

**CITY OF AUSTIN ELECTRIC UTILITY DEPARTMENT**

**PURCHASE SPECIFICATION**

**FOR**

**SUBSTATION RELAY PANELS**

<u>DATE</u>	<u>PREPARED BY</u>	<u>ISSUANCE/REVISION</u>	<u>APPROVAL SIGNATURES</u>
08/02/02	Steven Booher	Issuance	David Renfro
12/18/2009	M. Vela de Casillas	Revision	Homer Portillo
8/23/2010	M. Vela de Casillas	Revision	Homer Portillo
07/09/2012	M. Vela de Casillas	Revision	

<i>REASON FOR REVISION</i>	<i>AFFECTED PARAGRAPHS</i>
Modified panel list to reflect needs and added reference to the master drawings. Added nameplate description. Specified acceptable connection terminations and assembly conditions. Added tool calibration and inspection, material quality control, documentation and acceptance testing requirements.	4.0, 5.6, 5.8, 5.14, 5.16, 5.19, 5.21, 6.0, 7.3, 7.5 and 8.0
Add detail to panel construction requirements.	5.3, 5.4, 5.10, and 5.16.
Update panel list, specify panel construction of aluminum, and add an identification nameplate to the panels.	4.0, and 5.0

This specification, until rescinded, shall apply to each future purchase and contract for the commodity described herein. Retain for future reference.

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PURCHASE SPECIFICATION  
FOR  
SUBSTATION RELAY PANEL**

1.0 SCOPE AND CLASSIFICATION

1.1 Scope

The City of Austin Electric Utility Department is hereafter referred to as Austin Energy (AE).

This specification and attached drawings set forth the requirements for the manufacture and supply of substation relay panels.

1.2 Classification

1.2.1 The relay panels shall be used to protect high voltage transmission lines, substation equipment and the distribution system of Austin Energy.

1.2.2 The manufacturer of these panels shall have a minimum of five (5) years of experience manufacturing relay panels for the electric utility industry.

2.0 APPLICABLE STANDARDS

These relay panels shall be manufactured with highest quality materials and workmanship in accordance with the latest applicable standards of the ANSI, IEEE and NEMA.

3.0 FUNCTIONAL REQUIREMENTS

3.1 The Contractor shall provide relay panels of the height and width shown on the attached drawings.

3.2 The relay panel devices shall be fabricated as per the attached drawings.

3.3 The panels shall be rigid, self-supporting structures mounted on channel base sills with provisions for bolting to floor.

3.4 The panel shall be fabricated so that the control cables enter from the top.

3.5 The panels shall incorporate all the specified relaying and control equipment listed on the attached drawings along with any additional devices, as required, to provide operational panels. All listed devices shall be the responsibility of the vendor, unless specified otherwise in the solicitation.

4.0 TYPES OF RELAY PANELS

4.1 Listed below are the different types of relay panel packages utilized by Austin Energy. The transmitted files in PDF format containing the master drawings are located in *Attachment 1*.

4.1.1 Unit Sub Diff. Relay Panel- Master number R10\_387\_USD\_Xa\_REV C.

4.1.2 421 Line Relay Panel- Master number R10\_421\_Xa\_REV H.

4.1.3 Feeder Breaker Door Plate (351S & 501) - Master Number R14A.01a\_FDR\_351S\_501\_REV B.

4.1.4 Feeder Breaker Door Plate (351S) - Master Number R12\_FDR\_351S\_Xc\_Rev B.

4.1.5 2032 Communications Panel- Master number R10\_2032\_X\_Rev D.

4.1.6 3530 Communications Panel- Master number R10\_RTAC\_X\_Rev A.

4.1.7 Double RTAC Communications Panel- Master number R10\_2RTAC\_X\_Rev A.

- 4.1.8 487V Cap. Bank Panel- Master number R10\_CAP\_487V\_X\_REV J.
- 4.1.9 Breaker Control Panel- Master number R10\_BKR\_Ya\_Rev I.
- 4.1.10 Single Bus Diff. Relay Panel- Master number R10\_587ZSB\_Xa\_Rev G.
- 4.1.11 Double Bus Diff. Relay Panel- Master number R10\_587ZDB\_Xa\_Rev G.
- 4.1.12 MOD Panel- Master number R10\_MOD\_X\_Rev A.
- 4.1.13 One Circuit Metering Panel A- Master number R10\_MET\_SBSB1C\_X\_Rev A.
- 4.1.14 One Circuit Metering Panel B - Master number R10\_MET\_DBDB1C\_X\_Rev A.
- 4.1.15 Three Circuit Metering Panel A -Master number R10\_MET\_SBSB3C\_X\_Rev A.
- 4.1.16 Three Circuit Metering Panel B - Master number R10\_MET\_DBDB3C\_X\_Rev A.
- 4.1.17 Voltage Transfer Metering Panel-Master number R10\_MET\_DBDB3CVT\_X\_Rev A.
- 4.1.18 Power Quality Meter Panel-Master number R10\_6PQ\_X\_REV A.

## 5.0 CONSTRUCTION REQUIREMENTS

- 5.1 Exterior surfaces of the panels shall be free of non-specified holes, seams, dents, weld marks, burrs, loose scale, sharp edges, or other imperfections.
- 5.2 All screws, bolts, and washers shall be zinc-plated steel.
- 5.3 The panels shall be constructed of 1/8-inch aluminum (enforced with cross-bars where necessary). Door plates shall be made only of steel. All relays and equipment on the front surface shall be mounted flush or semi-flush.
- 5.4 After fabrication, if steel is used, the panel shall be painted with primer and two coats of enamel paint ANSI 70 semi-gloss gray in color exterior and white semi-gloss interior. Aluminum panels do not require painting; however they must be “brushed” or “buffed” to reduce the appearance of finger prints.
- 5.5 Control wiring shall be #12 AWG stranded tinned copper, switchboard wire, 600 volt insulation, type SIS, gray in color.
- 5.6 All control wiring shall be terminated on equipment case studs or terminal blocks and must be securely attached. *Splicing of any wire is unacceptable.*
- 5.7 All control wire shall have wire markers placed at each termination that identifies the termination location at the other end.
- 5.8 All terminations shall use insulated ring tongue terminals. Only ratcheting type tools are acceptable for crimping the terminal onto the wire. The manufacturer shall ensure wires are securely attached to terminals. *Spade lugs or push on terminals are not acceptable* for any termination in the panels.
- 5.9 Control wire shall be tie wrapped between equipment cases and terminal blocks. Small groups of wire not in wiring duct shall be adequately supported and tie wrapped.
- 5.10 Control wire shall be routed vertically on the rear outside edge of the panel in two 2-inch by 4-inch slotted channel wiring duct, standard gray. The wiring duct shall be screwed to the panel. The wire duct shall be provided with covers that are removable without tools.
- 5.11 All control wire shall be cut to length.
- 5.12 The back of all devices shall be permanently labeled.
- 5.13 Terminal blocks shall be clearly identified and labeled as found on the connection diagrams. Legible hand lettering is acceptable.
- 5.14 Unless otherwise noted on project specific drawings or instructions, nameplates shall be machine printed plastic adhesive tape, black background with white letters, dimensions and text arrangement per drawings.

