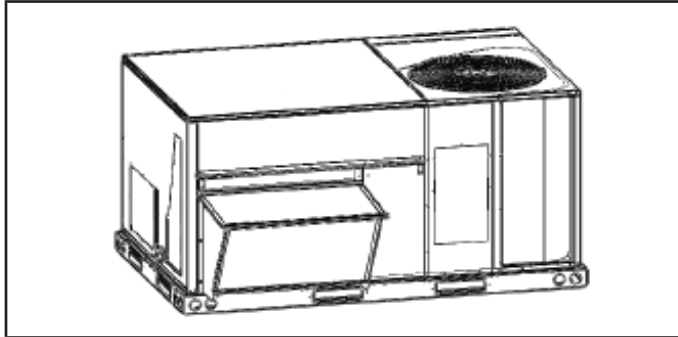


**24J59 HIGH PERFORMANCE  
ECONOMIZER****INSTALLATION INSTRUCTIONS FOR HIGH PERFORMANCE ECONOMIZER USED WITH  
ZC, ZG, ZH 036, 048, 060, 074 UNITS****FIGURE 1****Shipping and Packing List****Package 1 of 1 contains:**

- 1 - Economizer damper assembly
  - 1 - Outdoor air damper
  - 1 - Return air damper
  - 1 - Gravity exhaust damper
  - 1 - Economizer actuator
  - 1 - Economizer control module
  - 1 - Outdoor air temperature sensor
  - 1 - Top seal panel
  - 1 - Lower panel (hood top)
- 1 - Mixed air sensor and adaptor harness
- 1 - Hardware bag
- 1 - Hood parts package
  - 1 - Left hood side
  - 1 - Right hood side
  - 1 - Hood divider
  - 1 - Hood filter
- 1 - Side economizer panel

**Order Of Installation**

- Economizer
- Mixed air sensor
- Optional OA, RA and CO<sub>2</sub> (IAQ) sensors
- Power Exhaust fans (optional)
- Side economizer panel

**⚠ 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 qualified installer, service agency or the gas supplier.

**Application**

The 24J59 high performance economizer is used with ZC, ZG, ZH 036, 048, 060, 074 units in downflow 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 measures the supply air sensible temperature.

An outdoor air sensor is used to determine whether outdoor air is suitable for free cooling. The outdoor air sensor is factory-installed in all economizers. The high performance economizer is equipped with POL224.00 control module A6. The default OA temperature sensor or high limit sensor (RT26) is a CEC approved, California Title 24 fixed dry bulb device.

See TABLE 1 for outdoor and return air (OA and RA) sensor options. Refer to manufacturer's instructions provided for more details.

**TABLE 1****HIGH PERFORMANCE ECONOMIZERS**

<b>Sensors</b>	<b>Dampers modulate to maintain 55°F mixed air (R1) when:</b>
Single OA Sensible DEFAULT - approved for CA Title 24	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

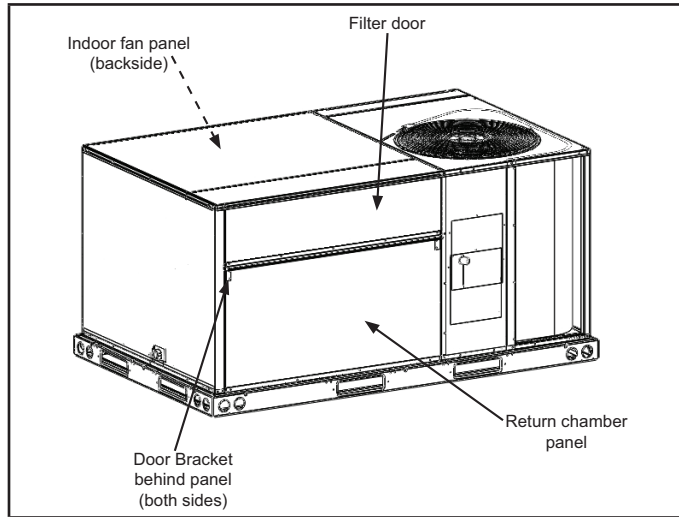
**INDOOR AIR QUALITY SENSOR**

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 economizer control module 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 sensors to the green IAQ leads provided on the economizer control module in the filter section as shown in FIGURE 7 and FIGURE 8.

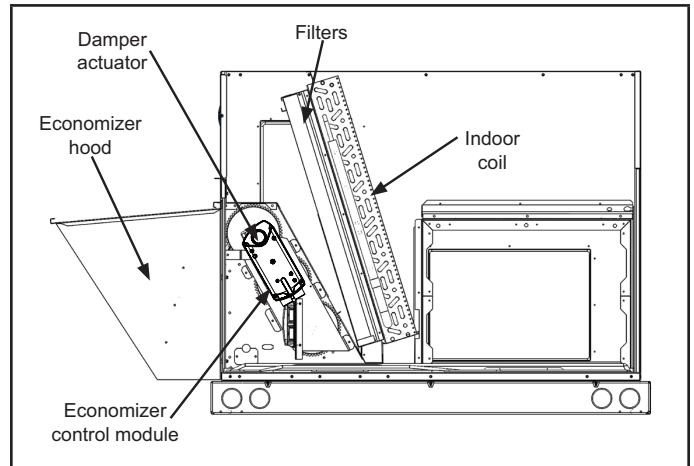
## **⚠ CAUTION**

**Danger of sharp metallic edges. Can cause injury. Take care when servicing unit to avoid accidental contact with sharp edges.**



**FIGURE 2**

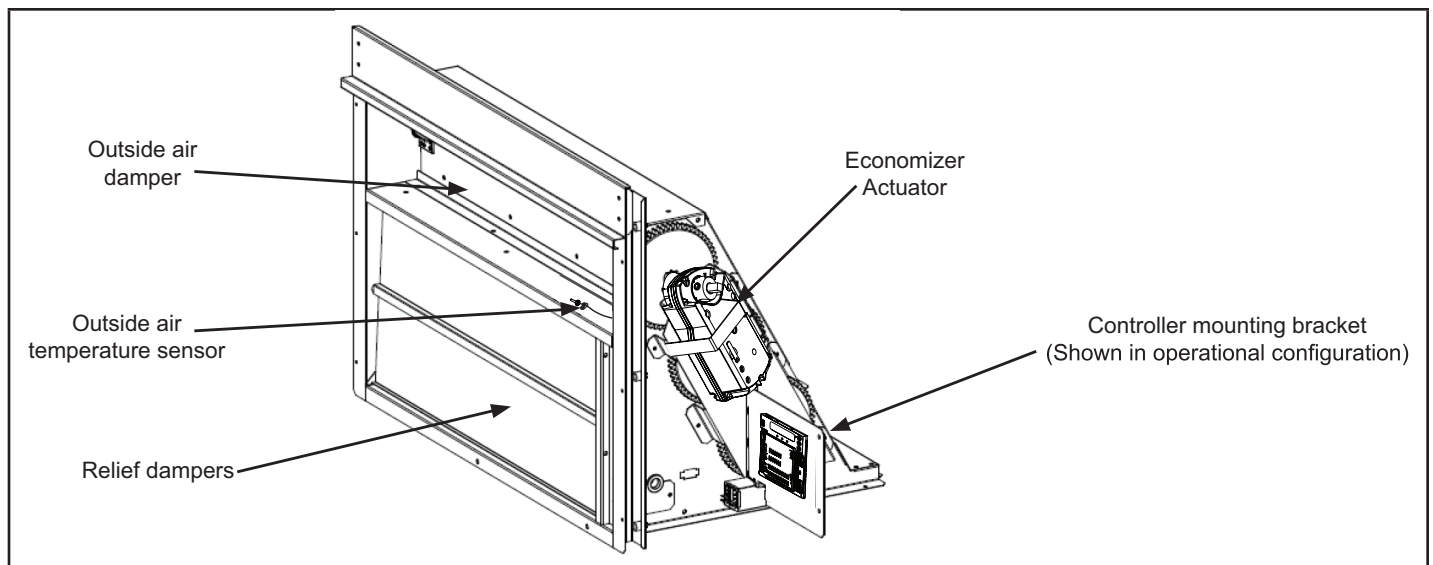
- 3 - Remove two screws that hold the controller mounting bracket and turn controller bracket from its shipping position 90° so the display faces the installer once economizer is installed in unit. See FIGURE 4.
- 4 - Install damper assembly into unit. Fit opening in bottom of damper assembly over the return air opening. See FIGURE 3.
- 5 - Partially back-out the 2 screws on the left side of the economizer top seal. Insert these 2 screws into the door bracket (see FIGURE 2 and FIGURE 5) holes and tighten. Place screws in bottom flange as shown in FIGURE 5.



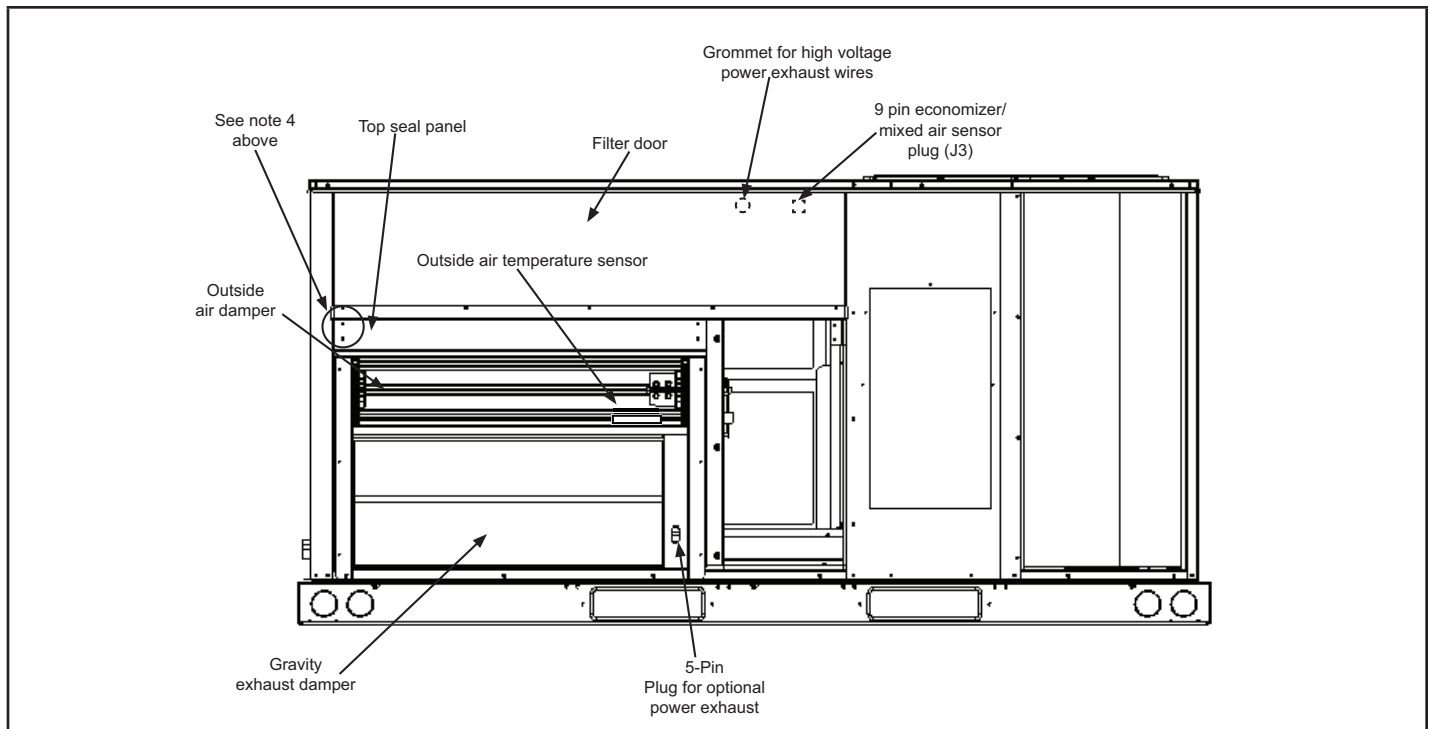
**FIGURE 3**

## **Install Economizer**

- 1 - Disconnect all power sources to the unit
- 2 - Remove the following panels from the unit;
  - Filter door panel
  - Return chamber panel
  - Indoor fan panel



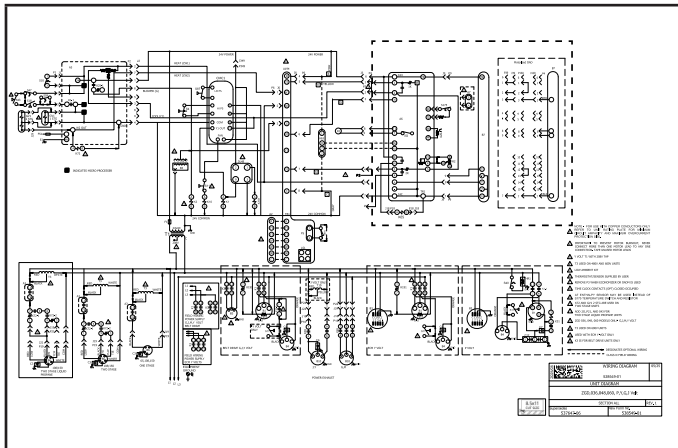
**FIGURE 4**



**FIGURE 5**

### Economizer Wiring

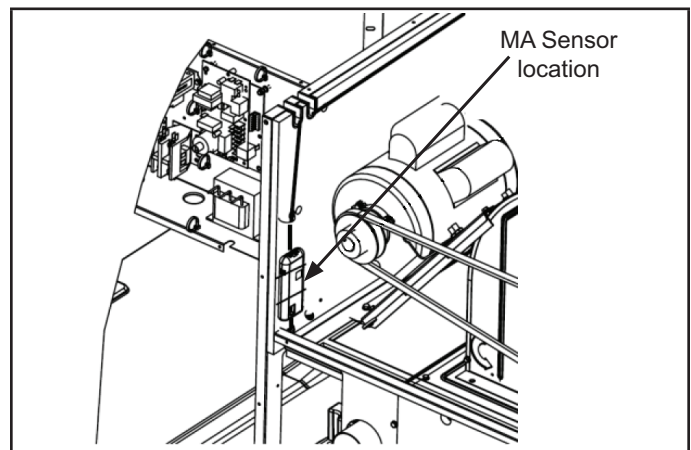
- 1 - Locate 9-pin J3 economizer jack harness seated in upper right panel inside filter compartment. Disconnect P3 jumper plug from J3 and retain jumper plug for future troubleshooting. Connect 9-pin P4 economizer plug from economizer control module harness to J3 economizer jack. Secure P4 harness with push in wire tie from parts bag and insert it into the 1/4" hole on top of filter rack. Refer to FIGURE 5.
- 2 - Connect any optional sensors as shown in FIGURE 8.
- 3 - If optional power exhaust is installed, wire according to instructions provided with power exhaust.
- 4 - Use wiring diagram provided in kit and affix over the economizer portion of the main unit diagram located on the inside of the control panel cover.



**FIGURE 6 - Wiring Diagram**

### Install Mixed Air Sensor

- 1 - Remove the mixed air sensor and mixed air sensor harness from the economizer parts bag.
- 2 - Remove the panel covering the indoor fan. Locate the 2 mixed air sensors wires in the unit from plug J3. The mixed air sensor wire colors are green and violet. Attach these 2 wires to the mixed air sensor adapter wire harness provided in kit and connect the other end of the mixed air sensor.
- 3 - Using the wire ties provided, tie the mixed air sensor to the wire bundle running down the wall of the inside of the blower deck.
- 4 - Secure wires in place so they don't interfere with unit operation.
- 5 - Replace the panel covering the indoor fan.



**FIGURE 7 - Mixed Air Sensor Installation**

## Outdoor Air Hood

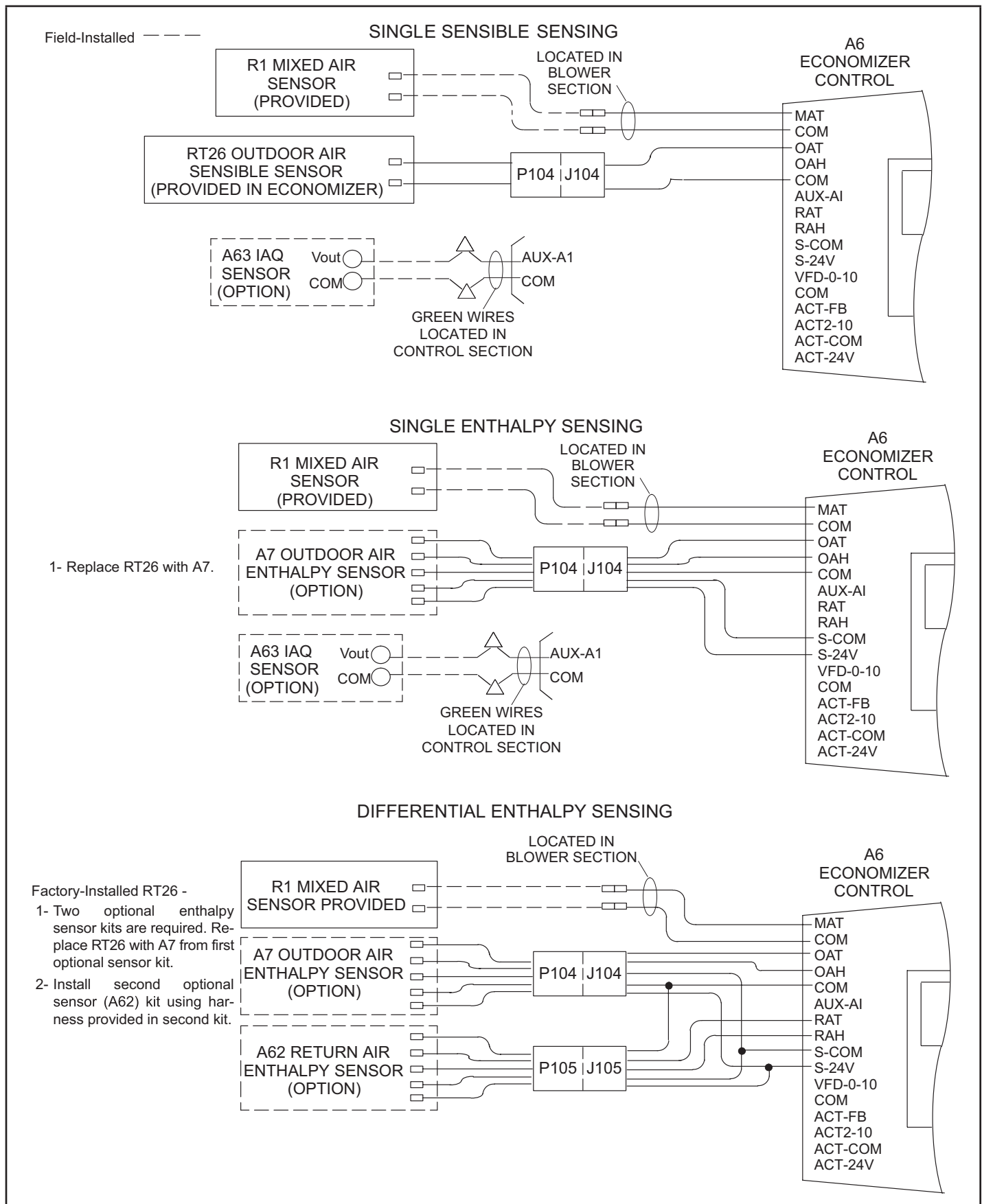
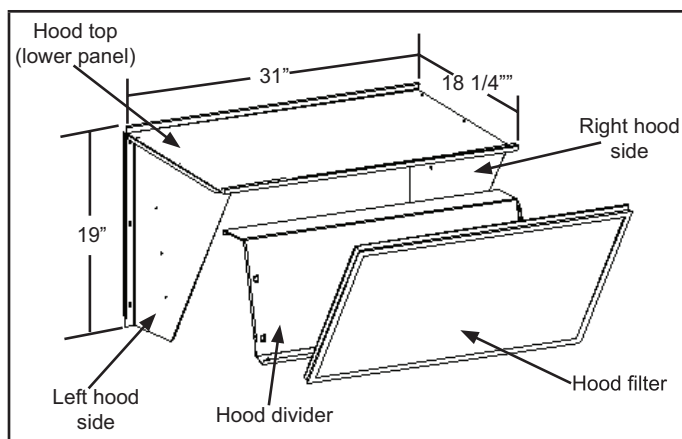


FIGURE 8



**FIGURE 9**

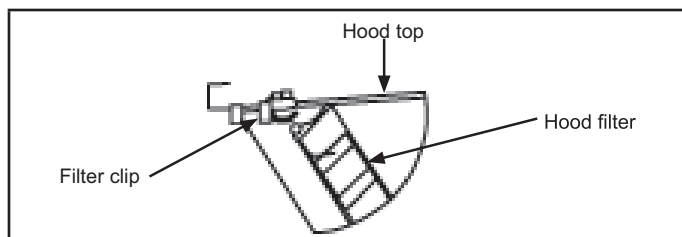
### Outdoor Air Hood

If using a power exhaust accessory skip this step. The hood parts shipped with the economizer will not be used.

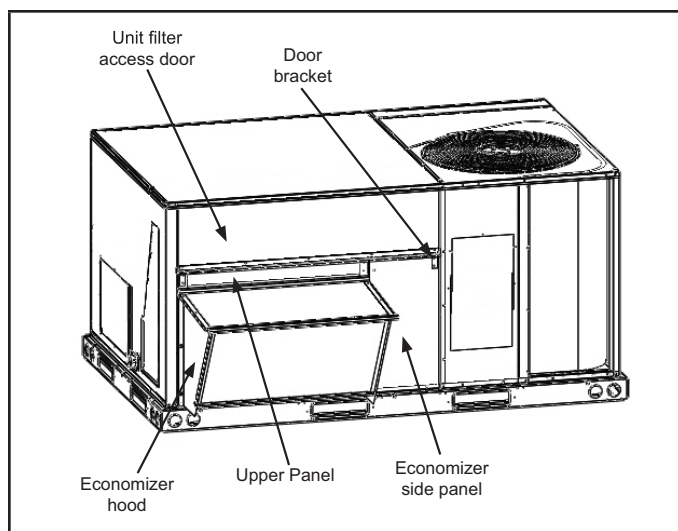
- 1 - Remove the hood top from the economizer assembly.
- 2 - Screw the hood sides to the hood top, See FIGURE 9.
- 3 - Screw the hood divider to the hood sides. Divider sits between the left and right hood side. Bottom angle of divider is used for the filter rack.
- 4 - Open the filter clips on the underneath side of the hood top and insert filter. See FIGURE 10.
- 5 - With hood assembled, fit the mating flange on hood top underneath the “knuckle” on the top seal panel. Attach hood over economizer as shown in FIGURE 3, FIGURE 5 and FIGURE 11.
- 6 - Screw hood to unit as shown in FIGURE 11.

### Economizer Side Panel

- 1 - Before installing economizer side panel make all necessary job specific settings to the economizer control module, including minimum position setting.
- 2 - Install side panel to the right side of hood, see FIGURE 11. Screw panel to economizer on left side, and into door bracket on right side of panel.
- 3 - Reinstall unit's filter access door.
- 4 - Caulk all seams and gaps along sides and bottom of economizer and economizer side panel sheet metal. Allow time for caulk to cure prior to placing unit into operation.



**FIGURE 10**



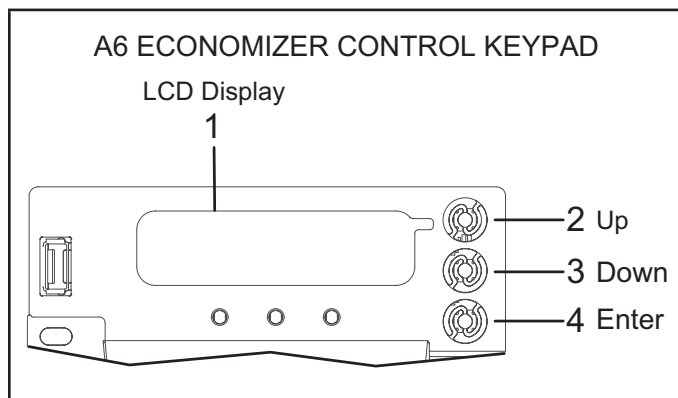
**FIGURE 11**

### High Performance Economizer - A6 Control

#### USER INTERFACE

See FIGURE 12.

- 1 - One-line LCD. After a period of inactivity, the controller displays the default HMI screen (free cooling status: “1FREECOOL YES” or “1FREECOOL NO”).
- 2 - Operation button (Up button) - Move to the previous value, step or category.
- 3 - Operation button (Down button)- Move to the next value, step or category.



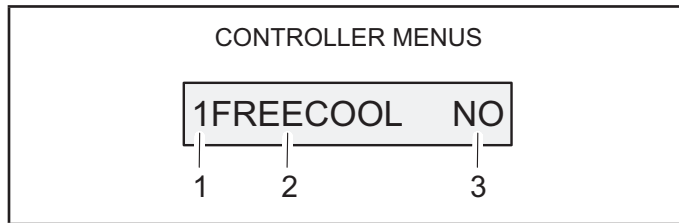
**FIGURE 12**

Operation button (Enter button):

- Press to edit the current value or option.
- Press to confirm a newly selected value or option.
- Press Enter + Up to jump up one entire category.
- Press Enter + Down to jump down one entire category.

## MENU STRUCTURE

See FIGURE 13.



**FIGURE 13**

- 1 - Menus are displayed in the Economizer Controller as per categories. There are eight first-level menus. Each menu is represented by a number at the beginning of the line on the LCD. Press Enter + Up or Down to toggle between different first-level menus.
  - 1: Status Display
  - 2: Basic Settings
  - 3: Advanced Settings
  - 4: Alarms
  - 5: Enter Configuration State and Reset
  - 6: I/O Config.
  - 7: Testing
  - 8: Enter Running State
- 2 - Sub-menus follow the numbered first-level menus closely. Pressing Up or Down can toggle between different sub-menus.
- 3 - At the end of the line, the LCD displays the value of the current sub-menu (if any). Enter the Edit mode by pressing Enter (if the value is editable). Press Up or Down to change the highlighted value. Press Enter to confirm the change and exit the Edit mode.

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

### 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 Building Energy Efficiency Standards.

**NOTE** - Values in the referenced standard will supersede values listed in TABLE 2.

**TABLE 2**

### 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 “BASIC SETTINGS” menu and change the “2TEMP OFF” parameter accordingly.

Single OA Enthalpy Sensing (Optional) -

To adjust the enthalpy setpoint, navigate to the “BASIC SETTINGS” menu and change the “2ENTH OFF” parameter accordingly.

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.

1INS	(MM/DD/YY) enter installation date
2FAN LACT*	( ) adjust VDC value until desired fresh air setpoint is reached when fan runs at low speed. *Appears only if unit is configured as 2SPEED.
2FAN HACT	( ) adjust VDC value until desired fresh air setpoint is reached

### SETUP AND CONFIGURATION - FIELD-INSTALLED ECONOMIZER

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

**IMPORTANT** - Before setup and configuration, it is recommended to obtain some location-based values such as shutoff points or utilize the location services in the Climatix mobile application.

Menus are displayed in the Economizer Controller as per categories. There are eight first-level menus. Each of them is represented by a number at the beginning of the line on the LCD. Press Enter + Up or Down to toggle between different first-level menus.

Navigate to the applicable menus and set the following parameters based on the unit configuration:

1INS	(MM/DD/YY) enter installation date
2FAN L ACT*	( ) adjust VDC value until desired fresh air setpoint is reached when fan runs at low speed. <i>*Appears only if unit is configured as 2SPEED.</i>
2FAN H ACT	( ) adjust VDC value until desired fresh air setpoint is reached
3DIF T LOC	(LAT)
3STG3 DLY	(120)
6Y2O	(NONE) For single-stage units (COOL 2) For 2-stage units
6FAN	(1 SPEED) For CAV units (2 SPEED) For MSAV units

### ALARM MONITORING

The controller is equipped with a 24V output signal that can be configured for remote alarm monitoring. Field-wire to provided blue wire marked "Aux2-O" near the controller for remote alarm monitoring.

**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.

### DEMAND CONTROL VENTILATION (DCV)

When a 0-10VDC CO2 sensor is wired to the POL224.00 economizer control A6 (leads provided), the 2DCV, 2VENTMAX L, 2VENTMAX H, 2 VENTMIN L and 2VENTMIN H parameters will appear under "BASIC SETTINGS" menu. Navigate to the "BASIC SETTINGS" menu to adjust setpoints as desired. Refer to the Siemens manual provided for more details.

For proper operation, the IAQ sensor must provide a 0-10VDC signal. Connect sensor leads to the provided white wire marked "AUX-AI" located near the A6 economizer control located in the filter section.

CO2 Sensor Used With High Performance Economizers-

When using any 0-10VDC sensor, set the ppm range using the POL224.00 economizer control A6 menu. Set the 6CO2 Rng L to 400 ppm and the 6CO2 Rng H to 1600 ppm.

## High Performance Economizer - Sequence of Operation

Refer to TABLE 3 through TABLE 6.

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 "2FAN DLY" 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 Siemens manual provided for details.

**TABLE 3****ECONOMIZER OPERATION - NO DCV (CO<sub>2</sub> 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 4****ECONOMIZER OPERATION - WITH DCV (CO<sub>2</sub> 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

**TABLE 5****ECONOMIZER OPERATION - NO DCV (CO<sub>2</sub> 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 2FAN DLY (Basic Settings 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 6****ECONOMIZER OPERATION - NO DCV (CO<sub>2</sub> 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 2FAN DLY (Basic Settings 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.