

INSTALLATION INSTRUCTIONS

MODELS (-)XRD-MCCM3 & (-)XRD-MECM3/TECM3

CONVERTIBLE AIRFLOW ECONOMIZERS

⚠ WARNING

THIS ACCESSORY IS TO BE INSTALLED BY A QUALIFIED, LICENSED SERVICE PERSON. TO AVOID UNSATISFACTORY OPERATION OR DAMAGE TO THE PRODUCT AND POSSIBLE UNSAFE CONDITIONS, INCLUDING ELECTRICAL SHOCK, REFRIGERANT LEAKAGE AND FIRE, THE INSTALLATION INSTRUCTIONS PROVIDED WITH THIS ACCESSORY MUST BE STRICTLY FOLLOWED AND THE PARTS SUPPLIED USED WITHOUT SUBSTITUTION. DAMAGE TO THE PRODUCT RESULTING FROM NOT FOLLOWING THE INSTRUCTIONS OR USING UNAUTHORIZED PARTS MAY BE EXCLUDED FROM THE MANUFACTURER'S WARRANTY COVERAGE.

⚠ WARNING

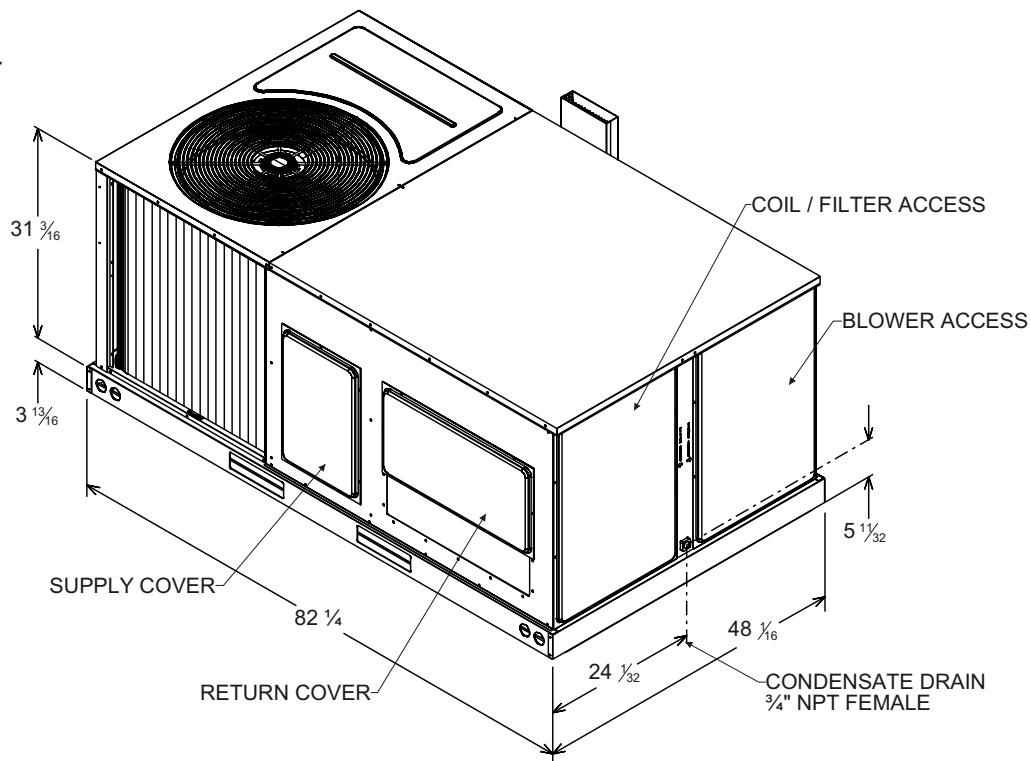
DISCONNECT ELECTRICAL POWER TO THE UNIT. FAILURE TO DO SO CAN CAUSE ELECTRICAL SHOCK RESULTING IN PERSONAL INJURY OR DEATH.

TOOLS REQUIRED FOR INSTALLATION:

$\frac{3}{8}$ " electric drill with $\frac{5}{16}$ " socket	Small flat blade (0.125" wide) screwdriver
$\frac{1}{8}$ " diameter drill bit for sheet metal.	Sheet metal tools (e.g. shears)

PACKAGE CONTENTS		(-)XRD-MECM3 (-)XRD-TECM3 economizer with controller, actuator, and outside enthalpy sensor attached	(-)XRD-MCCM3 economizer with controller, actuator, and outside enthalpy sensor attached
ITEM	DESCRIPTION	PART No.	PART No.
1	Discharge Air Sensor (Hardware Bag)	6036420 / 3112	6036408 / 3112
2	Permanent Filter	6036420 / 8569 15 ½ x 21 ¾	6036408 / 8570 15 ½ x 27 ¾
3	Bird Screen	6036420 / PERF	6036408 / PERF
4	OA Rainhood – Filter Access	6036420 / FAP	6036408 / FAP
5	OA Rainhood Assy – Left Side	6036420 / EHSL	6036408 / EHSL
6	OA Rainhood Assy – Right Side	6036420 / EHSR	6036408 / EHSR
7	OA Rainhood Assy – Bottom	6036420 / EHB	6036408 / EHB
8	OA Rainhood – Top	6036420 / EHT	6036408 / EHT
9	OA Rainhood – Filter Retainer	6036420 / FCH	6036408 / FCH
10	BR Rainhood Assy – Left Side	6036420 / EHS2L	6036408 / EHS2L
11	BR Rainhood Assy – Right Side	6036420 / EHS2R	6036408 / EHS2R
12	BR Rainhood Assy – Bottom	6036420 / EHB2	6036408 / EHB2
13	BR Rainhood – Top	6036420 / EHT2	6036408 / EHT2
14	BR Rainhood – Bird Screen	6036420 / FCH2	6036408 / FCH2
15	Hardware Bag	6036420 / HDW	6036408 / HDW

FIGURE 1
 (-)XRD-MECM3 Shown
 (-)XDX-MCCM3 Similar



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STEP 1:

Immediately upon receipt, all cartons and contents should be inspected for transit damage. Units with damaged cartons should be opened immediately. If damage is found, it should be noted on the delivery papers and a damage claim filed with the last carrier. Compare carton(s) contents to PACKAGE CONTENTS List (**TABLE 1**) above to note any missing items.

STEP 2:

Remove RETURN COVER, COIL/FILTER ACCESS PANEL and BLOWER ACCESS PANEL from the unit and retain for reuse (**SEE FIGURE 1**). Retain screws.

STEP 3:

Remove the RETURN AIR FILLER and carefully cut insulation attached to fully expose return air opening. Discard the RETURN AIR FILLER.

STEP 4:

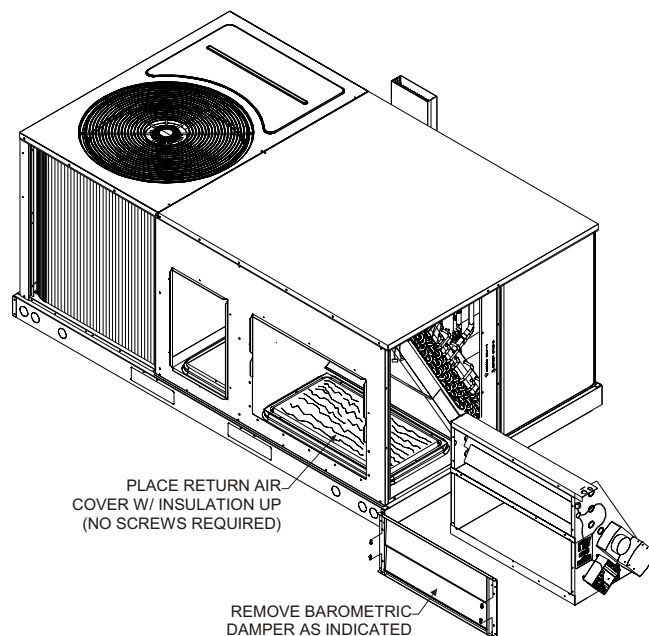
For sideflow applications, install the RETURN COVER in the bottom return opening. Discard the RETURN COVER for downflow applications.

