

1.0 GENERAL

- 1.1 The automated distribution switch shall conform to the following specification.
- 1.2 The switch shall be an outdoor, three-pole device incorporating single-gap, group-operated vacuum interrupters driven by a single stored-energy operating mechanism located on the switch assembly base.
- 1.3 The switch shall be configured (select appropriate description):
  - (a) Compact-crossarm upright
  - (b) Compact-crossarm upright—extra mounting-pole clearance
  - (c) Compact-crossarm upright compact (alley arm)
  - (d) Compact-crossarm tiered outboard
- 1.4 The switch manufacturer shall have a minimum of 20 years of experience in the production of distribution automation switches and have at least 5000 units installed and in operation.
- 1.5 The switch manufacturer shall supply all internal wiring for the switching system. The switch manufacturer shall supply detailed wiring diagrams, interconnection drawings, and remote terminal unit point data drawings (as required).
- 1.6 The switch shall perform as intended at temperatures from  $-40^{\circ}\text{C}$  to  $+40^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$  to  $+104^{\circ}\text{F}$ ).
- 1.7 Testing  
The following design tests shall have been performed on the switch, and certified test reports shall be provided upon request:
  - Interrupting: . . . . .IEEE C37.30.3™ - 2018
  - Dielectric: . . . . .IEEE C37.30.3™ - 2018
  - Radio Influence Voltage: . . . . .IEEE C37.30.3™ - 2018
  - Temperature Rise: . . . . .IEEE C37.30.3™ - 2018
  - Short-Time: . . . . .IEEE C37.30.3™ - 2018
  - Fault Closing: . . . . .IEEE C37.30.3™ - 2018
  - Mechanical Endurance: . . . . .IEEE C37.30.3™ - 2018

2.0 LOADBREAK SWITCH

- 2.1 The switch shall use an integrated stored-energy operating mechanism, with the drive train enclosed inside the switch base.
- 2.2 For switches in all upright mounting configurations:  
A color-coded interrupter position indicator (green for “open,” red for “closed”) shall be furnished on the \_\_\_\_\_ (*specify left side, right side, or left and right sides*) of the switch base.



For switches in the tiered-outboard mounting configuration:

A color-coded interrupter position indicator (green for “open,” red for “closed”) shall be furnished on the bottom of the switch base.

*or optionally, when required by the user*

For switches in all upright mounting configurations:

A reversed-color-coded interrupter position indicator (green for “closed,” red for “open”) shall be furnished on the \_\_\_\_\_ (*specify left side, right side, or left and right sides*) of the switch base.

*or optionally*

For switches in all upright mounting configurations:

An international symbol interrupter position indicator shall be furnished on the \_\_\_\_\_ (*specify left side, right side, or left and right sides*) of the switch base for switches in the upright, upright extra mounting-pole clearance, and compact mounting configurations. Specify bottom of the switch, for tiered-outboard mounting configurations.

- 2.3 The switch shall be furnished with permanent lifting means to facilitate installation.
- 2.4 The switch shall be furnished with tin-plated terminal pads.
- 2.5 The loading from jumpers shall not exceed 90 pounds in-line and 30 pounds perpendicular to the terminal pads, per IEEE Standard C37.30.1™ - 2011 sub clause 6.1.2.6.
- 2.6 The switch shall be furnished with provisions for mounting three surge arresters on one side of the switch.

*or optionally*

The switch shall be furnished with provisions for mounting three surge arresters on both sides of the switch.

2.7 60-Hz Ratings

Load-Current Interrupting: 900 Amperes  
 Peak Withstand: 41,600 Amperes, Peak  
 Duty-Cycle Fault-Closing: 12,500 Amperes, RMS Symmetrical, Five-Time

kV		
Nominal	Maximum	BIL
14.4	17.0	110
25	29	125●

● BIL rating should be:

Without Optional Disconnect		With Optional Disconnect		
Vacuum Interrupter	BIL kV	Vacuum Interrupter	Optional Disconnect	BIL kV
Closed	150	Open	Open	150
		Closed	Closed	150
Open	125	Open	Closed	125
Open	125	Open	Open	150

