

ECONOMIZERS

ECODCBX ECONOMIZERS

INSTALLATION INSTRUCTIONS FOR ECONOMIZER AND OUTDOOR AIR HOOD USED WITH LGH/LCH156–300S UNITS

Shipping and Packing List

Economizer Package 1 of 1 contains:
Damper Assembly

- 1– Economizer damper assembly
- 1 Relief air hood with barometric relief damper
- 1– Outside air hood

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 economizer is used with LG/LC 156–300S units in downflow air discharge applications. The economizer uses outdoor air for free cooling when temperature and/or humidity is suitable.

Optional field–provided sensors may be used instead of unit sensors to determine whether outdoor air is suitable for free cooling. Refer to Economizer Control Settings section and table 1.

TABLE 1

Mode	Field–Provided Sensors	Dampers will modulate to 55°F discharge air (RT6) when:
TMP	None Needed	OA temp. (RT17) is less than RA temp. (RT16) or when the Energy Management System sends an economizer enable message.**
ODE	C7400	OA enthalpy* (A7) is less than enthalpy setpoint.
DIF	(Two) C7400	OA enthalpy (A7) is less than RA enthalpy (A62).
GLO	Energy Management System With Global Output	Global input is energized (P297–9).

*Temperature + humidity= enthalpy.

**Energy management systems may require additional field–provided sensors; refer to manufacturer’s instructions.

Install Economizer

CAUTION

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

- 1– Disconnect all power to unit.
- 2– Release latches and open filter access panel.
- 3– Align bottom of economizer with economizer support bracket and slide economizer in to unit. See figure 1.
- 4– Fit economizer end plate over end of economizer and secure end plate with sheet metal screws.
- 5– Connect economizer plug P3 to unit jack J3 as shown in figure 2.

Outdoor Air Hood

The outdoor air hood is packaged separately but attached to the damper assembly crate. Use #10 self drilling screws to install hood unless noted otherwise. Refer to figure 3.

- 1– Remove and retain screws securing unit top back panel; remove and discard panel.
- 2– Secure top seal stiffener to back side of hood top seal. See figures 3.

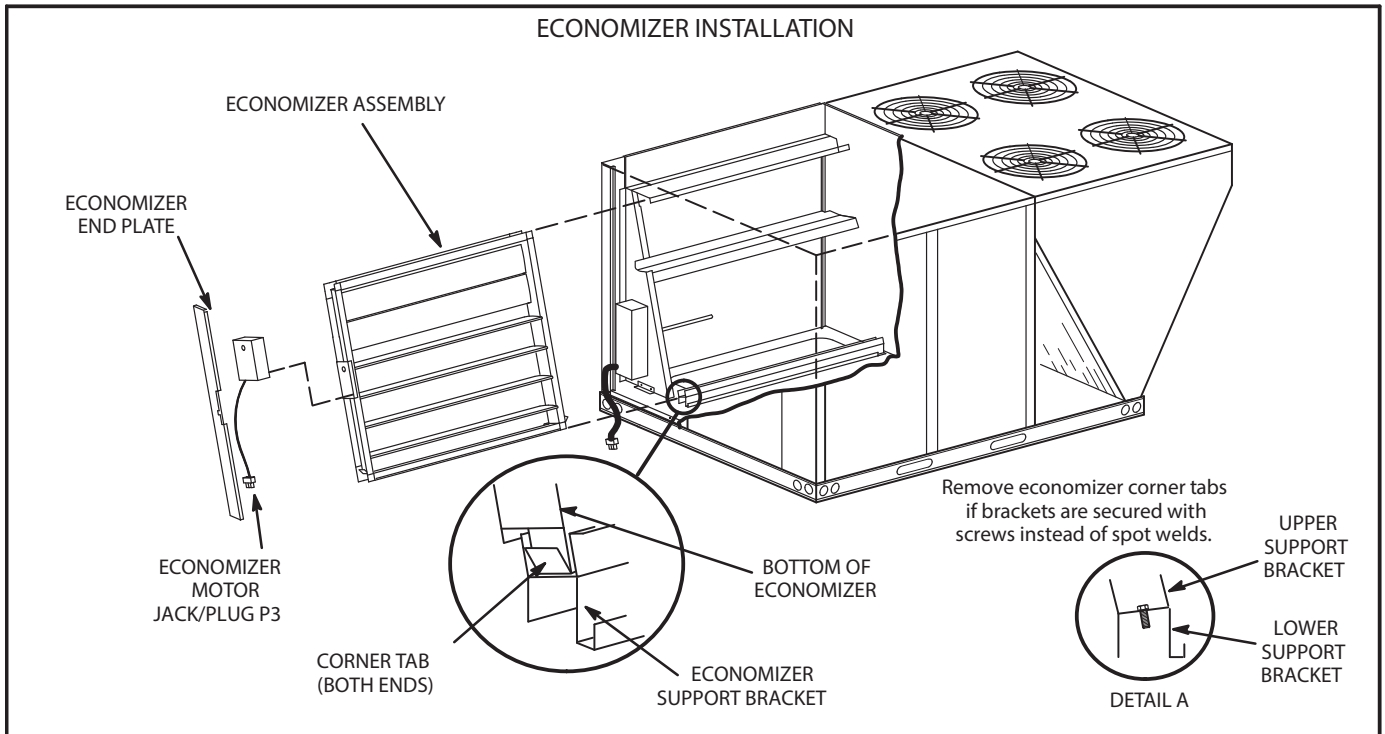


FIGURE 1

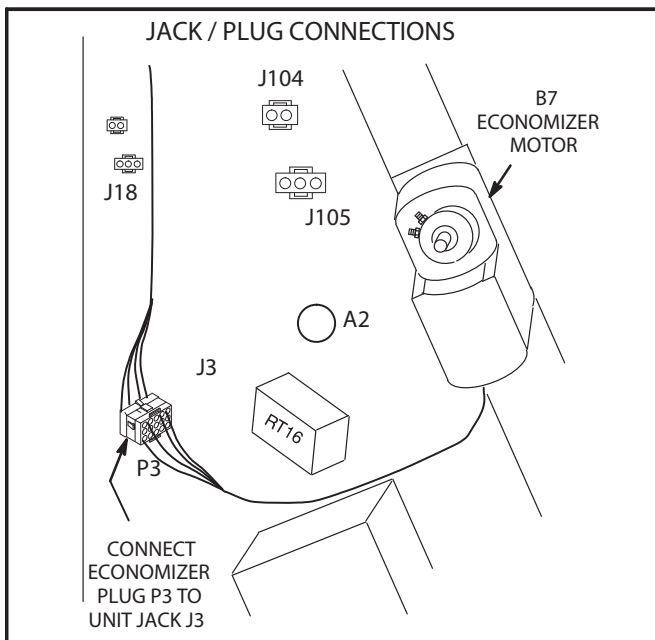


FIGURE 2

- 3- Slide hood top under unit cabinet top and secure using five retained top screws.
- 4- Tighten the two screws on each end of the hood top seal left loose in step 3.

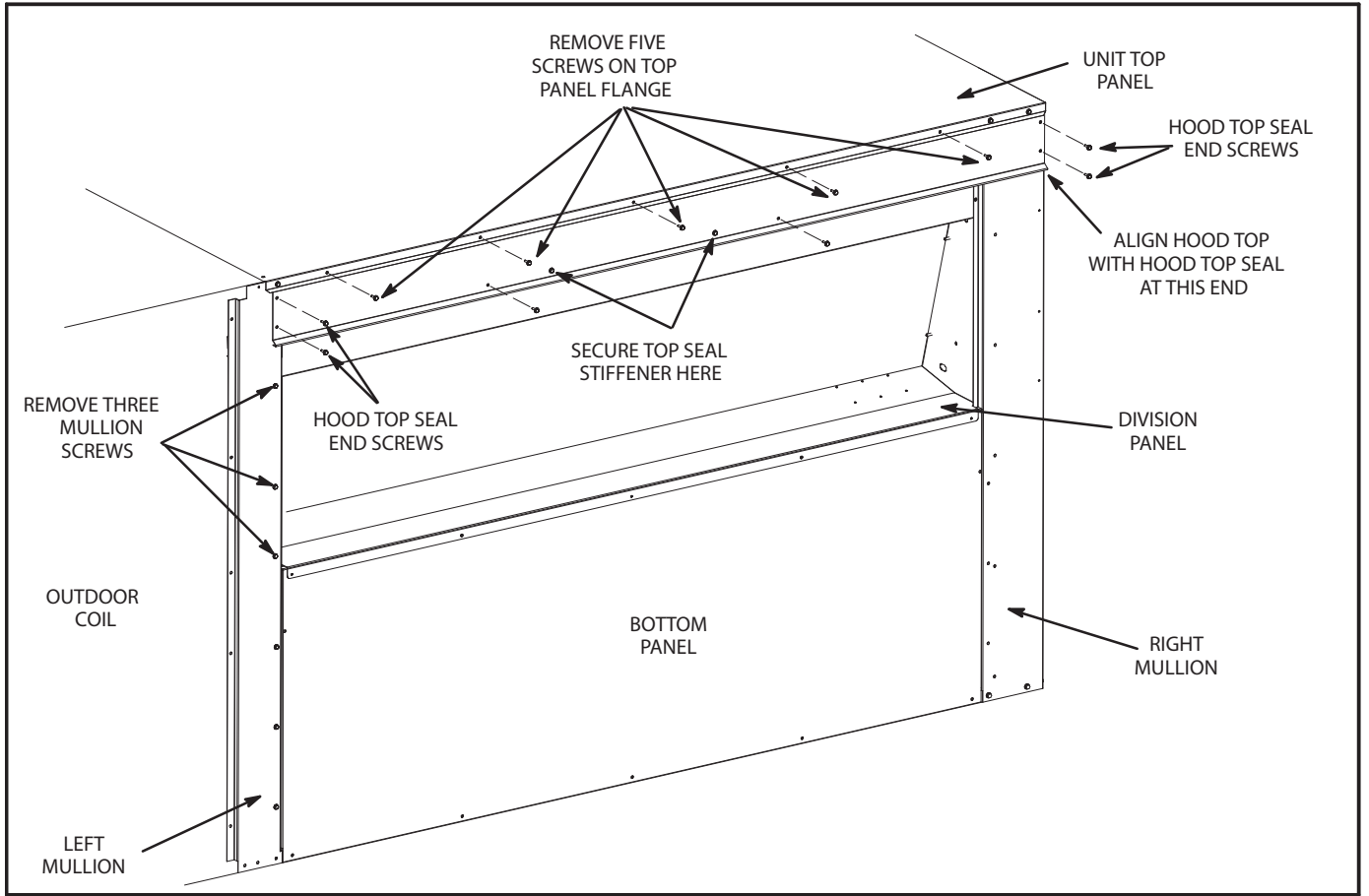


FIGURE 3

8- Install hood assembly to side of unit see figure 3.

Economizer Control Settings

The economizer is controlled by the Unit Controller which is located at the left corner of the unit control panel. The economizer DIP switch and mode setting devices are at the bottom center of the unit control. See figure 4.

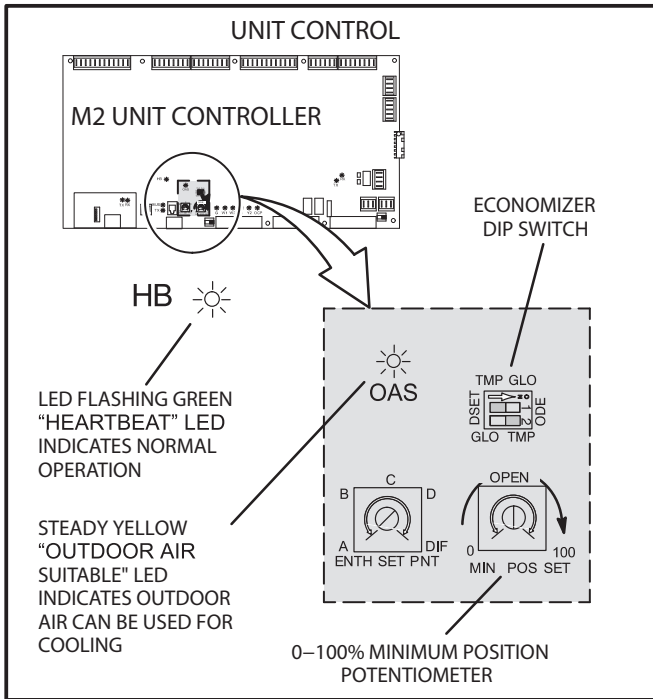


FIGURE 4

Set economizer DIP switch and enthalpy setting on the Unit Controller to the appropriate mode. See figure 5.

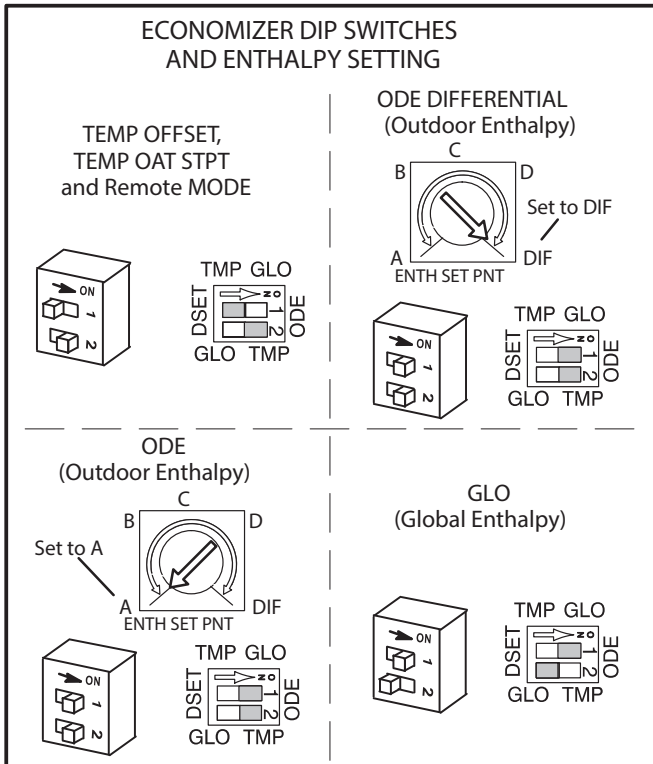


FIGURE 5

When using ODE or DIF mode, change additional settings as follows:

ODE MODE

Set enthalpy setpoint to "A." If the economizer is allowing air which is too warm or too humid to enter the system, adjust the setting lower (B, C, or D). Table 2 shows the approximate enthalpy control temperature setpoints at 50% relative humidity.

TABLE 2

Control Setting	Enthalpy Control Setpoint at 50% Relative Humidity – Approximate °F (°C)
A	73 (23)
B	70 (21)
C	67 (19)
D	63 (17)

Example:

At setting "A," the enthalpy control will modulate dampers open when outdoor air is at 73 °F (23 °C) and 50% relative humidity. If space temperatures are too warm, rotate the potentiometer to "B." The enthalpy control will now modulate dampers open when outdoor air is 70 °F (21 °C) and 50% relative humidity.

DIF MODE

Set enthalpy setpoint completely clockwise to DIF.

Damper Minimum Position Setting

In addition to the following method, damper minimum position may also be set using the Unit Controller display. Refer to the Unit Controller manual for details. A Unit Controller display adjustment will override potentiometer adjustment.

- 1- Set economizer DIP switch to "DSET" position as shown in figure 6.
- 2- Rotate MIN POS SET potentiometer to approximate desired fresh air percentage. Indicator on damper motor reads actual damper position in degrees open.

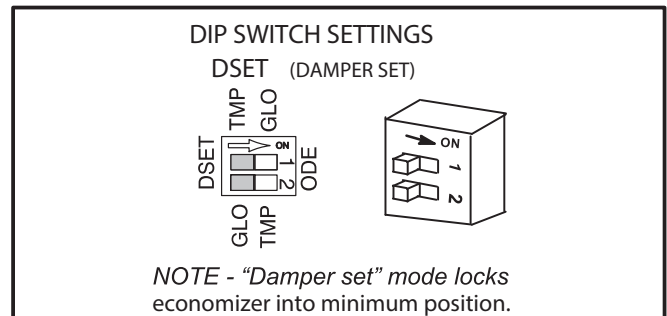


FIGURE 6

- 3– Measure outdoor air temperature. Mark the point on the bottom line of chart 1 and label the point “A” (40°F, 4°C shown).
- 4– Measure return air temperature. Mark that point on the top line of chart 1 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 1 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 higher. If fresh air percentage is more than desired, adjust MIN POS SET potentiometer lower. Repeat steps 3 through 8 until calculation reads desired fresh air percentage.
- 10–Return economizer DIP switch to original position.

Economizer Operation

NOTE – Use indicating lights on Unit Controller to determine thermostat demand.

See table 3 for economizer operation with a standard two-stage thermostat

Table 4 shows economizer operation with an energy management system which uses a global sensor.