STEP 5:

For sideflow applications, remove the barometric relief damper from economizer prior to installation in unit. This component will be relocated to the sideflow return air duct along with the barometric relief hood (**SEE FIGURE 2**).

FIGURE 2

SIDEFLOW APPLICATIONS ONLY



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NOTE:

Units produced after August 20, 1999, have economizer connections relocated. For units produced before this date, go to **STEP 6**. For units produced after this date, go to **STEP 7**.

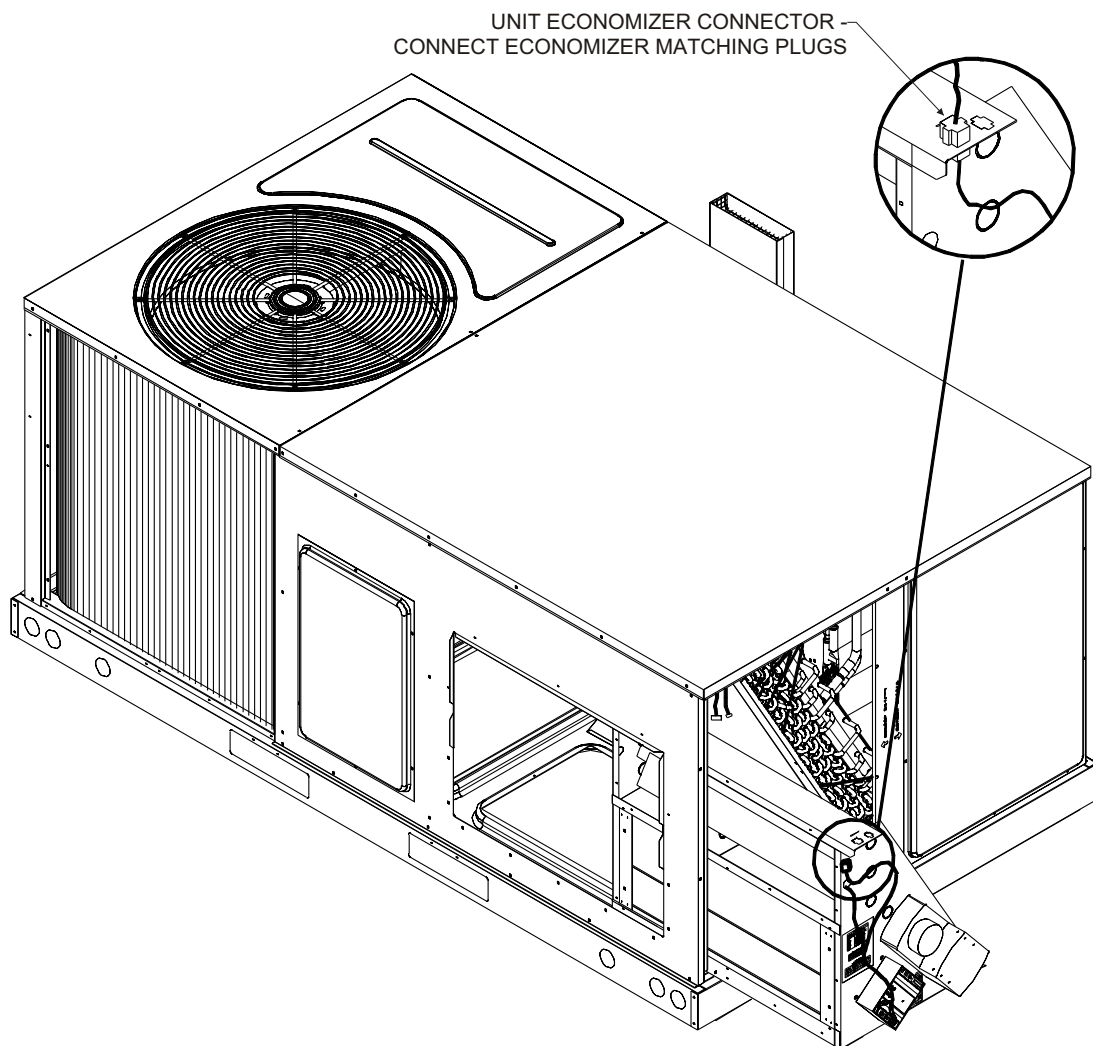
STEP 6:

These units will require an EXTENSION HARNESS (not provided) to connect the economizer to the ECONOMIZER PLUG provided on the unit. Remove jumper plugs, connect EXTENSION HARNESS to unit ECONOMIZER PLUG, and slide economizer into unit return air section being careful not to tear the insulation on the rear panel (**SEE FIGURE 3**). After the economizer is installed, snap the EXTENSION HARNESS plugs into the openings in the economizer top and connect mating economizer plug. Save the jumper plugs in this compartment for diagnostic purposes.

STEP 7:

Remove jumper plugs and slide economizer into unit return air section being careful not to tear the insulation on the rear panel (**SEE FIGURE 3**). After the economizer is installed, snap the unit ECONOMIZER PLUGS into the openings in the economizer top and connect mating economizer plug. Save the jumper plugs in this compartment for diagnostic purposes.

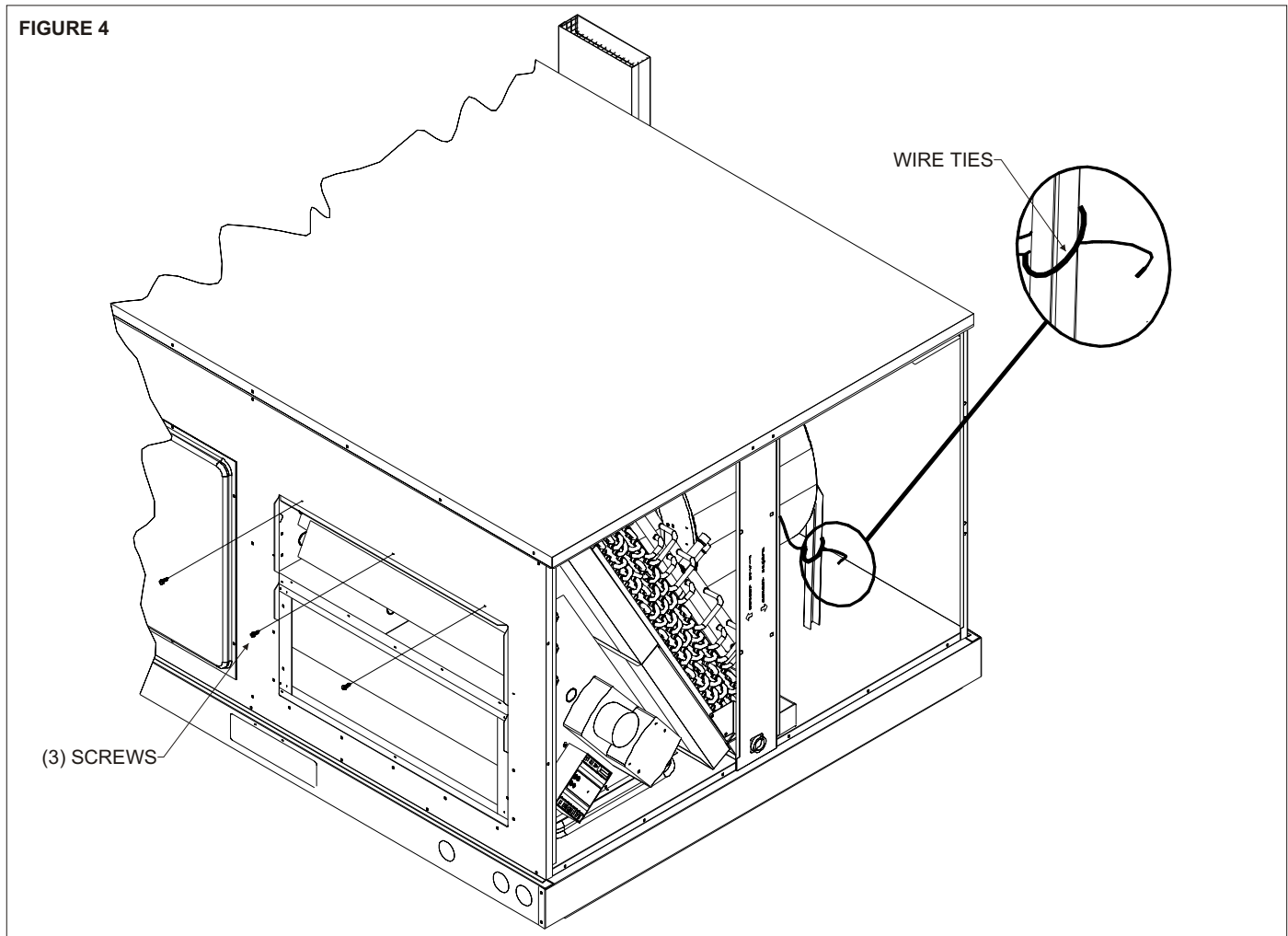
FIGURE 3



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STEP 8:

Using the holes located above the return air opening on the unit attach the economizer to the REAR PANEL using the screws removed in **STEP 2 (SEE FIGURE 4)**.

FIGURE 4**ECONOMIZER RAIN HOOD (FRESH AIR) ASSEMBLY****STEP 9:**

Fasten (7) OA RAINHOOD ASSY – BOTTOM to the (5) OA RAINHOOD ASSY – LEFT SIDE and the (6) OA RAINHOOD ASSY - RIGHT SIDE.

STEP 10:

Attach the two (9) OA RAINHOOD – FILTER RETAINERS to the (5) OA RAINHOOD ASSY – LEFT SIDE and the (6) OA RAINHOOD ASSY – RIGHT SIDE from **STEP 9** above. Please notice that the flange on the (9) OA RAINHOOD – FILTER RETAINERS must be as shown in (**SEE FIGURE 5**) to retain the (2) PERMANENT FILTER.

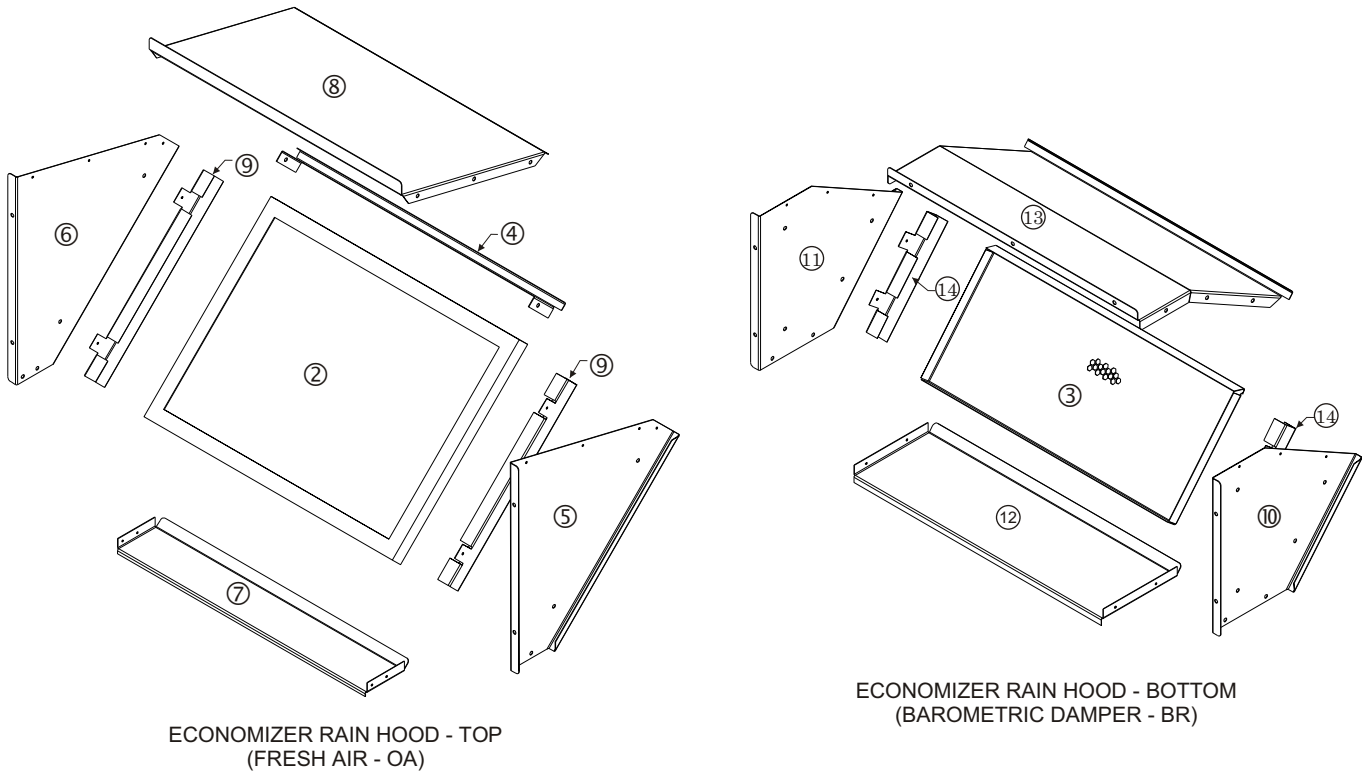
STEP 11:

Fasten (8) OA RAINHOOD – TOP to the (5) OA RAINHOOD ASSY – LEFT SIDE and the (6) OA RAINHOOD ASSY – RIGHT SIDE.

STEP 12:

Slide (2) PERMANENT FILTER between (9) OA RAINHOOD – FILTER RETAINERS and back into the (7) OA RAINHOOD ASSY – BOTTOM. Attach (4) OA RAINHOOD – FILTER ACCESS to the front/top of (5) OA RAINHOOD ASSY – LEFT SIDE and the (6) OA RAINHOOD ASSY – RIGHT SIDE.

FIGURE 5
 (-)XRD-MECM3 Shown
 (-)XDX-MCCM3 Similar



ECONOMIZER RAIN HOOD (BAROMETRIC DAMPER) ASSEMBLY

STEP 13:

Fasten (12) BR RAINHOOD ASSY – BOTTOM to the remaining (10) BR RAINHOOD ASSY – LEFT SIDE and the remaining (11) BR RAINHOOD ASSY – RIGHT SIDE.

STEP 14:

Attach the two (14) BR RAINHOOD – FILTER RETAINERS to the (10) BR RAINHOOD ASSY - LEFT SIDE and the (11) BR RAINHOOD ASSY – RIGHT SIDE from **STEP 13** above. Please notice that the flange on the (14) BR RAINHOOD – FILTER RETAINERS must be as shown in (**SEE FIGURE 5**) to retain the (3) BIRD SCREEN.

STEP 15:

Slide (3) BIRD SCREEN between (14) BR RAINHOOD – FILTER RETAINERS and back into the (12) BR RAINHOOD ASSY – BOTTOM.

STEP 16:

Fasten (13) BR RAINHOOD – TOP to the (10) BR RAINHOOD ASSY - LEFT SIDE and the (11) BR RAINHOOD ASSY – RIGHT SIDE.

STEP 17:

Fasten HOOD EXTENSION SIDES to the outside of HOOD EXTENSION BOTTOM and HOOD EXTENSION DIVIDER with screws provided with economizer. Fasten HOOD EXTENSION TOP to the OUTSIDE OF HOOD EXTENSION SIDES. (**SEE FIGURE 6.**)

STEP 18:

Install HOOD EXTENSION ASSEMBLY and economizer with remaining screws removed in **STEP 2.** (**SEE FIGURE 6.**)

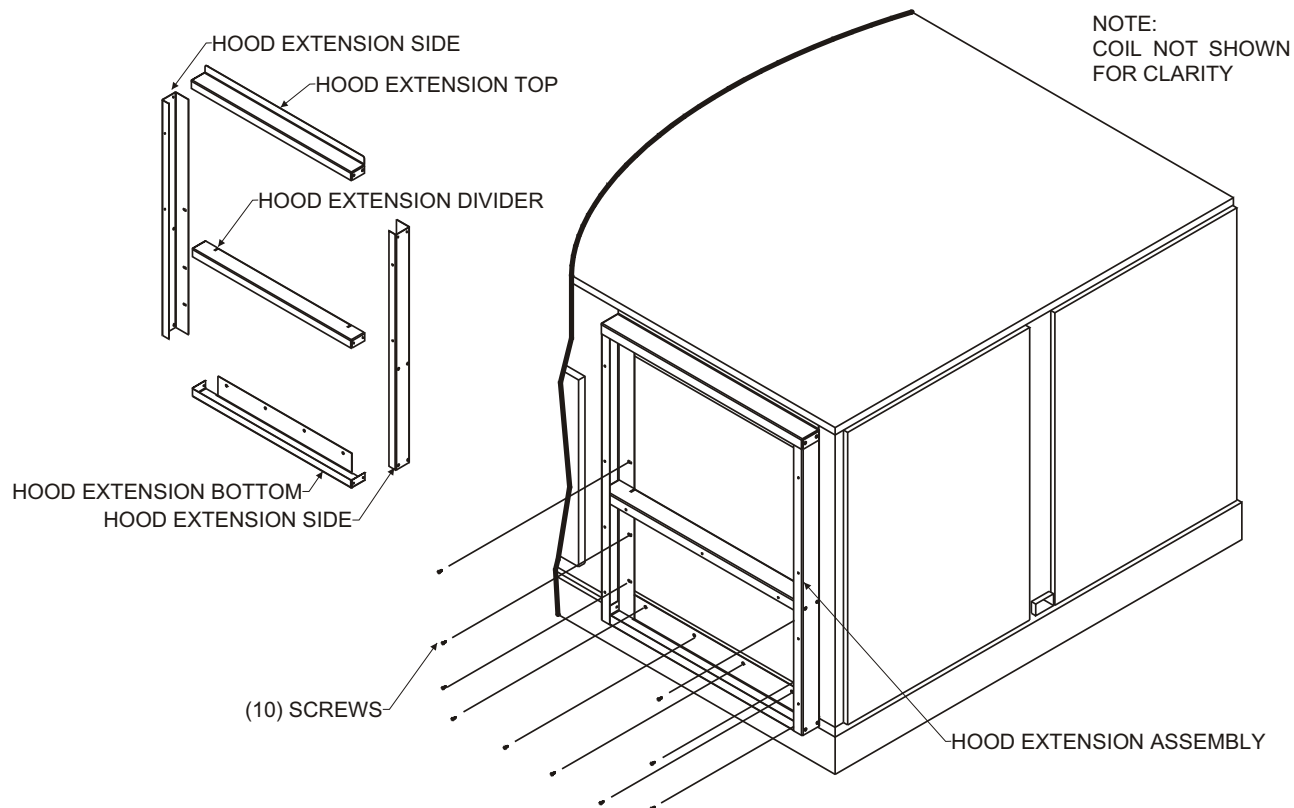


FIGURE 6

MODEL	"A"
3 - 6 TON	21.750 REF.
7 ½ TON	27.750 REF.

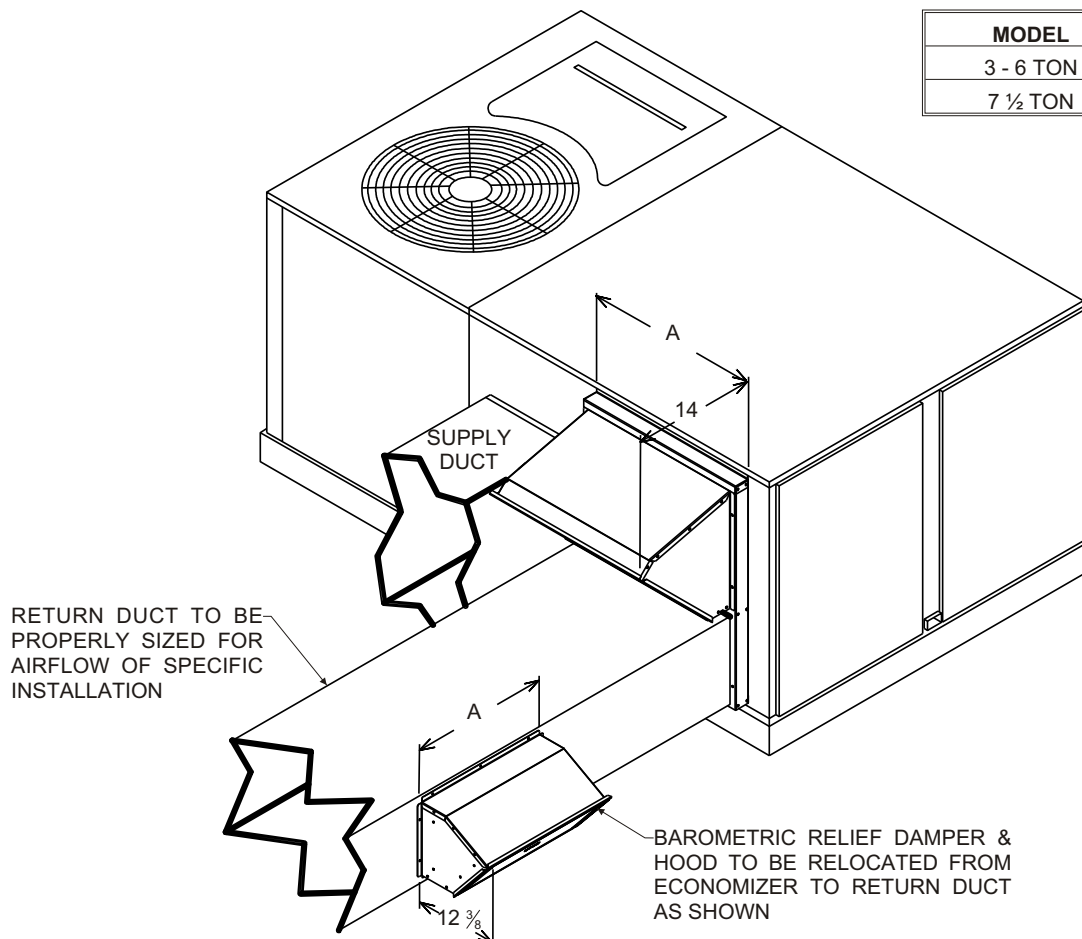
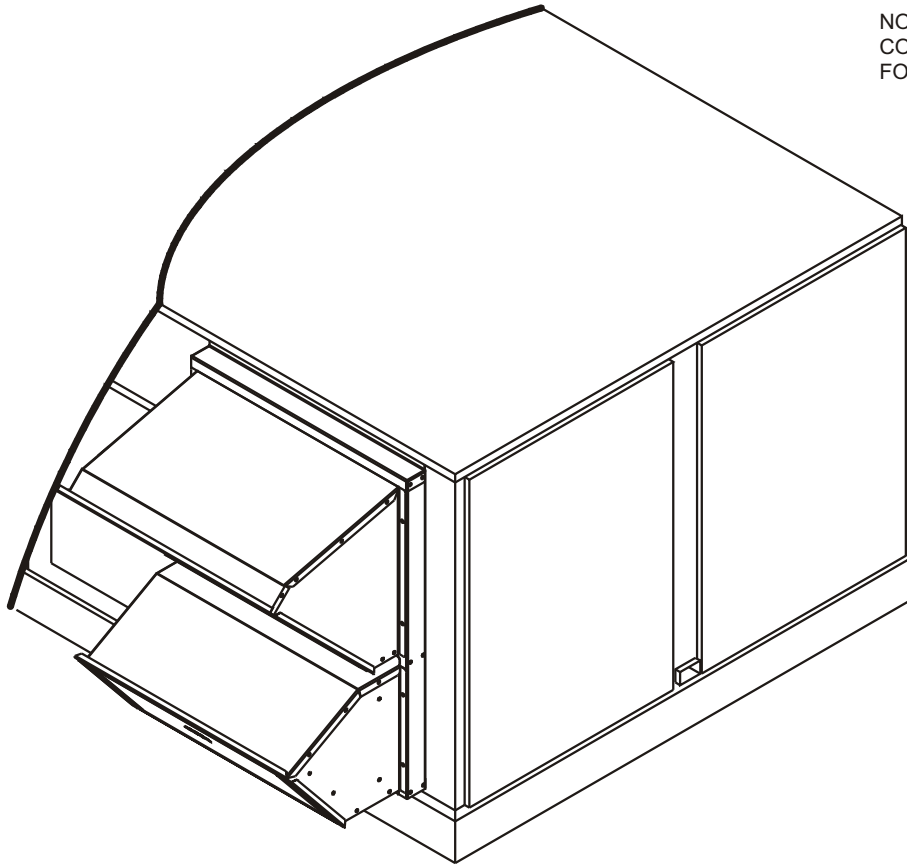


FIGURE 7

FIGURE 8

NOTE:
COIL NOT SHOWN
FOR CLARITY



STEP 19:

On downflow applications, the barometric relief hood mounts directly to the lower part of the HOOD EXTENSION opening using holes provided. On sideflow applications the barometric relief hood is attached to the return air duct.

STEP 20:

Mount the fresh air (upper) hood ((2) PERMANENT FILTER, (5) OA RAINHOOD ASSY – LEFT SIDE, (6) OA RAINHOOD ASSY – RIGHT SIDE, (7) OA RAINHOOD ASSY – BOTTOM, (8) OA RAINHOOD – TOP, (9) OA RAINHOOD – FILTER RETAINERS). Slide the fresh air hood flange under the HOOD EXTENSION top panel flange, align holes and secure with screw(s) provided (**SEE FIGURE 6**).

STEP 21:

Connect the (1) DISCHARGE AIR SENSOR to wires located on the blower support leg in the blower motor compartment (**SEE FIGURE 4**).

STEP 22:

Replace the BLOWER ACCESS PANEL with screws removed in **STEP 2**.

STEP 23:

Upon start-up check the economizer sequence of operation using the steps provided in these instructions. After testing unit operation and setting outside air damper minimum position, replace COIL/FILTER ACCESS panel with remaining screws.

DIRECT MOUNT ECONOMIZER SEQUENCE OF OPERATION

GENERAL

This accessory economizer package is designed to save energy costs by using outdoor air for cooling and ventilation in place of mechanical cooling whenever possible. The economizer continuously monitors indoor and outdoor air conditions and compares them to a user-selected setpoint to determine if free cooling is available.

ACCESSORIES

(-)XRX-AV02 — Dual Enthalpy Upgrade Kit

For maximum energy savings, this upgrade kit will allow the economizer to compare the outdoor air enthalpy to the return air enthalpy, instead of a user-selected setpoint to determine if "free cooling" is available.

(-)XRX-AR02 — Wall-Mounted Carbon Dioxide Sensor

For installations requiring Demand Control Ventilation (DCV) based upon indoor air levels of carbon dioxide (CO₂). When the unit supply fan is running, the CO₂ sensor modulates the outside air damper to maintain a user-selected CO₂ level inside the occupied space. Energy savings are achieved by not bringing in excessive amounts of outdoor air when the indoor air conditions are suitable. Energy savings can be substantial on buildings with highly variable occupancy rates.

Wall-Mounted Remote Potentiometer

For installations requiring remote adjustment of damper minimum position by the occupants, a remote potentiometer, such as the Honeywell S963B1128 can be used.

(-)XRX-BFG03/4C, (-)XRX-BGF03/4D, (-)XRX-BGF03/4Y — Power Exhaust Kit

For installations requiring more space static pressure relief than can be obtained with the standard barometric relief damper included with the economizer, a power exhaust kit can be added.

STARTUP

Attach connector from Economizer Controller to Rooftop Control Panel Connector and install discharge/mixed air temperature sensor per installation guide.

ADJUSTMENTS

5 potentiometers with screwdriver adjustment slots, starting from top of controller

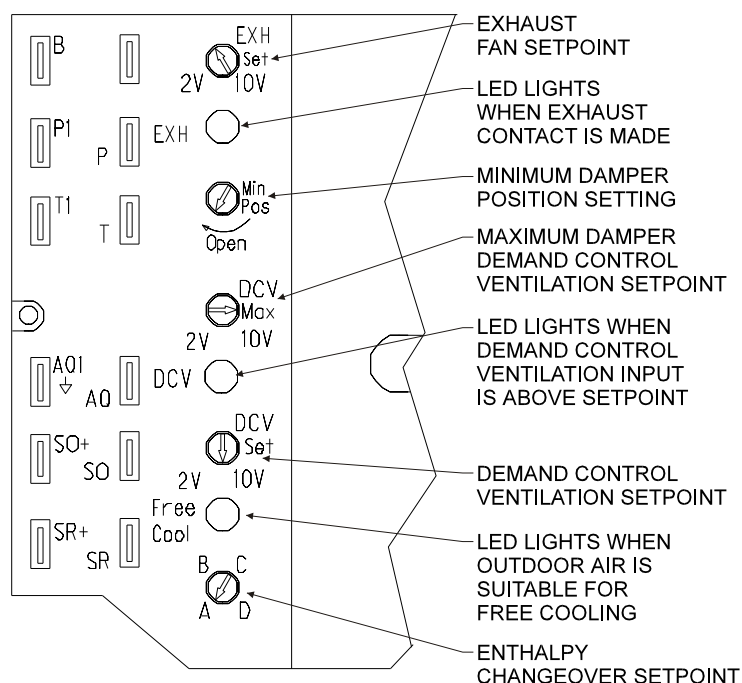
1. EXH Set — Adjustments for (optional) power exhaust

- The outside air damper position at which the power exhaust fan(s) will engage. The LED labeled EXH below the potentiometer adjustment will indicate when power exhaust is available. When the power exhaust call is made, the controller provides a 60 ±30 second delay before exhaust fan activation to allow the damper to reach the appropriate position.

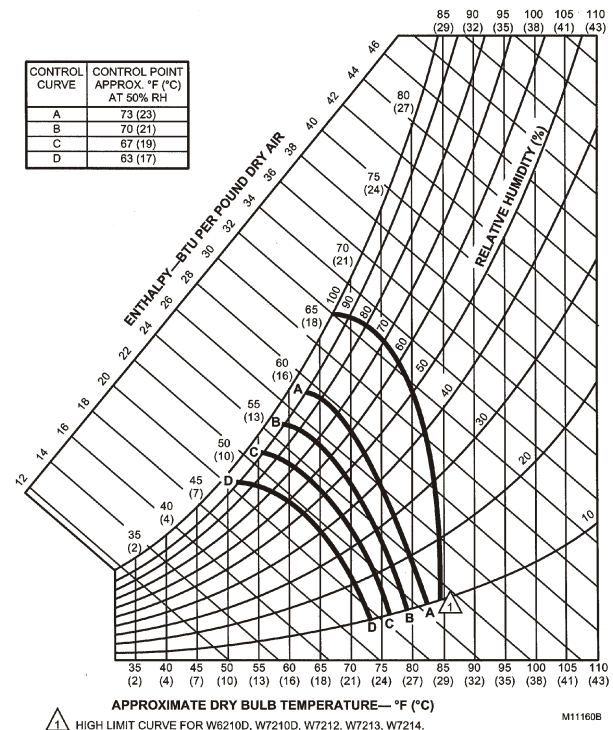
- Range of adjustment is from 0-100% (2-10V); in most applications the power exhaust is set to engage at about 70% outside air.

2. Min Pos — Outside Air Damper minimum position

- Adjust the minimum position potentiometer to allow the minimum amount of outdoor air, as required by local codes, to enter the building.



- B. Range of adjustment is from 0-100% (2-10V); in most applications the minimum position is adjusted to allow 10% to 25% outside air to enter the system.
 - C. The Outside Air Damper Minimum Position potentiometer can be adjusted at any time.
 - D. Whenever the "G" (supply fan) signal is present, the damper will open to this minimum position unless:
 - a. It may modulate to a greater position if overridden by the CO₂ sensor (DCV).
 - b. It may not open if overridden by the discharge air temperature sensor (Freeze Protect Mode).
3. DCV Max — Demand Control Ventilation (DCV) Maximum Setpoint
- A. The DCV maximum position potentiometer allows the installer to limit the amount of outdoor air flow into the building when the DCV overrides the mixed air sensor.
 - B. Setting the DCV maximum position of the damper prevents the introduction of large amounts of hot or cold air into the space.
 - C. Note: If the DCV maximum position is set below the outside air damper minimum position, the minimum position overrides the DCV maximum position (negating the function of the DCV).
4. DCV Set — Demand Control Ventilation (DCV) Setpoint
- A. The DCV can be any sensor that provides a 2-10Vdc output. The DCV modulates the outdoor damper to provide ventilation based on occupancy. Typically, a carbon dioxide (CO₂) sensor is used to indirectly monitor occupancy level.
 - B. No cooling signal (e.g. Y1, Y2) is required for the DCV to override the outdoor air damper when ventilation requires outdoor air.
 - C. The controller must receive a "G" (supply fan) signal to open the damper.
 - D. Range of adjustment is from 2 Volts to 10 Volts.
 - E. The DCV setpoint can be adjusted at any time.
 - F. The controller compares the CO₂ sensor input to the setpoint setting to determine the damper minimum position.
 - a. If the actual CO₂ level is below the setpoint, then the damper minimum position is determined by the damper minimum position potentiometer setting.
 - b. If the actual CO₂ level rises above the setpoint, then the damper minimum position is overridden proportionally more open.
 - c. If the discharge air temperature drops below 48°F (Freeze Protect Mode), the DCV input will be overridden and the damper may not open.
 - G. Compatible CO₂ sensors will have a 2-10Vdc output for a 0-1500 ppm CO₂ input.
 - H. Ensure proper polarity of the sensor wires when connecting to the economizer controller. Incorrect polarity negates the sensor signal.
5. Economizer Setpoint
- A. Only the coolest, driest outside air is used for economizer operation when the potentiometer is on setting "D". For greatest energy savings, the potentiometer is on setting "A".
 - B. Adjustment range is A, B, C, or D
 - a. Setting "A" = 73F db or 27 Btu/lbm @ 50% RH
 - b. Setting "B" = 70F db or 25 Btu/lbm @ 50% RH
 - c. Setting "C" = 67F db or 23 Btu/lbm @ 50% RH
 - d. Setting "D" = 63F db or 22 Btu/lbm @ 50% RH



- C. Economizer Setpoint potentiometer can be adjusted at any time.
- D. The controller compares the enthalpy sensor input with the economizer setpoint to determine if free cooling is available.
 - a. Single enthalpy strategy: If outdoor air enthalpy is lower than the setpoint, then free cooling is available. Note: The factory-installed 620-ohm resistor must be in place across terminals SR and SR+.
 - b. Dual enthalpy strategy: If outdoor air enthalpy is lower than return air enthalpy, then free cooling is available.
 - 1. Note: If using dual enthalpy, the Economizer Setpoint must be at the "D" setting.
 - 2. The factory-installed 620-ohm jumper must be removed to install the dual enthalpy upgrade kit.

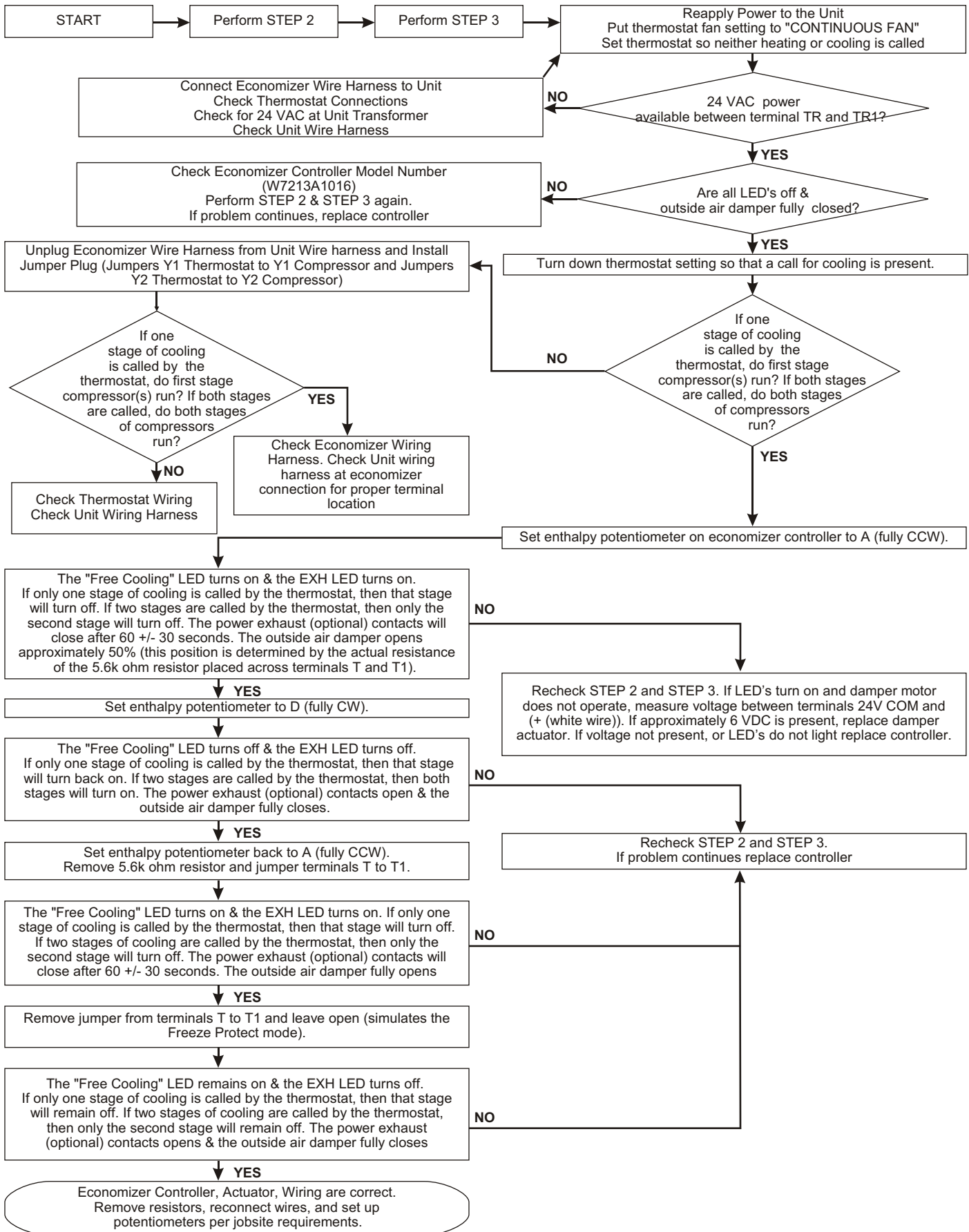
NORMAL OPERATION

1. Fan Only (G)
 - A. Damper will go to minimum position (in 90 seconds or less) whenever the "G" (supply fan) signal is present.
 - B. When "G" signal is removed, the outside air damper closes against blade seals for tight shutoff of outside air.
 - C. If the discharge air temperature drops below 48°F, then the control will override the minimum position setting and will modulate the outside air damper closed.
2. Call for First Stage of Cooling (Y1)
 - A. Economizer Unavailable (warm outdoor air). Compressor 1 is commanded on without delay.
 - B. Economizer Available (free cooling). The controller tries to maintain a discharge air temperature of 53°F ± 5 by modulating the outside air damper position.
3. Call for Second Stage of Cooling (Y2)
 - A. Economizer Unavailable (warm outdoor air). Compressor 2 is commanded on without delay.
 - B. Economizer Available (free cooling). Compressor 1 is commanded on without delay. The controller tries to maintain a discharge air temperature of 53°F ± 5 by modulating the outside air damper position. Compressor 2 is not activated in the economizer mode.
4. Call for Heat
 - A. Standard Air Conditioner with electric or gas heat. (W1 & W2)
 - a. The Thermostat controls the stages of heating directly.
 - b. If the control detects that the supply fan is on (through its "G" input), then the control will open the damper to minimum position.
 - c. If the discharge air temperature drops below 48°F, then the control will override the minimum position setting and will modulate the outdoor damper closed.
 - B. Heat Pump Operation (B)
 - a. The "B" signal from the Thermostat allows operation of the compressors to provide heating without delay.
 - b. If the control detects that the supply fan is on (through its "G" input), then the control can open the damper to minimum position.
 - c. If the discharge air temperature drops below 48°F, then the control will override the minimum position setting and will modulate the outdoor damper closed.
5. Low Ambient Compressor Lockout – None present.

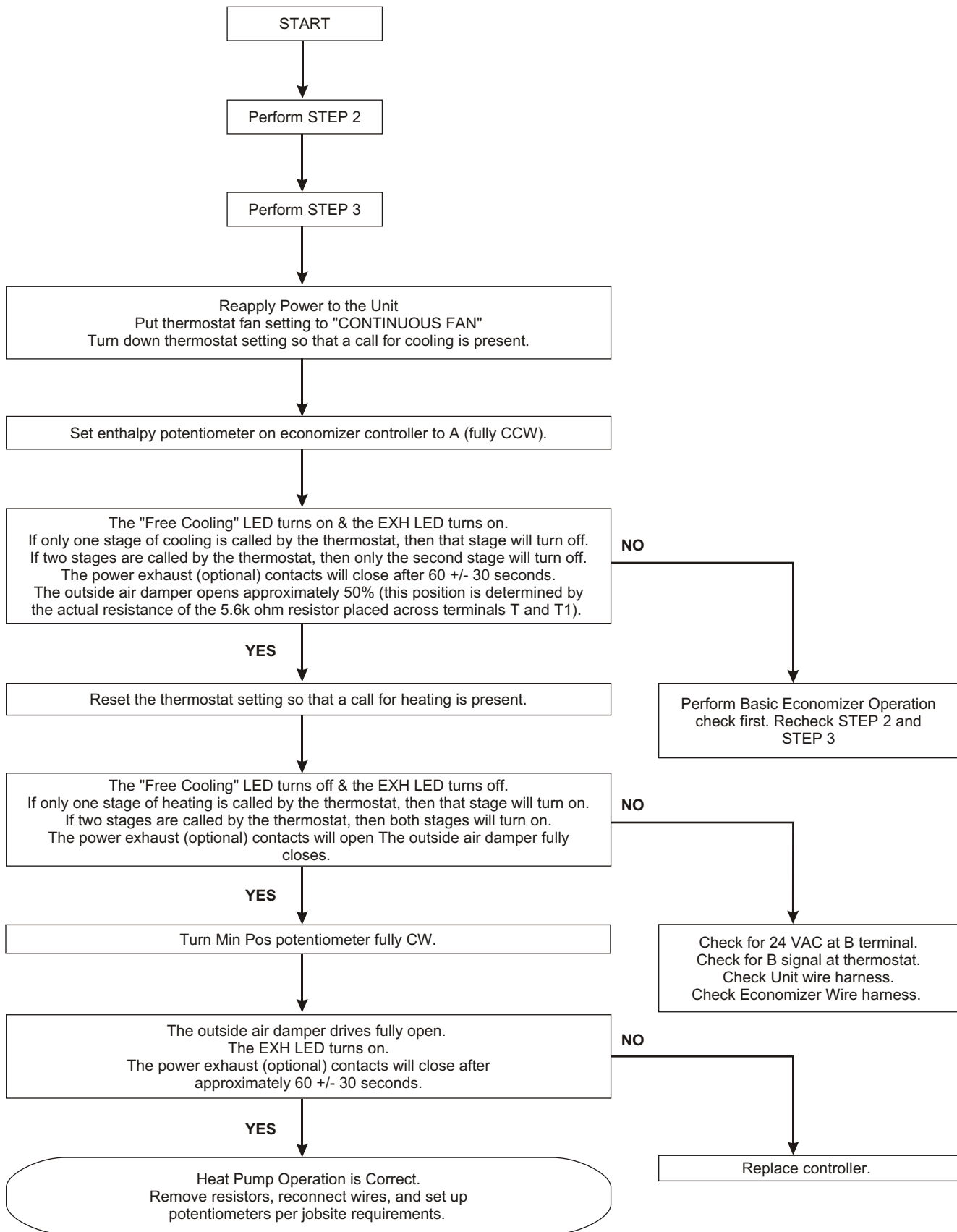
TROUBLESHOOTING

1. Checkout requires a handheld multimeter, 9V battery, a 5.6k ohm ¼ watt resistor, a 1.2k ohm ¼ watt resistor, a jumper wire with ¼" quick connect terminals, and the 620 ohm resistor that is factory-installed across terminals SR+ and SR. The terminal names below reference the economizer controller. Use the following flowcharts for to diagnose unit.
2.
 - a. Disconnect power to the unit.
 - b. Jumper P to P1 (factory installed jumper is normally present).
 - c. Remove outdoor air enthalpy sensor from terminals SO+ and SO and install the 1.2k ohm resistor.
 - d. Put 620 ohm resistor across terminals SR+ and SR (factory installed 620 ohm resistor is normally present and can be used).
 - e. Put 5.6k ohm resistor across T and T1.
3.
 - a. Turn (**EXH Set**) Exhaust fan Setpoint potentiometer fully CCW.
 - b. Turn (**Min Pos**) Minimum Outside Air Damper potentiometer fully CCW.
 - c. Turn (**DCV Max**) Demand Control Ventilation Maximum potentiometer fully CW.
 - d. Turn (**DCV Set**) Demand Control Ventilation Setpoint potentiometer fully CCW.
 - e. Turn enthalpy potentiometer to "D".

BASIC ECONOMIZER OPERATION

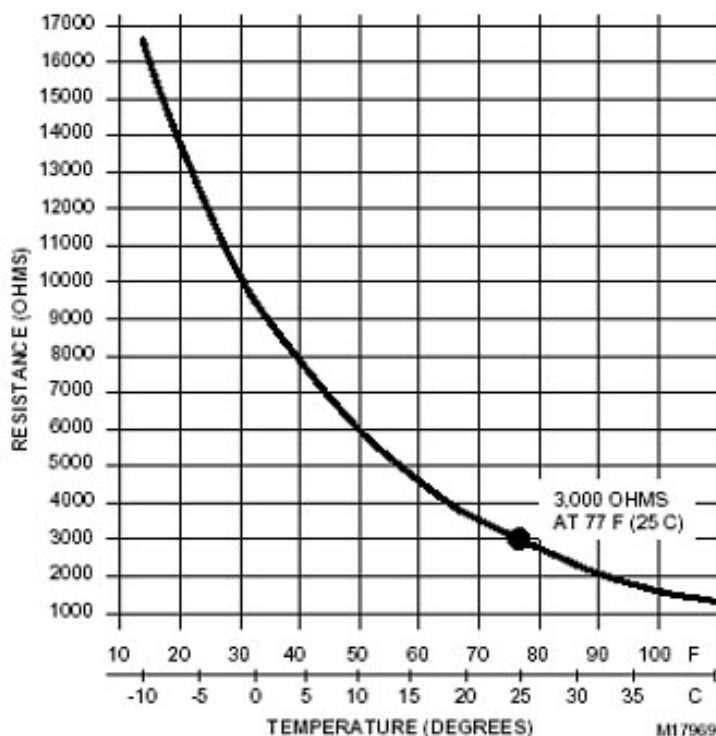


HEAT PUMP OPERATION
(Perform BASIC ECONOMIZER OPERATION check first)



Use the following graph and the multimeter to verify proper operation of the mixed air / discharge air temperature sensor.

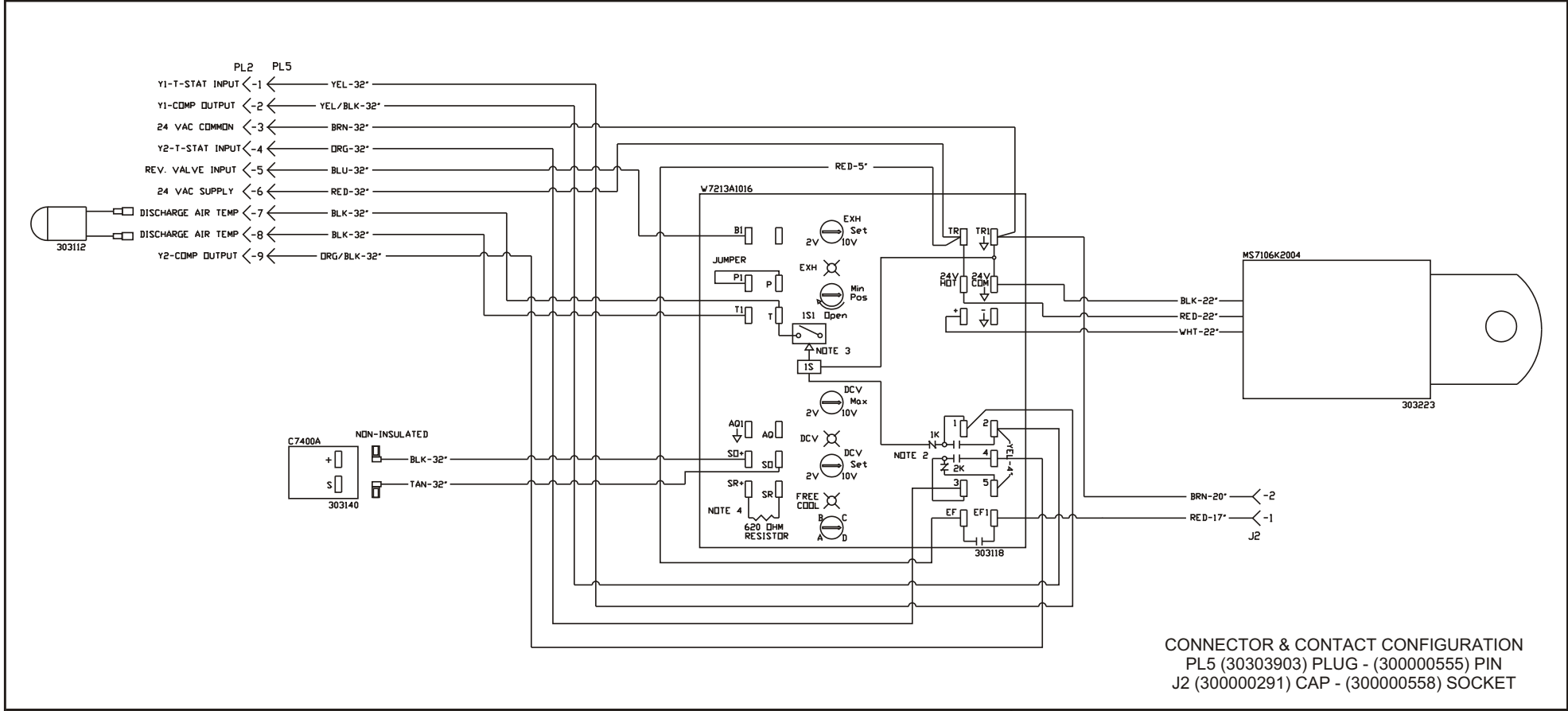
Measure the resistance (ohms) of the mixed air / discharge air temperature sensor with the multimeter. Look up the equivalent temperature on the graph. This should be the same as temperature the mixed air / discharge air sensor is detecting. If it is not, replace the mixed air /discharge air sensor.



NOTES

1. The mist eliminator (Permanent Outdoor Air Filter), is of aluminum mesh construction and should be cleaned by flushing regularly with warm soapy water. The replacement mist eliminator size is listed on the first page of these instructions.
2. When diagnosing the system, the best results are obtained by first putting the fan setting on the Thermostat to the "Continuous Fan" mode.
3. Operation of the optional power exhaust only depends upon the supply fan running and the damper position (it is possible to set the minimum position high enough to engage the power exhaust in the heating mode).
4. This economizer requires a two-stage thermostat.
5. Upon loss of power to the unit or economizer, the outside air damper will spring close shut in about 5 seconds.
6. Compressor Time Delays, Compressor Interstage Delays, Compressor Low Ambient Lockouts, etc. are not provided by the economizer controller.

HARNESS ENDS AT PL5	COMPONENT CODE 9RT1H Mixed Air Sensor C7400A Fresh Air Sensor J2 Power Exhaust Cap MS7106K Damper Actuator 24v PL2 Female A/C Unit Plug PL5 Male Economizer Plug W7213A Logic Module	WIRE COLOR CODE BLK Black BLU Blue BRN Brown GRN Green GRY Gray ORG Orange RED Red TAN Tan VIO Violet WHT White YEL Yellow	Revision	Change	Date
			A	Changed Mixed Air Sensor	02-23-06
			B	Changed fitting on 303140	05-09-06
			C	Changed to wiring harness	04-30-08
			D	Changed title block	06-17-09
			E	ECN# 5936	08-17-11
			F	ECN# 6466	05-02-13



- Notes:
- Unit wiring shown as reference only. Check unit wiring for actual unit wiring.
 - Relays 1K and 2K actuate when the Outdoor Air Enthalpy is lower than the Return Air Enthalpy.
 - 1S is an electronic switch which closes when powered by a 24 VAC input.
 - Factory installed resistor should be removed only if C7400 Differential Enthalpy Sensor is added.

Modulating Gear Economizer
RKNA/LNA/JNA 036-060
RKKA/JKA/LKA/KMA/JMA/LMA/KNL/LNL/JNL 036-072

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Date: May 2, 2013

Supersedes: 08-17-11

Drawn by: MGL

Unit #: 60-364-20

Diagram#: 6036420W

Approved by:

