

1. Scope

This specification covers the requirements for furnishing and delivering a 15kV, 600A, 3Ø, outdoor, pole-mounted, unitized, gang-operated, load-break switch with line voltage and current sensors and a SCADA compatible motor operator.

2. Reference Standards

All characteristics, definitions, terminology, voltage designations and tests, except as otherwise specified herein, shall be in accordance with the following industry standards for distribution, power and regulating transformers. When the following standards are superseded by an approved revision, the revision shall apply.

Industry Standards

ANSI C37.32-2002 American National Standard for High Voltage Switches, Bus Supports, and Accessories, Schedules of Preferred Ratings, Construction Guidelines, and Specifications

IEEE 1815-2010 IEEE Standards for Electric Power Systems Communications — Distributed Network Protocol (DNP3)

District Standards

Compatible Unit D0530 15kV 600A 3Ø Gang-Operated Load-Break Switch w/ Motor Operator, SCADA Compatible
Assembly Unit 12F720 Switch, 15kV 600A Gang-Operated Load-Break w/ Motor Operator, SCADA Compatible

3. General

Switches supplied under this specification shall include a factory assembled group operated unitized load break switch, factory mounted voltage and current sensors, motor operator with RTU and battery, control rod and all required hardware and cabling.

The following switch functions shall be available from the motor operator:

- Open & Close (via motor operator)
- Disable SCADA Control
- Decouple Drive Mechanism
- Open & Close (via manual operating lever)

Motor operated switches that require access to the switch arm for any of these functions are not acceptable.

4. Material ID Numbers

Material ID	Description
1002625	Switch, 15kV 600A 3Ø w/ Motor Operator

5. Electrical Ratings

Nominal Voltage	14.4kV
Max. Voltage	17kV
BIL	110kV
Continuous Current	600A
Momentary Current	40,000A RMS @ 10 cycles 20,000A @ 3 seconds
Fault Closing	20,000A RMS x 1 15,000A RMS x 3

6. Construction

6.1 Switch

15kV 600A group operated unitized load break switches shall be factory assembled and designed for horizontal crossarm mounting on single pole structures. All three switch mechanisms shall be factory adjusted for proper alignment and simultaneous opening or closing. Switches shall be capable of up to 50 feet of mounting distance between the motor operator and switch mounting crossarm.

6.2 Spacing

The separation between the center phase switch and the center of the pole must be a minimum of 24 inches. All other spacings shall conform to Figure 1 unless specified otherwise at time of purchase.

6.3 Crossarm

The switch shall be mounted on a pultruded fiberglass crossarm in an integral mounting base suitable for installation on wood, fiberglass steel and concrete poles. The crossarm shall have a gray UV resistant coating and shall be filled with closed cell foam. Crossarm ends shall be sealed.

6.4 Insulators

Switch mounting insulators shall be manufactured from polymeric material and shall be sky gray color, ANSI No. 70.

6.5 Switches

Switches shall be side break integer style with field replaceable load interrupters. Switches shall be equipped with NEMA standard two hole terminal lugs. Switch contacts shall be silver plated and terminal lugs shall be tin plated. Switches shall be capable of opening and closing under 3/8 inch ice formation.

6.6 Switch Drive Mechanism and Operating Rods

Switches may employ reciprocating or torsional drive mechanisms. Each switch shall be supplied with 30 feet of operating rod. Conductive control rods shall include either two insulated sections or one insulated section and a control rod insulator. Each switch shall include the all necessary control rod guides and couplings. Additional control rod sections, guides and couplings shall be available for construction and switch operation up to 50 feet from the motor operator.

7. Line Sensors and Cables

Sensor manufacturer and model are subject to prior District approval.

7.1 Voltage/Current Sensors

The switch shall include three factory installed voltage/current sensors. Sensor accuracy shall be 2% or better.

7.2 External Voltage Sensors

As an option, three additional voltage sensors shall be installed on the opposite side from the voltage/current sensors. Sensor accuracy shall be 2% or better.

7.3 Cables

Sensor cables shall be 30 feet long unless a different length is specified by the District. All cables shall have manufacturer installed terminations for connection to the motor operator enclosure. These terminations shall be the screwed, cannon or amphenol style plugs or District approved equivalent.

8. Motor Operator Enclosure

8.1 NEMA Rating

The motor operator enclosure shall be rated NEMA 3R. The enclosure shall be equipped with a drip gutter to prevent the ingress of water when the enclosure door is open in wet weather.

8.2 Mounting Provisions

The enclosure housing shall be equipped with two mounting brackets; one shall be above and the other below the enclosure. These two brackets shall be constructed to stand the panel off from the pole at least 4 inches. These brackets shall be able to accommodate 5/8 inch galvanized bolts mounted through the pole.

8.3 Locking Provisions

The enclosure shall be equipped with a handle that is capable of being locked with District padlocks, both long and short shanks.

8.4 Grounding

The control panel enclosure shall include a ground lug capable of accepting #4-#2 AWG solid copper wire.

8.5 Cable Terminations

All sensor cable connectors shall mount to the bottom side of the control panel enclosure. The connectors shall be weather-proof and shall be a quick disconnect type that do not require tools for makeup or removal; i.e., they shall be screwed cannon or amphenol style plugs or District approved equivalent.

8.6 Terminal Block

The control panel enclosure shall include a heavy duty terminal block with #6-#32 AWG screw terminal positions for terminating the District's wiring from the RTU. An easily readable, permanent method shall be used to identify all external connection terminal blocks.

8.7 Batteries

The control panel enclosure shall be configured to hold two 12 volt 13 Amp-Hour sealed lead acid batteries wired in series to provide 24 volt DC for operation. Batteries shall be Genesis G13EP, Odyssey PC545 or District approved equivalent. Batteries shall be securely mounted in the enclosure and shall be easily replaced in the field when required. Batteries shall be capable of maintaining full operation for a 25 hour minimum period at 20 °C. The controls will be shipped without batteries which will be supplied by the District.

8.8 Radio Mounting

If required, the motor operator shall include a District specified radio installed and tested in the motor operator enclosure.

9. Motor Operator & RTU

9.1 Operating Temperature

The motor operator shall operate in a temperature range of -40°C to 85°C. All components, assemblies, subassemblies and customer installed equipment shall also operate in a temperature range of -40°C to 85°C. An internal heater for humidity control shall be included.

9.2 Operating Power

The motor operator shall accept incoming 120VAC power to a power supply/battery charger board. An auxiliary power supply rated 12VDC @4.5A shall be included to supply District installed communications equipment. The motor operator shall monitor battery voltage and shutdown automatically upon detection of low battery voltage.

9.3 Decoupling Mechanism

The motor operator shall include a means to physically decouple the motor from the switch control rod so the switch cannot be actuated by the motor operator. Once decoupled, the switch shall be operable via a manual operating handle and pad-lockable for clearance and to prevent unauthorized operation. Recoupling the switch to the motor operator shall not require synchronization or other adjustments.

9.4 RTU

A Reliatronics RTU3200 shall be included with the motor operator. The RTU shall be mounted in the motor operator enclosure, fully wired and tested at the factory. Other RTUs may be acceptable with prior District approval.

9.5 Communications Protocol

The RTU shall use DNP3 communications protocol per IEEE 1815-2010.

10. Testing

The switch, sensor and motor operator assembly shall be fully tested and calibrated at the factory prior to shipment.

11. Guarantee

The failure of any switch, motor operator or sensor due to defective design, material and/or workmanship within eighteen months after being energized or twenty-four months after delivery, whichever comes first, shall be repaired or replaced without cost to the District. Any defect in design, material and/or construction discovered within this period shall be corrected on all switches furnished on this order at the manufacturer's expense, either by repair or by replacement.

12. Bidders' Data

Each bidder shall supply:

- Drawings of the complete switch assembly with motor operator with pole mounting details.
- A list itemizing the accessories in the motor operated switch package.
- A description of any proposed changes, additions or exceptions to the specification shall be submitted along with reasons for the departure.

13. Evaluation of Bids

The following factors will be considered in the analysis and evaluation of bids and subsequent bid award:

- Proposed delivery.
- Past performance of bidder and product.
- Conditions of warranty.
- Completeness of bidder's data.
- Construction details.

14. Packaging

Switches shall be shipped in an enclosed van and shall be suitably packaged to ensure against damage.