S&C 6801M
Automatic Switch Operator

for Overhead Distribution Switches and Disconnects

Simple, Economical Switch Automation

S&C's 6801M Automatic Switch Operator makes it easy to automate new or existing manual overhead distribution switches and disconnects of nearly any manufacture. This microprocessor-based operator combines sophisticated automatic control schemes with remote terminal unit functionality, data logging, control circuitry, and advanced communication capabilities in one easy-to-apply integrated package.

Not Just Switch Operator, . . . Switch Protection, Too

The 6801M Automatic Switch Operator captures and records speed and motor current information. It uses this information to detect changes in the operating characteristics of the switch caused by environmental and other conditions and to alert the SCADA operator to these changing conditions. The speed and motor current information is also provided locally in a graph that can be compared with a baseline established when the switch is installed and alert the operator that maintenance is needed. This indicator can reduce or eliminate the need for preventative maintenance.

Automatic Sectionalizing

The 6801M Switch Operator fully manages its associated switches or disconnects and, when coordinated with source-side reclosing devices, can automatically sectionalize a feeder based on contingencies such as overcurrent, loss of voltage, or phase unbalance—improving your system reliability. The 6801M Operator opens the switch or disconnect to sectionalize based on either reclose or fault counts.

When equipped with optional radio faulted-circuit indicators, the 6801M Operator can isolate faults without the need to fit the associated distribution switches or disconnects with voltage and current sensors. Sectionalizing is triggered by a signal from the radio faulted-circuit indicators, followed by loss of control power.

Automatic Restoration Using the IntelliTeam® SG Automatic Restoration System

When the associated distribution switches or disconnects have been fitted with voltage and current sensing, the 6801M Operator can be furnished with, or upgraded to, S&C's IntelliTeam SG Automatic Restoration System. This unique system enables multiple 6801M Operators to work together as teams with IntelliRupter® PulseCloser® Fault Interrupters, 6800 Series Automatic Switch Controls, and IntelliNode™ Interface Modules.

Using peer-to-peer communication, the teams quickly transfer load and minimize the number of customers affected by a fault or outage. Teams use true distributed intelligence—no central processing or SCADA supervision is required. The IntelliTeam SG Automatic Restoration System also works with reclosers equipped with an IntelliNode Interface Module, and each team of 6801M Operators can include a different type of switch or control.

Voltage and Current Sensing Capabilities

When furnished with optional voltage and current sensing, the 6801M Operator provides true RMS voltage and current readings plus fault detection, as well as:

- Signal processing and overcurrent detection
- Automatic sectionalizing
- Extended loss-of-phase protection
- Shots-to-lockout protective-device support

Operating voltage and current readings are true RMS measurements, with an accuracy of 0.5% over the entire temperature range. Phase-angle accuracy is ±1°. Fault magnitude, duration, and inrush restraint set points are all field-adjustable.

Single-Phase Voltage-Loss Protection

The 6801M Operator protects three-phase loads from single phasing by automatically opening the switch or disconnect if the phases become unbalanced. The operator can be programmed to reclose automatically when stable three-phase voltage returns.

Three-Phase Voltage-Loss Protection

The 6801M Operator automatically opens the switch or disconnect upon an extended three-phase voltage loss.

Shots-To-Lockout

The 6801M Operator includes a selectable shots-to-lockout feature that prevents the source-side reclosing device from reclosing into a feeder fault multiple times.

Hot Line Tag

Users can set the Hot Line Tag with either a SCADA command or with a configurable button on the faceplate. Only the command type used to set the tag can clear it.

Data Logging

The 6801M Operator continuously monitors control voltage and enclosure temperature. Daily maximum and minimum values are logged, as are time-averaged values at user-selected intervals.

In 6801M Operators furnished with optional voltage and current sensing, voltage, current, kvars, kilowatts, and phase angles are included in the daily maximum and minimum time-averaged records. Overcurrent, loss-of-voltage, fault magnitude, and duration data, as well as equipment diagnostics, are also recorded. A crystal-controlled, temperature-compensated real-time clock provides data time-stamping. The optional GPS feature provides time-stamp accuracy to 1 ms.

Data gathered at the switch or disconnect location are invaluable for analyzing circuit problems, troubleshooting system operation, and planning future expansion. Access to this information helps optimize the performance of your installation.

IntelliTeam SG data logging is especially useful for determining the exact sequence of events during a team reconfiguration and for comparing this information with substation data. The IntelliTeam SG Automatic Restoration System uses GPS time-stamping for accurate data comparison with other controls.

Integrated Power Supply and Battery System

The 6801M Operator features a single power supply, eliminating the problems inherent in operators using multiple power supplies and batteries.

The highly efficient power supply delivers temperature-compensated battery charging to maximize battery life.

The batteries are automatically tested at regular intervals. If battery voltage drops below a specified value, the operator is disabled, preventing improper operation of the switch or disconnect or deep discharge of the batteries.

Detailed information on battery and power-supply status is available at the faceplate LCD. Battery information can also be viewed using IntelliLink® Setup Software and is available to SCADA for remote monitoring.

Flexible Communications

To apply the 6801M Operator with IntelliTeam SG operation, each 6801M Operator in a team must be furnished with an S&C SpeedNet™ Radio, an S&C IntelliCom® DA Radio, or a fiber-optic transceiver.

The 6801M Operator supports a wide variety of other communication devices for use with SCADA systems, including radios from UtiliNet—and MDS, as well as cellular transceivers.

The 6801M Operator includes four communication ports: two Ethernet and two serial SCADA ports. It also includes a USB or serial faceplate connector for local monitoring and configuration. The operator can service SCADA requests even when a computer is connected locally. DNP 3.0 is the standard protocol.

Software and Control Architecture

The 6801M Operator—like all S&C automation products—runs under the supervision of a mature, reliable, state-of-the-art operating system.

The 6801M Operator is easily upgraded in the field. Upgrades can be implemented and set-point values configured using Windows®-based IntelliLink Setup Software, which runs on your personal computer. Faceplate ports—either serial or USB—provide easy local access to the control. Set points can also be configured remotely using optional IntelliLink Remote Setup Software.

Field-Proven Design

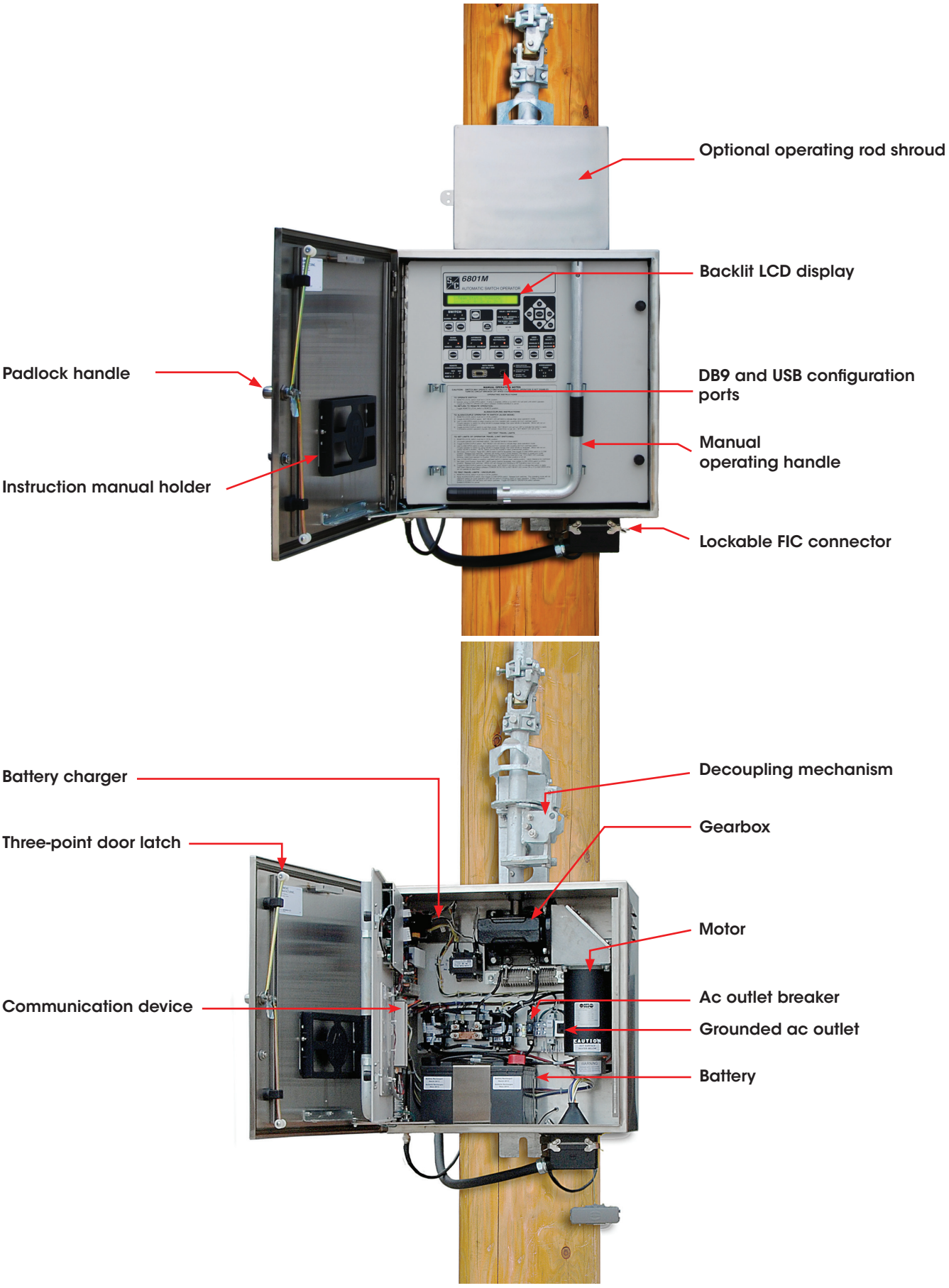
The 6801M Operator offers the security of S&C's field-proven computer technology and electronics manufactured in an ISO 9001-certified facility. Thousands of S&C controls are in use by hundreds of utilities, and the IntelliTeam SG Automatic Restoration System is the most widely used automatic restoration technology in the world.

