BAC-5971A Series

Touchscreen BACnet General Purpose Controllers

DESCRIPTION

KMC Conquest™ BAC-5971A series controllers are designed to control building systems and HVAC equipment. The integrated alarming, scheduling, and trending enable these general purpose BACnet Building Controllers to be powerful edge devices for the modern smart building ecosystem.

The built-in touchscreen display provides convenient viewing of the status of selected system parameters. The display can be customized using KMC Connect or TotalControl™ software.

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

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

The Ethernet-enabled BAC-5971AC**E** model 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, the controllers are 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.

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

The 10 inputs and 8 outputs can be expanded up to 72 inputs and 40 outputs using CAN-5900 Series Expansion Modules.

KMC Conquest™ Automation Hardware

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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

NOTE: Applications generally require custom programming. (See also **Sample Installation on page 6**.)

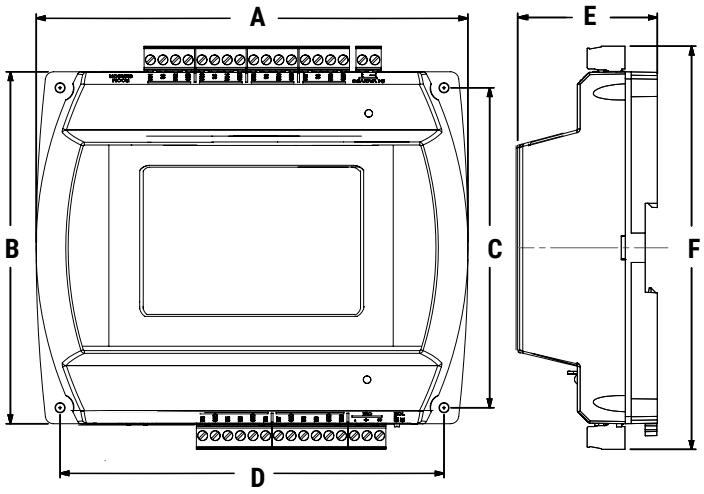
MODEL

APPLICATIONS	INPUTS*	OUTPUTS*	FEATURES			MODEL
			Real Time Clock	Ethernet Port	MS/TP Port	
AHU, chillers, boilers, cooling towers, pumps, lighting, FCU, HPU, RTU, unit ventilators, other HVAC	10 total: • 2 analog (temperature sensor port) • 8 universal inputs (software configurable as analog, binary, or accumulator on terminals)	8 universal: • Software configurable as analog or binary • Override boards give additional options**	✓		✓	BAC-5971AC
				✓		BAC-5971ACE

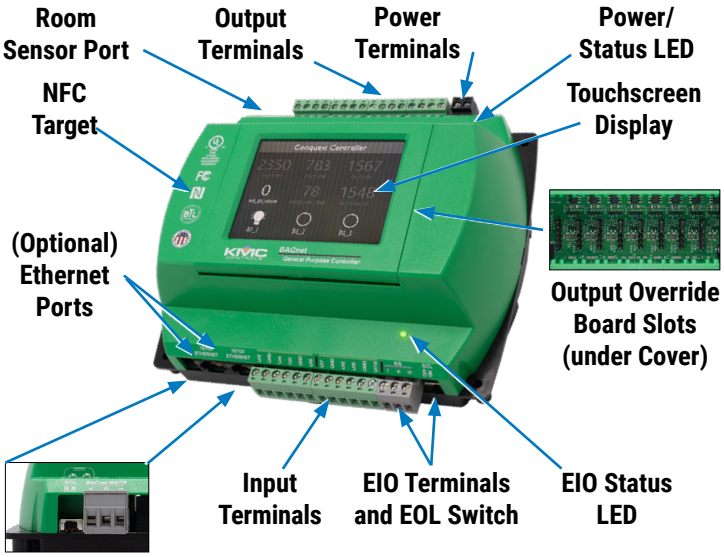
*Up to four CAN-5900 series I/O expansion modules can be used with BAC-5900A series controllers to provide up to 74 physical (Room Sensor port and terminal block) inputs and up to 40 outputs.

**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.

SPECIFICATIONS



DIMENSIONS		
A	6.750 inches	171 mm
B	5.500 inches	140 mm
C	5.000 inches	127 mm
D	6.000 inches	152 mm
E	2.012 inches	60 mm
F	6.300 inches	160 mm



TERMINAL COLOR CODE	
Black	24 VAC/VDC Power
Gray	MS/TP and CAN Communications
Green	Inputs and Outputs

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 4–20 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

Expansion (EIO)	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)	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)
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) or 18 AWG shielded twisted-pair, no more than 51 pf/ft (167 pf/m); use repeaters for longer distances.

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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

Configurability

OBJECTS*	MAXIMUM #**
Inputs and Outputs	
Analog, binary, or accumulator input	74
Analog or binary output	40
Values	
Analog value	300
Binary value	300
Multi-state value	100
Program and Control	
Program (Control Basic)	30
PID loop	50
Schedules	
Schedule	20
Calendar	10
Logs	
Trend log	40
Trend log multiple	20
Alarms and Events	
Notification class	20
Event enrollment	100
Tables	
Input tables	20
Control Basic tables	20

*Configuration allows creation and deletion of objects (with the 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.

**Up to four CAN-5900 series I/O expansion modules can be added to provide up to 74 physical (Room Sensor port and terminal block) inputs and up to 40 outputs.

Configuring, Programming, and Designing

SETUP PROCESS				KMC CONTROLS TOOL
Configuration	**Touchscreen UI Setup**	**Programming (Control Basic)**	**Web Page Graphics***	
✓				Built-in touchscreen display
✓				Conquest NetSensor
✓				Internal configuration web pages in Conquest Ethernet "E" models**
✓				KMC Connect Lite™ (NFC) app***
✓	✓	✓		KMC Connect™ software
✓****	✓	✓****	✓	TotalControl™ software
✓		✓		KMC Converge™ module for Niagara Workbench

*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.

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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 up to 2 hours for network time synchronization or full stand-alone operation

Display, Indicators, and Isolation

LCD display	Capacitive touchscreen, 3.5” (89mm) diagonally, customizable display content
LED indicators	Power/status, EIO (CAN) communication, Ethernet status
MS/TP bulbs	One network bulb assembly indicates reversed polarity and isolates circuit
Switches	EOL (end of line) for MS/TP network and EIO (CAN bus)

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	14 VA, plus external loads
Wire size	12–24 AWG, copper, in a removable screw terminal block

Enclosure and Mounting

Weight	15.8 ounces (0.45 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 BACnet Building Controllers
Type	BTL-certified as B-BC controller type

CAN (External Inputs Outputs) Protocol

CAN	CAN (Controller Area Network) bus on (EIO) terminals

Regulatory Approvals

UL	UL 916 Energy Management Equipment listed
BTL	BACnet Testing Laboratory listed as BACnet Building Controller (B-BC)
RoHS 2	RoHS 2 compliant
FCC	FCC Class A, Part 15, Subpart B and complies with Canadian ICES-003 Class A*

*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.)

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

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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	8-input, 8-output expansion module*
CAN-5902	16-input expansion module*
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)

***NOTE:** Up to four CAN-5900 series I/O expansion modules can be used with BAC-5900 series controllers to provide up to 74 physical (Room Sensor port and terminal block) inputs and up to 40 outputs.

****NOTE:** Only the HPO-6701 and HPO-6704 of the HPO-6700 series output override boards are approved for smoke control applications.

Miscellaneous Hardware

HCO-1103	Steel control enclosure (single controller) with DIN rail mounting, 10 × 7.5 × 2.5 inches (257 × 67 × 193 mm)
HCO-1035	Steel control enclosure, 20 × 24 × 6 inches (508 × 610 × 152 mm)*
HCO-1036	Steel control enclosure, 24 × 36 × 6 inches (610 × 914 × 152 mm)*
HPO-0063	Replacement output (override board) jumper, 2-pin (pack of 5)
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)
KMD-5567	MS/TP suppressor module and terminal connector (required for EIA-485 terminals of MS/TP model controllers in smoke control applications)

***NOTE**: For smoke control applications, the controller must be mounted in a UL Listed FSCS enclosure or listed enclosure with minimum dimensions. The HCO-1035 and HCO-1036 are approved for such applications.

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 CO_2 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
XEE-6112-100	96 VA, dual-hub (approved for smoke control applications)

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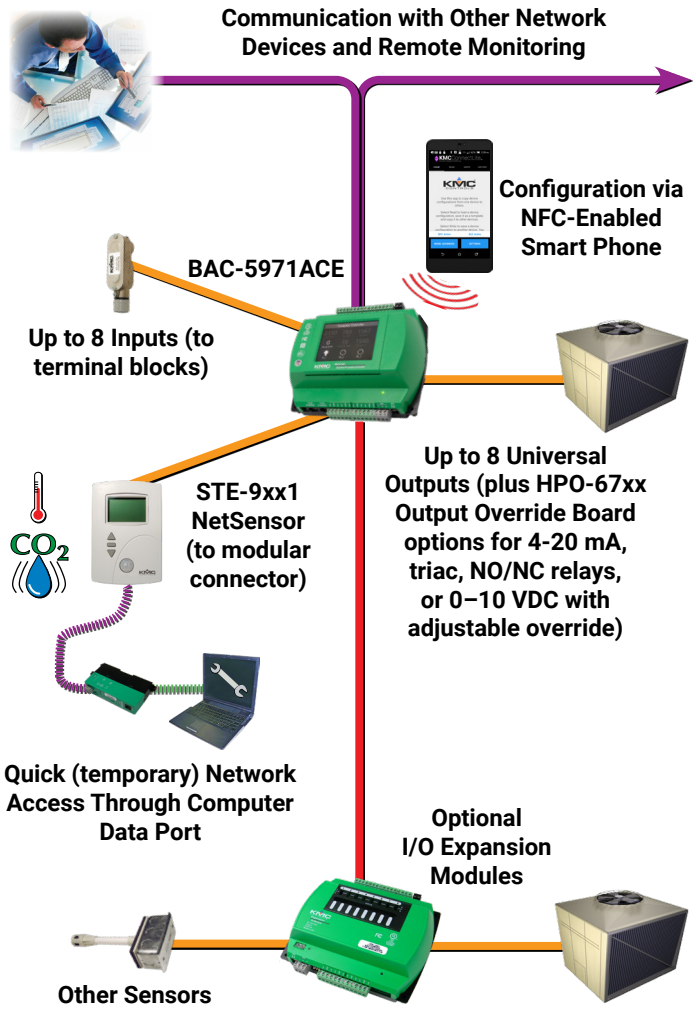
SAMPLE INSTALLATION



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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.

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