitution is submitted within the time frame stated herein above.

2. Requested substitution offers OCTA a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities OCTA must assume. OCTA's additional responsibilities may include compensation to consultants for redesign and evaluation services, increased cost of other construction by OCTA, and similar considerations.

3. Requested substitution does not require extensive redesign of the project or revisions to the contract documents.

4. Requested substitution is consistent with the contract documents and will produce indicated results.

5. Substitution request is fully documented and properly submitted.

6. Requested substitution will not adversely affect Contractor's Construction Schedule.

7. Requested substitution has received necessary approvals of authorities having jurisdiction.

8. Requested substitution is compatible with other portions of the work.

9. Requested substitution has been coordinated with other portions of the work.

10. Requested substitution provides specified warranty.

11. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions will not be considered if they are indicated or implied on shop drawings or project data submittals or Requests for Information without formal submittal request detailed in this section.

1.05 AVAILABILITY OF SPECIFIED ITEMS

A. Prior to execution of Contract, Contractor shall verify that all specified items will be available as required by the schedule for orderly and timely progress of the work. Notify OCTA Project Manager if specified items will not be available.

B. Costs of delays because of non-availability of specified items, when such delays could have been avoided by the Contractor, will deducted from amounts due or to become due the contractor, and will not be borne by OCTA.

C. Substitutions during construction for prior approved items will only be considered under the following circumstances:

1. Substitution is required for compliance with subsequent interpretation of code.

2. Specified item cannot be provided within the contract time or becomes unavailable through no fault of contractor.

3. Subsequent information discloses that specified item or system will not perform properly or fit in designated space, or manufacturer or supplier refuses to certify or warrant performance as required.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used

PART 4 – MEASUREMENT AND PAYMENT

A. No separate measurement will be made for the work of this section.

B. No separate payment will be made for the work of this section.

END OF SECTION

SECTION 01 26 00

CONTRACT MODIFICATION PROCEDURES

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Administrative and procedural requirements for handling and processing contract modifications.

B. Related Sections:

1. Section 01 60 00, Product Requirements, for procedures to approve comparable products.

2. Section 01 25 00, Substitution Procedures, for procedures to propose substitutions.

3. Section 01 26 13 Requests for Information, for procedures to clarify and interpret the contract documents.

1.02 MINOR CHANGES IN THE WORK / FIELD ORDERS

A. OCTA will issue supplemental instructions authorizing minor changes in the work, not involving adjustment to the Contract Price or the Contract Time, in written form.

1.03 DOCUMENTATION OF CHANGES IN AGREEMENT PRICE AND AGREEMENT TIME

A. Documentation of Changes in Contract Sum and Contract Time: Contractor shall provide full information required for evaluation of proposed changes and to substantiate costs of changes in the Work.

1. Maintain detailed records of Work completed on time and material basis. Contractor shall use “Daily Extra Work Report” provided by the Authority. All extra work reports shall be signed by the Authority and the Contractor verifying all extra materials and labor incorporated into the project at the end of each work day.

2. Document each quotation for a change in Contract Sum and Contract Time, with sufficient cost breakdown data for labor, materials, and equipment to allow evaluation of the quotation.

3. Provide details of cost of all material used for change in work. Provide detail of labor hours expended in change of work, and wage rate of worker. Provide total of hours equipment was used in the work, and hourly rate of the equipment.

B. Additional Data: Upon request by the Engineer, provide additional data to support computations:

1. Quantity of product, material, labor, and equipment.

2. Overhead and profit (20% includes all superintendence, taxes, insurance, bonds, overhead and profit, etc.). 20 percent overhead and profit shall be divided between Contractor and sub-contractor(s).

3. Justification for change in Contract Time, if claimed.

4. Credit for deletions from Contract, similarly documented.

1.04 CHANGE PROCEDURES

A. Change Procedure – General: The following describe administrative procedures to be followed in complying with provisions of the Conditions of the Contract for changes in the Work.

B. The Engineer's Supplemental Instructions: Minor changes in the Work, not involving an adjustment in either the Contract Sum or Contract Time, as authorized by the Conditions of the Contract. The Contractor shall take prompt action on such instructions.

C. OCTA-Initiated Proposal Requests: OCTA will issue a detailed description of proposed changes in the work that may require adjustment to the Contract Price or the Contract Time. If necessary, the description will include supplemental or revised drawings and specifications.

1. Proposal Requests issued by OCTA are not instructions either to stop work in progress or to execute the proposed change.

2. Proposal Request may include an estimate of additional or deductions in Contract Sum or Contract Time for executing the change and may include stipulations regarding overtime work and period of time the requested response from the Contractor shall be considered valid.

a. Within time specified in Proposal Request or five (5) calendar days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Price and the Contract Time necessary to execute the change. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.

c. Include costs of labor and supervision directly attributable to the change.

d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

e. Submit name of individual authorized to receive construction change documents and who is responsible for informing others in Contractor's employ or subcontractors of changes in the Work.

f. Quotation Form: Use forms acceptable to OCTA.

D. Upon OCTA's approval of a Proposal Request, OCTA will issue a Change Order for signatures of OCTA and Contractor. The OCTA and Contractor will sign the Change Order indicating acceptance and approval of the change.

1.05 WORK CHANGE DIRECTIVE

A. Work Change Directive: In accordance with provisions of the Conditions of the Contract, OCTA may issue a Work Change Directive. A Work Change Directive instructs Contractor to proceed with a change in the work, for subsequent inclusion in a Change Order.

B. Work Change Directive contains a complete description of change in the work. It also designates method to be followed to determine change in the Contract Price or the Contract Time. Contractor shall promptly execute the change in the Work.

C. Changes Based on Stipulated Sum or Time: Construction Change Directive shall be based on stipulated adjustment in Contract Sum and Contract Time as mutually-acceptable to the Authority and Contractor and the change shall be performed immediately. A Change Order for this amount shall be executed at the earliest convenience of all parties. Contractor shall provide a cost estimate based on section 1.03 of this section.

D. Changes Based on Unit Costs or Quantities: When scope of change cannot be accurately determined in advance, a Construction Change Directive shall be executed based on mutually-acceptable quantities and pre-determined unit prices. Actual costs shall be determined after completion of the Work and a Change Order for this amount shall be executed.

E. Changes Based on Time and Material Costs: If directed for changes for which amounts are not defined or are disputed, a Construction Change Directive will be issued by the Authority and Contractor shall execute the Work, keeping accurate records of time, both labor and calendar days, and cost of materials. See Section 1.03. A. 1.

F. Cost and Time Resolution: If amounts for changes in Agreement price and Agreement time cannot be agreed upon by the Authority and Contractor, amounts shall be resolved in accordance with requirements of the Conditions of the Contract for resolution of disputes.

G. Documentation: Maintain detailed records on a time and material basis of work required by the Work Change Directive. The total construction cost of the change shall not exceed the mutually agreed adjustment in Contract Sum and Contract time of the Change Order.

H. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the contract.

1.06 CHANGE ORDER

A. Change Orders, General:

1. In accordance with provisions of the Conditions of the Contract, the Engineer and Authority will review Contractor's response to a Proposal Request or a Construction Change Directive and determine with the Contractor the acceptable amount, if any, of the change in Contract Sum and Contract Time.

2. When agreement is reached on the change in Contract Time and Sum, the Engineer will prepare a Change Order, with supplementary documents (Contractor's cost estimate) as necessary to describe the change and the associated costs and schedule impacts, if any.

3. The Authority and Contractor will sign the Change Order indicating acceptance and approval of the change.

1.07 RECONCILIATION OF CHANGE ORDER

A. Schedule of Values: Promptly revise the Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjustment to the Contract Sum.

B. Schedules: Promptly revise progress schedules to reflect changes in Contract Time, revising sub-schedules to adjust time for other items of Work as may be affected by the change. Submit revised schedules at the next Application for Payment following approval and acceptance of the Change Order.

C. Change in work due to request for information, or any other reason shall not be reason for claims of delays by the contractor. Contractor shall allow the Consultant seven (7) days to respond to request for information, and additional fourteen (14) days to the Authority to make necessary changes to resolve changes in work and change orders. Allow the Authority 30 calendar days for final Change Order approval.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

PART 4 - MEASUREMENT AND PAYMENT

Not Used.

END OF SECTION

SECTION 01 26 13

REQUESTS FOR INFORMATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Section Includes:

1. The general requirements for Contractor's requests for information and pertains to all portions of the contract documents.

1.02 DEFINITION

A. A "Request for Information" is defined as a document submitted by the Contractor requesting clarification of a portion of the contract documents, hereinafter referred to as RFI.

B. All questions and requests for clarification of the Contract Documents from the contractor and subcontractors shall be submitted in writing as a "Request for Information".

1.03 CONTRACTOR'S REQUESTS FOR INFORMATION (RFI)

A. When the Contractor is unable to determine from the contract documents, the exact material, process or system to be installed, the Contractor shall request the OCTA to make a clarification of the indeterminate item. Wherever possible, such clarification shall be requested at the next appropriate project meeting, with the response entered into the meeting minutes. When clarification at the meeting is not possible, either because of the urgency of the need or the complexity of the item, the Contractor shall prepare and submit an RFI to the OCTA.

B. RFI's shall be submitted on a form provided by the OCTA. The Contractor will be given the form electronically upon Notice To Proceed.

C. RFI forms shall be completely filled in, and if prepared by hand, shall be fully legible after photocopying. Each page of attachments to RFI's shall bear the contract number, project name, RFI number. Each RFI shall reference a drawing number and/or Specification Section. The Contractor shall include sketches, mark ups on the contract drawings, and/or photographs to clearly demonstrate its requests or questions in each RFI. Contractor shall indicate on the RFI the date by which response is required.

D. RFI's from Subcontractors or Material suppliers shall be submitted through, reviewed by, and signed by the Contractor prior to submittal to the OCTA.

E. Prior to submitting an RFI, the Contractor shall carefully study the Contract Documents to assure that the requested information is not available therein. Contractor shall be responsible for insuring that RFI's are not frivolous or excessive.

F. Frivolous RFIs: Frivolous RFIs include requests for information shown in the contract documents or resulting from Contractor's failure to study and compare contract documents or to coordinate its own work; and RFIs that are incomplete, contain errors, or include unrelated items. The cost in time and materials on the part of OCTA and related design professionals to review unnecessary or frivolous RFIs will be assessed and deducted from the Contractor's final payment.

G. RFI's shall not be used for the following purposes:

1. To request approval of submittals.

2. To request approval of substitutions.

3. To request changes which entail additional cost or credit or changes in the contract time.

4. To request different methods of performing work than those shown or specified.

H. In the event the Contractor believes that a clarification by the OCTA results in additional cost, the Contractor shall not proceed with the Work indicated by the RFI until a Change Order is prepared and approved. Answered RFI's shall not be construed as approval to perform extra work.

I. RFIs submitted to request clarification of issues related to means, methods, techniques and sequencing of construction, or to establish scope of subcontractors' work will be returned without response.

J. Unanswered RFI's will be returned with a stamp or notation indicating: "Not Reviewed."

K. Assign each RFI a sequential number. Contractor shall prepare and maintain a log of RFI's and, at any time requested by the OCTA, Contractor shall furnish copies of the log showing all outstanding RFI's. Contractor shall also note all unanswered RFI's in the log.

L. Contractor shall allow for 14 calendar days review and response time for RFI's.

1.04 RESPONSE TO RFI'S

A. OCTA's response to RFIs will be in writing. RFIs received after 12:00 noon will be considered as received on the following working day for purposes of establishing the start of the 14 day response time. OCTA's response may include a request for

additional information, in which case OCTA's time for response will date from time of receipt of additional information.

B. No extension of time will be granted because of Contractor's failure to submit RFIs in a timely manner or to allow a sufficient amount of time for review.

C. OCTA's response will confirm a stated interpretation or solution or otherwise interpret the design intent; this may include an alternative solution, consistent with the design intent of the Contract Documents. Where such a solution would result, in the contractor's opinion, in an extra cost or time extension to the project, contractor shall notify the OCTA prior to implementing the response.

D. Each RFI and the OCTA's response shall become a part of the Contract Documents. To the extent that OCTA's response changes, modifies or amends any portion of the Contract Documents, the response shall be deemed sufficient. No revised Contract Documents will be issued unless the RFI response is insufficient in providing direction to the Contractor. Whenever possible, revised contract documents will be issued in 8-1/2x11 inch or 11x17 inch size, suitable for inclusion with the RFI response. Re-issuance of full size drawings or sets of drawings will be kept to an absolute minimum.

1.05 SPOKEN COMMUNICATIONS

A. Any spoken instructions given to the Contractor on the job site by any person other than the OCTA's personnel is subject to nullification by the OCTA. Contractor shall obtain written documentation of any and all spoken instructions (especially if instructions may reflect an addition to or deduction from the contract sum) from the OCTA prior to commencement of the work resulting from the verbal instructions.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used.

PART 4 – MEASUREMENT AND PAYMENT

No separate measurement or payment shall be made under this Section.

END OF SECTION

SECTION 01 29 00

PAYMENT PROCEDURES

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Administrative and procedural requirements necessary to prepare and process Applications for Payment.

2. Administrative and procedural requirements for preparing and submitting a Schedule of Values.

B. Related Sections:

1. Section 01 26 00, Contract Modification Procedures, for administrative procedures for handling changes to the contract.

2. Section 01 32 00, Construction Progress Documentation, for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

3. Section 01 33 00, Submittal Procedures, for administrative requirements governing the preparation and submittal of the Schedule of Values.

1.02 DEFINITIONS

A. Schedule of Values (Cost Breakdown): A document furnished by Contractor allocating portions of the Contract Price to various portions of the work and used as the basis for reviewing Contractor's Applications for Payment. The Contract Scope of Work including any and all required deliverables are considered by OCTA to be part of the Schedule of Values upon which progress payments will be made to the Contractor, and if not clearly identified in the Contractor's Schedule of Values, 100% of progress payment will not be made until all required Scope of Work items are completed and received by OCTA.

1.03 SCHEDULE OF VALUES

A. Prepare and submit within 15 calendar days after the effective date in the Notice to Proceed, but in any event prior to the Contractor's first Application for Payment, for approval by OCTA, a Schedule of Values. If the schedules are affected by Change Orders, prepare and submit updated copies of the schedules under this Section.

B. Submit, under the provisions of Section 01 33 00, Submittals, and a Schedule of Values including the following information:

1. Identify items in the Schedule of Values with the title of Project and location, agreement number, name and address of the Contractor, date of submission, Specification Section/Subsection number, Specification Section/Sub-section title, and Bid item number as contained in the Schedule of Quantities and Prices submitted with the Contractor's bid.

2. Schedule shall list the installed value of the component parts of the Work in sufficient detail to serve as a basis for computing values as itemized in the Cost Breakdown for progress payments during construction. Percentage of completed items installed will be paid.

3. Provide a line item to identify each of the following:

   a. Bonds;

   b. Insurance premiums;

   c. Field supervision;

   d. Mobilization cost (not to exceed 10% of the total contract amount).

4. Upon request by OCTA, support values given with data, which will substantiate the correctness of the values.

5. In addition to the requirements stated in the General Conditions, the Schedule of Values shall be in the form of an Excel hardcopy spreadsheet along with the electronic file on a read-only compact disk (CD-ROM).

C. Each item shall include a directly proportional amount of Contractor's overhead and profit, which will not be paid separately.

D. Lump Sum bid payment based on Schedule of Values approved by OCTA based on percentage of work completed.

E. The sum of all values listed in the schedule shall equal the total contract Sum.

F. Cost loading of Schedule of Values is for fund management purposes only and will not be constructed to establish unit cost.

G. OCTA's Review: OCTA will review the Schedule of Values to assure that they are reasonable and balanced. When approved, they will be used in reviewing and approving the monthly partial payment requests. If review by OCTA indicates that changes to the schedules are required, upon five (5) calendar days from receipt of notice from the OCTA, the Contractor shall revise and resubmit schedules in the same manner as the original schedules were prepared and submitted.

1.04 APPLICATION FOR PAYMENT – GENERAL

A. Progress Payment Application: The Authority, no later than 25th day of each month, shall prepare a progress payment estimate based on the estimated percentage of completion of work in the approved Schedule of Values and on the Contractor's actually incurred allowable expenses on such work. Fabricated materials, materials on site but not installed in construction and work items not completed shall not be included in progress payment and will not be paid by the Authority. The Authority will issue the progress payment, in the amount it deems appropriate, by approximately the 15th days of the following month.

B. Application for progress payments and partial progress payments shall be in accordance with Contract General Provision and the approved Schedule of Values.

C. The Contractor shall submit the progress payment application prepared by the Authority and signed by the Contractor’s authorized representative and furnish an invoice for further process based on a schedule to be established at the pre-construction meeting. Submit other documentation such as certified payroll, monthly labor utilization form, and waivers as required by contract.

D. For the final payment, OCTA shall determine if all Work of the Contract has been performed by the Contractor according to the provisions of the Contract. OCTA shall make a final estimate and determine the amount remaining due the Contractor. This amount shall include any amounts withheld from previous estimates, but exclude any and all deductions that have been or should be made at the time under other sections of these Specifications.

1.05 WORK AUTHORIZATION CHANGE NOTICE WORK

A. Measurement and payment of Work associated with a Work Authorization Change Notice (WACN) shall be as detailed in the OCTA’s Exhibit A.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

PART 4 - MEASUREMENT AND PAYMENT

Not Used.

END OF SECTION

SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Administrative provisions for coordinating construction operations on project including, but not limited to, the following:

   a. General project coordination procedures.

   b. Administrative and supervisory personnel.

   c. Project meetings.

B. Contractor is responsible for coordination with OCTA selected material suppliers and contractors involved in the project.

C. Related Sections:

1. Section 01 32 00, Construction Progress Documentation, for preparing and submitting Contractor's construction schedule.

2. Section 01 43 01, Contractor Qualifications and Requirements, for required staff and qualifications.

3. Section 01 71 23, Field Engineering, for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.

4. Section 01 77 00, Closeout Procedures, for coordinating closeout of the contract.

5. Individual specification sections for normal startup, testing, and adjusting procedures required.

1.02 COORDINATION

A. Coordination: Coordinate construction operations with those of other OCTA selected material suppliers and contractors. Coordinate construction operations included in different sections of the specifications to ensure efficient and orderly installation of each part of the work. Coordinate construction operations, included in different sections, which depend on each other for proper installation, connection, and

operation. Contractor is responsible for progress and performance of the work, and shall provide direction to others as required to properly coordinate trades and processes.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the work depends on installation of other components, before or after its own installation.

2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.

3. Make adequate provisions to accommodate items scheduled for later installation.

4. Coordinate equipment installation requirements with equipment contractors to prevent delays and facilitate proper installation. Acknowledge, accommodate, and respect equipment contractors' needs for access to the work for the periods required to complete equipment installation. Incorporate these periods into the construction progress schedule and work plan before commencing work.

B. Prepare memoranda for distribution to each party involved (including OCTA and separate contractors and suppliers) outlining special procedures required for coordination. Include such items as required notices, actions, reports, and list of attendees at meetings.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.

2. Preparation of the schedule of values.

3. Installation and removal of temporary facilities and controls.

4. Delivery and processing of submittals.

5. Progress meetings.

6. Pre-installation conferences.

7. Commissioning, Startup and adjustment of systems.

8. Training activities.

9. Project closeout activities.

D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1.03 KEY PERSONNEL

A. Key Personnel Names: Within 5 days of date of Notice to Proceed, submit a list of key personnel assignments, including superintendent and other personnel in attendance at project site. Conform to requirement of Section 01 43 01 Contractor Qualifications and Requirements. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and email addresses. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to project.

1. Post copies of list in project meeting room and in temporary field office. Keep list current at all times.

1.04 INITIAL CONSTRUCTION MEETING

A. The OCTA will schedule the Initial Construction Meeting (Pre-construction meeting) after the Contractor has been provided the written Notice to Proceed.

B. OCTA will distribute a notice of this meeting, along with an agenda of the subjects to be addressed at least one (1) work day prior to the meeting.

C. Contractor's Construction Project Manager and key staff, as defined in Section 01 43 01, and as identified per the requirements of 1.03, shall attend the meeting.

D. The following is a minimum agenda for the Initial Construction Meeting:

1. OCTA will explain and discuss:

a. Insurance, laws, codes, maintenance of traffic, permits, quality control, inspection, and related items.

b. Preparation, submittal, and review of Site Specific Work Plans (SSWP)

c. Procedures for processing RFI's and Submittals

d. Monthly estimate cutoff dates, and procedures for processing Applications for Payment.

e. Distribution of the contract documents.

f. Preparation of record documents.

g. Use of the premises.

h. Work restrictions and permitted working hours.

i. Owner's occupancy requirements.

j. Responsibility for temporary facilities and controls.

k. Procedures for disruptions and shutdowns.

l. Construction waste management and recycling.

m. Parking availability.

n. Areas available for Contractor's Office, work, and storage areas.

o. First aid.

p. Security.

q. Progress cleaning.

r. Level 3 Health, Safety and Environmental Specifications.

2. The Contractor shall introduce, explain, and discuss the following:

   a. Contractor's representatives and personnel, briefly describing each person's responsibilities, and furnishing complete contact information for the Contractor's staff.

   b. Arrangements for safety, first aid, emergency actions, and security.

   c. A list of Subcontractors and suppliers.

   d. Sequence of critical Work, the construction schedule and the submittal schedule.

   e. Plan for construction sequencing of entire Contract, general worksite layout, temporary facilities, erosion and sedimentation control plans, haul routes, noise, air and water pollution control and temporary closure plans.

   f. Breakdown of lump sum items and Schedule of Values.

g. Status of coordination and notification for utility Work.

h. Locations and use of office, storage, parking and construction areas.

i. Method of providing security to the Worksite.

j. Construction methods and coordination of Work within the provisions of the Contract Documents.

k. Coordination with the Work of Subcontractors and procedures for sharing access to the Worksite.

l. Plan for deliveries of major construction equipment and deliveries of long lead-time materials and products needed in the construction of this Contract.

1.05 PROGRESS MEETINGS

A. Progress meetings will be scheduled by OCTA on a weekly basis and more often as necessary. OCTA will make every effort to accommodate the Contractor's availability in establishing the meeting schedule.

B. Attendees: In addition to OCTA and representatives of the Contractor, subcontractors, suppliers, and other entities concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with project and authorized to conclude matters relating to the work.

C. Meetings will focus on the competent and timely execution of the Work under the Contract. The OCTA will chair these meetings. Weekly site meetings will start when Contract Work commences. At the weekly meetings the Contractor shall present a review of the following topics:

1. Safety and accidents.

2. Contractor's Schedule status.

3. Progress according to the current approved schedule.

4. Presentation of new 28-day schedule.

5. Critical activities on the 28-day schedule.

6. OCTA's needs and requests

7. Specific late items of Work.

8. Overall Project schedule status.

9. Contract time.

10. Public impacts, notifications, and contacts.

11. RFI, submittal and change order logs and status.

12. Contract Issues including:

    a. Status of proposal requests.

    b. Pending changes.

    c. Status of Change Orders.

    d. Pending claims and disputes.

    e. Documentation of information for payment requests.

1.06 PRE-INSTALLATION CONFERENCES:

A. Contractor shall conduct a pre-installation conference at Project site before each construction activity that requires coordination with other construction, as required in individual specification sections.

B. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advice OCTA of scheduled meeting dates.

C. Suggested Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

    1. Contract Documents.

    2. Options.

    3. Related RFIs.

    4. Purchases.

    5. Deliveries.

6. Submittals.
7. Review of any required mockups.
8. Possible conflicts.
9. Compatibility problems.
10. Time schedules.
11. Weather limitations.
12. Manufacturer's written recommendations.
13. Warranty requirements.
14. Compatibility of materials.
15. Acceptability of substrates.
16. Installation procedures.
17. Coordination with other work.
18. Required performance results.
19. Protection of adjacent work.

D. Contractor shall record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.

E. Reporting: Distribute minutes of the meeting to OCTA, each party present and to other parties requiring information.

F. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the work and reconvene the conference at earliest feasible date.

1.07 PROJECT CLOSEOUT MEETING:

A. OCTA will schedule and conduct a project closeout conference, at a time convenient to Contractor, but no later than 15 calendar days prior to the scheduled date of Substantial Completion. The conference will review requirements and responsibilities related to project closeout.

B. Attendees: OCTA, Contractor's key personnel, major subcontractors and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with project and authorized to conclude matters relating to the work.

C. Agenda: OCTA will introduce and discuss items of significance that could affect or delay Project closeout, including the following:

1. Preparation of record documents.
2. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
3. Submittal of written warranties.
4. Requirements for preparing operations and maintenance data.
5. Requirements for demonstration and training.
6. Preparation of Contractor's punch list.
7. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
8. Final Submittal procedures.
9. Coordination of separate contracts.
10. Owner's partial occupancy requirements.
11. Installation of Owner's fixtures, and equipment.
12. Responsibility for removing temporary facilities and controls.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.01 REPORTING

A. Minutes: OCTA Project Manager will record significant discussions and agreements achieved at all conference chaired by OCTA Project Manager, including initial construction meeting, progress meetings and project closeout meeting. OCTA Project Manager will distribute the meeting minutes to everyone concerned within five (5) working days of the meeting.

PART 4 - MEASUREMENT AND PAYMENT

No separate measurement or payment shall be made under this section.

END OF SECTION

SECTION 01 32 00

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section specifies the requirements for preparation of a preliminary schedule, a Contractor's Progress Schedule, related narratives, and progress reporting.

B. The reports and schedules shall be designed to:

1. Assure adequate planning and execution of the Work so that the Work is completed within the number of calendar days allowed in the Contract

2. Assist the Contractor and OCTA Project Manager in appraising:

a. The attainability of the proposed schedule.

b. Conformance to contract requirements.

c. The progress of Work.

C. For all schedules and scheduling requirements/activities related to this Contract, the Contractor shall utilize Primavera Project Planner version 7 or later, or Microsoft Project software as directed by the OCTA Project Manager.

1.02 SUBMITTALS

A. Submit the following information under the provisions of 01 33 00, Submittal Procedures. All electronic file submittals shall include the entire schedule, which is typically provided by utilizing the file backup routine in the software. Electronic submittals shall be on read-only compact disc (CD-ROM) media.

1. Construction Schedule (with narrative) in print and electronic format.

2. Contractor's Progress Schedule in print and electronic format.

3. Weekly Progress Reports (28 day schedule) in print and electronic format.

B. Milestones, as specified in the Contract Documents, shall be incorporated into all areas of the scheduling process.

1.03 CONTRACTOR'S CONSTRUCTION SCHEDULE (BASE SCHEDULE)

A. Within five (5) calendar days of the Notice to Proceed, the Contractor shall prepare and submit to the Engineer for approval a detailed schedule of work. This schedule shall indicate the areas in which the Contractor anticipates working and the dates during which construction operations will be performed. All submittals by the Contractor shall be listed as separate activities in the schedule. The Contractor shall submit three (3) hard copies and a PDF file of the schedule to the Engineer for approval.

B. The detailed schedules shall be of the bar chart or network diagram method, at the Contractor's option. The schedule shall be comprehensive, covering activities at the site of the work, procurement, and construction.

C. The schedule shall identify work items or Milestones that affect or are affected by OCTA Project Manager, other utilities, and other third parties including Subcontractors.

D. The work activities making up the schedule shall be of sufficient detail to assure that adequate planning has been done for proper execution of the Work and such that, in the judgment of the OCTA Project Manager, it provides an appropriate basis for monitoring and evaluating the progress of the Work. A work activity is defined as any activity requiring time and resources (manpower, equipment and/or material) to accomplish. Activity durations will be in workdays. Typical construction activity durations should be between 3 and 14 workdays. Exceptions may be reviewed by the OCTA Project Manager where sub-schedules will be used to define critical portions of prime schedules, materials delivery, key submittals, etc. Activities shall include but not necessarily be limited to the following:

1. Project mobilization.
2. Submittal and review of plans and procedures.
3. Procurement of Materials.
4. Each item of Work.
5. Final cleanup.
6. Final inspection.
7. All activities by Contractor, OCTA Project Manager, and others, which affect progress or required dates for completion, or both, for each part of the Work.
8. Release of areas to OCTA Project Manager according to Milestone Dates.

E. Other requirements that shall be incorporated into the Contractor's schedule include

1. Division of Work into major work areas (i.e. Areas 1, 2, etc.).

2. Manpower required to perform the Work in total man-hours by craft for each activity.

3. All activities that require unusual shift work, such as two shifts, 6-day workweek, etc. shall be clearly identified in the schedule.

F. Each activity shall be labeled with an alphanumeric work breakdown structure/sorting/selection code.

G. The sequence, duration in workdays, and interdependence of activities required for the complete performance of all work shall be shown.

H. The schedule shall begin with the date of the Notice to Proceed and conclude with the date of Final Completion shown in the Contract.

I. The network diagram shall include the following:

1. Time scaled network diagrams based on calendar days and shall be critical path method (CPM) precedence format showing the sequence/interdependence of activities required for complete accomplishment of all items of work.

2. Each activity shall be plotted so that the start/finish dates can be determined graphically (by comparison) with the calendar scale.

3. All network diagrams shall be drawn legibly and accurately on 22” x 34” size media, or other size acceptable to the OCTA Project Manager.

4. Each activity shall be labeled with complete description, planned duration in workdays, and total float time.

5. The schedules shall accurately indicate the sequence and interdependency of all work activities.

1.04 CONTRACTOR’S PROGRESS SCHEDULE

A. The Contractor shall update the Progress Schedule monthly (the “Schedule Update”) and submit to the OCTA Project Manager for review concurrent by the 5th of the month following month for which the progress reflected on schedule.

B. Progress Payment to Contractor will not be made until a schedule conforming to the requirements stated herein is submitted each month to the OCTA Project Manager. A continued failure to supply such schedule data shall be grounds for declaring Contractor in default of the Contract.

C. Contractor's progress schedule shall:

1. Become an integral part of the Contract and will establish interim completion dates for the various activities under the Contract and shall reflect and be consistent with the Milestone Dates established by the Contract.

2. Be used to determine if any activity is not completed by the Milestone date.

3. Be combined with the Schedule of Values for use in the Contractor's submittal/application for and the OCTA Project Manager's review and approval of monthly partial payments.

1.05 PROGRESS REPORTING

A. Contractor shall provide regular progress reports monthly along with progress schedule submittal to include as described herein.

B. A statement that the approved Contractor's Progress Schedule has not changed or has been revised. Only the revisions described in this statement shall be made to the progress schedule.

C. A 28-day schedule covering the past week, current week and two weeks ahead at each scheduled weekly meeting. The schedule shall be a bar chart schedule, divided into 28 calendar days, listing all activities for the four-week period. Scheduled and actual start and finish dates shall be shown. Each activity shall be identified by its approved activity number and a brief description. The bar chart schedule shall have in the heading the Project Title, Contract Number, Contractor's Name, Date, Contract Day Number and Remaining Contract Days.

1.06 PROGRESS EVALUATION

A. If at any time during the Project, the Contractor fails to complete any activity by its latest scheduled completion date and which late completion of such activity will impact the end date of the work past the Contract Completion Date, Contractor shall within five (5) working days, submit to the OCTA Project Manager a written statement as to how and when Contractor will reorganize his work force to return to the current Contractor's construction schedule. Whenever it becomes apparent from progress evaluation and updated construction schedule data that any Milestone Date(s) or the Contract Completion Date will not be met, Contractor, at his sole cost, shall take some or all of the following actions:

1. Increase construction manpower in such quantities and crafts as shall substantially eliminate the backlog of work and meet the current Contract Completion Date.

2. Increase the number of working hours per shift, the number of shifts per day, the number of work days per week, the amount of construction equipment, or any

combination of the foregoing sufficient to substantially eliminate the backlog of work.

3. Reschedule work items to achieve concurrent accomplishment of work activities.

B. Under no circumstances will the addition of equipment or construction forces, increasing work hours, or any other method, manner, or procedure required to return to the contractually required completion date be considered justification for a change order or treated as an acceleration.

C. The Contractor's Progress Schedule shall begin with the date of issuance of the Notice to Proceed (NTP) and conclude with the date of final completion of the project. Float or slack time within the Progress Schedule is not for the exclusive use or benefit of either the OCTA Project Manager or the Contractor but is a jointly owned expiring project resource available to both parties as needed to meet contract milestones and the Contract completion date.

1.07 SUBMITTAL OF SCHEDULES

A. The Contractor shall submit to the OCTA Project Manager for review, two (2) copies of the construction schedule (base schedule) within time frame specified herein. Allow OCTA a minimum of 2 weeks to review the construction schedule. Contractor shall address OCTA's comments on schedule and resubmit within five (5) workdays from receipt of OCTA' comments.

B. The Contractor shall submit to the OCTA Project Manager for review two (2) hard copies of the Contractor's Progress Schedule, one (1) copy of all schedule data, along with one electronic copy within the time frames specified herein. Updates of the Contractor's schedule shall be submitted monthly as part of the payment application submittal.

C. OCTA Project Manager will have five (5) workdays after receipt of the Contractor's Progress Schedule to respond. Upon receipt of OCTA Project Manager's comments, the Contractor shall confer with the OCTA Project Manager on the appraisal and evaluation of the proposed Contractor's Progress Schedule. The Contractor shall make necessary changes resulting from this review, and the Contractor's Progress Schedule shall be resubmitted for review within three (3) workdays after the receipt of comments.

D. The Contractor's construction schedule (base schedule) when reviewed and recognized by the OCTA Project Manager shall stand until updated schedules are submitted to reflect actual completed work, reviewed changes, or recognized delays.

E. All updated or revised schedules submitted after the base schedule shall be in the same detail as the base submittal unless modified in writing by the OCTA Project Manager.

1.08 REVISIONS TO REVIEWED SCHEDULE

A. The Contractor shall accomplish the Work in accordance with Contractor's construction schedule recognized by the OCTA Project Manager. Changes made to Contractor's construction schedule for accomplishing the Work shall in all cases require prior approval by the OCTA Project Manager.

B. The Contractor shall reflect processed Change Orders that affect the schedule, and issuance of emergency change authorizations in the next schedule submittal.

C. If Contractor desires to make a major change to Contractor's construction schedule, the Contractor shall submit to the OCTA Project Manager a schedule change request in writing stating the reasons and justification for the change, for OCTA's review and acceptance. Major changes are defined as follows:

1. Those that affect the time estimate for the accomplishment of an activity.

2. Those that affect the sequence when varied from the original schedule to a degree that there is doubt that the agreed Contract Completion Date will be met.

3. Changes to activities having adequate float to absorb the change shall be considered as minor changes, except that an accumulation of minor changes may be considered a major change when the effect of such changes impact the Project Milestones or the Contract Completion date.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not Used

PART 4 – MEASUREMENT AND PAYMENT

A. No separate measurement or payment shall be made under this section. Contractor's Progress Schedule will be reviewed each month. The monthly progress payment will not be made until the Contractor's Progress Schedule is found by the OCTA Project Manager to be in conformance with the requirements of this Section.

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section consists of requirements for Contractor submittals to the OCTA Project Manager including plans, procedures, certificates, shop drawings, product data, samples, and miscellaneous Work-related submittals. Individual submittal requirements are specified in the applicable specification section for each unit of Work. No construction work shall be commenced prior to submittals and acceptance of all submittals and shop drawings required per contract documents.

1.02 DEFINITIONS

A. Submittals are categorized for convenience as follows:

1. Plans and Procedures: Include narrative descriptions, diagrams, equipment, procedures for excavation, demolition, site clearing, maintenance of traffic, etc.

2. Certificates: Include certified material test reports, certification of proper disposal of demolition materials, or tickets demonstrating compliance with materials, tests or specifications indicated.

3. Equipment: Include equipment specifications, manufacturer information and demonstration of suitability of equipment for intended use.

4. Product Data: Standard published information ("catalog cuts") and specially prepared data for the Work of the Contract, including standard illustrations, schedules, brochures, diagrams, performance charts, instructions and other information to illustrate a portion of the Work. Include standard printed information on materials, products and systems to be furnished by the Contractor for this Contract.

5. Shop Drawings: Include detailed manufacturing and layout information, drawings, diagrams, schedules, and illustrations, demonstrating the contractor’s understanding and approach to meeting the intent of the plans and specifications. Shop drawings shall be submitted to the Engineer for review and comment on the conformance of the submitted information to the general intent of the design.

6. Samples: Include physical examples of materials either for limited visual inspection or selection, or (where indicated) for confirmation, testing, and analysis by the OCTA Project Manager.

7. Miscellaneous Submittals: Such submittals shall be related directly to the Work, not administration related. Include but not be limited to asphalt concrete mix design, work schedule, phasing plans, warranties, guarantees, maintenance agreements, workmanship bonds, survey data and reports, physical work records, quality testing and certifying reports, copies of industry standards, record drawings, field measurement data, operating and maintenance materials, overrun stock (and similar information) and, devices and materials applicable to the Work but not processed as shop drawings, product data or samples. Beside the shop drawings required in the project plans or specifications, the OCTA Project Manager may require additional shop drawings demonstrating the contractor's approach to meeting the intent of the plans and specifications as a part of Quality Control/Quality Assurance.

B. Product data, shop drawings, samples, and any other submittals are not contract documents.

1.03 SCHEDULE OF SUBMITTALS

A. It is the Contractor's responsibility to identify the submittals that will be required in each section of specifications and on the contract drawings and determine the date on which each submittal will be made. The submittal schedule, the timeline for which Contractor plans to deliver required submittals to OCTA shall be submitted by the Contractor at time of initial construction meeting to the OCTA Project Manager for review and acceptance. Allow OCTA a minimum of 14 calendar days to review Schedule of Submittal. After review and return by the Engineer, resubmit Schedule of Submittal within 7 calendar days.

B. Throughout the duration of the Contract, Contractor shall, at the OCTA Project Manager's request, submit all product or procedure documentation for any activity in the Contract.

1.04 GENERAL SUBMITTAL REQUIREMENTS

A. Administrative Requirements for Submittal: Submittals shall be made in accordance with requirements specified herein and in Product Sections of the Specifications.

B. Transmission of Submittals: Transmit all submittals through the Project Engineer, unless otherwise directed. Include all information specified below for identification of submittals and for monitoring of review process.

C. Make submittal at time required per the contract documents and per the Submittal Schedule accepted by the OCTA. Allow three (3) weeks for the OCTA's Consultant to review and accept submittals.

D. OCTA Project Manager and Contractor shall discuss at the initial construction meeting, the exact procedure to be adopted for the processing of submittals. Generally, submittals shall be made at the time indicated in Contractor's approved

submittal schedule. OCTA Project Manager will process submittals within 21 calendar days after receipt of each of submittals and resubmittals from Contractor. After review and return by the Engineer, resubmit the submittals within 7 calendar days.

E. Contractor shall be responsible for on time delivery and processing of submittals so as not to impede the progress of the Work. Contractor shall provide, unless otherwise indicated, five (5) hard copies of each submittal.

F. Contractor shall, before making submittals, ensure that products will be available in the quantities and in the time required by the Contract.

G. Contractor shall coordinate and sequence different categories of submittals for same work, and interface units of work, so that one will not be delayed for coordination with another.

H. Contractor shall maintain a file of all approved submittal documents on work site.

I. Where required by California law, or as specified in the Contract Documents, submittals shall be signed and sealed by a Professional Engineer licensed in the State of California, or Land Surveyor licensed in the State of California as applicable.

J. Submittals shall be consecutively and uniquely numbered using a document identifier including Contract number and the appropriate suffix, which will include specification section number and submittal number. Submittals under each specification section shall be in a separate package.

K. Submittals Identification: Identify each submittal by Specification Section number followed by a number indicating sequential submittal for that Section. Re-submittals shall use same number as original submittal, followed by a letter R and a number indicating sequential re-submittal. For example:

3300-1	First submittal for Section 3300 – Asphalt Concrete Mix Design
3300-2	Second submittal for Section 3300 – Asphalt Concrete Mix Design.
3300-2-R1	Re-submittal of second submittal for Section 3300 – Asphalt Concrete Mix Design.
3300-2-R2	Second re-submittal of second submittal for Section 3300 – Asphalt Concrete Mix Design.

1. Title each submittal with Project name, the Authority's Project number, Submittal number, Sequence number of Submittal, Contractor's Project number and submission date.

2. Identify each element on submittal by reference to Drawing sheet number, detail, schedule, number, assembly or equipment number, Specifications article and

paragraph, and other pertinent information to clearly correlate submittal with Contract Drawings. Identify field dimensions clearly and relationships to adjacent or critical features of Work, any deviations from the contract documents and applicable standards, ASTM, ACI, OSHA, ect.

L. Contractor's review of submittals: Prior to submission to the Engineer for review, Contractor shall review each submittal for completeness and conformance to specified requirements. Contractor shall stamp each submittal with a review action stamp and sign each copy certifying that:

1. Field measurements have been determined and verified.

2. Field construction criteria have been verified.

3. Catalog numbers and similar data are correct.

4. Conformance with requirements of Contract Drawings and Specifications is confirmed.

5. All deviations from requirements of Drawings and Specifications have been identified and noted, and product is available.

M. Submittals which are received from sources other than through Contractor's office or which have not undergone Contractor's review, will be returned marked "Without Action".

N. Contractor shall be responsible for timely delivery of submittals in the proper specified format for each submittal category.

O. Except as otherwise indicated in individual work sections, the Contractor shall comply with requirements specified herein for each indicated category of submittal.

P. The Contractor shall include an up-to-date log of submittals in each submittal package.

Q. Grouping of Submittals: Unless otherwise specifically permitted by the Engineer, make all submittals in groups containing all associated items. The Engineer may reject partial submittals as incomplete or hold them until related submittals are made. Submittals under a specification section shall be in one submittal package.

R. Unsolicited Submittals: Unsolicited submittals will be returned un-reviewed.

S. Record Submittals: When record submittals are specified, submit three hard copies or sets only. Record submittals will not be reviewed but will be retained for historical and maintenance purposes.

1.05 SHOP DRAWINGS

A. Shop drawings shall be prepared using AutoCAD. Unless otherwise approved by the OCTA Project Manager or indicated in specific sections of the project specific specifications, shop drawings shall be scaled sufficiently large to accurately show all pertinent aspects of the item and its relationship to the work. Acceptable shop drawings hard copy sizes are 22" x 34", 11" x 17" and 8½" x 11" and are scalable. The Contractor shall additionally submit the shop drawing on electronic media in PDF format and in AutoCAD format compatible with AutoCAD version 2012.

B. Shop drawings shall be original drawings prepared for submittal review, fabrication and execution of Work. Direct copies and modified reproductions of Contract Drawings will not be accepted for review. Provide space for review action stamps. Contractor shall field verify all existing conditions and all measurements on site before preparing and submitting shop drawings.

C. Shop drawings shall show, at a minimum, the following:

1. General project information:

    a. The original date of issue;

    b. The dates of all applicable revisions;

    c. The project title, project number, and address;

    d. The names of contractor, subcontractors, suppliers, manufacturers, separate detailers, etc…

2. Detailed manufacturing and layout information.

3. Drawings, diagrams, schedule and illustrations.

4. Bill of materials including materials types, dimensions and weights, quantities, origin of the materials, material certifications.

5. Welding procedure specifications.

6. Erection or installation plans.

7. Any other important items related to specific work of the Project and as requested by the OCTA's Project Manager.

D. Detailed work drawings shall be submitted by Contractor for temporary structures and for such other temporary work as may be required for construction, but which does not become an integral part of the completed project. Submittals shall include back-up calculations or any information needed to explain the structure or system or its intended use.

E. Where a submittal involves engineering computations or original design work is depicted, the submittal shall show the name, the State of California registration number, seal, and signature of the Professional Engineer certifying that such computations or design work are correct and in conformance with standards, codes, and acceptable engineering practice.

F. Contractor shall submit 5 hard copies and a PDF file of each shop drawing submittal. Distribution of submitted shop and working drawings by Contractor for OCTA Project Manager's use will be performed by OCTA Project Manager. Review comments of OCTA Project Manager, and other parties as may be required will be shown on the reproducible set when it is returned to Contractor. Contractor shall make and distribute all copies required for his purposes.

1.06 PRODUCT DATA

A. Contractor shall collect required data into one submittal for each unit of work or system, and mark each copy to show which choices and options are applicable to the Project.

B. Contractor shall include the manufacturer's standard printed recommendations for application and use, certification of compliance with standards, notation of field measurements, which have been checked, and special coordination requirements. A Material Safety Data Sheet (MSDS) shall be submitted for each product.

1.07 CERTIFICATES OF COMPLIANCE

A. Certificates of Compliance shall be submitted by Contractor to OCTA Project Manager for those materials and products for which no samples and test results are specified. The certificates shall:

1. State that the product complies with the respective contract specification and contract drawing requirements.

2. Be accompanied by a certified copy of test results pertaining to the product. All test equipment used shall be verified to be in calibration at the time of each test and test reports shall so indicate. No test shall be made without such verification. When required by the Contract Documents or by law, certified test results shall be sealed by a Professional Engineer licensed to practice in the State of California.

3. Show product represented and its location in the Contract, producer's name, product trade name and catalog number as applicable, place of product origin, test date, testing organization's name and address, quantity of the product to be furnished, and the related Contract Drawing and specification section numbers.

1.08 SAMPLES

A. Provide samples of each color, texture and pattern identical with final condition of proposed materials or products for the work. Include range of samples (not less than three units) where unavoidable variations may be expected. Submit one item only of actual assembly or product. Full-size and complete samples may be returned or may be incorporated into field mock-up and the Work.

B. Submit actual samples. Photographic or printed reproductions will not be accepted. For manufacturer's products, the Contractor shall submit samples from manufacturer, with manufacturer's finish.

C. Include information with each sample showing generic description, source or product name, manufacturer and compliance with standards and specifications.

D. Samples are submitted for review and confirmation by OCTA Project Manager. The Engineer will review and select material for Project only after all samples are received, so that materials may be probably coordinated. OCTA Project Manager will not test samples (except as otherwise indicated) for compliance with specifications. Contractor shall have the exclusive responsibility of demonstrating material compliance.

1.09 SURVEY DATA

A. As required per contract documents and/or by OCTA Project Manager, Contractor shall submit survey data, signed and sealed by a Land Surveyor licensed to practice in the State of California. Refer to Section 01 71 23, Field Engineering for requirements.

1.10 GENERAL DISTRIBUTION

A. Contractor shall provide distribution of OCTA Project Manager's reviewed submittals (not included in foregoing copy submittal requirements) to subcontractors, suppliers, fabricators and installers, governing authorities, and others as necessary for proper performance of the Work.

B. Contractor shall include such additional copies of transmittal to OCTA Project Manager, where required, to receive status marking before final distribution.

1.11 REVIEW OF SUBMITTALS

A. Submittals shall be a communication aid between Contractor and the Engineer by which interpretation of Contract Documents requirements may be confirmed in advance of construction. OCTA Project Manager will review submittals for general conformance with the design concept only. Such review by OCTA Project Manager shall not relieve Contractor or any subcontractor of responsibility for full compliance

with contract requirements, for proper design of details, for proper fabrication and construction techniques, for proper coordination with other trades, or for providing all devices required for safe and satisfactory construction and operation.

B. Changes shall only be authorized by separate written Change Order or Construction Change Authorization, in accordance with the Conditions of the Contract and Section 01 26 00 - Contract Modification Procedures.

1.12 SUBMITTAL STATUS

A. Submittals reviewed by OCTA Project Manager and returned to Contractor will be marked with one of the following designations:

1. Conforms.

2. Conforms with Corrections as Noted

3. Revise as Noted and Resubmit.

4. Rejected. Resubmit

5. No Action Taken

B. Contractor shall not proceed with procurement, manufacture or fabrication of items submitted for review, until such submittals have been designated by OCTA Project Manager as "Conforms" or “Conforms with Corrections as Noted". Until submittal items receive a conforming designation by OCTA Project Manager, any costs associated with procurement for these items shall be at the Contractor’s risk.

1.13 SUBMITTALS DESIGNATED AS "CONFORMS" OR "CONFORMS WITH CORRECTIONS AS NOTED"

A. Each copy of the submittal so designated by OCTA Project Manager will be identified accordingly by being so stamped and dated.

B. One reproducible copy will be returned to Contractor.

C. When a submittal has been designated as "Conforms" by OCTA Project Manager, Contractor shall carry out construction in accordance therewith and no further changes shall be made therein except upon written approval and instructions from OCTA Project Manager.

D. Contractor shall take responsibility for and bear all cost of damages, which may result from the ordering of any material or from proceeding with any part of the Work prior to submittal being marked "Conforms" or "Conforms with Corrections as Noted" by OCTA Project Manager.

E. Where drawings are stamped " Conforms with Corrections as Noted" OCTA Project Manager shall indicate the corrected detail or information as required.

F. Submittals stamped "Conforms" do not relieve the contractor from the responsibility of performance of Work as intended in the plans and specifications. Refer to 1.11 of this Section.

1.14 SUBMITTALS DESIGNATED AS "REVISE AND RESUBMIT," OR "REJECTED. RESUBMIT"

A. Each copy of the submittal so designated by OCTA Project Manager will be identified accordingly by being so stamped and dated.

B. One copy will be returned to Contractor.

C. If corrections to the submittals are required, copies returned to Contractor will be marked "Rejected. Resubmit", or "Revise and Resubmit", and the required corrections shall be made on the re-submittal copies.

D. Re-submittals will be handled in the same manner as first submittals. Direct specific attention in writing on re-submittals to revisions other than the corrections requested by OCTA Project Manager on previous submittals. Re-submittals shall use the same number as original submittal but will be modified by R and number of re-submittal in the suffix.

E. Contractor shall notify OCTA Project Manager prior to execution of any correction, which constitutes a change of the contract requirements indicated on the submittals.

1.15 SUBMITTALS DESIGNATED AS "NO ACTION TAKEN"

A. Each copy of the submittal so designated by OCTA Project Manager will be identified accordingly by being so stamped and dated.

B. One reproducible copy will be returned to Contractor.

C. Submittals made by the Contractor that are not required by the contract documents or were not otherwise requested shall be designated "No Action Taken"

PART 2 – PRODUCTS

Not Used.

INSTALLATION OF BATTERY-ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE

PART 3 – EXECUTION

Not Used.

PART 4 – MEASUREMENT AND PAYMENT

No separate measurement or payment shall be made under this Section.

END OF SECTION

SECTION 01 35 13

SPECIAL PROJECT PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Products and installation for patching and extending Work.

B. Transitions and adjustments.

C. Repair of damaged surfaces, finishes, and cleaning.

1.02 RELATED SECTIONS

A. Section 01 35 13 - Coordination with OCTA and Local Agencies: Authority occupancy and maintenance of utility services.

B. Section 01 73 29 - Cutting and Patching: General requirements for cutting and patching requirements.

C. Section 01 50 00 - Temporary Facilities and Controls: Temporary enclosures, protection installed Work, and cleaning during construction.

PART 2 - PRODUCTS

2.01 PRODUCTS FOR PATCHING AND EXTENDING WORK

A. New Materials: As specified in PART 2 - PRODUCTS of applicable product Specification Sections, provide suitable products and construction procedures for patching and extending Work.

B. Type and Quality of Existing Products: Determine by inspection and testing of Products where necessary, referring to existing construction as a standard.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that demolition is complete, and areas are ready for execution of Work.

B. Beginning of alteration Work will be interpreted to mean that Contractor has examined existing conditions and determined that they are acceptable.

3.02 PREPARATION

A. Coverings:

1. Provide weather- and dust-protection coverings as necessary to contain dust and debris. Protect OCTA Property, buses, equipment, utilities, landscaping, and accessories from dust. Provide appropriate covers over all buses parked adjacent to the work area or protect by sprinkling water over work area to control dust.

2. Close area of work with barricades to protect existing construction and new Work from traffic, weather, and extremes of temperature and humidity. At end of work day, provide enclosure around work area with flashing lights so that traffic is aware of construction excavations and new work.

3. Coordinate construction delineation with barricades, but provide OCTA staff cars buses adequate passage to enable the Authority to continue to pass through to parking areas. Provide Bus passage through construction areas if required. OCTA Facility will remain operational during construction.

4. Adjacent bus parking stalls will be used during construction. Provide adequate passage for OCTA buses and staff cars to park in adjacent parking stalls during construction. Do not allow contractor's cars or equipment to park in bus parking stalls adjacent to construction

5. See Section 01 50 00 - Temporary Facilities and Control for additional requirements.

B. Protective Devices and Directional Signage: Provide barricades, directional signage and other protective devices to enable the Authority to continue bus operations, bus traffic through construction areas, occupancy and operation in the existing buildings and adjacent parking stalls. See Section 01 50 00 - Temporary Facilities and Control for additional requirements.

C. Access for Work: Demolish, Cut, move or remove items as necessary for access for alterations, renovation and extension Work. Replace and restore at completion.

D. Disposal of Materials: Immediately remove unsuitable material not marked for salvage, such as decayed wood, insulation, asphalt concrete, corroded rebar, accessories and other materials as required to complete the work. Replace materials as specified for finished Work.

1. Do not allow debris to accumulate in work areas. Dispose debris daily off-site in a legal manner. Dispose all existing asphalt concrete and accessories that are to be removed, and legally dispose off-site.

2. Remove debris and abandoned items from work area and from parking spaces.

E. Surface Preparation: Remove surface finishes and prepare surfaces to provide for proper installation of new materials and finishes.

F. Protection: Protect buses and equipment parked adjacent to construction area from damage.

3.03 INSTALLATION

A. Coordinate Work for alterations and renovations to expedite completion and to accommodate the Authority's concurrent occupancy and use of the facility.

B. Coordinate Work for alterations and renovations in a timely manner to expedite completion and minimize disruption to the Authority's continued use occupied areas and spaces. Park all construction equipment and materials inside areas of construction and barricade construction area on all sides at end of work day. Provide flashing lights around work area from dusk to dawn.

C. Remove, cut, and patch Work in a manner to minimize damage and to provide a means of restoring products and finishes to original or specified new condition. Refer to Section 01 73 29 - Cutting and Patching.

D. Refinish visible existing surfaces to condition before start of construction. Match adjacent finish surface in color and material. Finish to specified condition for each material, with a near transition to adjacent finishes.

E. In addition to specified work, in case of breakdown of under or above ground utilities, plumbing, electrical power, signal systems, and lighting, restore to fully operational condition immediately as before construction commenced. All power, and other systems should be operational at end of work day. The plans are diagrammatic and do not show all utilities, ducting, equipment, and accessories on the site. Contractor will be required to repair immediately utilities, ducting, plumbing lines, power lines, signal and communication system, data lines, equipment, and accessories in case of breakdown or disruption due to construction work and as required to complete the work. Review OCTA record drawings of construction area before excavation.

F. Install products as specified in applicable product specification Sections.

3.04 TRANSITIONS

A. Where Work abuts or aligns with existing construction, perform a smooth and even transition. Patches shall match existing adjacent construction in texture and appearance.

B. When finished surfaces are cut so that a smooth transition is not possible, terminate existing surface along a straight line at a natural line of division. Refer to Section 01 73 29 - Cutting and Patching.

3.05 ADJUSTMENTS

A. Where removal of materials results in adjacent spaces becoming one, rework to a smooth plane without breaks, steps or bulkheads.

B. Where a change of plane of 1/4-inch or more occurs, submit recommendation for providing a smooth transition for the Engineer's review.

C. Fit Work at penetrations of surfaces as specified in Section 01 73 29 - Cutting and Patching.

3.06 REPAIR OF DAMAGED SURFACES

A. Replace portions of adjacent existing surfaces which are damaged, lifted, discolored, or showing other imperfections or require replacement or repairs during replacement work. Extent of replacement will be required to nearest construction joint, expansion joint, break line, natural break, or in a straight line. Provide a smooth transition between existing and new surface.

B. Repair substrate prior to patching finish.

C. Unless noted otherwise or directed by the OCTA Project Manager, all pavement striping, markings, and markers affected by the construction activities shall be reinstalled to match the existing conditions.

3.07 FINISHES

A. Finish surfaces as specified in applicable Sections.

B. Finish patches with material and paint to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections or joints.

3.08 CLEANING

A. In addition to cleaning specified in Section 01 74 23 - Cleaning, clean the Authority-occupied areas affected by construction activities. Clean areas around the site where asphalt concrete material has fallen during work day. Clean site of work daily before leaving site at end of each work day. Haul debris off-site daily. Clean adjacent bus parking areas daily before leaving site

INSTALLATION OF BATTERY-ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE

PART 4 – MEASUREMENT AND PAYMENT

No separate measurement or payment shall be made under this section.

END OF SECTION

SECTION 01 35 23

OWNER SAFETY REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. The Contractor shall comply with OCTA Level 3 Health, Safety and Environmental Specifications in the contract documents.

B. Work specified in this section consists of furnishing, operating, maintaining, and utilizing safety equipment; providing safety aids on construction equipment; and assuring safe operation. Compliance with requirements of this section shall not relieve Contractor from other obligations imposed elsewhere in contract, by law and by regulation.

1.02 OTHER SECTIONS WITH SAFETY REQUIREMENTS

A. OCTA Level 3 Health, Safety and Environmental Specifications

B. Section 01 14 22, Rules and Hours of Operation

C. Section 01 14 23, Coordination with OCTA and Local Agencies

D. Section 01 14 25, Procedures in Construction

E. Section 01 43 01, Contractor Qualifications and Requirements

1.03 REFERENCE STANDARDS

A. Comply with the provisions of all local, State and Federal codes, specifications, standards and recommended practices, and OCTA Project Manager Policy, in particular:

1. Cal/OSHA: California State Occupational Safety and Health Administration

2. OSHA: Federal Occupational Safety and Health Administration

1.04 QUALITY CONTROL AND QUALITY ASSURANCE

A. Contractor's selection and operation of construction equipment and tools shall meet requirements of California State and Federal Occupational Safety and Health Administration (Cal/OSHA, OSHA).

B. If there is a conflict between the above, the most stringent requirement will apply.

1.05 SUBMITTALS

A. Contractor shall submit, under provisions of Section 01 33 00, Submittals, the following information:

1. Information required by OCTA Level 3 Health, Safety and Environmental Specifications.

2. Material Safety Data Sheet, per Section 01 14 25, Procedures in Construction.

3. Notification to OCTA Project Manager as soon as reasonably possible of any injury to Contractor's employee, subcontractor of any tier, supplier or other entity engaged in any portion of the work while on OCTA Project Manager property. Contractor shall submit an injury report to OCTA Project Manager within 24 hours of said injury.

4. Other records as required by agencies listed in Part 1.03.

1.06 SAFETY AND HEALTH PERSONNEL

A. Provide a Site Safety Representative, as described in Sections 01 43 01 Contractor Qualifications and Requirements, OCTA Level 3 Health, Safety and Environmental Specifications, and the General Provisions, who shall coordinate and supervise onsite safety and health, including training and testing Contractor's personnel.

1.07 CONSTRUCTION AND SAFETY EQUIPMENT

A. Contractor shall conform to requirements of the OCTA Project Manager, Cal/OSHA, and to applicable codes and regulations of Federal, State, and local authorities having jurisdiction over jobsite safety.

1.08 TESTING EQUIPMENT

A. Testing equipment as applicable to work site safety shall conform to requirements of California Code of Regulations, Title 8, Division of Industrial Safety, unless indicated otherwise.

1.09 IDENTIFICATION OF CONTRACTOR/SUBCONTRACTOR PERSONNEL

A. While performing work at worksite, Contractor personnel of any tier shall be identified with employee's company name or logo affixed to employee's hardhat, identification badge, or other identification acceptable to OCTA Project Manager.

B. Contractor personnel shall wear hard hats, orange safety vests or orange T-shirts with reflective strips, safety glasses, and safety shoes at all times while on the project.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

PART 4 – MEASUREMENT AND PAYMENT

No separate measurement or payment shall be made under this Section.

END OF SECTION

SECTION 01 41 00

REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Requirements associated with regulations, standards, and requirements of authorities having jurisdiction.

B. Related Sections:

1. Section 01 14 25, Procedures in Construction.

2. Section 01 14 27, Legal Relations and Responsibility.

1.02 SUBMITTALS

A. Submit in accordance with Section 01 33 00, Submittal Procedures.

B. Before starting the work, submit to OCTA Project Manager copies of permit applications, permits, licenses, receipts for fee payments, judgments, and other similar documents, correspondence, and records obtained for performance of the work.

C. At completion, submit certifications, releases, jurisdictional settlements, notices and other similar documents under Section 01 77 00, Closeout Procedures.

1.03 APPLICABILITY OF INDUSTRY STANDARDS

A. Construction Industry Standards referenced in the contract documents have the same force and effect as if published herein and are made a part of the contract documents. Refer to Section 01 42 00 References.

B. Reference standards (referenced in the contract documents or by governing regulations) have precedence over non-referenced standards that are recognized in the industry for applicability to the work.

1. Building Codes: Performance of the Work shall meet or exceed the minimum requirements of California Code of Regulations (CCR), Title 24, including the following:

a. CCR Title 24, Part 2: Uniform Building Code (UBC), latest edition, with State

of California amendments; referenced as California Building Code (CBC).

b. CCR Title 24, Part 3: National Fire Protection Association (NFPA) 13 - National Electrical Code (NEC), latest edition, with State of California Amendments, referenced as California Electrical Code (CEC).

c. CCR Title 24, Part 9: Uniform Fire Code (UFC), latest edition, with State of California Amendments, referenced as California Fire Code (CFC).

d. CCR Title 24, Part 12: Uniform Building Code Standards (UBC Standards), latest edition, with State of California Amendments; referenced as California Building Standards Code (CBSC).

2. Performance of the Work shall also comply with applicable requirements of California Code of Regulations (CCR), as follows:

a. Title 19 - Public Safety.

b. Title 22 - Social Security.

c. Title 24 - Building Standards, Parts 2 through 7, and Title 25 as applicable.

3. References on the Drawings or in the Specifications to "code", "Code" or "building code" similar terms, not otherwise identified, shall mean the codes specified above, together with all additions, amendments, changes, and interpretations adopted by code authorities of the jurisdiction having authority over the Project.

4. The applicable edition of all codes shall be that adopted at the time of issuance of permits by the jurisdiction having authority and shall include all modifications and additions adopted by that jurisdiction(s).

C. Recognized industry standards shall be used where no specific standard is referenced in the contract documents. Obtain OCTA Project Manager's approval before using any non-referenced standards.

1.04 GOVERNING REGULATIONS AND AUTHORITIES

A. Contact authorities having jurisdiction directly for necessary information and decisions having a bearing on performance of the work.

B. Utility location and protection shall conform to Section 5, Utilities, of the Standard Specifications for Public Works Construction (SSPWC). At each OCTA's property, the contractor shall utilize an independent underground utility locating service, which uses standard locating techniques other than excavating, to identify the location of underground utilities in the areas of the work prior to excavating. The contractor shall determine the exact location of utilities identified in the work area by potholing using hand tools before using any power operated excavating equipment. Utilities now

shown on the plans which are in direct conflict with the work will be dealt with by change orders.

C. Comply with requirements under the National Pollutant Discharge Elimination System (NPDES).

1.05 OTHER APPLICABLE LAWS, ORDINANCES AND REGULATIONS

A. Work shall be accomplished in conformance with all applicable laws, ordinances, rules and regulations of Federal, State and local governmental agencies and jurisdictions, County of Orange, AQMD, CAL-OSHA, and all other agencies having authority over the Project.

B. Work shall be accomplished in conformance with all rules and regulations of public utilities, utility districts, and public agencies providing utility services.

C. Where such laws, ordinances, rules and regulations require more care or greater time to accomplish Work, or require better quality, higher standards or greater size of products, Work shall be accomplished in conformance to such requirements with no change to the Contract Sum And Contract Time, except where changes in laws, ordinances, rules and regulations occur subsequent to the execution date of the Agreement.

D. Contractor shall pay for and obtain all permits required by all agencies having jurisdiction over the work. Contractor shall be required to pay for all temporary utility connections and use to the respective utility company during construction.

1.06 PERMITS

A. Obtain required permits from regulating agencies. Do not start work in areas requiring permits before issuance of permits from authorities having jurisdiction.

1. Coordinate with regulating agencies to obtain required permits.

2. Submit copies of permit applications and permits to OCTA Project Manager.

3. Comply with permit requirements and assume responsibility for any violations.

B. Prepare permit applications and obtain permits as necessary for performance of the work, including but not limited to:

1. Maintenance and protection of vehicle traffic.

2. Excavation, dewatering and discharge of surface water and runoff into existing drainage systems or surface waters.

3. Disposal of debris and soils.

4. All other activities with potential to adversely affect the environment.

5. Written permission from property owner for right of entry onto private property where necessary.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

No separate measurement will be made for work of this section.

4.02 PAYMENT

Work of this section is considered incidental to work under other payment item(s) listed in the Schedule of Quantities and Prices and no separate payment will be made.

END OF SECTION

SECTION 01 42 00

REFERENCES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Use of references in Drawings and Specifications, including requirements for copies of reference standards at Project site.

2. Abbreviations and acronyms.

3. General provisions regarding references.

1.02 USE OF REFERENCES

A. References: The Drawings and Specifications contain references to various standards, standard specifications, codes, practices and requirements for products, execution, tests and inspections. These reference standards are published and issued by the agencies, associations, organizations and societies listed in this Section or identified in individual product specification Sections.

B. Relationship to Drawings and Specifications: Such references are incorporated into and made a part of the Drawings and Specifications to the extent applicable.

C. Referenced Grades Classes and Types: Where an alternative or optional grade, class or type of product or execution is included in a reference but is not identified on the Drawings or in the Specifications, provide the highest, best, and greatest of the alternatives or options for the intended use and prevailing conditions.

D. Copies of Reference Standards:

1. Reference standards are not furnished with the Drawings and Specifications because it is presumed that the Contractor, subcontractors, manufacturers, suppliers, trades and crafts are familiar with these generally-recognized standards of the construction industry.

2. Copies of reference standards may be obtained from publishing sources.

E. Jobsite Copies:

1. Contractor shall obtain and maintain at the Project site copies of reference standards identified on the Drawings and/or in the Specifications in order to properly execute the Work.

2. At a minimum, the following shall be readily available at the site:

   a. Local and State Building Codes: As referenced in Section 01060 - Regulatory Requirements.

   b. Safety Codes: State of California, California Code of Regulations (CCR), Title 8 - Industrial Relations, Chapter 4, Subchapter 7, General Industry Safety Orders.

   c. General Standards: UBC Standards, other model Code standards, UL Building Products Listing, FM Approval Guide and ASTM Standards in Building Codes.

   d. Fire and Life Safety Standards: All referenced standards pertaining to fire rated construction and exiting.

   e. Common Materials Standards: American Concrete Institute (ACI), American Institute of Steel Construction (AISC), American Welding Society (AWS), Gypsum Association (GA), National Fire Protection Association (NFPA), Tile Council of America (TCA) and Woodwork Institute of California (WIC) standards to the extent referenced within the Contract Specifications.

   f. Research Reports: ICBO Evaluation Service (ICBO ES) Research Reports and CABO National Evaluation Service Reports (NER), for products not in conformance to prescribed requirements stated in Building Code.

   g. Product Listings: Approval documentation, indicating approval of authorities having jurisdiction for use of product with City of Santa Ana.

F. Edition Date of References:

   1. When an edition or effective date of a reference is not given, it shall be understood to be the current edition or latest revision published as of the date indicated on the Drawings and Specifications.

   2. All amendments, changes, errata and supplements as of the effective date shall be included.

G. ASTM and ANSI References: Specifications and Standards of the American Society for Testing and Materials (ASTM) and the American National Standards Institute (ANSI) are identified in the Drawings and Specifications by abbreviation and number only and may not be further identified by title, date, revision or amendment. It is presumed that the Contractor is familiar with and has access to these nationally- and industry-recognized specifications and standards.

1.03 DEFINITIONS OF TERMS

A. Words and Terms Used on Drawings and in Specifications: Additional words and terms may be used in the Drawings and Specifications and are defined as follows:

1. Applicable: As appropriate for the particular condition, circumstance or situation.

2. Approved: Limited to duties and responsibilities of the Authority and the Engineer as stated in the Conditions of the Contract, for actions performed in the professional judgment of the Engineer or the Engineer's responsible design consultant, in conjunction with submittals, applications, and requests. Approvals shall be valid only if obtained in writing and shall not apply to matters regarding the means, methods, techniques, sequences and procedures of construction. Approval action shall not relieve the Contractor from responsibility to fulfill Contract requirements.

3. And/or: If used, shall mean that either or both of the items so joined are required.

4. Authority or Owner: The Orange County Transportation Authority, a legal entity organized and existing in the County of Orange under and by virtue of the laws of the State of California. All necessary action by the Authority pertaining to the contract will be taken by legally constituted authorities empowered to on behalf of the Orange County Transportation Authority.

5. Contractor: shall mean the individual, partnership, corporation, or other legal entity entering into contract with the Authority to perform the work covered by the contract documents, and these specifications.

6. Directed: Limited to duties and responsibilities of the Engineer as stated in the Conditions of the Contract, and meaning as instructed by the Engineer, in writing, regarding matters other than the means, methods, techniques, sequences and procedures of construction. Terms such as "directed", "requested", "authorized", "selected", "approved", "required", and "permitted" mean "directed by the Engineer", "requested by the Engineer", and similar phrases. No implied meaning shall be interpreted to extend the Engineer's responsibilities into the Contractor's supervision of construction.

7. Equal or Equivalent: As determined by the Engineer as being equivalent, considering such attributes as durability, finish, function, suitability, quality, utility, performance, and aesthetic features.

8. Engineer: shall mean the Project Manager of the Orange County Transportation Authority, acting either directly or through properly authorized agents or representatives acting within the scope of the particular duties entrusted to them.

9. Furnish: Means "supply and deliver, to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations."

10. Indicated: The term "indicated" refers to graphic representations, notes, or schedules on the Drawings, or other Paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Terms such as "shown", "noted", "scheduled", and "specified" are used to help the reader locate the reference. There shall be no limitation on location.

11. Install: Describes operations at the Project site including the actual unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations.

12. Installer:

    a. "Installer" refers to the Contractor or an entity engaged by the Contractor, such as an employee, subcontractor, or sub-subcontractor, for performance of a particular construction activity, including installation, erection, application and similar operations. Installers shall be adequately skilled and experienced in the operations they are engaged to perform.

    b. Experienced Installer: The term "experienced," when used with "installer" shall mean having a minimum of 5 previous projects similar in size to this Project, knowing the precautions necessary to perform the Work, and being familiar with requirements of authorities having jurisdiction over the Work.

13. Jobsite: Same as "Site."

14. Necessary: With due consideration of the conditions of the Project and, as determined in the professional judgment of the Engineer as being necessary for performance of the Work in conformance with the requirements of the Contract Documents, but excluding matters regarding the means, methods, techniques, sequences and procedures of construction.

15. Noted: Same as "Indicated."

16. Per: In accordance with or in compliance with.

17. Products: Material, system or equipment.

18. Project Site: Same as "Site."

19. Proper: As determined by the Engineer as being proper for the Work, excluding matters regarding the means, methods, techniques, sequences and procedures of construction, which are solely the Contractor's responsibility to determine.

20. Provide: "Furnish and install, complete, and ready for the intended use."

21. Regulation: Includes laws, ordinances, statutes and lawful orders issued by authorities having jurisdiction, as well as and rules, conventions and agreements within the construction industry that control performance of the Work.

22. Required: Necessary for performance of the Work in conformance with the requirements of the Contract Documents, excluding matters regarding the means, methods, techniques, sequences and procedures of construction, such as:

    a. Regulatory requirements of authorities having jurisdiction.
    b. Requirements of referenced standards.
    c. Requirements generally recognized as accepted construction practices of the locale.
    d. Notes, schedules and graphic representations on the Drawings.
    e. Requirements specified or referenced in the Specifications.
    f. Duties and responsibilities stated in the Bidding and Contract Requirements.

23. Scheduled: Same as "Indicated."

24. Selected: As selected by the Engineer or Authority from the full selection of the manufacturer's products, unless specifically limited in the Contract Documents to a particular quality, color, texture, or price range.

25. Shown: Same as "Indicated."

26. Site: Same as "Jobsite", "Site of the Work" or "Project Site;" the area or areas or spaces occupied by the Project and including adjacent areas and other related areas occupied or used by the Contractor for construction activities, either exclusively or with others performing other construction on the Project. The extent of the Project Site is shown on the Drawings, and may or may not be identical with the description of the land upon which the Project is to be built.

27. Subcontractor: The individual, partnership, corporation or other legal entity entering into a contract with the Contractor to perform a portion of the work.

28. Testing Laboratory or Laboratories: Same as "Testing and Inspection Agency."

29. Testing and Inspection Agency: An independent entity engaged to perform specific inspections or tests, at the Project Site or elsewhere, and to report on, and, if required, to interpret, results of those inspections or tests.

1.03 ABBREVIATIONS, ACRONYMS, NAMES AND TERMS, GENERAL

A. Abbreviations, Acronyms, Names and Terms: Where acronyms, abbreviations names and terms are used in the Drawings, Specifications or other Contract Documents, they shall mean the recognized name of the trade association, standards generating organization, authority having jurisdiction or other entity applicable.

B. Abbreviations: The following are commonly-used abbreviations which may be found on the Drawings or in the Specifications:

AC or ac	Alternating current or air conditioning (depending upon context)
AMP or amp	Ampere
C	Celsius
CFM or cfm	Cubic feet per minute
CM or cm	Centimeter
CY or cy	Cubic yard
DC or dc	Direct current
DEG or deg	Degrees
F	Fahrenheit
FPM or fpm	Feet per minute
FPS or fps	Feet per second
FT or ft	Foot or feet
Gal or gal	Gallons
GPM or gpm	Gallons per minute
IN or in	Inch or inches
Kip or kip	Thousand pounds
KSI or ksi	Thousand pounds per square inch
KSF or ksf	Thousand pounds per square foot
KV or kv	Kilovolt
KVA or kva	Kilovolt amperes
KW or kw	Kilowatt
KWH or kwh	Kilowatt hour
LBF or lbf	Pounds force
LF or lf	Lineal foot
M or m	Meter
MPH or mph	Miles per hour
MM or mm	Millimeter
PCF or pcf	Pounds per cubic foot
PSF or psf	Pounds per square foot
PSI or psi	Pounds per square inch
PSY or psy	Per square yard
SF or sf	Square foot
SY or sy	Square yard
V or v	Volts

C. Undefined Abbreviations, Acronyms, Names and Terms: Words and terms not otherwise specifically defined in this Section, in the Instructions to Bidders, in the Conditions of the Contract, on the Drawings or elsewhere in the Specifications, shall be as customarily defined by trade or industry practice, by reference standard and by specialty dictionaries such as the following:

1. The American Institute of Architects (AIA) Document M101, "Glossary of Construction Industry Terms".

2. The Construction Specifications Institute (CSI) Technical Document TD 2-4, "Abbreviations".

3. Dictionary of Architecture and Construction, (Cyril M. Harris, McGraw-Hill Book Company, 1975).

4. Encyclopedia of Associations, published by Gale Research Co., available in most libraries.

1.04 ABBREVIATIONS FOR AGENCIES, ASSOCIATIONS, CODES AND STANDARDS

A. Abbreviations for Agencies, Associations, Codes and Standards: The following abbreviations and acronyms may be used in the Drawings and Specifications. When used, the abbreviation or acronym shall mean the full name of the applicable agency, association, organization, society or standard.

AAMA	American Architectural Manufacturers Association
AAR	Association of American Railroads
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ADA	Americans with Disabilities Act
ADAAG	Americans with Disabilities Act Accessibility Guidelines
AGA	American Galvanizers Association
AGA	American Gas Association
AHRI	Air-Conditioning, Heating, and Refrigeration Institute
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
ALSC	American Lumber Standard Committee
AMCA	Air Movement and Control Association International, Inc.
ANSI	American National Standards Institute
APA	APA – The Engineered Wood Association (formerly American Plywood Association)
AREMA	American Railway Engineering and Maintenance-of-Way Association
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
ASME	ASME International (formerly American Society of Mechanical Engineers)
ASSE	American Society of Safety Engineers
ASSE	American Society of Sanitary Engineering
ASTM	ASTM International (formerly American Society for Testing and Materials)
AWI	Architectural Woodwork Institute
AWPA	American Wood Protection Association (formerly American Wood-Preservers' Association)
AWS	American Welding Society
BHMA	Building Hardware Manufacturers Association
Cal/EPA	California Environmental Protection Agency

Cal/OSHA	California Department of Industrial Relations, Division of Occupational Safety and Health
Caltrans	California Department of Transportation, Standard Plans & Specifications 2010 Edition
CBC	California Building Code
CEC	California Electrical Code
CFR	Code of Federal Regulations
CMC	California Mechanical Code
CPA	Composite Panel Association
CPC	California Plumbing Code
CPUC	California Public Utilities Authority
CRI	Carpet and Rug Institute
CRSI	Concrete Reinforcing Steel Institute
DHI	Door and Hardware Institute
DOC	U.S. Department of Commerce
DOT	U.S. Department of Transportation
EPA	U.S. Environmental Protection Agency
FM	FM Approvals
FM	FM Global (formerly Factory Mutual)
FRA	Federal Railroad Administration
FS	Federal Specification
FSC	Forest Stewardship Council
FTA	Federal Transit Administration
GA	Gypsum Association
GANA	Glass Association of North America
HI	Hydraulics Institute
HMMA	Hollow Metal Manufacturers Association
ICC	International Code Council
IEEE	Institute of Electrical and Electronics Engineers
IGCC	Insulating Glass Certification Council
IGMA	Insulating Glass Manufacturers Alliance
ISO	International Organization for Standardization
LBTC	Laguna Beach Transportation Center
LEED	Leadership in Energy and Environmental Design
MPI	Master Painters Institute
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry
NAAMM	National Association of Architectural Metal Manufacturers
NACE	NACE International (formerly National Association of Corrosion Engineers)
NEMA	National Electrical Manufacturers Association
NETA	InterNational Electrical Testing Association
NFPA	National Fire Protection Association
NFPA	National Forest Products Association
NFRC	National Fenestration Rating Council
NHLA	National Hardwood Lumber Association
NSF	NSF International (formerly National Sanitation Foundation)
OSHA	Occupational Safety and Health Administration

PCI	Precast/Prestressed Concrete Institute
PDI	Plumbing and Drainage Institute
PS	Product Standard (US Department of Commerce)
RCSC	Research Council on Structural Connections
RIS	Redwood Inspection Service
RTA	Railway Tie Association
SDI	Steel Deck Institute
SDI	Steel Door Institute
SCRRA	Southern California Regional Rail Authority
SCAQMD	South Coast Air Quality Management District
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
SPPWC	Standard Plans for Public Works Construction, 2015 Edition
SSPC	Society for Protective Coatings (formerly Steel Structures Painting Council)
SSPWC	Standard Specifications for Public Works Construction, 2015 Edition
TCNA	Tile Council of North America
UL	Underwriters Laboratories Inc.
USDOJ	U.S. Department of Justice
USDOT	U.S. Department of Transportation
USGBC	U.S. Green Building Council
WCLIB	West Coast Lumber Inspection Bureau (stamped WCLB)
WI	Woodwork Institute
WWPA	Western Wood Products Association

1.03 REFERENCE STANDARDS

A. General

1. Specifications, standards, and guidelines referenced in the text are incorporated by reference as if fully set forth. Where a referenced standard includes both administrative and technical provisions, and the administrative provisions conflict with the contract documents, only the technical provisions shall apply. If a referenced standard appears to conflict with the drawings and specifications, consult OCTA Project Manager for resolution.

2. The governing versions of reference standards and codes are those current at the time of contract execution, including errata, amendments, updates, etc., unless noted otherwise.

3. Contractor shall maintain the latest copy of applicable standards at jobsite during submittals, planning and progress of the work. Make standards available for use by OCTA Project Manager upon request.

4. Caltrans: Standard Plans and Specifications 2010 Edition.

5. Standard Plans for Public Works Construction (SPPWC) 2012 Edition, Standard Specifications for Public Works Construction (SSPWC) 2015 Edition.

B. ADA Standards

1. References to ADAAG or the ADA Accessibility Guidelines refer to the ADA [Americans with Disabilities Act] Accessibility Guidelines for Buildings and Facilities, adopted 7/23/04 by the U.S. Access Board, amended 8/5/05, supplemented 3/23/07 reflecting amendments by the U.S. Department of Transportation, available at www.access-board.gov .

2. References to USDOT ADA Standards refer to the U.S. Department of Transportation ADA Standards for Transportation Facilities, effective 11/29/06, available at www.access-board.gov .

3. References to USDOJ ADA Standards are to the U.S. Department of Justice ADA Standards for Accessible Design, 1994, available at www.access-board.gov, or to new standards (currently pending) if in effect at the time of execution of the contract documents.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

PART 4 - MEASUREMENT AND PAYMENT

Not Used.

END OF SECTION

SECTION 01 42 16

DEFINITIONS

PART 1 - GENERAL

1.01 GENERAL

This Section provides definition of terms cited in the Contract Documents.

1.02 DEFINITION OF TERMS

A. Wherever in the specifications and other Contract Documents, the following terms and abbreviations or pronouns in place of them, are used, the intent and meaning shall be interpreted as provided in this section unless the context otherwise requires.

1. Quality Assurance (QA): The process by which the OCTA Project Manager elects to monitor and assure that it receives proper construction related documentation from the Contractor. QA procedures measure the setting of schedules for the receipt and review of documentation and the quality of the information contained within the documentation.

2. Quality Control (QC): The process by which the OCTA Project Manager receives documentation from the Contractor that proves that the Contractor is providing the contractually mandated services, such as training, testing and inspection. Contractor must show evidence of internal procedures demonstrating how he will perform these mandated functions and submit documentation that QC verifications have been completed. QC is the responsibility of the Contractor.

3. Roadway Worker: Any OCTA Project Manager or Contractor employee whose duties include inspection, construction, roadway facilities or roadway machinery within the OCTA and/or City right of way.

4. Salvage: To save any removed item. The salvaged item shall be reused in the contract or delivered and stockpiled for the OCTA Project Manager as specified in the Contract Documents.

5. Site Specific Work Plan (SSWP): A program, plan, and schedule prepared and submitted by the Contractor and approved by the OCTA Project Manager that accurately describes and illustrates the manner in which work within the operating envelope will be accomplished, the impacts on any elements of the Operating System and the manner in which work will be accomplished with the OCTA Project Manager allotted work windows.

6. Project Applicant: all references made by City, local agencies, or other agencies to Project Applicant means the Contractor and not OCTA.

INSTALLATION OF BATTERY-ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

PART 4 – MEASUREMENT AND PAYMENT

No separate measurement or payment shall be made under this Section.

END OF SECTION

INSTALLATION OF BATTERY-ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE

SECTION 01 43 00

QUALITY ASSURANCE

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Administrative and procedural requirements for quality assurance.

1. Specific quality assurance requirements for individual construction activities are specified in the sections that specify those activities. Requirements in those sections may also cover production of standard products.

2. Requirements for Contractor to provide quality assurance services required by OCTA, or authorities having jurisdiction are not limited by provisions of this section.

B. Related Sections:

1. Section 01 43 01, Contractor Qualifications and Requirements.

2. Section 01 45 00, Quality Control.

1.02 DEFINITIONS

A. Quality Assurance Services: Activities, actions, and procedures performed before and during execution of the work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality Control Services: Tests, inspections, procedures, and related actions during and after execution of the work to evaluate that actual products incorporated into the work and completed construction comply with requirements. Refer to Section 01 45 00, Quality Control.

C. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not samples. Approved mockups establish the standard by which the work will be judged.

D. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, subcontractor, or sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trades people of the corresponding generic name.

E. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this project; having a minimum of five years' experience in work similar to that required for this project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.03 CONFLICTING REQUIREMENTS

A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to OCTA for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to OCTA for a decision before proceeding.

1.04 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual specification sections specify additional requirements.

B. Installer Qualifications: A firm or individual experienced (as defined above) in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this project, whose work has resulted in construction with a record of successful in-service performance.

C. Manufacturer Qualifications: A firm experienced (as defined above) in manufacturing products or systems similar to those indicated for this project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Fabricator Qualifications: A firm experienced (as defined above) in producing products similar to those indicated for this project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where project is located and who is experienced (as defined above) in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product which are similar to those indicated for this project in material, design, and extent.

F. Specialists: Certain sections of the specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirement for specialists shall not supersede building codes and regulations governing the work.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented by a recognized OCTA; and with additional qualifications specified in individual sections; and where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.

2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this project.

I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

1. Contractor responsibilities include the following:

a. Provide test specimens representative of proposed products and construction.

b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the work.

c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.

d. Build site-assembled test assemblies and mockups, where indicated, using installers who will perform same tasks for Project.

e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed work.

f. When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups; do not reuse products on project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to OCTA, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the contract documents.

J. Mockups: Before installing portions of the work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by OCTA.

2. Notify OCTA seven days in advance of dates and times when mockups will be constructed.

3. Demonstrate the proposed range of aesthetic effects and workmanship.

4. Obtain OCTA's approval of mockups before starting work, fabrication, or construction.

5. Allow seven days for initial review and each re-review of each mockup.

6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed work.

7. Demolish and remove mockups when directed, unless otherwise indicated.

PART 2 - PRODUCTS

Not Used

PART 3 - – EXECUTION

Not Used

INSTALLATION OF BATTERY-ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE

PART 4 - MEASUREMENT AND PAYMENT

No separate measurement will be made for the work of this section.

END OF SECTION

SECTION 01 43 01

CONTRACTOR QUALIFICATIONS AND REQUIREMENTS

PART 1 – GENERAL

1.01 CONTRACTOR DUTIES

A. Except as specifically noted otherwise, provide:

1. A Construction Project Manager, who shall serve as the Contractor's Representative for the Contract, at or beyond the requirements described in this section.

2. Other labor, supervision, and materials required for the work.

3. Other tools, equipment, and machinery required for the work.

4. Water, heat, and utilities required for the work.

5. Support facilities and services, including fully furnished field office facilities, necessary for the proper execution and completion of the work.

B. Pay legally required sales, consumer, and use taxes.

C. Secure and pay for fees, surcharges, taxes, permits, and licenses necessary for the proper execution of the work.

1.02 REFERENCE STANDARDS

A. OSHA: Occupational Safety and Health Administration regulations.

1.03 CONSTRUCTION PROJECT MANAGER

A. Provide for the work a Construction Project Manager who will manage and coordinate the overall aspects of the work. The Construction Project Manager's qualifications and experience shall include:

1. A minimum of five years of progressing work responsible experience on public works construction projects that include coordination, and scopes, types, and characters of work directly related to the scope of work of this contract.

2. Demonstrated ability to work safely and supervise individuals in safe work.

3. Previous positions and experience supervising and planning work activities of construction superintendents, project engineers, and support personnel foreman and crews.

4. Ability to read and understand survey, grading, paving, striping, utility, and structural plans.

5. Ability to develop and work from construction schedules.

B. The Construction Project Manager must:

1. Visit the site daily during the work to verify the work is proceeding per contract documents.

2. Be on the job during the work week to manage and coordinate all aspects of work for the full duration of the project.

3. Be able to respond immediately to emergency or problem calls, 24 hours a day, 7 days a week.

C. The Construction Project Manager shall have the necessary authority to provide instructions and orders to his authorized representatives. The Construction Project Manager shall not be replaced without advance approval by the OCTA Project Manager; OCTA Project Manager will have sole approval of the replacement. The Contractor may propose a supervisory personnel such as superintendent to serve as Construction Project Manager.

1.04 SITE SAFETY REPRESENTATIVE

A. Provide Site Safety Representative.

B. Site Safety Representative qualifications and experience must include:

1. Meeting qualifications set forth in the General Provision. Pass OCTA Level 3 Health, Safety and Environmental Requirements.

C. The Site Safety Representative must be headquartered for the duration of the project at Contractor's construction field office. .

D. The Site Safety Representative will be required to train and test Contractor's employees as described in Section 01 35 23, Owner Safety Requirements.

1.05 SUBMITTALS

A. Contractor shall submit for OCTA Project Manager's approval the name and professional history of each of the key positions identified in this specification section.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

3.01 PERSONNEL QUALIFICATION

A. Within five calendar days after Notice to Proceed, submit to OCTA Project Manager resumes of personnel listed above in Part 1 above. Each resume shall provide sufficient detail to demonstrate compliance with requirements. Submit a schedule showing, for each employee classification, number of personnel to be assigned to the work and duration of their assignments.

B. The OCTA Project Manager will review resumes to determine acceptability of qualifications and experience. The OCTA Project Manager's decision is final. Do not resubmit resumes of personnel deemed unacceptable by the OCTA Project Manager.

C. Substitutions: To replace any personnel identified in Part 1, follow this section's procedures for obtaining approval of the original personnel. This qualification process, shall be completed before the vacancy occurs. Provision for substitutions does not relieve Contractor of the responsibility to provide personnel as provided in Part 1.

PART 4 – MEASUREMENT AND PAYMENT

No separate measurement or payment will be made for work of this section.

END OF SECTION

INSTALLATION OF BATTERY-ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE

SECTION 01 45 00

QUALITY CONTROL

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Authority of OCTA Project Manager.
2. Responsibilities of the Contractor.
3. Inspection and testing by OCTA Project Manager.

B. Related Sections:

1. Section 01 14 23, Coordination with OCTA and Local Agencies.
2. Section 01 33 00, Submittal Procedures.
3. Section 01 41 00, Regulatory Requirements.
4. Section 01 43 00, Quality Assurance.
5. Section 01 60 00, Product Requirements.

1.02 AUTHORITY OF OCTA PROJECT MANAGER

A. OCTA Project Manager will determine whether the work is completed in accordance with the contract documents. OCTA Project Manager will decide all questions that may arise as to the quality or acceptability of materials furnished and work performed, and interpretations of the contract documents.

B. OCTA Project Manager may require the Contractor to finish a section on which work is in progress before work is started on any additional section. Refer to Section 01 14 22, Rules and Hours of Operation for requirements.

C. OCTA Project Manager may require the Contractor to submit additional shop drawings or documents to demonstrate the Contractor's understanding the intents of contract plans and specifications as part of quality control.

1.03 REFERENCES

A. ASTM D3740 - Practice for Evaluation of Agencies Engaged in Testing and/or Inspection Used in Engineering Design and Construction.

1.04 REGULATORY REQUIREMENTS FOR TESTING AND INSPECTION

A. Regulatory Requirements for Testing and Inspection: Inspections, testing and approvals as required by authorities having jurisdiction. Refer to Section 01060 - Regulatory Requirements.

1. California Code of Regulations (CCR) - Title 24, State Building Code (Uniform Building Code with State of California Amendments), latest edition, as adopted and interpreted by authorities having jurisdiction.

2. California Code of Regulations (CCR) - Title 22, Sections 94065, 94067 and 94069.

1.05 RESPONSIBILITIES OF THE CONTRACTOR

A. Cooperate with OCTA Project Manager and with other contractors as detailed in Section 01 14 24, Coordination with OCTA and Local Agencies.

B. Ensure that products, services, workmanship and site conditions comply with requirements of the Drawings and Specifications by coordinating, supervising, testing and inspecting the Work and by utilizing only suitably qualified personnel.

C. Perform the work to achieve the level of quality prescribed in the contract documents, including by reference, all Codes, laws, rules, regulations and standards. The no quality basic is prescribed, the quality shall be in accordance with the best accepted practices of the construction industry for the locale of the Project, for projects of this type.

D. Perform the work in the proper sequence in relation to the requirements of the OCTA and other contractors, all as may be directed by OCTA Project Manager.

E. Employ and assign knowledgeable and skilled personnel as necessary to perform quality control functions to ensure that the Work is provided as required.

F. Be responsible for any damage done by it or its agents to the work performed by the OCTA or another contractor.

1.06 SUPERVISION AND CONSTRUCTION PROCEDURES

A. Give the work the constant attention necessary to facilitate the progress of the work.

B. Be solely responsible for all construction means, methods, techniques, and procedures and for coordinating all portions of the work under the contract. Permission given by OCTA Project Manager to use any particular methods, equipment, or appliances shall not be construed to relieve the Contractor from furnishing other equipment or other appliances or adopting other methods when

those in use prove unsatisfactory, or as to bind OCTA Project Manager to accept work which does not comply with the contract.

C. Immediately remove from the work, when so ordered by OCTA Project Manager, and do not re-employ on any of the work, without written permission from OCTA Project Manager, any contractor or subcontractor employee doing unsafe, improper, or defective work; who, in OCTA Project Manager's judgment, refuses or neglects the direction of OCTA Project Manager given to the Contractor; who is deemed incompetent or disorderly; or who commits trespassing on public or private property in the vicinity of the work.

D. Be responsible for securing all work areas by barricade in accordance with local and State requirements as applicable at the end of each day.

1.07 QUALITY OF THE WORK

A. Quality of Products: Unless otherwise indicated or specified, all products shall be new, free of defects and fit for the intended use.

B. Quality of Installation: All Work shall be produced plumb, level, square and true, or true to indicated angle, and with proper alignment and relationship between the various elements. New material shall be installed so that drainage merges with existing flow patterns on the site towards the drains.

C. Protection of Existing and Completed Work: Take all measures necessary to preserve and protect existing and completed Work free from damage, deterioration, soiling and staining, until Acceptance by the Authority.

D. Standards and Code Compliance and Manufacturer's Instructions and Recommendations: Unless more stringent requirements are indicated or specified, comply with manufacturer's instructions and recommendations, reference standards and building code research report requirements in preparing, fabricating, erecting, installing, applying, connecting and finishing Work.

E. Deviations from Standards and Code Compliance and Manufacturer's Instructions and Recommendations: Document and explain all deviations from reference standards and building code research report requirements and manufacturer's product installation instructions and recommendations, including acknowledgement by the manufacturer that such deviations are acceptable and appropriate for the Project.

F. Verification of Quality: Work shall be subject to verification of quality by the Authority or Engineer in accordance with provisions of the Conditions of the Contract.

1. Contractor shall cooperate by making Work available for inspection by the Authority or Engineer or their designated representative.

2. Such verification may include mill, plant, shop, or field inspection as required. OCTA designated Inspector shall access to material inspection.

3. Provide access to all parts of the Work, including plants where materials or equipment are manufactured or fabricated.

4. Provide all information and assistance as required, including that by and from subcontractors, fabricators, materials suppliers and manufacturers, for verification of quality by the Authority or Engineer.

5. Contract modifications, if any, resulting from such verification activities shall be governed by applicable provisions in the Conditions of the Contract.

G. Observations by the Engineer and Engineer's Consultants: Periodic and occasional observations of Work in progress may be made by the Engineer and Engineer's consultants as deemed necessary to review progress of Work and general conformance with design intent.

H. Limitations on Inspection, Test and Observations: Neither employment of an Inspector of Record, independent testing and inspection agency, or observations by the Engineer and Engineer's consultants shall in no way relieve Contractor of obligation to perform Work in full conformance to all requirements of Contract Documents and applicable Building Code and other regulatory requirements.

I. The Engineer's Acceptance and Rejection of Work: The Engineer reserves the right to reject all Work not in conformance to the requirements of the Drawings and Specifications.

J. Correction of Non-Conforming Work: Non-conforming Work shall be modified, replaced, repaired or redone by the Contractor at no change in Contract Sum or Contract Time.

K. Acceptance of Non-Conforming Work: Acceptance of non-conforming Work, without specific written acknowledgement and approval of the Authority, shall not relieve the Contractor of the obligation to correct such Work.

L. Contract Adjustment for Non-conforming Work: Should the Authority or Engineer determine that it is not feasible or in Authority's interest to require non-conforming Work to be repaired or replaced, an equitable reduction in Contract Sum shall be made by agreement between the Authority and Contractor. If equitable amount cannot be agreed upon, a Construction Change Directive will be issued and the amount in dispute resolved in accordance with the Conditions of the Contract.

M. Non-Responsibility for Non-Conforming Work: The Engineer and the Engineer's consultants disclaim any and all responsibility for Work produced not in conformance with the Drawings and Specifications.

1.08 INSPECTION AND TESTING

A. The work is to be completed in accordance with the specifications, the drawings, and such instructions or directions as OCTA Project Manager may give to supplement drawings and specifications. Wherever the words "directed," "permitted," "approved," "acceptable," "satisfactory to," or similar words or phrases occur in the contract documents, they shall be understood to be functions of OCTA Project Manager to be exercised at his discretion.

B. The OCTA shall not be responsible for and shall not have control or charge over the acts or omissions of the Contractor, subcontractors, or any of their agents or employees, or any other persons performing any of the work.

C. Inspections and Tests by Authorities Having Jurisdiction: Contractor shall cause all tests and inspections required by authorities having jurisdiction to be made for Work under this Contract, Public Works Department, Fire Department, Health Department, AQMD, SCE and similar agencies. Except as specifically noted, scheduling, conducting and paying for such inspections shall be solely the Contractor's responsibility.

D. Inspections and Tests by Serving Utilities: Contractor shall cause all tests and inspections required by serving utilities to be made for Work under this Contract. Scheduling, conducting and paying for such inspections shall be solely the Contractor's responsibility.

E. Inspections and Tests by Manufacturer's Representatives: Contractor shall cause all tests and inspections specified to be conducted by materials or systems manufacturers to be made. Additionally, all tests and inspections required by materials or systems manufacturers as conditions of warranty or certification of Work shall be made, the cost of which shall be included in the Contract Sum.

F. Inspections by Independent Testing and Inspection Agency or Agencies: The following applies to tests and inspections:

   1. The Authority will select and pay for an independent testing and inspection laboratory or agency, to conduct tests and inspections as indicated on Drawings or Specifications, and as required by authorities having jurisdiction.

   2. Costs for additional tests, inspections and related services, due to the following, shall be reimbursed to the Authority by the Contractor and no change in Contract Time shall result.

      a. Failure to properly schedule or notify testing and inspection agency or authorities having jurisdiction.

      b. Changes in sources, lots or suppliers of products after original tests or inspections.

c. Changes in means methods, techniques, sequences and procedures of construction which necessitate additional testing, inspection and related services.

d. Changes in material after review and acceptance of submittal.

3. Test and Inspection Reports: After each inspection and test, one copy of report shall be promptly submitted to the Engineer, Engineer's consultant (as applicable), Authority, Contractor, City Inspector, and to agency having jurisdiction (if required by Code).

a. Reports shall clearly identify the following:

Date issued.
Project name and number.
Identification of product and Specifications Section in which Work is specified.
Name of inspector.
Date and time of sampling or inspection.
Location in Project where sampling or inspection was conducted.
Type of inspection or test.
Date of test.
Results of tests.
Comments concerning conformance with Contract Documents and other requirements.

b. Test reports shall indicate specified or required values and shall include statement whether test results indicate satisfactory performance of products.

c. Samples taken, but not tested, shall be reported.

d. Test reports shall confirm that methods used for sampling and testing conform to specified test procedures.

G. Contractor shall provide OCTA Project Manager, independent testing and inspection agency personnel, inspector of record and OCTA’s consultant with full access to the work and reasonable time for inspection for ascertaining whether or not the work is performed in accordance with the requirements and intent of the contract. No work shall be covered or materials used without making the work or materials available for inspection by OCTA Project Manager. If OCTA Project Manager so requests, the Contractor shall, at any time before acceptance of the work, remove or uncover such portions of the finished work as may be directed.

H. After examination, Contractor shall restore the work to the standard required by the contract documents. If the work examined proves acceptable, uncovering, removal, and replacement of the work in question will be paid for by OCTA by change order to the Contractor; but if the work proves unacceptable, the uncovering or removal and replacement of the work in question shall be at the Contractor's expense. Inspection will not relieve the Contractor from the responsibility for the quality of this work and to perform the work in accordance with the requirements of the contract documents.

I. All materials and every process of manufacture and construction shall be subject to inspection at all times. OCTA Project Manager and his designated representatives shall have free access to all operations. Contractor shall provide necessary materials and OCTA Project Manager shall have the right to select suitable samples of materials for testing or examination which the contractor shall supply without charge. In case such samples must be shipped to some other point for inspection or testing, Contractor shall box or crate samples as necessary and shall deliver them at points designated for shipment without charge. Omission of inspection shall not relieve the Contractor of its obligations to produce the work required by the contract documents. Materials not in compliance with contract requirements shall be removed promptly from the vicinity of the work, and the Contractor, at its expense, shall promptly remove, reconstruct, replace, and make good any defective work as directed in writing by OCTA Project Manager. Oversight or error in judgment of inspectors, or previous acceptance of the work, shall not relieve Contractor from the obligation to correct defects whenever discovered.

J. If the Contractor does not correct nonconforming work or remove rejected materials within a reasonable time fixed by written notice, OCTA Project Manager may direct that removals and corrections be performed by other contractors. Charges for such removals and corrections shall be deducted from the Contractor’s payment due under this contract or may be paid for by the Contractor's bonds held for this contract.

K. All inspection by OCTA Project Manager is for the protection of the OCTA and its interest and shall not relieve the Contractor of responsibility for providing work in accordance with the contract documents. After completion of the work, a final inspection will be made and any previous inspection or acceptance will not preclude rejection at the final inspection of any item that is not satisfactory to OCTA Project Manager or is not in accordance with the contract documents.

L. If, within the period of time prescribed by law or by the terms of any applicable special warranty required by the contract documents, whichever is longer, any of the work is found to be defective or not in accordance with the contract documents, the Contractor shall correct it promptly after receipt of a written notice from OCTA Project Manager. This obligation shall survive acceptance of the work or termination of the contract. In the event the OCTA prefers to accept or not require correction of defective or nonconforming work, the OCTA may do so instead of requiring its removal and correction, in which case OCTA Project Manager shall determine an appropriate sum to be deducted from the contract price or otherwise charged against the Contractor, which determination shall be final and binding upon the parties. Such adjustment shall be effected whether or not final payment has been made.

M. All defective work which has been rejected shall be remedied or removed and replaced by the Contractor at its own expense, in a manner acceptable to OCTA Project Manager.

N. Whenever all of the work provided for in the contract or authorized as force account work has been completed and the final cleaning-up performed, OCTA Project Manager will make the final inspection, and, if the work is found to be satisfactory, Contractor will be notified in writing of the acceptance. All portions of the work shall

be maintained by the Contractor at the standards required by the contract documents until final acceptance.

O. At OCTA Project Manager's discretion, portions of the work that are determined to be substantially complete may be accepted before all the project work is completed. After acceptance of substantially completed work, Contractor shall not use the finished product for any purpose without permission of OCTA Project Manager.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

3.01 FIELD QUALITY CONTROL/QUALITY ASSURANCE

A. Give minimum of 48 hour advance notice of each test and inspection to OCTA Project Manager when ready for testing, observation and inspection.

B. Should any compaction density/strength test or inspection fail to meet specification requirements, necessary corrective work shall be performed by the Contractor. Additional testing shall be required to determine that corrective work provides compaction in the failed area meeting requirements of these Specifications.

C. Contractor shall provide a record of testing results including corrective actions taken if necessary on the approved form to the OCTA Project Manager.

D. Contractor’s corrective work to meet requirements and retesting resulting from failing tests shall be at no additional cost to OCTA.

E. Obtain all inspections required by the local regulatory agencies and provide the Authority with the final sign-off cards for the project from the local regulatory agencies.

PART 4 – MEASUREMENT AND PAYMENT

No separate measurement or payment shall be made under this section.

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Temporary facilities and controls used during construction.

B. Related Sections:

1. Section 01 14 25, Procedures in Construction.
2. Section 01 14 27, Legal Relations and Responsibility.
3. Section 01 14 43, Environmental Resource Protection.
4. Section 01 71 13, Mobilization and Demobilization
5. Section 01 74 19, Construction Waste Management and Disposal.

1.02 SUBMITTALS

A. Submit in accordance with Section 01 33 00, Submittal Procedures.

B. Site Plans: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

C. Moisture Protection Plan: Describe procedures and controls for: protecting materials and construction from water absorption and damage, including delivery, handling, and storage; discarding water-damage materials; protocols for mitigation of water into completed work; and replacing water-damaged work.

1.03 QUALITY ASSURANCE

A. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

PART 2 - PRODUCTS

2.01 TEMPORARY FACILITIES, PRODUCTS, AND CONTROL

A. Common-Use Field Office: not required.

B. Storage and Fabrication Sheds: No equipment or tools are allowed to be stored at the jobsite without the OCTA Project Manager's written permission. If on-site storage is permitted, provide access and orderly provision for maintenance and for inspection of products.

C. Telephone Service: Provide mobile telephone service for project superintendent.

D. Temporary Electricity:

1. Connect to existing power service at location as directed. Power consumption shall not disrupt Owner's need for continuous service. Exercise measures to conserve energy.

2. Provide power outlets for construction operations, with branch wiring and distribution boxes. Provide flexible power cords as required.

3. Provide main service disconnect and over current protection at convenient location.

4. Comply with NECA, NEMA, and UL standards and regulations for temporary electric service.

5. Permanent convenience receptacles may be utilized during construction.

E. Temporary Fire Protection:

1. Maintain temporary fire protection facilities of the types needed until permanent facilities are installed. Fire Extinguishers shall be portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

2. Comply with NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations".

3. Fire safety during construction shall comply with CFC - California Fire Code (CCR) California Code of Regulations, Title 24, Part 9, Article 87.

4. Store combustible materials in containers in fire-safe locations.

5. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes.

6. Provide supervision of welding operations, combustion-type temporary heating units, and similar sources of fire ignition.

F. Barriers, enclosures and fencing:

1. Provide traffic cones to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.

2. Provide protection for plant life and trees designated to remain and for soft and hardscape areas adjacent to work, replace damaged materials in kind.

3. Protect non-owned vehicular traffic, stored materials, if allowed, site and structures from damage.

G. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.

H. Pollution Control:

1. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

2. Conform to Best Management Practices for waste management and material controls as defined in Section 4 of the Construction Activity Handbook published by the Storm Water Quality Association.

3. Coordinate construction activities with control procedures established in the Storm Water Pollution Prevention Plan (SWPPP).

I. Security:

1. Provide security and facilities to protect Work, from unauthorized entry, vandalism, or theft.

2. Coordinate with Owner’s security program.

J. Parking: No Contractor’s employees’ parking is allowed on site.

K. Traffic Control:

1. Comply with requirements of authorities having jurisdiction.

2. Obtain all required permits, provide all materials and maintain controls as required of authorities having jurisdiction.

3. Maintain access for fire-fighting equipment and access to hydrants.

L. Progress Cleaning:

1. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

2. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

3. Provide walk-off mats at each building entry affected by construction activities.

M. Waste Disposal:

1. Waste Management: In compliance with City regulations.

2. Maintain work areas free of waste materials, debris, and rubbish.

3. Remove waste materials, debris, and rubbish from site periodically during a work day and legally dispose of off-site at the end of each work day at 3:30 pm.

4. Maintain site area in a clean and orderly condition.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

A. Locate facilities where they will serve project adequately and result in minimum interference with performance of the work. Relocate and modify facilities as required by progress of the work.

1. Locate facilities to avoid protected areas as specified in Section 01 14 43, Environmental Resource Protection.

3.02 TEMPORARY UTILITIES

A. Provide and pay for temporary utility services and facilities such as sanitary facilities, telephone service and internet service adequate for construction and related activities.

3.03 TEMPORARY ROADS, PAVING, PARKING, AND SIMILAR IMPROVEMENTS, AND USE OF SITE

A. See Section 01 14 25, Procedures in Construction.

B. See Section 01 14 27, Legal Relations and Responsibility

3.04 PROTECTION OF AIR AND WATER RESOURCES AND OTHER ENVIRONMENTAL RESOURCES

A. See Section 01 14 25, Procedures in Construction.

B. See Section 01 14 27, Legal Relations and Responsibility.

C. See Section 01 14 43, Environmental Resource Protection.

3.05 CONSTRUCTION WASTE

A. See Section 01 74 19, Construction Waste Management and Disposal.

3.06 SECURITY AND FIRE PROTECTION

A. See Section 01 14 27, Legal Relations and Responsibility.

PART 4 - MEASUREMENT AND PAYMENT

Work of this section is incidental to other work and no separate measurement or payment will be made.

END OF SECTION

SECTION 01 57 13

TEMPORARY EROSION AND SEDIMENTATION CONTROL

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Temporary erosion and sedimentation control.

2. Accessories required for a complete installation.

B. Related Sections:

1. Section 01 14 25, Procedures in Construction.

2. Section 01 50 00, Temporary Facilities and Controls.

3. Section 01 14 43, Environmental Resource Protection

1.02 REFERENCE STANDARDS

A. Caltrans: State of California Department of Transportation, Standard Specifications.

B. Standard Specifications for Public Works Construction (SSPWC).

1.03 SUBMITTALS

A. Submit in accordance with Section 01 33 00, Submittal Procedures.

B. Working drawings and data on proposed straw bales and fiber rolls, including physical properties of various products.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store materials in accordance with recommendations of manufacturer.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Miscellaneous Materials:

1. Plastic sheeting: Clear polyethylene plastic sheeting at least 10 mils thick, secured with anchor restrainers (gravel filled bags) per Caltrans standard plans, 2010 edition.

2. Temporary Fiber Rolls and Straw Bales: Provide fiber rolls and straw bales with staking per Caltrans standard plans, 2010 edition. If staking is not feasible, contractor shall develop other suitable methods of anchoring that will be acceptable to OCFCD.

3. Temporary concrete washout facility, per Caltrans standard plans, 2010 edition.

4. Gravel bags per Caltrans standard plans, 2010 edition.

PART 3 - EXECUTION

3.01 GENERAL

A. Conform to all applicable local, state and Federal Regulations and laws pertaining to water pollution control and as specified in SSPWC section 7-8.6.

B. Accomplish erosion and sediment control through use of berms, dikes, swales, dams, fiber mats, plastic sheeting, netting, gravel, storm drain inlet protection, slope drains, sediment fences, and other sediment barriers; gravel construction entrances; and other erosion control devices or methods.

C. Coordinate temporary pollution control provisions with permanent erosion control features specified elsewhere in the contract documents to the extent practicable to assure economical, effective, and continuous erosion control throughout the construction and post-construction period.

D. OCTA Project Manager may limit surface area of erodible earth material exposed by clearing, grubbing, excavation, borrow, embankment, and fill operations

1. Provide immediate, permanent or temporary pollution control measures to prevent contamination of adjacent streams or other watercourses, lakes, ponds, or other areas of water impoundment.

2. Work may involve construction of temporary berms, dikes, dams, sediment basins, and slope drains; use of temporary mats; or other control devices or methods as necessary to control erosion.

E. Construct facilities required for clearing, grading, and land alteration activities, to ensure that sediment-laden water does not enter drainage systems or violate applicable water standards. Conform to requirements of Section 01 14 43, Environmental Resource Protection.

F. Permanent Features:

1. Incorporate permanent erosion control features at earliest practicable time. Use temporary pollution control measures to correct unforeseen conditions that develop during construction, to provide measures that are needed prior to installation of permanent pollution control features, or to temporarily control erosion that develops during normal construction.

2. Where erosion interferes with clearing and grubbing operations, schedule and perform work so that grading operations and permanent erosion control features can follow immediately; otherwise, provide temporary erosion control measures between successive construction stages.

G. Areas of Work:

1. Limit the area of clearing, grubbing, excavation, borrow, and embankment operations in progress commensurate with progress. Should seasonal limitations result in unrealistic coordination of operations, take temporary erosion control measures immediately.

2. Flag boundaries of clearing limits prior to construction.

a. Do not disturb or permit disturbance of ground beyond flagged boundary. Conform to requirements of Section 01 14 43, Environmental Resource Protection

b. Maintain flagging for duration of work.

3. Temporary soil erosion and sediment control may include construction work outside right of way where work is necessary as a result of project construction such as borrow pit operations, haul roads, and equipment storage sites.

H. Maintenance:

1. Maintain erosion control features installed, including replacement and upgrading of facilities when needed, until work is completed and notice of Final Acceptance issued.

2. Maintain catch basins (inlets with sumps or inverted siphons) so that not more than one foot depth of sediment is allowed to accumulate within a trap (or sump).

a. Clean catch basins and storm drains prior to paving and prior to Substantial Completion.

b. Remove sediment. Do not flush sediment-laden water into downstream system.

3. Keep paved areas clean for the duration of the project.

4. Measures in addition to those indicated may be required.

5. Do not permit more than a one-foot depth of sediment to accumulate behind a silt fence.

   a. Remove sediment or regrade it into slopes, and repair and reestablish silt fences as needed.

6. Remove silt fences in entirety when no longer required. Fences are required until uphill area has been permanently stabilized.

7. Remove pipes, end sections, drainage curbs, silt fences, and other materials from temporary erosion control devices; those not incorporated into permanent work become property of Contractor.

3.02 STORM DRAIN INLET PROTECTION

A. Storm drain inlet protection must prevent sediment from entering storm drain systems prior to permanent stabilization of disturbed areas.

B. Use storm drain inlet protection per Caltrans standards plans, 2010 edition:

   1. Where storm drain inlets are operational before permanent stabilization of disturbed drainage area.

   2. Adjacent to and immediately downhill of utility type construction in existing paved areas with catch basin drainage.

   3. When cleaning streets.

C. Use berms when required to direct drainage to flow through filters and prevent bypassing of inlets.

D. Do not permit more than one-foot depth of sediment to accumulate against storm drain inlet protection.

   1. Remove sediment and restore inlet protection as needed to maintain sediment trapping and filtering capability.

PART 4 - MEASUREMENT AND PAYMENT

No separate measurement or payment will be made for the work of this section.

END OF SECTION

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes administrative and procedural requirements for selection of products for use in the project; product delivery, storage, and handling.

1.02 SOURCE OF SUPPLY AND QUALITY OF MATERIALS

A. OCTA Project Manager shall approve the source of supply of each of the materials supplied by the Contractor before the purchase or delivery of materials to the work site. Promptly after receiving the Contract award, the Contractor shall notify OCTA Project Manager of all proposed material sources. If it is found after trial that sources of supply previously approved do not produce uniform and satisfactory products, or if the product from any source proves unacceptable at any time, the Contractor shall furnish materials from other sources as approved by OCTA Project Manager.

B. Only materials conforming to Specifications and approved in advance by OCTA Project Manager shall be used in the work. All material being used shall be subject to inspection or test at any time during their preparation or use. No material that after approval has in any way become unfit for use shall be used in the Work.

1.03 UNLOADING, HAULING AND STORING MATERIALS

A. The Contractor shall, at its expense, deliver, unload, store, handle, and be responsible for all materials whether furnished by the OCTA or by the Contractor.

B. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible.

1. Periodically inspect to ensure products are undamaged, and are maintained under required conditions.

2. Products damaged by improper storage or protection shall be removed and replaced with new products at no change in Contract Sum or Contract Time.

C. Store products to facilitate inspection and measurement of quantity or counting of units.

D. The unloading, storing and hauling of all the OCTA’s or Contractor's material shall be considered as incidental to contract pricing.

E. When permission to do so is given in writing by OCTA Project Manager, the Contractor may store materials and erect temporary buildings on OCTA property provided such property is not required for the OCTA's use or is not under lease to other parties.

F. Store moisture-sensitive products in a weathertight enclosure or covered with an impervious sheet covering. Provide adequate ventilation to avoid condensation. Maintain product storage within temperature and humidity ranges required by manufacturer's instructions.

1. For exterior storage of fabricated products, place on sloped supports above ground.

2. Store loose granular materials on solid surfaces in a well-drained area. Prevent mixing with foreign matter. Prevent material from flowing or blowing away to other areas of the site. Provide covers for sand, aggregate base, and debris so that wind does not cause it to blow away.

3. Arrange storage to provide access for inspection. Periodically inspect to assure products are undamaged, and are maintained under required conditions.

G. All electrical and mechanical equipment shall be stored so as to be protected from rain, sun, wind, sand, dust, moisture, etc. The equipment shall be stored on supports off the ground or on concrete slabs with all factory provided dust and moisture protection left in place until equipment is installed.

H. Electrical and mechanical equipment shall be maintained in accordance with the manufacturer's operation and maintenance instructions until the Contractor is relieved of the responsibility by OCTA Project Manager.

I. Store heavy materials away from the structure in a manner that will not endanger supporting construction.

J. Building materials shall be stored in a protected environment safe from sun, rain and excessive dust. Store cementitious products and materials on elevated platforms. Damaged or excessively dirty materials will not be permitted to be installed.

K. Protection:

1. Provide barriers, flashing lights, substantial coverings and notices to protect installed Work from traffic and subsequent construction operations.

2. Remove protective measures when no longer required and prior to Acceptance of the Work.

L. Delivery Requirements:

1. Schedule delivery to minimize long-term storage at project site and to prevent overcrowding of construction spaces.

2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.

3. Comply with manufacturer's instructions and recommendations for transportation, delivery and handling. Provide equipment and personnel to handle products by methods to prevent soiling, marring or other damage.

4. Deliver products to project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with manufacturer's labels and instructions for handling, storing, unpacking, protecting, and installing.

5. Contractor is responsible and shall be present at work side for receiving his material delivery at the work site. Promptly inspect products on delivery to ensure compliance with the contract documents and to ensure that products are undamaged and properly protected.

6. Contractor shall give OCTA a 48 hours notice prior to delivery of any products and materials.

1.04 PRODUCT SELECTION PROCEDURES

A. Products: Items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchase stock, and include material, equipment, assemblies, fabrications and systems.

B. General Product Requirements: Provide products that comply with the contract documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.

1. It is OCTA policy that all manufactured products and supplies be provided by United States manufacturing industries in agreement with related Union organizations. Therefore in the performance of the contract, Contractor shall give United States made products preference.

2. Named Product: Items identified by manufacturer's product name, including make or model designations indicated in the manufacturer's published product data.

3. Specific Product Requirements: Refer to requirements of Section 01 45 00 - Quality Control and individual product Specifications Sections in the project specifications for specific requirements for products.

4. Materials: Products that are shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed or installed to form a part of the Work.

5. Product Completeness: Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.

6. Minimum Requirements: Specified requirements for products are minimum requirements.

7. Standard Products: Where specific products are not specified, provide standard products of types that are suitable for the intended use in similar conditions and that have been produced and used successfully in similar situations on similar projects. Products shall be selected by the Contractor and subject to review and acceptance by the Engineer.

8. Code Compliance: All products, other than commodity products prescribed by Code, shall have a current ICBO Evaluation Service (ICBO ES) Research Report or CABO National Evaluation Report (NER).

9. Interchangeability: To the fullest extent possible, provide products of the same kind from a single source. Products required to be supplied in quantity shall be the same product and interchangeable throughout the Work. When options are specified for the selection of any of two or more products, the product selected shall be compatible with products previously selected.

10. Nameplates:

    a. Except for require labels and operating and safety instructions, do not attach manufacturer's identifying nameplates or trademarks on surfaces exposed to view in occupied spaces or to the exterior.

    b. Provide a permanent nameplate on each item of service-connected or power-operated equipment. Nameplates shall contain identifying information and essential operating data such as the following example:

        Name of manufacturer
        Name of product
        Model and serial number
        Capacity
        Power Characteristics
        Speed

11. OCTA reserves the right to limit selection to products with warranties not in conflict with requirements of the contract documents.

12. Where products are accompanied by the term "as selected" or similar, OCTA Engineer will make selection.

13. Where products are accompanied by the term "match sample" or similar, sample to be matched is OCTA Project Manager's.

14. Descriptive, performance, and reference standard requirements in the specifications establish salient characteristics of products.

C. General Product Selection Requirements:

1. Where products or manufacturers are identified in the specifications, the intent is not to limit competition or to restrict the work to only those products or manufacturers named. Rather, the intent is to establish the level of quality required and the product characteristics important to the success of the work. Subject to compliance with requirements, products of any manufacturer may be incorporated into the work, if shown to be equal to those listed to the satisfaction of OCTA Project Manager.

2. "Or Equal" Provision: Where "or equal" is included after named manufacturer(s) and product(s), equivalent products of unnamed manufacturers will be considered in accordance with requirements specified in Section 01 25 00 Substitution Procedures.

   a. Prior to submitting "Or Equal" product(s) for consideration, Contractor shall review and determine that product(s) meet or exceed the minimum quality and warranty provisions of the specified product.

   b. Cost and time considerations will be waived for products and manufacturers submitted under the "Or Equal" provision, except no increase in Contract Sum or Contract Time shall result.

   c. Contractor's attention is called to the substitution provisions of the Conditions of the Contract.

3. Products Specified by Description: Where Specifications describe a product, listing characteristics required, with or without use of a brand name, provide a product that provides the characteristics and otherwise complies with the specified requirements.

4. Products Specified by Performance Requirements: Where Specifications require compliance with performance requirements, provide product(s) that comply with performance requirements and are recommended by the manufacturer for the intended application. Verification of manufacturer's recommendations may be by product literature or by certification of performance from manufacturer.

5. Products Specified by Reference to Standards Only: Where Specifications require compliance with a standard, provided product shall fully comply with the standard specified.

6. Products Specified by Combination of Methods: Where products are specified by a combination of described characteristics, performance characteristics, reference standards and manufacturer identification, provide products conforming to all such characteristics.

7. Use of products or manufacturers, whether listed or not, is subject to demonstrated compliance with requirements of the contract documents.

D. Product Selection Procedures:

1. Basis of Design: Where products or manufacturers are identified as "basis of design" or where sizes, profiles, and dimensional requirements on drawings are based on a specific product or system, comply with provisions for comparable products to obtain approval for listed alternate products or manufacturers. Comply with provisions for substitutions to obtain approval for use of an equal unnamed product or manufacturer.

2. Specified Products: Where the specifications indicate that a product or manufacturer is to be selected from those listed, comply with the provisions for substitutions to obtain approval for use of an equal unnamed product.

3. Other Named Products: Where products or manufacturers are indicated without qualification, or with the words "or approved equal" or similar terms, comply with provisions for comparable products to obtain approval for use of an equal unnamed product.

4. Visual Matching Specification: Where specifications require matching an established sample, select a product that complies with requirements and matches Engineer's sample. OCTA Project Manager's decision will be final on whether a proposed product matches.

5. Visual Selection Specification: Where specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, Contractor shall select a product that complies with other specified requirements.

6. Full Range: Where specifications include the phrase "to match existing colors, patterns, textures" or similar phrase, OCTA Project Manager will select color, pattern, density, or texture from manufacturer's product line submitted by the Contractor, that includes both standard and premium items.

PART 2 - PRODUCTS

Not used.

PART 3 – EXECUTION

Not Used.

PART 4 - MEASURMENT AND PAYMENT

No separate measurement or payment will be made for the work of this section.

END OF SECTION

SECTION 01 71 13

MOBILIZATION AND DEMOBILIZATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. This section consists of the Contractor furnishing all transportation, labor, materials and equipment necessary and incidental to mobilization and demobilization to perform the work of this contract. Work for mobilization and demobilization as specified in this section consists of preparatory work and operations at the start of the Contract Work and removal of those items at Contract completion. Contractor shall provide written construction notices to residents and tenants adjacent to the project site per City requirements.

1.02 DEFINITIONS

A. Mobilization is operations necessary for the movement and arrival at the worksite of personnel, equipment, supplies, and appurtenances, all in ready and satisfactory working and operational order, which the Contractor intends to use for the work; for the establishment of all temporary offices and Contractor-owned structures and other temporary facilities necessary to perform the work; proper safety training of project personnel; and for incidental work and operations which must be performed prior to beginning work on the various contract items.

B. Demobilization is operations necessary for the removal of all personnel, equipment, supplies, appurtenances, Contractor-owned structures, temporary facilities, materials, and debris from the worksite and restoration of site and surrounding properties, affected by the Contractor's activities, to pre-construction conditions, as approved by OCTA Project Manager.

1.03 SUBMITTALS

A. Shop Drawing showing the installation of any pollution control/SWPPP features required for the Project to be established on the site prior to initiating construction, maintained for the duration of construction and removed upon completion of construction.

B. Copies of all required permits obtained prior to starting Work covered by the permit.

C. List of tenants that need to get the construction notice.

D. Proof from the post office that all letters (construction notices) got sent.

PART 2 - PRODUCTS

Not Used

PART 3 – EXECUTION

3.01 GENERAL

A. The Contractor shall provide personnel, equipment, temporary facilities, construction materials, tools, and supplies at the worksite at the time they are scheduled to be required.

B. The Contractor shall locate plant or equipment appropriately close to the portion of the work for which it will be used.

C. The Contractor shall obtain all necessary permits required by the local jurisdictions to perform the work of this Contract. The Contractor shall provide OCTA Project Manager copies of all permits obtained prior to starting work covered by the permit.

D. The Contractor shall install pollution control features required by permits for the construction. These features shall be maintained throughout the duration of construction and removed at the completion of construction.

E. Upon completion of the work, the Contractor shall remove all equipment, temporary facilities, construction tools, apparatus, equipment, unused materials and supplies, plant, and personnel from the worksite and shall leave the worksite in a clean and satisfactory condition as approved by OCTA Project Manager.

PART 4 – MEASUREMENT AND PAYMENT

Work is considered incidental to work under other payment items and no separate payment will be made.

END OF SECTION

SECTION 01 71 23

FIELD ENGINEERING

PART 1 – GENERAL

1.01 DESCRIPTION

A. Work Includes:

1. Employ land surveyors and professional engineers, licensed in the State of California, to perform surveying and field engineering as required per Contract Documents.

2. Establish and maintain baselines and field control points as required for construction layout survey.

3. Perform survey and measurement to establish design lines and grades.

4. Layout of the Work.

5. Other engineering services, as necessary, to accomplish the Work.

1.02 GENERAL

A. Contractor shall locate and protect all adjacent areas, utilities, equipment, buses, cars, and appurtenances.

B. Control area of work, so that it does not interrupt bus maintenance and operations activities, or bus or car traffic flow on the site. Provide barricade and traffic signs around work area, excavations, and contractor's equipment. Provide flashing lights from dusk to dawn on all sides of construction work.

C. Promptly report and repair to the Engineer's satisfaction disruption in utilities caused by construction work. Repair disruption of utilities immediately.

D. Make no changes without prior written notice to the Engineer.

1.03 SUBMITTALS

A. Submit for OCTA's approval the name and professional history of the land surveying firm designated by the Contractor as its project surveyor.

1. At a minimum the project surveyor must have five to ten years of verifiable experience performing field survey.

B. On request, submit to OCTA Project Manager documentation that verifies accuracy of field engineering work and surveying work. Submit data certifying the all dimensions, elevations, and locations of improvement are in conformance, or non-conformance, with Contract Documents at end of Project.

C. Prior to completion of project and when requested by OCTA Project Manager, submit a copy of site drawing prepared by California registered engineer and signed by land surveyor verifying that the elevations and locations of the work are in conformance with contract documents.

D. Contractor shall submit a complete copy of the baseline survey field notes and final layout.

E. Contractor shall provide As-built redline drawings to the Authority at the completion of the Project.

1.04 REQUIREMENTS

A. Field Engineering: Provide field engineering services, as necessary. Utilize recognized engineering practices.

B. Verification: Verify all existing dimensions before starting work. Record all existing pavement striping and markings and submit this record to OCTA before commencing any demolition work.

C. Layout and Control of the Work: Establish elevations, lines, and grade for all Work under this Contract. Locate and lay out by instrumentation and similar appropriate means. Contractor is responsible for all construction field survey and setting of grades and slopes. New asphalt or concrete paving flow patterns should merge with existing flow patterns on the site so that flow of water is directed towards existing gutters, swales, and storm drains on site. Protect in place existing storm drain system, swales, gutters, concrete walk, storm drain inlets, channel wall, fencing, on-site storage, OCTA equipment, and property during construction.

D. Verification of Work: Periodically verify layout and completed conditions of the Work by same means.

E. Project area shall be cordoned off using traffic cones during each construction phase on all sides at end of work day. Traffic cones shall be removed by the end of each work day.

1.05 QUALITY CONTROL

A. Contractor shall maintain a complete and accurate log of control and survey work as it progresses.

B. OCTA Project Manager reserves the option to check Contractor's survey measurements and calculations. Whether OCTA Project Manager exercises this option or not, the requirement for accuracy will not be waived.

C. On completion of construction and major site improvements, Contractor shall prepare a final certified survey illustrating dimensions, locations, angles, and elevations of construction and work site.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

3.01 EXAMINATION

A. Verify locations of survey control points prior to starting any work on the project site. Contractor shall field verify all existing dimensions, conditions, layout, grading that will affect the project before commencing any work.

B. Review OCTA record drawings for underground utilities and field verify all utilities that may affect construction activities before begin of demolition work. Contractor shall utilize an independent utility locator company to survey and map any and all utilities that may affect construction activities and determine if there are any utility lines in conflict with construction of this project.

C. Contractor shall conduct survey (line and grade) of existing improvements such as top of curb, finished surface, flow lines etc. before any demolition or removal is undertaken. Areas where pavement has failed or settled shall be documented.

D. Immediately notify OCTA Project Manager of any discrepancies discovered.

E. Finished grade shall match existing grade and ensure positive drainage is provided.

3.02 SURVEYS AND RECORDS

A. Working from lines and grades established by baseline survey as shown in relation to work, establish and maintain bench marks and other dependable markers to set lines and levels for work on site as needed to locate each element of the project.

B. Contractor shall inform tradesmen performing the work of marked lines and grades provided for their use in layout work.

C. Contractor shall provide a complete copy of baseline survey field notes and final layout to OCTA Project Manager prior to starting construction.

D. Certify all lines and grades to OCTA.

3.03 SURVEY REFERENCE POINTS

A. Contractor shall locate and protect survey control and reference points. Preserve permanent reference points during construction.

B. Contractor shall establish appropriate control datum for construction survey.

C. Contractor shall report to OCTA Project Manager the loss or destruction of any reference points or relocation required because of changes in grades or other reasons.

D. Contractor shall replace dislocated survey control points based on original survey control and shall make no changes without prior written notice to and approval by OCTA Project Manager.

PART 4 - MEASUREMENT AND PAYMENT

No separate measurement or payment will be made under this section.

END OF SECTION

SECTION 01 73 29

CUTTING AND PATCHING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Requirements and limitations for cutting and patching of Work.

1.02 RELATED SECTIONS

A. Section 01 11 00 - Summary of Work.

B. Individual Product Specification Sections:

1. Cutting and patching incidental to Work specified in the Section.

2. Coordination with Work specified in other Sections for openings required to accommodate Work specified in those other Sections.

C. Include:

1. Identification of Project.

2. Location and description of affected Work.

3. Explanation of necessity for irregular cutting and patching procedures.

4. Description of proposed special work and alternate products to be used.

5. Alternatives to cutting and patching.

6. Effect on existing construction and, if applicable, work being performed for the Authority under separate contracts.

7. Date and time Work will be executed.

8. Written permission of affected separate contractor.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Primary Products: As required for original installation and to match surrounding construction.

B. Product Substitution: For each proposed change in materials, submit request for substitution under provisions of Section 01 60 00 - Product Requirements.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examination, General: Inspect existing conditions prior to commencing Work, including elements subject to damage or movement during cutting and patching.

B. After uncovering existing Work, inspect conditions affecting proper accomplishment of Work.

C. Beginning of cutting or patching shall be interpreted to mean that existing conditions were found by Contractor to be acceptable.

3.02 PREPARATION

A. Temporary Supports: Provide devices and methods to protect other portions of Project from damage by providing temporary supports.

3.03 CUTTING AND PATCHING

A. Cutting and Patching:

1. Execute cutting, fitting, patching, excavation, and fill, to complete Work.

2. Coordinate installation or application of products for integrated Work.

B. Remedial Work: Remove and replace defective or non-conforming Work.

3.04 PERFORMANCE

A. Cutting and Patching:

1. Execute demolition, cutting and patching by methods to avoid damage to adjoining Work, and which will provide appropriate surfaces to receive final finishing.

2. Saw cut asphalt concrete or Portland cement concrete paving for smooth edges. Do not overcut corners.

3. Contractor is required to take all precautions during construction to prevent damage to OCTA buses, property, equipment, utilities, and OCTA personnel. All precautions are to taken per CAL-OSHA code to prevent accidents, and damage to adjacent OCTA property and appurtenances.

B. Restoration:

1. Restore Work with new products as specified in individual Sections.

2. Where affected or uncovered by construction work, finish adjacent surfaces and background to condition before construction. Match material, paint, and finish to nearest joint. Re-paint all curbs, traffic striping, legends, parking stalls, numbers, and paving as existed before construction. Damage to adjacent or OCTA property shall be repaired, at the Contractor's expense, to a condition as existed before construction and to OCTA's Project Manager's satisfaction.

C. Finishing: Refinish (material and paint) surfaces to match adjacent and similar finishes as used for the Project. (match material and paint finish). For continuous surfaces, refinish with material and paint to nearest intersection or natural break or joint. Replace equipment or appurtenances damaged due to demolition, cutting or patching work during construction. Provide material quality to level equal to or better than that which existed before construction started.

PART 4 - MEASUREMENT AND PAYMENT

No separate measurement or payment will be made under this section.

END OF SECTION

SECTION 01 74 19

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Includes: Procedures for ensuring optimal diversion of construction and demolition waste generated by the Project, and documentation procedures for tracking waste generation and diversion.

1.02 DEFINITIONS

A. Certified Mixed Debris Processing Facility: A solid waste processing facility that accepts loads of mixed debris for the purpose of recovering re-usable and recyclable materials and disposing of the non-recyclable residual material.

B. Class III Landfill: A landfill that accepts non-hazardous solid waste such as household, commercial, and industrial solid waste. A Class III landfill shall have a California Integrated Waste Management Board (CIWMB) solid waste facilities permit and is regulated by the Local Enforcement Agency.

C. Construction and Demolition (C&D) Debris: Solid waste and recyclable materials that result directly from construction and demolition of buildings and other structures, do not contain hazardous waste (as defined in CCR Title 22, Section 66621.3, *et seq*.), and contain no more than 1 percent putrescible wastes by volume, calculated on a monthly basis. C&D debris includes, but is not limited to: asphalt, concrete, portland cement, brick, lumber, wallboard, roofing material, ceramic tile, pipe, glass and associated packaging.

D. Disposal: Acceptance of solid waste at a legally operating facility for the purpose of landfilling.

E. Diversion: Activities that result in reducing the amount of waste disposed at a landfill. This can include source reduction activities, composting, recycling, and reuse.

F. Inert Backfill Site: A location, other than inert fill or other disposal facility, to which inert waste is taken for the purpose of filling an excavation, shoring, or another soils engineering operation.

G. Inert Fill: A facility that can legally accept inert waste such as asphalt and concrete exclusively for the purpose of disposal.

H. Inert Debris/Inert Waste: Solid waste and recyclable materials that are source separated or separated for reuse, do not contain hazardous waste (as defined in

CCR, Title 22, section 66261.3 et. seq.) or soluble pollutants at concentrations in excess of applicable water quality objectives, and do not contain significant quantities of decomposable waste. Inert debris may not contain more than 1 percent putrescible wastes by volume calculated on a monthly basis. Gravel, rock, soil, sand and similar materials, whether processed or not, that have never been used in connection with any structure, development, or other human purpose are not inert debris.

I. Mixed Debris: Material that includes commingled recyclable and non-recyclable construction and demolition debris.

J. Mixed Debris Processing Facility: A solid waste processing facility that accepts loads of mixed debris for the purpose of recovering re-usable and recyclable materials and disposing of the non-recyclable residual materials. Refer also to Certified Mixed Debris Processing Facility.

K. Permitted Waste Hauler: A company that possesses a valid and current permit from the County of Riverside to collect and transport solid waste from individuals or businesses in the County of Riverside.

L. Recycling: The process of sorting, cleaning, treating, and reconstituting materials for the purpose of using the altered form in the manufacture of a new product. Recycling does not include burning, incinerating, or thermally destroying solid waste.

1. On-site recycling materials that are sorted and processed for use in an altered form in the Project, (e.g. concrete is crushed for use as base for a parking lot on the site).

2. Off-site recycling source-separated materials hauled to another location and used in an altered form in the manufacture of a new product.

M. Recycling Facility: An operation that can legally accept materials for the purpose of processing the materials into an altered form for the manufacture of a new product. Depending on the types of materials accepted and operating procedures, a recycling facility may or may not be required to have a Solid Waste Facilities permit from the CIWMB or be regulated by the Local Enforcement Agency.

N. Reuse: Materials that are recovered for use in the same form. This includes materials that are reused on-site or off-site.

O. Salvage: Materials recovered for reuse or sale or donation to a third party.

P. Source Reduction: Any action causing a net reduction in the generation of solid waste. Source reduction includes, but is not limited to, reducing the use of non-recyclable materials, replacing disposable materials and products with reusable materials and products, reducing packaging, and reducing the amount of yard waste generated.

Q. Source-Separated Materials (Construction and Demolition Debris): Material that is

sorted at the site of generation by individual material type for the purpose of reuse or recycling, i.e., loads of concrete that are source-separated for delivery to a base course recycling facility to be crushed into road base material.

R. Solid Waste: Shall mean waste that the CIWMB has deemed acceptable for disposal at a Class III landfill and shall not include source-separated material.

S. Transfer Station: A facility that can legally accept solid waste for the purpose of temporarily storing the materials for re-loading onto other trucks and transporting materials to a landfill for disposal, or recovering some materials for reuse or recycling. Transfer stations must be permitted by the CIWMB and regulated by the Local Enforcement Agency.

1.03 SUBMITTALS

A. Waste Management Plan (WMP): Conduct a site assessment and estimate the types and quantities of materials, under the Project, that are anticipated for on-site or off-site processing, recycling, reuse, or disposal.

1. Not more than 10 working days after Notice to Proceed, submit to OCTA Project Manager a written WMP. The plan shall show the percentage of recycling for inert debris expected from the Project and the percentage recycling for the remaining C&D debris expected from the Project. While no minimum amounts of recycling have been established for this project, Contractor shall make every reasonable effort to achieve a minimum of 50% by weight of material that is recycled, re-used, salvaged or otherwise diverted from landfill.

2. OCTA Project Manager's approval of the Contractor's WMP will not otherwise relieve the Contractor of responsibility for adequate and continuing control of pollutants and other environmental protection measures.

3. Dirt and excavation spoils, whether reused as fill or not, will not be counted in the calculation of diverted and disposed materials.

B. Solid Waste Diversion and Disposal Report (SWDD Report): One week prior to the first of every month, and prior to Contractor's monthly progress estimate for payment, Contractor shall prepare and submit to OCTA Project Manager a written SWDD report quantifying all material generated in the Project which was either disposed or diverted from disposal through reuse or recycling during the time period covered by the SWDD report and progress payment. Include in the Report a cumulative history of the diversion and disposal for the Project. Attach supporting documentation including manifests, weigh tickets, receipts, reports, invoices, and other supporting documents specifically identifying the project, the recyclables and solid waste generated by the Project, and where the material was sent. The final SWDD report shall cover the complete time period of the Project and shall contain a list of the total waste disposed and/or diverted for each reporting period. The final SWDD report and supporting documentation shall be submitted within 30 Calendar Days of Project completion.

1.04 WASTE MANAGEMENT PLAN SUBMITTAL MEETING

A. On or about 5 working days after Notice to Proceed, OCTA Project Manager will schedule and attend a meeting with the Contractor to discuss the proposed WMP submittal. This meeting shall be held to allow the OCTA and the Contractor an opportunity to develop a mutual understanding regarding the recycling and reuse requirements and programs.

1.05 REUSE, SALVAGE, AND RECYCLING OPTIONS

A. Contractor shall make use of as many reuse and salvage options as is feasible. One option is the California Materials Exchange (CalMAX), a free program sponsored by the CIWMB.

B. Recycling shall include both on-site and off-site recycling of source-separated materials, as well as mixed debris recycling efforts.

C. On-site recycling program shall produce a quality product to meet the specifications identified in the Contract Documents, subject to approval. Estimate the amount of material to be used in the Project and include a program for off-site recycling of any excess material that cannot be used in the Project.

D. Develop and implement a program to include source separation of solid waste, to the greatest extent feasible, of the following types:

1. Asphalt

2. Concrete and concrete block

3. Rock

4. Wood (lumber)

5. Green material (i.e. tree trimmings)

6. Metals

E. Mixed Debris Recycling: Develop and implement a program to transport loads of commingled construction and demolition materials that cannot be feasibly source separated to a mixed debris recycling facility.

1.06 HAULING AND DISPOSAL OPERATIONS

A. Hauling: Arrange the collection and hauling of C&D debris by a waste hauler that is permitted by the County of Orange Waste Management Department and Agencies as applicable.

B. Recycling And Processing Facilities: Transport C&D debris to recycling or processing facilities. Contractor shall be familiar with the requirements for acceptance of C&D materials at the recycling and processing facilities before the material is delivered. Always call facilities in advance to verify requirements.

C. Disposal Facilities: Transport C&D debris that cannot be delivered to a recycling or processing facility, to a transfer station or disposal facility that can legally accept the materials for the purpose of disposal.

D. Site Disposal: Do not burn, bury, or otherwise dispose of solid waste on the Project job-site. All trash, debris, and removed materials shall be hauled away and legally disposed off-site on the same day they are removed.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

PART 4 – MEASUREMENT AND PAYMENT

No separate measurement or payment will be made under this section.

END OF SECTION

SECTION 01 74 23

CLEANING

PART 1 - GENERAL

1.01 DESCRIPTION.

A. Work Included:

1. Execute cleaning, during progress of the work, and at completion of the work.

B. Related Work Specified Elsewhere:

1. Cleaning for specific products or work; the respective specification section for that work.

2. Refer to Section 01 14 25, Procedures in Construction for requirements for restoration of project site(s), including but not limited to photographic documentation.

3. Refer to Section 01 71 13, Mobilization and Demobilization for requirements for removal of all of Contractors facilities, equipment and tools.

1.02 DISPOSAL REQUIREMENTS.

A. Conduct cleaning and disposal operations to comply with all applicable codes, local codes, ordinances, regulations and laws, rules and practices.

B. Conform to requirements of 01 74 19, Construction Waste Management and Disposal.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Use only those cleaning materials which will not create hazards to health or property and which will not damage surfaces.

B. Use only those cleaning materials and methods recommended by manufacturer of the surface material to be cleaned.

C. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 - EXECUTION

3.01 CLEANING DURING CONSTRUCTION

A. Provide all labor and equipment required to remove trash and broom clean project sites as required, including surrounding areas affected by construction activities.

B. Provide all labor and equipment required to load, haul, and legally dispose of all construction trash and debris at the end of each work day throughout the duration of the project.

C. Pay all dump fees required to legally dispose of materials.

D. Clean streets adjacent to the project site as required to meet the requirements of all local, City, County and State authorities.

E. Clean and wash parking lots and driveways.

F. Provide labor to clean the office trailer once a week.

G. Clean up all excess concrete from site concrete work.

H. Wet down dry materials and rubbish to prevent blowing dust.

I. At reasonable intervals during progress of work and at the end of each work day, remove waste materials, debris and rubbish from site and dispose of legally away from site.

J. Handle waste materials and debris in a controlled manner with as few handlings as possible; do not drop or throw materials from heights.

K. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly painted surfaces.

L. Do not place in fills or backfills or burry at site any waste material, rubbish or debris. Remove such material from project to a lawful disposal area by the end of each work day; pay all associated hauling and dumping charges.

M. Perform any additional cleaning or cleaning at shorter intervals when instructed to do so by OCTA Project Manager.

3.02 FINAL CLEANING

A. SUBSTANTIAL COMPLETION REVIEW CLEANING, GENERAL

1. Substantial Completion Review Cleaning, General: Execute a thorough cleaning prior to Substantial Completion review by the Engineer.

a. Clean surrounding areas affected by construction. Clean and repair all surrounding areas and appurtenances such as curbs, gutters, swales, storm drain, platforms, equipment, vents, buses, fences, Apex boxes, light concrete pedestal, landscaping, and driveways. Repair equipment, curbs, surrounding driveways, landscaping, and site affected by the construction work by thorough brooming and washdown. Remove all oil, concrete, debris, and paint from the surfaces mentioned.

b. Remove waste and surplus materials, rubbish and temporary construction facilities, utilities and controls from site.

2. Employ experienced workmen, or professional cleaners, for final cleaning.

3. In preparation for occupancy, conduct final inspection of sight-exposed surfaces, and of concealed spaces.

4. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials, from sight-exposed finished surfaces; polish surfaces so designated to shine finish.

5. Wash and shine glazing and mirrors.

6. Repair, patch and touch up marred surfaces to specified finish, to match adjacent surfaces.

7. Water-jet clean paved surfaces; rake clean other surfaces of grounds. Comply with SWPPP BMP measures.

8. Remove all protective construction coverings and coatings.

9. Contaminated Earth: Final clean-up operations shall include removal and lawful disposal of earth that is contaminated or unsuitable for support of plant life in planting areas, as well as filling of resulting excavations with suitable soil. Contaminated areas include those used for disposal of waste concrete, mortar, plaster, masonry and similar materials; areas in which washing out of concrete and plaster mixes or washing of tools and other similar cleaning operations have been performed; and areas that have been oiled, paved or chemically treated. Do not dispose of waste oil, solvents, paints, solvents and similar material of a penetrating nature by depositing or burying on OCTA's property.

10. Maintain cleaning until project is occupied.

11. Final cleaning shall be done to the satisfaction of OCTA Project Manager.

B. FINAL COMPLETION INTERIOR CLEANING

1. Final Completion Cleaning, General: Complete final cleaning before submitting final Application for Payment.

a. Remove asphalt, oil, grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, concrete material, and other foreign materials from all visible exterior surfaces.

b. Remove dust from all horizontal surfaces not exposed to view, including equipment, light standards, ledges, utilities, buses, apex boxes, and plumbing fixtures on site affected by construction.

c. Repair all disrupted or broken appurtenances which were damaged during construction to a new condition to the OCTA's Project Manager's satisfaction.

2. Clean all adjacent walls, equipment, and other appurtenances mentioned in article 3.1.A.1 above affected by construction work including areas adjacent to construction and on site.

3. Clean construction area in which phase has been completed and re-stripe before begin of next phase of work

C. FINAL COMPLETION SITE CLEANING

1. Site Cleaning: Broom clean exterior paved surfaces. Rake clean other surfaces of the grounds affected by construction material.

a. Wash down and scrub where necessary all paving soiled as a result of construction activities. Thoroughly remove material droppings, asphalt splatters, stains, oil, and adhered soil.

b. Remove from the site all construction waste, unused materials, excess soil and other debris resulting from the Work.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

PART 4 – MEASUREMENT AND PAYMENT

No separate measurement or payment will be made under this section.

END OF SECTION

SECTION 01 77 00

CLOSEOUT PROCEDURES

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Administrative and procedural requirements for contract closeout, including, but not limited to, the following:

a. Substantial Completion procedures.

b. Final Acceptance procedures.

B. Related Sections:

1. Section 01 74 23, Cleaning, for final cleaning of project site(s).

2. Section 01 78 00, Closeout Submittals, for operation and maintenance manual requirements.

3. Section 01 78 00, Closeout Submittals, for submitting record drawings, record specifications, and record product data.

4. Section 01 78 36, Warranties and Guarantees and Bonds, for submitting Warranties.

5. Divisions 02 through 49 sections for any specific closeout requirements for the work in those sections.

1.02 SUBSTANTIAL COMPLETION

A. Preliminary punch list review: At Contractor's request, the Engineer will attend a preliminary Contract closeout review, not earlier than 14 days prior to anticipated Substantial Completion review day. The Engineer and Contractor shall conduct a brief walk-though of Project to review scope, adequacy and completeness of the Work. The Engineer will prepare a typewritten list of items to be completed and corrected (preliminary punch list).

B. Before requesting review/inspection for determining date of Substantial Completion, the Contractor shall complete the following:

1. Execute cleaning and clear site of temporary facilities and controls, as specified in Section 01 50 00 Temporary Facilities and Controls and in Section 01 74 23 Cleaning.

2. Prior to Substantial Completion review, complete all testing, inspection, balancing, sterilization and cleaning of the Work. Obtain final City Inspection and City sign-off required for the Project. Provide original of final sign-off cards to the Authority.

3. Advise OCTA of pending insurance changeover requirements.

4. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents. Refer to Section 01 78 00, Closeout Submittals for requirements.

5. Obtain and submit releases permitting OCTA unrestricted use of the work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

6. Prepare and submit project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information. Refer to Section 01 78 00, Closeout Submittals for requirements.

7. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.

8. Make final changeover of permanent locks and deliver keys to OCTA Project Manager. Advise OCTA’s personnel of changeover in security provisions.

9. Complete startup testing of systems.

10. Submit test/adjust/balance records.

11. Terminate and remove temporary facilities from project site, along with mockups, construction tools, and similar elements. Refer to Section 01 71 13, Mobilization and Demobilization for requirements.

12. Advise OCTA Project Manager of changeover in utilities.

13. Submit changeover information related to OCTA’s occupancy, use, operation, and maintenance.

14. Complete final cleaning requirements, including touchup painting. Refer to Section 01 74 23, Cleaning for requirements.

15. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

C. Contractor's Certification: The Contractor shall submit to the Engineer written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Substantial Completion review by the Engineer. Provide five working days notice to the Engineer that Work is substantially complete.

D. Punch List Review: The Authority's Engineer, and the responsible design consultants, as may be necessary, will attend a Contract closeout review and conduct a walk-thorough of Project to review the updated list of items to be completed and corrected (Punch List).

1. Contractor shall prepare a list and record additions, deletions, and revisions as noted by the Engineer for completion or correction.

2. The Contractor shall complete all items on the punch list and notify the Engineer the completed items. The Engineer will update and distribute the revised Punch List after his next walk-through.

3. Costs of additional visits caused by incomplete scope of work or punch list items after the second visit to the site by the Engineer and the design consultants, to review completion and correction of Work, shall be reimbursed to the Authority by the Contractor.

E. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, OCTA Project Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. OCTA Project Manager will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by OCTA Project Manager, that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request re-inspection when the work identified in previous inspections as incomplete is completed or corrected.

2. Results of completed inspection will form the basis of requirements for final completion.

1.03 FINAL ACCEPTANCE

A. Preliminary Procedures: Before requesting final inspection for determining final acceptance, complete the following:

1. A final Application for Payment according to Section 01 29 00, Payment Procedures and the General Provisions of the Contract.

2. Submit certified copy of OCTA Project Manager's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and

dated by OCTA Project Manager. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.

3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

4. Instruct OCTA's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. Inspection: Submit a written request for final inspection for final acceptance. On receipt of request, OCTA Project Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. OCTA Project Manager will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request re-inspection when the work identified in previous inspections as incomplete is completed or corrected.

C. Engineer's Certification: The Engineer determines that the list of items to be completed and corrected (Punch List) is sufficiently complete for the Authority to occupy the Project area for the use to which it is intended.

D. Notice of Completion: The Authority, after receipt of the Engineer's certification, will record a Notice of Completion with the county.

PART 2 – PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

PART 4 - MEASUREMENT AND PAYMENT

No separate measurement or payment shall be made under this section.

END OF SECTION

SECTION 01 78 00

CLOSEOUT SUBMITTALS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Maintain at the site for OCTA Representative one record copy of Project record documents, including:

   a. Record drawings.

   b. Record specifications.

   c. Addenda.

   d. Change Orders and other Modifications to the Contract.

   e. OCTA's field orders and written instructions.

   f. Reviewed and Accepted Shop Drawings, Product Data and Samples.

   g. Field Test Reports.

   h. Referenced Documents.

B. Related Sections:

1. Section 01 77 00, Closeout Procedures.

2. Section 01 78 36, Warranties and Guarantees and Bonds.

3. Section 01 33 00, Submittal Procedures.

4. Sections in Division 02-49 for specific requirements related to work of those sections.

5. General Conditions for all financial and payment requirements.

1.02 SUBMITTALS

A. At Contract close-out, deliver Record Documents to the OCTA’s representative.

B. Accompany submittal with transmittal letter in duplicate, containing:

1. Date;

2. Project title and contract number;

3. Contractor's name and address;

4. Title and number of each Record Document; and

5. Signature of Contractor or his authorized representative.

C. Submit in accordance with Section 01 33 00, Submittal Procedures.

D. Record Drawings: Submit one set of full size marked-up record prints. Submit also as pdf electronic file on electronic media acceptable to OCTA Project Manager.

E. Record Specifications: Submit one set of contract specifications, including addenda and contract modifications. Submit also as pdf electronic file on electronic media acceptable to OCTA Project Manager.

F. Record Product Data: Submit one marked-up copy of each product data submittal. Submit also as pdf electronic file on electronic media acceptable to OCTA Project Manager.

1. Product data need not be submitted separately if included in operation and maintenance manuals.

G. Shop Drawings: Submit one hard copy of reviewed and accepted shop drawings. Also submit as PDF files and AutoCAD files on a CD ROM.

H. Operations and Maintenance Manual:

1. Manual content is specified in individual specification sections to be reviewed at the time of section submittals. Submit review manual content formatted and organized as required by the section. Where applicable, clarify and update reviewed manual content to correspond to modifications and field conditions.

2. Submit three paper copies of each Operations and Maintenance Manual. Include a complete operation and maintenance directory. Enclose tile pages and directories in clear plastic sleeves.

3. Submit PDF electronic file on digital media acceptable to OCTA Project Manager. Assemble each manual into a composite electronically-indexed file.

4. Initial Manual Submittal: Submit draft copy of each manual at least 30 calendar days before commencing demonstration and training. OCTA Project Manager will comment on whether general scope and content of manual are acceptable.

    a. Correct or modify each manual to comply with OCTA Project Manager's comments. Submit copies of corrected manual within 15 calendar days of receipt of comments and prior to commencing demonstration and training.

5. Final Manual Submittal: Submit each manual in final form before requesting inspection for Substantial Completion and at least 15 calendar days before commencing demonstration and training.

I. Other Documents: Unless otherwise specified, submit one (1) hard copy and a PDF electronic file of each document required herein.

1.03 FINAL COMPLETION SUBMITTALS:

A. Final Submittals: Submit to the Engineer all documents and products required by Specifications to be submitted, including the following which apply:

1. Project record drawings and specifications.

2. Operations and Maintenance data.

3. Guarantees, warranties and bonds.

4. Test reports and certificates of compliance.

5. Local Regulatory Jurisdiction(s) final Sign-off, including any and all documents required by governing authorities, utilities and other agencies, building permit cards, inspection cards signed-off as final by the inspectors, and certifications of inspections and tests.

B. Certificates of Compliance and Test Report Submittals: Submit to the Engineer certificates and reports as specified, as required by manufacturers for warranty and guarantee purposes, and as required by authorities having jurisdiction.

C. Subcontractor List: Submit to the Engineer five copies of updated Subcontractor and Materials Supplier List.

D. Warranty Documents: Prepare and submit to the Engineer warranties and bonds as specified in Section 01 78 36 Warranties and Guarantees and Bonds.

E. Final Payment: A final Application for Payment will be furnished by the Authority. The Authority will process the final payment per the General Provisions of the Contract.

1.04 PROJECT RECORD DOCUMENTS - GENERAL

A. Maintain on site, one set of the following record documents and record actual construction and all revisions to the Work:

1. Contract Drawings.

2. Project Manual, with Specifications, Addenda, Change Orders and other instruments modifying the Contract.

3. Reviewed shop drawings, product data and samples.

4. Store Record Documents separate from documents used for construction.

1.05 RECORD DRAWINGS:

A. Record Prints: Maintain one set of black-line white prints of the contract drawings and shop drawings for the sole purpose of recording all as-built changes to the work.

B. Preparation: Record information continuously as Work progresses. Do not conceal Work permanently until all required information is recorded. Require individual or entity who obtained record data, where individual or entity is installer, subcontractor, or similar entity, to prepare the marked-up record prints. Legibly and to scale, mark a reproducible set of Contract Drawings to record actual construction where installation varies from that shown on contract drawings, including:

1. Measured dimensions and cross section of work.

2. Measured horizontal and vertical locations of underground utilities, ducts, and vents from specific wall locations, including all new utilities installed and utilities found, abandoned or left in place, referenced to permanent surface improvements and to visible and accessible features of the structure.

3. Field changes of dimensions and details.

4. Details not on original Contract Drawings and any other changes to the original Contract Drawings (Changes of location of utilities, equipment, and other accessories).

5. As-Built information shall be shown along with RFIs, Submittals, Change Orders, or other indicating source of changes. References to written changes such as RFI’s of Field Directives should be clouded on the drawings with a copy of the written direction attached to the set of drawings.

6. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.

7. Accurately record information in an understandable drawing technique.

8. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.

C. Mark record sets in red ink. Use other colors as required to distinguish between changes for different categories of the work at same location.

1. Mark important additional information that was either shown schematically, such as conduit runs, or omitted from original drawings.

2. Note work change RFI numbers, directive numbers, alternate numbers, change order numbers, and similar identification, where applicable.

1.06 RECORD SPECIFICATIONS

A. Preparation: In PART 2 – PRODUCTS in each specification section, legibly mark in red ink and record actual products installed or used

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

2. Mark copy with the proprietary name and model number or catalog number of products, materials, and equipment furnished, including substitutions or alternates utilized and product options selected.

3. Record the name of manufacturer, supplier, installer, and other information necessary to provide a record of selections made.

4. For each principal product, indicate whether record product data has been submitted in operation and maintenance manuals instead of submitted as record product data.

5. Note related addenda, change orders, record product data, and record drawings, and other instruments modifying the Contract, where applicable.

1.07 SHOP DRAWINGS

A. Maintain as record documents.

1. Legibly annotate drawings to record changes made after review.

2. Record Shop Drawings:

a. Revise the shop drawings CAD files to reflect annotations made on record copy.

b. Submit hard copies, PDF files and CAD files compatible with AutoCAD 2012 and in accordance with paragraph 1.02.

1.08 OPERATIONS AND MAINTENANCE DOCUMENT DIRECTORY

A. Organization: Include a section in the directory for each of the following:

1. List of documents.

2. List of systems.

3. List of equipment.

4. Tables of contents.

B. List of systems and subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.

D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

E. Identification: In the document directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the contract documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, Preparation of Operating and Maintenance Documentation for Building Systems.

1.09 REQUIREMENTS FOR OPERATION AND MAINTENANCE MANUALS

A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.

2. Table of contents.

3. Manual contents.

B. Title Page: Include the following information:

1. Subject matter included in manual.

2. Name and address of project.

3. Name and address of OCTA.

4. Date of submittal.

5. Name and contact information for Contractor.

6. Name and contact information for OCTA Project Manager.

7. Names and contact information for major consultants to OCTA Project Manager that designed the systems contained in the manuals.

8. Cross-reference to related systems described elsewhere in the operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to specification section number in project manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Provide manuals for each piece of equipment including individual components and subsystems of complete assembly. Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder. Line out non-applicable text and illustration. The section of the manual on operation shall describe the functions and limitations of each component and its relationship to the system of which it is a part. Where several models, options, or styles are described, the manual shall identify the items actually provided.

E. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.

2. File Names and Bookmarks: Enable bookmarking of individual documents based upon file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel upon opening file.

F. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.

1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2 by 11 inch paper; with clear plastic sleeve on cover to hold label and cover sheet describing contents and with pockets inside covers to hold folded oversize sheets.

   a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.

   b. Identify each binder on front and spine, with printed title "Operation and Maintenance Manual," project name, subject matter of contents, and specification section number (on bottom of spine). Indicate volume number for multiple-volume sets.

2. Dividers: Heavy paper dividers with plastic covered tabs for each section of manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to specification section number and title of project manual.

3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.

4. Supplementary Text: Prepared on 8-1/2 by 11 inch white bond paper.

5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

   a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.

   b. If drawings are too large to be used as foldouts, fold and place drawings in labeled enveloped and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

G. Manuals shall contain the following minimum information for each product or system:

1. List of equipment furnished for project with name, address, and telephone number of each vendor.

2. Name, address and telephone number for nearest manufacturer’s service representative.

3. Catalog, model and serial number for the installed equipment.

4. Description of the normal and emergency operations of the equipment.

5. Statement of warranty and date warranty begins and ends.

6. Standard starting, stopping and operating instructions.

7. Emergency and special operating instructions and a list of service organizations (including addresses and telephone numbers) capable of rendering emergency service to the various parts of the system.

8. Copy of each wiring and control diagram.

9. Routine maintenance procedures.

10. Servicing and lubrication schedule.

11. Manufacturer’s printed operating and maintenance instructions and part lists. Operating and maintenance instructions for each and every item of equipment, setting forth in detail and step-by-step the procedure of starting, stopping, operating, and maintaining the entire system as installed. Include a schedule of recommended maintenance intervals.

12. Manufacturer’s recommended special maintenance tools.

13. List of spare parts to include recommended stock quantities for one year of routine maintenance.

14. Tabulation of motor nameplate horsepower, nameplate current, field-measured current, overlay relay setting, and catalog number for polyphase motors.

15. List of fuses, lamps, seals, and other expendable equipment and devices. Specify size, type, and ordering description. List name, address, email address, fax number, and telephone number of vendor.

16. A copy of shop drawings for mechanical, electrical, and instrument equipment in final form.

17. Certified equipment drawings or reviewed shop drawing data clearly marked for equipment furnished.

H. Brochures shall be loose leaf with durable plastic or fiberboard covers. Each sheet shall be reinforced to prevent tearing from continued use, and each brochure shall have the following information clearly printed on its cover:

1. Project name, name of Owner, and address.

2. Name and address of Owner's Representative.

3. Name and addresses of contractors and subcontractors and department to contact.

4. Telephone number of contractors, including night and emergency numbers.

5. Major equipment vendors' names and telephone numbers.

I. Equipment Data Sheet: Provide six sets of equipment data sheets, bound in three-ring binders, summarizing the equipment manufacturer's maintenance instructions and recommendations. A blank data sheet and a sample data sheet are attached at the end of this specification section.

1.10 PHOTOGRAPHS

A. Prior to performing any work on the site, the Contractor shall take a minimum of twenty (20) photographs of each project site. Each major area of work shall be the subject of at least one photograph.

B. After construction operations have been started at the site, the Contractor shall periodically take color photographs to show general site condition and progress of work. A minimum of twenty (20) photos shall be taken throughout each month and submitted to the OCTA Project Manager by the 5th of the following month. Each major area of work shall be the subject of at least one photograph.

C. The photo submittals shall be a read-only compact disk (CD-ROM) containing high-resolution electronic files of the color photographs. Each photograph will be captioned with date taken, location, and general description. In addition to the electronic file, the Contractor shall submit two (2) (8”X10”) prints of each photograph

PART 2 – PRODUCTS

Not Used

PART 3 - EXECUTION

3.01 RECORDING AND MAINTENANCE OF PROJECT RECORD DOCUMENTS

A. Recording: Post changes and modifications to project record documents as they occur; do not wait until the end of project.

B. Maintenance of Record Documents: Store record documents in the field office apart from the contract documents used for construction. Do not use project record documents for construction purposes. Maintain one copy of each submittal during the construction period for project record document purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for OCTA Project Manager's reference during normal working hours.

C. Label each document “PROJECT RECORD” in two-inch high printed letters, or a height appropriate to document size.

PART 4 - MEASUREMENT AND PAYMENT

No separate measurement or payment will be made for the work of this section. As-Built drawings and photographs will be reviewed each month by the OCTA Project Manager. The monthly payment will be reduced by 5% if, in the opinion of the OCTA Project Manager, the Contractor is not in conformance with the requirements of this section.

INSTALLATION OF BATTERY-ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE

SAMPLE

Preventive Maintenance and Operating Requirement Sheets

<table>
<tr><td colspan="2">Preventive Maintenance Program</td><td colspan="2">Equipment Record Number</td></tr>
<tr><td colspan="2">EQUIPMENT DESCRIPTION</td><td colspan="2">ELECTRICAL OR MECHANICAL DATA</td></tr>
<tr><td colspan="2">Name:</td><td colspan="2">Size:</td></tr>
<tr><td colspan="2">Serial No.:</td><td colspan="2" rowspan="2">Model:</td></tr>
<tr><td colspan="2">Vendor:</td></tr>
<tr><td colspan="2" rowspan="2">Vendor Address:</td><td colspan="2">Type:</td></tr>
<tr><td colspan="2">Mfr.:</td></tr>
<tr><td colspan="2">Vendor Rep:</td><td>Voltage:</td><td>Amps:</td></tr>
<tr><td colspan="2">Phone:</td><td>Phase:</td><td>rpm:</td></tr>
<tr><td colspan="3">Maintenance Work to be Done</td><td>Frequency*</td></tr>
<tr><td colspan="3"></td><td></td></tr>
<tr><td colspan="4">OPERATING REQUIREMENTS AND REFERENCE</td></tr>
</table>

*D - Daily; W - Weekly; B - Biweekly; M - Monthly; Q - Quarterly;
S - Semiannually; A - Annually.

INSTALLATION OF BATTERY-ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE

C-5-3922
EXHIBIT B

SAMPLE

Preventive Maintenance and Operating Requirement Sheets

Preventive Maintenance Program	Equipment Record Number	
EQUIPMENT DESCRIPTION	ELECTRICAL OR MECHANICAL DATA	
Name: Pump No. 1 Tag No.: P01-1	Size: 15 hp	
Serial No.: 123456ABC Vendor: ABC Pump Co.	Model: 140T Frame Serial No. 987654ZY Class F Insulation W/Space Heater	
Vendor Address: 1111 Pump Circle Newport Beach, CA 92663	Type: Mfr.: DEF Motors, Inc.	
Vendor Rep: XYZ Equipment, Inc.	Voltage: 460	Amps: 20
Phone: 714/752-0505	Phase: 3	RPM: 1,800
Maintenance Work to be Done		Frequency*
1. Operate all valves and check such things as a) bearing temperature, b) changes in running sound, c) suction and discharge gauge readings, d) pump discharge rate, and e) general condition of the drive equipment. 2. Check packing. 3. Checking pumping unit for any dust, dirt, or debris. (Continued on attached sheet)		D D W
OPERATING REQUIREMENTS AND REFERENCE		
For manufacturer's instructions regarding installation, operation, maintenance, and trouble shooting of this equipment, see Volume ____, Section _____.		

*D - Daily; W - Weekly; B - Biweekly; M - Monthly; Q - Quarterly;
S - Semiannually; A - Annually.

INSTALLATION OF BATTERY-ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE

C-5-3922
EXHIBIT B

SAMPLE

Preventive Maintenance and Operating Requirement Sheets

Preventive Maintenance Program	Equipment Record Number	
EQUIPMENT DESCRIPTION	ELECTRICAL OR MECHANICAL DATA	
Name:	Size:	
Serial No.:	Model:	
Vendor:		
Vendor Address:	Type:	
	Mfr.:	
Vendor Rep:	Voltage:	Amps:
Phone:	Phase:	RPM:
Maintenance Work to be Done		Frequency*
4. Lubricate bearing frame and motor bearings (consult manufacturer's instructions for type of grease or oil).		Q
5. Disassemble and change or repair the following a) impeller, b) shafts, c) shaft sleeve, d) rotary seals, and e) sleeve bearings.		A
OPERATING REQUIREMENTS AND REFERENCE		

*D - Daily; W - Weekly; B - Biweekly; M - Monthly; Q - Quarterly; S - Semiannually; A - Annually.

INSTALLATION OF BATTERY-ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE

END OF SECTION

SECTION 01 78 36

WARRANTIES, GUARANTEES, AND BONDS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included:

1. General administrative and procedural requirements for preparation and submission of warranties and bonds required by the Contract Documents, including manufacturer's standard warranties on products and special Project warranties. This section specifies the general requirements for written warranties and guarantees required by the Contract Documents.

   a. Refer to the Conditions of the Contract for terms of Contractor's special warranty of workmanship and materials.

   b. Certifications and other commitments and agreements for continuing services to the Authority are specified elsewhere in the Contract Documents.

1.02 RELATED DOCUMENTS AND SECTIONS

A. Section 01 33 00 – Submittal Procedures: General administrative requirements for submittals, applicable to warranties and bonds.

B. Section 01 77 00 – Closeout Procedures: General requirements for closeout of the Contract.

C. Section 01 78 00 – Closeout Submittals: Operating and Maintenance data binders to include copies of warranties and bonds documents.

D. Individual Product Specifications Sections: Special Project warranty requirements for specific products or elements of the Work; commitments and agreements for continuing services to Authority.

1.02 WARRANTIES AND GUARANTEES

A. General: Provide all warranties and manufacturer's guarantees with OCTA named as the beneficiary. For equipment, products, or components bearing a manufacturer's warranty of guarantee that extends for a period of time beyond the Contractor's warranty and guarantee, so state in the warranty or guarantee.

B. Warranty: Assurance to the Authority by the Contractor, installer, supplier, manufacturer or other party responsible as warrantor, for the quantity, quality,

performance and other representations of a product, system service of the Work, in whole or in part, for the duration of the specified period of time. Warranty shall be an agreement to repair to repair or replace, without cost and undue hardship to the Authority, work performed under the Contract which is found to be defective during the warranty or guaranty period (correction period).

C. Guaranty: Assurance to the Authority by the Contractor or product manufacturer or other specified party, as guarantor, that the specified warranty will be fulfilled by the guarantor in the event of default by the warrantor.

D. Standard Product Warranty: Preprinted, written warranty published by product manufacturer for particular products and specifically endorsed by the manufacturer to the Authority.

E. Special Project Warranty: Written warranty required by or incorporated into Contract Documents, to extend time limits provided by standard warranty or to provide greater rights for the Authority. For provisions for special warranties, refer to the Conditions of the Contract for terms of the Contractor's special warranty of the workmanship and materials.

F. Specific Warranty and Guarantee Requirements: Refer to Divisions 02 and higher.

G. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties shall not relieve the Contractor of warranty on the work that incorporates the products, nor shall they relieve suppliers, manufacturers and installers required to countersign special warranties with Contractor.

H. Related Damages and Losses: When correcting warranted work that has been found defective, remove and replace other work that has been damaged as a result of such defect or that must be removed and replaced to provide access for correction of warranted work.

I. Correction Period: The Correction Period shall be synonymous with warranty period and guaranty period used in the Contract Specifications. All defective work shall be initiated with 12 hours for critical system operations, as determined solely by the Authority, and within 3 calendar days for all other warranty work.

J. Reinstatement of Warranty: When work covered by a warranty has been found defective and has been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

K. Replacement Cost: Upon determination that work covered by a warranty has been found to be defective, replace or reconstruct the work to a condition acceptable to the OCTA, complying with applicable requirements of the Contract Documents. Contractor shall be responsible for all costs for replacing or reconstructing defective work regardless of whether the OCTA has benefited from use of the work through a portion of its anticipated useful service life.

L. The OCTA's Recourse: Written warranties made to the OCTA are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under law nor shall warranty periods be interpreted as limitations on time in which the OCTA can enforce such other duties, obligation, rights, or remedies.

M. Rejection of Warranties: The OCTA reserves the right to reject warranties and disallow the use of products with warranties in conflict with contract document requirements.

N. Warranty as Condition of Acceptance: The OCTA reserves the right to refuse to accept work for the project where a special warranty, certification or similar commitment is required until evidence is presented that those required to countersign such commitments are willing to do so.

1.03 PREPARATION OF WARRANTY AND GUARANTEE SUBMITTALS

A. Number of Copies: Two, unless otherwise specified or directed.

B. Special Project Warranty and Manufacturer's Guarantee Forms: Forms for Special Project Warranties and for Manufacturer's Guarantees are included in the Conditions of the Contract at the end of this Section. Prepare a written document utilizing the appropriate form, ready for execution by the Contractor or the Contractor and subcontractor, supplier or manufacturer. Submit a draft to the OCTA though OCTA Project Manager for approval prior to final execution.

1. Refer to Division 02 and higher for specific content requirements and particular requirements for submittal of special project warranties.

2. Prepare standard product warranties and product guarantees, excepting manufacturer's standard printed warranties and guarantees, on Contractor's, subcontractor's, material supplier, or manufacturer's own letterhead, addressed to the OCTA

3. Warranty and guarantee letters shall be signed by all responsible parties and by Contractor in every case, with modifications only as approved by OCTA Project Manager to suit the conditions pertaining to the warranty or guarantee.

C. Manufacturer's Guarantee Forms: Manufacturer's guarantee forms may be used in lieu of special project forms included at the end of the Section. Manufacturer's guarantee forms shall contain appropriate terms and identification, ready for execution by the required parties.

1. If proposed terms and conditions restrict guarantee coverage or require actions by the OCTA beyond those specified, submit draft of guarantee to the OCTA through Engineer for review and acceptance before performance of the work.

2. In other cases, submit draft of guarantee to OCTA Project Manager for approval prior to final execution of guarantee.

D. Signatures: By persons authorized to sign warranties, guarantees, and bonds on behalf of entity provided the warranty, guarantee, and bonds. All signatures shall be notarized.

E. Co-Signature: the Contractor shall cosign all installer's warranties and bonds Manufacturer's printed guarantees will not require co signatures.

1.04 FORM OF WARRANTY SUBMITTALS

A. Form of warranty and bond submittals: At final completion, compile 2 copies of each required warranty and guaranty and bond, properly executed by the Contractor, or by the Contractor and subcontractor, supplier or manufacturer. Collect and assemble all written warranties and guarantees into binders and deliver binders to OCTA Project Manager for final review and acceptance.

B. Prior to submission, verify that documents are in proper form, contain all required information and are properly signed.

C. Organize the warranty documents into an orderly sequence based on the table of contents of the Specifications.

D. Include a table of contents for the binder, neatly typed, following order, section names, and numbers of the Specifications.

E. Bind warranties and guarantees in heavy-duty, commercial quality, 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, with clear front and spine to receive inserts, and sized for 8 ½" by 11" paper.

F. Provide heavy paper dividers with celluloid or plastic covered tabs for each separate warranty. Mark tabs to identify products or installation, and the name, address, telephone number and responsible person for applicable installer, supplier and manufacturer.

G. Include on a separate typed sheet, if information is not contained in warranty or guarantee form, a description of the product or installation, and the name, address, telephone number, and responsible person for applicable installer, supplier, and manufacturer.

H. Identify each binder on front and spine with typed or printed inserts with title, "WARRANTIES, GUARANTEES, AND BONDS", the project title, and the name of the Contractor. If more than one volume of warranties and guarantees is produced, identify volume number of binder.

I. When operating and maintenance data manuals are required for warranted construction, include additional copies of each required warranty in each required manual. Coordinate with requirements specified in Section 01 78 00 Closeout Submittals.

1.05 TIME OF WARRANTY AND GUARANTEE SUBMITTALS

A. Preliminary Submittal: Unless otherwise specified, obtain preliminary copies of warranties and guarantees within ten (10) calendar days of completion of applicable item or work. Prepare and submit preliminary copies for review as specified herein.

B. Final Submittal: Submit fully executed copies of warranties and guarantees within ten (10) days of date of substantial completion but not later than three (3) days prior to date of application for final payment.

C. Date of Warranties and Guarantees: Unless otherwise directed, the commencement date for warranty and guarantee periods shall be the date of established in Certificate of Completion.

D. For warranties for work such as designated systems, equipment, component part or other portion of the Work is completed, accepted, and occupied or put to beneficial use by the Authority, by a separate agreement with Contractor, prior to Final Completion, submit properly executed warranties to the Engineer within ten (10) calendar days of completion of that designated portion of the Work. List date of commencement of warranty, guaranty, or bond period as date of Acceptance.

E. For warranties for Work not accepted as of the date of substantial completion, submit documents within ten (10) calendar days after acceptance. List the commencement date as the date of acceptance of such Work and as beginning of warranty, guaranty, and bond period.

F. Duration of Warranties and Guarantees: Unless otherwise specified or prescribed by law, warranty and guaranty periods (Correction Period) for all work shall not be less than one year from the filing date of notice of completion. See product specifications Sections in contract specifications for extended warranty and guaranty beyond the minimum duration.

PARTS 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

INSTALLATION OF BATTERY-ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE

PART 4 – MEASUREMENT AND PAYMENT

No separate measurement or payment shall be made under this Section.

INSTALLATION OF BATTERY-ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE

WARRANTY/GUARANTEE

FOR WORK

We, the undersigned, do hereby warranty and guarantee that the parts of the Work described above which we have furnished and/or installed for the OCTA is in accordance with the Contract Documents and that all said Work as installed will fulfill or exceed all of the Warranty and Guarantee requirements. We agree to repair or replace Work installed by us, together with any adjacent Work, which is displaced or damaged by doing so, that proves to be defective in Workmanship, material, or operation within a period of one (1) year from the date of final acceptance by the OCTA or from the date of Certificate of Substantial Completion, whichever is the earlier. Ordinary wear and tear and unusual neglect or abuse is accepted.

In the event of our failure to comply with the above-mentioned conditions within a reasonable time period determined by the OCTA, after notification in writing, we, the undersigned, all collectively and separately, hereby authorize the OCTA to have said defective Work repaired and/or replaced and made good, and agree to pay to the OCTA upon demand all moneys that the OCTA may expend in making good said defective Work, including all collection cost and reasonable attorney fees.

_____
(Subcontractor, Sub subcontractor, Manufacturer, or Supplier)

By_____

Title_____

State License No._____Date_____

_____
(Contractor)

By_____

State License No._____Date_____

Local Representative. For maintenance, repair, or replacement service, contact:

Name:_____

Address:_____

Phone Number:_____

INSTALLATION OF BATTERY-ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE

END OF SECTION

SECTION 01 79 00

DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Administrative and procedural requirements for instructing OCTA's personnel, including the following:

a. Demonstration of operation of systems, subsystems, and equipment.

b. Training in operation and maintenance of systems, subsystems, and equipment.

c. Demonstration and training video recordings.

B. Related Sections:

1. Divisions 02 through 49 sections for specific requirements for demonstration and training for products in those sections.

1.02 INFORMATIONAL SUBMITTALS

A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. Indicate proposed training modules utilizing manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

B. Qualification Data: For instructor.

C. Attendance Record: For each training module, submit list of participants and length of instruction time.

D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.03 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings: Submit two copies on CD within seven days of end of each training module.

1. Identification: On each copy, provide an applied label with the following information:

a. Name of Project.

b. Name and address of videographer.

c. Name of OCTA Project Manager.

d. Name of Contractor.

e. Date of video recording.

2. Transcript: Prepared on 8-1/2-by-11-inch paper, punched and bound in heavy-duty, three-ring, vinyl-covered binders. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding video recording. Include name of project and date of video recording on each page.

3. At completion of training, submit complete training manual(s) for OCTA's use.

1.04 QUALITY ASSURANCE

A. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 01 43 00, Quality Assurance, experienced in operation and maintenance procedures and training.

B. Videographer Qualifications: A professional videographer who is experienced photographing demonstration and training events similar to those required.

C. Pre-Instruction Conference: Conduct conference at project site to comply with requirements in Section 01 31 00, Project Management and Coordination. Review methods and procedures related to demonstration and training including, but not limited to, the following:

1. Inspect and discuss locations and other facilities required for instruction.

2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.

3. Review required content of instruction.

4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.05 COORDINATION

A. Coordinate instruction schedule with OCTA's operations. Adjust schedule as required to minimize disrupting OCTA's operations.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by OCTA Project Manager.

PART 2 - PRODUCTS

2.01 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual specification sections.
B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

    a. System, subsystem, and equipment descriptions.
    b. Performance and design criteria if Contractor is delegated design responsibility.
    c. Operating standards.
    d. Regulatory requirements.
    e. Equipment function.
    f. Operating characteristics.
    g. Limiting conditions.
    h. Performance curves.

2. Documentation: Review the following items in detail:

    a. Emergency manuals.
    b. Operations manuals.
    c. Maintenance manuals.
    d. Project record documents.

e. Identification systems.
f. Warranties and bonds.
g. Maintenance service agreements and similar continuing commitments.

3. Emergencies: Include the following, as applicable:

   a. Instructions on meaning of warnings, trouble indications, and error messages.
   b. Instructions on stopping.
   c. Shutdown instructions for each type of emergency.
   d. Operating instructions for conditions outside of normal operating limits.
   e. Sequences for electric or electronic systems.
   f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:

   a. Startup procedures.
   b. Equipment or system break-in procedures.
   c. Routine and normal operating instructions.
   d. Regulation and control procedures.
   e. Control sequences.
   f. Safety procedures.
   g. Instructions on stopping.
   h. Normal shutdown instructions.
   i. Operating procedures for emergencies.
   j. Operating procedures for system, subsystem, or equipment failure.
   k. Seasonal and weekend operating instructions.
   l. Required sequences for electric or electronic systems.
   m. Special operating instructions and procedures.

5. Adjustments: Include the following:

   a. Alignments.
   b. Checking adjustments.
   c. Noise and vibration adjustments.
   d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:

   a. Diagnostic instructions.
   b. Test and inspection procedures.

7. Maintenance: Include the following:

   a. Inspection procedures.
   b. Types of cleaning agents to be used and methods of cleaning.
   c. List of cleaning agents and methods of cleaning detrimental to product.
   d. Procedures for routine cleaning
   e. Procedures for preventive maintenance.

f. Procedures for routine maintenance.
g. Instruction on use of special tools.

8. Repairs: Include the following:

a. Diagnosis instructions.
b. Repair instructions.
c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
d. Instructions for identifying parts and components.
e. Review of spare parts needed for operation and maintenance.

PART 3 – EXECUTION

3.01 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 01 78 00, Closeout Submittals.

B. Set up instructional equipment at instruction location.

3.02 INSTRUCTIONS

A. Engage qualified instructors to instruct OCTA's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

B. OCTA Project Manager will furnish Contractor with names and positions of participants.

C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with OCTA personnel, through OCTA Project Manager, with at least seven days' advance notice.

D. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration/performance-based review.

E. Cleanup: Collect used and leftover educational materials and remove from project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.03 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

1. At beginning of each training module, record each chart containing learning objective and lesson outline.

B. Video Recording Format: Provide high-quality color video recordings with menu navigation in format acceptable to OCTA Project Manager.

C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to show area of demonstration and training. Display continuous running time.

D. Narration: Describe scenes on video recording by audio narration by microphone while video recording is recorded. Include description of items being viewed.

E. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.

F. Pre-Produced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

PART 4 - MEASUREMENT AND PAYMENT

No separate measurement or payment will be made for this section.

END OF SECTION

SECTION 02 41 00

DEMOLITION

PART 1 – GENERAL

1.1 RELATED SECTIONS

A. Section 01 74 19 “Construction Waste Management and Disposal”

B. Section 31 20 00 “Earthwork”

1.2 REFERENCE STANDARDS

A. The following is a list of standards which may be referenced in this Section:

1. American National Standards Institute (ANSI): A10.6, Safety Requirements for Demolition Operations.

2. Standard Specifications for Public Works Construction (“Standard Specifications”), 2018 Edition.

1.3 SUBMITTALS

A. Existing Conditions: Contractor shall provide documentation of existing items, adjoining construction and site improvements, actual locations of capped conduits and equipment abandoned in place that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.

1. Use sufficiently detailed photographs or video, which shall be submitted digitally.

2. Include plans and notations to indicate damage.

B. Waste Management Plan, per Section 01 74 19 Construction Waste Management and Disposal.

C. Weight Tickets: Submit weight tickets provided by the receiving processing facility or landfill.

1.4 QUALTITY ASSURANCE

A. Regulatory Requirements: Contractor shall comply with hauling and disposal regulations of authorities having jurisdiction.

1.5 PROJECT CONDITIONS

A. Contractor shall not commence demolition or earth moving operations until temporary erosion and sedimentation control measures, specified in Section 31 20 00 “Earthwork”, Subsection 3.1 "Temporary Erosion and Sedimentation Control" are in place.

B. Contractor shall maintain dust control at all times by watering.

C. Contractor shall accurately locate all existing utilities to identify any conflicts with the proposed work.

D. Contractor shall scan the work area using a metal detector of adequate strength prior to any excavation. Contractor shall be responsible for locating, protecting, and documenting on Record Drawings, all manholes, water valves, utility access frames and covers or other metal appurtenances buried below the existing pavement surface whether shown on the plans or not. Contractor shall notify OCTA Project Manager immediately of any existing utility found that is not shown on the plans.

E. Contractor shall protect in place existing improvements and utilities if specified to be protected in place in the plans.

F. Any existing site improvements (not indicated on the plans to be removed) that are damaged during demolition operations shall be restored (at the expense of the contractor) to their original conditions, as acceptable to OCTA Project Manager.

G. Contractor shall remove all existing site improvements indicated on plans and as required for installation of new improvements.

H. Contractor shall remove or abandon all existing utilities indicated on plans.

I. Contractor shall comply with federal, state, and local hauling and disposal regulations. In addition to the requirements of the General Conditions, Contractor’s safety requirements shall conform to ANSI A10.6.

J. Contractor shall conduct demolition to minimize interference with adjacent building and parking lot areas.

K. Contractor shall restore and clean-up site once site clearing operations are completed.

L. If any material found within the Contractor’s work area appears to be contaminated, it shall be handled per the contract documents.

1.6 DEFINITIONS

A. ACM: Asbestos-containing material.

B. ACP: Asbestos Cement Pipe

C. Demolition: Dismantling, razing, destroying, or wrecking of any fixed building, structure, surface or subsurface feature, site element, or any part thereof.

D. Remove: Detach items from existing construction and legally dispose of them to land fill off-site unless indicated to be removed and salvaged or removed and reinstalled.

E. Modify: Provide all necessary material and labor to modify an existing item to the condition indicated or specified.

F. Relocate: Remove, protect, clean and reinstall equipment, including electrical, instrumentation, and all ancillary components required to make the equipment fully functional, to the new location identified on the Drawings.

G. Salvage/Salvageable: Remove and deliver, to the specified location(s), the equipment, building materials, or other items so identified to be saved from destruction, damage, or waste; such property to remain that of OCTA Project Manager. Unless otherwise specified, title to items identified for demolition shall revert to Contractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 PROTECTION

A Protection of Existing Site Improvements:

1. Survey the site and examine the Drawings and Specifications to determine the extent of the Work before beginning construction operations.

2. Take necessary precautions to avoid damage to existing items scheduled to remain in place, to be reused, or to remain the property of OCTA Project Manager; any Contractor-damaged items shall be repaired or replaced as directed by OCTA Project Manager.

3. Do not overload pavements to remain. Pavement outside work area damaged by Contractor due to Contractor operations shall be restored to preconstruction conditions at no cost to OCTA. Contractor shall ensure that condition of existing pavement outside of work area is documented and included as part of the existing conditions submittal (1.3.A) to the OCTA Project Manager .

4. Do not overload already stabilized areas until OCTA Project Manager agrees it is acceptable to do so.

B. Protection of Personnel:

1. During demolition, continuously evaluate the condition of the existing improvement being demolished and take immediate action to protect all personnel working in and around the demolition site.

2. Provide temporary fencing and other forms of protection (approved in writing by OCTA) to protect OCTA personnel, subcontractor personnel, and any other people who may be present from injury due to demolition Work.

3. Provide protective measures as required to provide free and safe passage of OCTA personnel, subcontractor personnel, and any other people who may be present to occupied portions of the structure.

3.2 SAWCUT AND REMOVAL OF EXISTING PCC CURB, PAVEMENT AND SLAB

A. Sawcut existing PCC curb, pavement and slab as required for new improvements. No sawcut overcutting is allowed; repairs related to overcutting shall be considered within scope.

B. Legally remove, dispose, and recycle PCC waste materials as required.

3.3 BACKFILLING VOIDS LEFT BY REMOVALS

A. All voids left by removals of shall be backfilled with properly compacted engineering fill per Section 31 20 00 “Earthwork”. The cost to place this fill material shall be incidental to the removal items of work.

3.4 CLEAN UP

A. Debris and rubbish shall be removed from excavations, and shall be removed and transported in a manner that prevents spillage on streets or adjacent areas. Local regulations regarding hauling and disposal shall apply.

3.5 HAUL ROUTE AND DISPOSAL OF MATERIALS

A. The Contractor shall make every effort to recycle demolished materials. Items required to be removed shall become the property of the contractor and shall be removed from Project site and be lawfully hauled and disposed of. The cost to haul and dispose removed items shall be included in the cost of the items of work.

B. Contractor shall secure a Haul Route Permit from the City for all transport of import and export material on public streets.

C. The transport of import and export material on public streets shall be in accordance with all local governing agency standards.

END OF SECTION 02 41 00

SECTION 03 11 00

CONCRETE FORMWORK

PART 1 – GENERAL

1.1 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. The latest issue of the publication shall be used.

1. American Concrete Institute (ACI) Publications:
   ACI-318 Building Code Requirements
   ACI-347 Recommended Practice for Concrete Formwork

1.2 RELATED SECTIONS

A. Section 03 21 13 Concrete Reinforcement

B. Section 03 30 00 Cast-in-Place Concrete

C. Section 03 35 23 Concrete Finishing and Sealing

1.3 SUBMITTALS

A. Provide submittals in accordance with Division One requirements

1.4 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

A. Section 03 30 00 - “Cast-In-Place Concrete”: Supply of concrete accessories for placement by this section.

1.5 DESIGN REQUIREMENTS

A. Design, engineer and construct formwork, shoring and bracing to conform to design and code requirements; and such that the resultant concrete conforms to required shape, line, and dimensions.

B. Corners of equipment pad/foundation (all exposed edges) shall be chamfered.

1.6 QUALITY ASSURANCE

A. Perform work in accordance with ACI 301, ACI 318 and ACI 347

PART 2 – PRODUCTS

2.1 FORM MATERIALS

A. Forms shall be of wood, plywood, reinforced plastic or metal. Plywood, other than for lining, shall be concrete-form plywood not less than 5/8 inch thick conforming to Department of Commerce product standard PS-1 free of raised grain, torn surfaces, worn edges, patches, or other surface defects which would impair the texture of the concrete surface. Surfaces of steel forms shall be free from irregularities, dents and sags.

2.2 FORMWORK ACCESSORIES

A. Form accessories to be partially or wholly embedded in the concrete, such as ties and hangers, shall be of a commercially manufactured type. Nonfabricated wire shall not be used.

B. Form ties shall be constructed so that the ends of end fasteners can be removed without causing appreciable spalling at the surface of the concrete. After the ends or end fasteners of form ties have been removed, the embedded portion of the ties shall terminate not less than 3/4 inch from the formed surface of concrete to be permanently exposed to view.

PART 3 - EXECUTION

3.1 FORM MATERIALS

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.2 ERECTION – FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301, ACI 318 and ACI 347.

B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to over stressing by construction loads.

C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping.

D. Align joints and make watertight. Keep form joints to a minimum.

3.3 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Do not let excess form coating material stand in puddles in the forms nor shall such coating come in contact with hardened concrete against which fresh concrete is to be placed.

D. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings which are effected by agent. Soak inside surfaces of untreated forms with clean water prior to placement of concrete.

3.4 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items passing through concrete work.

B. Locate and set in place items which will be cast directly into concrete.

C. Coordinate with work of other sections in forming and placing openings, slots, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.

D. Install accessories in accordance with manufacturer's instructions, straight, level, and plumb. Ensure items are not disturbed during concrete placement.

3.5 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms.

B. Clean formed cavities of debris prior to placing concrete.

C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

D. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.6 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 301.

3.7 FIELD QUALITY CONTROL

A. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.

B. Inspect all corners of equipment pad/foundation (all exposed edges) to ensure all are chamfered.

3.8 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

C. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.

END OF SECTION 03 1100

SECTION 03 21 13

CONCRETE REINFORCEMENT

PART 1 - GENERAL REQUIREMENTS

1.1 Scope - Fabricate and install reinforcing and the related accessories required for cast-in-place concrete work.

1.2 Applicable documents - The following specifications and standards of the issues currently in force form a part of this section and are applicable as specified herein.

A. American Society for Testing and Materials (ASTM) Publications:
A 615 Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
A 853 Wire, Steel, Carbon for General Use.

1.3 RELATED SECTIONS

A. Section 03 11 13 Concrete Form Work
B. Section 03 30 00 Cast in Place Concrete
C. Section 03 35 23 Concrete Finishing and Sealing

PART 2 - PRODUCTS

2.1 Materials

A. Bars – All rebars shall be comply with ASTM A615 Grade 60 and Carrying rolled-on identifying marks to denote the mill location, bar size and grade 60 of steel shall also be marked to indicate minimum yield.

B. Tie bars – All tie bars shall comply with ASTM A615 Grade 60.

C. Material - Use deformed bars unless otherwise specified or shown.

PART 3 - EXECUTION

3.1 Forming - Unless noted otherwise, bend bars cold. Do not straighten or rebend without specific approval from OCTA.

3.2 Preparation - Remove from reinforcing scale, heavy rust, and any coating, which would reduce bond. Any rebar that comes in contact with form releasing agent shall be replaced.

3.3 Accessories - Provide spacers, chairs, wire ties, etc., necessary to properly assemble, space and support the reinforcing prior to concrete placement. Accessories shall be sized to provide required concrete coverage. Position and support bolts, anchors, and other cast-in place items with appropriate accessories.

3.4 Storage - Store reinforcing so that it is not less than 6 inches above ground.

END OF SECTION 03 21 13

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 A. RELATED SECTIONS

1. Section 03 11 13 Concrete Form Work
2. Section 03 21 13 Concrete Reinforcement
3. Section 03 35 23 Concrete Finishing and Sealing

B. Submittals: Submit the following:

1. Product data for reinforcement, forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, dry-shake finish materials, and others as requested by OCTA Project Manager.
2. Shop drawings for fabricating, bending, and placing concrete reinforcement.
3. Laboratory test reports or evaluation reports for concrete materials and concrete mix designs.
4. Written report to OCTA Project Manager for proposed concrete mix at least 15 days prior to start of concreting. Do not begin concrete production until mixes have been reviewed by OCTA Project Manager. Statement of mix design shall be signed by a registered Civil Engineer responsible for mix design.

C. Quality Assurance: Comply with provisions of ACI 301, "Specifications for Structural Concrete for Buildings," ACI 318, "Building Code Requirements for Reinforced Concrete," and CRSI "Manual of Standard Practice," except where more stringent requirements are indicated.

1.2 PRODUCTS

A. Form Materials: Furnish form materials with sufficient stability to withstand pressure of placed concrete without bow or deflection.

B. Reinforcing Materials: Deformed Reinforcing Bars - ASTM A 615, Grade 60, unless otherwise indicated.

C. Concrete Materials: As follows:

1. Portland Cement: ASTM C 150, Type V.
2. Fly Ash: ASTM C 618, Type F.
3. Aggregates: ASTM C 33.
4. Water: Potable.
5. No ducts or electrical conduits shall be embedded in the slab.

D. Admixtures: Provide admixtures that contain not more than 0.1 percent chloride ions.

1. Air-Entraining Admixture: ASTM C 260.
2. Water-Reducing, Retarding, and Accelerating Chemical Admixtures: ASTM C 494.

E. Related Materials: As follows:

1. Waterstops: Flat dumbbell or center bulb type, size to suit joints, of either rubber (CRD C 513) or PVC (CRD C 572).
2. Vapor Retarder: Clear 8-mil-thick polyethylene.
3. Water-Resistant Barrier: Polyethylene membrane with multi-ply kraft paper and glass-fiber-reinforced core.
4. Vapor Barrier: As noted on drawings.
5. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
6. Moisture-Retaining Cover: Waterproof paper, polyethylene film, or polyethylene-coated burlap, complying with ASTM C 171.
7. Membrane-Forming Curing Compound: ASTM C 309, Type 1. Moisture loss not more than 0.55 kg/sq. meter when applied at 200 sq. ft./gal.
8. Evaporation Control: Monomolecular film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss.

F. Mix Proportions and Design: Proportion mixes complying with mix design procedures specified in ACI 301.

1. Limit use of fly ash to not exceed 15 percent of cement content by weight.

2. Design mixes to provide normal weight concrete with the following properties:

   a. Caisson, columns and pilasters: Shall be 5000-psi, 28-day compressive strength; water-cement ratio, 0.50 maximum (for non-air-entrained) and 0.46 maximum (for air-entrained).

   b. BEB plug-in charger pad/foundation, BEB pantograph charger foundation, generator foundation, and switchboard pad/foundation: Shall be 4000-psi, 28-day compressive strength; water-cement ratio, 0.50 maximum (for non-air-entrained) and 0.46 maximum (for air-entrained).

   c. Concrete pavement and slab-on-grade: Shall be 4000-psi, 28-day compressive strength; water-cement ratio, 0.50 maximum (for non-air-entrained) and 0.46 maximum (for air-entrained).

3. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:

   a. Slabs: Not more than 3 inches.
   b. Foundation : Not more than 4 inches.

4. Adjust mix designs when material characteristics, job conditions, weather, test results, or other circumstances warrant. Do not use revised concrete mixes until laboratory test data and strength results have been submitted to and approved by OCTA Project Manager.

G. Use water-reducing, accelerating, and retarding admixtures that have been tested and accepted in mix designs in strict compliance with manufacturer's directions.

H. Ready-Mix Concrete: ASTM C 94.

I. Admixtures containing calcium chloride are not permitted for concrete used over metal deck.

1.3 EXECUTION

A. Formwork: Construct formwork so that concrete members and structures are of correct size, shape, alignment, elevation, and position. Select form materials to obtain required finishes.

1. Maintain formwork tolerances and surface irregularities within ACI 347 limits, Class A tolerances for concrete exposed to view and Class C tolerances for other concrete surfaces.
2. Provide openings in formwork to accommodate work of other trades. Accurately place and securely support items built into forms.
3. Clean and adjust forms prior to concrete placement. Apply form-release agents or wet forms as required. Retighten forms during concrete placement, if required, to eliminate mortar leaks.

B. Vapor Retarders/Barriers: Place vapor retarder/barrier membrane for slabs on grade, with joints lapped 6 inches and sealed.

C. Reinforcement: Accurately position and support reinforcement, and secure against displacement. Locate and support reinforcement to maintain minimum cover with metal chairs, runners, bolsters, spacers, and hangers as required. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

1. Dowel between new and existing adjacent slabs as indicated and/or required.

D. Joints: Locate and install construction, isolation, and control joints as indicated or required. Locate construction joints so they do not impair strength and appearance of structure. Place isolation and control joints in slabs-on-ground to stabilize differential settlement and prevent random cracking. Match existing site joint layout pattern.

E. Installation of Embedded Items: Set and build anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting diagrams, templates, and instructions provided by others for locating and setting.

1. Locate and support waterstops to prevent displacement.

F. Concrete Placement: Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," for placing concrete in a continuous operation within planned joints or sections. Do not begin concrete placement until other affected work is completed.

1. Consolidate placed concrete using mechanical vibrating equipment with hand rodding and tamping so that concrete is worked around reinforcement and other embedded items and into forms. Do not use vibration to move concrete horizontally.

2. Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placing, and curing.

   a. In cold weather comply with ACI 306.
   b. In hot weather comply with ACI 305.

G. Finish of Formed Surface: As follows:

1 Smooth-Formed Finish: Provide a smooth finish for concrete surfaces to be covered with a coating or covering material applied directly to concrete. Repair and patch defective areas, with projections completely removed and smoothed.

H. Monolithic Slab Finishes:

1. Heavy broom finish to match existing.

I. Curing: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather, apply an evaporation-control compound according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.

1. Begin initial curing as soon as free water has disappeared from exposed surfaces.
2. Continue curing unformed concrete surfaces by continuously wetted absorptive cover, or by moisture-retaining cover curing. Cure formed surfaces by moist curing until forms are removed. Keep concrete continuously moist for not less than 72 hours for high-early strength concrete and 7 days for all other concrete.

J. Field Quality Control: Perform sampling and testing during concrete placement, as follows:

1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.

   a. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
   b. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231, pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.

c. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4 deg C) and below, when 80 deg F (27 deg C) and above, and one test for each set of compressive-strength specimens.

2. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.

3. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive strength by more than 500 psi.

4. Test results will be reported in writing to OCTA Project Manager, Structural Engineer, ready-mix producer, and Contractor within 72 hours after tests.

5. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

6. Additional Tests: The testing agency may take additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by OCTA Project Manager. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

END OF SECTION 03 30 00

SECTION 03 35 23

CONCRETE FINISHING AND SEALING

PART 1 - GENERAL REQUIREMENTS

1.1 RELATED SECTIONS

A. Section 03 11 13 Concrete Form Work
B. Section 03 21 13 Concrete Reinforcement
C. Section 03 30 00 Cast-in-Place Concrete

1.2 Scope - Provide Sikaflex-2c NS TG sealant on cast-in-place concrete between equipment foundation/pad and pavement, and between construction joints (concrete pavements, per existing conditions) as called for on the drawings.

1.3 Related Work - Documents affecting work of this Division include, but are not necessarily limited to, Division 03 30 00, Cast-in-Place Concrete

1.4 Applicable Publications - Industry publications controlling the work of this Section include:

A. American Concrete Institute (ACI):

ACI 301: Specifications for Structural Concrete for Buildings.

B. American Society for Testing and Materials (ASTM):

ASTM C309: Liquid Membrane-Forming Compounds for Curing Concrete.

PART 2 - PRODUCTS

2.1 Joint sealant: Sikaflex-2c NS TG sealant.

PART 3 - EXECUTION

3.1 Formed Surfaces -

A. Unspecified Finish - If the finish of formed surfaces is not specifically called out on the drawings, provide the following finishes as applicable:
1. Rough form finish for all concrete surfaces not exposed to public view.
2. For all concrete surfaces exposed to public view, match adjacent finish surface and as approved by OCTA.

B. Rough form finish -
1. Leave surfaces with the texture imparted by forms, except patch tie holes and defects.
2. Remove fins exceeding 1/4" in height.

C. Smooth form finish -
1. Coordinate as necessary to secure form construction using smooth, hard, uniform surfaces, with number of seams kept to a practical minimum and in a uniform and orderly pattern.
2. Patch tie holes and defects.
3. Remove fins completely.

D. Related Unformed Finish - At tops of walls, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.2 Finishing Floor Slabs -

A. "Class A" - True plane within 1/8" in ten feet as determined by a ten foot straightedge placed anywhere on the slab in any direction.

B. "Class B" - True plane within 1/4" in ten feet as determined by a ten foot straightedge placed anywhere on the slab in any direction.

C. Unspecified - All interior concrete slabs shall be placed to a Class A plane tolerance with a troweled finish. All exterior concrete slabs shall be placed to a Class B plane tolerance with a broom finish.

D. Floated finish - After the concrete has been placed, consolidated, struck off, and leveled, do not work the concrete further until ready for floating. Begin floating when the water sheen has disappeared and when the surface has stiffened sufficiently to permit the operation. During or after the first floating, check the planeness of the surface with a ten foot straightedge applied at not less than two different angles. Cut down high spots and fill low spots, and produce a surface with a Class B tolerance throughout. Refloat the slab immediately to a uniform sandy texture.

E. Broom finish - Provide a floated finish as described above. While the surface is still plastic, provide a textured finish by drawing a fiber bristle broom uniformly over the surface. Provide the texturing in one direction only.

F. Scratch Finish - Apply scratch finish to monolithic slab surfaces to receive concrete floor topping or mortar setting beds for tile, Portland cement terrazzo, and other bonded applied cementitious finish flooring material, and as otherwise indicated. After placing slabs, plane surface to tolerances for floor flatness (Ff) of 15 and floor levelness (F1) of 13. Slope surfaces uniformly for drainage or to drains where required. After leveling, roughen surface before final set with stiff brushes, brooms, or rakes.

G. Sealer and Hardener - Sealer/hardener shall be applied to all interior concrete floors, which do not receive a floor covering.

H. Cleaning - Prior to treatment, the floors shall be thoroughly cured, cleaned and perfectly dry, with all work above them completed. On areas where forms are recently removed, remove all form oil and breaking compound residue to assure penetration of the product into the surface.

3.3. Application - In accordance with manufacturer’s instructions.

3.4 Concrete Curing and Protection

A. General - Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather, protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply in accordance with manufacturer’s instructions after screeding and bull floating, but before power floating and troweling.

B. Initial Curing - Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.

C. Curing Methods - Perform curing of concrete by moist curing, or by moisture-retaining cover curing, or by curing and sealing compound, or by combinations thereof, as herein specified.

D. Moist Curing

1. Keep concrete surface continuously wet by covering with water; or

2. Use continuous water-fog spray; or

3. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4-inch lap over adjacent absorptive covers.

E. Moisture-Retaining Cover Curing - Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3-inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during period using cover material and waterproof tape.

F. Curing and Sealing Compounds - Apply curing and sealing compound to exposed interior slabs and to exterior slabs, walks, and curbs. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete. Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation be power spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

G. Curing Formed Surfaces - Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specific above, as applicable.

H. Curing Unformed Surfaces - Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces, by application of appropriate curing method.

I. Treated Surfaces - Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture-retaining cover, unless otherwise directed.

3.5 Removal Of Forms - Formwork not supporting weight of concrete, such as walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations are maintained.

3.6 Concrete Surface Repairs

A. Repair and patch defective areas with cement mortar immediately after removal of forms.

B. Cut out honeycomb, rock pockets, voids over 1/4-inch in any dimension, and holes left by tie rods and bolts, down to solid concrete but in no case to a depth of less than 1-inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with specified bonding agent. Place patching mortar before bonding compound has dried.

C. For exposed-to-view surfaces, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

D. Repair of Formed Surfaces - Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of OCTA Project Manager. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on surface, and stains and other discoloration’s that cannot be removed by cleaning. Flush out form tie holes, fill with dry-pack mortar.

1. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.

E. Repair of Unformed Surfaces -

1. Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish.

2. Correct low and high areas as herein specific. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having required slope.

3. Repair finished unformed surfaces that contain defects that affect durability and concrete. Surface defects, as such, include crazing and cracks in excess of 0.01-inch wide or that penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, popouts, honeycomb, rock pockets, and other objectionable conditions.

4. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.

5. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with patching compound; Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to OCTA Project Manager.

6. Repair defective areas, except random cracks and single holes not exceeding 1-inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

END OF SECTION 03 35 23

SECTION 09 91 13

EXTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on exterior substrates.

1. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.

B. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, OCTA Project Manager will select from standard colors and finishes available.

1. Painting may include, but not limited to, the following:

a. Field painting of exposed bare and covered pipes, conduits, and/or ducts (including color coding)
b. CMU walls along exterior of the work area.
c. Surfaces of mechanical and electrical equipment that do not have a factory-applied final finish.
d. Bollards.
e. Wheel stops.
f. Striping for bus stalls.

C. Do not paint prefinished items, finished metal surfaces, operating parts, and labels.

1. Prefinished items include, but are not limited to, the following factory-finished components:
   a. Finished mechanical and electrical equipment.
   b. Light fixtures.

2. Finished metal surfaces include, but are not limited to, the following:

   a. Anodized aluminum.
   b. Stainless steel.
   c. Chromium plate.
   d. Copper and copper alloys.
   e. Bronze and brass.

3. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

1.3 DEFINITIONS

A. Flat: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. Velvet: 5 to 10 units at 60 degrees and 10 to 15 units at 85 degrees, according to ASTM D 523.

C. Eggshell: 10 to 15 units at 60 degrees and 15 to 30 units at 85 degrees, according to ASTM D 523.

D. Low-Luster and Low-Sheen: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

E. Semigloss: 35 to 70 units at 60 degrees, according to ASTM D 523.

F. Gloss and Full Gloss: More than 75 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification. Use same designations indicated on Drawings and in schedules. Include color designations.
2. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.

    a. VOC Content: Include VOC content for each product.

B. Samples for Verification: For each type of paint system and each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8-1/2 by 11 inches.
2. Apply coats on Samples in steps to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Applicator.

1.6 CLOSEOUT SUBMITTALS

A. Coating Maintenance Manual: Upon conclusion of the project, the Applicator, paint manufacturer, or paint supplier shall furnish a coating maintenance manual, such as Sherwin-Williams "Custodian Project Color and Product Information" or equal. Manual shall include:

1. Area summary with finish schedule.
2. Area detail designating where each product / color / finish was used.
3. Product data pages for each product used.
4. Material Safety Data Sheets (MSDS) for each product used.
5. Care and cleaning instructions.
6. Touch-up procedures.
7. Samples of each color and finish used.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than 1 gallon of each material and color applied.

a. Provide extra materials in unopened 1 gallon containers.

1.8 QUALITY ASSURANCE

A. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

B. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. OCTA Project Manager will select one surface to represent surfaces and conditions for application of each paint system.

a. Vertical and Horizontal Surfaces: Provide samples of not less than 100 sq. ft.
b. Other Items: OCTA Project Manager will designate items or areas required.

2. Final approval of color selections will be based on mockups.

a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by OCTA Project Manager at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless OCTA Project Manager specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information:

1. Product name or title of material.
2. Product description (generic classification or binder type).
3. Manufacturer's stock number and date of manufacture.
4. Contents by volume, for pigment and vehicle constituents.
5. Thinning instructions.
6. Application instructions.
7. Color name and number.
8. VOC content.

B. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.
3. Store on shelves or wood pallets.

1.10 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 degree F.

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 degree F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers Names: Shortened versions (shown in parentheses) of the following manufacturers names are used in other Part 2 articles:

1. Behr Process Corporation (Behr).
2. Dunn-Edwards Corporation (Dunn-Edwards).
3. Frazee Paint/Comex Group (Frazee).
4. Glidden Professional (Glidden).
5. PPG Architectural Finishes, Inc. (PPG)

6. Sherwin-Williams Company (The) (Sherwin-Williams).
7. Vista Paint (Vista).

B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles for the paint category indicated.

C. Source Limitations: Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats.

2.2 SUSTAINABILITY REQUIREMENTS

A. Comply with applicable provisions in the CGBC.

2.3 PAINT, GENERAL

A. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

B. Material Quality:

1. Provide paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
2. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.

C. Colors: As indicated on Drawings or, if not indicated, as selected by OCTA Project Manager from manufacturer's full range.

2.4 PRETREATMENT FOR GALVANIZED METAL

A. Galvanized Metal Pretreatment: Factory-formulated galvanized metal pretreatment for exterior and interior application.

1. Behr: Krud Kutter; Metal Clean & Etch.
2. Dunn-Edwards: Supreme Chemical; Metal Clean and Etch (SCME-01).
3. Frazee: Jasco; Prep N Prime.
4. Glidden: Jasco; Prep N Prime.
5. PPG: Duraprep Concentrated Multi-Purpose Cleaner Prep120.
6. Sherwin-Williams: DTM Wash Primer B71Y1.
7. Vista: Krud Kutter; Metal Clean & Etch.

2.5 METAL PRIMERS

A. Exterior Galvanized Metal Primer: Factory-formulated galvanized metal primer for exterior application.

1. Behr: Premium Plus Exterior Multi-Surface Primer & Sealer (436): Applied at a dry film thickness of not less than 1.8 mils.
2. Dunn-Edwards: Provide one of the following:

    a. GALV-ALUM Premium (GAPR00): Applied at a dry film thickness of not less than 2.0 mils.
    b. ULTRA-GRIP Premium Interior/Exterior Multi-Surface Primer UGPR00: Applied at a dry film thickness of not less than 1.5 mils.

3. Frazee: Provide one of the following:

    a. 561 Alkyd Acrylic Metal Primer: Applied at a dry film thickness of not less than 1.8 mils.
    b. 309 Ultratech Universal Water-Based Metal Primer: Applied at a dry film thickness of not less than 2.0 mils.

4. Glidden: Devflex Waterborne Acrylic DTM Primer 4020PF: Applied at a dry film thickness between 2.0 and 4.0 mils.
5. PPG: Pitt-Tech Plus DTM Industrial Primer 90-912: Applied at a dry film thickness between 2.0 and 4.0 mils.
6. Sherwin-Williams: Pro Industrial Pro-Cryl Primer, B66-310 Series: Applied at a dry film thickness between 2.0 and 4.0 mils.
7. Vista: 4800 Metal Pro Primer: Applied at a dry film thickness of not less than 2.5 mils.

2.6 WATER-BASED PAINTS

A. Exterior Semigloss Acrylic Enamel: Factory-formulated semigloss waterborne acrylic-latex enamel for exterior application. 35 to 70 units at 60 degrees, according to ASTM D 523.

1. Behr: Premium Plus Exterior Semi-Gloss (5050): Applied at a dry film thickness of not less than 1.4 mils.
2. Dunn-Edwards: SPARTASHIELD (SSHL50): Applied at a dry film thickness of not less than 1.5 mils.
3. Frazee: 124 Mirro Glide 100% Acrylic Semi-Gloss: Applied at a dry film thickness of not less than 1.4 mils.
4. Glidden: Ultra-Hide 150 Exterior Semi-Gloss Paint 2416V: Applied at a dry film thickness of not less than 1.6 mils.
5. PPG: Speedhide Exterior 100% Acrylic Latex Semi-Gloss 6-900XI: Applied at a dry film thickness of not less than 1.4 mils.
6. Sherwin-Williams: Provide one of the following:

    a. Sonoran Int/Ext Acrylic Latex Semi-Gloss, B40WJ9850 Series: Applied at a dry film thickness of not less than 1.5 mils.
    b. Solo 100% Acrylic Int/Ext S/G A76 Series: Applied at a dry film thickness of not less than 1.5 mils.

7. Vista: 7000 Acriglo Semigloss: Applied at a dry film thickness of not less than 1.4 mils.

2.7 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

C. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

D. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

1. Notify OCTA Project Manager about anticipated problems when using the materials specified over substrates primed by others.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations applicable to substrates and paint systems indicated.

B. Remove door and other hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations applicable to substrates and paint systems indicated.

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint faces, all four edges, edges of cutouts, and mortises of exterior doors and gates and entire exposed surface of exterior door frames.

    a. Paint all surfaces that will be covered by door hardware including, but not limited to, kick, mop, and armor protection plates.

3. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
4. Primers specified in painting schedules are required on items that are factory primed or factory finished.

B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by OCTA Project Manager, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

A. Zinc-Coated Metal: Provide the following finish systems over exterior zinc-coated metal surfaces:

1. Semigloss Acrylic-Enamel Finish: Two finish coats over a galvanized metal primer.

    a. Pretreatment: Exterior galvanized metal pretreatment.
    b. Primer: Exterior galvanized metal primer.
    c. Finish Coats: Exterior semigloss acrylic enamel.

END OF SECTION 09 91 13

SECTION 26 01 20

GENERAL ELECTRICAL PROVISIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 1 - Specification sections, apply to the work of this section.

1.02 SCOPE

A. The Construction Documents shall include the drawings and specifications covering all related work in addition to the electrical. The Contractor shall carefully examine all of the Construction Documents to acquaint himself with the responsibilities of the various Contractors regarding the supply, installation and connection of the Components of the various electrical and other systems.

B. It is intended that all systems should be complete and should include all components necessary for the operation of the system. If components are indicated on the drawings or inferred from the system requirements but not specified by catalogue number, such components shall be furnished by the manufacturer furnishing the remainder of the system.

C. In the event of a conflict of the requirements detailed in the drawings and any sections of the specification the Contractor shall inform OCTA Project Manager (Owner's representative) of such conflict in writing before ordering equipment. If such notification is not provided, the Contractor shall accept OCTA Project Manager’s decision on the resolution of such a conflict without any further compensation.

1.03 DEMOLITION, ALTERATION AND EXTENSION WORK IN AN EXISTING STRUCTURE.

A. Contractor shall survey the entire project site and become thoroughly familiar with actual existing conditions. Check the locations of all existing structures, equipment, wiring, etc. The intent of the work is shown on the drawings and described hereinafter.

B. While the existing facility is being altered, keep the present power service and necessary life safety systems intact.

C. Provide and perform demolition, alteration, extension, preparatory and miscellaneous work as indicated, specified or as required, complete. The work shall include:

1. Demolition and removal of existing electrical conduit, wiring and equipment required to complete the project.

2. Preparation of the existing building and electrical distribution to receive or connect the new work including relocation of existing electrical conduit, wiring, equipment, etc. where new work interferes with existing conditions.

3. Miscellaneous demolition, cutting, patching, alteration, and repair work in the existing building necessary for the completion of the entire project while maintaining electrical circuit continuity to all equipment, outlets, fixtures, etc. scheduled to remain.

4. Disconnecting, relocating, and reconnecting of electrical equipment as required by the construction modifications.

5. Coordination of power interruption with the OCTA Project Manager or utility company where necessary.

D. Salvage and Disposal: All removed material other than items to be reused shall be returned to the Owner or disposed of in accordance with instructions from OCTA Project Manager. Dispose all hazardous materials according to the guideline of State of California Department of Health Services and other agencies having jurisdiction.

1.04 ELECTRICAL SPECIFICATIONS AND DRAWINGS

A. The documents are written in a brief form for the purpose of work economy. For example: “Motor starters" is used in place of "The Contractor shall provide all motor starters". Omitted words shall be determined by inference.

B. It should be particularly noted that the terms "furnish", "provide", and "install" are interchangeable and that each of these terms means furnishing, installing, and connecting, unless otherwise stated.

C. When a catalog or series numbers are shown, they are intended to indicate the type and quality of product. The furnished product shall meet all specification requirements even if the product conforming to the given catalog number does not.

D. In the event of conflict between requirements, whether shown on drawings or in specifications, the most stringent requirements shall govern.

E. Wherever tables or schedule show quantities of materials they shall not be used as the final count. These figures serve only as an aid to Contractor. Each Contractor shall be responsible for furnishing all material noted on drawings or specified.

F. A minimum size or performance requirement specified shall be superseded by requirements specified in other technical specification sections or shown in drawings. For example: A minimum control wire size specified for an alarm system shall take precedence over the minimum wire sizes listed in Section 26 05 19 - Conductors.

G. When short circuit currents or interrupting capacities are indicated on drawings or specified, they shall be considered as minimum R.M.S. symmetrical unless otherwise stated.

H. The electrical drawings are diagrammatic and show the general arrangement of all raceways, equipment and appurtenances. They shall be followed as closely as actual building construction; field conditions and the work of other trades will permit. The electrical work shall conform to the requirements shown on the drawings.

I. Architectural drawings shall take precedence over electrical drawings, because of the small scale of the electrical drawings it is not possible to indicate all offsets, fittings, and accessories which may be required. The Contractor shall investigate the existing conditions affecting the work and shall arrange his work accordingly, providing such fittings and accessories as may be required to meet such conditions.

1.05 CODE AND STANDARDS

A. Code Compliance

1. Installation must conform to all applicable National, State and local codes, rules, ordinances, regulations and manufacturer's recommendations which will govern the quality and the character of work, style and size of materials.

2. In case of difference between building codes, state laws, local ordinances, industry standards and utility company regulations the Contractor shall bear all costs arising in correcting the deficiencies.

3. Should the Contractor perform any work that does not comply with the requirements, ordinances, industry standards and utility company regulations he shall bear all costs arising in correcting the deficiencies.

B. Building Codes

1. Comply with the latest editions of the following Codes promulgated by governing authority for the specific job site:

   a. California State Safety Orders
   b. California State Fire Prevention Commission Official Regulations
   c. California Electrical Code – CEC
   d. California Energy Regulations, Title 24
   e. National Electrical Code - NFPA 70
   f. Life Safety Code NFPA 101
   g. California Building Code – CBC

C. Industry Codes

1. All electrical equipment shall be listed by Underwriters' Laboratories, Inc. and shall meet all requirements established by NEC, NEMA and ANSI, and as specified hereinafter.

2. Materials and installation procedures shall comply with all applicable requirements of the following nationally accepted codes and standards.

ANSI	American National Standards Institute, Inc.
ASTM	American Society of Testing Materials
ETL	Electrical Testing Laboratories
IEEE	Institute of Electrical and Electronic Engineers
IPCEA	Insulated Power Cable Engineers Association
ITL	Independent Testing Laboratories
NBS	National Bureau of Standards
NECA	National Electrical Contractor Association
NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Protection Association
NRTL	Nationally Recognized Testing Laboratory
UL	Underwriters' Laboratories
USASI	United States of America Standards Institute

1.06 WORK AND WORKMANSHIP

A. General

1. These specifications may not include every detail or operation considered to be standard high grade installation procedure as it is assumed that the Contractor is familiar with these procedures. In the absence of specified details in the Contract Documents regarding installation procedure, the National Electrical Contractors Association "Standard of Installation" manual and the latest edition of Crofts "American Electricians, Handbook" shall be considered as minimum requirements.
2. The Contractor shall comply with all applicable provisions of NFPA-70, National Electrical Code.
3. Locations of all equipment connections are shown for bidding purposes only. The Contractor shall verify erection and connection requirements and details.
4. The Contractor shall read the specifications and drawings of all other trades and verify erection and connection requirements and details.
5. The Contractor shall take all field measurements as necessary for his work and shall be responsible for the accurate location and size of all openings, recesses, slots, ferrules, and the like.
6. Should any structural difficulties prevent the setting of cabinets, running of conduit, etc., at points shown on drawings, necessary minor deviations as determined by the Owner's Rep may be permitted only if authorized in writing.
7. Specific emphasis must be made that if the equipment other than that which the drawings were designed on does not properly adapt to the space allotted or is not easily accessible for repair and maintenance the Contractor is responsible for providing all additional access panels, pipe, fittings, all materials, labor, etc. to achieve the desired result.
8. Any extra costs which might result from deviations from the drawings to avoid interference shall be considered a "job condition" and no additional compensation will be considered applicable. In the event that any such interference occurs in the course of the work due to an error, omission or oversight by the Contractor, no additional compensation shall be allowed.
9. Interference which may occur during construction shall be brought to the immediate attention of the Owner's Rep and his decision confirmed in writing shall be final as to which trade shall take preference.
10. The finished job shall be functional and complete in every detail including all such items required for a complete system whether or

not these items be specified or shown on drawings.

11. Special attention shall be given to the accessibility of working and controlling parts. Adjustable parts shall be within easy reach. Removable parts shall have space for removal.
12. Underground utilities: Known underground services are shown at approximate locations on drawings. The Contractor shall exercise extreme care to avoid damage in exposing underground services:
    a. Where an underground facility is encountered which is not shown on drawings or mentioned in any other contract document, Contractor shall immediately notify OCTA Project Manager and responsible utility agency for direction.
    b. Do not proceed with Work until direction is received.

B. Quality Assurance:

1. Perform work in accordance with NECA Standard of Installation.
2. Manufacturer to be a company specialized in fabrication of respective production with a minimum of 10 years documented experience, or as indicated in the respective spec section.
3. Manufacturer provides quality control production testing for each unit of major equipment in accordance with applicable standards.
4. Maintain one copy of each testing document on site.

1.07 COORDINATION BETWEEN CONTRACTORS

A. The Contractor shall acquaint himself with details of all work to be performed by other trades and take necessary steps to integrate and coordinate his work with these trades.

B. Special attention shall be given to points where ducts cross other ducts or piping, where lighting fixtures fit into ceilings and where pipes, ducts and conduit pass through walls and columns.

C. Each Contractor shall be responsible for informing himself of the nature and arrangement of the materials and construction to which his work attaches or passes through.

1.08 PROTECTION AND REPAIR

A. In addition to the provisions and stipulations of the General and Supplementary General Conditions of the Contract each Contractor and Subcontractor shall provide various types of protection as follows:

1. Protect finished floors from chips and cutting oil by the use of metal receiving pans and an oil proof floor covering.

2. Protect equipment and finished surfaces from welding and cutting spatters with baffles and spatter blankets.
3. Protect equipment and finished surfaces from paint droppings, insulation adhesive and size droppings, etc. by use of drop cloths.
4. Maintain fire rating of walls and structures; provide fireproof enclosure where required.

1.09 RUBBISH

A. All rubbish resulting from the work herein specified shall be removed from the premises by the trade which produced it, as fast as it accumulates.

B. On completion of his work each Contractor shall remove and see that each of his Subcontractors removes from the site all tools, equipment, surplus material and rubbish pertaining to his own operations. Each Contractor or Subcontractor shall pay all costs for such removal and disposition and shall cooperate with the General Contractor in final cleaning.

C. Disposal of hazardous material shall be via guideline of the state of California, Department of Health Services and other authorities having jurisdiction.

1.10 ELECTRICAL CONNECTIONS TO EQUIPMENT

A. Connections and wiring diagrams shown on drawings or described in the specifications are typical and are for reference purposes only. Detailed diagram instructions and construction shop drawings will be required from the Contractor supplying the equipment.

1.11 PRODUCTS AND MATERIAL

A. General

1. Electrical equipment shall be new, listed by Underwriters' Laboratories and shall conform to the standard of the National Electrical Manufacturer's Association.

2. Materials used for like service shall be by the same manufacturer, e.g., all motor starters to be from the same manufacturer.

B. Prefabricated Equipment: Unless noted as field fabricated all equipment shall be delivered completely factory assembled and wired.

C. Approval: A specification followed by one or more manufacturers "or approved equal" is open to all equal products or materials unless otherwise noted. However, the Contractor shall supply one of the listed manufacturers at no additional cost if OCTA Project Manager finds the substituted product unsatisfactory.

D. Material: The Contractor shall submit to the Owner's Rep, for his approval within 48 hours after request, a list of all materials he proposes to use.

E. Storage

1. Provide suitable protection from weather and vandalism for all materials and equipment to be installed. Storage shall be dry, clean and safe. Any materials or equipment damaged, deteriorated, rusted or defaced due to improper storage shall be fully repaired, refinished or replaced as directed by OCTA Project Manager.
2. Cover and protect all equipment, materials, raceways, etc., before and after installation to prevent injury and to prevent entrance of grit, dirt and foreign matter.

1.12 SHOP DRAWINGS

A. General

1. Drawings shall be accurately drawn large scale drawings, adequately dimensioned, showing external and internal features, mechanical provisions, materials, gauges, electrical characteristics, wiring diagrams and such other information necessary to show compliance with the intent of the specifications and drawings.
2. Generalized diagrams having several alternate methods of connection will not be acceptable.
3. Catalog data in lieu of certified prints shall be submitted for standard specialties, wire and cable, switches, starters, insulation and similar items.
4. Contractor's responsibility includes coordination of his work with all other trades, fabrication process and technique of construction. The Contractor shall check all shop drawings for correct performance, size, capacity, clearance, and finish prior to submittal to OCTA Project Manager. Drawings must be stamped or marked to indicate Contractor has reviewed these drawings.
5. Contractor review shall ensure that equipment will fit into available space.

6. OCTA Project Manager will review submitted shop drawings as a further check and as a service to the Contractor. Such review does not relieve the Contractor of responsibility for correct ordering of material and equipment.

B. Shop Drawings

1. Contractor shall submit shop drawings of the following systems or equipment and other equipment requested by OCTA Project Manager:

a. Switchboards and Panelboards
b. Cabinets and Pull Boxes
c. Devices and Conductors
d. Transformers
e. BEB ChargePoint Power Blocks and Power Links
f. BEB ChargePoint Express Plus Pantograph
g. Fleetwatch FR200 Data Receiver
h. Emergency Power Diesel Generator

2. Each submitted item shall refer to the specification section and paragraph number in which the item is specified.

3. Approval of a specific item does not include approval of the assembly of which the item is a component.

1.13 DELIVERY SCHEDULE

A. The Contractor shall submit, upon request, a schedule listing the equipment and materials required to complete the installation, quantity ordered, the date of placing the order and the promised delivery date.

PART 2 - PRODUCT

2.01 GENERAL

A. All equipment and materials shall be new, and the current model or type of manufacturer is regularly engaged in their production. Where two or more units of the same class of equipment are required, they shall be products of the same manufacturer.

B. Equipment shall fit into the space allotted and shall have adequate and acceptable clearances for entry, service, and maintenance. The work shall be provided in an arrangement which will not necessitate cutting of structural members which will not interfere with lighting, HVAC equipment or doors, and which will present the best appearance possible.

C. Where equipment or materials are specified to be approved by and constructed and/or tested in accordance with the published standard of the UL, NRTL, ANSI, ASTM, ETL or any similar nationally recognized agency, the Contractor shall submit proof that the items furnished under this specification conform to such requirements.

2.02 COLOR SCHEDULE AND SAMPLES

A. The Contractor shall submit, upon request, a list of available finishes, together with color samples, for all equipment where color finishes are requested by OCTA Project Manager. The list of equipment will be made available to the Contractor before equipment delivery authorization is required.

PART 3 - EXECUTION

3.01 PROJECT CLOSE-OUT

A. AC Switchgear Test and Inspection

1. New breakers in the main switchboard shall be tested and inspected as follows:

   a. Circuit breakers shall be tested and inspected for proper trip operations on long delay, short delay and instantaneous trip. Test current for long delay tripping shall be 300% of rate trip. All circuits shall have Ductor readings made where possible.
   b. All bolted connections shall be checked and tightened for proper torque.
   c. A written report showing test results shall be submitted to OCTA Project Manager.

B. Tests

1. The Contractor shall furnish all necessary instruments and equipment required for making tests and shall make test of all wiring for shorts, open circuits, grounds, etc., and shall immediately correct any defective work.

2. When the entire installation has been completed and all lighting fixtures installed, test out all circuits and switching and demonstrate that the operation of the system is in accordance with the Contract Documents.

C. Spares

Fuses-Provide Owner with three (3) fuse refills for each size fuse used in the installation. Mount fuse clip in spare fuse cabinet. Located in main electrical room or maintenance shop.

D. Cleaning and Touch-Up

1. All panelboards, cabinets, switchboards, motor controllers, control panels and other enclosures shall be cleaned and the paint touched up as necessary to duplicate a factory's finished appearance. Touch-up paint shall match the color, composition and quality of the factory applied finish.
2. Label all electrical equipment or controls by means of engraved laminated plastic plates screwed or riveted to device. Height of letters to be not less than 1/4" unless otherwise specified or directed. Items to be labeled include the following:

    a. Main circuit breakers and switches
    b. All circuit breakers and switches in switchboards and distribution panels
    c. All panel boards (labeled on inside)
    d. Printed card labels may be used on items of equipment furnished with plastic windows. Labeling of the cards shall be neatly printed using a lettering device such as a "KROY" instrument.
    e. Directories on the inside of panelboards shall be type-written and shall show list of circuits and points, equipment of areas supplied (1/8" letter height acceptable).
    f. Labels or tags inside the covers of safety switches or motor starters noting interlocks, conductor sizes, etc., may be of the embossed adhesive type.

E. Record Drawings - At the end of the project the Contractor's working drawings shall be brought up to date and a set of prints delivered to the Owner's Rep with written material certification that all corrections are true and accurately noted installed thereon. Each drawing shall be labeled Record Drawings, dated and signed by the Contractor.

F. Operation and Maintenance (O&M) Manuals

1. These requirements are supplemental to those listed or referred to in any foregoing sections of these specifications.
2. Contractor shall prepare suitable bound volumes pertaining to his systems and equipment. Submit one (1) copy to the Owner's Rep for approval. After approval, submit three (3) copies to the Owner's Rep for delivery to the Owner.
3. Volumes shall be properly bound, indexed and contained in hard, heavy duty 3 ring binders. The following shall be clearly printed on the front cover:

    a. Project name, address and date
    b. Name and address of Architect-Engineer
    c. Telephone number of Contractor, including night or emergency

4. Bind the written operating instructions, shop drawings, equipment catalog cuts and manufacturer's instructions into the binder. Material to be assembled as follows:

    a. First page - Title of job, Owner, address, date of submittal, name of Contractor and name of Owner's Rep. Emergency operating instructions and/or list of service organizations (including address and telephone numbers) capable of rendering emergency service on 24-hour calls.
    b. Second page - Table of Contents.

5. Material shall be assembled in divisions according to the systems which are on the project (e.g., emergency distribution system, etc.). Each division shall include the following sections:

    a. First Section - Written description of system contents, where actually located in building, how each part functions individually and how system works as a whole. Conclude with a list of items requiring services and either state the service needed or refer to the manufacturer's data in the binder that describes the proper service.
    b. Second Section - A copy of each approved shop drawing (clearly marked for furnished item) with an index at the beginning of the section.
    c. Third Section - A copy of each manufacturer's operating instructions with an index at the beginning of the section.

d. Fourth Section - A list of all equipment used in the system, Contractor's purchase order numbers, supplier's name and address.
e. Field replacement parts list.

G. Guarantee and Warranty

1. These requirements are supplemental to those listed or referred to in any foregoing section of these specifications.
2. All wiring and conduit systems provided under Division 26 shall be guaranteed for a period of three (3) years.
3. Warranty period shall also apply to services, including instruction, adjustment, testing, noise control, etc.

H. Special Requirements

1. No work shall be performed "HOT".
2. Any power outages shall be performed on an after-hours basis, generally after midnight on weekends between the hours of 12.00 a.m. and 6:00 a.m. The Contractor shall coordinate the outage with OCTA Project Manager, giving at least twenty (20) days notice; Contractor shall obtain written approval from OCTA Project Manager regarding schedule outage. All after-hours related costs shall be included in the Contractors Bid.
3. Temporary service or service jumper to be provided when outage will be expected to last more than three hours. The cost of this service shall be addressed and shall be included in the contract.

END OF SECTION 26 01 20

SECTION 26 05 19

CONDUCTORS

PART 1- GENERAL

1.1 SECTION INCLUDES

A. Building wires and cables.

B. Underground power and control wires and cables.

C. Wiring connectors and connections.

1.2 RELATED SECTIONS

A. Section 26 05 33.13 - Conduits.

B. Section 26 05 33.16 - Boxes.

1.3 REFERENCES

A. ANSI/NFPA 70 - National Electrical Code.

1.4 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years of experience.

1.5 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI / NFPA 70.

1.6 PROJECT CONDITIONS

A. Verify that field measurements are as shown on Drawings.

B. Wire and cable routing shown on Drawings is approximate unless dimensioned. Route wire and cable as required to meet Project Conditions.

C. Where wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required.

1.7 COORDINATION

A. Determine required separation between cable and other work.

B. Determine cable routes to avoid interference with other work.

PART 2- PRODUCTS

2.1 EXTERIOR AND UNDERGROUND WIRE AND CABLE - #6 and SMALLER

A. Description: Stranded conductor insulated wire.

B. Conductor: Copper.

C. Insulation Voltage Rating: 600 volts.

D. Insulation: ANSI / NFPA 70, Type XHHW-2.

2.2 EXTERIOR AND UNDERGROUND WIRE AND CABLE - #4 and LARGER

A. Description: Stranded conductor insulated wire.

B. Conductor: Copper.

C. Insulation Voltage Rating: 600 volts.

D. Insulation: ANSI / NFPA 70, Type XHHW-2.

PART 3- EXECUTION

3.1 EXAMINATION

A. Verify that the interior of building has been protected from weather.

B. Verify that mechanical work is likely to damage wire and cable has been completed.

3.2 PREPARATION

A. Completely and thoroughly swab raceway before installing wires.

3.3 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Use solid conductor for feeders and branch circuits 10 AWG and smaller.

C. Use stranded conductors for control circuits.

D. Use conductor not smaller than 12 AWG for power and lighting circuits.

E. Use conductor not smaller than 16 AWG for control circuits.

F. Use #10 AWG conductors for 20 amperes, 120-volt branch circuits longer than 75 feet (23 m).

G. Use #10 AWG conductors for 20 amperes, 277-volt branch circuits longer than 200 feet (61 m).

H. Pull all conductors into the raceway at same time.

I. Use suitable wire pulling lubricant for building wire 4 AWG and larger.

J. Match the existing wiring color scheme.

K. Protect the exposed cable from damage.

L. Support cables above accessible ceiling, using spring metal clips or plastic cable ties to support cables from structure. Do not rest cable on ceiling panels.

M. Neatly train and lace wiring inside boxes, equipment, and panelboards.

N. Clean conductor surfaces before installing lugs and connectors.

O. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.

P. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, #8 AWG and smaller.

Q. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, #10 AWG and smaller.

R. Wiring connections to terminal blocks shall be made with crimp type locking-fork terminals for conductors #8 AWG or smaller.

S. All conductors #6 AWG or larger shall be terminated with compression type lugs.

3.4 INTERFACE WITH OTHER PRODUCTS

A. Identify each conductor with its circuit number or other designation indicated on Drawings.

3.5 FIELD QUALITY CONTROL

A. Inspect wire and cable for physical damage and proper connection.

B. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended values.

C. Verify continuity of each branch circuit conductor.

D. Verify that all circuits are free from grounds and short circuits.

END OF SECTION 26 05 19

INSTALLATION OF BATTERY-ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE

SECTION 26 05 26

GROUNDING

PART 1 - GENERAL

0.1 SECTION INCLUDES

A. Grounding electrodes and conductors.

B. Equipment grounding conductors.

C. Bonding.

1.2 RELATED SECTIONS

A. Section 26 01 20 - General Electrical Provisions.

1.3 REFERENCES

A. ANSI/NFPA 70 - National Electrical Code.

1.4 SUBMITTALS

A. Product Data: Provide data for grounding electrodes and connections.

B. Test Reports: Indicate overall resistance to ground.

C. Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation and installation of exothermic connectors.

1.5 PROJECT RECORD DOCUMENTS

A. Accurately record actual locations of grounding electrodes.

1.6 GROUNDING ELECTRODE SYSTEM

A. Metal underground water pipe.

B. Concrete-encased electrode.

C. Rod electrode.

1.7 PERFORMANCE REQUIREMENTS

A. Grounding System Resistance: 25 ohms maximum.

PART 1 - PRODUCTS

1.1 ROD ELECTRODE

A. Material: Copper.

B. Diameter: 3/4 inch.

C. Length: 20 feet.

1.2 MECHANICAL CONNECTORS

A. Material: Bronze.

1.3 WIRE

A. Material: Stranded copper.

B. Grounding Electrode Conductor: Size to meet NFPA 70 requirements.

PART 2 - EXECUTION

2.1 EXAMINATION

A. Verify that final backfill and compaction has been completed before driving rod electrodes.

2.2 INSTALLATION

A. Install Products in accordance with manufacturer's instructions.

B. Install rod electrodes in addition to other required ground electrodes where required to achieve specified resistance to ground.

C. Equipment Grounding Conductor: Provide separate, insulated conductor within each feeder circuit raceway. Terminate each end on suitable lug, bus, or bushing.

2.3 FIELD QUALITY CONTROL

A. Inspect grounding and bonding system conductors and connections for tightness and proper installation.

B. Use suitable test instrument to measure resistance to ground of system. Perform testing in accordance with test instrument manufacturer's recommendations using the fall-of-potential method.

C. Provide the owner with one copy of the test results

END OF SECTION 26 05 26

SECTION 26 05 29

SUPPORT DEVICES AND SEISMIC RESTRAINTS

PART 1- GENERAL

1.1 SECTION INCLUDES

A. Conduit and equipment supports.

B. Anchors and fasteners.

1.2 REFERENCES

A. NECA - National Electrical Contractors Association.

B. ANSI/NFPA 70 - National Electrical Code.

1.3 SUBMITTALS

A. Product Data: Provide manufacturer's catalog data for fastening systems.

B. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.

1.4 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70.

B. Conform to SMACNA - Guidelines for seismic restraints of mechanical systems.

PART 2- PRODUCTS

2.1 PRODUCT REQUIREMENTS

A. Materials and Finishes: Provide adequate corrosion resistance.

B. Provide materials, sizes, and types of anchors, fasteners, supports and seismic supports to carry the loads of equipment and conduit. Consider weight of wire in conduit when selecting products.

C. Anchors and Fasteners:

1. Concrete Structural Elements: Use Epoxy stainless steel anchors.
2. Steel Structural Elements: Use stainless steel beam clamps, ramset fasteners and welded fasteners.
3. Concrete Surfaces: Use Epoxy stainless steel anchors.
4. Hollow Masonry, Plaster, and Gypsum Board Partitions: Use stainless steel toggle bolts and hollow wall fasteners.
5. Solid Masonry Walls: Use Epoxy anchors.
6. Sheet Metal: Use stainless steel sheet metal screws.
7. Wood Elements: Use stainless steel wood screws.

2.2 STEEL CHANNEL

A. Description: Stainless steel.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Provide stainless steel anchors, fasteners, and supports in accordance with NECA "Standard of Installation".

C. Do not fasten supports to pipes, ducts, mechanical equipment, and conduit.

D. Do not use spring steel clips and clamps.

E. Do not use powder-actuated anchors.

F. Do not drill or cut structural members.

G. Fabricate supports from structural stainless steel beam, angle or channel. Rigidly weld members or use hexagon head bolts to present neat appearance with adequate strength, flexibility and/or rigidity. Use spring lock washers under all nuts.

H. Install surface-mounted cabinets and panelboards with minimum of four anchors.

I. In wet and damp locations use stainless steel channel supports to stand cabinets and panelboards one inch off wall.

J. Use stainless steel sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

K. Use neoprene washers, vibration isolators and seismic restraints where required.

END OF SECTION 26 05 29

INSTALLATION OF BATTERY-ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE

SECTION 26 05 33.13

CONDUITS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Metal conduit.

B. Liquid tight flexible metal conduit.

C. Electrical metallic tubing.

D. Nonmetal conduit.

E. Fittings and conduit bodies.

1.2 RELATED SECTIONS

A. Section 26 05 33.16 - Boxes.

B. Section 26 05 26 - Grounding.

C. Section 26 05 29 - Support Devices.

1.3 REFERENCES

A. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.

B. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated.

C. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.

D. ANSI/NFPA 70 - National Electric Code.

E. NECA "Standard of Installation".

1.4 DESIGN REQUIREMENTS

A. Conduit Size: ANSI/NFPA 70.

1.5 PROJECT RECORD DOCUMENTS

A. Accurately record actual routing of conduits larger than 2 inches (51 mm).

1.6 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70.

1.7 PROJECT CONDITIONS

A. Verify that field measurements are as shown on Drawings.

B. Verify routing and termination locations of conduit prior to rough-in.

PART 2 - PRODUCTS

2.1 CONDUIT REQUIREMENTS

A. Minimum Size: 1 inch (19 mm) unless otherwise specified.

B. Underground Installations:
1. More than Five Feet from Foundation Wall: Use Schedule 80 PVC
2. Within Five Feet from Foundation Wall: Use Schedule 80 PVC
3. In or Under Slab on Grade: Use Schedule 80 PVC
4. Minimum Size: 2 inch (25 mm).

C. Outdoor Locations, Above Grade: Use rigid steel.
1. Roof location: Refer to Section 3.2 part Y.

D. Wet and Damp Locations: Use Schedule 80 PVC conduit.

E. Dry Indoor Locations:

1. Concealed: Use rigid galvanized steel conduit (RGS).
2. Exposed: Use rigid galvanized steel conduit (RGS).

2.2 METAL CONDUIT

A. Rigid Steel Conduit: ANSI C80.1.

B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; material to match conduit. Conduit fittings shall be zinc coated and shall be of the threaded type. Double lock nuts with bushing caps shall be used on all conduit termination except where threaded hubs exist. For PVC coated conduit use plastic jacketed fittings.

2.3 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

A. Description: Interlocked steel construction with PVC jacket.

B. Fittings: ANSI/NEMA FB 1. Zinc coated steel type with insulated bushings by Burndy, Condulet, Steel City or Thomas & Betts.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install conduit in accordance with NECA "Standard of Installation."

B. Install nonmetallic conduit in accordance with manufacturer's instructions.

C. Arrange supports to prevent misalignment during wiring installation.

D. Support conduit using stainless steel or Aluminum straps, lay-in adjustable hangers, clevis hangers, and split hangers.

E. Group related conduits; support using conduit rack. Construct rack using stainless steel or Aluminum channels; provide space on each for 25 percent additional conduits.

F. Fasten conduit supports to building structure and surfaces under provisions of Section 16190.

G. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports

H. Do not attach conduit to ceiling support wires.

I. Arrange conduit to maintain headroom and present neat appearance.

J. Route conduit parallel and perpendicular to walls.

K. Route conduit installed above accessible ceilings parallel and perpendicular to walls.

L. Maintain adequate clearance between conduit and piping.

M. Maintain 12 inch (300 mm) clearance between conduit and surfaces with temperatures exceeding 104 degrees F (40 degrees C).

N. Cut conduit square using saw or pipe cutter; de-burr cut ends.

O. Bring conduit to shoulder of fittings; fasten securely.

P. Use conduit hubs to fasten conduit.

Q. Install no more than equivalent of three 90-degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use hydraulic one-shot bender to fabricate bends in metal conduit larger than 2 inch (50 mm) size.

R. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.

S. Provide suitable fittings to accommodate expansion and deflection where conduit crosses seismic, control and expansion joints.

T. Provide suitable pull string and caps on both ends in each empty conduit except sleeves and nipples.

U. Use suitable caps to protect installed conduit against entrance of dirt and moisture.

V. Ground and bond conduit under provisions of Section 16450.

W. All equipment connections shall be made with a short section (18” minimum - 36” maximum) length of flexible conduit. These connections shall be made with Seal-Tight conduit and be kept as short as possible.

X. Ceiling and roof penetrations shall be installed with rigid steel per description below:

1. Install rubber grommet at ceiling/roof penetration for rigid steel conduit.
2. Provide and install outdoor flexible conduit per section 3.1 part X from rigid steel conduit ceiling/roof penetration to equipment connection.

3.2 INTERFACE WITH OTHER PRODUCTS

A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods under the provisions of Section 07900.

B. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket.

END OF SECTION 26 05 33.13

INSTALLATION OF BATTERY-ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE

SECTION 26 05 33.16

BOXES

PART 1- GENERAL

1.1 SECTION INCLUDES

A. Wall and ceiling outlet boxes.

B. Pull and junction boxes.

1.2 RELATED SECTIONS: NONE

1.3 REFERENCES

A. NECA - Standard of Installation.

B. NEMA FB 1 - Fittings and Supports for Conduit and Cable Assemblies.

C. NEMA OS 1 - Sheet-steel Outlet Boxes, Device Boxes, Covers, and Box Supports.

D. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports.

E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

F. NFPA 70 - National Electrical Code.

1.4 SUBMITTALS FOR CLOSEOUT

A. Record actual locations and mounting heights of outlet, pull, and junction boxes on project record documents.

1.5 REGULATORY REQUIREMENTS Conform to requirements of NFPA 70.

PART 2- PRODUCTS

2.1 OUTLET BOXES

A. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.

1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include 1/2 inch male fixture studs where required.

B. Nonmetallic Outlet Boxes: NEMA OS 2, PVC. Provide gasketed cover by box manufacturer. Applicable to all outlet boxes for damp, wet and outdoor installations.

C. Cast Boxes: NEMA FB 1, Type FS or FD, cast feralloy. Provide gasketed cover by box manufacturer. Applicable to all outlet boxes for damp, wet or outdoor installations.

D. Wall Plates for Finished Areas: As specified in Section 16140.

PART 3- EXECUTION

3.1 EXAMINATION Verify locations of outlets prior to rough-in.

3.2 INSTALLATION

A. Install boxes in accordance with NECA "Standard of Installation."

B. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.

C. Electrical boxes are shown on Drawings in approximate locations unless dimensioned. Adjust box location up to 10 (3 m) feet if required to accommodate intended purpose.

D. Orient boxes to accommodate wiring devices oriented as specified in Section 16140.

E. Maintain headroom and present neat mechanical appearance.

F. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.

G. Install boxes to preserve fires resistance rating of partitions and other elements, using materials and methods specified in Section 07900.

H. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.

I. Use adjustable steel channel fasteners for hung ceiling outlet box.

J. Do not fasten boxes to ceiling support wires.

K. Support boxes independently of conduit.

L. Use gang box where more than one device is mounted together. Do not use sectional box.

M. Use gang box with plaster ring for single device outlets.

N. Use cast or PVC outlet box in exterior locations and wet locations.

O. Large Pull Boxes: Use hinged enclosure in interior dry locations, surface-mounted cast metal box in other locations.

3.3 ADJUSTING

A. Install knockout closures in unused box openings.

3.4 CLEANING

A. Clean interior of boxes to remove dust, debris, and other material.

B. Clean exposed surfaces and restore finish.

END OF SECTION 26 05 33.16

SECTION 26 05 53

ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Nameplates and labels.

B. Wire and cable markers.

C. Conduit markers.

D. Conduit color-coding.

E. Panelboard directories.

F. Wiring diagrams.

1.2 RELATED SECTIONS

A. Section 26 01 20 - General Electrical Provisions.

PART 2 - PRODUCTS

2.1 NAMEPLATES AND LABELS

A. Type NP Nameplates: Engraved three-layer laminated plastic with white letters on black background.

B. Locations:

1. Each electrical distribution and control equipment enclosure.
2. Communication cabinets.

C. Letter Size:

1. Use 1/8 inch (3 mm) letters for identifying individual equipment and loads.
2. Use 1/4 inch (6 mm) letters for identifying grouped equipment and loads.

2.2 LEGEND PLATES

A. Type LP: Die-stamped metal legend plate with mounting hole and positioning key.

B. Paint-fill engraved characters.

2.3 WIRE AND TERMINAL MARKERS

A. Self-adhering, pre-printed, self-laminating vinyl wrap-around strips.

B. Locations: Each conductor at panelboard gutters, pull boxes, outlet and junction boxes, and each load connection.

C. Legend:

1. Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings.
2. Control Circuits: Control wire number indicated on schematic and interconnection diagrams on drawings.

2.4 CONDUIT MARKERS

A. Description: High performance snap-on or pressure sensitive precoiled, preprinted suitable for indoor and outdoor conditiions.

B. Location: Furnish markers for each conduit longer than 10 feet.

C. Spacing: 20 feet on center.

D. Color:

1. 480 Volt System: Yellow.
2. 208 Volt System: Green.
3. Fire Alarm System: Red.
4. Telephone System: Brown.
5. Data System: Blue.

E. Legend:

1. 480 Volt System: 480 V.
2. 208 Volt System: 208 V.
3. Fire Alarm System: FA.
4. Telephone System: TEL.
5. Data System: DATA.

PART 3 - EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive nameplates and labels.

3.2 INSTALLATION

A. Install nameplate and label parallel to equipment lines.

B. Secure nameplate to equipment front using two screws or adhesive.

C. Secure nameplate to inside surface of recessed panelboard doors in finished locations.

D. Secure clear plastic-laminated wiring diagrams on the inside of cabinets, enclosures, panelboards, and switchboards.

3.3 WIRE IDENTIFICATION

A. Provide wire markers on each conductor in panelboard gutters, pull boxes, outlet and junction boxes, and at load connection. Identify with branch circuit or feeder number for power and lighting circuits, and with control wire number as indicated on equipment manufacturer's shop drawings for control wiring.

B. Provide conductor phase color coding as per Section 16120.

3.4 NAMEPLATING ENGRAVING

A. Provide type "NP" nameplates of minimum letter height as noted below.

1. Panelboards, Switchboards and Motor Control Centers: 1/4-inch to identify equipment designation. 1/8-inch to identify voltage rating and source.
2. Individual Circuit Breakers, Switches and Motor Starters in Panelboards, Switchboards, and Motor Control Centers: 1/8-inch to identify circuit and load served, including location.
3. Individual Circuit Breakers, Enclosed Switches, and Motor Starters: 1/8-inch to identify voltage rating and load served.
4. Transformers: 1/4-inch to identify equipment designation. 1/8-inch to identify primary and secondary voltages, primary source, and secondary load and location.

5. Equipment Cabinets, Terminal Cabinets, Control Panels and other Cabinets enclosing apparatus: 3/8-inch to identify equipment and designation.

B. Provide type "LP" metal legend plates for attachment to panel mounted operator's devices such as pilot lights, push buttons, selector switches, etc.

3.5 CONDUIT COLOR CODING SCHEDULE

A. Coordinate color of paint with Section 09900 - Painting to identify conduit by system.

B. Fire Alarm System: Red.

3.6 PANELBOARD DIRECTORIES

A. Provide typewritten directories arranged in numerical order showing number of room in which each device served by each panelboard circuit is located.

B. Verify room numbers to be used with Owner. Room number will not necessarily be those used on the Drawings.

B. Mount directories in a 6 inch by 8 inch metal frame under a clear plastic cover inside each panelboard door.

3.7 PLASTIC-LAMINATED WIRING DIAGRAMS

A. Provide clear plastic-laminated wiring diagrams for cabinets, enclosures, panelboards, and switchboards.

B. Secure clear plastic-laminated wiring diagrams to the inside surface of metal cabinets, enclosures, panelboards, and switchboards with adhesive.

C. Mount diagrams clear of latches, hinges, and viewports.

END OF SECTION 26 05 53

SECTION 26 22 13

DRY TYPE PAD MOUNTED DISTRIBUTION TRANSFORMERS

PART 1-GENERAL

1.1 SECTION INCLUDES

A. Dry type pad mounted distribution transformers.

1.2 RELATED SECTIONS

A. Section 03 30 00 - Cast-In-Place Concrete: Pads for transformer support.

1.3 REFERENCES

A. ANSI C37.47 - Specifications for Distribution Fuse Disconnecting Switches, Fuse Supports, and Current-Limiting Fuses.

B. 10 CFR 431.196 – Efficiency of Low Voltage Dry-Type Distribution Transformers.

C. NEMA ST 20 – Dry Type Transformers for General Applications.

D. NEMA AB1 - Molded Case Circuit Breakers.

E. NEMA 260 - Safety Labels for Pad Mounted Switchgear and Transformers Sited in Public Areas.

F. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment (International Electrical Testing Association).

G. NFPA 70 - National Electrical Code.

1.4 SUBMITTALS FOR REVIEW

A. Section 01 33 00 - Submittals: Procedures for submittals.

B. Shop Drawings: Indicate electrical characteristics and connection requirements, outline dimensions, connection and support points, weight, specified ratings and materials.

C. Product Data: Provide electrical characteristics and connection requirements, standard model design tests, and options.

1.5 SUBMITTALS FOR INFORMATION

A. Section 01 33 00 - Submittals: Submittals for information.

B. Test Reports: Indicate procedures and results for specified factory and field testing and inspection.

C. Submit manufacturer's installation instructions.

D. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

E. Manufacturer's Field Reports: Indicate activities on site, final adjustments and overcurrent protective device coordination curves, adverse findings, and recommendations.

1.6 PROJECT CLOSEOUT SUBMITTALS

A. Section 01 78 00 - Contract Closeout. Submittals for project closeout.

B. Include copy of manufacturer's certified drawings in project record documents.

C. Maintenance Data: Include maintenance instructions for cleaning methods; cleaning materials recommended; procedures for sampling and maintaining fluid.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience, and with service facilities within 100 miles of Project .

B. Testing Agency: Company member of International Electrical Testing Association and specializing in testing products specified in this section with minimum three years documented experience.

1.8 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Material and Equipment: Transport, handle, store, and protect products.

B. Accept transformers on site. Inspect for damage.

1.10 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

1.11 MAINTENANCE MATERIALS

A. Section 01 77 00 - Contract Closeout.

B. Furnish two each of any special tools required to operate and maintain transformer.

1.12 EXTRA PRODUCTS

A. Section 01 77 00 - Contract Closeout.

B. Furnish two of each size and type fuse.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Square D by Schneider Electric.

B. Eaton.

C. General Electric.

D. Siemens.

E. Or approved equal.

2.2 TWO WINDING TRANSFORMERS

A. NEMA ST 20, factory-assembled, air cooled dry type transformers, ratings as indicated on Drawings.

B. Insulation System and Average Winding Temperature Rise for Rated kVA as Follows:

1. 1 to 15 kVA: Class 185 with 115 degrees C rise.
2. 16 to 500 kVA: Class 220 with 115 degrees C rise.

C. Case temperature: Do not exceed 35 degrees C rise above ambient at warmest point.

D. Winding Taps:

1. Transformers Less than 15 kVA: Two 5 percent below rated voltage, full capacity taps on primary winding.
2. Transformers 15 kVA and Larger: 2 to 2-1/2 percent taps minimum above and below nominal rated voltage.

E. Sound Levels: NEMA ST 20.

1. 1 to 5 kVA: 30 dB.
2. 6 to 25 kVA: 40 dB.
3. 26 to 150 kVA: 42 dB.
4. 151 top 225 kVA: 43 dB.

F. Basic Impulse Level: 10 kV for transformers less than 300 kVA.

G. Transformer minimum impedance:

SIZE (kVA)	PERCENT IMPEDANCE
15	5.1
30	4.0
45	4.5
75	4.75
112.5	4.9
150	4.5
225	5.3

H. Ground core and coil assembly to enclosure by means of a visible flexible copper grounding strap in accordance with Article 250 of NFPA 70.

I. Mounting: Suitable for wall, floor, or trapeze mounting, except transformers larger than 75 kVA, suitable for floor mounting.

J. Coil Conductors: Continuous windings with terminations brazed or welded.

K. Enclosure: NEMA ST 20; Type 1, Type 3R non-ventilated. Provide lifting eyes or brackets.

L. Isolate core and coil from enclosure using vibration-absorbing mounts.

M. Nameplate: Include transformer connection data and overload capacity based on rated allowable temperature rise.

2.3 SERVICE CONDITIONS

A. Meet requirements for usual service conditions described in ANSI C57.12.00 and for the specified unusual service conditions.

B. Maximum Ambient Temperature: 104 degrees F (40 degrees C).

C. Altitude: 660 feet (200 m).

D. Load Current Harmonic Factor: 0.05 per unit, maximum.

E. Transformer Loading Requirements: None.

F. Other Unusual Service Conditions: None.

2.4 RATINGS

A. Capacity: See Drawings.

B. Primary Voltage: 480 V, delta connected.

C. Taps: Standard primary taps.

D. Secondary Voltage: 120/240 volts, wye connected.

E. Impedance: 4 percent minimum.

F. Basic Impulse Level: 95 kV.

2.5 FABRICATION

A. Conform to the requirements of ANSI C57.12.28.

2.6 FACTORY FINISHING

A. Clean surfaces before applying paint.

B. Apply corrosion-resisting primer to all surfaces.

C. Apply finish coat of baked enamel paint to 4 mils (1 mm) thick.

D. Finish Color: Manufacturer's standard dark gray finish.

2.7 SOURCE QUALITY CONTROL

A. Provide testing and analysis of under provisions of Section 01 45 00.

B. Provide factory tests to ANSI C57.12.90. Include routine tests as defined in ANSI C57.12.00 and the following other tests:

1. Impedance voltage and load loss.
2. Dielectric tests.
3. Audible sound level.
4. Short circuit capability.
5. Telephone influence factor (TIF).

C. Test insulating liquid samples in accordance with IEEE C57.121.

D. Make completed unit substation available for inspection at manufacturer's factory prior to packaging for shipment. Notify OCTA Project Manager at least 14 days before inspection is allowed.

E. Allow witnessing of factory inspections and tests at manufacturer's test facility. Notify OCTA Project Manager at least 14 days before inspections and tests are scheduled.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Coordination and Meetings: Verification of existing conditions prior to beginning work.

B. Verify that support pads provided under Section 03 30 00 are ready to receive Products.

3.2 INSTALLATION

A. Install plumb and level.

B. Install safety labels to NEMA 260.

3.3 FIELD QUALITY CONTROL

A. Section 01 45 00 - Test and Quality Control.

B. Inspection and test in accordance with NETA ATS, except Section 4.

C. Perform inspections and tests listed in NEMA ATS, Section 7.2. Include the following optional tests:

1. Power factor or dissipation-factor tests in accordance with manufacturer's instructions.
2. Winding-resistance tests for each winding at nominal tap setting.
3. Individual excitation current tests on each phase.
4. Insulating liquid specific gravity, power factor, water content, dissolved gas, and total combustible gas.
5. Operational test and adjustments on fan and pump controls and alarm functions.
6. Percent oxygen test on nitrogen gas blanket.

3.4 ADJUSTING

A. Section 01 77 00 - Contract Closeout: Adjusting installed work.

B. Adjust primary taps so that secondary voltage is within 2 percent of rated voltage.

END OF SECTION

SECTION 26 24 13

SWITCHBOARDS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. NEMA Type 3R Free Standing Switchboard shall have an electrical utility service termination section, a metering section, and a load circuit breaker section.

1.2 RELATED SECTIONS

A. Section 26 01 20 - General Electrical Provisions.

B. Section 26 05 29 - Support Devices and Seismic Restrains

C. Section 26 05 26 - Grounding.

1.3 REFERENCES

A. ANSI/NFPA 70 - National Electrical Code.

B. ANSI/IEEE C12.1 - Code for Electricity Metering.

C. ANSI C39.1 - Electrical Analog Indicating Instruments.

D. ANSI C57.13 - Instrument Transformers.

E. NEMA AB 1 - Molded Case Circuit Breakers and Molded Case Switches.

F. NEMA KS 1 - Enclosed Switches.

G. NEMA PB 2 – Dead-front Distribution Switchboards.

H. NEMA PB 2.1 - Proper Handling, Installation, Operation and Maintenance of Dead-front Switchboards Rated 600 Volts or Less.

1.4 SUBMITTALS

A. Shop Drawings: Indicate front and side views of enclosures with overall dimensions shown; conduit entrance locations and requirements; nameplate legends; size and number of bus bars per phase, neutral, and ground; and switchboard instrument details.

B. Product Data: Provide electrical characteristics including voltage, frame size and trip ratings, fault current withstand ratings, and time-current curves of all equipment and components.

C. Test Reports: Indicate results of factory production tests.

D. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver in 48 inch (1.2 m) maximum width shipping splits, individually wrapped for protection and mounted on shipping skids.

B. Accept switchboards on site. Inspect for damage.

C. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

D. Handle in accordance with NEMA PB 2.1 and manufacturer's written instructions. Lift only with lugs provided for the purpose. Handle carefully to avoid damage to switchboard internal components, enclosure, and finish.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Conform to NEMA PB 2 service conditions during and after installation of switchboards.

1.7 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Siemens.

B. Cutler - Hammer.

C. Square "D".

D. General Electric.

E. Or approved equal.

2.2 SWITCHBOARD

A. Description: NEMA PB 2 with electrical ratings and configurations as indicated.

B. Main Section Devices: Panel mounted.

C. Distribution Section Devices: Panel mounted.

D. Auxiliary Section Devices: Individually mounted.

E. Rating: Provide series connected protection rating in accordance with UL procedures.

F. Bus Material: Copper with tin plating, standard size.

G. Bus Connections: Bolted, accessible from front for maintenance.

H. Fully insulate load side bus bars in rear accessible compartments.

I. Ground Bus: Full length of switchboard.

J. Neutral Bus: **100% Rated**.

2.3 METERING COMPARTMENT

A. Provide a metering compartment.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that surface is suitable for switchboard installation.

3.2 INSTALLATION

A. Install switchboard in locations shown on Drawings, in accordance with manufacturer's written instructions and NEMA PB 2.1.

B. Tighten accessible bus connections and mechanical fasteners after placing switchboard.

3.3 FIELD QUALITY CONTROL

A. Inspect completed installation for physical damage, proper alignment, anchorage, and grounding.

B. Measure insulation resistance of each bus section phase to phase and phase to ground for one minute each, at test voltage of 1000 volts; minimum acceptable value for insulation resistance is 2 mega ohms.

C. Check tightness of accessible bolted bus joints using calibrated torque wrench.

3.4 ADJUSTING

A. Adjust all operating mechanisms for free mechanical movement.

B. Tighten bolted bus connections in accordance with manufacturer's instructions.

3.5 CLEANING

A. Touch up scratched or marred surfaces to match original finish.

END OF SECTION 26 24 13

SECTION 26 24 16

PANELBOARDS

PART 1 - GENERAL

1.1 THIS SECTION INCLUDES:

A. NEMA Type 3R, 480/277 V, 3 phase, 4 wires, circuit breaker type, distribution panelboards in stainless steel enclosures.

B. NEMA Type 3R, 120/240 V, 3 phase, 4 wires, circuit breaker type, branch circuit panelboards in stainless steel enclosures.

1.2 RELATED SECTIONS

A. Section 26 01 20 - General Electrical Provisions.

B. Section 26 05 19 – Conductors.

C. Section 26 05 26 – Grounding.

D. Section 26 05 29 - Support Devices.

E. Section 26 05 53 – Electrical Identification

1.3 REFERENCES

A. NECA (National Electrical Contractors Association) "Standard of Installation."

B. UL 67 – Standard for Panelboards

C. UL 50 – Enclosures for Electrical Equipment

D. NEMA AB 1 - Molded Case Circuit Breakers.

E. NEMA ICS 2 - Industrial Control Devices, Controllers, and Assemblies.

F. NEMA KS 1 - Enclosed Switches.

G. NEMA PB 1 - Panelboards.

H. NEMA PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.

I. NFPA 70 - National Electrical Code.

J. ASCE7-05, ASCE7-10, IBC2009, IBC2012, CBC 2019, BBCC 2015 Seismic Qualification, and OSHPD Special Seismic Certification Pre-approval OSP-0016-10.

1.4 MAINTENANCE MATERIALS

A. Provide two of each panelboard key.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. General Electric.

B. Eaton.

C. Schneider Electric Square "D".

D. Siemens.

E. Or Approved Equal.

2.2 DISTRIBUTION PANELBOARDS

A. Panelboards: NEMA Type 3R, 480/277 V, 3 phase, 4 wires, circuit breaker type.

B. Panelboard Bus: Copper, ratings as indicated. Provide copper ground bus in each panelboard.

C. Minimum integrated short circuit rating: As noted on drawings.

D. Molded Case Circuit Breakers: NEMA AB 1. Provide circuit breakers with integral thermal and instantaneous magnetic trip in each pole.

E. Provide circuit breaker accessory trip units and auxiliary switches as indicated.

F. Enclosure: NEMA Type 3R stainless steel.

G. Cabinet Front: Gasketed door with lockable vault handle.

2.3 BRANCH CIRCUIT PANELBOARDS

A. Branch Circuit Panelboard: NEMA 3R 120/240 V, 3 phase, 4 wires, circuit breaker type.

B. Panelboard Bus: Copper, ratings as indicated.

C. Minimum short circuit rating: As noted on drawings.

D. Molded Case Circuit Breakers: NEMA AB 1. Provide circuit breakers with integral thermal and instantaneous magnetic trip in each pole.

E. Enclosure: NEMA Type 3R stainless steel.

F. Cabinet Front: Gasketed door with lockable vault handle.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install panelboard in accordance with NEMA PB 1.1.

B. Install panelboard plumb. Provide supports in accordance with Section 26 05 29.

C. Height: 6 ft to top of panelboard.

D. Provide filler plates for unused spaces in panelboards.

E. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads.

3.2 FIELD QUALITY CONTROL

A. Measure steady state load currents at each panelboard feeder; rearrange circuits in the panelboard to balance the phase loads to within 20 percent of each other. Maintain proper phasing for multi-wire branch circuits.

B. Visual and Mechanical Inspection: Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections for circuit breakers, fusible switches, and fuses.

END OF SECTION 26 24 16

INSTALLATION OF BATTERY-ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE

SECTION 26 27 26

WIRING DEVICES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Receptacles.

B. Device plates and decorative box covers.

C. 8-port Gigabit Ehternet Switch and 6 Gbps Wireless Modem.

1.2 RELATED SECTIONS

A. Section 26 01 20 - General Electrical Provisions.

B. Section 26 05 33.16 - Boxes.

1.3 REFERENCES

A. NECA - Standard of Installation.

B. NEMA WD 1 - General Requirements for Wiring Devices.

C. NEMA WD 6 - Wiring Device -- Dimensional Requirements.

D. NFPA 70 - National Electrical Code.

1.4 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years of experience.

PART 2 - PRODUCTS

2.1 RECEPTACLES

A. Manufacturers:
   1. Hubbell.
   2. General Electric.
   3. Leviton
   4. Bryant

B. Description: NEMA WD 1, Heavy-duty general use receptacle. Finish: as required by Architect.

C. Configuration: NEMA WD 6, type as specified and indicated.

D. Convenience Receptacle: Type 5-20.

E. GFCI Receptacle: Convenience receptacle with integral ground fault circuit interrupter to meet regulatory requirements.

2.2 WALL PLATES

A. Decorative Cover Plate: Plastic. Finish: as required by Architect.
   1. Hubbell.
   2. Or equivalent.

B. Weatherproof Cover Plate: Gasketed cast metal with hinged gasketed device cover.
   1. Hubbell.
   2. Or equivalent.

2.3 ETHERNET SWITCH AND WIRELESS MODEM

A. Summary: Installation of an 8-port Gigabit Ethernet switch, a 6 Gbps wireless modem, and a 120V quad-receptacle in a NEMA 3R watertight lockable hinged-door stainless panel, 48” H x 24” W x 6.5” D.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that outlet boxes are installed at proper height.

B. Verify that wall openings are neatly cut and will be completely covered by wall plates.

C. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean debris from outlet boxes.

3.3 INSTALLATION

A. Install in accordance with NECA "Standard of Installation."

B. Install devices plumb and level.

C. Install switches with OFF position down.

D. Install receptacles with grounding pole on bottom.

E. Connect wiring device grounding terminal to outlet box with bonding jumper.

F. Install decorative plates on switch, receptacle, and blank outlets in finished areas.

G. Connect wiring devices by wrapping conductor around screw terminal.

H. Use jumbo size plates for outlets installed in masonry walls.

I. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

J. Install an 8-port Gigabit Ethernet switch, a 6 Gbps wireless modem, and a 120V quad-receptacle in a NEMA 3R watertight lockable hinged-door stainless panel, 48” H x 24” W x 6.5” D. The 120V quad-receptacle and 1” C, 4#10 wires, 1#10

ground wire shall be connected to two (2) 20A circuit breakers in Panelboard PB-GEN.

3.4 FIELD QUALITY CONTROL

A. Inspect each wiring device for defects.

B. Operate each wall switch with circuit energized and verify proper operation.

C. Verify that each receptacle device is energized.

D. Test each receptacle device for proper polarity.

E. Test each GFCI receptacle device for proper operation.

F. Test ethernet switch and wireless modem for proper operation.

3.5 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

3.6 CLEANING

A. Clean exposed surfaces to remove splatters and restore finish.

END OF SECTION 26 27 26

INSTALLATION OF BATTERY-ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE

SECTION 26 28 16.13

ENCLOSED CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Enclosed circuit breakers.

B. Enclosed electrically operated circuit breakers.

1.2 RELATED SECTIONS

A. Section 26 01 20 - General Electrical Provisions.

B. Section 26 05 29 - Support Devices and Seismic Restraints.

1.3 REFERENCES

A. NEMA AB 1 - Molded Case Circuit Breakers.

1.4 EXTRA MATERIALS

A. Provide three of each size and type current limiter.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Eaton

B. Square "D".

C. General Electric.

D. Siemens.

E. Or approved equal.

2.2 MOLDED CASE CIRCUIT BREAKER

A. Circuit Breaker: NEMA AB 1.

B. Service Conditions

1. Temperature: -5ºC to + 60ºC.
2. Altitude: up to 2000 meters above sea level.

2.3 ELECTRICALLY OPERATED CIRCUIT BREAKER (EOCB)

A. The electrically operated circuit breakers shall be available with a two-step stored-energy mechanism which can be charged manually or using a motor. The closing time shall be less than five (5) cycles. Closing and opening operations shall be initiated by remote control or by push buttons on the front cover. An O-C-O (open-close-open) cycle shall be possible without recharging. The EOCB breaker shall include a motor, shunt trip, and shunt close of the same voltage plus an overcurrent switch (SDE).

B. The face of EOCBs shall be marked ON/OFF and I/O, and equipped with a position indicator to show contact position.

2.4 TRIP UNIT CIRCUIT BREAKERS

A. Field - adjustable trip circuit breaker: Provide circuit breakers with frame sizes 200 amperes and larger with mechanism for adjusting setting for automatic operation.

B. Current limiting circuit breaker: Provide circuit breaker with automatically - resetting current limiting elements in each pole. Let - through current and energy: Less then permitted for same size class RK-5 fuse.

C. Solid - State circuit breaker: Provide circuit breaker with electronic sensing, timing and tripping circuits for adjustable current settings instantaneous trip and adjustable short time trip.

2.5 CURRENT LIMITERS

A. Current Limiter: Designed for application with molded case circuit breaker.

B. Coordinate limiter size with trip rating of circuit breaker to prevent nuisance tripping and to achieve interrupting current rating specified for circuit breaker.

C. Provide interlocks to trip circuit breaker and to prevent closing circuit breaker when limiter compartment cover is removed or when one or more limiter is not in place or has operated.

2.6 PRODUCT OPTIONS AND FEATURES

A. Provide accessories as needed.

B. Handle Lock: Include provisions for padlocking.

C. Provide mechanical trip device.

D. Provide grounding lug in each enclosure.

E. Provide Products suitable for use as service entrance equipment where so applied.

2.7 ENCLOSURE

A. Enclosure: NEMA AB 1: Type 1 for indoor installation.
Type 4 for outdoor installation.

B. Fabricate enclosure from steel.

C. Finish using manufacturer's standard enamel finish: color per Engineer’s requirements.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install enclosed circuit breakers where indicated, in accordance with manufacturer's instructions.

B. Install enclosed circuit breakers plumb. Provide supports in accordance with Section 26 05 29.

C. Height: 5 ft to operating handle.

D. For each electrically operated circuit breaker (EOCB), install and connect two (2) #10 wires in a duct from a load control module mounted inside a NEMA 3R lockable hinged door stainless steel panel to the EOCB.

E. Program the load control module to open the EOCBs upon a loss of the utility power and to close them based on the current draw on the emergency power generator. The EOCBs shall close upon the return of the utility power and the shutdown of the emergency power.

F. Provide engraved plastic nameplates.

3.2 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Section 01 45 00.

B. Inspect and test each circuit breaker to NEMA AB 1.

C. Inspect each circuit breaker visually.

D. Perform several mechanical ON-OFF operations on each circuit breaker.

E. Verify circuit continuity on each pole in closed position.

F. Determine that circuit breaker will trip on overcurrent condition, with tripping time to NEMA AB 1 requirements.

G. Include description of testing and results in test report.

3.3 ADJUSTING

A. Adjust trip settings so that circuit breakers coordinate with other overcurrent protective devices in circuit.

B. Adjust trip settings to provide adequate protection from overcurrent and fault currents.

END OF SECTION

SECTION 26 32 13.13

STANDBY POWER DIESEL ENGINE-DRIVEN GENERATOR SET

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes a packaged engine-generator set, a load control module, and Aluminum service access platforms suitable for use in transit facilities with the features as specified and indicated. Engine generators shall be used as the Standby power source certified by SCAQMD at minimum in Tier 2 but shall be capable of providing reliable power with no run-time limitations while the primary source of power is unavailable.

B. The standalone programmable load management controller shall be compatible with the generator's controls and operations, shall limit the total current draw to the generator's current capacity via utilization of current transformers and electrically operated circuit breakers, and shall automatically add and shed loads based on an easily assigned priority order to help keep the generator performing to its maximum capacity.

C. The Aluminum service access platforms shall have walk-grates, stairs, and safety railings, shall be fastened to the generator enclosure frame and anchored to the concrete slabs with stainless steel bolts compliant with 2022 CBC (California Building Code) seismic requirements and CAL-OSHA requirements, and shall be provided with the generator set by the generator's manufacturer.

D. During the startup testing and commissioning of the emergency power system including the emergency power generator, automatic transfer switch, load management controller, and all battery electric bus (BEB) charging stations, the load management controller shall keep seven (7) electrically operated circuit breakers (EOCBs) open after the emergency power transfer and close each EOCB one by one upon the availability of the emergency power capacity.

E. Any substitutions shall be submitted for consideration and approved as equal during the bidding process.

1.3 DEFINITIONS

A. Operational Bandwidth: The total variation from the lowest to highest value of a parameter over the range of conditions indicated, expressed as a percentage of the nominal value of the parameter

B. Standby Power (SP): Per ISO 8528 - The maximum power available during a variable electrical power sequence, under the stated operating conditions, for which a generating set is capable of delivering in the event of a utility power outage or under test conditions for up to 200 hours of operation per year with the maintenance intervals and procedures being carried out as prescribed by the manufacturers. The permissible average power output (Ppp) over 24 hours of operation shall not exceed 70 percent of the ESP unless otherwise agreed by the RIC engine manufacturer.

C. Prime Power (PRP): Per ISO 8528: The maximum power which a generating set is capable of delivering continuously whilst supplying a variable electrical load when operated for an unlimited number of hours per year under the agreed operating conditions with the maintenance intervals and procedures being carried out as a prescribed by the manufacturer. The permissible average power output (Ppp) over 24 hours of operation shall not exceed 70 percent of the PRP unless otherwise agreed by the RIC engine manufacturer.

D. Limited Time running Power (LTP): Per ISO 8528: The maximum power available, under the agreed operating conditions, for which the generating set is capable of delivering for up to 500 hours of operation per year with the maintenance intervals and procedures being carried out as prescribed by the manufacturers.

E. Continuous Operating Power (COP): Per ISO 8528: The maximum power which a generating set is capable of delivering continuously whilst supplying a constant electrical load when operated for an unlimited number of hours per year under the agreed operating conditions with the maintenance intervals and procedures being carried out as prescribed by the manufacturer.

F. Data Center Continuous (DCC): The maximum power which a generating set is capable of delivering continuously whilst supplying a variable or constant electrical load when operated for an unlimited number of hours in a data center application under the agreed operating conditions with the maintenance intervals and procedures being carried out as a prescribed by the manufacturer. The

permissible average power output (Ppp) over 24 hours of operation shall not exceed 100 percent of the DCC rating.

G. Operational Bandwidth: The total variation from the lowest to highest value of a parameter over the range of conditions indicated, expressed as a percentage of the nominal value of the parameter.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of packaged engine generator indicated include rated capacities, operating characteristics, a standalone programmable load management controller, aluminum service access platform, and other furnished specialties and accessories. In addition, include the following:

1. Thermal damage curve for generator.

2. Time-current characteristic curves for generator protective device.

3. Sound test data, based on a free field requirement.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, and location and size of each field connection.

1. Dimensioned outline plan and elevation drawings of engine-generator set and other components specified.

2. Wiring Diagrams: Control interconnection, Customer connections.

C. Certifications:

1. Submit statement of compliance which states the proposed products are certified to the emissions standards required by SCAQMD in Tier 2 at minimum, stationary emergency application.

2. Submit statement of compliance which states the proposed products are seismically certified in compliance with local requirements signed and sealed by a California licensed professional engineer.

1.5 INFORMATIONAL SUBMITTALS

A. Manufacturer Seismic Qualification Certification: Submit certification that the 28-hours fuel tank for the Standby Power Generator, the Sound Attenuated enclosures, and components will withstand seismic forces defined in Division 26

Section "Vibration and Seismic Controls for Electrical Systems." Include the following:

1. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

2. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

B. Source quality-control test reports.

1. Certified summary of prototype-unit test report. See requirements in Part 2 "Source Quality Control" Article Part A. Include statement indicating torsional compatibility of components.

2. Certified Test Report: Provide certified test report documenting factory test per the requirements of this specification, as well as certified factory test of generator set sensors per NFPA110 level 1.

3. List of factory tests to be performed on units to be shipped for this Project.

4. Report of exhaust emissions and compliance statement certifying compliance with applicable regulations.

C. Warranty:

1. Submit manufacturer’s warranty statement to be provided for this Project.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Manufacturer Qualifications: A qualified manufacturer. Maintain, within 100 miles of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.

C. Source Limitations: Obtain packaged generator sets and auxiliary components through one source from a single manufacturer.

D. Comply with NFPA 37 (Standard For the Installation and Use of Stationary Combustion Engines and Gas Turbines).

E. Comply with NFPA 70 (National Electrical Code. Equipment shall be suitable for use in systems in compliance to Article 700, 701, and 702).

F. Comply with NFPA 110 (Emergency and Standby Power Systems) requirements for Level 1 emergency power supply system.

G. Comply with UL 2200.

1.7 PROJECT CONDITIONS

A. Environmental Conditions: Engine-generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:

1. Ambient Temperature: 0.0 deg C (32.0 deg F) to 40.0 deg C (104.0 deg F).

2. Relative Humidity: 0 to 95 percent.

3. Altitude: Sea level to 100.0 feet (30.0 m).

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Emergency Power Diesel Generator:

1. Cummins Power Generation equipment, aluminum service access platform, and accessories.

a. Aluminum service access platform shall be manufactured and provided through Cummins.

2. Or approved equal shall be considered if equipment performance meets the requirements herein.

a. Aluminum service access platform to be manufactured and provided by approved generator manufacturer.

B. Stand Alone Programmable Load Shed Controllers

1. PSP Products

2. Or approved equal

2.2 ENGINE-GENERATOR SET

A. Factory-assembled and -tested, engine-generator set certified for SCAQMD Tier 2 at minimum:

1. PM = 0.15 g/bhp-hr;
2. NMHC+NOx = 4.8 g/bhp-hr;
3. CO = 2.6 g/bhp-hr.

B. Mounting Frame: Maintain alignment of mounted components without depending on concrete foundation; and have lifting attachments.

1. Rigging Information: Indicate location of each lifting attachment, generator-set center of gravity, and total package weight in submittal drawings.

C. Capacities and Characteristics:

1. Power Output Ratings: Electrical output power rating for Standby operation of not less than 1490 bhp / 1000 kW = 1250 kVA at 80 percent lagging power factor, 277/480 V, Series Wye, Three phase, 4 -wire, 60 hertz.

2. Alternator shall be capable of accepting maximum 4725 kVA in a single step and be capable of recovering to a minimum of 90% of rated no load voltage. Following the application of the specified kVA load at near zero power factor applied to the generator set.

3. Nameplates: For each major system component to identify manufacturer's name and address, and model and serial number of component. The engine-generator nameplate shall include information of the power output rating of the equipment.

D. Generator-Set Performance:

1. Steady-State Voltage Operational Bandwidth: 0.5 percent of rated output voltage from no load to full load.

2. Transient Voltage Performance: Not more than 20 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within 5 seconds. On application of a 100% load step the generator set shall recover to stable voltage within 10 seconds.

3. Steady-State Frequency Operational Bandwidth: 0.25 percent of rated frequency from no load to full load.

4. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.

5. Transient Frequency Performance: Not more than 15 percent variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within 5 seconds. On application of a 100% load step the generator set shall recover to stable frequency within 10 seconds.

6. Output Waveform: At full load, harmonic content measured line to line or line to neutral shall not exceed 5 percent total and 3 percent for any single harmonic. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50.

7. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, system shall supply a minimum of 300 percent of rated full-load current for not less than 8 seconds without damage to generator system components. For a 1-phase, bolted short circuit at system output terminals, system shall regulate both voltage and current to prevent over-voltage conditions on the non-faulted phases.

8. Start Time: Comply with NFPA 110, Level 1, Type 10, system requirements.

9. Ambient Condition Performance: Engine generator shall be designed to allow operation at full rated load in an ambient temperature under site conditions, based on highest ambient condition. Ambient temperature shall be as measured at the air inlet to the engine generator for enclosed units, and at the control of the engine generator for machines installed in equipment rooms.

10. Load Sharing: Engine generator shall share real and reactive load proportionally within plus or minus 3 percent with all other engine generators in the system.

2.3 ENGINE

A. Fuel: ASTM D975 #2 Diesel Fuel

B. Rated Engine Speed: 1800 RPM.

C. Lubrication System: The following items are mounted on engine or skid:

1. Lube oil pump: shall be positive displacement, mechanical, full pressure pump.

2. Filter and Strainer: Provided by the engine manufacturer of record to provide adequate filtration for the prime mover to be used.

3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.

D. Engine Fuel System: The engine fuel system shall be installed in strict compliance to the engine manufacturer's instructions

E. Main Fuel Pump: Mounted on engine. Pump ensures adequate primary fuel flow under starting and load conditions.

F. Coolant Jacket Heater: Electric-immersion type, factory installed in coolant jacket system. Comply with NFPA 110 requirements for Level 1 equipment for heater capacity and performance.

1. Designed for operation on a single 208 VAC, Single phase, 60Hz power connection. Heater voltage shall be shown on the project drawings.

2. Installed with isolation valves to isolate the heater for replacement of the element without draining the engine cooling system or significant coolant loss.

3. Provided with a 24VDC thermostat, installed at the engine thermostat housing.

G. Governor: Adjustable isochronous, with speed sensing. The governing system dynamic capabilities shall be controlled as a function of engine coolant temperature to provide fast, stable operation at varying engine operating temperature conditions. The control system shall actively control the fuel rate as appropriate to the state of the engine generator. Fuel rate shall be regulated as a function of starting, accelerating to start disconnect speed, accelerating to rated speed, and operating in various isochronous states.

H. Cooling System: Closed loop, liquid cooled

1. The generator set manufacturer shall provide prototype test data for the specific hardware proposed demonstrating that the machine will operate at rated standby load in an outdoor ambient condition of 40 deg C.

2. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.

3. Size of Radiator overflow tank: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.

4. Expansion Tank: Constructed of welded steel plate and rated to withstand maximum closed-loop coolant system pressure for engine used. Equip with gage glass and petcock.

5. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.

6. Duct Flange: Generator sets installed indoors shall be provided with a flexible radiator duct adapter flange.

I. Muffler/Silencer: Selected with performance as required to meet sound requirements of the application, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements. For generator sets with outdoor enclosures the silencer shall be inside the enclosure.

J. Air-Intake Filter: Engine-mounted air cleaner with replaceable dry-filter element and restriction indicator.

K. Starting System: 12 or 24V, as recommended by the engine manufacturer; electric, with negative ground.

1. Components: Sized so they will not be damaged during a full engine-cranking cycle with ambient temperature at maximum specified in Part 1 "Project Conditions" Article.

2. Cranking Cycle: As required by NFPA 110 for level 1 systems.

3. Battery Cable: Size as recommended by engine manufacturer for cable length as required. Include required interconnecting conductors and connection accessories.

4. Battery Compartment: Factory fabricated of metal with acid-resistant finish.

5. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation. The battery charging alternator shall have sufficient

capacity to recharge the batteries with all parasitic loads connected within 4 hours after a normal engine starting sequence.

6. Battery Chargers: Unit shall comply with UL 1236, provide fully regulated, constant voltage, current limited, battery charger for each battery bank. It will include the following features:

   a. Operation: Equalizing-charging rate based on generator set manufacturer's recommendations shall be initiated automatically after battery has lost charge until an adjustable equalizing voltage is achieved at battery terminals. Unit shall then be automatically switched to a lower float-charging mode and shall continue to operate in that mode until battery is discharged again.

   b. Automatic Temperature Compensation: Adjust float and equalize voltages for variations in ambient temperature from minus 20 deg C to plus 40 deg C to prevent overcharging at high temperatures and undercharging at low temperatures.

   c. Automatic Voltage Regulation: Maintain constant output voltage regardless of input voltage variations up to plus or minus 10 percent.

   d. Safety Functions: Sense abnormally low battery voltage and close contacts providing low battery voltage indication on control and monitoring panel. Sense high battery voltage and loss of ac input or dc output of battery charger. Either condition shall close contacts that provide a battery-charger malfunction indication at system control and monitoring panel.

   e. Provide LED indication of general charger condition, including charging, faults, and modes. Provide a LCD display to indicate charge rate and battery voltage. Charger shall provide relay contacts for fault conditions as required by NFPA110.

   f. Enclosure and Mounting: NEMA, Type 1, wall-mounted cabinet.

2.4 FUEL OIL STORAGE

A. Comply with NFPA 30.

B. Sub Base-Mounted Fuel Oil Tank: Provide a double wall secondary containment type sub base fuel storage tank. The tank shall be constructed of corrosion

resistant steel and shall be listed and labeled. The fuel tank shall include the following features:

1. Capacity: 2,000 gallons of fuel for 28 hours continuous operation at 100 percent rated power output.
2. Tank rails and lifting eyes shall be rated for the full dry weight of the tank, genset, and enclosure.
3. Electrical stub ups.
4. Normal & emergency vents.
5. Lockable fuel fill.
6. Mechanical fuel level gauge.
7. High and low level switches to indicate fuel level.
8. Leak detector switch.
9. Sub base tank shall include a welded steel containment basin, sized at a minimum of 110% of the tank capacity to prevent escape of fuel into the environment in the event of a tank rupture.
10. Fill port with overfill prevention valve (OFPV).
11. 5 gallon fill/spill dam or bucket.
12. Tank design shall meet the regional requirements for the Project location.

2.5 CONTROL AND MONITORING

A. Engine generator control shall be microprocessor based and provide automatic starting, monitoring, protection and control functions for the unit.

B. Automatic Starting System Sequence of Operation: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of generator set. When mode-selector switch is switched to the on position, generator set starts. The off position of same switch initiates generator-set shutdown. (Switches with different configurations but equal functions are acceptable.) When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate

alarms. Operation of the local (generator set-mounted) and/or remote emergency-stop switch also shuts down generator set.

C. Manual Starting System Sequence of Operation: Switching on-off switch on the generator control panel to the on position starts generator set. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of the local (generator set-mounted) and/or remote emergency-stop switch also shuts down generator set.

D. Standalone Programmable Load Management Controller: shall be compatible with the generator's controls and operations, shall limit the total current draw to the generator's current capacity via utilization of current transformers and electrically operated circuit breakers, and shall automatically add and shed loads based on an easily assigned priority order to help keep the generator performing to its maximum capacity. The load management controller shall keep seven (7) electrically operated circuit breakers (EOCBs) open after the emergency power transfer and close each EOCB one by one upon the availability of the emergency power capacity.

E. Configuration: Operating and safety indications, protective devices, system controls, engine gages and associated equipment shall be grouped in a common control and monitoring panel. Mounting method shall isolate the control panel from generator-set vibration. AC output power circuit breakers and other output power equipment shall not be mounted in the control enclosure.

F. Indicating and Protective Devices and Controls: As required by NFPA 110 for Level 1 system, and the following:

1. AC voltmeter (3-phase, line to line and line to neutral values).
2. AC ammeter (3-phases).
3. AC frequency meter.
4. AC kW output (total and for each phase). Display shall indicate power flow direction.
5. AC kVA output (total and for each phase). Display shall indicate power flow direction.
6. AC Power factor (total and for each phase). Display shall indicate leading or lagging condition.

7. Ammeter-voltmeter displays shall simultaneously display conditions for all three phases.

8. Emergency Stop Switch: Switch shall be a red “mushroom head” pushbutton device complete with lock-out/tag-out provisions. Depressing switch shall cause the generator set to immediately stop the generator set and prevent it from operating.

9. Fault Reset Switch: Supply a dedicated control switch to reset/clear fault conditions.

10. DC voltmeter (alternator battery charging).

11. Engine-coolant temperature gauge.

12. Engine lubricating-oil pressure gauge.

13. Running-time meter.

14. Generator-voltage and frequency digital raise/lower switches. Rheostats for these functions are not acceptable. The control shall adjustment of these parameters in a range of plus or minus 5% of the voltage and frequency operating set point (not nominal voltage and frequency values.) The voltage and frequency adjustment functions shall be disabled when the paralleling breaker is closed.

15. Fuel tank derangement alarm.

16. Fuel tank high-level shutdown of fuel supply alarm.

17. AC Protective Equipment: The control system shall include over/under voltage, reverse kVAR, reverse kW, over load (kW) short circuit, over current, loss of voltage reference, and over excitation shut down protection. There shall be a ground fault alarm for generator sets rated over 1000 amps, overload warning, and overcurrent warning alarm.

18. Status LED indicating lamps to indicate remote start signal present at the control, existing shutdown condition, existing alarm condition, not in auto, and generator set running.

19. A graphical display panel with appropriate navigation devices shall be provided to view all information noted above, as well as all engine status and alarm/shutdown conditions (including those from an integrated engine emission control system). The display shall also include integrated provisions

for adjustment of the gain and stability settings for the governing and voltage regulation systems.

20. Panel lighting system to allow viewing and operation of the control when the generator room or enclosure is not lighted.

21. Data Logging: The control system shall log the latest 20 different alarm and shut down conditions, the total number of times each alarm or shutdown has occurred, and the date and time the latest of these shutdown and fault conditions occurred.

22. DC control Power Monitoring: The control system shall continuously monitor DC power supply to the control, and annunciate low or high voltage conditions. It shall also provide an alarm indicating imminent failure of the battery bank based on degraded voltage recover on loading (engine cranking).

23. Paralleling Breaker control switches: The control shall include manual open and close provisions for the paralleling breaker, and LED status lamps indicating whether the breaker is open or closed.

G. Common Remote Audible Alarm: Comply with NFPA 110 requirements for Level 1 systems. Include necessary contacts and terminals in control and monitoring panel.

1. Overcrank shutdown.

2. Coolant low-temperature alarm.

3. Control switch not in auto position.

4. Battery-charger malfunction alarm.

5. Battery low-voltage alarm.

H. Remote Alarm Annunciator: Comply with NFPA 110. An LED labeled with proper alarm conditions shall identify each alarm event and a common audible signal shall sound for each alarm condition.

I. Remote Emergency-Stop Switch: Flush; wall mounted, unless otherwise indicated; and labeled. Push button shall be protected from accidental operation.

2.6 GENERATOR OVERCURRENT AND FAULT PROTECTION

A. Generator Overcurrent Protection: The generator set shall be provided with a UL Listed/CSA Certified protective device that is coordinated with the alternator provided to prevent damage to the generator set on any possible overload or overcurrent condition external to the machine. The protective device shall be listed as a utility grade protective device under UL category NRGU. The control system shall be subject to UL follow-up service at the manufacturing location to verify that the protective system is fully operational as manufactured. Protector shall perform the following functions:

1. Initiates a generator kW overload alarm when generator has operated at an overload equivalent to 110 percent of full-rated load for 60 seconds. Indication for this alarm is integrated with other generator-set malfunction alarms.

2. Under single phase or multiple phase fault conditions, or on overload conditions, indicates an alarm conditions when the current flow is in excess of 110% of rated current for more than 10 seconds.

3. Under single phase or multiple phase fault conditions, operates to switch off alternator excitation at the appropriate time to prevent damage to the alternator.

4. The operator panel shall indicate the nature of the fault condition as either a short circuit or an overload.

5. Senses clearing of a fault by other overcurrent devices and controls recovery of rated voltage to avoid overshoot greater than 120% of nominal voltage.

6. The protective system provided shall not include an instantaneous trip function.

2.7 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

A. Comply with NEMA MG 1.

B. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.

C. Electrical Insulation: Class H

D. Temperature Rise: 105 / Class F environment.

E. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, over speed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.

F. Permanent Magnet Generator (PMG) shall provide excitation power for optimum motor starting and short circuit performance.

G. Enclosure: Drip-proof.

H. Voltage Regulator: Solid-state type, separate from exciter, providing performance as specified. The voltage regulation system shall be microprocessor-controlled, 3-phase true RMS sensing, full wave rectified, and provide a pulse-width modulated signal to the exciter. No exceptions or deviations to these requirements will be permitted.

I. Windings: Two-thirds pitch stator winding and fully linked amortisseur winding.

J. Subtransient Reactance: 12 percent maximum, based on the rating of the engine generator set.

2.8 OUTDOOR GENERATOR-SET ENCLOSURE

A. Description: Sound Attenuated Steel housing. Multiple panels shall be lockable and provide adequate access to components requiring maintenance. Instruments, control, and battery system shall be mounted within enclosure.

B. Construction:

1. Louvers: Equipped with bird screen to permit air circulation when engine is not running while excluding birds and rodents.

2. Hinged Doors: With padlocking provisions. Restraint/Hold back hardware to prevent door to keep door open at 180 degrees during maintenance. Rain lips over all doors.

3. Exhaust System:

a. Muffler Location: Within enclosure.

4. Hardware: All hardware and hinges shall be stainless steel.

5. Mounting Base: Suitable for mounting on sub-base fuel tank or housekeeping pad.

6. A weather protective enclosure shall be provided which allows the generator set to operate at full rated load with a static pressure drop equal to or less than 0.5 inches of water.

7. Inlet ducts shall include rain hoods.

C. Engine Cooling Airflow through Enclosure: Housing shall provide ample airflow for engine generator operation at rated load in an ambient temperature of 40 deg C.

1. Louvers: Fixed-engine, cooling-air inlet and discharge.

D. Sound Performance: Reduce the sound level of the engine generator while operating at full rated load to a maximum of 74 dBA measured at the engine generator acoustic enclosure in a free field environment.

E. Site Provisions:

1. Lifting: Complete assembly of engine generator, enclosure, and sub base fuel tank shall be designed to be lifted into place as a single unit, using spreader bars.

2.9 VIBRATION ISOLATION DEVICES

A. Vibration Isolation: Generators installed on grade shall be provided with California approved seismic spring isolators integral to the generator.

2.10 ALUMINUM SERVICE ACCESS PLATFORM

A. The aluminum service access platforms shall have walk-grates, stairs, and safety railings

B. The aluminum service access platforms shall be fastened to the generator enclosure frame and anchored to the concrete slabs with stainless steel bolts compliant with 2022 CBC (California Building Code) seismic requirements and CAL-OSHA requirements

C. The aluminum service access platforms shall be provided with the generator set by the generator’s manufacturer.

2.11 FINISHES

A. Indoor and Outdoor Enclosures and Components: Powder-coated and baked over corrosion-resistant pretreatment and compatible primer. Manufacturer’s standard beige color or as directed on the drawings.

2.12 SOURCE QUALITY CONTROL

A. Prototype Testing: Factory test engine-generator set using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.

1. Tests: Comply with NFPA 110, Level 1 Energy Converters. In addition, the equipment engine, skid, cooling system, and alternator shall have been subjected to actual prototype tests to validate the capability of the design under the abnormal conditions noted in NFPA110. Calculations and testing on similar equipment which are allowed under NFPA110 are not sufficient to meet this requirement.

B. Project-Specific Equipment Tests: Before shipment, factory test engine-generator set manufactured specifically for this Project. Perform tests at rated load and power factor. Include the following tests:

1. Test engine generator set manufactured for this Project to demonstrate compatibility and functionality.
2. Full load run.
3. Maximum power.
4. Voltage regulation.
5. Steady-state governing.
6. Single-step load pickup.
7. Simulated safety shutdowns.
8. Provide 14 days' advance notice of tests and opportunity for observation of tests by Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with packaged engine-generator manufacturers' written installation, application, and alignment instructions and with NFPA 110.

B. Equipment shall be installed by the contractor in accordance with final submittals and contract documents. Installation shall comply with applicable state and local codes as required by the authority having jurisdiction. Install equipment in accordance with manufacturer's instructions and instructions included in the listing or labeling of UL listed products.

C. Installation of equipment shall include furnishing and installing all interconnecting wiring between all major equipment provided for the on-site power system. The contractor shall also perform interconnecting wiring between equipment sections, under the supervision of the equipment supplier.

D. Equipment shall be installed on concrete housekeeping pads. Equipment shall be permanently fastened to the pad in accordance with manufacturer’s instructions and seismic requirements of the site.

E. Equipment shall be initially started and operated by representatives of the manufacturer. All protective settings shall be adjusted as instructed by the Engineer and OCTA Project Manager.

F. All equipment shall be physically inspected for damage. Scratches and other installation damage shall be repaired prior to final system testing. Equipment shall be thoroughly cleaned to remove all dirt and construction debris prior to initial operation and final testing of the system.

G. On completion of the installation by the electrical contractor, the generator set supplier shall conduct a site evaluation to verify that the equipment is installed per manufacturer’s recommended practice.

3.2 ON-SITE ACCEPTANCE TEST

A. The complete installation shall be tested to verify compliance with the performance requirements of this specification following completion of all site work. Testing shall be conducted by representatives of the manufacturer, with required fuel supplied by Contractor. The Engineer and OCTA Project Manager shall be notified in advance and shall have the option to witness the tests. The generator set manufacturer shall provide a site test specification covering the entire system.

B. Prior to start of active testing, all field connections for wiring, power conductors, and bus bar connections shall be checked for proper tightening torque.

C. Installation acceptance tests to be conducted on site shall include a "cold start" test, a two hour full load (resistive) test, and a one-step rated load pickup test in

accordance with NFPA 110. Provide a resistive load bank and make temporary connections for full load test, if necessary.

D. Perform a power failure test on the entire installed system. This test shall be conducted by opening the power supply from the utility service, and observing proper operation of the system for at least 2 hours. Coordinate timing and obtain approval for start of test with site personnel.

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

3.4 SERVICE AND SUPPORT

A. The generator set supplier shall maintain service parts inventory for the entire power system at a central location which is accessible to the service location 24 hours per day, 365 days per year. The inventory shall have a commercial value of $3 million or more. The manufacturer of the generator set shall maintain a central parts inventory to support the supplier, covering all the major components of the power system, including engines, alternators, control systems, paralleling electronics, and power transfer equipment.

B. The generator set shall be serviced by a local service organization that is trained and factory certified in generator set service. The supplier shall maintain an inventory of critical power system replacement parts in the local service location. Service vehicles shall be stocked with critical replacement parts. The service organization shall be on call 24 hours per day, 365 days per year. The service organization shall be physically located within 100 miles of the site.

C. The manufacturer shall maintain model and serial number records of each generator set provided for at least 20 years.

3.5 SERVICE AGREEMENT:

A. The supplier shall include in the base price, a one-year service agreement. The maintenance shall be performed by factory authorized service technicians capable of servicing both the engine generator set and the transfer switch. This agreement shall include the following:

1. Generator supplier must have an in-house rental fleet with equipment sized to back up this project site.

2. All engine maintenance as recommended by the service manual.
3. All electrical controls maintenance and calibrations as recommended by the manufacturer.
4. All auxiliary equipment as a part of the emergency systems.
5. The supplier shall guarantee emergency service.
6. All expendable maintenance items are to be included in this agreement.
7. A copy of this agreement and a schedule shall be given to the OCTA Project Manager at the time of his acceptance, showing what work is to be accomplished and when.

END OF SECTION 26 32 13.13

INSTALLATION OF BATTERY-ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE

SECTION 26 33 44

BATTERY-ELECTRIC-BUS (BEB) CHARGERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Owner-Furnished-Equipment for ChargePoint Plug-In BEB Chargers – (10) Express Plus Power Blocks Model EXPP-PB1000-250A-PD, (40) EXPP-PM-40kW, (10) EXPP-PL1011B-3A1M0, (10) EXPP-BLOCK-Commissioning, and (10) EXPP-PL1000-Commissioning.

B. Owner-Furnished-Equipment for ChargePoint Pantograph BEB Charger – (3) Express Plus Power Blocks Model EXPP-PB1000-250A-PD, (12) EXPP-PM-40kW, (1) EXPP-PD-CONTROLLER, (1) EXPP-PL2014X-7A5X00, (1) Mast, (1) Pantograph, (3) EXPP-BLOCK-Commissioning, and (10) EXPP-PL2000-Commissioning.

C. The above Owner-Furnished-Equipment ChargePoint BEB charging stations shall be installed, tested, and commissioned by the Contractor under this Agreement **C-5-3922**.

1.2 RELATED SECTIONS

A. Section 01 33 00 – Submittal Procedures

B. Section 01 60 00 – Product Requirements

C. Section 26 01 20 - General Electrical Provisions.

D. Section 26 05 33.13 – Conduits

E. Section 26 05 19 - Conductors

F. Section 26 05 29 - Support Devices.

G. Section 26 05 53 – Electrical Identification

H. Section 26 05 26 - Grounding

1.3 REFERENCES

A. NECA (National Electrical Contractors Association) "Standard of Installation."

B. NEMA AB 1 - Molded Case Circuit Breakers.

C. NEMA ICS 2 - Industrical Control Devices, Controllers, and Assemblies.

D. NEMA KS 1 - Enclosed Switches.

E. NEMA PB 1 - Panelboards.

F. NEMA PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.

G. NFPA 70 - National Electrical Code.

1.4 MAINTENANCE MATERIALS

A. Provide three (3) bound copies of maintenance manuals for BEB Charging Stations and all installed components.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Owner-Furnished-Equipment for ChargePoint Plug-In BEB Chargers – (10) Express Plus Power Blocks Model EXPP-PB1000-250A-PD, (40) EXPP-PM-40kW, (10) EXPP-PL1011B-3A1M0, (10) EXPP-BLOCK-Commissioning, and (10) EXPP-PL1000-Commissioning.

B. Owner-Furnished-Equipment for ChargePoint Pantograph BEB Charger – (3) Express Plus Power Blocks Model EXPP-PB1000-250A-PD, (12) EXPP-PM-40kW, (1) EXPP-PD-CONTROLLER, (1) EXPP-PL2014X-7A5X00, (1) Mast, (1) Pantograph, (3) EXPP-BLOCK-Commissioning, and (10) EXPP-PL2000-Commissioning.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and surfaces to receive battery charger for compliance with requirements, installation tolerances, and other conditions affecting performance.

B. Examine BEB charging stations for physical damage upon receipt. Provide information on any damaged components required replacement to the Owner.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Anchor each assembly according to manufacturer's written instructions. Attach by bolting.

B. Comply with mounting and anchoring requirements specified in Section 26 05 29 – Support Devices and Seismic Restraints.

3.3 IDENTIFICATION

A. Identify BEB components and wiring according to Section 26 05 53 – Electrical Identification.

3.4 CONNECTION

A. Conduit installation requirements are specified in Section 26 05 33.13 – Conduits. Drawings shall indicate general arrangement of conduits, fittings, and specialties.

B. Ground equipment in accordance with Section 26 05 26 – Grounding. Drawings shall indicate general arrangement of grounding rods, cables and connections.

C. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.5 FIELD QUALITY CONTROL

A. Prepare for acceptance tests as follows:

1. Test insulation resistance for each bus, connecting supply and circuit.
2. Test continuity of each circuit.
3. Other Testing: In accordance with Section 01 45 00 – Quality Control.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including testing and adjusting solid-state controllers.

1. Test Reports: Prepare a written report in accordance with Section 01 45 00 – Quality Control and Section 01 79 00 – Demonstration and Training.

3.6 ADJUSTING

A. Set field-adjustable switches and controls in accordance with manufacturer's instructions.

3.7 CLEANING

A. Clean charger internally, on completion of installation, according to manufacturer's written instructions. Vacuum dirt and debris: do not use compressed air to assist in cleaning.

3.8 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

B. Verify that BEB are installed and connected according to the Contract Documents.

C. Verify that electrical wiring installation complies with manufacturer's submittal and installation requirements in Division 26 Sections.

D. Verify and confirm that BEB are installed, connected and tested in compliance with the limits for Class B Digital Device pursuant to Part 15 of the FCC Rules.

E. During the startup testing and commissioning of the emergency power system including the emergency power generator, automatic transfer switch, load management controller, and all battery-electric bus (BEB) charging stations, the load management controller shall keep seven (7) electrically operated circuit breakers (EOCBs) open after the emergency power transfer and close each EOCB one by one upon the availability of the emergency power capacity.

F. Complete installation and startup check according to manufacturer's written instructions.

3.9 DEMONSTRATION

A. Engage a factory-authorized service representative to train the Owner's operation personnel to adjust, operate, and maintain BEB charging stations.

1. Train Owner's operation personnel on procedures and schedules for float and equalize charging, troubleshooting, servicing, and maintaining equipment and schedules.

END OF SECTION

INSTALLATION OF BATTERY-ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE

SECTION 26 33 44 A

BATTERY-ELECTRIC BUS (BEB) CHARGERS – APPENDIX A

The following 44-page Site Design Guide, titled ***Power Block and Power Link 1000, Express Plus DC Fast Charging Platform***, prepared by ChargePoint, is appended to the preceding Section 26 33 44 – Battery-Electric Bus Chargers for project use.

The following 213-page Installation Guide, titled ***Express Plus DC Fast Charging Platform***, prepared by ChargePoint, is appended to the preceding Section 26 33 44 – Battery-Electric Bus Chargers for project use.

The following 73-page Site Design Guide, titled ***Pantograph Down 2000, Express Plus DC Fast Charging Station for Electric Buses***, prepared by ChargePoint, is appended to the preceding Section 26 33 44 – Battery-Electric Bus Chargers for project use.

The following 152-page Installation Guide, titled ***Pantograph Down 2000, Express Plus DC Fast Charging Station for Electric Buses***, prepared by ChargePoint, is appended to the preceding Section 26 33 44 – Battery-Electric Bus Chargers for project use.

Power Block and Power Link 1000

Express Plus DC Fast Charging Platform

Site Design Guide



IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

This manual contains important instructions for Power Link 1000 that shall be followed during installation, operation and maintenance of the unit.

WARNING:

1. **Read and follow all warnings and instructions before servicing, installing, or operating the ChargePoint® charging station.** Install and operate only as instructed. Failure to do so may lead to death, injury, or property damage, and will void the Limited Warranty.
2. **Only use licensed professionals to install your ChargePoint charging station and adhere to all national and local building codes and standards.** Before installing the ChargePoint charging station, consult with a licensed contractor, such as a licensed electrician, and use a trained installation expert to ensure compliance with local building and electrical codes and standards, climate conditions, safety standards, and all applicable codes and ordinances. Inspect the charging station for proper installation before use.
3. **Always ground the ChargePoint charging station.** Failure to ground the charging station can lead to risk of electrocution or fire. The charging station must be connected to a grounded, metal, permanent wiring system, or an equipment grounding conductor shall be run with circuit conductors and connected to the equipment grounding terminal or lead on the Electric Vehicle Supply Equipment (EVSE). Connections to the EVSE shall comply with all applicable codes and ordinances.
4. **Install the ChargePoint charging station on a concrete pad using a ChargePoint-approved method.** Failure to install on a surface that can support the full weight of the charging station can result in death, personal injury, or property damage. Inspect the charging station for proper installation before use.
5. **The product components are not suitable for use in Class 1 hazardous locations, such as near flammable, explosive, or combustible vapors or gases.**
6. **Supervise children near this device.**
7. **Do not put fingers into the electric vehicle connector.**
8. **Do not use this product if any cable is frayed, has broken insulation, or shows any other signs of damage.**
9. **Do not use this product if the enclosure or the electric vehicle connector is broken, cracked, open, or shows any other signs of damage.**

IMPORTANT: Under no circumstances will compliance with the information in a ChargePoint guide such as this one relieve the user of the responsibility to comply with all applicable codes and safety standards. This document describes approved procedures. If it is not possible to perform the procedures as indicated, contact ChargePoint. **ChargePoint is not responsible for any damages that may result from custom installations or procedures not described in this document or that fail to adhere to ChargePoint recommendations.**

Product Disposal

To comply with Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE), devices marked with this symbol may not be disposed of as part of unsorted domestic waste inside the European Union. Enquire with local authorities regarding proper disposal. Product materials are recyclable as marked.



Document Accuracy

The specifications and other information in this document were verified to be accurate and complete at the time of its publication. However, due to ongoing product improvement, this information is subject to change at any time without prior notice. For the latest information, see our documentation online at chargepoint.com/guides.

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Symbols

This guide and product use the following symbols:



DANGER: Risk of electric shock



WARNING: Risk of personal harm or death



CAUTION: Risk of equipment or property damage



IMPORTANT: Crucial step for installation success



Read the manual for instructions



Ground/protective earth

Illustrations Used in This Document

The illustrations used in this document are for demonstration purposes only and may not be an exact representation of the product. However, unless otherwise specified, the underlying instructions are accurate for the product.

Contents

Important Safety Instructions ii

1 Introduction **1**
Express Plus Components 1
Express Plus Guides 2
Questions 2

2 Site Design Guidelines **3**
Initial Site Guidelines 3
Plan for Future Charging Capacity 3
Charging Station Placement 4

3 Civil and Mechanical Design **9**
Weights 9
Dimensions 10
Pedestal-Mount Specifications 13
Wall or Overhead-Mount Specifications 21
Drainage 22
Clearances 23
Wheel Stops and Bollards 26
Ventilation 27
Accessibility 28
Signage 28

4 Electrical Design **29**
Upstream Components 29
Grounding/Earthing Requirements 30
Maintenance Switch 32
Conduit and Wiring Requirements 32
Maximum Wire Sizes 34

5 Connectivity **37**

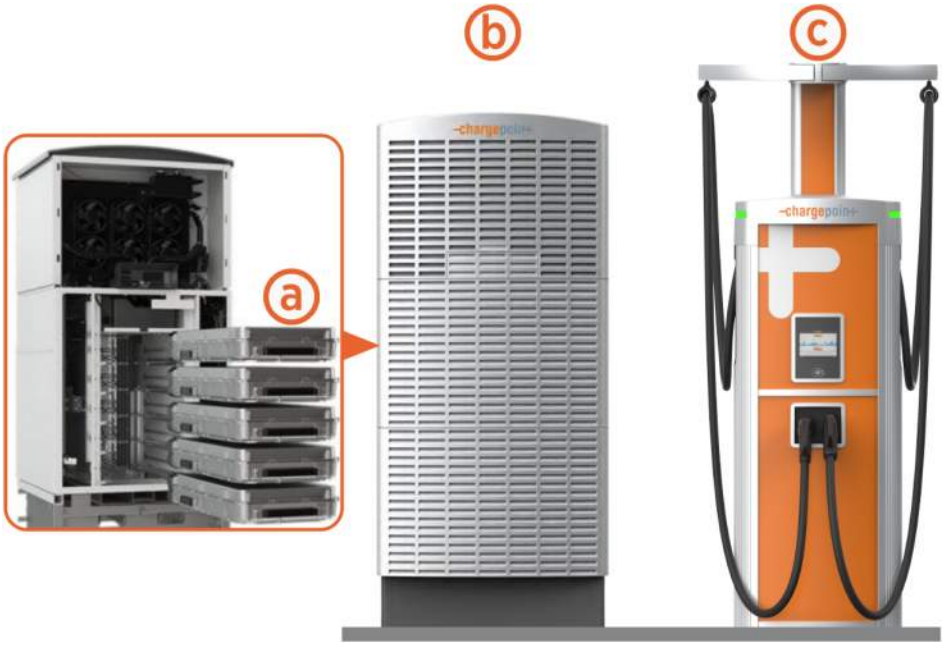
Introduction 1

This guide describes how to design a site for the ChargePoint® Express Plus DC fast charging platform. This includes civil, mechanical, and electrical infrastructure planning and any future upgrades to meet the EV charging demand.

IMPORTANT: ChargePoint recommends consulting with an engineer to create site specific drawings. Ensure the installation complies with all applicable codes and ordinances.

Express Plus Components

Express Plus is a scalable DC fast charging platform. It consists of three components: Power Module, Power Block, and Power Link.



(a) Power Module is the power conversion component. It converts the upstream AC power into DC power to output up to 40 kW of power.

(b) Power Block contains Power Modules. It can accommodate up to five Power Modules and has two DC outputs, capable of delivering up to 200 kW of power.

(c) Power Link is the charger. It receives DC power from Power Blocks. A Power Link can accommodate up to two charging cables to charge two electric vehicles simultaneously.

For full specifications and certifications, refer to the *Express Plus Datasheet* at chargepoint.com/guides .

Note: For sites that include Power Hub (an optional component of Express Plus), refer to the *Power Hub Site Design Guide* and *Installation Guide*.

Express Plus Guides

Access ChargePoint documents at chargepoint.com/guides.

Document	Content	Primary Audiences
Datasheet	Full station specifications	Site designer, installer, and station owner
Site Design Guide	Civil, mechanical, and electrical guidelines to scope and construct the site	Site designer or engineer of record
Concrete Mounting Template Guide	Instructions to embed the charging station template in a concrete pad with anchor bolts and conduit placement	Site construction contractor
Surface Conduit Entry Kit Guide	Instructions for sites where conduit cannot be run underground	Installer
Construction Signoff Form	Checklists used by contractors to ensure the site is correctly completed and ready for product installation	Site construction contractor
Installation Guide	Anchoring, wiring, and powering on	Installer
Operation and Maintenance Guide	Operation and preventive maintenance information	Station owner, facility manager, and technician
Service Guide	Component replacement procedures, including optional components	Service technician
Declaration of Conformity	Statement of conformity with directives	Purchasers and public

Questions

For assistance, go to chargepoint.com/support and find your region's technical support number.

Site Design Guidelines 2

Initial Site Guidelines

An onsite evaluation is needed to determine the wiring and conduit requirements from the electrical panel to the proposed parking spaces, as well as to measure cellular signal levels and identify suitable locations for any necessary cellular signal booster equipment.

If you have pre-existing infrastructure or are using your own preferred electrical contractor to prepare your site, a *Express Plus Construction Signoff Form* completed by a ChargePoint Operations and Maintenance (O&M) partner is required to certify compliance with electrical code, and to ensure everything was prepared to ChargePoint specifications.

CAUTION: Warranty Limitation

- If the charging station is not installed, commissioned, or serviced by a ChargePoint certified installer or technician using a ChargePoint-approved method, it is excluded from all ChargePoint and other warranties and ChargePoint is not responsible.
- You must be a licensed electrician and complete the training at chargepoint.com/installers to become ChargePoint certified and to access the ChargePoint web or app-based installer tools.

Plan for Future Charging Capacity

Designing electrical infrastructure to support current and future needs for EV charging helps avoid costly upgrades later as demand for EV charging grows.

Consider these methods to prepare a site for future charging stations in a later phase of work:

- Add extra capacity if electrical panels are being upgraded now.
- Use sub-panels as a way to shorten electrical paths.
- Maximize the conduit and conductor sizes (to product specifications) between the main electrical panel and future stations to prevent needing to re-pull wires or trenching work if the site uses underground wiring.
- Underground service wiring can be pre-staged if the correct site construction is performed in advance. Allowed terminations include a distribution unit, junction box, or plugged conduit. This eases cable pulls for future stations.

Charging Station Placement

To minimize costs, choose station locations that are close to the available electrical infrastructure. Selecting nearby locations help minimize long wire runs, as well as any conduit or trenching work if the site uses underground wiring.

WARNING: Express Plus components must be installed on a structure that is rated to support their weight. A level concrete base is recommended for Power Block and pedestal-mount Power Link 1000, and a flat wall or gantry for wall or overhead-mount Power Link 1000, respectively. Asphalt cannot support the full weight of Express Plus component. Failure to install the Express Plus components on a suitable structure may cause it to tip over, resulting in death, personal injury, or property damage.

Layout considerations:

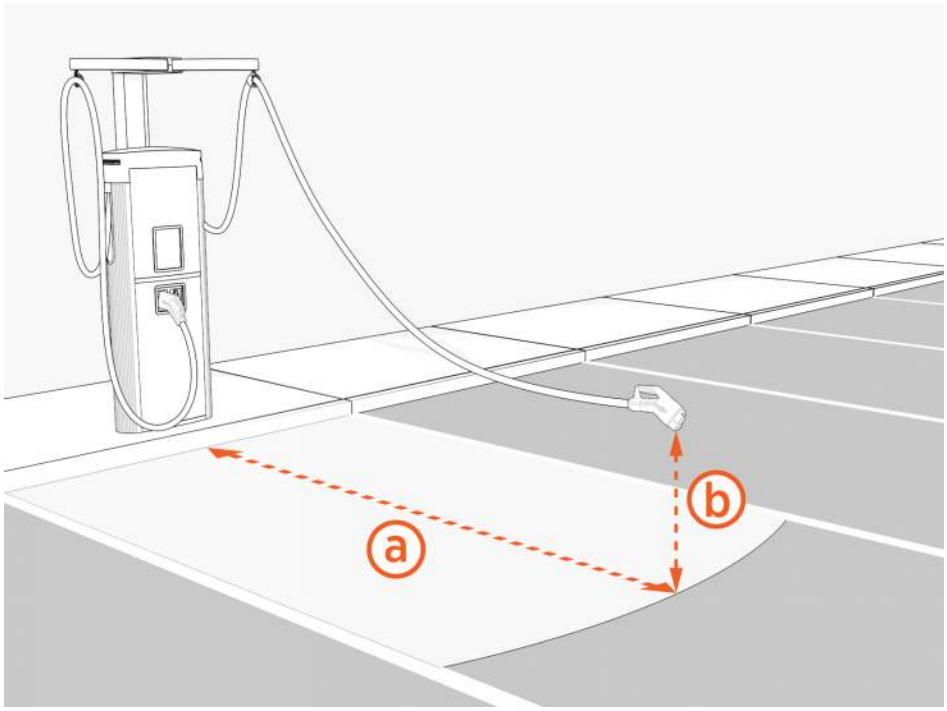
- Determine appropriate ground anchoring locations where concrete exists or can be installed (no asphalt surfaces).
- Consider locations where it will be easy to add future stations.
- If using conduits to pull wires, determine the best conduit layout to minimize linear conduit costs to multiple parking spaces. If possible, avoid or minimize trenching requirements, especially more costly trenching to run conduit under asphalt surfaces.
- Determine if the existing utility service and electrical panel capacity is sufficient. Identify costs for any necessary upgrades and/or a new dedicated electrical panel. ChargePoint recommends using a certified electrician to evaluate available capacity and identify any upgrades that may be required.
- If a dedicated EV electrical panel is required, choose a panel located close to the existing electrical supply.
- Measure cellular signal levels to ensure adequate cellular coverage at the station locations. To ensure adequate signal strength in underground or enclosed parking structures, cellular repeaters may be required. For more information, see Connectivity.
- ChargePoint recommends avoiding locations under trees where sap, pollen, or leaves would fall on the charging station and increase the station owner's site maintenance workload.

Guidelines for Different Parking Arrangements

- Choose adjacent parking spaces in an area with adequate lighting.
- Consider how easily drivers can find the stations they need to access.
- Check local requirements for accessibility and pathway width, sometimes called “path of travel”, to ensure that station placement does not restrict sidewalk use.
- A pad built into the head of a parking space (instead of on the sidewalk) is allowed if local code allows it compared to the minimum parking space length, and the pad meets all pad requirements listed in this document.

Cable Reach

The maximum reach from the station to charge port on a typical vehicle is approximately 3.76 m (12 ft 4 in) **(a)** at a height of 0.6 m (2 ft) **(b)** above the ground.



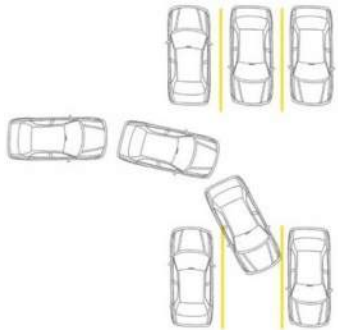
IMPORTANT:

- Diagonal stall parking is not recommended.
- Place each Power Link 1000 to maximize cable reach for the varied charge port locations on different EVs.

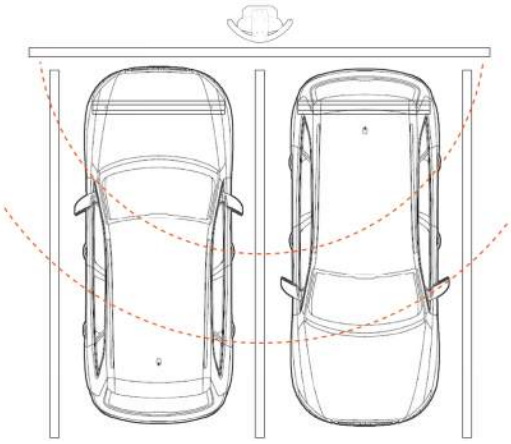
Commercial Parking Arrangement

- **Stall parking:** For stall parking, ChargePoint recommends using perpendicular parking stalls that allow a vehicle to enter either front-first or rear-first, to better accommodate the varied locations of EV charge ports.

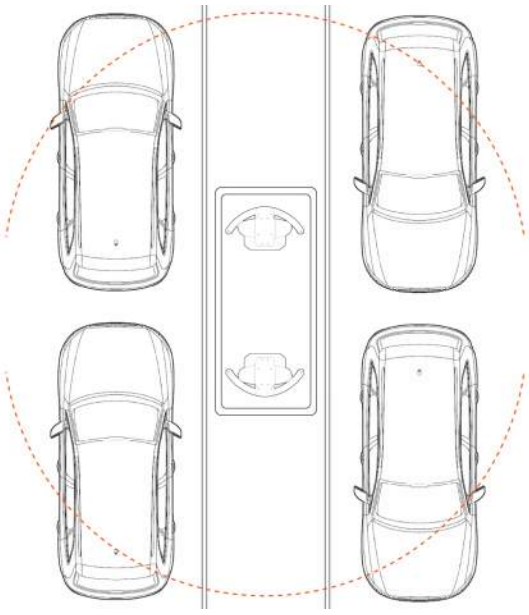
  Note: While ChargePoint tests charging stations with a majority of upcoming vehicles, ChargePoint cannot guarantee the port locations of future vehicles and cannot warrant the configurations proposed will work for all vehicles.



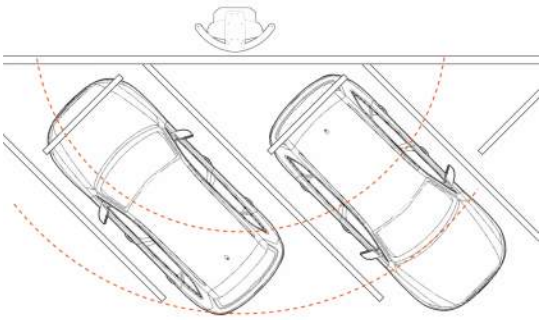
- Place single cable stations centered between two parking spaces so that the cable runs down the side of the stalls.



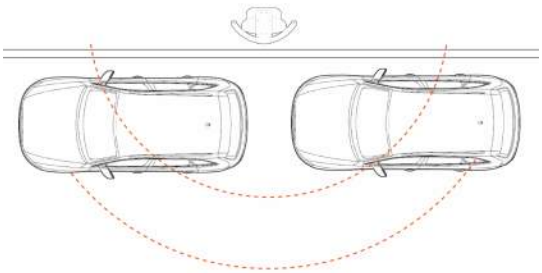
- **Island parking:** For pull-through parking (gas station model), ChargePoint recommends placing at least one charging station on each side of the island. This avoids situations where the charging station is on the opposite side of the vehicle from the charge port.



- **Diagonal parking:** Center the station on one parking space to maximize cable reach.

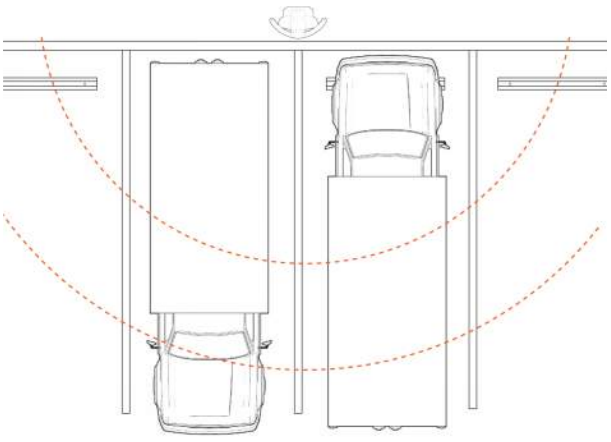


- **Curbside parking:** Center the station between parking spaces to maximize cable reach.

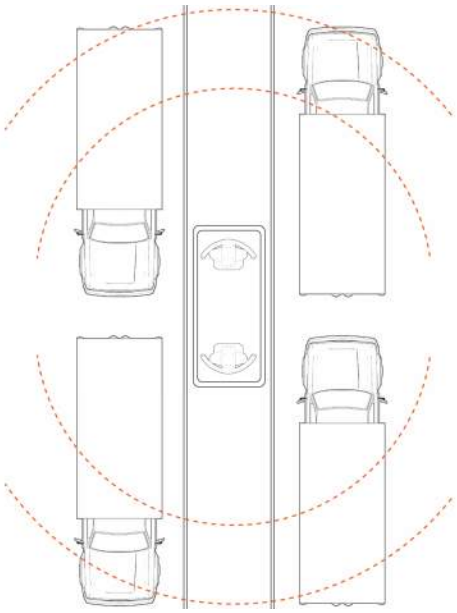


Fleet Parking Arrangement

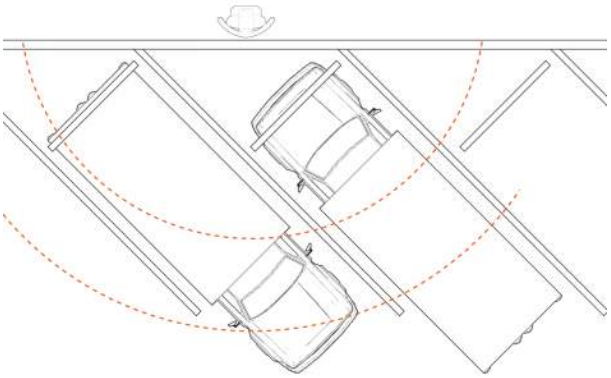
- **Stall parking:** If the station will have the same cable type, center the station between parking spots to allow each cable to be plugged in whenever it is available.



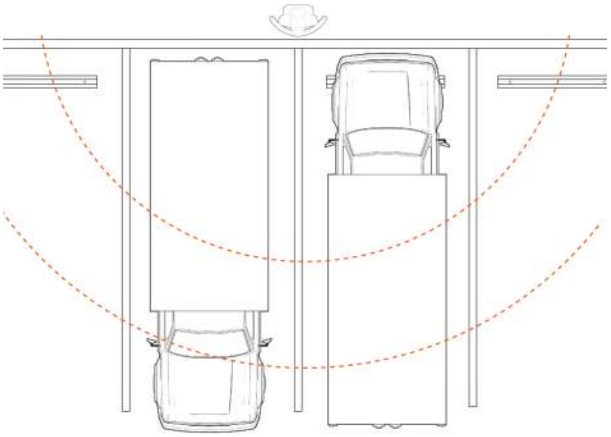
- **Island parking:** ChargePoint recommends placing a station in the center of the island facing away (station front is perpendicular to vehicles) in the same orientation. This allows the station to be accessible from both sides of the island.



- **Diagonal parking:** Center the station between parking spots.



Note: Place single cable stations centered between two parking spaces so that the cable runs down the side of the stall. This allows the station to be used by vehicle in either parking spot.



chargepoint®

Civil and Mechanical Design 3

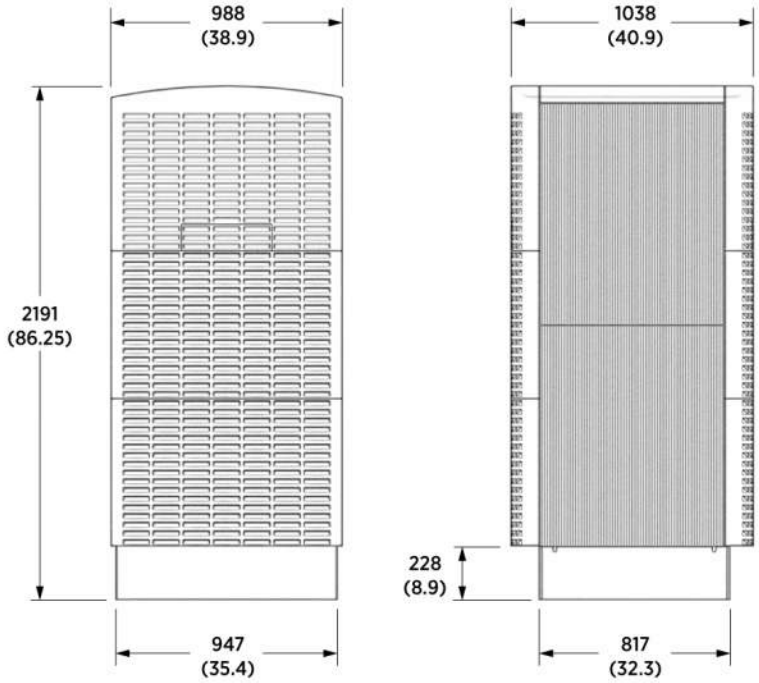
Weights

Component	Weight
Power Module	45 kg (98.5 lbs)
Power Block - fully loaded with five Power Modules	680 kg (1500 lbs)
Power Link 1000 - pedestal mounted (excludes charging cables and CMK)	200 kg (441 lbs)
Power Link 1000 - wall or overhead mounted (excludes charging cables and CMK)	120 kg (265 lbs)
Charging cable	16 - 37 kg (35 - 82 lbs)
Standard CMK - dual	20 kg (44 lbs)
Packaging excluded from weights listed above	45 - 90 kg (100-200 lbs)

Dimensions

Note: Images are not to scale. Measurements appear in metric units (mm), followed by imperial equivalents (inches).

Power Block

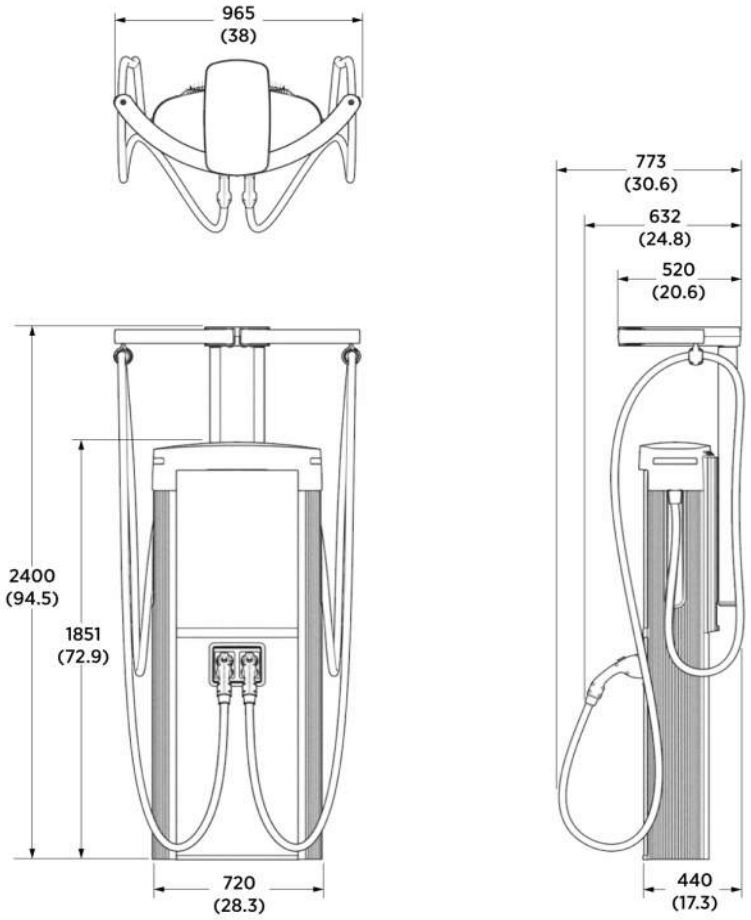


Power Link 1000

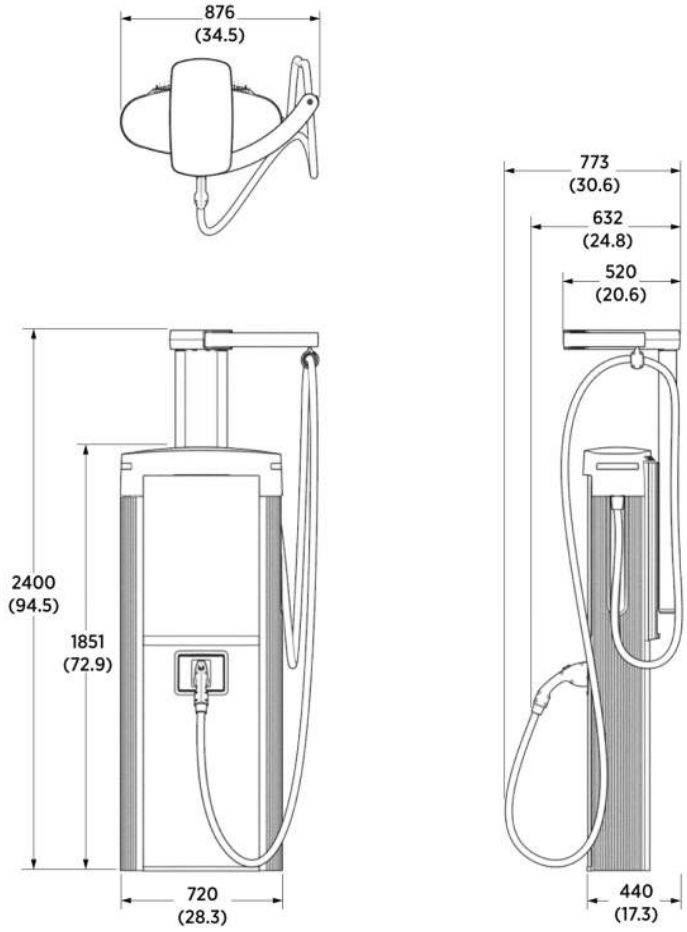
The Power Link 1000 is a vertical enclosure that can be mounted on a pedestal, wall, or overhead. Stations can be configured with one or two charge cables, available in multiple lengths. The Power Link 1000 can have different charging cable types (such as one CCS and one CHAdeMO) to offer flexibility, or it can have the same cable type (in cases such as commercial fleets). The cables cannot both charge at the same time.

The Power Link 1000 can be configured with a Cable Management Kit (CMK), a rear mast with arms that swing forward to extend cable reach.

Power Link 1000 With Dual Cable



Power Link 1000 With Single Cable



Pedestal-Mount Specifications

The Power Block and pedestal-mount Power Link 1000 must be installed on either a newly poured concrete pad embedded with the Concrete Mounting Template (CMT) or on an existing concrete surface using the Surface Conduit Entry (SCE) kit.

IMPORTANT:

- The concrete surface must be smooth and cannot exceed a slope of 20 mm per meter (1/4 inch per foot). If an existing concrete surface does not meet the slope requirement, a localized concrete pad must be poured and leveled to meet the slope requirement.
- Stub-up entry of wires laid underground is the most common installation method. Surface entry of wires laid above ground is allowed only at sites where the wires cannot be laid underground such as in a parking garage. Contact ChargePoint for the Surface Conduit Entry (SCE) Kit, which includes the hardware needed to install on an existing concrete surface.

WARNING: If not installed correctly, the ChargePoint charging station may pose a crushing hazard, leading to death, personal injury, or property damage. Always use the provided Concrete Mounting Template shown preinstalled here, or a ChargePoint-approved surface mounting solution, to install the ChargePoint charging station. Always install in accordance with applicable codes and standards using licensed professionals. Non approved installation methods are performed at the risk of the contractor and void the Limited One-Year Parts Exchange Warranty.

Concrete Pad Specifications

The concrete pad for the Power Block and Power Link 1000 must either be designed to be site-specific or must meet the specifications provided below. In some extreme conditions, a larger pad may be required. For sites with less stringent seismic, soil, or wind conditions, a smaller pad might be possible.

Conservative stability specifications for the Power Block and Power Link 1000 are listed below for the following design scenarios:

1. 170 mph wind, high seismic, Class 3 Soil
2. 170 mph wind, high seismic, Class 4 Soil
3. 170 mph wind, high seismic, Class 5 Soil
4. 140 mph wind, lower seismic, Class 3 Soil
5. 140 mph wind, lower seismic, Class 4 Soil
6. 140 mph wind, lower seismic, Class 5 Soil

All scenarios assume:

- Minimum concrete rating of 2500 PSI.
- All-threaded M16 anchor bolts are embedded 229 mm (9 in) into the concrete pad, and are made of ASTM F1554 Grade 55 carbon steel and hot dip galvanized (HDG).
- The anchor bolts placement is centered within the designed stability area.

Power Block

Design Scenarios	Pad Width		Pad Thickness	#N1 @ S1" O.C. Top Rebar	#N2 @ S2" O.C. Bottom Rebar
1	1753 mm (69 in)	1753 mm (69 in)	457 mm (18 in)	#4 @ 305 mm (12 in) O.C.	#4 @ 305 mm (12 in) O.C.
2	1753 mm (69 in)	1753 mm (69 in)	686 mm (27 in)	#4 @ 152 mm (6 in) O.C.	#4 @ 152 mm (6 in) O.C.
3	1524 mm (60 in)	1524 mm (60 in)	457 mm (18 in)	#4 @ 305 mm (12 in) O.C.	#4 @ 305 mm (12 in) O.C
4	1524 mm (60 in)	1524 mm (60 in)	457 mm (18 in)	#4 @ 305 mm (12 in) O.C.	#4 @ 305 mm (12 in) O.C.
5	1524 mm (60 in)	1524 mm (60 in)	457 mm (18 in)	#4 @ 305 mm (12 in) O.C	#4 @ 305 mm (12 in) O.C
6	1524 mm (60 in)	1524 mm (60 in)	457 mm (18 in)	#4 @ 305 mm (12 in) O.C	#4 @ 305 mm (12 in) O.C

Power Link 1000

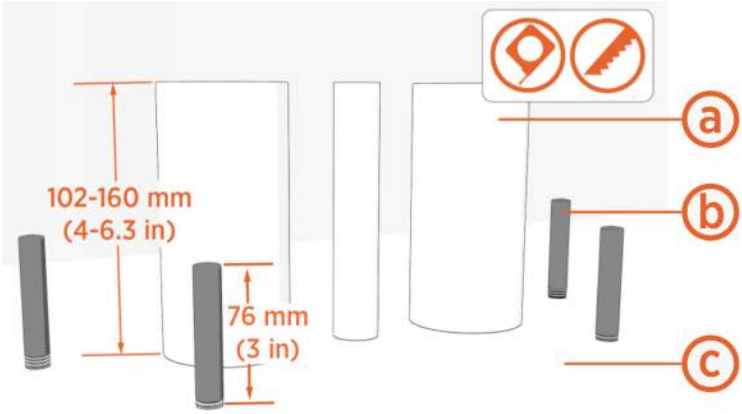
Design Scenarios	Pad Width		Pad Thickness	#N1 @ S1" O.C. Top Rebar	#N2 @ S2" O.C. Bottom Rebar
1	1499 mm (59 in)	1499 mm (59 in)	432 mm (17 in)	#4 @ 305 mm (12 in) O.C.	#4 @ 305 mm (12 in) O.C.
2	1499 mm (59 in)	1499 mm (59 in)	610 mm (24 in)	#5 @ 305 mm (12 in) O.C.	#5 @305 mm (12 in) O.C.
3	1499 mm (59 in)	1499 mm (59 in)	610 mm (24 in)	#5 @ 305 mm (12 in) O.C.	#5 @ 305 mm (12 in) O.C.
4	1219 mm (48 in)	1219 mm (48 in)	330 mm (13 in)	#4 @ 305 mm (12 in) O.C.	#4 @ 305 mm (12 in) O.C.
5	1219 mm (48 in)	1219 mm (48 in)	483 mm (19 in)	#5 @ 305 mm (12 in) O.C.	#5 @ 305 mm (12 in) O.C.
6	1219 mm (48 in)	1219 mm (48 in)	483 mm (19 in)	#5 @ 305 mm (12 in) O.C.	#5 @ 305 mm (12 in) O.C.

Wires Entry - Stub up

For stub-up wiring:

- The Power Block and Power Link 1000 pedestals must mount onto four M16 anchor bolts exposed 76 mm (3 in) above the concrete pad.
- The Concrete Mounting Template (CMT) of Power Block and Power Link 1000 must be embedded into a newly poured concrete pad to align anchor bolts and underground run stub up wiring conduits or armored cables.

  Note: The CMT of Power Block and Power Link 1000 are shipped separately, and they must be assembled onsite before pouring the concrete pad (refer to the *Power Block and Power Link 1000 Concrete Mounting Template Guide* for more information).
- In regions that use conduits, the conduits must not have bell ends and must be 102 – 160 mm (4 – 6-1/4 in) high from the concrete pad. Conduits with bell ends may interfere with tolerances inside the Power Block and Power Link 1000.

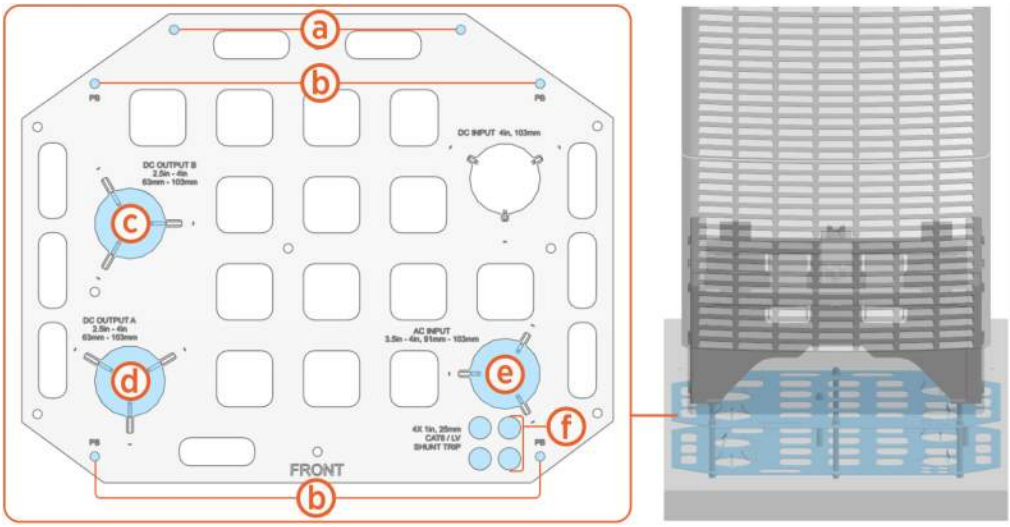


(a) Conduits
(b) Anchor bolts with protective caps
(c) Concrete pad

The following CMT sections provide wires entry or exit (through conduits or armored cables), and anchor bolt locations:

IMPORTANT: In regions that use conduits, the conduits must be laid per the conduit layout given on CMT and the outer diameter of conduits must not exceed the trade sizes listed. In regions that do not use conduits and/or use armored cables, the cables may be laid per the conduit layout given on the CMT.

Power Block CMT



(a) M16 anchor bolt (x2) locations for mounting SCE gland plate (applicable only for surface entry of wires).

(b) M16 anchor bolt (x4) locations for mounting Power Block (see Anchor Bolts Placement).

(c) HV DC output B wires exit.

(d) HV DC output A wires exit.

Note: The DC output of Power Block is the DC input for Power Link 1000.

(e) AC input wires entry.

(f) LV DC output, shunt trip wires, and Ethernet cable entry.

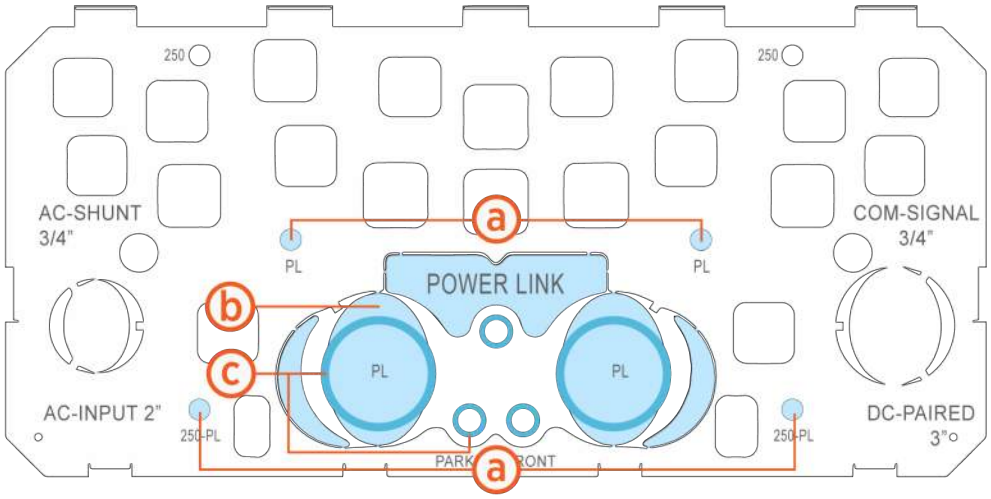
- One for shunt trip (if used).
- Three for LV wires and Ethernet cable.

The following table provides the maximum size and quantity of conduits that can be installed on Power Block:

IMPORTANT: The actual conduit size and quantity must be chosen based on site-specific wiring requirements. For wire specifications, see Conduit and Wiring Requirements.

Conduits For	Max. Conduit Trade Size		Max. Quantity
	North America	Europe	
AC input **(e)** and DC output wires **(c** & **d)**	4 in (103 mm)	110 mm	1 for AC input and 2 for DC output
LV DC input, shunt trip wires, and Ethernet cable **(f)**	1 in (25 mm)	25 mm	4

Power Link 1000 CMT



(a) M16 anchor bolt (x4) locations for mounting Power Link 1000 (see Anchor Bolts Placement).

(b) Breakaway tabs for entry of wires through conduits **(c)** or armored cables.

The following table provides the maximum size and quantity of conduits that can be installed on Power Link 1000 by removing the breakaway tabs **(b)**:

IMPORTANT:

- The actual conduit size and quantity must be chosen based on site-specific wiring requirements. The maximum conduit sizes listed are based on maximum quantity the Power Link 1000 can accommodate.
- For wire specifications, see Conduit and Wiring Requirements.

Conduits For	Max. Conduit Quantity x Trade Size
	North America
HV DC input wires	2 x 3-1/2 in (91 mm)
LV DC input wires and Ethernet cable	3 x 3/4 in (21 mm)

Wires Entry - Surface

Power Block and Power Link 1000 support wiring that is run above ground in protected wireways, for locations where no underground wiring access exists (parking garages, etc.) or where underground junction boxes are not permitted.

If wires or cables are run above ground, they must be housed in wireways that conform to local code. Use Power Block's and Power Link 1000's Surface Conduit Entry (SCE) kit for the following benefits (refer to the *Power Block and Power Link 1000 Surface Conduit Entry Kit Guide*):

- Support of the weight of conduits or armored cables and components without compromising cover panel integrity

- Ensure all terminations meet ingress requirements where they meet the component
- No obstructions to ventilation, which is required during operation

For above ground wiring:

- Ensure the plans for the concrete pad and access area allow full service access to all components. Surface wires entry might require larger clearance areas than embedded installations. A minimum of 610 mm (2 ft) clearance at rear side is recommended.
- Use flexible wires, and conduits or armored cables.
- Use conduit body type LBs to route wires into Power Link 1000 from rear left or rear right, and they must fit within the rear clearance of 610 mm or 2 ft.
- Use suitable conduit fittings to secure and seal the conduits and/or conduit bodies.
- Prepare the concrete surface where the components will be anchored so that the concrete surface is solid, smooth, and level with no old hardware or stub-ups extending above ground.

  Note: Surface wires entry can use the Concrete Mounting Template (CMT) for mounting.
- If installing on an existing concrete surface:
  - Install the anchor bolts by drilling into the concrete surface and using an epoxy having bonding strength of 11.7 MPa minimum, compressive strength of 82.7 MPa minimum, and tensile strength of 49.3 MPa minimum; such as Hilti HIT-RE 500 V3 (normal cure) or Hilti HIT-HY 200-A (fast cure).

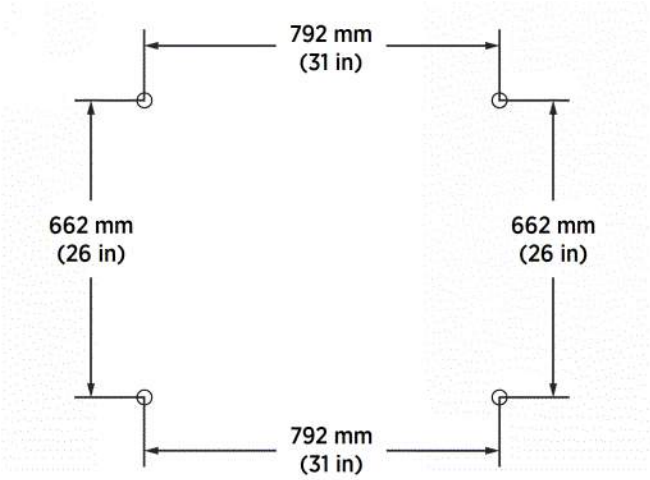
    Note: HIT-HY 200-A adhesive is required only if embedding anchor bolts into an existing concrete pad. It is not applicable for a new concrete pour with CMT.

    Note: Different epoxy types have different cure times at various temperatures. Check local temperatures for the site in advance to help choose an appropriate epoxy.
  - The concrete surface must meet the Concrete Pad Specifications; if not, it must be inspected and approved by a structural engineer for the specifications given below:

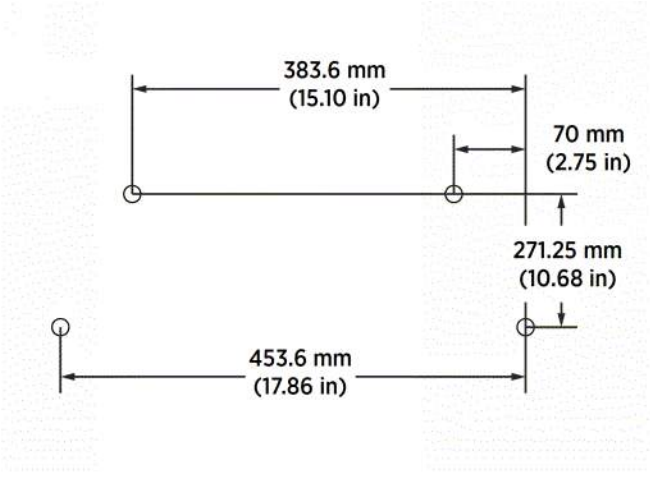
Specification	Power Block	Power Link 1000
Weight	680 kg (1500 lbs)	See Weights
Height x width	2.191 m (7ft 2 1/4 in) x 1 m (3 ft 3 3/8 in)	See Dimensions
Frontal area	Height * width	Height * width
CG height	1 m (3 ft 3 3/8 in)	1.524 m (5 ft)
Anchor bolts size and quantity	M16 (x4)	
Anchor bolts embedment	229 mm (9 in)	
Anchor bolts placement	See Anchor Bolts Placement	

Anchor Bolts Placement

Power Block



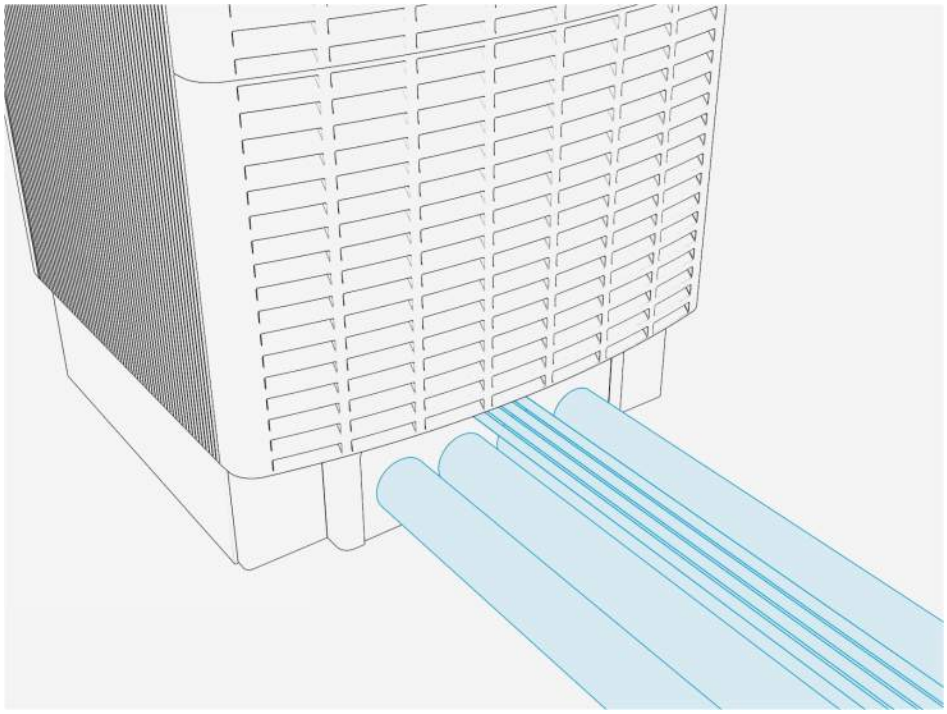
Power Link 1000



The following SCE sections provide wires entry or exit (through conduits or armored cables) locations:

Power Block SCE

The surface run wires must enter Power Block from the rear side through conduits or armored cables.



The following table provides the maximum size and quantity of conduits that can be installed on Power Block using the Power Block SCE kit:

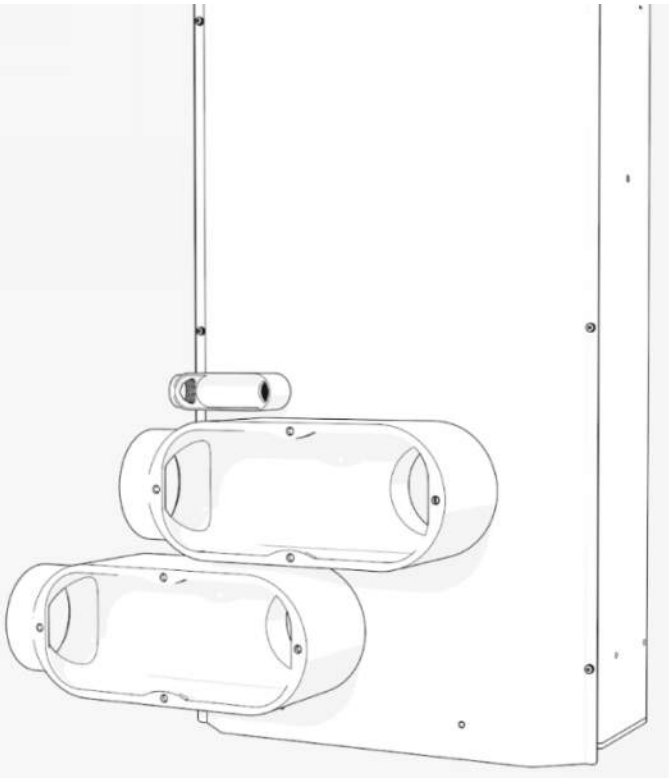
IMPORTANT:

- The actual conduit size and quantity must be chosen based on site-specific wiring requirements.
- For wire specifications, see Conduit and Wiring Requirements.

Conduits For	Max. Conduit Trade Size		Max. Quantity
	North America	Europe	
AC input and DC output wires	4 in (103 mm)	110 mm	1 for AC input and 2 for DC output
LV DC input, shunt trip wires, and Ethernet cable	1 in (25 mm)	25 mm	4

Power Link 1000 SCE

The surface run wires must enter Power Link 1000 from the rear side through conduits or armored cables.



The following table provides the maximum size and quantity of conduits that can be installed on Power Link 1000 using the Power Link 1000 SCE kit:

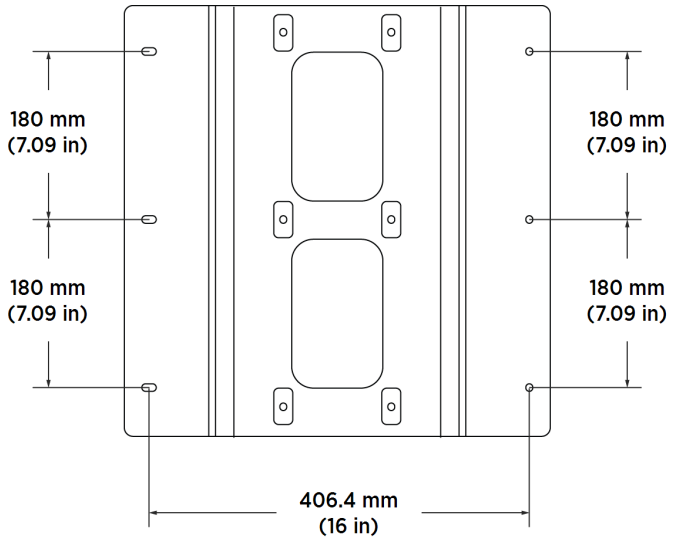
IMPORTANT:

- The actual conduit size and quantity must be chosen based on site-specific wiring requirements.
- For wire specifications, see Conduit and Wiring Requirements.

Conduits For	Max. Conduit Trade Size	Max. Quantity
HV DC input wires	103 mm (4 in)	2
LV DC input wires and Ethernet cable	21 mm (3/4 in)	2

Wall or Overhead-Mount Specifications

The Power Link 1000 mounts onto a wall or an overhead structure (such as a gantry) using a bracket that attaches to its back. The bracket has six mounting holes sized for M8 bolts.



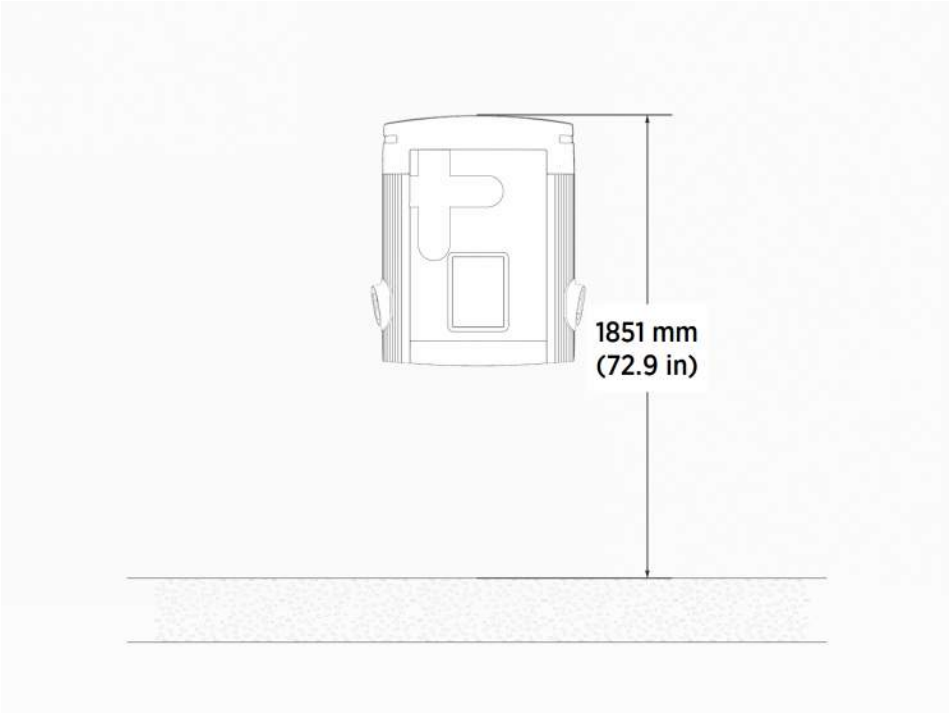
For wall or overhead mounted stations:

- The Power Link 1000 must be mounted upright. Do not mount it in any other orientation.
- The wall must be smooth and plumb.
- The wall or overhead structure must have a structural capacity of 1780 N (400 lbf), and it must be designed or verified by a structural engineer per local codes. In the event of a vehicle driveaway incident, this structural strength is required to withstand the pull-out force.
- The wires must enter Power Link 1000 from the bottom side through conduits or armored cables.

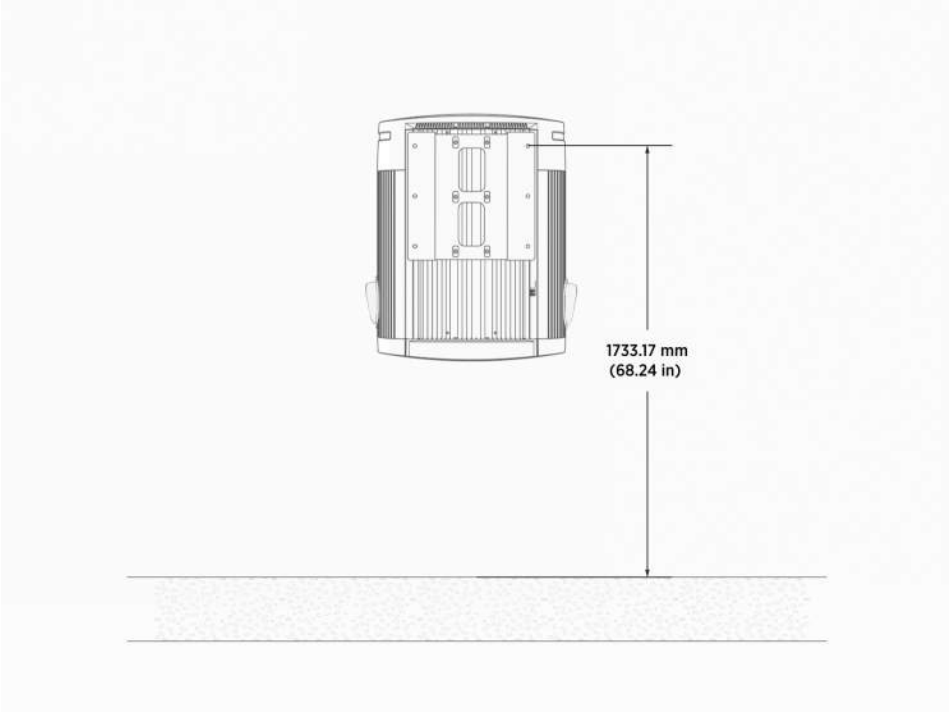
IMPORTANT:

- Although the heights are given below, the height for fleet applications can vary with gantry mount.

- The maximum height of the Power Link 1000 must be 1851 mm (72.9 in) above a finished floor.



- The maximum height of the mounting bracket is 1733.17 mm (68.24 in) above a finished floor.



Drainage

Ensure any site slopes, walls, or fencing do not trap water around the installation site.

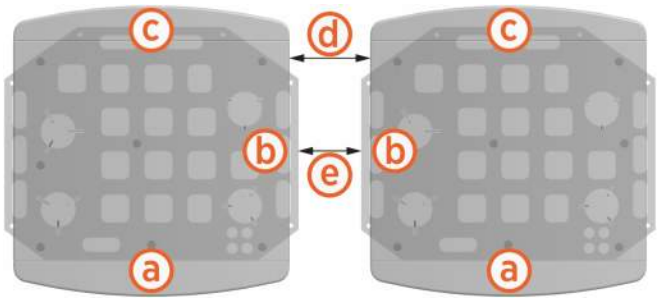
WARNING: Exposing the ChargePoint® charging components to over 457 mm (18 in) of standing water could create an electrocution, shock, or fire hazard.

If the component has been exposed to standing water, cut power to the component and contact ChargePoint before the component is powered on.

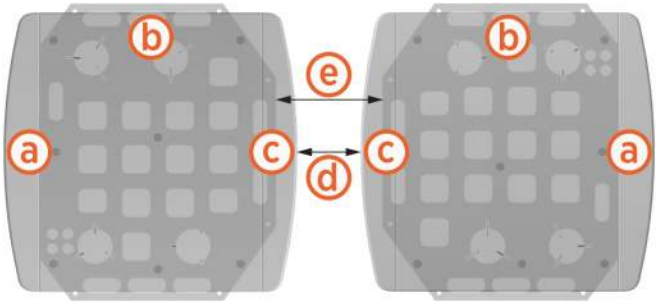
Clearances

Power Block

Two Power Blocks laid side-to-side



Two Power Blocks laid back-to-back



The following table provides the clearances required for service and ventilation around the Power Block (PB):

Side	PBs Layout	Clearance		
(a) Front	-	-		Min. 1 m (3 ft 3-3⁄8 in)
(b) Sides	PBs laid side-to-side	Minimum	**(d)** PB to PB	51 mm (2 in)
			(e) CMT to CMT	CMTs overlap by 15 mm
		Otherwise	**(d)** PB to PB	152 - 203 mm (6 - 8 in)
			(e) CMT to CMT	116 - 167 mm (4-9/16 - 6-9/16 in)
(c) Rear	PBs laid back-to-back		**(d)** PB to PB	457 - 609 mm (18 - 24 in)
			(e) CMT to CMT	609 - 761 mm (24 - 30 in)
Note: If placing two Power Blocks back-to-back and are using surface conduit entry, there must be at least 609 mm (24 in) of shared rear clearance.				

Additionally, follow the clearance guidelines below:

- Front and rear clearances must be at grade level +/- 13 mm (1/2 in).
- The interior of the Power Block is accessed from both the front and rear cover panels, which lift off. No separate door swing clearance is required.
- Fencing, bollards, or wheel stops must not encroach upon the clearances listed above, if present. These barriers are not explicitly required by ChargePoint.

- Power Blocks can be laid side-to-side with minimal spacing for service and ventilation. If laid side-to-side, wiring can enter from the rear or outside face, using either stub-up entry (recommended) or surface entry. When laid side-to-side, wiring for the row cannot pass through one Power Block into another.
- Side clearances can be shared between Power Blocks as long as:
  - At least 51 mm (2 in) of clearance is maintained between each Power Block.
  - Required service clearance is maintained at the front and rear sides.
  - At least 457 mm (18 in) of clearance is available at each end of a row of Power Blocks.

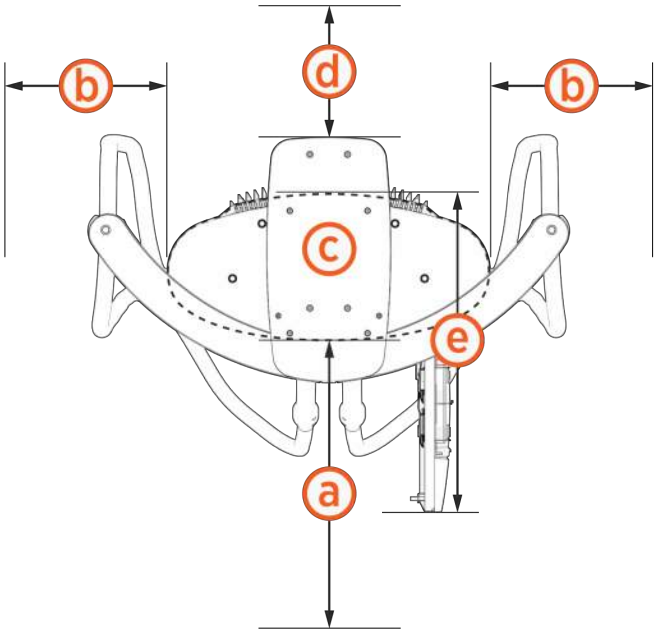
Note: For any questions about allowable layouts, contact ChargePoint.

CAUTION: Each Power Module weighs 45 kg (98.5 lbs). At least two people are required to replace a Power Module. The front clearance must be spacious enough to accommodate at least two people.

IMPORTANT: Check local and regional codes for any additional clearance requirements regarding safety, high voltage equipment, and accessibility requirements.

Power Link 1000

The Power Link 1000 requires minimum site and service clearances listed below.



Power Link 1000	Clearance
(a) Front Minimum open space	610 mm (2 ft)
(b) Side	305 mm (12 in) from top corner to top corner. Two Power Link 1000 can share side clearance provided adequate clearance is allowed for CMK arms. **Note:** CMK

Power Link 1000		Clearance
		arms cannot share side clearance.
(c) Top	Pedestal or wall mounted	26 mm (1 in) from top of CMK
	Overhead mounted	305 mm (12 in) from top of Power Link 1000
(d) Rear	Pedestal mounted	203 mm (8 in) **Note:** If two Power Link 1000 are positioned back-to-back or using surface conduit entry, there must be at least 610 mm (2 ft) of clearance. In the case of back-to-back, the clearance can be shared.
(e) Door swing plus station width		730 mm (2 ft 4-3/4 in)

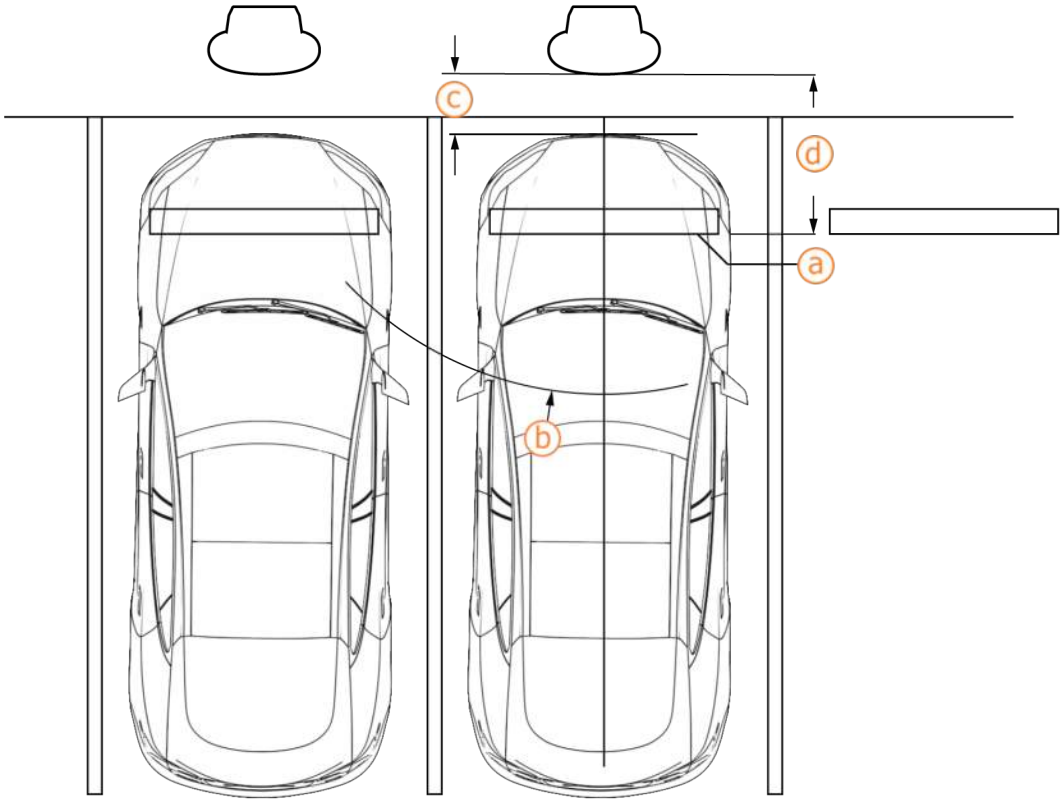
Wheel Stops and Bollards

Bollards and wheel stops are not explicitly required by ChargePoint. However, ChargePoint recommends these best practices and considerations when designing the site:

- Permanent bollards or wheel stops must not encroach upon the clearances listed in the clearance diagrams in this section. Removable bollards are allowed if service personnel have the ability to move them as needed.
- Where permitted by code, wheel stops are preferred over bollards for head-in or back-in spaces.

Wheel Stops

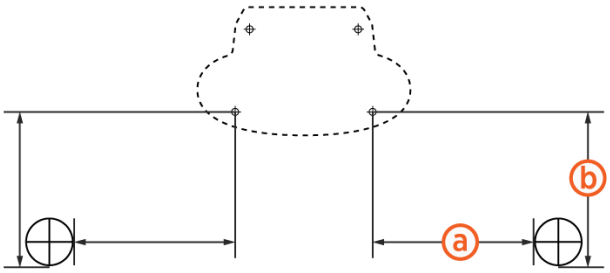
- When using wheel stops, consider the average vehicle overhang distance for the largest type of vehicle (passenger, bus, etc.), as well as leaving space for the driver to walk up and access the station.
- Position wheel stops to actively block at least one wheel, without presenting a trip hazard to pedestrians walking between vehicles.

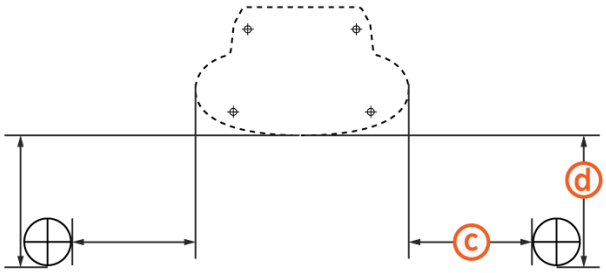


a. Wheel stop, positioned to actively block at least one wheel
b. Cable reach radius: 3.76 m (148 in)
c. Recommended distance for walk-up access: 609 mm (24 in)
d. Recommended distance between wheel stop and station: 1371 mm (54 in) for passenger vehicles

Bollards

- When bollards are required by code, needed for snowy areas, or needed for curbside spaces, ensure bollard placement does not interfere with removing and replacing charge cables in the station's holsters.
- Try to minimize bollard interference with the movement of charge cables between the station and the vehicle. Bollard height is recommended to be no higher than 914 mm (36 in) where needed.
- Follow the measurements listed for bollards placement:
    a. Anchor bolt to bollard inside edge: 254 mm (10 in)
    b. Anchor bolt to bollard front edge: 424 mm (16.7 in)
    c. Power Link 1000 side to bollard inside edge: 122 mm (4.8 in)
    d. Power Link 1000 front to bollard front edge: 305 mm (12 in)



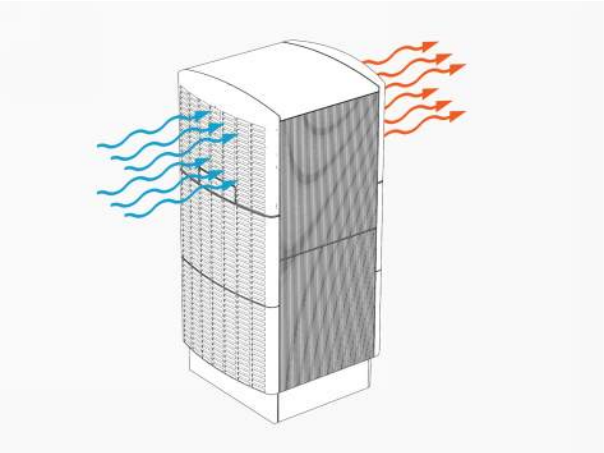


Ventilation

Power Block

Intake vents are positioned at the front of the Power Block (blue arrows), and exhaust vents are at the rear (orange arrows). When positioning multiple Power Blocks, orient intake and exhaust to avoid recirculation.

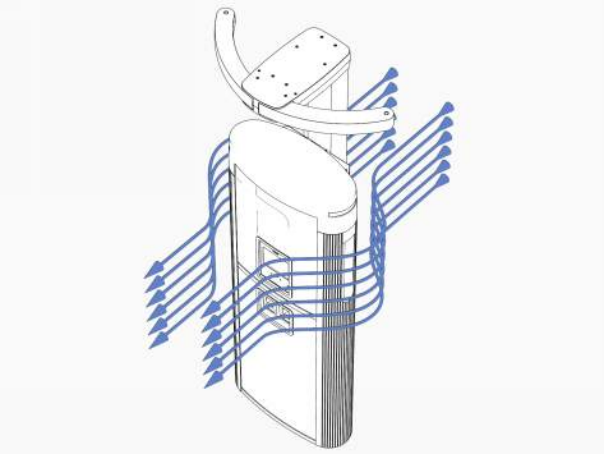
Note: Power Block requires 10 kW (34,000 BTU/hr) of heat rejection.



Power Link

Ensure that any installation, especially an indoor installation, has adequate airflow to dissipate heat at maximum operation. The charging location must allow fresh ambient airflow. Do not install a charging component where it is exposed to air that is heated above ambient temperatures. Restriction of airflow, or temperatures outside the operating range, might result in reduced maximum performance.

Note: Power Link 1000s without liquid cooled cables require 500 W (1,700 BTU/hr) of heat rejection. Power Link 1000s with liquid cooled cables require 5.3 kW (18,000 X BTU/hr).



Accessibility

Comply with regional accessibility laws, regulations, and ordinances. The Power Link 1000 charging station must not block ramps or pathways and the height of the interactive display cannot exceed the maximum height as dictated by local laws.

Signage

Refer to local and regional code to design the following elements for the site:

- Any required re-striping of parking spaces
- EV or Accessible EV signs
- EV or Accessible EV paint markings on and around the parking spaces

WARNING: Exposing the ChargePoint® charging components to over 457 mm (18 in) of standing water could create an electrocution, shock, or fire hazard.

If the component has been exposed to standing water, cut power to the component and contact ChargePoint before the component is powered on.

Electrical Design 4

The default Express Plus installation requires service wiring installed underground. (If a site requires surface mounting, contact ChargePoint before beginning work, to obtain an approved installation method.) Conduit and wire size are determined based on the length of runs from the electrical panel to the station location. Service wiring in conduit, or armored cable, must be run as required to comply with local electrical codes. Consult national and local codes or a project engineer to determine the grade, quality, and size of the conduit or cable.

The Power Block is available in 250, 300, 350, and 500 A versions, each with its own fuses and rating labels.

Note: All wiring and conduit is supplied by the contractor unless otherwise indicated.

Upstream Components

Charging stations are considered continuous load devices (EVs draw maximum load for long durations). Therefore, electrical branch circuits to EV chargers must be sized at 125% of the load on each leg of a 3-phase panel for North American installations, in accordance with National Electric Code requirements. For other regions, refer to local code.

When planning multiple EV charging stations, it is best practice to segment non-continuous and continuous loads, with all branch circuits for EV charging on a dedicated electrical panel assembly with adequate circuit breakers. When sizing new electrical panels dedicated for EV charging, all branch circuits must support continuous load.

Each Power Block requires its own service panel breaker as follows:

Nominal Voltage	Input Current Rating	Branch Circuit Capacity and Breaker	Breaker Size
Europe: 400 V	315 A	350 A or 400 A	400 A
North America: 480 V	260 A		350 A or 400 A

WARNING: Only use new circuit breakers. Used breakers can damage equipment and introduce the potential for an electrical fire.

In areas with frequent thunderstorms, add surge protection at the service panel for all circuits.

Ensure all power and ground connections, especially those at the breaker and bus bar, are clean and tight. Remove all oxide from all conductors and terminals before connecting wiring.

The Power Link charging station is tested to IEC 61000-4-5, Level 5 (6 kV @ 3000 A) standards.

AC Disconnect Switch

A local AC disconnect switch, separate from the shunt trip wiring, is recommended to be installed between each Power Block and the electrical panel. This is especially important if the main electrical panel or utility room is distant, out of line of sight, or has restricted access. For North America installations, refer to disconnect switch requirements per NEC Article 625, “Electric Vehicle Charging and Supply Equipment Systems”.

Transformer Configuration

Refer to the following table to configure electrical service.

	North America	Europe
Input Rating	480 VAC, 3-phase, 260 A, 60 Hz	400 VAC, 3-phase, 310 A, 50 Hz
Electrical Service Configuration	277/480 3-phase plus ground, grounded WYE (Y) configuration*	230/400, 3-phase plus ground, grounded WYE (Y) configuration*
Product Connection	3-phase 480 plus ground (neutral not used)	3-phase 400 plus protective earth (neutral not used)
Harmonic Current Rating	K factor 4	K factor 4

*Delta (floating or grounded) is not supported

Grounding/Earthing Requirements

- The Power Block must be connected to a grounded, metal, permanent wiring system.
    - North America: A service ground conductor must be run with circuit conductors and connected to an equipment-grounding terminal on the Power Block.
    - Europe: Use TN-S or TN-C-S configurations. (TT is not recommended because it requires RCDs.)
- Ensure a grounding conductor that complies with local codes is properly grounded to earth at the service equipment or, when supplied by a separate system, at the supply transformer.
- The Power Block must be connected to a grounded, metal, permanent wiring system. An equipment-grounding conductor must be run with circuit conductors and connected to an equipment-grounding terminal or lead on the Power Link.
- All charging components must be bonded to one another in sequence: either Power Block to Power Link, or Power Block to distribution cabinet (if used) to Power Link.
- Some regions also require a grounding rod to be installed adjacent to each component. Check local code to ensure compliance.

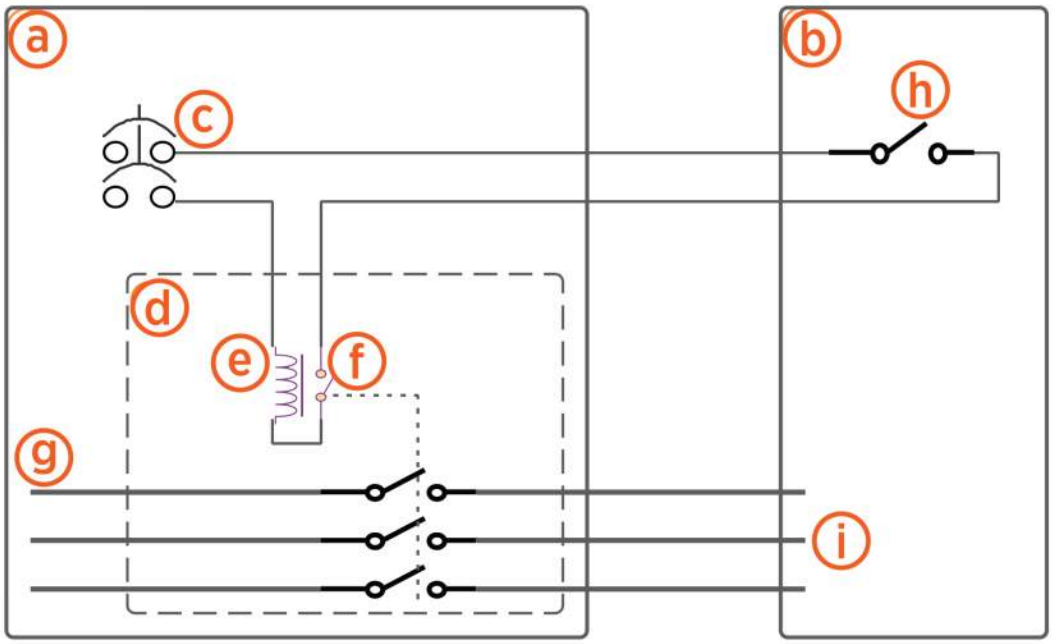
Shunt Trip Wiring

The Power Block provides a set of unpowered (dry) contacts to connect to an optional shunt trip device. These contacts are rated to 240 VAC and 6 amps.

Wiring sections to and from the Power Block are deactivated when unsafe conditions are detected, such as unintended cover panel removal. A breaker reset is required any time the shunt trip is activated.

If installed, each Power Block must be wired to the shunt trip unit of its own upstream circuit breaker. Upstream AC power must be shut off at the panel to remove shock risk inside the Power Block. All shunt trip behavior is already hard-coded into the charging station and has no programmable variables.

Emergency stop devices are governed by local and regional codes and may be required in some sites. If one is required by code or by the site, confirm specifications with your ChargePoint representative.



a. Electrical panel
b. Power Block
c. Control voltage supply, maximum 240 VAC
d. Shunt trip circuit breaker
e. Shunt trip coil
f. Auxiliary contacts (closed when main contacts are closed)
g. Three-phase AC main
h. Power Block shunt trip contacts, Normally Open (inside the auxiliary power supply, accessible on field wiring terminal block)
i. Three-phase Power Block AC input

Maintenance Switch

ChargePoint strongly recommends selecting the maintenance switch option on each Power Link for fleet implementations, to improve system uptime during maintenance. For Power Links that do not have an internal or external DC disconnect switch, servicing the station requires the Power Block upstream to be powered off. This can affect system uptime and fleet scheduling.

Power Links have two options for disconnecting DC power. The station can be purchased with an optional maintenance switch already installed in the station body, or an external switch can be added between each Power Link and its Power Block if preferred. External DC disconnect switches are required to have Normally Closed (NC) contact feedback wired into the Power Link.

For stations with the internal maintenance switch, the disconnect feedback positively conveys to the Power Link that the DC connection is open upstream, and the unit can be serviced safely.

If the Power Link detects its door is opening but the disconnect status is absent, or the disconnect is closed, the station signals the upstream Power Block to disable its output to prevent a shock hazard. The system software keeps the Power Block outputs disabled until the site owner clears all needed safety checks.

Conduit and Wiring Requirements

For full product specifications, refer to the Express Plus Datasheet. Using that data, ensure the installation location is equipped with service wiring that supports the Express Plus site's power requirements:

IMPORTANT:

- For AC and DC high voltage (HV), high conductance wiring, use copper or aluminum wires rated for 1000 V and 90 °C (194 °F).
- For low voltage (LV) DC wiring, use only copper wires rated for 1000 V and 75 °C (167 °F).
- Use copper lugs for copper wires and aluminum lugs for aluminum wires. The lugs must be nickel, tin, or silver plated compression (not mechanical) lugs. Nickel plated and used with dielectric grease is recommended.

In regions that use conduit, the outer diameter of conduit must not exceed the sizes called out in the conduit layout drawing below.

In regions that do not use conduit, armored cable may be laid in the same configuration to conform to the wire placement on mounting templates.

Note: For North American installations, per UL 2202, overhead configurations must use no more than three conductors per pole, and those three conductors cannot be larger than 85 mm^2 (3/0 AWG). Reference UL code for wire bend limitations for 203 mm (8 in) of available space.

Notes for all wiring regions:

- Use one input feed per Power Block.
- The maximum wiring run length is 100 m (328 ft) between a Power Block and each of its Power Links for DC conductors, 48 V DC wiring, and Ethernet.
- 48 V DC wiring must be rated for 1000 V.
- Power Link conduit must be sealed to maintain a Pollution Degree 2 environment.

- Power Link conduit must be metallic.
- Ethernet communication between Power Blocks and Power Links must be outdoor rated Cat6 Shielded Twisted Pair (STP) cable, with the shield wire terminated at the Power Block end. Lesser grades of cable do not have the required noise immunity.
- All sizes are generic and provided for reference only. The installation contractor must perform site-specific wire sizing, taking into account run length, site conditions, and applicable codes.

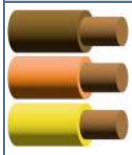
Maximum Wire Sizes

Note: The tables provide the largest possible wire sizes in each case. All sizing assumes a maximum ambient temperature of 50 °C (122 °F). Actual wire sizing and types should be designed to be site-specific.

48 V DC Power

Type	Wire Insulation Rating	Size (Max.)	Conduit Trade Size (Max.)
48 V DC	1000 V DC	16 mm^2 (6 AWG)	21 mm (3/4 in)

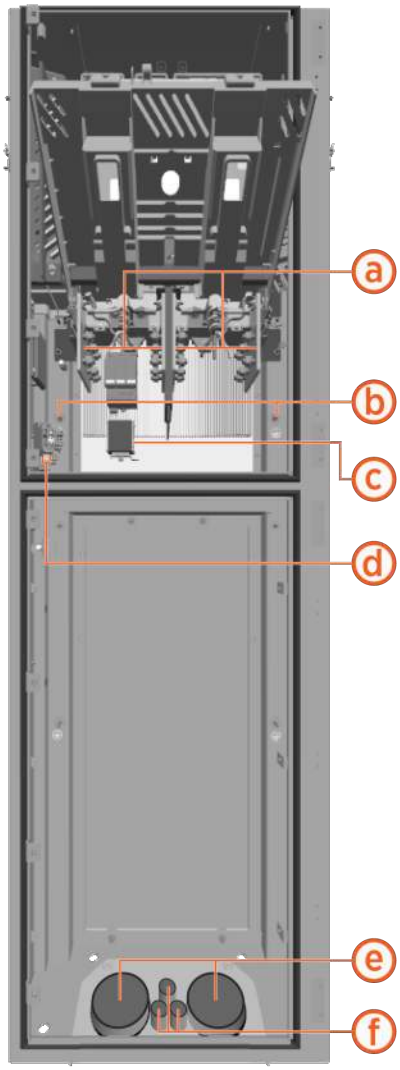
AC Input

Wire		Quantity	Size	Lug Size
	AC input	Max 12 (four per pole)	Max 400 mm^2 (750 MCM)	Long barrel and tongue with two holes 44.5 mm (1-3/4 in) apart and must fit M12 stud. Max. tongue width is 47.5 mm (1-7/8 in)
	Ground	One per Power Block	Refer to the local code for size.	Short barrel and tongue with single hole and must fit M12 stud.

DC Output

The Power Link can be installed with maximum of six HV wires per DC input (maximum three per pole).

Note: The DC output of Power Block is the DC input for Power Link.



	Wire Landing	Max. Wire Quantity x Size	Max. Conduit Quantity x Size	Lug Size
a	350 A, 1000 V DC input	12 x 95 mm^2 (3/0 AWG) (six per input, three per pole)	e 2 x 91 mm (3.5 in) (six HV and one ground wire per conduit)	Long barrel and tongue with two holes 44.5 (1.75 in) apart, must fit M12 (1/2 in) stud, max. tongue width 31 mm (1.22 in) for a and 23.4 mm (0.92 in) for b.
b	Ground connection	2 x 50 mm^2 (1/0 AWG)		Short barrel and tongue with single hole, must fit M6 stud.
c	Ethernet connection	1 x outdoor rated Cat6 STP, straight-through T568-B pattern	f 3 x 21 mm (3/4 in) (two LV and one Ethernet wire per conduit)	N/A
d	48 V DC input	Min. 2 x 16 mm^2 (6 AWG) Max. 2 x 25 mm^2 (4 AWG) (two per input, one per pole)		

North American Requirements

	Inputs to Power Block		Power Block to Each Power Link 1000		
	AC and Gnd	Shunt Trip / EPO	HV DC Output	48 V DC Output	Ethernet
Circuit Voltage	480 V AC	< 240 V	100 - 1000 V	48 V	--
Max Current	260 A	6 A	200, 250, or 350 A	32 A	--
Notes	L1, L2, L3, Gnd			Rated for 1000 V	Outdoor rated Cat6 STP

UK and European Requirements

	Inputs to Power Block		Power Block to Each Power Link 1000		
	AC and Gnd	Shunt Trip / EPO	HVDC Output	48 VDC Output	Ethernet
Circuit Voltage	400 V AC	< 240 V	200-1000 V	48 V	--
Max Current	315 A	6 A	200, 250, or 350 A	32 A	--
Notes	3p+E			Rated for 1000 V	Outdoor rated Cat6 STP

Connectivity 5

A consistently strong cellular signal is needed before installers can activate the vehicle charging station. Weak or sporadic signal can affect crucial aspects of the charging station, including:

- Accuracy in reporting
- Ability for drivers to use the mobile app
- Ability for customer support to troubleshoot problems
- Support for advanced features such as Power Management or Waitlist

A strong signal is also required for the ChargePoint Assure maintenance and management programs.

ChargePoint stations use cellular data connections to reach ChargePoint Cloud Services. This allows secure, PCI-compliant data connections without requiring any other form of internet connectivity at an install site or imposing additional network management responsibilities on a site host.

Each station has its own cellular connection.

Signal Strength and Quality

You must use a cellular signal detection device (such as a Siretta Snyper LTE or equivalent) to take signal strength readings at the exact proposed mounting location of the charging station. If the charging station does not have its own cellular connection, take the signal strength reading at the proposed mounting location of the gateway station.

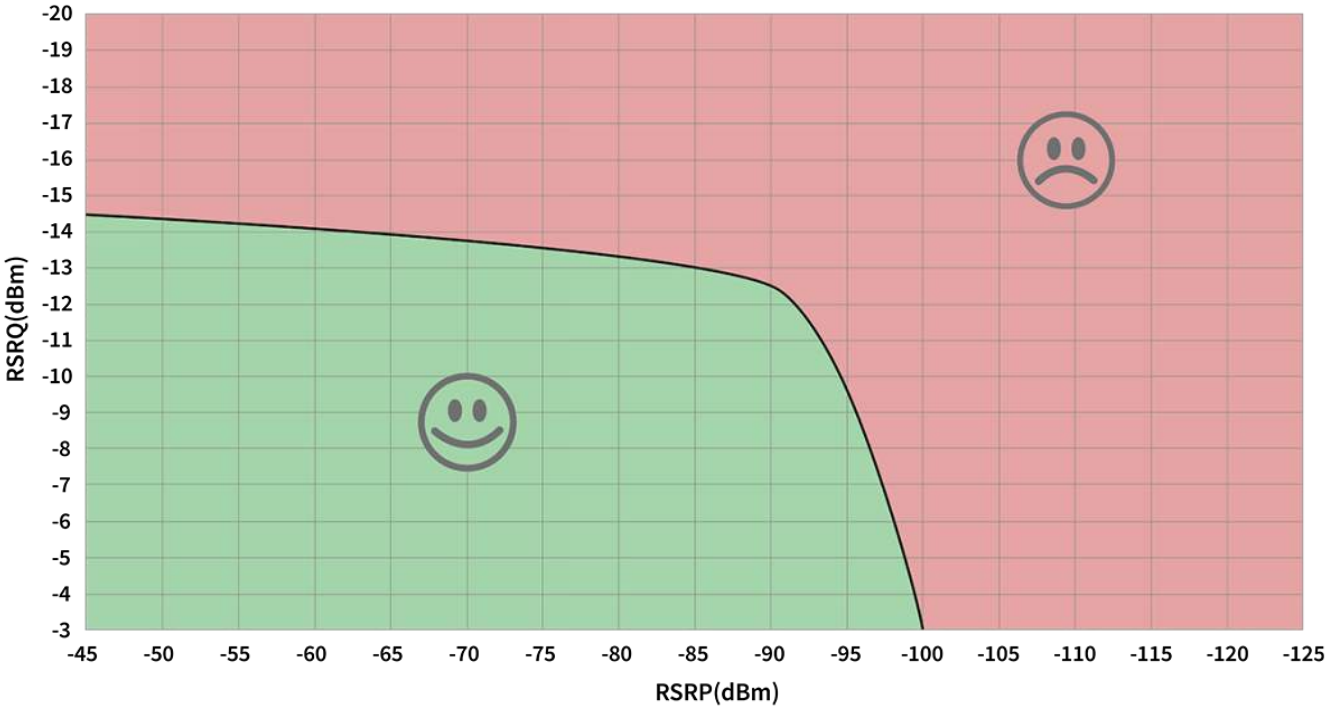
In North America, ChargePoint products all support LTE bands 2, 4, and 5. The most commonly supported carriers to check during site evaluation are:

- US: AT&T, T-Mobile, and Verizon
- Canada: Rogers, Telus, and Bell

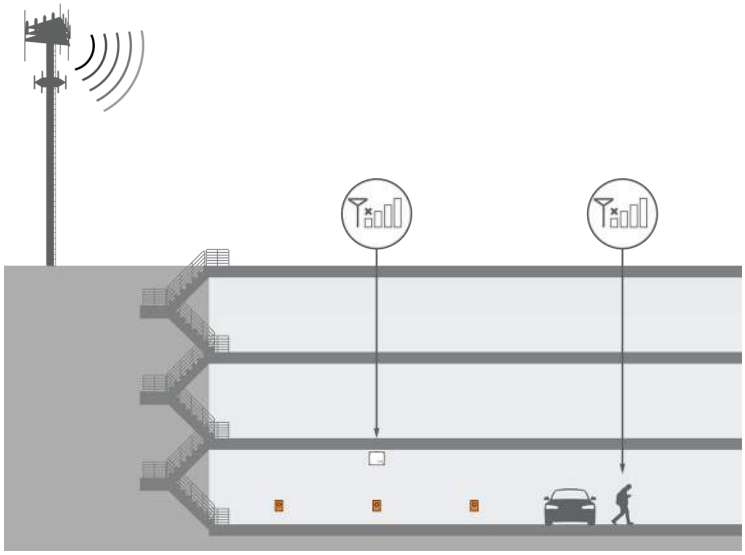
In Europe, ChargePoint products all support LTE bands 1, 3, 7, 8, and 20. 900 and 1800 MHz are also supported for 2G fallback. Partners vary by country.

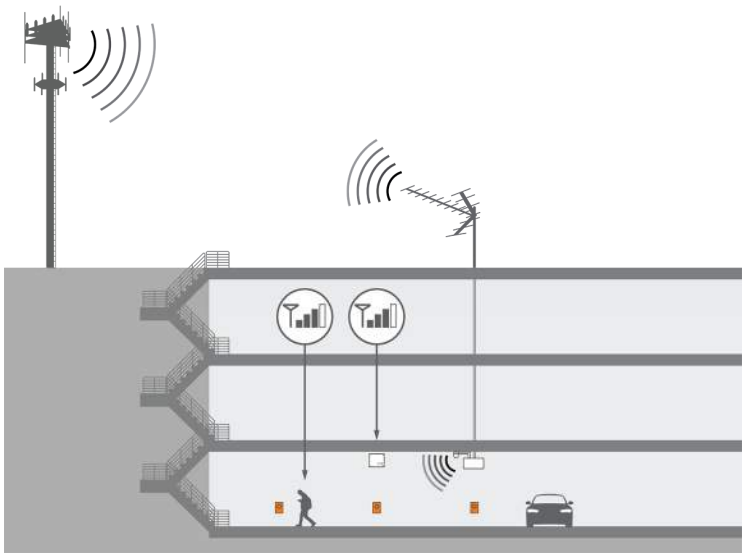
You must test the LTE signal strength at the proposed mounting location of every gateway station and ensure the location meets the minimum RSRQ at -12.5 dB or better, for RSRP measured at -90 dBm or better. Refer to the graph for acceptable combinations.

Note: These numbers are all negative, so -70 dBm is stronger than -85 dBm, and -90 dBm is weaker.



If the signal strength is weaker than this, take cellular readings at the location where any cellular signal booster antennas will be installed. Ensure enough signal exists for that repeater model. Install repeaters to boost the strength of the cellular signals. Repeaters are often required when installing charging stations in an underground garage or enclosed parking structure.





For other regions, or if the site does not have strong signal on these bands, contact your ChargePoint representative for additional solutions.

ChargePoint strongly recommends a consultation with a cellular connectivity specialist before all installations. A consultation can verify:

- Service with a supported carrier on a supported LTE band
- Available signal and local noise levels on applicable bands
- Site changes to correctly meet your needs, both for station bandwidth and other phone coverage for customer or tenant satisfaction

Repeaters

Some sites require repeaters to ensure strong signal to all stations. If a repeater is required, look for a model with these features:

- Specifically LTE compatible on the listed bands
- Multi-carrier
- Multi-band
- Not already dedicated to FirstNet or other first responder-specific networks
- Auto-gain recommended

Note: Do not rely on readings taken with a cell phone when conducting site surveys. Many signal boosters and network extenders may not be compatible with ChargePoint hardware, including certain types of Distributed Antenna Systems (DAS), micro/nano/pico/femto-cells, and carrier- or band-specific signal boosters.

Limited Warranty Information and Disclaimer

The Limited Warranty you received with your charging station is subject to certain exceptions and exclusions. For example, your use of, installation of, or modification to, the ChargePoint® charging station in a manner in which the ChargePoint® charging station is not intended to be used or modified will void the limited warranty. You should review your limited warranty and become familiar with the terms thereof. Other than any such limited warranty, the ChargePoint products are provided "AS IS," and ChargePoint, Inc. and its distributors expressly disclaim all implied warranties, including any warranty of design, merchantability, fitness for a particular purposes and non-infringement, to the maximum extent permitted by law.

Limitation of Liability

CHARGEPOINT IS NOT LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, PUNITIVE OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION LOST PROFITS, LOST BUSINESS, LOST DATA, LOSS OF USE, OR COST OF COVER INCURRED BY YOU ARISING OUT OF OR RELATED TO YOUR PURCHASE OR USE OF, OR INABILITY TO USE, THE CHARGING STATION, UNDER ANY THEORY OF LIABILITY, WHETHER IN AN ACTION IN CONTRACT, STRICT LIABILITY, TORT (INCLUDING NEGLIGENCE) OR OTHER LEGAL OR EQUITABLE THEORY, EVEN IF CHARGEPOINT KNEW OR SHOULD HAVE KNOWN OF THE POSSIBILITY OF SUCH DAMAGES. IN ANY EVENT, THE CUMULATIVE LIABILITY OF CHARGEPOINT FOR ALL CLAIMS WHATSOEVER RELATED TO THE CHARGING STATION WILL NOT EXCEED THE PRICE YOU PAID FOR THE CHARGING STATION. THE LIMITATIONS SET FORTH HEREIN ARE INTENDED TO LIMIT THE LIABILITY OF CHARGEPOINT AND SHALL APPLY NOTWITHSTANDING ANY FAILURE OF ESSENTIAL PURPOSE OF ANY LIMITED REMEDY.

FCC Compliance Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Important: Changes or modifications to this product not authorized by ChargePoint, inc., could affect the EMC compliance and revoke your authority to operate this product.

Exposure to Radio Frequency Energy: The radiated power output of the 802.11 b/g/n radio and cellular modem (optional) in this device is below the FCC radio frequency exposure limits for uncontrolled equipment. The antenna of this product, used under normal conditions, is at least 20 cm away from the body of the user. This device must not be co-located or operated with any other antenna or transmitter by the manufacturer, subject to the conditions of the FCC Grant.

ISED (formerly Industry Canada)

This device complies with the licence-exempt RSS standard(s) of Innovation, Science and Economic Development Canada (ISED). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil est conforme aux flux RSS exemptés de licence d'Innovation, Sciences et Développement économique Canada (ISDE). L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter.

Radiation Exposure Statement: This equipment complies with the IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.

Énoncé d'exposition aux rayonnements: Cet équipement est conforme aux limites d'exposition aux rayonnements ioniques RSS-102 Pour un environnement incontrôlé. Cet équipement doit être installé et utilisé avec un Distance minimale de 20 cm entre le radiateur et votre corps.

FCC/IC Compliance Labels

Visit chargepoint.com/labels.

chargepoint.com/support

75-001359-01 r5

Express Plus

DC Fast Charging Platform

Installation Guide



IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

This manual contains important instructions for Express Plus that shall be followed during installation, operation and maintenance of the unit.

WARNING:

1. **Read and follow all warnings and instructions before servicing, installing, or operating the ChargePoint® charging station.** Install and operate only as instructed. Failure to do so may lead to death, injury, or property damage, and will void the Limited Warranty.
2. **Only use licensed professionals to install your ChargePoint charging station and adhere to all national and local building codes and standards.** Before installing the ChargePoint charging station, consult with a licensed contractor, such as a licensed electrician, and use a trained installation expert to ensure compliance with local building and electrical codes and standards, climate conditions, safety standards, and all applicable codes and ordinances. Inspect the charging station for proper installation before use.
3. **Always ground the ChargePoint charging station.** Failure to ground the charging station can lead to risk of electrocution or fire. The charging station must be connected to a grounded, metal, permanent wiring system, or an equipment grounding conductor shall be run with circuit conductors and connected to the equipment grounding terminal or lead on the Electric Vehicle Supply Equipment (EVSE). Connections to the EVSE shall comply with all applicable codes and ordinances.
4. **Install the ChargePoint charging station on a concrete pad using a ChargePoint-approved method.** Failure to install on a surface that can support the full weight of the charging station can result in death, personal injury, or property damage. Inspect the charging station for proper installation before use.
5. **The product components are not suitable for use in Class 1 hazardous locations, such as near flammable, explosive, or combustible vapors or gases.**
6. **Supervise children near this device.**
7. **Do not put fingers into the electric vehicle connector.**
8. **Do not use this product if any cable is frayed, has broken insulation, or shows any other signs of damage.**
9. **Do not use this product if the enclosure or the electric vehicle connector is broken, cracked, open, or shows any other signs of damage.**
10. **Use only copper conductor wire, as specified, rated for 90 °C (194 °F).**

IMPORTANT: Under no circumstances will compliance with the information in a ChargePoint guide such as this one relieve the user of the responsibility to comply with all applicable codes and safety standards. This document describes approved procedures. If it is not possible to perform the procedures as indicated, contact ChargePoint. **ChargePoint is not responsible for any damages that may result from custom installations or procedures not described in this document or that fail to adhere to ChargePoint recommendations.**

Document Accuracy

The specifications and other information in this document were verified to be accurate and complete at the time of its publication. However, due to ongoing product improvement, this information is subject to change at any time without prior notice. For the latest information, see our documentation online at chargepoint.com/guides or chargepoint.com/eu/guides.

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Symbols

This guide and product use the following symbols:



DANGER: Risk of electric shock



WARNING: Risk of personal harm or death



CAUTION: Risk of equipment or property damage



IMPORTANT: Crucial step for installation success



Read the manual for instructions



Ground/protective earth

Illustrations Used in This Document

The illustrations used in this document are for demonstration purposes only and may not be an exact representation of the product. However, unless otherwise specified, the underlying instructions are accurate for the product.

Contents

Important Safety Instructions ii

1 Prepare for Installation 1
This Guide 1
Components 1
Questions 3
Bring These Tools and Materials 4
Check Site Readiness 7
Check Express Plus Shipping Crates 15

2 Install Power Block 18
Disconnect Power 19
Prepare Power Block Pad 20
Install Power Block Pedestal 23
Install Power Block Enclosure 34
Connect Power Block Wiring 46
Install Power Block Internal Parts and Fill Coolant 64
Install Power Block Covers and Door 74

3 Power Link Configurations 85

4 Install Pedestal Mounted Power Link 86
Disconnect Power 86
Prepare Power Link Pad 88
Mount and Secure Power Link 91
Connect Wiring 106
Install DC Smart Cable 124
Install Doors 134
Install Covers 137
Install Swingarms Onto Station and Hang Charging Cable 149

5 Install Overhead Mounted Power Link 158
Disconnect Power 158

Install and Secure to the Mounting Plate 160
Connect the Wiring 171
Install DC Smart Cable 185
Install Doors and Vinyl Signs 185

6 Hang Charging Cable Onto Tool Balancer 188
Check Post (or Other Approved Structure) 189
Assemble and Hang 191

7 Verify and Adhere Ratings Label 199
Power Link 199
Power Block 199

8 Power On 200

9 Complete Station Setup 202
Run Installation Wizard 202
Pinpoint Location of Power Block and Power Link 202

10 Recommended Checklist 205
Third-Party Service Providers 206
Questions 206

Prepare for Installation 1

This Guide

Follow this guide to install the ChargePoint® Express Plus DC fast-charging platform. You will need at least two people to install this system.

Components

Express Plus is a scalable solution to provide DC fast-charging for electric vehicles. It consists of modular components that may vary with the design of each site.

Express Plus Power Link	Express Plus Power Block	Express Plus Power Module
Charging station • Configurable cables • Optional: Control and Communications Module (CCOM) • Mounts onto a standard pedestal (as shown) or overhead (wall or gantry)	Power cabinet • Centralizes power conversion • Supplies DC power to Power Link • Includes liquid cooling system for each Power Module	Power electronics module • Converts AC to DC power • Modular, scalable design • Fit up to five inside a Power Block
		

ChargePoint Cloud Dashboard
Online software for station owners and managers: • Communicates with Express Plus charging platform via cellular connectivity • Supports remote diagnostics for station owners and managers, and ChargePoint administrators • Includes functionality for station owners and managers to access and create reports • Provides station owners and managers control of hardware settings and commands for users



CAUTION: Warranty Limitation

- If the charging station is not installed, commissioned, or serviced by a ChargePoint certified installer or technician using a ChargePoint-approved method, it is *excluded* from all ChargePoint and other warranties and ChargePoint is not responsible.
- You must be a licensed electrician and complete the training at chargepoint.com/installers to become ChargePoint certified and to access the ChargePoint web or app-based installer tools.



WARNING: Do not install or service the charging station in inclement weather. If you work in rain or wind, you must use a weather-proof shelter that covers all boxes and components.



CAUTION: Keep components in original packaging, free of moisture, and protected from damage until you install or service them at the site. Store all shipments of components in a dry covered location and protect from moisture.



CAUTION: Use low torque settings when working with power tools during installation or servicing. Over-torquing can damage the equipment.



IMPORTANT: Ensure the installation complies with all applicable codes and ordinances.

Access ChargePoint documents at chargepoint.com/guides.

Document	Content	Primary Audiences
Datasheet	Full station specifications	Site designer, installer, and station owner
Site Design Guide	Civil, mechanical, and electrical guidelines to scope and construct the site	Site designer or engineer of record
Concrete Mounting Template Guide	Instructions to embed the charging station template in a concrete pad with anchor bolts and conduit placement	Site construction contractor
Surface Conduit Entry Kit Guide	Instructions for sites where conduit cannot be run	Installer

Document	Content	Primary Audiences
	underground	
Construction Signoff Form	Checklists used by contractors to ensure the site is correctly completed and ready for product installation	Site construction contractor
Installation Guide	Anchoring, wiring, and powering on	Installer
Operation and Maintenance Guide	Operation and preventive maintenance information	Station owner, facility manager, and technician
Service Guide	Component replacement procedures, including optional components	Service technician
Declaration of Conformity	Statement of conformity with directives	Purchasers and public

Note: For all specifications other than dimensions and weights, refer to the product's Datasheet.

Questions

For assistance, contact ChargePoint Support (chargepoint.com/support) for your region.

Bring These Tools and Materials

Installing the Express Plus requires at least two people. Additionally, the installer must bring the following tools and materials. These are not provided by ChargePoint.

Tools



Forklift

- Rated for ≥ 680 kg (1500 lb)
- Maximum size of forklift tines:
  - Width = 102–127 mm (4–5 in)
  - Maximum thickness ≤ 57 mm (2.25 in)
- If your site has height constraints, use alternative equipment



Stepladder



Lock out/tag out equipment



Hard hat



Cut-resistant gloves



Safety glasses



Head lamp



Measuring tape or other tool to measure height, length, and distance



Level



Use hand to tighten



Box cutter



Phillips screwdriver set

- #2 Phillips screwdriver with long handle
- #3 Phillips screwdriver
- #5 Phillips screwdriver
- Right angle (90°) #5 Phillips screwdriver



Flat head screwdriver



Torx wrench set

- T25
- T30

Note: Only for tool balancer: T20



Torx security wrench

- T25


Torque wrenches for 4 to 95 Nm (3 to 70 ft-lb)


Socket wrench set including deep sockets, up to 25 mm


Hydraulic hole punch tool (to cut 4 inch holes in gland plate)


Multimeter with Cat III 1000 V ratings, such as Fluke 87V or similar


Wire strippers, including Ethernet (Cat6 STP) cable


Wire cutters, including Ethernet (Cat6 STP) cable


Dieelectric grease


Cable ties


Isopropyl wipes and towel roll


Coolant funnel
Two gallon coolant


Wire brush (to remove concrete from bolts)


Smartphone with: Internet connectivity


Adjustable wrench


Cable puller or fish tape


Conduit cutters (to cut up to 4 inch conduits)


Ethernet tester such as a Klein Tools VDV526-052 VDV LAN Scout Jr. Tester or similar


Ethernet (RJ45) connector crimping tool


Lug crimping tool


Torque paint pen


Permanent marker


Duct seal compound


Padlock provided by station owner if required (for security panel on Power Block)


Broom and vacuum


ChargePoint installer login credentials


QR code scanner (usually built into the camera app)


Exact location of stations or units, including parking space


Ferrule crimp tool (for 16 mm^2 or 6 AWG wire)

- AC and ground conductors as required by site drawings
- DC conductors as required by site drawings
- 48 V DC wiring as required by site drawings
- Shunt trip wiring (if on site drawings)
- Power Block DC and AC lugs:
  - Plated copper compression lugs (not mechanical)
  - Must fit M12 stud size
  - Must fit 44.5 mm (1.75 in) hole spacing
  - 2-hole specified for North America
  - Maximum tongue width ≤50.8 mm (2 in)
- **Note:** Check site drawings for quantity of lugs.
- Power Link DC lugs:
  - Copper plated compression lugs (not mechanical)
  - Must fit M12 stud size
  - Must fit 44.5 mm (1.75 in) hole spacing
  - 2-hole specified for North America
  - Maximum tongue width:
    - ≤48 mm if 2 conductors per line
      or
    - ≤24.5 mm if 3 conductors per line
- **Note:** Check site drawings for quantity of lugs.
- Cat6 Shielded Twisted Pair (STP) Ethernet wiring
  Note: FTP, UTP, and lesser grades of cable do not have the required noise immunity
- RJ45 shielded connectors
- Type LB conduit body (for overhead installation only) - maximum 3 inch

Check Site Readiness

The Power Block and Power Link can be installed on either a newly poured pad or an existing concrete surface. The Power Block and Power Link also support wiring run above ground for locations where no underground wiring access exists (such as parking garages) or where underground junction boxes are not permitted.



WARNING: If not installed correctly, the ChargePoint charging station may pose a fall hazard, leading to death, personal injury, or property damage. Always use the provided Concrete Mounting Template shown preinstalled here, or a ChargePoint-approved surface mounting solution, to install the ChargePoint charging station. Always install in accordance with applicable codes and standards using licensed professionals. Non approved installation methods are performed at the risk of the contractor and void the Limited One-Year Parts Exchange Warranty.

Before beginning work, check that the site meets these civil and mechanical requirements:

- Each concrete pad must be fully cured and smooth, and must not exceed a slope of approximately 20 mm per meter (0.25 in per ft).
- Each Power Block concrete pad has either a site drawing approved by a structural engineer for this specific site, or an existing concrete pad that has been approved by a structural engineer for the Power Block's dimensions and weight.
- Each Power Link pad must conform to the design requirements listed in the *Express Plus Site Design Guide*.
- Walls, fences, or slopes must not prevent water from draining from the pad.
- You have sufficient space around the installation pad to use a forklift and other lifting equipment, unpack crates, remove packing materials, and allow two people to freely move throughout the area.

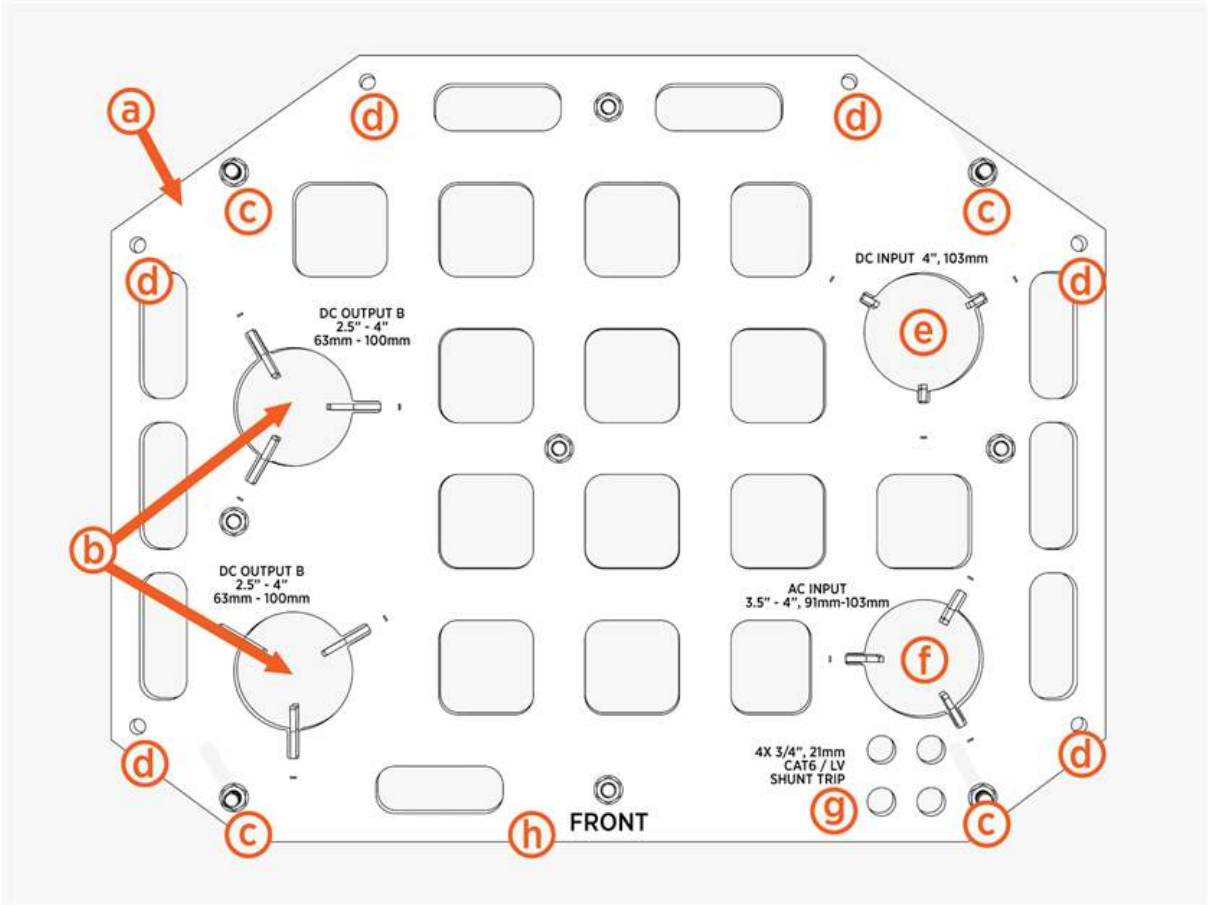


IMPORTANT: Remove any concrete that is not level with the rest of the surface so you can level the components. Use a grinder or a hammer and chisel to remove any bumps in the concrete.

Power Block Readiness

Concrete Mounting Template (CMT)

The Power Block Concrete Mounting Template (CMT) should already be embedded in the concrete pad, unless the site is using a surface-conduit entry. Verify the AC and DC conduits are positioned correctly.



Space For	Max. Size	Max. Quantity
a. Power Block Concrete Mounting Template (CMT)		
b. DC output conductors' conduit entry	103 mm (4 in) trade size	2
c. M16 anchor bolts entry	76 mm (3 in) above concrete for mounting Power Block	4
d. Anchors for surface conduits entry (alternative configuration)	Options (one side only): two left, two rear, or two right	2
e. DC auxiliary input conductors' conduit entry (requires optional package)	103 mm (4 in) trade size conduit	1

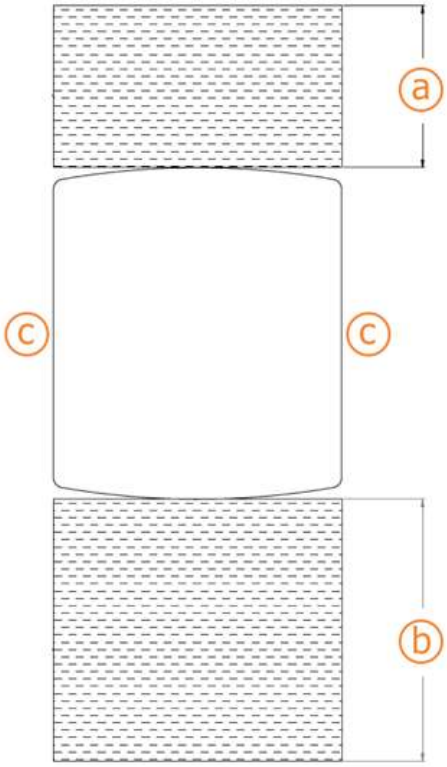
Space For	Max. Size	Max. Quantity
f. AC input conductors' conduits entry	103 mm (4 in) trade size conduit	1
g. 48 V DC wires' and Cat6 Shielded Twisted Pair (STP) Ethernet cable's conduit entry	21 mm (3/4 in) trade size conduit	4
i. Shunt trip, if present	Check site drawings.	1
ii. One Ethernet, one 48 V DC out	Check site drawings.	1
iii. Two Ethernet, either one or two 48 V DC out	Check site drawings.	2
iv. Three Ethernet, either one or two 48 V DC out	Check site drawings.	3

Note: For the maximum wire sizes, see the *Express Plus Site Design Guide*.

Clearances

The Power Block requires minimum site and service clearances.

Note: Image not to scale.

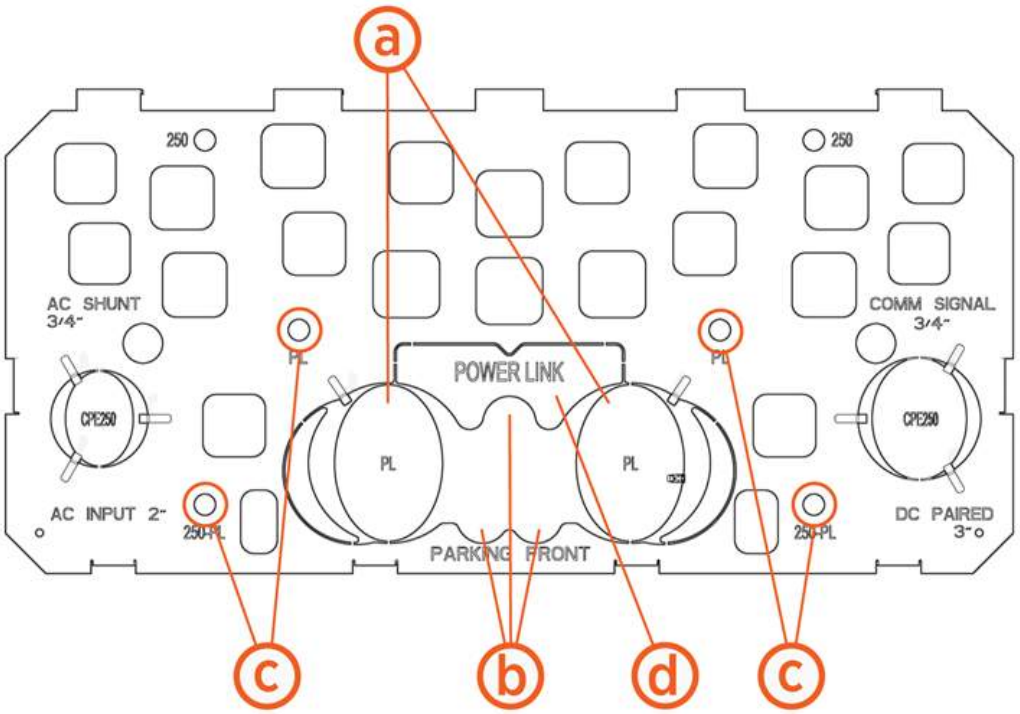


Power Block	Clearance
a. Rear	610 mm (24 in) recommended (for rear service access) 457 mm (18 in) required
b. Front	1000 mm (39.3 in)
c. Side	51 mm (2 in)

Power Link Readiness

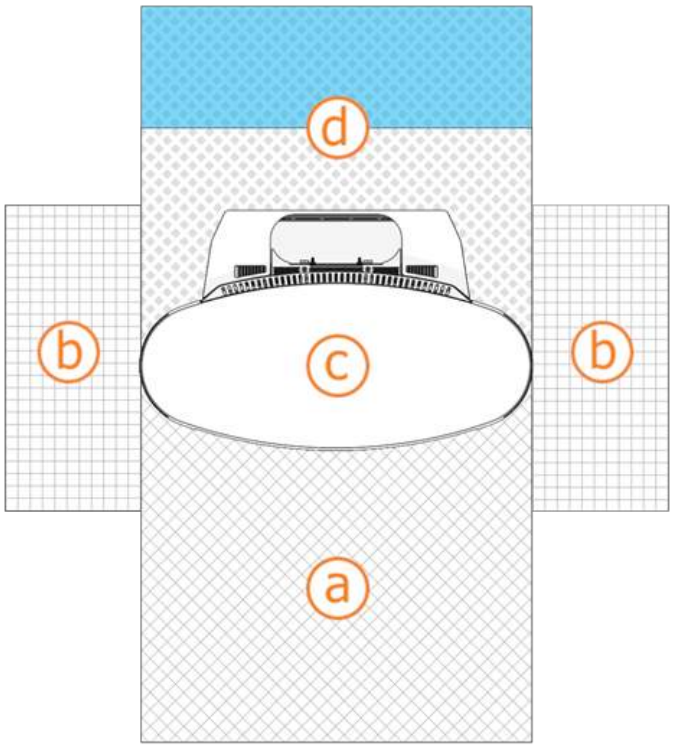
Concrete Mounting Template (CMT)

If the Power Link is pedestal-mounted and using stub-up wiring, ensure the Power Link Concrete Mounting Template (CMT) is already embedded in the concrete pad.



Space For	Max. Size	Max. Quantity
a. DC input conductors' conduit entry	Each up to 91 mm (3.5 in) trade size conduit	2
b. 48 V DC wires' and Cat6 Shielded Twisted Pair (STP) Ethernet cable's conduit entry	21 mm (3/4 in) trade size conduit **Note:** Check site drawings.	3
c. M16 anchor bolts entry	76 mm (3 in) above concrete for mounting Power Link	4

Clearances



Note: Image not to scale.

Power Link		Clearance
a. Front		
	Minimum open space	610 mm (24 in)
	Door swing + width of unit	730 mm (28 3/4 in)
b. Side		305 mm (12 in) from top corner to top corner Two Power Link units can share side clearance provided adequate clearance is allowed for Cable Management Kit (CMK) arms. **Note:** CMK arms cannot share side clearance.
c. Top		
	Pedestal mounted:	26 mm (1 in) from top of Cable Management Kit (CMK)
	Overhead mounted:	305 mm (12 in) from top of Power Link
d. Rear		203 mm (8 in) or 457 mm (18 in) with liquid cooled cable. This provides clearance for CMK and liquid cool cable service. **Note:** If two Power Link are positioned back-to-back, there must be at least 610 mm (24 in) of shared clearance.

CAUTION: You will need greater clearance for special methods and accessories.

Special Method	Clearance
Tool balancer (mounted to a separate structure)	Must have enough clearance to open doors or remove covers. **Note:** Do not mount the tool balancer in front of Power Link to avoid obstructing or interfering with operation, maintenance, or service.
Surface conduit entry	Rear: 610 mm (24 in)

CAUTION: You must meet additional site requirements for special methods and accessories. See the *Express Plus Site Design Guide*.

General Estimates for Lifting

Power Link Configuration	Power Link (no cables or cable management)	Charging Cable Weight	Cable Management Kit (includes swingarms)
Standard	208 kg (459 lbs) (120 kg (283 lbs) Power Link + 80 kg (176 lbs) pedestal)	~3.2–3.5 kg/m (7 - 8 lbs) longer lengths vary	20 kg (44 lbs)
Overhead Mounted (to a wall, gantry, post, or other surface)	120 kg (265 lbs)		—

Electrical Readiness

If the site does not meet these basic requirements, contact ChargePoint before continuing.

- The appropriate circuit protection and metering is in place at the installation site.
- A grounding conductor that complies with local codes is properly grounded to earth at the service equipment or, when supplied by a separate system, at the supply transformer.
- A correctly rated, dedicated breaker is installed for each Power Block:

Nominal Voltage	Input Current Rating	Branch Circuit Capacity and Breaker	Breaker Size
Europe: 400 V	315 A	350 A or 400 A	400 A
North America: 480 V	260 A		350 A or 400 A

- Breakers have shunt trip capability (if specified) to each Power Block.
- All necessary electrical infrastructure has been completed per local codes and ChargePoint specifications for 3-phase power plus ground, with properly sized wire at the station. (Neutral is not required for system operation.)
- Wi-Fi and cellular signal strength meet the requirements stated in the Site Design Guide.

For questions about site specifications, refer to the *Express Plus Datasheet* and *Express Plus Site Design Guide*.

IMPORTANT: The Power Link is tested to IEC 61000-4-5, Level 5 (6 kV @ 3000 A) standards. In geographic areas that experience frequent thunderstorms, supplemental surge protection must be installed at the service panel.

Check Express Plus Shipping Crates

Each Express Plus ships in multiple crates. Ensure you have all components at the installation site.

Note: Refer to the *Power Link 2000 Installation Guide* for all the components' list.

CAUTION: Always transport and store the charging components in their original packaging. Use appropriate lifting equipment (forklift or crane, lifting straps, and any corresponding attachments and accessories). Ensure the load rating of all lifting equipment is adequate for the weight of the crated components.

CAUTION: Keep components in original packaging, free of moisture, and protected from damage until you install or service them at the site. Store all shipments of components in a dry covered location and protect from moisture.

IMPORTANT: Leave components in the shipping crate until needed. When removing, protect them from damage (such as scratches) by placing them flat on a blanket or tarp, face up. Do not stand up cover panels, as they may be knocked or blown over. Cover charging connectors to prevent damage or ingress.

Power Block	• Power Block unit(s)
	• Pedestal
	• Gland plates
	• Enclosure (upper and lower cabinets together)
	  • Lower heat exchanger (dry box hex)
	  Note: This ships in a box inside the lower cabinet of the enclosure.
	• Fuses
	• Doors and covers
	  • Lower door preinstalled

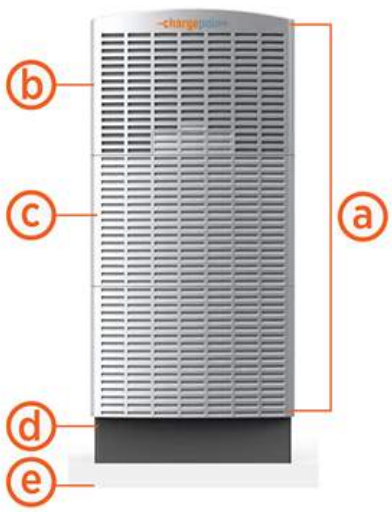
Power Link	• Power Link station(s) • Charging cable(s) (1 or 2 per station) • Cable Management Kit (CMK) or tool balancer
Power Module	• Up to five per Power Block
Installation Kit	• Duct seal compound • Propylene glycol coolant **Note:** The coolant label references its Material Safety Datasheet. • T25 Torx security screwdriver • Coolant funnel



WARNING: Lower heat exchanger and each Power Module are heavy. Two people are needed to install these components.

Install Power Block 2

Follow these instructions to anchor, install, and wire each Power Block.



a. Enclosure
b. Upper cabinet (wet box)
   - Preassembled
c. Lower cabinet (dry box)
   - Preassembled
   - Built-in slots for forklift tines
d. Pedestal
   - Built-in slots for forklift tines
e. Pad

IMPORTANT: If the site has height constraints for installation, contact ChargePoint to get the instructions and clearances that you will need for the modified process. You will likely need a crane with lifting shackles and a spreader bar (constraints may differ among sites).

Note to ChargePoint Personnel:

- If the site has height constraints for installation, the installer must first check clearance from the ceiling above the pad and from any objects to ensure nothing will obstruct the movement of equipment and components during this modified installation.
- Installer may remove the upper cabinet (refer to the Service Guide).
- With the upper cabinet removed, the four M10 threaded mounting points on the lower cabinet (at upper corners) can accept crane lifting shackles but only with a spreader bar.
- Installer may use a crane with lifting shackles and a spreader bar to install the pedestal (onto the pad), then lower cabinet, and upper cabinet.
- Installer must reinstall upper cabinet onto lower cabinet (refer to the Service Guide).

Disconnect Power

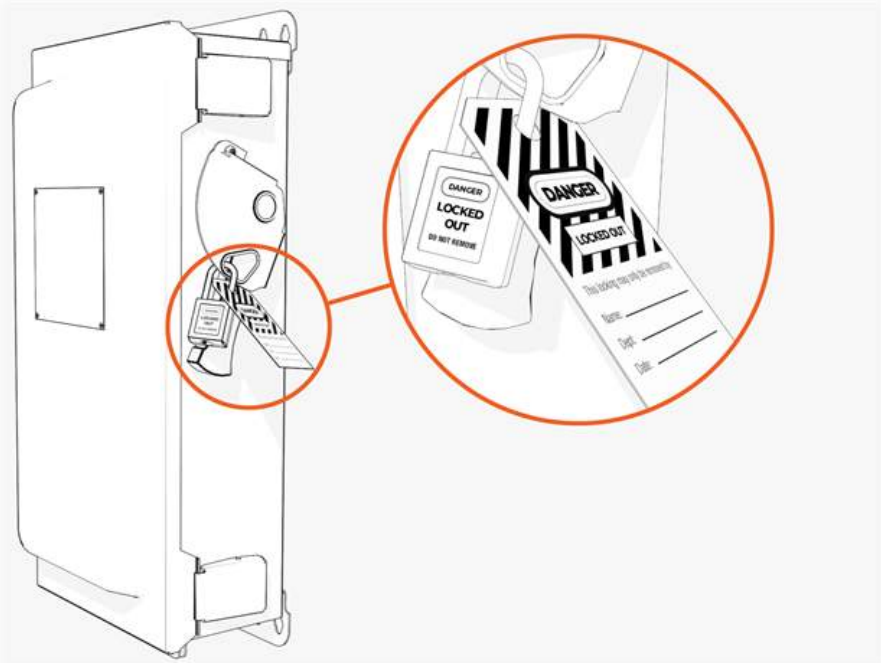
DANGER: RISK OF SHOCK

- Before any procedure, disconnect the power.
- Follow local code and site lockout/tagout procedure to de-energize the station.
- Wait for energy to dissipate (approximately five minutes).
- Keep power off until all covers and panels are reinstalled and the work is complete.

FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN SERIOUS INJURY, LOSS OF LIFE, OR PROPERTY DAMAGE.

1. Disconnect power at the site electrical panel.

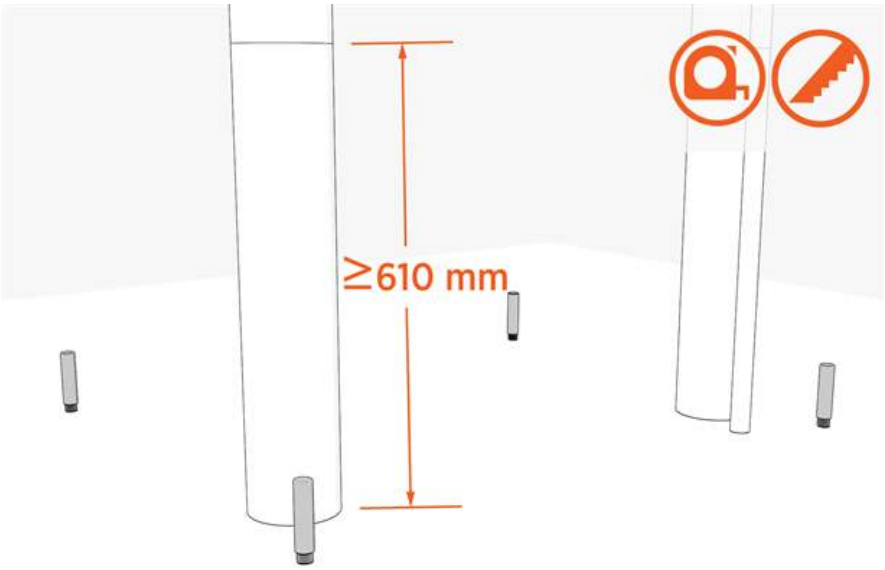
   Note: Follow standard practice and local code to de-energize the applicable circuit and lock out/tag out the disconnect before proceeding.



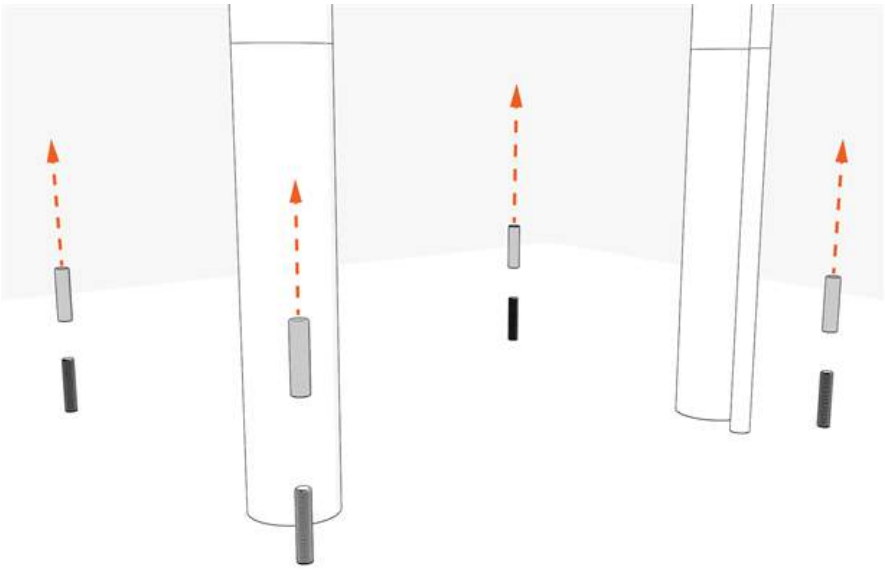
2. Use a multimeter to test that power is off.

Prepare Power Block Pad

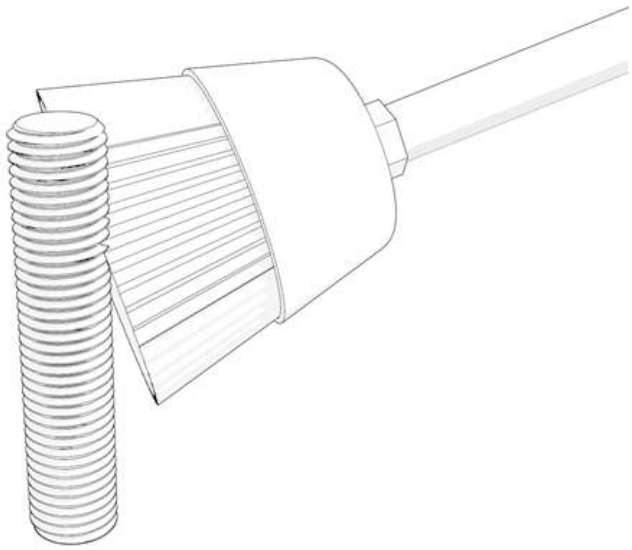
1. Ensure all stub-ups are at least (a) 610 mm (24 in) high. If armored cable is used, strip the outer jacket to the same height.



2. Remove plastic caps.



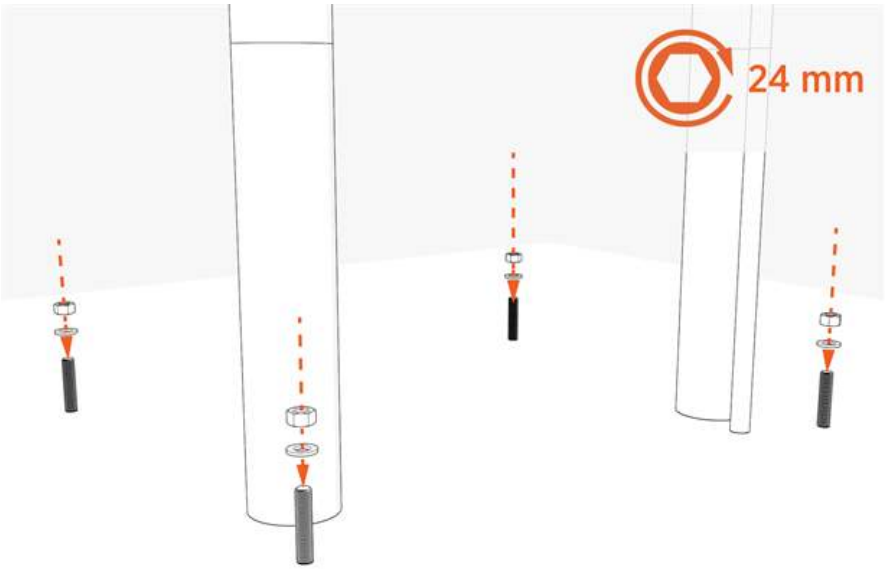
3. Use a wire brush to clean bolt threads. Alternatively, use a spare hex nut and run it down the stub-ups to clean the threads.



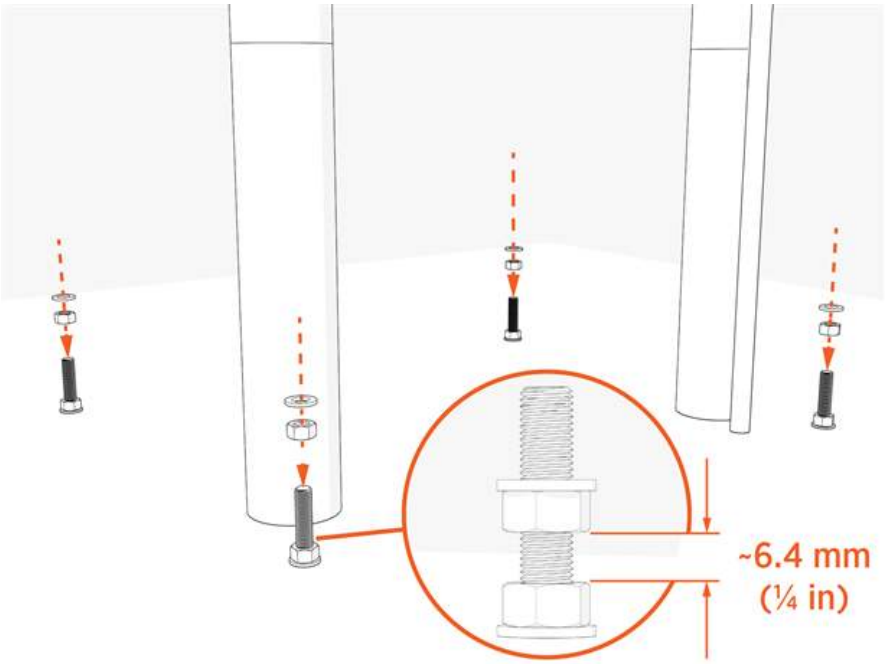
4. Install one washer and one nut onto each bolt. Torque to 54 Nm (40 ft-lb).

   Note: Washer and nut should be flush against concrete.

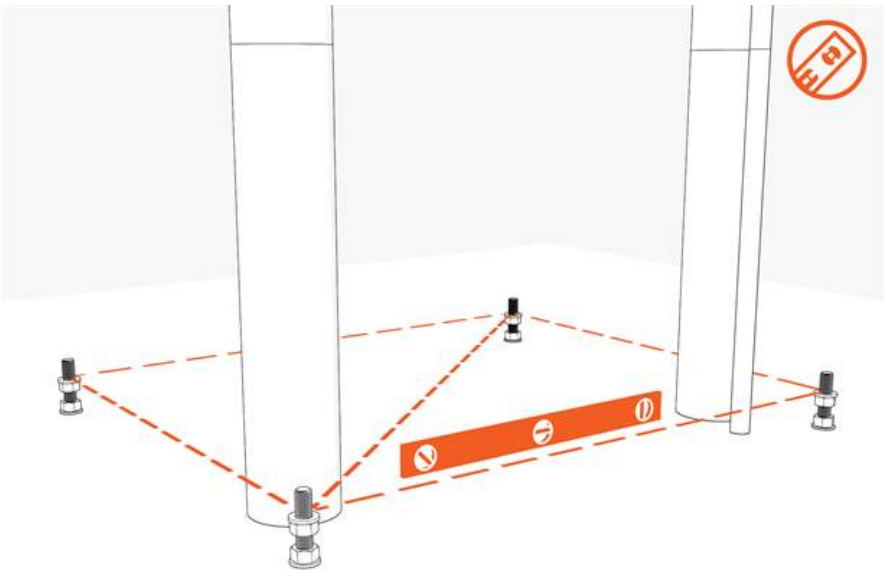
   Note: If epoxied, do not exceed the epoxy torque rating.



5. Install washers and leveling nuts. Maintain ~6.4 mm (1/4 in) between each leveling nut and bottom nut.



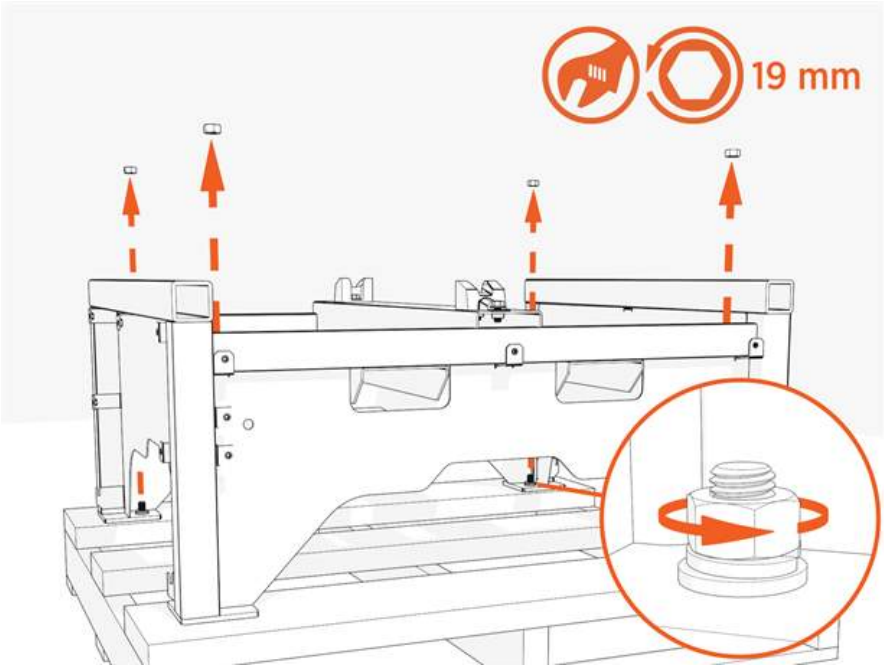
6. Check the leveling nuts.



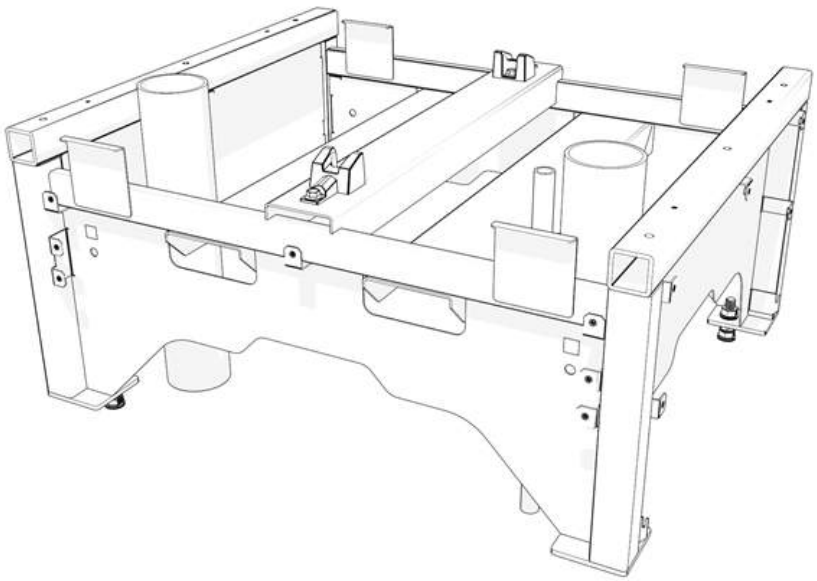
Install Power Block Pedestal

Uncrate the Pedestal

1. Unfasten and lift off the crate cover.
2. Uninstall four corner nuts and one center front nut. Discard nuts, washers, and bolts.



3. Uninstall three nuts and bolts from each gland plate. Remove the gland plates temporarily.

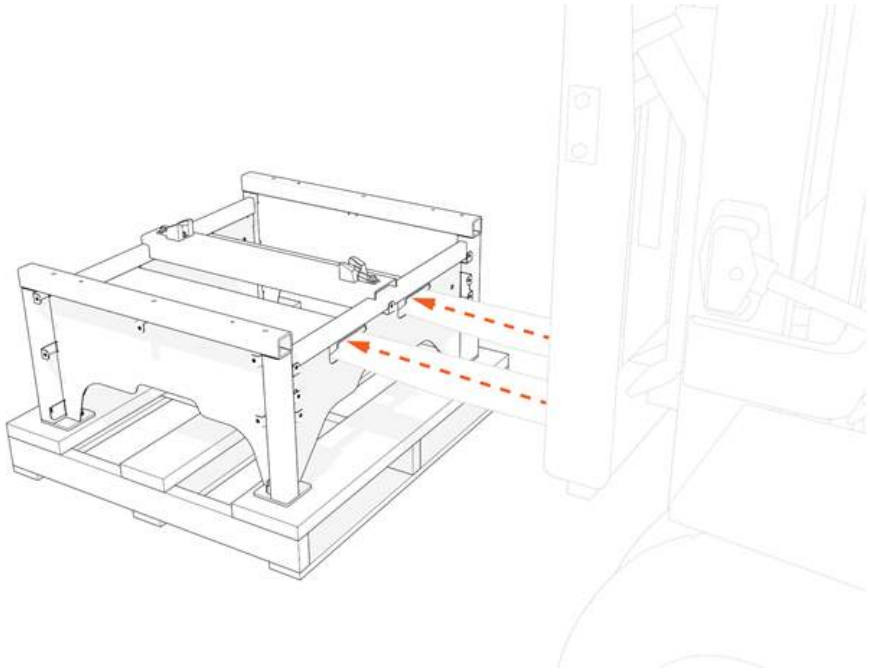


4. Check the rubber gaskets on the underside of the pedestal.
   If you find any gaps, contact ChargePoint (chargepoint.com/support).

Mount and Secure the Pedestal

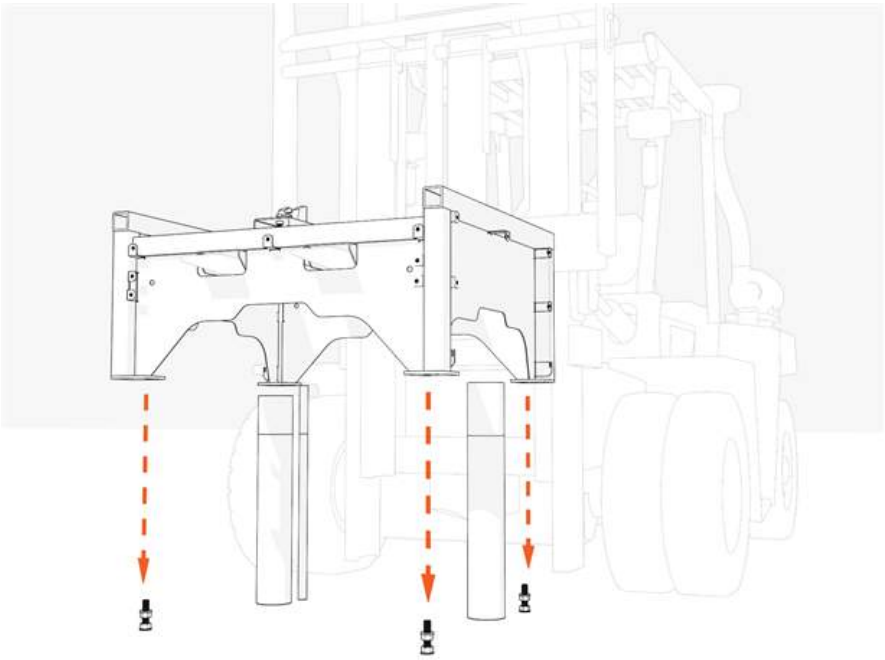
1. Before you move the pedestal onto the pad, adjust the forklift tines to 102-127 mm (4-5 in) width.
   Insert the forklift tines through the rectangular openings at front and back.

> **CAUTION:** If any wider, the forklift tines may hit a conduit stub-up.
> Do not hit a wall or other obstacle that may be behind the Power Block pad.

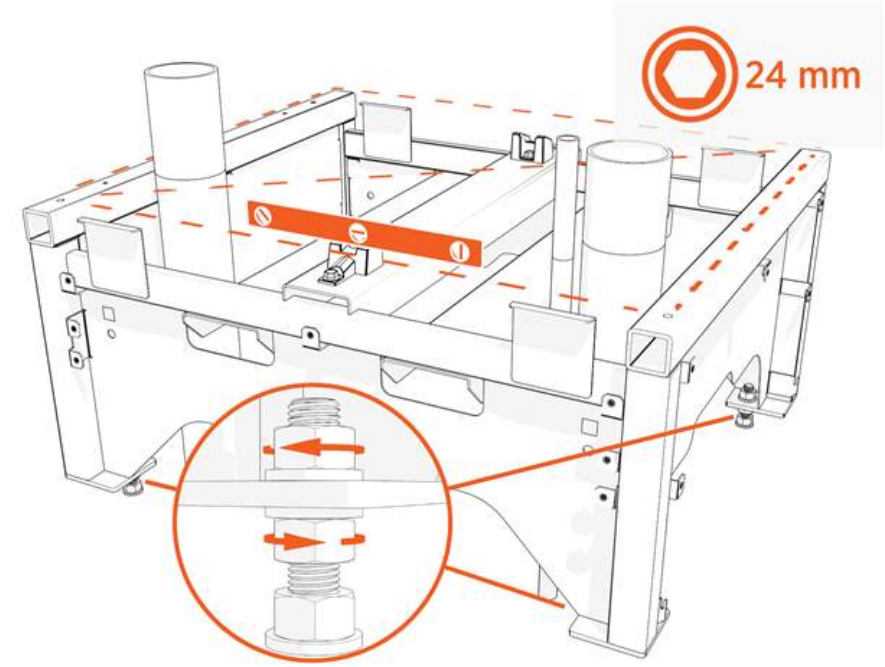


2. Suspend the pedestal above the pad. As you lower the pedestal down, align the holes in the pedestal feet to the anchor bolts.

   Note: Move wiring out of the way.

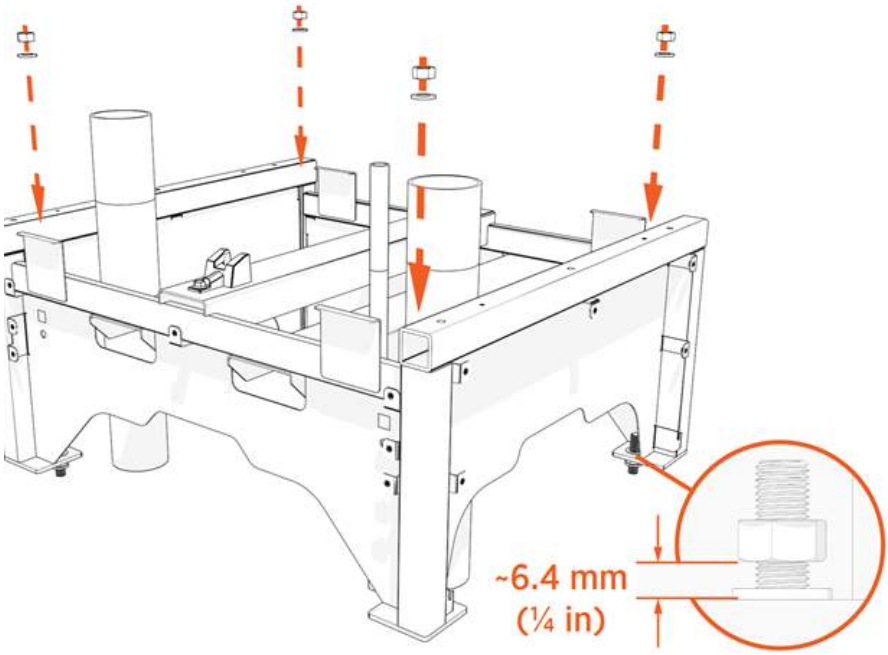


3. When the pedestal is fully seated, check that all sides are level. If not, adjust three of the leveling nuts.

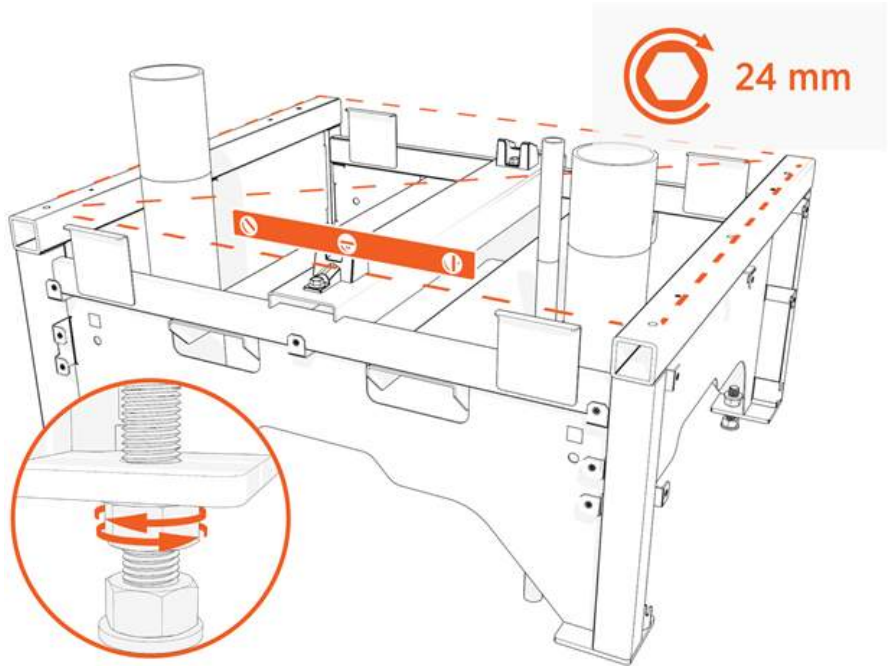


4. Partially install a washer and "top" nut.

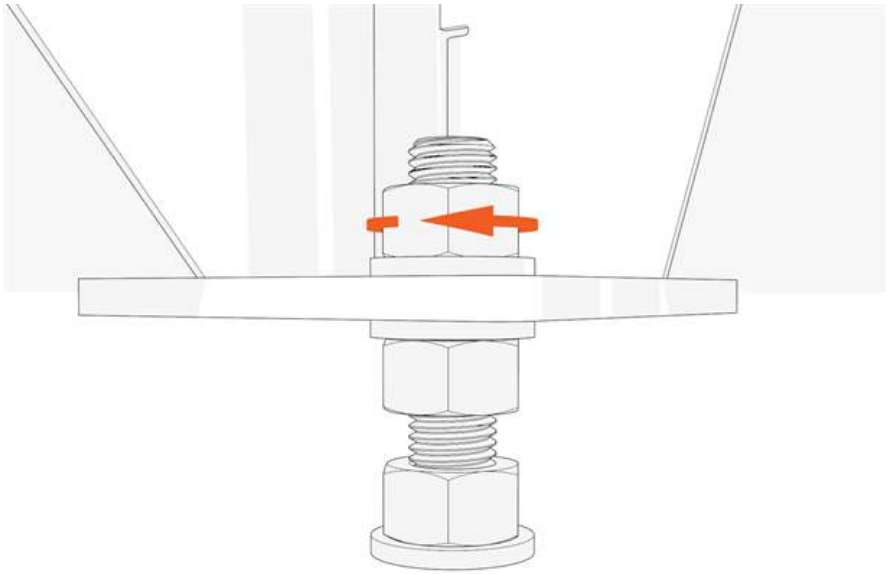
   Note: Do not tighten yet. Leave ~6.4 mm (1/4 in) gap between the top nut and the pedestal foot.



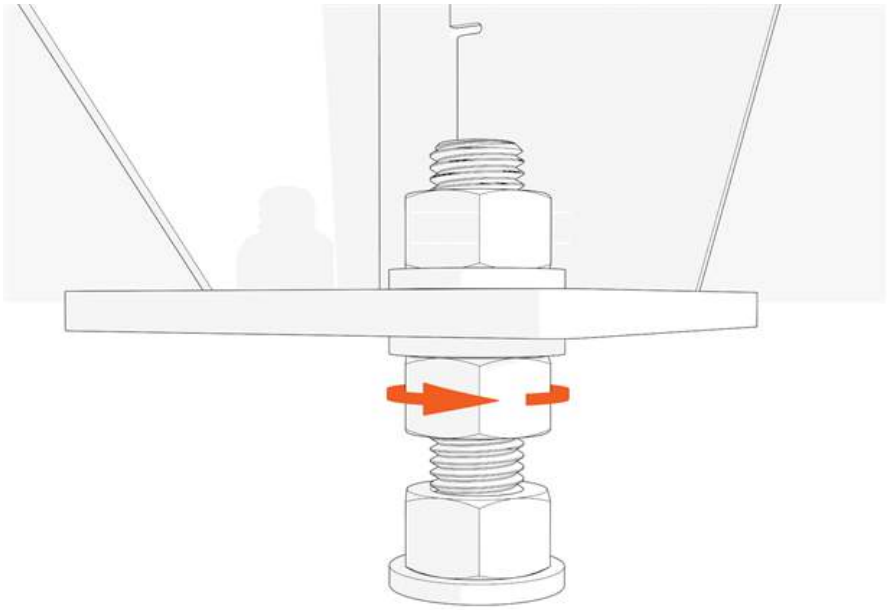
5. Recheck and adjust leveling nuts again.



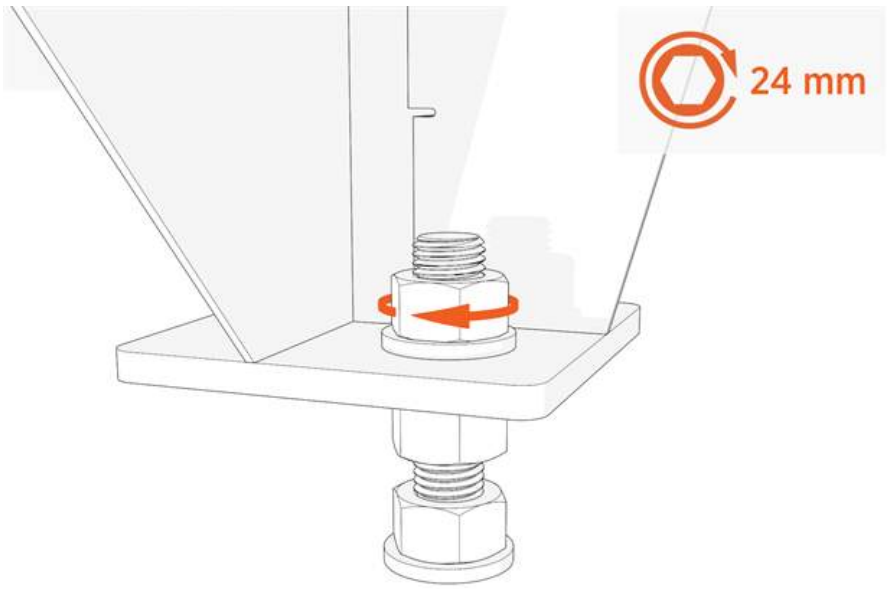
6. When the pedestal is level, tighten four top nuts by hand.



7. Rotate the fourth (last) leveling nut to be flush against the pedestal.

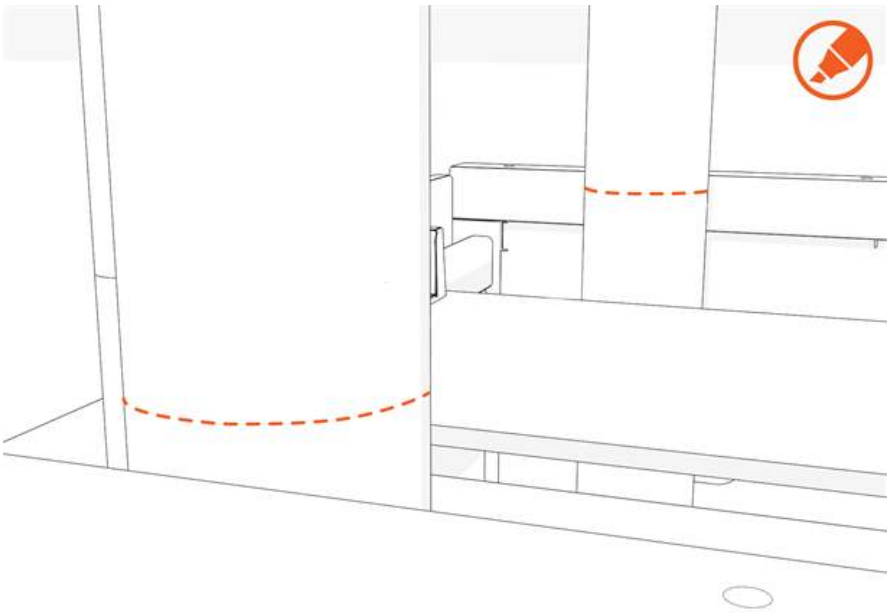


8. Torque all top nuts to 95 Nm (70 ft-lb).

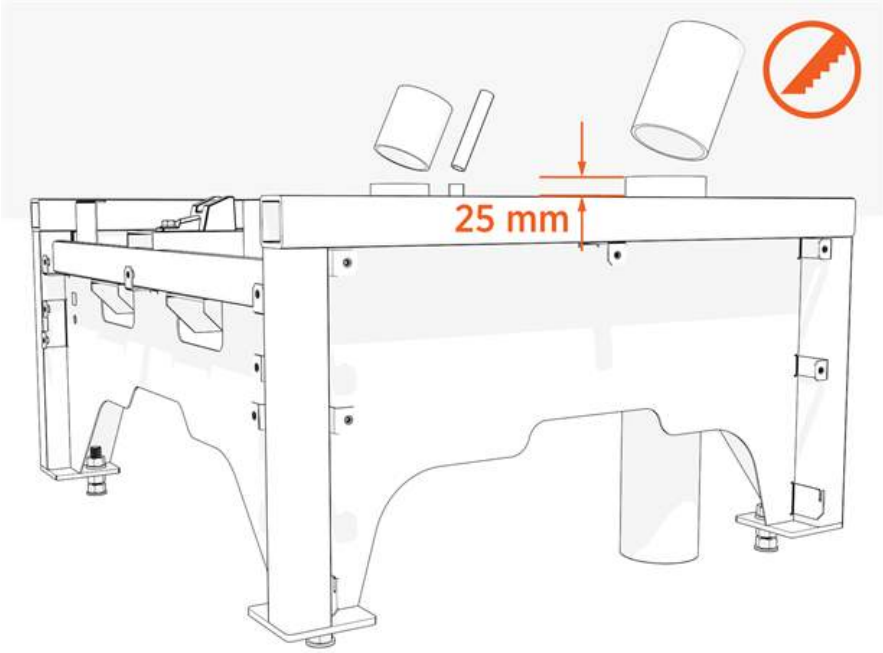


Prepare Gland Plates

1. Mark the conduit stub-ups at the height of the pedestal top surface.



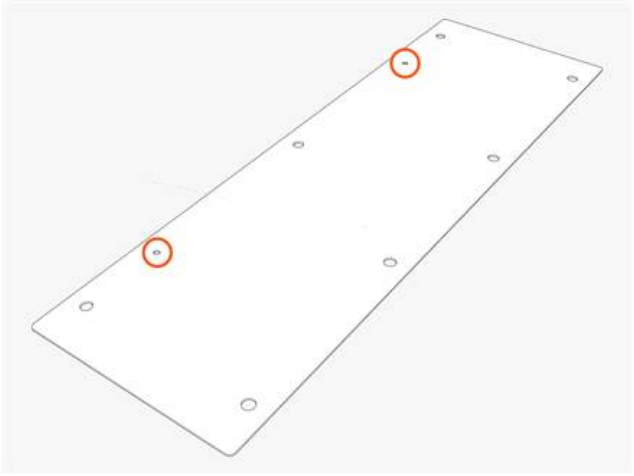
2. Measure and cut each conduit stub-up to a height of 25 mm (1 in) above the gland plate and file the edges smooth.

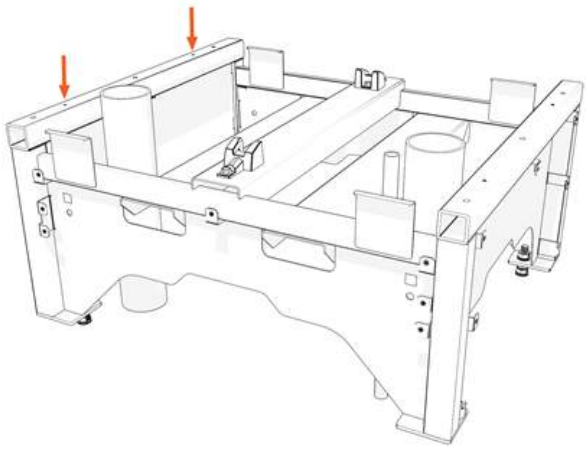


CAUTION: If you fail to file the edges, wires can be damaged by the stub-up.

CAUTION: Do not use conduits with bell ends. They may interfere with tolerances inside the enclosure.

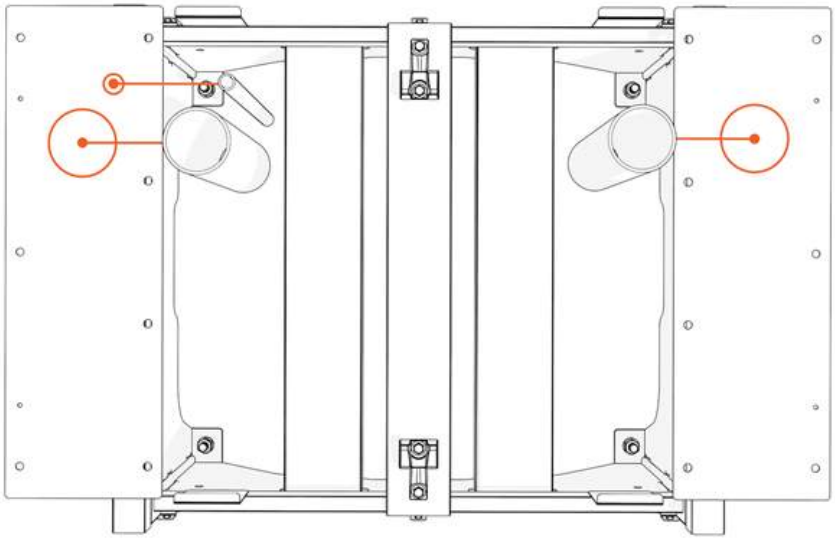
3. Use the two outer pins to align each gland plate.





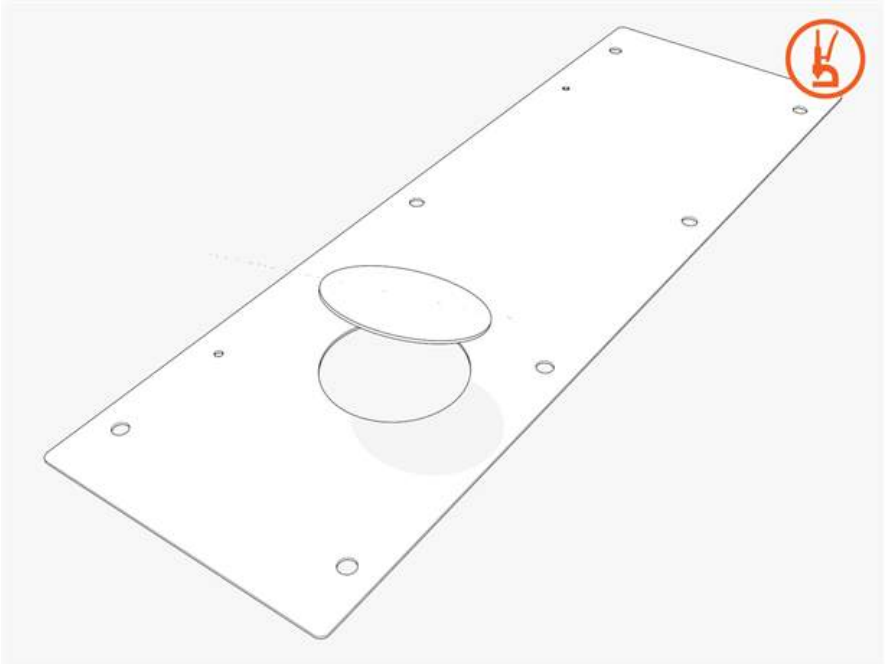
4. Mark the gland plate with the exact locations of each stub-up.

5. Mark a pilot point on the gland plates.

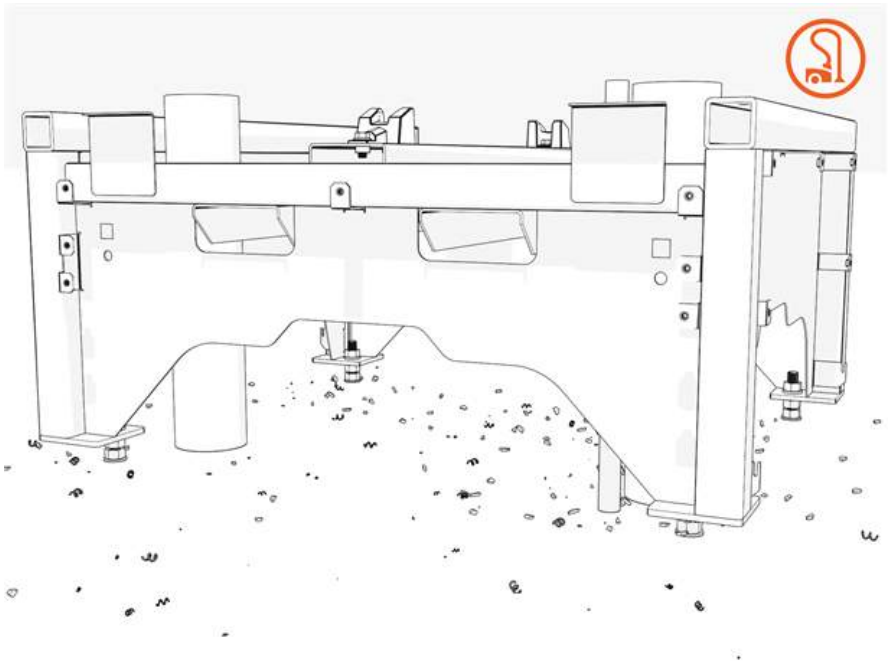


6. Use the hydraulic hole punch to create holes for all conduits.

IMPORTANT: You must match the size of each conduit.



7. Vacuum all metal shavings and any other debris.



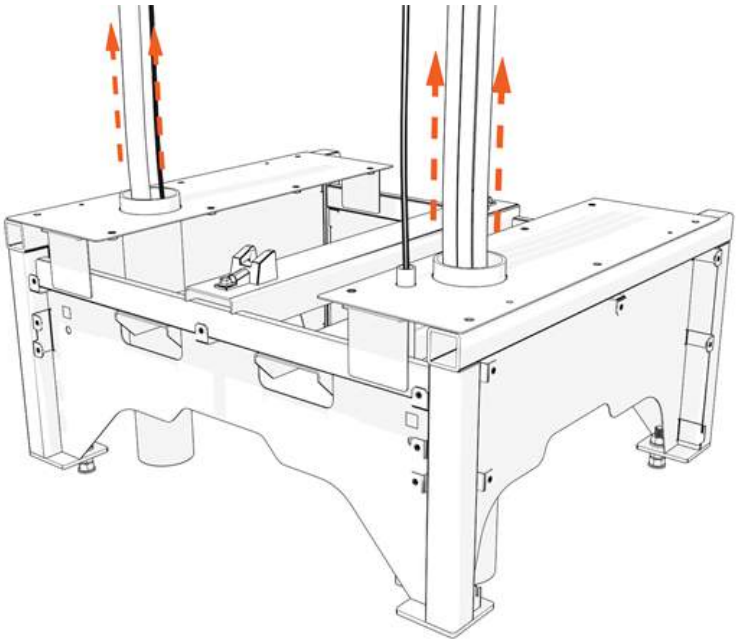
Pull Wiring Through Conduits

1. Pull all wires. Match the locations shown on the Power Block Concrete Mounting Template (CMT).

IMPORTANT: Do not pull a Neutral wire.

DC output	1 or 2 conduits
DC auxiliary input (optional)	1 conduit
AC input	1 conduit
48 V DC and Cat6 Shielded Twisted Pair (STP) Ethernet conduits: i. Shunt trip, if present ii. One Ethernet, one 48 V DC out iii. Two Ethernet, either one or two 48 V DC out iv. Three Ethernet, either one or two 48 V DC out	1, 2, 3, or 4 conduits **Note:** Check site drawings for the conduit configurations.

2. Retain these lengths of service loops:
    - 1219 mm (4 ft) of conductor and ground wire at Power Block
    - 1524 mm (5 ft) of conductor and ground wire at Power Link
    - 1829 mm (6 ft) of Ethernet and 48 V wire at each end

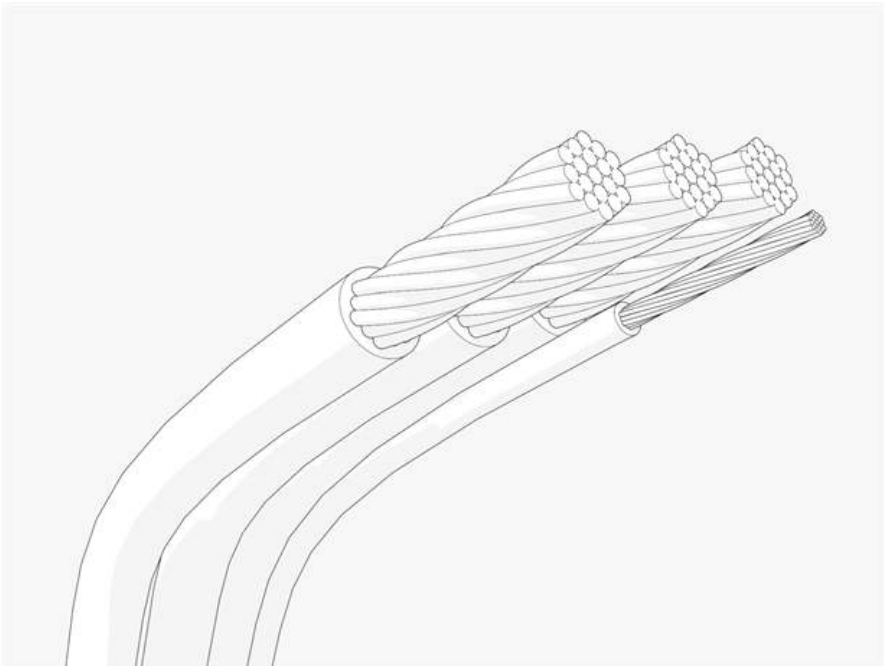


Note: For maximum wire and ground sizes and their minimum conduit sizes, see the *Express Plus Site Design Guide*.

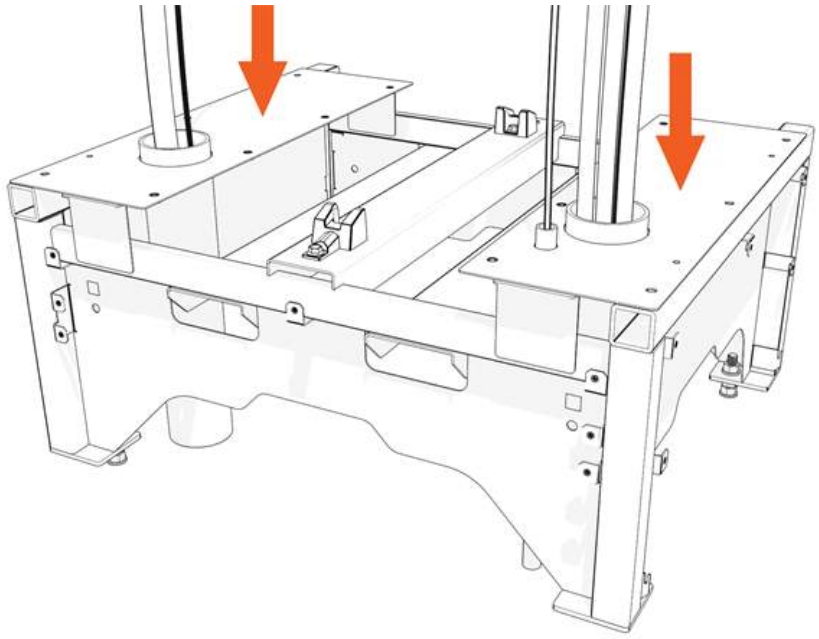
Note: To route surface conduit wiring, refer to the Surface Mount Guide.

3. Perform a continuity check of wires. Repair any damaged wires.

IMPORTANT: If you fail to repair damaged wires, you may impact site commissioning.



4. Reinstall gland plates.



Install Power Block Enclosure

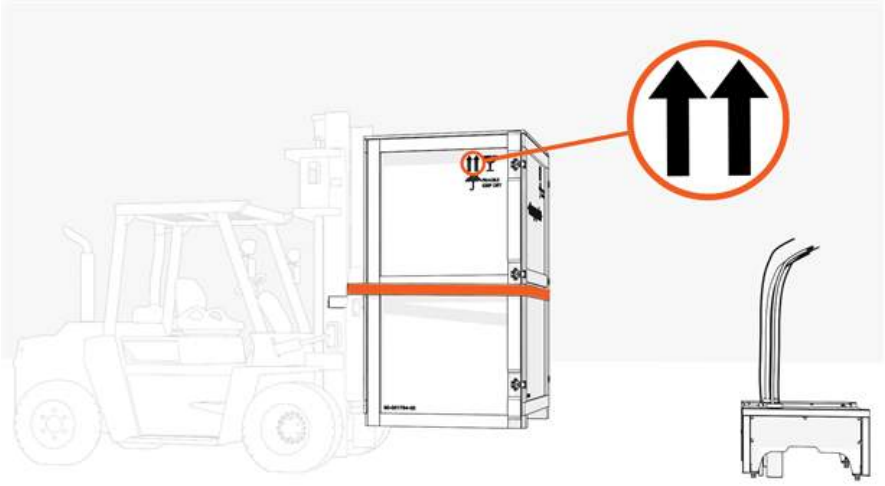
WARNING: The crate is heavy and can cause injury or death if dropped. Do not stand or walk beneath the crate while it is being lifted. Take precautions against the crate tipping or sliding.



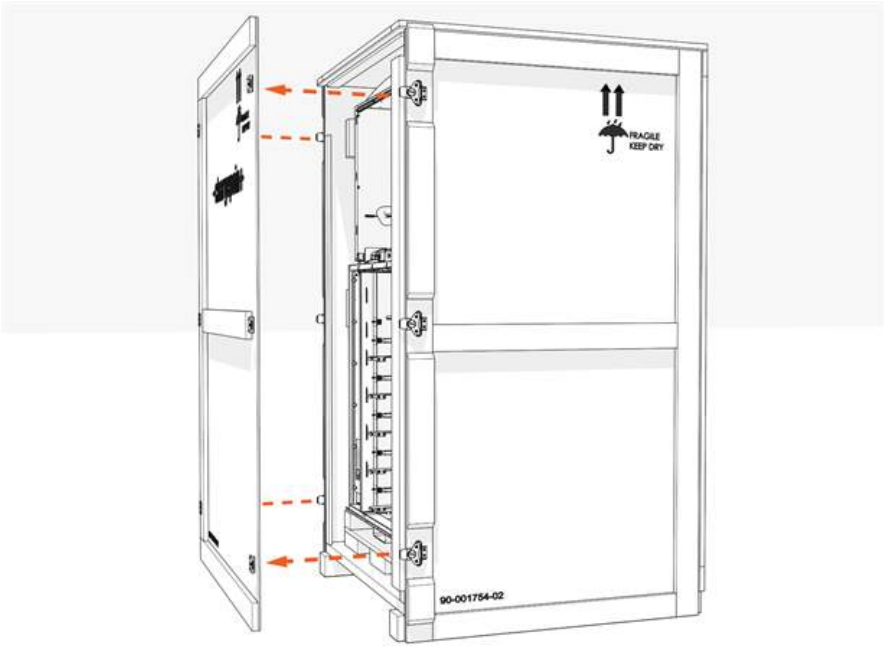
CAUTION: Maintain the upright orientation of the crate.

Prepare the Enclosure

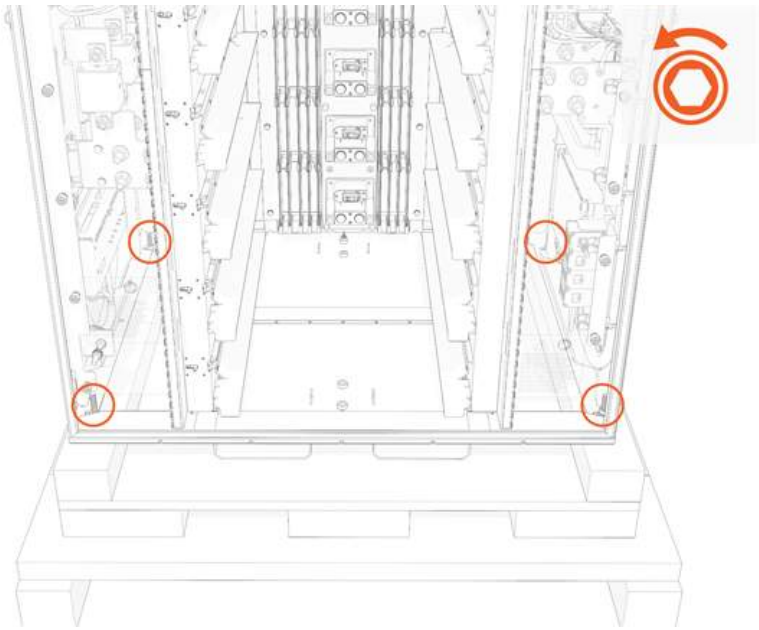
1. Transport the crate to the installation site. Use lifting straps to stabilize.



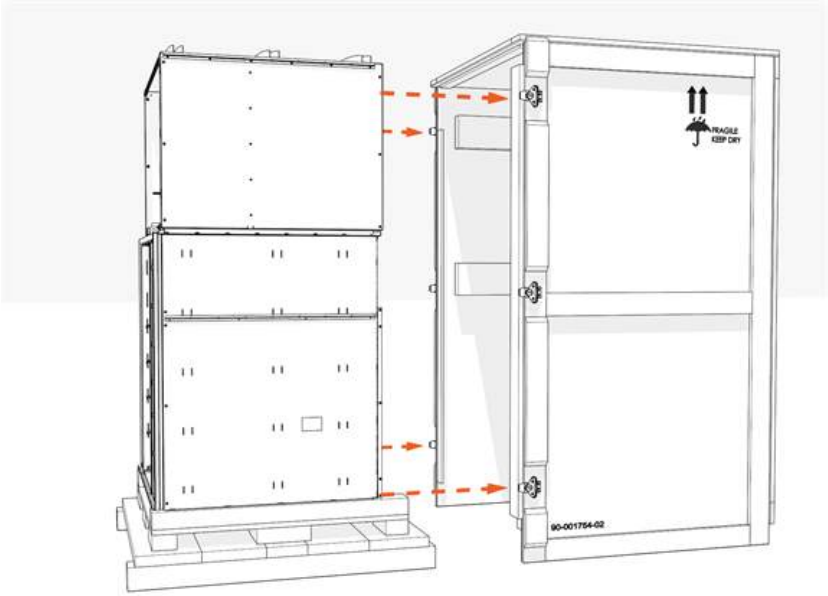
2. Unfasten and lift off the crate front.



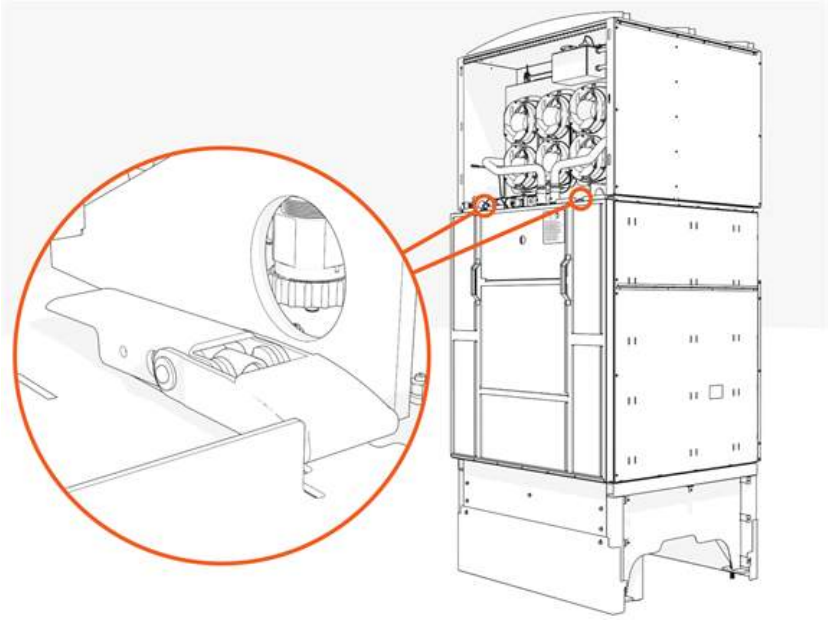
3. Use two persons to remove the crate:
    a. Uninstall four lag bolts from the crate bottom.



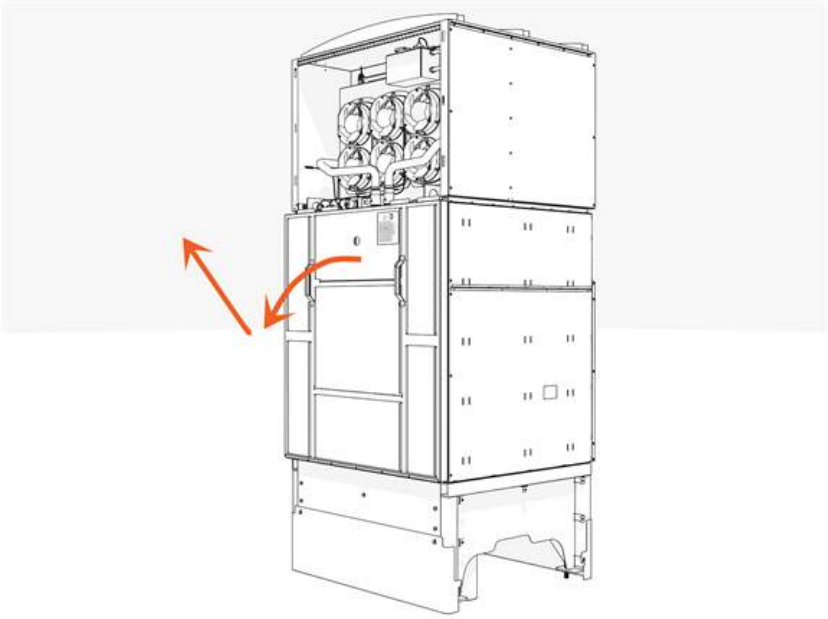
    b. Slide off the top, sides, and back of the crate.



4. Uninstall the lower door:
    a. Unfasten the two latches.



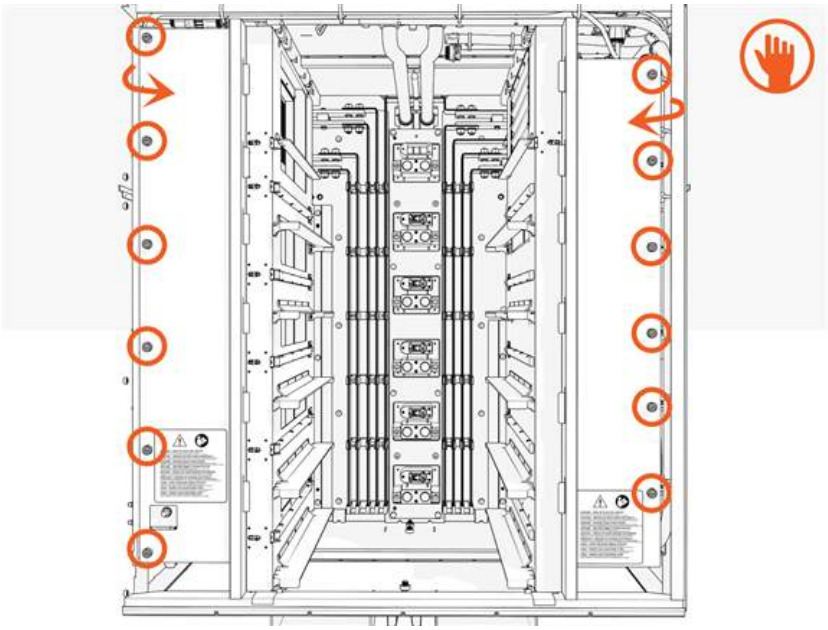
    b. Hold and tilt out the top of the door. Lift up and off.



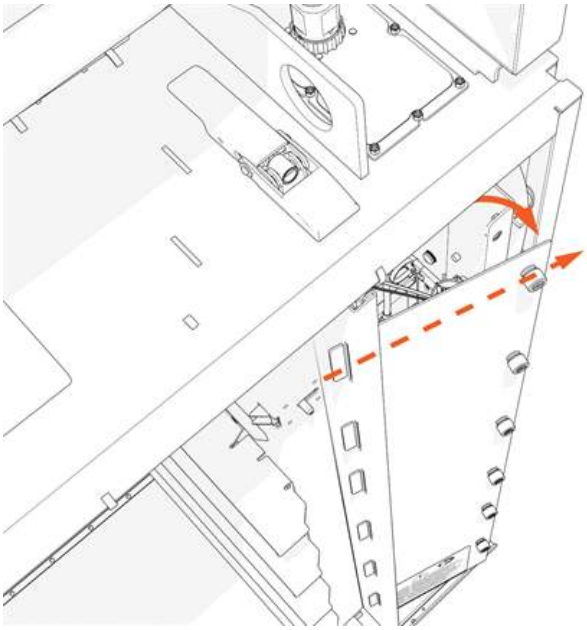
5. Remove the package that contains the lower heat exchanger (dry box hex).

    Note: You will install this later.

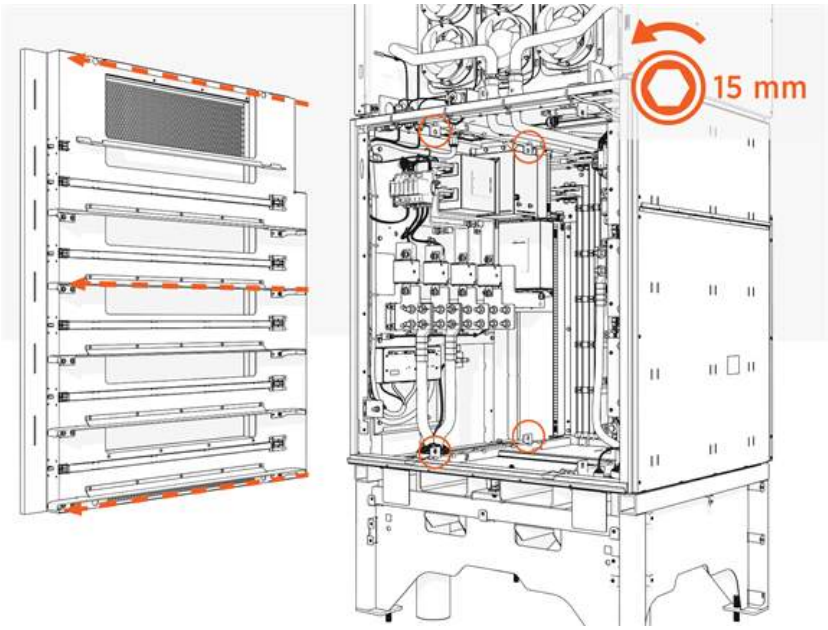
6. Remove two transparent shields (touchsafe panels):
    a. Loosen six captive screws by hand for each transparent shield (or use a #5 Phillips screwdriver).



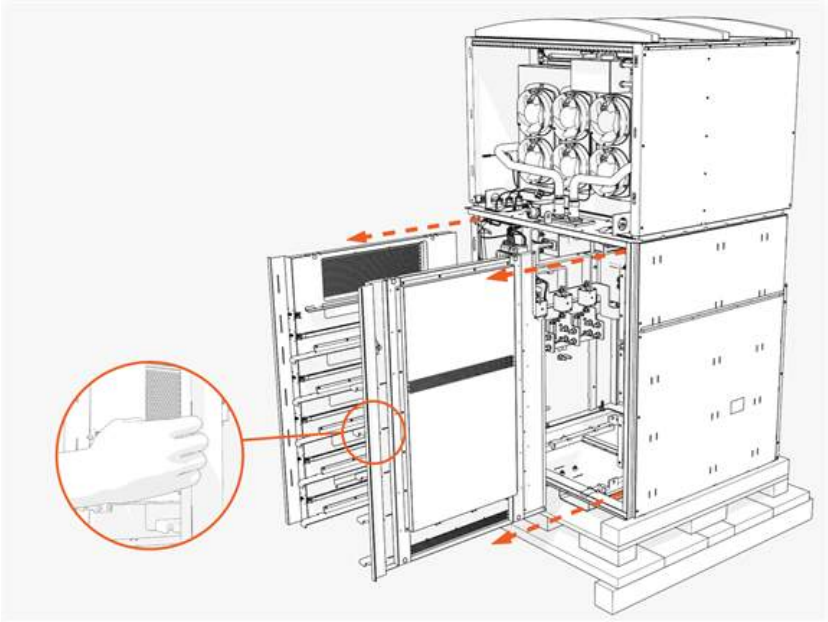
    b. Slightly rotate out the edge with the screws.



7. Remove two racks:
    a. Uninstall the two upper and two lower screws attaching the rack to the lower cabinet interior.

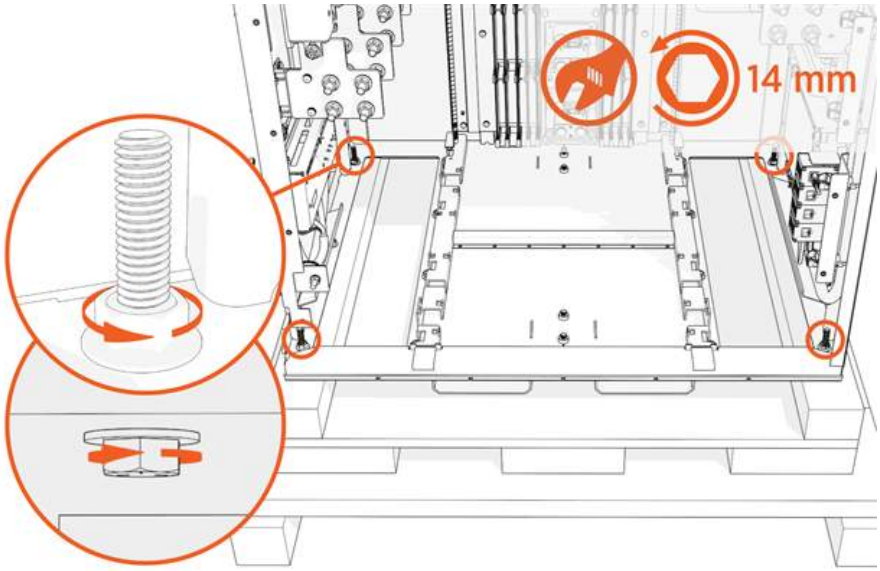


    b. Hold the outer edge of the rack and slide it out.



8. Uninstall four nuts from the base of the crate. Discard these nuts, washers, and bolts.

CAUTION: Do not drag the bottom of the Power Block enclosure at any time. Gaskets underneath can be damaged.



Position and Secure the Enclosure Using a Forklift

Note: You can position and secure the enclosure by using a forklift or by using an overhead lift (see Position and Secure the Enclosure Using an Overhead Lift).

1. Insert forklift tines into slots at bottom of the enclosure. Position straps around upper half.



2. Move and hold enclosure above pedestal. Keep it elevated. Route wiring up through bottom of enclosure.



3. Slowly move the enclosure down toward the pedestal. Continue to pull wiring up through bottom.



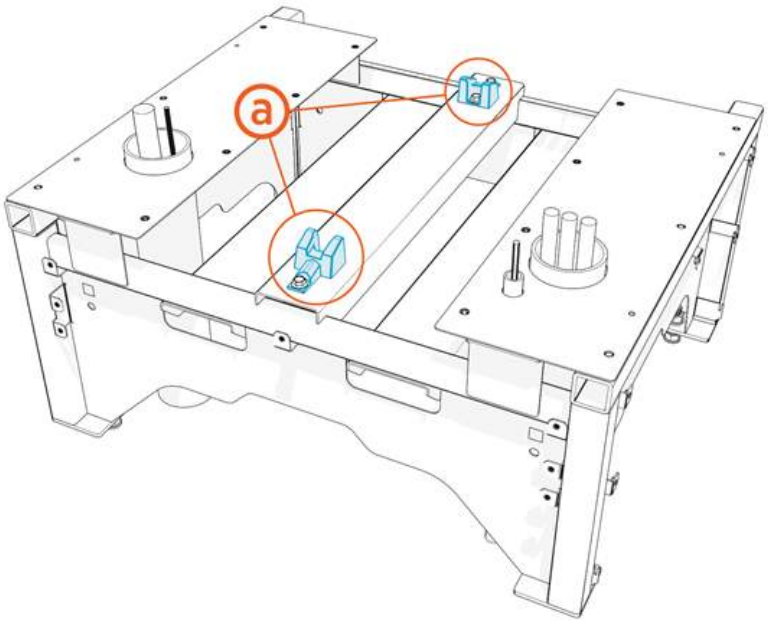
4. Position the enclosure a few centimeters (inches) above the pedestal. Continue to move wiring out of the way. Align the screw holes with approximately 6 mm (1/4 in) of space between the enclosure and the pedestal.
5. The pedestal beam has rough alignment features **(a)** that assist in aligning the enclosure bolt holes with the mounting nuts in the pedestal.

   To properly engage the rough alignment features, position the enclosure approximately within:

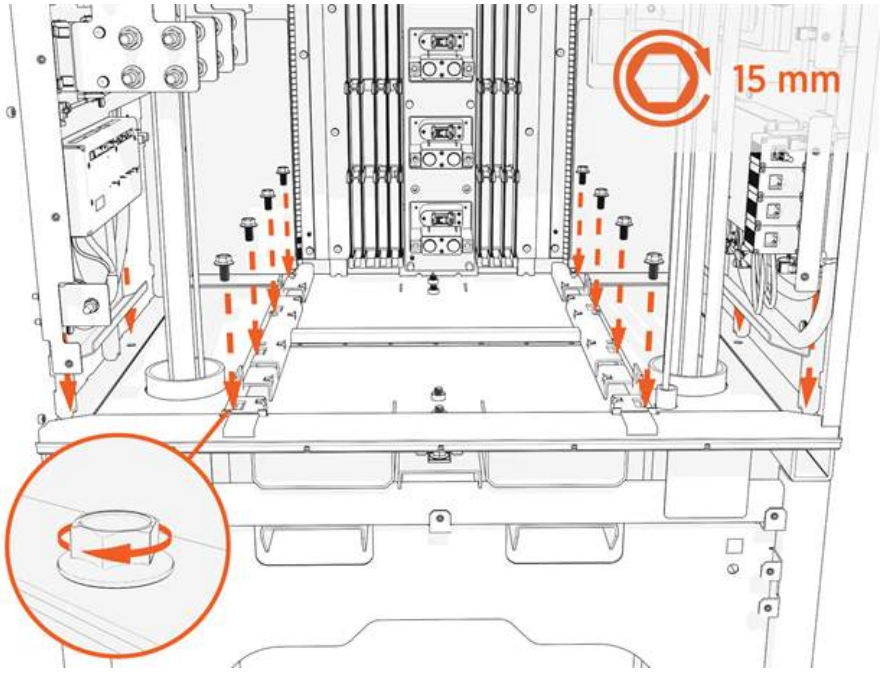
   - ± 50 mm (2 in) front-to-back
   - ± 28 mm (1 in) side-to-side

   of the nominal hole alignment while lowering it onto the pedestal.

   Note: After lowering the enclosure, if the holes (see Step 6 below) are not aligned, then re-raise the enclosure and try again with more precision.



6. Install seven hex bolts on each plate. Torque to 19 Nm (168 in-lb).



Position and Secure the Enclosure Using an Overhead Lift

You can use an overhead lift in tight locations where a forklift cannot reach or cannot be onsite to lift and move the Power Block into place.

Note: Installing the Express Plus requires at least two people. Additionally, the installer must bring the following tools and materials. These are not provided by ChargePoint

Bring These Tools and Materials

Tools



Nylon lifting straps (x2)

- Length: 4.572 m to 6.096 m (15 ft to 20 ft)
- Capacity: 567 kg (1250 lb)



Spreader bar (x1) (steel lifting beam with shackles)

- Length: 1 m to 2 m (3.28 ft to 6.56 ft)
- Capacity: 907.19 kg (2000 lb)

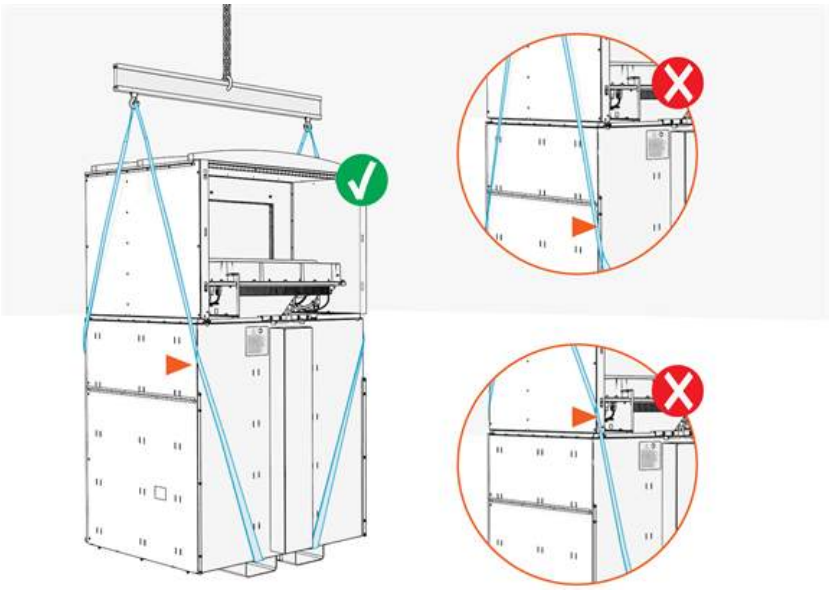


CAUTION: Lifting using the spreader bar is essential. Lifting from the forks without one:

- Will be unstable
- Will put extra forces on the straps and sheet metal
- Has not been tested, nor approved

1. Prepare the enclosure for the overhead lift:
    a. Attach the spreader bar to your lifting device.
    b. Feed one end of each lifting strap through the fork lift tunnels.
    c. Attach both ends of the lifting straps to the spreader bar. The attachment points should be 1 m to 1.5 m (39.37 in to 59.06 in) apart and centered on the spreader bar.

    Note: These steps can be done with the spreader bar on the ground or in a raised position, centered above the enclosure.
2. After the spreader bar is in the raised position, ensure the following:
    a. The lengths of the lifting straps, both front and rear are approximately equal. Otherwise, the enclosure will tilt when raised.
    b. The straps are wrapped around the corners of the enclosure, roughly halfway up the height--above the side brackets, but below the top enclosure. This will prevent damage to the straps or the enclosure.



3. Follow **Steps 2 through 6** of the previous section (Position and Secure the Enclosure Using a Forklift section).

Connect Power Block Wiring

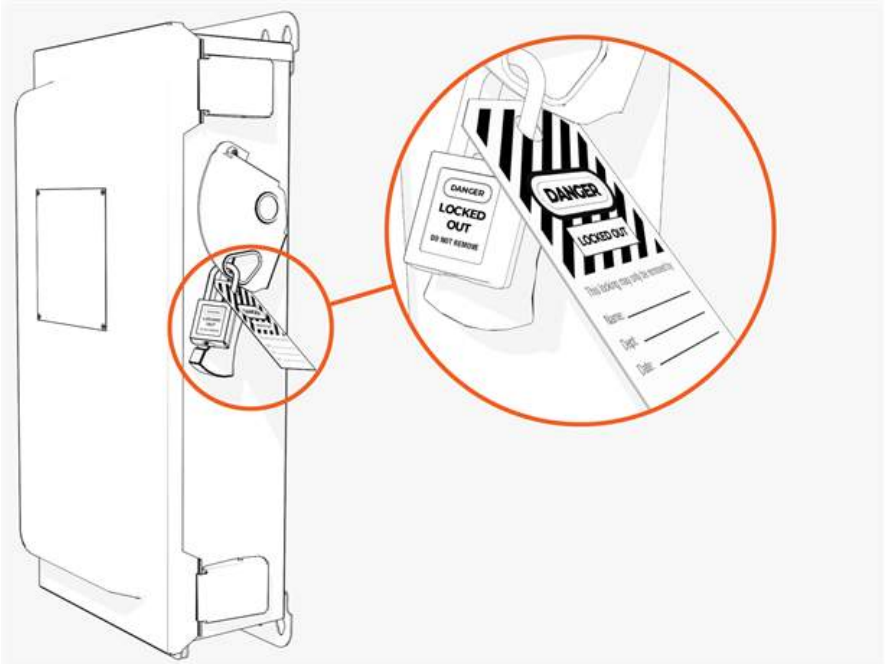
DANGER: RISK OF SHOCK

- Before any procedure, disconnect the power.
- Follow local code and site lockout/tagout procedure to de-energize the station.
- Wait for energy to dissipate (approximately five minutes).
- Keep power off until all covers and panels are reinstalled and the work is complete.

FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN SERIOUS INJURY, LOSS OF LIFE, OR PROPERTY DAMAGE.

CAUTION: Ensure a grounding conductor that complies with local code is properly grounded to earth at service equipment or, when supplied by a separate system, at the supply transformer.

1. Disconnect power at the site electrical panel. Follow standard practice and local code to de-energize the applicable circuit and lock out/tag out the disconnect before proceeding. Use a multimeter to test that power is off.



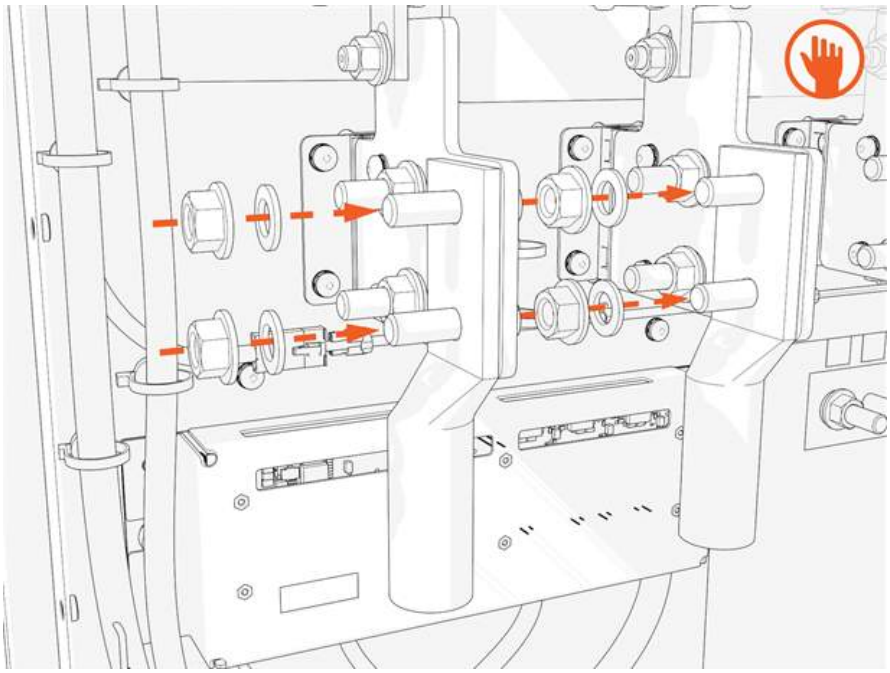
2. Install lugs without the conductors onto bus bars and hand-tighten.

   Note: Use included bolts, washers, and nuts.

   a. DC output

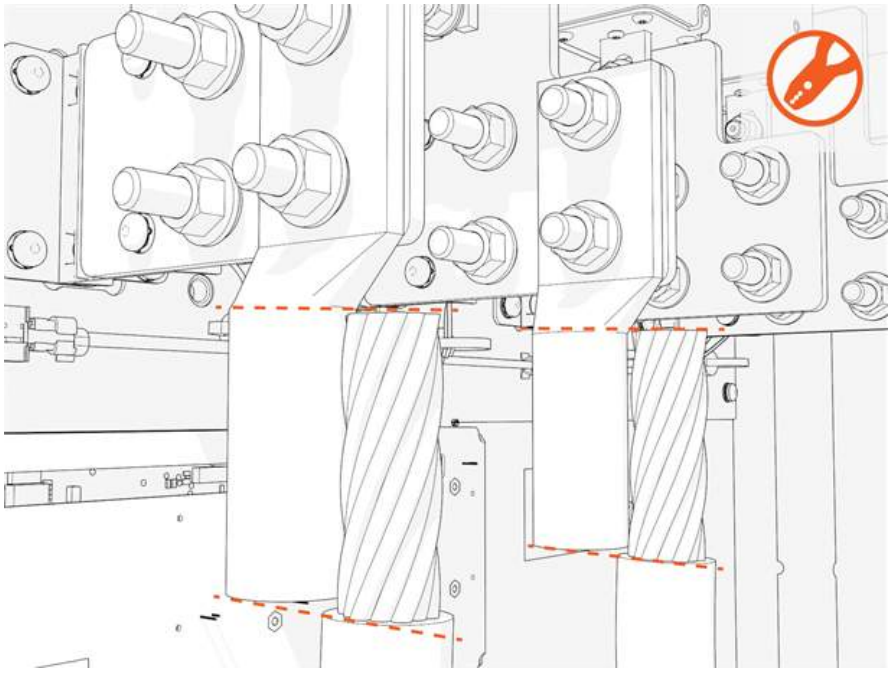
   b. AC input

   c. DC input, if applicable



3. Measure the length from each conductor to its corresponding lug. Mark the conductor at the point where you will need to cut it.

4. Strip and cut the conductors to the desired length.

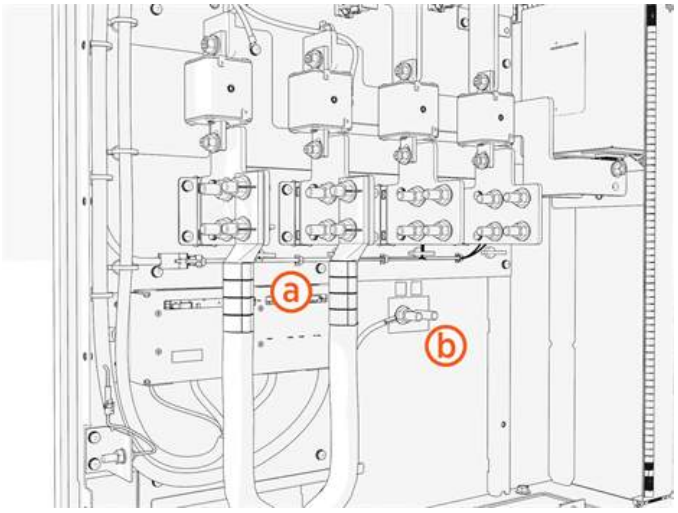


Install Conductors and Lugs, Ground Wires, and Fuse Kits

IMPORTANT: For any DC or AC lug with a single hole, the lug must be installed **within +/- 10° from vertical** to avoid interference.

a. DC output lugs
b. DC ground wire

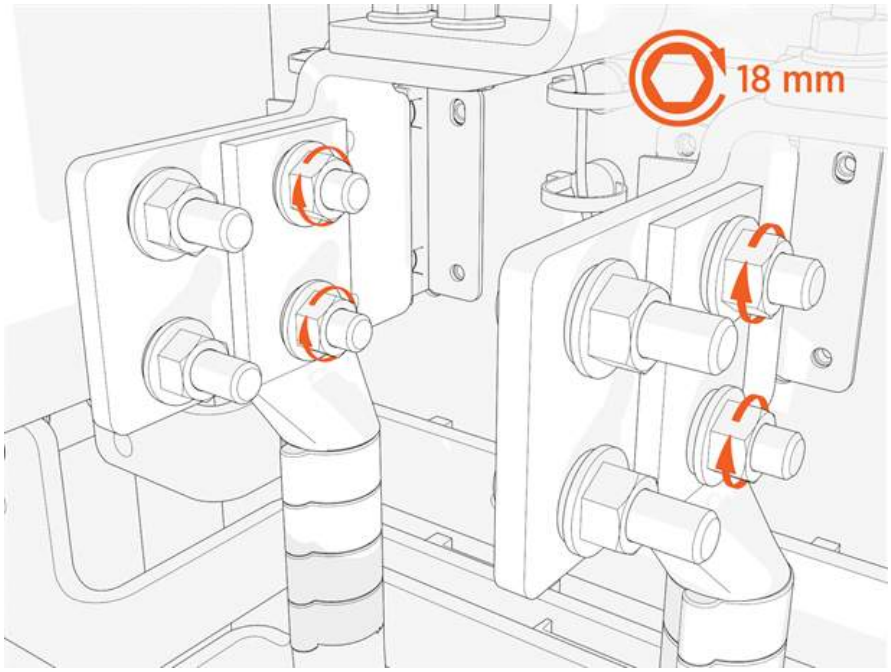
Note: For each AC and DC bus bar, only one washer per bus bar hole is required, even if lugs are installed onto the front and back of the same bus bar.



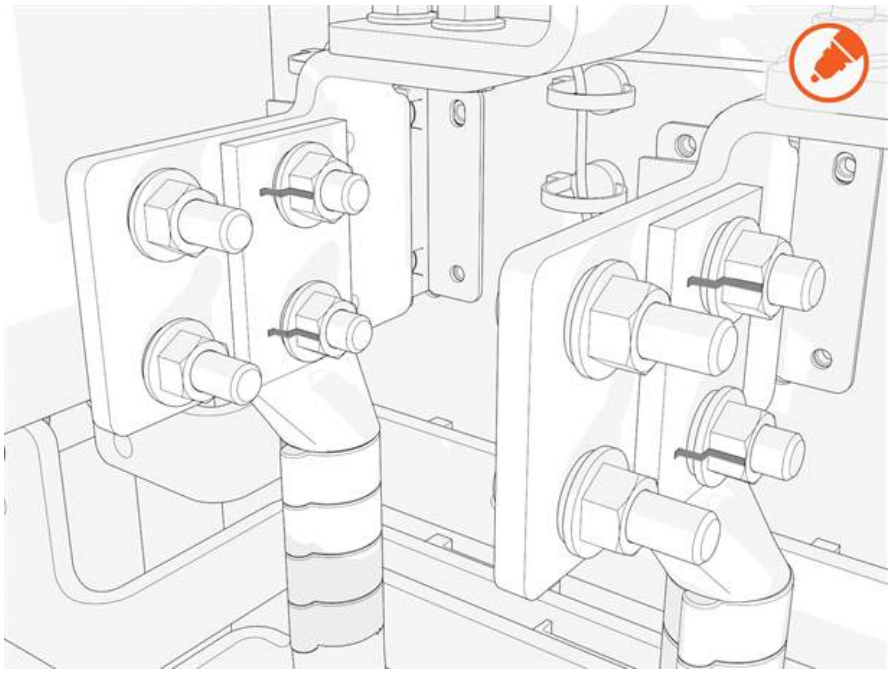
DC Output Lugs

1. Uninstall the lugs (if you installed them previously to measure length). Apply dielectric grease onto the back of each lug.
2. Crimp a DC output lug onto each conductor.

   Note: Use the lug manufacturer's crimp tool and die.
3. Install lugs onto each bus bar and torque to 29 ± 8 Nm (256 ± 70 in-lb).

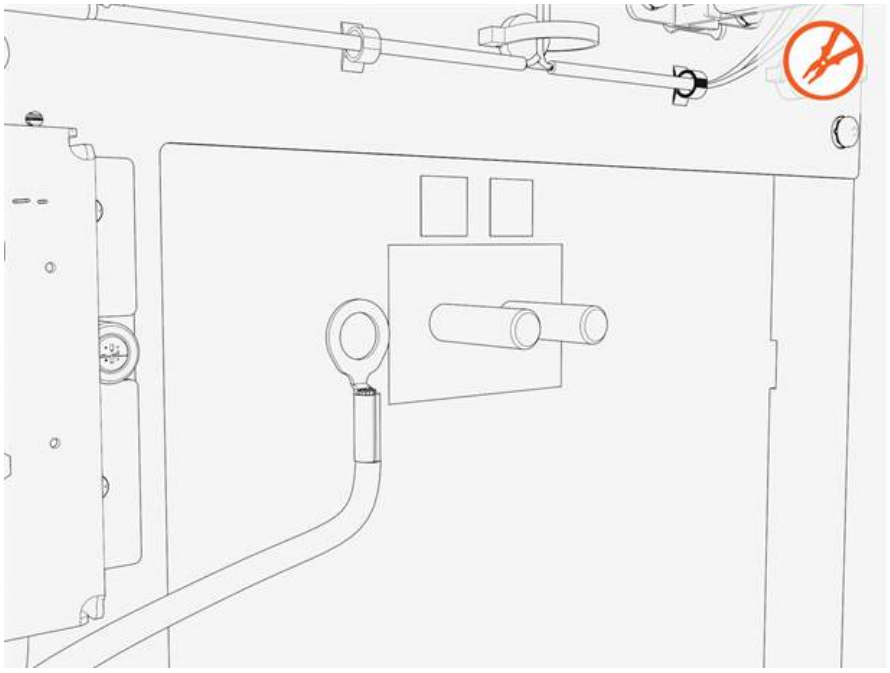


4. Mark all torqued power connections.

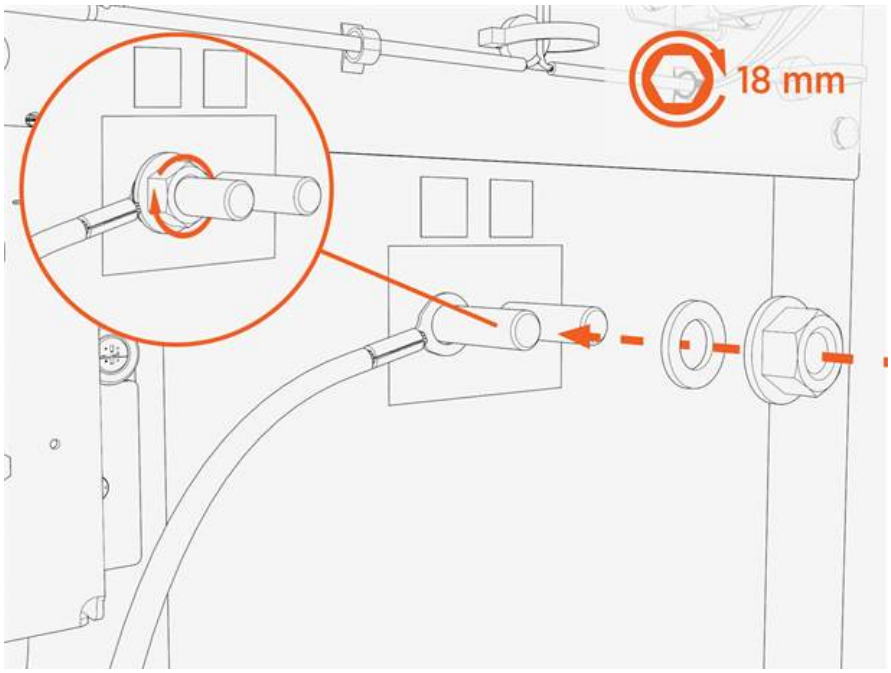


DC Ground Wire

1. Crimp a 13 mm (1/2 in) single-hole lug onto the DC ground wire.



2. Connect the GND (protective earth) service wiring to the stud on the left side of the enclosure.

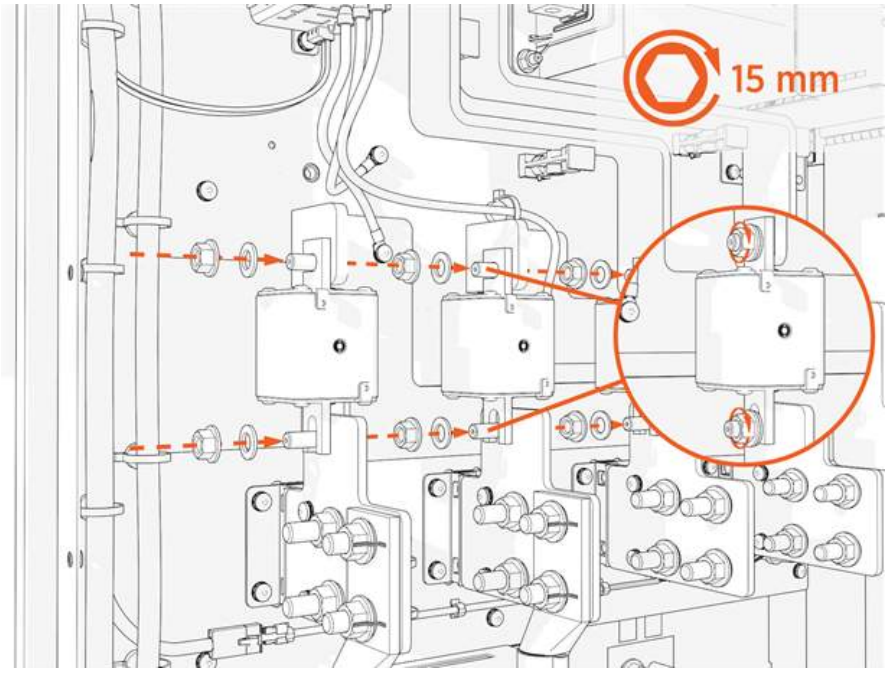


DC Fuse Kits

IMPORTANT:

- Route all wiring away from the fuses. Each fuse can reach very high temperatures.
- The rating on the fuse label will be higher than the rating on the fuse packaging. This is normal and is done so that the fuse performance is sufficient at elevated temperatures.

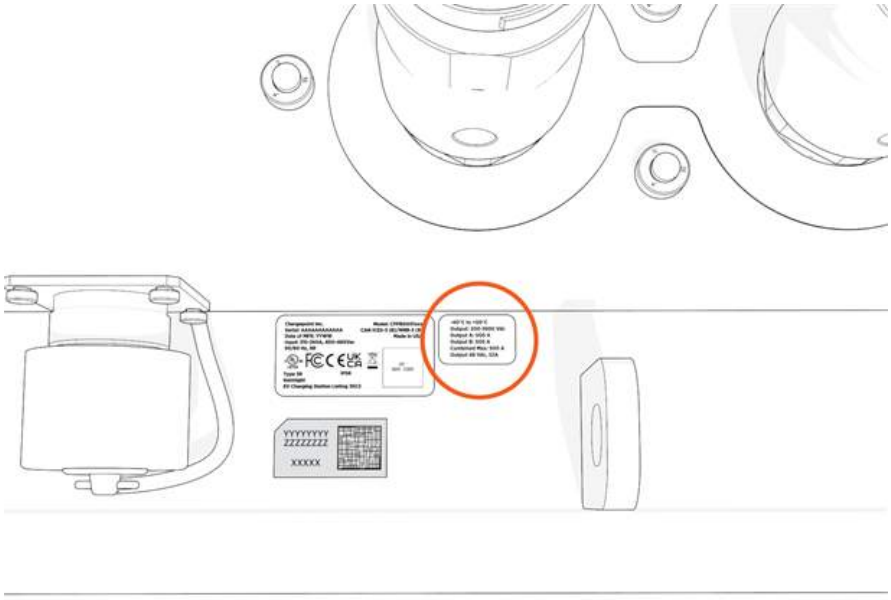
1. Install all DC fuses (regardless of number of lugs used) between the landing bus bar and the DC bus bar. Torque to 19 Nm (168 in-lb).



Adhere Ratings Label

IMPORTANT: Position the label near the serial number label, next to Ethernet port.

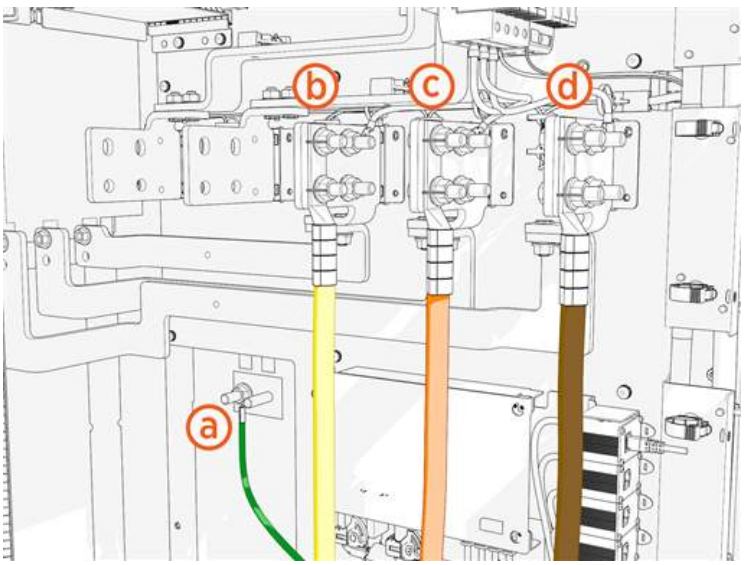
1. Adhere the associated ratings label.



AC Input Lugs

IMPORTANT: If the AC input wiring uses only one 750 kcmil conductor, it must be installed on the bus bar in the position farthest from the wall (toward the center) to avoid interference.

a. Ground wire
b. L3
c. L2
d. L1

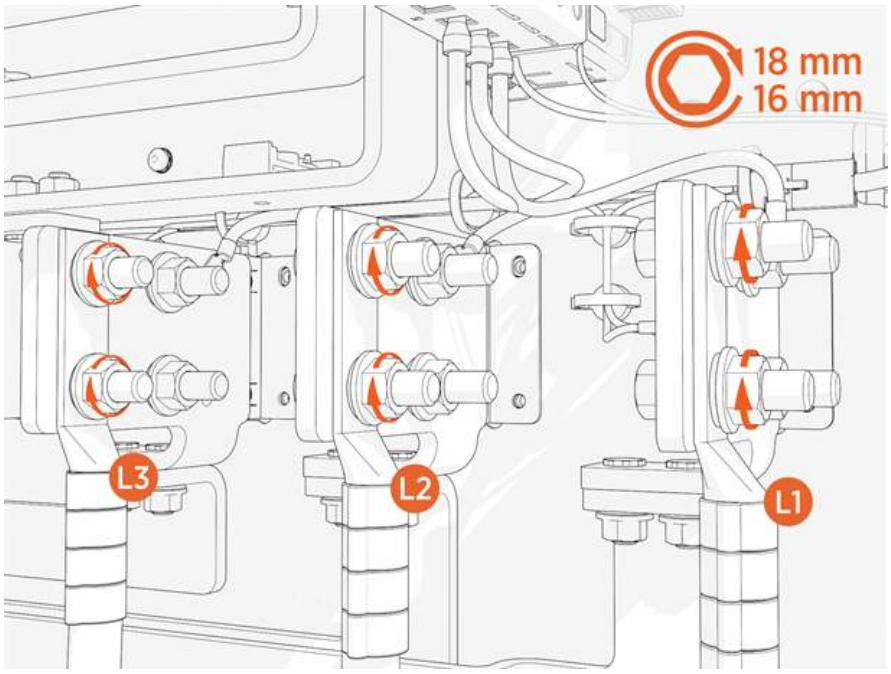


1. Uninstall the lugs (if you installed them previously to measure length). Apply dielectric grease onto the back of each lug.
2. Strip and crimp an AC input lug onto each conductor.

   Note: Use the lug manufacturer's crimp tool and die.

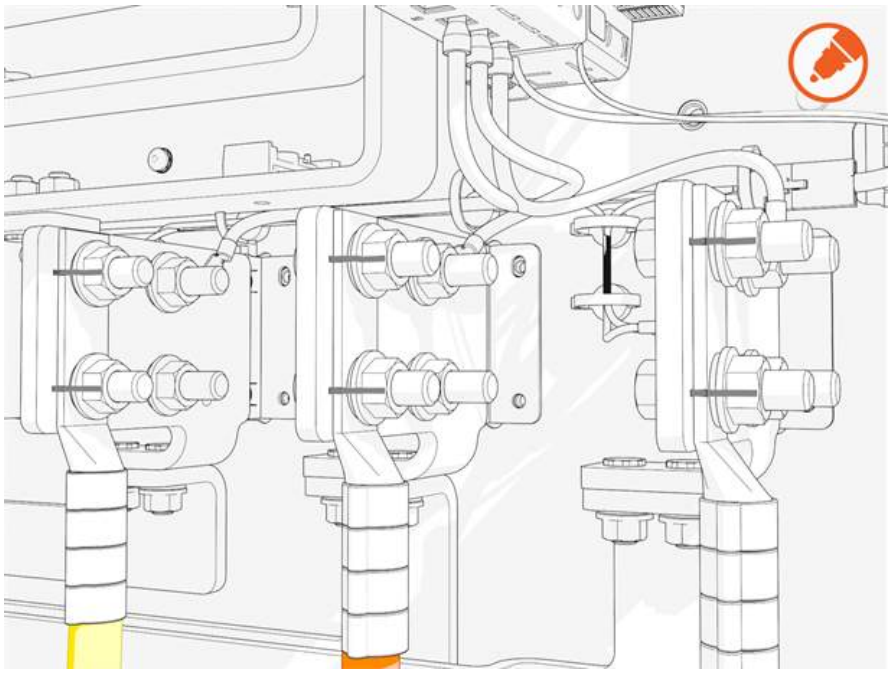


3. Install the L1, L2, and L3 lugs onto each bus bar with M12 bolts. Torque to 29 ± 8 Nm (256 ± 70 in-lb).



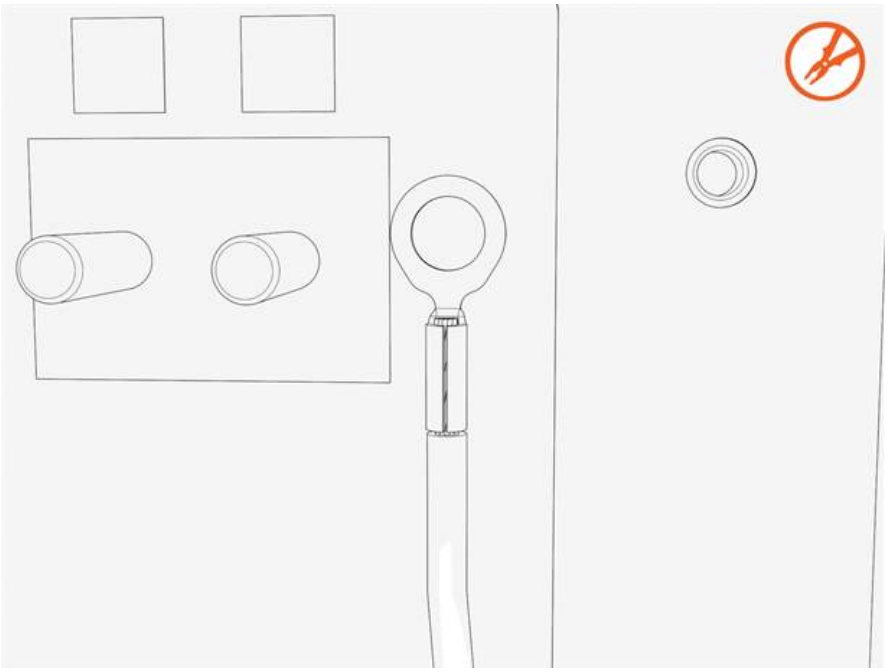
IMPORTANT: Ensure the L1, L2, and L3 cables are installed in the correct order for counter-clockwise phase rotation. Incorrect installation creates a phase rotation error later in the process.

4. Mark all torqued power connections.

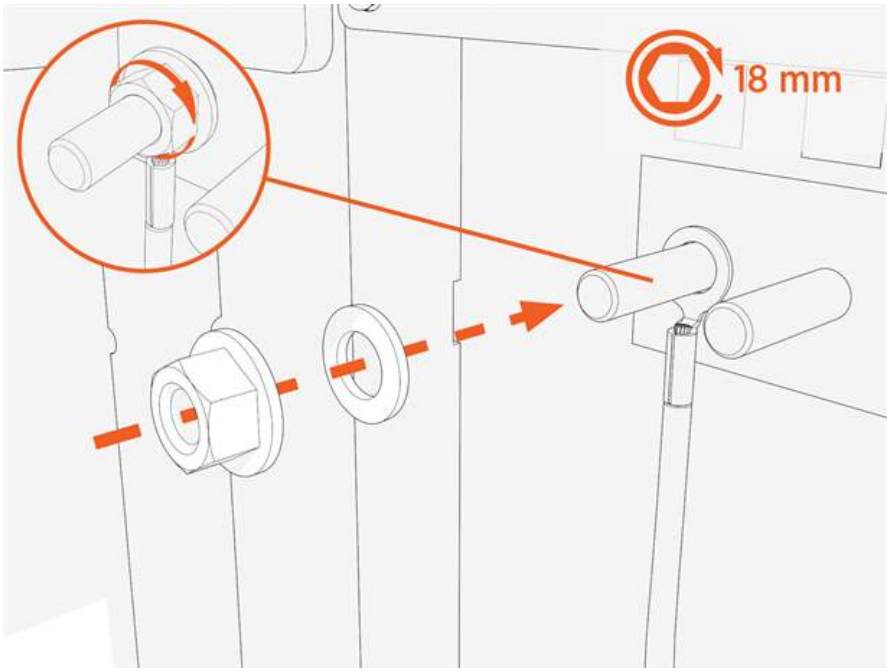


AC Ground Wire

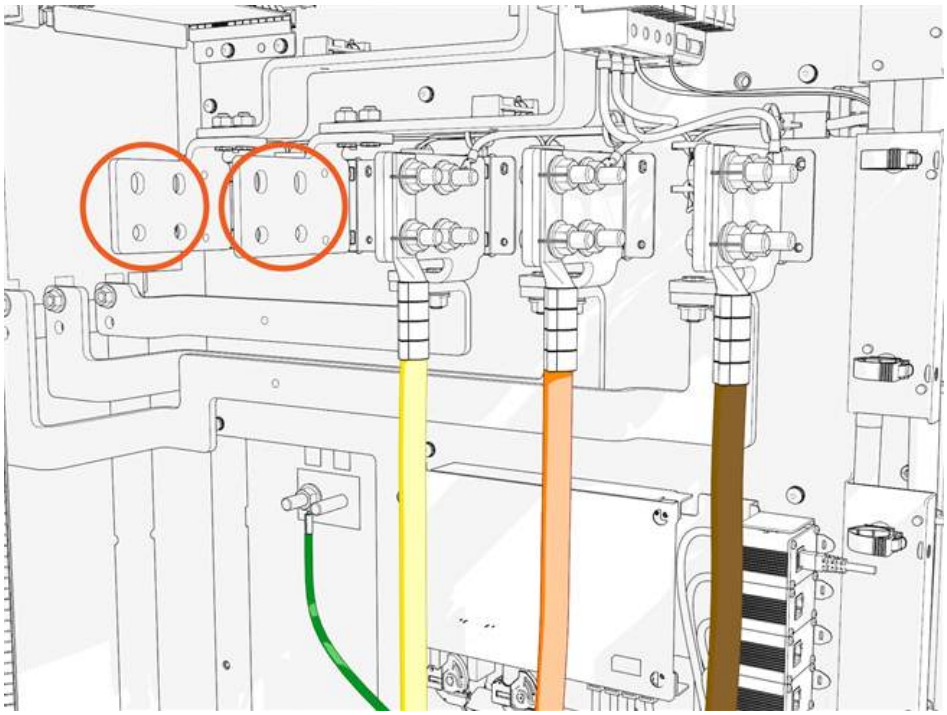
1. Crimp a 13 mm (1/2 in) single-hole lug onto the AC ground wire.



2. Connect the GND (protective earth) service wiring to the stud on the left side.

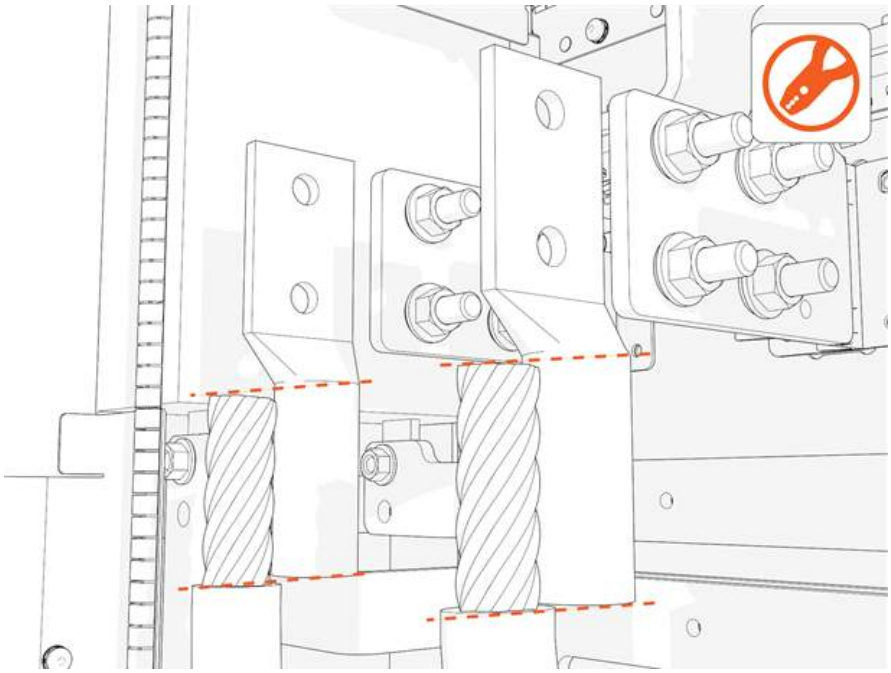


DC Input Lugs

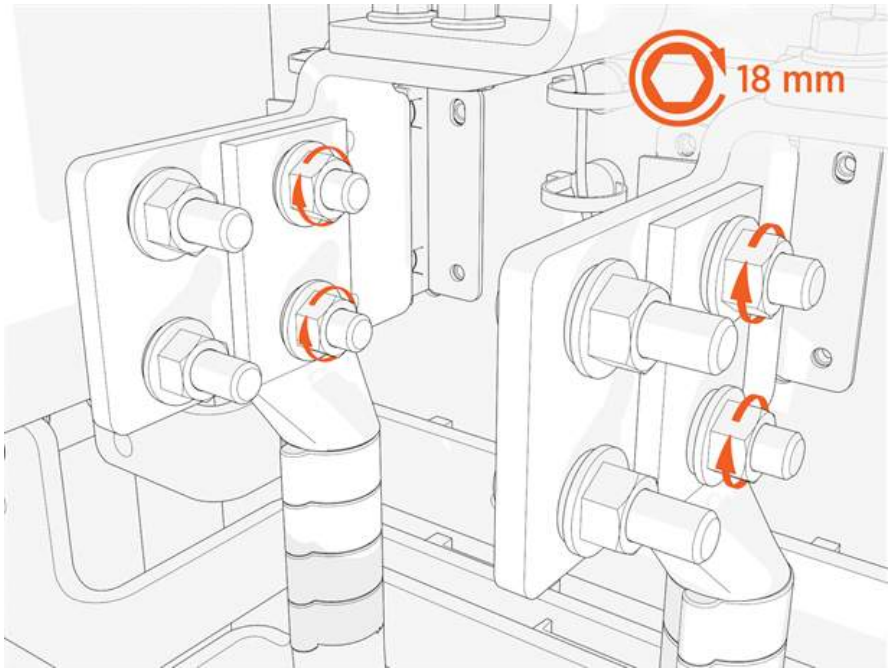


1. Uninstall the lug (if you installed them previously to measure length). Apply dielectric grease onto the back of each lug.
2. Strip and crimp a DC input lug onto each conductor.

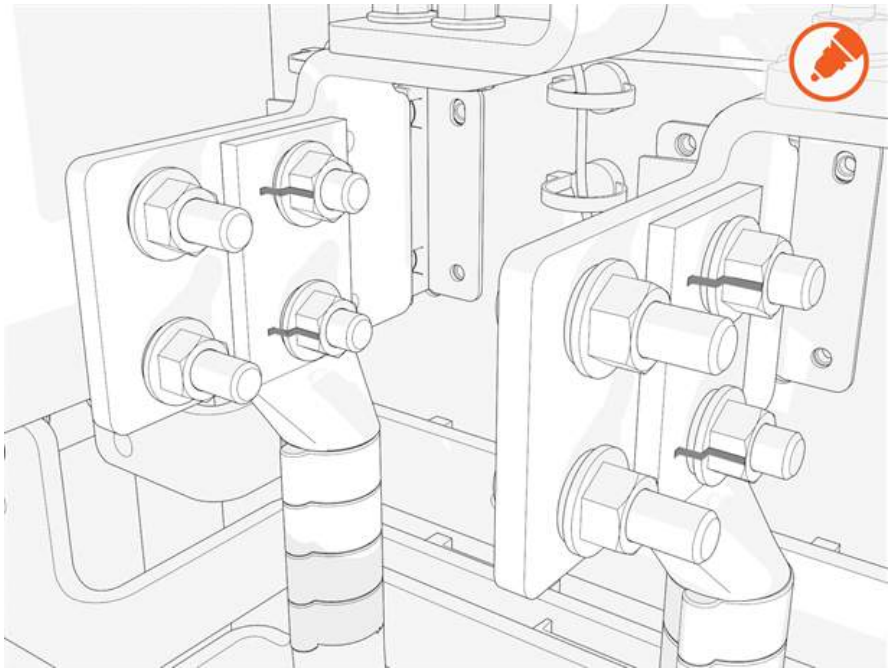
   Note: Use the lug manufacturer's crimp tool and die.



3. Install lugs onto each bus bar and torque to 29 ± 8 Nm (256 ± 70 in-lb).



4. Mark all torqued power connections.



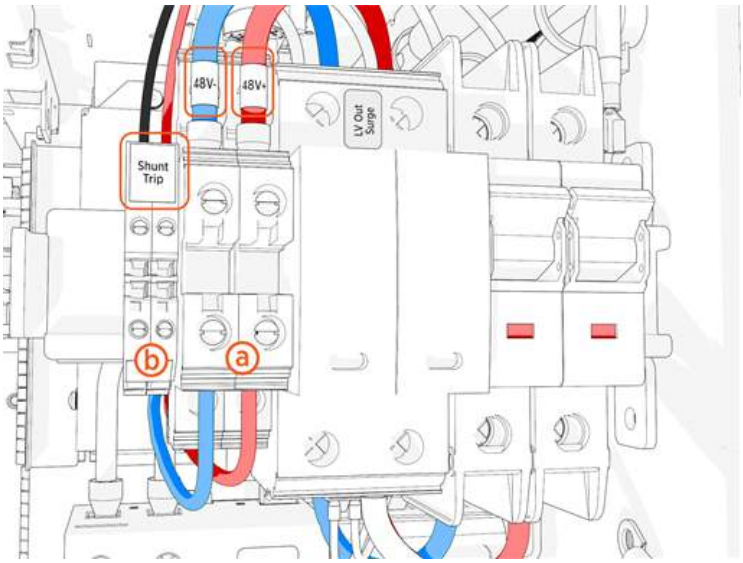
48 V DC and (if Applicable) Shunt Trip

Check the 48 V DC wiring requirements in the site drawings:

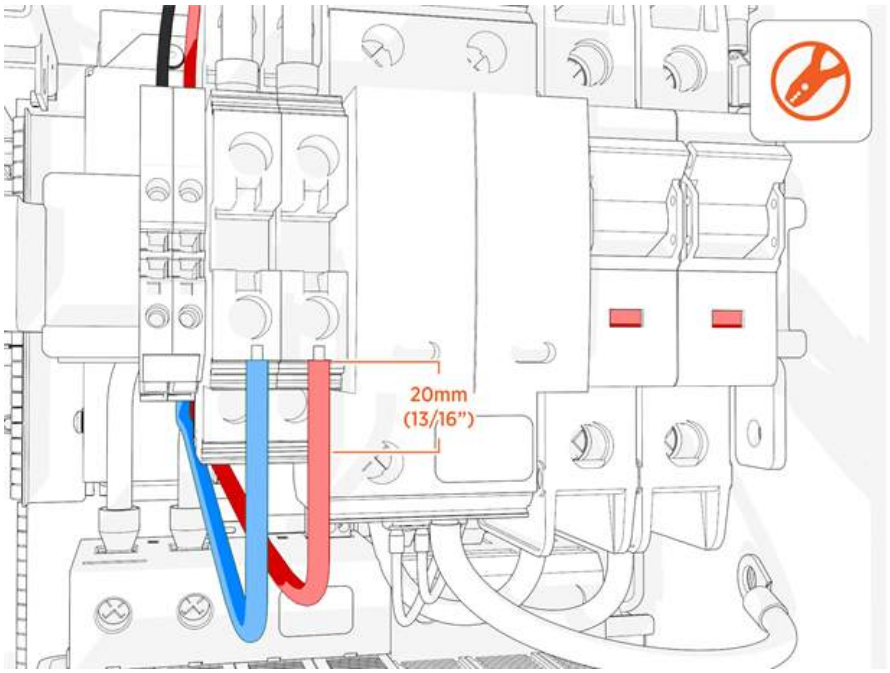
48 V DC Wire Size	Conduit Size	Installation
16 mm^2 (6 AWG)	21 mm (3/4 in)	Install two 48 V DC wires and one Ethernet cable into one conduit.
Note: Use only copper conductor wire rated for 90 °C (194 °F).		

a. 48 V DC
b. Shunt trip (if any)

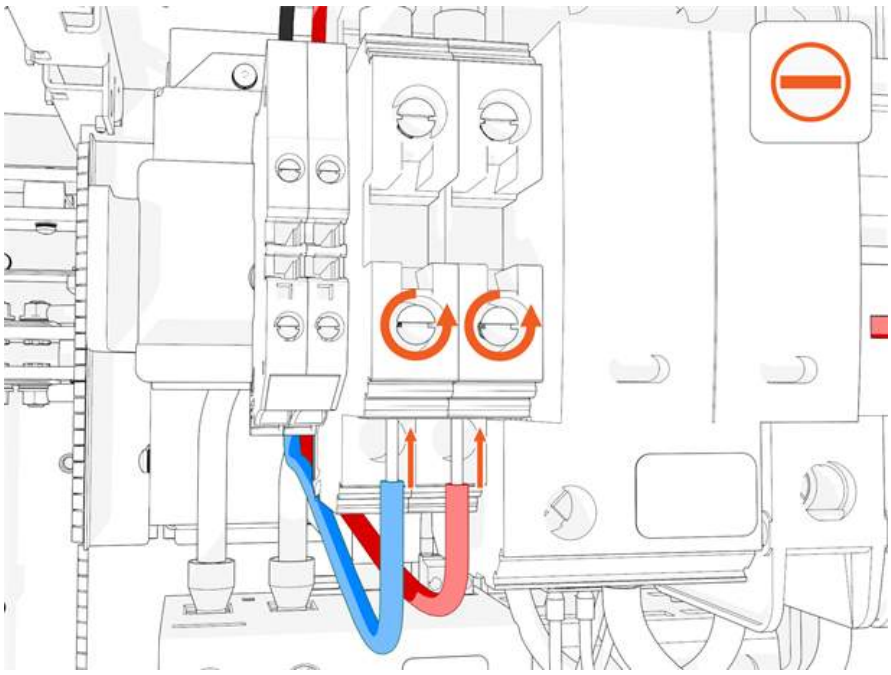
Note: Notice the labels.



1. Strip each 48 V DC and any shunt trip wires to 20 mm (13/16 in).

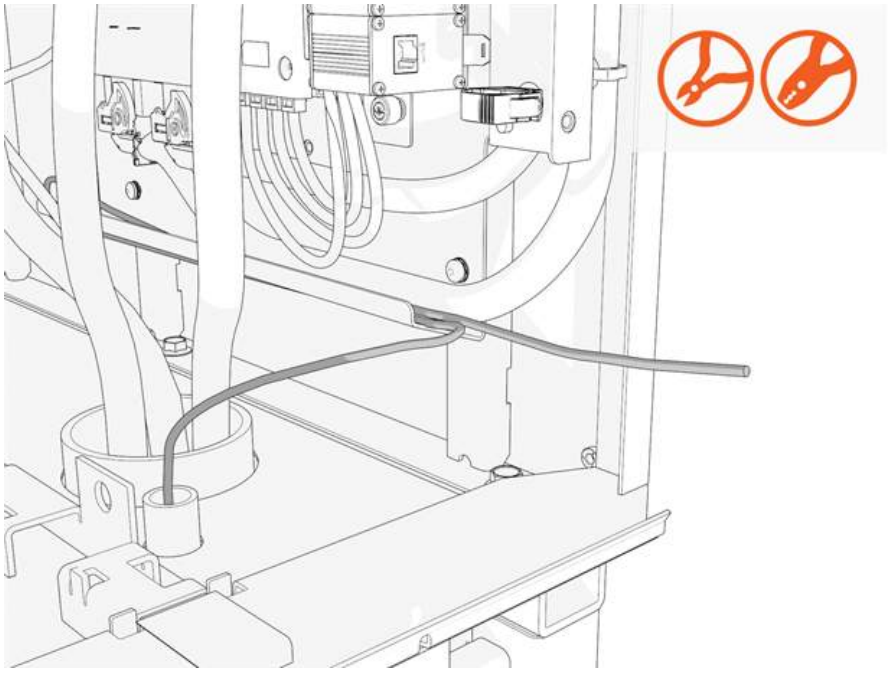


2. Loosen each terminal tab and seat the wire. Tighten the screw. Push-pull to test.



Cat6 STP Ethernet Cable

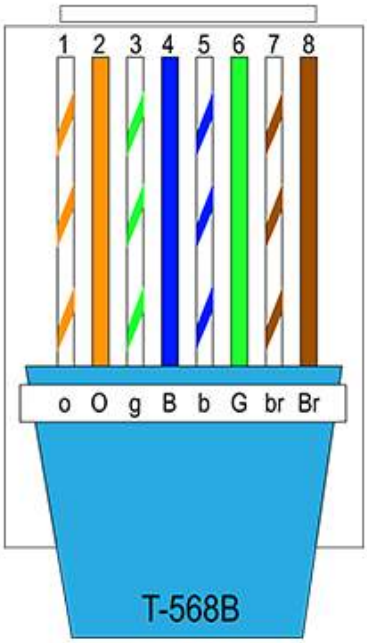
1. Trim each Cat6 STP Ethernet cable to provide a 914 mm (36 in) service loop.



2. Terminate both ends. Field crimp a shielded connector onto each Ethernet wire.

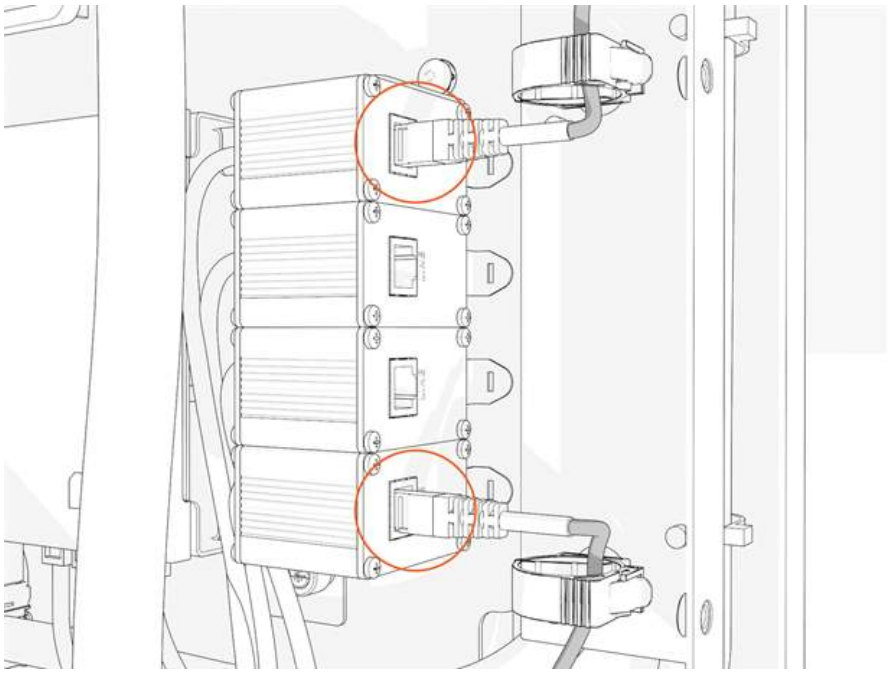


3. Use a straight-through T568-B pattern.



4. Connect the shield wire termination.
5. Test each Ethernet wire functionality.
6. Connect each Ethernet connector to an available port (at lower right). Push-pull to test.

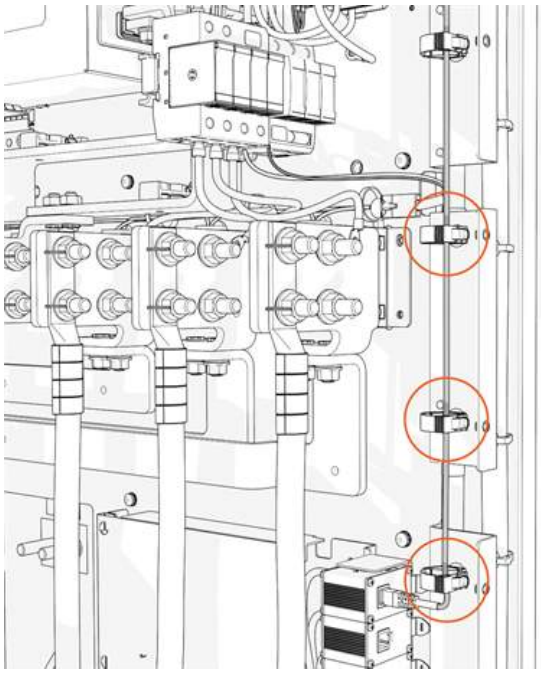
   Note: Ports are interchangeable.



Route and Secure

1. Route the Ethernet, 48 V DC, and shunt trip wires down the front, right side. Secure onto the cable-routing clips.
2. Position excess Ethernet wire loops behind the controller board mounts.

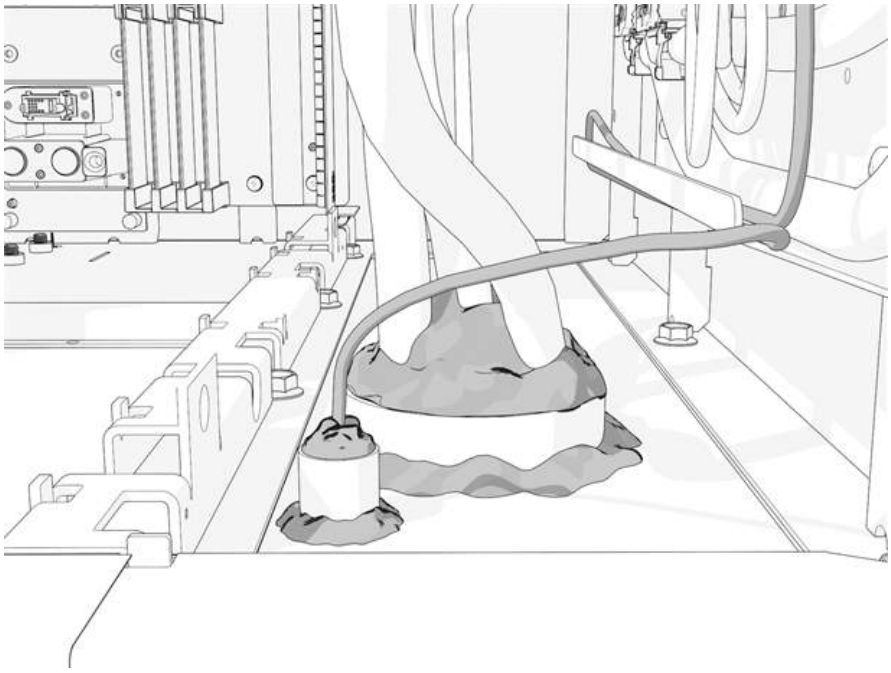
   Note: This is to prevent covers from pinching these wires.



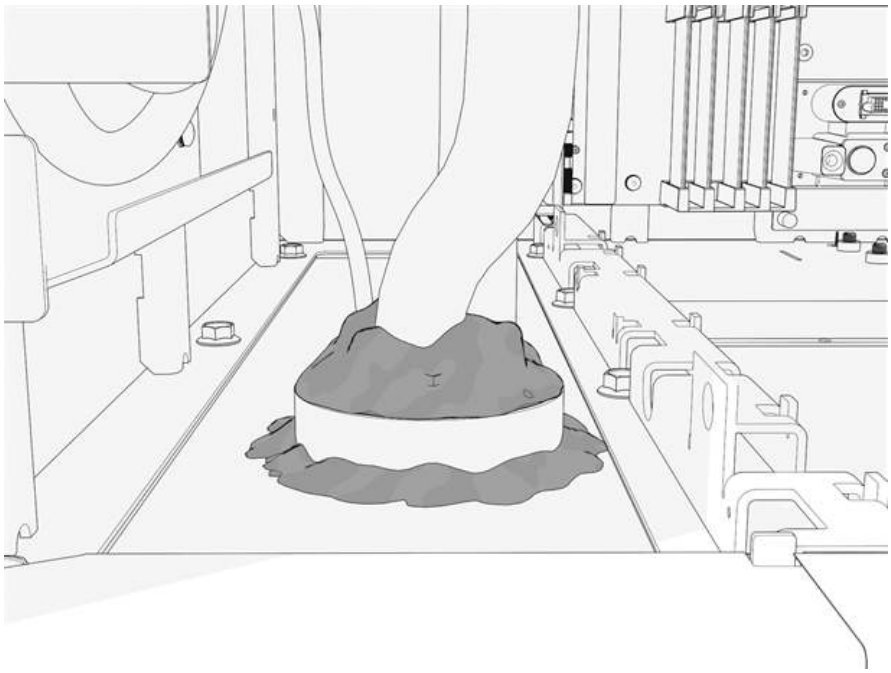
Seal Completely

IMPORTANT: The conduit opening must be sealed to protect the wiring from any debris, pests, and other matter.

1. Vacuum all wire ends and metal shavings from the enclosure.
2. Use duct seal compound (included) to seal all wiring openings and seal inside conduits.



3. Use the duct seal compound to seal the conduits around and to the gland plates.



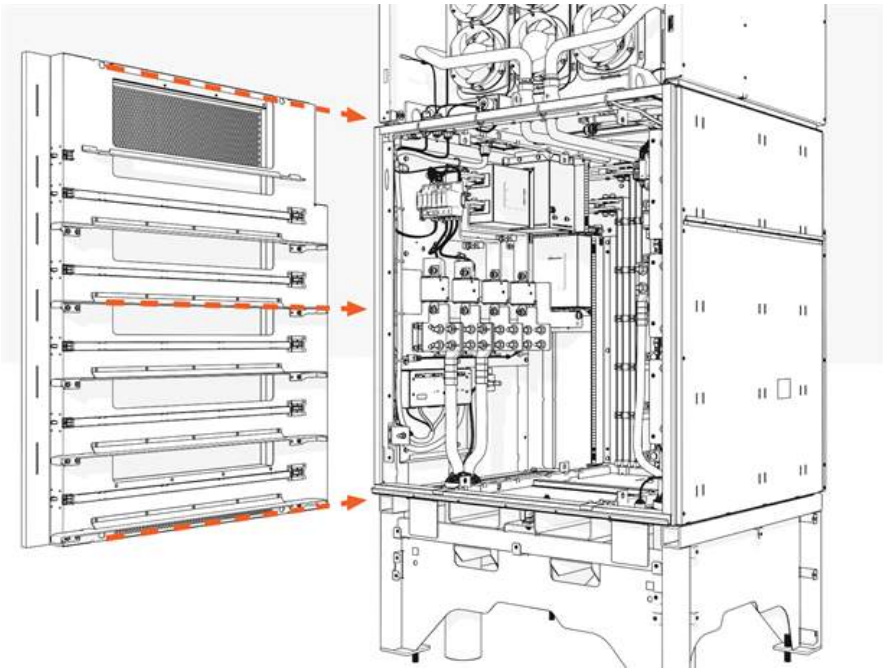
Install Power Block Internal Parts and Fill Coolant

A Power Block can use up to five Power Modules, which ship in separate pallets.

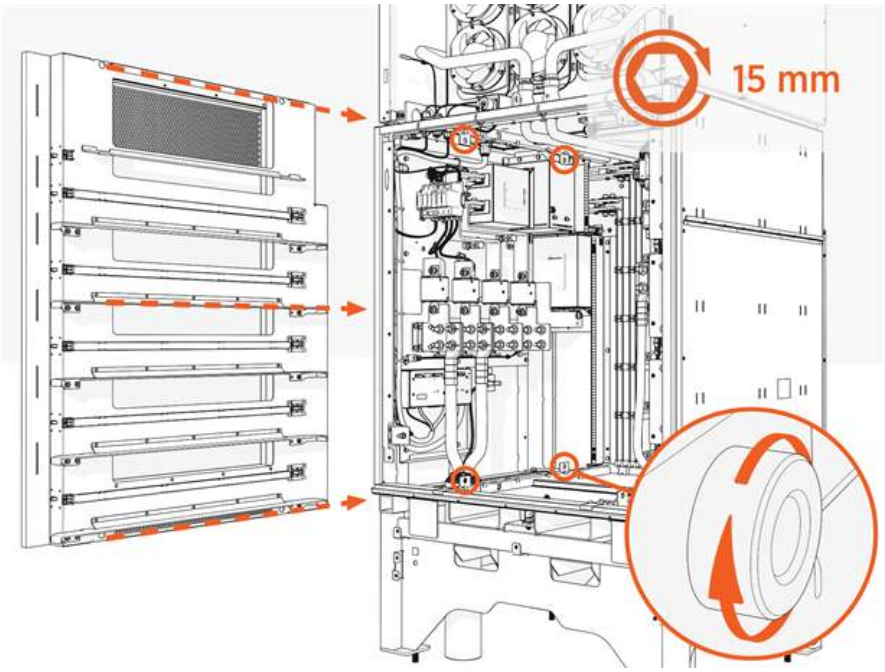
CAUTION: Install the rack with latches on the left. Orient the supports toward each other to form shelves for each Power Module.

Install Left and Right Racks

1. Align each rack vertically along the guide rails. Slide into the lower cabinet.

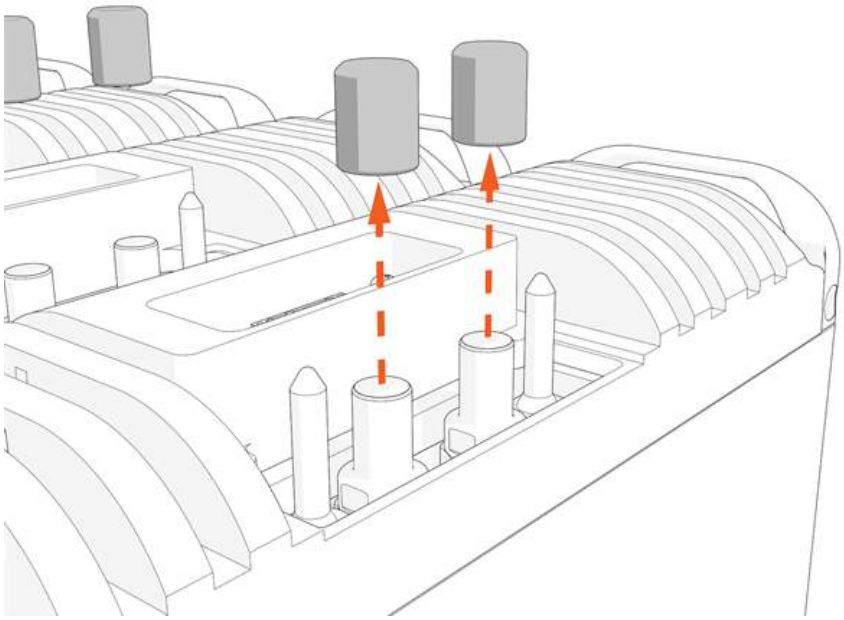


2. Install screws into the cabinet interior (front and rear, upper and lower) for each rack and torque to 19 Nm (168 in-lb).

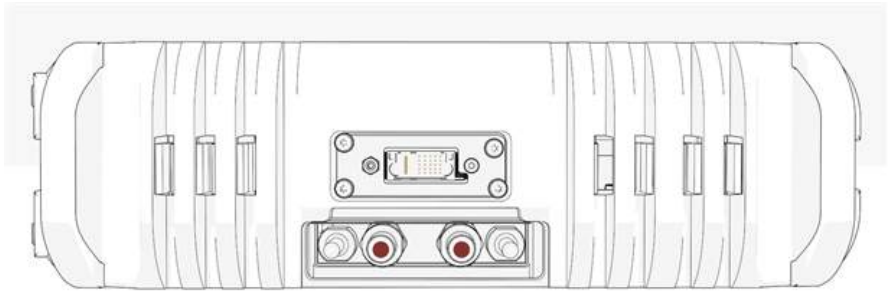


Power Module Installation

1. Remove caps from the coolant ports.

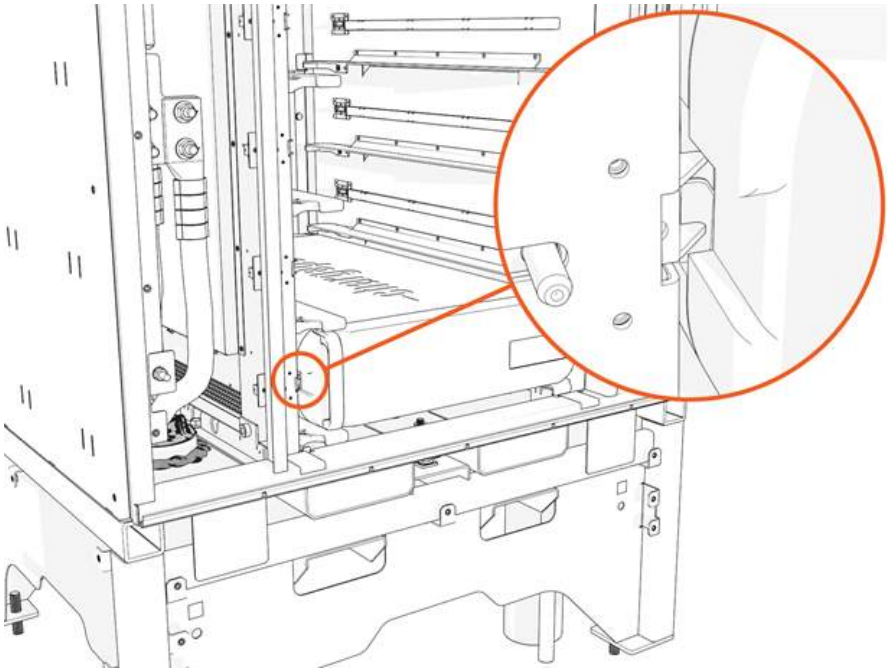


2. Position the Power Module with the data connector above the coolant port to align with the module mate.

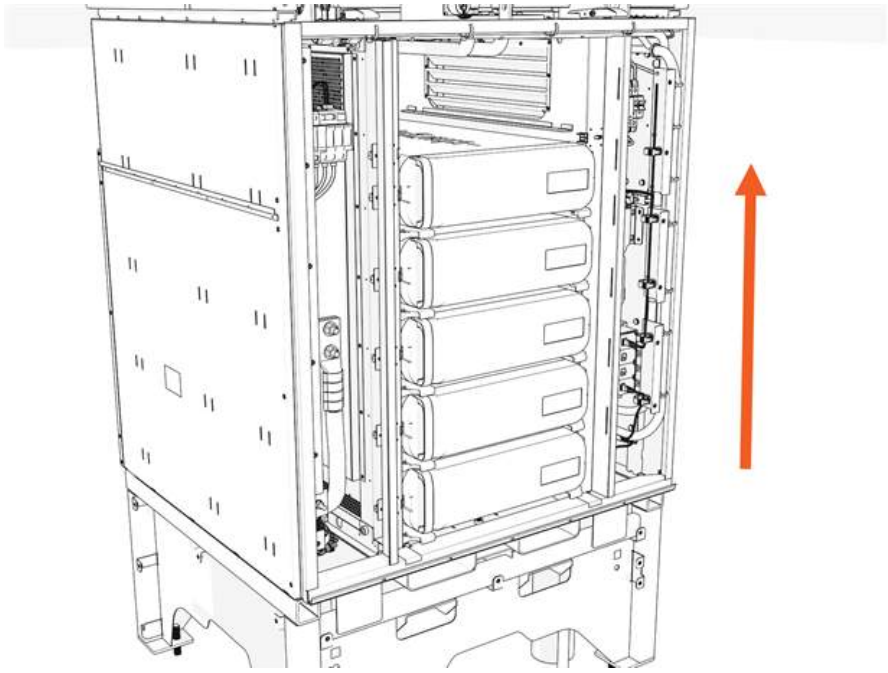


3. Insert the Power Module onto the rack and slide it in until the latch locks.

IMPORTANT: Install Power Modules from lowest to highest.



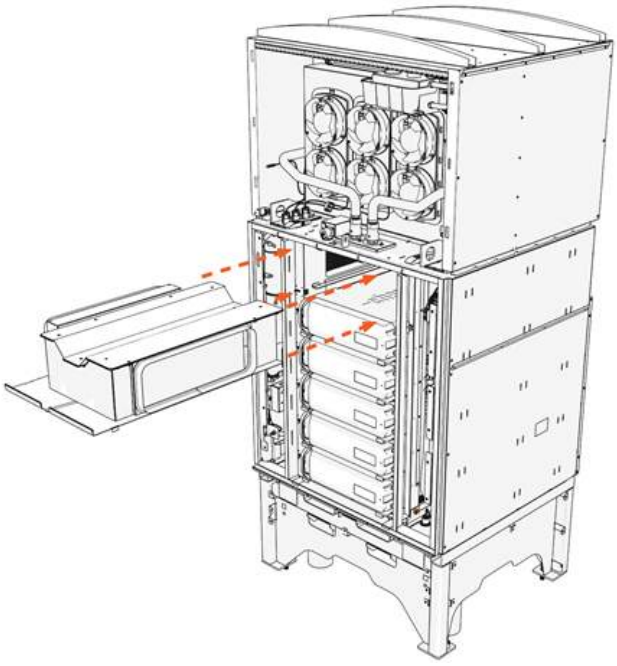
Insert Power Modules from the bottom rack to the top.



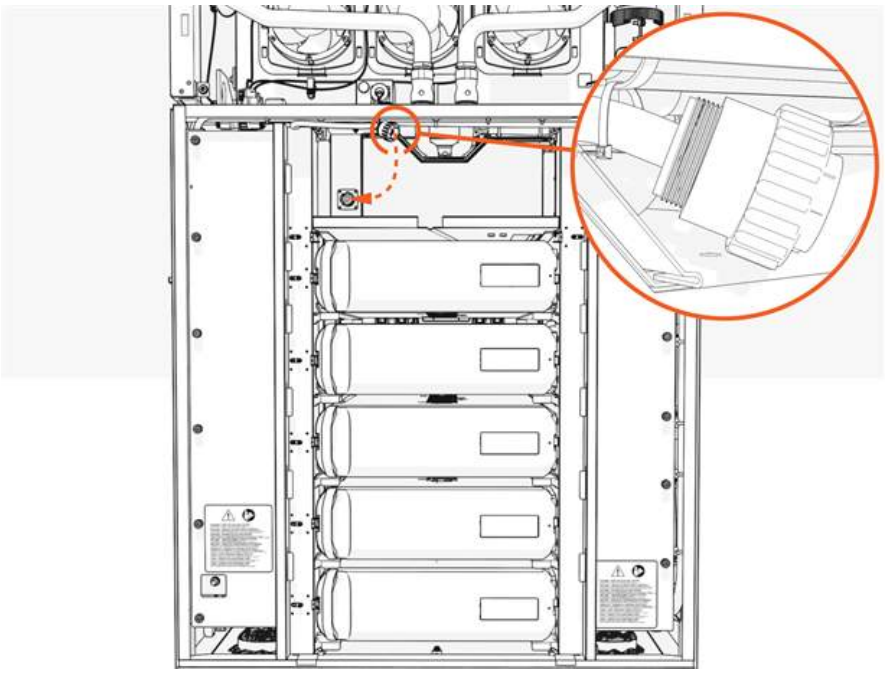
Install the Lower Heat Exchanger

Note: Cut any zip ties to release the round multipin power connector.

1. Slide the heat exchanger onto the top shelf.



2. Reconnect the round multipin connector (front left). Push down and rotate the outer ring to screw down. Push-pull to test.



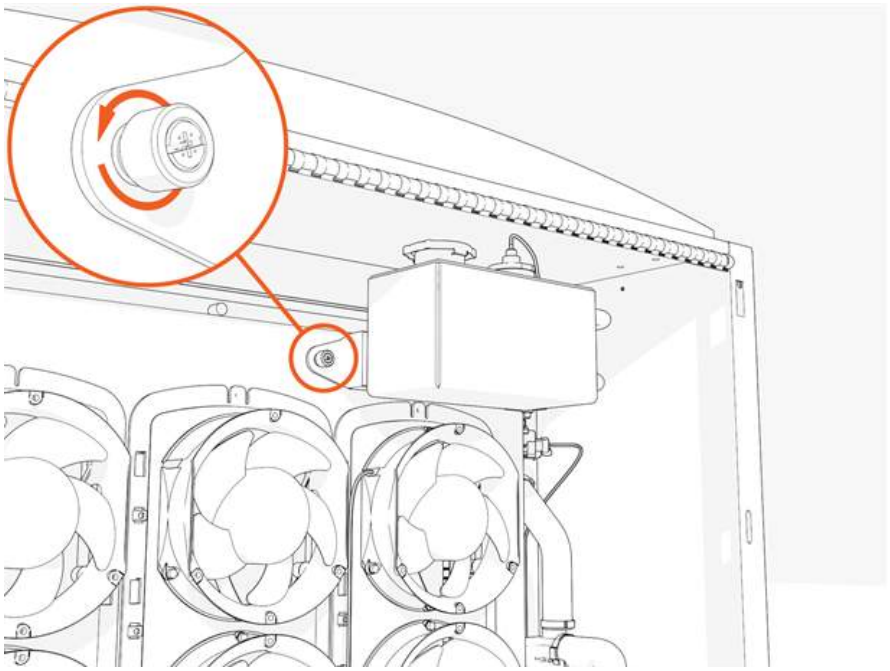
CAUTION: After you service the coolant system or remove, reinstall, or replace a Power Module, always refill or top off the coolant.

You must also check the coolant level at the intervals required by the maintenance schedule in the Operation and Maintenance Guide.

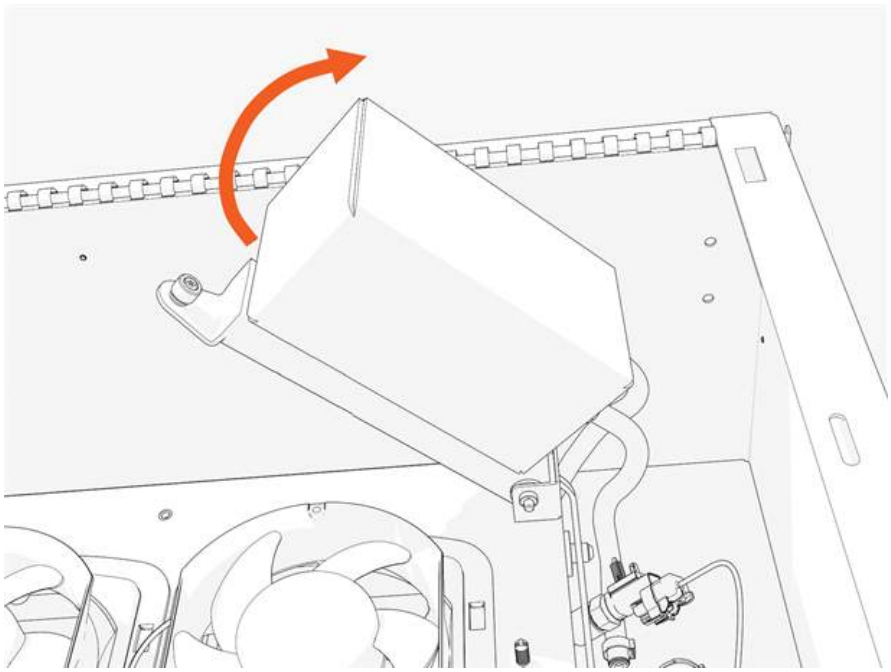
Fill Coolant

Open Reservoir

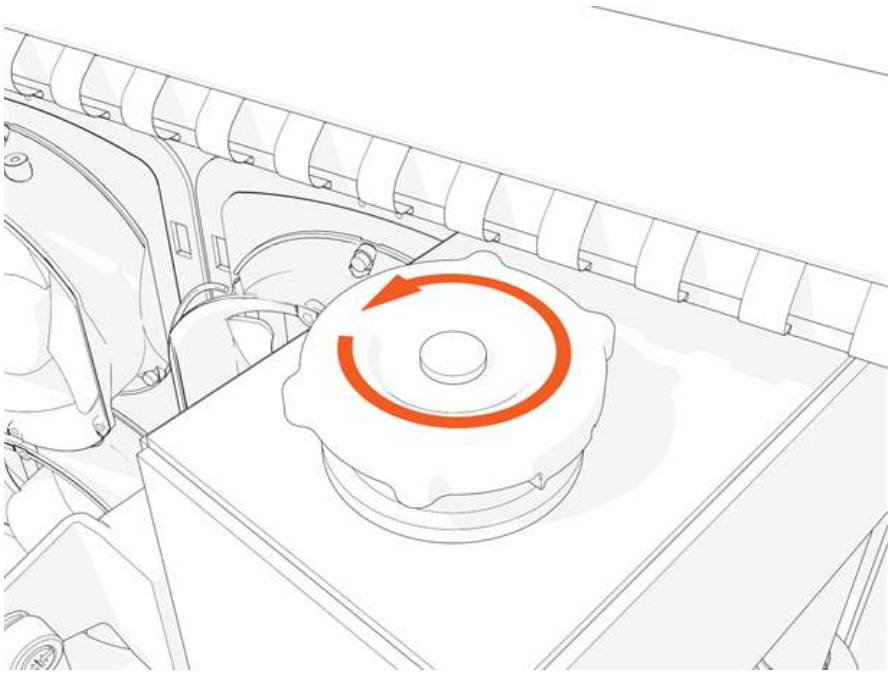
1. Open the coolant reservoir to release pressure. Loosen the captive screw.



2. Pull the left side of the reservoir to rotate out. Hold it open.



3. Push down and unscrew the cap.

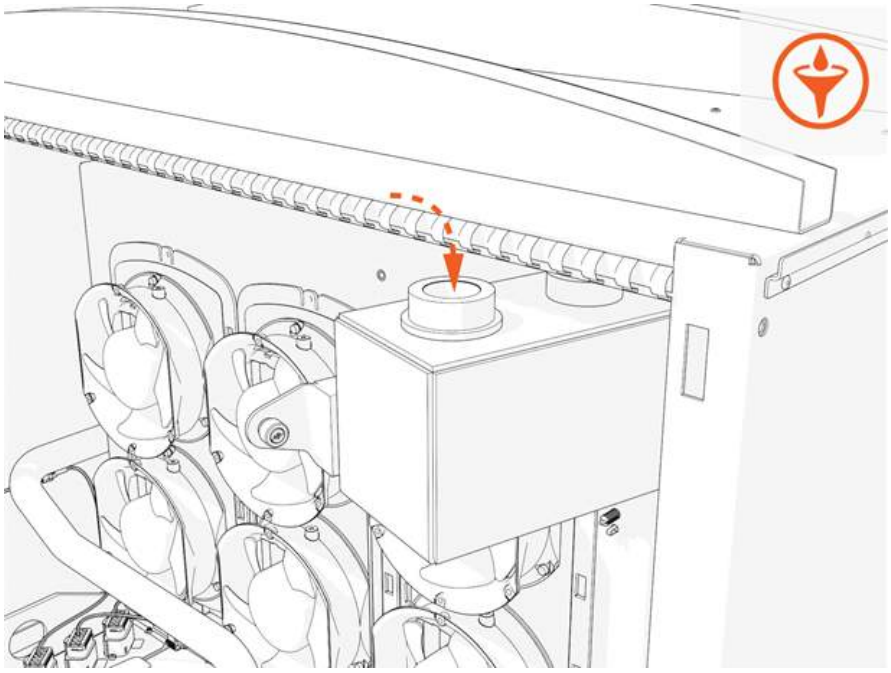


Pour Coolant

Refill

1. Position the stepladder so you can view the top of the coolant reservoir.
2. Hold the reservoir open and place the funnel into it.

3. Pour in new coolant. Fill to the bottom of the neck or to the maximum level indicated on the reservoir.



4. Replace the cap.
5. Slowly release the reservoir back into position. Tighten the captive screw by hand.

Deaerate

IMPORTANT: Deaerate to clear any trapped air that may have entered the coolant hoses during service. You must power on the Power Block to do this. If you fail to do so, you may impair performance and damage components.

1. If you removed them, reinstall all Power Modules.
2. If you removed it, reinstall the front door.
3. Reinstall the removed panels.

4. Power on.

DANGER: RISK OF SHOCK

Do not turn on Power Block if other people are installing or servicing any other connected units.



First check that all connected units are off and no work is being performed. Inform everyone on-site of your plan and timing, follow lock out/tag out procedues, and ensure that everyone remains safe.

Alternatively, you may postpone the step to drawdown and deaerate until it is safe to do so. Continue to close up the Power Block now. Then after all units are installed and the site is clear to power on the Power Block, follow the steps to drawdown and deaerate.

5. The Power Block startup runs the deaeration sequence.
6. Alternatively, log in to the ChargePoint Cloud Dashboard (na.chargepoint.com or eu.chargepoint.com).
7. Find and select the Power Block you are servicing.
8. Go to Status/Actions tab and select the Purge Coolant System button.
9. If coolant level is low, top off the coolant.

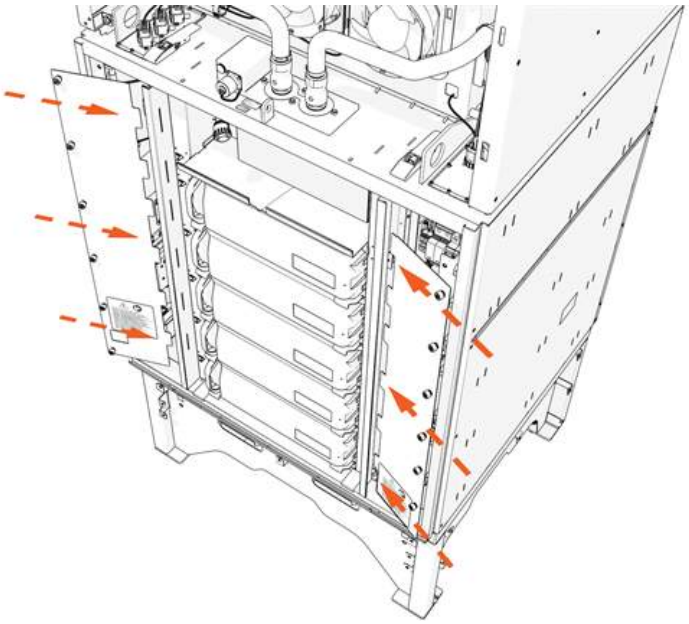
Top Off

1. Remove the front upper panel.
2. Top off the coolant.
3. Replace the cap.
4. Slowly release the reservoir back into position. Tighten the captive screw by hand.

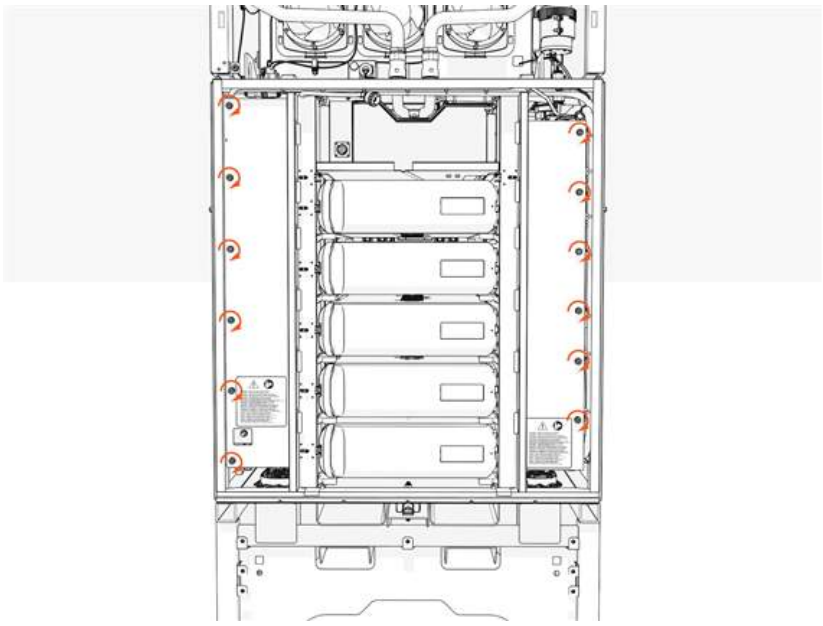
Reinstall Transparent Shields

1. Align the tabs on the transparent panel with the slots in the racks. Insert the tabs into the slots.

   Note: For the left shield only, align the hole over the door switch.



2. Tighten the captive screws.

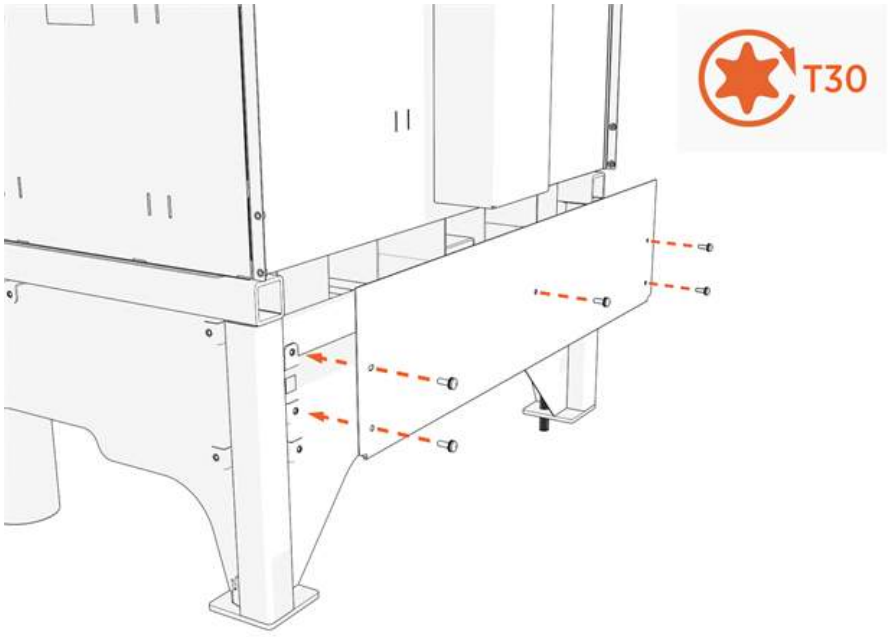


Install Power Block Covers and Door

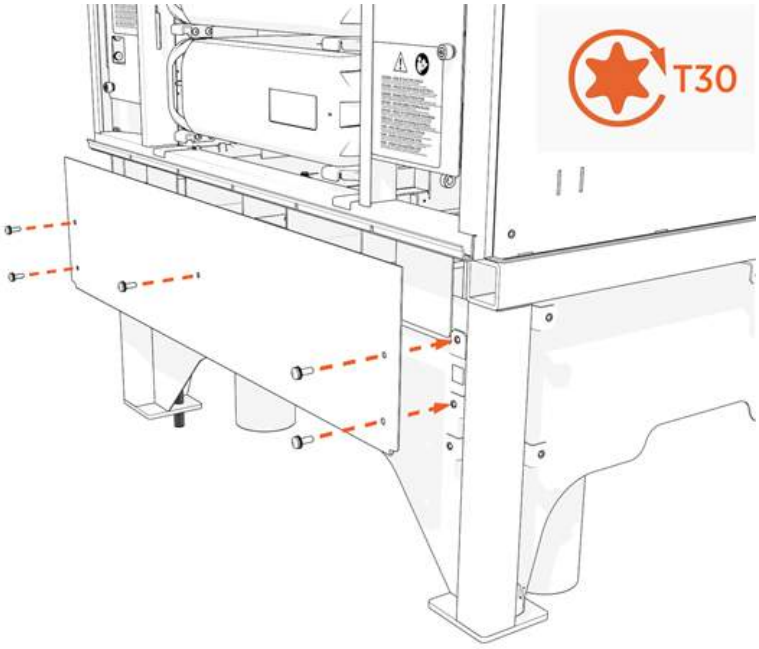
Pedestal Covers

Upper Covers (Front and Rear Pedestal):

1. Align the rear upper cover and install screws. Torque to 10.1 Nm (90 in-lb).

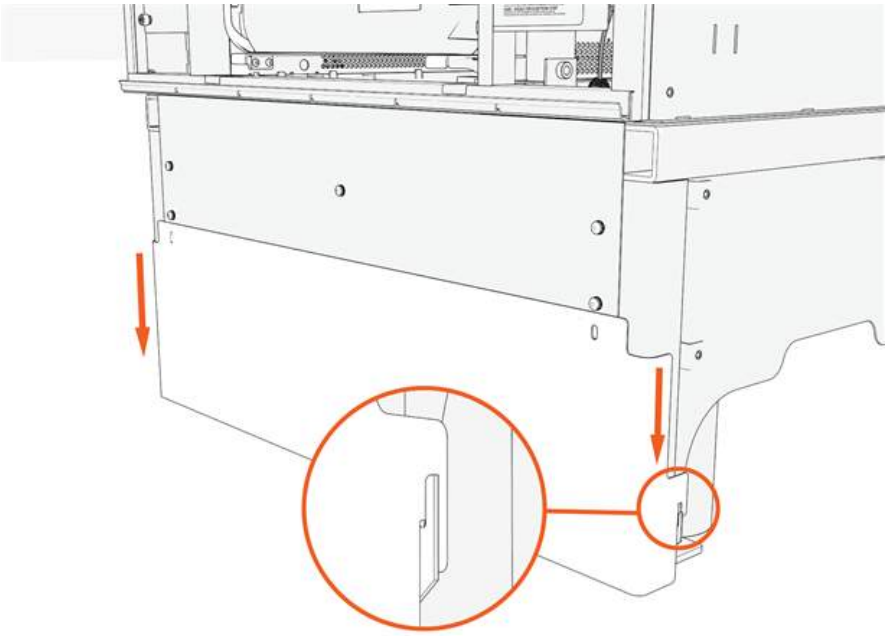


2. Repeat with the front upper cover.

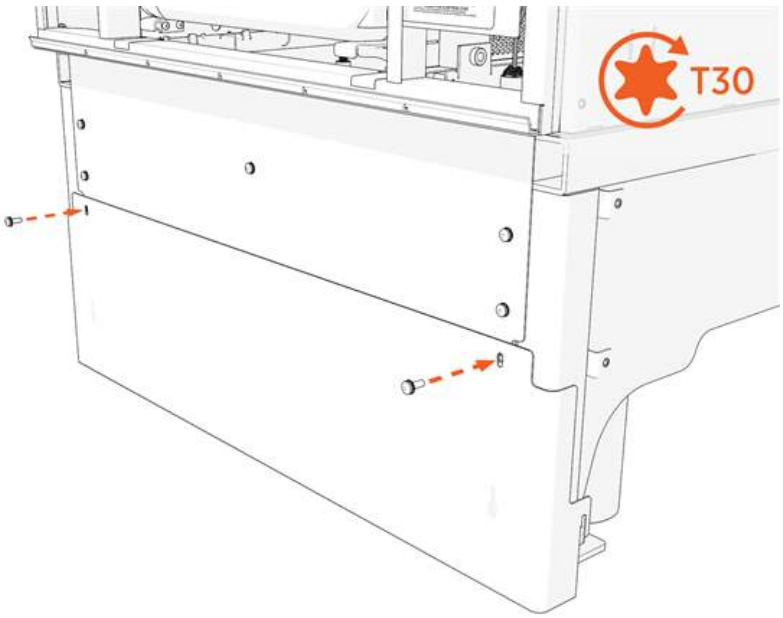


3. Notice the hooks near the bottom inside of the lower covers. Align the hooks. Slide each lower cover down onto the pedestal.

   Note: Ensure the two hooks (left and right) engage at the bottom.



4. Install the screws into each cover. Torque to 10.1 Nm (90 in-lb).

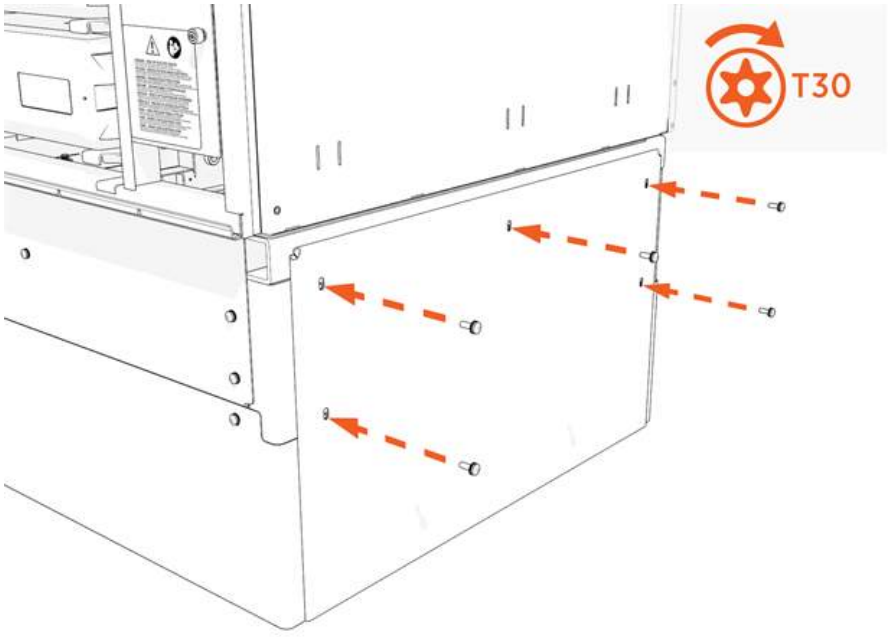


5. Notice the hooks near the bottom inside of the side covers. Align the hooks. Slide each side cover down onto the pedestal.

   Note: Ensure the two hooks (left and right) engage at the bottom.

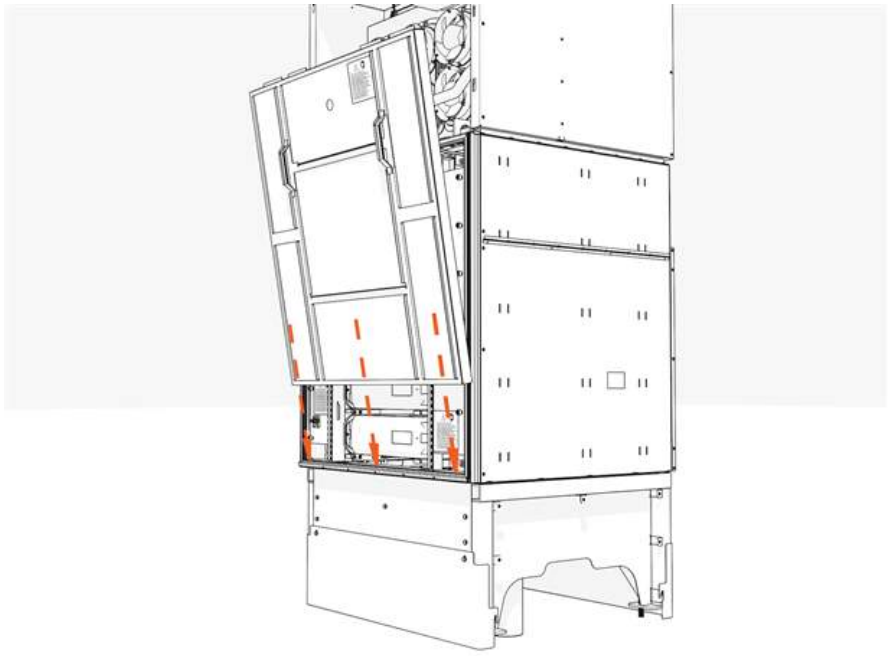


6. Install screws into each side cover. Torque to 10.1 Nm (90 in-lb).

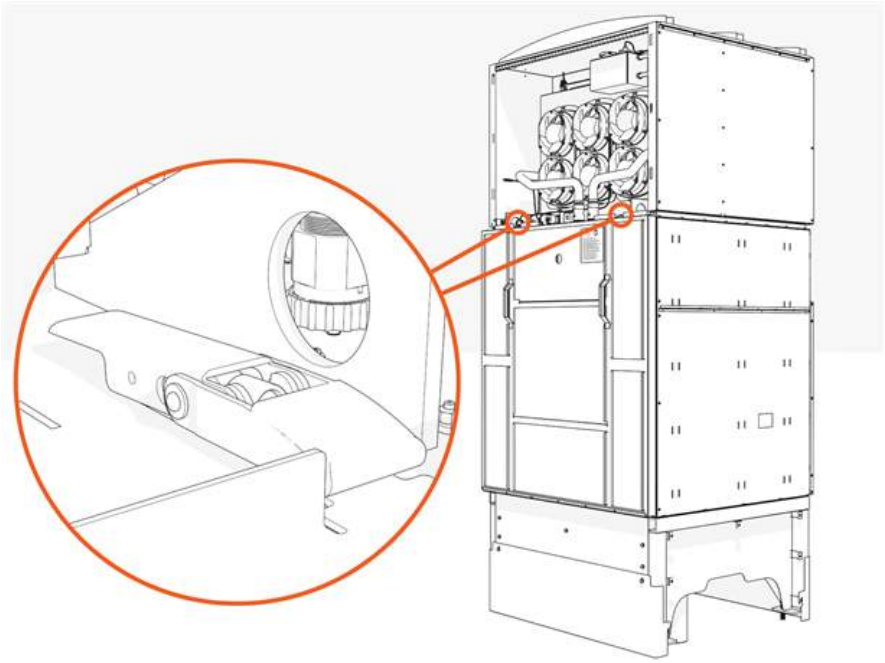


Lower Front Door

1. Hook the bottom of the door onto the lip of the cabinet.

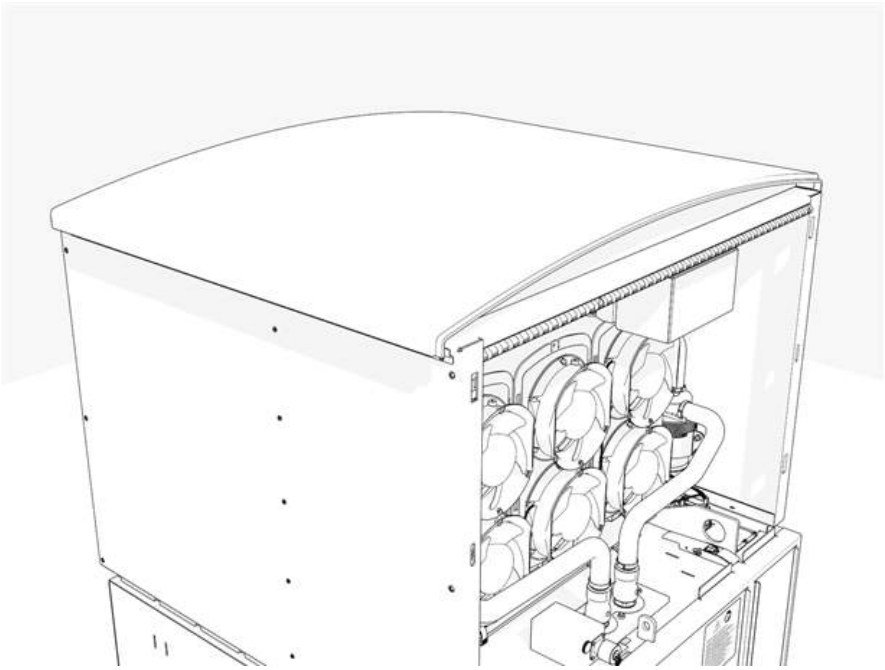


2. Align and fasten the two latches at the top.

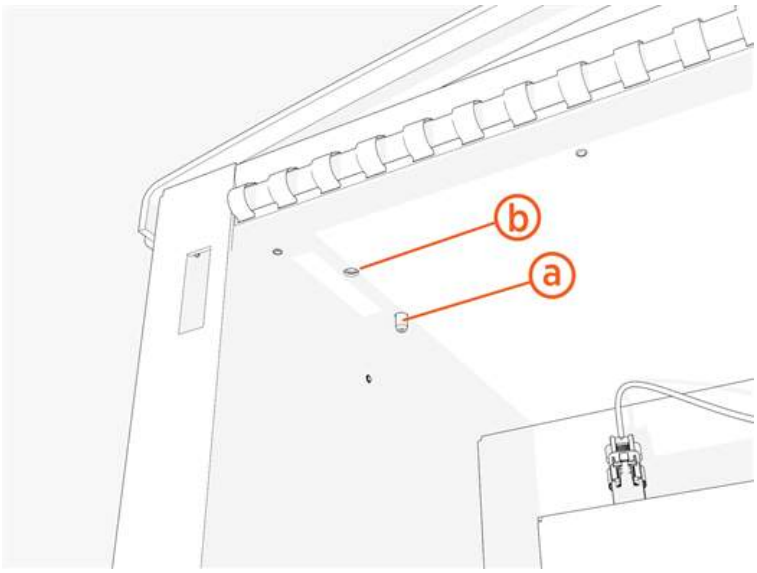


Enclosure Top cover

1. Align the top cover (arched).



2.



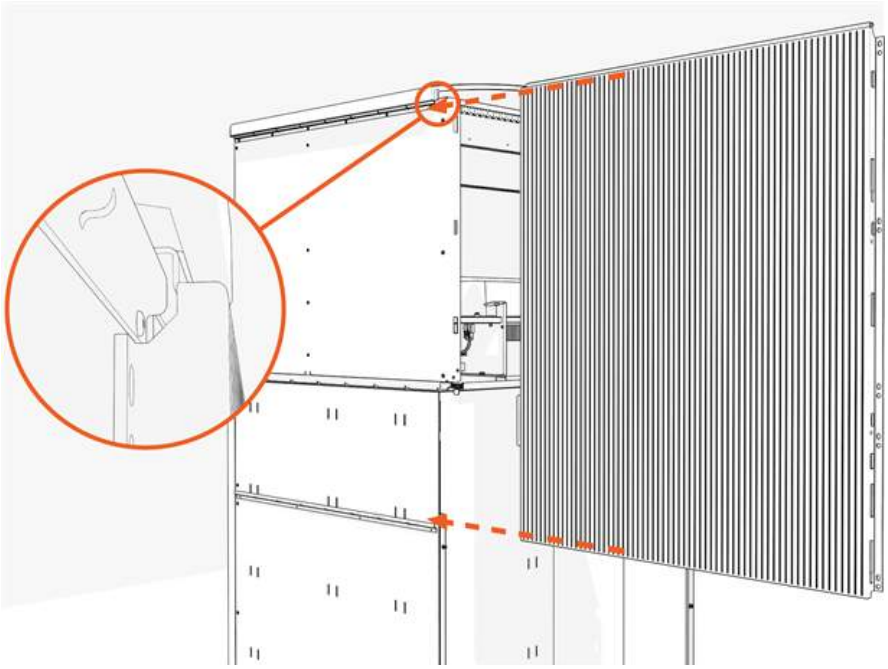
a. Locator pin
b. Screw

a. Fit four locator pins into the corners of the top inside.
b. Install four M6 screws into the corners of the top inside. Torque to 10.1 Nm (90 in-lb).

Enclosure Side covers

1. Slide the four side covers into the rails.

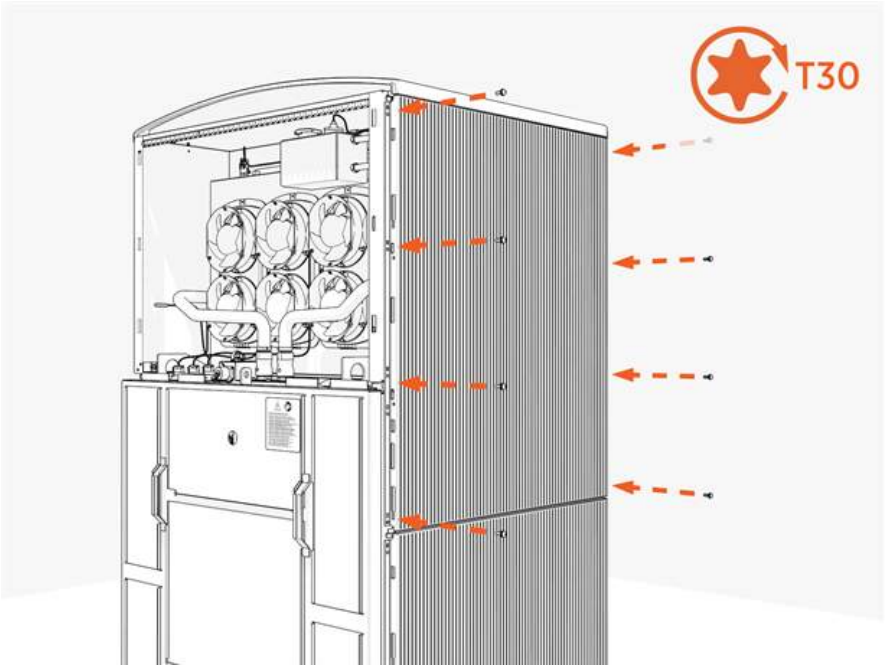
   Note: Panels are identical.



Upper Side covers

1. Install screws on the front and rear edges. Torque to 10.1 Nm (90 in-lb).

   Note: Start with the bottom corner.

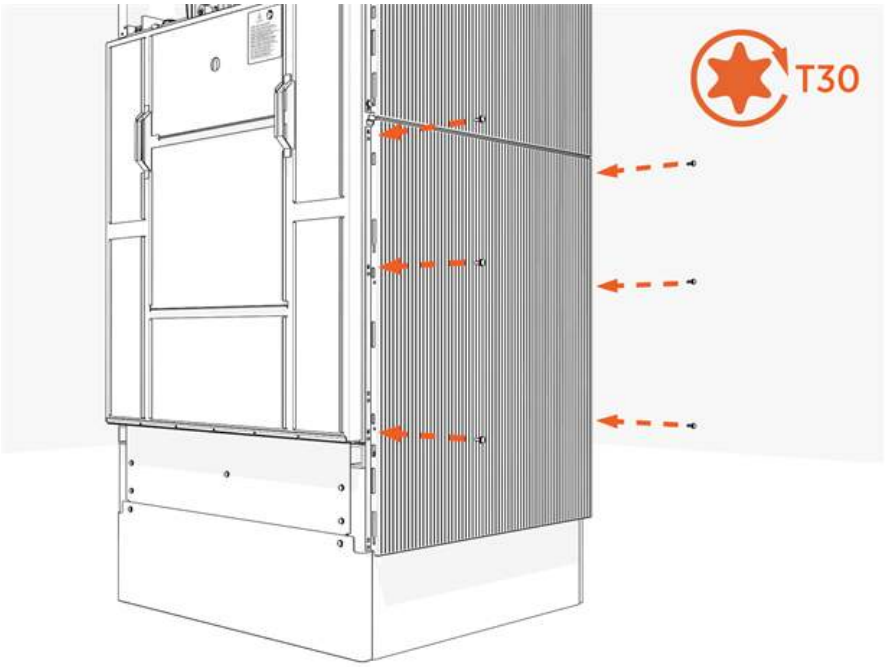


2. Repeat on the second upper side cover.

Lower Side covers

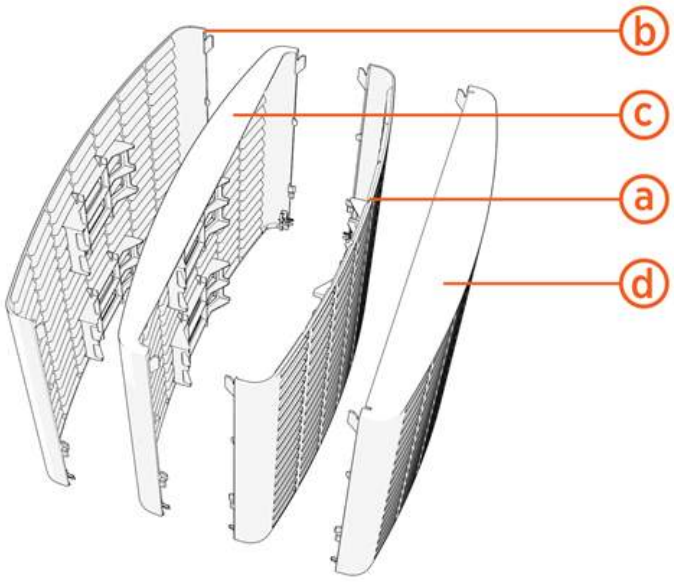
1. Install screws on the frontand rear edges of both lower side covers. Torque to 10.1 Nm (90 in-lb).

   Note: You can access all four screws on each upper cover, but only three on each lower cover (because the pedestal overlaps the fourth screw).



2. Repeat on the second lower side cover.

Enclosure Front and Back Covers



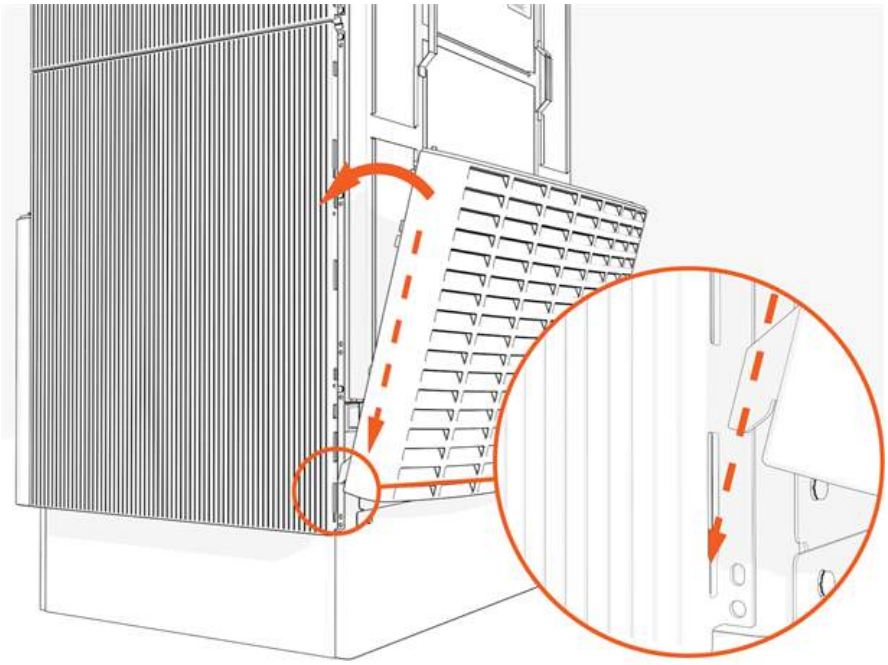
a. Upper
b. Middle
c. Lower front
d. Lower rear (notch on bottom right)

Lower and Middle Covers

1. Start with the lower cover.

   Note: Rear lower cover has a small notch in the bottom right corner.

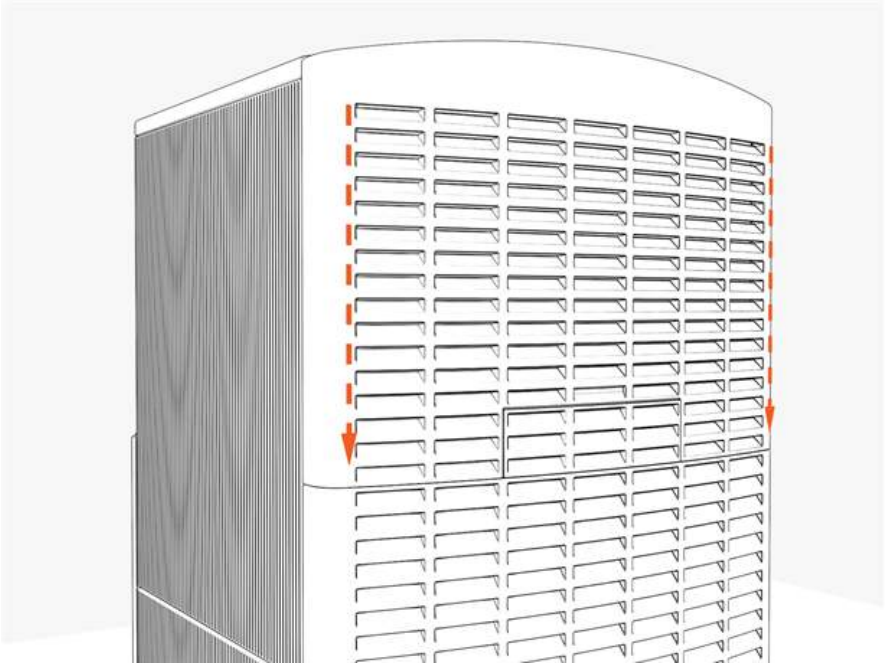
2. Align the four hooks at the bottom, then the top corners. Shift the cover into position.



3. Repeat with the middle cover.

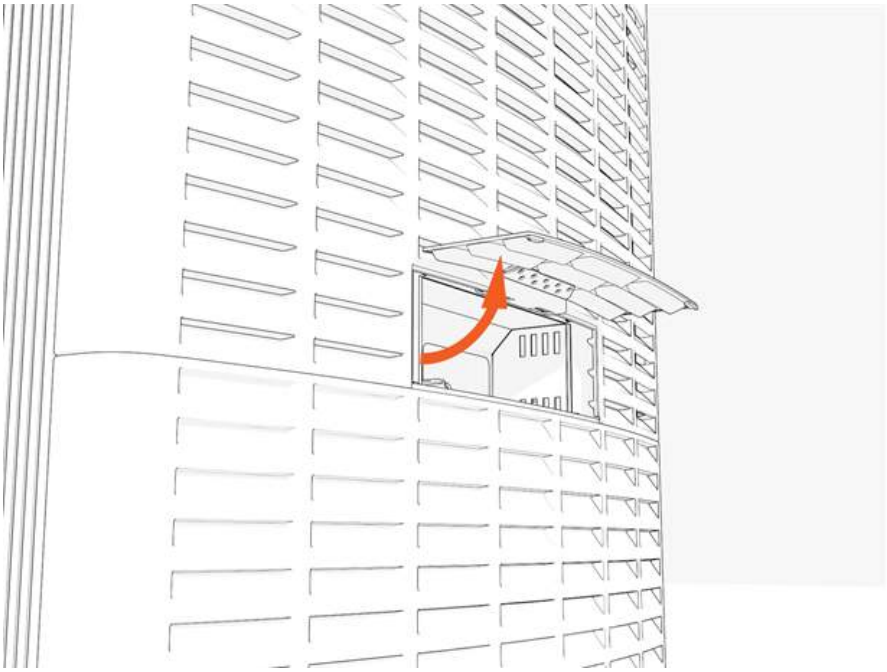
Upper cover

1. Hang the upper cover at all four corners. Push down to engage.



Lock

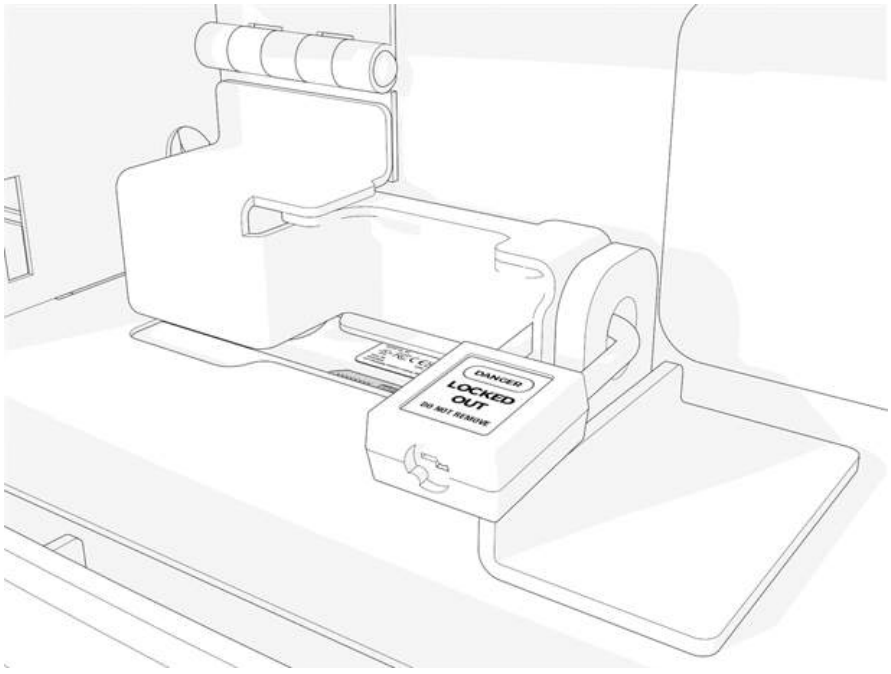
1. Lift open the security panel.



2. Lower the metal tab to align the two holes.



3. Insert the padlock through the two holes and lock it.



Power Link Configurations 3

The Power Link is available in multiple configurations. Before proceeding, check your site plans for the station configuration.

IMPORTANT: Instructions vary for each configuration. Continue to the applicable instructions below.

Standard pedestal	Mounted off the ground "overhead"
• Concrete pad • Surface Conduit Entry	• Wall • Gantry • Post • Other approved surface

Pedestal

One charging cable



Two charging cables



Tool Balancer



Overhead

Mounted to a wall, post, gantry, or other surface



Note: Only one charging cable can operate at a time.

4 Install Pedestal Mounted Power Link

Follow these instructions to anchor, install, and wire each Power Link as a pedestal mount.

CAUTION: To protect the charging cables from damage, keep them wrapped throughout the installation process.

IMPORTANT: If the site has height constraints for installation, contact ChargePoint to get instructions and clearances that you will need for the modified process.

Alternatively, you may use a forklift bracket kit, or a crane with lifting shackles and a spreader bar (constraints may differ among sites).

Disconnect Power

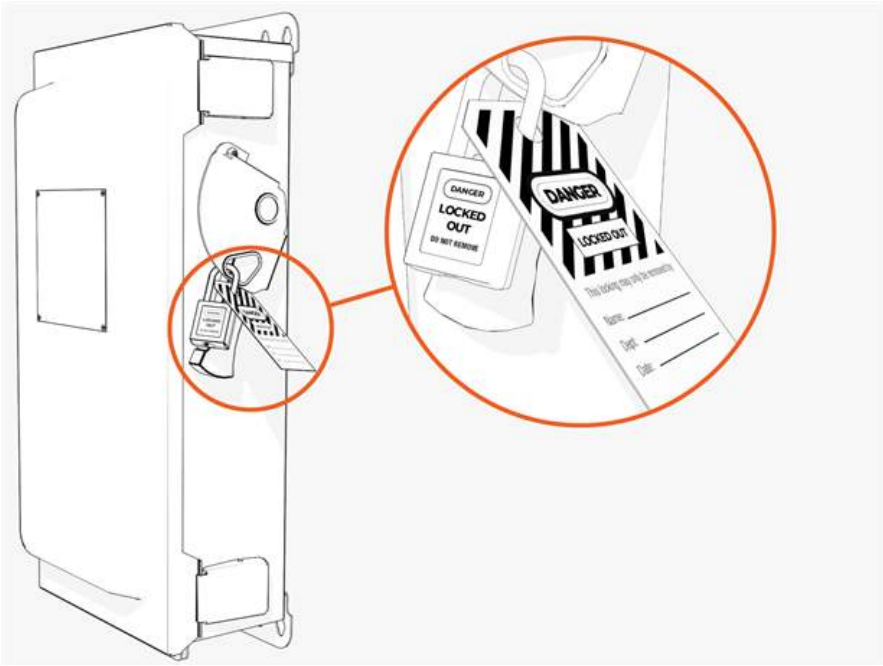
DANGER: RISK OF SHOCK

- Before any procedure, disconnect the power.
- Follow local code and site lockout/tagout procedure to de-energize the station.
- Wait for energy to dissipate (approximately five minutes).
- Keep power off until all covers and panels are reinstalled and the work is complete.

FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN SERIOUS INJURY, LOSS OF LIFE, OR PROPERTY DAMAGE.

1. Disconnect power at the site electrical panel.

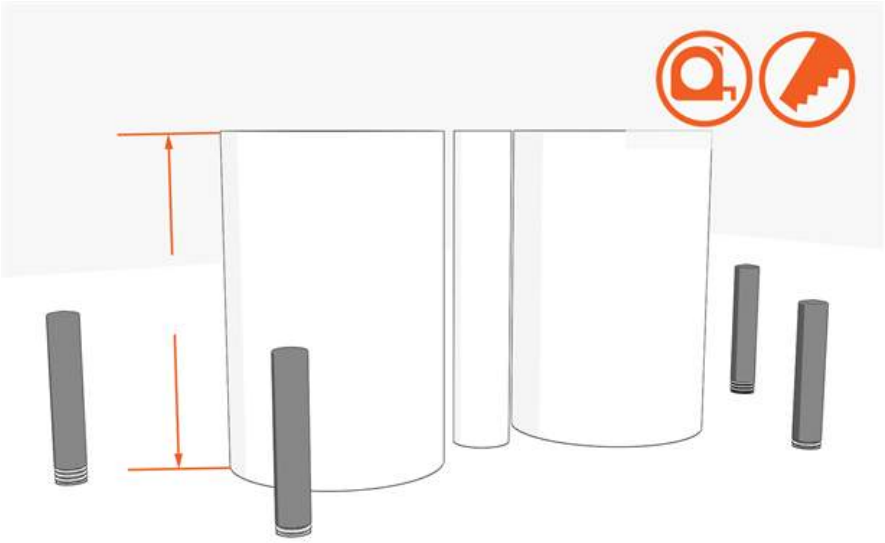
   Note: Follow standard practice and local code to de-energize the applicable circuit and lock out/tag out the disconnect before proceeding.



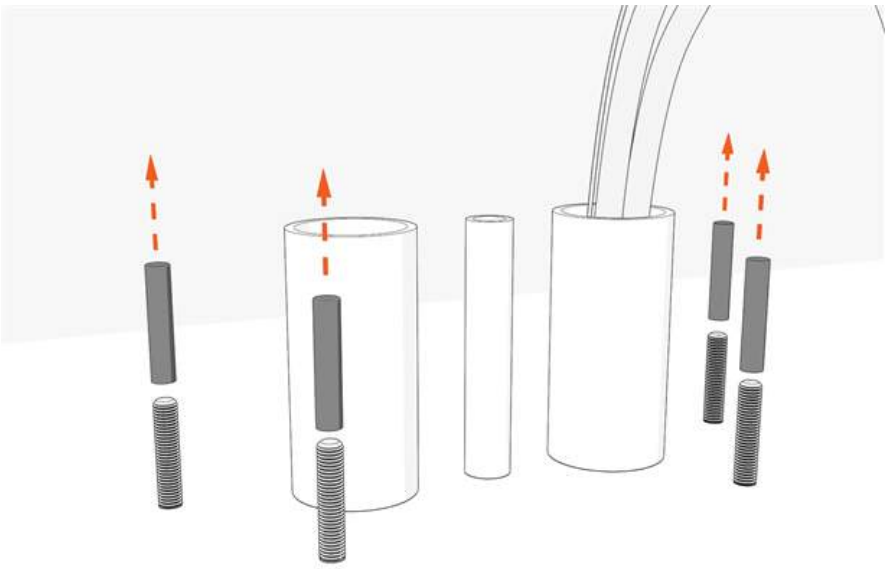
2. Use a multimeter to test that power is off.

Prepare Power Link Pad

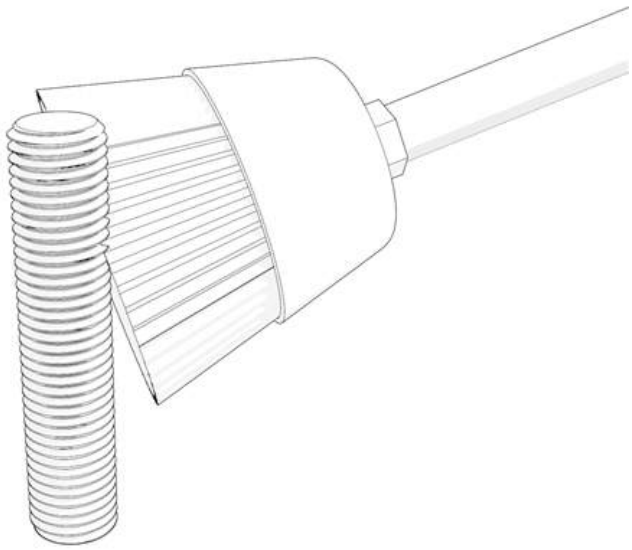
1. Ensure all stub-ups are (a) 102–160 mm (4–6.3 in) high.
   If armored cable is used, strip the outer jacket to the same height.



2. Remove plastic caps.

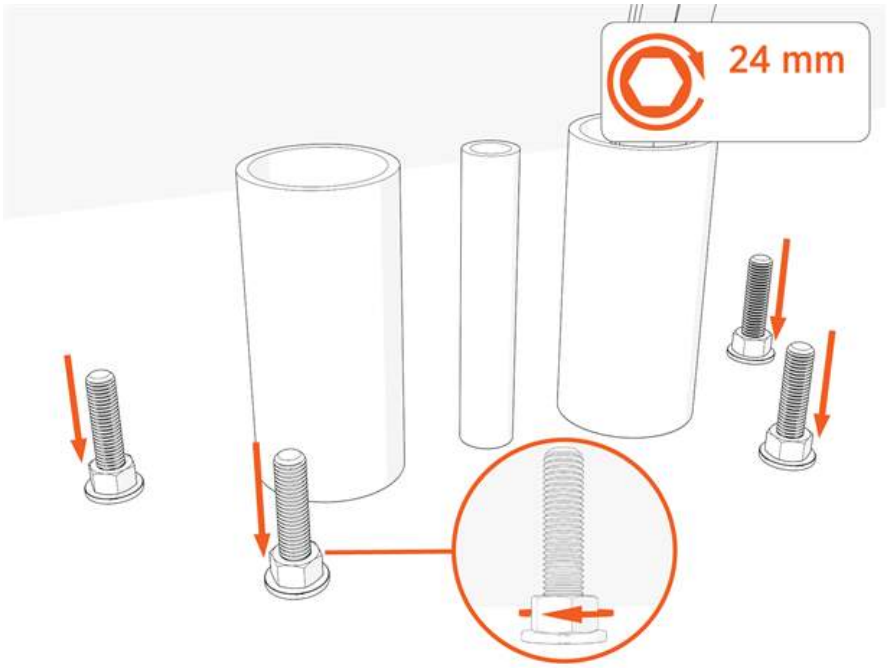


3. Use a wire brush to clean bolt threads.

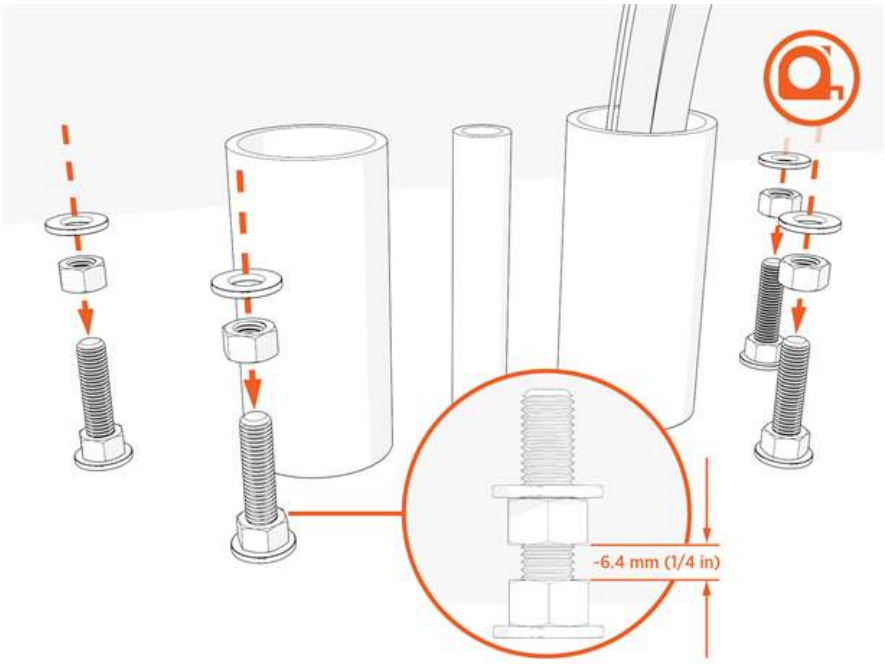


4. Install one concrete clamp washer and nut onto each of the four anchor bolts. Torque to 54 Nm (40 ft-lb).

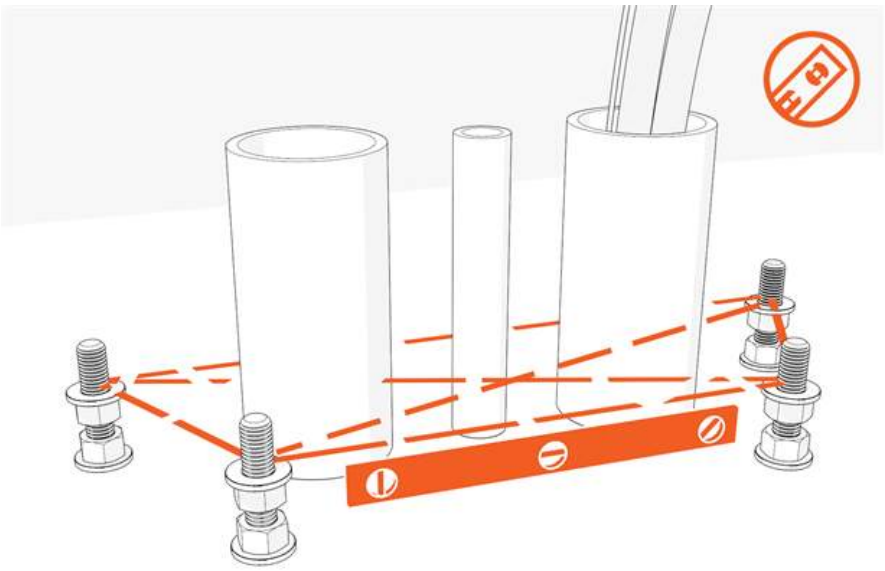
   Note: On epoxied surfaces, do not exceed the epoxy torque rating.



5. Install "leveling" nuts and washers onto the bolts by hand. Maintain a space of (a) ~6.4 mm (1/4 in) between each leveling nut and bottom nut.



6. Check that leveling nuts are level with each other.



7. Pull service wiring through the conduit (see the Express Plus Site Design Guide). Retain 1524 mm (60 in) of service loop for each cable.

CAUTION: Do not use conduits with bell ends. They may interfere with tolerances inside the enclosure.

Mount and Secure Power Link

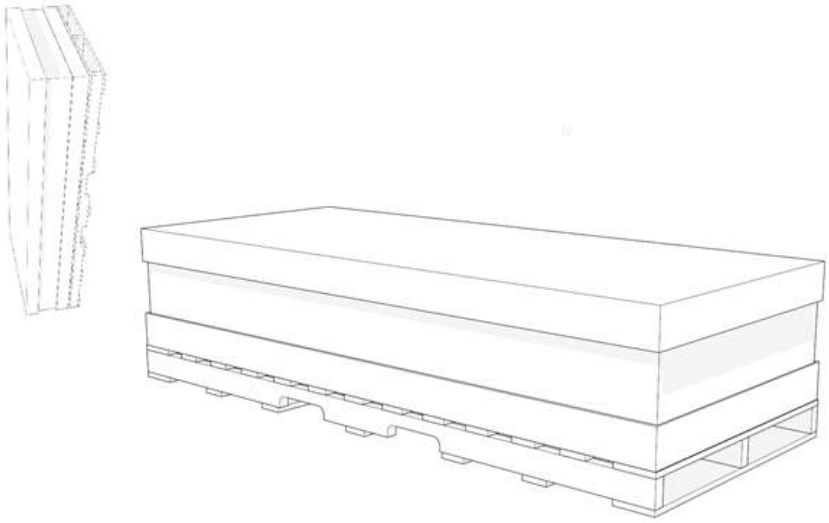
CAUTION: To protect the charging cables from damage, keep them wrapped throughout the installation process.

Unpack

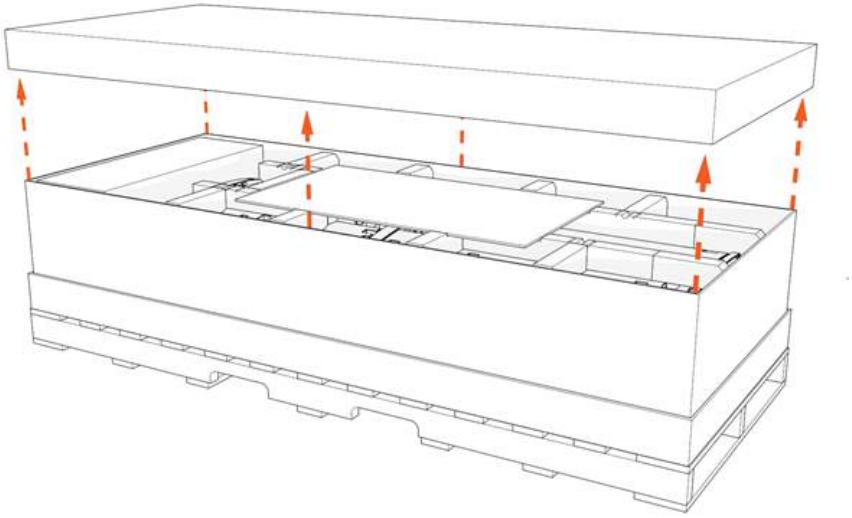
1. Transport the crate upright to the installation site and then lay it down flat.

WARNING: The crate is heavy and can cause injury or death if dropped. Do not stand or walk beneath the crate while it is being lifted. Take precautions against the crate tipping or sliding.



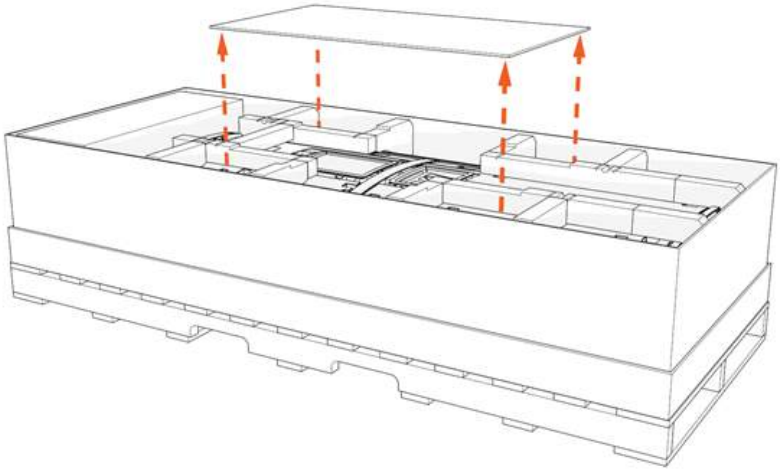


1. Lift off the crate cover.

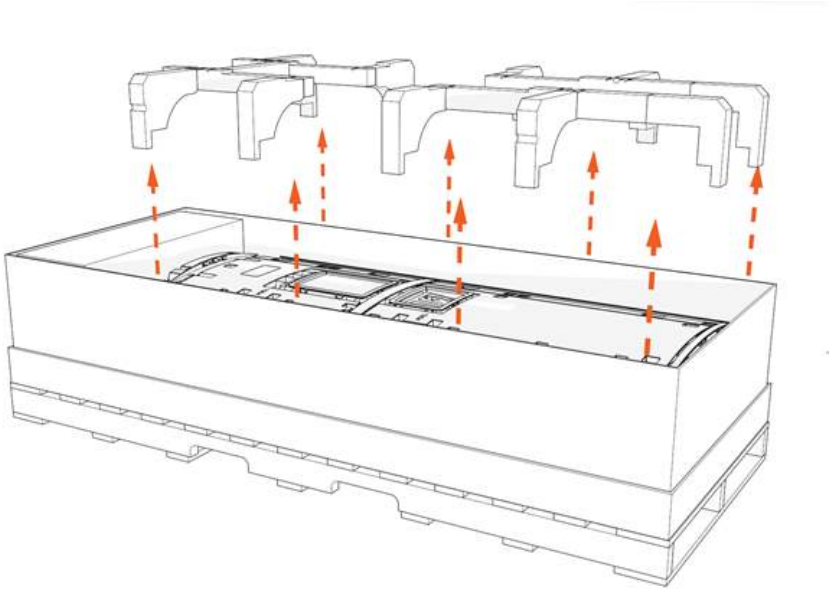


2. Set aside the separate packages that are inside the crate.

   Note: These packages contain vinyl signs, trims, and top cover (helmet) to be installed later.



3. Remove the top foam inserts.



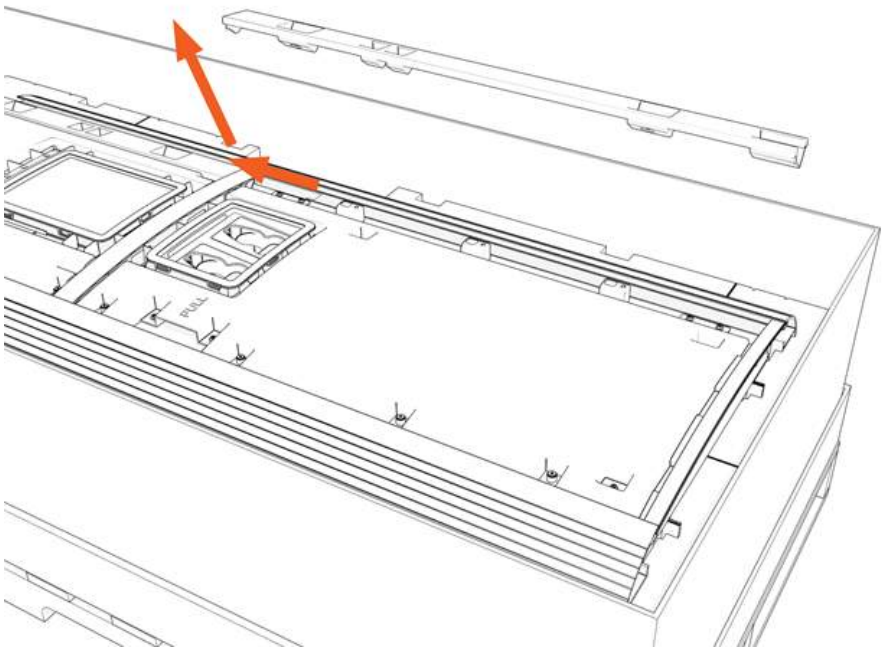
Access Base of Cabinet

IMPORTANT: Keep components in a cool area out of direct sunlight until you reinstall them.

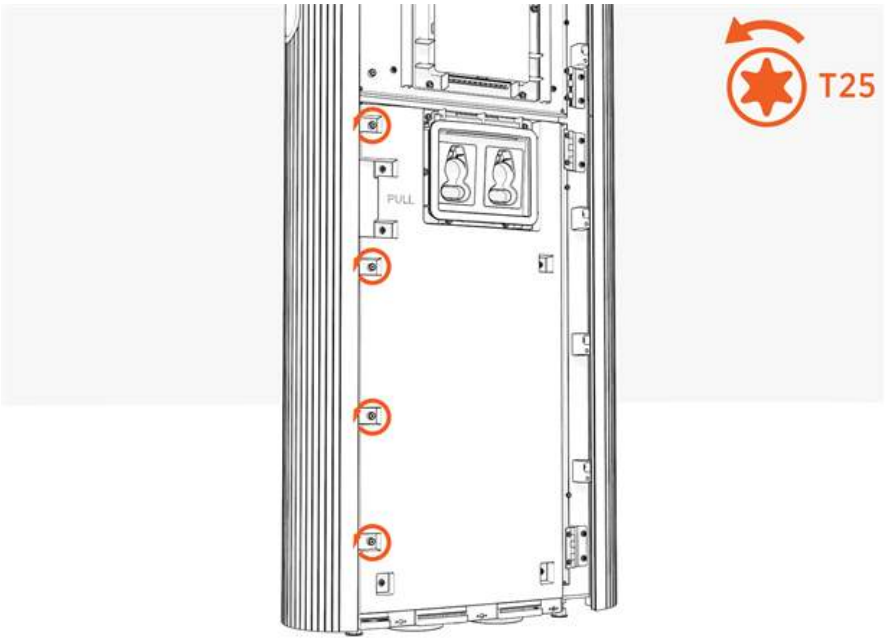
1. Loosen screws from the lower door bracket (only if covers are B. Install Vinyl Signs, Trims, and Top Cover).



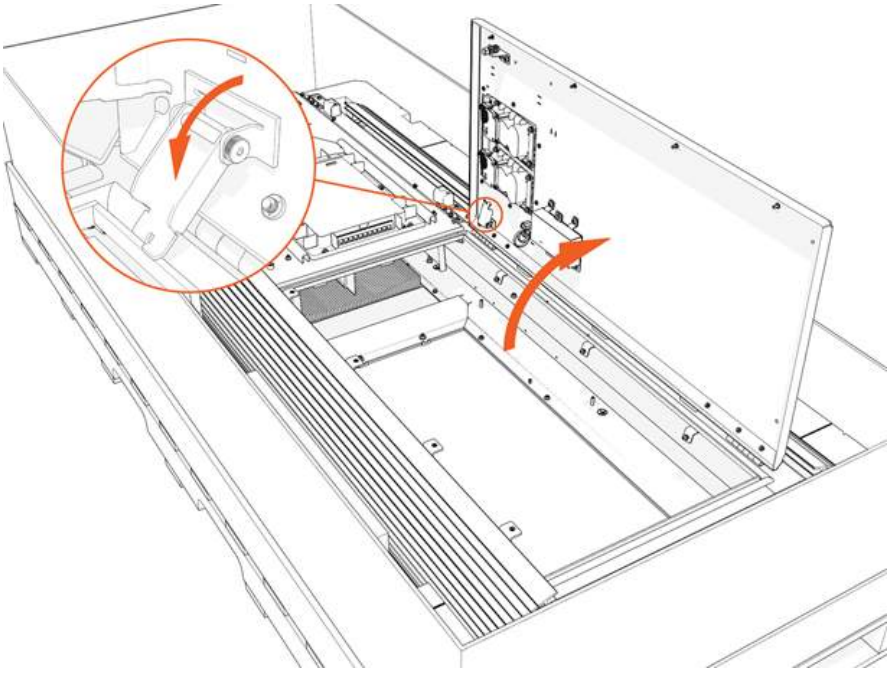
2. Hold the middle of the door bracket. Lift and tilt out.



3. Uninstall screws along the left side to open the door.

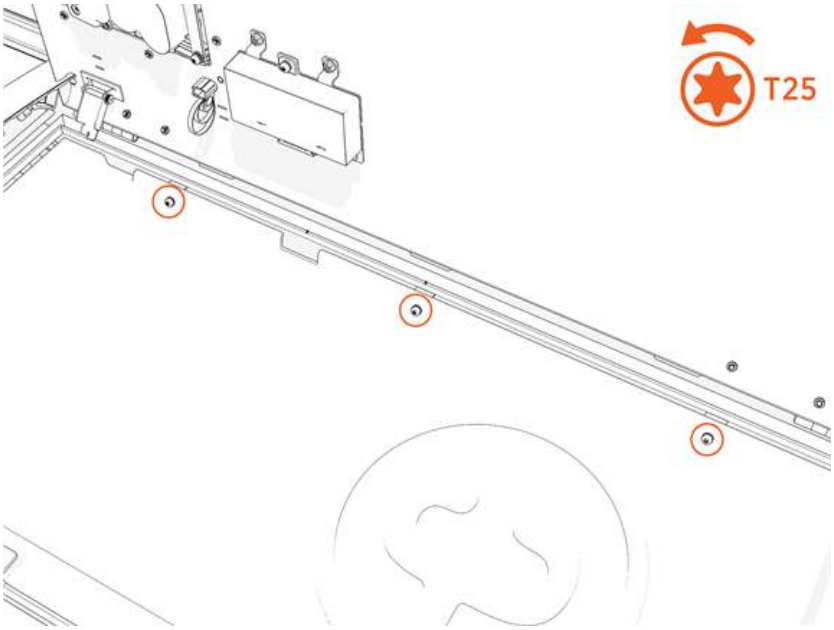


4. Rotate the orange wind stops into the door gap.

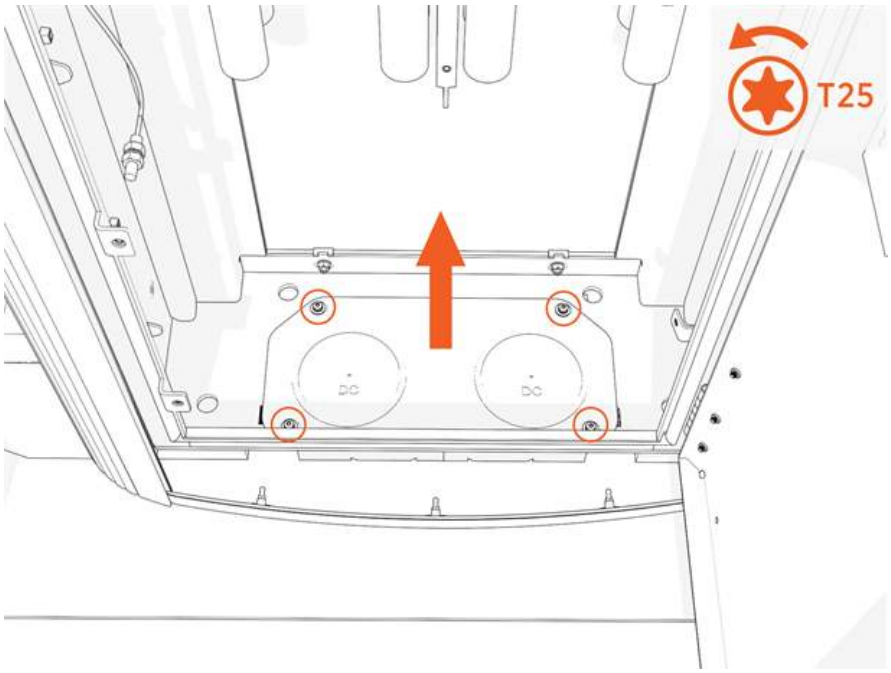


5. Inside the lower cabinet, uninstall the lower safety panel (if present) and gland plate.

a. Loosen screws on the right side. Tilt out and slide the panel out of the slots.

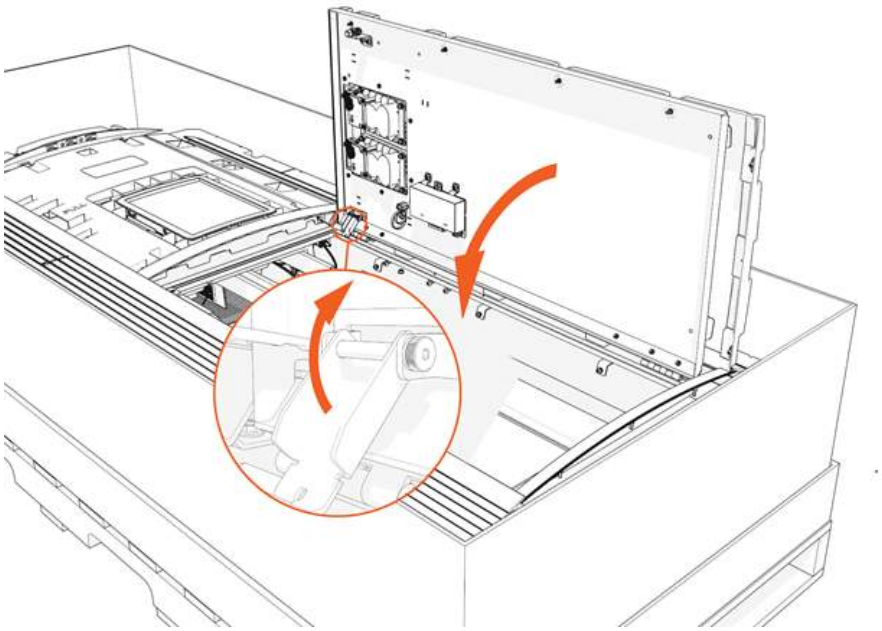


6. Uninstall screws and lift out the gland plate.

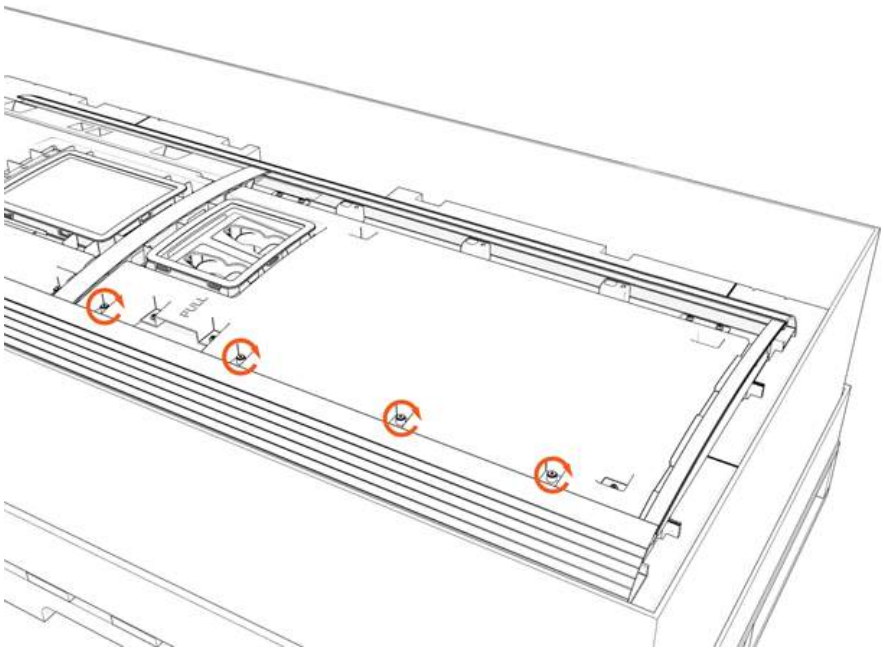


7. Temporarily reinstall the lower door. Disengage the wind stops.

   Note: The upper door should remain closed until a much later step.

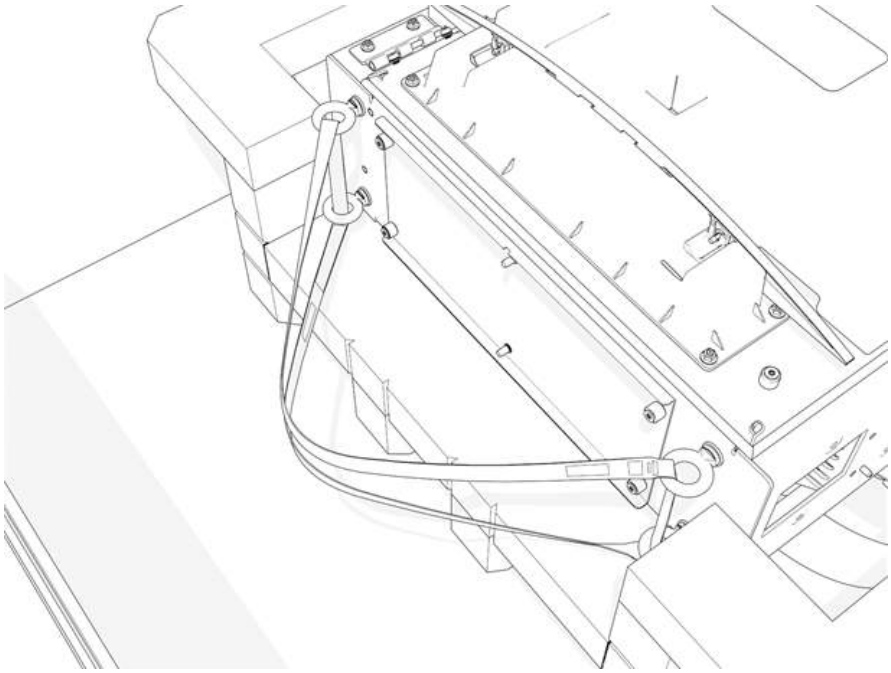


Tighten screws by hand.

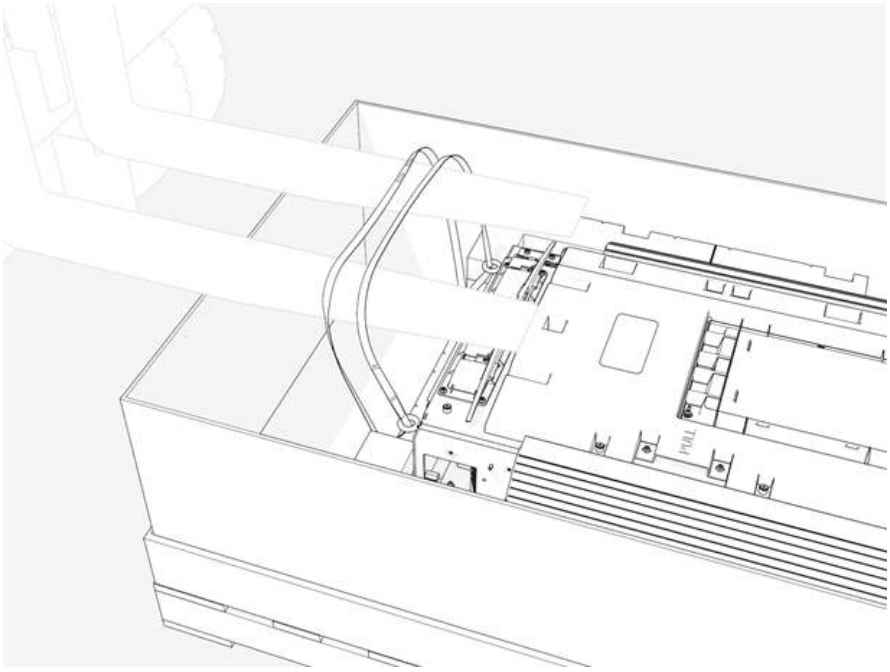


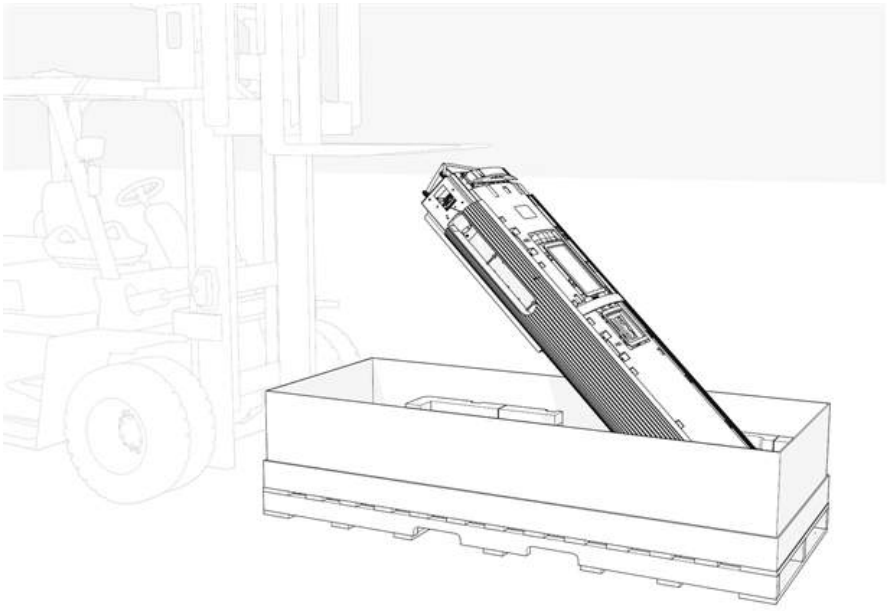
Position the Power Link

1. At the top of the Power Link, locate four preinstalled eye bolts and lifting straps.

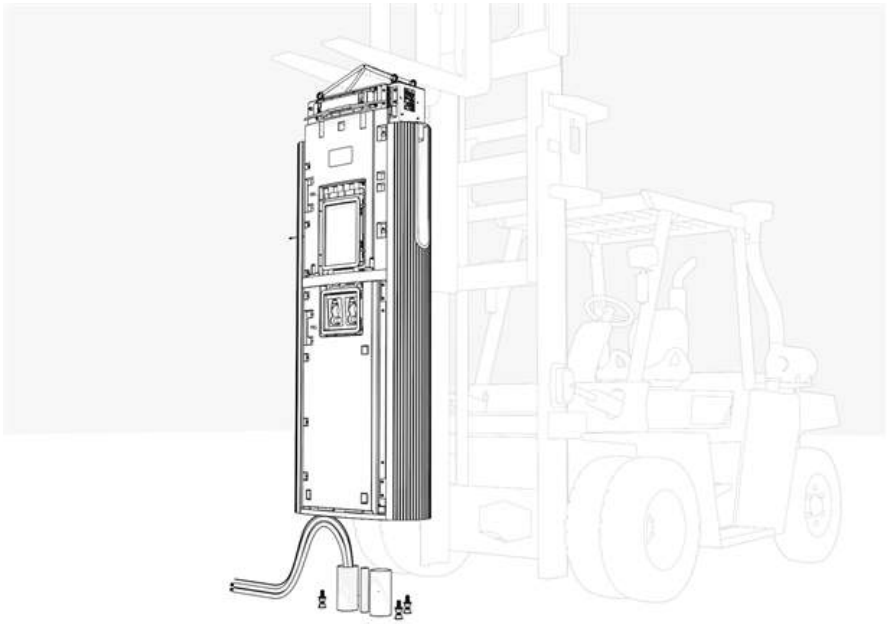


2. Thread the lifting straps through the eye bolts.

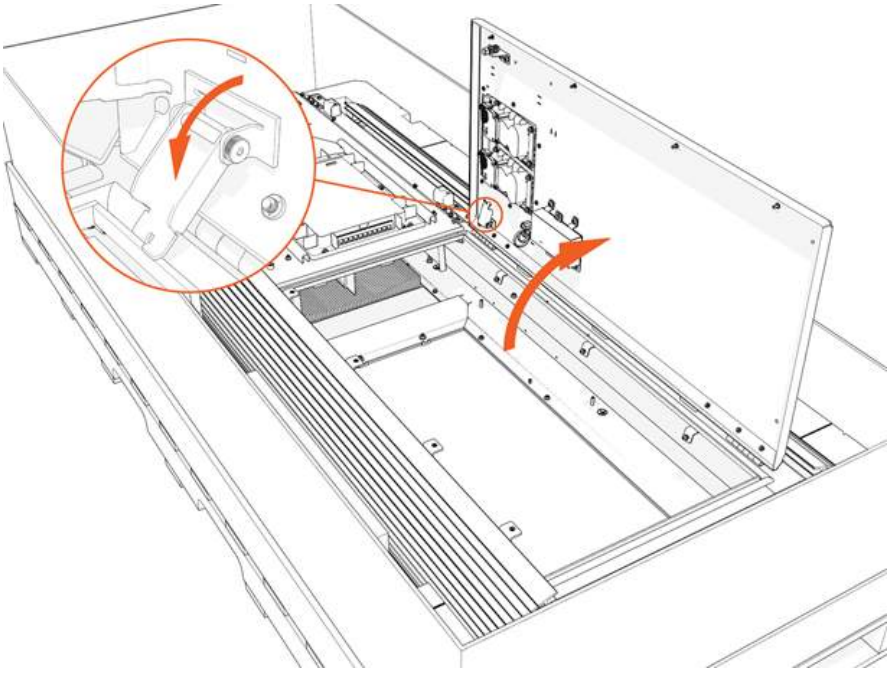




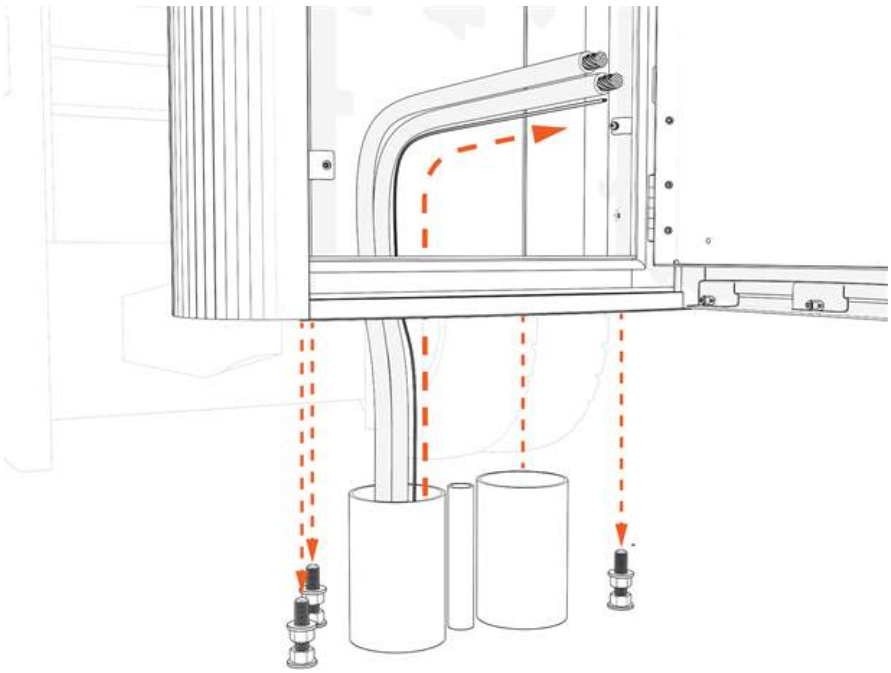
3. Move and suspend the Power Link above the concrete pad. Keep it elevated.



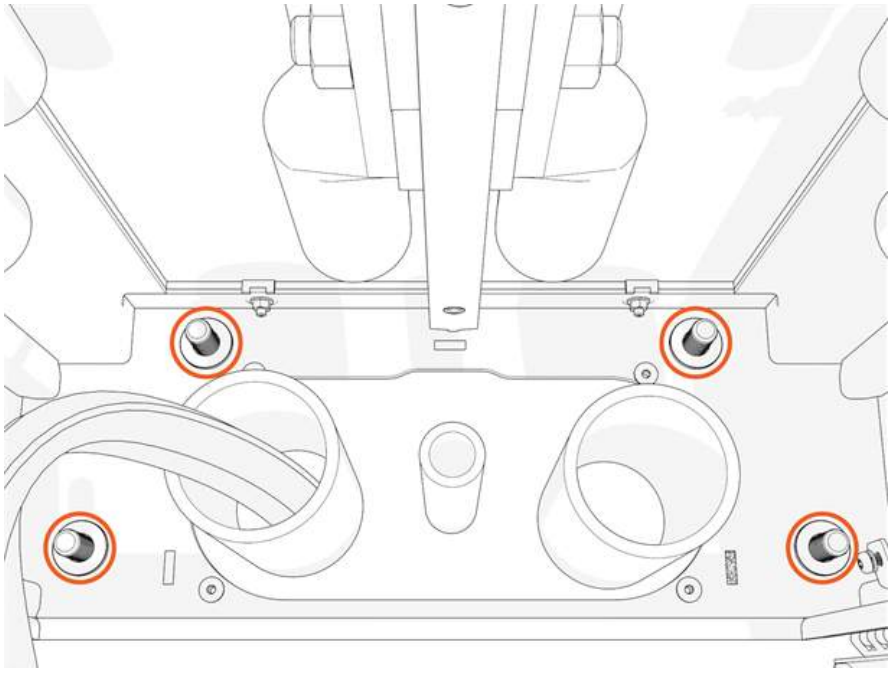
4. Loosen screws to open the lower door again. Engage the wind stops.



5. Route wiring through the bottom.

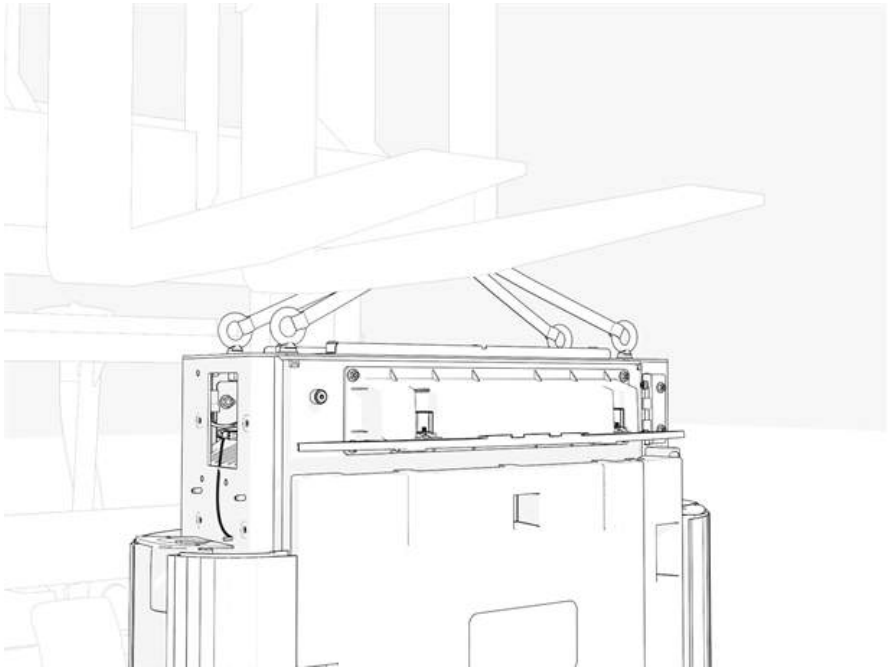


6. Align the holes with the anchor bolts.

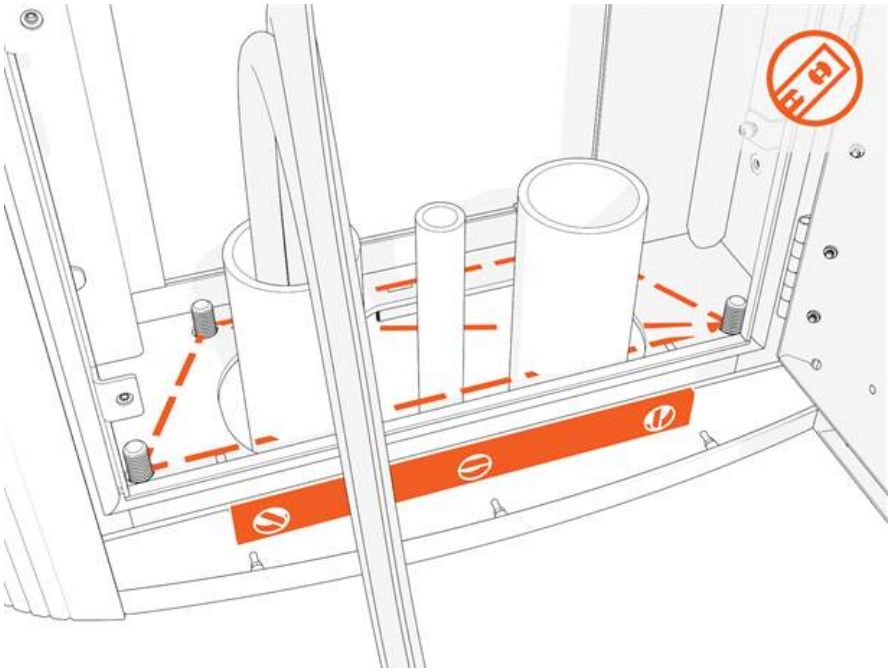


7. Slowly move the Power Link down onto the anchor bolts. Provide slack to the lift straps, but keep them attached.

   Note: Continue to pull wiring through bottom.

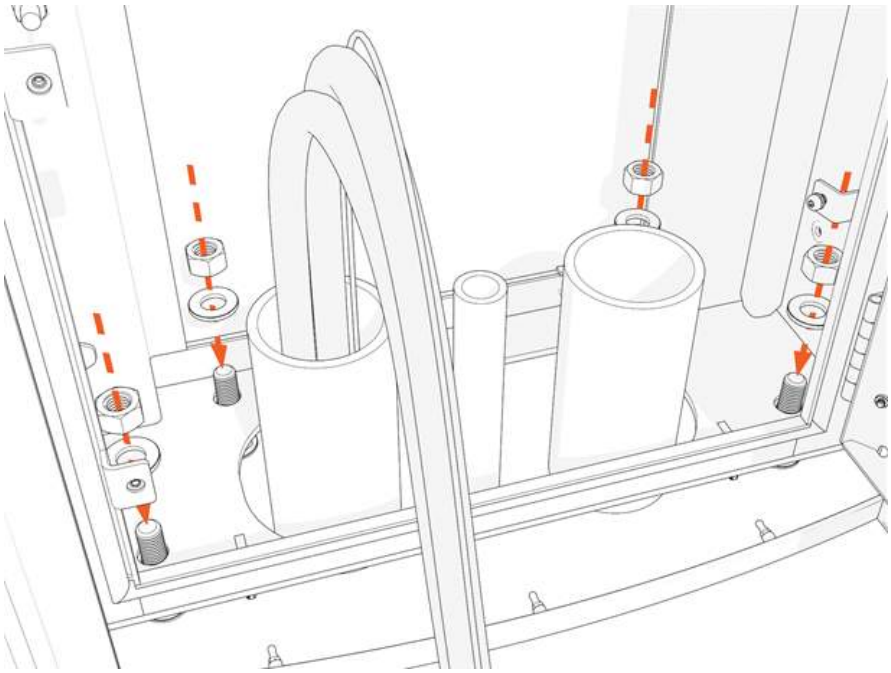


8. When the Power Link is fully seated, check that all sides are level (vertically and horizontally). If not, adjust three leveling nuts.



9. Partially install a washer and "top" nut onto each bolt by hand.

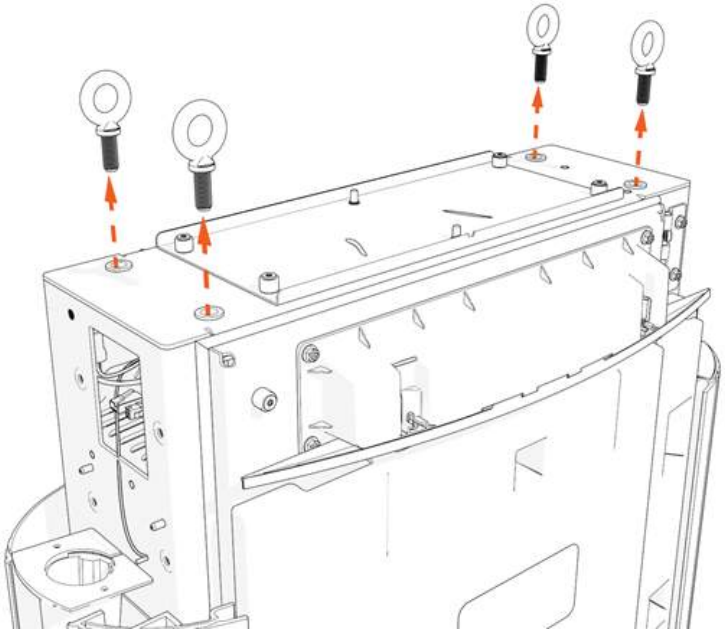
   Note: Do not tighten yet.



10. Recheck and adjust three leveling nuts.
11. When Power Link is level, rotate the fourth leveling nut until flush.
12. Torque the top nuts to 95 Nm (70 ft-lb).



13. Remove the lift straps and eye bolts.

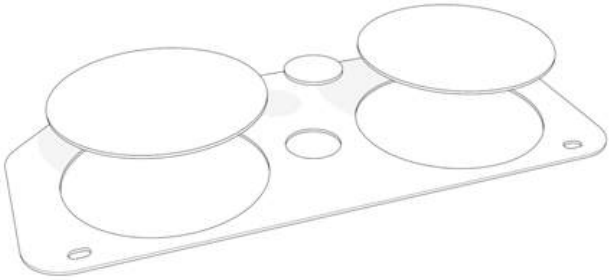


Gland Plate

14. Check site drawings. Use a hydraulic hole punch to create openings in the gland plate for those conduits:

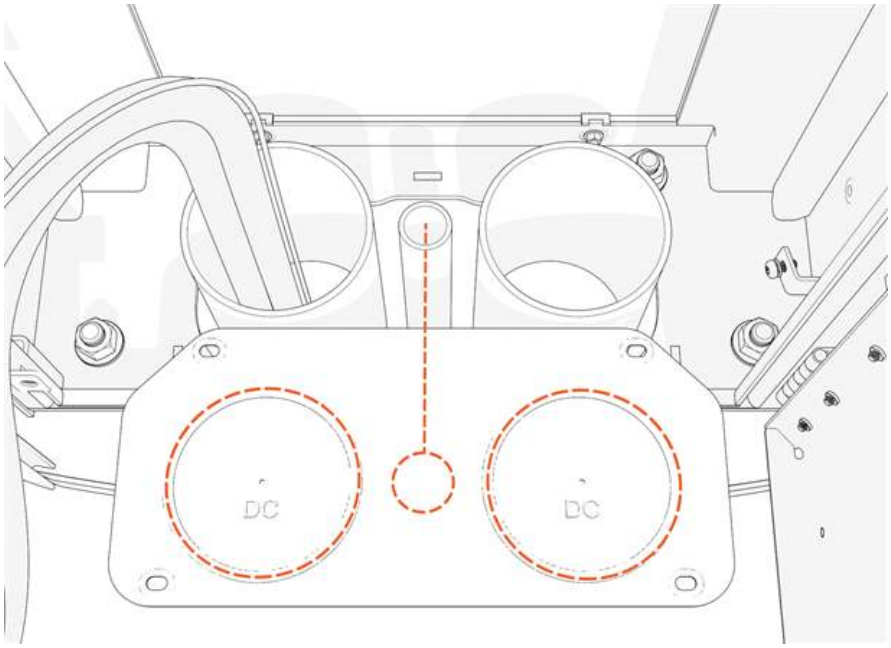
    a. DC input conduits
        i. Check for *one or two* DC conduits.
        ii. Use the gland plate pilot holes as a guide.
        iii. Punch out *one or two* larger openings.

    b. 48 V DC and Ethernet conduits
        i. Check for *one, two, or three* conduits (middle of gland plate).
        ii. Punch out *one, two, or three* smaller opening(s).



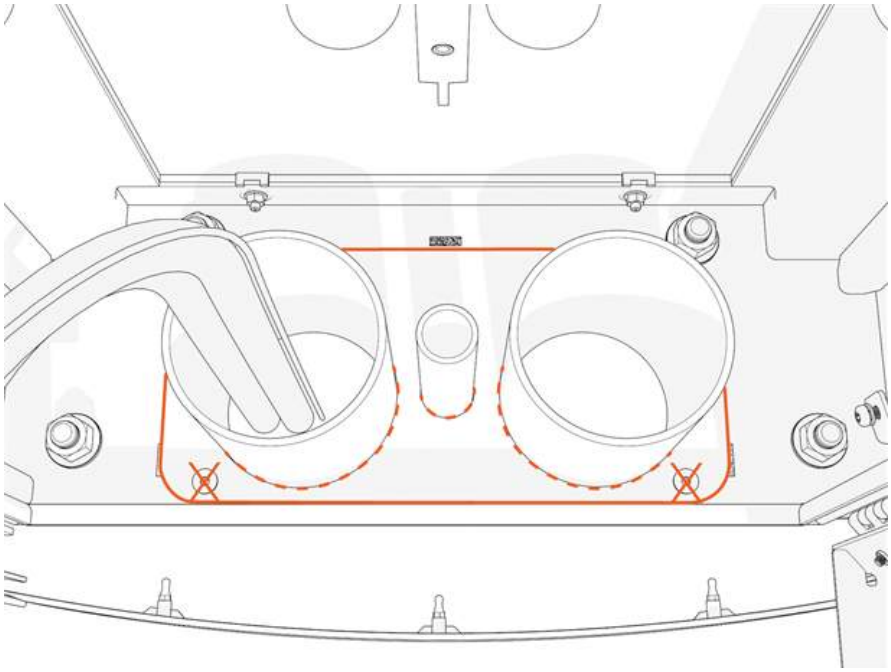
Note: You may have a different number of conduits.

Match the size of each conduit. Each opening must be large enough for the entire conduit to pass through.



15. Reposition the gland plate. Pull all conductors through the openings.

IMPORTANT: Do not reinstall the gland plate screws yet.



Connect Wiring

(Standard Pedestal)

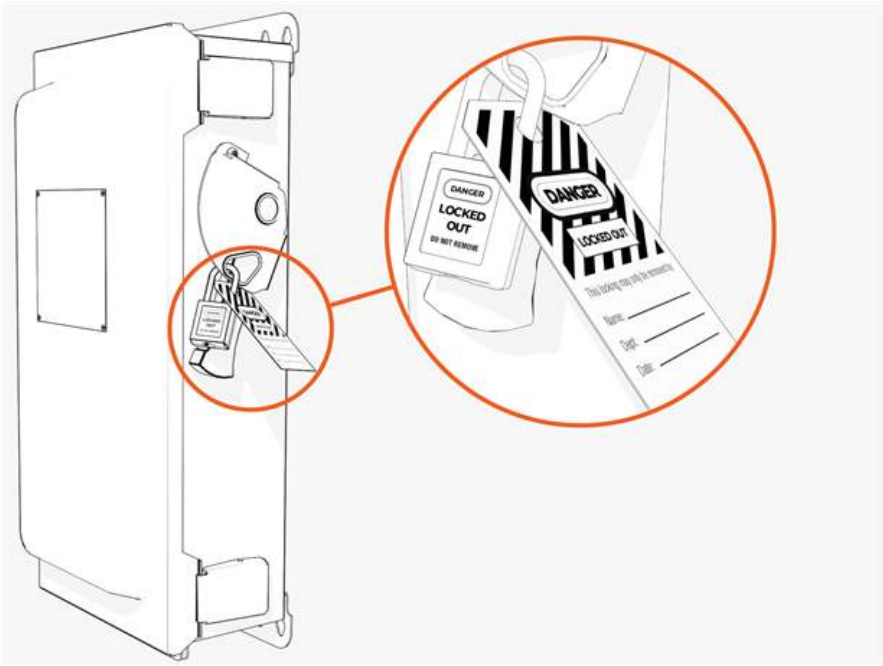
DANGER: RISK OF SHOCK

- Before any procedure, disconnect the power.
- Follow local code and site lockout/tagout procedure to de-energize the station.
- Wait for energy to dissipate (approximately five minutes).
- Keep power off until all covers and panels are reinstalled and the work is complete.

FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN SERIOUS INJURY, LOSS OF LIFE, OR PROPERTY DAMAGE.

1. Disconnect power at the site electrical panel.

   Note: Follow standard practice and local code to de-energize the applicable circuit and lock out/tag out the disconnect before proceeding.

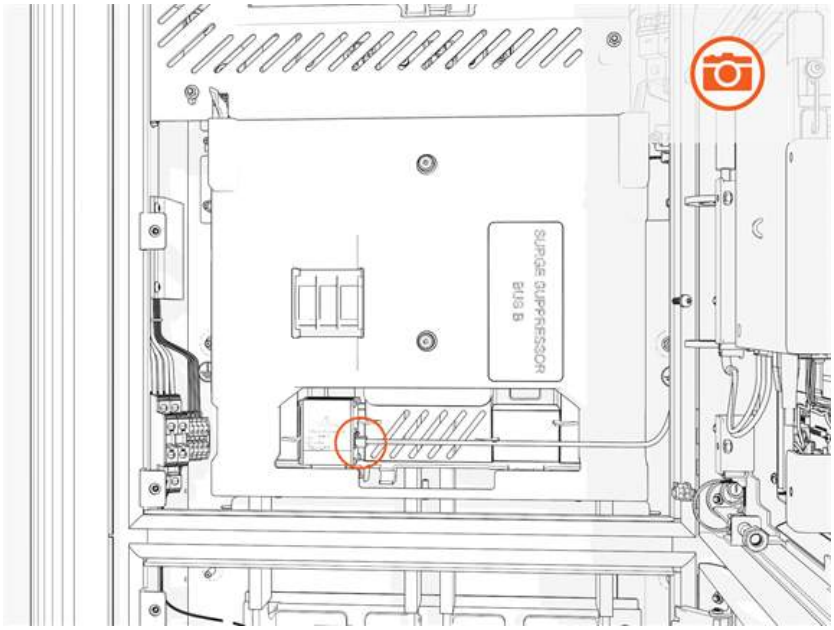


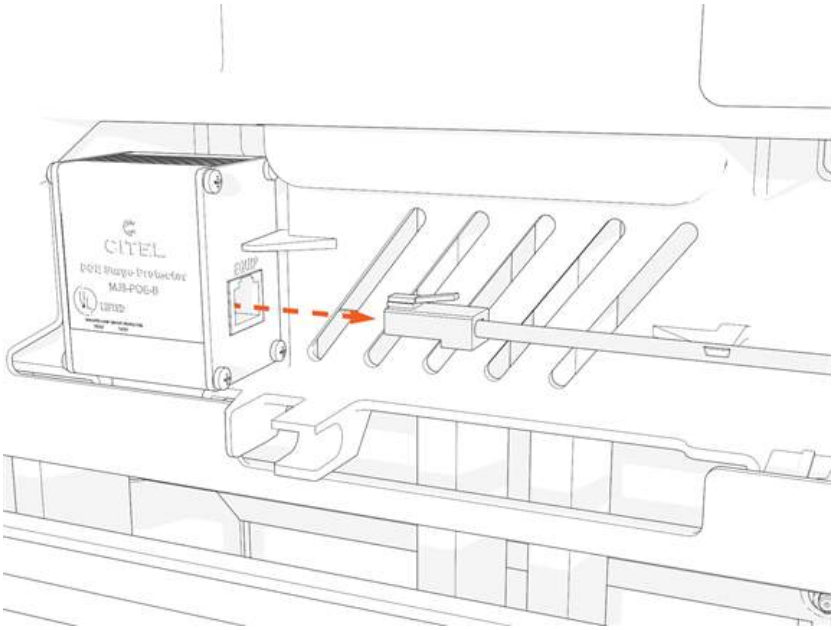
2. Use a multimeter to test that power is off.

IMPORTANT: The upper and lower bus bar plates look similar. Both sets are inscribed (A-, A+ [single] or A-, A+, B-, B+ [dual]) and have lug nuts preinstalled.

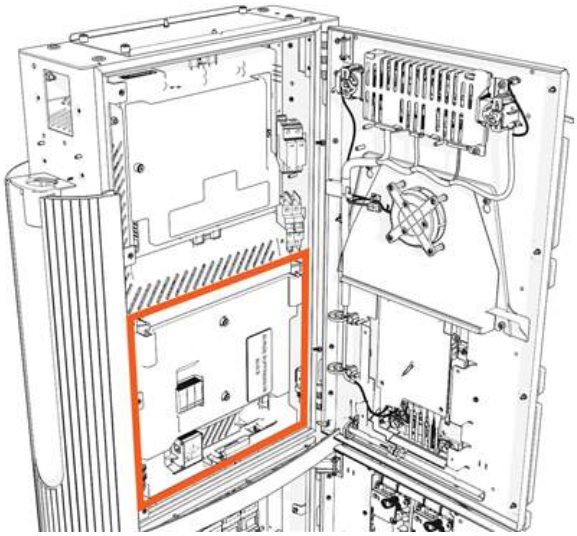
a. Disconnect the Ethernet cable from the Ethernet surge suppressor.

Note: Take a photo or note to identify which port later.

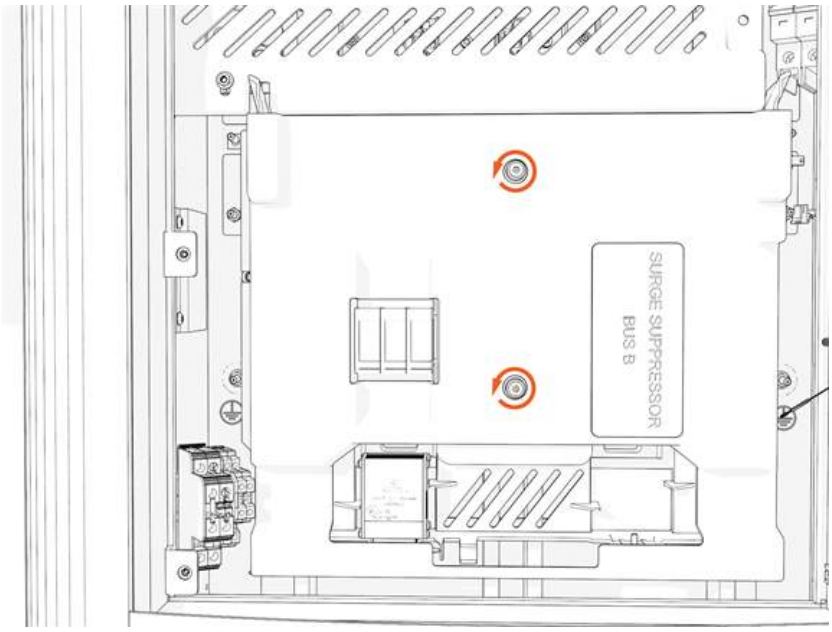




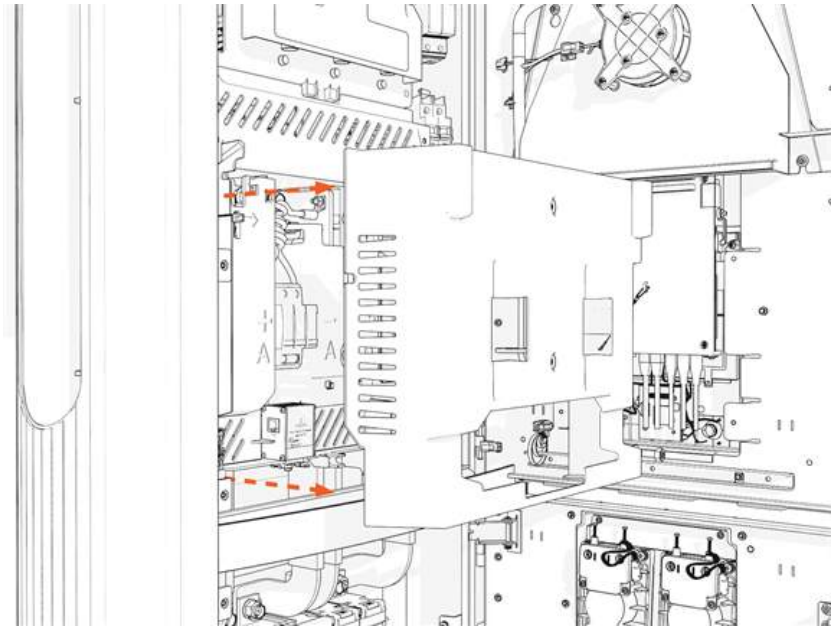
b. Access the upper bus bars.



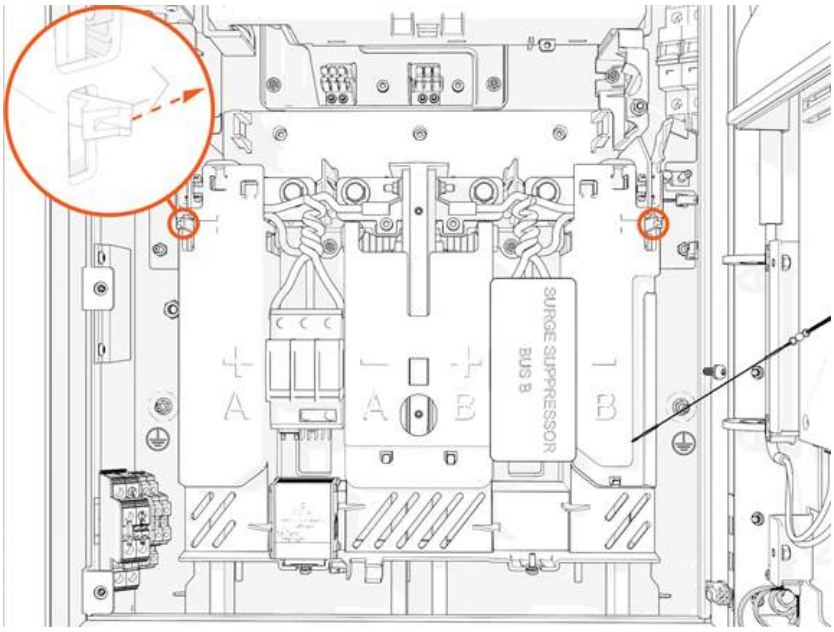
c. On the power plate cover, loosen the captive screws.



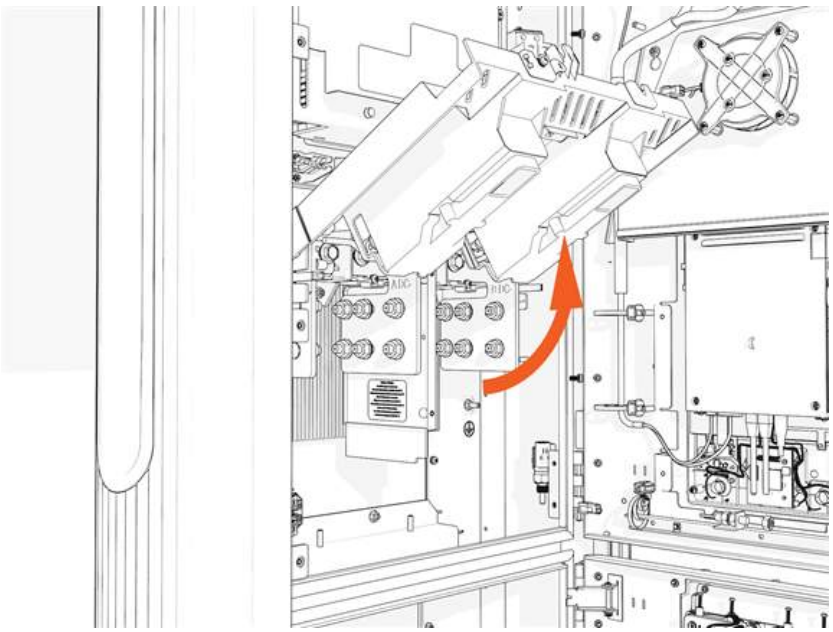
d. Remove the cover.



e. Release the tabs on the upper safety cover.



f. Lift up from the bottom until it locks in the open position.



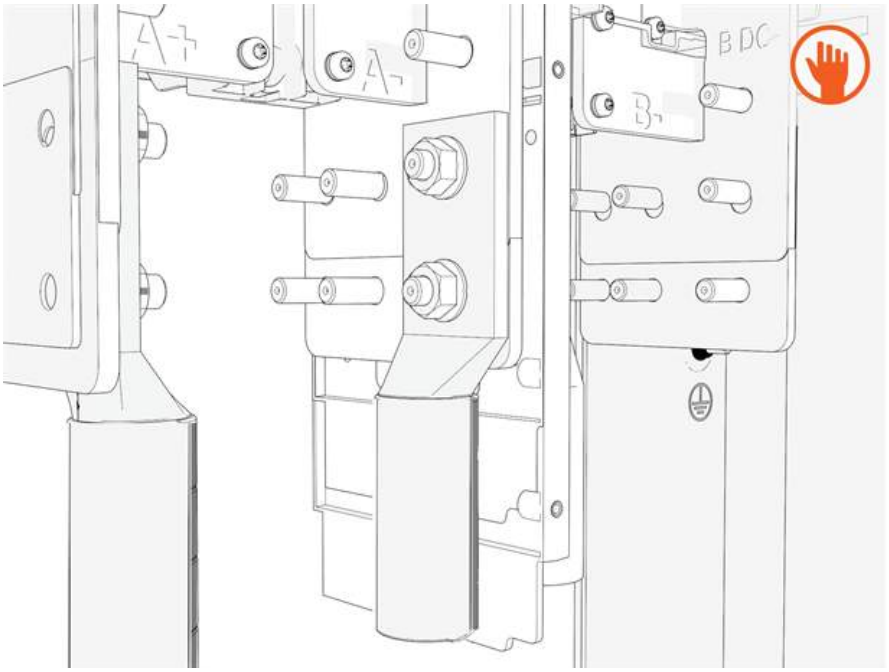
Install DC Conductors and Lugs, and Ground Wire

1. Ensure you have de-energized the applicable circuit and locked out/tagged out the disconnect according to standard practice and local code before proceeding.
2. Use a multimeter to test that power is off.
3. Route all conductors into the correct area within the cabinet.

Measure and Cut

1. Loosely install lugs only (without the conductors) onto bus bars. Hand-tighten.

   Note: Use included bolts, washers, and nuts



2. Measure the length from each conductor to its corresponding lug.

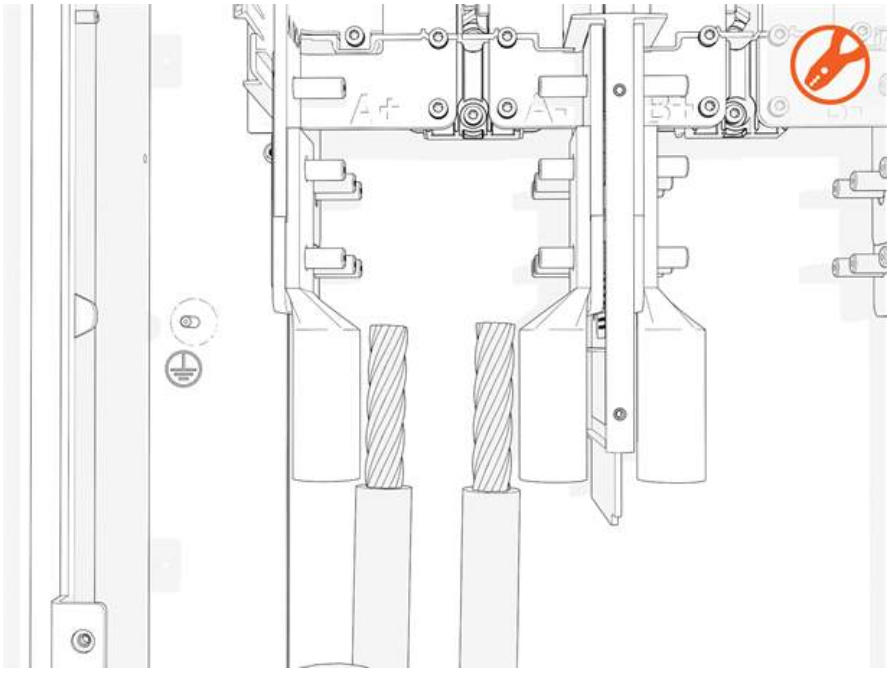
   Mark each conductor at the point where you will need to trim it.

IMPORTANT: Match the A and B Power Link bus bars to the A and B Power Block bus bars.

Note: DC bus bars are marked in order from left to right:

Single Input	Dual Input
A- A+	A- A+ B- B+

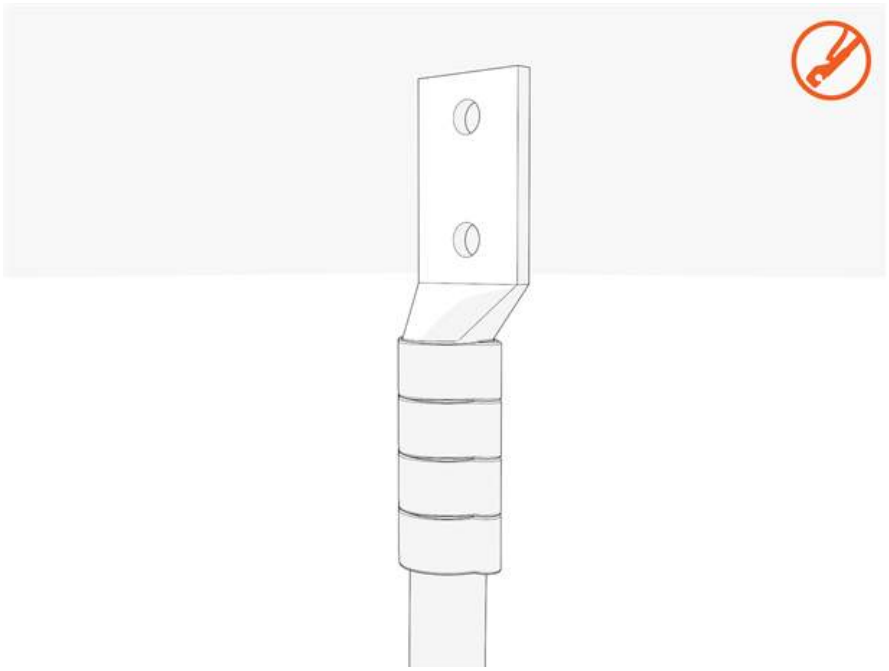
3. Strip and cut the conductors to the desired length.



DC Lugs

1. Uninstall the lugs. Crimp a lug onto each conductor.

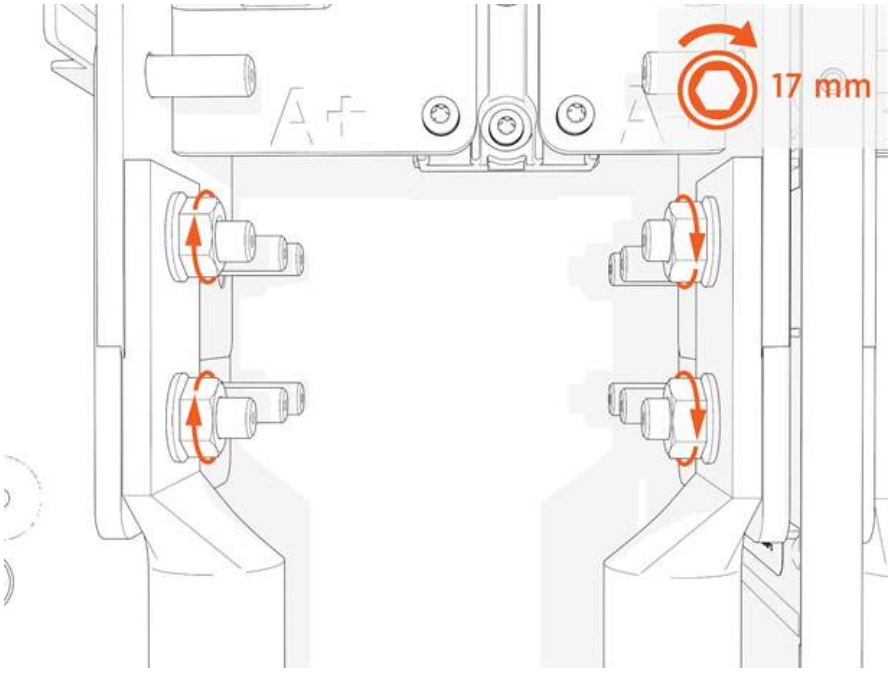
IMPORTANT: Use compression lugs with the specifications . Use the lug manufacturer's tool and die. If required, heatshrink or tape the crimp area to meet local code.



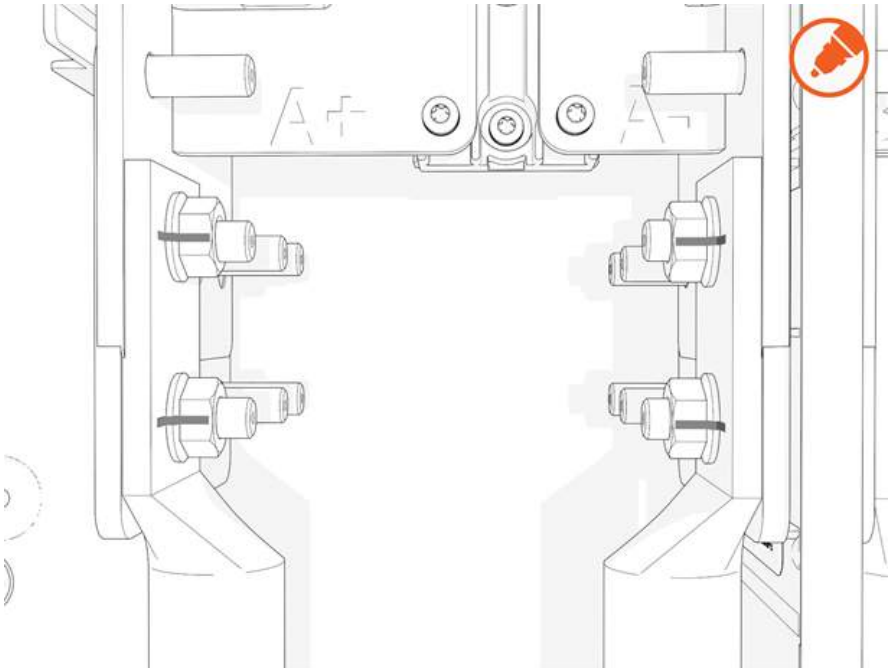
2. Land the DC lugs on the terminals. Torque nuts to 19 Nm (168 in-lb).

   Note: Fasteners are pretreated with dielectric grease.

   CAUTION: If using 500 kcmil conductors, you must use the back set of lugs to avoid interference with the surge suppressor panel.

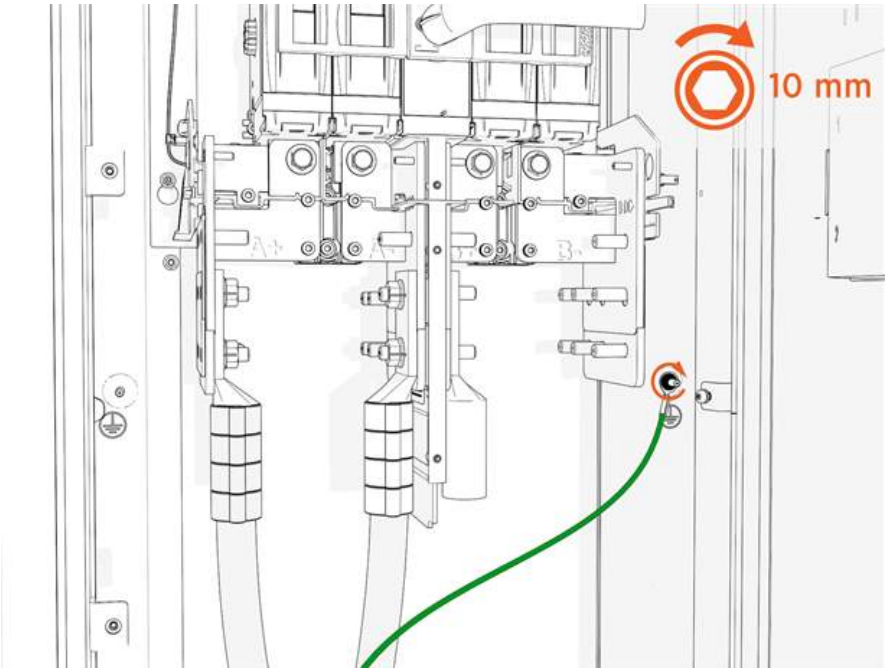


3. Mark all torqued power connections.

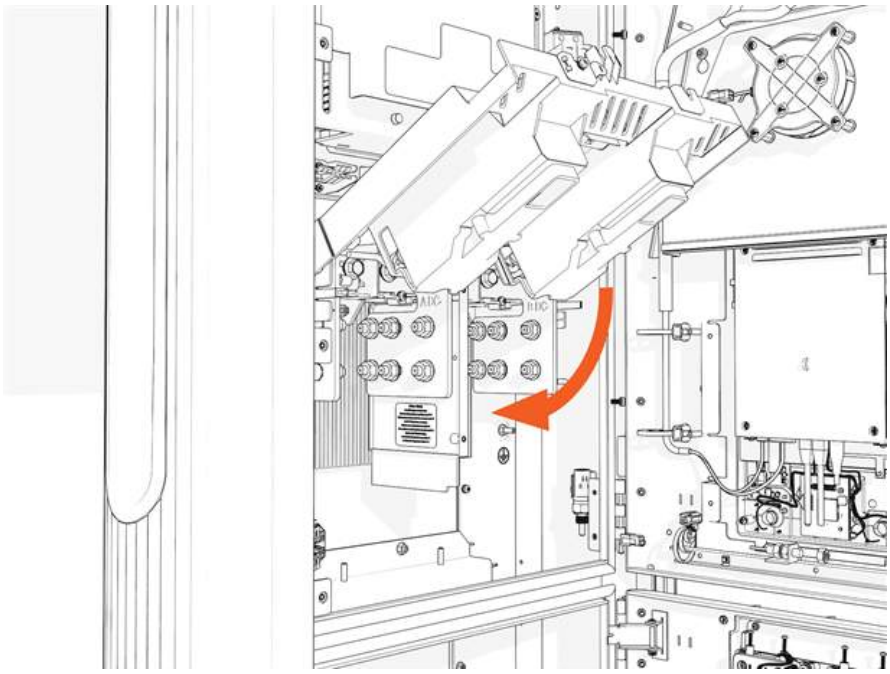


DC Ground Wire

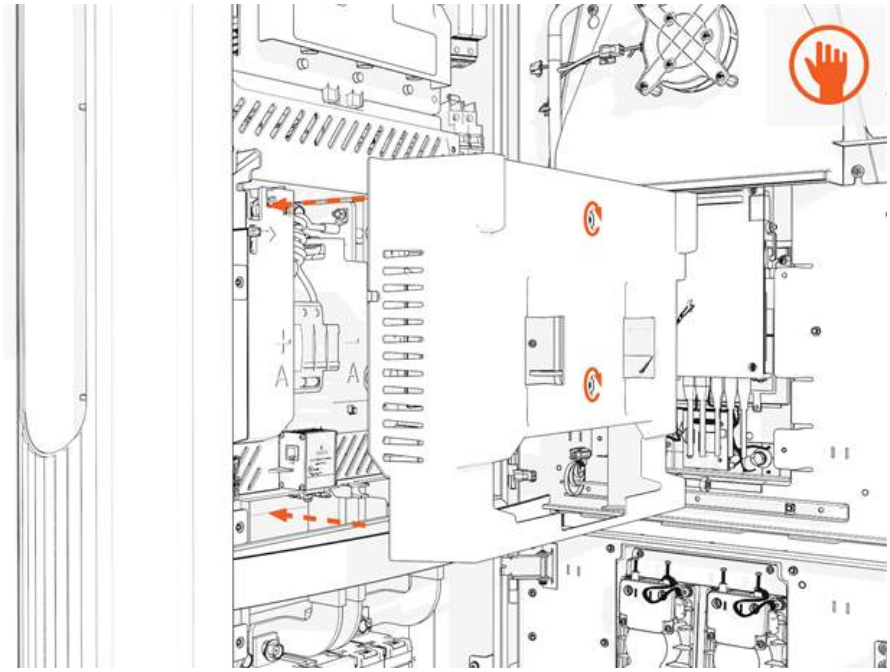
1. Land the ground wire onto a ground stud. Torque to 7 Nm (60 in-lb).



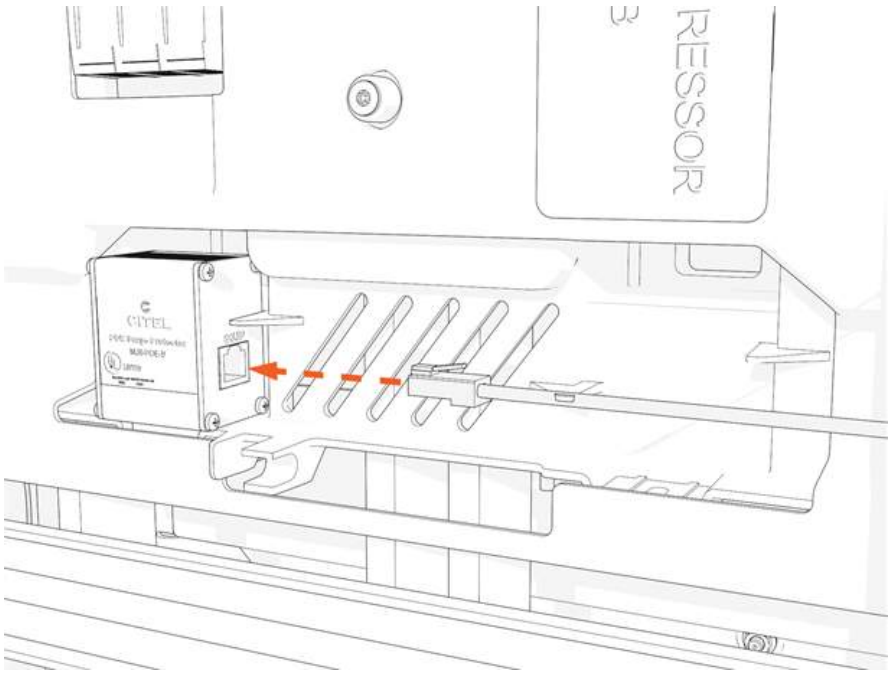
2. If you are installing the "Overhead" Mounted configuration:
   Tilt down the upper safety cover to close.



3. Position the power plate cover. Hand tighten the captive screws.



4. Reconnect Ethernet cable(s) to Ethernet surge suppressor into the same ports as before.

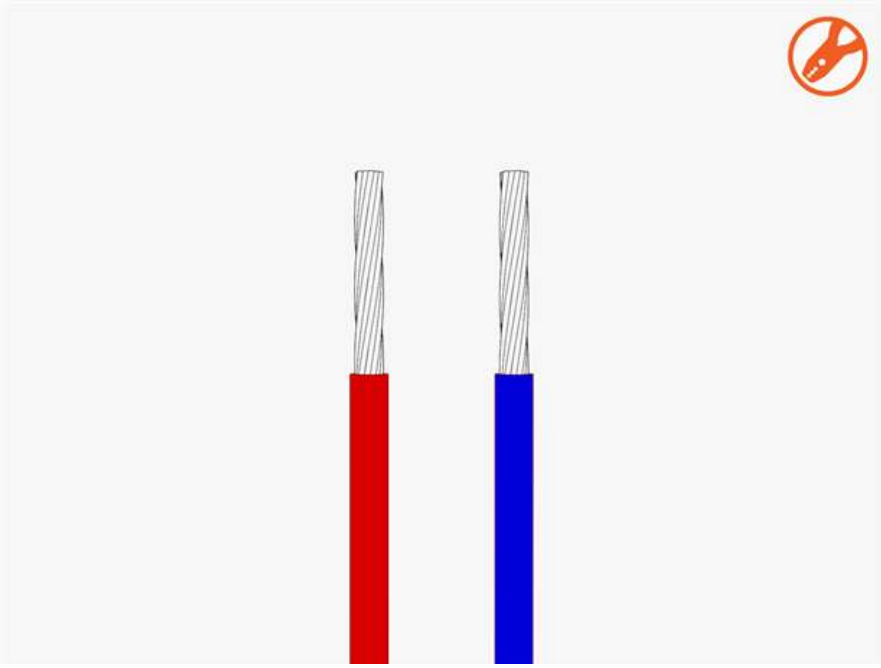


48 V DC Wiring

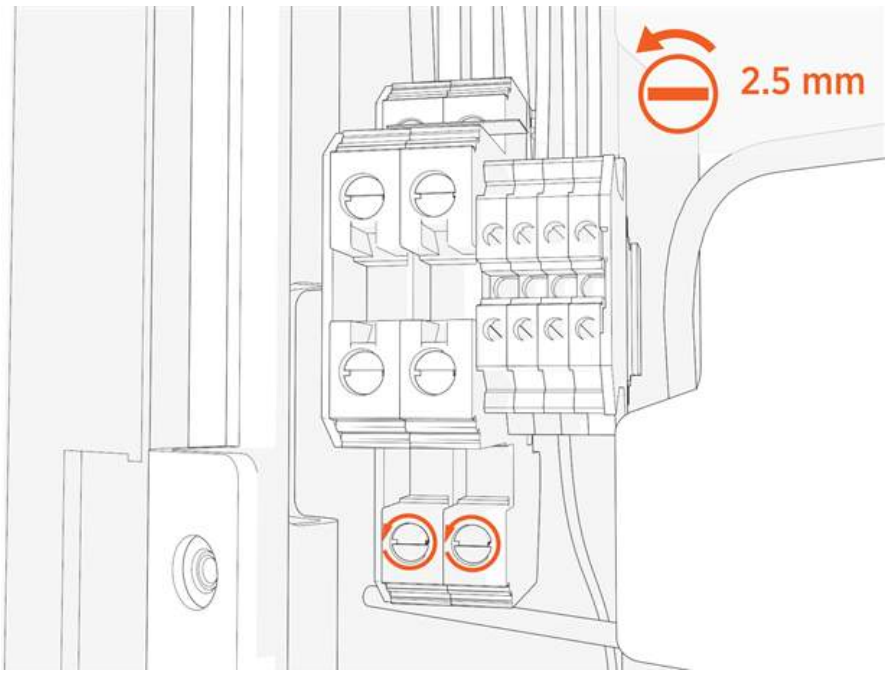
1. Check the 48 V DC wiring requirements in the site drawings:

48 V DC Wire Size	Conduit Size	Installation
16 mm^2 (6 AWG)	21 mm (3/4 in)	Install two 48 V DC wires and one Ethernet cable into one conduit.
Note: Use only copper conductor wire rated for 90 °C (194 °F).		

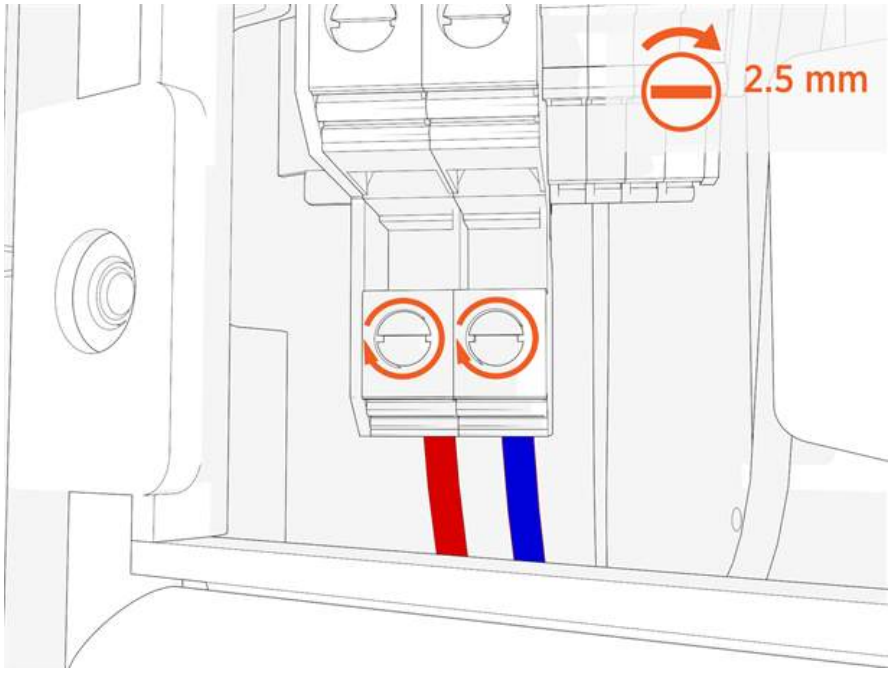
2. Strip the 48 V DC wires.



3. Loosen each terminal tab (upper cabinet, left side).



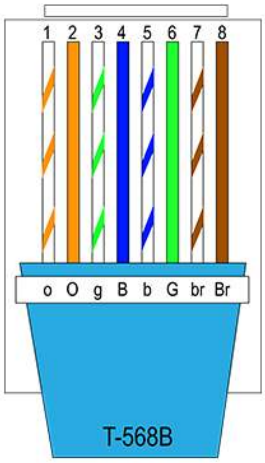
4. Seat the 48 V DC wires. Push-pull to test.



Cat6 STP Ethernet Cable

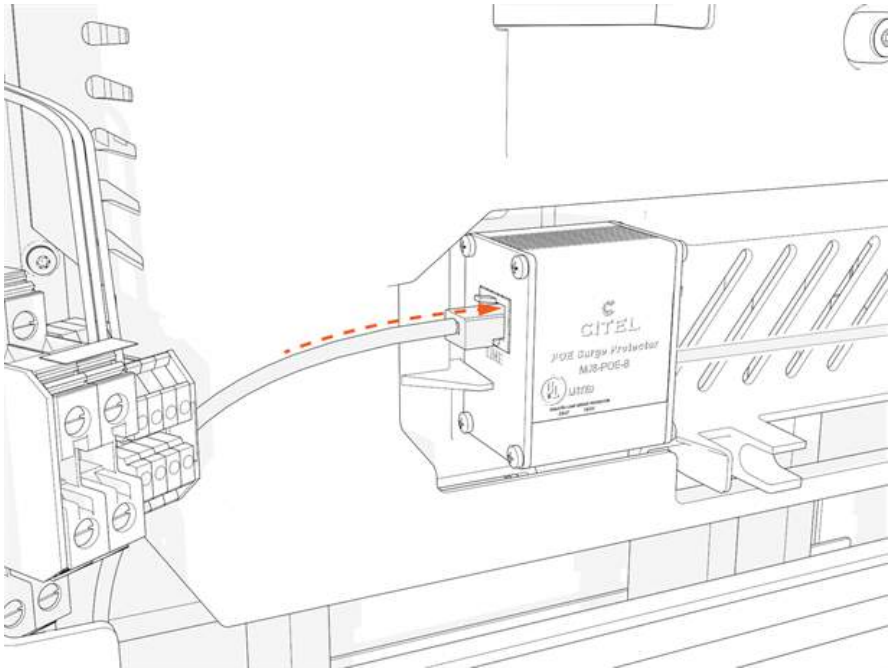
1. Trim the Cat6 STP Ethernet wires to length and allow for a service loop. Terminate both ends.

2. Field crimp a shielded connector onto each Cat6 STP Ethernet wire. Use a straight-through T568-B pattern.



IMPORTANT: Do not connect the shield wire here at the Power Link termination.

3. Test each Ethernet wire for functionality.
4. Identify which blue surge suppressors already have cables in the line-out (right) positions. Connect the Ethernet connectors to those surge suppressors at the line-in (left) positions. Push-pull to test.

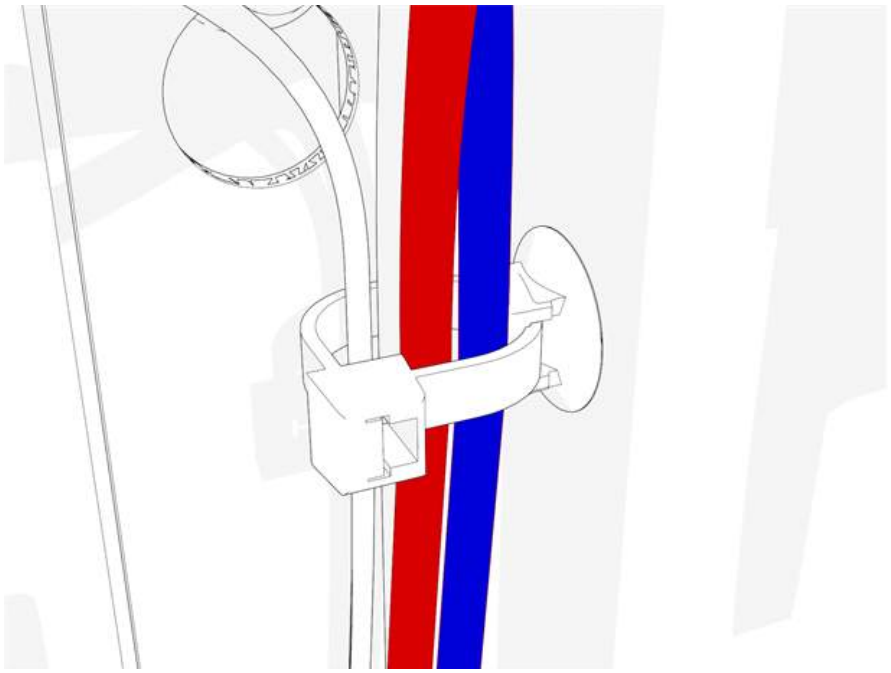


Secure and Seal Gland Plate

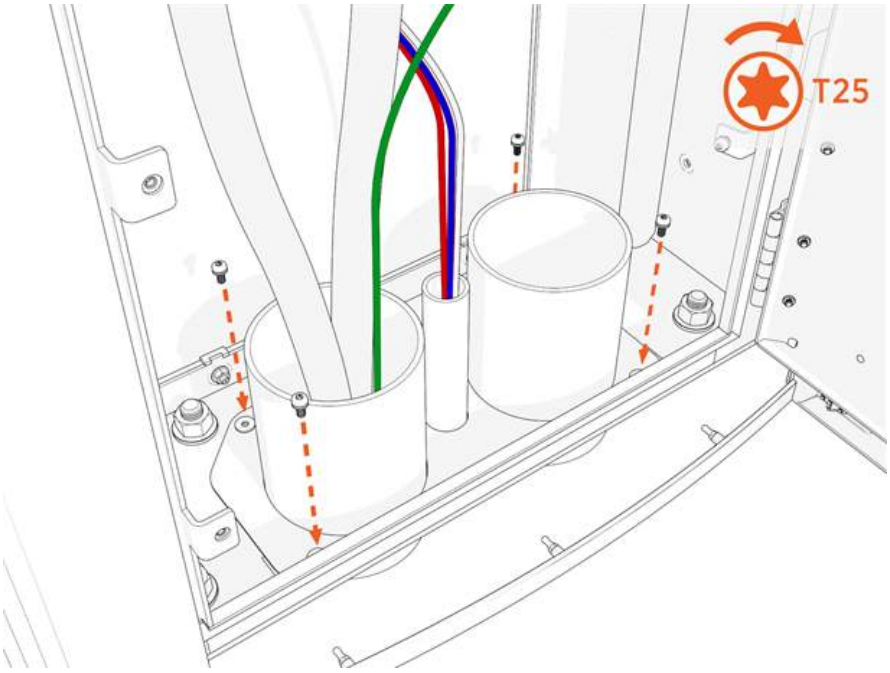
1. Vacuum all wire ends and metal shavings.



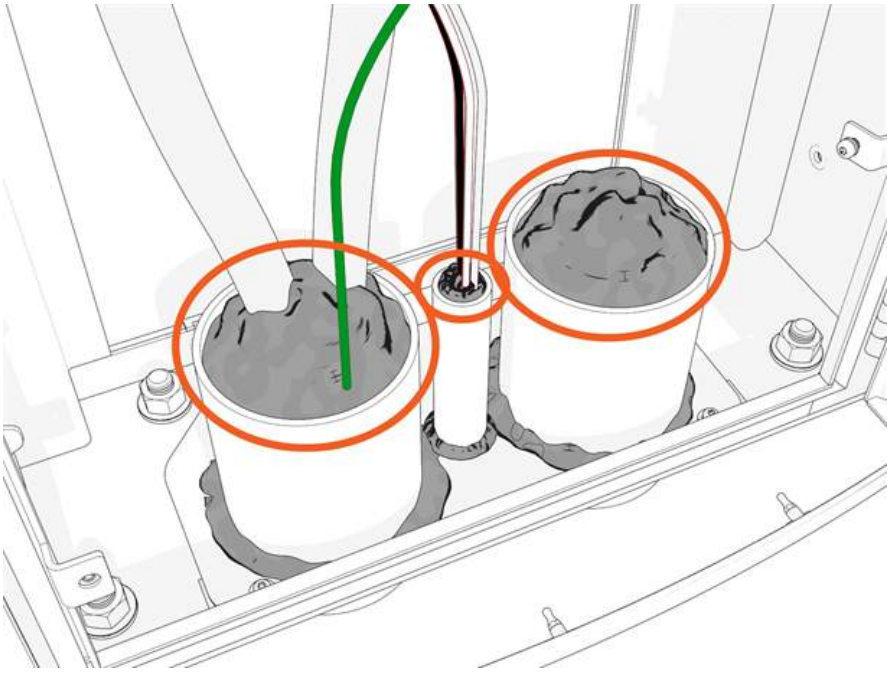
2. Secure wiring with clips as needed.



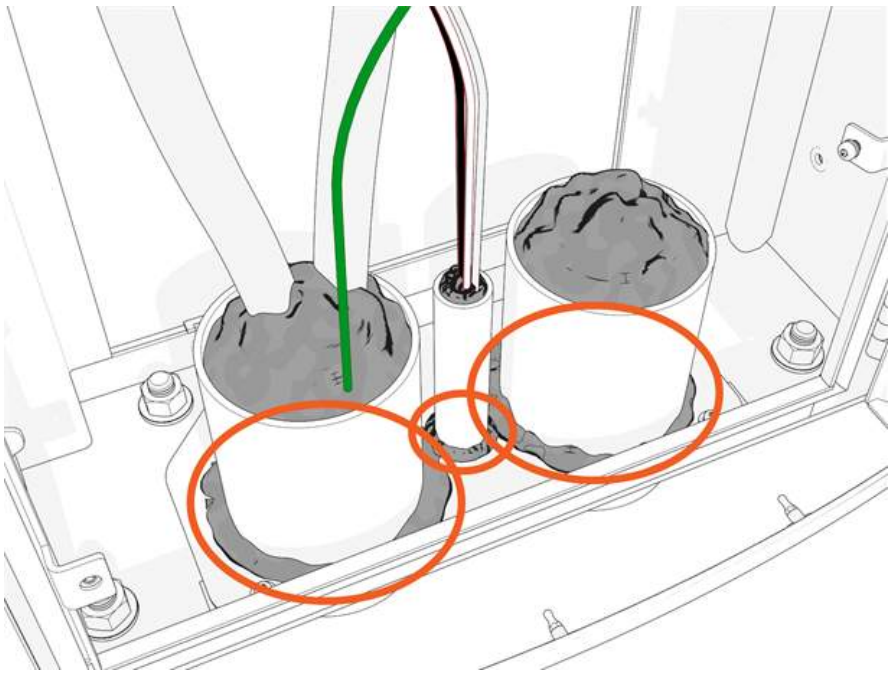
3. Align the gland plate and install screws.



4. Use duct seal compound to seal inside conduit openings.

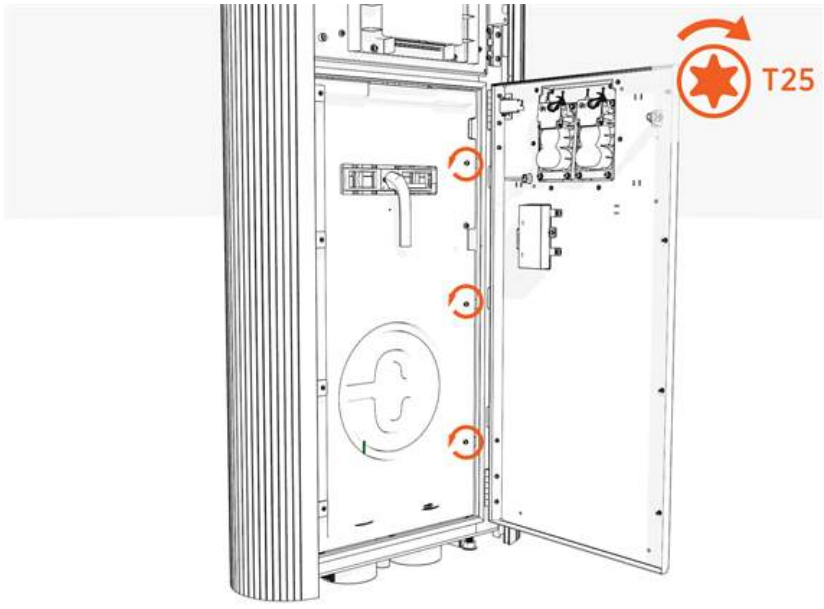


5. Seal the gland plate around and to each conduit.

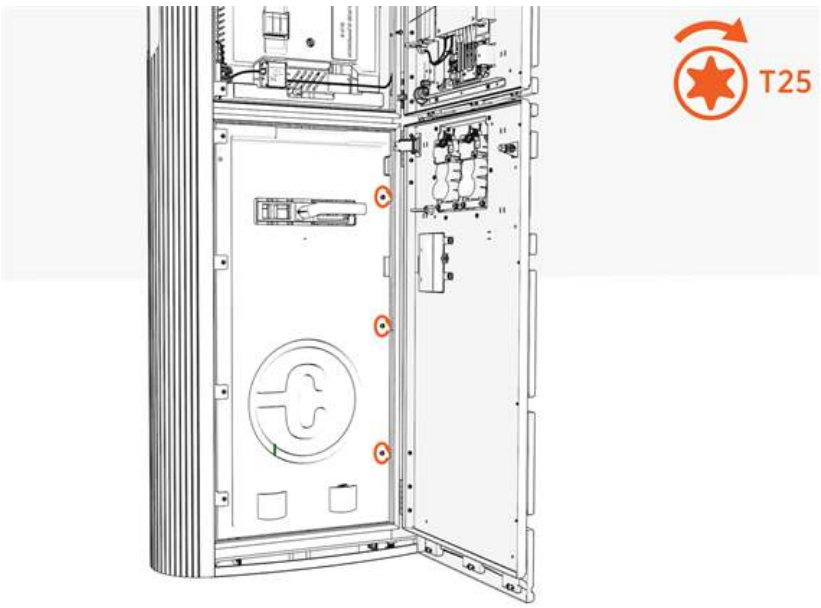


Reinstall Lower Safety Panel (if applicable)

1. Slide in the panel behind the slots on the left.



2. Install screws (x3) (use T25 security screwdriver) on the right side. Torque to 2.8 Nm (25 in-lb).



Install DC Smart Cable

DANGER: RISK OF SHOCK

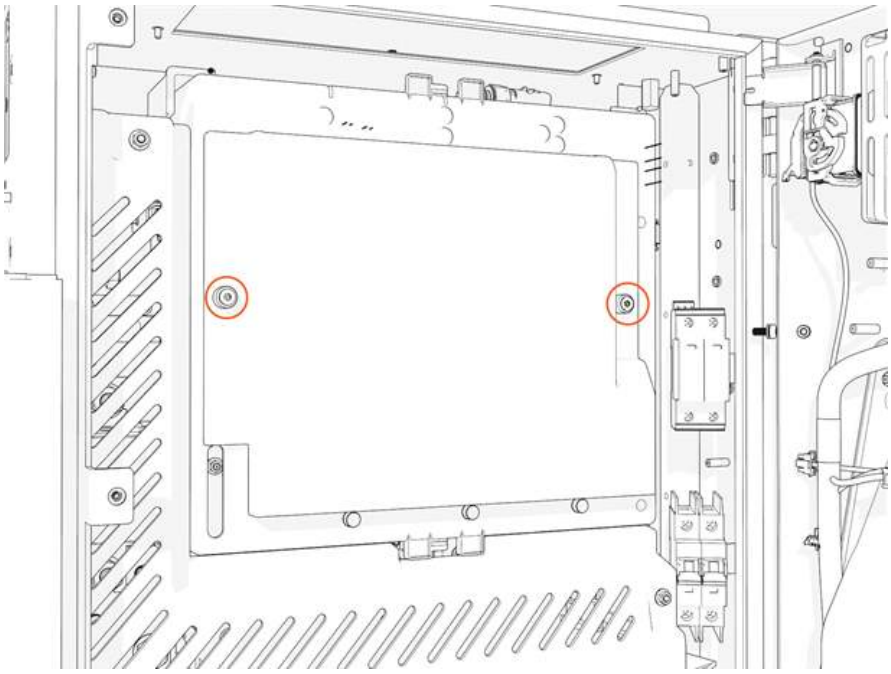
- Before any procedure, disconnect the power.
- Follow local code and site lockout/tagout procedure to de-energize the station.
- Wait for energy to dissipate (approximately five minutes).
- Keep power off until all covers and panels are reinstalled and the work is complete.

FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN SERIOUS INJURY, LOSS OF LIFE, OR PROPERTY DAMAGE.

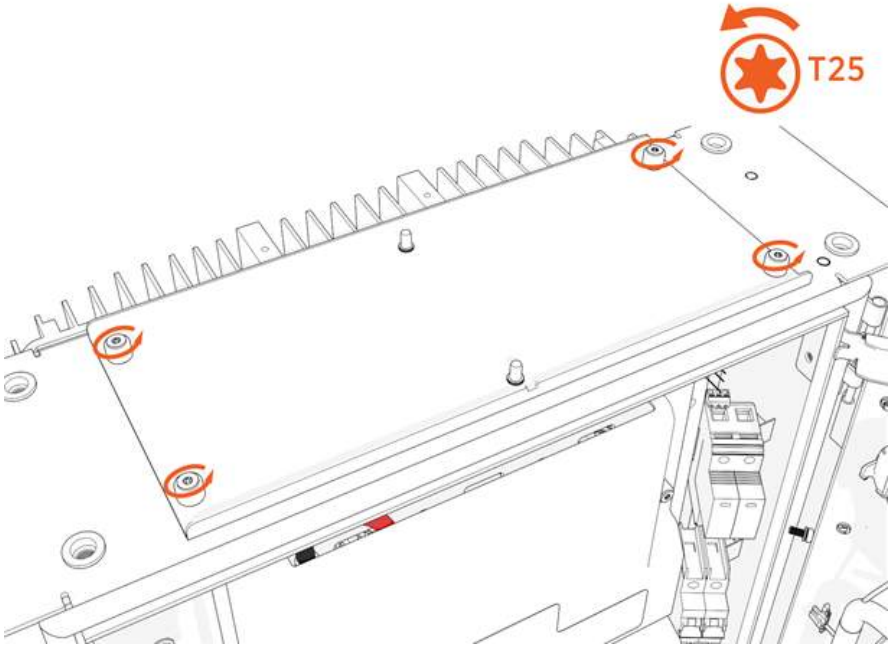
Remove Safety Cover and Top Access Panel

1. Loosen (do not unscrew completely) the two screws and slightly slide the safety cover up to remove it.

   Note: The + and - signs on the safety cover indicate the DC lug landing locations for positive (i.e., red color) and negative (i.e., black color) wires respectively.

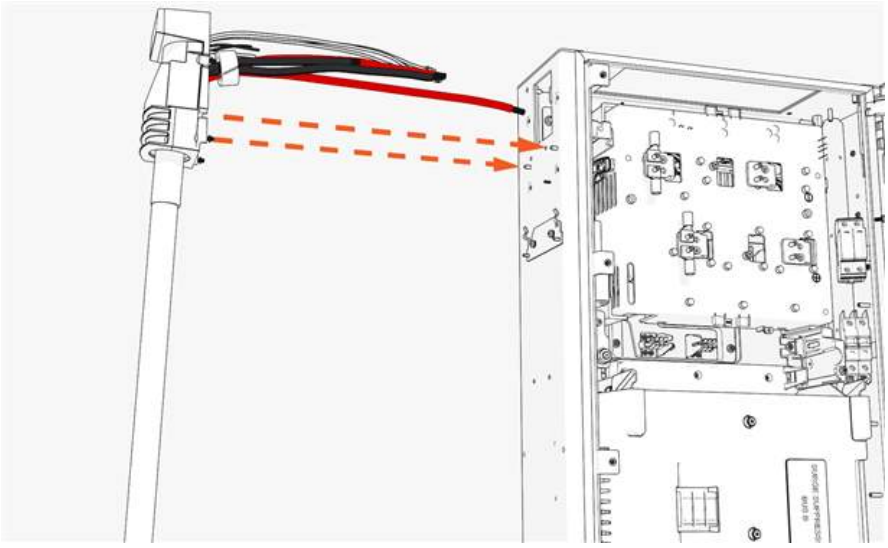


2. Position a stepladder so you can reach the top access panel.
3. Loosen captive screws and lift off the panel.



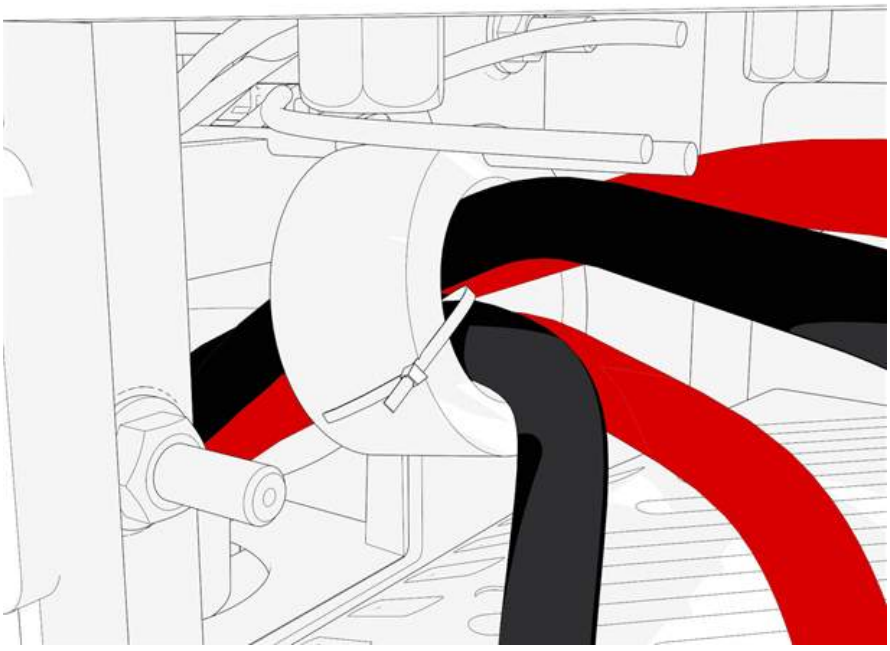
Route Into Cabinet

1. Unwrap the charging cable.
2. Route the connectors, DC cables and lugs, ferrite ring, and ground wire into the upper cabinet through the opening behind the cable housing.



Note: Tilt the ferrite ring to fit.

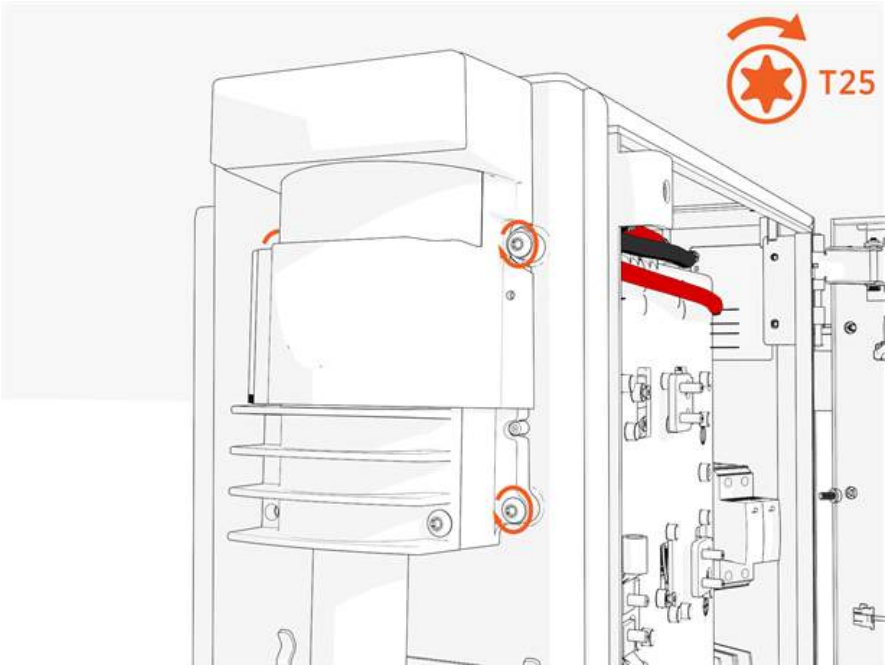
3. If you removed the zip tie, attach a removable zip tie to the cables and ferrite ring.



Cable Housing

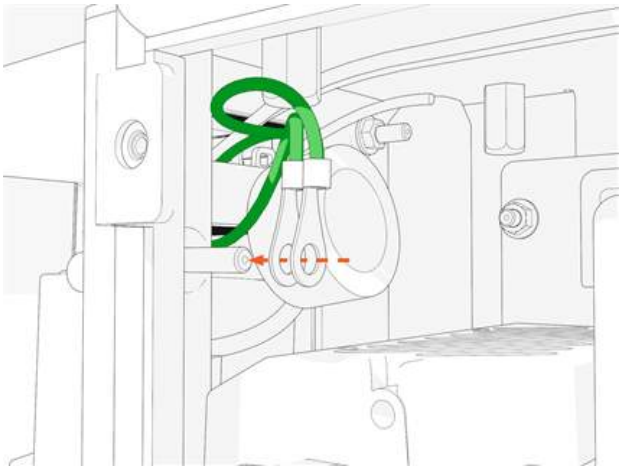
1. Align the cable housing onto the pegs. Torque to 4.5 Nm (40 in-lb).

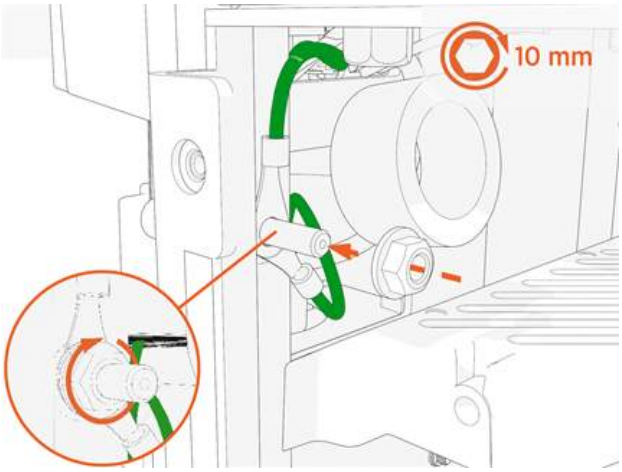
   Note: Hold or clamp the cable housing in position.



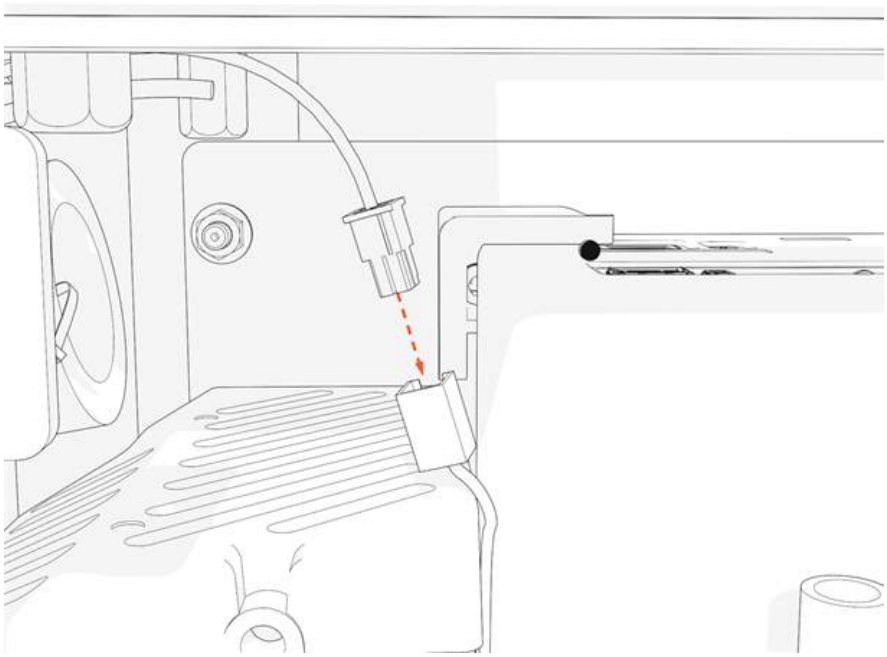
Ground Wire, 48 V Power, and Ethernet

1. Locate the bolt near the cable housing. Install two ground wires for each charging cable. Secure the wires with a nut. Torque to 5.6 Nm (50 in-lb).





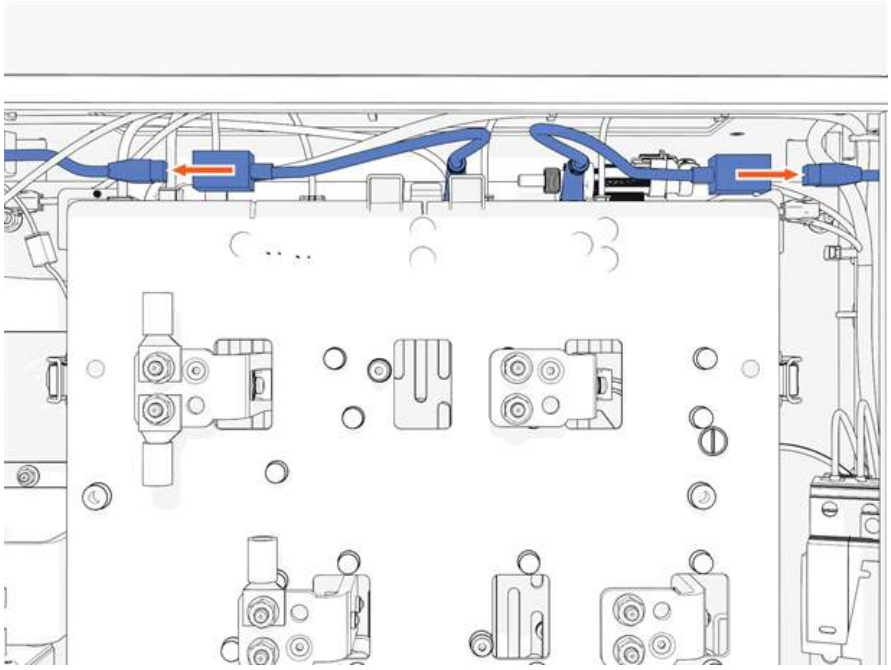
2. Locate the right and left wire harness. Connect one 48 V four-pin power connector to each.



CAUTION:

- If you switch connector ports, you could cause charging cable misidentification or disrupt status reporting between the local system and the ChargePoint Cloud Dashboard.
- If you don't attach the lugs to their correct plate locations, you could reverse positive (red) and negative (black) polarity. This could damage the station or vehicle.

3. Plug the RJ45 Ethernet connectors from the left and right charging cables into RJ45 couplers on the left and right side respectively.



DC Lugs and Nuts

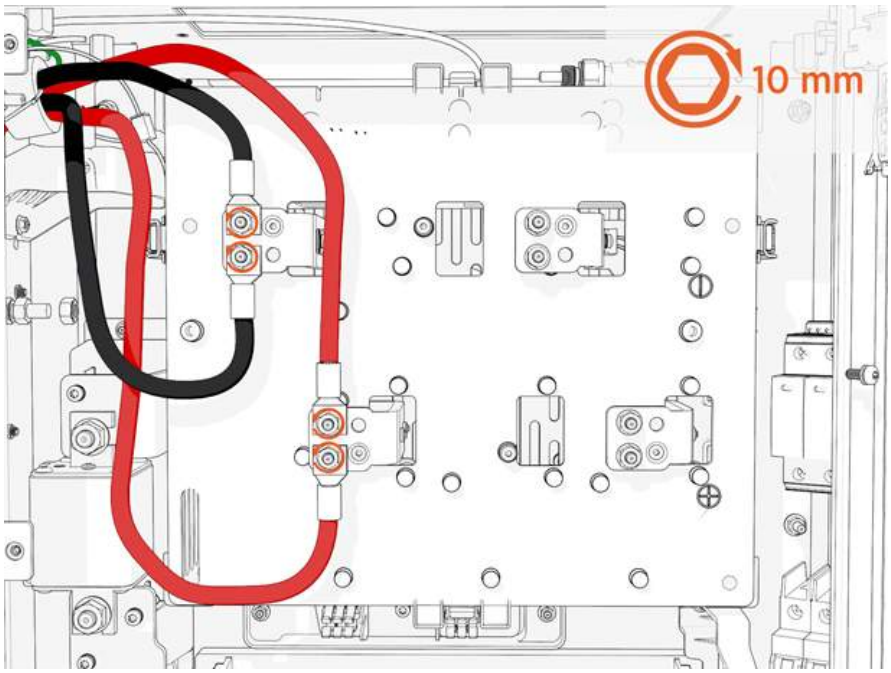
1. Land each positive and negative DC lug with a nut on the correct plate.

   Torque to 5.6 Nm (50 in-lb).

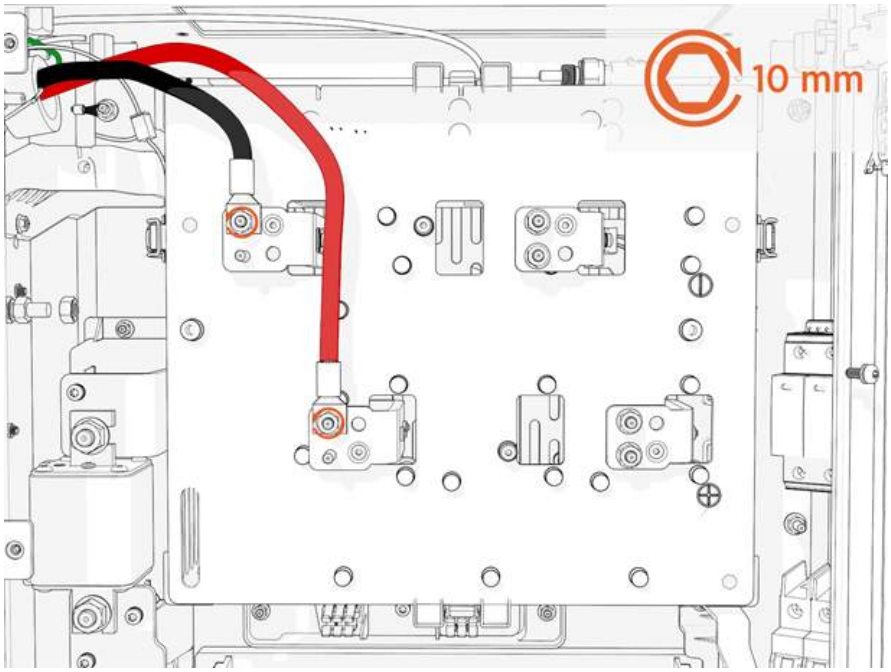
   Note: Ensure that the cable pigtails (i.e., loose ends) crimped into a lug are not rubbing against the lug landing plate.

2. Install either four DC lugs for each charging cable of 350 A or two DC lugs for each charging cable of 250 A or less.

350 A:

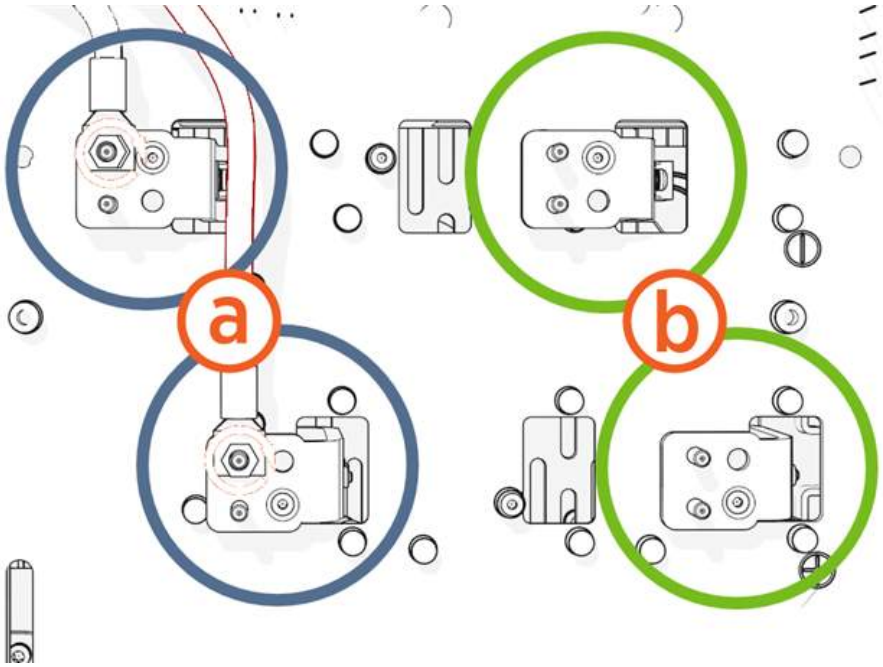


250 A or less:



You must install the charging cable lug to either a left or right plate corresponding to the left or right charging cable.

a. Left charging cable
b. Right charging cable



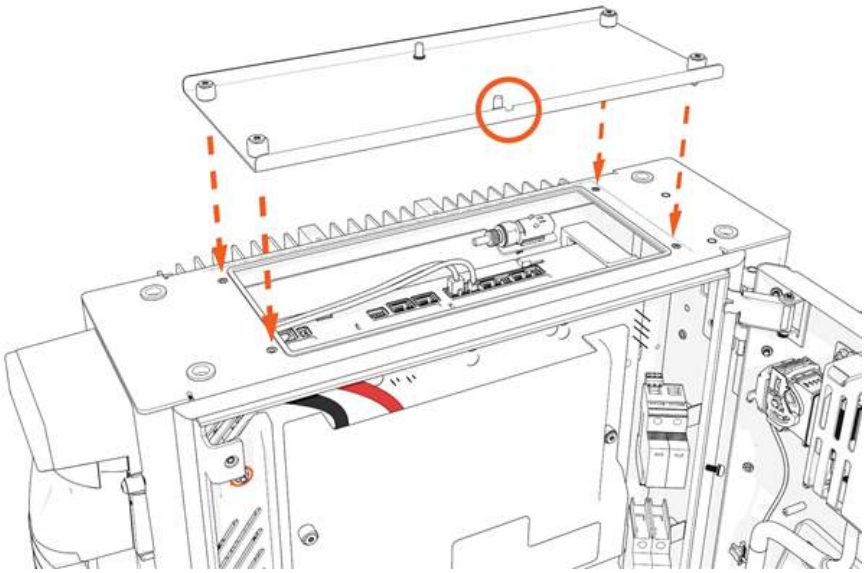
You must install each charging cable lug to either an upper or a lower plate to maintain the correct negative (black) or positive (red) polarity.

CAUTION: If you don't install lugs to the correct plate locations, you could reverse positive (red) / negative (black) polarity. This could damage the station or vehicle.

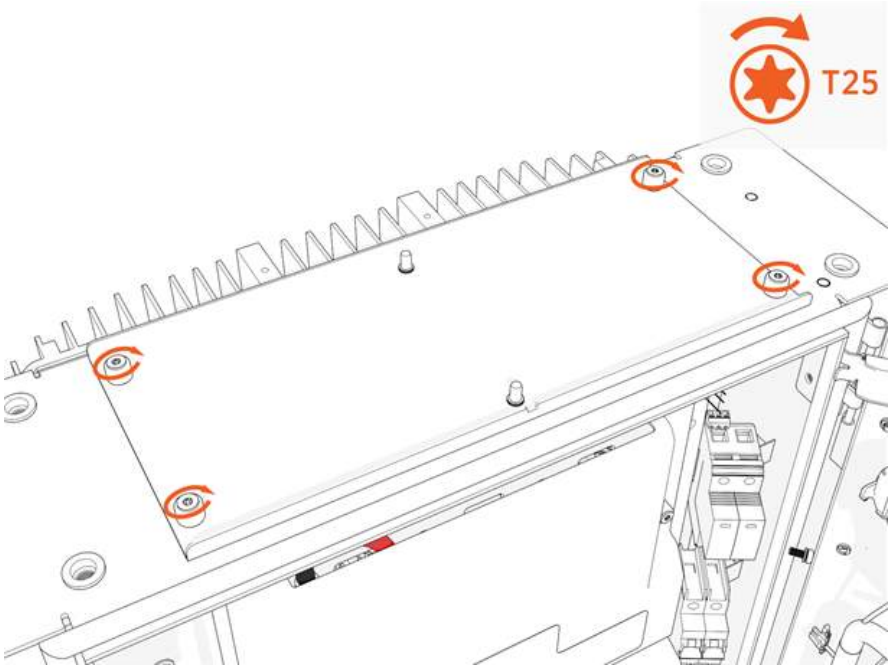
3. Mark all torqued power connections.
4. Repeat these steps on the other side to install the second charging cable (only if the charging station has second charging cable).

Reinstall Safety Cover and Top Access Panel

1. Use a stepladder to position yourself above the panel.
2. Position the panel with the notch at the front.

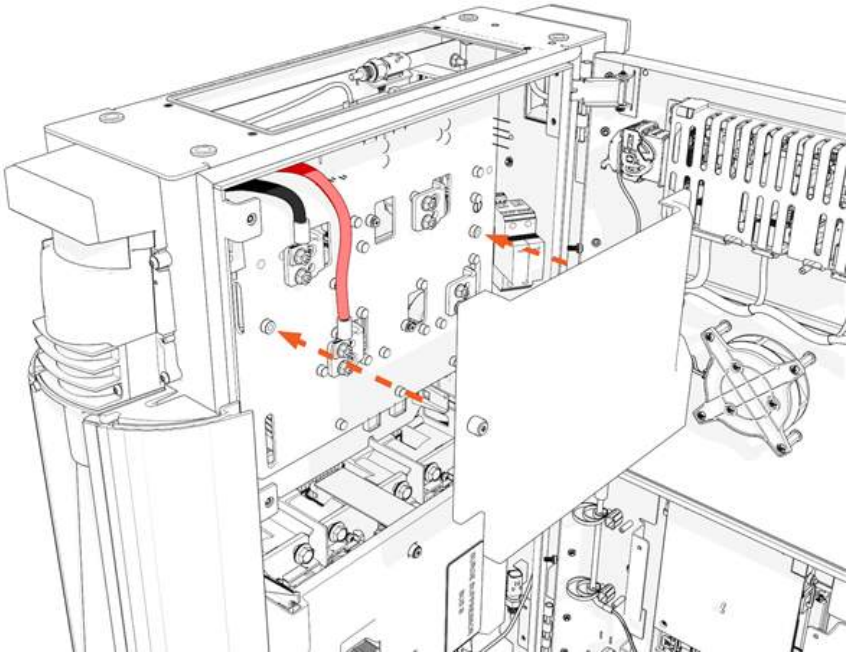


3. Torque to 2.8 Nm (25 in-lb).

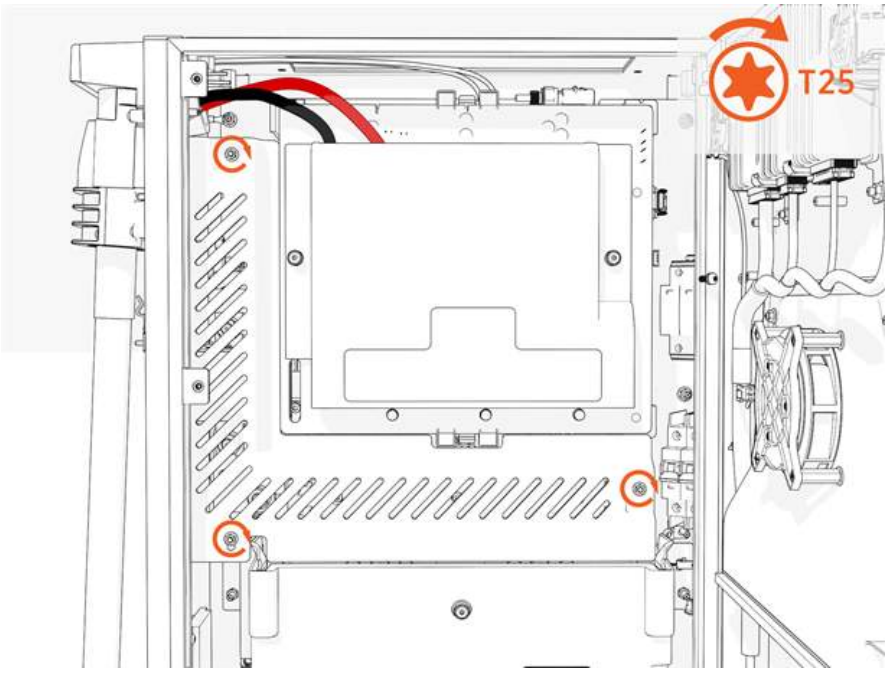


4. Align and insert the keyholes on the safety cover and slightly slide the safety cover down to hold it in place.

   Note: The safety cover has ribs in place to ensure that the charge cable terminations cannot touch the lug landing plates.



5. Tighten the two M4 screws.

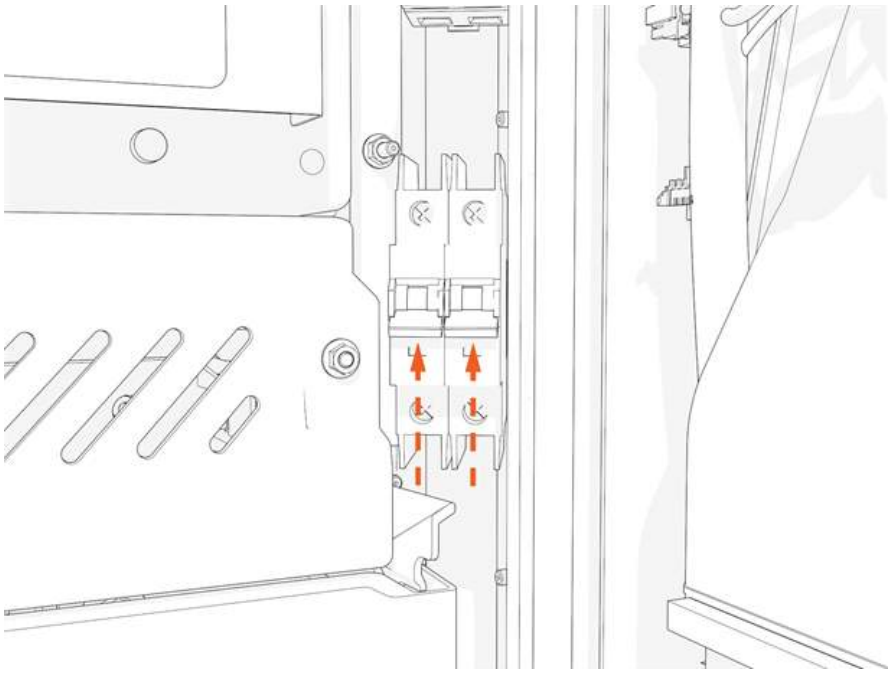


Install Doors

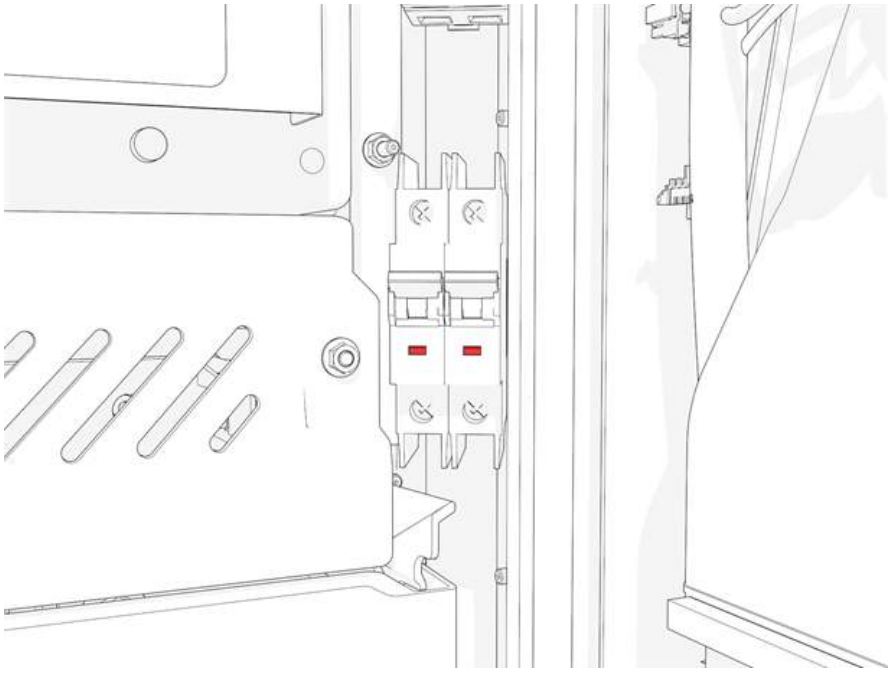
(Standard Pedestal)

Power On 48 V

1. Locate the 48 V DC breaker.



2. Flip up the switch to ON. The indicator light should turn red.



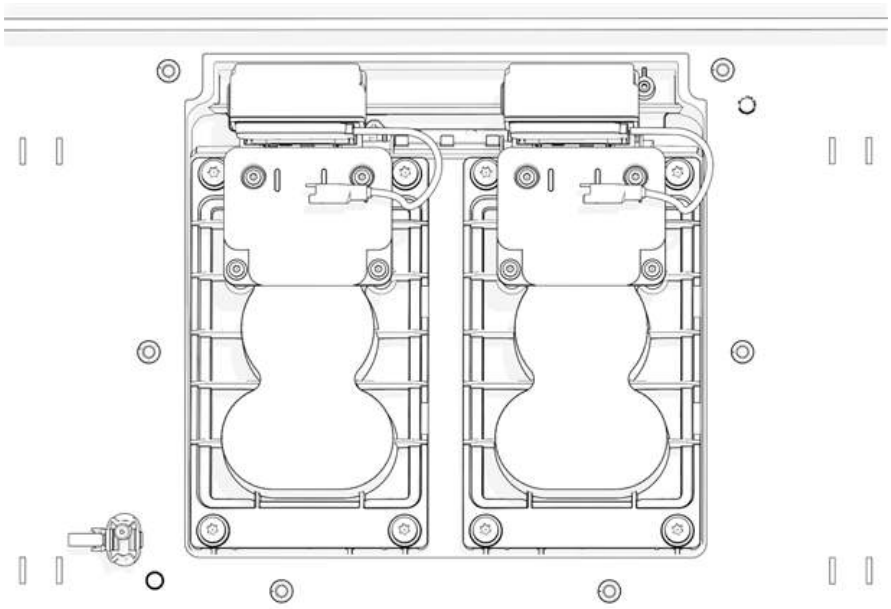
Install Upper Door

Note: If your unit has a lower safety panel that you did not yet reinstall, do so now.

Install and Connect Holsters

IMPORTANT: Route the holster wiring correctly to avoid charging cable misidentification or disruption to status reporting between the local system and the ChargePoint Cloud Dashboard.

1. Match each holster to the connector type for each charging cable on each side.
2. Fit the correct holster into the opening at the center. Install screws into each holster.



3. Optional lock feature:

   Route and connect the wiring to each holster.

   a. Route the wiring harness through the notch (at right) in the lower safety panel.
   b. Locate the markings "1" and "2" on the housing at the base of the wires.
   c. Connect the holster near the door hinge to wire "2".
   d. Connect the holster near the door opening to wire "1".

Install Lower Door

1. Disengage wind stops and close the door.
2. Torque screws on the door to 4.5 Nm (40 in-lb).
3. On the right side of the door, insert the bottom of the door bracket. Tilt in the top of the door bracket. Push down into position.
4. Torque screws on the door bracket to 1 Nm (10 in-lb).

Install Covers

(Standard Pedestal)

Identify if you have preassembled covers or unassembled components (vinyl signs, trims, and top cap).

Note: To request a change, contact ChargePoint Support (chargepoint.com/support).

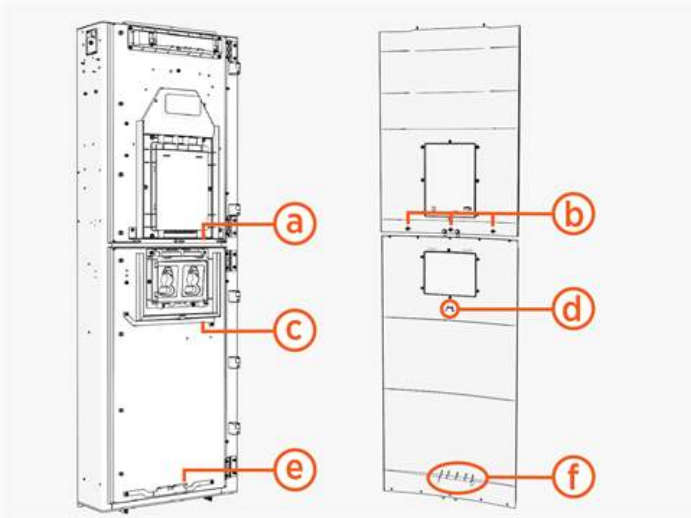
IMPORTANT:

Continue to the applicable instructions.

A. Preassembled covers	B. Unassembled vinyl signs, trims, and top cap

A. Install Preassembled Covers

1. Notice the three brackets on the doors. Pins and hooks on the covers fit into these.



Upper door and cover:

a. Upper bracket with three clips
b. Three pins

Lower door and cover:

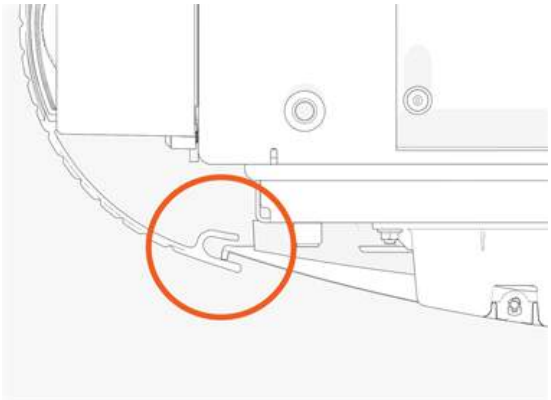
c. Middle bracket
d. Middle hook

e. Lower bracket
f. Lower hook

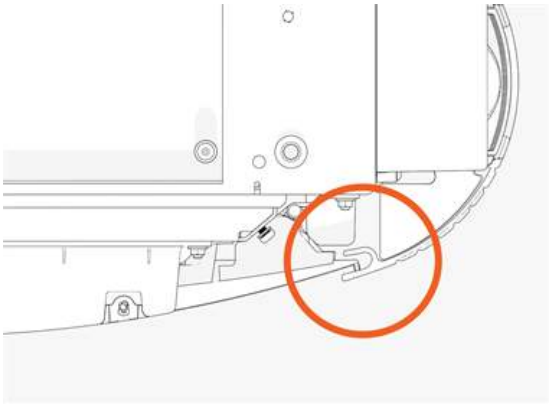
Front Covers

IMPORTANT: The upper and lower covers fit into vertical grooves at the right and left. Notice the location of the grooves when viewed from the top.

Left

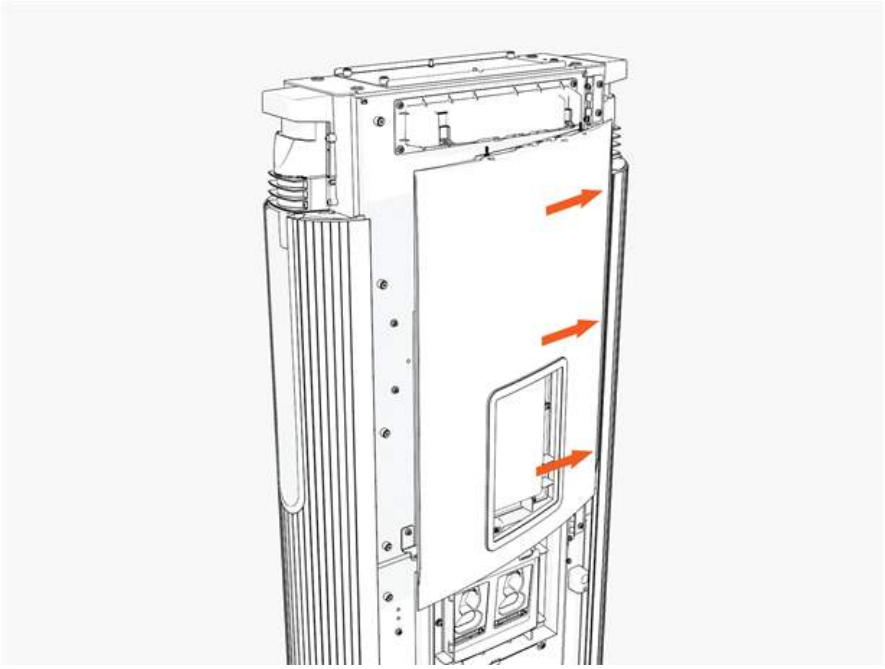


Right



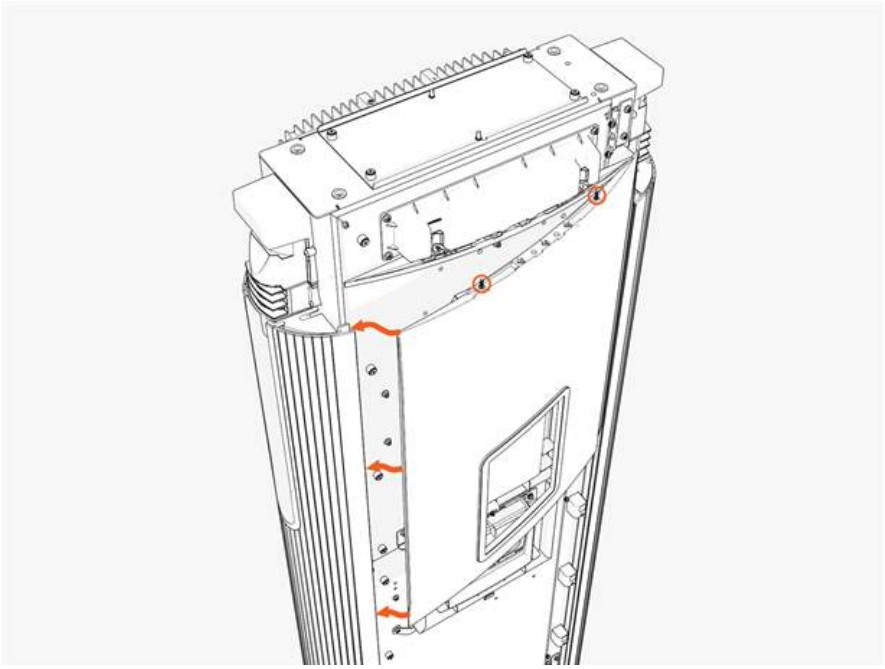
Upper Cover

2. Slide the left or right edge of the cover into the left or right groove.

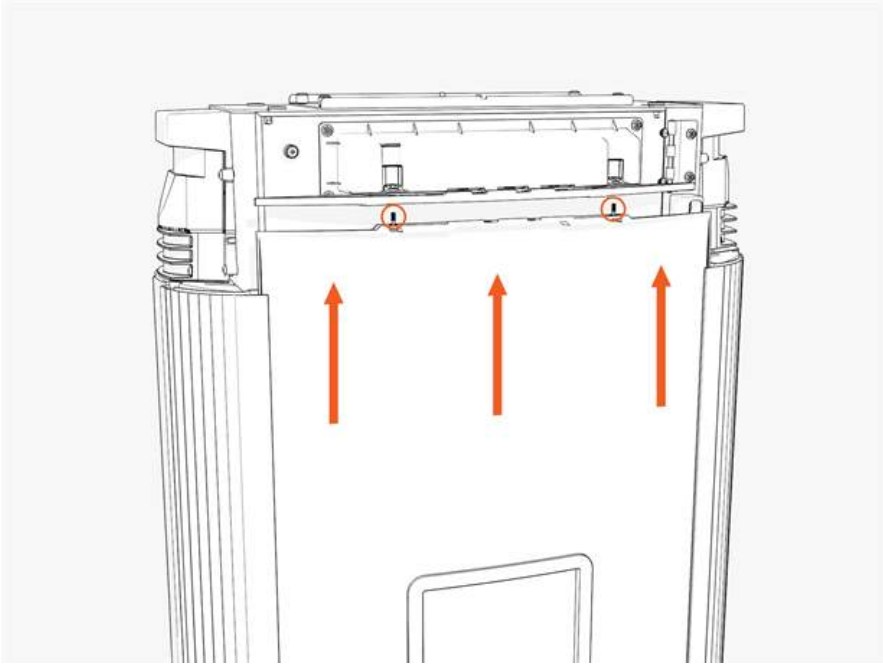


3. Rotate and bend in to slide the other edge into the other vertical groove.

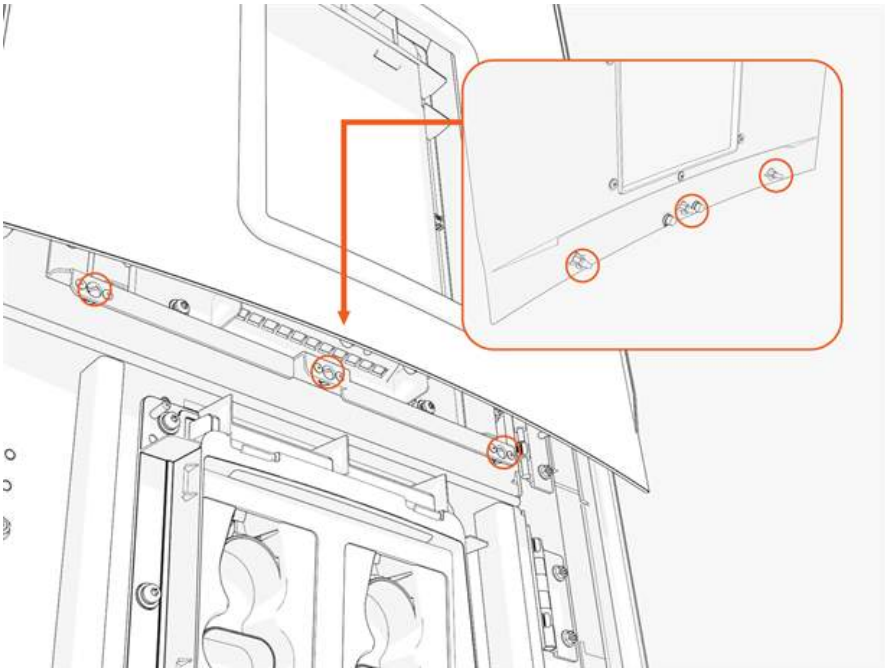
   While rotating in, ensure the captive screws at the top edge of the cover do not come in contact with the downlight housing.



4. Hold and flex the bottom center of the cover slightly outward and slide it up to mate with the downlight housing. Align and seat the captive screws with the openings in the downlight housing (screws will be tightened later when the top cap is installed).



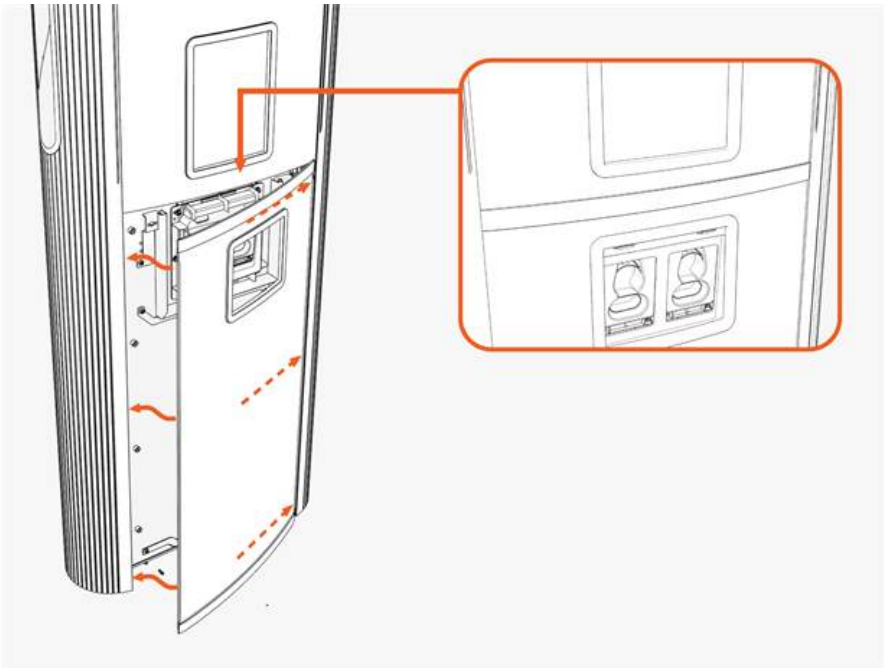
While flexed, align the three ball studs on the cover with holes into the bracket on the door, and press the cover in to clip in the ball studs.



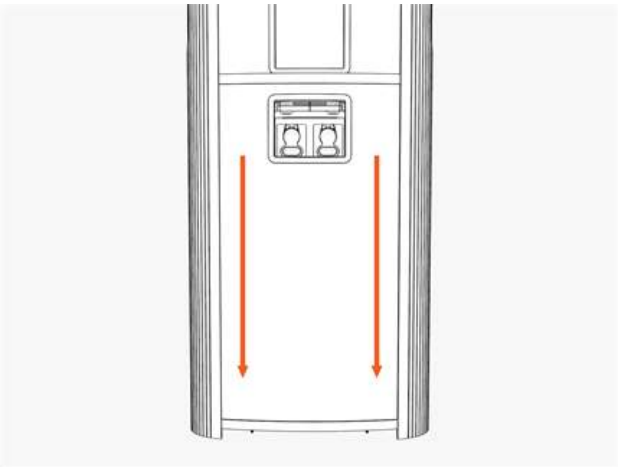
Lower Cover

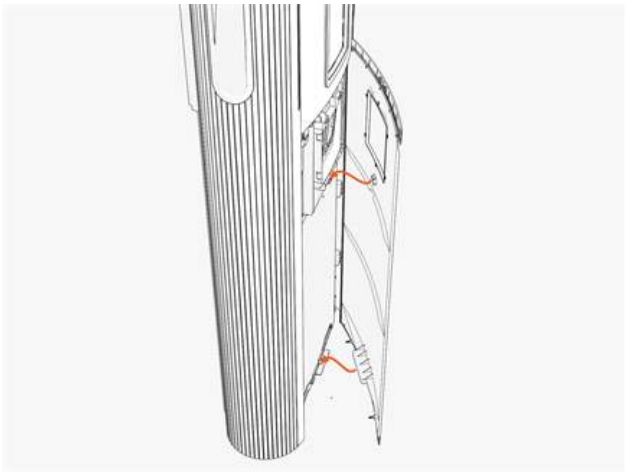
1. Slide the left or right edge of the cover into the left or right groove and then rotate and bend in to slide the other edge into the other vertical groove.

   While sliding in the edges, hold the waistband (i.e., top edge of the lower cover) just below the lower edge of the CCOM trim, or overlap the top portion of the lower cover about 30-35 mm (1.25-1.5 in) over the bottom portion of the upper cover.



2. Check the top and bottom corners to make sure the waistbands are seated in the groove, and then slide the cover down. While sliding down, press in on the lower edge of the holster trim and lower edge of the cover to engage the hooks behind the cover.





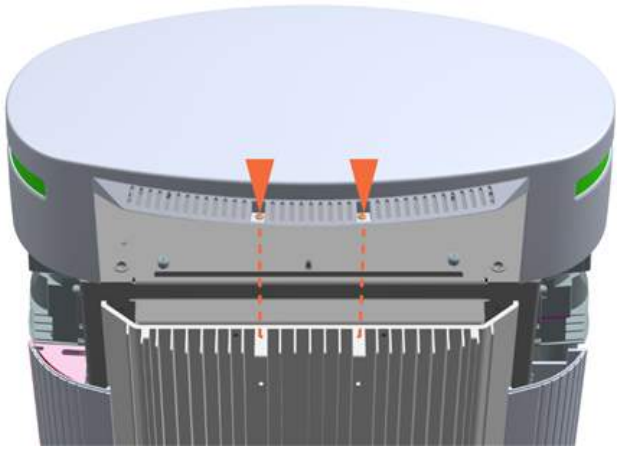
Top Cap

3. Align the screws (x4) (two at front and two at rear) and install the top cap.

Front

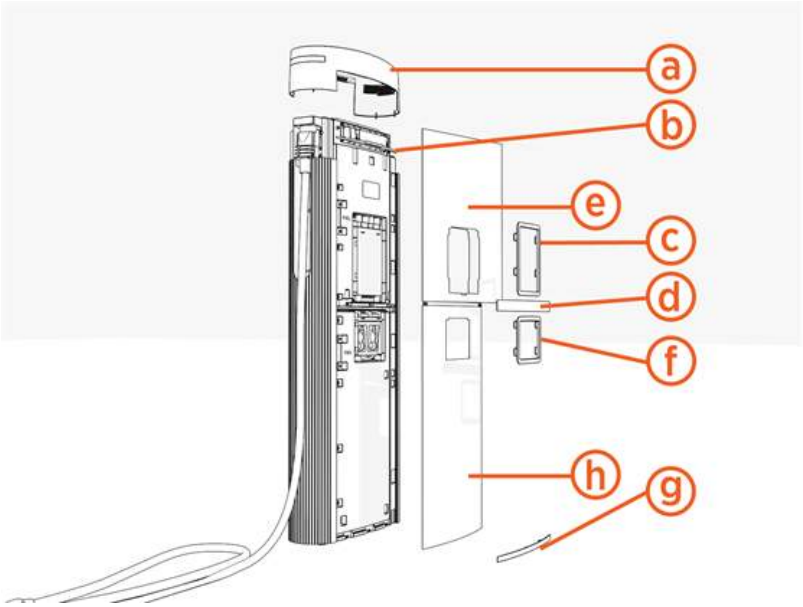


Rear



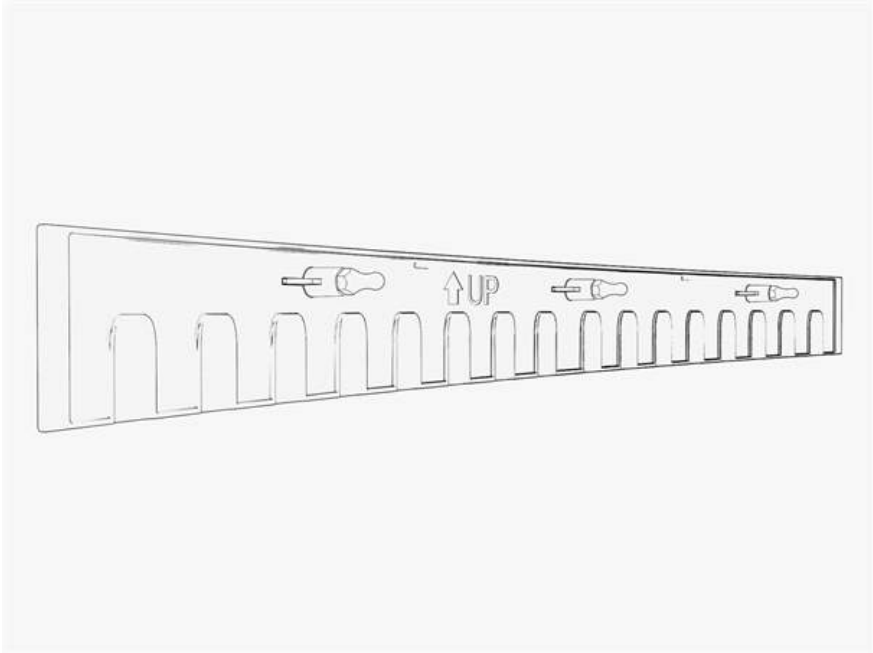
4. Torque the M5 screws (x2) at rear side to **2.8 Nm (25 in-lb)** and M4 screws (x2) at front side to **1.7 Nm (15 in-lb)** (use T25 security screwdriver).

B. Install Vinyl Signs, Trims, and Top Cover

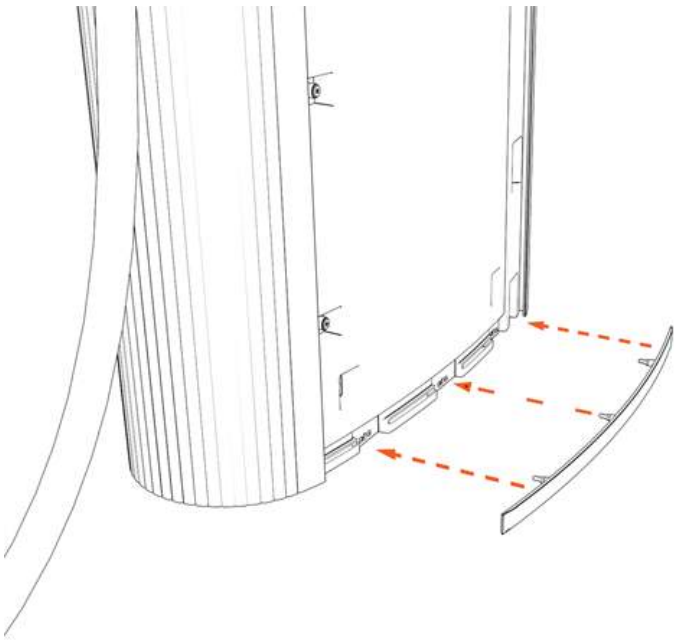


a. Top cover (helmet)
b. Upper trim
c. Interactive display trim (optional)
d. Middle trim
e. Upper vinyl sign
f. Holster trim
g. Lower trim
h. Lower vinyl sign

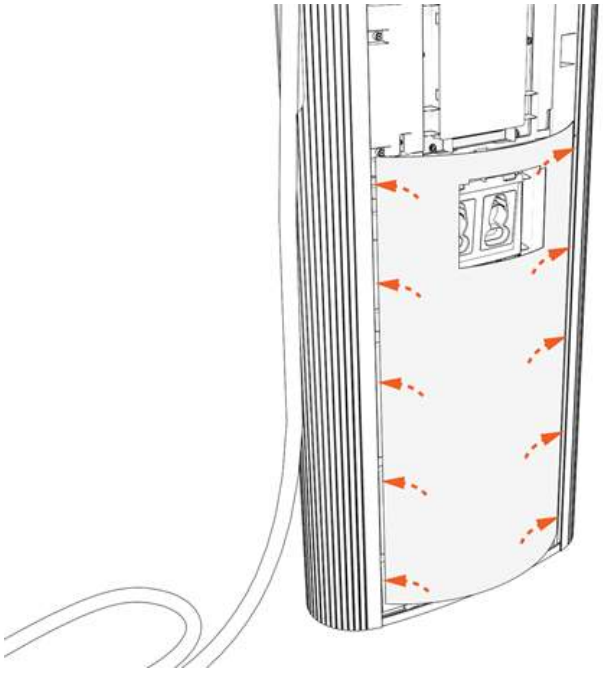
IMPORTANT: Notice the imprint on the trim shows which edge goes "UP."



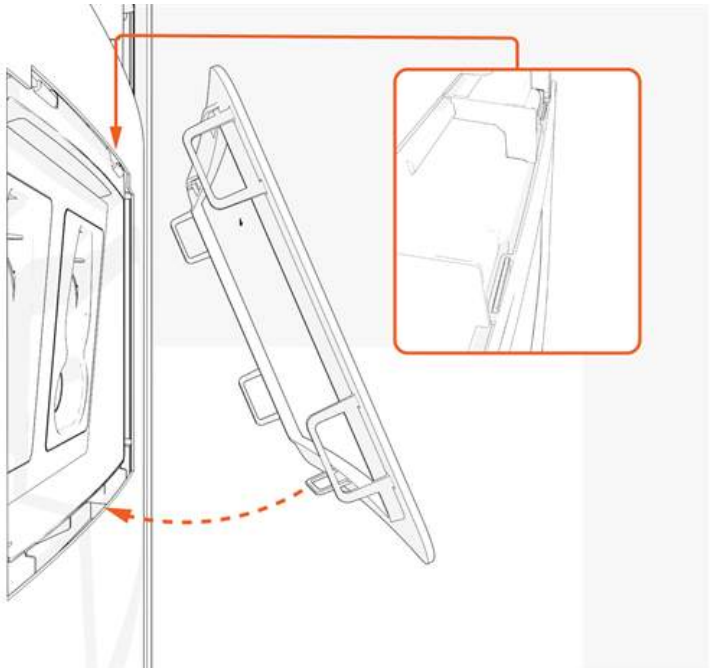
1. Push in the lower trim until it engages with the center and side clips.



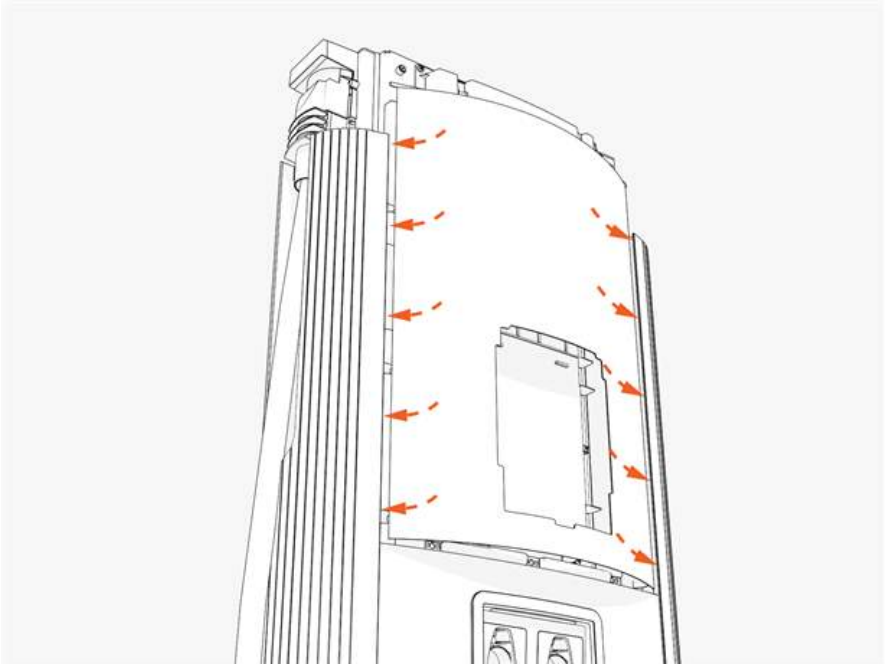
2. Insert the lower cover behind the lower trim. Simultaneously insert both sides of the lower cover.



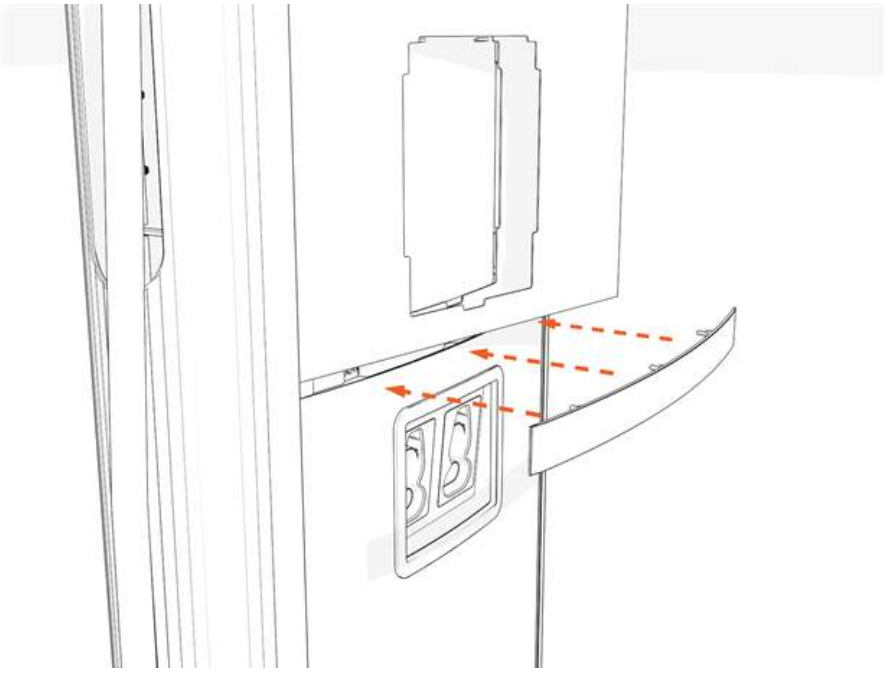
3. Hook the upper side of the holster trim onto two hooks and rotate in. Then press the lower side of the trim into place.



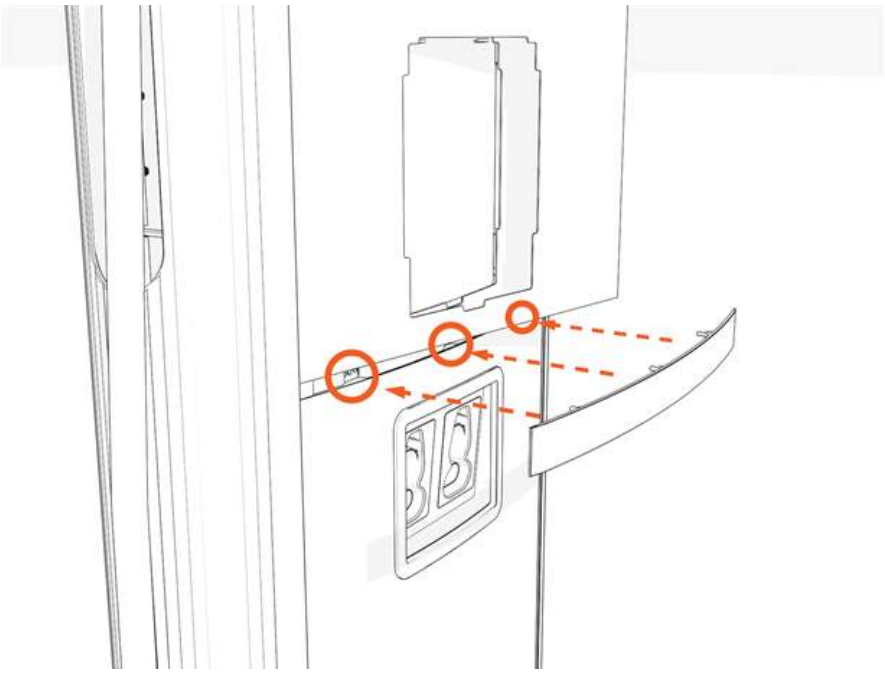
4. Insert the upper cover into each side. **Note:** Logo is on upper left.



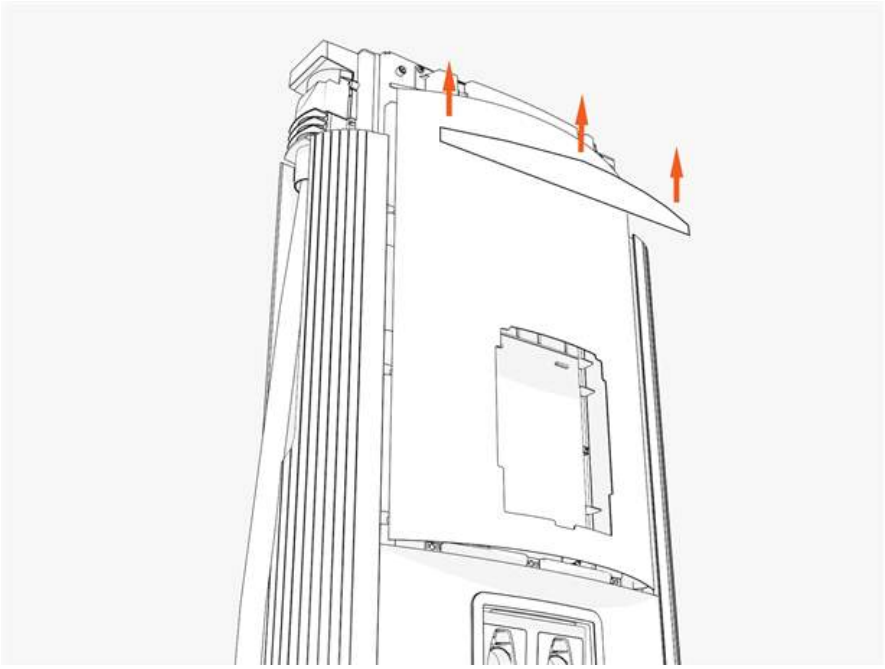
5. Align the upper cover and the ends of the middle trim. Hold the cover in position so that it does not block the trim clips.



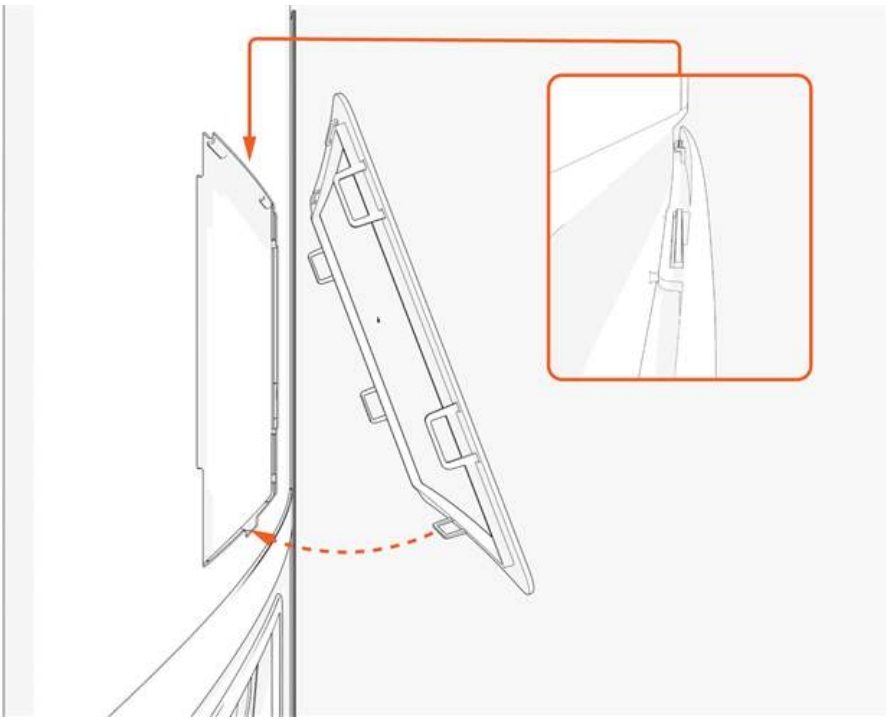
6. Push in the middle trim until it engages with the center and side clips.



7. Align the upper trim with the magnetic side up. Insert the upper trim until it snaps into position.



8. Hook the upper side of the CCOM trim onto two hooks and rotate in. Then press the lower side of the trim into place.

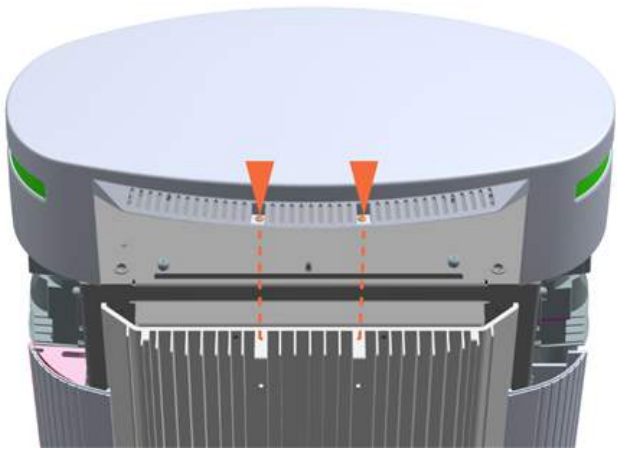


9. Align the screws (x4) (two at front and two at rear) and install the top cap.

Front



Rear



10. Torque the M5 screws (x2) at rear side to **2.8 Nm (25 in-lb)** and M4 screws (x2) at front side to **1.7 Nm (15 in-lb)** (use T25 security screwdriver).

Continue to Charging Cable Instructions

Check your site plans to identify your hanging mechanism. Follow the applicable instructions below:

1. Standard cable management kit (CMK) with swingarms (onto Power Link)
2. Tool balancer (onto another surface)

IMPORTANT: Before installing the tool balancer, you must first mount and install the Power Link to an approved surface (wall, post, gantry, or similar structure).

Note: A CMK includes swingarms that attach directly to the Power Link station to manage standard-length (i.e., 4.6 m or 15 ft) charging cables. A tool balancer is attached to a separate structure to manage medium-length (i.e., 7.6 m or 25 ft) charging cables but uses the same ball clamp.

Install Swingarms Onto Station and Hang Charging Cable

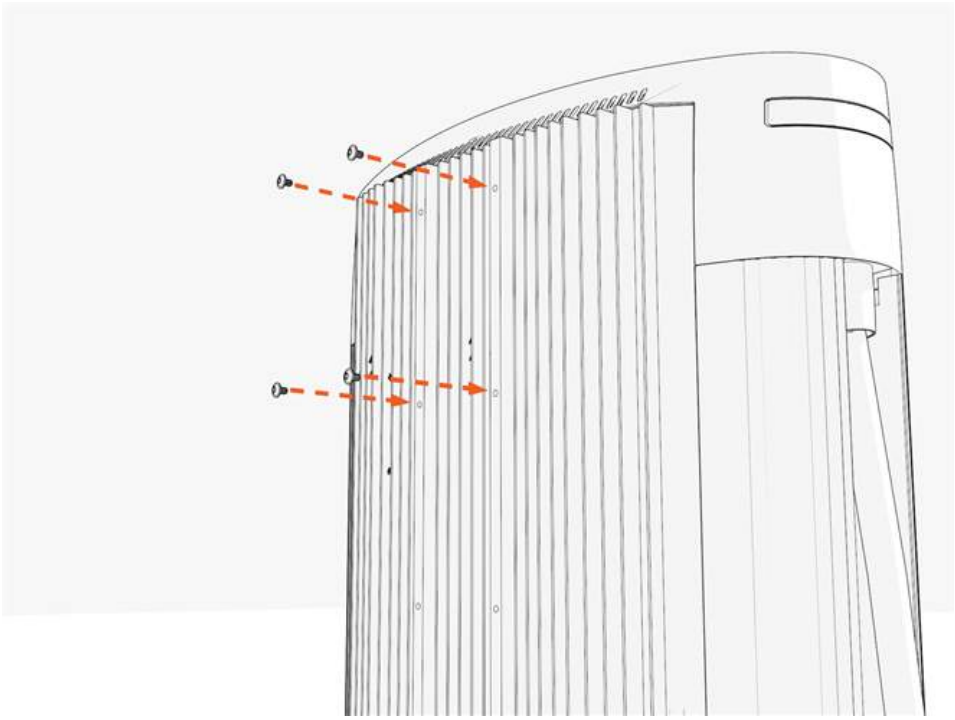
(Standard Pedestal)

Identify if your site plans include a Cable Management Kit (CMK) or a tool balancer.

Note: A CMK includes swingarms that attach directly to the Power Link station to manage standard-length (i.e., 4.6 m or 15 ft) charging cables. A tool balancer is attached to a separate structure to manage medium-length (i.e., 7.6 m or 25 ft) charging cables but uses the same ball clamp.

Install CMK Mast, Swingarms, and Vinyl Signs

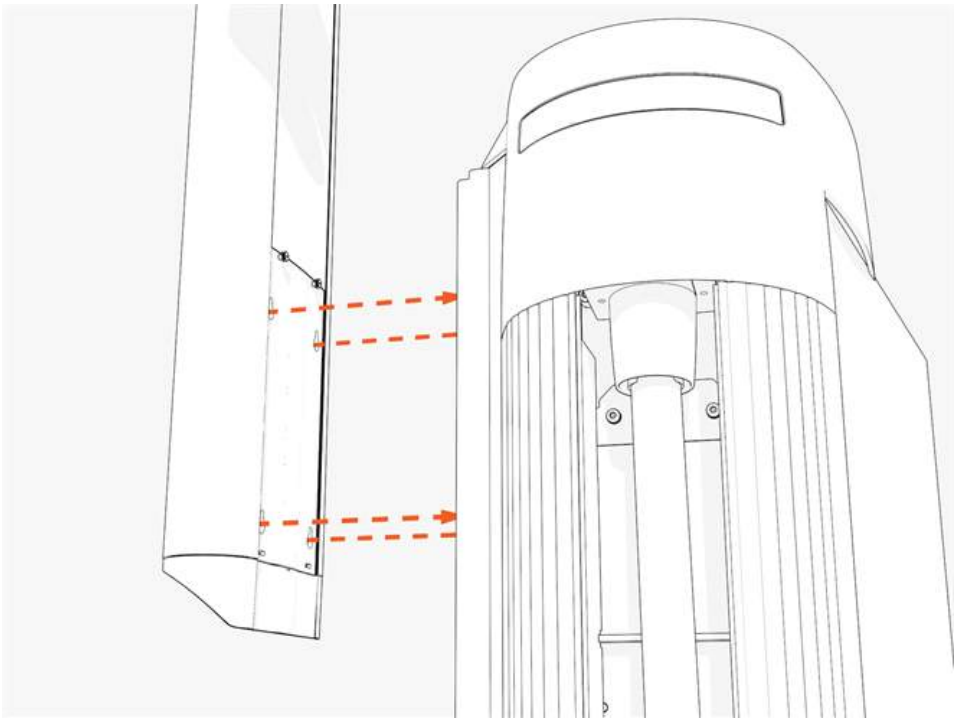
1. Use upper four holes to partially install screws into the rear exterior of Power Link.



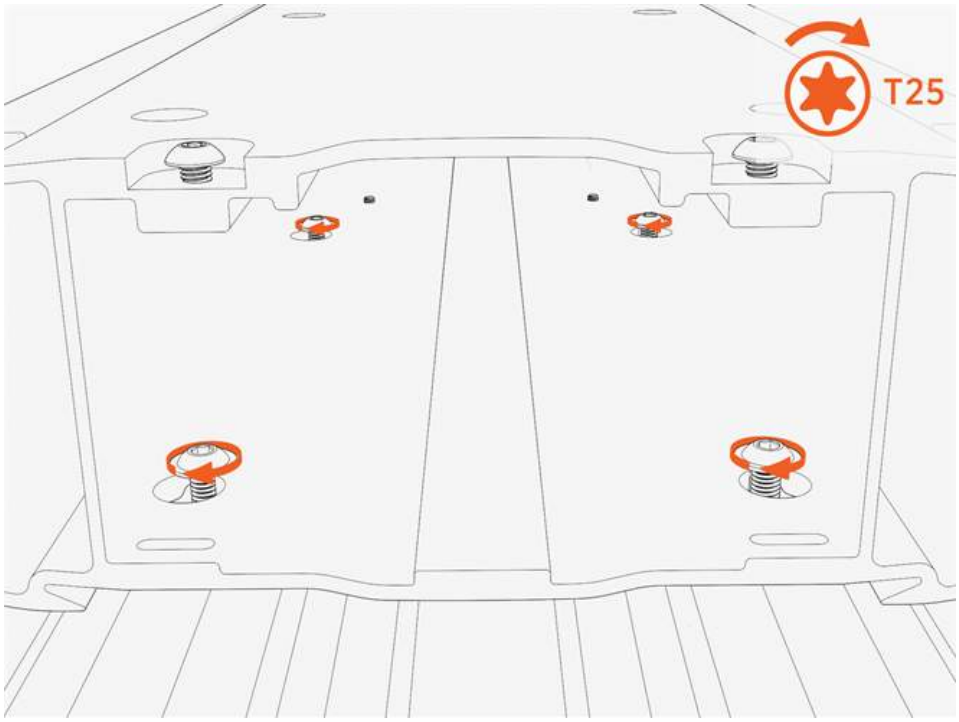
2. Hang the mast using the middle and lower keyholes.

   Final install height of the CMK should be 2413 mm (7 ft 11 in).

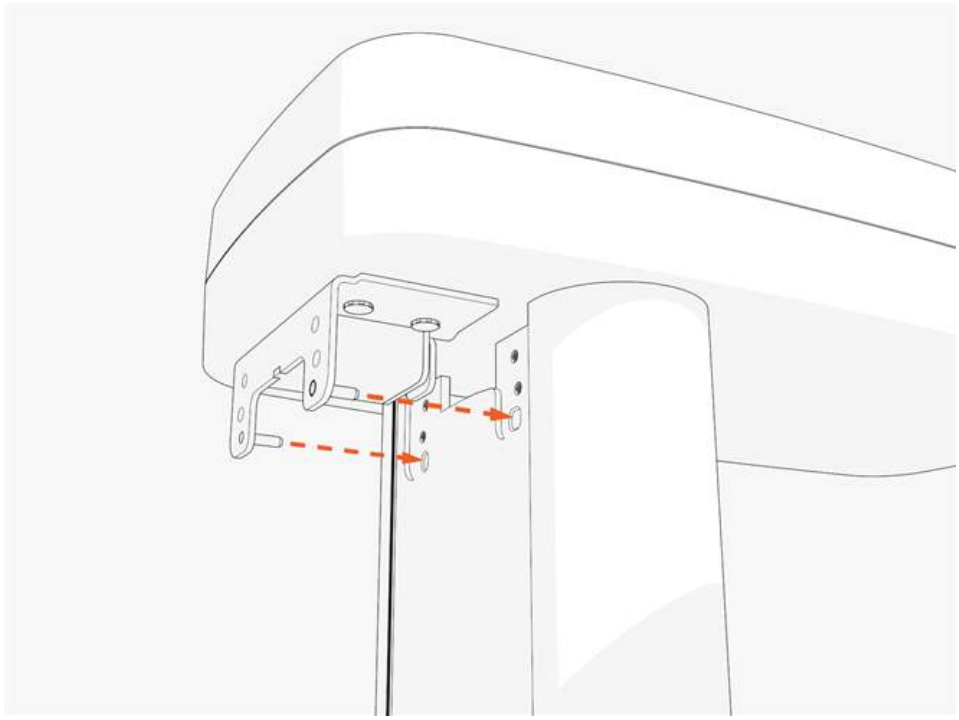
   Note: The CMK can be lowered 203 mm (8 in) by utilizing the upper and middle keyholes to allow for installations with low overhead clearance.



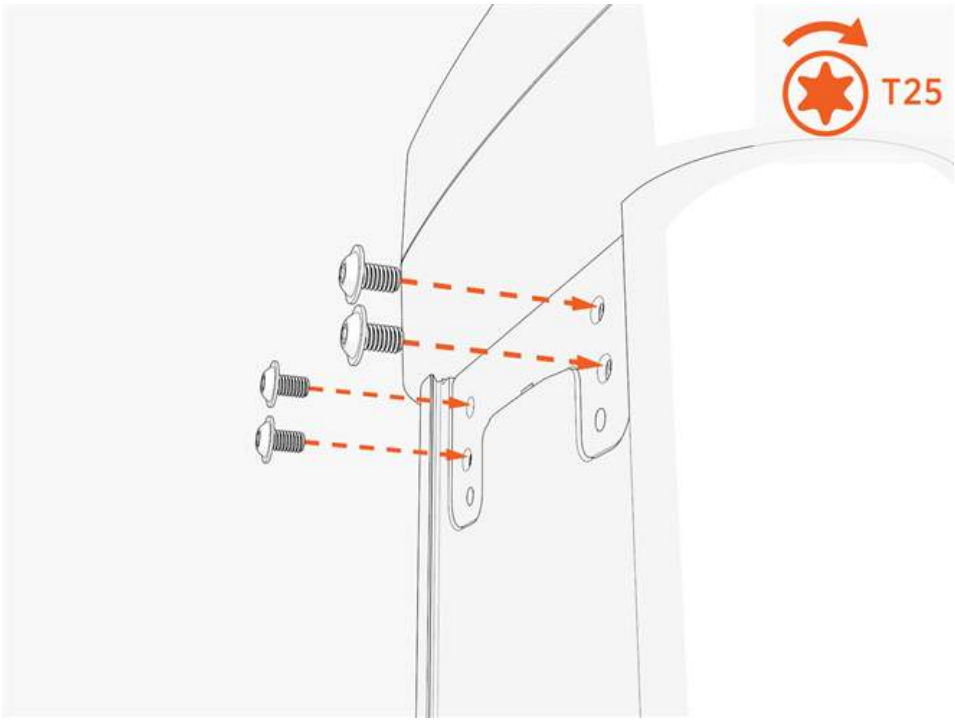
3. Torque to 5.6 Nm (50 in-lb) (use T30 Torx screwdriver).



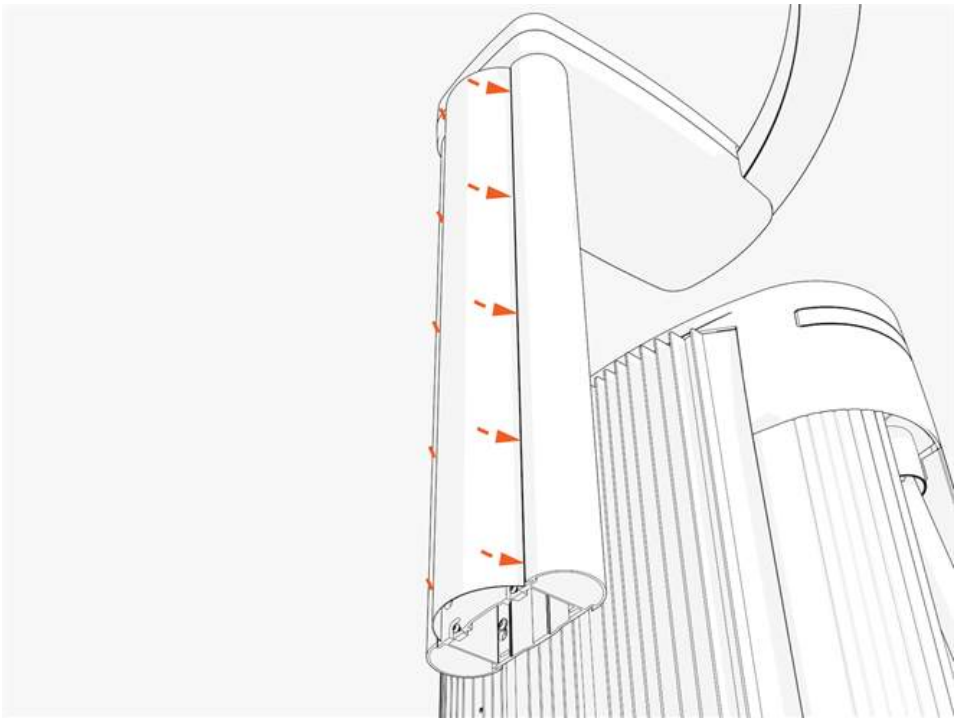
4. Insert two alignment pins into the bottom center of the swingarm attachment. Position the pins into the top of the mast.



5. Torque to 5.6 Nm (50 in-lb) (use T30 Torx screwdriver).



6. Install the vinyl signs onto the front and rear of the mast. Bend the vinyl sign on the long axis. Slip the edges into the grooves in the mast.

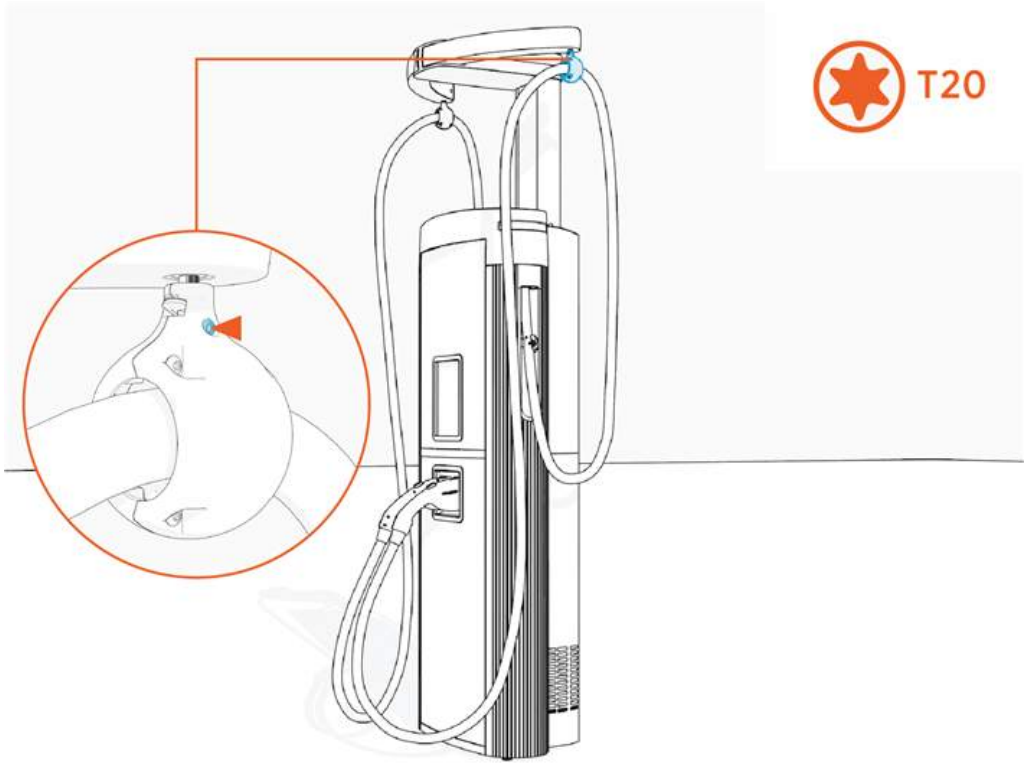


Hang the Charging Cable

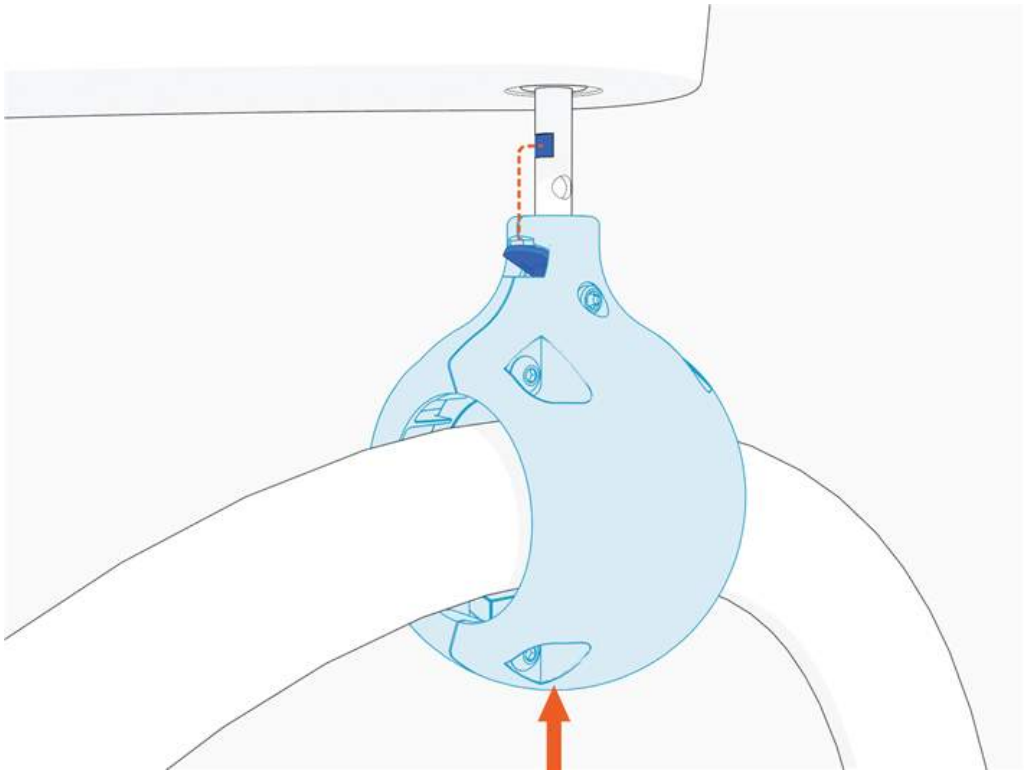
1. Position the stepladder so that you can reach the hanging point.



2. Loosen the screw on the ball clamp if it is not loose.

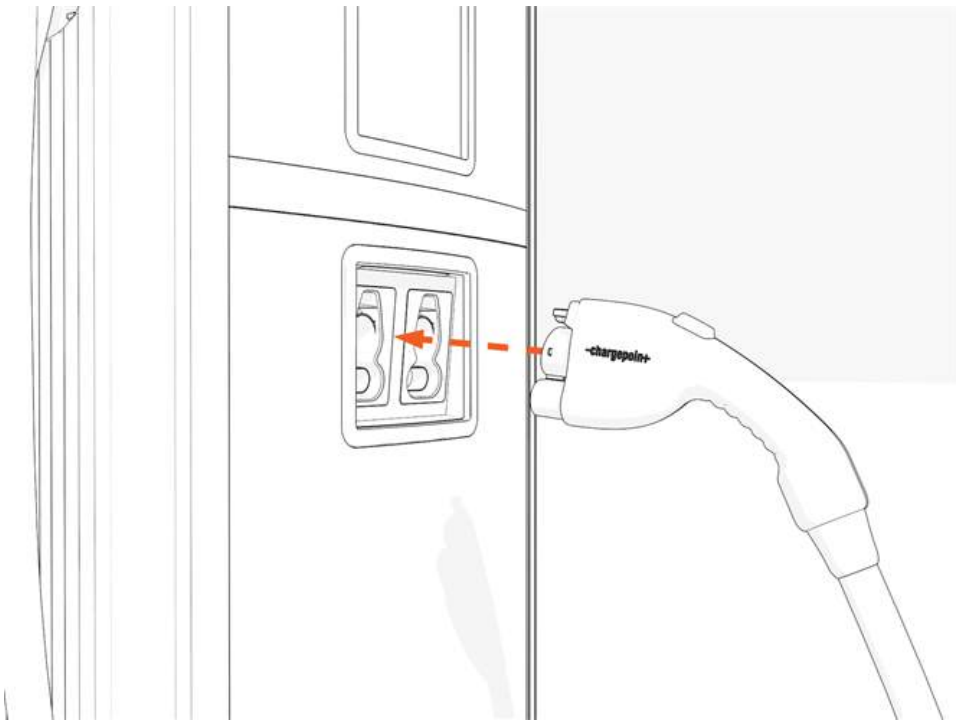


3. Align the spring with flat notch on the anchor pin and gently push the ball clamp onto the anchor pin to hang the cable.

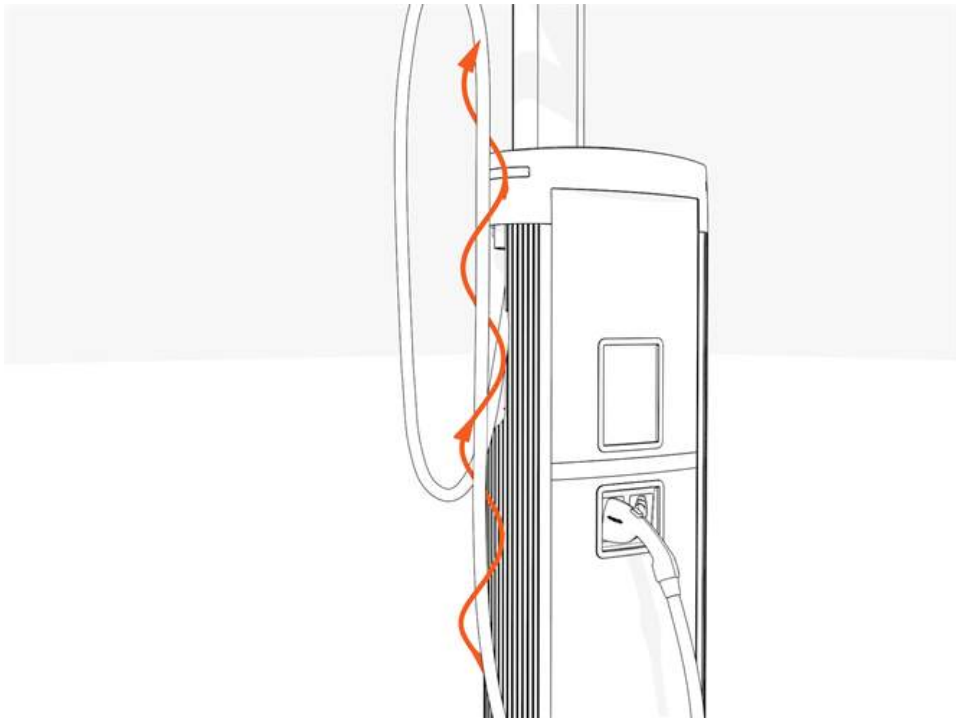


4. Torque the screw to **2.8 Nm (25 in-lb)**

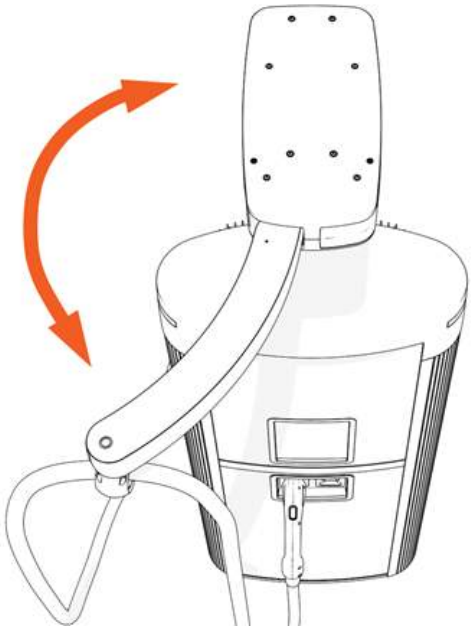
5. Place each charging cable in the holster.



6. Untangle any twists.



7. Check that the charging cables and swingarms operate smoothly by fully extending and retracting.
8. If you find limited motion or retraction, contact ChargePoint at chargepoint.com/support.



Complete Installation

Skip to Verify and Adhere Labels.

5 Install Overhead Mounted Power Link

Follow these instructions to anchor, install, and wire each Power Link onto a wall or gantry.



DANGER: Check the site plans for the number and type of fasteners required to install the mounting plate and the Power Link.

Fasteners must be appropriate and rated for the type of surface and the combined weight of the Power Link and all charging cables and accessories. If not, the Power Link could fall and injure people, damage property, or both.



CAUTION: To protect the charging cables from damage, keep them wrapped throughout the installation process.

Disconnect Power



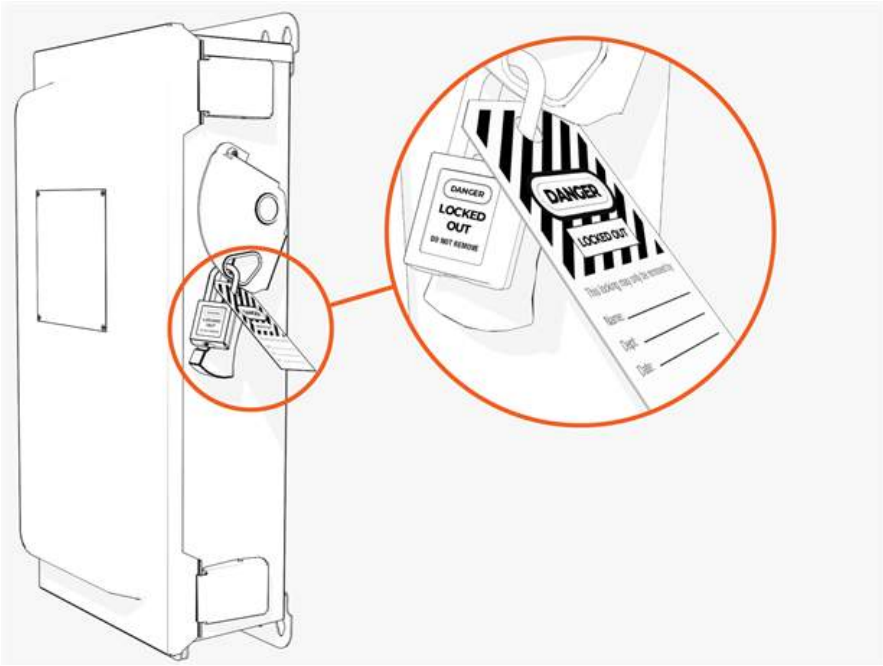
DANGER: RISK OF SHOCK

- Before any procedure, disconnect the power.
- Follow local code and site lockout/tagout procedure to de-energize the station.
- Wait for energy to dissipate (approximately five minutes).
- Keep power off until all covers and panels are reinstalled and the work is complete.

FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN SERIOUS INJURY, LOSS OF LIFE, OR PROPERTY DAMAGE.

1. Disconnect power at the site electrical panel.

   Note: Follow standard practice and local code to de-energize the applicable circuit and lock out/tag out the disconnect before proceeding.



2. Use a multimeter to test that power is off.

Install and Secure to the Mounting Plate

Mark Location

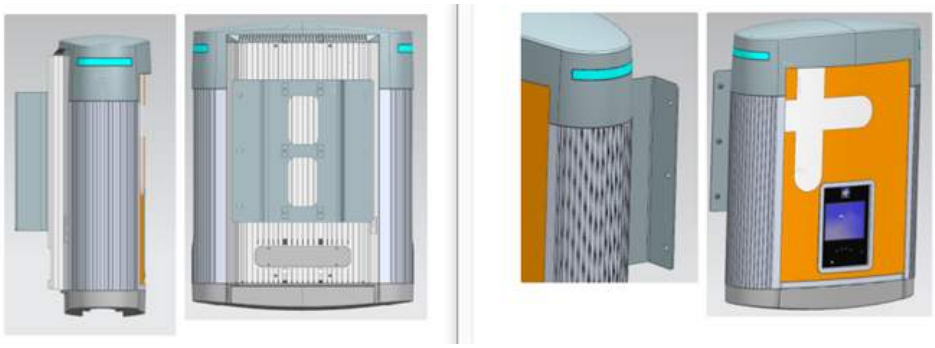
1. Use a multimeter to test each DC conductor for continuity.
2. If not already done, pull service wiring through the wall or conduit as described in the Express Plus Site Design Guide.
3. Measure the distance above grade that the Power Link will sit.

> **CAUTION:** Check your specific site plans and the Site Design Guide to ensure the Power Link mounting location meets minimum clearances above ground to comply with ADA regulations and above grade to comply with flood regulations.

4. Use the mounting plate as a template to determine position. Measure position and ensure level placement. Mark the mounting holes.
5. Consult site plans for any site-specific requirements.
6. Attach the mounting plate to the surface. Install six M8 bolts or studs spaced 400 mm (16 in) center to center.

   Torque to the specification indicated in the site plans.

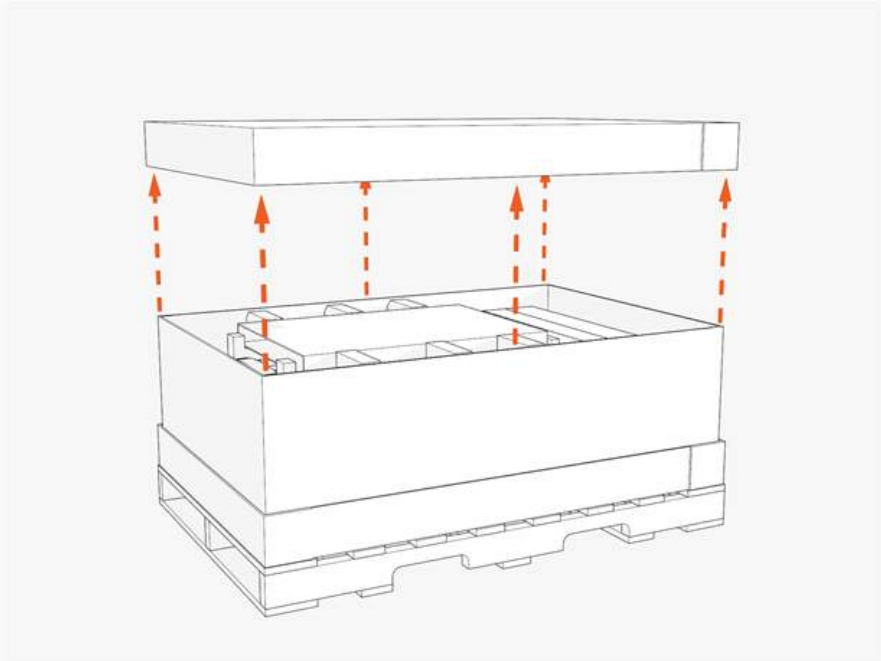
   Note: Contractor provides fasteners. Site plans must specify fasteners appropriate for and rated to secure the weight to the material.



> **IMPORTANT:** Align the vertical center of the mounting plate with the wiring that enters from the ground or rear of the installation site.

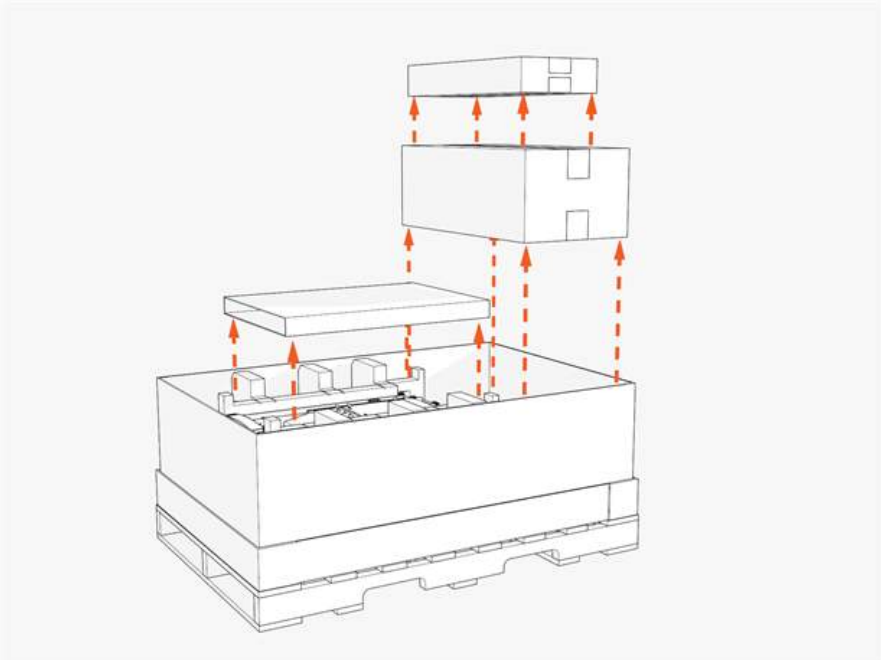
Unpack

1. Lift off the crate cover.

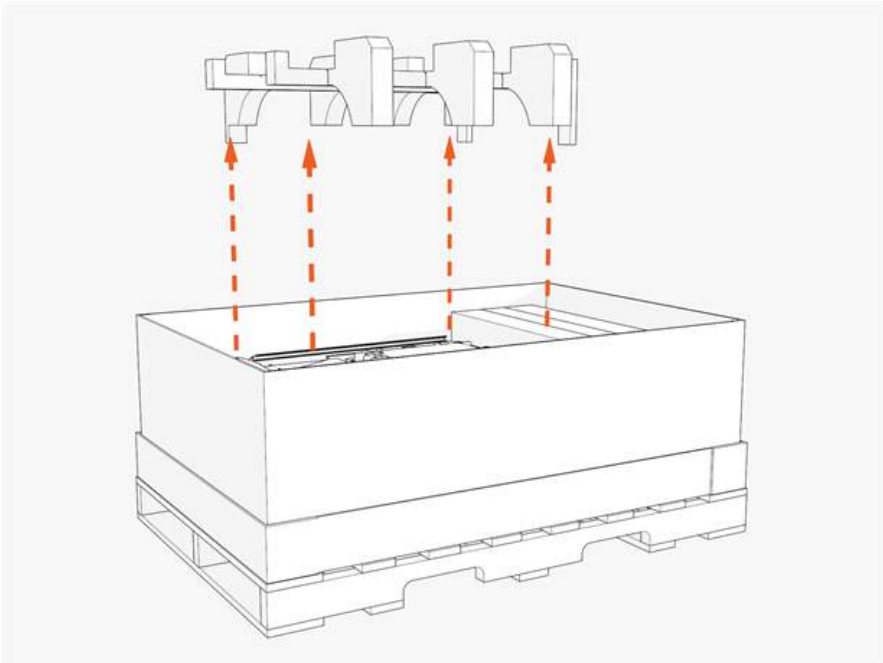


2. Set aside the separate packages that are inside the crate.

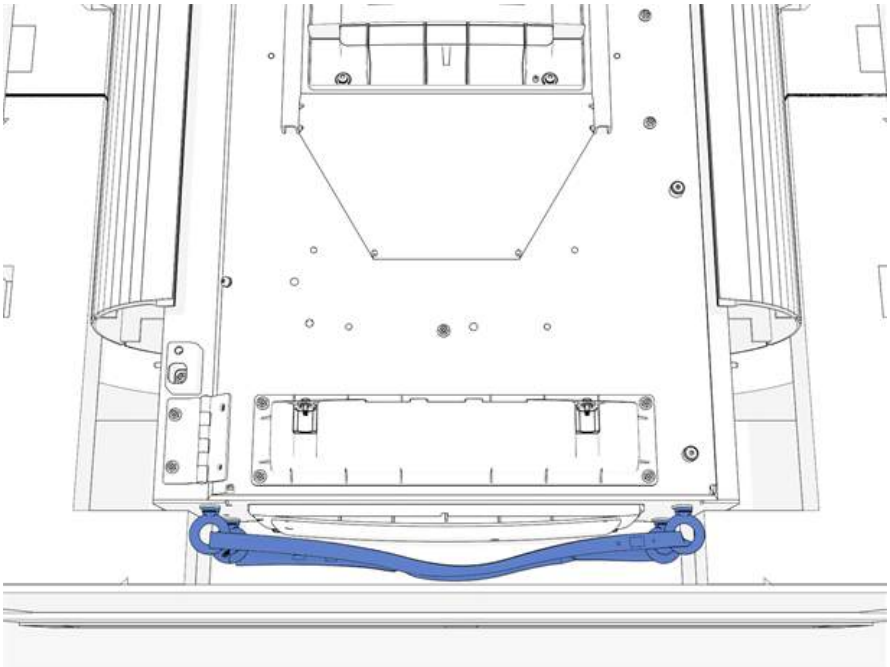
   Note: These packages contain vinyl signs, trims, and top cover to be installed later.



3. Remove the top foam inserts.



4. At the top of the Power Link, locate four preinstalled eye bolts and lifting straps.

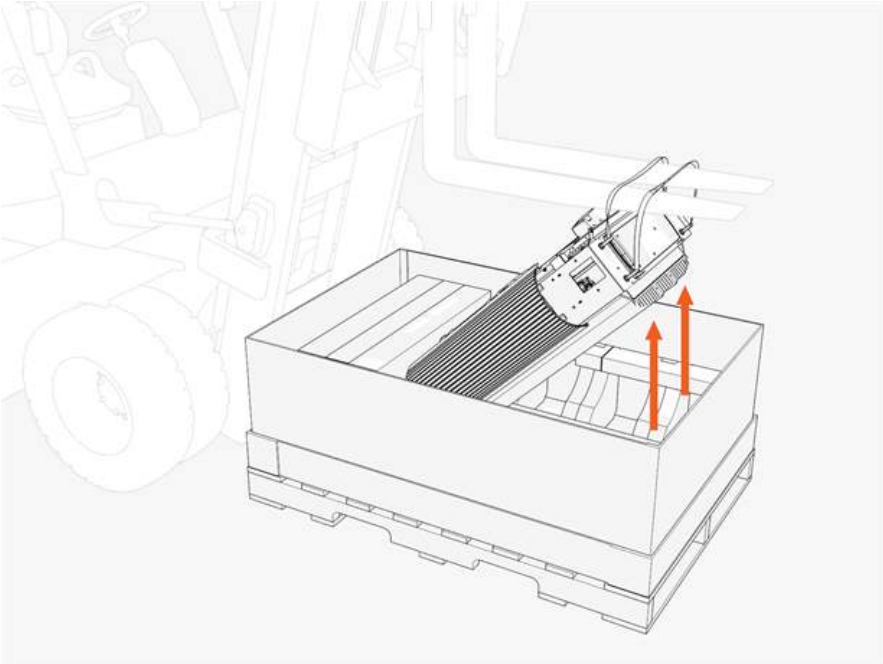


Access Inside

IMPORTANT: Keep components in a cool area out of direct sunlight until you reinstall them.

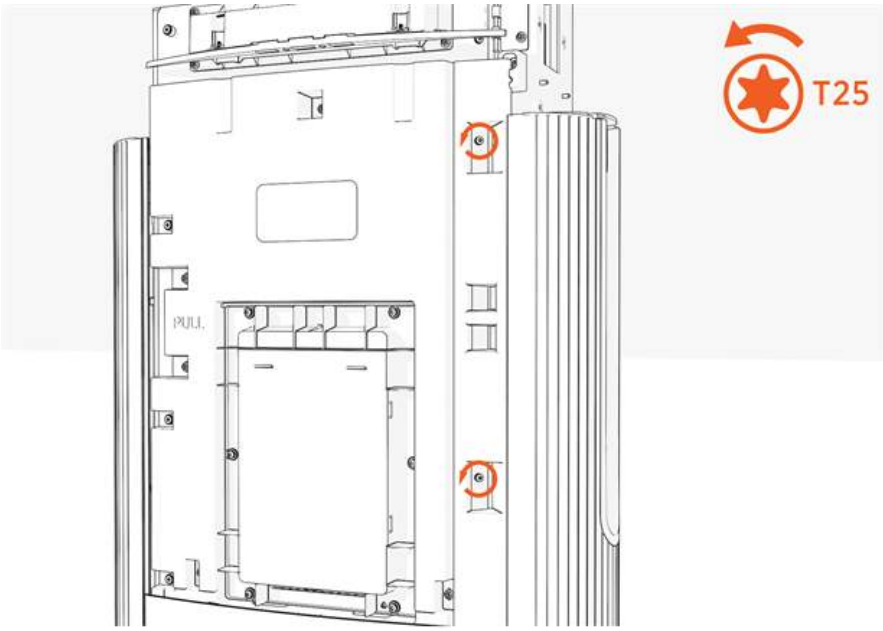
1. Lift up the Power Link by the lifting straps.

   Note: Use a forklift or service cart with retaining straps.

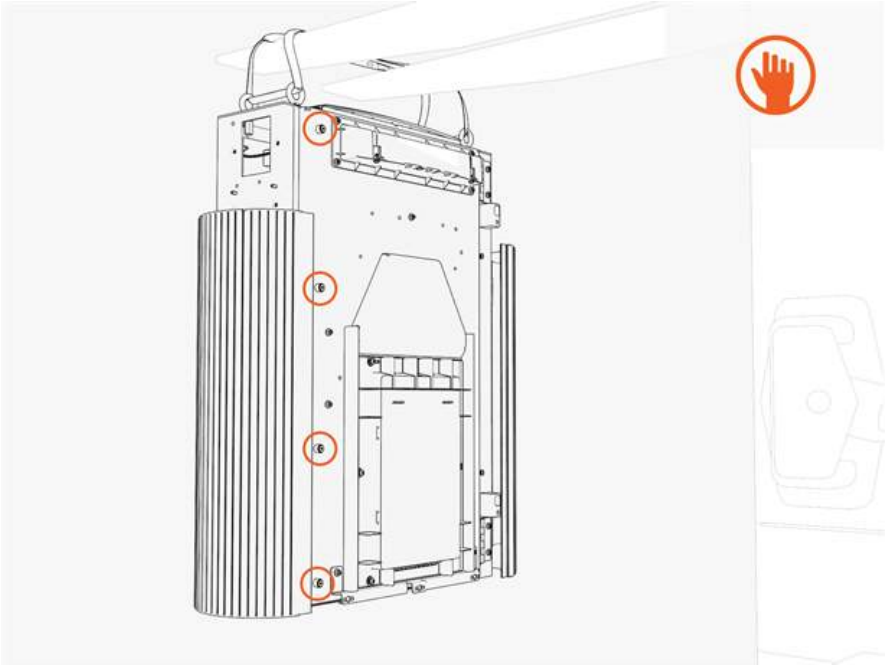


2. Loosen the two screws from the door bracket (only if covers are B. Install Vinyl Signs, Trims, and Top Cover).

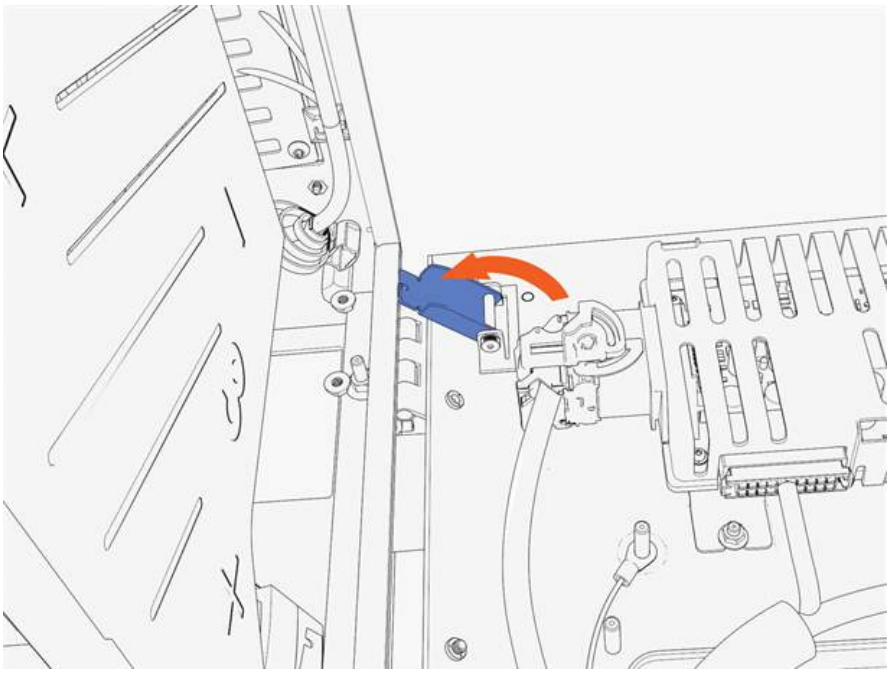
   Hold the middle of the door bracket. Lift and tilt out.



3. Uninstall the four screws along the left side to open the door.



4. At the hinges inside the door, rotate the orange-colored wind stops into the door gap (to prevent the door from accidentally closing while you work).

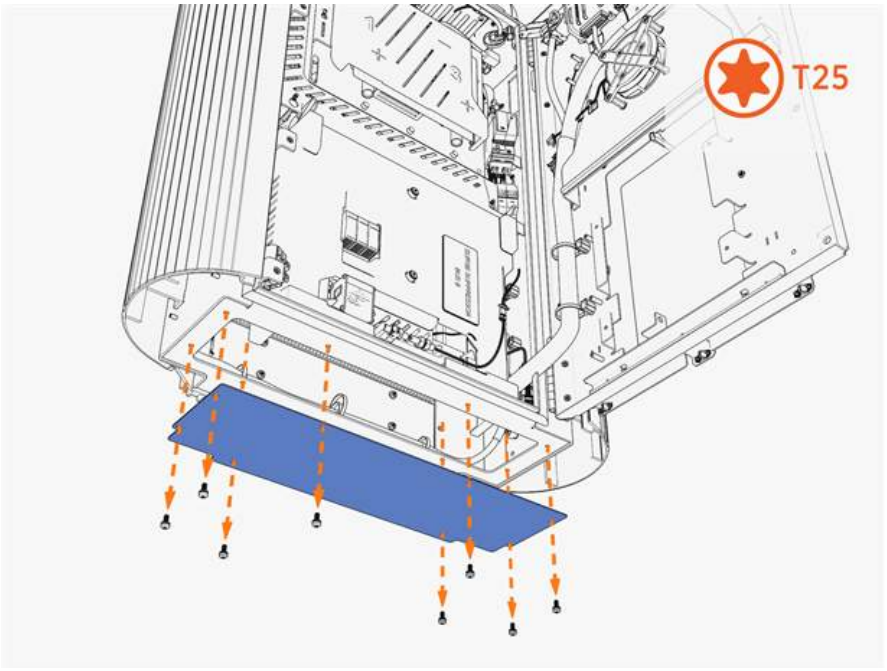


Gland Plate

1. Uninstall the screws from the gland plate located at the bottom.

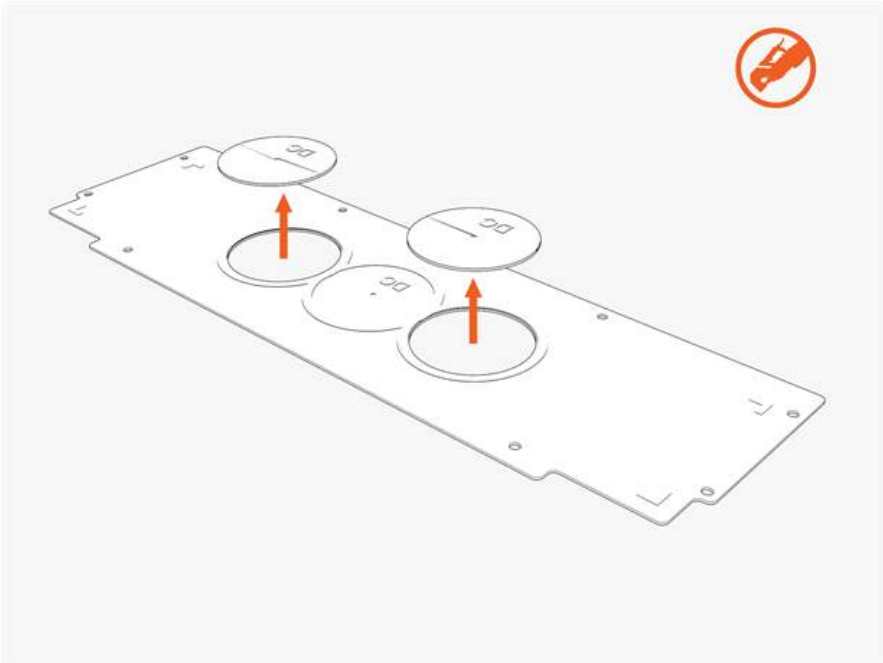


2. Remove the gland plate.

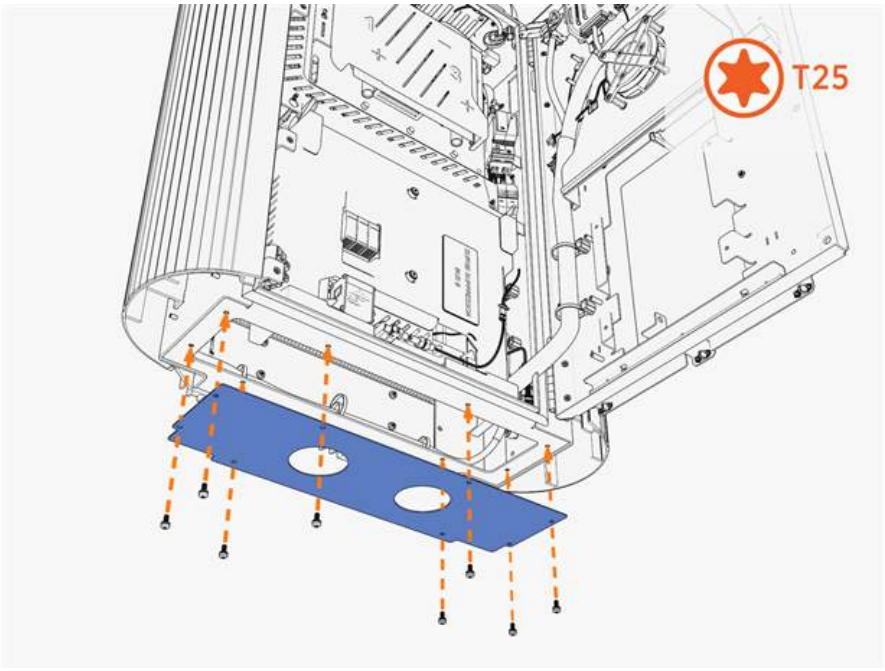


3. Use a hydraulic hole punch to create openings in the gland plate for this wiring:

a. DC input conduits
    i. Check if the site plans require one or two DC conduits.
    ii. Use the gland plate pilot holes as a guide.
    iii. Punch out one or two DC opening(s).
b. 48 V DC and Ethernet conduits
    i. Check if the site plans require one, two, or three conduits.
    ii. Punch out the correct number of 48 V DC and Ethernet opening(s).

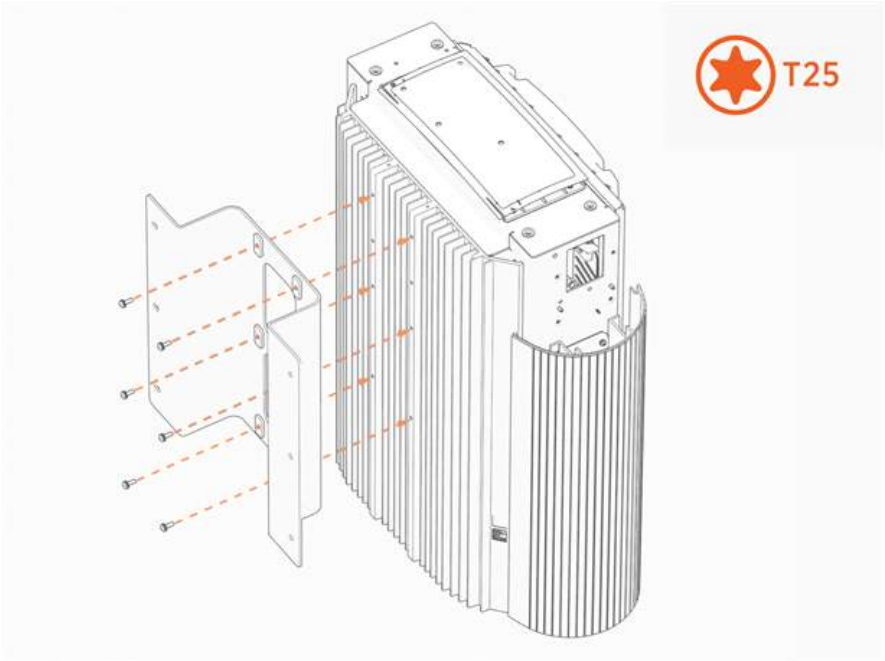


4. Reinstall the gland plate.

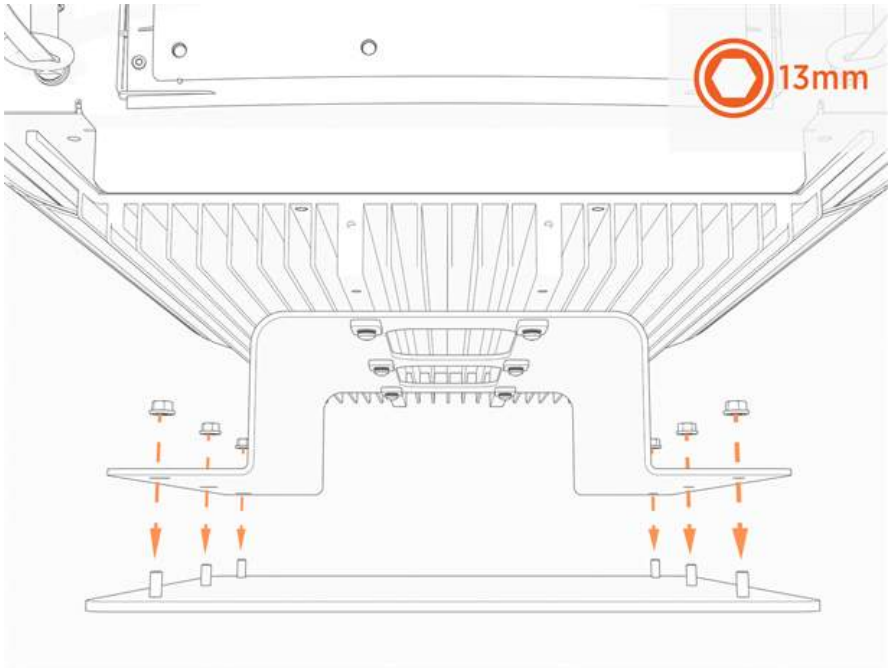


Mount

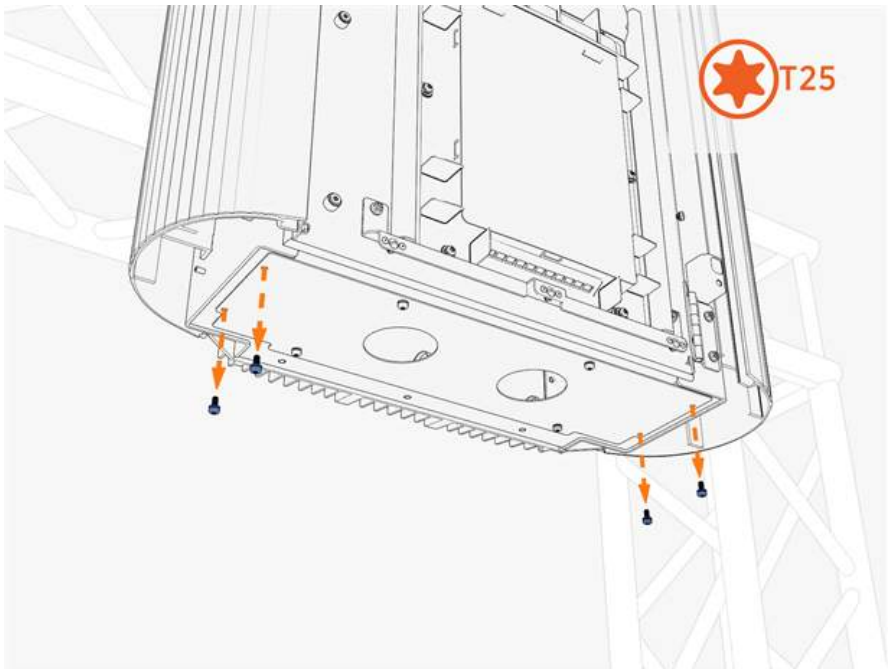
1. Disengage windstops and close the door. Install screws into the door.
2. Move the wiring out of the way.
3. Install the wall mount bracket onto the back of the Power Link.



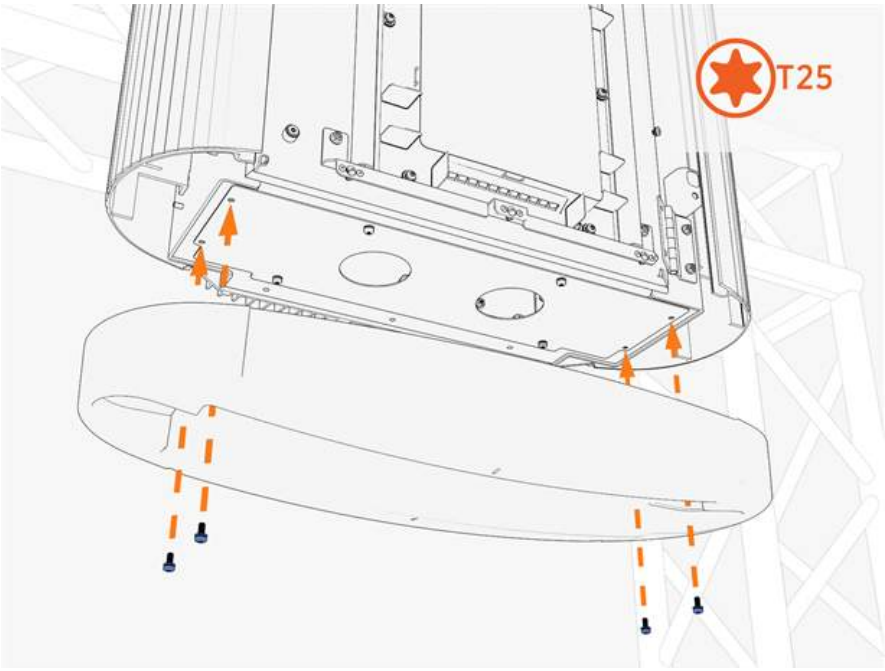
4. Attach the wall mount plate onto the bracket. Install fasteners called for by the site plans. Torque to the specification indicated in the site plans. Mount as preferred.
Note: Contractor provides fasteners. Site plans must specify fasteners appropriate for and rated to secure the weight to the material.



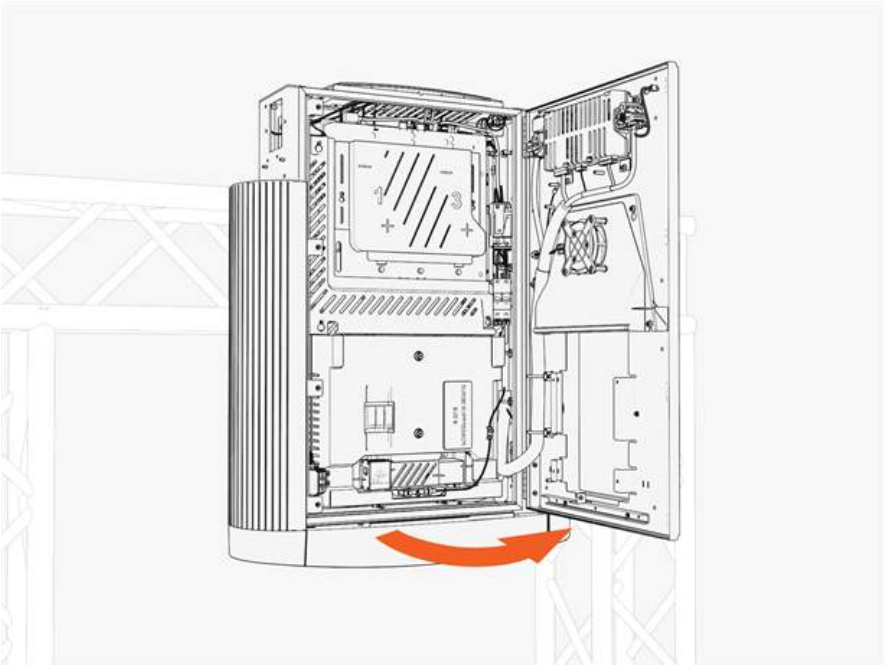
5. Remove the four outer screws from the gland plate (if previously reinstalled).



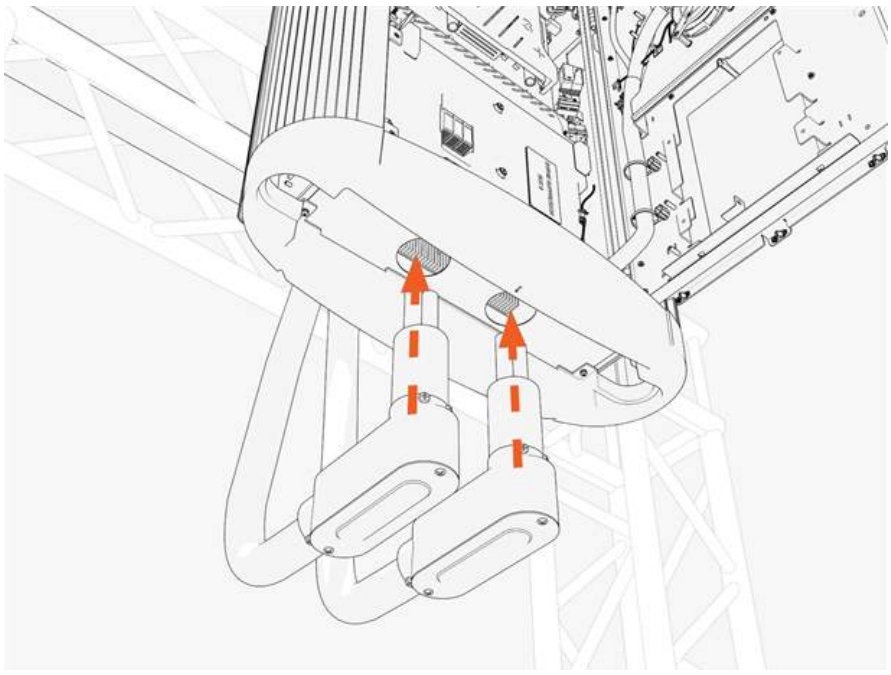
6. Use those screws to install the bottom cap.



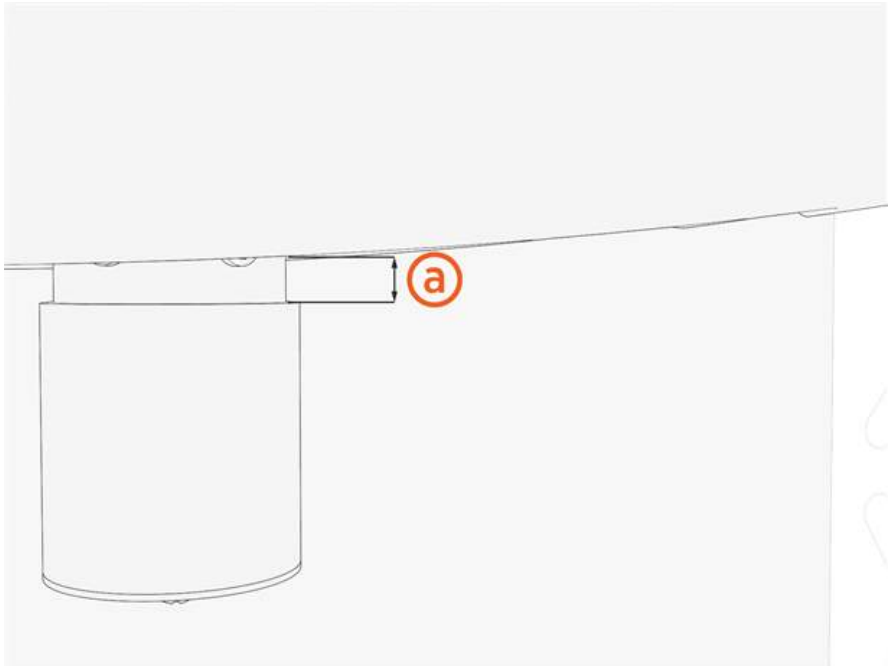
7. Disengage windstops and close the door. Install screws into the door.
8. Reopen the door.



9. Route the wiring through the bottom.



Note: Ensure that there is (a) 12 mm (1/2 in) clearance between the bottom cap and the conduit.



Connect the Wiring

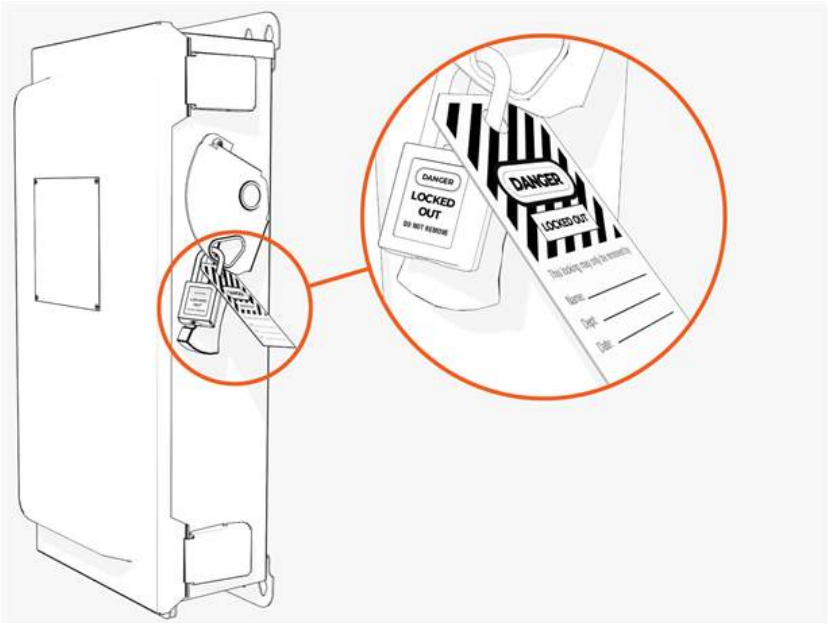
DANGER: RISK OF SHOCK

- Before any procedure, disconnect the power.
- Follow local code and site lockout/tagout procedure to de-energize the station.
- Wait for energy to dissipate (approximately five minutes).
- Keep power off until all covers and panels are reinstalled and the work is complete.

FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN SERIOUS INJURY, LOSS OF LIFE, OR PROPERTY DAMAGE.

1. a. Disconnect power at the site electrical panel.

   Note: Follow standard practice and local code to de-energize the applicable circuit and lock out/tag out the disconnect before proceeding.



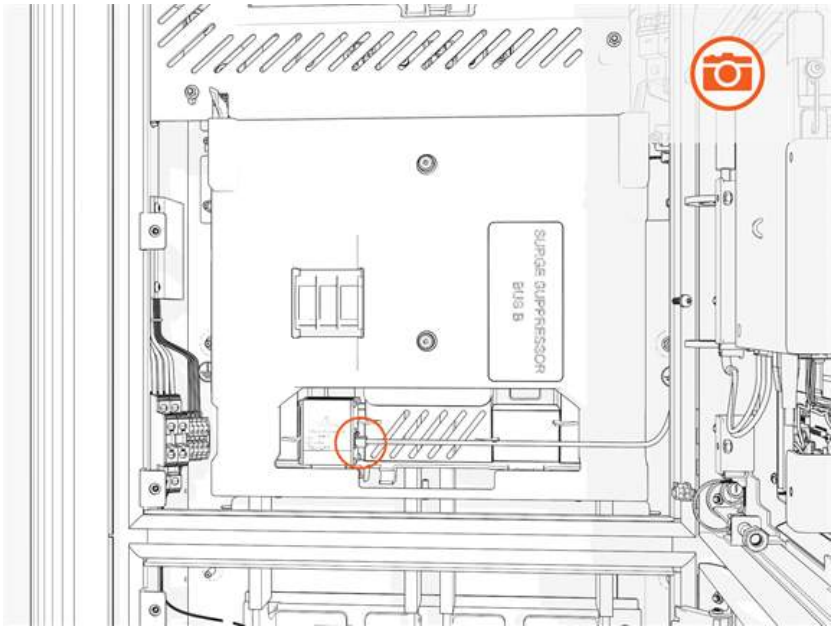
   b. Use a multimeter to test that power is off.

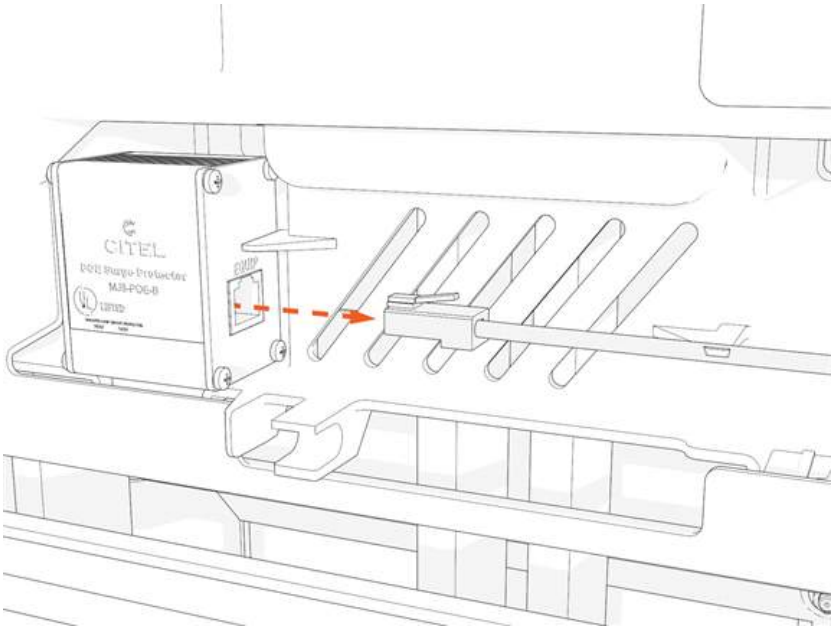
2. Access the bus bars.

IMPORTANT: The upper and lower bus bar plates look similar. Both sets are inscribed (A-, A+ [single] or A-, A+, B-, B+ [dual]) and have lug nuts preinstalled.

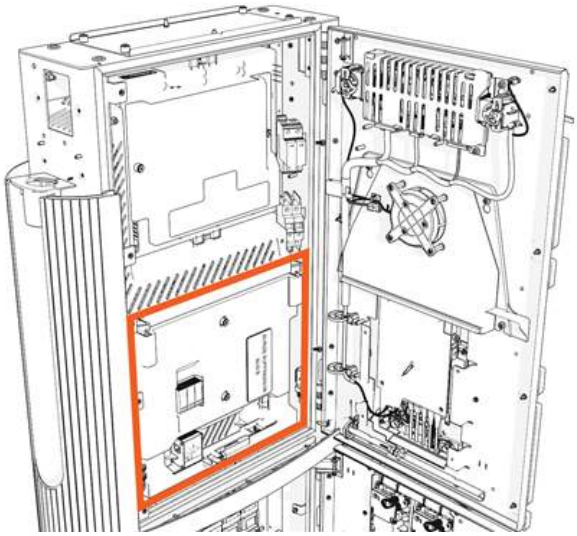
a. Disconnect the Ethernet cable from the Ethernet surge suppressor.

Note: Take a photo or note to identify which port later.

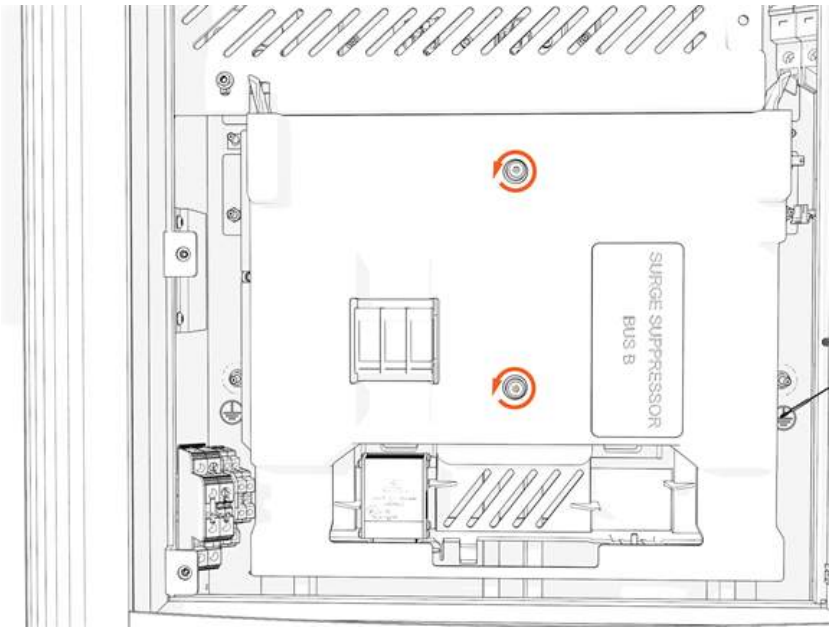




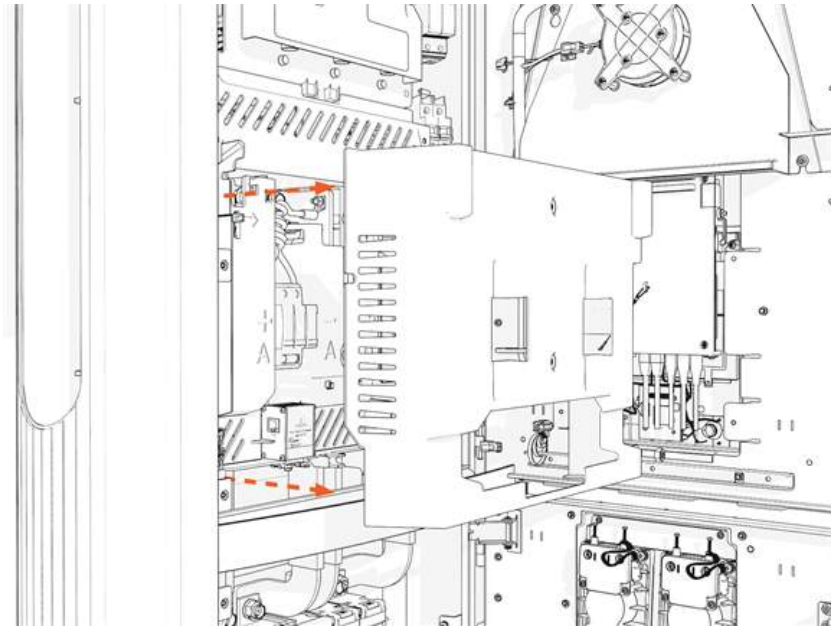
b. Access the upper bus bars.



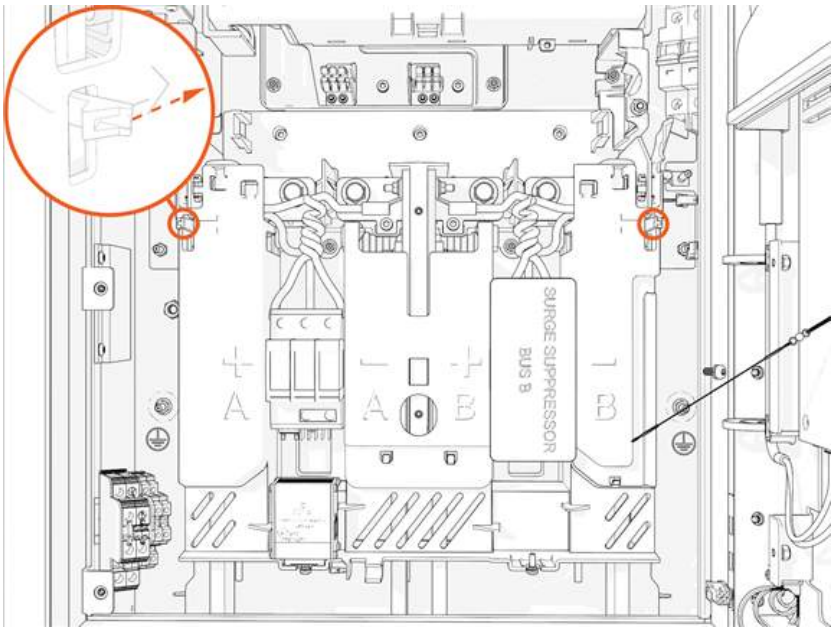
c. On the power plate cover, loosen the captive screws.



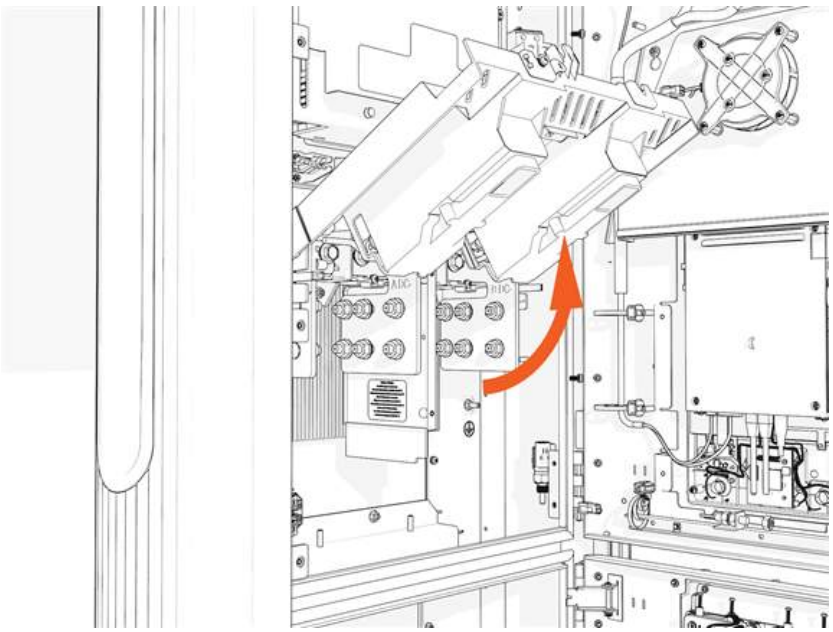
d. Remove the cover.



e. Release the tabs on the upper safety cover.



f. Lift up from the bottom until it locks in the open position.



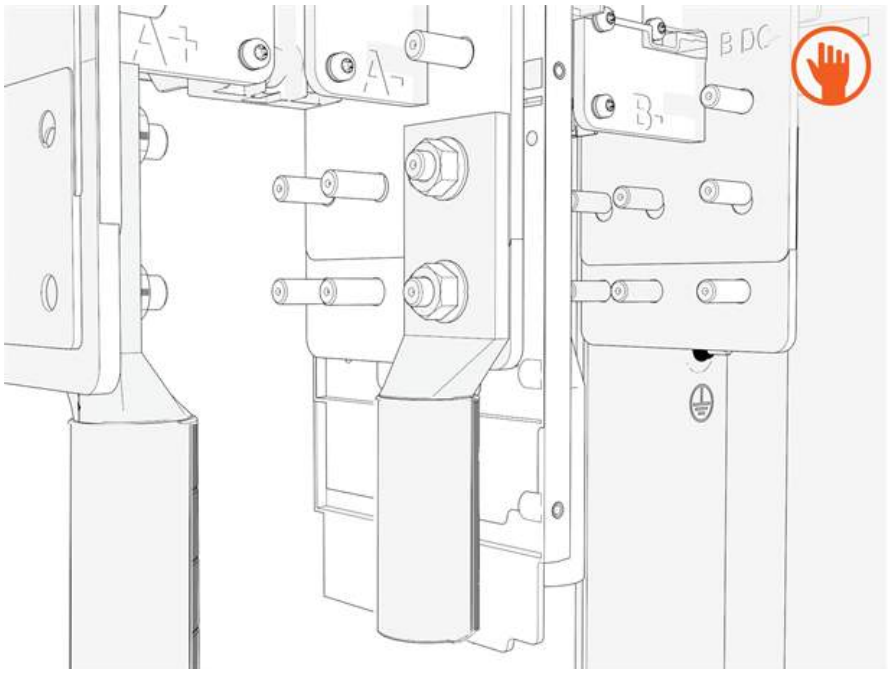
Install DC Conductors and Lugs, and Ground Wire

1. Ensure you have de-energized the applicable circuit and locked out/tagged out the disconnect according to standard practice and local code before proceeding.
2. Use a multimeter to test that power is off.
3. Route all conductors into the correct area within the cabinet.

Measure and Cut

1. Loosely install lugs only (without the conductors) onto bus bars. Hand-tighten.

   Note: Use included bolts, washers, and nuts



2. Measure the length from each conductor to its corresponding lug.

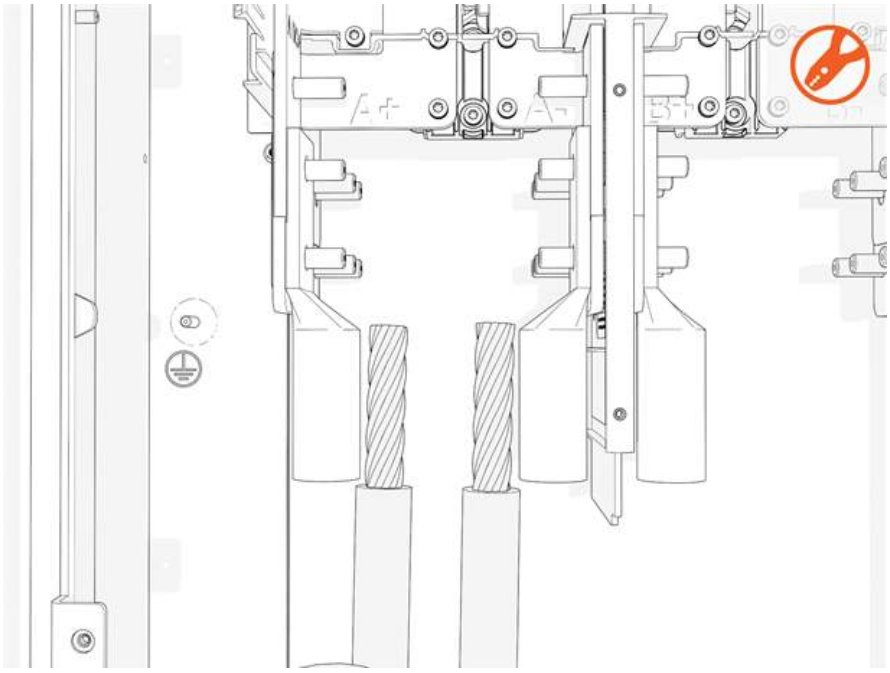
   Mark each conductor at the point where you will need to trim it.

IMPORTANT: Match the A and B Power Link bus bars to the A and B Power Block bus bars.

Note: DC bus bars are marked in order from left to right:

Single Input	Dual Input
A- A+	A- A+ B- B+

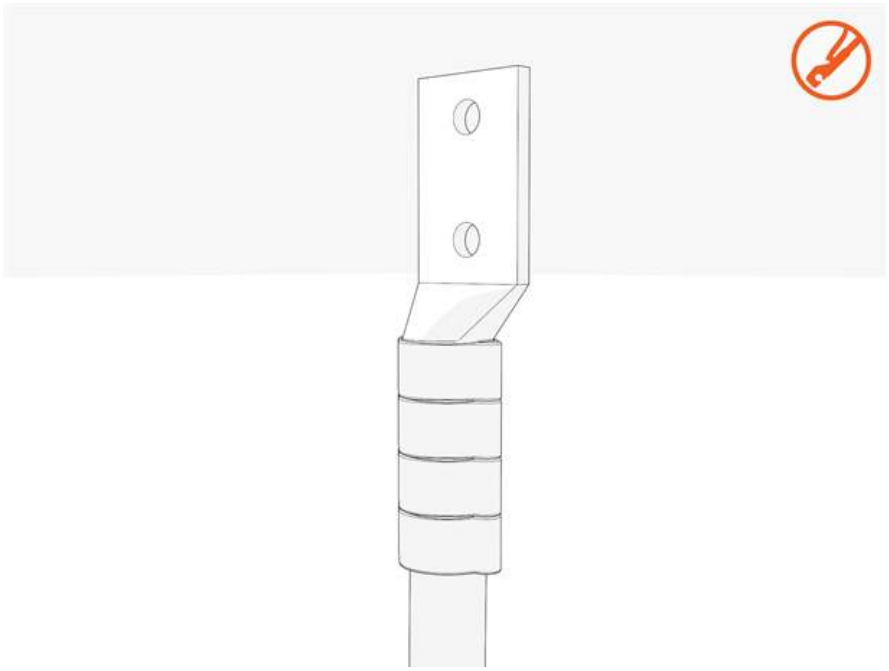
3. Strip and cut the conductors to the desired length.



DC Lugs

1. Uninstall the lugs. Crimp a lug onto each conductor.

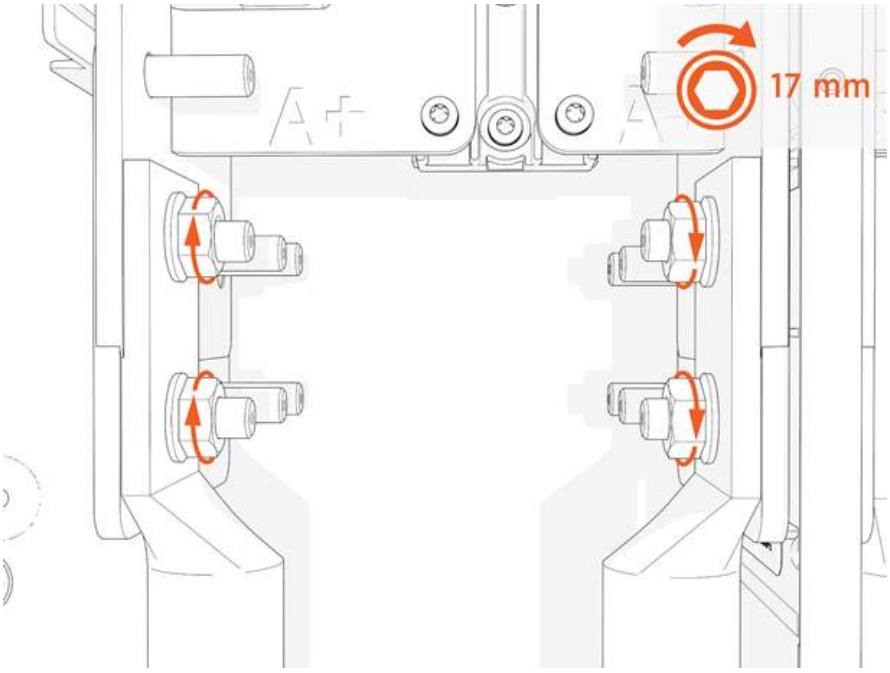
IMPORTANT: Use compression lugs with the specifications . Use the lug manufacturer's tool and die. If required, heatshrink or tape the crimp area to meet local code.



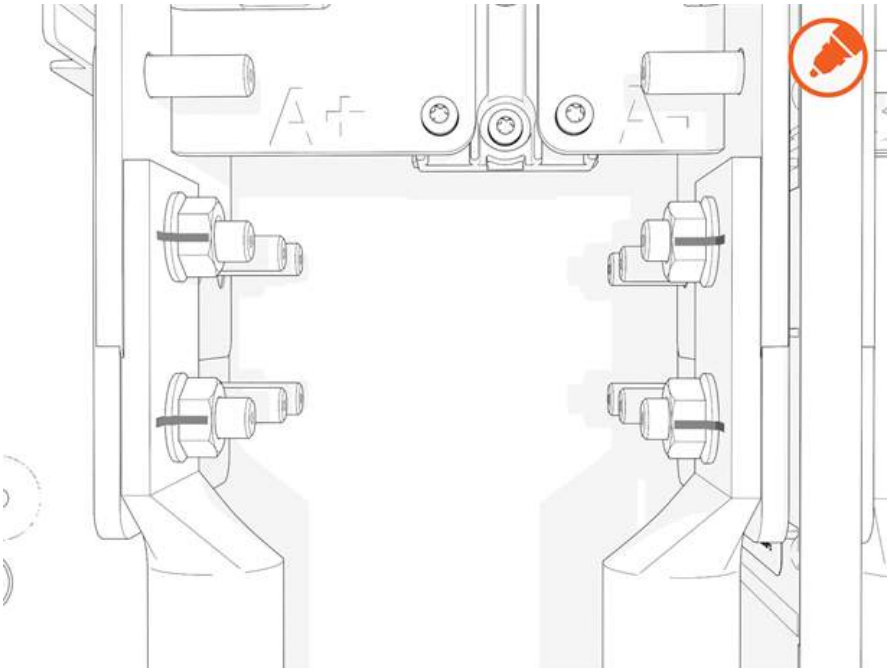
2. Land the DC lugs on the terminals. Torque nuts to 19 Nm (168 in-lb).

   Note: Fasteners are pretreated with dielectric grease.

   CAUTION: If using 500 kcmil conductors, you must use the back set of lugs to avoid interference with the surge suppressor panel.

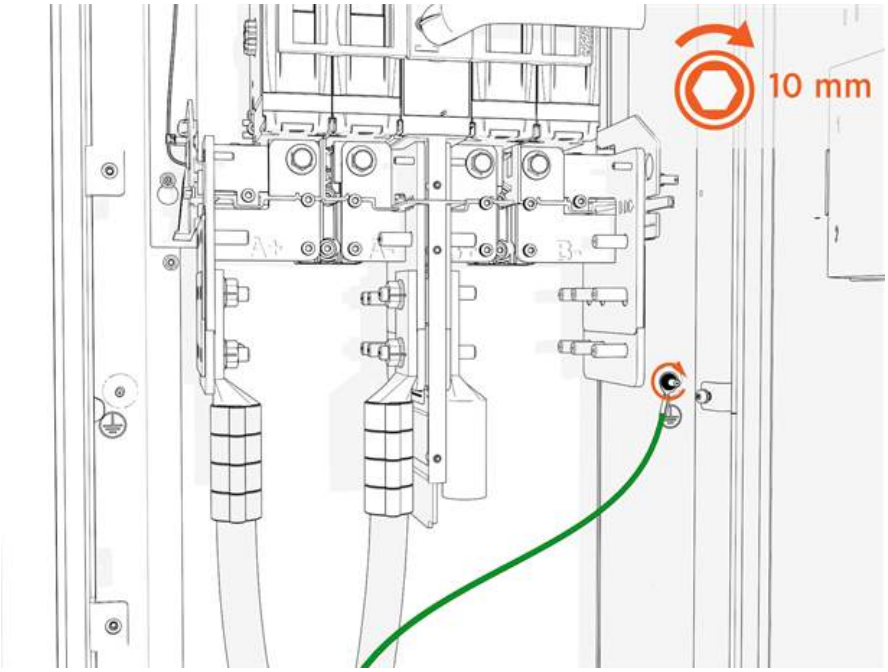


3. Mark all torqued power connections.

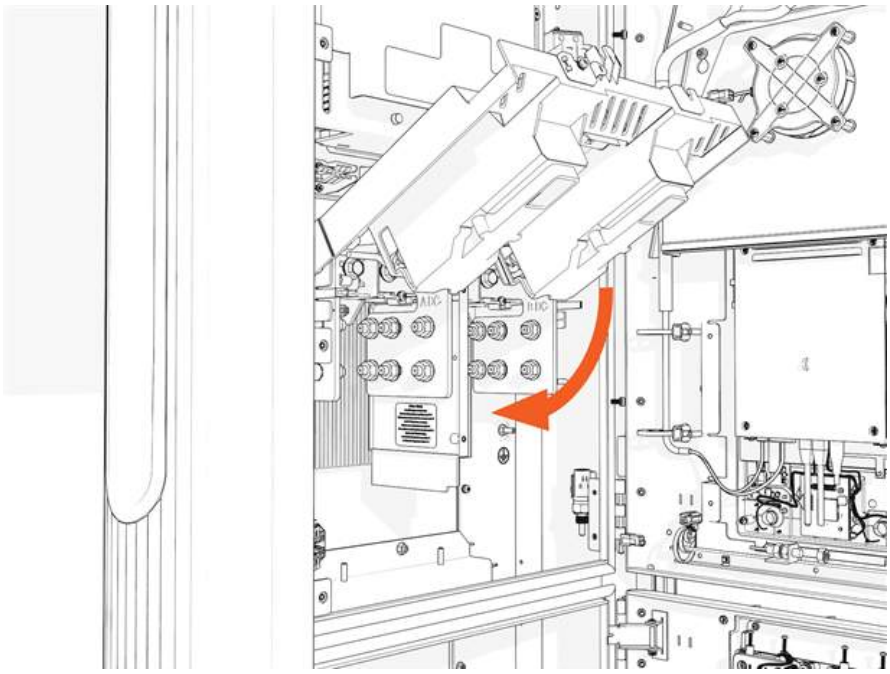


DC Ground Wire

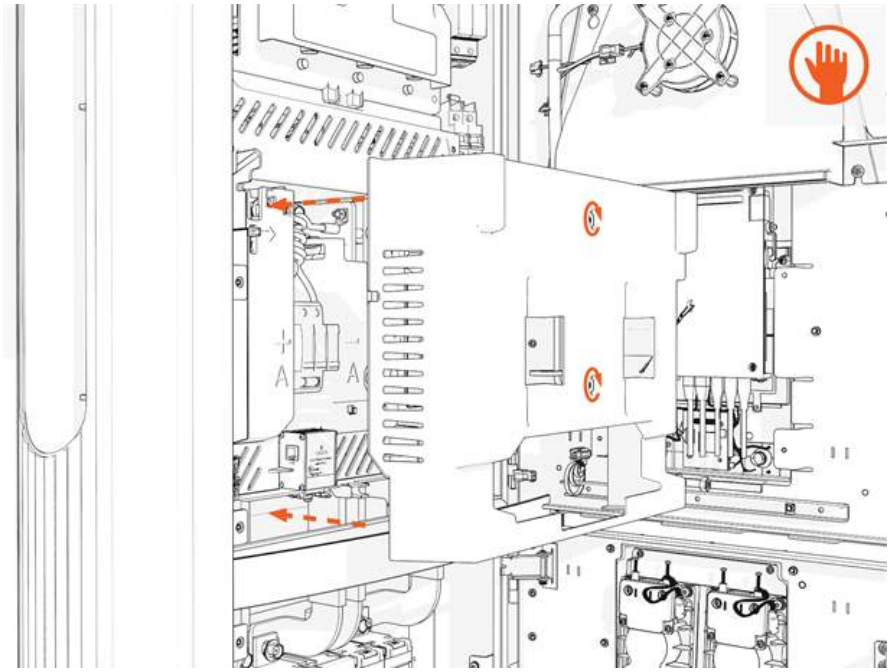
1. Land the ground wire onto a ground stud. Torque to 7 Nm (60 in-lb).



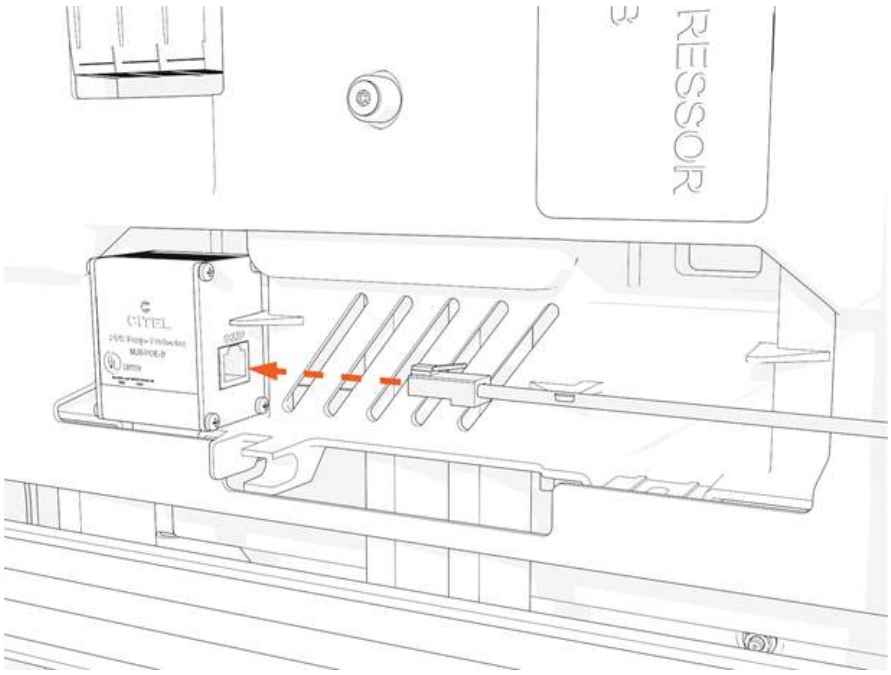
2. If you are installing the "Overhead" Mounted configuration:
   Tilt down the upper safety cover to close.



3. Position the power plate cover. Hand tighten the captive screws.



4. Reconnect Ethernet cable(s) to Ethernet surge suppressor into the same ports as before.

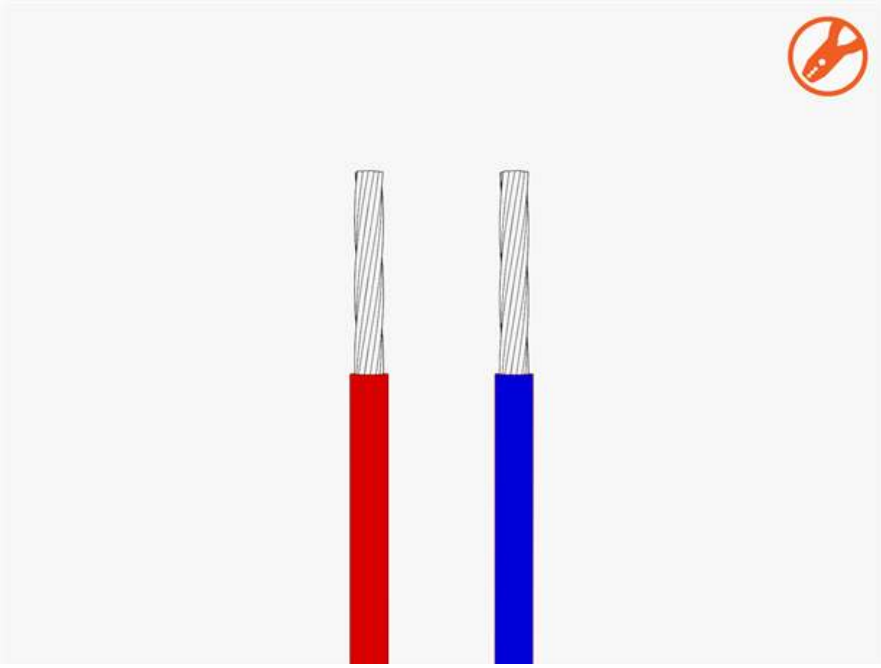


48 V DC Wiring

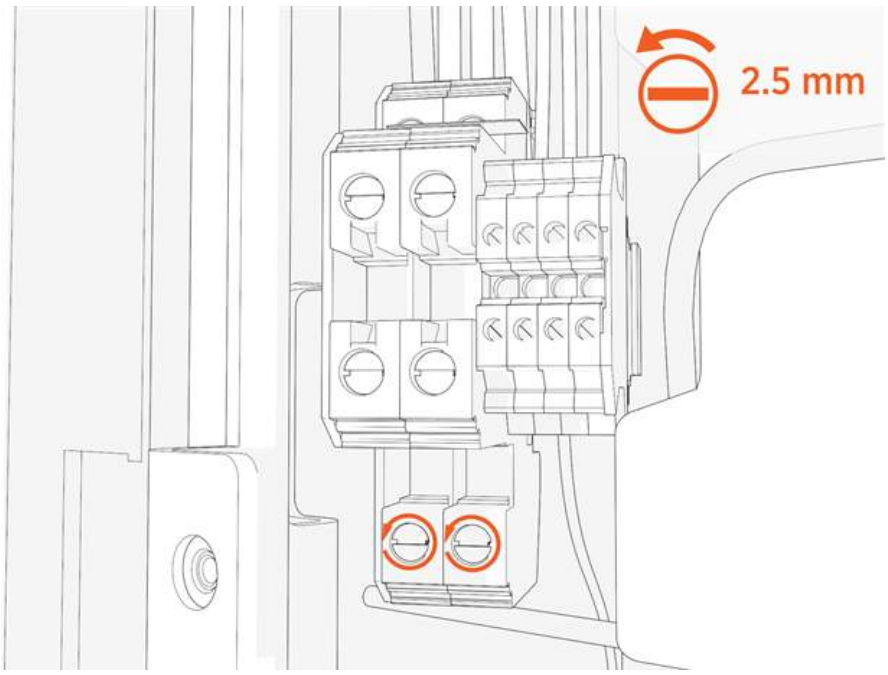
1. Check the 48 V DC wiring requirements in the site drawings:

48 V DC Wire Size	Conduit Size	Installation
16 mm^2 (6 AWG)	21 mm (3/4 in)	Install two 48 V DC wires and one Ethernet cable into one conduit.
Note: Use only copper conductor wire rated for 90 °C (194 °F).		

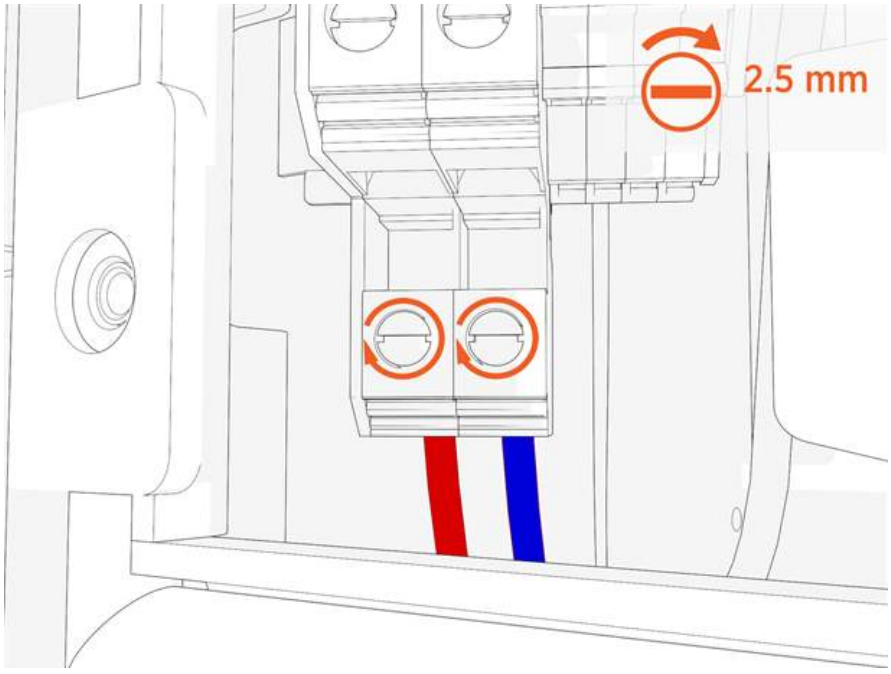
2. Strip the 48 V DC wires.



3. Loosen each terminal tab (upper cabinet, left side).



4. Seat the 48 V DC wires. Push-pull to test.

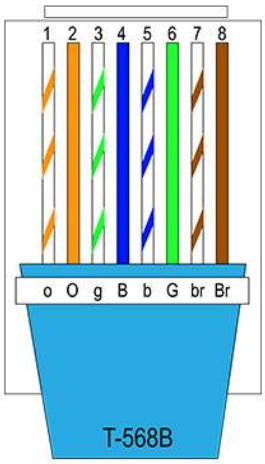


5. To close the panel, lift back of hinge.

Cat6 STP Ethernet Cable

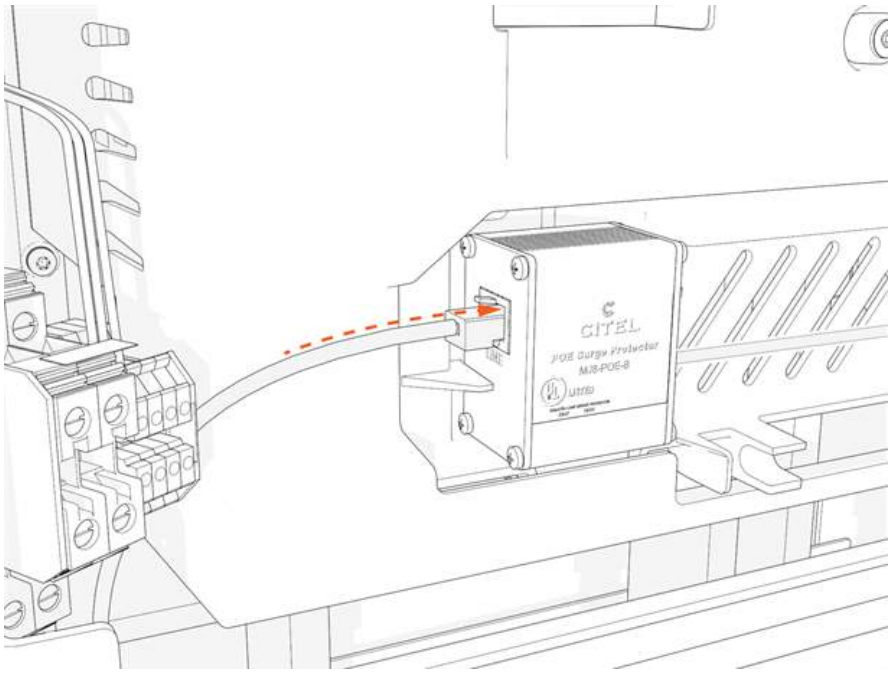
1. Trim the Cat6 STP Ethernet wires to length and allow for a service loop. Terminate both ends.

2. Field crimp a shielded connector onto each Cat6 STP Ethernet wire. Use a straight-through T568-B pattern.



IMPORTANT: Do not connect the shield wire here at the Power Link termination.

3. Test each Ethernet wire for functionality.
4. Identify which blue surge suppressors already have cables in the line-out (right) positions. Connect the Ethernet connectors to those surge suppressors at the line-in (left) positions. Push-pull to test.



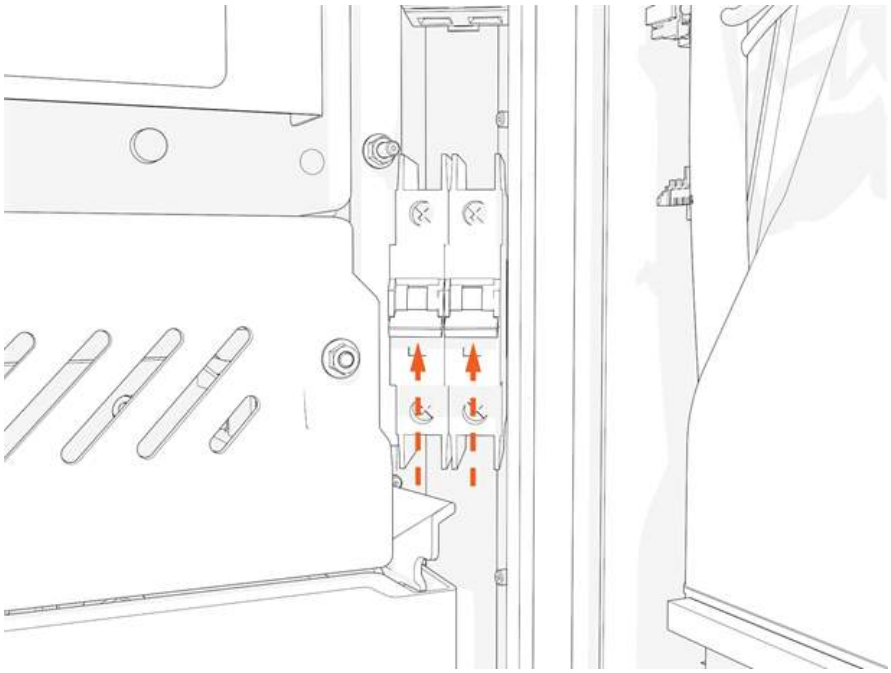
Install DC Smart Cable

See Install DC Smart Cable.

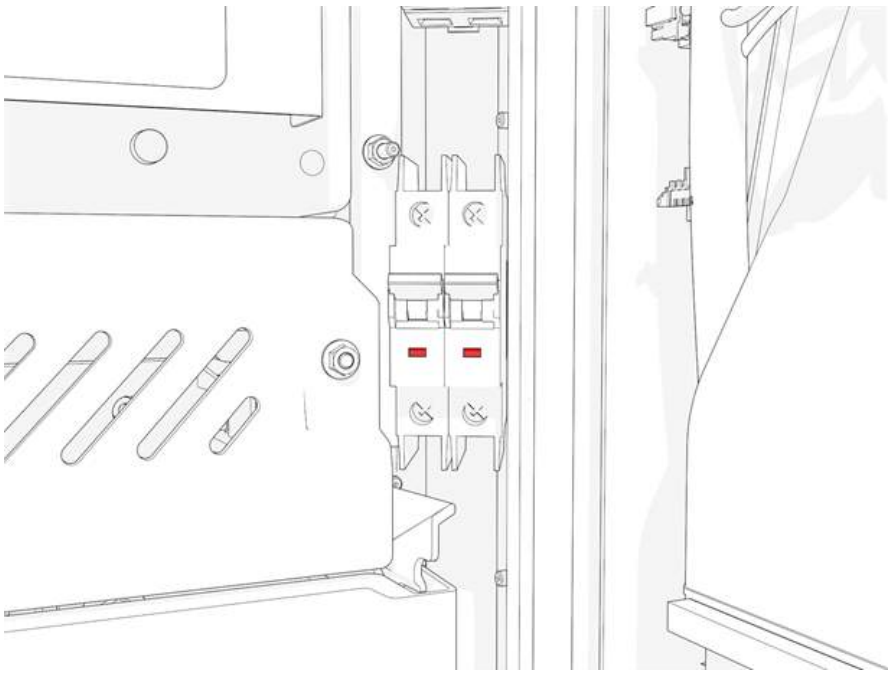
Install Doors and Vinyl Signs

Power On 48 V

1. Locate the 48 V DC breaker.



2. Flip up the switch to ON. The indicator light should turn red.



Install Door

1. Disengage wind stops and close the door.
2. Torque screws on the door to 4.5 Nm (40 in-lb).
3. On the right side of the door, insert the bottom of the door bracket. Tilt in the top of the door bracket. Push down into position.
4. Torque screws on the door bracket to 1 Nm (10 in-lb).

Install Vinyl Signs, Trim, and Top Cover



a. Top cover
b. CCOM trim (optional, not shown)
c. Lower trim
d. Vinyl sign
e. Bottom cover

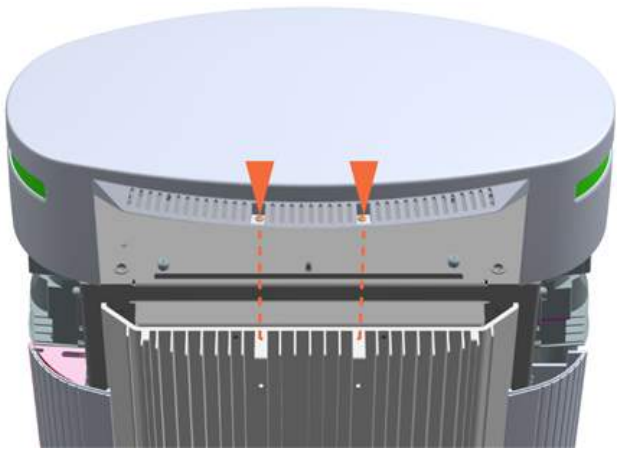
1. Position the bottom cover.
2. Reinstall screws. Torque to 2.8 Nm (25 in-lb).

3. Push in the lower trim until it engages with the center and side clips.
4. Simultaneously insert both sides of the vinyl sign. Lower the vinyl sign behind the lower trim.
5. Align the screws (x4) (two at front and two at rear) and install the top cap.

Front



Rear



6. Torque the M5 screws (x2) at rear side to **2.8 Nm (25 in-lb)** and M4 screws (x2) at front side to **1.7 Nm (15 in-lb)** (use T25 security screwdriver).

Continue to Charging Cable Instructions

Install the tool balancer.

6 Hang Charging Cable Onto Tool Balancer

Identify if your site plans include a Cable Management Kit (CMK) or a tool balancer.

Note: A CMK includes swingarms that attach directly to the Power Link station to manage standard-length (i.e., 4.6 m or 15 ft) charging cables. A tool balancer is attached to a separate structure to manage medium-length (i.e., 7.6 m or 25 ft) charging cables but uses the same ball clamp.

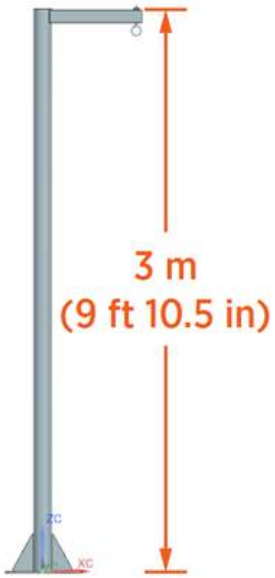
WARNING: Use the tool balancer distances, heights, positions, tension setting, and other requirements stated in this section, unless you have express approval from ChargePoint in approved site drawings to use alternative specifications and site configuration. If in doubt, contact ChargePoint Support (chargepoint.com/support).

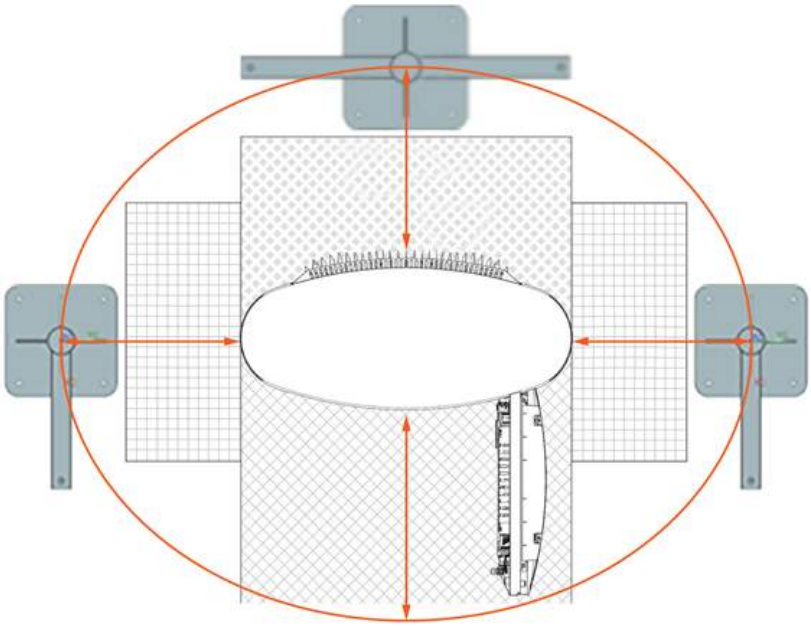
Ensure that you implement these requirements. If you fail to do so, the tool balancer may not be properly installed and could cause death, personal injury, or property damage. ChargePoint is not responsible for a design that is not approved by its authorized representatives or that does not conform to these requirements.

IMPORTANT: Do not attempt to mount a tool balancer to anything other than a structure that has been approved by ChargePoint.

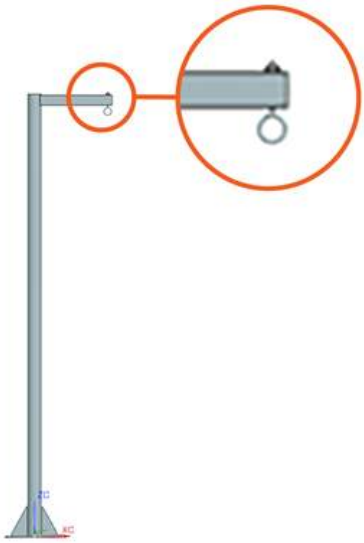
Check Post (or Other Approved Structure)

1. Check that the site meets all requirements of the Site Design Guide and the site drawings, including the following requirements for the post (unless you have another approved structure). If you find any discrepancies, contact your site engineer or construction manager.
    - Post height: 3 m (9 ft 10.5 in)
    - Post and structural arm capacity:
        - Normal capacity: 25 kg (55 lb)
        - Maximum capacity: 200 kg (440 lb) - to prevent deformation of the post in the event the driver drives away with the charging cable plugged in
    - Clearance: Must have enough clearance to open doors or remove covers





2. Attach an eye bolt or other appropriate fastener to the structural arm of post at point where you will hang the tool balancer.



Assemble and Hang

Determine the Ball Clamp Type

IMPORTANT: Instructions vary for each configuration. Continue to the applicable instructions below.

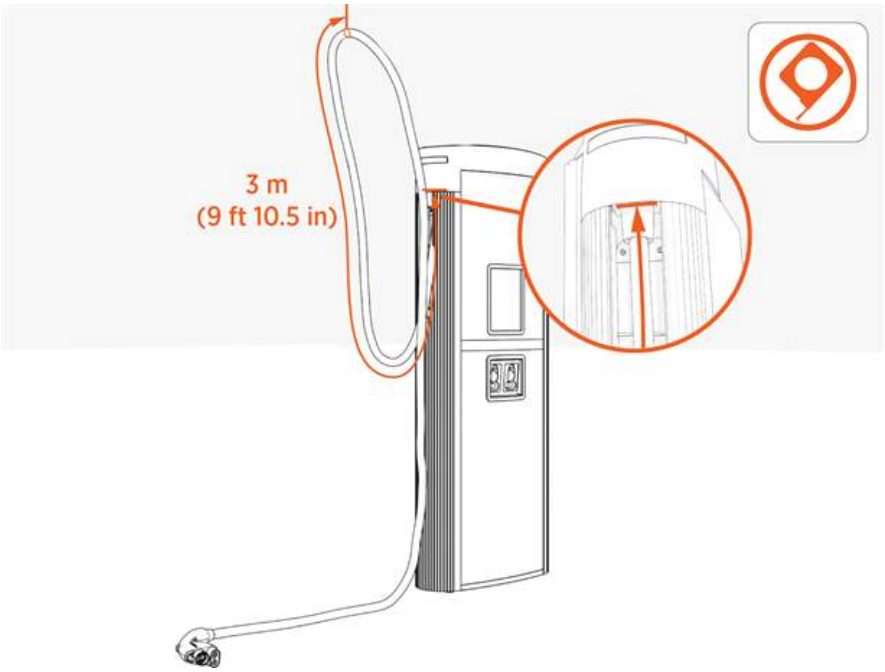
A. *Unassembled* ball clamp	B. *Preassembled* ball clamp

A. *Unassembled* Ball Clamp (Tetherball) — Assemble and Position

If the ball clamp is not preassembled and preattached to the charging cable, assemble the ball clamp and eyelet, and position them on the charging cable:

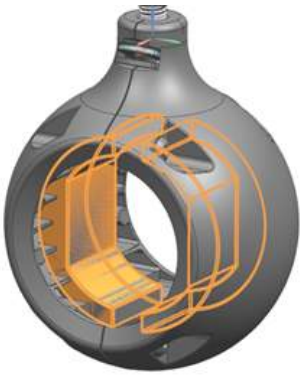
1. Measure 3 m (9 ft 10.5 in) along the length of charging cable. Start measuring where the charging cable exits the upper side of the Power Link cable housing exterior.

   Mark this point.

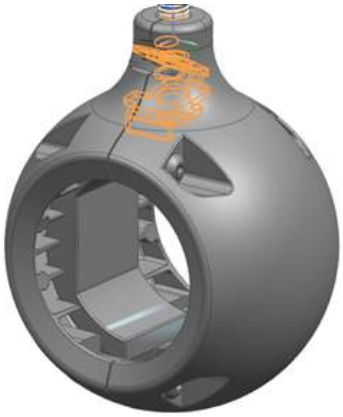


Ball Clamp

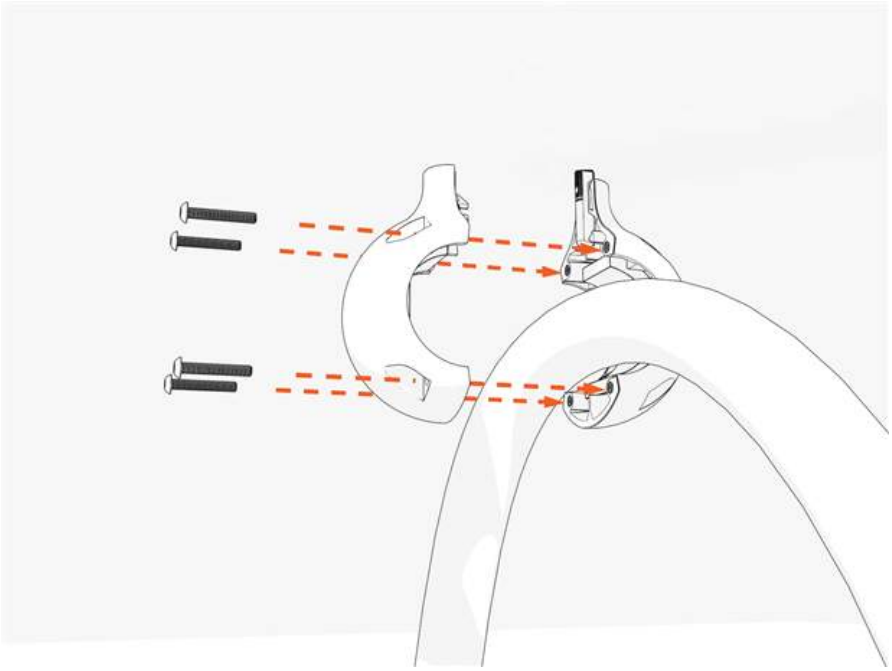
2. Assemble the ball clamp:
    a. Identify the compression pad for the outer diameter of your charging cable. Place compression pad inside half of the ball clamp.



    b. Hold spring in position inside half of the ball clamp.



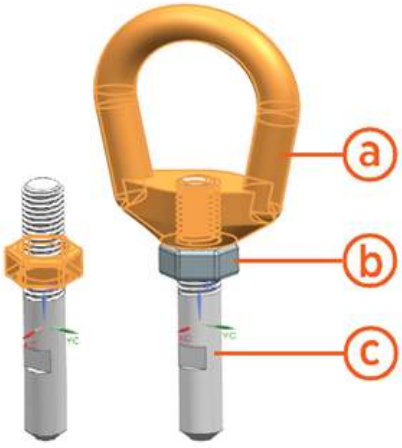
c. Align and position both halves of the ball clamp around the charging cable.



d. Loosely install screws into the ball clamp.
e. Slide the ball clamp to the 3 m (9 ft 10.5 in) point marked on the charging cable (see Step 1).
f. Torque the screws to 2 Nm (1.5 ft-lb).

Eyelet

3. Assemble the eyelet.



a. Eye nut
b. M8 nut
c. Pin

a. Install the M8 nut onto the pin.
b. Install the Eye nut onto the pin.
c. Torque the M8 nut to 20 Nm (177 in lb).

4. Insert the eyelet into the hole in the ball clamp of the charging cable.

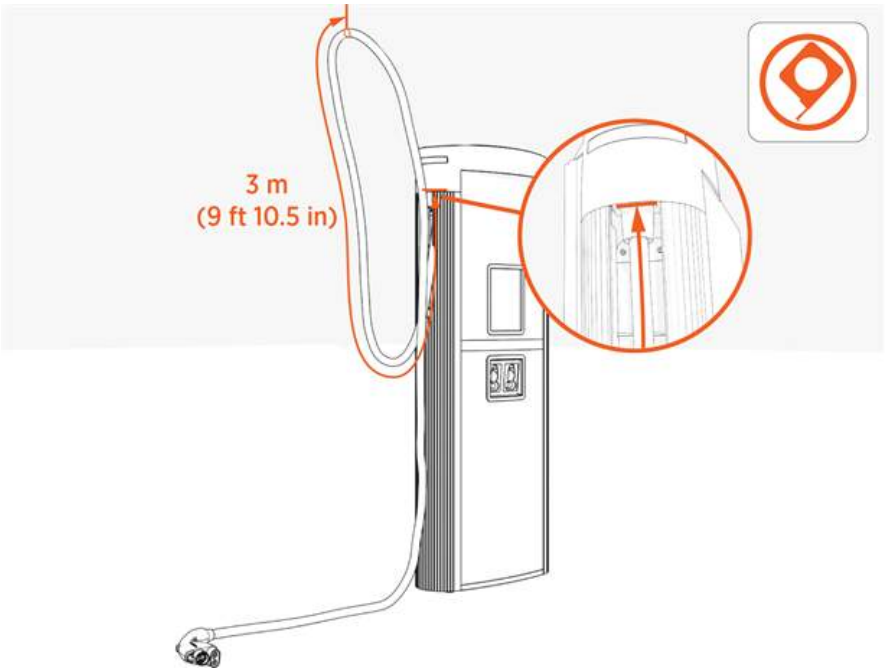
   Push-pull to test. The spring in the ball clamp should secure the eyelet. Continue to Set Tension and Attach to Post.



B. *Preassembled* Ball Clamp — Check Position on Charging Cable

Alternatively, if the ball clamp arrives preassembled and preattached to the charging cable and eyelet, check the position of the ball clamp on the charging cable. Correct if necessary.

1. Measure 3 m (9 ft 10.5 in) along the length of charging cable. Start measuring where the charging cable exits the upper side of the Power Link cable housing exterior.
2. If necessary, slide the ball clamp to the 3 m (9 ft 10.5 in) point on the charging cable.



Set Tension and Attach to Post

3. To set tension on the tool balancer, rotate the dial on the tool balancer.

   Refer to the table below to see the required tension for a cable rating.



a. Top carabiner hook
b. Dial
c. Bottom carabiner hook

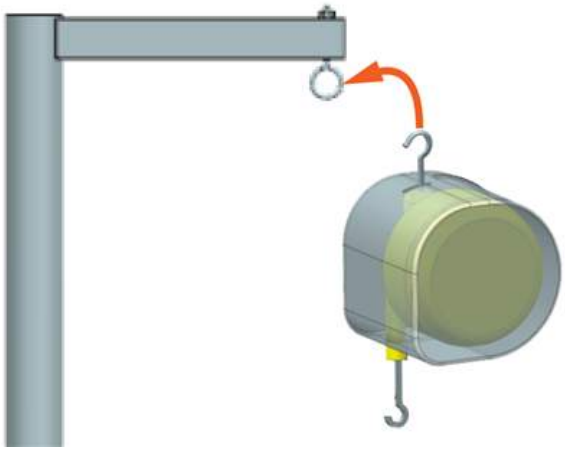
Cable rating	200 A	350 A
Required tension	12.5 kg (27.5 lb)	15 kg (33 lb)

4. Place tool balancer into the rain cover and zip the rain cover.

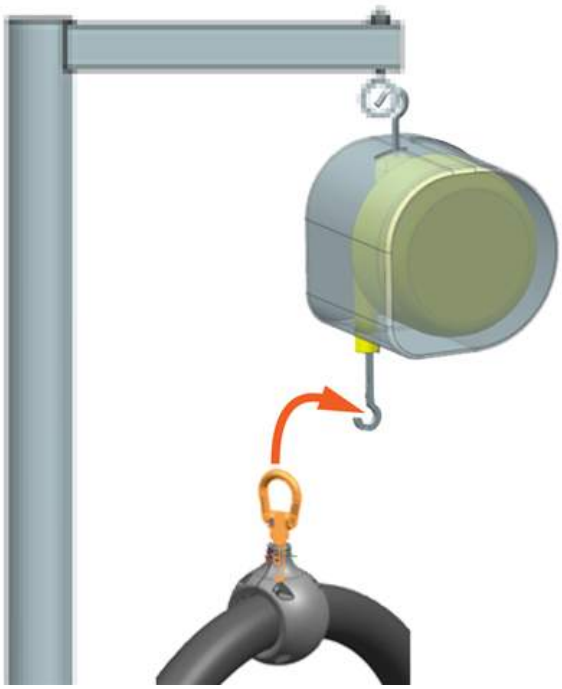
   Make sure to insert the top carabiner hook into the slot in the rain cover and keep the bottom carabiner hook out of the cover.



5. Hang the tool balancer from eye bolt on the post or other approved structure:
    a. Hold the top carabiner hook of the tool balancer.
    b. Press the top carabiner onto the eye bolt on the post.
    c. Ensure the carabiner closes, and the connection is secure.



6. Attach the charging cable ball clamp to the tool balancer:
    a. Hold the bottom carabiner hook of the tool balancer.
    b. Press the eyelet of the charging cable ball clamp onto the bottom carabiner.
    c. Ensure the carabiner closes, and the connection is secure.



7. Check that the tension setting on the tool balancer has not changed and is still correct.



CAUTION: The charging cable must be at least 2 cm (0.80 in) above the ground and clear of all nearby obstacles.
If the charging cable does not have sufficient ground clearance, incrementally increase the tension setting on the tool balancer.
Contact ChargePoint Support (chargepoint.com/support) if you have questions.

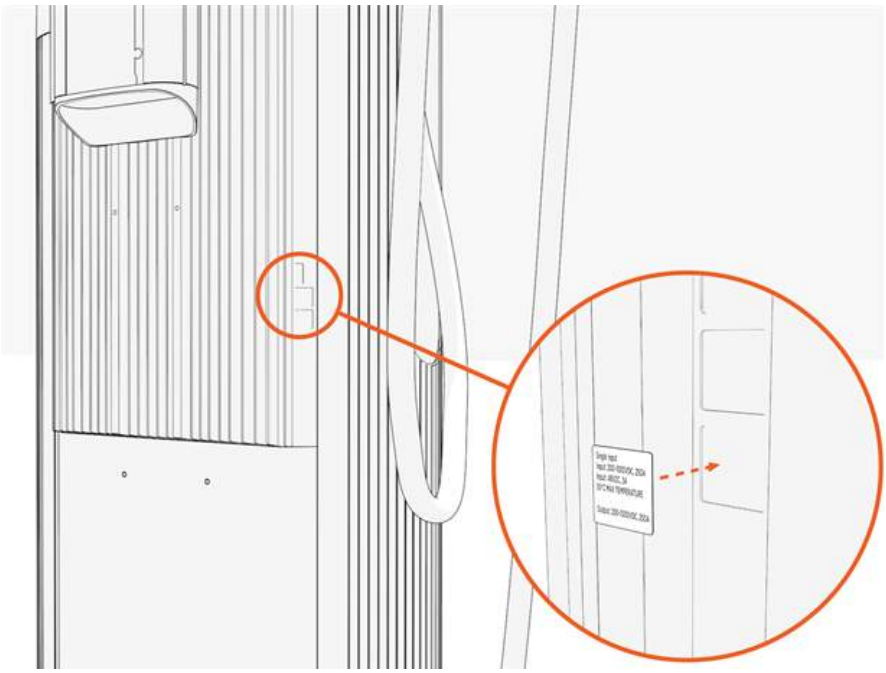
Check Operation

8. Move and extend each charging cable to check that it operates smoothly.
   If you find limited motion, contact ChargePoint at chargepoint.com/support.

Verify and Adhere Ratings Label 7

Power Link

1. Locate the ratings label and serial number on the back right edge of the heat sink.



2. Verify the ratings listed on the site drawing.
3. Choose the correct ratings label from the label sheet (included).
4. Adhere the label to the indentation.

Power Block

Note: You should have already applied the ratings label when you connected the wiring inside the Power Block.

8 Power On

You must be a ChargePoint certified installer or technician to power on the charging station, or warranty limitations apply.

1. Ensure all doors, covers, vinyl signs, and all other parts have been correctly installed and the work is complete.
2. Turn on power at the same points that you turned it off.

   Note: If the site has a remote shunt trip switch, ensure that the switch is in the operating position.
3. Wait for self-diagnostics to run.
4. View diagnostics information.
5. If you have not yet configured the station (such as pricing, messaging, and additional options), do so after installation or service is complete. Refer to the Express Plus *Operation and Maintenance Guide*.

IMPORTANT: Remember to complete the post-installation checklist.

Self-Diagnostics

The station runs the following self-diagnostics after being energized. The system may take several minutes to initiate. You may see messages intermittently until the system fully boots up.

Self-Diagnostic	After Installation	After Service or Power Outage
Electrical safety checks	✓	✓
Lighting checks	✓	✓
Display panel checks	✓	✓
Component operation checks	✓	✓
Network connectivity checks	✓	✓
Installation Wizard (for the installer to complete configuration and pinpoint the station on maps)	✓	–

View Diagnostics Information

1. Log in to the ChargePoint Cloud Dashboard at na.chargepoint.com or eu.chargepoint.com.
2. Select **Stations**.

3. Select the station name to view the station specific information.

   Apply filters to filter out the station you are looking for.
4. Select **Status/Actions** tab > **Component Diagnostics** to view the diagnostics information.
5. Alternatively, select the **Diagnostics** tab.

IMPORTANT: If a red status alert appears, contact ChargePoint immediately. A yellow status alert provides you with information; unless functionality appears affected, typically no action is required.

Complete Station Setup 9

After you power on the charging station at the breaker panel (see Power On), complete the station setup. You must have completed the installer training and received your installer login. To complete the next steps, you need:

- Installer login
- Activation label (i.e., QR code label including the MAC address and activation password) for Power Block and Power Link, if not already applied to the station
- A smartphone with camera, QR code scanning app (usually built into the camera app), Internet connectivity
- The exact location (to the parking space) where the Power Block and Power Link are physically installed

Run Installation Wizard

IMPORTANT: Instructions vary for each configuration. Complete this procedure only for the Power Link with a touchscreen display unit. This procedure is not applicable to Power Link without a touchscreen display unit.

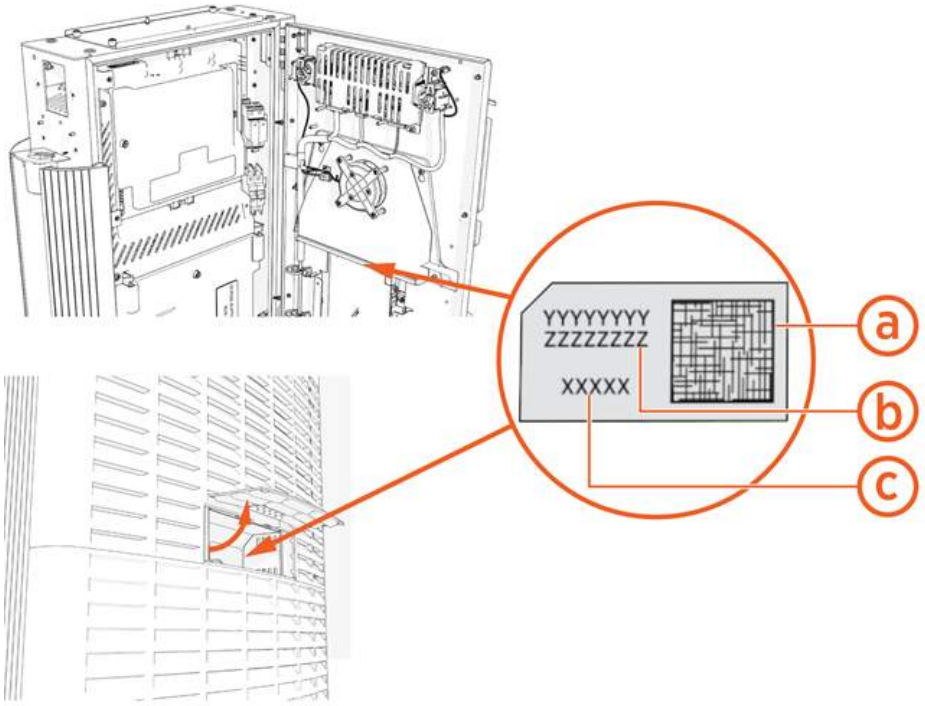
1. On the Power Link touchscreen display, select your language.

   This does not permanently affect the charging station's display language.
2. Select "New station" or "Replace an existing station."
3. Ensure that you have all required items and select Yes.
4. Follow the onscreen prompts.

Pinpoint Location of Power Block and Power Link

IMPORTANT: Complete this procedure for both Power Link and Power Block separately. Both Power Link and Power Block have their own MAC address and activation password.

1. Find the activation label:
   - Power Link: You can find it on top of the display or non-display unit.
   - Power Block: You can find it behind the security panel (see Adhere Ratings Label).



a. QR code
b. MAC address
c. Activation password

If your smartphone has QR code scanning app

2. Open the QR Code scanning app on your smartphone and point the camera at the QR code on the activation label.

   Your smartphone browser automatically redirects to the installer pinpointing page. Confirm that the URL of the page is o.chargepoint.com.
3. Log into the installer site using your installer login.
4. Confirm the MAC address and activation password are automatically entered and correct, select **Next**. Continue from Step 5 below.

If your smartphone does not have QR code scanning app

2. Using your smartphone or laptop browser, go to o.chargepoint.com.
3. Log into the installer site using your installer login.
4. Enter the MAC address and activation password printed on the activation label, and select **Next**.
5. Select the Location Permission button. Your GPS coordinates are required to complete the pinpointing process.
6. Select the type of installation and select **Next**.
7. Enter the site address and select **Next**.
8. Verify the address and select **Next**.

9. Move pin to exact location of charging station on the map and select **Next**.
10. Enter additional station location details such as parking lot name, building name, floor label, and parking restrictions, if applicable and select **Next**.
11. Add Helpful Information for Drivers and select **Take a photo** to upload an image such as photo of the location and station.
12. Follow any onscreen prompts to complete the pinpointing.

Recommended Checklist 10

To adhere to ChargePoint best practices, complete this checklist before you leave the site.

☐	I/we reconnected all ground/earth connections or confirmed they were connected, including those to ground lugs on pedestal and overhead installations.
☐	I/we confirmed that all connections have correct polarity and are installed on the correct bus.
☐	I/we inserted all service wiring into the terminal blocks and ensured that all electrical connections are clean and snug (not pinched or trapped).
☐	I/we cleaned and vacuumed all electrical enclosures to ensure they are clean and free of wire strands, metal shavings, and all other debris.
☐	I/we properly reinstalled and torqued all fasteners that were removed during service or installation.
☐	For stations with a cable management kit (CMK) or tool balancer, I/we checked that the charging cables extend and retract fully and operate smoothly.
☐	I/we removed any twists from and straightened all charging cables.
☐	I/we checked that no packaging or other foreign objects were inside any unit.
☐	I/we reinstalled all covers, doors, panels, and vinyl signs.
☐	I/we checked that the station is fully secured and does not rock or move.
☐	I/we checked that the Power Block is labeled with the panel and breaker information, and that the Power Link is labeled with the upstream Power Block or Power Hub, or I/we labeled them.
☐	I/we ensured the parking area is clean and free of all packaging, debris, and anything that could damage vehicle tires.
☐	I/we observed that the system completed self-diagnostics, including the network test, and started successfully. If the unit has a display, it showed the default message, and did not show the unit as unavailable. If no display, the lights indicated connectivity and did not indicate a fault.
☐	If possible, I/we completed a test charging session successfully without any faults or alerts.
☐	I/we prepared all local forms that are required.

Third-Party Service Providers

Services Performed

Description of Service Provided	
Location	
Unit	
Panel ID	
Breaker	

Contact Information

Service Provider	
Technician Name	
Service Company Name	
Address	
Contact Person	
Phone	

Site Owner/Customer	
Contact Person	
Business Name	
Site Address	
Phone	

Questions

For assistance, go to chargepoint.com/support and find your region's technical support number.

Limited Warranty Information and Disclaimer

The Limited Warranty you received with your charging station is subject to certain exceptions and exclusions. For example, your use of, installation of, or modification to, the ChargePoint® charging station in a manner in which the ChargePoint® charging station is not intended to be used or modified will void the limited warranty. You should review your limited warranty and become familiar with the terms thereof. Other than any such limited warranty, the ChargePoint products are provided "AS IS," and ChargePoint, Inc. and its distributors expressly disclaim all implied warranties, including any warranty of design, merchantability, fitness for a particular purposes and non-infringement, to the maximum extent permitted by law.

Limitation of Liability

CHARGEPOINT IS NOT LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, PUNITIVE OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION LOST PROFITS, LOST BUSINESS, LOST DATA, LOSS OF USE, OR COST OF COVER INCURRED BY YOU ARISING OUT OF OR RELATED TO YOUR PURCHASE OR USE OF, OR INABILITY TO USE, THE CHARGING STATION, UNDER ANY THEORY OF LIABILITY, WHETHER IN AN ACTION IN CONTRACT, STRICT LIABILITY, TORT (INCLUDING NEGLIGENCE) OR OTHER LEGAL OR EQUITABLE THEORY, EVEN IF CHARGEPOINT KNEW OR SHOULD HAVE KNOWN OF THE POSSIBILITY OF SUCH DAMAGES. IN ANY EVENT, THE CUMULATIVE LIABILITY OF CHARGEPOINT FOR ALL CLAIMS WHATSOEVER RELATED TO THE CHARGING STATION WILL NOT EXCEED THE PRICE YOU PAID FOR THE CHARGING STATION. THE LIMITATIONS SET FORTH HEREIN ARE INTENDED TO LIMIT THE LIABILITY OF CHARGEPOINT AND SHALL APPLY NOTWITHSTANDING ANY FAILURE OF ESSENTIAL PURPOSE OF ANY LIMITED REMEDY.

FCC Compliance Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Important: Changes or modifications to this product not authorized by ChargePoint, inc., could affect the EMC compliance and revoke your authority to operate this product.

Exposure to Radio Frequency Energy: The radiated power output of the 802.11 b/g/n radio and cellular modem (optional) in this device is below the FCC radio frequency exposure limits for uncontrolled equipment. The antenna of this product, used under normal conditions, is at least 20 cm away from the body of the user. This device must not be co-located or operated with any other antenna or transmitter by the manufacturer, subject to the conditions of the FCC Grant.

ISED (formerly Industry Canada)

This device complies with the licence-exempt RSS standard(s) of Innovation, Science and Economic Development Canada (ISED). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil est conforme aux flux RSS exemptés de licence d'Innovation, Sciences et Développement économique Canada (ISDE). L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter.

Radiation Exposure Statement: This equipment complies with the IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.

Énoncé d'exposition aux rayonnements: Cet équipement est conforme aux limites d'exposition aux rayonnements ioniques RSS-102 Pour un environnement incontrôlé. Cet équipement doit être installé et utilisé avec un Distance minimale de 20 cm entre le radiateur et votre corps.

FCC/IC Compliance Labels

Visit chargepoint.com/labels.

chargepoint.com/support

75-001428-01 r6

Pantograph Down 2000

Express Plus DC Fast Charging Station for Electric Buses

Site Design Guide



IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

This manual contains important instructions for Pantograph Down 2000 that shall be followed during installation, operation and maintenance of the unit.

WARNING:

1. **Read and follow all warnings and instructions before servicing, installing, or operating the ChargePoint® product.** Install and operate only as instructed. Failure to do so may lead to death, injury, or property damage, and will void the Limited Warranty.
2. **Only use licensed professionals to install your ChargePoint product and adhere to all national and local building codes and standards.** Before installing the ChargePoint product, consult with a licensed contractor, such as a licensed electrician, and use a trained installation expert to ensure compliance with local building and electrical codes and standards, climate conditions, safety standards, and all applicable codes and ordinances. Inspect the product for proper installation before use.
3. **Always ground the ChargePoint product.** Failure to ground the product can lead to risk of electrocution or fire. The product must be connected to a grounded, metal, permanent wiring system, or an equipment grounding conductor shall be run with circuit conductors and connected to the equipment grounding terminal or lead on the Electric Vehicle Supply Equipment (EVSE). Connections to the EVSE shall comply with all applicable codes and ordinances.
4. **Install the ChargePoint product using a ChargePoint-approved method.** Failure to install on a surface that can support the full weight of the product can result in death, personal injury, or property damage. Inspect the product for proper installation before use.
5. **The product is not suitable for use in Class 1 hazardous locations, such as near flammable, explosive, or combustible vapors or gases.**
6. **Supervise children near this device.**
7. **Do not put fingers into the electric vehicle connector, or touch fingers to charging rails.**
8. **Do not use this product if any cable is frayed, has broken insulation, or shows any other signs of damage.**
9. **Do not use this product if the enclosure or the electric vehicle connector is broken, cracked, open, or shows any other signs of damage.**
10. **Wire and wire terminal information are provided in the ChargePoint product Site Design Guide and Installation Guide.**
11. **Torques for installation of wire terminals are provided in the ChargePoint product Installation Guide.**
12. **The ChargePoint product maximum operating temperature is 50 °C (122 °F).**
13. **Site operator is responsible for making sure that no mechanical damage occurs and the pantograph is installed in a location that doesn't present a safety risk.** If used carelessly, the pantograph could critically injure someone just from the extension force.

IMPORTANT: Under no circumstances will compliance with the information in a ChargePoint guide such as this one relieve the user of the responsibility to comply with all applicable codes and safety standards. This document describes approved procedures. If it is not possible to perform the procedures as indicated, contact ChargePoint. **ChargePoint is not responsible for any damages that may result from custom installations or procedures not described in this document or that fail to adhere to ChargePoint recommendations.**

Document Accuracy

The specifications and other information in this document were verified to be accurate and complete at the time of its publication. However, due to ongoing product improvement, this information is subject to change at any time without prior notice. For the latest information, see our documentation online at chargepoint.com/guides.

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Symbols

This guide and product use the following symbols:

DANGER: Risk of electric shock

WARNING: Risk of personal harm or death

CAUTION: Risk of equipment or property damage

IMPORTANT: Crucial step for installation success

Read the manual for instructions

Ground/protective earth

Illustrations Used in This Document

The illustrations used in this document are for demonstration purposes only and may not be an exact representation of the product. However, unless otherwise specified, the underlying instructions are accurate for the product.

Contents

Important Safety Instructions ii

1 Introduction **1**
- Pantograph Down 2000 Components 1
- System Overview 3
- Safety Warning 7
- Express Plus Guides 8
- Questions 8

2 Site Design Guidelines **10**
- Initial Site Guidelines 10
- Plan for Future Charging Capacity 10
- System Placement 11
- Component Placement Relative to Bus 12

3 Civil and Mechanical Design **16**
- Weights 16
- Dimensions 17
- Mount and Wire Entry Specifications 24
- Drainage 41
- Flood Plane 41
- Clearances 41
- Bollards 47
- Ventilation 47
- Accessibility 48
- Signage 48

4 Electrical Design **49**
- Power Block Electrical Supply Requirements 49
- PD Controller Electrical Supply Requirements 51
- Grounding Requirements 51
- Power Link 2000 Site Considerations 51
- Wiring Requirements 52

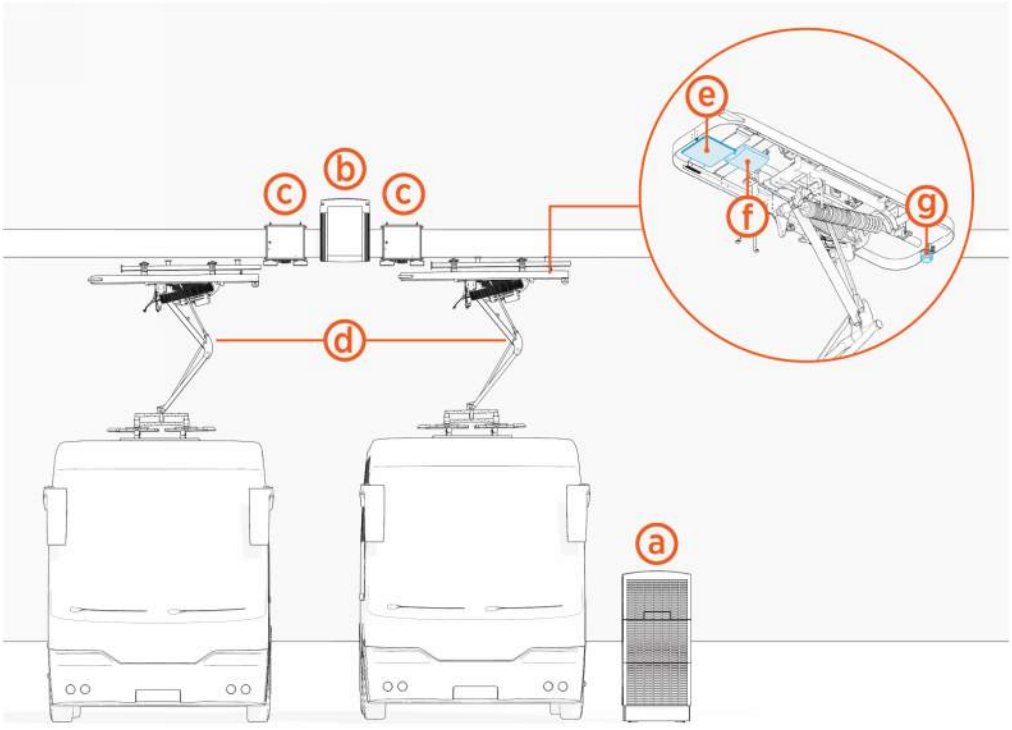
5 Connectivity **63**
Signal Strength and Quality 63
Repeaters 65

Introduction 1

This document describes how to design a project site for the ChargePoint® Express Plus Pantograph Down 2000 DC fast charging solution for electric buses. This includes guidelines and best practices for electrical infrastructure and capacity planning, construction, and concrete work required prior to installation of distribution cabinets.

IMPORTANT: ChargePoint recommends consulting with an engineer to create site specific drawings. Ensure the installation complies with all applicable codes and ordinances.

Pantograph Down 2000 Components



Express Plus Pantograph Down 2000 is a modular solution for scalable fast charging of electric buses in the depot or on-route. There are two Pantograph Down 2000 installation configuration types. The "mast configuration" offers an integrated structural solution while the "depot configuration" is suitable for any site design that mounts the system components to site structures. The solution comprises the following product components, shown above in depot charging configuration:

(a) Power Block: Power cabinet that houses AC to DC power converters called Power Modules. Supplies DC output power to Power Link 2000s. Each Power Block can output up to 200 kW of power.

(b) Power Link 2000: Dispenser that communicates with the bus during charging, connects to the ChargePoint Cloud Dashboard, and dispenses high voltage DC power to the bus through a pantograph connector.

(c) PD Controller: Smart interface that enables a Power Link 2000 to control a pantograph, and monitors the control pilot. Also hosts the Wi-Fi access point and RFID reader that enables wireless charging communication with the bus.

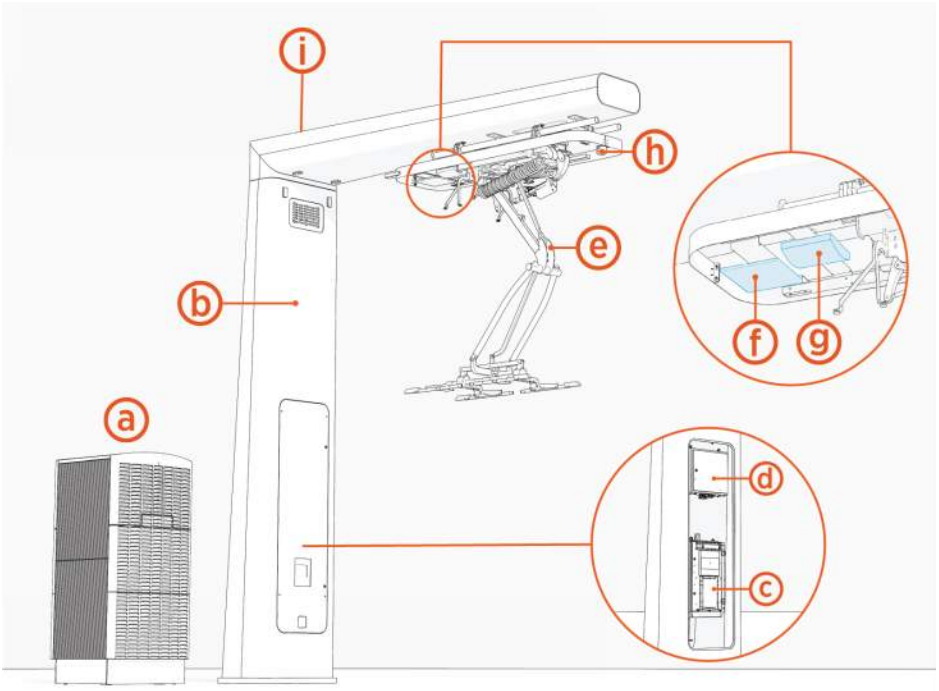
(d) Pantograph: Electromechanical connector that lowers onto bus charging rails and delivers high voltage DC charge power to the bus. Raises out of the way when not in use.

(e) Wi-Fi antenna: Antenna for wireless communication between the bus and the Pantograph Down 2000 system.

(f) RFID antenna: Antenna for bus identification.

(g) Status LED: LED status indicator for the Power Link 2000 charging port.

Pantograph Down 2000 also supports charging with the Pantograph Down 2000 Mast, shown below. This is a structure that fully encloses a Power Link 2000 and PD Controller within its column, and supports a pantograph, Wi-Fi antenna, RFID antenna, and status LED on its arm. A Smart Antenna at the top of the mast ensures robust network connectivity.

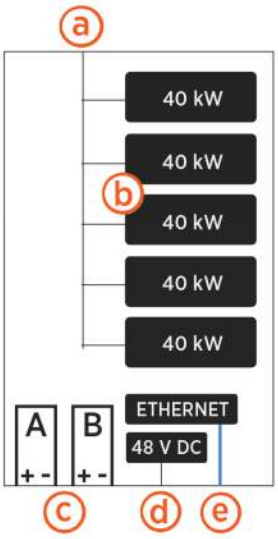


(a) Power Block
(b) Pantograph Down 2000 Mast
(c) Power Link 2000
(d) PD Controller
(e) Pantograph
(f) Wi-Fi antenna
(g) RFID antenna
(h) Status LED
(i) Smart Antenna (not visible in this view)

Note: The Wi-Fi antenna, RFID antenna, and status LED are collectively referred to as *auxiliary components*.

System Overview

Power Block



Power Block block diagram:

(a) Three phase AC power input

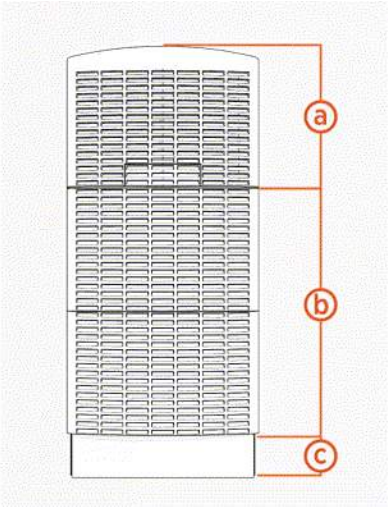
(b) Configurable with up to five 40 kW Power Modules, for a maximum total output of 200 kW

(c) Two available HV DC power outputs (A and B)

(d) 48 V DC power output

(e) Ethernet output

Physically, the Power Block is a ground-mounted enclosure structured with an upper and lower enclosure, stacked on a pedestal:

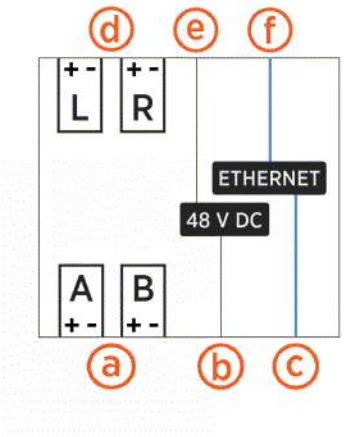


(a) Upper enclosure: Auxiliary power supply and temperature management components

(b) Lower enclosure: Bay for Power Modules and bus bars to land all input and output cables

(c) Pedestal: Secures the Power Block and provides access for either stub-up or surface mount installations on a concrete pad

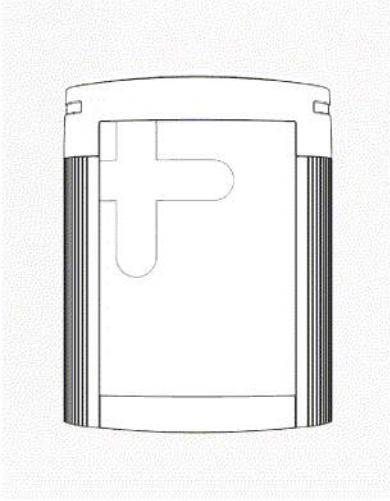
Power Link 2000



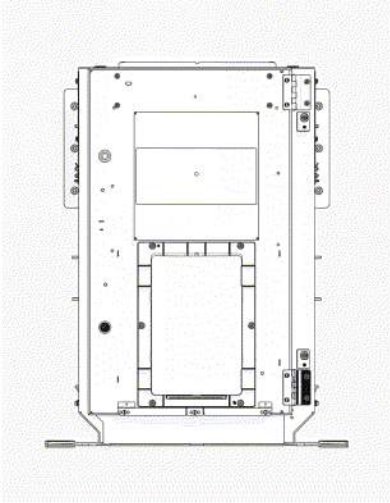
Power Link 2000 block diagram:

- **(a)** Single or dual HV DC input power paths (A and B)
- **(b)** 48 V DC power input
- **(c)** Ethernet input
- **(d)** Single or dual HV DC outputs (L and R)
- **(e)** 48 V DC power output
- **(f)** Ethernet output

Physically, the Power Link 2000 is a vertical enclosure that comes in two primary variants:



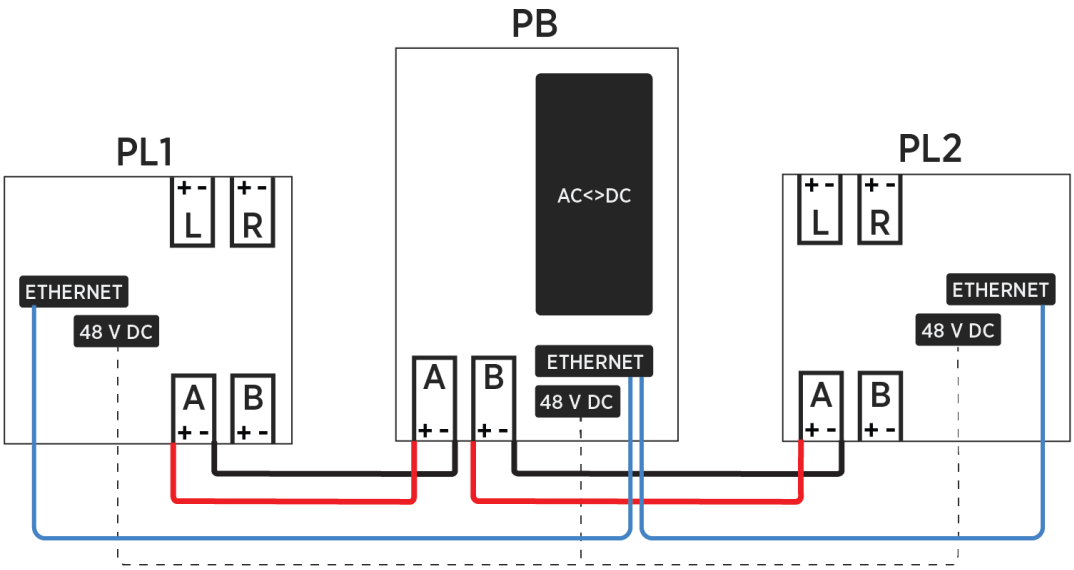
Depot mount enclosure:
Designed for gantry, ceiling, or wall mount, this enclosure is clad with external cosmetic covers. The depot mount Power Link 2000 is available with single or dual outputs, supporting one pantograph per output. Dual output Power Link 2000s support both simultaneous and sequential charging.



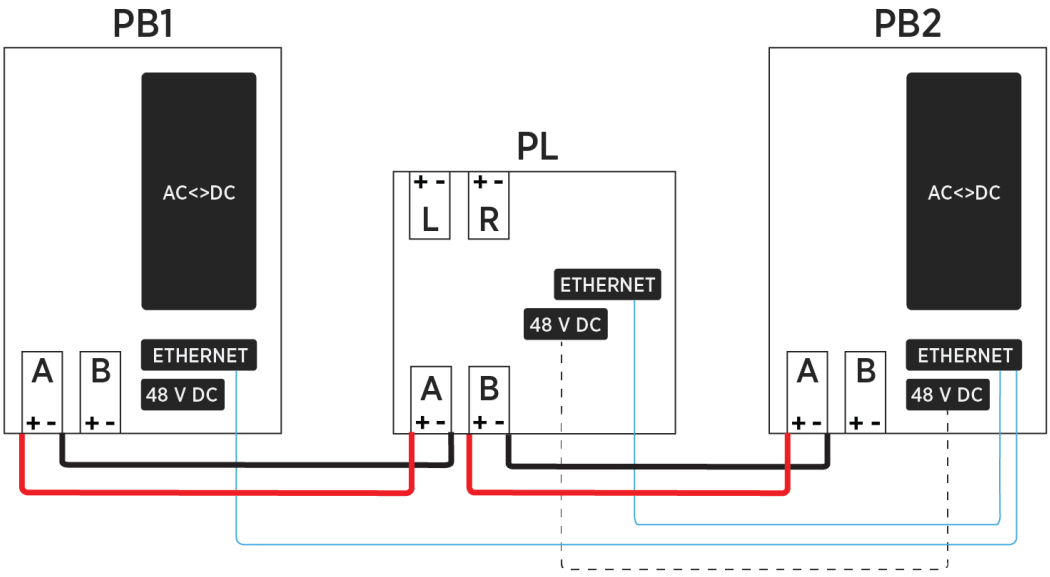
Mast mount enclosure:
Designed for mount within the Pantograph Down 2000 Mast, this enclosure has no cosmetic covers, and supports a single output connection to a pantograph.

Power Block to Power Link 2000 Configurations

The DC output of the Power Block is the DC input of the Power Link 2000. Each Power Block has two HV DC outputs that can be fed to a single Power Link 2000, or to two different Power Link 2000s. A sample block diagram of a single Power Block connected to two Power Link 2000s is shown below. The Power Block also feeds 48 V DC power and Ethernet connectivity to the Power Link 2000s.



In turn, for Pantograph Down 2000 applications, the Power Link 2000 can accept high voltage DC input from up to two Power Blocks, as shown in the example below.

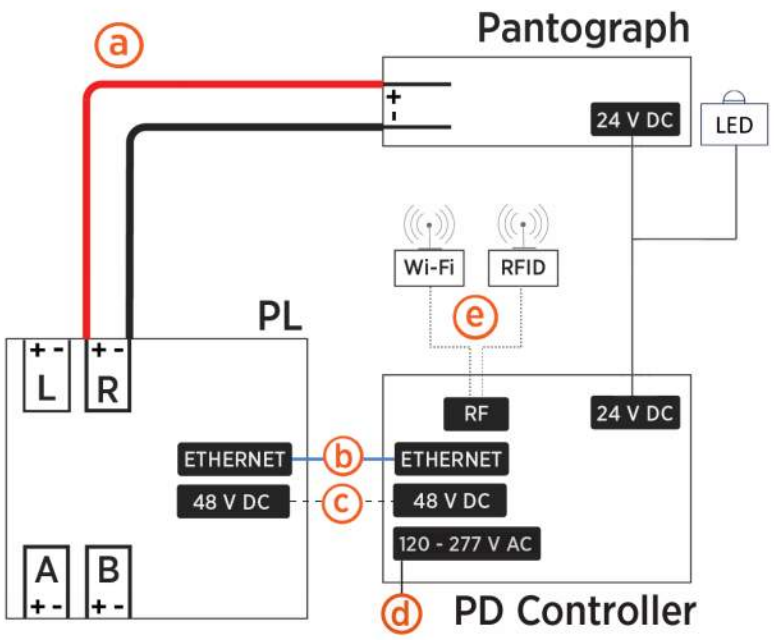


This is a modular architecture that enables many Power Block to Power Link 2000 configurations, only two of which are illustrated above. The actual Power Block to Power Link 2000 configuration for each site will vary depending on the number stations, the charging capacity required for each charging station, simultaneous or sequential charging requirements, and other criteria.

IMPORTANT: The configurations shown above are only two of many supported configurations for Pantograph Down 2000. Contact a ChargePoint representative for the ChargePoint approved wiring architecture for your specific project. Non-approved wiring between Power Blocks and Power Link 2000s may not enable Pantograph Down 2000 to function as expected.

Power Link 2000 Downstream Configuration

Each Power Link 2000 HV DC output connects to one pantograph. One PD Controller is required for each pantograph. The PD Controller requires 48 V DC and Ethernet connectivity from the Power Link 2000, as well as single-phase AC power from the site. The PD Controller has connection to the status LED, Wi-Fi antenna, and RFID antenna. The PD Controller also has connection to the pantograph for control pilot, actuation commands, and other pantograph functions. The block diagram below illustrates the connectivity between a Power Link 2000 and a pantograph/PD Controller pair.



(a) Power Link 2000 HV DC output to pantograph

(b) Ethernet connection between Power Link 2000 and PD Controller

(c) Power Link 2000 48 V DC output to PD Controller

(d) PD Controller 120-277 V AC power input

(e) RF connection from PD Controller to Wi-Fi antenna and RFID antenna

(f) 24 V DC connection from PD Controller to pantograph and status LED

Pantographs

Pantograph Down 2000 integrates with the following pantographs:



Schunk SLS 201.102 - High power charging, fast actuation pantograph. Suitable for mount from a ceiling, gantry, or mast.

Safety Warning

WARNING: Danger of crushing, pinching, and mechanical damage.

Site Operator Responsibilities:

- Ensure the pantograph is installed in a location free from safety hazards and restrict access to the movement area with appropriate safety measures.
- Inspect the equipment regularly for mechanical damage and address any issues promptly.

Operator and Bystander Safety:

- This pantograph moves quickly and has pinch points.
- To avoid serious injury, keep clear of the moving pantograph and ensure bystanders maintain a safe distance.
- Never reach into the mechanism or touch the moving pantograph.
- No one is allowed underneath the equipment during operation.

FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN SERIOUS INJURY, LOSS OF LIFE OR PROPERTY DAMAGE.

Express Plus Guides

Pantograph Down 2000 is a part of the Express Plus product family.

Access ChargePoint documents at chargepoint.com/guides.

Document	Content	Primary Audiences
Datasheet	Full station specifications	Site designer, installer, and station owner
Site Design Guide	Civil, mechanical, and electrical guidelines to scope and construct the site	Site designer or engineer of record
Concrete Mounting Template Guide	Instructions to embed the charging station template in a concrete pad with anchor bolts and conduit placement	Site construction contractor
Surface Conduit Entry Kit Guide	Instructions for sites where conduit cannot be run underground	Installer
Construction Signoff Form	Checklists used by contractors to ensure the site is correctly completed and ready for product installation	Site construction contractor
Installation Guide	Anchoring, wiring, and powering on	Installer
Operation and Maintenance Guide	Operation and preventive maintenance information	Station owner, facility manager, and technician
Service Guide	Component replacement procedures, including optional components	Service technician
Declaration of Conformity	Statement of conformity with directives	Purchasers and public

ChargePoint Documentation

Questions

For assistance, go to chargepoint.com/support and find your region's technical support number.

Site Design Guidelines 2

Initial Site Guidelines

An onsite evaluation is needed to determine conduit and wiring requirements from the panel to the proposed bus charging locations, as well as to measure cellular signal levels and identify suitable locations for any necessary cellular signal booster equipment.

If you have pre-existing infrastructure or are using your own preferred electrical contractor to prepare your site, a *Pantograph Down 2000 Construction Signoff Form* completed by a ChargePoint Operations and Maintenance (O&M) partner is required to certify compliance with electrical code, and to ensure everything was prepared to ChargePoint specifications.

IMPORTANT: You must be a licensed electrician and complete online training to become a ChargePoint certified installer. If you do not complete training, you cannot access the ChargePoint network to complete installation.

Find online training at: chargepoint.com/installers

If the charging station is not installed by a ChargePoint certified installer, using a ChargePoint approved method, it is not covered under warranty and ChargePoint is not responsible for any malfunctions.

Plan for Future Charging Capacity

Designing electrical infrastructure to support current and future needs for EV charging helps avoid costly upgrades later as demand for EV charging grows.

Consider these methods to prepare a site for future charging stations in a later phase of work:

- Add extra capacity if electrical panels are being upgraded now.
- Use sub-panels as a way to shorten electrical paths.
- Maximize the conduit and conductor sizes (to product specifications) between the main electrical panel and future stations, to prevent needing to re-pull wire later.
- Below-ground wiring can be pre-staged if the correct site construction is performed in advance. Allowed terminations include a distribution unit, junction box, or plugged conduit. This eases cable pulls for future stations.
- Consider locations and spaces where it will be easy to add future stations.

System Placement

The placement of the Pantograph Down 2000 solution must meet the following requirements:

- Do not install Pantograph Down 2000 in a Class 1 hazardous location, as classified by NEC or local codes.
- Site conditions must be compatible with the following specifications listed in the Pantograph Down 2000 datasheet:
    - Operational altitude
    - Operating temperature
    - Operating humidity
    - Enclosure rating
- The maximum wind speed under which the Schunk 201.102 pantograph can operate is 74 mph (11.6 Bft).
- Pantograph Down 2000 components must be installed on a surface rated for the weight of the component:
    - A level concrete base for Power Blocks and Pantograph Down 2000 Masts
    - An overhead structure or wall, supported by a concrete base for Power Link 2000s and PD Controllers
    - An overhead structure supported by a concrete base for pantographs.



WARNING: Do not install components on asphalt. Asphalt cannot support the full weight of the enclosures. Failure to install the enclosure on a suitable surface may cause it to tip over, resulting in death, personal injury, or property damage.

  Determine component installation locations where concrete exists or can be installed (no asphalt surfaces).
- The ground beneath the pantograph must not exceed a 10 degree grade.
- The utility service and electrical panel capacity must be sufficient for the site. Evaluate the existing service and infrastructure, and identify costs for any necessary upgrades and/or a new dedicated electrical panel. ChargePoint recommends using a certified electrician to evaluate available capacity and identify any upgrades that may be required.
- If a dedicated EV electrical panel is required, choose a panel located close to the existing electrical supply.
- Measure cellular signal levels at the installation site to ensure adequate cellular coverage at the Power Link 2000 (or Smart Antenna, if using the Pantograph Down 2000 Mast). To ensure adequate signal strength in underground or enclosed parking structures, cellular repeaters may be required. For more information, see Connectivity.
- Component placement must comply with regional regulations and ordinances. Do not block ramps or pathways.

- For any pantograph installed outdoors, a roof shield (overhead covering) is required to protect the pantograph from UV exposure. In regions that experience snow or ice conditions, the roof shield also prevents build up of snow or ice on the pantograph. In regions that experience freezing rain or horizontal snow fall, equipping the pantograph with side shields is recommended.

The following practices are recommended:

- To minimize costs, choose station locations that are as close as possible to the available electrical infrastructure. Selecting nearby locations helps minimize long wire runs, as well as any conduit or trenching work if the site uses underground service wiring.
- Determine the best conduit layout to minimize linear conduit costs to multiple parking spaces. If possible, avoid or minimize trenching requirements, especially more costly trenching to run conduit under asphalt surfaces.
- Avoid installing Pantograph Down 2000 components near trees where falling sap, pollen, or leaves would increase station maintenance workload.

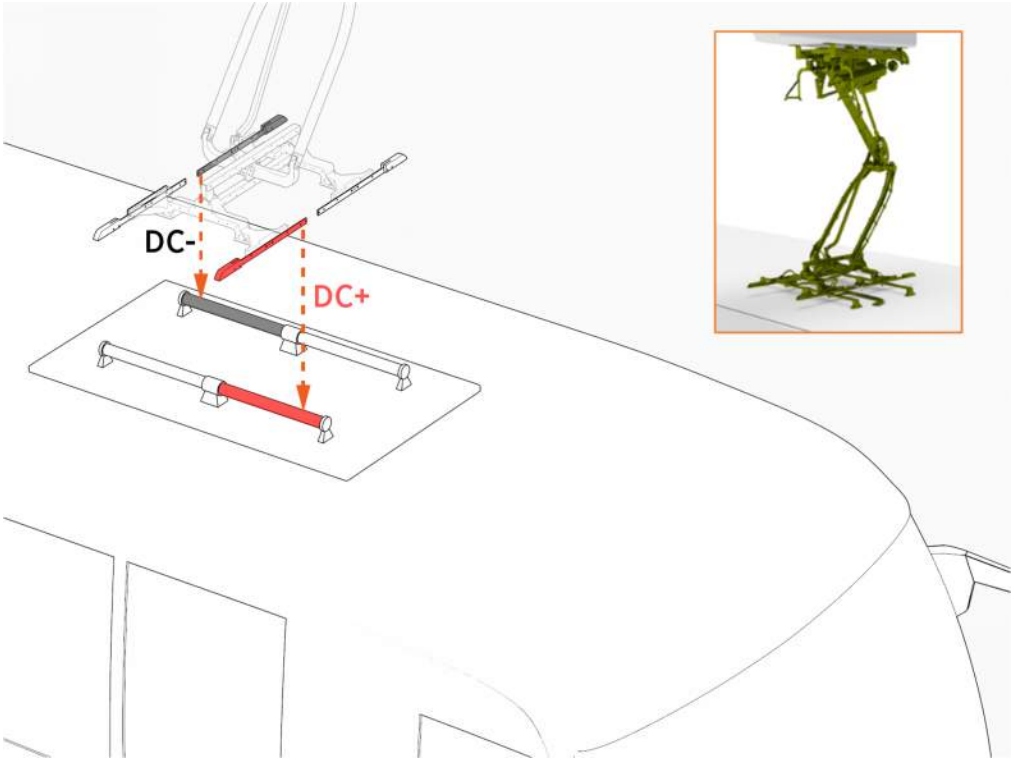
Component Placement Relative to Bus

Pantograph Down 2000 requires correct alignment between charging system components and the bus, per the SAE International J3105-1 standard. This standard specifies the dimensions of the bus contact rails, and the position of the contact rails on top of the bus. See www.sae.org for more information.

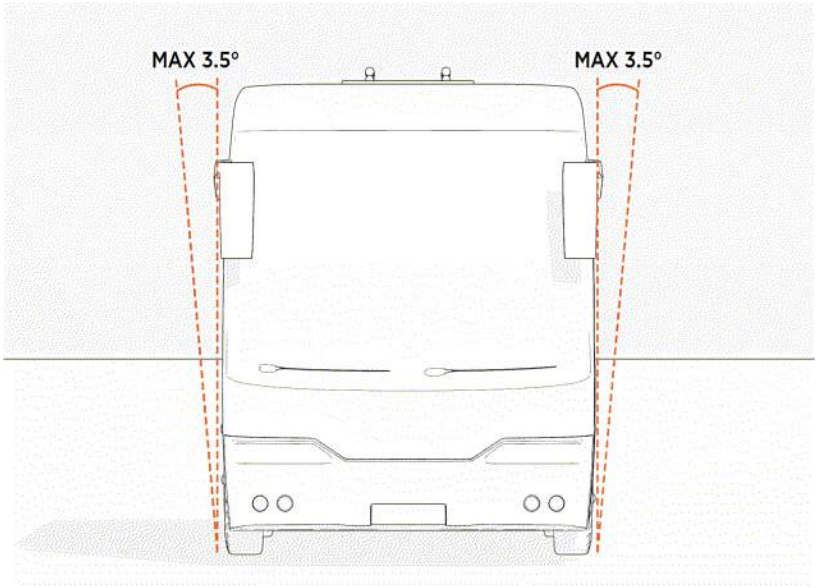
Pantograph Position and Orientation

The pantograph must be positioned such that its conductor rails lower directly onto the bus contact rails, perpendicular to the bus rails, and centered over the bus rails. The pantograph must install in the correct orientation, such that:

- The pantograph DC+ conductor rail aligns to the bus DC+ contact rail.
- The pantograph DC- conductor rail aligns to the bus DC- contact rail.



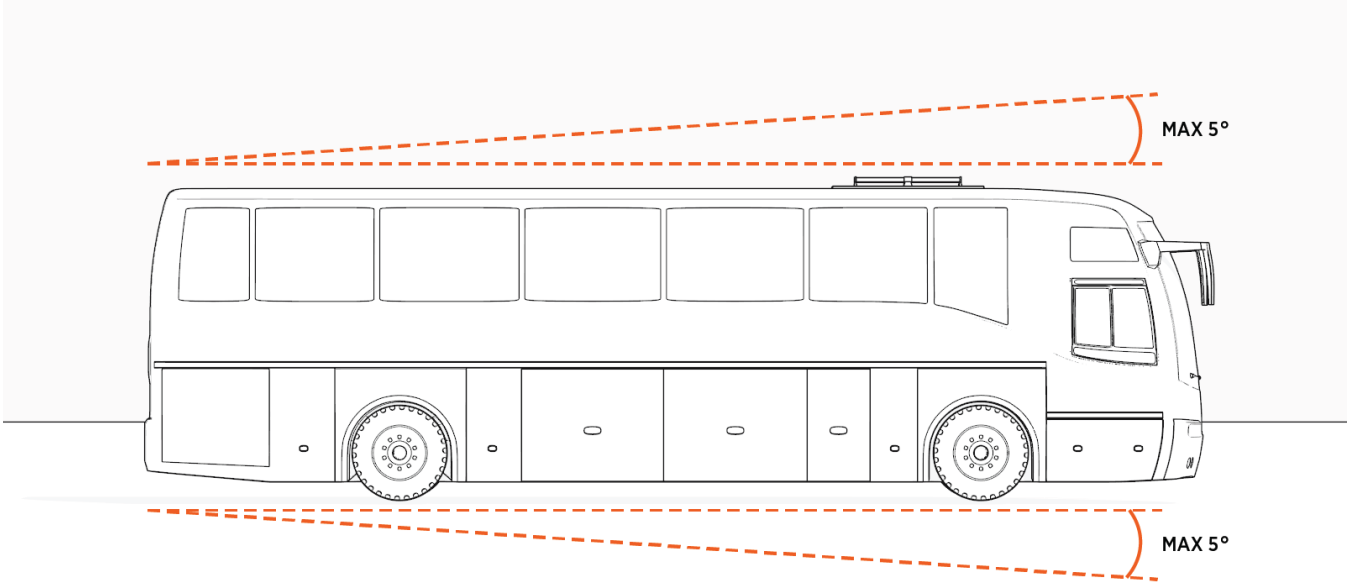
Maximum Slope in Transverse Direction



The transverse direction is the direction in the plane of the road, perpendicular to the bus driving direction. The maximum angle the bus may tilt in the transverse direction is 3.5 degrees, whether due to a tilt in part of the parking surface beneath the bus or due to the bus kneeling. A transverse tilt of the bus will shift the top of the bus relative to the center axis of the bus, and should be taken into account when calculating placement of the pantograph. In general, the plane of the pantograph rails should be as parallel as possible to the bus parking surface.

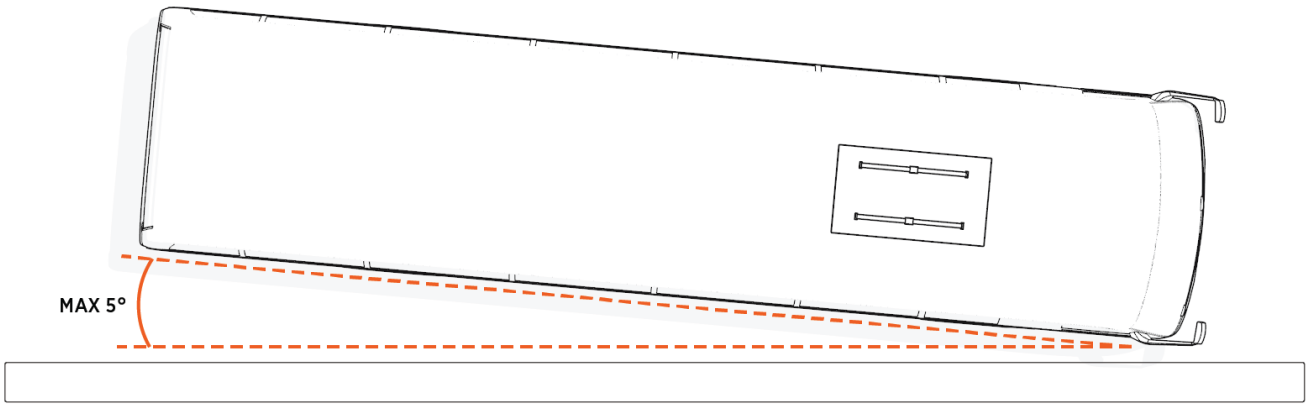
Maximum Slope in Longitudinal Direction

The maximum ramp angle of the bus in the longitudinal direction (driving direction of bus) is 5 degrees. A longitudinal tilt of the bus will shift the top of the bus relative to the center axis of the bus, and should be taken into account when calculating placement of the pantograph. In general, the plane of the pantograph rails should be as parallel as possible to the bus parking surface.



Maximum Offset Angle Relative to Curb

Pantograph Down 2000 accommodates a maximum angle for vehicle offset from the curb of 5 degrees.



Civil and Mechanical Design 3

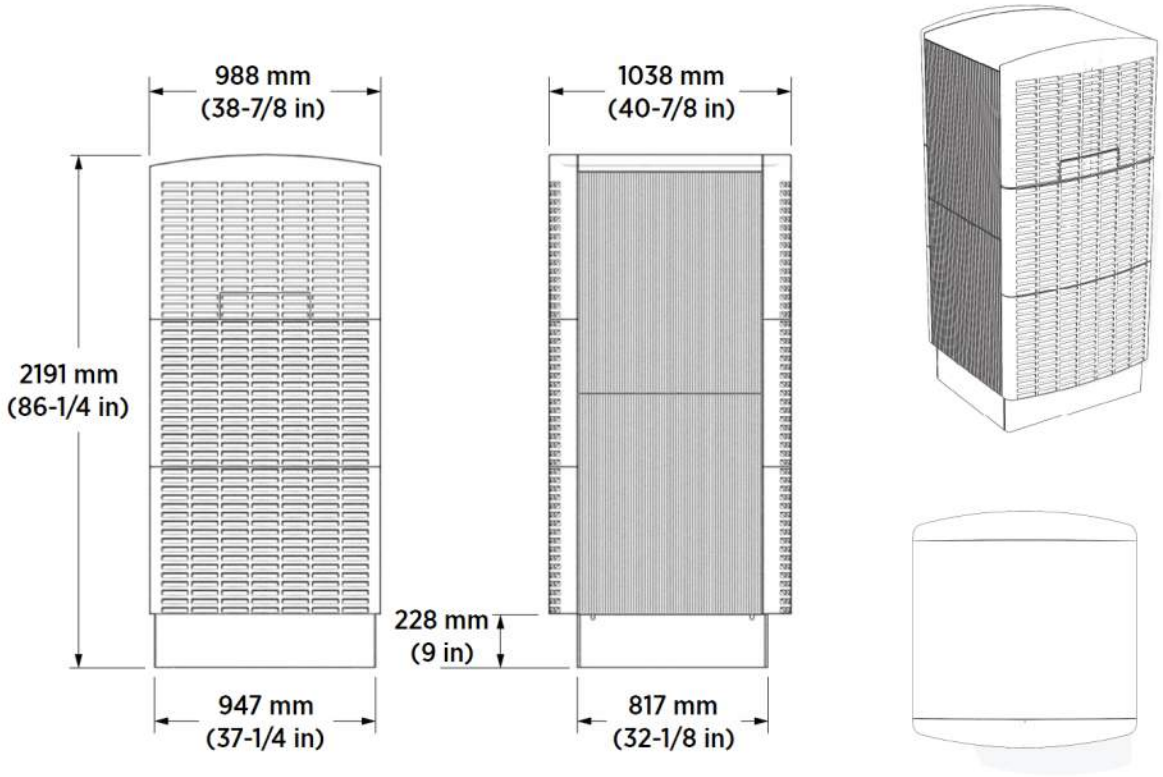
Weights

Component	Variant or Note	Weight
Power Module	--	45 kg (98.5 lb)
Power Block	Equipped with (x5) Power Modules	680 kg (1500 lb)
Power Link 2000	Depot mount enclosure	130 kg (287 lb)
	Mast mount enclosure	120 kg (265 lb)
PD Controller	--	32.2 kg (71 lb)
Pantographs	Schunk SLS 201.102	Refer to manufacturer datasheets at schunk-group.com
Auxiliary components assembly (Wi-Fi antenna, RFID antenna, and status LED with mounting frame and cables)	For use with Schunk SLS 201 pantographs	52.2 kg (115 lb)
Pantograph Down 2000 Mast	Weight of mast alone (not including products that mount on or within mast)	2722-3715 kg (6000-7000 lb)

Dimensions

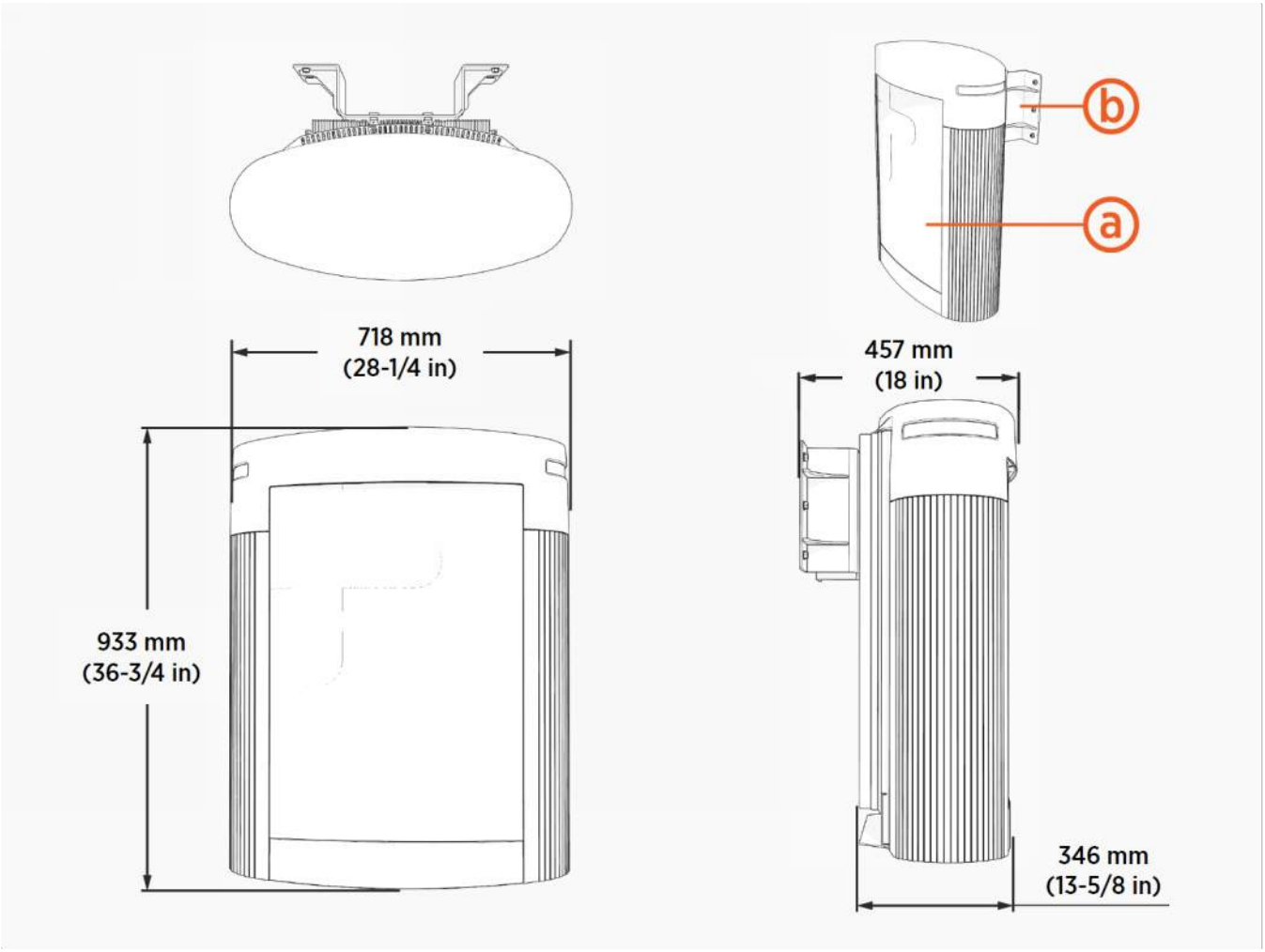
Note: Images given in this section are not to scale.

Power Block



Power Link 2000

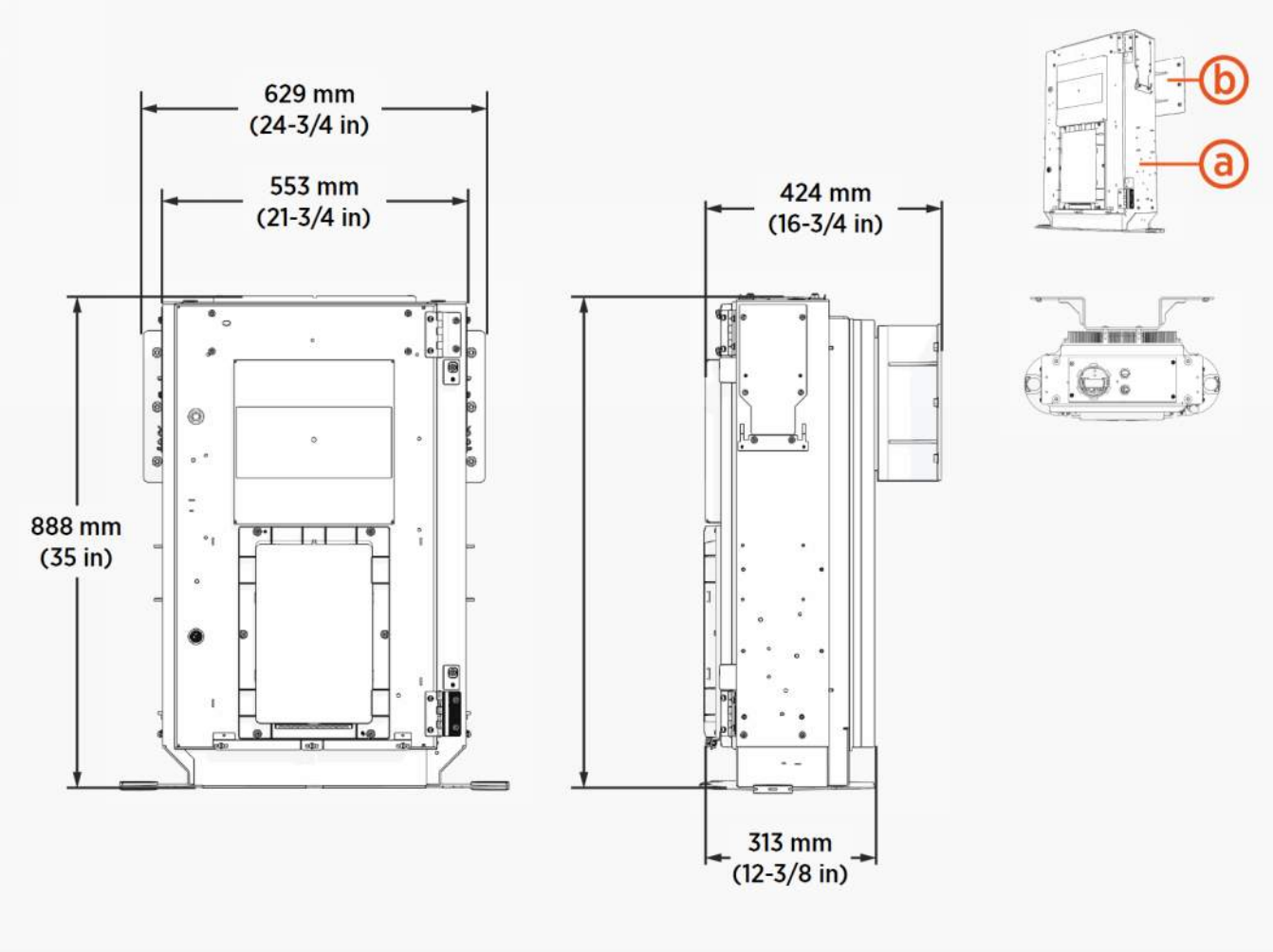
Depot Mount Enclosure



(a) Enclosure

(b) Mounting Bracket

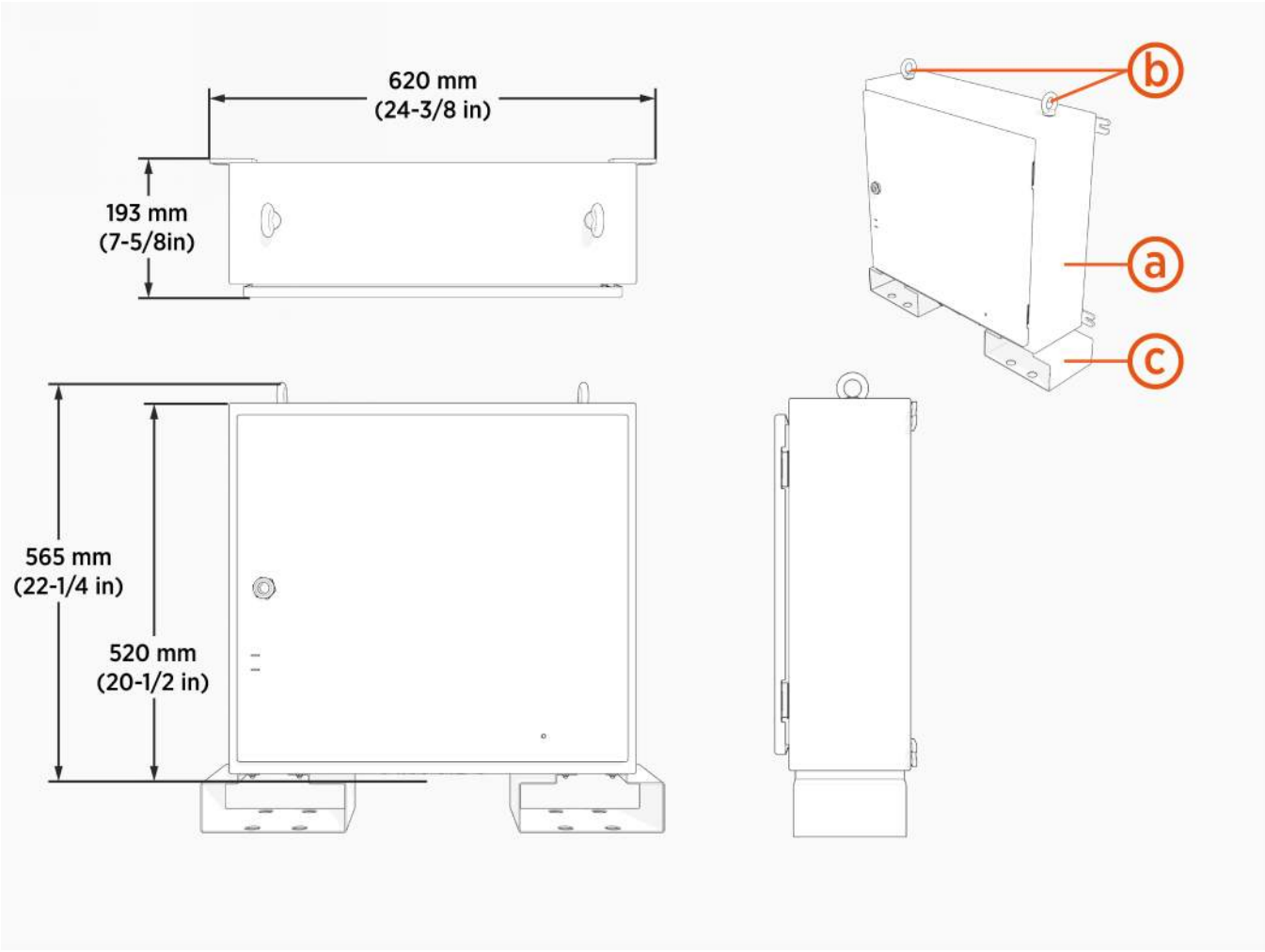
Mast Mount Enclosure



(a) Enclosure

(b) Mounting Bracket

PD Controller



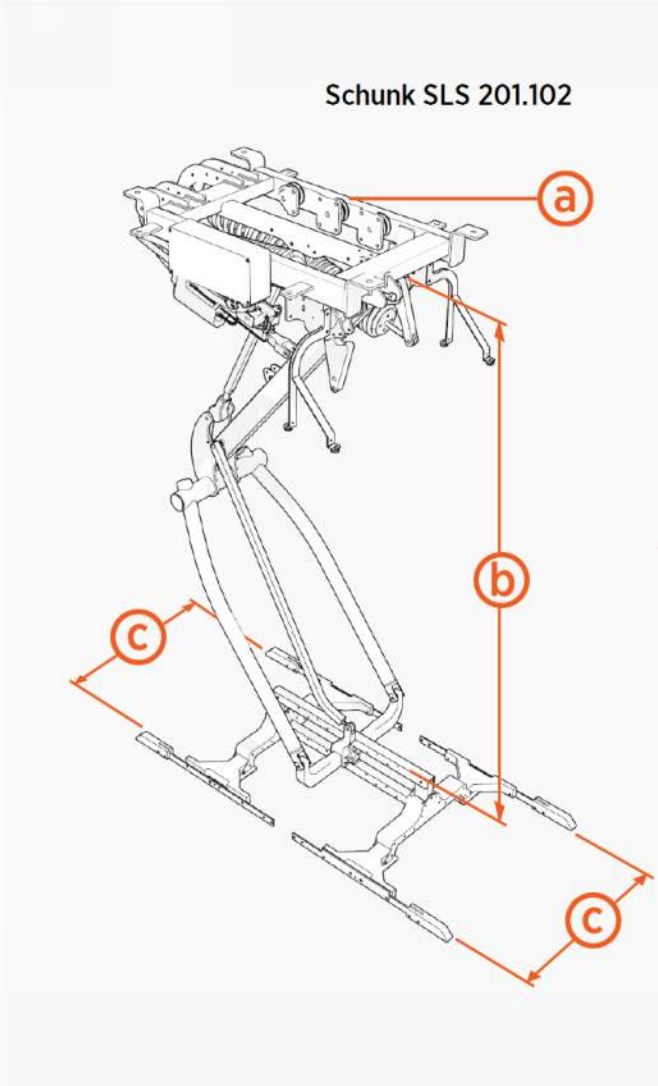
(a) Enclosure

(b) Lifting eye bolts (optional removal after enclosure mount)

(c) Lifting brackets (mandatory removal after enclosure mount)

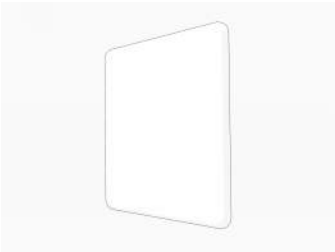
Pantographs

For pantograph dimensions, refer to the manufacturer's product datasheets at schunk-group.com.

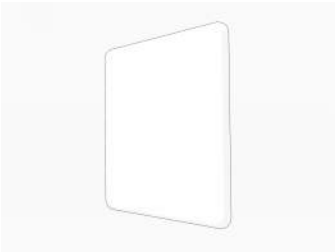


(a) Base frame
(b) Actuation frame and drive mechanism
(c) Pan head with conductor rails

Auxiliary Components



Wi-Fi Antenna



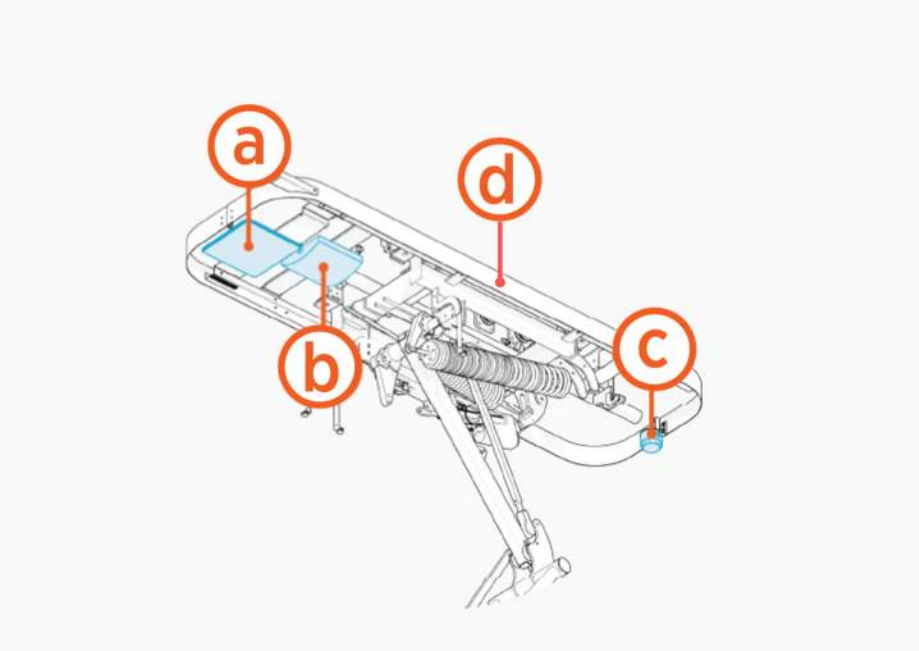
RFID Antenna



Status LED

The Wi-Fi antenna, RFID antenna, and status LED are collectively referred to as auxiliary components.

For use with the Schunk SLS 201.102 pantograph, these components attach to a mounting frame, which in turn attaches to the pantograph. For dimensions of the entire assembly, see Auxiliary Component Mount.



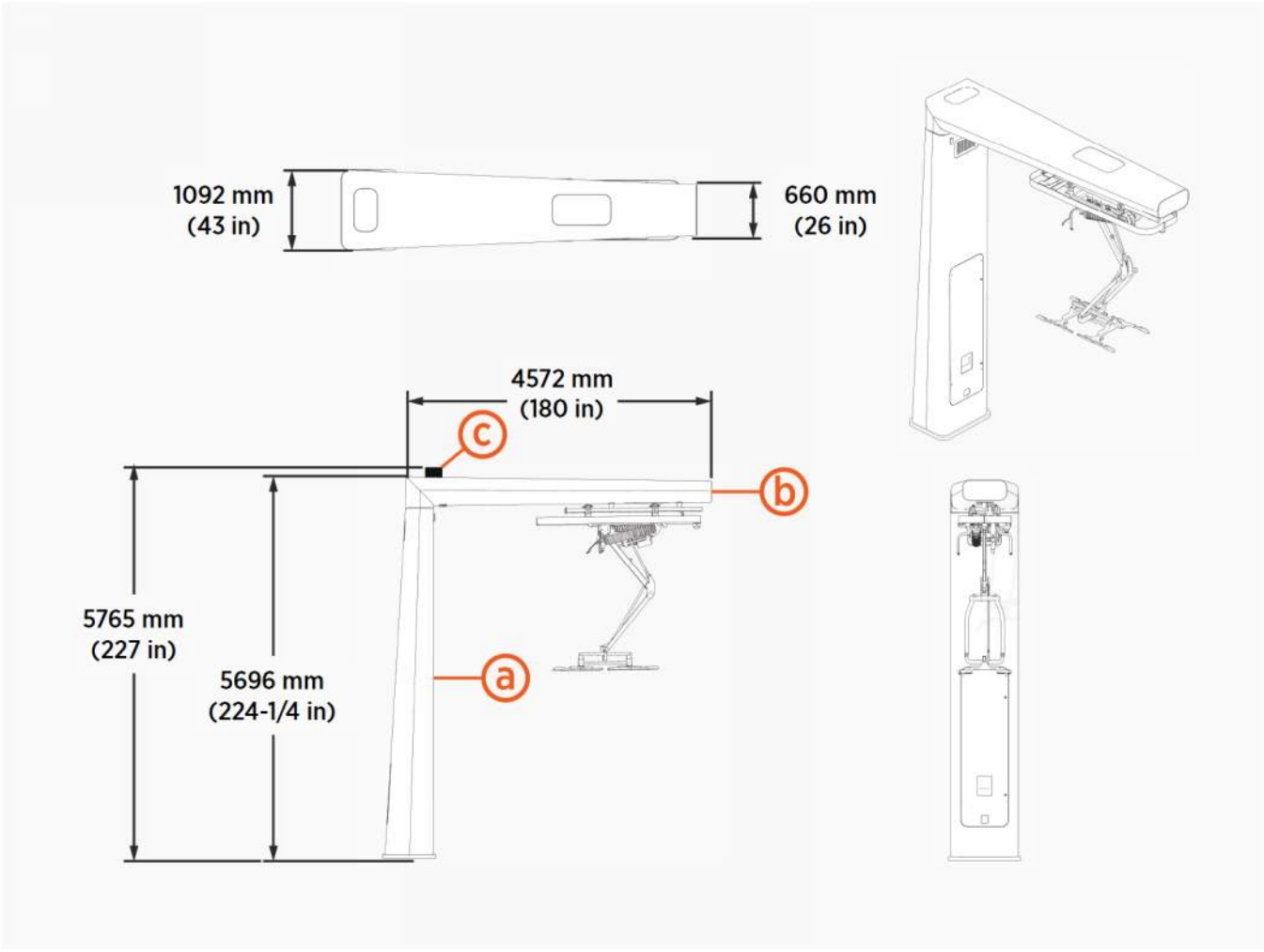
(a) Wi-Fi antenna
(b) RFID antenna
(c) Status LED
(d) Mounting frame

Dimensions of the Wi-Fi antenna and RFID antenna alone can be found on their manufacturer product datasheets:

Antenna	Manufacturer	Model Name	Part Number	Website
Wi-Fi	HUBER+SUHNER	SENCITY® Spot-L Wi-Fi Antenna	1354.17.0001	hubersuhner.com
RFID	RFMAX Antennas	R9029WHPRTF Circularly Polarized RFID Antenna	R9029-WHP-RTF	rfmax.com

Pantograph Down 2000 Mast

Dimensions are given below for a typical Pantograph Down 2000 Mast. Actual mast dimensions will vary on a site-specific basis.



(a) Pole

(b) Arm

(c) Smart Antenna

Mount and Wire Entry Specifications

Component	Mount Surface	Entry Conduits
Power Block	Concrete pad (new or existing)	Embedded conduit stub-ups or surface conduit entry
Power Link 2000	Overhead structure, wall, or within mast	Surface conduit entry
PD Controller	Overhead structure, wall, or within mast	Surface conduit entry
Pantograph	Overhead structure, including suspension from mast arm	Surface conduit entry
Pantograph Down 2000 Mast	Concrete foundation (must be a newly poured foundation)	Embedded conduit stub-up only

Further mount specifications for each component are provided in the following sections.

WARNING: If not installed correctly, ChargePoint charging components may pose a crushing hazard, leading to death, personal injury, or property damage. Always use a ChargePoint-approved mounting method to install the ChargePoint charging components, as described in this section. Always install in accordance with applicable codes and standards using licensed professionals. Non-approved installation methods are performed at the risk of the contractor and void the Limited One-Year Parts Exchange Warranty.

Power Block Mount

Concrete Pad Specifications

The Power Block must be installed on a concrete pad. The concrete pad may be either newly poured or it may be an existing concrete surface.

IMPORTANT: The concrete surface must be smooth and cannot exceed a slope of 20 mm per meter (1/4 in per foot). If an existing concrete surface does not meet the slope requirement, a localized concrete pad must be poured and leveled to meet the slope requirement.

The concrete pad must either be designed to be site-specific or must meet the one of the specifications provided below. In some extreme conditions, a larger pad may be required. For sites with less stringent seismic, soil, or wind conditions, a smaller pad might be possible.

Conservative concrete stability specifications for the Power Block are listed below for the following design scenarios:

1. 170 mph wind, high seismic, Class 3 Soil
2. 170 mph wind, high seismic, Class 4 Soil
3. 170 mph wind, high seismic, Class 5 Soil

4. 140 mph wind, lower seismic, Class 3 Soil
5. 140 mph wind, lower seismic, Class 4 Soil
6. 140 mph wind, lower seismic, Class 5 Soil

All scenarios assume:

- Minimum concrete rating of 2500 PSI.
- All-threaded M16 anchor bolts are embedded 229 mm (9 in) into concrete pad, are made of ASTM F1554 Grade 55 carbon steel, and are hot dip galvanized.
- The anchor bolt pattern is centered within the designed stability area.

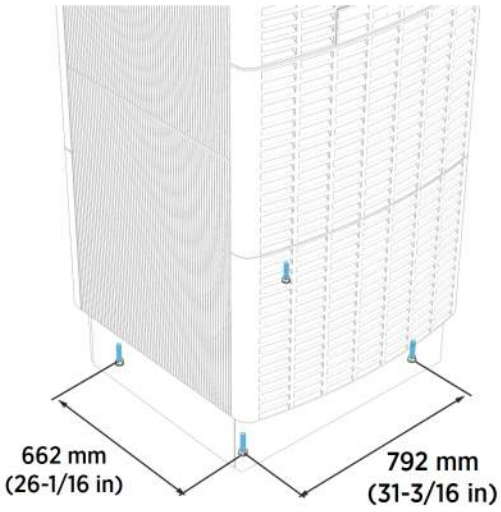
Design Scenario #	B1, Width	B2, Width	T, Thickness	#N1 @ S1" O.C. Top Rebar	#N2 @ S2" O.C. Bottom Rebar
1	1753 mm (69 in)	1753 mm (69 in)	457 mm (18 in)	#4 @ 305 mm (12 in) O.C.	#4 @ 305 mm (12 in) O.C.
2	1753 mm (69 in)	1753 mm (69 in)	686 mm (27 in)	#4 @ 152 mm (6 in) O.C.	#4 @ 152 mm (6 in) O.C.
3	1524 mm (60 in)	1524 mm (60 in)	457 mm (18 in)	#4 @ 305 mm (12 in) O.C.	#4 @ 305 mm (12 in) O.C
4	1524 mm (60 in)	1524 mm (60 in)	457 mm (18 in)	#4 @ 305 mm (12 in) O.C.	#4 @ 305 mm (12 in) O.C.
5	1524 mm (60 in)	1524 mm (60 in)	457 mm (18 in)	#4 @ 305 mm (12 in) O.C.	#4 @ 305 mm (12 in) O.C.
6	1524 mm (60 in)	1524 mm (60 in)	457 mm (18 in)	#4 @ 305 mm (12 in) O.C.	#4 @ 305 mm (12 in) O.C.

In the case of using an existing pad, the pad must either meet one of the above specifications, or it must be inspected and approved by a structural engineer for the specifications given below:

Weight	680 kg (1500 lb)
Height x width	2191 mm (86 1/4 in) x 1000 mm (39-3/8 in)
Frontal area	Height * Width
CG height	1000 mm (39-3/8 in)
Anchor bolts size and quantity	M16 (x4)
Anchor bolts embedment	229 mm (9 in)
Anchor bolts placement	See Anchor Bolt Placement

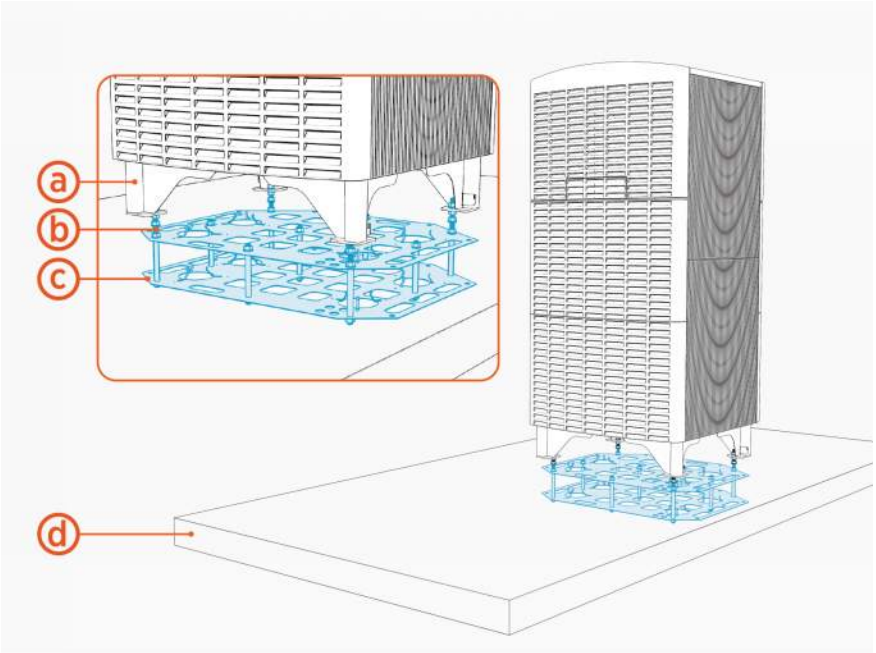
Anchor Bolt Placement

The Power Block mounts over four anchor bolts embedded in a concrete pad, with the anchor bolt pattern shown here.



New Pad Mount with Stub-Up Wire Entry

The most common mounting method for the Power Block is a new pad installation using a Concrete Mounting Template (CMT), with stub-up wire entry:



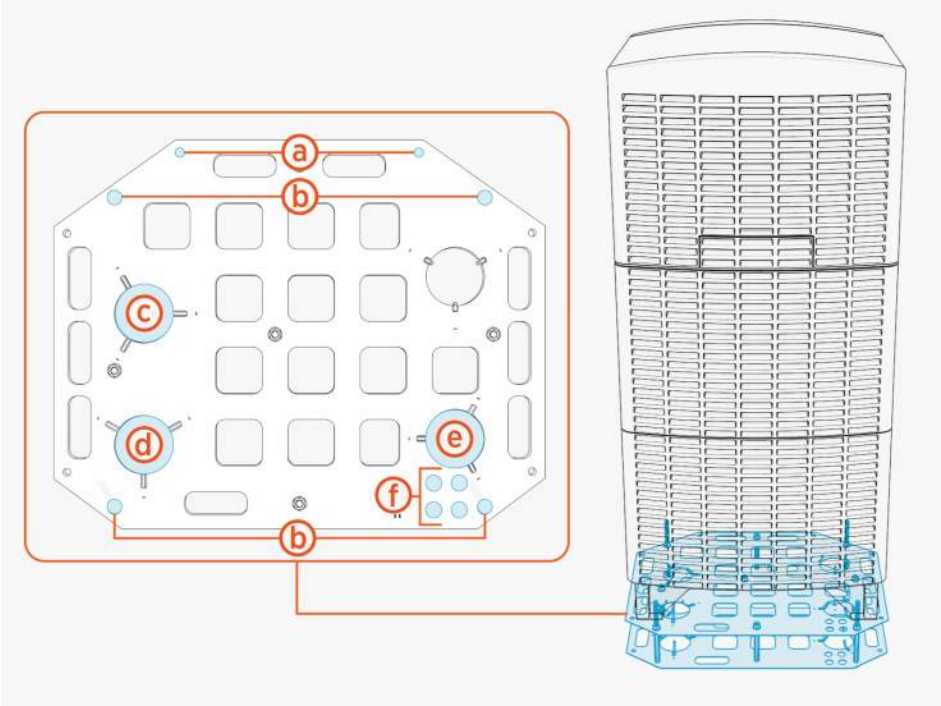
- The Power Block pedestal **(a)** mounts onto four M16 anchor bolts **(b)** exposed 76 mm (3 in) above the concrete pad.
- The CMT **(c)** is embedded into a newly poured concrete pad **(d)** to align anchor bolts and underground stub-up wiring conduits.

Note: The CMT is shipped separately and must be assembled onsite before pouring the concrete pad. Refer to the *Concrete Mounting Template Guide* for more information.

- In regions that use conduits, the conduits must not have bell ends. Conduits with bell ends may interfere with tolerances inside the Power Block.
- Conduits must stub-up 559 - 914 mm (22 - 36 in) above the concrete pad surface.

Power Block CMT

The Power Block CMT positions the anchor bolts and wire conduits as shown below.



(a) M16 anchor bolt (x2) locations for mounting SCE gland plate (applicable only for surface conduit entry).

(b) M16 anchor bolt (x4) locations for mounting Power Block (see Anchor Bolt Placement).

(c) HV DC output B wires exit.

(d) HV DC output A wires exit.

Note: The DC output of Power Block is the DC input for Power Link 2000.

(e) AC input wires entry.

(f) LV DC output wires, shunt trip wires, and Ethernet cable exit.

- One for shunt trip (if used).
- Three for LV DC and Ethernet.

IMPORTANT: In regions that use conduits, the conduits must be laid per the conduit layout given on CMT and the outer diameter of conduits must not exceed the trade sizes listed.

The following table provides the maximum size and quantity of conduits that can be installed on Power Block through the CMT:

Conduits For	Max. Conduit Trade Size	Max. Quantity
AC input wires	4 in (103 mm)	1
DC output wires	4 in (103 mm)	2
LV DC input wires, shunt trip wires, and Ethernet cables	1 in (25 mm)	4

IMPORTANT: The actual conduit size and quantity must be chosen based on site specific wiring requirements. For wire specifications, see Wiring Requirements.

Surface Mount

The Power Block may be installed on an existing concrete surface in accordance with the following guidelines:

- The concrete surface must be inspected and approved by a structural engineer, as described in Concrete Pad Specifications.
- The anchor bolts are installed in the concrete surface as follows:
  - Anchor holes are drilled into the concrete using the anchor bolt pattern given in Anchor Bolt Placement. The holes are drilled to a depth so that 76 mm (3 in) of each anchor bolt is exposed above the concrete pad.
  - Anchor bolts are epoxied into the holes. Use an epoxy with a minimum bonding strength of 11.7 MPa, compressive strength of 82.7 MPa minimum, and tensile strength of 49.3 MPa minimum; such as Hilti HIT-RE 500 V3 (normal cure) or Hilti HIT-HY 200-A (fast cure).

    Note: HIT-HY 200-A adhesive is required only if embedding anchor bolts into an existing concrete pad. It is not applicable for a new concrete pour with CMT.

    Note: Different epoxy types have different cure times at various temperatures. Check local temperatures for the site in advance to help choose an appropriate epoxy.
- The anchor bolts must be hot dip galvanized.
- Wires must enter the Power Block using Surface Wire Entry.

Surface Wire Entry

Power Block supports wiring that is run above ground in protected wireways, for locations where no underground wiring access exists (parking garages, etc.) or where underground junction boxes are not permitted.

If wires or cables are run above ground:

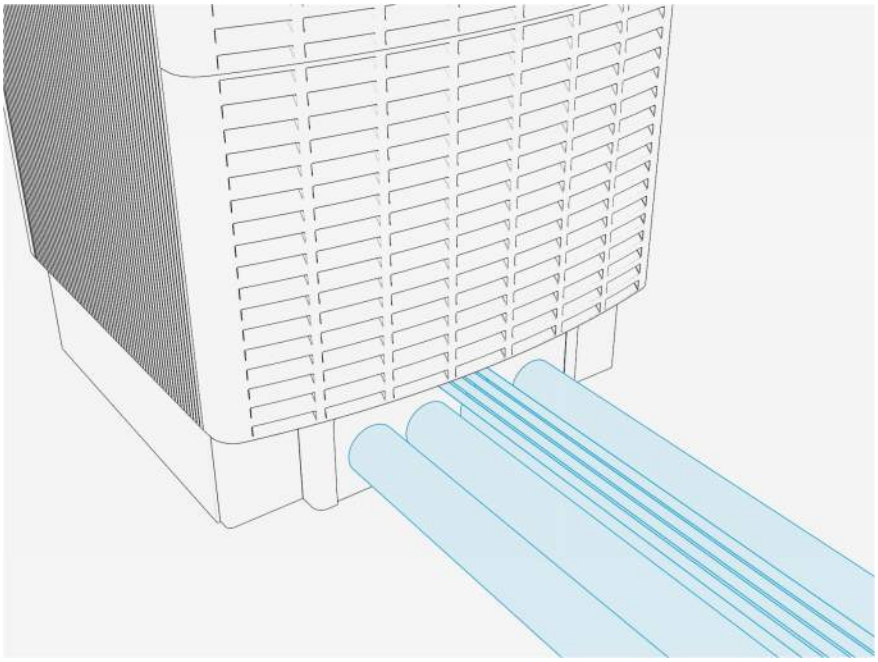
- They must be housed in wireways that conform to local code.
- Ensure the plans for any concrete pad and access area allow full service access to all components. Surface wires entry might require larger clearance areas than embedded installations. A minimum of 609 mm (24 in) clearance at rear side is recommended
- Use flexible wires and conduits.

- Use suitable conduit fittings to secure and seal the conduits.
- Prepare any concrete surface where components will be anchored so that the concrete is solid and smooth, with no old hardware or stub-ups extending above grade.

  Note: Surface wires entry can use the Concrete Mounting Template (CMT) for mounting.

Power Block Surface Conduit Entry (SCE) Kit

The Power Block SCE Kit provides a sturdy pedestal cover panel onto which surface conduits may be fastened at the rear side of the Power Block. The surface run wires must enter Power Block from the rear side through conduits or armored cables.



Use the Power Block SCE Kit for the following benefits:

- Supports the weight of conduits and components without compromising cover panel integrity
- Ensures all terminations meet ingress requirements where they meet the component
- Ensures no obstructions to ventilation required for operation

The following table provides the maximum size and quantity of conduits that can be installed on Power Block using the Power Block SCE Kit:

Conduits For	Max. Conduit Trade Size	Max. Quantity
AC input wires	4 in (103 mm)	1
DC output wires	4 in (103 mm)	2
LV DC input wires, shunt trip wires, and Ethernet cables	1 in (25 mm)	4

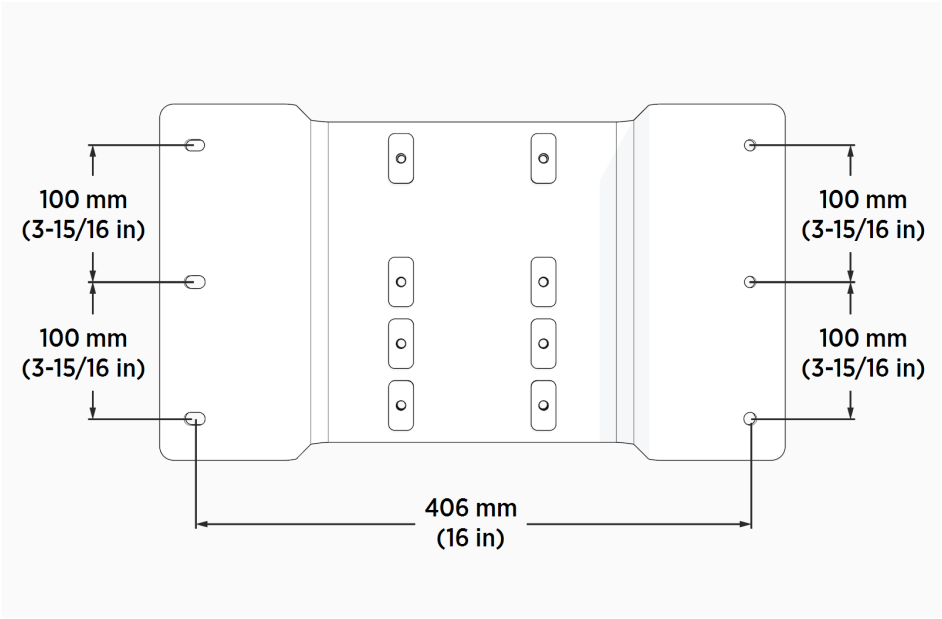
IMPORTANT: The actual conduit size and quantity must be chosen based on site specific wiring requirements. For wire specifications, see Wiring Requirements.

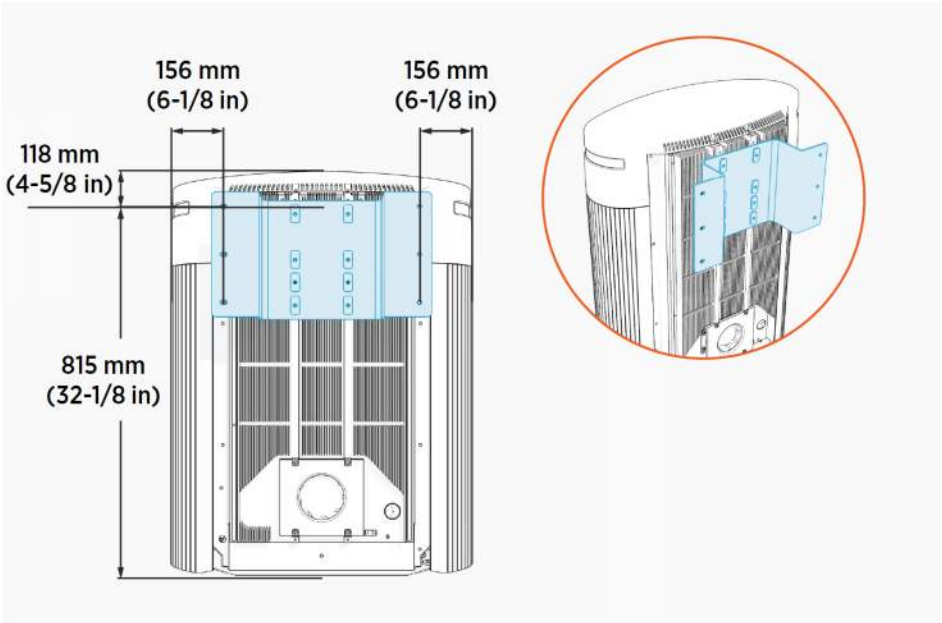
IMPORTANT: Stub-up entry of wires laid underground is the most common installation method. Surface entry of wires laid above ground is allowed only at sites where the wires cannot be laid underground such as in a parking garage. Contact ChargePoint for the Surface Conduit Entry (SCE) Kit, which includes the hardware needed to install on an existing concrete surface. See also the *Power Block Surface Conduit Entry Kit Guide*.

Power Link 2000 Mount

Depot Mount Enclosure

The Power Link 2000 mounts onto a wall or an overhead structure (such as a gantry) using a bracket that attaches to the back of the Power Link 2000. The bracket has six mounting holes sized for M8 bolts.

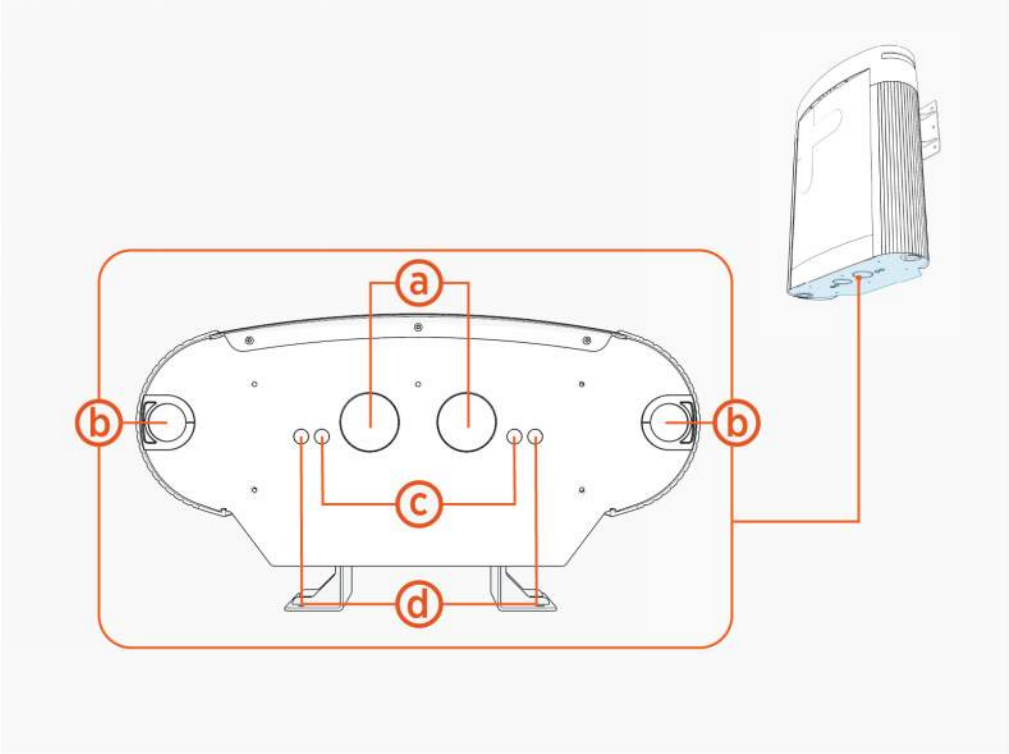




For wall or overhead mounted stations:

- The Power Link 2000 must be mounted upright. Do not mount it in any other orientation.
- The mounting surface must be smooth and plumb.
- The wall or overhead structure must have a structural capacity of 1780 N (400 lbf), and it must be designed or verified by a structural engineer per local codes.

Wires and cables enter the Power Link 2000 by surface conduit entry. The depot mount Power Link 2000 accepts all conduits at the bottom of its enclosure, at the locations shown below. The maximum size and quantity of the conduits are also given.



Conduits For	Conduit Trade Size	Max. Quantity
(a) HV DC input wires from Power Block(s)	Max. 3 in (78 mm)	2
(b) HV DC wires to pantograph(s)	3 in (78 mm)	2
(c) 48 V DC input wires and Ethernet cables from Power Block(s)	Max. 3/4 in (21 mm)	2
(d) 48 V DC wires and Ethernet cables to PD Controller (s)	Max. 3/4 in (21 mm)	2

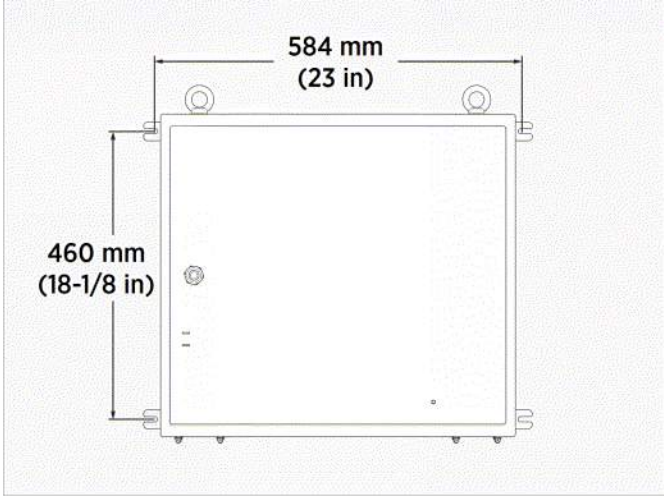
IMPORTANT: The actual conduit size and quantity must be chosen based on site specific wiring requirements. For wire specifications, see Wiring Requirements.

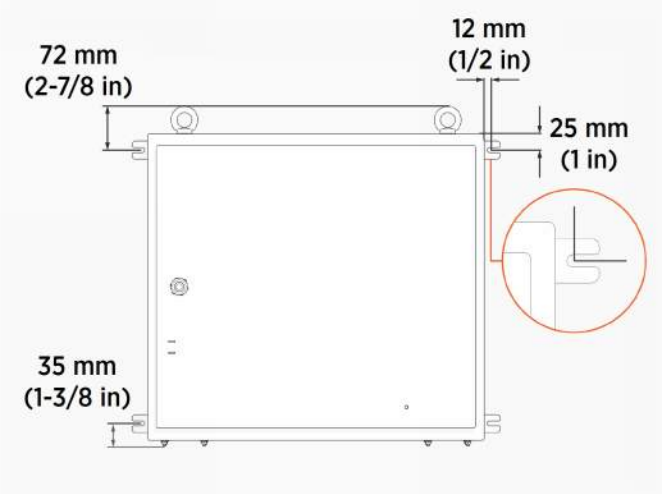
For surface run wiring to the depot mount Power Link 2000:

- All wires must be housed in wireways that conform to local code.
- Use flexible wires.
- Use suitable conduit fittings to secure and seal the conduits to the enclosure.

PD Controller Mount

The PD Controller enclosure mounts using four mounting tabs on the back edge of the enclosure. The tabs are sized to accept M8 bolts.

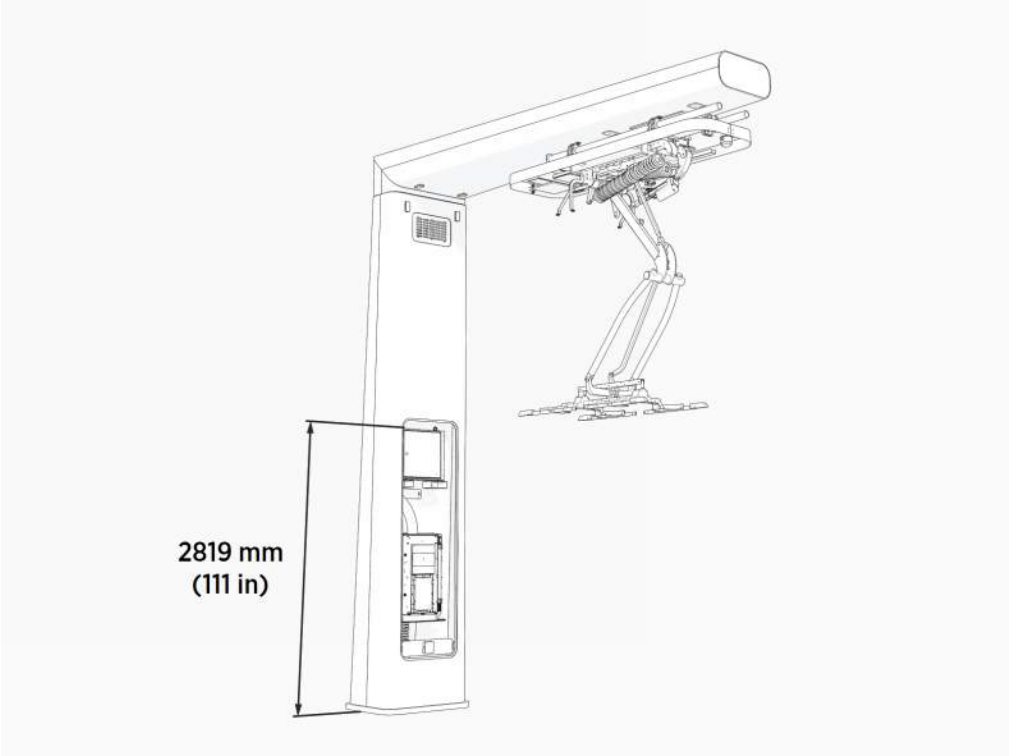




For wall or overhead mounted PD Controllers:

- The PD Controller must be mounted upright. Do not mount it in any other orientation.
- The mounting surface must be smooth and plumb.
- The mounting surface or structure must be designed or verified for the weight of the PD Controller by a structural engineer, per local codes. See Weights.

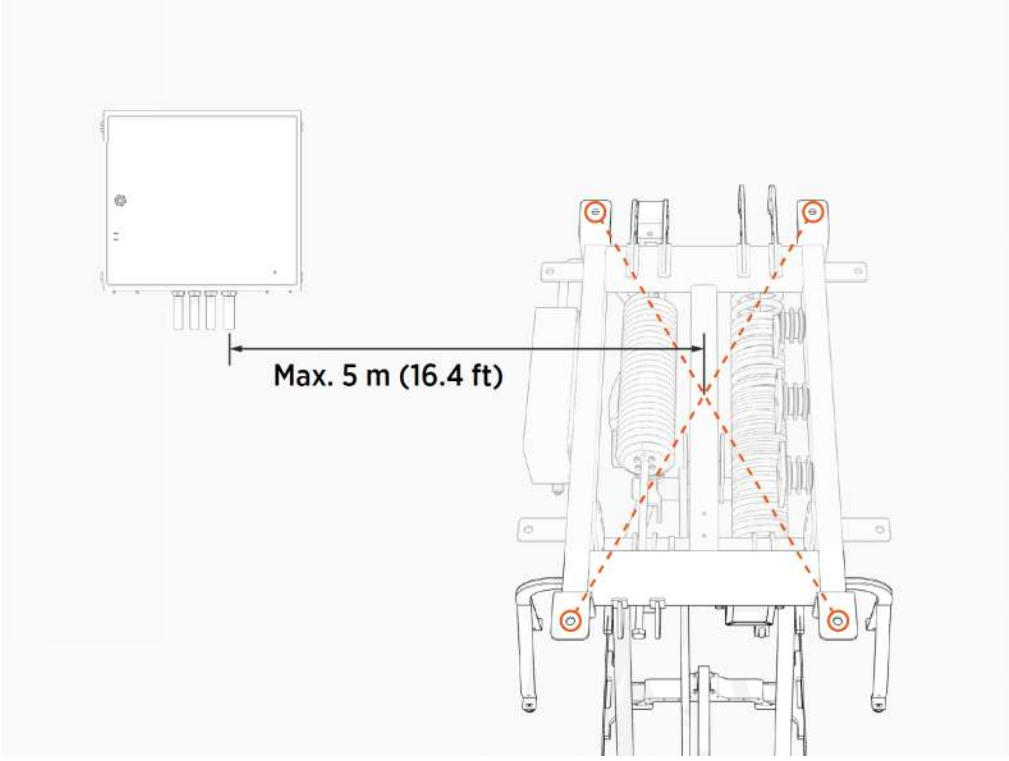
The PD Controller mounts into the Pantograph Down 2000 Mast at the height shown below. Take this height into account when planning wire lengths.



The PD Controller ships with a controller interface cable, a single cable that bundles the following cables:

- Pantograph control pilot cable
- Pantograph control cable
- Pantograph rest sensor cable
- Status LED cable

At full length, the controller interface cable allows a maximum distance of 5 m (16.4 ft) between the PD Controller and pantograph, as shown below. The controller interface cable may be cut to length.



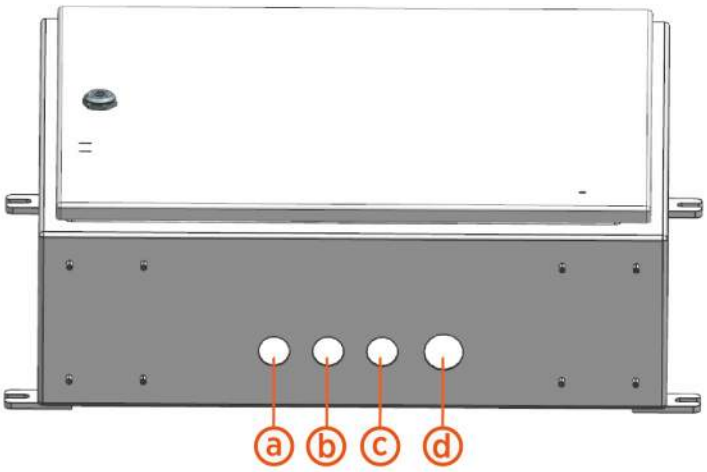
The PD Controller ships with two RF coaxial cables for connection to the Wi-Fi and RFID antennas. Each cable is 5 m (16.4 ft) length and cannot be cut to length. Custom cables of different length may be ordered for the site, and must meet the cable specifications listed below. There is no minimum length bound.

Cable	Max. Length	Cable Type	Termination A*	Termination B*
Wi-Fi antenna	10 m (32.8 ft)	LMR-240 or equivalent, must be same outer diameter, 6.1 mm (0.24 in) outer diameter, and low loss operating up to 5.8GHz or higher.	RP-SMA male	N-type male
RFID antenna	10 m (32.8 ft)	LMR-240 or equivalent, must be same outer dimension, and low loss operating up to 1 GHz or higher.	RP-SMA male	N-type male

*Termination A lands at the PD Controller. Termination B lands at the antenna.

Note: The LMR-240 cable has a one-time bend radius of 19 mm (0.75 in) and repeated bend radius of 63 mm (2.5 in). If these are exceeded, the cable may be damaged and the system may not operate. If using an LMR-240 equivalent, do not violate the bend radius of that cable type.

Note: The RF coaxial cables cannot be coiled within the PD Controller.



Wire	Wire Entry Type	Required Size (Conduit Trade Size or Cable Gland)	Required Quantity (Conduit or Cable Gland)
(a) 120-277 V AC input wires from site	Conduit required	3/4 in (21 mm)	1
(b) 48 V DC, Ethernet, chassis ground from Power Link 2000	Conduit required	3/4 in (21 mm)	1
(c) RF coaxial cables to RFID and Wi-Fi antennas (one cable to each antenna)	Conduit or cable gland	3/4 in (21 mm)	1
(d) Controller interface cable	Conduit or cable gland	1 in (27 mm)	1

The PD Controller ships with cable glands for the RF coaxial cables and controller interface cable. These are installed either at the PD Controller or at end of the conduit run to the pantograph. The cable glands are 1 in (27 mm) and 3/4 in (21 mm) NPT.

For 120-277 V AC, 48 V DC, and ground wiring:

- All wires must be housed in wireways that conform to local code.
- Use flexible wires.
- Use suitable conduit fittings to secure and seal the conduits.
- See Wiring Requirements for wire size requirements.

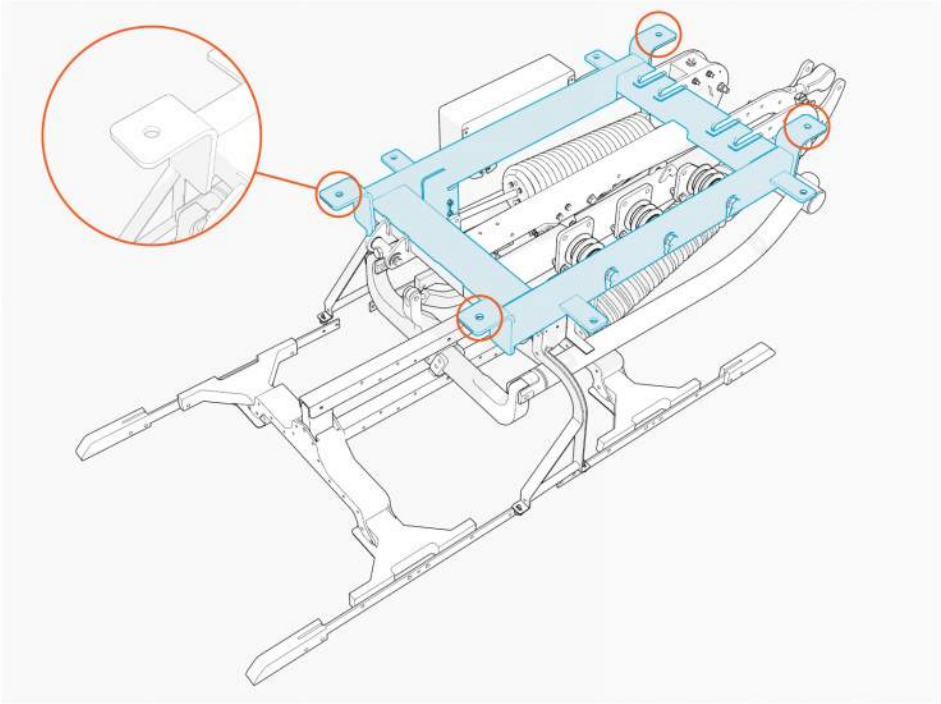
Pantograph Mount

The pantographs mount to an overhead surface or structure:

- The mounting surface must be smooth and parallel to the ground beneath it, within tolerances specified by Component Placement Relative to Bus.
- The mounting surface or structure must be designed or verified for the weight of the pantograph by a structural engineer, per local codes. See Weights.

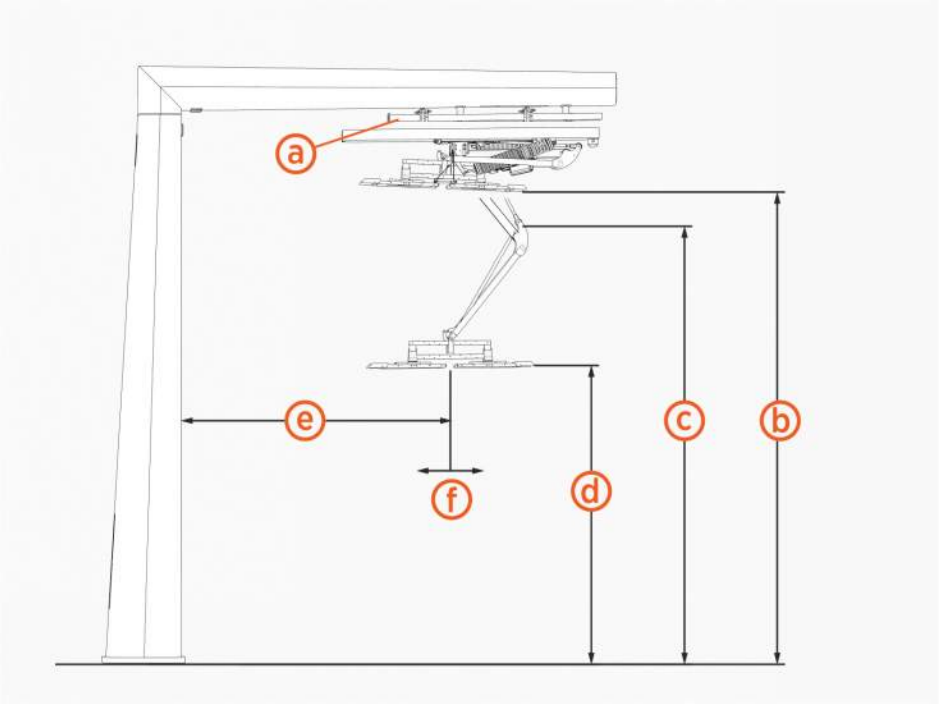
Schunk SLS 201.102 Mount

The Schunk SLS 201.102 pantograph mounts using four mounting supports located on their base frame, with mounting holes sized for M16 hardware. Refer to Schunk product documentation for full details and dimensions.



For depot mount of the pantograph, be aware the SAE International J3105 standard specifies a minimum height clearance between the charging rails and the ground beneath it. Ensure the pantograph is installed in such a way that its charging rails cannot be touched by persons standing below or next to the pantograph.

On the typical-sized Pantograph Down 2000 Mast, the Schunk SLS 201.102 pantograph mounts onto a pair of rails on the mast, with the range of operating positions shown below. The position of the pantograph is adjustable in the transverse direction along a 457 mm (18 in) span on the rails.



(a) Mounting rails

(b) Pantograph resting height: 4500 mm (177-1/4 in) ± 30 mm (1-1/4 in)

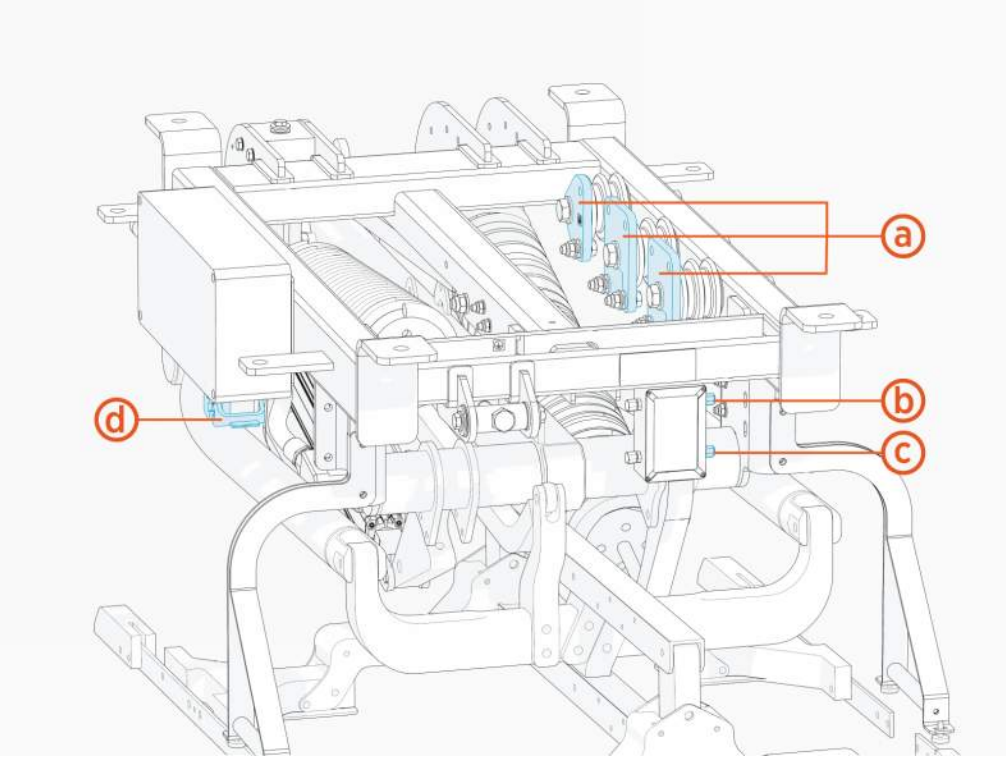
(c) Pantograph highest working height: 4305 mm (169-1/2 in)

(d) Pantograph lowest working height: 2811 mm (110-3/4 in)

(e) With pantograph centered on mounting rails, distance from pantograph rail center line and pole: 2597 mm (102-1/4 in)

(f) Adjustable position of pantograph rail center line, in transverse direction : ± 229 mm (9 in)

High voltage DC, ground, and 24 V DC wires land on terminals located at the base frame of the pantograph.



(a) High voltage DC input (+/-) and high power ground bus bars

(b) Control pilot wire landing

(c) Rest sensor wire landing

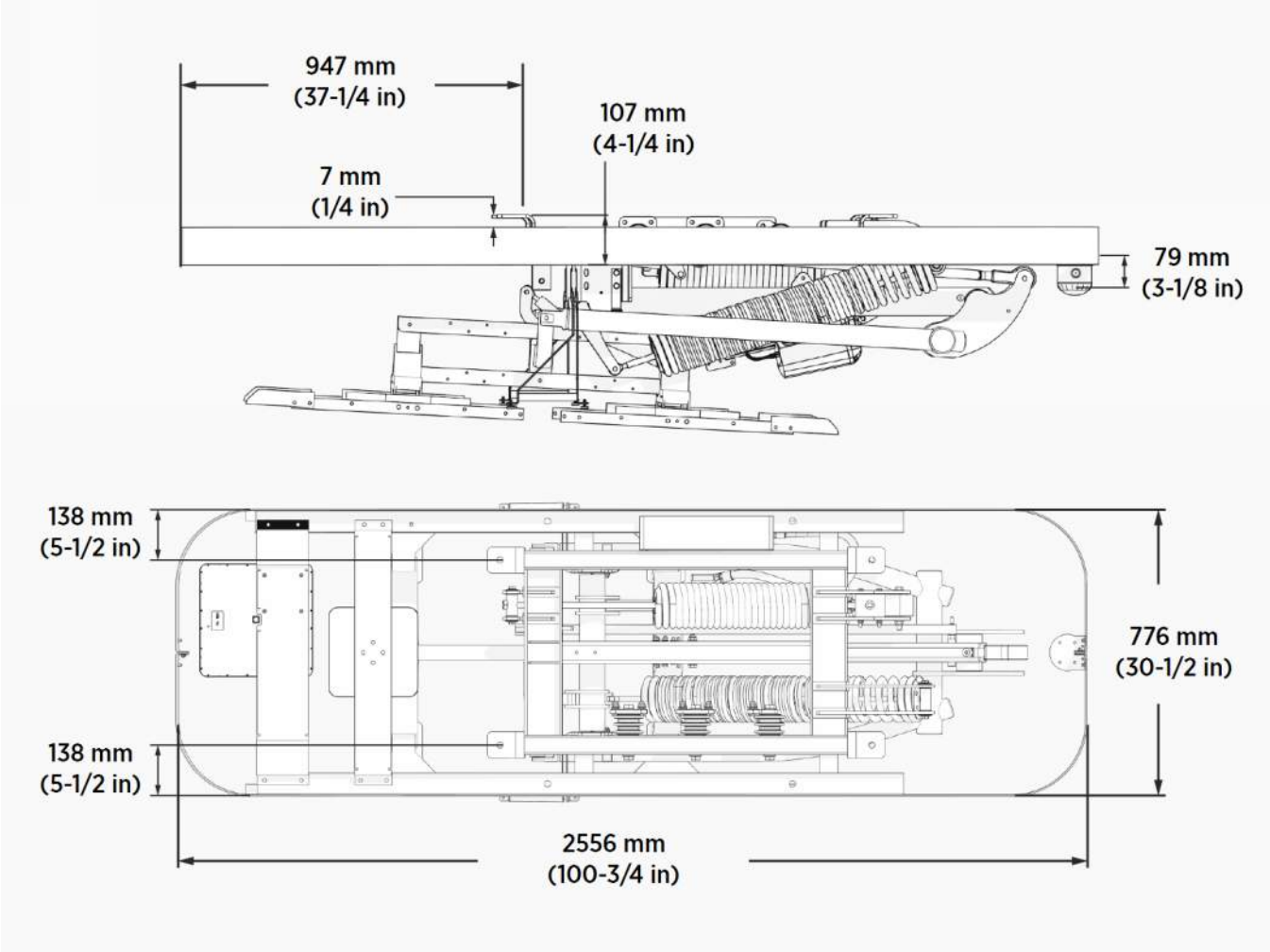
(d) Pantograph control wire landing

See Wiring Requirements for HV DC wire size requirements.

Auxiliary Component Mount

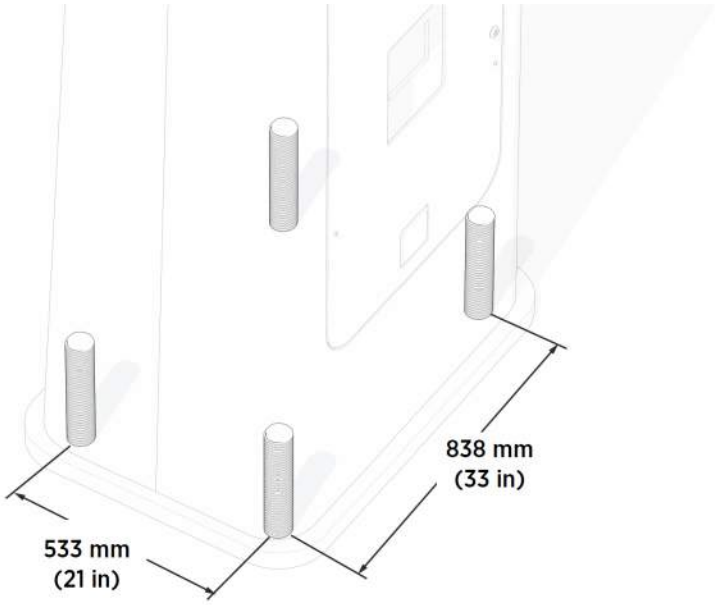
Schunk SLS 201

The Wi-Fi antenna, RFID antenna, and status LED mount to the Schunk SLS 201.102 pantograph through the use of a mounting frame. The mounting frame positions the antennas relative to the pantograph connector (and top of the bus) as required by the SAE International J3105 standard.



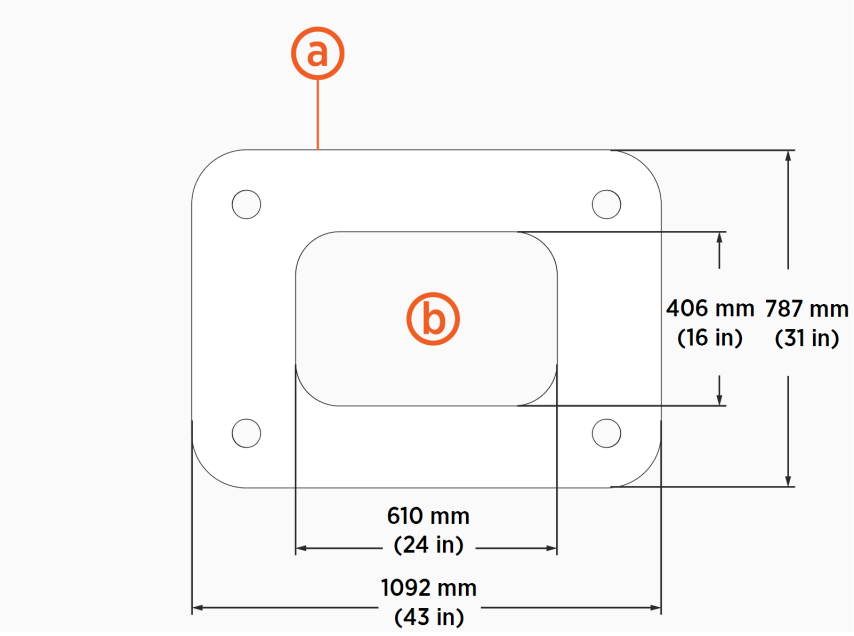
Pantograph Down 2000 Mast Mount

The Pantograph Down 2000 Mast is mounted onto four 2-1/4 inch anchor bolts embedded in a concrete foundation, with the anchor bolt pattern shown below.



The concrete foundation for the mast must be newly poured. Contact ChargePoint to obtain structural specifications for designing a concrete foundation for your mast.

Pantograph Down 2000 Mast input cables must run under the grade surface in trenches and enter the mast through the base of the pole, via embedded conduit stub-ups. Surface conduit entry is not supported. A top-down view of the conduit stub-up and cable entry location is shown below.



(a) Mast base plate

(b) Base plate opening for conduit and wire entry

Note: Conduits entering the base of the Pantograph Down 2000 Mast are required for wires entering the bottom of the Power Link 2000, and for the PD Controller AC input wires.

Drainage

Ensure any site slopes, walls, or fencing do not trap water around the installation site.

Flood Plane

Power Block is designed for a 457 mm (18 in) flood plane. If the site has a flood plane greater than 457 mm (18 in) for a 100-year flood event, consider installing the Power Block on a raised concrete pad.

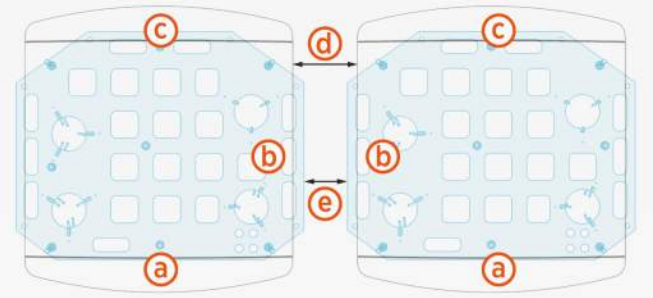
WARNING: Exposing the Power Block to over 457 mm (18 in) of standing water could create an electrocution, shock, or fire hazard.

If a Power Block has been exposed to standing water, cut power to the component and contact ChargePoint before the component is powered on.

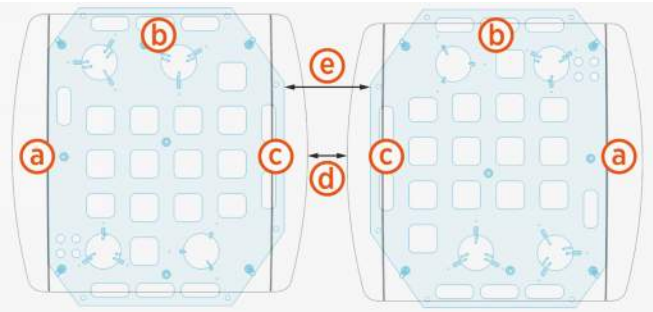
Clearances

Power Block

Two Power Blocks laid side-to-side



Two Power Blocks laid back-to-back



The following table provides the clearances required for service and ventilation around the Power Block (PB):

Side	PBs Layout	Clearance		
(a) Front	-	-		Min. 1000 mm (39-3/8 in)
(b) Sides	PBs laid side-to-side	Minimum	**(d)** PB to PB	51 mm (2 in)
			(e) CMT to CMT	CMTs overlap by 15 mm
		Otherwise	**(d)** PB to PB	152 - 203 mm (6 - 8 in)
			(e) CMT to CMT	116 - 167 mm (4-9/16 - 6-9/16 in)
(c) Rear	PBs laid back-to-back		**(d)** PB to PB	457 - 609 mm (18 - 24 in)
			(e) CMT to CMT	609 - 761 mm (24 - 30 in)
Note: If placing two Power Blocks back-to-back using surface conduit entry, there must be at least 609 mm (24 in) of shared rear clearance.				

Additionally, follow the clearance guidelines below:

- Front and rear clearances must be at grade level +/- 13 mm (1/2 in).
- The interior of the Power Block is accessed from both the front and rear cover panels, which lift off. No separate door swing clearance is required.
- Fencing, bollards, or wheel stops must not encroach upon the clearances listed above, if present. These barriers are not explicitly required by ChargePoint.
- Power Blocks can be laid side-to-side with minimal spacing for service and ventilation. If laid side-to-side, wiring can enter from the rear or outside face, using either stub-up entry (recommended) or surface entry. When laid side-to-side, wiring for the row cannot pass through one Power Block into another.
- Side clearances can be shared between Power Blocks as long as:
    - At least 51 mm (2 in) of clearance is maintained between each Power Block.
    - Required service clearance is maintained at the front and rear sides.
    - At least 457 mm (18 in) of clearance is available at each end of a row of Power Blocks.

Note: For any questions about allowable layouts, contact ChargePoint.



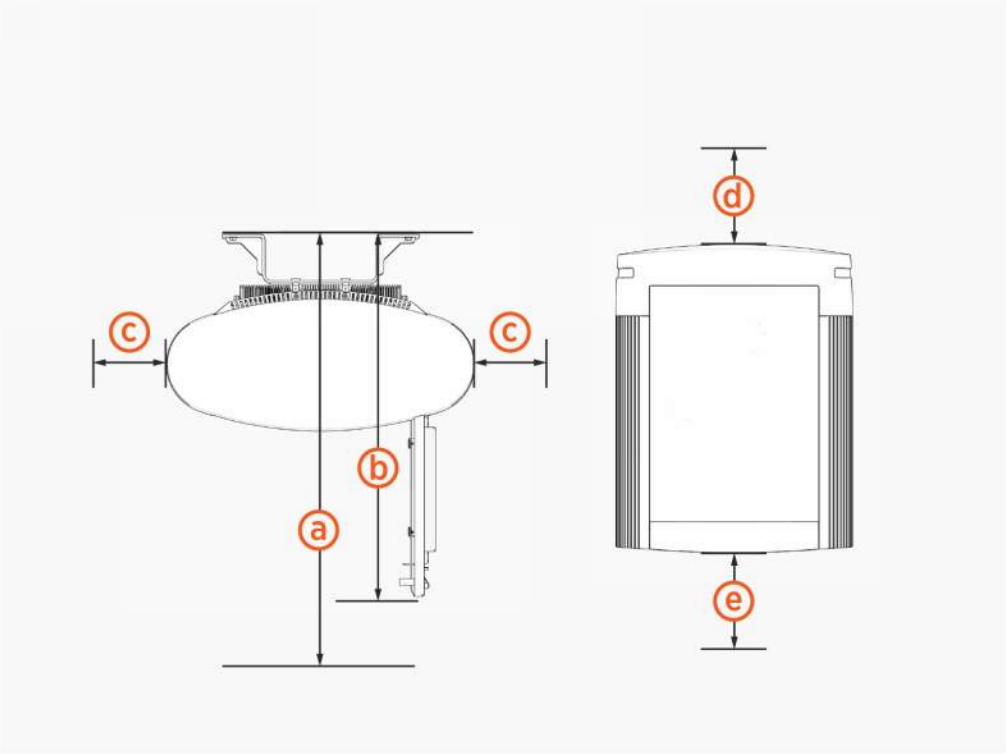
CAUTION: Each Power Module weighs 45 kg (98.5 lbs). At least two people are required to replace a Power Module. The front clearance must be spacious enough to accommodate at least two people.



IMPORTANT: Check local and regional codes for any additional clearance requirements regarding safety, high voltage equipment, and accessibility requirements.

Power Link 2000

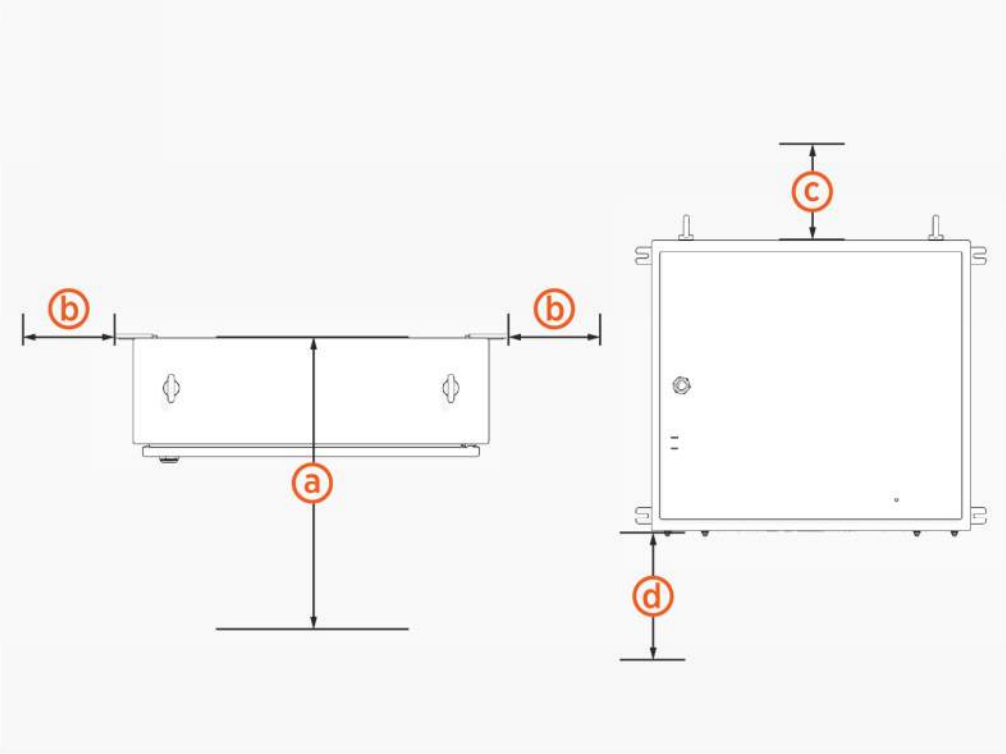
The depot mount Power Link 2000 requires the minimum site and service clearances listed below.



Location	Clearance
(a) Front - Minimum Open Space	1062 mm (41-3/4 in)
(b) Front - Door Swing + Unit Depth	849 mm (33-1/2 in)
(c) Sides	305 mm (12 in)
(d) Top	305 mm (12 in)
(e) Bottom	610 mm (24 in)

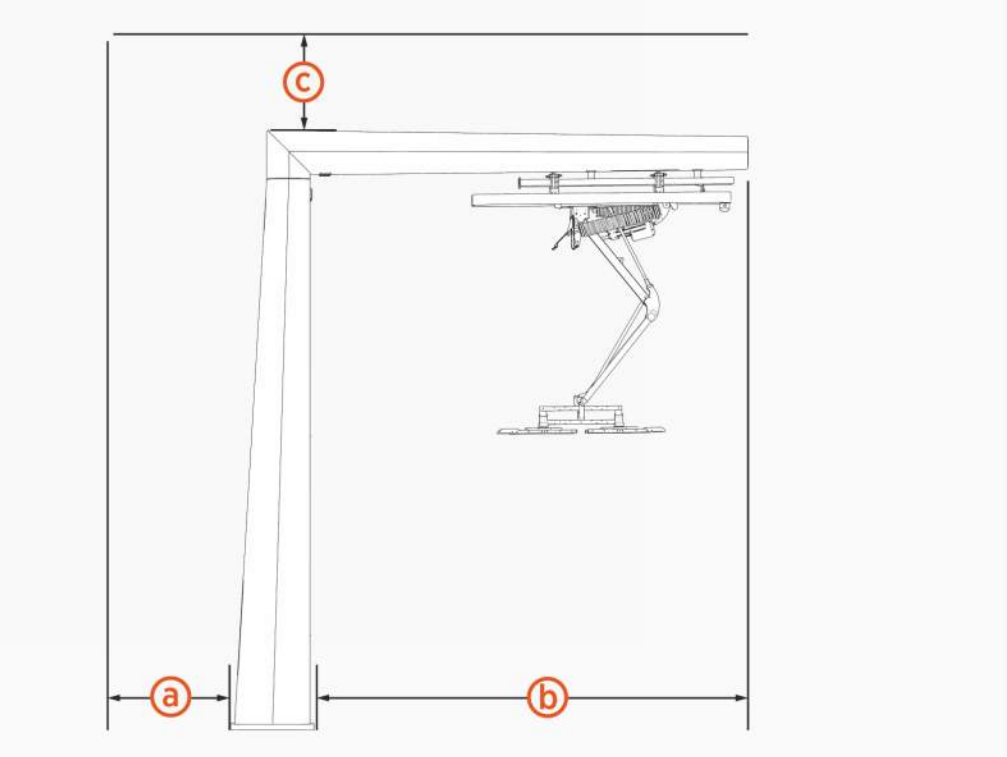
PD Controller

The PD Controller requires the minimum site and service clearances listed below.



Location	Clearance
(a) Front	737 mm (29 in)
(b) Sides	102 mm (4 in)
(c) Top	102 mm (4 in)
(d) Bottom	250 mm (9-3/4 in)

Pantograph Down 2000 Mast

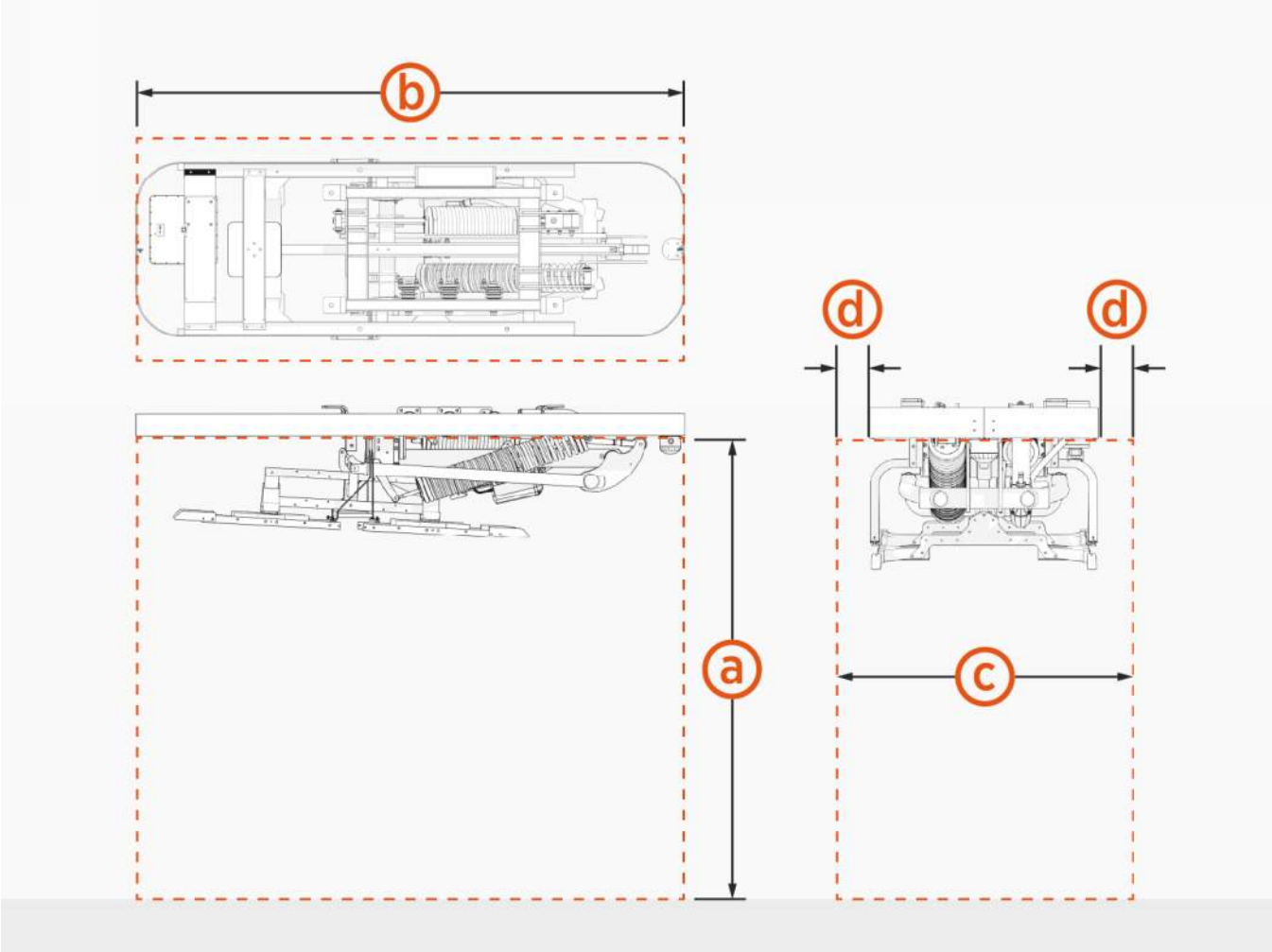


Location	Clearance
(a) Rear	914 mm (36 in) minimum at grade
(b) Front	The area in front of the pole and below the pantograph must have at grade clearance for lift access to the pantograph. The area in front of the pole must have clearance for forklift access to the mast front door.
(c) Top	914 mm (36 in) minimum for installation and service access, at Smart Antenna and panels on top of mast arm

Clearance in front of the pole and beneath the pantograph is also required for bus entry, bus charge, and bus exit. This specification depends on bus dimensions and site layout. See Pantograph Mount for position of pantograph relative to mast.

Pantograph

The Schunk SLS 201.102 pantograph requires a keep out-zone beneath it. The site plan should keep the zone clear of all objects except for the displayed ChargePoint-provided components.



Dimension	Description	Value
(a) Height	The height of keep out zone starts from the bottom of auxiliary component mounting frame and extends towards the ground.	2350 mm (92-1/2 in)
(b) Length	The length of keep out zone spans the total length of the auxiliary component mounting frame.	2556 mm (100-3/4 in)
(c) Width	The width of the keep out zone extends 100 mm (4 in) **(d)** beyond the sides of auxiliary component mounting frame.	976 mm (38-1/4 in)

Bollards

Bollards are not explicitly required by ChargePoint. If applicable, ChargePoint recommends these best practices and considerations when designing bollards for the site:

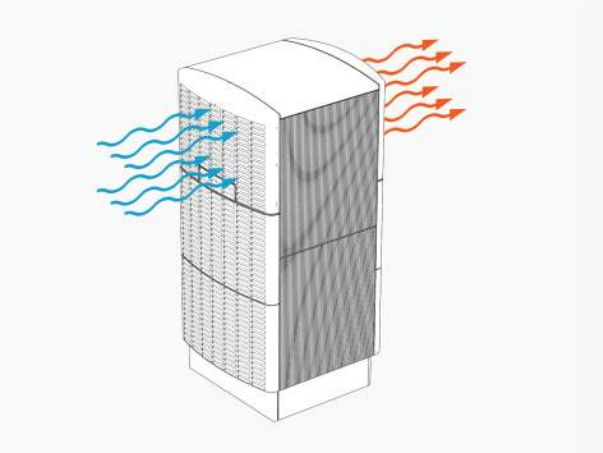
- Permanent bollards must not encroach upon the clearance areas described in Clearances.
- Removable bollards are allowed if service personnel have the ability to move them as needed.

Ventilation

Power Block

Intake vents are positioned at the front of the Power Block (blue arrows), and exhaust vents are at the rear (orange arrows). When positioning multiple Power Blocks, orient intake and exhaust to avoid recirculation.

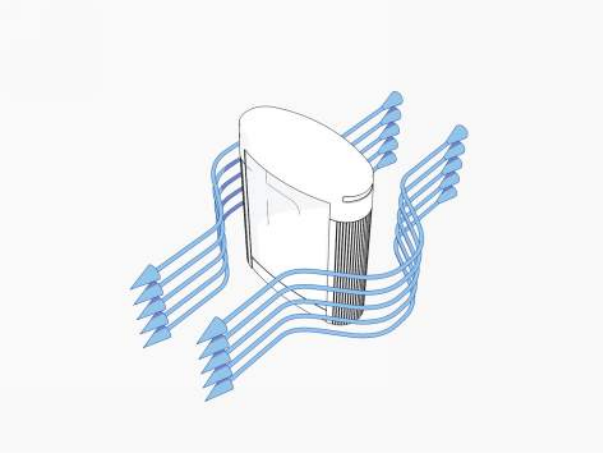
Note: Power Block requires 10 kW (34,000 BTU/hr) of heat rejection.



Power Link

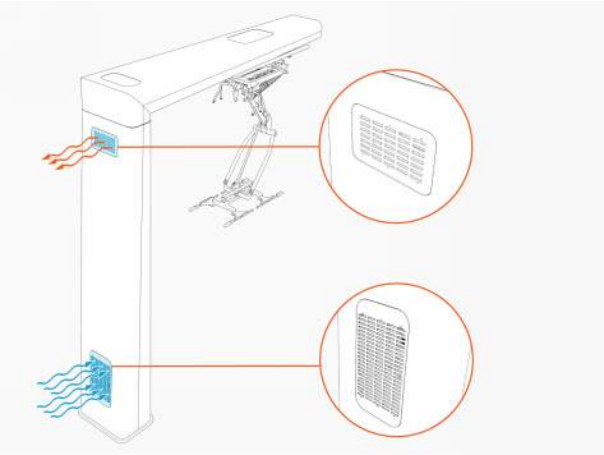
Ensure that any installation, especially an indoor installation, has adequate airflow to dissipate heat from the station. The station location must allow fresh ambient airflow and must be free of any objects that might restrict airflow to the station. A station experiencing temperatures in excess of the maximum allowed operating temperature may deliver reduced maximum performance.

Note: Power Link 2000s require 500 W (1,700 BTU/hr) of heat rejection per output.



Pantograph Down 2000 Mast

Vents are positioned on the rear of the mast. Ensure the installation location has adequate airflow to dissipate heat from the Power Link 2000 enclosed within the mast. The mast location must allow fresh ambient airflow and must be free of any objects that might restrict airflow from the vents. A station experiencing temperatures in excess of the maximum allowed operating temperature may deliver reduced maximum performance.



Accessibility

Comply with regional accessibility laws, regulations, and ordinances. Pantograph Down 2000 components, such as the Power Block, the Power Link 2000, or the Pantograph Down 2000 Mast, must not block ramps or pathways.

Signage

Refer to local and regional code to design the following elements for the site:

- Any required re-striping of parking spaces
- EV or Accessible EV signs
- EV or Accessible EV paint markings on and around the parking spaces

ChargePoint recommends posting signage indicating the maximum drive-through height for vehicles passing beneath the chargers.

Electrical Design 4

Conduit and wire size are determined based on current. Service wiring in conduit, or armored cable, must be run as required to comply with local electrical codes. Consult national and local codes or a project engineer to determine the grade, quality, and size of the conduit or cable.

The Power Block is available in 250, 330, 350, and 500 A versions, each with its own rating labels.

Note: All wiring and conduit is supplied by the contractor unless otherwise indicated.

Power Block Electrical Supply Requirements

Charging stations are considered continuous load devices (EVs draw maximum load for long durations). Therefore, electrical branch circuits to EV chargers must be sized at 125% of the load on each leg of a 3-phase panel for North American installations, in accordance with National Electric Code requirements. For other regions, refer to local code.

When planning multiple EV charging stations, it is best practice to segment non-continuous and continuous loads, with all branch circuits for EV charging on a dedicated electrical panel assembly with adequate circuit breakers. When sizing new electrical panels dedicated for EV charging, all branch circuits must support continuous load.

Each Power Block requires its own service panel breaker as follows:

Nominal Voltage	Max. AC Input Current	Continuous Load (125%)	Breaker Size
North America: 480 V	260 A	325 A	350 A and 400 A

Note: The Power Block has a short circuit current rating of 65 kA.

The Power Link 2000 charging station is tested to IEC 61000-4-5, Level 5 (6 kV @ 3000 A) standards.

AC Disconnect Switch

A local AC disconnect switch, separate from the shunt trip wiring, is recommended to be installed between each Power Block and the electrical panel. This is especially important if the main electrical panel or utility room is distant, out of line of sight, or has restricted access. For North America installations, refer to disconnect switch requirements per NEC Article 625, “Electric Vehicle Charging and Supply Equipment Systems”.

Transformer Configuration

Refer to the following table to configure electrical service.

	North America
Input Rating	480 VAC, 3-phase, 260 A, 60 Hz
Electrical Service Configuration	277/480 3-phase plus ground, grounded WYE (Y) configuration*
Product Connection	3-phase 480 plus ground (neutral not used)
Harmonic Current Rating	K factor 4

*Delta (floating or grounded) is not supported.

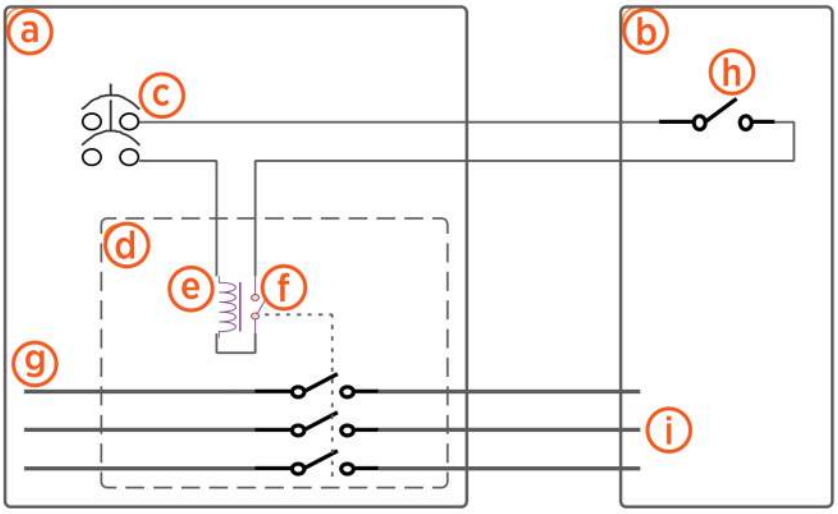
Shunt Trip Wiring

The Power Block provides a set of unpowered (dry) contacts to connect to an optional shunt trip device. These contacts are rated to 240 VAC and 6 amps.

Wiring sections to and from the Power Block are deactivated when unsafe conditions are detected, such as unintended cover panel removal. A breaker reset is required any time the shunt trip is activated.

If installed, each Power Block must be wired to the shunt trip unit of its own upstream circuit breaker. Upstream AC power must be shut off at the panel to remove shock risk inside the Power Block. All shunt trip behavior is already hard-coded into the Power Block and has no programmable variables.

Emergency stop devices are governed by local and regional codes and may be required in some sites. If one is required by code or by the site, confirm specifications with your ChargePoint representative.



(a) Electrical panel
(b) Power Block
(c) Control voltage supply, maximum 240 VAC
(d) Shunt trip circuit breaker
(e) Shunt trip coil
(f) Auxiliary contacts (closed when main contacts are closed)
(g) 3-phase AC main
(h) Power Block shunt trip contacts, Normally Open (inside the auxiliary power supply, accessible on field wiring terminal block)
(i) 3-phase Power Block AC input

PD Controller Electrical Supply Requirements

The PD Controller AC power input can range from single-phase 60 Hz 120 V AC to 277 V AC. See the peak current ratings below for the different supply voltages.

- 120 V AC, 60 Hz, 4 A
- 208-277 V AC, 60 Hz, 2 A

Ensure upstream wiring and protection circuitry is suitable and code-compliant.

Grounding Requirements

- The Power Link 2000 must be connected to a grounded, metal, permanent wiring system.
    - A service ground conductor must be run with circuit conductors and connected to an equipment-grounding terminal on the Power Block.

  Note: The leakage current from Power Block to protective earth conductor can reach up to 200 mA.
- Ensure a grounding conductor that complies with local codes is properly grounded to earth at the service equipment or, when supplied by a separate system, at the supply transformer.
- The Power Block must be connected to a grounded, metal, permanent wiring system. An equipment-grounding conductor must be run with circuit conductors and connected to an equipment-grounding terminal or lead on the Power Link 2000.
- All charging components must be bonded to one another in sequence:
    - Power Block to Power Link 2000; Power Link 2000 to pantograph(s)
    - Power Block to Power Hub; Power Hub to Power Link 2000; Power Link 2000 to pantograph (s)
- Some regions also require a grounding rod to be installed adjacent to each component. Check local code to ensure compliance.
- The PD Controller must be grounded according to local code.

Power Link 2000 Site Considerations

Power Link 2000 Soft Shutdown

The soft shutdown function is an optional feature that can be installed as a way to stop a charge session on that Power Link 2000. It is not meant to safely service the Power Link 2000 or take the place of a HV disconnect switch.

To use this feature, the installer must select and mount a physical soft shutdown switch (one per Power Link 2000) with the following specifications:

- 2.5 mm^2 (14 AWG) THHN insulation building wire rated to 600 V
- Normally Open (NO) configuration
- Switch current of 2 ma

- Switch voltage of 48 V
- Gold contacts suggested

When creating the site drawings, consider where any soft shutdown switches should be positioned. If applicable, consider disability and accessibility regulations for your region when choosing switch locations.

To wire the soft shutdown switch to the Power Link 2000:

1. Run the wiring in one of the Ethernet/LV openings in the Power Link 2000 concrete mounting template.
2. Route the wire away from other conductors carrying large currents.
3. Twist the two wires together, using a minimum of five twists per foot.
4. Connect the two terminals of the switch to the terminal block inside the Power Link 2000 labeled “Soft_Shutdown”, next to the 48 VDC terminals (described in the Express Plus Installation Guide). The terminals do not have fixed polarity.

When the switch is closed, the Power Link 2000 software ends the current charging session as normal, then opens DC contactors in the Power Link 2000. The station stays in this state regardless of station power, not allowing operation. Only a service technician can place the Power Link 2000 back into service once the switch is reset to Open.



WARNING: The HV DC wires from the Power Block could still be energized with the switch closed.

Power Link 2000 Smart Antenna

The Power Link 2000 is equipped with an internal cellular modem for connectivity with ChargePoint, as described in Connectivity. Additionally, each Power Link 2000 can be equipped with a Smart Antenna for increased strength of connection to the cellular network.

For an overhead-mounted Power Link 2000 (e.g. mounted to a gantry, ceiling or wall), the Smart Antenna is ordered separately as needed, and is field-installed within the top cap of the Power Link 2000.

The Smart Antenna is required for a Power Link 2000 enclosed within a Pantograph Down 2000 Mast. The Smart Antenna mounts at the top of the mast, and connects to the Power Link 2000 using a USB cable routed internally within the mast. The USB cable is included with the Smart Antenna.

Sequential Charging Kit

The dual output Power Link 2000 ships configured for simultaneous charging. Units may be configured for sequential charging by field installing a Sequential Charging Kit. The Sequential Charging Kit is ordered separately.

Wiring Requirements

For full product specifications, refer to the *Express Plus Pantograph Down 2000 Datasheet*. Using that data, ensure the installation location is equipped with service wiring that supports the Express Plus Pantograph Down 2000 site’s power requirements:

IMPORTANT:

- For AC and DC high voltage (HV), high current wiring, use copper or aluminum wires rated for 90 °C (194 °F).
  - AC high current wires can be THHN/THHW/THW-2/THWN-2 based on site condition (dry or wet) and rated for 600 V.
  - DC HV wires can be XHHW/XHHW-2 based on site condition (dry or wet) and rated for 1000 V.
- For low voltage (LV) DC wiring, use only copper wires (XHHW/XHHW-2 based on site condition, dry or wet) rated for 1000 V and 75 °C (167 °F).
- For PD Controller 120-277 V AC input wires, use only copper wires rated for 600 V AC and 75 °C (167 °F).
- Use copper lugs for copper wires and aluminum lugs for aluminum wires. The lugs must be nickel, tin, or silver plated compression (not mechanical) lugs. Nickel plated and used with dielectric grease is recommended.

In regions that use conduit:

- The outer diameter of conduit must not exceed the trade sizes listed in Mount and Wire Entry Specifications.
- The quantity of conduits must not exceed the maximum quantities listed in Mount and Wire Entry Specifications.

In regions that do not use conduit, armored cable may be laid in the same configuration to conform to the wire placement on mounting templates.

Note: For all wiring regions:

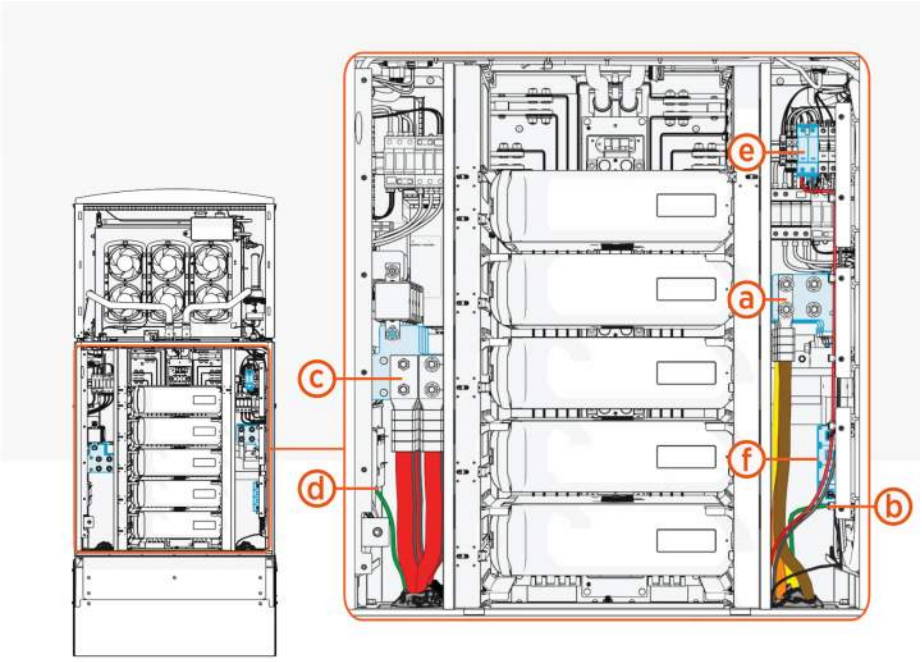
- Use one AC input feed per Power Block.
- Maximum wire run lengths are:
  - 100 m (328 ft) between a Power Block and each connected Power Link 2000
  - 30 m (98 ft) between a Power Link 2000 and each connected pantograph
- Power Link 2000 and PD Controller conduits must be sealed to maintain a Pollution Degree 2 environment.
- Use rain-tight conduits for the Power Link 2000 and PD Controller for installation in the Pantograph Down 2000 Mast.
- Ethernet communication between components must be outdoor rated Cat6 Shielded Twisted Pair (STP) cable. Lesser grades of cable do not have the required noise immunity. The shield wire must be terminated at only one end, the source end:
  - For Ethernet cables connecting between Power Block and Power Link 2000, terminate the shield wire only at the Power Block.
  - For Ethernet cables connecting between Power Link 2000 and the PD Controller, terminate the shield wire only at the Power Link 2000.

- For the maximum size and quantity of wire conduits, see:
  - Power Block Mount and Conduit Entry
  - Power Link 2000 Mount and Conduit Entry
  - PD Controller Mount and Conduit Entry

Power Block

The Power Block takes AC input from the site and provides DC output to Power Link 2000(s).

Wire Entry and Landing



(a) AC input
(b) Ground input
(c) HV DC output
(d) Ground output
(e) LV DC output
(f) Ethernet output

Wire Quantity, Size, and Termination

IMPORTANT: Following are wire specifications for the Power Block, including the maximum quantity and size that the wire terminals can accommodate. All sizing assumes a maximum ambient temperature of 50 °C (122 °F). Wire sizes specified below are generic and provided for reference only. Actual wire quantity and size must be chosen based on site-specific wiring requirements and according to the maximum allowed conduit filling rate per local code.

Input Wire	Quantity	Size	Termination
AC input	Max. 12 (four per pole)	Max. 400 mm^2 (750 MCM)	Lug: Long barrel and tongue with two holes spaced 44.5 mm (1-3/4 in) apart and sized for M12 studs Max. tongue width: 47.5 mm (1-7/8 in)
Ground	One per Power Block	Refer to local code for size	Lug: Short barrel and tongue with single hole sized for M12 stud

Output Wire	Quantity	Size	Termination
HV DC output A and B*	Max. 12 (six per output, three per pole)	See Power Link 2000 DC Input	Lug: Long barrel and tongue with two holes spaced 44.5 mm (1-3/4 in) apart and sized for M12 studs Max. tongue width: 49 mm (1-15/16 in)
Ground	One per Power Block	Refer to local code for size	Lug: Short barrel and tongue with single hole sized for M12 stud
LV DC output	See Depot Mount Power Link 2000 DC Input		
Ethernet output			

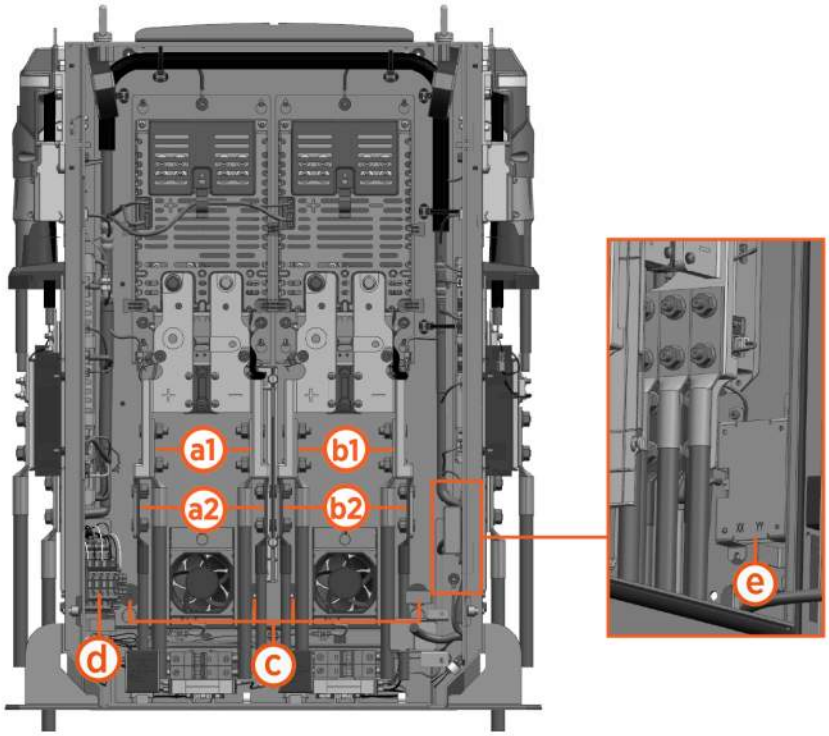
*Power Block has two DC outputs (A and B). Each DC output can accept maximum of six HV DC wires (three per pole).

Depot Mount Power Link 2000

The DC output (HV and LV) from Power Block(s) is the input for the Power Link 2000. The Power Link 2000 provides HV DC output to the pantograph(s), and provides LV DC output to each PD Controller paired with a pantograph.

DC Input Wire Landing

The depot mount Power Link 2000 has two HV DC input power paths, A and B. Each power path has two landings for receiving input wires, an upper landing and a lower landing.



(a1) HV DC input A, upper landing

(a2) HV DC input A, lower landing

(b1) HV DC input B, upper landing

(b2) HV DC input B, lower landing

(c) Ground input

(d) LV DC input

(e) Ethernet input

DC Input Wire Quantity, Size, and Termination

IMPORTANT: Following are wire specifications for the Power Link 2000, including the maximum quantity and size that the wire terminals can accommodate. All sizing assumes a maximum ambient temperature of 50 °C (122 °F). Wire sizes specified below are generic and provided for reference only. Actual wire quantity and size must be chosen based on site-specific wiring requirements and according to the maximum allowed conduit filling rate per local code.

Wire	Quantity	Size	Termination
HV DC input A and B* (Max. 500 A per landing)	Max. 12 (six per landing, three per pole)	Upper landings: Max. 120 mm^2 (4/0 AWG)	Lug: Long barrel and tongue with two holes spaced 44.5 mm (1-3/4 in) apart and sized for M12 studs Max. tongue width: 31 mm (1-1/4 in) for upper landings, 25.9 mm (1 in) for lower landings Aluminum lug max. tongue thickness: 10 mm (0.4 in) for upper landings**, 5 mm (0.2 in) for lower landings
		Lower landings: Max. 120 mm^2 (4/0 AWG)	
Ground input	Max. 4 (one per Power Block)	Refer to local code for size; Max. 50 mm^2 (1/0 AWG)	Lug: Short barrel and tongue with single hole and sized for M6 stud
LV DC input	Max. 4 (two per input, one per pole)	Max. 16 mm^2 (6 AWG)	Stripped wire end
Ethernet input	1	Cat6 STP cable, outdoor rated	RJ45 connector

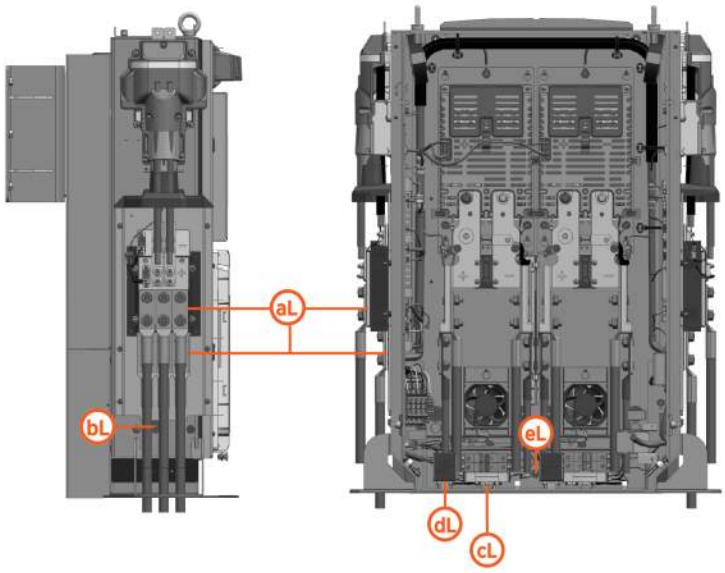
*Each HVDC input power path (A and B) can accept a maximum of 12 HV DC wires (six per landing, three per pole).

**Aluminum lug max. tongue thickness for upper landings is 5 mm (0.2 in) for earlier Power Link 2000s.

DC Output Wire Landing

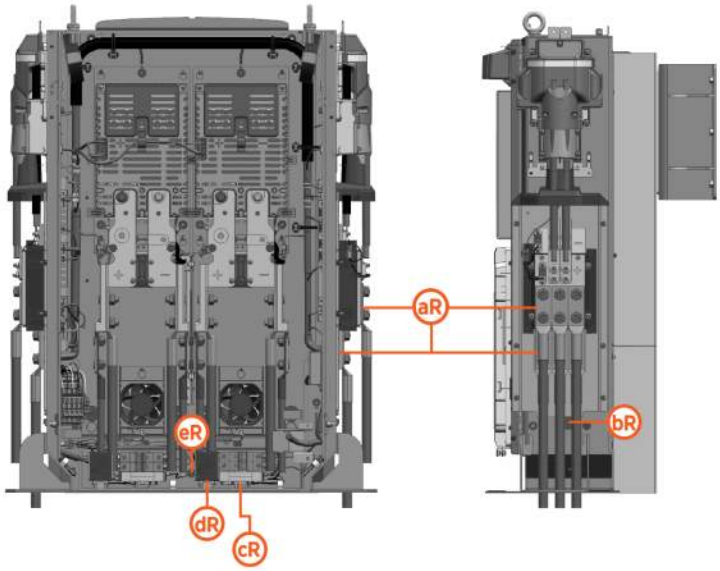
The depot mount Power Link 2000 supports up to two HV DC outputs (L and R). Each output is the HV DC input for one pantograph. The pantographs are designated Pantograph L and Pantograph R, accordingly. The Power Link 2000 also outputs LV DC, chassis ground, and Ethernet connection to each PD Controller paired with a pantograph.

The illustration below shows the landing locations for DC output wires connecting to Pantograph L and its paired PD Controller (front view of the Power Link 2000).



(aL) HV DC output L
(bL) High power ground L
(cL) LV DC output L
(dL) Ethernet output L
(eL) Chassis ground output L

The illustration below shows the landing locations for DC output wires connecting to Pantograph R and its paired PD Controller (front view of the Power Link 2000).



(aR) HV DC output R
(bR) High power ground R
(cR) LV DC output R
(dR) Ethernet output R
(eR) Chassis ground output R

DC Output Wire Quantity, Size, and Termination

IMPORTANT: Following are wire specifications for the Power Link 2000, including the maximum quantity and size that the wire terminals can accommodate. All sizing assumes a maximum ambient temperature of 50 °C (122 °F). Wire sizes specified below are generic and provided for reference only. Actual wire quantity and size must be chosen based on site-specific wiring requirements and according to the maximum allowed conduit filling rate per local code.

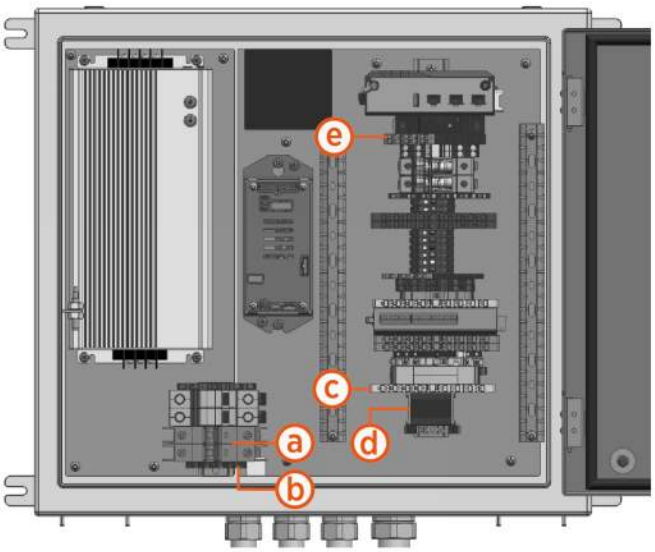
Wire	Quantity	Size	Termination
HV DC output L and R* (Max. 500 A)	Max. 12 (six per output, three per pole)	Max. 150 mm^2 (300 MCM)	Lug: Long barrel and tongue with two holes spaced 44.5 mm (1-3/4 in) apart and sized for M12 studs Max. tongue width: 31 mm (1-1/4 in) Aluminum lug max tongue thickness: 5 mm (0.2 in)
High power ground output	Max. 2 (one per pantograph)	Refer to local code for size; Max. 50 mm^2 (1/0 AWG)	Lug: Short barrel and tongue with single hole sized for M6 stud
LV DC output	Max. 4 (two per output, one per pole)	1 mm^2 (18 AWG)	Stripped wire end
Chassis ground output	Max. 2 (one per output)	1 mm^2 (18 AWG)	Ring terminal sized for M6 stud
Ethernet output	Max. 2 (one per output)	Cat6 STP cable, outdoor rated	RJ45 connector

*Each HV DC output (L and R) can have a maximum of six HV DC wires (three per pole).

PD Controller

Each PD Controller is configured with AC input from the site as well as LV DC and Ethernet connections from a Power Link 2000.

Wire Landing



(a) 120-277 V AC input
(b) AC PE
(c) LV DC input
(d) Ethernet input
(e) Chassis ground

Wire Quantity, Size, and Termination

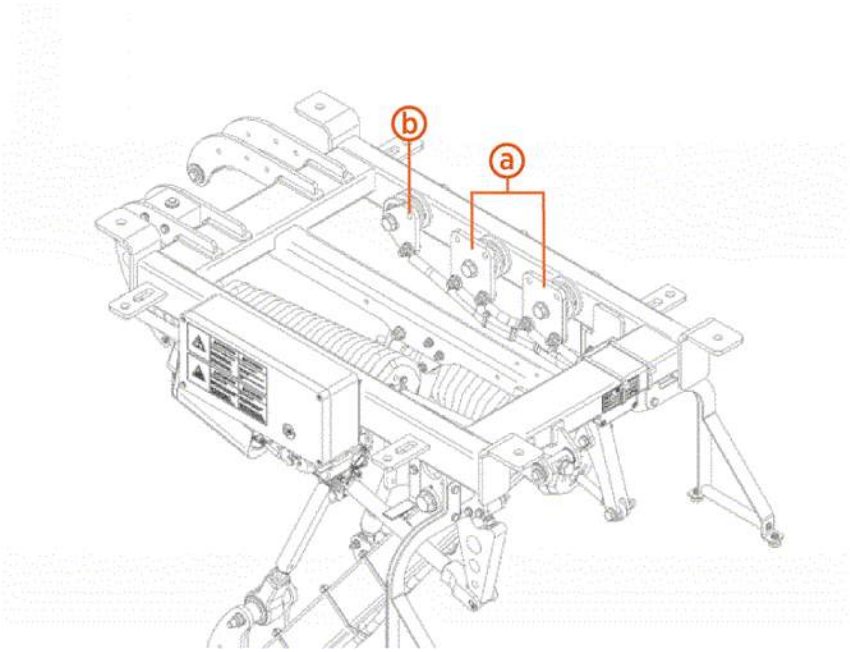
IMPORTANT: Following are wire specifications for the PD Controller, including the maximum quantity and size that the wire terminals can accommodate. All sizing assumes a maximum ambient temperature of 50 °C (122 °F). Wire sizes specified below are generic and provided for reference only. Actual wire quantity and size must be chosen based on site-specific wiring requirements and according to the maximum allowed conduit filling rate per local code.

Wire	Quantity	Size	Termination
120-277 V AC input	2 (one per pole)	Size based on branch circuit breaker; Max. 16 mm^2 (6 AWG)	Stripped wire end
AC PE	1	Size based on branch circuit breaker; Max. 16 mm^2 (6 AWG)	Stripped wire end
LV DC input	See Depot Mount Power Link 2000 DC Out		Stripped wire end
Ethernet input	See Depot Mount Power Link 2000 DC Out		RJ45 connector
Chassis ground	See Depot Mount Power Link 2000 DC Out		Stripped wire end

Schunk SLS 201.102 Pantograph

Each pantograph is configured with HVDC connection from the Power Link 2000.

Wire Landing



(a) HV DC input
(b) Ground

Schunk SLS 201.102

Wire Quantity, Size, and Termination

Wire	Max. Wire Quantity and Size	Termination
HV DC input (Max. 500 A)	See Depot Mount Power Link 2000 DC Out	Single hole lug, must fit M10 stud
Ground	See Depot Mount Power Link 2000 DC Out	Single hole lug, must fit M10 stud

North American Wire, Voltage, and Current Ratings

	Inputs to Power Block		Power Block to Each Power Link 2000		
	AC and Gnd	Shunt Trip / EPO	HV DC Output	48 V DC Output	Ethernet
Circuit Voltage	480 V AC	≤ 240 V AC	100 - 1000 V	48 V	--
Max. Current	260 A	6 A	200, 250, 350, or 500 A	32 A	--
Notes	Rated for 600 V L1, L2, L3, Gnd			Rated for 1000 V	Outdoor rated Cat6 STP

	Inputs to PD Controller		Power Link 2000 to Each Pantograph	Power Link 2000 to each PD Controller	
	120 -277 V AC Input		HV DC Output	48 V DC Output	Ethernet
Circuit Voltage	120 V AC	208-277 V AC	100 - 1000 V	48 V	--
Max. Current	4 A	2 A	200, 250, 350, 400, or 500 A	6 mA	--
Notes	Rated for 600 V, 50/60 Hz, single phase			Rated for 1000 V	Outdoor rated Cat6 STP

Connectivity 5

A consistently strong cellular signal is needed before installers can activate the vehicle charging station. Weak or sporadic signal can affect crucial aspects of the charging station, including:

- Accuracy in reporting
- Ability for drivers to use the mobile app
- Ability for customer support to troubleshoot problems
- Support for advanced features such as Power Management or Waitlist

A strong signal is also required for the ChargePoint Assure maintenance and management programs.

ChargePoint stations use cellular data connections to reach ChargePoint Cloud Services. This allows secure, PCI-compliant data connections without requiring any other form of internet connectivity at an install site or imposing additional network management responsibilities on a site host.

Each station has its own cellular connection.

Signal Strength and Quality

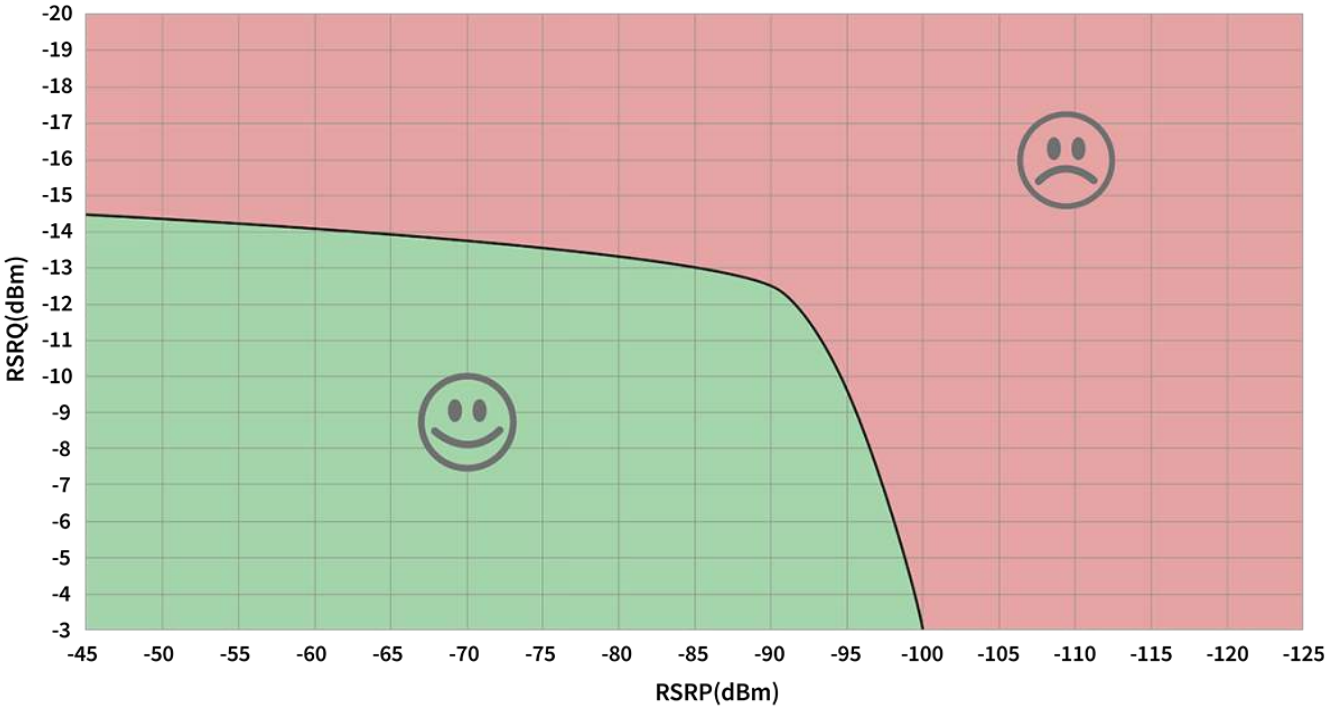
You must use a cellular signal detection device (such as a Siretta Snyper LTE or equivalent) to take signal strength readings at the exact proposed mounting location of the charging station. If the charging station does not have its own cellular connection, take the signal strength reading at the proposed mounting location of the gateway station.

In North America, ChargePoint products all support LTE bands 2, 4, and 5. The most commonly supported carriers to check during site evaluation are:

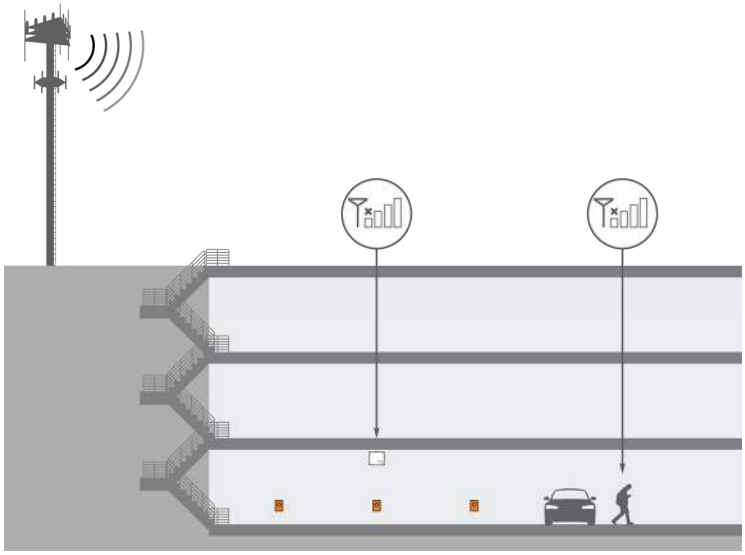
- US: AT&T, T-Mobile, and Verizon
- Canada: Rogers, Telus, and Bell

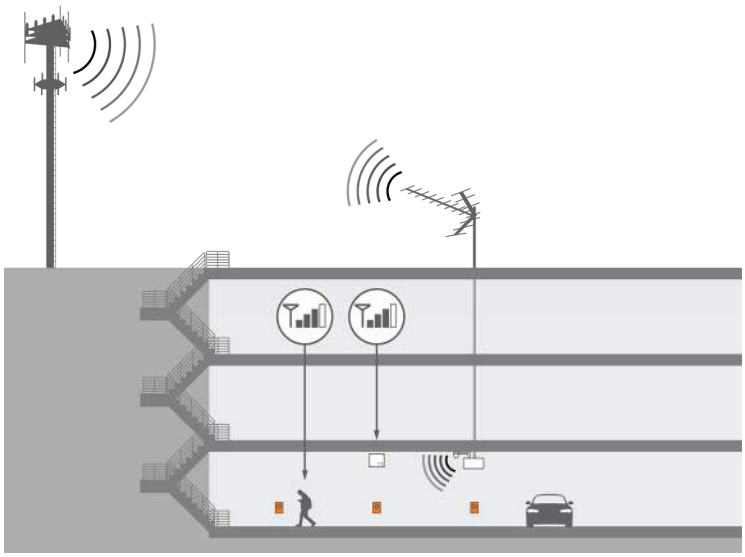
You must test the LTE signal strength at the proposed mounting location of every gateway station and ensure the location meets the minimum RSRQ at -12.5 dB or better, for RSRP measured at -90 dBm or better. Refer to the graph for acceptable combinations.

Note: These numbers are all negative, so -70 dBm is stronger than -85 dBm, and -90 dBm is weaker.



If the signal strength is weaker than this, take cellular readings at the location where any cellular signal booster antennas will be installed. Ensure enough signal exists for that repeater model. Install repeaters to boost the strength of the cellular signals. Repeaters are often required when installing charging stations in an underground garage or enclosed parking structure.





For other regions, or if the site does not have strong signal on these bands, contact your ChargePoint representative for additional solutions.

ChargePoint strongly recommends a consultation with a cellular connectivity specialist before all installations. A consultation can verify:

- Service with a supported carrier on a supported LTE band
- Available signal and local noise levels on applicable bands
- Site changes to correctly meet your needs, both for station bandwidth and other phone coverage for customer or tenant satisfaction

Repeaters

Some sites require repeaters to ensure strong signal to all stations. If a repeater is required, look for a model with these features:

- Specifically LTE compatible on the listed bands
- Multi-carrier
- Multi-band
- Not already dedicated to FirstNet or other first responder-specific networks
- Auto-gain recommended

Note: Do not rely on readings taken with a cell phone when conducting site surveys. Many signal boosters and network extenders may not be compatible with ChargePoint hardware, including certain types of Distributed Antenna Systems (DAS), micro/nano/pico/femto-cells, and carrier- or band-specific signal boosters.

Limited Warranty Information and Disclaimer

The Limited Warranty you received with your charging station is subject to certain exceptions and exclusions. For example, your use of, installation of, or modification to, the ChargePoint® charging station in a manner in which the ChargePoint® charging station is not intended to be used or modified will void the limited warranty. You should review your limited warranty and become familiar with the terms thereof. Other than any such limited warranty, the ChargePoint products are provided "AS IS," and ChargePoint, Inc. and its distributors expressly disclaim all implied warranties, including any warranty of design, merchantability, fitness for a particular purposes and non-infringement, to the maximum extent permitted by law.

Limitation of Liability

CHARGEPOINT IS NOT LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, PUNITIVE OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION LOST PROFITS, LOST BUSINESS, LOST DATA, LOSS OF USE, OR COST OF COVER INCURRED BY YOU ARISING OUT OF OR RELATED TO YOUR PURCHASE OR USE OF, OR INABILITY TO USE, THE CHARGING STATION, UNDER ANY THEORY OF LIABILITY, WHETHER IN AN ACTION IN CONTRACT, STRICT LIABILITY, TORT (INCLUDING NEGLIGENCE) OR OTHER LEGAL OR EQUITABLE THEORY, EVEN IF CHARGEPOINT KNEW OR SHOULD HAVE KNOWN OF THE POSSIBILITY OF SUCH DAMAGES. IN ANY EVENT, THE CUMULATIVE LIABILITY OF CHARGEPOINT FOR ALL CLAIMS WHATSOEVER RELATED TO THE CHARGING STATION WILL NOT EXCEED THE PRICE YOU PAID FOR THE CHARGING STATION. THE LIMITATIONS SET FORTH HEREIN ARE INTENDED TO LIMIT THE LIABILITY OF CHARGEPOINT AND SHALL APPLY NOTWITHSTANDING ANY FAILURE OF ESSENTIAL PURPOSE OF ANY LIMITED REMEDY.

FCC Compliance Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Important: Changes or modifications to this product not authorized by ChargePoint, inc., could affect the EMC compliance and revoke your authority to operate this product.

Exposure to Radio Frequency Energy: The radiated power output of the 802.11 b/g/n radio and cellular modem (optional) in this device is below the FCC radio frequency exposure limits for uncontrolled equipment. The antenna of this product, used under normal conditions, is at least 20 cm away from the body of the user. This device must not be co-located or operated with any other antenna or transmitter by the manufacturer, subject to the conditions of the FCC Grant.

ISED (formerly Industry Canada)

This device complies with the licence-exempt RSS standard(s) of Innovation, Science and Economic Development Canada (ISED). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil est conforme aux flux RSS exemptés de licence d'Innovation, Sciences et Développement économique Canada (ISDE). L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter.

Radiation Exposure Statement: This equipment complies with the IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.

Énoncé d'exposition aux rayonnements: Cet équipement est conforme aux limites d'exposition aux rayonnements ioniques RSS-102 Pour un environnement incontrôlé. Cet équipement doit être installé et utilisé avec un Distance minimale de 20 cm entre le radiateur et votre corps.

FCC/IC Compliance Labels

Visit chargepoint.com/labels.

chargepoint.com/support

75-001642-01 r0

Pantograph Down 2000

Express Plus DC Fast Charging Station for Electric Buses

Installation Guide: Depot Configuration





IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

This manual contains important instructions for Pantograph Down 2000 that shall be followed during installation, operation and maintenance of the unit.

WARNING:

1. **Read and follow all warnings and instructions before servicing, installing, or operating the ChargePoint® product.** Install and operate only as instructed. Failure to do so may lead to death, injury, or property damage, and will void the Limited Warranty.
2. **Only use licensed professionals to install your ChargePoint product and adhere to all national and local building codes and standards.** Before installing the ChargePoint product, consult with a licensed contractor, such as a licensed electrician, and use a trained installation expert to ensure compliance with local building and electrical codes and standards, climate conditions, safety standards, and all applicable codes and ordinances. Inspect the product for proper installation before use.
3. **Always ground the ChargePoint product.** Failure to ground the product can lead to risk of electrocution or fire. The product must be connected to a grounded, metal, permanent wiring system, or an equipment grounding conductor shall be run with circuit conductors and connected to the equipment grounding terminal or lead on the Electric Vehicle Supply Equipment (EVSE). Connections to the EVSE shall comply with all applicable codes and ordinances.
4. **Install the ChargePoint product using a ChargePoint-approved method.** Failure to install on a surface that can support the full weight of the product can result in death, personal injury, or property damage. Inspect the product for proper installation before use.
5. **The product is not suitable for use in Class 1 hazardous locations, such as near flammable, explosive, or combustible vapors or gases.**
6. **Supervise children near this device.**
7. **Do not put fingers into the electric vehicle connector, or touch fingers to charging rails.**
8. **Do not use this product if any cable is frayed, has broken insulation, or shows any other signs of damage.**
9. **Do not use this product if the enclosure or the electric vehicle connector is broken, cracked, open, or shows any other signs of damage.**
10. **Wire and wire terminal information are provided in the ChargePoint product Site Design Guide and Installation Guide.**
11. **Torques for installation of wire terminals are provided in the ChargePoint product Installation Guide.**
12. **The ChargePoint product maximum operating temperature is 50 °C (122 °F).**
13. **Site operator is responsible for making sure that no mechanical damage occurs and the pantograph is installed in a location that doesn't present a safety risk.** If used carelessly, the pantograph could critically injure someone just from the extension force.

IMPORTANT: Under no circumstances will compliance with the information in a ChargePoint guide such as this one relieve the user of the responsibility to comply with all applicable codes and safety standards. This document describes approved procedures. If it is not possible to perform the procedures as indicated, contact ChargePoint. **ChargePoint is not responsible for any damages that may result from custom installations or procedures not described in this document or that fail to adhere to ChargePoint recommendations.**

Document Accuracy

The specifications and other information in this document were verified to be accurate and complete at the time of its publication. However, due to ongoing product improvement, this information is subject to change at any time without prior notice. For the latest information, see our documentation online at chargepoint.com/guides.

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Symbols

This guide and product use the following symbols:

DANGER: Risk of electric shock

WARNING: Risk of personal harm or death

CAUTION: Risk of equipment or property damage

IMPORTANT: Crucial step for installation success

Read the manual for instructions

Ground/protective earth

Illustrations Used in This Document

The illustrations used in this document are for demonstration purposes only and may not be an exact representation of the product. However, unless otherwise specified, the underlying instructions are accurate for the product.

Contents

Important Safety Instructions ii

1 Introduction **1**
- Product Components 1
- System Configurations 2
- Document Scope 5
- Express Plus Guides 6
- Questions 6

2 Prepare for Installation **8**
- Check Site Readiness 8
- Bring These Tools and Materials 9
- Pantograph Down 2000 Packages 17
- Safety Warning 18
- Disconnect Power 19

3 Mount Schunk 201 Pantograph **21**
- Uncrate and Prepare Pantograph 22
- Prepare Mounting Surface 23
- Mount Pantograph 24

4 Mount Power Link 2000 and PD Controller **27**
- Prepare Power Link 2000 Site 27
- Lift and Open Power Link 2000 28
- Prepare Power Link 2000 Gland Plate 30
- Mount Power Link 2000 34
- Prepare PD Controller Site 36
- Mount PD Controller 37
- Connect Power Link 2000 Conduits 39
- Connect PD Controller Conduits 41

5 Mount Auxiliary Components to Schunk SLS 201 ..... **46**
- Introduction 47

Install Side Rails 47
Install Wi-Fi and RFID Antenna Assemblies 49
Install Front Cover With Status LED 51
Save Remaining Frame Parts 54

6 Connect Power Link 2000 Wires 55
Access Internal Bus Bars 56
Access External Bus Bars 57
Pull, Cut, and Connect Wires 61
How To Connect Wires 61

7 Connect Schunk SLS 201 Wires 82
Pull and Cut HV DC Wires 82
Connect HV DC and Ground Wires 83
Connect LV Cables 85

8 Connect Auxiliary Component Cables 95
Prepare for Cable Connection 95
Connect RFID Cable 96
Connect Wi-Fi Antenna Cable 97
Connect Status LED Cable 97

9 Connect PD Controller Wires 99
Connect AC Input Wires 100
Connect LV DC and Ethernet Wires 106
Connect Antenna Cables 111
Connect Controller Interface Cable Wires 114

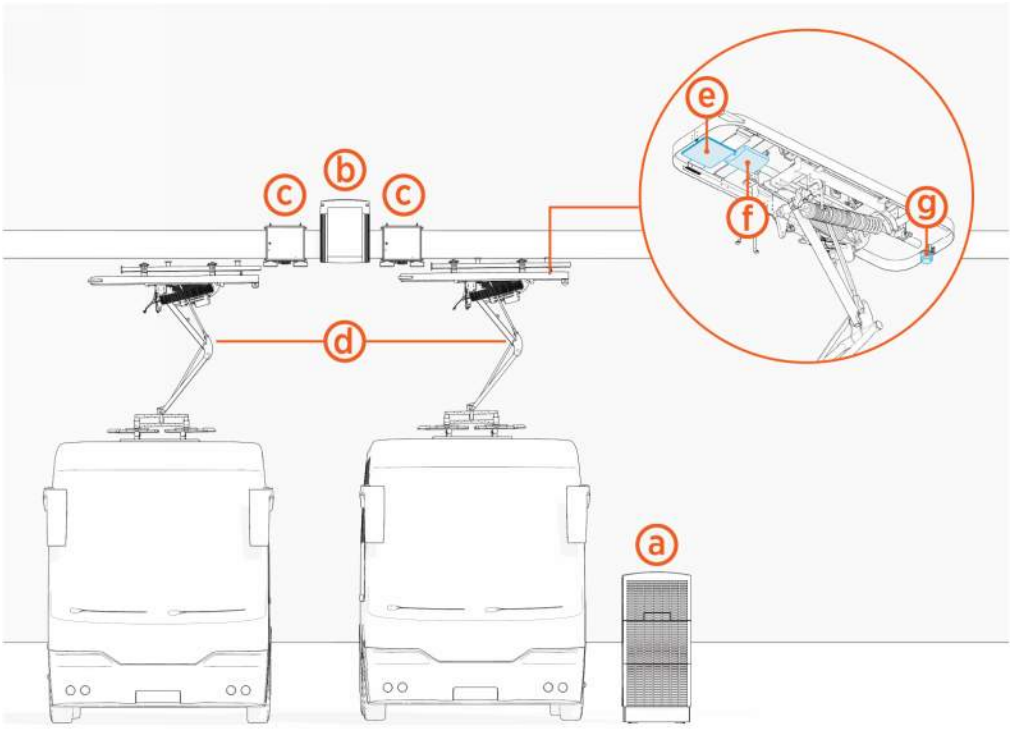
10 Complete the Install 121
Complete Auxiliary Component Frame 121
Close Power Link 2000 126
Install Power Link 2000 Covers 132
Close PD Controller 135

A Appendix: Sequential Charging Kit 137
Install Sequential Charging Kit 137

B Appendix: Low Voltage Wire Reference 139
RFID and Wi-Fi Antenna Cable 139
Controller Interface Cable Schunk SLS 201.102 141

Introduction 1

Product Components



Express Plus Pantograph Down 2000 is a modular solution for scalable fast charging of electric buses in the depot or on route. The solution comprises the following product components, shown above in depot charging configuration:

- **(a)** Power Block: Power cabinet that houses AC to DC power converters called Power Modules. Supplies DC output power to Power Link 2000s. Each Power Block can output up to 200 kW of power.
- **(b)** Power Link 2000: Dispenser that communicates with the bus during charging, connects to the ChargePoint Cloud Dashboard, and dispenses high voltage DC power to the bus through a pantograph connector.

(c) PD Controller: Smart interface that enables a Power Link 2000 to control a pantograph, and monitors the control pilot. Also hosts the Wi-Fi access point and RFID reader that enables wireless charging communication with the bus.

(d) Pantograph: Electromechanical connector that lowers onto bus charging rails and delivers high voltage DC charge power to the bus. Raises out of the way when not in use.

(e) Wi-Fi antenna: Antenna for wireless communication between the bus and the Pantograph Down 2000 system.

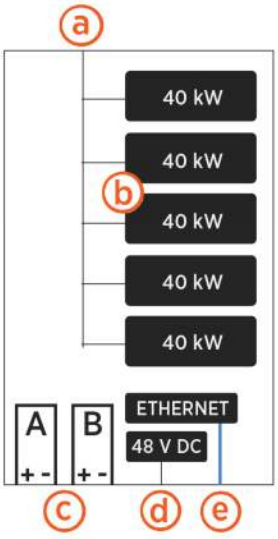
(f) RFID antenna: Antenna for bus identification.

(g) Status LED: LED status indicator for the Power Link 2000 charging port.

System Configurations

Power Block to Power Link 2000 Configuration

There are multiple configurations possible between Power Block and Power Link 2000. An understanding of the following Power Block and Power Link 2000 block diagrams forms the basis for understanding Power Block to Power Link 2000 configurations.



Power Block block diagram:

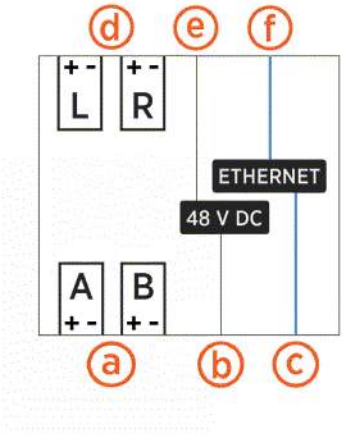
(a) Three phase AC power input

(b) Configurable with up to five 40 kW Power Modules, for a maximum total output of 200 kW

(c) Two available HV DC power outputs (A and B)

(d) 48 V DC power output

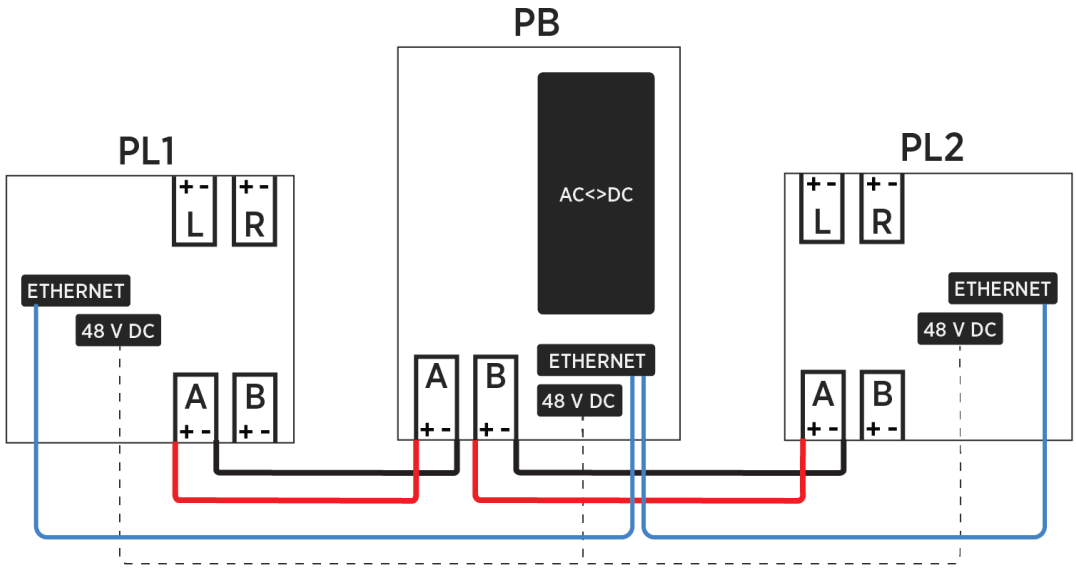
(e) Ethernet output



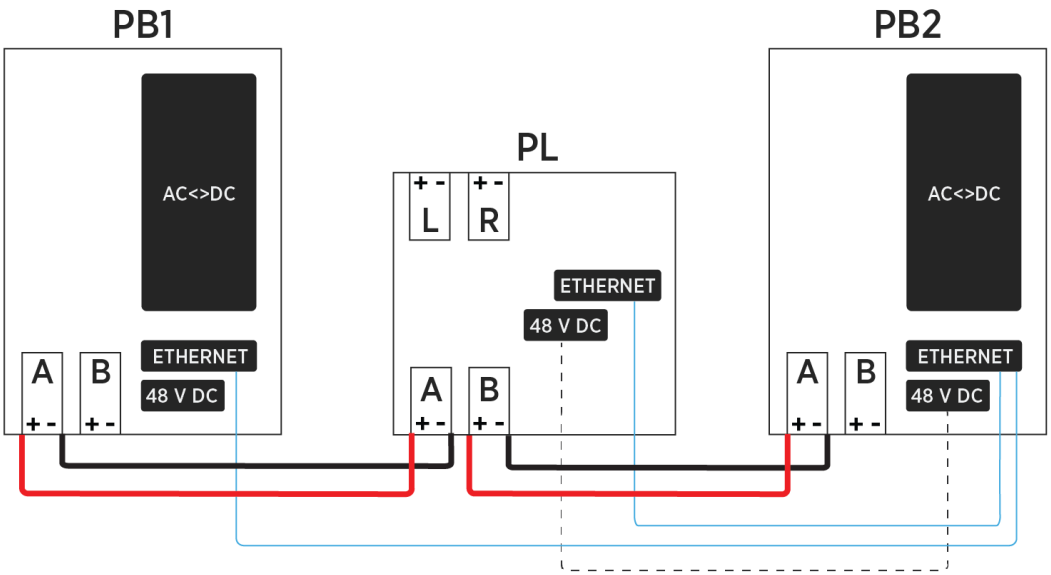
Power Link 2000 block diagram:

- **(a)** Single or dual HV DC input power paths (A and B)
- **(b)** 48 V DC power input
- **(c)** Ethernet input
- **(d)** Single or dual HV DC outputs (L and R)
- **(e)** 48 V DC power output
- **(f)** Ethernet output

The DC output of the Power Block is the DC input of the Power Link 2000. Each Power Block has two HV DC outputs that can be fed to a single Power Link 2000, or to two different Power Link 2000s. A sample block diagram of a single Power Block connected to two Power Link 2000s is shown below. The Power Block also feeds 48 V DC power and Ethernet connectivity to the Power Link 2000s.



In turn, for Pantograph Down 2000 applications, the Power Link 2000 can accept high voltage DC input from up to two Power Blocks, as shown in the example below.



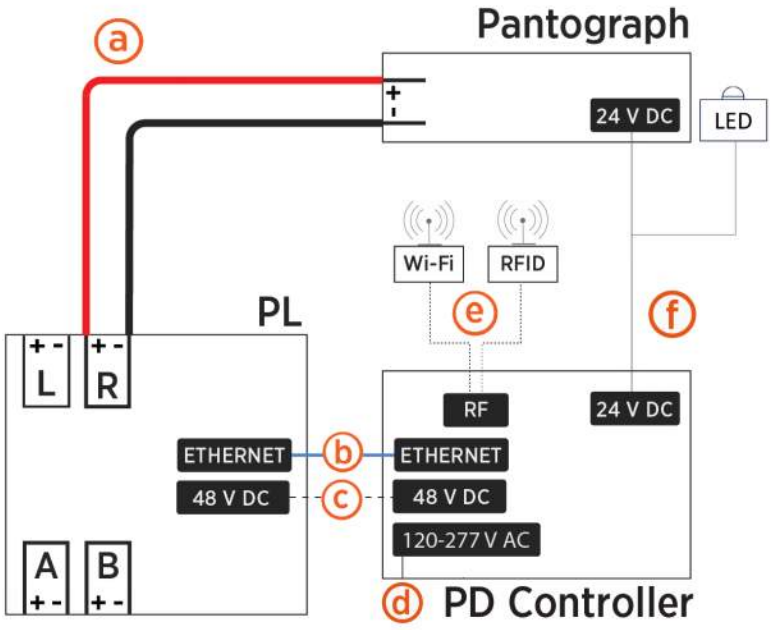
This is a modular architecture that enables many Power Block to Power Link 2000 configurations, only two of which are illustrated above. The actual Power Block to Power Link 2000 configuration for each site will vary depending on the number stations, the charging capacity required for each charging station, simultaneous or sequential charging requirements, and other criteria.

IMPORTANT: The configurations shown above are only two of many supported configurations for Pantograph Down 2000. Before beginning installation work, contact a ChargePoint representative for the ChargePoint approved wiring architecture for your specific project. Non-approved wiring between Power Blocks and Power Link 2000s may not enable Pantograph Down 2000 to function as expected.

Pantograph Down 2000 Downstream Configuration

Your installation project may involve a dual output Power Link 2000 that powers two pantographs or a single output Power Link 2000 that powers a single pantograph.

Each Power Link 2000 HV DC output connects to one pantograph. One PD Controller is required for each pantograph. The PD Controller requires 48 V DC and Ethernet connectivity from the Power Link 2000, as well as single-phase AC power from the site. The PD Controller has connection to the status LED, Wi-Fi antenna, and RFID antenna. The PD Controller also has connection to the pantograph for control pilot, actuation commands, and other pantograph functions. The block diagram below illustrates the connectivity between a Power Link 2000 and a pantograph/PD Controller pair.



(a) Power Link 2000 HV DC output to pantograph

(b) Ethernet connection between Power Link 2000 and PD Controller

(c) Power Link 2000 48 V DC output to PD Controller

(d) PD Controller 120-277 V AC power input

(e) RF connection from PD Controller to Wi-Fi antenna and RFID antenna

(f) 24 V DC connection from PD Controller to pantograph and status LED

Smart Antenna

The Power Link 2000 is equipped with an internal cellular modem for connectivity with ChargePoint. In areas with poor cellular signal strength, the Power Link 2000 may be additionally equipped with a Smart Antenna for increased strength of connection to the cellular network. The Smart Antenna is field-installed.

Document Scope

This guide covers installation of the Power Link 2000, PD Controller, pantograph, Wi-Fi antenna, RFID antenna, status LED, and Smart Antenna in Pantograph Down 2000 depot configuration. For installation of the Power Block, refer to the *Express Plus Power Block Installation Guide*.

Pantograph Down 2000 can also be installed in a mast configuration. See the *Express Plus Pantograph Down 2000 Installation Guide: Mast Configuration* for details.

Express Plus Guides

Access ChargePoint documents at chargepoint.com/guides.

Document	Content	Primary Audiences
Datasheet	Full station specifications	Site designer, installer, and station owner
Site Design Guide	Civil, mechanical, and electrical guidelines to scope and construct the site	Site designer or engineer of record
Concrete Mounting Template Guide	Instructions to embed the charging station template in a concrete pad with anchor bolts and conduit placement	Site construction contractor
Surface Conduit Entry Kit Guide	Instructions for sites where conduit cannot be run underground	Installer
Construction Signoff Form	Checklists used by contractors to ensure the site is correctly completed and ready for product installation	Site construction contractor
Installation Guide	Anchoring, wiring, and powering on	Installer
Operation and Maintenance Guide	Operation and preventive maintenance information	Station owner, facility manager, and technician
Service Guide	Component replacement procedures, including optional components	Service technician
Declaration of Conformity	Statement of conformity with directives	Purchasers and public

Questions

For assistance, go to chargepoint.com/support and find your region's technical support number.

Prepare for Installation 2

Check Site Readiness

Ensure that:

- The electrical equipment is installed and labeled in accordance with the National Electrical Code (NEC) and all applicable requirements of the serving electric utility company and the authority having jurisdiction.
- Power Blocks are installed at locations proposed in the site drawings.
- The installation site (such as a ceiling, gantry, or wall) for each Power Link 2000, PD Controller, and pantograph meets the following requirements:
    - The site was designed and approved by a structural engineer for the component dimensions and weights given in the Site Design Guide.
    - The mount surface is prepped with anchor locations (such as embedded anchor bolts or anchor bolt holes) per instructions given in the site plans.
    - The wires and conduits meet the requirements given in the site plans.
- The installation site meets the drainage, ventilation guidelines, and clearances given in the Site Design Guide.
- Sufficient space is available to use a forklift or other lifting equipment, unpack, remove packing materials, and allow two people to freely move throughout the site.

Electrical Readiness

Refer to the *Pantograph Down 2000 Datasheet* and Site Design Guide at chargepoint.com/guides for electrical input and output specifications.

Bring These Tools and Materials

Installing Pantograph Down 2000 requires at least two people.

Additionally, the installer must bring the following equipment, tools, and materials. These are not provided by ChargePoint.

CAUTION: Comply with these guidelines to prevent component damage.

- Use appropriately sized tools to torque fasteners.
- Use the given torque values to tighten the fasteners.
- Ensure that the tools such as torque tool, multimeter, and Ethernet tester are calibrated.

Equipment for Lifting Enclosures and Pantograph



Forklift with anti-slip forks

- Rated for ≥ 680 kg (1500 lb)
- Fork max size:
  - Width = 102–127 mm (4–5 in)
  - Thickness ≤ 57 mm (2.25 in)
- If your site has height constraints or heights that exceed the service range of a forklift, use alternative equipment

Equipment and Tools for Installation



Paper towel roll



Industrial vacuum cleaner



Hard hat



Safety glasses



Cable ties



Magnet tray



Wire brush (to remove any residue on anchor bolts)



Cut-resistant gloves



Ladder



Box cutter


Cable puller or fish tape


Level


Multimeter (meter and probes rated for 1000 V)


Conduit cutter (to cut up to 4 in conduits)


Wire cutters, including Ethernet (Cat6 Shielded Twisted Pair (STP)) cable


Lug crimping tool and die


Torque wrench


Hex socket set (including 7 mm, 8 mm, 10 mm, 13 mm, 17 mm, 24 mm deep socket, 9/16 in, 15/16 in, 2-3/8 in, 3-1/2 in)


Wrench set (including 3/4 in, 5/16 in, 13/16 in, 20 mm, 33 mm, 42 mm, and adjustable)


T25 Security screwdriver


Phillips head screwdriver set (#2)


Permanent marker


Measuring tape or other tool to measure height, length, and distance


Lock out/tag out equipment


Ethernet tester such as a Klein Tools VDV526-052 VDV LAN Scout Jr. Tester or similar


Pliers


Wire strippers, including Ethernet (Cat6 STP) cable


Ethernet (RJ45) connector crimping tool


Torque screwdriver


Hex wrench set (including 10 mm)


Torx screwdriver (T20, T25, T30)


Flathead screwdriver set (including 2.5 mm and 3.5 mm tip for terminal blocks)


Torque paint pen


Anti-oxidant joint compound (to make gastight joint between wire and lug) and wire pulling lubricant


Weatherproof sealant


Hydraulic hole punch


Smartphone with internet connectivity


ChargePointInstaller app


Dielectric grease


Rubber mallet


QR code scanner (usually built into the camera app)


ChargePoint installer login credentials

Wires and Lugs for Installation

The installer must bring the following wires and lugs. They are not provided by ChargePoint.

IMPORTANT:

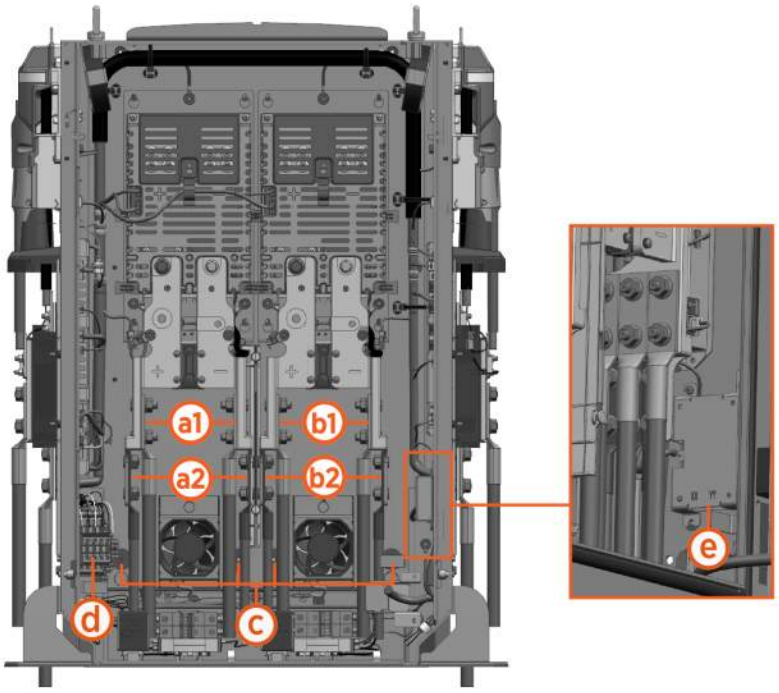
- For AC and DC high voltage (HV), high current wiring, use copper or aluminum wires rated for 90 °C (194 °F).
  - AC high current wires can be THHN/THHW/THW-2/THWN-2 based on site condition (dry or wet) and rated for 600 V.
  - DC HV wires can be XHHW/XHHW-2 based on site condition (dry or wet) and rated for 1000 V.
- For low voltage (LV) DC wiring, use only copper wires (XHHW/XHHW-2 based on site condition, dry or wet) rated for 1000 V and 75 °C (167 °F).
- For PD Controller 120-277 V AC input wires, use only copper wires rated for 600 V AC and 75 °C (167 °F).
- Use copper lugs for copper wires and aluminum lugs for aluminum wires. The lugs must be nickel, tin, or silver plated compression (not mechanical) lugs. Nickel plated and used with dielectric grease is recommended.

The following sections provide the maximum quantity and size of wires and lugs that can be installed on the Pantograph Down 2000 product bus bars and terminals. All sizing assumes a maximum ambient temperature of 50 °C (122 °F). Minimum wire sizes are determined by local code. Wire sizes and quantities given below are generic and provided for reference only. Refer to the site drawings for the actual quantity and size of wires and lugs required for the site.

Power Link 2000 Input

The DC and Ethernet output from Power Block(s) is the input for the Power Link 2000.

The depot mount Power Link 2000 has two HV DC input power paths, A and B. Each power path has two landings for receiving input wires, an upper landing and a lower landing.



(a1) HV DC input A, upper landing

(a2) HV DC input A, lower landing

(b1) HV DC input B, upper landing

(b2) HV DC input B, lower landing

(c) Ground input

(d) LV DC input

(e) Ethernet input

IMPORTANT: Following are wire specifications for the Power Link 2000, including the maximum quantity and size that the wire terminals can accommodate. All sizing assumes a maximum ambient temperature of 50 °C (122 °F). Wire sizes specified below are generic and provided for reference only. Actual wire quantity and size must be chosen based on site-specific wiring requirements and according to the maximum allowed conduit filling rate per local code.

Wire	Quantity	Size	Termination
HV DC input A and B* (Max. 500 A per landing)	Max. 12 (six per landing, three per pole)	Upper landings: Max. 120 mm^2 (4/0 AWG)	Lug: Long barrel and tongue with two holes spaced 44.5 mm (1-3/4 in) apart and sized for M12 studs Max. tongue width: 31 mm (1-1/4 in) for upper landings, 25.9 mm (1 in) for lower landings Aluminum lug max. tongue thickness: 10 mm (0.4 in) for upper landings**, 5 mm (0.2 in) for lower landings
		Lower landings: Max. 120 mm^2 (4/0 AWG)	
Ground input	Max. 4 (one per Power Block)	Refer to local code for size; Max. 50 mm^2 (1/0 AWG)	Lug: Short barrel and tongue with single hole and sized for M6 stud
LV DC input	Max. 4 (two per input, one per pole)	Max. 16 mm^2 (6 AWG)	Stripped wire end
Ethernet input	1	Cat6 STP cable, outdoor rated	RJ45 connector, unshielded

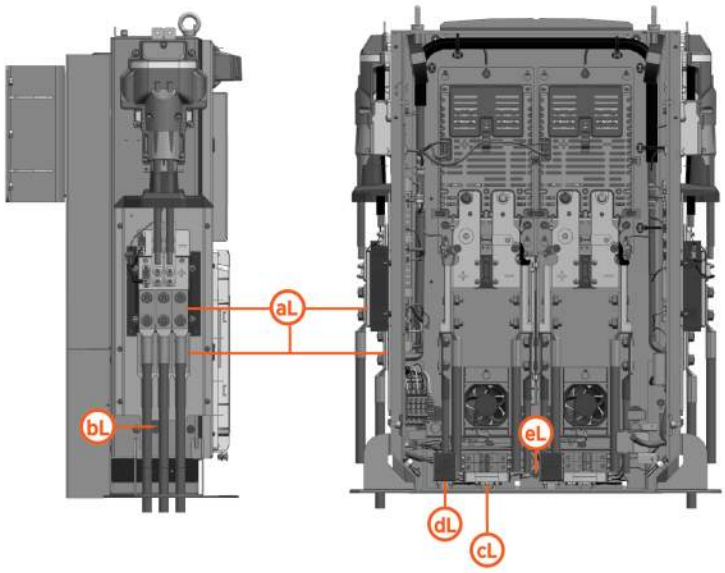
*Each HVDC input power path (A and B) can accept a maximum of 12 HV DC wires (six per landing, three per pole).

**Aluminum lug maximum tongue thickness for upper landings is 5 mm (0.2 in) for earlier Power Link 2000s.

Power Link 2000 Output

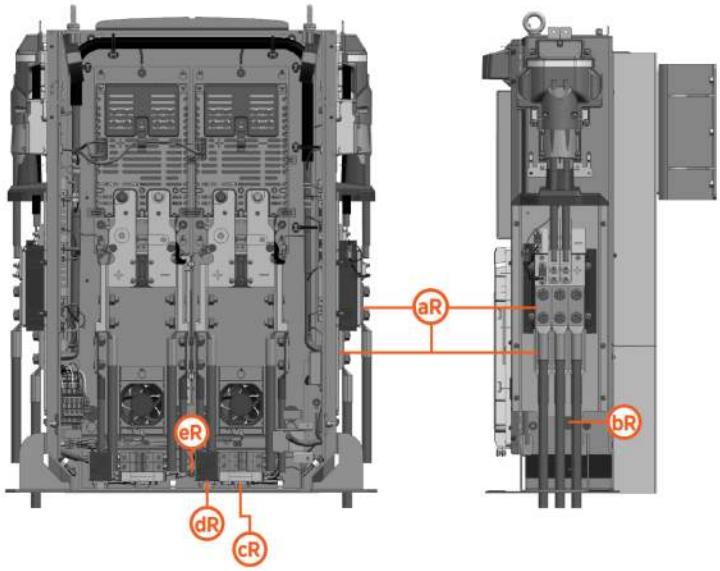
The depot mount Power Link 2000 supports up to two HV DC outputs (L and R). Each output is the HV DC input for one pantograph. The pantographs are designated Pantograph L and Pantograph R, accordingly. The Power Link 2000 also outputs LV DC, chassis ground, and Ethernet connection to each PD Controller paired with a pantograph.

The illustration below shows the landing locations for DC output wires connecting to Pantograph L and its paired PD Controller (front view of the Power Link 2000).



(aL) HV DC output L
(bL) High power ground L
(cL) LV DC output L
(dL) Ethernet output L
(eL) Chassis ground output L

The illustration below shows the landing locations for DC output wires connecting to Pantograph R and its paired PD Controller (front view of the Power Link 2000).



(aR) HV DC output R
(bR) High power ground R
(cR) LV DC output R
(dR) Ethernet output R
(eR) Chassis ground output R

Note: Single output Power Link 2000 are equipped with right (R) side outputs.

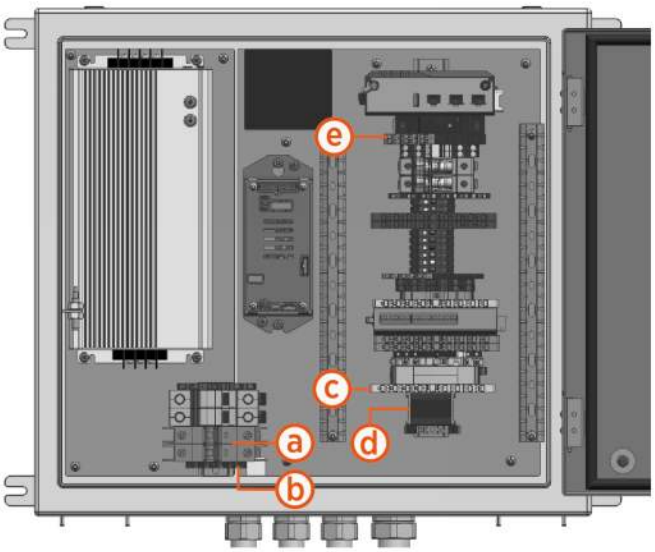
IMPORTANT: Following are wire specifications for the Power Link 2000, including the maximum quantity and size that the wire terminals can accommodate. All sizing assumes a maximum ambient temperature of 50 °C (122 °F). Wire sizes specified below are generic and provided for reference only. Actual wire quantity and size must be chosen based on site-specific wiring requirements and according to the maximum allowed conduit filling rate per local code.

Wire	Quantity	Size	Termination
HV DC output L and R* (Max. 500 A)	Max. 12 (six per output, three per pole)	Max. 150 mm^2 (300 MCM)	Lug: Long barrel and tongue with two holes spaced 44.5 mm (1-3/4 in) apart and sized for M12 studs Max. tongue width: 31 mm (1-1/4 in) Aluminum lug max. tongue thickness: 5 mm (0.2 in)
High power ground output	Max. 2 (one per pantograph)	Refer to local code for size; Max. 50 mm^2 (1/0 AWG)	Lug: Short barrel and tongue with single hole sized for M6 stud
LV DC output	Max. 4 (two per output, one per pole)	1 mm^2 (18 AWG)	Stripped wire end
Chassis ground output	Max. 2 (one per output)	1 mm^2 (18 AWG)	Ring terminal sized for M6 stud
Ethernet output	Max. 2 (one per output)	Cat6 STP cable, outdoor rated	RJ45 connector, shielded

*Each HV DC output (L and R) can have a maximum of six HV DC wires (three per pole).

PD Controller

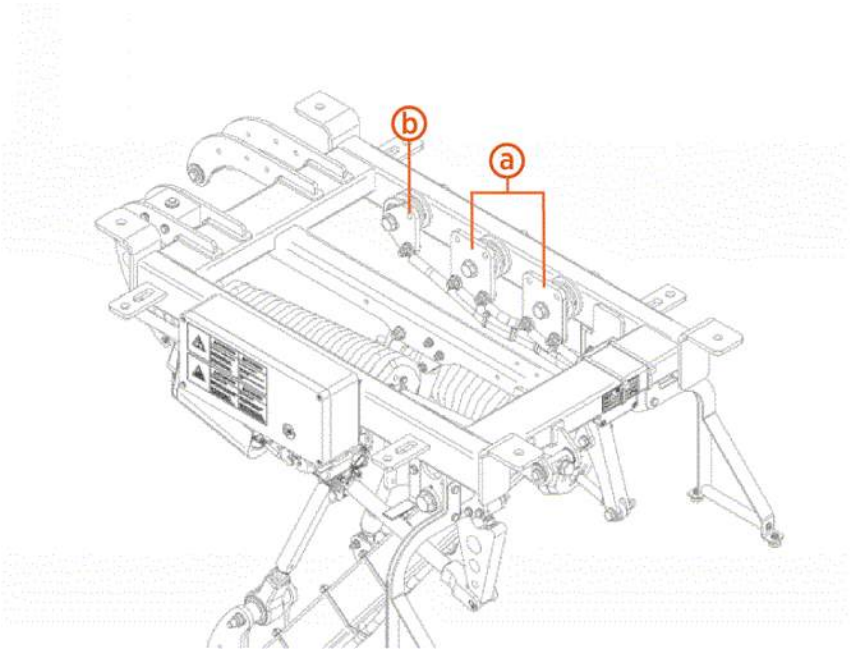
The PD Controller is configured with AC input from the site as well as LV DC and Ethernet connections from a Power Link 2000.



(a) 120-277 V AC input
(b) AC PE
(c) LV DC input
(d) Ethernet input
(e) Chassis ground

Wire	Quantity	Size	Termination
120-277 V AC input	2 (one per pole)	Size based on branch circuit breaker; Max. 16 mm^2 (6 AWG)	Stripped wire end
AC PE	1	Size based on branch circuit breaker; Max. 16 mm^2 (6 AWG)	Stripped wire end
LV DC input	See Power Link 2000 DC Out		Stripped wire end
Ethernet input	See Power Link 2000 DC Out		RJ45 connector, unshielded
Chassis ground	See Power Link 2000 DC Out		Stripped wire end

Schunk SLS 201.102 Pantograph



(a) HV DC input
(b) Ground

Schunk SLS 201.102

Wire	Max. Wire Quantity and Size	Termination
HV DC input (Max. 500 A)	See Power Link 2000 DC Out	Single hole lug, must fit M10 stud
Ground	See Power Link 2000 DC Out	Single hole lug, must fit M10 stud

Pantograph Down 2000 Packages

WARNING: Component crates are heavy and can cause injury or death if dropped. Do not stand or walk beneath the crate while it is being lifted. Take precautions against the crate tipping or sliding.



IMPORTANT: Leave components in the shipping crate until needed. When removing, protect them from damage (such as scratches) by placing them flat on a blanket or tarp, face up. Do not stand up cover panels, as they may be knocked or blown over. Cover charging connectors to prevent damage or ingress.

IMPORTANT: Keep components out of direct sunlight in a cool area until you install them.

CAUTION: Always transport and store components in their original packaging. Use appropriate lifting equipment (forklift or crane, lifting straps, and any corresponding attachments and accessories). Ensure the load rating of all lifting equipment is adequate for the weight of the crated components.

CAUTION: Keep components in original packaging, free of moisture, and protected from damage until you install or service them at the site. Store all shipments of components in a dry covered location and protect from moisture.

Following are the package components and their weights and dimensions to help you prepare the site for their arrival:

Package	Dimensions (LxWxH)	Max. Weight
Power Link 2000	1.52 x 1.14 x 0.51 m (60 x 45 x 20 in)	182 kg (400 lb)
PD Controller	800 x 787 x 330 mm (31-1/2 x 31 x 13 in)	37 kg (81 lb)
Schunk SLS 201.102	2.3 x 1.2 x 1 m (90 x 48 x 40 in)	329 kg (725 lb)
Auxiliary Components and Mounting Frame for Schunk SLS 201.102	2.71 x 0.93 m x 0.34 (106-3/4 x 36-1/4 x 13-1/4 in)	75 kg (165 lb)

Safety Warning

WARNING: Danger of crushing, pinching, and mechanical damage.

Site Operator Responsibilities:

- Ensure the pantograph is installed in a location free from safety hazards and restrict access to the movement area with appropriate safety measures.
- Inspect the equipment regularly for mechanical damage and address any issues promptly.

Operator and Bystander Safety:

- This pantograph moves quickly and has pinch points.
- To avoid serious injury, keep clear of the moving pantograph and ensure bystanders maintain a safe distance.
- Never reach into the mechanism or touch the moving pantograph.
- No one is allowed underneath the equipment during operation.

FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN SERIOUS INJURY, LOSS OF LIFE OR PROPERTY DAMAGE.

Disconnect Power

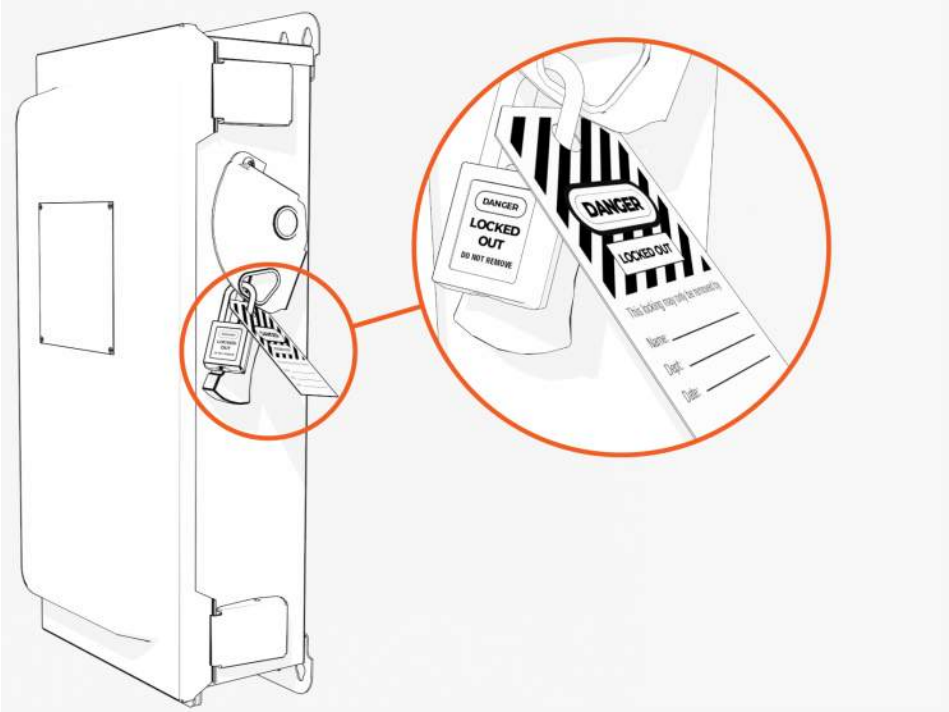
DANGER: RISK OF SHOCK

- Before any procedure, disconnect the power.
- Follow local code and site lockout/tagout procedure to de-energize the station.
- Wait for energy to dissipate (approximately five minutes).
- Keep power off until all covers and panels are reinstalled and the work is complete.

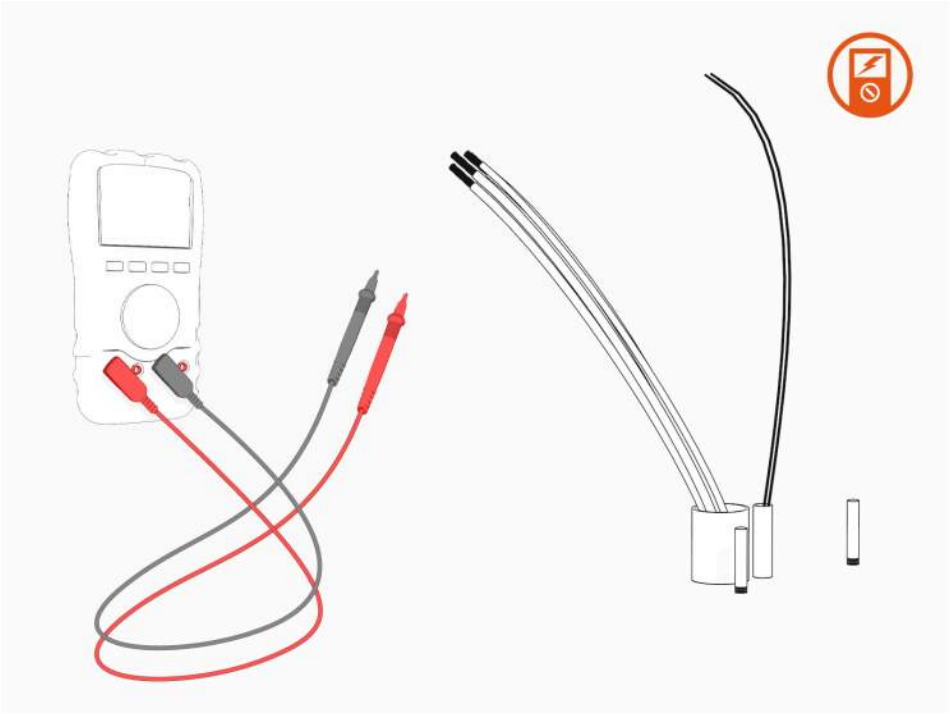
FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN SERIOUS INJURY, LOSS OF LIFE, OR PROPERTY DAMAGE.

1. Disconnect power at the site electrical panel.

   Note: Follow standard practice and local code to de-energize the applicable circuit and lockout/tagout the disconnect before proceeding.



2. Use a multimeter to test that the unit is de-energized.



Mount Schunk 201 Pantograph 3

WARNING: Do not install or service the charging station in inclement weather. If you work in snow, rain, or wind, you must use a weather-proof shelter that covers all boxes and components.

IMPORTANT: Ensure the installation complies with all applicable codes and ordinances.

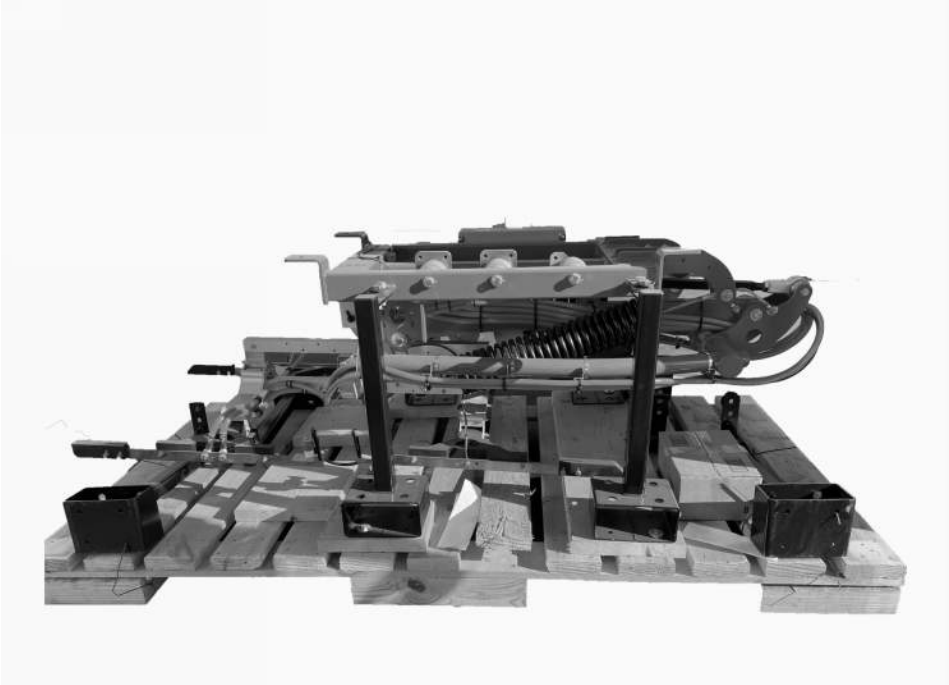
CAUTION: Warranty Limitation

- If the charging station is not installed, commissioned, or serviced by a ChargePoint certified installer or technician using a ChargePoint-approved method, it is *excluded* from all ChargePoint and other warranties and ChargePoint is not responsible.
- You must be a licensed electrician and complete training at chargepoint.com/installers to become ChargePoint certified and to access ChargePoint's web-based installer tools or ChargePoint Installer app.

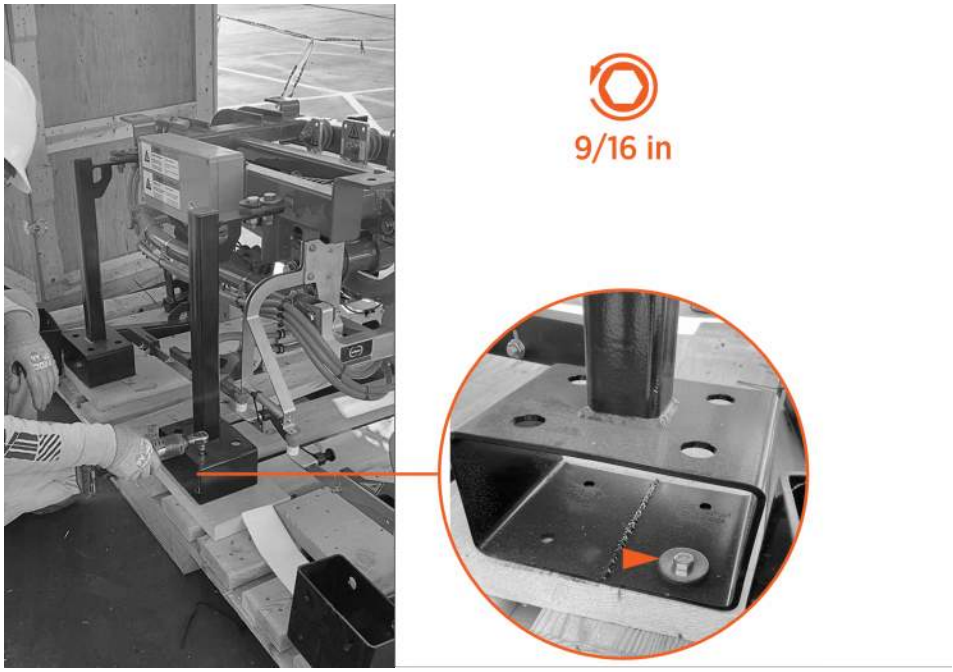
CAUTION: Use low torque settings when working with power tools during installation or servicing. Over-torquing can damage the equipment.

Uncrate and Prepare Pantograph

1. Remove protective wrapping and uncrate the pantograph.



2. Remove the pallet bolts (x4).

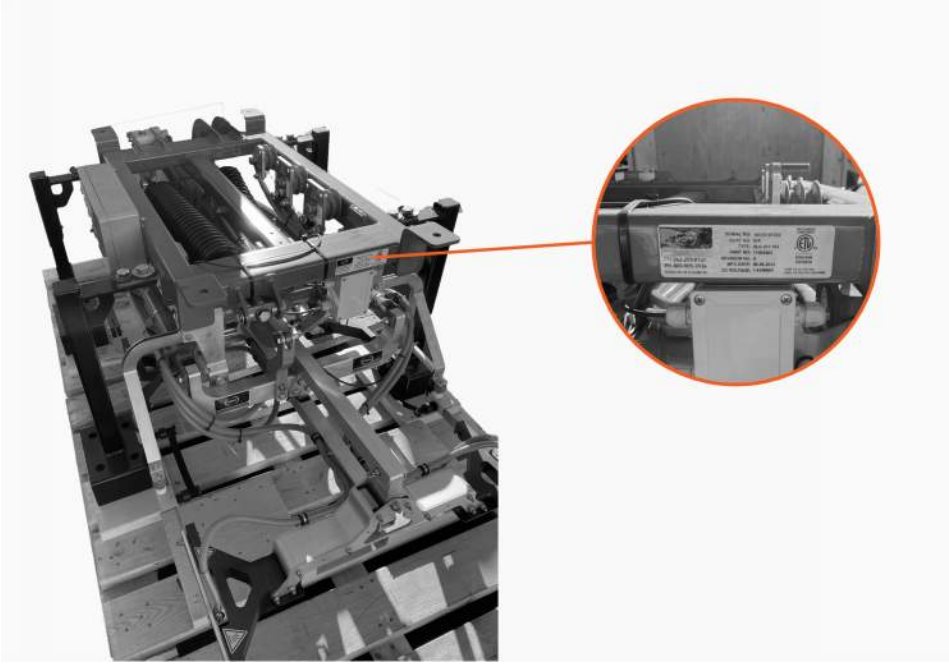


3. On the frame of the pantograph, mark the location of the high voltage DC terminals (positive, negative and ground).



4. Photograph the label on the pantograph and submit the photograph to the project manager.

   Note: The label contains information required for service calls, and will be difficult to view after the pantograph is installed at final height.



Prepare Mounting Surface

1. Identify the pantograph mounting location per the site plan.
2. Mark the locations of the mounting holes or studs.

3. Prepare the mounting holes or studs. Consult the site plan for any site-specific requirements.

Mount Pantograph

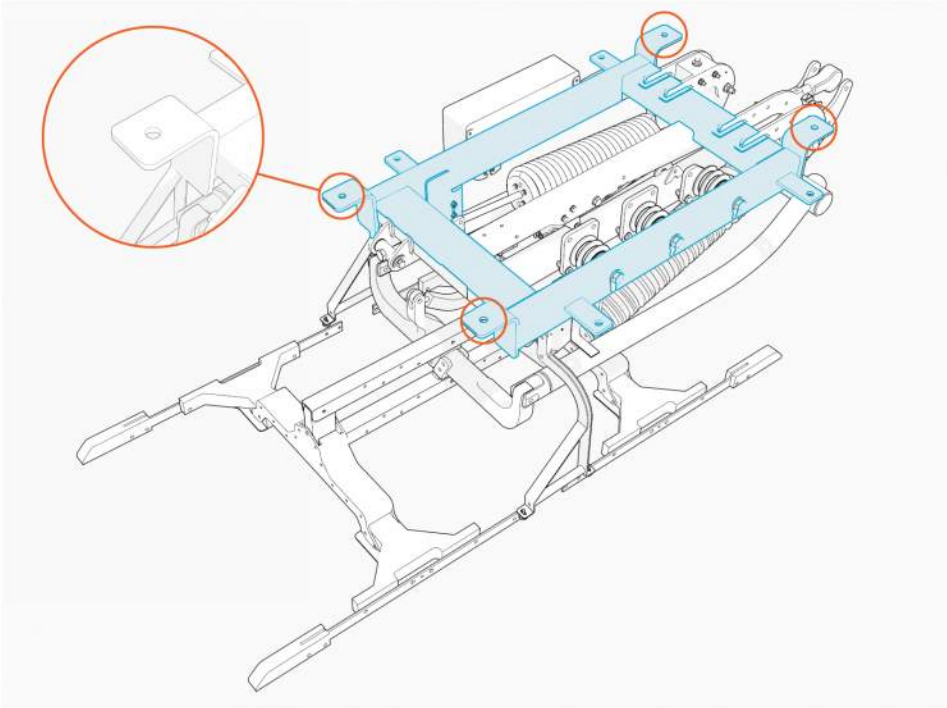
1. Insert forklift tines into pantograph lifting brackets.



2. Lift and transport the pantograph to its mounting location.

3. Attach the pantograph to the mounting platform using the main mounting supports. Install fasteners called for by the site plans. Torque to the specification indicated in the site plans.

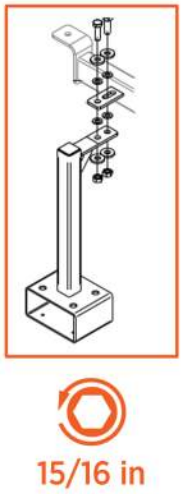
   Note: Contractor provides fasteners. Site plans must specify fasteners appropriate for mounting surface and rated to secure the weight of the pantograph, the auxiliary components, and the auxiliary component mounting frame.

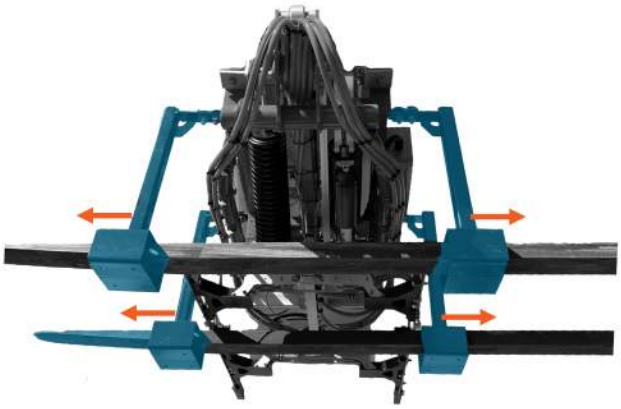


4. Lower the forklift tines slightly to release the weight of the pantograph. Do not remove the forklift from the pantograph lifting brackets.

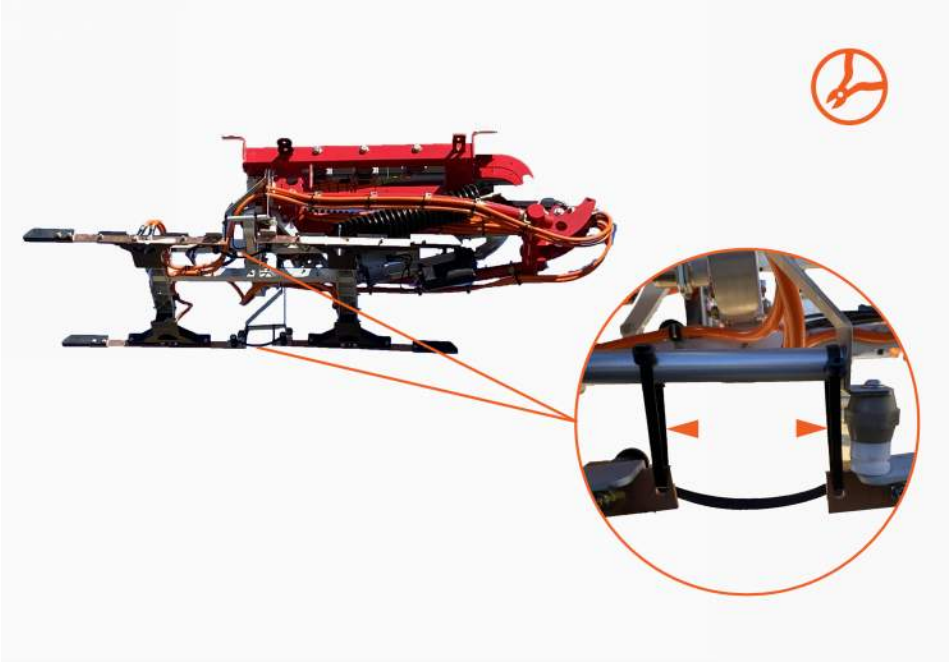


5. Remove fastener to release the pantograph lifting bracket (x4). Slide the brackets off the forklift tines or up against the forklift.





6. Remove the forklift.
7. Cut and remove zipties (x4) to free the pantograph charging rails.



Mount Power Link 2000 and PD Controller 4

WARNING: Do not install or service the charging station in inclement weather. If you work in snow, rain, or wind, you must use a weather-proof shelter that covers all boxes and components.

IMPORTANT: Ensure the installation complies with all applicable codes and ordinances.

IMPORTANT: Keep components out of direct sunlight in a cool area until you install them.

CAUTION: Warranty Limitation

- If the charging station is not installed, commissioned, or serviced by a ChargePoint certified installer or technician using a ChargePoint-approved method, it is *excluded* from all ChargePoint and other warranties and ChargePoint is not responsible.
- You must be a licensed electrician and complete training at chargepoint.com/installers to become ChargePoint certified and to access ChargePoint's web-based installer tools or ChargePoint Installer app.

CAUTION: Use low torque settings when working with power tools during installation or servicing. Over-torquing can damage the equipment.

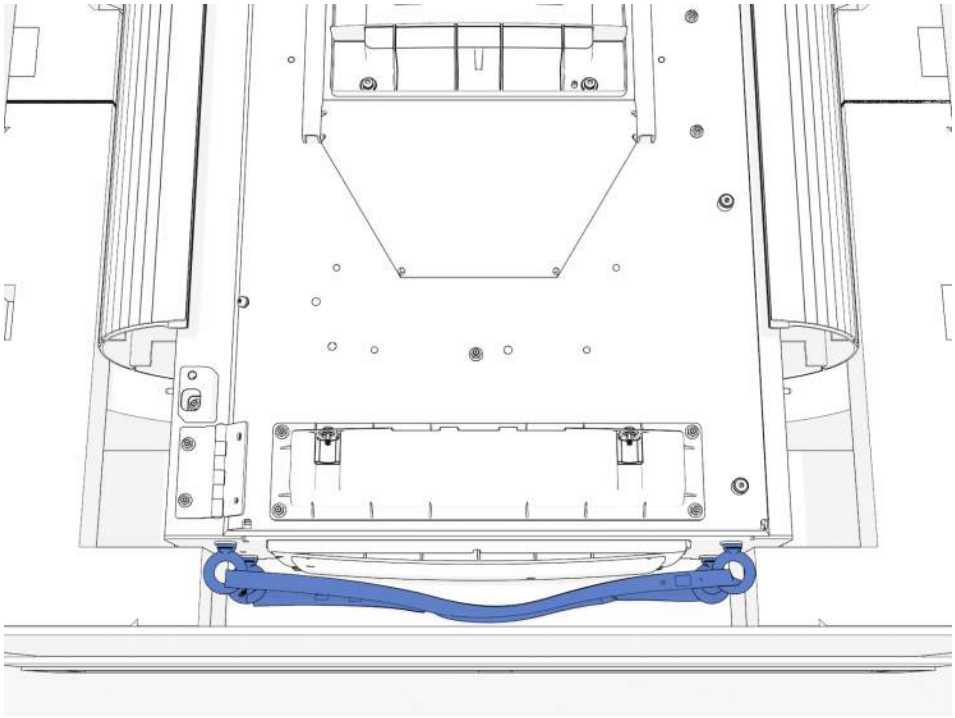
CAUTION: While installing fasteners inside the Pantograph Down 2000, make sure not to drop the fasteners inside conduit openings. You may use conduit caps or covers to temporarily cover the conduit openings.

Prepare Power Link 2000 Site

1. Identify the Power Link 2000 mounting location per the site plan.
2. Use the mounting bracket as a template to determine placement. Measure position and ensure level placement. Mark the locations of the mounting holes or studs.
3. Prepare the mounting holes or studs. Consult the site plan for any site-specific requirements.

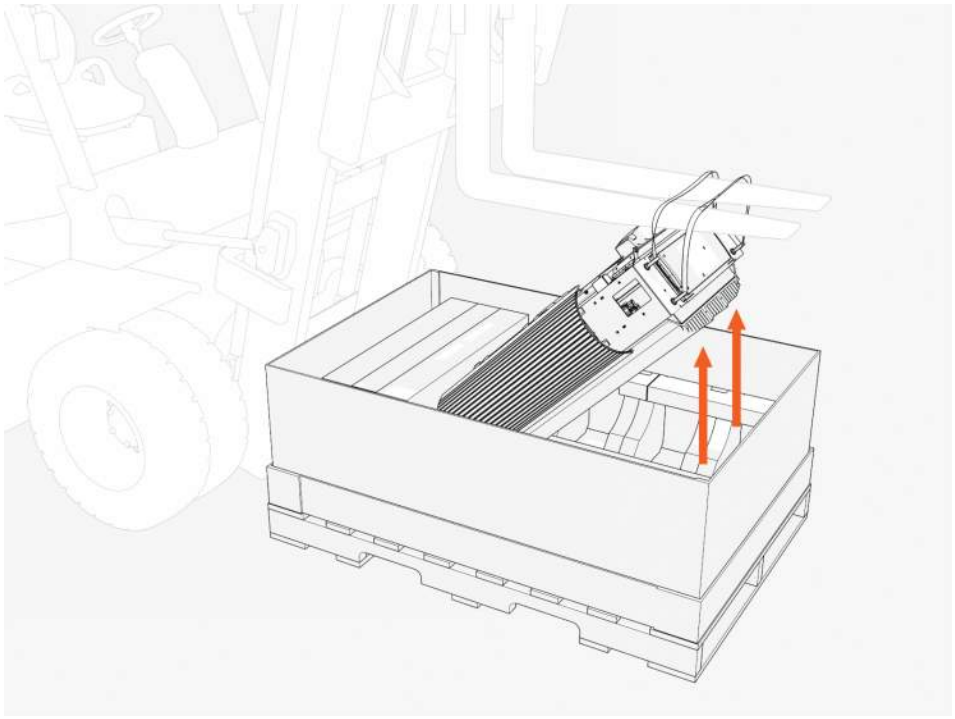
Lift and Open Power Link 2000

1. At the top of the Power Link 2000, locate four preinstalled eye bolt and lifting straps.

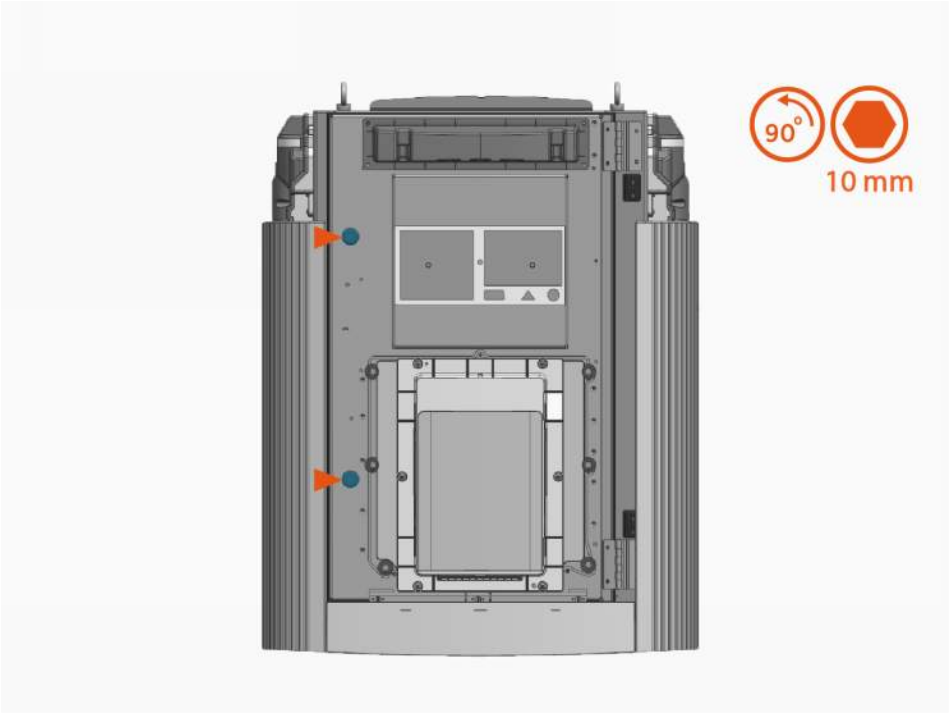


2. Lift up the Power Link 2000 by the lifting straps to eye level.

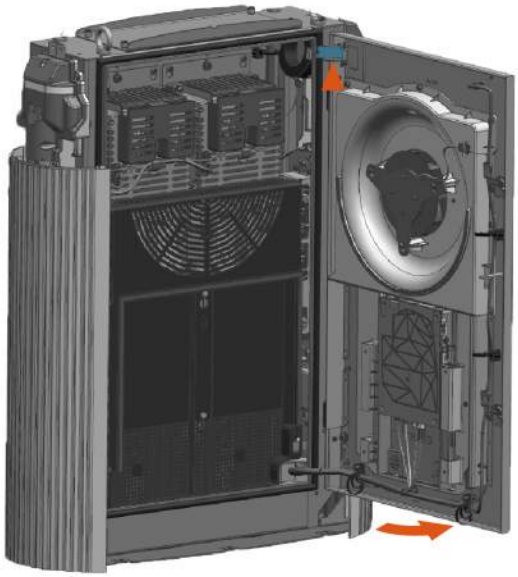
   Note: Use a forklift or service cart with retaining straps.



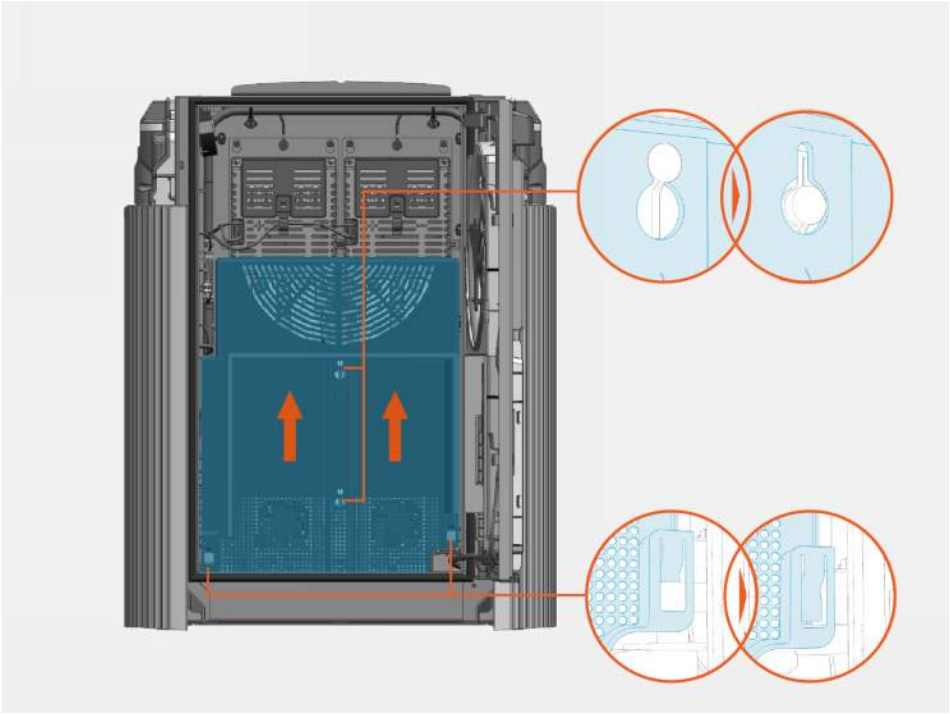
3. Quarter turn the door latches (x2) to unlock the door.



4. Open the door and engage the door stopper.

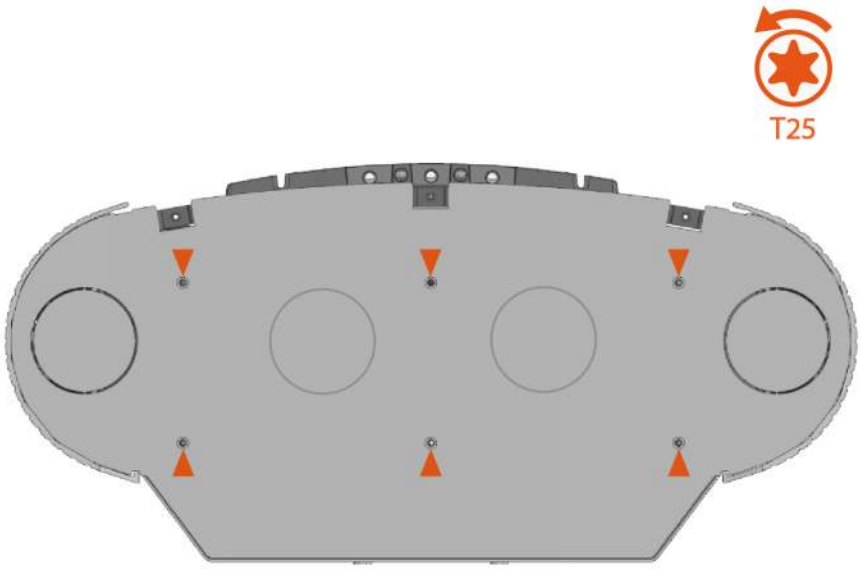


5. Slide the bus bar safety cover up to remove from hooks (x2) and latches (x2).

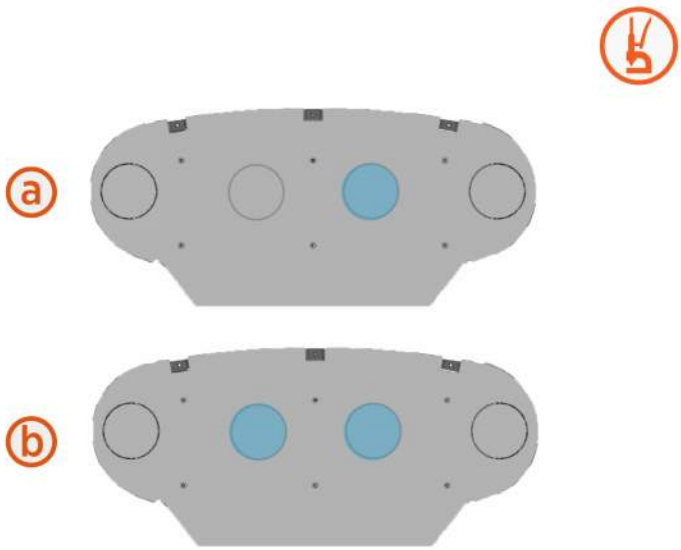


Prepare Power Link 2000 Gland Plate

1. Uninstall the screws (x6) from the Power Link 2000 bottom gland plate.

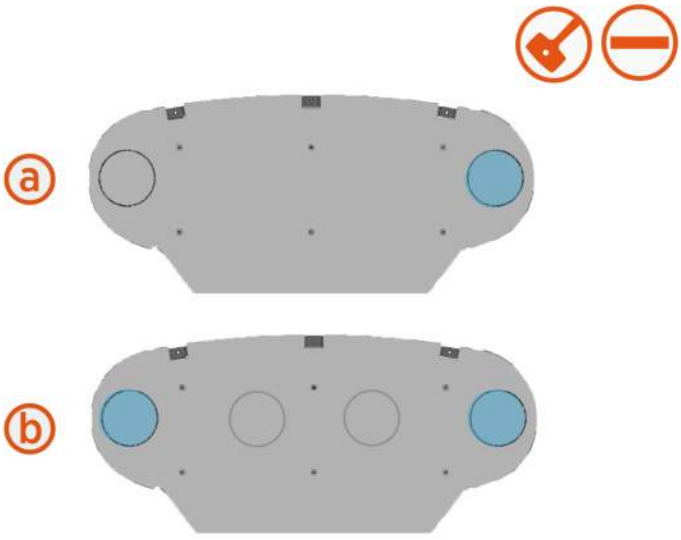


2. Remove the gland plate.
3. Create openings in the gland plate for HV DC input conduits.
    a. Check if site plans require one or two HV DC input conduits.
    b. Use a hydraulic hole punch to create the opening(s) at the marked guide(s).



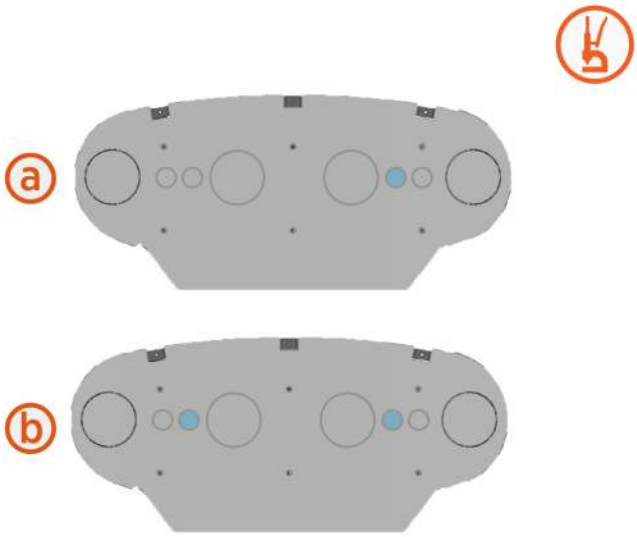
HV DC conduit holes:
(a) Single input
(b) Dual input

4. Create openings in the gland plate for HV DC output conduits.
    a. Check if site plans require one or two HV DC output conduits.
    b. Remove the knock-out(s) from the gland plate.



HV DC conduit holes:
(a) Single output
(b) Dual output

5. Create openings in the gland plate for 48 V DC and Ethernet input conduits.
    a. Check if the site plans require one or two conduits.
    b. Use a hydraulic hole punch to create the openings.

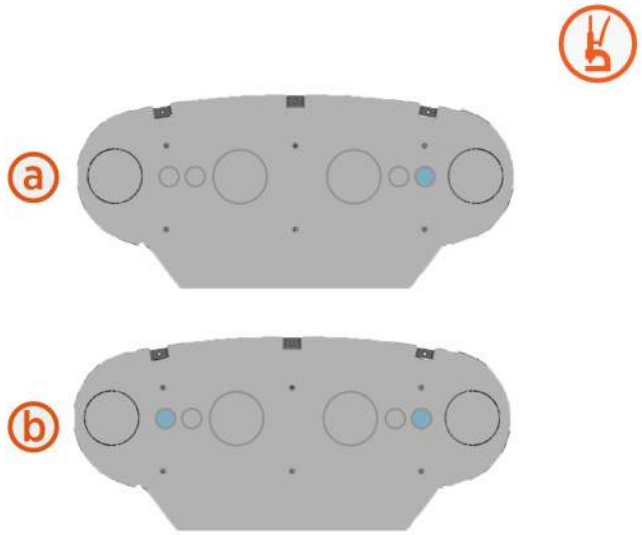


48 V DC and Ethernet conduit holes:

(a) Single input

(b) Dual input

6. Create openings in the gland plate for 48 V DC and Ethernet output conduits.
   a. Check if the site plans require one or two conduits.
   b. Use a hydraulic hole punch to create the openings.

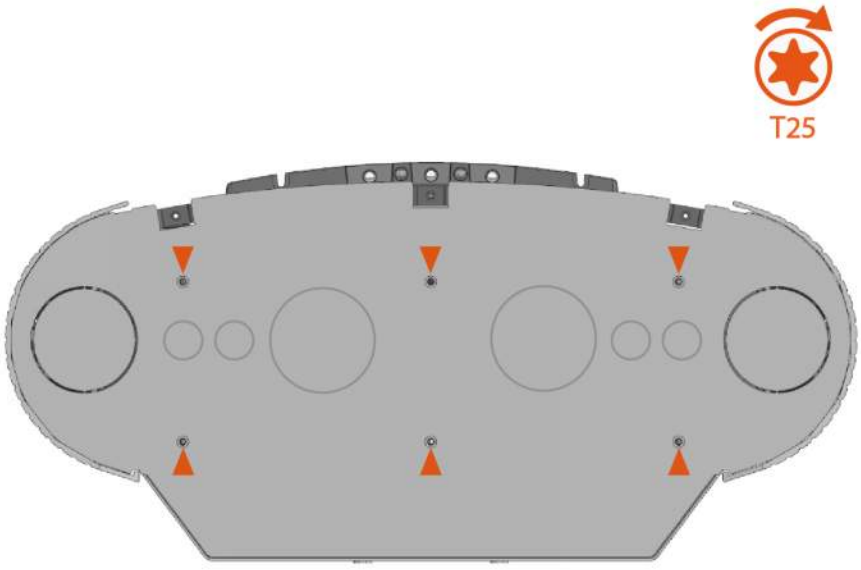


48 V DC and Ethernet conduit holes:

(a) Single output

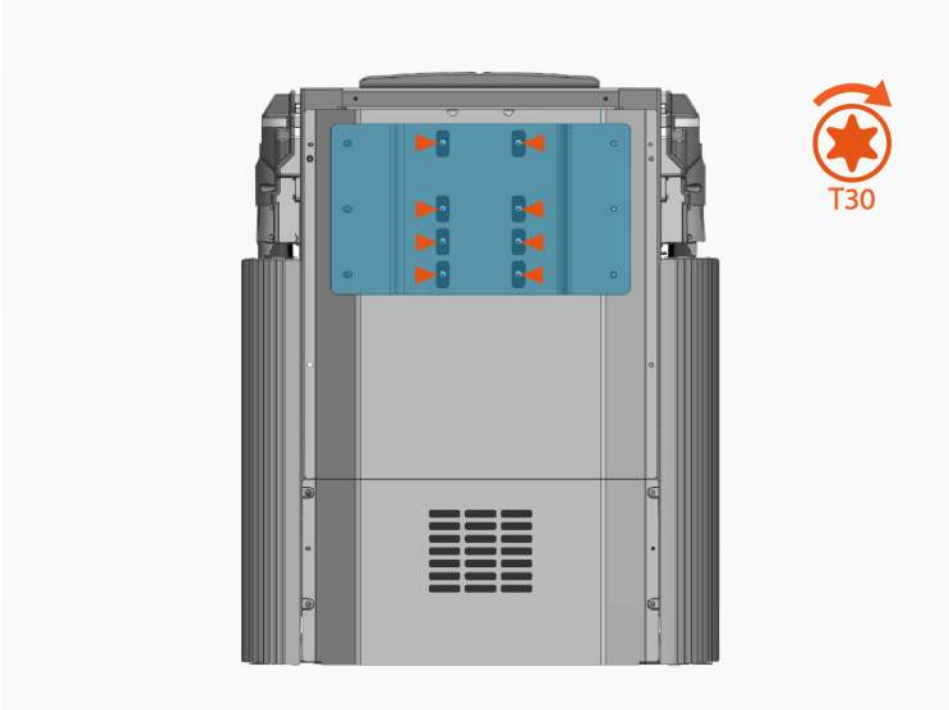
(b) Dual output

7. Reinstall the gland plate. Torque screws (x6) to **4.5 Nm (40 in-lb)**.

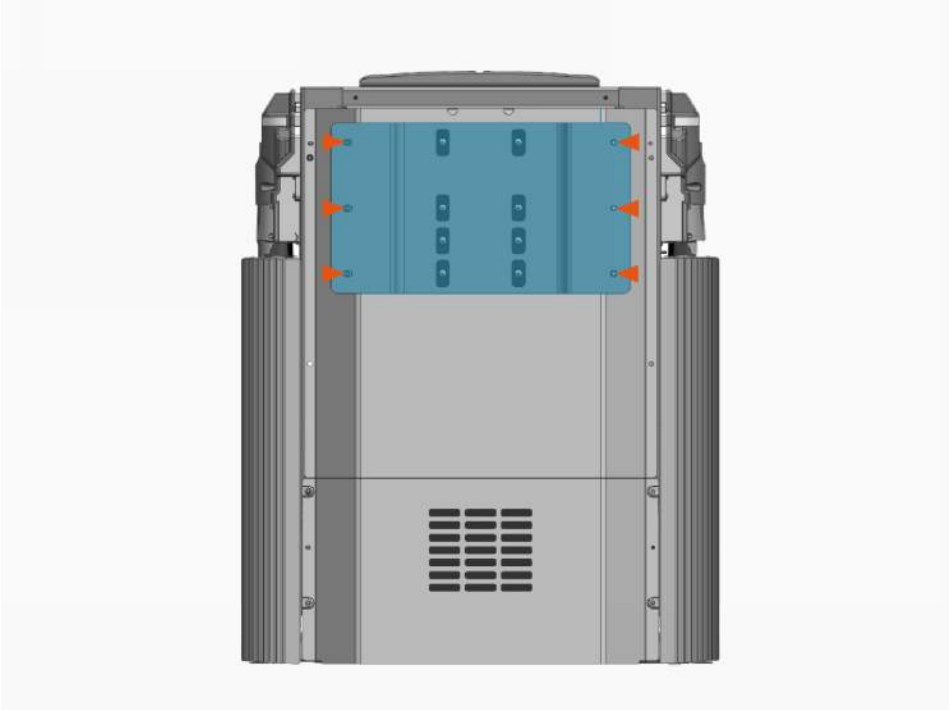


Mount Power Link 2000

1. Attach the mounting bracket to the back of the Power Link 2000 with M6 screws (x8). Torque to **5.6 Nm (50 in-lb)**.

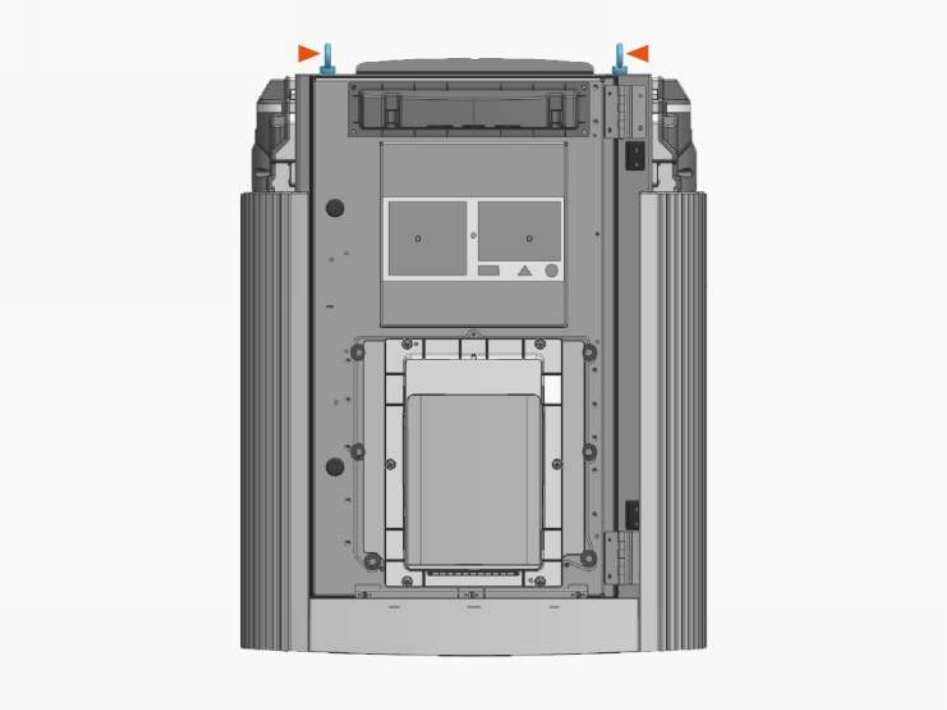


2. Mount the Power Link 2000 with fasteners (x6). Use fasteners specified by the site plan. Torque to the specification indicated by the site plan.



Note: Contractor provides the fasteners. Site plans must specify fasteners appropriate for the mounting surface and rated to secure the weight of the Power Link 2000.

3. Release the lifting straps and remove the eye bolts (x4) and rubber washers (x4). Use either an adjustable wrench or screwdriver's shaft to loosen the eye bolts.

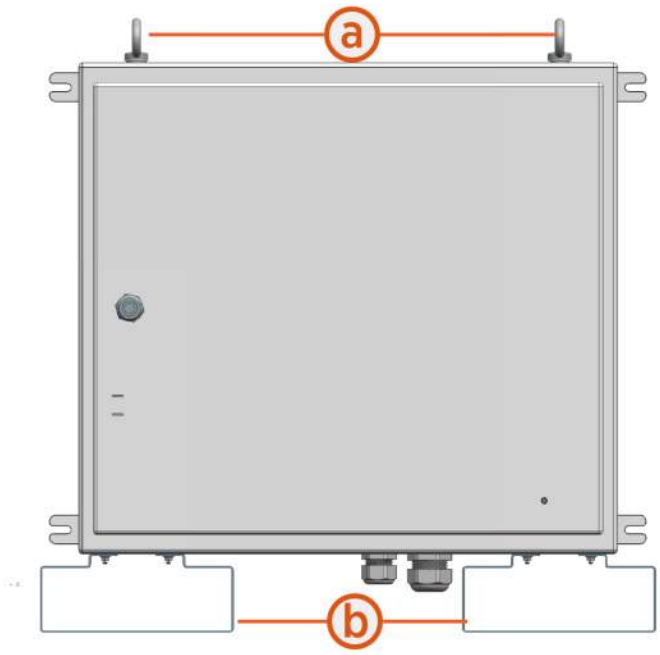


Prepare PD Controller Site

1. Identify the PD Controller mounting location per the site plan.
2. Mark the locations of the mounting holes or studs. Ensure level placement.
3. Prepare the mounting holes or studs. Consult the site plan for any site-specific requirements.

Mount PD Controller

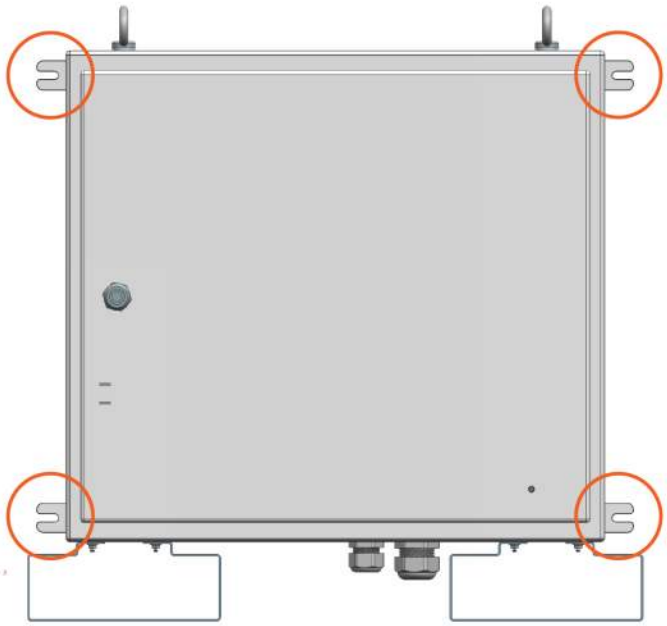
1. Based on the site configuration and available space, determine the appropriate method for lifting and transporting the PD Controller. The enclosure can be transported using the grips shown below. You may reuse the lifting straps shipped with the Power Link 2000.
    a. Eye bolts (x2)
    b. Lifting brackets (x2)



2. Lift and transport the PD Controller to its mounting location.

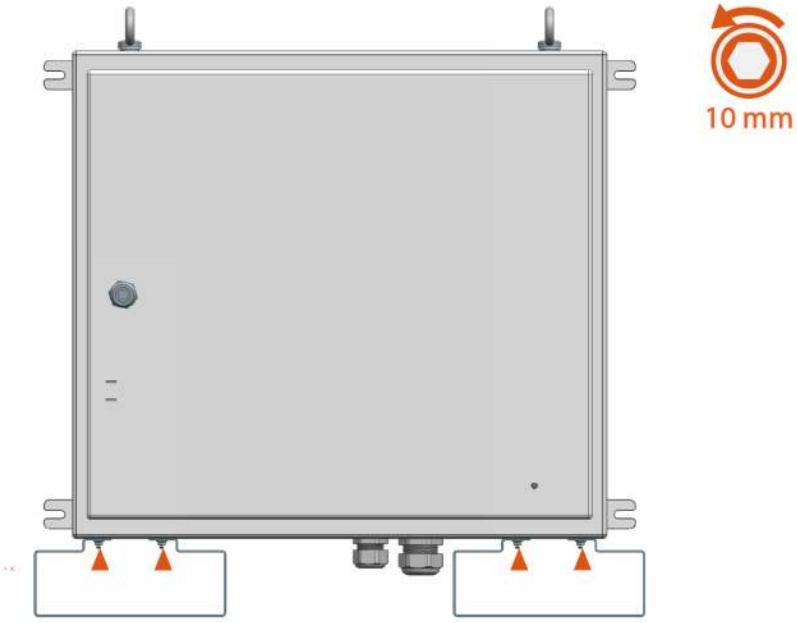
3. Mount the PD Controller with fasteners (x4). Use fasteners specified by the site plan. Torque to the specification indicated by the site plan.

   Note: Contractor provides the fasteners. Site plans must specify fasteners appropriate for the mounting surface and rated to secure the weight of the Power Link 2000.



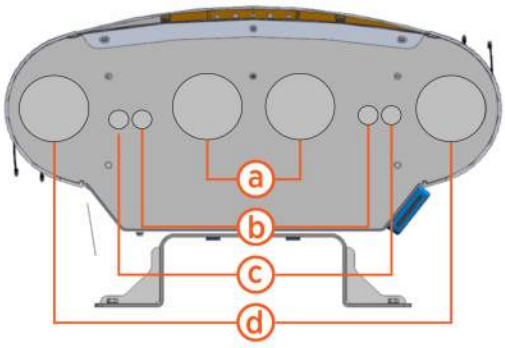
4. Remove the forklift.

5. Remove nuts to detach the lifting brackets (x4 nuts per bracket).



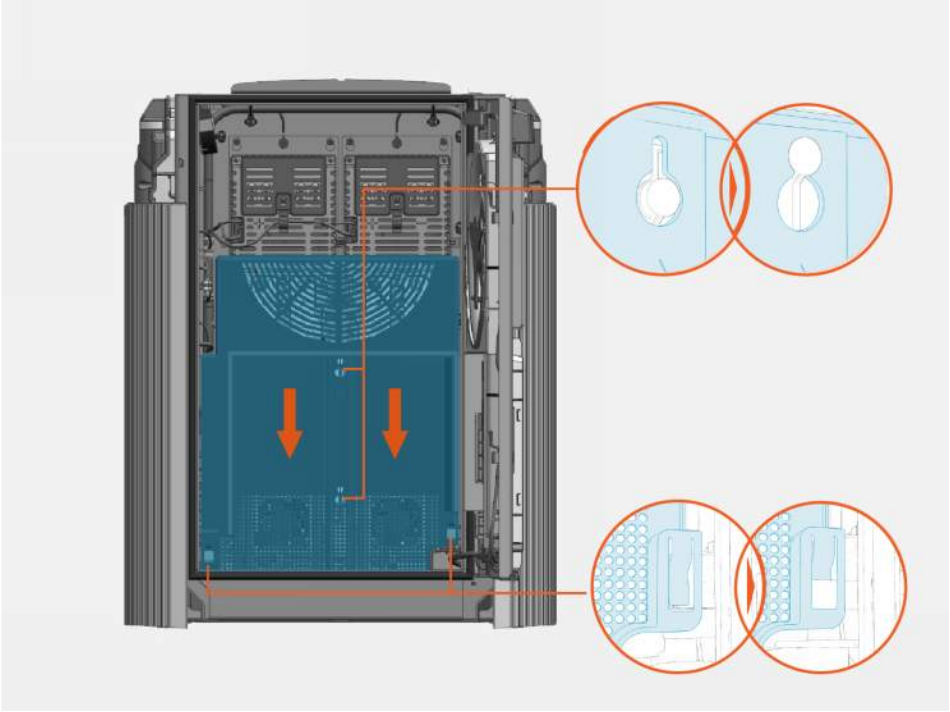
Connect Power Link 2000 Conduits

1. Open the Power Link 2000 door and engage the door stopper.
2. Connect conduits to the bottom gland plate.



a. HV DC input (Qty 1 or 2)
b. LV DC input (Qty 1 or 2)
c. LV DC output (Qty 1 or 2)
d. HV DC output (Qty 1 or 2)

3. Install bus bar safety cover onto the hooks (x2) and latches (x2). Slide the cover down to engage the latch.



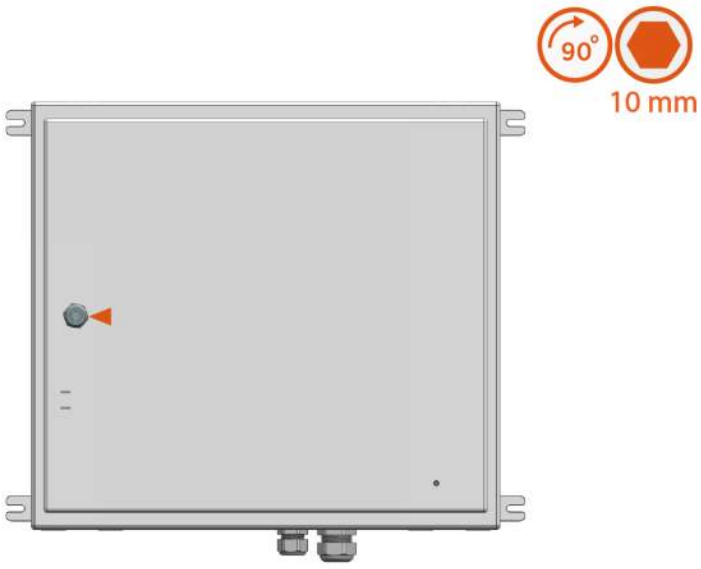
4. Disengage the door stopper and close the door.



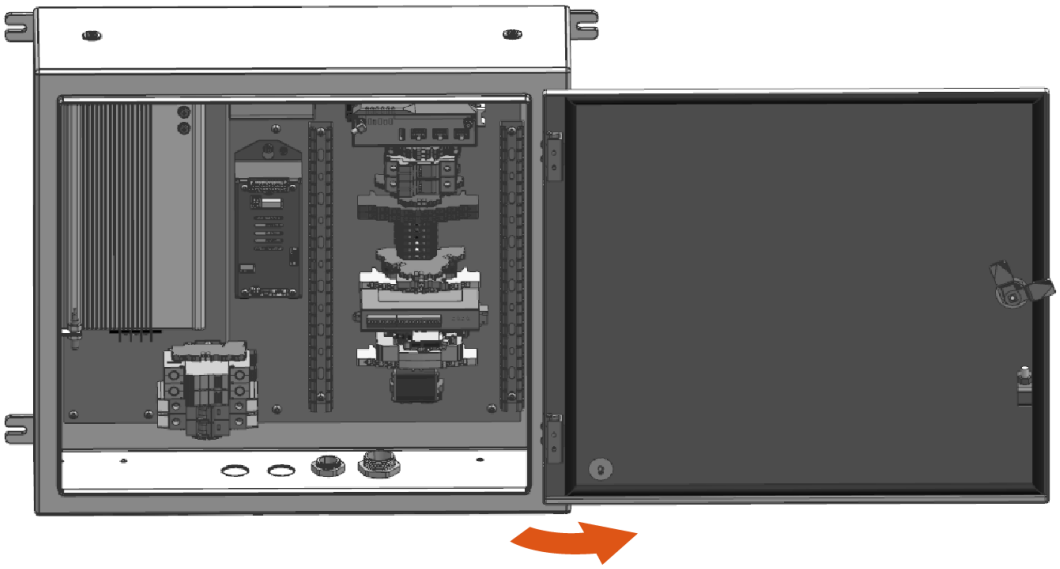
Note: The Pantograph Down 2000 system may take more than one day to install. Lock the Power Link 2000 door if leaving a site for the day.

Connect PD Controller Conduits

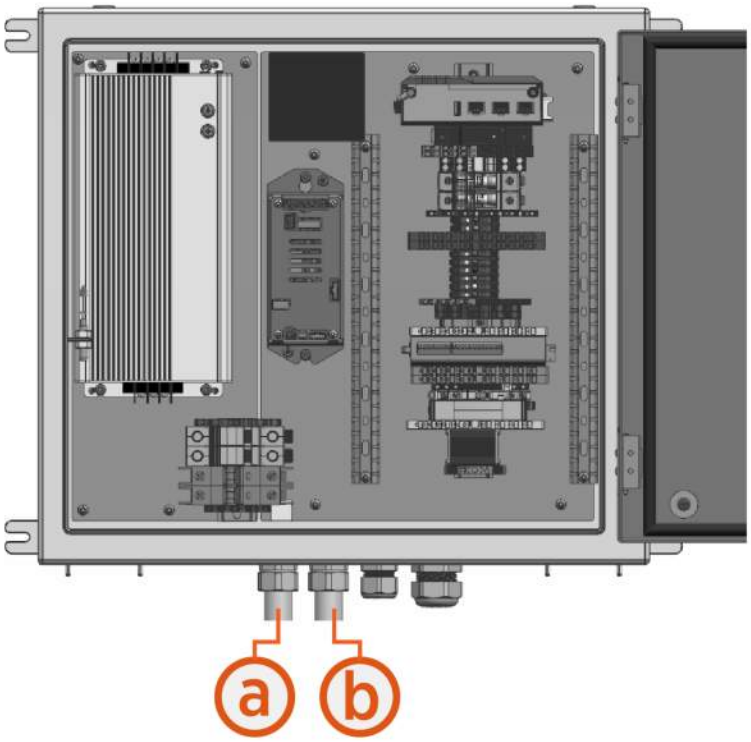
1. Quarter turn the door latch to unlock the PD Controller door.



2. Open the enclosure.

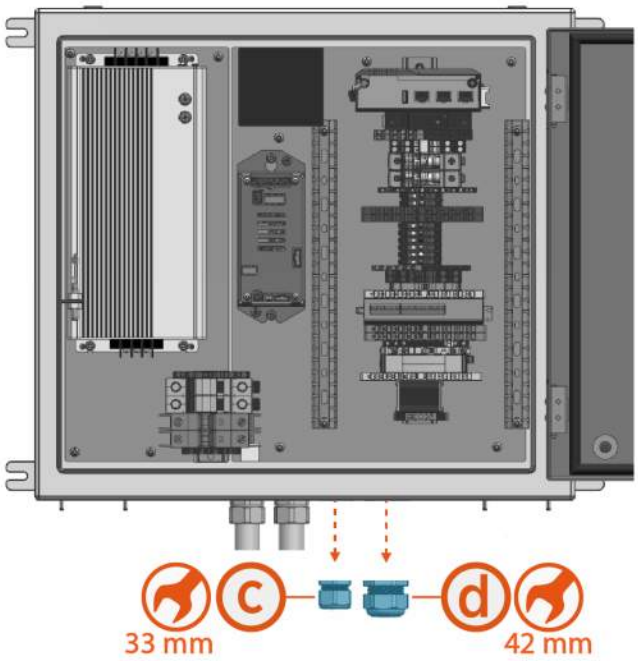


3. Connect AC and LV input conduits to the bottom of enclosure.



(a) AC input conduit
(b) LV input conduit

4. If the site plan calls for the antenna cables or the controller interface cable to enter the PD Controller through conduit, take the following steps:
    a. Remove the cable gland(s).

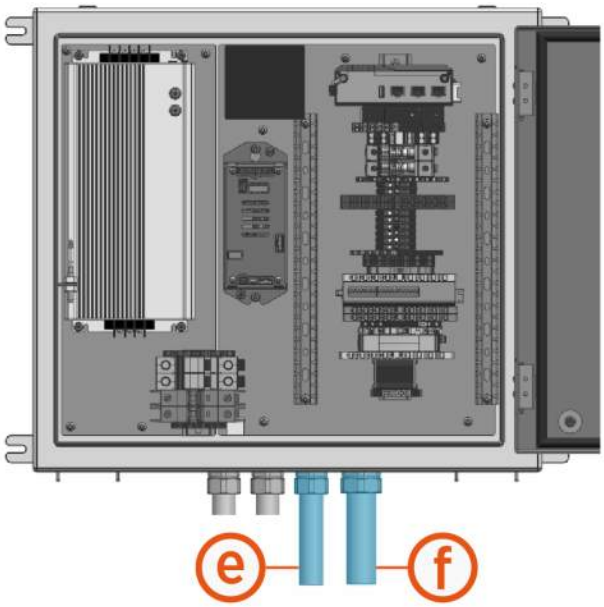


(c) Wi-Fi and RFID antenna cable gland

(d) Controller interface cable gland

Note: Save all conduit gland parts for later reuse. Do not discard.

    b. Connect conduit(s) to the bottom of enclosure.



(e) Wi-Fi and RFID antenna cable conduit

(f) Controller interface cable conduit

5. Close the PD Controller door.



Note: The Pantograph Down 2000 system may take more than a single day to install. Lock the PD Controller door if leaving a site for the day.

Mount Auxiliary Components to Schunk SLS 201

5

WARNING: Do not install or service the charging station in inclement weather. If you work in snow, rain, or wind, you must use a weather-proof shelter that covers all boxes and components.

IMPORTANT: Ensure the installation complies with all applicable codes and ordinances.

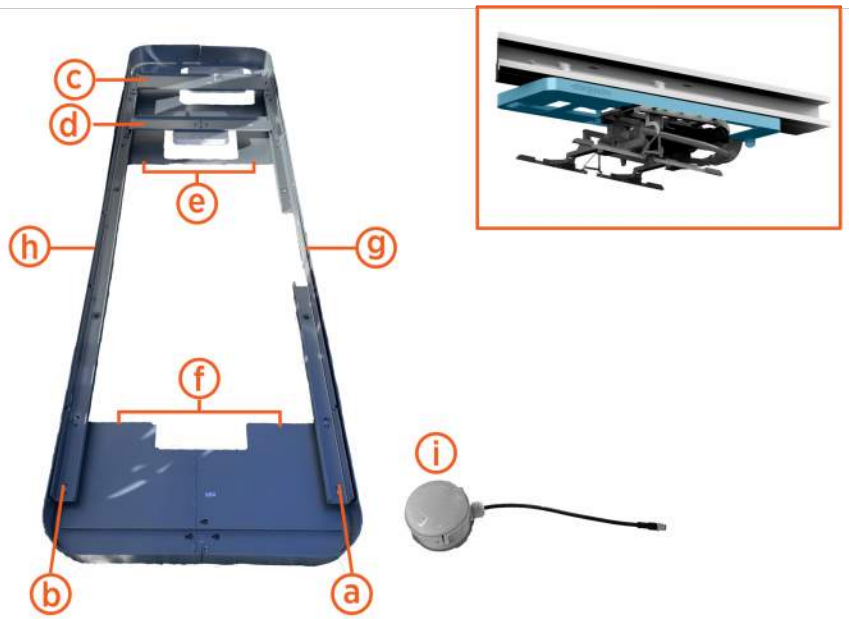
CAUTION: Warranty Limitation

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- You must be a licensed electrician and complete training at chargepoint.com/installers to become ChargePoint certified and to access ChargePoint's web-based installer tools or ChargePoint Installer app.

CAUTION: Use low torque settings when working with power tools during installation or servicing. Over-torquing can damage the equipment.

Introduction

A mounting frame attaches the auxiliary components (Wi-Fi antenna, RFID antenna, and status LED) to the Schunk SLS 201 pantograph.

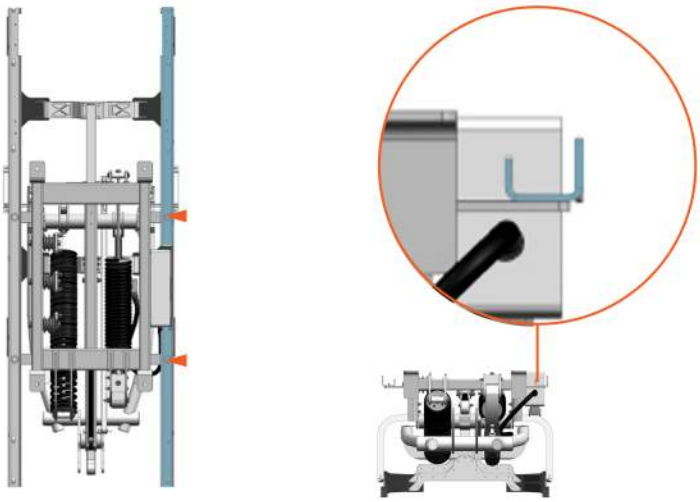


- **(a)** Right side rail
- **(b)** Left side rail
- **(c)** Wi-Fi antenna assembly
- **(d)** RFID antenna assembly
- **(e)** Rear cover
- **(f)** Front cover
- **(g)** Right side cover
- **(h)** Left side cover
- **(i)** Status LED

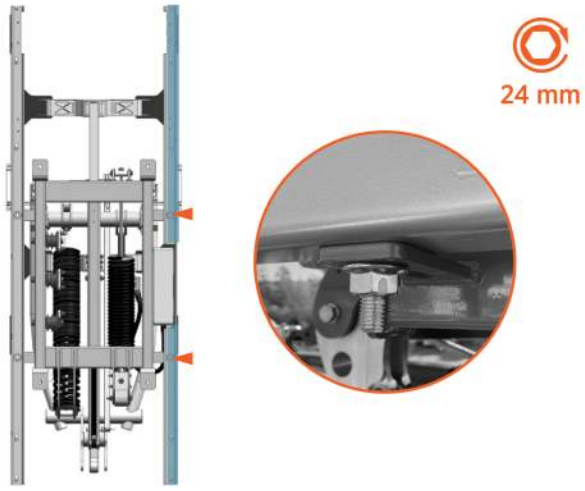
Install Side Rails

1. Align the right side rail to the pantograph aid mounting supports.

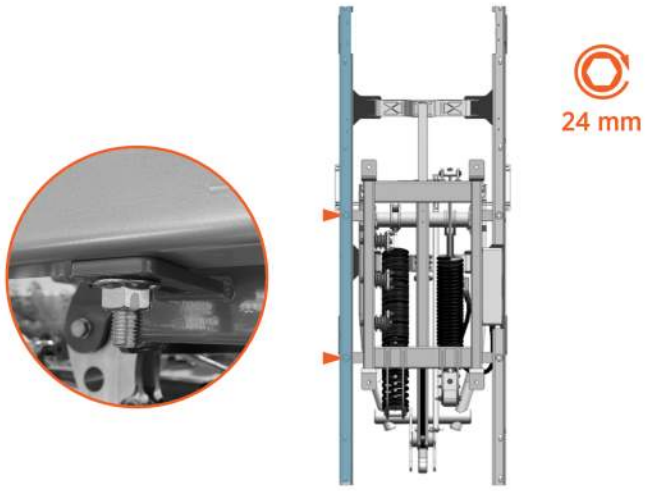
   Note: The right side rail has a cutout notch to accommodate the pantograph electric control unit. The left side rail does not.



2. Install M16 bolt and flange nut at mounting supports (x2 fastener sets total) to fasten rail. Torque to **94.9 Nm (70 ft-lb)**.

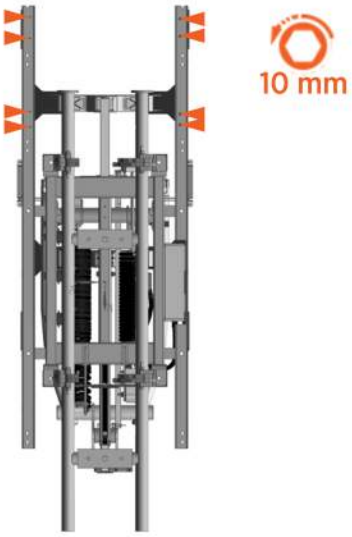


3. Repeat above steps to install the left side rail on the pantograph.

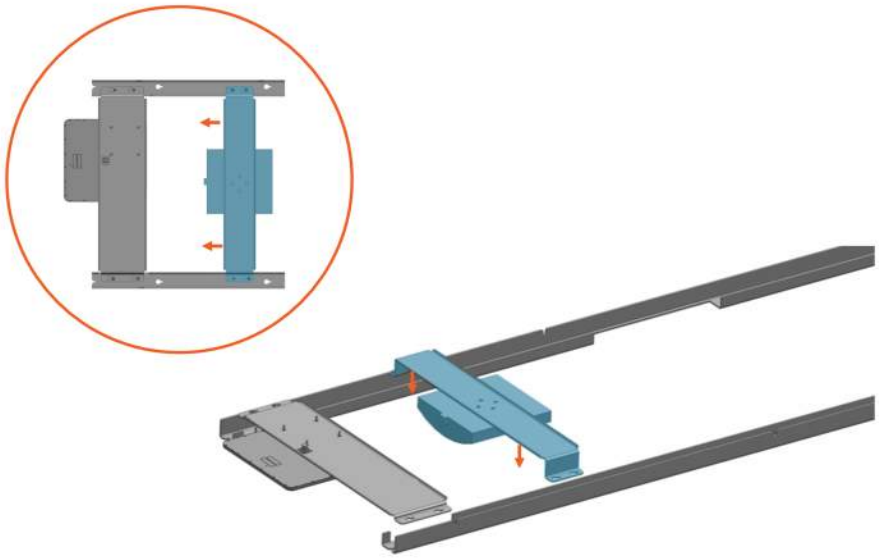


Install Wi-Fi and RFID Antenna Assemblies

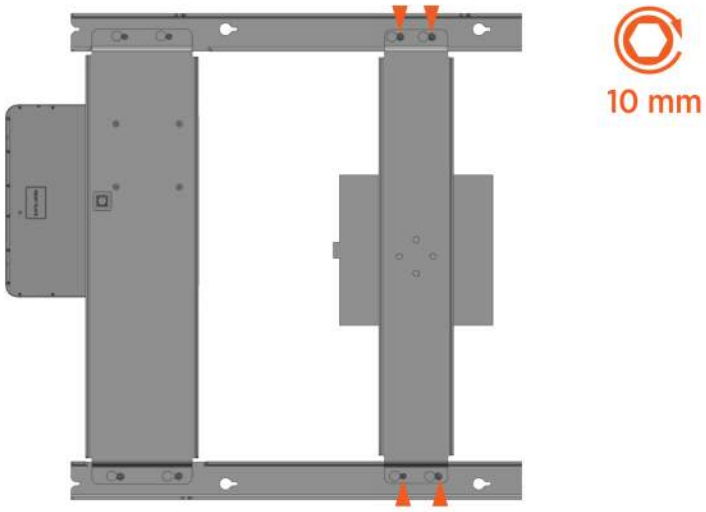
1. Loosen (do not remove) the M6 nuts (x8) at the rear of the left and right rails.



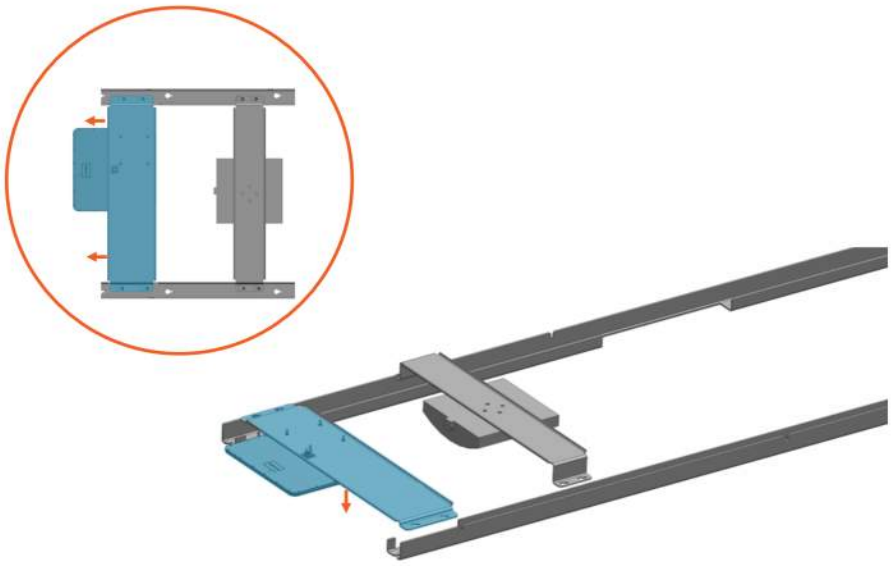
2. Install the RFID assembly onto the left and right rails. Align the keyhole slots on the RFID assembly to the studs on the rails, and slide the assembly to engage the keyhole lock.



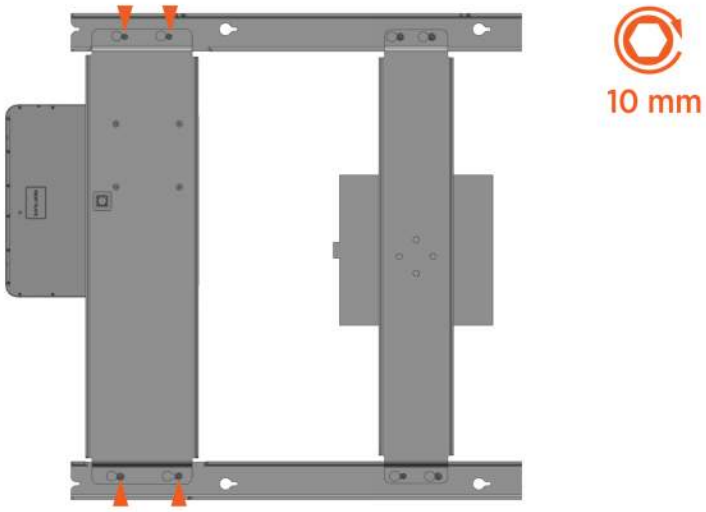
3. Tighten the M6 nuts (x4). Torque to **5.6 Nm (50 in-lb)**.



4. Install the Wi-Fi assembly onto the left and right rails. Align the keyhole slots on the Wi-Fi assembly to the studs on the rails, and slide the assembly to engage the keyhole lock.



5. Tighten the M6 nuts (x4). Torque to **5.6 Nm (50 in-lb)**.

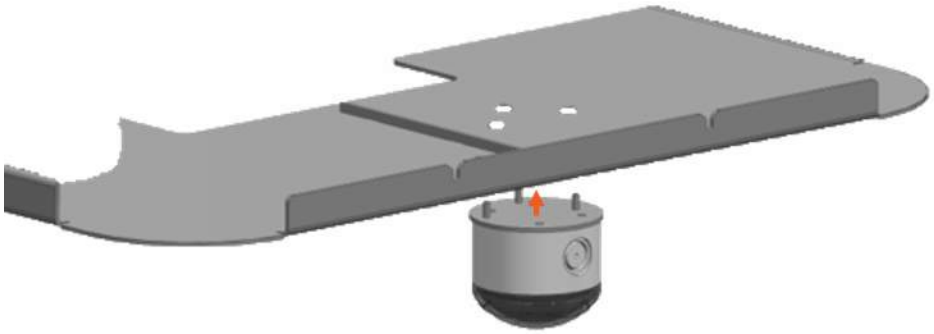


Install Front Cover With Status LED

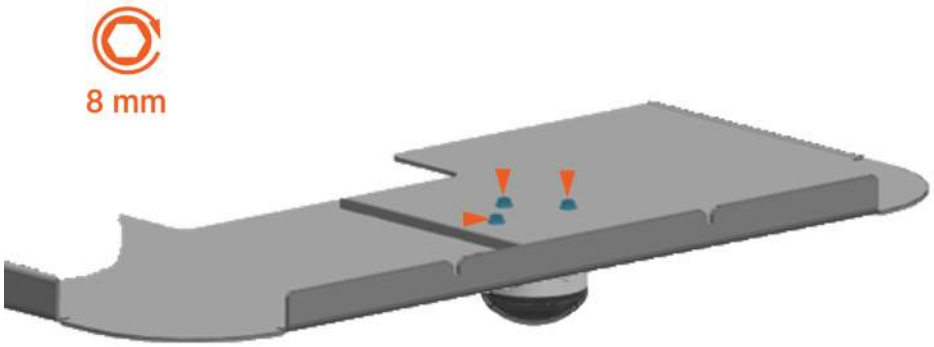
1. Loosen (do not remove) M5 nuts (x3) on the status LED.



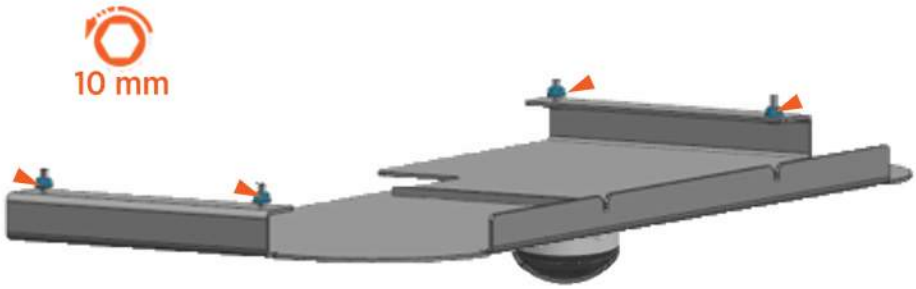
2. Mount the status LED to the front cover. Twist the status LED to lock its mounting studs into the keyhole slots.



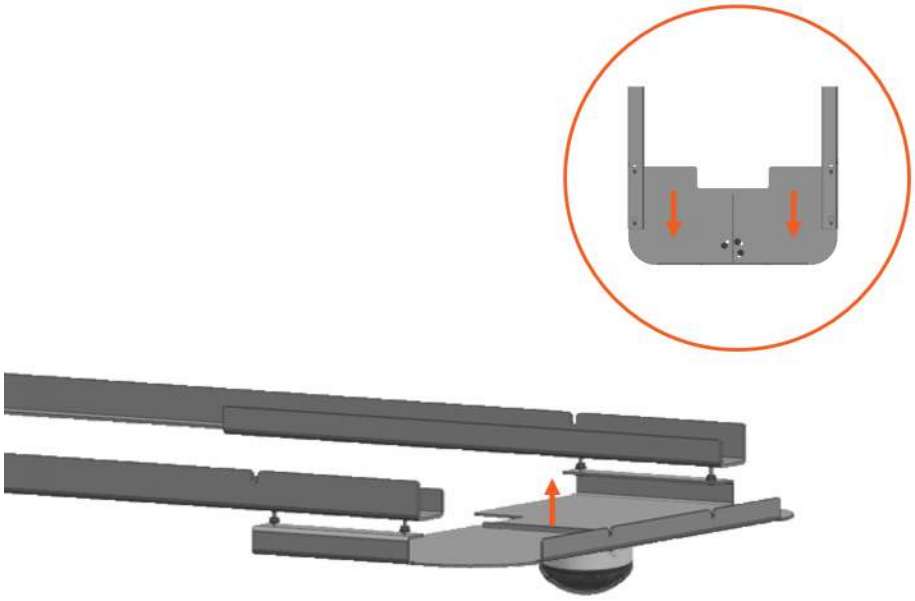
3. Torque M5 nuts (x3) to **4.5 Nm (40 in-lb)**.



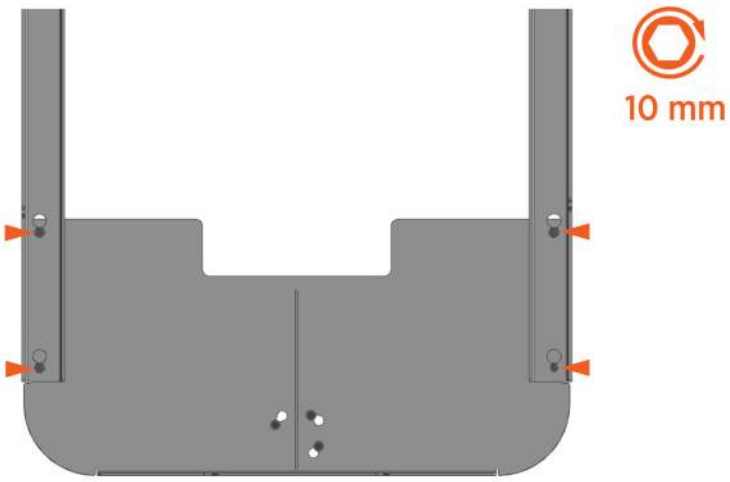
4. Loosen (do not remove) M6 nuts (x4) on the front cover.



5. Install the front cover assembly onto the left and right rails. Align the keyhole slots in the cover to the studs on the rails, and slide the cover to engage the keyhole locks.



6. Tighten the M6 nuts (x4). Torque to **5.6 Nm (50 in-lb)**.



Save Remaining Frame Parts

Save the remaining parts of the auxiliary component mounting frame for later installation. The rear cover and side covers will not install until after cables are connected to the antennas. See Complete Auxiliary Component Frame.

Connect Power Link 2000 Wires 6

WARNING: Do not install or service the charging station in inclement weather. If you work in snow, rain, or wind, you must use a weather-proof shelter that covers all boxes and components.

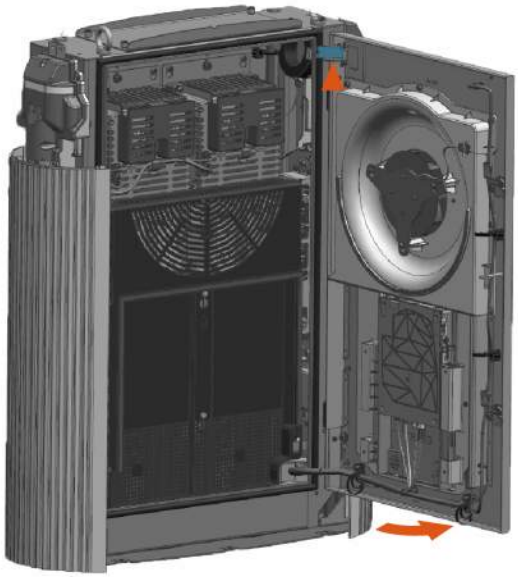
IMPORTANT: Ensure the installation complies with all applicable codes and ordinances.

CAUTION: Warranty Limitation

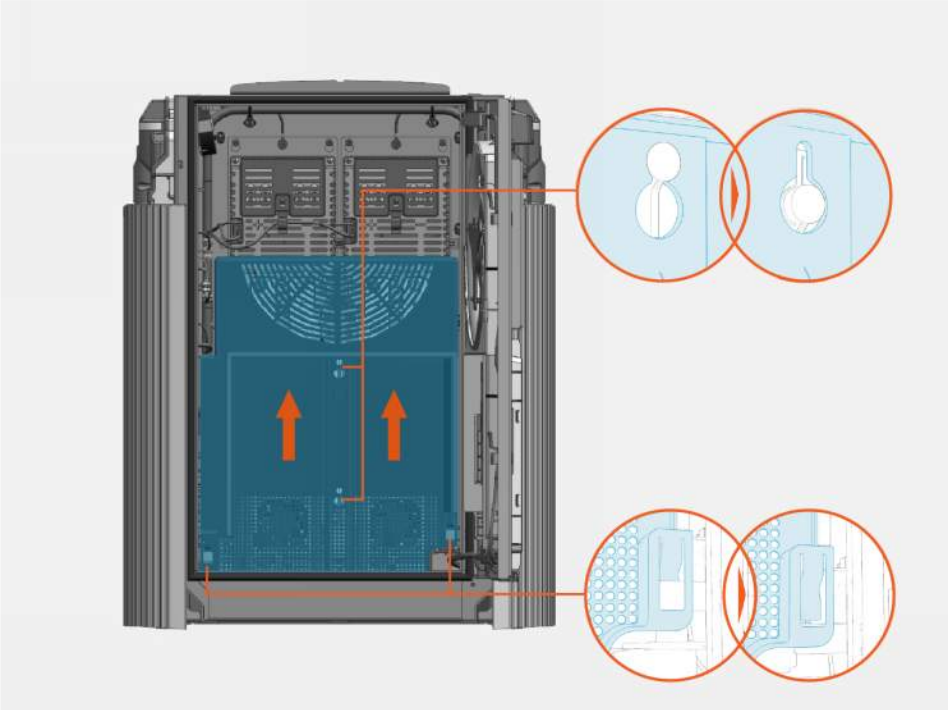
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- You must be a licensed electrician and complete training at chargepoint.com/installers to become ChargePoint certified and to access ChargePoint's web-based installer tools or ChargePoint Installer app.

Access Internal Bus Bars

1. Open the door and engage the door stopper.

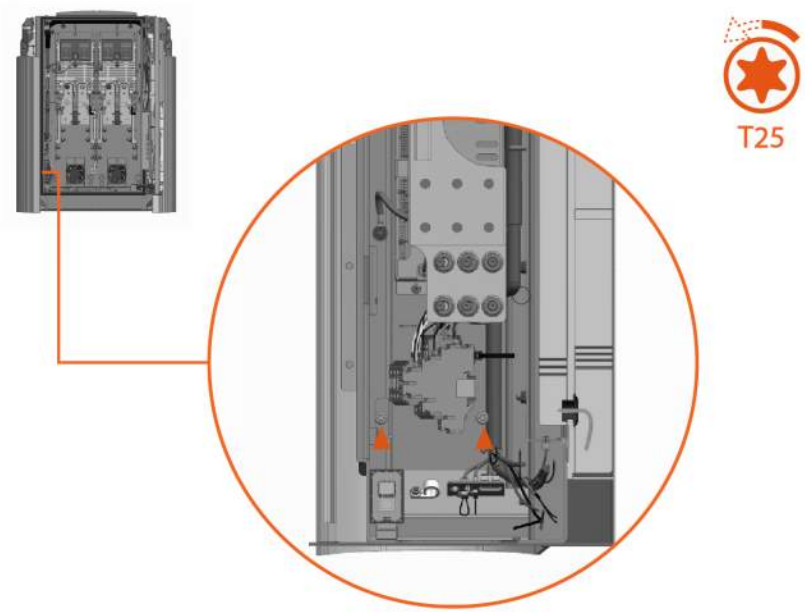


2. Slide the bus bar safety cover up to remove from hooks (x2) and latches (x2).

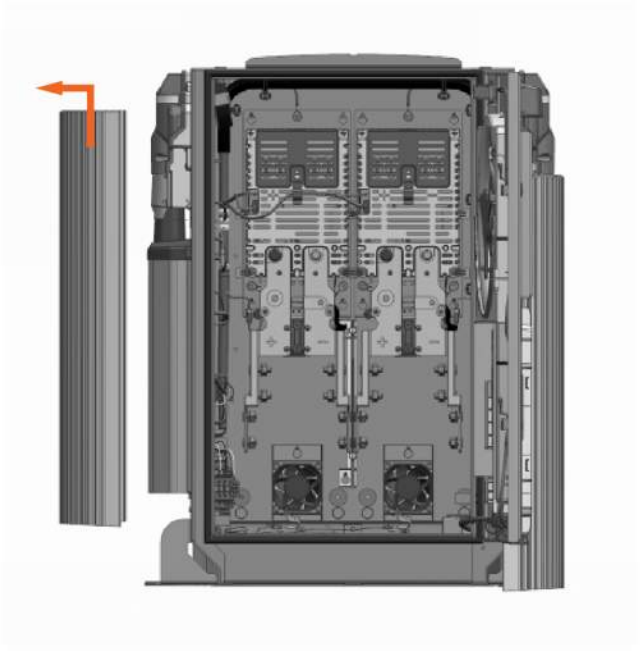


Access External Bus Bars

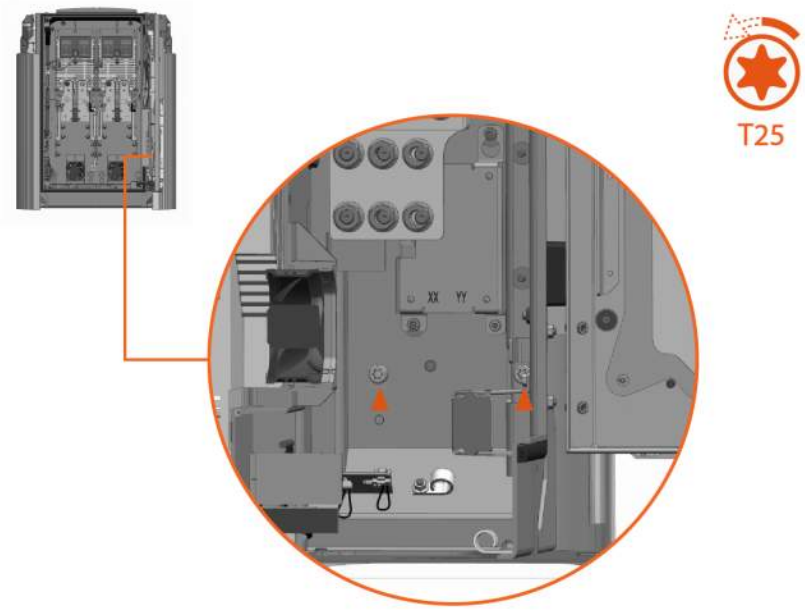
1. Loosen captive screws (x2) on the interior left wall of enclosure.



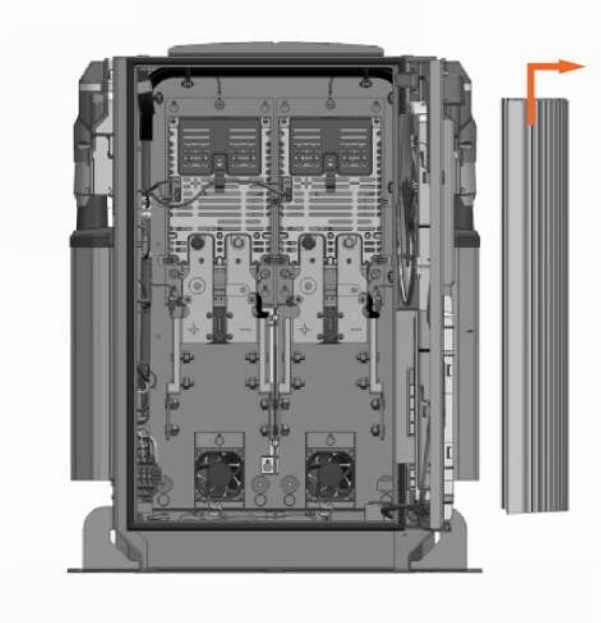
2. Slide the left side panel upward to release it from hooks (x2) on the Power Link 2000 frame.



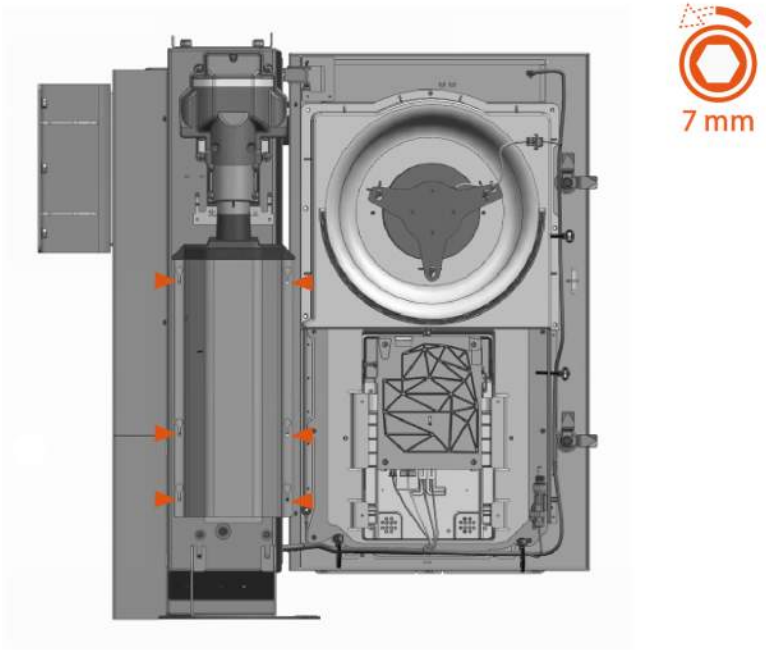
3. Loosen captive screws (x2) on the interior right wall of enclosure.



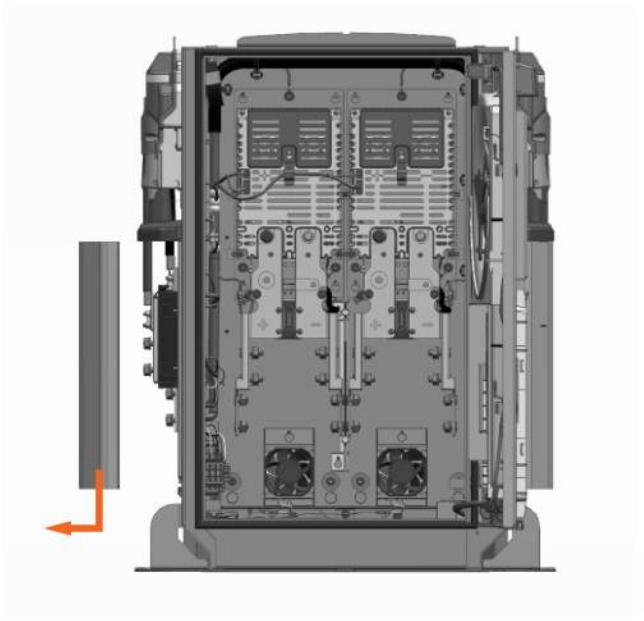
4. Slide the right side panel upward to release it from hooks (x2) on the Power Link 2000 frame.



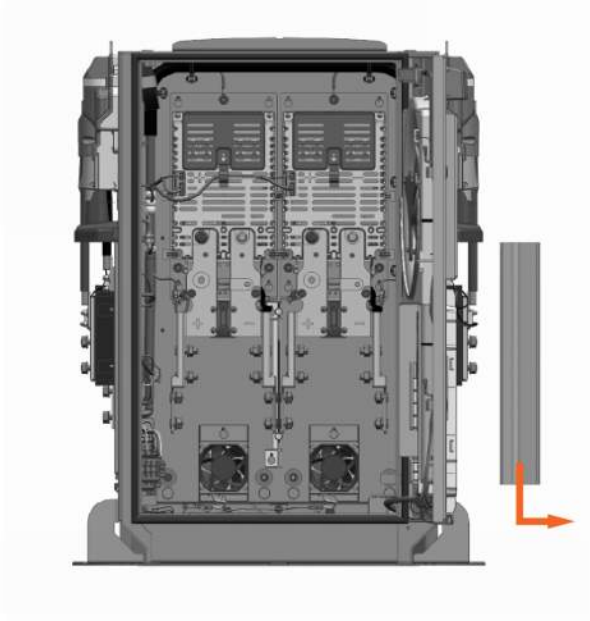
5. Loosen (do not remove) nuts (x6) at the left HV DC output safety cover.



6. Slide the safety cover downward to release it from the Power Link 2000 frame. Remove the cover.



7. Repeat procedure to remove the right HV DC output safety cover.



Pull, Cut, and Connect Wires

HV DC Output Wires

1. Pull and cut the HV DC output wires to length for landing on the HV DC output bus bars. Take into account the length of the lug that will terminate each wire. If necessary, apply a non-conductive wire pulling lubricant. See Output Wires for wire landing locations.
2. Connect the HV DC output wires. See How To Connect Wires.

HV DC Input Wires

1. Pull and cut the HV DC input wires to length for landing on the HV DC input bus bars. Take into account the length of the lug that will terminate each wire. If necessary, apply a non-conductive wire pulling lubricant. See How To Connect Wires for wire landing locations.
2. Connect the HV DC input wires. See How To Connect Wires.

IMPORTANT: Before pulling additional wires into the enclosure, land all wires to prevent crowding in the work area.

3. If the site plan requires the Power Link 2000 be configured for sequential charging, install the Sequential Charging Kit. See Appendix: Sequential Charging Kit

LV DC and Ethernet Wires

1. Pull the 48 V DC, Ethernet, and chassis ground wires into the enclosure. Cut the wires to length for landing. See How To Connect Wires for wire landing locations.

IMPORTANT: Depending on the site configuration, there may be a great number of wires to connect. Pull and connect wires one conduit at a time for an orderly installation.

2. Connect the LV DC wires. See How To Connect Wires.

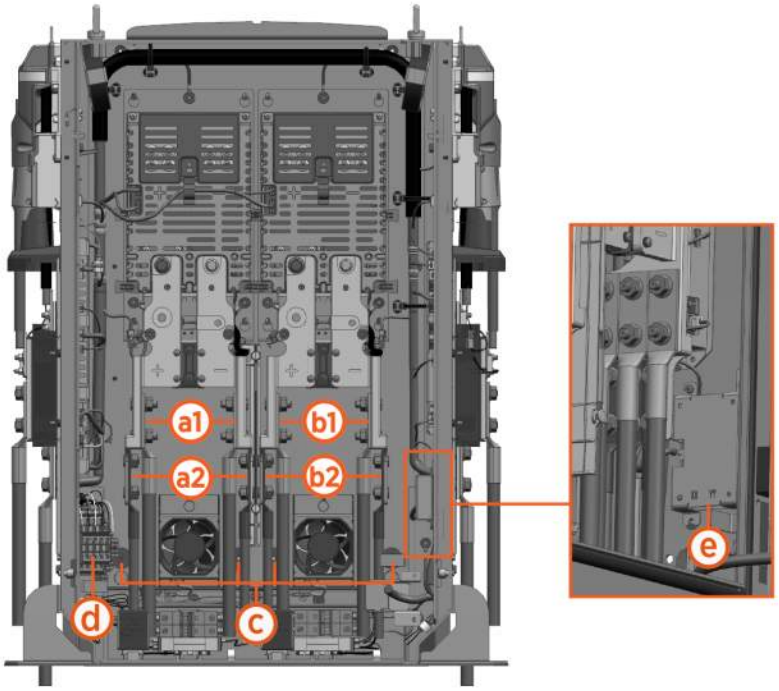
How To Connect Wires

Note: See Materials for wire and wire termination specifications.

Input Wires

The DC and Ethernet output from Power Block(s) is the input for the Power Link 2000.

The depot mount Power Link 2000 has two HV DC input power paths, A and B. Each power path has two landings for receiving input wires, an upper landing and a lower landing.



(a1) HV DC input A, upper landing

(a2) HV DC input A, lower landing

(b1) HV DC input B, upper landing

(b2) HV DC input B, lower landing

(c) Ground input

(d) LV DC input

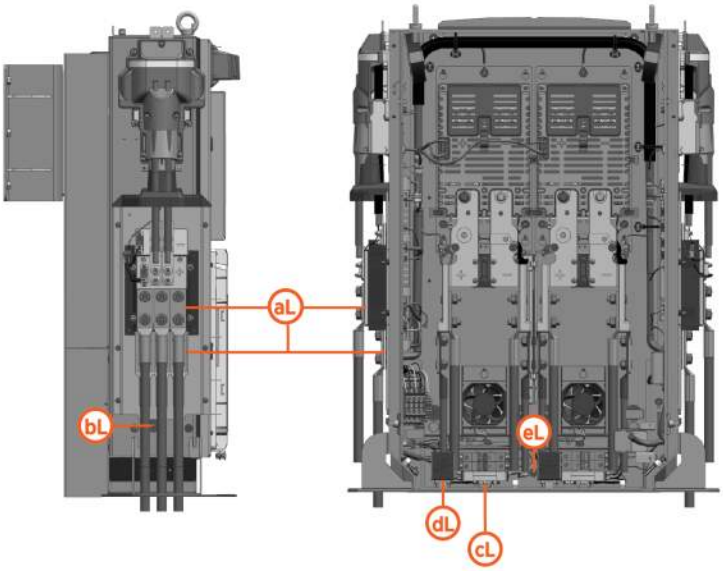
(e) Ethernet input

Wire	How to Connect
HV DC input wires (Max. 500 A)	See Connect HV DC and Ground Wires
High power ground wire (one from each Power Block)	
LV DC input wires	See Connect LV DC Input Wires
Ethernet input cable	See Connect Ethernet Input Cable

Output Wires

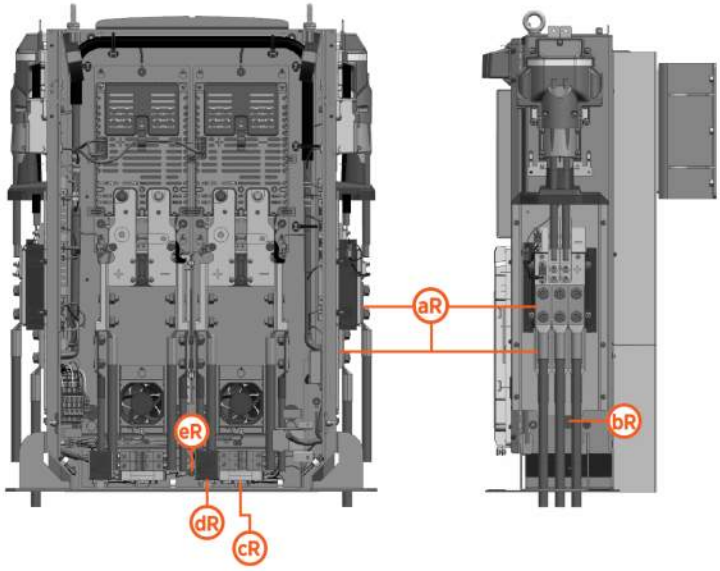
The depot mount Power Link 2000 supports up to two HV DC outputs (L and R). Each output is the HV DC input for one pantograph. The pantographs are designated Pantograph L and Pantograph R, accordingly. The Power Link 2000 also outputs LV DC, chassis ground, and Ethernet connection to each PD Controller paired with a pantograph.

The illustration below shows the landing locations for DC output wires connecting to Pantograph L and its paired PD Controller (front view of the Power Link 2000).



(aL) HV DC output L
(bL) High power ground L
(cL) LV DC output L
(dL) Ethernet output L
(eL) Chassis ground output L

The illustration below shows the landing locations for DC output wires connecting to Pantograph R and its paired PD Controller (front view of the Power Link 2000).



(aR) HV DC output R
(bR) High power ground R
(cR) LV DC output R
(dR) Ethernet output R
(eR) Chassis ground output R

Note: Single output Power Link 2000 are equipped with right (R) side outputs.

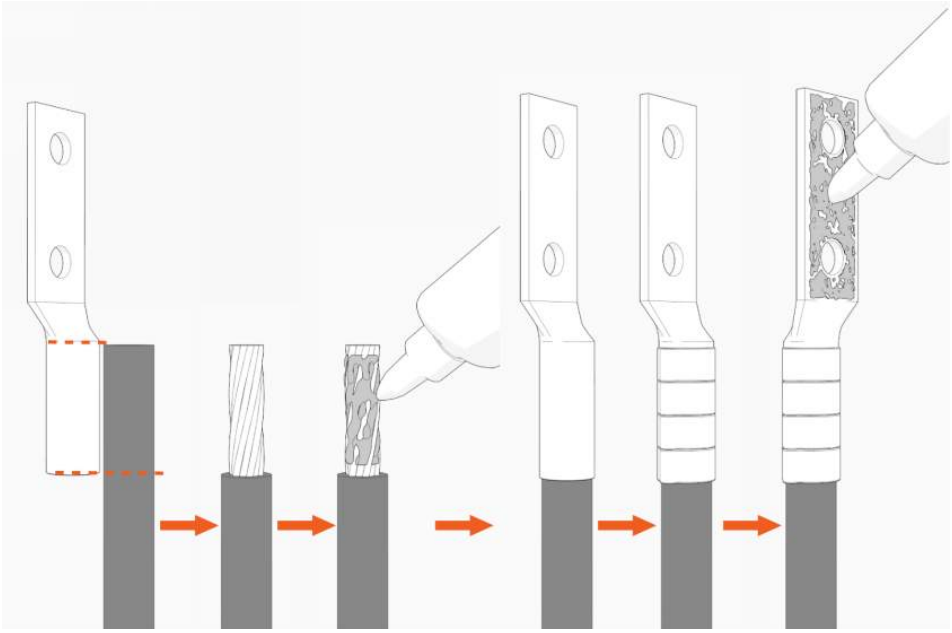
Wire	How To Connect
HV DC output wires (Max. 500 A each output)	See Connect HV DC and Ground Wires
High power ground wires	
LV DC output wires	See Connect LV DC Output Wires
Chassis ground wires	See Connect Chassis Ground Wire
Ethernet cables	See Connect Ethernet Output Cables

Connect HV DC and Ground Wires

IMPORTANT: Before you begin, make note of the following:

- See How To Connect Wires for the wire landing locations.
- Make sure no wire material is exposed below the lug barrel. If necessary, heat shrink or tape the exposed area to meet the local code requirements.
- Wipe off any remains of wire pulling lubricant if applied.

1. Prepare the wires.



Note: The illustration above shows the preparation of a HV DC wire with a double hole lug. The same procedure applies for preparing the high power ground wire with a single hole lug.

a. Mark the lug's barrel height on the wire terminal.

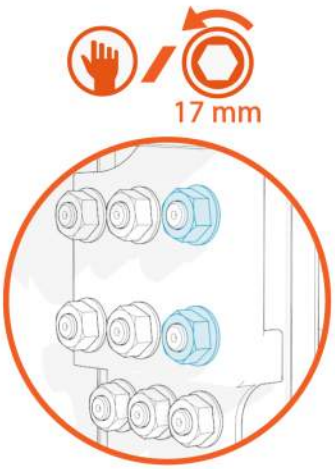
b. Strip the jacket on the marked terminal. Use a suitable wire stripper, such as Klein tool.

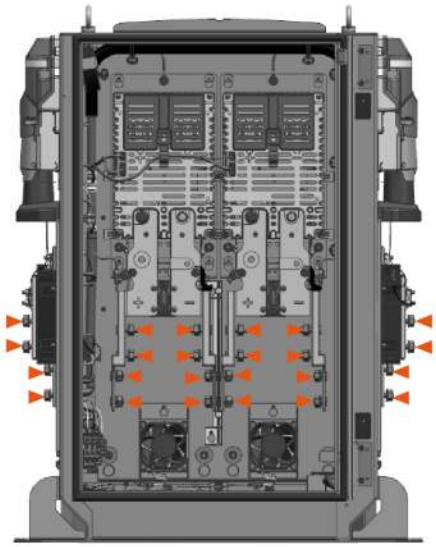
c. If recommended by the wire manufacturer or local code, apply an anti-oxidant joint compound to the stripped wire material to make a gastight joint with the lug.

d. Insert the stripped terminal into the lug's barrel and crimp it. Use a suitable lug crimping tool and/or die recommended by the lug manufacturer.

e. Apply dielectric grease to the lug's tongue surface that comes in contact with the bus bars.

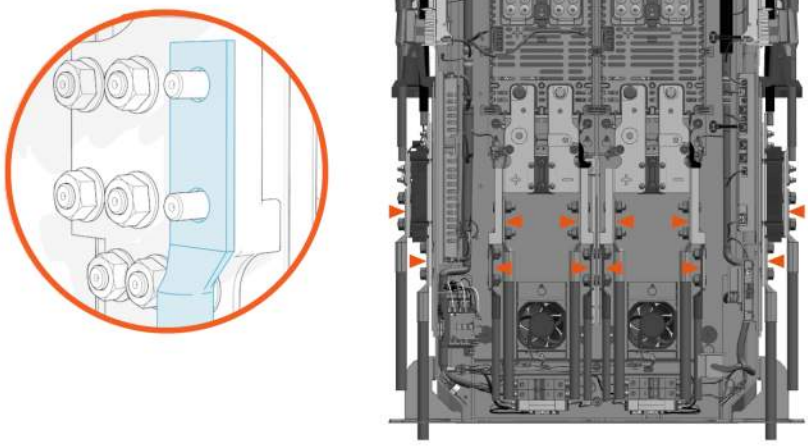
2. Remove lug nuts from the HV DC wire bus bars.





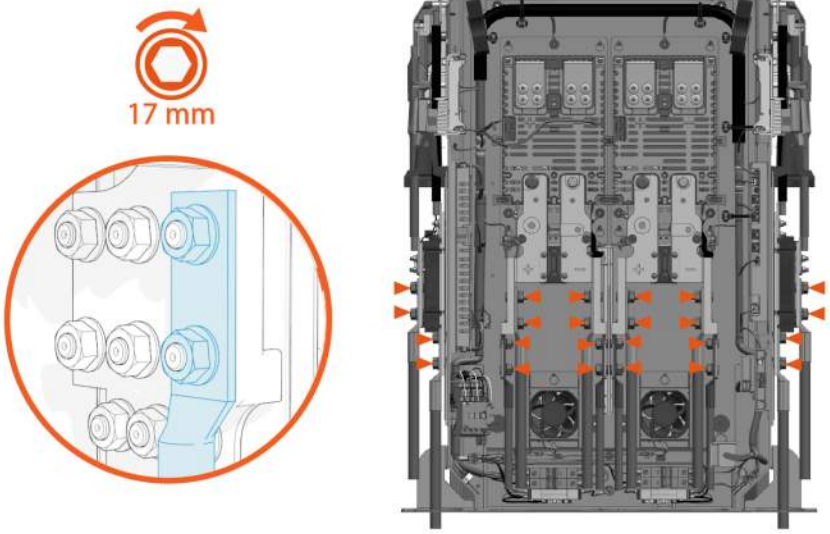
3. Install the prepared wire onto the studs.

IMPORTANT: When connecting the HV DC wires, install the red (+) wire's lug onto the bus bar's positive (+) pole and black (-) wires onto the bus bar's negative (-) pole.



4. Reinstall the lug nuts and torque them.

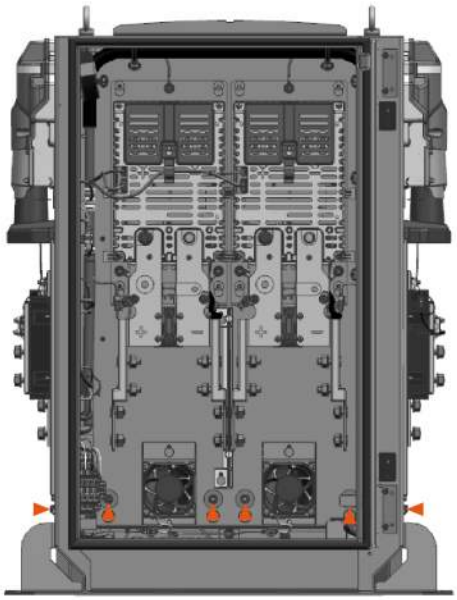
IMPORTANT: Torque the HV DC wire lug nuts to **19 Nm (14 ft-lb)**.



5. Mark all torqued connections to ensure all lug nuts have been tightened. Torque marks are required to pass post-installation inspection.

6. Repeat the steps above for all high power ground wires.

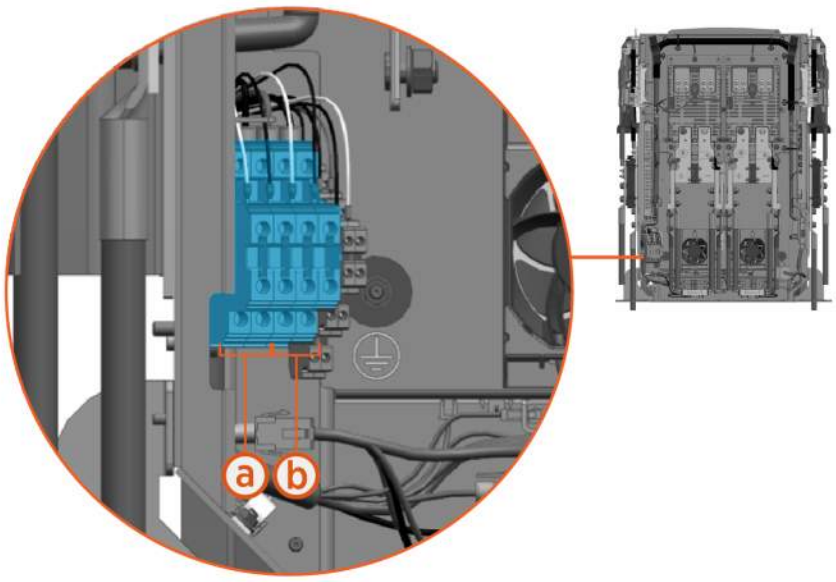
IMPORTANT: Torque the high power ground wire lug nuts to **5.6 Nm (50 in-lb)**.



Connect LV DC Input Wires

Follow the procedure below for each LV DC wire pair.

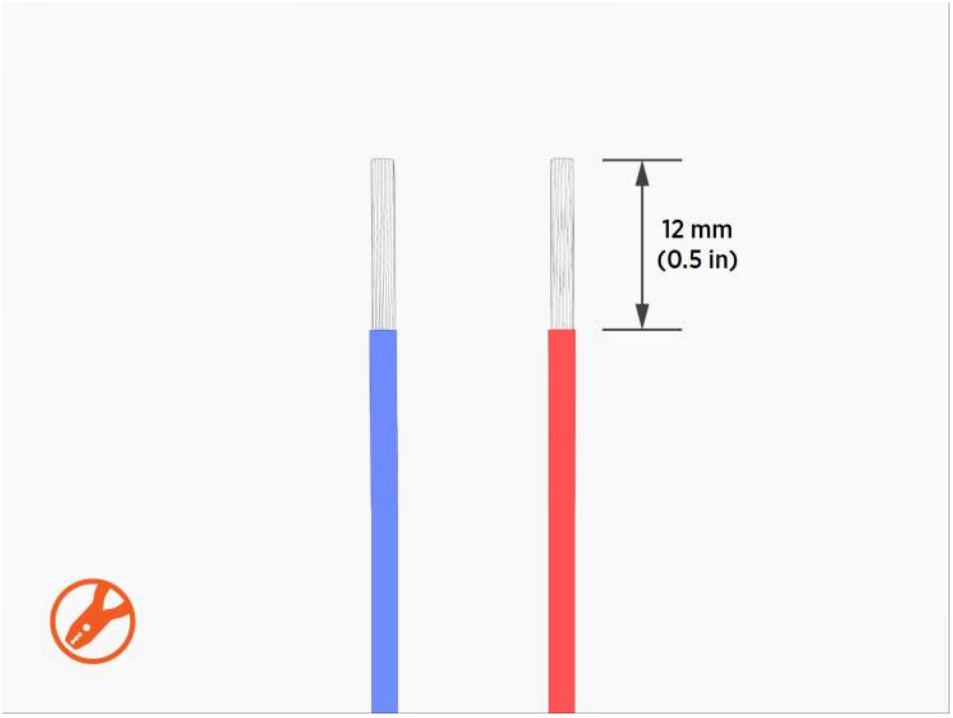
1. Identify the target terminals for landing the LV DC input wire pair.



(a) Primary LV DC input terminals

(b) Secondary LV DC input terminals

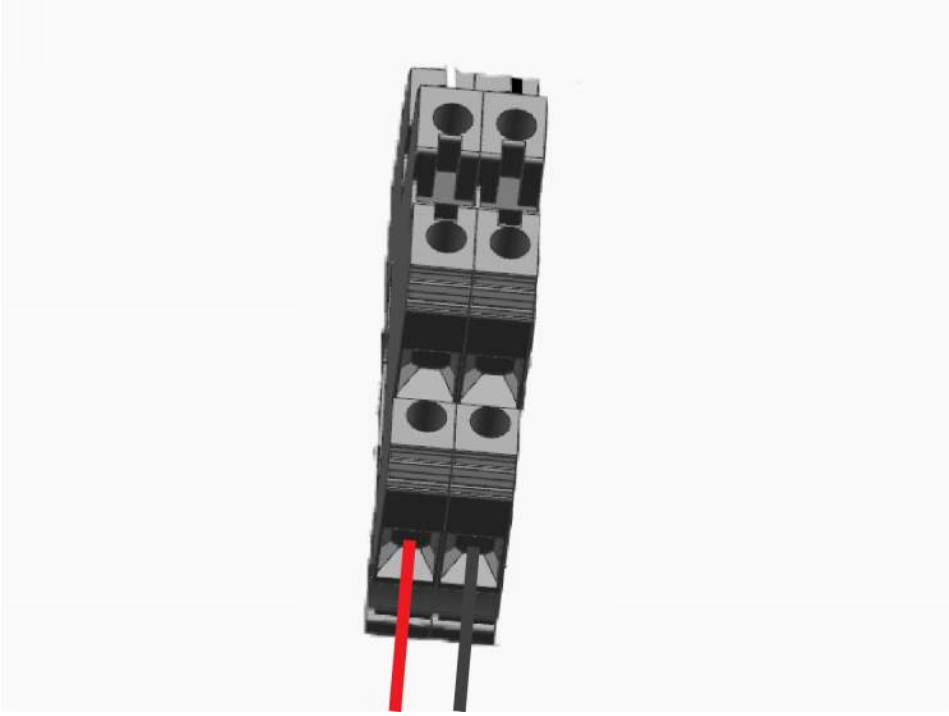
2. Strip the wire jackets.



3. Loosen the terminal screws (x2).



4. Insert positive (+) wire into left terminal and negative (-) wire into right terminal.



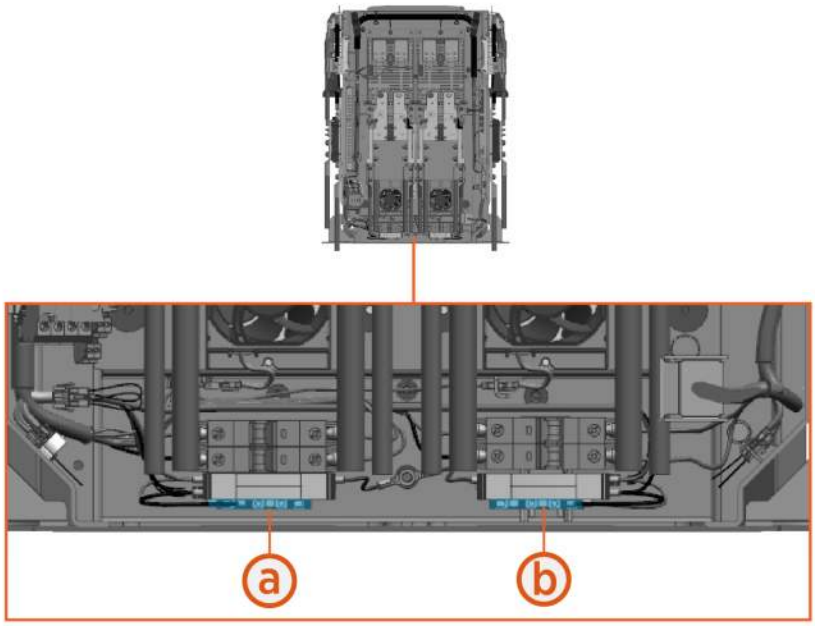
5. Torque the screws (x2) to **1.5 Nm (13.3 in-lb)**. Push-pull to test that both wires (+ and -) are secured.



Connect LV DC Output Wires

Follow the procedure below for each LV DC output wire pair.

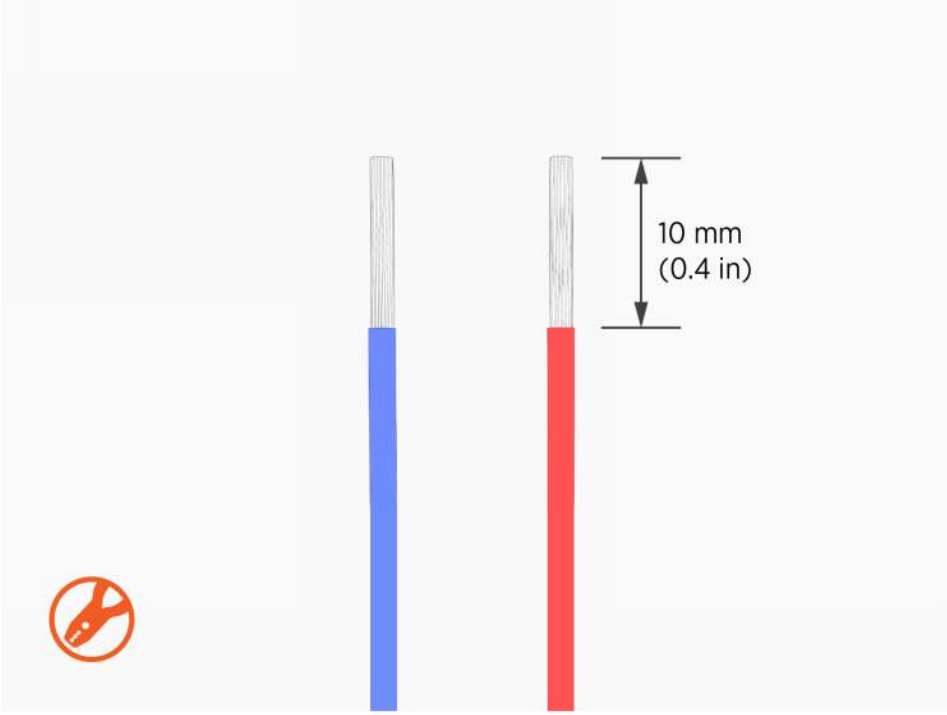
1. Identify the target terminal for landing the LV DC wire pair.



(a) LV DC output terminal L

(b) LV DC output terminal R

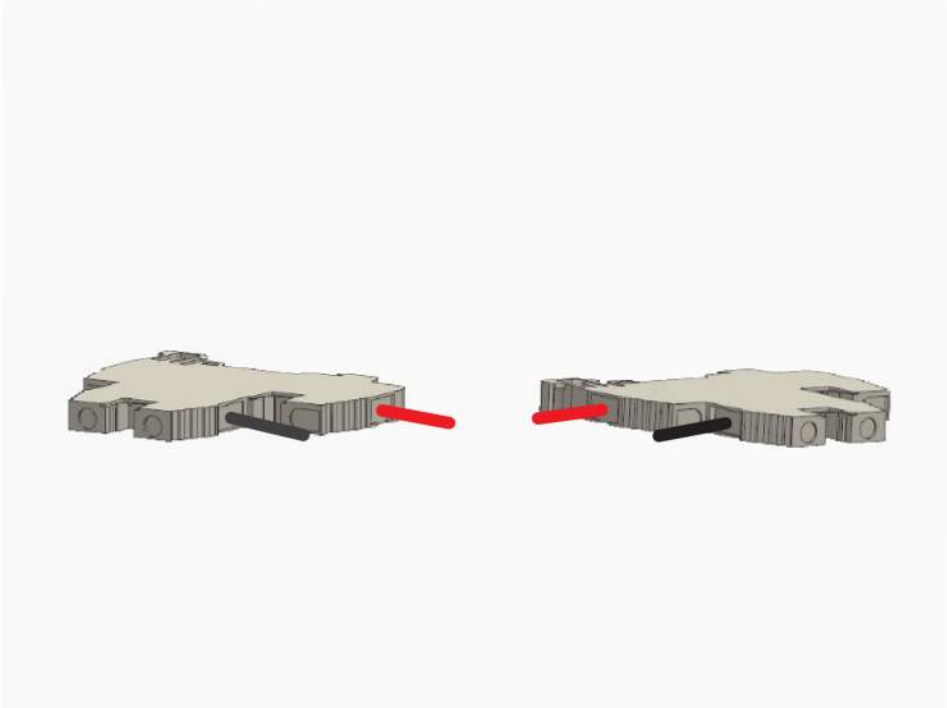
2. Strip the wire jackets.



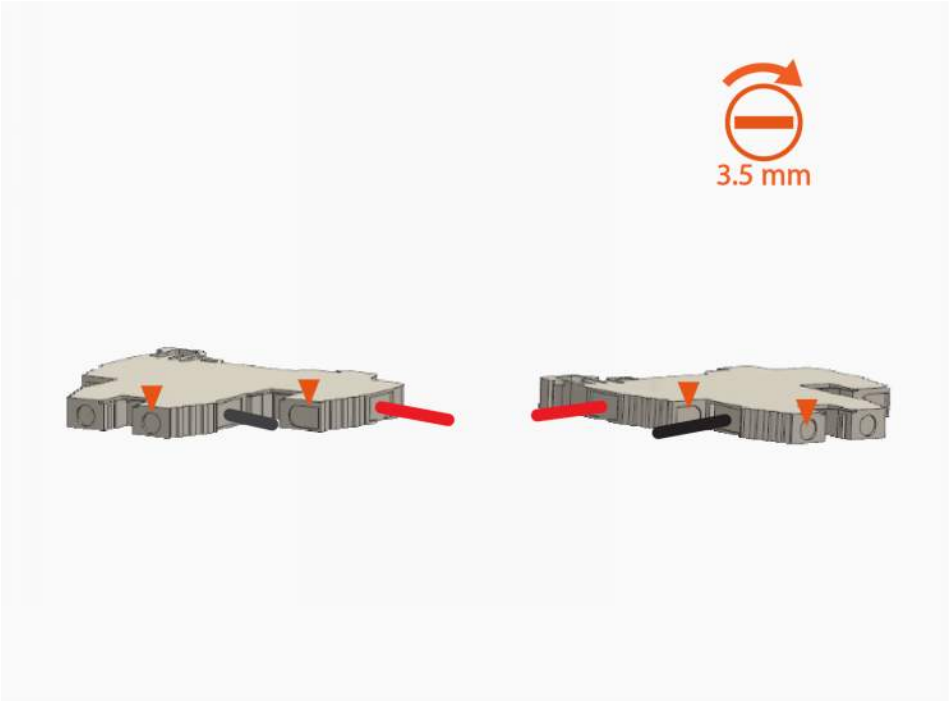
3. Loosen the terminal screws (x2).



4. Insert positive (+) wire into lower terminal (terminal closest to back of the Power Link 2000). Insert the negative (-) wire into upper terminal (terminal closest to the front of the Power Link 2000).



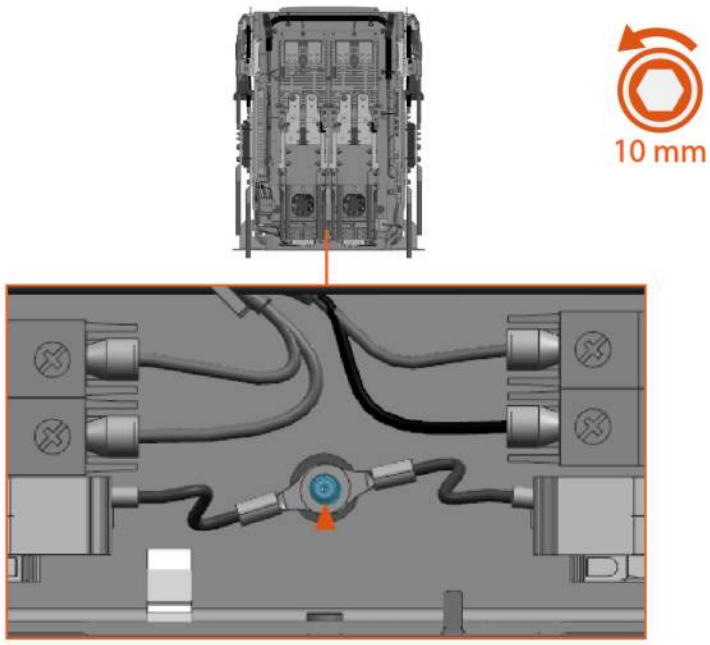
5. Torque the screws (x2) to **0.7 Nm (6.2 in-lb)**. Push-pull to test that both (+ and -) wires are secured.



Connect Chassis Ground Wire

Follow the procedure below for each chassis ground wire.

1. Strip the ground wire for installation of a ring terminal.
2. Crimp the ring terminal onto the wire end.
3. Remove the lug nut from the chassis ground stud.



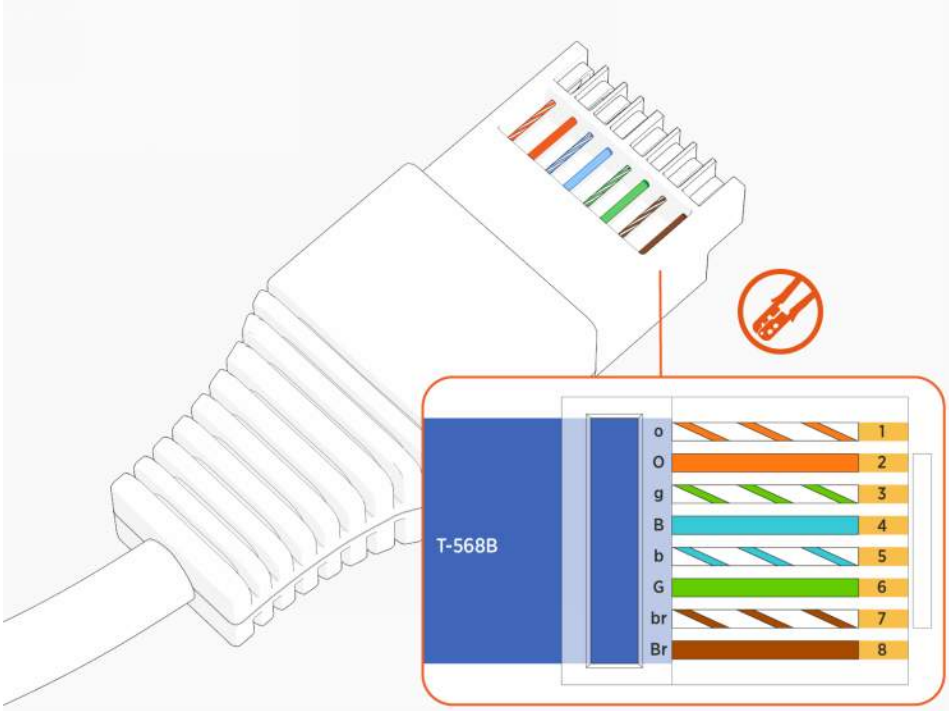
4. Install the prepared wire onto the stud.

   Note: The chassis ground stud terminates multiple wires. Stack the wire terminal on top of any already existing on the stud.
5. Reinstall the lug nut. Use a 10 mm socket. Torque to **5.6 Nm (50 in-lb)**.

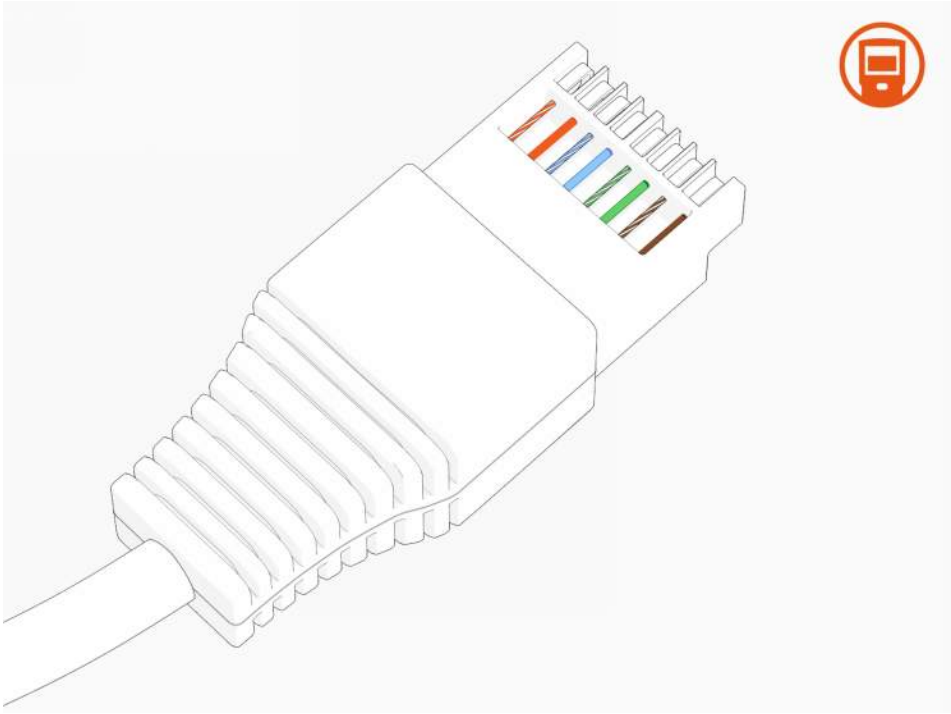
Connect Ethernet Input Cable

1. Trim Ethernet (Cat6 STP) cable terminal to length, allowing for a service loop.
2. Field crimp a shielded RJ45 connector onto the Ethernet cable. Use straight-through T568-B pattern.

IMPORTANT: Do *not* ground the RJ45 connector at this end of the cable. A grounded RJ45 is required only at the Power Block termination or the cable.

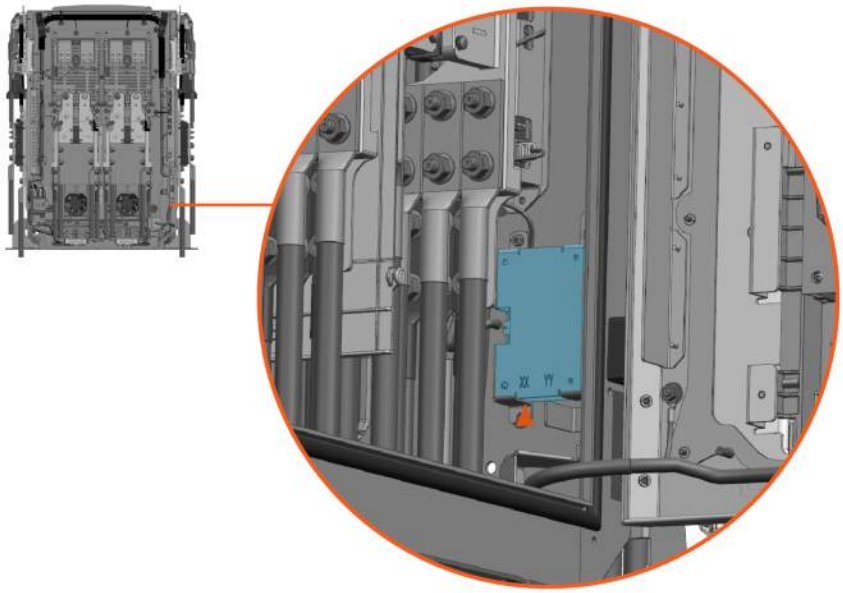


3. Test the Ethernet cable for functionality.



4. Connect the cable to the left port of the Smart Ethernet Switch.

   Note: To establish a secure connection, the RJ45 connector latch must click into the Smart Ethernet Switch.

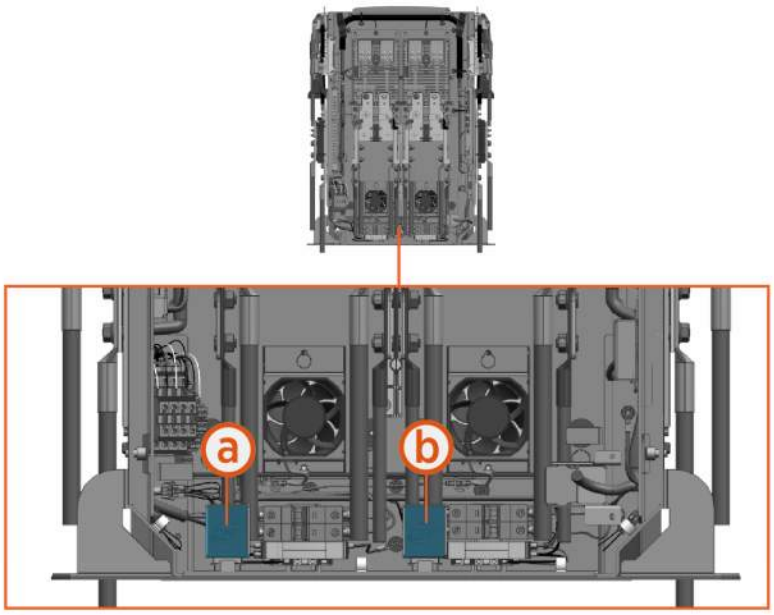


Connect Ethernet Output Cables

Power Link 2000 to PD Controller Ethernet Cables

For each Ethernet output cable connecting from the Power Link 2000 to a PD Controller, follow the procedure below.

1. Identify the target terminal for landing the Ethernet cable.

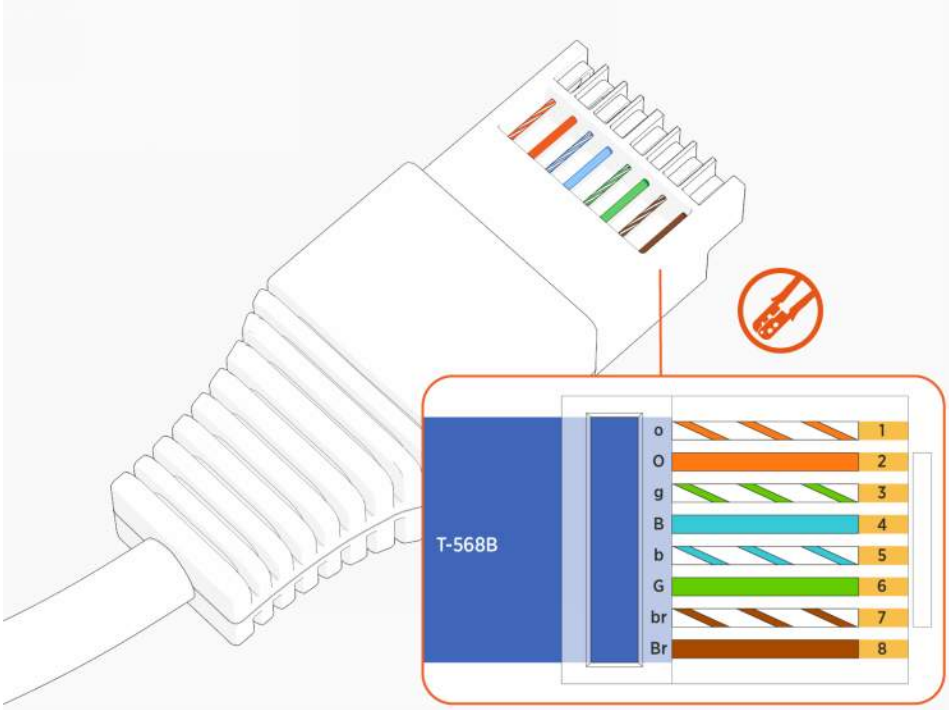


(a) Ethernet output L
(b) Ethernet output R

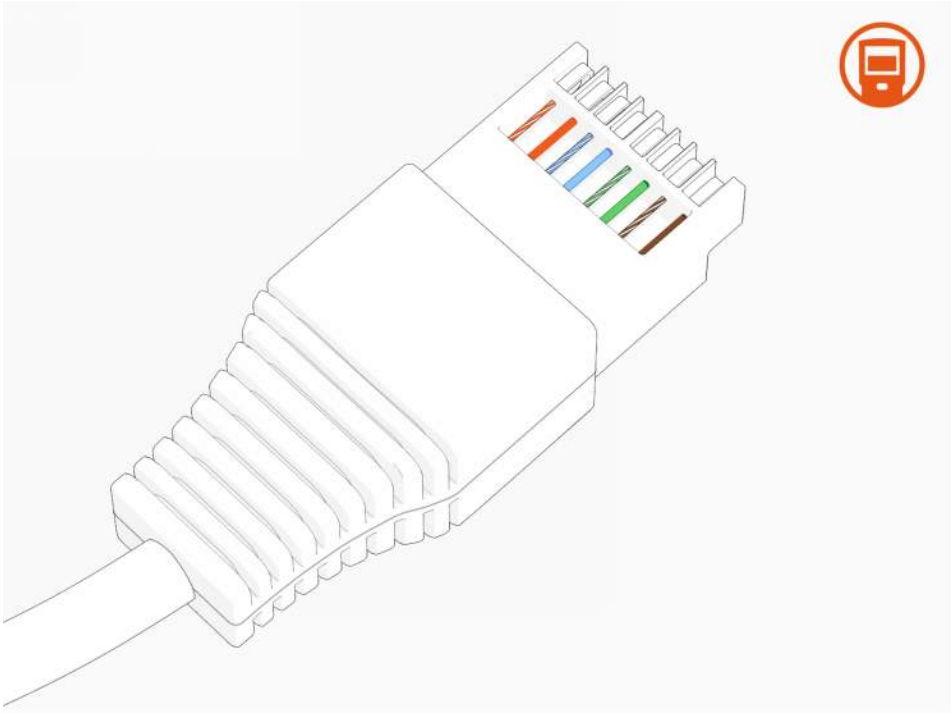
2. Trim Ethernet (Cat6 STP) cable terminal to length, allowing for a service loop.

3. Field crimp a shielded RJ45 connector onto the Ethernet cable. Use straight-through T568-B pattern.

IMPORTANT: Ground the RJ45 connector at this end of the Ethernet cable. Do not ground the RJ45 connector at the PD Controller termination of the cable.



4. Test the Ethernet cable for functionality.



5. Connect the cable to the surge suppressor.

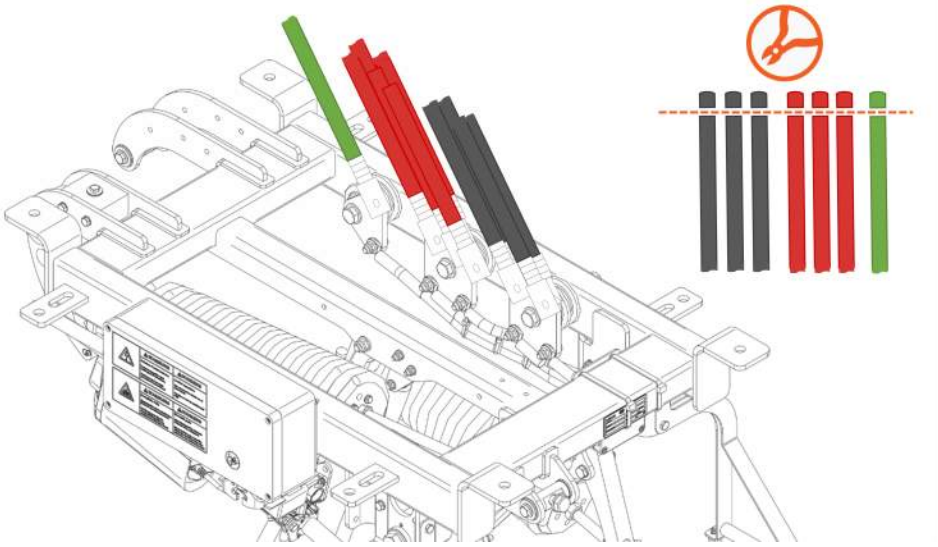
   Note: To establish a secure connection, the RJ45 connector latch must click into the Ethernet surge suppressor.



Connect Schunk SLS 201 Wires 7

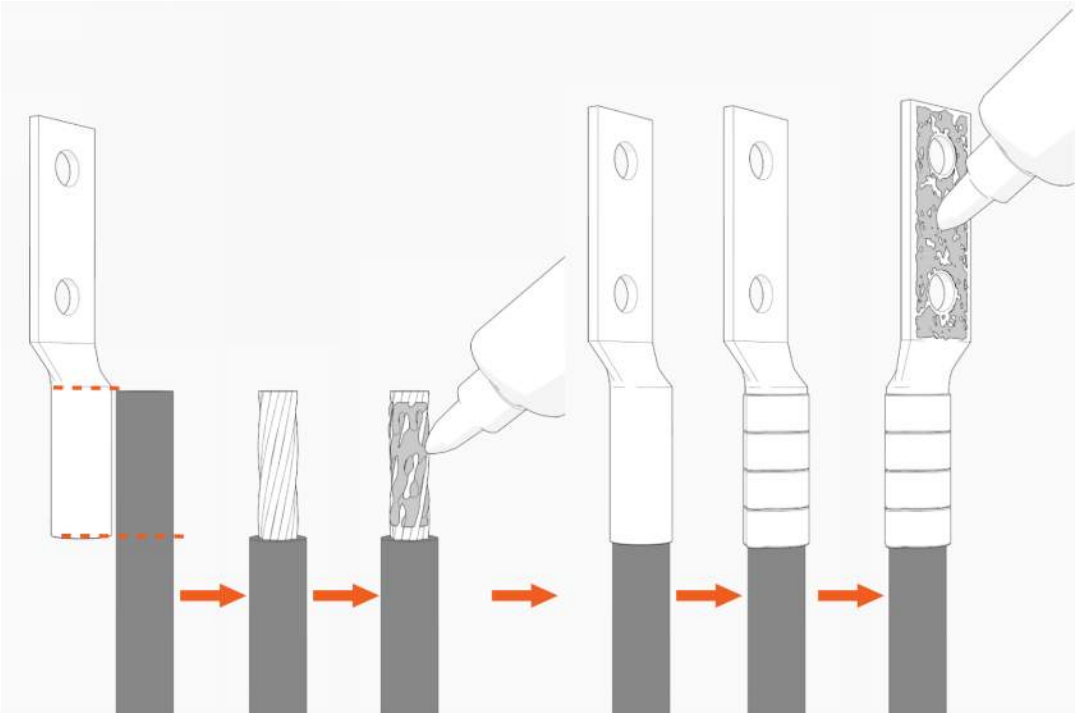
Pull and Cut HV DC Wires

1. Pull and cut the HV DC wires to length for reaching the bus bars on the pantograph. Account for the length of the lug that will terminate each wire.



Connect HV DC and Ground Wires

Prepare Wires

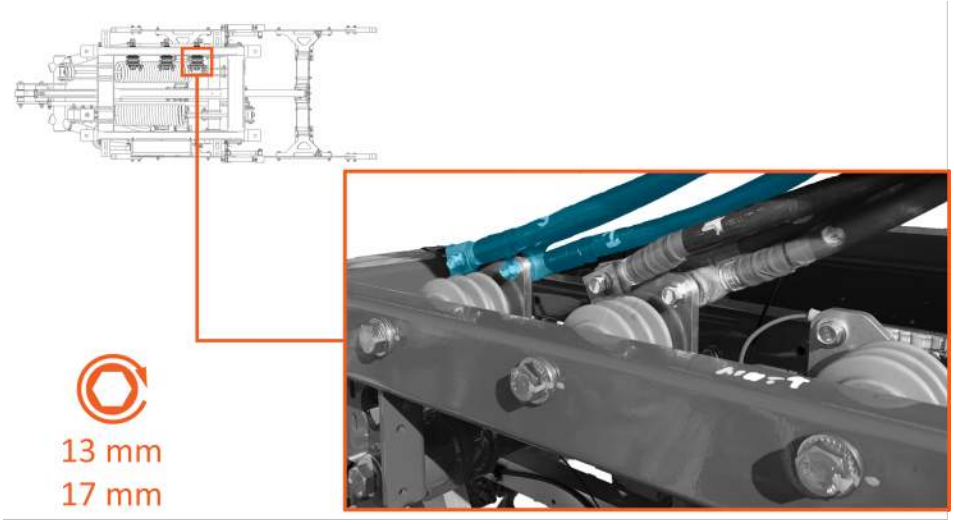


Note: The illustration above shows the preparation of a HV DC wire with a double hole lug. The same procedure applies for preparing the high power ground wire with a single hole lug.

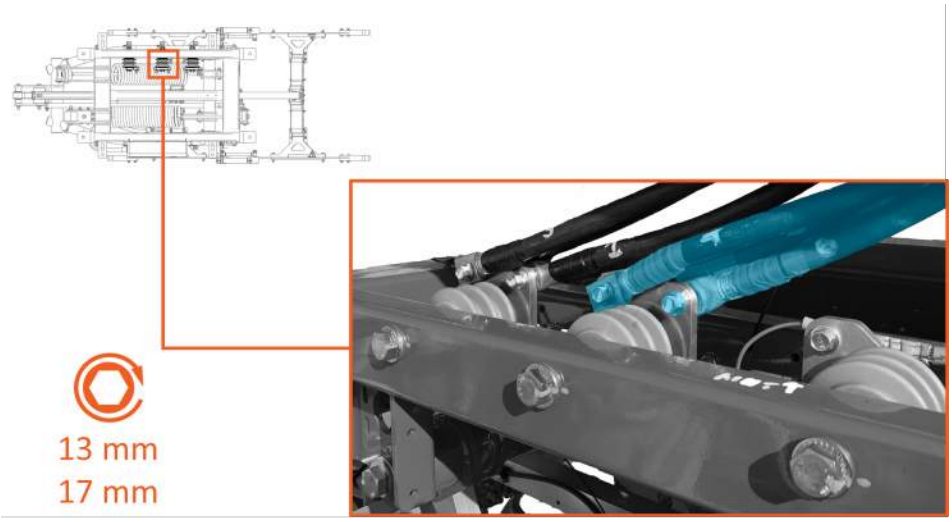
1. Mark the lug's barrel height on the wire terminal.
2. Strip the jacket on the marked terminal. Use a suitable wire stripper, such as Klein tool.
3. If recommended by the wire manufacturer or local code, apply an anti-oxidant joint compound to the stripped wire material to make a gastight joint with the lug.
4. Insert the stripped terminal into the lug's barrel and crimp it. Use a suitable lug crimping tool and/or die recommended by the lug manufacturer.
5. Apply dielectric grease to the lug's tongue surface that comes in contact with the bus bars.

Connect HV DC Wires

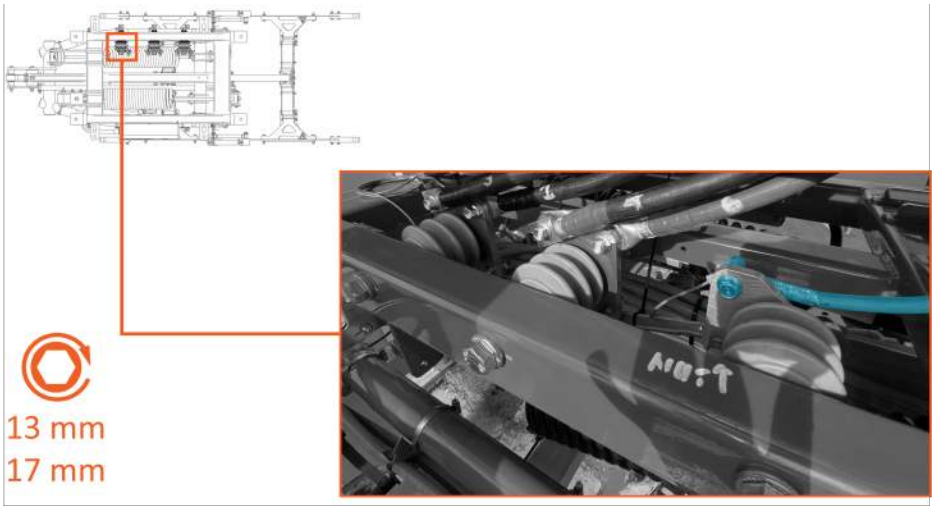
1. Connect high voltage wires to the negative (-) HV bus bar of the pantograph. Wires may land on both sides of the bus bar. Torque to **19 Nm (14 ft-lb)**.



2. Connect high voltage wires to the positive (+) HV bus bar of the pantograph. Wires may land on both sides of the bus bar. Torque to **19 Nm (14 ft-lb)**.



3. Connect the high power ground wire to the ground bus bar. Torque to **19 Nm (14 ft-lb)**.



4. Mark all torqued connections to ensure all lug nuts have been tightened. Torque marks are required to pass post-installation inspection.

Connect LV Cables

Route Controller Interface Cable

1. Identify the controller interface cable. See Appendix: Low Voltage Wire Reference
2. If the site plan calls for the controller interface cable to run within conduit, install the 1 in (27 mm) NPT cable gland (provided with the PD Controller) onto the end of the conduit nearest to the pantograph. Use a 42 mm wrench. Torque to **13 Nm (115 in-lb)**.
3. Route or pull (through conduit) the controller interface cable from the pantograph to the PD Controller.

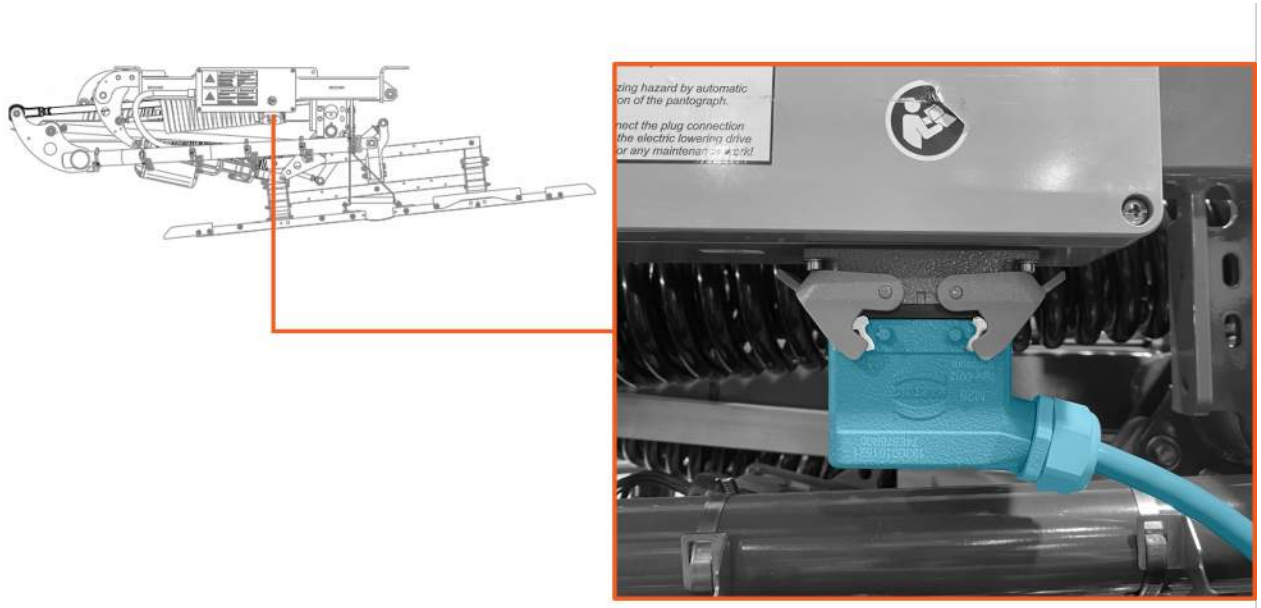
   Note: The cable can be pulled through conduit in only one direction, from the pantograph to the PD Controller. Furthermore, the cable must be fed into the conduit through the cable gland capping the conduit end.

   Note: Ensure there is sufficient cable length to land the cable wires inside of the PD Controller. See Connect PD Controller Wires.

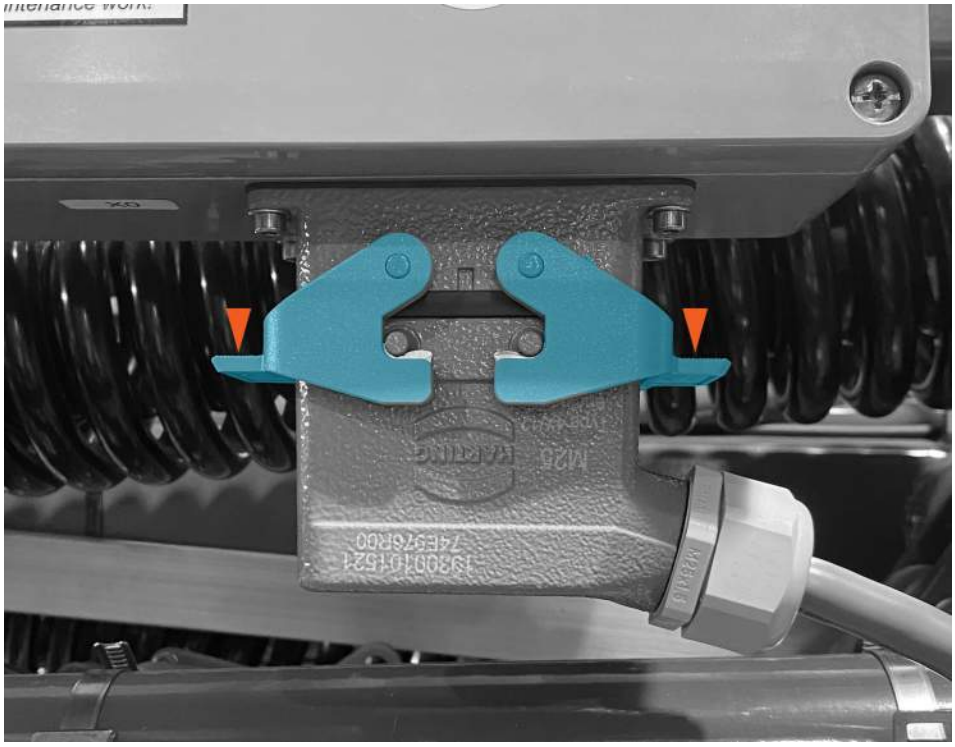
Connect Pantograph Control Cable

1. Route the pantograph control cable to the pantograph electric control unit. Ensure the cable is kept clear of high voltage exposed conductors and the pantograph arms through their full movement range.

2. Connect the pantograph control cable.



3. Push down on the latch tabs to secure the connector.

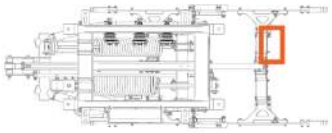


4. Use zip ties to keep the cable secured and away from the pantograph arms and charging rails.

Connect Control Pilot Cable

1. Route the pantograph control pilot cable to reach the pantograph control box. Ensure the cable is kept clear of high voltage exposed conductors and the pantograph arms through the entire movement range.





2. Quarter turn spring latches (x4) to open the pantograph control box.

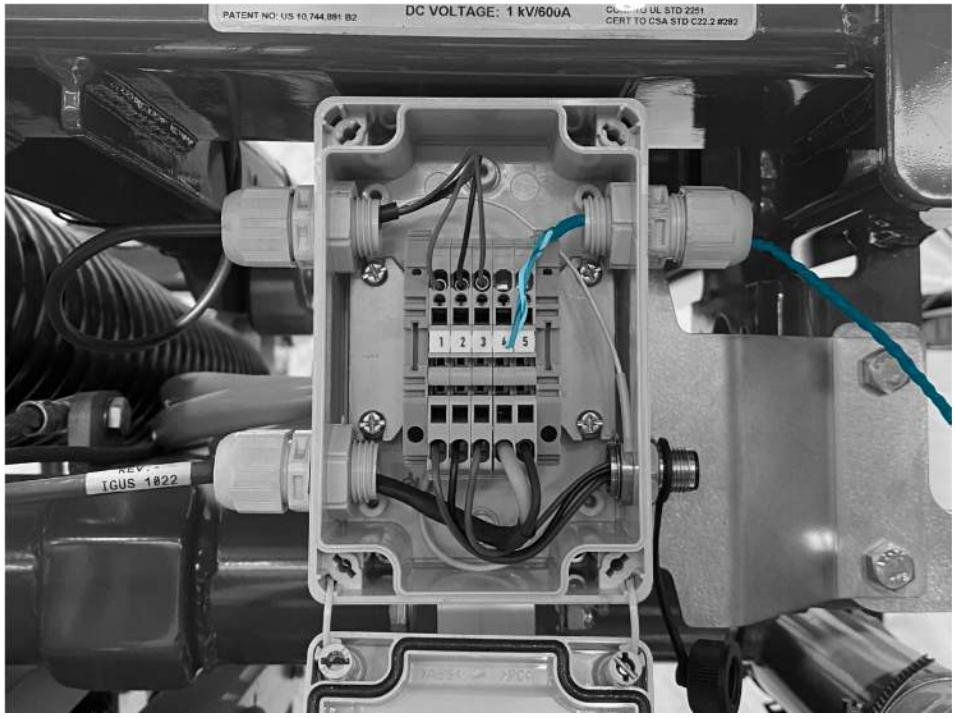
   Note: The latches are operated with a Phillips head screwdriver but they are not screws. Gently push the latch head inwards with the screwdriver and initiate the turn. Part way through the turn, keep the screwdriver in contact with the latch, but discontinue application of inward pressure. Continue turning until the latch pin pops out.

   IMPORTANT: Be gentle when operating the latches. The latches can break if the screwdriver applies significant torque.

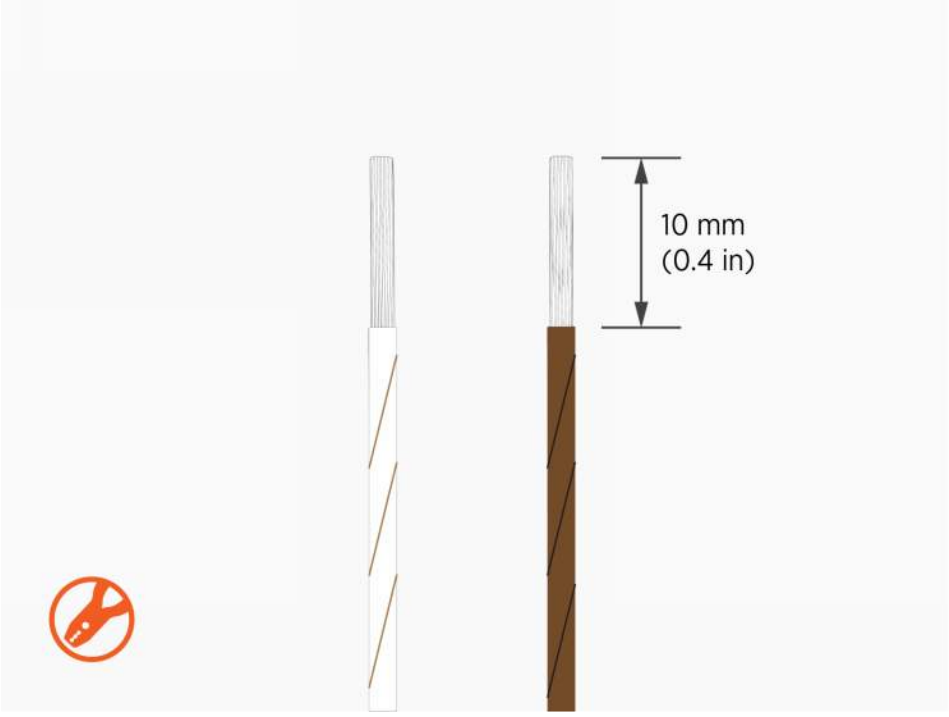




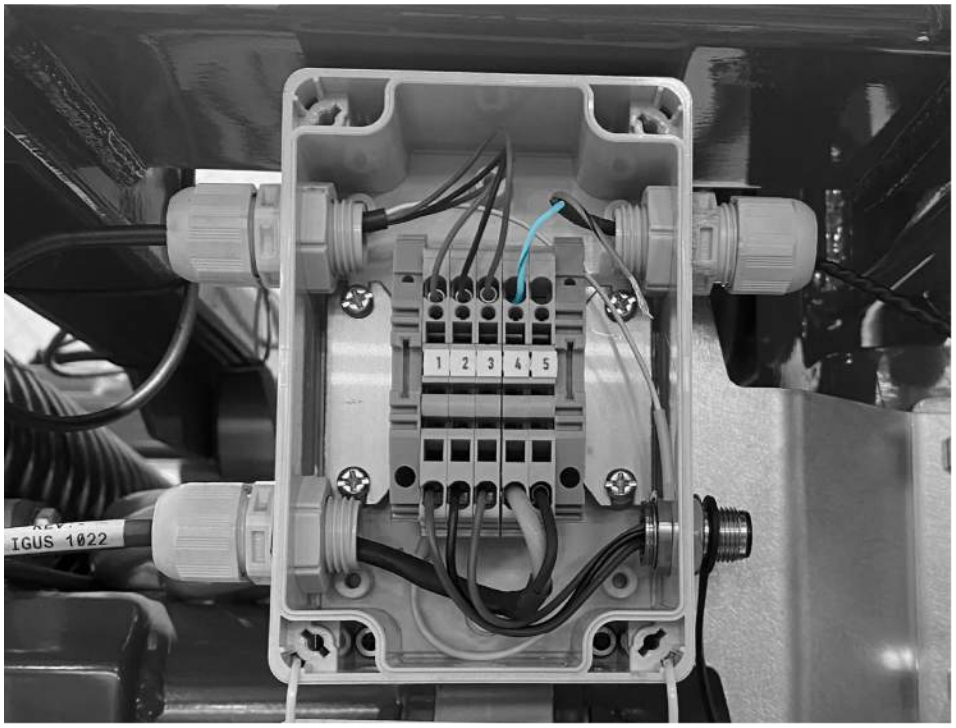
3. Route the control pilot cable though the cable gland.



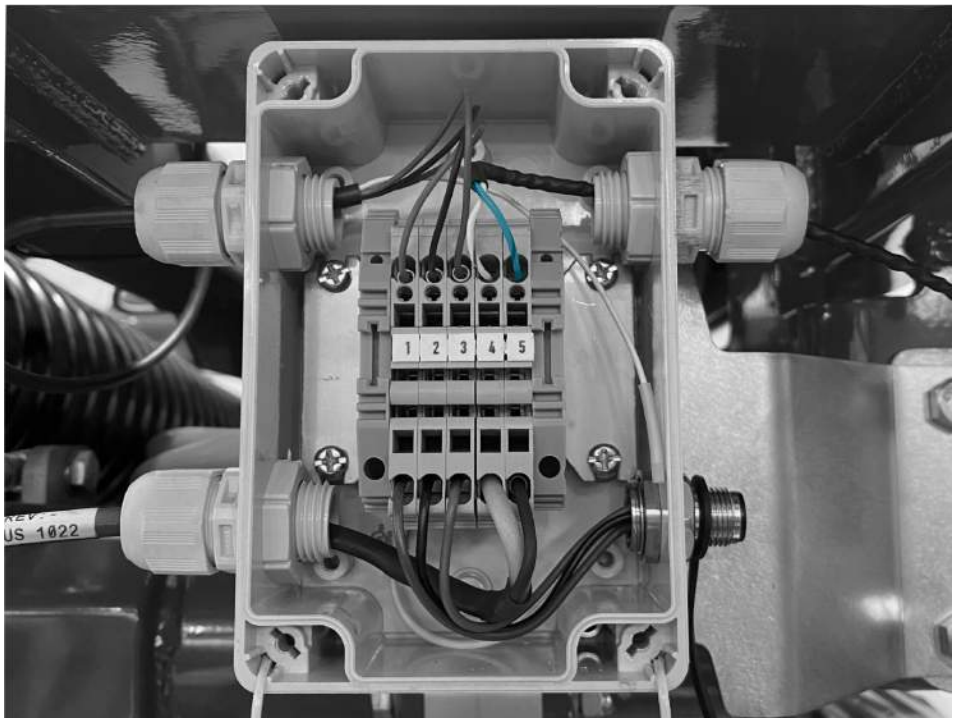
4. Strip the wire jackets.



5. Insert the control pilot wire (white/brown) into terminal 4. Use a flat head screwdriver to open the terminal port. Push-pull to test the wire is secured.



6. Insert the control pilot shield wire (brown/black) into terminal 5. Use a flat head screwdriver to open the terminal port. Push-pull to test the wire is secured.



7. Close the box. Quarter turn spring latches (x4).

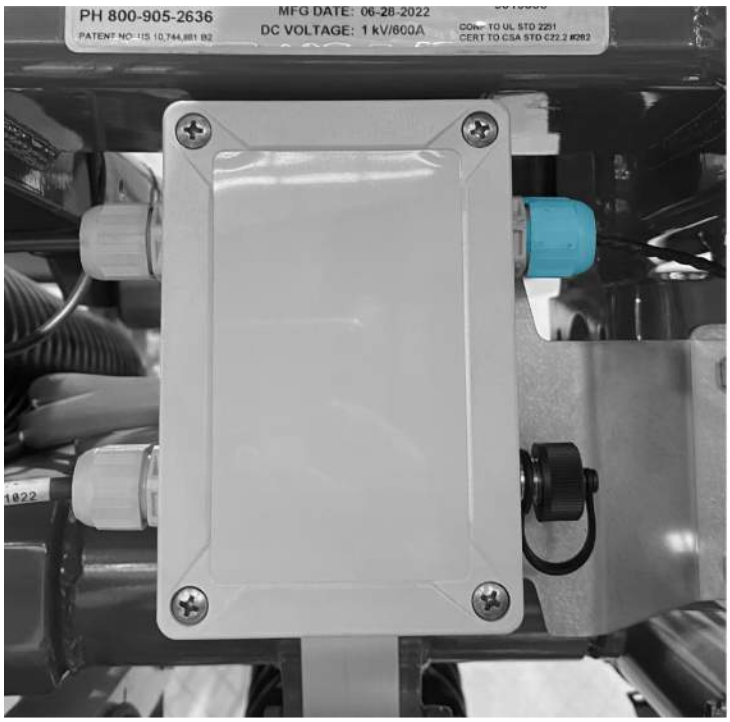
   Note: The latches are operated with a Phillips head screwdriver but they are not screws. Gently push the latch head inwards with the screwdriver and initiate the turn. Part way through the turn, keep the screwdriver in contact with the latch, but discontinue application of inward pressure. Continue turning until the latch pin latches into a locking groove.

   IMPORTANT: Be gentle when operating the latches. The latches can break if the screwdriver applies significant torque.





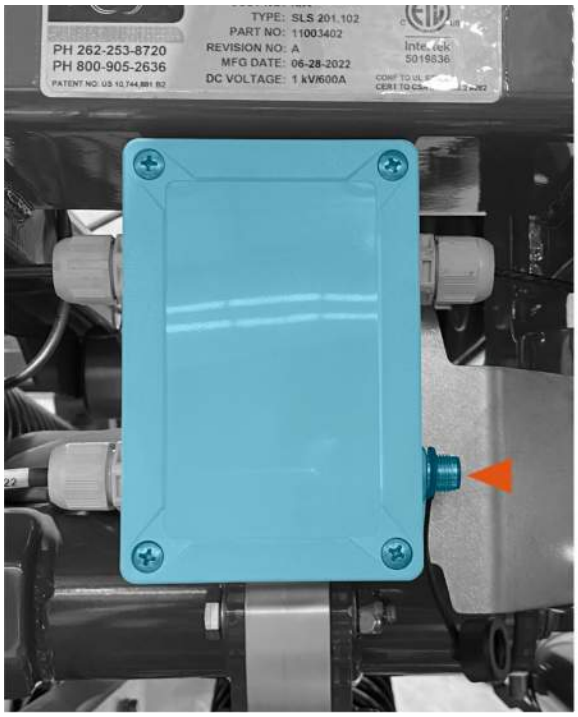
8. Tighten the cable gland. Torque to **1.5 Nm (13.3 in-lb)**.

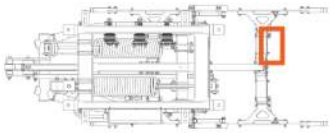


9. Use zip ties to keep the cable secured and away from the pantograph arms and charging rails.

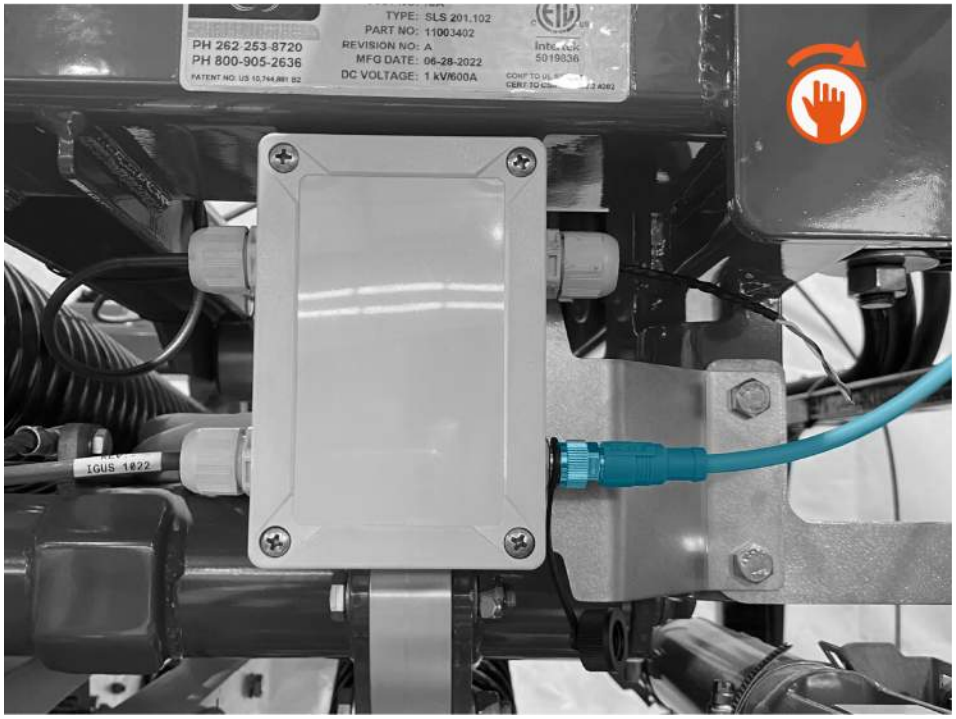
Connect Rest Sensor Cable

1. Route the pantograph rest sensor cable to the pantograph control box. Ensure the cable is kept clear of high voltage exposed conductors and the pantograph arms through their full movement range.





2. Connect the rest sensor cable. Hand-tighten.



3. Use zip ties to keep the cable secured and away from the pantograph arms and charging rails.

8 Connect Auxiliary Component Cables

WARNING: Do not install or service the charging station in inclement weather. If you work in snow, rain, or wind, you must use a weather-proof shelter that covers all boxes and components.

IMPORTANT: Ensure the installation complies with all applicable codes and ordinances.

CAUTION: Warranty Limitation

- If the charging station is not installed, commissioned, or serviced by a ChargePoint certified installer or technician using a ChargePoint-approved method, it is *excluded* from all ChargePoint and other warranties and ChargePoint is not responsible.
- You must be a licensed electrician and complete training at chargepoint.com/installers to become ChargePoint certified and to access ChargePoint's web-based installer tools or ChargePoint Installer app.

Prepare for Cable Connection

1. Identify the RFID and Wi-Fi antenna cables. See Appendix: RFID and Wi-Fi Antenna Cable Reference.
2. Before uncoiling the antenna cables, label both ends of each cable.

   Note: The antenna cables shipped with the system are identical and interchangeable. However if one or both cables are custom ordered for the site, the cables may be different in length and/or type. Be sure the cables are labeled accurately.
3. If the site plan calls for the antenna cables to run within conduit, install the 3/4 in (21 mm) NPT cable gland (provided with the PD Controller) onto the end of the conduit nearest to the pantograph. Use a 33 mm wrench. Torque to **7.9 Nm (70 in-lb)**.
4. Route or pull (through conduit) the cables between the antennas and the PD Controller.

   Note: Ensure there is sufficient cable length to terminate the cables inside of the PD Controller. See Connect PD Controller Wires.

   Note: The cables can be pulled through the conduit in only one direction, from the antennas to the PD Controller. Furthermore the cables must be fed through the cable gland capping the conduit end. Feeding the RP-SMA connectors through the cable gland may be snug. See Appendix: RFID and Wi-Fi Antenna Cable Reference for recommended technique.

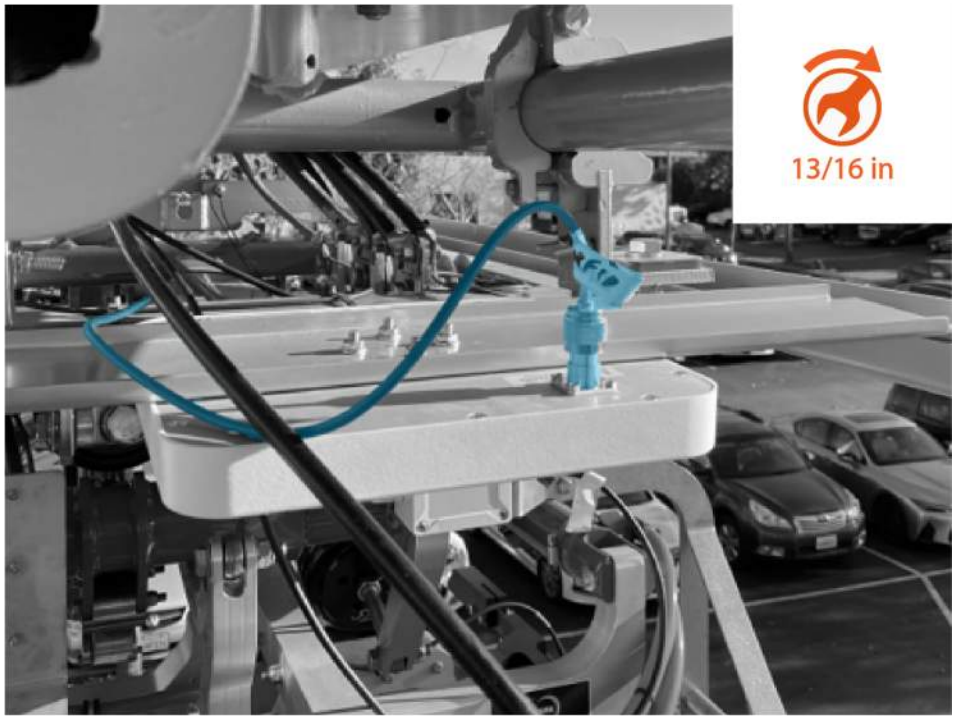
Connect RFID Cable

1. Route the RFID cable end to the RFID antenna. Keep the cable clear of high voltage exposed conductors and the pantograph arms through the entire movement range.

CAUTION: You may coil the cable to take up excess slack. However, note the LMR-240 cable shipped with Pantograph Down 2000 has a one-time bend radius of 19 mm (0.75 in) and repeated bend radius of 63 mm (2.5 in). Do not exceed the bend radius or the cable may be damaged and the system may not operate. If using an LMR-240 equivalent cable, do not exceed the bend radius limits for the cable type used.

CAUTION: The antenna cable must not be accidentally kinked during the installation process. Doing so can damage the cable.

2. Connect the RFID antenna cable. Torque to **1.5 Nm (13.3 in-lb)**.



3. Use zip ties to secure the antenna cable away from the pantograph arms and charging rails.

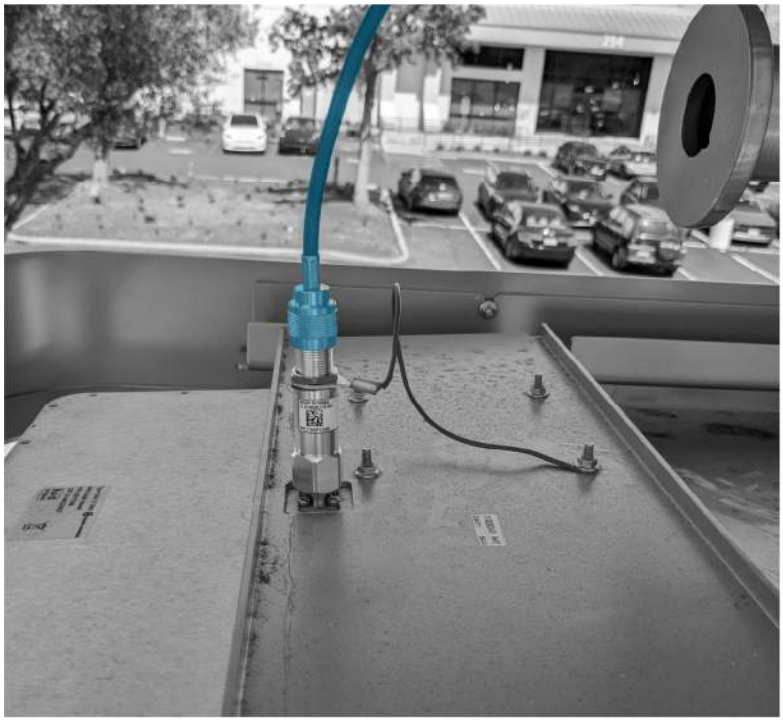
Connect Wi-Fi Antenna Cable

1. Route the Wi-Fi cable end to the Wi-Fi antenna. Keep the cable clear of high voltage exposed conductors and the pantograph arms through the entire movement range.

CAUTION: You may coil the cable to take up excess slack. However, note the LMR-240 cable shipped with Pantograph Down 2000 has a one-time bend radius of 19 mm (0.75 in) and repeated bend radius of 63 mm (2.5 in). Do not exceed the bend radius or the cable may be damaged and the system may not operate. If using an LMR-240 equivalent cable, do not exceed the bend radius limits for the cable type used.

CAUTION: The antenna cable must not be accidentally kinked during the installation process. Doing so can damage the cable.

2. Connect the Wi-Fi antenna cable. Torque to **1.5 Nm (13.3 in-lb)**.



3. Use zip ties to secure the antenna cable away from the pantograph arms and charging rails.

Connect Status LED Cable

1. Identify the status LED cable. See Appendix: Low Voltage Wire Reference.
2. Route the status LED cable end to the status LED. Keep the cable clear of high voltage exposed conductors and the pantograph arms through the entire movement range. Coil the cable as needed to take up excess slack.

3. Connect the status LED cable to the short cable attached to the status LED. Hand-tighten.



4. Use a zip tie looped through a hole in the front cover to secure the cable.



5. Use zip ties to secure the status LED cable away from the pantograph arms and charging rails.

Connect PD Controller Wires 9

WARNING: Do not install or service the charging station in inclement weather. If you work in snow, rain, or wind, you must use a weather-proof shelter that covers all boxes and components.

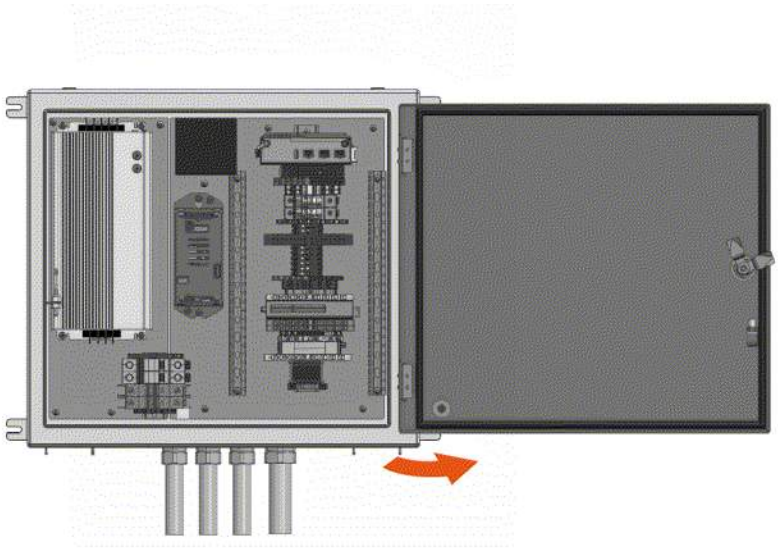
IMPORTANT: Ensure the installation complies with all applicable codes and ordinances.

CAUTION: Warranty Limitation

- If the charging station is not installed, commissioned, or serviced by a ChargePoint certified installer or technician using a ChargePoint-approved method, it is *excluded* from all ChargePoint and other warranties and ChargePoint is not responsible.
- You must be a licensed electrician and complete training at chargepoint.com/installers to become ChargePoint certified and to access ChargePoint's web-based installer tools or ChargePoint Installer app.

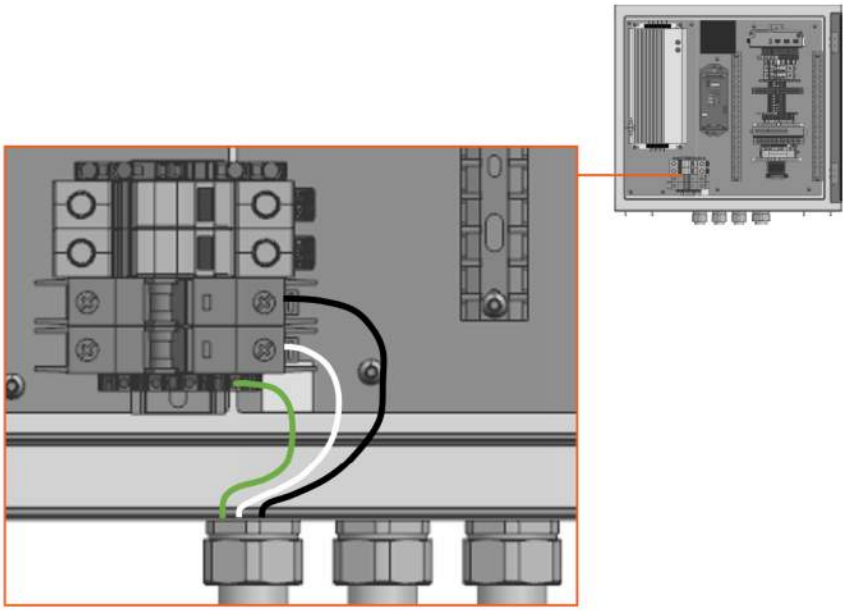
Connect AC Input Wires

1. Open the PD Controller door.

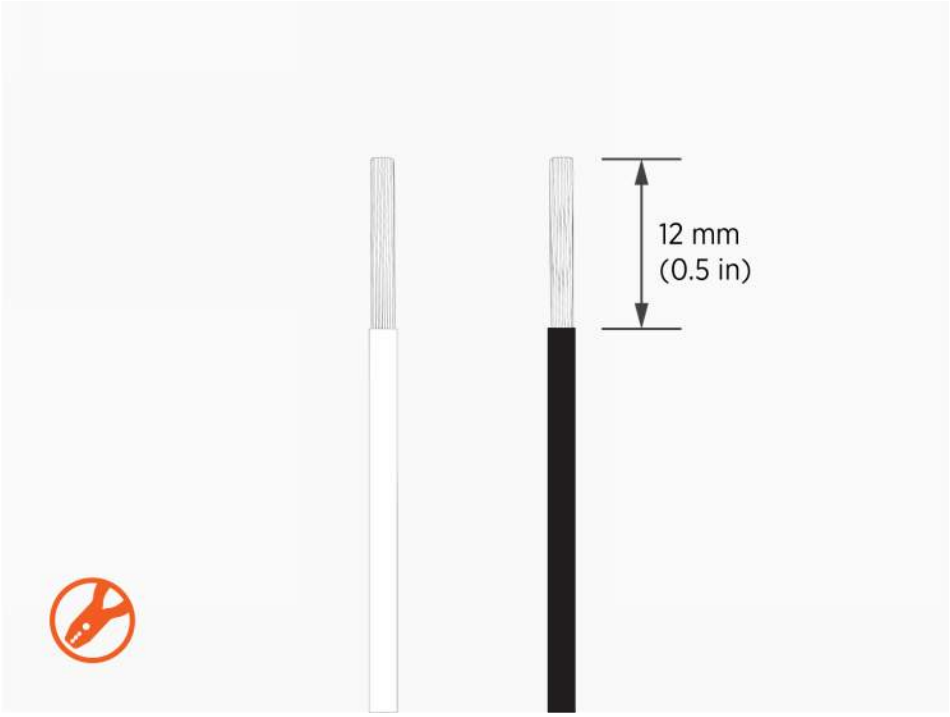


2. Pull and cut the 120-277 V AC wires to length for landing on the AC circuit breaker and ground terminal.

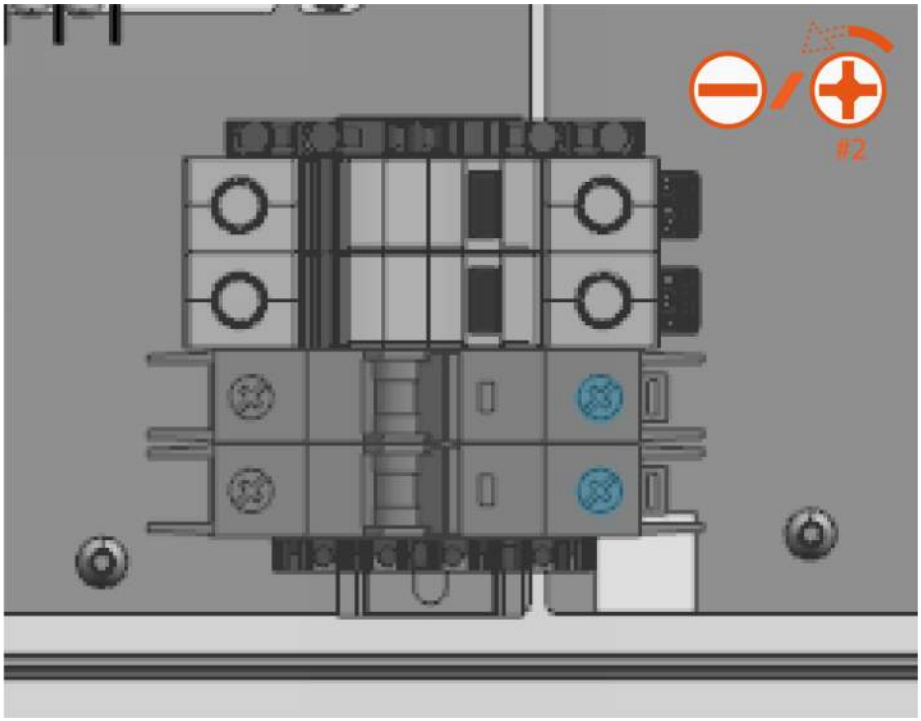
WARNING: The AC wire length inside the enclosure must not exceed 127 mm (5 in). Allowing a longer wire length inside the enclosure leaves a potential for protection circuitry failure and introduces a potential electrical hazard.



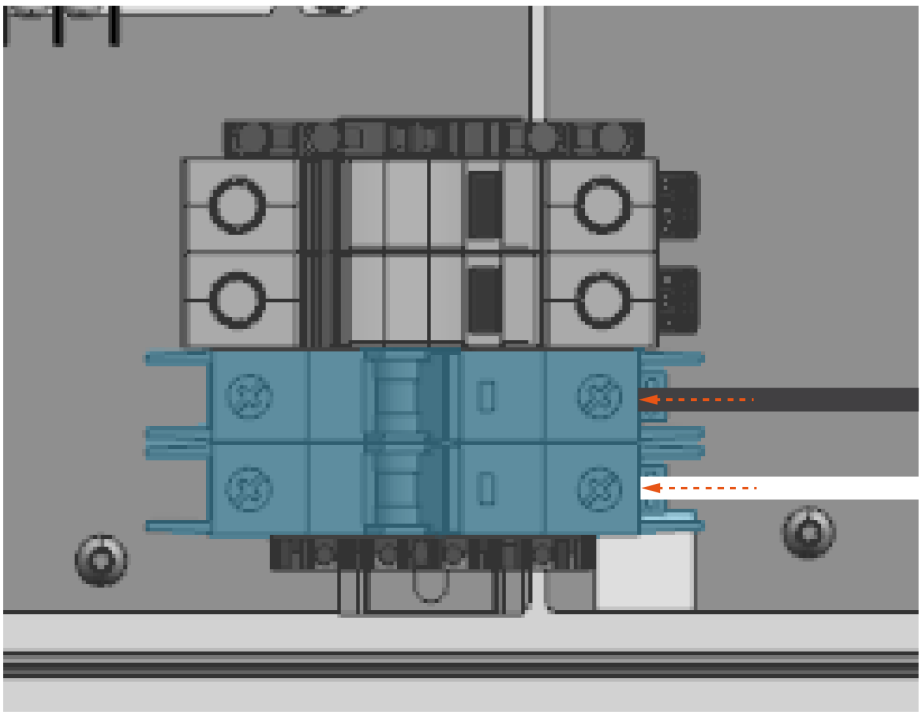
3. Strip the AC wire jackets.



4. Loosen the AC circuit breaker set screws (x2).

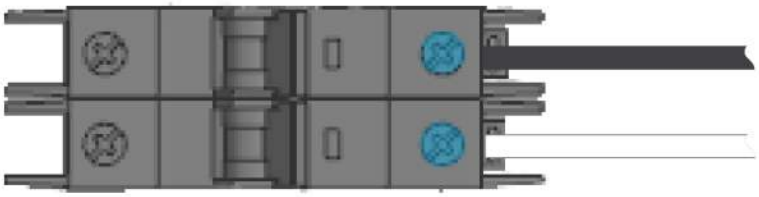


5. Insert the AC wires into the terminals. Insert the live wire into the upper terminal. Insert the neutral wire into the lower terminal.

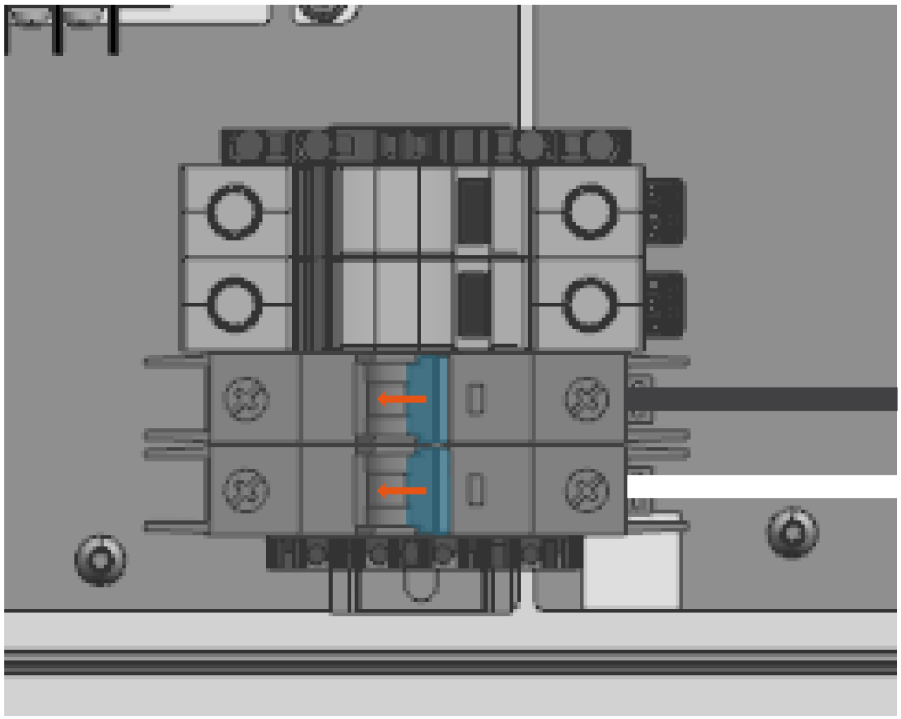


6. Torque the AC circuit breaker set screws (x2) to **2.4 Nm (21.2 in-lb)** for 18-12 AWG wires, **2.8 Nm (24.8 in-lb)** for 10-8 AWG wires, or **4 Nm (35.4 in-lb)** for 6 AWG wires. Push-pull to test the wires are secured.

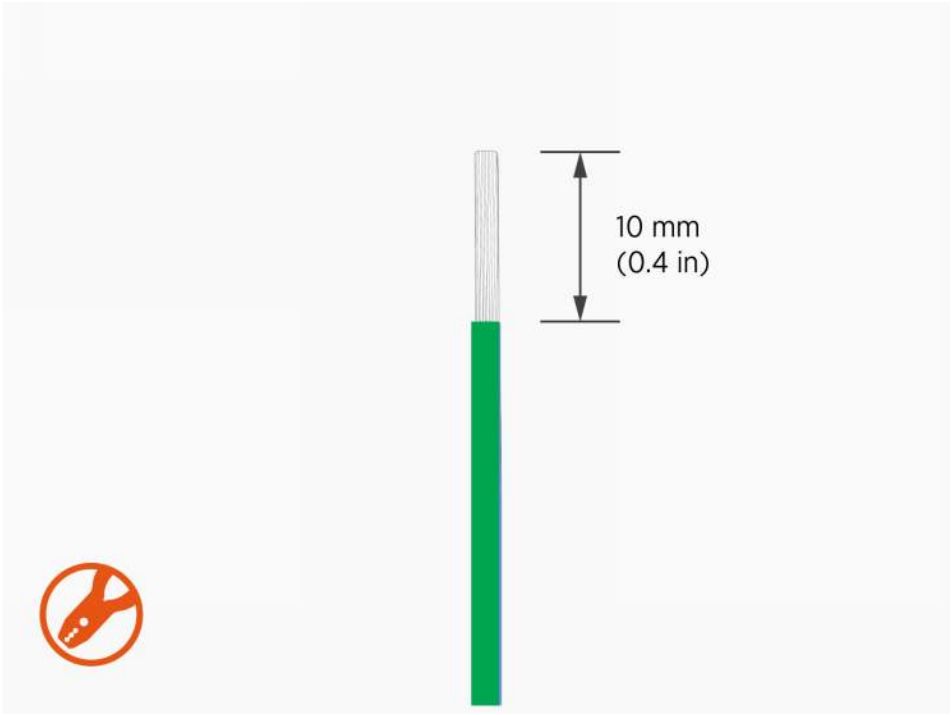




7. Flip the AC circuit breaker switches (x2) to the ON position. The indicator window should display red.



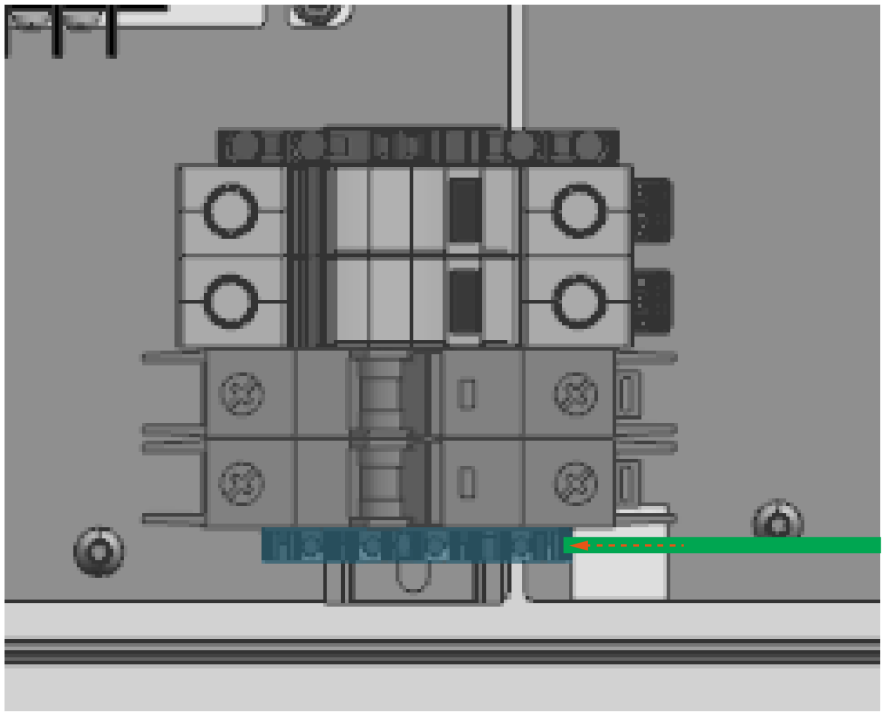
8. Strip the AC PE wire jacket.



9. Loosen the AC PE terminal set screw.



10. Insert the AC PE wire into the terminal.



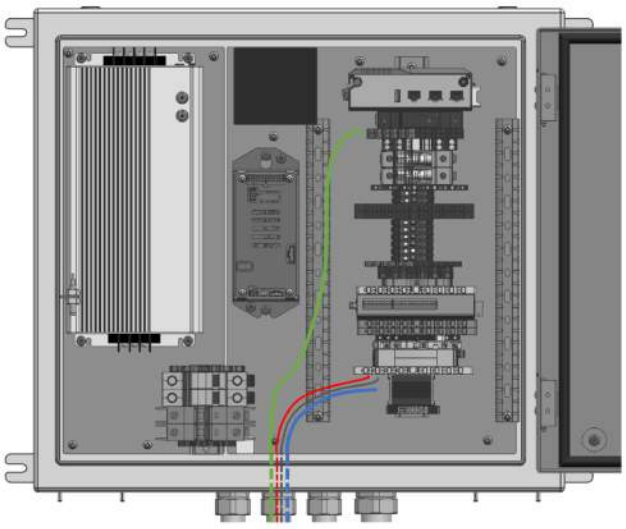
11. Torque the terminal set screw to **1.7 Nm (15 in-lb)**. Push-pull to test the wire is secure.



Connect LV DC and Ethernet Wires

Pull Wires

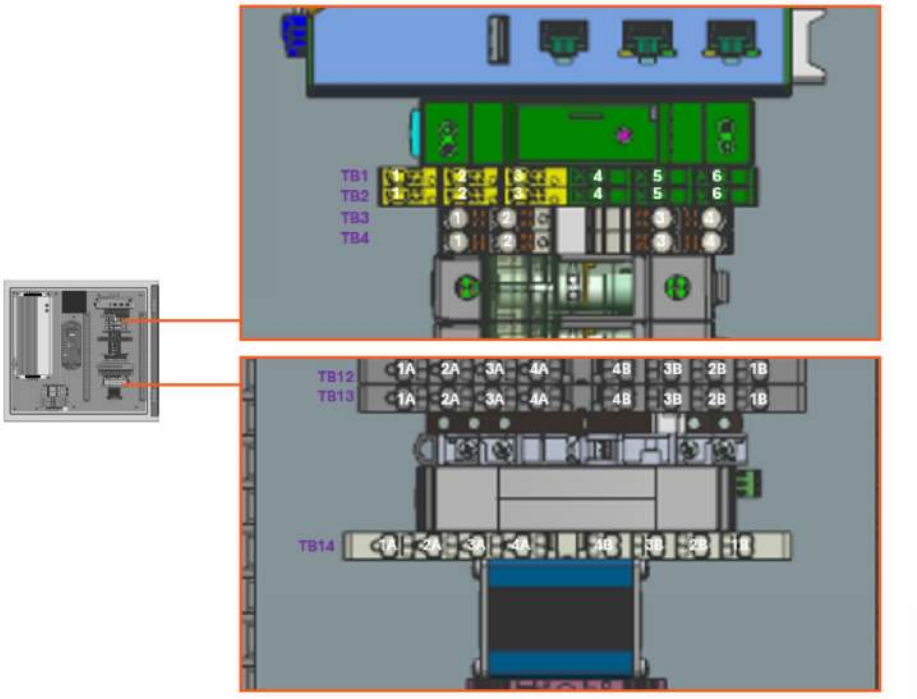
Pull the 48 V DC wires, Ethernet cable, and chassis ground wire into the enclosure.



Cut and Connect 48 V DC and Ground Chassis Wires

1. Route and cut the 48 V DC and ground chassis wires to length for landing on their terminals. Use the diagram and table below to identify the wire landing locations. Also note the wire strip length given.

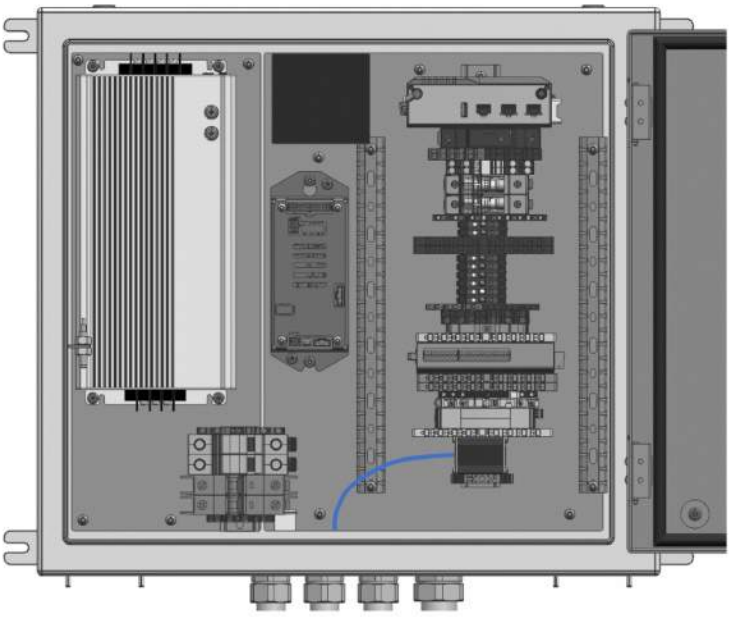
Wire	Terminal Block ID	Port Number	Wire Strip Length
48 V DC positive (+)	TB14	1A	10 mm (0.4 in)
48 V DC negative (-)	TB14	2A	
Chassis ground	TB1	1	12 mm (0.5 in)



2. Repeat the steps below to connect each 48 V DC and ground chassis wire at the appropriate landing terminal.
    a. Strip the wire end.
    b. Insert the wire into its designated terminal port. Use a 2.5 mm flathead screwdriver to release the port clamp for wire insertion.
    c. Push-pull to test the wire is secure.

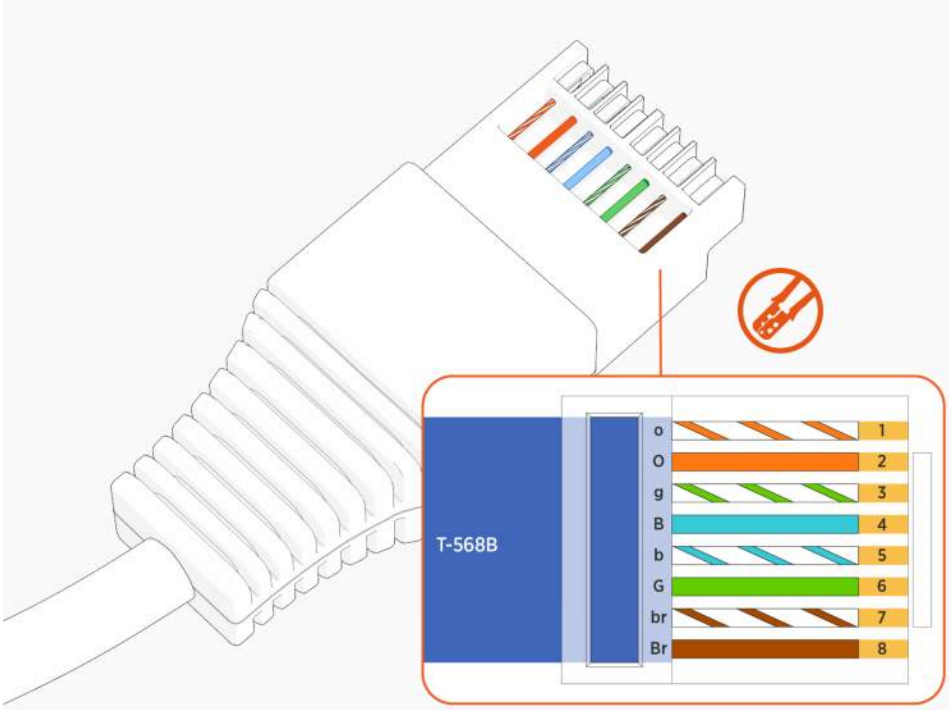
Connect Ethernet Cable

1. Route the Ethernet (Cat6 STP) cable to the Ethernet surge suppressor and trim to length. Allow for a service loop.

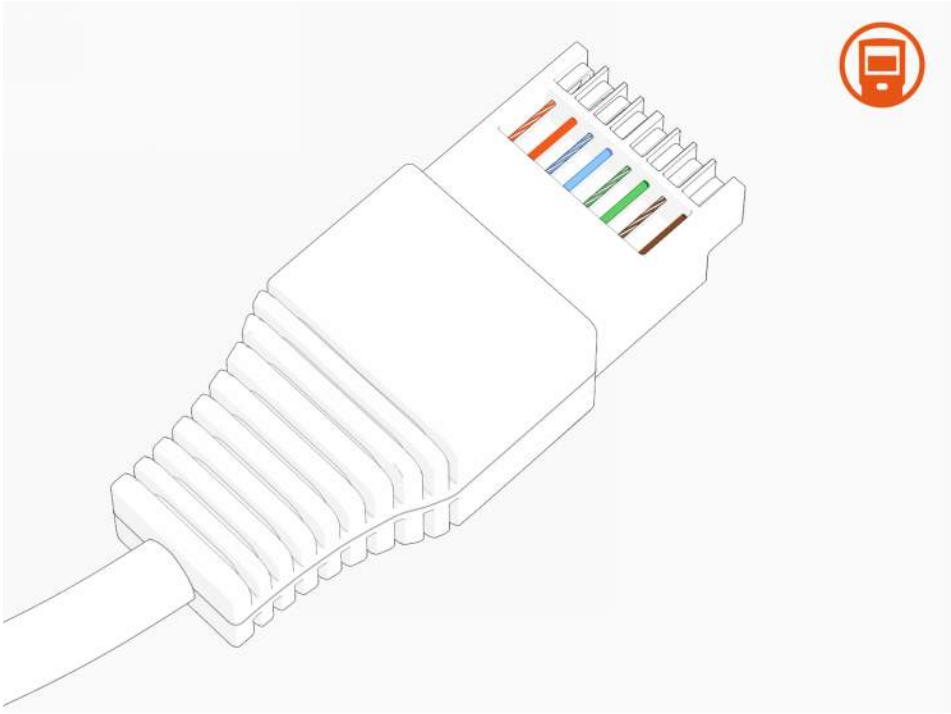


2. Field crimp a shielded RJ45 connector onto the Ethernet cable. Use straight-through T568-B pattern.

IMPORTANT: Do *not* ground the RJ45 connector at this end of the cable. A grounded RJ45 is required only at the Power Link 2000 termination or the cable.



3. Test the Ethernet cable for functionality.



4. Connect the cable to the Ethernet surge suppressor.

   Note: To establish a secure connection, the RJ45 connector latch must click into the surge suppressor.

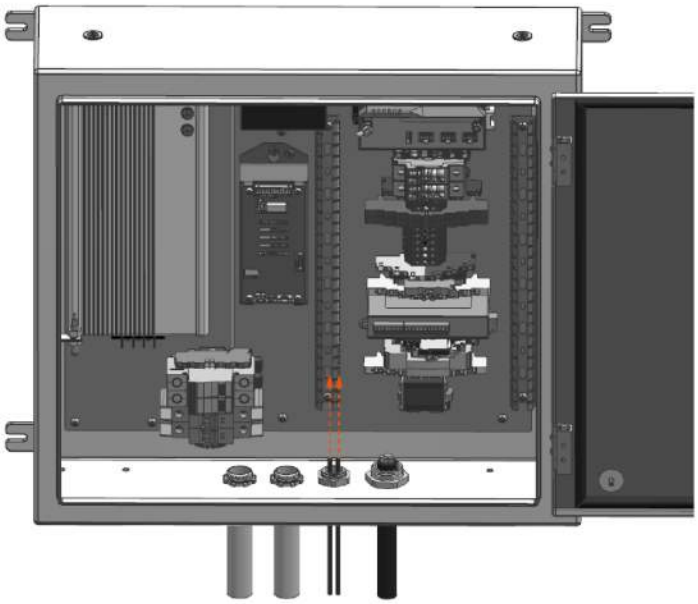


Connect Antenna Cables

1. Route the Wi-Fi and RFID antenna cables into the PD Controller enclosure.
    - **For cables run without conduit:**

      Route the cables into the PD Controller through the 3/4 in (21 mm) NPT cable gland.

      Note: Feeding the RP-SMA connectors through the cable gland may be snug. See Appendix: RFID and Wi-Fi Antenna Cable Reference for recommended technique.



    - **For cables specified to run with conduit:**

      Pull the cables through the conduit into the PD Controller (if not already done).

      Note: The cables can be pulled through the conduit in only one direction, from the antennas to the PD Controller.

      Note: The conduit end closest to the antennas must have a 3/4 in (21 mm) NPT cable gland (shipped with the PD Controller) installed on it. See Prepare for Auxiliary Component Cable Connection.

      Note: Feeding the RP-SMA connectors through the cable gland may be snug. See Appendix: RFID and Wi-Fi Antenna Cable Reference for recommended technique.

- **For cables run with or without conduit:**

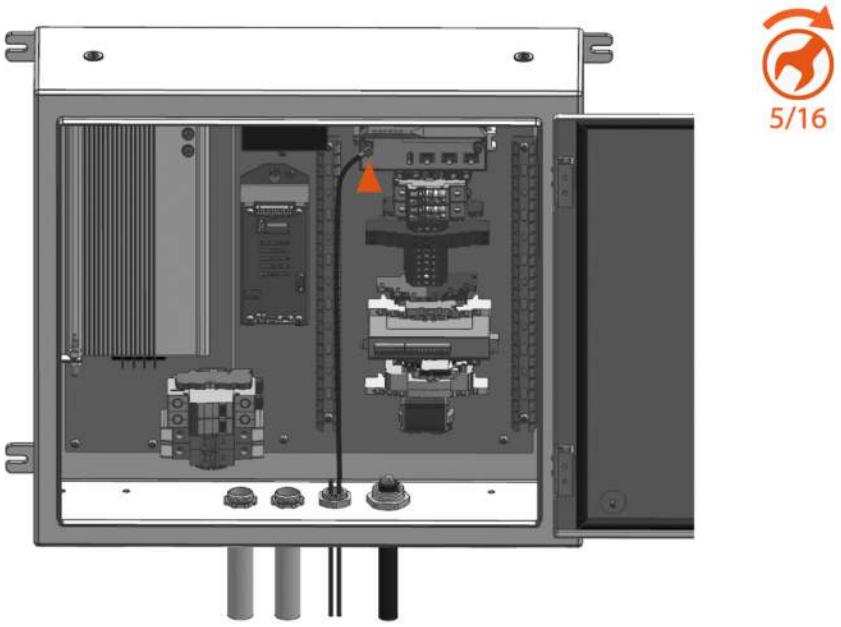
  Coil the cables outside the enclosure as needed to take up excess slack.

IMPORTANT:

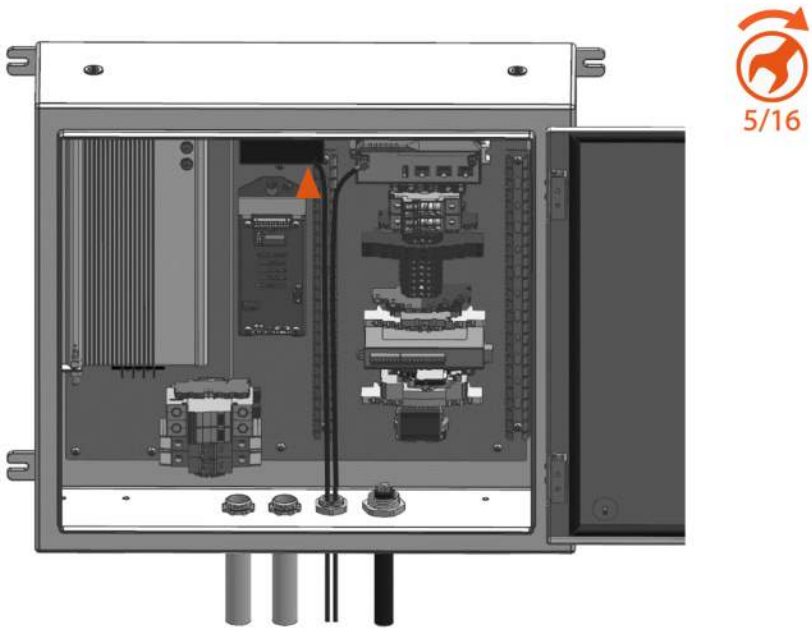
- Do not coil the antenna cables within the PD Controller.
- If the cables are already connected at the antennas, you may need to disconnect the cables from the antennas to take up excess cable slack at the antennas and then reconnect the cables. See Connect Auxiliary Component Cables.

CAUTION: The LMR-240 antenna cables shipped with Pantograph Down 2000 have a one-time bend radius of 19 mm (0.75 in) and repeated bend radius of 63 mm (2.5 in). Do not exceed the bend radius or the cable may be damaged and the system may not operate. If using an LMR-240 equivalent cable, do not exceed the bend radius limits for the cable type used.

2. Connect the Wi-Fi cable to the Wi-Fi Access Point. Torque to **0.45 Nm (4 in-lb)**.

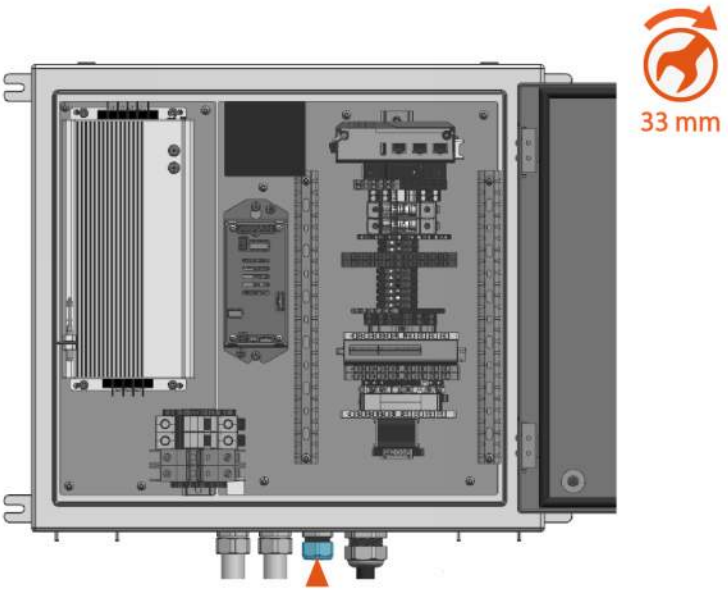


3. Connect RFID cable to the RFID Reader. Torque to **0.45 Nm (4 in-lb)**.



4. Tighten the antenna cable gland cap.
    - **For cables run without conduit:**

      The cable gland is located at the PD Controller. Torque the cap to **4.5 Nm (40 in-lb)**.



    - **For cables run with conduit:**

      The cable gland is located at the end of the conduit near the antennas. Torque the cap to **4.5 Nm (40 in-lb)**. Use a 33 mm wrench.
5. If the antenna cables are not run through conduit, use zip ties to secure and support the cables along the full length of the cables outside of the PD Controller.

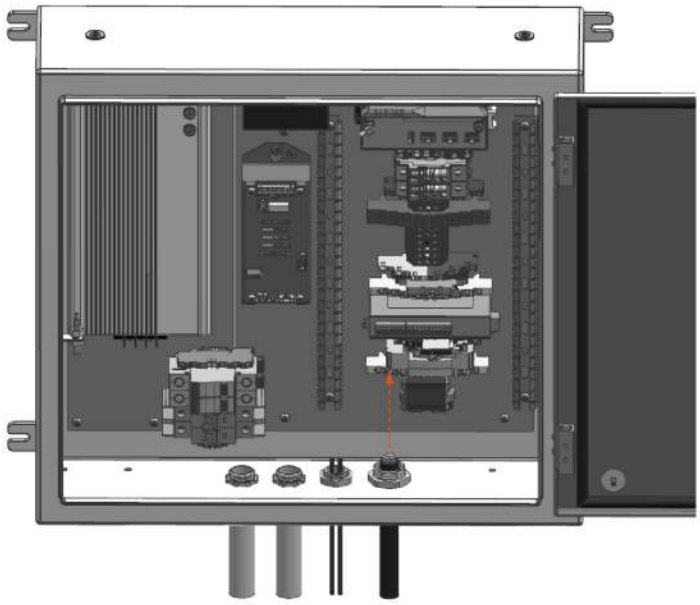
Connect Controller Interface Cable Wires

Prepare for Wire Connection

1. Become familiar with the controller interface cable wires that terminate at the PD Controller. See Appendix: Low Voltage Wire Reference

2. Route the controller interface cable into the PD Controller enclosure.
    - **For cable run without conduit:**

      Route the cable to enter the PD Controller through the 1 in (27 mm) NPT cable gland.



    - **For cable specified to run with conduit:**

      Pull the cable through the conduit into the PD Controller (if not already done).

      Note: The cable can be pulled through the conduit in only one direction, from the pantograph to the PD Controller.

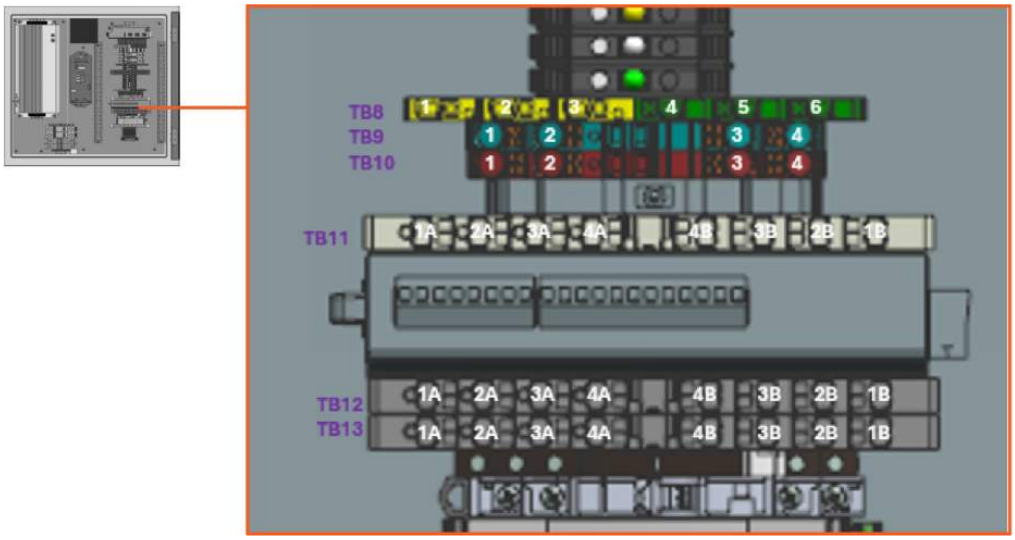
      Note: The conduit end closest to the pantograph must have a 1 in (27 mm) NPT cable gland (shipped with the PD Controller) installed on it and the controller interface cable must be fed into the conduit through the gland. See Route Controller Interface Cable.
    - **For cable run with or without conduit:**

      The controller interface cable may not coil or bunch within the enclosure. In the following steps, cable wires must be cut to length for routing directly to the landing terminals, without excess wire length.

Connect Pantograph Control Cable Wires

1. Route and cut the pantograph control cable wires to length for landing on their terminals. Use the diagram and table below to identify the wires and their landing locations. Also note the wire strip length given.

Wire	Wire Color	Wire Gauge	Terminal Block ID	Port Number	Wire Strip Length
Pantograph low current 24 V	Red/white	20 AWG (0.5 mm^2)	TB9	4	13 mm (0.5 in)
Pantograph motor GND	Black	14 AWG (2.5 mm^2)	TB8	6	12 mm (0.5 in)
Pantograph high current GND	Black	16 AWG (1.5 mm^2)	TB8	5	12 mm (0.5 in)
Pantograph low current GND	Black	20 AWG (0.5 mm^2)	TB8	4	12 mm (0.5 in)
Pantograph high current 24 V	Red	14 AWG (2.5 mm^2)	TB10	4	13 mm (0.5 in)
Raised	Blue	20 AWG (0.5 mm^2)	TB11	1B	10 mm (0.4 in)
Lowered	Yellow	20 AWG (0.5 mm^2)	TB11	2B	10 mm (0.4 in)
Request raise	Blue/white	20 AWG (0.5 mm^2)	TB13	1B	10 mm (0.4 in)
Request lower	Yellow/white	20 AWG (0.5 mm^2)	TB13	2B	10 mm (0.4 in)

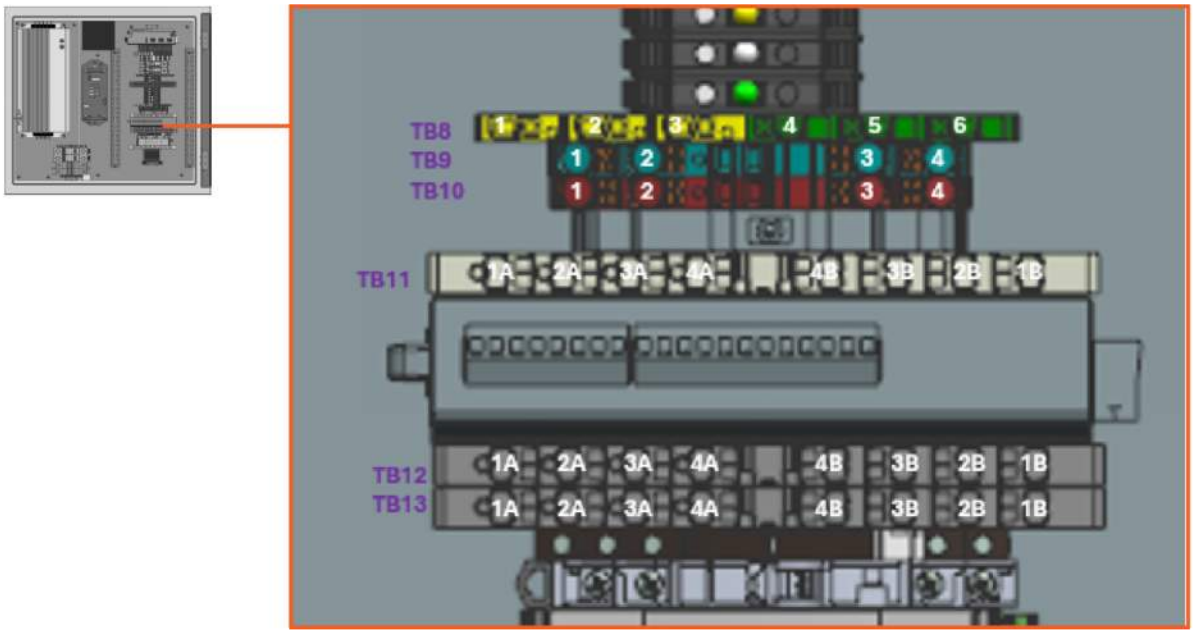


2. Repeat the steps below to connect each pantograph control cable wire at the appropriate terminal.
    a. Strip the wire end.
    b. Insert the wire into its designated terminal port. Use a 2.5 mm flathead screwdriver to release the port clamp for wire insertion.
    c. Push-pull to test the wire is secure.

Connect Pantograph Rest Sensor Cable Wires

1. Route and cut the pantograph rest sensor cable wires to length for landing on their terminals. Use the diagram and table below to identify the wires and their landing locations. Also note the wire strip length given.

Wire	Wire Color	Wire Gauge	Terminal Block ID	Port Number	Wire Strip Length
Rest signal	Green/blue	20 AWG (0.5 mm^2)	TB11	4B	10 mm (0.4 in)
Rest 24 V	Red/white	20 AWG (0.5 mm^2)	TB9	3	13 mm (0.5 in)
Rest GND	Black	20 AWG (0.5 mm^2)	TB8	3	12 mm (0.5 in)

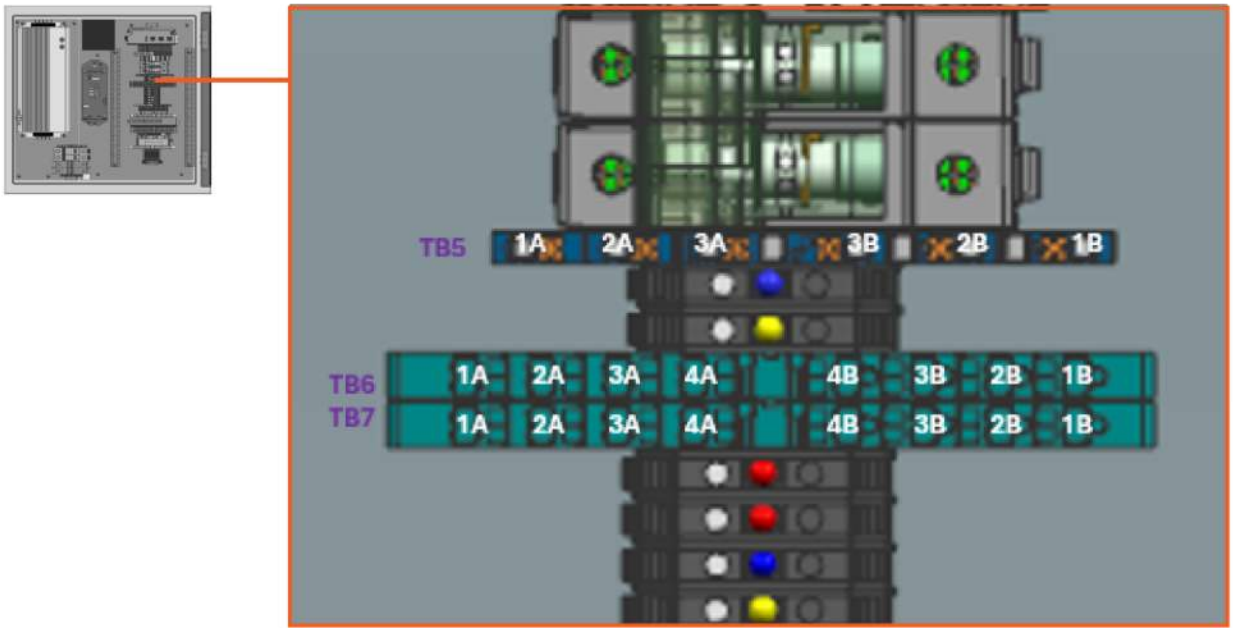


2. Repeat the steps below to connect each pantograph control cable wire at the appropriate terminal.
    a. Strip the wire end.
    b. Insert the wire into its designated terminal port. Use a 2.5 mm flathead screwdriver to release the port clamp for wire insertion.
    c. Push-pull to test the wire is secure.

Connect Pantograph Control Pilot Cable Wires

1. Route and cut the pantograph control pilot cable wires to length for landing on their terminals. Use the diagram and table below to identify the wires and their landing locations. Also note the wire strip length given.

Wire	Wire Color	Wire Gauge	Terminal Block ID	Port Number	Wire Strip Length
Control pilot	White/brown	20 AWG ($0.5\ mm^2$)	TB5	1B	12 mm (0.5 in)
Control pilot shield	Brown/black	20 AWG ($0.5\ mm^2$)	TB5	2B	12 mm (0.5 in)

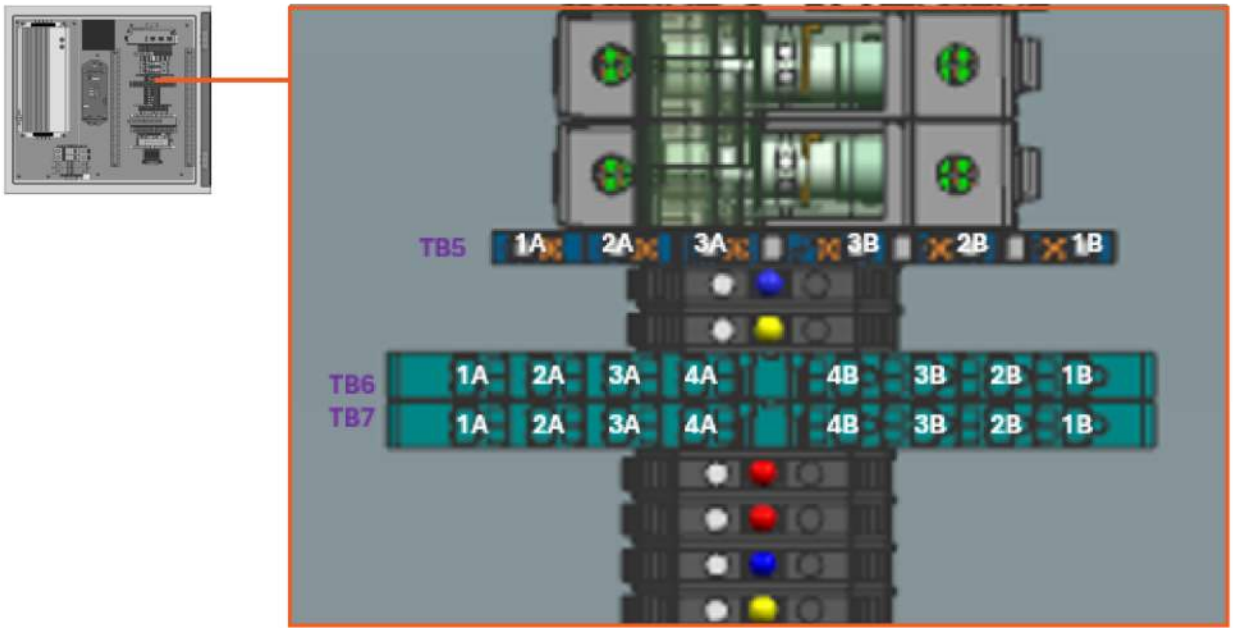


2. Repeat the steps below to connect each pantograph control cable wire at the appropriate terminal.
    a. Strip the wire end.
    b. Insert the wire into its designated terminal port. Use a 2.5 mm flathead screwdriver to release the port clamp for wire insertion.
    c. Push-pull to test the wire is secure.

Connect Status LED Cable Wires

1. Route and cut the status LED cable wires to length for landing on their terminals. Use the diagram and table below to identify the wires and their landing locations. Also note the wire strip length given.

Wire Color	Wire Gauge	Terminal Block ID	Port Number	Wire Strip Length
Orange	24 AWG (0.2 mm^2)	TB6	1B	10 mm (0.4 in)
White/orange	24 AWG (0.2 mm^2)	TB6	2B	10 mm (0.4 in)
Brown	24 AWG (0.2 mm^2)	TB6	3B	10 mm (0.4 in)
White/brown	24 AWG (0.2 mm^2)	TB6	4B	10 mm (0.4 in)
Blue	24 AWG (0.2 mm^2)	TB7	1B	10 mm (0.4 in)
White/blue	24 AWG (0.2 mm^2)	TB7	2B	10 mm (0.4 in)
Green	24 AWG (0.2 mm^2)	TB7	3B	10 mm (0.4 in)
White/green	24 AWG (0.2 mm^2)	TB7	4B	10 mm (0.4 in)

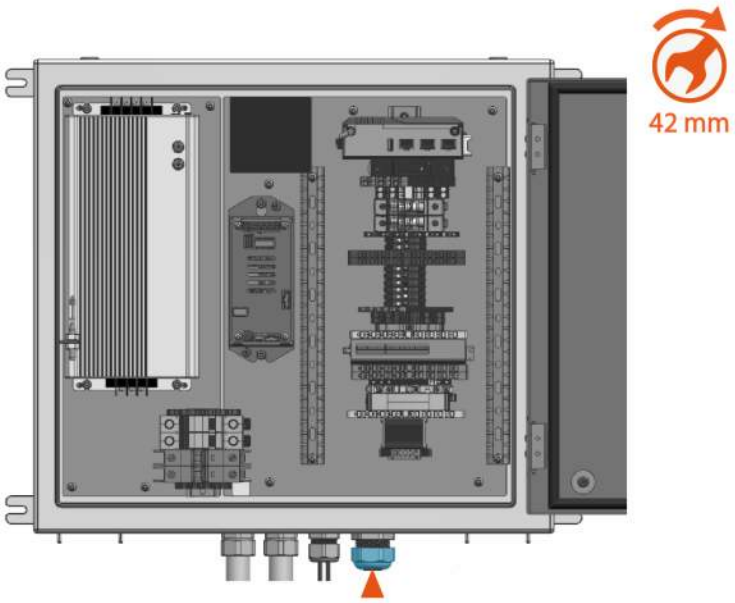


2. Repeat the steps below to connect each pantograph control cable wire at the appropriate terminal.
   a. Strip the wire end.
   b. Insert the wire into its designated terminal port. Use a 2.5 mm flathead screwdriver to release the port clamp for wire insertion.
   c. Push-pull to test the wire is secure.

Secure Controller Interface Cable

1. Tighten the cable gland cap.
    - **For cable run without conduit:**

      The cable gland is located at the PD Controller. Torque the cap to **4.5 Nm (40 in-lb)**.



    - **For cable run with conduit:**

      The cable gland is located at the end of the conduit near the antennas. Torque the cap to **4.5 Nm (40 in-lb)**. Use a 42 mm wrench.
2. Use zip ties to secure and support the cable along its full length outside of the PD Controller. Skip this step if the cable is run through conduit.

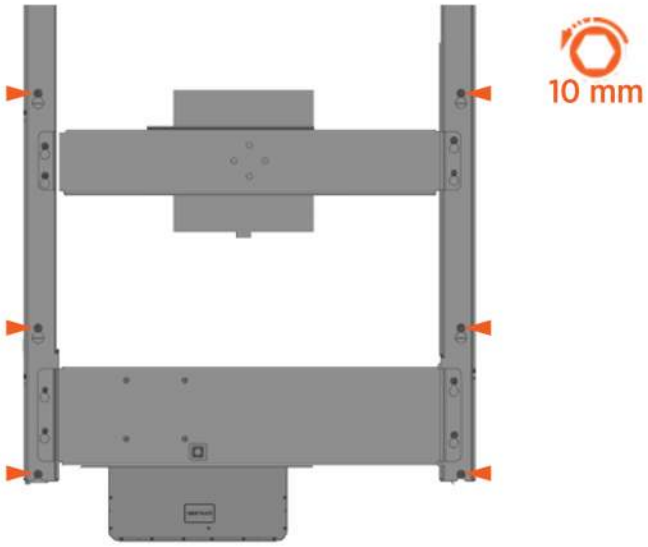
Complete the Install 10

IMPORTANT: Do not reconnect the power after completing the installation. An authorized commissioning partner will commission, power on, pinpoint, and configure Pantograph Down 2000 after installation.

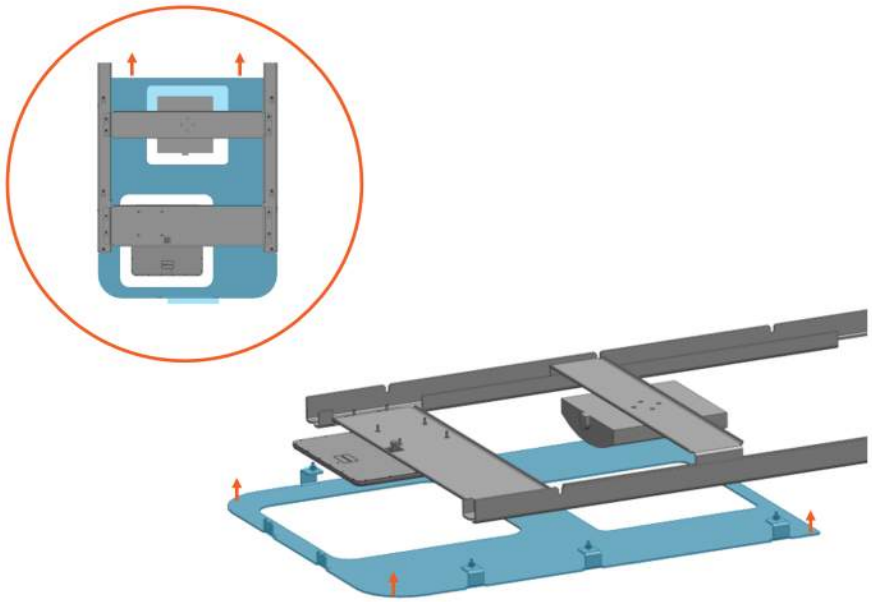
Complete Auxiliary Component Frame

Install Rear Cover

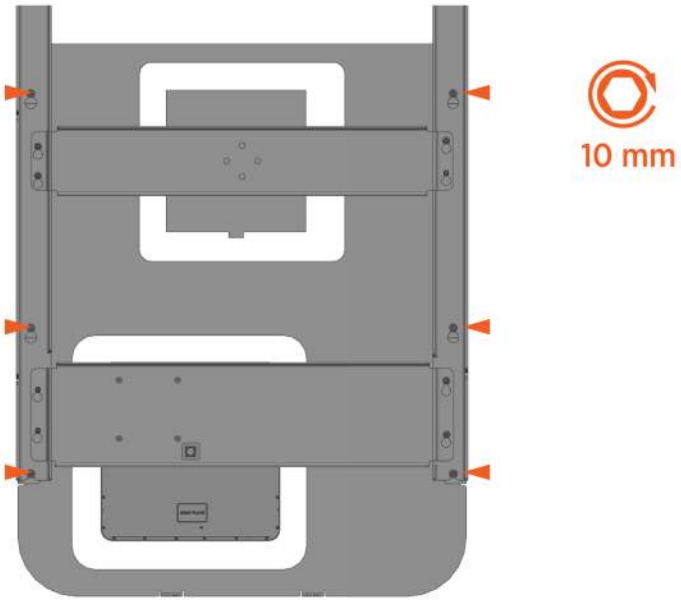
1. Loosen (do not remove) M6 nuts (x6) at the rear of the left and right rails of the auxiliary component mounting frame.



2. Install the rear cover onto the left and right rails. Align the keyhole slots in the cover to the studs on the rails, and slide the cover to engage the keyhole lock.



3. Tighten the M6 nuts (x6). Torque to **5.6 Nm (50 in-lb)**.

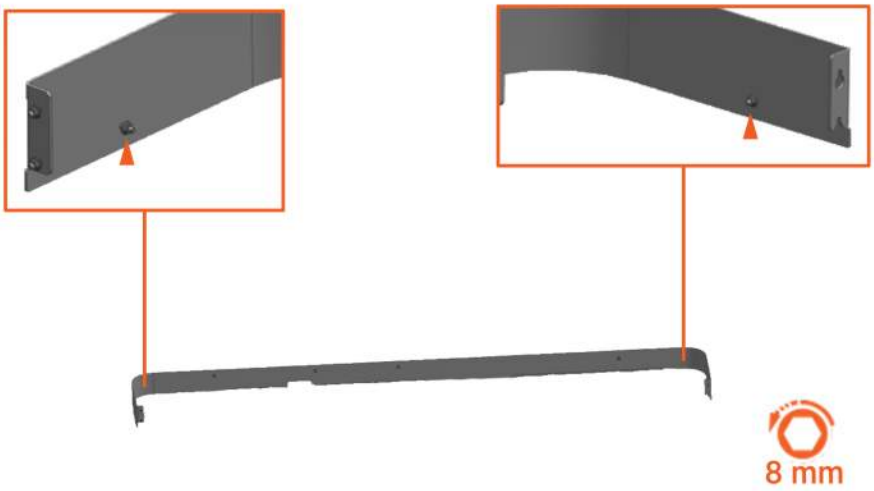


Install Side Covers

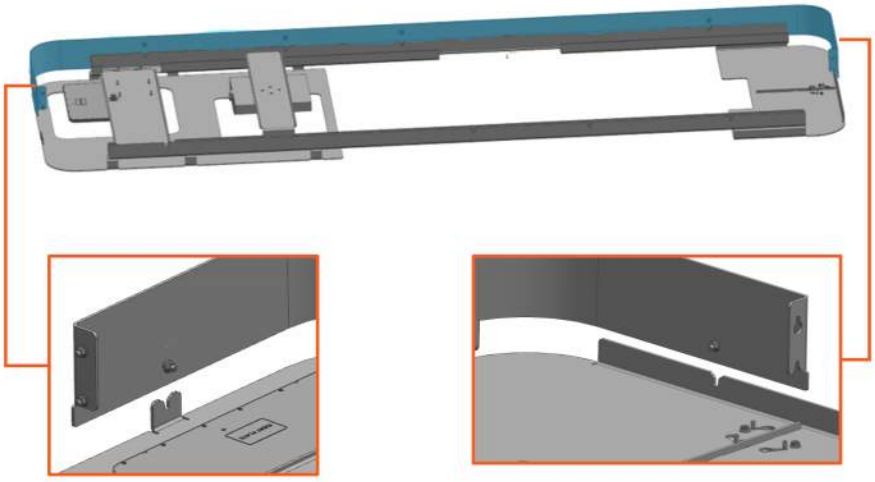
1. Loosen (do not remove) the M6 nuts (x4) on the length of the left side cover.



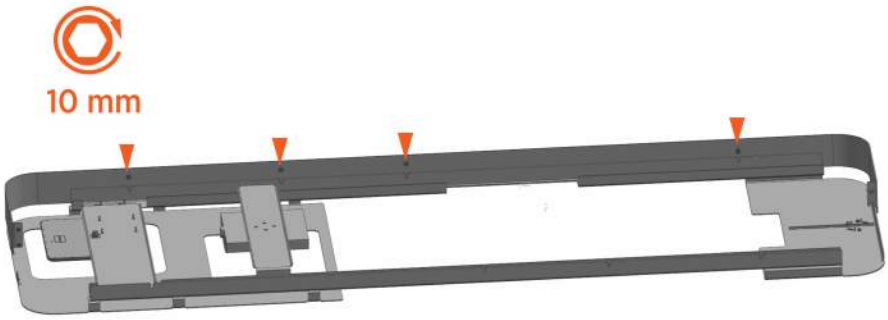
2. Loosen (do not remove) the M5 nuts on the ends of the side cover (x1 nut per end).



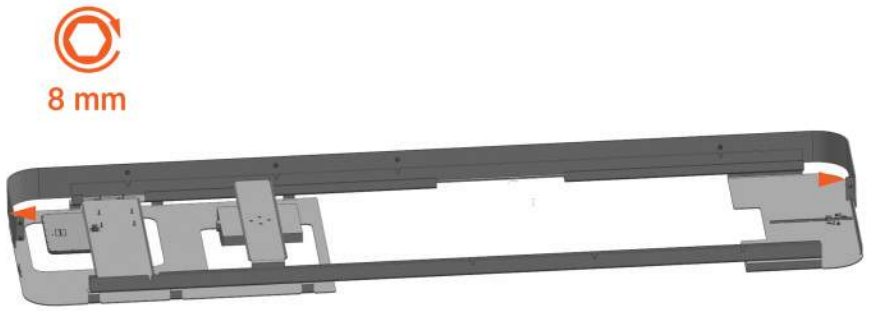
3. Align the side cover to the keyhole slots on the left side rail. Make sure the ends of the cover are seated correctly.



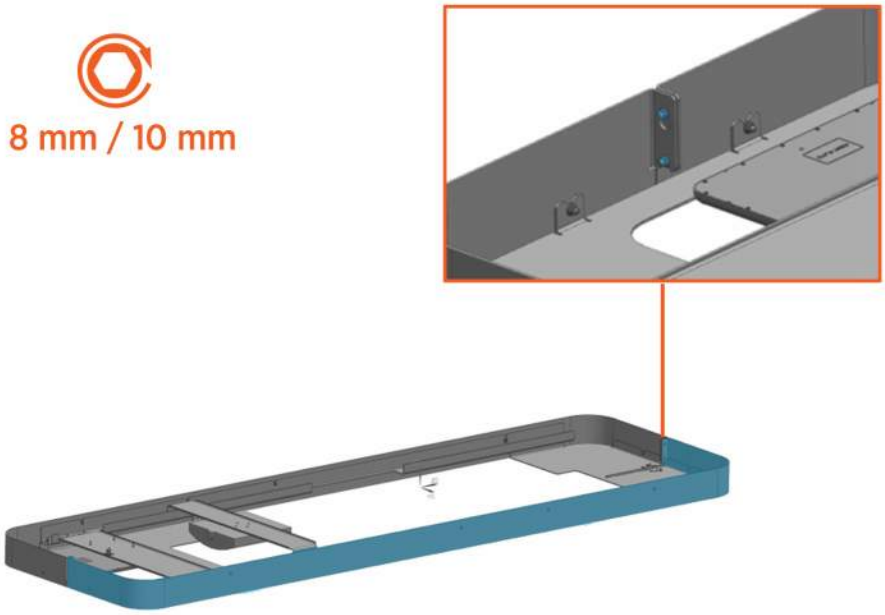
4. Tighten M6 nuts (x4) to fasten the side cover. Torque to **5.6 Nm (50 in-lb)**.



5. Tighten M5 nuts at each end of the side cover (x1 nut per end). Torque to **4.5 Nm (40 in-lb)**.



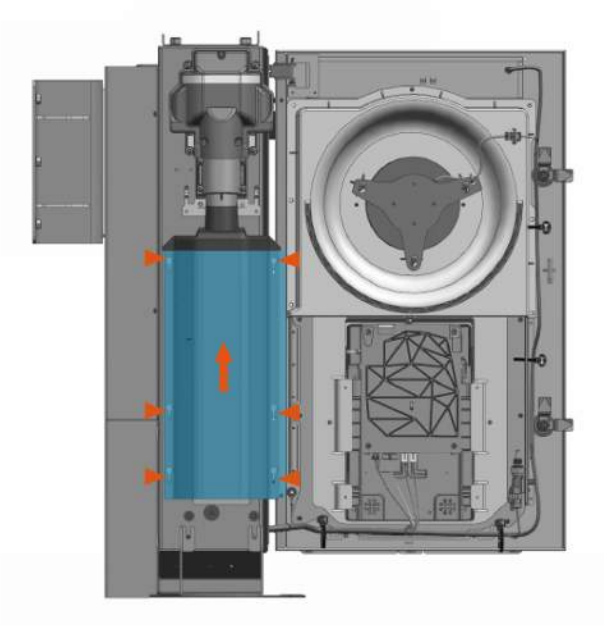
6. Repeat above steps to install the right side cover. At the front end of the frame, align and fasten the left and right side cover together with nuts (x4).



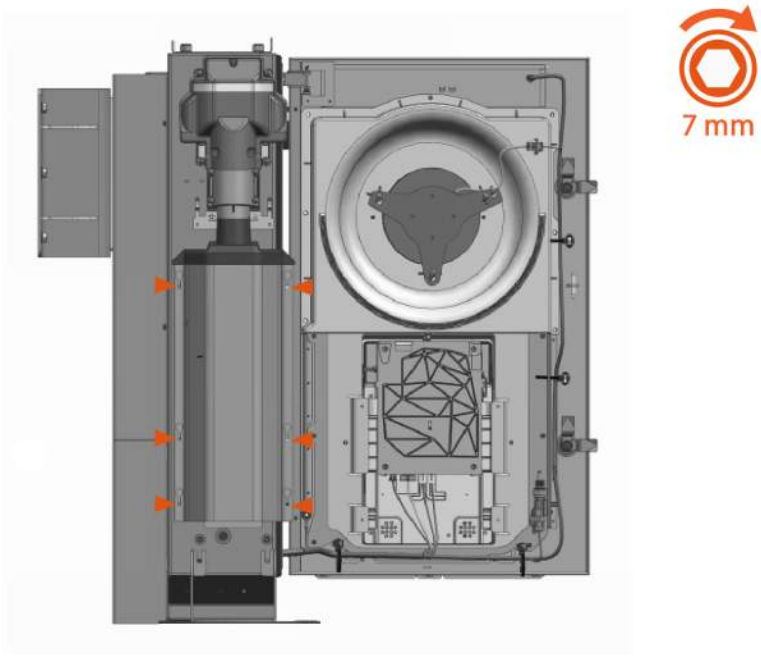
Close Power Link 2000

Reinstall HV DC Output Safety Cover

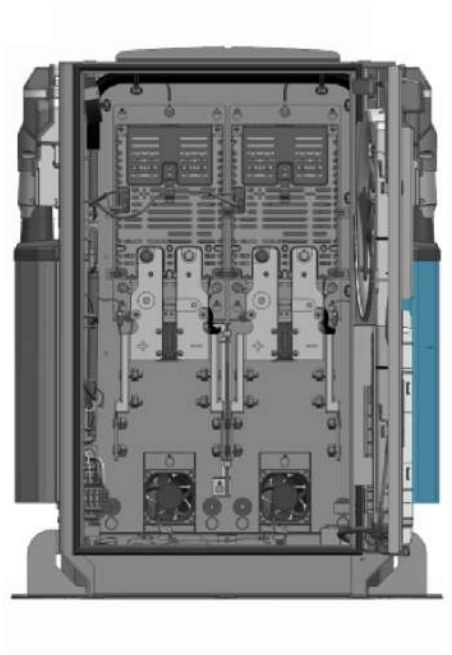
1. Align the left HV DC output safety cover keyholes over nuts (x6). Slide the cover upward to mate the top edge of the safety cover into the grommet groove above it.



2. Tighten nuts (x6). Torque to **1.7 Nm (15 in-lb)**.

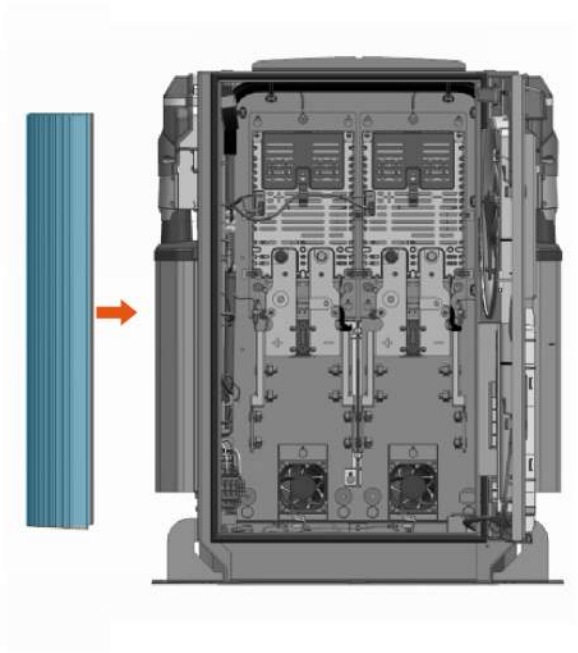


3. Repeat to install the right HV DC output safety cover.

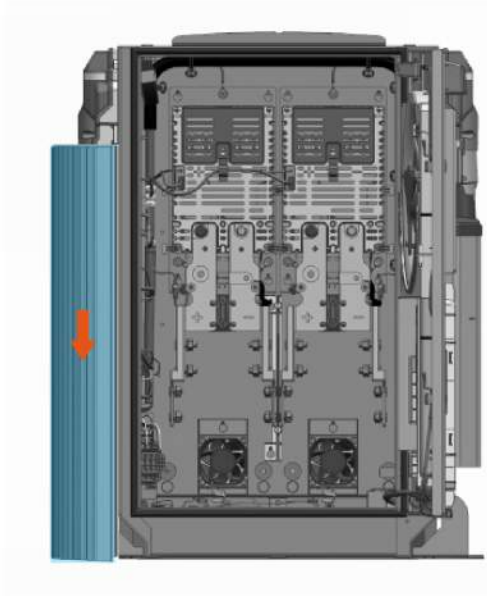


Reinstall Side Panels

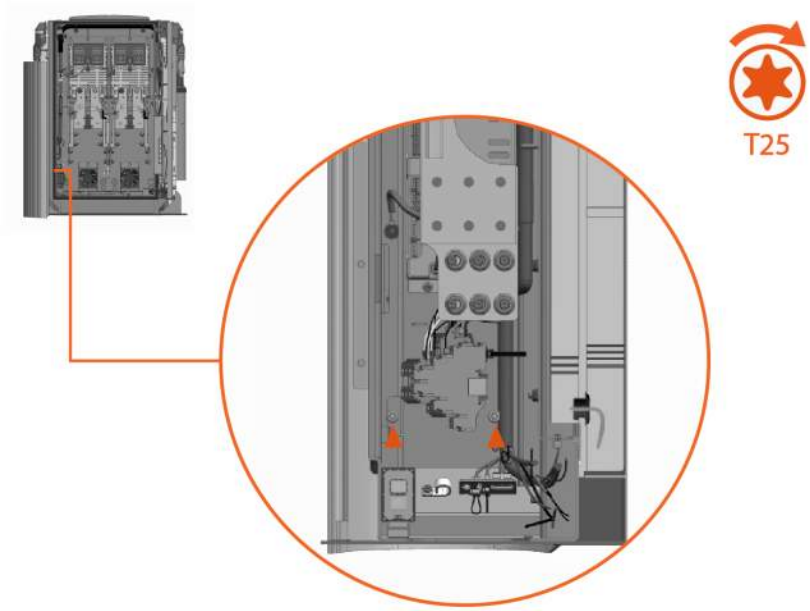
1. Align the left side panel to the hooks (x2) and alignment pins (x2) on the Power Link 2000 frame.



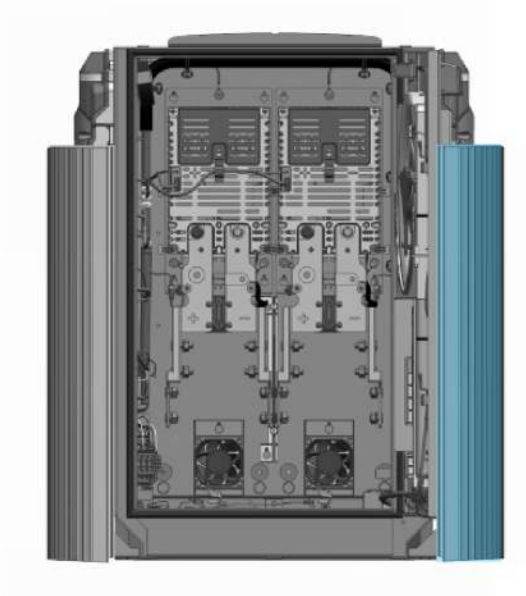
2. Firmly slide the side panel downward until it engages with the hooks (x2) on the frame.



3. Fasten the side panel to the frame with captive screws on interior left wall of enclosure. Torque to **4.5 Nm (40 in-lb)**.

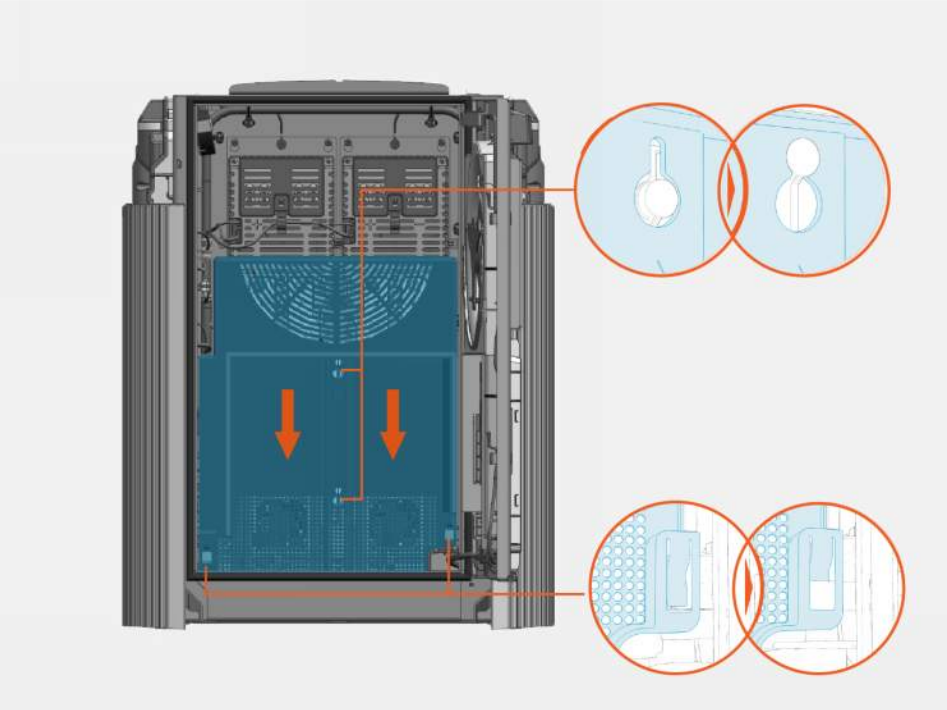


4. Repeat to install the right side panel.



Reinstall HV DC Input Bus Bar Safety Cover

1. Vacuum any residue from the bottom of the enclosure.
2. Install input bus bar safety cover onto the hooks (x2) and latches (x2). Slide the cover down to engage the latch.

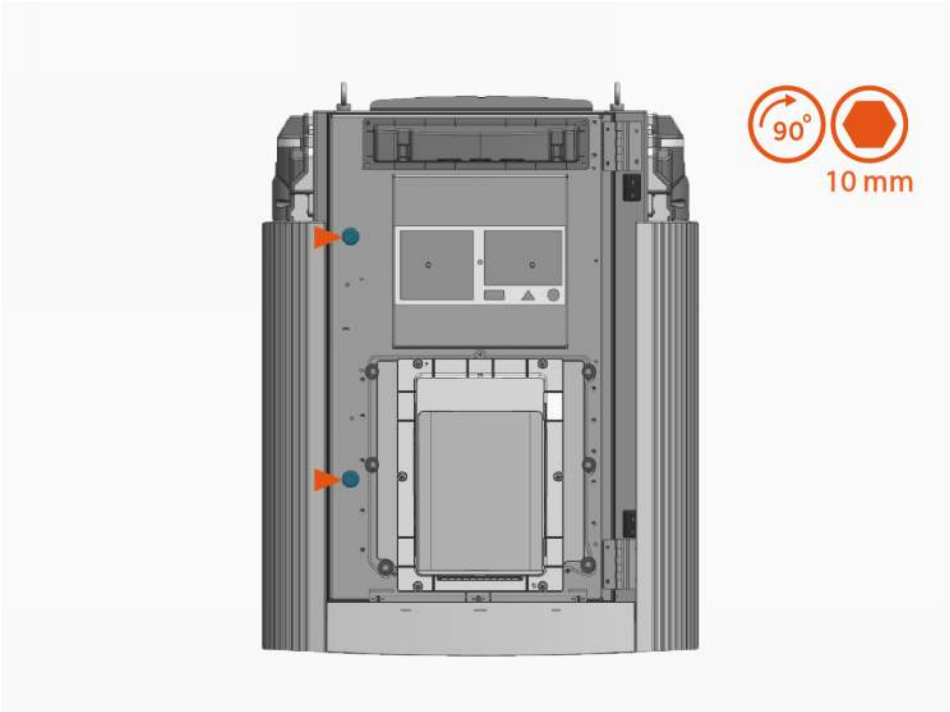


Close Door

1. Disengage the windstop and close the door.

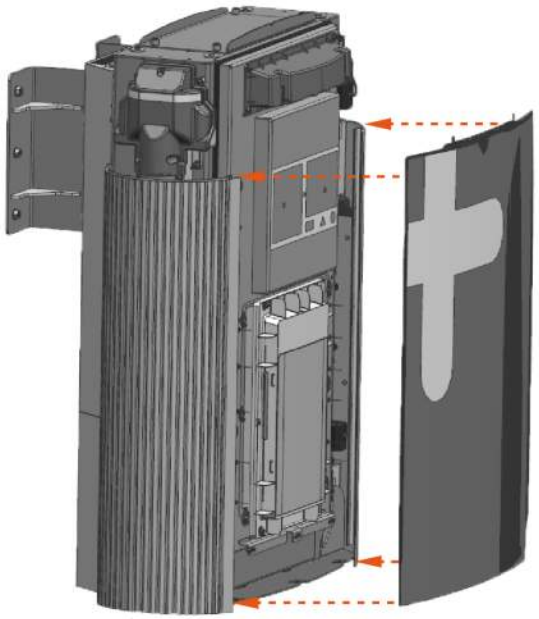


2. Quarter turn the door latches (x2).

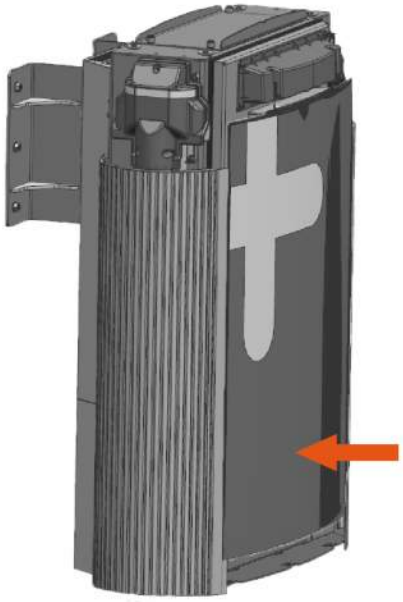


Install Power Link 2000 Covers

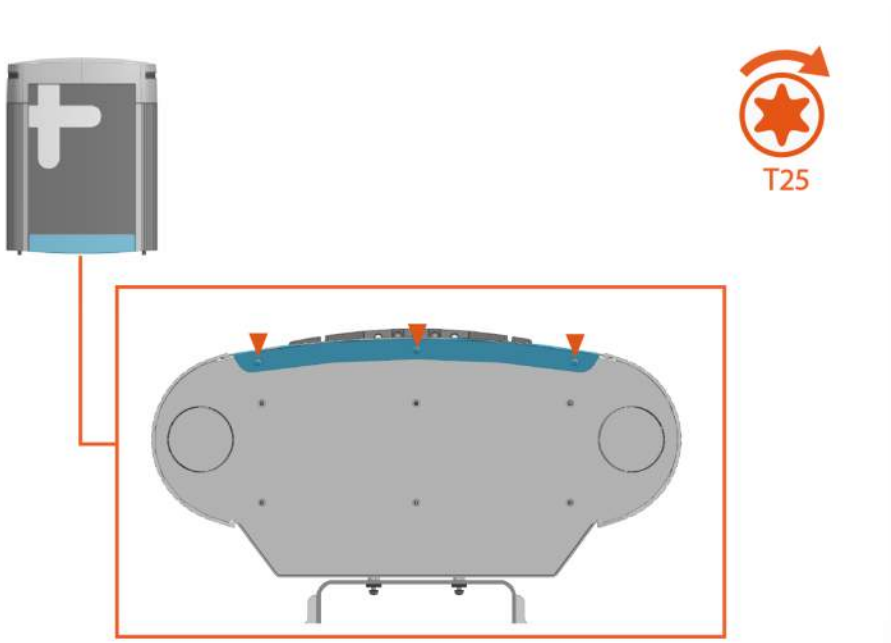
1. Install front cover. Insert the right and left edges of the cover into grooves at the front sides of the enclosure. Push the bottom of the front cover to engage ball studs into stud grips.



2. Push on the front cover to engage a set of ball studs on the back side of the cover into stud grips.



3. Install the bottom crown. Torque captive screws (x3) to **4.5 Nm (40 in-lb)**.



4. Install the top cap.
    - Align the captive screws (x2) at the front of the top cap.



    - Align the captive screws (x2) at the rear of the top cap.

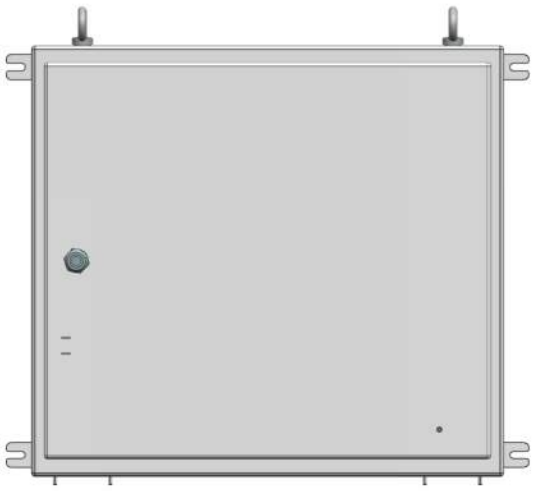


5. Torque the rear screws (x2) to **2.8 Nm (25 in-lb)** and front screws (x2) to **1.7 Nm (15 in-lb)**. Use a T25 Torx Security screwdriver.

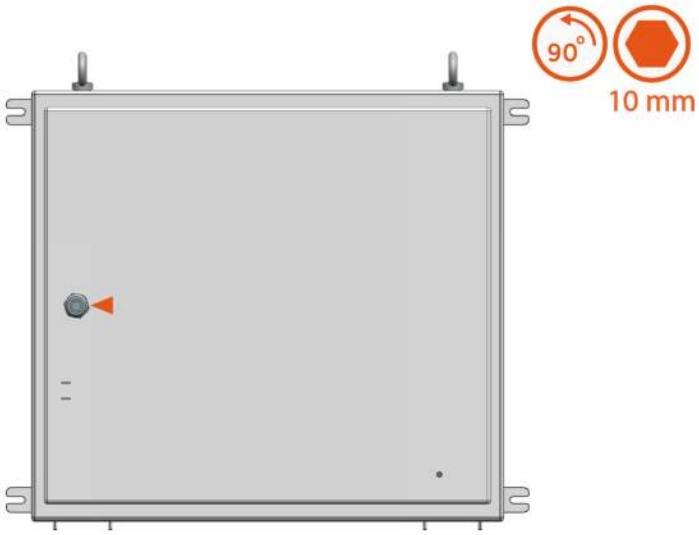
Close PD Controller

Close Door

1. Vacuum any residue from the bottom of the enclosure.
2. Close the door.



3. Quarter turn to lock the door.

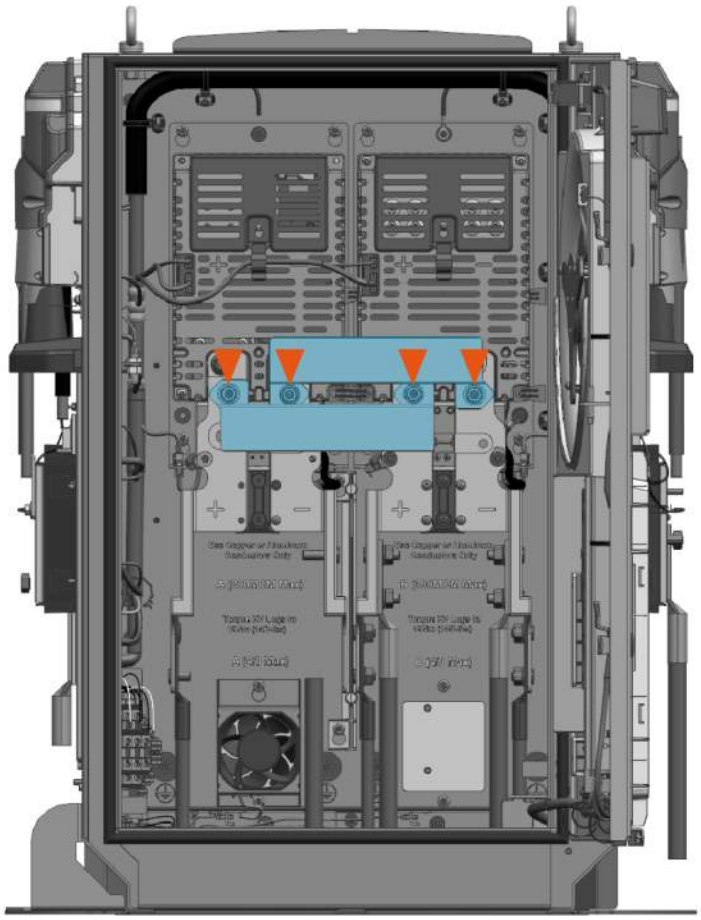


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Appendix: Sequential Charging Kit A

Install Sequential Charging Kit

Install bus bar bridge (x2). Fasten with M8 concentric washer and nut at each stud (x4). Torque to **12.2 Nm (9 ft-lb)**.





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Appendix: Low Voltage Wire Reference B

RFID and Wi-Fi Antenna Cable

The PD Controller ships with two RF coaxial cables for connection to the Wi-Fi and RFID antennas. Each cable is 5 m (16.4 ft) length and cannot be cut to length. Custom cables of different length may be ordered for the site, and must meet the cable specifications listed below. There is no minimum length bound.

Cable	Max. Length	Cable Type	Termination A*	Termination B*
Wi-Fi antenna	10 m (32.8 ft)	LMR-240 or equivalent, must be same outer diameter, 6.1 mm (0.24 in) outer diameter, and low loss operating up to 5.8 GHz or higher.	RP-SMA male	N-type male
RFID antenna	10 m (32.8 ft)	LMR-240 or equivalent, must be same outer dimension, and low loss operating up to 1 GHz or higher.	RP-SMA male	N-type male

*Termination A lands at the PD Controller. Termination B lands at the antenna.

IMPORTANT:

- The LMR-240 cable has a one-time bend radius of 19 mm (0.75 in) and repeated bend radius of 63 mm (2.5 in). If these are exceeded, the cable may be damaged and the system may not operate. If using an LMR-240 equivalent, do not violate the bend radius of that cable type.
- The RF coaxial cables may not be coiled within the PD Controller.

The PD Controller ships with a pre-installed 3/4 in (21 mm) NPT multi-hole cable gland for the secure entry of the antenna cables at the enclosure. Alternatively, the antenna cables may enter the PD Controller by conduit. In the latter case, the cable gland must be removed from the PD Controller and installed at the end of the conduit terminating at the antennas.

The antenna cables can be fed through the gland in only one direction, from the antennas towards (or into) the PD Controller. Feeding the RP-SMA connectors through the gland may be snug and should be done using the following steps:

1. Remove the gland insert from the gland housing.
2. Insert the cables through the gland insert.



CAUTION: Push the RP-SMA connector head through the gland insert by holding the connector itself to avoid the risk of kinking the cable.

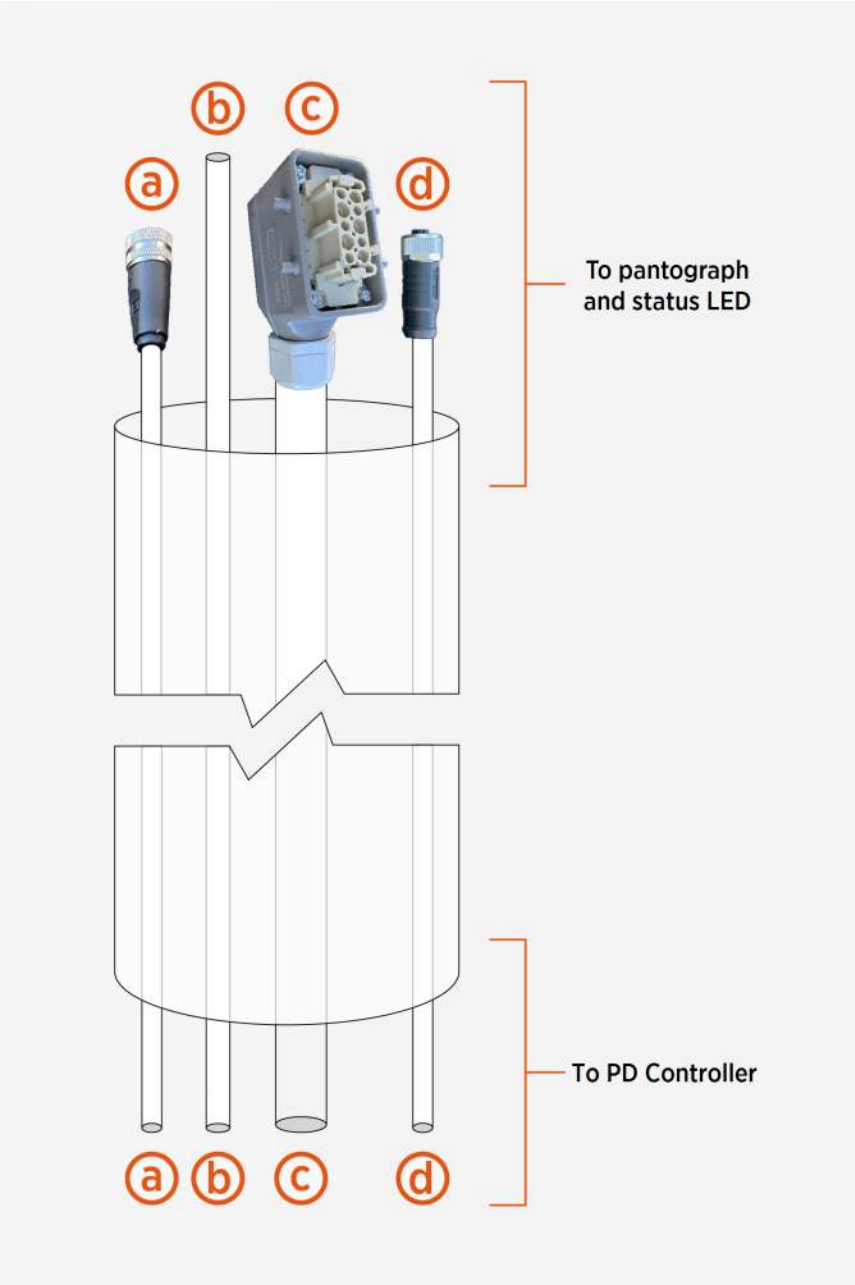
3. Reinstall the gland insert fully into the gland body.

When routing the antenna cables between the PD Controller and the antennas, keep in mind the following three factors:

1. The RF coaxial cables may not be coiled within the PD Controller.
2. The RF coaxial cables may not be cut. (They may be ordered to custom length as discussed above.)
3. The RF coaxial cables may not be bent beyond the bend radius limits discussed above.

Controller Interface Cable Schunk SLS 201.102

The controller interface cable is a single cable that bundles four system cables.



(a) Pantograph rest sensor cable
(b) Pantograph control pilot cable
(c) Pantograph control cable
(d) Status LED cable

Cable Terminations at PD Controller

One end of the controller interface cable terminates at the PD Controller. The system cables at this end are unterminated. The wires at this end of the cable are landed within the PD Controller by wire color. For locations of the landing terminals within the PD Controller, see Connect Controller Interface Cable Wires.

Pantograph Control Cable

Wire	Wire Color	Wire Gauge	Terminal Block ID	Port Number	Wire Strip Length
Pantograph low current 24 V	Red/white	20 AWG (0.5 mm^2)	TB9	4	13 mm (0.5 in)
Pantograph motor GND	Black	14 AWG (2.5 mm^2)	TB8	6	12 mm (0.5 in)
Pantograph high current GND	Black	16 AWG (1.5 mm^2)	TB8	5	12 mm (0.5 in)
Pantograph low current GND	Black	20 AWG (0.5 mm^2)	TB8	4	12 mm (0.5 in)
Pantograph high current 24 V	Red	14 AWG (2.5 mm^2)	TB10	4	13 mm (0.5 in)
Raised	Blue	20 AWG (0.5 mm^2)	TB11	1B	10 mm (0.4 in)
Lowered	Yellow	20 AWG (0.5 mm^2)	TB11	2B	10 mm (0.4 in)
Request raise	Blue/white	20 AWG (0.5 mm^2)	TB13	1B	10 mm (0.4 in)
Request lower	Yellow/white	20 AWG (0.5 mm^2)	TB13	2B	10 mm (0.4 in)

Pantograph Rest Sensor Cable

Wire	Wire Color	Wire Gauge	Terminal Block ID	Port Number	Wire Strip Length
Rest signal	Green/blue	20 AWG (0.5 mm^2)	TB11	4B	10 mm (0.4 in)
Rest 24 V	Red/white	20 AWG (0.5 mm^2)	TB9	3	13 mm (0.5 in)
Rest GND	Black	20 AWG (0.5 mm^2)	TB8	3	12 mm (0.5 in)

Pantograph Control Pilot Cable

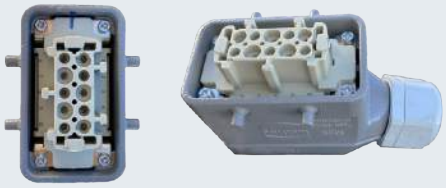
Wire	Wire Color	Wire Gauge	Terminal Block ID	Port Number	Wire Strip Length
Control pilot	White/brown	20 AWG (0.5 mm^2)	TB5	1B	12 mm (0.5 in)
Control pilot shield	Brown/black	20 AWG (0.5 mm^2)	TB5	2B	12 mm (0.5 in)

Status LED Cable

Wire Color	Wire Gauge	Terminal Block ID	Port Number	Wire Strip Length
Orange	24 AWG (0.2 mm^2)	TB6	1B	10 mm (0.4 in)
White/orange	24 AWG (0.2 mm^2)	TB6	2B	10 mm (0.4 in)
Brown	24 AWG (0.2 mm^2)	TB6	3B	10 mm (0.4 in)
White/brown	24 AWG (0.2 mm^2)	TB6	4B	10 mm (0.4 in)
Blue	24 AWG (0.2 mm^2)	TB7	1B	10 mm (0.4 in)
White/blue	24 AWG (0.2 mm^2)	TB7	2B	10 mm (0.4 in)
Green	24 AWG (0.2 mm^2)	TB7	3B	10 mm (0.4 in)
White/green	24 AWG (0.2 mm^2)	TB7	4B	10 mm (0.4 in)

Cable Terminations at Pantograph and Status LED

One end of the controller interface cable terminates at the pantograph and status LED. The pantograph rest sensor cable, pantograph control cable, and status LED cables at this end are terminated with connectors. The control pilot cable is unterminated.

System Cable	Connector Type	Reference Image
Pantograph rest sensor	M12, A-code, 4-pin, female	
Pantograph control	Harting, female	
Status LED	M12, A-code, 8-pin, female	

Routing Through Conduit and Cable Gland

The PD Controller ships with a pre-installed 1 in (27 mm) NPT cable gland for the secure entry of the controller interface cable at the enclosure. Alternatively, the cable may enter the PD Controller by conduit. In the latter case, the cable gland must be removed from the PD Controller and installed at the end of the conduit terminating at the pantograph.

Due to the size of the terminating connectors on one end of the cable, the controller interface cable can be fed through the cable gland and through the conduit in only one direction, from the pantograph towards (or into) the PD Controller.

Limited Warranty Information and Disclaimer

The Limited Warranty you received with your charging station is subject to certain exceptions and exclusions. For example, your use of, installation of, or modification to, the ChargePoint® charging station in a manner in which the ChargePoint® charging station is not intended to be used or modified will void the limited warranty. You should review your limited warranty and become familiar with the terms thereof. Other than any such limited warranty, the ChargePoint products are provided "AS IS," and ChargePoint, Inc. and its distributors expressly disclaim all implied warranties, including any warranty of design, merchantability, fitness for a particular purposes and non-infringement, to the maximum extent permitted by law.

Limitation of Liability

CHARGEPOINT IS NOT LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, PUNITIVE OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION LOST PROFITS, LOST BUSINESS, LOST DATA, LOSS OF USE, OR COST OF COVER INCURRED BY YOU ARISING OUT OF OR RELATED TO YOUR PURCHASE OR USE OF, OR INABILITY TO USE, THE CHARGING STATION, UNDER ANY THEORY OF LIABILITY, WHETHER IN AN ACTION IN CONTRACT, STRICT LIABILITY, TORT (INCLUDING NEGLIGENCE) OR OTHER LEGAL OR EQUITABLE THEORY, EVEN IF CHARGEPOINT KNEW OR SHOULD HAVE KNOWN OF THE POSSIBILITY OF SUCH DAMAGES. IN ANY EVENT, THE CUMULATIVE LIABILITY OF CHARGEPOINT FOR ALL CLAIMS WHATSOEVER RELATED TO THE CHARGING STATION WILL NOT EXCEED THE PRICE YOU PAID FOR THE CHARGING STATION. THE LIMITATIONS SET FORTH HEREIN ARE INTENDED TO LIMIT THE LIABILITY OF CHARGEPOINT AND SHALL APPLY NOTWITHSTANDING ANY FAILURE OF ESSENTIAL PURPOSE OF ANY LIMITED REMEDY.

FCC Compliance Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Important: Changes or modifications to this product not authorized by ChargePoint, inc., could affect the EMC compliance and revoke your authority to operate this product.

Exposure to Radio Frequency Energy: The radiated power output of the 802.11 b/g/n radio and cellular modem (optional) in this device is below the FCC radio frequency exposure limits for uncontrolled equipment. The antenna of this product, used under normal conditions, is at least 20 cm away from the body of the user. This device must not be co-located or operated with any other antenna or transmitter by the manufacturer, subject to the conditions of the FCC Grant.

ISED (formerly Industry Canada)

This device complies with the licence-exempt RSS standard(s) of Innovation, Science and Economic Development Canada (ISED). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil est conforme aux flux RSS exemptés de licence d'Innovation, Sciences et Développement économique Canada (ISDE). L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter.

Radiation Exposure Statement: This equipment complies with the IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.

Énoncé d'exposition aux rayonnements: Cet équipement est conforme aux limites d'exposition aux rayonnements ioniques RSS-102 Pour un environnement incontrôlé. Cet équipement doit être installé et utilisé avec un Distance minimale de 20 cm entre le radiateur et votre corps.

FCC/IC Compliance Labels

Visit chargepoint.com/labels.

chargepoint.com/support

75-001671-01 r0

SECTION 26 36 23

AUTOMATIC TRANSFER SWITCH

PART 1 - GENERAL

1.1 SCOPE

Furnish and install NEMA 3R automatic transfer switch (ATS) with number of poles, amperage, voltage, and withstand current ratings as shown on the plans. Each automatic transfer shall consist of an inherently double throw power transfer switch unit and a microprocessor controller, interconnected to provide complete automatic operation. All transfer switch and control panels shall be the product of the same manufacturer.

1.2 RELATED SECTIONS

A. Section 26 01 20 - General Electrical Provisions.

1.3 REFERENCES

A. UL1008 – Standard for Transfer Switch Equipment

B. CSA certified to CSA 22.2 No. 178 – 1978 Automatic Transfer Switches

C. IEC 60947-6-1 Low-voltage Switchgear and Controlgear; Multifunction equipment; Automatic Transfer Switching Equipment

D. NFPA 70 - National Electrical Code.

E. NFPA 110 – Emergency and Standby Power Systems

F. IEEE Standard 446 – IEEE Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications

G. NEMA Standards ICS10-1993 (formerly ICS2-447) – AC Automatic Transfer Switches

H. UL 508 Industrial Control Equipment

1.4 SUBMITTALS

A. Product Data: Provide catalog sheets showing voltage, switch size, ratings and size of switching and overcurrent protective devices, operating logic, short circuit ratings, dimensions, and enclosure details.

B. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.

1.5 OPERATION AND MAINTENANCE DATA

A. Operation Data: Include instructions for operating equipment. Include instructions for operating equipment under normal and emergency conditions when engine generator is running.

B. Maintenance Data: Include routine preventative maintenance and lubrication schedule. List special tools, maintenance materials, and replacement parts.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

B. Handle in accordance with manufacturer's written instructions. Lift only with lugs provided for the purpose. Handle carefully to avoid damage to internal components, enclosure and finish.

1.7 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

1.8 MAINTENANCE SERVICE

A. Furnish service and maintenance of transfer switch for one year from Date of Substantial Completion.

1.9 MAINTENANCE MATERIALS

A. Provide two of each special tool required for maintenance.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. ASCO.

B. Or approved equal.

2.2 MECHANICALLY HELD TRANSFER SWITCH

A. The transfer switch shall be electrically operated and mechanically held. The electrical operator shall be a single-solenoid mechanism, momentarily energized. Main operators which include overcurrent disconnect devices will not be accepted. The switch shall be mechanically interlocked to ensure only one of two possible positions, normal or emergency.

B. The switch shall be positively locked and unaffected by momentary outages so that contact pressure is maintained at a constant value and temperature rise at the contacts is minimized for maximum reliability and operating life.

C. All main contacts shall be silver composition. Switches rated 600 amperes and above shall have segmented, blow-on construction for high withstand current capability and be protected by separate arcing contacts.

D. Inspection of all contacts shall be possible from the front of the switch without disassembly of operating linkages and without disconnection of power conductors. A manual operating handle shall be provided for maintenance purposes. The handle shall permit the operator to manually stop the contacts at any point throughout their entire travel to inspect and service the contacts when required.

E. Designs utilizing components of molded-case circuit breakers, contactors, or parts thereof which are not intended for continuous duty, repetitive switching or transfer between two active power sources are not acceptable.

F. Where neutral conductors must be switched, the ATS shall be provided with fully rated neutral transfer contacts.

G. Where neutral conductors are to be solidly connected, a neutral terminal plate with fully rated AL-CU pressure connectors shall be provided.

2.3 MICROPROCESSOR CONTROLLER WITH MEMBRANE INTERFACE PANEL

A. The controller's sensing and logic shall be controlled by a single built-in microprocessor for maximum reliability, minimum maintenance, and the ability to communicate serially through an optional serial communication module.

B. A single controller shall provide twelve selectable nominal voltages for maximum application flexibility and minimal spare part requirements. Voltage sensing shall be true RMS type and shall be accurate to ± 1% of nominal voltage. Frequency sensing shall be accurate to ± 0.2%. The panel shall be capable of operating over a temperature range of -20 to +60 degrees C and storage from -55 to +85 degrees C.

C. The controller shall be connected to the transfer switch by an interconnecting wiring harness. The harness shall include a keyed disconnect plug to enable the controller to be disconnected from the transfer switch for routine maintenance. Sensing and control logic shall be provided on multi-layer printed circuit boards. Interfacing relays shall be industrial grade plug-in type with dust covers. The panel shall be enclosed with a protective cover and be mounted separately from the transfer switch unit for safety and ease of maintenance. The protective cover shall include a built-in pocket for storage of the operator's manuals.

D. All customer connections shall be wired to a common terminal block to simplify field-wiring connections.

E. The controller shall meet or exceed the requirements for Electromagnetic Compatibility (EMC) as follows:

1.	EN 55011:1991	Emission standard - Group 1, Class A
2.	EN 50082-2:1995	Generic immunity standard, from which:
	EN 61000-4-2:1995	Electrostatic discharge (ESD) immunity
	ENV 50140:1993	Radiated Electro-Magnetic field immunity
	EN 61000-4-4:1995	Electrical fast transient (EFT) immunity
	EN 61000-4-5:1995	Surge transient immunity
	EN 61000-4-6:1996	Conducted Radio-Frequency field immunity

2.4 ENCLOSURE

A. The ATS shall be furnished in a NEMA type 3R enclosure unless otherwise shown on the plans.

B. Provide strip heater with thermostat for Type 3R enclosure requirements.

C. Controller shall be flush-mounted display with LED indicators for switch position and source acceptability. It shall also include test and time delay bypass switches.

PART 3 - OPERATION

3.1 CONTROLLER DISPLAY and KEYPAD

A. A four line, 20 character LCD display and keypad shall be an integral part of the controller for viewing all available data and setting desired operational parameters. Operational parameters shall also be available for viewing and limited control through the serial communications input port. The following parameters shall only be adjustable via DIP switches on the controller:

1. Nominal line voltage and frequency

2. Single or three phase sensing

3. Operating parameter protection

4. Transfer operating mode configuration
(Open transition, Closed transition, or Delayed transition)

All instructions and controller settings shall be easily accessible, readable and accomplished without the use of codes, calculations, or instruction manuals.

3.2 VOLTAGE, FREQUENCY and PHASE ROTATION SENSING

A. Voltage and frequency on both the normal and emergency sources (as noted below) shall be continuously monitored, with the following pickup, dropout, and trip setting capabilities (values shown as % of nominal unless otherwise specified):

Parameter	Sources	Dropout / Trip	Pickup / Reset
Undervoltage	N&E,3ϕ	70 to 98%	85 to 100%
Overvoltage	N&E,3ϕ	102 to 115%	2% below trip
Underfrequency	N&E	85 to 98%	90 to 100%
Overfrequency	N&E	102 to 110%	2% below trip
Voltage unbalance	N&E	5 to 20%	1% below dropout

B. Repetitive accuracy of all settings shall be within ± 0.5% over an operating temperature range of -20°C to 60°C.

C. Voltage and frequency settings shall be field adjustable in 1% increments either locally with the display and keypad or remotely via serial communications port access.

D. The controller shall be capable (when activated by the keypad or through the serial port) of sensing the phase rotation of both the normal and emergency sources. The source shall be considered unacceptable if the phase rotation is not the preferred rotation selected (ABC or CBA).

E. Source status screens shall be provided for both normal & emergency to provide digital readout of voltage on all 3 phases, frequency, and phase rotation.

F. The controller shall include a user selectable algorithm to prevent repeated transfer cycling to a source on an installation which experiences primary side, single phase failures on a Grounded Wye – Grounded Wye transformer which regenerates voltage when unloaded. The algorithm shall also inhibit retransfer to the normal (utility) source upon detection of a single phasing condition until a dedicated timer expires, the alternate source fails, or the normal source fails completely and is restored during this time delay period. The time delays associated with this feature shall be adjustable by the user through the controller keypad and LCD.

3.3 TIME DELAYS

A. An adjustable time delay of 0 to 6 seconds shall be provided to override momentary normal source outages and delay all transfer and engine starting signals. Capability shall be provided to extend this time delay to 60 minutes by providing an external 24 VDC power supply.

B. A time delay shall be provided on transfer to emergency, adjustable from 0 to 60 minutes, for controlled timing of transfer of loads to emergency.

C. Two time delay modes (which are independently adjustable) shall be provided on re-transfer to normal. One time delay shall be for actual normal power failures and the other for the test mode function. The time delays shall be adjustable from 0 to 60 minutes. Time delay shall be automatically bypassed if the emergency source fails and the normal source is acceptable.

D. A time delay shall be provided on shut down of engine generator for cool down, adjustable from 0 to 60 minutes.

E. A time delay activated output signal shall also be provided to drive an external relay(s) for selective load disconnect control. The controller shall have the ability to activate an adjustable 0 to 5 minute time delay in any of the following modes:

1. Prior to transfer only.
2. Prior to and after transfer.
3. Normal to emergency only.
4. Emergency to normal only.
5. Normal to emergency and emergency to normal.
6. All transfer conditions or only when both sources are available.

3.4 ADDITIONAL FEATURES

A. A three position momentary-type test switch shall be provided for the ***test / automatic / reset*** modes. The test position will simulate a normal source failure. The reset position shall bypass the time delays on either transfer to emergency or retransfer to normal.

B. A SPDT contact, rated 5 amps at 30 VDC, shall be provided for a low-voltage engine start signal. The start signal shall prevent dry cranking of the engine by requiring the generator set to reach proper output, and run for the duration of the cool down setting, regardless of whether the normal source restores before the load is transferred.

C. Auxiliary contacts, rated 10 amps, 250 VAC shall be provided consisting of one contact, closed when the ATS is connected to the normal source and one contact closed, when the ATS is connected to the emergency source.

D. LED indicating lights (16 mm industrial grade, type 12) shall be provided; one to indicate when the ATS is connected to the normal source (green) and one to indicate when the ATS is connected to the emergency source (red).

E. LED indicating lights (16 mm industrial grade, type 12) shall be provided and energized by controller outputs. The lights shall provide true source availability of the normal and emergency sources, as determined by the voltage sensing trip and reset settings for each source.

F. An Inphase monitor shall be provided in the controller. The monitor shall control transfer so that motor load inrush currents do not exceed normal starting currents, and shall not require external control of power sources. The inphase monitor shall be specifically designed for and be the product of the ATS manufacturer. The inphase monitor shall be equal to ASCO Feature 27.

G. The controller shall be capable of accepting a normally open contact that will allow the transfer switch to function in a non-automatic mode using an external control device.

H. **Engine Exerciser -** The controller shall provide an internal engine exerciser. The engine exerciser shall allow the user to program up to seven different exercise routines. For each routine, the user shall be able to:

1. Enable or disable the routine.
2. Enable or disable transfer of the load during routine.
3. Set the start time, .
   - time of day
   - day of week
   - week of month (1st, 2nd, 3rd, 4th, alternate or every)
4. Set the duration of the run.

At the end of the specified duration the switch shall transfer the load back to normal and run the generator for the specified cool down period. A 10-year life battery that supplies power to the real time clock in the event of a power loss will maintain all time and date information.

I. **System Status -** The controller LCD display shall include a “System Status” screen which shall be readily accessible from any point in the menu by depressing the “ESC” key a maximum of two times. This screen shall display a clear description of the active operating sequence and switch position. For

example,

Normal Failed
Load on Normal
TD Normal to Emerg
2min15s

Controllers that require multiple screens to determine system status or display "coded" system status messages, which must be explained by references in the operator's manual, are not permissible.

J. Self Diagnostics - The controller shall contain a diagnostic screen for the purpose of detecting system errors. This screen shall provide information on the status input signals to the controller which may be preventing load transfer commands from being completed..

K. Data Logging – The controller shall have the ability to log data and to maintain the last 99 events, even in the event of total power loss. The following events shall be time and date stamped and maintained in a non-volatile memory:

1. Event Logging

    1. Data and time and reason for transfer normal to emergency.
    2. Data and time and reason for transfer emergency to normal.
    3. Data and time and reason for engine start.
    4. Data and time engine stopped.
    5. Data and time emergency source available.
    6. Data and time emergency source not available.

2. Statistical Data

    1. Total number of transfers.
    2. Total number of transfers due to source failure.
    3. Total number of days controller is energized.
    4. Total number of hours both normal and emergency sources are available.

L. Communications Module – Shall provide remote interface module to support monitoring of vendor's transfer switch, controller and optional power meter. Module shall provide status, analog parameters, event logs, equipment settings & configurations over embedded webpage and open protocol. Features shall include:

1. Email notifications and SNMP traps of selectable events and alarms may be sent to a mobile device or PC.
2. Modbus TCP/IP, SNMP, HTTP, SMTP open protocols shall be simultaneously supported.
3. Web app interface requiring user credentials to monitor and control the transfer switch supporting modern smart phones, tablets and PC browsers. User will be able to view the dynamic one-line; ATS controls status, alarms, metering, event logging as well as settings.

4. Secure access shall be provided by requiring credentials for a minimum of 3 user privilege levels to the web app, monitor (view only), control (view and control) and administrator (view, control and change settings). 128-Bit AES encryption standard shall be supported for all means of connectivity.
5. Shall allow for the initiating of transfers, retransfers, bypassing of active timers and the activating/deactivating of engine start signal shall be available over the embedded webpage and to the transfer switch vendor's monitoring equipment.
6. An event log displaying a minimum of ninety-nine (99) events shall be viewable and printable from the embedded webpages and accessible from supported open protocols.
7. Four (4) 100 Mbps Ethernet copper RJ-45 ports, five (5) serial ports, Termination dip-switches and LEDs for diagnostics.
8. DIN rail mountable.

This option shall be equivalent to ASCO accessory 72EE2

O. External DC Power Supply – An optional provision shall be available to connect an external 24 VDC power supply to allow the LCD and the door mounted control indicators to remain functional when both power sources are dead. This option shall be equivalent to ASCO accessory 1G.

PART 4 - ADDITIONAL REQUIREMENTS

4.1 WITHSTAND AND CLOSING RATINGS

A. The ATS shall be rated to close on and withstand the available rms symmetrical short circuit current at the ATS terminals with the type of overcurrent protection shown on the plans. WCR ATS ratings as be as follows when used with specific circuit breakers:

ATS Size	Withstand & Closing Rating MCCB	W/CLF
30	22,000A	100,000
70 - 200	22,000A	200,000
230	22,000A	100,000
260 – 400	42,000A	200,000
600 – 1200	65,000A	200,000
1600 – 2000	85,000A	200,000
2600 – 3000	100,000A	200,000

4.2 TESTS AND CERTIFICATION

A. The complete ATS shall be factory tested to ensure proper operation of the individual components and correct overall sequence of operation and to ensure that the operating transfer time, voltage, frequency and time delay settings are in compliance with the specification requirements.

B. Upon request, the manufacturer shall provide a notarized letter certifying compliance with all of the requirements of this specification including compliance with the above codes and standards, and withstand and closing ratings. The certification shall identify, by serial number(s), the equipment involved. No exceptions to the specifications, other than those stipulated at the time of the submittal, shall be included in the certification.

C. The ATS manufacturer shall be certified to ISO 9001: 2000 International Quality Standard and the manufacturer shall have third party certification verifying quality assurance in design/development, production, installation and servicing in accordance with ISO 9001: 2000.

4.3 SERVICE REPRESENTATION

A. The ATS manufacturer shall maintain a national service organization of company-employed personnel located throughout the contiguous United States. The service center's personnel must be factory trained and must be on call 24 hours a day, 365 days a year.

B. The manufacturer shall maintain records of each switch, by serial number, for a minimum of 20 years.

C. For ease of maintenance, the transfer switch nameplate shall include drawing numbers and serviceable part numbers.

END OF SECTION

SECTION 31 20 00

EARTHWORK

PART 1 - GENERAL

1.1 RELATED SECTIONS

A. Section 02 41 00 “Demolition”

1.2 REFERENCE STANDARDS

A. The following is a list of standards which may be referenced in this section:

1. Standard Specifications for Public Works Construction (“Standard Specifications”), 2018 Edition
2. American Society for Testing and Materials

1.3 SUBMITTALS

A. Contractor shall submit a job mix design for all base rock and import fill material to be used on project as required in these Special Provisions:

1. Provide copies of gradation reports and material certificates signed by material producer and Contractor, certifying that each material complies with, or exceeds, specified requirements.
2. Provide samples upon request.

1.4 QUALTITY ASSURANCE

A. Contractor shall coordinate with OCTA Project Manager daily on-site monitoring and testing during earthwork and compaction efforts, which shall be provided by OCTA.

B. Testing Agency shall monitor and test the following:

1. Inspect and test Class A Topsoil material and confirm that it complies with the Project requirements.
2. Inspect and test placement of Class A Topsoil and confirm that the maximum lift thickness, placement, and compaction of engineering fill complies with the Project requirements
3. Inspect and test all subgrades and confirm that compaction and bearing capacities comply with the Project requirements

1.5 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth moving operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from OCTA Project Manager.

2. Provide alternate routes around closed or obstructed traffic ways if required by OCTA Project Manager.

B. Utility Locator Service: Notify local “811” before beginning earth moving operations.

C. Do not commence earth moving operations until temporary erosion- and sedimentation-control measures.

D. Blasting shall not be permitted.

1.6 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.

2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Class A Topsoil: Imported satisfactory soil material for landscaping and planting.

C. Structures: Footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

D. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill, drainage fill, drainage structure, drainage course, or topsoil materials.

E. Utilities: On-site underground pipes, conduits, ducts, and cables.

F. Clearing and Grubbing: Trimming and removal of trees, brush, weeds, stumps, trash, sod, grass, stumps, roots, other vegetation on or below the ground surface, and other debris.

PART 2 - PRODUCTS

2.1 CLASS A TOPSOIL

A. Provide Class A Topsoil materials only when satisfactory soil materials are not available from excavations.

B. Material shall be evaluated by OCTA Project Manager for its suitability as Class A Topsoil prior to importation to the project site.

C. Material shall conform to Section 800-1.1.2 of the Standard Specifications for Public Works Construction ("Standard Specifications"), 2018 Edition.

2.2 SUBGRADE BRIDGING MATERIAL, 3 IN. MINUS

A. Imported Subgrade Bridging Material, 3 in. minus or crushed PCC pavement to be used as stabilization layer shall conform to the following gradations:

Sieve Size	Percent Passing (by weight)
125mm (5")	100
100mm (4")	100
75mm (3")	100
62.5mm (2-1/2")	89
50mm (2")	55
37.5mm (1-1/2")	24
25mm (1")	4
19mm (3/4")	1
12.5mm (1/2")	1
9.5mm (3/8")	1
4.75mm (No.4)	1

2.3 3/4" MINUS ROCK

A. For gradation refer to Table 200-1.2 (A) of the Standard Specifications.

PART 3 - EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. The work includes implementation and maintenance of a Storm Water Pollution Prevention Plan (SWPPP), including QSP and QSD services, and implementation and maintenance of SWPPP Best Management Practices (BMPs) required to prevent and control discharges of dust, soil, sediment, debris, and other pollutant from the project site onto adjacent areas and/or into the storm water conveyance system from construction activities shown on the project drawings.

The SWPPP and BMPs shall apply to all construction related areas and activities associated with the project, such as staging areas, equipment and material storage sites, waste management areas, temporary plant sites, and borrow pit operations which may be outside the construction limits.

B. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent condition has been established.

C. When permanent conditions are established, remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

D. Prevent sediment inundation from construction activities into infiltration and rock gallery trenches.

3.2 PROTECTION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.

B. Protect and maintain erosion and sedimentation controls during earth moving operations.

C. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

D. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by OCTA Project Manager; reshape and recompact.

E. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration.

3.3 DEWATERING AND FLOW CONTROL

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.4 UNCLASSIFIED EXCAVATION

A. No excavation beyond the limits shown on the plans shall take place without authorization of OCTA Project Manager.

B. Excavated material that is deemed acceptable by OCTA Project Manager shall be reused on-site in applicable Work.

3.5 EXCAVATION FOR NON-BUILDING STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Excavations for Non-Building Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

2. Excavation for Underground Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.

3.6 PLACEMENT OF CLASS A TOPSOIL

A. Grading and placement of Class A Topsoil shall conform to Section 801-2 of the Standard Specifications for Public Works Construction ("Standard Specifications"), 2018 Edition.

3.7 GRADING

A. Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

3.8 SUBGRADE PREPARATION

A. Finish subgrades to required elevations within the following tolerances:

1. Subgrade for pavement, curb and gutter, driveways, or other roadway structures shall not vary more than 0.02 feet from the specified grade and cross section.
2. Subgrade for subbase or base material shall not vary more than 0.04 feet from the specified grade and cross section.

3.9 CLEARING AND GRUBBING

A. Contractor shall remove all trees, brush, weeds, stumps, trash, sod, grass, stumps, roots, other vegetation on or below the ground surface, and other debris. Removal limits shall extend to grading limits. Any vegetation damaged or removed outside the grading limits shall be replaced in kind at no additional expense to OCTA.

END OF SECTION 31 20 00

SECTION 31 23 26

BASE COURSE

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Installation of base material.

B. Related Requirements:

1. Division 01 - General Requirements.

2. Section 31 20 00 - Earthwork

1.02 SUBMITTALS

A. Crushed aggregate base (CAB) shall consist of native rock without naturally occurring asbestos or recycled materials. The CONTRACTOR shall submit written documentation, which identifies the source, volume, and proposed transport date of the material for review and approval by OCTA Project Manager prior to importing the material. A statement on company letterhead from the CAB source, stamped by either a California Professional Geologist or Engineer, which states that the subject materials are native rock, do not contain any recycled materials and that the source quarry does not mine ultramafic materials, a source of natural occurring asbestos shall be included in the submittal.

1. Suppliers include, but are not limited to:

a. Hansen Aggregates.

b. Vulcan Materials, Reliance Company.

c. Vulcan Materials Durbin.

C. Product Data: Submit material source, technical information and test data for base materials. Gradation and quality certifications shall be dated within 30 days of the submittal.

D. Sample: Submit sample of proposed base course material.

1.03 QUALITY ASSURANCE

A. Comply with the following as a minimum requirement: Standard Specifications for Public Works Construction, current edition.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Crushed Aggregate Base (CAB) materials shall conform to the requirements of the Standard Specifications for Public Works Construction: Section 200 - Rock Materials.

B. Crushed Miscellaneous Base (CMB) or materials generated on site shall not be used as a base course material.

2.02 MATERIAL APPROVAL

A. Base material shall be inspected by the Project Inspector for gradation and material content prior to installation. OCTA may choose to have additional tests performed by a testing agency, retained by the OCTA, before installation.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install base course material in layers not exceeding 4 inches in thickness, unless required otherwise. Grade and compact to indicated levels or grades, cut and fill, water and roll until the surface is compacted and true to line, grade and required section. Provide a relative compaction of at least 95 percent, unless otherwise required.

3.02 PROTECTION

A. Protect the Work of this section until Substantial Completion.

3.03 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 32 17 23

PAVEMENT STRIPING AND MARKINGS

PART 1 – GENERAL

1.01 DESCRIPTION

A. Section Includes:

1. Labor, materials, and equipment necessary and incidental to applying pavement striping and marking on parking lots and painting of curbs.

1.02 REFERENCE STANDARDS

A. Caltrans: State of California Department of Transportation, Standard Specifications.

B. Caltrans: State of California Department of Transportation, California MUTCD.

C. CCR, Title 24: California Code of Regulations: California Building Code.

1.03 SUBMITTALS

A. Product Data: Technical data for each type of pavement marking materials. Provide manufacturer's recommendations for application, including limitations, safety, and environmental requirements, application rates, dry film thickness (DFT), and equipment required for application.

B. Test Reports and Certifications: Manufacturer's certification that products used comply with SCAQMD regulations for VOC content.

1.04 QUALITY ASSURANCE

A. Pavement striping and marking shall be performed by workers with proven skills required to perform the work in accordance with the correct location, alignment, and dimensions of the striping and markings as shown in the drawings or as modified by OCTA Project Manager.

B. At no additional cost to OCTA, repair or replace pavement markings which fail to present a uniform appearance and those which are marred and damaged by traffic or by other causes.

C. Until acceptance by OCTA Project Manager, Contractor shall be responsible for maintenance of pavement striping and markings until the roadway and/or parking area is open to vehicular traffic.

D. Pavement striping and markings, whether temporary or permanent, shall be completed before the roadway or parking area is opened for vehicular traffic.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver paint materials to site in manufacturer's original, unopened, and labeled containers. Keep containers in clean condition, free of foreign materials, and paint residue. Protect from freezing. Remove paints exposed to freezing conditions and replace at no expense to OCTA when required by OCTA Project Manager.

1.06 PROJECT CONDITIONS

A. Striping and Markings: Apply traffic paints when temperature surfaces and surrounding air temperatures are between 50 deg F and 90 deg F and weather is not windy or humid, unless otherwise permitted in writing by paint manufacturer and authorized by OCTA Project Manager.

1. Do not apply paints to wet or damp surfaces.

2. Do not apply paints to asphalt or asphalt sealers which have not thoroughly cured and dried.

B. Take precautions to avoid effects of wind drift during the application of liquid materials.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Paint for traffic striping and marking shall comply with Caltrans Standard Specifications Sections 84-1 and 84-3. Type of paint shall either be standard dry or fast dry waterborne and SCAQMD compliant.

B. Glass Beads: Conform to California State Specification No. 8010-004 (type II).

2.02 COLORS

A. Color for pavement striping shall be Caltrans Standard Specifications "white" and “yellow” unless otherwise indicated on drawings.

B. Parking Areas: Colors per Caltrans Standard Specifications Section 84-3.02 unless otherwise indicated on drawings.

1. Red: Safety and restricted marking (fire lanes and curb markings).

2. Yellow: Traffic and safety markings (directional markings and graphics, lane and curb markings).

3. Blue: Accessible parking stalls and graphics and disability markings.

4. White: Traffic lanes, parking stalls, and elsewhere.

PART 3 – EXECUTION

3.01 PREPARATION

A. Layout chalk markings at locations and to dimensions indicated on approved shop drawings. Use stencils, templates, forms, and guidelines for word markings, letters, numerals, and symbols.

B. Verify that pavement surface is dry, free of dirt, grease, oil, acids, laitance, curing compounds, or foreign matter that will reduce the bond between the paint and pavement.

1. Bituminous Surface: Allow bituminous pavement minimum 30 days to cure prior to application of paint. If paint curls or discolors, removed paint, prepare surface, and recoat.

2. Portland Cement Concrete Surface: Allow portland cement concrete to cure for a minimum of 28 days prior to application of paint. Test for moisture prior to application of paint.

C. Clean contaminated areas with solution of trisodium phosphate (10 percent Na_3PO_4 by weight) or other approved cleaning solution. Rinse with clean water and dry prior to application of paint.

3.02 APPLICATION

A. Paint traffic stripes, lines and pavement markings in accordance with the provisions in Sections 84-1, General, and 84-3, Painted Traffic Stripes and Pavement Markings, of the Caltrans Standard Specifications, details shown on drawings, the Caltrans Standard Plans, Manual of Uniform Traffic Control Devices (MUTCD), and the California Building Code.

B. Paint: Mix paint in accordance with manufacturer's instructions. Apply at recommended application rate and surface temperature. Addition of thinner is not permitted.

C. Apply paint by using a striping machine, except for special areas and markings that are inaccessible or not adaptable to machine application, in which case hand application will be permitted with approved masking or stencil use.

D. The striping machine shall be an approved spray-type marking machine capable of producing the specified dimensions of the markings, striping, etc. with clear-cut edges and uniform smooth film thickness.

E. The minimum wet film thickness of the paint shall be 15 mils or in accordance with the manufacturer's recommendation and approved by OCTA Project Manager.

F. Striping and Markings: Provide straight edged uniform line width as shown on the drawings, or if not shown, 4 inches. At accessible parking stalls conform to CBC Figures 11B-18A, 18B and 18C as applicable.

1. Stall Divisions: Provide standard and compact size parking stalls as shown on Contract Drawings, white for standard stalls; blue for accessible stalls.

2. Provide two coats for all painting work including but not limited to all car and bus parking stalls striping, pavement markings, letters, numbers, words, captions, and signage painting shall be aligned straight, clean, without paint smears, blurs, and splatters. All striping, markings and related signage shall be in place, completed and dry prior to the opening of the area for traffic. Add reflectorized glass beads to the second coat of

paint striping, for all bus stalls, handicap signs, arrows, numbers and call-outs. Reflectorized glass beads shall broadcast into wet paint at the rate of approximately 5 pounds per gallon of paint.

G. Arrows and Pavement Signs: Paint directional arrows and markings with stencils. At islands and no parking areas, stripe areas with 4 inch wide stripes.

H. Fire Lane Markings: Comply with governing fire OCTA's requirements. Use approved stencils for lettering and graphics.

I. Contractor shall arrange the work so that the paint is completely dry and the construction area is ready to be open for traffic by the end of each work day.

3.03 TOLERANCES

A. Width of Stripe: Maximum variance of 1/4 inch.

B. Alignment of Stripe: Maximum deviation 1/2 inch in 50 feet.

3.04 CLEANUP

A. Clean up overspray with approved materials and leave a clean and complete project. Remove surplus materials and rubbish and legally dispose of offsite.

PART 4 - MEASUREMENT AND PAYMENT

No separate measurement or payment will be made for the work of this section.

END OF SECTION

SECTION VII: LIST OF DRAWINGS - EXHIBIT C

LIST OF DRAWINGS

By this reference, the following drawings are incorporated in this Invitation For Bids.

Sheet Identification	Description	Number of Sheets
SA-T001	Title Sheet, Drawing Index, Scope of Work, Project Location and Vicinity Map	1
SA-GN-1	General Notes	1
SA-E001	Electrical Abbreviations, Symbols and Notes	1
SA-E101	Site Plan	1
SA-E102	New Equipment Plan	1
SA-E103	New Plan at Generator	1
SA-E104	New Plan at BEB	1
SA-E301	BEB and Pantograph BEB Charger Single Line Diagram	1
SA-E401	Battery Electric Bus Charger & Panel Schedules	1
SA-E501	New Main BEB Switchboard and ATS Elevation	1
SA-E502	Details and Sections	1
SA-E503	Details and Sections	1
SA-E504	Details and Sections	1
SA-E505	Details and Sections	1
SA-E506	Details and Sections	1
SA-S001	Structural Abbreviations, Symbols and Notes	1
SA-S101	Demolition Plan	1
SA-S102	New Equipment Area Plan	1
SA-S103	New Plan at Generator	1
SA-S104	New Plan at BEB	1
SA-S501	Details and Sections	1
SA-S502	Details and Sections	1
SA-S503	Details and Sections	1
SA-S504	BEB Pantograph Charger Mounting Detail	1
SA-S505	Details and Sections	1
C-26	Existing OCTA Bus Maintenance Facility Storm Drain Profiles	1

ORANGE COUNTY TRANSPORTATION AUTHORITY

SANTA ANA BUS BASE

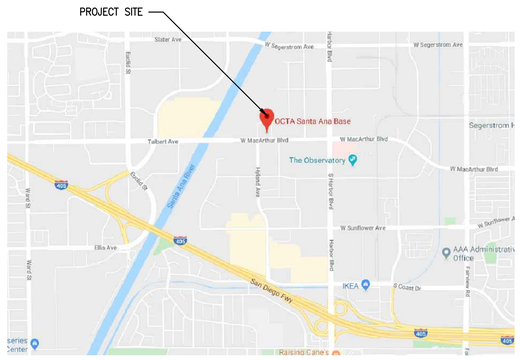
INSTALLATION OF BATTERY-ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE

4301 WEST MACARTHUR BOULEVARD

SANTA ANA, CA 92704

CONTRACT No. C-5-3922

VICINITY MAP



PROJECT LOCATION



PROJECT INFORMATION

OWNER:	ORANGE COUNTY TRANSPORTATION AUTHORITY (OCTA)
SITE ADDRESS:	4301 WEST MACARTHUR BLVD., SANTA ANA, CA 92704
FACILITY USE:	BUS MAINTENANCE
ZONE:	INDUSTRIAL
REFERENCE:	–
BUILDING FOOT PRINT:	N/A
ALLOWABLE FLOOR AREA:	N/A
TYPE OF CONSTRUCTION:	N/A
SPRINKLERS REQUIREMENT:	N/A
HAZARD MATERIAL:	NO HAZARDOUS MATERIAL IS STORED NEARBY

OWNER
ORANGE COUNTY TRANSPORTATION AUTHORITY (OCTA)
550 S. MAIN STREET
ORANGE, CA 92868

CONSULTING ENGINEERS
DAHL, TAYLOR & ASSOCIATES, Inc.
2960 DAIMLER STREET
SANTA ANA, CA 92705

BUILDING CODES AND STANDARDS

2022 BUILDING STANDARDS ADMINISTRATIVE CODE, PART 1, TITLE 24 C.C.R.

2022 CALIFORNIA BUILDING CODE (CBC), PART 2, TITLE 24 C.C.R.

2022 CALIFORNIA ELECTRICAL CODE (CEC), PART 3, TITLE 24 C.C.R.

2022 CALIFORNIA MECHANICAL CODE (CMC) PART 4, TITLE 24 C.C.R.

2022 CALIFORNIA PLUMBING CODE (CPC), PART 5, TITLE 24. C.C.R

2022 CALIFORNIA ENERGY CODE, PART 6, TITLE 24 C.C.R.
2022 CALIFORNIA FIRE CODE, PART 9, TITLE 24 C.C.R.

2022 CALIFORNIA REFERENCED STANDARDS, PART 12, TITLE 24 C.C.R.
TITLE 19 C.C.R., PUBLIC SAFETY, STATE FIRE MARSHAL REGULATIONS.

2022 CALGreen

ALL WORK AND MATERIALS SHALL BE IN FULL ACCORDANCE WITH THESE CODES AND ALL APPLICABLE LOCAL ORDINANCES. WHERE CONTRACT DOCUMENTS EXCEED THESE REQUIREMENTS WITHOUT VIOLATING CODE AND REGULATION REQUIREMENTS, CONTRACT DOCUMENTS SHALL TAKE PRECEDENCE. WHERE CODES CONFLICT, THE MORE STRINGENT SHALL APPLY.

CONTRACTORS BID NOTES

1. CONTRACTORS BIDDING ON THIS PROJECT SHALL REVIEW THE ENTIRE IFB 5-3922 PACKAGE INCLUDING THE DRAWING SET, DIVISION I SPECIFICATIONS, AND TECHNICAL SPECIFICATIONS IN PREPARATION OF THEIR BID. REMOVAL OF ANY PORTION OF THE IFB PACKAGE IS PROHIBITED.
2. GENERAL CONTRACTOR WILL BE RESPONSIBLE FOR THE SCOPE OF WORK AS DESCRIBED IN THE ENTIRE IFB PACKAGE, FOR INSTALLATION, STARTUP TESTING, AND COMMISSIONING OF CHARGEPOINT BEB PLUG-IN AND PANTOGRAPH CHARGERS, AND FOR COORDINATION OF ALL TRADES.
3. GENERAL CONTRACTOR AND SUB-CONTRACTORS ARE TO COORDINATE ALL RELATED WORK AND SCE INSTALLATION OF MEDIUM VOLTAGE EQUIPMENT.

SCOPE OF WORK

1. COORDINATION WITH SOUTHERN CALIFORNIA EDISON (SCE) FOR SCE INSTALLATION OF A NEW ELECTRICAL SERVICE, CONDUITS, SWITCH CABINET, UTILITY TRANSFORMER, AND WIRING, AND FOR TERMINATION OF UTILITY FEEDERS IN THE METERED SWITCHBOARD.
2. INSTALLATION, STARTUP TESTING, AND COMMISSIONING OF NEW ELECTRICAL DISTRIBUTION SYSTEM TO FEED POWER TO NEW BATTERY-ELECTRIC-BUS (BEB) CHARGERS.
3. INSTALLATION, STARTUP TESTING, AND COMMISSIONING OF THIRTEEN (13) CHARGEPOINT POWER BLOCKS, TEN (10) CHARGEPOINT POWER LINK 1000 BEB CHARGERS, AND ONE (1) PANTOGRAPH DOWN 2000 BEB CHARGER THAT ARE FURNISHED BY OCTA.
4. INSTALLATION, STARTUP TESTING, AND COMMISSIONING OF NEW EMERGENCY POWER SYSTEM CONSISTING OF A GENERATOR, AN AUTOMATIC TRANSFER SWITCH, A REMOTE MONITORING PANEL, A PSP PRODUCTS LSC SERIES STANDALONE PROGRAMMABLE LOAD MANAGEMENT CONTROLLER, WIRING, AND ALUMINUM PLATFORMS WITH SAFETY PROTECTION RAILINGS AND STAIRS FOR SERVICE ACCESS.
5. INSTALLATION, STARTUP TESTING, AND COMMISSIONING OF NEW FLEETWATCH FR200 DATA RECEIVERS, LOCKABLE HINGED DOOR STAINLESS STEEL CABINETS, ETHERNET SWITCH, WIFI MODEM, CAT6 STP CABLING, CONTROL WIRING, 120V RECEPTACLES, AND 120V POWER WIRING.
6. AN INDEPENDENT UTILITY LOCATOR TO VERIFY UNDERGROUND UTILITIES PRIOR TO SAW-CUTTING, REMOVAL, AND DISPOSAL OF CONCRETE CURB AND PAVEMENT. TRENCHING, & REPLACEMENT OF 9" THICK REINFORCED CONCRETE PAVEMENT TO MATCH THE EXISTING CONCRETE PAVEMENT.
7. CONSTRUCTION OF CONCRETE CURBS, FOUNDATIONS, PADS, PAVEMENT, PAVEMENT STRIPING AND MARKING, SLABS, WHEEL STOPS, GRANITE GRAVEL FILL, AND BOLLARDS TO PROTECT AND SUPPORT CHARGEPOINT BEB CHARGER CABINETS AND PANTOGRAPH MAST, EMERGENCY POWER GENERATOR, SWITCHBOARD, PANEL-BOARDS, COMMUNICATION AND CONTROL CABINETS, SCE SWITCH CABINET, AND SCE UTILITY TRANSFORMER.
8. REFER TO IFB 5-3922 DOCUMENTS FOR COMPLETE SCOPE OF WORK.

DRAWING INDEX

SHEET		DESCRIPTION
1	SA-T001	TITLE SHEET, DRAWING INDEX, SCOPE OF WORK, PROJECT LOCATION AND VICINITY MAP
2	SA-GN-1	GENERAL NOTES
3	SA-E001	ELECTRICAL ABBREVIATIONS, SYMBOLS AND NOTES
4	SA-E101	SITE PLAN
5	SA-E102	NEW EQUIPMENT PLAN
6	SA-E103	NEW PLAN AT GENERATOR
7	SA-E104	NEW PLAN AT BEB CHARGERS
8	SA-E301	BEB PLUG-IN AND PANTOGRAPH CHARGER SINGLE LINE DIAGRAM (SLD)
9	SA-E401	BATTERY-ELECTRIC-BUS (BEB) CHARGER & PANEL SCHEDULES
10	SA-E501	NEW MAIN BEB SWITCHBOARD AND ATS ELEVATION
11	SA-E502	DETAILS AND SECTIONS
12	SA-E503	DETAILS AND SECTIONS
13	SA-E504	DETAILS AND SECTIONS
14	SA-E505	DETAILS AND SECTIONS
15	SA-E506	DETAILS AND SECTIONS
16	SA-S001	STRUCTURAL ABBREVIATIONS, SYMBOLS AND NOTES
17	SA-S101	DEMOLITION PLAN
18	SA-S102	NEW EQUIPMENT AREA PLAN
19	SA-S103	NEW PLAN AT GENERATOR
20	SA-S104	NEW PLAN AT BEB CHARGERS
21	SA-S501	DETAILS AND SECTIONS
22	SA-S502	DETAILS AND SECTIONS
23	SA-S503	DETAILS AND SECTIONS
24	SA-S504	BEB PANTOGRAPH CHARGER MOUNTING DETAIL
25	SA-S505	DETAILS AND SECTIONS
26	C-26	EXISTING OCTA BUS MAINTENANCE FACILITY STORM DRAIN PROFILES

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Sheet Title: TITLE SHEET, DRAWING INDEX, SCOPE OF WORK, PROJECT LOCATION AND VICINITY MAP

Project: OCTA SANTA ANA BUS BASE
INSTALLATION OF BEB CHARGERS & ELEC. INFRASTR.
4301 WEST MACARTHUR BOULEVARD, SANTA ANA, CA

JOB #	1.19.6
DESIGN BY:	SDV
DRAWN BY:	TMP
CHECKED BY:	QV
DATE	03-07-2025
SCALE	AS NOTED
SHEET	SA-T001

550 South Main Street
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714/560/OCTA

OCTA

GENERAL NOTES

GENERAL NOTES:

1) THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIAL, TOOLS, AND EQUIPMENT TO PROVIDE A COMPLETE AND FINISHED PRODUCT. ALL MATERIALS SHALL BE NEW, UNLESS NOTED OTHERWISE.

2) ALL WORK PERTAINING TO THIS PROJECT SHALL BE DONE IN ACCORDANCE WITH THESE PLANS AND THE SPECIFICATIONS, AND CONTRACT DOCUMENTS, AND THE LOCAL AGENCY OF JURISDICTION BUILDING CODE REQUIREMENTS. CONTRACTOR IS REQUIRED TO OBTAIN CONSTRUCTION PERMIT AND BUSINESS LICENSE FROM THE CITY BEFORE BEGINNING CONSTRUCTION WORK.

3) THE CONTRACTOR SHALL INFORM THE PROJECT MANAGER 72 HOURS BEFORE STARTING CONSTRUCTION WORK. THE PROJECT ENGINEER WILL SCHEDULE A MEETING BETWEEN CONTRACTOR AND OCTA FACILITY AND OPERATION STAFF BEFORE WORK BEGINS.

4) THE CONTRACTOR SHALL PROVIDE ALL NECESSARY BARRICADES, FENCES AROUND WORK AREA, WARNING SIGNS, AND OTHER PROTECTIVE DEVICES, AND TAKE ALL NECESSARY PRECAUTIONARY MEASURES TO PROTECT ALL OCTA PERSONNEL, PUBLIC, PROPERTY AND THE WORK.

5) DUST CONTROL SHALL BE REQUIRED DURING CONSTRUCTION. DUST SHALL BE CONTROLLED BY THE CONTRACTOR BY ENCLOSING AREA OF WORK WITH PLASTIC SHEET OR CANVAS BARRICADES TO PREVENT DUST SPREAD TO ADJACENT BUSES, BUILDINGS, EQUIPMENT AND OCTA WORKERS.

6) DEMOLITION NECESSARY FOR COMPLETION OF CONSTRUCTION SHALL BE A PART OF THIS PROJECT. THE EXISTING MATERIAL REMOVED DURING CONSTRUCTION, SHALL BE LEGALLY DISPOSED OFF-SITE DAILY. ALL DEBRIS SHALL BE REMOVED FROM PREMISES DAILY AND ALL AREAS SHALL BE LEFT IN A CLEAN (BROOM) CONDITION AT ALL TIMES, AND AT THE END OF EACH WORK DAY, CLEAN THE WORK AND SURROUNDING AREAS WHERE CONSTRUCTION DEBRIS HAS SPREAD DURING THE WORK DAY.

7) ALL DRAINAGE FROM NEW CONSTRUCTION WORK SHALL BE PREVENTED FROM ENTERING EXISTING STORM DRAINS ON SITE.

8) THE CONTRACTOR IS REQUIRED TO TAKE ALL PRECAUTIONARY MEASURES TO LOCATE AND PROTECT ABOVE AND BELOW GROUND UTILITIES, EQUIPMENT, AND STRUCTURES SHOWN OR NOT SHOWN ON THESE PLANS. THE PROTECTION OF ALL UTILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR. AT EACH OCTA'S PROPERTY, THE CONTRACTOR SHALL UTILIZE AN INDEPENDENT UNDERGROUND UTILITY LOCATING SERVICE, WHICH USES STANDARD LOCATING TECHNIQUES OTHER THAN EXCAVATING, TO IDENTIFY THE LOCATION OF UNDERGROUND UTILITIES IN THE AREAS OF THE WORK PRIOR TO EXCAVATING. THE CONTRACTOR MUST DETERMINE THE EXACT LOCATION OF UTILITIES IDENTIFIED IN THE WORK AREA BY POTHOLING USING HAND TOOLS BEFORE USING ANY POWER OPERATED EXCAVATING EQUIPMENT. UTILITIES NOT SHOWN ON THE PLANS WHICH ARE IN DIRECT CONFLICT WITH THE WORK WILL BE DEALT WITH BY CHANGE ORDER. THE CONTRACTOR SHALL BEAR ALL EXPENSE FOR THE REPAIR OR REPLACEMENT OF UTILITIES OR OTHER PROPERTY DAMAGE BY HIS OPERATIONS IN CONJUNCTION WITH THE EXECUTION OF THE CONTRACT WORK.

9) THE CONTRACTOR SHALL DELINEATE TRAFFIC THROUGH THE CONSTRUCTION WORK AREA, AND SHALL COOPERATE WITH THE OCTA FACILITY, OPERATIONS, AND MAINTENANCE PERSONNEL TO KEEP THE FACILITY OPERATIONAL AT ALL TIMES. PROVIDE A 20 FEET WIDE DRIVE-WAY ADJACENT TO WORK AREA FOR BUS AND OTHER TRAFFIC TO PASS AROUND WORK AREA. PROVIDE ACCESS FOR BUS AND CAR PARKING IN ADJACENT PARKING STALLS. CONTRACTOR IS REQUIRED TO KEEP OCTA BUS AND FACILITY TRAFFIC OPERATIONAL AT ALL TIMES. DO NOT PARK TRUCKS EQUIPMENT IN BUS DRIVEWAYS, ENTRANCE OR EXITS.

10) ALL WORK SHALL BE COMPLETED BETWEEN THE HOURS OF 7:00 A.M. AND 3:30 P.M. ALL EXISTING FACILITIES, EQUIPMENT, AND UTILITIES DISCONNECTED BY CONTRACTOR DURING THE WORK DAY SHALL BE RE-CONNECTED AT 3:30 PM FOR OCTA TO CONTINUE ITS NORMAL AFTER HOURS OPERATIONS.

11) PLANS HAVE BEEN PREPARED FROM VISUAL AND ACTUAL MEASUREMENT OF THE WORK AREA. THE CONTRACTOR SHALL REPORT TO THE PROJECT MANAGER ANY ERROR, INCONSISTENCY, OR OMISSION HE MAY DISCOVER IN THE DRAWINGS BEFORE BEGINNING WORK. THE CONTRACTOR IS RESPONSIBLE FOR CORRECTING ANY ERROR AT NO COST TO THE AUTHORITY AFTER THE START OF CONSTRUCTION. THE CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS BEFORE SUBMITTING HIS BID. IN CASE OF DISCREPANCIES, CONTRACTOR SHALL OBTAIN CLARIFICATION FROM THE PROJECT MANAGER. SUBMITTAL OF BID INDICATES CONTRACTOR IS AWARE OF SITE AND WORK CONDITIONS AND UNDERSTANDS THE WORK REQUIRED BY THE CONTRACT.

12) ON SITE VERIFICATION OF ALL DIMENSIONS AND CONDITIONS SHALL BE RESPONSIBILITY OF THE CONTRACTOR, NOTIFY PROJECT MANAGER OF ANY DISCREPANCY BEFORE STARTING WORK.

13) THE CONTRACTOR SHALL PROVIDE TEMPORARY WATER, POWER, AND OTHER FACILITIES REQUIRED TO COMPLETE THE PROJECT. CONTRACTOR SHALL PROVIDE TEMPORARY TOILET FACILITIES ON SITE FOR HIS WORKERS WHICH SHALL BE CLEANED ON A DAILY BASIS.

14) THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COMPLETE SECURITY OF THE WORK WHILE THE WORK IS IN PROGRESS AND UNTIL COMPLETED.

15) THE CONTRACTOR SHALL BE RESPONSIBLE FOR AND SHALL REPLACE OR REMEDY ANY FAULTY, IMPROPER OR INFERIOR MATERIAL OR WORKMANSHIP, OR ANY DAMAGE TO WORK OR ADJACENT AREAS OR STRUCTURES.

16) CONTRACTOR SHALL COMPLY WITH ALL SAFETY CODE REGULATIONS AND THE STATE DEPARTMENT OF INDUSTRIAL RELATIONS, DIVISION OF INDUSTRIAL SAFETY (O.S.H.A.) REQUIREMENTS.

17) VERIFY ALL MEASUREMENTS ON SITE BEFORE PREPARING AND SUBMITTING SHOP DRAWINGS.

18) THE CONTRACTOR SHALL POST ADVANCE CONSTRUCTION WARNING SIGNS. THE CONTRACTOR SHALL PROVIDE ALL BARRICADES, WARNING SIGNS, AND PROTECTIVE DEVICES AND SHALL TAKE ALL NECESSARY MEASURES TO PROTECT ALL PERSONNEL, PROPERTY, AND THE WORK SITE DURING CONSTRUCTION. CONTRACTOR SHALL PROVIDE FLASHING LIGHTS AROUND THE CONSTRUCTION WORK AREA ON THE BARRICADES FROM DUSK (4:00 PM) TO DAWN (7:00 AM) EVERYDAY WHEN WORK IS IN PROGRESS. COMPLETELY CLOSE WITH BARRICADES ENTRANCE AND EXITS OF THE CONSTRUCTION AREA, AND INSTALL NOTIFICATION SIGNS IN ADVANCE OF CLOSURE OF THE AREA FOR CONSTRUCTION, INSTALL NOTIFICATION SIGNS ONE WEEK BEFORE CONSTRUCTION BEGINS.

19) WORK UNDER THIS CONTRACT SHALL BE DONE SO THAT EXISTING BUS OPERATIONS AND BUS MAINTENANCE SHALL REMAIN IN FULL OPERATIONS DURING CONSTRUCTION. OCTA'S BUS OPERATION AND BUS MAINTENANCE, REPAIR SHALL REMAIN UNINTERRUPTED, ONGOING, AND IN FULL OPERATION DURING CONSTRUCTION. CONTRACTOR SHALL ARRANGE HIS WORK TO OFFER LEAST INTERFERENCE TO OCTA'S CONTINUED DAILY BUS OPERATION AT THE BUS BASE. KEEP NON-CONSTRUCTION AREAS OPEN TO OCTA STAFF WORK.

20) CONTRACTOR SHALL ARRANGE HIS WORK TO OFFER LEAST INTERFERENCE WITH OCTA DAILY BUS OPERATIONS. OCTA PROJECT MANAGER WILL COORDINATE WORK ACTIVITIES, AND TEMPORARY CHANGES IN FACILITY ACTIVITY WHICH ARE NECESSARY FOR CONTRACTOR'S WORK. CONTRACTOR SHALL COORDINATE HIS WORK ACCORDINGLY.

21) THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGES TO EXISTING FACILITIES RESULTING FROM HIS CONSTRUCTION. ALL DISTURBED OR DAMAGED AREAS SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE AND/OR PATCHED TO MATCH ADJACENT MATERIALS, OR AS EXISTED BEFORE CONSTRUCTION.

22) IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ALL UTILITIES WHETHER SHOWN ON THE DRAWINGS OR NOT, AND TO PROTECT THEM AS NECESSARY. THE CONTRACTOR SHALL BEAR ALL EXPENSE OF REPAIR OR REPLACEMENT OF UTILITIES DAMAGED BY HIS OPERATIONS OR CONSTRUCTION WORK. CONTRACTOR SHALL LOCATE ALL UTILITIES IN THE WORK AREA AND PROTECT THEM FROM DAMAGE. IF DAMAGED BY CONSTRUCTION, CONTRACTOR WILL BE REQUIRED TO REPAIR DAMAGED UTILITY IMMEDIATELY SO THAT OCTA BUS OPERATIONS IS NOT INTERRUPTED. PROVIDE TEMPORARY UTILITIES DURING BREAKDOWN PERIOD. CONTRACTOR SHALL FULLY CO-OPERATE WITH OCTA BUS AND FACILITY MAINTENANCE STAFF TO COMPLETE THE WORK. IF REQUIRED BY OCTA STAFF, PROVIDE TEMPORARY FACILITIES, UTILITIES, OR EQUIPMENTS DURING TEMPORARY DISCONNECTION, BREAKDOWN, OR DAMAGE OF OCTA FACILITIES, UTILITIES, OR EQUIPMENTS DUE TO CONTRACTOR'S WORK.

23) NO OMISSION OF THE WORK SHALL BE MADE WITHOUT WRITTEN APPROVAL OF OCTA.

24) NO SUBSTITUTION OF THE WORK SHALL BE MADE WITHOUT WRITTEN APPROVAL OF OCTA. CHANGES TO THE CONTRACT DRAWINGS OR SPECIFICATIONS SHALL BE MADE BY A WRITTEN ADDENDUM OR CHANGE ORDER APPROVED BY OCTA.

25) ALL WORKMANSHIP SHALL BE PERFORMED BY SKILLED MECHANICS USING THE BEST STANDARD PRACTICES OF THE TRADE AND CONSTRUCTION INDUSTRY.

26) WHERE NO SPECIFIC DETAIL IS SHOWN, THE CONSTRUCTION SHALL BE SIMILAR TO THAT INDICATED OR NOTED FOR SIMILAR CONDITIONS OF CONSTRUCTION ON THE PROJECT. REFERENCES OF NOTES AND DETAILS TO SPECIFIC CONDITIONS AND LOCATIONS SHALL NOT LIMIT THEIR APPLICABILITY.

27) THE STRUCTURE IS DESIGNED AS A STABLE UNIT AFTER ALL COMPONENTS ARE INSTALLED. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL TEMPORARY SHORING, BRACING, SCAFFOLDING, AND OTHER SUPPORTS NECESSARY. CONTRACTOR SHALL PROVIDE ALL NECESSARY TEMPORARY BACKING, SUPPORTS, SLEEVES, FRAMING FOR SUPPORTING THE WORK DURING INSTALLATION.

28) CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PREVENT OCTA STAFF AND BUSES FROM ENTERING CONSTRUCTION AREA DURING DEMOLITION AND CONSTRUCTION. SIGNS SHALL BE POSTED TO NOTIFY OCTA WORKERS OF CONSTRUCTION. PROVIDE BARRIERS AROUND GENERAL AREA OF CONSTRUCTION WHILE WORK IS IN PROGRESS. FENCES, BARRICADES, ENCLOSURES, WARNING SIGNS, ETC. SHALL BE PROVIDED AROUND THE LOCAL WORK AREA BY THE CONTRACTOR TO KEEP THE PUBLIC OUT OF CONTRACTOR'S WORK AREA AND WARN THE PUBLIC OF CONSTRUCTION WORK IN PROGRESS.

29) THE CONTRACTOR SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT INCLUDING SAFETY OF ALL PERSONS AND PROPERTY AND THAT THE REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.

30) THE CONTRACTOR SHALL BE RESPONSIBLE FOR SAFETY AND SECURITY OF THE PROPERTY AND ALL WORKERS ON SITE. CONTRACTOR SHALL PROVIDE ALL SAFETY EQUIPMENT FOR HIS WORKERS.

31) THE SCHEDULE OF THE PROJECT IS CRITICAL. EACH SUB-CONTRACTOR SHALL START HIS WORK PER THE SCHEDULE AND PURSUE IT DILIGENTLY AND COMPLETE IT IN ACCORDANCE WITH THE GENERAL CONTRACTOR'S SCHEDULE OF CONSTRUCTION. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR THE SUPERVISION OF THE WORK OF ALL ITS SUB-CONTRACTORS.

32) CARE SHALL BE EXERCISED TO PREVENT DAMAGE DUE TO CARELESSNESS OR VANDALISM. ALL MATERIALS AND EQUIPMENT SHALL BE SECURED AFTER WORKING HOURS. NO CONSTRUCTION MATERIALS OR EQUIPMENT ARE TO BE LEFT UNSECURED AT ANY TIME. THE CONTRACTOR SHALL PROVIDE FOR HIS OWN SECURITY, STORAGE ENCLOSURES AS NECESSARY IN DESIGNATED LAY-DOWN OR STORAGE ENCLOSURE AREA APPROVED BY THE OCTA FACILITY MAINTENANCE MANAGER. THE CONTRACTOR SHALL BE RESPONSIBLE TO FENCE AND SECURE HIS STORAGE AND EQUIPMENT AT ALL TIMES. OCTA IS NOT RESPONSIBLE FOR CONTRACTOR'S MATERIAL OR EQUIPMENT LOSS ON OCTA PROPERTY. CONTRACTOR'S MATERIALS, TRUCKS, OR EQUIPMENTS SHALL NOT BLOCK TRAFFIC DRIVEWAYS OR OCTA BUS OPERATIONS AND MAINTENANCE WORK DURING CONSTRUCTION.

33) DO NOT BLOCK BUS ENTRANCE, EXITS AND DRIVEWAYS OR BUS PARKING STALLS WITH CONTRACTOR'S MATERIAL, EQUIPMENT OR TRUCKS. KEEP ALL MATERIALS, TOOLS, EQUIPMENT, AND TRUCKS WITHIN LIMIT OF CONSTRUCTION OR IN ASSIGNED SPACE BY FACILITY MANAGER.

34) DO NOT LOAD OR STORE NEW EQUIPMENT (TO BE INSTALLED) AT ONE SPOT OR LOCATION ON THE ROOF.

35) WHEN WORKING ON ROOF TO INSTALL EQUIPMENT DURING CONSTRUCTION, CONTRACTOR IS REQUIRED TO CORDON OFF (WITH TRAFFIC DELINEATORS AND YELLOW WARNING TAPE) WORKING AREA BELOW IN THE SHOP (MAINTENANCE BUILDING) SO THAT OCTA WORKERS ARE AWARE OF CONSTRUCTION WORK OVERHEAD ON ROOF. PREVENT TOOLS, EQUIPMENT AND DEBRIS FROM FALLING BELOW IN WORK AREAS OF MAINTENANCE BUILDING.

36) THIS TASK SHALL BE COORDINATED WITH THE PROJECT MANAGER, BUS BASE MANAGER, AND FACILITY MANAGER

A JOB HAZARD ANALYSIS SHALL BE DEVELOPED FOR THE TASK THAT IDENTIFIES DAILY SAFETY TAILGATE BRIEFINGS, BARRICADES, VEHICLE AND EQUIPMENT STAGING (DIAGRAM), COMMUNICATIONS, EVACUATING EFFECTED PERSONNEL INSIDE THE BUILDING, CRANE ACTIVITY, REMOVING OLD EQUIPMENT, INSTALLING NEW EQUIPMENT, FALL PROTECTION, ALLOWING EFFECTED EVACUATED PERSONNEL BACK INTO THEIR AREA OF BUILDING, HOUSEKEEPING/CLEAN-UP, DEMOBILIZATION. THE JOB HAZARD ANALYSIS IS REQUIRED TO BE SUBMITTED TO THE OCTA PROJECT MANAGER 10 WORKING DAYS PRIOR TO THE SCHEDULED HVAC TASK ACTIVITY FOR OCTA REVIEW.

NO LATER THAN TEN (10) WORKING DAYS PRIOR TO THE ARRIVAL OF A CRANE, THE CONTRACTOR MUST PROVIDE THE MOST RECENT ANNUAL AND QUADRENNIAL CERTIFICATES. THE CONTRACTOR MUST ALSO PROVIDE CRANE OPERATOR CERTIFICATES FROM THE NATIONAL COMMISSION FOR THE CERTIFYING OF CRANE OPERATORS (NCCCO), AS OUTLINED IN CIIPP, NO LATER THAN TEN WORKING DAYS PRIOR TO A CRANE OPERATOR WORKING ON SITE.

PICK AND CARRY WITH RUBBER TIRED CRANES IS FORBIDDEN ON OCTA PROJECTS.

A RIGGING PLAN DEVELOPED BY THE CRANE COMPANY OR CRANE OWNER IS REQUIRED FOR ALL LIFTS. THE RIGGING PLAN SHALL BE SUBMITTED NO LATER THAN 10 WORKING DAYS PRIOR TO THE SCHEDULED CRANE ACTIVITY FOR OCTA REVIEW.

THE PLAN SHALL INCLUDE:

- THE VERIFIED LOAD WEIGHT AND THE RIGGING WEIGHTS
- BOTTOM ANGLE AND REACH IN FEET FOR THIS LOAD PLACEMENT
- COPY OF THE LOAD CHART APPLICABLE TO THE ANGLE, REACH AND LOAD
- THE PERCENTAGE OF CRANE RATED CAPACITY FOR THIS LOAD PLACEMENT
- A PLOT PLAN OR GOOGLE MAP DIAGRAM OF THE CRANE SET-UP LOCATION AND THE LOAD PLACEMENT LOCATIONS
- IDENTIFY THE COMMUNICATION METHOD (RADIO, HAND SIGNAL, ECT.)
- DELIVERY TRUCK/TRAILER LOCATION

CRITICAL LIFTS REQUIRE AN ENGINEERED PLAN DESIGNED BY A REGISTERED PROFESSIONAL ENGINEER LICENSED IN CALIFORNIA. A CRITICAL LIFT INCLUDES, BUT IS NOT LIMITED TO:

1. ANY LIFT LOCATION THAT COULD RESULT IN THE BOOM OR LOAD FALLING INTO A HAZARDOUS AREA IN THE EVENT OF A MISHAP, INCLUDING ENERGIZED ELECTRICAL WIRING AND EQUIPMENT, GAS MANIFOLDS, AND OPERATING MACHINERY,
2. LIFTS EQUAL TO OR GREATER THAN 10 TONS,
3. LIFTS EQUAL TO OR GREATER THAN 75% OF RATED CAPACITY,
4. LIFTS OVER OCCUPIED BUILDINGS, RAILWAYS OR PUBLIC ROAD WAYS,
5. THE USE OF MULTIPLE CRANES FOR ONE LIFT, AND/OR
6. LIFT AND TRANSIT OF LOAD GREATER THAN 75% OF RATED CAPACITY OF TRACK CRAWLER CRANE.

37) DURING CONSTRUCTION REMOVE EQUIPMENT, DISCONNECT OR REMOVE UTILITIES, AND ROOF ACCESSORIES TO FACILITATE AND INSTALL NEW EQUIPMENT. REINSTALL ALL THE ABOVE AFTER NEW EQUIPMENT HAS BEEN INSTALLED AND OPERATIONAL. INFORM OCTA, SEVEN DAYS AHEAD OF EQUIPMENT OF UTILITY DISCONNECTION.

38) THE PROTECTION OF ALL OCTA PROPERTY, STRUCTURES, EQUIPMENT, UTILITIES, AND ACCESSORIES IS THE RESPONSIBILITY OF THE CONTRACTOR.

39) THE EXTENT OF THE WORK IS ONLY INDICATED GENERALLY ON THE DRAWINGS ARE BASED ON EXISTING CONDITIONS AND RECORD DRAWINGS.

40) IT IS THE INTENT OF THESE CONSTRUCTION DOCUMENTS TO INCLUDE ITEMS AND COMPONENTS FOR THE PROPER EXECUTION OF THE WORK, AND FOR THE PROVISION FOR A COMPLETE FUNCTIONING SYSTEM. IN THAT REGARD ALL APPURTENANT AND ACCESSORY ITEMS AND COMPONENTS REQUIRED FOR THE CONSTRUCTION OF COMPLETE AND FUNCTIONING SYSTEM SHALL BE PROVIDED WHETHER SPECIFICALLY IDENTIFIED IN THESE DOCUMENTS OR NOT.

41) BEFORE SUBMITTING A BID, CONTRACTOR SHALL VISIT THE SITE IN THE PRE-BID JOB-WALK AND VERIFY ALL EXISTING ITEMS SHOWN ON THE PLANS, CONDITIONS, HAZARDS, ELEVATIONS, STRUCTURES, EQUIPMENT, UTILITIES, AND LOCAL REQUIREMENTS. SUBMISSION OF A BID BY THE CONTRACTOR SHALL BE DEEMED EVIDENCE OF SUCH VISIT AND REVIEW OF SITE. ALL BIDDERS SHALL TAKE THESE EXISTING CONDITIONS INTO CONSIDERATION AND A LACK OF SPECIFIC INFORMATION ON THE DRAWING SHALL NOT RELIEVE THE CONTRACTOR OF ANY RESPONSIBILITY. NO REQUEST FOR ADDITIONAL PAYMENT SHALL BE CONSIDERED AS VALID DUE TO FAILURE TO ALLOW FOR CONDITIONS WHICH CURRENTLY EXISTS ON SITE.

42) LOCATIONS AND ELEVATIONS OF THE VARIOUS ITEMS INCLUDED WITHIN THE WORK HAVE BEEN OBTAINED FROM EXISTING DRAWINGS AND LIMITED FIELD SURVEY. CONTRACTOR SHALL EXAMINE THE SITE, VERIFY FIELD CONDITIONS, STRUCTURES, EQUIPMENT UTILITIES AND SERVICES REQUIRED AND BE ADEQUATELY INFORMED AS TO THEIR RELATION TO THE WORK. THE SUBMISSION OF BID SHALL BE DEEMED OF EVIDENCE OF SUCH A VISIT.

43) OCTA STAFF WILL CONTINUE TO WORK ON BUS MAINTENANCE AND REPAIR DURING CONSTRUCTION IN THE MAINTENANCE BUILDING. CONTRACTOR'S WORK SHALL NOT DISRUPT OCTA BUS MAINTENANCE WORK.

44) CONTRACTOR WILL BE ALLOWED TO WORK ON REMOVING AND REPLACING ONE HV UNIT AT A TIME. CONTRACTOR SHALL REMOVE AND REPLACE ONE FAN AND COMPLETE ALL WORK ON THE FAN INCLUDING MAKING IT OPERATIONAL BEFORE PROCEEDING TO THE NEXT HV UNIT REPLACEMENT. THE CONTRACTOR SHALL COORDINATE THE WORK WITH OCTA PROJECT MANAGER AND FACILITY MAINTENANCE TO SEQUENCE HIS DAILY WORK SCHEDULE.

45) CONTRACTOR SHALL SCHEDULE DEACTIVATION OF UTILITIES WITH THE OCTA PROJECT MANAGER AND FACILITY MAINTENANCE. DEACTIVATION OR RELOCATION OF UTILITIES, SYSTEMS, EQUIPMENT, OR OTHER ACCESSORIES SHALL BE SCHEDULE A WEEK IN ADVANCE WITH THE PROJECT MANAGER. PROVIDE TEMPORARY SERVICE DURING DEACTIVATION PERIOD. MINIMIZE DEACTIVATION DOWN TIME.

46) CONTRACTOR SHALL COVER ALL OCTA EQUIPMENT, STRUCTURES BELOW IN BUS MAINTENANCE BAYS WHEN WORKING ON ROOF TO PREVENT DUST SPREAD AND DAMAGE TO OCTA TOOLS, EQUIPMENT. CLEAN ALL ABOVE ITEMS AND WORK AREA AT END OF WORK DAY.

47) THE GENERAL CONTRACTOR SHALL TAKE ALL PREVENTIVE MEASURES DURING CONSTRUCTION TO PREVENT DAMAGE TO OCTA PROPERTY AND STAFF WORKING IN AND AROUND THE BUILDING. THE MAINTENANCE BUILDING STAFF WILL BE WORKING IN THE BUILDING DURING CONSTRUCTION WORK. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR AND SHALL REPLACE OR REPAIR ANY FAULTY IMPROPER OR INFERIOR MATERIAL OR WORKMANSHIP OR ANY DAMAGE TO THE WORK OR ADJACENT AREAS, OR STRUCTURES IN AND AROUND THE MAINTENANCE BUILDING.

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MARK	DATE	BY	REVISIONS

Sheet Title: GENERAL NOTES

Project: OCTA SANTA ANA BUS BASE
INSTALLATION OF BEB CHARGERS & ELEC. INFRASTR.
4301 WEST MACARTHUR BOULEVARD, SANTA ANA, CA

JOB #	1.19.6
DESIGN BY:	SDV
DRAWN BY:	TMP
CHECKED BY:	QV
DATE	03-07-2025
SCALE	AS NOTED
SHEET	SA-GN-1

550 South Main Street
Orange, CA 92668
714/560/OCTA

OCTA

IFB 5-3922
ADDENDUM NO. 1
ATTACHMENT A

GENERAL NOTES

1. THE ELECTRICAL DRAWINGS, SPECIFICATIONS AND GENERAL NOTES DESCRIBE THE SCOPE OF WORK; CONSTRUCTION DOCUMENTS ARE TO BE USED FOR THE PURPOSE OF BIDDING, BUILDING DEPARTMENT REVIEW, AND TO SECURE THE NECESSARY CONSTRUCTION PERMIT. ALL EQUIPMENT SHOWN IS NEW, CONTRACTOR FURNISHED AND INSTALLED, UNLESS NOTED OTHERWISE (U.N.O.).

2. THE CONTRACTOR SHALL VERIFY THE INPUT VOLTAGE AND AMPERAGE (HORSEPOWER) RATING OF ALL EQUIPMENT PRIOR TO INSTALLATION, AND NOTIFY THE ENGINEER FOR DIRECTION PRIOR TO PROCEEDING.

3. PROVIDE AN ADDITIONAL JUNCTION BOX (SIZE AS REQUIRED) WHERE THE NUMBER OF CONDUCTORS EXCEEDS THE MAXIMUM ALLOWED FOR A GIVEN JUNCTION POINT OR OUTLET.

4. ELECTRICAL CONTRACTOR SHALL PROVIDE CONSTRUCTION AND SHOP DRAWINGS FOR APPROVAL BY THE OWNER BASED ON THESE DRAWINGS, SPECIFICATIONS AND ADDITIONAL DESIGN CRITERIA FURNISHED BY OWNER.

5. CONTRACTOR'S BID SHALL INCLUDE ALL PREMIUM OVERTIME COSTS, UTILITY CHARGES, COST FOR TEMPORARY UTILITY SERVICES, ALTERATION, DEMOLITION AND EXTENSION WORK, PLAN CHECK / INSPECTION FEES, MISCELLANEOUS CONTINGENCY COSTS, ETC.

6. IF CONTRACTOR PROPOSES TO SUBSTITUTE FOR EQUIPMENT SPECIFIED, CONTRACTOR SHALL SUBMIT A REQUEST FOR CONSIDERATION TO THE OWNER AND ENGINEER IN WRITING PRIOR TO COMMENCEMENT OF WORK. ALL SUBSTITUTIONS MUST BE SUBMITTED TO THE ENGINEER FOR HIS REVIEW AND APPROVAL. SUCH REVIEW SHALL NOT RELIEVE THE CONTRACTOR FROM COMPLYING WITH THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS, THE CONTRACTOR SHALL BE RESPONSIBLE AT HIS OWN EXPENSE FOR ANY CHANGES RESULTING FROM HIS PROPOSED SUBSTITUTIONS WHICH AFFECT OTHER PARTS OF HIS OWN WORK OR THE WORK OF OTHER CONTRACTORS.

7. THE ELECTRICAL DRAWINGS ARE DIAGRAMMATIC ONLY. DO NOT SCALE THE ELECTRICAL DRAWINGS TO DETERMINE THE LOCATION OF EQUIPMENT OR OUTLETS. COMPLY WITH ALL THE CLEARANCES AND MOUNTING HEIGHT REQUIREMENTS. ROUTE CONDUITS PER FIELD CONDITIONS, PREVENTING CONFLICTS WITH STRUCTURAL ELEMENTS AND EXISTING EQUIPMENT AND UTILITIES. COMPLY WITH THE NATIONAL ELECTRICAL CODE.

8. ALL FINAL CONNECTIONS TO FURNISHED EQUIPMENT SHALL BE MADE BY THE CONTRACTOR UNLESS OTHERWISE NOTED. VERIFY ELECTRICAL CHARACTERISTICS AND U.L. LISTING PRIOR TO CONNECTION.

9. SEAL ALL PENETRATIONS THROUGH FIRE RATED WALLS, CEILINGS, FLOORS, ETC., TO MAINTAIN THE EXISTING FIRE RATING. FURNISH AND INSTALL FIRE RATED ENCLOSURE FOR ALL EQUIPMENT PENETRATING INTO FIRE RATED ENVELOPES, SPACES, ETC. PER NEC 300-21.

10. ELECTRICAL OUTLETS ON OPPOSITE SIDES OF FIRE RATED WALLS AND PARTITIONS MUST BE SEPARATED BY A DISTANCE OF 24 INCHES HORIZONTAL. OPENINGS IN FIRE RATED WALLS MUST BE FIRE STOPPED.

11. CONDUCTORS SHALL BE COPPER XHHW/XHWW-2 600 VOLT INSULATION. USE PROPER TEMPERATURE RATING OF CONDUCTORS BASED ON THE AMBIENT AIR TEMPERATURE WHERE CONDUCTORS ARE LOCATED. HIGHER AMPACITY CONDUCTORS AND LARGER RACEWAY SHALL BE PROVIDED AS REQUIRED TO MEET THE AMPACITY CORRECTION FACTORS AS INDICATED IN NEC TABLE 310 AND ELSEWHERE IN CODE.

12. THE SEISMIC BRACING AND ANCHORAGE OF ELECTRICAL CONDUITS, BUS DUCTS, WIREWAYS AND CABLE TRAYS SHALL BE IN ACCORDANCE WITH THE "GUIDELINE FOR SEISMIC RESTRAINS OF MECHANICAL SYSTEMS AND PLUMBING PIPING SYSTEMS" PUBLISHED BY SMACNA LATEST VERSION.

13. WHERE BRACING AND ANCHORAGE DETAILS ARE NOT SHOWN ON THE DRAWINGS OR IN THE GUIDELINE, THE FIELD INSTALLATION SHALL BE SUBJECT TO THE APPROVAL OF THE PROJECT ENGINEER. ALL EQUIPMENT ANCHORAGE SHALL BE DESIGNED PER 2022 CBC & ASCE 7-16 FORMULA 13.3-1, 13.3-2, AND 13.3-3.

14. PRIOR TO COMMENCEMENT OF WORK, CONTRACTOR SHALL SURVEY THE ENTIRE PROJECT SITE AND BECOME THOROUGHLY FAMILIAR WITH ACTUAL EXISTING CONDITIONS. THE INTENT OF THE WORK IS SHOWN ON THE DRAWINGS AND DESCRIBED HEREIN. THE CONTRACTOR SHALL BE DEEMED TO HAVE MADE SUCH A STUDY AND EXAMINATION AND TO ACCEPT ALL CONDITIONS PRESENT AT THE SITE. NO REQUEST FOR ADDITIONAL PAYMENT SHALL BE CONSIDERED VALID, DUE TO CONTRACTOR FAILURE TO ALLOW IN COST ESTIMATE FOR CONDITIONS WHICH MAY EXIST.

15. EXISTING CONDITIONS SHOWN ARE FROM AVAILABLE RECORD DRAWINGS AND VISUAL FIELD SURVEYS AND SHOWN FOR REFERENCE ONLY. CONTRACTOR SHALL VERIFY ACTUAL EXISTING CONDITIONS AT SITE PRIOR TO STARTING WORK.

16. ALL ELECTRICAL WORK SHALL BE PERFORMED PER NEC, UTILIZING THE CODE ISSUED IN FORCE AT THE LOCATION OF THE CONSTRUCTION SITE. ELECTRICAL WORK SHALL COMPLY WITH ALL APPLICABLE CURRENT BASE CODES AND REGULATIONS.

17. ALL ELECTRICAL EQUIPMENT UTILIZED AT THIS PROJECT SHALL BE U.L. LABELED OR U.L. LISTED.

18. INSTALL ALL WIRING IN CONDUITS.

19. ALL ELECTRICAL PANEL BOARD BUSES SHALL BE COPPER.

20. ALL ELECTRICAL DEVICES AND EQUIPMENT MOUNTED ON THE EXTERIOR OF THE BUILDING OR EXPOSED TO WEATHER SHALL BE NEMA 3R WEATHERPROOF TYPE.

21. CONSTRUCTION WORK SHALL BE DONE IN A MANNER WHICH WILL NOT CAUSE INCONVENIENCE OR DANGER TO USERS OF THE PREMISES AND ADJACENT AREAS AND NOT INTERFERE WITH THEIR WORK. ANY CONSTRUCTION WORK TO BE PERFORMED MUST BE PLANNED IN ADVANCE. SCHEDULING SHALL BE DONE IN COOPERATION WITH AUTHORIZED ISD'S PROJECT MANAGER, WHO WILL BE AVAILABLE BEFORE AND DURING THE PERFORMANCE OF THE WORK. INCLUDE ALL PREMIUM TIME CHARGES IN BID TO COVER THE AFTER-HOURS AND WEEKEND WORK.

22. DO ALL DRILLING, CUTTING, CHANNELING AND PATCHING REQUIRED TO INSTALL ELECTRICAL WORK AS INDICATED OR HEREIN SPECIFIED. ALL HOLES, CURBS, ETC., IN FLOORS, CEILINGS AND WALLS SHALL BE PATCHED, UNLESS INDICATED OTHERWISE. PAINT ALL NEW EXPOSED ELECTRICAL RACEWAYS, CABINETS, ENCLOSURES AND FITTINGS TO MATCH THE COLOR OF ADJACENT SURFACES IN FINISHED AREAS.

ABBREVIATIONS

A	AMPERE
AC	AIR CONDITIONING
AF	AMPERE FUSE OR AMP FRAME
AFC	AVAILABLE FAULT CURRENT
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AIC	AMPERES INTERRUPTING CAPACITY (SYMMETRICAL)
ALT	ALTERNATE
ARCH	ARCHITECTURAL
AS	AMPERE SWITCH
AT	AMPERE TRIP
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
BATT	BATTERY
BCC	BARE COPPER CONDUCTOR
BD	BOARD
BFG	BELOW FINISHING GRADE
BKBD.	BACKBOARD
BLDG.	BUILDING
C	CONDUIT
CAT	CATALOG
CATV	CABLE TELEVISION
CB	CIRCUIT BREAKER
CEC	CALIFORNIA ELECTRICAL CODE
CL	CURRENT LIMITING
CLF	CURRENT LIMITING FUSES
CLG	CEILING
CLK	CLOCK
C.O.	CONDUIT ONLY
COMM.	COMMUNICATION
CONT.	CONTINUATION
CT	CURRENT TRANSFORMER
CTC	COMMUNICATION TERMINAL CABINET
CTRL	CONTROL
CU	COPPER
CW	COLD WATER
DB	DECIBEL
DC	DIRECT CURRENT
DE	DUAL ELEMENT
DEF	DUAL ELEMENT SWITCH
DISC. SW.	DISCONNECT SWITCH
DN	DOWN
DP	DEPTH
DPP	DISTRIBUTION POWER PANEL
DWG.	DRAWING
(E)	EXISTING
EA	EACH
E.C.	EMPTY CONDUIT
EF	EXHAUST FAN
ELECT.	ELECTRICAL
ELEV	ELEVATION
EMAC	ENERGY MANAGEMENT AND CONTROL
EMRG.	EMERGENCY
EMS	ENERGY MANAGEMENT AND ENVIRONMENTAL CONTROL SYSTEM
EMT	ELECTRICAL METALLIC TUBING
EN	EXISTING AT NEW LOCATION
EQPT.	EQUIPMENT
EXIST.	EXISTING
EXT	EXTERIOR
F	FUSE
FA	FIRE ALARM, FORCED AIR
FACP	FIRE ALARM CONTROL PANEL
FAU	FURNACE
FBO	FURNISHED BY OTHERS
FD	FIRE DEPARTMENT
FDR	FEEDER
FL	FLOOR
FLA	FULL LOAD AMPERES
FOC	FLOOR MATERIAL CHANGE
FOS	FACE OF STUD
FS	FUSIBLE SWITCH
FT.	FOOT/FEET
G	GROUND
GA	GAUGE
GFI	GROUND FAULT CIRCUIT INTERRUPTER
GFP	GROUND FAULT PROTECTION
GND	GROUND
GSA	GENERAL SERVICES AGENCY
H	HOOD (KITCHEN)
HD	HEAVY DUTY
HID	HIGH INTENSITY DISCHARGE
HOA	HAND-OFF-AUTO
HP	HORSEPOWER
HPF	HIGH POWER FACTOR
HPS	HIGH PRESSURE SODIUM
HW	HOT WATER
HZ	HERTZ
IC	INTERCOM
IG	ISOLATED GROUND
IMC	INTERMEDIATE METALLIC CONDUIT
INC	INCANDESCENT
J-BOX	JUNCTION BOX
KVA	KILOVOLT AMPERES
KW	KILOWATT
LA	LIGHTING ARRESTOR
LCL	LONG CONTINUOUS LOAD
L.O.	LUGS ONLY
LTG.	LIGHTING
MCB	MAIN CIRCUIT BREAKER
MCC	THOUSAND CIRCULAR MIL(S)
MECH	MECHANICAL
MH	MANHOLE OR MOUNTING HEIGHT
	NEUTRAL, OR METAL HALIDE
MIN	MINIMUM
MLO	MAIN LUGS ONLY
LOD	MOTOR OPERATED DAMPER
MTD	MOUNTED
MTG	MOUNTING
N	NEUTRAL
(N)	NEW
NA	NON-AUTOMATIC
N.C.	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
N.I.C.	NOT IN CONTRACT
NL	NIGHT LIGHT
N.O.	NORMALLY OPEN
NTS	NOT TO SCALE
O.C.	ON CENTER
OD	OUTSIDE DIAMETER
OL	OVER LOAD
ORV	OPERATOR RELIEF VEHICLES
P	POLE
PB	PULLBOX
P/B	PUSH BUTTON
PH	PHASE
PL	PHILIPS FLUORESCENT LAMPS
PIV	POST INDICATING VALVE
PNL	PANEL
POC	POINT OF CONNECTION
PP	POWER PANEL
PR	PAIR
PRI	PRIMARY
PT	POTENTIAL TRANSFORMER
PVC	POLYVINYL CHLORIDE
PVS	PHOTO VOLTAIC SYSTEM
PWR	POWER
R	EXISTING TO BE RELOCATED
RECEPT.	RECEPTACLE
REQ'D	REQUIRED
REQMT'S	REQUIREMENTS
RF	RETURN FAN
RGS	RIGID GALVANIZED STEEL
RLA	RUNNING LOAD AMPS
RM.	ROOM
RMS	ROOT-MEAN-SQUARE
RR	REMOVE AND RELOCATE
RSC	RIGID STEEL CONDUIT
SEC	SECURITY
SF	SQUARE FEET
SHT.	SHEET
SP	SINGLE POLE
ST	SINGLE THROW
STA	STATION
SURF	SURFACE
SW.	SWITCH
TCL	TOTAL CONNECTED LOAD
TD	TIME DELAY
TEL	TELEPHONE
TEMP	TEMPORARY
TTB	TELEPHONE TERMINAL BOARD
TV	TELEVISION
TYP.	TYPICAL
UE	UNDERGROUND ELECTRICAL
UG	UNDERGROUND
U.L.	UNDERWRITERS LABORATORIES
U.O.N.	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTED POWER SUPPLY
UT	UNDERGROUND TELEPHONE
V	VOLT
VA	VOLTAMP(S)
VAR	VARIABLE
VL	VERIFY LOCATION
VISCO	VALLEY IRON STEEL CO.
W	WATTS OR WIRE
W/	WITH
WH	WATER HEATE
W/O	WITHOUT
WP	WEATHERPROOF
X	EXISTING TO BE REMOVED
XFMR	TRANSFORMER
+12"	HEIGHT FROM FINISHED FLOOR TO CENTER LINE OF DEVICE
1P, 2P	SINGLE OR DOUBLE POLE
ø	PHASE PROVIDE FURNISH & INSTALL

SYMBOLS LEGEND

- PANEL BOARD
- (E) RECESSED MOUNTED BRANCH CIRCUIT PANEL BOARD
- (E) SURFACE MOUNTED BRANCH CIRCUIT PANEL BOARD
- (N) SURFACE MOUNTED BRANCH CIRCUIT PANEL BOARD
- (N) RECESSED MOUNTED BRANCH CIRCUIT PANEL BOARD
- WP — WEATHERPROOF
- A-4 — HOMERUN TO PANEL "A", CIRCUIT 4
- CONDUIT CONCEALED IN WALL OR CEILING
- CONDUIT BELOW FLOOR OR GRADE, OR IN SLAB
- CONDUIT EXPOSED
- WM — WIREMOLD
- X — CONDUIT EXPOSED
- 3/4"C-2#12, 1#12N, 1#12G
- 3/4"C-3#12, 1#12N, 1#12G
- CONDUIT STUBBED AND CAPPED
- CONDUIT RUNNING UP
- CONDUIT RUNNING DOWN
- WEATHERTIGHT FLEX CONDUIT TO EQUIPMENT
- CONDUIT, FLEXIBLE WITH WIRING AS INDICATED
- PULLBOX, SIZE AS SHOWN ON PLAN
- (M) METER
- (G) GENERATOR
- CONTACTOR
- OVERLOAD RELAY
- GROUND
- (5) ELECTRICAL MOTOR OR EXHAUST FAN (5 HORSEPOWER)
- TRANSFORMER
- (T) THERMOSTAT
- PHOTOCELL
- WALL MOUNTED COMBINATION DATA TELEPHONE OUTLET AT +15" U.O.N
- WALL MOUNTED TELEPHONE OUTLET AT +15" U.O.N
- PROVIDE FLEXIBLE FINAL CONNECTION. LIQUID TIGHT FOR EXTERIOR OR DAMP LOCATIONS.
- S — SINGLE POLE SWITCH. +48" AFF. UNLESS OTHERWISE NOTED
- S^3 — THREE WAY SWITCH. +48" AFF. UNLESS OTHERWISE NOTED
- Sab — SUB-LETTERS AT SWITCH IDENTIFIED SWITCH LEG
- Sm — MOTOR RATED SWITCH
- S^S — NEW WALL SWITCH OCCUPANCY SENSOR. +48" AFF. UNLESS OTHERWISE NOTED. LEVITON OSSMT-MDA OR APPROVE EQUAL.
- $\ominus_1$ — DUPLEX RECEPTACLE. +26"AFF., U.O.N 1 = CIRCUIT NUMBER
- $\ominus_1$ — DOUBLE DUPLEX RECEPTACLE. +26"AFF., U.O.N 1 = CIRCUIT NUMBER
- WP GFI $\ominus_1$ — DUPLEX RECEPTACLE. WEATHERPROOF, GROUND FAULT CIRCUIT INTERRUPTER. +15" AFF UON. 1 = CIRCUIT NUMBER
- $\ominus^1$ — 208/230V RECEPTACLE. +26"AFF., U.O.N 1 = CIRCUIT NUMBER
- $\ominus^1$ — 250V RECEPTACLE. +26"AFF., U.O.N 1 = CIRCUIT NUMBER
- $\ominus^1$ — 480V RECEPTACLE. +15"AFF., U.O.N 1 = CIRCUIT NUMBER
- SWITCHED DUPLEX RECEPTACLE
- SPECIAL RECEPTACLE. SIZE AS NOTED.
- DUPLEX-RECEPTACLE IN NON-METALLIC BOX WITH STAINLESS STEEL COVER IN CONCRETE (MANUFACTURE: CARLON, ROUND FLOOR BOX MODEL #E971FB, TWO-DOOR COVER MODEL #E97SS2).
- (1) NOTE REFERENCE CALL OUT
- LIGHT LINE WEIGHT INDICATES EXISTING TO REMAIN
- HEAVY THICK LINE INDICATES NEW WORK
- DASHED LINE INDICATES DEMOLITION

- (E) INDICATES EXISTING
- (N) INDICATES NEW
- A/22 — LIGHT FIXTURE CALL-OUT. TOP NUMBER: IDENTIFICATION NUMBER. BOTTOM NUMBER: INPUT WATTAGE.
- NON-FUSED DISCONNECT SWITCH
- F — FUSED DISCONNECT SWITCH, FUSED PER EQUIPMENT MANUFACTURER'S NAMEPLATE RATING
- $\boxtimes_1$ — MOTOR STARTER, NEMA SIZE AS INDICATED.
- $\boxtimes^1_1$ — MOTOR STARTER WITH O.L. PROTECTION, H.O.A SWITCH A RED PILOT LIGHT, AUXILIARY CONTACTS AND L.V. TRANSFORMER, PROVIDE NAMEPLATES. NUMBER ADJACENT INDICATES STARTER SIZE.
- COMBINATION MOTOR STARTER WITH THERMAL/MAGNETIC C/B AND ELECTRONIC OVERLOAD RELAYS
- MOLDED CASE CIRCUIT BREAKER SIZE AS INDICATED ON SINGLE LINE DIAGRAM.
- 100AS 90AFU — FUSED SWITCH. "AS" INDICATES AMPERE SWITCH RATING, "AFU" AMPERE FUSE RATING, NUMBER OF POLES AS INDICATED.
- SWITCH
- (M) UTILITY METER SOCKET, WITH C.T.S, CLIPS, ETC., PER SERVING UTILITY COMPANY.
- NEW CEILING-MOUNT DAYLIGHT SENSOR. WATT STOPPER MODEL # LS-101 OR APPROVED EQUAL.
- (J) JUNCTION BOX, CEILING MOUNTED OR WALL MOUNTED
- S^t — NEW WALL TIMER SWITCH. +48" AFF. UNLESS OTHERWISE NOTED. LEVITON 6124H OR APPROVE EQUAL.
- S_M — NEW MOTOR RATED SNAP SWITCH
- A-012 — NEW LIGHTING FIXTURE A=PANEL NAME 01=CIRCUIT NUMBER 2=TIMER SWITCH CONTROLING FIXTURE
- A-0123 — NEW LIGHTING FIXTURE A=PANEL NAME 01=CIRCUIT NUMBER 2=TIMER SWITCH CONTROLING FIXTURE 3=DAYLIGHT SENSOR CONTROLING FIXTURE
- A-01 — NEW FLUORESCENT LIGHTING FIXTURE A=PANEL NAME 01=CIRCUIT NUMBER
- P/1 — MECHANICAL EQUIPMENT CALL OUT, SEE MECHANICAL DRAWINGS FOR FULL RATING

REGISTERED PROFESSIONAL ENGINEER — QUANG D. VU — NO. E19980 — ELECTRICAL — STATE OF CALIFORNIA

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2960 DANLER STREET
SANTA ANA, CALIFORNIA 92705
TEL: # (949) 756-8654
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MARK	DATE	BY	REVISIONS

Sheet Title: ELECTRICAL ABBREVIATIONS, SYMBOLS AND NOTES

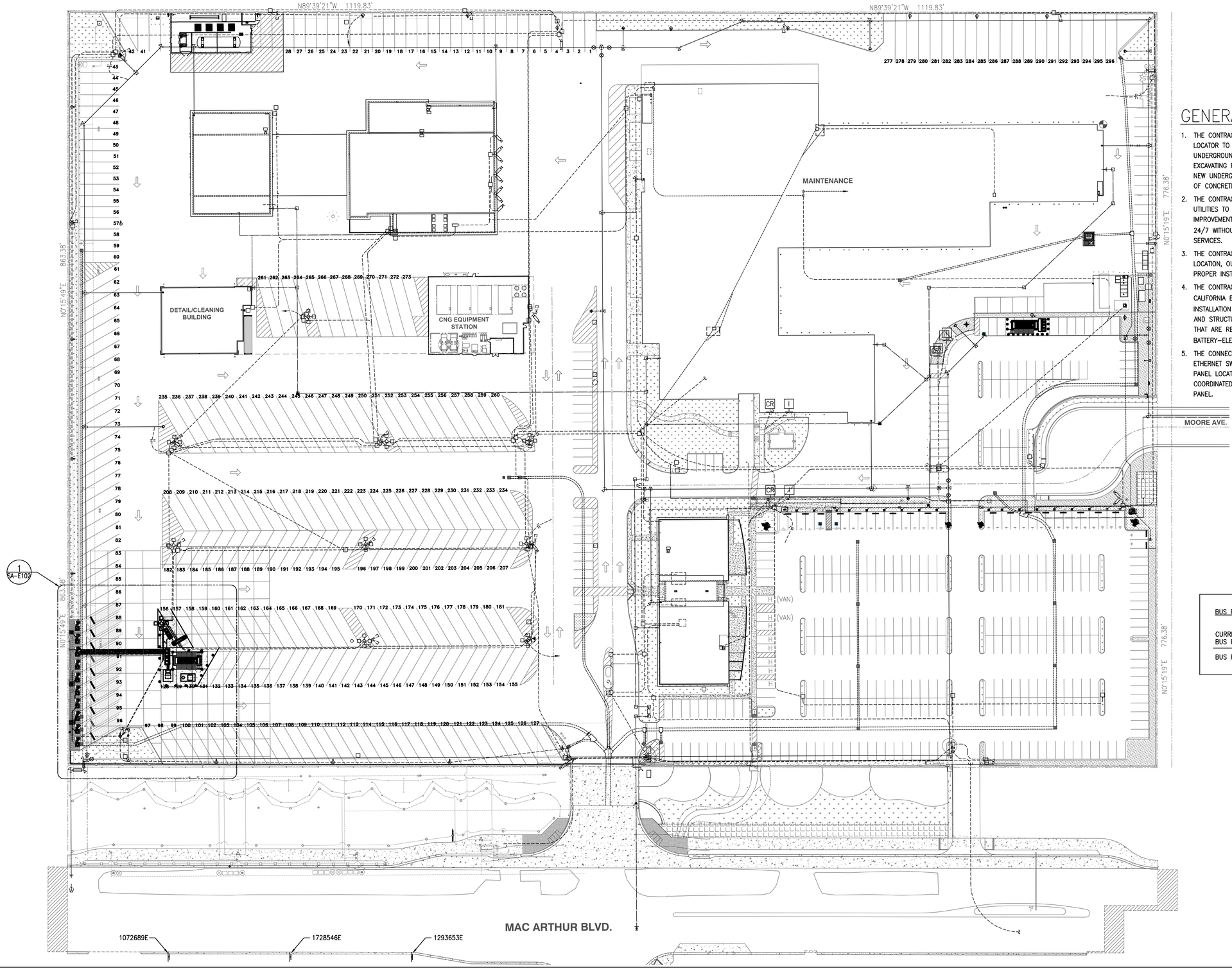
Project: OCTA SANTA ANA BUS BASE
INSTALLATION OF BEB CHARGERS & ELEC. INFRASTR.
4301 WEST MACARTHUR BOULEVARD, SANTA ANA, CA

JOB #	1.19.6
DESIGN BY:	SDV
DRAWN BY:	TMP
CHECKED BY:	QV
DATE	03-07-2025
SCALE	AS NOTED
SHEET	SA-E001

550 South Main Street
Orange, CA 92668
714/560/OCTA

OCTA

IFB 5-3922
ADDENDUM NO. 1
ATTACHMENT A



GENERAL NOTES:

1. THE CONTRACTOR SHALL UTILIZE AN INDEPENDENT UTILITY LOCATOR TO VERIFY, CONFIRM, AND DOCUMENT ALL EXISTING UNDERGROUND UTILITIES PRIOR TO SAW-CUTTING AND EXCAVATING PAVEMENT, AND TRENCHING FOR INSTALLATION OF NEW UNDERGROUND ELECTRICAL CONDUITS AND CONSTRUCTION OF CONCRETE FOUNDATIONS.
2. THE CONTRACTOR SHALL RELOCATE EXISTING UNDERGROUND UTILITIES TO ACCOMMODATE CONSTRUCTION OF NEW IMPROVEMENTS AND KEEP SANTA ANA BUS BASE IN OPERATION 24/7 WITHOUT ANY INTERRUPTIONS TO ITS OPERATIONS AND SERVICES.
3. THE CONTRACTOR SHALL INSTALL PULL BOXES IN ACCESSIBLE LOCATION, OUT OF TRAFFIC AREA, AND AS REQUIRED FOR PROPER INSTALLATION OF CABLES.
4. THE CONTRACTOR SHALL COORDINATE WITH SOUTHERN CALIFORNIA EDISON (SCE) FOR SCE'S LOCATION AND INSTALLATION OF MEDIUM VOLTAGE (MV) FEEDER SUBSTRUCTURES AND STRUCTURES, SWITCH CABINET, AND UTILITY TRANSFORMER THAT ARE REQUIRED FOR NEW ELECTRICAL SERVICE TO FEED BATTERY-ELECTRIC-BUS (BEB) CHARGERS.
5. THE CONNECTION OF A NEW CAT6 STP ETHERNET CABLE TO AN ETHERNET SWITCH INSIDE AN EXISTING SECURITY SURVEILLANCE PANEL LOCATED NEAR THE MAIN SLIDING GATE WILL BE COORDINATED WITH THE OCTA IT MANAGER FOR ACCESS TO THE PANEL.

BUS PARKING STALL CALCULATION

CURRENT BUS PARKING STALLS:	260
BUS PARKING STALLS LOST:	3
BUS PARKING STALLS AVAILABLE:	257

SITE PLAN

SCALE 1"=50'-0"

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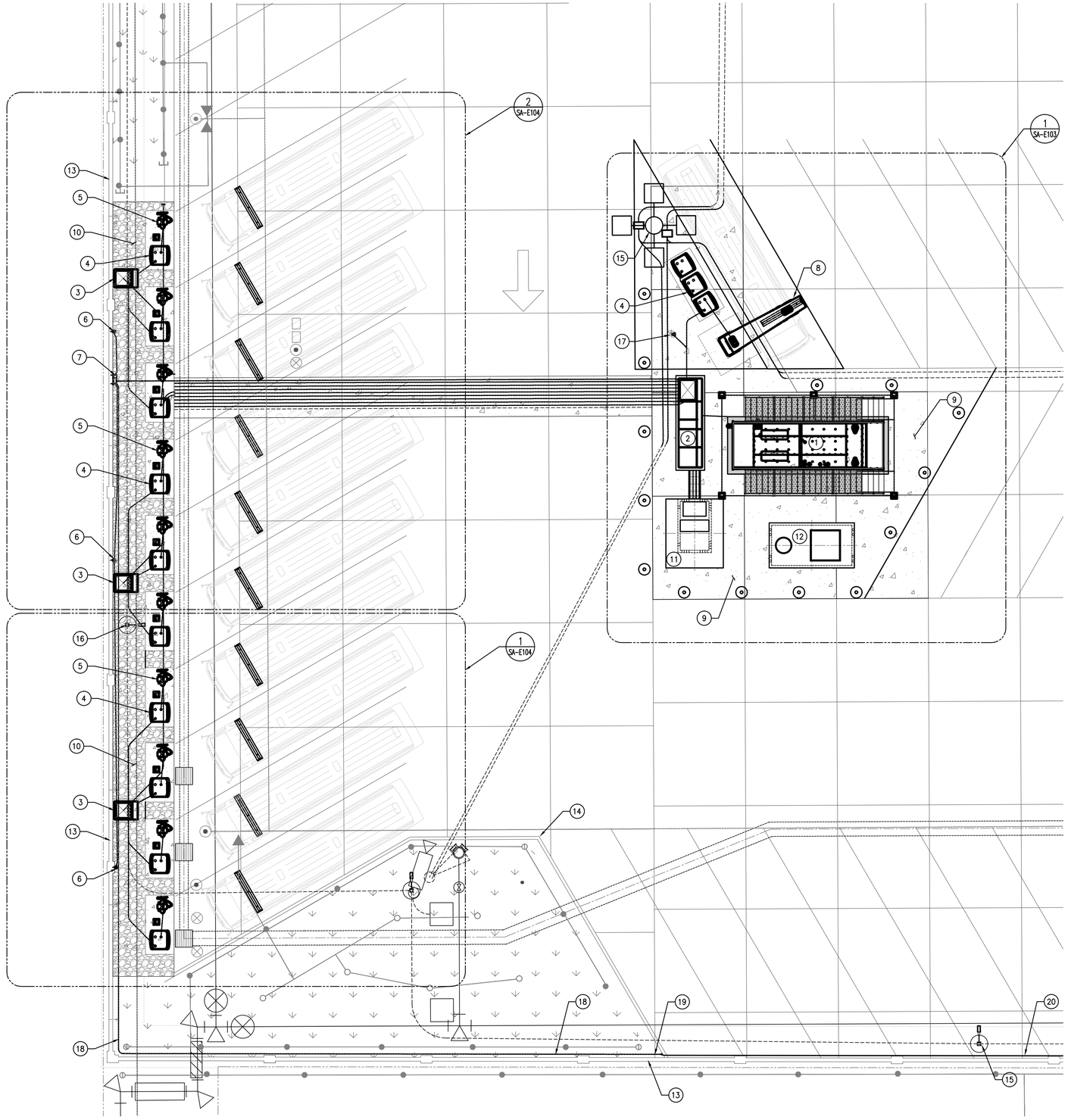
Sheet Title SITE PLAN

Project OCTA SANTA ANA BUS BASE
INSTALLATION OF BEB CHARGERS & ELEC. INFRASTR.
4301 WEST MACARTHUR BOULEVARD, SANTA ANA, CA

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CONSTRUCTION NOTES:

1. NEW 1000KW EMERGENCY POWER DIESEL GENERATOR.
2. NEW NEMA 3R MAIN METERED SWITCHBOARD "MSB-BEB" AND ATS.
3. NEW NEMA 3R SWITCHBOARD "SB-BEB".
4. NEW CHARGEPOINT POWER BLOCK. (TYPICAL OF 13).
5. NEW CHARGEPOINT POWER LINK 1000 BEB CHARGER. (TYPICAL OF 10).
6. NEW FLEETWATCH FR200-GR (DATA RECEIVER). SEE SA-E505 FOR DETAILS.
7. NEW NEMA 3R LOCKABLE HINGED S.S. NETWORK PANEL (48"x24"x6.5").
8. NEW CHARGEPOINT EXPRESS PLUS PANTOGRAPH DOWN 2000 BEB CHARGER.
9. SAW CUT EXISTING 10" REINFORCED CONCRETE PAVEMENT AREA, REMOVE, AND LEGALLY DISPOSE OFF-SITE. NEW 4,000 PSI REINFORCED CONCRETE PAVEMENT AND JOINT LINES, WHICH ARE 16' O.C.
10. REMOVE AND LEGALLY DISPOSE OFF-SITE EXISTING LANDSCAPE (MULCH) AND SUBGRADE SOIL IN AREA TO 6" BELOW TOP OF CURB. COMPACT SOIL TO 90% DENSITY AND FILL AREA WITH NEW 3/4" GRAVEL.
11. SCE UTILITY TRANSFORMER THAT IS FURNISHED AND INSTALLED BY SCE.
12. SCE MV SWITCH CABINET PME-8 THAT IS FURNISHED AND INSTALLED BY SCE.
13. EXISTING CMU WALL.
14. EXISTING CONCRETE CURB.
15. (1) INSTALL NEW UNDERGROUND CONDUITS AND TRAFFIC-RATED PULL BOXES. (2) INSTALL NEW ELECTRICAL WIRES AND COMMUNICATION CABLES FROM THE "BEFORE" PULL BOXES AND POLE TO THESE NEW PULL BOXES AND THEN, TO THE EXISTING "AFTER" PULL BOXES AND POLE. (3) RELOCATE AND INSTALL THE EXISTING LIGHT POLE WITH LOUD SPEAKER ON THE NEW CONCRETE FOUNDATION. (4) SPLICE THE NEW WIRES AND CABLES TO THE EXISTING WIRES AND CABLES TO MATCH THE EXISTING INSTALLATION AND FUNCTIONALLY TEST THE LIGHTS AND SPEAKER. SEE DETAIL 3/SA-E503.
16. EXISTING LIGHT POLE.
17. NEW FLEETWATCH FR200(DATA RECEIVER).
18. NEW UNDERGROUND 2"C PVC SCH. 80 AND CAT6 STP ETHERNET CABLE TO THE S.S. NETWORK PANEL. CONNECT CAT6 CABLE TO THE ETHERNET SWITCH.
19. NEW 2"C PVC SCH. 80 AND CAT6 STP ETHERNET CABLE MOUNTED ON EXISTING CMU WALL GOES DOWN UNDERGROUND IN THE LANDSCAPE AREA. INSTALL NEMA 3R PULL BOXES TO FACILITATE CAT6 CABLE PULL. PAINT CONDUIT AND PULL BOXES TO MATCH EXISTING CMU WALL COLOR.
20. CONNECT NEW 2"C PVC SCH. 80 AND CAT6 STP ETHERNET CABLE MOUNTED ON EXISTING CMU WALL TO AN EXISTING SECURITY SURVEILLANCE PANEL NEAR THE MAIN GATE. CONNECT CAT6 CABLE TO AN ETHERNET SWITCH INSIDE THE PANEL.

FLEETWATCH FR200 DATA ACQUISITION:

AFTER COMPLETE INSTALLATION OF ALL FLEETWATCH FR200 UNITS, FLEETWATCH FACTORY TECHNICIANS SHALL PERFORM PROGRAMMING, TESTING, COMMISSIONING, AND DEMONSTRATING THE FOLLOWING FUNCTIONS.

1, DIRECTLY OBTAIN MILEAGE FROM BUS.

2, OBTAIN CHARGE AMOUNT FROM CHARGEPOINT CLOUD SOFTWARE.

3. CONVERT CHARGEPOINT DATA TO DGE, FORMAT IT INTO A STANDARD TRANSACTION, AND TRANSMIT IT TO OCTA'S MAINTENANCE SOFTWARE SYSTEM.

PROVIDE 3 DAYS OF FIELD AND CLASSROOM TRAINING INCLUDING WRITTEN HARD COPY AND ELECTRONIC MANUALS TO OCTA PERSONNEL ON OPERATIONS AND MAINTENANCE OF THE FLEETWATCH FR200 DATA ACQUISITION SYSTEM.

N

NEW EQUIPMENT PLAN

SCALE 1"=10'-0"

1

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MARK	DATE	BY	REVISIONS
1			

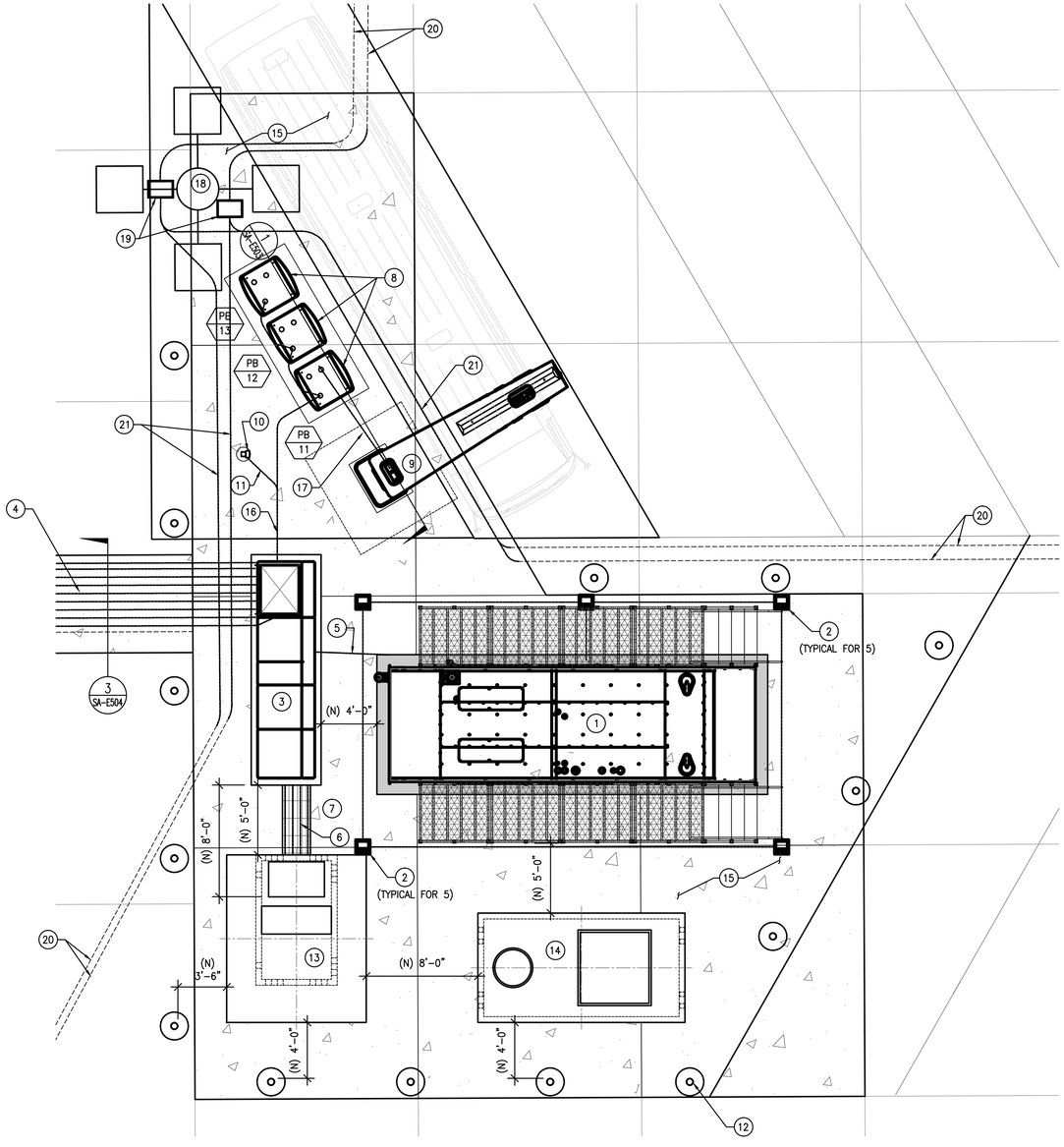
Sheet Title: NEW EQUIPMENT PLAN

Project: OCTA SANTA ANA BUS BASE
INSTALLATION OF BEB CHARGERS & ELEC. INFRASTR.
4301 WEST MACARTHUR BOULEVARD, SANTA ANA, CA

JOB #	1.19.6
DESIGN BY:	SDV
DRAWN BY:	TMP
CHECKED BY:	QV
DATE	03-07-2025
SCALE	AS NOTED
SHEET	SA-E102

550 South Main Street
Orange, CA 92668
714/560/OCTA

OCTA



GENERAL NOTES:

1. THE CONTRACTOR SHALL UTILIZE AN INDEPENDENT UTILITY LOCATOR TO VERIFY, CONFIRM, AND DOCUMENT ALL EXISTING UNDERGROUND UTILITIES PRIOR TO SAW-CUTTING AND EXCAVATING PAVEMENT, AND TRENCHING FOR INSTALLATION OF NEW UNDERGROUND ELECTRICAL CONDUITS AND CONSTRUCTION OF CONCRETE FOUNDATIONS.
2. THE CONTRACTOR SHALL RELOCATE EXISTING UNDERGROUND UTILITIES TO ACCOMMODATE CONSTRUCTION OF NEW IMPROVEMENTS AND KEEP SANTA ANA BUS BASE IN OPERATION 24/7 WITHOUT ANY INTERRUPTIONS TO ITS OPERATIONS AND SERVICES.
3. THE CONTRACTOR SHALL INSTALL PULL BOXES IN ACCESSIBLE LOCATION, OUT OF TRAFFIC AREA, AND AS REQUIRED FOR PROPER INSTALLATION OF CABLES.
4. THE CONTRACTOR SHALL COORDINATE WITH SOUTHERN CALIFORNIA EDISON (SCE) FOR SCE'S LOCATION AND INSTALLATION OF MEDIUM VOLTAGE (MV) FEEDER SUBSTRUCTURES AND STRUCTURES, SWITCH CABINET, AND UTILITY TRANSFORMER THAT ARE REQUIRED FOR NEW ELECTRICAL SERVICE TO FEED BATTERY-ELECTRIC-BUS (BEB) CHARGERS.

CONSTRUCTION NOTES:

1. NEW 1000KW EMERGENCY POWER DIESEL GENERATOR.
2. NEW 12"x12"x18" POLYOLEFIN GROUND INSPECTION HOUSING. SEE DETAIL 1/E506.
3. NEW NEMA 3R MAIN METER SWITCHBOARD "MSB-BEB", ASCO AUTOMATIC TRANSFER SWITCH "ATS", & 208Y/120V DISTRIBUTION BOARD.
4. NEW (12) 5"C PVC SCH. 80- 3#750 MCM & 1#4/0 GND, (4) 5"C PVC SCH. 80 SPARE, 2"C PVC SCH. 80 - CAT 6 CABLE, GLASS FIBER CABLE & 2"C PVC SCH. 80 - 2#10 & 1#10 GND. AND (2) 2"C PVC SCH. 80 SPARE.
5. NEW (4) 5"ØC PVC SCH. 80 - 3#750 MCM & 1#4/0 GND., (4) 5"ØC PVC SCH. 80 SPARE, (1) 2"ØC PVC SCH. 80 - 8#12 CONTROL WIRES, (1) 2"ØC PVC SCH. 80, 14#10 & (2) SPARE 2"ØC PVC SCH. 80.
6. NEW (8) 5"ØC PVC SCH. 80 - 3#750 MCM AND 1#4/0 GND. AND (4) 5"ØC PVC SCH. 80 SPARE.
7. NEW CONCRETE UTILITY TRENCH, 36" WIDE x 36" DEEP WITH METAL GRATING.
8. NEW CHARGEPOINT POWER BLOCK. (TYPICAL OF 3).
9. NEW CHARGEPOINT EXPRESS PLUS PANTOGRAPH DOWN 2000 BEB CHARGER.
10. NEW FLEETWATCH FR200-GR (DATA RECEIVER). SEE 4/SA-E505 FOR SUPPORT DETAILS.
11. NEW 1"ØC PVC SCH. 80 CAT6 ETHERNET CABLE AND 1"ØC PVC SCH. 80 2#12 & 1#12 GND.
12. NEW 6"ø BOLLARD.
13. SCE UTILITY TRANSFORMER THAT IS FURNISHED AND INSTALLED BY SCE.
14. SCE MEDIUM VOLTAGE (MV) PME-8 SWITCH CABINET THAT IS FURNISHED AND INSTALLED BY SCE.
15. SAW CUT EXISTING 10" REINFORCED CONCRETE PAVEMENT AREA, REMOVE AND LEGALLY DISPOSED OFF-SITE. NEW 4,000 PSI REINFORCED CONCRETE PAVEMENT AND JOINT LINES, WHICH ARE 16' O.C.
16. NEW (3) 4"ØC PVC SCH. 80 - 3#350 MCM, 1#4/0 GROUND, & (3) 1"C CAT6 STP CABLE OUTDOOR RATED FROM NETWORK CABINET.
17. NEW (3) 2"C, 2#4/0 HV DC
    (1) 1"C, 2#6 48V DC & (1) CAT6 STP ETHERNET CABLE OUTDOOR RATED FROM EACH POWER BLOCKS PB-11 AND PB-12 TO POWER LINK 2000.
18. (1) INSTALL NEW UNDERGROUND CONDUITS AND TRAFFIC-RATED PULL BOXES. (2) INSTALL NEW ELECTRICAL WIRES AND COMMUNICATION CABLES FROM THE "BEFORE" PULL BOXES AND POLE TO THESE NEW PULL BOXES AND THEN, TO THE EXISTING "AFTER" PULL BOXES AND POLE. (3) RELOCATE AND INSTALL THE EXISTING LIGHT POLE WITH LOUD SPEAKER ON THE NEW CONCRETE FOUNDATION. (4) SPLICE THE NEW WIRES AND CABLES TO THE EXISTING WIRES AND CABLES TO MATCH THE EXISTING INSTALLATION AND FUNCTIONALLY TEST THE LIGHTS AND SPEAKER. SEE DETAIL 3/SA-E503.
19. NEW PULL BOX FRB BOX AMRMORCAST #A6001946TAX18. SEE 4/SA-E506 FOR DETAILS.
20. EXISTING UNDERGROUND ELECTRICAL CONDUITS & WIRES - VERIFY LOCATION & CONNECTION, RELOCATE THEM TO ALLOW FOR INSTALLATION OF NEW EQUIPMENT, & RECONNECT THEM TO EXISTING INSTALLATIONS. CONTRACTOR SHALL COMPLETE TASKS QUICKLY, PRIOR TO NEW EQUIPMENT INSTALLATION, & WITH NO SERVICE INTERRUPTIONS.
21. NEW UNDERGROUND POWER LINES AND COMMUNICATION LINES.

N

NEW PLAN AT GENERATOR

SCALE 3/16"=1'-0" 1

REGISTERED PROFESSIONAL ENGINEER
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MARK	DATE	BY	REVISIONS

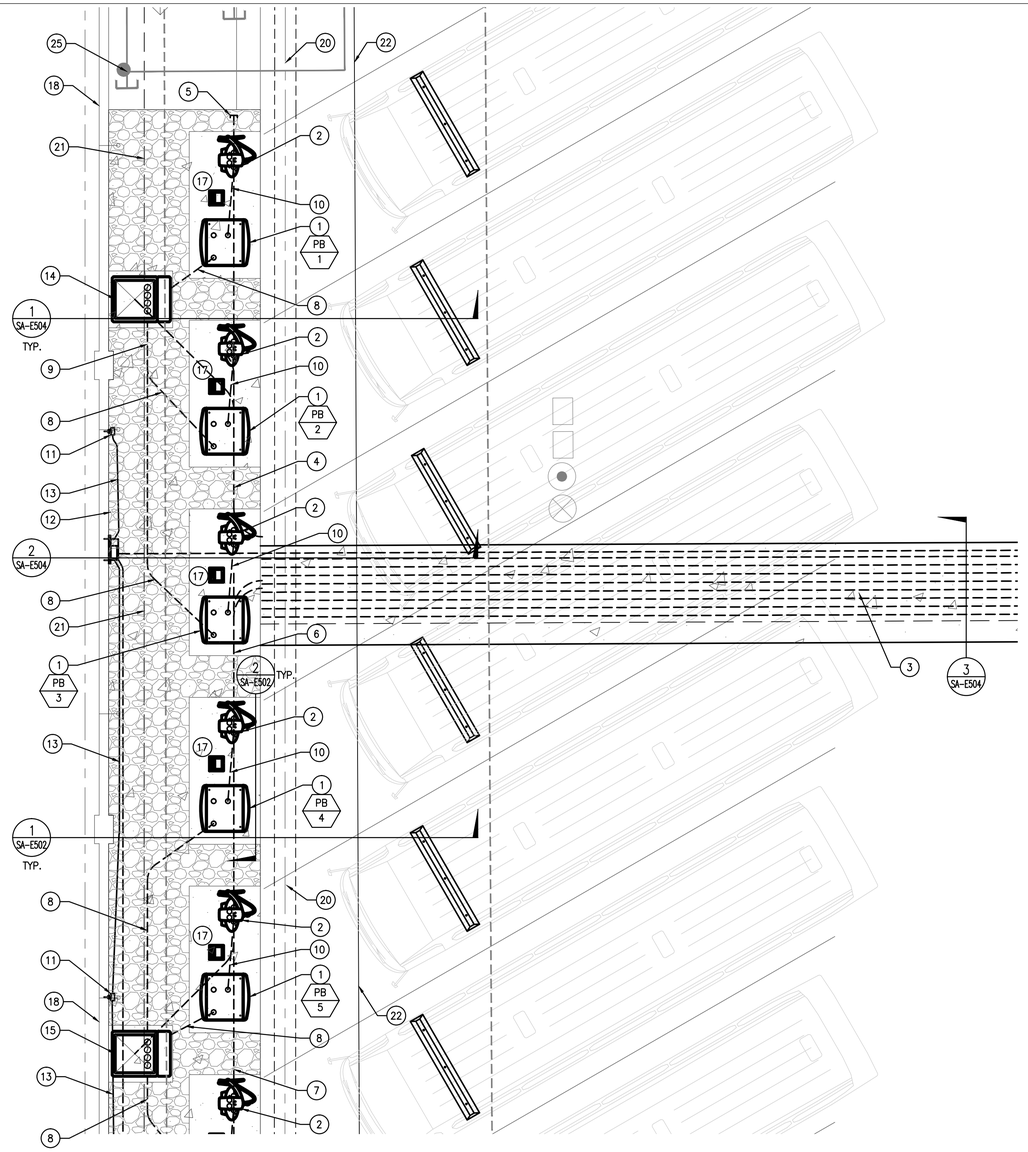
Sheet Title: NEW PLAN AT GENERATOR

Project: OCTA SANTA ANA BUS BASE
INSTALLATION OF BEB CHARGERS & ELEC. INFRASTR.
4301 WEST MACARTHUR BOULEVARD, SANTA ANA, CA

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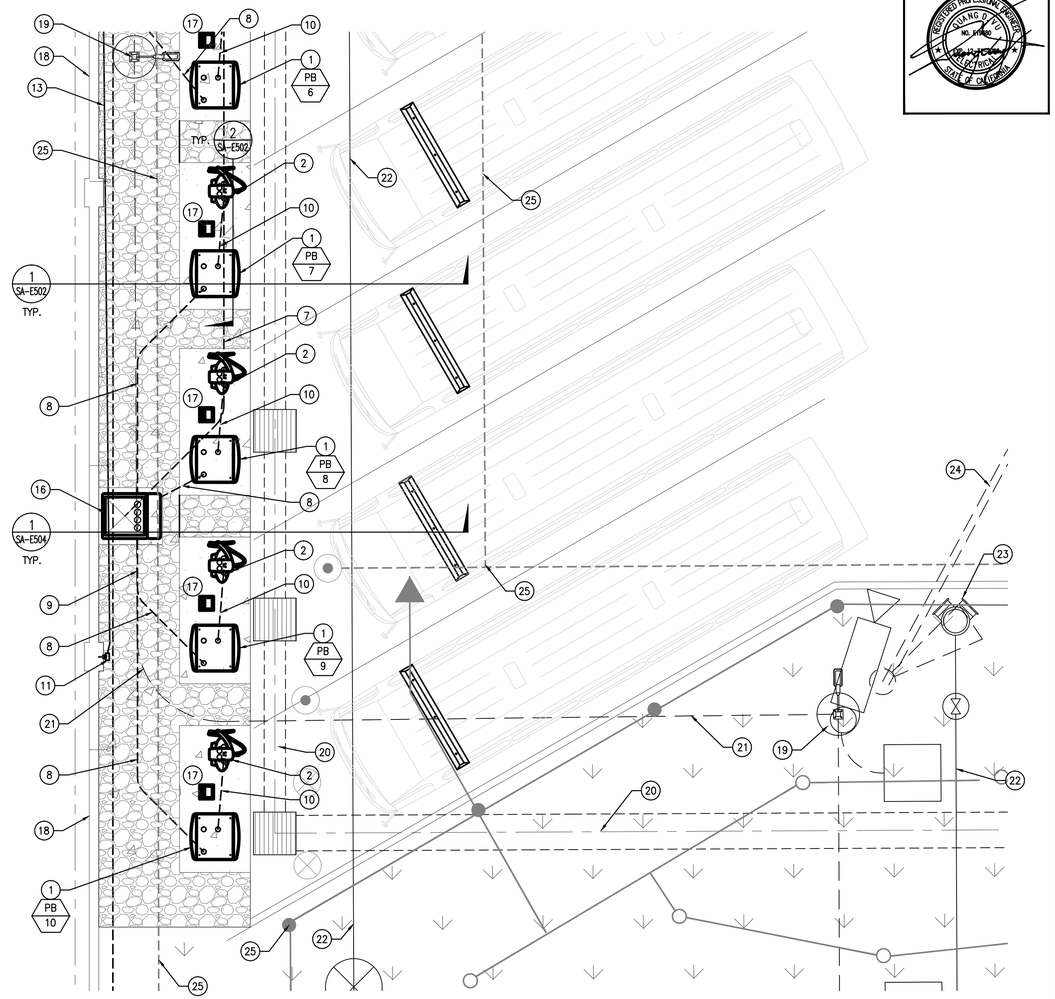
550 South Main Street
Orange, CA 92668
714/560/OCTA

OCTA



NEW BEB CHARGER PLAN

SCALE 3/16"=1'-0" 2



NEW BEB CHARGER PLAN

SCALE 3/16"=1'-0" 1

CONSTRUCTION NOTES:

1. NEW CHARGEPOINT POWER BLOCK. (TYPICAL OF 10).
2. NEW CHARGEPOINT POWER LINK 1000 BEB CHARGER. (TYPICAL OF 10).
3. NEW (12) 5"C PVC SCH. 80– 3#750 MCM & 1#4/0 GND, (4) 5"C PVC SCH. 80 SPARE, 2"C PVC SCH. 80 – CAT 6 CABLE & 2"C PVC SCH. 80 – 2#10 & 1#10 GND. AND (2) 2"C PVC SCH. 80 SPARE.
4. NEW (4) 5"C PVC SCH. 80– 3#750 MCM & 1#4/0 GND, (4) 5"C PVC SCH. 80 SPARE.
5. NEW TRAFFIC–RATED PULLBOX & (4) 5"C SPARE PVC SCH. 80 STUBBED AND CAPPED W/ PULL ROPE AND PLUG FOR FUTURE USE.
6. NEW (8) 5"C PVC SCH. 80– 3#750 MCM & 1#4/0 GND.
7. NEW (4) 5"C PVC SCH. 80– 3#750 MCM & 1#4/0 GND.
8. NEW (1) 4"C PVC SCH. 80–3#350 MCM, 1#4/0 GROUND.
9. NEW (2) 4"C PVC SCH. 80–3#350 MCM, 1#4/0 GROUND.
10. NEW (1) 2"C, 2#4/0 MCM, 1/#4 GROUND, (1) 1"C, 2#6 48V DC WIRES & (1) CAT6 STP ETHERNET CABLE OUTDOOR RATED, (1) 1"C SPARE.
11. NEW FLEETWATCH FR200–GR (DATA RECEIVER) (TYPICAL OF 3). SEE SA–E505 & SA–E506 FOR INSTALLATION & SUPPORT DETAILS.
12. NEW NEMA 3R LOCKABLE HINGED S.S. NETWORK PANEL (48"x24"x6.5"). SEE 1/SA–E505 AND 2/SA–E505 FOR SUPPORT DETAILS.
13. NEW 1"ØC PVC SCH. 80 CAT6 ETHERNET CABLE & 1"ØC PVC SCH. 80 – 2#12 & 1#12 GND TO FLEETWATCH FR55 PANEL MOUNTED ON EXISTING CMU WALL. PAINTED TO MATCH EXISTING CMU WALL. SEE 1/SA–E505 FOR DETAILS.
14. NEW NEMA 3R SWITCHBOARD "SB–BEB–1".
15. NEW NEMA 3R SWITCHBOARD "SB–BEB–2".
16. NEW NEMA 3R SWITCHBOARD "SB–BEB–3".
17. NEW 12"x12"x18" POLYOLEFIN GROUND INSPECTION HOUSING. SEE DETAIL 1/E506.
18. EXISTING CMU WALL.
19. PROTECT EXISTING (E) LIGHT POLE DURING CONSTRUCTION.
20. PROTECT (E) UNDERGROUND (U/G) STORM DRAIN LINE DURING CONSTRUCTION.
21. REMOVE, RELOCATE, AND REPLACE (E) U/G ELECTRICAL CONDUIT & WIRES TO ACCOMMODATE CONSTRUCTION & MAINTAIN SITE LIGHTING WITHOUT INTERRUPTION. NUMERICALLY TAG CONDUITS & WIRES THAT ARE TO BE REMOVED, RELOCATED, AND REPLACED AND SUBMIT A WRITTEN REPORT INCLUDING DESTINATION, FUNCTION, NUMBER, TYPE, AND VOLTAGE OF EACH CONDUIT AND WIRE TO THE PROJECT MANAGER FOR REVIEW AND CONFIRMATION BEFORE EXECUTING THE REMOVAL. PERFORM FUNCTIONAL TESTING FOR ALL INVOLVED DEVICES.
22. PROTECT (E) U/G WATER LINE DURING CONSTRUCTION.
23. PROTECT EXISTING FIRE HYDRANT DURING CONSTRUCTION.
24. REMOVE AND REPLACE EXISTING POWER WIRES AND COMMUNICATION CABLES WITH NEW WIRES AND CABLES TO ACCOMMODATE RELOCATION OF UPSTREAM LIGHT POLE AND PULL BOXES. SEE NOTE #21 FOR TAGGING, REPORTING, AND TESTING REQUIREMENTS.
25. EXISTING IRRIGATION. SEE SA–S101 FOR REMOVAL, CAPPING, AND REPLACEMENT OF EXISTING IRRIGATION PIPES AND SPRINKLER HEADS.

CONSTRUCTION NOTES

SCALE NONE 3

REGISTERED PROFESSIONAL ENGINEER — JULIUS N. G. DY — NO. 57980 — CIVIL — STATE OF CALIFORNIA

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MARK	DATE	BY	REVISIONS
1			

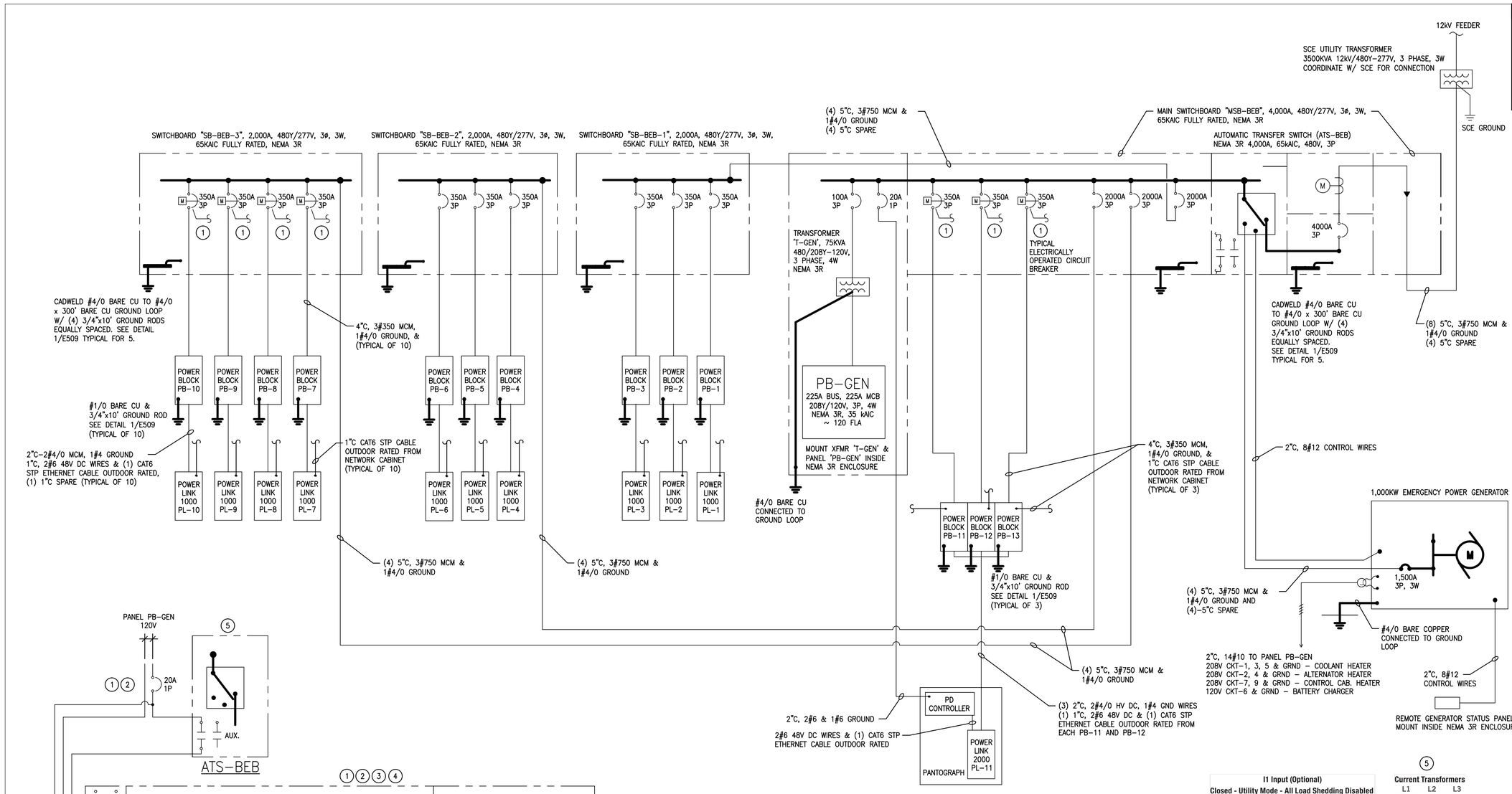
Sheet Title: NEW PLAN AT BEB

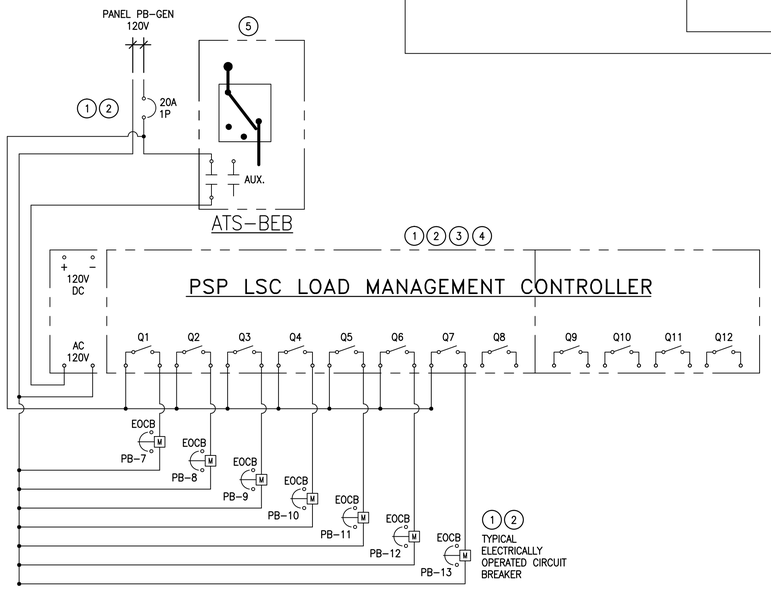
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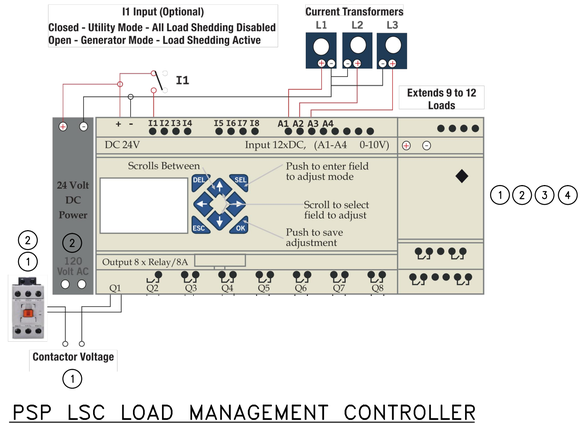




EMERGENCY POWER LOAD MANAGEMENT WIRING DIAGRAM

EMERGENCY POWER LOAD MANAGEMENT NOTES:

1. CONNECT 2 – #10 AUTOMATIC CONTROL WIRES IN 1"C TO PSP LSC SERIES UNIT TO OPEN AND CLOSE EACH OF THE SEVEN (7) ELECTRICALLY OPERATED CIRCUIT BREAKERS BASED ON LOAD AMPERES IN COMPARISON TO CAPACITY AMPERES OF THE 1000 KW GENERATOR.
2. INSTALL 1"C, 2#10 AND 1#10 GROUND WIRES FROM PANEL PB-GEN TO PSP LSC SERIES LOAD MANAGEMENT CONTROLLER TO PROVIDE 120V POWER TO THE LSC CONTROLLER AND CONTACTS, AND 2"C, 12#10 WIRES FROM THE LSC CONTROLLER TO SWITCHBOARD SB-BEB-3.
3. INSTALL ETHERNET SWITCH, WIFI MODEM, PSP LSC SERIES CONTROLLER, A 120V POWER WIRE TERMINAL STRIP, A 120V CONTROL WIRE TERMINAL STRIP, A 24V DC WIRE TERMINAL STRIP, REMOVAL COVER WIRE RACEWAYS, AND 120V RECEPTACLES IN A 48" x 24" X 6.5" NEMA 3R STAINLESS STEEL HINGED DOOR PANEL.
4. COORDINATE WITH CUMMINS GENERATOR APPLICATION ENGINEER AND FOLLOW MANUFACTURER'S INSTRUCTIONS FOR PSP LSC SERIES CONTROLLER TO SET UP THE OPEN AND CLOSE OPERATION SEQUENCE OF SEVEN (7) ELECTRICALLY OPERATED CIRCUIT BREAKERS TO KEEP THE GENERATOR'S CURRENT DRAW AT 1250A, TO CLOSE ONE (1) EOCB WHEN THE CURRENT DRAW IS BELOW 1000A, AND TO OPEN (1) EOCB WHEN THE CURRENT DRAW IS OVER 1250A. THE OPEN/CLOSE ORDER SEQUENCE IS THE POWER BLOCK (PB) NUMERICAL ORDER. SUBMIT LOAD MANAGEMENT WIRING SHOP DRAWINGS AND A CONTROL SEQUENCE AND PROVIDE PERFORMANCE TESTING AND COMMISSIONING FOR THE EMERGENCY POWER LOAD MANAGEMENT SYSTEM.
5. AT THE AUTOMATIC TRANSFER SWITCH (ATS), INSTALL 1500A, 480V RATED CURRENT TRANSFORMERS (CTs) ON WIRES COMING FROM THE 1000KW GENERATOR AND LOW VOLTAGE CONTROL WIRES TO READ THE GENERATOR'S ACTUAL CURRENT AND ACCURATELY MANAGE LOADS TO PREVENT OVERLOADING.



PSP LSC LOAD MANAGEMENT CONTROLLER

SINGLE LINE DIAGRAM – ELECTRICAL DISTRIBUTION SYSTEM FOR BEB AND PANTOGRAPH BEB CHARGERS

SCALE NONE

1

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Sheet Title: BEB AND PANTOGRAPH BEB CHARGER SINGLE LINE DIAGRAM

Project: OCTA SANTA ANA BUS BASE
INSTALLATION OF BEB CHARGERS & ELEC. INFRASTR.
4301 WEST MACARTHUR BOULEVARD, SANTA ANA, CA

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SCALE	AS NOTED
SHEET	SA-E301

550 South Main Street
Orange, CA 92668
714/560/OCTA

OCTA

PANELBOARD NAME:	PANEL "SB-BEB-1"	MOUNTING:			OVERSIZED NEUTRAL BUS: NO.			SPECIAL ENCLOSURE:
BUS: 2000 A	VOLTAGE: 480/277 VOLTS, 3-Ph, 3-W				MAIN (Amps): 2000 A / 3 P		KAIC 65	TOP OR BOTTOM FEED: SEE PLANS
LOCATION					FED FROM:			

DESCRIPTION	LOAD KVA A	LOAD KVA B	LOAD KVA C	CONT.	QTY	BRKR TRIP	BRKR P	CKT REF		BRKR P	BRKR TRIP	QTY	CONT.	LOAD KVA A	LOAD KVA B	LOAD KVA C	DESCRIPTION
POWER BLOCK PB-1	57				–	350	3	1	2	3	350			57			POWER BLOCK PB-2
POWER BLOCK PB-1		57			–	350		3	4		350				57		POWER BLOCK PB-2
POWER BLOCK PB-1			57		–	350		5	6		350					57	POWER BLOCK PB-2
POWER BLOCK PB-3	57				–	350	3	7	8	3	350			–			–
POWER BLOCK PB-3		57			–	350		9	10		350				–		–
POWER BLOCK PB-3			57		–	350		11	12		350					–	–
–	–				–	350	3	13	14	3	350			–			–
–		–			–	350		15	16		350				–		–
–			–		–	350		17	18		350					–	–
–	–				–	350	3	19	20	3	350			–			–
–		–			–	350		21	22		350				–		–
–			–		–	350		23	24		350					–	–
PARTITAL TOTAL	114	114	114											57	57	57	PARTIAL TOTALS
TOTAL CONNECTED/PHASE	171	171	171														

TOTAL CONNECTED VA = TOTAL VA + 0.25 x CONT. VA = 513 + 128.25 = 641.25 KVA AV . AMPS/PH = 771.30 A

NOTES:

TYPICAL SWITCHBOARD "SB-BEB-1" SCHEDULE

SCALE NONE 3

PANELBOARD NAME:	PANEL "SB-BEB-2"	MOUNTING:			OVERSIZED NEUTRAL BUS: NO.			SPECIAL ENCLOSURE:
BUS: 2000 A	VOLTAGE: 480/277 VOLTS, 3-Ph, 3-W				MAIN (Amps): 2000 A / 3 P		KAIC 65	TOP OR BOTTOM FEED: SEE PLANS
LOCATION					FED FROM:			

DESCRIPTION	LOAD KVA A	LOAD KVA B	LOAD KVA C	CONT.	QTY	BRKR TRIP	BRKR P	CKT REF		BRKR P	BRKR TRIP	QTY	CONT.	LOAD KVA A	LOAD KVA B	LOAD KVA C	DESCRIPTION
POWER BLOCK PB-4	57				–	350	3	1	2	3	350			57			POWER BLOCK PB-5
POWER BLOCK PB-4		57			–	350		3	4		350				57		POWER BLOCK PB-5
POWER BLOCK PB-4			57		–	350		5	6		350					57	POWER BLOCK PB-5
POWER BLOCK PB-6	57				–	350	3	7	8	3	350			–			–
POWER BLOCK PB-6		57			–	350		9	10		350				–		–
POWER BLOCK PB-6			57		–	350		11	12		350					–	–
–	–				–	350	3	13	14	3	350			–			–
–		–			–	350		15	16		350				–		–
–			–		–	350		17	18		350					–	–
–	–				–	350	3	19	20	3	350			–			–
–		–			–	350		21	22		350				–		–
–			–		–	350		23	24		350					–	–
PARTITAL TOTAL	114	114	114											57	57	57	PARTIAL TOTALS
TOTAL CONNECTED/PHASE	171	171	171														

TOTAL CONNECTED VA = TOTAL VA + 0.25 x CONT. VA = 513 + 128.25 = 641.25 KVA AV . AMPS/PH = 771.30 A

NOTES:

TYPICAL SWITCHBOARD "SB-BEB-2" SCHEDULE

SCALE NONE 4

PANELBOARD NAME:	PANEL "SB-BEB-3"	MOUNTING:			OVERSIZED NEUTRAL BUS: NO.			SPECIAL ENCLOSURE:
BUS: 2000 A	VOLTAGE: 480/277 VOLTS, 3-Ph, 3-W				MAIN (Amps): 2000 A / 3 P		KAIC 65	TOP OR BOTTOM FEED: SEE PLANS
LOCATION					FED FROM:			

DESCRIPTION	LOAD KVA A	LOAD KVA B	LOAD KVA C	CONT.	QTY	BRKR TRIP	BRKR P	CKT REF		BRKR P	BRKR TRIP	QTY	CONT.	LOAD KVA A	LOAD KVA B	LOAD KVA C	DESCRIPTION
POWER BLOCK PB-7	57				–	350		1	2		350			57			POWER BLOCK PB-8
POWER BLOCK PB-7		57			–	350		3	4		350				57		POWER BLOCK PB-8
POWER BLOCK PB-7			57		–	350		5	6		350					57	POWER BLOCK PB-8
POWER BLOCK PB-9	57				–	350	3	7	8	3	350			57			POWER BLOCK PB-10
POWER BLOCK PB-9		57			–	350		9	10		350				57		POWER BLOCK PB-10
POWER BLOCK PB-9			57		–	350		11	12		350					57	POWER BLOCK PB-10
–	–				–	350	3	13	14	3	350			–			–
–		–			–	350		15	16		350				–		–
–			–		–	350		17	18		350					–	–
–	–				–	350	3	19	20	3	350			–			–
–		–			–	350		21	22		350				–		–
–			–		–	350		23	24		350					–	–
PARTITAL TOTAL	114	114	114											114	114	114	PARTIAL TOTALS
TOTAL CONNECTED/PHASE	228	228	228														

TOTAL CONNECTED VA = TOTAL VA + 0.25 x CONT. VA = 684 + 171 = 855 KVA AV . AMPS/PH = 1028.40 A

NOTES:

TYPICAL SWITCHBOARD "SB-BEB-3" SCHEDULE

SCALE NONE 5

PANELBOARD NAME:	PANEL "MSB-BEB"	MOUNTING:			OVERSIZED NEUTRAL BUS: NO.			SPECIAL ENCLOSURE:
BUS: 4000 A	VOLTAGE: 480/277 VOLTS, 3-Ph, 3-W				MAIN (Amps): 4000 A / 3 P		KAIC 65	TOP OR BOTTOM FEED: SEE PLANS
LOCATION					FED FROM:			

DESCRIPTION	LOAD KVA A	LOAD KVA B	LOAD KVA C	CONT.	QTY	BRKR TRIP	BRKR P	CKT REF		BRKR P	BRKR TRIP	QTY	CONT.	LOAD KVA A	LOAD KVA B	LOAD KVA C	DESCRIPTION
POWER BLOCK PB-11	57				–	350	3	1	2	3	350			57			POWER BLOCK PB-12
POWER BLOCK PB-11		57			–	350		3	4		350				57		POWER BLOCK PB-12
POWER BLOCK PB-11			57		–	350		5	6		350					57	POWER BLOCK PB-12
POWER BLOCK PB-13	57				–	350	3	7	8	3	2000			171			SWITCHBOARD SB-BEB-1
POWER BLOCK PB-13		57			–	350		9	10		2000				171		SWITCHBOARD SB-BEB-1
POWER BLOCK PB-13			57		–	350		11	12		2000					171	SWITCHBOARD SB-BEB-1
SWITCHBOARD SB-BEB-3	228				–	2000	3	13	14	3	2000			171			SWITCHBOARD SB-BEB-2
SWITCHBOARD SB-BEB-3		228			–	2000		15	16		2000				171		SWITCHBOARD SB-BEB-2
SWITCHBOARD SB-BEB-3			228		–	2000		17	18		2000					171	SWITCHBOARD SB-BEB-2
XFMR "T-GEN"	14.41				–	100	3	19	20	3	–			–			–
XFMR "T-GEN"		14.41			–	100		21	22		–				–		–
XFMR "T-GEN"			14.41		–	100		23	24		–					–	–
–	–				–	–	3	25	26	3	–			–			–
–		–			–	–		27	28		–				–		–
–			–		–	–		29	30		–					–	–
–	–				–	–	3	31	32	3	–	–		–			–
–		–			–	–		33	34		–	–			–		–
–			–		–	–		35	36		–	–				–	–
PANTOGRAPH PD CONTROLLER	0.55				–	20	1	37	38	3	–	–		–			–
–		–			–	–		39	40		–	–			–		–
–			–		–	–		41	42		–	–				–	–
PARTITAL TOTAL	356.96	356.41	356.41											399	399	399	PARTIAL TOTALS
TOTAL CONNECTED/PHASE	755.96	755.41	755.41														

TOTAL CONNECTED VA = TOTAL VA + 0.25 x CONT. VA = 2,266.78 + 566.70 = 2,833.48 KVA AV . AMPS/PH = 3,408.15 A

NOTES:

SWITCHBOARD "MSB-BEB" SCHEDULE

SCALE NONE 1

PANELBOARD NAME:	PANEL "PB-GEN"	MOUNTING:			OVERSIZED NEUTRAL BUS: NO.			SPECIAL ENCLOSURE:
BUS: 125 A	VOLTAGE: 120/208 VOLTS, 3-Ph, 4-W				MAIN (Amps): MLO / 3 P		KAIC 35	TOP OR BOTTOM FEED: SEE PLANS
LOCATION					FED FROM: XFMR "T-BEB"			

DESCRIPTION	LOAD VA A	LOAD VA B	LOAD VA C	CONT.	QTY	BRKR TRIP	BRKR P	CKT REF		BRKR P	BRKR TRIP	QTY	CONT.	LOAD VA A	LOAD VA B	LOAD VA C	DESCRIPTION
1000 KW GENERATOR BLOCK HEATER 1	–				–	30	1	1	2	1	20			–			1000 KW GENERATOR BATTERY CHARGER
1000 KW GENERATOR BLOCK HEATER 1		–			–	30	1	3	4	1	20				–		1000 KW GENERATOR RECEPTACLE
1000 KW GENERATOR BLOCK HEATER 2			–		–	30	1	5	6	1	20					–	GENERATOR FUEL CONTROLLER
1000 KW GENERATOR BLOCK HEATER 2	–				–	30	1	7	8	1	20			180			GFIC RECEPTACLE
RECEPTACLE-WP CONTROL PANEL		180			–	20	1	9	10	1	15				60		FLEETWATCH DATA RECEIVER FR200-GR UNIT
RECEPTACLE-WP CONTROL PANEL			180		–	20	1	11	12	1	15					60	FLEETWATCH DATA RECEIVER FR200-GR UNIT
CONTROL POWER-ELEC. OPERATED CBs	380				–	20	1	13	14	1	15			60			FLEETWATCH DATA RECEIVER FR200-GR UNIT
CONTROL POWER-ELEC. OPERATED CBs		380			–	20	1	15	16	1	20				380		POWER FOR PSP LSC CONTROLLER
–			–		–	–	1	17	18	–	–					–	–
–	–				–	–	–	19	20	–	–			–			–
–		–			–	–	–	21	22	–	–				–		–
–			–		–	–	–	23	24	–	–					–	–
PARTITAL TOTAL	–	–	–											–	–	–	PARTIAL TOTALS
TOTAL CONNECTED/PHASE	–	–	–														

TOTAL CONNECTED VA = TOTAL VA + 0.25 x CONT. VA = – + – = – VA AV . AMPS/PH = – A

NOTES:

PANEL "PB-GEN" SCHEDULE

SCALE NONE 2

OWNER-FURNISHED BATTERY ELECTRIC BUS (BEB) CHARGER SCHEDULE

SYMBOL	QUANTITY	MAKE	MODEL	PORT	INPUT CAPACITY KVA	ELECTRICAL VOLT/P/AMP	OUTPUT VOLT/AMP DC	REQUIRED CIRCUIT BREAKER AMPS	DC CONNECTION	CABLE LENGTH	LCD DISPLAY	–	INSTALLATION REMARKS FOR THE CONTRACTOR
PB 1-10 / PL 1-10	10	CHARGEPOINT	POWER BLOCK POWER LINK 1000	SINGLE	160	480 / 3 / 260	100-1000V/350A	350	NACS (J3400), CCS1 (SAE J1772 COMBO), CCS2 (IEC 61851-23), CHAdeMO	19'	FULL COLOR 203 mm (8 in) INTERACTIVE DISPLAY WITH FULL MOTION VIDEO, UV PROTECTION, GESTURE TOUCH CONTROLS, AND MULTI-LANGUAGE SUPPORT	–	INSTALL CONDUITS AND CABLES FOR AC UTILITY POWER, DC POWER, ETHERNET CAT6, INTERLOCK CONTROLS, AND GROUNDING FOR COMPLETE INSTALLATION REQUIRED BY CHARGEPOINT MANUFACTURER.
PB 11-13 / PL 11	3 PB 1 PL 2000	CHARGEPOINT	POWER BLOCK POWER LINK 2000	PANTOGRAPH	160	480 / 3/ 260	100-1000V/350A	350	–	–	–	–	INSTALL CONDUITS AND CABLES FOR AC UTILITY POWER, DC POWER, ETHERNET CAT6, INTERLOCK CONTROLS, AND GROUNDING FOR COMPLETE INSTALLATION REQUIRED BY CHARGEPOINT MANUFACTURER.

PB 1

PB-1 TO 10 = POWER BLOCK COUPLED WITH POWER LINK 1000 (PL). PB-11 TO 13 = PANTOGRAPH POWER BLOCKS COUPLED WITH POWER LINK 2000. INSTALL CONDUITS AND OUTDOOR RATED CABLES FOR AC UTILITY POWER, DC POWER, CAT6 ETHERNET, INTERLOCK CONTROLS, AND GROUNDING FOR COMPLETE INSTALLATION, STARTUP TESTING, AND COMMISSIONING REQUIRED BY CHARGEPOINT MANUFACTURER. FOLLOW CHARGEPOINT GUIDES FOR DATA, SITE DESIGN, AND INSTALLATION.

OWNER-FURNISHED - BATTERY ELECTRIC BUS (BEB) CHARGER SCHEDULE

SCALE NONE 5

REGISTERED PROFESSIONAL ENGINEER — TSUNG D. YU — NO. E17980 — ELECTRICAL — STATE OF CALIFORNIA

DAHL, TAYLOR & ASSOCIATES
CONSULTING ENGINEERS
2960 DAHLER STREET
SANTA ANA, CALIFORNIA 92705
TEL: # (949) 756-8654
FAX: # (949) 502-0777

MARK	DATE	BY	REVISIONS

Sheet Title: BATTERY ELECTRIC BUS CHARGER & PANEL SCHEDULES

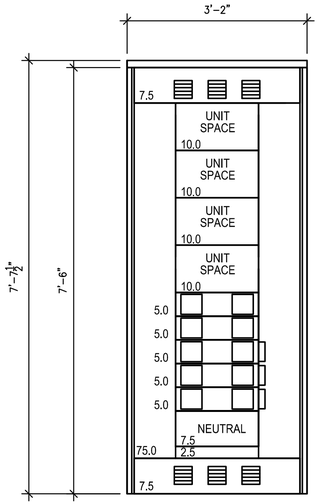
Project: OCTA SANTA ANA BUS BASE
INSTALLATION OF BEB CHARGERS & ELEC. INFRASTR.
4301 WEST MACARTHUR BOULEVARD, SANTA ANA, CA

JOB #	1.19.6
DESIGN BY:	SDV
DRAWN BY:	TMP
CHECKED BY:	QV
DATE	03-07-2025
SCALE	AS NOTED
SHEET	SA-E401

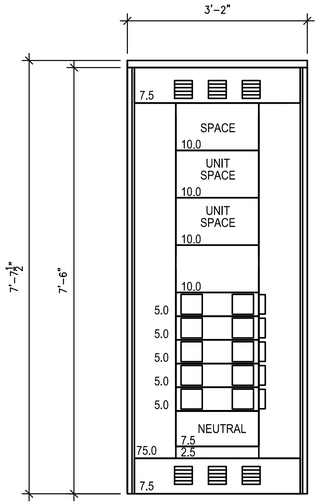
550 South Main Street
Orange, CA 92668
714/560/OCTA

OCTA

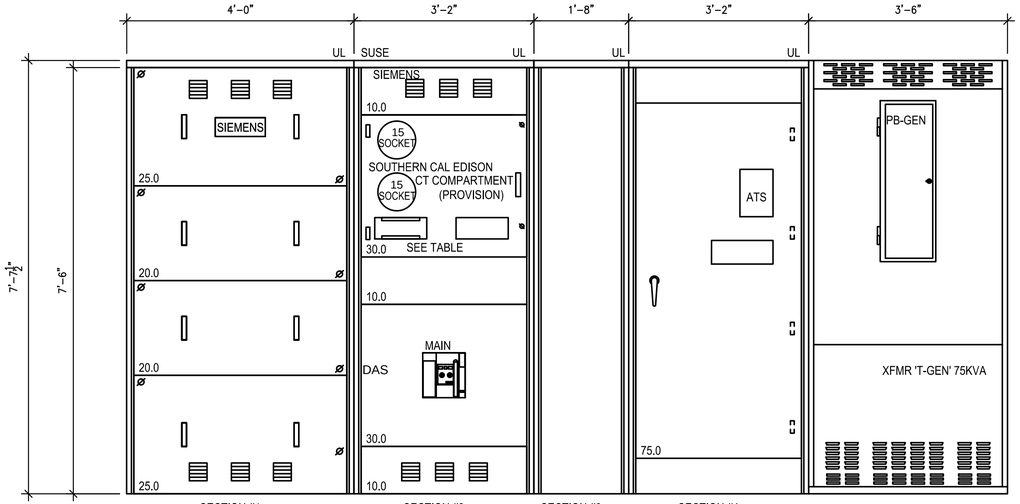
IFB 5-3922
ADDENDUM NO. 1
ATTACHMENT A



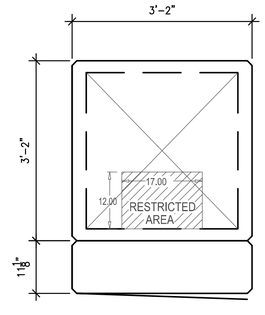
NEW "SB–BEB–3" ELEVATION — SCALE 3/4"=1'–0" — 3

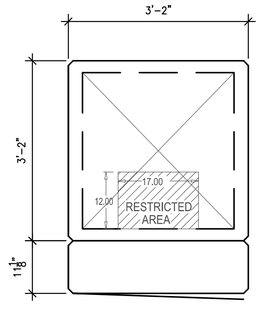


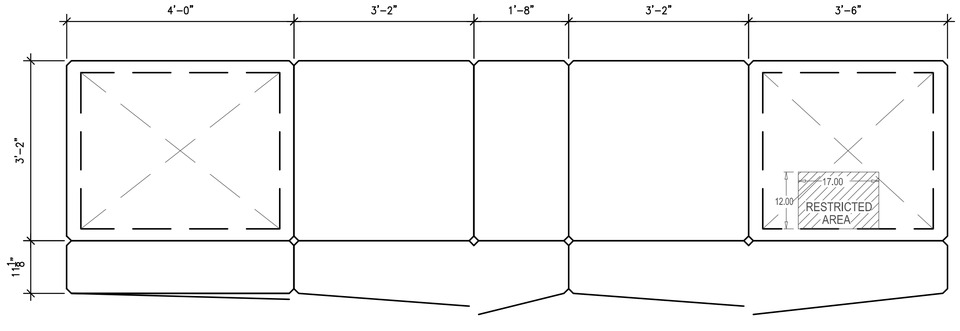
NEW "SB–BEB–1" & "SB–BEB–2" ELEVATION — SCALE 3/4"=1'–0" — 2



NEW MAIN BEB SWITCHBOARD "MSB–BEB" AND ATS ELEVATION — SCALE 3/4"=1'–0" — 1







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CONSULTING ENGINEERS
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SANTA ANA, CALIFORNIA 92705
TEL: # (949) 756–8654
FAX: # (949) 502–0777

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1	·	·	·

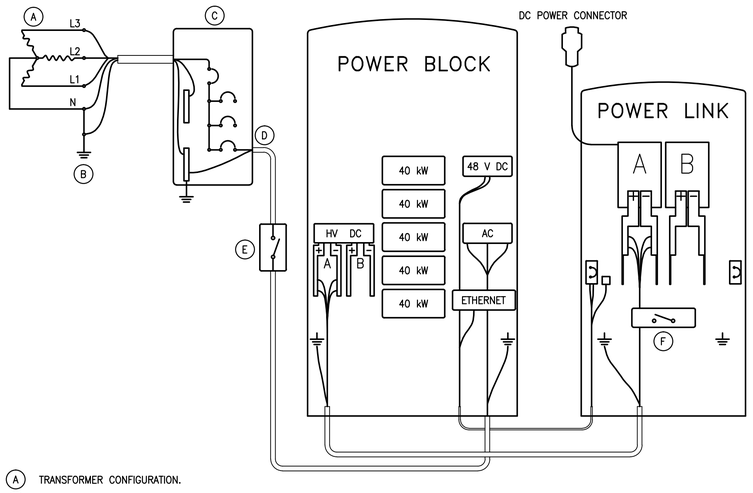
Sheet Title: NEW MAIN BEB SWITCHBOARD AND ATS ELEVATION

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4301 WEST MACARTHUR BOULEVARD, SANTA ANA, CA

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SHEET	SA-E501

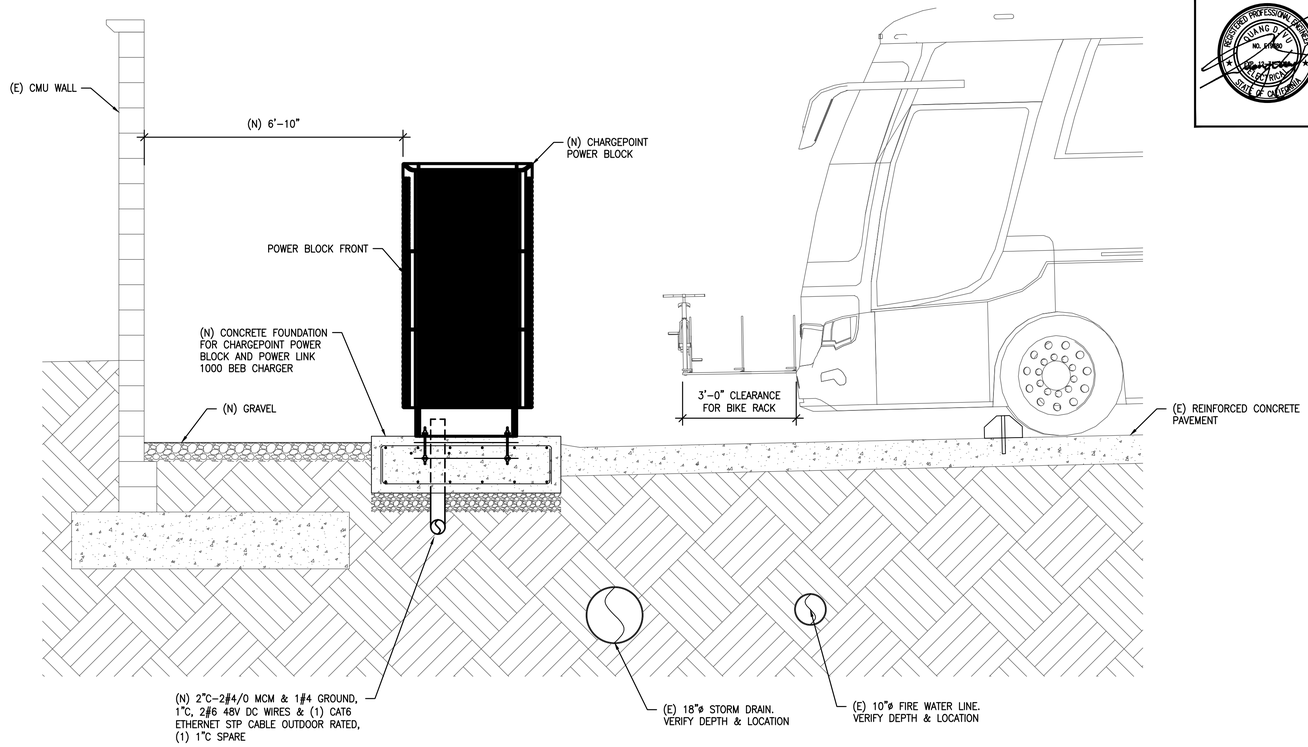
550 South Main Street
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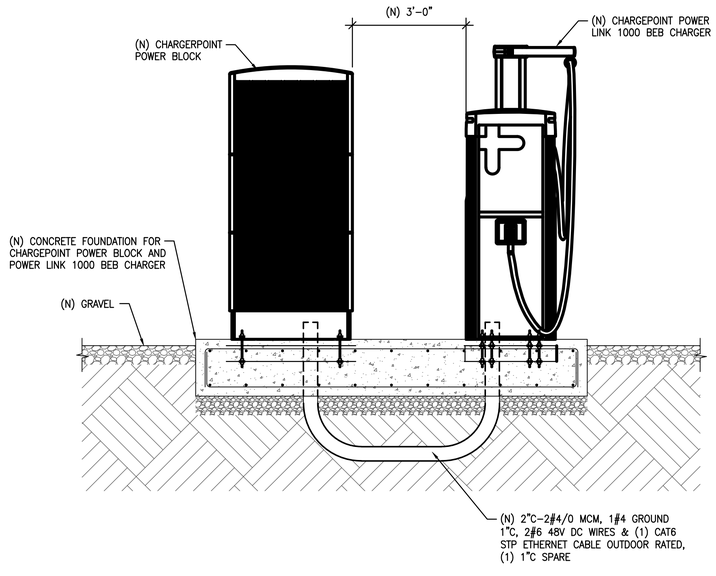


(A) TRANSFORMER CONFIGURATION.
(B) GROUND CONNECTION.
(C) ELECTRICAL PANEL.
(D) CIRCUIT BREAKERS.
(E) AC DISCONNECT SWITCH (OPTIONAL).
(F) MAINTENANCE SWITCH (OPTIONAL).

TYPICAL WIRING DIAGRAM FOR CHARGEPOINT CHARGER | SCALE NONE | 3



SECTION | SCALE 1/2"=1'-0" | 1



SECTION | SCALE NONE | 2

–

SCALE NONE | 4

REGISTERED PROFESSIONAL ENGINEER
HUNG D. VU
No. 57982
ELECTRICAL
STATE OF CALIFORNIA

DAHL, TAYLOR & ASSOCIATES
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2960 DANLER STREET
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TEL: # (949) 756-8654
FAX: # (949) 502-0777

MARK	DATE	BY	REVISIONS
1	·	·	·

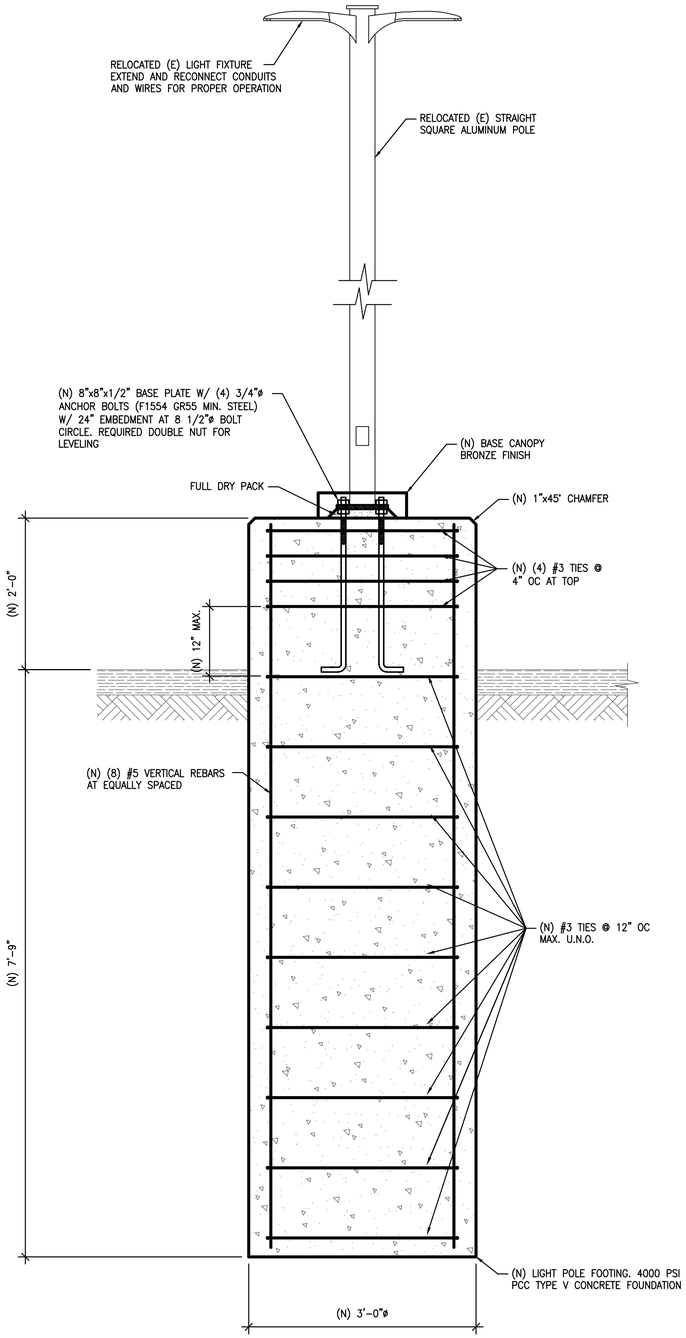
Sheet Title DETAILS AND SECTIONS

Project OCTA SANTA ANA BUS BASE
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4301 WEST MACARTHUR BOULEVARD, SANTA ANA, CA

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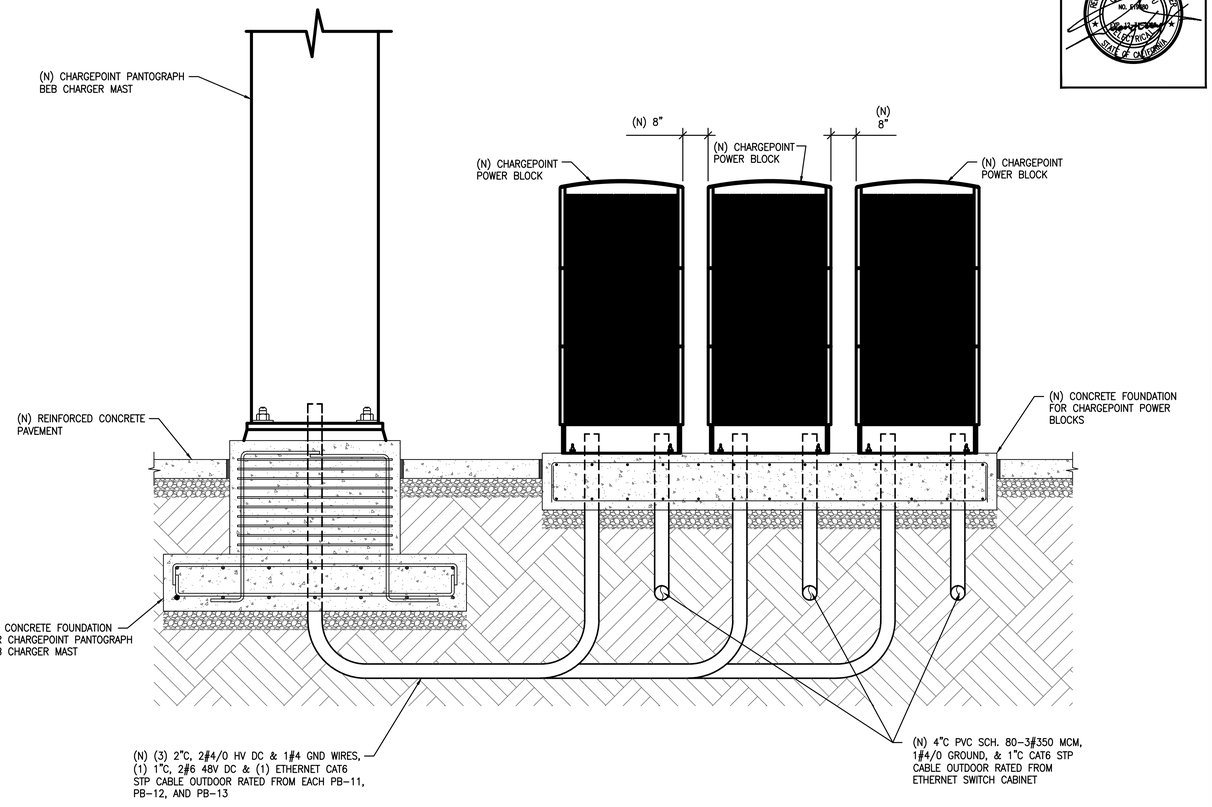
OCTA



EXISTING LIGHT POLE AT NEW LOCATION DETAIL

SCALE NONE

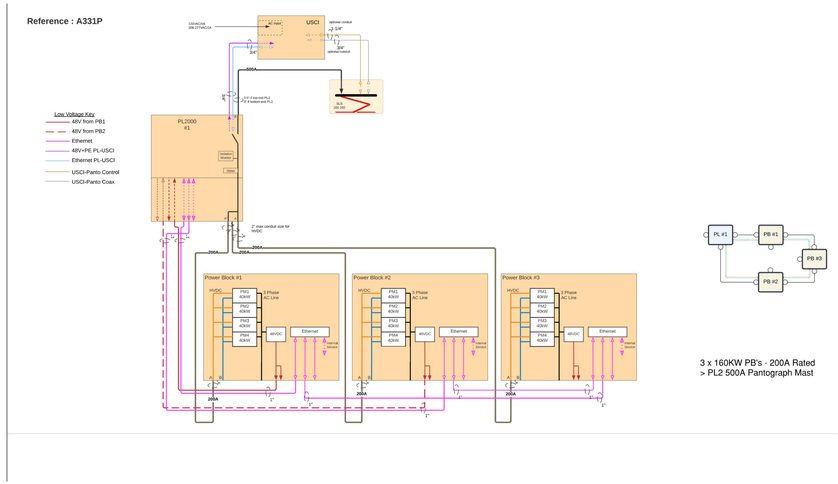
3



SECTION

SCALE 1/2"=1'-0"

1



3 x 160KW PB's - 200A Rated
> PL2 500A Pantograph Mast

POWER WIRING DIAGRAM FOR PANTOGRAPH BEB CHARGER

SCALE NONE

2

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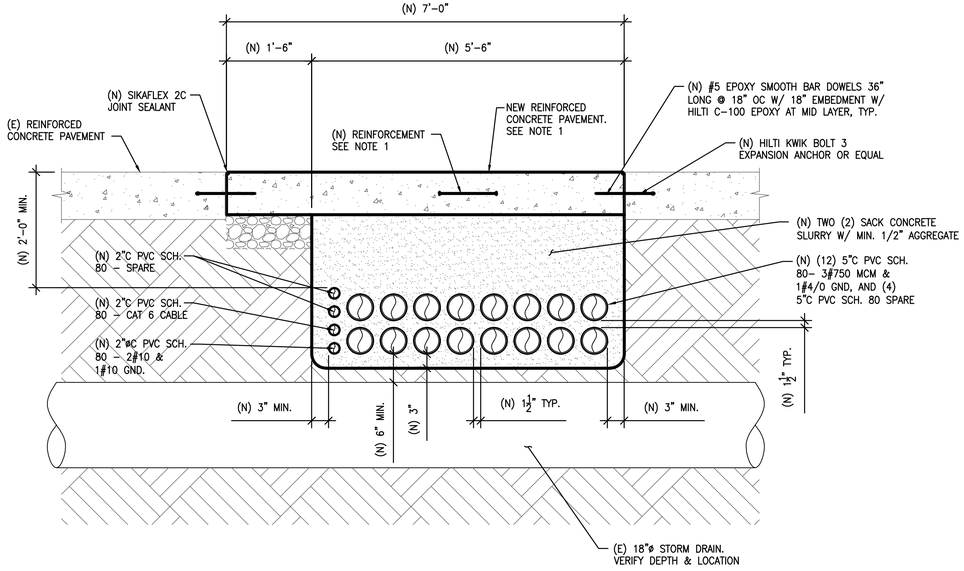
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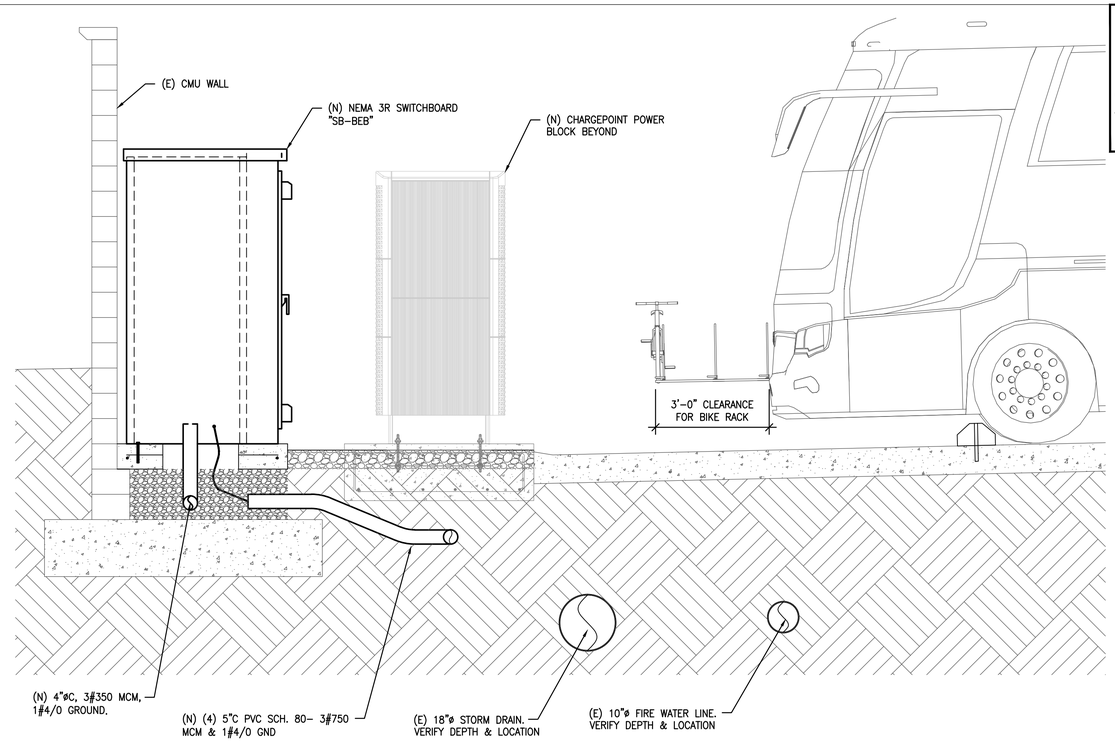
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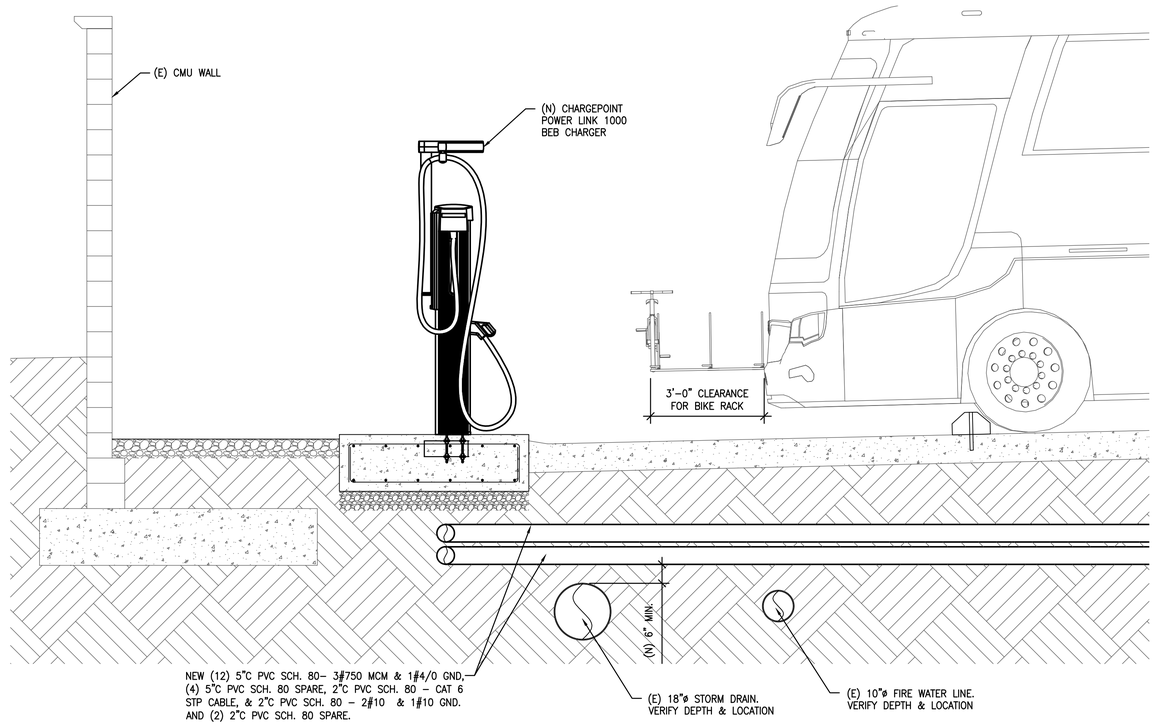
NOTES:

1. NEW 9" THICK, 4,000 PSI AT 28 DAYS PCC TYPE V CONCRETE PAVEMENT WITH #4 REINFORCING STEEL BARS @ 12" ON CENTERS EACH WAY.

CONCRETE ENCASED CONDUIT CROSS SECTION — SCALE 3/4"=1'-0" — 3



SECTION — SCALE 1/2"=1'-0" — 1



SECTION — SCALE 1/2"=1'-0" — 2

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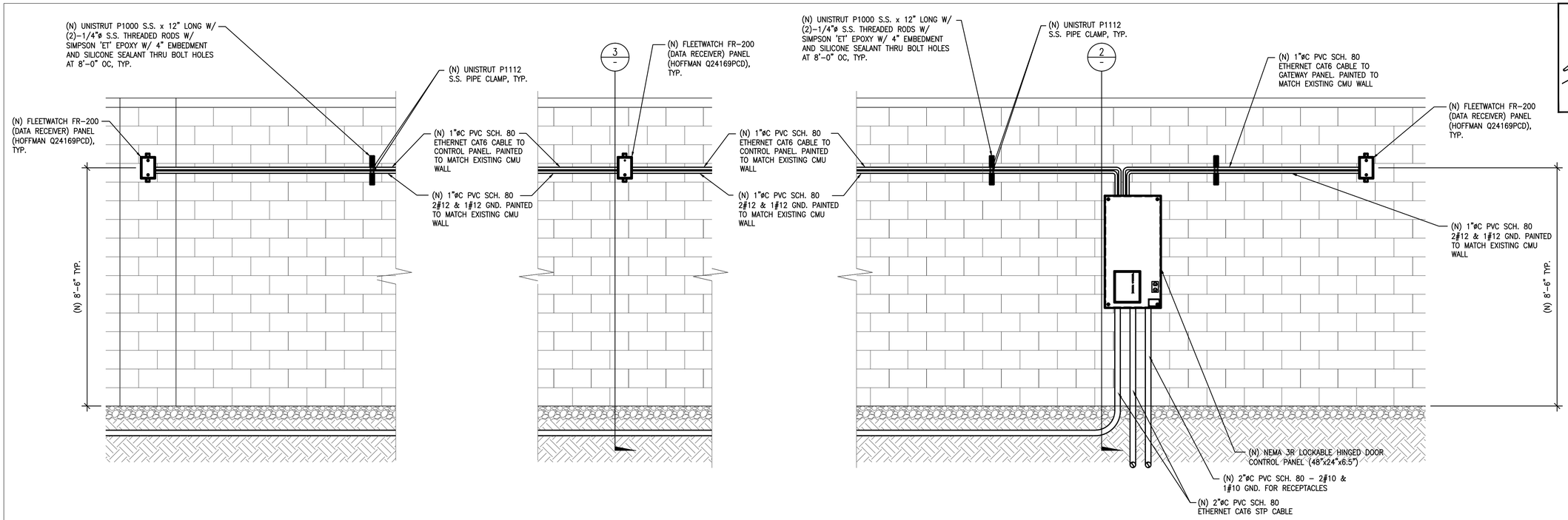
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SHEET	SA-E504

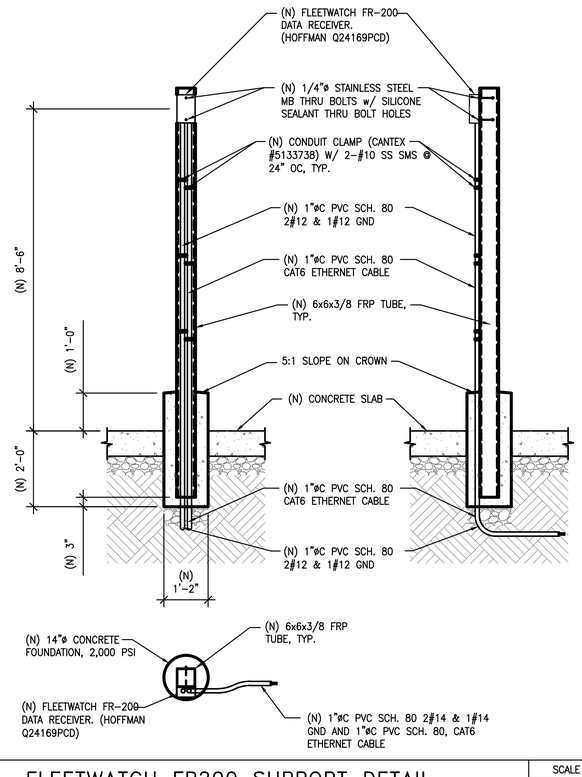
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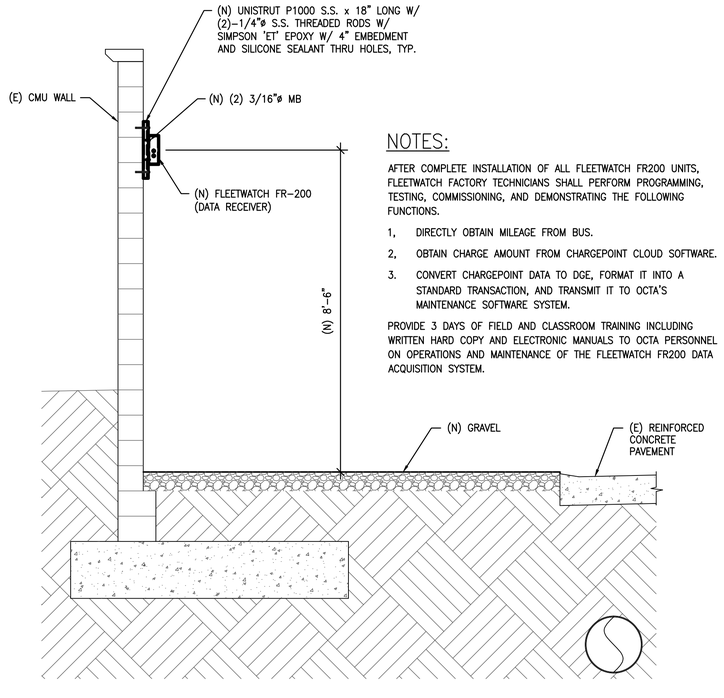
CONTROL PANEL AND FLEETWATCH FR–200 (DATA RECEIVER) ON CMU WALL

SCALE 1/2"=1'–0" (1)



FLEETWATCH FR200 SUPPORT DETAIL

SCALE 1/2"=1'–0" (4)



NOTES:

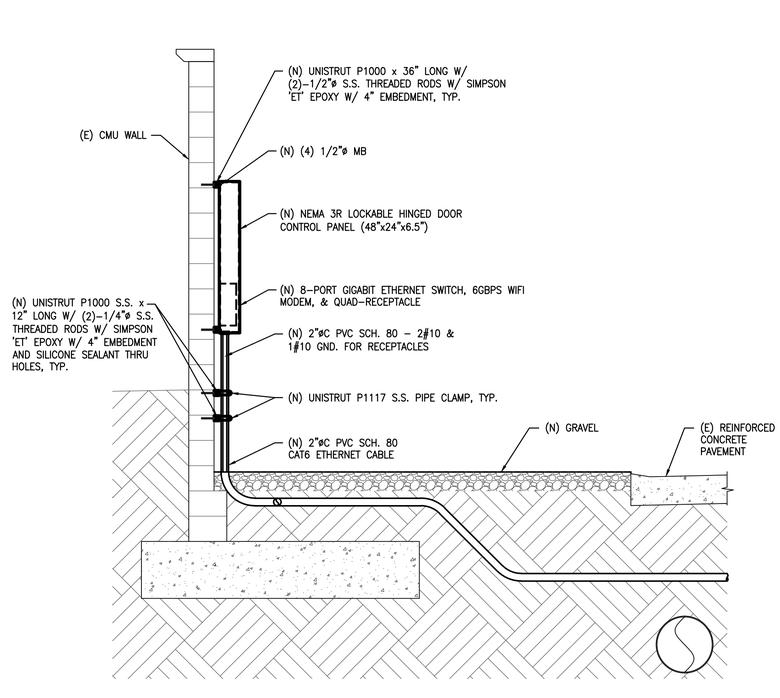
AFTER COMPLETE INSTALLATION OF ALL FLEETWATCH FR200 UNITS, FLEETWATCH FACTORY TECHNICIANS SHALL PERFORM PROGRAMMING, TESTING, COMMISSIONING, AND DEMONSTRATING THE FOLLOWING FUNCTIONS.

1. DIRECTLY OBTAIN MILEAGE FROM BUS.
2. OBTAIN CHARGE AMOUNT FROM CHARGEPOINT CLOUD SOFTWARE.
3. CONVERT CHARGEPOINT DATA TO DGE, FORMAT IT INTO A STANDARD TRANSACTION, AND TRANSMIT IT TO OCTA'S MAINTENANCE SOFTWARE SYSTEM.

PROVIDE 3 DAYS OF FIELD AND CLASSROOM TRAINING INCLUDING WRITTEN HARD COPY AND ELECTRONIC MANUALS TO OCTA PERSONNEL ON OPERATIONS AND MAINTENANCE OF THE FLEETWATCH FR200 DATA ACQUISITION SYSTEM.

FLEETWATCH FR200 SUPPORT DETAIL

SCALE 1/2"=1'–0" (3)



NEMA 3R CONTROL PANEL SUPPORT DETAIL

SCALE NONE (2)

REGISTERED PROFESSIONAL ENGINEER — HUNG D. VU — NO. 17980 — ELECTRICAL — STATE OF CALIFORNIA

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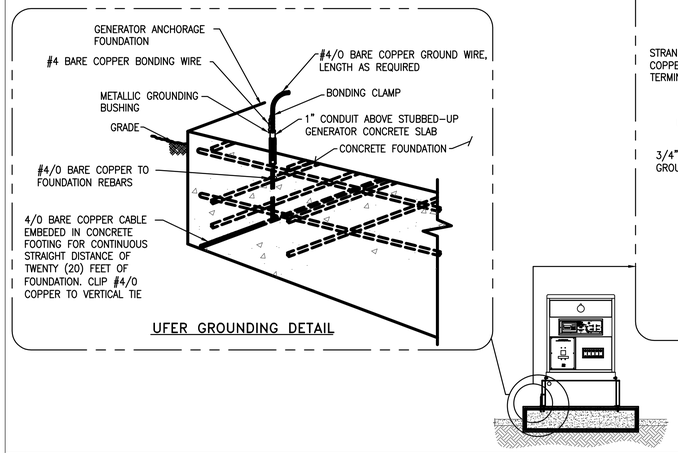
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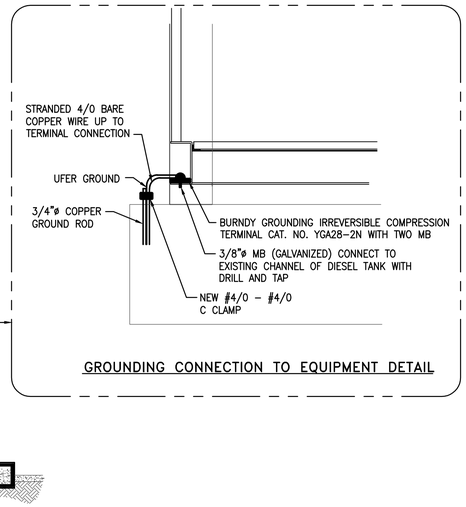
JOB #	1.19.6
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DATE	03–07–2025
SCALE	AS NOTED
SHEET	SA-E505

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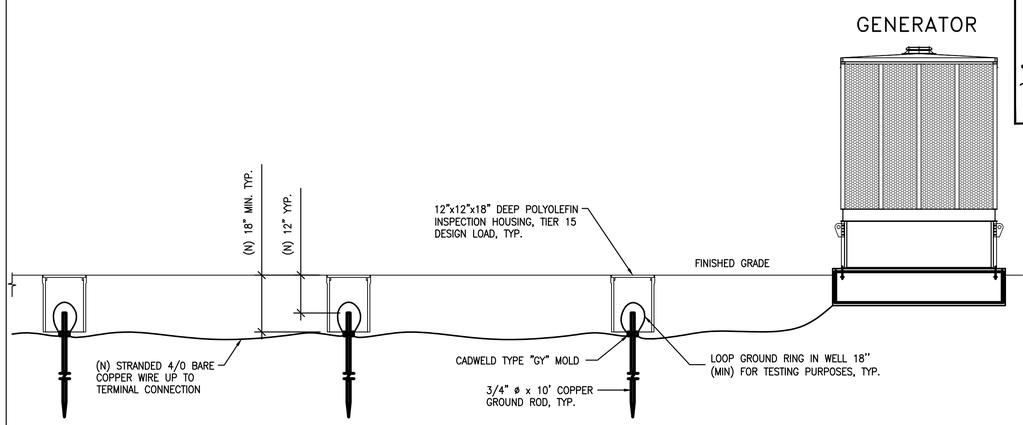
OCTA



UFER GROUNDING DETAIL



GROUNDING CONNECTION TO EQUIPMENT DETAIL



GROUND TEST WELL DETAIL

SCALE NONE 1

GROUND DETAIL

SCALE NONE 2

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2960 DAHLER STREET
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REVISIONS

MARK	DATE	BY	REVISIONS
1			

Sheet Title: DETAILS AND SECTIONS

Project: OCTA SANTA ANA BUS BASE
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4301 WEST MACARTHUR BOULEVARD, SANTA ANA, CA

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SCALE	AS NOTED
SHEET	SA-E506

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FLEETWATCH® FR200-GR STAND-ALONE GATE READER

Fleet Information Technology by SA SYSTEMS, INC.

PRODUCT FEATURES

FLEETWATCH® Stand-Alone Receivers allow remote data collection without requiring the installation of a full Fluid Management Control System. The FR200-GR is designed for installation in remote environments such as gated entrances to collect vehicle mileage as assets enter and exit property. They can also be installed in parking areas, at garage entrances, and other similar locations to gather information from infrequently fueled support vehicles, remotely stored paratransit fleets, and remote parking hubs.

These systems are designed to provide an easy mechanism for collecting data from newer electric vehicles (mileage, SOC, and approximate energy use) that don't often visit existing fueling areas. When integrated with the Fleetwatch EV Cloud, they operate alongside select EV and BEB chargers to enable total data collection for the EV fleet (energy used, energy lost, SOC, mileage, fault codes, etc.).

All data collected integrates directly with the existing Fleetwatch Fluid Management System. Readings are stored for later reporting, or can create direct transactions that feed data into existing maintenance and reporting systems.

Newer UWB functionality built into the unit integrates alongside existing Fleetwatch Location Awareness Technology offerings to precisely track vehicle position.



FR200-GR Stand-Alone Fixed Receiver is integrated with the FLEETWATCH® Fluid Management System for fully electronic capture of vehicle information

FR200-GR Technical Specifications

Power:	120VAC/0.5A or 12VDC/0.5A
Interface:	Ethernet or RS-232
Transmit & Receiver Frequency:	125kHz Beacon, 2.4GHz DSSS 802.15.4, Zigbee Channels 11-25 UWB Channels 5 and 9 (6.5GHz and 8GHz)
Operating Range:	-40C to 85C (-40F to 185F)
Dimensions:	15.28x11.34x4.84 Inches (388x288x123 mm)
Weight:	7.04lbs Typical Configuration

P.O. Box 1928 • Rockwall, TX 75087 • 972-722-1009 (voice) • 972-722-1033 (fax) www.fleetwatch.com

FLEETWATCH FR200 DATA SHEET

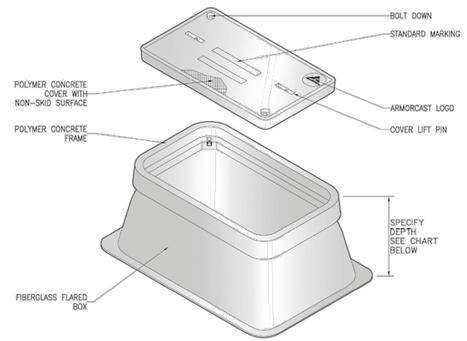
SCALE NONE 4

13" x 24" FRP FLARED BOX ASSEMBLY

12" & 24" DEPTHS

FIBERGLASS — ARMORCAST PRODUCTS COMPANY

A6001946



13"W x 24"L FRP FLARED BOX ASSEMBLIES Specify Depth Below

DESCRIPTION	NOMINAL SIZE W x L x D	LOAD RATING	ANSI TIER	PART NUMBER	APPROX. WEIGHT	PALLET QTY.
Box & Cover Assembly	13" x 24" x 12"	10K	8	A6001946AX12	70 lbs.	16
	13" x 24" x 12"	20K	15	A6001946TAX12	81 lbs.	16
Box & Cover Assembly	13" x 24" x 18"	10K	8	A6001946AX18	74 lbs.	16
	13" x 24" x 18"	20K	15	A6001946TAX18	85 lbs.	16
Box & Cover Assembly	13" x 24" x 24"	10K	8	A6001946AX24	87 lbs.	12
	13" x 24" x 24"	20K	15	A6001946TAX24	98 lbs.	12

COMPONENTS

DESCRIPTION	NOMINAL SIZE W x L x D	LOAD RATING	ANSI TIER	PART NUMBER	APPROX. WEIGHT	PALLET QTY.
Replacement Covers	13" x 24"	10K	8	A6001866	33 lbs.	50
	13" x 24"	20K	15	A6001969	41 lbs.	50
Replacement Boxes	13" x 24" x 12"	10K / 20K	8 /15	A6001946X12	36 lbs.	16
	13" x 24" x 18"	10K / 20K	8 /15	A6001946X18	46 lbs.	16
	13" x 24" x 24"	10K / 20K	8 /15	A6001946X24	58 lbs.	12
Extensions 18" Boxes Only	13" x 24" x 8"	10K / 20K	8 /15	A6001946EX8	31 lbs.	16
	13" x 24" x 16"	10K / 20K	8 /15	A6001946EX16	43 lbs.	8

• Boxes are Open Bottom.
• For sizes not shown please contact Armorcast Products for more information

FIBERGLASS BOXES

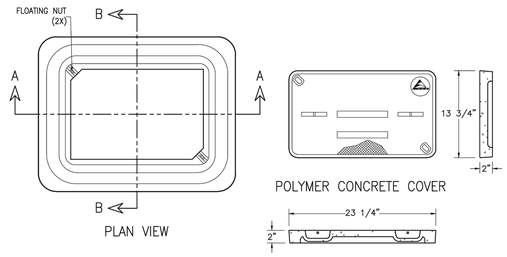
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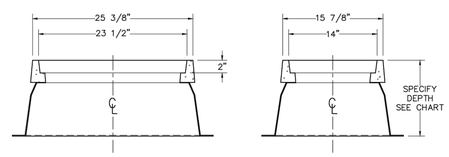
13" x 24" FRP FLARED BOX ASSEMBLY

STANDARD DIMENSIONS

ARMORCAST PRODUCTS COMPANY — FIBERGLASS

A6001946





Armorcast Products Company reserves the right to update or discontinue product information at any time without notice.

FIBERGLASS BOXES

www.armorcastprod.com Tel: (818) 982-3600 Fax: (818) 982-7742

MANHOLE DETAIL

SCALE NONE 3

LATERAL LOAD DESIGN CRITERIA

BUILDING CODES: 2022 CBC AND ASCE 7-16

WIND LOAD

P=qGCp-qi(GCpi) for Enclosed & Partially Enclosed Building — Per Equation 27.3-1

Where: Wind Speed Vfm=78 Mile per hour (fast wind speed)
Basic Wind Speed V3s=92 Mile per hour (3 sec gust wind speed)
H=Building mean height
C=Exposure category
Cp=External Pressure Coefficient — Per Figure 27.3-1 to 27.3-3
GCpi=Internal Pressure Coefficient — Per Table 26.13-1
V=3 second gust wind speed
q=qz for windward walls elevated at height z above the ground.
q=qh for leeward walls, sidewalls, and roof evaluated at height h.
qi=qh for windward walls, sidewalls, leeward walls, and roofs of enclosed buildings.
qi=qz for positive internal pressure evaluation in partially enclosed buildings where height z = highest opening.

P=qh(GCp-(GCpi)) — Per Equation 29.4-4

P=Ptable(EAF)(RF)Kz — Per Equation 30.6-1

Where
EAF(Exposure Adjustment Factor) — Per Table 30.6-2
Kz(Topographic Factor as defined in Section 26.8)
RF(Effective Area Reduction Factor) — Per Table 30.6-2

F = qh(GCf)(As) for Freestanding Walls — Per Equation 29.3-1
F = qz(GCf)(Af) for Tanks and Open Signs, Frames, and Trussed Towers — Per Equation 29.4-1

Where:
qh(Velocity Pressure evaluated at height h) — Per Equation 29.3-1
G(Gust-effect Factor) — Per Section 26.11
Cf(Force coefficient) — Per Figure 29.3-1
Af = Projected Area
As = Gross Area

SEISMIC LOAD FOR NONBUILDING STRUCTURE DESIGN
PER ASCE 7-16

V=(Cs)(W) — (FORMULA 12.8-1)
Cs=(Sds)(Ie)/R — (FORMULA 12.8-2)
WHERE
V= Seismic base shear
Cs=The seismic response coefficient
W= The seismic effective weight
Sds=The design spectral response acceleration parameter
R= The response modification factor
Ie= The important factor = 1
Cs(min.)=0.01

SEISMIC LOAD FOR EQUIPMENT SUPPORT AND ANCHOR DESIGN
PER ASCE 7-16

Fp=[((0.4)(ap)(Sds)(Wp))/(Rp/Ip)][1+2(z/h)] (13.3-1)
Fp(MAX.)=(1.6)(Sds)(Ip)(Wp) (13.3-2)
Fp(MIN.)=(0.3)(Sds)(Ip)(Wp) (13.3-3)
Fp(VERT.)=(0.2)(Sds)(Ip)(Wp)

WHERE: BASED ON SITE CLASS E
SEISMIC DESIGN CATEGORY D
Ss=1.162
Fa= 1.2 Short-period site coefficient, per table 11.4.1 ASCE 7-16
Sms=(Fa)(Ss) = 1.394g, Per 11.4-1 ASCE 7-16
Sds=(2/3)(Sms) = 0.93g, Per 11.4-3 ASCE 7-16
Rp=Component response modification factor, per table 13.5-1 or 13.6-1 ASCE 7-16
ap=Component amplification factor, per table 13.5-1 or 13.6-1 ASCE 7-16
Ip= 1 Component importance factor, per 13.1.3 ASCE 7-16
z=Height of component in structure withrespect to the base, per 13.3.1 ASCE 7-16
h=Average roof height of structure with respect to the base, per 13.3.1 ASCE 7-16
Wp=Component operating weight, per 13.3.1 ASCE 7-16

SPECIAL INSPECTION PROGRAM

ADDRESS OR LEGAL DESCRIPTION: 4301 WEST MACARTHUR BLVD., SANTA ANA, CA 92704

PLAN CHECK NUMBER: OWNER'S NAME: OCTA

I, AS THE OWNER, OR AGENT OF THE OWNER (CONTRACTOR MAY NOT EMPLOY THE SPECIAL INSPECTOR), CERTIFY THAT I, OR THE ENGINEER OF RECORD, WILL BE RESPONSIBLE FOR EMPLOYING THE SPECIAL INSPECTOR(S) AS REQUIRED BY CALIFORNIA BUILDING CODE (CBC) SECTION 1704.1 FOR THE CONSTRUCTION PROJECT LOCATED AT THE SITE LISTED ABOVE.

SIGNED: DATE:

I, AS THE ENGINEER OF RECORD, CERTIFY THAT I HAVE PREPARED THE FOLLOWING SPECIAL INSPECTION PROGRAM AS REQUIRED BY CBC SECTION 1704 FOR THE CONSTRUCTION PROJECT LOCATED AT THE SITE LISTED ABOVE.

SIGNED: DATE:

1. LIST OF WORK REQUIRING SPECIAL INSPECTION:

- ☒ SOILS COMPLIANCE PRIOR TO FOUNDATION INSPECTION
- ☐ STRUCTURAL CONCRETE OVER 2500 PSI
- ☐ PRESTRESSED CONCRETE
- ☐ STRUCTURAL MASONRY DESIGNER SPECIFIED
- ☒ FIELD WELDING
- ☒ HIGH STRENGTH BOLTING
- ☐ EPOXY ANCHORS
- ☐ SPRAYED-ON FIREPROOFING
- ☐ OTHER:

GENERAL NOTES

1. THE CONTRACTOR SHALL:
   a) THOROUGHLY REVIEW ALL CONTRACT DOCUMENTS, AND VERIFY ALL DIMENSIONS AND CONDITIONS AT THE SITE PRIOR TO START OF CONSTRUCTION.
   b) IMMEDIATELY NOTIFY THE ARCHITECT OR ENGINEER OF ANY OMISSION OR DISCREPANCY BETWEEN VARIOUS ELEMENTS OF THE CONTRACT DOCUMENTS FOR DIRECTION BEFORE PROCEEDING WITH THE WORK.
   c) IMMEDIATELY NOTIFY THE ARCHITECT OR ENGINEER OF ANY CONDITION WHICH IN HIS OPINION MIGHT ENDANGER THE STABILITY OR OTHERWISE CAUSE DISTRESS OF THE STRUCTURE.
   d) BE RESPONSIBLE FOR ALL FORM WORK AND SHORING WORK DURING CONSTRUCTION.
   e) ENSURE PROPER ALIGNMENT OF FINAL STRUCTURE INCLUDING ANY PRELOADING OF THE STRUCTURE TO DETERMINE FINAL POSITION OF THE COMPLETED WORK.
   f) COORDINATE MECHANICAL, PLUMBING AND ELECTRICAL DRAWINGS FOR SIZE AND LOCATION OF ALL OPENINGS REQUIRED FOR DUCTS, PIPES, SLEEVES, ELECTRICAL CONDUITS AND OTHER ITEMS TO BE EMBEDDED IN CONCRETE OR BE INCORPORATED IN STRUCTURAL WORK.
   g) SAFELY DISTRIBUTE ALL CONSTRUCTION MATERIALS TO BE TEMPORARILY STORED ON ROOF/FLOOR FRAMING OR OTHER PARTS OF THE STRUCTURE SO THE DESIGN LIVE LOAD WILL NOT BE EXCEEDED.
2. ALL WORK SHALL CONFORM TO THE REQUIREMENT OF ALL REGULATING AGENCIES EXERCISING AUTHORITY OVER ANY PORTION OF THE WORK INCLUDING THE STATE OF CALIFORNIA DIVISION OF INDUSTRIAL SAFETY AND CAL/OSHA TITLE 21 & 24 ETC., AND SHALL CONFORM TO THE CALIFORNIA BUILDING CODE 2016 EDITION.
3. ALL WORK SHALL CONFORM TO THE BEST PRACTICE PREVAILING IN THE VARIOUS TRADES COMPRISING THE WORK.
4. ANY ASTM DESIGNATIONS SHALL BE AS AMENDED TO DATE.
5. THE CONTRACTOR SHALL PROVIDE TEMPORARY ERECTION BRACING AND SHORING FOR ALL STRUCTURAL MEMBERS OR AS REQUIRED FOR STRUCTURAL STABILITY OF THE STRUCTURE DURING ALL PHASES OF CONSTRUCTION.
6. THE CONTRACTOR SHALL REFER TO THE SPECIFICATIONS FOR INFORMATION NOT COVERED BY THESE GENERAL NOTES OR THE STRUCTURAL DRAWINGS. SPECIFIC NOTES AND DETAILS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS.
7. CONTRACTOR SHALL GIVE DUE AND LEGAL NOTICE TO ADJACENT PROPERTY OWNERS REGARDING THE PROTECTION OF THEIR PROPERTY AND STRUCTURES WHICH MAY BE NECESSARY DUE TO EXCAVATION AND CONSTRUCTION INDICATED ON THESE DRAWINGS, IN DUE TIME PRIOR TO START OF EXCAVATION.

CONCRETE

1. CONCRETE PCC TYPE V SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS AS FOLLOWS.
   A. FOUNDATION, FOOTINGS, PILES, PILE CAPS: 4,000 PSI.
   B. COLUMNS, PILASTERS: 5,000 PSI.
   C. PAD, PAVEMENT, SLAB-ON-GRADE: 4,000 PSI.
   D. LIGHTWEIGHT CONCRETE: 3,000 PSI.
2. ALL CONCRETE SHALL BE STONE CONCRETE UTILIZING AGGREGATE CONFORMING TO ASTM C33. MAX. SIZE OF AGGREGATE 3/4".
3. CEMENT SHALL BE TYPE V CONFORMING TO TABLE 19-A-4 OF C.B.C. READY-MIXED CONCRETE SHALL CONFORM TO C.B.C., WATER AND CEMENT RATIO TO BE 0.5.
4. CONCRETE COVER OVER REINFORCING STEEL SHALL BE AS FOLLOWS:
   a) CONCRETE AGAINST EARTH (UNFORMED).....3"
   b) CONCRETE AGAINST EARTH (FORMED).....2"
   c) CONCRETE BEAMS AND COLUMNS (STRUCTURAL).....2"
   d) CONCRETE SLABS (STRUCTURAL).....1"
   e) CONCRETE WALLS-INTERIOR FACE.....1"
   EXTERIOR FACE.....1-1/2"
5. BEFORE CONCRETE IS PLACED THE CONTRACTOR SHALL COORDINATE AND CHECK WITH ALL TRADES TO ENSURE THE PROPER PLACEMENT OF ALL OPENINGS, SLEEVES, INSERT, CURBS, DEPRESSIONS, ETC., RELATING TO THE WORK A SHOWN IN THE DRAWINGS. ANY CHANGE OR DISCREPANCY SHALL BE APPROVED BY THE STRUCTURAL ENGINEER AND THE LOCAL BUILDING AGENCY PRIOR TO PLACING OF CONCRETE.
6. SLEEVES, OPENINGS OR OTHER ATTACHMENTS NOT SHOWN ON THE DRAWINGS SHALL BE APPROVED BY THE STRUCTURAL ENGINEER AND THE LOCAL BUILDING AGENCY PRIOR TO PLACING OF THE CONCRETE.
7. ALL CONCRETE MIXES SHALL CONFORM TO THE PROPORTIONS ESTABLISHED BY CODE FOR THE VARIOUS CONCRETE STRENGTHS REQUIRED FOR THE WORK. CONTRACTOR MAY AT THIS OPTION ENGAGE A CERTIFIED INDEPENDENT TESTING LABORATORY TO PREPARE MIX DESIGNS FOR THE WORK, AND HAVE COPIES OF SUCH MIX DESIGN AS WELL AS 7-DAY AND 28-DAY CYLINDER TEST RESULTS WITHIN 6 MONTHS SUBMITTED TO THE STRUCTURAL ENGINEER AND LOCAL BUILDING OFFICIALS TO OBTAIN APPROVAL PRIOR TO ITS USE IN THE WORK.
8. ALL CONCRETE UNLESS OTHERWISE NOTED ON PLANS WILL BE REGULAR WEIGHT HARD ROCK TYPE (150 LB/CU. FT.) AGGREGATE SHALL CONFORM TO A.S.T.M. C-33 WITH PROVEN SHRINK CHARACTERISTICS OF LESS THAN 0.04% AS PER A.S.T.M. C-157. AGGREGATE FOR CONCRETE FILL OVER STEEL DECK SHALL BE LIGHTWEIGHT EXPANDED SHALL AGGREGATE CONFORMING TO ASTM 330.
9. MAXIMUM SLUMP OF CONCRETE USED IN POLE FOUNDATION WORK SHALL BE FOUR INCHES ± 1/4". VIBRATION: VIBRATION OF CONCRETE SHALL BE IN ACCORDANCE WITH THE GENERAL PROVISIONS OUTLINED IN PORTLAND CEMENT ASSOCIATION SPECIFICATIONS ST26. CURING: CONCRETE SHALL BE MAINTAINED IN A MOIST CONDITION FOR MINIMUM OF FIVE DAYS AFTER ITS PLACEMENT. APPROVED CURING COMPOUNDS MAY BE USED IN LIEU OF MOIST CURING.
10. ANCHOR BOLTS, DOWELS, INSERTS, ETC. SHALL BE SECURELY TIED IN PLACE PRIOR TO POURING CONCRETE.
11. LOCATING CONSTRUCTION AND POUR JOINTS SHALL BE APPROVED BY THE OWNER PRIOR TO POURING CONCRETE.
12. ALL CONCRETE SHALL BE PLACED UNDER THE SUPERVISION OF A DEPUTY INSPECTOR LICENSED BY THE LOCAL BUILDING OFFICIAL FOR CONTINUOUS INSPECTION.
13. INSPECTION AND TESTS SHALL COMPLY WITH SECTION 1704 OF THE CBC.

REINFORCING STEEL

1. ALL REINFORCING STEEL SHALL COMPLY WITH 2016 CBC AND SHALL BE NEW STOCK DEFORMED BARS CONFORMING TO ASTM A-615 GRADE, OR ASTM A-706 FOR THOSE TO BE WELDED, AS FOLLOWS:
   a) STIRRUPS & TIES.....GRADE 60
   b) ALL OTHERS.....GRADE 60
   c) ALL OTHER.....GRADE 60
   d) WALL DOWELS TO FOOTING.....GRADE 60

   A. DEFORMATIONS SHALL BE IN ACCORDANCE WITH A.S.T.M. A305.
   B. WELDED WIRE FABRIC SHALL BE MADE OF COLD DRAWN WIRE CONFORMING TO ASTM A185 AND SHALL BE SPLICED WITH A MINIMUM LAP OF 12".
   C. TIE WIRE SHALL CONFORM TO ASTM A-82.
2. ALL BARS SHALL BE FREE OF RUST, GREASE, MILL SCALE OR ANY MATERIAL WHICH MIGHT AFFECT ITS BOND TO CONCRETE.
3. ALL BAR BENDS SHALL BE MADE COLD. NO REBENDING OF BARS WILL BE PERMITTED.
4. BAR LAPS SHALL BE MADE AWAY FROM POINTS OF MAXIMUM STRESS, AROUND CORNERS IN EACH DIRECTION OR AT LOCATIONS SHOWN ON THE DRAWINGS OR AS INDICATED BELOW. THE MINIMUM AMOUNT OF ANY LAP SHALL BE NOT LESS THAN 2 FEET.
   a) HORIZONTAL STEEL IN CONCRETE SLABS, WALLS, BEAMS AND GIRDERS - 36 DIAMETERS.
   b) CONCRETE BLOCK MASONRY - 48 DIAMETERS.
5. ALL TESTING OF REINFORCING STEEL SHALL BE AS REQUIRED BY LOCAL BUILDING CODE OR AS OTHERWISE NOTED IN THE SPECIFICATIONS.
6. REFER TO CONCRETE NOTES FOR REQUIREMENTS FOR PLACEMENT DRAWINGS.
7. PRIOR WELDING PROCEDURE APPROVAL IS REQUIRED FOR WELDING OF REINFORCING STEEL AND STEEL SHALL BE COMPLY WITH ASTM A706.
8. WELDING OF REINFORCING STEEL SHALL BE PERFORMED BY THE ELECTRIC ARC PROCESS AND PERFORMED, UTILIZING EXX-70 ELECTRODES. ALL WELDING TO BE DONE UNDER THE CONTINUOUS INSPECTION OF A DEPUTY-INSPECTOR REGISTERED BY THE LOCAL BUILDING OFFICIAL.
9. ALL REINFORCING STEEL SHALL BE SUPPORTED AND TIED IN CONFORMANCE WITH THE LATEST EDITION OF "THE MANUAL OF REINFORCING STEEL PRACTICE FOR REINFORCED CONCRETE STRUCTURES".
10. FOR SPLICES OF REBARS TO BE MECHANISM SPLICER U.N.O. SEE NOTE #7.
11. STAGGER SPLICES A MINIMUM OF TWICE THE LAP LENGTH FOR HORIZONTAL REINFORCEMENT.
12. FOR WELDED REBARS USE ASTM A706 GRADE 60 WELDED REBARS WITH EXX-70.

CONCRETE BLOCK MASONRY AND BRICK MASONRY

1. CONCRETE BLOCK UNITS 12"x4"x16" SHALL BE MEDIUM WEIGHT GRADE "N" UNITS CONFORMING TO ASTM C90. GRADE "N". REFER TO ARCHITECTURAL DRAWING AND /OR SPECIFICATIONS FOR BLOCK SIZE, FACE COLOR, JOINTING, ETC.
2. THE SPECIFIED COMPRESSIVE STRENGTH OF MASONRY (f'm) IS 2000 PSI AT 28 DAYS WITH FULL STRESS USED IN THE DESIGN. THE COMPRESSIVE STRENGTH OF MASONRY SHALL EQUAL OR EXCEEDf'm WITH VERIFICATION BY PRISM TESTING OR UNIT STRENGTH METHOD IN ACCORDANCE WITH 2010 CBC SECTION 2105.
3. MASONRY UNITS SHALL BE SUFFICIENTLY MOIST AT TIME OF LAYING TO PREVENT DEHYDRATION OF MORTAR AND GROUT. ABSORPTION RATE SHALL NOT EXCEED .25 OUNCES PER SQUARE INCH OF DURING ONE MINUTE PERIOD.
4. MASONRY UNITS SHALL BE FREE OF ALL SUBSTANCES WHICH MIGHT IMPAIR THE BOND OF THE UNITS TO MORTAR AND GROUT. FULL SIZE UNITS, OR FULL SIZE UNITS CUT TO PROPER SIZE ONLY SHALL BE USED IN THE WORK. ALL MASONRY UNITS SHALL BE FREE FROM OBJECTIONABLE AMOUNTS OF CRACKS AND SPALLS.
5. MORTAR SHALL BE MACHINE MIXED TO TYPE 'S' MIX CONSISTING BY VOLUME OF 1 PART CEMENT TO 3 PARTS SAND WITH 1/4 TO 1/2 PART LIME PUTTY. THE MORTAR SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2000 PSI AT THE AGE OF 28 DAYS.
6. GROUT SHALL BE MACHINE MIXED BY VOLUME AND CONSIST OF 1 PART PORTLAND CEMENT, 3 PARTS SAND WITH 1/10 TO 1/5 PART LIME PUTTY. GROUT SPACE MORE THAN 2 INCHES IN WIDTH FOR BRICK MASONRY AND 4 INCHES IN WIDTH FOR CONCRETE BLOCK MASONRY MAY HAVE BEEN IN ADDITION TO THE SAND NOT MORE THAN 2 PARTS PEA GRAVEL. THE GROUT SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT THE AGE OF 28 DAYS.
7. CEMENT FOR MORTAR AND GROUT SHALL BE A LOW ALKALI TYPE CONFORMING TO ASTM C150. LIME SHALL BE TYPE 'S' HYDRATED LIME MEETING THE REQUIREMENTS OF ASTM C20-6.
8. GROUT SHALL BE READY-MIXED CONCRETE, DELIVERED IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM C94.
9. IF WORK IS STOPPED FOR ONE HOUR OR LONGER PROVIDE HORIZONTAL CONSTRUCTION JOINTS BY STOPPING THE GROUT BETWEEN BLOCK UNITS AND REINFORCING STEEL SHALL NOT BE LESS THAN 1/2".
10. THE THICKNESS OF GROUT BETWEEN BLOCK UNITS AND REINFORCING STEEL SHALL NOT BE LESS THAN 1/2".
11. ALL CELLS CONTAINING HORIZONTAL OR VERTICAL REINFORCING STEEL, BOLTS, OR INSERTS SHALL BE GROUTED. WHERE REINFORCING STEEL OCCURS IN OR ADJACENT TO MORTAR JOINTS, THE CELLS ON EACH SIDE OF SAID STEEL SHALL BE GROUTED WHEN NON-SOLID GROUT WALLS ARE USED.
12. FOOTING DOWEL IN MASONRY WALLS SHALL BE THE SAME SIZE AND SPACING AS VERTICAL WALL REINFORCEMENT.
13. NO PIPES OR DUCTS SHALL BE PLACED IN MASONRY WALLS UNLESS SPECIFICALLY MIXED OR DETAILED.
14. BOLTS OR INSERTS SHALL BE GROUTED WITH 1" MINIMUM OF GROUT BETWEEN BOLT OR INSERT AND MASONRY.
15. MASONRY WALLS ABOVE 10'-0" IN HEIGHT SHALL BE BRACED DURING ERECTION. THE BRACING SHALL WITHSTAND A WIND LOAD OF 22 LBS PER SQUARE FOOT APPLIED PERPENDICULAR TO WALL IN EITHER DIRECTION. BRACING SHALL REMAIN IN PLACE UNTIL ROOF DIAPHRAGM IS INSTALLED.
16. FULL HEAD AND BED JOINTS ARE REQUIRED FOR "ALL CELLS FILLED" CONSTRUCTION.
17. ALL CONCRETE BLOCKS SHALL BE LAID IN A RUNNING BOND.
18. ALL GROUT MUST BE CONSOLIDATED EITHER BY (1) VIBRATION OVER THE HEIGHT OF POUR (VIBRATION MUST BE PERFORMED AFTER THE INITIAL LOSS OF WATER AND BEFORE INITIAL SET) OR (2) BY PUDDLING, USING A SHRINKAGE COMPENSATING ADMIXTURE.
19. PROVIDE CLEAN-OUT OPENINGS AT BOTTOM OF ALL VERTICALLY GROUTED CELLS IF GROUT LIFT EXCEEDS 5'-0". MAXIMUM GROUT LIFT IS 10'-0".
20. SHRINKAGE CONTROL JOINTS SHALL BE SPACED AT NO MORE THAN 400 SQUARE FEET OF WALL AND SHALL BE REQUIRED AT MAJOR CHANGES IN WALL HEIGHT, CHANGES IN WALL THICKNESS, WALL OPENINGS AND AT CONTROL JOINTS IN FOUNDATION, IN ROOF AND IN FLOORS, ETC.

LEGEND

FC 1 — EQUIPMENT DESIGNATION / EQUIPMENT NUMBER-1

1 / S-3 — SEE SECTION 1 ON SHEET S-3

2 — KEY NOTE DESIGNATION

CONCRETE

ACOUSTIC

PLYWOOD

STEEL

ABBREVIATIONS

A.B.	ANCHOR BOLT	H	HEIGHT
ABV.	ABOVE	H.D.	HOLD DOWN
A/C	AIR CONDITIONING	HR.	HOUR
A.D.	AREA DRAIN		
ADJ.	ADJUSTABLE	IN.	INCH
ALT.	ALTERNATE	INSP.	INSPECTION
ALUM.	ALUMINUM	INSUL.	INSULATION
APPROX.	APPROXIMATE	INT.	INTERIOR
@	AT		
&	AND	L.	LENGTH
L	ANGLE	LBS./#	POUNDS
		LLH	LONG LEG HORIZONTAL
BRD/BD.	BOARD	LLV	LONG LEG VERTICAL
BLK.	BLOCK		
BLKG.	BLOCKING	MAX.	MAXIMUN
BM.	BEAM	MED.	MEDIUM
BOT.	BOTTOM	MET.	METAL
B.S.	BOTH SIDE	MIN.	MINIMUM
C.C.	CENTER TO CENTER	N	NORTH
CEM.	CEMENT	(N)	NEW
C.I.	CAST IRON	N.I.C.	NOT IN CONTRACT
C.M.U.	CONCRETE MASONRY UNIT	NTS	NOT TO SCALE
COL.	COLUMN		
CONC.	CONCRETE	O.C.	ON CENTER
CONT.	CONTINOUS	OPP.	OPPOSITE
CONTR.	CONTRACTOR	OTO	OUT TO OUT
CTR.	CENTER		
		PL.	PLATE
DBL.	DOUBLE	PLYWD.	PLYWOOD
DBSD.	DOUBLE STUD	P.S.F.	POUNDS PER SQUARE FOOT
DIAG.	DIAGONAL	P.S.I.	POUNDS PER SQUARE INCH
DIAM.	DIAMETER	PTN.	PARTITION
DN.	DOWN		
D.O.	DOOR OPENING	S	SOUTH
DR.	DOOR	SHED	SCHEDULE
		SIM.	SIMILAR
(E)	EXISTING	SMS	SHEET METAL SCREWS
EMBED'T	EMBEDMENT	SPEC.	SPECIFICATION
EQ.	EQUAL	SQ.	SQUARE
E.W.	EACH WAY	STL.	STEEL
EXT.	EXTERIOR		
		T & B	TOP AND BOTTOM
FDN.	FOUNDATION	TS	TUBE
FL.	FLOOR	T.W.	TOP OF WALL
F.O.C.	FACE OF CONCRETE	TYP.	TYPICAL
FTG.	FOOTING		
		U.N.O.	UNLESS NOTED OTHERWISE
GA.	GAUGE		
GALV.	GALVANIZED	W	WEST
G.S.M.	GALVANIZED SHEET METAL	W.	WASHER
GYP.BD.	GYPSUM BOARD	W/	WITH
		W/O	WITHOUT
		WT.	WEIGHT

REGISTERED PROFESSIONAL ENGINEER — MIEN NGO — No. C58590 — CIVIL — STATE OF CALIFORNIA

DAHL, TAYLOR & ASSOCIATES
CONSULTING ENGINEERS
2960 DAIMLER STREET
SANTA ANA, CALIFORNIA 92705
TEL: # (949) 756-8654
FAX: # (949) 502-0777

MARK	DATE	BY	REVISIONS

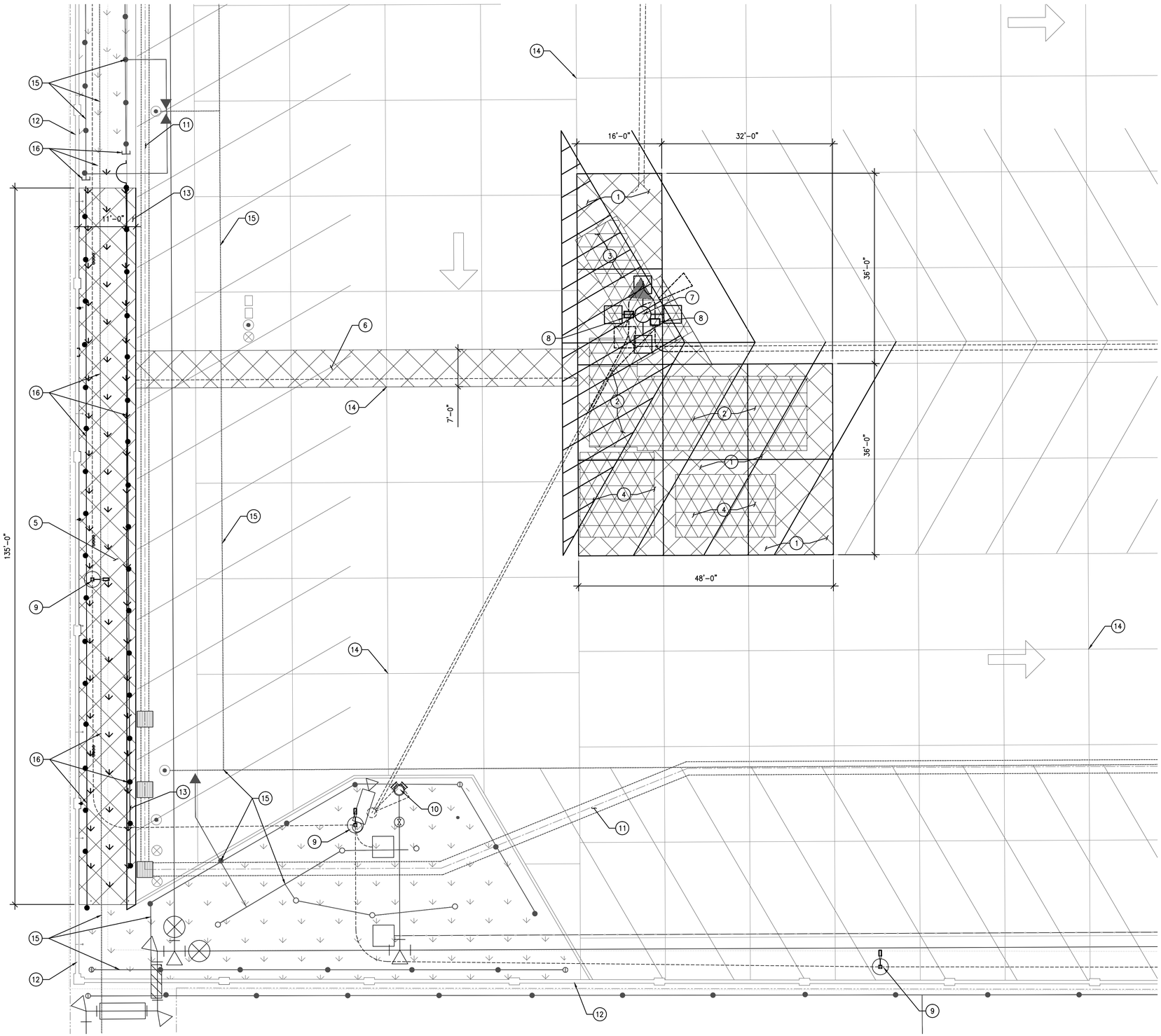
Sheet Title: STRUCTURAL ABBREVIATIONS, SYMBOLS AND NOTES

Project: OCTA SANTA ANA BUS BASE
INSTALLATION OF BEB CHARGERS & ELEC. INFRASTR.
4301 WEST MACARTHUR BOULEVARD, SANTA ANA, CA

JOB #	1.19.6
DESIGN BY:	SDV
DRAWN BY:	TMP
CHECKED BY:	QV
DATE	03-07-2025
SCALE	AS NOTED
SHEET	SA-S001

550 South Main Street
Orange, CA 92668
714/560/OCTA

OCTA



DEMOLITION NOTES:

SAW CUT OVERCUTTING OF CONCRETE PAVEMENT IS NOT ALLOWED. REPAIRS RELATED TO SAW CUT OVERCUTTING SHALL BE CONSIDERED WITHIN THE CONSTRUCTION SCOPE. DEBRIS, SPOIL, AND WASTE SHALL BE LEGALLY DISPOSED OFF-SITE.

1. SAW-CUTTING OF EXISTING 10" REINFORCED CONCRETE PAVEMENT AREA. REMOVAL AND LEGAL OFF-SITE DISPOSAL OF SPOILS AND WASTE, AND GROUND EXCAVATION.
2. EXCAVATION AREA FOR NEW 1000 KW GENERATOR ENCLOSURE, NEMA 3R METERED SWITCBOARD & AUTOMATIC TRANSFER SWITCH, AND ELECTRICAL EQUIPMENT.
3. EXCAVATION AREA FOR NEW CHARGEPOINT POWER BLOCKS AND PANTOGRAPH DOWN 2000 BEB CHARGER.
4. EXCAVATION AREA FOR NEW SCE MEDIUM VOLTAGE (MV) UTILITY TRANSFORMER AND PME-8 SWITCH CABINET.
5. EXCAVATION AREA FOR NEW BUS CHARGERS. REMOVE AND LEGALLY DISPOSE OFF-SITE EXISTING LANDSCAPE (MULCH) AND SUBGRADE SOIL IN AREA TO 6" TOP OF CURB.
6. SAW-CUTTING OF EXISTING 10" REINFORCED CONCRETE PAVEMENT AREA, EXCAVATION, TRENCHING, REMOVAL, AND LEGAL OFF-SITE DISPOSAL OF SPOILS AND WASTE FOR INSTALLATION OF UNDERGROUND CONDUITS.
7. EXISTING LIGHT POLE TO BE RELOCATED.
8. EXISTING PULL BOXES, CONDUITS, AND WIRES TO BE REMOVED AND REPLACED.
9. EXISTING LIGHT POLE TO REMAIN. PROTECT IN PLACE.
10. EXISTING FIRE HYDRANT TO REMAIN. PROTECT IN PLACE.
11. EXISTING STORM DRAIN TO REMAIN. PROTECT IN PLACE.
12. EXISTING CMU WALL TO REMAIN. PROTECT IN PLACE.
13. EXISTING CONCRETE CURB TO BE SAW-CUT, REMOVED, AND LEGALLY DISPOSED.
14. TYPICAL EXISTING CONSTRUCTION JOINTS.
15. EXISTING IRRIGATION HEADS, PIPES, AND CONTROL VALVES TO REMAIN.
16. REMOVAL AND LEGAL OFF-SITE DISPOSAL OF EXISTING IRRIGATION PIPING AND HEADS IN INSTALLATION AREA OF BEB CHARGING AND ELECTRICAL EQUIPMENT. CAPPING OFF FOR PIPES TO REMAIN IN OPERATION. RELOCATION & REPLACEMENT OF PRIMARY IRRIGATION WATER PIPES THAT ARE IN THE WAY OF NEW CONSTRUCTION.

DEMOLITION PLAN

SCALE 1"=10'-0" 1

REGISTERED PROFESSIONAL ENGINEER
HIEN NGO
No. C58590
CIVIL
STATE OF CALIFORNIA

DAHL, TAYLOR & ASSOCIATES
CONSULTING ENGINEERS
2960 DAHLER STREET
SANTA ANA, CALIFORNIA 92705
TEL: # (949) 756-8654
FAX: # (949) 502-0777

MARK	DATE	BY	REVISIONS
1			

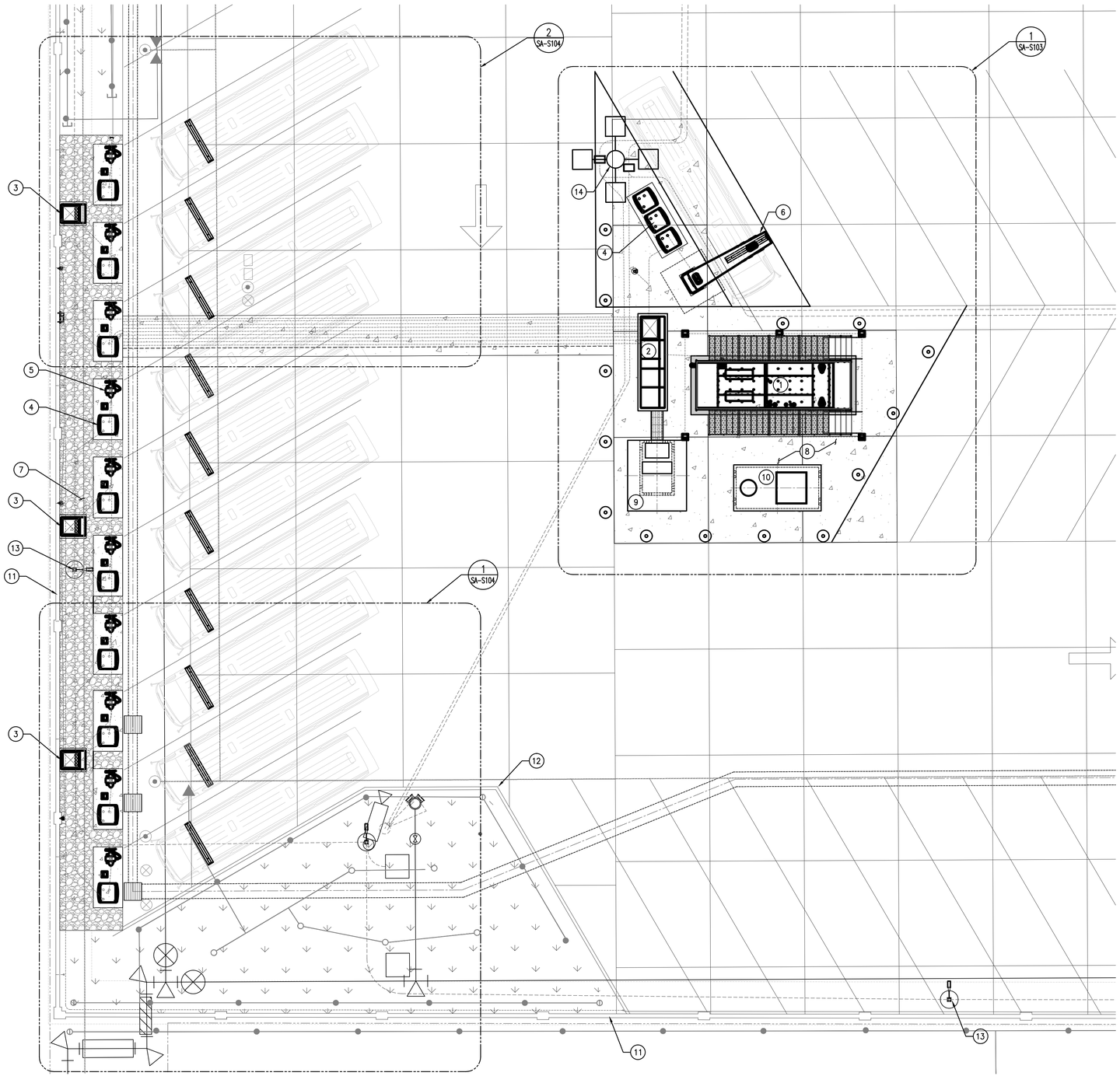
Project OCTA SANTA ANA BUS BASE
INSTALLATION OF BEB CHARGERS & ELEC. INFRASTR.
4301 WEST MACARTHUR BOULEVARD, SANTA ANA, CA

Sheet Title DEMOLITION PLAN

JOB #	1.19.6
DESIGN BY:	SDV
DRAWN BY:	TMP
CHECKED BY:	QV
DATE	03-07-2025
SCALE	AS NOTED
SHEET	SA-S101

550 South Main Street
Orange, CA 92668
714/560/OCTA

OCTA



CONSTRUCTION NOTES:

1. NEW 1000KW EMERGENCY POWER DIESEL GENERATOR.
2. NEW NEMA 3R MAIN SWITCHBOARD "MSB-BEB" AND ASCO ATS.
3. NEW NEMA 3R SWITCHBOARD "SB-BEB".
4. NEW CHARGEPOINT POWER BLOCK. (TYPICAL OF 13).
5. NEW CHARGEPOINT POWER LINK 1000 BEB CHARGER. (TYPICAL OF 10).
6. NEW CHARGEPOINT EXPRESS PLUS PANTOGRAPH DOWN 2000 BEB CHARGER.
7. NEW 3/4" GRAVEL FILL.
8. NEW 9" THICK, 4,000 PSI REINFORCED CONCRETE PAVEMENT UNDERLAIN BY 7.25" OF BASE OVER SUBGRADE SOIL. BASE AND SUBGRADE SOIL SHALL BE COMPACTED TO A MINIMUM OF 95% RELATIVE COMPACTION.
9. SCE UTILITY TRANSFORMER THAT IS FURNISHED AND INSTALLED BY SCE.
10. SCE MV PME-8 SWITCH CABINET THAT IS FURNISHED AND INSTALLED BY SCE.
11. EXISTING CMU WALL TO BE PROTECTED DURING CONSTRUCTION.
12. EXISTING CONCRETE CURB TO BE PROTECTED DURING CONSTRUCTION.
13. EXISTING LIGHT POLE TO BE PROTECTED DURING CONSTRUCTION.
14. RELOCATED LIGHT POLE WITH NEW FOUNDATION AT NEW LOCATION. SEE ELECTRICAL DRAWINGS FOR DETAILS AND REQUIREMENTS.

N

NEW EQUIPMENT PLAN

SCALE 1"=10'-0" 1

REGISTERED PROFESSIONAL ENGINEER
NIEN NGO
No. C58590
EXP. 12-31-2025
CIVIL
STATE OF CALIFORNIA

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Sheet Title: NEW EQUIPMENT AREA PLAN

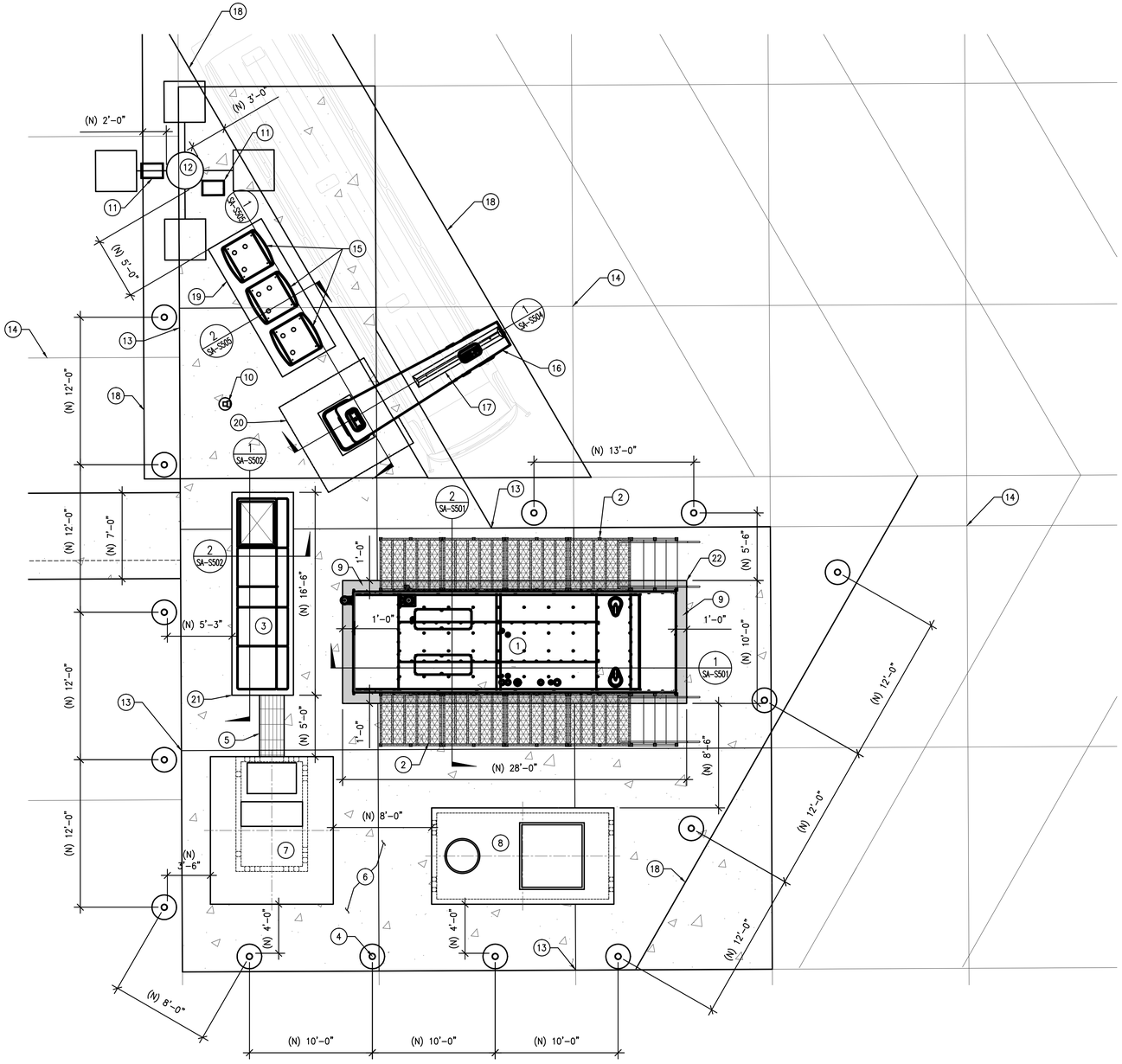
Project: OCTA SANTA ANA BUS BASE
INSTALLATION OF BEB CHARGERS & ELEC. INFRASTR.
4301 WEST MACARTHUR BOULEVARD, SANTA ANA, CA

JOB #	1.19.6
DESIGN BY:	SDV
DRAWN BY:	TMP
CHECKED BY:	QV
DATE	03-07-2025
SCALE	AS NOTED
SHEET	SA-S102

550 South Main Street
Orange, CA 92668
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IFB 5-3922
ADDENDUM NO. 1
ATTACHMENT A



CONSTRUCTION NOTES:

1. NEW 1000KW EMERGENCY POWER DIESEL GENERATOR.
2. NEW ALUMINUM SERVICE PLATFORM BY CUMMINS – GENERATOR.
3. NEW NEMA 3R MAIN SWITCHBOARD "MSB-BEB" AND ASCO ATS.
4. NEW 6"ø BOLLARDS (TYPICAL OF 14). SEE DETAIL 3/SA-502.
5. NEW CONCRETE UTILITY TRENCH, 24" WIDE x 36" DEEP WITH METAL GRATING.
6. NEW 9" THICK, 4,000 PSI PCC TYPE V REINFORCED CONCRETE PAVEMENT UNDERLAIN BY 7.25" OF BASE OVER SUBGRADE SOIL. BASE AND SUBGRADE SOIL SHALL BE COMPACTED TO MINIMUM OF 95% RELATIVE COMPACTION.
7. SCE UTILITY TRANSFORMER THAT IS FURNISHED AND INSTALLED BY SCE.
8. SCE MV PME-8 SWITCH CABINET THAT IS FURNISHED AND INSTALLED BY SCE.
9. PAINT 12" WIDE YELLOW STRIP AROUND AND ON RISER EDGE OF THE GENERATOR'S CONCRETE FOUNDATION.
10. NEW FLEETWATCH FR200 (DATA RECEIVER).
11. NEW ELECTRICAL PULL BOX, SEE DETAIL #4 / SA-E506.
12. RELOCATED LIGHT POLE WITH NEW FOUNDATION AT NEW LOCATION, SEE DETAIL #3 / SA-E503.
13. NEW CONSTRUCTION JOINT LINE.
14. EXISTING CONSTRUCTION JOINT LINE.
15. NEW CHARGEPOINT POWER BLOCK. (TYPICAL OF 3).
16. NEW CHARGEPOINT EXPRESS PLUS PANTOGRAPH DOWN 2000 BEB CHARGER.
17. NEW WHEEL STOP, SEE DETAIL #1 /SA-S503.
18. PAINT PARKING STALL STRIPES TO MATCH THE PRIOR CONDITIONS SUCH AS COLOR, LOCATION, & WIDTH
19. NEW 12'-0" x 5'-0" x 1'-6" DEEP REINFORCED CONCRETE FOUNDATION FOR CHARGEPOINT POWER BLOCK.
20. NEW 8'-0" x 8'-0" x 1'-6" DEEP REINFORCED CONCRETE FOUNDATION FOR PANTOGRAPH BEB CHARGER MAST.
21. NEW 16'-6" x 5'-0" x 2'-6" DEEP REINFORCED CONCRETE FOUNDATION FOR MAIN SWITCHBOARD "MSB-BEB" AND ASCO ATS.
22. NEW 28'-0" x 10'-0" x 3'-0" DEEP REINFORCED CONCRETE FOUNDATION FOR 1000KW GENERATOR.

N

NEW PLAN AT GENERATOR

SCALE 3/16"=1'-0" 1

REGISTERED PROFESSIONAL ENGINEER
HIEN NGO
No. C58590
EXP 12-31-26
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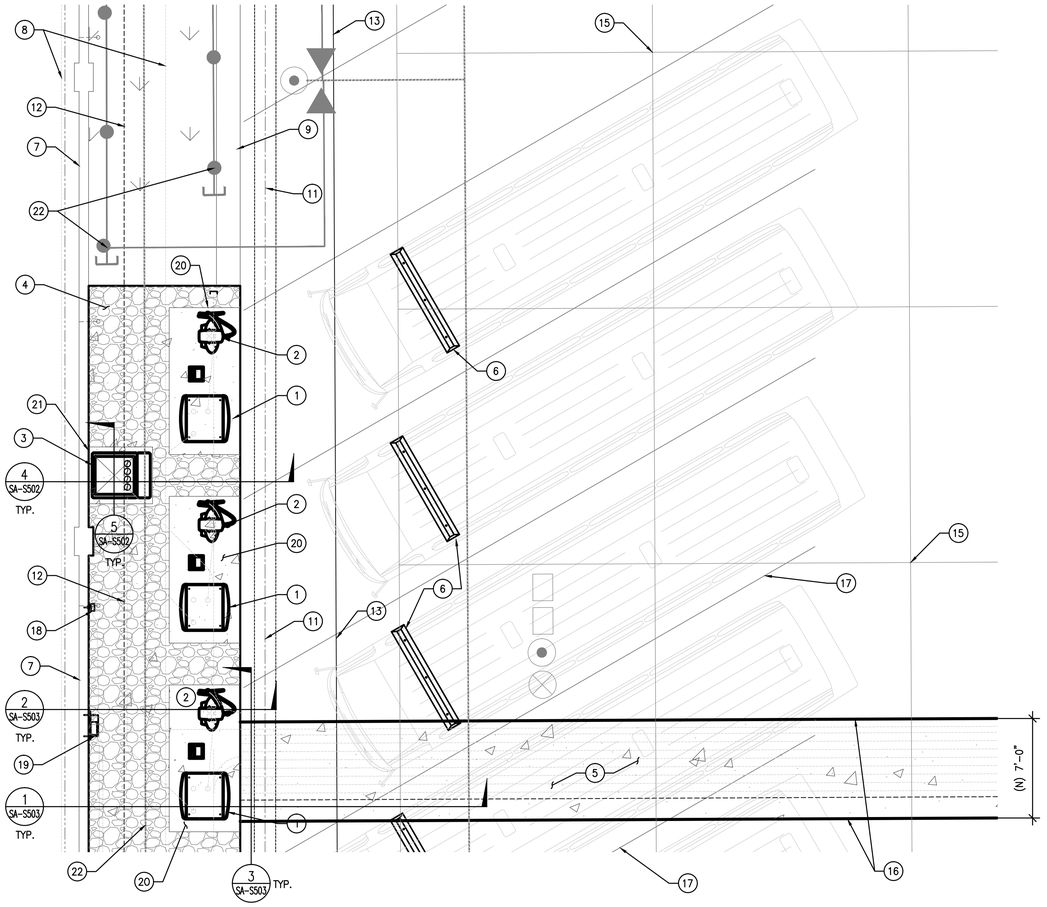
Sheet Title NEW PLAN AT GENERATOR

Project OCTA SANTA ANA BUS BASE
INSTALLATION OF BEB CHARGERS & ELEC. INFRASTR.
4301 WEST MACARTHUR BOULEVARD, SANTA ANA, CA

JOB #	1.19.6
DESIGN BY:	SDV
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SCALE	AS NOTED
SHEET	SA-S103

550 South Main Street
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NEW PLAN AT BATTERY-ELECTRIC-BUSES (BEBs)

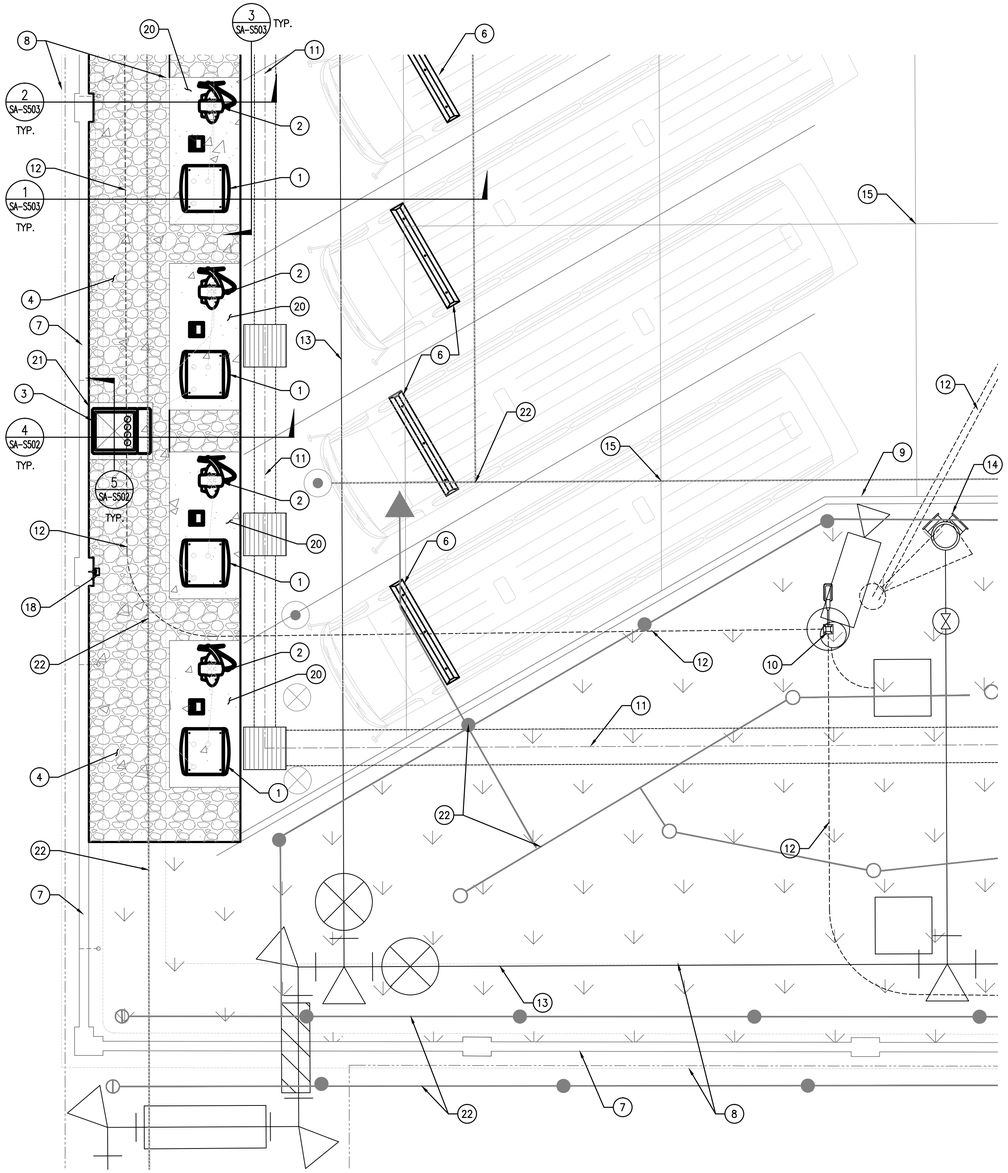
SCALE 3/16"=1'-0" | 2

CONSTRUCTION NOTES:

1. NEW CHARGEPOINT POWER BLOCK. (TYPICAL OF 10).
2. NEW CHARGEPOINT POWER LINK 1000 BEB CHARGER. (TYPICAL OF 10).
3. NEW NEMA 3R SWITCHBOARD "SB-BEB". (TYPICAL OF 3).
4. NEW 3/4" GRAVEL FILL.
5. NEW 9" THICK, 4,000 PSI PCC TYPE V REINFORCED CONCRETE PAVEMENT UNDERLAIN BY 7.25" OF BASE OVER SUBGRADE SOIL. BASE AND SUBGRADE SOIL SHALL BE COMPACTED TO MINIMUM OF 95% RELATIVE COMPACTION.
6. NEW WHEEL STOP, SEE DETAIL #1 / SA-S503. (TYPICAL OF 10).
7. EXISTING CMU WALL.
8. EXISTING CMU WALL FOOTING.
9. EXISTING CONCRETE CURB.
10. EXISTING LIGHT POLE.
11. EXISTING UNDERGROUND STORM DRAIN.
12. REMOVE, RELOCATE, AND REPLACE (E) U/G ELECTRICAL CONDUIT & WIRES TO ACCOMMODATE CONSTRUCTION & MAINTAIN SITE LIGHTING WITHOUT INTERRUPTION. NUMERICALLY TAG CONDUITS & WIRES THAT ARE TO BE REMOVED, RELOCATED, AND REPLACED AND SUBMIT A WRITTEN REPORT INCLUDING DESTINATION, FUNCTION, NUMBER, TYPE, AND VOLTAGE OF EACH CONDUIT AND WIRE TO THE PROJECT MANAGER FOR REVIEW AND CONFIRMATION BEFORE EXECUTING THE REMOVAL. PERFORM FUNCTIONAL TESTING FOR ALL INVOLVED DEVICES.
13. EXISTING UNDERGROUND WATER LINE.
14. EXISTING FIRE HYDRANT.
15. EXISTING CONSTRUCTION JOINT.
16. NEW CONSTRUCTION JOINT.
17. PAINT PARKING STALL STRIPES TO MATCH THE PRIOR CONDITIONS INCLUDING COLOR, LOCATION, LENGTH, AND WIDTH.
18. NEW FLEETWATCH FR200 (DATA RECEIVER) (TYPICAL OF 3).
19. NEW NEMA 3R LOCKABLE HINGED S.S. NETWORK PANEL (48"x24"x6.5").
20. NEW 10'-4" x 5'-0" x 1'-6" DEEP REINFORCED CONCRETE FOUNDATION FOR CHARGEPOINT POWER BLOCK AND POWER LINK 1000 BEB CHARGER. PROVIDE ⅝" THICK EPDM RUBBER OR FELT EXPANSION JOINT FILLER AND SIKAFLEX SELF-LEVELING POLURETHANE SEALANT BETWEEN NEW CONCRETE PAD AND EXISTING CONCRETE CURB / PAVEMENT.
21. NEW 4'-6" x 4'-0" x 8" DEEP REINFORCED CONCRETE FOUNDATION FOR BEB SWITCHBOARD "SB-BEB". FOR CONCRETE JOINT, PROVIDE EXPANSION JOINT FILLER AND SEALANT AS SPECIFIED IN NOTE #20.
22. REMOVAL AND LEGAL OFF-SITE DISPOSAL OF EXISTING IRRIGATION PIPING AND HEADS IN INSTALLATION AREA OF BEB CHARGING AND ELECTRICAL EQUIPMENT. CAPPING OFF FOR PIPES TO REMAIN IN OPERATION. RELOCATION & REPLACEMENT OF PRIMARY IRRIGATION WATER PIPES THAT ARE IN THE WAY OF NEW CONSTRUCTION.

CONSTRUCTION NOTES

SCALE NONE | 3



NEW PLAN AT BATTERY-ELECTRIC-BUSES (BEBs)

SCALE 3/16"=1'-0" | 1

REGISTERED PROFESSIONAL ENGINEER
HIEN NGO
No. C58590
12-31-26
CIVIL
STATE OF CALIFORNIA

DAHL, TAYLOR & ASSOCIATES
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2960 DAHLER STREET
SANTA ANA, CALIFORNIA 92705
TEL: # (949) 756-8654
FAX: # (949) 502-0777

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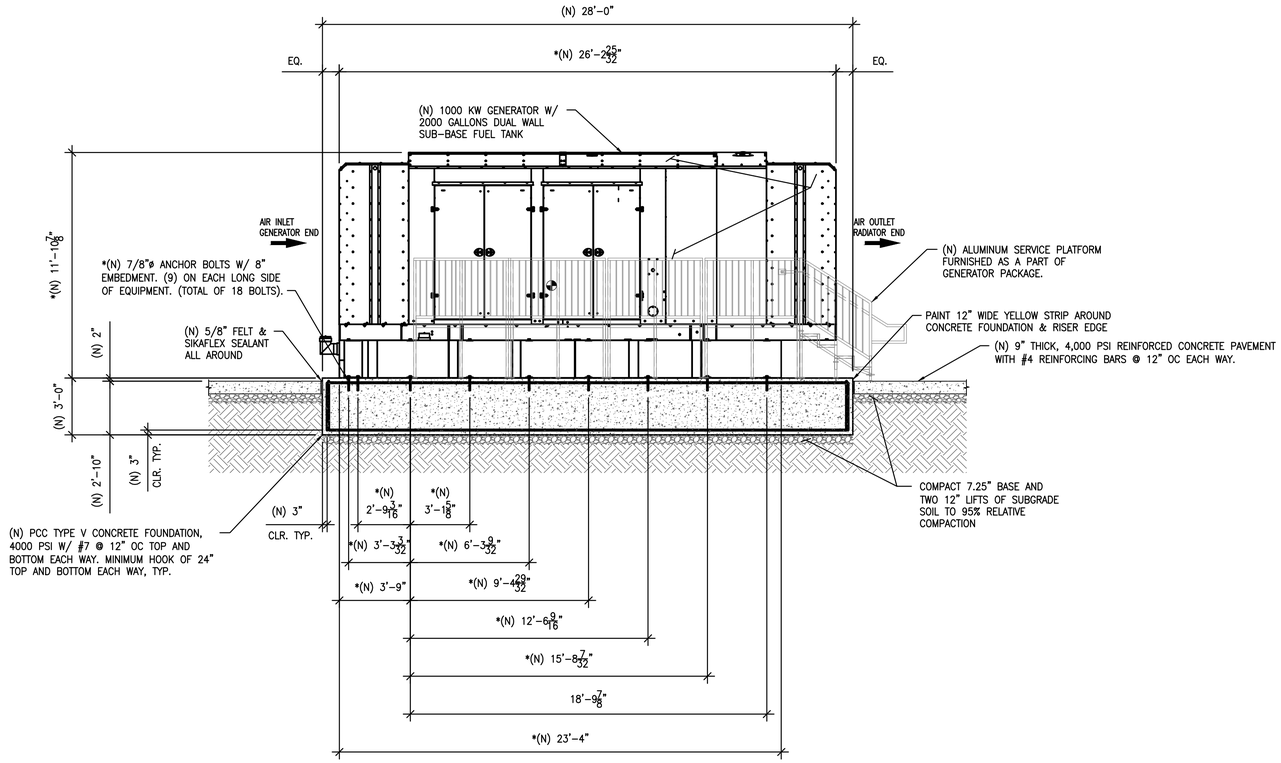
Sheet Title
NEW PLAN AT BATTERY-ELECTRIC-BUSES (BEBs)

Project
OCTA SANTA ANA BUS BASE
INSTALLATION OF BEB CHARGERS & ELEC. INFRASTR.
4301 WEST MACARTHUR BOULEVARD, SANTA ANA, CA

JOB #	1.19.6
DESIGN BY:	SDV
DRAWN BY:	TMP
CHECKED BY:	QV
DATE	03-07-2025
SCALE	AS NOTED
SHEET	SA-S104

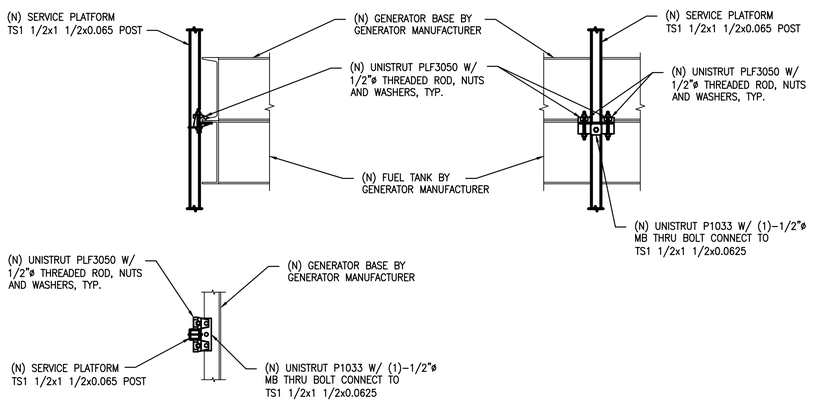
550 South Main Street
Orange, CA 92668
714/560/OCTA

OCTA

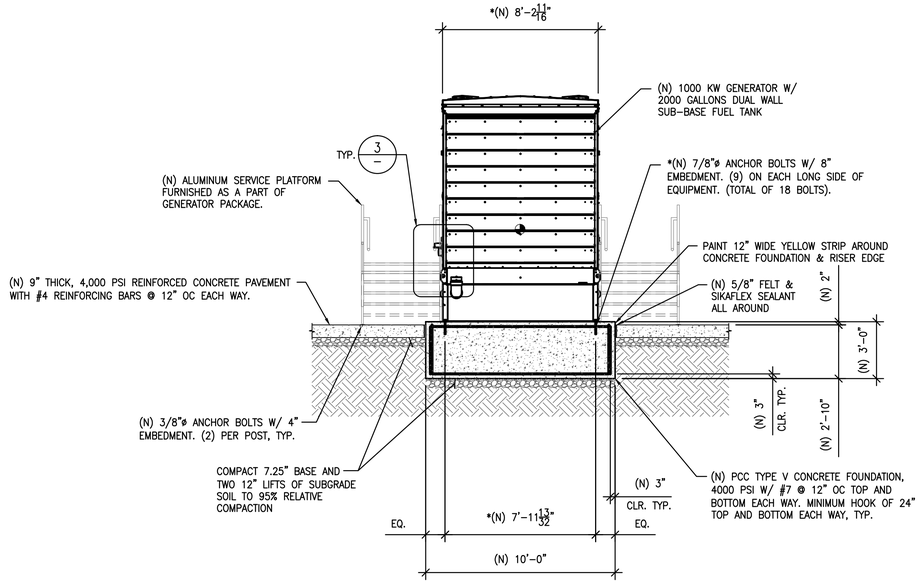


* CONTRACTOR SHALL COORDINATE WITH MANUFACTURER FOR EXACT EQUIPMENT DIMENSIONS, LOCATIONS AND NUMBER OF ANCHOR BOLTS.

GENERATOR ENCLOSURE AND DIESEL TANK MOUNTING DETAIL — SCALE 1/4"=1'-0" — 1



ATTACHMENT PLATFORM TO GENERATOR DETAILS — SCALE 1"=1'-0" — 3



* CONTRACTOR SHALL COORDINATE WITH MANUFACTURER FOR EXACT EQUIPMENT DIMENSIONS, LOCATIONS AND NUMBER OF ANCHOR BOLTS.

GENERATOR ENCLOSURE AND DIESEL SUB-BASE TANK MOUNTING DETAIL — SCALE 1/4"=1'-0" — 2

REGISTERED PROFESSIONAL ENGINEER — MIEN NGO — No. C58590 — EXP. 12-31-26 — CIVIL — STATE OF CALIFORNIA

DAHL, TAYLOR & ASSOCIATES
CONSULTING ENGINEERS
2960 DAHLER STREET
SANTA ANA, CALIFORNIA 92705
TEL: # (949) 756-8654
FAX: # (949) 502-0777

MARK	DATE	BY	REVISIONS

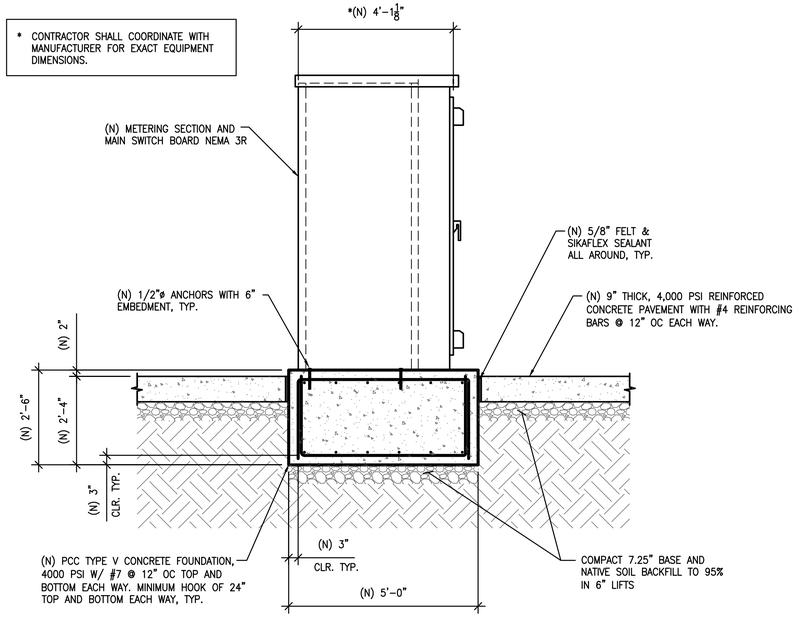
Sheet Title DETAILS AND SECTIONS

Project OCTA SANTA ANA BUS BASE
INSTALLATION OF BEB CHARGERS & ELEC. INFRASTR.
4301 WEST MACARTHUR BOULEVARD, SANTA ANA, CA

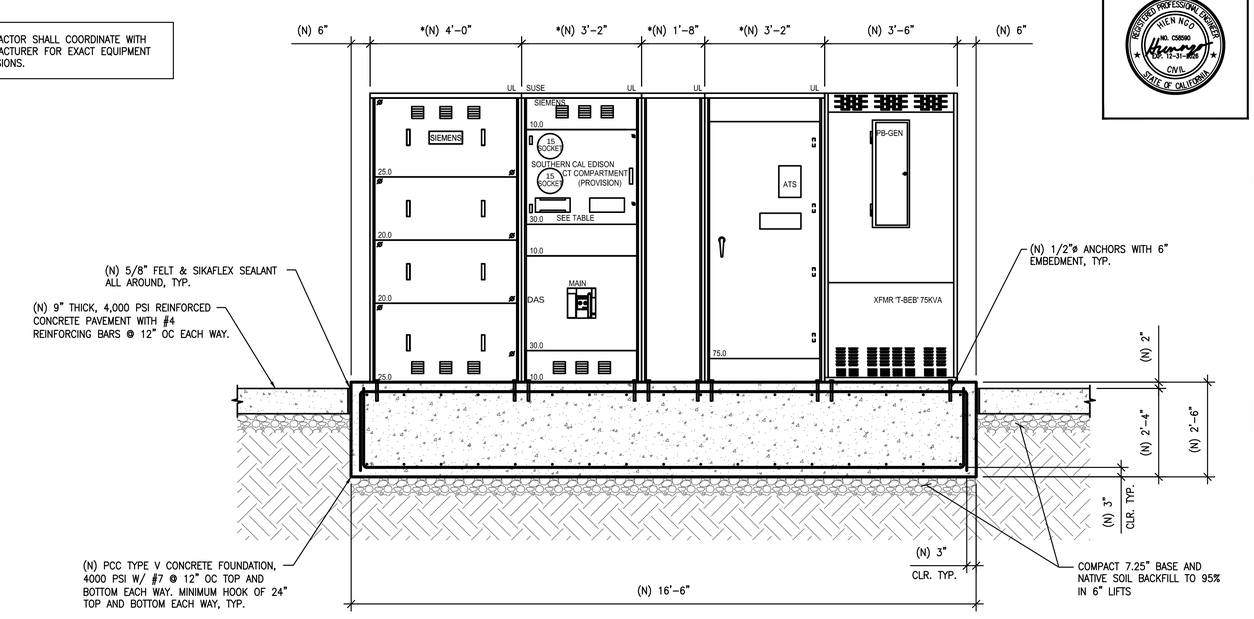
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DESIGN BY:	SDV
DRAWN BY:	TMP
CHECKED BY:	QV
DATE	03-07-2025
SCALE	AS NOTED
SHEET	SA-S501

550 South Main Street
Orange, CA 92668
714/560/OCTA

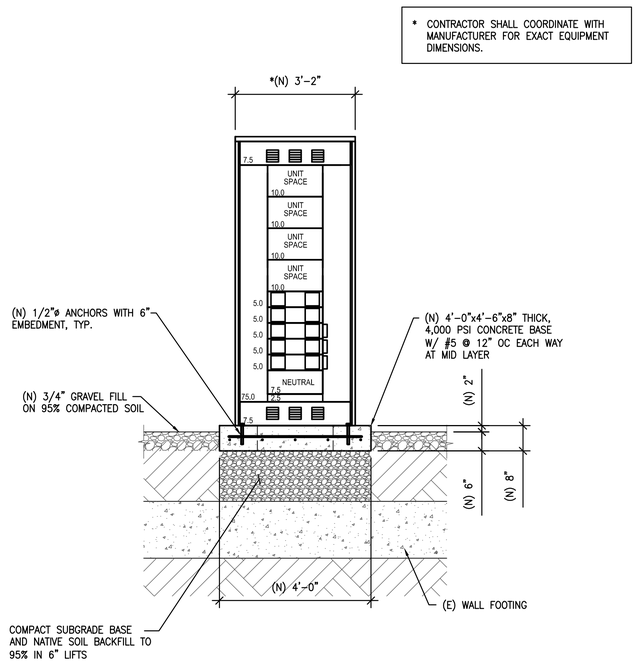
OCTA



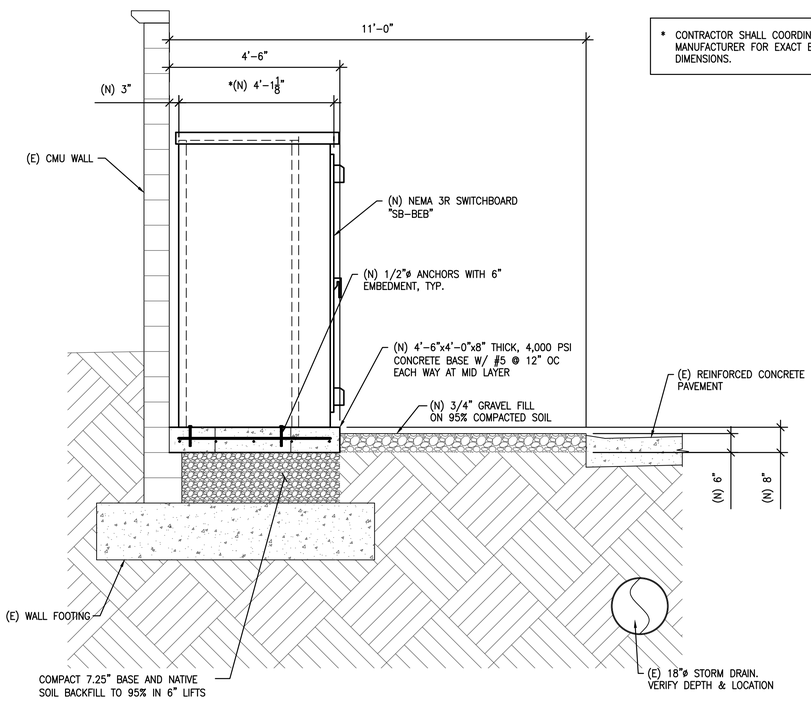
MAIN BEB SWITCHBOARD "MSB-BEB" MOUNTING DETAIL — SCALE 1/2"=1'-0" — 2



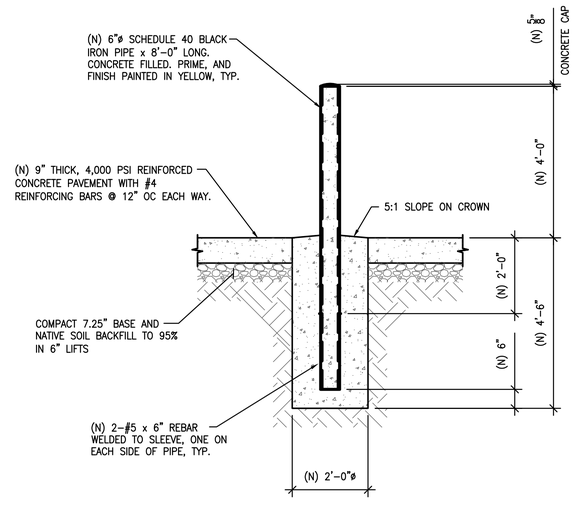
MAIN SWITCHBOARD "MSB-BEB" MOUNTING DETAIL — SCALE 1/2"=1'-0" — 1



BEB SWITCHBOARD "SB-BEB" MOUNTING DETAIL — SCALE 1/2"=1'-0" — 5



BEB SWITCHBOARD "SB-BEB" MOUNTING DETAIL — SCALE 1/2"=1'-0" — 4



BOLLARD DETAIL — SCALE 1/2"=1'-0" — 3

REGISTERED PROFESSIONAL ENGINEER — STEVEN M. DAHL — No. C58590 — 12-31-25 — CIVIL — STATE OF CALIFORNIA

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2960 DANLER STREET
SANTA ANA, CALIFORNIA 92705
TEL: ∮ (949) 756-8654
FAX: ∮ (949) 502-0777

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1			

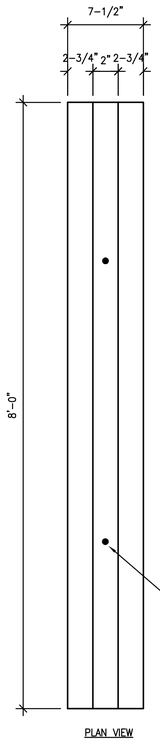
Sheet Title DETAILS AND SECTIONS

Project OCTA SANTA ANA BUS BASE
INSTALLATION OF BEB CHARGERS & ELEC. INFRASTR.
4301 WEST MACARTHUR BOULEVARD, SANTA ANA, CA

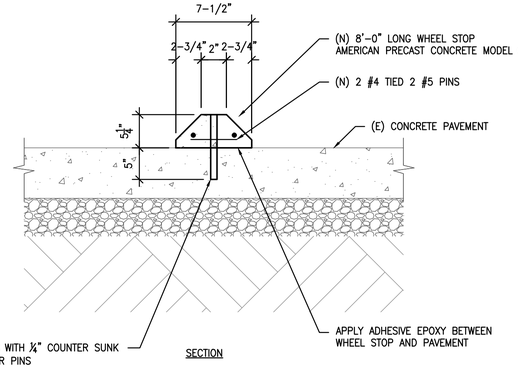
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SHEET	SA-S502

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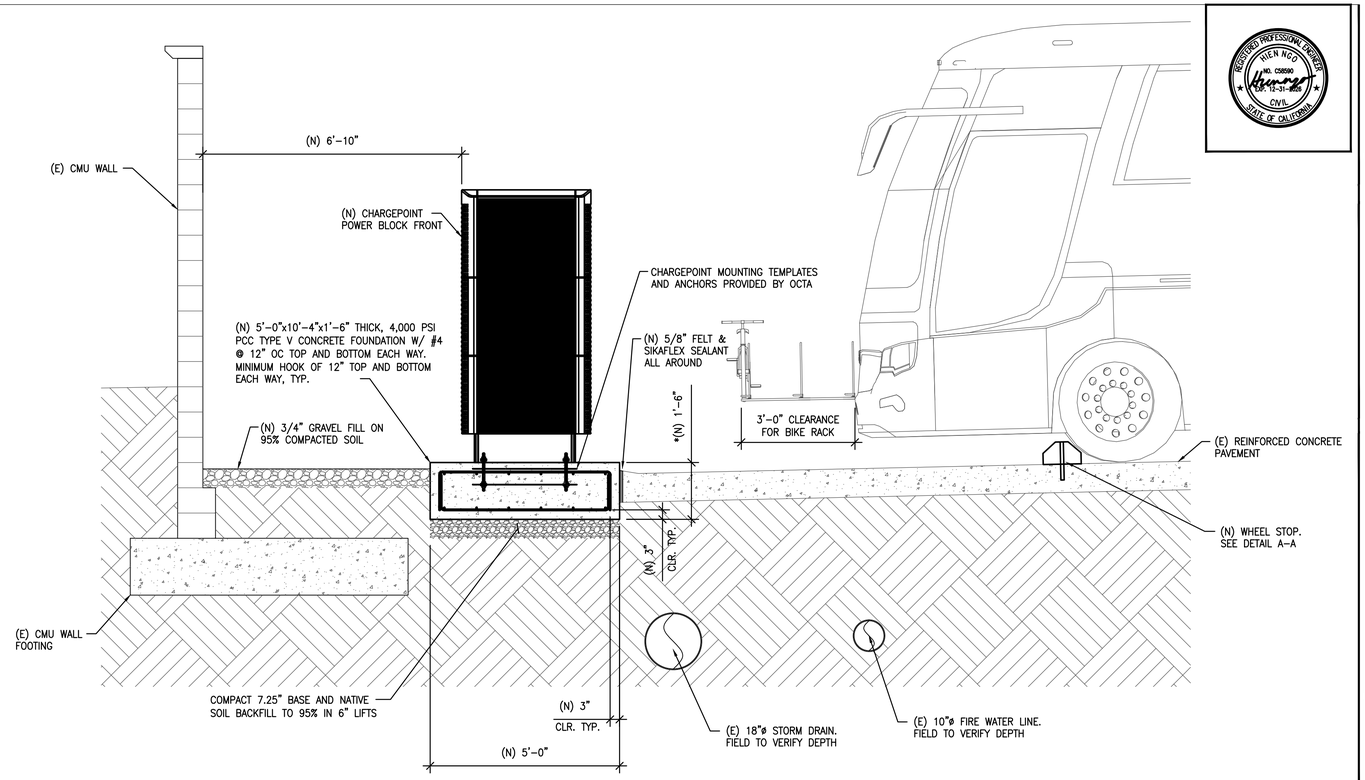


PLAN VIEW



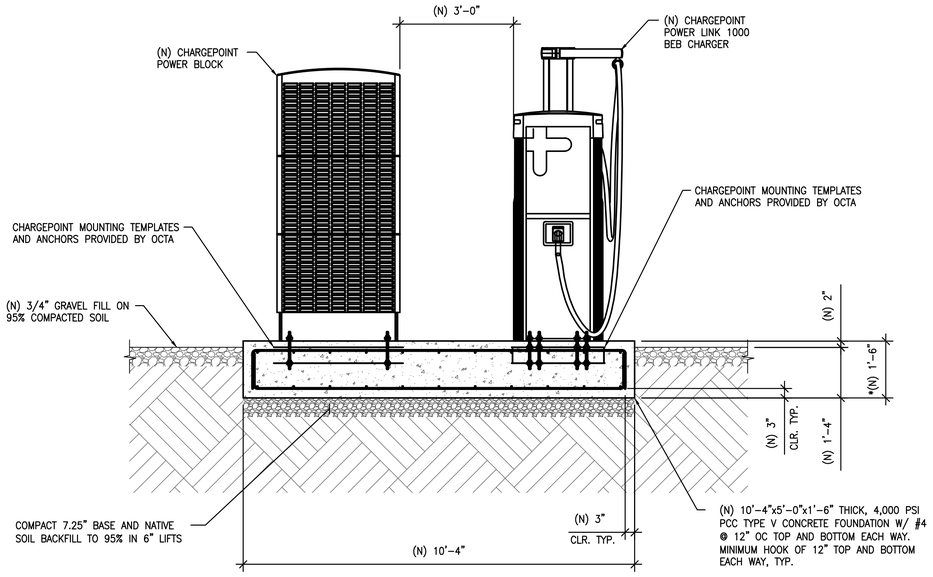
SECTION

DETAIL A–A



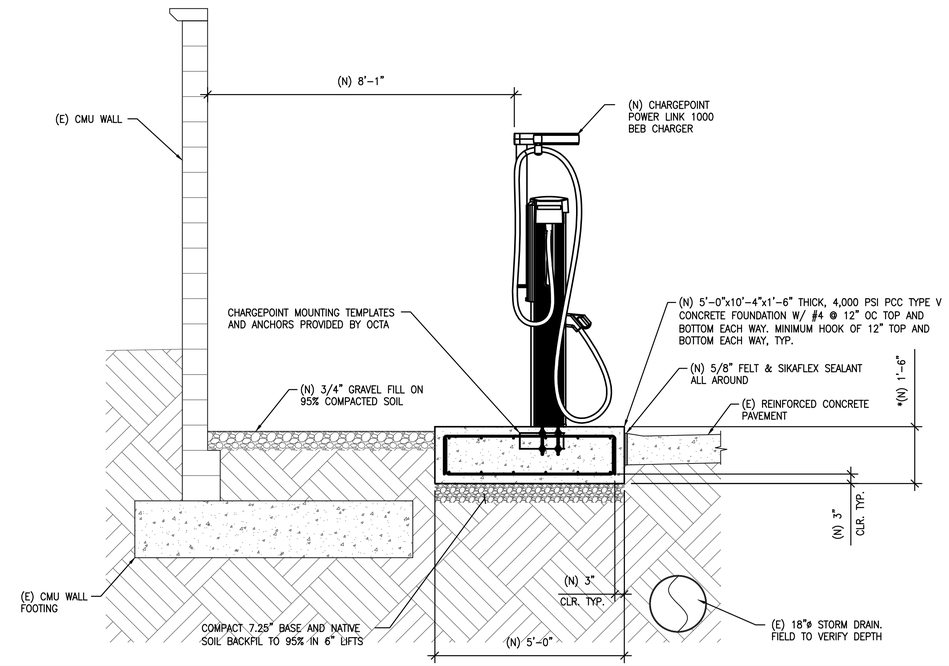
CHARGEPOINT POWER BLOCK MOUNTING DETAIL

SCALE 1/2"=1'-0" (1)



CHARGEPOINT POWER BLOCK & POWER LINK 1000 BEB CHARGER MOUNTING DETAIL

SCALE 1/2"=1'-0" (3)



CHARGEPOINT POWER LINK 1000 BEB CHARGER MOUNTING DETAIL

SCALE 1"=1'-0" (2)

REGISTERED PROFESSIONAL ENGINEER
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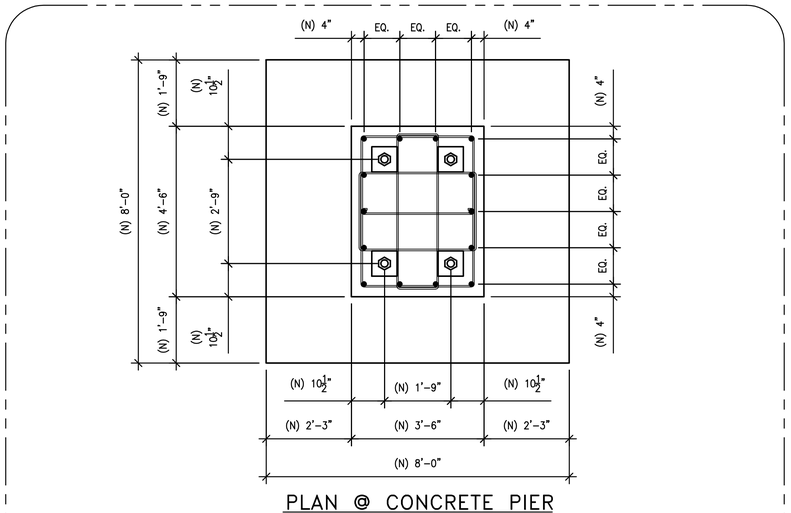
Sheet Title
DETAILS AND SECTIONS

Project
OCTA SANTA ANA BUS BASE
INSTALLATION OF BEB CHARGERS & ELEC. INFRASTR.
4301 WEST MACARTHUR BOULEVARD, SANTA ANA, CA

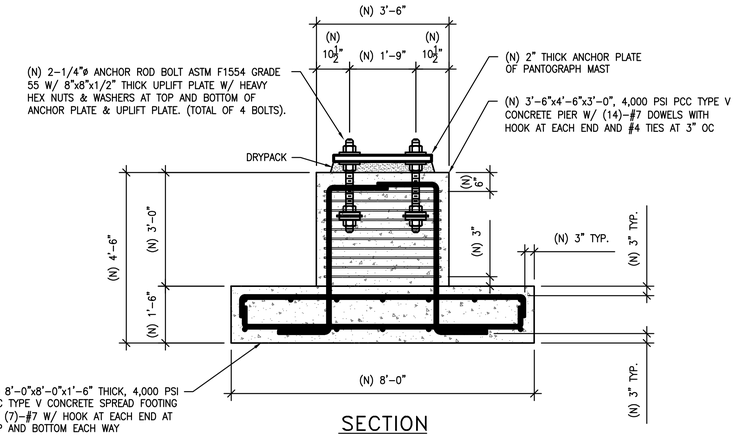
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SHEET	SA-S503

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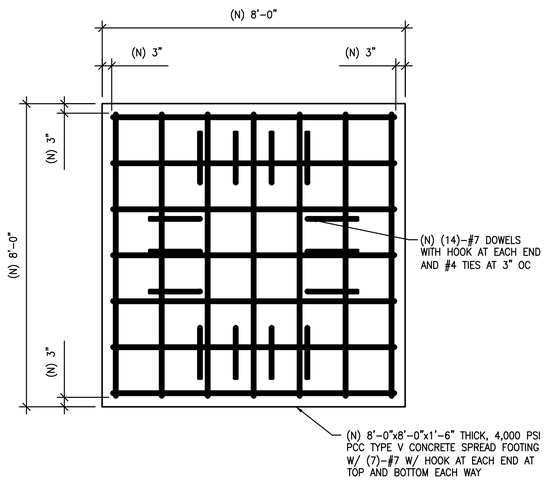
OCTA



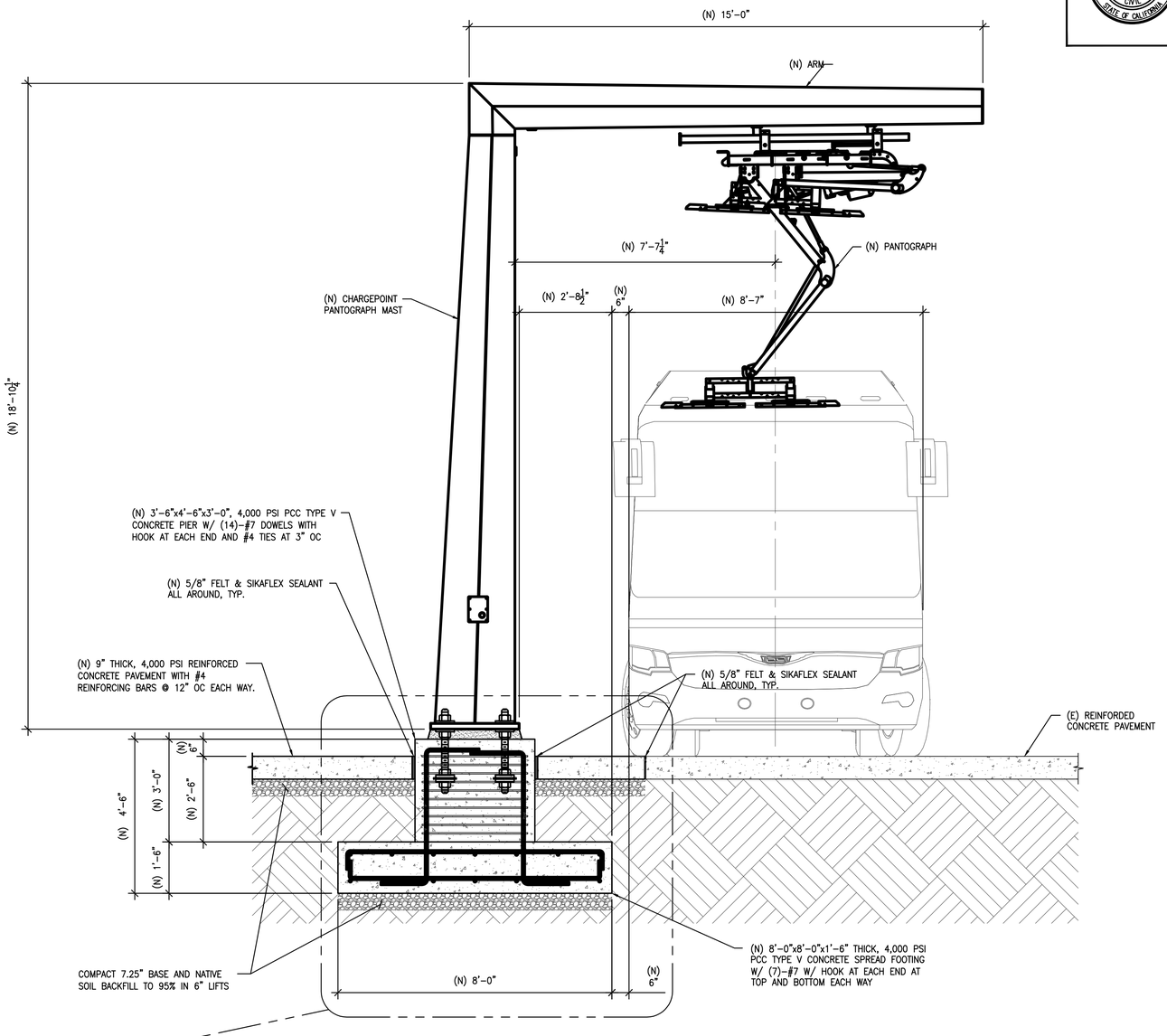
PLAN @ CONCRETE PIER



SECTION



PLAN @ SPREAD FOOTING



CHARGEPOINT PANTOGRAPH BEB CHARGER MOUNTING DETAIL

SCALE 1/2"=1'-0" 1

REGISTERED PROFESSIONAL ENGINEER — NIEN NGO — No. C58590 — 12-31-25 — CIVIL — STATE OF CALIFORNIA

DAHL, TAYLOR & ASSOCIATES
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2960 DAHLER STREET
SANTA ANA, CALIFORNIA 92705
TEL: # (949) 756-8654
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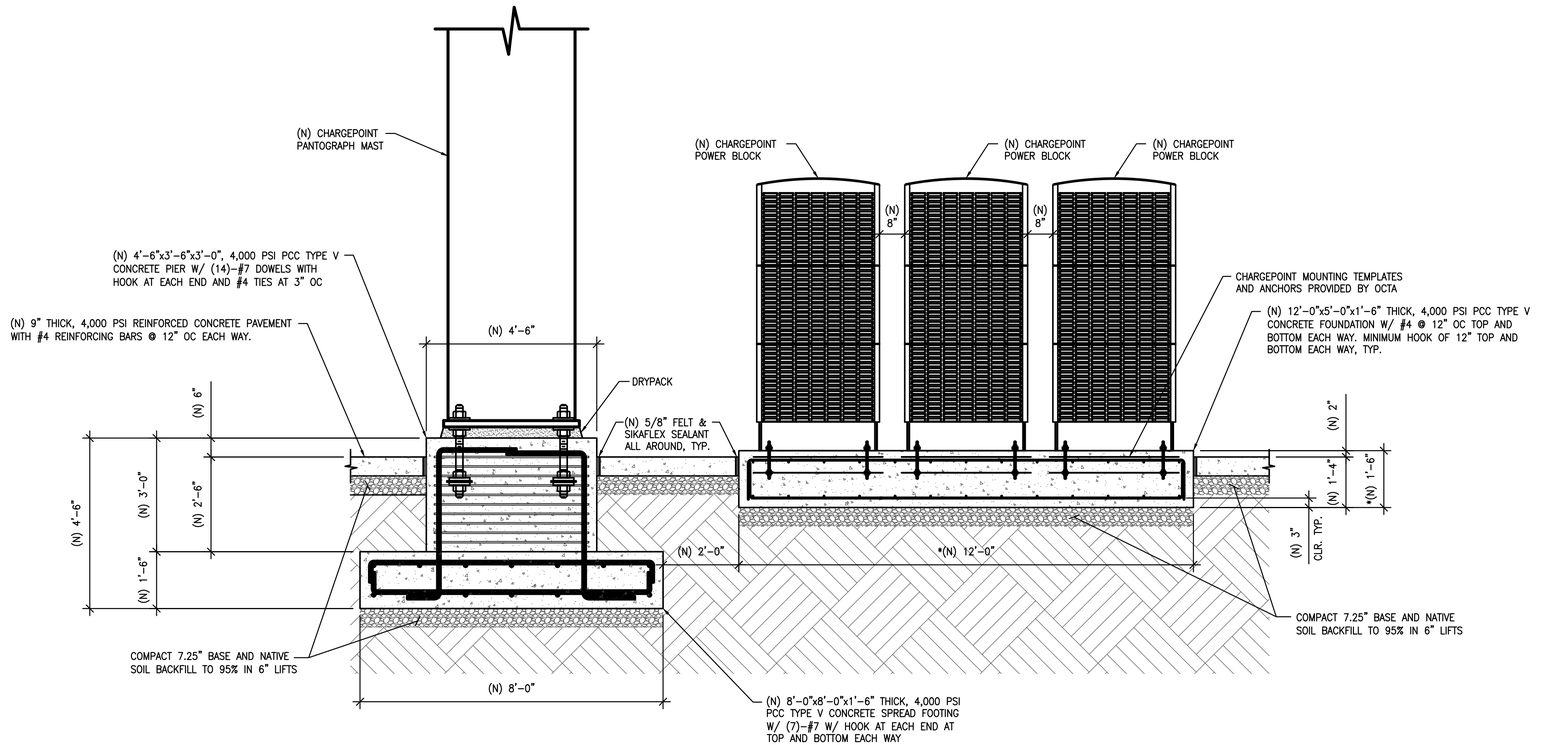
Sheet Title
BEB PANTOGRAPH CHARGER MOUNTING DETAIL

Project
OCTA SANTA ANA BUS BASE
INSTALLATION OF BEB CHARGERS & ELEC. INFRASTR.
4301 WEST MACARTHUR BOULEVARD, SANTA ANA, CA

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SCALE	AS NOTED
SHEET	SA-S504

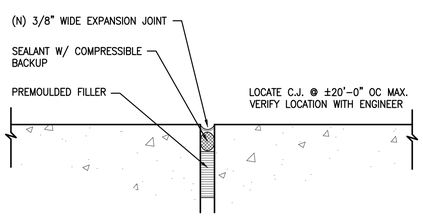
550 South Main Street
Orange, CA 92668
714/560/OCTA

OCTA

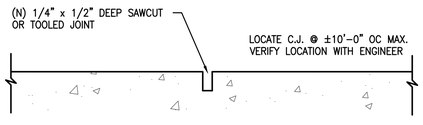


CHARGEPOINT PANTOGRAPH BEB CHARGER MOUNTING DETAIL

SCALE 1/2"=1'-0" — 1



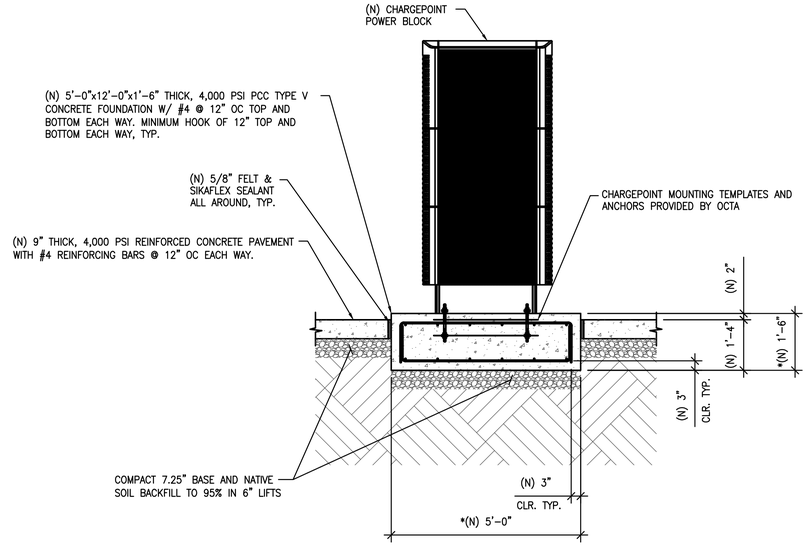
EXPANSION JOINT



CONTROL JOINT

CONSTRUCTION JOINT DETAIL

SCALE NONE — 3



CHARGEPOINT POWER BLOCK MOUNTING DETAIL

SCALE 1/2"=1'-0" — 2

REGISTERED PROFESSIONAL ENGINEER — HIEN NGO — No. C58590 — 12-31-25 — CIVIL — STATE OF CALIFORNIA

DAHL, TAYLOR & ASSOCIATES
CONSULTING ENGINEERS
2960 DAIMLER STREET
SANTA ANA, CALIFORNIA 92705
TEL: # (949) 756-8654
FAX: # (949) 502-0777

MARK	DATE	BY	REVISIONS

Sheet Title: DETAILS AND SECTIONS

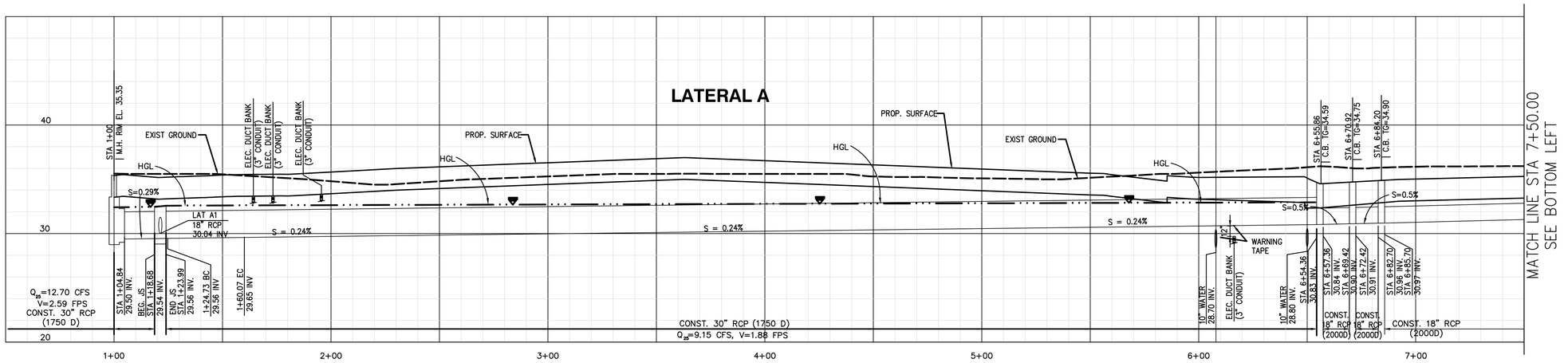
Project: OCTA SANTA ANA BUS BASE
INSTALLATION OF BEB CHARGERS & ELEC. INFRASTR.
4301 WEST MACARTHUR BOULEVARD, SANTA ANA, CA

JOB #	1.19.6
DESIGN BY:	SDV
DRAWN BY:	TMP
CHECKED BY:	QV
DATE	03-07-2025
SCALE	AS NOTED
SHEET	SA-S505

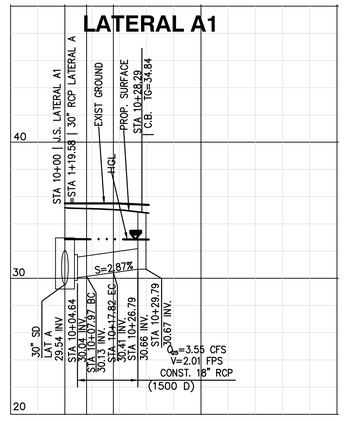
550 South Main Street
Orange, CA 92668
714/560/OCTA

OCTA

LATERAL A

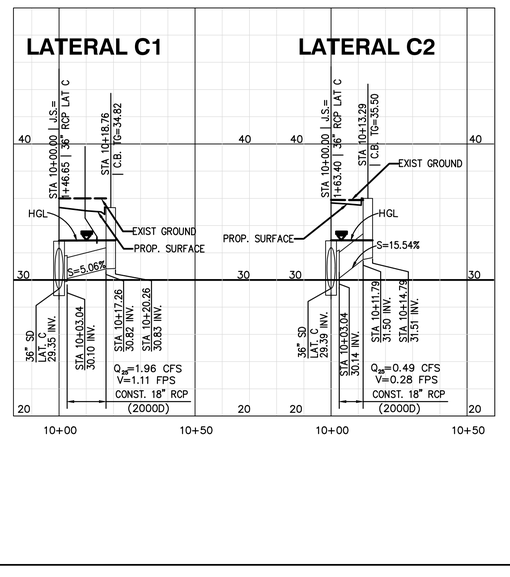


LATERAL A1

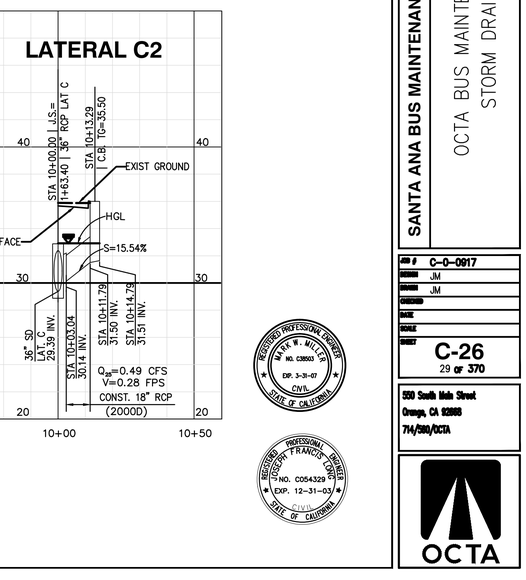


LATERAL B

LATERAL C1



LATERAL C2



PROFILE SCALE
HORIZONTAL 1" = 20'
VERTICAL 1" = 4'

REGISTERED PROFESSIONAL ENGINEER
MARK W. MILLER
NO. C38503
EXP. 3-31-07
CIVIL
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
JOSEPH FRANCIS LOMBARDO
NO. C054329
EXP. 12-31-05
CIVIL
STATE OF CALIFORNIA

BOYLE ENGINEERING CORPORATION
1501 Quail Street
Newport Beach, California 92660
949-476-3300

MARK	DATE	REVISIONS	BY
C	9/21/04	–	JP
B	7/02/04	–	
A	7/02/04	–	

REVISED FOR RE-BID

SANTA ANA BUS MAINTENANCE AND OPERATIONS BASE

OCTA BUS MAINTENANCE FACILITY
STORM DRAIN PROFILES

JOB #	C-0-0917
DESIGNED	JM
DRAWN	JM
CHECKED	
DATE	
SCALE	
SHEET	C-26
	29 OF 370

550 South Main Street
Orange, CA 92868
714/560/OCTA

OCTA

DSN: LI:\OCTA\1.2.2.2 (OCS) 08 Bus Maint. Fac\08-Drawings\Levels And MDB Generated\C-26 OCTA Storm Drain Profiles.dwg HERB. ASHMUS
DATE: Mar 08, 2005 7:50am
PRINTED: 03/08/05

SECTION VIII: LEVEL 3 HEALTH, SAFETY AND ENVIRONMENTAL SPECIFICATIONS – EXHIBIT H

LEVEL 3 HEALTH, SAFETY AND ENVIRONMENTAL (HSE) SPECIFICATIONS

REQUIRED HSE SUBMITTAL SUMMARY

The contractor shall submit copies of the items listed below for contract scope work on OCTA projects and property. Copies shall be provided prior to contractor's mobilization onto OCTA projects and property. Contractor shall provide compliant written Health, Safety & Environmental (HSE) submittals within 30 days of the contract notice to proceed.

HSE submittals shall comply with the 1988 Drug Free Workplace Act, or the Department of Transportation (DOT), or the Federal Transportation Administration (FTA) requirements (according to OCTA procurement funding guidelines) and comply with the California Code of Regulations (CCR) Title 8 regulatory standards.

Contractor's established written programs/plans shall comply with CCR Title 8 regulatory standards. All HSE related programs/plans submitted to OCTA for acceptance shall be prepared and submitted by a qualified HSE professional who is recognized by an organization of industry standard (i.e., CSP, CIH, CHST, CHMM, etc.) and is experienced in developing compliant written HSE programs. The site safety HSE representative shall participate in the HSE submittal process.

1. Contractor shall provide a copy of Company's Injury Illness Prevention Program in accordance with CCR Title 8, Section 3203.

2. Contractor shall provide a copy of their Company HSE Policy/Procedure Manual, in compliance with CCR Title 8 Standards for awarded scope.

3. Contractor shall provide a copy of their Policy or Substance Abuse Prevention Program.

4. Contractor shall provide a copy of their Hazard Communication Program and MSDS Management Program in compliance with CCR Title 8, Section 5194, Hazard Communication Standard.

5. On-Site HSE Representative:
   On Facility Modification Projects, The Contractor shall submit a resume of the designated on-site qualified HSE Representative. The HSE Representative shall possess a current certification from the Board of Certified Safety Professionals (BCSP), plus five (5) years construction or scope agreement HSE experience enforcing HSE compliance on heavy or industrial construction project sites, the last two years of which have been administering HSE in the construction or scope discipline for which the Contractor is contracting with the Authority. The designated HSE Representative shall participate in all HSE related submittals through completion of scope.

   On Capital Programs, The Contractor's on-site qualified HSE Representative shall be a Certified Safety Professional (CSP) with current standing from the Board of Certified Safety Professionals (BCSP) or a Construction Health and Safety Technician (CHST) with current standing from the (BCSP) or a Certified Industrial Hygienist (CIH) with current standing from the American Board of Industrial Hygiene (ABIH), or an equal professional HSE Certificate of standing from The National Examination Board in Occupational Safety and Health (NEBOSH), that is

acceptable to the Authority. The Contractor's on-site HSE Representative(s) shall provide a resume and have a minimum of seven (7) years heavy construction experience in administering HSE programs on heavy construction project sites, the last two years of which have been administering HSE in the construction/scope discipline for which Contractor is contracting with the Authority.

6. A Detailed Site Specific HSE Work Implementation Plan:
   This plan shall be prepared and submitted by a recognized HSE professional experienced in developing compliant written HSE programs. Indicate the methods and procedures, and include the sequence of tasks as listed on the project schedule, include the hazards, tools and equipment, and the safe work practices to mitigate the hazards in a format acceptable OCTA. Specify safety measures in accordance with applicable Cal/OSHA standards, South Coast Air Quality Management District (SCAQMD) rules, National Fire Protection Association (NFPA), National Electric Code (NEC), American National Standards Institute (ANSI) codes and regulations, job hazard analysis, policies, procedures, HSE training requirements and known and potential hazards of Contractor's scope. Plans shall be prepared as specified above, and may require if necessary a professional engineer licensed to practice in the state of California, when so required by the provisions of the California Board for Professional Engineer and Surveyors.

PART I – GENERAL

1.0 GENERAL HEALTH, SAFETY AND ENVIRONMENTAL REQUIREMENTS

A. The Contractor, its subcontractors, suppliers, and employees have the obligation to comply with all Authority health, safety and environmental compliance department (HSEC) requirements of this safety specification, project site requirements, and bus yard safety rules, as well as all federal, state, and local regulations pertaining to scope of work or agreements with the Authority including California Department of Transportation safety requirements and special provisions. Additionally, manufacturer requirements are considered incorporated by reference, as applicable, to this scope of work.

B. Observance of unsafe acts or conditions, serious violation of health and safety standards, non-conformance of Authority HSEC requirements, or disregard for the intent of these safety specifications to protect people and property, by Contractor may be reason for termination of scope or agreements with the Authority, at the sole discretion of the Authority.

C. The Authority HSEC requirements, and references contained within this scope of work shall not be considered all-inclusive as to the hazards that might be encountered. Safe work practices shall be pre-planned and performed, and safe conditions shall be maintained during the course of this work scope.

D. The Contractor shall specifically acknowledge that it has primary responsibility to prevent and correct all health, safety and environmental hazards for which it and its employees, or its subcontractors (and their employees) are responsible. The Contractor shall further acknowledge their expertise in recognition and prevention of hazards in the operations for which they are responsible, that the Authority may not have such expertise, and is relying upon the Contractor for

such expertise. The Authority retains the right to notify the Contractor of potential hazards and request the Contractor to evaluate and, as necessary, to eliminate those hazards.

E. The Contractor shall provide all necessary tools, equipment, and related safety protective devices to execute the scope of work in compliance with the Authority's HSEC requirements, CCR Title 8 Standards, and recognized safe work practices.

F. The Contractor shall instruct all its employees, and all associated sub-contractors under contract with the Contractor who works on Authority projects in the following; recognition, identification, and avoidance of unsafe acts and/or conditions applicable to its work.

PART II – SPECIFIC REQUIREMENTS

2.0 While these safety specifications are intended to promote safe work practices, Contractors are reminded of their obligation to comply with all federal (Code of Federal Regulations (CFR) Sections 1926 & 1910 Standards), state (CCR Title 8 Standards), local and municipal safety regulations, and Authority health, safety and environmental requirements applicable to their project scope. Failure to comply with these standards may be cause for termination of scope or agreements with the Authority, at the sole discretion of the Authority.

2.1 REQUIRED DOCUMENTATION / REPORTING REQUIREMENTS

The Contractor at a minimum shall provide the following documents to the Authority's Project Manager. Items A through E below shall be submitted and accepted by the Authority's Project Manager prior to Contractor mobilization. Item F upon each occurrence, and for items G through K, contractor shall verify the following documentation is in place, prior to and during contract scope and make the same available to the Authority upon request within 72 hours.

Contractor's established written programs/plans shall comply with CCR Title 8 regulatory standards. All new programs/plans shall be prepared and submitted by a qualified HSE professional who is recognized by an organization of industry standard (i.e., CSP, CIH, CHST, STS, CHMM, etc.) and is experienced in developing compliant written HSE programs. The site safety HSE representative shall participate in the scope submittal process.

A. A Comprehensive Project Specific Health, Safety, and Environmental (HSE) Work Plan.

a. The Contractor shall develop a site project plan that may include, but is not limited to: Permits, Evacuation, Emergency Plan, Roles and Responsibilities, Scope and Construction Activity Details, Constructability Review, Contractor Coordination Process, Safe Work Methods, Hazard Identification & Risk Control, First Aid and Injury Management, Emergency Procedures, Public Protection, Authority and Contractor Site Rules, Incident Reporting and Investigation, Specialized Work or Licensing, Training and Orientation Requirements, Chemical Management, and Subcontractor Management.

b. A Detailed Site Specific HSE Implementation Plan: This plan shall be prepared and submitted by a recognized HSE professional (current BCSP Certification in good standing, i.e., CSP, CHST, OHST) experienced in developing compliant written HSE programs, acceptable to OCTA. Indicate the methods and procedures, and include the sequence of tasks as listed on the project schedule, include the hazards, tools and equipment, and the safe work practices to mitigate the hazards in a format acceptable OCTA. Specify safety measures in accordance with applicable Cal/OSHA standards, SCAQMD rules, NFPA, NEC, ANSI codes and regulations, job hazard analysis, policies, procedures, HSE training requirements and known and potential hazards of Contractor's scope. Plans shall be prepared as specified above, and may require if necessary a professional engineer licensed to practice in the state of California, when so required by the provisions of the California Board for Professional Engineer and Surveyors.

B. Contractor shall provide a copy of their Company HSE Policy/Procedure Manual, in compliance with CCR Title 8 Standards for awarded scope.

C. Contractor shall provide a copy of Company's Injury Illness Prevention Program in accordance with CCR Title 8, Section 3203.

D. Contractor shall provide a copy of their Policy or Substance Abuse Prevention Program that complies with the 1988 Drug Free Workplace Act.

E. Contractor shall provide the resume and qualifications/certifications of assigned project designated Onsite HSE Representative for this scope as identified in section 2.3 of this specification.

F. Accident/Incident investigation report within 24 hours of event (immediate verbal notification to Authority Project Manager, followed by Written Report).

The following required documentation shall be provided to the Authority's Project Manager, upon Authority request, within 72 hours.

G. A copy of Contractor weekly site safety inspection report with status of corrections, upon request, within 72 hours.

H. Contractor shall provide a copy of the Contractors and subcontractors competent person list (submit to Authority Project Manager, upon Authority request, within 72 hours).

I. Contractors and subcontractors training records for qualified equipment operators, electrical worker certification (NFPA 70E), confined space training, HAZWOPER training, and similar personnel safety training certificates as applicable to the agreement scope and as requested by the OCTA Project Manager and/or HSEC department, upon Authority request, within 72 hours and prior to starting or during the scope activity (submit to Project Manager).

J. A monthly report that includes number of workers on project, a list of subcontractors, work hours (month, year to date, & project cumulative) of each contractor, labor designation, OSHA Recordable injuries and illnesses

segregated by medical treatment cases, restricted workday cases, number of restricted days, lost workday cases, and number of lost work days, and recordable incident rate. Contractor shall provide to the Authority, upon request, within 72 hours.

K. TRAINING DOCUMENTATION

To ensure that each employee is qualified to perform their assigned work, when applicable to scope work, Contractor shall verify training documentation is in place, prior to and during contract scope, and make available to the Authority, upon request, within 72 hours. Training may be required by the Authority or CCR Title 8 Standards and required for activity on Authority's property and/or Authority projects. Contractor shall provide to Authority, upon request, within 72 hours.

2.2 HAZARD COMMUNICATION (CCR Title 8, Section 5194)

A. Contractor shall comply with CCR Title 8, Section 5194 Hazard Communication Standard. Prior to chemical use on Authority property and/or project work areas the Contractor shall provide to the Authority Project Manager copies of Material Safety Data Sheet (MSDS) for all applicable products used, if any.

B. All chemicals including paint, solvents, detergents and similar substances shall comply with SCAQMD Rules 103, 1113, and 1171.

2.3 DESIGNATED HEALTH, SAFETY, ENVIRONMENTAL (HSE) REPRESENTATIVE

A. Before beginning on-site activities, the Contractor shall designate an On-site HSE Representative. This person shall be a Competent or Qualified Individual as defined by the Occupational, Safety, and Health Administration (OSHA), familiar with applicable CCR Title 8 Standards, and has the authority to affect changes in work procedures that may have associated cost, schedule and budget impacts.

B. The Contractor's on-site qualified HSE Representative for all Authority projects is subject to acceptance by the Authority Project Manager and the HSEC Department Manager. All contact information of the On-site HSE Representative (name, phone, and fax and pager/cell phone number) shall be provided to the Authority Project Manager.

QUALIFICATIONS – <u>On Capital Programs</u>, the Contractor shall submit a resume of the full time, on-site qualified HSE Representative(s) who reports directly to the Contractor's Project Manager or Superintendent, and who is responsible for HSE oversight for field operations on the project no later than ten (10) days after receipt of Notice to Proceed, and prior to mobilization. The Contractor's On-site HSE Representative(s) shall have a minimum of seven (7) years heavy construction experience in administering HSE programs on heavy construction project sites, the last two years of which have been administering HSE in the construction discipline for which Contractor is contracting with the Authority. The Contractor's On-site HSE Representative shall be a Certified Safety Professional (CSP) with current standing from the Board of Certified Safety Professionals (BCSP), or a Construction Health and Safety Technician (CHST) with current

standing from the BCSP or a Certified Industrial Hygienist (CIH) with current standing from the American Board of Industrial Hygiene (ABIH), or an equal professional HSE Certificate of standing from The National Examination Board in Occupational Safety and Health **(**NEBOSH), that is acceptable to the Authority. The Contractor's On-site HSE Representatives(s) shall be on site during all operational hours. The On-site HSE Representative(s) shall set up, carry forward and aggressively and effectively maintain the project specific safety program and IIPP covering all phases of the work. If at any time the Contractor wishes to replace their On-site HSE Representative(s), the Contractor must provide written notice thirty (30) days prior to change of personnel to the Authority. The Contractor shall take all precautions and follow all procedures for the safety of, and shall provide all protection to prevent injury to, all persons involved in any way in the scope work and all other persons, including, without limitation, the employees, agents, guests, visitors, invitees and licensees of the Authority who may be involved. This requirement applies continuously and is not limited to normal working hours. The designated HSE Representative shall participate in all HSE related submittals. The Authority reserves the right to allow for an exception to modify these minimum qualification requirements for unforeseen circumstances, at the sole discretion of the Authority Project Manager and HSEC Department Manager.

On Facility Modification Projects, the Contractor shall submit a resume of the full time qualified on-site HSE Representative who reports directly to the Contractor's Project Manager or Superintendent, and who is responsible for safety oversight for field operations on the project no later than ten (10) days after receipt of Notice to Proceed, and prior to mobilization. The Contractor's On-Site HSE Representative shall hold a current certification from the BCSP, plus five (5) years construction or scope HSE experience enforcing HSE compliance on heavy construction or industrial construction project sites, the last two years of which have been administering HSE in the construction or scope discipline for which Contractor is contracting with the Authority. The Contractor's On-site HSE Representative(s) shall be on site during all operational hours. The designated HSE Representative shall participate in all HSE related submittals. The Authority reserves the right to allow for an exception and to modify these minimum qualification requirements for unforeseen circumstances, at the sole discretion of the Authority Project Manager and HSEC Department Manager.

1. Capital Programs may include, but are not limited to, projects involving demolition and construction of; heavy construction, rail projects, highway projects, parking lots and structures, fuel stations, building construction, facility modifications, bus base construction, EPA/DTSC remediation, AQMD air or soil monitoring, fuel tank removal or modification, major bus base modifications, handling potential hazardous waste projects, and similar projects as deemed a Capital Program at the sole discretion by the Authority.

2. Facility Modification Projects may include, but are not limited to, projects involving minor demolition and construction or improvement projects for transportation centers, bus base sites and/or building modifications, equipment and/or building upgrades, and similar projects as deemed a Facility Modification Project at the sole discretion by the Authority.

3. Competent Individual means an individual who is capable of identifying existing and predictable hazards in the surroundings or working conditions

which are unsanitary, hazardous, or dangerous to employees and/or property, and who has authorization to take prompt corrective measures to eliminate them.

4. Qualified Individual means an individual who by possession of a recognized degree, certificate, certification or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his/her ability to solve or resolve problems relating to the subject matter, the work, or the project.

C. The Contractor shall designate a Competent Individual for each task, as required by Cal-OSHA standards or laws. The task Competent Individual shall be responsible for the prevention of accidents. If the Authority or any public agency with jurisdiction notifies the Contractor of any claimed dangerous condition at the site that is within the Contractor's care, custody or control, the Contractor shall take immediate action to rectify the condition at no additional cost to the Authority. The Contractor shall be responsible for the payment of all fines levied against the Authority for deficiencies relating to the Contractor's supervision or conduct and/or control of the scope agreement.

D. On Facility Modification Projects, the Authority Project Manager reserves the right to require the Contractor to provide one additional full-time safety representative with qualifications as identified in section 2.3 (C), above whenever the number of individuals from the Contractor, its subcontractors, suppliers, and vendors meets or exceeds 15 workers, there are multiple scope work sites, or as warranted by the scope of work at the sole discretion by the Authority.

E. On Capital Programs, the Authority's Project Manager reserves the right to require the Contractor to provide one additional full-time safety representative with qualifications as identified in item 2.3 (C) above whenever the number of individuals from the Contractor, its subcontractors, suppliers, and vendors meets or exceeds 50 workers, or is warranted by the scope of work.

2.4 SITE HSE ORIENTATION

The Contractor shall conduct and document a project site safety orientation for all Contractor personnel, subcontractors, suppliers, vendors, and new employees assigned to the project prior to performing any work on Authority projects, a copy of the HSE orientation attendance list shall be provided to the Authority Project Manager. The safety orientation, at a minimum, shall include, as applicable, Personal Protection Equipment (PPE) requirements, eye protection, ANSI class 2 reflective vests, designated smoking, eating, and parking areas, traffic speed limit and routing, cell phone policy, and barricade requirements. When required by scope, additional orientation shall include fall protection, energy isolation lock-out/tag-out (LOTO), confined space, hot work permit, security requirements, and similar project safety requirements.

2.5 INCIDENT NOTIFICATION AND INVESTIGATION

A. The Authority shall be promptly notified of any of the following types of incidents:

1. Damage to Authority property (or incidents involving third party property damage);

2. Reportable and/or recordable injuries (as defined by the U. S. Occupational Safety and Health Administration);

3. Incidents impacting the environment, i.e. spills or releases on Authority property.

B. Notifications shall be made to Authority representatives, employees and/or agents. This includes incidents occurring to contractors, vendors, visitors, or members of the general public that arise from the performance of Authority contract work. An initial immediate verbal notification, followed by a written incident investigation report shall be submitted to Authority's Project Manager within 24 hours of the incident.

   A final written incident investigative report shall be submitted within seven (7) calendar days, and include the following information. The current status of anyone injured, photos of the incident area, detailed description of what happened, the contributing factors that led to the incident occurrence, a copy of the company policy or procedure associated with the incident and evaluation of effectiveness, copy of the task planning documentation, copy of the Physician's first report of injury, updated OSHA 300 Log, and the corrective action initiated to prevent recurrence. This information shall be considered the minimum elements required for a comprehensive incident report acceptable to OCTA.

C. A Serious Injury, Serious Incident, OSHA Recordable Injury / Illness, or Significant Near Miss shall require a formal incident review at the discretion of the Authority's Project Manager. The incident review shall be conducted within seven (7) calendar days of the incident. This review shall require a senior executive from the Contractors' organization to participate in the presentation. The serious incident presentation shall include action taken for the welfare of the injured, a status report of the injured, causation factors leading to the incident, a root cause analysis, and a detailed recovery plan that identifies corrective actions to prevent a similar incident, and actions to enhance safety awareness.

   1. Serious Injury: includes an injury or illness to one or more employees, occurring in a place of employment or in connection with any employment, which requires inpatient hospitalization for a period in excess of twenty-four hours for other than medical observation, or in which an employee suffers the loss of any member of the body, or suffers any serious degree of physical disfigurement.

   2. Serious Incident: includes property damage of $500.00 or more, an incident requiring emergency services (local fire, paramedics and ambulance response), news media or OCTA media relations response, and/or incidents involving other agencies (Cal/OSHA, EPA, AQMD, DTSC, etc.) notification or representation.

   3. OSHA Recordable Injury / Illness: includes and injury / illness resulting in medical treatment beyond First Aid, an injury / illness which requires restricted duty, or an injury / illness resulting in days away from work.

4. Significant Near Miss Incident; includes incidents where no property was damaged and no personal injury sustained, but where, given a slight shift in time or position, damage and/or injury easily could have occurred.

2.6 REGULAR INSPECTIONS & THIRD PARTY INSPECTIONS

A. Frequent and regular inspections of the project jobsite shall be made by the Contractor's On-site HSE Representative, or another Competent Individual designated by the Contractor. Unsafe acts and/or conditions noted during inspections shall be corrected immediately.

B. The Contractor is advised that representatives of regulatory agencies (i.e., CAL-OSHA, EPA, SCAQMD, etc.), upon proper identification, are entitled to access onto Authority property and projects. The Authority Project Manager shall be notified of their arrival as soon as possible.

2.7 ENVIRONMENTAL REQUIREMENTS

A. The Contractor shall comply with Federal, State, county, municipal, and other local laws and regulations pertaining to the environment, including noise, aesthetics, air quality, water quality, contaminated soils, hazardous waste, storm water, and resources of archaeological significance. Expense of compliance with these laws and regulations is considered included in the agreement. Contractor shall provide water used for dust control, or for pre-wetting areas to be paved, as required; no payment will be made by OCTA for this water.

B. The Contractor shall prevent pollution of storm drains, rivers, streams, irrigation ditches, and reservoirs with sediment or other harmful materials. Fuels, oils, bitumen, calcium chloride, cement, or other contaminants that would contribute to water pollution shall not be dumped into or placed where they will leach into storm drains, rivers, streams, irrigation ditches, or reservoirs. If operating equipment in streambeds or in and around open waters, protect the quality of ground water, wetlands, and surface waters.

C. The Contractor shall protect adjacent properties and water resources from erosion and sediment damage throughout the duration of the contract. Contractor shall comply with applicable NPDES permits and Storm Water Pollution Prevention Plan (SWPPP) requirements.

D. Contractor shall comply with all applicable EPA, Cal EPA, Cal Recycle, DTSC, SCAQMD, local, state, county and city standards, rules and regulations for hazardous and special waste handling, recycling and/ disposal. At a minimum, Contractor shall ensure compliance where applicable with SCAQMD Rule 1166, CCR Title 8, Section 5192, 29 CFR Subpart 1910.120, 49 CFR Part 172, Subpart H, 40 CFR Subpart 265.16 and CCR Title 22 Section 6625.16. Contractor shall provide OCTA a schedule of all hazardous waste and special or industrial waste disposal dates in advance of transport date. Only authorized OCTA personnel shall sign manifests for OCTA generated wastes. Contractor shall ensure that only current registered transporters are used for disposal of hazardous waste and industrial wastes. The Contractor shall obtain approval from OCTA for the disposal site locations in advance of scheduled transport date.

E. If the Contractor encounters on the site material reasonably believed to be asbestos, polychlorinated biphenyl (PCB) or other Hazardous Substance (as defined in California Health and Safety Code, and all regulations pursuant thereto) which has not been rendered harmless, the Contractor shall immediately stop work in that area affected and report the condition to the Authority in writing. The work in the affected area shall not thereafter be resumed except by written agreement of the Authority and Contractor if in fact the material is asbestos or polychlorinated biphenyl (PCB) or other hazardous substance and has not been rendered harmless. The work in the affected area shall be resumed in the absence of asbestos or polychlorinated biphenyl (PCB) or other hazardous substance, or when it has been rendered harmless, by written agreement of the Authority and the Contractor, or in accordance with a final determination by an Environmental Consultant employed by the Authority.

F. The Contractor shall not permit any hazardous substances to be brought onto or stored at the Project Site or used in the construction of the work, except for specified materials and commonly used construction materials for which there are no reasonable substitutes. All such materials shall be handled in accordance with all manufacturers' guidelines, warnings and recommendations and in full compliance with all applicable laws. All notices required to be given with respect to such materials shall be given by the Contractor. The Contractor shall not intentionally release or dispose of hazardous substances at the Project Site or into the soil, drains, surface or ground water, or air, nor shall the Contractor allow any Sub-Contractor, subcontractor or supplier or any other person for whose acts the Contractor or any subcontractor, vendor or supplier may be liable, to do so. For purposes of Contract Documents, "hazardous substance" means any substance or material which has been determined or during the time of performance of the work is determined to be capable of posing a risk of injury to health, safety, property or the environment by any federal, state or local governmental authority.

2.8 VEHICLE AND ROADWAY SAFETY REQUIREMENTS

A. The Contractor shall ensure that all Contractor vehicles, including those of its subcontractors, suppliers, vendors and employees are parked in designated parking areas, are identified by company name and/or logo, and comply with traffic routes, and posted traffic signs in areas other than the employee parking lots.

B. Personal vehicles belonging to Contractor employees shall not be parked on the traveled way or shoulders including any section closed to public traffic, or areas of the community that may cause interference or complaints

C. The Contractor shall comply with California Department of Transportation safety requirements and special provisions when working on highway projects.

D. The Contractor shall conform to American Traffic Safety Services Association (Quality Standard for Work Zone Control Devices 1992).

2.9 LANGUAGE REQUIREMENTS

For safety reasons, the Contractor shall ensure employees that do not read, or understand English, shall be within visual and hearing range of a bilingual

supervisor or responsible designee at all times when on the Authority property or projects.

2.10 PERSONAL PROTECTIVE EQUIPMENT AND CLOTHING

Contractors, and all associated subcontractors, vendors and suppliers are required to provide their own personal protective equipment (PPE), including eye, head, foot, and hand protection, respirators, reflective safety vests, and all other PPE required to perform their work safely on Authority projects.

A. RESPIRATORS (CCR Title 8, Section 5144) - The required documentation for training and respirator use shall be provided to the Authority's Project Manager upon request within 72 hours. All compliance documentation as required by CCR Title 8, Section 5144, Respiratory Protective Equipment.

B. EYE PROTECTION – The Authority requires eye protection on construction projects and work areas that meet ANSI Z-87.1 Standards.

C. BUS BASE – Minimum PPE required includes but is not limited to; Eye protection, class 2 reflective vest, steel toe or construction type footwear that meets ANSI Z41 1991 are recommended.

D. CONSTRUCTION PROJECTS - Minimum PPE required includes but is not limited to; hard hat, eye protection, hand protection, class 2 reflective vest, safety toe footwear that meets ANSI Z41 1991 are recommended.

E. HARD HATS: Approved hard hat that meet ANSI Z89. 1 (latest revision). Hard hats should be affixed with the company/agency logo and/or name. The bill shall be worn forward. Metal hard hats and cowboy style are forbidden on Authority projects.

F. FOOTWEAR: Enclosed leather that covers the ankles, such as a construction type boot. Employees shall not wear casual dress shoes, open toe, sneakers, sandals, canvas-type shoes, or other shoes that have thin soles or heels that are higher than normal in construction work areas. Safety toe footwear that meets ANSI Z41 1991 are recommended on construction sites and in operating facilities.

G. CLOTHING/SHIRTS: minimum or waist length shirts with sleeves (4" minimum).

H. CLOTHING/TROUSERS: Cover the entire leg. If flare-legged trousers are worn, the trouser bottoms must be tied to prevent catching. No sweat pants, or trousers with holes.

2.11 AERIAL DEVICES (CCR Title 8, Section 3648)

Aerial devices are defined in CCR Title 8 as any vehicle-mounted or self-propelled device, telescoping extensible or articulating, or both, which is primarily designed to position personnel. If aerial devices are to be used, the required documentation in

CCR Title 8, Section 3648 shall be provided to the Authority's Project Manager, upon request, within 72 hours.

2.12 CONFINED SPACE ENTRY (CCR Title 8, Section 5157)

Before any employee will be allowed to enter a confined space, the required documentation as required by CCR Title 8, Section 5157 shall be provided to the Authority's Project Manager, upon request, within 72 hours.

A. RECOMMENDED: a copy of the most recent calibration record for each air monitoring unit, 3-gas monitor or "sniffer" to be used by the Entry Supervisor prior to entering permit-required confined spaces.

2.13 CRANES

A. Crane activity shall comply with 29 CFR 1926.550, CCR Title 8 Standards, manufacture's recommendations and requirements, applicable American Society of Mechanical Engineers (ASME), and ANSI Standards. In addition, Contractor shall comply with the following requirements: Prior to using mobile cranes, the Contractor shall provide to the Authority Project Manager, items I, 2 & 3 of the following documentation a minimum of seven (7) days prior to activity, and item 4 on each day of crane activity.

1. Cranes require a submittal of the annual certification, and copy of the cranes most recent quarterly inspection.

2. A copy of each crane operator's qualification (NCCCO or equivalent) of company-authorized crane operators that have been properly trained in the equipment's use and limitations. Operator certification as required by CCR Title 8, Section 5006.1.

3. A rigging plan is required for all lifts. Critical lifts require an engineered plan designed by a registered professional engineer licensed in the State of California.

4. Contractor shall provide the name and qualifications of each "Qualified Rigger" as defined by OSHA.

5. Rigging scope activity shall comply with 29 CFR Subparts1926.250, 1929.753 and CCR Title 8 Standards.

6. All rigging equipment shall be free from defects, in good operating condition and maintained in a safe condition.

7. Rigging equipment shall be inspected by a designated, competent employee prior to initial use on the project, prior to each use, and documented inspections performed regularly. Records shall be kept on jobsite of each of these inspections by contractor and be made available to the Authority upon request within 72 hours.

8. Only one (1) sling eye should be in a hook, for multiple slings a shackle shall be used to prevent separation of slings, and prevent stress on weak points of the hook.

9. Contractor shall prepare a documented daily crane inspection report.

B. Pick and carry with rubber tired cranes is forbidden on Authority projects.

C. Engineered Critical Lifts

A critical lifts is established where any one of the following conditions are created:

1. Where in the crane's current configuration at any point during the lift, a gross load weight exceeds 75% of the capacity of the crane.

2. A gross weight equal to, or greater than 10 tons.

3. Lifts over buildings, equipment, public roadways, structures, or power lines.

4. A single lift where two or more cranes are used, including tandem lifts and tailing cranes.

5. Lifts made in close proximity of power lines, as defined by CCR Title 8 voltage clearance specifications.

6. Lifts involving helicopters, and specialized or unique and complex rigging equipment.

7. Hoisting of suspended work platforms.

8. Static tower crane erection and dismantlement.

9. Making lifts below the ground level where the crane is positioned.
   Note: Where the below the ground lift is minimal (evaluated by California registered professional engineer), a critical lift plan may not be required.

D. Critical Lift Plan

Where a critical lift will be performed, a written critical lift plan shall be submitted to the Authority Project Manager prior to commencing with the lift. The written plan shall include the following:

1. Crane manufacturer, capacity, and all specifications for the configuration to be used for the lift.

2. Load chart data for the crane to be used to make the lift. Total calculated weight of the load to be lifted including all rigging and other deductions consistent with the manufacturer's load chart.

3. Engineering data shall be provided on the hook assembly (manufacture's certification or independent laboratory testing and load testing within the past 60 days), below-the hook rigging, and all specialized below-the-hook lifting devices.

4. Diagrams of the lift that provides geometrical conditions of the load, rigging, and all crane positions during the lift. The drawing shall provide the following:

    A. Locations of all components to be lifted prior, during and after the lift is completed.

    B. Radius points.

    C. Swing patterns.

    D. In the event that the lift must be aborted, positions where the load may be safely landed.

    E. Areas where any personnel, public, and vehicles must be evacuated during the lift.

5. Potential ground loading for each point of contact by the crane in selected locations in which the crane will perform the critical lift.

6. Soil and subsurface data and information pertaining to the location on which the crane used for the critical lift will be positioned. This information shall be procured from an authoritative source such as a geotechnical engineer or a professional civil engineer registered in the state of California.

    Note: *This information may be available from the Authority for selected locations on some projects.*

7. An engineer shall use the data provided in #5 and #6 above to verify and confirm the following:

    A. That the soil and subsurface conditions are capable of supporting all loads imposed during the critical lift.

    B. That the designs of cribbing and other supports used under the crane load points are appropriate to safely transfer such loads.

8. Signature and stamp on the plan by a California registered professional engineer, evidencing review of the plan as meeting the requirements that all

loads and load information and calculations contained in the plan are approved, acceptable and safe to perform.

9. Operator qualifications.

10. Method by which communication will be provided to the crane operator. (Designated signal person, two-way radio, hard wire phone system, etc.).

11. A critical lift hazard analysis which identifies the particular hazards (including weather, wind, obstructions, etc.) associated with the lift and the means and methods to reduce, mitigate, or eliminate the hazards.

12. Emergency action plan.

13. Documentation of lift and pre-job meeting shall be conducted by Contractor's Project Manager.

The written plan shall be submitted 7 days prior to any critical lift for review by the Authority Project Manager and the Authority HSEC department. No critical lifts shall be conducted prior to such review.

E. OVERHEAD CRANES

Before using the Authority overhead cranes, each Contractor shall designate a limited number of employees to attend a training session on the use and limitations of overhead cranes with designated Authority personnel.

2.14 DEMOLITION OPERATIONS (CCR Title 8, Section 1734)

Before starting demolition activities the required documentation shall be provided to the Authority's Project Manager, upon request, within 72 hours. Contractor shall provide all compliance documentation as required by CCR Title 8 Article 31.

A. The Contractor shall be responsible for visiting and examining the project site to assess and personally determine the extent of demolition, associated work, debris removal, disposal and general work to be done under this section.

B. The Contractor shall take possession of all demolished materials, except as noted otherwise in the Contract Documents, and be responsible for disposing of them in accordance with applicable laws and regulations. On-site burning or burial of demolition materials will not be permitted.

C. Provide continuous noise and dust abatement as required, preventing disturbances and nuisances to the public, workers, and the occupants of adjacent premises and the surrounding areas. Dampen areas affected by demolition operation as necessary to prevent dust nuisance.

D. Site demolition plan: Indicate methods, procedures, equipment, and structures to be employed. Specify safety measures in accordance with applicable codes including signs, barriers, and temporary walkways. Plans shall be prepared by a

qualified person (CSP, CIH, CHST, CHMM, etc.), or as necessary by a professional engineer licensed to practice in the State of California, when so required by the provisions of the California Board for Professional Engineer and Surveyors.

E. Equipment, haul routes, and disposal sites to be used in the demolition and disposal work. Copy of manifests showing delivery of disposed materials in accordance with the plan and permit conditions. Certification that all demolished materials removed from the site have been disposed of in accordance with applicable laws and regulations.

2.15 EXCAVATION OPERATIONS (CCR Title 8, Section 1541)

Before starting excavation activities more than 5 feet deep into which people shall enter, the required documentation shall be provided to the Authority's Project Manager, upon request, within 72 hours. All compliance documentation shall comply with the following CCR Title 8, Section 1541 requirements:

A. A copy of the Contractor's Excavation Permit.

B. Attention is directed to the applicable sections of the Labor Code concerning trench excavation safety plans, "Trench Safety." Excavation for any trench 5 feet or more in depth shall not begin until the Contractor has received approval from the Engineer of the Contractor's detailed plan for worker protection from the hazards of caving ground during the excavation of that trench and any design calculations used in the preparation of the detailed plan. Excavations 20 feet or greater shall be engineered and plan stamped by a California registered professional engineer.

C. The detailed plan shall show the details of the design of shoring, bracing, sloping or other provisions to be made for worker protection during the excavation. No plan shall allow the use of shoring, sloping or a protective system less effective than that required by the Construction Safety Orders of the Division of Occupational Safety and Health. If the plan complies with the shoring system standards established by the Construction Safety Orders, the plan shall be submitted at least five (5) days before the Contractor intends to begin excavation for the trench.

D. Excavations and trenches shall be inspected by a "Competent Person" daily and after every rainfall to determine if they are safe. Daily inspections shall be recorded. Documentation is to be kept on site and available for review upon request.

E. Excavations are considered class 'C' soil unless documented testing in accordance with 29 CFR Subpart P, Section 1926.650 and CCR Title 8 Standards supports a class 'B' soil classification and is confirmed and stamped by a California registered professional engineer. In no case will excavations be classified as class 'A' soil.

2.16 FALL PROTECTION (CCR Title 8, Sections 1669-1671)

The following standards are required when performing work on Authority property. The required documentation shall be provided to the Authority's Project Manager, upon request, within 72 hours.

A. Fall protection is required for workers exposed to falls in excess of six (6) feet.

B. When conventional fall protections methods are impractical or create a greater hazard, a written plan in conformance with CCR Title 8, Article 24, shall be submitted to the Authority a minimum of seven (7) days in advance of the scheduled activity.

2.17 FORKLIFTS, BACKHOES AND OTHER INDUSTRIAL TRACTORS (CCR Title 8, Section 3664)

CCR Title 8 defines backhoes as "industrial tractors". All compliance documentation shall be provided as required by CCR Title 8, Section 3664. The following required documentation shall be provided to the Authority's Project Manager, upon request, within 72 hours:

A. A copy of each operator's certificate or a list of company-authorized industrial tractor operators that have been properly trained in the equipment's use and limitations. Please state which equipment, and model each operator has been authorized to operate (i.e. forklifts, backhoe, bulldozer, front-end loader, etc.).

2.18 ELECTRICAL OPERATIONS

HIGH VOLTAGE (CCR Title 8, Sections 2700-2974)

Any work on electrical equipment defined by OSHA as high-voltage, at or above 600 volts, requires specialized training certifications and personal protective equipment. Before any high-voltage work commences, the Authority Project Manger must be notified and must provide approval. The following required NFPA 70E certification and a certificate of training from a recognized organization of a two day high voltage safety training course shall be provided to the Authority's Project Manager, upon request, within 72 hours:

A. A list of the name(s) of the company-designated high voltage Qualified Electrical Worker(s)

LOW VOLTAGE (CCR Title 8, Sections 2299-2599)

Only qualified persons shall work on electrical equipment or systems.

A. Electrical Certification of Training; Contractor employees working on or around electrical panels, wiring, motors, electrical energy sources or similar electrical devices shall have attended a NFPA 70E, Electrical Safety Course and provide to the OCTA Project Manager a copy of employees' NFPA 70E qualification certificate of training for each employee assigned to electrical tasks on OCTA property or projects.

2.19 POWDER-ACTUATED TOOLS (CCR Title 8, Section 1685)

Before using tools such as “Hilti guns” or other powder-actuated tools, the following required documentation shall be provided to the Authority’s Project Manager, upon request, within 72 hours.

A. A copy of each qualified person’s valid operator card.

2.20 SCAFFOLDS (CCR Title 8, Sections 1635.1-1677)

Scaffold erection shall be in compliance with CCR Title 8 Standards. All compliance documentation shall be provided as required by CCR Title 8, Sections 1635.1-1677. In addition, the Contractor shall comply with the following additional requirements.

A. All scaffolds on Authority project shall be inspected by a competent person qualified for scaffolds in accordance with CCR Title 8 Standards.

B. Contractor shall arrange for a third party inspection, at least quarterly, by a credentialed professional (insurance carrier, scaffold manufacturer representative, or similar) in addition to the contractors daily self inspections.

C. A proper scaffold inspection and tagging system shall be maintained identifying compliance status (Example: Green/safe, Yellow/modified-fall protection required, Red/unsafe-do not use).

D. Contractor shall have a fall protection plan that meets CCR Title 8 Standards for scaffold erectors, an erection/dismantling plan shall be submitted to Authority Project Manager for review prior to start of activity.

E. Scaffold erection/dismantling shall install handrails beginning on the first level above ground erected, and erectors shall plan erection and dismantling in a manner to maximize handrail protection and minimize employees at unprotected areas.

2.21 WARNING SIGNS AND DEVICES

Signs, signals, and/or barricades shall be visible at all times when and where a hazard exists. Overhead tasks, roofing tasks, excavations, roadwork activity, demolition work, and other recognized hazards shall have guardrail protection, warning barricades, or similar protective measures acceptable to the Authority’s Project Manager. Signs, signals, and/or barricades shall be removed when the hazard no longer exists.

2.22 STEEL ERECTION

Steel Erection scope activity shall comply with 29 CFR Subpart R, Section 1926.750, and CCR Title 8 Standards. In addition to OSHA Standards, Contractor shall comply with the following requirements.

A. Erection planning should incorporate installation methods using aerial devices (man-lifts) and elevated work platforms (scissor lift) to minimize fall hazards of climbing steel where possible. A detailed written job safety analysis (JSA) shall

identify installation methods, equipment, and control methods to minimize potential fall hazards.

B. The Contractor shall not allow any employee to walk the steel unprotected from falls. Contractor employees must be tied-off and "coon" the beam until safety cables are provided to which employees shall use 100% tie-off protection. Two lanyards are required to ensure 100% tie-off protection.

C. A safe means of access to the level being worked shall be planned. Climbing and sliding down columns are not considered safe access and are forbidden on Authority projects.

D. A qualified rigger shall inspect the rigging prior to each shift and each lift.

E. Multiple lift rigging (Christmas Treeing) lifts are forbidden on Authority property and controlled projects.

2.23 AUDITS

A. The Authority may make periodic patrols of the project site as a part of its normal security and safety program. The Contractor shall not be relieved of its aforesaid responsibilities and the Authority shall not assume same, nor shall it be deemed to have assumed, any responsibility otherwise imposed upon the Contractor, as a result of safety patrols by the Authority.

B. The Authority may audit the Contractor’s safety program for HSE compliance at various intervals of the project, at the sole discretion of the Authority. Elements may include, but are not limited to: OSHA injury & illness records and logs, Job Safety Analysis and safety plans, equipment operator licenses and training records, incident reports, meeting minutes, engineered plans, safety meeting records, crane and rigging plans, equipment inspection records, qualifications of and interviews with key Contractor management personnel, and other similar information. The Contractor shall support and cooperate with these audits at no additional compensation or schedule impacts with this contract.

2.24 RAILWAY SAFETY PRECAUTIONS

A. Work on operating railways shall be in compliance with 49 CFR, Part 214, CCR Title 8 Standards, and the Southern California Regional Rail Authority (SCRRA).

B. New construction rail projects require that all employers and contractors are responsible to assure employees are trained and understand on-track safety procedures, and follow roadway worker rules identified in 49 CFR, Part 214, CCR Title 8, SCRRA, the California Department of Transportation (CalTrans), and OCTA HSE Construction Management Requirements (i.e., item E references).

C. Minimum PPE for workers include hard hat, safety glasses, orange (i.e., rail company approved color) class 2 reflective vest, safety toe footwear that meets

ANSI Z41 1991 (lace-up type over the ankle) and hearing protection (on person and worn as necessary).

2.25 FINES

The Contractor shall be responsible for the payment of all fines levied against the Authority for HSE violations arising from or related to activities over which Contractor has responsibility per the contract..

2.26 COMPLIANCE COSTS

Compliance with Health, Safety and Environmental Compliance identified in these aforementioned Authority Safety Specifications shall be at the expense of the Contractor, and included in Bid Documents to the Authority for the Contractor's scope. The Authority shall incur no additional cost or schedule impacts by Contractor, for compliance with California Construction Safety Orders, CCR Title 8 Standards, Federal OSHA Standards, and the Authority Safety Specifications for the protection of persons and property.

2.27 REFERENCES

A. CCR Title 8 Standards (Cal/OSHA)
B. CFR Including 1910 and 1926 Standards
C. NFPA, NEC, ANSI, NIOSH Standards
D. USACE Construction Quality Management Manuel (EM-385-1-1)
E. Construction Industry Institute (CII)
F. OCTA Construction Management Procedures Manual
G. OCTA Yard Safety Rules

END OF DOCUMENT

BID BOOKLET INVITATION FOR BID (IFB) 5-3922
BOOK 2 OF 2

INSTALLATION OF BATTERY ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE

ORANGE COUNTY TRANSPORTATION AUTHORITY
550 South Main Street
P.O. Box 14184
Orange, CA 92863-1584
(714) 560-6282

Key IFB Dates

Issue Date:	**March 10, 2025**
Pre-Bid Conference/Site Visit:	**March 18, 2025**
Questions/Approved Equal Submittal:	**March 20, 2025**
Bids Submittal Date:	**April 8, 2025**

BID DOCUMENT SUBMISSION CHECKLIST

IFB NO._____

PROJECT TITLE: _____

The Orange County Transportation Authority has prepared this checklist as a reminder of the documents required to be submitted with the bid. These documents must be complete, fully executed, notarized where appropriate as required in the bid documents in order to render the bid responsive.

THE FOLLOWING CHECKED DOCUMENTS MUST BE SUBMITTED WITH THE BID:

General IFB Forms:

	Bid Form – include all pages 1 through 4. *All addenda must be acknowledged, signed, dated, corporate seal*
	Bid Security Form: Bid Bond or Check (circle one) *Correct bid number, signed, dated, notarized (bid bond)*
	Information Required of Bidder *Provide all information, signed*
	Bidders Certificate of Compliance Regarding Workers Compensation Insurance *Signed and dated*
	Bidders Certificate of Compliance Regarding State of California Business and Professions Code Section 7028.15 *Signed, dated, notarized*
	List of Subcontractors (Exhibit D) *License Number- address/ name should match that associated with License # on CSLB website, DIR Registration Number, Description of work (one subcontractor for each portion), Dollar amount and Bidders name at bottom of form*
	Status of Past and Present Contracts Form *Signed, dated*
	Non-Collusion Declaration Form *Signed, dated*
	Iran Contracting Act Certification Applicable (Bids over $1,000,000 only) *Signed, dated, (select one option only)*

Signature on this Bid Document Submission Checklist is affirmation that items marked above are hereby submitted with the bid. I understand that failure to complete and/or submit any of the required documents may deem my bid non-responsive.

_____ _____
Authorized Signature Print Name and Title

_____ _____
Firm Name Date

OCTA

BID FORM

The undersigned hereby proposes to perform all work for which a contract may be awarded and to furnish any and all plant, labor, services, material, tools, equipment, supplies, transportation, utilities, and all other items and facilities necessary therefore as required in the **IFB 5-3922**, **"INSTALLATION OF BATTERY ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE"**, and to do everything required therein; and further proposes that, if this bid is accepted, will contract in the form and manner stipulated to perform all the work in strict conformity therewith within the time limits set forth therein, and will accept as full payment therefore, the following price:

Description	**Total Lump Sum Bid Amount**
_____	$ _____

A cashier's check/certified check/bid bond (circle applicable term) properly made payable to Orange County Transportation Authority, hereinafter designated as the Owner, for the sum of _____
Dollars
($ _____)
which amount is not less than ten percent (10%) of the total amount of this bid, is attached hereto and is given as a guarantee that the undersigned will execute the Agreement and furnish the required bonds, "Guaranty" and "Certificate of Insurance", if awarded the contract, and in case of failure to do so within the time provided, (a) the proceeds of said check shall be forfeited to the Authority; or (b) surety's liability to the Authority for forfeiture of the face amount of the bond shall be considered as established [circle (a) or (b)].

The undersigned hereby represents that:

BID FORM, PAGE 2

1. Bidder has thoroughly examined and become familiar with the work required and documents included under this IFB. The bidder understands that the award of the contract, if it is awarded, will be based on the lowest total bid submitted by a responsive and responsible bidder, and further, that the amounts and the total on the Bid Form will be subject to verification by the Authority.

2. By investigation at the site of the work and otherwise, it is satisfied as to the nature and location of the work and is fully informed as to all conditions and matters, which can in any way affect the work or the cost thereof.

3. Bidder fully understands the scope of the work/specifications and has checked carefully all words and figures inserted in said Invitation For Bids (IFB) and further understands that the Authority will in no way be responsible for any errors or omissions in the preparation of this bid. Bidder further asserts that it is capable of performing quality work to meet Authority's requirements.

4. Bidder will execute the Agreement and furnish the required Performance and Payment Bonds, Guaranty and proof of insurance coverage within ten (10) calendar days after notice of acceptance of bid by the Authority; and further, that this bid may not be withdrawn for a period of 120 calendar days after the date set for the opening thereof, unless otherwise required by law. If any bidder shall withdraw its bid within said period, the bidder shall be liable under the provisions of the Bid Security, or the bidder and the surety shall be liable under the Bid Bond, as the case may be.

5. Bidder hereby certifies that this bid is genuine and not a sham or collusive or made in the interest or on behalf of any person not herein named, and the undersigned has not directly or indirectly induced or solicited any other bidder to put in a sham bid, or any other person, firm, or corporation to refrain from bidding; the undersigned has not in any manner sought by collusion to secure for himself an advantage over any other bidder.

6. In conformance with current statutory requirements of Section 1860, et. seq., of the Labor Code of the State of California, the Bidder shall execute the document included in this IFB entitled "Bidder's Certificate of Compliance Regarding Workers' Compensation Insurance."

7. Bidder hereby further certifies that each, and every representations made in this bid are true and correct and made under penalty of perjury.

BID FORM, PAGE 3

8. Bidder shall permit the authorized representative of the Authority to inspect and audit all data and records of bidder relating to this bid, and if awarded a contract resulting from this bid, shall permit such inspection and audit of all data and records of bidder related to bidder's performance of such contract.

9. Bidder does not employ anyone who is now, or for one (1) year immediately prior to the date of this offer was, a director, officer, member, or employee of the Orange County Transportation Authority. The undersigned has not agreed to pay a fee contingent upon the award of a contract resulting from this bid to anyone who is now, or for one (1) year immediately prior to the date of this bid was, a director, officer, member, or employee of the Orange County Transportation Authority. No member of or delegate to the Congress of the United States shall be admitted to any share of the contract or to any benefit arising therefrom.

10. If awarded a contract resulting from this bid, bidder shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, age or national origin. The bidder shall take affirmative action to ensure that applicants are employed, and that employees are treated during their employment, without regard to their race, religion, color, sex, age or national origin. Such actions shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship.

11. Bid will be in effect for 120 calendar days after the bid closing date.

BID FORM, PAGE 4

Now: In compliance with the **Invitation For Bids (IFB) 5-3922**, **"INSTALLATION OF BATTERY ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE"**, the undersigned, with full cognizance thereof, hereby proposes to perform the entire work in strict compliance with all of the said requirements and provisions for the prices set forth herein upon which award of contract is made. The undersigned affirms that the information provided herein is true and accurate and that any misrepresentations are made under penalty of perjury.

Dated _____ , 202_ Bidder _____

The above bid includes Signature _____

Addenda Nos. _____ Name _____

Title _____

Bidder's Authorized Representative _____

Title _____

Telephone # _____

Fax # _____

Email Address _____

Bidders post office address _____

_____

_____

Corporation organized under the laws of the State of _____

Contractor's License No. _____

Expiration Date of License _____

Surety or sureties _____

_____

(CORPORATE SEAL)

BID SECURITY FORM
BID BOND

KNOW ALL MEN BY THESE PRESENTS:

That, _____ as principal and Bidder and _____ as Surety, are held and firmly bound unto the Orange County Transportation Authority, of State of California, hereinafter referred to as "Authority," in the sum of _____ Dollars ($_____), to be paid to the Authority, its successors, and assigns; for which payment, well and truly to be made, bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents, this amount being ten percent (10%) of the total amount of the Bid.

THE CONDITION OF THIS OBLIGATION IS SUCH, that if the certain bid of the above named bounden principal _____ _____ for_____ at the Orange County Transportation Authority's _____ as specifically set forth in documents entitled **IFB 5-3922, "INSTALLATION OF BATTERY ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE",** shall not be withdrawn within a period of 120 calendar days after the date set for the opening of bids, (unless otherwise required by law, and notwithstanding the award of the contract to another Bidder), and that if said bid is accepted by the Authority through action of its legally constituted contracting authorities and if the above bounden_____ its heirs, executors, administrators, successors and assigns, shall execute a contract for such construction and deliver the required Performance and Payment Bonds, "Guaranty," and proof of insurance coverage within ten (10) calendar days after notification of contract award from the Authority, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect.

IN WITNESS WHEREOF, we hereunto set our hands and seals this _____ day of _____, 202_.

_____
_____

NOTE: The standard printed bond form of any bonding company acceptable to the Authority may be used in lieu of the foregoing approved sample bond form provided the security stipulations protecting the Authority are not in any way reduced by use of the security company's printed standard form.

BID SECURITY FORM
CHECK TO ACCOMPANY BID

(NOTE: The following form shall be used in case check accompanies bid)

Accompanying this bid is a Certified or Cashiers check (circle the appropriate one) payable to the order of Orange County Transportation Authority, hereinafter referred to as "Authority" for _____ dollars ($_____), this amount being ten percent (10%) of the total amount of the Bid submitted in response to **IFB 5-3922, "INSTALLATION OF BATTERY ELECTRIC BUS CHARGERS AND ELECTRICAL INFRASTRUCTURE AT SANTA ANA BUS BASE"**. The proceeds of this check shall become the property of Authority provided this bid shall be accepted by Authority through action of its legally constituted contracting authorities and the undersigned shall fail to execute a contract and furnish the required Guaranty Form, Performance and Payment Bonds and proof of insurance coverage within ten (10) calendar days after date of notification of contract award from the Authority. The proceeds of this check shall also become the property of the Authority if the undersigned bidder withdraws the bid within the period of 120 days after the date set for the opening thereof, unless otherwise required by law, and notwithstanding the award of the contract to another bidder. Otherwise, the check shall be returned to the undersigned.

Bidder:_____

Signature:_____

Date:_____

NOTE: If the bidder desires to use a bond instead of check, the Bid Bond form shall be executed and the sum of this bond shall be ten percent [10%] of the total amount of the bid.

INFORMATION REQUIRED OF BIDDER

The bidder is required to supply the following information. Additional sheets may be attached if necessary.

1. Name of Bidder: _____
2. Business Address: _____
3. Telephone ( )_____ Fax ( )_____E-Mail: _____
4. Type of Firm - Individual, Partnership or Corporation: _____
5. Corporation organized under the laws of state of: _____
6. Contractor's License No.:_____ Class_____Years of Experience: __
7. Expiration Date of License: _____
8. Is your firm a certified small business in California? Yes____ No____
9. List the names and addresses of all owners of the firm or names and titles of all officers of the corporation:

   _____

   _____

INFORMATION REQUIRED OF BIDDER, PAGE 2

10. Please list the following: a) All prior and current license numbers that the current owner(s) or officers possess or have possessed in the last five years and the current status of those license; b) any prior company names that the owner(s) had in operation during the previous five years.

Current Officers or Owners Name	Prior Company Names (During the last 5 years)	Prior and Current License Numbers	Status of License

Note: If additional space is required to detail the information requested, please attach another page. All information requested must be included. Failure to identify all of the information may result in your bid being found non-responsive and your bid being rejected.

11. List all construction projects (public and private) for which Bidder has provided general contractor services for the past three years:

Contract Type (Public or Private)	Project Description	Dates of Service	Total Cost	Name and Address of Owner	Contact Name and Phone Number

Note: If additional space is required to detail the information requested, please attach another page. All information requested must be included. Failure to identify all of the information, may result in your bid being found non-responsive and your bid being rejected.

12. List the name, address and phone number of Superintendent for this project:

_____

13. List all construction projects (public and private) for which Superintendent has provided services as a Superintendent for the past three years.

Contract Type (Public or Private)	Project Description	Dates of Service	Total Cost	Name and Address of Owner	Contact Name and Phone Number

Bidder hereby certifies that it:

_____ is a certified Disadvantaged Business Enterprise as defined herein.

_____ is not a Disadvantaged Business Enterprise as defined herein.

NOTE: If requested by the Authority, bidder shall furnish a certified financial statement, financial data, or other information and references sufficiently comprehensive to permit an appraisal of its current financial condition.

I hereby certify the above is true and correct to the best of my belief.

_____
Signature

_____
Name

_____
Title

_____
Company Name

_____
Telephone Number

_____
Fax Number

_____
Email Address

NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246)

1. The Bidders' attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.

2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate work force in each trade on all construction work in the covered area, are as follows:

   Timetable Goals for Minority Participation for Each Trade (11.9)

   Goals for Female Participation in Each Trade (6.9)

   These goals are applicable to all the Contractor's construction work (whether or not it is federal or federally assisted) performed in the covered area.

   The Contractor's compliance with the Executive Order and the regulations in 41 C.F.R. Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 C.F.R. 60-4.3 (a), and its efforts to meet the goals established for the geographical area where the contract resulting from this solicitation is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from contractor to contractor or from project to project for the sole purpose of meeting the contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 C.F.R. Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within ten (10) working days of award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor; employer identification number; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.

4. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" includes the County of Orange, California.

BIDDER'S CERTIFICATE OF COMPLIANCE REGARDING WORKERS' COMPENSATION INSURANCE

In conformance with current statutory requirements of Section 1860, et. seq., of the Labor Code of the State of California, the undersigned confirms the following certification:

> "I am aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for Workers' Compensation or to undertake self-insurance in accordance with the provisions of that code and I will comply with such provisions before commencing the performance of the work of this Contract."

Bidder/Contractor:_____

Signature: _____

Name and Title: _____

Date: _____

BIDDER'S CERTIFICATE OF COMPLIANCE REGARDING STATE OF CALIFORNIA BUSINESS AND PROFESSIONS CODE SECTION 7028.15

Contractor License Number: _____

Expiration Date of Contractor's License: _____

Each, every and all of the representations made by Bidder in the attached bid are true and correct.

Name of Bidder/Contractor: _____

Signed: _____

Title: _____

Subscribed to and sworn before me, a Notary Public in and for the State of California, on _____, 202___.

_____
Notary Public

My commission expires on:

_____, 202__
(NOTARY SEAL)

LIST OF SUBCONTRACTORS (EXHIBIT D)

List only the subcontractors, which will perform work or labor or render services to the bidder in excess of one-half of one percent (1/2 of 1%) of the bidder's total bid amount. Do not list alternative subcontractors for the same work. (Use additional sheets if necessary.)

Name & Address Under Which Subcontractor is Licensed	License Number	DIR Registration No.	Specific Description of Work to be Rendered	Small Business Y/N	Type	Dollar Amount
						$
						$
						$
						$
						$
						$
TOTAL VALUE OF SUBCONTRACTED WORK						$

Bidder's Name _____

STATUS OF PAST AND PRESENT CONTRACTS FORM

On the form provided below, Offeror/Bidder shall list the status of past and present contracts where the firm has either provided services as a prime vendor or a subcontractor during the past five (5) years in which the contract has been the subject of or may be involved in litigation with the contracting authority. This includes, but is not limited to, claims, settlement agreements, arbitrations, administrative proceedings, and investigations arising out of the contract.

A separate form must be completed for each contract. Offeror/Bidder shall provide an accurate contact name and telephone number for each contract and indicate the term of the contract and the original contract value. Offeror/Bidder shall also provide a brief summary and the current status of the litigation, claims, settlement agreements, arbitrations, administrative proceedings, or investigations. If the contract was terminated, list the reason for termination.

Offeror/Bidder shall have an ongoing obligation to update the Authority with any changes to the identified contracts and any new litigation, claims, settlement agreements, arbitrations, administrative proceedings, or investigations that arise subsequent to the submission of the bid. Each form must be signed by an officer of the Offeror/Bidder confirming that the information provided is true and accurate.

Project city/agency/other:
Contact Name: **Phone:**
Project Award Date: **Original Contract Value:**
Term of Contract:
(1) Litigation, claims, settlements, arbitrations, or investigations associated with contract:
(2) Summary and Status of contract:
(3) Summary and Status of action identified in (1):
(4) Reason for termination, if applicable:

By signing this Form entitled “Status of Past and Present Contracts,” I am affirming that all of the information provided is true and accurate.

_____ _____

Name Signature

_____ _____

Title Date

Revised. 03/16/2018

Non-Collusion Affidavit

To the Orange County Transportation Authority

In accordance with Title 23 United States Code Section 112 and Public Contract Code 7106 the bidder declares that the bid is not made in the interest of, or on the behalf of, any undisclosed person, partnership, company, association, organization or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and, further, that the bidder has not, directly, or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

Name of Bidder:_____

Signature: _____

Date:_____

IRAN CONTRACTING ACT CERTIFICATION

(California Public Contract Code Sections 2200, *et seq.*)

The Iran Contracting Act of 2010 (PCC Sections 2200-2208), prohibits bidders who are engaged in investment activities in the energy sector of Iran from bidding on, submitting proposals for, or entering into or renewing contracts with public entities for goods or services of one million dollars ($1,000,000) or more. At the time of submitting a bid, each bidder must certify that the bidder is not identified on the Department of General Services list of ineligible persons pursuant to PCC Section 2203(b). Each bidder is also required to certify that the bidder is not engaged in investment activities in violation of the Iran Contracting Act of 2010.

A bidder who is engaged in investment activities in the energy sector of Iran is defined as:

3. A person providing goods or services of twenty million dollars ($20,000,000) or more in the energy sector of Iran, including a person that provides oil or liquefied natural gas tankers, or products used to construct or maintain pipelines used to transport oil or liquefied natural gas, for the energy sector of Iran; or
4. A person that is a financial institution that extends twenty million dollars ($20,000,000) or more in credit to another person, for 45 days or more, if that person will use the credit to provide goods or services in the energy sector in Iran and is identified on a list created pursuant to PCC Section 2203(b).

A bidder is not required to certify that it is engaged in investment activities in the energy sector of Iran if the bidder is exempt from the certification under PCC Section 2203(c) or (d). If the bidder is exempt from the certification requirement, the bidder will be required to provide documentation demonstrating the exemption.

To comply with the Iran Contracting Act of 2010, the bidder shall complete **one** of the options below. Please note: under PCC Section 2205, false certification of this form may result in civil penalties of $250,000 or twice the amount of the contract for which false certification was made, termination of the contract, and/or ineligibility to bid on contracts for a period of three years.

Option No. 1: Certification

I, the official named below, certify I am duly authorized to execute this certification on behalf of the vendor/financial institution identified below, and the vendor/financial institution identified below, and any subcontractor who will perform work or labor or render services to the vendor identified below, is not on the current Department of General Services list identifying persons engaged in investment activities in the energy sector of Iran, and is not a financial institution extending twenty million dollars ($20,000,000) or more in credit to another person/vendor, for 45 days or more, if that other person/vendor will use the credit to provide goods or services in the energy sector in Iran and is identified on the current Department of General Services list identifying persons engaged in investment activities in the energy sector of Iran.

Vendor/Financial Institution: _____

Signature: _____

Name and Title: _____

Date: _____

Option No. 2: Exemption

Pursuant to PCC Section 2203(c) and (d), a public entity may permit a bidder or financial institution engaged in investment activities in Iran, on a case-by-case basis, to be eligible for, or to bid on, submit proposals for, or enter into or renew a contract with a public entity for goods or services of one million dollars ($1,000,000) or more. If the bidder, financial institution, or any subcontractor who will perform work or labor or render services to the bidder has obtained an exemption from the certification requirement, please complete and sign below and attach the documentation demonstrating the exemption approval.

Vendor/Financial Institution: _____

Signature: _____

Name and Title: _____

Date: _____

Option No. 3: Non-Applicability

Pursuant to PCC Section 2203(b), a bidder or financial institution engaged in investment activities in Iran may not be eligible for, or to bid on, submit proposals for, or enter into or renew a contract with a public entity for goods or services of one million dollars ($1,000,000) or more. If the contract is not for goods or services of one million dollars ($1,000,000) or more, please sign below indicating that the contract is not for goods or services of one million dollars ($1,000,000) or more and thus bidder is not required to certify and does not meet the exemption.

Vendor/Financial Institution: _____

Signature: _____

Name and Title: _____

Date: _____