

**INSTALLATION INSTRUCTIONS FOR ECONOMIZERS AND OUTDOOR AIR HOODS USED WITH KG/KC/KH/KD 024, 030, 036, 048, 060, 072, 074, 090 UNITS**

Note - Disregard shipping and packing list and installation sections when dampers are factory-installed.

**Shipping and Packing List**

**Package 1 of 1 contains:**

- 1- Economizer damper assembly<sup>A</sup>
- 1- GED<sup>B</sup> (gravity exhaust/barometric relief damper) assembly
- 1- Exhaust hood kit containing:
  - 1-Exhaust hood top<sup>A</sup>
  - 2-Hood sides<sup>C</sup>
  - 1-GED seal<sup>C</sup>
- 1- Outdoor air hood kit containing:
  - 1-Outdoor air hood top<sup>A</sup>
  - 2-Hood sides<sup>D</sup>
- 1- Mist eliminator filter<sup>D</sup>
- 2- Mist eliminator filter brackets<sup>D</sup>
- 1- Bag assembly containing:
  - #10-32 X 1/2 Thread-forming screws
  - #10-16 X 5/8 Self-drilling screws
  - #8-32 X 1/2 Thread-forming screws
  - Mixed air sensor (R1)
  - Mixed air sensor bracket (10U56 & 57 only)
  - 2-Wire ties (90W61 & 62 only)

<sup>A</sup>Already in place when economizer is factory-installed.

<sup>B</sup>Optional GED already installed in field-installed economizer

<sup>C</sup>Shipped under the exhaust air cover when economizer is factory-installed.

<sup>D</sup>Shipped in the blower section when economizer is factory-installed.

**Order Of Installation:**

- Return air cover (horizontal airflow)*
- Economizer*
- Mixed air sensor (R1)*
- Remove GED (horizontal airflow and PEF options)*
- Optional OA/RA sensors*
- Power exhaust fans*
- GED in lower hood (horizontal and PEF options)*
- RA Transition (horizontal airflow)*
- RA duct (horizontal airflow)*
- Lower outdoor air hood*
- Upper outdoor air hood*

**⚠ 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	
Part No.	Unit Application
14D90 - 609258-09	KG/KC 024-090 KH/KD 024-074
16X75 - 609258-11 High Performance	KG/KC 024-090 KH/KD 024-074

The K1ECON economizer is used with KG/KC/KH/KD 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.

**Standard Economizer**

The OA sensible control is the default economizer control. The OA thermostat, S175, is provided in this kit. See table 1 for outdoor and return air (OA and RA) sensor options. Refer to instructions provided with sensors for installation.

**TABLE 1  
STANDARD ECONOMIZERS**

Sensors	Dampers modulate to maintain 55°F mixed air (R1) 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 & 1 in RA	OA temperature and humidity (A7) is lower than RA temperature and humidity (A62).
IAQ Sensor	CO <sub>2</sub> sensed (A63) is higher than CO <sub>2</sub> setpoint.



## High Performance (Low Leak) Economizer

The high performance economizer is equipped with a W7220 control module A6. 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 2 for outdoor and return air (OA and RA) sensor options. Refer to manufacturer's instructions provided for more details.

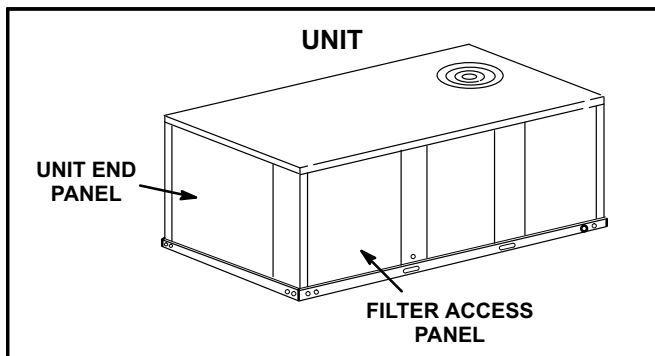
**TABLE 2  
HIGH PERFORMANCE ECONOMIZERS**

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 <sub>2</sub> sensed (A63) is higher than CO <sub>2</sub> setpoint.

### IAQ SENSING (A63)

An IAQ 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<sub>2</sub>) increases.

For proper operation, the IAQ sensor must provide a 2-10VDC, 100 ohm impedance signal. Connect sensor leads to AQ and AQ1 terminals on the A6 economizer control located in the filter section.



**FIGURE 1**

## Install Economizer - Downflow

1. Open unit end panel. See figure 1.
2. Install damper assembly through end of unit. Fit opening in bottom of damper assembly over the return air opening. See figure 2.

## Install Mixed Air Sensor (R1)

### Standard Economizer

Sensor is factory-installed on units equipped with a factory-installed economizer.

- 1- Disconnect all power to unit and open filter access panel. See figure 1.
- 2- Locate mixed air sensor wires connected to the T/T1 terminals on the A6 economizer control.
- 3- Install mixed air sensor, provided in kit, on indoor coil bracket. Secure with screw as shown in figure 3.
- 4- Locate the plastic conduit on top of the filter rack. Route the mixed air sensor wires through the conduit to the mixed air sensor. See figure 3.
- 5- Connect wires to terminals on mixed air sensor. See figures 3 and 5. Sensor is not polarity sensitive.

### High Performance Economizer

- 1- Disconnect all power to unit and open filter access panel. See figure 1.
- 2- Locate orange mixed air sensor wires marked MAT-1/MAT-2 in wire bundle. Cut wire ties to separate sensor wiring from bundle.
- 3- Install mixed air sensor R1, provided in kit, on supply air blower housing as shown in figure 4.
- 4- Locate the plastic conduit on top of the filter rack. Route the mixed air sensor harness through the conduit to the mixed air sensor. See figure 3.
- 5- Connect MAT harness to mixed air sensor (R1).

## ECONOMIZER INSTALLATION

**OUTDOOR AIR SENSOR LOCATED ON OTHER SIDE OF PANEL.  
OUTDOOR AIR SENSOR OPTIONS INCLUDE:**

S175 Outdoor Air Thermostat  
(Standard Economizers with Sensible Sensor)

RT26 Outdoor Air Temperature Sensor  
(High Performance Economizers with  
Sensible Sensors)

A7 Outdoor Air Enthalpy Sensor (Standard or  
High Performance Economizer with Single  
Enthalpy Sensors)

**B7  
DAMPER  
MOTOR**

**A6  
ECONOMIZER  
CONTROL**

**MIXED AIR SENSOR  
WIRING IN THIS  
BUNDLE**

**POWER EXHAUST WIRES  
ONLY CONNECTED WHEN  
UNIT IS EQUIPPED WITH  
POWER EXHAUST**

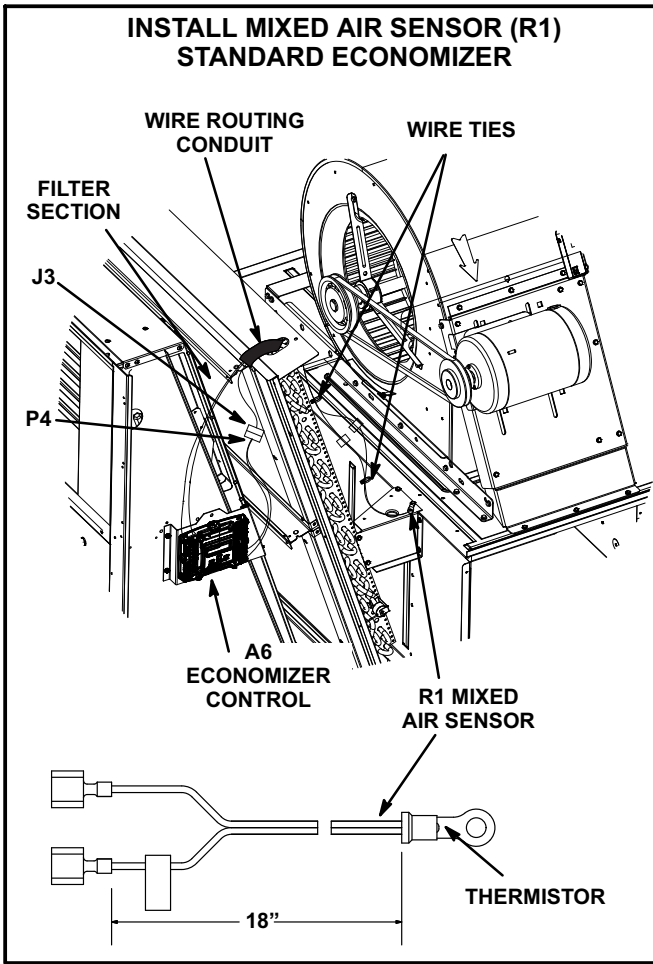
**ECONOMIZER  
(STANDARD SHOWN)**

**Note - Take care not to damage the  
A6 economizer control module and  
wiring during installation. Remove  
the corner mullion if necessary.**

**UNIT**

**RETURN AIR  
OPENING**

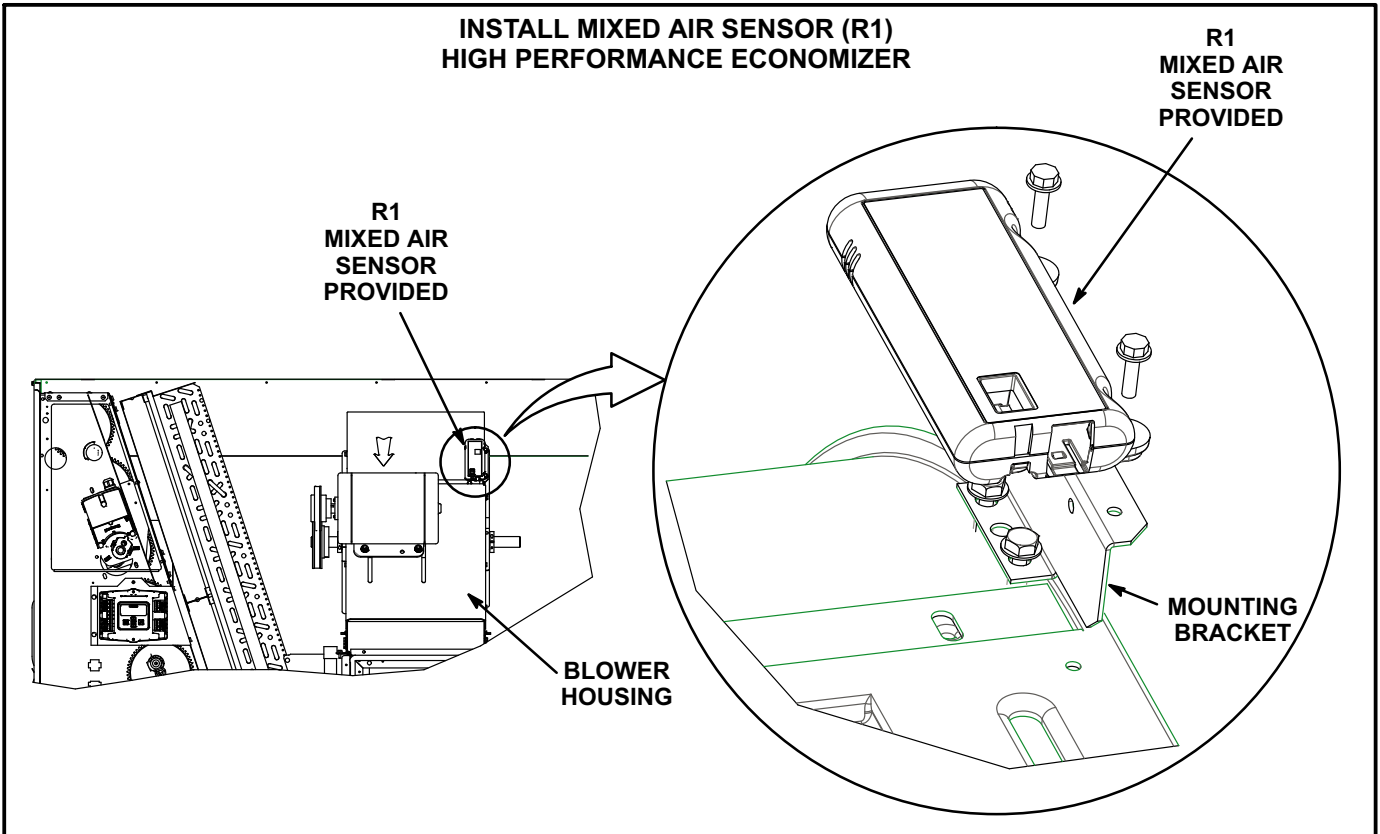
**FIGURE 2**



**FIGURE 3**

**Wiring**

- 1- Locate 15-pin J3 economizer jack harness hanging on left side of filter compartment. J3 is located in the same area on both standard and high performance economizers. See figure 3.
- 2- Disconnect P3 jumper plug from J3 and retain jumper plug for future troubleshooting. Connect 15-pin P4 economizer plug on A6 economizer control harness to J3 economizer jack. See figure 3.
- 3- Connect any optional sensors as shown in figure 5 or 6.
- 4- Bundle power exhaust wires and secure away from other components. If optional power exhaust is installed, wire according to instructions provided with power exhaust.
- 5- Affix D1 economizer wiring diagram section to inside of compressor access panel. Position diagram to the right of "C" control wiring diagram section.



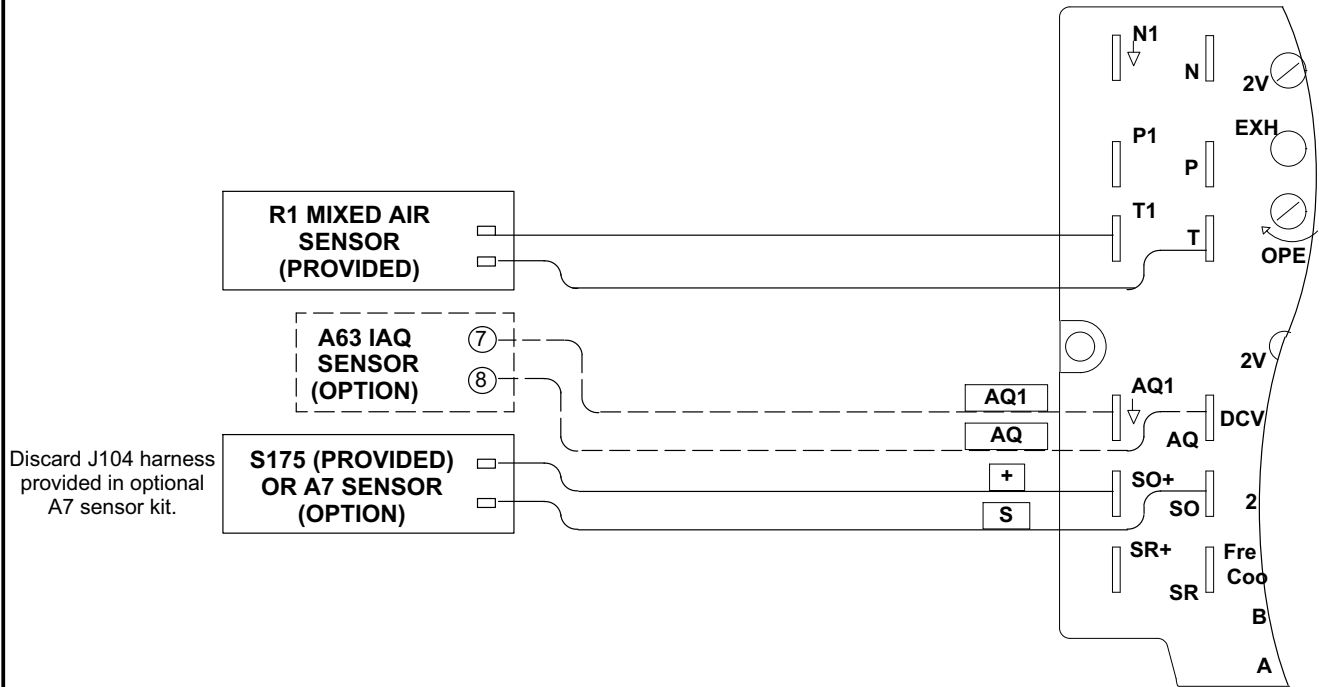
**FIGURE 4**

**WIRE CONNECTIONS - STANDARD ECONOMIZERS**

Field-Installed - - - -

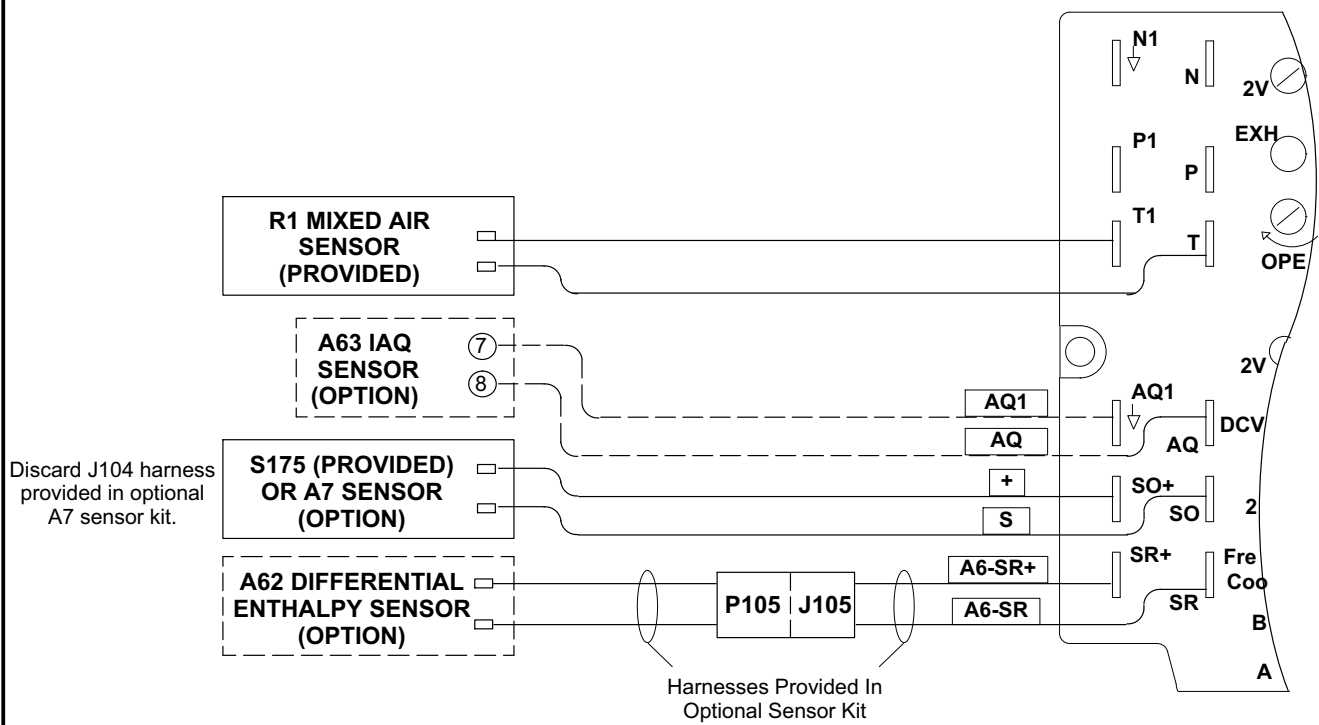
**SINGLE SENSING**

**A6 ECONOMIZER CONTROL**



**DIFFERENTIAL SENSING**

**A6 ECONOMIZER CONTROL**

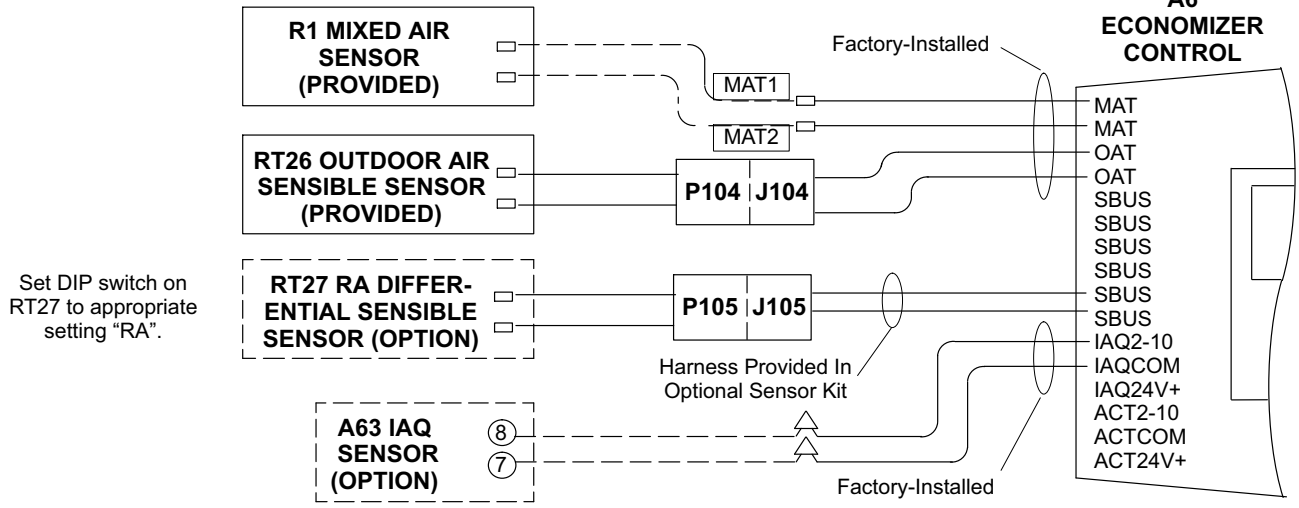


**FIGURE 5**

# WIRE CONNECTIONS - HIGH PERFORMANCE ECONOMIZERS

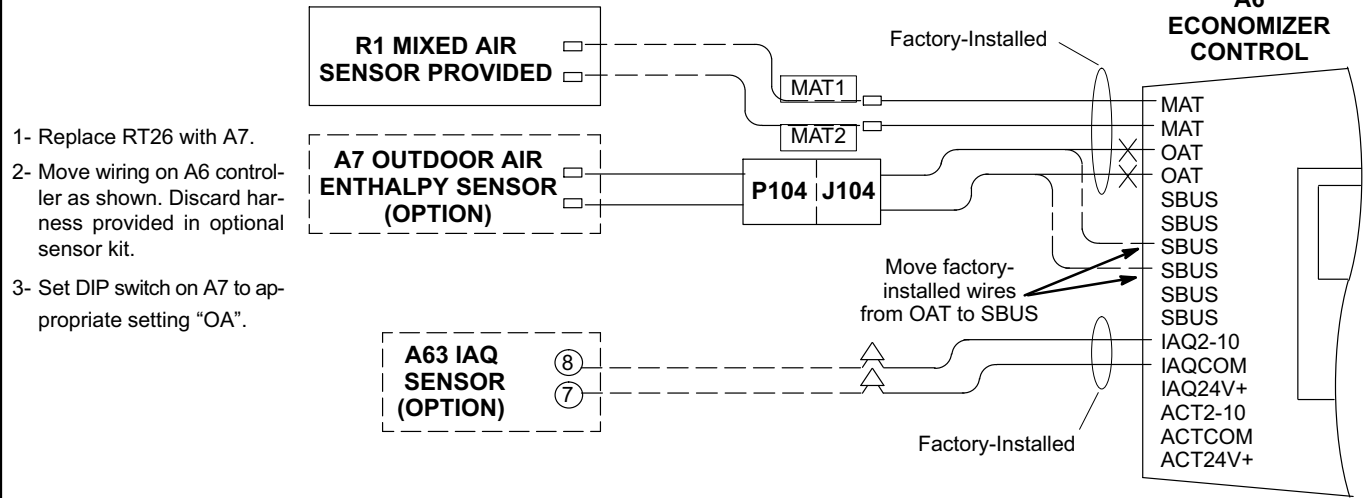
Field-Installed - - - -

## SINGLE AND DIFFERENTIAL SENSIBLE SENSING



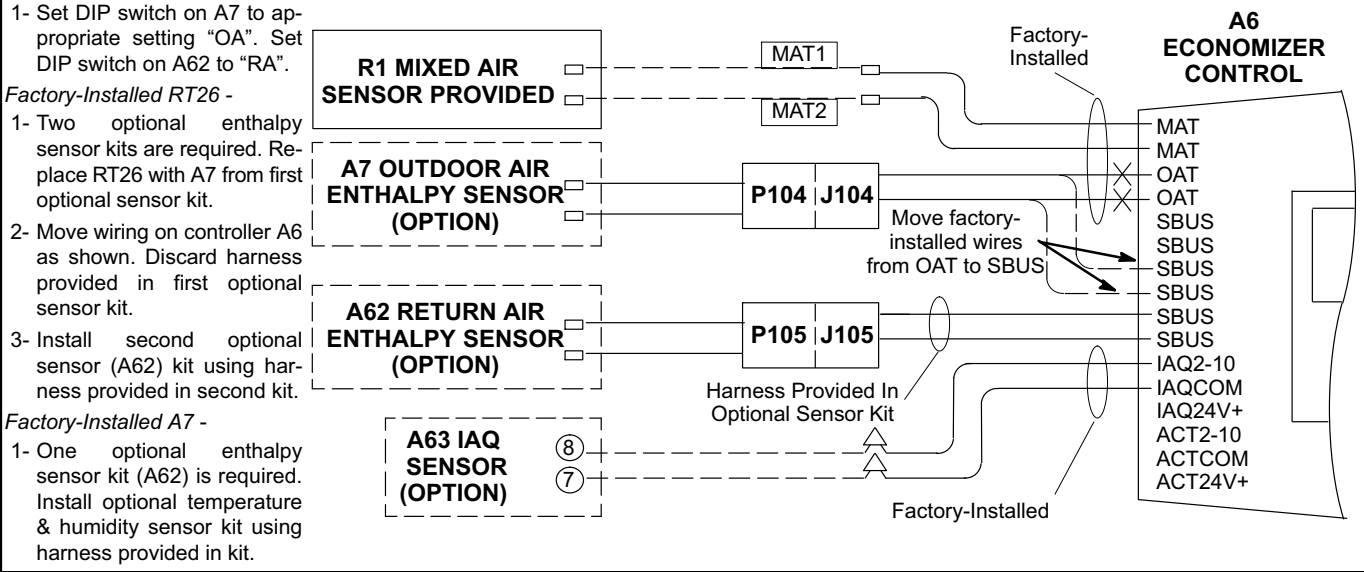
Set DIP switch on RT27 to appropriate setting "RA".

## SINGLE ENTHALPY SENSING



- 1- Replace RT26 with A7.
- 2- Move wiring on A6 controller as shown. Discard harness provided in optional sensor kit.
- 3- Set DIP switch on A7 to appropriate setting "OA".

## DIFFERENTIAL ENTHALPY SENSING



- 1- Set DIP switch on A7 to appropriate setting "OA". Set DIP switch on A62 to "RA".
- Factory-Installed RT26 -*
- 1- Two optional enthalpy sensor kits are required. Replace RT26 with A7 from first optional sensor kit.
  - 2- Move wiring on controller A6 as shown. Discard harness provided in first optional sensor kit.
  - 3- Install second optional sensor (A62) kit using harness provided in second kit.
- Factory-Installed A7 -*
- 1- One optional enthalpy sensor kit (A62) is required. Install optional temperature & humidity sensor kit using harness provided in kit.

FIGURE 6

## GED (Barometric Relief Dampers)

**NOTE** - GED is optional when economizer is factory-installed.

Remove GED from the economizer (when present) and install in the exhaust air hood when:

- Optional power exhaust fans are installed
- Economizer is installed in horizontal air flow

- 1- Remove the GED from the economizer. See figure 7.
- 2- Install the GED in the exhaust or lower hood as shown in figure 9.

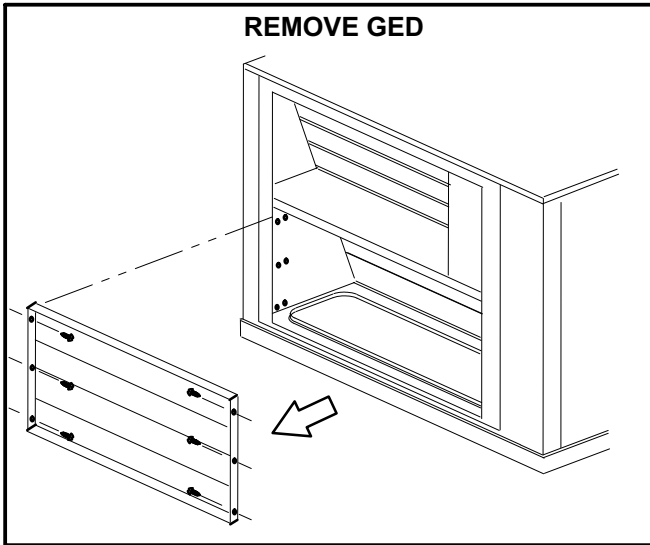


FIGURE 7

## Outdoor Air Hoods

*Factory-Installed Economizers Only -*

Both hood tops and pivot brackets are secured to unit. The lower hood is provided and installed only when the economizer is equipped with an optional GED. Hood parts are located under the exhaust panel and in the blower section. Lift hood tops and assemble hoods as described for field-installed economizers.

- 1- Make sure all sensors and outdoor air section accessories are installed before installing hoods.
- 2- Install pivot brackets and seal on unit as shown in figure 8.
- 3- Assemble hoods as shown in figure 9. Slide top of hoods into the ends of pivot brackets. Install birdscreen bracket after birdscreens are in place.
- 4- Install hoods on unit as shown in figure 10.
- 5- Caulk ends of pivot bracket to seal watertight.

