

SECTION 18110

SOLID-STATE CODED TRACK CIRCUITS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Section includes requirements for furnishing, installing, testing, and documenting solid-state track circuit elements.
- B. Final application logic programs will be furnished by the Owner.

1.02 REFERENCE STANDARDS

- A. Code of Federal Regulations (CFR), Title 49, Transportation:
 - 1. Part 236 Rules, Standards, and Instructions for Railroad Signal System
- B. American Railway Engineering and Maintenance of Way Association (AREMA):
 - 1. Communication and Signals Manual of Recommended Practices (C&S Manual).

1.03 SUBMITTALS

- A. Submit a narrative explanation of the electrical and/or mechanical methods of configuration control used to ensure that the application logic software installed is the correct software for the specific location and that it is the latest version. It shall explain Contractor's procedures for handling components of the solid-state track circuit equipment.
- B. Submit certified acceptance reports.
- C. Submit test reports and verification of tests as described herein under Testing.

1.04 QUALITY ASSURANCE

- A. Install and test the solid-state track circuit equipment in accordance with all applicable requirements of CFR 49, Part 236 and the recommendations of the AREMA C&S Manual, Part 8.1.2. When following the recommendations of the AREMA C&S Manual substitute the word "shall" for the word "should" in the applicable Manual Part.
- B. Perform operational testing of the equipment in accordance with the requirements specified in Section 18600, Signal Systems Testing.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Ship the solid-state modules separately from the wired card cages. Package modules individually in ESD safe packaging, in a sturdy carton with the type of module printed on the outside of the carton.
- B. Package plug-in modules for shipment separately from their card cage units using ESD safe packaging. Protect each item from damage or loss during handling and shipment.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Electronic track circuits shall be compatible with highway grade crossing constant warning devices. Utilization of bi-directional, unidirectional, and auxiliary crossing control functions shall be provided per Contract Drawings and manufacturer's specifications. Track filters shall be installed in track leads, as shown on the Contract Drawings.
- B. Where new equipment is to be furnished and installed in existing locations, the equipment furnished shall be the same make as called for in the Contract Documents.
- C. Track circuit shall function to provide continuous train detection throughout the length of the circuit whenever a shunt of 0.06 ohms is applied to the rails, including the turnouts.
- D. Furnish any specialized test or calibration instruments, equipment, or tools that may be needed in order to test and place in-service the equipment installed under this Section, as shown on the Contract Drawings. Ensure all test and diagnostic equipment is in the Contractor's possession and within the project limits a minimum of 30 days prior to installation.
- E. Conduct an acceptance test on Owner-furnished units prior to loading at the warehouse.
- F. Conduct acceptance testing of Owner-furnished components before transporting from the warehouse and installing. Provide certified acceptance reports at time of delivery.

2.02 APPLICATION LOGIC

- A. The Owner will provide the application logic for each programmable module to the Contractor. Application Logic will be furnished upon demonstration of readiness for pretest. This application logic will provide the functionality as shown in the Contract Drawings and shall conform to CFR 49, Part 236. Where specified in the Contract Documents, the Contractor shall furnish the program specified to the manufacturer for factory testing and certification.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install solid-state coded track circuits at locations indicated on the Contract Drawings.
- B. Install the solid-state track circuit equipment in signal instrument shelters or cases as shown on Contract Drawings.
- C. The solid-state track circuit equipment layouts shall provide for easy access to test points, indicators, and adjustments.
- D. Install equipment in accordance with the manufacturer's installation and adjustment procedures.

3.02 TESTING

- A. Conduct tests as recommended in AREMA C&S Manual Parts 2.4.1, 3.3.1, and 7.4.1 to ensure proper operation of the signal and grade crossing systems.
- B. Conduct tests to ensure that the signal system conforms to CFR 49, Part 236.
- C. Conduct all tests required under Section 18600, Signal Systems Testing.
- D. Testing, including pre-testing, shall include operating any handthrow switches and lighting all signals. The use of lamp simulators in lieu of, or in parallel with signal lamps will not be allowed in pre-testing.

END OF SECTION