BAC-9000 Series VAV Controller

Installation Guide

Complete the following steps to install a Conquest™ BAC-9000 Series VAV Controller-Actuator.

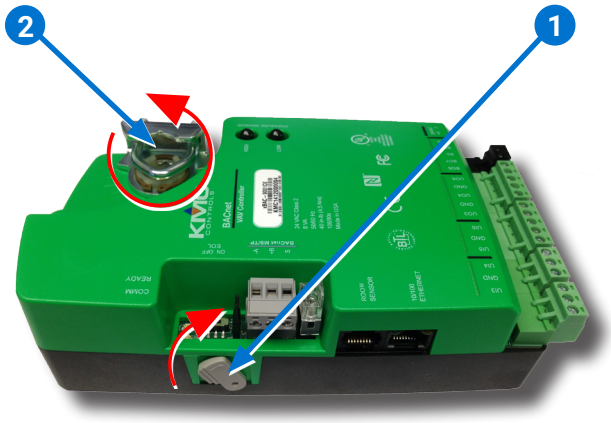
Refer to the **Conquest BAC-9000 Series BACnet VAV Controller-Actuators (B-AAC) data sheet** for controller specific information on the web at **kmccontrols.com**.

SET DRIVE HUB ROTATION LIMIT

NOTE: Complete steps 1–5 if the VAV damper rotation limit is either 60 or 45 degrees.

NOTE: If the VAV damper rotates 90 degrees, go to step 6.

1. Push and hold the **gear release** 1 and rotate the **drive hub** and **V-clamp** 2 to the left.



NOTE: The **V-clamp nuts** 3 should be on top.

2. Turn the controller over.

3. Remove the **stop screw** 4 from the storage location and clean any debris from the threads.

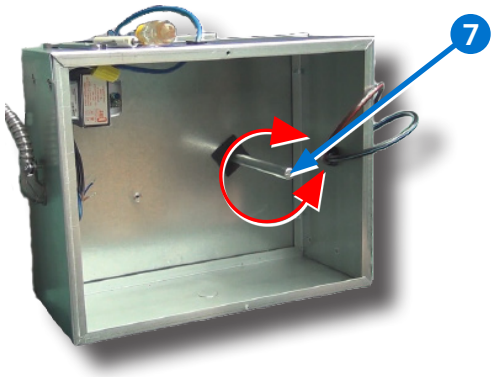
4. Insert the stop screw into the **60** 5 or **45** 6 stop hole position.

5. Tighten the screw until the screw head touches the plastic in the bottom of the recess.

NOTE: Overtightening the screw can cause compression in the case which may interfere with the controller operation.

ALIGN VAV DAMPER & DRIVE HUB

6. Manually rotate the **damper shaft** 7 on the VAV box to fully open the damper.

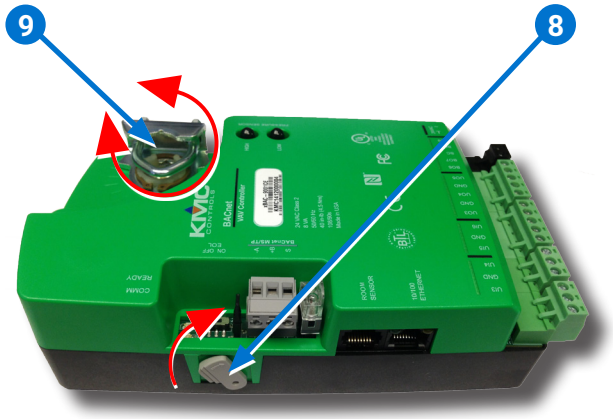


NOTE: The drive hub and V-clamp will be rotated in the same direction in step 8.

7. Push and hold the **gear disengagement lever** 8 on the side of the controller.

8. Rotate the **drive hub and V-clamp** 9 in the same direction that opened the damper.

NOTE: Continue to rotate the drive hub and V-clamp until they reach a stop.



INSTALL CONTROLLER

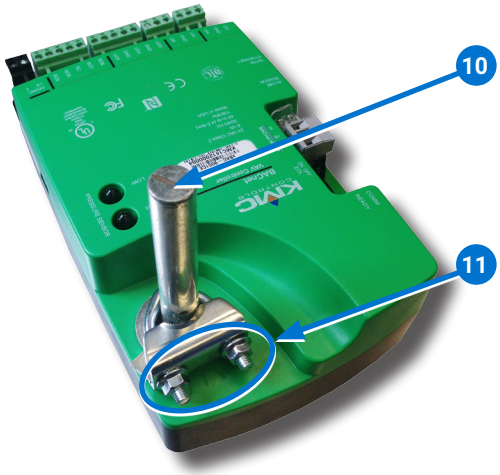
NOTE: Install the controller in a metal enclosure.

NOTE: The controller can be installed on a 3/8"–5/8" (9.5–16mm) round or 3/8"–7/16" (99.5–11mm) square damper shaft with a minimum length of 2" (51mm).

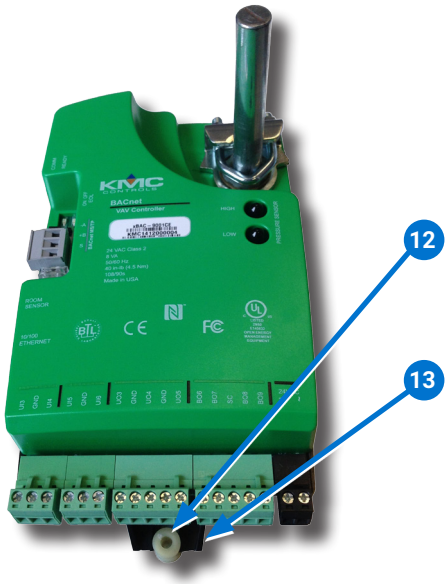
9. Position the controller over the **damper shaft** 10 so the color coded **terminal blocks** are easy to access for wiring.

NOTE: The black terminals are for power. The green terminals are for inputs and outputs. The gray terminals are for communication.

10. Finger tighten the **V-clamp nuts** 11 to position the damper shaft in the drive hub.



11. Center the **mounting bushing** 12 in the **mounting tab** 13.



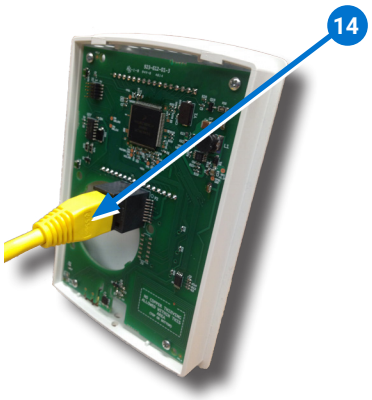
12. Attach the controller to the VAV box with a **#8 sheet metal screw** through the **mounting bushing** 12.

13. Evenly tighten the **V-clamp nuts** 11 on the drive hub to 30–35 in-lb.

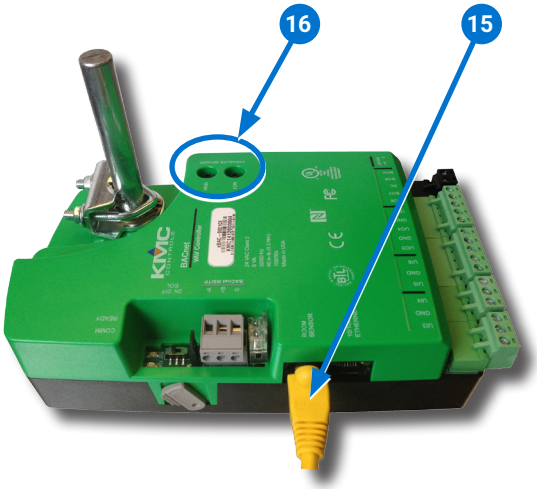
CONNECT STE-9000 SENSOR

NOTE: Refer to the Conquest **STE-9000 Series NetSensor Installation Guide** to install a sensor.

14. Plug an **Ethernet patch cable** 14 connected to an STE-9000 Series NetSensor into the **ROOM SENSOR** 15 port of the controller.



NOTE: The Ethernet patch cable should be a maximum of 150 feet (45 meters).



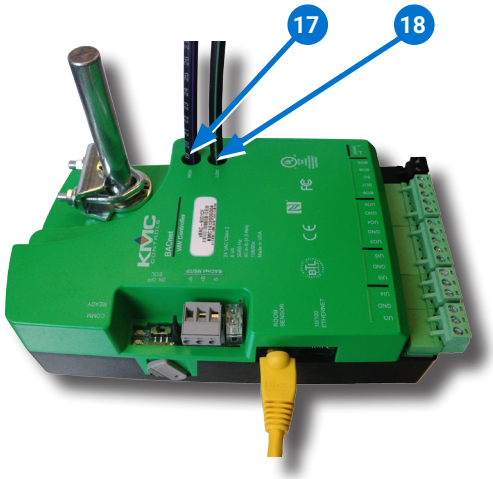
CONNECT PRESSURE FLOW SENSOR

NOTE: Complete steps 15–17 if an air flow sensor is installed.

NOTE: The BAC-9021 controller does not have PRESSURE SENSOR ports.

NOTE: Use 1/4 inch (6.35 mm) FR tubing. Tubing should not be longer than 20 feet (6 meters).

15. Remove the **black shipping plugs** 16 from the PRESSURE SENSOR ports.
16. Connect the high pressure tube from the pressure flow sensor to the **HIGH** 17 port on the controller.
17. Connect the low pressure tube from the pressure flow sensor to the **LOW** 18 port on the controller.



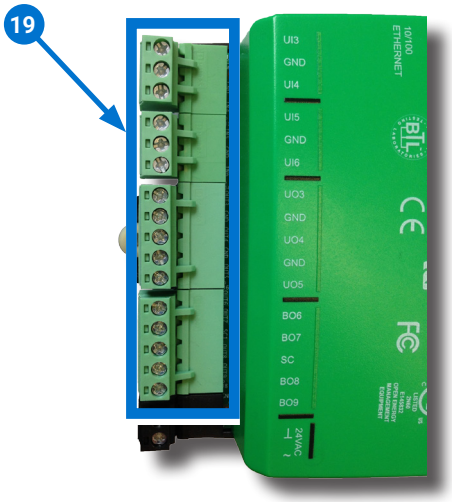
CONNECT AUXILIARY EQUIPMENT

NOTE: Auxiliary VAV equipment such as fans, heaters, reheat valves, and discharge air temperature sensors can be connected to the controller.

18. Connect auxiliary VAV equipment to the **green terminal blocks** 19.

NOTE: Wire sizes 12–24 AWG can be clamped together into each terminal.

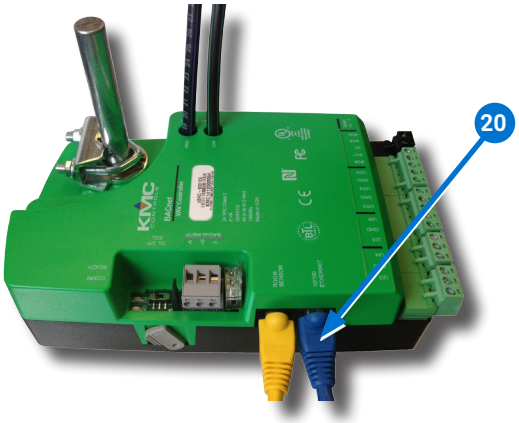
NOTE: No more than two (16 AWG) wires can be joined at a common point.



CONNECT ETHERNET NETWORK

19. Connect an **Ethernet patch cable** 20 to the **10/100 ETHERNET** port (BAC-9001CE only).

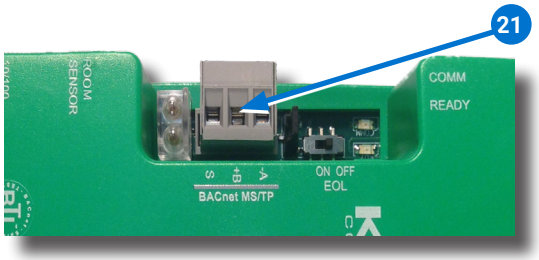
    NOTE: The Ethernet patch cable should be a CAT 5 or better and a maximum of 328 feet (100 meters) between devices.



CONNECT MS/TP NETWORK

20. Wire the network to the gray **BACnet MS/TP network terminal block** 21.

    NOTE: Use 18 gauge AWG shielded twisted pair cable with maximum capacitance of 51 picofarads per foot (0.3 meters) for all network wiring (Belden cable #82760 or equivalent).



21. Connect the –A terminals in parallel with all other –A terminals on the network.

22. Connect the +B terminals in parallel with all other +B terminals on the network.

23. Connect the shields of the cable together at each device using a wire nut or the S terminal in KMC BACnet controllers.

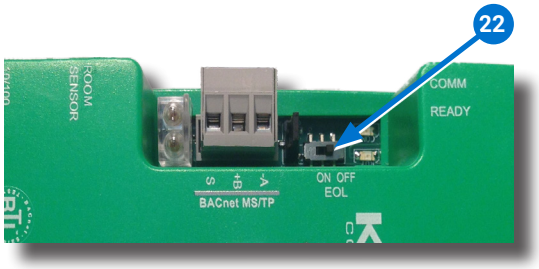
24. Connect the cable shield to a good earth ground at **one end only**.

    NOTE: For principles and good practices when connecting an MS/TP network, see **Planning BACnet Networks (Application Note AN0404A)**.

SELECT END OF LINE (EOL)

NOTE: The EOL switch is shipped from the factory in the OFF position.

25. If the controller is at either end of a BACnet MS/TP network, turn the **EOL switch** 22 to **ON**.



CONNECT POWER

NOTE: Follow all local regulations and wiring codes.

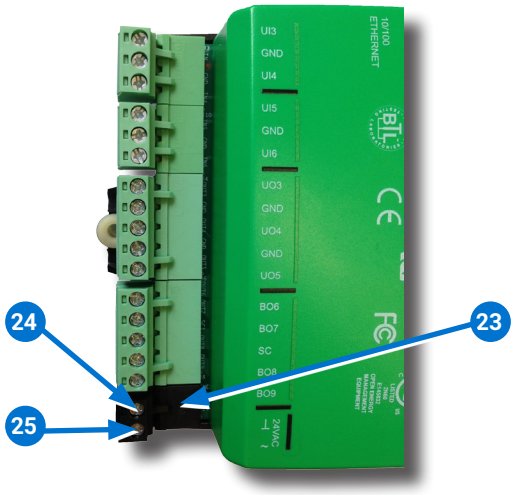
NOTE: Use either shielded connecting cables or enclose all cables in conduit to maintain RF emissions specifications.

NOTE: Connect a 24 VAC, Class-2 transformer to the **black power terminal block** 23 of the controller.

NOTE: Connect only one controller to each 24 VAC, Class-2 transformer with 12-24 AWG copper wire.

26. Connect the neutral side of the transformer to the controllers **common terminal ⊥** 24.

27. Connect the AC phase side of the transformer to the controllers **phase terminal ~** 25.



POWER AND COMMUNICATION STATUS

The **status LEDs** indicate power connection and network communication.

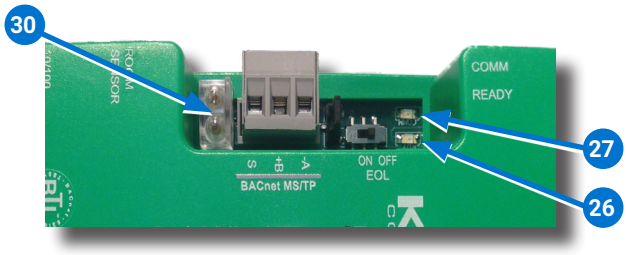
NOTE: If neither the green READY LED nor the amber COMM LED is lit, check the fuse, power, and cable connections to the controller.

GREEN READY LED 26

- During initialization, the green READY LED is ON for 5 to 20 seconds.

THEN

- The green READY LED flashes once per second, indicating power.



AMBER BACnet MS/TP COMM LED 27

- The amber COMM LED flashes at a one-half-second rate during power-up.
- The amber COMM LED flickers as it receives and passes the token over the BACnet MS/TP network.

ETHERNET LEDs

The **Ethernet status LEDs** indicate network connection and communication speed.

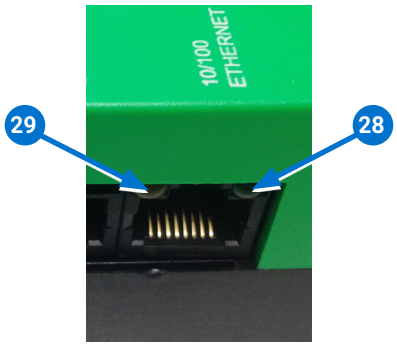
NOTE: If neither the green READY LED nor the amber COMM LED is ON, check the transformer fuse, power, and connections to the controller.

GREEN ETHERNET LED 28

- The green Ethernet LED stays lit when the controller is connected to the network.
- The green Ethernet LED is OFF when the controller is not powered or not communicating with the network.

AMBER ETHERNET LED 29

- The amber Ethernet LED flashes when the controller is communicating with the network.
- The amber Ethernet LED is OFF when the controller is communicating with the network at 10 Mbps.



NETWORK ISOLATION BULBS

The two **network isolation bulbs** 30 serve three functions:

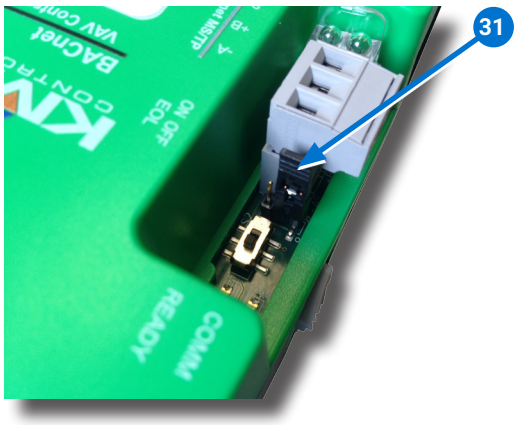
1. Removing the bulbs opens the MS/TP circuit and isolates the expansion module from the network.
2. If one or both bulbs are lit, it indicates the network is improperly phased.
   - This means the ground potential of the expansion module is not the same as other controllers on the network.
   - If this happens, fix the wiring. (See **CONNECT MS/TP NETWORK** on page 4.)
3. If the voltage or current on the network exceeds safe levels, the bulbs blow, opening the circuit.
   - If this happens, fix the problem and replace the bulb assembly.

WATCH DOG JUMPER

The **Watch Dog Jumper** 31 resets the controller if there is a power failure or a communication timeout between the controller and the network:

NOTE: The controller is shipped from KMC with the Watch Dog Jumper installed on the outer 2 pins.

NOTE: The Watch Dog Jumper should never be removed.



REPLACEMENT PARTS

HPO-0055	Replacement Network Bulb Module for Conquest Controllers, Pack of 5
HPO-9901	Conquest Hardware Replacement Parts Kit

NOTE: HPO-9901 includes the following:

Terminal Blocks	**DIN Clips**
(1) Black 2 Position	(2) Small
(2) Grey 3 Position	(1) Large
(2) Green 3 Position	
(4) Green 4 Position	
(2) Green 5 Position	
(2) Green 6 Position	

CONTROLLER SET UP

Refer to the table to set up the controller. See the documents or Help systems for the respective KMC Tool to use.

NOTE: After the controller has been configured, an STE-6010/6014/6017 series analog sensor can be connected to the controller in place of an STE-9000 series digital netsensor.

SET UP PROCESS			KMC TOOL
Config-uration	**Programming (Control Basic)**	**Web Page Graphics***	
✔			Conquest NetSensor
✔			KMC Connect Lite app or software**
✔	✔		KMC Connect software
		✔	TotalControl software
		✔	KMC Converge module for Niagara^{AX} WorkBench

*Custom graphical user-interface web pages can be hosted on a remote web server, but not in the controller.

**Requires a Near Field Communication (NFC) enabled Android mobile device or tablet or an Android or Apple mobile device, paired with an NFC-Bluetooth fob, running the KMC Connect Lite app or a PC, paired/connected to an NFC-Bluetooth fob, running the KMC Connect Lite Desktop software.

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