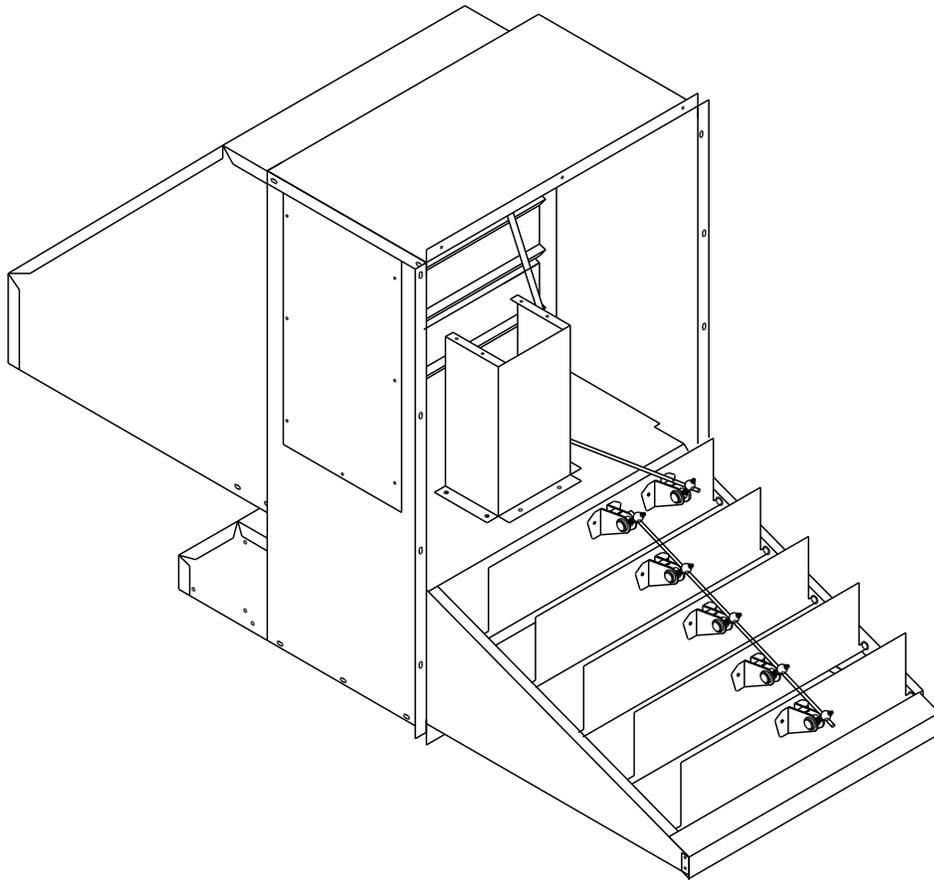


Package Unit Modulating Economizer

Installation Instructions



Downflow Unit

Warning:

 Recognize this symbol as an indication of Important Safety Information!

- Read all instructions prior to installation.
- Disconnect electrical power to the unit before servicing.
- Failure to do so can cause electrical shock resulting in personal injury or death.
- Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. Refer to this manual. For assistance or additional information consult a qualified installer or service agency.

DO NOT DESTROY. PLEASE READ CAREFULLY AND KEEP IN A SAFE PLACE FOR FUTURE REFERENCE

INSTALLATION INSTRUCTION

DOWNFLOW ECONOMIZER # 558870
 PACKAGE EQUIPMENT MODELS
 R6G(D,F) 024-060* / *R8GD 036*-060*
 P6SD 024-060* / *Q6SD 024*-060*

FORM# 136D-0312 (Replaces 136D-1008)

Note:

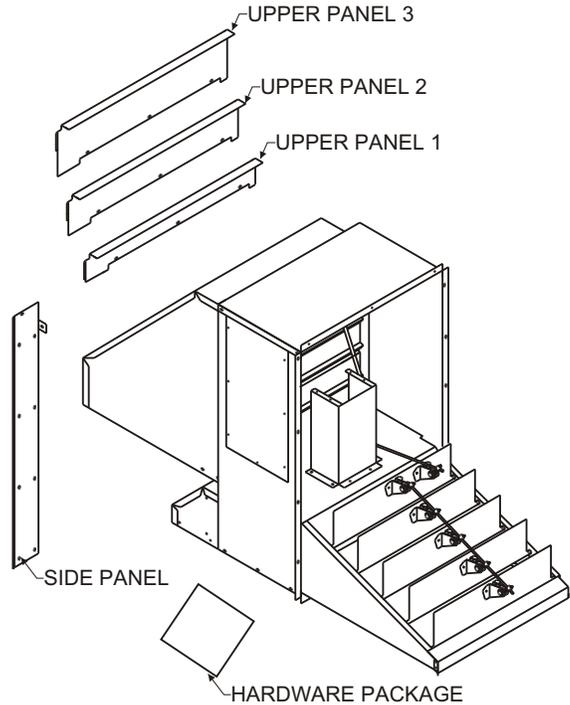
Reference Unit Technical Service Literature for application requirements.

