DESCRIPTION

KMC Conquest™ BAC-9300 series controllers are designed to operate unitary and terminal 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 factory-supplied programming covers common unitary applications. 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) while the controller is unpowered.

The Ethernet-enabled BAC-93x1C models can also be configured by connecting an HTML5-compatible web browser to the built-in configuration web pages.

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 Niagara 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 unitary equipment:

- Air handling units (AHU)
- Chilled beams
- Constant air volume (CAV) with external actuator
- Fan coil units (FCU)
- Heat pump units (HPU)
- Roof top units (RTU)
- Unit ventilators
- Variable air volume (VAV) with external actuator

(Some applications require custom programming. 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>RTU, HPU, FCU, AHU, and unit ventilator</td>
<td>1 opt. air pressure sensor and 8 (total) standard: 2 analog (temp. sensor port) 6 universal inputs (software configurable as analog, binary, or accumulator on terminals)</td>
<td>10 total: 6 triacs (binary) 4 universal (software configurable as analog or binary)</td>
<td></td>
<td>BAC-9301</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ethernet Port</td>
<td>BAC-9301C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>MS/TP Port</td>
<td>BAC-9301CE</td>
</tr>
<tr>
<td>VAV/CAV (with external tri-state actuator), RTU/ HPU static pressure monitoring/control</td>
<td></td>
<td></td>
<td></td>
<td>BAC-9311</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ethernet Port</td>
<td>BAC-9311C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>MS/TP Port</td>
<td>BAC-9311CE</td>
</tr>
</tbody>
</table>

KMC Controls, 19476 Industrial Drive, New Paris, IN 46553 / 877-444-5622 / Fax: 574-831-5252 / www.kmccontrols.com
**Inputs and Outputs**

### Inputs, Universal (6 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)

### Input, Integrated Air Pressure Sensor (BAC-9311)
- **Δ pressure range**: 0 to 2" wc (0 to 500 Pa)
- **Sensor accuracy**: ±4.5% of the reading or (when near zero) 0.0008" wc (0.2 Pa), whichever is greater (@ 25° C); internally linearized and temperature compensated
- **Connections**: Barbed for 1/4 inch FR (Flame Retardant) tubing

### Outputs, Universal (4 on Terminal Blocks)
- **Universal outputs**: Configurable as an analog (0 to 12 VDC) or binary object (0 or 12 VDC, on/off)
- **Power/protection**: Each short-circuit protected universal output capable of driving up to 100 mA (at 0–12 VDC) or 100 mA total for all outputs
- **Resolution**: 12-bit digital-to-analog conversion
- **Wire size**: 12–24 AWG, copper, in removable screw terminal blocks

### Outputs, Triac (6 Binary)
- **Triac outputs**: Optically isolated zero-crossing triac output configured as a binary object
- **Power**: Maximum switching 24 VAC at 1.0 A for each output; maximum total for controller is 3.0 A
- **Wire size**: 12–24 AWG, copper, in removable screw terminal blocks

### Communication Ports
- **MS/TP (optional)**: One EIA-485 port (removable terminal block) for BACnet MS/TP, operating at 9.6, 19.2, 38.4, 57.6, 76.8, or 115.2 kilobaud; max. length of up to 4,000 feet (1,200 meters) of 18 AWG shielded twisted-pair, no more than 51 pf/ft (167 pf/m); use repeaters for longer distances

---

**DIMENSIONS**

<table>
<thead>
<tr>
<th></th>
<th>A (6.744 inches)</th>
<th>B (5.500 inches)</th>
<th>C (5.000 inches)</th>
<th>D (6.000 inches)</th>
<th>E (1.500 inches)</th>
<th>F (6.279 inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>171 mm</td>
<td>140 mm</td>
<td>127 mm</td>
<td>152 mm</td>
<td>38 mm</td>
<td>159 mm</td>
</tr>
</tbody>
</table>

**TERMINAL COLOR CODE**

<table>
<thead>
<tr>
<th>Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>24 VAC/VDC Power</td>
</tr>
<tr>
<td>Gray</td>
<td>MS/TP Communications</td>
</tr>
<tr>
<td>Green</td>
<td>Inputs and Outputs</td>
</tr>
</tbody>
</table>
Ethernet (optional) On "E" models only, two 10/100BaseT Ethernet connectors 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)

NFC NFC (Near Field Communication) up to 1 inch (2.54 cm) from the top of the enclosure

Room sensor Modular STE connection jack for STE-9000 series digital sensors and STE-6010/6014/6017 analog sensors

Auxiliary One serial port with mini Type B connector (reserved for future use)

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>8 for BAC-9301 9 for BAC-9311</td>
</tr>
<tr>
<td>Analog or binary output</td>
<td>10</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>
<td></td>
</tr>
<tr>
<td>Program (Control Basic)</td>
<td>10</td>
</tr>
<tr>
<td>PID loop</td>
<td>10</td>
</tr>
<tr>
<td>Schedules</td>
<td></td>
</tr>
<tr>
<td>Schedule</td>
<td>2</td>
</tr>
<tr>
<td>Calendar</td>
<td>1</td>
</tr>
<tr>
<td>Logs</td>
<td></td>
</tr>
<tr>
<td>Trend log</td>
<td>20</td>
</tr>
<tr>
<td>Trend log multiple (must be created)</td>
<td>4 (default 0)</td>
</tr>
<tr>
<td>Alarms and Events</td>
<td></td>
</tr>
<tr>
<td>Notification class</td>
<td>5</td>
</tr>
<tr>
<td>Event enrollment</td>
<td>40</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.

Configuring, Programming, and Designing

<table>
<thead>
<tr>
<th>SETUP PROCESS</th>
<th>KMC CONTROLS TOOL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuration</td>
<td>Conquest NetSensor</td>
</tr>
<tr>
<td>Programming</td>
<td>Internal configuration web pages in Conquest Ethernet &quot;E&quot; models**</td>
</tr>
<tr>
<td>(Control Basic)</td>
<td>KMC Connect Lite™ (NFC) app***</td>
</tr>
<tr>
<td>Web Page Graphics*</td>
<td>KMC Connect™ software</td>
</tr>
<tr>
<td>TotalControl™ software</td>
<td>KMC Converge™ module for Niagara WorkBench</td>
</tr>
<tr>
<td></td>
<td>KMC Converge GFX module for Niagara WorkBench</td>
</tr>
</tbody>
</table>

*Custom graphical user-interface web pages can be hosted on a remote web server, but not in the controller.

**Conquest Ethernet-enabled "E" models with the latest firmware can be configured with an HTML5 compatible web browser from pages served from within the controller. For information, see the Conquest Ethernet Controller Configuration Web Pages Application Guide.

***Near Field Communication via enabled smart phone or tablet running the KMC Connect Lite app.

****Full configuration and programming of KMC Conquest controllers is supported starting with TotalControl ver. 4.0.

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 and MS/TP communication or Ethernet status
- MS/TP bulbs: One network bulb assembly indicates reversed polarity and isolates circuit
- Switch: EOL (end of line) for MS/TP
Installation

Power
Supply voltage 24 VAC (50/60 Hz) or 24 VDC; –15%, +20%; Class 2 only; non-supervised (all circuits, including supply voltage, are power limited circuits)
Required power 8 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 on 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

Regulatory Approvals
UL UL 916 Energy Management Equipment listed
BTL BACnet Testing Laboratory listed as Advanced Application Controller (B-AAC)
CE CE compliant
RoHS 2 RoHS 2 compliant
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

NOTE: See also the selection chart in the Connecting a Remote Actuator to a BAC-9311 section of the KMC Conquest Controller Application Guide.

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

Differential Air Pressure Sensors

SSS-1012 Sensor, 3-5/32 inches (80 mm) length
SSS-1013 Sensor, 5-13/32 in. (137 mm) length
SSS-1014 Sensor, 7-21/32 in. (194 mm) length
SSS-1015 Sensor, 9-29/32 in. (252 mm) length

Miscellaneous Hardware

HCO-1103 Steel control enclosure with DIN rail mounting, 10 x 7.5 x 2.5 inches (257 x 67 x 193 mm)
SP-001 Screwdriver (KMC branded) with a hex end (for NetSensor cover screws) and a flat blade end (for controller terminals)
HPO-9901 Controller replacement parts kit with terminal blocks (1 gray, 1 black, 2 green 3-terminal, 4 green 4-terminal, 2 green 5-terminal, 2 green 6-terminal) and DIN clips (2 small for router and 1 large for controllers)

Network Communications

BAC-5051E BACnet router with single MS/TP and IP/Ethernet ports
HPO-0055 Replacement network bulb assembly (pack of 5)
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

**HPO-9005**  
Room sensor adapter allows the use of other sensors and optional setpoint potentiometers (with wire leads or terminal blocks) to be used instead of STE-601x sensor models with modular jacks

**NOTE:** Other STE-6000 series sensors are not fully compatible with the dedicated sensor port. However, various other models can be used with an HPO-9005 adapter or with the controller screw terminals. See the STE-6000 series data sheet for more information. For digital sensor information, see the STE-9000 series.

**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 temperature sensors for viewing, configuring, and optional humidity, occupancy, and CO₂ sensing

**HPO-9001**  
NetSensor distribution module

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

Air Pressure Sensor (BAC-9311 Models)

Up to 6 Sensors (to terminal blocks)

4 Universal and 6 Triac Outputs

Quick (temporary) Network Access Through Computer Data Port

**FOR MORE INFORMATION ABOUT INSTALLATION AND OPERATION, SEE:**

- BAC-9300 Series Controller Installation Guide
- KMC Conquest Controller Application Guide
- KMC Conquest Wiring: BAC-9300 Series Controllers (Video)

**SUPPORT**

Additional resources for installation, configuration, application, operation, programming, upgrading, and much more are available on the web at www.kmccontrols.com. Log-in to see all available files.