2.8 50-Hz Ratings

Load-Current Interrupting: 900 Amperes  
 Peak Withstand: 41,600 Amperes, Peak  
 Duty-Cycle Fault-Closing: 12,500 Amperes, RMS Symmetrical, Five-Time

kV		
Nominal	Maximum	BIL
10	15	110
20	24	125●

● BIL rating should be:

Without Optional Disconnect		With Optional Disconnect		
Vacuum Interrupter	BIL kV	Vacuum Interrupter	Optional Disconnect	BIL kV
Closed	150	Open	Open	150
		Closed	Closed	150
Open	125	Open	Closed	125
Open	125	Open	Open	150

- 2.9 The switch shall have been tested and rated for at least 3,500 switched Close-Open operations at 900 amperes.
- 2.10 Switches in the upright mounting configurations, when furnished with the optional visible-break disconnect specified in Section 4.1, shall be capable of continuously carrying and interrupting up to 900 amperes at ambient temperatures up to 39°C (102°F) or 900 amperes up to 40°C (104°F) with a minimum wind velocity of 2 feet (610 mm) per second.

### 3.0 OPERATING MECHANISM

- 3.1 The integral stored-energy operating mechanism shall be capable of electrically opening and closing the switch, or manually opening and closing the switch by means of a standard or extendible hookstick. No vertical operating shaft shall be required.
- 3.2 The optional visible-break disconnect specified in Section 4.1, when furnished, shall be mechanically interlocked with the operating mechanism such that the disconnect is blocked from opening until the interrupters are opened.
- 3.3 The operating mechanism shall be mechanically interlocked with the optional visible-break disconnect specified in Section 4.1, when furnished, such that manual and electrical operation of the interrupters is blocked when the disconnect is open.
- 3.4 The operating mechanism shall include:
  - (a) Low-resistance contacts for indication of Open/Close position.
  - (b) Wiping contacts to prevent operational difficulties arising from frost or corrosion.
  - (c) Self-lubricating bearings.
- 3.5 The operating mechanism shall be capable of operating electrically at a minimum operating voltage of 16 Vdc.
- 3.6 The operating mechanism shall require no more than two pulls of 60 pounds maximum to operate manually when the mechanism is fully charged.
- 3.7 Stored energy in the operating mechanism shall not be released upon large impact load to the switch or pole.
- 3.8 The operating mechanism shall be tested in the manner described in Section 1.7.

*Specify the optional features in Sections 4.1 through 4.6 as required:*

### 4.0 OPTIONAL FEATURES

- 4.1 For switches in the upright, upright extra pole-mounting clearance, and upright compact mounting configurations:

The switch shall be furnished with a visible-break disconnect comprised of three interlocked, single-phase, hookstick-operated blades.
- 4.2 The switch shall be furnished with a \_\_\_\_\_ (*specify 25-foot, 35-foot, 45-foot, 75-foot, or 100-foot*) (*specify 7.6-m, 10.7-m, 13.7-m, 22.9-m, or 30.5-m*) long shielded control cable in liquid-tight flexible metal conduit, for connection to the optional control unit.
- 4.3 Sensors shall be furnished on one side of the switch for three-phase monitoring of line current. Sensing shall be accurate to within  $\pm 3\%$  across the tested temperature range of  $-40^{\circ}\text{C}$  to  $+40^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$  to  $+104^{\circ}\text{F}$ ).

*or*

Sensors shall be furnished on both sides of the switch for three-phase monitoring of line current and voltage. Sensing shall be accurate to within  $\pm 3\%$  across the tested temperature range of  $-40^{\circ}\text{C}$  to  $+40^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$  to  $+104^{\circ}\text{F}$ ). Voltage sensors shall have isolated secondaries to protect the inputs of the Remote Terminal Unit (RTU) from potentially damaging voltage surges.

*or*

The switch shall be furnished with stationary support insulators and mounting provisions for \_\_\_\_\_ (*specify type*) sensors.

- 4.4 For switches in the upright, upright extra pole-mounting clearance, and upright compact mounting configurations:

The switch shall be furnished with a pole band and J-bolts.

*or*

The switch shall be furnished with provisions for dead-ending, including a pole band with J-bolts, dead-ending angles, and a set of extension links.

- 4.5 The switch shall be furnished with wildlife covers to minimize animal-intrusion-related faults.
- 4.6 *For switch in the upright, upright-compact, or tiered-outboard configurations:* The switch can be furnished with optional integral dead-ending brackets capable of supporting 2000-pound tension per conductor in instances where conductors are attached to one side of the switch, or 8000-pound tension per conductor in instances where conductors are attached to both sides of the switch.

*or*

*For switch in the upright—extra mounting-pole clearance configuration:* The switch can be furnished with optional integral dead-ending brackets capable of supporting 1500-pound tension per conductor in instances where conductors are attached to one side of the switch, or 8000-pound tension per conductor in instances where conductors are attached to both sides of the switch.

*Specify one of the following optional features as required:*

5.0 SELF-POWERED COMMUNICATION AND CONTROL UNIT

- 5.1 The manufacturer shall furnish a custom-engineered communication and control unit, including a/an \_\_\_\_\_ (*specify type*) remote terminal unit and a/an \_\_\_\_\_ (*specify type*) communication device.
- 5.2 Control power shall be provided by the optional three-phase current/voltage sensors located on the front side of the switch, specified in Section 4.3.

*or*

Control power shall be provided by the optional three-phase current/voltage sensors located on the front and the pole-saddle sides of the switch, specified in Section 4.3. A transfer scheme shall be furnished to ensure continuous control power as long as one side of the switch is energized.

- 5.3 A temperature-compensated constant voltage battery charger and rechargeable, sealed-lead, starved-electrolyte battery packs shall be provided in the communication and control unit.

- 5.4 Controls for local electrical opening and closing of the switch and for selecting Local or Remote operation shall be provided in the communication and control unit.
- 5.5 Color-coded interrupter position indicating lamps (green for “open,” red for “closed”) shall be furnished in the communication and control unit.  
*or optionally*  
Reversed-color-coded interrupter position indicating lamps (green for “closed,” red for “open”) shall be furnished in the communication and control unit.
- 5.6 An operation counter shall be provided in the communication and control unit.
- 5.7 The communication and control unit and all standard components shall be rated for an ambient temperature range of  $-40^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$  to  $+158^{\circ}\text{F}$ ).
- 5.8 The communication and control unit enclosure shall be of 316L stainless steel with gasketed front, designed to the NEMA 4X standard. Appropriate venting shall be provided to prevent gas and moisture buildup. Vents shall be louvered, screened, and filtered to prevent entry of insects and to minimize entry of dust and wind-driven rain into the enclosure.

*or*

### 5.0 EXTERNALLY POWERED COMMUNICATION AND CONTROL UNIT

- 5.1 The manufacturer shall furnish a custom-engineered communication and control unit, including a/an \_\_\_\_\_ (*specify type*) remote terminal unit and a/an \_\_\_\_\_ communication device.
- 5.2 Control power shall be provided by an external 120-Vac power source.
- 5.3 A high-output, temperature-compensated constant-voltage battery charger with unique battery management system, and rechargeable, sealed-lead, starved-electrolyte batteries shall be provided in the communication and control unit.
- 5.4 Controls for local electrical opening and closing of the switch and for selecting Local or Remote operation shall be provided in the communication and control unit.
- 5.5 Color-coded interrupter position indicating lamps (green for “open,” red for “closed”) shall be furnished in the communication and control unit.  
*or optionally*  
Reversed-color-coded interrupter position indicating lamps (green for “closed,” red for “open”) shall be furnished in the communication and control unit.
- 5.6 An operation counter shall be provided in the communication and control unit.
- 5.7 The communication and control unit and all standard components shall be rated for an ambient temperature range of  $-40^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$  to  $+158^{\circ}\text{F}$ ).
- 5.8 The communication and control unit enclosure shall be of 316L stainless steel with gasketed front, designed to the NEMA 4X standard. Appropriate venting shall be provided to prevent gas and moisture buildup. Vents shall be louvered, screened, and filtered to prevent entry of insects and to minimize entry of dust and wind-driven rain into the enclosure.

