Smart solutions.
Strong relationships.

Automatic Capacitor Controls

Innovative • Reliable • Versatile • Simple

Control For All Seasons

The MCap II and eCAP II series of capacitor controls are a powerful yet affordable choice for controlling single step switched capacitor banks.

The MCap II automatically opens or closes the capacitor switches in response to system changes. The eCAP II provides the same functionality plus remote control of the capacitor bank and remote access to system data.

The MCap II and the eCAP II can be programmed to switch based on changes in:

- Voltage
- Amps
- Vars
- Power factor
- Temperature
- Watts
- Time
- Day of week

The Standard eCAP II (QCE1) control provides remote, local, and automatic control in a simple package

The Standard MCap II(QCM1) control provides local and automatic control in a simple package.

The MCap II and eCAP II are available as a Standard model or an Extended model, which adds a 2-line LCD display and toggle switches that can be used to program the control in the field without a computer. All models include a USB port for interfacing with a PC, data retrieval, and viewing system information.

All controls can be furnished with either a Full or Limited feature set. The Limited version supports time, temperature and voltage switching strategies while the Full Feature version supports all switching parameters.

The control firmware is flash upgradeable via the front panel USB port, so as improvements and bug fixes are released, the control can be easily upgraded to incorporate all the latest feature sets.

All MCap II and eCAP II controls include support for a line post current sensor regardless of the feature set chosen by the user.

Your first choice

... the Smart choice

AND ALL STRATEGIES

The eCAP II performs the same functions as the MCap II plus supports remote communication with SCADA. Communications equipment is mounted inside the enclosure to protect the communications device and simplify antenna connections. All analog, status, and control points are remotely accessible via DNP3, Modbus, or QUICS communications protocol (other protocols available).

The eCAP II is also available as a *Limited* version (Time, Temperature, & Voltage functions only).

Control features include:

- **Choice of mounting scheme 4 or 6-jaw meterbase or direct pole mount**
- **Support for all line post current sensors**
- **Compatibility with all oil and vacuum, motor or solenoid operated switches**
- **Neutral current or voltage trip or close support**
- **All control fuses located on front panel**

The Extended MCap II (QCM2) control provides local and automatic control in a package complete with LCD display and front panel configuration switches.

The Extended eCAP II (QCE2) controller provides remote and local control in a package complete with LCD display and front panel configuration switches.

- **Hardware and software can be upgraded to add functionality as needs evolve**
- **Test jacks for measuring voltage and current**
- **SuperCap instead of a battery to maintain the internal clock and historical data; provides greater reliability and lower cost of ownership both in material and maintenance time/labor.**

eCAP II also includes:

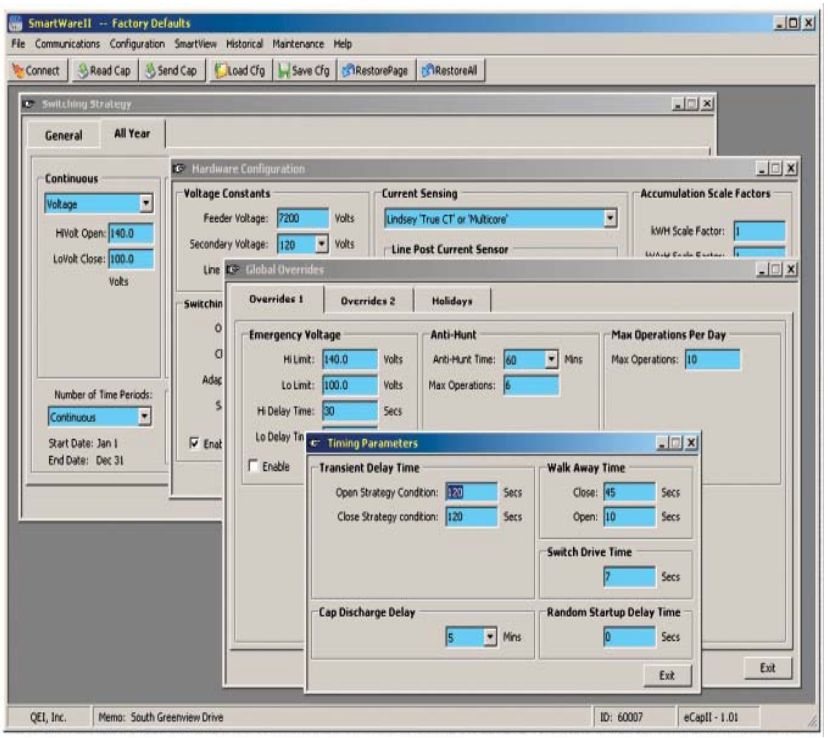
- **DNP 3.0 level 2 compliant**
- **Unsolicited reporting and a user selectable point list**
- **Support for all communication media (radio cellular, etc)**
- **SCADA override and inhibit to coordinate local and remote control functions**
- **Hinged faceplate protects communication device from the elements when control door is open**

SMARTWARE II™

SmartWare II allows a user to create or modify a switching strategy and send it to a control, read the current configuration, save or load a configuration to or from a file, monitor real-time control operation, and retrieve historical data.

The graphical user interface (GUI) is streamlined and follows a logical progression through each of the available menu options. Tool Tips and message boxes guide the user through the controller setup, and the program performs extensive error checking (min, max, non-numerical values) on and between displays.

Smartware II supports up to 4 seasons with up to 3 time periods per season. Each season or time period can use the same or different switching strategy.



Strategies

Available bank states and switching strategies are:

- No Operation
- Always Opened
- Always Closed
- Voltage
- Temperature
- Current
- kVAr
- KW
- Power Factor

Overrides

Both Seasonal & Global overrides can be configured for:

- Reverse Power
- Neutral Current/Voltage
- Max Operations Per Day
- Emergency Voltage
- Day-of-the-Week (DOW) Override

Safety Timers

User adjustable timers include

- Anti-Hunt
- Capacitor Discharge
- Transient delays
- Maximum Operations
- Walk away (when control is operated manually)

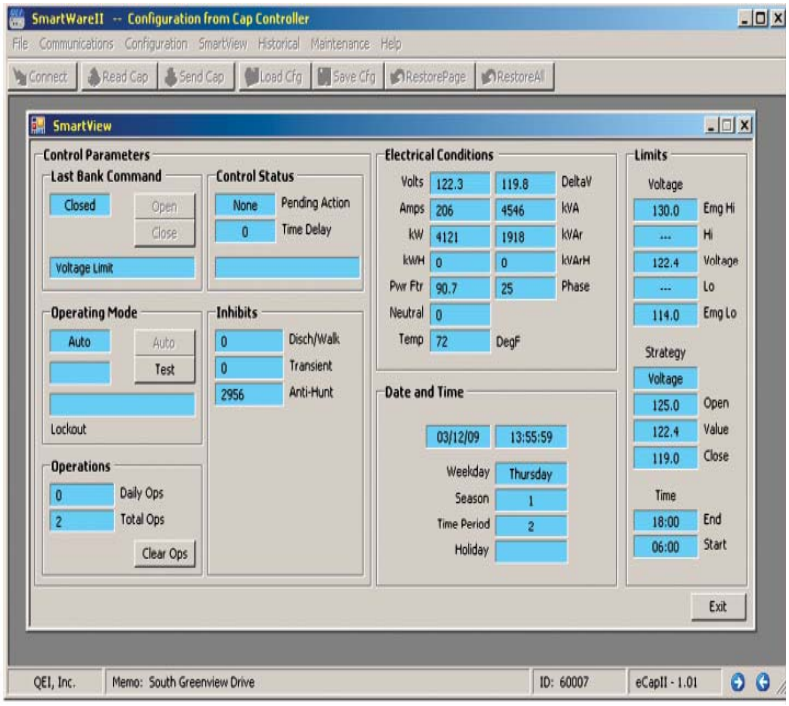
Smart Holidays

Up to 50 holidays can be specified (one-time or recurring, fixed or rule-based). The controller can be configured to open or close the bank during a holiday plus a voltage override can be enabled for the holiday.

Daylight Saving Time

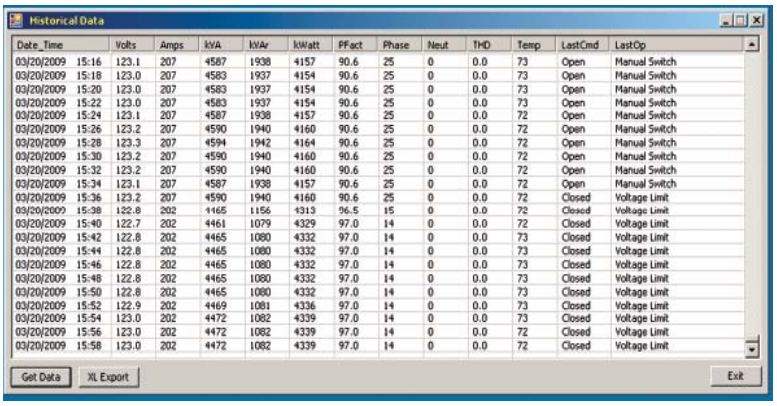
Can be enabled or disabled, and the starting and ending DST dates can be specified.

Setting the Standard for Automation Controls



SmartView Display

SmartView allows the user to view system information and operate the control in the field using a computer. The "Limits" section provides a summary of the current switching strategy settings. A Test Mode is provided for opening or closing the capacitor bank.



Trend Table displays up to 252 days of collected data

Trend Table

The Trend Table display allows a user to view all collected trend data from the control in a tabular form. The displayed data can be exported to either an Excel file (spreadsheet) or an html file by selecting the XL Export button.

Various report formats can be chosen using multiple electrical parameters with ***SmartTrend.***

SmartTREND™

The trends are displayed as 1-4 strip charts with 1-2 colored pens on each chart. Controls are provided to adjust the scale of each pen. Select the pen number; then select the Zoom button. The user can zoom the pen trace in or out, move the trace up or down, or type in the minimum and/or maximum trace limits. The pen number of each trace is shown with the pen label on the far left or right of the strip chart.

SPECIFICATIONS

Input Voltage	120 VAC or 240VAC The supply voltage is also used to sense the line voltage.
Line Frequency	50 Hz or 60 Hz
Power Consumption	6 - 8 VA max.
Capacitor Switch Relays	Electro-mechanical relays rated at 20 amps continuous duty at 240 VAC.
Optional Temperature Sensor Range	- 0º to 140ºF (-15º to 60ºC)
Line Current Sensor Input	Line Post Sensor (LPCS): Max Input = 25.5 Vrms. Current Transformer (CT) Models: Max input = 5 Amps. (Line Current Sensor not supported for Limited models.)
Neutral Detection Sensor Input	Line Post Sensor (LPCS): Max Input = 25.5 Vrms. Current Transformer (CT): Max input = 5 Amps. Potential Transfromer (PT): Max input 150 Vac. (Neutral Detection sensor not supported for Limited models.)
Historical Data Storage	The average of all electrical parameters is saved on a 5-minute interval (84 days), or 15-minute interval (252 days) stored in non-volatile (Flash) memory.
Front Panel USB Data Port	Used for configuration of controller, display of real-time measurements, and historical data collection. Also allows for firmware upgrades via laptop PC.
Language Interface	English standard, Spanish available on request
Enclosure	NEMA 4X rated, weatherproof outdoor type. Non-corrosive high impact polymer. MCap II: 8”H x 8”W x 4”D eCAP II: 12”H x 10”W x 6”D
Weight (Approximate Depending on Mounting Option)	MCap II 5 lbs. (2.3 kg) eCap II 9.5 lbs. (4.3 kg)
Environment	Temperature: -40ºF to 149ºF (-40ºC to 65ºC) Humidity: 95% (non-condensing)
Radio/Modem Power Supply (eCAP II)	2.5 Amp 12VDC power supply and isolated RS-232 connection
Mounting Configuration	Meter Socket or Surface Mount
Upgrades	Firmware upgrades via front panel USB port
Standard Protocols (eCAP II)	DNP3.0, Modbus, QUICS, others available on request

CONFIGURATION OPTIONS — QC

CONTROL TYPE
- M — MCap II
- E — ECap II

FUNCTIONALITY (Note 1)
- 1 — Standard
- 2 — Extended (LCD Display & Configuration Switches)
- 3 — Limited Standard (Time, Temp, Voltage only)
- 4 — Limited Extended (TTV, LCD Display & Configuration Switches)

CONTROL OPERATING VOLTAGE & FREQUENCY
- 1 — 120 VAC/60 Hz
- 2 — 120 VAC/50 Hz
- 3 — 240 VAC/60 Hz
- 4 — 240 VAC/50 Hz

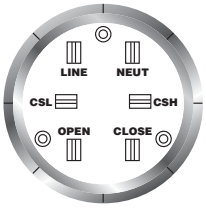
MOUNTING/BASE CONFIGURATION (Note 2)
- A — Meter Base 'A' Configuration
- C — Meter Base 'C' Configuration
- D — Meter Base 'D' Configuration
- E — Meter Base 'E' Configuration
- F — Meter Base 'F' Configuration
- G — Meter Base 'G' Configuration
- H — Meter Base 'H' Configuration
- J — Meter Base 'J' Configuration
- K — Meter Base 'K' Configuration
- P — Cable (7-Pin Circular Connector), for Surface Mount
- T — Terminal Strip, for Surface Mount

PHASE CURRENT INPUT (Note 2 & 3)
- 1 — 0-25VAC INPUT (Line Post Sensor) (Default for Limited Models)
- 2 — 0-5 AMP INPUT (CT)

NEUTRAL DETECTION INPUT (Note 2 & 3)
- 1 — None (Default for Limited Models)
- 2 — 0-5 AMP INPUT (Neutral Current CT)
- 3 — 0-150VAC INPUT (Neutral Voltage PT)

TEMPERATURE SENSING OPTION
- N — No Temperature Sensor
- T — Temperature Sensor

Note 1: Limited models provided with time-temperature-voltage only software
Note 2: Meter Base A, C, D, E, F do not support Neutral detection
Note 3: CT's & PT's can have high voltage outputs, observe proper safety procedures.
Note 4: Limited models do not support phase current sensing or neutral detection of any type.
Note 5: Default interface is English, for Spanish configuration must end in "/S" (ex. QCM-1/1/T/1/1/N/**S**)



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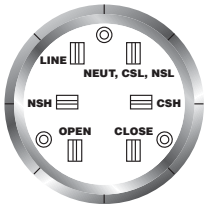

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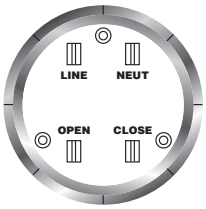

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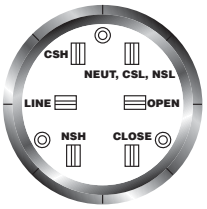

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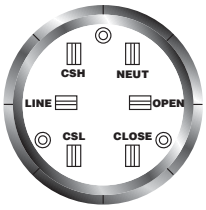

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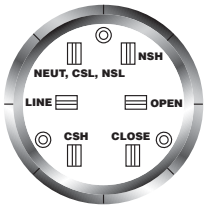

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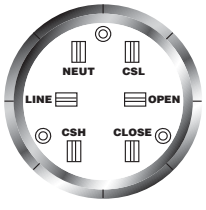

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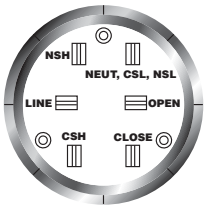

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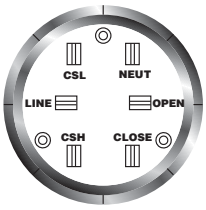

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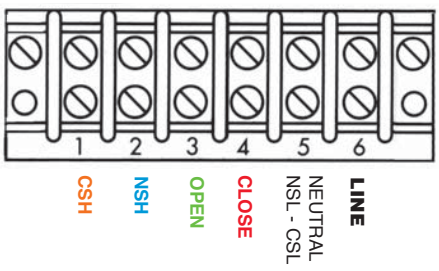
CONTROL CABLES — QEC

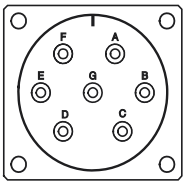
CABLE CONNECTOR TYPE
- **A** — Circular Style Connector (female) at controller end, no connector at other end
- **B** — No connector at either end (for Terminal Strip Connections)
- **C** — Circular Style Connector on each end (for connection to junction box)

LENGTH OF CABLE IN FEET
Maximum Length = 45ft (15m)
(Standard Control Cable is 6 conductor 16 AWG neoprene cable.)

Terminal Strip Wiring



CSH = Line Curr Signal High
CSL = Line Curr Signal Low
NSH = Neut Curr Signal High
NSL = Neut Curr Signal Low



Circular Style Connector Pin-Out for Pole-Mount Capacitors
(as viewed from enclosure exterior)

A	**Line**	**Black**
B	**Open**	**Green**
C	**Close**	**Red**
D	Not Used	
E	NSH	**Blue**
F	CSH	**Orange**
G	Neutral,CSL,NSL	White

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Strong Relationships.

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· Remote Terminal Units · Substation Automation
· Distribution Automation · Feeder Automation
· Capacitor Controllers

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