

INSTRUCTIONS FOR (-)XRX-AW04 or (-)XRX-AW05 MOTORIZED FRESH AIR DAMPER KIT

⚠ Recognize this symbol as an indication of Important Safety Information!

⚠ WARNING

THESE INSTRUCTIONS ARE INTENDED AS AN AID TO QUALIFIED SERVICE PERSONNEL FOR PROPER INSTALLATION, ADJUSTMENT, AND OPERATION OF THIS KIT. READ THESE INSTRUCTIONS THOROUGHLY BEFORE ATTEMPTING INSTALLATION, ADJUSTMENT, OR OPERATION. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN IMPROPER INSTALLATION, ADJUSTMENT, SERVICE OR MAINTENANCE, POSSIBLY RESULTING IN FIRE, ELECTRICAL SHOCK, PROPERTY DAMAGE, PERSONAL INJURY, OR DEATH.

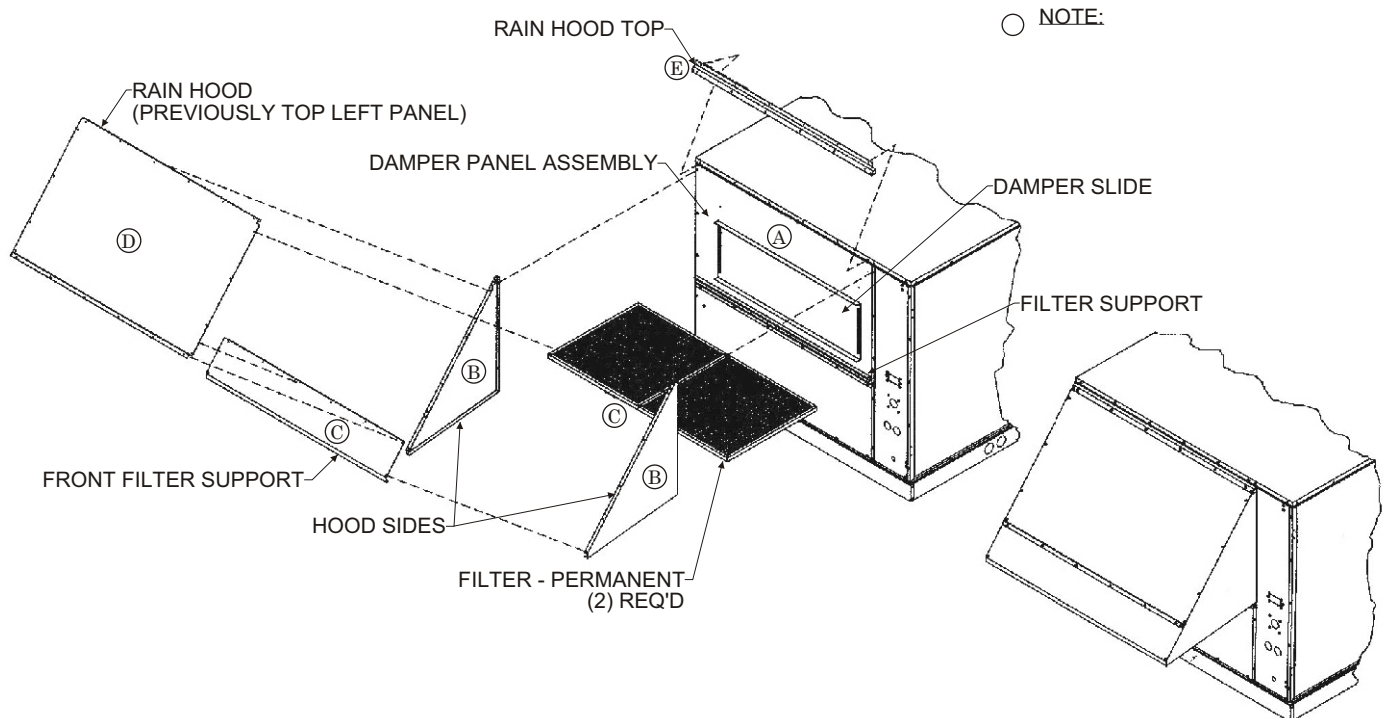
⚠ WARNING

BEFORE BEGINNING ANY MODIFICATION, BE SURE MAIN DISCONNECT SWITCH IS IN THE "OFF" POSITION. FAILURE TO DO SO CAN CAUSE ELECTRICAL SHOCK RESULTING IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH. TAG DISCONNECT WITH A SUITABLE WARNING LABEL.

