Installation Instructions

CO_2 Sensing Kit

Foundation™ Packaged Rooftop Units
3 to 5 Tons
15 to 25 Tons

Model Numbers:	**Used With:**
BAYCO2K300*, ASYSTAT900*	Foundation Wall Mounted Sensor
BAYCO2K301*, ASYSTAT901*	Foundation Duct Mounted Sensor

⚠ 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.

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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.**

⚠WARNING

R-454B Flammable A2L Refrigerant!

Failure to use proper equipment or components as described below could result in equipment failure, and possibly fire, which could result in death, serious injury, or equipment damage.

The equipment described in this manual uses R-454B refrigerant which is flammable (A2L). Use ONLY R-454B rated service equipment and components. For specific handling concerns with R-454B, contact your local representative.

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Revision History

- Used with information updated to meet A2L standards.
- Added Installation - 15 to 25 Tons chapter.

General Information

Carefully review installation instructions.

- 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

Table 1. BAYCO2K300*/ASYSTAT900*

Qty	Description
1	CO_2 Demand-Controlled Ventilation Wall-Sensor (X13790422) with Instructions and Mounting Hardware
1	CO_2 Kit Has Been Installed Label

Table 2. BAYCO2K301*/ASYSTAT901*

Qty	Description
1	CO_2 Demand-Controlled Ventilation Duct-Sensor (X13790423) with Instructions and Mounting Hardware
1	CO_2 Kit Has Been Installed Label

Inspection

1. Unpack all components of the kit.
2. Check carefully for shipping damage. If any damage is found, report it immediately, and file a claim against the transportation company.

Installation – 3 to 5 Tons

⚠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. Verify with a CAT III or IV voltmeter rated per NFPA 70E that all capacitors have discharged.

1. Remove compressor access panel.
2. Apply CO_2 Kit Has Been Installed label next to the main unit wiring diagram label.
3. Install CO_2 sensor in conditioned space or return air duct according to instructions provided with the sensor.
4. Make field wiring connections to LTB per unit wiring schematic located on compressor access panel.
5. Route low voltage external field wiring and secure to existing low voltage zone sensor or thermostat wiring.
6. Reinstall the compressor access panel.

CO_2 Sensor Operation for Units With Economizer

Demand Control Ventilation (DCV) – Standard Economizer

- DCV eliminates over-ventilating the space by allowing the fresh air damper to close further than non-CO_2 sensing systems, reducing power consumption.
- DCV adjusts the fresh air damper between a DCV minimum position and design minimum position.
- DCV Minimum Position equals non- CO_2 sensing systems minimum damper position - 10 percent, or more, down to 0 percent open.
- When the CO_2 level is greater than or equal to the DCV Minimum CO_2 setpoint, the supply fan is energized and the fresh air damper modulates between the DCV minimum position setpoint and the design minimum setpoint, increasing the amount of outdoor air flow and reducing the CO_2 level in the space.
- The damper will only open up to the design minimum position setpoint.
- If the CO_2 level drops below the DCV minimum CO_2 setpoint - 50 ppm, the fresh air damper will drive to the DCV minimum position.
- If CO_2 level rises above the building CO_2 setpoint, the fresh air damper will open to the design minimum position setpoint.
- DCV setpoint potentiometers on the economizer module can be adjusted for CO_2 concentrations from 300 to 2000 ppm (lower limit to upper limit).

Demand Control Ventilation (DCV) – Low Leak Economizer

- DCV eliminates over-ventilating the space by allowing the fresh air damper to close further than non-CO_2 sensing systems, reducing power consumption.
- JADE controller adjusts the fresh air damper between the VENTMIN position and VENTMAX position.
- VENTMIN position equals non-CO_2 sensing systems MIN POS position down to 0 percent open.
- When the CO_2 level is greater than or equal to the CO_2 ZERO setpoint, the supply fan is energized and the fresh air damper modulates between the VENTMIN and the VENTMAX setpoints, increasing the amount of outdoor airflow and reducing the CO_2 level in the space. The damper will only open up to the VENTMAX setpoint.
- If the CO_2 level drops below the CO_2 ZERO setpoint, the fresh air damper will drive to the VENTMIN position.
- If CO_2 level rises above the (CO_2 ZERO + CO_2 SPAN) setpoint, the fresh air damper will open to the VENTMAX setpoint.
- JADE controller can be adjusted for CO_2 concentrations from 0 to 2000 ppm (lower limit to upper limit).

DCV Setup, Damper Position, and CO_2 Setpoint

⚠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. Verify with a CAT III or IV voltmeter rated per NFPA 70E that all capacitors have discharged.

1. Before beginning, turn the fan ON.
2. Conduct the minimum position setpoint procedure used WITHOUT CO_2.
3. Obtain and record visually the potentiometer setting and/or the corresponding DC voltage settings for the min and max required to meet ASHRAE standards.

Standard Economizer CO_2 Setup

1. Turn off power to the unit for this procedure.
2. Connect CO_2 sensor to LTB terminals per installers guide and confirm CO_2 sensor is working correctly.

   The unit/ Economizer Control Actuator (ECA) module must see a working CO_2 sensor at start-up to enable DCV. DCV will be disabled if there is an invalid CO_2 reading.
3. Set the DCV Minimum Position to meet regulatory requirements using the MIN POS, DCV MAX potentiometer.

   To adjust the position setting for the required ventilation air, turn the MIN POS, DCV MAX potentiometer clockwise OPEN to increase the amount of ventilation, or counterclockwise CLOSE to decrease the amount of ventilation. Full clockwise = 40%, full counterclockwise = 0% (damper closed).
4. Set design minimum position to meet code requirements using MIN POS, Design potentiometer.

   To adjust the position setting for the required ventilation air, turn the MIN POS, Design potentiometer clockwise OPEN to increase the amount of ventilation, or counterclockwise CLOSE to decrease the amount of ventilation. Full clockwise = 50%, full counterclockwise = 10%.
5. Set DCV Minimum CO_2 setpoint to desired value using DCV SETPOINT, L potentiometer.

   To adjust the potentiometer, turn clockwise to increase ppm, counterclockwise to decrease ppm. Range is 300 to 1900 ppm.
6. Set building CO_2 setpoint to desired value using DCV SETPOINT, UL potentiometer.

   To adjust the potentiometer, turn clockwise to increase ppm, counterclockwise to decrease ppm. Range is 1000 to 2000 ppm.
7. DCV damper and CO_2 settings are now complete.

   With no fan operation there will be no damper movement. As a result, adjustments will be approximate. Better accuracy can be obtained by testing and balancing the economizer system. Refer to the table below for help approximating the damper blade position.

Table 3. Voltage to percent open

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

Low Leak Economizer CO_2 Setup

1. Turn off power to the unit for this procedure.
2. Connect CO_2 sensor to LTB terminal per installers guide and confirm CO_2 sensor is working correctly.

   The unit economizer module must see a working CO_2 sensor at start up in order to enable DCV. DCV parameters will not display or will be invalid.
3. Go to the SETPOINTS menu on the economizer controller and set DCV SET to meet regulatory requirements. Default setting is 1100 ppm and can range from 500 to 2000 in increments of 100.

   Above the setpoint, the outside air dampers will modulate open to bring in additional outside air to maintain a space ppm level below the setpoint.
4. Set VENTMAX setpoint to meet regulatory requirements. Used for ventilation max cfm setpoint. Displays 2 to 10V if <3 sensors (RA, OA, and MA). Default is 2.8V. With 2-speed fan units, VENTMAX L (low speed fan) and VENTMAX H (high speed fan) settings are required. Default for VENTMAX L is 3.2V and VENTMAX H is 2.8V.

   VENTMAX is the same setting as MIN POS would be if you did not have the CO_2 sensor.
5. Set VENTMIN setpoint to meet regulatory requirements. Used for ventilation min cfm. This is the ventilation for less than maximum occupancy of the space. Displays 2 to 10 V if <3 sensors (RA, OA, and MA). Default is 2.25V. With 2-speed fan units, VENTMIN L (low speed fan) and VENTMIN H (high speed fan) settings are required. Default for VENTMIN L is 2.5V and VENTMIN H is 2.25V.

   In DCVCAL ENA mode, dampers controlled by CFM for both VENTMAX and VENTMIN setpoints.
6. Set CO_2 ZERO to 400 ppm and the CO_2 SPAN to 1600 ppm in the ADVANCED SETUP menu.

   Under the ADVANCED SETUP Menu, DCVCAL ENA turns on the DCV automatic control of the dampers and resets ventilation based on the RA, OA, and MA sensor conditions. It requires all sensors (RA, OA, MA, and CO2). This operation is not operable with a 2-speed fan unit.

Installation – 15 to 25 Tons

1. Remove compressor access panel.
2. Apply CO_2 Kit Has Been Installed label next to the main unit wiring diagram label.
3. Install CO_2 sensor in conditioned space or return air duct according to instructions provided with the sensor.
4. Make field wiring connections to Symbio™ 700 UC J22 pins 1 to 3.
5. Route low voltage external field wiring and secure to existing low voltage zone sensor or thermostat wiring.
6. Reinstall the compressor access panel.

CO_2 Sensor Operation for Symbio™ 700 with Economizer

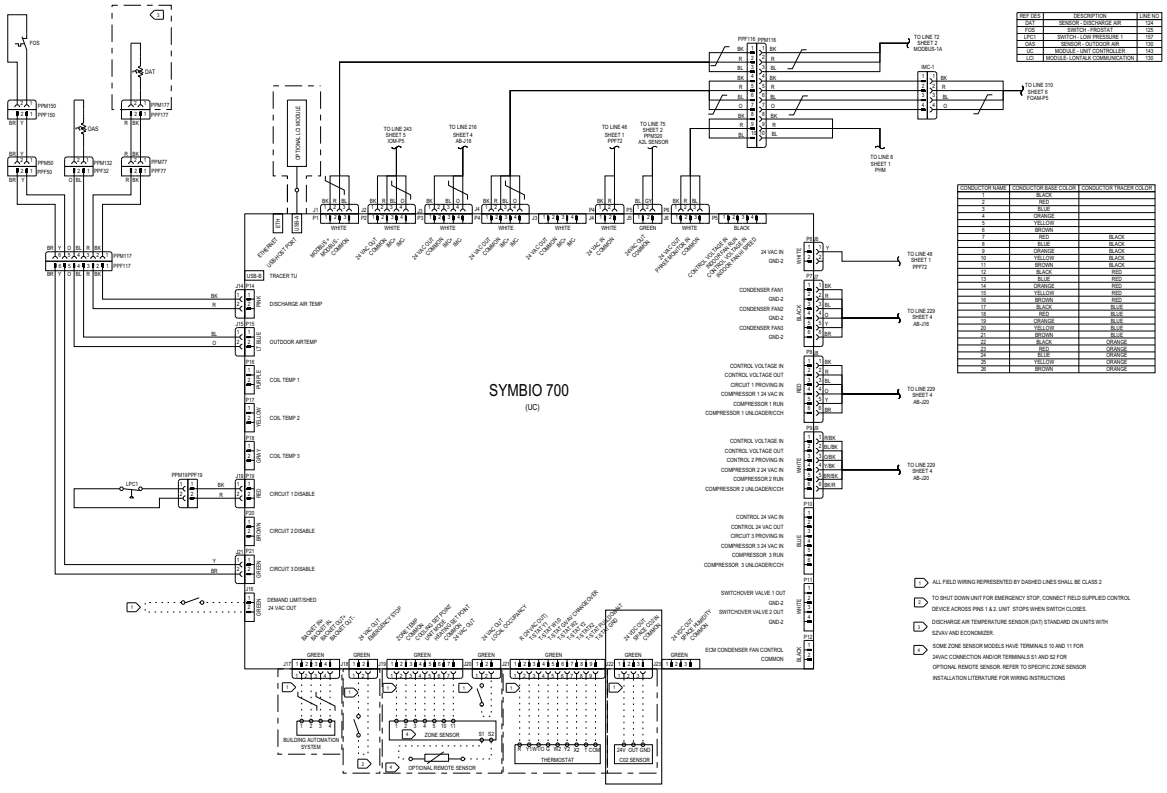
Demand Control Ventilation (DCV)

- DCV eliminates over-ventilating the space by allowing the fresh air damper to close further than non-CO_2 sensing systems, reducing power consumption.
- DCV adjusts the fresh air damper between a DCV Minimum Position and Design Minimum Position. DCV Minimum Position equals non-CO_2 sensing systems minimum damper position - 10 percent, or more, down to 0 percent open.
- When the CO_2 level is greater than or equal to the DCV Minimum CO_2 setpoint, the supply fan is energized and the fresh air damper modulates between the DCV Minimum Position Setpoint and the Design Minimum Setpoint, increasing the amount of outdoor air flow and reducing the CO_2 level in the space.
- The damper will only open up to the Design Minimum Position Setpoint.
- If the CO_2 level drops below the DCV Minimum CO_2 Setpoint - 50 ppm, the fresh air damper will drive to the DCV Minimum Position.
- If CO_2 level rises above the building CO_2 setpoint, the fresh air damper will open to the Design Minimum Position setpoint.

DCV Setup, Damper Position, and CO_2 Setpoint

1. Before beginning, turn the fan ON.
2. Conduct the Minimum Position Setpoint procedure used without CO_2.
3. Obtain and record visually the Minimum Position Setpoint setting and/or the corresponding DC voltage settings for the min and max required to meet ASHRAE standards.

Figure 1. CO_2 sensor wiring



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