

Product Description

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Qualified Persons

WARNING

The equipment covered by this publication must be installed, operated, and maintained by qualified persons who are knowledgeable in the installation, operation, and maintenance of overhead electric power distribution equipment along with the associated hazards. A qualified person is one who is trained and competent in:

- The skills and techniques necessary to distinguish exposed live parts from non live parts of electrical equipment.
- The skills and techniques necessary to determine the proper approach distances corresponding to the voltages to which the qualified person will be exposed.
- The proper use of the special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools for working on or near exposed energized parts of electrical equipment.

These instructions are intended only for such qualified persons. They are not intended to be a substitute for adequate training and experience in safety procedures for this type of equipment.

Read this Instruction Sheet

Read this instruction sheet thoroughly before installing or operating your S&C 6801M Automatic Switch Operator. Familiarize yourself with the safety information and precautions on pages 3 and 4. The latest version of this publication is available online in PDF format at sandc.com/support/publications/6801M-switch-operators-pubs.asp.

Retain this Instruction Sheet

This instruction sheet is a permanent part of your S&C 6801M Automatic Switch Operator. Designate a location where you can easily retrieve and refer to it.

Warranty

SPECIAL WARRANTY PROVISIONS: The standard warranty contained in seller's standard conditions of sale, as set forth in Price Sheet 150, applies to S&C 6801M Automatic Switch Operators, except that the first paragraph of said warranty is replaced by the following:

(1) General: Seller warrants to the immediate purchaser or end user for a period of 2 years from the date of shipment that the equipment delivered will be of the kind and quality specified in the contract description and will be free of defects of workmanship and material. Should any failure to conform to this warranty appear under proper and normal use within ten years after the date of shipment the seller agrees, upon prompt notification thereof and confirmation that the equipment has been stored, installed, operated, inspected, and maintained in accordance with recommendations of the seller and standard industry practice, to correct the nonconformity either by repairing any damaged or defective parts of the equipment or (at seller's option) by shipment of necessary replacement parts. The seller's warranty does not apply to any equipment that has been disassembled, repaired, or altered by anyone other than the seller. This limited warranty is granted only to the immediate purchaser or, if the equipment is purchased by a third party for installation in third-party equipment, the end user of the equipment. The seller's duty to perform under any warranty may be delayed, at the seller's sole option, until the seller has been paid in full for all goods purchased by the immediate purchaser. No such delay shall extend the warranty period.

Replacement parts provided by seller or repairs performed by seller under the warranty for the original equipment will be covered by the above special warranty provision for its duration. Replacement parts purchased separately will be covered by the above special warranty provision.

WARRANTY QUALIFICATIONS: Warranty of S&C 6801M Automatic Switch Operators is contingent upon the installation, configuration, and use of the operator or software in accordance with S&C's applicable instruction sheets. This warranty does not apply to major components not of S&C manufacture, such as batteries, communication devices, and remote terminal units. However, S&C will assign to immediate purchaser or end user

all manufacturers' warranties that apply to such major components. S&C does not warrant that the switching device ratings will be unaffected by the use of the 6801M Automatic Switch Operator. Contact S&C to discuss possible limitations. S&C's Power System Services can provide validation testing services if desired. Contact S&C for a quotation.

END USER LICENSE AGREEMENT: End user is granted a nontransferable, non-sub-licensable, nonexclusive license to use the LinkStart Connection Management Software, IntelliLink® Remote Setup Software, IntelliTeam® SG Automatic Restoration Software, Automatic Sectionalizing Software, and/or other Software furnished with 6801M Automatic Switch Operators only upon acceptance of all the terms and conditions of the seller's end user license agreement set forth in Price Sheet 155.

Understanding Safety-Alert Messages

There are several types of safety-alert messages which may appear throughout this instruction sheet as well as on labels attached to the 6801M Automatic Switch Operators. Familiarize yourself with these types of messages and the importance of the various signal words, as explained below.

⚠ DANGER
“DANGER” identifies the most serious and immediate hazards which <i>will likely</i> result in serious personal injury or death if instructions, including recommended precautions, are not followed.


⚠ WARNING
“WARNING” identifies hazards or unsafe practices which <i>can</i> result in serious personal injury or death if instructions, including recommended precautions, are not followed.

⚠ CAUTION
“CAUTION” identifies hazards or unsafe practices which <i>can</i> result in minor personal injury or product or property damage if instructions, including recommended precautions, are not followed.

NOTICE
“NOTICE” identifies important procedures or requirements that <i>can</i> result in product or property damage if instructions are not followed.

Following Safety Instructions

If you do not understand any portion of this instruction sheet and need assistance, contact your nearest S&C Sales Office or S&C Authorized Distributor. Their telephone numbers are listed on S&C's website www.sandc.com. Or call S&C Headquarters at (773) 338-1000; in Canada, call S&C Electric Canada Ltd. at (416) 249-9171.

NOTICE	
Read this instruction sheet thoroughly and carefully before installing or operating your S&C 6801M Automatic Switch Operator.	

Replacement Instructions and Labels

If you need additional copies of this instruction sheet, contact your nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.

It is important that any missing, damaged, or faded labels on the equipment be replaced immediately. Replacement labels are available by contacting your nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.

Description

Applicable Software

This instruction sheet is used with **ST6801MSS-6.1.x** and **SG6801MSX-6.1.x**. The “x” can indicate any number from 0 to 255. Other related software component version information is found on the *Setup > General > Revisions* screen.

The software revision is shown in the installer file name (-6.1.x), and on the *Setup > General > Revisions* screen. For questions regarding the applicability of information in this instruction sheet to future software releases, please contact S&C.

CAUTION

Serious risk of personal injury or death may result from contact with electric distribution equipment when electrical isolation and grounding procedures are not followed.

The equipment described in this document must be operated and maintained by qualified persons who are thoroughly trained and understand any hazards that may be involved. This document is written only for such qualified persons and is not a substitute for adequate training and experience in safety procedures for accessing high-voltage equipment.

WARNING

These instructions do not replace the need for utility operation standards. Any conflict between the information in this document and utility practices should be reviewed by appropriate utility personnel and a decision made as to the correct procedures to follow.

The S&C 6801M Automatic Switch Operator is connected to switchgear operating at primary voltage levels. High voltage may be present in the wiring to the switch operator or the switch operator itself during certain failures of the switchgear wiring or grounding system, or due to a failure of the switch itself. For this reason, access to the switch operator should be treated with the same safety precautions that would be applied when accessing other high-voltage lines and equipment. Follow all locally-approved safety procedures when working on or around this switch operator.

Before attempting to access an existing switch installation, check carefully for visible or audible signs of electrical or physical malfunction (do this before touching or operating the switch operator or any other part of the installation). These warning signs include such things as smoke, fire, open fuses, crackling noises, loud buzzing, etc. If a malfunction is suspected, treat all components of the installation, including the switch operator and associated mounting hardware, as if they were elevated to primary (high) voltage.

Whenever you are manually reconfiguring the circuit (for example, during repairs), follow your company's operating procedures to disable automatic operation of the IntelliTeam SG Automatic Restoration System. This prevents any unexpected operation of a team member.

You can disable the IntelliTeam SG system by pressing the Automatic Restoration **CHANGE** faceplate button to select **PROHIBITED** on the faceplate of any active IntelliTeam SG team member of the team you want to disable.

6801M Automatic Switch Operator Overview

The S&C 6801M Switch Operator is a fully-integrated, microprocessor-based control that lets you automate almost any distribution-class switch. The electromechanical components, control, and communications are combined in a single, factory-integrated enclosure for maximum reliability, versatility, and cost effectiveness. Shown in Figure 1 and Figure 2 on page 6.

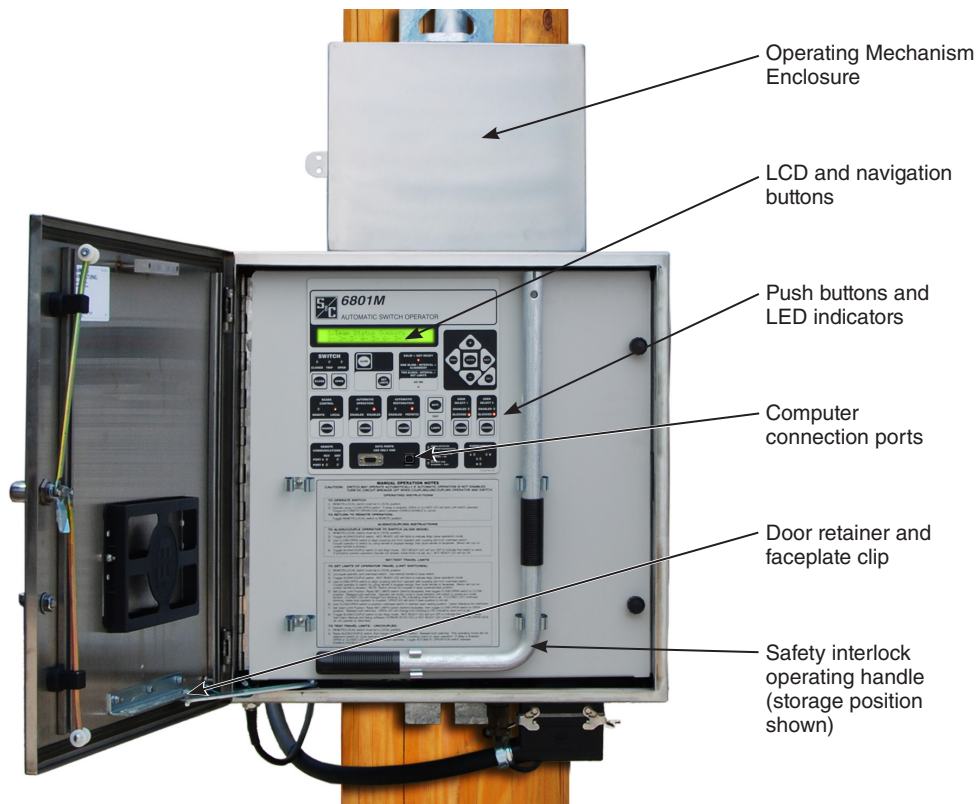


Figure 1. Switch operator with enclosure door open.

- **Switch operator enclosure**—Sturdy, mild carbon steel enclosure (stainless steel optional) provides weatherproof and tamper-resistant protection for the switch operator components.
- **Three-point latching**—Gives added security when the door is locked.
- **Padlockable door handle**—The door can be padlocked to prevent tampering.
- **Door pocket**—A convenient place to store data sheets, instruction booklets, and other installation information.
- **Door retainer**—Holds the enclosure door open while you use the faceplate.
- **Faceplate LCD**—Permits local viewing of setpoint values and historical data without using a portable computer. A label inside the door helps you navigate the LCD information easily.
- **Faceplate LEDs and switches**—Clearly labeled LEDs display information about the present state of the switch operator. Switches permit local, manual control of the installation.
- **Faceplate data ports**—Allow you to connect your computer to the switch operator then use the IntelliLink software to view data, change setpoints, download logged data, and update the control software.

Description

- **Switch interface connector**—Provides a connection point on the bottom of the switch operator enclosure for cables carrying sensor data and switch status signals; often referred to as the FIC (field interface connector).
- **Mounting channel**—Mounting holes with slots make it easy to hang and align the switch operator.

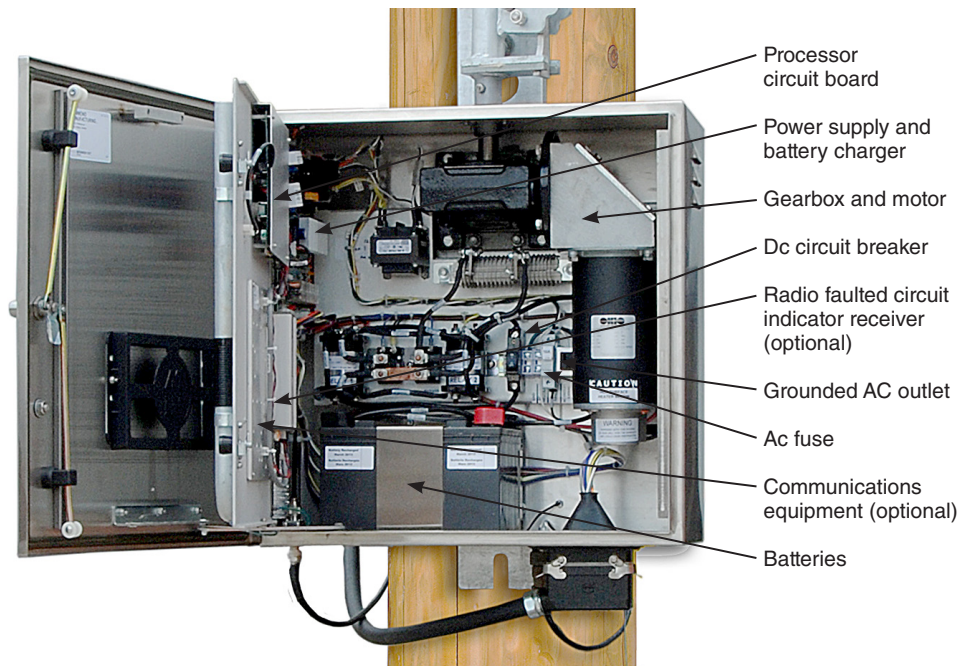


Figure 2. Switch operator with faceplate open.

- **Electronics**—Modularized for easy troubleshooting and replacement.
- **Power supply/battery charger and I/O board**—Provides the control circuitry and electrical outputs to maintain battery charge and operate the electronics modules.
- **Universal communication mounting plate**—A pre-drilled plate for mounting a radio, or modem, etc.
- **Communications equipment**—DNP protocol for a radio, modem, or other device for 2-way communication between the switch operator and the SCADA master station. IntelliTeam SG supports peer-to-peer communication.
- **Decoupler**—In the Torsional Switch Operator, the decoupler allows the witch to be mechanically decoupled from the switch operator. In the Reciprocating Switch Operator, the switch can be decoupled by pulling out a pin on the crank arm at the rear of the enclosure.
- **Gearbox**—Connects the switch operator motor to the output operating rod.
- **Motor**—The powerful dc motor provides extremely high torque to operate the switch quickly and reliably.
- **Dc circuit breaker**—Disconnects the batteries from the motor circuitry when it detects an electrical overload.
- **Ac fuse**—Disconnects the control power.

Features

- **Grounded ac outlet**—An easily-accessed power source for your portable computer.
- **Batteries**—Two 12 volt batteries provide a non-interruptable 24-Vdc source of power for the switch operator.
- **Dependable quality**—Electronics manufactured in an ISO 9001-certified plant.
- **Tough and reliable**—Designed to withstand the difficult environmental and electrical conditions found in electric distribution applications.
- **Rugged, well-proven core electronics design**—The microprocessor, memory, and all related components are based on technology developed for S&C's full range of control products.
- **Data logging capabilities**—Useful for both stand-alone and communications-oriented applications.
- **Flexible communications capabilities**—Has a serial and USB communications port for local communication with your portable PC, and a SCADA port for remote communications applications.
- **Easy setpoint control of most operating parameters**—Automatic operation options, address information, and other operating parameters can be viewed and changed as needed.
- **Non-volatile memory**—Programming, setpoints, and data stored in permanent, non-volatile memory for maximum field functionality and reliability.
- **Accurate timestamp**—Crystal-controlled clock provides accurate timestamping of real-time data.
- **Control software**—Resides in the switch operator and manages the moment-by-moment functioning of the installation. Can be easily updated, using the IntelliLink software Update utility. Version upgrades are handled through software uploads, and you will never need to exchange computer or memory ICs.
- **IntelliLink software**—Lets you verify and change all setup and configuration parameters, monitor real-time operating data, perform troubleshooting, create reports, and export data for use in spreadsheets. Resides on your portable computer and runs in the Microsoft® Windows® environment.
- **Highly-efficient, computer-controlled power supply/battery charger system**—Provides 12-volt, 24-volt, and other voltages from a single 24-volt source for Switch Operator and communications equipment. Fully temperature-compensated charging, accurate measurement of battery voltage, and response predictions (for heavy loads) yield maximum battery life and minimize required maintenance.

Options

- **Current and voltage sensing option**—The 6801M Switch Operator can also include special features which customize it for use with additional current and voltage sensors. The analog board can support three current sensors and up to six voltage sensors. Voltage and current sensing adds the functionality to include three phase automatic sectionalizing, analog real-time data and data logging, and calculation/logging of the power factor kVARs, kW, etc. This board uses industry standard voltage and current sensors. Contact your S&C representative for further details.

IntelliTeam® SG Automatic Restoration System

S&C 6801M Switch Operators with the IntelliTeam SG Automatic Restoration System let mechanically operated switches form teams that provide fast, fully automatic fault isolation and service restoration. Using peer-to-peer communication and distributed intelligence, team members protect a line segment by monitoring the feeder(s) for voltage loss and fault conditions, sharing information (both within the team and between teams), and making decisions on how to pickup load safely and effectively. With the IntelliTeam SG System, you can implement complex configurations, with multiple alternate sources.

IntelliTeam SG Automatic Restoration System features include:

- **Distributed intelligence**—The team does not require a SCADA master station for circuit reconfiguration, though the IntelliTeam SG Automatic Restoration System is compatible with SCADA systems using DNP.
- **Automatic load transfer**—Team members can transfer load from their normal source to an alternate source to provide power to as many customers as possible. Teams coordinate automatic operations to prevent overloading of a feeder during transfer operations. Each team can have multiple alternate sources.
- **Return to normal**—If you enable this feature, the team members return the circuit to its normal configuration automatically once a stable three-phase voltage has been restored to the faulted line segment.
- **READY status on LCD**—The faceplate alpha-numeric display shows “RDY” when the team is ready to take action, even if a transfer event has already taken place. It indicates that there are no errors, faults, battery problems, or team communication problems present.
- **Safety and reliability features**—The IntelliTeam SG Automatic Restoration System is designed to avoid operational problems, such as opening a switch when the current is above the load-break rating. Features that help to ensure team safety include the ability to limit the number of line segments picked up by a team, updated loading information, logic preventing extended parallel circuits, and sensitivity to the needs of utility personnel operating the control or switch manually.
- **Local setup of remote team controls**—When team members have their RTU addresses set, you can use S&C IntelliLink® Setup Software and a portable computer to enter or change setpoint values for any team member on the communications network from a single control – even members of other teams. IntelliLink software can speak both TTY and DNP.
- **Critical team information available locally**—IntelliLink software and the local LCD can display critical data for all of the team members. Information is available for each team where the local control is a member.
- **Stand-alone operation fallback**—If team operation is not possible, team members operate as stand-alone sectionalizer controls.