507380-07
7/2020
Supersedes 507380-06

K1ECON20B-2 & K1ECON22B-4 ECONOMIZERS

INSTALLATION INSTRUCTIONS FOR ECONOMIZERS USED WITH KG/KC/KH 092-150 B BOX UNITS

Note - When the economizer is factory-installed, refer to GED hood installation on Page 26 and outdoor air hood installation on Page 27.

Shipping and Packing List

Package 1 of 1 contains:

1 - Economizer damper assembly

1 - Gravity exhaust damper (GED) assembly

1 - Bag assembly containing:
- #10 - 16 X 5/8” sheet metal screws
- #12 - 14 X 5/8” self-drilling/self-tapping screws
- #10 - 32 X 1/2” thread-forming screw
- #4 - 40 X 3/8” thread-forming screws
- #8 - 32 X 1/2” thread-forming screws
- #6 - 32 X 7/8” thread-forming screws
- 1 - Insertion wire tie

1 - Hood package (shipped inside economizer package) contains:
- 1 - Outdoor air hood top seal
- 1 - Outdoor air hood top
- 2 - Outdoor air hood sides (left and right)
- 1 - Outdoor air hood bottom filter bracket
- 1 - Top filter seal bracket
- 1 - Filter spacer
- 2 - Filters
- 1 - Gravity exhaust hood top
- 1 - Gravity exhaust hood top support
- 2 - Gravity exhaust hood sides (left and right)

1 - Single sensible sensor (S175 or RT26)

1 - Wiring harnesses (P104)

1 - Resistor assembly

1 - Economizer control (A6) with harness

1 - Sensor (R1)

2 - Sensor mounting brackets (17U09 only)

NOTE *- For horizontal applications, order horizontal discharge kit separately.*

NOTE *- Gravity exhaust dampers are required for use with economizers and must be installed. For low profile horizontal applications, order LAGEDH separately. See table 1.*

⚠CAUTION

As with any mechanical equipment, contact with sharp sheet metal edges can result in personal injury. Take care while handling this equipment and wear gloves and protective clothing.

⚠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 HVAC installer or equivalent, service agency, or the gas supplier

Application

The K1ECON economizer is used with KG/KC/KH units in downflow and horizontal air discharge applications. Economizer dampers will modulate to maintain 55°F (13°C) supply air when outdoor air is suitable. The mixed air temperature sensor (R1) measures the supply air sensible temperature.

The mixed air sensor is provided in field-installed kits and installed according to these instructions. The mixed air sensor is factory-installed when the unit is equipped with an economizer.

Two types of economizers are available. See table 1.

TABLE 1

Print No.	Cat. No.	Kit Description
603366-05	13U45	Standard Economizer
603366-11	20U81	High Performance Economizer
LB-68922F	53K04	Low Profile GED - Horizontal Applications

NOTICE

Install accessories in the following order:
1-Economizer dampers
2-Sensors (installation and wiring)
3-Gravity exhaust dampers
4-Gravity exhaust damper hoods
5-Outdoor air hoods

Table of Contents

General

K1ECON20B-1 Standard Economizer

The standard economizer is equipped with a W7212 economizer control module A6. The default OA temperature sensor is the OA thermostat, S175, provided in this kit. See table 2 for outdoor and return air (OA and RA) sensor options. Refer to instructions provided with sensors for installation.

TABLE 2
STANDARD ECONOMIZER SENSORS

Sensors	Dampers will modulate to 55°F discharge air (RT6) when:
Single OA Sensible	OA temperature (S175) is lower than free cooling setpoint.
Single OA Enthalpy	OA temperature and humidity (A7) is lower than free cooling setpoint.
Differential Enthalpy - 1 in OA and 1 in RA	OA temperature and humidity (A7) is lower than RA temperature and humidity (A62).
IAQ Sensor	CO_2 sensed (A63) is higher than CO_2 setpoint.

K1ECON22B-2 High Performance Economizer

The high performance economizer is equipped with a W7220 control module A6. This application provides low leak, fault detection and diagnostic capabilities. The default OA temperature sensor or high limit sensor (RT26) is a CEC approved, California Title 24 fixed dry bulb device (provided in this kit). See table 3 for outdoor and return air (OA and RA) sensor options. Refer to manufacturer's instructions provided for more details.

TABLE 3
HIGH PERFORMANCE ECONOMIZERS

Sensors	Dampers modulate to maintain 55°F mixed air (R1) when:
Single OA Sensible DEFAULT - approved for CA Title24	OA temperature (RT26) is lower than free cooling setpoint.
Single OA Enthalpy Not approved for CA Title 24	OA temperature and humidity (A7) is lower than free cooling setpoint.
Differential Enthalpy - 1 in OA & 1 in RA Not approved for CA Title 24	OA temperature and humidity (A7) is lower than RA temperature and humidity (A62).
IAQ Sensor	CO_2 sensed (A63) is higher than CO_2 setpoint.

Horizontal Applications

For horizontal applications, a separately ordered horizontal discharge kit is required. The horizontal, field-fabricated return air duct must be sized to accommodate the gravity exhaust damper and hood shipped with the economizer (if used). A separately ordered low profile gravity exhaust damper and hood kit is available for size restricted applications. Refer to *Gravity Exhaust Damper Installation* section for details.

Gravity Exhaust Damper

Gravity exhaust dampers allow exhaust air to be discharged from the system when an economizer and/or power exhaust is operating. Exhaust dampers are required unless other provisions are made to exhaust indoor air. Gravity exhaust dampers also prevent outdoor air infiltration during unit off cycle.

IAQ Sensing (A63)

An IAQ (CO_2) sensor is used when demand control ventilation (DCV) is specified. Damper minimum position can be set lower than traditional minimum air requirements resulting in cost savings. The IAQ sensor allows the A6 to open dampers to traditional ventilation requirements as room occupancy (CO_2) increases.

Connect sensor leads to AQ and AQ1 terminals on the A6 economizer control located in the filter section.

When a W7220 high performance economizer is installed, the 0-10VDC sensor must be set to a CO_2ZERO of 400ppm and Co_2SPAN of 1600ppm. Use the ADVANCED SETUP menu on the W7220 A6 economizer control module.

Standard Economizer - Installation

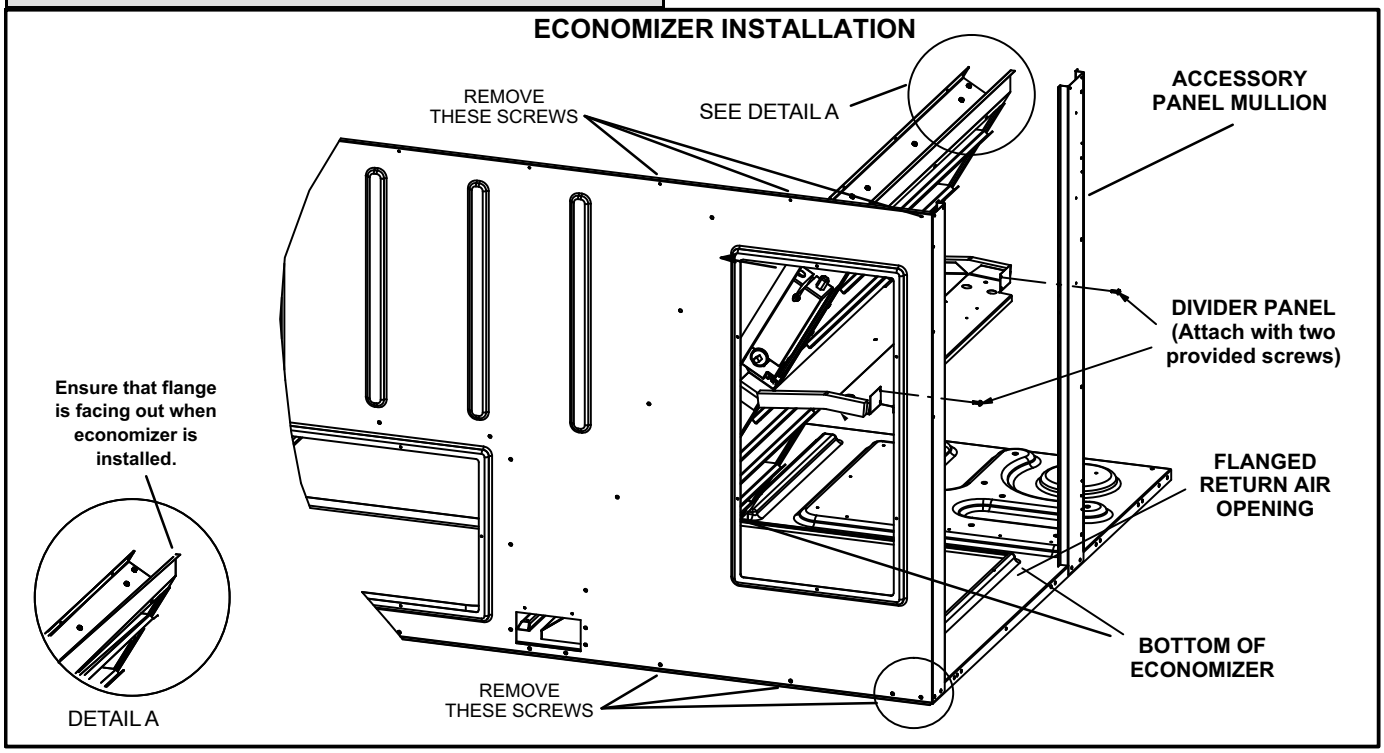


FIGURE 1

DAMPERS

1- Disconnect all power to unit.

2- Remove accessory compartment access panel.

3- Remove and retain screws from top and bottom of rear panel. Remove screws from accessory panel mullion and remove mullion. Lift the top of the unit as needed. See figure 1.

4- Slide the bottom of the economizer over the flanged return air opening in the base of the unit until it settles into place. See figure 1.

5- Use provided screws to secure economizer divider panel to unit end mullion and accessory compartment mullion as shown in figure 1.

6- Before securing unit top panel with retained screws, position the outdoor air hood top seal under the panel as shown in figures 28 and 29. The outdoor air hood top seal is shipped with the other outdoor air hood components.

ECONOMIZER CONTROL MODULE (A6) INSTALLATION

1- Install A6 economizer control below control panel as shown in figure 2. Secure with #6 - 32 X 7/8" TFS screws provided.

MIXED AIR SENSOR (R1) INSTALLATION

1- Remove blower access panel.

2- Install sensor in location shown in figure 3 and 4. Secure with single screw provided in kit.

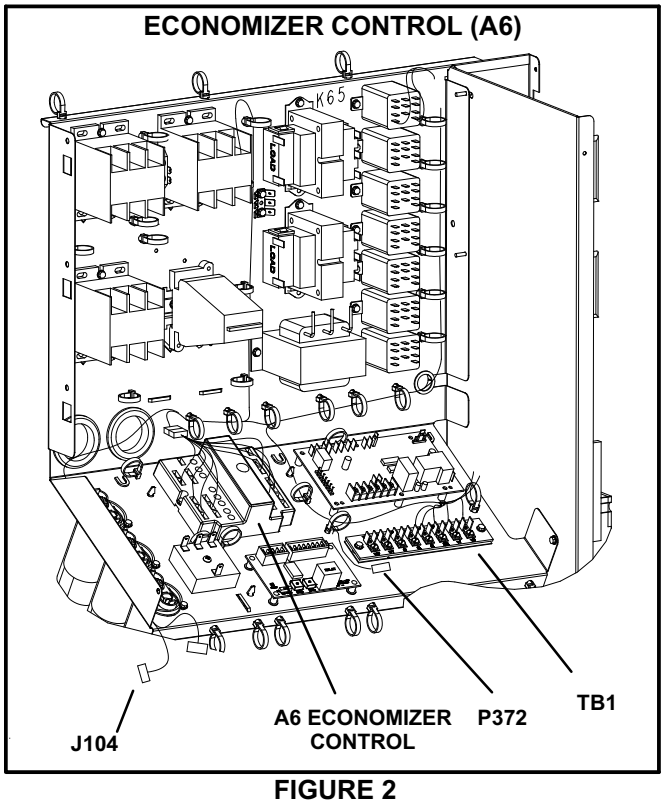


FIGURE 2

Standard Economizer-Installation (continued)

MIXED AIR SENSOR (R1)

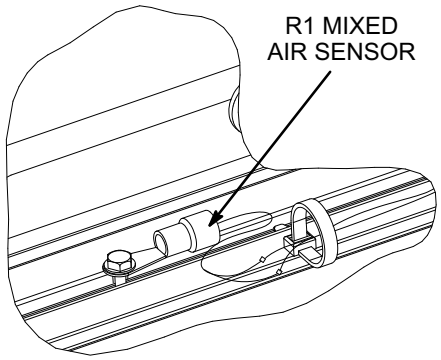


FIGURE 3

MIXED AIR SENSOR (R1) LOCATION

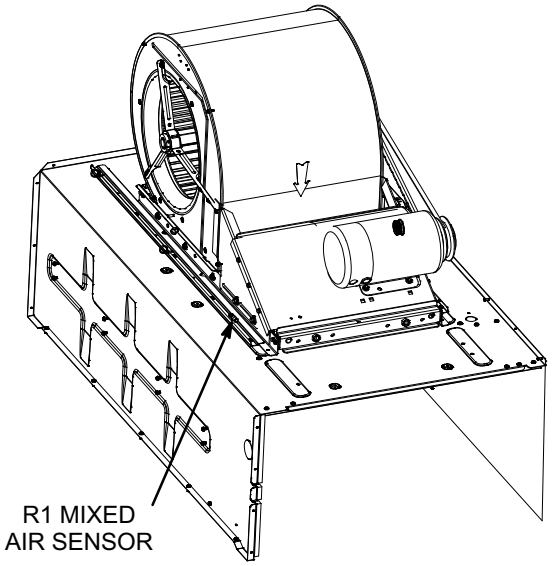


FIGURE 4

OUTDOOR AIR THERMOSTAT (S175)

1- Install S175 thermostat on mounting bracket using #6 - 32 X ⅞" screws.

2- Install mounting bracket on divider panel as shown in figure 5. Secure with #8 - 32 X ½" TFS screws.

SINGLE SENSIBLE CONTROL (S175)

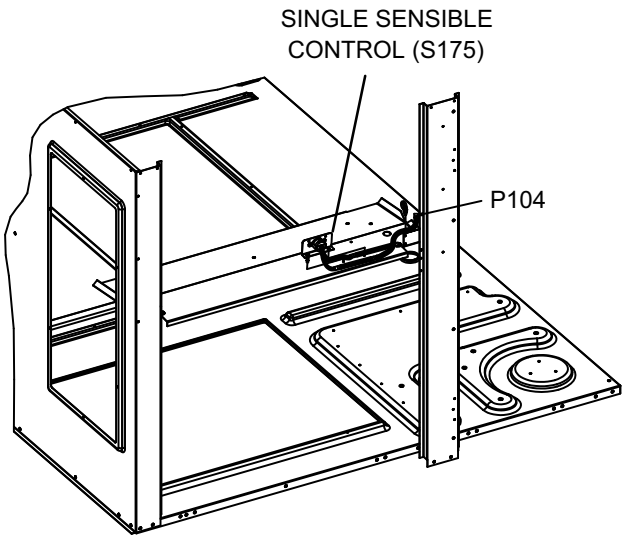


FIGURE 5

Standard Economizer - Electrical

ECONOMIZER CONTROLLER (A6) HARNESS CONNECTIONS

1- Disconnect and discard the 15-pin male plug attached to factory-installed J3.

2- Locate harness installed on economizer control (A6).

3- Connect the 15-pin male plug P4 to the 15-pin female jack J3 on the unit control harness.

4- Route harness as shown in figure 6 and use push-in wire tie to secure harness to side wall.

5- Push J10 and J104 from economizer control harness into openings in side wall. See figure 7.

6- Connect the 15-pin plug P3 from the damper motor to the economizer control J10 jack inserted into the wall in the previous step.

OUTDOOR AIR THERMOSTAT (S175)

1- Make wiring connections as shown in figures 8 and 10. Secure harness with wire tie provided in kit.

2- Insert P104 plug into J104, previously installed in the side of the economizer as shown in figure 5 and 7.

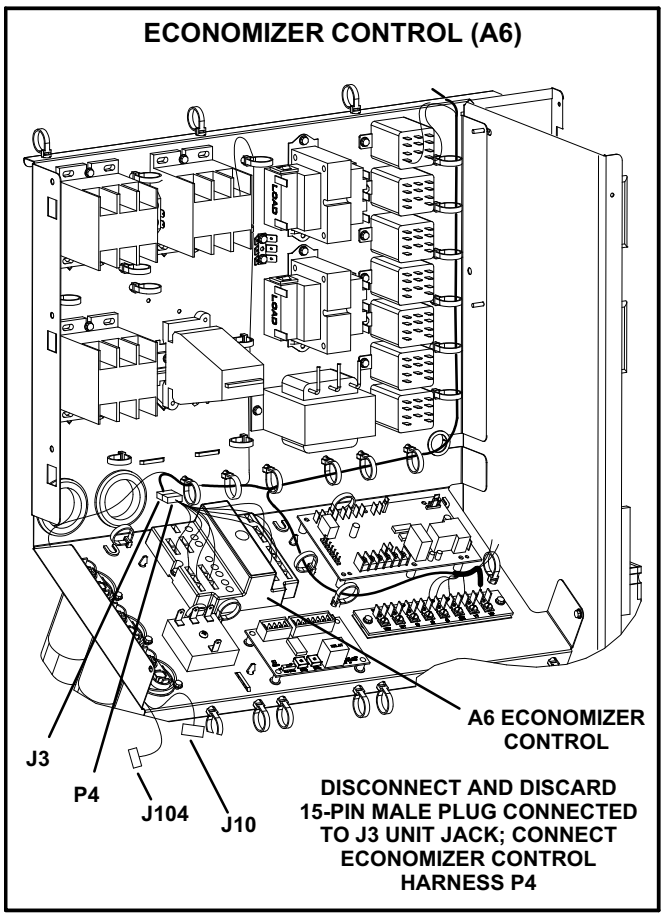


FIGURE 6

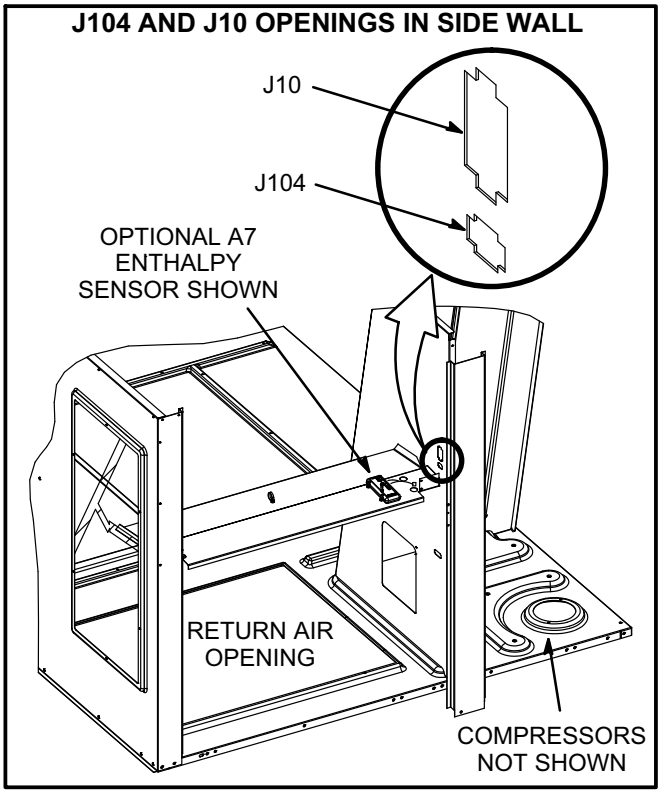


FIGURE 7

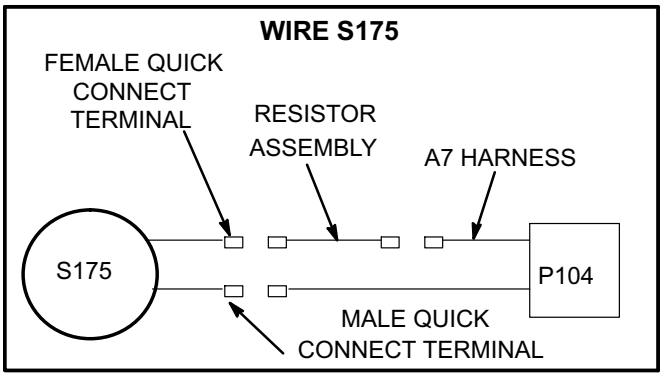


FIGURE 8

MIXED AIR SENSOR (R1) CONNECTIONS

1- Connect J3 harness wires marked “R1” to sensor installed in blower section. See figure 10.

OPTIONAL SENSOR CONNECTIONS

An optional return air sensible sensor (RT27) can be added for differential sensible sensing. The sensible configuration can be replaced by temperature and humidity (enthalpy) sensor (A7/A62). See figure 10.

An optional CO2 sensor (A63) can be added for demand control ventilation (DCV).

Refer to installation instructions shipped with optional sensor for more details.

Standard Economizer - Electrical
(continued)

UNITS EQUIPPED WITH AN OPTIONAL VFD ONLY

1- Remove the jumper between P and P1 terminals on A6 economizer control. See figure 9.

2- Locate the wires marked P and P1 in the control compartment. Connect the P and P1 wires to P and P1 terminals on A6 respectively.

3- Adjust the minimum position potentiometer (MIN POS) on A6 fully open (completely clockwise).

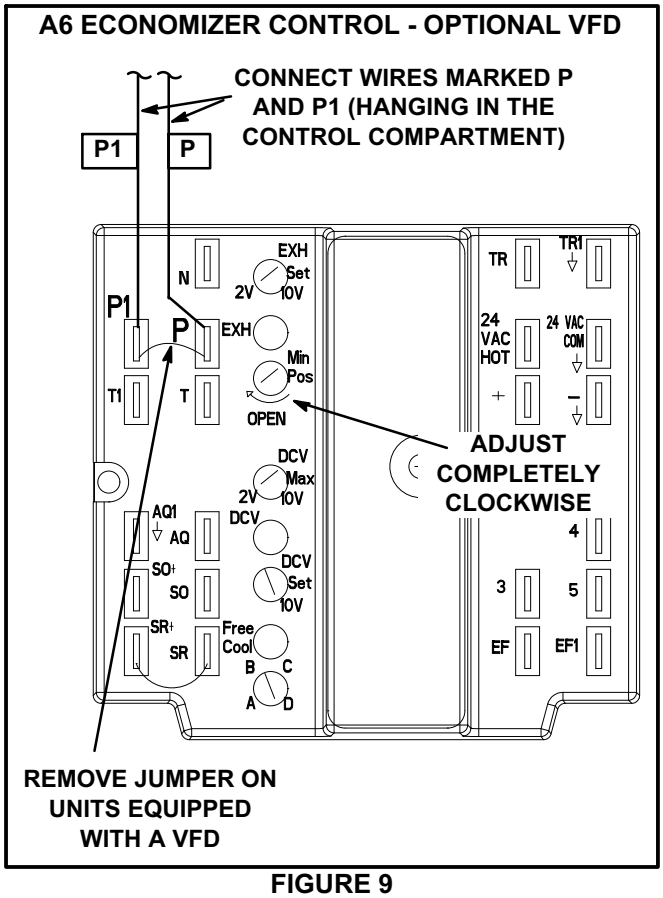


FIGURE 9

Standard Economizer - Electrical (continued)

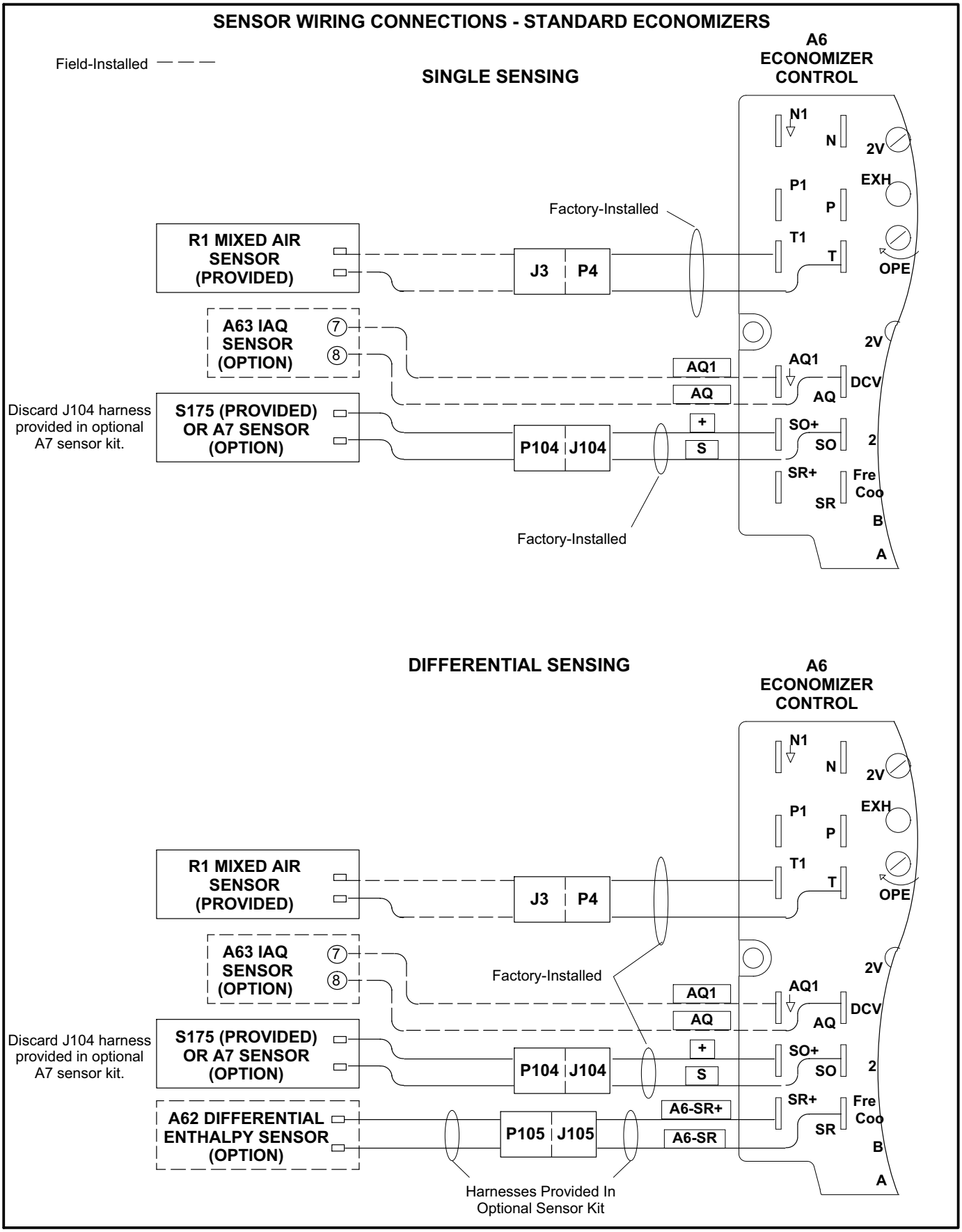


FIGURE 10

Standard Economizer - Settings

LEDs

A steady green Free Cool LED indicates that outdoor air is suitable for free cooling. A steady green DCV LED indicates that the IAQ reading is higher than setpoint requiring more fresh air. See figure 11.

FREE COOLING SETPOINT

Single Temperature or Enthalpy Sensing:

The economizer control (A6) setpoint may be adjusted when an enthalpy (A7) sensor is used to determine outdoor air suitability, See figure 11.

Free cooling will be enabled when outdoor air temperature or enthalpy are lower than the free cooling setpoint. The free cooling setpoints for sensible temperature sensors is 55°F. Table 4 shows the free cooling setpoints for enthalpy sensors. Use the recommended setpoint and adjust as necessary.

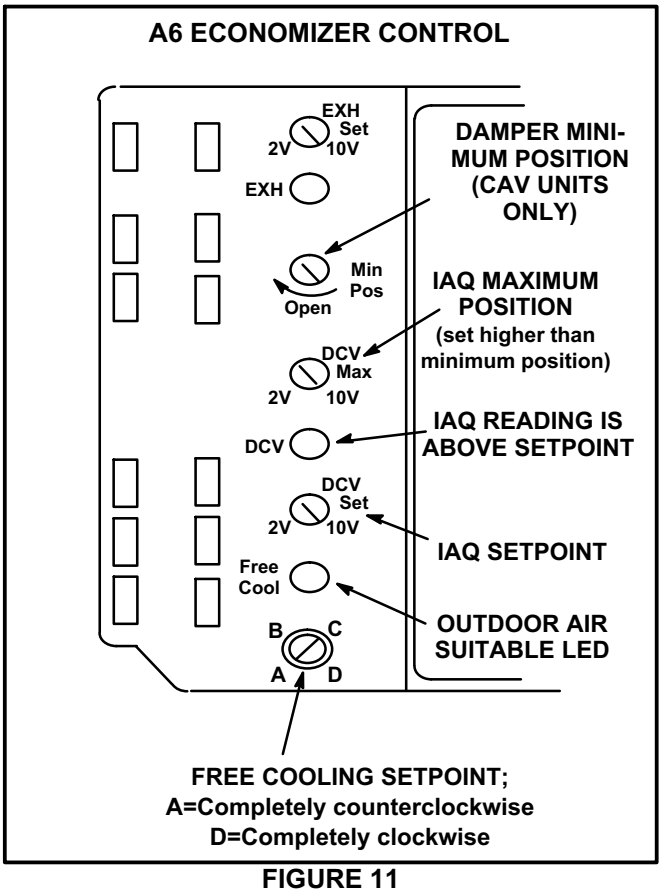


FIGURE 11

For example: At setting A (table 4), free cooling will be enabled when outdoor air enthalpy is lower than 73°F and 50% RH. If indoor air is too warm or humid, lower the setpoint to B. At setting B, free cooling will be enabled at 70°F and 50% RH.

TABLE 4
ECONOMIZER FREE COOLING SETPOINTS

Control Setting	Enthalpy Setpoint At 50% RH
A*	73° F (23° C)
B	70° F (21° C)
C	67° F (19° C)
D	63° F (17° C)

*Setting A is recommended.

Differential Sensing:

Two sensors can be used to compare outdoor air to return air. When outdoor air is cooler than return air, outdoor air is suitable for free cooling. Adjust the free cooling setpoint to “D” in this application.

When return air is cooler than outdoor air, the damper will modulate to the minimum position.

DAMPER MINIMUM POSITION SETTING

NOTE *- A jumper is factory-installed between TB1 R and OC terminals to maintain occupied status (allowing minimum fresh air). See figure 12. When using an electronic thermostat or energy management system with an occupied/unoccupied feature, remove jumper. Make wire connections to R and OC as shown in literature provided with thermostat or energy management system. Either the jumper wire or optional device must be connected to A1 and A2 for the economizer to function. See figure 12.*

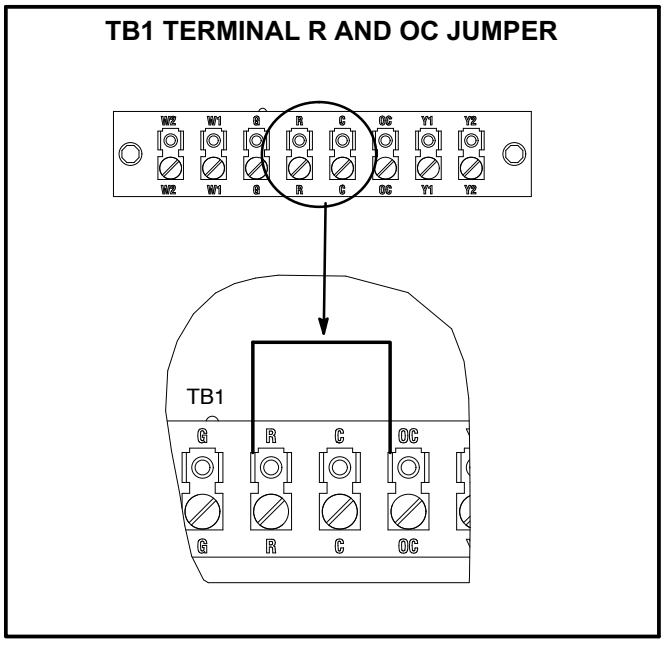


FIGURE 12

Units Equipped With A VFD -
Set minimum damper position on the VFD control board. Refer to unit installation instructions for details.

Standard Economizer - Settings (continued)

1- Set thermostat to occupied mode if the feature is available. Make sure jumper is in place between TB1 terminals R and OC if using a thermostat which does not have the feature. Turn on the blower using the thermostat or a jumper between TB1 terminals R and G.

2- Rotate MIN POS SET potentiometer to approximate desired fresh air percentage.

***NOTE** - Damper minimum position can be set lower than traditional minimum air requirements when an IAQ sensor is specified.*

3- Measure outdoor air temperature. Mark the point on the bottom line of chart 2 and label the point “A” (40°F, 4°C shown).

4- Measure return air temperature. Mark that point on the top line of chart 2 and label the point “B” (74°F, 23°C shown).

5- Measure mixed air (outdoor and return air) temperature. Mark that point on the top line of chart 2 and label point “C” (70°F, 21°C shown).

6- Draw a straight line between points A and B.

7- Draw a vertical line through point C.

8- Draw a horizontal line where the two lines meet. Read the percent of fresh air intake on the side.

9- If fresh air percentage is less than desired, adjust MIN POS SET potentiometer clockwise (further open). If fresh air percentage is more than desired, adjust MIN POS SET potentiometer counterclockwise (less open). Repeat steps 3 through 8 until calculation reads desired fresh air percentage.

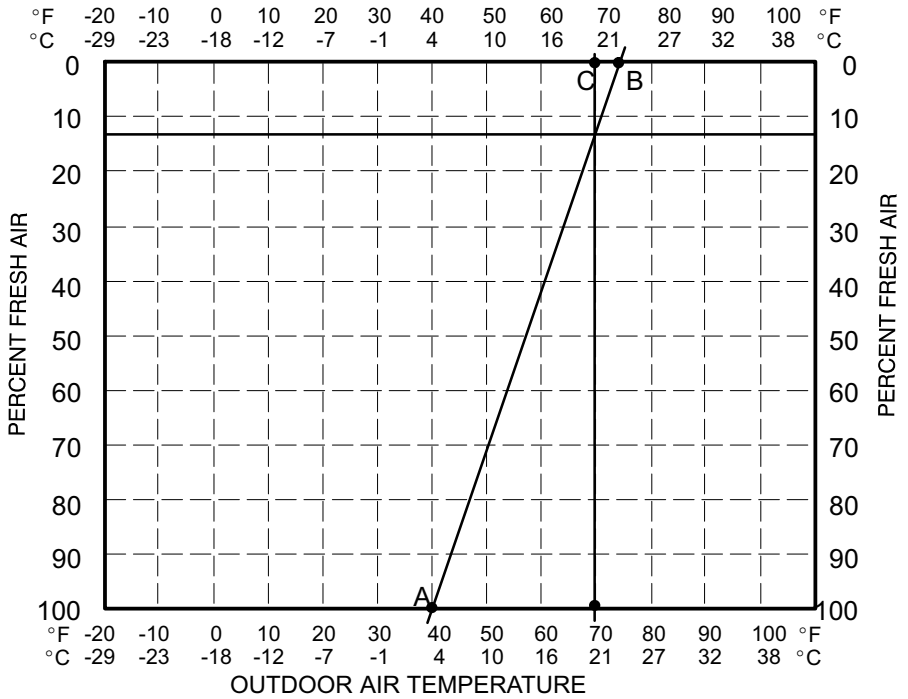
DCV SET AND DCV MAX SETTINGS

The DCV SET potentiometer is factory-set at approximately 50% of the potentiometer range. Using a standard 1-2000ppm CO_2 sensor, dampers will start to open when the IAQ sensor reads approximately 1000ppm. Adjust the DCV SET potentiometer to the approximate setting specified by the controls contractor. Refer to figure 11.

The DCV MAX potentiometer is factory-set at approximately 50% of the potentiometer range or 6VDC. Dampers will open approximately half way when CO_2 rises above setpoint. Adjust the DCV MAX potentiometer to the approximate setting specified by the controls contractor. Refer to figure 11.

***NOTE** - DCV Max must be set higher than economizer minimum position setting for proper demand control ventilation.*

CHART 2
CALCULATE MINIMUM FRESH AIR PERCENTAGE



Standard Economizer - Sequence of Operation

ECONOMIZER

When the outdoor air is suitable, dampers will modulate between minimum position and full open to maintain 55°F (12.8°C) supply air.

See table 5 for economizer operation when outdoor air is suitable. See table 6 for economizer operation when outdoor air is NOT suitable.

IAQ SENSOR

During the occupied period, dampers will open to DCV MAX when IAQ reading is above setpoint (regardless of thermostat demand or outdoor air suitability). DCV MAX will NOT override damper full-open position. The DCV MAX setting may override damper free cooling position when occupancy is high and outdoor air temperatures are low.

Note - R1 senses mixed air temperature below 45°F (7°C), dampers will move to fully closed until mixed air temperature rises to 48°F (9°C).

TABLE 5

ECONOMIZER OPERATION-OUTDOOR AIR IS **SUITABLE** FOR FREE COOLING -- FREE COOL LED "ON"

THERMOSTAT DEMAND	DAMPER POSITION		MECHANICAL COOLING
	UNOCCUPIED	**OCCUPIED**	
Off	Closed	Closed	No
G	Closed	Minimum	No
Y1	Modulating	Modulating	No
Y2	Modulating	Modulating	Stage 1
Y3	Modulating	Modulating	Stage 2

TABLE 6

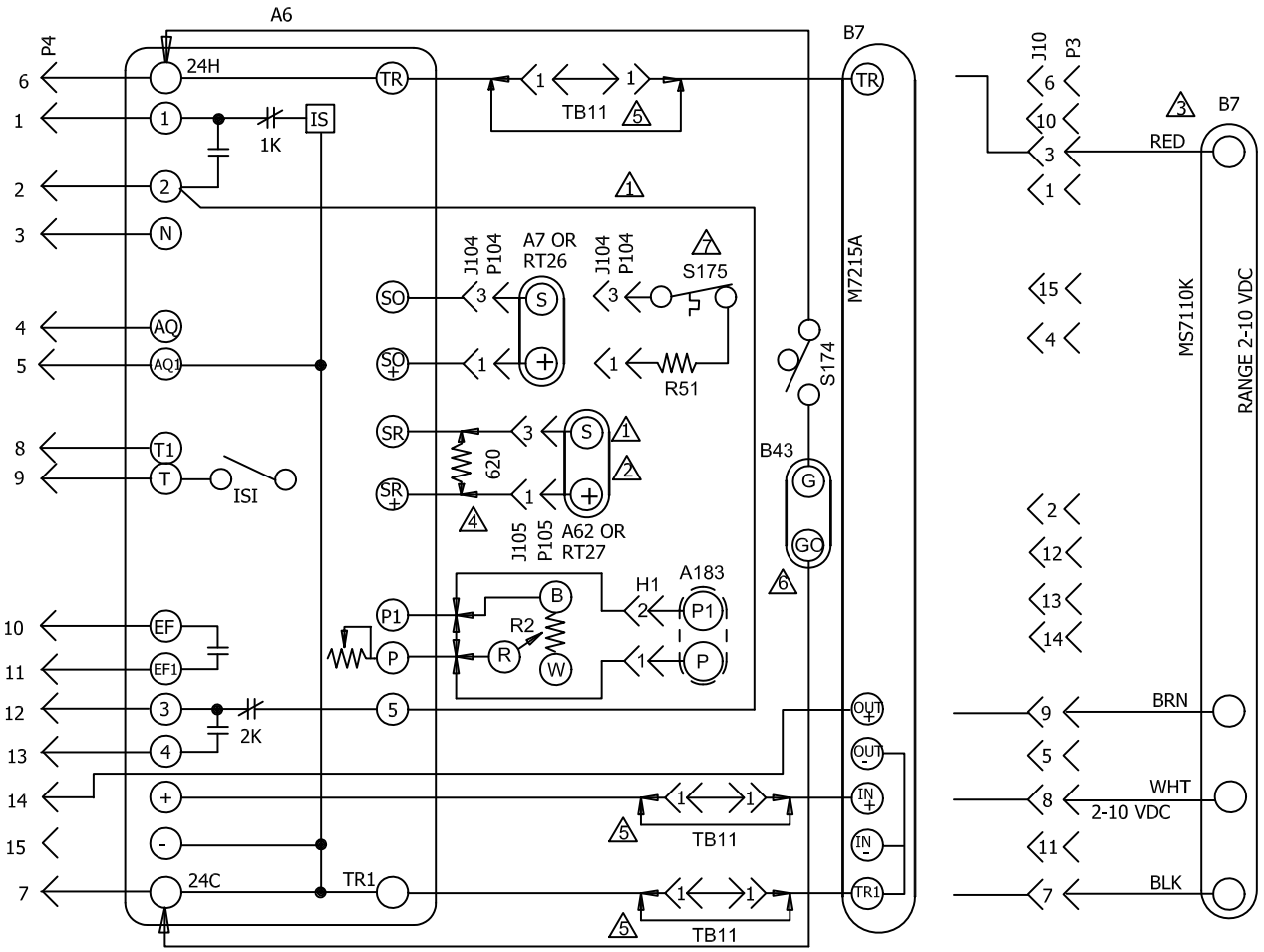
ECONOMIZER OPERATION-OUTDOOR AIR IS **NOT SUITABLE** FOR FREE COOLING -- FREE COOL LED "OFF"

THERMOSTAT DEMAND	DAMPER POSITION		MECHANICAL COOLING
	UNOCCUPIED	**OCCUPIED**	
Off	Closed	Closed	No
G	Closed	Minimum*	No
Y1	Closed	Minimum*	Stage 1
Y2	Closed	Minimum*	Stage 2

*IAQ sensor can open damper to DCV max.

Standard Economizer - Wiring Diagram

TYPICAL ECONOMIZER WIRING DIAGRAM - KG, KC & KH UNITS



KEY	COMPONENT
A6	CONTROL-SOLID STATE ENTHALPY
A7	SENSOR-SOLID STATE ENTHALPY
A62	SENSOR-ENTHALPY, INDOOR
A183	CONTROL, VFD BOARD
B7	MOTOR-DAMPER, ECONOMIZER
B43	MOTOR-EXHAUST DAMPER
H1	HEADER 1 ON LANDMARK VFD BOARD
J10	JACK-ECONOMIZER
J104	JACK-SENSOR,OUTDOOR ENTHALPY
J105	JACK-SENSOR,RETURN AIR ENTHALPY
P3	PLUG-LESS ECONOMIZER
P4	PLUG-ECONOMIZER
P104	PLUG-SENSOR,OUTDOOR ENTHALPY
P105	PLUG-SENSOR,RETURN AIR ENTHALPY
R2	POT-MINIMUM POSITION
R51	RESISTOR-SENSIBLE 820 OHM
RT26	SENSOR-OUTDOOR AIR TEMP
RT27	SENSOR-INDOOR AIR TEMP
S175	THERMOSTAT-SENSIBLE TEMP 55-70F
S174	SWITCH-EXHAUST DAMPER
TB11	TERMINAL STRIP-CLASS II VOLT

DESIGNATES OPTIONAL WIRING

CLASS II FIELD WIRING

1. RT26 AND RT27, TEMPERATURE SENSORS MAY BE USED INSTEAD OF A7 AND A62 ENTHALPY SENSORS
2. A62 ENTHALPY SENSOR OR RT27 USED FOR DIFFERENTIAL SENSING
3. USED ON C BOX UNITS
4. REPLACE A7 OR RT26 WITH 620 OHM RESISTOR FOR CONTROLS WITH GLOBAL ECON
5. TB11 USED ON "C" BOX ONLY WITH MOTOR M7215A
6. OPTIONAL EXHAUST DAMPER TO HOLD EXHAUST DAMPER CLOSED WHEN OUTSIDE AIR DAMPER IS CLOSED
7. OPTIONAL OUTDOOR THERMOSTAT TO REPLACE RT26 SENSIBLE SENSOR

	LANDMARK WIRING DIAGRAM	11/11
ACCESSORIES		
ECONOMIZER		
SECTION D		REV 0
Supersedes	New Form No. 537080-02	

High Performance Economizer - Installation

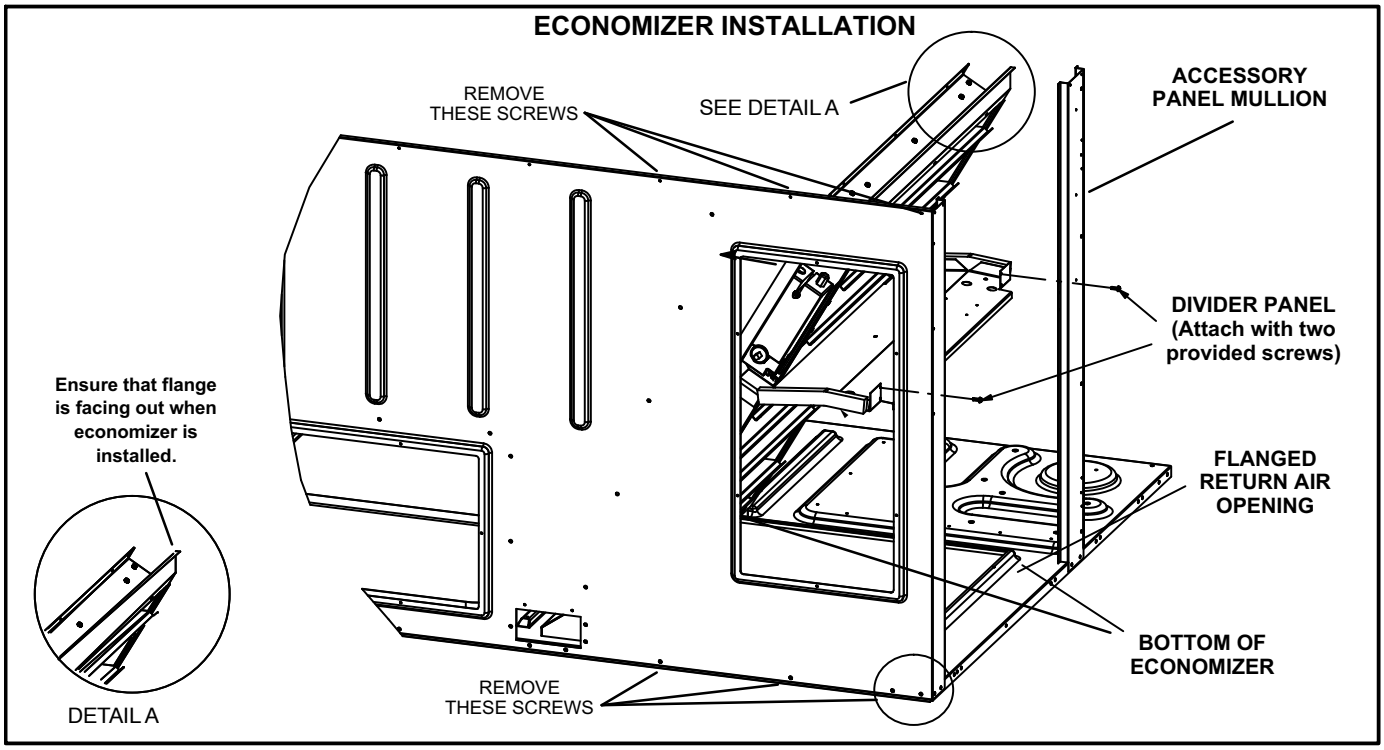


FIGURE 13

DAMPERS

1- Disconnect all power to unit.

2- Remove accessory compartment access panel.

3- Remove and retain screws from top and bottom of rear panel. Remove screws from accessory panel mullion and remove mullion. Lift the top of the unit as needed. See figure 13.

4- Slide the bottom of the economizer over the flanged return air opening in the base of the unit until it settles into place. See figure 13.

5- Use provided screws to secure economizer divider panel to unit end mullion and accessory compartment mullion as shown in figure 13.

6- Before securing unit top panel with retained screws, position the outdoor air hood top seal under the panel as shown in figures 28 and 29. The outdoor air hood top seal is shipped with the other outdoor air hood components.

ECONOMIZER CONTROL (A6) INSTALLATION

1- Install A6 economizer control below control panel as shown in figure 14. Secure with #6 - 32 X ⅞ TFS screws provided.

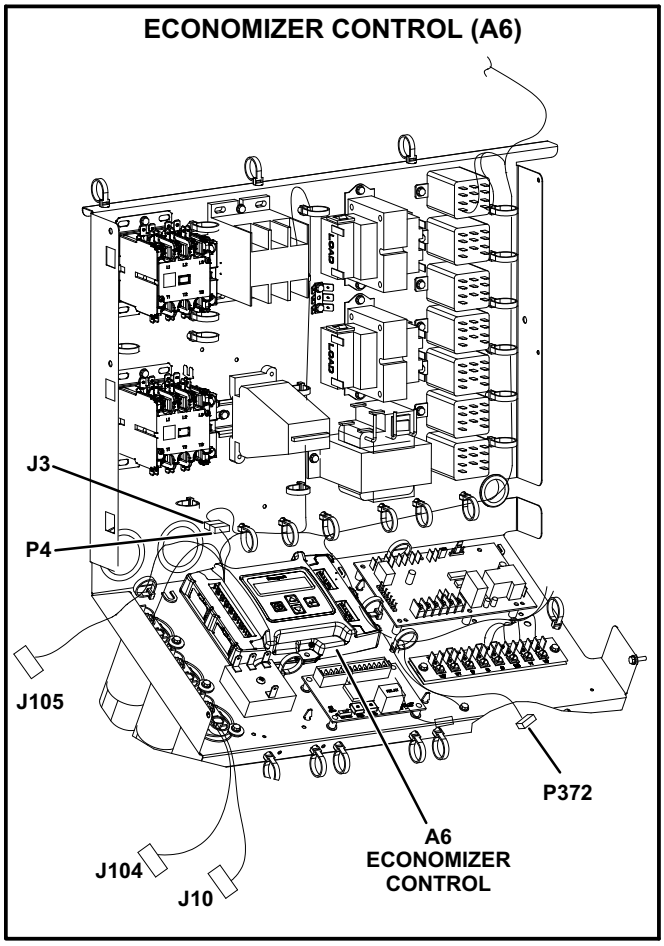


FIGURE 14

High Performance Economizer - Installation (continued)

MIXED AIR SENSOR (R1) INSTALLATION

1- Remove blower access panel.

2- Install sensor on mounting bracket as shown in figure 15. Secure with #8 - 32 X ½" TFS screws provided in kit.

3- Install sensor and bracket assembly on blower housing as shown in figure 16. Secure with #8 - 32 X ½" TFS screws provided in kit.

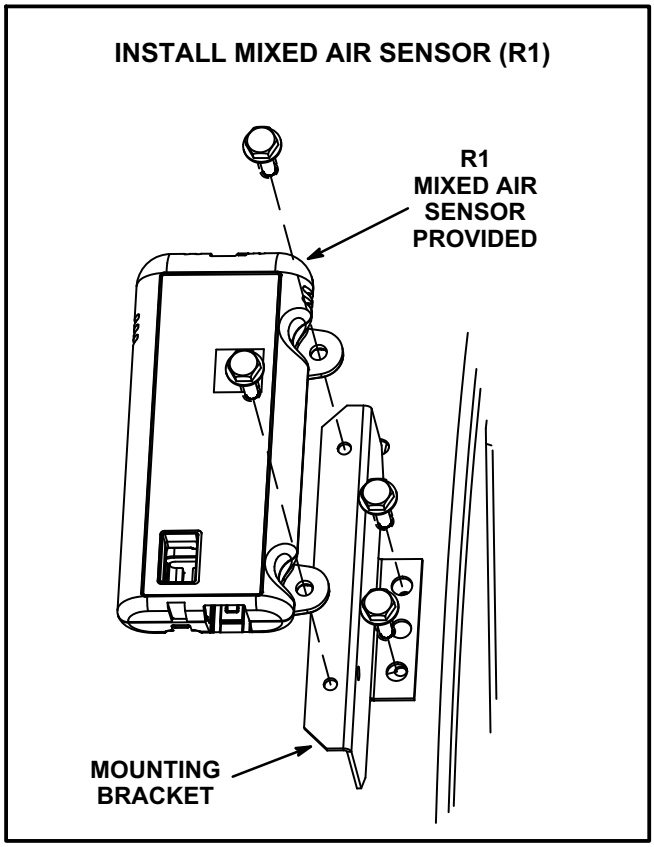


FIGURE 15

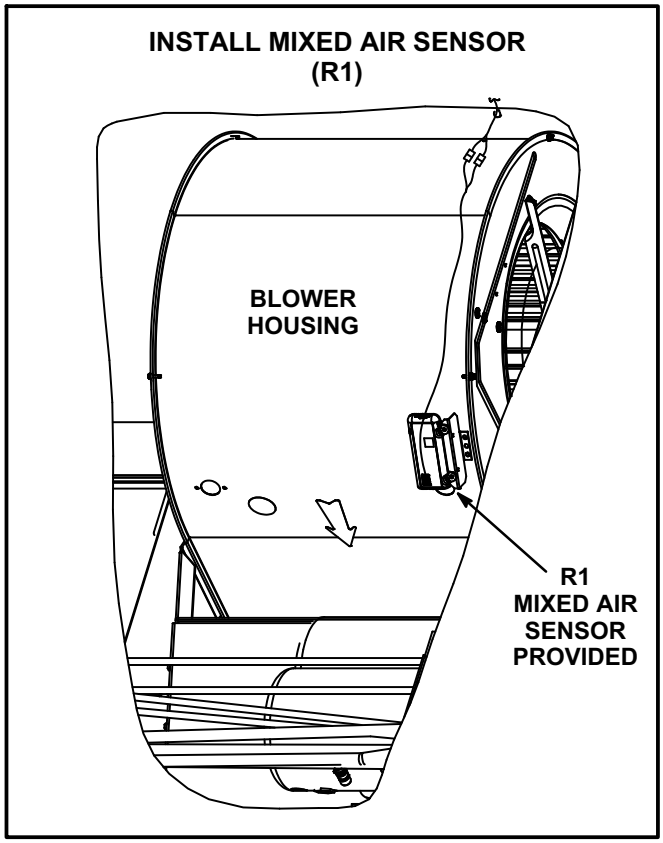


FIGURE 16

OUTDOOR AIR SENSOR (RT26) INSTALLATION

1- Mount sensor onto the economizer divider panel as shown in figure 17. Use #6 - 32 X ⅞" TFS screws provided.

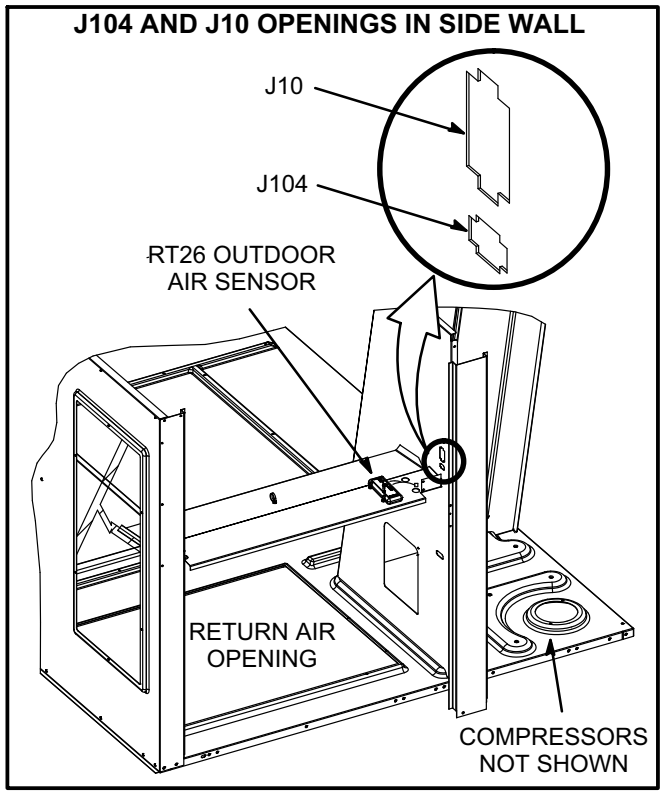


FIGURE 17

High Performance Economizer - Electrical

CONTROLLER HARNESS A6 CONNECTIONS

NOTE - Wires marked P and P1 are hanging in the control section. These wires are connected on units equipped with standard economizers AND a VFD only.

1- Disconnect and discard the 15-pin male plug attached to factory-installed J3.

2- Locate harness installed on economizer control (A6).

3- Connect the 15-pin male plug P4 to the 15-pin female jack J3 on the unit control harness.

4- Locate 2-wire harness marked J104--A6-OAT and connect one end to the economizer controller A6 terminals marked OAT (orange).

5- Route harness as shown in figure 18 and use push-in wire tie to secure harness to side wall.

6- Push J10 and J104 from economizer control harness into openings in side wall. See figure 19.

7- Connect the 15-pin plug P3 from the damper motor to the economizer control J10 jack inserted into the wall in the previous step.

OUTDOOR AIR SENSOR CONNECTION (RT26)

1- Locate 2-wire harness marked P104--SENSOR.

2- Insert P104 plug into the side of the economizer as shown in 19 And connect the other end to the sensor.

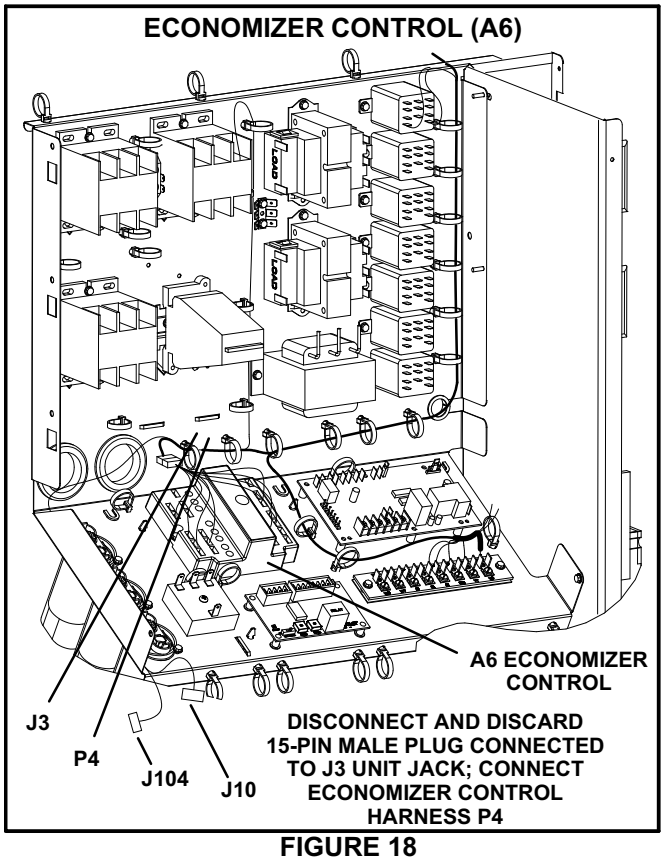


FIGURE 18

MIXED AIR SENSOR CONNECTION (R1)

1- Connect J3 harness wires marked “R1” to the 10” R1 adapter harness. Connect the other side of the R1 adapter harness into the mixed air sensor. See figure 15 And 16. Make sure to secure wires away form moving parts.

OPTIONAL SENSOR CONNECTIONS

An optional return air sensible sensor (RT27) can be added for differential sensible sensing. The sensible configuration can be replaced by temperature and humidity (enthalpy) sensor A7 for single enthalpy sensing. RT26 / RT27 can be replaced by temperature and humidity (enthalpy) sensors A7 / A62 for differential enthalpy sensing. See figure 20 for sensor wiring.

An optional CO2 sensor (A63) can be added for demand control ventilation (DCV).

For proper operation, the IAQ sensor must provide a 0-10VDC signal. Connect sensor leads to AQ and AQ1 terminals on the A6 economizer control located in the filter section.

CO_2 Sensor Used With High Performance Economizers- When using any 0-10VDC sensor, set the ppm range using the W7220 economizer control A6 ADVANCED SETUP menu. Set the CO2ZERO to 400 ppm and the CO2SPAN to 1600 ppm.

Refer to installation instructions shipped with optional sensor for more details.

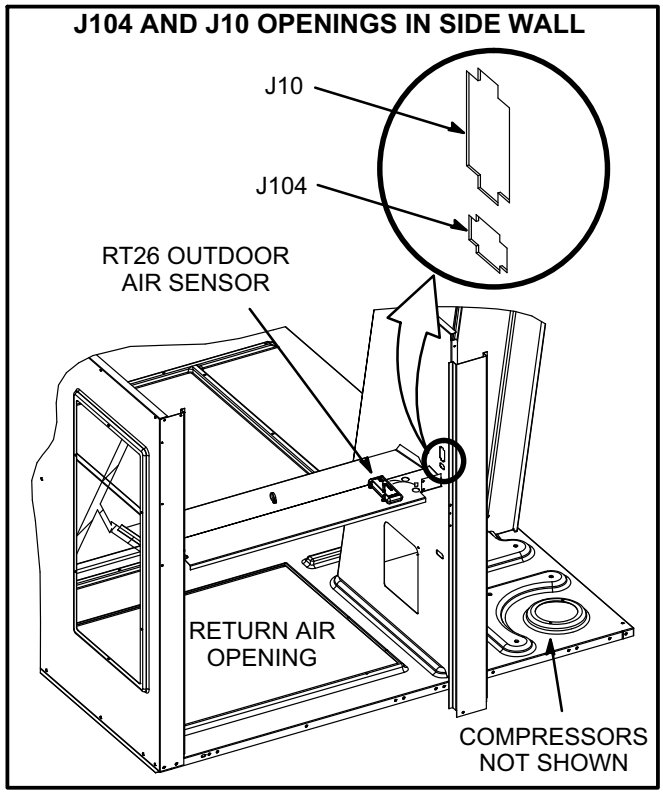


FIGURE 19

High Performance Economizer - Electrical (continued)

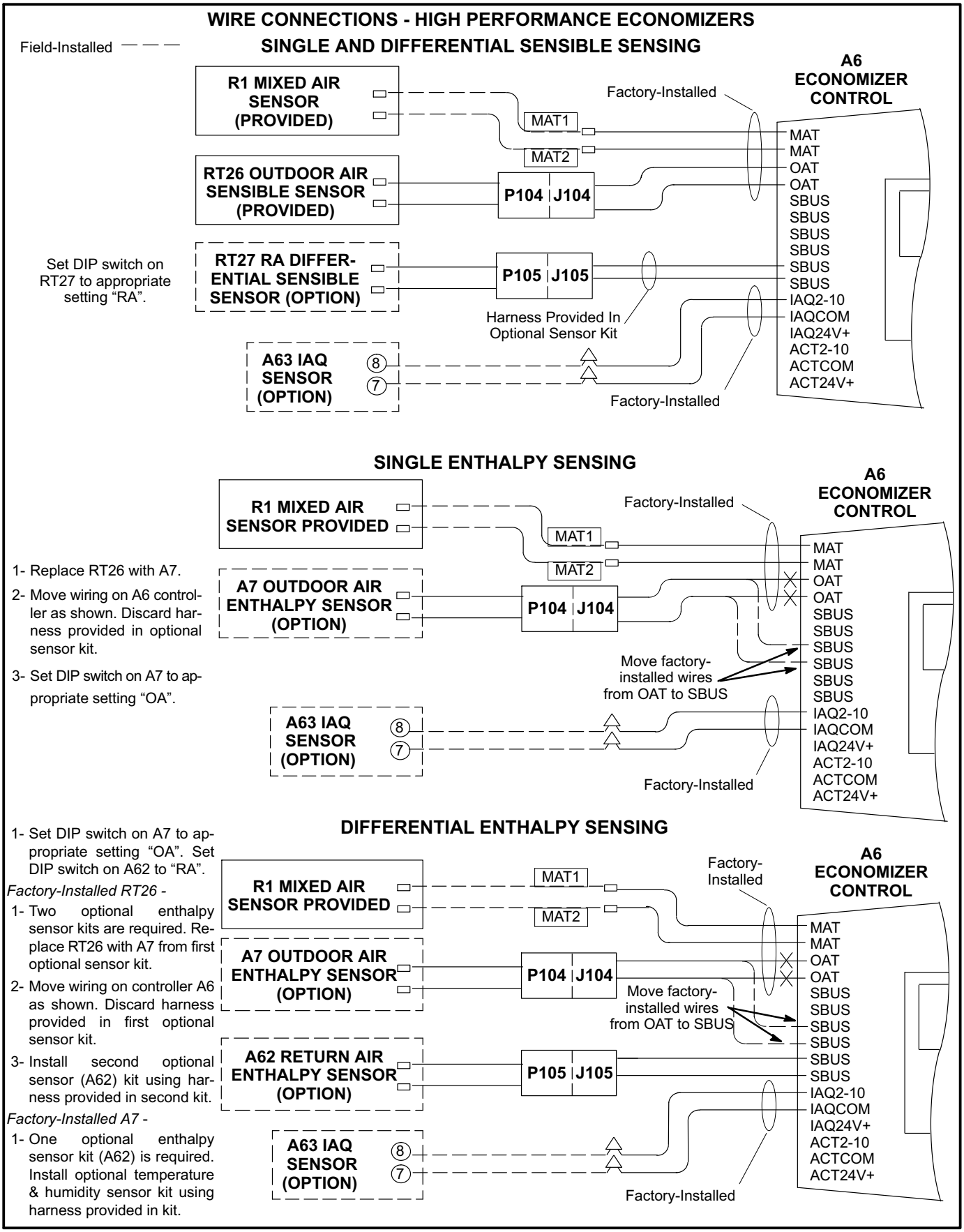


FIGURE 20

High Performance Economizer - A6 Control

***NOTE** - The A6 economizer control will be in the "setup" mode for the first sixty minutes after powered. If a sensor for outdoor air or SBUS device (sensor, actuator) is disconnected during the set up mode, the A6 will not alarm that failure. The R1 mixed air sensor is a system "critical" sensor; if the mixed air sensor is removed during the set up mode, the A6 will alarm. After sixty minutes the A6 will change to operation mode and all components removed or failed will alarm in the operation mode.*

INITIAL SETUP

Factory-Installed Economizer -

The A6 economizer control is pre-programmed **and a limited number of parameters need to be set during the initial setup in the field**. *See Setup and Configuration - Factory-Installed Economizer* section.

Field-Installed Economizer -

A default program must be modified for proper operation in each application. This is done during the initial setup procedure. *See Setup and Configuration - Field-Installed Economizer* section.

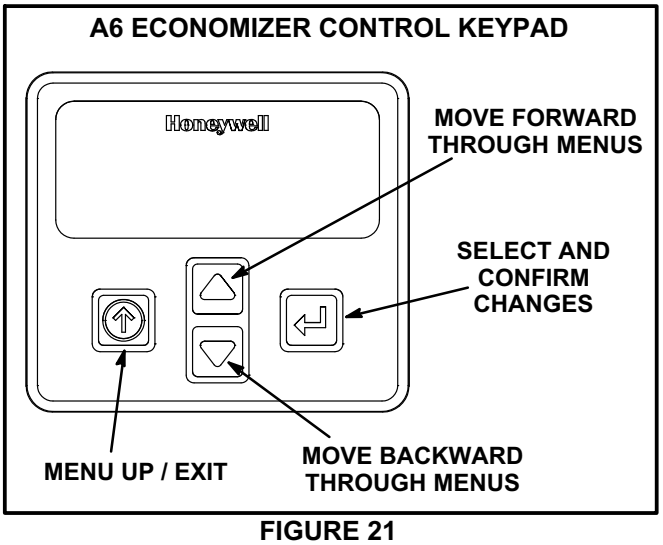


FIGURE 21

USING THE KEYPAD

Use the keypad as follows:

- Navigate to the desired menu.
- Press the ↵ button (enter) to display the first item in the currently displayed menu.
- Use the ▲ and ▼ buttons to scroll to the desired parameter.
- Press the ↵ enter button (enter) to display the value of the currently displayed item.
- Press the ▲ button to increase (change) the displayed parameter value.[a]
- Press the ▼ button to decrease (change) the displayed parameter value.[a]
- Press the ↵ enter button (enter) to accept the displayed value and store it in non-volatile RAM.
- CHANGE STORED displays.
- Press the ↵ button (enter) to return to the current menu parameter.
- Press the ⓘ button (MenuUp/Exit) to return to the previous menu.

[a]When values are displayed, pressing and holding the ▲ or ▼ button causes the display to automatically increment.

MENU STRUCTURE

The menus in display order are:

•STATUS
•SETPOINTS
•SYSTEM SETUP
•ADVANCED SETUP
•CHECKOUT
•ALARMS

For a complete list of parameters refer to the Honeywell installation manual provided in this kit.

IMPORTANT - Menu parameters will be different depending on each configuration. For example: if a DCV (CO_2) sensor is not used, none of the DCV parameters will appear and only MIN POS will display. If a CO_2 sensor is used, the DCV SET, VENTMIN and VENTMAX will appear.

SETUP AND CONFIGURATION - FACTORY-INSTALLED ECONOMIZER

Program the following parameters into the controller. Navigate to the specific menus to make the changes required.

IMPORTANT - During setup, the economizer control is live at all times.

The setup process uses a hierarchical menu structure. Press the ▲ and ▼ arrow buttons to move forward and backward through the menus and press the ↵ button to select and confirm setup item changes.

In the ***SYSTEM SETUP*** Menu

INSTALL	(MM/DD/YY) enter installation date
FAN CFM	( ) enter rooftop unit indoor blower CFM.
AUX1 OUT	(NONE) enter SYS if controller is wired for remote alarm monitoring.

In the ***SETPOINTS*** Menu

MIN POS	(VDC) adjust VDC value until desired fresh air setpoint is reached.

High Performance Economizer - A6 Control (continued)

SETUP AND CONFIGURATION - FIELD-INSTALLED ECONOMIZER

Program the following parameters into the controller. Navigate to the specific menus to make the changes required.

IMPORTANT - During setup, the economizer control is live at all times.

The setup process uses a hierarchical menu structure. Press the ▲ and ▼ arrow buttons to move forward and backward through the menus and press the ↵ button to select and confirm setup item changes.

In the ***SYSTEM SETUP*** Menu

INSTALL	(MM/DD/YY) enter installation date
EQUIPMENT	(CONV)
AUX2 IN	(HEAT W1)
FAN SPEED	(1SPEED CAV unit) (2SPEED MSAV unit)
FAN CFM	( ) enter highest indoor blower capacity of rooftop unit.
AUX1 OUT	(NONE) change to SYS if A6 controller is wired for remote alarm monitoring.
OCC	(INPUT)

In the ***ADVANCED SETUP*** Menu

MA LO SET	(45ºF)
FREEZE POS	(CLOSE)
STG3 DLY	(2HRS)
SD DMPR POS	(CLOSED)

In the ***SETPOINTS*** Menu

MA SET	(55ºF)	
LO T LOCK	(32ºF)	
MIN POS	(VDC)	refer to minimum position setting section for details.

ALARM MONITORING

The controller is equipped with a 24V output signal that can be configured for remote alarm monitoring.

In the “SYSTEM SETUP“ menu change the *“AUX1 OUT”* setting to *“SYS“*. Refer to figure 22 for wiring connections provided.

Note - Newer units are factory-wired to facilitate feedback wiring connections when a BACnet™ *option is installed. Newer units can be identified by a P372 plug located near TB1 in the control box. One white and one gray wire are connected to P372. On older units, call 1-800-453-6669 for wiring assistance.*

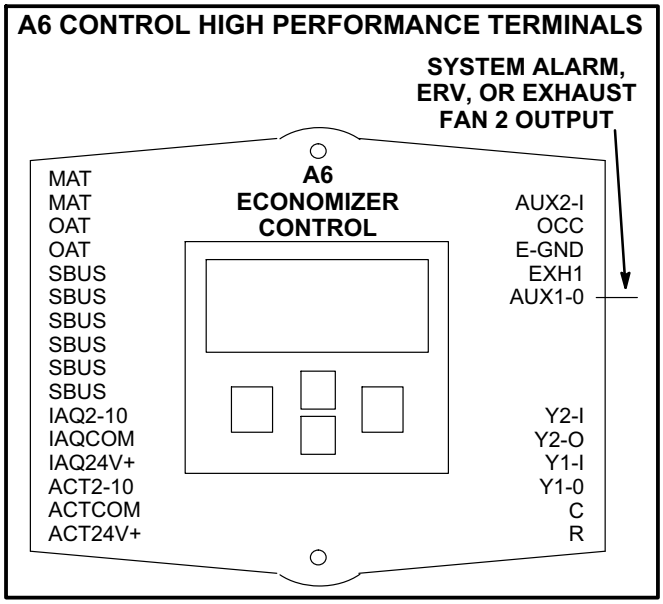


FIGURE 22

High Performance Economizer - Settings

FREE COOLING SETPOINT

Single OA Sensible Sensing (Default) -

The default free cooling setpoint or high limit setpoint is 63°F. This means that the outdoor air is suitable for free cooling at 62°F and below and not suitable at 64°F and above. This setpoint is adjustable.

For *California Title 24* compliance, adjust the free cooling setpoint based on:

-The climate zone where the unit is installed. See table 7.

-The setpoint requirement published by the California Energy Commission. See *Section 140.4 - Prescriptive Requirements for Space Conditioning Systems of the 2013 Energy Efficiency Standards.*

Note - Values in the referenced standard will supersede values listed in table 7.

TABLE 7
FREE COOLING SETPOINT - SINGLE SENSIBLE

Climate Zone	Setpoint
1, 3, 5, 11-16	75°F
2, 4, 10	73°F
6, 8, 9	71°F
7	69°F

To adjust the setpoint, navigate to the *"SETPOINTS"* menu and change the *"DRYBLB SET"* parameter accordingly.

Single OA Enthalpy Sensing (Optional) -

The controller uses enthalpy boundary "curves" for economizing when used with an enthalpy sensor. Refer to the Honeywell installation instruction for details.

Differential Sensing (Optional) -

Two sensors can be used to compare outdoor air to return air. When outdoor air is cooler than return air, outdoor air is suitable for free cooling. When return air is cooler than outdoor air, the damper will modulate to the minimum position.

DAMPER MINIMUM POSITION

***NOTE** - 24 volts must be provided at unit TB1 terminals **R** and **OC** to enable economizer operation (allowing minimum fresh air). Typically a separately ordered thermostat or energy management system with an occupied/unoccupied output is connected between TB1 **R** and **OC** terminals. The thermostat will provide 24 volts to the A6 economizer control during the occupied time period to enable economizer minimum position. If a device is not used to enable the economizer, install a jumper wire between TB1 terminals **R** and **OC** to maintain minimum position continuously. See figure 23.*

*Make wire connections to TB1 terminals **R** and **OC** as shown in literature provided with thermostat or energy management system.*

TB1 TERMINAL R AND OC JUMPER

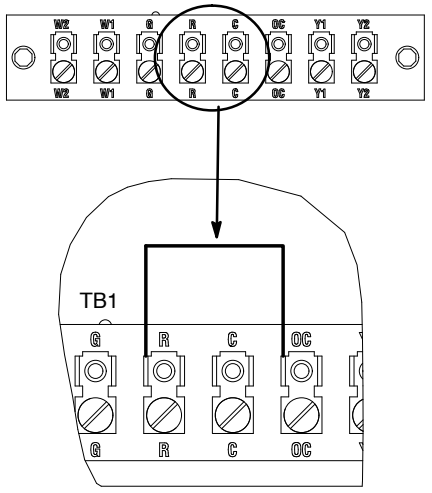


FIGURE 23

UNITS WITH 1-SPEED SUPPLY AIR BLOWER

1- Set thermostat to occupied mode if the feature is available. Make sure jumper is in place between TB1 terminals R and OC if using a thermostat which does not have the feature.

2- Turn on the blower using the thermostat or a jumper between TB1 terminals R and G.

3- Navigate to the *"SETPOINTS"* menu and select "*MIN POS"*. Adjust value (2-10VDC) to the approximate desired fresh air percentage.

3.0 VDC - 12% Open Damper

3.5 VDC - 18% Open Damper

4.0 VDC - 25% Open Damper

4.5 VDC - 31% Open Damper

5.0 VDC - 37% Open Damper

5.5 VDC - 43% Open Damper

6.0 VDC - 50% Open Damper

***NOTE** - Damper minimum position can be set lower than traditional minimum air requirements when an IAQ sensor is specified.*

4- Measure outdoor air temperature. Mark the point on the bottom line of chart 1 and label the point "A" (40°F, 4°C shown).

High Performance Economizer - Settings (continued)

5- Measure return air temperature. Mark that point on the top line of chart 1 and label the point “B” (74°F, 23°C shown).

6- Measure mixed air (outdoor and return air) temperature. Mark that point on the top line of chart 1 and label point “C” (70°F, 21°C shown).

7- Draw a straight line between points A and B.

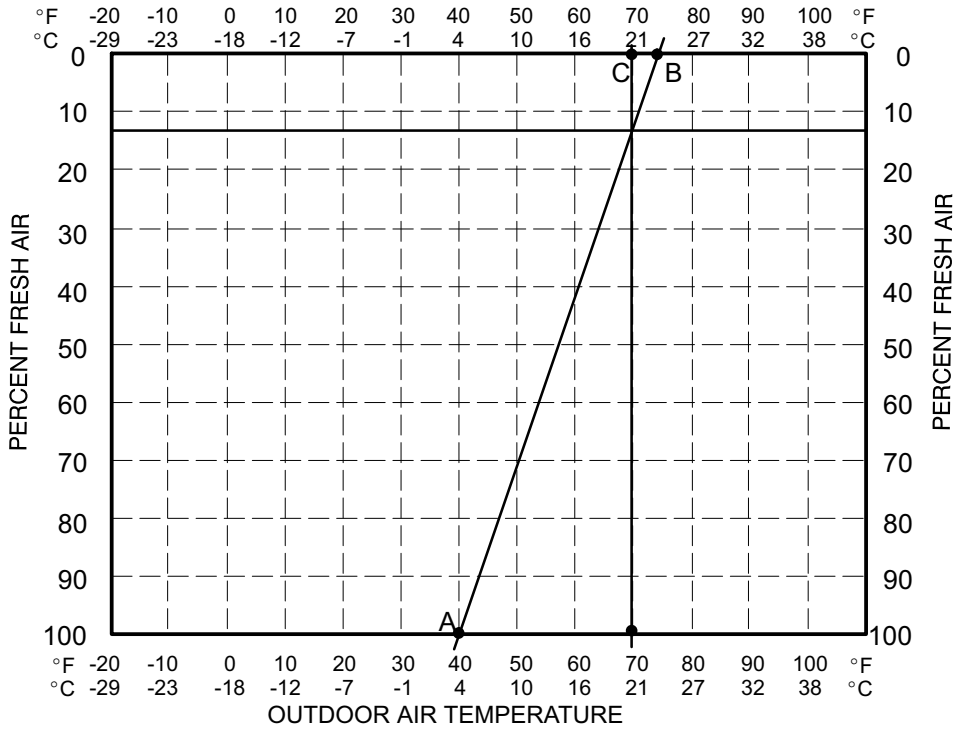
8- Draw a vertical line through point C.

9- Draw a horizontal line where the two lines meet. Read the percent of fresh air intake on the side.

10- Repeat steps 3 through 8 until calculation reads desired fresh air percentage.

If fresh air percentage is less than desired, use the A6 keypad to adjust “MIN POS” values higher (further open). If fresh air percentage is more than desired, adjust “MIN POS” values lower (less open). Repeat steps 3 through 8 until calculation reads desired fresh air percentage.

CHART 1
CALCULATE MINIMUM FRESH AIR PERCENTAGE



High Performance Economizer - Settings (continued)

UNITS WITH 2-SPEED SUPPLY AIR BLOWER

***NOTE** - AFTER setting minimum positions, set the "VENT SPEED" switch on the VFD control board to "LO". See figure 24. Minimum position potentiometers do not function when the unit is equipped with a W7220 economizer control.*

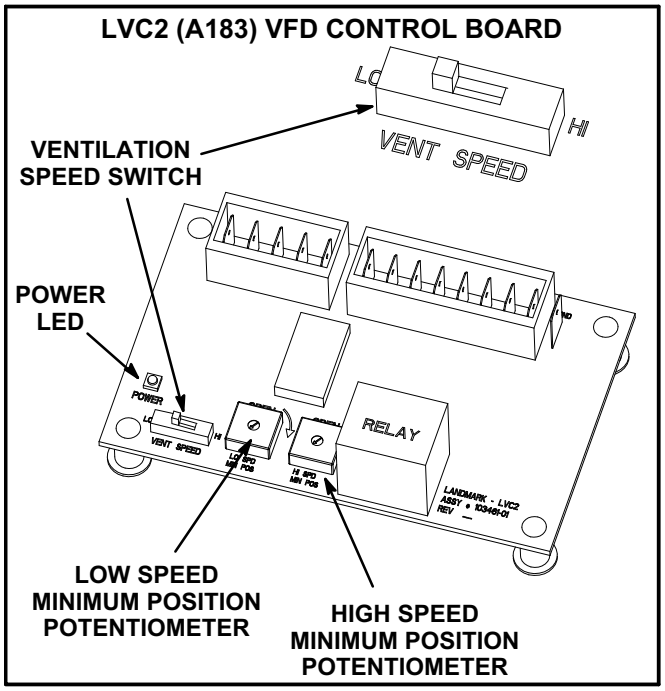


FIGURE 24

1- Set thermostat to occupied mode if the feature is available. Make sure a jumper is in place between TB1 terminals R and OC when using a thermostat which does not have this feature.

2- **Minimum damper position setting - Low Speed Switch the blower speed setting on the VFD control board to "LO".**

3- Turn on the indoor blower using the thermostat or by placing a jumper between TB1 terminals R and G. The inverter or variable frequency drive (VFD) should display "40.00Hz".

4- Navigate to the *"SETPOINTS"* menu and select "*MIN POS L"*. Adjust value (2-10VDC) to the approximate desired fresh air percentage and save the input.

3.0 VDC - 12% Open Damper
3.5 VDC - 18% Open Damper
4.0 VDC - 25% Open Damper
4.5 VDC - 31% Open Damper
5.0 VDC - 37% Open Damper
5.5 VDC - 43% Open Damper
6.0 VDC - 50% Open Damper

***NOTE** - Damper minimum position can be set lower than traditional minimum air requirements when an IAQ sensor is specified.*

5- Navigate to the "CHECKOUT" menu and select "VMAX-LS". Press ↵.

6- Display will read "DAMPER VMAX-LS RUN?". Press ↵.

7- Damper will drive to the setpoint value stored in step 4-.

8- Measure outdoor air temperature. Mark the point on the bottom line of chart 1 and label the point "A" (40°F, 4°C shown).

9- Measure return air temperature. Mark that point on the top line of chart 1 and label the point "B" (74°F, 23°C shown).

10- Measure mixed air (outdoor and return air) temperature. Mark that point on the top line of chart 1 and label point "C" (70°F, 21°C shown).

11- Draw a straight line between points A and B.

12- Draw a vertical line through point C.

13- Draw a horizontal line where the two lines meet. Read the percent of fresh air intake on the side.

14- Repeat steps 4 through 13 until calculation reads desired fresh air percentage.

If fresh air percentage is less than desired, use the A6 keypad to adjust "MIN POS L" values higher (further open). If fresh air percentage is more than desired, adjust "MIN POS L" values lower (less open).

15- **Minimum damper position setting - High Speed Switch the blower speed setting on the VFD control board to "HI".** The VFD should display "60.00HZ".

16- Navigate to the *"SETPOINTS"* menu and select "*MIN POS H"*. Adjust value (2-10VDC) to the approximate desired fresh air percentage.

3.0 VDC - 12% Open Damper
3.5 VDC - 18% Open Damper
4.0 VDC - 25% Open Damper
4.5 VDC - 31% Open Damper
5.0 VDC - 37% Open Damper
5.5 VDC - 43% Open Damper
6.0 VDC - 50% Open Damper

***NOTE** - Damper minimum position can be set lower than traditional minimum air requirements when an IAQ sensor is specified.*

17- Navigate to the "CHECKOUT" menu and select "VMAX-HS". Press ↵.

18- Display will read "DAMPER VMAX-HS RUN?". Press ↵.

High Performance Economizer - Settings (continued)

19- Damper will drive to the setpoint value stored in step 16-.

20- Measure outdoor air temperature. Mark the point on the bottom line of chart 1 and label the point “A” (40°F, 4°C shown).

21- Measure return air temperature. Mark that point on the top line of chart 1 and label the point “B” (74°F, 23°C shown).

22- Measure mixed air (outdoor and return air) temperature. Mark that point on the top line of chart 1 and label point “C” (70°F, 21°C shown).

23- Draw a straight line between points A and B.

24- Draw a vertical line through point C.

25- Draw a horizontal line where the two lines meet. Read the percent of fresh air intake on the side.

26- Repeat steps 16 through 25 until calculation reads desired fresh air percentage.

If fresh air percentage is less than desired, use the A6 keypad to adjust *“MIN POS H”* values higher (further open). If fresh air percentage is more than desired, adjust *“MIN POS H”* values lower (less open).

27- **Set the “VENT SPEED” switch on the VFD control board to “LO”.**

DEMAND CONTROL VENTILATION (DCV)

When a 0-10VDC CO_2 sensor is wired to the W7220 economizer control A6 (leads provided), the *DCV SET, DCV MIN*, and *DCV MAX* parameters will appear under *“SETPOINTS“* menu. Navigate to the *“SETPOINTS“* menu to adjust setpoints as desired. Refer to the Honeywell manual provided for more details.

For proper operation, the IAQ sensor must provide a 0-10VDC signal. Connect sensor leads to AQ and AQ1 terminals on the A6 economizer control located in the filter section.

CO_2 Sensor Used With High Performance Economizers -

When using any 0-10VDC sensor, set the ppm range using the W7220 economizer control A6 ADVANCED SETUP menu. Set the CO2ZERO to 400 ppm and the CO2SPAN to 1600 ppm.

High Performance Economizer - Sequence of Operation

Refer to tables 8, 9, 10 or 11.

When the outdoor air is suitable and a thermostat demand calls for 1st stage cooling (Y1), the economizer will modulate the dampers between the minimum and fully open positions to maintain a 55°F (12.8°C) mixed air temperature. When there is an increased thermostat demand for second stage cooling (Y2), the economizer damper opens 100% and the economizer controller (A6) will bring on the compressor. The damper will stay open 100% with the compressor running simultaneously until Y2 demand is met.

NOTE – If a two-speed fan is installed, the economizer controller (A6) will delay the compressor start for 5 minutes (default). To adjust the delay from 1 to 20 minutes, adjust the "2SP FAN DELAY" setting.

NOTE – *When there is a Y1 cooling demand, the economizer controller (A6) will display the mixed air temperature (R1). When there is a Y2 cooling demand and compressors are operating, the economizer controller (A6) will display the outdoor air temperature (RT26 or A7). In either case, the economizer controller (A6) will use the mixed air sensor for low temperature lock-out.*

TROUBLESHOOTING, ALARMS AND CHECKOUT TESTS

Refer to the Honeywell manual provided for details.

TABLE 8

ECONOMIZER OPERATION - NO DCV (CO_2 SENSOR, 1-SPEED SUPPLY FAN)

DCV	OA Good to Economize?	Y1-I	Y2-I	Y1-O	Y2-O	Occupied	Unoccupied
None	No	Off	Off	0-v/Off	0-v/Off	MIN POS	Closed
		On	Off	24-v/On	0-v/Off	MIN POS	Closed
		On	On	24-v/On	24-v/On	MIN POS	Closed
None	Yes	Off	Off	0-v/Off	0-v/Off	MIN POS	Closed
		On	Off	0-v/Off	0-v/Off	MIN POS to Full-Open	Closed to Full-Open
		On	On	24-v/On	0-v/Off	Full-Open	Full-Open

TABLE 9

ECONOMIZER OPERATION - WITH DCV (CO_2 SENSOR, 1-SPEED SUPPLY FAN)

DCV	OA Good to Economize?	Y1-I	Y2-I	Y1-O	Y2-O	Occupied	Unoccupied
Below set	No	Off	Off	0-v/Off	0-v/Off	VENTMIN	Closed
		On	Off	24-v/On	0-v/Off	VENTMIN	Closed
		On	On	24-v/On	24-v/On	VENTMIN	Closed
	Yes	Off	Off	0-v/Off	0-v/Off	VENTMIN	Closed
		On	Off	0-v/Off	0-v/Off	VENTMIN to Full-Open	Closed to Full-Open
		On	On	24-v/On	0-v/Off	Full-Open	Full-Open
Above set	No	Off	Off	0-v/Off	0-v/Off	VENTMIN to VENTMAX	Closed
		On	Off	24-v/On	0-v/Off	VENTMIN to VENTMAX	Closed
		On	On	24-v/On	24-v/On	VENTMIN to VENTMAX	Closed
	Yes	Off	Off	0-v/Off	0-v/Off	VENTMIN to VENTMAX	Closed
		On	Off	0-v/Off	0-v/Off	VENTMIN to Full-Open	Closed to Full-Open
		On	On	24-v/On	0-v/Off	Full-Open	Full-Open

High Performance Economizer - Sequence of Operation (continued)

TABLE 10

ECONOMIZER OPERATION - NO DCV (CO_2 SENSOR, 2-SPEED SUPPLY FAN)

DCV	OA Good to Economize?	Y1-I	Y2-I	Fan Speed	Y1-O	Y2-O	Occupied	Unoccupied
None	No	Off	Off	Low	0-v/Off	0-v/Off	MIN POS L	Closed
		On	Off	Low	24-v/On	0-v/Off	MIN POS L	Closed
		On	On	High	24-v/On	24-v/On	MIN POS H	Closed
None	Yes	Off	Off	Low	0-v/Off	0-v/Off	MIN POS L	Closed
		On	Off	High	0-v/Off	0-v/Off	MIN POS L to Full-Open	Closed to Full-Open
		On	On	High	Delay (b) 24-v/On	0-v/Off	Full-Open	Full-Open

(b) With 2SP FAN DELAY (Advance Setup Menu), when in the economizing mode, there is a delay for the high speed fan to try to satisfy the call for second-stage cooling by turning on the fan to high and opening the OA dampers to 100% before the first-stage mechanical cooling is enabled.

TABLE 11

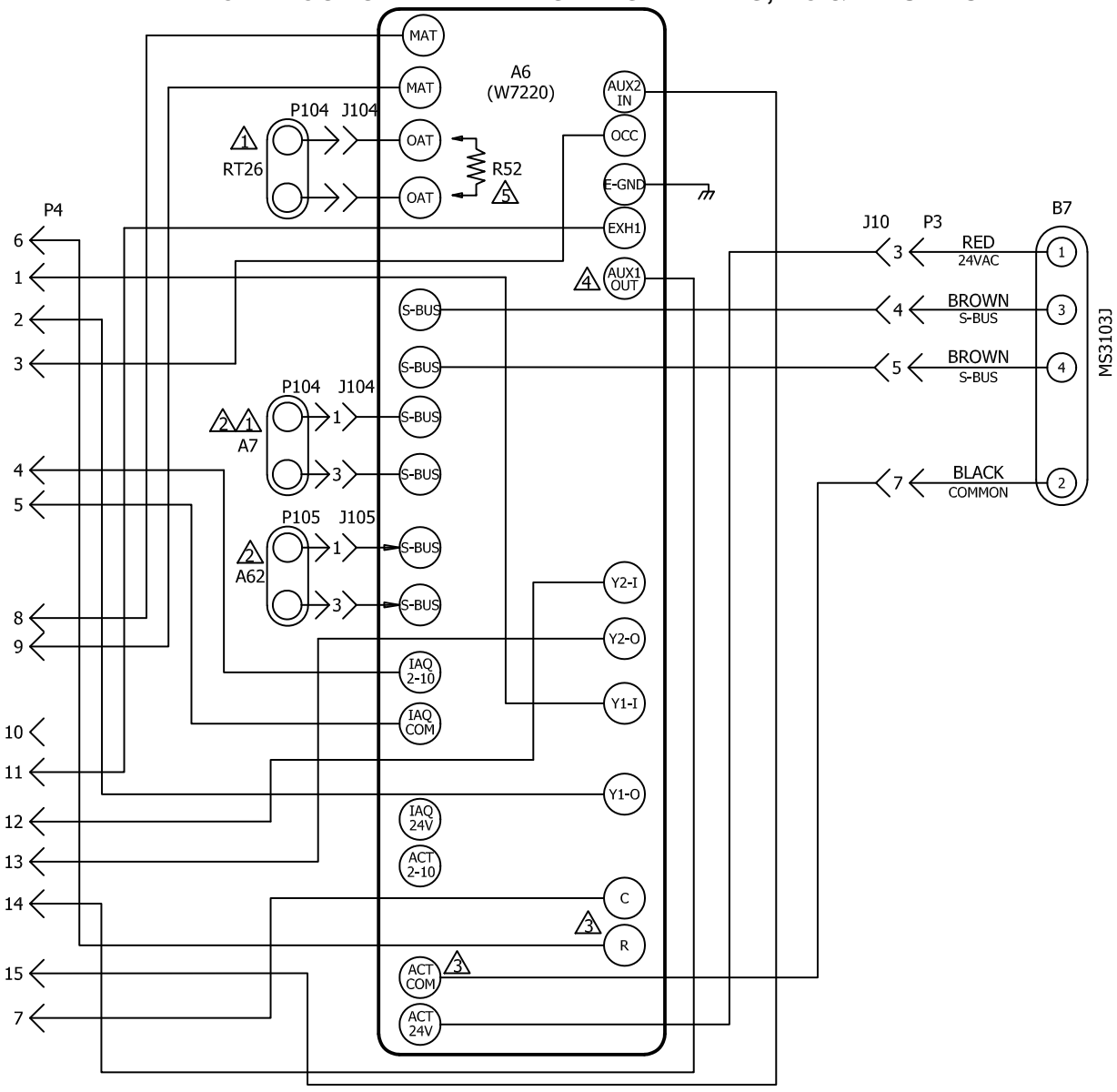
ECONOMIZER OPERATION - WITH DCV (CO_2 SENSOR, 2-SPEED SUPPLY FAN)

DCV	OA Good to Economize?	Y1-I	Y2-I	Fan Speed	Y1-O	Y2-O	Occupied	Unoccupied
Below set	No	Off	Off	Low	0-v/Off	0-v/Off	VENTMIN L	Closed
		On	Off	Low	24-v/On	0-v/Off	VENTMIN L	Closed
		On	On	High	24-v/On	24-v/On	VENTMIN H	Closed
	Yes	Off	Off	Low	0-v/Off	0-v/Off	VENTMIN L	Closed
		On	Off	High	0-v/Off	0-v/Off	VENTMIN L to Full-Open	Closed to Full-Open
		On	On	High	Delay (b) 24-v/On	0-v/Off	Full-Open	Full-Open
Above set	No	Off	Off	Low	0-v/Off	0-v/Off	VENTMIN L to VENTMAX L	Closed
		On	Off	Low	24-v/On	0-v/Off	VENTMIN L to VENTMAX L	Closed
		On	On	High	24-v/On	24-v/On	VENTMIN H to VENTMAX H	Closed
	Yes	Off	Off	Low	0-v/Off	0-v/Off	VENTMIN L to VENTMAX L	Closed
		On	Off	High	0-v/Off	0-v/Off	VENTMIN L to Full-Open	Closed to Full-Open
		On	On	High	Delay (b) 24-v/On	0-v/Off	Full-Open	Full-Open

(b) With 2SP FAN DELAY (Advance Setup Menu), when in the economizing mode, there is a delay for the high speed fan to try to satisfy the call for second-stage cooling by turning on the fan to high and opening the OA dampers to 100% before the first-stage mechanical cooling is enabled.

High Performance Economizer - Wiring Diagram

TYPICAL ECONOMIZER WIRING DIAGRAM - KG, KC & KH UNITS



KEY	COMPONENT
A6	CONTROL - ECONOMIZER
A7	SENSOR - OUTDOOR ENTHALPY
A62	SENSOR - INDOOR ENTHALPY
B7	MOTOR - DAMPER, ECONOMIZER
J10	JACK - ECONOMIZER MOTOR
J104	JACK - SENSOR OUTDOOR
J105	JACK - SENSOR RETURN AIR
P3	PLUG - ECONOMIZER MOTOR
P4	PLUG - ECONOMIZER
P104	PLUG - SENSOR OUTDOOR
P105	PLUG - SENSOR RETURN AIR
RT26	SENSOR - OUTDOOR AIR TEMP
R52	RESISTOR, OAT BYPASS

1. OUTDOOR AIR TEMP SENSOR RT26 OR OUTDOOR AIR ENTHALPY SENSOR A7 MAY BE USED
2. FOR DIFFERENTIAL ENTHALPY SENSING USE OUTDOOR ENTHALPY SENSOR A7 AND INDOOR ENTHALPY SENSOR A62
3. REFER ALSO TO MAIN UNIT WIRING DIAGRAM SECTION C
4. PROGRAMMABLE, USE FOR EXHAUST FAN 2 OUTPUT OR ERV OR SYSTEM ALARM OUTPUT
5. R52 USED WITH NOVAR 2024 OR 2051 DDC CONTROLS.

DESIGNATES OPTIONAL WIRING

CLASS II FIELD WIRING

2019/01	WIRING DIAGRAM 537636-02	01/19
ACCESSORIES		
JADE CONTROL ECONOMIZER (B & C-BOX)		
SECTION B		REV 0
Supersedes 537636-02	New Form No. 537636-03	

Gravity Exhaust Damper Installation

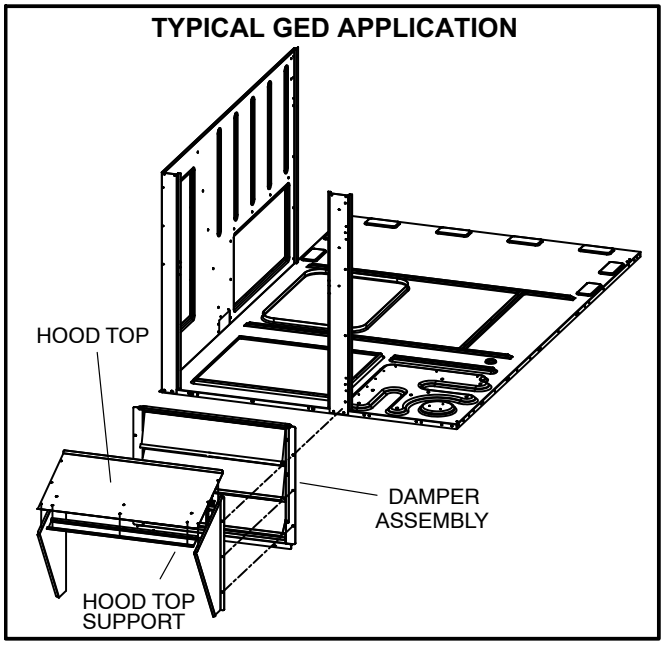


FIGURE 25

Downflow Application -- GED

1- Remove lower accessory compartment access panel (if necessary).

2- Apply foam insulating tape around the back of the flanged edges of the GED assembly.

***NOTE** - When GED is being used with the PEF power exhaust fans, gravity exhaust damper is installed over the outer side of the PEF assembly. See figure 26.*

3- Align holes along the flanged edge of the GED with holes along he bottom of the unit.

4- Use provided screws to secure gravity exhaust assembly to unit.

5- Restore power to unit.

GED Hood Installation

1- Attach hood top to hood top support at the top of the damper assembly. See figure 25.

2- Remove screws from sides of economizer assembly (if installed). Remove paper backing from foam gaskets on hood sides. Secure left and right hood sides to the damper assembly as shown in figure 25.

3- Secure hood top to the hood sides.

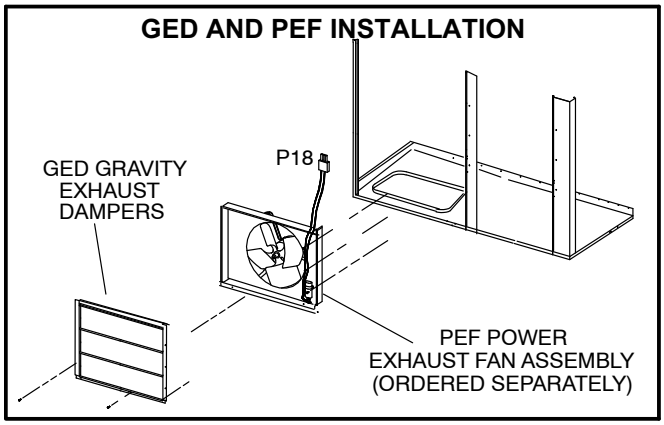


FIGURE 26

Horizontal Application

For horizontal applications, a separately ordered horizontal discharge kit is required. The horizontal, field-fabricated return air duct must be sized to accommodate the gravity exhaust damper and hood shipped with the economizer. A separately ordered low profile gravity exhaust damper (LAGEDH) and hood kit is available for size restricted applications. See figure 27.

1 - Cut one opening in return air plenum. Make sure opening is centered top to bottom in plenum.

2 - Secure hood sides to hood top as shown in figure 27.

3 - Apply foam insulating tape around the back of the flanged edges of the exhaust damper assembly.

4 - Align screw holes on top edges of hood and damper assembly.

5 - Slide combined exhaust damper assembly into plenum opening and secure using screws provided. See figure 27.

6 - Restore power to unit.

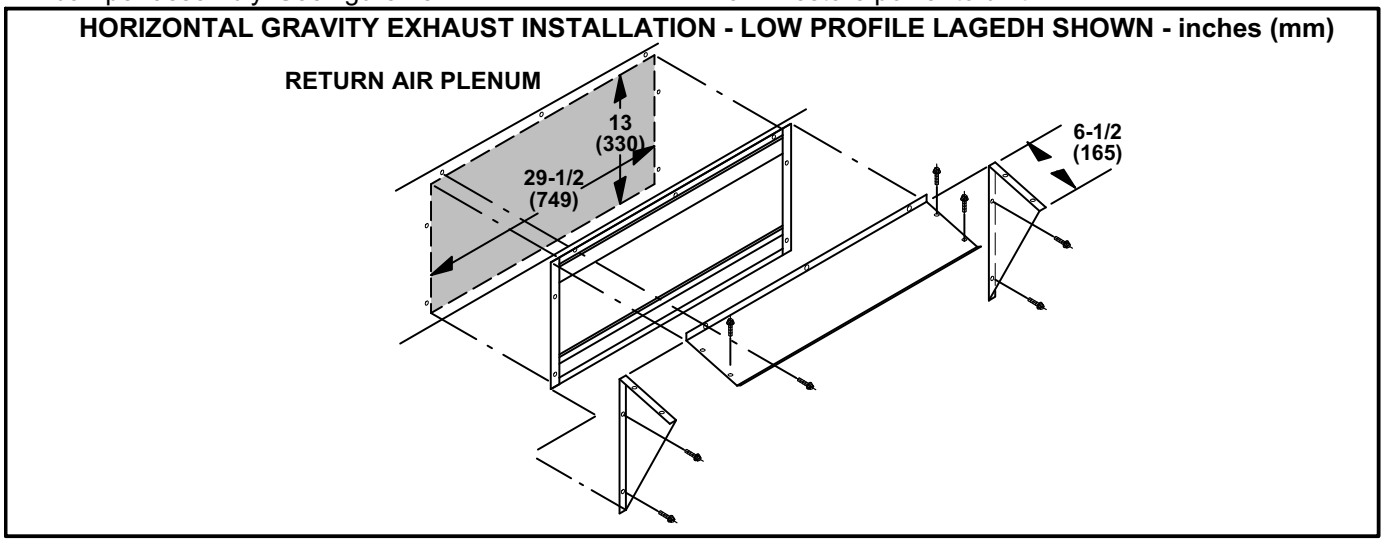


FIGURE 27

Install Outdoor Air Hood

The outdoor air hood is packaged separately and is attached to the economizer assembly crate. Use #10 self-drilling screws to assemble and install hood unless otherwise noted.

1- Remove screws which secure unit top panel to accessory compartment cabinet. Lift top panel to install hood top seal.

2 - Slide hood top seal under unit cabinet top and secure using three of the existing cabinet top panel screws. Install, but do not tighten, the screws on each end of the hood.

3 - Position the hood top edge V-channel under the corresponding V-channel on hood top seal and slide hood from right to left until it is properly positioned.

4 - Secure hood left side to the hood top and to the unit cabinet using the provided screws. See figure 28.

5 - Secure the hood right side to the hood top. Do NOT secure the hood right side to unit.

6 - Align the two holes on the left hood side with the two holes in the top filter seal bracket. Secure using provided screws.

7 - Secure top filter seal bracket to the right hood side in the same manner.

8 - Secure the right hood side to the unit.

9 - Slide two filters into slot of the bottom filter seal bracket. Insert a filter spacer between the two filters and secure it to the hood top panel. Use the provided threaded hex insert and a #10 - 32 X 1/2" thread forming screw to secure the hood top filter bracket. See figure 29.

NOTE *- Slide the filters to the left side of the hood. Make sure there are no air gaps between either two filters or the filter and the hood right side.*

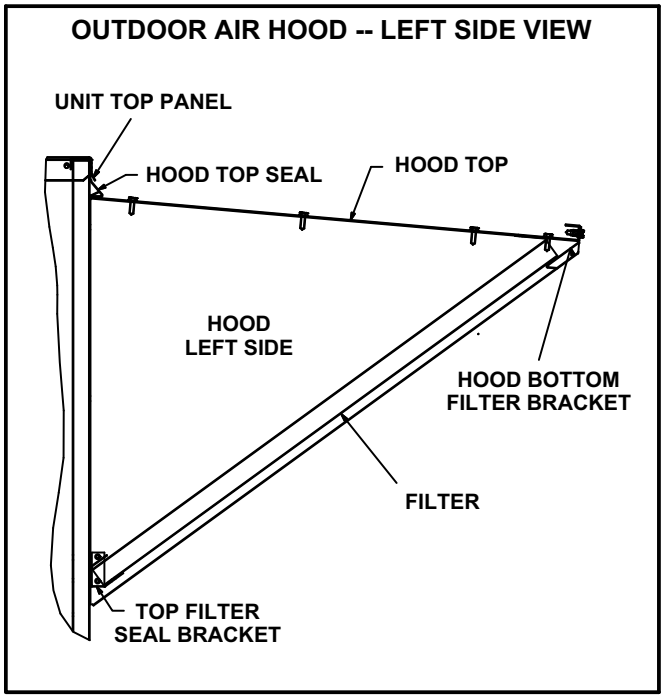


FIGURE 28

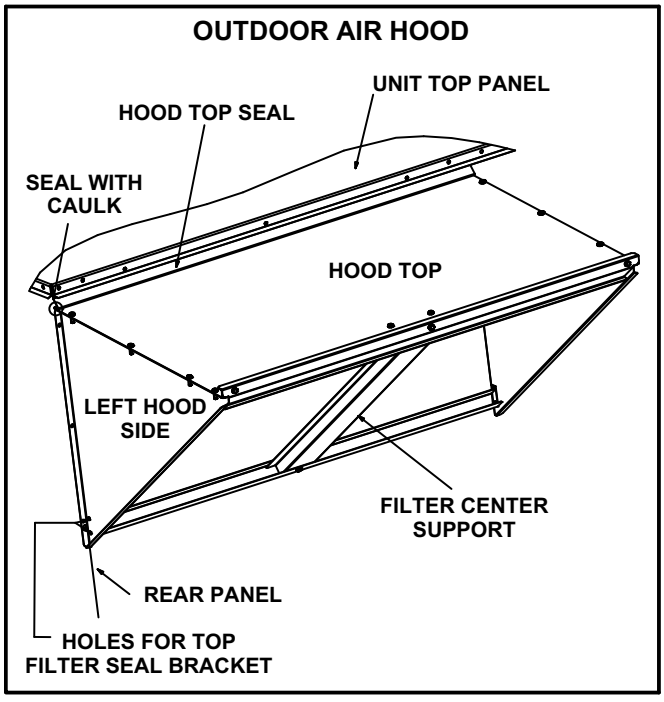


FIGURE 29

Install Economizer - Horizontal

A field-fabricated return air duct transition and duct inlet must be installed in horizontal applications. K1HECK, horizontal discharge kit, must be ordered separately.

1- Remove unit end panel. See figure 30.

2- Install the downflow return air cover in horizontal airflow applications. See instructions provided with K1HECK and figure 30.

3- Make sure the horizontal return air cover on the back side of the unit remains in place. The opening is used when an economizer is not installed. See figure 31.

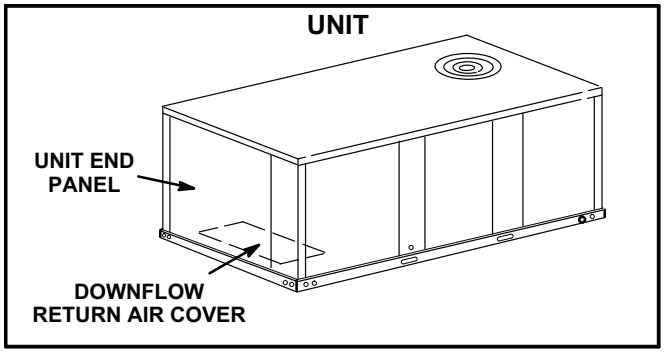


FIGURE 30

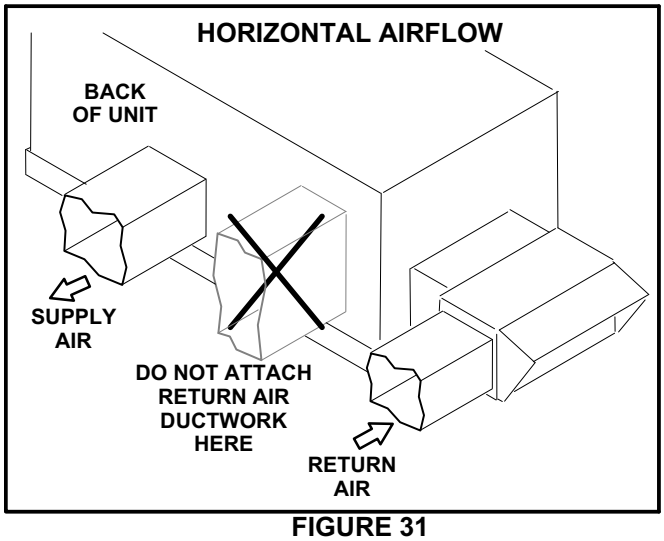


FIGURE 31

4- Install the economizer and R1 mixed air sensor and connect wiring as shown in appropriately named sections of this manual.

5- Install the field-fabricated return air duct transition and duct inlet on the unit end. See figure 32. Support the transition and duct inlet as needed.

6- Install the upper hood on the unit as shown in appropriate section of this manual.

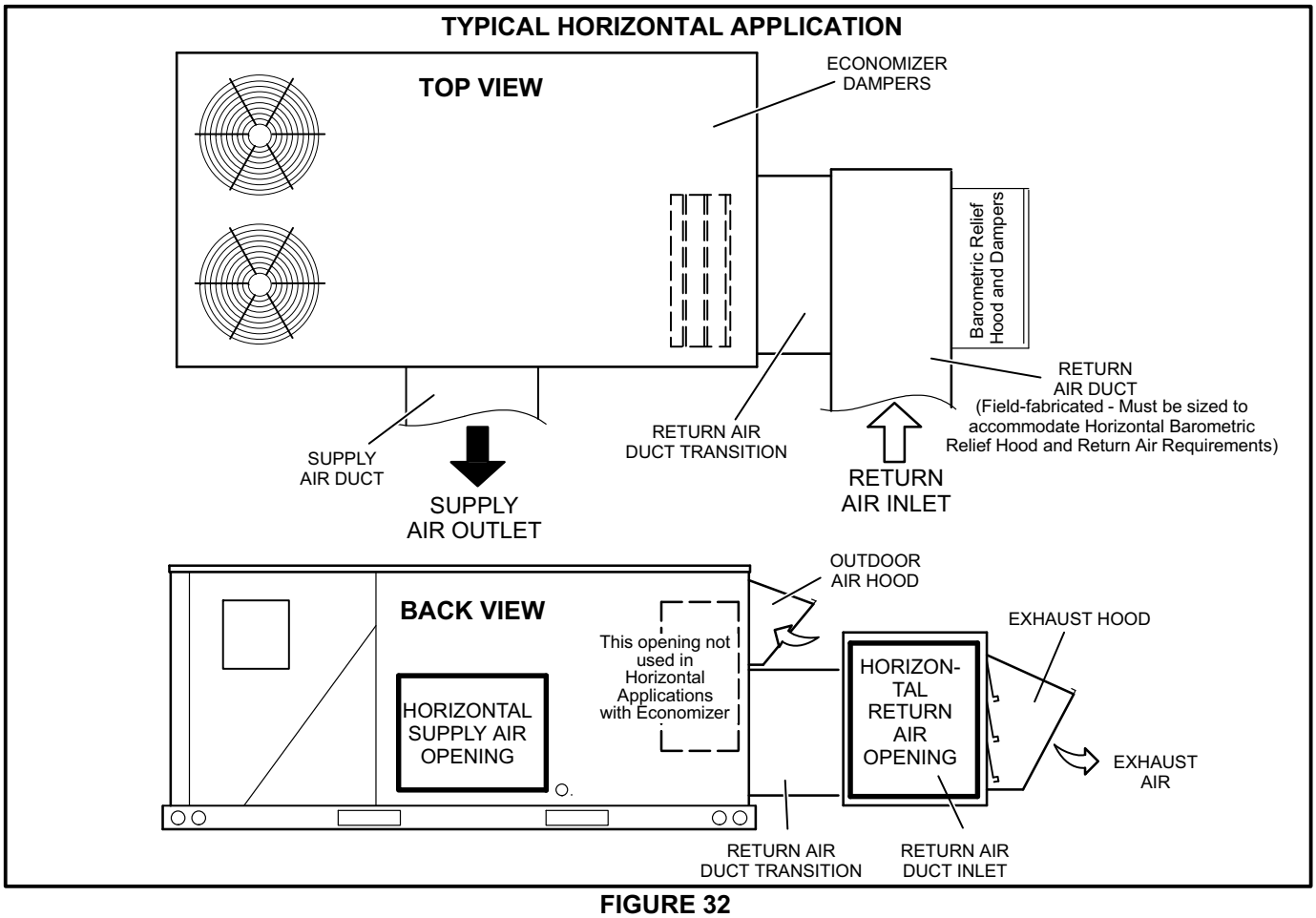


FIGURE 32