

S&C IntelliCAP PLUS[®] Automatic Capacitor Controls



S&C ELECTRIC COMPANY
Specialists in Electric Power Switching and Protection

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Versatile capacitor controls for stand-alone and SCADA applications

A New Generation of Controls

IntelliCAP PLUS Automatic Capacitor Controls are specifically designed for the control of pole-mounted and pad-mounted switched capacitor banks in electric distribution systems. These reliable, easy-to-use, flexible devices are ideal for both SCADA and stand-alone applications.

IntelliCAP PLUS Controls replace S&C EnergyLine 1000 Series Controls. These economical new devices combine the versatility and high performance of the 1000 Series with more streamlined electronics. And with a more compact enclosure, installation and setup are even easier.

A Variety of Automatic Control Functions

IntelliCAP PLUS Controls offer a full range of automatic functions:

- Voltage, time, temperature, time-biased voltage, and time-biased temperature control strategies in a single unit.
- Optional VAR and current control strategies. IntelliCAP PLUS Controls work with current sensors from S&C, Lindsey, Fisher Pierce, and Piedmont Dielectrics. A simple set point selection ensures proper operation.
- Optional neutral current or voltage sensing to detect blown fuses and stuck switches. The neutral current/voltage capability is standard in the software, so retrofitting is as easy as adding a sensor.
- SCADA override strategy. When enabled, this feature lets the master station issue a command, then returns the control to its regular control strategy after a user-selected period of time.
- Voltage/temperature override.
- Automatic calculation of voltage change (and kVAR change, if applicable) due to capacitor bank switching.
- User-enabled automatic adjustments for daylight savings and holidays.
- Daily limit on automatic switching operations.
- Extensive data logging and graphing for optimizing field performance.

Compact Size

IntelliCAP PLUS Controls are available in electric meter base, pole mounting bracket, and wall mounted bracket configurations. Communication equipment is installed inside the door. The compact enclosure is strong, lightweight, and UV-stable for reliable operation in the harsh environments seen in electric utility applications.

Bracket-mounted controls have many connector options. Available with both standard and VAR controls, a prewired plug connects the bottom of the enclosure to a J box on the pole via a weatherproof cable. No further wiring is needed.

Easy Operation

The IntelliCAP PLUS Control faceplate includes tactile-feedback membrane switches. These switches allow field personnel wearing work gloves to set up and operate the control. The manual override switch lets you control the bank from the faceplate.

A two-line liquid-crystal display is standard on every IntelliCAP PLUS Control. The LCD scrolls through real-time information, displays alarms, and gives you access to all set points. This wide-temperature-range LCD operates down to -30°C.

You can also readily access the test points and load fuse from the front of the device. Controls with three-phase sensing include three voltage and three current test points.

Flexible Communications

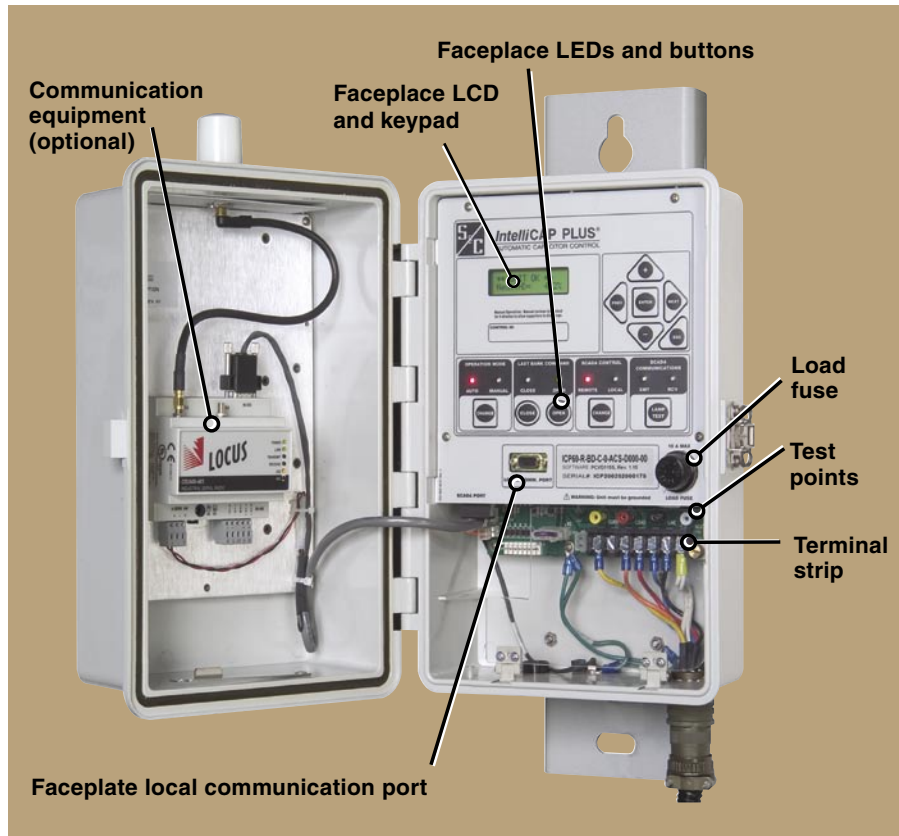
IntelliCAP PLUS Controls have two communication ports: a SCADA port for remote operation, and a DB9 faceplate connector and optional optical port for local setup. The control can service SCADA requests even with a PC connected locally.

S&C supports IntelliCAP PLUS Controls with a variety of communication hardware options and software protocols. Hardware options include:

- UtiliNet®
- CellNet®
- MDS—Microwave Data Systems
- Modems (Scan Data Bell 202 or Hayes™ compatible)
- Cellular transceivers
- Fiber-optic transceivers
- Paging modules (for one-way communication)
- Telemetric telemetry module
- Others (contact S&C)

DNP 3.0 is the standard protocol for IntelliCAP PLUS Controls. Protocol options include:

- PG&E SCADA (Cooper 2179)
- Landis & Gyr Telegyr 8979
- Others (contact S&C)



With IntelliCAP PLUS, you can be sure your distribution capacitors are working.

IntelliCAP PLUS Controls include these innovative features:

- *Proven control strategies*
- *Sophisticated automatic control logic. Ensures effective use and switching of the capacitor bank, improves VAR correction, and minimizes customer voltage complaints*
- *Support for both one-way and two-way communication*
- *Easy field retrofit of almost any communication device*
- *Setup via computer or faceplate keypad*
- *User-friendly faceplate with tactile-feedback switches, standard two-line LCD, and test points for sensor input*
- *Valuable real-time metering and data logging, including harmonics*
- *Optional neutral current or voltage sensing with corrective action and retry features*
- *Designed to withstand the tough environment and electrical conditions of electric distribution applications*

You can upgrade protocols for the field using IntelliLINK™ Setup Software, S&C's Windows®-based program for interfacing with the control locally.

With communication equipment installed, you can also change set point values remotely via S&C's WinMon® Graphic User Interface.

What is IntelliLINK®?

IntelliLINK Setup Software is S&C's Windows®-based program for interfacing locally with our family of controls. You can view real-time data, manage set points, gather troubleshooting information, and download historical data for reports—all from screens that are easy to use and understand.

Real-Time Metering

Engineering and operations personnel have access to real-time data, including:

- Line Voltage
- Temperature
- Current
- kVARs
- Power kW
- Power Factor
- Power kVA
- Harmonics

Harmonics

IntelliCAP PLUS calculates total harmonic distortion (THD) as well as the 3rd, 5th and 7th harmonics every 15 minutes.

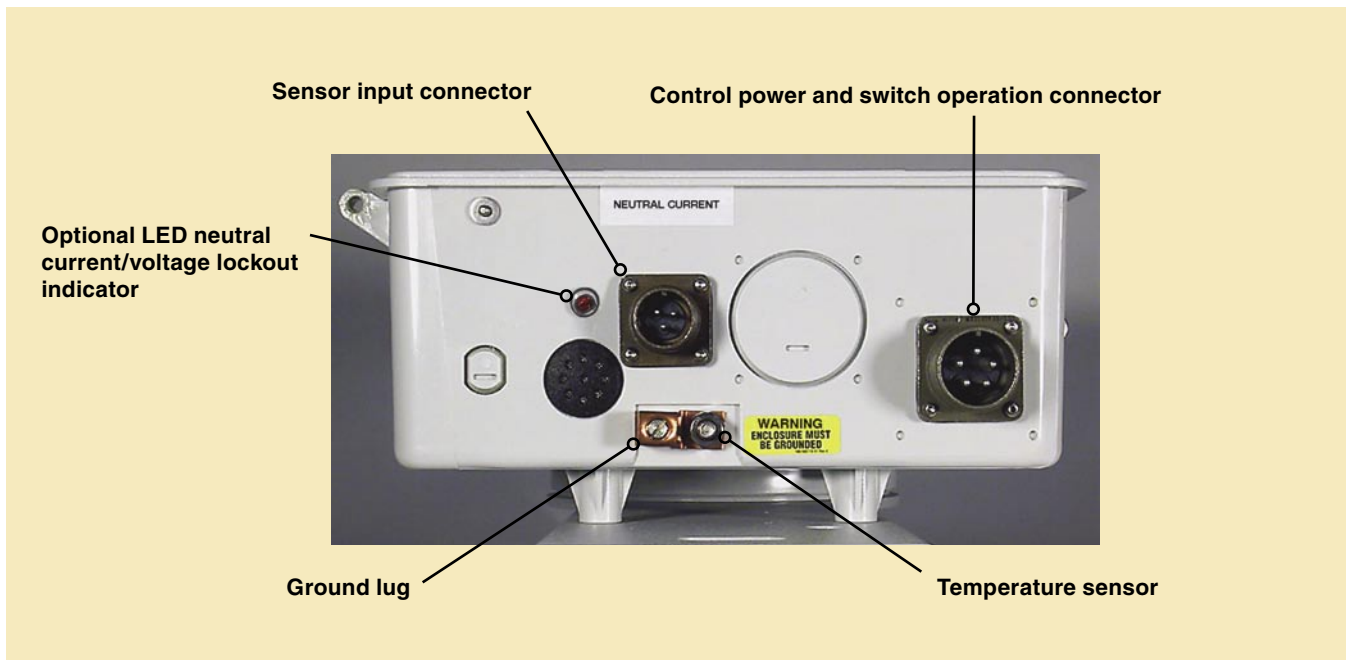
Extensive Data Logging

- IntelliCAP PLUS logs voltage, temperature, current, power factor, kVAR, kW, and neutral current/voltage if applicable.

- You can adjust the data logging interval from 1 minute to 60 minutes.
- The control logs the time and reason for switching events, as well as the voltage levels (and VARs, if applicable) before and after bank switching.
- The control records the time and date of power cycles.
- You can view the daily minimum and maximum sensor values, as well as the number of switching cycles for the last month and since installation.
- The IntelliCAP PLUS software lets you view graphs of logged data online.

Field-Proven Design

You have the security of S&C's field-proven microprocessor-based technology, manufactured in an ISO 9002-certified plant. Thousands of S&C controls are in use by over 100 utilities.



Specifications

Electrical Operating Characteristics

- Operating voltage range: 90 Vac to 288 Vac
- Selectable nominal operating voltage: 110, 115, 120, 127, 220, 230, or 240 Vac; 50 or 60 Hz

Electrical Isolation/Protection

- Insulation withstand: 2.5 kV RMS
- Surge withstand: ANSI/IEEE C37.90.1-1989
- Power-line surge withstand: ANSI/IEEE C62.41-1991 CATS B3, C1, and C3 (C3 is optional)
- ESD protection: MIL-STD-HDBK-263, IEC 1000-4-2
- Radiated emissions: FCC Part 15 Class B, EN55022B and ANSI C63.4
- Radiated susceptibility: 14 kHz to 512 kHz at 10 V/m; 512 kHz to 10 GHz at 5 V/m

Fuses

- Control and radio fuse: Time-delayed GMD 2A
- Load fuse: TRM-10 (physically interchangeable with FNM/FNQ)
- Maximum rating: 250 Vac

Environmental Operating Characteristics

- Temperature: -40°C to 70°C^①
- Humidity: 5% to 95% (non-condensing)

Sensor Inputs^{②③}

- True RMS voltage and current sensing
- Voltage Input range: 85 to 288 Vac 0 to 5 Vac sensor input (three-phase controls only)
- Accuracy: $\pm 0.3\%$ full scale over temperature range
Resolution: 0.1 Vac

- Temperature Input range: -40°C to 70°C (-40°F to 158°F)
Accuracy: $\pm 1.1^\circ\text{C}$ ($\pm 2^\circ\text{F}$) Resolution: 1° (C or F)
- Timeclock: Battery-backed, < ± 10 minutes/year, S&C temperature-compensated algorithm
- Current Input range: 0 to 10 Vac (sensor); 0 to 5 A secondary (CT); Rating: 150% continuous (both sensor and CT) Accuracy: $\pm 0.5\%$ full scale over temperature range Resolution: 1 A RMS
- Phase angle Input range: 0 to 359° Accuracy: $\pm 1^\circ$ at 10% of full-scale current Resolution: $1/8^\circ$
- Neutral current Input range: 0 to 100 A Accuracy: $\pm 1\%$ full scale at 5% of full-scale current
- Neutral voltage Input range: 0 to 120 Vac Accuracy: $\pm 1\%$ full scale over temperature range

Output Contacts (Relays)

- Pulsed or latched (1 open, 1 close)
- Silver nickel alloy
- Life expectancy: 100,000 operations at rated load
- Contact rating: 20 A @ 250 Vac, 1 HP 120/250 Vac, 1 Phase^④

^① Operation of LCD to -30°C.

^② Specification applies to control only. System accuracy depends on sensor manufacturer.

^③ Current and phase-angle specifications apply to VAR units only. Neutral current/voltage specifications apply to neutral current/voltage units only.

^④ Tested to confirm suitability for operating Joslyn VerSaVac™ switches

Enclosure

- Noncorrosive, impact-resistant, UV-stable Lexan®; stainless-steel latch with 7/16" hole for padlock
- 97/8"w × 143/4"h × 73/4"d (without bracket or meter base)
- Approximate weight (no communication equipment): 81/4 lbs.
- Four-jaw or six-jaw electric meter base, pole mounting bracket, or wall mounting bracket
- NEMA 3R

Memory

- Non-volatile, flash and battery-backed RAM—20-year expected life in powered state (10-year expected life in unpowered state)
- Does not require firmware change to upgrade software

Calendar

- Perpetual calendar—crystal-controlled, temperature-compensated, automatically adjusted for leap year
- User-enabled automatic holidays and daylight savings time changeover

Communication Ports

- Faceplate RS232 DB9 connector; optional Type 2 optical port for local communication (ref. ANSI C12.13-1985 Optical Port-Type 2)
- Dedicated SCADA port

Communication Hardware and Protocols^①

- Maximum communication hardware dimensions: 121/4" × 71/2" × 213/16"
- Radio power supply: 13.4 Vdc, 1 A continuous, 3 A transmit
- UtiliNet®, CellNet®, MDS; modems; cellular transceivers; fiber-optic transceivers
- DNP 3.0 standard; optional protocols: PG&E SCADA (Cooper 2179); Landis & Gyr Telegyr 8979

Quality

- Electronics manufactured in an ISO 9002-certified facility

^① Consult S&C for an updated list of communication hardware and protocols supported.



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