TOOLS REQUIRED FOR INSTALLATION:

$\frac{3}{8}$ " electric drill with $\frac{5}{16}$ " socket	Small flat blade (0.125" wide) screwdriver
12" extension for $\frac{5}{16}$ " socket	Scratch Awl

PACKAGE CONTENTS		-XRX-AW04 Motorized Fresh Air Damper Kit with feedback	-XRX-AW05 Motorized Fresh Air Damper Kit with feedback
ITEM	DESCRIPTION	PART No.	PART No.
1	I&O Manual	RMIOAD16D	RMIOAD16D

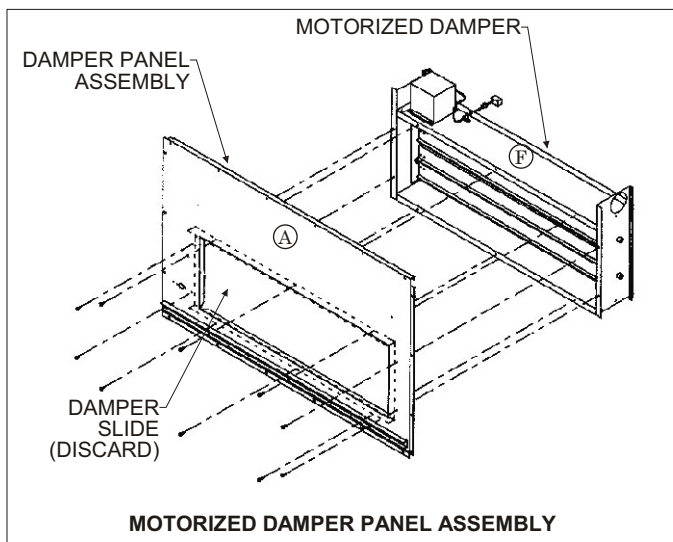


IF UNIT HAS NO EXISTING MANUAL FRESH AIR DAMPER

Check packing list of the Manual Fresh Air Damper (not included) below to identify all parts.

PACKAGE CONTENTS		-XRF-KDA1 Manual Fresh Air Damper	-XRF-KFA1 Manual Fresh Air Damper
ITEM	DESCRIPTION	PART No.	PART No.
1	Permanent Filter	6028513D / 857 (2 ea) 11.875" x 23.875"	6028516 / 8570 (3 ea) 23.875" x 23.875"
2	I & O Manual	RMIOAD13D	RMIOAD16
3	Hardware Bag	6028513D / HDW	6028516 / HDW
4	OA Rainhood – Front Filter Support	6028513D / FAP	6028516 / FAP
5	OA Rainhood Assy – Left Side	6028513 / EHSL	6028516 / EHSL
6	OA Rainhood Assy – Right Side	6028513 / EHSR	6028516 / EHSR
8	OA Rainhood – Top	6028513 / EHT	6028516 / EHT
9	Damper Panel Assy	6028513 / PBPA	6028516 / PBPA

1. Assemble motorized damper panel assembly by removing the damper slide from (A) damper panel assembly, then attaching the (F) motorized damper to the opposite side. Use (6) of the screws from the damper slide to attach the motorized damper.



