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Economizer & Power Exhaust Combination Package
Install Guide
PECD-SRTCA-D2-L & T

Foremost HVAC Accessory Manufacturer

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Small Rooftop Units
3 to 12.5 Tons (48/50LC 14 Not Included)
Accessory Ultra Low Leak
Vertical Economizer Accessory

Installation Instructions

Part No: ECD-SRT12CA-D2*H, ECD-SRT34CA-D2*H and ECD-SRT05CA-D2*H

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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 Economizer 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 is too humid, integrating the compressor with outdoor air when free cooling is available, and locking out the compressor when outdoor-air temperature is too cold. Demand control ventilation is supported.

This Economizer can be used with 1 or 2 speed indoor fan motor units.

The Economizer system utilizes gear-drive technology with a direct-mount spring return actuator that will close upon loss of power. The Economizer system comes standard with fault detection and diagnostics (FDD), an outdoor air sensor, and mixed air temperature sensor (also called supply air temperature sensor). Outdoor enthalpy, indoor (return) dry bulb or enthalpy, and CO2 sensors are available for field installation. See Table 5 for sensor usage.

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 Economizer controller.

See Table 1-3 for package usage. See Table 4 for package contents.

See Table 5 for sensor usage.

IMPORTANT: These economizers meet all economizer damper 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 ± 1/32 inch.

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

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Table 1 - Carrier Usage Chart

CARRIER MODEL NUMBER	ECONOMIZER PART NUMBER
Small Cabinet	
48/50HC, LC 04-06 48/50TC 04-07 50TCQ 04-07 50HCQ 04-06 50KCQ04-06 48/50KC 04-06	Dry Bulb OA Sensor = ECD-SRT12CA-D2DH
	Enthalpy OA Sensor = ECD-SRT12CA-D2EH
Large Cabinet	
48/050HC 07-12 48/50LC 07 48/50TC 08-14 50TCQ 08-12 50HCQ 07-09	Dry Bulb OA Sensor = ECD-SRT34CA-D2DH
	Enthalpy OA Sensor = ECD-SRT34CA-D2EH
Extra Large Cabinet	
48/50HC 14 48/50LC 08-12 48/50TC 16 50TCQ 14 50HCQ 12	Dry Bulb OA Sensor = ECD-SRT05CA-D2DH
	Enthalpy OA Sensor = ECD-SRT05CA-D2EH

Table 2 - Bryant Usage Chart

BRYANT MODEL NUMBER	ECONOMIZER PART NUMBER
Small Cabinet	
581J/551J 04-06 549J/547J/559J/582J 04-06 548J/580J/558J 04-07	Dry Bulb OA Sensor = ECD-SRT12CA-D2DH
	Enthalpy OA Sensor = ECD-SRT12CA-D2EH
Large Cabinet	
581J/551J 07-12 580J/558J 08-14 548J 08-12 549J 07-09	Dry Bulb OA Sensor = ECD-SRT34CA-D2DH
	Enthalpy OA Sensor = ECD-SRT34CA-D2EH
Extra Large Cabinet	
581J/551J 14 580J/558J 16 548J 14 549J 12	Dry Bulb OA Sensor = ECD-SRT05CA-D2DH
	Enthalpy OA Sensor = ECD-SRT05CA-D2EH

Table 3 - ICP Usage Chart

ICP MODEL NUMBER	ECONOMIZER PART NUMBER
Small Cabinet	
RGH/RAH 036-060 RGS/RAS 036-072 RHS 036-072 RHX/RHH 036-060 RGX/RAX 036-060	Dry Bulb OA Sensor = ECD-SRT12CA-D2DH
	Enthalpy OA Sensor = ECD-SRT12CA-D2EH
Large Cabinet	
RGH/RAH 072-120 RAS/RGS 090-150 RHH 072-102 RHS 090-120	Dry Bulb OA Sensor = ECD-SRT34CA-D2DH
	Enthalpy OA Sensor = ECD-SRT34CA-D2EH
Extra Large Cabinet	
RGH/RAH 150 RAS/RGS 180 RHS 150 RHH 120	Dry Bulb OA Sensor = ECD-SRT05CA-D2DH
	Enthalpy OA Sensor = ECD-SRT05CA-D2EH

Table 4 - Package Contents

ECONOMIZER PART NUMBER	QTY	CONTENTS
ECD-SRT12CA-D2*H, ECD-SRT34CA-D2*H	1	Economizer Damper Assembly with Actuator and Outside Air Sensor
	1	Jade 9901-2020 (HW: W7220) Controller with Attached Harness*
	1	9901-2021 (HW: C7250) Mixed Air Temp Sensor*
	1	9962-0407-SAOEXT 4-Wire Harness* ⚠1
	1	Hood Assembly with Top and 2 Sides
	1	Hood Divider
	1	Aluminum Filter
	1	Hardware Bag*
ECD-SRT05CA-D2*H	1	Economizer Damper Assembly with Actuator and Outside Air Sensor
	1	Jade 9901-2020 (HW: W7220) Controller with Attached Harness*
	1	9901-2021 (HW: C7250) Mixed Air Temp Sensor*
	1	9962-0407-SAOEXT 4-Wire Harness* ⚠1
	1	Hood Assembly with Top and 2 Sides
	1	Hood Divider
	1	Hood Filter Divider
	2	Aluminum Filter
	1	Hardware Bag*

* Shipped in hardware kit for field installation
HW = Honeywell
⚠1 On some models the 9962-0407-SAOEXT harness is built in to the standard harness attached to the controller.

Table 5 - Economizer Sensor Usage

APPLICATION	ECONOMIZER WITH OUTDOOR AIR SENSOR
	Accessories Required
Outdoor Air Dry Bulb	The 9901-2021 (C7250) outdoor air dry bulb sensor is factory installed on "D2DH" economizer.
Single Enthalpy	The 9901-2022 (C7400S) outdoor air enthalpy sensor is factory installed on "D2EH" economizers
Mixed Air Sensor	9901-2021 (C7250) provided with economizer and field installed in blower compartment.
Differential Dry Bulb or Enthalpy	9901-2022-DIFF JC2*

* Includes 9901-2022 sensor and wiring harness.

ACCESSORIES LIST - The Economizer system has several field-installed accessories available to optimize performance. Refer to Table 6 for authorized parts and power exhaust descriptions.

Table 6 —Economizer Field-Installed Accessories

DESCRIPTION	PART NUMBER
208/230v 1PH Prop Power Exhaust for Small Cabinet	PPD-SRT12CA-D-1V
460v 3PH Prop Power Exhaust for Small Cabinet	PPD-SRT12CA-D-4V
208/230v 1PH Prop Power Exhaust for Large Cabinet	PPD-SRT34CA-D-1V
460v 3PH Prop Power Exhaust for Large Cabinet	PPD-SRT34CA-D-4V
208/230v 1PH Prop Power Exhaust for Extra Large Cabinet	PPD-SRT05CA-D-1V
460v 3PH Prop Power Exhaust for Extra Large Cabinet	PPD-SRT05CA-D-4V
Enthalpy Sensor (OA)	9901-2022
Differential (Return) Sensor	9901-2022-DIFF JC2
Economizer Angle Seal Kit for use on unit's with Hinged Filter Door - for Small Cabinet	0640-0100-HDANGL
Economizer Angle Seal Kit for use on unit's with Hinged Filter Door - for Large Cabinet	0640-0200-HDANGL
Economizer Angle Seal Kit for use on unit's with Hinged Filter Door - for Extra Large Cabinet	0640-0300-HDANGL

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 Fault Detection and Diagnostic 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 9901-2022-DIFF JC2.

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

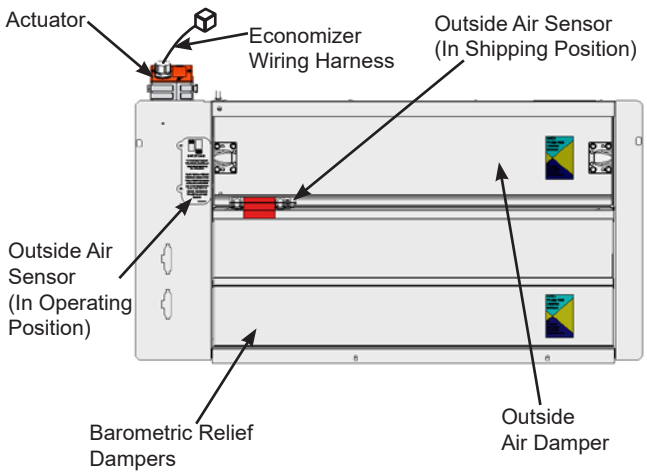


Fig. 1 - Economizer Component Locations — (ECD-SRT12CA-D2*H Shown)

INSTALLATION

Note: If installing economizer on 48/50LC 07-12 units, see special section beginning on page 10.

Step 1: Turn off power supply(s) and install lockout tag.

Step 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 Figure 2. Set the filter door aside for re-installation later.

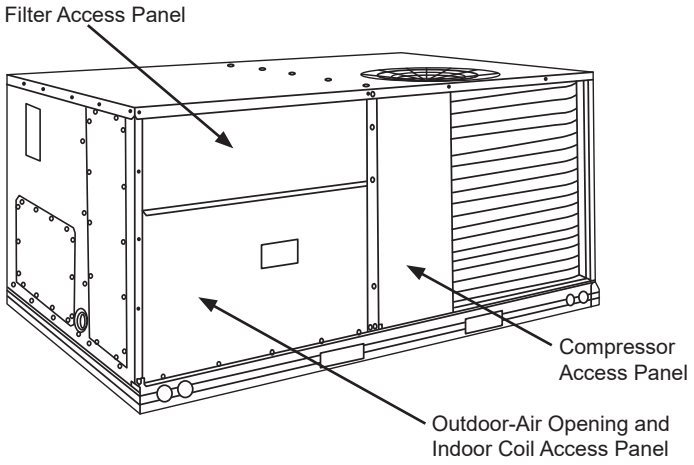


Fig. 2 - Typical Access Panel Locations

Step 3: Remove the indoor coil access panel and discard. See Figure 2.

Step 4: Slide the economizer assembly into the rooftop unit. See Figure 3.

Note: on small and large cabinets be sure to engage the rear economizer flange under the tabs on the unit base in the return air chamber. See Figure 4.

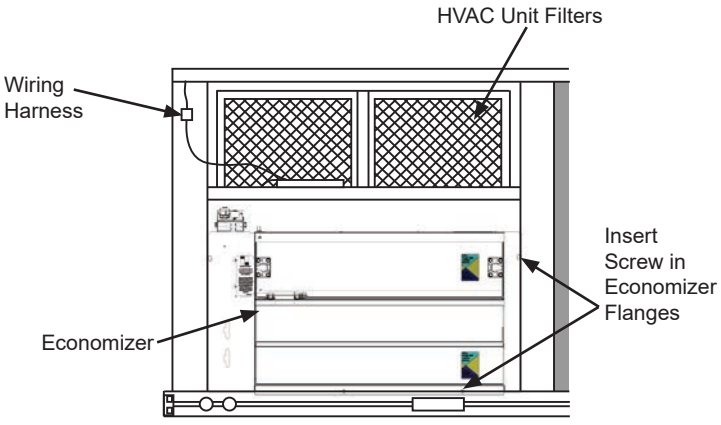


Fig. 3 - Economizer Installed on HVAC Unit (ECD-SRT12CA-D2*H Shown)

For 48/50LC 07-12 Instructions, see pages 10-12

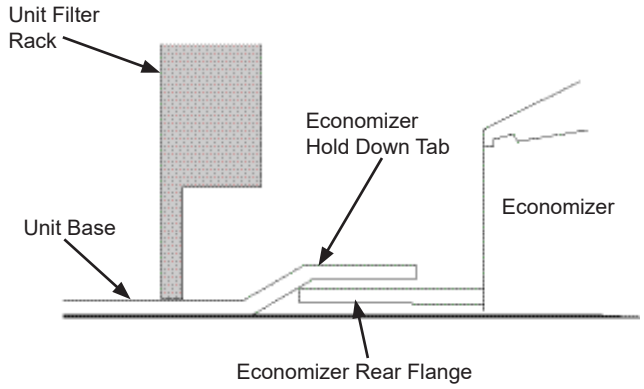


Fig. 4 - Rear Economizer Flange Installation (ECD-SRT12CA-D2*H and ECD-SRT34CA-D2*H)

Step 5: Ensure economizer is square (tolerance +/- 1/32"). Screw the economizer to the unit along both side flanges and bottom flange. See Figure 3.

Step 6: Remove the red tape securing the relief dampers for shipping purposes. Relocate the outside air sensor from its shipping location to its operating position, see Fig. 1

Step 7: If an economizer with a dry bulb sensor will be operating with an enthalpy outside air sensor, remove the factory installed 9901-2021 dry bulb sensor from the front face of the economizer (see Figure 1), and install the accessory enthalpy sensor 9901-2022 in the same location as the dry bulb sensor. Connect the (2) wire gray harness with plug from the economizer to the enthalpy sensor. See wiring diagram Figures 23 and 28. Refer to "9901-2022 Outside Air Enthalpy Sensor" section for more details on enthalpy settings

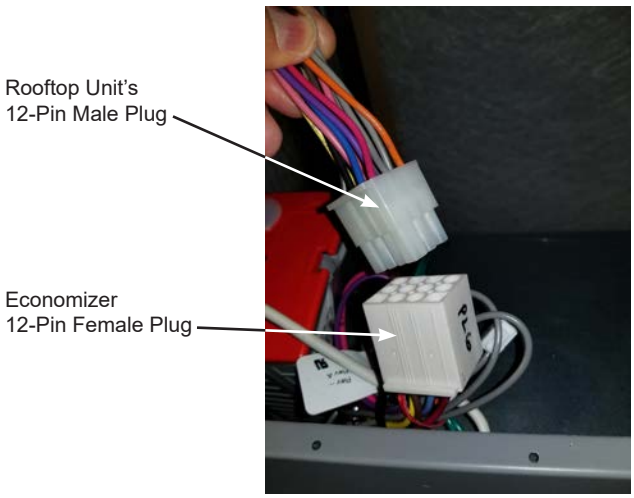


Figure 5 – Connect Economizer Harness to Unit PL6 Economizer Harness

Step 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 economizer plug into the unit wiring harness. See Figure 5. *Note: the 12-pin jumper plug should be saved for future use, in the event that the economizer is ever removed. The jumper plug is not needed as long as the economizer is installed.*

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

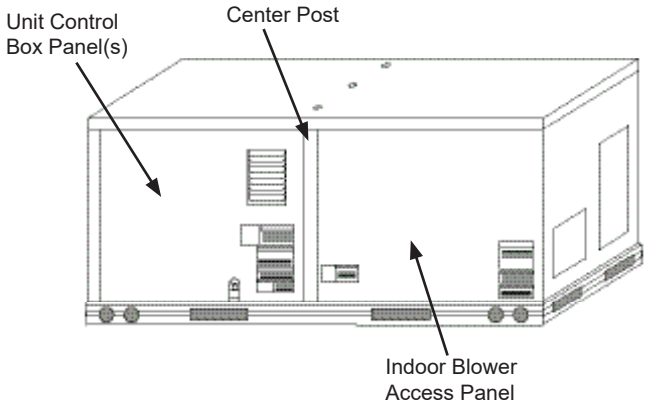


Fig. 6 - Typical Indoor Fan Motor Access Panel Locations

Step 10: In the hardware kit provided with the economizer is the 9901-2020 Jade controller (Honeywell W7220). The controller is attached to a mounting bracket and the economizer 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 Figure 7.

Figure 7 – Mount Controller Assembly in Unit Control Box
(Some control box configurations may differ)

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

For 48/50LC 07-12 Instructions, see pages 10-12

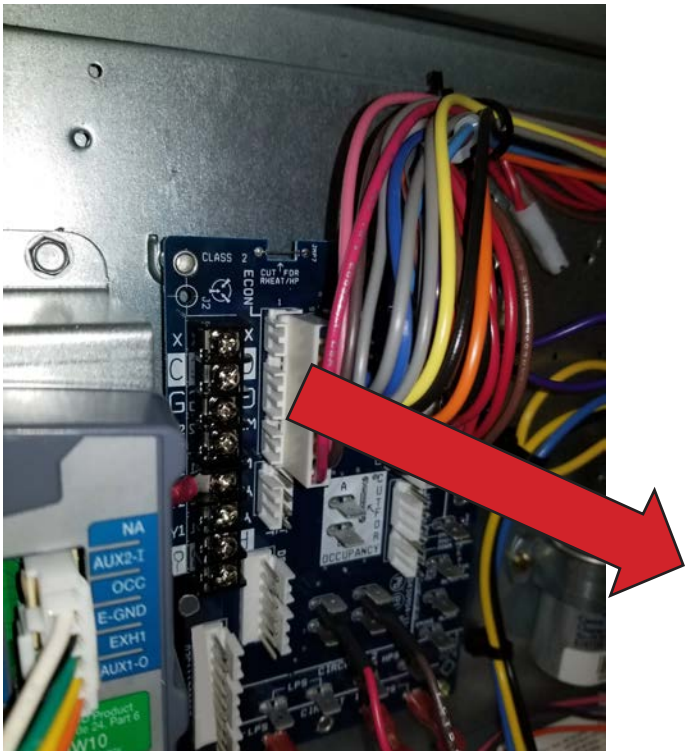


Figure 8 – Unplug ECON plug from Central Terminal Board (CTB)

Step 12: Connect the 10-pin female ECON plug removed from the CTB to the 10-pin male plug from the Jade controller harness. See Figures 9 and 23.

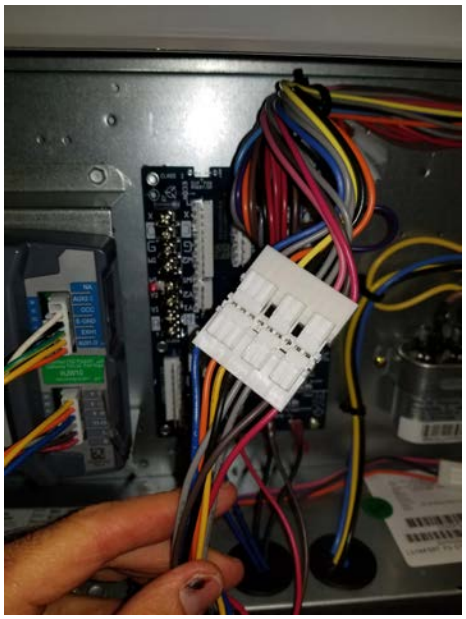


Figure 9 – Connect 10-pin Plugs Together

Step 13: Connect the 10-pin female plug from the Jade controller harness to ECON on the CTB. See Figures 10 and 23.

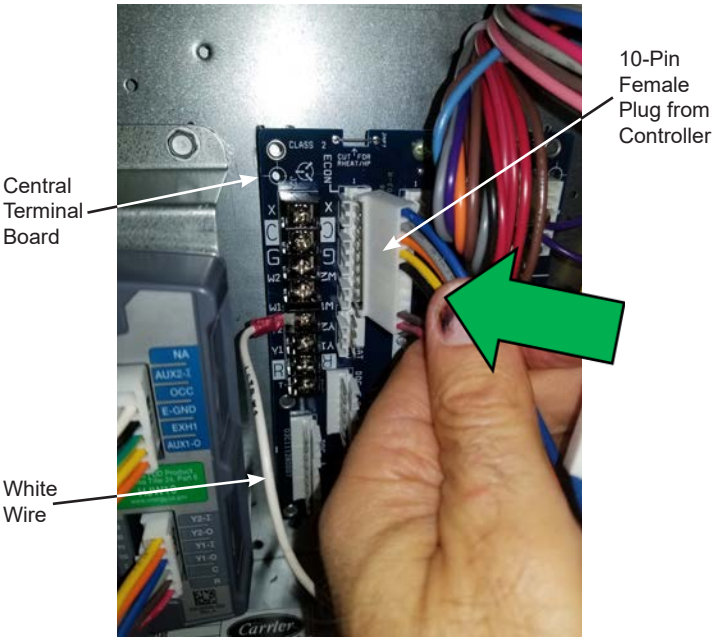


Figure 10 – Connect 10-Pin Jade Plug to Central Terminal Board

Step 14: Connect the White wire from the Jade controller harness to the W1 terminal on the CTB. See Figures 10 and 23.

Step 15: Connect the red and brown wires from the Jade controller harness to the CTB. See Figures 11 and 23. The red wire connects to “R” on the CTB, and the brown wire connects to “C”.

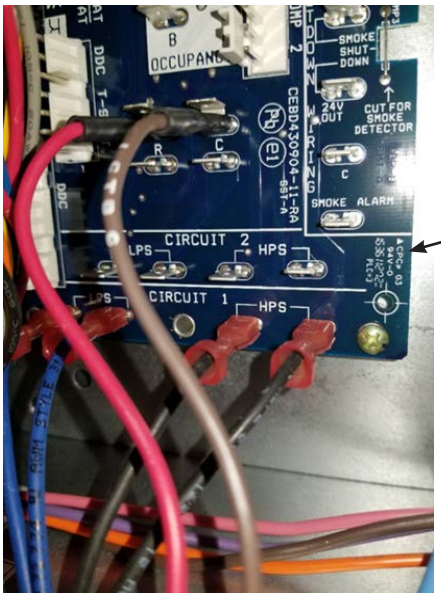


Figure 11 – Connect Red and Brown Wires to Central Terminal Board

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

For 48/50LC 07-12 Instructions, see pages 10-12

Figure 12 – Connect Ground Wire From Controller

Step 17: Locate the 9962-0407-SAOEXT harness (with 4-pin female plug) provided in the economizer hardware kit. Connect the 9962-0407-SAOEXT harness to the 4-wire harness with a male plug from the Jade controller harness. See Figures 13 and 23. Important - See note ⚠ below.

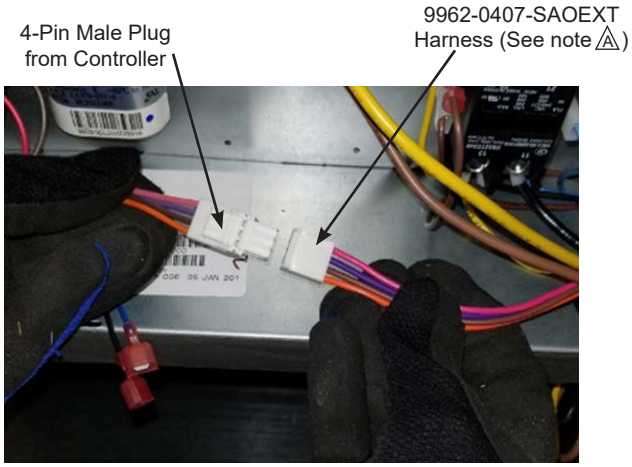


Figure 13 – Connect 9962-0407-SAOEXT Harness to Harness from Controller (See note ⚠)

Step 18: Route the 4-wire 9962-0407-SAOEXT harness through the divider between the control box and the indoor blower section. See Figure 14. Important - See note ⚠ below.

Note ⚠:
On some models the 9962-0407-SAOEXT is built in to and is a part of the standard harness attached to the Jade W7220 controller terminals "MAT" and "OAT".

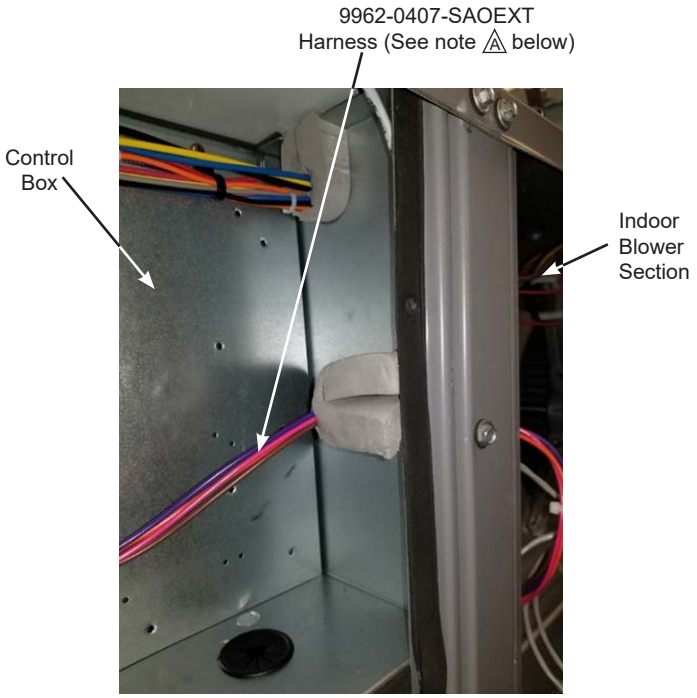


Figure 14 – Route 9962-0407-SAOEXT Harness to Indoor Blower Section (See note ⚠ below)
(Some control box configurations may differ)

Step 19: Screw the 9901-2021 mixed air (MAT) sensor (Honeywell C7250) to the left side edge of indoor blower through pre-punched holes, see Figure 15. Confirm that the screws do not interfere with blower rotation. Connect the 2-pin plug from the 9962-0407-SAOEXT harness to the MAT sensor. See Figures 15 and 23. Important - See note ⚠ below.

Figure 15 – Mount and connect Mixed Air Sensor

For 48/50LC 07-12 Instructions, see pages 10-12

Step 20: Connect the pink and violet wires from the 4-wire 9962-0407-SAOEXT harness to the pink and violet terminals in the wire bundle in the indoor blower section. See Figures 16 and 23. See note Ⓐ.

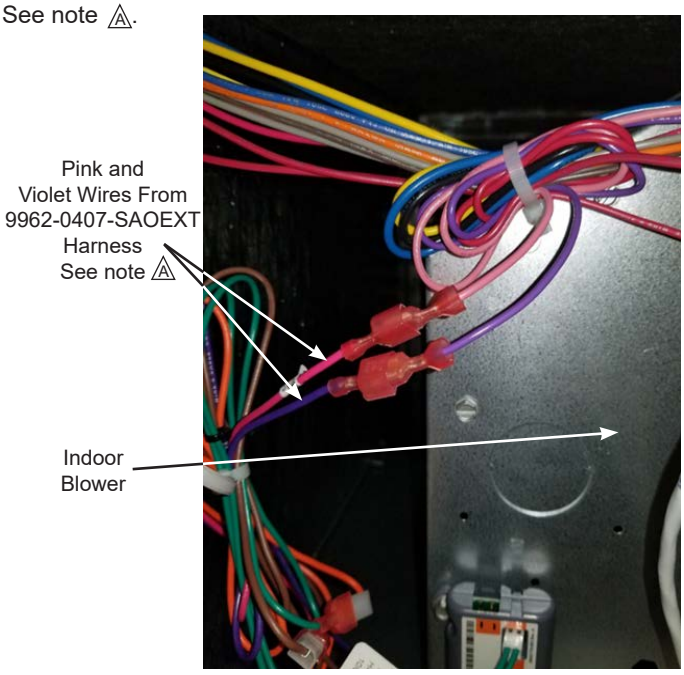
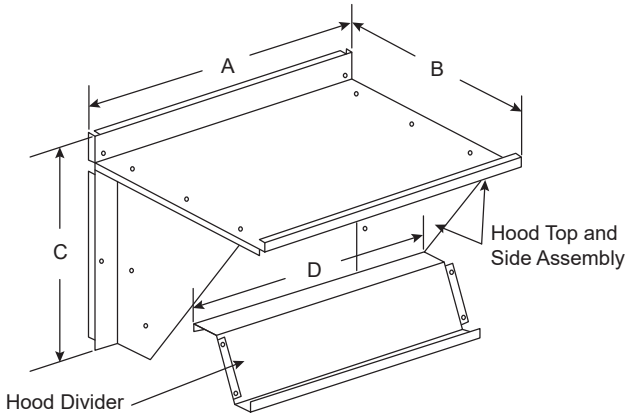


Figure 16 – Connect Pink and Violet Wires in Indoor Blower Section

Step 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.

Step 22: Assemble the economizer hood by screwing the hood divider to the hood subassembly (top and sides). See Figure 17. Note on the ECD-SRT05CA-D2*H there is also a center hood filter divider – screw in place. See Figure 18.



ECONOMIZER P/N	A	B	C	D	SHIP WT.
ECD-SRT12CA-D2*H	30.37”	17.43”	19.05”	29.5”	55 lb
ECD-SRT34CA-D2*H	40.37”	22.28”	24.48”	36.27”	80lb
ECD-SRT05CA-D2*H	52.92”	27.03”	33.41”	49.92”	98lb

NOTE: The ECD-SRT05CA-D2*H hood has 2 aluminum filters and a hood filter divider that installs between the filters.

Figure 17 – Economizer Hood Assembly

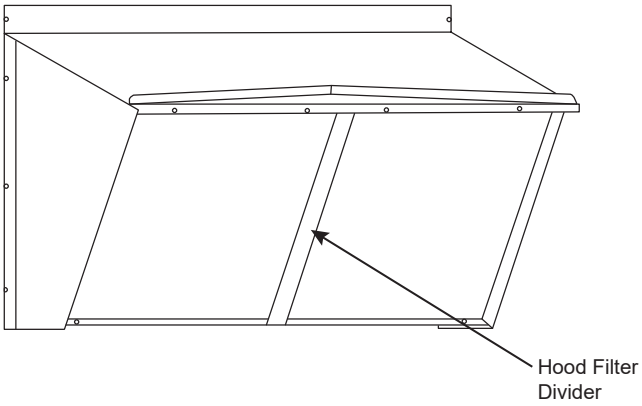


Figure 18 – Filter Divider on ECD-SRT05CA-D2*H Hood

Step 23: Install aluminum filter(s) in economizer hood. Clips at top of hood will hold filters in place. See Figure 19.

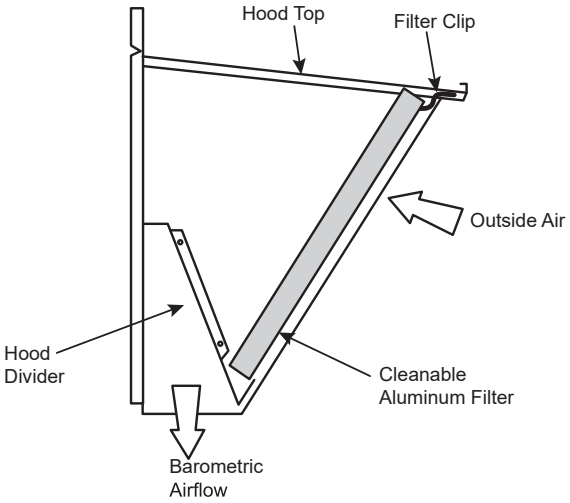


Figure 19 – Fully Assembled Hood

Step 24: Install economizer hood over economizer. Screw hood in place through pre-punched holes. Reinstall the unit’s filter access door. See Figure 20. Re-install the Indoor blower access panel. See Figure 6.

For 48/50LC 07-12 Instructions, see pages 10-12

Figure 20 – Install Economizer Hood and Unit Filter Access Door

Step 25: After powering 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 Figure 6.

Economizer performance charts are below. See base unit installation manual to make adjustments to meet building ventilation requirements.

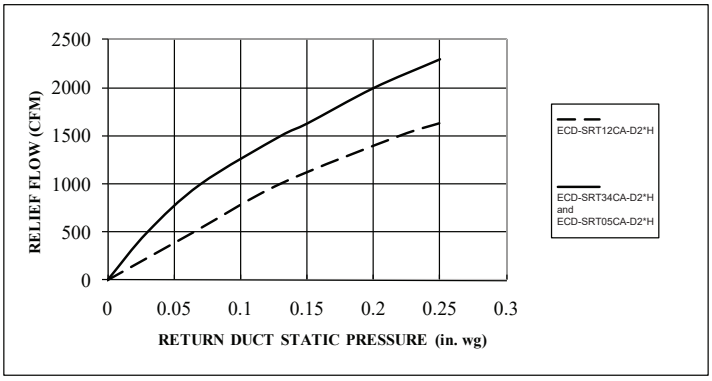


Figure 21 – Barometric Relief Flow Capacity

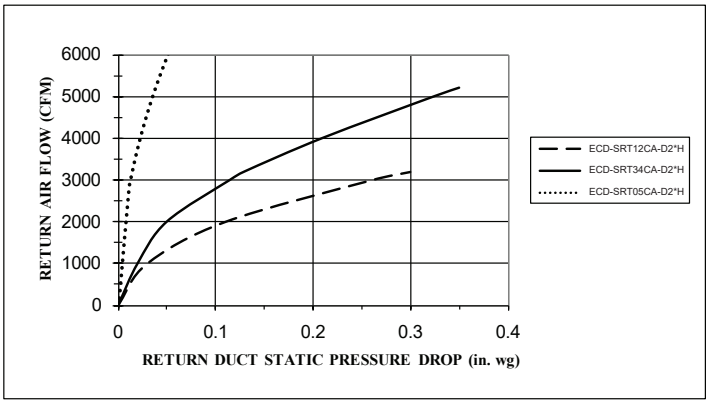


Figure 22 – Return Air Pressure Drop

For 48/50LC 07-12 Instructions, see pages 10-12

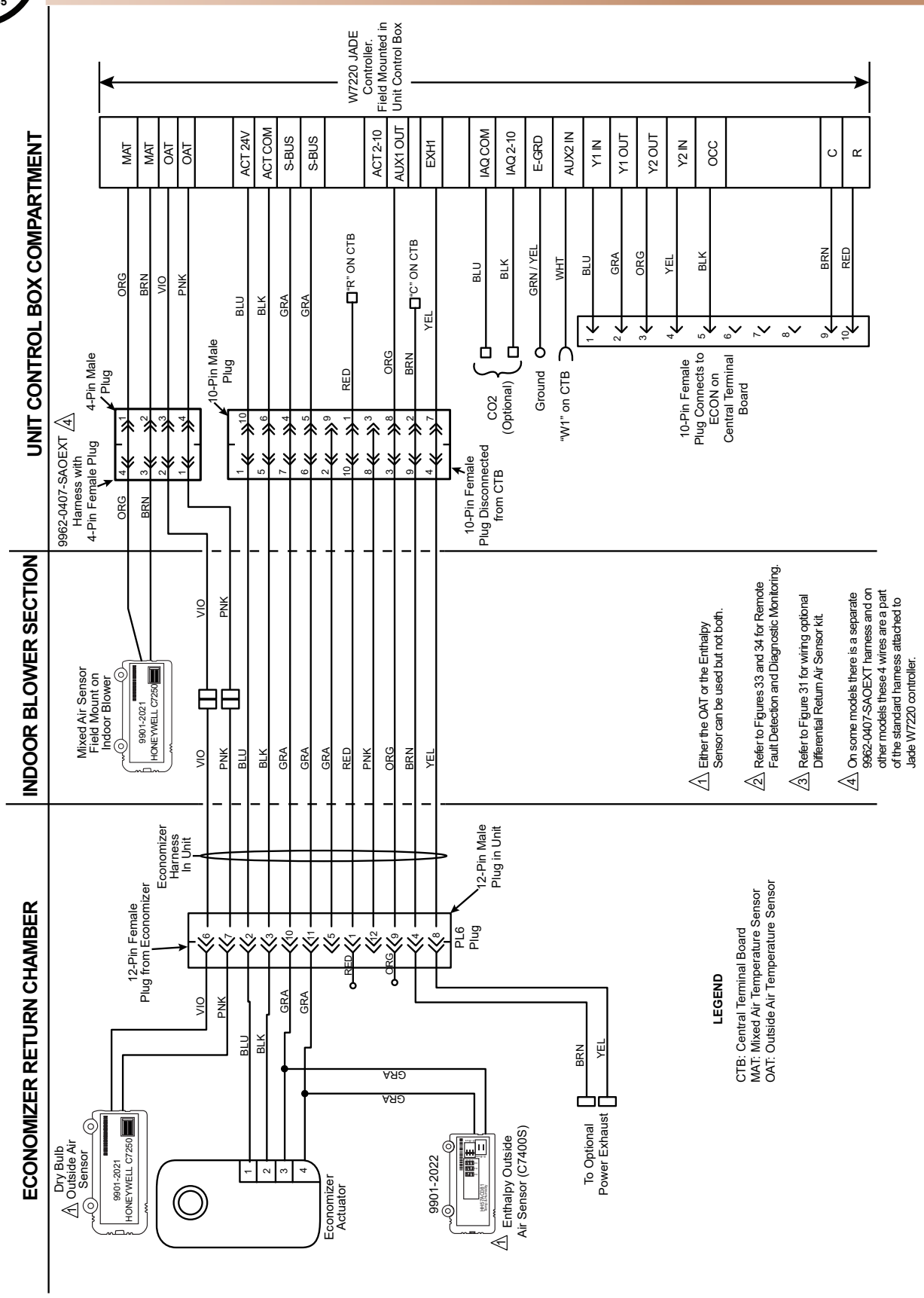


Figure 23 – Typical Economizer Wiring Diagram for 1 or 2 Speed Units (Not for 48/50LC 07-12 Units)

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Instructions for 48/50LC 07-12 Units Only

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

Step LC1. Follow steps 1 through 10 earlier in these instructions.

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 Figure 24. Set this harness aside as a small section may be used for LC units, see Figure 27.

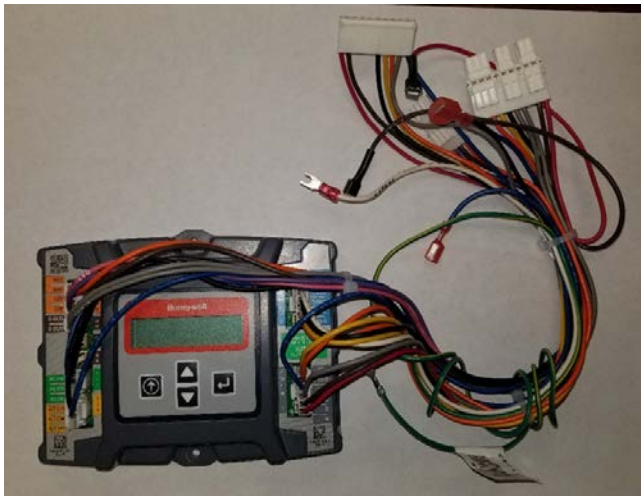

Figure 24 – Remove Complete Harness Factory-Attached to W7220 Controller

Note: The complete 4-wire 9962-0407-SAOEXT harness provided with the economizer will also NOT be used on the 48/50LC07-12 units, see Figure 24A. However, a small section may be used for the MAT, see Figure 27.

Figure 24A – 9962-0407-SAOEXT Not Used on 48/50LC 07-12 Units

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 Figure 25 and 26.

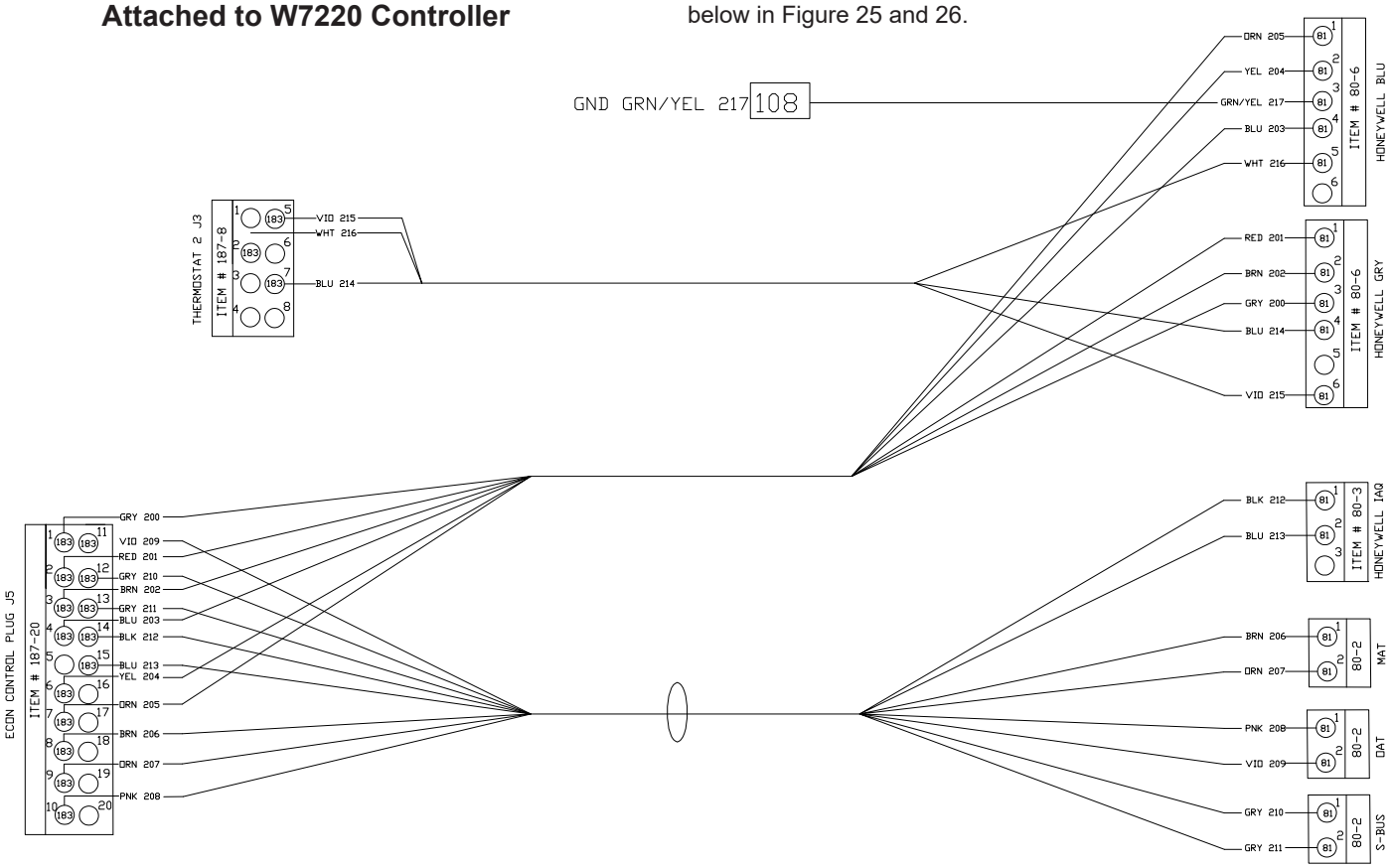

Figure 25 – 48LCHSRADH--A00 W7220 Controller Harness Shipped With 48/50LC 07-12 Units

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Instructions for 48/50LC 07-12 Units Only

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

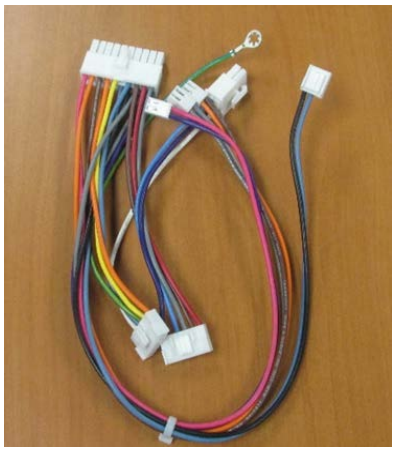

Figure 26 – Photo of 48LCHSRADH--A00 W7220 Controller Harness Shipped With 48/50LC 07-12 Units

Step LC4. The connectors on the right side of Figure 25 on the 48LCHSRADH—A00 harness attach to the Jade W7220 controller installed in the unit control box. See Figures 25 and 28. 48LCHSRADH—A00 harness connectors are labeled to easily identify the plug-in location on the controller.

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 Figure 28

Step LC6. The connectors on the left side of Figure 25 on the 48LCHSRADH—A00 harness attach to the unit's CSC board. Connect J3 and J5 plugs to the CSC board.

Step LC7. Screw the green wire with yellow stripe in the 48LCHSRADH—A00 harness to the control box (ground). See Figures 12 and 28.

Step LC8. Mount the provided 9901-2021 mixed air temperature (MAT) sensor (C7250) to the indoor blower. Confirm that the screws do not interfere with blower rotation. See Figure 15.

IMPORTANT:

The brown and orange wires in the indoor blower section for the mixed air sensor have spade terminals, and will not connect directly to the MAT sensor, which requires a 2-pin plug.

Some Economizer Models:

Locate brown and orange MAT wires on the 9962-0407-SAOEXT harness, see Figure 15. Cut the orange and brown leading to the 2-pin MAT plug. Splice these 2 wires to the brown and orange wires in the indoor blower section. Connect the 2-pin plug to the mixed air sensor, see Figures 27 and 28.

Other Economizer Models:

Locate the brown and orange wire on the original Jade harness, see Figure 27. Disconnect the terminals on the brown and orange MAT wires, see Figure 27. Connect these terminals to the brown and orange wires factory installed in the blower section. Connect the 2-pin plug to the mixed air sensor, see Figure 28.

Step LC9. Follow steps 21 through 25 earlier in instructions.

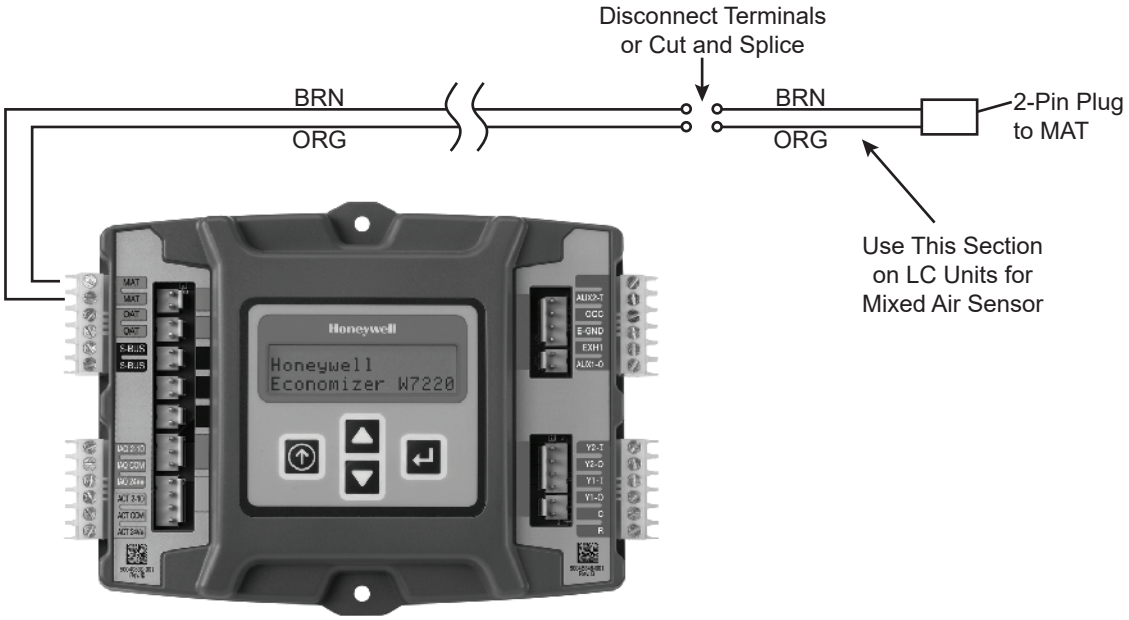

Figure 27 - Use Part of 9962-0407-SAOEXT Harness for MAT Sensor on LC Units

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Since 1965

Instructions for 48/50LC 07-12 Units Only

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

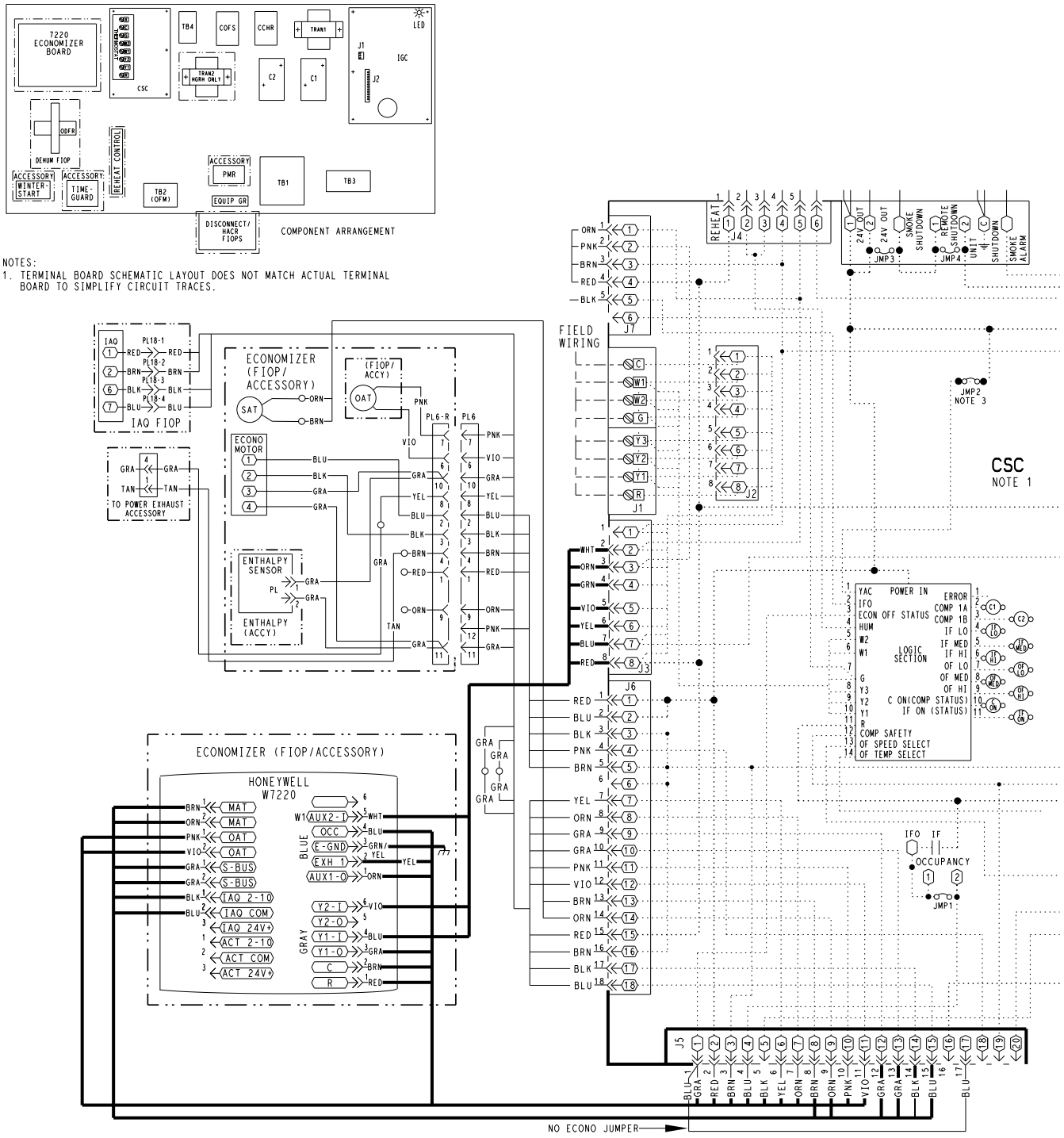


Figure 28 - Typical Wiring Diagram For 48/50LC 07-12 Units

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

9901-2022 SINGLE OUTSIDE AIR ENTHALPY SENSOR

When using the 9901-2022 (Honeywell C7400S) enthalpy sensor (See Figure 30) for outside air changeover, the existing 9901-2021 (Honeywell C7250) dry bulb sensor must be removed if applicable. See Figure 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 thru 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 9901-2022 sensor for outside air sensor, the dipswitches on the sensor must be set to OFF-OFF-OFF. See Table 8.*

The (2) gray wires with a plug from the economizer harness in the return chamber plug directly into the 9901-2022 enthalpy sensor. See Figures 23 and 28 for wiring.

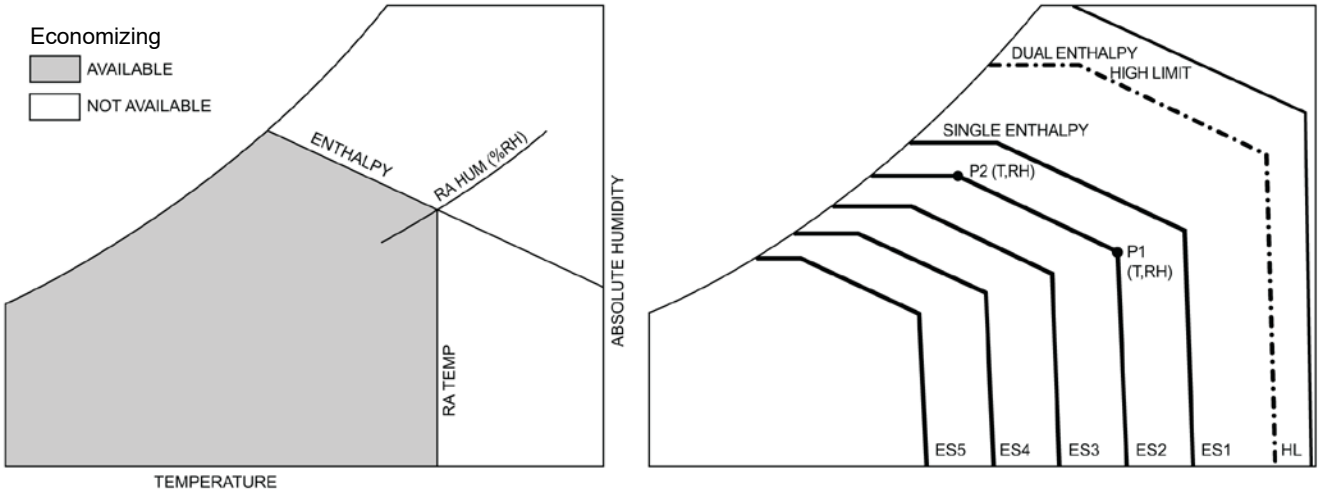


Figure 29 – Enthalpy Curve Boundaries

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	34.0	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

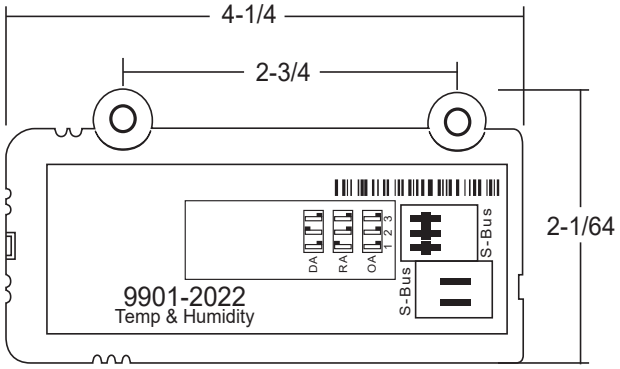


Figure 30 - 9901-2022 (C7400S) Dimensional, connection and switching information

Table 8 – 9901-2022 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

DA - Discharge Air (not used on economizer)
RA - Return Air
OA - Outside Air
Default Setting = OFF-OFF-OFF

INSTALLING DIFFERENTIAL RETURN AIR SENSOR

The 9901-2022-DIFF JC2 differential return sensor kit must be field mounted in the system's return duct work. The kit includes a wiring harness, that connects the economizer harness in the return chamber of the unit, to the provided 9901-2022 sensor. Wire per Figure 31.

In addition to using the 9901-2022 (Honeywell C7400S) sensor (See Figure 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 9901-2022 sensor for differential return air, the dipswitches on the sensor must be set to ON-OFF-OFF. See Table 8.*

When using the 9901-2022-DIFF JC2 differential return enthalpy or dry bulb temperature option, see Table 9 for California Title 24 setting requirements by region.

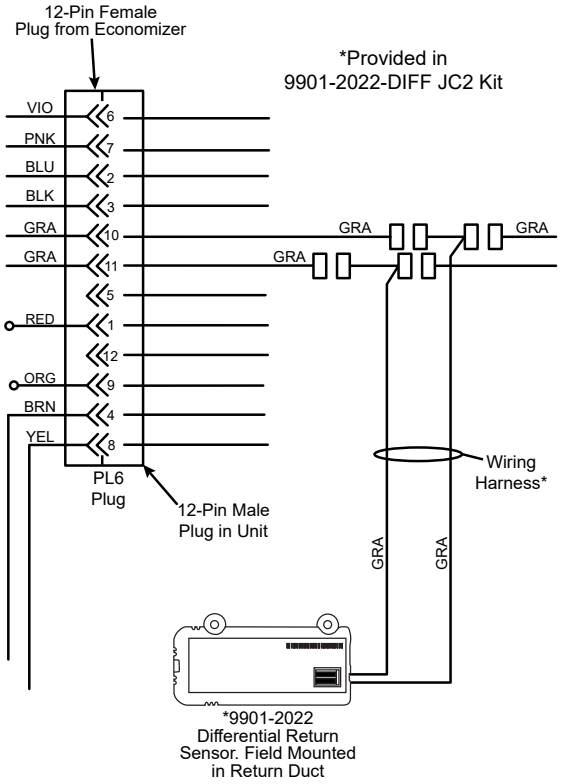


Figure 31 – Wiring Differential Return Air Sensor

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 change over. 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 CONTROL VENTILATION

Refer to economizer wiring diagram Figures 23 and 28 and DCV instructions if demand control ventilation (CO2 sensor) is used. CO2 sensor will wire into the blue and black connections at the Jade controller as shown in Figures 23, 28 and 32. If a field installed CO2 sensor is connected to the economizer controller, a demand controlled ventilation strategy will operate automatically. As the CO2 level in the space increases above the setpoint (on the economizer controller), the minimum position of the dampers will be increased proportionally, until the Maximum Ventilation setting is reached. As the space CO2 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.

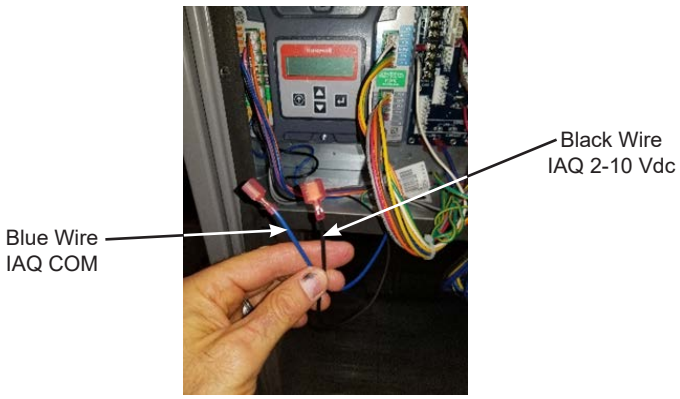


Figure 32 – CO2 wiring connections to Jade controller

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 Figure 34 for typical wiring to the Jade controller. Refer to codes for proper labeling of light.

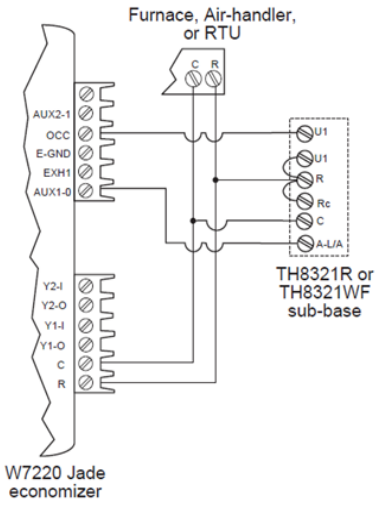
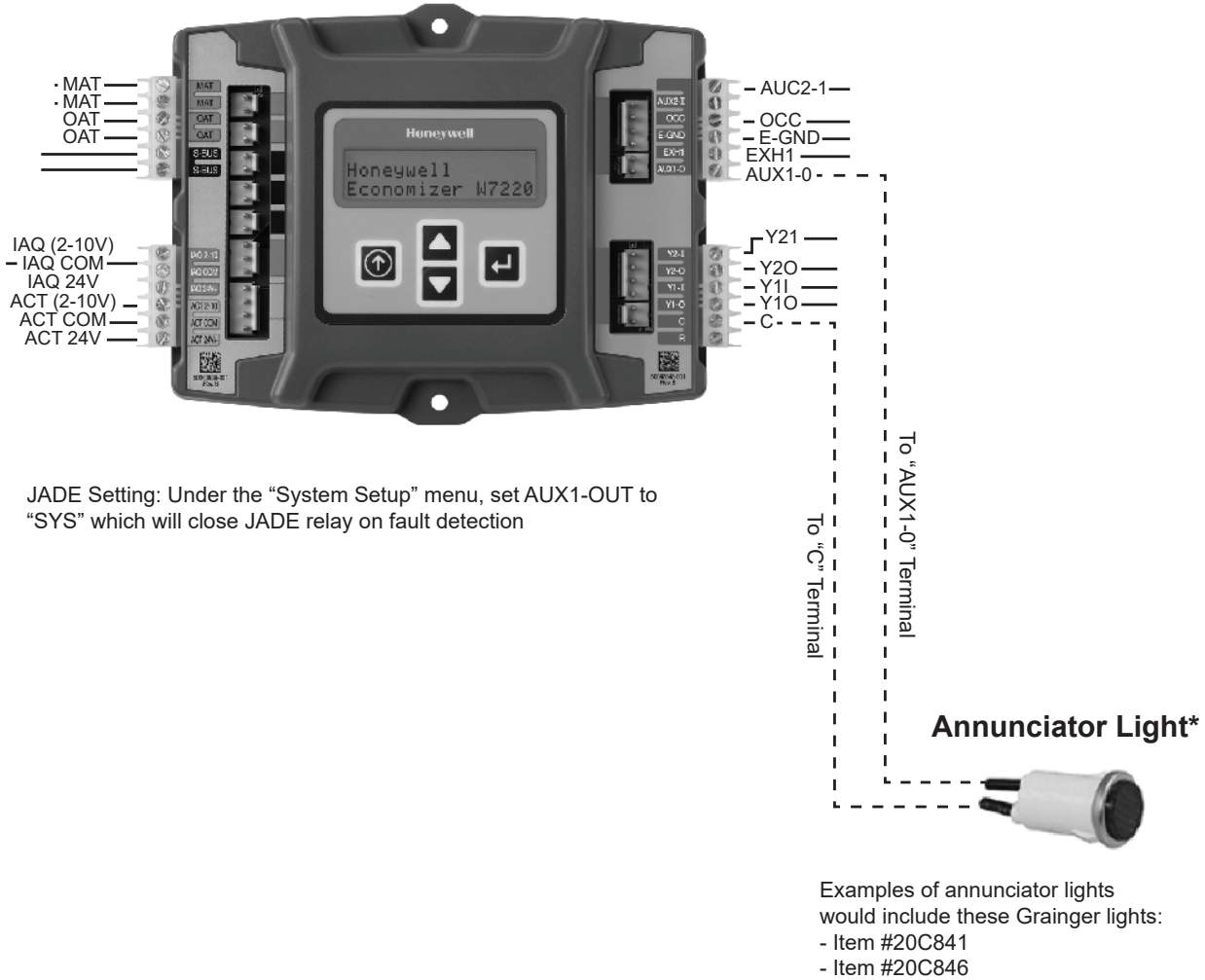


Figure 33 – Thermostat Wired For Remote FDD

W7220 Economizer Controller Module



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

Figure 34 – Annunciator Light Wired for Remote FDD

W7220 ECONOMIZER

The economizer controller used on electro mechanical units is the Honeywell W7220 which is to be located in the RTU base unit's Control Box. See Fig 35 for button description of the W7220 controller. The W7220 controller provide 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

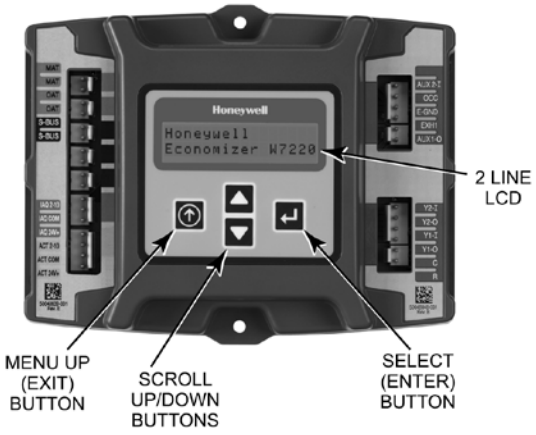


Fig. 35 - W7220 Controller

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 Figure 35) are used to scroll through the menus and menu items, select menu items, and to change parameter and configuration settings.

Using the Keypad with Menus

To use the keypad when working with menus:

- Press the ▲ (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 economizer system.

The Menus in display order are:

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

IMPORTANT NOTE: The default setting on the W7220 controller is for a "Fan Type" with 2 speed. If your unit is 1 speed, the setting under SYSTEM SETUP > FAN TYPE must be changed to 1 speed. *NOTE: Some models' default may vary.*

PROGRAMMING THE 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: instead of setting the SETPOINTS you can use the **defaults** already set in the Jade controller – see **default** settings below.* See Table 10 for summerized 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 degrees, but the range is anywhere from 38 to 70 degrees F.
- LOW T LOCK: This setting locks out the compressor (or mechanical cooling) at a given temperature. The default is 32 degrees F, but the controller's range is from -45 to 80 degrees F.
- DRYBULB SET: if you have an economizer with a dry bulb outside air sensor you will see and set the DRYBULB SET. The default setting is 63 degrees F but the controller's range is 48 to 80 degrees F.
- ENTH CURVE: if you have a single enthalpy outside air sensor instead of a dry bulb, you will see and set the ENTH CURVE setting. There are 5 setting options: ES1 thru 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. If you have a single speed unit there will be only one minimum position setting. The default is 2.8 volts, but the range is 2-10Vdc.
  - o MIN POS H and MIN POS L: If your unit is 2 speed, there will be 2 minimum position settings that show up on the menu. The first is MIN POS H (for high speed) which has a default of 2.8 volts. The second is MIN POS L (for low speed), which has a default of 3.2. *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: Allows you 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 W1.
- FAN TYPE: Set for either single or 2 speed. The default is 2 speed.
- 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 SINGLE SPEED UNIT		FOR 2 SPEED UNITS		
	Controller Menu Item	Default	Set To:	Default	Set To:	Note
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	2.8 Vdc	2 to 10 Vdc	NA		Only displayed if set up for single speed unit
	MIN POS H	NA	NA	2.8 Vdc	2 to 10 Vdc	Only displayed if set up for 2 speed unit
	MIN POS L	NA	NA	3.2 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	W1*	W1	W1*	W1	Always set to W1
	FAN TYPE	2 speed*	1 speed	2 speed*	2 speed	Default may vary on some models
	AUX1 OUT	NONE	SYS	NONE	SYS	Set to SYS for remote FDD monitoring
	OCC	INPUT	INPUT	INPUT	INPUT	Always set to INPUT

Note 1: For 2 speed unit, under SYSTEM SETUP: EQUIPMENT= CONV, AUX2 I = W1, and FAN TYPE = 2 SPEED

Note 2: More sophisticated controller setups, including for DCV or power exhaust, are available by referring to Table 11 options

NA = Not applicable

*Available on Firmware 1.15 June 2018 and later

Table 11 — Menu Structure*

Menu	Parameter	Parameter Default Value	Parameter Range and Increment[b]	Notes
STATUS	ECON 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 1st 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[c]	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 (CO2 sensor required, accessory or factory option) Displays value of measured CO2 from CO2 sensor. Invalid if not connected, short or out–of–range
	DCV STATUS	n/a	ON/OFF	DEMAND CONTROL VENTILATION STATUS (CO2 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

* Table 11 illustrates the complete hierarchy. your menu parameters may be different depending on your configuration.

Table 11 — Menu Structure (cont)*

v

Menu	Parameter	Parameter Default Value	Parameter Range and Increment[b]	Notes
STATUS (cont)	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
	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 (Available firmware 1.15, June 2018 and later)	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 enthalpy 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 differential 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	1100ppm	500 to 2000 ppm; increment by 100	DEMAND CONTROL VENTILATION SETPOINT Displays only if CO2 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	2.8 V	2 to 10 Vdc	VENTILATION MINIMUM POSITION. Only displayed if controller is set for single speed unit under FAN TYPE, and if DCV is NOT used.
	MIN POS L	3.2 V	2 to 10 Vdc	VENTILATION MINIMUM POSITION AT LOW SPEED Displays ONLY if used on 2 speed units and CO2 sensor is NOT used.
	MIN POS H	2.8 V	2 to 10 Vdc	VENTILATION MINIMUM POSITION AT HIGH SPEED Displays ONLY if used on 2 speed units and CO2 sensor is NOT used.
	VENTMAX L	2.8 V	2 to 10 Vdc	DCV MAXIMUM DAMPER POSITION AT LOW SPEED (Requires CO2 sensor connected)
	VENTMAX H	4.4 V	2 to 10 Vdc	DCV MAXIMUM DAMPER POSITION AT HIGH SPEED (Requires CO2 sensor connected)
	VENTMIN L	2.25 V	2 to 10 Vdc	DCV MINIMUM DAMPER POSITION AT LOW SPEED (Requires CO2 sensor connected)
	VENTMIN H	2.8 V	2 to 10 Vdc	DCV MINIMUM DAMPER POSITION AT HIGH SPEED (Requires CO2 sensor connected)
	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
	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

Note: MIN POS defaults may vary on some models.

* Table 11 illustrates the complete hierarchy. your menu parameters may be different depending on your configuration.

Table 11 — Menu Structure (cont)*

Menu	Parameter	Parameter Default Value	Parameter Range and Increment[b]	Notes
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	W1	Always set to W1	Always set to W1
	FAN TYPE	2 speed	1 speed / 2 speed	Sets the economizer controller for operation of 1 speed or 2 speed indoor fan system. Note: Default settings may vary.
	FAN CFM	5000cfm	100 to 15000 cfm; increment by 100	UNIT DESIGN AIRFLOW (CFM) Enter ONLY if using DCVCAL ENA = AUTO
	AUX1 OUT	NONE	NONE ERV EXH2 SYS	Select OUTPUT for AUX1 O relay NONE = not configured (output is not used) ERV = Energy Recovery Ventilator[d] 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
	FACTORY DEFAULT	NO	NO or YES	Resets all set points to factory defaults when set to YES. LCD will briefly flash YES and change to NO but all parameters will change to factory default values.
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	0ppm	0 to 500 ppm: Increment by 10	CO2 ppm level to match CO2 sensor start level.
	CO2 SPAN	2000ppm	1000 to 3000 ppm; Increment by 50	CO2 ppm span to match CO2 sensor.
	STG3 DLY	2.0h	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 2nd stage of cooling when economizer is 1st stage and mechanical cooling is 2nd
	SD DMPR POS	CLO	CLO or OPEN	Function NOT AVAILABLE with 2–speed mode
	DCVCAL ENA	MAN	manual or auto	Turns on the DCV automatic control of the dampers. Resets ventilation. For single speed units only.
	MATTCAL	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	0.0°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	0.0°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 2nd 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 illustrates the complete hierarchy. your menu parameters may be different depending on your configuration.

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 good for ERV operation.[d] • SYS – 24 Vac out. Issues a system alarm
ALARMS(_)				Alarms display only when they are active. The menu title “ALARMS(_)” includes the number of active alarms in parenthesis ( ).
	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 provides 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

*Table 11 illustrates the complete hierarchy. your menu parameters may be different depending on your configuration.

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.

To perform a Checkout test:

1. Scroll to the desired test in the Checkout menu using the ▲ and ▼ buttons.
2. Press the ↵ button to select the item.
3. RUN? appears.
4. Press the ↵ button to start the test.
5. The unit pauses and then displays IN PROGRESS.
6. When the test is complete, DONE appears.
7. 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.

LEGEND

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

⚠ 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 connections)
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 Block		
	n/a	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 Block		
Y2—1	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 with Economizer — For Occupied mode operation of economizer, 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 economizer 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 mixed 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 called for. 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 Economizer — 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	**DAMPER POSITION**				
NO CO2 SENSOR	CLOSED	MIN POS-L	MIN POS-L	MIN POS-H	MIN POS-H
W/ CO2 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 you clear it, it is redisplayed 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 re-calibrate it?	The sensor is not able to be re-calibrated in the field. However there is a menu item under the ADVANCED menu where you are able to input a limited off set in temperature and humidity for each sensor you have connected to the economizer.
Can I go back to factory defaults and start over?	Under the SYSTEM SETUP menu you can change the setpoints to the factory defaults.
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 are temperature is the temperature of air that you want to supply to the space. In a commercial building, this is between 50 to 55°F (10 to 13°C). The mixed are 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 CO2 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 Control 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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MicroMetl

Since 1965

INSTALLATION INSTRUCTIONS
Power Exhaust Option
Centrifugal Blower

GENERAL

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

These instructions are intended as a general guide and do not supersede Building and/or Electrical codes in any way.

All phases of the installation must comply with all NATIONAL, STATE and LOCAL CODES.

IMPORTANT: *This document is the property of the end user and is to remain with the equipment.*

Installation and servicing of air conditioning equipment can be hazardous due to high pressures of hazardous gases, moving parts, and electrical components. Only trained and qualified service personnel should install, service, or repair air conditioning equipment

Untrained personnel can perform basic maintenance functions of cleaning coils, and cleaning and replacing filters, but all other operations should be performed by trained service personnel.

When working on air conditioning equipment, observe precautions in literature, tags, and labels attached to the unit, and other safety precautions that may apply.

The optional Power Exhaust systems, available for Economizer applications, include Constant Volume Propeller Fan, Constant Volume Centrifugal Blower, and Variable (Modulating) Centrifugal Blower for building pressure control. In some cases, this assembly will replace the OA Hood and Relief Hood of the Economizer. In others only the Relief Hood is replaced.

The following instructions are for the installation of the RTU mounted exhaust for Downflow (Vertical) applications, and Duct Mounted (Horizontal) applications. Any wiring information provided in these instructions is provided for wire routing and generic connections, only. See Supplemental Instructions and/or provided wiring diagram for all electrical connections and/or Set Up procedures.

Optional motorized relief is also available for positive closure. See Motorized Relief Supplemental Instructions for more details.

Note: *A dedicated power source and disconnect may be required when installing a power exhaust.*

Note: *External Static will be specific to each job and will include everything external of the Power Exhaust cabinet, including the RTU and Return Air opening.*

SAFETY CONSIDERATIONS

⚠ WARNING

Turn off main power to the roof top unit (RTU) or air handling unit (AHU). Lockout and tag disconnect switch before starting installation, performing service, or maintenance operations.

Electrical shock and/or moving parts could cause personal injury, or death.

CAUTION

HEAVY OBJECT

To prevent personal injury use lifting aides and proper lifting techniques when installing, removing or replacing.

CAUTION

When working on air conditioning equipment, observe precautions in literature, tags and labels attached to the unit and other safety precautions that may apply.

Installation and servicing of air conditioning equipment can be hazardous due to high pressures of hazardous gases, moving parts, electrical components, and sharp sheet metal parts. Wear safety glasses and gloves.

Only trained and qualified service personnel should install, service, or repair air conditioning equipment. Untrained personnel can perform basic maintenance functions of cleaning coils, and cleaning and replacing filters, but all other operations should be performed by trained service personnel.

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PRE-INSTALLATION

1. **Inspect Shipment for Damage** - File claim with shipping company if accessory is damaged or incomplete. Contact your supplier for any missing parts.

Important: *To eliminate any delays in shipping and to insure part(s) replacement accuracy, provide the Economizer/Power Exhaust Model Number and Production Number.*

2. **Check Unit Clearance** - In addition to the clearances required for the RTU, provide sufficient space for airflow clearance, wiring, and servicing this accessory after it is mounted on unit - See Submittal Data for unit dimensions and weight.

Exhaust/Outside Air Hood	24”
Access Door(s)	36”
Top	36”

INSTALLATION

Please read these instructions thoroughly before beginning the installation.

Constant Volume and Modulating Downflow Installations:

1. Follow the instructions provided with the economizer to complete the economizer installation.

2. Set Power Exhaust Assembly in front of HVAC unit and check to be sure all clearances are met - See Pre-Installation Step 2.

3. If provided attach Molex 4-pin plug (Orange / Yellow wires) to Receptacle in Economizer Panel for Start/Stop Control. If not, route the Start/Stop (Orange/Yellow) control wires to the Economizer Control Exhaust Fan terminals, Actuator Auxiliary Switch wires, or Building Management System for unit Start/Stop function. See Supplemental Instructions and/or provided wiring diagram for wiring details.

4. **Skip this step if not installing Modulating Power Exhaust.** If tubing was pre-installed prior to RTU installation, route MicroMetl factory supplied pressure tubing to the location the pre-installed tubing was terminated (cut to length if necessary). Connect factory tubing to the field installed tubing (may require a field supplied coupler)

Note: *If tubing not pre-installed, approximately 25 ft. of tubing is supplied with Power Exhaust that can be fed down the return air duct, or with stat wire, to building envelope.*

Important! *Do Not terminate tubing in ductwork! The negative pressure of the return air is not representative of building pressure - See Figure 1.*

5. Install room pressure sensing port (factory supplied) in ceiling or wall. Avoid close proximity to supply registers. A Coaxial cover plate (field supplied) may be used for a clean finish - See Fig. 1

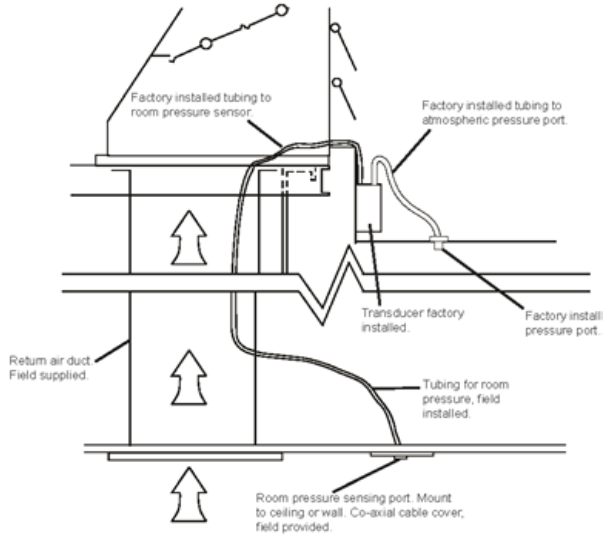

Fig. 1 - Typical Pressure Tubing Installation

6. Tip power exhaust back and elevate onto RTU base rail.

7. Being careful not to pinch control wires and/or tubing at bottom of unit, tilt power exhaust up to mate with RTU. Properly installed the top and both sides will be flush with RTU. Attach with provided screws. Use provided Blank-off panel where applicable.

8. Some models require a field installed Hood over the Relief Dampers. If a pre-installed Hood was removed for access to screws, re- install at this time.

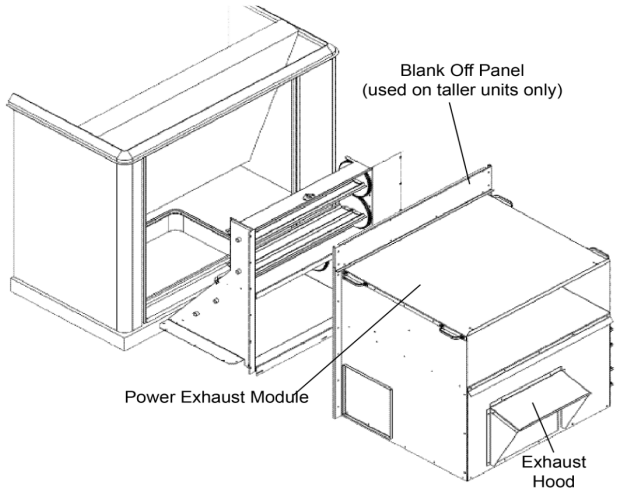

Fig. 2 - Typical Small to Midsize Downflow Power Exhaust with Built-in OA Hood (Not unit specific)

9. Install all Filler Panel(s) where necessary.

10. Caulk all seams to ensure weather tight seal

11. Connect Power Exhaust to an electrical source in accordance with voltage specified on the MicroMetl Name Plate affixed to the Power Exhaust Assembly. Please adhere to all applicable National, State, and Local Codes.

Note: *A knockout and junction box is provided for external routing of High Voltage Power. High Voltage (SEOOW) Cable for internal routing of High Voltage Power is not provided. All High Voltage wiring and connections to be provided by others.*

12. Open the Blower Door for inspection of the following:

- Wires free from moving parts
- Tubing free from kinks and moving parts
- Belt(s) for tension and alignment
- Sheaves and Pulley’s properly tightened (Set Screws Tight).

13. Open the Control Door and inspect all electrical connections.

14. See Wiring Diagram for wiring information.

15. For Modulating units (VFD controlled) units, see Supplement Control Document for setup and wiring options

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Constant Volume and Modulating Horizontal Installations:

1. Follow the instructions provided with the economizer to complete the economizer installation.

2. Set Power Exhaust assembly in front of intended mounting location of the Horizontal Duct and check to be sure all clearances are met - See Table 1 on pg. 2.

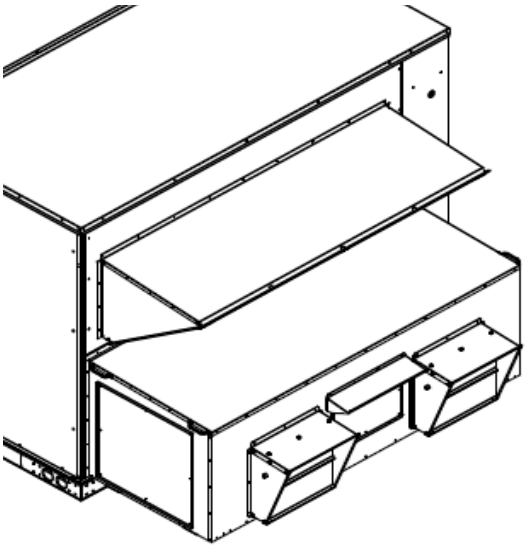

Fig. 3 - Typical Large Downflow Installation

3. Measure and cut opening in Horizontal Duct to match Power Exhaust opening.

4. Mount the Power Exhaust assembly to the duct with the provided screws and caulk all seams to ensure weather tight seal. Field fabricated support legs, or other support mechanism may be required. See Fig. 4.

Note: *Some units come with Duct Plenums - See Fig. 5 - as part of the assembly. In this case, attach the Plenum to the RTU then connect the ductwork. Set the Power Exhaust in front of the opening and route any tubing and wiring through the RA opening. Then lift and attach the Power Exhaust.*

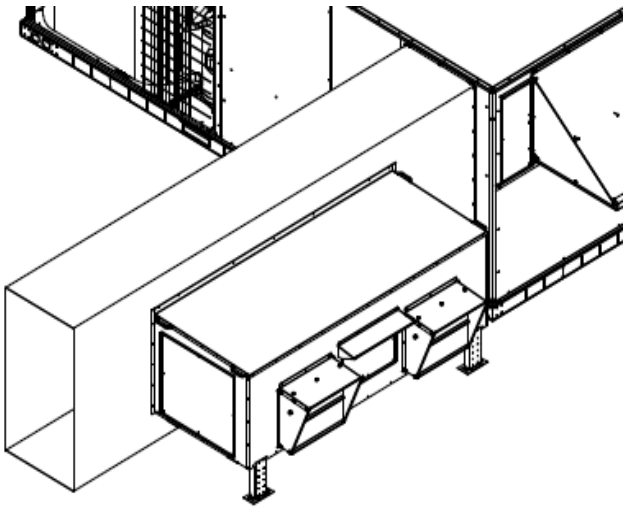

Fig. 4 - Typical Large Horizontal Power Exhaust Installation

5. Open the Blower Door to access the Start/Stop control wiring and pressure tubing (Modulating version only). Route the Start/Stop (Orange/Yellow) control wires to the Economizer Control Exhaust Fan terminals, Actuator Auxiliary Switch wires, or Building Management System for unit Start/Stop function. See Supplemental Instructions and/or provided wiring diagram for wiring details.

6. **Skip this step if not installing Modulating Power Exhaust.** If tubing was pre-installed prior to RTU installation, route MicroMetl factory supplied pressure tubing to the location the pre-installed tubing was terminated (cut to length if necessary). Connect factory tubing to the field installed tubing (may require a field supplied coupler)

Note: *If tubing not pre-installed, approximately 25 ft. of tubing is supplied with the Power Exhaust that can be routed to the building envelope.*

Important! *Do Not terminate tubing in ductwork! The negative pressure of the return air is not representative of building pressure - See Figure 1.*

7. Install room pressure sensing port (factory supplied) in ceiling or wall. Avoid close proximity to supply registers. A Coaxial cover plate (field supplied) may be used for a clean finish - See Fig. 1

8. Connect the Power Exhaust to an electrical source in accordance with voltage specified on the MicroMetl Name Plate affixed to the power exhaust assembly. Please adhere to all applicable National, State, and Local Codes.

Note: *A knockout and junction box is provided for external routing of High Voltage Power. High Voltage (SEOOW) Cable for internal routing of High Voltage Power is not provided. All High Voltage wiring and connections to be provided by others.*

9. Open blower door for inspection of the following:

- Wires free from moving parts
- Tubing free from kinks and moving parts
- Belt(s) for tension and alignment
- Sheaves and Pulley's properly tightened (Set Screws Tight).

10. Open control door and inspect all electrical connections.

11. See Wiring Diagram for wiring information.

12. For Modulating units (VFD controlled) see Supplement Control Document for setup and wiring options.

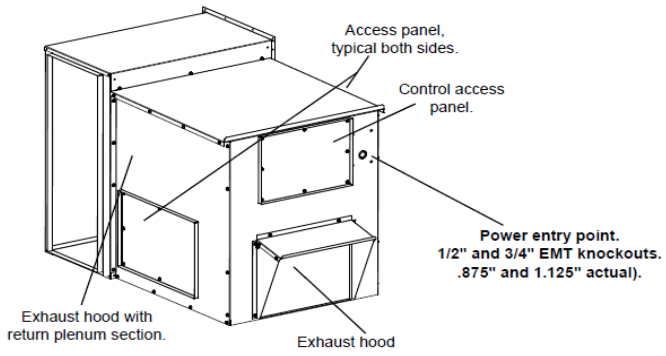

Fig. 5 - Horizontal Duct Mount with Plenum

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Indianapolis, IN 46226
1.800.MMC.HVAC (EST)
indycustomerservice@micrometl.com

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MicroMetl Sparks
905 Southern Way
Sparks, NV 89431
1.800.884.4662 (PST)
sparkscustomerservice@micrometl.com

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GENERAL

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

These instructions are intended as a general guide and do not supersede Building and/or Electrical codes in any way.

All phases of the installation must comply with all NATIONAL, STATE and LOCAL CODES.

IMPORTANT: *This document is the property of the end user and is to remain with the equipment.*

Installation and servicing of air conditioning equipment can be hazardous due to high pressures of hazardous gases, moving parts, and electrical components. Only trained and qualified service personnel should install, service, or repair air conditioning equipment.

Untrained personnel can perform basic maintenance functions of cleaning coils, and cleaning and replacing filters, but all other operations should be performed by trained service personnel.

When working on air conditioning equipment, observe precautions in literature, tags, and labels attached to the unit, and other safety precautions that may apply.

The MicroMetl optional Power Exhaust systems available for Economizer applications include Constant Volume Propeller Fan, Constant Volume Centrifugal Blower, and Variable (Modulating) Centrifugal Blower for building pressure control. The following pages will address the Modulating version.

When ordered with modulaing controls, the MicroMetl Power Exhaust comes standard with VFD for motor modulation, a Pressure Transducer to monitor building pressure, and fuses. About 25' of vinyl tubing is provided to be routed into the building along with a pressure terminal. The VFD is programmed for stand alone function and does not require any setup. However, occasionally the building pressure setpoint (PI) may need to be addressed.

The system may also be ordered without the Transducer for Third Party Control. If ordered for Third Party Control, a standard program will be uploaded; however, the program can be field modified as needed to be used with or without BACnet.

Optional Motorized Relief is available for positive closure. See supplemental instructions for the Motorized Relief for more details.

SAFETY CONSIDERATIONS

⚠ WARNING

Turn off main power to the roof top unit (RTU) or air handling unit (AHU). Lockout and tag disconnect switch before starting installation, performing service, or maintenance operations.

Electrical shock and/or moving parts could cause personal injury, or death.

CAUTION

When working on air conditioning equipment, observe precautions in literature, tags and labels attached to the unit and other safety precautions that may apply.

Installation and servicing of air conditioning equipment can be hazardous due to high pressures of hazardous gases, moving parts, electrical components, and sharp sheet metal parts. Wear safety glasses and gloves.

Only trained and qualified service personnel should install, service, or repair air conditioning equipment. Untrained personnel can perform basic maintenance functions of cleaning coils, and cleaning and replacing filters, but all other operations should be performed by trained service personnel.

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KEYPAD OPERATING AND STATUS DISPLAY

Upon Power Up the Inverter is in Operating Mode, after a short initialization phase.

In the Operating Mode, the Keypad displays information on the Status of the Inverter.

Lenze i510 QR Code

Keypad Display	Display	Meaning
If the inverter is inhibited, the keypad shows “STOP”: 1 2 3 VEL:FLEX:AIN1 STOP LOC REM MAN AUTO SET↵ 5	1 - Active Control Mode:	
	VEL	Speed Mode
	PID	Process Control Mode
	TRQ	Torque Mode
	JOG	Manual Mode
	2 - Active Control Source:	
	FLX	Flexible I/O Configuration
	KPD	Keypad
	KPDF	Keypad (complete control via Keypad including set-point selection
	NET	Network
	3 - Active Setpoint Source:	
	AINx	Analog input x
	KPD	Keypad
	NET	Network
	FREQ	Digital frequency
	PRx	Preset setpoint x
	SEGx	Segment x
	MOP	Motor potentiometer
	4 - Current direction of rotation:	
	FWD	Motor is rotating forwards
	REV	Motor is rotating backwards
	5 - Lower status line:	
	LOC	Local keypad control active.
	REM	Remote control via terminals, network, etc. active.
	MAN	Manual setpoint selection via keypad active.
	AUTO	Automatic setpoint selection via terminals, network, etc. active.
	SET	Blinking if one parameter setting has been changed but has not been saved in the memory module with mains failure protection. Save settings: Press keypad enter key longer than 3s.
If the Inverter is enabled, the Keypad shows the Output Frequency of the Inverter: 1 4 VEL:RUN:FWD Hz 20.0 LOC REM MAN AUTO SET↵ 5		
In the Process Control Mode, instead of the Output Frequency, the Process Control Setpoint is displayed. PID:FLEX:AIN2 50.00 LOC REM MAN AUTO SET↵		
If an error is pending, the keypad shows the following information: 1 Warn. DC Bus UV 01 W 3221 LOC REM MAN AUTO SET↵ 2 3 Faults (F) and trouble (T) are displayed continuously. Warnings (W) are only displayed every 2 seconds for a short time.	1 - Error Text 2 - Error Type: F Fault T Trouble W Warning 3 - Error Code (hexadecimal)	
Restart Pending AI1 fault 01 W 3221 LOC REM MAN AUTO SET↵	After a disturbance, a restart is possible if the error condition is not active anymore. The keypad shows this by the “Restart Pending” note. The note is displayed in a 1-second interval alternating with the error text	

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MicroMetl VFD Programming does not require all keys on the Keypad to be functional. The functional keys are the Navigation (UP/DOWN) Arrows, the Enter (Go to Menu/Parameter) Key, and the Exit (Quit) Key.

***IMPORTANT!** - For Safety reasons the **Stop Motor Key** is also valid, but the Start Motor Key will not restart the blower if the Stop Motor Key is pressed.*

To restart the blower after the Stop Motor Key is pressed the following steps must be performed:

1. Press the Start Motor Key to change the Display from **KSTOP** to **STOP**.

2. Cycling the device is also required by:

   a. Remove the Start/Stop Signal between the 24V and DI1 terminals for approx. 3 seconds; OR:
   b. Unplug the 6-Pin Plug for approx. 3 seconds; OR:
   c. Cycle Power to the Power Exhaust. The Display must go blank before re-applying power.

Neither the CTRL (Keypad Control), nor the R/F(Change Direction) Key are valid. If pressed Error will be displayed.

	Navigation in the menu Parameter alteration
	Go to Menu/Parameters Confirm parameter
	Quit Menu/Parameters
CTRL	Keypad control
	Start motor
R F	Change direction of rotation
	Stop motor

PARAMETERS

The Parameter List in this Drive is extensive and many are unrelated to this application; therefore, only a limited number of Parameters will be accessible for manipulation. All other Parameters will be Read Only. The Limited Parameters are found in Group 0 (Favorites) and can be accessed as follows:

1. Use the ↵ (Enter) key in the operating mode to navigate to the parameterization mode one level below. Password in the upper left corner with 0 in the lower right will appear.

***Note:** By using the ↩ (Back) key you can navigate one level upwards again at anytime. By using the ↩ key you can also exit (abort) the editing mode without accepting the new setting.*

2. Use the Enter key a second time and GROUP 0 will appear. You are now in the parameter level of the group selected. Press Enter again and P100.00 or similar will appear.

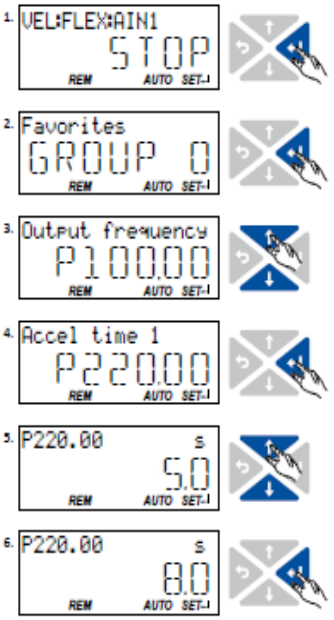
3. Use the ↑ (UP) and ↓ (DOWN) navigation keys to move to the desired parameter.

4. Use the ↵ key to enter the desired Parameter. You are now in the Editing Mode.

5. Set the desired value using the ↑ and ↓ navigation keys.

6. Use the ↵ key to accept the changed setting. The Editing Mode is exited.

***Note:** If one or more parameter setting has been changed with the keypad but has not been saved in the memory module with mains failure protection, the SET display is blinking.*
In order to save parameter settings in the user memory of the memory module, press the keypad Enter key longer than 3 seconds. Cycle power to the Inverter for new parameter to take effect.



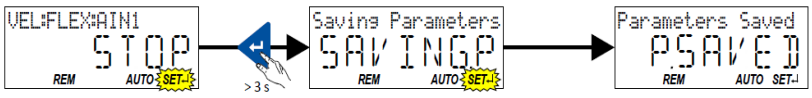


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Table 2 - MicroMetl Group 0 Favorites List

The Favorites Parameters List is as follows:

1. P100.00 - Output Frequency (Read Only)
2. P104.00 - Motor Current - Running Value (Read Only)
3. P106.00 - Motor Voltage - Actual Input (Read Only)
4. P150.00 - DC-bus on-UV (Read Only)
5. P201.01 - Frequency Setpoint Source
6. P210.00 - Minimum Frequency
7. P211.00 - Maximum Frquency
8. P220.00 - Acceleration Time (Freq. Mode)
9. P221.00 - Deceleration Time (Freq. Mode)
10. P302.00 - V/f Characteristics
11. P305.00 - Switching Frequency
12. P308.01 - Max Load Amps (%)
13. P310.01 - Motor Phase Failure Response
14. P310.02 - Current Threshold
15. P310.03 - Voltage Threshold
16. P317.01 - Skip Frequencies - Skip Freq. 1
17. P317.02 - Skip Frequencies - Skip Bandwidth 1
18. P317.03 - Skip Frequencies - Skip Freq. 2
19. P317.04 - Skip Frequencies - Skip Bandwidth 2
20. P323.00 - Motor Current (Amps)
21. P324.00 - Max Current (%)
22. P400.37 - Network Control
23. P420.01 - Relay Function
24. P420.02 - DO1 Function
25. P430.01 - AI1 Input Range
26. P508.00 - BACnet Activate Network
27. P510.01 - BACnet MS/TP MAC Address
28. P510.02 - BACnet Baudrate
29. P510.03 - BACnet Data Format (Fixed)
30. P510.04 - BACnet Device ID #
31. P510.05 - BACnet Device Name
32. P510.06 - BACnet Min. Response Delay
33. P510.07 - BACnet Max Master Property
34. P510.08 - BACnet Max Info Frames
35. P510.09 - BACnet 'I-AM' Service
36. P510.10 - BACnet Re-initialization Service
37. P514.01 - BACnet COM Loss Time-out
38. P515.01 - BACnet COM Loss Reaction
39. P600.02 - PID AI1 Process Variable
40. P606.01 - PID Acceleration Time
41. P606.02 - PID Deceleration Time
42. P610.01 - PID Sleep Mode Activation
43. P610.02 - PID Sleep Mode Stop Method
44. P610.03 - PID Sleep Mode Freq. Threshold
45. P610.04 - PID Sleep Mode Feedback Threshold
46. P610.05 - PID Sleep Mode Delay Time
47. P610.06 - PID Sleep Mode Recovery
48. P700.01 - Load VFD Default Settings
49. P700.05 - Load OEM Default Settings

Table 3 - MicroMetl Group 0 Settings Values

P201 - Frequency Setpoint Source:

1. Keypad
2. **Analog Input 1** ***(dependent on program)***
3. **Analog Input 2** ***(dependent on program)***
5. Network

P210/211 - Min/Max Frequency:

15Hz Min/60Hz Max

P220/221 - Accel/Decel Time:

5 or 10 Seconds Accel / 5 or 10 Seconds Decel
(dependent on program)

P302 - V/f Characteristics:

0 - Linear
1 - Quadriatic
2 - Multipoint
3 - Eco

P305 - Switching Frequency:

1. 4 kHz variable / drive-optimised
2. 8 kHz variable / drive-optimised
3. 16 kHz variable / drive-optimised 5. 2 kHz fixed / drive-optimized
6. 4 kHz fixed / drive-optimised
7. 8 kHz fixed / drive-optimised
8. 16 kHz fixed / drive-optimised
11. 4 kHz variable / min. Pv
12. 8 kHz variable / min. Pv
13. 16 kHz variable / min. Pv
15. 2 kHz constant/min. Pv
16. 4 kHz constant/min. Pv
17. 8 kHz constant/min. Pv
18. 16 kHz constant/min. Pv
21. 8 kHz variable / drive-optimised / 4 kHz min.
22. 16 kHz variable / drive-optimised / 4 kHz min.
23. 16 kHz variable / drive-optimised / 8 kHz min.
31. 8 kHz variable /min. Pv / 4 kHz min.
32. 16 kHz variable /min. Pv / 4 kHz min.
33. 16 kHz variable /min. Pv / 8 kHz min.

P308.01 - Max Load Amps (%)

150%

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P310.01 - Motor Phase Protection Failure
0 - No Response
1 - Warning
2 - Trouble
3 - Fault

P310.02 - Motor Phase Protection Current Threshold
5 %

P310.03 - Motor Phase Protection Voltage Threshold
25 Volts @ 230V
40 Volts @ 460V

P317 - Skip Frequencies/Bandwidth
Hz

P323 - Motor Current
Dependent on Size

P324 - Max Current
200%

P400 - Network Connection
0 - Not Connected
1 - Constant TRUE
11 - Digital Input 1
12 - Digital Input 2
13 - Digital Input 3
14 - Digital Input 4
15 - Digital Input 5

P420 - Relay and DO1 Function
0 - Not Connected
1 - Constant TRUE
11 - Digital Input 1 ***(DO1 Function Default)***
12 - Digital Input 2
13 - Digital Input 3
14 - Digital Input 4
15 - Digital Input 5
51 - Ready for Operation ***(Relay Function Default)***
52 - Operation Enabled
53 - Stop Active
56 - Error Active
57 - Error (non-resettable) Active
60 - Heatsink Temperature Warning Active
66 - Flying Restart Active
67 - DC Brake Active
69 - Rotational Direction Reversed
70 - Frequency Threshold Exceeded
72 - Setpoint Speed Reached
73 - PID Feedback = Setpoint
74 - PID Idle State Active
75 - PID Min Alarm Active
76 - PID Max Alarm Active
77 - Min/Max Alarm Active
78 - Current Limit Reached
81 - Error of Analog Input 1 Active
82 - Error of Analog Input 2 Active
104 - Local Control Active
105 - Remote Control Active
106 - Manual Setpoint Selection Active
107 - Automatic Setpoint Selection Active
115 - Release Holding Brake
117 - Motor Phase Failure

P430 - AI1 Input Range
0 - 0-10Vdc
1 - 0-5Vdc
2 - 2-10Vdc
4 - 4-20mA
5 - 0-20mA

P508 - BACnet Active Network
0 - No Action
1 - Restart with Current Values
2 - Restart with Factory Default
5 - Stop Fieldbus Operation
10 - Busy
11 - Cancelled
12 - Faulted

P510.01 - BACnet MS/TP MAC Address
1-254
Default 1

P510.02 - BACnet Baudrate
0: Automatic
3: 9600 bps
4: 19200 bps
5: 38400 bps (Default)
6: 57600 bps
7: 76800 bps
8: 115200 bps

P510.03 - BACnet Data Format (Fixed)
0: Automatic – not available on BACnet
1: 8, E, 1 – not available on BACnet®
2: 8, O, 1 – not available on BACnet®
3: 8, N, 2 – not available on BACnet®
4: 8, N, 1 – Fixed for BACnet®

P510.04 - BACnet Device ID #
Default 0

P510.05 - BACnet Device Name
20 character string
Default i500 ***(not configuarable with Keypad)***

P510.06 - BACnet Min. Response Delay
0-1000ms
Default 0

P510.07 - BACnet Max Master Property
0-127
Default 127

P510.08 - BACnet Max Info Frames
1-255
Default 1

P510.09 - BACnet 'I-AM' Service
0 – Send at Power up ONLY
1 – Send Continuously (approx. every 60 sec)

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P510.10 - BACnet Re-initialization Service
16 character string
Default: "password"

P600.02 - PID AI1 Process Variable
1 - Analog Input 1
2 - Analog Input 2
3 - DC-bus Voltage
4 - Motor Current
5 - Network P606:01/02
0-3600 Seconds

P610.01 - PID Sleep Mode Activation
0 - Disabled
1 - Output Frequency <Threshold
2 - Output Frequency <Threshold OR Process variable >Feed-back Threshold
3 - Output Frequency <Threshold OR Process variable <Feed back Threshold

P610.02 - PID Sleep Mode Stop Method
0 - Coasting
1 - Deceleration to Standstill
2 - Stop Method used as set in P203:03

P610.03 - PID Sleep Mode Freq. Threshold
15.0 Hz.

P610.04 - PID Sleep Mode Feedback Threshold
PID Units
15.0 Default or 12.0 depending on program

P610.05 - PID Sleep Mode Delay Time
Seconds - **Default 300 or 150 depending on program**

P610.06 - PID Sleep Mode Recovery
0 - Setpoint > Threshold OR System Deviation > Bandwidth
1 - Process variable < recovery threshold
2 - Process variable > recovery threshold

P700.01/05 - Load VFD/OEM Default Settings
0 - Off / Ready
1 - On / Strat
2 - In Progress
3 - Action Cancelled (Status Feedback only)
4 - No Access (Status Feedback only)
5 - No Access - Inverter Disabled (Status Feedback only)

SETUP

Setting the PI Setpoint

The controller is programmed to maintain building pressure of .05" wg. This is displayed in whole numbers - i.e. 50.00 will be .05" wg. This number represents a 0-100% of the 0.0" - 0.10" wg. scale of the Transducer. If necessary the PI Control Setpoint can be field changed. The following steps explain the procedure:

To ensure blower does not run during the Setup process, disconnect the Start/Stop Control – either the Yellow or Orange wires connected to the 6-Pin Plug. See Wire Diagrams for details.

During Power Up the controller will flash Green and Blue lights. Once booted up the Control will show STOP on the LCD Screen. This indicates the controller is ready for operation.

1. Expose the Setpoint by pressing the UP or DOWN Arrow key once.

2. Lower the settings by pressing the DOWN Arrow key

3. Raise the setting by pressing the UP Arrow key

4. Press the Enter ↵ Key when finished. The screen will revert back to STOP. The change made will remain in memory.

Note: *Most jobs can be satisfied with a .03" (30.00 PI Units) to .05" (50.00 PI Units) setting – See Table 1*

Parameter Setpoints

MicroMetl pre-programs all VFDs to the values listed in Table 2. These values (Favorites) will always be present and can be re-established at any time; as can the Lenze i510 Default values. This can be accomplished by exercising the reset option in Parameter P700.01 and P700.05.

Any Parameter(s) changed in the field will not be retained in Long-Term Memory. If the VFD is Reset to either the VFD (Factory) or MicroMetl (OEM) Default Values all Parameters set in the field will be lost.

Table 1 – Pressure Chart – Screen displays in PI Units

Transducer Output		*Space Pressure*	*PI Units*
Vdc or mA (output)		*in wg.*	*(Sreen Display)*
0	*0.00*	*0.00*	*00.0*
1	*2.00*	*0.01*	*10.0*
2	*4.00*	*0.02*	*20.0*
3	*6.00*	*0.03*	*30.0*
4	*8.00*	*0.04*	*40.0*
5	*10.00*	*0.05*	*50.0*
6	*12.00*	*0.06*	*60.0*
7	*14.00*	*0.07*	*70.0*
8	*16.00*	*0.08*	*80.0*
9	*18.00*	*0.09*	*90.0*
10	*20.00*	*0.10*	*100.0*

To access Group 0 (Favorites) Parameters take the following steps:

1. Press the Enter ↵ Key twice. Level 1 then Group 0 will appear, then press Enter again, P100.00 or similar will appear.

2. Press the UP ↑ Arrow or DOWN ↓ Arrow to scroll through the Parameters

3. Press the Enter Key to enter the Parameter you want to change.

   a. Use the UP/DOWN arrows to change the value.
   b. After a value is changed press the Enter Key once to save the setting.
   c. Once all changes have been made press the Return ↩ Key twice. STOP will appear on the screen. Unit is ready for operation.

4. Contact MicroMetl if access to other Parameters are required.

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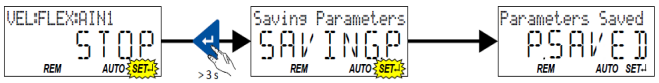
Saving Parameter Settings in the Memory Module

Save Parameter Settings with Keypaad

If one or more parameter setting(s) has been changed with the keypad but has not been saved in the Memory Module with Mains Failure Protection, the SET display will be blinking.

In order to save parameter settings in the User Memory of the Memory Module, press the keypad enter key longer than 3 s.



Cycle the unit off and back on for the settings to be accepted.

Important: *The Display must go blank (Capacitors fully discharged) before power is restored*.

Pressure Transducer

The MAMAC transducer is set at the factory to sense building pressure between 0.0" to 0.1" w.c, to operate in concert with the AC Tech with a 0-10Vdc output for Uni-directional control. See Fig. 1 for Dip Switch settings. See Table 1 for scaling values.

For more information see MAMAC Technical Information.

MAMAC QR CODE

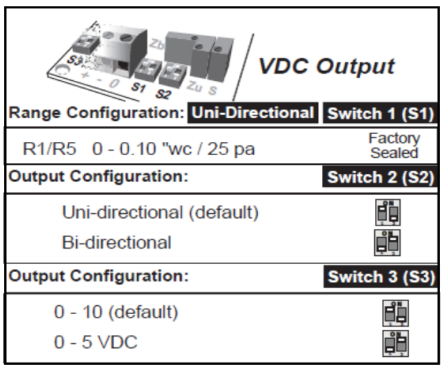


Fig. 1 - Dip Switch Settings

For 4-20mA control, an Ashcrift transducer is used. The pressure range of operation is also 0.0" to 0.1" w.c., but of course, the output is 4-20mA. Unlike the MAMAC transducer, however, these are fixed values and cannot be changed. For more information see Ashcroft Installation & Operation Manual 011-10130 AMR 1M.
While field calabration is acceptable on both the MAMAC and Ashcroft transducers, it is not recommended unless the instruments used for testing have been labratory calabrated within the last 12 months.

If field calabration is required the following steps should be followed:

MAMAC:

1. Connect terminals [+] and [-] to the appropriate power source. The [-] terminal is also the negative output terminal.

2. Connect a Digital Volt Meter on DC volts across [O] and [-] terminal.

3.Disconnect both the High and Low pressure ports. If configured for uni-direction, adjust Zu trimmer to achieve the desired low output value. If configured for bi-direction, adjust Zb trimmer to achieve desired low output.

4. Apply high pressure (0.10 w.c.) to the unit and adjust span trimmer [S] to obtain the desired voltage output.

5. Repeat steps 3 and 4 until desired calibration is achieved.

Ashcroft:

1. To find true zero differential pressure, pneumatically connect the high and low pressure connections together using a short piece of vinyl tubing.

2. Adjust the Zero potentiometer to the desired low output value.

3. Remove the jumper tubing and connect the high and low pressure tubes.

4. Apply high pressure (0.10" w.c.) to the unit and adjust the Span potentiometer to the desired voltage output.

Ashcroft QR CODE

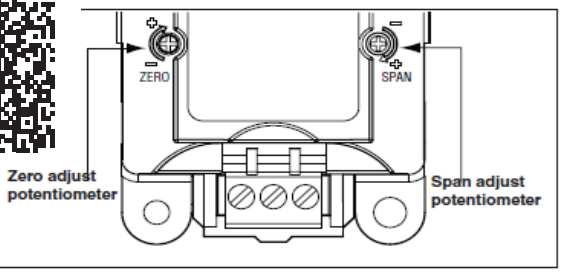


Fig. 2 - Ashcroft Pressure Transducer

Setting up BACnet Control

With the Start/Stop signal open power up the VFD. Once the VFD is booted up STOP will appear on the LCD Screen.

1. Press the Enter ↵ Key twice. LEVEL 1 then GROUP 0 will appear.

2. Press Enter ↵ and P100.00 or similar will appear.

3. Using the UP/Down ↑/↓ Arrows go to P201.01 and press Enter.

4. Using the UP Arrow change the value to 5 and press Enter. P201.01 will re-appear.

5. Using the UP Arrow go to P400.37 and press Enter.

6. Using the UP/DOWN Arrows change value to TRUE (1).

7. Using the UP Arrow go to P510.01 and press Enter.

8. Using the UP/DOWN Arrows set the MAC Address then press Enter. P510.01 will re-appear.

9. Using the UP Arrow go to P510.02 and press Enter.

10. Using the UP/Down Arrows set the desired Baud Rate. Thenpress Enter. P510.02 will re-appear.

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11. Using the UP Arrow go to P510.04 and press Enter. Parameter P510.03 is the BACnet Data Format and is fixed at 8, N, 1 and is not configurable.

12. Using the UP/DOWN Arrows set the BACnet Device ID # then press Enter. P510.04 will re-appear.

13. Using the UP Arrow go to P510.06 and press Enter. *Parameter P510.05 is not configurable with Keypad.*

14. Using the UP/DOWN Arrows set the BACnet Min. Response Delay if necessary then press Enter. P510.06 will re-appear.

15. Using the procedures discribed above set the following parameters as necessary:

P510.07 - Max. Master Property
P510.08 - Max. Info Frames
P510.09 - "I-AM" Service

16. After all Parameters have been addressed press the Return ↩ Key; GROUP 0 will appear and SET ↵ will be flashing in lower right corner. Press Enter and hold for 3 seconds. SavingP then P.Saved will appear. Once P.Saved appears release Enter. All changed Parameters will be save in Memory.

Note: *To review additional Parameters related to BACnet go to Group 5. These Parameters can be viewed but no values can be changed. If additional Parameters need to be accessed and changed contact MicroMetl for assistance.*

SEQUENCE OF OPERATION

The MicroMetl version of the Lenze i510 Variable Frequency Drive (VFD) is enabled when circuit 24V and DI1 is closed. This can be done by installing a jumper between the two, or via a remote contact. This contact can be the Exhaust Option on the Economizer Logic marked EF and EF1 on the electromechanical W7212, the EXF 2-pin connector on the ReliaTel RTEM – see Economizer Instructions for Sequence of Operation, the Auxiliary Switch option on the Actuator Motor, or a relay. See wire Diagram Options for details.

A Pressure Transducer is utilized to monitor the building pressure. The Transducer provides a 0-10VDC signal to terminals AI2 and GND, or a 4-20mA signal at terminals AI1 and GND on the VFD to control the motor speed. On a scale of 0" to .10" wg. and 0-10Vdc, for example, the transducer will output ~ 3.0 VDC (8.5mA) @ .03" wg. and ~ 5.0 VDC (11.5mA) @ .05" wg.

If a jumper between 24V and DI1 is used to enable the VFD the motor is commanded on and will run at minimum speed (15Hz) for a minimum of 2.5 minutes or 5 minutes, depending on the program, if the building pressure stays below the PI Setpoint (typically .03" to .05" w.c.). When the building pressure rises above Setpoint the frequency output to the motor will be increased for increased motor speed. If the pressure stays above Setpoint, the motor will continue to increase in speed until it achieves maximum speed of 60Hz, or the building pressure decreases to below Setpoint. If the building pressure stays below, or drops below the predetermined Setpoint for longer than 2.5 or 5 minutes mentioned earlier, the motor is commanded OFF and the display will show SLP. This feature is called the Sleep Mode. Needless to say, if the pressure rises above the Setpoint the motor will be commanded back on and the Sleep Timer will be reset.

Assuming a Setpoint of .03" the transducer will output a VDC or mA signal in relation to the building pressure. Once the signal rises above the Setpoint the motor will begin to increase in speed. The PI Protocol of the VFD controls the response time, however. So if the increase is only a spike the VFD may not respond right away, or possibly, not at all. Additionally, if the increase is minor and the pressure fails to decrease with the increase in motor speed, the VFD will continue to increase the frequency output to increase the motor speed. This is because the goal of the VFD is to try to maintain Setpoint. Because of this, the frequency output of the VFD does not always correspond with the Transducer VDC output.

WIRING

Wiring for Single Phase and Three Phase Input

In applications where Single Phase is required, MicroMetl will provide a drive that is rated for Single and Three Phase inputs. Whether Single Phase or Three Phase input the output to the motor will always be Three Phase. Therefore, in the case of Single Phase units the input wiring will be to terminals L1 and L2 only, where the wiring for Three Phase applications will be to terminals L1, L2, and L3.

For typical wiring of 3 Phase High Voltage and Control Connections see Fig. 1. For High Voltage Single Phase variations with 3 Phase Output see Fig. 2.

Control Wiring

For full wiring options, see provided Wiring Document. Choose one of the following options for controlling the ON/OFF function of the VFD:

1. Continuous Enable Operation:

Place a jumper between 24V and DI1. The Drive will sleep (turn off) during periods of low building pressure.

Note: *If jumper is utilized the VFD will operate independent of the Economizer. This could result in undesirable operation and high energy consumption.*

2. Enable/Disable Operation:

a. Connect control wires to actuator Auxiliary Switch (if available).

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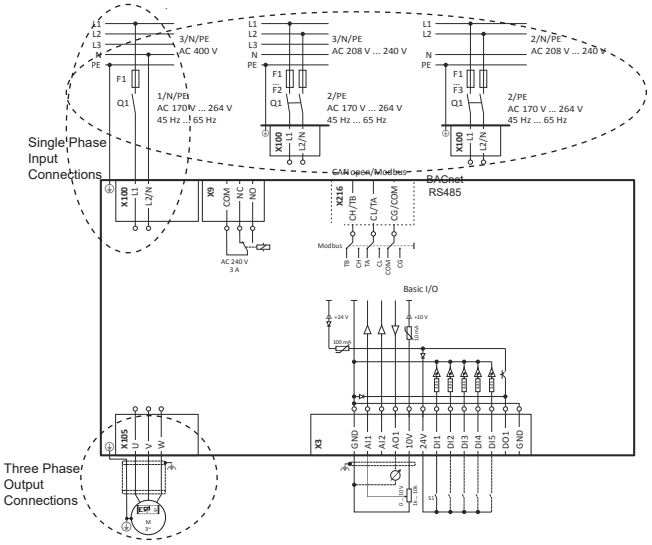

Fig. 2 - Single Phase Input with Three Phase Output

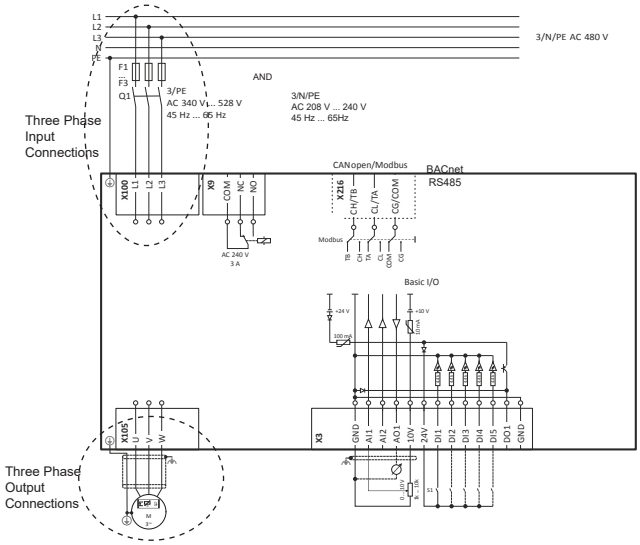

Fig. 1 - Three Phase Input with Three Phase Output

i. Connect provided Yellow and Orange control wires to Yellow and Orange wires going to Terminals 24V and DI1.
ii. Route and connect loose ends of Yellow and Orange control wires to the Actuator Auxiliary Switch identified as S1 and S3.

b. Install Relay (if not already provided) in Power Exhaust Control Panel or other conventient location.

i. Connect Yellow and Orange wires to N.O. contacts of the relay end and 24V and DI1 on the other. Applications where the relay is not installed in the Control Panel will require these wires to be extended.
ii. Connect the 24Vac Exhaust Fan output from the Economizer Control to Terminals A and B of the relay.
iii. Route these wires to a 24Vac control output. See unit specific Wire Diagram for details.

c. Install Tilt Switch to Damper or Gear for ON/OFF operation.

i. Connect control wires to Tilt Switch
ii. Connect other ends of control wires to 24V and DI1

3. Building Management (Automated) System (aka BMS or BAS) for Enable/Disable operation:

a. Connect BMS/BAS Start/Stop (Dry Contact) Control to 24V and DI1
b. Provide 0-10Vdc signal to AI2 and GND; OR
c. Provide 4-20mA signal to AI1 and GND

4. Building Management Full Control:

a. Analog Control:

i. If ordered for 3rd Party Control the Lenze Drive will be programmed and wired for full BMS/BAS Control - see provided Wire Diagram for details.
ii. If ordered for Standard PID Control follow the below steps to convert to BMS/BAS Control:

1. locate and disconnect the Orange and Pink wires located between the 6-Pin Plug and VFD see provided Wire Diagram.
2. Reconnect the two Orange wires along with field provided wire jumper to the Pink wire going to the DI3 terminal on the VFD - see provided Wire Diagram for details.
3. Unplug and remove Pressure Transducer.
4. Connect Black and White wires previously attached to the Pressure Transducer to the BMS/BAS 0-10Vdc Control source.
5a. If Relay is provided make connection per the provided Wire Diagram; OR:
5b. Remove the Relay and connect Dry Contact Start/Stop control directly to the Orange and Yellow wires - i.e. Actuator Aux. Switch, Tilt Switch (provided by others), or BMS/BAS Controls; OR:
5c. Remove Relay and install jumper between the Orange and Yellow wires for 24/7 Enable Function.

b. BACnet Control:

i. If ordered for 3rd Party Control the Lenze Drive will be programmed and wired for full BMS/BAS Analog Control - see provided Wire Diagram for details. Go to step iii below.
ii. If ordered for Standard PID Control follow the below steps to convert to BMS/BAS Control:

1. locate and disconnect the Orange and Pink wires located between the 6-Pin Plug and VFD see provided Wire Diagram.
2. Reconnect the two Orange wires along with field provided wire jumper to the Pink wire going to the DI3 terminal on the VFD - see provided Wire Diagram fordetails.
3. Unplug and remove Pressure Transducer.
4a. If Relay is provided make connection per the provided Wire Diagram; OR:
4b. Connect Dry Contact Start/Stop control directly to the Orange and Yellow wires - i.e. Actuator Aux. Switch, Tilt Switch (provided by others), or BMS/BAS Controls; OR:
4c. Install jumper between the Orange and Yellow wires for 24/7 Enable Function.

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RESET PARAMETERS

If you find it necessary to have to reset the VFD to Lenze Factory Settings, or MicroMetl OEM Values the following steps should be followed:

1. Using the method layed out under Parameters to enter Group 0.

2. Using the UP/DOWN Arrows go to P700.01 for Reset Factory Default Settings, or P701.05 to Load (reset) OEM Data.

3. Changing either of these from 0 to 1 will reset any user setting(s) to Lenze Factory or MicroMetl OEM Values respectively.

Important: *By executing this device command, all parameter settings made by the user are lost!*

4. If needed change any Parameters in Group 0 as described under Parameters on previous pages. Contact MicroMetl if access to other Parameters are required.

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Form No. CD-PE-B

MicroMetl

Since 1965

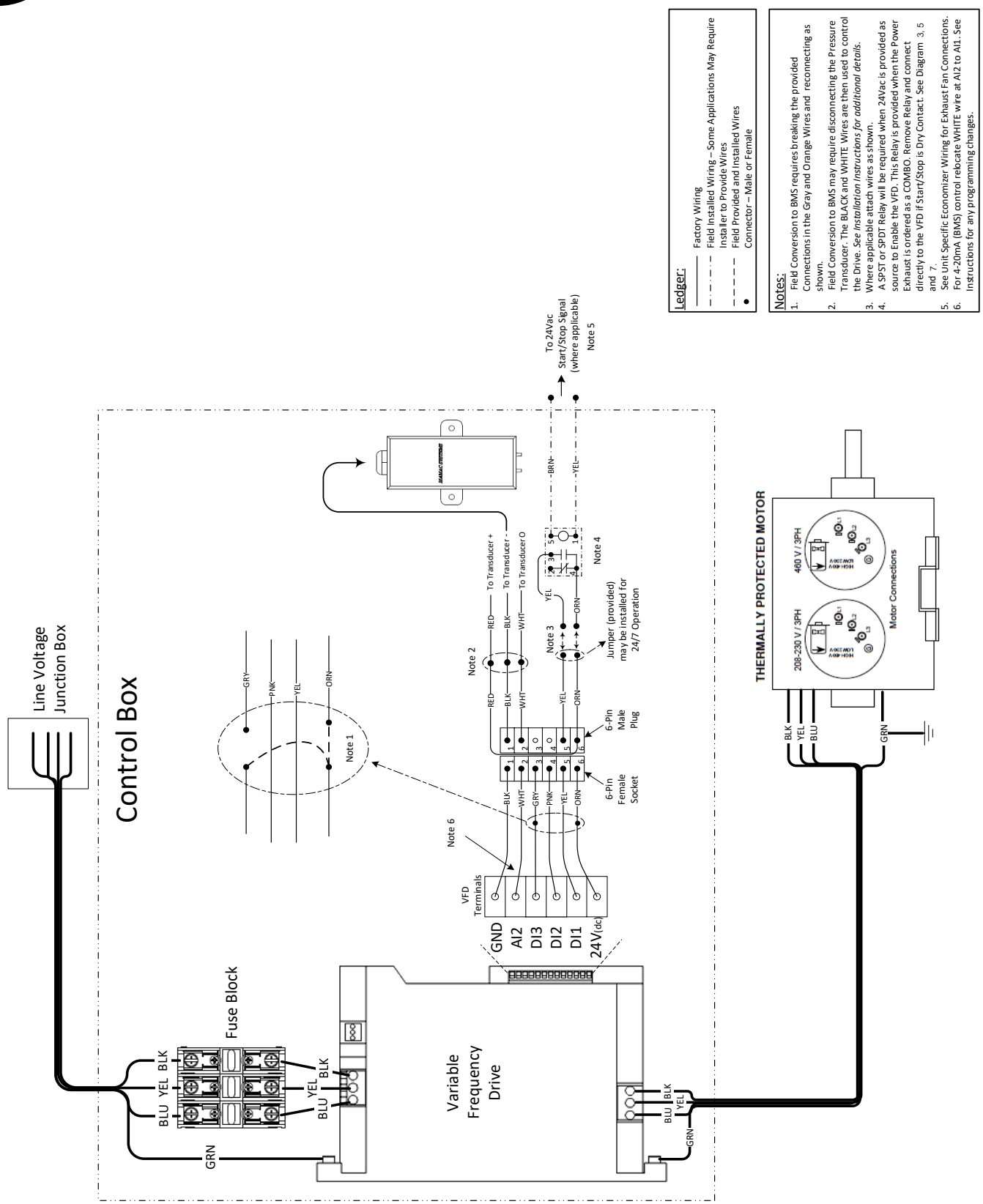
WIRE DIAGRAM

Modulating Power Exhaust

General Purpose *(not Brand/Unit Specific)*

Building Pressure Controlled w/24Vac Start/Stop Signal & Single Motor

Follow Notes for any Required Field Wiring and/or Modifications.



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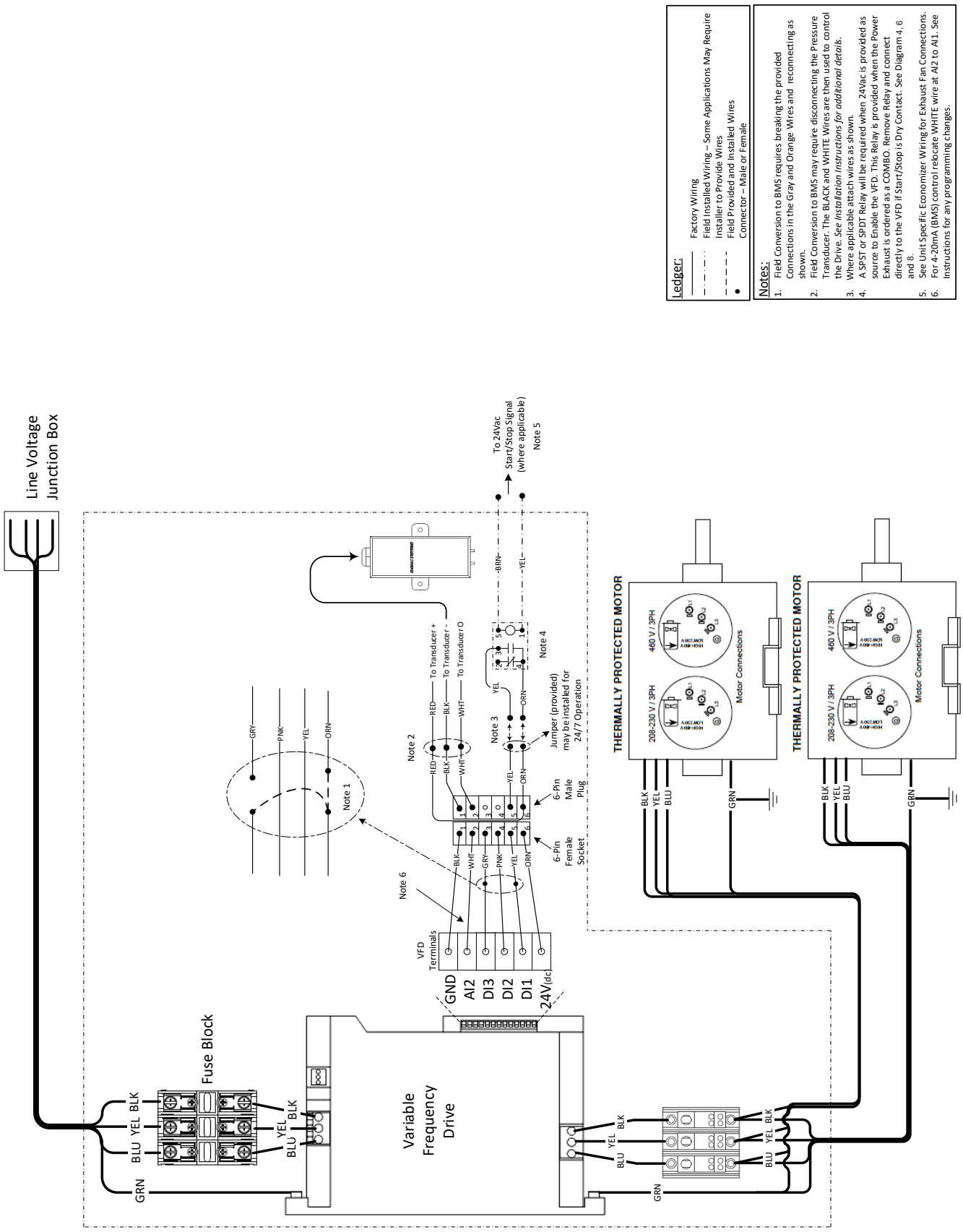
Building Pressure Controlled w/24Vac Start/Stop Signal & Multiple Motors

Follow Notes for any Required Field Wiring and/or Modifications.



Ledger:

- Factory Wiring
- Field Installed Wiring – Some Applications May Require Installer to Provide Wires
- Field Provided and Installed Wires
- Connector – Male or Female

Notes:

1. Field Conversion to BMS requires breaking the provided Connections in the Gray and Orange Wires and reconnecting as shown.
2. Field Conversion to BMS may require disconnecting the Pressure Transducer. The BLACK and WHITE Wires are then used to control the Drive. *See Installation Instructions for additional details.*
3. Where applicable attach wires as shown.
4. A SPST or SPDT Relay will be required when 24Vac is provided as source to Enable the VFD. This Relay is provided when the Power Exhaust is ordered as a COMBO. Remove Relay and connect directly to the VFD If Start/Stop is Dry Contact. See Diagram 4, 6 and 8.
5. See Unit Specific Economizer Wiring for Exhaust Fan Connections.
6. For 4-20mA (BMS) control relocate WHITE wire at AI2 to AI1. See Instructions for any programming changes.

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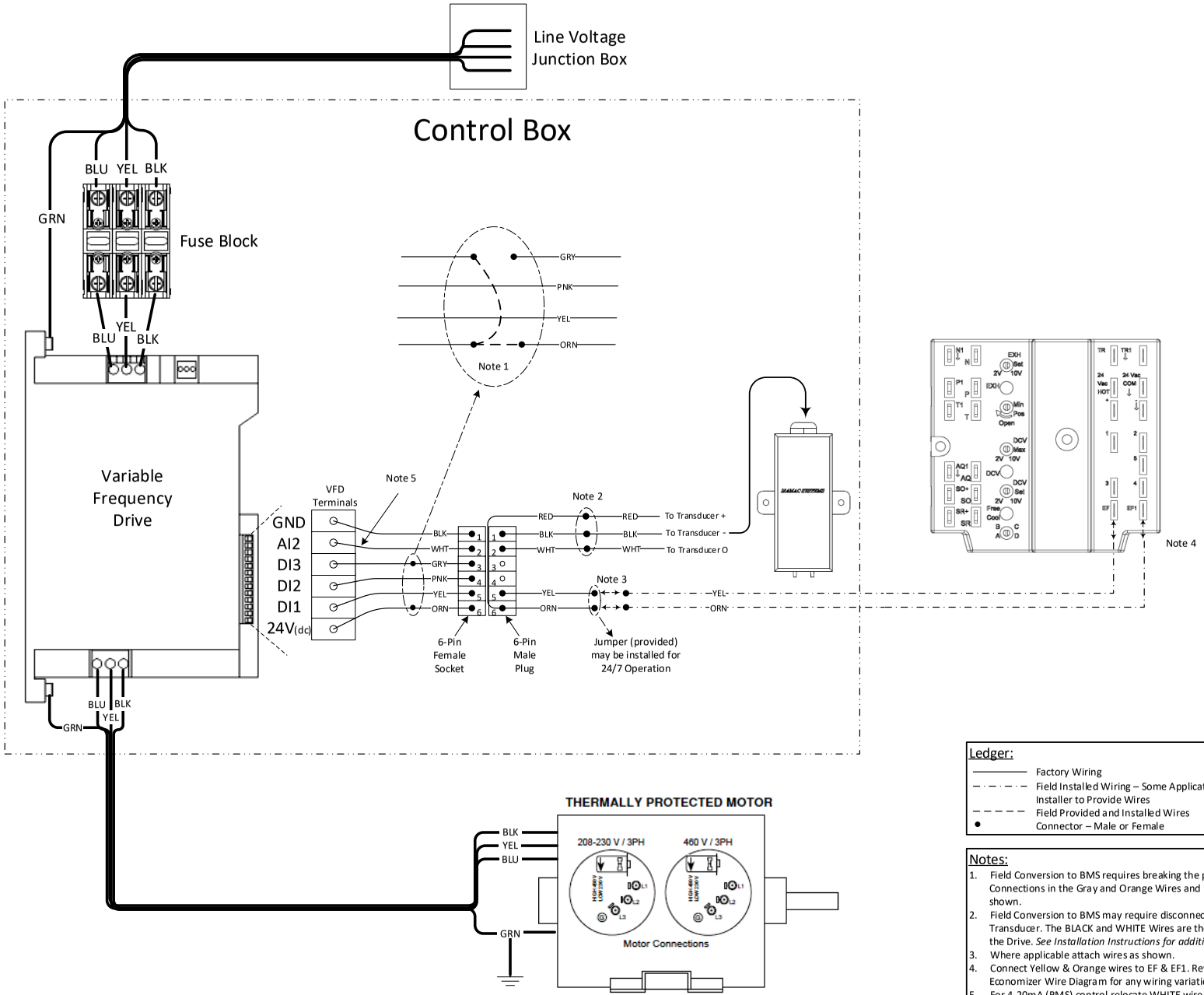
Building Pressure Controlled w/W7212A Start/Stop Signal & Single Motor

Follow Notes for any Required Field Wiring and/or Modifications.



Ledger:

- Factory Wiring
- Field Installed Wiring – Some Applications May Require Installer to Provide Wires
- Field Provided and Installed Wires
- Connector – Male or Female

Notes:

1. Field Conversion to BMS requires breaking the provided Connections in the Gray and Orange Wires and reconnecting as shown.
2. Field Conversion to BMS may require disconnecting the Pressure Transducer. The BLACK and WHITE Wires are then used to control the Drive. *See Installation Instructions for additional details.*
3. Where applicable attach wires as shown.
4. Connect Yellow & Orange wires to EF & EF1. Review Unit Specific Economizer Wire Diagram for any wiring variations.
5. For 4-20mA (BMS) control relocate WHITE wire at AI2 to AI1. See Instructions for any programming changes.

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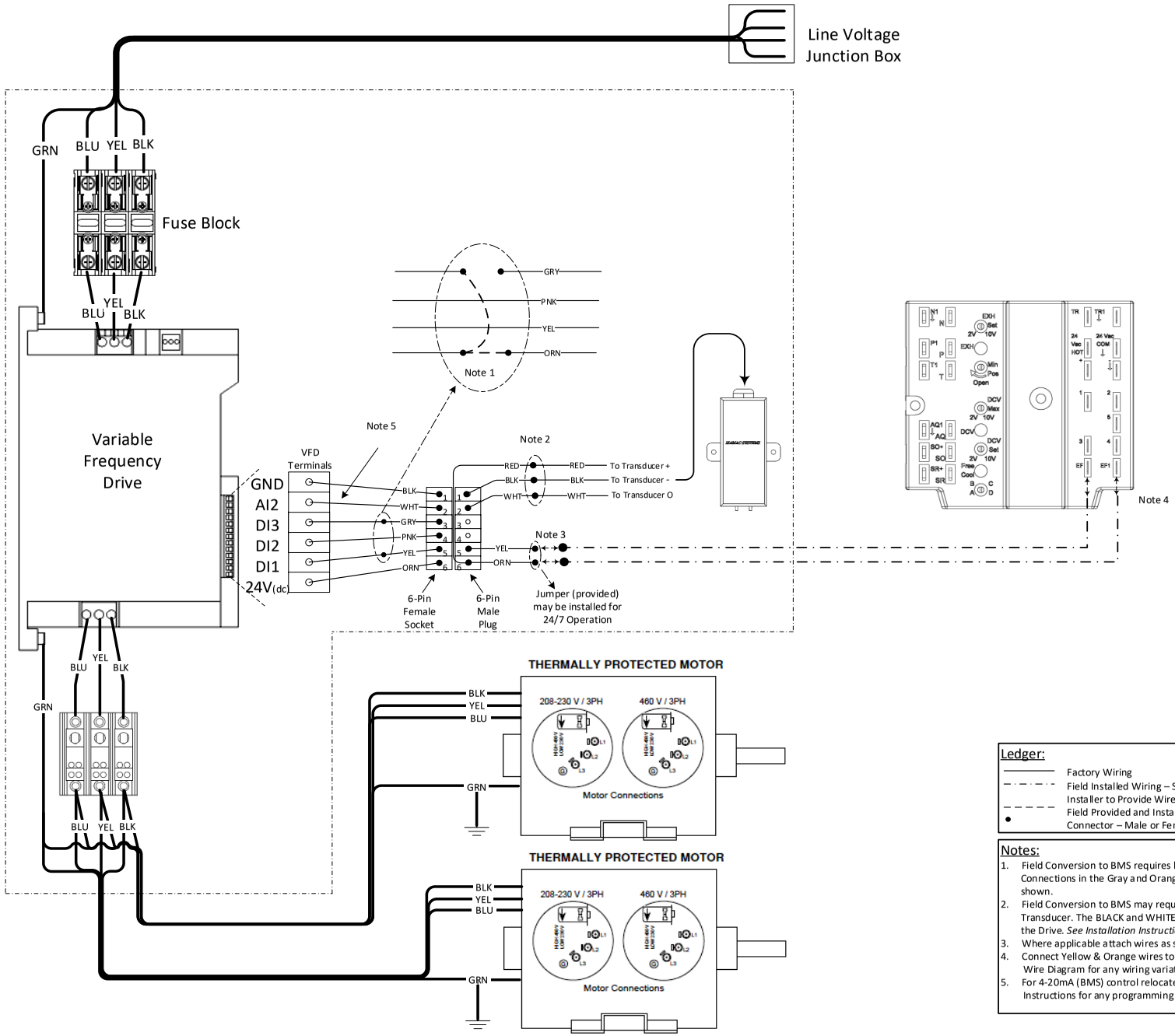
Building Pressure Controlled w/W7212A Start/Stop Signal & Multiple Motors

Follow Notes for any Required Field Wiring and/or Modifications.



Ledger:

- Factory Wiring
- Field Installed Wiring – Some Applications May Require Installer to Provide Wires
- Field Provided and Installed Wires
- Connector – Male or Female

Notes:

1. Field Conversion to BMS requires breaking the provided Connections in the Gray and Orange Wires and reconnecting as shown.
2. Field Conversion to BMS may require disconnecting the Pressure Transducer. The BLACK and WHITE Wires are then used to control the Drive. *See Installation Instructions for additional details.*
3. Where applicable attach wires as shown.
4. Connect Yellow & Orange wires to EF & EF1. Review Unit Specific Wire Diagram for any wiring variations.
5. For 4-20mA (BMS) control relocate WHITE wire at AI2 to AI1. See Instructions for any programming changes.

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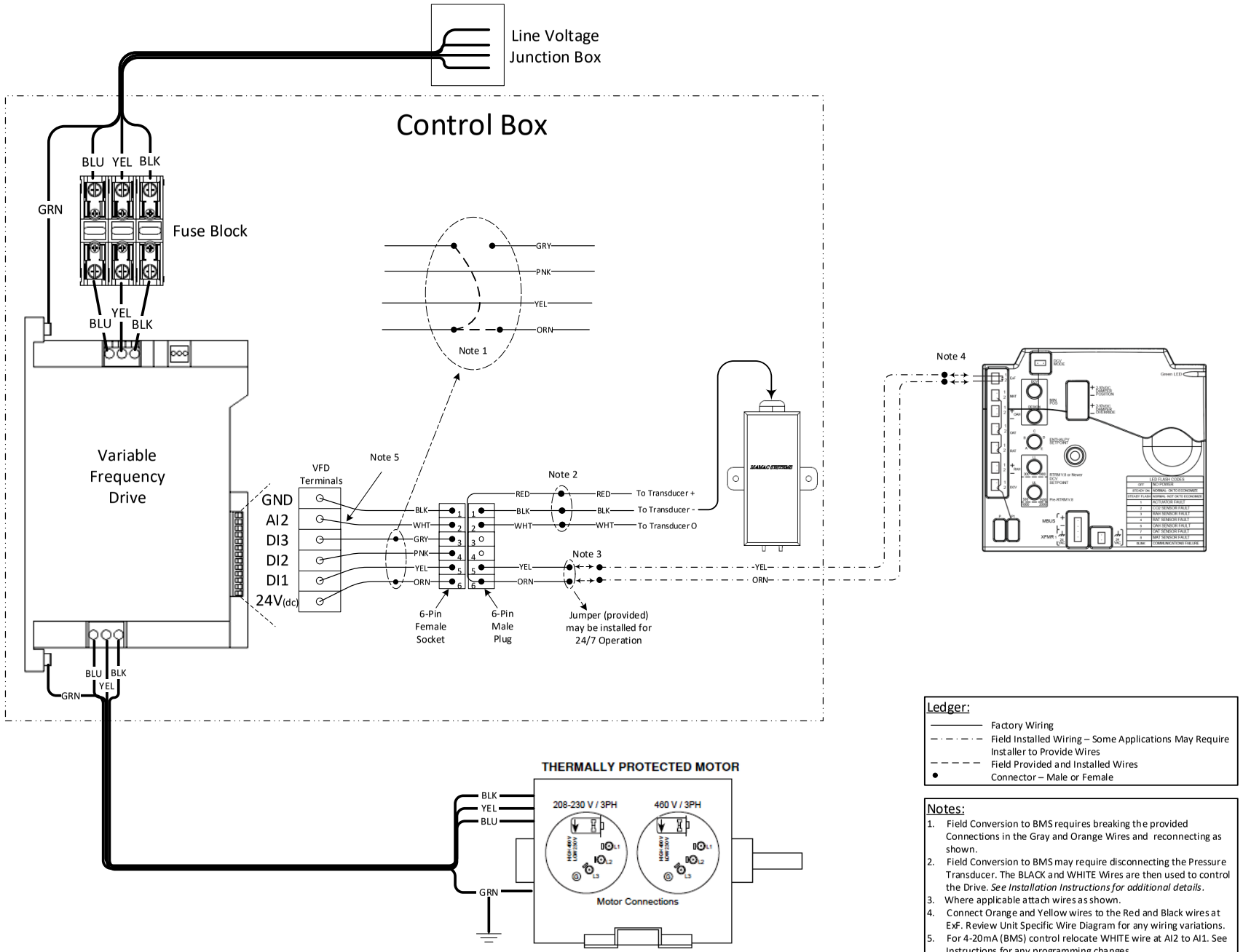
Building Pressure Controlled w/RTEM Start/Stop Signal & Single Motor

Follow Notes for any Required Field Wiring and/or Modifications.



Ledger:

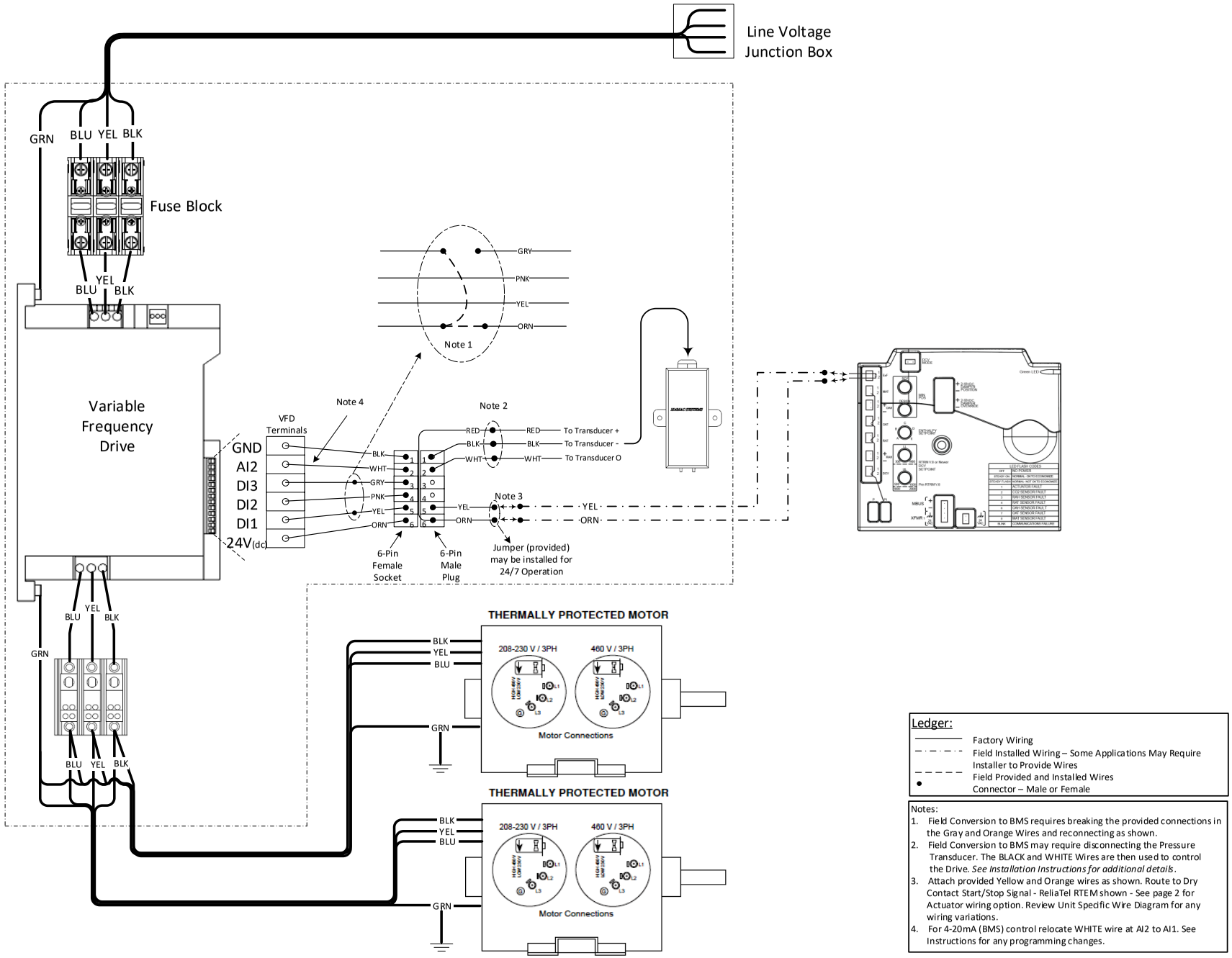
- Factory Wiring
- Field Installed Wiring – Some Applications May Require Installer to Provide Wires
- Field Provided and Installed Wires
- Connector – Male or Female

Notes:

1. Field Conversion to BMS requires breaking the provided Connections in the Gray and Orange Wires and reconnecting as shown.
2. Field Conversion to BMS may require disconnecting the Pressure Transducer. The BLACK and WHITE Wires are then used to control the Drive. *See Installation Instructions for additional details.*
3. Where applicable attach wires as shown.
4. Connect Orange and Yellow wires to the Red and Black wires at ExF. Review Unit Specific Wire Diagram for any wiring variations.
5. For 4-20mA (BMS) control relocate WHITE wire at AI2 to AI1. See Instructions for any programming changes.

Building Pressure Controlled w/RTEM Start/Stop Signal & Multiple Motors

Follow Notes for any Required Field Wiring and/or Modifications.



Ledger:

- Factory Wiring
- Field Installed Wiring – Some Applications May Require Installer to Provide Wires
- Field Provided and Installed Wires
- Connector – Male or Female

Notes:

1. Field Conversion to BMS requires breaking the provided connections in the Gray and Orange Wires and reconnecting as shown.
2. Field Conversion to BMS may require disconnecting the Pressure Transducer. The BLACK and WHITE Wires are then used to control the Drive. *See Installation Instructions for additional details.*
3. Attach provided Yellow and Orange wires as shown. Route to Dry Contact Start/Stop Signal - ReliaTel RTEM shown - See page 2 for Actuator wiring option. Review Unit Specific Wire Diagram for any wiring variations.
4. For 4-20mA (BMS) control relocate WHITE wire at AI2 to AI1. See Instructions for any programming changes.

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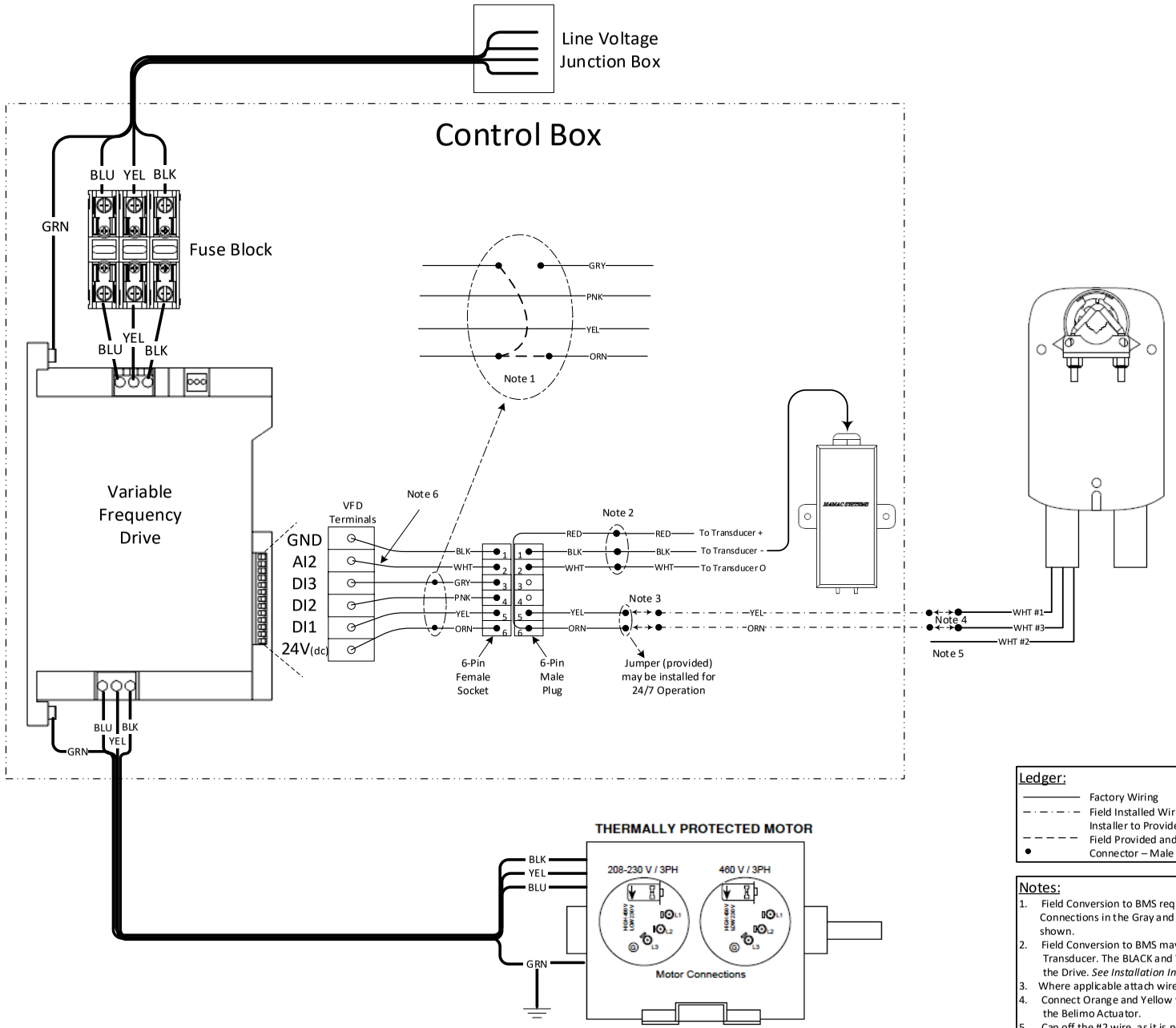
Building Pressure Controlled w/Actuator Start/Stop Signal & Single Motor

Follow Notes for any Required Field Wiring and/or Modifications.



Ledger:

- Factory Wiring
- Field Installed Wiring – Some Applications May Require Installer to Provide Wires
- Field Provided and Installed Wires
- Connector – Male or Female

Notes:

1. Field Conversion to BMS requires breaking the provided Connections in the Gray and Orange Wires and reconnecting as shown.
2. Field Conversion to BMS may require disconnecting the Pressure Transducer. The BLACK and WHITE Wires are then used to control the Drive. *See Installation Instructions for additional details.*
3. Where applicable attach wires as shown.
4. Connect Orange and Yellow wires to the White #1 and #3 wires of the Belimo Actuator.
5. Cap off the #2 wire, as it is not used.
6. For 4-20mA (BMS) control relocate WHITE wire at AI2 to AI1. See Instructions for any programming changes.

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Building Pressure Controlled w/Actuator Start/Stop Signal & Multiple Motors

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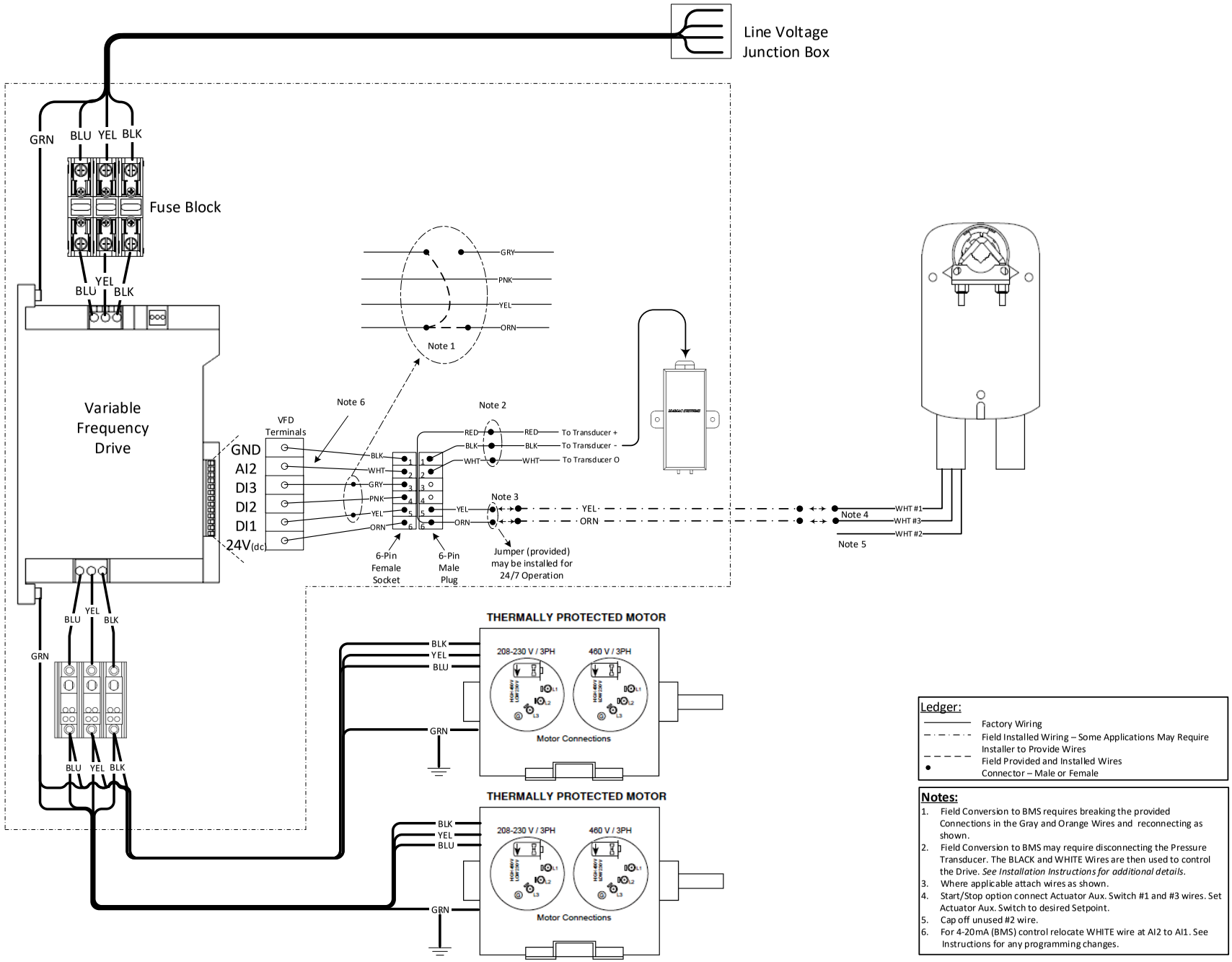

Ledger:

- Factory Wiring
- Field Installed Wiring – Some Applications May Require Installer to Provide Wires
- Field Provided and Installed Wires
- Connector – Male or Female

Notes:

1. Field Conversion to BMS requires breaking the provided Connections in the Gray and Orange Wires and reconnecting as shown.
2. Field Conversion to BMS may require disconnecting the Pressure Transducer. The BLACK and WHITE Wires are then used to control the Drive. *See Installation Instructions for additional details.*
3. Where applicable attach wires as shown.
4. Start/Stop option connect Actuator Aux. Switch #1 and #3 wires. Set Actuator Aux. Switch to desired Setpoint.
5. Cap off unused #2 wire.
6. For 4-20mA (BMS) control relocate WHITE wire at AI2 to AI1. See Instructions for any programming changes.

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Third Party (BMS) Controlled w/Actuator Start/Stop Signal & Single Motor

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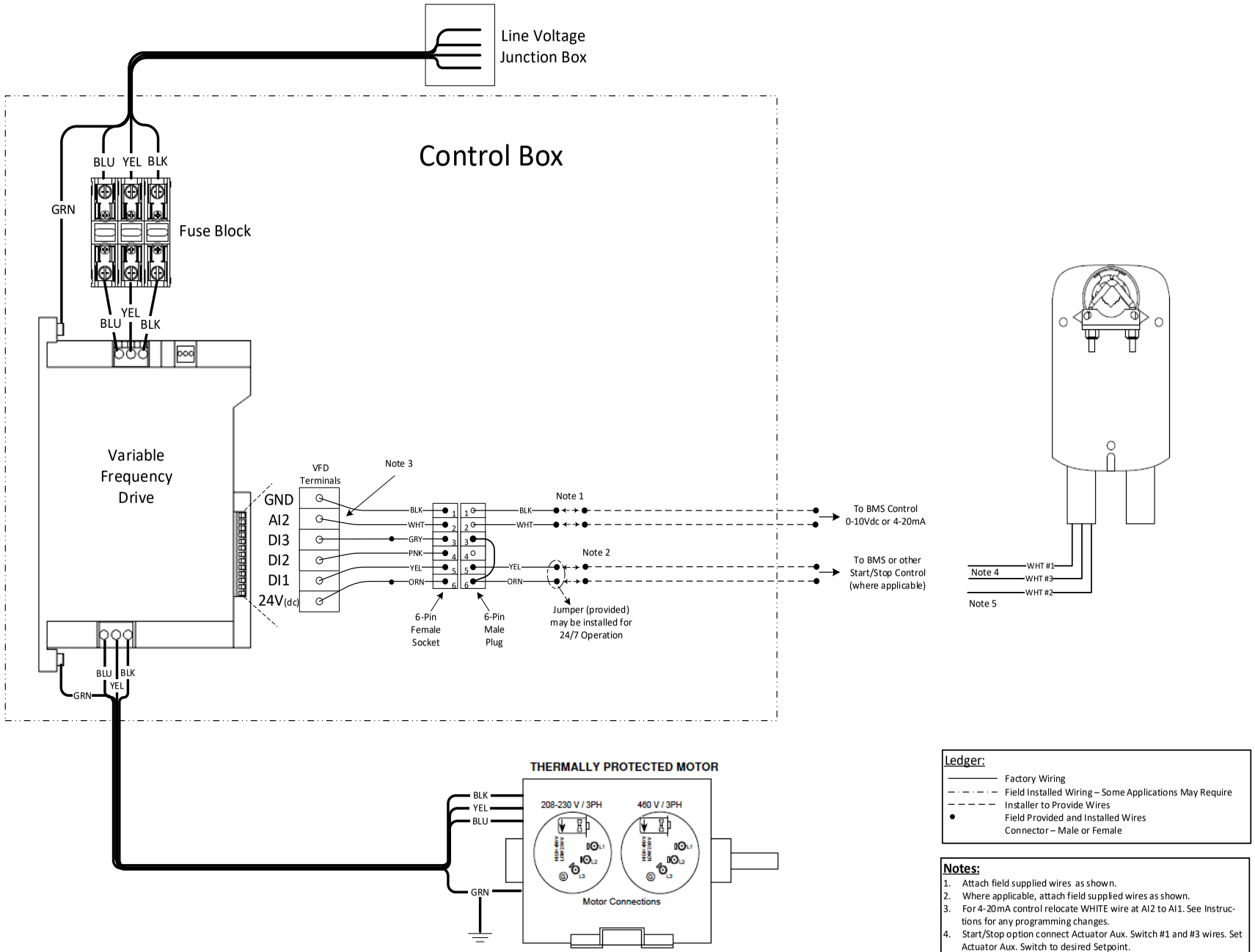

Ledger:

- Factory Wiring
- Field Installed Wiring – Some Applications May Require Installer to Provide Wires
- Field Provided and Installed Wires
- Connector – Male or Female

Notes:

1. Attach field supplied wires as shown.
2. Where applicable, attach field supplied wires as shown.
3. For 4-20mA control relocate WHITE wire at AI2 to AI1. See Instructions for any programming changes.
4. Start/Stop option connect Actuator Aux. Switch #1 and #3 wires. Set Actuator Aux. Switch to desired Setpoint.
5. Cap off unused #2 wire.

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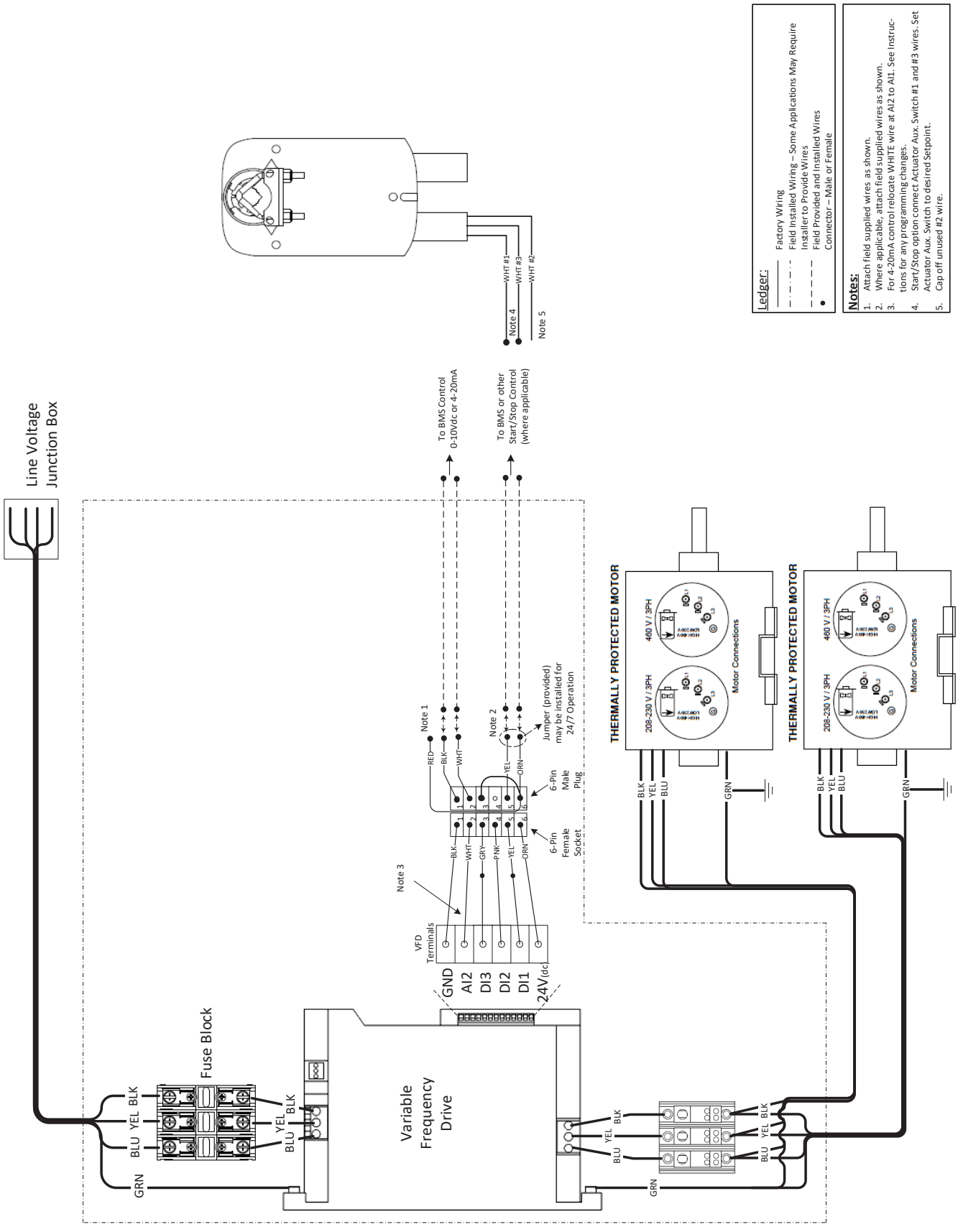
Third Party (BMS) Controlled w/Actuator Start/Stop Signal & Multiple Motors

Follow Notes for any Required Field Wiring and/or Modifications.



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