

IntelliCAP PLUS™

Automatic Capacitor Control



FLEXIBLE
INTELLIGENT
AUTOMATION

For the control of pole-mounted and pad-mounted switched capacitor banks



IntelliCAP PLUS helps make sure your distribution capacitors are working.

New Generation Cap Control

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

The IntelliCAP PLUS controls replace EnergyLine's 1000 Series. They retain the original product's versatility and high performance, while streamlining the electronics, using a more compact enclosure, and making installation and setup even easier – all for an affordable price.

Automatic Control

The IntelliCAP PLUS control offers 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. The IntelliCAP PLUS controls work with current sensors from EnergyLine, Lindsey, Fisher Pierce, and Piedmont Dielectrics. A simple setpoint selection ensures proper operation.
- ◆ Optional neutral current or voltage sensing to detect blown fuses and

The IntelliCAP PLUS controls include these innovative features:

- ◆ Proven control strategies for the effective switching of capacitor banks
- ◆ Sophisticated automatic control logic insures effective use and switching of the capacitor bank, improves VAR correction, and minimizes customer voltage complaints
- ◆ Support for both 1-way and 2-way communications options, with dual communication ports
- ◆ Easy field retrofit for almost any communications device
- ◆ Setup via computer or faceplate keypad
- ◆ User-friendly faceplate includes tactile-feedback switches, standard 2-line LCD, and test points for sensor input
- ◆ Valuable real-time metering and data logging, including harmonics
- ◆ Three-phase option for applications where detailed metering data is needed
- ◆ Optional neutral current or voltage sensing with corrective action and retry features
- ◆ Designed to withstand the tough environment and electrical conditions found in electric distribution applications

Features

stuck switches. The neutral current/voltage capability is standard in all software, which makes retrofitting as easy as adding a sensor.

- ◆ SCADA override strategy. When enabled, this feature lets the master station issue a command, and then returns the control to its regular control strategy after a user-selected period of time.
- ◆ Voltage/temperature override.
- ◆ Automatic calculation of the voltage change (and kVAR change, if applicable) due to capacitor bank switching.
- ◆ User-enabled automatic adjustments for daylight savings and holidays.
- ◆ Daily limit of automatic switching operations.
- ◆ Extensive data logging and graphing to qualify optimum field performance.

Compact Size

The IntelliCAP PLUS is available in socket, bracket, or wall mounted configurations. Communications equipment is installed right inside the door. The compact enclosure is strong, light-weight, and UV-stable for reliable operation in the harsh environments seen in electric utility applications.

The bracket mounted control has many connector options. Available with both standard and VAR controls, this 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 faceplate includes tactile-feedback membrane switches. The design allows field personnel wearing work gloves to operate and set up the control. The manual override switch lets you control the bank from the faceplate.

A 2-line LCD is standard on every IntelliCAP PLUS control. The LCD scrolls through real-time information, displays alarms, and gives you access to all setpoints. 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 unit. Controls with 3-phase sensing include 3 voltage and 3 current test points.

Flexible Communications

The capacitor control has two communications ports: one SCADA port (for remote operation), and a DB9 faceplate connector and/or an optical port (for local setup). The control can service SCADA requests even while you are connected locally with a computer.

EnergyLine supports the IntelliCAP PLUS controls with a variety of communications hardware options and software protocols. The hardware options are:

- ◆ Schlumberger's UtiliNet®
- ◆ Schlumberger's CellNet®
- ◆ MDS - Adaptive Broadband
- ◆ Modems (Bell 202, CDPD, or Hayes™-compatible)

- ◆ Cellular transceivers
- ◆ Fiber optic transceivers
- ◆ Paging modules (for 1-way communications)
- ◆ Telemetric telemetry module
- ◆ Other (contact EnergyLine)

Communications equipment may be factory-mounted inside the control to save on installation costs.

DNP 3.0 is the standard protocol in the IntelliCAP PLUS control. Other protocol options are:

- ◆ PG&E SCADA (Cooper 2179)
- ◆ Landis & Gyr Telegyr 8979
- ◆ Other (contact EnergyLine)

You can upgrade the protocols in the field using IntelliLINK™ Setup Software, EnergyLine's Windows®-based program for interfacing with the control locally. This gives you a simple migration path to new protocol implementations.

With communications equipment installed, you can also change the set-point values remotely via EnergyLine's WinMon® Graphic User Interface.

Real-Time Metering

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

- ◆ Line Voltage
- ◆ Temperature
- ◆ Current

What is IntelliLINK®?

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

A versatile capacitor control for stand-alone and SCADA applications

- ◆ kVARs
- ◆ Power kW
- ◆ Power Factor
- ◆ Power kVA
- ◆ Harmonics

Harmonics

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

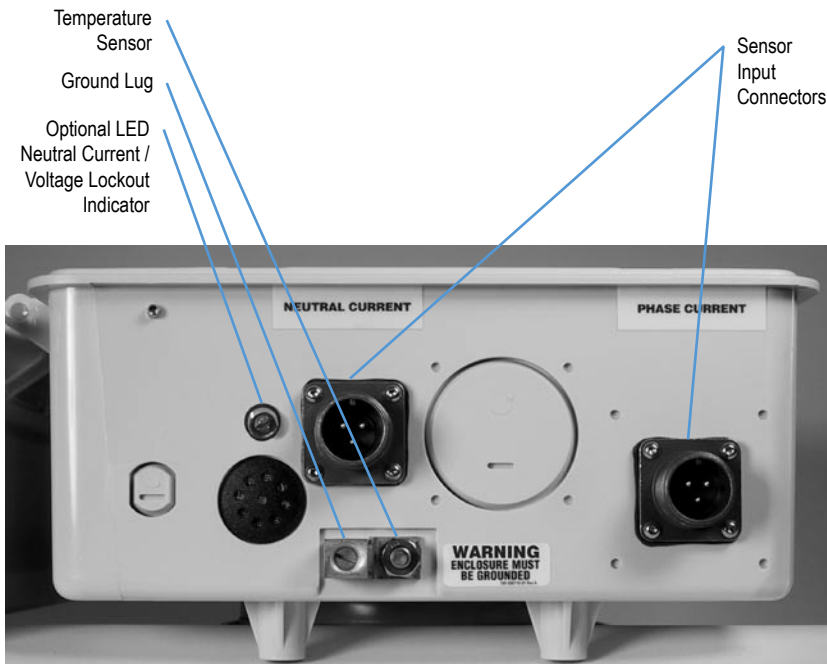
Extensive Data Logging

- ◆ 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 EnergyLine's field proven microprocessor-based technology, manufactured in an ISO 9002-certified plant. Thousands of EnergyLine controls are being used by over 100 utilities.

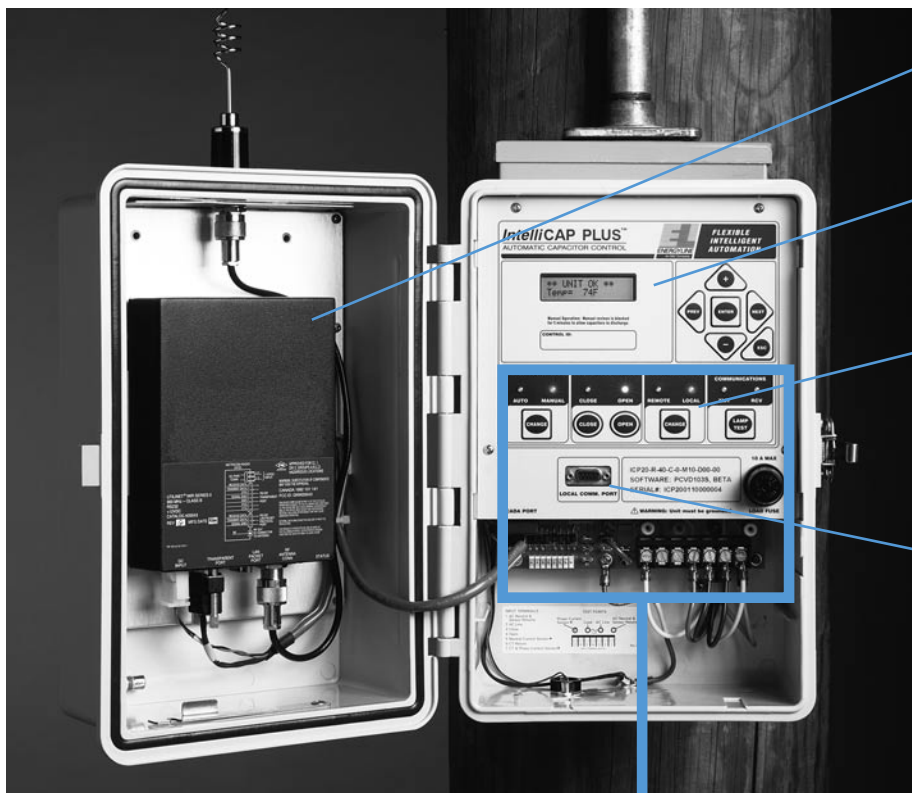


Ordering Information

The following questions will help us prepare a quotation for your order.

1. What control strategies and sensing options are required?
2. What communications port will be used?
3. How will you mount the IntelliCAP PLUS?
4. What neutral input is required?
5. Do you want a neutral alarm indicator?
6. What connection options are required?
7. What communications protocol(s) will you use?
8. What communications hardware will you use, if any?
9. What are the antenna requirements, if any?

If you have any questions, please feel free to contact us at (510) 864-6850 or info@energyline.com

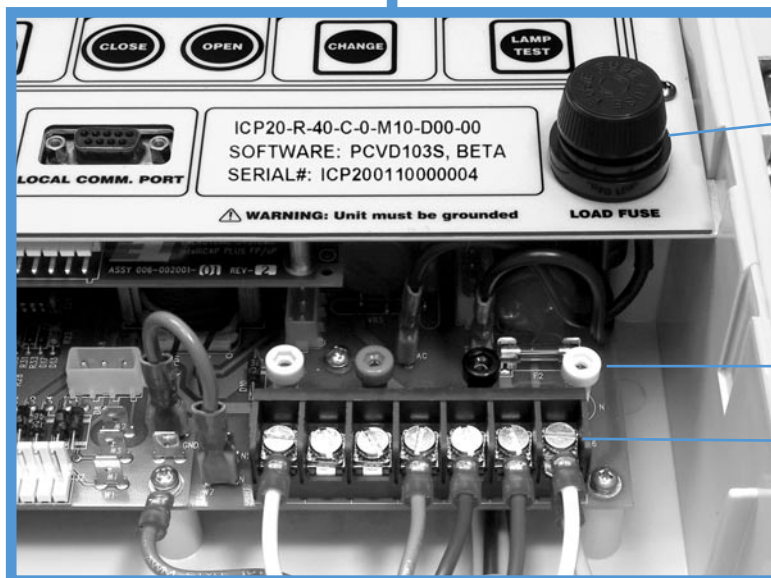


Communications Equipment (optional)

Faceplate LCD and Keypad

Faceplate LEDs and Buttons

Faceplate Local Comm Port



Load Fuse

Test Points

Terminal Strip

CLOSE OPEN CHANGE LAMP TEST
 LOCAL COMM. PORT ICP20-R-40-C-0-M10-D00-00
 SOFTWARE: PCVD103S, BETA
 SERIAL#: ICP200110000004
 WARNING: Unit must be grounded LOAD FUSE
 ASST 008-002001-01 REV-7/2

*Whether for
SCADA or
for stand-alone
use...*



EnergyLine's

IntelliCAP PLUS Capacitor Controls

*offer the intelligence
and flexibility you need
today and into the future.*

Specifications



IntelliCAP PLUS

Operating Electrical 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

Operating Environmental Characteristics

- Temperature¹: -40°C to 70°C
- Humidity: 5-95% (non-condensing)

Sensor Inputs^{2,3}

- True RMS voltage and current sensing
- Voltage
 - Input range: 85-288 VAC
 - 0-5 VAC sensor input (3-phase controls only)
 - Accuracy: $\pm 0.3\%$ full scale (over temperature range)
 - Resolution: 0.1 VAC
- Temperature
 - Input range: -45°C to 60°C (-49°F to 140°F)
 - Accuracy: $\pm 1.1^\circ\text{C}$ ($\pm 2^\circ\text{F}$)
 - Resolution: 1° (C or F)
 - Timeclock: Battery backed, better than ± 10 minutes/year, EnergyLine temperature-compensated algorithm
- Current
 - Input range: 0-10 VAC (sensor); 0-5 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: 0-120 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: 20A @ 250 VAC, 1 HP 120/250 VAC, 1 Phase⁴

Enclosure

- Non-corrosive, impact resistant, UV-stable LEXAN®; stainless steel latch with 7/16" hole for padlock
- 9.85" w x 14.75" h x 7.75" d (without bracket or meter base)
- Approximate weight (no communications equipment): 8.25 lbs.
- 4-jaw or 6-jaw electric meter base, pole mount bracket, or wall mount 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

Communications Ports

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

Communications Hardware and Protocols⁵

- Maximum communications hardware dimensions: 12.25" x 7.5" x 2.8" (standard on all units)
- Radio power supply: 13.4 VDC, 1 A continuous, 3 A transmit (standard on all units)
- Schlumberger's UtiliNet®, Schlumberger's CellNet®, MDS; modems; cellular transceivers; fiber optic transceivers; Motorola® Darcocom™
- 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 Operation of LCD to -30°C.

² This specification applies to the EnergyLine IntelliCAP PLUS 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.

⁵ Consult EnergyLine for current list of communications hardware and protocols supported.

Information in this document is subject to change without notice.