BAC-5841-16 and BAC-5842-16

VAV Advanced Application Controllers, 8 x 8

Description and Application

These native BACnet, fully programmable, direct digital controllers are factory **pre-programmed and pre-configured** for use in commercial/residential pressure-dependent **VAV zoning** applications. They have modular input and output jacks to simplify field wiring, using standard Ethernet cables (with modular RJ-45 plugs) for input sensors and KMC HSO-2200 series cables with RJ-12 modular plugs on the outputs. Outputs are typically connected to KMC MEP-4042/4842 proportional actuators with integral RJ-12 modular jacks.

They provide up to four zones of individual damper actuator control when used with a KMD-1x6x/1x8x/12x1 NetSensor and three STE-6014 or STE-6016 room sensors. They also provide On/Off control of an associated AHU fan, two stages of heat, and two stages of cool with the use of external KMC REE-5501 staging relay modules. (See the sample application drawing on page 4.)

These controllers provide precise monitoring and control of connected points. Remote building automation systems may further command occupancy modes and control setpoints of the networked devices, process alarm conditions, and use information generated by the controllers to optimize the performance of "upstream" air handlers, fans, and other building automation functions.

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Models

BAC-5841-16	VAV controller with Real Time Clock (RTC)
BAC-5842-16	VAV controller without RTC

NOTE: For **Under Floor Air Distribution (UFAD)** applications, see the BAC-**5841/5842** data sheet.

Specifications

Pre-Programmed Features

- Default programmed to provide up to 4 zones of pressure-dependent VAV zone control using connected proportional MEP-4042/4842 actuators. Space temperature sensing and setpoint control are provided via 3 STE-6014 or STE-6016 sensors and 1 KMD-1x6x/1x8x NetSensor.
- Air handler minimum air flow requirements are expected to be provided by: (1) the installer setting the minimum travel stops on each zone control damper actuator to provide a minimum level of air flow, (2) a gravity bypass damper control provided by others, or (3) static pressure bypass damper control provided with an optional KMC TPE-1474-21 and MEP-4042 (on Out 5) applied to the bypass damper.
- Default programming to provide 1 intermittent or constant operation fan output, 2 stages of DX cooling, and 2 stages of heating with the use of REE-5501 external staging relay modules.

- Input #1 is default programmed to be used with a KMC Model STE-1002/1004 and STE-14xx series thermistor duct sensor to provide Discharge Air Temperature (DAT) low limit protection. Low limit operation will cause the DX compressor(s) to be disabled below 45° F. DX compressors are re-enabled at 55°. (A DAT sensor must be installed for the system to function properly.)
- Automatic Heat/Cool changeover of the connected unitary equipment is provided based on combined demand of heating and cooling zones. During "intermediate" periods of heating or cooling (typically spring and fall), the controller will automatically switch from heating to cooling mode using a 20 minute cycle to provide adequate heating and cooling as necessary to each zone. Controlled zone dampers will automatically switch from reverse to direct acting as appropriate to prevent overheating or sub-cooling of an individual zone.
- If total heating or cooling demand is less than 10%, heating or cooling will be "locked out" to prevent rapid cycling between heating and cooling and the wasting of energy.
- Default programmed to accept external Building Automation System (BAS) occupancy or override command control @ priority 8. In the stand-alone mode, the unit will default to an "intermittent fan" operation. If the cooling or heating demand exceeds 10%, the fan will be enabled to operate until the demand is less than 5%. A value may be toggled using the Netsensor button #3 to select "constant fan" operation. In this mode, the fan will run continuously unless commanded off by a remote BAS @ priority 8 or higher.
- If a KMD-1261/1281 NetSensor with a motion sensor is used and no motion is detected in the zone for more than 15 minutes, then Zone 5 will be set to a "standby" mode with a temporary vacancy setpoint. During standby mode, the normal setpoint is temporarily adjusted (down during heating and up during cooling) by 3° F. The user may toggle a value using NetSensor button #2 that will cause all zones (instead of just Zone 5) to go to standby if no motion is sensed.

Programmable features

- See BAC-5801/5802 PIC statement for supported BACnet objects

Outputs (model dependent)

- 8 pre-configured outputs for control of proportional actuators or staged equipment
- 5 modular 6-pin RJ-12 female jacks for use with HSO-2200 series cables (or local equivalent)
- Removable screw terminal block, wire size 14–22 AWG for unitary equipment control
- Standard and custom units of measure
- 0–10 volts DC for analog objects
- 0 or 12 volts DC for binary objects
- Outputs protected against intermittent shorts
- Maximum output current 100 mA per output or 350 mA total

Inputs

- Four modular inputs pre-configured as zone temperature sensing inputs, setpoint inputs, or DAT sensing inputs
- Four modular 8-pin RJ-45 female jacks for use with standard Ethernet cables to connect to STE-6014 or STE-6016 sensors
- Built-in sensor selection switch for STE-6014 or STE-6016 room sensors—when set to the "STE-6016" position, the controller sources necessary power for the LCD digital display on the STE-6016 sensors (internally using Output 8)
- Integral switchable network End of Line (EOL) resistors, indicating fuses, and network isolation switch with LED indication of operation for BACnet MS/TP communications
- Standard units of measure
- 10-bit analog-to-digital conversion
- Overvoltage input protection
- Compatible with KMD-1x6x/1x8x NetSensors

Schedules

- 8 Schedule objects
- 3 Calendar objects

Alarms and events

- Supports intrinsic reporting
- 8 Notification class objects

Trends

- 8 Trend objects

Memory and clock

- Real time clock with power backup for 72 hours (BAC-5841-16 only)

- Programs and program parameters are stored in nonvolatile memory
- Auto restart on power failure

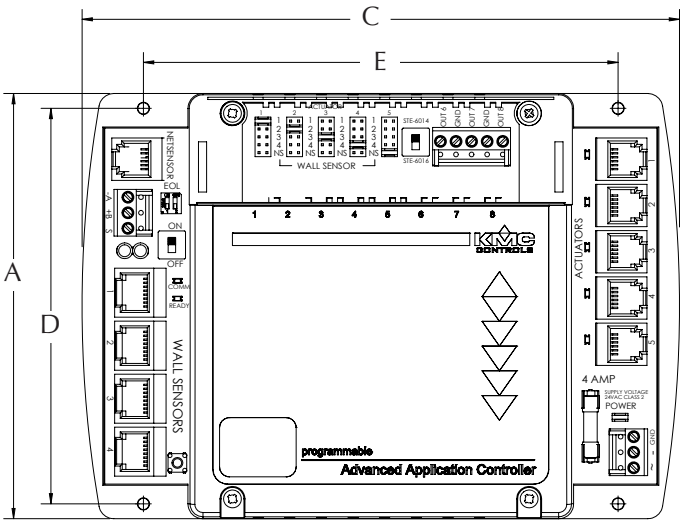
Communications

- BACnet MS/TP compliant
- MS/TP operating at up to 76.8 kilobaud
- Automatically assigns MAC addresses and device instance numbers
- Modular jack for NetSensor connection (5 VDC at 25 mA typical)

Regulatory

- FCC Class A, Part 15, Subpart B

Dimensions



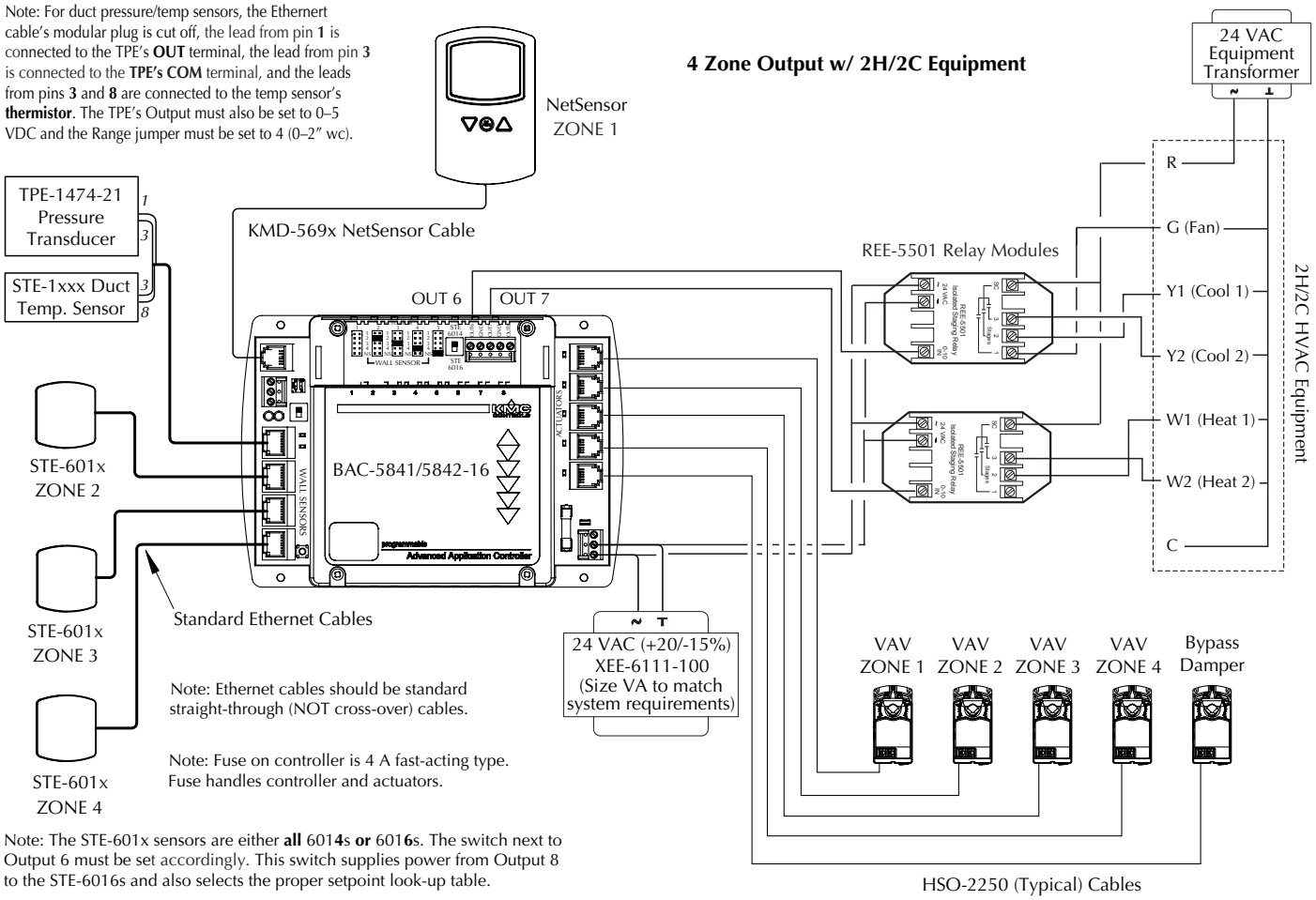
A	B	C	D	E
5.38 in.	1.98 in.	7.55 in.	5.0 in.	6.0 in.
137 mm	50 mm	192 mm	127 mm	152 mm

Installation

Supply Voltage	24 VAC (–15%, +20%), 60 Hz, 3.6 VA (not including connected actuators), Class 2 only
Fuse	4 A, fast acting
Weight	14 ounces (395 g)
Case Material	Green and black flame-retardant plastic
Environmental Limits	
Operating	32 to 120° F (0 to 49° C)
Shipping	–40 to 140° F (–40 to 60° C)
Humidity	0 to 95% RH (non-condensing)
Software Compatibility	Requires the current version of BACstage or TotalControl for field customization or modification of default configuration and programming features

Sample VAV Zoning Application

Note: For duct pressure/temp sensors, the Ethernert cable's modular plug is cut off, the lead from pin **1** is connected to the TPE's **OUT** terminal, the lead from pin **3** is connected to the **TPE's COM** terminal, and the leads from pins **3** and **8** are connected to the temp sensor's **thermistor**. The TPE's Output must also be set to 0–5 VDC and the Range jumper must be set to 4 (0–2″ wc).



Note: Ethernet cables should be standard straight-through (NOT cross-over) cables.

Note: Fuse on controller is 4 A fast-acting type. Fuse handles controller and actuators.

Note: The STE-601x sensors are either **all** 601**4**s **or** 601**6**s. The switch next to Output 6 must be set accordingly. This switch supplies power from Output 8 to the STE-6016s and also selects the proper setpoint look-up table.

Cable P/N	Cable Length	Max. # of Daisy-Chained MEP-4x42s	
		WithOUT HSO-5010	WITH HSO-5010*
HSO-2203	3 feet	8	8
HSO-2206	6 feet	8	8
HSO-2212	12 feet	6	8
HSO-2220	20 feet	4	8
HSO-2250	50 feet	2	4
*For examples of the HSO-5010 3-way "Y" modular connector in use with the actuators, see the MEP-4042/4842 data sheet.			

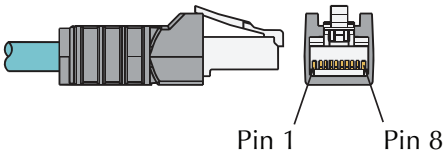
NOTE: Room temperature sensors must **all** be STE-601**4**s **or all** be STE-601**6**s and the switch by Output 6 must be set accordingly.

STE-6014

STE-6016

NOTE: To use a standard straight-through Ethernet cable with the **duct** sensors:

1. Cut off one modular plug.
2. Strip the wires connected to pins **1**, **3**, and **8**.
3. Connect those wires to the duct sensors as noted in the system diagram.
4. Tape back or cut off all other wires.



Accessories

Connectors and Fuses

902-602-04	Replacement three-pin removable terminal block
902-602-06	Replacement five-pin removable terminal block
HPO-0054	Replacement fuse bulb
HPO-0063	Replacement two-pin jumper

Enclosure

HCO-1102	Steel control enclosure, 10.1 W x 2.4 H x 7.1" D (257 x 62 x 181 mm)

Power Transformers

XEE-6112-100	Transformer, 120-to-24 VAC, 96 VA, dual-hub
XEE-6311-100	Transformer, 120/240/277/480-to-24 VAC, 96 VA, dual-hub

Sensors

KMD-116x	NetSensor
KMD-118x	NetSensor with humidity sensor
KMD-12x1	NetSensor with motion sensor
STE-1002	Thermistor (Type II) with 3-foot leads for discharge air temperature
STE-1004	Thermistor (Type II) with 5-foot leads for discharge air temperature
STE-1400 Series	Duct sensors (Type III thermistors) for discharge air temperature
STE-6014	Room temp. sensor w/ rotary setpoint dial
STE-6016	Room temp. sensor w/ LCD display and up/down setpoint buttons
TPE-1474-21	Low pressure transducer (–0.5 to +0.5", –1 to +1", 0 to 1", 0 to 2" wc)

Actuators

MEP-4042	40 inch-lbs. min. torque, with modular jacks
MEP-4842	80 inch-lbs. min. torque, with modular jacks

Cables and Miscellaneous

HSO-2350	DDC controller analog output cable, 50 ft., with RJ-12 plug on one end (provides 2–10 VDC control signal to actuator from remote controller)
HSO-22**xx**	Modular cables, RJ-12 plug on both ends **(see the table and sample application on the page 4 for the appropriate part number)**
HSO-2121	Transformer cable, 12 inches, with RJ-12 plug on one end (provides local power to actuator from transformer mounted at actuator location)
HSO-5010	"Y" connector with 3 RJ-12 jacks (allows powering of two strings of actuators when power is applied through an HSO-2121 and the HSO-5010 "splitter" is mounted in the center of each string)
KMD-5690	25-foot NetSensor cable
KMD-5691	50-foot NetSensor cable
KMD-5692	75-foot NetSensor cable
REE-5501	Relay module, three-stage reheat

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