Installation Instructions

Part No: CRECOMZR067A01, CRECOMZR069A01, and CRECOMZR071A01

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SAFETY CONSIDERATIONS

Installation of this accessory can be hazardous due to system pressures, electrical components and equipment, and equipment locations (such as a roof or elevated surface). Only trained qualified installers and service technicians should install, start up, and service this equipment.

When installing this accessory, observe precautions in the literature and on any labels attached to the equipment and all other safety precautions may apply.

- Follow all safety codes.
- Wear safety glasses and work gloves.
- Use care in handling and installing the accessory.

It is important to recognize safety information. This is the safety-alert symbol ⚠. When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury.

Understand the signal words DANGER, WARNING, CAUTION, and NOTE. These words are used with the safety-alert symbol. DANGER identifies the most serious hazards which will result in severe personal injury or death. WARNING signifies hazards which could result in personal injury or death. CAUTION is used to identify unsafe practices, which may result in minor personal injury or product and property damage.

NOTE is used to highlight suggestions which will result in enhanced installation, reliability, or operation.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could cause personal injury or death. Before performing service or maintenance operations on the unit, always turn off main power switch to unit and install lock(s) and lockout tag(s). Unit may have more than one power switch. Ensure electrical service to rooftop unit agrees with voltage and amperage listed on the unit rating plate.

⚠ CAUTION

CUT HAZARD

Failure to follow this caution may result in personal injury.

Sheet metal parts may have sharp edges or burrs. Use care and wear appropriate protective clothing, safety glasses and gloves when handling parts and servicing roof top units.

⚠ CAUTION

Failure to follow this caution may result in personal injury and damage to the unit. Cover the duct opening as a precaution so objects cannot fall into the return duct opening. Be sure to remove the cover when installation is complete.

GENERAL

The EconoMi$er® X system utilizes the latest technology available for integrating the use of free cooling with mechanical cooling for packaged rooftop units. The code compliant Jade W7220 control system optimizes energy consumption, zone comfort, and equipment cycling by operating the compressors when the outdoor-air temperature is too warm, integrating the compressor with outdoor air when free cooling is available, and locking out the compres-

sor when outdoor-air temperature is too cold. Demand control ventilation is supported.

This EconoMi$er X system can be used with 1 or 2 speed indoor fan motor units. (All other speed settings listed are for future use.)

The EconoMi$er X system utilizes gear-drive technology with a direct-mount spring return actuator that will close upon loss of power. The EconoMi$er X system comes standard with fault detection and diagnostics (FDD), an outdoor air temperature sensor, and mixed air temperature sensor (also called supply air temperature sensor). Outdoor enthalpy, indoor (return) dry bulb or enthalpy, and CO_2 sensors are available for field installation.

Standard integrated barometric relief dampers provide natural building pressurization control. An optional power exhaust system is available for applications requiring even greater exhaust capabilities. The power exhaust set point is adjustable at the EconoMi$er X controller.

See Tables 1-3 for package usage. See Table 4 for package contents. See Table 5 for sensor usage.

IMPORTANT: These economizers meet all the economizer requirements as specified in ASHRAE 90.1, IECC and California's Title 24. Economizer must be installed square to avoid damper leakage or damper binding. Squareness tolerance is $\pm 1/32$ inch.

IMPORTANT: Read these instructions completely before attempting to install the accessory economizer.

Table 1 — Carrier Usage Chart

CARRIER MODEL NUMBER	ECONOMI$ER® X PART NUMBER
Small Cabinet	
48/50FC*04-07 48/50GC*04-06 50HCQ 04-06 50KCQ 04-06 50TCQ 04-07 48/50HC, LC 04-06 48/50KC 04-06 48/50TC 04-07	CRECOMZR067A01
Large Cabinet	
48/50HC 07-12 48/50LC 07 48/50TC 08-14 50HCQ 07-09 50TCQ 08-12	CRECOMZR069A01
Extra Large Cabinet	
48/50HC 14 48/50LC 08-12 48/50TC 16 50HCQ 12 50TCQ 14	CRECOMZR071A01

Table 2 — Bryant Usage Chart

BRYANT MODEL NUMBER	ECONOMI$ER® X PART NUMBER
Small Cabinet	
548J/580J/558J 04-07 549J/547J/559J/582J 04-06 581J/551J 04-06 581K/551K 04-06 582K/559K 04-07	CRECOMZR067A01
Large Cabinet	
548J 08-12 549J 07-09 580J/558J 08-14 581J/551J 07-12	CRECOMZR069A01
Extra Large Cabinet	
548J 14 549J 12 580J/558J 16 581J/551J 14	CRECOMZR071A01

Table 3 — ICP Usage Chart

ICP MODEL NUMBER	ECONOMI$ER® X PART NUMBER
Small Cabinet	
RGH/RAH 036-060 RGS/RAS 036-072 RGV/RAV 036-072 RGW/RAW 036-060 RGX/RAX 036-060 RHX/RHH 036-060 RHS 036-072	CRECOMZR067A01
Large Cabinet	
RAS/RGS 090-150 RGH/RAH 072-120 RHH 072-102 RHS 090-120	CRECOMZR069A01
Extra Large Cabinet	
RAS/RGS 150 RGH/RAH 150 RHS 150 RHH 120	CRECOMZR071A01

Table 4 — Package Contents

ECONOMIZER PART NUMBER	QTY	CONTENTS
CRECOMZR067A01, CRECOMZR069A01	1	EconoMi$er Damper Assembly with Actuator and HH79AH001 (HW: C7250) Outside Air Sensor
	1	Jade HW63AW002 (HW: W7220) Controller with Attached Harness*
	1	HH79AH001 (HW: C7250) Mixed Air Temp Sensor*
	1	50HE403859 2-(green) wire harness for mixed air temperature sensor*
	1	48TMHSRSE--A20 4-Wire Harness*
	1	Hood Assembly with Top and 2 Sides
	1	Hood Divider
	1	Aluminum Filter
	1	Hardware Bag*
CRECOMZR071A01	1	EconoMi$er Damper Assembly with Actuator and HH79AH001 (HW: C7250) Outside Air Sensor
	1	Jade HW63AW002 (HW: W7220) Controller with Attached Harness*
	1	HH79AH001 (HW: C7250) Mixed Air Temp Sensor*
	1	50HE403859 2-(green) wire harness for mixed air temperature sensor*
	1	48TMHSRSE--A20 4-Wire Harness*
	1	Hood Assembly with Top and 2 Sides
	1	Hood Divider
	1	Hood Filter Divider
	2	Aluminum Filters
	1	Hardware Bag*

* Shipped in hardware kit for field installation.
HW = Honeywell

Table 5 — EconoMi$er® X Sensor Usage

APPLICATION	ECONOMI$ER X WITH OUTDOOR AIR DRY BULB SENSOR		
	Accessories Required		
Outdoor Air Dry Bulb	HH79AH001 outdoor air dry bulb sensor is factory installed on economizer.		
Mixed Air Sensor	HH79AH001 provided with economizer and field-installed in blower compartment.		
Single Enthalpy	HH57AC081		
Differential Dry Bulb or Enthalpy	CRDIFRASN01A00* (When available, or MicroMetl part number 9901-2022-DIFF JC2)		
CO_2 for DCV Control using a Wall-Mounted CO_2 Sensor	33ZCSENCO2 or CGCDXSEN004A00		
CO_2 for DCV Control using a Duct-Mounted CO_2 Sensor	33ZCSENCO2 or CGCDXSEN004A00† and 33ZCSENCO2 or CGCDXASP00100**	OR	CRCBDIOX005A00††

* Includes HH57AC081 sensor and wiring harness.
† Accessory CO_2 sensors.
** Accessory aspirator boxes required for duct-mounted applications.
†† CRCBDIOX005A00 is an accessory that contains both 33ZCSENCO2 and 33ZCASPCO2 accessories.

Accessories List

The EconoMi$er X system has several field-installed accessories available to optimize performance. Refer to Table 6 for authorized parts and power exhaust descriptions.

Table 6 — EconoMi$er® 2 Field-Installed Accessories

DESCRIPTION	PART NUMBER
208/230v 1PH Power Exhaust for Small Cabinet	CRPWREXH030A01
460v 3PH Power Exhaust for Small Cabinet	CRPWREXH021A01
208/230v 1PH Power Exhaust for Large Cabinet	CRPWREXH022A01
460v 3PH Power Exhaust for Large Cabinet	CRPWREXH023A01
208/230v 1PH Power Exhaust for Extra Large Cabinet	CRPWREXH080A00
460v 3PH Power Exhaust for Extra Large Cabinet	CRPWREXH081A01
Enthalpy Sensor (OA)	HH57AC081
Differential (Return) Sensor	CRDIFRASN01A00*
CO_2 Sensor and Aspirator Box	CRCBDIOX005A00
Return Air CO_2 Sensor (4 to 20 mA)	CRCBDIOX002A00
CO_2 Room Sensor (4 to 20 mA)	33ZCSENCO2 or CGCDXSEN004A00
Aspirator Box for Duct Mount CO_2 Sensor (4 to 20 mA)	33ZCASPCO2 or CGCDXASP001A00
Economizer Angle Seal Kit for use with unit's with Hinged Filter Door - for Small Cabinet	CRPECONV003A00
Economizer Angle Seal Kit for use with unit's with Hinged Filter Door - for Large Cabinet	CRPECONV004A00
Economizer Angle Seal Kit for use with unit's with Hinged Filter Door - for Extra Large Cabinet	CRPECONV007B00

* When available, or order MicroMetl PN 9901-2022-DIFF JC2.

Compliance

Economizers meet California Energy Commission Title 24 prescriptive section 140.4 (damper leakage etc.), and mandatory section 120.2.i for Fault Detection and Diagnostic controls.

Economizers meet ASHRAE 90.1 damper leakage requirements and meet Fault Detection and Diagnosis requirements.

Economizers meet IECC damper leakage and Fault Detection and Diagnostic requirements.

NOTE: IECC requires differential return air sensor, which must be ordered separately. See Accessory CRDIFRASN01A00.

Outside air, and return air and relief air dampers are AMCA rated.

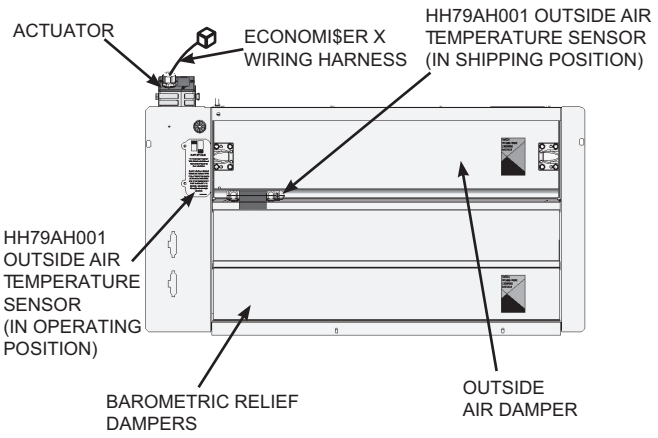


Fig. 1 — EconoMi$er® X Component Locations (CRECOMZR067A01 Shown)

For 48/50LC 07-12 Instructions, see "Instructions for 48/50LC 07-12 Units Only" on page 10.

INSTALLATION

NOTE: If installing economizer on 48/50LC 07-12 units, see "Instructions for 48/50LC 07-12 Units Only" on page 10.

1. Turn off unit power supply(s) and install lockout tag.
2. Remove the existing unit filter access panel. Raise the panel and swing the bottom outward. The panel is now disengaged from the track and can be removed. See Fig. 2. Set the filter door aside for re-installation later.

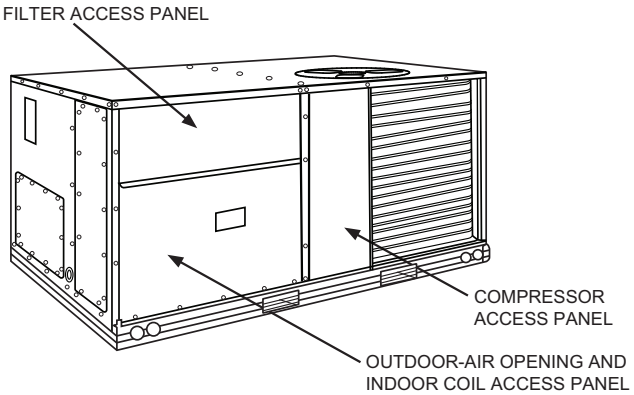


Fig. 2 — Typical Access Panel Locations

3. Remove the indoor coil access panel and discard. See Fig. 2.
4. Slide the EconoMi$er X assembly into the rooftop unit. See Fig. 3.

NOTE: On small and large cabinets be sure to engage the rear EconoMi$er X flange under the tabs on the unit base in the return air chamber. See Fig. 4.

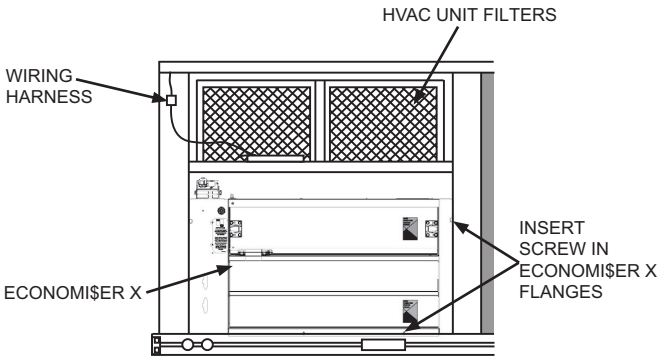


Fig. 3 — EconoMi$er® X Assembly Installed on HVAC Unit (CRECOMZR067A01 Shown)

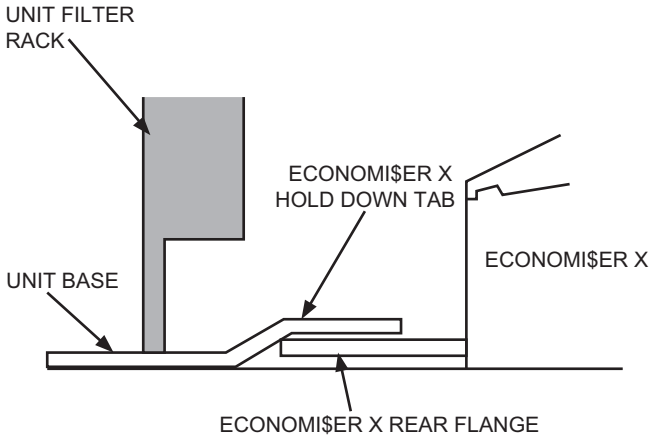


Fig. 4 — EconoMi$er X Flange Installation (CRECOMZR067A01 and CRECOMZR069A01)

5. Ensure EconoMi$er X assembly is square (tolerance $\pm 1/32$ inch). Screw the EconoMi$er X to the unit along both side flanges and bottom flange. See Fig. 3.
6. Remove the red tape securing the relief dampers for shipping purposes. Relocate the HH79AH001 dry bulb sensor from its shipping location to its operating position; see Fig. 1.
7. If the EconoMi$er X assembly will be operating with an enthalpy outside air sensor, remove the factory-installed HH79AH001 dry bulb sensor from the front face of the economizer (see Fig. 1) and install the accessory enthalpy sensor HH57AC081 in the same location as the dry bulb sensor. Connect the 2-wire gray harness with plug from the EconoMi$er X assembly to the enthalpy sensor. See wiring diagrams on pages 9 and 12. Refer to "Installing Optional HH57AC081 Single Outside Air Enthalpy Sensor" on page 13 for more details on enthalpy settings.

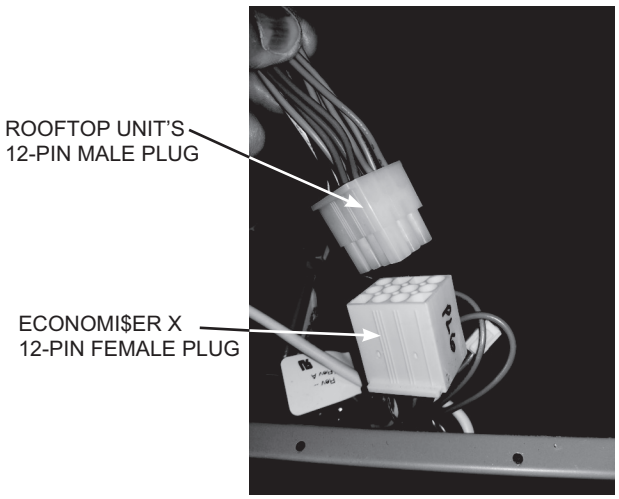


Fig. 5 — Connect EconoMi$er X Harness to Unit PL6 Economizer Harness

8. Remove and save the 12-pin jumper plug from the unit economizer harness located in the upper left corner of the unit. Insert the EconoMi$er X plug into the unit wiring harness. See Fig. 5.

NOTE: The 12-pin jumper plug should be saved for future use, in the event that the EconoMi$er X is ever removed. The jumper plug is not needed as long as the EconoMi$er X is installed.

9. Remove the indoor blower access panel and the panel(s) covering the unit control box. See Fig. 6.

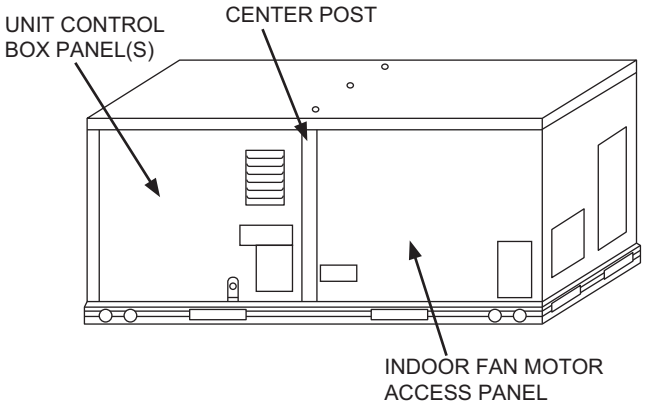


Fig. 6 — Typical Indoor Fan Motor Access Panel Locations

10. In the hardware kit provided with the EconoMi$er X assembly is the HH63AW002 Jade controller (Honeywell W7220). The controller is attached to a mounting bracket and the EconoMi$er X harness is attached to the controller. Mount the controller assembly on the left side of the unit control box. Screw bracket to the control box through pre-punched holes in control box. See Fig. 7.

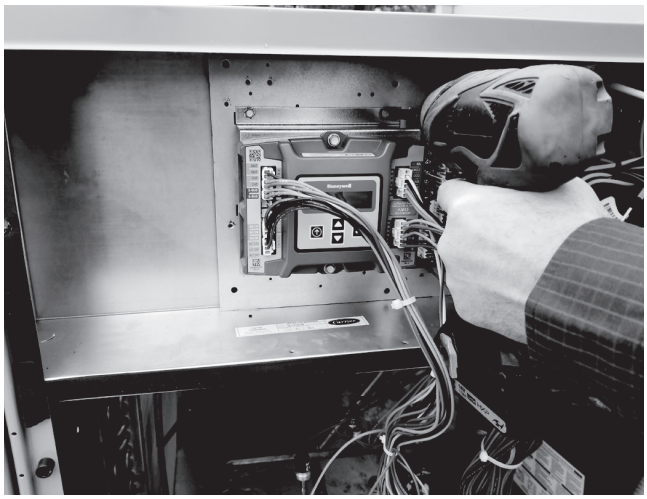


Fig. 7 — Mount Controller Assembly in Unit Control Box
(Some control box configurations may differ)

11. Unplug the 10-pin female ECON plug currently connected to the Central Terminal Board (CTB). See Fig. 8.

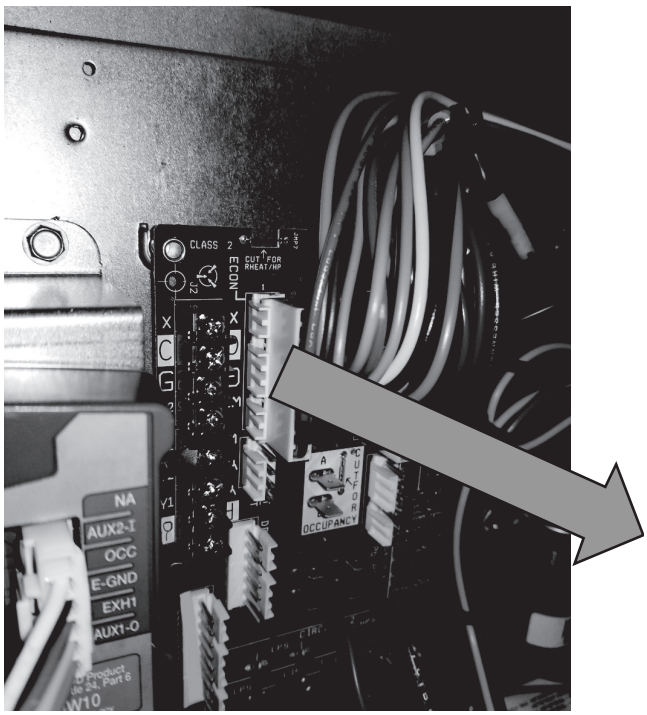


Fig. 8 — Unplug ECON plug from Central Terminal Board (CTB)

12. Connect the 10-pin female ECON plug removed from the CTB to the 10-pin male plug from the Jade controller harness. See Fig. 9 and page 9.

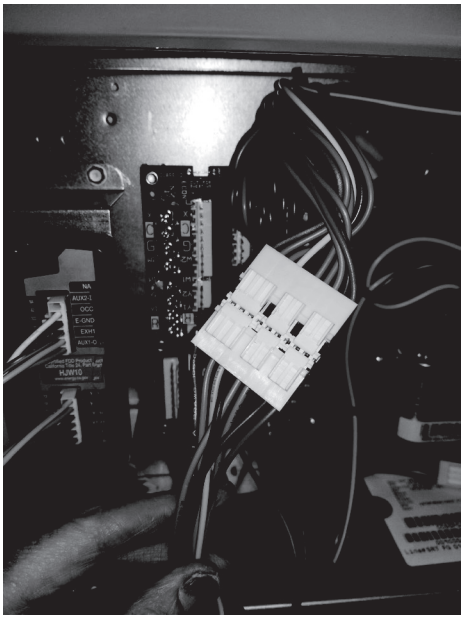


Fig. 9 — Connect 10-pin Plugs Together

13. Connect the 10-pin female plug from the Jade controller harness to ECON on the CTB. See Fig. 10 and page 9.

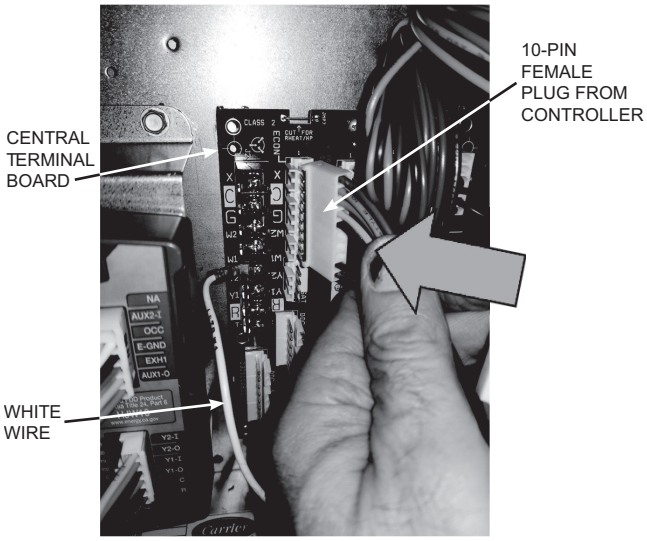


Fig. 10 — Connect 10-Pin Jade Plug to Central Terminal Board

14. Connect the White wire from the Jade controller harness to the W1 terminal on the CTB. See Fig. 10 and page 9.
15. Connect the red and brown wires from the Jade controller harness to the CTB. See Fig. 11 and page 9. The red wire connects to “R” on the CTB, and the brown wire connects to “C”.

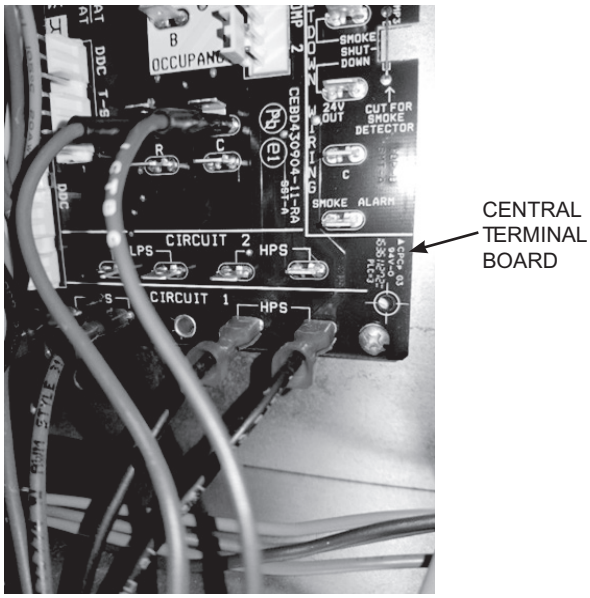


Fig. 11 — Connect Red and Brown Wires to Central Terminal Board

16. Locate the green wire with yellow stripe from the Jade controller harness and screw it to the control box (ground). See Fig. 12 below.



Fig. 12 — Connect Ground Wire From Controller

17. Locate the 48TMHSRSE--A20 harness (with 4-pin female plug) provided in the hardware kit with the EconoMi$er X assembly. Connect the 48TMHSRSE--A20 harness to the 4-wire harness with a male plug from the Jade controller harness. See Fig. 13 and page 9.

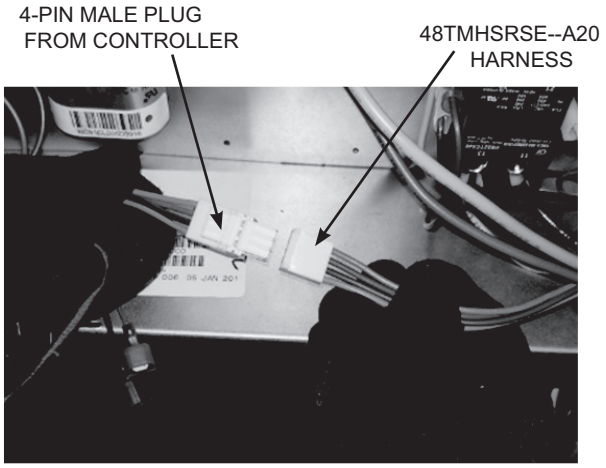


Fig. 13 — Connect 48TMHSRSE--A20 Harness to Harness from Controller

18. Route the 4-wire 48TMHSRSE--A20 harness through the divider between the control box and the indoor blower section. See Fig. 14.

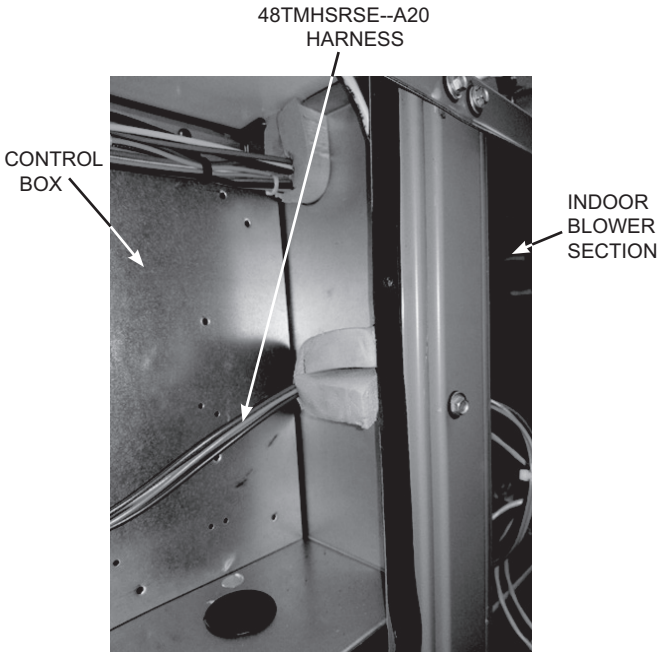


Fig. 14 — Route 48TMHSRSE--A20 Harness to Indoor Blower Section
(Some control box configurations may differ)

19. Screw the HH79AH001 mixed air (MAT) sensor (Honeywell C7250) to the left side edge of indoor blower through pre-punched holes; see Fig. 15. Confirm that the screws do not interfere with blower rotation. Locate the 50HE403859 2-green wire harness shipped with the EconoMi$er X kit. It will have a plug on one end and terminals on the other end. Connect the plug from this harness to the MAT sensor. See Fig. 15. Connect the 2 spade terminals on the 50HE403859 harness to the orange and brown wires from the 4-wire 48TMHSRSE--A20 Harness. See Fig.15 and page 9.

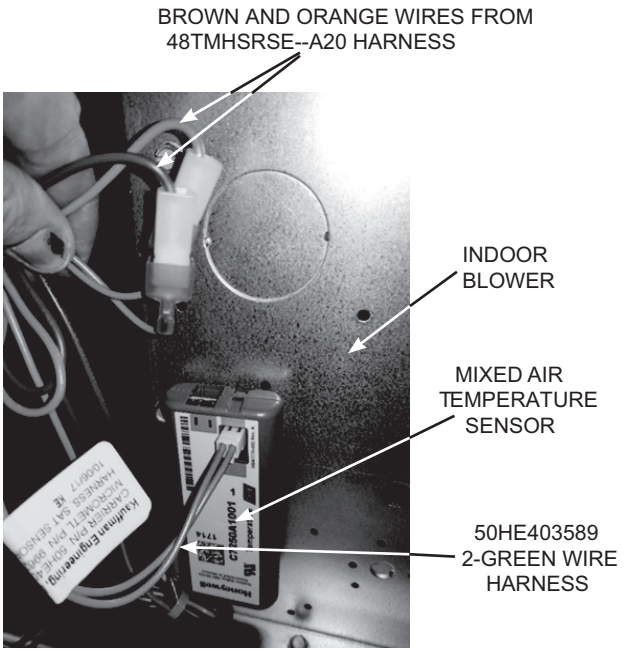


Fig. 15 — Mount and Connect Mixed Air Sensor

20. Connect the pink and violet wires from the 4-wire 48TMHSRSE--A20 harness to the pink and violet terminals in the wire bundle in the indoor blower section. See Fig. 16 and page 9.

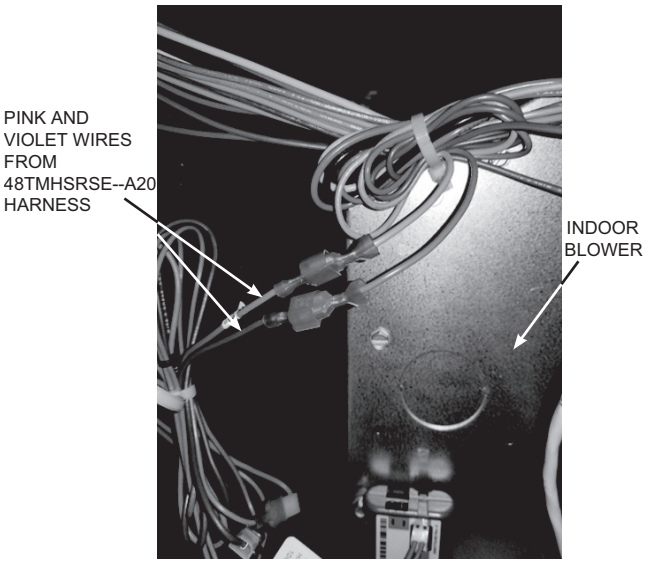
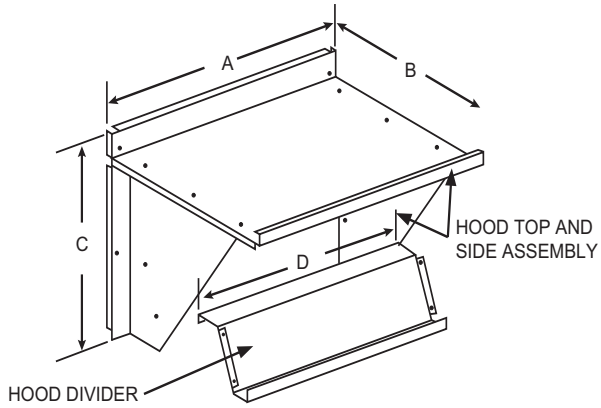


Fig. 16 — Connect Pink and Violet Wires in Indoor Blower Section

21. If using differential return sensor or DCV sensor, install it now. See installation details later in the instructions, and the wiring diagram for further information.
22. Assemble the EconoMi$er X hood by screwing the hood divider to the hood subassembly (top and sides). See Fig. 17. Note on the CRECOMZR071A01 there is also a center hood filter divider; screw in place. See Fig. 18.



ECONOMIZER P/N	A (in.)	B (in.)	C (in.)	D (in.)	SHIP WT. (lb)
CRECOMZR067A01	30.37	17.43	19.05	29.50	55 lb
CRECOMZR069A01	40.37	22.28	24.48	36.27	80 lb
CRECOMZR071A01	52.92	27.03	33.41	46.92	98 lb

NOTE: The CRECOMZR071A01 hood has 2 aluminum filters and a hood filter divider that installs between the filters.

Fig. 17 — EconoMi$er® X Hood Assembly

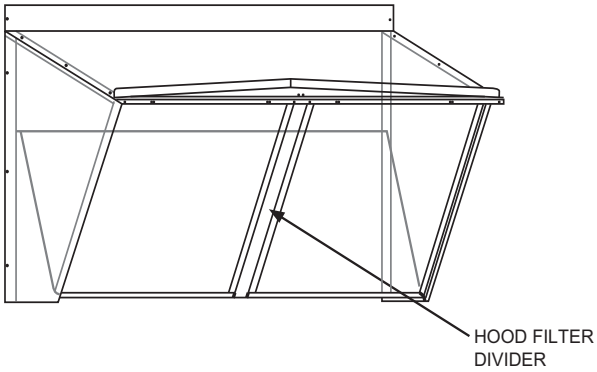


Fig. 18 — Filter Divider on CRECOMZR071A01 Hood

23. Install aluminum filter(s) in EconoMi$er X hood. Clips at top of hood will hold filters in place. See Fig. 19.

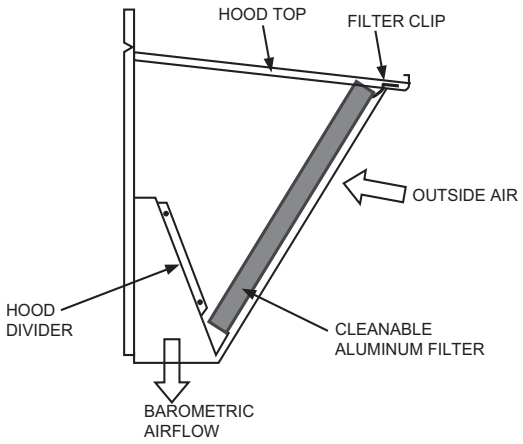


Fig. 19 — Fully Assembled Hood

24. Install EconoMi$er X hood over economizer. Screw hood in place through pre-punched holes. Reinstall the unit's filter access door. See Fig. 20. Re-install the Indoor blower access panel. See Fig. 6.



Fig. 20 — Install EconoMi$er X Hood and Unit Filter Access Door

25. After powering unit controller, program the Jade W7220 controller per the instructions to follow. See Table 8 for summarized controller set up instructions. After all settings have been made, re-install the unit control box panel. See Fig. 6.

Economizer performance charts are shown in Fig. 21 and 22. See base unit installation manual to make adjustments to meet building ventilation requirements. See Fig. 23 for typical EconoMi$er X wiring diagram.

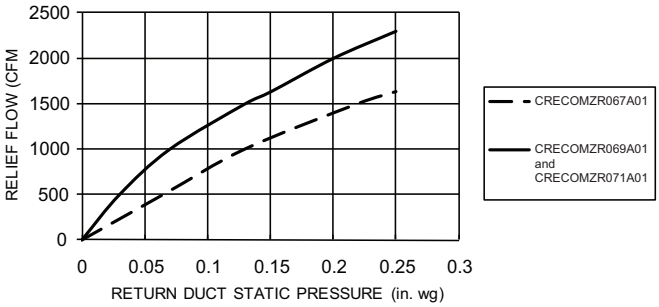


Fig. 21 — Barometric Relief Flow Capacity

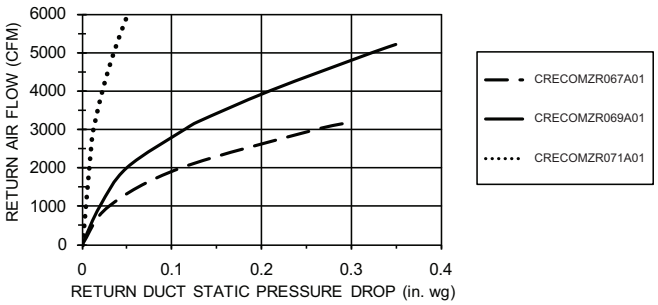


Fig. 22 — Return Air Pressure Drop

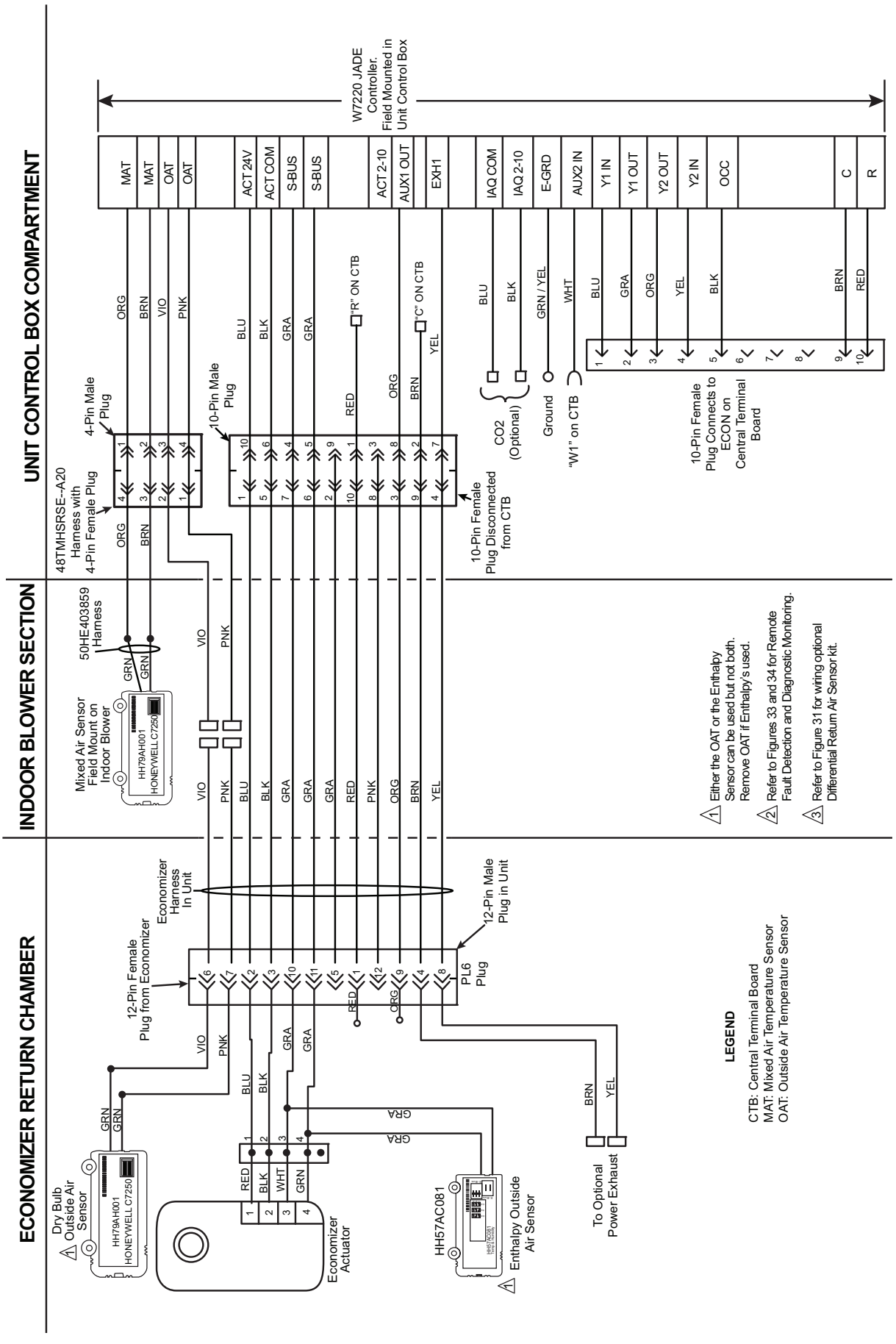


Fig. 23 — Typical EconoMi$er X Wiring Diagram for 1 or 2 Speed Units (Not for 48/50LC 07-12 Units)

Instructions for 48/50LC 07-12 Units Only

IMPORTANT: This section is for economizer installation instructions on 48/50LC 07-12 units only.

1. Step LC1. Follow steps 1 through 10 earlier in these instructions.
2. Step LC2. The 48/50LC 07-12 units require different wiring than is factory-attached to the W7220 Jade controller. Disconnect the complete wiring harness factory-attached to the W7220 Jade controller, as shown below in Fig. 24. This harness can be discarded.

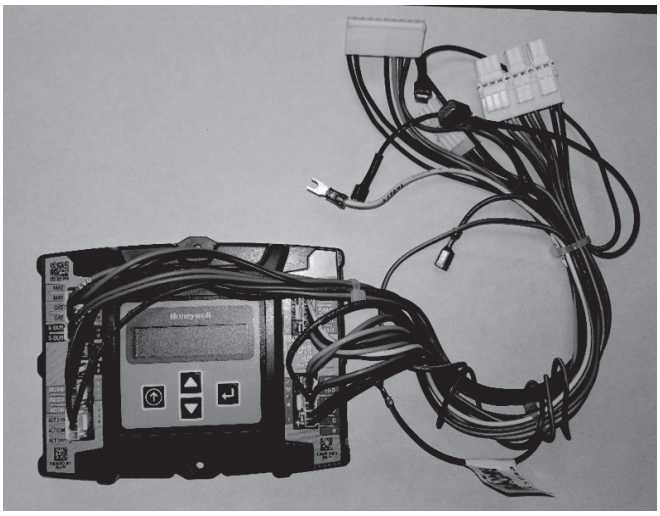


Fig. 24 — Remove Complete Harness Factory Attached to W7220 Controller

NOTE: The 4-wire 48TMHSRSE--A20 harness provided with the economizer will also NOT be used on the 48/50LC07-12 units; see Fig. 25.



Fig. 25 — 48TMHSRSE--A20 Not Used on 48/50LC 07-12 Units

3. Step LC3. The 48/50LC 07-12 units that do not have a factory-installed economizer will have a new Jade W7220 controller wiring harness shipped in the control box section of the HVAC unit. This harness, Carrier part number 48LCHSRADH--A00, is shown below in Fig. 26 and 27.

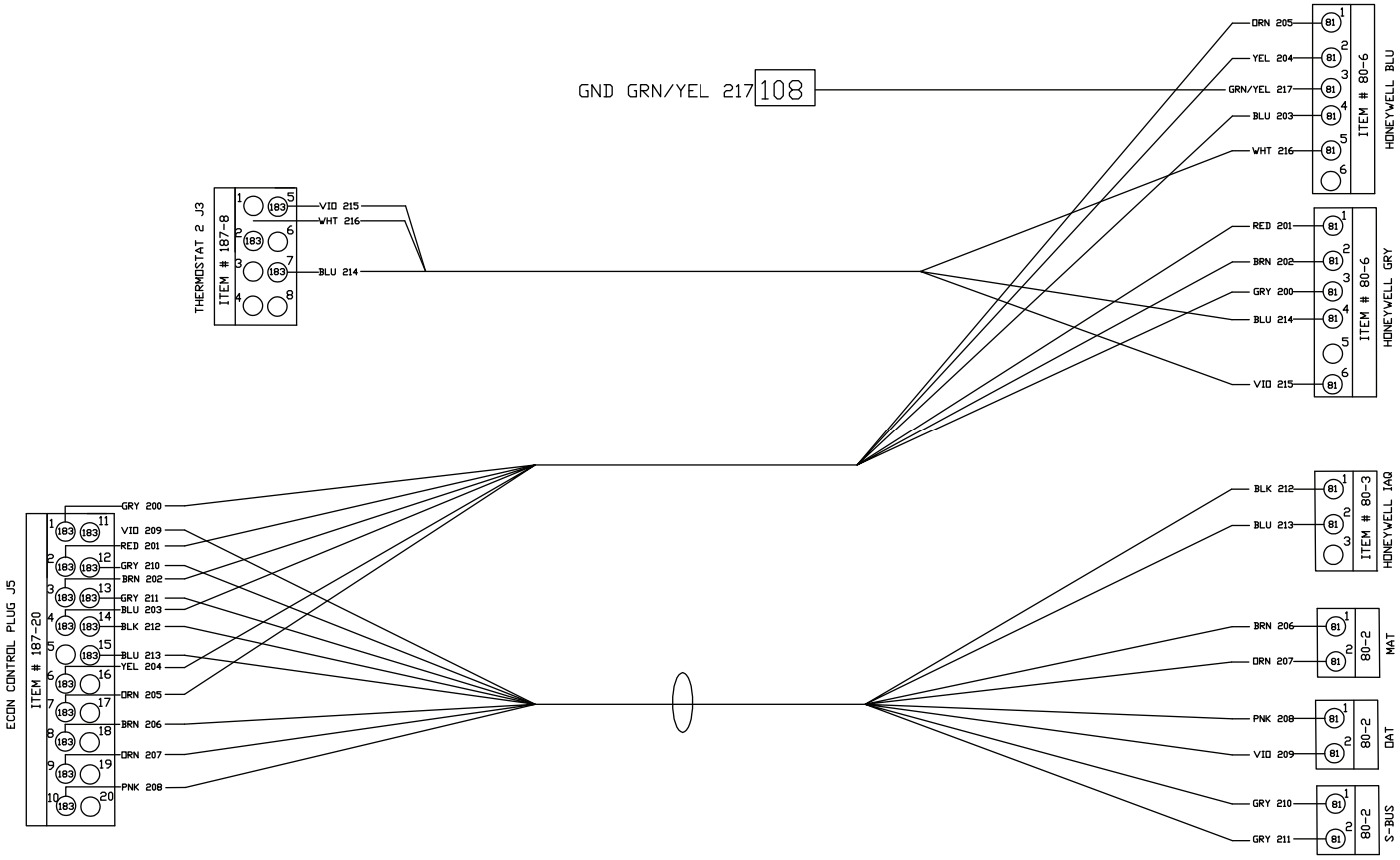


Fig. 26 — 48LCHSRADH--A00 W7220 Controller Harness Shipped With 48/50LC 07-12 Units

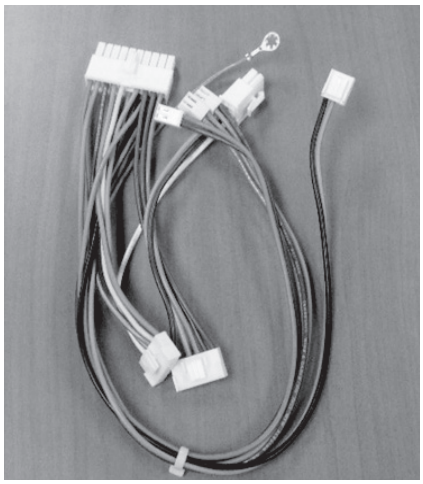
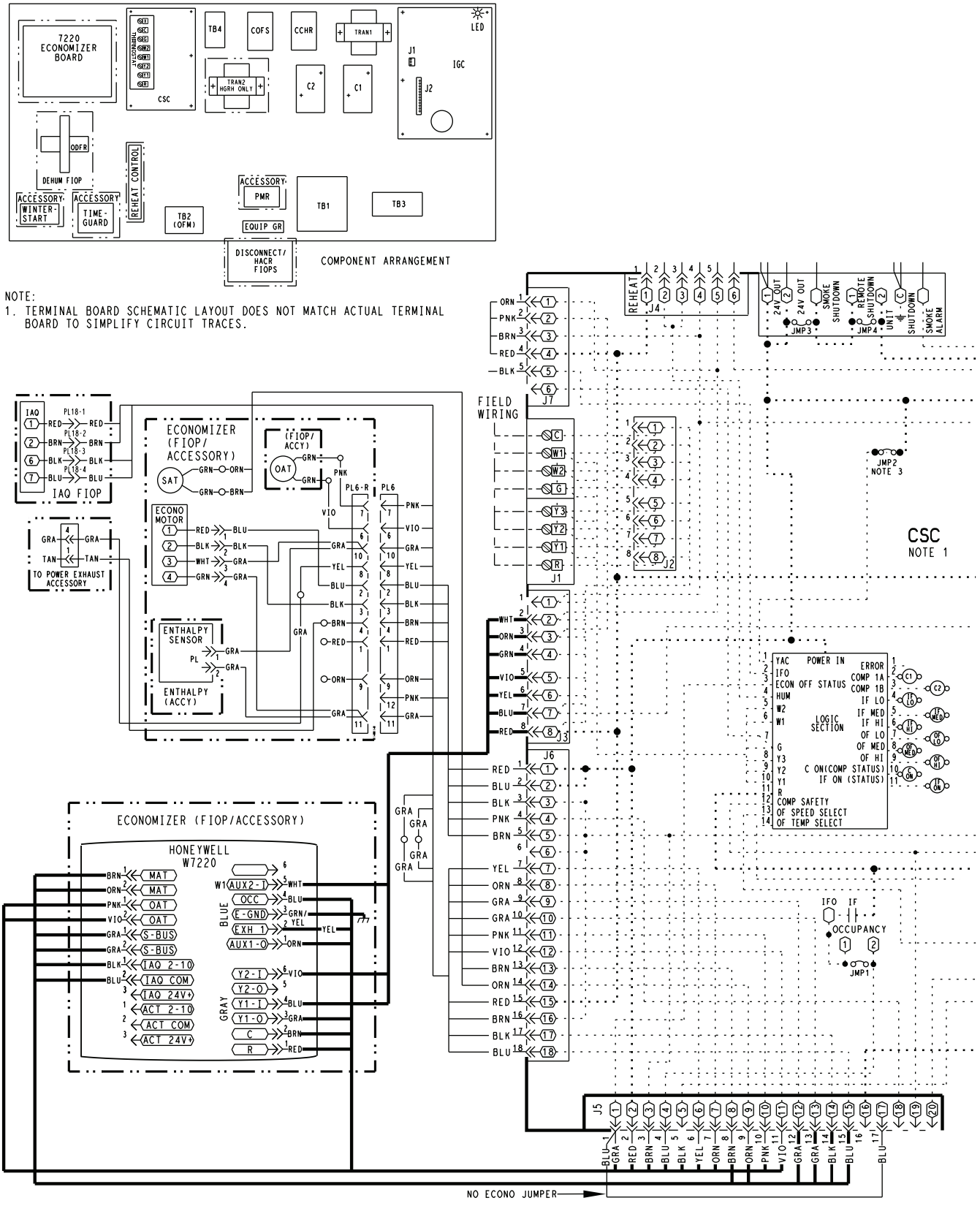


Fig. 27 — Photo of 48LCHSRADH--A00 W7220 Controller Harness Shipped with 48/50LC 07-12 Units

4. Step LC4. The connectors on the right side of Fig. 26 on the 48LCHSRADH--A00 harness attach to the Jade W7220 controller installed in the unit control box. See Fig. 26 and 28. 48LCHSRADH--A00 harness connectors are labeled to easily identify the plug-in location on the controller.
5. Step LC5. Locate the Compressor Staging Control (CSC) board in the HVAC unit. When a field-installed economizer is used the J5 jumper on the CSC must be removed. Remove the J5 jumper. See Fig. 28.
6. Step LC6. The connectors on the left side of Fig. 26 on the 48LCHSRADH--A00 harness attach to the unit's CSC board. Connect J3 and J5 plugs to the CSC board.
7. Step LC7. Screw the green wire with yellow stripe in the 48LCHSRADH--A00 harness to the control box (ground). See Fig. 12 and 28.
8. Step LC8. Mount the provided HH79AH001 mixed air temperature (MAT) sensor (C7250) to the indoor blower. Confirm that the screws do not interfere with blower rotation. See Fig. 15. Locate the 50HE403859 2-green wire harness shipped with the EconoMi$er X kit. It will have a plug on one end and terminals on the other end. Connect the plug from this harness to the MAT sensor. See Fig. 15. Connect the (2) spade terminals on the 50HE403859 harness to orange and brown wires in the indoor blower section wire bundle.
9. Step LC9. Follow steps 21 through 25 earlier in these instructions.



NOTES:
1. Harness shown in bold is 48LCHSRADH--A00 harness, which is shipped in the control box of 48/50LC 07-12 units and must be field connected to the W7220 controller provided with the economizer.
2. Harness attached to the W7220 controller from the Carrier factory is removed and not used with 48/50LC 07-12 units.

Fig. 28 — Typical Wiring Diagram For 48/50LC 07-12 Units

Installing Optional HH57AC081 Single Outside Air Enthalpy Sensor

When using the HH57AC081 (Honeywell C7400S) enthalpy sensor (Fig. 30) for outside air changeover, the existing HH79AH001 (Honeywell C7250) dry bulb sensor must be removed. The enthalpy sensor will be mounted in the same location as the dry bulb sensor; see Fig. 1. When the enthalpy sensor's OA temperature, enthalpy, and dew point are below the respective setpoints, the outside air can be used for free-cooling. When any of these is above the setpoint, free-cooling will not be available. Figure 29 shows the enthalpy boundaries in the W7220 Jade controller. There are 5 enthalpy boundaries (setpoints ES1 through ES5), which are defined by dry bulb temperature, enthalpy, and dew point. ES3 is the default setting. Table 7 shows the High Limit Curves for each setting. Important: to use the HH57AC081 sensor for outside air sensor, the dip switches on the sensor must be set to OFF-OFF-OFF. See Table 8.

The 2 gray wires with a plug from the EconoMi$er X harness in the return chamber plug directly into the HH57AC081 enthalpy sensor. See Fig. 23 and 28 for wiring.

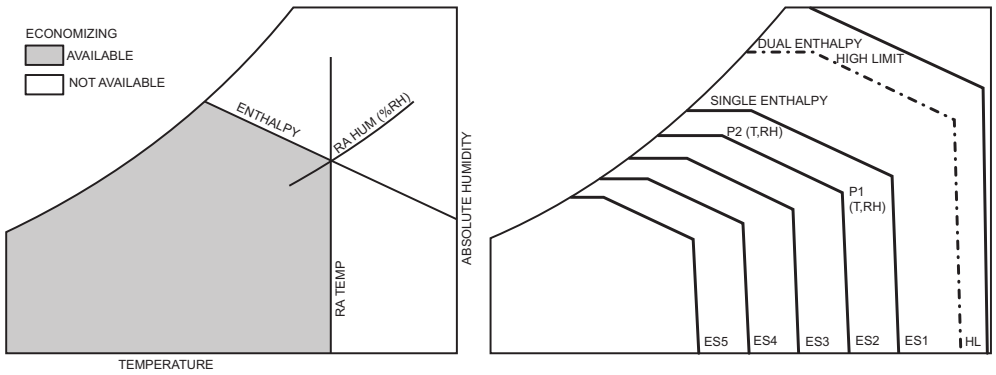
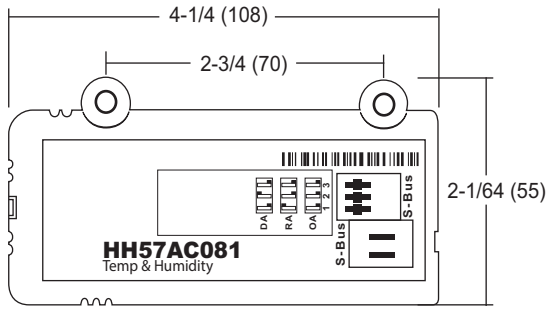


Fig. 29 — Enthalpy Curve Boundaries

Table 7 — Single Enthalpy and Dual Enthalpy High Limit Curves

ENTHALPY CURVE	TEMP. DRY BULB (F)	TEMP. DEWPOINT (F)	ENTHALPY (btu/lb/da)	POINT P1		POINT P2	
				TEMP. (F)	HUMIDITY (%RH)	TEMP. (F)	HUMIDITY (%RH)
ES1	80	60	28.0	80	36.8	66.3	80.1
ES2	75	57	26.0	75	39.6	63.3	80.0
ES3	70	54	24.0	70	42.3	59.7	81.4
ES4	65	51	22.0	65	44.8	55.7	84.2
ES5	60	48	20.0	60	46.9	51.3	88.5
HL	86	66	32.4	86	38.9	72.4	80.3



NOTE: Dimensions are in. (mm).

Fig. 30 — HH57AC081 Dimensional, Connection and Switching Information

Table 8 — HH57AC081 Sensor Dip Switch Settings

USE	DIP SWITCH POSITIONS FOR SWITCHES 1, 2, AND 3		
	1	2	3
DA	OFF	ON	OFF
RA	ON	OFF	OFF
OA	OFF	OFF	OFF

LEGEND

DA — Discharge Air (not used on EconoMi$er X)

RA — Return Air

OA — Outside Air

Default Setting = OFF-OFF-OFF

Installing Differential Return Air Sensor

The CRDIFRASN01A00 differential return sensor kit must be field mounted in the system's return duct work. The kit includes a wiring harness, that connects the EconoMi$er X harness in the return chamber of the unit, to the provided HH57AC081 sensor. Wire per Fig. 31.

In addition to using the HH57AC081 (Honeywell C7400S) sensor (Fig. 30) for a single enthalpy sensor, it can also be used as a differential return enthalpy or dry bulb sensor. Figure 29 shows the dual enthalpy boundaries in the W7220 Jade controller. With dual enthalpy the high limit boundary is ES1 when there are no stages of mechanical cooling energized and HL (high limit) when a compressor stage is energized. Table 7 shows the High Limit Curves for each setting. Important: to use the HH57AC081 sensor for differential return air, the dipswitches on the sensor must be set to ON-OFF-OFF. See Table 8.

When using the CRDIFRASN01A00 differential return enthalpy or dry bulb temperature option, see Table 9 for California Title 24 setting requirements by region.

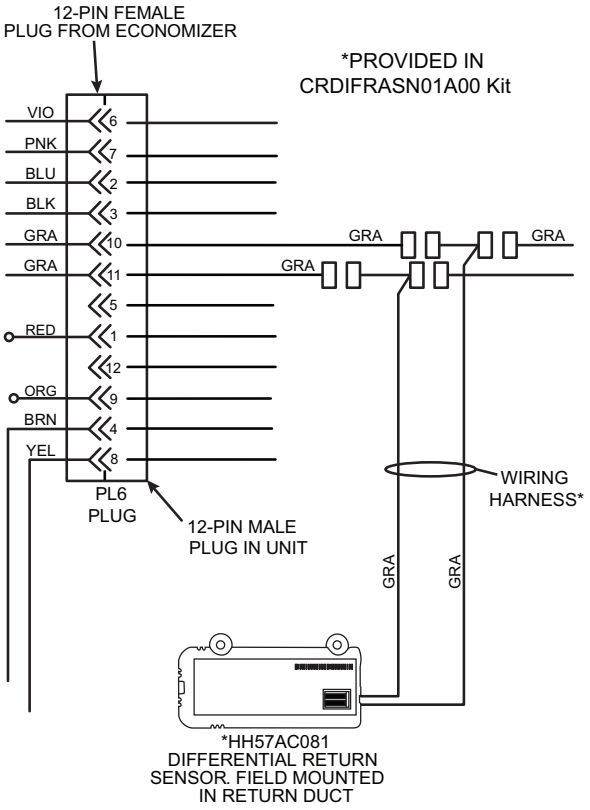


Fig. 31 — Wiring Differential Return Air Sensor

California's Title 24 High Temperature Limit Settings

California's Title 24 code requires a high temperature limit setting for all dry bulb outside air economizer changeover. The temperatures vary by the region within California. See Table 9 for high limit settings.

Table 9 — California Title 24 Regional High Limit Dry Bulb Temperature Settings

DEVICE TYPE*	CLIMATE ZONES	REQUIRED HIGH LIMIT (ECONOMIZER OFF WHEN): DESCRIPTION
FIXED DRY BULB	1, 3, 5, 11-16	OAT exceeds 75°F
	2, 4, 10	OAT exceeds 73°F
	6, 8, 9	OAT exceeds 71°F
	7	OAT exceeds 69°F
DIFFERENTIAL DRY BULB	1, 3, 5, 11-16	OAT exceeds RA Temp.
	2, 4, 10	OAT exceeds -2°F
	6, 8, 9	OAT exceeds -4°F
	7	OAT exceeds -4°F
FIXED ENTHALPY† + FIXED DRY BULB	ALL	OAT exceeds 28 Btu/lb of dry air or OAT exceeds 75°F

* Only the high limit control devices listed are allowed to be used and at the setpoints listed. Others such as Dew Point, Fixed Enthalpy, Electronic Enthalpy, and Differential Enthalpy Controls may not be used in any climate zone for compliance with Section 140.4(e)1 unless approval for use is provided by the Energy Commission Executive Director.

† At altitudes substantially different than sea level, the Fixed Enthalpy limit value shall be set to the enthalpy value at 75°F and 50% relative humidity. As an example, at approximately 6,000 foot elevation, the fixed enthalpy limit is approximately 30.7 Btu/lb.

Demand Controlled Ventilation (DCV)

Refer to EconoMi$er X wiring diagrams Fig. 23 and 28 and DCV instructions if demand control ventilation (CO_2 sensor) is used. CO_2 sensor will wire into the blue and black connections at the Jade controller as shown in Fig. 23, 28, and 32. If a field-installed CO_2 sensor is connected to the EconoMi$er X controller, a demand-controlled ventilation strategy will operate automatically. As the CO_2 level in the space increases above the setpoint (on the EconoMi$er X controller), the minimum position of the dampers will be increased proportionally, until the Maximum Ventilation setting is reached. As the space CO_2 level decreases because of the increase in fresh air, the outdoor damper will follow the higher demand condition from the DCV mode or from the free cooling mode.

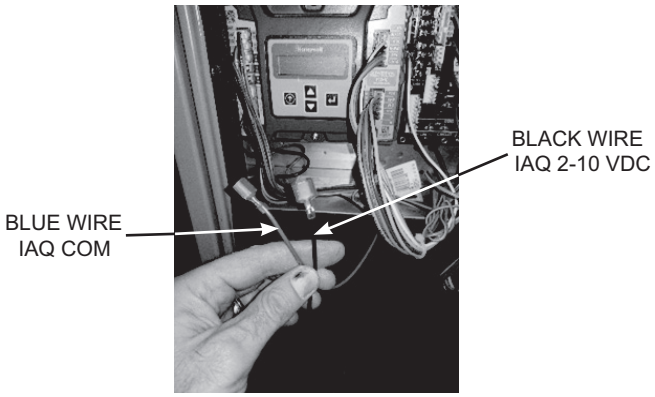


Fig. 32 — CO_2 Wiring Connections to Jade Controller

Remote (Downstairs) Monitoring of Controller's Fault Detection and Diagnostics

Many codes including IECC, Title 24, and ASHRAE 90.1 require that the economizer's faults be accessible by operating or service personal, or annunciated locally on zone thermostat. To setup remote monitoring on the controller, under SYSTEM SETUP, AUX1-OUT must be set to SYS.

The latest versions of Honeywell's TH8321WF or TH8321R thermostats are options for meeting this requirement. Figure 33 shows an example of the thermostat wiring to the Jade controller. Follow instructions provided with Honeywell thermostat.

Another option that is acceptable to some codes is an annunciator light visible by service personnel. See Fig. 34 for typical wiring to the Jade controller. Refer to codes for proper labeling of light.

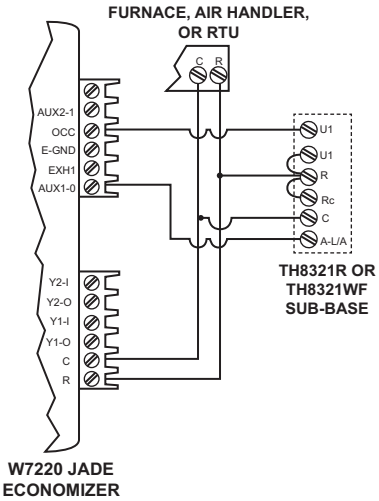
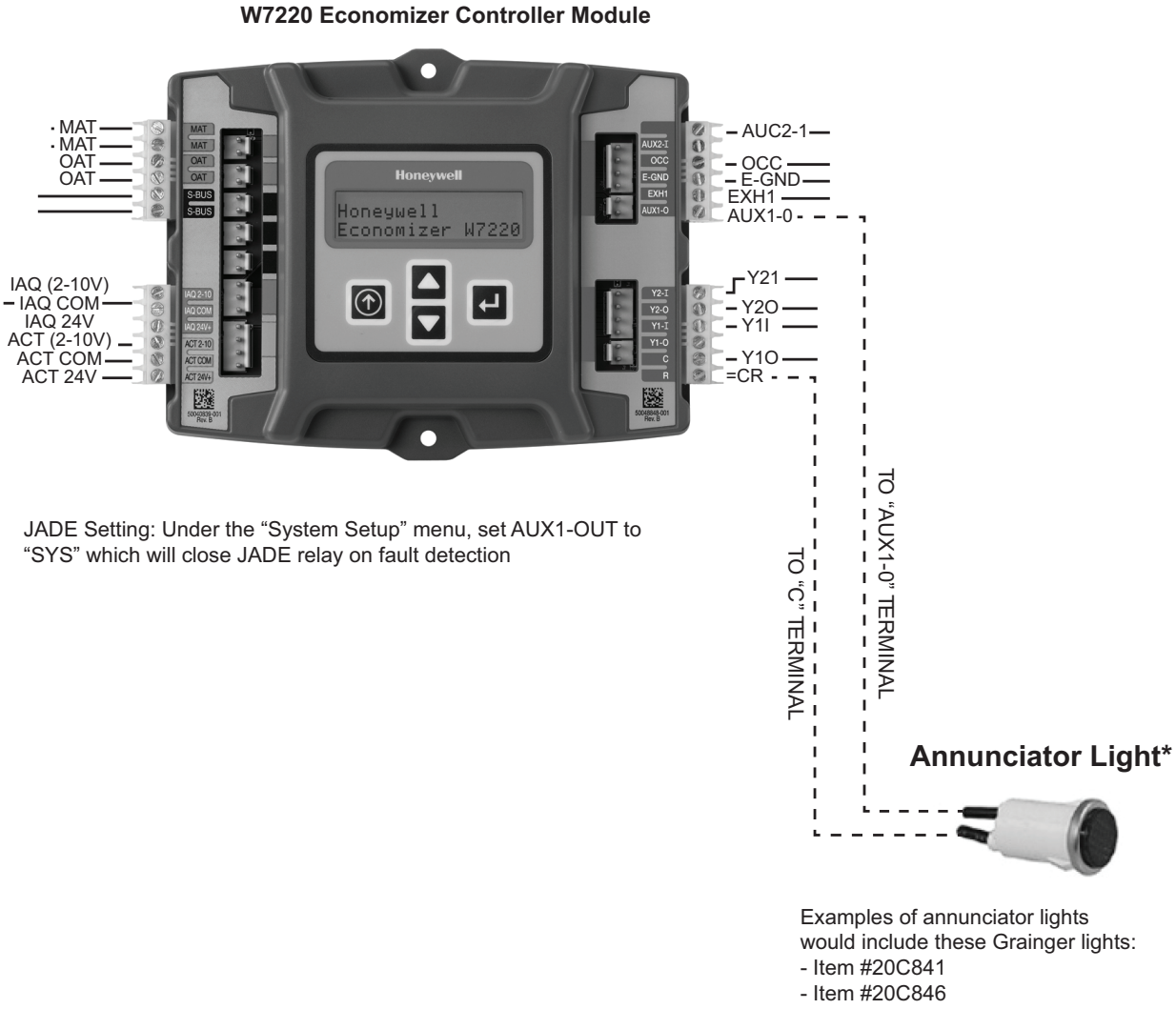


Fig. 33 — Thermostat Wired For Remote FDD



JADE Setting: Under the "System Setup" menu, set AUX1-OUT to "SYS" which will close JADE relay on fault detection

Examples of annunciator lights would include these Grainger lights:
- Item #20C841
- Item #20C846

Fig. 34 — Annunciator Light Wired for Remote FDD

GENERAL JADE W7220 CONTROLLER AND SENSOR INFORMATION

W7220 Economizer

The economizer controller used on electromechanical units is the Honeywell W7220 which is to be located in the RTU base unit's control box. See Fig. 35 for button descriptions of the W7220 controller. The W7220 controller provides the following:

- 2-line LCD interface screen for setup, configuration, and troubleshooting.
- On-board fault detection and diagnostics
- Sensor failure loss of communications identification
- Automatic sensor detection
- Capabilities for use with multiple-speed indoor fan systems

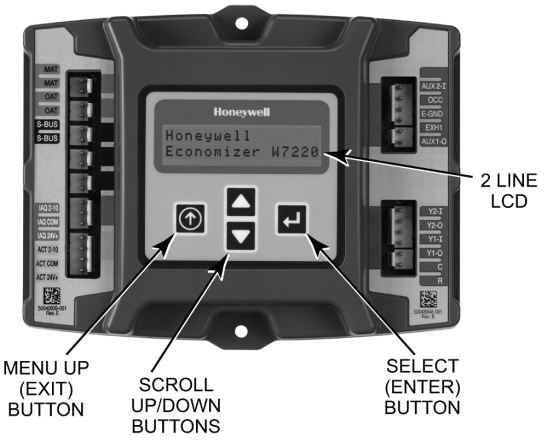


Fig. 35 — W7220 Controller

User Interface

The user interface consists of a LCD display and a 4-button keypad on the front of the economizer controller.

Keypad

The four navigation buttons (see Fig. 35) are used to scroll through the menus and menu items, select menu items, and change parameter and configuration settings.

Using the Keypad with Menus

To use the keypad when working with menus:

- Press ▲ (Up arrow) button to move to the previous menu.
- Press the ▼ (Down arrow) button to move to the next menu.
- Press the ↵ (Enter) button to display the first item in the currently displayed menu.
- Press the ⓘ (Menu Up/Exit) button to exit a menu's item and return to the list of menus.

Using the Keypad with Settings and Parameters

To use the keypad when working with Setpoints, System Setup Advanced Settings, Checkout Tests and Alarms:

1. Navigate to the desire menu.
2. Press the ↵ (Enter) button to display the first item in the currently displayed menu.
3. Use the ▲ and ▼ buttons to scroll to the desired parameter.
4. Press the ↵ (Enter) button to display the value of the currently displayed item.
5. Press the ▲ button to increase (change) the displayed parameter value.
6. Press the ▼ button to decrease (change) the displayed parameter value.

NOTE: When values are displayed, pressing and holding the ▲ or ▼ button causes the display to automatically increment.

7. Press the ↵ (Enter) button to accept the displayed value and store it in nonvolatile RAM.
8. "CHANGE STORED" displays.
9. Press the ↵ (Enter) button to return to the current menu parameter.
10. Press the ⓘ (Menu Up/Exit) button to return to the previous menu.

Menu Structure

Table 11 illustrates the complete hierarchy of menus and parameters for the EconoMi$er X system.

The menus in display order are:

- STATUS
- SETPOINTS
- SYSTEM SETUP
- ADVANCED SETUP
- CHECKOUT
- ALARMS

IMPORTANT: The default setting on the W7220 controller is for a Fan Type" with 2 speed. For a 1 (single) speed unit, the setting under SYSTEM SETUP > FAN TYPE must be changed to 1 speed.

PROGRAMMING JADE W7220 CONTROLLER

The next several pages detail the different status displays, setpoints, setup, and alarms available on the controller. This list below and Table 10 summarizes the inputs required for a standard application with a single outside air sensor.

NOTE: Default settings already set in the Jade controller may be used instead of setting the SETPOINTS; see default settings below. See Table 10 for summarized standard settings or for more detail see Table 11 — Menu Structure.

Setpoints

- MAT SET: this sets the mixed air temperature (MAT) setting. The controller has a default of 53°F, but the range is anywhere from 38 to 70°F.
- LOW T LOCK: This setting locks out the compressor (or mechanical cooling) at a given temperature. The default is 32°F, but the controller's range is from -45 to 80°F.
- DRYBULB SET: for an economizer with a dry bulb outside air sensor, set the DRYBULB SET. The default setting is 63°F but the controller's range is 48 to 80°F.
- ENTH CURVE: for a single enthalpy outside air sensor instead of a dry bulb, set the ENTH CURVE setting. There are 5 setting options: ES1 through ES5. Check the economizer literature for the limits for each of these settings. ES3 is the default setting.
- MIN POS: The minimum position allows for ventilation even when not in the free-cooling mode. A single speed unit has only one minimum position setting. The default is 4.4 volts, but the range is 2-10Vdc.
- MIN POS H and MIN POS L: A 2 speed unit has 2 minimum position settings that show up on the menu. The first is MIN POS H (for high speed) which has a default of 4.4 volts. The second is MIN POS L (for low speed), which has a default of 6.0. Note that MIN POS H and MIN POS L are only displayed if under SYSTEM SETUP: AUX2 IN is set to "W1" and FAN TYPE is set to 2 speed.

System Setup

- INSTALL: Use to set the current date. Use the keypad buttons to scroll to the correct date.
- EQUIPMENT: Always set to CONV even if the unit is a heat pump.
- AUX2 IN: Always set to W.
- FAN TYPE: Set for either single or 2 speed. The default is 2 speed. (See Note 3 below.)
- AUX1 OUT: If remote Fault Detection and Diagnostic (FDD) monitoring is required select SYS.
- OCC: occupancy, always set to INPUT

Table 10 — Standard Jade W7220 Controller Configuration for 1 or 2 Speed Unit

CONTROLLER MENU ITEM		FOR SINGLE SPEED UNIT		FOR 2 SPEED UNITS		NOTE
		DEFAULT	SET TO:	DEFAULT	SET TO:	
SETPOINTS	MAT SET	53°F	38° to 70°F	53°F	38° to 70°F	
	LOW T LOCK	32°F	-45° to 80°F	32°F	-45° to 80°F	
	DRYBLB SET	63°F	48° to 80°F	63°F	48° to 80°F	Only displayed if using single DB OA sensor
	ENTH CURVE	ES3	ES1 to ES5	ES3	ES1 to ES5	Only displayed if using a single enthalpy OA sensor
	MIN POS	4.4 Vdc	2 to 10 Vdc			Only displayed if set up for single speed unit
	MIN POS H	NA	NA	4.4 Vdc	2 to 10 Vdc	Only displayed if set up for 2 speed unit
	MIN POS L	NA	NA	6.0 Vdc	2 to 10 Vdc	Only displayed if set up for 2 speed unit
SYSTEM SETUP	INSTALL	1/1/2010	Current date	1/1/2010	Current date	
	EQUIPMENT	CONV	CONV	CONV	CONV	Always set to CONV, even on HP units
	AUX2 I	W	W	W	W	Always set to W
	FAN TYPE	2 speed	1 speed	2 speed	2 speed	See Note 3
	AUX1 OUT	NONE	SYS	NONE	SYS	Set to SYS for remote FDD monitoring
	OCC	INPUT	INPUT	INPUT	INPUT	Always set to INPUT

NOTES:
1. For 2 speed unit, under SYSTEM SETUP: EQUIPMENT= CONV, AUX2 I = W, and FAN TYPE = 2 SPEED
2. More sophisticated controller setups, including for DCV or power exhaust, are available by referring to Table 11 options
3. Note 3: Fan speed options are:
   a. 1 speed
   b. 2 speed
   c. 2 speed: 1 heat, 1 cool (for future use)
   d. 3 speed: 1 heat, 2 cool (for future use; do not use 3 speed setting for LC units)

NA = Not applicable

Table 11 — Menu Structure*

MENU	PARAMETER	PARAMETER DEFAULT VALUE	PARAMETER RANGE AND INCREMENT†	NOTES
STATUS	ECONO AVAIL	NO	YES/NO	ECONOMIZING AVAILABLE YES = economizing available; the system can use outside air for free cooling when required
	ECONOMIZING	NO	YES/NO	ECONOMIZING ACTIVE YES = Outside air being used for first stage cooling. NO = Economizing not active
	OCCUPIED	NO	YES/NO	OCCUPIED YES = OCC signal received from space thermostat or unitary controller. YES = 24 Vac on terminal OCC. NO = 0 Vac on terminal OCC
	HEAT PUMP	N/A**	COOL HEAT	HEAT PUMP MODE (Not available on 2 Speed configuration)
	COOL Y1—IN	OFF	ON/OFF	FIRST STAGE COOLING DEMAND (Y1—IN) Y1—I signal from space thermostat or unitary controller for Cooling Stage 1. ON = 24 Vac on terminal Y1—I OFF = 0 Vac on terminal Y1—I
	COOL Y1—OUT	OFF	ON/OFF	FIRST STAGE COOLING RELAY OUTPUT ON = 24 Vac on terminal Y1—O; Stage 1 mechanical cooling called on OFF = 0 Vac on terminal Y1—O; no mechanical cooling
	COOL Y2—IN	OFF	ON/OFF	SECOND STAGE COOLING DEMAND (Y2—IN) Y2—I signal from space thermostat or unitary controller for Cooling Stage 2. ON = 24 Vac on terminal Y2—I OFF = 0 Vac on terminal Y2—I
	COOL Y2—OUT	OFF	ON/OFF	SECOND STAGE COOLING RELAY OUTPUT ON = 24 Vac on terminal Y2—O; Stage 2 mechanical cooling called on OFF = 0 Vac on terminal Y2—O; no Stage 2 mechanical cooling
	MA TEMP	nn°F (or °C)	0 to 140°F (–18 to 60°C)	MIXED AIR TEMPERATURE, Cooling Mode Displays value of measured mixed/cooled air from MAT sensor in fan section. Displays_____ if not connected, short or out-of-range.
	DA TEMP	nn°F (or °C)	0 to 140°F (–18 to 60°C)	DISCHARGE AIR TEMPERATURE, after Heating section (Accessory sensor required) Displays when Discharge Air sensor is connected and displays measured discharge temperature. Displays_____ if sensor sends invalid value, if not connected, short or out-of-range.
	OA TEMP	nn°F (or °C)	–40 to 140°F (–40 to 60°C)	OUTSIDE AIR TEMPERATURE Displays measured value of outdoor air temperature. Displays_____ if sensor sends invalid value, if not connected, short or out-of-range.
	OA HUM	nn%	0 to 100%	OUTSIDE AIR RELATIVE HUMIDITY Displays measured value of outdoor humidity from accessory OA enthalpy sensor.
	RA TEMP	nn°F (or °C)	0 to 140°F (–18 to 60°C)	RETURN AIR TEMPERATURE (Accessory sensor required) Displays measured value of return air temperature from return air sensor.
	RA HUM	nn%	0 to 100%	RETURN AIR RELATIVE HUMIDITY (Accessory enthalpy sensor required) Displays measured value of return air humidity from return air sensor.
	IN CO2	_ _ _ ppm	0 to 2000 ppm	SPACE/RETURN AIR CO2 (CO_2 sensor required, accessory or factory option) Displays value of measured CO_2 from CO_2 sensor. Invalid if not connected, short or out-of-range
	DCV STATUS	N/A	ON/OFF	DEMAND CONTROLLED VENTILATION STATUS (CO_2 sensor required, accessory or factory option) Displays ON if IN CO2 value above setpoint DCV SET and OFF if below setpoint DCV SET.
	DAMPER OUT	2.0v	2.0 TO 10.0v	Displays voltage output to the damper actuator. 0% = OA Damper fully closed 100%= OA Damper full open
	ACT POS	nn%	0 to 100%	Displays actual position of outdoor air damper actuator 2.0V = OA Damper fully.closed 10.0V = OA Damper full open
	ACT COUNT	N/A	1 to 65535	Displays number of times actuator has cycled. 1 Cycle equals accrued 180° of actuator movement in any direction
	ACTUATOR	N/A	OK/Alarm (on Alarm menu)	Displays Error if voltage or torque is below actuator range
	EXH1 OUT	OFF	ON/OFF	EXHAUST STAGE 1 RELAY OUTPUT Output of EXH1 terminal: ON = relay closed OFF = relay open
	EXH2 OUT	OFF	ON/OFF	EXHAUST STAGE 2 RELAY OUTPUT Output of AUX terminal; displays only if AUX = EXH2 ON = relay closed OFF = relay open

Table 11 — Menu Structure*(cont)

MENU	PARAMETER	PARAMETER DEFAULT VALUE	PARAMETER RANGE AND INCREMENT†	NOTES
STATUS (cont)	ERV	OFF	ON/OFF	ENERGY RECOVERY UNIT RELAY OUTPUT Output of AUX terminal; displays only if AUX = ERV ON = relay closed OFF = relay open
	MECH COOL ON	0	0, 1, or 2	Displays stage of mechanical cooling that is active.
	FAN SPEED	N/A	LOW or HIGH	SUPPLY FAN SPEED Displays speed setting of fan on a 2-speed fan unit.
	W (HEAT ON)	N/A	ON/OFF	HEAT DEMAND STATUS Displays status of heat demand on a 2-speed fan unit.
SETPOINTS	MAT SET	53°F (12°C)	38 to 70°F; (3 to 18°C) increment by 1	MIXED AIR SETPOINT Setpoint determines where the economizer will modulate the OA damper to maintain the mixed air temperature.
	LOW T LOCK	32°F (0°C)	–45 to 80°F; (–43 to 27°C) increment by 1	COMPRESSOR LOW TEMPERATURE LOCKOUT Setpoint determines outdoor temperature when the mechanical cooling cannot be turned on.
	DRYBLB SET	63°F (17°C)	48 to 80°F (9 to 27°C) increment by 1	OA DRY BULB TEMPERATURE CHANGEOVER SETPOINT Setpoint determines where the economizer will assume outdoor air temperature is good for free cooling; e.g.: at 63°F (17°C), unit will economize at 62°F (16.7°C) and below and not economize at 64°F (17.8°C) and above. There is a 2°F (1.1°C) deadband. DRYBULB SET is only displayed if the economizer has a single dry bulb sensor
	DRYBLB DIF	0°F	0° to 6°F increment by 2	DRYBULB DIFFERENTIAL will only show if using dual drybulb, i.e., when an outdoor air temperature sensor C7250 is attached to OAT terminals, and a C7400S sensor is wired to S-Bus and configured for RAT (return air). Free cooling will be assumed whenever OA Temp is at or below RAT minus this drybulb setting.
	ENTH CURVE	ES3	ES1, ES2, ES3, ES4, or ES5	ENTHALPY CHANGEOVER CURVE (Requires enthalpy sensor option) Enthalpy boundary “curves” for economizing using single enthalpy.
	DCV SET	1100 ppm	500 to 2000 ppm; increment by 100	DEMAND CONTROLLED VENTILATION SETPOINT Displays only if CO_2 sensor is connected. Setpoint for Demand Control Ventilation of space. Above the setpoint, the OA dampers will modulate open to bring in additional OA to maintain a space ppm level below the setpoint.
	MIN POS	4.4 V	2 to 10 Vdc	VENTILATION MINIMUM POSITION. Only displays if controller is set for single speed unit under FAN TYPE, and if DCV is NOT used.
	MIN POS L	6.0 V	2 to 10 Vdc	VENTILATION MINIMUM POSITION AT LOW SPEED. Only displays if unit is set for 2 or 3 speed and CO2 is not used. IF using 2 speed with 1 heat and 1 cool then set for HEATING ventilation. If using 3 speed with 1 heat and 2 cool then set for LOW SPEED COOLING ventilation.
	MIN POS M	5.4V	2 to 10 Vdc	VENTILATION MINIMUM POSITION AT MEDIUM SPEED. Only displays if unit is set for 3 speed with 1 heat and 2 cool, and CO2 is not used. Set for HEATING ventilation.
	MIN POS H	4.4 V	2 to 10 Vdc	VENTILATION MINIMUM POSITION AT HIGH SPEED. Only displays if unit is set for 2 or 3 speed and CO2 is not used. IF using 2 speed with 1 heat and 1 cool then set for COOLING ventilation. If using 3 speed with 1 heat and 2 cool then set for HIGH SPEED COOLING ventilation.
	VENTMAX L	6.0 V	2 to 10 Vdc	DCV MAXIMUM DAMPER POSITION AT LOW SPEED. Only displays if unit is set for 2 speed or 3 speed with 1 heat and 2 cool. IF using 2 speed with 1 heat and 1 cool then set for HEATING ventilation. If using 3 speed with 1 heat and 2 cool then set for LOW SPEED COOLING.
	VENTMAX M	5.4V	2 to 10 Vdc	DCV MAXIMUM DAMPER POSITION AT MEDIUM SPEED. Only displays if unit is set for 3 speed with 1 heat and 2 cool. Set for HEATING ventilation.
	VENTMAX H	4.4 V	2 to 10 Vdc	DCV MAXIMUM DAMPER POSITION AT HIGH SPEED. Only displays if unit is set for 2 speed or 3 speed with 1 heat and 2 cool. IF using 2 speed with 1 heat and 1 cool then set for COOLING ventilation. If using 3 speed with 1 heat and 2 cool then set for HIGH SPEED COOLING ventilation.
	VENTMIN L	3.7 V	2 to 10 Vdc	DCV MINIMUM DAMPER POSITION AT LOW SPEED. Only displays if unit is set for 2 speed or 3 speed with 1 heat and 2 cool. IF using 2 speed with 1 heat and 1 cool then set for HEATING ventilation. If using 3 speed with 1 heat and 2 cool then set for LOW SPEED COOLING.
	VENTMIN M	3.4V	2 to 10 Vdc	DCV MINIMUM DAMPER POSITION AT MEDIUM SPEED. Only displays if unit is set for 3 speed with 1 heat and 2 cool. Set for HEATING ventilation.
	VENTMIN H	2.8 V	2 to 10 Vdc	DCV MINIMUM DAMPER POSITION AT HIGH SPEED. Only displays if unit is set for 2 speed or 3 speed with 1 heat and 2 cool. IF using 2 speed with 1 heat and 1 cool then set for COOLING ventilation. If using 3 speed with 1 heat and 2 cool then set for HIGH SPEED COOLING ventilation.
	ERV OAT SP	32°F (0°C)	0 to 50°F; (–18 to 10°C) increment by 1	ENERGY RECOVERY VENTILATION UNIT OUTDOOR AIR TEMPERATURE SETPOINT Only displayed when AUX1 O = ERV
	EXH1 SET	50%	0 to 100%	Exhaust fan set point for single speed units. Based on OA Damper position to activate power exhaust.
	EXH1 L SET	65%	0 to 100%; Increment by 1	EXHAUST FAN SETPOINT AT LOW SPEED (on 2 speed unit) Setpoint for OA damper position when exhaust fan is powered by the economizer

Table 11 — Menu Structure*(cont)

MENU	PARAMETER	PARAMETER DEFAULT VALUE	PARAMETER RANGE AND INCREMENT†	NOTES
SETPOINTS (cont)	EXH1 H SET	50%	0 to 100%; Increment by 1	EXHAUST FAN SETPOINT AT HIGH SPEED (on 2 speed unit) Setpoint for OA damper position when exhaust fan is powered by the economizer
	EXH2 L SET	80%	0 to 100%; Increment by 1	EXHAUST FAN STAGE 2 SETPOINT AT LOW SPEED Setpoint for OA damper position when exhaust fan 1 is powered by the economizer. Only used when AUX1—O is set to EHX2. NOTE: Standard power exhaust kits have only 1 speed, therefore EXH2 is not applicable
	EXH2 H SET	75%	0 to 100%; Increment by 1	EXHAUST FAN STAGE 2 SETPOINT AT HIGH SPEED Setpoint for OA damper position when exhaust fan 1 is powered by the economizer. Only used when AUX1—O is set to EHX2. NOTE: Standard power exhaust kits have only 1 speed, therefore EXH2 is not applicable
SYSTEM SETUP	INSTALL	01/01/10		Display order = MM/DD/YY Setting order = DD, MM, then YY.
	UNITS DEG	°F	°F or °C	Sets economizer controller in degrees Fahrenheit or Celsius
	EQUIPMENT	CONV	Conventional or HP	Always set to CONV even for heat pump
	AUX2 I	W	W required for 2-speed mode	Always set to W
	FAN TYPE	2 speed	1 speed / 2 speed	Sets the economizer controller for operation of 1 speed or 2 speed indoor fan system.
	FAN CFM	5000cfm	100 to 15000 cfm; increment by 100	UNIT DESIGN AIRFLOW (CFM) Enter ONLY if using DCVCAL ENA = AUTO
	AUX OUT	NONE	NONE ERV EXH2 SYS	Select OUTPUT for AUX1 O relay NONE = not configured (output is not used) ERV = Energy Recovery Ventilator†† EXH2 = second damper position relay closure for second exhaust fan SYS = use output as an FDD remote alarm signal
	OCC	INPUT	INPUT or ALWAYS	Always set to INPUT
ADVANCED SETUP	MA LO SET	45°F (7°C)	35° to 55°F; (2° to 12°C) Incremented by 1°	MIXED AIR TEMPERATURE LOW LIMIT Temperature to achieve Freeze Protection (close damper and alarm if temperature falls below setup value)
	FREEZE POS	CLO	CLO or MIN	FREEZE PROTECTION DAMPER POSITION Damper position when freeze protection is active CLO = closed MIN = MIN POS or VENTMIN
	CO2 ZERO	0 ppm	0 to 500 ppm; increment by 10	CO_2 ppm level to match CO_2 sensor start level.
	CO2 SPAN	2000 ppm	1000 to 3000 ppm; increment by 50	CO_2 ppm span to match CO_2 sensor.
	STG3 DLY	2.0 h	0 min, 5 min, 15 min, then 15 min intervals. Up to 4 h or OFF	COOLING STAGE 3 DELAY Delay after stage 2 for cool has been active. Turns on second stage of cooling when economizer is first stage and mechanical cooling is second
	SD DMPR POS	CLO	CLO or OPN	Function NOT AVAILABLE with 2-speed mode
	DCVCAL ENA	MAN	MAN (manual) AUTO	Turns on the DCV automatic control of the dampers. Resets ventilation. For single speed units only.
	MAT T CAL	0.0°F (or C)	±2.5°F (±1.4°C)	MIXED AIR TEMPERATURE CALIBRATION Allows for the operator to adjust for an out of calibration mixed air temperature (MAT) sensor
	OA T CAL	1.0°F (or C)	±2.5°F (±1.4°C)	OUTSIDE AIR TEMPERATURE CALIBRATION Allows for the operator to adjust for an out of calibration outside air temperature (OAT) sensor
	OA H CAL	0% RH	±10% RH	OUTSIDE AIR HUMIDITY CALIBRATION Allows for the operator to adjust for an out of calibration outside air enthalpy sensor
	RA T CAL	2.0°F (or C)	±2.5°F (±1.4°C)	RETURN AIR TEMPERATURE CALIBRATION Allows for the operator to adjust for an out of calibration return air temperature (RA) sensor
	RA H CAL	0% RH	±10% RH	RETURN AIR HUMIDITY CALIBRATION Allows for the operator to adjust for an out of calibration return air enthalpy sensor
	DA T CAL	0.0°F (or C)	±2.5°F (±1.4°C)	DISCHARGE AIR TEMPERATURE CALIBRATION Allows for the operator to adjust for an out of calibration discharge air temperature (DAT) sensor
	2SP FAN DELAY	5 Minutes	0 to 20 minutes in 1 minute increments	TIME DELAY ON SECOND STAGE ECONOMIZING While in the Economizing mode, this is the delay between thermostat Y2 call and Y1—O output to mechanical cooling stage, to allow high speed fan operation to attempt to cool space first.

Table 11 — Menu Structure*(cont)

MENU	PARAMETER	PARAMETER DEFAULT VALUE	PARAMETER RANGE AND INCREMENT†	NOTES
CHECKOUT	DAMPER VMIN-HS	N/A	N/A	Positions OA damper to VMIN High Speed position
	DAMPER VMAX-HS	N/A	N/A	Positions OA damper to VMAX High Speed position
	DAMPER OPEN	N/A	N/A	Positions OA damper to the full open position.
	DAMPER CLOSE	N/A	N/A	Positions damper to the fully closed position
	CONNECT Y1-O	N/A	N/A	Closes the Y1—O relay (Y1—O)
	CONNECT Y2-O	N/A	N/A	Closes the Y2—O relay (Y2—O)
	CONNECT AUX1O	N/A	N/A	Energizes the AUX1O output. If Aux setting is: • NONE= not action taken • ERV = 24 Vac out. Turns on or signals an ERV that the conditions are not good for economizing but are for ERV operation†† • SYS = 24 Vac out. Issues a system alarm
Alarms display only when they are active. The menu title “ALARMS(_)” includes the number of active alarms in parenthesis ( ).				
ALARMS(_)	MA T SENS ERR	N/A	N/A	MIXED AIR TEMPERATURE SENSOR ERROR
	CO2 SENS ERR	N/A	N/A	CO2 SENSOR ERROR
	OA T SENS ERR	N/A	N/A	OUTSIDE AIR TEMPERATURE SENSOR ERROR OAT sensor connected at input terminals OAT
	OA SYLK SENS ERR	N/A	N/A	OUTSIDE AIR ENTHALPY SENSOR ERROR OAT sensor connected on S—bus
	DA T SENS ERR	N/A	N/A	DISCHARGE AIR TEMPERATURE SENSOR ERROR
	SYS ALARM	N/A	N/A	When AUX1-0 is set to SYS and there is any alarm (e.g., failed sensors, etc.), the AUX1-0 terminal has 24 Vac out.
	ACT UNDER V	N/A	N/A	ACTUATOR VOLTAGE LOW Voltage received at actuator is below expected range
	ACT OVER V	N/A	N/A	ACTUATOR VOLTAGE HIGH Voltage received at actuator is above expected range
	ACT STALLED	N/A	N/A	ACTUATOR STALLED Actuator stopped before reaching commanded position.

LEGEND

LCD — Liquid Crystal Display
MAT — Mixed Air Temperature
OAT — Outdoor Air Temperature
OCC — Occupied
RAT — Return Air Temperature
RTU — Rooftop Unit

* Table 11 illustrates the complete hierarchy. The menu parameters may be different depending on the configuration. For example, if there is no DCV (CO_2) sensor, then none of the DCV parameters appear.

† When values are displayed, pressing and holding the ▲ or ▼ button causes the display to automatically increment.

** N/A = Not Applicable.

†† ERV Operation: When in cooling mode AND the conditions are NOT OK for economizing - the ERV terminal will be energized. In the Heating mode, the ERV terminal will be energized when the OA is below the ERV OAT setpoint in the setpoint menu.

Checkout Tests

Use the Checkout menu (see Table 11) to test the damper operation and any configured outputs. Only items that are configured are shown in the Checkout menu.

NOTE: See User Interface for information about menu navigation and use of the keypad.

1. To perform a Checkout test:
2. Scroll to the desired test in the Checkout menu using the ▲ and ▼ buttons.
3. Press the ↵ button to select the item.
4. RUN? appears.
5. Press the ↵ button to start the test.
6. The unit pauses and then displays IN PROGRESS.
7. When the test is complete, DONE appears.
8. When all desired parameters have been tested, press the ⓘ (Menu up) button to end the test.

Checkout test can be performed at any time during the operation of the system as a test that the system is operable.

⚠ CAUTION

EQUIPMENT DAMAGE HAZARD

Failure to follow this caution may result in damage to equipment.

Be sure to allow enough time for compressor startup and shutdown between checkout tests so that you do not short-cycle the compressors.

W7220 Economizer Module Wiring

Use Tables 12 and 13 to locate the wiring terminals for the economizer module.

Table 12 — Economizer Module - Left Hand Terminal Blocks

LABEL	TYPE	DESCRIPTION
Top Left Terminal Block		
MAT **MAT**	20k NTC and COM	Mixed Air Temperature Sensor (Polarity Insensitive Connection)
OAT **OAT**	20k NTC and COM	Outdoor Air Temperature Sensor (Polarity Insensitive Connection)
S-BUS **S-BUS**	S-BUS (Sylk Bus)	Enthalpy Control Sensor (Polarity Insensitive Connection)
Bottom Left Terminal Block		
IAQ 2-10	2-10 vdc	Air Quality Sensor Input (e.g. CO_2 sensor)
IAQ COM	COM	Air Quality Sensor Common
IAQ 24V	24 vac	Air Quality Sensor 24 vac Source
ACT 2-10	2-10 vdc	Damper Actuator Output (2-10 vdc)
ACT COM	COM	Damper Actuator Output Common
ACT 24v	24 vac	Damper Actuator 24 vac Source

Table 13 — Economizer Module - Right Hand Terminal Blocks

LABEL	TYPE	DESCRIPTION
Top Right Terminal Blocks		
	na	The first terminal is not used.
AUX2 I	24 vac IN	Shut Down (SD) or HEAT (W) Conventional only and Heat Pump Changeover (O-B) in Heat Pump mode.
OCC	24 vac IN	Occupied/Unoccupied Input
E-GND	E-GND	Earth Ground - System Required
EXH1	24 vac OUT	Exhaust Fan 1 Output
AUX1 O	24 vac OUT	Programmable: Exhaust fan 2 output or ERV or System alarm output
Bottom Right Terminal Blocks		
Y2-I	24 vac IN	Y2 in - Cooling Stage 2 Input from space thermostat
Y2-O	24 vac OUT	Y2 out - Cooling Stage 2 Output to stage 2 mechanical cooling
Y1-I	24 vac IN	Y1 in - Cooling Stage 2 Input from space thermostat
Y1-O	24 vac OUT	Y1 out - Cooling Stage 2 Output to stage 2 mechanical cooling
C	COM	24 vac Common
R	24 vac	24 vac Power (hot)

Time-out and Screen Saver

When no buttons have been pressed for 10 minutes, the LCD displays a screen saver, which cycles through the Status items. Each status item displays in turn and cycles to the next item after 5 seconds.

START-UP AND OPERATION

Cooling, Unit with EconoMi$er® X

For Occupied mode operation of EconoMi$er X system, there must be a 24-v signal at terminals R and OCC (provided through PL6-3 from the unit's IFC coil). Removing the signal at OCC places the EconoMi$er X control in Unoccupied mode. See Table 14 for Damper Position Control.

During Occupied mode operation, indoor fan operation will be accompanied by economizer dampers moving to Minimum Position setpoint for ventilation. If indoor fan is off, dampers will close. During Unoccupied mode operation, dampers will remain closed unless a Cooling (by free cooling) or DCV demand is received.

When free cooling using outside air is not available, the unit cooling sequence will be controlled directly by the space thermostat. Outside air damper position will be closed or Minimum Position as determined by Occupancy mode and fan signal.

When free cooling is available as determined by the appropriate changeover command (dry bulb, outdoor enthalpy, differential dry bulb or differential enthalpy), a call for cooling (Y1 closes at the thermostat) will cause the economizer control to modulate the dampers open and closed to maintain the unit supply air temperature. Default mixed air temperature is 53°F, with a range of 38°F to 70°F. Compressor will not run.

Should 100% outside air not be capable of satisfying the space temperature, space temperature will rise until Y2 is closed. The economizer control will call for compressor operation. Dampers will modulate to maintain MAT at set point concurrent with Compressor 1 operation. The "Low T Lock" setting (default 32°F) will lock out compressor operation when outside air temperature is below setpoint.

When space temperature demand is satisfied (thermostat Y1 opens), the dampers will return to Minimum Damper position if indoor fan is running or fully closed if fan is off.

If accessory power exhaust is installed, the power exhaust fan motors will be energized by the economizer control as the dampers open above the EXH1 SET setpoint and will be de-energized as the dampers close below the EXH1 SET setpoint. (For single speed unit.)

Damper movement from full closed to full open (or vice versa) will take between 1 $^1/_2$ and 2 $^1/_2$ minutes.

Heating with EconoMi$er® X

During Occupied mode operation, indoor fan operation will be accompanied by economizer dampers moving to Minimum Position setpoint for ventilation. If indoor fan is off, dampers will close. During Unoccupied mode operation, dampers will remain closed unless a DCV demand is received.

When the room temperature calls for heat (W1 closes), the heating controls are energized.

Table 14 — Damper Position Control, 2-Speed Fan Motor, Economizer Cooling Not Available

INPUT	VOLTAGE				
OCC	0-V	24-V	24-V	24-V	24-V
Y1	0-V	0-V	24-V	24-V	0-V
Y2	0-V	0-V	0-V	24-V	0-V
W1	0-V	0-V	0-V	0-V	24-V
	SUPPLY FAN MOTOR SPEED				
SUPPLY FAN MOTOR SPEED	OFF	LOW	LOW	HIGH	HIGH
	DAMPER POSITION				
No CO_2 Sensor	CLOSED	MIN POS-L	MIN POS-L	MIN POS-H	MIN POS-H
W/ CO_2 Sensor	CLOSED	FROM VENTMIN L TO VENTMAX L	FROM VENTMIN L TO VENTMAX L	FROM VENTMIN H TO VENTMAX H	FROM VENTMIN H TO VENTMAX H

TROUBLESHOOTING

For a list of common operating issues and concerns see Table 15.

Power Loss (Outage or Brownout)

All setpoints and advanced settings are restored after any power loss or interruption, as all settings are stored in the economizer controller's non-volatile flash memory.

NOTE: If power goes below 18 Vac, the W7220 module assumes a power loss and the 5-minute power up delay will become functional when power returns above 18 vac.

Alarms

The economizer module provides alarm messages that display on the 2-line LCD.

NOTE: Upon power up, the module waits several seconds before checking for alarms. This allows time for all the configured devices (e.g. sensors, actuator) to become operational.

If one or more alarms are present and there has been no keypad activity for at least 5 minutes, the Alarms menu displays and cycles through the active alarms.

The Alarms menus can be navigated at any time. See Table 11 for the Alarms menu.

Clearing Alarms

Once the alarm has been identified and the cause has been removed (e.g. replaced faulty sensor). They can be cleared from the display.

To clear an alarm, perform the following:

1. Navigate to the desired alarm.
2. Press the ↵ button.
3. ERASE? displays.
4. Press the ↵ button.
5. ALARM ERASED displays.
6. Press the ⏫ (Menu Up/Exit) button to complete the action and return to the previous menu.

NOTE: If the alarm still exists after being cleared, it will redisplay within 5 seconds.

Table 15 — Operating Issues and Concerns

ISSUE OR CONCERN	POSSIBLE CAUSE AND REMEDY
My outdoor temperature reading on the STATUS menu is not accurate	Check the sensor wiring: • Enthalpy sensors are to be wired to the S-Bus terminals. • Temperature sensors are to be wired to the OAT and MAT terminals.
If my enthalpy sensor drifts in accuracy over time, can I recalibrate it?	The sensor cannot be re-calibrated in the field; however, a menu item under the ADVANCED menu allows input of a limited offset in temperature and humidity for each sensor connected to the economizer.
Will I be able to see the LCD screen when it is in the unit?	The LCD screen has a backlight that is always illuminated.
What is a good setpoint for the Mixed Air Temperature (MAT)?	The mixed air temperature is the temperature of air to supply to the space. In a commercial building, this is between 50 and 55°F (10 to 13°C). The mixed air is the mixing of the return air and the outdoor air.
I am using enthalpy sensors. Why did the control ask me to input a dry bulb changeover temperature?	In the event the humidity sensor in the enthalpy sensors fails, the backup algorithm in the control is to default to the temperature sensor in the enthalpy sensor.
In checkout, the outdoor damper closes when I command it to open.	Check the actuator linkage or rotation. In the CHECKOUT mode, the outdoor damper should drive open or closed with the return air damper having the opposite effect.
How do I set my minimum position when using a CO_2 sensor?	The minimum position is set using the VENTMIN and VENTMAX setup in the SETPOINTS menu. VENTMIN is the minimum ventilation required when using an occupancy sensor and VENTMAX is the minimum ventilation when not using an occupancy sensor for Demand Controlled Ventilation. The VENTMAX position is set the same as with the potentiometer on the analog economizers and is the output voltage to the damper actuator. The range is 2 Vdc closed OA damper and 10 Vdc open OA damper.
What if my damper does not go completely closed in the checkout operation?	Check the damper linkage or hub to make sure the damper is able to close completely.
Does the economizer save my program values if the unit loses power?	Yes, once the changes are stored in the controller they will be stored until they are changed by the operator.
If the unit is left in checkout, how long will the unit stay in checkout mode without input?	The unit will remain in checkout for 10 minutes, then return to normal operation.

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