Step 1:

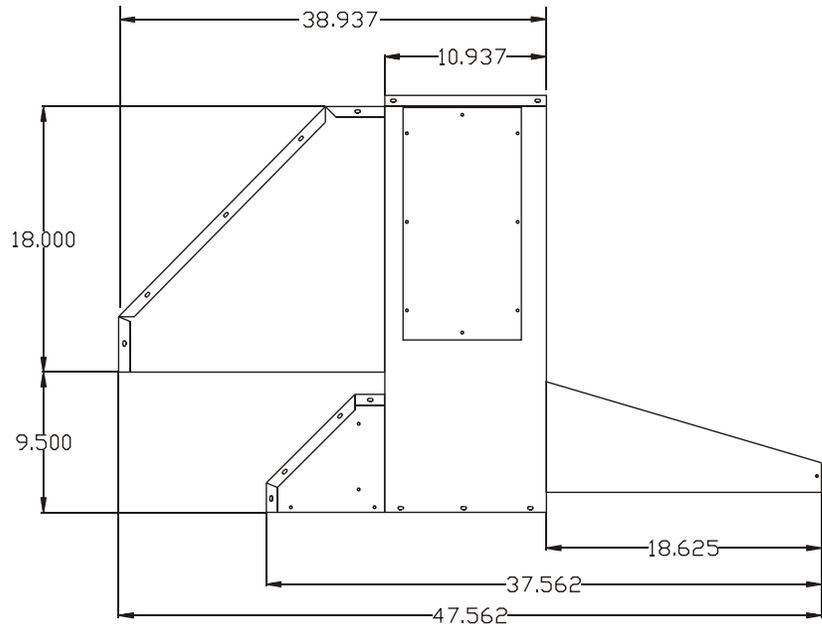
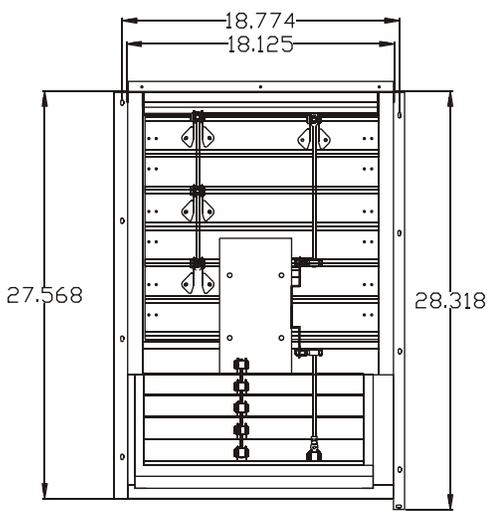
Inspect economizer for shipping damage and correct parts with list below.

- 1 - Economizer Assembly w/ Filter installed
- 3 - Upper Adaptor Panels
- 1 - Side Adaptor Panel
- 1 - Outdoor Air Hood (Attached to Economizer)
- 1 - Hardware Package
 - 1 - Wiring Diagram Sticker
 - 1 - Mixed Air Sensor (MAS)
 - 2 - 29" Extension Wires for Mixed Air Sensor
 - 3 - 6" Wire Tie
 - 3 - #10 x 16 x 1/2" Self-Tapping Screws
 - 10 - #10 x 16 x 1/2" Type A Screws
 - 1 - .875 Bushing Shutter

Note: For rooftop or other installations that requires the economizer to be lifted or hoisted, always lift economizer with the supplied packaging in place to prevent damage from lifting and rigging equipment.



Shipping Information			
Height	Length	Width	Weight
35"	57 1/2"	20 1/2"	118

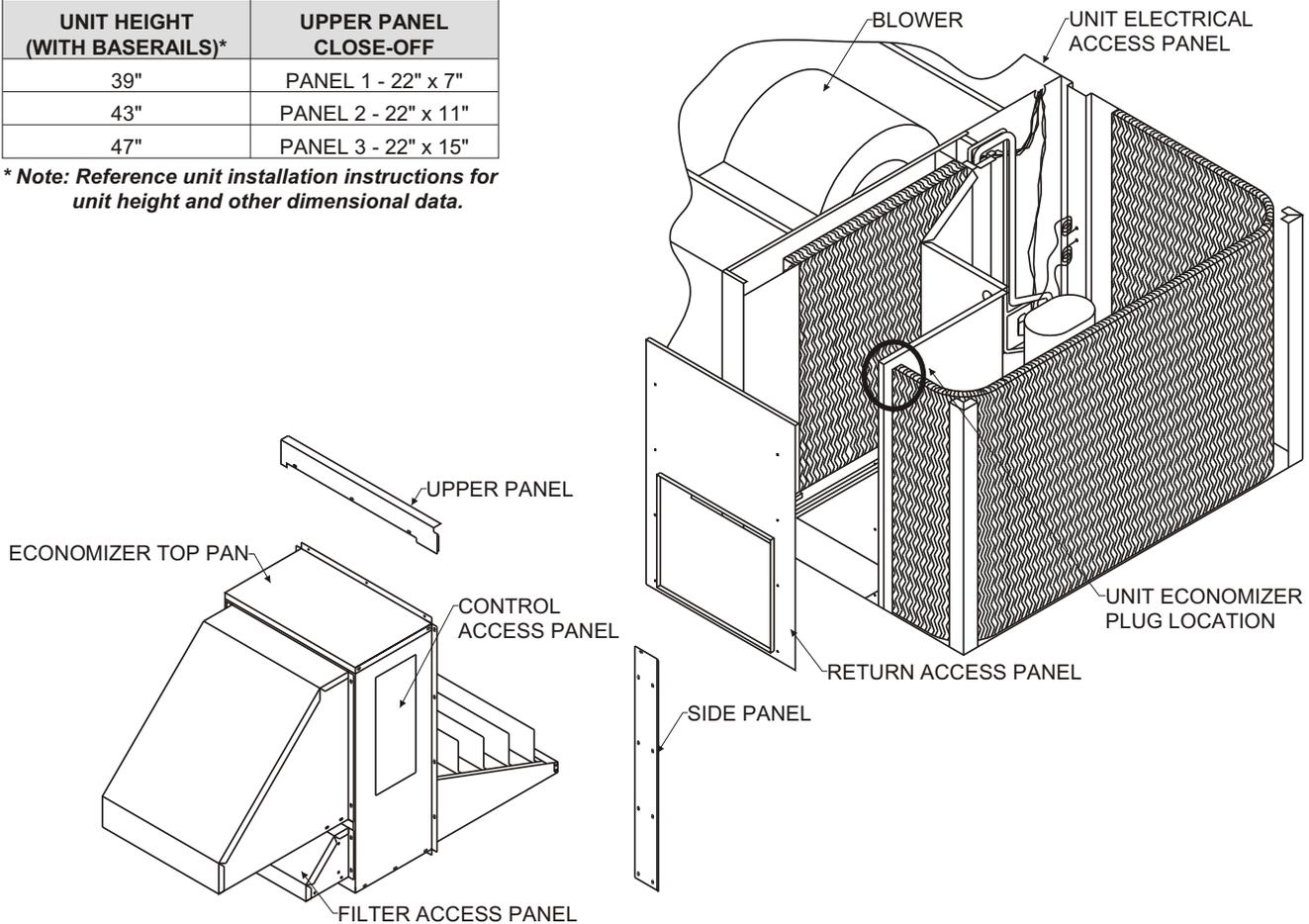


INSTALLATION INSTRUCTION

DOWNFLOW ECONOMIZER # 558870
PACKAGE EQUIPMENT MODELS
R6G(D,F) 024-060* / *R8GD 036*-060*
P6SD 024-060* / *Q6SD 024*-060*

UNIT HEIGHT (WITH BASERAILS)*	UPPER PANEL CLOSE-OFF
39"	PANEL 1 - 22" x 7"
43"	PANEL 2 - 22" x 11"
47"	PANEL 3 - 22" x 15"

* Note: Reference unit installation instructions for unit height and other dimensional data.



Step 2:

Shutdown unit and disconnect from electrical power.

Step 3:

Remove the return access panel and the unit electrical access panel. (Save screws.)

Step 4:

Using Caution to not puncture coil tubing, install side panel on unit.

Step 5:

Take the tab on side panel and place on the return side of divider wall and secure with self-tapping screw provided.

Step 6:

Remove unit filter rack (if installed) and filters.

Step 7:

Locate economizer plug in unit return air compartment (top right corner). Loosen/cut any zip ties that restrict its movement and prepare it for connection to the economizer.

Step 7a:

(If necessary) install differential enthalpy control in return air duct.

Step 8:

Remove filter from economizer to prevent damage during installation. (Accessed through lower, barometric hood panel.)

Step 9:

Install economizer in unit and attach only with left and right side mounting screws. Ensure economizer rails sit flush on return air opening lip. Use Caution to not tear insulation on unit side wall or floor. Use screws that were removed in Step 3.

Step 10:

Remove economizer top pan (4 screws) and connect economizer harness to unit wiring harness. Inspect all wiring and linkage connections for security and proper operation.

INSTALLATION INSTRUCTION

DOWNFLOW ECONOMIZER # 558870
PACKAGE EQUIPMENT MODELS
R6G(D,F) 024-060* / *R8GD 036*-060*
P6SD 024-060* / *Q6SD 024*-060*

Step10a:

If installed make sure differential enthalpy wiring connections are made in accordance with that kits instructions. Ensure that wires are protected from all sharp edges, inadvertent grounding and will not become entangled with filter or movable vanes.

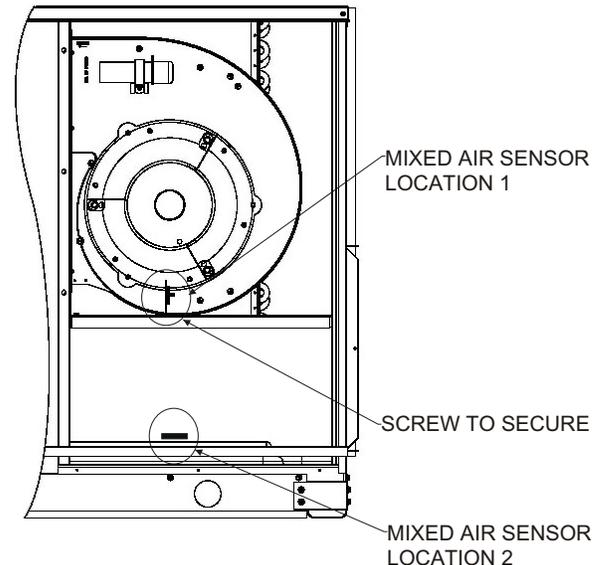
Step11:

Remove unit blower access panel and install mixed air sensor in appropriate location (as shown in Figure) with two self tapping screws and then make electrical connection. Replace blower access panel.

Note: *Some older units are equipped for mixed air sensor location 1 installation for these units, if desired, the mixed air sensor can be installed in location 2 for optional performance. See Next Page for more information.*

Step 12:

Replace economizer top pan and install side panel and appropriate upper close-off panel. Replace economizer filter and filter access panel. Ensure all mounting screws, panels, and doors are installed.



Step 13:

Minimum Fresh Air Damper Position Adjustment

Damper minimum position keeps the outdoor air damper from closing completely during system operation for ventilation of building contaminants and people occupancy. Consult your State or local codes as required.

1. Ensure main power to outdoor unit is disconnected.
2. Set thermostat "SYSTEM" switch to "OFF" position and "FAN" switch to "AUTO".
3. Install jumper wire across unit low voltage terminal board "R" and "G" terminal.
4. Disconnect mixed air sensor from the W7459A terminals T and T1 and short terminals T and T1.
5. Ensure the factory installed jumper is in place across W7459A terminals P and P1.
6. Calculate the appropriate mixed air temperature per the following equation:

$$* (\text{Return Air Temp.} \times \% \text{ of Return Air}) + (\text{Outside Air Temp.} \times \% \text{ of Outside Air}) = \text{Mixed Air Temperature}$$

Example: Assume local code requires 10% outdoor air during occupied conditions, (200 CFM of total unit CFM = 2,000) outdoor air is 50 Deg. F, and return air is 75 Deg. F.

Under these conditions, what is the mixed air temperature in the supply duct?

$$* (50 \text{ Deg. F} \times 0.1) + (75 \text{ Deg. F} \times 0.9) = 5.0 \text{ Deg. F} + 67.5 \text{ Deg. F} = \mathbf{72.5 \text{ Deg. F}}$$

7. Restore power to the outdoor section.
8. Carefully adjust the MIN POS potentiometer on the W7459A control module (See Figure 3) with a small screwdriver until the mixed air temperature reaches the calculated value. Ensure both sets of damper blades operate properly.
9. Once minimum position adjustments are completed, turn off power to the outdoor unit. Damper will move to fully close.
10. Remove jumper wire across "R" and "G" on unit low voltage terminal board and T and T1 on the W7459A control module.
11. Reconnect the mixed air sensor across W7459A terminals T and T1.

Step 14:

Double check all electrical connections and make desired enthalpy settings.

See Page 7. C - Outdoor Enthalpy Changeover Setpoint along with Figures 1 and 3.

Step 15:

Return power to the unit.

INSTALLATION INSTRUCTION

DOWNFLOW ECONOMIZER # 558870
PACKAGE EQUIPMENT MODELS
R6G(D,F) 024-060* / *R8GD 036*-060*
P6SD 024-060* / *Q6SD 024*-060*

Mixed-Air Sensor Installation Instructions For Gas Heat Models:

Step A:

Remove Blower Door and unit supply duct-cap assembly if necessary.

Step B:

Locate Unit mixed-air sensor wires. Connect economizer mixed air sensor wires supplied in parts bag.

Step C:

Locate and remove plastic plug in wire routing location in blower shelf. Install supplied star-bushing and route wires through bushing

Step D:

Install mixed air sensor with supplied self-tapping screw to duct lip through the hole in the flange of the sensor bracket.

Locate the sensor approximately 3" to 6" inches from corner of supply opening, while ensuring that the wires will reach the sensor.

Note: See picture for mixed air sensor locations for Gas Heat Units. For Electric Heat applications refer to the instruction on next page.

Step E:

Connect sensor wires to mixed air sensor, ensure that connections are tight, wires are protected from sharp edges and cannot become entangled by rotating equipment. Secure wires with zip-ties as necessary.

Step F:

Go back to step 12 of installation instructions and complete economizer installation steps.

Note: Some older units may not have the wire routing hole located in blower shelf. For these units it is recommended to create the wire routing hole as instructed below to locate the mixed air sensor as described above for optimum economizer performance but the mixed air sensor can be mounted in location 1 (see figure, previous page) if desired.

Do not, under any circumstances, route wires around any sheet metal edges.

Creating Wire Routing hole:

Measuring 1 1/2" from both the bottom right flange of the blower shelf and exposed edge of the blower shelf, (see picture to right) mark hole location. Drill pilot hole and punch hole with 7/8" sheet-metal hole punch. Alternately drill hole to 7/8" with sheet metal "step-bit". De-bur hole diameter and install 7/8" star-bushing. Route wires and mount sensor as described above.

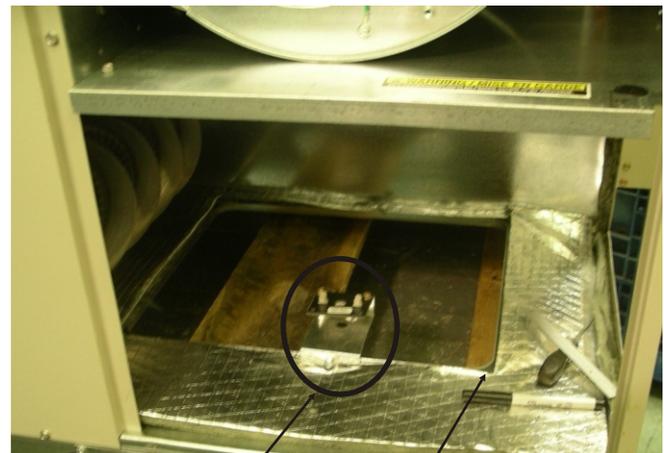
UNIT MIXED AIR
SENSOR WIRES



MIXED AIR SENSOR
WIRE ROUTING
LOCATION

HORIZONTAL
SUPPLY CLOSE
OFF COVER

DUCT-CAP ASSEMBLY



ALTERNATE MIXED AIR
SENSOR LOCATION
(GAS HEAT MODELS)

3" TO 6" FROM CORNER



INSTALLATION INSTRUCTION

DOWNFLOW ECONOMIZER # 558870
PACKAGE EQUIPMENT MODELS
R6G(D,F) 024-060* / *R8GD 036*-060*
P6SD 024-060* / *Q6SD 024*-060*

Mixed-Air Sensor Installation Instructions For Electric Heat Models:

Step A:

Remove Blower Door and unit supply duct-cap assembly if necessary. (Access to duct-cap assembly is performed through horizontal supply close-off cover.)

Step B:

Locate Unit mixed-air sensor wires. Connect economizer mixed air sensor wires supplied in parts bag.

Step C:

Install mixed air sensor with supplied self-tapping screw to blower shelf through the hole in the flange of the sensor bracket.

Locate the sensor with approximately 6" inches of clearance from any obstruction, while ensuring that the wires will reach the sensor.

Note: See picture for mixed air sensor location for Electric Heat Units. For Gas Heat applications refer to the instruction on previous page.

Step D:

Connect sensor wires to mixed air sensor, ensure that connections are tight, wires are protected from sharp edges and cannot become entangled by rotating equipment. Secure wires with zip-ties as necessary.

Step E:

Go back to step 12 of installation instructions and complete economizer installation steps.

UNIT MIXED AIR
SENSOR WIRES



MIXED AIR SENSOR
MOUNTING
LOCATION

HORIZONTAL
SUPPLY CLOSE
OFF COVER

ELECTRIC HEAT KIT
MOUNTING LOCATION

INSTALLATION INSTRUCTION

DOWNFLOW ECONOMIZER # 558870
 PACKAGE EQUIPMENT MODELS
 R6G(D,F) 024-060* / *R8GD 036*-060*
 P6SD 024-060* / *Q6SD 024*-060*

RETURN FILTER REPLACEMENT (16 x 20 x 1)

Step 1:

Remove 2 screws on filter access panel on barometric relief hood.

Step 2:

Lift blade to allow filter to be removed

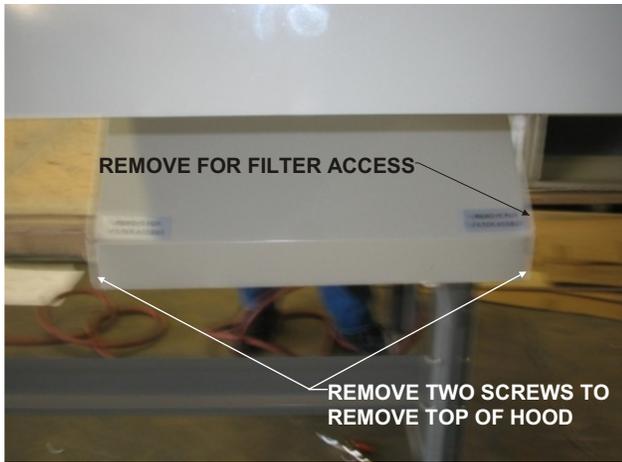
Step 3:

Slide filter out through hood and replace with new filter.

Step 4:

Replace top of hood and secure with screws.

(See pictures below and to the right)

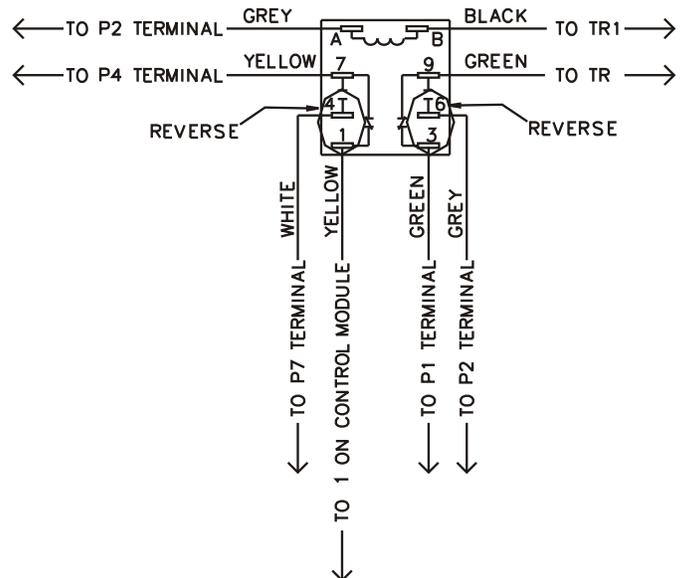


Notes for use with heat pumps

Economizer Configuration Instructions for use with O/B configurable thermostats with Heat pumps

When this economizer is used in conjunction with a heat pump, special attention must be given to the thermostat. Some newer digital thermostats only allow a single choice of an "O" or "B" signal. When configuring this economizer for use with one of these thermostats, the thermostat must be configured to provide an "O" signal to ensure proper operation of the reversing valve. Additionally the economizers relay must be reconfigured to account for the loss of the "B" signal. To do this, reverse the connections of the white and yellow wires on relay terminal numbers 1 and 4. Then reverse the green and grey wires at the relay terminal numbers 3 and 6. Ensure that all connections are secure and follow the regular installation instructions for all other operations. (See diagram to the right.)

Note: Some unit wiring diagrams may still show the "B" input signal to the unit. On these systems, connect the applicable wires to the thermostats "O" signal.



INSTALLATION INSTRUCTION

**DOWNFLOW ECONOMIZER # 558870
PACKAGE EQUIPMENT MODELS
R6G(D,F) 024-060* / *R8GD 036*-060*
P6SD 024-060* / *Q6SD 024*-060***

OPERATION

A. Cooling Mode

1. On a call for cooling, with ambient temperature and humidity above enthalpy control setpoint, damper will open to minimum vent position only.
2. On a call for cooling, with ambient temperature and humidity suitable for cooling, enthalpy control will shift stage one control to outside air and shift stage two thermostat to first stage compressor. Damper will modulate to control supply air temperature at 55°F (13°C). If additional cooling is required, compressor one may be energized through second stage of thermostat.

B. Heating Mode

1. On a call for heat damper will open to the minimum vent position only.

C. Outdoor Enthalpy Changeover Setpoint

The outdoor enthalpy changeover setpoint is used to return the outdoor air damper to minimum position when enthalpy rises above setpoint. Enthalpy setpoint scale markings located on W7459, are A, B, C and D; See Figure 1 for corresponding control point. The factory-installed 620 ohm jumper must be in place across terminals S_R and +.

SETTINGS AND ADJUSTMENTS

Potentiometers with screwdriver adjustment slots, located on the face of the W7459 economizer control device, provide adjustments for the minimum damper

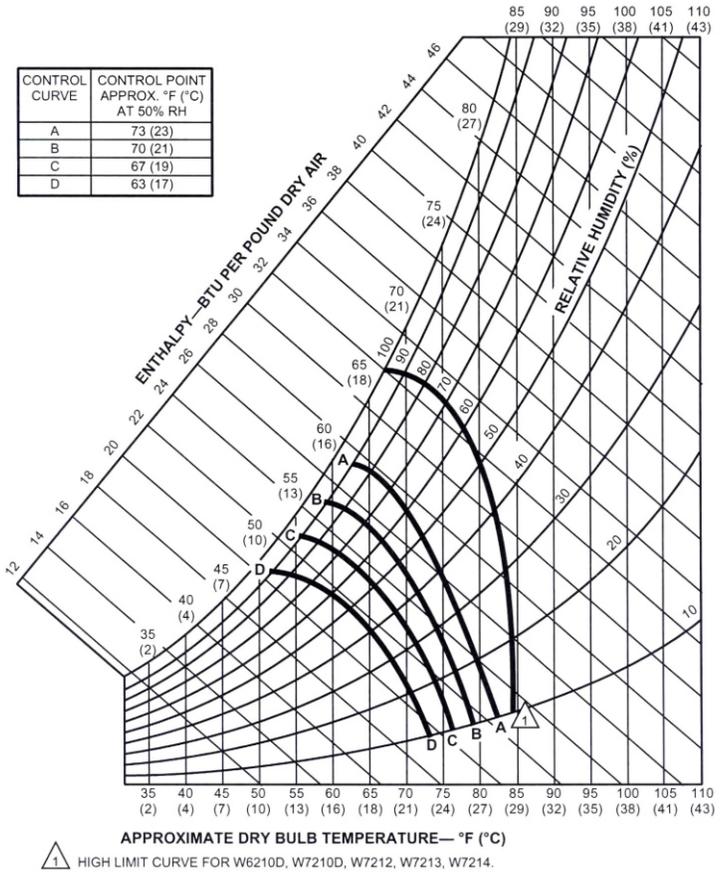
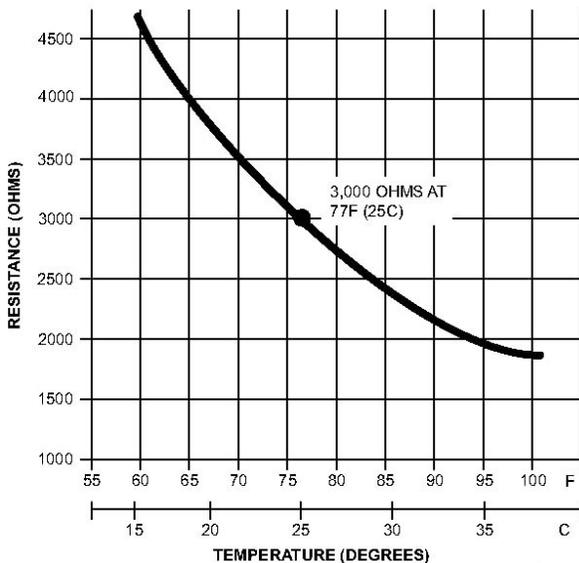
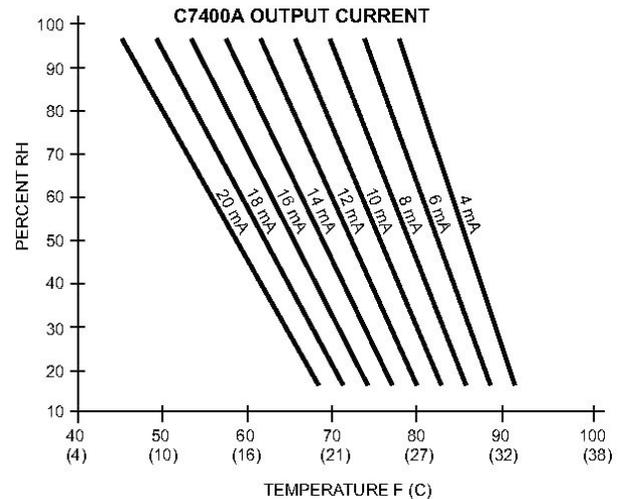


Figure 1



**C7150B Air Temperature Sensors
resistance versus temperature.**



**C7400A Sensor output current
vs. relative humidity**

INSTALLATION INSTRUCTION

DOWNFLOW ECONOMIZER # 558870
PACKAGE EQUIPMENT MODELS
 R6G(D,F) 024-060* / *R8GD 036*-060*
 P6SD 024-060* / *Q6SD 024*-060*

CHECKOUT AND TROUBLESHOOTING

Check the W7459 for proper operation. Table 1 describe how to simulate various environmental conditions. Make necessary minor adjustments to the minimum position until desired operation is obtained.

If the economizer system does not operate properly, check individual components of the system according to the instructions provided with each device.

If the other components operate properly when disconnected from the W7459, but the system (as a whole) does not, replace the W7459.

Checkout Procedure	Proper Response
1. a. Disconnect power at TR and TR1.	----
b. Disconnect Jumper P to P1.	
c. Jumper TR to 1.	
d. Jumper T1 to T.	
e. If connected, remove C7400 Solid State Enthalpy Sensor from terminals S _O and +. Ensure factory-installed 620 ohm resistor is connected to terminals S _R and +.	LED is off.
f. Apply power (24 Vac) to terminals TR and TR1.	Motor is in closed position.
2. a. Disconnect factory-installed 620 ohm resistor from terminals S _R and +.	LED turns on (A model only, for D model, go to step 3). Motor drives toward open.
3. a. To simulate high and low enthalpy (single enthalpy sensor), reconnect factory-installed 620 ohm resistor from terminals S _R and +. Connect 1.2K ohm 4074EJM Checkout Resistor across terminals S _O and +	----
b. Turn enthalpy setpoint potentiometer to "A".	LED turns on, indicating low enthalpy. Motor drives toward open.
c. Turn enthalpy setpoint potentiometer to "D".	LED turns on, indicating high enthalpy. Motor drives toward closed.
d. Disconnect the 1.2K ohm checkout resistor.	----
4. a. To verify sensor operation, reconnect the + lead of outdoor enthalpy sensor to the + terminal of W7459	----
b. Connect a DC milliammeter between terminal S _O of the W7459A and terminal S of the enthalpy sensor. (Positive meter lead to terminal S of the enthalpy sensor.)	Milliammeter indication is between 3 and 25 mA if sensor is operating properly. If milliammeter indicates zero, the sensor may be wired backwards.
c. When using differential enthalpy, check the return air enthalpy sensor by connecting a DC milliammeter between terminal S _R of the W7459A and terminal S of the return air enthalpy sensor. (Positive meter lead to terminal S of the enthalpy sensor.)	Milliammeter indication is between 3 and 25 mA if sensor is operating properly. If milliammeter indicates zero, the sensor may be wired backwards

MAINTENANCE

1. Damper motor is prelubricated and does not require further lubrication.
2. Make visual inspection of dampers and linkage assemblies during routine maintenance.
3. Filters should be checked periodically and cleaned when necessary.
4. The washable filters supplied with the economizer can be cleaned with water and a mild detergent.
5. Take note of "Air Flow Direction" marking on filter frame when reinstalling.

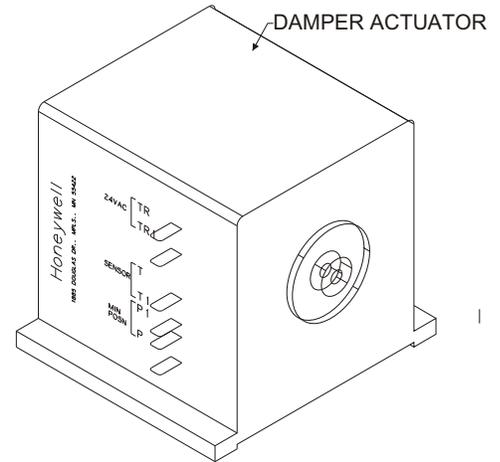


Figure 2

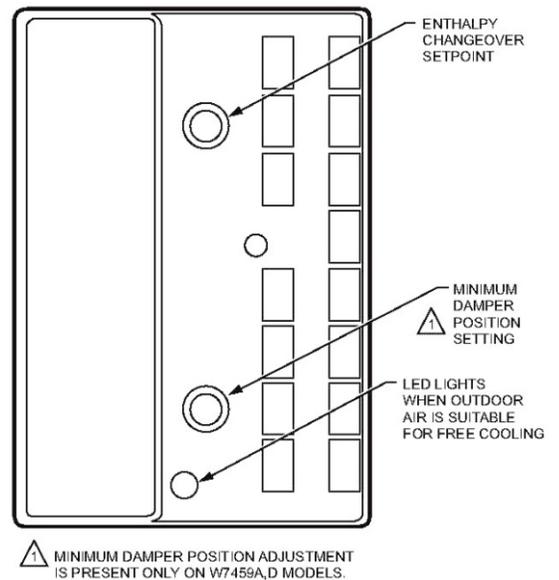
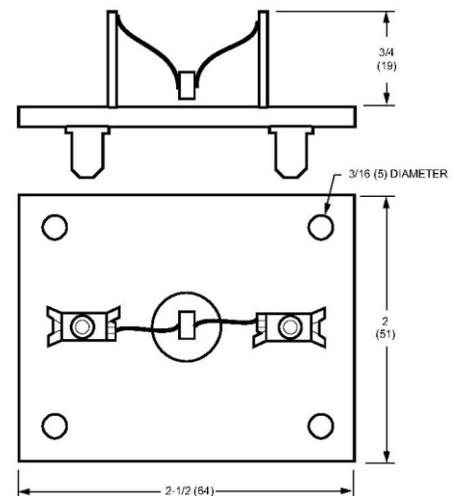


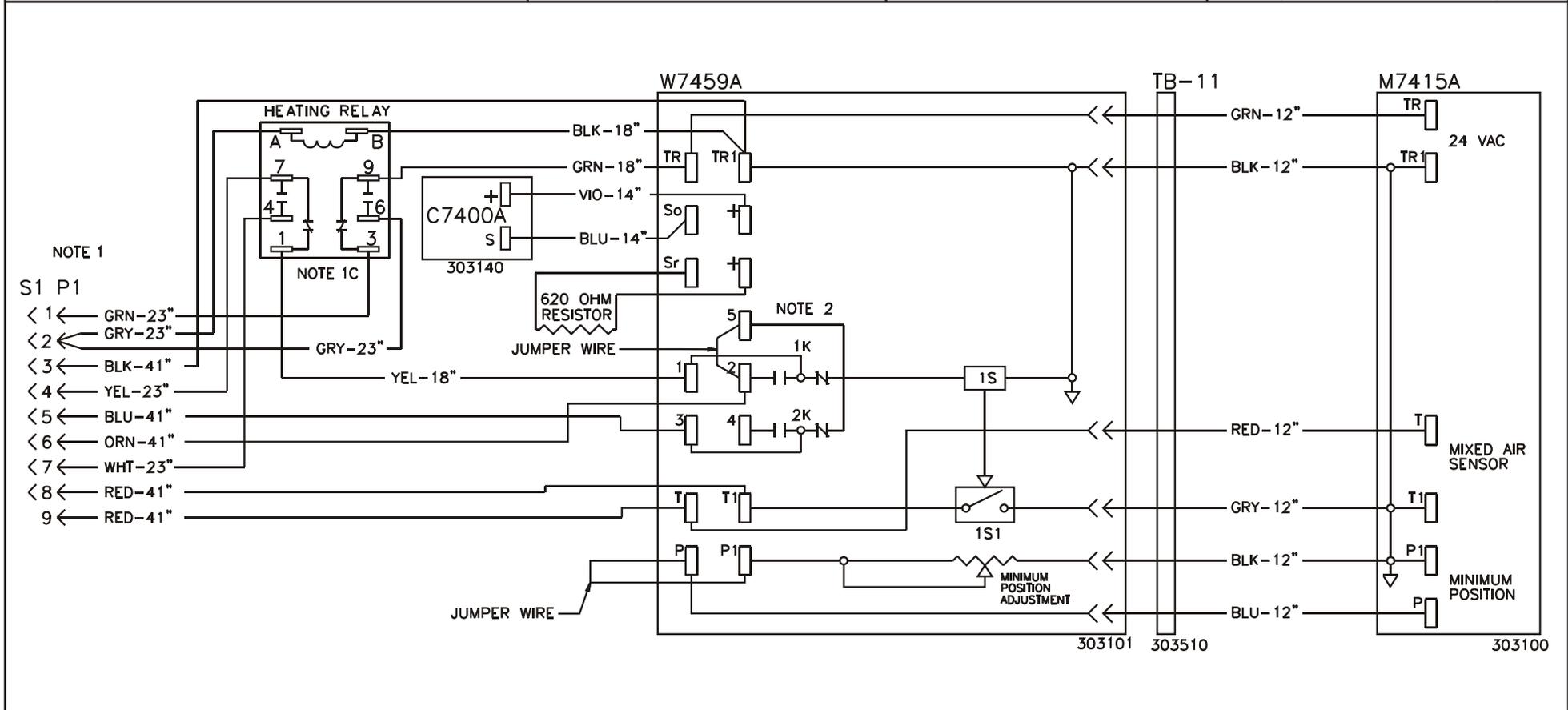
Figure 3



Approximate dimensions of C7150B Mixed/Discharge Air Sensor in. (mm).

HARNESS DETAIL	COMPONENT CODE	WIRE COLOR CODE	Revision	Change	Date
			A	Added notes to drawing	03-07-12
			B	Changed Note 1	03-14-12
CE# = WIRE END DESIGNATION E2 STUD #6 18 Ga. Wire E3 Female ¼ Quick Disc. E4 Male ¼ Quick Disc. Insul E6 Wire Nut Size 73B E7 Raw End E8 Female ⅜ Quick Disc.	C7150C Mixed Air Sensor C7400A Fresh Air Sensor M7415A Damper Actuator 24v P1 Economizer Plug S1 Unit Plug TB-11 Terminal Board W7459A Logic Module	BLK Black BLU Blue GRN Green GRY Gray ORN Orange RED Red VIO Violet WHT White YEL Yellow			

HARNESS ENDS AT P1



- Notes:
- S1-Pin 2 connection is:
 - connected to "Yellow" side of gas valve on package gas/electric units.
 - connected to "W" low voltage terminal on package air conditioning units.
 - connected to "O" thermostat terminal on package heat pump units.

See "Notes for Use with Heat Pumps", Page 6, for required economizer wiring changes.
 - For mechanical cooling (compressor) to energize during economizer cooling mode of operation, a thermostat "Y2" call must be present. A 2 stage cooling thermostat is required for this application.

See Unit Wiring Diagram for Connections

Modulating Downflow Economizer

RRS ROOFTOP SYSTEMS
A Ruskin Company

1625 Diplomat Drive
Carrollton, Texas 75006
Phone: (972) 247-7447
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Date: March 14, 2012

Supersedes: 03-07-12

Drawn by: MGL

Unit #: 47-314-06D

Diagram#: 4731406DW

Approved by: