

Middle Tennessee Electric



Fall Creek Substation

Control House Design and Construction Specifications RFP

November 2024

SECTION 100

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SECTION 200

CONTROL HOUSE RFP LETTER

November 18, 2024

Subject: Fall Creek Substation Control House RFP

To Whom It May Concern:

This letter requests proposals to design, procure, and construct the Fall Creek Substation Control House and the Relay/Control Panels, including miscellaneous equipment for Middle Tennessee Electric (MTE) per the attached specifications and drawings. MTE will evaluate the proposals, and the winning bid may not be the lowest priced. The company selected for this project will be referred to as the "Manufacturer" in this letter. Entities submitting proposals will be referred to as "Bidders."

The proposals shall include a Bill of Materials, drawings, and other documents required to support your bid to MTE for our evaluation. Also, include a list of the major suppliers of materials and subcontractors. MTE reserves the right to request the Manufacturer to change subcontractors or suppliers before the contract is signed. Refusal to change subcontractors or suppliers may cause the proposal to be rejected. The proposals include a schedule showing the starting date, design target dates, approval drawing dates, completion dates of each stage of construction, etc. There is to be one section of the proposal that is labeled "Exceptions." The "Exceptions" section of the proposal shall include any items the Bidder is proposing not to follow in the specifications. MTE will evaluate each "Exception" on its merit. Without specific approval for the "Exception" in writing, the contractor must follow the MTE specification.

The Manufacturer delivery date for the Control House is **September 16, 2025**. There will not be any extensions on the deadline date unless the hold-up is due to the fault of MTE or extreme acts of nature such as a tornado touching down on the site, extensive flooding, or other extreme unforeseen site conditions as determined by MTE.

Bidding Information

The bid opening will be at **1:30 PM** on **January 13, 2025**. The bid opening will be a public online bid opening, and the Manufacturer's representatives are welcome to attend virtually.

Bids are made with the specific understanding that MTE reserves the right to reject all proposals without explanation. No late submissions will be accepted. No compensation will be given for bid preparation or bid submittal.

Included in this bid package are the following documents and drawings:

- Control House Specification
- General Bill of Materials
- General Control House Layout & Details
- General Relay/Control Panel Layout & Details
- Nameplate Schedule
- Point-to-point wiring diagrams
- Communication cables diagram
- AC & DC Panelboard details
- Control switch specification sheets

If you have any questions, don't hesitate to get in touch with me at (615) 494-1593 or larry.taylor@mtemc.com.

Sincerely,



Larry D. Taylor, PE

Engineering Technology Supervisor

Middle Tennessee Electric Membership Corporation

555 New Salem Highway

Murfreesboro, TN 37129

(615) 494-1593 | larry.taylor@mtemc.com



Energy. Service. Life.

Initial _____ No Bid

SECTION 300

RUS CONTRACT FORM 198

U.S. Department of Agriculture
Rural Utilities Service
EQUIPMENT CONTRACT
NOTICE AND INSTRUCTIONS TO BIDDERS

1. **Sealed proposals** for the furnishing and delivering f.o.b. Control House
Per MTEMC Specifications
of equipment for the rural electric project of MTE Fall Creek Substation
RUS designation TN 19 Rutherford, (hereinafter called the "Owner") will be received by the Owner on or before
1:30 o'clock P M., January 13, 2025, at its office at
555 New Salem Road, Murfreesboro, TN 37129 at which time and place the proposals will be
X publicly opened and read.
 privately opened. The Owner, subsequent to the bid opening, may elect to conduct clarifying discussions with the bidder to resolve any questions related to the substance of the bidder's proposal and to arrive at a final price for a responsive bid.

Any proposals received subsequent to the time specified will be promptly returned to the Bidder unopened.
2. **Obtaining Documents.** The Plans, Specifications, and Construction Drawings, together with all necessary forms and other documents for bidders may be obtained from the Owner, or from the Engineer Larry Taylor at the latter's office at 555 New Salem Road, Murfreesboro, TN 37129. The Plans, Specifications, and Construction Drawings may be examined at the office of the Owner or at the office of the Engineer.
3. **Manner of Submitting Proposals.** Proposals and all supporting instruments must be submitted on the forms furnished by the Owner and must be delivered in a sealed envelope addressed to the Owner. The name and address of the Bidder and the date and hour of the opening of bids must appear on the envelope in which the Proposal is submitted. Proposals must be completed in ink or typewritten. No alterations or interlineations will be permitted, unless made before submission, and initialed and dated. The successful Bidder will be required to execute two additional counterparts of the Proposal.
4. **Due Diligence.** Prior to the submission of the Proposal, the Bidder shall make and shall be deemed to have made a careful examination of the Plans, Specifications, Construction Drawings, and form of Proposal, and shall review the location and nature of the proposed construction, the transportation facilities, the kind and character of soil and terrain to be encountered, the kind of facilities required before and during the construction of the project, general local conditions, environmental and historic preservation considerations, and all other matters that may affect the cost and time of completion of the work. Bidder will be required to comply with all federal, state, and local laws, rules, and regulations applicable to its performance, including those pertaining to the licensing of contractors, and the Anti Kick-Back Act of 1986 (41 U.S.C. 51 et seq).
5. **Proposals** will be accepted only from those pre-qualified bidders invited by the Owner to submit a proposal.
6. **The Time for Delivery of the Equipment** is of the essence of the Contract and shall be as specified by the Engineer in the Proposal.

7. **Evaluation Factors.** In estimating the lowest cost to the Owner as one of the factors in deciding the award of the Contract, the Owner will consider, in addition to the price quoted in the Proposals, the following:

8. **Debarment Certification.** The Bidder must provide to the Owner a suspension and debarment certificate in the form attached hereto.

9. **Contract is Entire Agreement.** The Contract to be effected by the acceptance of the Proposal shall be deemed to include the entire agreement between the parties thereto, and the Bidder shall not claim any modifications thereof resulting from any representation or promise made at any time by any officer, agent or employee of the Owner or by any other person.

10. **Minor Irregularities.** The Owner reserves the right to waive minor irregularities or minor errors in any Proposal, if it appears to the Owner that such irregularities or errors were made through inadvertence. Any such irregularities or errors so waived must be corrected on the Proposal in which they occur prior to the acceptance thereof by the Owner.

11. **Bid Rejection.** The Owner reserves the right to reject any or all Proposals.

12. **Definition of Terms.** The terms "Administrator" and "Engineer" as used throughout this Contract shall be as defined in Article VI, Section 1, of the Proposal.

Middle Tennessee Electric

Owner



By

Engineering Technology Supervisor

Authorized Representative - Title

11-18-2024

Date

PROPOSAL

TO:

MTEMC, 555 New Salem Road, Murfreesboro, TN 37129

(hereinafter called the "Owner").

ARTICLE I--GENERAL

Section 1. Offer to Furnish and Deliver. The undersigned (hereinafter called the "Bidder") hereby proposes to furnish and deliver the equipment (hereinafter called the "Equipment") described in the Plans, Specifications, and Construction Drawings for the following prices:

Item: Per Specification Price: _____

Item: _____ Price: _____

The prices of Equipment set forth herein shall include the cost of delivery to:

Fall Creek Substation, Hwy 52 & Powells Chapel Rd, Rutherford Co, TN

The prices set forth herein do not include any sums which are or may be payable by the Bidder on account of taxes imposed by any taxing authority upon the sale, purchase or use of the Equipment. If any such tax is applicable to the sale, purchase or use of the Equipment hereunder, the amount thereof shall be added to the purchase price and paid by the Owner.

Section 2. Materials and Equipment. The Bidder agrees to furnish and use in the construction of the project under this Proposal, in the event the Proposal is accepted, only such "fully accepted," "conditionally accepted," and "technically accepted" materials and equipment which have been accepted by RUS as indicated in the current RUS Informational Publication 202-1, "List of Materials Acceptable for Use on Systems of RUS Electrification Borrowers," including revisions adopted prior to the Bid Opening. The use of "conditionally accepted" or "technically accepted" materials and equipment requires prior consent by the Owner or Engineer.

The Bidder will purchase all materials and equipment outright and not subject to any conditional sales agreements, bailment, lease or other agreement reserving unto the seller any right, title or interest therein. All such materials and equipment shall be new.

Section 3. Description of Contract. The Notice and Instructions to Bidders, Plans, Specifications, and Construction Drawings, which by this reference are incorporated herein, together with the Proposal and Acceptance constitute the Contract. The Plans, Specifications, and Construction Drawings, including maps, special drawings, and approved modifications in standard specifications are attached hereto and identified

as follows:

Section 4. Due Diligence. The Bidder has made a careful examination of the Plans, Specifications, and Construction Drawings attached hereto, and has become informed as to the location and nature of the proposed construction, the transportation facilities, the kind and character of soil and terrain to be encountered, and the kind of facilities required before and during the construction of the project, and has become acquainted with the labor conditions, federal, state, and local laws, rules, and regulations applicable to its performance.

Section 5. Warranty of Good Faith. The Bidder warrants that this Proposal is made in good faith and without collusion or connection with any person or persons bidding for the same work.

ARTICLE II--DELIVERY AND WARRANTY

Section 1. Delivery. The Bidder shall deliver the Equipment:

_____ within _____ days after receipt of the written order or orders of the Owner.

_____ not later than _____, 20_____. See RFP

The time for delivery shall be extended for the period of any reasonable delay due exclusively to causes beyond the control and without the fault of the Bidder, including, but not limited to, acts of God, fires, strikes, and floods.

Section 2. Defective Materials and Workmanship.

- a. All Equipment furnished hereunder shall be subject to the inspection, tests, and approval of the Owner and the Engineer, and the Bidder shall furnish all information required concerning the nature or source of any Equipment and provide adequate facilities for testing and inspecting the Equipment at the plant of the Bidder.
- b. The Equipment furnished hereunder shall become the property of the Owner upon delivery, provided, however, that the Owner or the Engineer, within one year after initial operation of the Equipment, or within the period for which the Equipment is guaranteed, whichever is longer, may reject any Equipment which does not comply with the Specifications attached hereto and made a part hereof or with the guarantees, if any, of the Bidder and the manufacturer. Upon any such rejection, the Bidder shall repair or replace such defective Equipment within a reasonable time after notice in writing from the Owner. If any such defective materials, equipment, or workmanship so replaced or repaired is found to be defective within one year after the completion of the replacement or repair, the Bidder shall

replace or remedy such defective materials, equipment, or workmanship. In the event of failure by the Bidder so to do, the Owner may make such replacement and the cost and expense thereof shall be paid by and recoverable from the Bidder.

- c All manufacturers' guarantees of Equipment, if any, shall be transferred and assigned to the Owner upon delivery of any Equipment and before final payment is made for such Equipment. Such guarantees shall be in addition to those required of the Bidder by other provisions of this Contract.

ARTICLE III--PAYMENT

Section 1. Payments to Bidder.

- a. Upon the shipment of any Equipment hereunder, the Bidder shall submit to the Owner a detailed statement of the Equipment shipped. The Owner shall, upon receipt of the Equipment, pay the Bidder ninety percent (90%) of the contract price of the Equipment. When the Equipment has been installed, placed in satisfactory operation, tested and accepted by the Owner, the Owner shall make final payments therefore to the Bidder; provided, however, such final payment shall be made not later than thirty (30) days after delivery of the Equipment, unless such acceptance by the Owner shall be withheld because of the fault of the Bidder.
- b. No payment shall be due while the Bidder is in default in respect of any of the provisions of this Contract and the Owner may withhold from the Bidder the amount of any claim by a third party against either the Bidder or the Owner based upon an alleged failure of the Bidder to perform the work hereunder in accordance with the provisions of this Contract.

ARTICLE IV--PARTICULAR UNDERTAKINGS OF THE BIDDER

The provisions of this Article IV apply to any work performed by the Bidder at the project site.

Section 1. Protection to Persons and Property. The Bidder shall at all times take all reasonable precautions for the safety of employees on the project and of the public, and shall comply with all applicable provisions of federal, state, and local laws, rules, and regulations and building and construction codes, in addition to the safety rules and procedures of the Owner.

The following provisions shall not limit the generality of the above requirements:

- a. The Bidder shall at no time and under no circumstances cause or permit any employee of the Bidder to perform any work upon energized lines, or upon poles carrying energized lines, unless otherwise specified in the Notice and Instructions to Bidders.
- b. The Bidder shall transport and store all material in facilities and vehicles which are designed to protect the material from damage. The Bidder shall ensure that all vehicles, trailers, and other equipment used comply with all applicable licensing,

- traffic, and highway requirements.
- c. The Bidder shall conduct its operations to cause the least possible obstruction of public highways.
 - d. The Bidder shall make good and fully repair all injuries and damages to the project or any portion thereof under the control of the Bidder by reason of any act of God or other casualty or cause whether or not the same shall have occurred by reason of the Bidder's negligence.
 - (i) To the maximum extent permitted by law, Bidder shall defend, indemnify, and hold harmless Owner and Owner's directors, officers, and employees from all claims, causes of action, losses, liabilities, and expenses (including reasonable attorney's fees) for personal loss, injury, or death to persons (including but not limited to Bidder's employees) and loss, damage to or destruction of Owner's property or the property of any other person or entity (including but not limited to Bidder's property) in any manner arising out of or connected with the Contract, or the materials or equipment supplied or services performed by Bidder, its subcontractors and suppliers of any tier. But nothing herein shall be construed as making Bidder liable for any injury, death, loss, damage, or destruction caused by the sole negligence of Owner.
 - (ii) To the maximum extent permitted by law, Bidder shall defend, indemnify, and hold harmless Owner and Owner's directors, officers, and employees from all liens and claims filed or asserted against Owner, its directors, officers, and employees, or Owner's property or facilities, for services performed or materials or equipment furnished by Bidder, its subcontractors and suppliers of any tier, and from all losses, demands, and causes of action arising out of any such lien or claim. Bidder shall promptly discharge or remove any such lien or claim by bonding, payment, or otherwise and shall notify Owner promptly when it has done so. If Bidder does not cause such lien or claim to be discharged or released by payment, bonding, or otherwise, Owner shall have the right (but shall not be obligated) to pay all sums necessary to obtain any such discharge or release and to deduct all amounts so paid from the amount due Bidder.
 - (iii) Bidder shall provide to Owner's satisfaction evidence of Bidder's ability to comply with the indemnification provisions of subparagraphs i and ii above, which evidence may include but may not be limited to a bond or liability insurance policy obtained for this purpose through a licensed surety or insurance company.
 - e. Upon violation by the Bidder of any of the provisions of this section, after written notice of such violation given to the Bidder by the Engineer or the Owner, the Bidder shall immediately correct such violation. Upon failure of the Bidder so to do the Owner may correct such violation at the Bidder's expense: Provided, however, that the Owner may, if it deems it necessary or advisable, correct such violation at the Bidder's expense without such prior notice to the Bidder.

Section 2. Insurance. The Bidder shall take out and maintain throughout the period of its operations at the project site the following types and minimum amounts of insurance:

- a. Workers' compensation and employers' liability insurance, as required by law, covering all its employees who perform any of the obligations of the Bidder under the contract. If any employer or employee is not subject to the workers' compensation laws of the governing state, then insurance shall be obtained voluntarily to extend to the employer and employee coverage to the same extent as though the employer or employee were subject to the workers' compensation laws.
- b. Public liability insurance covering all operations under the contract shall have limits for bodily injury or death of not less than \$1 million each occurrence, limits for property damage of not less than \$1 million each occurrence, and \$1 million aggregate for accidents during the policy period. A single limit of \$1 million of bodily injury and property damage is acceptable. This required insurance may be in a policy or policies of insurance, primary and excess including the umbrella or catastrophe form.
- c. Automobile liability insurance on all motor vehicles used in connection with the contract, whether owned, non-owned, or hired, shall have limits for bodily injury or death of not less than \$1 million per person and \$1 million each occurrence, and property damage limits of \$1 million for each occurrence. A single limit of \$1 million of bodily injury and property damage is acceptable. This required insurance may be in a policy or policies of insurance, primary and excess including the umbrella or catastrophe form.

The Owner shall have the right at any time to require public liability insurance and property damage liability insurance greater than those required in subsection "b" and "c" of this Section. In any such event, the additional premium or premiums payable solely as the result of such additional insurance shall be added to the Contract price.

The Owner shall be named as Additional Insured on all policies of insurance required in subsections "b" and "c" of this Section.

The policies of insurance shall be in such form and issued by such insurer as shall be satisfactory to the Owner. The Bidder shall furnish the Owner a certificate evidencing compliance with the foregoing requirements which shall provide not less than (30) days prior written notice to the Owner of any cancellation or material change in the insurance.

ARTICLE V--REMEDIES

Section 1. Liquidated Damages. The time of the delivery of the Equipment is of the essence of the Contract. Should the Bidder neglect, refuse or fail to deliver the Equipment within the time herein agreed upon, after giving effect to extensions of time, if any, herein provided, then, in that event and in view of the difficulty of estimating with exactness damages caused by such delay, the Owner shall have the right to deduct from and retain out of such moneys which may be then due, or which may become

due and payable to the Bidder the sum of See RFP dollars () per day for each and every day that such delivery is delayed beyond the specified time, as liquidated damages and not as a penalty; if the amount due and to become due from the Owner to the Bidder is insufficient to pay in full any such liquidated damages, the Bidder shall pay to the Owner the amount necessary to effect such payment in full: Provided, however, that the Owner shall promptly notify the Bidder in writing of the manner in which the amount retained, deducted or claimed as liquidated damages was computed.

Section 2. Cumulative Remedies. Every right or remedy herein conferred upon or reserved to the Owner or the Government or the Administrator shall be cumulative, shall be in addition to every right and remedy now or hereafter existing at law or in equity or by statute and the pursuit of any right or remedy shall not be construed as an election: Provided, however, that the provisions of Section 1 of this Article shall be the exclusive measure of damages for failure by the Bidder to deliver the Equipment within the time herein agreed upon.

ARTICLE VI--MISCELLANEOUS

Section 1. Definitions.

- a. The term "Administrator" shall mean the Administrator of the Rural Utilities Service of the United States of America and his or her duly authorized representative or any other person in whom or authority in which may be vested the duties and functions which the Administrator is now authorized by law to perform.
- b. The term "Engineer" shall mean the Engineer employed by the Owner, to provide engineering services for the project and said Engineer's duly authorized assistants and representatives.

Section 2. Materials and Supplies. In the performance of this contract there shall be furnished only such un-manufactured articles, materials, and supplies as have been mined or produced in the United States or in any eligible country, and only such manufactured articles, materials, and supplies as have been manufactured in the United States or in any eligible country substantially all from articles, materials, or supplies mined, produced or manufactured, as the case may be, in the United States or in any eligible country; provided that other articles, materials, or supplies may be used in the event and to the extent that the Administrator shall expressly in writing authorize such use pursuant to the provisions of the Rural Electrification Act of 1938, being Title IV of Public Resolution No. 122, 75th Congress, approved June 21, 1938. For the purposes of this section, an "eligible country" is any country that applies with respect to the United States an agreement ensuring reciprocal access for United States products and services and suppliers to the markets of that country, as determined by the United States Trade Representative. The Bidder agrees to submit to the Owner such certificates with respect to compliance with the foregoing provision as the Administrator from time to time may require.

Section 3. Patent Infringement. The Bidder shall hold harmless and indemnify the Owner from any and all claims, suits and proceedings for the infringement of any patent or patents covering Equipment purchased hereunder.

Section 4. Compliance with Laws. The Bidder shall comply with all federal, state, and local laws, rules, and regulations applicable to its performance under the contract and the construction of the project. The Bidder acknowledges that it is familiar with the Rural Electrification Act of 1936, as amended, the Anti Kick-Back Act of 1986 (41 U.S.C. 51 et seq), and 18 U.S.C. §§ 286, 287, 641, 661, 874, 1001, and 1366, as amended.

The Bidder represents that to the extent required by Executive Orders 12549 (3 CFR, 1985-1988 Comp., p. 189) and 12689 (3 CFR, 1989 Comp., p. 235), Debarment and Suspension, and 7 CFR part 3017, it has submitted to the Owner a duly executed certification in the form prescribed in 7 CFR part 3017.

The Bidder represents that, to the extent required, it has complied with the requirements of Pub. L. 101-121, Section 319, 103 Stat. 701, 750-765 (31 U.S.C. 1352), entitled "Limitation on use of appropriated funds to influence certain Federal contracting and financial transactions," and any rules and regulations issued pursuant thereto.

Section 5. Equal Opportunity Provisions.

a. Bidder's Representations.

The Bidder represents that:

It has __, does not have, 100 or more employees, and if it has, that it has _____, has not __, furnished the Equal Employment Opportunity-Employers Information Report EEO-1, Standard Form 100, required of employers with 100 or more employees pursuant to Executive Order 11246 of September 24, 1965, and Title VII of the Civil Rights Act of 1964.

The Bidder agrees that it will obtain, prior to the award of any subcontract for more than \$10,000 hereunder to a subcontractor with 100 or more employees, a statement, signed by the proposed subcontractor, that the proposed subcontractor has filed a current report on Standard Form 100.

The Bidder agrees that if it has 100 or more employees and has not submitted a report on Standard Form 100 for the current reporting year and that if this Contract will amount to more than \$10,000, the Bidder will file such report, as required by law, and notify the Owner in writing of such filing prior to the Owner's acceptance of this Proposal.

b. Equal Opportunity Clause. During the performance of this Contract, the Bidder agrees as follows:

(1) The Bidder will not discriminate against any employee or applicant for employment because of race, color, religion, sex or national origin. The Bidder will take affirmative action to ensure that applicants are employed, and

that employees are treated during employment without regard to their race, color, religion, sex or national origin. Such action shall include, but not be limited to, the following: Employment, upgrading, demotions or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection of training, including apprenticeship. The Bidder agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this Equal Opportunity Clause.

- (2) The Bidder will, in all solicitations or advertisements for employees placed by or on behalf of the Bidder, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex or national origin.
- (3) The Bidder 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' representative of the Bidder's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- (4) The Bidder will comply with all provisions of Executive Order 11246 of September 24, 1965, and the rules, regulations and relevant orders of the Secretary of Labor.
- (5) The Bidder 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 its 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.
- (6) In the event of the Bidder's noncompliance with the Equal Opportunity Clause 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 Bidder 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 provided by law.
- (7) The Bidder will include this Equal Opportunity Clause in every subcontract or purchase order unless exempted by the rules, regulations, or order 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 Bidder 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 Bidder becomes involved in, or is

threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency, the Bidder may request the United States to enter into such litigation to protect the interests of the United States.

- c. **Certificate of Non-segregated Facilities.** The Bidder certifies that it does not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The Bidder certifies further that it will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it will not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The Bidder agrees that a breach of this certification is a violation of the Equal Opportunity Clause in this Contract. As used in this certification, the term “segregated facilities” means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin, because of habit, local custom, or otherwise. The Bidder agrees that (except where it has obtained identical certifications from proposed subcontractors for specific time periods) it will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity Clause, and that it will retain such certifications in its files.

