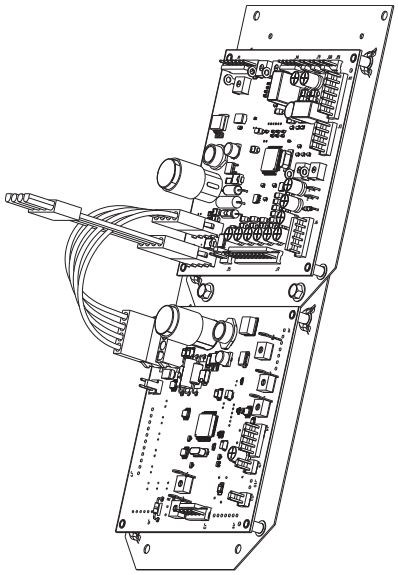
Installation Instructions

CO_2 Sensing Kit

Used with Precedent™ 17 Plus, Multi-Speed Indoor Fan, Single Zone VAV (SZVAV)



Model Number:	**Used With:**
BAYCO2K101*, ASYSTAT721*	Wall mount CO_2 sensor and DCV wiring
BAYCO2K103*, ASYSTAT723*	Duct mount CO_2 sensor and DCV wiring
*Digit 26 = 0 (DCV wiring is included in the kit)	
BAYSENS250*, ASYSTAT250*	Duct mount CO_2 sensor only
BAYSENS251*, ASYSTAT251*	Wall mount CO_2 sensor only
*Digit 26 = 1 (DCV wiring is already installed in unit)	

List of applicable Precedent™ models

T/YHC037-047, T/YHC067, T/YZC036-120, D/WHC090**, D/WSC120**, D/WHC036-060

**Digit 15 = 6, 7

⚠SAFETY WARNING

Only qualified personnel should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed, adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all precautions in the literature and on the tags, stickers, and labels that are attached to the equipment.

June 2023 **ACC-SVN139M-EN**

Introduction

Read this manual thoroughly before operating or servicing this unit.

Warnings, Cautions, and Notices

Safety advisories appear throughout this manual as required. Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.

The three types of advisories are defined as follows:

⚠WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠CAUTION	Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It could also be used to alert against unsafe practices.
NOTICE	Indicates a situation that could result in equipment or property-damage only accidents.

Important Environmental Concerns

Scientific research has shown that certain man-made chemicals can affect the earth's naturally occurring stratospheric ozone layer when released to the atmosphere. In particular, several of the identified chemicals that may affect the ozone layer are refrigerants that contain Chlorine, Fluorine and Carbon (CFCs) and those containing Hydrogen, Chlorine, Fluorine and Carbon (HCFCs). Not all refrigerants containing these compounds have the same potential impact to the environment. Trane advocates the responsible handling of all refrigerants.

Important Responsible Refrigerant Practices

Trane believes that responsible refrigerant practices are important to the environment, our customers, and the air conditioning industry. All technicians who handle refrigerants must be certified according to local rules. For the USA, the Federal Clean Air Act (Section 608) sets forth the requirements for handling, reclaiming, recovering and recycling of certain refrigerants and the equipment that is used in these service procedures. In addition, some states or municipalities may have additional requirements that must also be adhered to for responsible management of refrigerants. Know the applicable laws and follow them.

⚠WARNING

Proper Field Wiring and Grounding Required!

Failure to follow code could result in death or serious injury. All field wiring MUST be performed by qualified personnel. Improperly installed and grounded field wiring poses FIRE and ELECTROCUTION hazards. To avoid these hazards, you MUST follow requirements for field wiring installation and grounding as described in NEC and your local/state/national electrical codes.

⚠WARNING

Personal Protective Equipment (PPE) Required!

Failure to wear proper PPE for the job being undertaken could result in death or serious injury. Technicians, in order to protect themselves from potential electrical, mechanical, and chemical hazards, MUST follow precautions in this manual and on the tags, stickers, and labels, as well as the instructions below:

- **Before installing/servicing this unit, technicians MUST put on all PPE required for the work being undertaken (Examples; cut resistant gloves/sleeves, butyl gloves, safety glasses, hard hat/bump cap, fall protection, electrical PPE and arc flash clothing). ALWAYS refer to appropriate Safety Data Sheets (SDS) and OSHA guidelines for proper PPE.**
- **When working with or around hazardous chemicals, ALWAYS refer to the appropriate SDS and OSHA/GHS (Global Harmonized System of Classification and Labeling of Chemicals) guidelines for information on allowable personal exposure levels, proper respiratory protection and handling instructions.**
- **If there is a risk of energized electrical contact, arc, or flash, technicians MUST put on all PPE in accordance with OSHA, NFPA 70E, or other country-specific requirements for arc flash protection, PRIOR to servicing the unit. NEVER PERFORM ANY SWITCHING, DISCONNECTING, OR VOLTAGE TESTING WITHOUT PROPER ELECTRICAL PPE AND ARC FLASH CLOTHING. ENSURE ELECTRICAL METERS AND EQUIPMENT ARE PROPERLY RATED FOR INTENDED VOLTAGE.**

⚠ WARNING

Follow EHS Policies!

Failure to follow instructions below could result in death or serious injury.

- **All Trane personnel must follow the company's Environmental, Health and Safety (EHS) policies when performing work such as hot work, electrical, fall protection, lockout/tagout, refrigerant handling, etc. Where local regulations are more stringent than these policies, those regulations supersede these policies.**
- **Non-Trane personnel should always follow local regulations.**

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Installation

General

An economizer must be installed and functional before attempting to install a CO_2 sensing kit.These sensors detect and control the carbon dioxide level in the conditioned space by measuring CO_2 concentration, comparing it with a user-adjustable set point and sending a corresponding control signal to the economizer module. This causes the economizer damper to be positioned so that sufficient fresh air is introduced into the conditioned space to reduce and maintain the CO_2 concentration to a minimum level as selected by the user.

Parts List

Quantity	Description
Each CO_2 sensor kit includes:	
1	ReliaTel™ Ventilation Module (RTVM) X13651517
4	#6-32 x 3/4 in. RTVM mount screw
1	Wire harness (4366-7752)
2	Bracket (4366-0923)
2	Bracket mount screws #10-16 x 1/2
1	Length of 1/8 in. x 3/4 in. foam gasket tape
2	#8-32 Screws for mounting LTB
2	Wire tie, Standard
5	Wire tie, Pop-In anchor type
1	Wire harness (4366-3302) with low voltage terminal board, for CO_2 and ventilation override
1	Plastic bushing for 1.09 diameter hole
1	Plastic bushing for 0.88 diameter hole
1	Wiring diagram adhesive label
1	CO_2 Kit Has Been Installed label
BAYCO2K101*, ASYSTAT721* and BAYSENS251*, ASYSTAT251* include:	
1	CO_2 Demand-controlled ventilation wall-sensor (4190 4100) with instructions and mounting hardware
BAYC02K103*, ASYSTAT723* and BAYSENS250*, ASYSTAT250* include:	
1	CO_2 Demand-controlled ventilation duct-sensor (4190 4101) with instructions and mounting hardware

Inspection

Unpack all components of the CO_2 sensing and check carefully for shipping damage. If any damage is found, report it immediately, and file a claim against the transportation company.

⚠WARNING

Hazardous Voltage w/Capacitors!

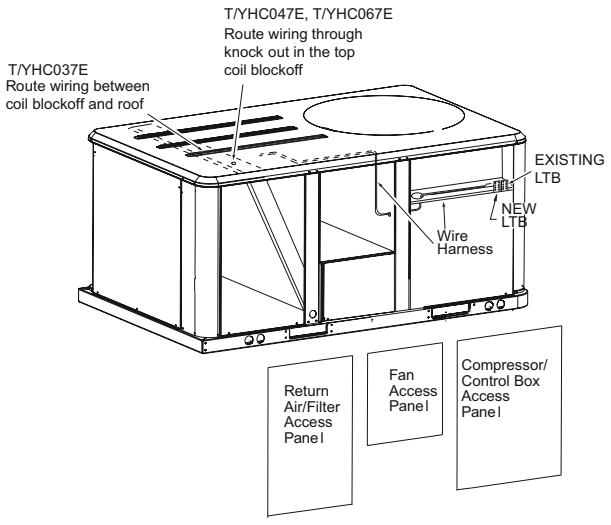
Failure to disconnect power and discharge capacitors before servicing could result in death or serious injury. Disconnect all electric power, including remote disconnects and discharge all motor start/run capacitors before servicing. Follow proper lockout/ tagout procedures to ensure the power cannot be inadvertently energized. For variable frequency drives or other energy storing components provided by Trane or others, refer to the appropriate manufacturer's literature for allowable waiting periods for discharge of capacitors. Verify with a CAT III or IV voltmeter rated per NFPA 70E that all capacitors have discharged.

1. Remove access panels. See Figure 1.

CO_2 Kits	Ventilation Override Kit	Harness
BAYCO2K101*	BAYVNOR002*	4366-3302
ASYSTAT721*		
BAYCO2103*		
ASYSTAT723*		

Note: *If at least one of these accessories has previously been installed, or the unit has factory installed reheat dehumidification (model digit 22 = B) or factory installed DCV wiring (model digit 26 = 1), skip to Step 24.*

Figure 1. D/WHC090, WSC120**, Y/TZC 072-102 units (digit 30 = C,D,F)**



2. Refer to wiring diagram 4366-1048 (included in kit) and the following instructions to install the CO_2 and ventilation override wiring harness 4366-3302 in the unit.
   Refer to the unit wiring diagrams inside the compressor access panel for location and identification of components.

3. For units other than Y/TZC120 and D/WSC120**, check the indoor/outdoor divider panel for a knockout below the control box. See Figure 1, p. 4.

   If knockout exists, remove it in preparation for installing the harness.

   If it does not exist, use an Greenlee type punch to install a 7/8-inch diameter hole in the location. See Figure 1, p. 4.
4. Y/TZC120 and D/WSC120** use the hole on the left wall of the high voltage control box compartment for harness routing. See Figure 2.
5. Place the harness provided with the kit in the unit control box and install the low voltage terminal board (LTB) attached to the kit.
6. Place the LTB adjacent to the similar LTB in the unit control box and secure with the two # 8 screws provided using the two existing 0.136-inch diameter holes in the control box.
7. Connect wire 100EE from the kit harness to the existing LTB, terminal 3. See Figure 4, p. 8.
8. Connect wire 101YY to the low voltage common terminal on TNS1.

   For Y/TZC120 and D/WSC120** connect wire 101YY to the low voltage terminal block in the upper left corner of the control box.
9. Route the remaining wires in the kit harness through the control box. Pull them through the large hole in the far-left side of the bottom of the control box. Next, pull them through the hole made in Step 3. Take the 0.88-inch diameter, plastic bushing provided and place it around the wires. Snap it into the hole to protect the wires.

   For Y/TZC120 and D/WSC120** route the remaining wires in the kit harness through the hole in the left wall of the high voltage control box compartment.
10. Refer to wiring diagram 4366-1048 (included in the kit) and connect the 3-pin connector 5P6 on harness 4366-3302 to the ReliaTel™ Options Module (RTOM) connector 5J6.

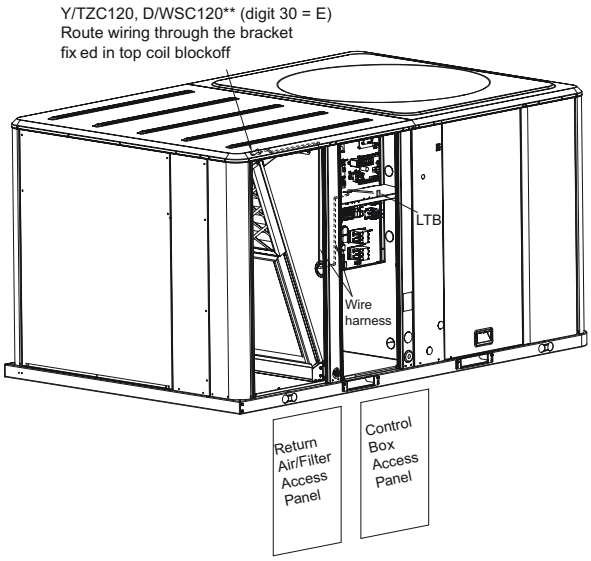
Important: *For Y/TZC 072-120 units: RTOM and RTVM modules are located in the control box and should be mounted without a bracket.*

For T/YHC037E*R, T/YHC047E*R, T/YHC067E*R (17 Plus) and T/YZC036E*R, T/YZC048F*R, T/YZC060E*R

11. Install bracket 4366-0923 below the RTOM. See Figure 5, p. 8, Figure 6, p. 9, and Figure 7, p. 9.

Note: *Some RTOM brackets cannot be mounted. If this is the case, replace existing RTOM bracket with additional 4366-0923 bracket included in kit.*

Figure 2. Y/TZC120, D/WHC120, D/WHC090, D/WSC120** units (digit 30 = E)**



12. Install the RTVM (ReliaTel Ventilation Module) on bracket 4366-0923. See Figure 5, p. 8, Figure 6, p. 9, and Figure 7, p. 9.

Note: *J1, J2 connectors are located at the top left for proper harness connections. See Figure 7, p. 9.*

13. Disconnect factory harness from RTOM-J2 connector and connect harness to RTVM-J2 connector.
14. Connect harness 4366-7752 (included in the kit) to the RTOM-J2 connector and RTVM-J1 connector.

Notes:

- *RTOM-J2 connector is the outlet. RTVM-J1 connector is the plug.*
  Verify harness connector locks are engaged to confirm 4366-1172 is installed correctly. See Figure 7, p. 9.
- *Remove knockout from the indoor top coil block-off. See Figure 1, p. 4.*

15. Route wires 150 A and 151 A (multiconductor cable) along the bottom of the raceway and through the top coil block-off knockout (along with power exhaust motor wires, if available).
16. Place the 1.09-inch plastic bushing around the cable and in the knockout hole to protect the cable if a bushing is not available. See Figure 1, p. 4.
17. For T/YHC037E and T/YZC036E, route wires 150 A and 151 A (multiconductor cable) along the bottom of the raceway and between the roof and coil block-off in line with one of the roof ribs. See Figure 1, p. 4.

T/YZC(072, 090, 102), D/WHC090**, and D/WSC120**

18. Refer to Figure 1, p. 4 and locate the RTOM module behind the fan access panel. Check the panel for two mounting holes below the RTOM. If holes exist, mount the RTVM with two ea. #6 x 32 screws. If holes do not exist, use a (#35, 7/64, 2.8-mm) drill bit to create two holes just below the RTOM and mount the RTVM.
    a. Disconnect factory harness from RTOM-J2 connector and connect harness to RTVM-J2 connector.
    b. Connect harness 4366-7752 (included in the kit) to RTOM-J2 and RTVM-J1 connector.

Note: *RTOM-J2 connector is the receptacle. RTVM-J1 connector is the plug.*
Verify harness connector locks are engaged to confirm 4366-1172 is installed correctly. See Figure 6, p. 9.

    c. Remove knockout from the indoor top coil block-off. See Figure 1, p. 4.
    d. Route wires 150 A and 151 A (multiconductor cable) along the bottom of the raceway and then through the top coil block-off knockout (along with power exhaust motor wires, if available).
    e. Place the 1.09-inch plastic bushing around the cable and in the knockout hole to protect the cable if a bushing is not available. See Figure 1, p. 4.

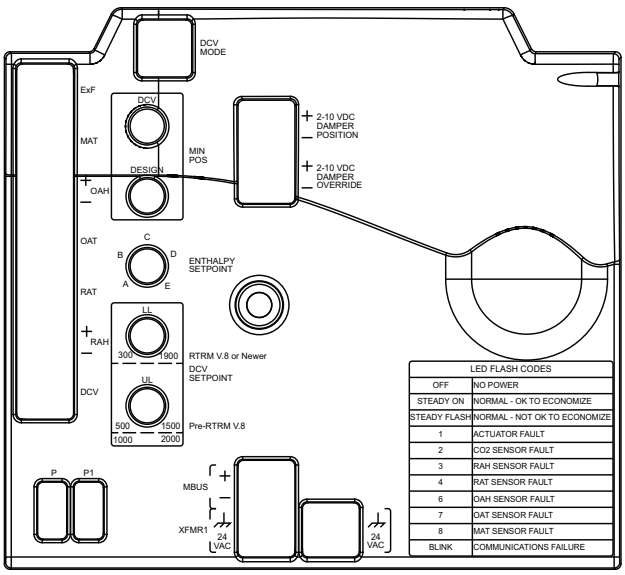
T/YZC120 and WSC120E

19. Refer to Figure 2, p. 5 and locate the RTOM module in the upper left control box. Check the control panel for two mounting holes just above the RTOM, centered at the top of control box. If holes exist, mount the RTVM with two ea. #6 x 32 screws. If holes do not exist, use a (#35, 7/64, 2.8-mm) drill bit to create two holes and install the RTVM.
    a. Disconnect factory harness from RTOM-J2 connector and connect harness to RTVM-J2 connector.
    b. Connect harness 4366-7752 (included in kit) to RTOM-J2 connector and RTVM-J1 connector.

Note: *RTOM-J2 connecter is the receptacle. RTVM-J1 connector is the plug.*
Verify harness connector locks are engaged to confirm 4366-1172 is installed correctly. See Figure 6, p. 9.

    c. Route wires 150 A and 151 A (multiconductor cable) over top coil block-off. See Figure 2, p. 5.

Figure 3. RTEM module



20. Connect plug 6P8 to the jack marked **DCV** on the RTEM per the wiring diagram.
21. To avoid air and moisture leakage, install foam gasket tape around wires at plastic bushings to seal barrier penetrations.

Note: *Use provided wire ties to secure excess wiring and prevent wires from contacting sharp edges or hot surfaces.*

22. On the compressor access panel, next to the main unit wiring diagram, apply the provided CO_2 and ventilation override wiring diagram label.
23. Apply **BAYCO$_2$ Kit has been installed** label next to the main unit wiring diagram label.
24. Install CO_2 sensor in conditioned space or return air duct according to instructions packed with the sensor.
25. Make field wiring connections to LTB installed above per CO_2 and ventilation override wiring diagram.
26. Route low voltage external field wiring and secure to existing low voltage zone sensor or thermostat wiring.
27. Replace any filters removed in Step 1 of installation instructions.

Unit Close up

Replace the three access panels removed in Step 1 p. 4.

Demand Control Ventilation (DCV)

To reduce power consumption, DCV eliminates over-ventilating the space by allowing the fresh air damper to close further than non- CO_2 sensing systems.

DCV adjusts the fresh air damper from a DCV minimum position up to the design minimum position. Units with variable speed fan will require special handling of the fresh air damper minimum position control in order to compensate for the non-linearity of airflow. An RTVM and RTEM are utilized to accommodate five (Design/DCV) minimum position POTs for damper adjustments. The minimum offset between DCV minimum position and design minimum position is 10% and is maintained throughout the fan range.

Table 1. Damper ranges

POTs	Damper Range
POT 1	Low Fan Design Min Position (0-100% damper range, default 50%)
POT 2	Low Fan DCV Min Position (0-100% damper range, default 40%)
POT 3	Mid Fan Design Min Position (0-75% damper range, default 37%)
POT 4	High Fan Design Min Position (10- 50% damper range, default 25%)
POT 5	High Fan DCV Min Position (0- 40% damper range, default 15%)

Table 2. RTVM setpoint POTs

POTs	RTVM Setpoint
POT 1	Low Fan Design Min Position = RTVM: R130 (SA REHEAT)
POT 2	Low Fan DCV Min Position = RTVM: R41 (DEHUMID)
POT 3	Mid Fan Design Min Position = RTVM: R136 (DA COOL - FAN SPD)

Note: See Figure 5, p. 8.

Table 3. RTEM setpoint POTs

POTs	RTEM Setpoint
POT 4	High Fan Design Min Position = RTEM: MIN POS-DESIGN
POT 5	High Fan DCV Min Position = RTEM: MIN POS-DCV

Note: See Figure 3, p. 6.

DCV can be adjusted for CO_2 concentrations from 300 - 2000 ppm using the DCV SETPOINT-LL/UL POTs located on the RTEM.

DCV SETPOINT-LL corresponds to DCV Minimum CO_2 concentration setting of 300 - 1900 ppm.

DCV SETPOINT-UL corresponds to building CO_2 setpoint with concentrations of 500 - 2000 ppm.

Damper position for all conditions is determined using an algorithm that weighs CO_2 concentration, fan speed, damper minimum position settings.

When the CO_2 level is greater than or equal to DCV SETPOINT-LL, the supply fan is energized and fresh air damper modulates between a minimum opening of high fan DCV minimum position up to a maximum of low fan design minimum position.

If the CO_2 level reaches DCV SETPOINT-UL, the fresh air damper will modulate between minimum opening of high fan design minimum position and maximum of low fan design minimum position.

If the CO_2 levels drops below DCV SETPOINT-LL, the fresh air damper will modulate between minimum opening of high fan DCV minimum position up to low fan DCV minimum position. If the fan mode is set to AUTO the fan will shut-off when CO_2 level is 50 ppm below DCV SETPOINT-LL.

DCV Setup, Damper Position and CO_2 Setpoint

Important: *Before turning on the fan, conduct the minimum position setpoint procedure used without CO_2 to obtain and record visually the POT setting and/or the corresponding DC voltage settings for the min and max required to meet ASHRAE standards.*

⚠WARNING

Hazardous Voltage w/Capacitors!

Failure to disconnect power and discharge capacitors before servicing could result in death or serious injury. Disconnect all electric power, including remote disconnects and discharge all motor start/run capacitors before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized. For variable frequency drives or other energy storing components provided by Trane or others, refer to the appropriate manufacturer's literature for allowable waiting periods for discharge of capacitors. Verify with a CAT III or IV voltmeter rated per NFPA 70E that all capacitors have discharged.

Note: *For better accuracy, connect a DC voltmeter to the **2-10 VDC Damper Position** terminals on the RTEM module to verify adjustments. Refer to Table 4, p. 8 to determine the damper blade position.*

1. Remove power from unit.
2. Connect CO_2 sensor to LTB terminals per instructions.

Note: *To enable DCV, the system control must see a working CO_2 at start-up. DCV will be disabled if there is an invalid CO_2 reading.*

3. Apply power to unit and confirm the CO_2 sensor is working.

Notes:

- *To adjust the damper position turn the potentiometer clockwise to increase or counterclockwise to decrease the amount of ventilation. Refer to Table 1.*
- *Use the ReliaTel™ TEST Mode to set the fan condition for damper position adjustment. For TEST model step description, see the ReliaTel Test Label on the unit access panel.*

4. Set DCV minimum damper position to meet regulatory requirements by adjusting:
   a. POT 2. DCV Min Position - To energize low fan, put ReliaTel in TEST Mode Step 1 (Fan On).
   b. POT 5. DCV Min Position - To energize high fan, put ReliaTel in TEST Mode Step 4 (Cool 2).

   Note: *For units with three steps of cooling, put ReliaTel in TEST Mode Step 5 (COOL 3) for high fan.*
5. Set design minimum damper position to meet code requirements by adjusting:
   a. POT 1. Design Min Position - To energize min fan, put ReliaTel in TEST Mode Step 1 (Fan On).
   b. POT 3. Design Min Position - To energize mid fan, put ReliaTel in TEST Mode Step 3 (Cool 1).
   c. POT 4. Design MIn Position - To energize fan high fan, put ReliaTel in TEST Mode Step 4 (COOL 2). For units with three steps of cooling, put ReliaTel in TEST Mode Step 5 (COOL 3) for high fan.
6. Set design minimum damper position to meet code requirements using MIN POS, Design potentiometer.
   - To increase the amount of ventilation, turn the MIN POS, design potentiometer clockwise to **OPEN**. Full clockwise = 50%.
   - To decrease the amount of ventilation, turn the MIN POS, design potentiometer counterclockwise to **CLOSE**. Full counterclockwise = 10%.
7. Set DCV Minimum CO_2 setpoint to desired value using DCV SETPOINT, LL potentiometer.

Note: *To adjust the potentiometer, turn clockwise to increase ppm, counterclockwise to decrease ppm. Range is 300 - 1900 ppm.*

8. Set building CO_2 setpoint to desired value using UL DCV SETPOINT potentiometer.

   To increase the potentiometer, turn clockwise to increase ppm and counterclockwise to decrease ppm. Range is 500-2000 ppm.

Table 4. Voltage to percent open

Approx. DC voltage	Percent open (%)
2	0
3	12.5
3.8	25
4.7	37.5
5.8	50

Figure 4. Wiring diagram

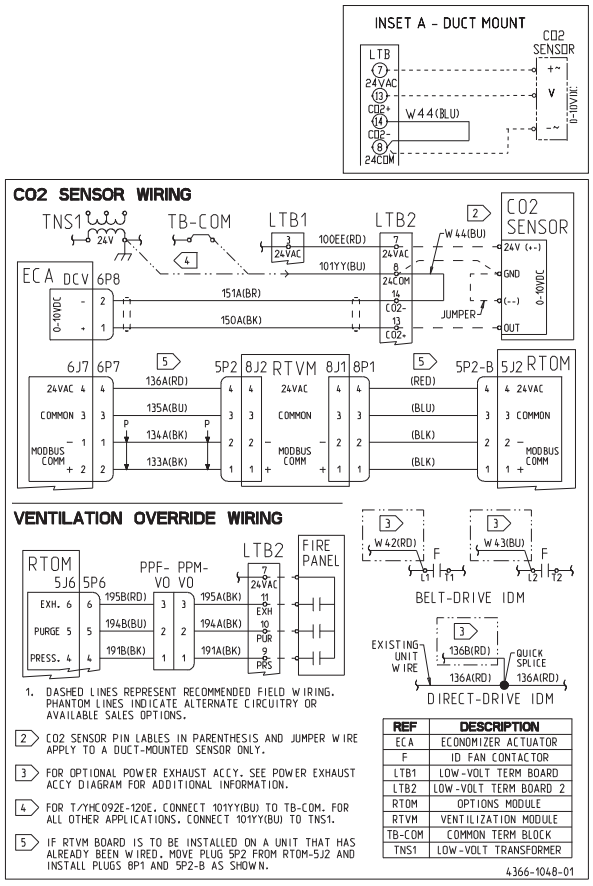


Figure 5. ReliaTel™ ventilation module (RTVM)

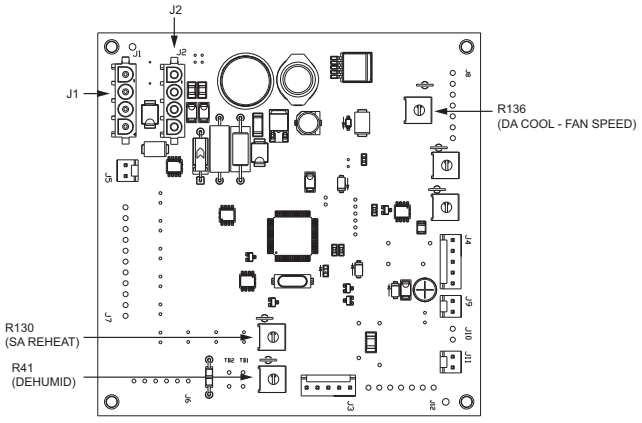


Figure 6. 17 plus options

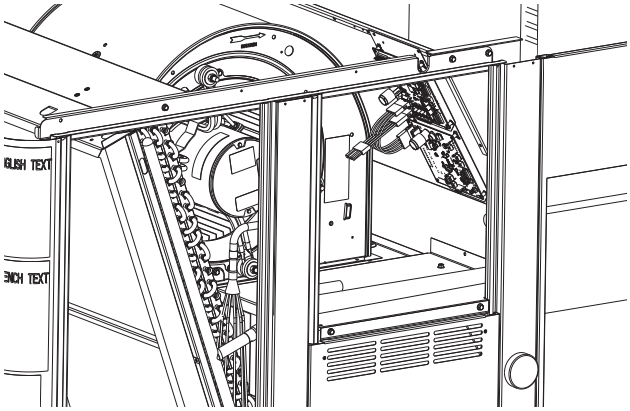
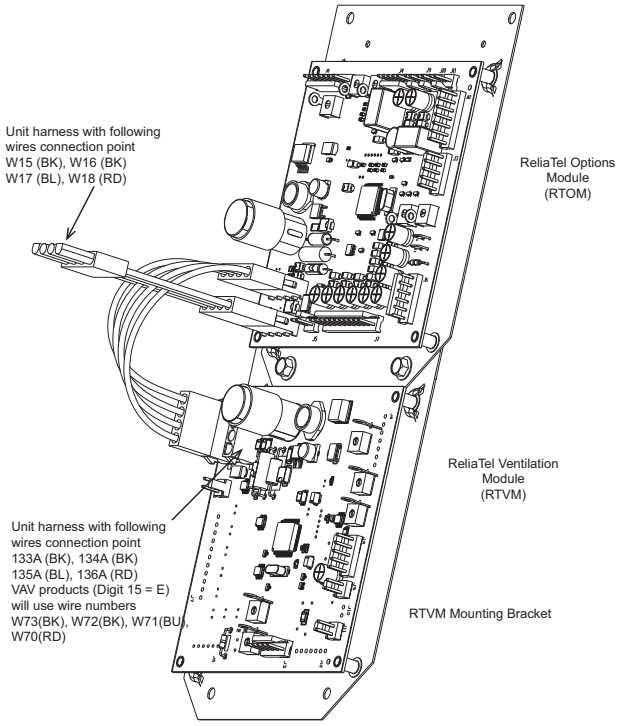


Figure 7. RTVM, RTEM connections



Notes

Trane and American Standard create comfortable, energy efficient indoor environments for commercial and residential applications. For more information, please visit trane.com or americanstandardair.com.

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Supersedes ACC-SVN139L-EN (Apr 2020)