EXPECTED IMPLEMENTATION JANUARY 2015

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678 TRAFFIC CONTROLLER ACCESSORIES.
(REV 5-30-14) (FA 7-14-14) (1-15)

SECTION 678 is deleted and the following substituted:

SECTION 678
TRAFFIC CONTROLLER ACCESSORIES

678-1 Description.

Furnish and install traffic controller accessories as shown in the Plans. Meet the requirements of Section 603.

678-2 Materials.

Use traffic controller accessories listed on the Department's Approved Product List (APL). Ensure that all traffic controller accessories are permanently marked with the manufacturer's name or trademark, model or part number, and serial number.

Traffic controllers must meet the following applicable industry standards:

NEMA TS1 Conflict Voltage Monitor ..... NEMA TS-1-1989, Section 6
NEMA TS2 Malfunction Management Unit ..... NEMA TS-2-2003, Section 4
Load Switch ..... NEMA TS 2 2003, Section 6.2
Flasher ..... NEMA TS 2 2003, Section 6.3
Flash Transfer Relay ..... NEMA TS 2 2003, Section 6.4
210 Conflict Monitor (Model 210) ..... CALTRANS TEES, 2009
Power Supply Module (Model 206) ..... CALTRANS TEES, 2009
Power Distribution Assembly ..... CALTRANS TEES, 2009 6.4.3
Flash Transfer Relay (Model 430) ..... CALTRANS TEES, 2009 6.4.5.1.5
Input File ..... CALTRANS TEES, 2009 6.4.4
Current Monitor (Model 208) ..... CALTRANS TEES, 2009 3.7.2

Ensure all traffic controllers perform all specified functions during and after being subjected to the environmental testing procedures described in NEMA TS-2, Sections 2.2.7, 2.2.8, and 2.2.9.

678-2.1 Time Switch: Ensure the time switch is a 24-hour timer which controls the daily switching operation of circuit contacts at preselected times.

Type 1 time switches must contain a single circuit contact and a solid state timer with at least 48 programmable on and off times.

Type 2 time switches must contain two circuit contacts and a solid state timer with at least three independently programmable on and off times per circuit.

Type 3 time switches must contain three circuit contacts and a solid state timer with at least three independently programmable on and off times per circuit.

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678-2.1.1 Timing: Solid state timing must be accomplished by digital circuits utilizing the power line 60 Hz frequency as the normal timing reference. Time-of-day must be settable and displayed in maximum increments of one minute.

678-2.1.2 Programming: Programming for selection of contact openings or closures must be provided in maximum increments of one minute for Types 1 through 3 time switches.

A day omit device or circuit must be provided with Types 1 through 3 time switches to omit the programmed switching operation for any combination of up to three days of the week. A positive means of indicating the day of the week must be provided with Types 1 through 3 time switches.

678-2.1.3 Reserve Power: Type 1, Type 2, and Type 3 solid state time switches must be provided with a battery backup circuit which maintains time during a power failure of up to 10 hours. The timing accuracy of battery backup circuits during a power failure must be plus or minus 0.5 seconds.

678-2.1.4 Output Circuit Contacts: Each output circuit contact must be rated for a 3A, 115 V_{AC} load. The output circuit contact must have 115 V_{AC} present when the timer turns the circuit on.

678-2.1.5 Construction Requirements: Time switches must be enclosed in durable sheet aluminum or approved alternate housing. A terminal strip or screws must be provided with the time switch for AC power and all output circuit contacts.

678-3 Installation.

678.3.1 General: Install all system control equipment in accordance with the manufacturer's recommendations. Terminate wires on the appropriate terminal strips in the controller cabinet with insulated terminal lugs. Neatly bundle, secure, and identify all wiring and cables.

678-3.2 Time Switch: Mount time switches on the inside wall of the controller cabinet in such a manner as to allow easy access for programming the switch. Ensure that the load current on the output circuits of the time switch does not exceed 3 A at 115 $V_{AC.}$ Whenever time switches are used for transferring a controller assembly to and from flashing operation, wire the controller cabinet for uniform code flashing as specified in Section 676.

678-4 Basis of Payment.

No separate payment will be made for traffic controller accessories. Include the cost in the Contract unit price for the traffic controller assembly.