Product Description

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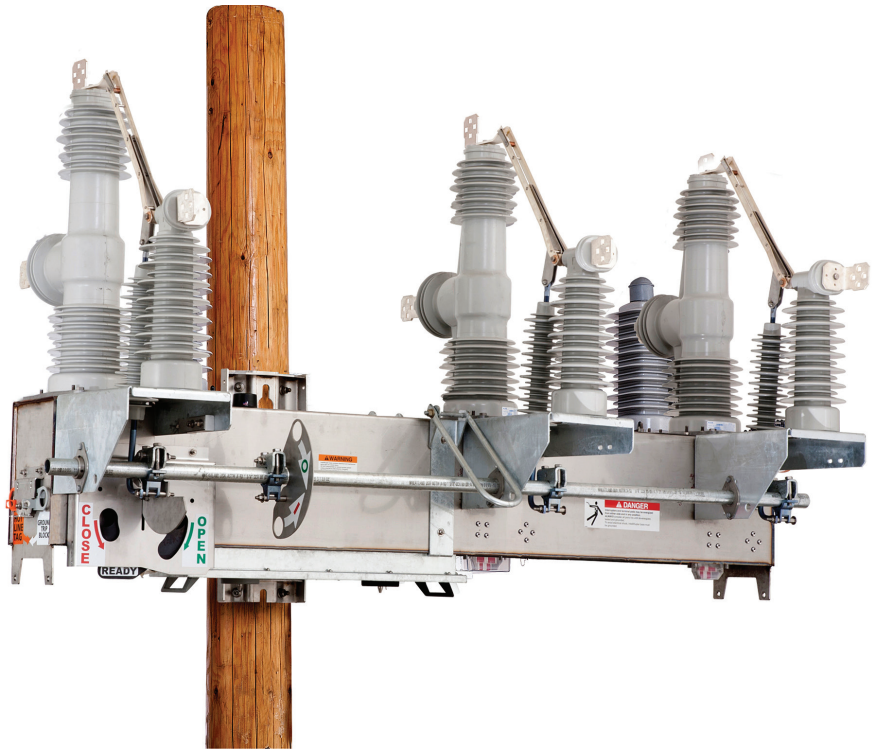

Supersedes Instruction Sheet dated July 2, 2012

August 28, 2017

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

Thoroughly and carefully read this instruction sheet before programming, operating, or maintaining your S&C IntelliRupter PulseCloser Fault Interrupter. Familiarize yourself with the safety information on page 3. The latest version of this instruction sheet is available online in PDF format at **www.sandc.com > Support > Product Literature**.

Retain this Instruction Sheet

This instruction sheet is a permanent part of your S&C IntelliRupter PulseCloser Fault Interrupter. Designate a location where you can easily retrieve and refer to it.

Replacement Instructions

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.

IntelliRupter PulseCloser Fault Interrupter

S&C IntelliRupter PulseCloser Fault Interrupter is a package of fault-interrupting and control components which provides fault isolation and circuit restoration functions on an overhead distribution system. IntelliRupter® fault interrupter can operate as a standalone fault interrupter or, with appropriate options, can be integrated into a SCADA system and/or an S&C IntelliTeam® II Automatic Restoration System.

IntelliRupter fault interrupter features PulseClosing® Technology—a unique means for verifying that the line is clear of faults before initiating a close operation. PulseClosing Technology is a superior alternative to conventional reclosing. It significantly reduces stress on system components as well as voltage sags experienced by customers upstream of the fault.

IntelliRupter fault interrupter uses three-pole, electrically operated vacuum interrupters rated 630 amperes continuous, 12,500 amperes interrupting. A rating of 800 amperes continuous is assigned with a 2 ft./sec wind—similar to conductor ratings. IntelliRupter fault interrupter provides full live-switching performance under any and all ice conditions—circuit making, circuit breaking, and PulseClosing operations are accomplished within the interrupters; there are no external moving parts.

Each IntelliRupter fault interrupter is factory-assembled on a single base with:

- Unique magnetic latching actuators, which provide single-phase or three-phase tripping and lockout of the interrupters. The interrupters can also be manually tripped by means of a pull-ring, operable from the ground with an extendo stick.
- Sensors for three-phase monitoring of line current and three-phase monitoring of line voltage on both sides of each interrupter.
- One or two integral power modules, which derive the required operating energy directly from the distribution line. An optional external power supply allows the IntelliRupter fault interrupter to be powered from a dc battery, or ac service voltages.
- Open/close indicator for each phase.
- Manually actuated open/close/ready lever, operable from the ground with an extendo stick.
- Manually actuated lever, to enable or disable a hot line tag or disable an electronically set hot line tag. The lever is operable from the ground using an extendo stick. A hot line tag indicator on the protection and control module shows a “set” tag.
- Manually actuated lever, if provided, to block user configured elements. User selections are: ground/negative sequence overcurrent elements; sensitive earth overcurrent elements; circuit testing; or change to an alternate general profile. The lever is operable from the ground using an extendo stick. The control status indicator will light for 10 seconds to indicate the lever actuation was detected.
- A control group, featuring a hookstick-removable protection and control module and communication module mounted in the base. The control group is easily configured and operated from the safety and security of a vehicle parked near the base of the pole, by means of a secure Wi-Fi communication link to a laptop computer.
- A unique multi-function status indicator on the protection and control module, which shows that the control group is operating normally. The blink rate changes if a Wi-Fi connection has been made, control power has been lost, or the position of the open/close/ready operating lever has been changed.
- Integrated Global Positioning System, which provides 1-ms accurate time-stamping of events to speed post-event analysis, as well as IntelliRupter fault interrupter location data for entry in the user’s graphical information system.
- Provisions for mounting three surge arresters on each side of the IntelliRupter fault interrupter. Joslyn *Zforce* Type ZHP (Heavy Duty) polymer-housed metal-oxide surge arresters can be optionally factory-installed and wired.
- Single-point lifting means for convenient rigging and hoisting of IntelliRupter fault interrupter during installation.

IntelliRupter fault interrupter is available in the upright-crossarm mounting configuration, with or without an integral, hookstick-operated disconnect for visible air-gap isolation of switched-open circuits. The disconnect is interlocked with the interrupters to ensure that the pole-units are open prior to opening or closing the disconnect; a status point for remote monitoring of disconnect position is included. The interrupters may be operated with the disconnect in the open position.

IntelliRupter fault interrupter pole-units are molded of S&C Cypoxy™▲ Insulator material. The sensors are embedded, thus eliminating the cost, clutter, and complexity associated with separately mounted sensors. Total system accuracy, including sensing, control, and interrupting time is nominally ±2% for both voltage and current.

▲ Cypoxy is the S&C trademark for S&C's cycloaliphatic epoxy resin system. Cypoxy is nontracking, self-scouring, nonweathering… there's never a compromise of insulation integrity.

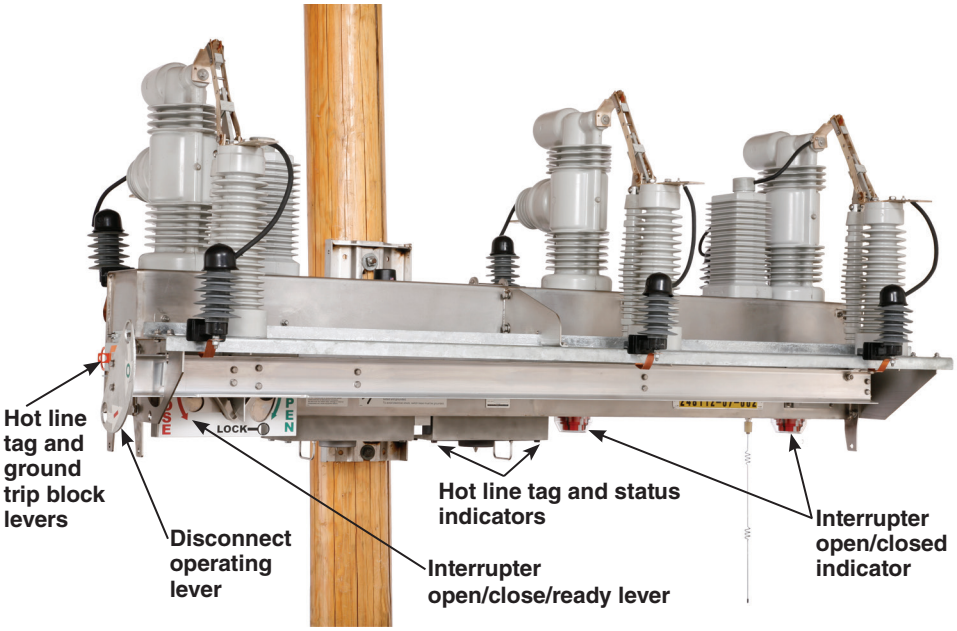

Figure 1. 15.5 kV and 27 kV IntelliRupter fault interrupter operating levers and indicators.

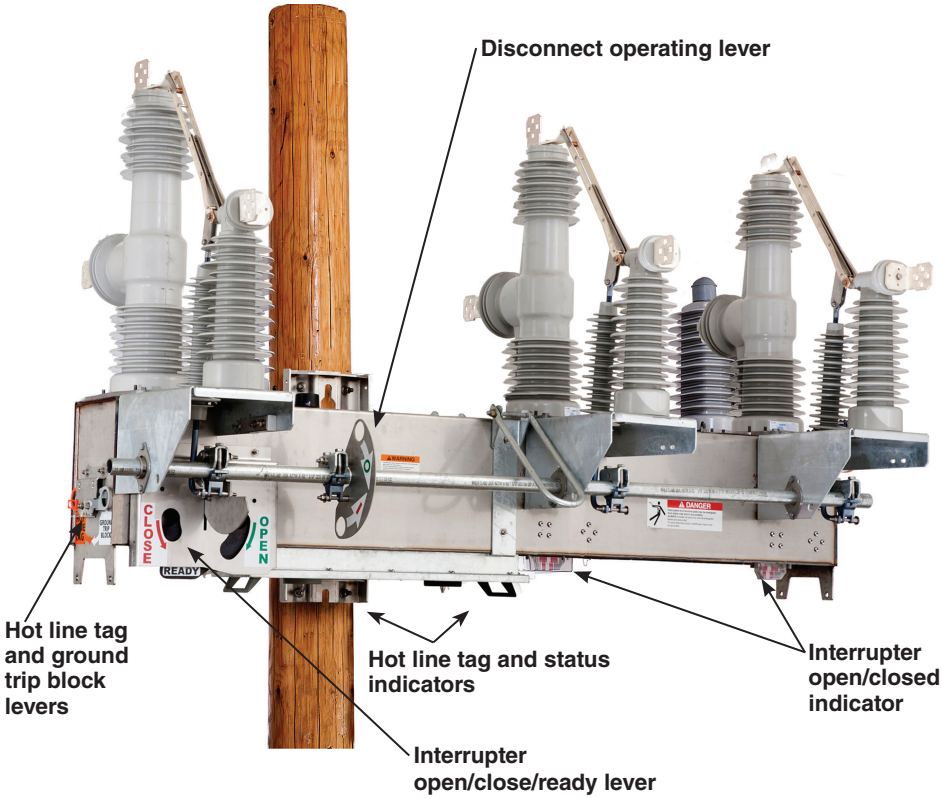

Figure 2. 38 kV IntelliRupter fault interrupter operating levers and indicators.

Control Groups

IntelliRupter fault interrupter is available with a variety of software control groups. Each features easy configuration and operation, using secure Wi-Fi communication to a nearby laptop computer.

IntelliRupter fault interrupter operation is based on the installed Control Group, the communication system used, and real-time operating conditions. Protective relaying features are unique for each operating mode.

Standard Control Group

Ideal for the following applications:

- IntelliTeam® SG Automatic Restoration System. Teams use peer-to-peer communication, real-time data, and distributed intelligence to make automatic operating decisions. No central processing or SCADA is required, though fully supported. Each IntelliRupter fault interrupter must be furnished with an S&C SpeedNet™ Radio or other approved communication device.
- Automatic source transfer using two IntelliRupter fault interrupters. The IntelliRupter fault interrupters ensure a high degree of critical-load continuity by minimizing interruptions resulting from the loss of one source. Each IntelliRupter fault interrupter must be furnished with an S&C SpeedNet Radio or other approved communication device.
- Automatic loop restoration using normally closed IntelliRupter fault interrupters or conventional reclosers, with a normally open IntelliRupter fault interrupter switching point. The feeder on either side of the switching point can be fed from a different source. If a fault occurs on either feeder, the normally closed devices in that feeder

open, then use PulseClosing Technology (or reclose) sequentially to sectionalize and isolate the fault. Service is automatically restored to unfaulted line segments by closing the normally open IntelliRupter fault interrupter.

- Wide-area SCADA, when equipped with an S&C SpeedNet Radio or other approved communication device.
- Stand-alone (non-communicating) applications.

Approved communication devices permit configuration, operation, interrogation, and software maintenance of IntelliRupter fault interrupter from any location having access to the communication system, using optional S&C IntelliLink® Remote Setup Software.

No batteries are required for stand-alone applications and applications with operating times of 30 seconds or less; ac line voltage must be available on the side of the IntelliRupter fault interrupter with the integral power module or control power must be available from the external power supply, if furnished.

The Standard Control Group includes IntelliTeam SG Bronze Level Software. When furnished with optional IntelliTeam SG Silver Level Software, the Standard Control Group is additionally suitable for basic closed-loop applications. When furnished with optional IntelliTeam SG Gold Level Software, the Standard Control Group is additionally suitable for basic closed-loop applications and applications on systems with three or more sources. IntelliTeam® Designer configuration and license management software unlocks IntelliTeam SG software, making setup fast and easy.

Standard Control Group with Battery Backup

This control group is identical to the Standard Control Group and is suitable for the same applications. It additionally includes batteries that support operation for a minimum of four hours after loss of ac line voltage on both sides of IntelliRupter fault interrupter, permitting extended dead-line switching.

Universal Control Group

This control group is identical to the Standard Control Group with Battery Backup but includes either IntelliTeam SG Gold Level Software and IntelliTeam Designer Configuration and License Management Software, or an IntelliTeam II Software License, as specified. When IntelliTeam SG Gold is specified, the Universal Control Group is suitable for all applications of the Standard Control Group with Battery Backup, as well as basic closed-loop applications and applications on systems with three or more sources. When the IntelliTeam® II Automatic Restoration System is specified, the Universal Control Group is suitable for all IntelliTeam II system applications.

Fault Testing

After tripping on overcurrent, conventional reclosers test for the presence of a fault by reclosing several times. Conventional reclosing subjects the system to the same high-magnitude fault current during each reclose test. The effects are made even more severe when slower inverse curves are used, which subject the system to longer fault duration.

PulseClosing Technology

Unlike conventional reclosers, IntelliRupter fault interrupter can be configured to fault test using PulseClosing Technology—a precisely timed, quick close-and-open of each successive phase, with analysis of the resulting voltage and current waveforms to determine if a fault is present. Pulseclosing Technology subjects the system to only a small fraction of the fault energy of conventional reclosing; IntelliRupter fault interrupter will close if no fault is detected on any phase. Pulseclosing Technology can also be initiated before a regular closing operation, when IntelliRupter fault interrupter is open and locked-out.

Conventional Closing

An IntelliRupter fault interrupter can alternately be configured to use conventional “hard” closing for each test after the initial trip. Such “hard” closing may be necessary to allow fuses to operate, after an initial very-fast-trip, fuse-saving operation.

Profiles

Closing Profiles

A Closing Profile is used when closing an open and locked-out IntelliRupter fault interrupter. Synchronization check prior to closing may be selected. PulseClosing Technology may be selected as well. Overcurrent, voltage, and frequency protection are set for one trip to lockout. The Closing Profile is time-limited, and will switch to the assigned General Profile after successfully closing. The Second Closing Profile can be configured with different parameters.

Hot Line Tag Profile

A Hot Line Tag can be set locally or by SCADA. In such instances, the Hot Line Tag Profile is used. Overcurrent, voltage, and frequency protection are set for one trip to lockout.

Cold Load Pickup

The Cold Load Pickup modifier can be configured to provide appropriate overcurrent protection after an extended outage.

IntelliTeam SG Automatic Restoration System

IntelliRupter fault interrupters may be applied with S&C 6800 Series Automatic Switch Controls operating overhead and underground distribution switches, as well as S&C IntelliNode™ Interface Modules applied with protective relays and recloser controls not of S&C manufacture, in an IntelliTeam SG Automatic Restoration System. Using peer-to-peer communication with distributed intelligence, the IntelliTeam SG system tracks system conditions and quickly initiates service restoration. The IntelliTeam SG system requires no central monitoring or SCADA control, though SCADA is fully supported.

With an IntelliTeam SG system, restoration proceeds without the delays inherent in dispatcher-operated or centrally-controlled systems. It monitors real-time current and voltage throughout the system and uses this data to make smart switching decisions. The IntelliTeam SG system operates after protection operations have completed, and it then restores load without overloading a source or any line segment.

Module Service

Should an error occur in the protection and control module, preventing normal operation of the IntelliRupter fault interrupter, the module can be removed and replaced from a bucket truck, using the S&C Module Handling Fitting, Catalog Number 4450, attached to a suitable hookstick. If automatic configuration has been selected, sensor calibration, site, and configuration information will be written into the new module; it will function exactly like the module which it replaced. This module configuration information is stored in auxiliary memory in the base of the IntelliRupter fault interrupter. The removed module may then be returned to S&C for diagnosis and repair.

The communication module can also be removed and replaced from a bucket truck, using the S&C Module Handling Fitting, Catalog Number 4450, attached to a suitable hookstick. Battery condition is periodically tested by the temperature-compensated charging system, and an alarm is transmitted when battery voltage is low. Removal of the communication module allows easy field replacement of the battery.