SECTION 16051

MISCELLANEOUS ELECTRICAL DEVICES

# GENERAL

## DESCRIPTION

### This section includes materials and installation of miscellaneous electrical devices and equipment, such as disconnect switches, thermostats, float switches, photoelectric switches, time switches, pressure switches, and intrusion alarm switches.

## RELATED WORK SPECIFIED ELSEWHERE

### Section 16010: General Electrical Requirements.

## SUBMITTALS

### Submit shop drawings in accordance with the General Conditions.

### Submit ratings and characteristics including voltage ratings, continuous current ratings, conduit entry restrictions, and enclosure type and dimensions.

## MEASUREMENT AND PAYMENT

### Payment for the work in this section shall be included as part of the lump-sum bid amount stated in the Proposal.

# MATERIALS

## DISCONNECT SWITCHES

### Provide non-fusible disconnect switches with ampere rating and number of poles as indicated in the drawings. Switches for use on circuits 240 volts and below shall be NEMA general duty Type LD. Switches for use on 480-volt circuits shall be NEMA heavy-duty Type HD. Unless indicated otherwise, provide switches indoors in NEMA Type 1 enclosures and outdoors, or where indicated to be weatherproof, in NEMA Type 4X stainless steel enclosures. Mechanisms shall have quick-make and quick-break operating handles and provisions for padlocking in the "OFF" position. The switch shall have an interlock to prevent unauthorized opening of the hinged cover when the switch is in the "ON" position and an interlock to prevent closing the switch mechanism with the hinged cover open. On the front of the enclosure, attach a nameplate that identifies the load per Section 16010. For general-duty type applications, provide Cutler Hammer GUN; Square D 3130 series; or equal. For heavy-duty applications, provide Cutler Hammer HUN series; Square D 3110 series; or equal.

## THERMOSTATS

### Thermostats shall be line voltage type. Thermostats shall have 70°F to 140°F set point range, and motor current rated contacts. Provide Honeywell T631A-1022 , or equal.

## FLOAT SWITCHES

### Each float switch shall contain a single-pole mercury switch which shall actuate when the longitudinal axis of the float is horizontal and deactivates when the liquid level falls 1 inch below the actuation elevation. Float construction shall consist of a polypropylene housing with a firmly bonded electrical cable protruding. One end of the cable shall be permanently connected to the enclosed mercury switch, and the entire assembly shall be encapsulated to form a completely watertight and impact-resistant unit.

### Mercury switch rating shall be 10 amperes at 120 volts, 60 hertz, non-inductive. Switch contacts shall be normally open or normally closed as detailed in the schematic drawings. Float cable shall be PVC Type STO, No. 18 conductors (41 strand) rated 600 volts.

### Floats shall include an internal stabilizing weight so that the float may be suspended from above.

### Float switches shall be Healy-Ruff Type S or equal.

## PHOTOELECTRIC SWITCHES

### Photoelectric switches, where shown on the drawings, shall provide automatic switching of outdoor lighting by natural daylight by switching lights on when daylight diminishes and off at sunrise.

### Photoelectric switches shall be tamperproof, hermetically sealed cells with adjustable turn-on light level selector. Switches shall be enclosed in a die-cast aluminum or zinc housing, gasketed for weatherproofing. Units shall operate in a temperature range of 0°F to 140°F with fail-safe operation. Provide switches with a delay of up to two minutes to prevent false switching. Provide single-pole single-throw snap action switches rated 2,000 watts (tungsten), 120/277-volt a-c. Provide Tork Model 2100 or equal.

## PRESSURE SWITCHES

### Pressure switches shall be Type 403 stainless steel bourdon tube actuating an enclosed, metal contact snap-action, DPDT, Form C switch, Switch shall have separate set point and reset point adjustments. Contact shall be connectable as normally open or normally closed. Adjustment of the switch set points shall be accomplished without having to gain access to the interior of the unit. Pressure switch range shall be as directed in the field. Enclosure shall be NEMA 4. Provide Square D 9012 GAW-xxx, GBW-xxx, GCW-xxx, as applicable

## INTRUSION ALARM SWITCHES

### Doors, Gates, Hatches and Ladders:

#### Provide magnetic contact type switch with one SPDT contact rated for 24-volt d c and 10 volt-amperes. Switches shall be UL listed.

#### Provide General Electric 2500 series industrial wide gap surface mount magnetic contacts with flexible stainless steel conduit permanently attached to the device. Provide mounting brackets for surface mounting to door jamb, swing gate, or sliding gate per manufacturer’s recommendations. The typical magnetic switch is a Sentrol Model 2507-AH, Aritech 2500 Series, or equal.

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## POSITION LIMIT SWITCHES FOR VALVES

### Provide watertight and dust-tight NEMA 4 or IP65/66 position limit switches for indication of open or closed positions of valves as shown in the drawings. Provide single-pole double-throw contacts rated for 3 amperes break, minimum, at 120-volt a-c, 35% power factor. Provide an adjustable mounting bracket to permit the actuation point to be field adjustable at any point of the valve’s travel. Switch shall be Square D, Allen-Bradley, or equal.

## Ground Fault Monitoring

### Ground Fault Monitor to be "Littlefuse SE-701-0D (This is 24VDC, to be powered from the TCP) The appropriate CT is required. The CT is to be installed around the Load Feeders in the ATS. (6) additional wires are needed from the ATS to the TCP. The monitor is to be mounted in a dedicated MCC bucket. If there is no available space in the MCC, the unit can be installed in the ATS.

### The Switchboard Main CB, MCC Main CB and Generator Main CB are all to have Shunt Trip capabilities with (2) control wires each running back to the PLC. The wires are to be marked, capped, and coiled in the bottom of the TCP.

### Two DI’s are to be shown on the P&ID drawings from the GF unit to the TCP PLC shown as spares. The District may or may not decide to utilize these additional components however the means will be in place should they decide to use them.

## TryStar Docking Station

### All applicable options are to be listed on the plans.

### Connections for services of 200 amps or less shall utilize a 200a pin & sleeve reverse service male receptacle with angle adapter. The Russelstoll part number for the required assembly is DS24004MRAB0. This part number includes the angle enclosure.

### Cable terminations are to utilize PosiLoc connections for all connections over 200 amps.

# EXECUTION

## INSTALLING INTRUSION ALARM SWITCHES

### The switches shall be interfaced with the TCP. Mount switch on inside doorframe such that when the door is opened, the normally closed switch contacts shall open and, when door is closed, the normally closed switch contacts shall close.

## FIELD TESTING

### All testing required herein shall be incorporated into the overall Commissioning Plan.

### Operate each disconnect switch three times, under load, and verify that all phases of the load are disconnected each time.

### **Thermostats:** Adjust thermostats above and below the ambient temperature. Verify that the equipment controlled operates per the plans or other sections of these specifications.

### **Intrusion Alarm Switches:** Verify operation by closing and opening each door or hatch and checking receipt of signals at TCP.

### **Photoelectric Switch:** Simulate nighttime by placing object over sensor or witness nighttime automatic controls. Verify lights turn on and off.

### **Float Switches:** Operate float switches three times, minimum, and verify that controls operate per the plans or other sections of these specifications. Verify float actuates at the required level.

### **Pressure Switches:** Set pressure switches as directed in the field. Simulate pressure and verify that the equipment controlled operates per the plans and other sections of these specifications.

**END OF SECTION**