



FOR: CO2 SENSOR WIRING TO CANFAB ECONOMIZER OR MIXING BOX

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PART NO: \*\*\*\*-EQD/EQW

## CO2 SENSOR MINIMUM POSITION AND MAXIMUM POSITION SET POINTS

- 1. POWER IS TO BE TURNED OFF TO THE UNIT FOR THE BEGINNING OF THIS PROCEDURE.
- 2. REMOVE RETURN AIR TEMPERATURE (RAT) SENSOR CONNECTOR FROM RAT TERMINALS (IF INSTALLED).
- 3. CONNECT CO2 SENSOR TO LTB TERMINALS PER WIRING DIAGRAM PROVIDED AND ENSURE CO2 SENSÓR IS WORKING CORRECTLY.

NOTE : THE UNIT/ECONOMIZER CONTROL ACTUATOR (ECA) MODULE MUST SEE A WORKING CO2 SENSOR AT START UP IN ORDER TO ACCOMPLISH THE DCV ADJUSTMENT PROCEDURE. IF DONE CORRECTLY A TWO FLASH CODE WILL BE SEEN AT THE ECA LED. IF NOT DONE CORRECTLY A FOUR (4) FLASH CODE WILL BE SEEN ON THE ECA LED INDICATING A BAD RAT SENSOR.

4. ADJUST THE "MIN POS/DCV MAX" POTENTIOMETER TO MINIMUM FULL COUNTER CLOCKWISE (CCW).

- 5. ADJUST THE "DCV SETPOINT" POTENTIOMETER TO MINIMUM FULL COUNTER CLOCKWISE (CCW). TO SET THE DCV MINIMUM POSITION SETPOINT
- 6. APPLY POWER TO THE UNIT AND PLACE THE ZONE SENSOR (OR THERMOSTAT) FAN SELETOR TO THE "OFF" POSITION AND THE HEAT/COOL SELECTOR TO THE "OFF" POSITION.

NOTE : BECAUSE THE INDOOR FAN IS NOT OPERATING THERE WILL BE NO DAMPER MOVEMENT NOTED.

INSTALL A JUMPER CROSS THE RAT TERMINALS ON THE ECA MODULE.
REMOVE THE CONNECTOR FROM THE DCV TERMINALS ON THE ECA MODULE.

NOTE : THE ECONOMIZER LED WILL FLASH (2) TIMES INDICATING THE UNIT HAS ENTERED THE SETUP MODE. IF THE LED DOES NOT FLASH (2) TIMES INDICATING THAT THE UNIT HAS ENTERED THE SETUP MODE OR THE LED FLASHES (4) TIMES INDICATING A FAILED RAT SENSOR, CYCLE POWER AND REPEAT 1 THROUGH 8 AGAIN.

9. SET DCV MINIMUM POSITION TO MEET REGULATORY REQUIREMENTS USING THE "MIN POS/DCV MAX" POT.

NOTE : 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.

- 10. CAREFULLY REMOVE THE JUMPER FROM THE RAT TERMINALS. THE ECA MODULE LED WILL FLASH (5) TIMES INDICATING THE SETTING FOR MINIMUM POSITION HAS BEEN SAVED TO MEMORY. TO SET THE DCV MAXIMUM POSITION SETPOINT
- 11. CONNECT RAT SENSOR CONNECTOR TO RAT TERMINALS (IF INSTALLED).
- 12. CONNECT DCV CONNECTOR TO DCV TERMINALS.
- 13. SET DCV MAXIMUM POSITION TO MEET CODE REQUIREMENTS USING "MIN POS/DCV MAX" POTENTIOMETER.

NOTE : 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. THE DCV MAXIMUM POSITION SETTING MUST BE SET GREATER THAN THE DCV MINIMUM SETPOINT.

- 14. DCV MINIMUM AND MAXIMUM SETTING ARE NOW COMPLETE.
- 15. AT THIS POINT THE UNIT DISCONNECT CAN BE OPENED AND ANYTHING DISCONNECTED DURING THE SETUP PROCEDURE CAN BE REINSTALLED. ALSO THE REQUIRED "DCV SETPOINT" ADJUSTMENT CAN NOW BE MADE IN ORDER TO MEET CODE. ONCE COMPLETED POWER CAN BE RESTORED TO THE UNIT.

NOTE : WITH NO FAN OPERATION THERE WILL BE NO DAMPER MOVEMENT. BECAUSE OF THIS ADJUSTMENTS WILL BE APPROXIMATE. BETTER ACCURACY CAN BE OBTAINED BY CONNECTING A DC VOLTMETER TO THE "2–10 VDC DAMPER POSITION" TERMINALS ON THE ECA MODULE TO CHECK/VERIFY THE ADJUSTMENTS THAT HAVE BEEN MADE. IF CHANGES ARE NECESSARY OF THE ADJUSTMENTS ARE INCORRECT FOR THE "DCV MINMUM SETPOINT", THE SETUP PROCEDURE WILL NEED TO BE RUN AGAIN AND THEN RE-CHECKED. IF ADJUSTMENTS ARE NECESSARY FOR THE "DCV MAXIMUM SETPOINT" ADJUSTMENTS MAY BE MADE STARTING AT STEP 11. REFER TO INFORMATION BELOW FOR HELP APPROXIMATING THE DAMPER BLADE POSITION.

2VOLT=0% : 3VOLT=12.5% : 3.8VOLT=25% : 4.7VOLT=37.5% : 5.8VOLT=50%		
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ENGINEER:	DISTRIBUTOR:	
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## **CO2** Sensing Kit Installation Instructions

Used with 3-5 Ton 17 Plus Precedent, 7.5 & 8.5 Ton High Efficiency with Multi-Speed Indoor Motor or Single Zone VAV, 10 Ton with Multi-Speed Indoor Motor or Single Zone VAV Units

## Parts List that must be Ordered from Trane to work with CanFab CO2 Kit

- (1) ReliaTel Ventilation Module (RTVM) X13651517
- (1) ReliaTel Options Module (RTOM)
- (1) Wire Harness (4366-7752)
- (2) Brackets (4366-0923)
- (1) Wire Harness (4366-3302) with Low Voltage Terminal Board, for CO2 & Ventilation Override

### Installation

- 1. Remove access panels from a/c unit. Return Air/Filter Access Panel, Fan Access Panel, Compressor/Control Box Access Panel.
- 2. Install CO2 and Ventilation Override wiring harness 4366-3302 in the unit according to the wiring diagram and following directions. Refer to the unit wiring diagrams inside the compressor access panel for location and identification of components.
- 3. For units other than T/YHC092E-120E & WSC120E, check the indoor/outdoor divider panel for a knockout just below the control box. If knockout exists, remove it in preparation for installing the harness. If it does not exist, punch a 7/8" diameter hole in that location.
- 4. For T/YHC092E-120E & WSC120E use the hole on the left wall of the high voltage control box compartment for the harness routing.
- 5. Place the harness into the unit control box and install the Low Voltage Terminal Board (LTB). Place the LTB adjacent to the similar LTB in the unit control box and secure in place.
- 6. Connect wire 100EE from the kit harness to the existing LTB.
- Connect wire 101YY to the low voltage common terminal on TNS1. For T/YHC092E-120E and WSC120E connect wire 101YY to the low voltage terminal block in the upper left corner of the control box.
- 8. Route the remainder of the 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 and then through the hole made in the divider panel in step above. For T/YHC092E-120E & WSC120E route the remainder of the wires in the kit harness through the hole in the left wall of the high voltage control box compartment. Connect 3-pin connector 5P6 on harness 4366-3302 to ReliaTel Options Module (RTOM) connector 5J6 according to the wiring diagram.
- 9. Connect 3-pin connector 5P6 on harness 4366-3302 to ReliaTel Options Module (RTOM) connector 5J6 according to wiring diagram.
- 10. Install RTOM bracket 4366-0923. Some RTOM bracket versions do not have bracket mounting capability. In this case replace existing RTOM bracket with additional 4366-0923 bracket.

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- 11. Install ReliaTel Ventilation Module (RTVM) on bracket 4366-0923. J1, J2 connectors will be located at the top left for proper harness connections.
- 12. Disconnect factory harness from RTOM-J2 connector and connect harness to RTVM-J2 connector.
- 13. Connect harness 4366-7752 to RTOM-J2 connector and RTVM-J1 connector. RTOMJ2 connector has female pins and RTVM-J1 connector has male pins. Ensure harness 4366-1172 is installed correctly by verifying the harness connector locks are engaged.
- 14. Route wires 150A & 151A along the bottom of the raceway and then through the top coil blockoff.
- 15. For T/YHC037E, route wires 150A & 151A along the bottom of the raceway and then between the roof and coil blockoff in line with one of the roof ribs.
- 16. Connect plug 6P8 to the jack marked "DCV" on the RTEM.
- 17. Install CO2 sensor in conditioned space or return air duct according to instructions packaged with the sensor.
- 18. Make field wiring connections to LTB installed above per CO2 and Ventilation Override wiring diagram.
- 19. Route low voltage external field wiring along with and secure to existing low voltage zone sensor or thermostat wiring.
- 20. Replace any filters that were removed in installation instructions.

# CO2 Sensor Operation for ReliaTel Units With Economizer and Variable Speed Fan (T/YHC037E\*R,T/YHC047E\*R,T/YHC067E\*R (17Plus) or Single Zone VAV)

#### **Demand Control Ventilation (DCV)**

DCV adjusts the fresh air damper from DCV Minimum Position up to the Design Minimum Position. Units with variable speed fan will requires 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 5 (Design/DCV) Min Positions POTs for damper adjustments. The minimum offset between DCV Minimum Position and Design Minimum Position is 10% and is maintained throughout the fan range.

- POT 1. Fan 50% Design Min Position (0-100% damper range, default 50%)
- POT 2. Fan 50% DCV Min Position (0-100% damper range, default 40%)
- POT 3. Fan 82% Design Min Position (0-100% damper range, default 37%)
- POT 4. Fan 100% Design Min Position (0-50% damper range, default 25%)
- POT 5. Fan 100% DCV Min Position (0-50% damper range, default 15%)

#### **RTVM setpoint POTs**

- POT 1. Fan 50% Design Min Position = RTVM : R130 (SA REHEAT)
- POT 2. Fan 50% DCV Min Position = RTVM : R41 (DEHUMID)
- POT 3. Fan 82% Design Min Position = RTVM : R136 (DA COOL FAN SPD)

#### **RTEM setpoint POTs**

- POT 4. Fan 100% Design Min Position = RTEM : MIN POS-DESIGN
- POT 5. Fan 100% DCV Min Position = RTEM : MIN POS-DCV

DCV can be adjusted for CO2 concentrations from (300-2000\_ ppm using the DCV SETPOINT-LL/UL POTs located on the RTEM. DCV SETPOINT-LL corresponds to DCV Minimum CO2 concentration setting of (300-1900) ppm. DCV SETPOINT-UL corresponds to building CO2 setpoint with concentrations of (500-2000) ppm. Damper position for all conditions is determined using an algorithm that weights CO2 concentration, fan speed, damper minimum position setting. When the CO2 level is greater than of equal to DCV SETPOINT-LL the supply fan is energized and fresh air damper modulates between a minimum

opening of Fan 100% DCV Min Position up to maximum of Fan 50% Design Min Position. If the CO2 level reaches DCV SETPOINT-UL the fresh air damper will modulate between minimum opening of Fan 100% Design Min Position and maximum of Fan 50% Design Min Position. If the CO2 level drops below DCV SETPOINT-LL the fresh air damper will modulate between minimum opening of Fan 100% DCV Min Position up to Fan 50% DCV Min Position. If the fan mode is set to AUTO the fan will shut off when CO2 level is 50 ppm below DCV SETPOINT-LL.

## CO2 Sensor Operation for ReliaTel Units With Economizer and Multi-Speed Fan T/YHC092E-120E,T/YHC092F,T/Y/WSC120

#### **Demand Control Ventilation (DCV)**

DCV adjusts the fresh air damper from DCV Minimum Position up to the Design Minimum Position. Units with Multi-Speed indoor fan will require special handling of the fresh air damper minimum position control in order to compensate for the non-linearity of airflow through the outside air damper along with the multiple supply fan speeds. An RTVM and RTEM are utilized to accommodate 4 (Design/DCV) Min 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.

- POT 1. Low Speed Design Min Position (0-100% damper range, default 50%)
- POT 2. Low Speed DCV Min Position (0-100% damper range, default 40%)
- POT 3. High Speed Design Min Position (0-50% damper range, default 25%)
- POT 4. High Speed DCV Min Position (0-50% damper range, default 15%)

#### **RTVM setpoint POTs**

- POT 1. Low Speed Design Min Position = RTVM : R130 (SA REHEAT)
- POT 2. Low Speed DCV Min Position = RTVM : R41 (DEHUMID)

#### **RTEM setpoint POTs**

- POT 4. High Speed Design Min Position = RTEM : MIN POS-DESIGN
- POT 5. High Speed DCV Min Position = RTEM : MIN POS-DCV

DCV can be adjusted for CO2 concentrations from (300-2000\_ ppm using the DCV SETPOINT-LL/UL POTs located on the RTEM. DCV SETPOINT-LL corresponds to DCV Minimum CO2 concentration setting of (300-1900) ppm. DCV SETPOINT-UL corresponds to building CO2 setpoint with concentrations of (500-2000) ppm. Damper position for all conditions is determined using an algorithm that weights CO2 concentration, fan speed, damper minimum position setting. When the CO2 level is greater than of equal to DCV SETPOINT-LL the supply fan is energized and fresh air damper modulates between a minimum opening of Fan 100% DCV Min Position up to maximum of Fan 50% Design Min Position. If the CO2 level reaches DCV SETPOINT-UL the fresh air damper will modulate between minimum opening of Fan 100% DCV SETPOINT-LL the fresh air damper will modulate between minimum opening of Fan 100% DCV Min Position. If the fan mode is set to AUTO the fan will shut off when CO2 level is 50 ppm below DCV SETPOINT-LL.

## DCV Setup, Damper Position and CO2 Setpoint

Before you begin turn the fan "ON" and conduct the Minimum Position Setpoint procedure used WITHOUT CO2 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. With no fan operation there will be no damper

movement. Because of this adjustments will be approximate. Better accuracy can be obtained by connecting a DC voltmeter to the "2-10 VDC Damper Position" terminals on the RTEM module to check/verify the adjustments that have been made. Refer to information below for help approximating damper blade position. 2volts = 0%: 3volts = 12.5%: 3.8volts = 25%: 4.7volts = 37.5%: 5.8volts = 50%

- 1. Remove power from the unit.
- 2. Connect CO2 sensor to LTB terminals per installers guide. The unit/economizer control actuator (ECA) module must see a working CO2 sensor at start up in order to enable DCV. DCV will be disabled anytime there is an invalid CO2 reading.
- 3. Apply power to unit and ensure CO2 sensor is working correctly.
- 4. Set DCV Minimum Damper Position to meet regulatory requirements by adjusting
  - a. POT 2. DCV Min Position To energize fan 50%, put ReliaTel in TEST Mode Step 1 (Fan On)
  - b. POT 5. DCV Min Position To energize Fan 100%, put ReliaTel in TEST Mode Step 4 (Cool 20)
- 5. Set Design Minimum Damper Position to meet code requirements by adjusting
  - a. POT 1. Design Min Position To energize fan 50%, put ReliaTel in TEST Mode Step 1 (Fan On)
  - b. POT 3. Design Min Position To energize fan 82%, put ReliaTel in TEST Mode Step 3 (Cool 1)
  - c. POT 4. Design Min Position To energize fan 100%, put ReliaTel in TEST Mode Step 4 (Cool 2) (For units with 3-Steps of cooling, put ReliaTel in TEST Mode Step 5 (Cool 3) for High Speed Fan)
- 6. Set Design Minimum Damper Position to meet code requirements using "MIN POS Design" potentiometer.
- 7. Set DCV Minimum CO2 Setpoint to desired value using "DCV SETPOINT-LL" potentiometer.
- 8. Set building CO2 Setpoint to desired value using "UL DCV SETPOINT" potentiometer.



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PART NO: \*\*\*\*-EQD/EQW

#### CO2 SENSOR WIRING TO HONEYWELL JADE ECONOMIZER LOGIC CO2 SENSOR CFEQ-D (DUCT MOUNT) CFEQ-W (WALL MOUNT) ORANGE CLOSES ON PPM GREEN BROWN COMMON YELLOW YELLOW |AQ| 2 - 100 - 10 VRED BLACK AC+/DC+ IAQ COM BLACK AC-/GND RED IAQ 24V NOTE: ALL ITEMS SHIPPED LOOSE FOR FIELD INSTALLATION. WIRE NOT INCLUDED. FIELD CONNECT TO TERMINALS ON ECONOMIZER LOGIC MODULE IN MIXING BOX OR ECONOMIZER. CO2 SENSOR, PROVIDED BY CANFAB, FIELD MOUNTED, MODEL C7232B1006/U FOR DUCT MOUNTING OR MODEL C7232A1008/U FOR WALL MOUNTING. CO2 SET-UP PROCEDURE : 1. CO2 SENSOR MUST BE WIRED INTO LOGIC BEFORE POWER IS TURNED ON TO THE LOGIC MODULE. 2. ENTER THE MAIN MENU AND GO TO "SETPOINTS". 3. GO TO PARAMETER "DCV SET". THIS IS A 500-2000 ppm RANGE SETPOINT. SETPOINT FOR DCV OF SPACE.

- 3. GO TO PARAMETER "DCV SET". THIS IS A 500–2000 ppm RANGE SETPOINT. SETPOINT FOR DCV OF SPACE ABOVE THE SETPOINT, THE OA DAMPERS WILL MODULATE OPEN TO BRING IN ADDITIONAL OA TO MAINTAIN A SPACE ppm LEVEL BELOW THE SETPOINT. SEE PAGE 14 IN JADE ECONOMIZER MODULE BOOKLET.
- 4. GO TO PARAMETER "VENTMAX". THIS IS A 2 to 10Vdc RANGE SETPOINT. USED FOR VENTILATION MAX CFM SETPOINTS. 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. SEE PAGE 14 IN JADE ECONOMIZER MODULE BOOKLET.
- 5. GO TO PARAMETER "VENTMIN". THIS IS A 2 to 10Vdc RANGE SETPOINT. USED FOR VENTILATION MIN CFM SETPOINTS. THIS IS THE VENTILATION FOR LESS THAN MAXIMUM OCCPANCY OF THE SPACE. 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. SEE PAGE 14 IN JADE ECONOMIZER MODULE BOOKLET.
- 6. FOR ADVANCED SETUPS, GO TO MAIN MENU AND "ADVANCED SETUP".
- 7. GO TO PARAMETER "CO2 ZERO". THIS IS A 0 to 500 ppm RANGE SETPOINT. CO2 ppm LEVEL TO MATCH CO2 SENSOR START LEVEL. SEE PAGE 16 IN JADE ECONOMIZER MODULE BOOKLET.
- 8. GO TO PARAMETER "CO2 SPAN", THIS IS A 1000 to 3000 ppM RANGE SETPOINT. CO2 ppm SPAN TO MATCH CO2 SENSOR. SEE PAGE 16 IN JADE ECONOMIZER MODULE BOOKLET.
- 9. REFER TO THE JADE ECONOMIZER MODULE BOOKLET FOR OTHER STARTUP OPTIONS AND TROUBLESHOOTING.

FIELD WIRING	
PROJECT:	DATE:
ENGINEER:	DISTRIBUTOR:
DRAWING NUMBER: 1255CO.DWG	rb/MR 01.29.10