*or*

## 5.0 6801 AUTOMATIC SWITCH CONTROL

- 5.1 The manufacturer shall furnish a fully integrated automatic switch control, providing sophisticated remote terminal unit functionality. It shall include a/an \_\_\_\_\_ (*specify type*) communication device. The control shall be upgradable to the manufacturer's proprietary automatic restoration system, which uses peer-to-peer communication and distributed intelligence to make operating decisions. No central processing or SCADA shall be required, though fully supported.
- 5.2 Control power shall be provided by an external 120-Vac power source.  
*or optionally*  
Control power shall be provided by the optional three-phase current/voltage sensors located on the front and the pole-saddle sides of the switch, specified in Section 4.3. A transfer scheme shall be furnished to ensure continuous control power as long as one side of the switch is energized.
- 5.3 A high-output, temperature-compensated, constant-voltage battery charger with unique battery management system, and rechargeable, sealed-lead, starved-electrolyte batteries shall be provided in the automatic switch control.
- 5.4 Controls for local electrical opening and closing of the switch and for selecting Local or Remote operation shall be provided in the automatic switch control.
- 5.5 Color-coded interrupter position indicating lamps (green for "open," red for "closed") shall be furnished in the automatic switch control.  
*or optionally*  
Reversed-color-coded interrupter position indicating lamps (green for "closed," red for "open") shall be furnished in the automatic switch control.
- 5.6 Diagnostic indicating lamps shall be furnished in the automatic switch control.
- 5.7 Local communication access shall be provided via a DB9 connector.
- 5.8 The automatic switch control and all standard components shall be rated for an ambient temperature range of  $-40^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$  to  $+158^{\circ}\text{F}$ ).
- 5.9 The automatic switch control enclosure shall be of non-corrosive aluminum. Appropriate venting shall be provided to prevent gas and moisture buildup. Vents shall be louvered, screened, and filtered to prevent entry of insects and to minimize entry of dust and wind-driven rain into the enclosure.  
*Specify the optional features in Sections 5.10 through 5.11 as required:*
- 5.10 The full version of the manufacturer's proprietary automatic restoration system software shall be furnished.
- 5.11 Graphical user interface software shall be furnished, providing full online access to the configuration, real-time, and historical data of the automated distribution switch and other distribution automation equipment.

*or*

### 5.0 6802 AUTOMATIC SWITCH CONTROL

- 5.1 The manufacturer shall furnish a fully integrated automatic switch control for remote supervisory or source-transfer application, providing sophisticated remote terminal unit functionality. It shall include a/an \_\_\_\_\_ (*specify type*) communication device. The control shall be upgradable to the manufacturer's proprietary automatic restoration system, which uses peer-to-peer communication and distributed intelligence to make operating decisions. No central processing or SCADA shall be required, though fully supported.
- 5.2 Control power shall be provided by the optional three-phase current/voltage sensors located on the front and the pole-saddle sides of the switch, specified in Section 4.03. A transfer scheme shall be furnished to ensure continuous control power as long as one side of the switch is energized.
- 5.3 A high-output, temperature-compensated, constant-voltage battery charger with unique battery management system, and rechargeable, sealed-lead, starved-electrolyte batteries shall be provided in the automatic switch control.
- 5.4 Controls for local electrical opening and closing of the switch and for selecting Local or Remote operation shall be provided in the automatic switch control.
- 5.5 Color-coded interrupter position indicating lamps (green for "open," red for "closed") shall be furnished in the automatic switch control.  
*or optionally*  
Reversed-color-coded interrupter position indicating lamps (green for "closed," red for "open") shall be furnished in the automatic switch control.
- 5.6 Diagnostic indicating lamps shall be furnished in the automatic switch control.
- 5.7 Local communication access shall be provided via a DB9 connector.
- 5.8 The automatic switch control and all standard components shall be rated for an ambient temperature range of  $-40^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$  to  $+158^{\circ}\text{F}$ ).
- 5.9 The automatic switch control enclosure shall be of non-corrosive aluminum. Appropriate venting shall be provided to prevent gas and moisture buildup. Vents shall be louvered, screened, and filtered to prevent entry of insects and to minimize entry of dust and wind-driven rain into the enclosure.
- 5.10 The full version of the manufacturer's proprietary automatic restoration system software shall be furnished.
- 5.11 Graphical user interface software shall be furnished, providing full online access to the configuration, real-time, and historical data of the automated distribution switch and other distribution automation equipment.