8. While trapping (C) filters between (C) front filter support and the (A) damper assembly, attach the front filter support to the (B) hood sides with (3) screws provided.
9. Attach (D) rain hood (previously identified as the unit top left panel) to the (B) hood sides with (4) screws each side and (6) screws between the rain hood and the front filter support.
10. Tuck the (E) rain hood top under the top panel of the unit and attach to the same location as the upper edge of (A) damper panel assembly with (6) screws that were removed in step 2.

IF UNIT HAS EXISTING MANUAL FRESH AIR DAMPER

Reverse assembly procedures above until damper panel assembly is removed. Remove damper slide and replace with the motorized fresh air damper. Reassemble per the directions above.

2. Remove all screws from top left panel of the unit and set the top left panel aside (retain screws and top left panel for later use).
3. Remove 12-pin jumper plug from unit economizer harness and reconnect to mating plug on motorized fresh air damper harness.
4. Connect mating 12-pin plug on fresh air damper harness to unit economizer harness.
5. Connect 4-pin plug on unit economizer harness directly to the controller module on the motorized fresh air damper assembly. NOTE: The 4-pin plug may have a protective black covering that must first be removed before the 4-pin plug can be installed.
6. Set the damper panel assembly on the unit in place of the top left panel that was removed.
7. Secure the (B) hood sides to the edges of the (A) motorized damper panel assembly with (6) screws removed in step 2.

COMMUNICATING MOTORIZED FRESH AIR DAMPER SEQUENCE OF OPERATION

GENERAL

This accessory is generally used to allow adjustment of the outdoor air damper minimum position through a Building Automation System (BAS) and provide feedback of the actual damper position. It also allows one to remotely monitor and vary the outside air requirement with the addition of an occupancy sensor (such as a CO₂ sensor) through a Demand Controlled Ventilation (DCV) strategy to save energy costs.

ACCESSORIES

RXXR-AV03 – Dual Enthalpy Upgrade Kit

This kit allows the motorized fresh air damper to function as an economizer by monitoring outdoor air conditions and comparing them to a user-selected setpoint to determine if free cooling is available. Because there is not a return air damper or barometric relief damper for exhaust air, the return air duct static will determine the amount of outside air brought in, but typically no greater than 50% of the supply air volume.

RXXR-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 (270 ohm), such as the Honeywell S963B1136 can be used.

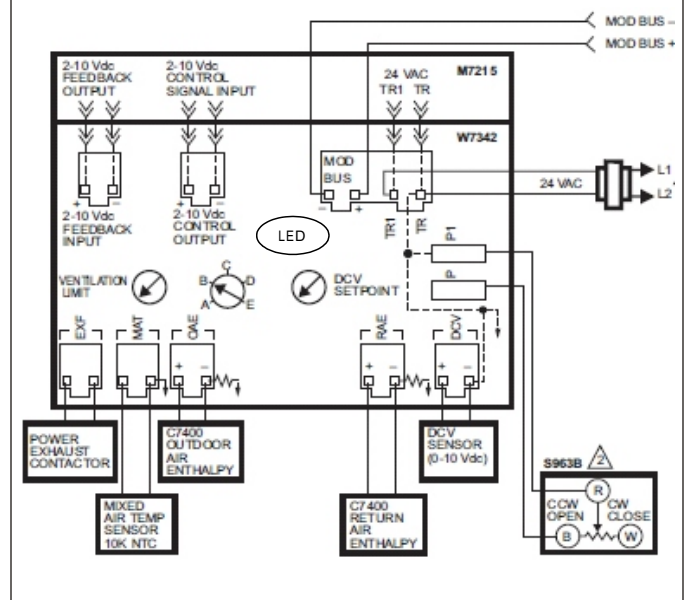
STARTUP

Attach 12-pin Rooftop unit wiring harness to 12-pin harness on motorized fresh air damper. Attach 4-pin Rooftop unit wiring harness directly to economizer logic module (ELM).

ADJUSTMENTS ON ELM CONTROLLER

3 potentiometers with screwdriver adjustment slots, starting from top of controller (See Figure 1).

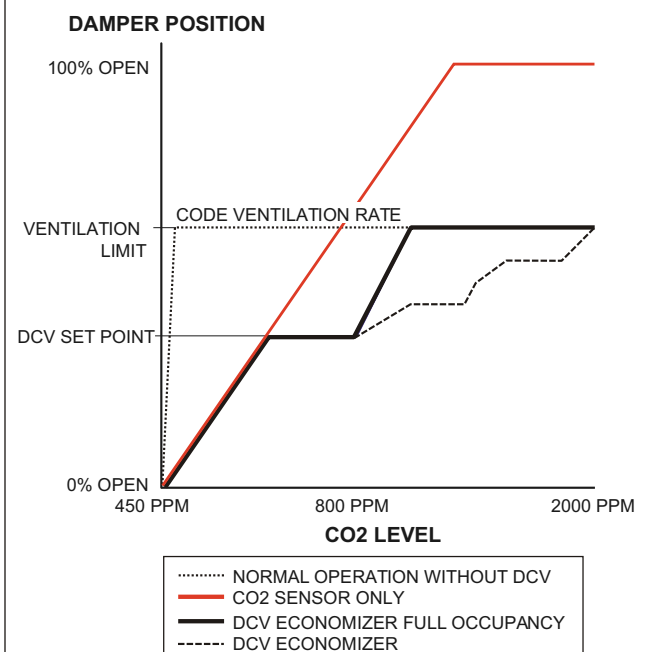
Figure 1



Note: Before any adjustments are made, the Rooftop Unit Controller should be placed in "Occupied" Mode.

1. Ventilation Limit – Outside Air Damper minimum position
 - A. Adjust the Ventilation Limit potentiometer to allow the minimum amount of outdoor air, as required by local codes, to enter the building (See Figure 2). The CO₂ sensor, if present, should be disconnected or **DISABLED** during this step.

Figure 2

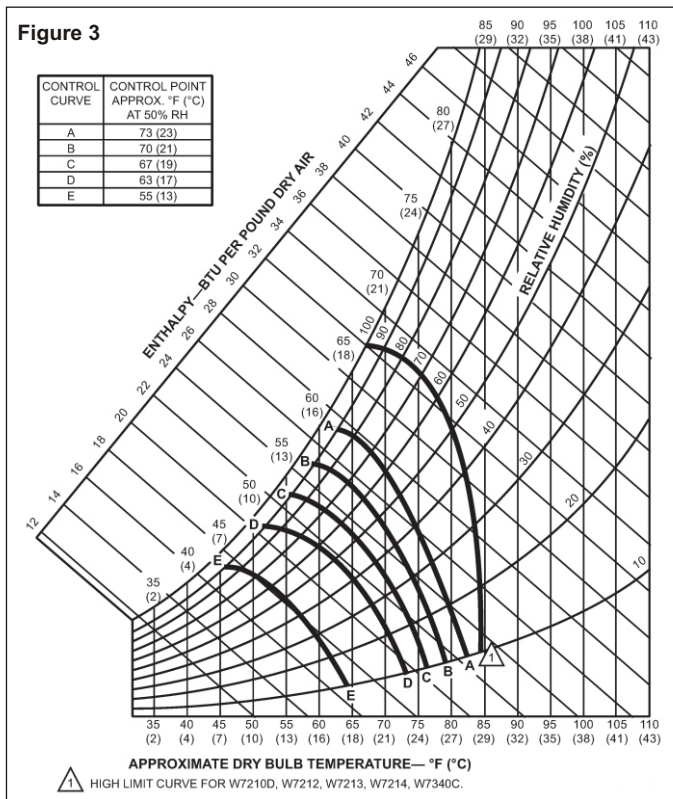


M23972A

- B. Range of adjustment is from 0-100% (2-10Vdc output); in most applications the minimum position is adjusted to allow 10% to 25% outside air to enter the system.
- C. Whenever the supply fan signal is present, the damper will open to this minimum position unless:
 - i. It may modulate to a lesser position if overridden by the CO₂ sensor (DCV).
 - ii. It may not open if overridden by the discharge air temperature sensor (Freeze Protect Mode).
 - iii. The unit controller or communication network may override any adjustments made to the economizer controller. Adjustments may be made from the Rooftop Unit Controller keypad and display or the communication network and has priority over the potentiometer setting.

2. Economizer Setpoint

- A. Only the coolest, driest outside air is used for economizer operation when the potentiometer is on setting "E". For greatest energy savings, the potentiometer is on setting "A" (**See Figure 3**).



- B. Adjustment range is A, B, C, D, or E.
 - i. Setting "A" = 73°F db or 27 Btu/lbm @ 50% RH
 - ii. Setting "B" = 70°F db or 25 Btu/lbm @ 50% RH
 - iii. Setting "C" = 67°F db or 23 Btu/lbm @ 50% RH
 - iv. Setting "D" = 63°F db or 22 Btu/lbm @ 50% RH
 - v. Setting "E" = 55°F db or 18 Btu/lbm @ 50% RH

- C. Economizer Setpoint potentiometer can be adjusted at any time, but not through the Rooftop Unit Controller keypad or network.
 - D. The controller compares the enthalpy sensor input with the economizer setpoint to determine if free cooling is available. If outdoor air enthalpy is lower than the setpoint, then free cooling is available.
- ## 3. DCV Setpoint – Demand Control Ventilation (DCV) Setpoint
- A. The DCV can be any sensor that provides a 0-10Vdc output. The DCV modulates the outdoor damper to provide ventilation based on occupancy. Typically a carbon dioxide sensor (CO₂) is used to indirectly monitor occupancy level.
 - B. No cooling signal is required for the DCV to override the outdoor air damper when ventilation requires outdoor air.
 - C. The controller must receive a supply fan signal to open the damper.
 - D. Range of adjustment is from 0 volts to 10 volts.
 - E. The DCV setpoint can be adjusted at any time. The default setting is 50% of the Ventilation Limit setting.
 - F. The Rooftop Unit Controller or communication network may override any adjustments made to the economizer controller and has priority over the potentiometer setting.
 - G. The controller compares the CO₂ sensor input to the DCV setpoint to determine the damper minimum position. If a CO₂ sensor is present, the damper modulates between the DCV setpoint and the Ventilation Limit.
 - i. If the actual CO₂ level is below the setpoint, then the damper minimum position is determined by the DCV setpoint potentiometer setting.
 - ii. If the actual CO₂ level rises above the setpoint, then the damper minimum position is overridden proportionally more open to a maximum of the Ventilation Limit potentiometer setting.
 - iii. If the discharge air temperature drops below 48°F (Freeze Protect Mode), the DCV input will be overridden and the damper may not open.
 - H. Compatible CO₂ sensors will have a 0-10Vdc output for a 0-2000 ppm CO₂ input.
 - I. Ensure proper polarity of the sensor wires when connecting to the economizer logic module (ELM). Incorrect polarity negates the sensor signal.

NORMAL OPERATION

1. Fan Only
 - A. Damper will go to minimum position (in 90 seconds or less) whenever the supply fan signal is present.
 - B. When supply fan signal is removed, the outside air damper closes against blade seals for a 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
 - 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. Compressor 2 is not activated in the economizer mode.
3. Call for Second Stage of Cooling
 - A. Rooftop unit in Thermostat Control Mode
 - i. Economizer Unavailable (warm outdoor air). Compressor 2 is commanded on without delay.
 - ii. 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.
 - B. Rooftop unit in Network Control Mode
 - i. Economizer Unavailable (warm outdoor air). Compressor 2 is commanded on without delay.
 - ii. Economizer Available (free cooling). Compressor 1 is commanded on without delay. The outside air damper position is held in the 100% open position until the call for second stage cooling is removed. The discharge temperature is ignored. Compressor 2 is not activated in the economizer mode.
4. Call for Heat
 - A. If the control detects that the supply fan is on, then the control will open the damper to minimum position.
 - B. 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.

COMMUNICATION

The Rooftop Unit Controller communicates to the Economizer Logic Module (ELM) via the 4-pin Rooftop unit wiring harness under the RS485 (MODBUS® RTU) standard.

The table (**Table 1**) lists the values that are shown on the Rooftop Unit Controller Display and are communicated to the Economizer Logic Module (ELM). The Rooftop Unit Controller is the master device and sends requests to the ELM slave device which then responds.

	Economizer Menu On Rooftop Controller	Adjustable Range	Default setting
1	Econ. Status Economizer Available / Economizer Not Available	N/A	N/A
2	Econ. Status Diff Enthalpy / Single Enthalpy	N/A	N/A
3	Econ. Status Exh. Fan is ON/OFF	N/A	N/A
4	* Enthalpy Setpt. A / B / C / D / E	A/B/C/D/E	A
5	Eff.Mix.Air Temp XXX.X °F	N/A	N/A
6	* Mixed Air Setpt. XXX.X °F	0 - 99	45
7	Ext.Mix.Air Temp XXX.X °F	N/A	N/A
8	* Econ. Vent. Limit XXX %	0 - 100	0
9	* Econ.Exh. ON/OFF XXX %	0 - 100	50
10	* Econ. DCV Limit XXX %	0 - 100	0
11	* DCV Control Enabled / Disabled	Enabled / Disabled	Disabled
12	* DCV Level Setpt. XXXX ppm	500 - 2000	700
13	Ext. DCV Level XXXX ppm	N/A	N/A
14	Eff. DCV Level XXXX ppm	N/A	N/A
15	Eff.Eco.Position XXX %	N/A	N/A
16	Eff.Min.Position XXX %	N/A	N/A
17	Local. Min. Pos. XXX %	N/A	N/A
18	Econ. Faults DCV Sensor Fault OAE Sensor Fault RAE Sensor Fault MAT Sensor Fault Actuator Fault	N/A	N/A
19	Econ Firm Vrsn	N/A	0103

TABLE 1

*MENUS THAT ARE USER ADJUSTABLE

1. Econ. Status. Displays whether the enthalpy is acceptable for economization.
2. Econ. Status. Displays whether the system is using single or differential enthalpy (DIFFERENTIAL OR DUAL ENTHALPY CONTROL IS NOT APPLICABLE TO THE MOTORIZED FRESH AIR DAMPER).
3. Econ. Status. Displays the status of the optional power exhaust fan (NOT APPLICABLE TO MOTORIZED FRESH AIR DAMPER).
4. Enthalpy Setpoint. Displays the five levels the user must choose for the enthalpy set point. Figure 7 indicates what each of those levels represents in the psychometric chart. This setting determines the level at which economization is allowed.

5. Eff. Mix. Air Temp. Displays the current value of mixed air temperature.
6. Mix Air Setpt. When the mixed air temperature falls below this set point, the freeze protection control will disable the mixed air control and close the outdoor damper to the effective minimum position.
7. Ext. Mix. Air Temp. Displays the discharge air temperature reading from the Rooftop Unit Controller.
8. Econ. Vent. Limit. Displays the minimum acceptable outside-air ventilation rate as a percentage of outdoor air damper position. The volumetric flow-rate of outside air required can be determined from building codes, ASHRAE standards, or standard practice. The use of a CO₂ sensor can lower the minimum outdoor air quantity as described in the next section for Demand Control Ventilation (DCV). The system allows the adjustment of the ventilation limit through four different methods, listed below in order of priority:
 - A. Network interface (BACnet® or Lonworks®)
 - B. Rooftop Unit Controller Display and Keypad
 - C. Remote potentiometer
 - D. Direct adjustment through the Ventilation Limit potentiometer on the ELM control.
9. Econ. Exh. ON/OFF. Display allows the user to change the set point of what percentage of outside air damper position the exhaust fan is energized (NOT APPLICABLE TO MOTORIZED FRESH AIR DAMPER).
10. Econ. DCV Limit The economizer will allow the dampers to close more than the minimum position if the indoor air quality is not contaminated. The Econ. DCV Limit can be set from 0 to 100% but must be lower than the Ventilation Limit setting. The default value is 50% of the Ventilation Limit setting.
11. Econ. DCV Control. If connected to a CO₂ sensor, the ELM regulates the amount of outdoor air supplied to the space to maintain the level of carbon dioxide below the recommended 700ppm above the outdoor level. In this case, CO₂ levels serve as a proxy for building occupancy and the rate of human-generated indoor pollutants. Once the DCV is operating, the minimum damper position can then be lowered to the DCV Setpoint. By default, this value is 50% of the ventilation limit, but the user has the option to adjust it through network or Rooftop Unit Controller keypad and display. The user also has the option to disable DCV altogether.
12. DCV Level Setpt. The DCV level setpt is a selectable level of carbon dioxide that system does not allow to be exceeded. The set point is communicated to the economizer and the minimum ventilation position is changed in order to prevent the increase of CO₂.
13. Ext. DCV Level. Displays the value the Rooftop Unit Controller sends to the Economizer (used with networked CO₂ sensors not connected directly to the economizer).
14. Eff. DCV Level. Displays the actual DCV Level (CO₂ level) in ppm.
15. Eff. Eco. Position. Displays the actual position of the economizer outside air damper.
16. Eff. Min Pos. Displays the current value of the effective minimum outside air damper position.

17. Local Min. Pos. Displays the local ventilation limit position that is set at the ELM.
18. Econ Faults. Displays any ELM sensor faults.
19. Econ Firm Vrsn. Displays the build date and the software version installed on the ELM.

TROUBLESHOOTING

The ELM status LED (See Figure 1) will be:

1. On steady when economizer is operating normally.
2. On and off (blinking) occurs 20 seconds after the economizer senses a fault in the system, e.g. no signal from sensor, no communication from Rooftop Unit Controller. Check Rooftop Unit Controller Display for fault readout.
3. Off when the economizer does not have power.

When diagnosing the system, the best results are obtained by first putting the fan setting for Thermostat Controlled units to the "Continuous Fan" mode. For Network controlled units, the Rooftop Unit Controller should be set to the "Occupied Mode".

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 second page of these instructions.
2. For operation in Thermostat mode, this economizer requires a two-stage thermostat.
3. Upon loss of power to the unit or economizer, the outside air damper will spring close shut in about 5 seconds.
4. Compressor Time Delays, Compressor Interstage Delays, Compressor Low Ambient Lockouts, etc. are not provided by the economizer controller.
5. If DCV is **DISABLED** and a CO₂ sensor is connected to the economizer, the CO₂ level will still display on the Rooftop Unit Controller, but will not be used for control.

HARNESS ENDS AT PL21 & PL20

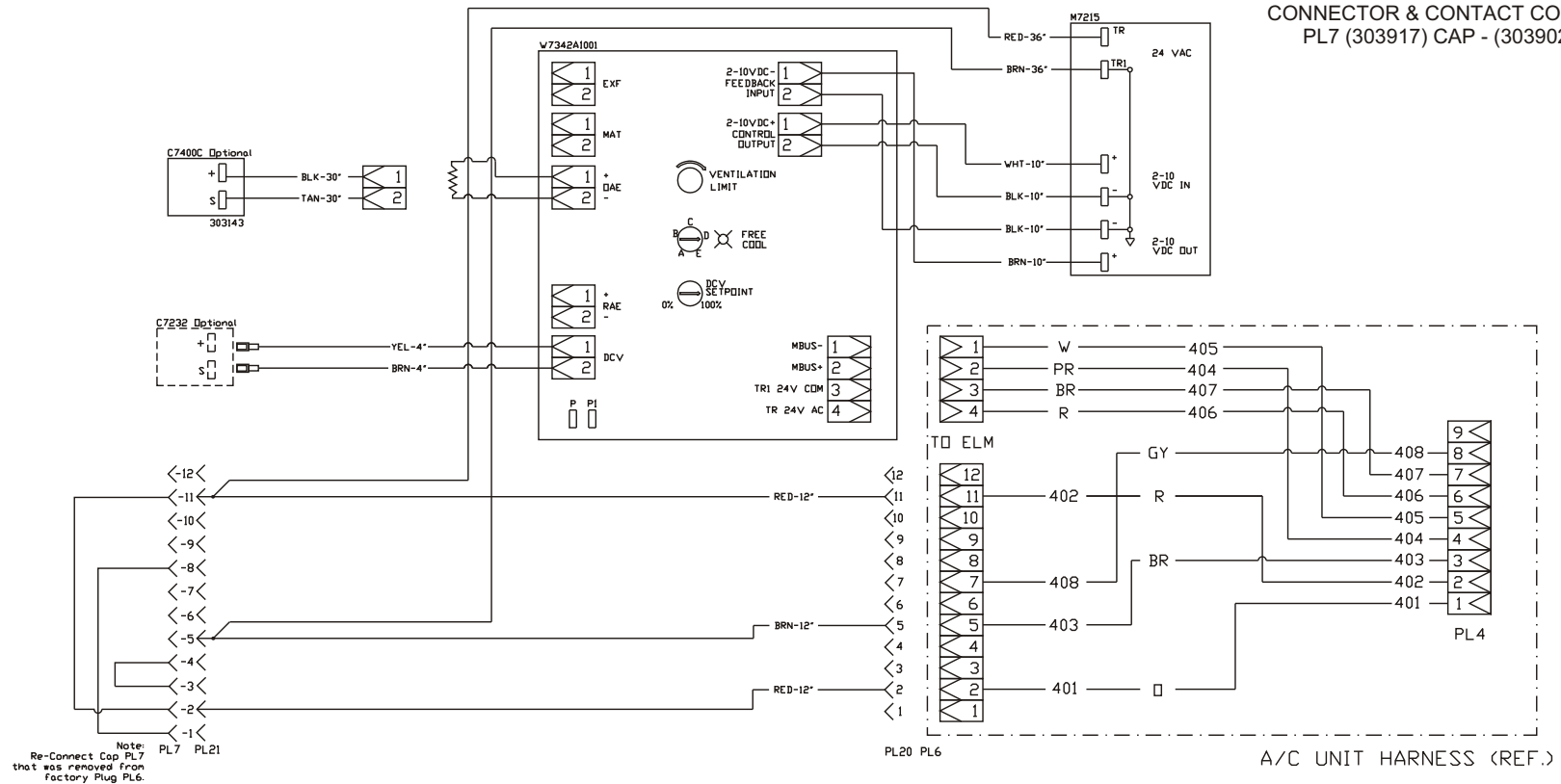
COMPONENT CODE

C7400C Fresh Air Sensor
M7215 Damper Actuator 24v
PL6 Male A/C Unit Plug
PL7 Female A/C Unit Plug
PL20 Female Damper Plug
PL21 Male Smoke Plug
W7342A Logic Module

WIRE COLOR CODE

BLK	Black	BLU	Blue
BRN	Brown	GRY	Gray
ORG	Orange	RED	Red
VIO	Violet	WHT	White
YEL	Yellow		

Revision	Change	Date



CONNECTOR & CONTACT CONFIGURATION
PL7 (303917) CAP - (303902) SOCKET

- Notes:
- Unit wiring shown as reference only. Check unit wiring for actual unit wiring.

**0-35% Motorized Outside Air
RKNL / RLNL 072-300**



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Date: September 10, 2010
Supersedes:
Drawn by: MGL
Unit #: 60-28D-13/16
Diagram#: 6028D16W
Approved by: