

SECTION 01270 - INSTALL CATHODIC PROTECTION SYSTEM WIRING

(Follow all instructions and make all edits with "Track Changes" turned on. This Section is not published in the Oregon Standard. If there are no instructions [purple text] above a subsection, paragraph, sentence, or bullet, then include it in the Project, unless the item(s) that are included in the subsection, paragraph, sentence, or bullet are not required on the Project and then they should be deleted. In general do not re-number or re-letter subsections when item(s) are deleted. Delete all purple text before preparing the final document. All other modifications to this Section will require ODOT Technical Resource and State Specifications Engineer approval.)

Section 01270, ~~which~~ is not a Standard Specification and, is included in this Project by Special Provision.

Description

01270.00 Scope - In addition to the requirements of Section 01201 and Section 01210, ~~provide~~ furnish and install cathodic protection system wiring providing direct current distribution to CP zones, reference cell monitoring, and communication interconnects between CP cabinets.

This Work is to be done in a way that does not degrade the Bridge's visual and architectural character.

01270.01 Timing - Perform installation of conduit, junction boxes, and the associated wiring and miscellaneous Equipment in each zone after the Work required under Section 01260 has been completed in that zone.

01270.02 Submittals - Submit detailed descriptions of all Materials to be used according to 00150.37. Identify all relevant constituents and properties of each Material and the Specifications with ~~which~~ where it complies. Data published by the manufacturer is acceptable. Provide conduit cement data clearly indicating the manufacturer's recommended installation temperature range.

Submit detailed procedures for the Work of this Section according to 00150.37 at least 21 Calendar Days before the scheduled start of the Work. Include the manufacturer's specifications and operating instructions for all Equipment and a plan for installing and testing electrical conductors. Do not start this Work until written approval is received from the Engineer.

Submit unstamped wiring drawings according to 00150.35 that show the identification and labeling scheme for all wires and conduits.

Submit a conduit and wire installation plan according to 00150.37 at least 21 Calendar Days before the start of installation, showing how the Work is coordinated with scheduled movements of the Work containment system.

Submit unstamped as-built drawings according to 00150.37, showing the location, wiring details, and labeling of all power distribution, permanent reference cells and conduit runs within 30 Calendar Days of completing the Work.

Materials

01270.10 Electrical Conductors - Comply with 01201.18. ~~Provide~~Furnish consistent wiring insulation color for all zones with separate, unique colors for anode wiring, rebar wiring, and reference cell wiring.

~~Provide~~Furnish No. 16 AWG shielded, twisted pair instrumentation cable meeting the following requirements:

- Cable rated for 300 volts
- Primary insulation XLPE
- Outer jacket moisture and sunlight resistant 190 °F rated polyvinyl chloride
- Shielding providing 100 percent coverage of twisted pair with aluminum foil-polyester tape with 18 AWG drain wire

~~Provide~~Furnish UL labeled, Type XHHW stranded copper wire for all conductors with 600 volt rated insulation rated for 167 °F operation in wet or dry locations.

01270.11 Materials ~~-~~—Furnish Materials meeting the following requirements:

Brass Nuts and Bolts	01201.16(a)
Conduit and Fittings	01201.15
Heat Shrink Tubing, Electrical Tape	01201.13
Labels	01201.17
Non-Conductive Resin	01201.11
Non-Conductive Sealant	01201.12
Ring Connectors, Solder	01201.14
Stainless Steel-Bolting Materials	01201.16(b)

~~Provide~~Furnish tin-plated brass, barrier-style, 2-pole terminal blocks rated for 600V and able to accept #16 AWG wire.

Equipment

01270.20 Short Circuit Detection Equipment - Comply with 01201.20.

01270.30 Technician Qualifications - Perform all Work of this Section, except for installation and removal of temporary electrical service, using Oregon licensed electricians holding a Class "A" or Class "B" Limited Energy Technician license, General Journeyman license, or General Supervising license.

01270.31 Supervisor Qualifications - Supervise all Work of this Section using an Oregon licensed electrician holding a General Supervising license.

Construction

01270.40 Conduit and Fittings - Install conduit and fittings according to 01201.41.

01270.41 Connections:

(a) Wire-to-Wire - Make wire-to-wire splice and tap connection only in junction boxes with prior Engineer approval. Insulate all splice and tap connections using heat shrink tubing.

(b) Wire-to-Anode - Crimp and solder the ring connector to the anode end of the DC power distribution wire. Attach the ring connector between two brass nuts to the bolt on the anode terminal plate assembly. Tighten the first brass nut on the bolt to a hand tight condition with a non-adjustable wrench. Place the ring connector over the bolt and tighten a second brass nut against the ring connector to a hand tight condition with a non-adjustable wrench. Tighten a third brass nut, with a wrench, to a hand-tight condition against the second nut.

(c) Wire-to-Rebar Terminal - Crimp and solder the ring connector to the rebar terminal end of the DC power distribution wire. Attach the wire lug between two brass nuts to the threaded rod on the rebar terminal. Run the first brass nut onto the threaded rod. Place the wire lug over the threaded rod and tighten a second brass nut to a hand tight condition with a non-adjustable wrench against the first nut. Tighten a third brass nut with a wrench to a hand tight condition against the second nut.

(d) Wire-to-Zone Rectifier - Connect DC power wiring from the anode terminal plates and rebar terminals to the corresponding zone power supply terminal strips in the CP cabinets.

(e) Wire-to-Binding Post (System Negative at King Bar) - ~~Provide~~Furnish a test wire lug connected to a brass binding post in the side of the junction box at each king bar terminal. Construct this connection with XHHW wire, brass nuts, brass bolts or all-thread, and copper ring connectors.

(f) Reference Cell-to-Instrumentation Cable - Mount a 2-pole, barrier style terminal block inside the king bar junction box using stainless steel or brass nuts and bolts. Connect the reference cell lead and the king bar lead to the terminals. Connect the instrumentation cable wire to the other side of the terminal. Torque terminals to manufacturer's recommendations. Do not connect shield wire at this terminal block.

(g) Instrumentation Cable-to-CP Cabinet - Run the cable without splicing from the terminal block to the monitoring terminal strips in the CP cabinet. Torque terminals to manufacturer's recommendations

01270.42 Labeling - Secure labels to both ends of conductors with clear heat-shrink tubing ~~conforming according~~ to 01201.13. Label both connections at all splice points. Designate the zone number for all DC power wiring according to the following example:

D 10 P

Where D = DC Power
 10 = Zone Number
 P = Positive lead to anode (N = Negative lead to rebar)

Designate the zone number for all remote monitoring system wiring according to the following example:

R 02 A

Where R = Reference cell circuit
 02 = Zone Number
 A = First reference cell installed in zone (B = second)

01270.43 Short Circuit Detection - Locate and eliminate short circuits according to 01201.40.

Eliminate short circuits using a method approved by the Engineer at no additional cost to the Agency.

Measurement

01270.80 Measurement - No measurement of quantities will be made for Work performed under this Section.

Payment

01270.90 Payment - The accepted quantities of Work performed under this Section will be paid for at the Contract Lump Sum amount for the item "Install Cathodic Protection System Wiring".

Payment will be payment in full for furnishing and placing all Materials, and for furnishing providing all Equipment, labor and Incidentals necessary to complete the Work as specified.