

Installation Guide (3/0 Outputs)

Quick Start

The KMC FlexStat series of intelligent temperature/humidity-sensing, wall-mounted, thermostat/controllers are native BACnet Advanced Application Controllers (B-AAC) for use in a BACnet system. The FlexStat simplifies networked zone control for common packaged HVAC equipment by including an on-board library of programs that permits rapid configuration of a wide range of HVAC control applications.

To use the FlexStat:

1. Mount and wire the unit (see this Installation Guide).

NOTE: This document gives basic mounting, wiring, and setup information only. For configuration, programming, operation, and other information, see the KMC Controls web site (www.kmccontrols.com) for the latest documents and firmware. For installation instructions of FlexStats with output configurations other than 3 relays and 0 analog outputs, see that model's respective installation guide.

2. Configure/program the unit (see the BAC-10000 Series Operation and Application Guides).
3. If necessary, troubleshoot any issues (see the BAC-10000 Series Operation Guide).
4. Operate the unit (see the BAC-10000 Series Operation Guide).

Mounting

For optimum temperature sensor performance, the FlexStat must be mounted on an inside wall and away from heat sources, sunlight, windows, air vents, and air circulation obstructions (e.g., curtains, furniture).

Additionally, for a model with an occupancy sensor option, be sure to install it where it will have an unobstructed view of the most typical traffic area (see the Application Guide for more information).

If replacing an existing thermostat, label wires as needed for reference when removing the existing thermostat.

1. Complete rough-in wiring at each location prior to thermostat installation. Cable insulation must meet local building codes.
2. Turn the hex screws in the bottom and top of the FlexStat **clockwise** until they clear the cover. (See Illustration 1.) Pull the cover away from the backplate (mounting base).
3. Route the cable through the backplate.
4. With the embossed UP toward the ceiling, fasten the backplate directly to a **vertical** 2 x 4 inch wall handy-box. (For horizontal or 4 x 4 applications, use the HMO-10000 wall mounting plate.)
5. Make the appropriate connections to the terminal blocks. (See the Connections and Wiring section.)
6. Place the FlexStat cover over the backplate **while being careful not to pinch or dislodge any wiring**. Back the hex screws (counterclockwise) out of the brackets until they engage the FlexStat cover and hold it in place.

CAUTION

To prevent mounting screw heads from touching the circuit board in the thermostat, use only the mounting screws supplied by KMC Controls. Using screws other than the type supplied may damage the FlexStat.

NOTE: This document is for 3 relay and 0 analog output BAC-1xx30 series only. See other installation guides for the proper FlexStat series.

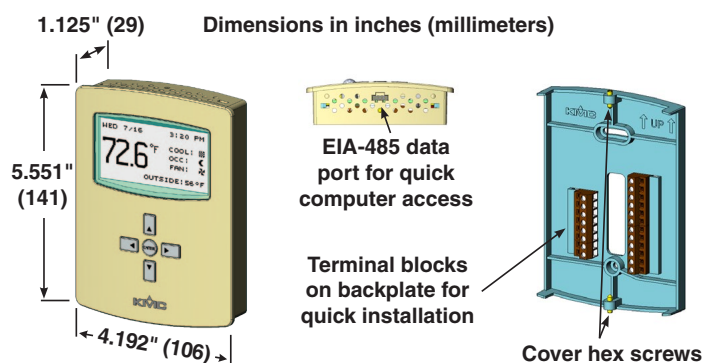


Illustration 1—Dimensions and Connections

Connections and Wiring

MS/TP Wiring

Connect the $-A$ terminals in parallel with all other $-A$ terminals on the network and the $+B$ terminals in parallel with all other $+B$ terminals. (See Illustrations 2 and 4.) Connect the shields of the cable (Belden cable #82760 or equivalent) together at each device. Use a wire nut or the S terminal in KMC BACnet controllers. (FlexStats, however, do not have an S terminal.) Connect the cable shield to a good earth ground **at one end only**.

NOTE: The S terminal in KMC controllers is provided as a connecting point for the shield. The terminal is not connected to the ground of the controller. When connecting to controllers from other manufacturers, verify the shield connection is not connected to the controller's ground.

For more information on principles and good practices when connecting an MS/TP network, see Planning BACnet Networks (Application Note AN0404A).

MS/TP EOL (End-Of-Line) Termination

The controllers/thermostats on the physical ends of the EIA-485 wiring segment must have end-of-line termination installed for proper network operation. (See Illustrations 2 and 3.) If a FlexStat is at the physical **end** of the MS/TP network line, set **both** the EOL termination switches (**1 and 2**) to **On** (to the **right**) on the back of the circuit board. If not on the end, ensure that both switches are Off (left).

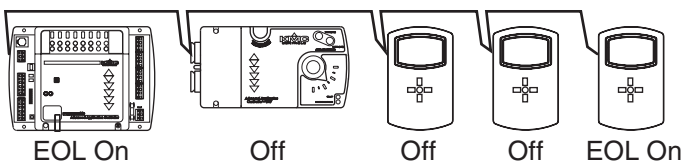


Illustration 2—MS/TP Network End-Of-Line Termination

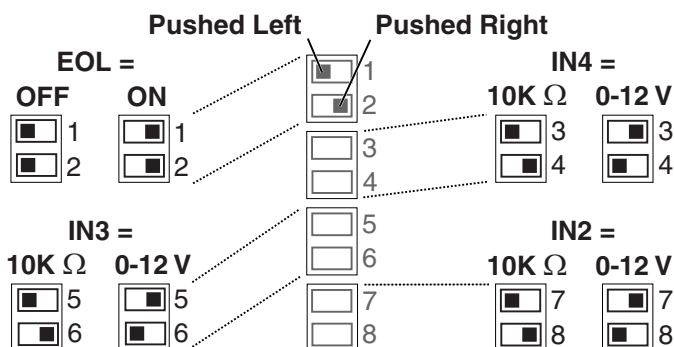


Illustration 3—EOL and Pull-Up Switch Resistor Positions

Input Connections

Passive input devices require pull-up resistors in the circuit. For **passive** input devices (e.g., switch contacts and Type III 10K ohm thermistors) on IN2 through IN4, set the pull-up switches on the back of the circuit board to the **10K** position. For **active** voltage devices, set the switches to the **0-12 VDC** position. (See Illustrations 3 and 4.)

NOTE: Unlike the EOL switch pairs (1-2), the **INPUT switch pairs (3-4, 5-6, and 7-8) must NOT have both switches set to the left or both set to the right**—if switch 3 is set to the left, for example, switch 4 must be set to the right (or vice versa). **ALL the input pull-up resistor switch pairs must be fully latched in either 10K Ohm or 0-12 VDC positions even if a switch pair has no input connected!** A single incorrect switch position may cause errors in multiple inputs.

NOTE: For more information on wiring for specific, selectable applications, see the **Applications section starting on page 4**. (These applications are the packaged programs selectable from the Advanced > Application menu in the BAC-1xx30C models.) See also the BAC-10000 Series Application Guide on www.kmcccontrols.com.

NOTE: FlexStat inputs do not support 1K ohm RTDs. To use a 4-20 current loop input or map analog inputs as binary values, see the BAC-10000 Series Application Guide.

NOTE: IN1 is the room temp. sensor AI1

NOTE: SC = Switched (Relay) Common

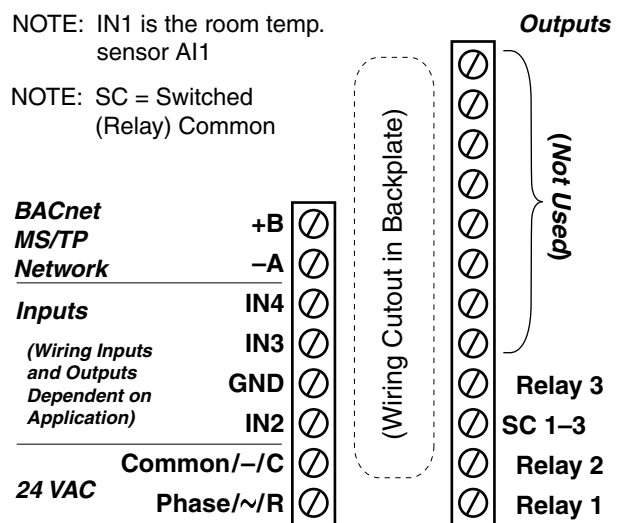


Illustration 4—Terminals and Connections

Output Connections

Connect the device under control between the desired relay terminal and the **SC (Switched Relay Common)** terminal (see Illustration 4). For the bank of three relays, there is one Switched (relay) Common connection (see Illustration 5).

Relays are NO, SPST (Form “A”). Max. output current is **1 A for individual RELAYS @ 24 VAC/VDC or a total of 1.5 A.**

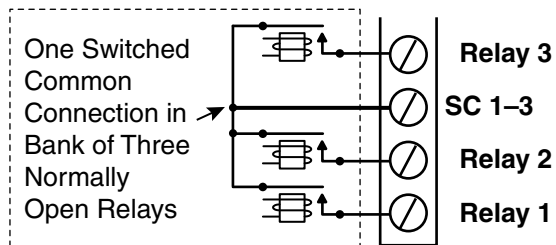


Illustration 5—Switched (Relay) Common and Relays

⚠ CAUTION

Relays are for Class-2 voltages (24 VAC) only. Do not connect line voltage to the relays!

NOTE: The output terminals 5 through 12 (above Relay 3) are not used in the BAC-1xx30C models. (The terminals are used in BAC-1xx36C and BAC-1xx63C models.)

Power Connection

The FlexStat requires an external, 24 volt, AC power source. Use a KMC Controls Class-2 transformer to supply power. Connect the transformer’s **neutral** lead to the 24 VAC **Common/-/C** terminal and the AC **phase** lead to the 24 VAC **Phase/~ /R** terminal. (See Illustration 5.) Power is applied to the FlexStat when the transformer is plugged in.

KMC Controls recommends powering only one controller/thermostat from each transformer. If installing a FlexStat in a system with other controllers/thermostats powered from a single transformer, however, phasing must be correct and the total power drawn from the transformer must not exceed its rating.

Configuration

To configure the FlexStat, navigate the menus and change settings by pressing a combination of buttons. Press the **Right** (Menu) button and then the:

- Enter button to select and/or exit value editing.
- Up/Down button to move among entries (up/down lines).
- Left/Right button to move among value fields (left/right spaces).
- Left button to return to the Home screen.

Humidity and motion sensor options are dependent on the FlexStat model. For operation, configuration, troubleshooting, and other information, see the BAC-10000 Series Operation Guide.

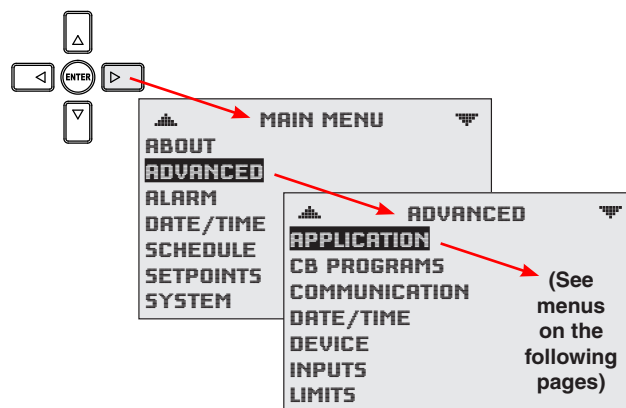


Illustration 6—Configuration Screens

NOTE: Applications on pages 4–7 are the packaged programs selectable from the Advanced > Application menu in the BAC-1xx30C models. The details are for BAC-1xx30C models only. Other FlexStat models have additional applications.

Applications

AHU (Air Handler Unit)—1 Heat and 1 Cool

APPLICATION

DEGREES SCALE: °F

APP: AIR HANDLER

OPT: MECH CLG

ADDITIONAL SETUP

ADDITIONAL SETUP

FAN

HUMIDITY

SENSORS

NOTE: Humidity and occupancy sensor options are dependent on the FlexStat model. In the BAC-10130C/11130C, dehumidification or economizer can be selected, but not both.

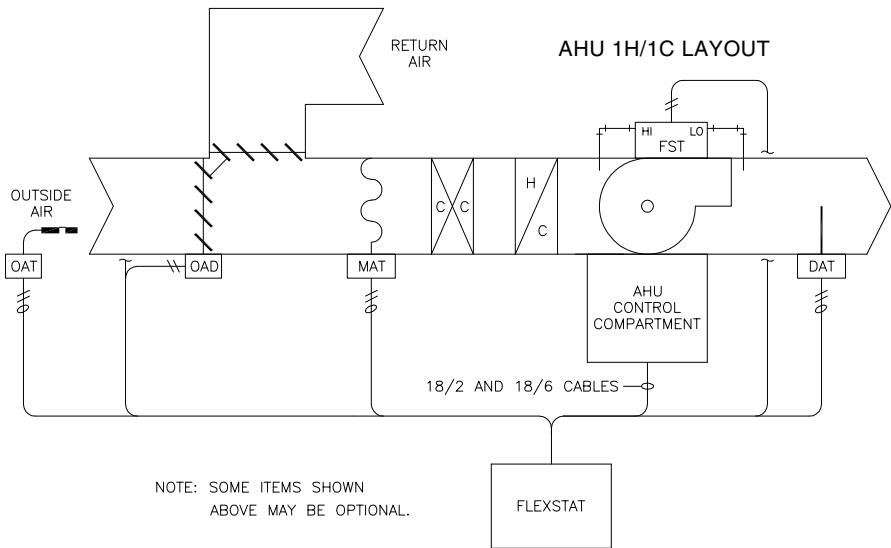
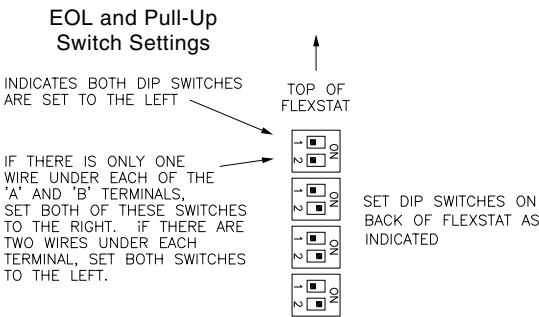
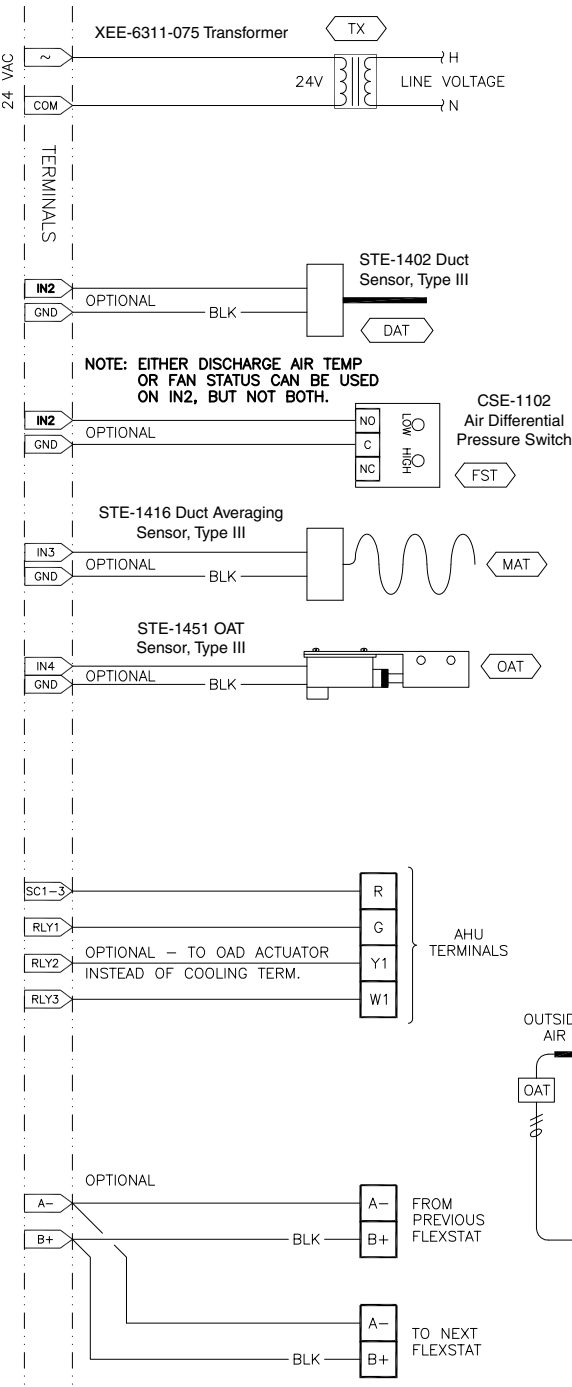
NOTE: Connections and menus reflect firmware version R1.3.0.4 or later.

Input Terminals	AHU Input Connections	BACnet Objects
IN4	Opt. Outside Air Temp. (OAT)*	AI4
IN3	Opt. Mixed Air Temp. (MAT)*	AI3
GND	Ground	
IN2	Optional FST or DAT**	AI2

*When using optional Outside Air Damper, must also have MAT/OAT inputs (typically 10K, Type III thermistors). Ensure pull-up resistor switch positions are set properly—see Illustration 3 on page 2.
**Fan Status (FST) or Discharge Air Temperature (DAT) is an optional, selectable input. Ensure pull-up resistor switch positions are set properly (10K position) for the relay, switch, or Type III thermistor.

Output Terminals	Typical Terminal Codes	AHU Output Connections	BACnet Objects
Relay 3	W1	Heat 1	BO3
SC 1–3	R	24 VAC (for relay terminals 1–3)	
Relay 2	Y1 (or OAD)	Cool 1 or Optional Outside Air Damper	BO2
Relay 1	G	Fan 1	BO1

NOTE: Although typical terminal code letters are shown, check the schematics of your unit for wiring details.



Cooling Unit—1 Cool

APPLICATION

DEGREES SCALE: °F

APP: CLG UNIT

ADDITIONAL SETUP

ADDITIONAL SETUP

FAN

SENSORS

NOTE: Humidity and occupancy sensor options are dependent on the FlexStat model.

CAUTION

Relays are for Class-2 voltages (24 VAC) only. Do not connect line voltage to the relays!

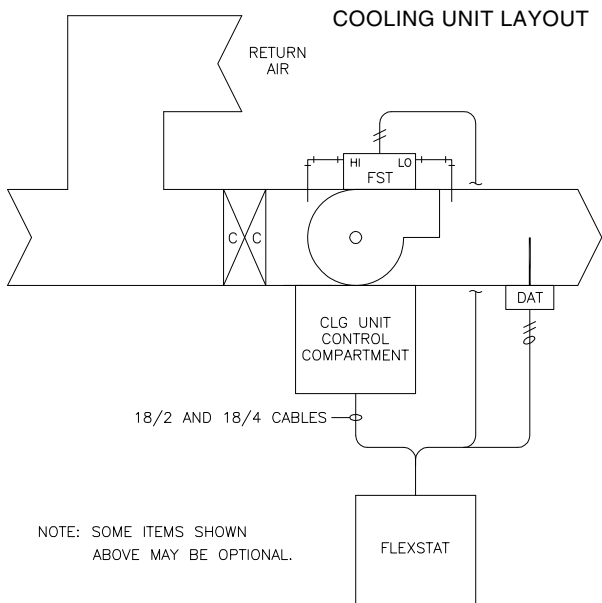
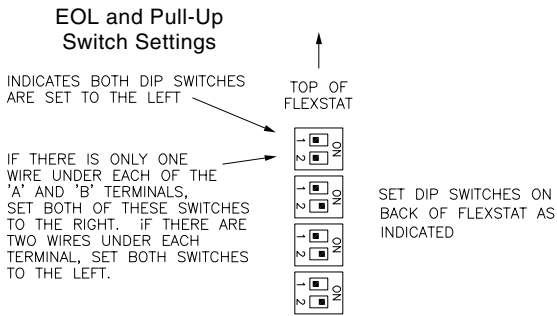
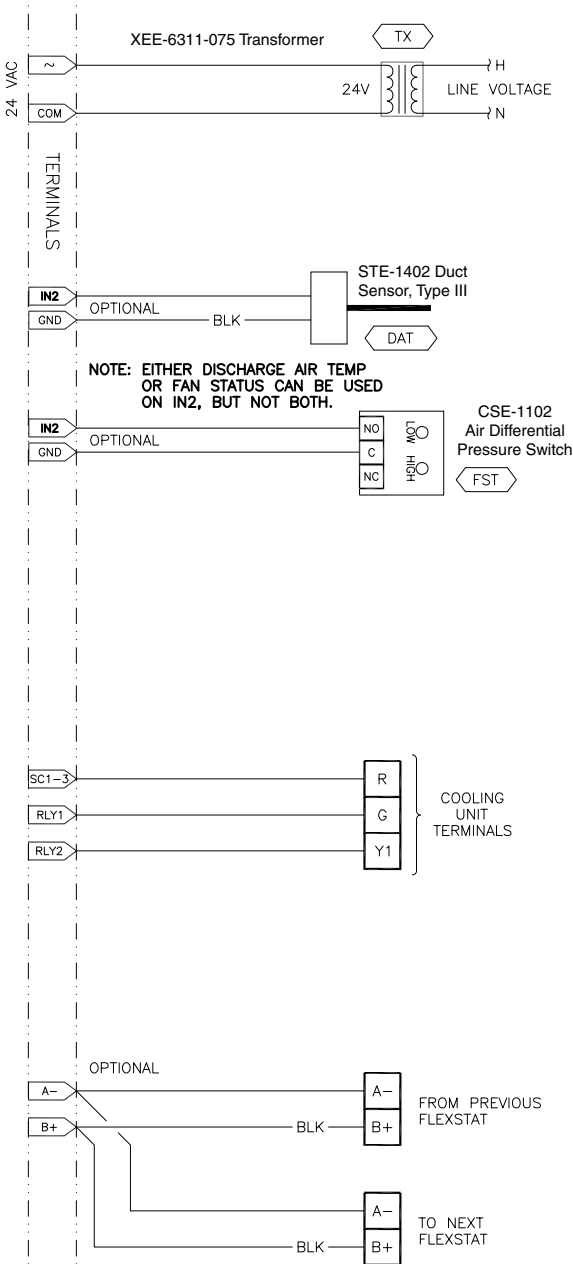
Input Terminals	Cooling Input Connections	BACnet Objects
IN4		A/4
IN3		A/3
GND	Ground	
IN2	Optional FST or DAT*	A/2

*Fan Status (FST) or Discharge Air Temperature (DAT) is an optional, selectable input. Ensure pull-up resistor switch positions are set properly (10K position) for the relay, switch, or Type III thermistor.

Output Terminals	Typical Terminal Codes	Cooling Output Connections	BACnet Objects
Relay 3			BO3
SC 1–3	R	24 VAC (for relay terminals 1–3)	
Relay 2	Y1	Cool 1	BO2
Relay 1	G	Fan	BO1

NOTE: Although typical terminal code letters are shown, check the schematics of your unit for wiring details.

NOTE: Connections and menus reflect firmware version R1.3.0.4 or later.



Heating Unit—1 Heat

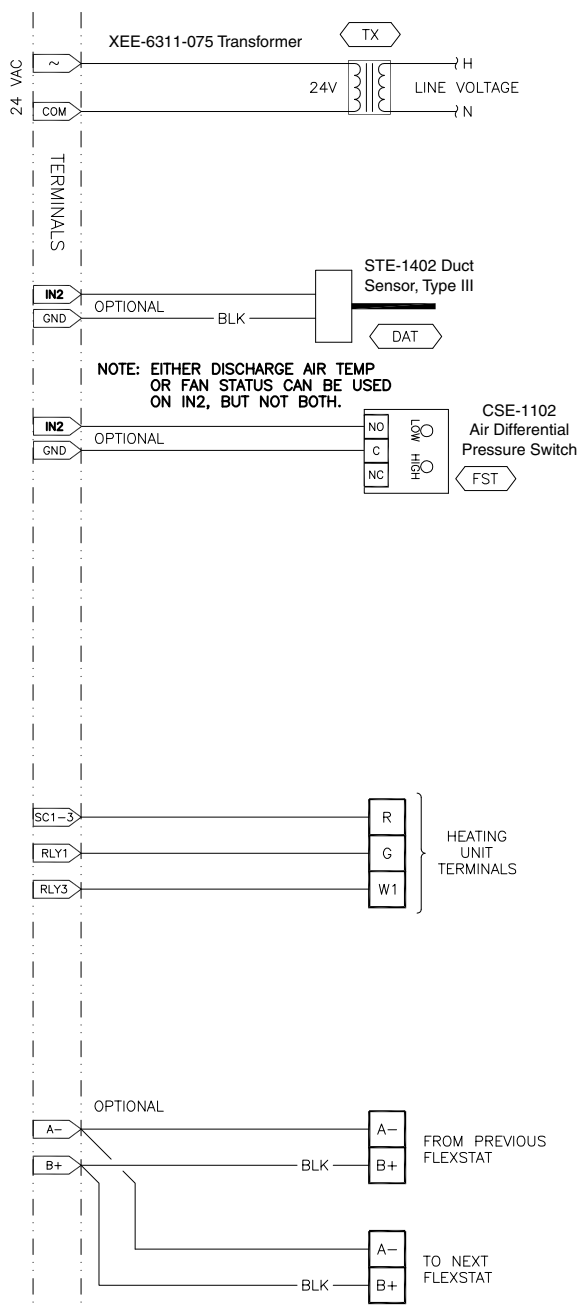
APPLICATION
DEGREES SCALE: °F
APP: HTG UNIT
ADDITIONAL SETUP

ADDITIONAL SETUP
FAN
SENSORS

NOTE: Humidity and occupancy sensor options are dependent on the FlexStat model.

⚠ CAUTION

Relays are for Class-2 voltages (24 VAC) only. Do not connect line voltage to the relays!



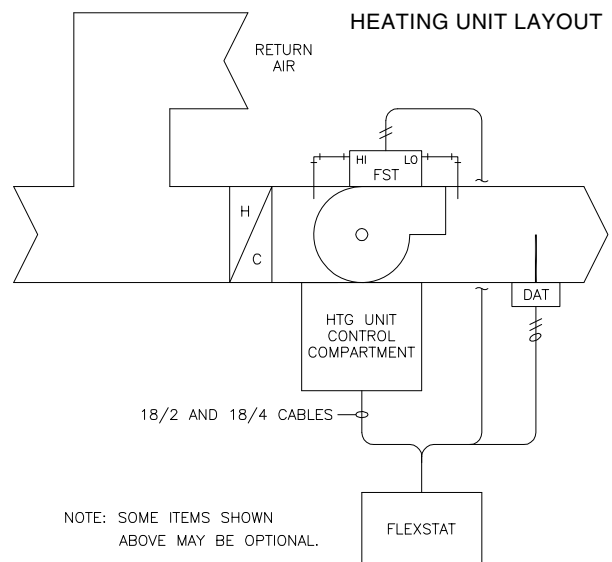
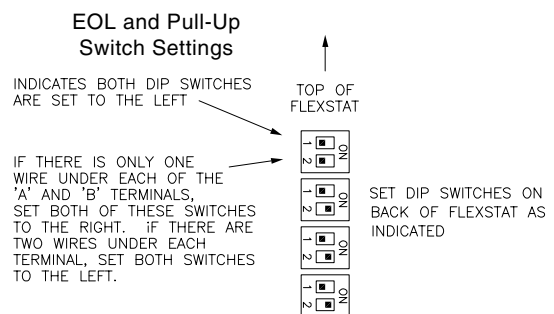
Input Terminals	Heating Input Connections	BACnet Objects
IN4		(A/I4)
IN3		(A/I3)
GND	Ground	
IN2	Optional FST or DAT*	AI2

*Fan Status (FST) or Discharge Air Temperature (DAT) is an optional, selectable input. Ensure pull-up resistor switch positions are set properly (10K position) for the relay, switch, or Type III thermistor.

Output Terminals	Typical Terminal Codes	Heating Output Connections	BACnet Objects
Relay 3	W1	Heat 1	BO3
SC 1-3	R	24 VAC (for relay terminals 1-3)	
Relay 2			(BO2)
Relay 1	G	Fan	BO1

NOTE: Although typical terminal code letters are shown, check the schematics of your unit for wiring details.

NOTE: Connections and menus reflect firmware version R1.3.0.4 or later.



HPU (Heat Pump Unit)—1 Compressor

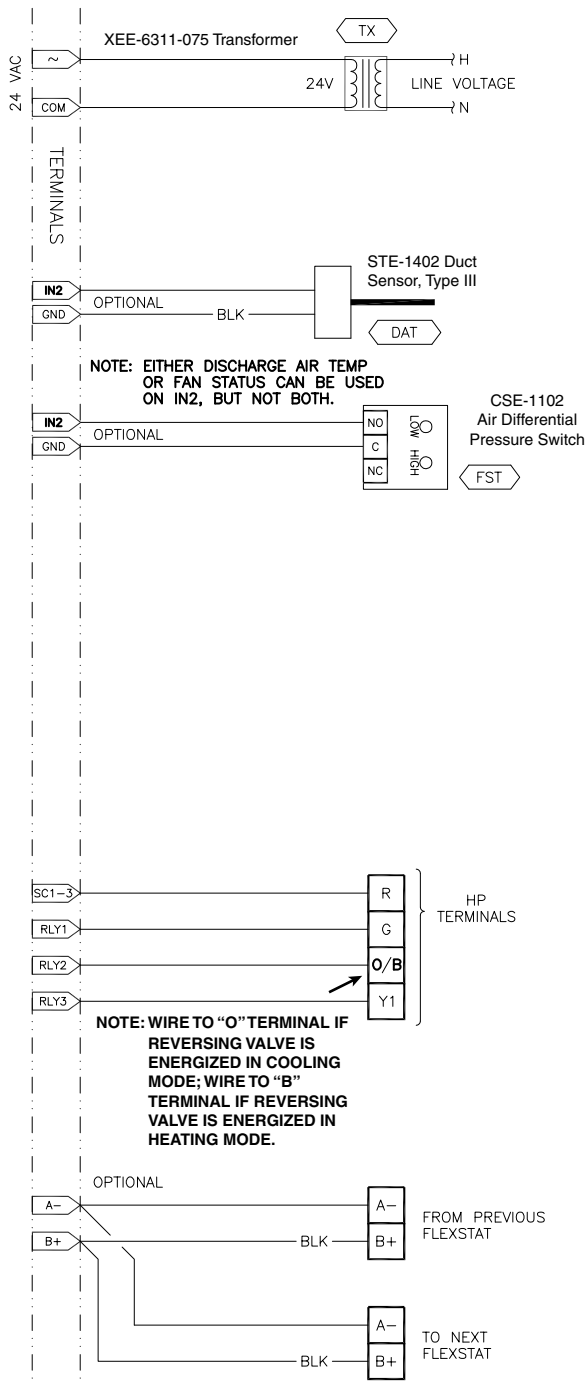
APPLICATION
DEGREES SCALE: °F
APP: HEAT PUMP
ADDITIONAL SETUP

ADDITIONAL SETUP
FAN
SENSORS
VALVE

NOTE: Humidity and occupancy sensor options are dependent on the FlexStat model.

CAUTION

Relays are for Class-2 voltages (24 VAC) only. Do not connect line voltage to the relays!



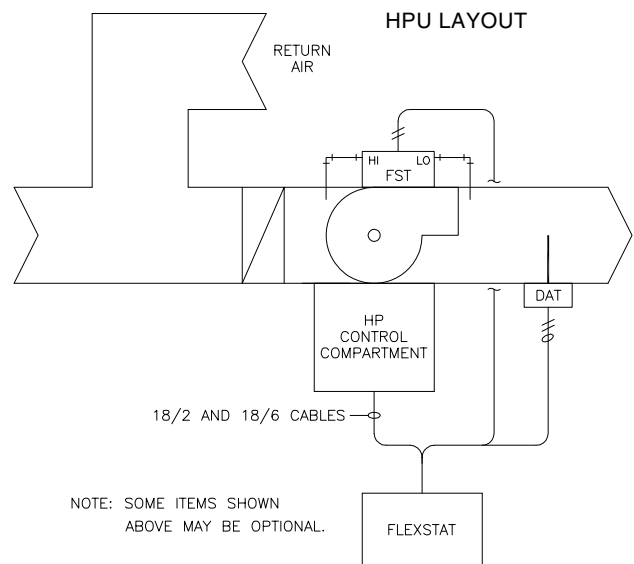
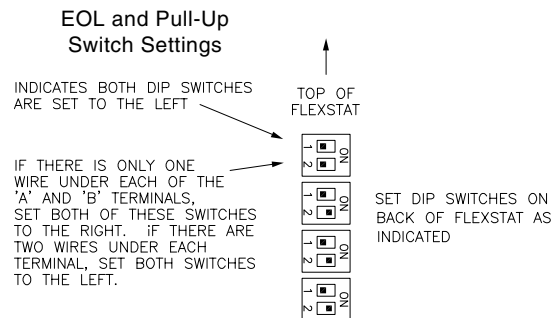
Input Terminals	HPU Input Connections	BACnet Objects
IN4		(A/4)
IN3		(A/3)
GND	Ground	
IN2	Optional FST or DAT*	A/2

*Fan Status (FST) or Discharge Air Temperature (DAT) is an optional, selectable input. Ensure pull-up resistor switch positions are set properly (10K position) for the relay, switch, or Type III thermistor.

Output Terminals	Typical Terminal Codes	HPU Output Connections	BACnet Objects
Relay 3	Y	Compressor	BO3
SC 1–3	R	24 VAC (for relay terminals 1–3)	
Relay 2	O/B	Reversing Valve (see O/B Note in schematic)	BO2
Relay 1	G	Fan	BO1

NOTE: Although typical terminal code letters are shown, check the schematics of your unit for wiring details.

NOTE: Connections and menus reflect firmware version R1.3.0.4 or later.



Specifications

Supply Voltage	24 VAC (+20%/–15%), Class 2
Supply Power	1 VA steady state, up to 3 VA at start-up
Outputs	Binary outputs (NO, SPST, Form "A" relays) carry 1 A maximum per relay or 1.5 A total @ 24 VAC/VDC
Inputs (IN2–IN4)	0–12 VDC, analog
Display	64 x 128 pixel dot matrix LCD
Case Material	Light almond or white flame-retardant plastic
Dimensions	5.551 x 4.192 x 1.125 inches (141 x 106 x 28.6 mm)
Weight	0.48 lbs. (218 g)
Sensors	Type II thermistor for temperature, CMOS for humidity
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)

NOTE: For more specifications, see the BAC-10000 Series Data Sheet.

Accessories

HMO-10000	Horizontal or 4 x 4 handy box wall mounting plate, light almond (see the Mounting section)
HMO-10000W	HMO-10000 in white
HPO-0044	Replacement cover hex screw
SP-001	Flat blade and hex end screwdriver
XEE-6000 Series	Transformers (see the Power Connection section and schematics)

NOTE: For more accessories and usage, see the BAC-10000 Series Operation Guide.

Maintenance

Remove dust as necessary from the holes in the top and bottom. Clean the display with soft, damp cloth and mild soap.

Additional Resources

The **latest support files** are always available on the KMC Controls web site (www.kmccontrols.com). To see all available files, you will need to log-in to the Partners site.

For operation, configuration, troubleshooting, upgrading, and other information, see the BAC-10000 Series Operation Guide.

For additional wiring, application, and programming information, see the BAC-10000 Series Application Guide.

For specifications, see the BAC-10000 Series Data Sheet.



Important Notices

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KMC Controls, Inc.
 19476 Industrial Drive
 New Paris, IN 46553
 574.831.5250
www.kmccontrols.com
info@kmccontrols.com