- 5.15 Each relay panel shall also be provided with an additional nameplate mounted on the back of the panel with the following information:
- Manufacturer
  - Date of Manufacture
  - Project Name when specified
  - Relay Panel Drawing Number and Revision from the schematic drawing provided with the Purchase Order.
  - AE Purchase Order Number
- 5.16 The control equipment and indicating devices shall be arranged as per the attached drawings.
- 5.17 Each panel shall include a full width copper ground bus bar 27 3/4-inch by 1-inch by 1/4-inch that makes metal to metal contact with the panel. Drill and tap the ground with at least 20 evenly spaced 10/32 holes with washer head grounding screws. Provide properly sized hole in the panel side at each end of the ground bus to facilitate mounting an intertie bus bar to an adjacent panel bus bar. Provide one intertie bus bar with slotted holes and two 1/4 inch copper bolts, nuts, and washers for the bus intertie connections. Supply, as part of the ground bus, two grounding terminals, one at each end, to accept #6 to 4/0 stranded copper.
- 5.18 Relay sockets shall be mounted on extruded aluminum Din Rail mounting tracks.
- 5.19 The relay panel shall be of a modular rack design to facilitate operation, maintenance, and future reconfiguration. Each device row shall be removable from the front of the panel. Areas that do not have devices mounted shall have a blank removable panel. Screws used to secure the panel plates to the channel shall be either self-tapping or drilled and tapped. The use of bolts and nuts to secure front plate panels is not acceptable.
- 5.20 The control panels shall be fabricated using strict workmanship guidelines ensuring AE requirements are met. The work area and tools should at a minimum adhere to the following:
- 5.20.1 The cable and wiring area shall have a controlled environment to limit entry of contamination.
- 5.20.2 Tools shall be clean and properly maintained by the manufacturer. Calibration and inspection records shall be kept and made available to AE upon request.
- 5.21 The offered price shall include all equipment as listed on each drawing, the wiring of each terminal point of the equipment to terminal blocks/test switches within the panel, testing and delivery for each item bid.
- 5.22 Austin Energy will provide project specific panel drawings which will include (but not limited to) exact point to point schematic and wiring diagrams and nameplate information at time of order.

## 6.0 MATERIAL REQUIREMENTS

The manufacturer shall subject all materials used in the construction of the relay panels to rigid quality assurance and control standards. The manufacturer shall have complete traceability on all materials from receiving until final installation in the relay panel. Material tracking and inspection reports shall be made available to the AE inspector upon request.

## 7.0 TEST REQUIREMENTS

- 7.1 AE reserves the right to visit the manufacturing facility and to observe the relay panels while undergoing construction and testing. The manufacturer may not charge AE for its right to visit the facility during construction and testing. AE shall be notified at least (3) weeks prior to start of the required tests. If three (3) weeks notice is not given before the start of testing, AE reserves the right to have the manufacturer, at its sole expense, delay the testing until AE inspector(s) assigned to this purchase are available. Furthermore, if the AE inspector(s) arrives on site and the relay panels are not ready for testing within eight (8) hours, AE reserves the right to postpone the testing for up to three (3) weeks and the manufacturer shall reimburse AE for any travel and labor costs incurred by AE due to vendor delays.
- 7.2 Manufacturer shall completely assemble the panels before shipment and apply A/C and D/C voltage to each respective circuit for twenty-four (24) hours. After assembly the manufacturer shall test the panels to ensure operation in the desired manner with appropriate targets, lights, inputs, and outputs. Test the panels for

control, indication, and data acquisition. The panel manufacturer shall functionally test each component separately. Additionally, the manufacturer shall perform polarity and phase checks, check the wiring for continuity and the absence of shorts and grounds. These tests are not intended to replace any tests that the manufacture would normally perform to verify the integrity of the panels, but will be included in the standard test.

- 7.3 Manufacturer shall check all wiring for loose wires, improper crimps and other workmanship defects.
- 7.4 Austin Energy will provide AC and DC schematics to facilitate testing after bid award.
- 7.5 Relay panels must pass all AC, DC and performance tests stated in this specification prior to delivery to AE.

#### 8.0 DOCUMENTATION REQUIREMENTS

The manufacturer shall provide with each panel delivery, a copy of the AC, DC, and functional tests performed on the panel demonstrating its compliance with all AE requirements. This quality control documentation shall be provided with the solicitation response. Quality control records of the panels' fabrication process shall be available for AE review upon request. All reports shall be in English and in standard non-metric units of measure.