

CONTROLS KITS AND ACCESSORIES

507411-04
8/2022
Supersedes 507411-03

KMC BACnet® Module Kits

Installation instructions for BACnet® Module Kits (16X70, 16X71, 16X72, and 17A08) with Commercial Rooftop and Split System Units

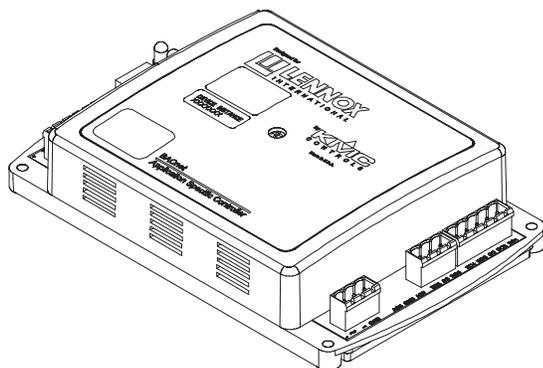


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⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life.

Installation and service must be performed by a licensed professional installer (or equivalent) or service agency.

Shipping and Packing List

BACnet assembly (1)	
Installation Instruction (1)	
16X70 bag assemblies.	Contains: • #1016 X 5/8 screws (3) • Wiring diagram sticker (1)
16X71 bag assembly	Contains: • #8-32 x 1/2 screws (5) • Wire-tie insertion (1) • Wiring diagram sticker (1) • DDC panel holder (1) • Latch (1)
16X72 bag assembly	Contains: • #1016 X 5/8 screws (2) • Wire-tie insertion (1) • Wiring diagram sticker (1)
17A08 bag assembly	• #1016 X 5/8 screws (6) • Wiring diagram sticker (2)

General

The BAC830456 controller is a custom BACnet application specific controller intended for use on commercial KG/KC/ KH/ZC/ZG/ZH rooftop and ELA and EL_XA split system units. The BACnet controller (BAC830456) was developed to communicate with building automation systems that support the BACnet Application Specific Controller (B-ASC) device profile.

The following table only applies to the new EL_XC / EL_XP / EL_XA models built after January 1, 2023. The control system can be used on all ELA models with a production end date of 12/31/22.

Table 1. EL_XA Matchups

Outdoor Cooling Model	Indoor Air Handler Model
EL072XCSST	EL072XASS
EL072XCSST	EL090XASD
EL090XCSST	EL090XASD
EL090XCSST	EL120XASD
EL120XCSST	EL120XASD
Outdoor Heat Pump Model	Indoor Air Handler Model
EL072XPSST	EL090XASD
EL090XPSST	EL090XASD
EL120XPSST	EL120XASD

The BACnet controller is connected to the unit through TB1.

Zone temperature may be supplied from a local sensor, either a STE8001 Digital Sensor or STE6011 Discrete Sensor, or mapped from a third-party BACnet device to the BACnet controller BAC830456. As part of a complete facilities management system, the BAC8304 controller provides precise monitoring and control of connected points.

Network Cable

INSTANT ID

Instance ID will ship from the factory as a randomized, unique number. The system integrate may change this number through the STE8001 digital sensor if desired.

CONTROLLER COMMUNICATIONS

The controller communicates through a MS/TP master RS485 connection at the following baud rates: 9600, 19.2K, 38.4K, and 76.8K.

The controller is capable of auto-baud to determine the baud-rate of the connected MS/TP network. The auto-baud is active at the time the controller is powered up. Removable and locking terminal blocks will accept 14 to 22 AWG wire. It is compatible with twisted pair, shielded 22AWG minimum cable such as Belden part numbers 8761, 88761 and catalog numbers 27M19, 94L63 or 68M25.

FACTORY COMMUNICATION CONFIGURATION

The network cable should be routed using best practices to avoid induced noise.

Do not route alongside high voltage wiring or in proximity to high-voltage or high-frequency devices, such as ignition controls and variable frequency drives.

Connect the -A terminal in parallel with all other terminals. Connect the +B terminal in parallel with all other + terminals. Connect the shields of the cable together at each controller using the S terminal. See "Figure 1. MS/TP Network Wiring" for MS/TP network wiring. It is recommended that the physical network be arranged in a daisy chain topology.

IMPORTANT

A qualified systems integrator with adequate training and experience is required to integrate and commission the KMC BACnet module into a third party BACnet building automation system. Front end software is used to validate the system configuration when the controller is connected to the BACnet Network.

Network Bus Termination

When the BACnet® module is at the end of a daisy-chain of the EIA485 wiring segment, the controller must have end-of-line termination installed for proper network operation. Set the network end of line (EOL) DIP switch S3 to ON state for network termination, see "Figure 3. BACnet End-of-Line Switches (S3)" on page 3.

Installing BACnet Assembly

1. Disconnect all electrical power to unit.
2. Open compressor section access doors (except for ELA and EL_XA units).
3. Install BACnet assembly:
 - a. A and A+ Box Units - Position the BACnet assembly in front of control panel and secure the assembly with the provided three #10-16 x 5/8" SMS screws to the compressor wall located at the right-side of control panel, see "Figure 5. Landmark A- and A+-Boxes" on page 4.
 - b. B Box Units - Position the BACnet assembly in front of control panel and secure the assembly with the provided three #8-32 x 1/2" TFS screws to the control box located at the right-side of control panel, see "Figure 6. Landmark B-Box" on page 4 and "Figure 7. Raider B-Box" on page 4).
 - c. C Box Units - Position the BACnet assembly so that the BACnet module faces the control panel. Align dimples or knock-outs in unit mullion with engaging holes in DDC mounting bracket. Secure with the provided two 5/8" sheet metal screws, see "Figure 8. Landmark C-Box" on page 4.

d. ELA and EL_XA Units - Place the BACnet in the enclosure and secure it. Place the enclosure on the top panel (Not on any Access Panels) and secure it using #10 Screws. Use the #10 screws to also attach the cover to the enclosure.

4. Connect the BACnet network wiring to the BACnet module as shown in figure 1 to the BACnet network connector shown in "Figure 2. Network Connections".

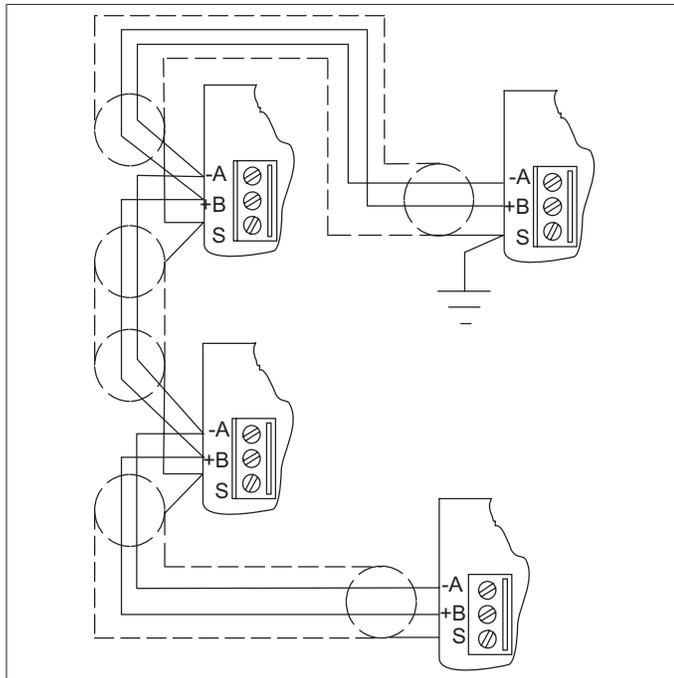


Figure 1. MS/TP Network Wiring

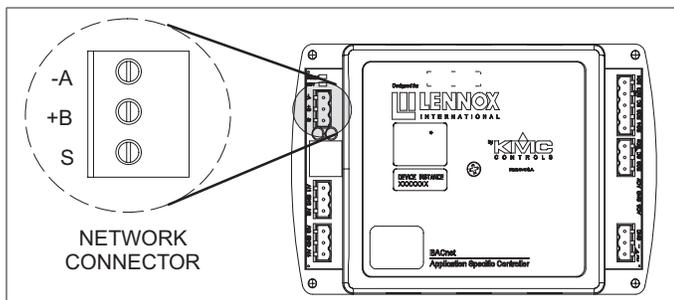


Figure 2. Network Connections

5. To configure the BACnet MAC address, see System Integration on page 5.

6. Set EOL switch to ON if the BACnet module is at the end of the daisy chain network.

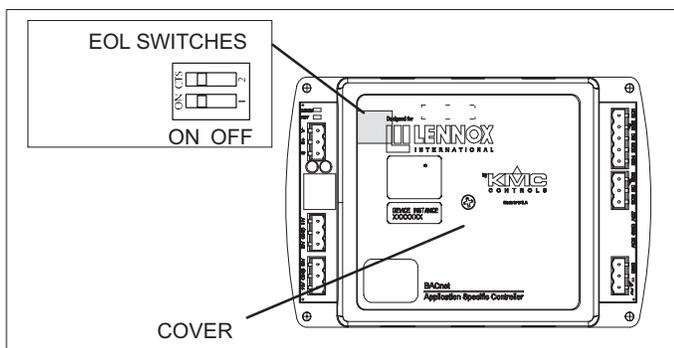


Figure 3. BACnet End-of-Line Switches (S3)

7. Verify that the network isolation bulbs are installed and secure.

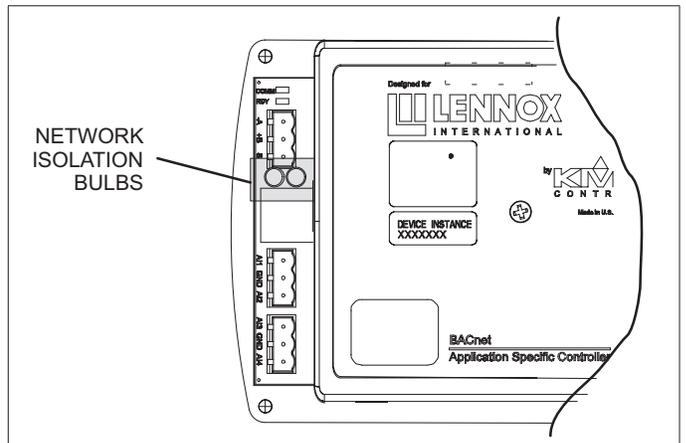


Figure 4. Network Isolation Bulbs

8. When power-up, the BACnet module will begin to communicate provided the network has been correctly configured.

9. Check for the status LEDs (Green/READY, Amber/COMM).

10. To configure the BACnet network refer to the BACnet KMC Installation and Operation Manual.

Jack Plug Connections

1. Route harnesses coming from sub-assembly as shown on the following illustrations.
2. Connect wires marked TB1 to terminal strip TB1.

NOTE: Wires are labeled (hot stamped) to the plugs to identify wire positions.

ELA AND ELA_XA UNITS

Location of Outdoor Unit:

1. 0 to 49 feet (15 meters): Use 20 AWG cables to supply power to the controller.
2. 50 to 151 feet (15.01 to 46 meters): Use 18 AWG cables to supply power to the controller.
3. 152 feet (46.01 meters) and over: Use a local isolated 24VAC transformer to supply power to the controller. Use 20 AWG cables.

ROOFTOP UNITS WITH JADE CONTROLLER

1. Route harness from K253 relay to the BACnet module.
2. Connect J372 from the BACnet harness and P372 from the unit control harness located near the TB1 terminal strip.

ELA AND ELA_XA UNITS WITH JADE CONTROLLER

1. Mount relay provided as shown in "ELA and ELA_XA Split System (Up-Flow Position Shown)" on page 4.
2. Route harness from relay to the BACnet module.

Route Harness stamped J3-14 and J3-5 from relay to the JADE controller.

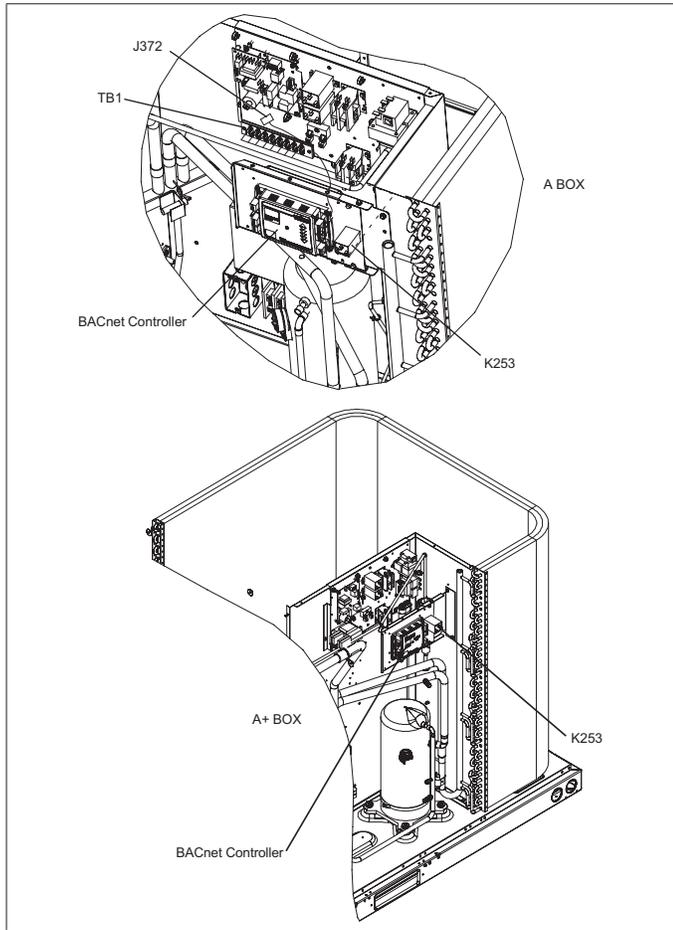


Figure 5. Landmark A- and A+-Boxes

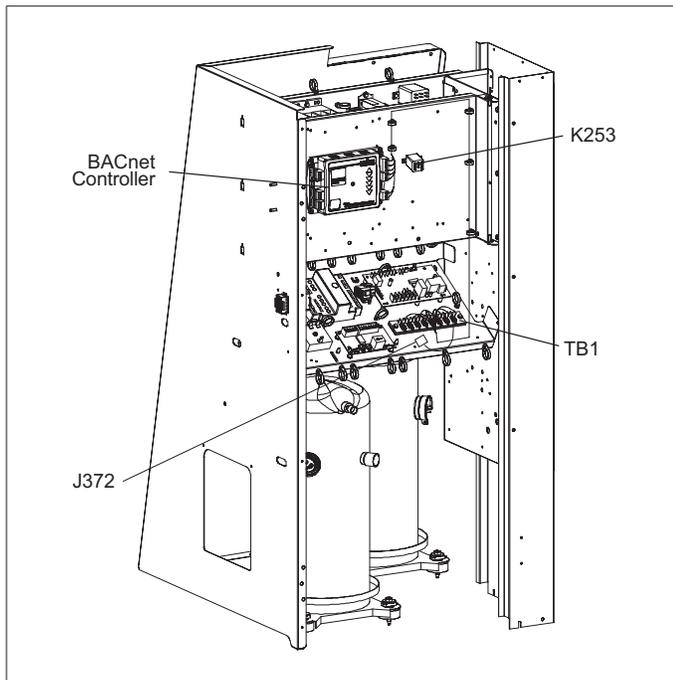


Figure 6. Landmark B-Box

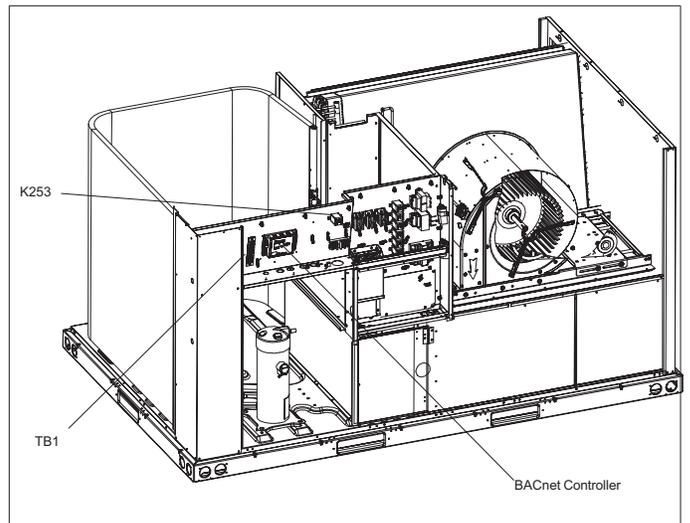


Figure 7. Raider B-Box

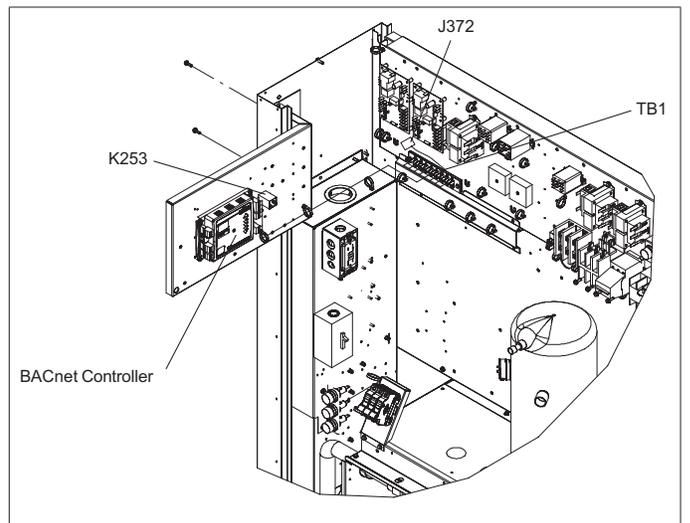


Figure 8. Landmark C-Box

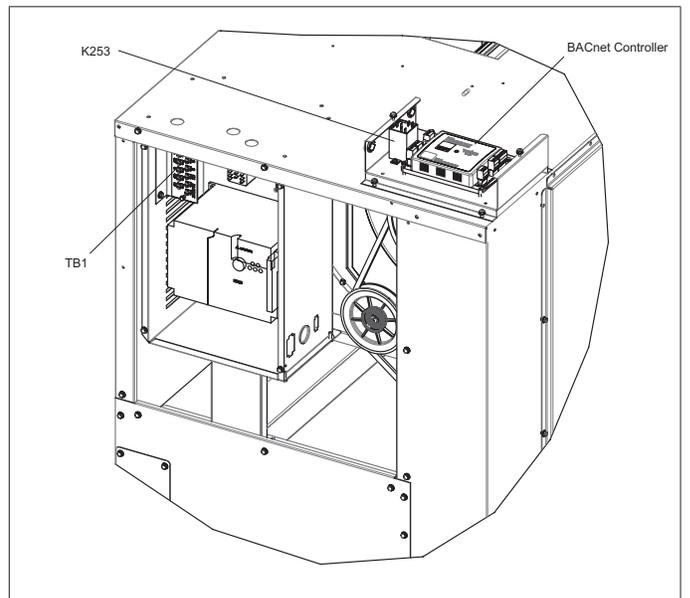


Figure 9. ELA and ELA_XA Split System (Up-Flow Position Shown)

Field Configuration and Setup

Configuration of the factory default application will be accomplished by either user input through the digital wall sensor (STE-8001) or BACnet writes to the appropriate points.

Communication configuration of the MAC address is accomplished by DIP switches. Device instance number and baud-rate is configured through the digital wall sensor

SYSTEM INTEGRATION

The following steps should be followed to integrate the BAC-8304-56 into a existing BACnet network:

1. Set BACnet MAC address.
 - a. Remove controller cover. One screw in the center of the cover secures the cover in place.

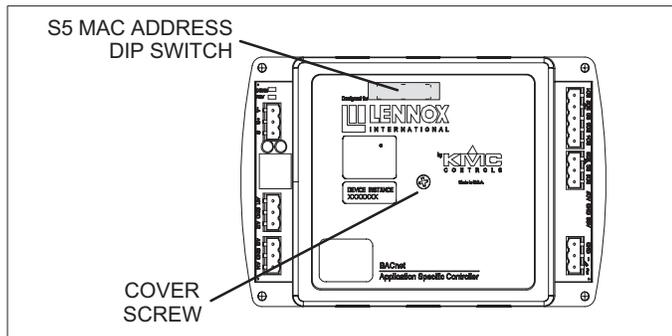


Figure 10. BACnet MAC Address Dip Switches Location (S5)

- b. Set the DIP switch S5 (see figure 10) to the desired address combination. The individual DIP switch channels will be summed to determine the MAC address (e.g. switches 1, 2, and 16 active will produce a MAC address of 19).

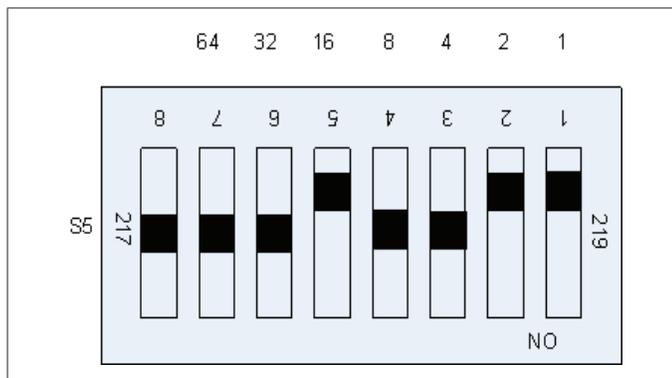


Figure 11. BACnet MAC Address Dip Switches

- c. Reinstall the controller cover.

NOTE: If the controller is powered when DIP switches are changed, the control will need to be power cycled to make the MAC address change active.

2. Set the BACnet Instance Identification (if desired).
 - a. Ensure the STE-8001 is connected to the controller.
 - b. Press and hold the increment and decrement buttons together until the display changes. The user will be prompted for the Level 2 password,

or if a Level 2 password is not set, the user will be taken to the COMM display.

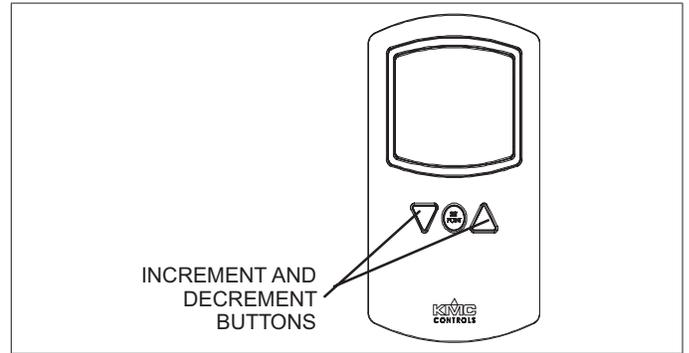


Figure 12. STE-8001W (97W23)

- c. Use the increment/decrement buttons to navigate to the COMM commissioning function. When COMM is displayed, press the set point button.
 - d. When D identification appears on the screen, the Instance identification may be changed. Use the increment/decrement buttons to change the first digit of the D identification. Press the set point button to index to the next digit. Repeat for all seven digits.
 - e. After the seventh digit is set, pressing the set point button will advance the user to the BAUD menu.
3. Set the MS/TP Baud Rate (if desired).
 - a. While in the BAUD display, press the increment/decrement buttons to select the desired baud rate. Press the set point button to save the current settings. The display returns to the COMM root menu.
 - b. Press the increment or decrement buttons to select CNFG (to change other controller settings) or EXIT to exit the configuration menu structure and return to the temperature display.
4. Connect the controller to a BACnet network and verify system configuration with front-end software.

NOTE: Refer to the KMC produced Installation and Applications Guide (103902-01) for KMC BACnet control module setting options when a JADE controller is installed on the unit.

WALL SENSORS

STE8001 models are supported through a modular RJ45 connection.

NOTE: The maximum cable length recommended is 75 feet (between controller and sensor).

OPERATING THE STE-8001

The STE-8001 is a digital wall sensor and control configuration tool. To adjust system parameters, pressing either the increment or decrement button changes the selection, setting, or value. Pressing the set point button saves the setting or value and advances the user to the next display or menu. The home screen, or default screen, is considered to be the temperature display.

NOTE: The STE-8001 sensor will also display system time if a BACnet Time synchronization has been received within the preceding 24 hours.

PASSWORD PROTECTION

The STE-8001 allows two levels of password protection: level 1 and level 2. Passwords are 4-digit numbers, set in the advanced menu (described below). If the password is non-configured (i.e. set to all zeros, 0000), no password is required to advance the display into additional displays.

The user must enter level 1 password is required to adjust the occupied cooling and heating set points. The user must enter the level 2 password to adjust any controller configuration parameter (communication or sequence parameters). The default Level 1 and Level 2 passwords are 0000.

NOTE: Passwords may be reset using DIP switch #8 on the BAC-8304-56 controller. To reset the password, DIP switch #8 shall be placed in the ON position while the controller is not powered. The controller is powered up until the RDY LED blinks in rapid sequence. Power should be removed from the controller and DIP switch #8 returned to the OFF position. The controller can then be powered normally and the passwords will be reset to 0000.

CONFIGURING SET POINTS WITH THE STE-8001

To enter or change the occupied set points, a level 1 password is required (if a level 1 password has been set). If a password is 0000, the user is not prompted to enter the password before moving into the menu structure. Starting from the temperature display, press the set point button. Using the increment/decrement buttons, enter the level 1 password (if configured). If the correct password is entered, or no password is configured, the display will advance to the occupied cooling set point display. Using the increment/decrement buttons, change the occupied cooling set point. Once the desired set point is entered, press the set point button. The display will advance to the occupied heating set point display. Repeat the process to enter the occupied heating set point. Once the occupied heating set point is entered, pressing the set point button will return the display to the temperature display.

Wiring Diagrams

1. Controls contractor completes field wiring connections to optional system components shown in dotted lines in the following wiring diagrams.
2. Wiring diagram sections are affixed to inside of unit panel in alphabetical order. "Figure 13. Affixing System Wiring Diagram" shows an example of a complete system diagram on an installation consisting of a unit with an electromechanical or electronic control system and a modulating economizer. Select the appropriate wiring diagram from the kit and affix the C section wiring diagram, provided, over the top of the existing C section wiring diagram.

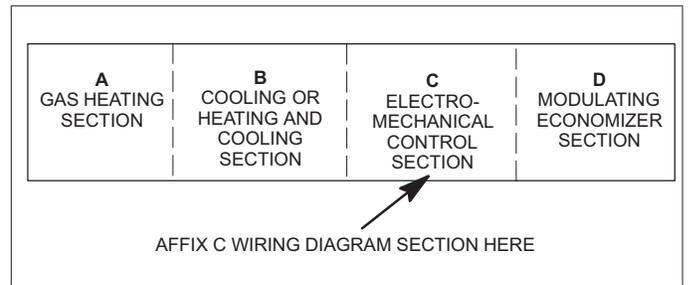
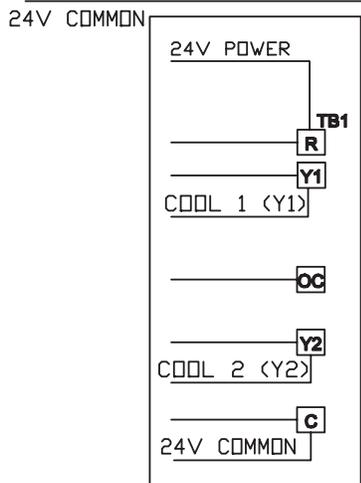
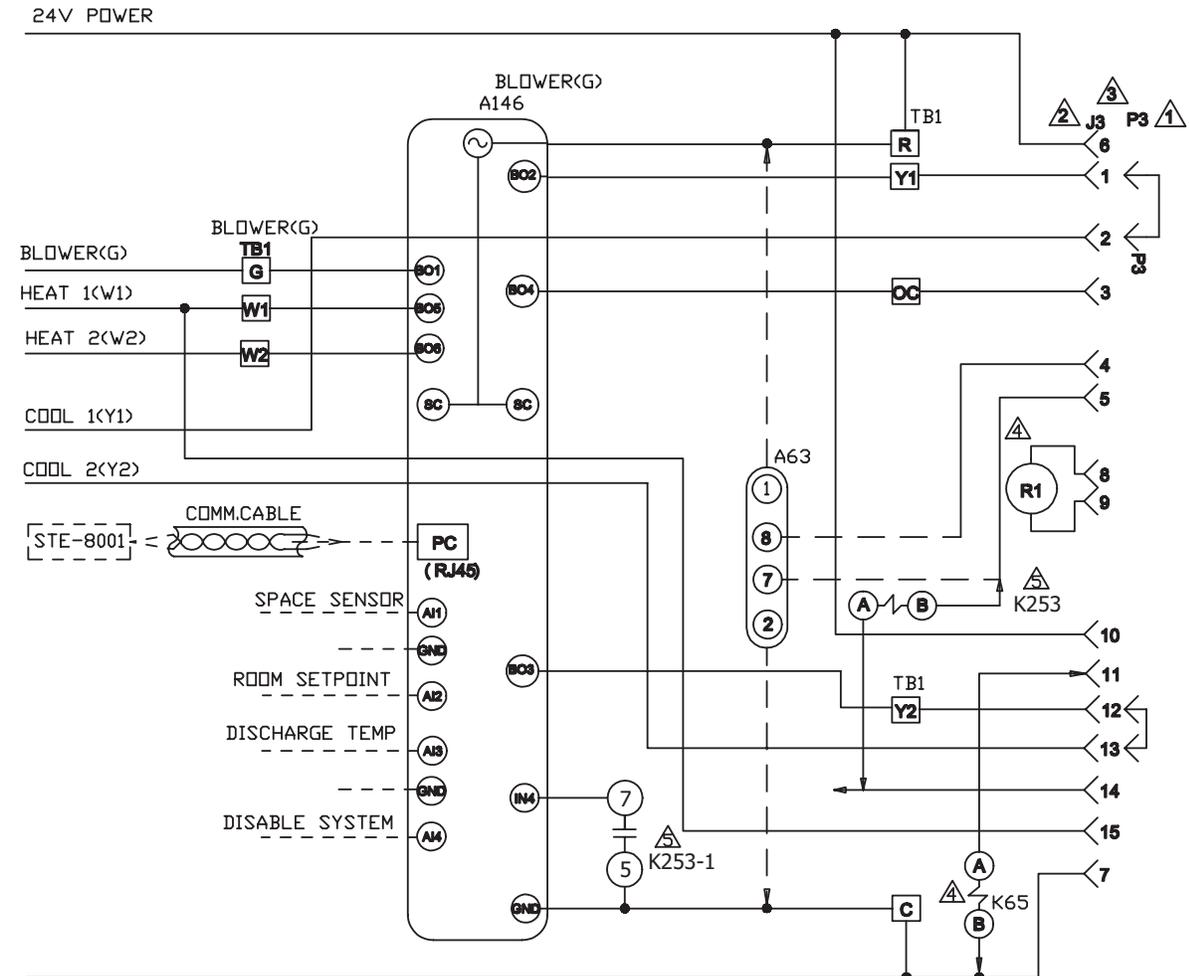


Figure 13. Affixing System Wiring Diagram

CONTROL FOR BACNET MODULE - KC/KG/KH A-, A+-, B- AND C-Box (CAV)



KEY	COMPONENT
A146	CONTROL, BACNET
A63	SENSOR, CO2
J3/P3	JACK/PLUG, UNIT ECONOMIZER
K65	RELAY, EXHAUST
K253	RELAY, ECON FOD
R1	SENSOR, MIXED AIR OR SUPPLY AIR
TB1	TERMINAL STRIP, CLASS II VOLTAGE

- ⚠ REMOVE P3 WHEN ECONOMIZER IS USED ONLY ON KCA, KGA AND KHA 180 THROUGH 300 UNITS
- ⚠ J3 MAXIMUM LOAD 20VA 24VAC CLASS II
- ⚠ J3 AND P3 ARE NOT USED ON KCA, KGA AND KHA 096 THROUGH 150 UNITS WITHOUT ECONOMIZER
- ⚠ 092-300 UNITS ONLY

⚠ ONLY USED ON UNITS WITH JADE(W7220 ECONOMIZER CONTROL)

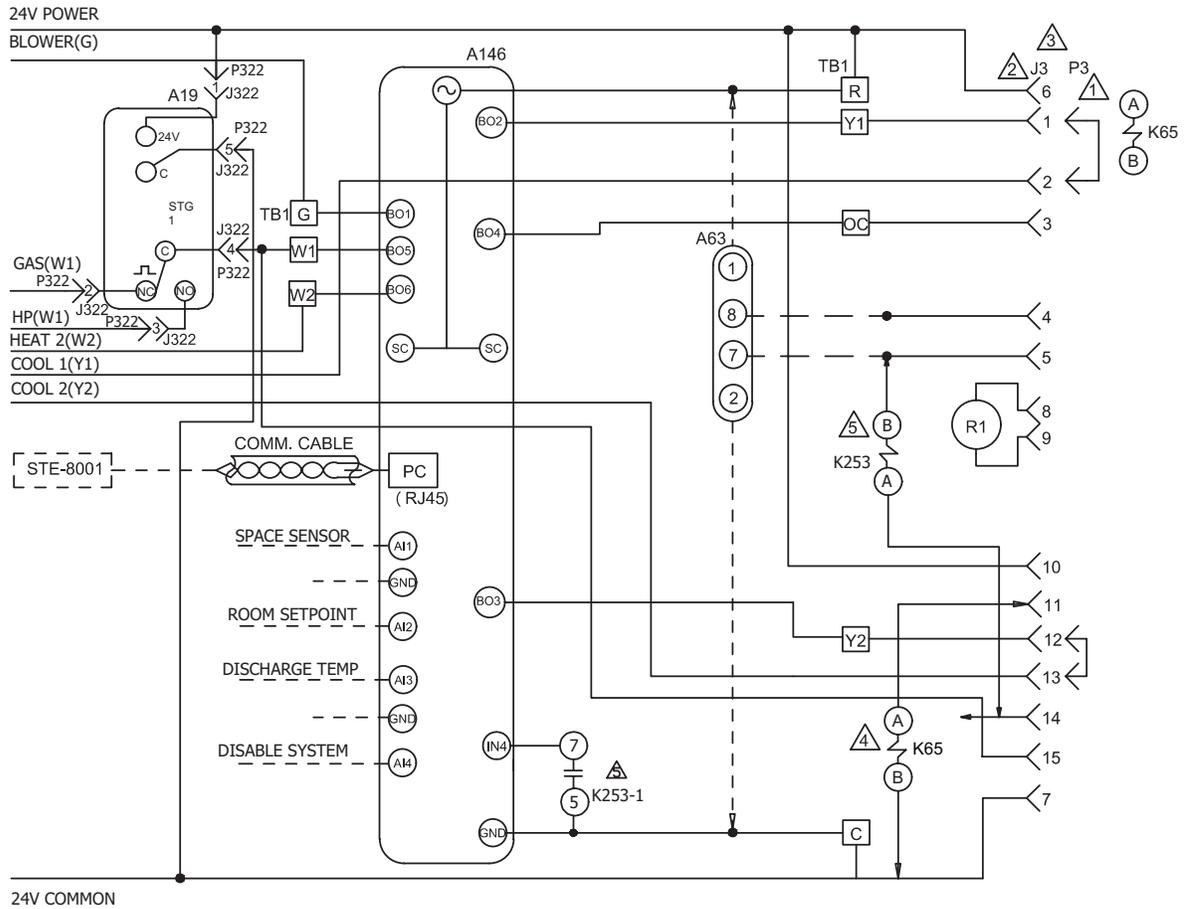
CONNECTION SCHEME FOR KCA, KGA AND KHA 092 THROUGH 150 UNITS WITHOUT ECONOMIZER ONLY

— DESIGNATES OPTIONAL WIRING
 - - - CLASS II FIELD WIRING

03/18		WIRING DIAGRAM	03/18
		537644-02	
CONTROLS			
CONTROL FOR BACNET MODULE (CAV)			
SECTION A			REV. 0
Supersedes 537563-01		New Form No. 537644-02	

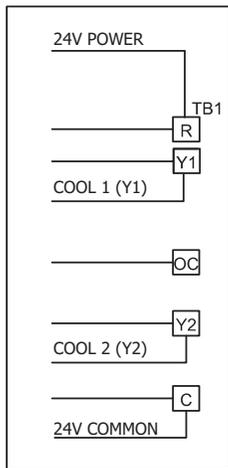
Figure 14. Control for BACnet Module KC/KG/KH A-, A+-, B- and C-Box (CAV)

CONTROL FOR BACNET MODULE - KD A-, A+- AND B-Box (CAV)



24V COMMON

KEY	COMPONENT
A146	CONTROL, BACNET
A63	SENSOR, CO2
A19	THERMOSTAT, ELECTRONIC OUTDOOR
J/P3	JACK/PLUG, ECONOMIZER OR BYPASS
J/P322	JACK/PLUG, A19 OUTDOOR THERMOSTAT
K65	RELAY, EXHAUST FAN
K253	RELAY, ECON FOD
R1	SENSOR, MIXED AIR OR SUPPLY AIR
TB1	TERMINAL STRIP, CLASS II VOLTAGE



△ CONNECTION SCHEME FOR KDB UNITS WITHOUT ECONOMIZER ONLY

△ ONLY USED ON UNITS WITH JADE (W7220 ECONOMIZER CONTROL)

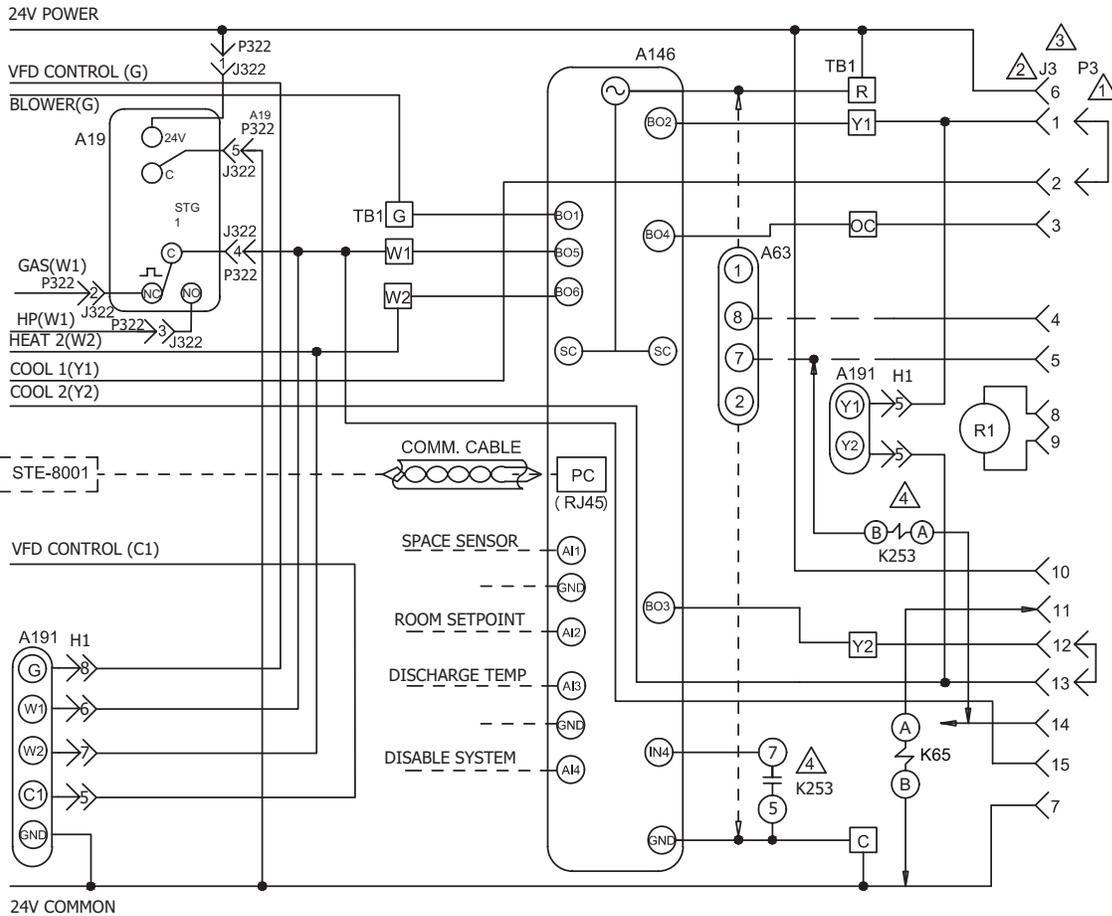
— DENOTES OPTIONAL COMPONENTS
 - - - CLASS II FIELD WIRING

- △1 REMOVE P3 WHEN ECONOMIZER IS USED
- △2 J3 MAXIMUM LOAD 20VA 24VAC CLASS II
- △3 J3/P3 ARE NOT USED ON KDB UNITS WITHOUT ECONOMIZER
- △4 092-122 UNITS ONLY

03/18		WIRING DIAGRAM	03/18
		537861-02	
CONTROLS - KDB			
CONTROL FOR BACNET MODULE (CAV A,A+, B BOX)			
SECTION C			REV 0
Supersedes		New Form No. 537861-02	

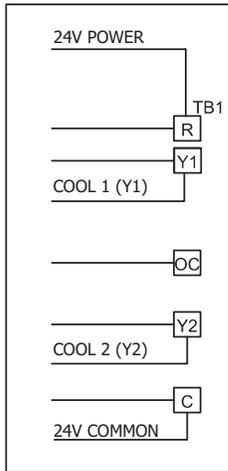
Figure 16. Control for BACnet Module - KD A-, A+- and B-Box (CAV)

CONTROL FOR BACNET MODULE - KD B-Box (VFD)



24V COMMON

KEY	COMPONENT
A19	THERMOSTAT, ELECTRONIC OUTDOOR
A63	SENSOR, CO2
A146	CONTROL, BACNET
A191	CONTROL, FCB BOARD
H1	HEADER 1 ON FCB BOARD
J3/P3	JACK/PLUG, ECONOMIZER OR BYPASS
J/P322	JACK/PLUG, A19 OUTDOOR THERMOSTAT
K65	RELAY, EXHAUST FAN
K253	RELAY, ECON FOD
R1	SENSOR, MIXED AIR OR SUPPLY AIR
TB1	TERMINAL STRIP, CLASS II VOLTAGE



CONNECTION SCHEME FOR KDB UNITS WITHOUT ECONOMIZER ONLY

- ⚠️ REMOVE P3 WHEN ECONOMIZER IS USED, ONLY ON KCA, KGA AND KHA 180 THROUGH 300 UNITS.
- ⚠️ J3 MAXIMUM LOAD 20VA 24VAC CLASS II
- ⚠️ J3/P3 ARE NOT USED ON KDB UNITS WITHOUT ECONOMIZER
- ⚠️ ONLY USED ON UNITS WITH JADE (W7220 ECONOMIZER CONTROL)

— DENOTES OPTIONAL COMPONENTS
 - - - CLASS II FIELD WIRING

03/18		WIRING DIAGRAM	09/16
		537862-02	
CONTROLS - KDB			
CONTROL FOR BACNET MODULE (VFD B BOX)			
SECTION C			REV 0
Supersedes		New Form No. 537862-02	

Figure 17. Control for BACnet Module - KD B-Box (VFD)

CONTROL FOR BACNET MODULE - ZC/ZG/ZH B-Box

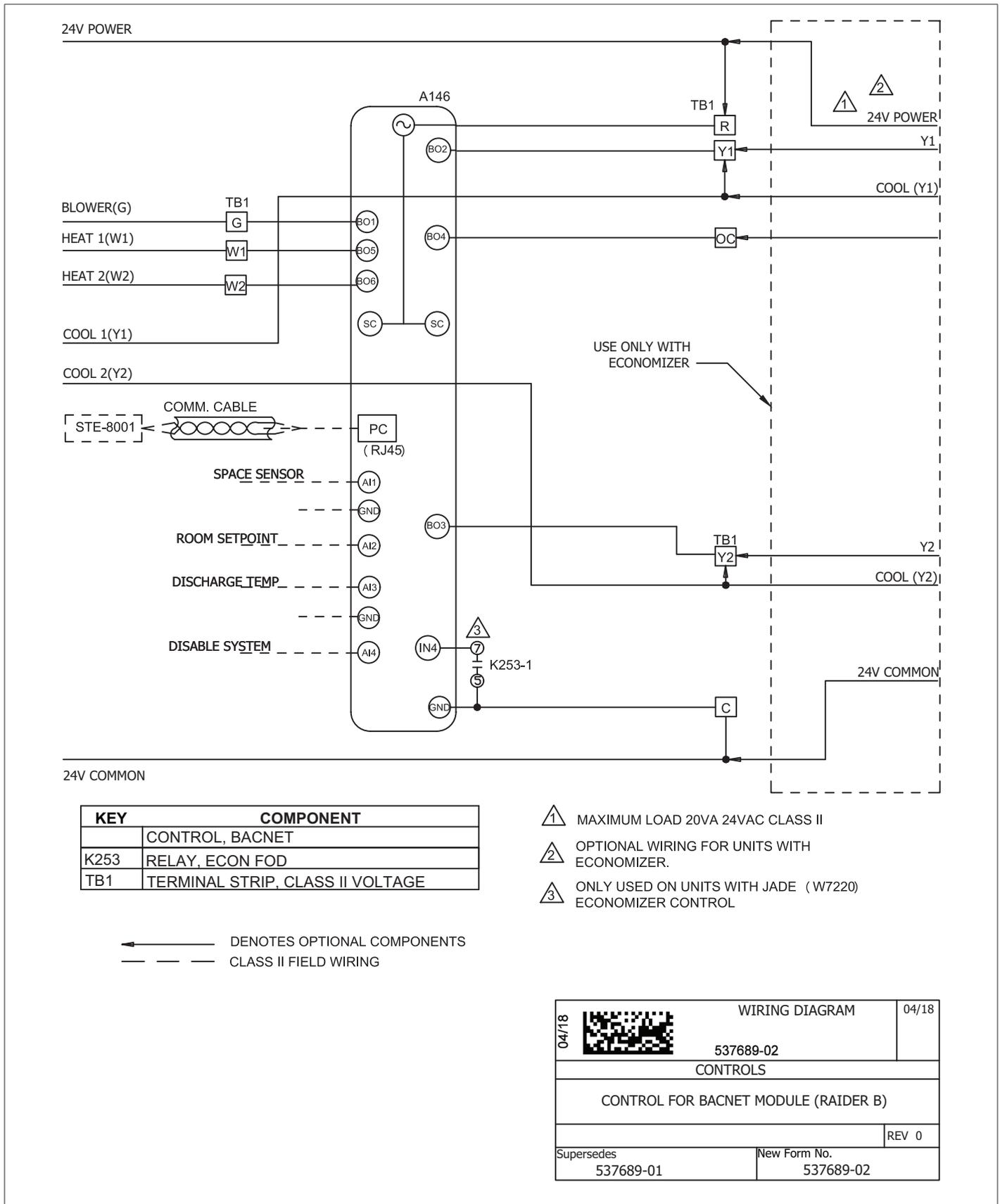
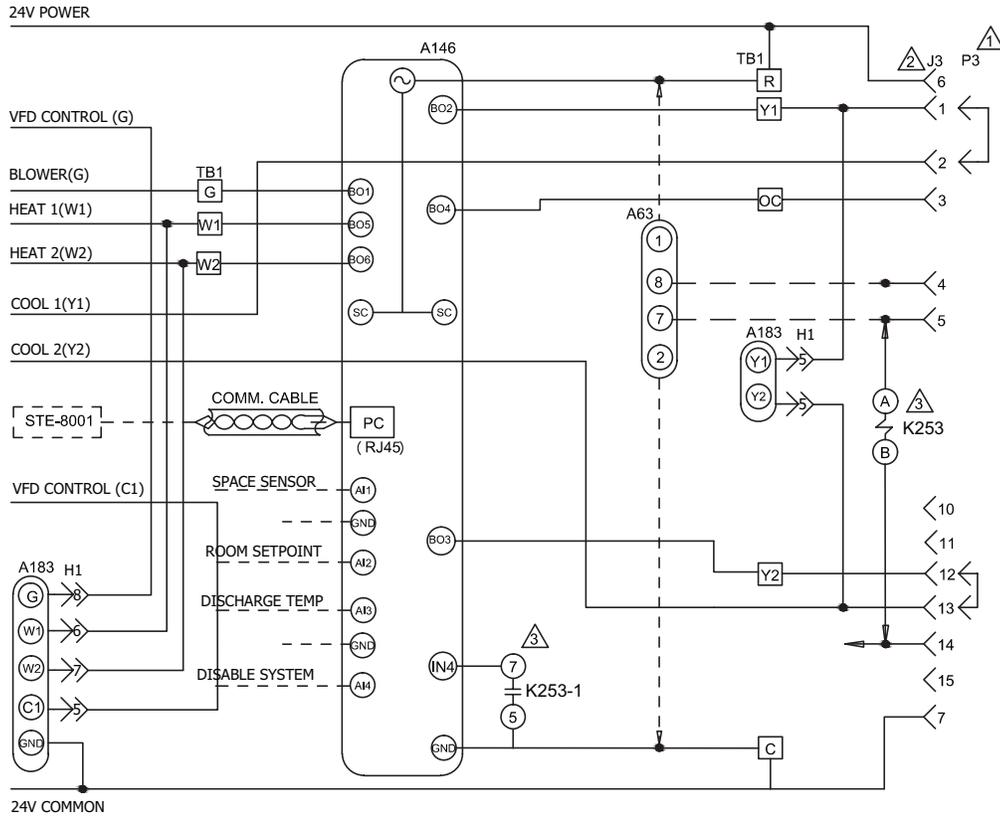


Figure 18. Control for BACnet Module - ZC/ZG/ZH B-Box

CONTROL FOR BACNET MODULE - ELA AND ELA_XA SPLIT SYSTEM



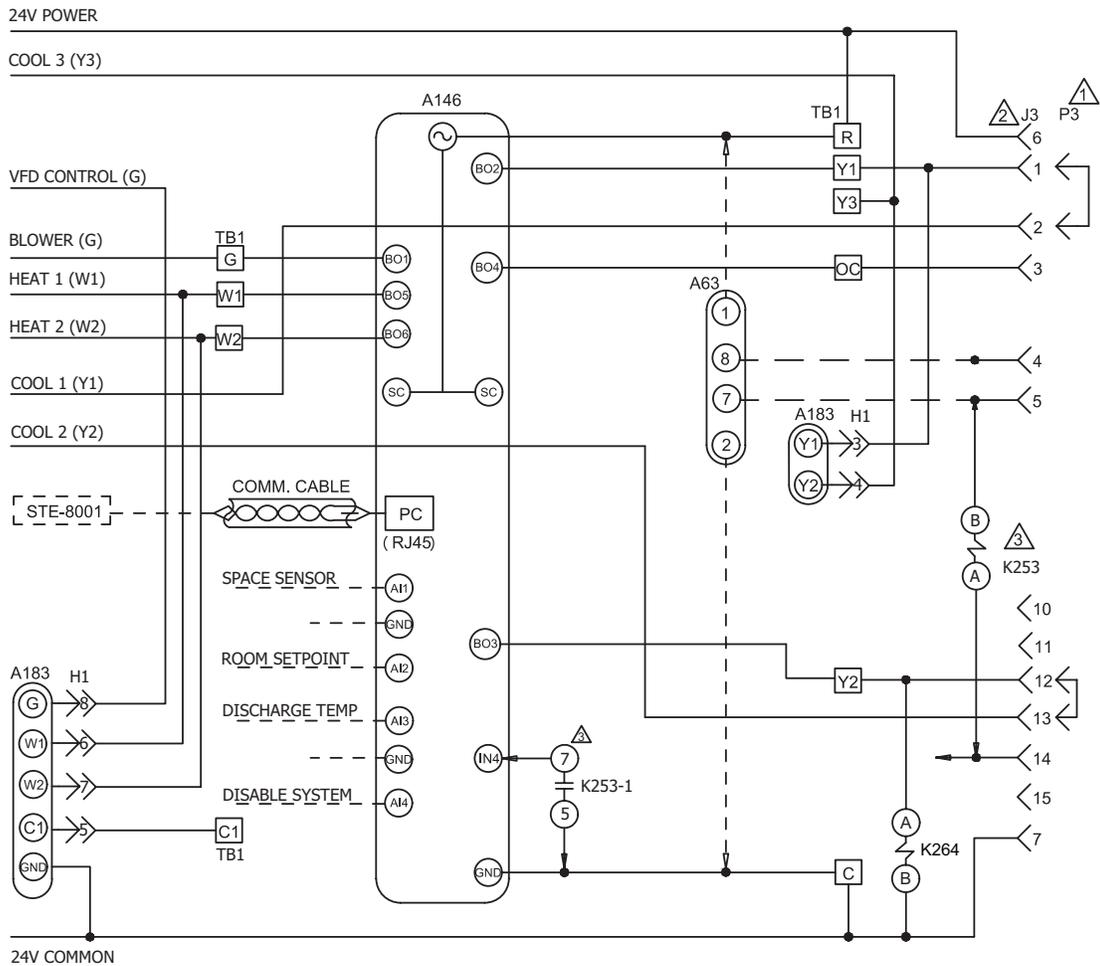
KEY	COMPONENT
A146	CONTROL, BACNET
A63	SENSOR, CO2
A183	CONTROL, VFD BOARD
H1	HEADER 1 ON VFD BOARD
J3/P3	JACK/PLUG, ECONOMIZER OR BYPASS
K253	RELAY, ECON FDD
R1	SENSOR, MIXED AIR OR SUPPLY AIR
TB1	TERMINAL STRIP, CLASS II VOLTAGE

- ⚠ REMOVE P3 WHEN ECONOMIZER IS USED, ONLY ON KCA, KGA AND KHA 180 THROUGH 300 UNITS.
- ② J3 MAXIMUM LOAD 20VA 24VAC CLASS II
- ③ ONLY USED ON UNITS WITH JADE (W7220) ECONOMIZER CONTROL

— DENOTES OPTIONAL COMPONENTS
 - - - CLASS II FIELD WIRING

10/17		WIRING DIAGRAM	10/17
		537932-01	
CONTROLS			
CONTROL FOR BACNET MODULE - ELA UNIT			
SECTION C		REV 1	
Supersedes		New Form No. 537932-01	

Figure 19. Control for BACnet Module - ELA Split System



KEY	COMPONENT
A146	CONTROL, BACNET
A63	SENSOR, CO2
A183	CONTROL, VFD BOARD
H1	HEADER 1 ON VFD BOARD
J3/P3	JACK/PLUG, ECONOMIZER OR BYPASS
K253-1	RELAY, ECON FDD
K264	RELAY, A96 SIGNAL SWITCHING
R1	SENSOR, MIXED AIR OR SUPPLY AIR
TB1	TERMINAL STRIP, CLASS II VOLTAGE

- ① REMOVE P3 WHEN ECONOMIZER IS USED
- ② J3 MAXIMUM LOAD 20VA 24VAC CLASS II
- ③ ONLY USED ON UNITS WITH JADE (W7220) ECONOMIZER CONTROL

DENOTES OPTIONAL COMPONENTS
 CLASS II FIELD WIRING

2022/07 	WIRING DIAGRAM	08/22
	538307-01	
CONTROLS		
CONTROL FOR BACNET MODULE - EL_XA UNITS		
SECTION C		REV. 0
Supersedes	New Form No. 538307-01	

Figure 20. Control for BACnet Module - EL_XA Split System

