

# **Installation Guide (3/6 Outputs)**

### **Quick Start**

#### A CAUTION

This document is for 3-relay, 6-analog-output, 6-external-input BAC-12xx36/13xx36/14xx36 series only. These models are not compatible with the backplates of older BAC-10000 series FlexStats (with only 3 external outputs). If replacing an older 3-input FlexStat, replace the backplate as well. See other installation guides for other models.

NOTE: BAC-14xx36 series FlexStats were discontinued in August 2021.

To select and use a FlexStat in an application:

- Select the appropriate model for the intended application and options (see the BAC-12xxxx/13xxxx Series FlexStat Data Sheet).
- 2. Mount and wire the unit (see this Installation Guide).
- 3. Configure/program the unit (see the FlexStat Operation and Application Guides).
- 4. If necessary, troubleshoot any issues (see the FlexStat Operation Guide).
- 5. Operate the unit (see the FlexStat Operation 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 for the latest documents.

Models	Dimension	ns in Inc	ches (mm)
woders	Α	В	С
BAC-12xxxx (shown)	1.125 (29)	5.551	4.192 (106)
BAC-13xxxx/14xxxx	1.437 (36.5)	(141)	5.192 (132)

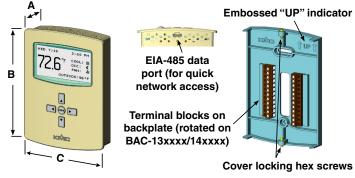


Illustration 1—Dimensions and Installation

# Mounting

For optimum temperature sensor performance, the FlexStat must be mounted on an interior 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, install it where it will have unobstructed view of the most typical traffic area. (See the FlexStat 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.

#### **A** CAUTION

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To prevent mounting screw heads from touching the circuit board in the thermostat, use only the mounting screws supplied by KMC Controls. Using other screws may damage the FlexStat. Do not turn screws in farther than necessary to remove the cover.

- 2. If the cover is locked on the backplate, turn the hex screws in the bottom and top of the FlexStat **CLOCKWISE** until they (just) clear the cover. (See Illustration 1.) Pull the cover away from the backplate (mounting base).
- 3. Route the wiring through the backplate.
- 4. With the embossed "UP" and arrows toward the ceiling, fasten the backplate to a wall handy-box. BAC-12xxxx models mount directly on vertical 2 x 4 inch boxes, but they require an HMO-10000/ HMO-10000W wall mounting plate for horizontal or 4 x 4 boxes. BAC-13xxxx/14xxxx models mount directly on any of those types of boxes.
- 5. Make the appropriate connections to the terminal blocks. (See *Connections and Wiring on page 2*.)
- 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.

# **Connections and Wiring**

### Wiring Considerations

- Because of the many connections (power, network, inputs, outputs, and their respective grounds or switched commons), be sure wiring is well planned before installation of conduit!
- Make sure that conduit for all wiring has adequate diameter for all necessary wiring. Using 1-inch conduit and junction boxes is recommended! Use external junction boxes above the ceiling or in another convenient location as needed to make connections that run to the FlexStat's junction box.
- To prevent excessive voltage drop, use a conductor size that is adequate for the wiring length!
   Allow plenty of "cushion" to allow for transient peaks during startup.
- Using multiple conductor wires for all inputs (e.g., 8 conductor) and outputs (e.g., 12 conductor) is recommended. Grounds for all the inputs can be combined on one wire.

#### **A** CAUTION

To avoid damage from ground loops and other communication issues in networked FlexStats, correct phasing on MS/TP network and power connections on ALL the networked controllers is critically important.

### **Network Wiring**

For **Ethernet or IP** communications, plug an Ethernet cable into the RJ-45 jack on the back of the FlexStat.

For MS/TP communications, 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 5.) 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 an EIA-485 wiring segment must have end-of-line termination installed for proper network operation. (See Illustrations 2 through 4.) If a FlexStat is at the physical **end** of the MS/TP network line, set **both** the EOL termination switches to **On** (to the **right/up**) on the back of the circuit board. If not on the end, ensure that both switches are Off (left/down).

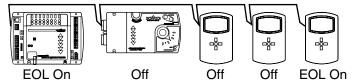


Illustration 2—MS/TP Network End-Of-Line Termination

#### **Input Pull-Up Switches**

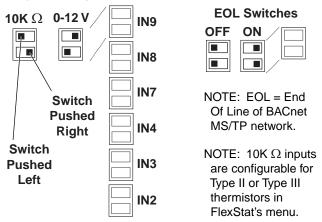


Illustration 3—BAC-12xxxx EOL/Pull-Up Switch Positions

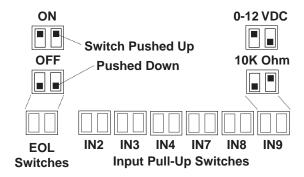


Illustration 4—BAC-13xxxx/14xxxx Switch Positions

#### **A** CAUTION

This document is for 3-relay, 6-analog-output, 6-external-input BAC-12xx36/13xx36/14xx36 series only. These models are not compatible with the backplates of older BAC-10000 series FlexStats (with only 3 external outputs). If replacing an older 3-input FlexStat, replace the backplate as well. See other installation guides for other models.

NOTE: BAC-14xx36 series FlexStats were discontinued in August 2021.

	C = Switched Common			I	P/Ethernet Network
	N1 and IN5–6 are d for internal sen	-	;		(Optional)  Outputs
Inputs	IN9	0		Ø	Analog 9
(Minima io	IN8	Ø		$\bigcirc$	GND 7-9
(Wiring is dependent		Ø	te)	0	Analog 8
application	IN7	Ø	pla	0	Analog 7
MS/TP	+B	Ø	ac	0	Analog 6
Network	-A	Ø	B	0	GND 4-6
Inputs	IN4	Ø	Wiring Cutout in Backplate	Ø	Analog 5
•	IN3	Ø	Cutc	Ø	Analog 4
	GND	Ø	) მ(	Ø	Relay 3
	IN2	Ø	Virir	$\bigcirc$	SC 1–3
	Common/-/C	Ø		$\bigcirc$	Relay 2
24 VAC	Dhood /s//D	a	``'	$\Box$	Polav 1

Illustration 5—(BAC-12xx36) Terminals and Connections

Phase/~/R

NOTE: On BAC-13xxxx/14xxxx models, terminals are rotated 90° CCW.

### Input Connections

Passive input devices require pull-up resistors in the circuit. For **passive** input devices (e.g., switch contacts and 10K ohm thermistors) on IN2 through IN4 and IN7 through IN9, 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 through 5.)

NOTE: Unlike the EOL switch pairs, the INPUT switch pairs must NOT have both switches set to the same direction—if one of the pair's switches is set to the left, for example, the other 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 position even if a switch pair has no input connected! A single incorrect switch position may cause errors in multiple inputs.

NOTE: **Type II or III 10K ohm thermistors can be selected by changing the menu setting** in Advanced > Inputs > Input # > Sensor (see *Configuration on page 4*). If a **remote space temperature sensor** is connected to AI7, space temperature can be configured for onboard, remote, averaging of the two, the lowest reading, or the highest reading.

NOTE: FlexStat inputs do not support 1K ohm RTDs.

NOTE: To use a 4–20 current loop input or map analog inputs as binary values, see the

FlexStat Application Guide.

NOTE: To use a remote SAE-10xx CO<sub>2</sub> sensor, see

the FlexStat Operation Guide.

NOTE: For more information on wiring specific

applications (AHU and FCU), see *Applications on page 5*. (These applications are the packaged programs selectable from the Advanced > Application menu in the BAC-1xxx36 models.) See also the **FlexStat** 

Application Guide.

### **A** CAUTION

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

#### **A** CAUTION

3

Relay 1

Do not mistakenly connect 24 VAC to an analog output ground. This is not the same as a relay's switched common. See the backplate's terminal label for the correct terminal.

### **Output Connections**

Connect the device under control between the desired output terminal and the related SC (Switched Common for relays) or GND (Ground for analog outputs) terminal. (See Illustration 5). For the bank of three relays, there is one Switched (relay) Common connection (in place of the GND terminal used with analog outputs). (See Illustration 6.) For the relay circuit, the phase side of the AC should be connected to the SC terminal.

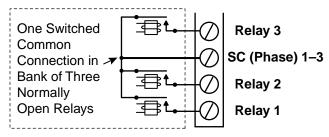


Illustration 6—Switched (Relay) Common and Relays

Do not attach a device that draws current exceeding the FlexStat's output capacity:

- Maximum output current for individual ANA-LOG outputs (4–9) is 20 mA @ 12 VDC (each).
- Max. output current is 1 A for individual RELAYS
   @ 24 VAC/VDC or a total of 1.5 A for relays 1–3.

For example, (discontinued) KMC REE-3211 relays would exceed the FlexStat's analog output capacity, but they can be used with the FlexStat's internal relays 1–3 as shown in the following applications pages. (Use a Core Components CVR11C-0/LD96200 in the REE-3211's place in those applications.)

FlexStat relays 1–3 are **NO**, **SPST** (**Form "A"**). (To emulate binary outputs with the analog outputs, set the output voltage to be either 0 or 12 VDC in Control Basic.)

#### **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 powered.

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.

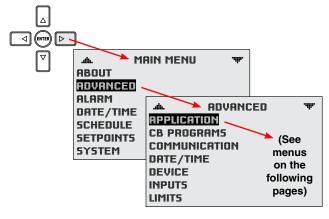


Illustration 7—Configuration Screens

NOTE: Applications on pages 5–11 are the packaged programs selectable from the Advanced > Application menu in the BAC-1xxx36 (only) models. Other FlexStat models have other applications.

NOTE: Humidity, motion, and CO<sub>2</sub> sensor options in menus are dependent on the FlexStat model and selected application.

For detailed configuration, operation, troubleshooting, and other information, see the FlexStat Operation Guide.

For additional wiring, customization, programming, and application information, see the FlexStat Application Guide.

# **Applications Notes and Cautions**

### **A** CAUTION

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

Do not mistakenly connect 24 VAC to an analog output ground.

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

NOTE: These applications are for **3 relay** and **6 analog** output BAC-12xx36/13xx36/14xx36 series only. See other installation guides for other models.

NOTE: CO<sub>2</sub>, humidity, and motion sensor options are dependent on FlexStat model.

NOTE: For Bill of Materials listings of the various accessories shown in the sample diagrams, see the FlexStat Application Guide.

NOTE: Since the KMC REE-3211 is discontinued, use Core Components CVR11C-0/LD96200 in its place. Do not use either with analog outputs! See *Output Connections on page 3*.

## **Maintenance**

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

To maintain maximum sensitivity of the built-in motion sensor, occasionally wipe dust or dirt off the lens—but do not use any fluid on the sensor.

# **Applications**

# FCU (Fan Coil Unit)—2 Pipe, Modulating

APPLICATION
DEGREES SCALE: °F
11PP: FAN COIL
OPT: 2-PIPE
ADDITIONAL SETUP

IN3 GND

IN2

GND

RLY1

RLY2

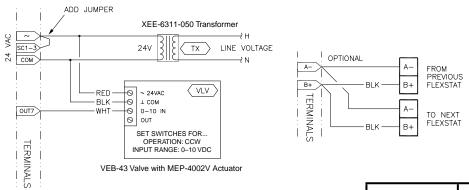
RI Y3

OPTIONAL

BLK

NOTE:

ADDITIONAL SETUP
FAN
OPTIMUM START
SENSORS
VALVE



STE-1454 Strap-On Temp. Sensor, Type III

In firmware earlier than R2.1.0.18, an option for a DAT on IN2 was available for a built-in trend log. For later firmware, use KMC Connect or TotalControl to create a custom trend if this is desired.

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С

W-TMP

Output Terminals	FCU Output Connections	BACnet Objects
Analog 9		A09
GND	Ground (for analog output terminals 7–9)	
Analog 8		A08
Analog 7	Valve (VLV)	AO7
Analog 6		A06
GND		
Analog 5		A05
Analog 4		A04
Relay 3	Fan 3	BO3
SC 1–3	24 VAC (for relay terminals 1-3)	
Relay 2	Fan 2	BO2
Relay 1	Fan 1	BO1

Input Terminals	FCU Input Connections	BACnet Objects
IN9	Opt. Remote CO <sub>2</sub> Sensor*	AI9
IN8		Al8
IN7	Opt. Remote Temp. Sensor*	AI7
IN4		Al4
IN3	Supply Water Temp. (W-TMP)**	Al3
GND	Ground	
IN2	Optional FST*	Al2

\*Fan Status (FST) and (not shown on the diagram) remote temp./CO<sub>2</sub> sensors are optional inputs. Set pull-up resistor switch positions appropriately (see the Input Connections section).
\*Input for Supply Water Temp is typically a 10K,Type III thermistor.

FST UNIT FCU FAN OFF DISCONNECT SWITCH (BY OTHERS) OLOW CUT CUT CUT OHIGH LINE VOLTAGE Nλ СОМ O- WHT/RED -BRN-O--com-pur-O-O-wht/pur-

NC −GRY−O

R1

-com-pur-C

NC -GRY-O

R2

-com-pur-O

NC -GRY-O

R3

REE-3211 or CVR11C-0/LD96200 Multi-Voltage Relays

O— WHT/RED —

O-WHT/RED-

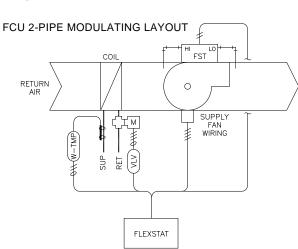
O-WHT/GRY

CAP OFF ALL UNUSED WIRES

CAP OFF ALL UNUSED WIRES CSE-1102

Air Differential Pressure Switch

NOTE: Do not use REE-3211/CVR11C-0/ LD96200 relays with analog outputs! See Output Connections on page 3.



### FCU—4 Pipe, Modulating

APPLICATION
DEGREES SCALE: °F
APP. FAN COIL
OPT: 4-PIPE
ADDITIONAL SETUP

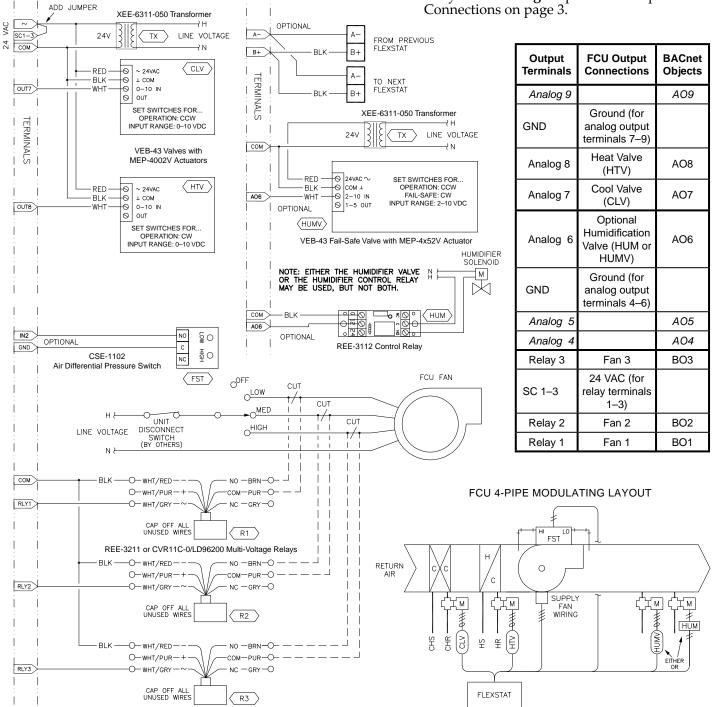
ADDITIONAL SETUP
FAN
HUMIDITY
OPTIMUM START
SENSORS
VALVE

NOTE: In firmware earlier than R2.1.0.18, an option for a DAT on IN2 was available for a built-in trend log. For later firmware, use KMC Connect or TotalControl to create a custom trend if this is desired.

Input Terminals	FCU Input Connections	BACnet Objects
IN9	Opt. Remote CO <sub>2</sub> Sensor*	AI9
IN8		Al8
IN7	Opt. Remote Temp. Sensor*	AI7
IN4		Al4
IN3		Al3
GND	Ground	
IN2	Optional Fan Status (FST)*	Al2

\*Fan Status (FST) and (not shown on the diagram) remote temp./CO<sub>2</sub> sensors are optional inputs. Set pull-up resistor switch positions appropriately (see the Input Connections section).

NOTE: Do not use REE-3211/CVR11C-0/LD96200 relays with **analog** outputs! See Output Connections on page 3.



**APPLICATION** DEGREES SCALE: °F RPP: AIR HANDLER OPT: 1H/1C ADDITIONAL SETUP

**ADDITIONAL SETUP** DAMPER FRN HUMIDITY OPTIMUM START **SENSORS** 

NOTE: Do not use REE-3211/CVR11C-0/LD96200

relays with analog outputs! See Output

Connections on page 3.

NOTE: For MAT sensor use with firmware earlier than R2.1.0.18, see the FlexStat Economizer Change of MAT to DAT Service Bulletin available on the KMC Partners web site.

Input Terminals	AHU Input Connections	BACnet Objects	
IN9 Opt. Remote CO <sub>2</sub> Sensor* A			
IN8	Al8		
IN7	Opt. Remote Temp. Sensor*	AI7	
IN4 Opt. Outside Air Temp. (OAT)** Al4			
IN3	AI3		
GND			
IN2 Optional Fan Status (FST)* Al2			
*Fan Status (FST), Discharge Air Temperature (DAT), and (not shown on the diagram) remote temp./CO <sub>2</sub> sensors are optional inputs. Set			

pull-up resistor switch positions appropriately (see the Input Connections section).

ir Damper, DAT/OAT inputs must

Output Terminals  AHU Output Conner Terminals  AHU Output Conner Terminals  Analog 9 Optional Outside Air Damper GND Ground (for analog output:  Analog 8 Analog 8  Analog 8  Analog 7  Analog 6 Optional Humidification M. HUMN)  BILK 9 COM BILK 9 COM FAILSAFE in Direction Actuator Robustor FAILSAFE in Direction Actuator Robustor FAILSAFE in Direction Actuator Robustor FAILSAFE in Direction Actuator FAI		available on the Rivic Lattriers wet	^^V	When using the also be connec	e optional Outside Air Damper, DAT/0 ited.
Analog 9 Optional Outside Air Damper  BLK S COM L  WHT O 1-5 OUT  BLK SCE IN INTEGRATION Copposite of Fail-Safe Form Cotates to Open Return Damper Rotates to Close Rotates to Close Outside Air Damper INPUT RANGE: 2-10 VDC  SET SWITCHES FOR  OAD  SET SWITCHES FOR  OAD  SET SWITCHES FOR  OAD  SET SWITCHES FOR  OAD  OPTIONAL  BLK OCOM L  Rotates to Close Outside Air Damper INPUT RANGE: 2-10 VDC  Analog 6 Optional Humidification Manalog output:  Analog 7  Analog 6 Optional Humidification Manalog output:  Analog 7  Analog 6 Optional Humidification Manalog output:  Analog 7  Analog 7  Analog 6 Optional Manalog output:  Analog 6 Optional Humidification Manalog output:  Analog 7  Analog 7  Analog 6 Optional Outside Air Damper Inputs:  SET SWITCHES FOR  For OAD  OPTIONAL  BLK  OPTIONAL  OPTIONAL  BLK  OAT  OPTIONAL  OP	24 VAC	24V			AHU Output Connections
GND Ground (for analog output:  Analog 8  Analog 7  Analog 8  Analog 7  Analog 6  Optional Humidification Visualization Copensite of Fail-Safe Fai		RED O 24VAC ~ SET SWITCHES FOR		Analog 9	Optional Outside Air Damper (OAD
Rotates to Open Return Damper INPUT RANGE: 2-10 VDC  MEP-4552 or MEP-7x52 Actuators  OPTIONAL  RED S 24VAC SET SWITCHES FOR  BLK S (COM. 1) OPTIONAL  PRED S 24VAC SET SWITCHES FOR  OPERATION: Opposite of Fail-Safe FAIL-SAFE: in Direction Actuation Rotates to Close Outside Air Damper INPUT RANGE: 2-10 VDC  STE-1402 Duct Sensor, Type III  NS OPTIONAL  BLK  OPTIONAL  OPTIONAL  OPTIONAL  OPTIONAL  OPTIONAL  OPTIONAL  OPTIONAL  OPTIONAL  STE-1451 OAT Sensor, Type III  OPTIONAL  OPTIONAL  RED S 24VAC (For relay term Rotates to Close Outside Air Damper in the last page for network, humidification, and fan speed options.  NS OPTIONAL  OPTIONAL  STE-1451 OAT Sensor, Type III  OPTIONAL  NS OPTIONAL  STE-1451 OAT Sensor, Type III  OPTIONAL  NA OPTIONAL  NA OPTIONAL  STE-1451 OAT Sensor, Type III  OUTSIDE  Analog 8  Analog 7  Analog 6  Optional Humidification W. HUMV)  Analog 5  Analog 4  Optional Fan Sp  Relay 3  Relay 3  Relay 3  Relay 2  Cool 1 (Y1)  Relay 1  Fan 1 (G)  *If optional Outside Air Damper is used, no inputs.  NA HU 1H/1C LA  ARR  AHU 1H/1C LA  ARR  AHU 1H/1C LA  ON OPTIONAL  NA OPTIO	A09	WHT OPERATION: Opposite of Fail-Safe		GND	Ground (for analog output termina
Analog 6 Optional Humidification Visually Set Switches For  Set Switches For  OPTIONAL  SET Switches For  OPTIONAL  SET Switches For  OPTIONAL  See also the AHU—Additional Options section on the last page for network, humidification, and fan speed options.  OPTIONAL  OPTIONAL  OPTIONAL  SEE Also the AHU—Additional Options section on the last page for network, humidification, and fan speed options.  OPTIONAL  OPTIONAL  SEE Also the AHU—Additional Options section on the last page for network, humidification, and fan speed options.  OPTIONAL  SEE Also the AHU—Additional Options decide Air Damper is used, no inputs.  OPTIONAL  STE-1451 OAT Sensor, Type III  H  H  OPTIONAL  STE-1451 OAT Sensor, Type III  OOAT  OAT  OAT  OAT  OAT  OAT  OAT	: : 	Rotates to <b>Open Return</b> Damper		Analog 8	
Analog 6 Optional Humidification Model of Fall-Safe Fall	: : 	MEP-4552 or MEP-7x52 Actuators OPTIONAL		Analog 7	
STE-1402 Duct Sensor, Type III  N3 OPTIONAL OND	TERMIN	RED © 24VAC ↑ SET SWITCHES FOR		Analog 6	Optional Humidification Valve (HI HUMV)
Rotates to Close Outside Air Damper INPUT RANGE: 2-10 VDC  Sensor, Type III  N3  OPTIONAL  BLK  DAT  See also the AHU—Additional Options section on the last page for network, humidification, and fan speed options.  Pressure Switch  OPTIONAL  SEE also the AHU—Additional Options section on the last page for network, humidification, and fan speed options.  Pressure Switch  STE-1451 OAT Sensor, Type III  NO  OPTIONAL  SEE also the AHU—Additional Options section on the last page for network, humidification, and fan speed options.  Pressure Switch  STE-1451 OAT Sensor, Type III  NO  OPTIONAL  BLK  AHU 1H/1C LA  AHU 1H/1C LA  AR  AHU 1H/1C LA  ON  OPTIONAL  INA OPTIONAL  BLK  ON  OPTIONAL  BLK  ON  OPTIONAL  AR  AHU 1H/1C LA  AR  ON  OPTIONAL  OPTIONAL  AR  OPTIONAL  OPTIONAL  ON  OPTIONAL  AR  AHU 1H/1C LA  AR  ON  OPTIONAL  ON  ON  ON  ON  ON  ON  ON  ON  ON  O	- IN	WHT — 9 2–10 IN OPERATION: Opposite of Fail-Safe		GND	Ground (for analog output termina
SIE-1402 Duct Sensor, Type III  N3 OPTIONAL  See also the AHU—Additional Options section on the last page for network, humidification, Pressure Switch  OPTIONAL  CSE-1102 Air Differential PST  CSE-1102 Air Differential PST  NC  OPTIONAL  SEE also the AHU—Additional Options section on the last page for network, humidification, and fan speed options.  Relay 2  Relay 1  Fan 1 (G)  *If optional Outside Air Damper is used, n inputs.  RETURN  AHU 1H/1C LA  AHU 1H/1C LA  OND  STE-1451 OAT Sensor, Type III  AHU 1H/1C LA  OND  STE-1451 OAT Sensor, Type III  OPTIONAL  BLK  OND  OPTIONAL  BLK  OND  OAT  AHU 1H/1C LA  AHU 1H/1C LA  OND  OAT  OAT  OAT  AHU 1H/1C LA  OND  OAT  OAT  OAT  OAT  OAT  OAT  OAT  OA		Rotates to Close Outside Air Damper		Analog 5	
Sensor, Type III  OPTIONAL BLK  DAT  See also the AHU—Additional Options section on the last page for network, humidification, and fan speed options.  CSE-1102 Air Differential Pressure Switch  CSE-1451 OAT Sensor, Type III  Relay 3  Heat 1 (W1) SC 1–3  24 VAC (for relay term Relay 2  Cool 1 (Y1) Relay 1  Fan 1 (G) *If optional Outside Air Damper is used, n inputs.  RETURN AHU 1H/1C LA  AIR		STF-1402 Duct		Analog 4	Optional Fan Speed
See also the AHU—Additional Options section on the last page for network, humidification, and fan speed options.  CSE-1102 Air Differential FST NC TXI LINE VOLTAGE  OPTIONAL  See also the AHU—Additional Options section on the last page for network, humidification, and fan speed options.  Relay 2  Relay 1  Fan 1 (G)  *If optional Outside Air Damper is used, n inputs.  AHU 1H/1C LA  RETURN  AHU 1H/1C LA  OPTIONAL  STE-1451 OAT Sensor, Type III  OUTSIDE  ARETURN  AHU 1H/1C LA	IN3	Sensor, Type III		Relay 3	Heat 1 (W1)
AHU 1H/1C LA  AHU 1H/1C LA  Relay 2 Cool 1 (Y1)  Relay 1 Fan 1 (G)  *If optional Outside Air Damper is used, n inputs.  *I		BLK — I —		SC 1–3	24 VAC (for relay terminals 1-
OPTIONAL  CSE-1102 Air Differential Pressure Switch  STE-1451 OAT Sensor, Type III  TX1  LINE VOLTAGE  OUTSIDE  for network, humidification, and fan speed options.  *If optional Outside Air Damper is used, n inputs.  *Relay 1  *If optional Outside Air Damper is used, n inputs.  *Relay 1  *If optional Outside Air Damper is used, n inputs.  *AHU 1H/1C LA  AHU 1H/1C LA  AIR  OUTSIDE  ARETURN  AHU 1H/1C LA  AIR  OUTSIDE  ARETURN  AHU 1H/1C LA  OUTSIDE  AIR  OUTSIDE  OUTSIDE  ARETURN  AHU 1H/1C LA  OUTSIDE  OUTSIDE  ARETURN  AHU 1H/1C LA  OUTSIDE  OUTSIDE  OUTSIDE	ii		Options section	Relay 2	Cool 1 (Y1)
OPTIONAL  CSE-1102 Air Differential FST  NC TO OAT  AHU 1H/1C LA  RETURN AHU 1H/1C LA  STE-1451 OAT Sensor, Type III  TX1 LINE VOLTAGE  OUTSIDE  ARETURN AHU 1H/1C LA  RETURN AHR TD  OUTSIDE  ARETURN AHR TD  OUTSIDE  OUTSIDE  ARETURN AHR TD  OUTSIDE  OUTSIDE  OUTSIDE			for network,	Relay 1	Fan 1 (G)
Pressure Switch  Pressure Switch  RETURN  AHU 1H/1C LA  STE-1451 OAT Sensor, Type III  AHU 1H/1C LA  STE-1451 OAT Sensor, Type III  OUTSIDE  AIR  OUTSIDE  AIR  OUTSIDE  AIR	GND	CSE-1102 Air Differential	and fan speed		utside Air Damper is used, must als
OAT	SC1-3	OPTIONAL  BLK  STE-1451 OAT Sensor, Type III   24V    TX1	SU  BRN-O AUTO OFFO  OFFO  OFFO	AIF	AHU CONTROLS  # OF COND. DEPENDS ON UNIT CONFIG.

R1

CAP OFF ALL UNUSED WIRES

Output Terminals	AHU Output Connections	BACnet Objects		
Analog 9	Optional Outside Air Damper (OAD/RTD)*	AO9		
GND	Ground (for analog output terminals 7–9)			
Analog 8		A08		
Analog 7		A07		
Analog 6	Optional Humidification Valve (HUM or HUMV)	AO6		
GND	Ground (for analog output terminals 4–6)			
Analog 5		A05		
Analog 4	Optional Fan Speed	AO4		
Relay 3	Heat 1 (W1)	BO3		
SC 1–3	24 VAC (for relay terminals 1–3)			
Relay 2	Cool 1 (Y1)	BO2		
Relay 1	Fan 1 (G)	BO1		
*If optional C	*If optional Outside Air Damper is used, must also have DAT/OAT			

NOTE: IF NO 'G' TERMINAL IS PRESENT, CONNECT RLY1 TO OPTIONAL RELAY SIGNAL AND RELAY '-' TO AHU 'C' TERMINAL (TRANSFORMER GND).

### AHU—1 or 2 Heat and Modulating Cool

**APPLICATION** DEGREES SCALE: °F APP. AIR HANDLER OPT: 2H/MOD C **RDDITIONAL SETUP** 

ADDITIONAL SETUP DAMPER FAN HUMIDITY OPTIMUM START **SENSORS** STAGING

Do not use REE-3211/CVR11C-0/LD96200 NOTE:

relays with analog outputs! See Output

Connections on page 3.

XEE-6311-075 or XEE-6311-100 Transformer

NOTE: For MAT sensor use with firmware earlier than R2.1.0.18, see the FlexStat Economizer Change of MAT to DAT Service Bulletin available on the KMC Partners web site.

Input Terminals	AHU Input Connections	BACnet Objects
IN9	Opt. Remote CO <sub>2</sub> Sensor*	AI9
IN8		Al8
IN7	Opt. Remote Temp. Sensor*	AI7
IN4	Opt. Outside Air Temp. (OAT)**	Al4
IN3	Opt. Discharge Air Temp. (DAT)**	AI3
GND	Ground	
IN2	Optional FST*	Al2

\*Fan Status (FST), Discharge Air Temperature (DAT), and (not shown on the diagram) remote temp./CO2 sensors are optional inputs. Set pull-up resistor switch positions appropriately (see the Input Connections section).

When using the optional Outside Air Damper, DAT/OAT inputs must also be connected.

XEE-6311-075 or XEE-6311-100 Transformer  H  24V  LINE VOLTAGE  N	Output Terminals	AHU Output Connections	BACnet Objects
	Analog 9	Optional Outside Air Damper (OAD/RTD)*	AO9
RED O 24VAC ~ SET SWITCHES FOR	GND	Ground (for analog output terminals 7–9)	
A09 WHT S 2-10 IN OPERATION: Opposite of Fail-Safe FAIL-SAFE: In Direction Actuator	Analog 8		A08
: :       Rotates to <b>Open Return</b> Damper	Analog 7	Cooling Valve (CLV)	A07
MEP-4552 or MEP-7x52 Actuators	Analog 6	Optional Humidifier Valve (HUM or HUMV)	AO6
RED S 24VAC SET SWITCHES FOR  BLK S COM 1 OPERATION: Opposite of Fail-Safe  ON S T SAIL-SAFE: In Direction Actuator	GND	Ground (for analog output terminals 4–6)	
BLK S COM 1 SET SWITCHES FOR    Description   Set Switches For   Description   Set Switches For   Description   Set Switches For   Set Switches For   Description   Set Switches For   Set Switches For   Description   Set Switches For   Set S	Analog 5		A05
OPTIONAL SAFE: In Direction Actuator Rotates to Close Outside Air Damper INPUT RANGE: 2-10 VDC	Analog 4	Optional Fan Speed	AO4
	Relay 3	Optional Heat 2 (W2)	ВО3
STE-1402 Duct Sensor, Type III OPTIONAL BLK	SC 1–3	24 VAC (for relay terminals 1–3)	
DAT	Relay 2	Heat 1 (W1)	BO2
See also the AHU—Additional	Relay 1	Fan 1 (G)	BO1
Options section on the last page for network, humidification, and fan speed options.	*If optional (inputs.	Outside Air Damper is used, must also have D	AT/OAT
STE-1451  OPTIONAL BLK STE-1451 OAT Sensor, Type III	RETURN	AHU 1 OR 2 H / MODULATING C LAY	OUT
XEE-6311-050 Transformer  XEE-6311-050 Transformer  N  XEE-6311-050 Transformer  OUTSIDE  AIR  OUTSIDE  AIR  OAT  OAT  OAT  VEB-43 Fail-Safe Valve with MEP-4x52V Actuator  CAUTION: DO NOT APPLY > 24V	i i	CCC C C C C C C C C C C C C C C C C C	MA HOWNTH EITHER OR OR OR OTHER OTHER OR OTHER O
TO RELAY TERMINALS  AHU TERMINALS  SUPI  RLY3  OPTIONAL  W2  C		R FLEXSTAT  IIT STARTER WIRING AND TO VFD 'RUN' COMMAND INPUT.	<u>, ur</u>

### AHU—Modulating Heat and 1 or 2 Cool

APPLICATION
DEGREES SCALE: °F
HPP AIR HANDLER
OPT: MOD H/2 C
ADDITIONAL SETUP

ADDITIONAL SETUP

ORMPER
FAN
HUMIDITY
OPTIMUM START
SENSORS
STAGING

NOTE: Do not use REE-3211/CVR11C-0/LD96200 relays with **analog** outputs! See Output

Connections on page 3.

NOTE: For MAT sensor use with firmware earlier than R2.1.0.18, see the FlexStat Economizer Change of MAT to DAT Service Bulletin available on the KMC Partners web site.

Input Terminals	AHU Input Connections	BACnet Objects
IN9	Opt. Remote CO <sub>2</sub> Sensor*	AI9
IN8		Al8
IN7	Opt. Remote Temp. Sensor*	AI7
IN4	Opt. Outside Air Temp. (OAT)**	Al4
IN3	Opt. Discharge Air Temp. (DAT)**	AI3
GND	Ground	
IN2	Optional FST*	Al2

\*Fan Status (FST), Discharge Air Temperature (DAT), and (not shown on the diagram) remote temp./CO $_2$  sensors are optional inputs. Set pull-up resistor switch positions appropriately (see the Input Connections section).

\*\*When using the optional Outside Air Damper, DAT/OAT inputs must also be connected.

XEE-6311-075 or XEE-6311-100 Transformer  H  24V   TX2 LINE VOLTAGE		Output Terminals	AHU Output Connections	BACnet Objects
COM		Analog 9	Optional Outside Air Damper (OAD/RTD)*	AO9
RED S 24WAC ~ SET SWITCHES FOR		GND	Ground (for analog output terminals 7–9)	
A09 WHT O 2–10 IN OPERATION: Opposite of Fail-Safe		Analog 8	Heating Valve (HTV)	AO8
		Analog 7		A07
MEP-4552 or MEP-7x52 Actuators		Analog 6	Optional Humidifier Valve (HUM or HUMV)	AO6
RED S 24VAC SET SWITCHES FOR		GND	Ground (for analog output terminals 4–6)	
BLK — S COM 1   WHT — S   2–10 IN OPERATION: Opposite of Fail-Safe		Analog 5		AO5
OPTIONAL  OPTIONAL  OPTIONAL  OPTIONAL  OPTIONAL		Analog 4	Optional Fan Speed	AO4
STE-1402		Relay 3	Optional Cool 2 (Y2)	ВО3
IN3 OPTIONAL BLK		SC 1–3	24 VAC (for relay terminals 1-3)	
STE-1402 Duct Sensor, DAT		Relay 2	Cool 1 (Y1)	BO2
	See also the AHU—Additional Options section	Relay 1	Fan (G)	BO1
Pressure Switch	and fan speed options.			
IN4 OPTIONAL BLK  STE-1451 OAT Sensor, Type III		RETURN AIR	AHU MODULATING H / 1 OR 2 C L	AYOUT
RED S 24VAC ~ ITIV	OUTSIDE AIR OAT ONN OAD	<b>++</b> \	COOLING CONTROL	
CAUTION: DO NOT APPLY >24V TO RELAY TERMINALS AHU TERMINALS  RLY3 OPTIONAL Y2 C	-BRN-O- — AUTO	PPLY FAN STARTER (BY OTHERS)	FLEXSTAT	EITHER
NOTE: IF NO 'G' TERMINAL IS PRESENT, CONNECT RLY1 CAP OFF ALL UNUSED WIRES R1  AND RELAY SIGNAL UNUSED WIRES R1			STARTER WIRING AND VFD 'RUN' COMMAND INPUT.	

# AHU—Modulating Heat and Modulating Cool

APPLICATION
DEGREES SCALE: °F
APP. AIR HANDLER
OPT: MOD H/MOD C
ADDITIONAL SETUP

ADD JUMPER

RODITIONAL SETUP

ORNIPAT

FAN

HUMIDITY

OPTIMUM START

SENSORS

VALVE

NOTE: Do not use REE-3211/CVR11C-0/LD96200 relays with analog outputs! See *Output Connections on page 3*.

NOTE: For MAT sensor use with firmware earlier than R2.1.0.18, see the **FlexStat Economizer Change of MAT to DAT Service Bulletin** available on the KMC Partners web site.

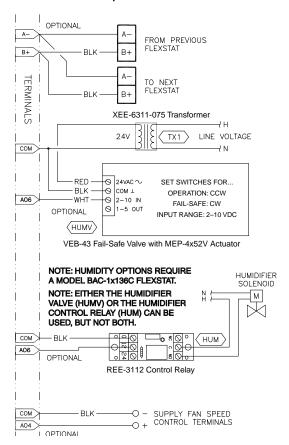
Input Terminals	AHU Input Connections	BACnet Objects		
IN9	Opt. Remote CO <sub>2</sub> Sensor*	Al9		
IN8		Al8		
IN7	Opt. Remote Temp. Sensor*	AI7		
IN4	Opt. Outside Air Temp. (OAT)**	Al4		
IN3	Opt. Discharge Air Temp. (DAT)**	Al3		
GND	Ground			
IN2	Optional FST or DAT*	Al2		
*Fan Status (FST) Discharge Air Temperature (DAT), and (not shown				

\*Fan Status (FST), Discharge Air Temperature (DAT), and (not shown on the diagram) remote temp./CO<sub>2</sub> sensors are optional inputs. Set pull-up resistor switch positions appropriately (see the Input Connections section).

\*\*When using the optional Outside Air Damper, DAT/OAT inputs must also be connected.

A SC1-3	XEE-6311-075 or XEE-6311-100 Transformer  H  24V     TX2   LINE VOLTAGE	Output Terminals	AHU Output Connections	BACnet Objects			
İ	RTD	Analog 9	Optional Outside Air Damper (OAD/RTD)*	AO9			
<u> </u>	RED → 24VAC ~ SET SWITCHES FOR  BLK → COM ⊥ OPERATION: Opposite of Fail-Safe	GND	Ground (for analog output terminals 7–9)				
A09	WHT S 2-10 IN FAIL-SAFE: In Direction Actuator Rotates to <b>Open Return</b> Damper	Analog 8	Heating Valve (HTV)	AO8			
i di	INPUT RANGE: 2–10 VDC	Analog 7	Cooling Valve (CLV)	AO7			
TERMINALS	MEP-4552 or MEP-7x52 Actuators	Analog 6	Optional Humidifier Valve (HUM or HUMV)	AO6			
. IS 1	RED → 24VAC ~ SET SWITCHES FOR	GND	Ground (for analog output terminals 4–6)				
	BLK OCM OPERATION: Opposite of Fail-Safe WHT OF A CONTROL FAIL-SAFE: In Direction Actuator	Analog 5		A05			
: : 	OPTIONAL    S   1-5 OUT   PAIL-SAFE. III DEBUTO RECIDENT RECIPIENT RECI	Analog 4	Optional Fan Speed	AO4			
: : 	XEE-6311-075 Transformer	Relay 3		ВО3			
: : 	24V RIE TX1 LINE VOLTAGE	SC 1–3	24 VAC (for relay terminals 1–3)				
СОМ	<u> </u>	Relay 2		BO2			
; ; 	PED S 24VAC 2. SET SWITCHES FOR CLV See als	Relay 1	Fan	BO1			
:	BLK O COM 1 OPERATION: CCW AHU—Ad	ditional *If optional C	Outside Air Damper is used, must also have	DAT/OAT			
_A07_>	WHT	st page inputs.					
AOS	RETURN AHU MODULATING H / MODULATING C LAYOUT						
IN2	OPTIONAL BLK  DAT  OUTSIDE AIR						
GND	STE-1451 OAT Sensor, Type III	OHS	STARTER VVFD	HUM HUM EITHER OR			
IN4 GND	OPTIONAL BLK OAT	SUPPLY FAN STARTER (BY OTHERS)	FLEXSTAT				
COM	O-WHT/GRY-~ NC -GRY-O	C ###	ER WIRING AND				
: : 	UNUSED WIRES R1 RELAY CONTACTS TO VED TRUNT COMMAND INPUT.						
	REE-3211 or CVR11C-0/LD96200 Multi-Voltage Relays						

### AHU—Additional Options



NOTE: Do not use REE-3211/CVR11C-0/LD96200 relays with **analog** outputs! See *Output Connections on page 3*.

# Important Notices

The material in this document is for information purposes only. The contents and the product it describes are subject to change without notice. KMC Controls, Inc. makes no representations or warranties with respect to this document. In no event shall KMC Controls, Inc. be liable for any damages, direct or incidental, arising out of or related to the use of this document.

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. A BAC-12xxxx Class B digital apparatus complies with Canadian ICES-003. A BAC-13xxxx/14xxxx Class A digital apparatus complies with Canadian ICES-003 Class A.

#### **A** CAUTION

This document is for 3-relay, 6-analog-output, 6-external-input BAC-12xx36/13xx36/14xx36 series only. THESE MODELS ARE NOT COMPATIBLE WITH THE BACKPLATES OF OLDER BAC-10000 SERIES FLEXSTATS (WITH ONLY 3 EXTERNAL INPUTS)! If replacing an older 3-input FlexStat, replace the backplate as well of the new FlexStat will be damaged.

### **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 specifications and accessories, see the BAC-12xxxx/13xxxx Series FlexStat Data Sheet.

For operation, configuration, troubleshooting, and other information, see the FlexStat Operation Guide.

For additional wiring, application, and programming information, see the FlexStat Application Guide.

For additional instructions on programming, see the Help system for KMC Connect, TotalControl, or KMC Converge.

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