Section 6. Successors and Assigns. Each and all of the covenants and agreements herein contained shall extend to and be binding upon the successors and assigns of the parties hereto. The Owner and Bidder acknowledge that this Contract is assigned to the Government, acting through the Administrator, for security purposes under the Owner’s mortgage and security instrument.

Section 7. Independent Contractor. The Bidder shall perform the work as an independent contractor, not as a subcontractor, agent, or employee of the Owner. Upon acceptance of this Proposal, the successful Bidder shall be the Contractor and all references in the Proposal to the Bidder shall apply to the Contractor.

Section 8. Approval by the Administrator: This contract does _____, does not X , require approval of the Administrator. No acceptance of a Proposal for a contract upon which approval of the Administrator is required shall become effective until the contract has been approved by the Administrator; provided that no obligation shall arise hereunder unless such approval is given within one-hundred twenty (120) days after the date set for the opening of the proposals. The acceptance of a Proposal for a contract upon which approval of the Administrator is not required shall become effective the date of acceptance by the Owner.

ATTEST:

Bidder

Secretary

President

Dated

Address

The Proposal must be signed with the full name of the Bidder. If the Bidder is a partnership, the Proposal must be signed in the partnership name by a partner. If the Bidder is a corporation, the Proposal must be signed in the corporate name by a duly authorized officer and the corporate seal affixed and attested by the Secretary of the Corporation.

ACCEPTANCE

Subject to the approval of the Administrator, if approval of the Administrator is required, the Owner hereby accepts the foregoing Proposal of the Bidder, _____

_____ for the following Equipment:

Control House per specifications

for a total contract price of \$ _____ (_____ dollars.)

Owner

By _____
Authorized Representative

Secretary

_____, 20 ____
Date of Contract

SECTION 400

GENERAL SCOPE OF WORK

GENERAL SCOPE OF WORK

I. GENERAL DESCRIPTION OF WORK

- A. Design, manufacture, assembly, testing, delivery, and off-loading of one concrete prefabricated control building with anchor bolts and equipment, including but not limited to Relay/Control panels, relays, controls, AC and DC distribution panels, heat pumps, substation batteries, battery charger, and any required miscellaneous equipment per the specification and drawings.

II. PROJECT SITE CONDITIONS

- A. The control building and equipment provided shall be designed for Seismic Zone 1 conditions per the latest UBC Edition, 100 mph wind velocity per ASCE 7, and a Heavy loading NESC District.

III. DELIVERY

- A. Delivery shall be F.O.B. foundation to **Fall Creek Substation, Hwy 452 and Powells Chapel Rd, Rutherford Co., TN.**
- B. Manufacturer shall be responsible for arranging crane service, rigging personnel, and all other necessary equipment needed to off-load the control building to the site foundation.
- C. A three (3) days' notice shall be given before delivery. Failure to do so may result in a delay to offload and accept delivery.
- D. Acceptable delivery hours are from 8:00 AM till 3:00 PM on normal business days Monday thru Thursday, excluding MTE observed holidays.
- E. Delivery date shall be **September 16, 2025.**
- F. Manufacturer, if required, shall store the Control building for a period of up to (4) weeks after the required delivery date without any charges incurred by MTE. MTE will make reasonable attempt to be ready for the Control building by the proposed delivery date but may need to postpone the delivery due to unforeseen circumstances.
- G. Liquidated damages
 - 1. Manufacturer shall incur a penalty of (\$1000) per day for delivery past the required delivery date. Maximum penalty shall not exceed 10% of Contract Price. MTE reserves the right to waive liquidated damages at the MTE's discretion.

IV. SHIPPING AND HANDLING

- A. Manufacturer assumes all liability for equipment during shipping and shall repair or replace any items damaged during shipping.
- B. Manufacturer shall install/re-install on-site any items disassembled or not installed for shipping reasons (e.g. Fans, batteries, photo-eyes, antennas, etc....).

V. SUBMITTALS

- A. Three (3) sets of Approval Drawings shall be provided to MTE before the manufacture of any portion of the equipment with one (1) set being returned to the manufacturer with comments. Approval by MTE shall not relieve the manufacturer of the responsibility for the correctness of the drawings furnished by the manufacturer nor the compliance with the specifications and the latest ANSI, ASTM, UBC, ASCE, NEC, NEMA, ICEA, AISC, AISI, MBMA, ASHRAE, and IEEE standards, unless so stated by MTE at the time of approval. MTE will not accept any damages incurred by manufacturer due to the manufacturing process being started before approval of the pertinent drawings.
- B. Three (3) sets of Final Drawings and Documentation shall be provided to MTE at the time of delivery. One (1) copy of the electronic files is to be provided on a flash drive marked with a professional looking label. All drawings shall be provided in the newest AutoCAD format and all other documents in Excel or Word format.
- C. Three (3) sets of Operations & Maintenance Manuals shall be provided to MTE at the time of delivery. O&M Manuals to be provided in a D-ring binder. One (1) set shall be submitted for approval before shipment of the Control House. One (1) copy of the O&M Manuals is to be provided on a flash drive marked with a professional looking label.
- D. MTE to provide the following drawings and documentation:
 - 1. General control building layout
 - 2. General Relay/Control panel layout
 - 3. General Bill of Materials listing major equipment
 - 4. Single-line diagram
 - 5. Three-line schematics
 - 6. DC Control schematics
 - 7. Communications schematics
 - 8. Nameplate schedule
 - 9. AC & DC panelboard layouts
 - 10. Relay/Control Panel point-to-point wiring diagrams
- E. Manufacturer to provide the following drawings and documentation:
 - 1. Foundation loadings and anchor bolt plan shall be submitted to MTE no later than sixty (60) days after award of the contract.
 - 2. A proposed foundation design and foundation loading calculations. A slab foundation design is required. Pier type or ring wall type foundations are not acceptable.
 - 3. Final control building layout and details
 - 4. Final control building interior layout and details
 - 5. Control building elevations
 - 6. Control building utility wiring diagrams
 - 7. Final Relay/Control panel layouts & fabrication details
 - 8. Final Bill of Materials
 - 9. Operations & Maintenance Manuals

10. As-built changes, if any, for MTE provided drawings and documentation
11. Any and all paper documentation that comes with any of the equipment installed inside the control house

VI. PAYMENT TERMS

- A. MTE shall make progress payments as follows:
 1. Following delivery of the Control House and upon receipt of an Invoice for Payment accompanied by MTE Engineer's recommendation for payment, 90% of the Contract Price, less any amounts as determined by the MTE Engineer, shall be paid.
 2. Final Payment shall be made (30) days after delivery and upon receipt of the final Invoice for Payment less any amounts determined by the MTE Engineer. All documentation must be received in a finalized format before final payment will be made.

VII. WARRANTY

- A. All materials and workmanship shall be guaranteed by the manufacturer for a period of twelve (12) months following shipment of the equipment.

SECTION 500

PROTECTIVE RELAYING AND CONTROL PANELS

PROTECTIVE RELAYING AND CONTROL PANELS

I. DESCRIPTION

A. Relay/Control Panels including all relaying equipment, communication cables, misc. hardware, wiring, and testing requirements.

II. APPROVED PANEL MANUFACTURERS

- A. The approved panel manufacturers are as follows:
1. EP²
 2. Keystone EMC
 3. KVA
 4. Panelmatic
 5. Schweitzer Engineering Laboratories (SEL)

III. DESIGN DATA

- A. Relay/Control Panels and equipment shall be designed, sized, manufactured, and tested in accordance with the following standards:
1. ANSI C37 Series, Protective Relays and Proposed Standard C37.21 for Switchboards
 2. ANSI C39.1, Switchboard Instruments
 3. ICEA, Specifications for Wire and Cable
 4. NEC, Current Rating of Control Wiring
 5. NEMA
 6. IEEE
 7. AISI

IV. RELAY/CONTROL PANEL CONSTRUCTION

- A. Relay/Control Panel shall be a freestanding structure with provisions for securely fastening to a concrete floor.
- B. Relay/Control Panel shall be constructed from 11 gauge cold-rolled steel.
- C. Relay/Control Panel shall be painted ANSI 61 gray on the exterior and Gloss White on the interior.
- D. Relay/Control Panel shall be 19" rack-mounted panel style. See MTE drawings for panel layouts.
- E. Relay/Control Panel shall be 90"H x 24"W x 24"D.
- F. Provide a 1" x 1/4" copper ground bus at the bottom of each Relay/Control Panel.
1. The copper ground bus shall be connected to the Relay/Control Panel via two 5/8" gun studs.
 2. The gun studs shall be free of paint to ensure a good connection to the copper ground bus.
 3. The Relay/Control Panel's ground buses shall be connected to each other and

- provide a means for connection to the building ground (4/0 awg).
4. The ground bus shall run the full width of the Relay/Control Panels.
 5. The ground bus shall be drilled and tapped to accommodate 10/32 screws. A minimum of 24 slots per Relay/Control Panel.
- G. Relay/Control Panel shall provide a method for MTE to securely fasten incoming field cables (eg. wire way or cable tie-off tabs).
- H. Nameplates shall be black laminated plastic composition, with permanent white engraved lettering, and beveled edges (white core w/ black front). The nameplates **MUST** be fastened to panel using small round head stainless steel screws.
- I. All hardware shall be stainless steel (eg. screws, bolts, and nuts).

V. **WIRING**

- A. Use No. 12 AWG stranded tinned copper conductor, 600 VAC class, type SIS cross-linked polyethylene insulation for all secondary and control circuits.
- B. Use No. 10 AWG stranded tinned copper conductor, 600 VAC class, type SIS cross-linked polyethylene insulation for all current transformer secondary circuits.
- C. All wiring shall be permanently labeled using a “Device Coordinate” method (e.g. 1AA-15). Panduit LJSL series or equivalent labels shall be used.
- D. For Phoenix/Euro style terminal blocks see SEL application guide AN2014-08 for details. Connections for green Euro-style terminal blocks require an appropriate single or dual conductor bootlace ferrule or terminal lug. Conductors shall be sized accordingly.
- E. Wiring inside of cable tray shall be rated for cable tray use.
- F. All panel-to-panel wiring shall be connected through terminal block points from each panel. Direct device-to-device wiring between panels is unacceptable. Manufacturer is responsible for providing and connecting all panel-to-panel wiring.
- G. Terminations shall be made using non-insulated ring-tongue connectors. Panduit, Thomas & Betts, Burndy, or Amp brand connectors shall be used. Use of any connector that is not UL listed is unacceptable.
- H. A maximum of two (2) connections per terminal stud shall be followed.
- I. Single conductor terminations shall be landed with the crimp out. Termination points with two conductors shall be landed as follows: first conductor shall be crimp in and second conductor shall be crimp out.
- J. All terminations shall be made with the manufacturer’s suggested crimp tool. All crimp tools shall be tested and certified to the manufacturer’s specification. Wire terminations will be randomly tested upon receipt of the Relay/Control Panels. Failure of more than two (2) terminations may require the manufacturer to provide an on-site visit to re-check all terminations.
- K. Panel wiring and terminations shall stay clear of terminal block side(s) designated for field connections.
- L. Use of Panduit style wire way is permitted. If wire way is used, then a minimum of 15% spare volume shall be provided on the relay panel side and the field cable connection side

shall be empty.

- M. Physical wiring diagrams shall utilize a device coordinate method. Tabular method is not acceptable.

VI. TESTING

- A. All testing must be performed by qualified personnel with extensive knowledge of electric utility substation controls.
- B. Test personnel shall possess the ability to discern between proper and improper circuit design and functionality and shall possess the ability to suggest corrective action. Any corrections shall be approved by MTE beforehand.
- C. Relay/Control Panels shall pass an initial point-to-point ringer test per the physical wiring diagram before functional testing may begin.
- D. Relay/Control Panels shall be fully functionally tested. This includes, but is not limited to, applying current and voltage to all relaying and metering to check for proper operation. Currents must be injected to ensure proper connection of wiring through test switches to metering and relaying. Where possible, confirm currents and voltages via the relaying or metering displays.
- E. All relaying conditions must be simulated via breaker simulators and other devices to ensure the desired outcome for the relaying. If manufacturer believes something to be un-conventional or not standard industry practice, then work shall be stopped immediately, and MTE made aware of the conflict. MTE will provide resolution for the conflict.
- F. Re-block all electro-mechanical devices after testing.
- G. All devices shall be powered up and verified to work properly.
- H. All spare outputs, contacts, and input shall be tested for proper operation.
- I. Misc. equipment shall be tested for proper operation.
- J. Testing must be performed in accordance with all applicable NEC, IEEE, ANSI and NEMA standards.
- K. Testing results shall be submitted to MTE via the Operation & Maintenance Manuals.
- L. MTE shall be notified at least two (2) weeks prior to functional testing and retains the right to witness the functional testing stage should it be deemed necessary.

VII. RELAYS AND MISC. EQUIPMENT

- A. Refer to MTE provided Bill of Material for specific part numbers and descriptions. All equipment shall be provided as listed. Any items deemed as equivalents must be approved before use.
- B. Manufacturer shall provide all relaying and controls including misc. hardware.
- C. Relays shall be SEL.
- D. TVA shall supply the Underfrequency relaying insert and manufacturer shall install.
- E. Terminal blocks shall be rated for 30A, 600Vac, and equipped with insulating barriers between poles. GE Type EB or Marathon equivalent shall be used. Terminal strips shall

be clearly marked as shown on drawings. CT circuits shall have “Shorting” Type terminal blocks with a shorting pin for each pole. All other circuits shall have “Straight Strap” Type terminal blocks.

- F. Fuse blocks shall be rated for 30A, 250V. Fuses shall be sized as shown on drawings.
- G. Indication lights shall be long-life LED type with removable cap and replaceable lamps. Ledtronics type RLPH, GE type ET-16, or equivalent shall be used.
- H. Control switches and lockout relays shall be Electroswitch Series 24.
- I. Test switches shall be ABB type FT-19R.

VIII. COATING SYSTEM – (HIGH PERFORMANCE / LOW MAINTENANCE)

- A. All coatings shall be applied inside an environmentally controlled (air quality, temperature and humidity) paint booth with ventilation and filtration provisions in full EPA compliance and in accordance with the coating manufacturer’s requirements. *Coating performed in outside, ambient air conditions shall NOT be acceptable.*
- B. At least one (1) coat of primer is required with a minimum of two (2) finish coats. Relay/Control Panels shall have a glossy finish. One (1) can of touch-up paint shall be provided.
- C. All coatings shall be applied using an *electrostatic application process*.
- D. All exterior and interior surfaces shall be thoroughly cleaned prior to coating application per the coating manufacturer’s recommended practice.
- E. The following minimum coating system test results shall be adhered to:
 - 1. Corrosion Resistance (Salt spray): Passes 2000 hours per ASTM-B117
 - 2. Color & Gloss Retention: Only slight change after 500 and 1000 hours in Q.U.V. test
 - 3. Oil Resistance Immersion: Passes both 72 hours at 78 degrees F and 72 hours at 212 degrees to 220 degrees F
 - 4. Hardness: Minimum H pencil hardness
 - 5. Abrasion Resistance: 3000 cycles per ASTM D4060 using Teledyne Taber with CS-10 wheels
 - 6. Chemical Resistance: Excellent
 - 7. Washability & Stain Resistance: Excellent
 - 8. Humidity Resistance: 1000 hours per ASTM-D2247 run at 113 degrees F

SECTION 600

CONTROL HOUSE AND EQUIPMENT

CONTROL BUILDING AND EQUIPMENT

I. GENERAL

A. Scope

1. This document specification covers the design and fabrication requirements of a single-story, single-module concrete equipment control house unit. The delivered unit, described in the subsections that follow, includes structural, electrical, and mechanical systems required to satisfy MTE's control house.

B. Classification

1. The control house unit, hereinafter referred to as "control house", shall be of nominal dimension shown on the MTE control house drawing in the Appendix section.

C. Submittals

1. Submit the information specified in this subsection to MTE and approved before start of control house fabrication. Include clear explanations where drawings and data deviate from MTE control house drawing or this specification.
2. Preliminary Drawings. Submit shop drawings that include the following details:
 - a) interior layout, including reflected ceiling plan
 - b) load path or whole control house section that describes frame and sheathing materials, and structural fasteners
 - c) one-line electrical diagram that describes service and feeder power wiring in the control house
 - d) circuit breaker panel schedule that identifies rating & location of circuits furnished with control house
3. Foundation Drawing. Submit foundation plan drawing showing slab plan dimensions and control house tie-down details. If soil-bearing data is provided with this order, also furnish foundation structural details, such as concrete strength and reinforcing steel.

II. APPLICABLE DOCUMENTS

- A. The following documents, of issue in effect at time of invitation-for-bid or request-for-proposal, form a part of this specification to the extent specified herein. At time of publication, editions indicated were valid.
- B. In event of conflict between the MTE control house drawing and this specification, the drawing shall take precedence. In event of conflict between this specification and other documents specified herein, this specification shall take precedence.
- C. All standards are subject to revision. Manufacturer shall apply the most recent editions of standards indicated below:
- D. **Documents**
 - MTE control house drawing
 - ACI 304: Guide for Measuring, Mixing, Transporting, and Placing Concrete
 - ACI 305: Hot Weather Concreting
 - ACI 306: Cold Weather Concreting
 - ACI 308: Standard Practice for Curing Concrete
 - ACI 309: Guide for Consolidation of Concrete
 - ACI 318: Building Code Requirements for Structural Concrete
 - ARI 210/240: Standard for Unitary Air Conditioning and Air Source Heat Pump Equipment
 - ASCE 7: Minimum Design Loads for Buildings and Other Structures
 - ASHRAE 90.1: Energy Efficient Design of New Buildings

ASTM A36: Standard Specification for Structural Steel
ASTM A185: Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
ASTM A615: Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
ASTM C31: Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33: Standard Specification for Concrete Aggregate
ASTM C39: Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C150: Standard Specification for Portland Cement
ASTM C172: Standard Method of Sampling Freshly Mixed Concrete
ASTM C260: Standard Specification for Air-Entraining Admixtures in Concrete
ASTM C330: Standard Specification for Lightweight Aggregate for Structural Concrete
ASTM C494: Standard Specification for Chemical Admixtures in Concrete
ASTM E84: Test Method for Surface Burning Characteristics of Building Materials [fire retardant]
ASTM E119: Test Methods for Fire Tests of Building Construction and Materials [fire resistance]
ASTM E136: Test Method for Behavior of Materials in a Vertical Tube Furnace [non-combustibility]
ASTM E152: Methods of Fire Tests of Door Assemblies
AWS D1.1: Structural Welding Code-Steel
AWS D1.4: Structural Welding Code-Reinforcing Steel
EIA 222: Structural Standards for Steel Antenna Towers and Antenna Supporting Structures
IBC: International Building Code, International Code Council (ICC)
NBC: National Building Code, Building Official Code Association (BOCA)
NFPA-70: National Electric Code, National Fire Protection Association
SBC: Standard Building Code, Southern Building Code Conference International (SBCCI)
UBC: Uniform Building Code, International Conference of Building Officials (ICBO)
UL 752: Bullet Resisting Equipment
UL 1449: 2nd Ed., Transient Voltage Surge Suppressor
IEEE 484, Recommended Practice for Installation of Large Storage Batteries
IEEE 450, Recommended Practice for Maintenance, Testing, and Replacement of Large Storage Batteries
IEEE 485-1997, Recommended Practice for Sizing Lead-Acid Batteries for Stationary Applications
ANSI A358.1, Emergency Eyewash and Shower Equipment

III. REQUIREMENTS

A. Engineer, design, and fabricate control house to conform to performance requirements specified, herein. Requirements are categorized by discipline as structural, electrical, mechanical, and architectural. Ancillary equipment and systems not classified as above are specified as a miscellaneous requirement.

B. Structural Requirements

1. Design Loads. Design control house to resist loads from wind, gravity, structural movement including thermally induced, and to withstand in-service use (e.g. weather) without failure.
2. Provide floor panel with integral and flush lifting provisions that permit crane lift without the use of separate bolt-on devices, but make use of readily available crane hardware, e.g., hooks, shackles, or D-rings. Design lifting provision for control house tie-down. Tie-down hardware in wall not permitted.
3. Unless otherwise indicated, design loads are:
 - a) 200 psf uniform floor live load per ASCE 7 while on foundation
 - b) 125 psf uniform floor live load per ASCE 7 during lifting and transport
 - c) 100 psf uniform roof live load per ASCE 7
 - d) 120-150 mph wind load per ASCE 7, exposure C
 - e) Seismic: importance factor 1.0, use group I, spectral response coefficients – SDS = 0.47 & SD1 = 0.19, site class D
 - f) 2-hour fire resistance per ASTM E119 on exterior walls
 - g) Level 4 high rifle bullet resistance when tested in accordance with UL 752
 - h) In addition, control house shall be capable of certification under the following model code influences and construction classifications when classed as **S2** occupancy:
 - i) UBC [ICBO] V_N
 - j) SBC [SBCCI] IV_U
 - k) NBC [BOCA] 5B
 - l) IBC [ICC]..... 5B
4. Materials. Furnish required materials and components in the process necessary for structural system.
5. Concrete. Use concrete formulation with no less than 4000-psi compressive strength at 28 days and a density less than 100 pcf.
 - a) Cement: Type I or II Portland cement per ASTM C150
 - b) Aggregate: lightweight sand per ASTM C33 and lightweight coarse per ASTM C330; use coarse aggregate no larger than ¾ inches nominal.
 - c) Admixtures: air entraining admixtures per ASTM C260 and water reducing admixtures per ASTM C494.
 - d) Water: clean and free of oils, acids, solids, salts, organic materials, or other substances harmful to concrete or reinforcing steel. Use no non-potable water.

6. Steel. Use embedded reinforcing and other structural steel components that conform to the following:

- a) Rebar: use grade 60 deformed reinforcing bar per ASTM A615
- b) Welded wire fabric: use $f_y=60$ ksi wire fabric reinforcement per ASTM A185
- c) Other steel: use ASTM A36 steel, or better, for other steel components, e.g. weld plates, lifting and tie-down hardware

7. Installation.

a) Panel Fabrication. Construct floor, walls, and roof into pre-cast reinforced concrete panels in conformance with ACI 318 with a minimum thickness of 6" on floors and 4" on roof and wall panels. Cast reinforced steel plates in floor, walls, and roof panels to provide for welded panel-to-panel connections. Also:

- (1) Measure, mix, and transport concrete per ACI 304
- (2) Collect concrete samples for strength testing per ASTM C172, mold into cylinders per ASTM C31, and test for compressive strength per ASTM C39; see also Section 4, herein
- (3) Cure concrete in forms and protect from moisture loss, excessive heat, and freezing until removal from form; conform to ACI 305 and ACI 306 as required for hot and cold concreting
- (4) Consolidate concrete per ACI 309
- (5) Mold or screed minimum 1/4" per foot slope on roof in two directions for proper water drainage
- (6) Mold steel door frames into cast panel walls where required by drawing [client drawing number]; see also §3.4.2(F), herein; include step-joint threshold to prevent water from entering control house
- (7) Mold keyed or step-joint edges into fabricated panels to enhance moisture protection and water runoff; mold roof/wall so that joint is not exposed
- (8) Treat wall panels with retarders as required to permit exposure of coarse aggregate for exterior finish; "seeding" of exterior surface with coarse aggregate is not permitted

b) Control house Assembly. Install weatherproofing features as concrete panels are assembled. Weld finished panels together to form rigid concrete shell. Also:

- (1) Dust and waterproofing per §3.4.2, herein
- (2) Welding: use certified welders and conform to applicable provisions of AWS D1.1 and D1.4

C. **Electrical Requirements**

1. Electric Power & Lighting. Engineer, design, and furnish electrical system compatible with applicable electrical details on MTE control house drawing and NFPA 70, the National Electrical Code. Except as noted on MTE control house drawing also comply with the following:

- a) General interior lighting: minimum of 50 fc at the work plane, 30" above finished floor
- b) LED interior lighting is preferred.
- c) Emergency interior lighting: self-contained unit with battery back-up for 1½ hours of service when fully charged
- d) Service AIC rating: 10,000 amps minimum

- e) Provide 15-amp duplex convenience receptacles around room perimeter
2. Electric Control Wiring. Engineer, design and furnish controls that will operate on-board systems without need for operator intervention. Also provide alarm wiring that will alert persons present and remote alarm systems of conditions that require attention.
3. Air Conditioner Unit Control. Provide thermostatic controls to operate primary air conditioner for ordinary loads and alternate air conditioner for periods of high load that cannot be sustained by primary unit. Configure system to alternate between redundant air conditioners to level running time.
4. Generator Control. On control houses equipped with generator, provide control to sense voltage or frequency fault, start generator, and switch control house load from the utility power grid to generator; see separate specification for complete generator controls.
5. Fire Suppression Control. On control houses equipped with fire suppression and detection, provide control to sense the following conditions and provide stated alarm, and provide wired control contacts for field connection to MTE monitor:
 - a) First alarm: if any detector in any zone senses positive, sound horn or siren and close “first alarm” contacts
 - b) Second alarm (pre-discharge): if any two (2) detectors from different zones sense positive, sound bell (or horn with different tone characteristic than first alarm), close “second alarm” contacts, shut-down air handling systems, and initiate discharge of suppression agent after 10-second countdown
 - c) Trouble alarm: if power should fail, or supervised circuit be opened or shorted, close “trouble alarm” contact
 - d) Manual release: if pull station located near door is engaged, begin immediate initiation of countdown to discharge and agent release
 - e) Manual abort: while mushroom pushbutton is engaged, suspend countdown to discharge and agent release
 - f) Wire detector, discharge, manual release, abort, and audible alarms as supervised circuits to detect inadvertent circuit damage or disruption.
6. Miscellaneous Alarms. Provide the following additional alarms by wiring form “C” alarm contacts to MTE monitor:
 - a) High temperature alarm (HTA): engage contacts when temperature exceeds preset limit
 - b) Low temperature alarm (LTA): engage contacts when temperature falls below preset limit
 - c) High humidity alarm (HHA): engage contacts when relative humidity exceeds preset limit
 - d) Low humidity alarm (LHA): engage contacts when relative humidity falls below preset limit
 - e) Door (intrusion) alarm (DA): engage contacts when magnetic pick senses door opening
 - f) Power fail alarm (PFA): engage contact when total system power or single phase is lost
 - g) Smoke alarm (D_n): engage when smoke products are sensed in line smoke detector; not required as separate item when fire suppression and detection system is specified
 - h) Hydrogen detection alarm (HDA): engage contact upon detection of hydrogen gas

- i) Surge Arrester alarm (SUR): engage contact upon detection of status change
7. Materials. Furnish materials, components, and devices that are new and of highest quality, and standard products of manufacturers regularly engaged in their production. Ensure that, where applicable, electric materials are listed or recognized by Underwriters Laboratories, or another 3rd-party agency approved by MTE. See MTE's control house drawing for specific components and systems, as well as circuit ratings and sizes. Conform to the following:
- a) Power wiring: 600V THHN or THWN wire sized in accordance with NFPA-70; use size 12 awg minimum
 - b) Control wiring: 250V TFFN solid wire sized in accordance with manufacturer or listing instructions for class 2 thermostat, generator, or fire detection systems; use #18 awg minimum
 - c) Alarm wiring: 250V solid shielded, twisted cable assemblies; use #22 awg minimum
 - d) Fixed raceway: EMT, rigid metal conduit, or metal wireway size per NFPA-70
 - e) Flexible raceway; use liquidtight conduit on exterior and flexible metal conduit on interior of control house
 - f) Branch circuit breakers: thermal magnetic circuit breakers; rate breakers that supply lighting circuits as "SWD" and motor loads as "HACR"
 - g) Light fixtures: 2-tube, 4-foot surface-mounted fluorescent fixtures with CBM-rated ballast, prismatic wrap-around diffuser, and in-line RFI filters for noise suppression or LED
 - h) Wiring devices: use UL listed quiet-type lighting toggle switches and grounded receptacles
 - i) Service Disconnects: Fused disconnects or enclosed circuit breakers labeled as "suitable for use as service equipment"
8. Installation. Perform all wiring in accordance with best commercial practice in accordance with NFPA-70.
- a) Install wiring in surface mount EMT conduit; where flexible conduit is required by code between equipment and final junction box in circuit, use flexible metal conduit on interior and liquidtight conduit on control house exterior
 - b) Where required, use properly sized and insulated wire nuts for conductor splices; locate no splices except in outlet or junction boxes.
 - c) Install 75W incandescent exterior door light with vandal-resistant lens and, when required by drawing [client drawing number], a photocell and switched override
 - d) Coordinate location of interior light fixtures to maximize illumination between rows of equipment
 - e) Center duplex receptacles 18 inches above finished floor and locate so that no point along room perimeter is greater than six feet from a receptacle
 - f) Insofar as practical, enclose class 2 signal circuits in raceway
9. AC Panelboard.
- a) 120/240V, 1 phase, 3-wire, 42 circuit bolt-on breakers, surface mount, 10-kAIC, 225A bus rating, 225A main breaker.
 - b) As circuit breakers shall be clearly labeled with a panel schedule.
 - c) Provide a minimum of (3) 3" conduits from panelboard to cable tray.
 - d) Provide calculated amps per phase.

- e) See MTE drawing for requirements.
- 10. DC Panelboard.
 - a) 250V, 48 circuit plug-in breakers, surface mount, 10-kAIC, 225A bus rating, 150A main breaker.
 - b) As circuit breakers shall be clearly labeled with a panel schedule.
 - c) Provide a minimum of (3) 3” conduits from panelboard to cable tray.
 - d) See MTE drawing for requirements.
- 11. Telecommunications Panel
 - a) See MTE drawings for part numbers and requirements.
 - b) Provide a minimum of (2) 3” conduits from the Telecommunications panel to cable tray.
 - c) Two (2) 2” galvanized steel conduits must protrude through one exterior and interior wall below the Telecommunications Panel. Each conduit shall be plugged at the exterior end with a galvanized square head solid plug.
- 12. Provide conduit entrance boxes as shown on drawings. The conduit entrance boxes shall have removable bottom plates to allow field punching holes for conduits. The conduit entrance boxes shall have padlockable doors with a continuous hinge for permitting entry into the enclosures for work. Bolt-on covers are NOT allowed. A field installed skirt extension may be required from the bottom of the conduit entrance box to ground level.

D. Mechanical Requirements

- 1. Performance. Furnish and install mechanical systems as specified in this section when identified on MTE control house drawing.
- 2. HVAC System. Design and equip control house for heating, ventilation, and air conditioner system that will maintain interior temperature under specified operating conditions. Calculate heating and cooling based on heat load of control house manufacturer’s installed equipment and control house conduction losses and solar loading; and when furnished, use sensible and latent losses from MTE-furnished equipment loads, ventilation and personnel losses. Control house manufacturer shall calculate the heat load of all installed equipment. Size system for 100% redundancy under the following operating conditions:
 - a) Ambient temperature: -30°F (-35°C) thru 104°F (40°C)
 - b) Interior temperature: 65°F (18°C) minimum at minimum ambient, and 84°F (30°C) maximum at maximum ambient temperature,
 - c) Ambient humidity: 5-95%
- 3. Ventilation. Design and equip control house for complete air change every thirty minutes.
 - a) Backup cooling unit: control vent fan with thermostat that engages ventilation fan when temperature exceeds air conditioner’s normal cooling window
- 4. Fire Suppression System. If fire suppression and detection system is specified on MTE control house drawing, design system to stop air infiltration from air handling units. Fit vent fan discharge and intake with motorized dampers for containment of suppression agent. Provide electrical controls to shut down fans and air conditioners and close dampers before suppression agent discharge but not before commitment of system to discharge. See also separate specification for fire suppression and detection system.

5. Engine-Generator. If engine-generator is specified on MTE control house drawing, design and equip control house for alternate power service and size generator set to maintain control house complete operation through occasional power interruptions. MTE will furnish control house manufacturer with power requirements of MTE equipment and projected outage duration. See separate specification for selection of engine generator
6. Materials. Except where alternate approval is permitted, furnish only UL-listed equipment; also:
 - a) air conditioners: wall-mounted units with SEER rating no less than 10.0 and capacity rated using ARI 210/240; equip each unit with low ambient control, anti-cycle relay, integral circuit breaker disconnect, and washable filter
 - b) heater: built-in to wall mount air conditioner, smallest standard rating available for the air conditioner required
 - c) engine-generator: see separate specification
 - d) fire-suppression and detection system: see separate specification
 - e) fire extinguisher: class ABC Halon 1211 or class BC CO₂; each extinguisher fully charged to capacity with 9lb minimum
 - f) vent louvers: aluminum gravity shutters for fan intake and exhaust; add motor operator where fire suppression system is specified
 - g) vent fan: ac powered, single-speed with built-in or separate overload
 - h) thermostats: vent and air conditioner control over range of 50°-90°F; provide air conditioner control for integral heat and control to continuously run evaporator fan
7. Installation.
 - a) Air Conditioner. Install air conditioners for transport as well as operation. Use stainless steel fastening hardware for mounting air conditioners. Seal exterior with UV-resistant caulk and install drip edge over top of each unit to prevent water entry. Install fixed return grille and supply grille with one-way adjustable slats. Locate units for maximum circulation and behind no equipment obstructions.
 - b) Engine-Generator. Secure gensets in separate generator room with dedicated entrance door (similar to equipment room door, but large enough to accommodate eventual removal of generator). In addition, provide the following features for generator installation:
 - (1) Design wall to separate generator and equipment rooms to provide one (1) hour minimum fire resistance
 - (2) Equip generator room with wall-mounted fire extinguisher
 - (3) Emergency light

E. Architectural Requirements

1. Construct control house with standard interior and exterior finish and weather resistance consistent with environment of the continental United States.
2. Performance. Provide necessary weatherproofing to prevent moisture and dust infiltration. Provide panel insulation to reduce heat loss from conduction. Add insulation to floor, wall, and roof construction to ensure that total control house U₀ factor is less than 0.09 btu/hr/ft²/°F when calculated per ASHRAE 90.1.
3. Materials. Furnish components and materials that conform to architectural requirements of this specification. Also:
 - a) Dust seal: pre-compressed, self-expanding polyurethane joint sealant
 - b) Water seal: butyl tape or caulk
 - c) Roof finish: white mastic coating made with elastomeric acrylic

- d) Exterior wall coating: clear, non-yellowing and UV resistant acrylic sealer
- e) Exterior trim (concrete surfaces): high-build, textured, water based, acrylic paint for masonry and concrete;
- f) Exterior door: heavy duty steel, fully-welded with continuous aluminum tamperproof hinge
- g) Insulation walls/roof: use polyisocyanurate or other insulation with equivalent K-factor
- h) Insulation floor: use polystyrene or other insulation with equivalent K-factor
- i) Control house entrance shall be a 48"x84" door with a panic bar style operating mechanism.
- j) Desk shall be self-supporting and removable. Wall-mounted folding desk are NOT allowed.

4. Installation.

- a) Interior Finish. Finish interior walls and ceiling with white laminated sheathing board and vinyl trim. Finish floor with light colored commercial-grade vinyl.
- b) Exterior Finish. Finish exterior with medium colored exposed aggregate finish sealed with UV-resistant clear coat and painted trim. Finish roof with seamless UV-resistant elastomeric coating.
- c) Weatherproofing. Add dust and waterproofing to fabricated concrete panels before assembly:
 - (1) Waterproofing: double-seal all wall-to-wall and roof-to-wall joints with butyl sealant; to permit water runoff, use no waterproofing on wall-to-floor joints
 - (2) Dust proofing: seal exterior exposure of wall-to-wall and floor-to-wall joints with a dust seal

IV. SURGE PROTECTION

- A. The surge protector shall be GE Catalog# TLE120S050WM.
- B. Surge protection shall be mounted less than 6 inches from AC panel.

V. BATTERY SYSTEM

- A. The battery system shall consist of batteries, battery rack, rubber mat, eyewash station, spill containment, and battery charger.
- B. The battery spill containment system shall be made of a non-corrosive material and shall be capable of holding the entire volume of battery acid contained within the battery system.
- C. The battery system nominal voltage shall be 125VDC.
- D. The battery system shall be electrically isolated from ground.
- E. The batteries shall be Alpha Catalog# 40PzS 6-200, 130VDC, 200Amp hour, Lead Selenium. Batteries to include safety and flip top flame arrester caps. Any accessories necessary for testing and maintaining batteries shall be provided.
- F. Two (2) battery cell lifting straps shall be provided.

- G. The battery rack shall be Alpha Catalog# 2G570/2900 SEB, Seismic zone 1, 2-step, 1-tier. The battery rack rails shall be covered with plastic insulators.
- H. The battery charger shall be Alpha Catalog# ACS160252084061A0.
- I. The eyewash station shall be Survival Air Systems Catalog #SAS 5135 or equivalent. It can be obtained at NAPA Auto. The drain pipe shall be routed to the outside of the building to prevent spillage inside the control building.
- J. The Hydrogen Gas Detector shall be Arrgh!! Manufacturing Catalog #H2 HGD-DR.

VI. BATTERY CHARGER TRANSFER SWITCH AND BATTERY EMERGENCY SERVICE

- A. The following requirements will allow MTE to feed a backup battery charger and/or accept DC power from a backup battery bank.
 - 1. Two (2) 2" galvanized steel nipples must protrude through one exterior and interior wall near the battery charger. Each nipple shall be plugged at the exterior end with a galvanized square head solid plug.
 - 2. Two (2) junction boxes shall be required as follows:
 - a. One (1) junction box shall contain two (2) two-pole power distribution blocks mounted horizontally. One set of power blocks shall be wired between the 125VDC output of the battery charger and DC battery charger breaker of the DC distribution panel. The top of the terminal blocks shall be considered the "source" side, where the battery charger output is considered the "source". A 2" opening at the bottom of the junction box shall contain a grommet. The junction box shall be labeled with black phenolic with white engraved lettering, "BATTERY CHARGER DC JUNCTION."
 - c. One (1) junction box shall contain two (2) two-pole power distribution blocks mounted horizontally. One set of power blocks shall be wired between the 240VAC output of the designated battery charger AC breaker of the AC distribution panel and "AC INPUT" of the battery charger. The power blocks shall be rated to carry a minimum 30A current. The top of the terminal blocks shall be considered the "source" side, where the AC breaker output is considered the "source". A 2" opening at the bottom of the junction box shall contain a grommet. The junction box shall be labeled with black phenolic with white engraved lettering, "BATTERY CHARGER AC JUNCTION."

VII. QUALITY ASSURANCE

- A. At MTE, quality is a primary concern. Control house manufacturer must maintain an aggressive quality assurance program that ensures delivered units meet highest standards of workmanship and materials, and that these specifications are satisfied.
- B. Organization**
 - 1. Provide for separate quality assurance organization where authority and responsibility are clearly defined in writing. This organization shall have:

- a) Clear authority to withhold items that do not meet quality standards.
- b) Direct access to top management at each facility so that quality problems can be efficiently resolved
- c) Quality assurance manual with current approval by nationally recognized third party agency
- d) Records on each deliverable unit relative to item acceptance and rejection, plus disposition of rejected items

C. Material Control

- 1. Provide for program to ensure materials and components meet requirements specified herein and manufacturer's own specifications, and that nonconforming materials will not be used. This program shall include:
 - a) Receiving inspection program where receiving inspectors have ready access to appropriate drawings, engineering orders, specifications, vendor catalogs, purchase orders, etc.
 - b) Area with controlled access for adequate storage and security of materials furnished by customers
 - c) Material aging program to control use of materials with limited shelf life
 - d) Documented system for handling nonconforming materials, including means of removing nonconforming materials from process

D. Test Equipment

- 1. Provide for controlled program that maintains calibration of measuring devices, gauges, and test equipment. This includes:
 - a) Procedures that call for periodic inspection of tools used for inspection in production process and means of removing nonconforming tools and test equipment
 - b) Written working standards of accuracy for test equipment and periodic calibration program to primary standards traceable to National Bureau of Standards
 - c) Program to stamp test equipment with most recent calibration date and due date of next calibration
- 2. **In-Process Inspection**
 - a) Provide for program to ensure work-in-process and finished goods meet applicable codes & standards, manufacturer's standards, and requirements specified herein. This program shall provide for means to:
 - (1) Prevent unauthorized use of nonconforming or uninspected materials
 - (2) Inspect finished items to ensure that contract requirements are met using drawing and other documents that reflect latest changes
 - (3) Compile and maintain inspection log of in-process and final inspections of deliverable units
 - (4) Identify inspection status of in-process work
 - (5) Track disposition of rejected items, including reworked items

VIII. DOCUMENTATION

A. Engineering Drawings

- 1. Submit three (3) complete set of engineering drawings with each delivered control house unit. Include the following in each set:

- a) Final dimensioned interior layout, including wall orientation and ceiling plan showing all installed components and surface raceway
- b) Exterior elevations on all four (4) main views
- c) Electric feeder diagram, including electric service information panel schedules
- d) Control wiring diagrams and schedule of manufacturer-installed control house alarms
- e) Schedule of key allowable stresses, including wind, live floor, and live roof loads, and seismic shear coefficient; also list construction and occupancy classification
- f) Schedule of fire resistance ratings
- g) Shipping and foundation information, including approximate shipping weight
- h) Total control house section that identifies all structural components and connections, sheathings and finishes; identify total load path from top of roof to foundation connection
- i) Provide drawings on paper format no smaller than B-size, 11" x 17"; also make final engineering drawings available on AutoCAD .DWG format on CD.

B. Calculations

- 1. For certification, from a licensed PE in the state of Tennessee, submit one (1) set of complete engineering calculations as required:
 - a) Structural: justify control house construction with structural design loads
 - b) Electrical: justify service size using loads of all known equipment
 - c) Lighting: justify furnished lighting with illumination level required using zonal cavity method
 - d) Energy: justify control house construction and insulation with overall control house energy efficiency required using system performance method of ASHRAE 90.1; when required for state certification, also justify per code having jurisdiction
 - e) Air conditioner; justify air conditioner size using actual air conditioner performance with control house conduction loss, solar loading, lighting loss, vent loss, and equipment load
 - f) Fire-suppression: justify agent tank fill with control house internal area using appropriate specific volume

C. Service Manual

- 1. Provide three (3) operations and maintenance manual with each delivered control house unit. Assemble manual in bound format with table of contents to identify major divisions. Compile manual to include:
 - a) Model and serial numbers for control house and major components (e.g. air conditioner, engine-generator, etc.)
 - b) Building statement of warranty
 - c) Warranty information on components with transferable warranty
 - d) Manufacturer data on electrical and mechanical systems, and electrical components where available
 - e) control house start-up information
 - f) preventive maintenance procedures and schedule
 - g) control house repair procedures

D. Warranty

- 1. Furnish, with each delivered unit, statement of warranty that includes all systems furnished and installed by manufacturer for period of not less than one (1) year

and to commence no sooner than manufacturer's final invoice date. Items to include in statement of warranty:

- a) assignments of warranties of any systems, materials or components that exceed the one (1) year control house warranty period
- b) clear instruction on activating warranty
- c) clear instructions on submitting claims for service under warranty, including 24-hour phone contact

IX. SITEWORKS

A. Transportation to Site

1. Deliver prefabricated control house to disclosed site without damage or deformity. Encase delicate exterior components and cover openings for protection against transportation damage. Use tractor-trailer combination designed for proper over width, over height, and overweight load per DOT regulations. Use trailer with air-ride suspension.

B. Off Loading

1. Furnish crane to off load control house on MTE-furnished foundation. Provide detailed offloading drawings that describe recommended rigging requirements. Furnish and install tie-down hardware.

C. On-Site Services

1. Install all items removed for transportation; this includes, but is not limited to drip caps, hoods, and exterior lights. Work to be performed no later than seven (7) days after delivery to site.

D. Certifications

1. Furnish MTE up to four (4) sets of plans prepared and signed by a professional engineer legally authorized to practice in jurisdiction where control house will be delivered, verifying that structure meets indicated loading requirements and codes of authorities having jurisdiction. MTE will disclose site location at time of order. Also provide state certification (decal, insignia, letter, etc.) as required to legally deliver and place manufactured control house on disclosed site.

APPENDIX

BILL OF MATERIALS
MTEMC -Fall Creek Substation

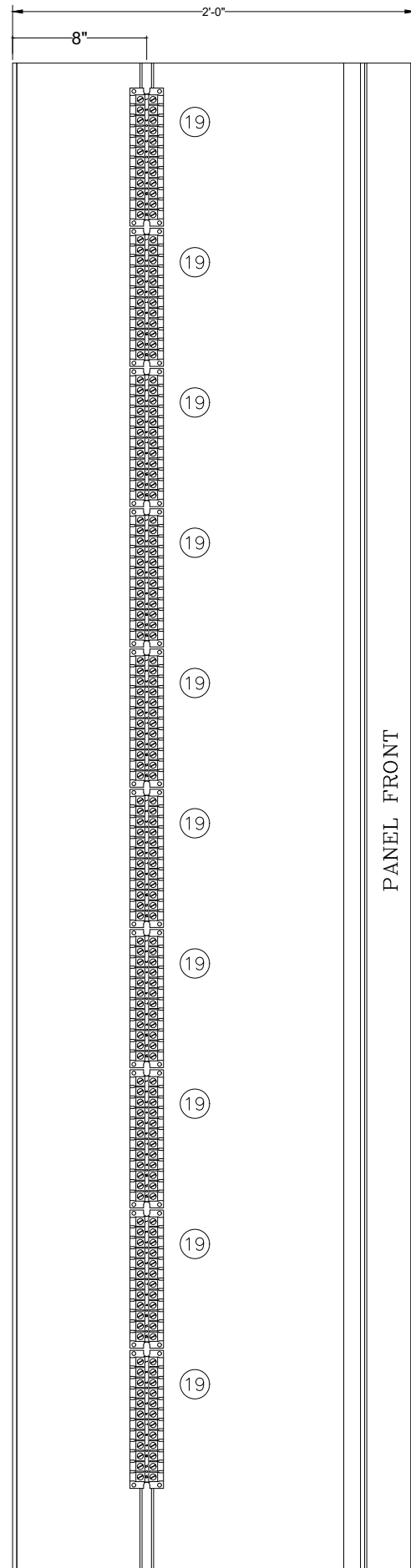
Item#	Manufacturer	Catalog#	Description	Quantity
1		PANELS	RELAY PANEL: 90"H x 24"W x 24"D, SEE MTEMC DRAWINGS FOR DETAILS.	5
2	SEL	24402H12B1B11630 2440#2CK2	DISCRETE PROGRAMMABLE AUTOMATION CONTROLLER; MOUNTING: HORIZONTAL RACK MOUNTING; I/O OPTIONS: 48 DIGITAL INPUT, 0 DIGITAL OUTPUT (48DI, 0DO); CONTROL VOLTAGE: 24 VDC/VAC DIGITAL INPUT VOLTAGE; SERIAL PORT 2: EIA-232, STANDARD; ETHERNET CONNECTION OPTIONS: DUAL COPPER 10/100BASE-T, STANDARD; COMMUNICATIONS PROTOCOL: DNP3, STANDARD; CONFORMAL COATING: NONE.	1
3	SEL	24070003B 2407#0201	GPS SATELLITE-SYNCHRONIZED CLOCK; FIRMWARE: STANDARD; OPTIONAL COMMUNICATIONS PORT: NONE; ANTENNA: GPS ANTENNA WITH 75 FEET OF CABLE; PACKAGING: CLOCK WITH 19" RACK-MOUNT BRACKET.	1
4	SEL	252301H13A0A0XX KEY:7533	ANNUNCIATOR PANEL WITH COMMUNICATIONS, FIRMWARE: STANDARD; POWER SUPPLY: 125/250 VDC OR VAC; HARDWARE MOUNTING: HORIZONTAL RACK MOUNT, 5U; COMMUNICATION OPTIONS: 2 EIA-232 REAR PORTS, 1 EIA-232 FRONT PORT; SERIAL COMMUNICATIONS PROTOCOLS: STANDARD PLUS DNP 3.00 LEVEL 2 SLAVE; AUXILIARY CARD: EIA-232 OR EIA-485 SERIAL COMMUNICATION CARD; CONTROL INPUT VOLTAGE: 125 VDC OR VAC; CONFORMAL COAT: NONE	1
5	SEL	3350#QQYT	REAL TIME AUTOMATION CONTROLLER; MOUNTING: HORIZONTAL RACK MOUNT, 3U; POWER SUPPLY: 125/250 VDC, 120/240 VAC.	2
6	SEL	751001AA01A1A85AC00 751#6CMH	FEEDER PROTECTION RELAY, HIGH-SIDE OF TRANSFORMER; FRONT PANEL: 5-INCH COLOR TOUCHSCREEN WITH 8 PUSHBUTTONS; SLOT A POWER SUPPLY VOLTAGE: 110-250 VDC (110-240 VAC), 50/60 HZ; SLOT A DIGITAL INPUT VOLTAGE: 125 VDC/VAC; SLOT B ETHERNET (PORT 1): SINGLE 10/100BASE-T ETHERNET; SLOT B REAR SERIAL PORT (PORT 3): EIA-232; SLOT C: SERIAL COMM (EIA-232/485); SLOT D: 4 DI / 4 DO ELECTROMECHANICAL (FORM A), 125 VDC/VAC; SLOT E: 4 DI / 4 DO ELECTROMECHANICAL (FORM A), 125 VDC/VAC; SLOT Z VOLTAGE INPUTS: 3-PHASE AC VOLTAGE (300 VAC); SLOT Z CURRENT INPUTS: 5 AMP PHASE, 5 AMP NEUTRAL; CONFORMAL COAT: NONE.	2
7	SEL	07872EE1AA01A7985A200 787#H2KH	TRANSFORMER PROTECTION RELAY; MODEL OPTIONS: 2-WINDING CURRENT DIFFERENTIAL, 1 NEUTRAL CURRENT AND 3 VOLTAGE INPUTS; FRONT PANEL: 5-INCH COLOR TOUCHSCREEN WITH 8 PUSHBUTTONS; SLOT A POWER SUPPLY VOLTAGE: 110-250 VDC (110-240 VAC); SLOT A DIGITAL INPUT VOLTAGE: 125 VDC/VAC; SLOT B ETHERNET (PORT 1): SINGLE 10/100BASE-T ETHERNET; SLOT B REAR SERIAL PORT (PORT 3): EIA-232; SLOT C: SERIAL COMM (EIA-232/485); SLOT D: 4 DI / 4 DO ELECTROMECHANICAL (FORM A), 125 VDC/VAC; SLOT E: 5 AMP NEUTRAL AC CURRENT INPUT / 3-PHASE AV VOLTAGE (300 VAC) INPUTS; SLOT Z CURRENT INPUTS: 6-PHASE AC CURRENT INPUT (5 AMP WINDING 1 / 5 AMP WINDING 2); SLOT Z VOLTAGE INPUTS: NA; CONFORMAL COAT: NONE.	2
8	SEL	751001AA01A7085AC00 751#BC94	FEEDER PROTECTION RELAY, LOW-SIDE OF TRANSFORMER; FRONT PANEL: 5-INCH COLOR TOUCHSCREEN WITH 8 PUSHBUTTONS; SLOT A POWER SUPPLY VOLTAGE: 110-250 VDC (110-240 VAC), 50/60 HZ; SLOT A DIGITAL INPUT VOLTAGE: 125 VDC/VAC; SLOT B ETHERNET (PORT 1): SINGLE 10/100BASE-T ETHERNET; SLOT B REAR SERIAL PORT (PORT 3): EIA-232; SLOT C: SERIAL COMM (EIA-232/485); SLOT D: 4 DI / 4 DO ELECTROMECHANICAL (FORM A), 125 VDC/VAC; SLOT E: VSYNC (300 VAC) / VBAT (300 VDC) / 4 ARC-FLASH DETECTION INPUTS; SLOT Z VOLTAGE INPUTS: 3-PHASE AC VOLTAGE (300 VAC); SLOT Z CURRENT INPUTS: 5 AMP PHASE, 5 AMP NEUTRAL; CONFORMAL COAT: NONE.	2
9	SEL	951031B2 9510#0101 KEY: 1913	CONTROL SWITCH MODULE; LED INPUT VOLTAGE: 125 VDC; LED/BUTTON COLOR COMBINATION: OPEN = GREEN, CLOSE = RED; PUSHBUTTON GUARDS: WITH GUARDS WITH CONFIGURABLE LABELS.	4
10	SEL	0735LX20944EFXB4XX16201XX 735#MDCK	MULTI-FUNCTION METER; ENCLOSURE TYPE: NONE; METERING FORM: FORM 9 (4-WIRE WYE; 3 PTS, 3CTS); SLOT A POWER SUPPLY VOLTAGE: 110-240 VAC 50/60 HZ, 110-250 VDC; CONTROL INPUT VOLTAGE: 125 VDC/VAC; SLOT B ETHERNET: SINGLE 10/100 BASE-T; SLOT B SERIAL PORT 3: EIA 485 INCLUDES PORT 2 EIA-232 STANDARD; SLOT C COMMS: EIA-232, EIA-485; SLOT D I/O: 4 DI / 4 DO ELECTROMECHANICAL; CURRENT CLASS: CL2/10/20, OPTIMIZED FOR LOW-END ACCURACY; SYSTEM FREQUENCY: 60 HZ; SOFTWARE BUNDLE: NONE; CONFORMAL COAT: NONE.	2
11	***TVA	TVA UFLS	TVA UFLS PRE-WIRED RELAY INSERT. FURNISHED BY TVA AND INSTALLED BY CONTROL HOUSE MANUFACTURER.	1
12	STATES	402-D-B	TEST SWITCH, TYPE SMH, 2-POLE, BACK CONNECTED, RATED FOR 250V DC, 30A	10

13	ABB	FR3GJ76036J76	FT-19R TEST SWITCH ASSEMBLY, THREE RACK UNIT MOUNTING HEIGHT, GRAY (ANSI61 SMOOTH SURFACE), THREE 10 POLE TEST SWITCHES WITH THE FOLLOWING ARRANGEMENT: POSITION A: C-C C-C C-C P P P P POSITION B: T T T T T T T T T T POSITION C: C-C C-C C-C P P P P	2
14	ABB	FR3GJ76M24036	FT-19R TEST SWITCH ASSEMBLY, THREE RACK UNIT MOUNTING HEIGHT, GRAY (ANSI61 SMOOTH SURFACE), THREE 10 POLE TEST SWITCHES WITH THE FOLLOWING ARRANGEMENT: POSITION A: C-C C-C C-C P P P P POSITION B: C-C C-C C-C C-C P P POSITION C: T T T T T T T T T T	2
15	ABB	FR3GM24T91036	FT-19R TEST SWITCH ASSEMBLY, THREE RACK UNIT MOUNTING HEIGHT, GRAY (ANSI61 SMOOTH SURFACE), THREE 10 POLE TEST SWITCHES WITH THE FOLLOWING ARRANGEMENT: POSITION A: C-C C-C C-C C-C P P POSITION B: P P P T T T T T T T POSITION C: T T T T T T T T T T	2
16	ESW	24304RE	INSTRUMENT AND CONTROL SWITCH, SERIES 24, ROTARY TAP, OVAL HANDLE, 4 DECK, TRIPLE THROW WITH OFF, WITH THE FOLLOWING ENGRAVING: TITLE: "BANK SWITCH", 11 O'CLOCK POSITION: "BANK 1", 12 O'CLOCK POSITION: "NORMAL", 1 O'CLOCK POSITION: "PARALLEL", 2 O'CLOCK: "BANK 2". SEE ATTACHED CONFIGURATION SHEET.	1
17	GE	116B6708G43A73C4	INDICATION LIGHT, TYPE ET-16, LED, 125 VDC, CLEAR LENSE CAP WITH AMBER LED LAMP. TWO SPARES.	4
18	GE	EB27B04S	TERMINAL BLOCK, 4 POLE, SHORTING TYPE, NO WHITE MARKING STRIP, RATED FOR 600V, 30A, BRASS NICKEL PLATED SCREWS AND CONNECTORS, WIRE RANGE #10 TO #16 AWG COPPER WIRE. (WITH PROVISIONS FOR HOLDING 4 SHORTING PINS WHEN NOT IN USE)	10
19	GE	EB25B12	TERMINAL BLOCK, 12 POLE, STRAIGHT STRAP TYPE, WITH WHITE MARKING STRIP, RATED FOR 600V, 75A, BRASS NICKEL PLATED STUDS AND CONNECTORS, WIRE RANGE #10 TO #16 AWG COPPER WIRE.	66
20	BUSSMAN	H25030-2S	FUSEBLOCK, 2 POLE, CLASS H(K), RATED FOR 250V, 30A.	22
21	BUSSMAN	H25030-3S	FUSEBLOCK, 3 POLE, CLASS H(K), RATED FOR 250V, 30A.	2
22	BUSSMAN	NON-10	FUSE, 10 AMP. 10 SPARE.	60
23	SEL	SEL-2800M1 KEY:1177	EIA-232 FIBER-OPTIC TRANSCEIVER, 0-40,000 BAUD, 500m, MALE DB-9 CONNECTOR, PLASTIC SHELL ENCLOSURE.	0
24	SEL	SEL-2810MR KEY:1378	MULTI MODE FIBER OPTIC TRANSCEIVER WITH IRIG-B RECEIVER, 0-20000 BITS PER SECOND, 500 M, EIA-232 MALE DB-9 CONNECTOR.	22
25	SEL	SEL-2810MT KEY:1390	MULTI-MODE FIBER-OPTIC TRANSCEIVER, EIA-232, WITH IRIG-B TRANSMITTER OR RECEIVER, 0-20,000 BITS PER SECOND, 500 m, MALE DB-9 CONNECTOR, IRIG-B TRANSMITTER.	20
26	SEL	C478A-6FT	CABLE, DATA & IRIG, SEL-3530 (DTE) TO SEL 700 SERIES W/ IRIG.	24
27	SEL	C605A-12FT	CABLE, DATA & IRIG, SEL-3530 (DTE) TO SEL 700 SERIES W/ IRIG.	8
28	SEL	C605A-18FT	CABLE, DATA & IRIG, SEL-3530 (DTE) TO SEL 700 SERIES W/ IRIG.	8
29	SEL	C953-5FT	CABLE, BNC TO BNC, FOR SEL 3530 COMM PROCESSOR TO SEL 2407.	2
30	MEAN WELL		POWER SUPPLY, NDR-120-24.	1
31	SEL	C605A-6FT	CABLE, DATA & IRIG, SEL-3530 (DTE) TO SEL 700 SERIES W/ IRIG.	2
32	EXELTECH	XP-1100-120V	POWER INVERTER XP-1100 WITH 5.25" X 19" FACE PLATE 020-00132-400	1
33	FBO*		CABLE, CAT6. 1 SPARE.	5
34	FBO*		SERIAL CABLE	1
35	MIDDLE ATLANTIC PRODUCTS	QMA-D3LK	HEAVY DUTY RACK MOUNT STORAGE DRAWER, LOCKING; COLOR: BLACK; RACKING HEIGHT: 3U, DIMENSIONS: 15.875" W X 14.5" D.	2
36	SYNACCESS	NP-05B	NETWORK CONTROLLED POWER STRIP, 5 OUTLETS, 1 RS232 PORT.	1
37	CyberPower	CPS1215RMS	Basic PDU, 120V/15A, 12 Outlets, 15ft Power Cord, 1U Rackmount	2
38	FBO*	DIN RAIL	RAILING FOR MOUNTING 24V POWER SUPPLY.	1
39				
40				
41	Tripp-Lite	SRDINRAIL2U	Adjustable Rack-Mount DIN Rail Kit	1
42	Hubbell	DRUB15	DIN Rail Utility Box, Complete Unit- Duplex Receptacle, 1) 15A 125V, 2-Pole 3-Wire Grounding, 5-15R, Gray.	2
43	Eaton	FAZ-C15/1-NA-DC-SP	15 Amp, 1-Pole, FAZ Series Din Rail Mount Circuit Breaker, 125V DC, 10 kAIC. C Curve, 5 - 10X In Current Rating. UL 489.	2
44	Eaton	FAZ-C10/1-NA-SP	10 Amp, 1-Pole, FAZ Series Din Rail Mount Circuit Breaker, 277/480V AC, 48V DC, 10 kAIC. C Curve, 5 - 10X In Current Rating. UL 489.	1
45	Weidmuller	380660000	DIN Rail Mount Terminal Block, 2 Positions, 12 AWG, 6 AWG, 16 mm ² , Screw, 76 A	6
46	Cisco	CBS110-24PP-NA	Cisco Business CBS110-24PP-NA Unmanaged Switch 24 Port GE Partial PoE 2x1G SFP Shared	1

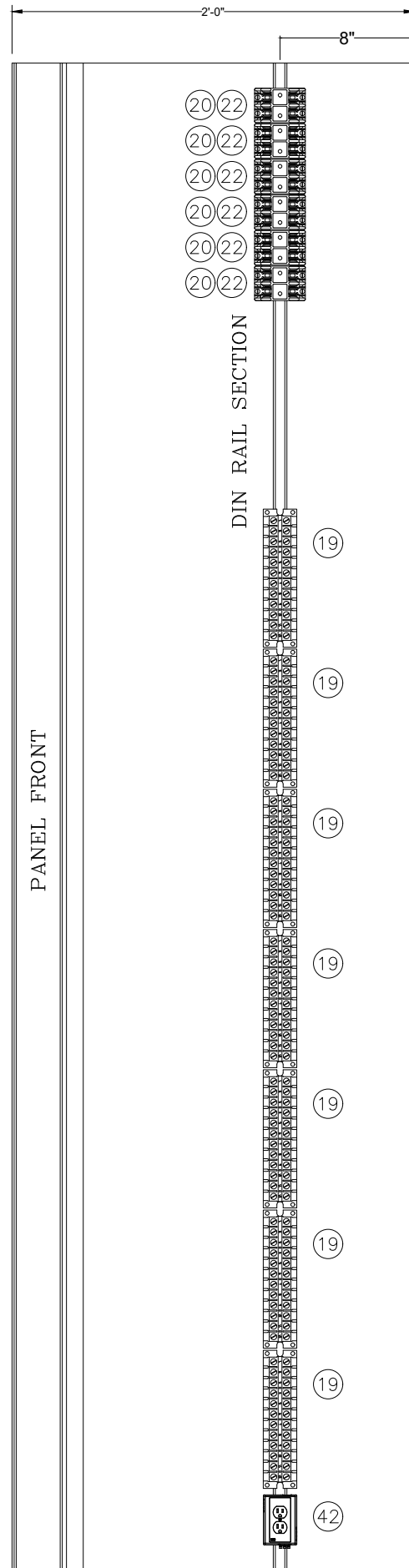
47	Juniper	ACX2200-AC	ACX2200 Universal Metro Router	1
48	Total Cable Solutions	FLP-03B-04802-3501-00602	Fiber Patch Panel	1
49	CUBE-IT Wall-Mount Cabinet	11890-736	CUBE-IT Wall-Mount Cabinet; Gen 3; 36"H x 24"W x 18"D (910 mm x 610 mm x 460 mm); 19U; #12-24 Tapped Rails; Solid Metal Door; Black.	1
50		WLLMH	NAMEPLATES (SEE MTEMC DRAWINGS FOR DETAILS), WIRE, LUGS, LABELS, AND MISC. HARDWARE.	1

FBO*= FURNISHED BY OWNER/INSTALLED BY OWNER

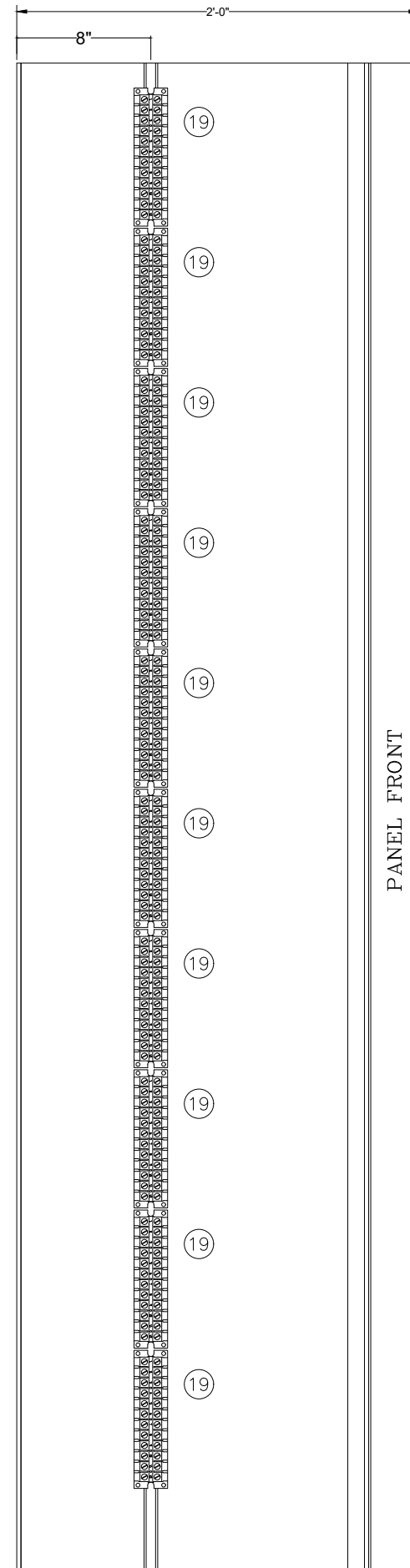
***= TO BE PROVIDED AND INSTALLED BY MTEMC



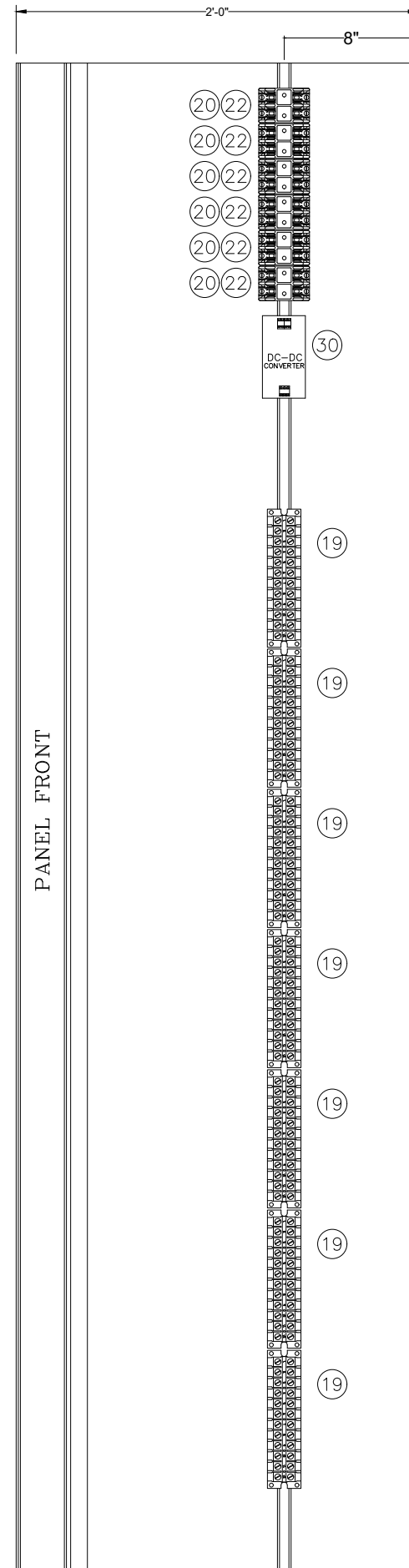
PANEL #1
LEFT SIDE (REAR VIEW)



PANEL #1
RIGHT SIDE (REAR VIEW)



PANEL #2
LEFT SIDE (REAR VIEW)



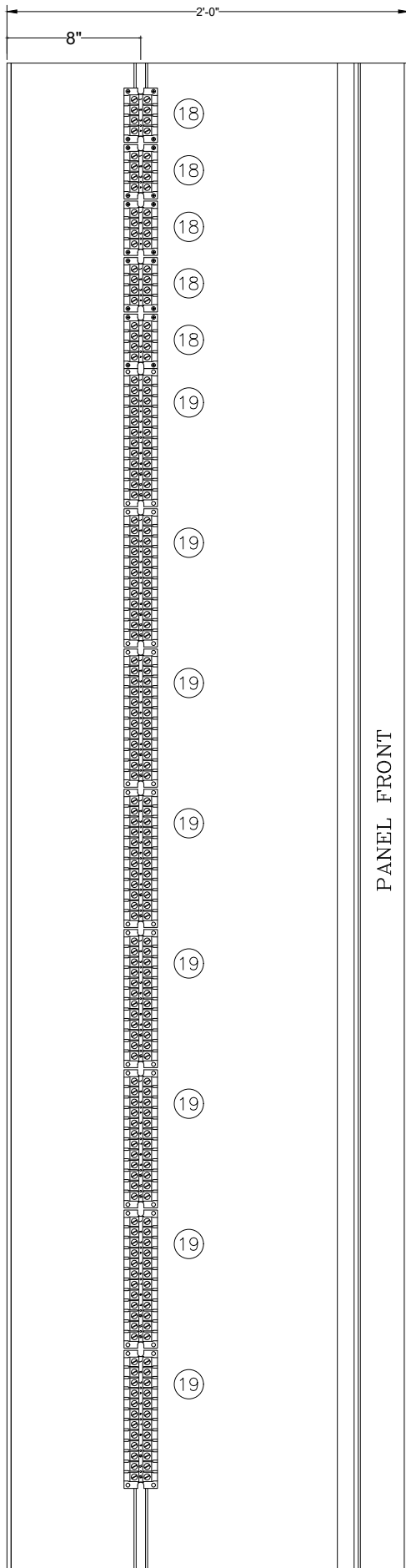
PANEL #2
RIGHT SIDE (REAR VIEW)

1. PANELS ARE 19" RACK MOUNT STYLE.
2. 1U = 1-3/4"
3. NAMEPLATES SHALL BE FASTENED TO PANEL WITH STAINLESS SCREWS.

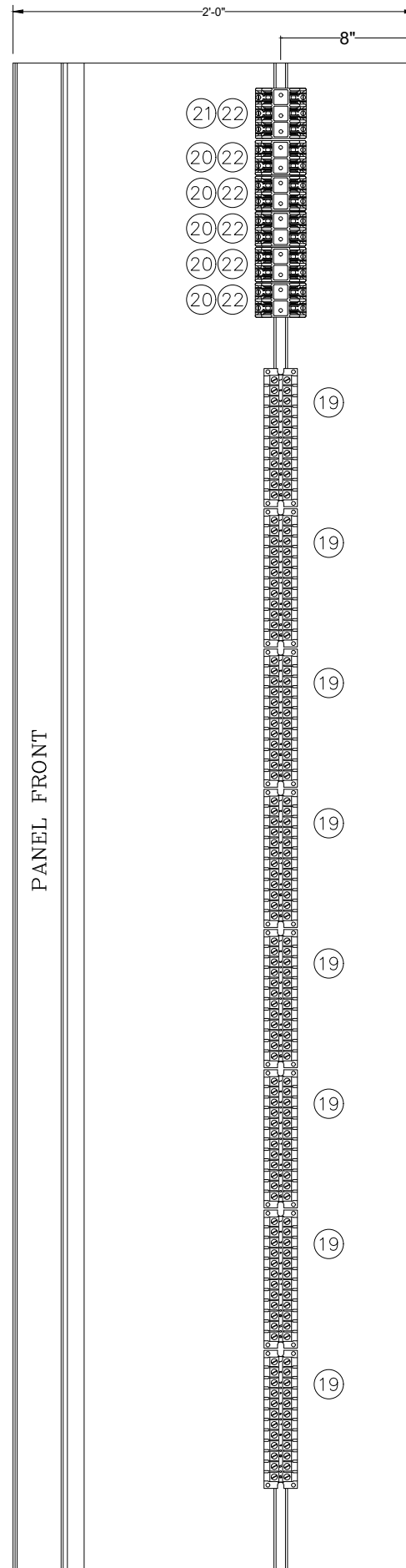
⊗ - BILL OF MATERIAL ITEM NUMBER
 ⊞ - NAMEPLATE NUMBER

DATE	REVISION	BY

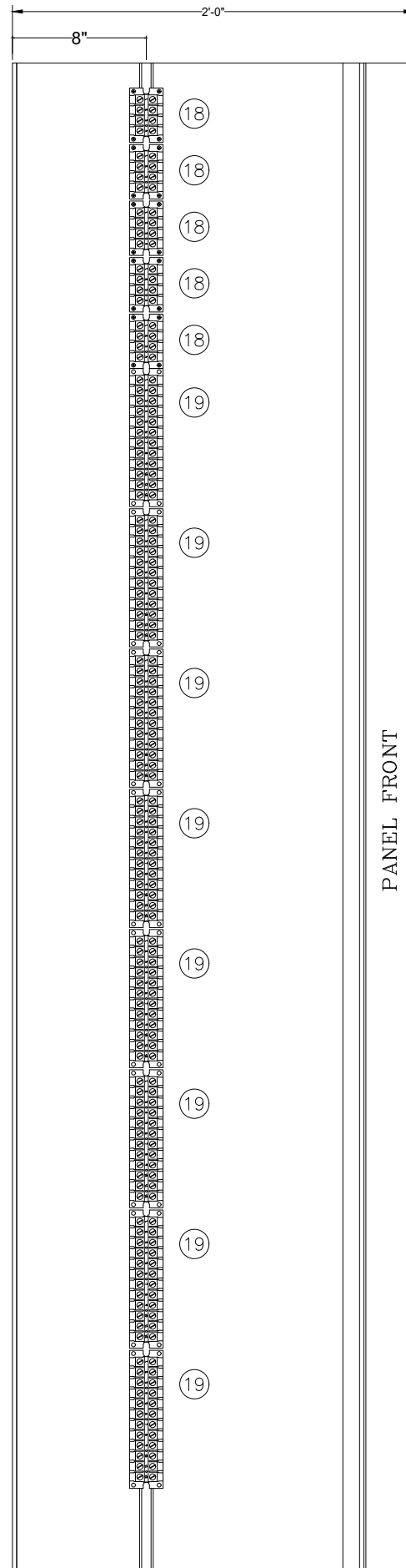
MTEMC		
FALL CREEK SUBSTATION SWITCHBOARD LAYOUTS		
SCALE: NTS	APPROVED	DATE
PREPARED BY: LDT	DRAWING NO.	NOV. 18, 2024
DRAWN BY: L. TAYLOR	FCE-140	SHEET 2
CHECKED BY: LDT		OF 11 SHEETS



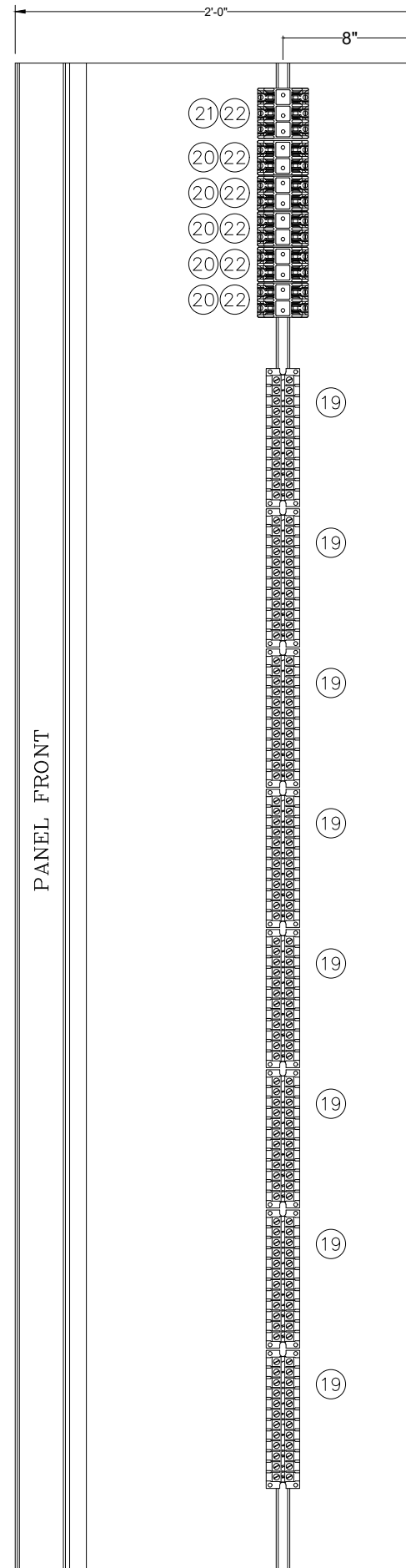
PANEL #3
LEFT SIDE (REAR VIEW)



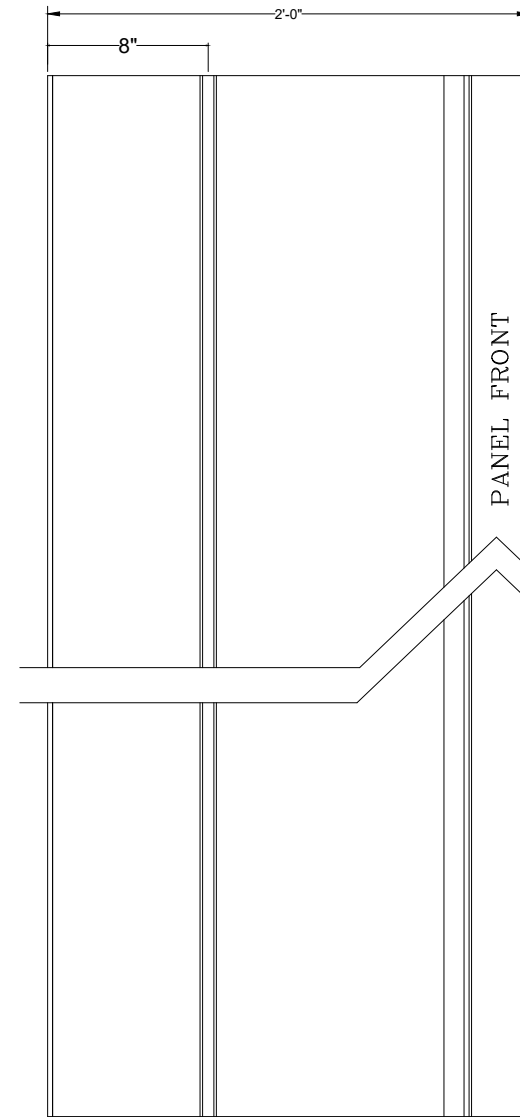
PANEL #3
RIGHT SIDE (REAR VIEW)



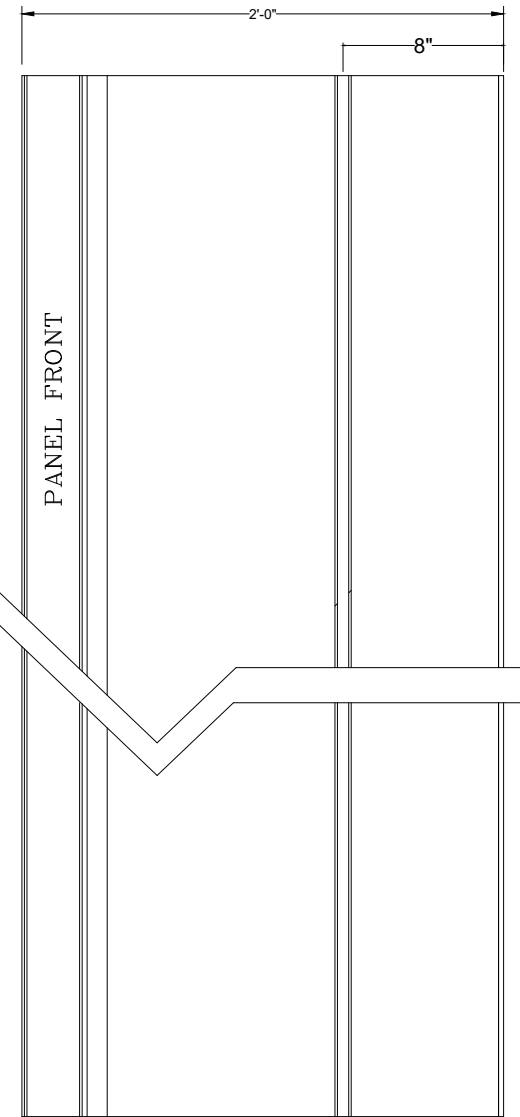
PANEL #4
LEFT SIDE (REAR VIEW)



PANEL #4
RIGHT SIDE (REAR VIEW)



PANEL #5
LEFT SIDE (REAR VIEW)



PANEL #5
RIGHT SIDE (REAR VIEW)

1. PANELS ARE 19" RACK MOUNT STYLE.
2. 1U = 1-3/4"
3. NAMEPLATES SHALL BE FASTENED TO PANEL WITH STAINLESS SCREWS.

⊗ - BILL OF MATERIAL ITEM NUMBER
 ⊠ - NAMEPLATE NUMBER

DATE	REVISION	BY

MTEMC		
FALL CREEK SUBSTATION SWITCHBOARD LAYOUTS		
SCALE: NTS	APPROVED	DATE
PREPARED BY: LDT	DRAWING NO.	NOV. 18, 2024
DRAWN BY: L. TAYLOR	FCR-140	SHEET 3
CHECKED BY: LDT		OF 11 SHEETS

PANEL#1 NAMEPLATES

NO.	SIZE	TEXT HEIGHT	LINE 1	UNDERFREQUENCY	LINE 3
1	1" x 3"	1/8"	PANEL NO. 1		
2	1" x 3"	1/8"	TVA	UNDERFREQUENCY	SCHEME
3	1" x 3"	1/8"			
4	1" x 3"	1/8"			
5	1" x 3"	1/8"			
6	1" x 3"	1/8"			
7	1" x 3"	1/8"			
8	1" x 3"	1/8"			
9	1" x 3"	1/8"			
10	1" x 3"	1/8"			
11	1" x 3"	1/8"			
12	1" x 3"	1/8"			
13	1" x 3"	1/8"			
14	1" x 3"	1/8"			
15	1" x 3"	1/8"			
16	1" x 3"	1/8"			
17	1" x 3"	1/8"			
18	1" x 3"	1/8"			
19	1" x 3"	1/8"			
20	1" x 3"	1/8"			

PANEL#2 NAMEPLATES

NO.	SIZE	TEXT HEIGHT	LINE 1	LINE 2	LINE 3
1	1" x 3"	1/8"	PANEL NO. 2		
2	1" x 3"	1/8"			
3	1" x 3"	1/8"	2440	STATION DPAC	24VDC
4	1" x 3"	1/8"	GPS CLOCK		
5	1" x 3"	1/8"	30	STATION	ANNUNCIATOR
6	1" x 3"	1/8"	3350-1	COMMUNICATION	RTAC PROCESSOR
7	1" x 3"	1/8"	3350-2	LOGIC	RTAC PROCESSOR
8	1" x 3"	1/8"	43BNK	BANK SELECTOR	SWITCH
9	3" x 5.5"	1/8"	SEE DETAIL		
10	3" x 5.5"	1/8"	SEE DETAIL		
11	3" x 5.5"	1/8"	SEE DETAIL		
12	1" x 3"	1/8"			
13	1" x 3"	1/8"			
14	1" x 3"	1/8"			
15	1" x 3"	1/8"			
16	1" x 3"	1/8"			
17	1" x 3"	1/8"			
18	1" x 3"	1/8"			
19	1" x 3"	1/8"			
20	1" x 3"	1/8"			

PANEL#5 NAMEPLATES

NO.	SIZE	TEXT HEIGHT	LINE 1	LINE 2	LINE 3
1	1" x 3"	1/8"	PANEL NO. 5		
2	1" x 3"	1/8"			
3	1" x 3"	1/8"			
4	1" x 3"	1/8"			
5	1" x 3"	1/8"			
6	1" x 3"	1/8"			
7	1" x 3"	1/8"			
8	1" x 3"	1/8"			
9	3" x 5.5"	1/8"			
10	3" x 5.5"	1/8"			
11	3" x 5.5"	1/8"			

PANEL#3 NAMEPLATES

NO.	SIZE	TEXT HEIGHT	LINE 1	LINE 2	LINE 3
1	1" x 3"	1/8"	PANEL NO. 3		
2	1" x 3"	1/8"	751-1H	H.S. OVERCURRENT	RELAY
3	1" x 3"	1/8"	787-1	DIFFERENTIAL	RELAY
4	1" x 3"	1/8"	751-1L	L.S. OVERCURRENT	RELAY
5	1" x 3"	1/8"	01CS-912	PRIMARY	CIRCUIT SWITCHER
6	1" x 3"	1/8"	CKT SW 912	DC POWER	TRIP COIL
7	1" x 3"	1/8"	01CS-914	BACKUP	CIRCUIT SWITCHER
8	1" x 3"	1/8"	CKT SW 914	DC POWER	TRIP COIL
9	1" x 3"	1/8"	MFM-1	METERING	LOW-SIDE
10	1" x 2"	1/8"	29H-1	BANK#1 H.S. O.C.	CUT-OUT
11	1" x 2"	1/8"	29D-1	BANK#1 DIFF.	CUT-OUT
12	1" x 2"	1/8"	29R-1	BANK#1 L.S. O.C.	CUT-OUT
13	1" x 2"	1/8"	29BR-1	BANK#1 OPP. C.S.	CUT-OUT
14	1" x 3"	1/8"			
15	3" x 5.5"	1/8"	SEE DETAIL		
16	3" x 5.5"	1/8"	SEE DETAIL		
17	3" x 5.5"	1/8"	SEE DETAIL		
18	3" x 5.5"	1/8"	SEE DETAIL		
19	3" x 5.5"	1/8"	SEE DETAIL		
20	3" x 5.5"	1/8"	SEE DETAIL		
21	3" x 5.5"	1/8"	SEE DETAIL		
22	3" x 5.5"	1/8"	SEE DETAIL		
23	3" x 5.5"	1/8"	SEE DETAIL		

PANEL#4 NAMEPLATES

NO.	SIZE	TEXT HEIGHT	LINE 1	LINE 2	LINE 3
1	1" x 3"	1/8"	PANEL NO. 4		
2	1" x 3"	1/8"	751-2H	H.S. OVERCURRENT	RELAY
3	1" x 3"	1/8"	787-2	DIFFERENTIAL	RELAY
4	1" x 3"	1/8"	751-2L	L.S. OVERCURRENT	RELAY
5	1" x 3"	1/8"	01CS-922	PRIMARY	CIRCUIT SWITCHER
6	1" x 3"	1/8"	CKT SW 922	DC POWER	TRIP COIL
7	1" x 3"	1/8"	01CS-924	BACKUP	CIRCUIT SWITCHER
8	1" x 3"	1/8"	CKT SW 924	DC POWER	TRIP COIL
9	1" x 3"	1/8"	MFM-2	METERING	LOW-SIDE
10	1" x 2"	1/8"	29H-2	BANK#2 H.S. O.C.	CUT-OUT
11	1" x 2"	1/8"	29D-2	BANK#2 DIFF.	CUT-OUT
12	1" x 2"	1/8"	29R-2	BANK#2 L.S. O.C.	CUT-OUT
13	1" x 2"	1/8"	29BR-2	BANK#2 OPP. C.S.	CUT-OUT
14	1" x 3"	1/8"			
15	3" x 5.5"	1/8"	SEE DETAIL		
16	3" x 5.5"	1/8"	SEE DETAIL		
17	3" x 5.5"	1/8"	SEE DETAIL		
18	3" x 5.5"	1/8"	SEE DETAIL		
19	3" x 5.5"	1/8"	SEE DETAIL		
20	3" x 5.5"	1/8"	SEE DETAIL		
21	3" x 5.5"	1/8"	SEE DETAIL		
22	3" x 5.5"	1/8"	SEE DETAIL		
23	3" x 5.5"	1/8"	SEE DETAIL		

TELECOM PANEL NAMEPLATES

NO.	SIZE	TEXT HEIGHT	LINE 1	LINE 2	LINE 3
1	1" x 3"	1/8"	PRIMARY POWER	(INVERTER POWER)	
2	1" x 3"	1/8"	BACKUP POWER	(HOUSE POWER)	
3	1" x 3"	1/8"			
4	1" x 3"	1/8"			
5	1" x 3"	1/8"			
6	1" x 3"	1/8"			
7	1" x 3"	1/8"			
8	1" x 3"	1/8"			
9	1" x 3"	1/8"			

NOTES:

- NAMEPLATES SHALL BE BLACK PHENOLIC WITH WHITE CORE. RESULT IS A BLACK NAMEPLATE WITH WHITE LETTERING.

XX - NAMEPLATE NUMBER

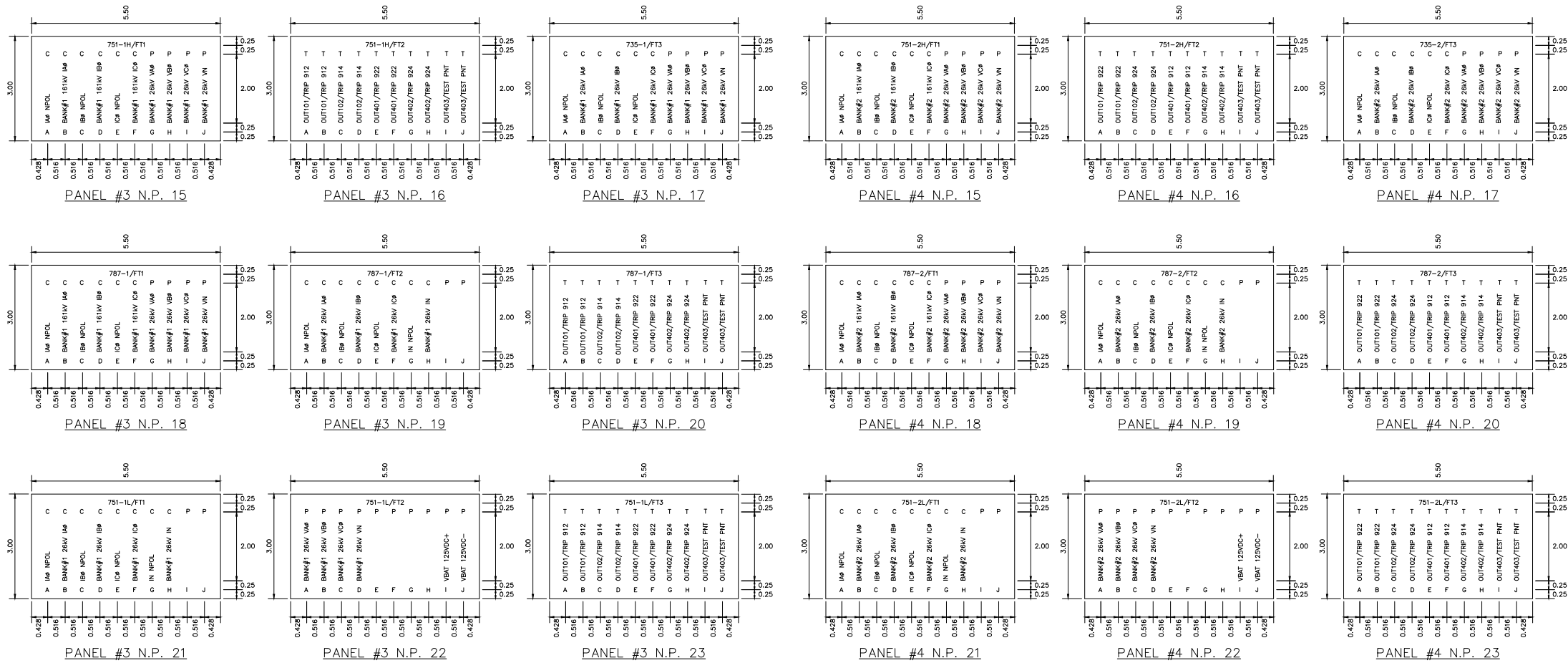
DATE	REVISION	BY

MTEMC

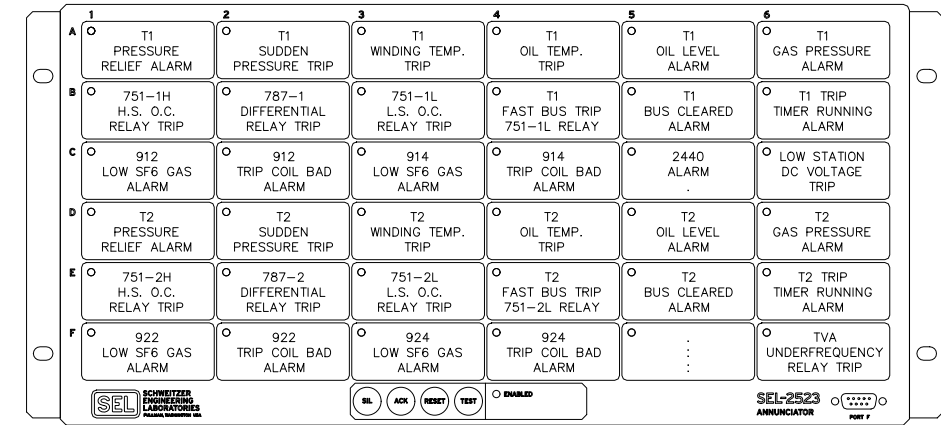
FALL CREEK SUBSTATION
NAMEPLATE SCHEDULE

SCALE: 1/4" = 1"	APPROVED	DATE
PREPARED BY: LDT	DRAWING NO.	NOV. 18, 2024
DRAWN BY: LTAYLOR	FCR-140	SHEET 4
CHECKED BY: LDT		OF 11 SHEETS

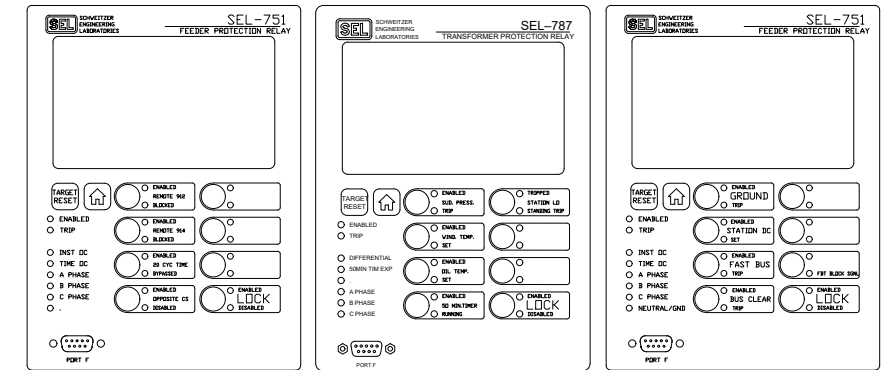
NAMEPLATE DETAILS (SEE DWG 140-4)



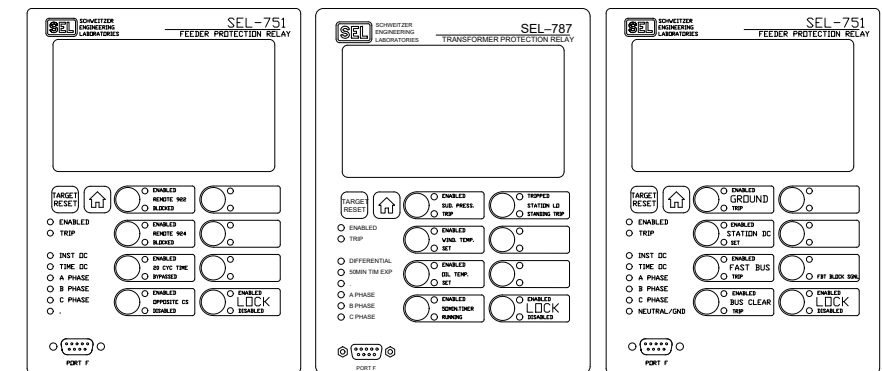
ANNUNCIATOR NAMEPLATE DETAILS



RELAY LABEL DETAILS PANEL #3



RELAY LABEL DETAILS PANEL #4



NOTES:

- NAMEPLATES SHALL BE BLACK PHENOLIC WITH WHITE CORE. RESULT IS A BLACK NAMEPLATE WITH WHITE LETTERING.

XX - NAMEPLATE NUMBER

DATE	REVISION	BY

MTEMC

FALL CREEK SUBSTATION NAMEPLATE SCHEDULE

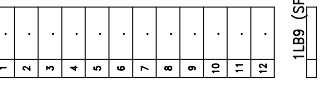
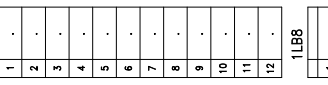
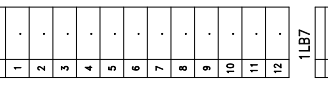
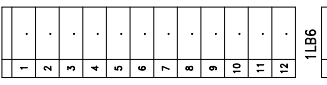
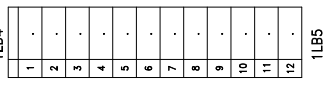
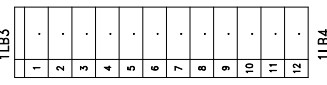
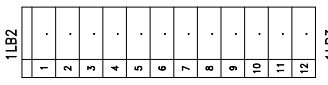
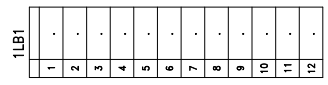
SCALE: 1/4" = 1"	APPROVED	DATE NOV. 18, 2024
PREPARED BY: LDT	DRAWING NO. FCR-140	SHEET 5
DRAWN BY: LAYLOR		OF 11 SHEETS
CHECKED BY: LDT		

LEFT

PANEL NO. 1

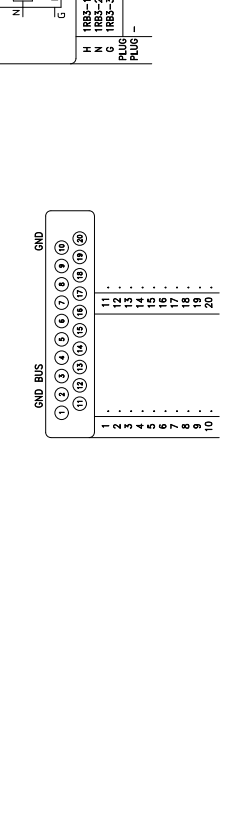
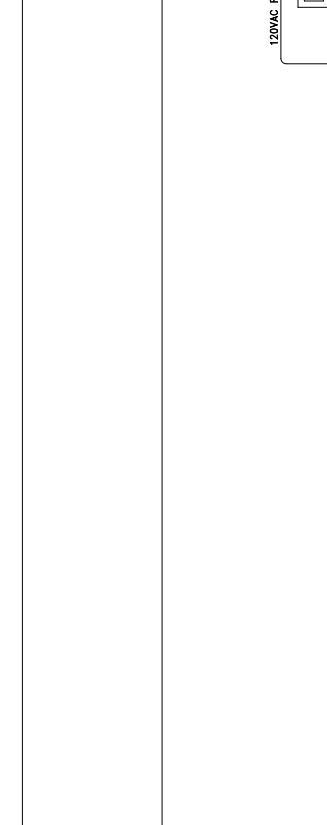
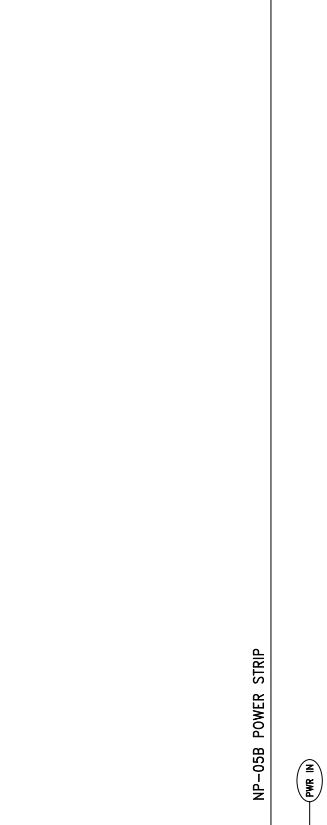
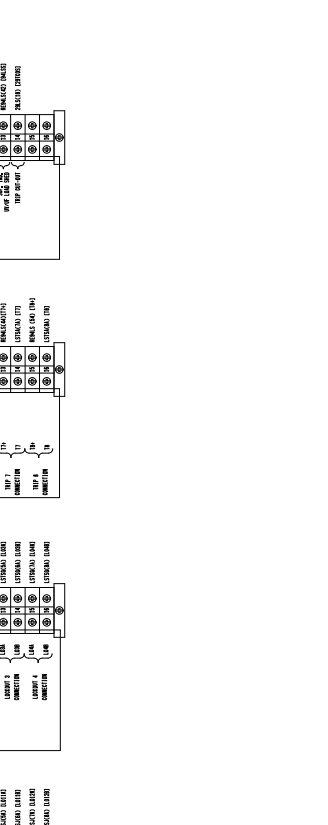
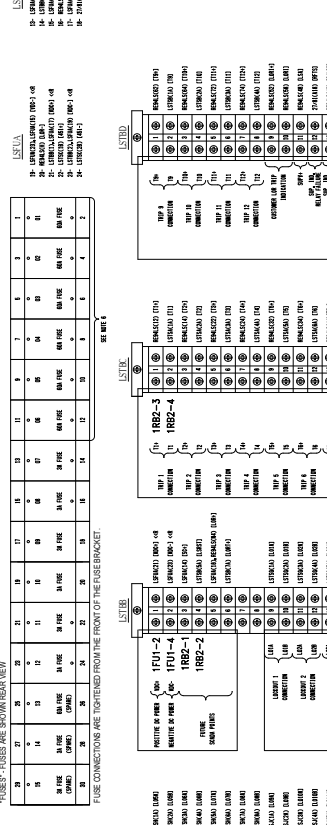
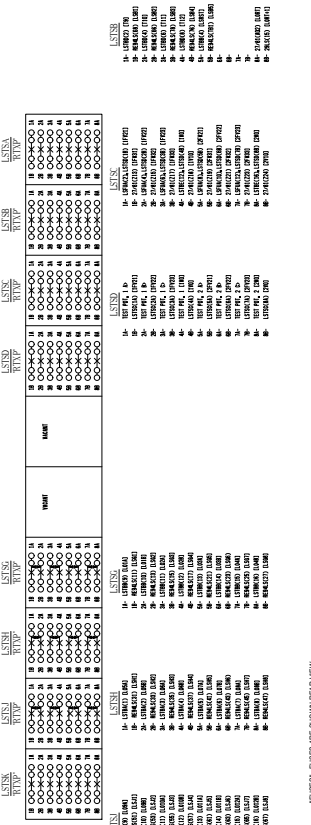
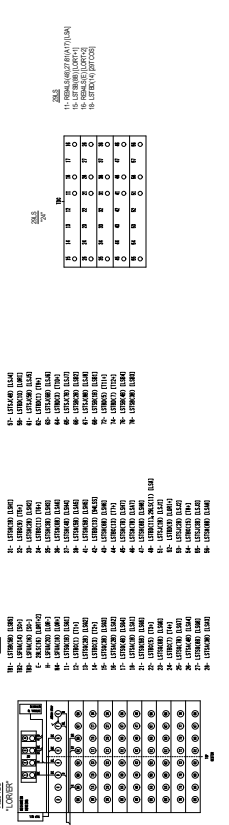
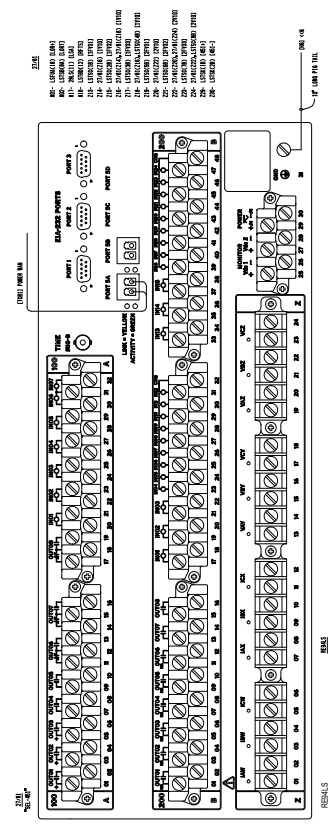
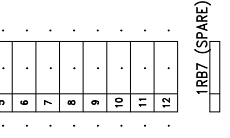
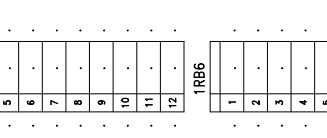
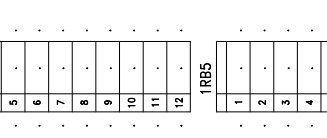
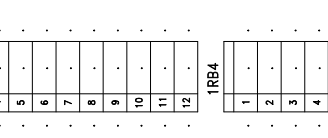
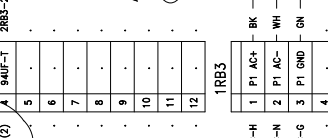
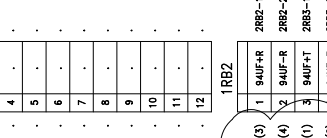
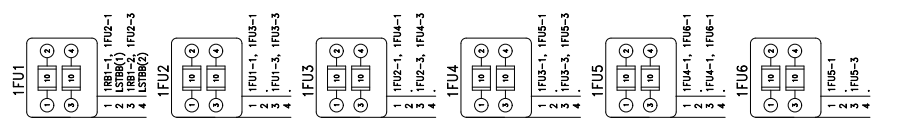
(REAR VIEW)

RIGHT



1LB9 (SPARE)

1LB10 (SPARE)



- NOTES
1. RED TEXT DENOTES CT CKTS W/ #10AWG.
 2. PT & DC CKTS GET #14AWG.
 3. RTU WIRING TO BE #16AWG.

DATE	REVISION	BY

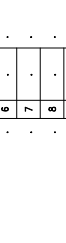
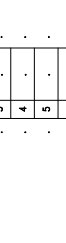
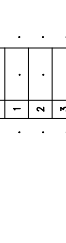
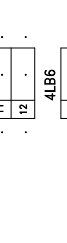
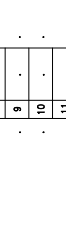
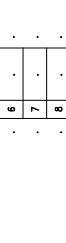
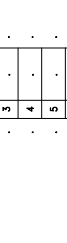
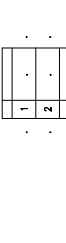
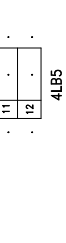
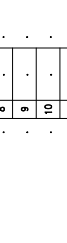
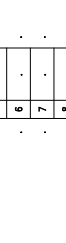
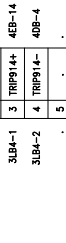
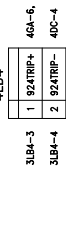
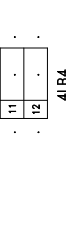
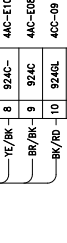
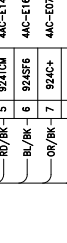
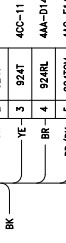
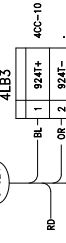
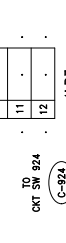
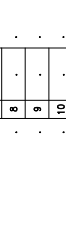
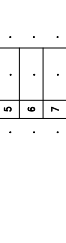
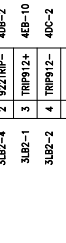
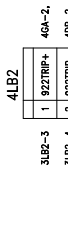
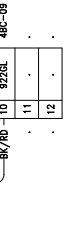
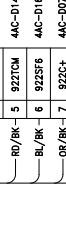
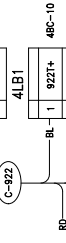
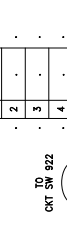
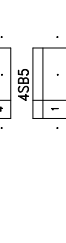
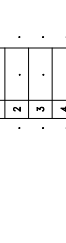
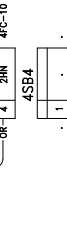
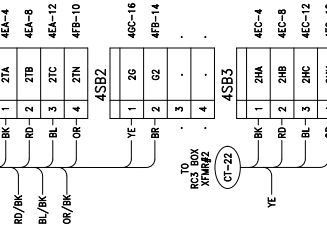
MTEMC

FALL CREEK SUBSTATION
SWITCHBOARD WIRING DIAGRAM

SCALE: NTS	APPROVED	DATE
PREPARED BY: LDT	DRAWING NO.	NOV. 18, 2024
DRAWN BY: LDT	FCR-140	SHEET 6
CHECKED BY: LDT		OF 11 SHEETS

TO RCS BOX X/MHZ CT-21

4S11

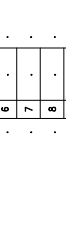
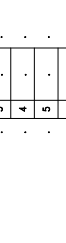
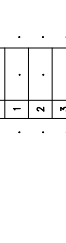
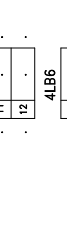
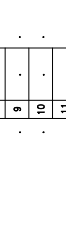
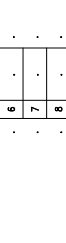
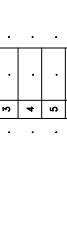
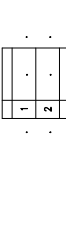
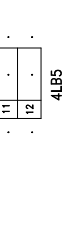
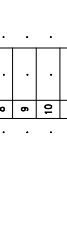
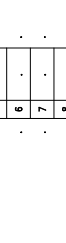
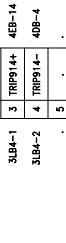
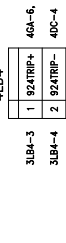
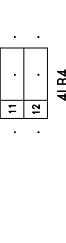
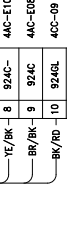
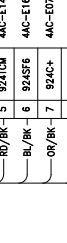
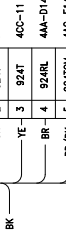
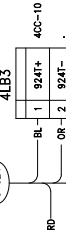
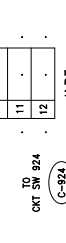
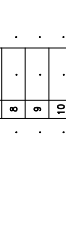
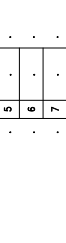
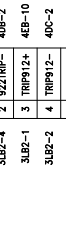
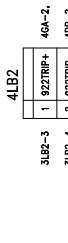
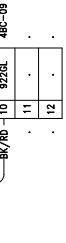
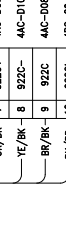
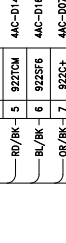
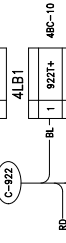
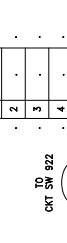
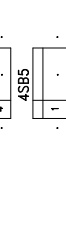
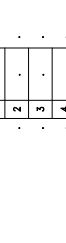
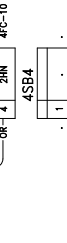
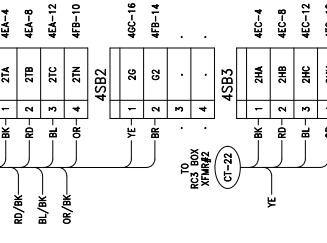


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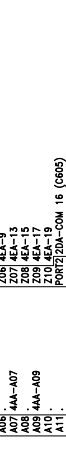
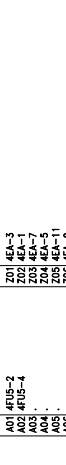
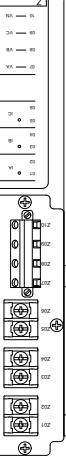
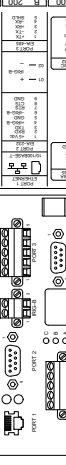
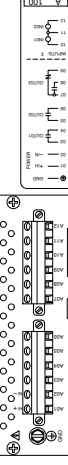
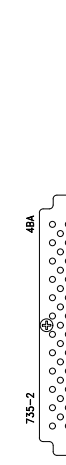
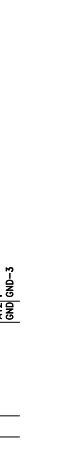
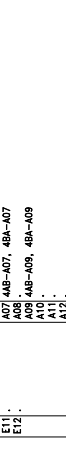
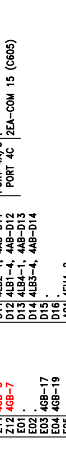
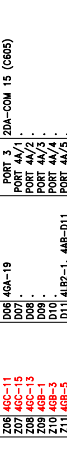
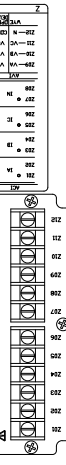
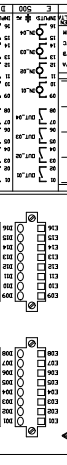
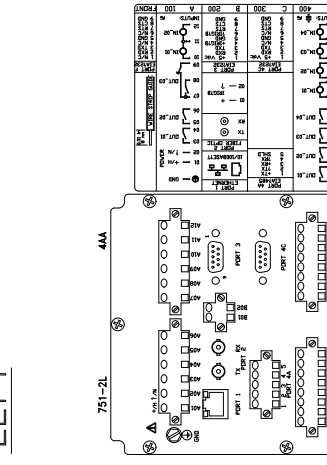
PANEL NO. 4

(REAR VIEW)

RIGHT



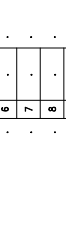
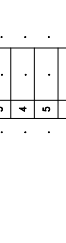
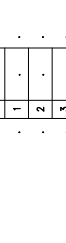
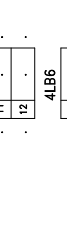
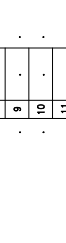
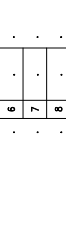
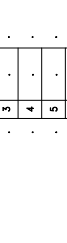
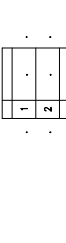
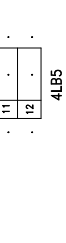
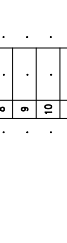
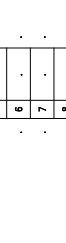
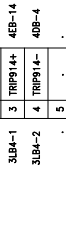
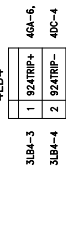
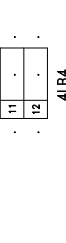
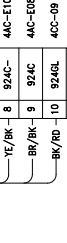
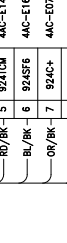
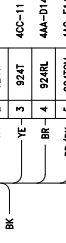
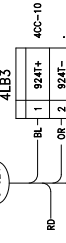
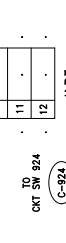
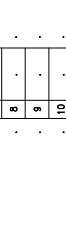
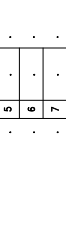
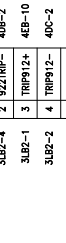
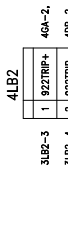
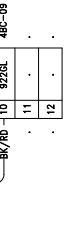
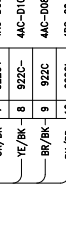
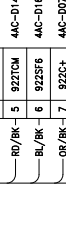
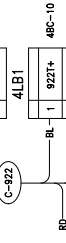
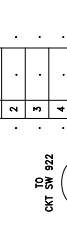
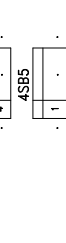
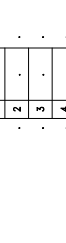
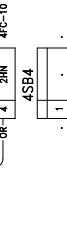
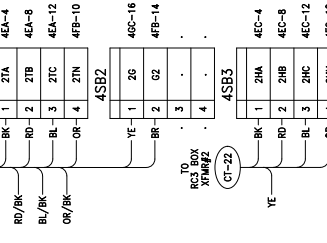
4S11



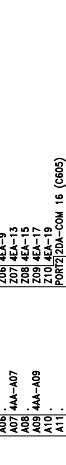
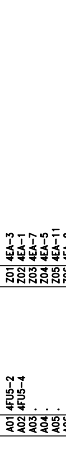
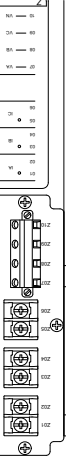
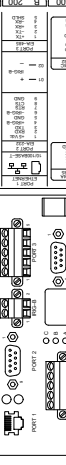
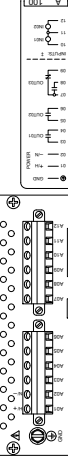
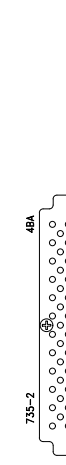
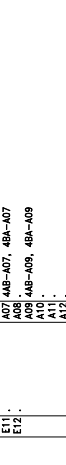
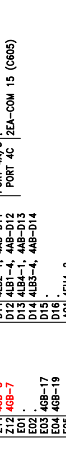
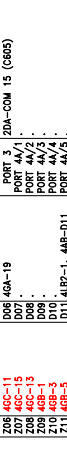
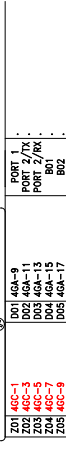
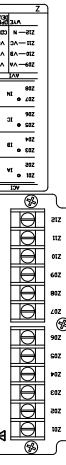
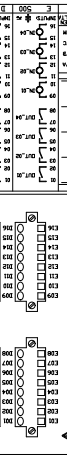
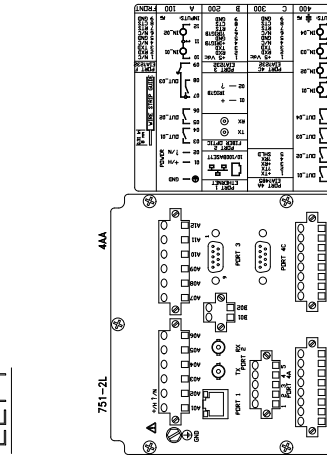
PANEL NO. 4

(REAR VIEW)

RIGHT



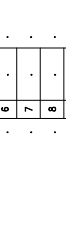
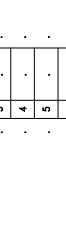
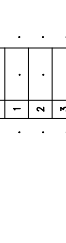
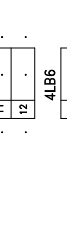
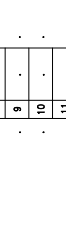
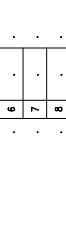
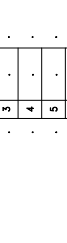
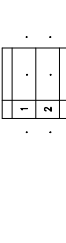
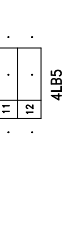
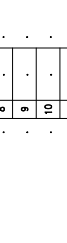
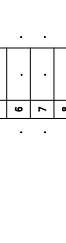
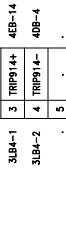
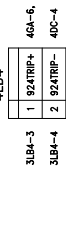
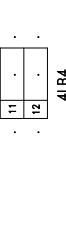
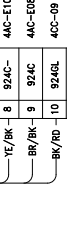
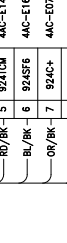
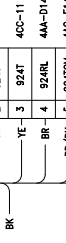
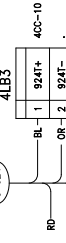
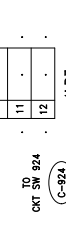
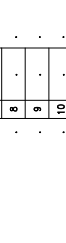
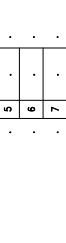
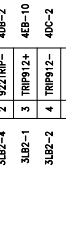
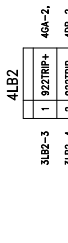
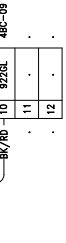
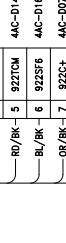
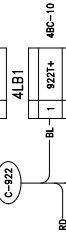
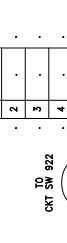
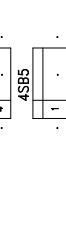
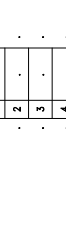
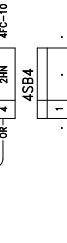
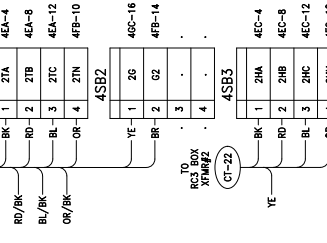
4S11



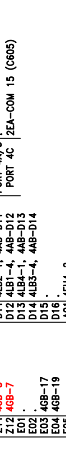
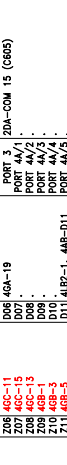
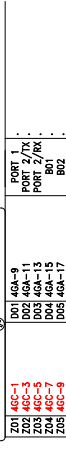
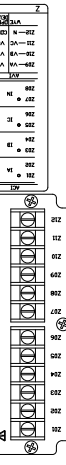
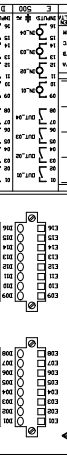
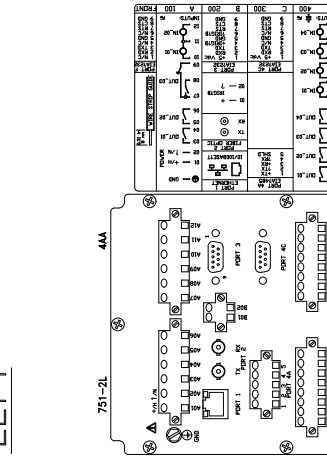
PANEL NO. 4

(REAR VIEW)

RIGHT



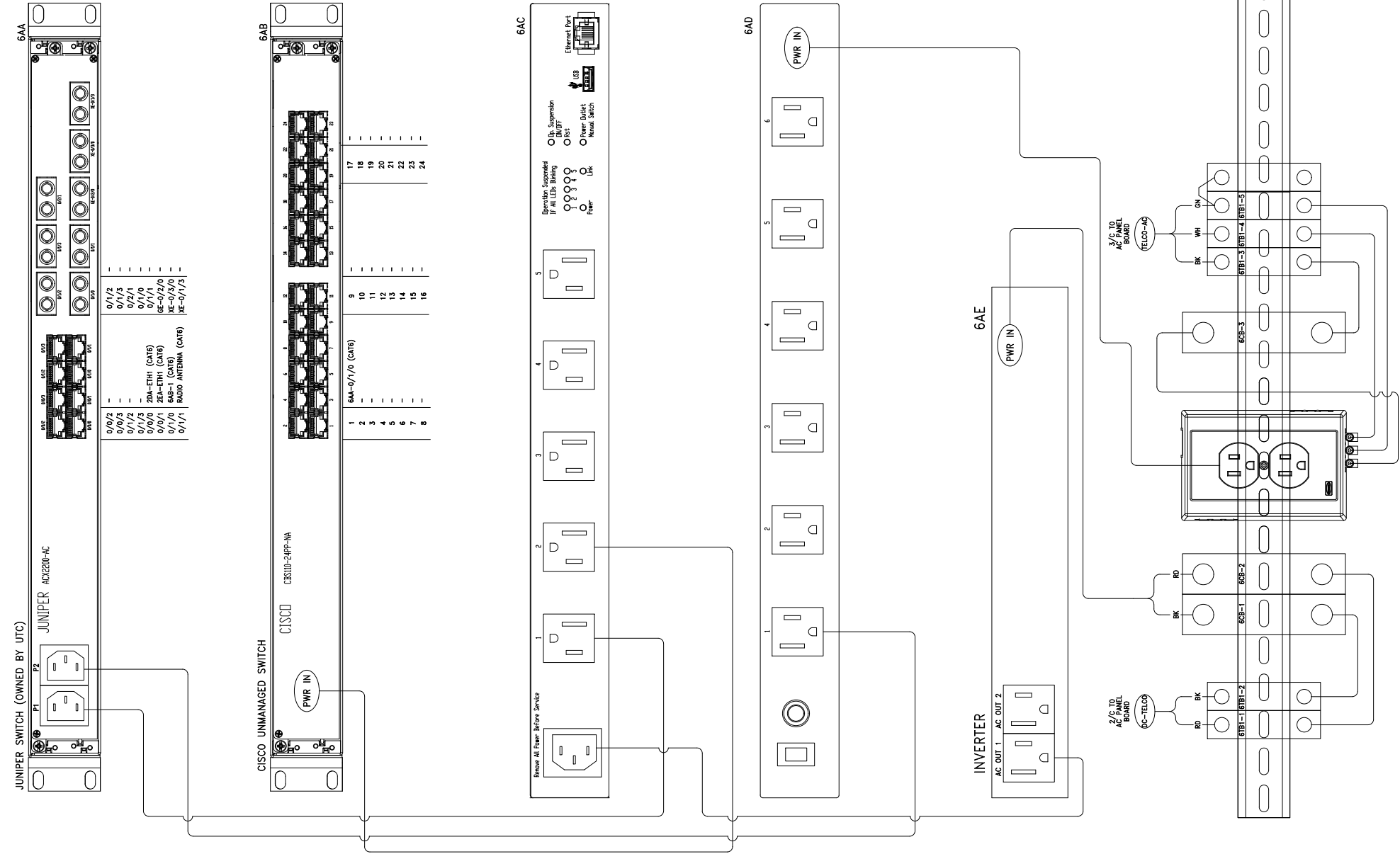
4S11



TELECOMMUNICATIONS PANEL

(FRONT VIEW)

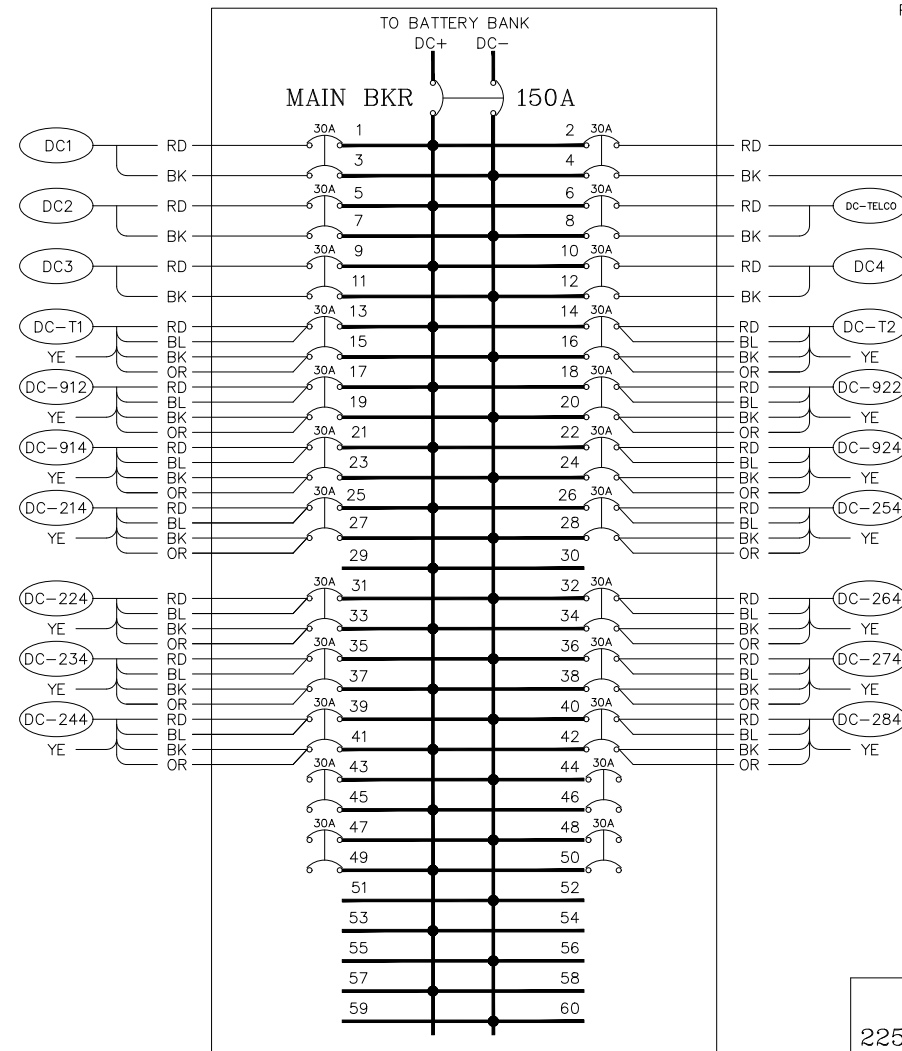
LGX FIBER PATCH PANEL



- NOTES
1. RED TEXT DENOTES CT CKTS W/ 10AWG.
 2. PT & DC CKTS GET #12AWG.
 3. ALL OTHER WIRING TO BE #12AWG.

DATE	REVISION	BY
MTEMC		
FALL CREEK SUBSTATION SWITCHBOARD WIRING DIAGRAM		
SCALE: NTS	APPROVED	DATE NOV. 18, 2024
PREPARED BY: LDT	DRAWING NO.	SHEET 11
DRAWN BY: L.TAYLOR	FCR-140	OF 11 SHEETS
CHECKED BY: LDT		

225A, 250VDC MAX., 48CKT
DC DISTRIBUTION PANEL

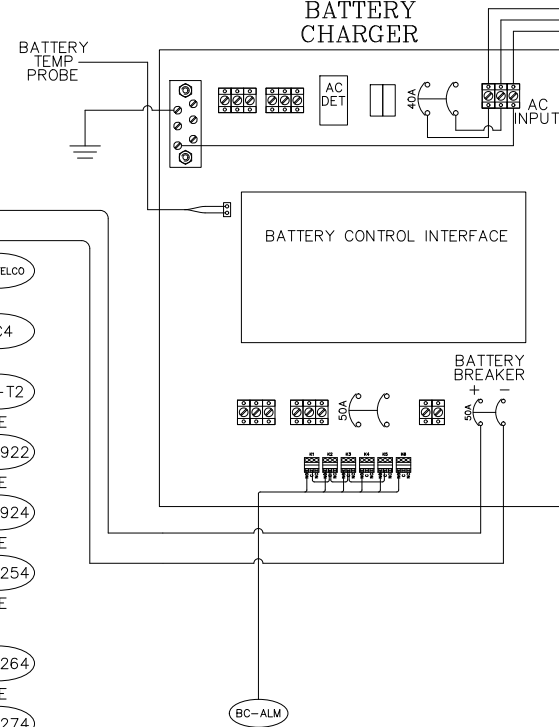


SWITCH HOUSE DC DISTRIBUTION PANEL

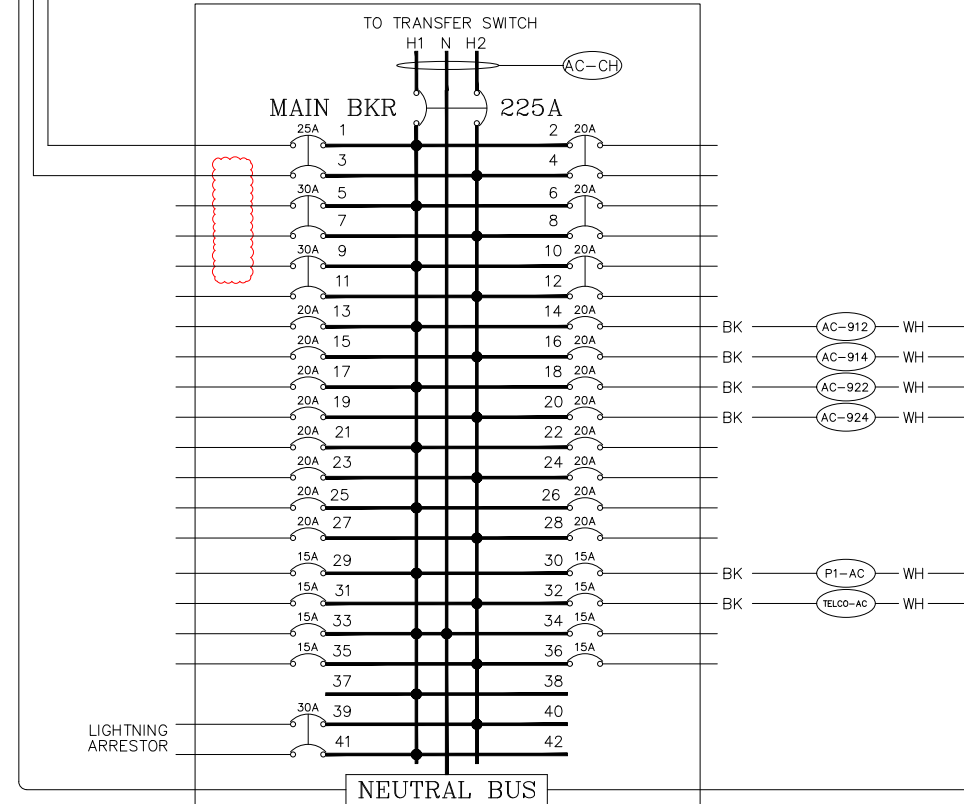
DC PANEL SCHEDULE			
225A	130VDC	150A	MAIN BKR
30 AMP RELAY PANEL #1	1	2	30 AMP BATTERY CHARGER
	3	4	
30 AMP RELAY PANEL #2	5	6	30 AMP TELECOM PANEL #6
	7	8	
30 AMP RELAY PANEL #3	9	10	30 AMP RELAY PANEL #4
	11	12	
30 AMP TRANSFORMER #1	13	14	30 AMP TRANSFORMER #2
	15	16	
30 AMP CKT SWR 912	17	18	30 AMP CKT SWR 922
	19	20	
30 AMP CKT SWR 914	21	22	30 AMP CKT SWR 924
	23	24	
30 AMP BREAKER 214	25	26	30 AMP BREAKER 254
	27	28	
	29	30	
30 AMP BREAKER 224	31	32	30 AMP BREAKER 264
	33	34	
30 AMP BREAKER 234	35	36	20 AMP BREAKER 274
	37	38	
30 AMP BREAKER 244	39	40	30 AMP BREAKER 284
	41	42	
30 AMP SPARE	43	44	30 AMP SPARE
	45	46	
30 AMP SPARE	47	48	30 AMP SPARE
	49	50	
	51	52	
	53	54	
	55	56	
	57	58	
	59	60	

CIRCUIT DIRECTORY

BATTERY CHARGER



225A 42CKT
AC DISTRIBUTION PANEL



SWITCH HOUSE AC DISTRIBUTION PANEL

AC PANEL SCHEDULE			
225 AMP	240 VOLT	1Ø	MAIN LUG
25 AMP BATTERY CHARGER	1	2	20 AMP POWER FAIL ALARM
	3	4	
30 AMP HVAC	5	6	20 AMP SPARE
	7	8	
30 AMP HOUSE REC	9	10	20 AMP SPARE
	11	12	
20 AMP BATT EXHAUST FAN	13	14	20 AMP 912 HEATER
20 AMP LIGHTS & EM LIGHTS	15	16	20 AMP 914 HEATER
20 AMP HOUSE REC	17	18	20 AMP 922 HEATER
20 AMP SPARE	19	20	20 AMP 924 HEATER
20 AMP SPARE	21	22	20 AMP TVA
20 AMP SPARE	23	24	20 AMP SPARE
20 AMP SPARE	25	26	20 AMP SMOKE DETECTORS
20 AMP SPARE	27	28	20 AMP TVA COMMS
15 AMP SPARE	29	30	15 AMP RELAY PANEL #1
15 AMP SPARE	31	32	15 AMP TELECOM PANEL #6
15 AMP SPARE	33	34	15 AMP SPARE
15 AMP SPARE	35	36	15 AMP SPARE
XX AMP EMPTY	37	38	XX AMP EMPTY
30 AMP LIGHTNING ARRESTOR	39	40	XX AMP EMPTY
	41	42	XX AMP EMPTY

CIRCUIT DIRECTORY

DATE	REVISION	BY
MTEMC		
FALL CREEK SUBSTATION AUXILIARY WIRING DETAILS		
SCALE: N.T.S.	APPROVED	DATE
CREATED BY: LDT	DRAWING NO.	NOV. 18, 2024
DRAWN BY: L.TAYLOR	FCR-142	SHEET 1
CHECKED BY: LDT		OF 4 SHEETS

CUBE-iT® Wall-Mount Cabinet

CUBE-iT® Wall-Mount Cabinet provides a secure, easy-to-install, swing-out storage solution for information and communications technology (ICT) equipment. Attractive design, security features and range of optional fan kits make it ideal for public areas or equipment rooms with limited floor space.



KEY FEATURES

- Three-part, swing-out design allows access and service to the front and rear of equipment
- A single lock and key (CH751) on the front door provides access to the entire cabinet
- Rear panel includes 1" (25.4 mm) and 3" (76 mm) knockouts, and can accept 3/4" (19 mm) and 2.5" (63.5 mm) conduit. The 3" (76 mm) knockouts include edge-protection grommets
- Rear panel features cable tie and attachment points for accessory rack-mount brackets
- UL® 2416 Listed, 300 lb (136 kg) load rating
- Internal latch mechanism secures the rear panel; slim-profile does not impact cabling space
- Hinge design allows the installer to remove the rear panel for easier installation on the wall
- Cabinet body includes one pair of adjustable depth 19" EIA threaded equipment mounting rails
- Cable pass-through knockout with optional brush seal makes it ideal for retrofit installations
- Optional low-decibel (31 dB), dual-fan kit provides quiet operation while cooling equipment
- Factory-prepped bonding feature provides convenience and reduces installation time
- Ships fully assembled

ADVANTAGES

- ➔ **Easy Access to Equipment**
 - Three-part, swing-out design enables easy access to the front and rear of installed equipment
- ➔ **Modern, Sleek Design**
 - Attractive design with multiple door styles and colors make it suitable for use in public areas outside of telecommunications rooms
 - Low-decibel, dual-fan kit option provides quiet operation while keeping active equipment cool
- ➔ **Retrofit Capability**
 - Removable top and bottom rear panels with a rectangular knockout are perfect for retrofit deployments over existing equipment and cabling
- ➔ **Increased Security**
 - A single lock and key on the front door provides access to the cabinet; the rear section is only accessible via an internal latch inside the front door
- ➔ **High Load Rating**
 - 300 lb (136 kg) UL 2416 Listed load rating supports heavier equipment
- ➔ **Cable Management Features and Options**
 - A host of optional cable management accessories help keep cables neat and organized

SPECIFICATIONS

Description	Wall-mount enclosure with lockable front door and swing-out rear access to equipment
Use	For indoor use only, in environmentally controlled areas; may not be used outdoors, in harsh environments, or in air-handling spaces
Available Sizes	<ul style="list-style-type: none"> • Heights: 24" (610 mm), 36" (910 mm) and 48" (1220 mm) • Widths: 24" (610 mm); 19" EIA rack-mount • Depths: 18" (460 mm), 24" (610 mm), 30" (760 mm)
Usable Interior Space	<ul style="list-style-type: none"> • Heights: 12U, 19U, 26U • Widths: 19" EIA rack-mount • Depths: refer to dimensional drawings on page 2
Cable Access	<ul style="list-style-type: none"> • (8) 1" (25.4 mm) and 3" (76 mm) knockouts, 4 top/4 bottom. Knockouts can accept 3/4" (19 mm) or 2.5" (63.5 mm) conduit • (4) Edge-protection grommets are included for the 3" (76 mm) knockouts • Removable top/bottom panel on rear panel *Can't remove while under load; must remove center chassis • (1) Rectangular knockout, 9"W x 2.2"D (230 mm x 55 mm)
Equipment Support	<ul style="list-style-type: none"> (1) Pair L-shaped equipment mounting rails in the main cabinet body • 19"W, EIA-310-D compliant • Universal hole pattern, 5/8"-5/8"-1/2" vertical hole spacing • Threaded #12-24 equipment mounting holes • 5"D (130 mm) rear panel punched to accept accessory equipment mounting brackets, see dimensional drawings on page 2 • Includes 50 each #12-24 equipment mounting screw

Global Availability

US & Canada

Simi Valley, CA
800-834-4969

Canada

Toronto, Ontario, Canada
+905-850-7770

chatsworth.com • techsupport@chatsworth.com

Europe

Buckinghamshire, UK
+44-1628-524-834

Middle East & Africa

Dubai, UAE
+971-4-2602125

Doha, Qatar
+974-4-267422

Latin America

+52-55-5203-7525
Toll Free within Mexico
800-201-7592

chatsworth.com.co

Asia Pacific

+86 21 6880-0266
chatsworth.com.cn



CHATSWORTH
PRODUCTS

SPECIFICATIONS

Load Capacity	300 lbs (136 kg) of equipment, open or closed
Certifications	<ul style="list-style-type: none"> • UL-2416 • cUL CSA C22.2 • UL 508A: Type 1 • NEMA Type 1 • IEC 60529 IP20
Material	<ul style="list-style-type: none"> • Steel sheet cabinet body, rear panel and door • Door is extruded metal frame with solid metal or tinted tempered glass panel • Equipment mounting rails are aluminum
Construction	Riveted and bolted
Finish	Powder coat paint Black or Glacier White

Space-Saving Design and Easy Access to Equipment

CUBE-iT Wall-Mount Cabinets feature highly functional elements to provide class-leading support and storage of ICT equipment. CUBE-iT Cabinets allow easy access to the front and rear of the cabinet, making it ideal for telecommunications rooms. Additionally, high airflow vent pattern and optional low-decibel, dual-fan kit provides equipment cooling without interfering noise. The new modern, sleek design with range of options make the cabinet ideal for use in office spaces, conference rooms, classrooms, or any public spaces where floor space is limited.

The swing-out, three-part design secures equipment while maintaining ease of access for serviceability. CUBE-iT Wall-Mount Cabinet is accessed by a keyed lock on the front door. Once unlocked, an internal latch is accessible just inside the front door on the main chassis. Simply turn the lever to release the main chassis from the wall to gain access to the rear of equipment. Additionally, the cabinet is configurable for right or left swing.

The cabinet body delivers exceptional strength and rigidity. The UL 2416 Listed 300 lb (136 kg) load-rating provides tested support for heavier equipment. For an updated look with a robust, high-quality viewing panel, the front door has an optional tempered glass window. Use CUBE-iT Wall-Mount Cabinet to meet growing demands, Power over Ethernet (PoE) deployments, faster wireless and premise networks, audio and video equipment, security and monitoring equipment and smart building initiatives.

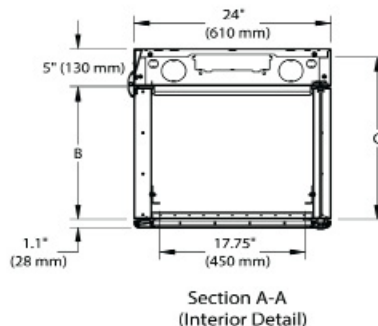
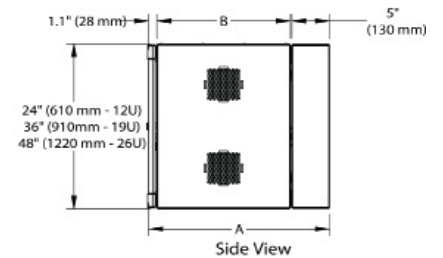
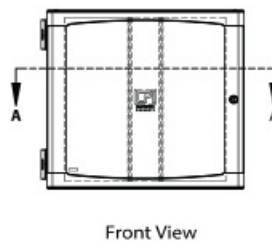
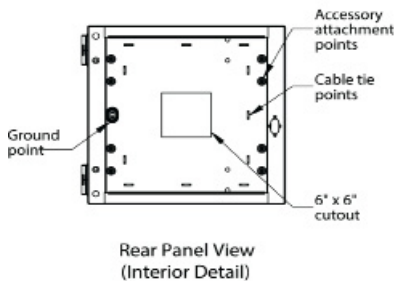
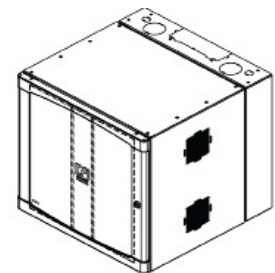
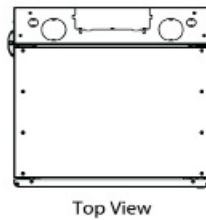
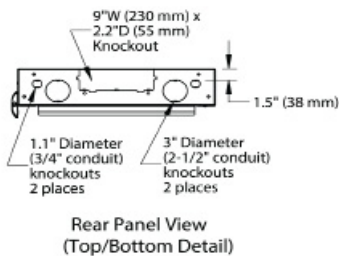
The removable top and bottom rear panels feature a rectangular cable pass-through knockout with optional brush seals, providing a larger opening for cables that can accept patch panels, making CUBE-iT a great solution for retrofit and existing infrastructure, or for use with factory-terminated structured cabling.

CUBE-iT Wall-Mount Cabinet is available in three heights and three depths to support 12U, 19U or 26U of equipment.

RELATED ACCESSORIES

- Universal Cable Runway
- Rack-Mount Shelf
- Foot Kit for CUBE-iT Wall-Mount Cabinet
- Saf-T-Grip® Straps
- Horizontal Rack Busbar
- Horizontal Switched eConnect® PDU
- RIM-750
- Ground Jumper

DIMENSIONS:



Depth		
Overall - A	Cabinet Body - B	Max. Equipment - C
18" (460 mm)	11.7" (297 mm)	15.9" (403 mm)
24" (610 mm)	17.7" (449 mm)	21.9" (556 mm)
30" (760 mm)	23.7" (602 mm)	27.9" (708 mm)

NOTE: Maximum equipment depth denotes values that still allow the center chassis to swing away from rear panel.

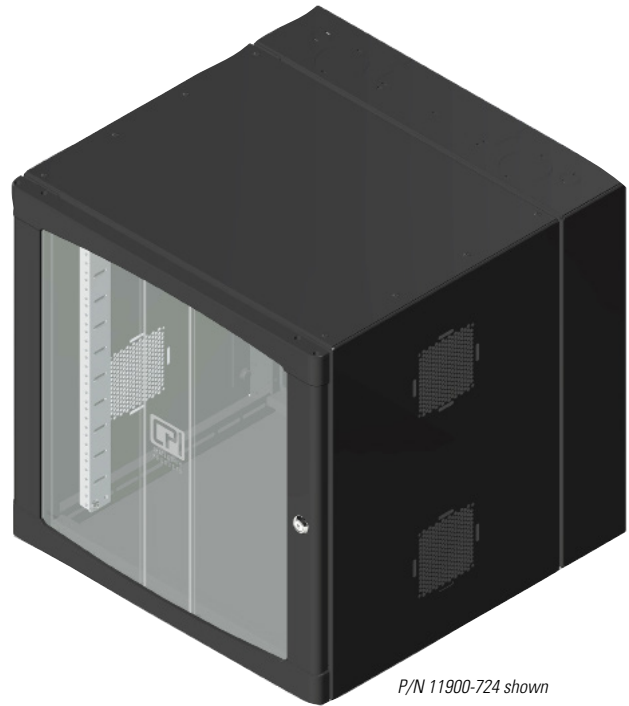
ORDERING INFORMATION:

CUBE-iT Wall-Mount Cabinets

- Attaches to the wall with included installation hardware
- Available in 12U, 19U and 26U heights, with solid metal or tempered glass door options
- All cabinet styles are 24"W (610 mm)
- Includes CH751 keyed lock

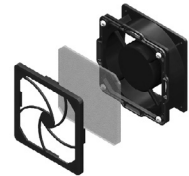
Part Number	Cabinet Depth	Door Style	Shipping Weight lb (kg)
24"H (610 mm) CUBE-iT Cabinet			
11890-X24	18" (460 mm)	Solid	90 (40.9)
11901-X24	18" (460 mm)	Tempered Glass	90 (40.9)
11840-X24	24" (610 mm)	Solid	101 (45.9)
11900-X24	24" (610 mm)	Tempered Glass	101 (45.9)
11996-X24	30" (760 mm)	Solid	112 (50.9)
12419-X24	30" (760 mm)	Tempered Glass	112 (50.9)
36"H (910 mm) CUBE-iT Cabinet			
11890-X36	18" (460 mm)	Solid	114 (51.8)
11901-X36	18" (460 mm)	Tempered Glass	114 (51.8)
11840-X36	24" (610 mm)	Solid	128 (58.2)
11900-X36	24" (610 mm)	Tempered Glass	128 (58.2)
11996-X36	30" (760 mm)	Solid	142 (64.5)
12419-X36	30" (760 mm)	Tempered Glass	142 (64.5)
48"H (1220 mm) CUBE-iT Cabinet			
11890-X48	18" (460 mm)	Solid	139 (63.2)
11901-X48	18" (460 mm)	Tempered Glass	139 (63.2)
11840-X48	24" (610 mm)	Solid	155 (70.5)
11900-X48	24" (610 mm)	Tempered Glass	155 (70.5)
11996-X48	30" (760 mm)	Solid	171 (77.7)
12419-X48	30" (760 mm)	Tempered Glass	171 (77.7)

Note: X=Color; 7=Black and E=Glacier White



P/N 11900-724 shown

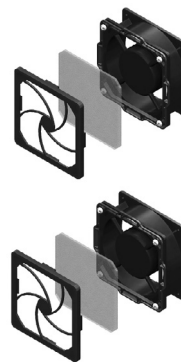
ACCESSORIES:



Standard Fan and Filter Kit for CUBE-iT Wall-Mount Cabinet

- Pressurizes interior of the cabinet, forcing warm air out of open vents
- Assembly Includes 1 fan, 1 filter, and 1 vent cover
- Noise Level: 39 dB (measured at 3' (1 m) distance)
- Airflow: 115 CFM (170 CMH)
- 6'L (1.8 m) NEMA 5-15P/6-15P Power Cord

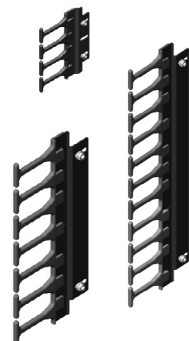
Part Number	Description	Shipping Weight lb (kg)
40972-001	115 Volt, 50/60 Hz, 5-15P power cord	2 (0.8)
40972-002	230 Volt, 50/60 Hz, 6-15P Power cord	2 (0.8)
40973-001	Replacement Filter Kit, Pack of 5	2 (0.8)



Low-Decibel Dual-Fan and Filter Kit for CUBE-iT Wall-Mount Cabinet

- Pressurizes interior of the cabinet, forcing warm air out of open vents
- Assembly Includes 2 fans and 2 filters
- Noise Level: 31 dB (measured at 3' (1 m) distance)
- Recommended placement on bottom right and left sides of the cabinet
- Airflow: 120 CFM (204 CMH)
- 6'L (1.8 m) NEMA 5-15P/6-15P Power Cord

Part Number	Description	Shipping Weight lb (kg)
40975-001	115 Volt, 50/60 Hz, 5-15P power cord	4 (1.8)
40975-002	230 Volt, 50/60 Hz, 6-15P Power cord	4 (1.8)
40973-001	Replacement Filter Kit, Pack of 5	2 (0.8)



Vertical Cabling Section for CUBE-iT Wall-Mount Cabinet

- Attaches to the outside edge of equipment mounting rails
- 4U height; openings align with rack-mount unit spaces on equipment mounting rails
- Sold in pairs
- Order additional kits as-needed per cable management requirements

Part Number	Description	Shipping Weight lb (kg)
40970-704	4U, 7"H x 0.5"D (178 mm x 13 mm)	3 (1.4)
40970-707	7U, 12.3"H x 0.5"D (311 mm x 13 mm)	3 (1.4)
40970-711	11U, 19.3"H x 0.5"D (489 mm x 13 mm)	4 (1.8)

Color is black.



Vertical Lashing Bracket for CUBE-iT Wall-Mount Cabinet

- Provides multiple lashing points for premise cables
- Attaches to center chassis with included hardware
- Adjustable front-to-rear

Part Number	Description	Shipping Weight lb (kg)
40971-X24	24"H x 4"W (610 mm x 100 mm)	4 (1.8)
40971-X36	36"H x 4"W (910 mm x 100 mm)	6 (2.7)
40971-X48	48"H x 4"W (1220 mm x 100 mm)	8 (3.6)

Note: X=Color; 7=Black and E=Glacier White

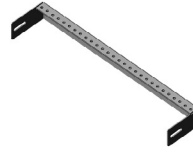
ACCESSORIES:



Cable Port Brush Kit for CUBE-iT Wall-Mount Cabinet

- Optional cover when rectangular knockout on the rear panel is removed
- Seals opening around cables with brush seal
- Sold in pairs

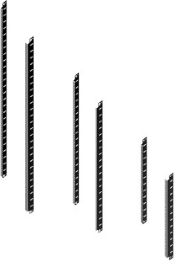
Part Number	Description	Shipping Weight lb (kg)
25190-000	0.8"H x 10.6"W x 2.9"D (20 mm x 268 mm x 74 mm)	2 (0.9)



Horizontal Wire Management Bar for CUBE-iT Wall-Mount Cabinet

- Attaches to the rear of the equipment mounting rails
- Secures premise cables after termination on patch panels
- Includes mounting hardware and 12 cable ties

Part Number	Description	Shipping Weight lb (kg)
11837-701	1.5"H x 19.3"W x 3.7"D (38 mm x 490 mm x 94 mm)	4 (1.8)



Equipment Mounting Rail Kit for CUBE-iT Wall-Mount Cabinet

- Use with equipment that needs front and rear support
- Sold in pairs
- Aluminum material

Part Number	Description	Shipping Weight lb (kg)
12787-524	12U; For 24"H (610 mm) cabinet	4 (1.8)
12787-536	19U; For 36"H (910 mm) cabinet	6 (2.7)
12787-548	26U; For 48"H (1220 mm) cabinet	8 (3.6)

Note: CUBE-iT Wall-Mount includes one pair of Equipment Mounting Rails

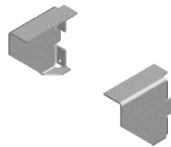


Rack-Mount Shelf

- For use with small equipment such as modems, routers and fiber modules in 19" EIA racks
- 1U; Includes multiples tie-down points
- Supports up to 20 lb (9.1 kg) of equipment

Part Number	Description	Shipping Weight lb (kg)
40974-X19	Rack-Mount Shelf, 1U x 19"W x 10"D (483 mm x 250 mm)	4 (1.8)

Note: X=Color; 7=Black and E=Glacier White



90° Mounting Bracket for CUBE-iT Cabinets

- Attaches to rear panel on CUBE-iT Cabinets
- Creates a 19" EIA x 2U vertical rack-mount space
- 2 brackets per kit, 3.9"H x 1"W x 4"D
(99 mm x 25.4 mm x 101.6)

Part Number	Description	Shipping Weight lb (kg)
13285-501	2U, 1 pair, Clear finish	3 (1.4)



Ground Jumpers

- Provide common bonding from equipment rack or cabinet to halo conductor
- Available individually or in packages of 10
- Constructed of UL Listed components

Part Number	Description	Shipping Weight lb (kg)
40159-009	9' (2.7 m) Ground Jumper, 1 Each	2 (0.9)
40159-019	9' (2.7 m) Ground Jumper, 10 Each	20 (1.9)



LED Light Kit for CUBE-iT Cabinets

- Attaches to the bottom, top or side of CUBE-iT Cabinets
- Toggle switch, 4W LED light
- Detachable, 120 VAC with NEMA 1-15P Power Cord

Part Number	Description	Shipping Weight lb (kg)
12803-701	LED Light Kit, 4W, 120 Vac	2 (0.9)



Power Strip for CUBE-iT Cabinets

- Select straight or locking plug style
- 115 VAC; 15 Amp or 20 Amp
- 10'L (3 m) power cord and circuit breaker
- Includes (8) 5-20R outlets

Part Number	Description	Shipping Weight lb (kg)
12820-701	15A Power Strip, NEMA 5-15P	4 (1.8)
12820-702	15A Power Strip, NEMA L5-15P	4 (1.8)
12820-705	20A Power Strip, NEMA 5-20P	4 (1.8)
12820-706	20A Power Strip, NEMA L5-20P	4 (1.8)

Note: Surge-protected options available



Foot Kit for CUBE-iT Wall-Mount Cabinet

- For use on desktops or floor when not installed on a wall
- Pack of 4

Part Number	Description	Shipping Weight lb (kg)
13483-001	Foot Kit	2 (0.9)



CPI now offers Extended Limited Warranties on CPI-Branded Electronic products, available for two additional years beyond the expiration of the Original Warranty Period (3 years).

Contact CPI Customer Service, or visit www.chatsworth.com/warranty for more information.

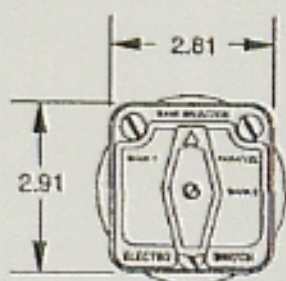
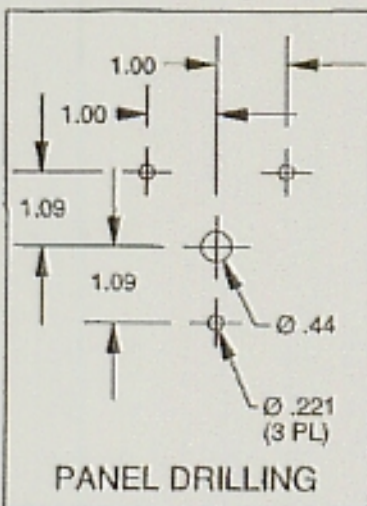
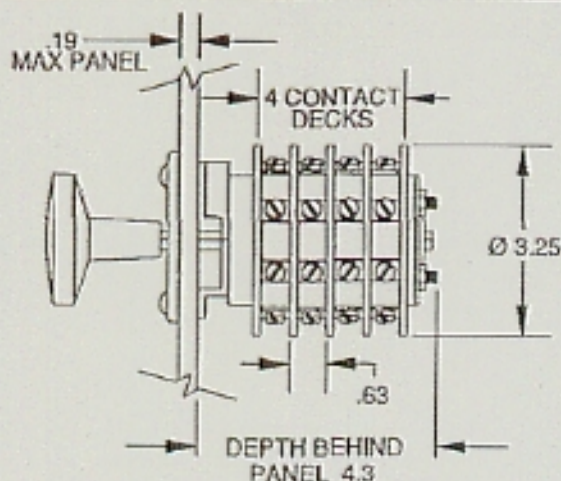
Interested in learning more about CUBE-iT Enclosure solutions? Call us at 800-834-4969, or email Technical Support at techsupport@chatsworth.com.



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TEL: (781)335-5200 FAX: (781)335-4253SERIES 24
CONTROL SWITCH

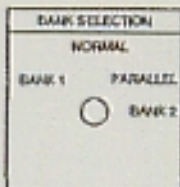
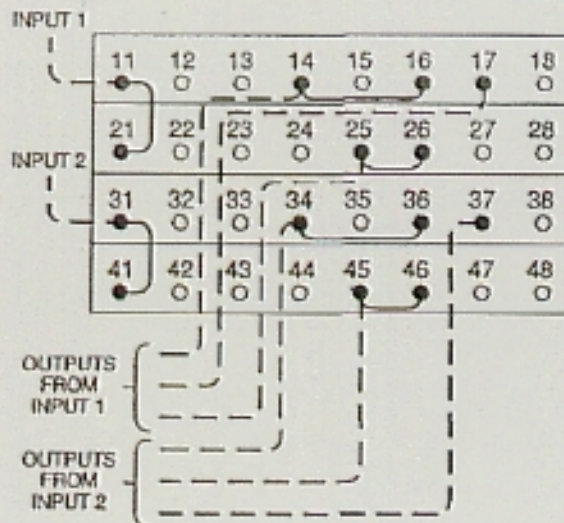
24304RE

(1) #10-32
MOUNTING SCREWS
SUPPLIED# 6-32 X 6.25
BD. HD. TERMINAL SCREWS
SUPPLIED UNASSEMBLED.SPECIAL FEATURES:
STOP SCREWS IN 2&6 (LIMIT CODE: -4G)

ACTION: MAINTAINED

TITLE: BANK SELECTION

DECK	CONTACTS HANDLE END	POSITION ENGRAVING			
		BANK 1	NORMAL	PARALLEL	BANK 2
1	11 \circ — — \circ 14	X			
	11 \circ — — \circ 16			X	
	11 \circ — — \circ 17				X
2	21 \circ — — \circ 25	X	X		
	21 \circ — — \circ 26		X	X	
3	31 \circ — — \circ 34	X			
	31 \circ — — \circ 36			X	
	31 \circ — — \circ 37				X
4	41 \circ — — \circ 45	X	X		
	41 \circ — — \circ 46		X	X	

HANDLE
POSITIONSENGRAVING CODE
010C-4B37G● TERMINALS & JUMPERS
SUPPLIED AS SHOWN

- - - - - CUSTOMER SUPPLIED WIRING

CONTACT DECKS



DECKS 1 & 3 BBM



DECKS 2 & 4 MBB

MADE BY: CMM

DATE: 12/31/02

APPR. BY: CMM

DATE: 12/31/02

SHEET 1 OF 1

REV.

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REVISIONS: