**DESCRIPTION**

KMC Conquest™ BAC-5900 series controllers are designed to control building systems and HVAC equipment. The integrated alarming, scheduling, and trending enable these BACnet Advanced Application Controllers to be powerful edge devices for the modern smart building ecosystem.

The controllers feature simple, menu-driven setup choices using an STE-9000 series digital sensor, which can be installed permanently as the room sensor or used temporarily as a technician’s service tool.

Alternately, quick configuration of controller properties can be done using NFC (Near Field Communication) from a smart phone, tablet, or computer (using KMC Connect Lite™ app or software) while the controller is unpowered.

To meet the most demanding building automation custom requirements, these controllers are also fully programmable. Custom configuration and programming, with wizards for application programming selection/configuration, are enabled by KMC Connect™ software and the KMC Converge™ module for NiagaraAX Workbench.

KMC Converge and TotalControl™ software additionally provide the capability of creating custom graphical web pages (hosted on a remote web server) to use as a custom user-interface for the controllers.

**APPLICATIONS**

Can be used with the following types of equipment:

- Air handling units
- Boilers
- Chillers
- Chilled beams
- Cooling towers
- Fan coil units
- Heat pump units
- Pumps
- Roof top units
- Unit ventilators
- Other HVAC and building automation system equipment

(See also Sample Installation on page 5.)

**MODELS**

<table>
<thead>
<tr>
<th>APPLICATIONS</th>
<th>INPUTS*</th>
<th>OUTPUTS*</th>
<th>FEATURES</th>
<th>MODEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>AHU, chillers, boilers, cooling towers, pumps, lighting, FCU, HPU, RTU, unit ventilators, other HVAC</td>
<td>10 total: • 2 analog (temperature sensor port) • 8 universal inputs (software configurable as analog, binary, or accumulator on terminals)</td>
<td>8 universal: • Software configurable as analog or binary • Override boards give additional options**</td>
<td>Real Time Clock (RTC) Ethernet Port MS/TP Port</td>
<td>BAC-5901C BAC-5901CE</td>
</tr>
</tbody>
</table>

*Up to four (8 x 8) CAN-5901 I/O expansion modules can be used with BAC-5900 series controllers to provide up to (internal and external) 42 inputs and 40 outputs.

**HPO-6700 series output override board series provide (triac, NC/NO relays, 4–20 mA, adjustable 0–10 VDC) options for devices that cannot be powered from a standard universal output. The boards can also be used with the CAN-5901.
Inputs and Outputs

**Inputs, Universal (8 on Terminal Blocks)**

- **Universal inputs**: Configurable as analog, binary, or accumulator objects
- **Termination**: 1K and 10K ohm sensors, 0–12 VDC, or 0–20 mA (without need for an external resistor)
- **Resolution**: 16-bit analog-to-digital conversion
- **Protection**: Overvoltage protection (24 VAC, continuous)
- **Wire size**: 12–24 AWG, copper, in removable screw terminal blocks

**Input, Dedicated Room Sensor Port**

- **Connector**: Modular connector for STE-9xx1 series digital wall sensors or STE-6010/6014/6017 analog temperature sensors
- **Cable**: Uses standard Ethernet patch cable up to 150 feet (45 meters)

**Outputs, Universal (8 on Terminal Blocks)**

- **Universal outputs**: Configurable as an analog (0 to 12 VDC) or binary object (0 or 12 VDC, on/off); alternately, an output override board is installed for devices that cannot be powered from a standard universal output
- **Power/protection**: Each short-circuit protected universal output capable of driving up to 100 mA (at 0–12 VDC) or 300 mA total for all outputs
- **Resolution**: 12-bit digital-to-analog conversion
- **Wire size**: 12–24 AWG, copper, in removable screw terminal blocks

**Communications**

- **Auxiliary**: One serial port with mini Type B connector (reserved for future use)
- **Expansion**: One CAN serial bus connection (terminal block) for daisy-chaining I/O expansion modules up to 200 feet (61 meters) from the controller via standard shielded twisted-pair wire
- **Ethernet (optional)**: On "E" model only, one 10/100BaseT Ethernet connector for BACnet IP, Foreign Device, and Ethernet 802.3 (ISO 8802-3); segmentation supported; up to 328 ft (100 m) between controllers (using T568B Category 5 or better cable)
Configurability

<table>
<thead>
<tr>
<th>OBJECTS*</th>
<th>MAXIMUM #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inputs and Outputs</td>
<td></td>
</tr>
<tr>
<td>Analog, binary, or accumulator input</td>
<td>42</td>
</tr>
<tr>
<td>Analog or binary output</td>
<td>40</td>
</tr>
<tr>
<td>Values</td>
<td></td>
</tr>
<tr>
<td>Analog value</td>
<td>120</td>
</tr>
<tr>
<td>Binary value</td>
<td>80</td>
</tr>
<tr>
<td>Multi-state value</td>
<td>40</td>
</tr>
<tr>
<td>Program and Control</td>
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</tr>
<tr>
<td>Program (Control Basic)</td>
<td>10</td>
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<tr>
<td>PID loop</td>
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<tr>
<td>Schedules</td>
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<td>Schedule</td>
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<td>Calendar</td>
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<td>Logs</td>
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</tr>
<tr>
<td>Trend log</td>
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<tr>
<td>Alarms and Events</td>
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<tr>
<td>Notification class</td>
<td>5</td>
</tr>
<tr>
<td>Event enrollment</td>
<td>10</td>
</tr>
</tbody>
</table>

*Configuration allows creation and deletion of objects (maximum number of objects shown). The number and configuration of default objects depends on the selected application. For lists of default objects, see the KMC Conquest Controller Application Guide. See also the PIC statement for all supported BACnet objects.

Hardware Features

Processor, Memory, and Clock

- Processor: 32-bit ARM® Cortex-M4
- Memory: Programs and configuration parameters are stored in nonvolatile memory; auto restart on power failure
- RTC: Real time clock with (capacitor) power backup for 72 hours ("C" model only) for network time synchronization or full stand-alone operation

Indicators and Isolation

- LED indicators: Power/status, MS/TP and CAN communication, and Ethernet status
- MS/TP bulbs: One network bulb assembly indicates reversed polarity and isolates circuit
- Switches: EOL (end of line) for MS/TP and CAN bus

Installation

Power

- Supply voltage: 24 VAC (~15%, +20%), 50/60 Hz
- Class 2 only; non-supervised (all circuits, including supply voltage, are power limited circuits)
- Required power: 14 VA, plus external loads
- Wire size: 12–24 AWG, copper, in a removable screw terminal block
Enclosure and Mounting

Weight 14 ounces (0.4 kg)

Case material Green and black flame retardant plastic

Mounting Direct mounting to panels or DIN rails

Environmental Limits

Operating 32 to 120° F (0 to 49° C)

Shipping −40 to 160° F (−40 to 71° C)

Humidity 0 to 95% relative humidity (non-condensing)

Warranty, Protocol, and Approvals

Warranty

KMC Limited Warranty 5 years (from mfg. date code)

BACnet Protocol

Standard Meets or exceeds the specifications in ANSI/ASHRAE BACnet Standard 135-2010 for Advanced Application Controllers

Type BTL-certified as a B-AAC controller type (pending)

CAN Protocol

CAN CAN (Controller Area Network) bus on terminals

Regulatory Approvals

UL UL 916 Energy Management Equipment listed

BTL BACnet Testing Laboratory listed as Advanced Application Controller (B-AAC) (pending)

CE CE compliant (pending)

RoHS RoHS compliant (pending)

FCC FCC Class A, Part 15, Subpart B and complies with Canadian ICES-003 Class A*

ACCESSORIES

NOTE: For accessory details, see the respective product data sheets and installation guides.

Actuators

MEP-4xxx Actuators, 25 to 90 in-lb., fail-safe and non-fail-safe

MEP-7xxx Actuators, 180 and 320 in-lb., fail-safe and non-fail-safe

Communications

BAC-5051E Single port router

HPO-0055 Replacement network bulb assembly (pack of 5)

HPO-5551 Router technician cable kit

HPO-9003 NFC Bluetooth/USB module (fob)

HSO-9001 Ethernet patch cable, 50 feet

HSO-9011 Ethernet patch cable, 50 feet, plenum rated

KMD-5567 Network surge suppressor

I/O Expansion and Output Override Boards

CAN-5901 I/O expansion module, 8 x 8

HPO-6701 Triac output w/ zero-cross switching (AC only)

HPO-6702 0–10 VDC analog with adjustable override potentiometer

HPO-6703 Relay, NO contacts (AC/DC)

HPO-6704 4–20 mA DC current loop with adjustable override potentiometer

HPO-6705 Relay, NC contacts (AC/DC)

Miscellaneous Hardware

HCO-1102 Steel control enclosure, 10.1 x 2.4 x 7.1 inches (257 x 62 x 181 mm)

HPO-0063 Replacement output (override board) jumper, 2-pin (pack of 5)

HPO-9901 Controller replacement parts kit with terminal blocks and DIN clips

*This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. (NFC operation meets FCC compliance while the controller is in an unpowered state.)
**Room Sensors, Analog**

- **STE-6010W10** Temperature sensor, white
- **STE-6014W10** Sensor with rotary setpoint dial, white
- **STE-6017W10** Sensor with rotary setpoint dial and override button, white

**NOTE:** Other STE-6000 series sensors are not fully compatible with the dedicated sensor port. However, various other models can be used with the screw terminals. See the STE-6000 series data sheet for more information. For digital sensor information, see the STE-9000 series data sheet.

**NOTE:** To order the STE-601x sensor with light almond color instead of white, drop the W on the end of the model number (e.g., STE-6010W is white and STE-6010 is light almond).

**Room Sensors, Digital (LCD Display)**

- **STE-9000 Series** KMC Conquest NetSensor digital room temp. sensors for viewing and configuration and optional humidity, occupancy, and CO₂ sensing (see STE-9000 series data sheet for options)
- **HPO-9001** NetSensor distribution module (future release)

**Sensors, Miscellaneous**

- **STE-1405** DAT sensor with plenum-rated cable
- **STE-1451** OAT sensor

**Transformers, 120 to 24 VAC**

- **XEE-6111-050** 50 VA, single-hub
- **XEE-6112-050** 50 VA, dual-hub

**SAMPLE INSTALLATION**

- **Communication with Other Network Devices and Remote Monitoring**
- **Configuration via NFC-Enabled Smart Phone**
- **Quick (temporary) Network Access Through Computer Data Port**
- **Optional I/O Expansion Modules**
- **Up to 8 Inputs (to terminal blocks)**
- **Up to 8 Universal Outputs (plus HPO-67xx Output Override Board options for 4-20 mA, triac, NO/NC relays, or 0–10 VDC with adjustable override)**

**For more information about installation and operation, see:**

- **BAC-5900 Series Controller Installation Guide**
- **KMC Conquest Controller Application Guide**

**SUPPORT**

Additional resources for installation, configuration, application, operation, programming, upgrading, and much more are available on the web at [www.kmccontrols.com](http://www.kmccontrols.com). To see all available files, log-in to the KMC Partners site.