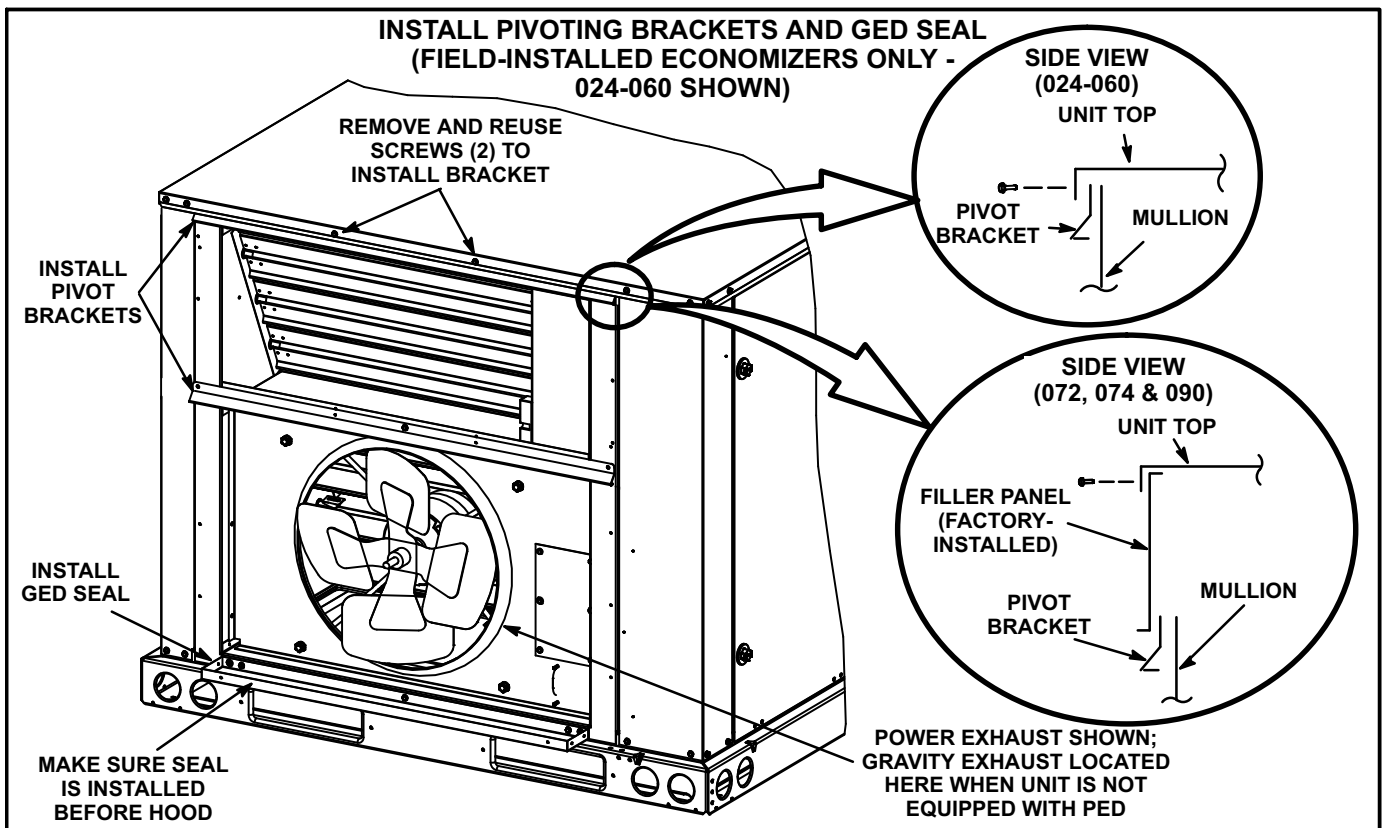
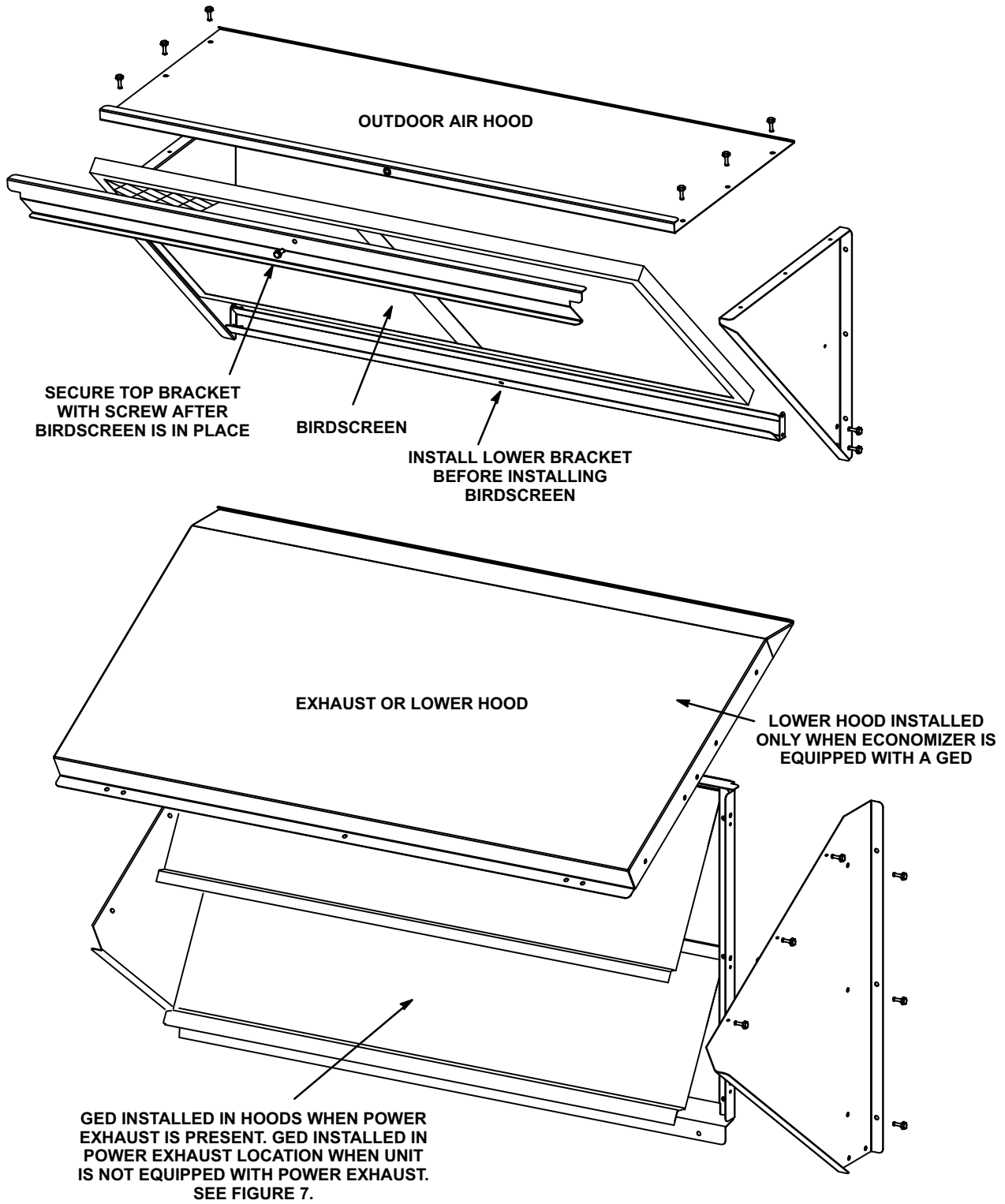


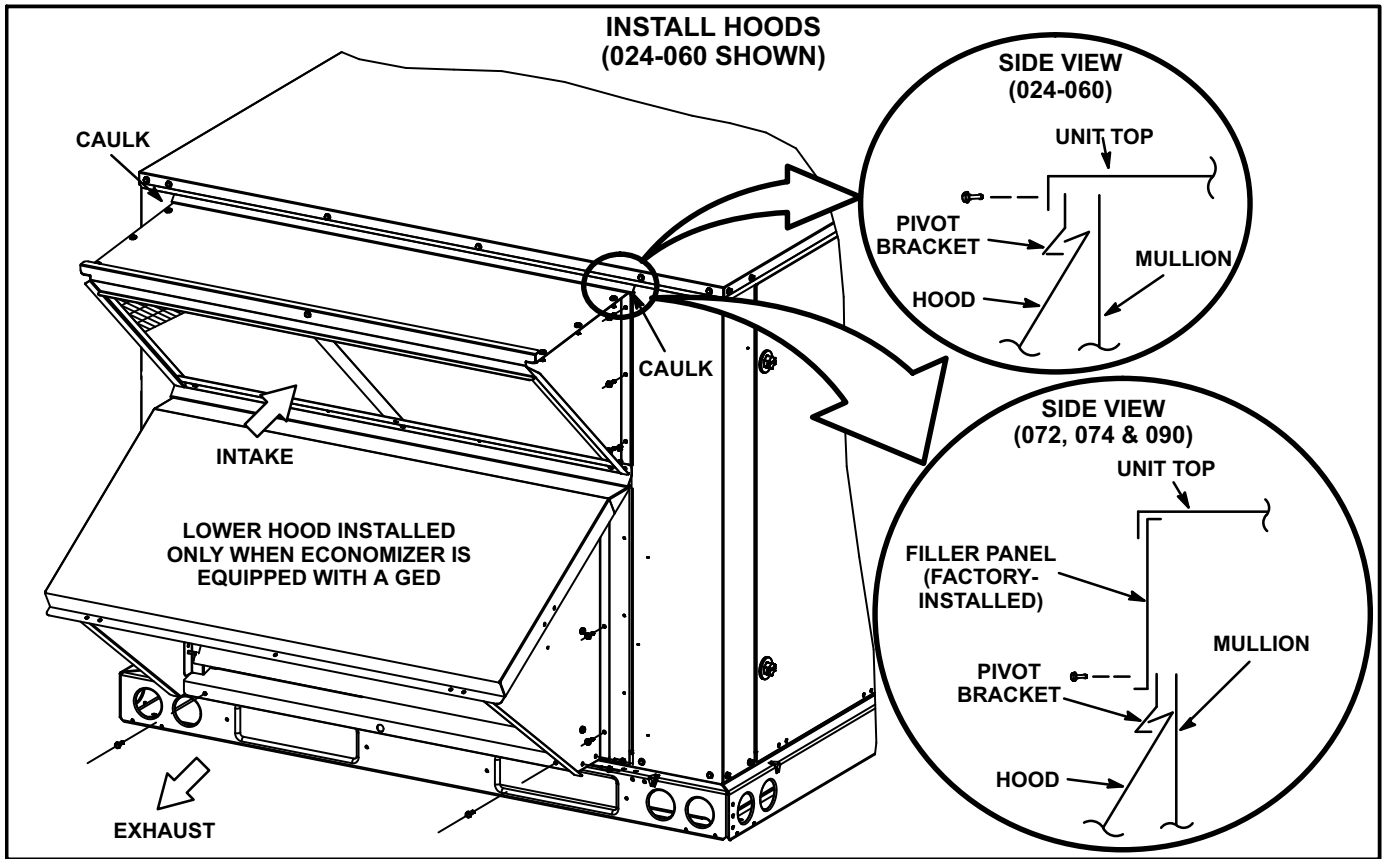
FIGURE 8

**ASSEMBLE HOODS**



**FIGURE 9**



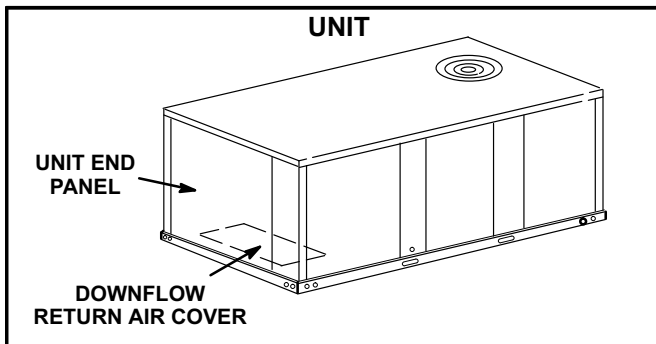


**FIGURE 10**

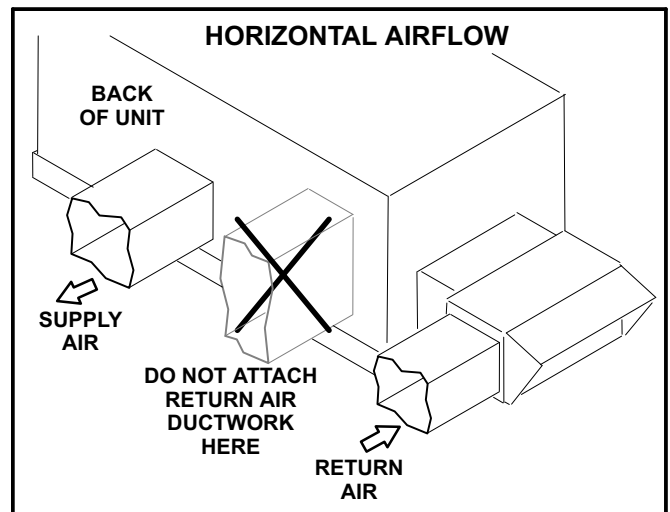
**Install Economizer - Horizontal**

A field fabricated return air duct transition and duct inlet must be installed in horizontal applications.

- 1- Remove unit end panel. See figure 11.
- 2- Install the downflow return air cover in horizontal airflow applications. Secure with #10 sheet metal screws provided in kit. See figure 11.
- 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 12.
- 4- Install the economizer and R1 mixed air sensor and connect wiring as shown in appropriately named sections of this manual.



**FIGURE 11**



**FIGURE 12**

- 5- Install the field-fabricated return air duct transition and duct inlet on the unit end. See figure 13. Support the transition and duct inlet as needed.
- 6- Install the lower (exhaust) hood on the return air duct. The barometric relief dampers should already be installed in the hood as shown in the "Barometric Relief Damper" section of this manual.
- 7- Install the upper hood on the unit as shown in appropriate section of this manual.

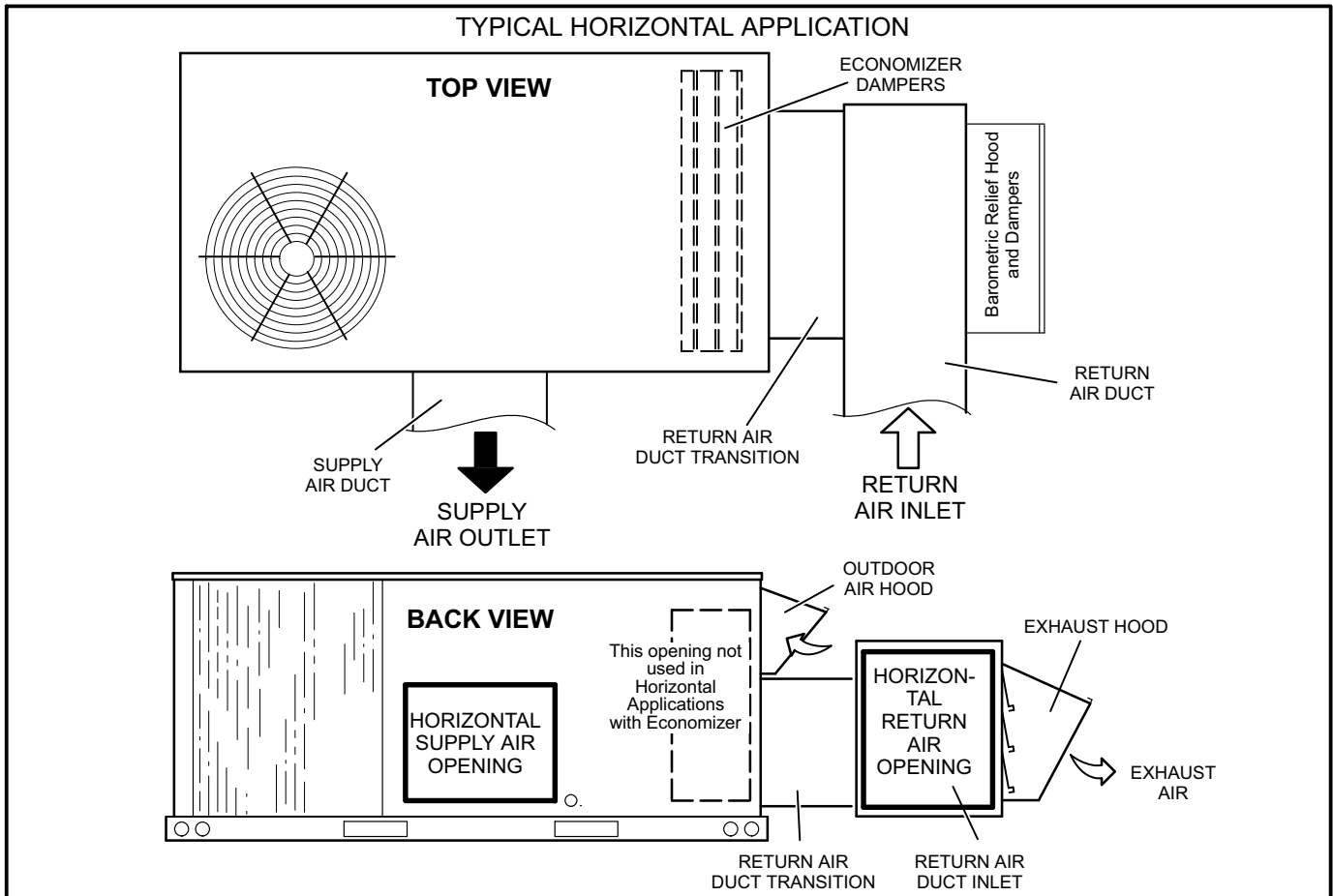


FIGURE 13

**Economizer Control (A6) - Standard Economizer**

**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 14.

**FREE COOLING SETPOINT**

**NOTE** - The following conditions assume unit is operating during occupied time period.

**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 14.

Free cooling will be enabled when outdoor air temperature or enthalpy are lower than the free cooling setpoint. The free cooling setpoint for sensible temperature sensors is 55°F. Table 3 shows the free cooling setpoints for enthalpy sensors. Use the recommended setpoint and adjust as necessary.

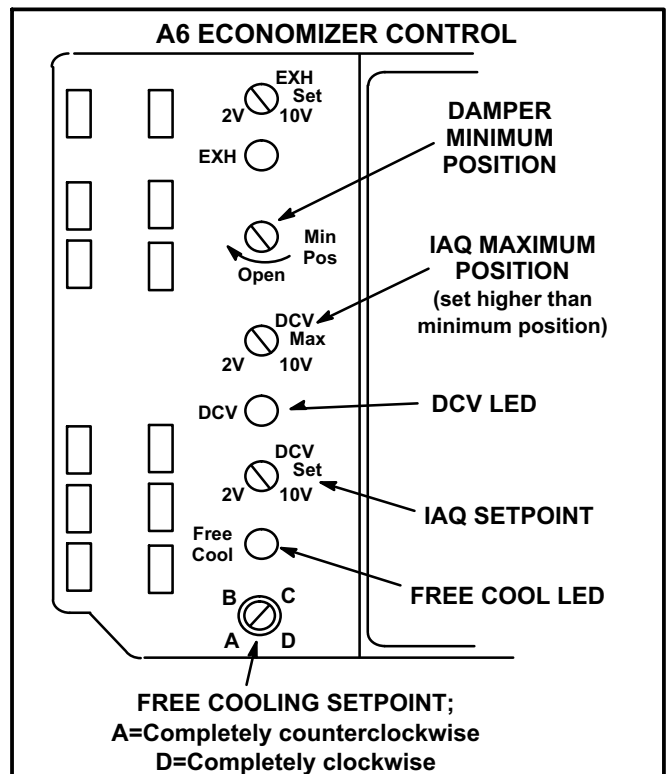


FIGURE 14

For example: At setting A (table 3), 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.

**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.

**TABLE 3  
ENTHALPY 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)

**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<sub>2</sub> 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 14.

The DCV MAX potentiometer is factory-set at approximately 50% of the potentiometer range or 6VDC. Dampers will open approximately half way when CO<sub>2</sub> rises above setpoint. Adjust the DCV MAX potentiometer to the approximate setting specified by the controls contractor. Refer to figure 14.

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

**Economizer Control (A6) - High Performance Economizer**

**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.

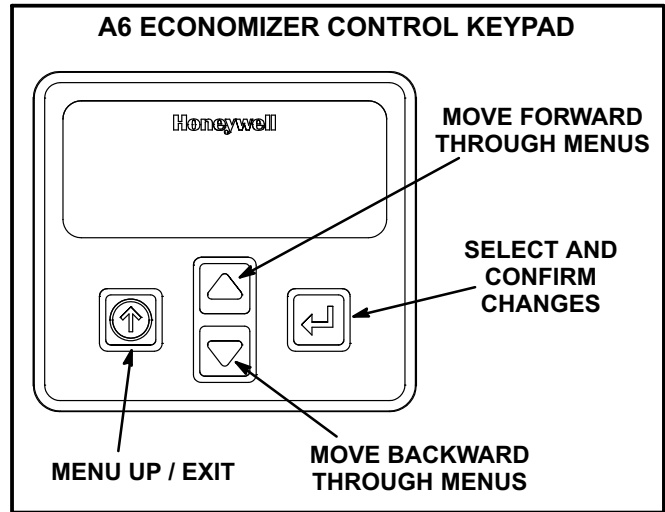
**INITIAL SETUP**

*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 15**

**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.<sup>a</sup>
- Press the ▼ button to decrease (change) the displayed parameter value.<sup>a</sup>
- 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.

<sup>a</sup>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<sub>2</sub>) sensor is not used, none of the DCV parameters will appear and only MIN POS will display. If a CO<sub>2</sub> sensor is used, the DCV SET, VENTMIN and VENTMAX will appear.*

## 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 4.

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

**NOTE** - Values in the referenced standard will supersede values listed in table 4.

**TABLE 4**

### 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.

## 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.

### 1- 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.

### 2- In the SETPOINTS Menu

- MIN POS ( VDC) refer to minimum position setting section for details.

## 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.

### 1- In the SYSTEM SETUP Menu

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

2- In the **ADVANCED SETUP** Menu

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

3- In the **SETPOINTS** Menu

MA SET (55°F)  
 LO T LOCK (32°F)  
 MIN POS ( ) VDC) adjust VDC value until  
 desired fresh air  
 setpoint is reached.

**DEMAND CONTROL VENTILATION (DCV)**

When a 2-10VDC CO<sub>2</sub> sensor is wired to the controller (leads provided), the *DCV SET*, *VENTMIN*, and *VENTMAX* 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.

**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 16 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.*

**Damper Minimum Position Setting - Both Standard and High Performance Economizers**

**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.

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

- 1- Set thermostat to occupied mode if the feature is available. Make sure jumper is in place between TB1 terminals R and OCP 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- *Standard Economizers* -  
 Rotate MIN POS SET potentiometer to approximate desired fresh air percentage.

*High Performance Economizers* -  
 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.

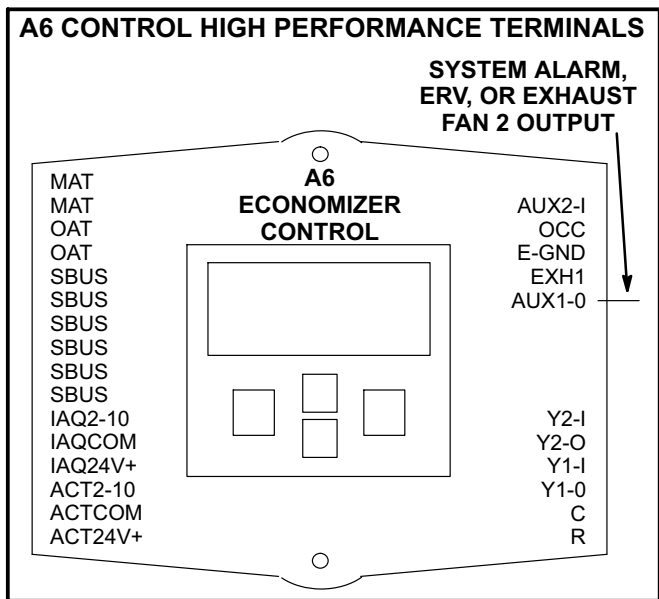


FIGURE 16

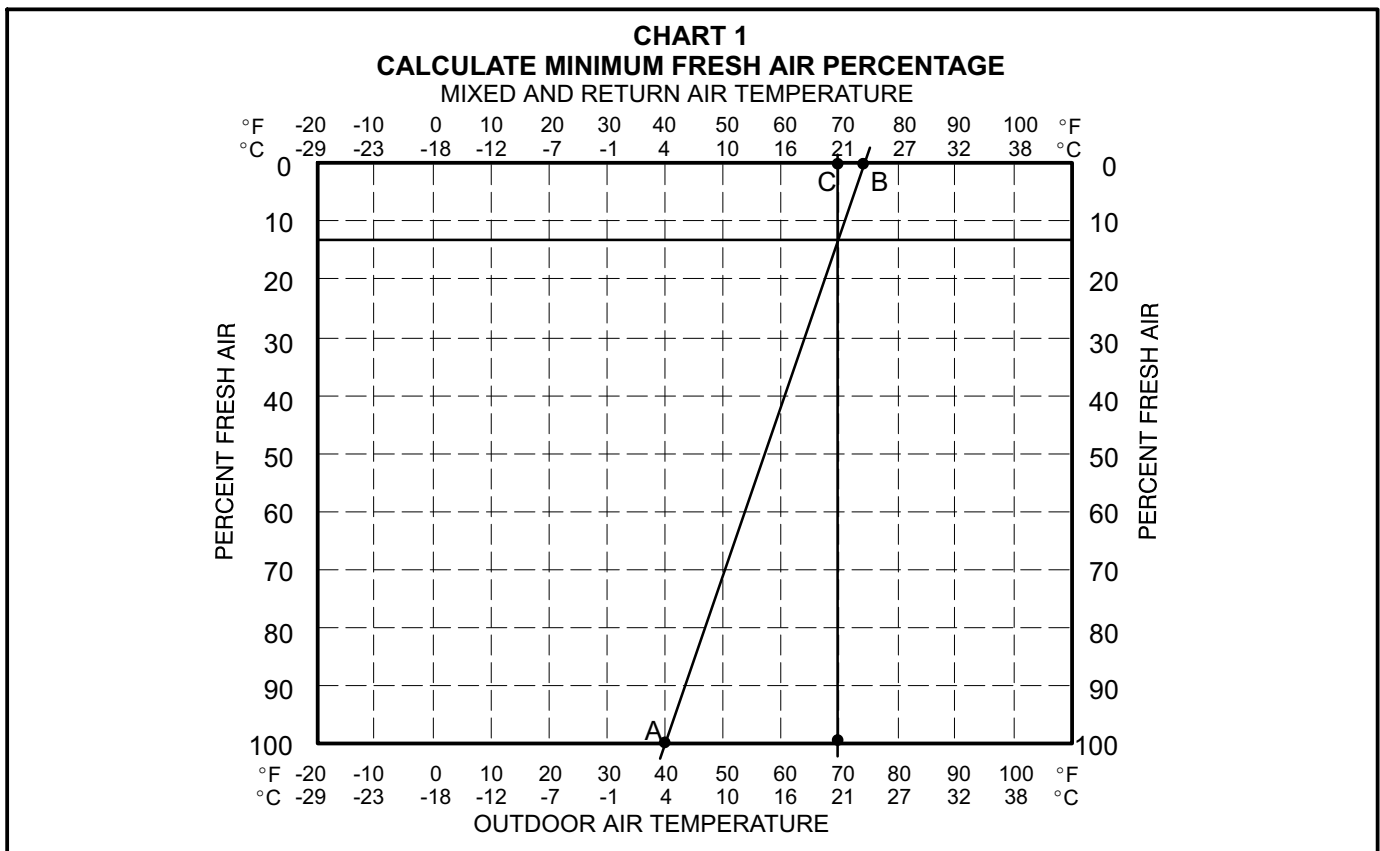
- 4- Measure outdoor air temperature. Mark the point on the bottom line of chart 1 and label the point "A" (40°F, 4°C shown).
- 5- Measure return air temperature. Mark that point on the top line of chart 1 and label the point "B" (74°F, 23°C shown).
- 6- Measure mixed air (outdoor and return air) temperature. 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- *Standard Economizers* -

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 4 through 9 until calculation reads desired fresh air percentage.

*High Performance Economizers* -

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 4 through 9 until calculation reads desired fresh air percentage.



## Standard Economizer Operation

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** - If 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

THERMOSTAT DEMAND	DAMPER		MECHANICAL COOLING
	UNOCCUPIED	OCCUPIED <sup>1</sup>	
OF	Closed	Closed	No
G	Closed	Minimum	No
Y1	Modulating*	Modulating*	No
Y2	Modulating*	Modulating*	STAGE 1

\*IAQ sensor can open damper to DCV max.

<sup>1</sup>Damper position when no occupied/unoccupied signal is available from building thermostat or energy management system.

**TABLE 6**  
**ECONOMIZER OPERATION**  
OUTDOOR AIR IS **NOT SUITABLE** FOR FREE COOLING – FREE COOL LED “OFF”

THERMOSTAT DEMAND	DAMPER POSITION		MECHANICAL COOLING
	UNOCCUPIED	OCCUPIED <sup>1</sup>	
Off	Closed	Closed	No
G	Closed	Minimum*	No
Y1	Closed	Minimum*	Stage 1
Y2	Closed	Minimum*	Stage 1

\*IAQ sensor can open damper to DCV max.

<sup>1</sup>Damper position when no occupied/unoccupied signal is available from building thermostat or energy management system.

## High Performance Economizer Operation

### OPERATION

Refer to table 7 or 8.

When the outdoor air is suitable and a thermostat demand calls for 1<sup>st</sup>. 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. At that point, K8 relay will switch from the R1 mixed air sensor to R51 resistor

allowing the economizer damper to stay open 100%. The damper will stay open 100% with the compressor running simultaneously until Y2 demand is met.

**NOTE** – Because of the sensor location, the mixed air temperature displayed on the economizer controller (A6) is only true when no mechanical cooling or heating is initiated. During mechanical cooling (compressor running), the MA temperature displayed will be the temperature equivalent of the fixed resistor and not the actual MA temperature.

### TROUBLESHOOTING, ALARMS AND CHECKOUT TESTS

Refer to the Honeywell manual provided for details.

**TABLE 7  
ECONOMIZER OPERATION - NO DCV (CO<sub>2</sub> SENSOR)**

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 8  
ECONOMIZER OPERATION - WITH DCV (CO<sub>2</sub> SENSOR)**

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