Both tables show the occupied and unoccupied time period. The occupied time period is determined by the thermostat or energy management system.

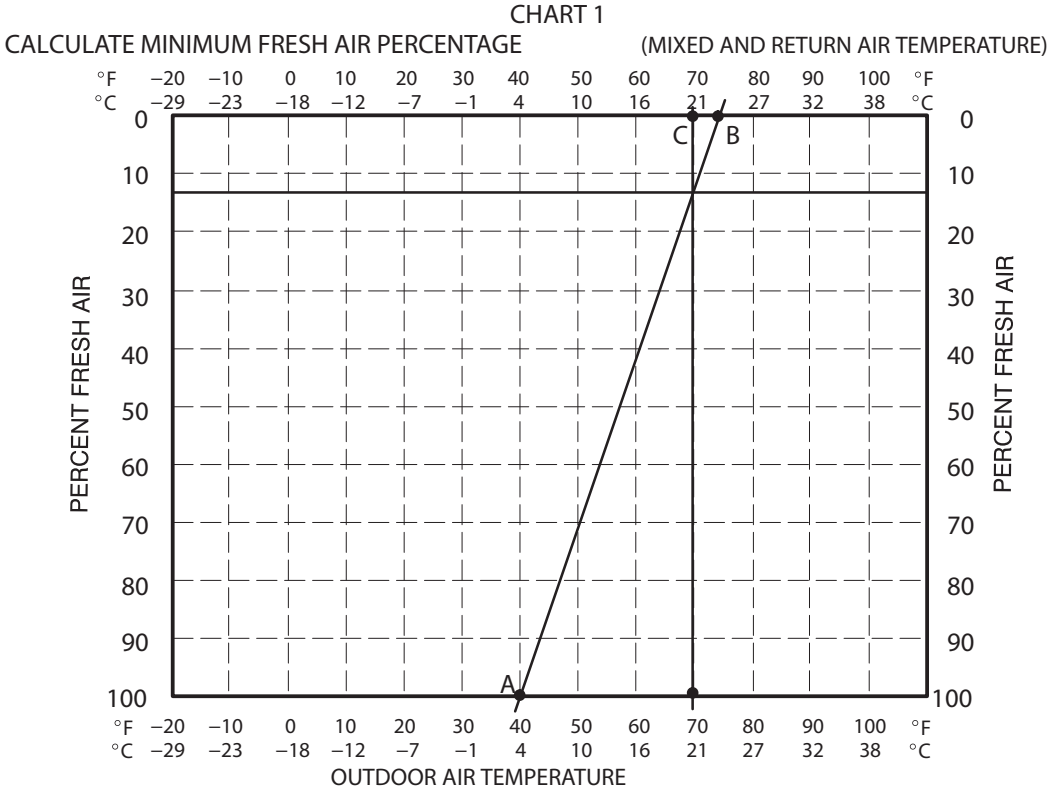
Table 5 shows economizer operation in zone sensor mode.

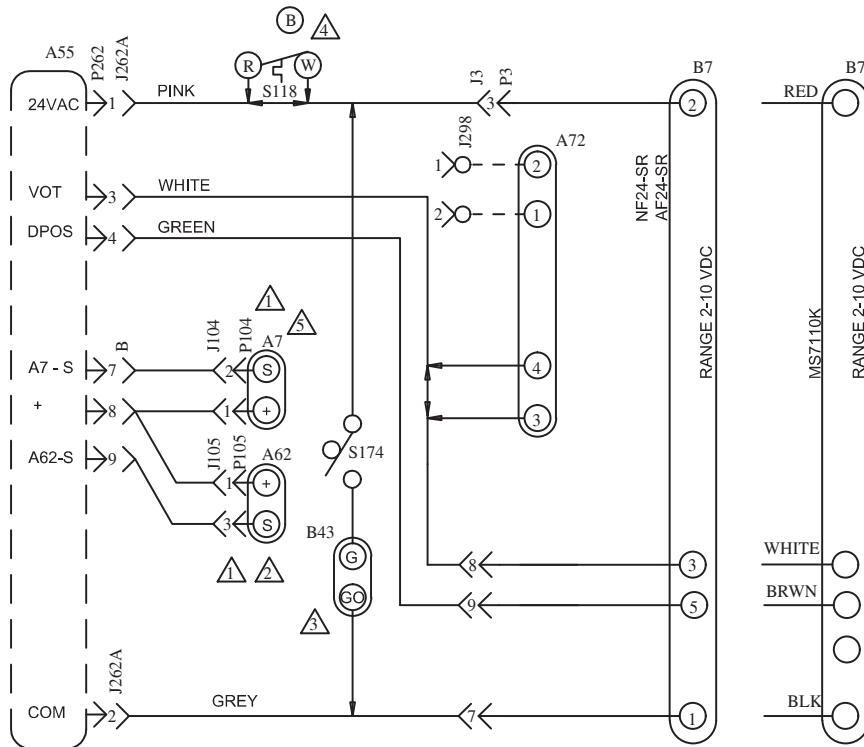
IAQ DAMPER OPERATION

The Unit Controller has a 0–10VDC IAQ input for a standard 0–2000ppm CO₂ sensor. The economizer starts opening at a CO₂ level of 500 ppm (default) and reaches full open at a CO₂ level of 1000ppm. These levels are adjustable as outlined in the Unit Controller manual under the menu Settings>Setpoints>IAQ.

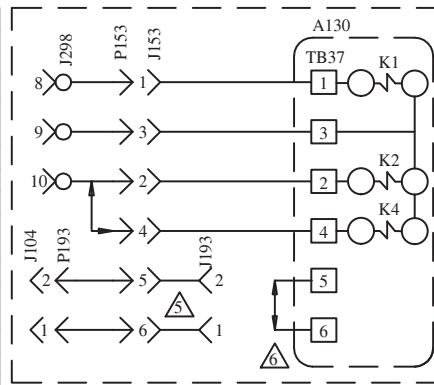
If the economizer is operating in the free cooling mode and the IAQ sensor demands more fresh air, the IAQ demand will override the free cooling demand to open the dampers further or to keep them open. A flashing OAS LED on the Unit Controller indicates an IAQ override condition.

The IAQ function is not energized during the unoccupied or night time period.





DESCRIPTION	
KEY	COMPONENT
A7	SENSOR, SOLID STATE ENTHALPY
A130	CONTROL, ERS
A55	CONTROL, MAIN PANEL LENNOX
A62	SENSOR, ENTHALPY INDOOR
A72	CONTROL, REMOTE MIN POS (OPT)
B7	MOTOR, DAMPER ECONOMIZER
B43	MOTOR, EXHAUST DAMPER
J3	JACK, UNIT ECONOMIZER
J104	JACK, SENSOR OUTDOOR ENTHALPY
J105	JACK, SENSOR RETURN AIR ENTHALPY
J153	JACK, ENTHALPY / DAMPER MOTOR
J193	JACK, ENTHALPY SENSOR
J298A	JACK, IAQ INTERFACE
J262A	JACK, DAMPER MOTOR
J262B	JACK, ENTHALPY SENSORS
P3	PLUG, ECONOMIZER BYPASS
P153	PLUG, ENTHALPY / DAMPER MOTOR
P193	PLUG, ENTHALPY SENSOR
P262	PLUG, ECONOMIZER OUTPUT
S118	THERMOSTAT, DESICANT DEFROST
S174	SWITCH, EXHAUST DAMPER



ENERGY RECOVERY WHEEL HOOK UP

- ⚠ DELETE A7 AND A62 (IF USED) FOR EITHER GLOBAL ENTHALPY OR SENSIBLE TEMPERATURE CONTROL
- ⚠ FOR UNIT DIFFERENTIAL ENTHALPY CONTROL, ADD A62 RETURN AIR ENTHALPY SENSOR
- ⚠ OPTIONAL EXHAUST DAMPER ACTUATOR TO HOLD EXHAUST DAMPER CLOSED WHEN OUTSIDE AIR DAMPER IS CLOSED
- ⚠ S118 USED ON 35 TO 50 TON ENERGENCE UNITS WITH ENERGY RECOVERY WHEEL (ERW)
- ⚠ REPOSITION A7 ENTHALPY SENSOR FROM ROOFTOP UNIT ECONOMIZER INTO INTAKE HOOD OF THE ERW ROOFTOP UNIT
- ⚠ REMOVE JUMPER WHEN INSTALLING OPTIONAL LOW AMBIENT SWITCH

NOTE- THIS DIAGRAM USED ONLY WHEN ECONOMIZER OR MOTORIZED OUTDOOR AIR DAMPERS ARE INSTALLED.

————— DESIGNATES OPTIONAL WIRING
 - - - - - CLASS II FIELD WIRING

WIRING DIAGRAM		09/09
ACCESSORIES		
ENERGENCE™ SERIES ECONOMIZER AND MOTORIZED OAD PIVOTING WHEEL ENERGY RECOVERY SYSTEM OPTION		
SECTION D		
Supersedes	New Form No.	
	537189-01	

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TABLE 3
ECONOMIZER OPERATION – Standard Two–Stage Thermostat (Default Option)

THERMOSTAT DEMAND	DAMPER POSITION UNOCC.	DAMPER POSITION OCCUPIED	MECHANICAL COOLING
OUTDOOR AIR IS NOT SUITABLE FOR FREE COOLING--OAS LED "OFF"			
OFF	CLOSED	CLOSED	NO
G	CLOSED	MINIMUM	NO
Y1	CLOSED	MINIMUM	STAGE 1
Y2	CLOSED	MINIMUM	STAGES 1 AND 2
OUTDOOR AIR IS SUITABLE FOR FREE COOLING--OAS LED "ON"			
OFF	CLOSED	CLOSED	NO
G	CLOSED	MINIMUM	NO
Y1	MODULATING	MODULATING	NO
Y2	MODULATING	MODULATING (1)	STAGE 1

NOTE – Modulating dampers adjust to control supply air (RT6) to 55 °F (13 °C). (1) The Unit Controller goes into a "cool down" or "warm-up" mode when the occupied time period starts. (2) Units with two–stage compressor operation will operate only stage 1 with a Y2 demand.

TABLE 4
ECONOMIZER OPERATION WITH GLOBAL SENSING – Energy Management System (Default Option)

THERMOSTAT DEMAND	DAMPER POSITION UNOCC.	DAMPER POSITION OCCUPIED	MECHANICAL COOLING
GLOBAL INPUT OFF --OAS LED "OFF"			
OFF	CLOSED	CLOSED	NO
G	CLOSED	MINIMUM	NO
Y1	CLOSED	MINIMUM	STAGE 1
Y2	CLOSED	MINIMUM	STAGES 1 AND 2
GLOBAL INPUT ON --OAS LED "ON "			
OFF	MODULATING	MODULATING	NO
G	MODULATING	MODULATING	NO
Y1	MODULATING	MODULATING	STAGE 1
Y2	MODULATING	MODULATING (1)	STAGES 1 AND 2 (2)

NOTE – Modulating dampers adjust to control supply air (RT6) to 55 °F (13 °C). (1) The Unit Controller goes into a "cool down" or "warm-up" mode when the occupied time period starts. (2) Units with two–stage compressor operation will operate only stage 1 with a Y2 demand (default).

TABLE 5
ECONOMIZER OPERATION – Zone Sensor Mode

DEMAND	DAMPER POSITION UNOCC.	DAMPER POSITION OCCUPIED	MECHANICAL COOLING
OUTDOOR AIR IS NOT SUITABLE FOR FREE COOLING--OAS LED "OFF"			
OFF	CLOSED	CLOSED	NO
G	CLOSED	MINIMUM	NO
Cooling Stage 1	CLOSED	MINIMUM	COMPRESSOR 1
Cooling Stage 2	CLOSED	MINIMUM	COMPRESSOR 1 & 2
Cooling Stage 3	CLOSED	MINIMUM	COMPRESSOR 1, 2, & 3
Cooling Stage 4	CLOSED	MINIMUM	COMPRESSOR 1, 2, 3, & 4
OUTDOOR AIR IS SUITABLE FOR FREE COOLING--OAS LED "ON"			
OFF	CLOSED	CLOSED	NO
G	CLOSED	MINIMUM	NO
Cooling Stage 1	MODULATING	MODULATING	NO
Cooling Stage 2	FULL OPEN*	FULL OPEN*	COMPRESSOR 1
Cooling Stage 3	FULL OPEN*	FULL OPEN*	COMPRESSORS 1 & 2
Cooling Stage 4	FULL OPEN*	FULL OPEN*	COMPRESSORS 1, 2, 3, & 4

*Damper will modulate to maintain 55 °F supply air when ECTO 6.27 is changed to setting "0". NOTE - Modulating dampers adjust to control supply air (RT6) to 55 °F (13 °C).