BAC-190000 Series FlexStats

Touchscreen Room Sensors/Controllers

DESCRIPTION

KMC Conquest™ BAC-190000 series FlexStats provide flexible, set-and-forget control over indoor environmental quality. They can do this as stand-alone HVAC control units without the expense of a large BAS (Building Automation System) or as integrated, networked components of a BAS. FlexStats are wall-mounted, touchscreen, combined sensors and controllers. The intelligent integral temperature/humidity/motion/CO_2-sensing, wall-mounted thermostats simplify networked zone control for common HVAC equipment, which can be controlled via the on-board or custom libraries of programs. The integrated schedules, alarms, and trends enable these native BACnet Advanced Application Controllers (B-AAC) to be powerful edge devices for the modern smart building ecosystem.

Key features include the following:

- A **touchscreen** operator interface provides system viewing and adjusting for users. The customizable screen features a title bar, room temperature and setpoint displays, four-object icon bar, time and date display, and up to 24 total rotation value displays (e.g., humidity, CO2, OAT, and DAT) in three areas of eight current values each.
- Up to four internal **sensors** in a single package minimizes labor, wiring, and wall space, while standard temperature and optional humidity, motion, and CO_2 sensors allow expanded energy-efficient control.
- Besides the internal sensors, **input** terminals for six external inputs are provided. Nine **outputs** provide a combination of relays and universal (analog) outputs.
- Communication options include **BACnet** MS/TP, Ethernet, or IP (Normal or Foreign Device).
- An on-board library of programs permits models to be **rapidly configured from the touchscreen** for a range of control applications. For demanding custom requirements, these controllers are also **fully programmable**, using KMC software, to adapt the standard library to the unique application-specific requirements of a particular project.
- KMC TotalControl™ additionally provides the capability of creating **custom graphical** web pages (hosted on a remote web server) to use as a remote user-interface for the controllers.
- The IoT platform KMC Commander® provides remote monitoring and control with **quickly createable dashboard** thermostat and trend "cards" on a PC or mobile device as well as remote alarms and dedicated trend graph pages.

APPLICATIONS

BAC-19xx**36**C models:

- Air Handling Units
- Unit Ventilators (4-Pipe)

BAC-19xx**63**C models:

- Fan Coil Units (2- and 4-Pipe)
- Heat Pump Units
- Roof Top Units

These applications can be configured from the touchscreen without using any software. Additional customization and applications beyond the standard library can be created using software. (See **Configuring, Programming, and Designing on page 4**.) See also **Sample Installation on page 6**.

MODELS

See the chart on the next page. BAC-19xx**36**C (3 relays, 6 analog/universal outputs) and BAC-19xx**63**C (6 relays, 3 analog/universal outputs), such that model numbers with a:

- **5** in the first numeral slot (i.e., BAC-19**5**xxxC) include integrated CO_2 and motion sensors.
- **3** in the first numeral slot (i.e., BAC-19**3**xxxC) include an integrated CO_2 sensor.
- **2** in the **first** numeral slot (i.e., BAC-19**2**xxxC) include an integrated motion sensor.
- **2** in the **second** numeral slot (i.e., BAC-19x**2**xxC) include an integrated humidity sensor.
- **C** suffix (i.e., BAC-19xxxx**C**) include a hardware Real Time Clock (standard on all models).
- **E** suffix (i.e., BAC-19xxxx**E**) have Ethernet (BACnet over Ethernet, BACnet over IP, or BACnet over IP as Foreign Device) communication options. MS/TP models have no E.

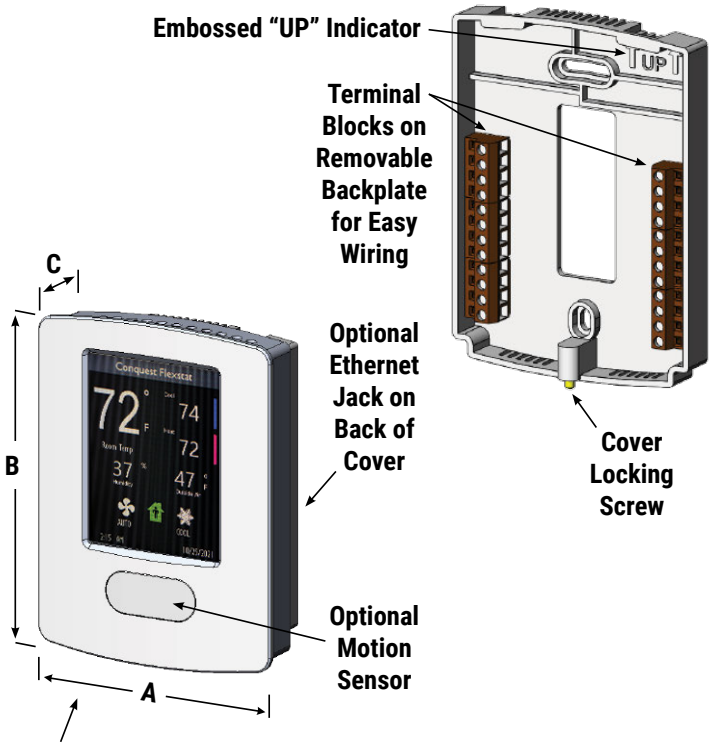
Model Applications*		Integrated Sensors**	BACnet Network Connection
FCU, HPU, and RTU	AHU and Unit Ventilator		
BAC-190063CEW***	BAC-190036CEW	Temperature	Ethernet/IP
BAC-190063CW	BAC-190036CW		MS/TP
BAC-190263CEW	BAC-190236CEW	Temperature, Humidity	Ethernet/IP
BAC-190263CW	BAC-190236CW		MS/TP
BAC-192063CEW	BAC-192036CEW	Temperature, Motion	Ethernet/IP
BAC-192063CW	BAC-192036CW		MS/TP
BAC-192263CEW	BAC-192236CEW	Temperature, Motion, Humidity	Ethernet/IP
BAC-192263CW	BAC-192236CW		MS/TP
BAC-193263CEW	BAC-193236CEW	Temperature, Humidity, CO_2	Ethernet/IP
BAC-193263CW	BAC-193236CW		MS/TP
BAC-195263CEW	BAC-195236CEW	Temperature, Humidity, Motion, CO_2	Ethernet/IP
BAC-195263CW	BAC-195236CW		MS/TP

*NOTE: Applications and options are dependent on the model. See **Applications on page 1**.

**NOTE: Terminals are provided for up to six additional (external) inputs.

***NOTE: All models are white ("W") and contain a hardware Real Time Clock ("C").

SPECIFICATIONS



DIMENSIONS		
A	3-7/8 inches	984 mm
B	5-1/8 inches	1302 mm
C	1-5/16 inches	330 mm

Sensors

Temperature Sensor

Sensor type	Thermistor, 10K Type II
Accuracy	±0.36° F (±0.2° C)
Resistance	10,000 ohms at 77° F (25° C)

Humidity Sensor (optional)

Sensor type	CMOS
Range	0 to 100% RH
Accuracy @ 25°C	±3% RH (10 to 90% RH)
Response time	Less than or equal to 4 seconds

CO_2 Sensor (optional)

Detector type	Non Dispersive Infrared (NDIR), with dual channel detector for superior stability
Rated life	15 years minimum
Operating limits	32° to 122° F (0 to 50° C)
CO_2 range	400 to 10,000 ppm
Accuracy	±(30 ppm + 3% of measured value)
Calibration	Automatic calibration built-in*

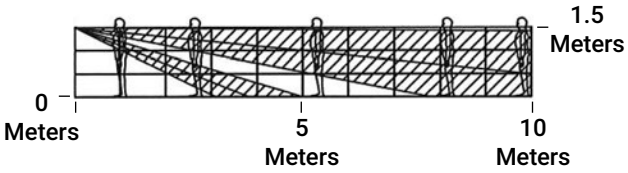
***NOTE:** The CO_2 sensor uses a self-calibration technique designed to be used in applications where **CO_2 concentrations will periodically drop to outside ambient conditions** (approximately 400 ppm), typically during unoccupied periods. The "Standard" DCV mode option is compliant with 2019 California Title 24 Part 6 120.1(c)4.

Motion Sensor (optional)

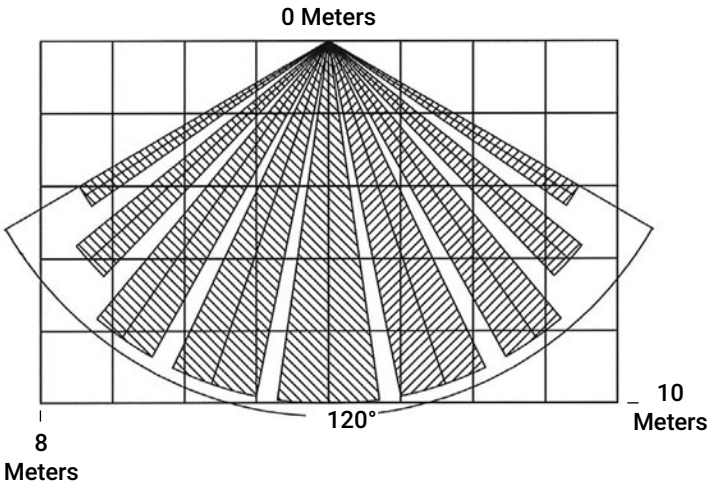
Detector type	Passive infrared
Range and Coverage	33 feet (10 meters)—see **(Optional) Motion Sensing Coverage on page 3**

(Optional) Motion Sensing Coverage

Side View



Top View



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	14–22 AWG, copper, screw terminal blocks

Outputs, Universal (3 or 6)

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 each bank of 3 outputs (outputs 4-6 and 7-9)
Resolution	12-bit digital-to-analog conversion
Wire size	14–22 AWG, copper, screw terminal blocks

Outputs, Relays (3 or 6)

Relays outputs	The NO, SPST (Form "A") relays carry 1 A max. per relay or 1.5 A per bank of 3 relays (relays 1–3 and 4–6) @ 24 VAC/VDC
Wire size	14–22 AWG, copper, screw terminal blocks

Communications

MS/TP (optional)	One EIA-485 port (screw terminals) 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); not available on "E" models
Ethernet (optional)	On "E" model only, a 10/100BaseT Ethernet connector for BACnet IP (Normal or Foreign Device) or Ethernet 802.3 (ISO 8802-3); segmentation supported; up to 328 ft (100 m) between controllers (using T568B Category 5 or better cable)

Configurability

OBJECTS*	DEFAULT #	MAXIMUM #
Inputs and Outputs**		
Analog, binary, or accumulator input	10	
Analog or binary (relay) output	9	
Values		
Analog value	62	120
Binary value	60	180
Multi-state value	12	40
Program and Control		
Program (Control Basic)***	10	
PID loop	7	10
Schedules		
Schedule	2	
Calendar	1	
Logs		
Trend log	10	20
Trend log multiple	1	4
Alarms and Events		
Notification class	2	5
Event enrollment	10	40
Tables		
Input tables	4	
Control Basic tables	4	

*Configuration allows creation and deletion of objects. The configuration of default objects depends on the selected application.

**6 external inputs (terminal blocks) and up to 4 (dependent on model) internal sensors

***10 program objects containing a library of 5 built-in programs and 5 empty program objects (for any customized Control Basic programming).

Configuring, Programming, and Designing

Basic configuration of a FlexStat can be done (without any software) through the built-in menu structure available on the touchscreen.

For additional customization, programming (with Control Basic), and/or creating graphics for the controller, see the table for the most relevant KMC Controls tool. See the documents or Help systems for the respective KMC tool for more information.

SETUP PROCESS			KMC CONTROLSTOOL
Configuration	**Programming (Control Basic)**	**Web Page Graphics**	
✓			FlexStat Screen Menus
✓	✓		**KMC Connect™** software (ver. 1.0.15.x or later)
✓	✓	✓*	**TotalControl™** software (ver. 4.5.2.x or later)
		✓**	**KMC Commander®** IoT platform

*Custom graphical user-interface web pages created in TotalControl can be hosted on a remote web server, but they are not hosted in the FlexStat.

**KMC Commander can display thermostat and trend "cards," trends, alarms, and schedules on its web pages for monitor and control of FlexStats and many other devices.

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

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	13 VA, plus external loads
Wire size	14–22 AWG, copper, in a removable screw terminal block

Connections

Screw terminals	Wire size 14–22 AWG, for inputs, outputs, power, and MS/TP network
Modular RJ-45 jack	Ethernet port on “E” versions for standard T568B (Category 5 or better) Ethernet patch cable up to 328 feet (100 meters)
Four-pin EIA-485	Data port on the underside of the case enables easy temporary computer connection to the BACnet network (using an interface cable included with the HPO-5551 tech cable kit for the BAC-5051E)

Display

Type	Color resistive touchscreen
Size	2-7/8 x 2-3/16 inches (720 x 550 mm)
Features	Customizable screen includes a title bar, dedicated room temperature and setpoint displays, customizable four-object icon bar, time and date display, and up to 24 total rotation value displays (e.g., humidity, CO2, OAT, and DAT) in three areas of eight current values each
Icons	Animated, language-independent, symbols showing fan, occupancy, heating, cooling, and auto

Enclosure and Mounting

Weight	0.6 lbs. (0.27 kg)
Case material	Flame-retardant plastic
Mounting	Surface mount directly to any flat surface or to a 2 x 4 inch or 4 x 4 inch electrical box (mounting on a 4 x 4 box requires an HMO-10000W backplate)

NOTE: The two-piece design allows field rough-in and termination of field wiring to the backplate without needing the FlexStat at the site—permitting FlexStats to be bulk-configured off-site and plugged into the wired backplates at a later time if desired.

Environmental Limits

Operating	34 to 125° F (1.1 to 51.6° C)
Shipping	–40 to 140° F (–40 to 60° 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

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

ACCESSORIES

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

Actuators and Valves

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
VEB-43 series	2-way, NPT, control ball valves
VEB-46 series	3-way, NPT, Control Ball Valve

Communications

BAC-5051E	BACnet router
HPO-5551	Router technician cable kit
HSO-9001	Ethernet patch cable, 50 feet
HSO-9011	Ethernet patch cable, 50 feet, plenum rated
HSO-9012	Ethernet patch cable, 75 feet, plenum rated
KMD-5567	MS/TP network surge suppressor

Mounting Hardware

HMO-10000W	White mounting plate, allows mounting to 4 x 4 inch electrical boxes
HPO-0044	Replacement cover hex screw
SP-001	(KMC branded) screwdriver with a hex end (for cover screws) and a flat blade end (for controller terminals)

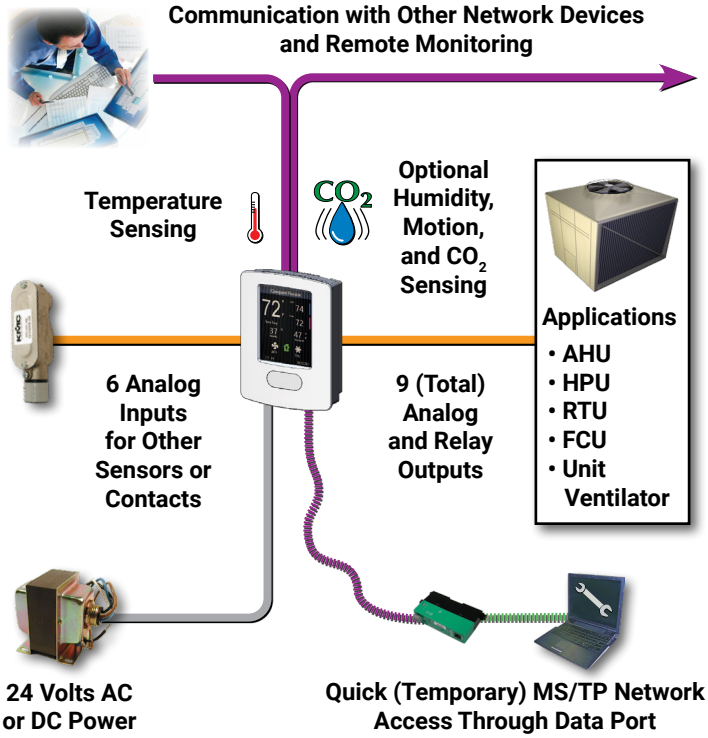
Sensors, External

CSE-1102/1103	Fan status differential pressure switch
CTE-3006/3007	Low limit switch, SPDT
STE-1405	DAT sensor with plenum-rated cable
STE-1451	OAT sensor
STE-6011W10	Space temperature sensor, white

Transformers, 120 to 24 VAC

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

SAMPLE INSTALLATION



NOTE: Potential applications are dependent on the model. See **Applications on page 1** and **Models on page 1**.

NOTE: Two-piece design allows field rough-in and termination of field wiring to the backplate without needing the BAC-190000 series FlexStats at the site—permitting them to be bulk-configured off-site and plugged into the wired backplates at a later time if desired.

NOTE: BAC-190000 series FlexStats are **not** plug-in replacements for the older BAC-1000/120000/130000/140000 series FlexStats. The new BAC-190000 series backplate will need to be installed in the place of the older one. Wiring, configuration, and/or programming may also need changes.

NOTE: For more information about mounting and maintenance, see **Room Sensor and Thermostat Mounting and Maintenance Application Guide**.

SUPPORT

The latest support files are always available on the KMC Controls web site (**www.kmccontrols.com**). Log in to see all available files.

For specific FlexStat information, see the **BAC-19xxxx FlexStat Installation Guide** for:

- General installation procedures
- Maintenance information

See the **BAC-19xxxx FlexStat Sequence of Operation and Wiring Guide** for:

- Sample wiring for applications
- Sequences of operation
- Input/output objects and connections

See the **BAC-19xxxx FlexStat Application Guide** for:

- Configuration of settings
- Passwords
- Communication options
- Display customization
- CO_2 and DCV information
- Wiring considerations
- Restarting options
- Troubleshooting

For additional instructions on custom configuration and programming, see the Help system in the relevant KMC software tool.

 Specifications and design are subject to change without notice 926-035-01E