Switches and Disconnects Suitable for Automation

The 6801M Automatic Switch Operator is suitable for automating all S&C Alduti-Rupter® Switches and S&C Convertible Disconnects in all current ratings and voltage ratings up to 69 kV. The operator provides full normal operating life for these devices.

The 6801M Switch Operator has been determined suitable for operating some devices not manufactured by S&C—both overhead-distribution switches and disconnects. Other switches and disconnects also may be suitable for power operation with the 6801M Switch Operator. Please contact the nearest S&C Sales Office for details regarding non-S&C devices and for the fault-closing ratings of S&C switches.

The interrupting or fault-closing capabilities, or the operating life of non-S&C-manufactured devices, *could possibly* be affected by power operation using the 6801M Operator. Again, please contact the nearest S&C Sales Office for details.



Rotating-Drive 6801M Automatic Switch Operator.

Specifications

Reciprocating-Drive Operator Performance

- Control rod reciprocation speed: 14 inches (35.6 cm) in 0.5 sec
- Control rod travel range: 0 to 15 inches (38.1 cm)
- Accuracy: ±0.2 inch

Rotating-Drive Operator Performance

- Control rod rotation speed: 90° in 0.5 sec
- Control rod travel range: 0 to 180°
- Accuracy: ±2.0°

Travel Limit

- Microprocessor-controlled, two-step

Motor

- 3.6-HP dc

Control Power

- 120 or 240 Vac, 50/60 Hz

Environmental Operating Characteristics

- Temperature: -58°F (-50°C/LCD -30°C) to +158°F (+70°C)
- Humidity: 0 to 95% (noncondensing)
- Microprocessor-controlled heater minimizes condensation

Voltage and Current Sensing Option

- True RMS voltage and current sensing
- Voltage accuracy: ±0.5% full scale over temperature range; resolution: 0.1 Vac
- Current sensor input range: 0 to 900 A RMS
- Current accuracy: ±0.5% full scale over temperature range; resolution: 1 A RMS
- Phase angle range: 0 to 360°
- Phase angle accuracy: ±1° at 5% of full-scale current; resolution: ⅛°
- Overcurrent fault-detection range: 0 to 4000 A RMS (Refer to the nearest S&C Sales Office for other ranges.)
- Overcurrent fault-detection accuracy: ±0.5% full scale

Radio Faulted-Circuit Indicator Option

- Performance in accordance with sensor manufacturer's specifications (Refer to the nearest S&C Sales Office for faulted-circuit indicators supported.)

Communication Ports

- Two Ethernet
- Two SCADA RS232 connectors, 1,200 to 57,600 baud
- One USB/DB9 configuration port

Communication Hardware

- See S&C Specification Bulletin 1045M-31

Protocol

- DNP 3.0

Power Supply/Battery Charger

- Supports communication equipment
- Provides automatic, remote, and local battery testing
- Charger: 50 W, regulated 24 Vdc
- Battery: 33 amp-hour, sealed lead-acid
- Expected battery carryover: 16 hours; varies with battery type, age, ambient temperature, communication device, and number of switch/disconnect operations

Enclosure

- Mounting: Galvanized-steel pole-mount bracket with lifting hole
- Material: Mild steel, painted with RAL 7035, light gray
- Dimensions: 24 inches (61 cm) W × 24 inches (61 cm) H × 13 inches (33 cm) D, less bracket
- Weight: 175 lbs. (79 kg), less battery