Product Description

Table of Contents

June 17, 2024

Qualified Persons

⚠ WARNING

Only qualified persons who are knowledgeable in the installation, operation, and maintenance of overhead and underground electric distribution equipment, along with all associated hazards, may install, operate, and maintain the equipment covered by this publication. A qualified person is someone who is trained and competent in:

- The skills and techniques necessary to distinguish exposed live parts from nonlive 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 special precautionary techniques, personal protective equipment, insulated 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

NOTICE

Thoroughly and carefully read this instruction sheet and all materials included in the product's instruction handbook before installing or operating the 6800 Series Automatic Switch Controls. Become familiar with the Safety Information on page 4 and Safety Precautions on page 5. The latest version of this publication is available online in PDF format at **sandc.com/en/support/product-literature/**.

Retain this Instruction Sheet

This instruction sheet is a permanent part of the 6800 Series Automatic Switch Controls. Designate a location where this publication can be easily retrieved.

Proper Application

⚠ WARNING

The equipment in this publication is only intended for a specific application. The application must be within the ratings furnished for the equipment. See S&C Specification Bulletin 1045-31.

Special Warranty Provisions

The standard warranty contained in seller's standard conditions of sale, as set forth in Price Sheet 150, applies to 6800 Series Automatic Switch Controls, except that the first paragraph of said warranty is replaced by the following:

(1) General: The seller warrants to the immediate purchaser or end user for a period of two 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 two 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 the 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 the 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 the seller or repairs performed by the 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 6800 Series Automatic Switch Controls 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 the 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 Systems Solutions can provide validation testing services if desired. Contact S&C for a quotation.

Understanding Safety-Alert Messages

Several types of safety-alert messages may appear throughout this instruction sheet and on labels and tags attached to the 6801M Automatic Switch Operator. Familiarize yourself with these types of messages and the importance of these various signal words:

⚠ DANGER

"DANGER" identifies the most serious and immediate hazards that will result in serious personal injury or death if instructions, including recommended precautions, are not followed.

⚠ WARNING

"WARNING" identifies hazards or unsafe practices that can result in serious personal injury or death if instructions, including recommended precautions, are not followed.

⚠ CAUTION

"CAUTION" identifies hazards or unsafe practices that can result in minor personal injury if instructions, including recommended precautions, are not followed.

NOTICE

"NOTICE" identifies important procedures or requirements that can 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 the nearest S&C Sales Office or S&C Authorized Distributor. Their telephone numbers are listed on S&C's website **sandc.com**, or call the S&C Global Support and Monitoring Center at 1-888-762-1100.

NOTICE

Read this instruction sheet thoroughly and carefully before installing the 6800 Series Automatic Switch Controls.

Replacement Instructions and Labels

If additional copies of this instruction sheet are needed, contact the 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 the nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.

⚠ DANGER

The 6800 Series Automatic Switch Control line voltage input range is 93 to 276 Vac. Failure to observe the precautions below will result in serious personal injury or death.

Some of these precautions may differ from your company's operating procedures and rules. Where a discrepancy exists, follow your company's operating procedures and rules.

1. **QUALIFIED PERSONS**. Access to the 6800 Series Automatic Switch Control must be restricted only to qualified persons. See the "Qualified Persons" section on page 2.
2. **SAFETY PROCEDURES.** Always follow safe operating procedures and rules.
3. **PERSONAL PROTECTIVE EQUIPMENT.** Always use suitable protective equipment, such as rubber gloves, rubber mats, hard hats, safety glasses, and flash clothing, in accordance with safe operating procedures and rules.
4. **SAFETY LABELS.** Do not remove or obscure any of the "DANGER," "WARNING," "CAUTION," or "NOTICE" labels.
5. **MAINTAINING PROPER CLEARANCE.** Always maintain proper clearance from energized components.

Applicable Software

This instruction sheet is used with software versions **SG6801Installer-3.2.x** and **SG6802-3Installer-3.2.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 version number is on the setup file label, and on the *Setup>General>Revisions* screen. For questions regarding the applicability of information in this chapter to future software releases, contact S&C Electric Company.

⚠ 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 6800 Series Automatic Switch Control is connected to switchgear operating at primary voltage levels. High voltage may be present in the wiring to the switch control or the switch control itself during certain failures of the switchgear wiring or grounding system, or because of a failure of the switch itself. For this reason, access to the switch control 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 control.

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 control 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 control and associated mounting hardware, as if they were elevated to primary (high) voltage.

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

The IntelliTeam SG/II system can be disabled by pressing the Automatic Restoration CHANGE faceplate button to select "Prohibited" on the faceplate of any active 6800 Series team member of the team to be disabled.

IntelliTeam SG/ II Systems

6800 Series controls with the IntelliTeam SG/II system enable Scada-Mate® Switching Systems, Omni-Rupter® Switches, remote supervisory Vista® Underground Distribution Switchgear, and pad-mounted distribution switches, or a combination of these, to form teams that provide fast, fully automatic fault isolation and service restoration. Up to two automatic switch positions of the pad-mounted gear can be used and configured independently to provide further flexibility for the transfer process. Using peer-to-peer communications 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 pick up load safely and effectively. With IntelliTeam SG/II systems, complex configurations with multiple alternate sources can be implemented.

Features

Some IntelliTeam SG/II system features include:

- **Distributed intelligence—**The team does not require a SCADA master station for circuit reconfiguration, though an IntelliTeam SG/II 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—**When enabling this feature, the team members return the circuit to its normal configuration automatically when a stable three-phase voltage has been restored to the faulted line segment.
- **Ready status on LCD—**The faceplate alphanumeric display shows “RDY” when the team is ready to take action, even if a transfer event has already taken place. It indicates there are no errors, faults, battery problems, or team communication problems present.
- **Safety and reliability features—**An IntelliTeam SG/II 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, IntelliLink® Setup Software and a portable computer can be used 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 standalone sectionalizer controls.

6801 Switch Control Features

The 6801 switch control package includes the following major components, as shown in Figure 1 and Figure 2 on page 9.

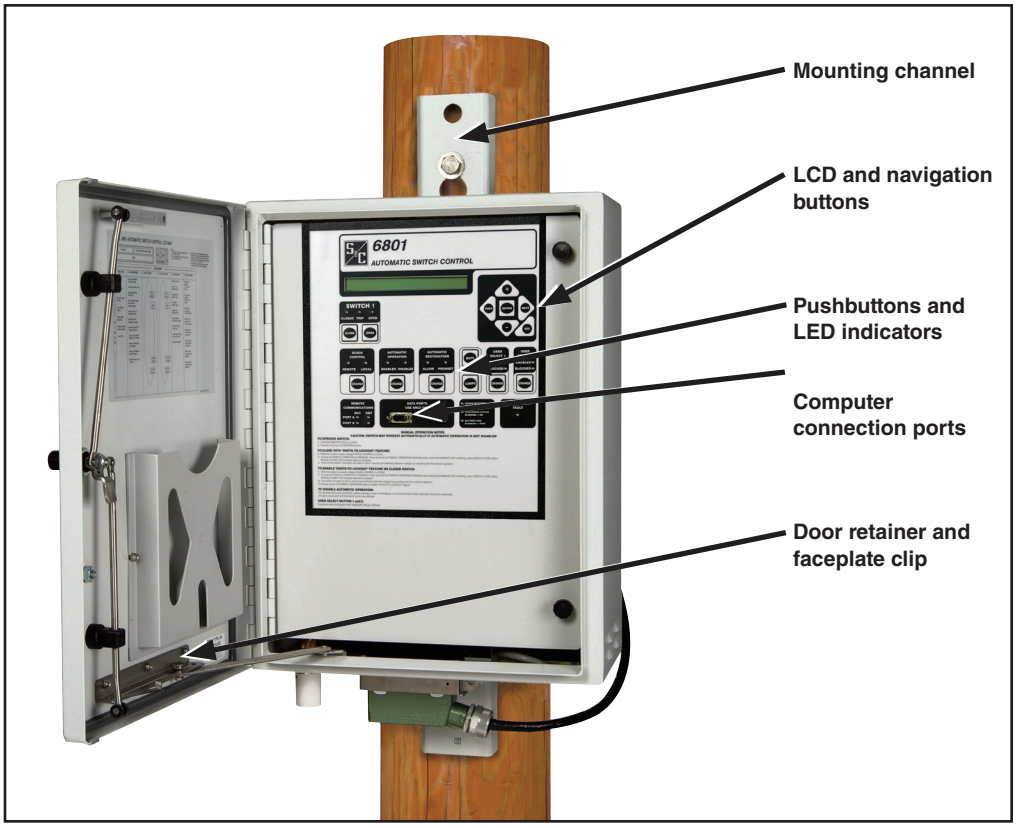

Figure 1. Switch control with enclosure door open (6801 control shown).

- **Switch control enclosure (if applicable)—**A sturdy, corrosion resistant aluminum box provides weatherproof and tamper-resistant protection for the switch control components.
- **Switch interface connector(s)—**These provide a connection point on the bottom of the switch control enclosure for cables carrying sensor data and control/status signals; often referred to as the FIC (field interface connector).
- **Mounting channel (6801 control) or flanges (6802/6803 controls)—**Special mounting holes/slots make it easy to hang and align the switch control. The channel on the S&C 6801 is compact enough to allow the line-worker to grasp the pole (instead of the enclosure) when climbing past the enclosure.
- **Faceplate LCD—**This permits local, easy 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 control. Switches permit local, manual control of the installation. On the 6802/6803 controls, each line switch can be controlled individually.
- **Faceplate Data Ports—**These allow connecting a computer to the switch control. Users can then use the IntelliLink software to view data, change setpoints, download logged data, and update the control software.
- **Faceplate retainer (6801 control)—**This holds the faceplate open while working inside the control enclosure.
- **Door pocket (6801 control)—**This provides a convenient place to store information bulletins, instruction booklets, and other installation information.
- **Door retainer (6801 control)—**This holds the enclosure door open while viewing and using the faceplate.

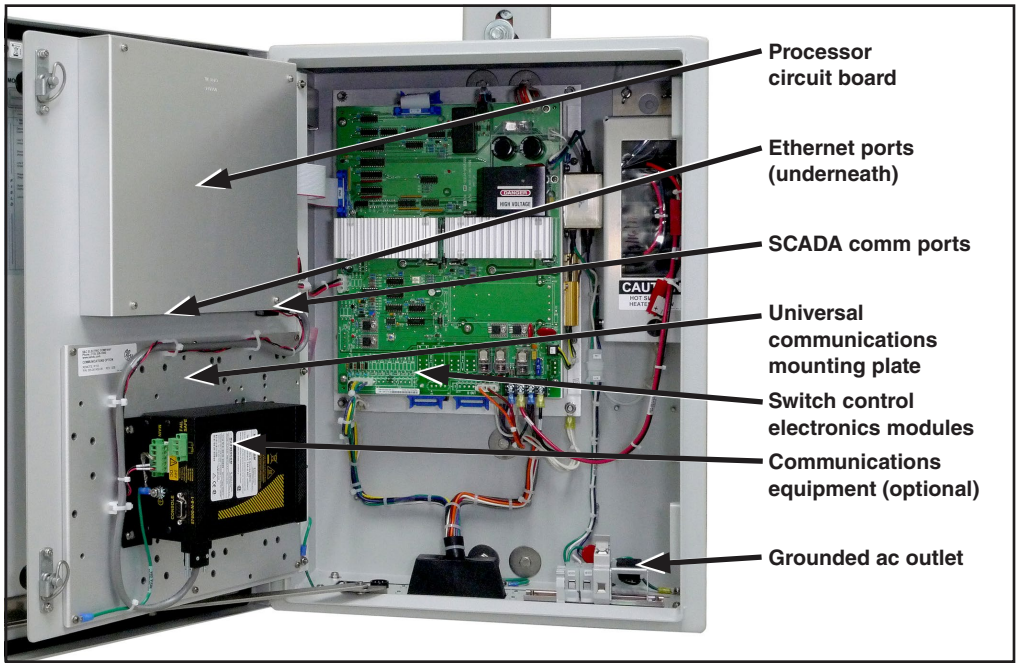

Figure 2. Switch control with faceplate open (S&C 6801 shown).

- **Switch control electronics modules—**These are modularized for easy trouble-shooting and replacement.
- **Universal communications mounting plate—**This provides a solid base on which the equipment for SCADA and team communications (radio, modem, etc.) is mounted.
- **Communications equipment—**An IntelliTeam SG/II system uses DNP protocol and a radio, modem, or other device for peer-to-peer communication and for 2-way communication between the switch control and the SCADA master station.

- **Grounded ac outlet (S&C 6801)—**This provides an easily accessed power source for a portable computer. This feature requires a connection to ac control power, it is not supported by sensor power.
- **Control software—**The software resides in the switch control and manages the moment-by-moment functioning of the installation. Users can easily update it using the IntelliLink software Update utility. Version upgrades are handled through software uploads, and computer or memory integrated circuits never need to be exchanged.
- **IntelliLink software—**The software enables users to verify and change all setup and configuration parameters, monitor real-time operating data, perform troubleshooting, create reports, and export data for use in spreadsheets. It resides on the portable computer used and runs in the Microsoft® Windows® Operating System environment.

6800 Series Switch Control Features

All controls in the 6800 series controls include the following features:

- **Dependable quality—**Electronics are manufactured in an ISO 9001-certified plant.
- **Tough and reliable—**Controls are 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 (with over 100,000 units in the field since 1985).
- **Data logging capabilities—**This is useful for both standalone and communications-related applications.
- **Flexible communications—**The controls have a local communications port (for connecting to with your portable computer) and two DNP and Ethernet ports (for communication with other IntelliTeam system controls or SCADA).
- **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 are stored in permanent, non-volatile memory for maximum reliability.
- **Accurate timestamp—**A crystal-controlled clock, or optional GPS system, provide accurate timestamping of real-time data.
- **Electrical isolation designed for the application—**All power is supplied to external devices and their interfaces (including switch motors, wetting voltage for external digital inputs, and external sensor conditioning circuitry) is isolated by opto-couplers and can withstand a surge of 2500 Volts RMS for one minute.
- **Highly-efficient, computer-controlled power supply/battery charger system—**The system provides battery charging (24 or 36 Vdc, depending on the switch in use) and other voltages from a single source for the switch control, switch, and communications equipment. Fully temperature-compensated charging, accurate measurement of battery voltage, and response predictions (for heavy loads) yield maximum battery life and minimal required maintenance. The switch control regularly tests the battery, lighting a faceplate LED and setting a SCADA alarm when a new battery is required.

- **Battery back-up power—**Phis provides power for critical components even during complete ac power loss.
- **Automatic line sectionalizing feature—**When combined with a sourceside reclosing device, this feature can assist in the speedy isolation of faults. This minimizes service loss for the maximum number of customers.
- **Phase-loss protection feature—**This feature minimizes single-phase damage to customer equipment when voltage is lost on only one or two phases.
- **Automatic reclose feature—**Following a phase loss, this feature automatically recloses the switch when steady three-phase voltage resumes.
- **Shots-to-lockout feature—**This feature limits the number of **Reclose** operations performed by the source-side protective device (recloser, breaker, etc.) when closing into a fault.
- **Reliable overcurrent fault detection—**This includes a redundant electronic path for phase fault current, scaled specifically for fault detection. A ground fault current is measured as the analog vector sum of the three individually sensed phase currents.
- **Switch control power supplied by S&C sensors—**Switch controls connected to most S&C switches can receive power directly from the S&C sensors (for circuits with voltages near the nominal rating of the sensors). This is especially useful where ac control power is unavailable. If both control power and sensor power are available, the switch control uses control power. If control power fails, the control automatically switches to sensor power. Other 6800 Series controls are powered from an external 120- or 240-Vac line.

Additional 6801 Control Features

The 6801 switch control also includes special features that customize it for use with overhead switches. These features include:

- **Custom ac voltage and current-signal conditioning—**The conditioning is specifically designed and tested for use with the type of sensors in use.
- **Specialized enclosure wiring—**The switch interface connector and internal enclosure wiring are matched to the control cable.
- **Switch control shipped ready to install—**The control is modular with prewired connectors and requires no discrete field wiring other than 120-Vac control power.
- **Visible disconnect—**This disconnect supports the S&C “-D2” **Visible Disconnect** option (disconnect closed and latched indication) for Scada-Mate Switch applications, both in the IntelliLink software and in the SCADA status points. When the visible disconnect is open, the switch cannot operate. The “-D2” option is a standard feature on “-R2” operating mechanisms and is an optional feature on “-R1” mechanisms.
- **Reports when “Local” is selected—**in the pad-mount motor operator cabinet.

Additional 6802/6803 Control Features

The 6802/6803 switch controls also include special features that customize them for use with multi-switch installations. These features include:

- **Custom ac voltage and current-signal conditioning—**Specifically designed and tested for use with up to six current and six voltage sensors, or nine current and three voltage sensors.
- **Specialized enclosure wiring—**Internal wiring is matched to the pad-mounted switch operator and sensor cables.
- **Switch control shipped ready for integration—**The control requires only mounting in the low-voltage compartment and connection of control/status, sensor, ac power, and communication wiring. The switch control can also be factory-installed in new pad-mounted switchgear.
- **Separate automatic control setpoints for switch 1 and switch 2—**These setpoints enable selecting independent setpoint values and enable automatic features for each switch.