

## **SECTION 18300**

### **RELAYS**

#### **PART 1 - GENERAL**

##### **1.01 DESCRIPTION**

- A. Section includes requirements for relays. Unless indicated as Owner Furnished in Section 01600, Materials, or as relocated on the Contract Drawings, relays shall be Contractor furnished.

##### **1.02 REFERENCE STANDARDS**

- A. American Railway Engineering and Maintenance of Way Association (AREMA):
  - 1. Communications and Signals Manual of Recommended Practices (C&S Manual). When following the recommendations of the AREMA C&S Manual substitute the word "shall" for the word "should" in the applicable Manual Part.

##### **1.03 SUBMITTALS**

- A. Contractor shall provide acceptance testing and documentation for each relay when it is transported from the warehouse to the job site.
- B. Complete Test Report Form provided by the Engineer for each vital relay installed under this Contract. Use typewritten characters to fill in all information requested on the form.

##### **1.04 QUALITY ASSURANCE**

- A. Vital relays shall meet the recommendations of AREMA C&S Manual Part 6.2.1, where they do not conflict with any requirements specified herein. Vital Relays shall be of the type as designated in the PCJPB Standard Drawings.
- B. Factory testing of each relay shall be the manufacturer's standard.
- C. Before any relay is used, obtain the Engineer's written acceptance. Acceptance will be based on the test results and the proper completion of the Test Report Form.

##### **1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Ship vital relays separately from the wired racks in which they are to be used. Package relays individually; each in a sturdy corrugated cardboard carton with the drawing number of the relay printed on the outside of the carton. Store relays in a protected area until tested and installed.

**1.06 SPARE PARTS AND SPECIAL TOOLS**

- A. Refer to Section 01600, Materials, for details regarding packaging and delivery of spare parts and special tools.
- B. Furnish spare relays in the quantities indicated on the Contract Drawings.
- C. Furnish one test tool or relay wrench for each shelter where relays are installed.
- D. Furnish 12 inserting/extracting tools for each type of contact requiring a special tool.

**PART 2 – PRODUCTS**

**2.01 GENERAL**

- A. Relays shall be in dustproof enclosures, except a provision shall be made for ventilation where required for heat dissipation.

**2.02 VITAL DC RELAYS**

- A. General:
  - 1. Vital Relays shall be Alstom Type B, Invensys Rail Type "ST", or equal. Contractor shall use the specific relays shown on the Contract Drawings.
  - 2. Vital dc relays, unless otherwise indicated on the Contract Drawings, shall be of the plug-in type and rack-mounted. Relays shall have a transparent dust cover made of a nonflammable composition that will not support combustion.
  - 3. Vital Relays, with a nominal operating voltage of 10 to 16 volts, shall be capable of operating continuously without resultant damage, with a minimum voltage range of 7 to 21 volts inclusive, applied to their operating circuits.
  - 4. Vital relays shall have a test terminal to allow convenient measurement of the coil voltage.
  - 5. Design biased neutral vital relays so that gravity alone will prevent the armature from picking up if the permanent magnet is de-energized or if no current is applied to the coil, due to interruption of the normal magnetic circuit.
  - 6. All front contacts shall be silver-to-metal carbon, meeting the recommendations of the AREMA C&S Manual Part 6.2.1.
  - 7. When three dc vital relays, suppressed as specified herein, are connected in parallel and operated as a test load from normal working voltage, a vital relay front or back contact that breaks this load shall be capable of at least five million operations at this load without the contact resistance, measured with ten milliamp current, exceeding five ohms.

8. Arc suppression for vital relays shall be built into the relay or into its plugboard.
9. Equip vital plug-in relays, except vital time-element relays and special application relays, with front current testing facilities. Where shown on the Contract Drawings, provide facilities to enable the testing of voltage from the front of the relay, without having to remove the relay or remove adjacent relays.
10. Equip vital relays with a registration plate to prevent relays of the wrong style, contact arrangement, or operating characteristics, from being inserted into the plugboard.

### **2.03 IDENTIFICATION**

- A. Facilities shall be included for mounting an approved typed or printed relay nametag for each relay, either on the relay cover or on the relay cabinet front plate, as applicable. The nametag shall be easily replaceable, but shall not come off during normal service.
- B. Identification shall be in accordance with Section 18360, Signal Systems Miscellaneous Products.

## **PART 3 - EXECUTION**

### **3.01 INSTALLATION**

- A. Ensure that the relay operating characteristics have not been altered due to damage during shipping procedures.
- B. Ensure that all ac and dc power buses are open while installing relays. Do not reconnect buses until all relays have been installed.
- C. Install and wire the relays as shown on the Contract Drawings.
- D. Identify each relay with nametag.

### **3.02 FIELD QUALITY CONTROL**

- A. All dc vital relays shall be tested and inspected in accordance with AREMA C&S Manual Part 6.4.1.
- B. Perform tests in accordance with Section 18600, Signal Systems Testing.
- C. Record test measurements on Test Report Form provided by the Engineer.

**END OF SECTION**