BAC-4000 Series
AppStat™

Description

The KMC AppStat combines the power of a space-mounted equipment controller with the convenience of built-in temperature, humidity and motion sensors. The controllers include a wide range of factory supplied programs for the following applications.

◆ Two and four pipe fan coil units
◆ Roof top units
◆ Heat pump units
◆ Packaged and split unitary systems

Stand alone operation No special programming, software applications, or setup tools are required to configure and commission an AppStat. All options can be set by using only the five front panel buttons and the easy-to-read menus in the full color display.

New or retrofit applications The attractive two-piece design is ideal for new installations or upgrades of older, less efficient thermostats. AppStat installation requires only mounting the backplate to a wall or electrical box, connecting wires to screw terminals, and plugging the AppStat into the backplate.

Bright, full-color display The full color display is easy to read across a room even in bright sunlight. Users can easily choose between Fahrenheit or Celsius values. The display features large numbers and simple color icons to indicate heating or cooling, occupied, unoccupied or local setback modes, and fan operation. For models with a humidity sensor, the temperature and humidity values alternate on the display.

Network ready All models are native BACnet, Application Specific Controllers ready to connect to a BACnet MS/TP network. Device instance, MAC address, and baud rate are set from the password protected front controls. All models feature a hardware clock and BACnet schedule that can be set up from the front panel or as standard BACnet objects and properties.

Shown with optional motion sensor.

Still . . . Made in the U.S.A.

Specifications

Full color user interface
The user interface is a color display and with five push buttons. Backlighting automatically starts when any button is pushed and remains lit for 60 seconds after the last button is pushed. Through the menu driven display, an operator can do the following.

◆ Change setpoints and fan, heating, cooling modes.
◆ Choose between Fahrenheit or Celsius values
◆ Set BACnet addressing
◆ Set up and commission the installation
◆ Add or change user passwords
◆ Configure any available options

Security
Separate passwords for users and control technicians and engineers.

Screen type
◆ 128 × 128 pixels
◆ Active color LCD with LED back lighting
◆ 1.00 x 1.04 inches (25 x 26 mm)

Inputs and outputs

All inputs and outputs for the AppStat are set up at the factory and do not require set up in the field.

Inputs

Analog inputs for discharge air temperature, water supply temperature, outside air temperature, fan status, and remote temperature sensor.

◆ Sensors are automatically detected
◆ Inputs accept industry-standard 10K ohm (Type II or III) thermistors sensors.
◆ Input overvoltage protection up to 24 volts AC, continuous.
◆ 12-bit analog-to-digital conversion

Relay outputs

◆ All relay outputs are normally open, SPST, Form "A" relays
◆ 1 Ampere maximum per relay at 24 volts AC or DC for each output. Maximum for all relay outputs is 3 amperes (72VA)
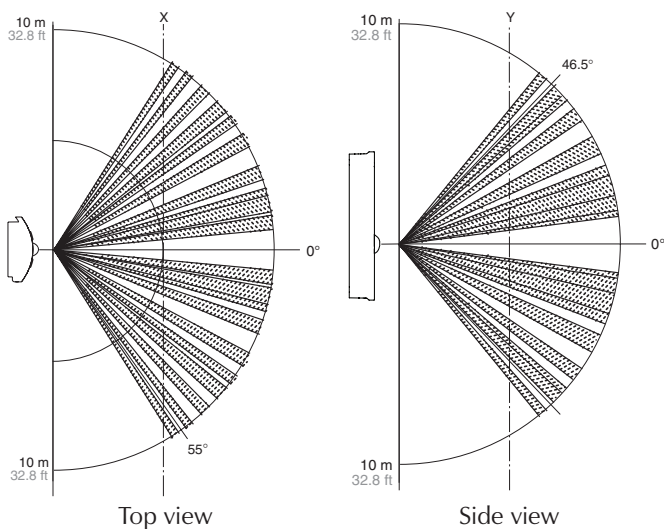
Analog outputs

◆ Short-circuit protected
◆ Loads up to 10 mA at 0–12 volts DC
◆ 8-bit PWM digital-to-analog conversion

Connections

Screw terminal blocks, wire size 14–22 AWG, for inputs, outputs, power, and network connections.

Motion sensor range

Detector type	Passive infrared
Range	33 feet (10 meters). See diagrams.

Top view   Side view

BACnet communication

◆ Integral peer-to-peer BACnet MS/TP network communications.
◆ Network speed from 9600 to 76,800 baud
◆ Front panel selection for device instance, MAC address, and baud rate
◆ Meets or exceeds ANSI/ASHRAE BACnet Standard 135-2008 for Application Specific Controllers.

Accuracy–temperature only models

Type	Thermistor
Accuracy	±0.36° F (±0.2° C)
Resistance	10,000 Ω at 77° F (25° C)
Operating range	48 to 96° F (8.8 to 35.5° C)

Accuracy–temperature and humidity models

Temperature Sensor

Type	CMOS
Accuracy	±0.9° F offset (±0.5° C) from 40 to 104° F (4.4 to 40° C)
Resolution	±0.1° F (±0.1° C)
Operating range	36 to 120° F (2.2 to 48.8° C)
Response time	5 to 30 seconds

Humidity Sensor

Type	CMOS
Humidity	0 to 100% RH
Accuracy @ 25°C	± 2% RH (10 to 90% RH)
Response time	4 seconds or less

Regulatory approvals

◆ UL 916 Energy Management Equipment
◆ FCC Class A, Part 15, Subpart B and complies with Canadian ICES-003 Class B
◆ BACnet Testing Laboratory listed
◆ SASO PCP Registration KSA R-103260

XEE-6111-040	Single-hub 120 volt transformer
XEE-6112-040	Dual-hub 120 volt transformer
HMO-10000W	White mounting plate for horizontal or 4 x 4 handy box wall mounting

Operating sequences

Fan Coil Units
AppStats for the control of fan coil units are available with inputs, outputs, and sequences of operation for the following functions.

- Two-pipe heating and cooling with on/off valves, modulating valves, or both
- Four-pipe heating and cooling with on/off valves, modulating valves, or both
- Three-speed or modulating fan control
- Automatic or manual fan control
- Remote space temperature sensor
- Local temperature setback mode based on optional built-in motion sensor
- Dehumidification on models with humidity sensor

Roof Top and Unitary Units
AppStats for the control of roof top or similar packaged or split unitary units are available with inputs, outputs, and sequences of operation for the following functions.

- One or two stage heating
- One or two stage cooling
- Optional economizer Automatic or manual fan control
- Modulating valves or on/off heating and cooling valves
- Remote space temperature sensor
- Local temperature setback mode based on optional built-in motion sensor
- Dehumidification on models with humidity sensor

Heat Pump Units
AppStats for the control of heat pump units are available with inputs, outputs, and sequences of operation for the following functions.

- Two stages of heat and two stages of cooling plus auxiliary heat
- Optional economizer
- Dehumidification-in models with auxiliary heat and a humidity sensor
- Local temperature setback mode based on optional built-in motion sensor
- Automatic or manual fan control

Installation information

Mounting
Backplate mounts to a standard 2 x 4 inch vertical handy-box or Euro style box. The controller is secured to the backplate with a concealed Allen screw.

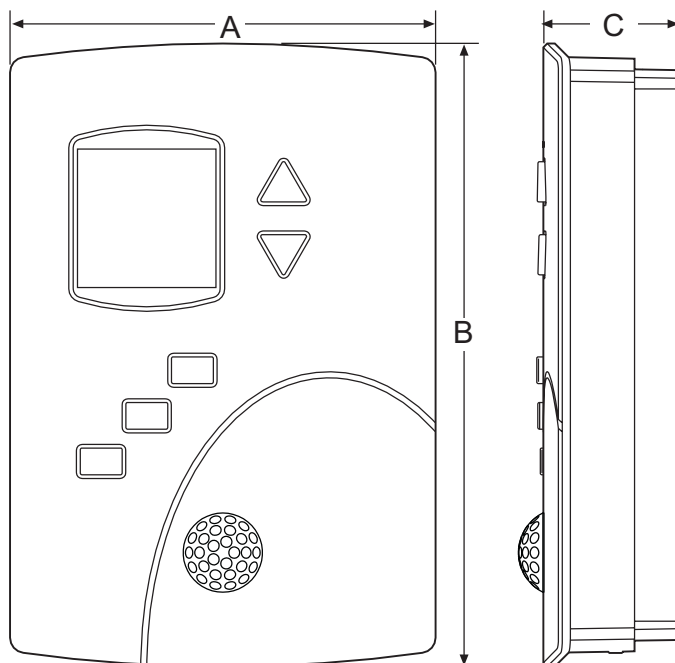|	
Material	White flame-retardant plastic
Weight	Approx. 6 oz. (170 grams)
Supply voltage	24 volts AC (–15%, +20%), 50-60 Hz, 12 VA, Class 2 only, non-supervised (all circuits, including supply voltage, are power limited circuits)

Environmental Limits

Operating	32 to 140° F (0 to 49° C)
Shipping	–40 to 160° F (–40 to 71° C)
Humidity	0 to 95% RH non-condensing

Dimensions
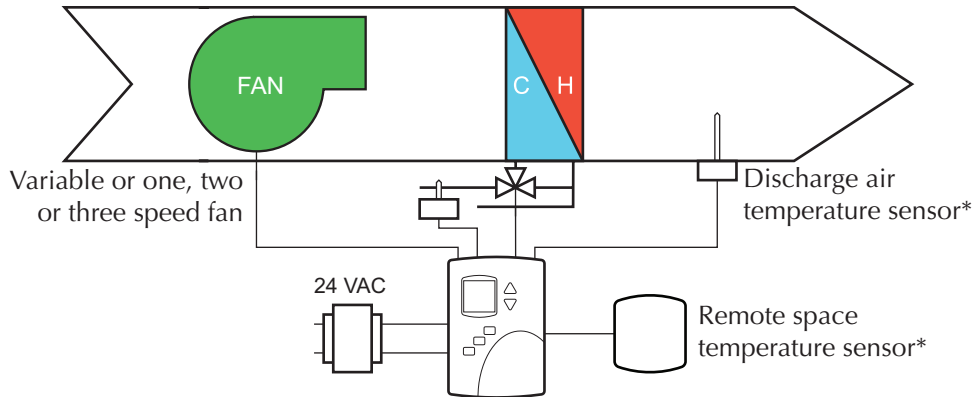
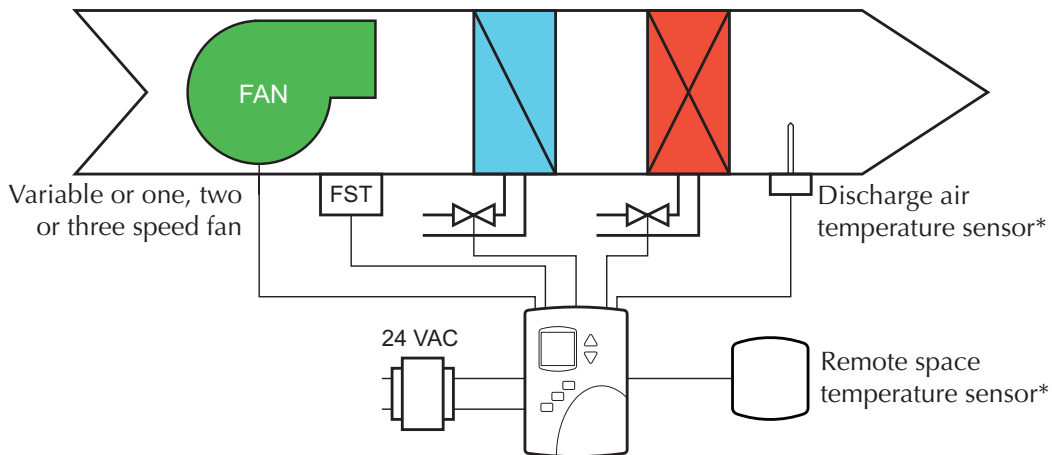| A	B	C
3.50 in.	5.12 in.	1.13 in.
89 mm	130 mm	29 mm

Fan Coil Unit Applications

The following block diagrams are only a sample of the applications available for the AppStat models for fan coil units. Complete details for all AppStat applications are in the manual *Installation, Applications, and Operation for AppStat* available at GetAppStat.com.
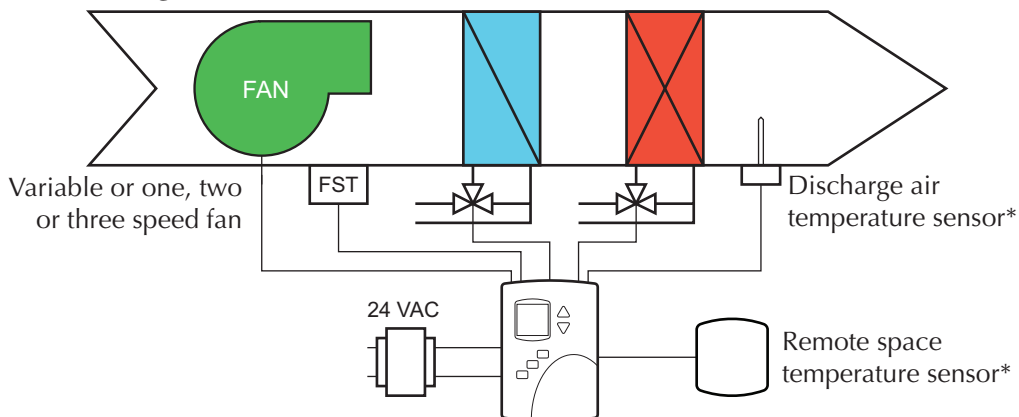
Two-pipe with modulating valve

Variable or one, two or three speed fan

FAN

C H

24 VAC

Discharge air temperature sensor*

Remote space temperature sensor*

Four-pipe with on/off valves

Variable or one, two or three speed fan

FAN

FST

24 VAC

Discharge air temperature sensor*

Remote space temperature sensor*

Four-pipe with modulating valves

Variable or one, two or three speed fan

FAN
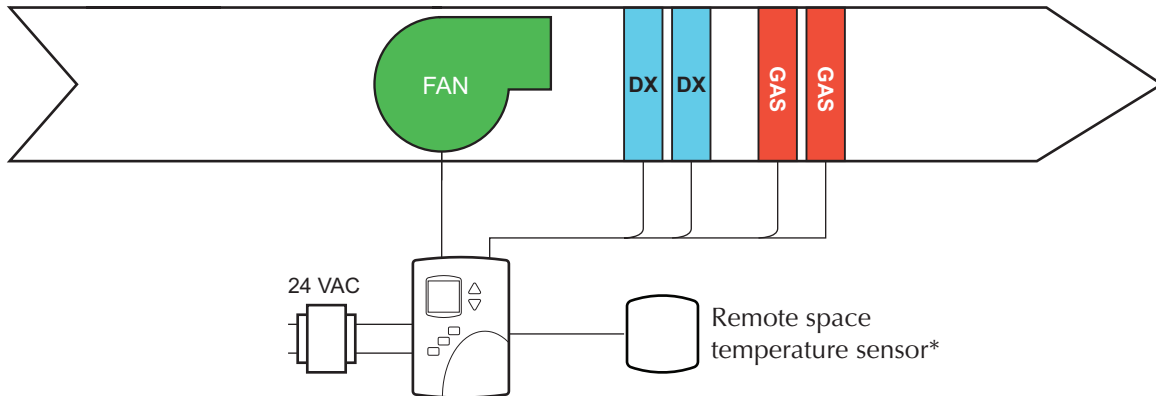
FST

24 VAC

Discharge air temperature sensor*

Remote space temperature sensor*

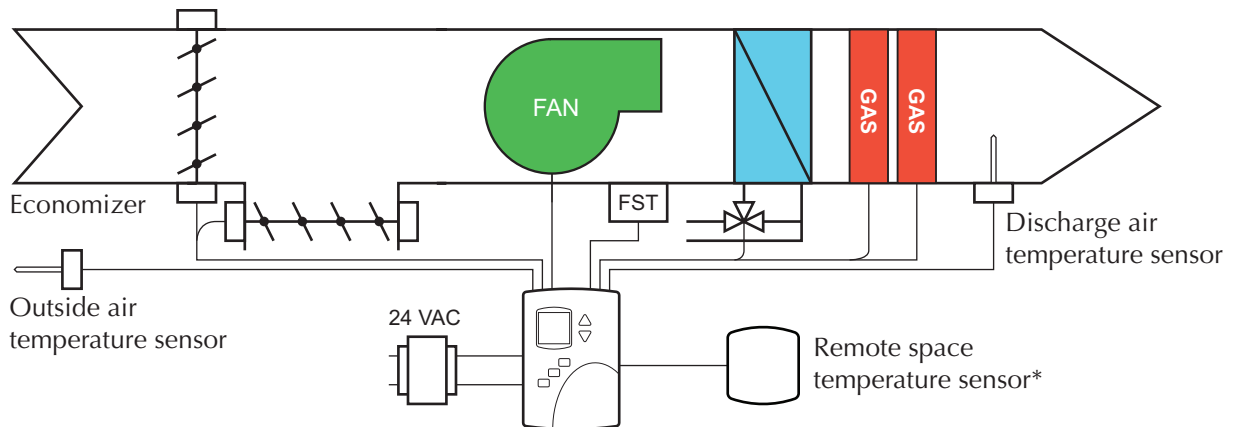*Fan status switch, discharge air and remote space temperature sensors are optional items.

The following block diagrams are only a sample of the applications available for the AppStat models for roof top units or similar packaged or split unitary units. Complete details for all AppStat applications are in the manual *Installation, Applications, and Operation for AppStat* available at GetAppStat.com.

Two-stage DX cooling and two-stage gas heat

FAN | DX | DX | GAS | GAS

24 VAC

Remote space temperature sensor*

Chilled water cooling and two-stage gas heat

FAN | GAS | GAS

Economizer

FST

Discharge air temperature sensor

Outside air temperature sensor

24 VAC

Remote space temperature sensor*

Chilled water cooling and hot water heat with modulating valves

FAN

Economizer

FST

Discharge air temperature sensor

Outside air temperature sensor
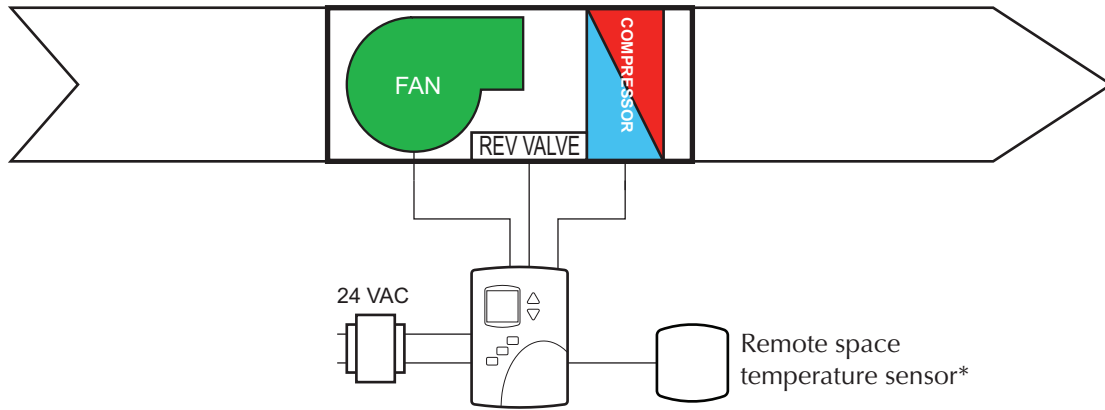
24 VAC

Remote space temperature sensor*
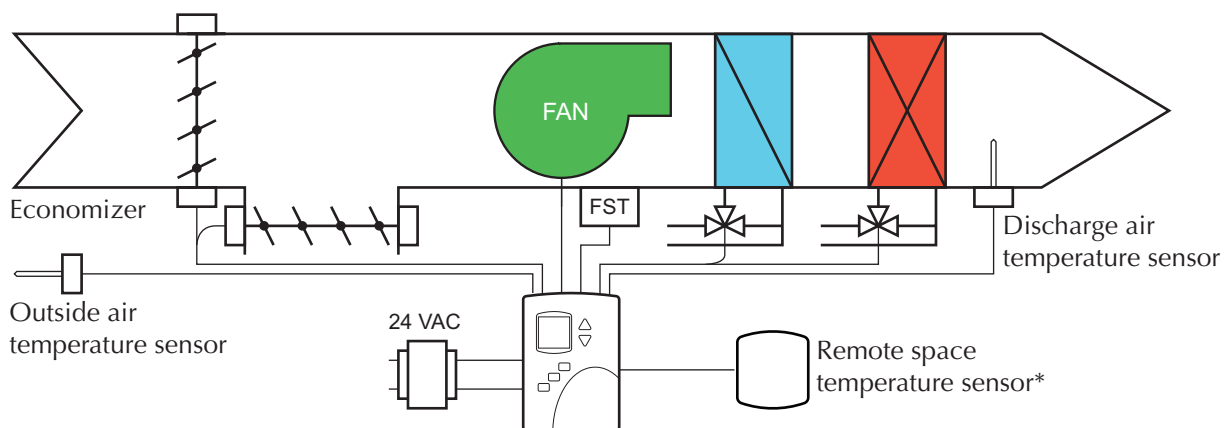
* Economizer, fan status switch, discharge air and remote space temperature sensors are optional items.
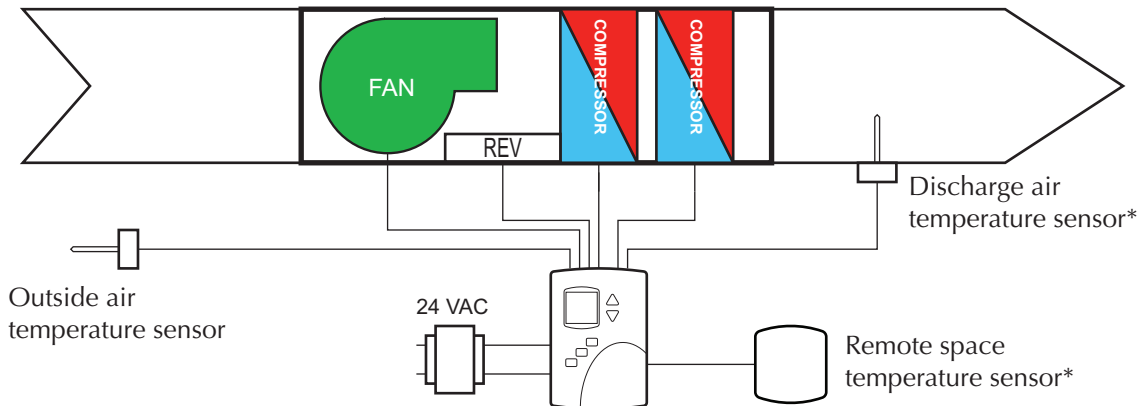
Heat Pump Unit Applications

The following block diagrams are only a sample of the applications available for the AppStat models for heat pump units. Complete details for all AppStat applications are in the manual *Installation, Applications, and Operation for AppStat* available at GetAppStat.com.
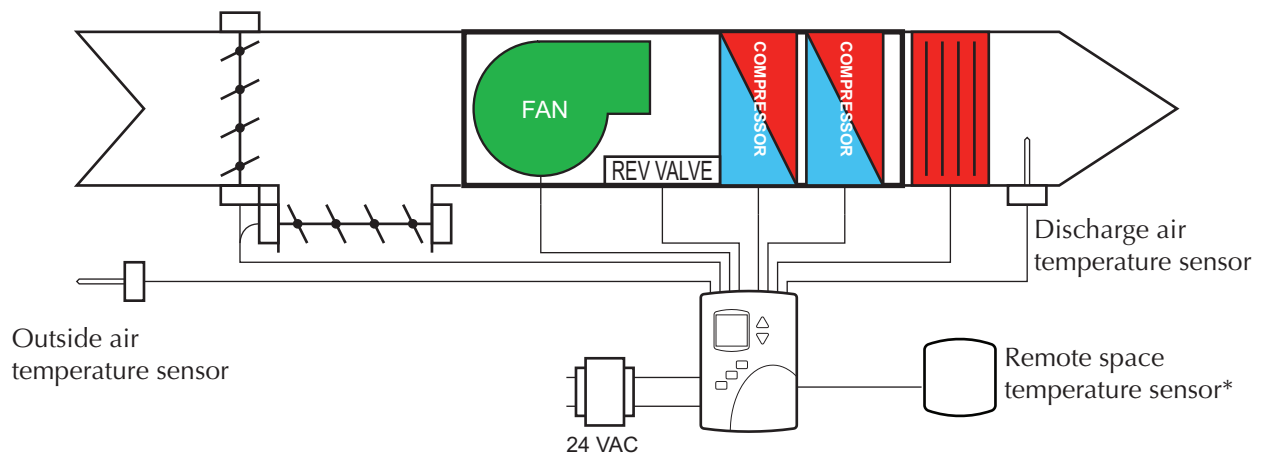
Single compressor heat pumps

Dual compressor heat pumps

Dual compressor heat pumps with economizer and auxiliary heat

* Economizer, discharge air and remote space temperature sensors are optional items.

Ordering information for AppStat Fan Coil Unit models

Application	Options		Model number
Fan Coil Unit 2-pipe and 4-pipe On/Off valves Three-speed fan	With humidity sensor Required for dehumidification	With motion sensor	BAC-4221CW0001
		Without motion sensor	BAC-4021CW0001
	Without humidity sensor	With motion sensor	BAC-4201CW0001
		Without motion sensor	BAC-4001CW0001
Fan Coil Unit 2-pipe and 4-pipe Modulating valves Three-speed fan	With humidity sensor Required for dehumidification	With motion sensor	BAC-4222CW0001
		Without motion sensor	BAC-4022CW0001
	Without humidity sensor	With motion sensor	BAC-4202CW0001
		Without motion sensor	BAC-4002CW0001
Fan Coil Unit 2-pipe and 4-pipe On/Off valves Modulating speed fan	With humidity sensor Required for dehumidification	With motion sensor	BAC-4227CW0001
		Without motion sensor	BAC-4027CW0001
	Without humidity sensor	With motion sensor	BAC-4207CW0001
		Without motion sensor	BAC-4007CW0001
Fan Coil Unit 2-pipe and 4-pipe Modulating valves Modulating speed fan	With humidity sensor Required for dehumidification	With motion sensor	BAC-4228CW0001
		Without motion sensor	BAC-4028CW0001
	Without humidity sensor	With motion sensor	BAC-4208CW0001
		Without motion sensor	BAC-4008CW0001
Fan Coil Unit 2-pipe and 4-pipe Modulating or On/Off valves Three-speed or modulating speed fan	With humidity sensor Required for dehumidification	With motion sensor	BAC-4223CW0001
		Without motion sensor	BAC-4023CW0001
	Without humidity sensor	With motion sensor	BAC-4203CW0001
		Without motion sensor	BAC-4003CW0001

Ordering information for AppStat Roof Top Unit models

Application	Options		Model number
Roof Top Unit On/Off valves One or two-stages heat One or two stages cooling Fan control	With humidity sensor Required for dehumidification	With motion sensor	BAC-4221CW0002
		Without motion sensor	BAC-4021CW0002
	Without humidity sensor	With motion sensor	BAC-4201CW0002
		Without motion sensor	BAC-4001CW0002
Roof Top Unit Modulating or on/off valves One or two-stages heat One or two stages cooling Fan control Economizer	With humidity sensor Required for dehumidification	With motion sensor	BAC-4223CW0002
		Without motion sensor	BAC-4023CW0002
	Without humidity sensor	With motion sensor	BAC-4203CW0002
		Without motion sensor	BAC-4003CW0002

Ordering information for Heat Pump models

Application	Options		Model number
Heat Pump Unit 3 heat, 2 cool Fan control	With humidity sensor Required for dehumidification	With motion sensor	BAC-4221CW0003
		Without motion sensor	BAC-4021CW0003
	Without humidity sensor	With motion sensor	BAC-4201CW0003
		Without motion sensor	BAC-4001CW0003
Heat Pump Univt 3 heat, 2 cool Fan control Economizer	With humidity sensor Required for dehumidification	With motion sensor	BAC-4223CW0003
		Without motion sensor	BAC-4023CW0003
	Without humidity sensor	With motion sensor	BAC-4203CW0003
		Without motion sensor	BAC-4003CW0003

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