Alternative Damper Shaft Mounting Screw Position

Adjustable Stops

Mounting Clip

Damper Shaft Hex Mounting Screws

Actuator Clutch Release

Damper Position Indicator

Alternative Damper Shaft Mounting Screw Position

Damper Shaft

Damper Shaft Collar

Alternate Mounting Bracket

Cover Release

Cover Release

Battery Location (Remove cover)

4-Position Dipswitch

Service Port Location (Remove cover)

Velocity Sensor Inputs (Barbed fittings)

P1 (LO)

P2 (HI)

Jumper for Actuator Direction

866-V
Andover Continuum

(LOW)

AIR FLOW INPUT

(HIGH)

TD LED = Yellow
RD LED = Green
Wireless LED = Red

CAUTION
MORE THAN ONE DISCONNECT SWITCH MAY BE REQUIRED TO DE-ENERGIZE THIS EQUIPMENT BEFORE SERVICING.

RS-485 PORT

COM + 21
COM − 20
SHIELD 19

Two CPU LEDs
Green = b3 controller
Yellow = i2 controller

This equipment complies with part 15 of the FCC rules. Operation is subject to the following two conditions. (1) This device may not cause harmful interference. (2) This device must accept any interference received, including interference that may cause undesired operation.

1 IN1
2 IN2
3 RET
4 IN3
5 IN4
6 RET

UNIVERSAL INPUTS

ANALOG OUTPUTS 0-10 VDC⎓

A07 18
RET 17
AO6 16

TRIAC REF 15

Wiring Requirements:
300V
8A
22 - 12AWG
6 inch-lb screw tourque

7 SPWR
8 RET
9 IN5

SMART SENSOR

DIGITAL OUTPUTS 24VAC∿, 0.5A

OUT5 14
OUT4 13
OUT3 12

Note: *Input, Output, and Smart Sensor connections will vary per controller model.*

10 24VAC∿
11 ⏚

USE COPPER CONDUCTORS ONLY
INPUT: CLASS 2 POWER ONLY
24VAC∿, 0.42A, 10VA, 50/60HZ

Mounting Bracket

Cover Release
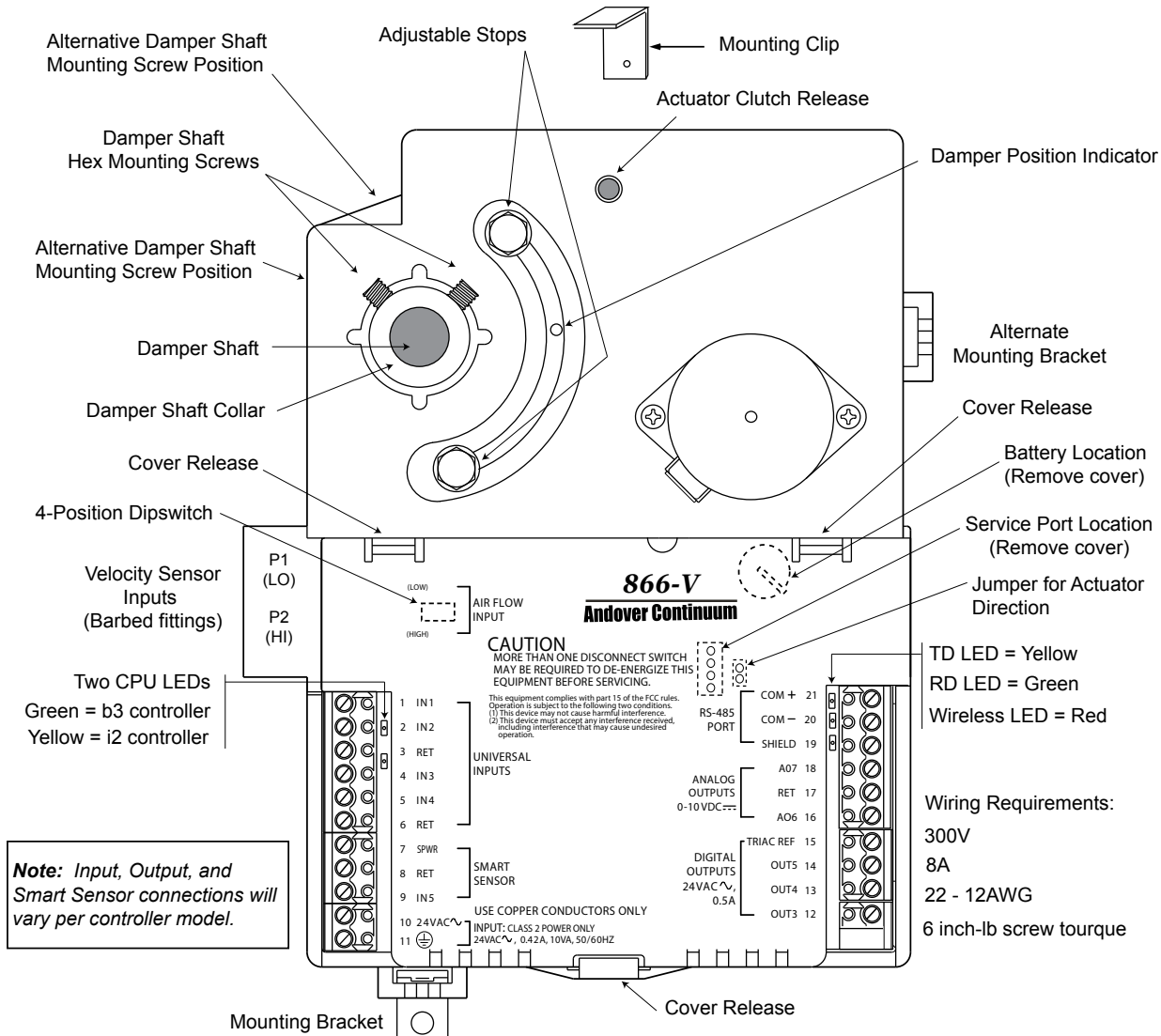
i2/b3 865/866/885-V Controller Installation

To install the controller, follow these steps:

1. Check the mounting location for the Andover Continuum i2 or b3 865/866/885-V controller. The unit is typically mounted with the controller extending down or to the right from the damper shaft. However, the controller can be operated in any position within the vertical plane.

   Note: Installing the controller to the right (with the barbed fittings pointing down) helps prevent condensate from migrating into the on-board velocity sensor.

   With a downward extension, the available area around the damper shaft must measure 6" (160 mm) down from the lower edge of the shaft, 4.5" (120 mm) to the right, 1.5" (40 mm) to the left and 1.75" (45 mm) above the shaft. Ensure the location allows enough clearance for servicing.

2. The actuator is designed to mount over a $1/2$" (12.7 mm) diameter shaft with a minimum of 2.5" (63.5 mm) of exposed shaft. If the damper shaft diameter is less than $1/2$" (12.7 mm) an adapter is required. An adapter (p/n AM-135) is available from Schneider Electric to allow mounting on $3/8$" (9.5 mm) damper shaft. The 865/866/885-V controller will not work with larger damper shaft diameters.

3. If the exposed damper shaft is less than 2" (51 mm) but at least 1" (25.4 mm) long, move the two damper shaft mounting screws to the alternate lower damper shaft positions.

4. Select the mounting bracket location that provides the most stability for the operation of the actuator. Position the mounting clip in the desired mounting bracket. Do not insert the clip more than half-way into the bracket. This allows the clip and the back of the actuator to properly align with the VAV box.

Schneider Electric

5. Press and hold the green actuator clutch release and rotate the VAV damper shaft by hand to the fully closed position. Note whether the damper is rotated clockwise (CW) or counter-clockwise (CCW) to close.

6. Slip the controller over the damper shaft. Position the actuator and, using a self tapping sheet metal screw, secure the mounting clip to the VAV box.

7. Next, press the actuator toward the box until the actuator comes into contact with the VAV box, the mounting clip snaps into the bracket, or the back of the actuator comes into contact with the VAV box.

8. Press and hold the green actuator clutch release (see Figure on cover page) and rotate the actuator collar to a nearly closed position, the 5° index mark, if the damper shaft was rotated counter-clockwise to close (Step 5). Rotate the actuator collar to the 85° index mark if the damper shaft was rotated clockwise to close (Step 5).

9. Tighten the two damper hex mounting screws using a $^1/_8$" hex Allen wrench. The minimum torque required to secure the controller to the damper shaft depends on the shaft material. The maximum torque for the socket screws is 30 inch-pounds (3.4 Nm).
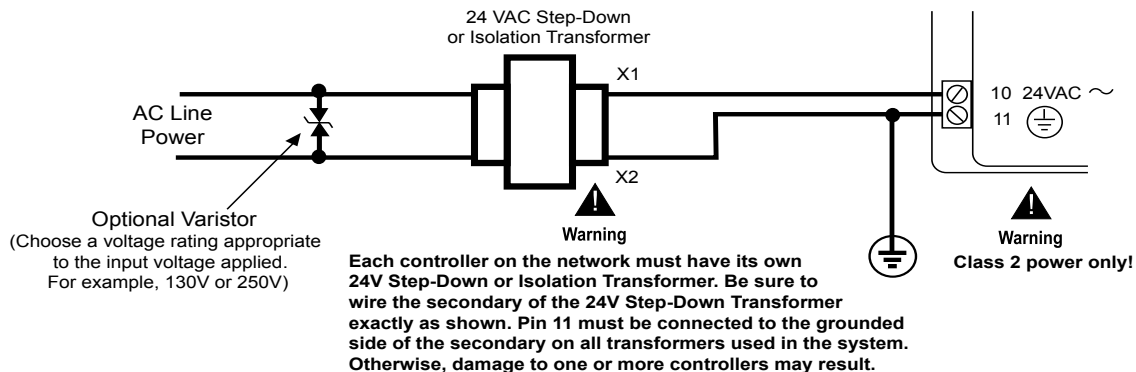
Note: The damper should rotate freely when the clutch is released. If it does not, the actuator may not be properly aligned with the damper shaft – it may be necessary to repeat Steps 4 through 9 using a new orientation.

10. If the damper does not provide a mechanical stop in the open direction, or it is not desirable to use the damper's open stop, set the adjustable stops on the 865/866/885-V controller to the desired position. Use a $^1/_4$" hex driver to adjust the screw stop on the controller.

Note: For the 866-V model only, you must calibrate the damper position feedback reporting option before using. You calibrate damper position feedback reporting by changing the damper's output attribute, LCDState, from DISABLED to ENABLED. The attribute, OverrideValue, indicates the damper position as a fractional value from 0 (at the closed stop) to 1 (at the open stop).

Whenever the Actuator Clutch Release button is pressed and the Actuator is moved manually, you need to recalibrate damper position feedback reporting. During damper calibration, the damper output will rotate from one end-stop to the other and then return to its original position. It is also recommended that you periodically recalibrate damper position feedback reporting using a Plain English (PE) program.

AC Power Connection

24 VAC Step-Down or Isolation Transformer

AC Line Power

Optional Varistor
(Choose a voltage rating appropriate to the input voltage applied. For example, 130V or 250V)

Warning
Each controller on the network must have its own 24V Step-Down or Isolation Transformer. Be sure to wire the secondary of the 24V Step-Down Transformer exactly as shown. Pin 11 must be connected to the grounded side of the secondary on all transformers used in the system. Otherwise, damage to one or more controllers may result.

10 24VAC ∼
11

Warning
Class 2 power only!

Note: Use care when attaching power wiring to these connectors. They are not to be used as a strain relief. The connectors cannot withstand excessive bending or flexing. Failing to install this transformer on remote controllers can damage it and other controllers on the network.

Wiring Rules

These modules are intended for installation within the enclosure of another product.

Do not remotely ground any part of the input sensor wiring.

Remote grounds connected to the return terminal could make the system operate incorrectly or damage the equipment.

The signal return is not true earth ground. It is an electronic reference point necessary to interpret the sensor properly.

For reliable input operation, follow these input wiring guidelines:
- Never lay wires across the surface of a printed circuit board.
- Wires should never be within 1" or 25 mm of any component on a printed circuit board.
- Use shielded input wire.
- Terminate the shield of the input wires at one end of the run only — preferably at the end where your I/O module is located.

- When stripping wire, be careful not to drop small pieces of wire inside the cabinet.
- Don't run your input wiring in the same conduit with AC power.
- Don't run your input wiring in the same conduit with your output wiring.

Grounding the Controller

To insure proper operation of the controller, it must be connected to a good earth ground. The connection must be made as close to the module as possible.
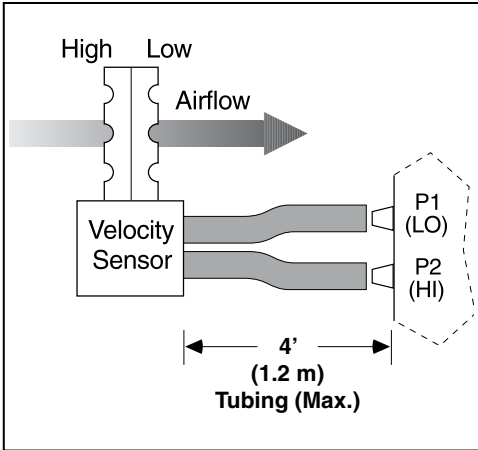
Caution: Earth ground (⏚) must be connected to avoid module damage.

Removing the Plastic Battery Tab

Before operating the controller, open the cover and remove the protective plastic battery tab. The battery location is shown in the illlustration on the cover page.

Connecting the Air Velocity Sensor

1. Connect the low pressure side of the velocity sensor to the barbed fitting labeled P1 (LO) on the controller.

2. Connect the high pressure side of the velocity sensor to the fitting labeled P2 (HI) on the controller.

Notes: Use a recommended maximum length of 4' (1.2 m) FRPE plyetheylene tubing or 0.25" (6.34 mm) O.D. and 0.125" (3.175 mm) I.D. Tygon tubing.

Do not expose the velocity sensor to moisture. If moisture condensation is a potential problem, orient the tubing and controller so that the barbed fittings are above the lowest part of the tubing to create a moisture trap.

Connections for i2/b3 865-V Controller
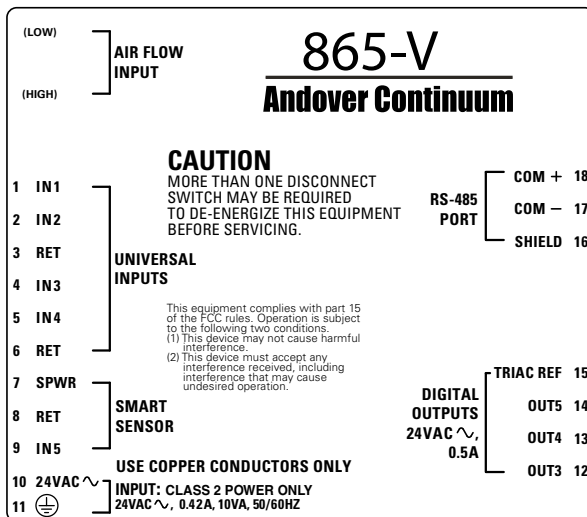
Airflow Input
One Low and one High connection

Universal Inputs
Four input and two return connections — terminals 1-6

Smart Sensor Bus Interface
One Smart Sensor connection — terminals 7-9

Power Connection
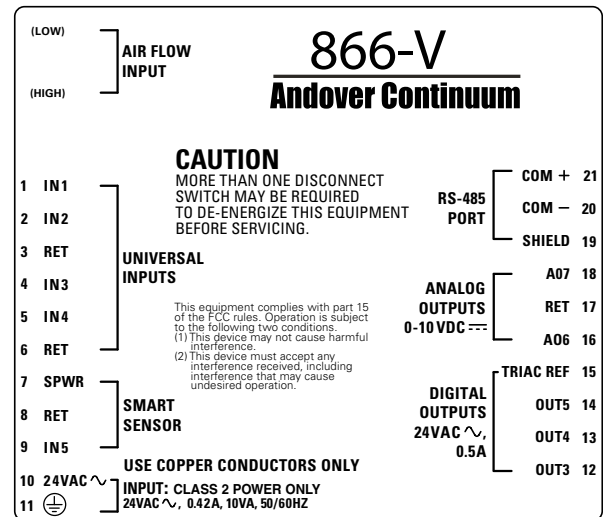One 24 VAC connection and ground — terminals 10-11

Digital Outputs
Three output connections and one triac reference — terminals 12-15

RS-485 Port
One port for a BACnet MS/TP or Infinet connection — terminals 16-18

Connections for i2/b3 866-V Controller

Airflow Input
One Low and one High connection

Universal Inputs
Four input and two return connections — terminals 1-6

Smart Sensor Bus Interface
One Smart Sensor connection — terminals 7-9

Power Connection
One 24 VAC connection and ground — terminals 10-11

Digital Outputs
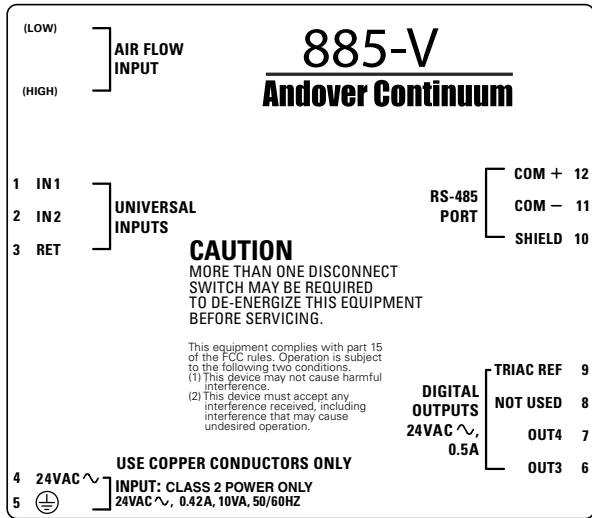Three output connections and one triac reference — terminals 12-15

Analog Outputs
Two analog outputs and one return connection — terminals 16-18

RS-485 Port
One port for a BACnet MS/TP or Infinet connection — terminals 19-21

Connections for i2/b3 885-V Controller

885-V
Andover Continuum

AIR FLOW INPUT
(LOW)
(HIGH)

UNIVERSAL INPUTS
1 IN1
2 IN2
3 RET

RS-485 PORT
COM + 12
COM − 11
SHIELD 10

CAUTION
MORE THAN ONE DISCONNECT
SWITCH MAY BE REQUIRED
TO DE-ENERGIZE THIS EQUIPMENT
BEFORE SERVICING.

This equipment complies with part 15
of the FCC rules. Operation is subject
to the following two conditions.
(1) This device may not cause harmful
interference.
(2) This device must accept any
interference received, including
interference that may cause
undesired operation.

DIGITAL OUTPUTS 24VAC ∿, 0.5A
TRIAC REF 9
NOT USED 8
OUT4 7
OUT3 6

USE COPPER CONDUCTORS ONLY
4 24VAC ∿
5 ⏚
INPUT: CLASS 2 POWER ONLY
24VAC ∿, 0.42A, 10VA, 50/60HZ

Airflow Input
One Low and one High connection

Universal Inputs
Two input and one return connection — terminals 1-3

Power Connection
One 24 VAC connection and ground — terminals 4-5

Digital Outputs
Two output connections and one triac reference — terminals 6-9

RS-485 Port
One port for a BACnet MS/TP or Infinet connection — terminals 10-12

Physical Dimensions

7.75"
(197 mm)

6.25"
(159 mm)

2.5"
(63 mm)
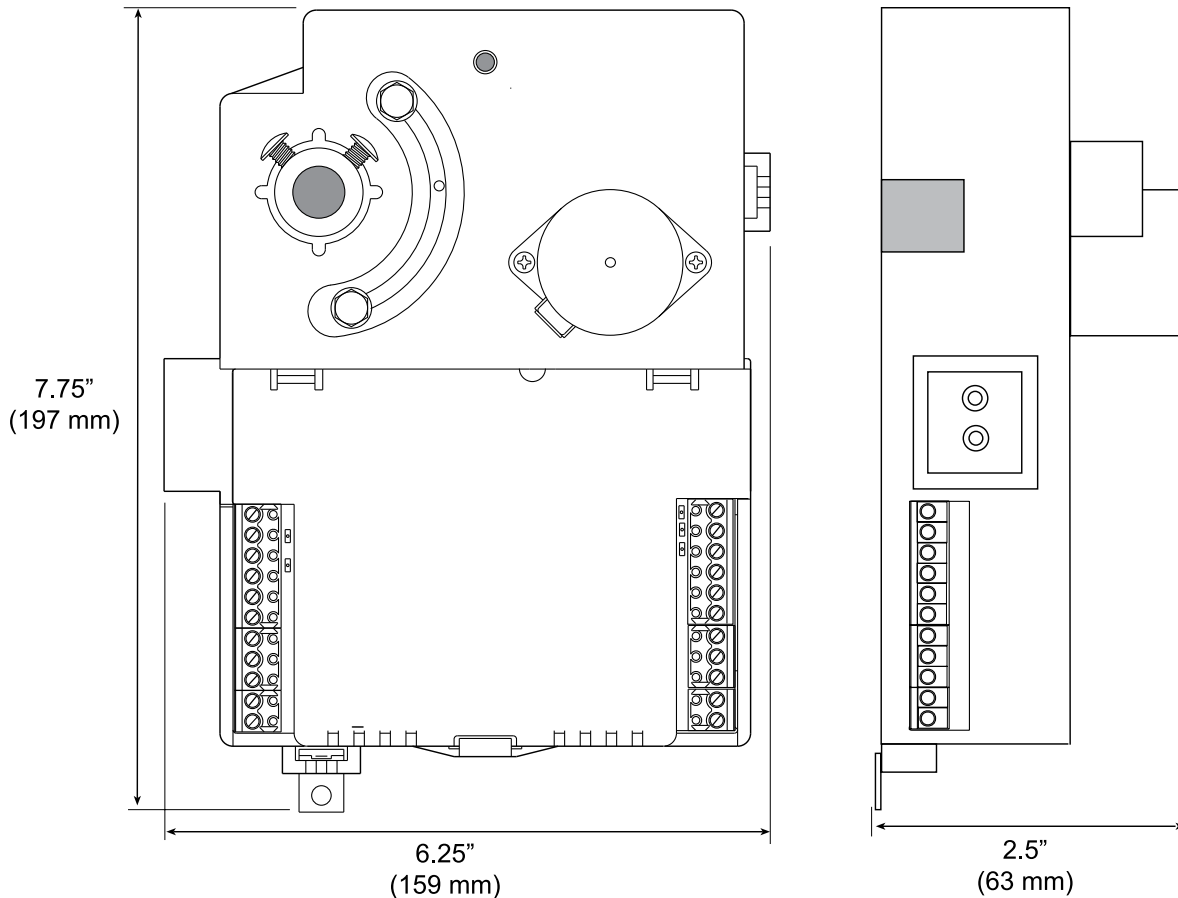
Wiring Digital Outputs

Form A Triac Outputs

The new i2/b3 865/866-V controllers use three Form A triac output terminals with a single triac reference. This configuration gives you the flexibility to wire the single triac reference as either a hot or ground connection. On these new controllers, all three outputs must be wired the same, as either hot or ground switch applications.

To make a hot switch connection, connect one of the output terminals (OUTX, where X = 3, 4, or 5) to a load, and connect the Triac Reference to the incoming 24 VAC power.

Switching Option - Triac "Form A" Hot Connection

Note: i2/b3 885-V Controller only has two digital outputs
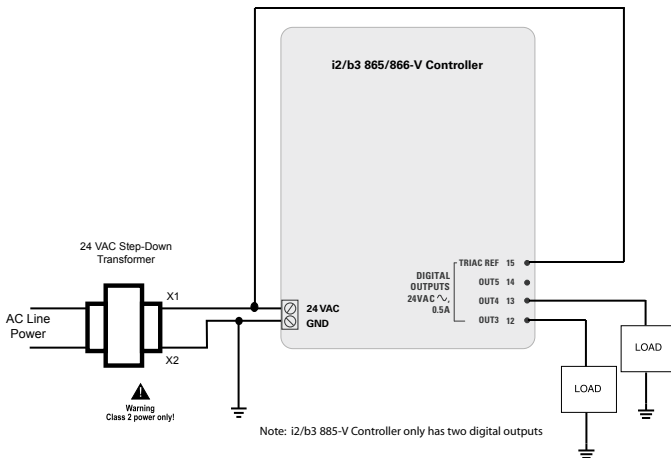
To make a ground switch connection, connect one of the output terminals (OUTX, where X = 3, 4, or 5) to a load in series with the 24 VAC incoming power, and connect the Triac Reference to ground.

Switching Option - Triac "Form A" Ground Connection

Note: i2/b3 885-V Controller only has two digital outputs
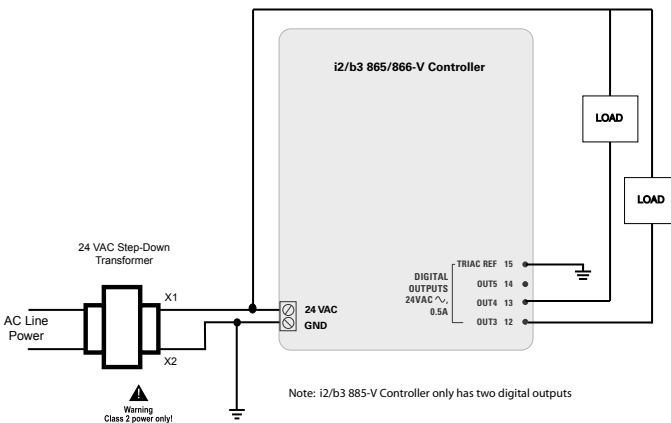
The new i2/b3 885-V controller, which only has two output terminal connections, works the same, allowing for either two hot or ground switch applications

Form K Triac Outputs

To create a Form K triac connection on the new i2/b3 865/866-V controllers, make the individual connections from terminals 12 and 13 (OUT3 and OUT4), or use terminals 13 and 14 (OUT4 and OUT5), with a common ground reference to terminal 15 (TRIAC REF).*

Switching Option - Triac "Form K" Ground Connection

Note: i2/b3 885-V Controller only has two digital outputs
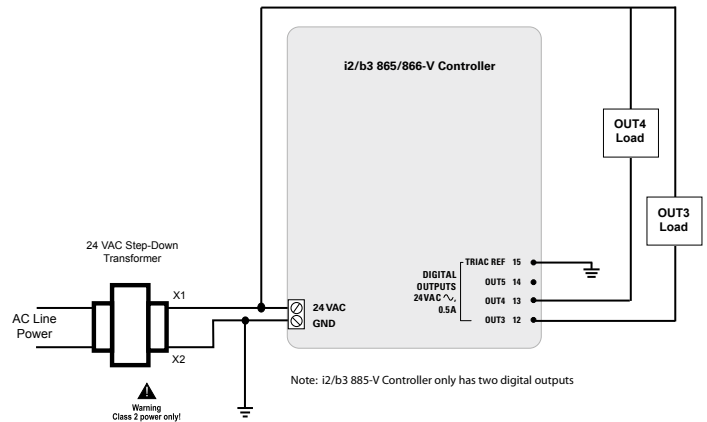
To maintain Form K triac connections on the new i2/b3 885-V controller, make the individual connections from terminals 6 and 7 (OUT3 and OUT4) with a common ground reference to terminal 9 (TRIAC REF).**

Notes: * Use Andover Continuum CyberStation is set the lower numbered digital output terminal to "tristate".
** Terminal 8 is not used on the 885-V controller.

Wireless Network Operation

Cable Access Cut-Out on Cover
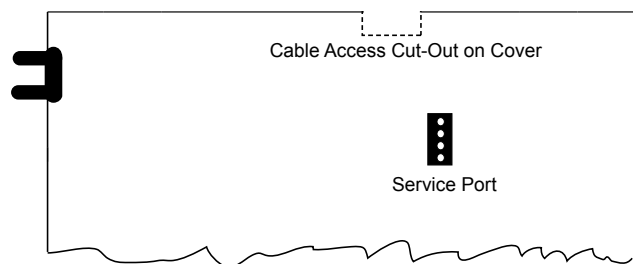
Service Port

To connect the controller to a Wireless Adapter, remove the cover and connect the Andover Continuum Wireless Adapter cable to the Service Port and run the cable through the cable access opening (cut-out) on the cover.

You must set two Continuum CyberStation software attributes for wireless operation:

• The comm port must have the Default Mode set to "Wireless".
• The software must "Learn" (discover) all the controllers on the Continuum network.

These attributes are set using the CommPort Editor in CyberStation. You need configuration privileges to configure a controller or comm port.

Specifications

Dimensions
7.75" W x 6.25" L x 2.5" H (197 x 159 x 63.5 mm)

Operating Environment
Temperature: 32° to 122° F (0° to 50° C)
Humidity: 10 to 90% RH, non-condensing

Power Requirement
Power: 24 VAC, +10% -15%, 50/60 Hz, Class 2 Limited Power
Power Consumption: Less than 10VA
Overload Protection: Fused, MOV protected

Airflow Input
Range: 0 to 1" W.C. (0-250 Pa)
Resolution: 0.0013" W.C. (0.33 Pa) @ 73° F (23° C)
Accuracy: +/- 0.05" W.C. (12.50 Pa) @ 73° F (23° C)

Communications
RS-485 port for implementing BACnet MS/TP or Infinet connections, including:
- Three-position removable screw terminal
- Standard service port, four-position shrouded connector
- Support for wireless adapter
- LEDs:
    TD = Transmit Enable
    RD = Received Data
    Wired/Wireless Field Bus

CPU LEDs
- Green = b3 software model (BACnet)
- Yellow = i2 software model (Infinet)

Damper Shaft Mounting Screws
Torque Minimum: Varies according to shaft material
Torque Maximum: 30 inch-pounds (3.4 Nm)
Hex screws: 10-32 (with supplied hex wrench)

Damper Actuator (Motor)
Shaft Diameter: 1/2" (3/8" with AM-135 adapter)
Shaft Torque: 53 inch-pounds
Damper Speed: 180 sec. @ 60 Hz and 216 sec. @ 50 Hz; for 90°
Adjustable end limits with two set screws
Motor:
- Type = 24 VAC synchronous
- Motor Protection: Mechanical clutch
- Manual clutch override with a push-button release
- Hardware position feedback (model 866-V only)

Actuator Jumper Settings (Tri-State for directional control)
Jumper Connected
- + (On) = Clockwise (CW)
- - (-On) = Counter Clockwise (CCW)
- Off
Jumper Disconnected
- + (On) = Counter Clockwise (CCW)
- - (-On) = Clockwise (CW)
- Off

Terminal Contact Ratings
- 300V
- 8A
- 22 - 12AWG
- 6 inch-lb screw torque

Universal Inputs
Connections:
- Model 865 — Four inputs and two returns
- Model 866 — Four inputs and two returns
- Model 885 — Two inputs and one return
Input Voltage Range: 0-5.115 VDC
Input Impedance: 10K to 5.120 V
Input Voltage Resolution: 5.0 mV
Digital Resolution: 10 bits
Input Voltage Accuracy: +/- 15 mV
Temperature Range: -30° to 230° F (-34° to 110° C)
Temperature Accuracy: +/- 1° F from -10° to +150° F
                    (+/- 0.56° C from -23° to +66° C)
Counter Frequency: 4 Hz @ 50% duty cycle
Input Protection: +/- 1000V transients
Input Filter: 16 Hz with a one pole RC filter
Connector: Removable, 5 mm screw terminal
4-Position Dipswitch (Model 865 and Model 866):
- One switch per input
- Four universal inputs
- Enables/Disables input pullup resistors

Smart Sensor Interface
Connections:
- Model 865 — One input, SPWR, and return
- Model 866 — One input, SPWR, and return
- Model 885 — Not Available

Digital Outputs
Connections:
- Model 865 — Three triac output and one reference
- Model 866 — Three triac output and one reference
- Model 885 — Two triac output and one reference
SPST Accuracy: 0.1 second for pulse width modulation
Contact Ratings: 0.5A Maximum, 24VAC
Connector: Removable, 5 mm screw terminal

Analog Outputs
Connections:
- Model 865 — Not Available
- Model 866 — Two analog output and one return
- Model 885 — Not Available
Analog Output Channels Required: Two, Voltage only
Voltage Output Range: 0-10V
Output Source Current: 5 mA Maximum
Voltage Output Load: 2K Minimum Impedance
Voltage Output Resolution: 50 mV
Digital Resolution: 8 bits
Output Voltage Accuracy: 100 mV
Connector: Removable, 5 mm screw terminal

Regulatory Notices

Federal Communications Commission
FCC Rules and Regulations CFR 47, Part 15, Class A
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.
(2) This device must accept any interference received, including interference that may cause undesired operation.

Caution: The user that changes or makes modifications not expressly approved by Schneider Electric for compliance could void the user's authority to operate the equipment.

Industry Canada
ICES-003
This is a Class A digital device that meets all requirements of the Canadian Interference Causing Equipment Regulations.

CE - Compliance to European Union (EU)
2004/108/EC - EMC Directive
This equipment complies with the rules of the Official Journal of the European Communities specified in the EMC directive
89/336/EEC governing the Self Declaration of the CE Marking for the European Union.

N1831 C-Tick (Australian Communications Authority (ACA))
This equipment carries the C-Tick label and complies with EMC and radio communications regulations of the Australian Communications Authority (ACA), governing the Australian and New Zealand (AS/NZS) communities.

WEEE - Directive of the European Union (EU)
This equipment and its packaging carry the waste of electrical and electronic equipment (WEEE) label, in compliance with European Union (EU) Directive 2002/96/EC, governing the disposal and recycling of electrical and electronic equipment in the European community.

and UL listed product for the United States and Canada, Open Energy Management

Related Documentation

Document	Document Number
i2/b3 865/866/885-V Controller Retrofit Guide	30-3001-988
i2 Controller Technical Reference	30-3001-861
b3 and b4920 Controller Technical Reference	30-3001-862
b3xxx PICS statements — contact Schneider Electric Technical Support	