



# IntelliCap<sup>®</sup> 2000 Automatic Capacitor Controls

# IntelliCap® 2000 Automatic Capacitor Controls: Intelligent Two-Way Communicating Controls for Smart Grid Applications

IntelliCap 2000 Automatic Capacitor Controls are specifically designed to control pole-mounted and pad-mounted switched capacitor banks in electric distribution systems to regulate reactive power or line voltage. These reliable, easy-to-use, microprocessor-based controls normally operate autonomously based on the control strategy selected.

With a one-way communication device installed, an IntelliCap 2000 control can also operate in response to switching commands from SCADA or other centralized control. With a two-way communication device installed, local status information and feeder data are additionally available remotely. Remote configuration also is possible.

IntelliCap 2000 controls are superior to other two-way communicating capacitor controls, which only operate in response to centralized control commands based on measurements at the substation. With the normal stand-alone operation of IntelliCap 2000 controls:

- A communication problem won't compromise VAR support.
- A problem at one capacitor bank won't affect other capacitor banks.
- Multiple contingencies are handled automatically.
- System changes and expansion don't require extensive reprogramming.

## Fulfill Major Smart Grid Goals

With IntelliCap 2000 controls equipped with two-way communication, there's no need for your crews to periodically inspect each of your distribution capacitor banks. Any problems will be reported immediately, so you can be confident your capacitor banks are functioning properly.

Your transmission and distribution losses and operation and management costs will be significantly decreased, too, through asset optimization and heightened efficiency—major goals for the smart grid.

## Provide a Full Range of Automatic Functions

IntelliCap 2000 controls offer a wide range of software-selectable functions, including:

- Voltage, time, temperature, time-biased voltage, and time-biased temperature control strategies (VAR and current control strategies are optionally available.)
- Voltage/temperature and SCADA override strategies (When enabled, the control returns to its regular control strategy after receiving a SCADA command.)
- Automatic calculation of voltage change (and kvar change, if applicable) due to capacitor bank switching
- Automatic adjustment for daylight savings time and holidays
- A daily limit on automatic switching operations
- Undervoltage and overvoltage protection

Neutral input sensing is optionally available and can lock out the capacitor bank if blown fuses or stuck switch poles are detected.

## Flexible Communication and Protocol Options

IntelliCap 2000 controls are available with a variety of factory-installed communication devices, including:

- SpeedNet™ Radios
- MDS TransNet 900® Radios
- MDS SD9™ Radios
- A Telemetric DNP-RTMII-FLX for FlexNet System
- Dymec 5843HRT Fiber-Optic Modems

They're also available "communication device ready" for user-furnished communication devices using DNP 3.0 Level 2.

## Easy to Install

IntelliCap 2000 controls are offered in a number of convenient mounting types: a four-jaw electric meter base, a six-jaw electric meter base, a pole mounting bracket, and a wall mounting bracket. Pre-wired plugs are available for bracket-mounted controls, eliminating the need for field wiring.

The compact, padlockable Lexan® enclosure is strong, light-weight, and UV-stable for years of reliable operation in harsh environments. The communication device—when furnished—conveniently mounts inside the enclosure door. The associated antenna can be mounted on top of the door or on the pole.

IntelliCap 2000 controls accept a single-phase voltage signal from a voltage transformer, which is also used to derive control power. With the optional voltage sensing input feature, sensing and power can be derived from separate sources. Models with var and current control strategies additionally accept a single-phase current signal from an S&C CS Line Post Current Sensor or a current transformer. The neutral input sensing feature, when specified, accepts a signal from a voltage transformer, an S&C Outdoor Voltage Sensor, a Lindsey Voltage Sensor, or a current sensor. See Figure 1 and Figure 2 on page 4.

## Easy to Set Up and Configure

IntelliCap 2000 controls are set up and configured with a personal computer running Windows® and IntelliLink® Setup Software through the faceplate USB connector, or over a SCADA system with IntelliLink Setup Software.

## Flexible Data Access

The tactile-feedback buttons, two-line liquid-crystal display, and a manual override switch on the faceplate permit control operation and data review at the site. Faceplate test points for the sensor inputs allow performance evaluation. IntelliCap 2000 controls support IntelliLink software, which allows you to remotely access all your S&C Automation Products that communicate using the DNP 3.0 Level 2 protocol from any personal computer connected to the DNP network. You'll be able to perform remote firmware upgrades, configure controls, access historical and real-time data, and troubleshoot all the devices from a single location.

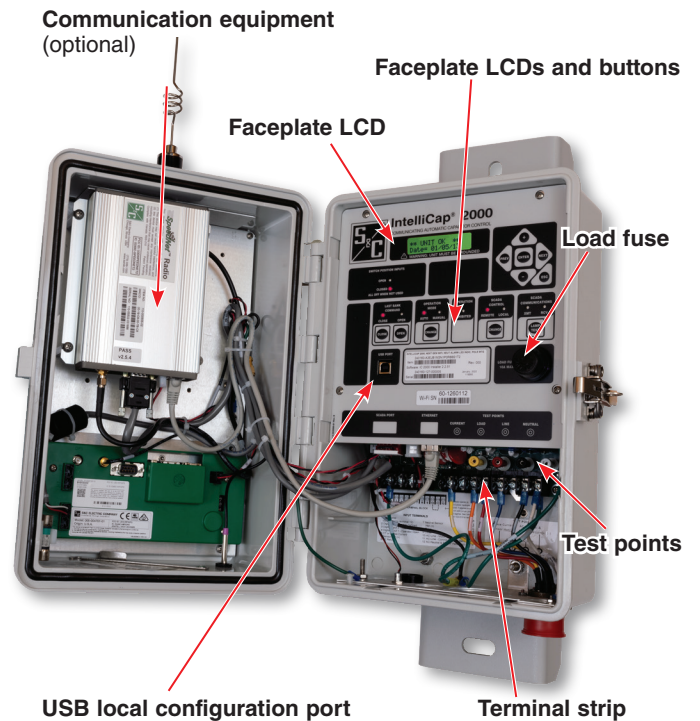


Figure 1. Interior of enclosure.

## Extensive Data Access, Logging, and Graphing

IntelliCap 2000 controls provide real-time access to true RMS line voltages and currents, kW, kVA, kvar, power factor, temperature, and harmonics.

IntelliCap 2000 controls also offer extensive data logging and graphing capabilities for optimizing performance. A wide range of parameters are logged at the selected interval and can be downloaded as tables or graphics. They include:

- Temperature, voltage, current, power factor, kvar, kW, and neutral current/voltage (if applicable) (Logging intervals can be adjusted from one to 60 minutes for two to 120 days of voltage and temperature data.)
- Up to 10,000 Historic Log entries that include switching events and the date and time of power cycles
- Daily minimum and maximum voltages, temperatures, currents, kW, kvar, power factors, neutral currents/voltages (if applicable), and the number of switching cycles in the last month and since installation

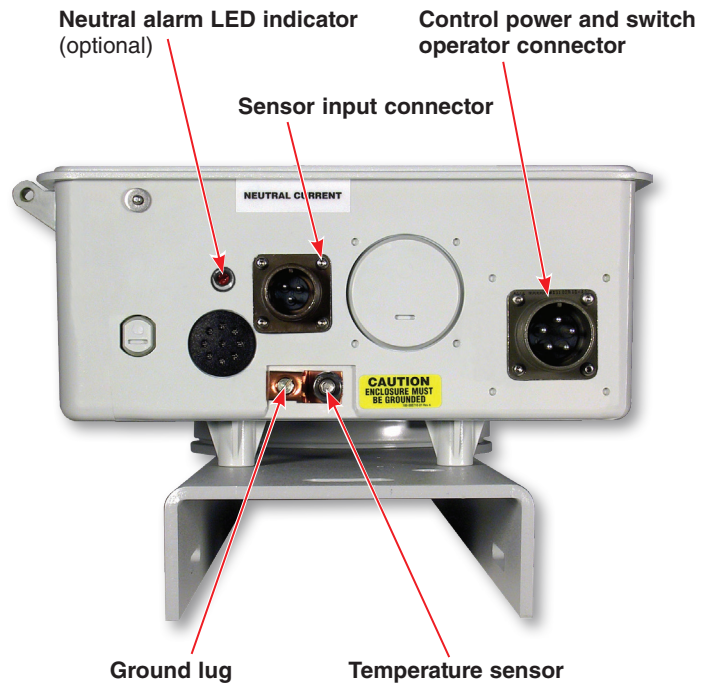


Figure 2. Underside of enclosure.

## Specifications

### Electrical Operating Characteristics

- Selectable nominal operating voltage: 110, 115, 120, and 127 Vac, 50 or 60 Hz

### Electrical Isolation/Protection

- Insulation withstand: 2.5 kV RMS
- Surge withstand: ANSI/IEEE C37.90.1, EN/IEC 61000-4-4 and -4-5 2004, and ANSI C62.41 Section 5.3.1 Categories C1 and C3
- ESD protection: IEEE C37.90.3-2001 and IEC 61000-4-2:2008
- Radiated emissions: FCC Part 15B, EN 55022B
- Radiated susceptibility: IEC 61000-4-3:2008 10 V/m and IEEE C37.90.2-2004 35 V/m

### Fuses

- Control and communication device fuse: time-delayed GMD 2 A, 250 Vac
- Load fuse: TRM-10 (interchangeable with FNM/ FNQ), 250 Vac

### Environmental Operating Characteristics

- Temperature: -40° C (-40° F) to +70° C (+158° F) [-30° C (-22° F) to +70° C (+158° F) for liquid-crystal display]
- Humidity: 5% to 95% (non-condensing)

### Voltage Input

- Line voltage input range: 93 to 135 Vac
- Line voltage reading accuracy (control only):  $\pm 0.15\%$  of full-scale voltage, with resolution of 0.1 Vac
- Bank-operation voltage range: 93 Vac to 135 Vac

### Current Input

- Line current input range: 0 to 10 Vac, 150% continuous for an S&C CS Line Post Current Sensor or CSV Line Post Current/Voltage Sensor; 0 to 5 A, 150% continuous for current transformer
- Line current reading accuracy (control only):  $\pm 0.15\%$  of full-scale current, with resolution of 1 A RMS

### Neutral Input

- Neutral voltage input range: 0 to 120 Vac
- Neutral voltage reading accuracy (control only):  $\pm 1\%$  of full-scale voltage
- Neutral current input range: 0 to 100 A
- Neutral current reading accuracy (control only):  $\pm 1\%$  full scale at 5% of full-scale current

### Phase Angle Input

- Phase angle input range: 0 to 359°
- Phase angle reading accuracy:  $\pm 1^\circ$  at 10% of full-scale current, with resolution of  $\frac{1}{8}^\circ$

### Temperature Sensor

- Temperature input range: -40° C (-40° F) to +70° C (+158° F)
- Temperature reading accuracy:  $\pm 1^\circ$  C with resolution of 1° C

### Output Contacts

- Type: pulse or latched; 1 open, 1 closed
- Rating: 20 A at 250 Vac; 120/250 Vac, single phase
- Life expectancy: 100,000 operations at rated load

### Communication Ports

- Ethernet RJ45 connector for communication device
- SCADA EA-232 port for communication device

### Memory/Calendar

- Memory: non-volatile, flash and MRAM
- Retention life: 20 years
- Calendar: perpetual with automatic adjustment for leap year; accommodates user-enabled holidays and changeover to daylight savings time

### Quality

- Manufactured in ISO 9002-certified facility
- 10 year warranty



## Specifications

### Enclosure

- Construction: non-corrosive, impact-resistant, UV-stable, NEMA 3R, Lexan; stainless steel latch with a  $\frac{7}{16}$ -inch hole for a padlock
- Mounting type: four-jaw electric meter base, a six-jaw electric meter base, a pole mounting bracket, or a wall mounting bracket
- Dimensions:  $9\frac{7}{8}$  inches (251 mm) wide  $\times$   $14\frac{3}{4}$  inches (375 mm) high  $\times$   $7\frac{3}{4}$  inches (197 mm) deep, less meter base or mounting bracket
- Maximum dimensions of communication device:  $7\frac{1}{2}$  inches (191 mm) wide  $\times$   $12\frac{1}{4}$  inches (311 mm) high  $\times$   $2\frac{13}{16}$  inches (71 mm) deep
- Weight, less communication device:  $8\frac{1}{4}$  pounds (3.74 kg)

