## Description and Application

The KMC FlexStat series of flexible, intelligent temperature/humidity/occupancy-sensing, wall-mounted, thermostat/controllers are native BACnet Advanced Application Controllers (B-AAC) for connection with a BACnet system. The set-and-forget FlexStat simplifies networked zone control for common packaged HVAC equipment, such as single- and multi-stage packaged, unitary, and split systems (including high SEER/EER variable speed packaged equipment), as well as factory-packaged and field-applied economizers, water-source and air-to-air heat pumps, fan coil units, central station air handling units, and other similar applications.

In addition, an on-board library of programs permits a single model to be rapidly configured for a wide range of HVAC control applications. Thus, a single "one size fits all" FlexStat model can replace multiple competitor models. A single BAC-10163CW, for example, can be configured for any and all of these application options:

◆ Air handling unit, with proportional heating and cooling valves, and with optional economizer, dehumidification, and/or fan status

◆ Fan coil unit, 2-pipe or 4-pipe, proportional or 2-position valves, with optional dehumidification (w/ 4-pipe option) and/or fan status

◆ Heat pump unit, with up to two compressor stages, and with optional auxiliary heat, emergency heat, dehumidification, and/or fan status

◆ Roof top unit, with up to two H/C stages, and with optional economizer, dehumidification, and/or fan status

FlexStats also provide the capability to customize the standard library of sequences using KMC's BAC-stage programming tool. This enables a local authorized KMC installing contractor to adapt the standard library to the unique site needs and application specific requirements of a particular project.

Standard hardware options include a mix of output configurations (relays and universal outputs), optional on-board humidity/occupancy sensing, and inputs for additional remote external sensors such as outside air temperature and CO_2 sensors.
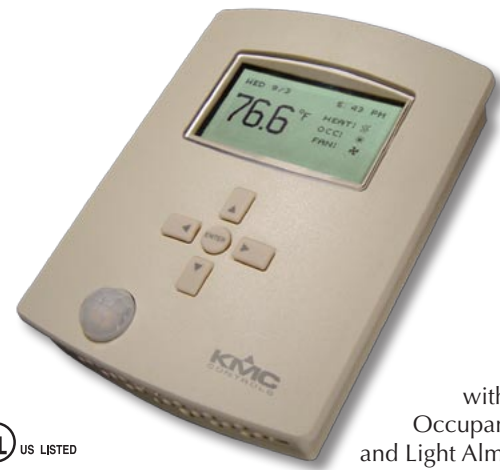
(Shown with Optional Occupancy Sensor and Light Almond Case)

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Features

Interface and Function

◆ User-friendly, 64 x 128 pixel, dot-matrix LCD display and 5 buttons for data selection and entry

◆ Six On/Off and independent heating and cooling setpoint periods per day

◆ Schedules can be set uniquely for each day, 5-1-1, or 5-2 daily schedules

◆ Easy copy function for rapid schedule programming in stand-alone and small network applications

◆ Built-in, factory-tested libraries of configurable application control sequences

◆ Integral energy management control with optimum start/stop, energy deadband heating and cooling setpoints, and other advanced features

◆ Three levels of password-protected access (user/operator/administrator) prevent disruption of operation and configuration

◆ Integral CMOS temperature and (on relevant models) humidity sensing for accurate operation

◆ Optional occupancy sensor (shown in photo above)

◆ Model choices enable "best fit" of sequence in new and retrofit applications with other field devices, such as proportional or 3-wire "floating" actuators and staged equipment; functionally replace most Viconics and other competitors' products

◆ All models have 72-hour power (capacitor) backup and a real time clock for network time synchronization or full stand alone operation

Features (Cont.)

Inputs

◆ Three analog inputs (that can also be mapped as binary inputs in Control Basic) for use with external devices such as mixed air temperature, fan status, outside air, and CO_2 sensors

◆ Analog inputs accept industry-standard 10K ohm thermistor sensors or dry contacts

◆ Inputs can be configured via a switch for 10K ohm pull-up resistors (for unpowered contacts or devices) or 0–12 VDC

◆ Input overvoltage protection (24 VAC, continuous)

◆ 12-bit analog-to-digital conversion on inputs

Outputs

◆ Up to nine outputs, analog and binary (relays)

◆ Each short-circuit protected analog output capable of driving up to 20 mA (at 0–12 VDC)

◆ The NO, SPST (Form "A") relays carry 1 A max. per relay or 1.5 A per bank of 3 relays (relays 1–3, 4–6, and 7–9) @ 24 VAC/VDC

◆ 8-bit digital-to-analog conversion on outputs

Installation

◆ Backplate mounts on a standard vertical 2 x 4-inch wall handy-box, and the cover is secured to the backplate by two concealed hex screws

◆ Two-piece design allows field rough-in and termination of field wiring to back plate without electronics at the site (see the Dimensions section)

◆ Attractive white (standard) or light almond (optional) plastic case

Connections

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

◆ Integral peer-to-peer BACnet MS/TP LAN network communications on all devices (with configurable baud rate from 9600 to 76.8K baud)

◆ A four-pin EIA-485 (formerly RS-485) data port on the underside of the case enables easy temporary computer connection to the BACnet network (access with a KMD-5624 cable—requires use of KMD-5576 or third-party interface)

BACnet® International

Configurability

I/O

◆ Up to 7 analog input objects (IN1 is space temperature, IN2–IN4 are 0–12 VDC inputs, IN5 is reserved for humidity, IN6 is reserved for motion detection, IN7 is reserved for CO_2)

◆ Up to 9 analog or binary output objects

Value

◆ 60 analog value objects

◆ 40 binary value objects

◆ 10 multi-state value objects (with up to 16 states each)

Program and control

◆ 8 PID loop objects

◆ 10 program objects (contains a library of built-in programs and customized Control Basic programming can be done through BACstage or TotalControl)
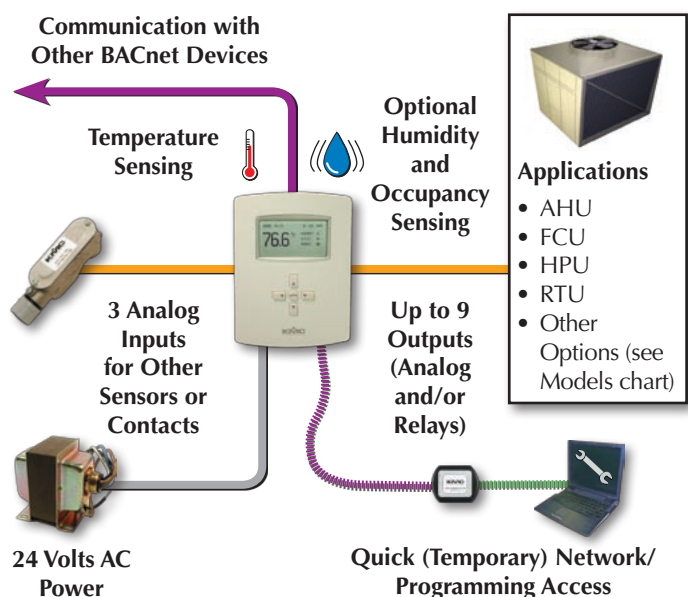
Schedules and trends

◆ 2 schedule objects

◆ 1 calendar object

◆ 2 trend objects, each of which holds 256 samples

Alarms and events

◆ 5 notification class (alarm/event) objects

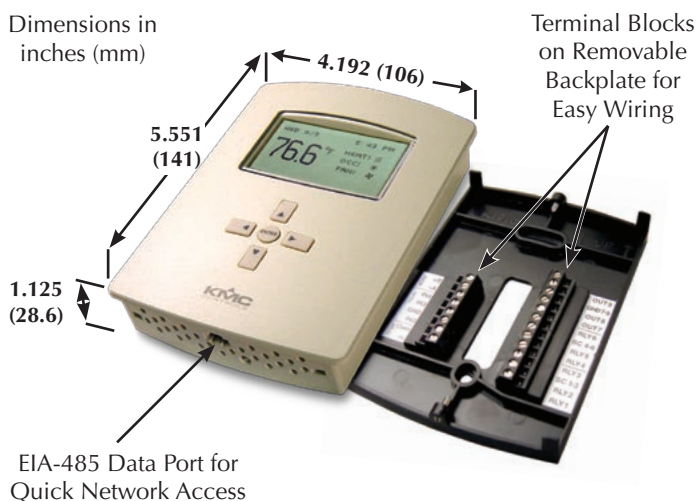◆ 10 event enrollment objects

Sample Installation

Communication with Other BACnet Devices

Temperature Sensing

Optional Humidity and Occupancy Sensing

Applications
• AHU
• FCU
• HPU
• RTU
• Other Options (see Models chart)

3 Analog Inputs for Other Sensors or Contacts

Up to 9 Outputs (Analog and/or Relays)

24 Volts AC Power

Quick (Temporary) Network/ Programming Access

Models

Model*	Outputs**	Optional Sensors***	Typical Applications
BAC-10030CW	3 Relays (Binary Outputs) (All models have 3 analog inputs)	None	• 1H/1C packaged and split systems • 1H/1C heat pumps (no aux. heat) • Terminal reheat (staged) • 2-pipe FCUs with 1-speed fan, 2-position valve, fresh air control • 4-pipe FCUs with 1-speed fan, 2-position Heat and Cool valves • Unit heaters • Other single-stage thermostat applications
BAC-10130CW		Humidity	• Same as BAC-10030CW • View room humidity
BAC-11030CW		Occupancy	• Same as BAC-10030CW • Occupancy-based operation
BAC-11130CW		Humidity and Occupancy	• Same as BAC-10030CW • Occupancy-based operation • View room humidity
BAC-10036CW	3 Relays and 6 Analog Outputs	None	• 1H/1C, fan, and 6 universal outputs • 3-speed fan, 2- or 4-pipe FCUs with modulating valves • Central station AHUs with modulating Heat/Cool • Variable-speed fan output • Single-stage applications
BAC-10136CW		Humidity	• Same as BAC-10036CW • Dehumidification sequence • Humidification sequence
BAC-11036CW		Occupancy	• Same as BAC-10036CW • Occupancy-based operation
BAC-11136CW		Humidity and Occupancy	• Same as BAC-10136CW • Occupancy-based operation
BAC-10063CW	6 Relays and 3 Analog Outputs	None	• 2H/2C, fan • Multi-stage packaged or split systems • Multi-stage heat pumps with or without factory-packaged economizers • Central station AHUs with modulating Heat/Cool • 3-speed fan, 2- or 4-pipe FCUs with modulating or 2-position valves
BAC-10163CW		Humidity	• Same as BAC-10063CW • Humidification sequence • Dehumidification sequence
BAC-11063CW		Occupancy	• Same as BAC-10063CW • Occupancy-based operation
BAC-11163CW		Humidity and Occupancy	• Same as BAC-10163CW • Occupancy-based operation
BAC-10090CW	9 Relays	None	• 1H/1C, fan, and 6 binary outputs • 2H/2C, fan, and 4 binary outputs • 3H/3C, fan, and 2 binary outputs • 3H/3C plus ERV, reheat, or 3-speed fan
BAC-10190CW		Humidity	• Same as BAC-10090CW • Dehumidification sequence • Humidification sequence
BAC-11090CW		Occupancy	• Same as BAC-10090CW • Occupancy-based operation
BAC-11190CW		Humidity and Occupancy	• Same as BAC-10190CW • Occupancy-based operation

*The standard color is white. To order the optional light almond color, remove the "W" at the end of the model number (e.g., BAC-11163C). Light almond cases have an additional cost and minimum order quantities.

**Analog outputs produce 0–12 VDC @ 20 mA maximum, and relays carry 1 A max. per relay or 1.5 A per bank of 3 relays (relays 1–3, 4–6, and 7–9) @ 24 VAC/VDC.

***All models have a temperature sensor and 3 analog inputs. (*Certain models/features are pending release.*)

Specifications

Supply Voltage	24 VAC (+20%/–15%), Class 2
Supply Power	1 VA steady state, up to 3 VA at start-up
Connections	Wire clamp type terminal blocks; 14–22 AWG, copper
	Four-pin EIA-485
Outputs (up to 9)	Analog outputs produce 0–12 VDC, **20 mA** maximum
	Binary outputs (NO, SPST, Form "A" relays) carry **1 A** max. per relay **or** a total of **1.5 A per bank** of 3 relays (relays 1–3, 4–6, and 7–9) @ 24 VAC/VDC
Inputs (IN2–IN4)	Analog 0–12 VDC (active/passive contacts, 10K thermistors)
Display	64 x 128 pixel dot matrix LCD
Case Material	White (standard) or light almond flame-retardant plastic
Dimensions	5.551 x 4.192 x 1.125 inches (141 x 106 x 28.6 mm)
Approvals	UL 916 Energy Management Equipment FCC and BTL listings pending
Weight	0.48 lbs. (218 g)
Occupancy Sensor	10 meter (33 feet) range

Temperature/Humidity Model Sensors

Sensor Type	CMOS
Temperature Readings	
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 Readings	
Range	0 to 100% RH
Accuracy @ 25°C	±2% RH (10 to 90% RH)
Response Time	Less than or equal to 4 seconds

Temperature-Only Model Sensors

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

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% RH (non-condensing)

Dimensions and Connectors

Dimensions in inches (mm)

4.192 (106)

5.551 (141)

1.125 (28.6)

Terminal Blocks on Removable Backplate for Easy Wiring

EIA-485 Data Port for Quick Network Access

Accessories

HPO-0044	Replacement cover hex screw
KMD-5575	Network repeater/isolator
KMD-5567	Surge suppressor
KMD-5576	EIA-485 to USB Communicator
KMD-5624	PC data port (EIA-485) cable
KMD-5699	FlexStat firmware upgrade kit
SP-001	Flat blade & hex end screwdriver
XEE-6111-040	Transformer, 120-to-24 VAC, 40 VA, single-hub
XEE-6112-040	Transformer, 120-to-24 VAC, 40 VA, dual-hub

Support

FlexStats come with a printed Installation Guide (P/N 913-034-01). Additional documentation for operation, configuration, programming, application, and much more information is available on the award-winning KMC Controls web site (www.kmccontrols.com). The web site will also contain future updates to firmware (that can be upgraded with the KMD-5699 firmware flash upgrade kit).