48/50A 020-060
High-Capacity Power Exhaust and Conversion Package Accessories

Installation Instructions

Power Exhaust Part Numbers: CRPWREXH071A00 through CRPWREXH079A00
Conversion Package Numbers: CRPECONV005A00, CRPECONV006A00

CONTENTS

SAFETY CONSIDERATIONS

Installation and servicing of air-conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install, repair, or service air-conditioning equipment.

Untrained personnel can perform basic maintenance functions of cleaning coils and filters and replacing filters. All other operations should be performed by trained service personnel. When working on air-conditioning equipment, observe precautions in the literature, tags and labels attached to the unit, and other safety precautions that may apply.

Follow all safety codes, including ANSI (American National Standards Institute) Z223.1. Wear safety glasses and work gloves. Use quenching cloth for unbrazing operations. Have fire extinguisher available for all brazing operations.

⚠ WARNING

Before performing service or maintenance operations on unit, turn off main power switch to unit. Electrical shock could cause personal injury.

⚠ WARNING

Electrical shock can cause personal injury and death. Shut off all power to this equipment during installation. There may be more than one disconnect switch. Tag all disconnect locations to alert others not to restore power until work is completed.

GENERAL

Refer to Table 1 for package usage. For a complete list of parts contained in each kit see Table 2. For sizes 020-050, either 1 or 2 module versions of the accessory may be ordered and installed depending on the desired exhaust airflow. For size 060, either 2 or 3 module versions of the accessory may be ordered and installed depending on the desired exhaust airflow.

The high-capacity power exhaust blowers are shipped assembled and packaged one hood assembly per container.

Each module has 2 high-capacity power exhaust blowers. Brackets, wires and extra gasket screws are also included in the package.

In addition to the power exhaust accessory, the following accessories are required (see Table 3):

- To convert a constant volume unit without power exhaust to a modulating power exhaust unit, conversion kits CRPECONV005A00 and CRPECONV006A00 must be installed.
  NOTE: If the unit has the factory-installed hot gas bypass (HGBP) option (also referred to as a minimum load valve), or Digital Compressor, or if it's a VAV (Variable Air Volume) unit, then the CRPECONV005A00 kit will not be required.
- To convert a VAV unit without power exhaust to a modulating power exhaust unit, conversion kit CRPECONV006A00 must be installed.

⚠ CAUTION

When removing panels from the unit, be careful not to damage roof or other surfaces with the panels.

Table 1 — High-Capacity Power Exhaust Package Usage

UNIT SIZE	VOLTAGE	NUMBER OF MODULES	PART NUMBER
48/50A020-050	208/230-3-60	1	CRPWREXH071A00
		2	CRPWREXH074A00
	460-3-60	1	CRPWREXH072A00
		2	CRPWREXH075A00
	575-3-60	1	CRPWREXH073A00
		2	CRPWREXH076A00
48/50A060	208/230-3-60	2	CRPWREXH074A00
		3	CRPWREXH077A00
	460-3-60	2	CRPWREXH075A00
		3	CRPWREXH078A00
	575-3-60	2	CRPWREXH076A00
		3	CRPWREXH079A00

NOTE: For 48/50A Series units, to convert a constant volume unit with no power exhaust to a modulating power exhaust unit, accessory conversion kits CRPECONV005A00 and CRPECONV006A00 must be purchased and installed in addition to the power exhaust accessory. If the unit has the factory-installed hot gas bypass (HGBP) option, then the CRPECONV005A00 kit is not required. To convert a VAV unit without power exhaust to a modulating power exhaust unit, accessory conversion kit CRPECONV006A00 must be purchased and installed in addition to the power exhaust accessory.

Table 2 — High-Capacity Power Exhaust Parts List

ITEM DESCRIPTION (QUANTITY)	QUANTITY (PART NO. CRPWREXH---A00)								
	071	072	073	074	075	076	077	078	079
Power Exhaust Module Assembly	1	1	1	2	2	2	3	3	3
Auxiliary Control Panel Terminal Block	1	1	1	1	1	1	1	1	1
ECB-1 to VFD Control Wiring Harness (20 ft)	1	1	1	1	1	1	1	1	1
VFD to VFD Control Wiring Harness (10 ft)	—	—	—	1	1	1	2	2	2
Auxiliary Panel to VFD Power Wiring (20 ft)	1	1	1	2	2	2	3	3	3
CCB to Auxiliary Panel Power Wiring (36 ft)	—	—	—	—	—	—	1	—	—
Replacement Control Circuit Breaker	—	—	—	1	—	1	1	1	—

LEGEND

ECB — Economizer Control Board
VFD — Variable Frequency Drive

Table 3 — Conversion Package Parts List

ACCESSORY	ITEM DESCRIPTION (QUANTITY)
CRPECONV005A00	Economizer Board — 50ZZ401127
CRPECONV006A00	Building Pressure Transducer — HK05ZG022 Control Tube (1)

INSTALLATION

Vertical Discharge Units (48/50AJ,AK,A2,A3,A6,A7)

NOTE: For 48/50A020-050 units, 1 or 2 modules may be installed. For 48/50A060 units, 2 or 3 modules may be installed. Installation will be repeated for each module.

1. Unpack accessory packages.
2. Disconnect power to unit.
3. If the economizer hoods have been installed, perform the following:
   a. Remove the filters from the economizer hoods.
   b. Remove the 5 screws from the bottom of the economizer hood(s) and the 3 screws on each side of the economizer hood(s). Save screws.
   c. Remove the upper panel by removing screws and pulling out the economizer assembly at the bottom to release panel. Save screws.
   d. Remove the lower panel. Save all screws.
   e. There are 2 economizer hoods and 4 panels on size 020-050 units. There are 3 economizer hoods and 6 panels on size 060 units. Repeat this step for each economizer hood and panel (if required).
   If the economizer hoods have not been installed, remove the upper and lower panels covering each return air section. See Fig. 1. Save all screws.
4. Open the unit filter access door. Remove the panel below the filters that covers the auxiliary control panel. See Fig 2. Mount the auxiliary control panel terminal block in the auxiliary control box in the location shown in Fig 3.
5. Route the wires from the 20-ft long power exhaust control and power harnesses through the hole(s) in the auxiliary control panel. See Fig. 3. Secure the metal clad connector with the locknut.
6. Connect the terminals on the end of the power harness wires to the auxiliary control panel terminal block as shown in Fig. 4-6. The other end of the 20-ft harness will be routed through the return/exhaust section of the unit to the economizer section. Remove the factory-installed power exhaust harness and plug(s) below the economizer (see Fig. 7) and replace with accessory harness and power exhaust plugs. Secure the harness in place so as not to interfere with the economizer or power exhaust.
7. Set each power exhaust module in front of the relief openings (being careful not to damage the roof). With the 2 and 3 module accessory packages, make sure that the module marked “Module 1” is closest to the auxiliary control panel.
8. Plug the wiring harness from the power exhaust module into the mating plug from the power harness installed in Step 6.

9. Route the control wiring from the module closest to the auxiliary control panel to ECB-1. Plug the control harness plug with 500-ohm resistor on Terminal J9, pins 1 and 2 on the ECB-1 control board. See Fig. 8. Route the VFD (variable frequency drive) control wiring behind each support panel that separates each exhaust module and plug the control wiring into the VFD of the next module(s).
10. Set the power exhaust module in place over the exhaust opening on the unit. The bottom flange of the module will rest on top of the unit base rail. Caulk the module's mating flanges and secure to the unit.
11. In the auxiliary control box, remove the red, brown and blue wires from the factory-installed power exhaust contactors. These contactors will not be used with this accessory power exhaust. Transfer these wires to terminals 11, 12, and 13 on the auxiliary control panel terminal block installed in Step 4 as shown. See Fig. 4-6. Follow all local and applicable electrical codes.
12. When installing part numbers CRPWREXH074, 076, 077 or 078 replace the control circuit breaker (CCB) in the main control box with the replacement CCB provided.
    NOTE: For the three-module, 208/230 v, 3 ph power exhaust (part no. CRPWREXH077A00), a field-installed 8 AWG (American Wire Gage) wire must be routed from the control circuit breaker (CCB) in the main control box of the unit to the accessory terminal block (in the auxiliary control box).
13. Remove tape from damper blades.
14. Complete the Configuration section on page 7.

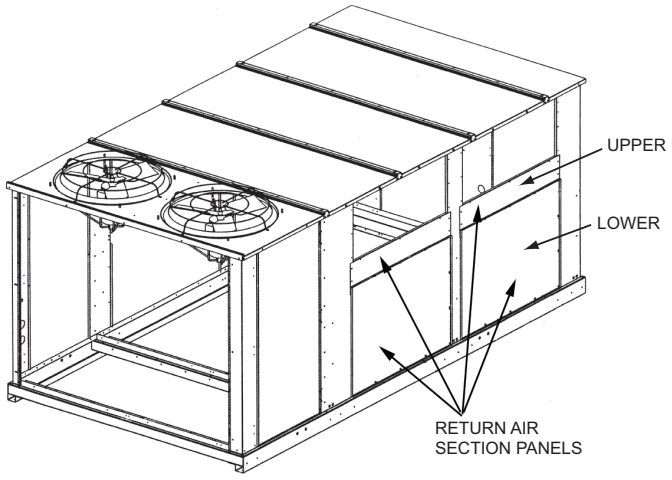


Fig. 1 — Typical Panel Locations (48/50A020 Unit Shown)

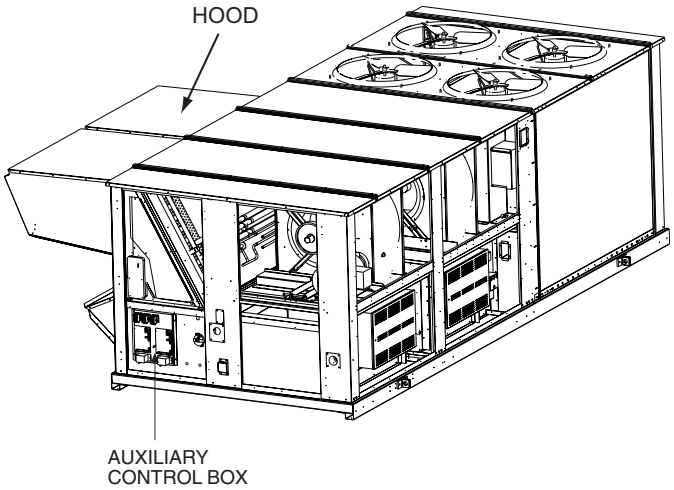


Fig. 2 — Auxiliary Panel Location (48/50A040 Series Unit Shown)

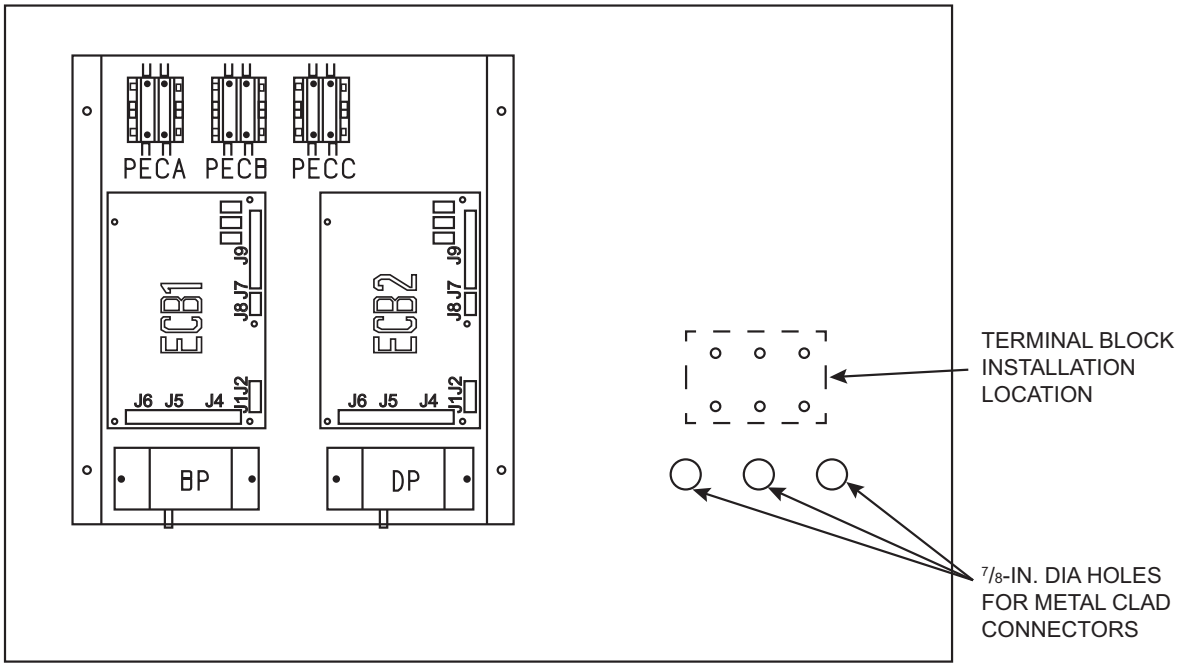


Fig. 3 — Auxiliary Control Box

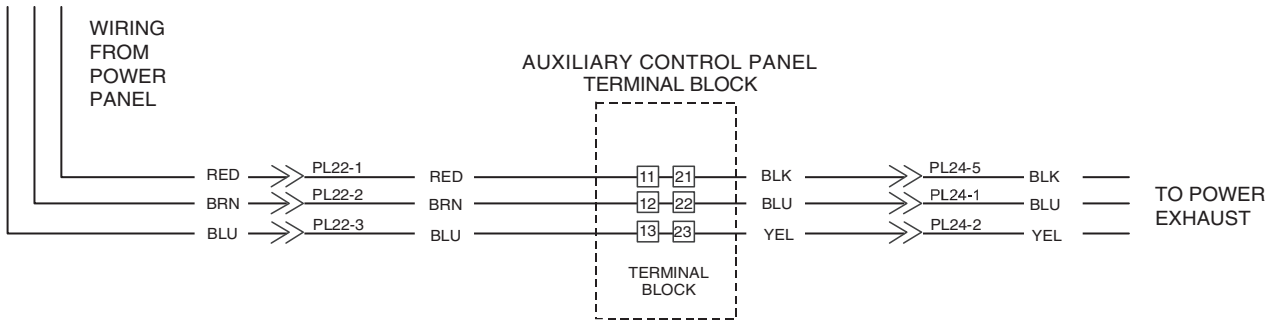


Fig. 4 — Power Exhaust Wiring (One Module)

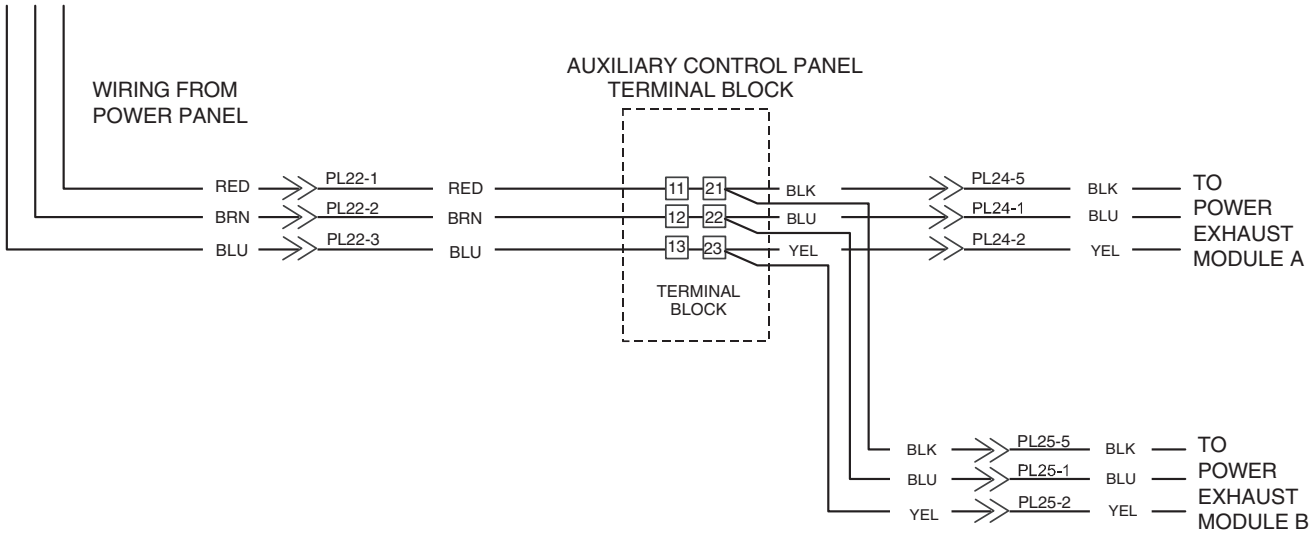


Fig. 5 — Power Exhaust Wiring (Two Modules)

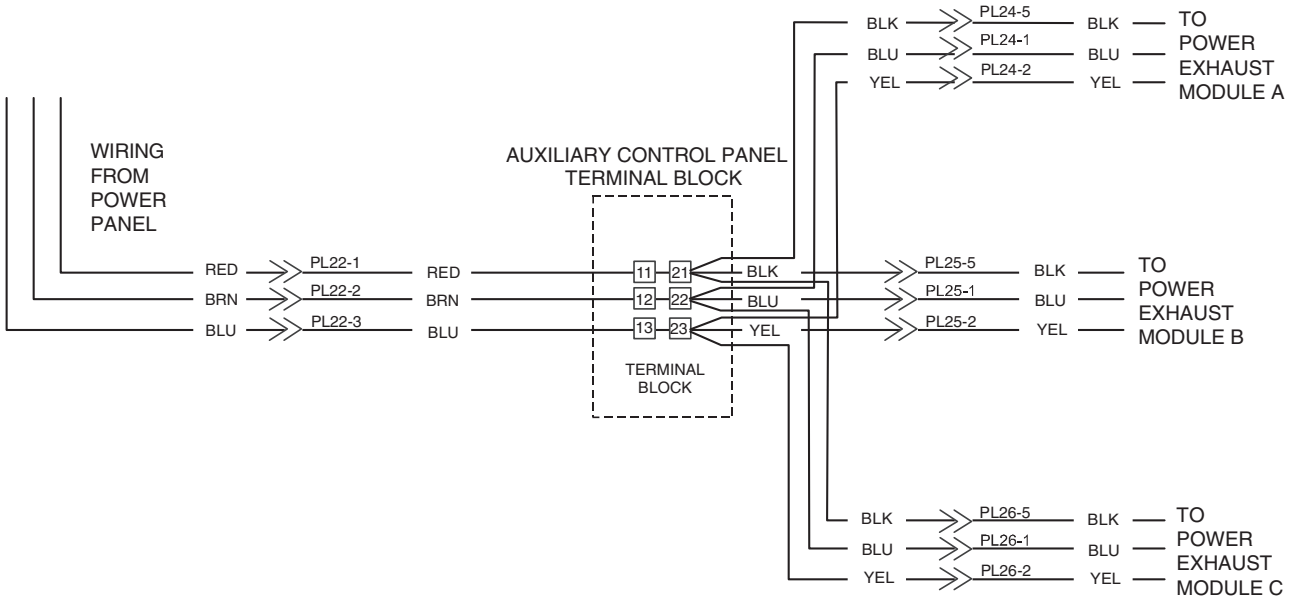


Fig. 6 — Power Exhaust Wiring (Three Modules)

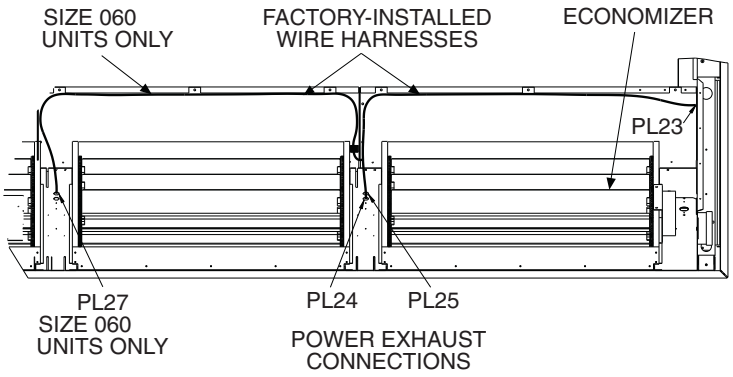


Fig. 7 — Wire Harness Plug Location

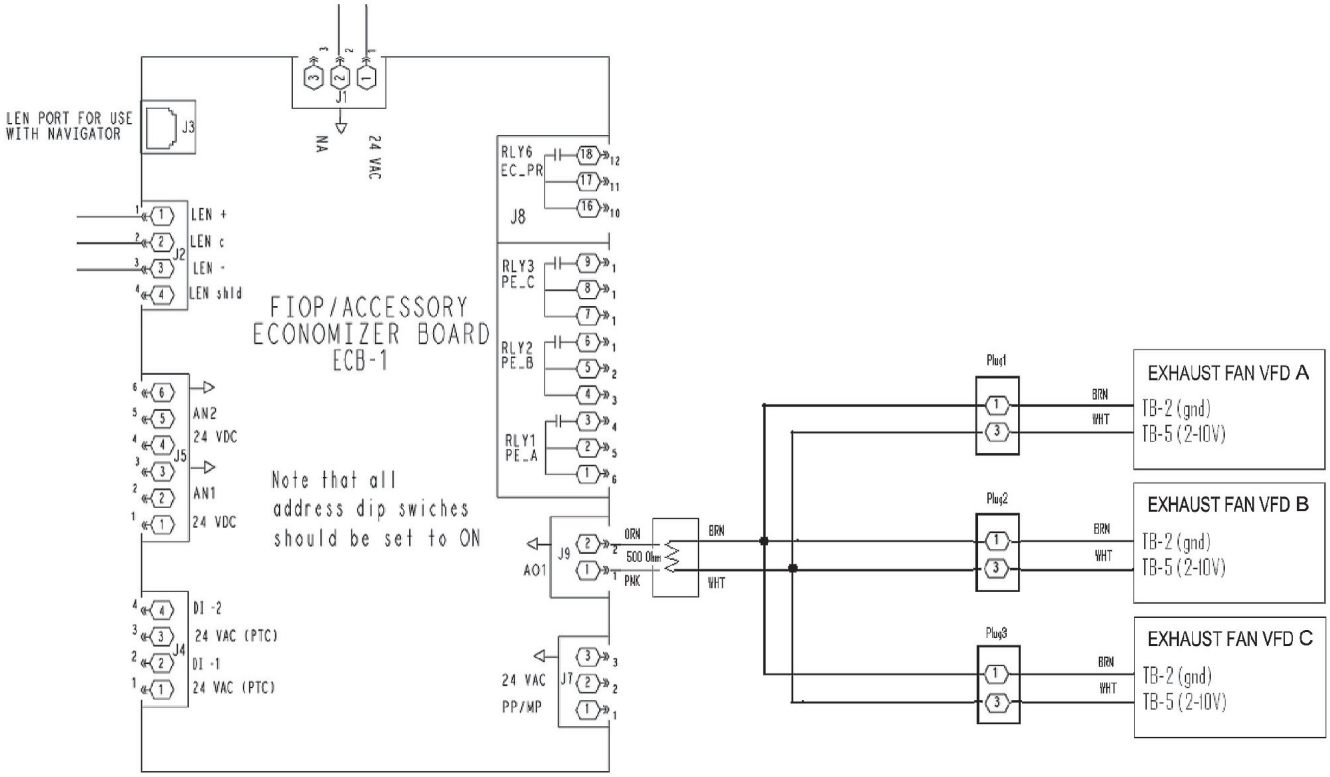
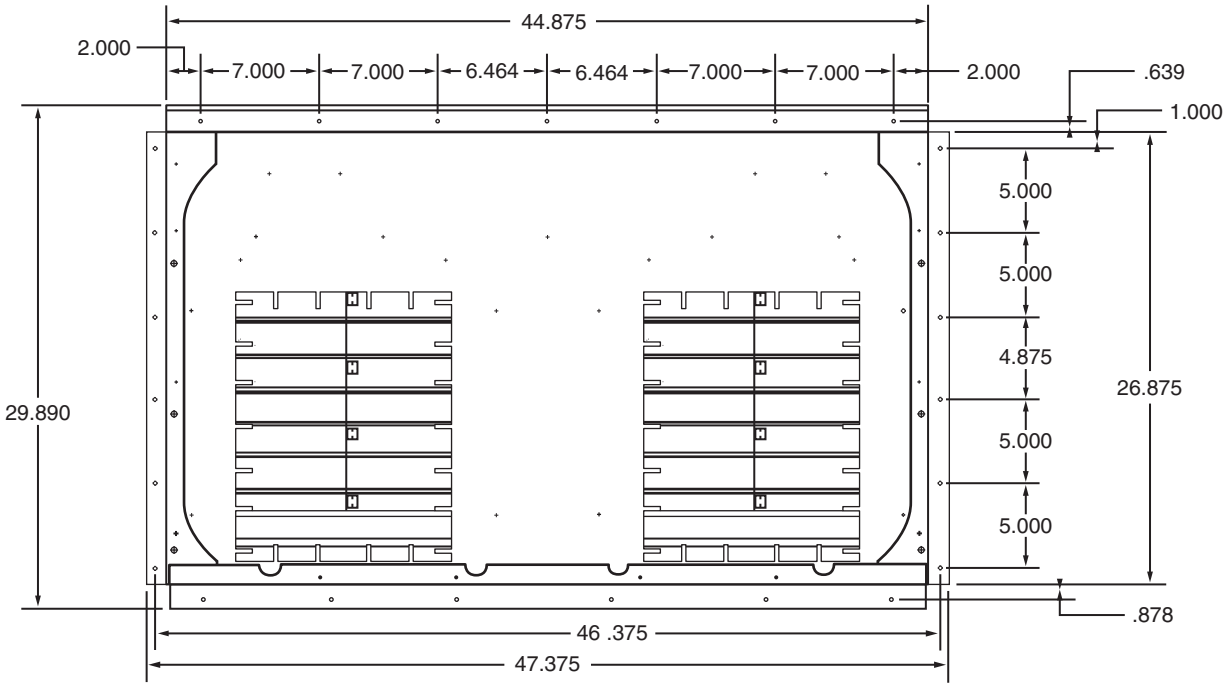


Fig. 8 — Auxiliary Control Box ECB1 Wiring

Horizontal Discharge Units (48/50AW,AY,A4,A5,A8,A9)

1. Unpack accessory package. The support panel is not used and may be discarded.
2. Disconnect power to unit.
3. Provide openings 43-in. wide by 26.5-in. high in the side of the return air duct for the number of accessories ordered. See Fig. 9 and 10. Ensure that the transition required to accommodate these openings begins at least 3.5 feet away from the outdoor-air hood. Any obstruction closer than 3.5 feet will interfere with the airflow and result in rain entering the hood through the filters. See Fig. 10.
4. Drill engagement holes for $^1/_4$-in. screws around openings as shown in Fig. 9.
5. Open the unit filter access door. Remove the panel below the filters that covers the auxiliary control panel. Mount the auxiliary control panel terminal block in the auxiliary control box in the location shown in Fig 3.
6. Route the wires from the 20-ft long power exhaust control and power harnesses harness through the hole(s) in the auxiliary control panel. See Fig. 3. Secure the metal clad connector with the locknut.
7. Connect the terminals on the end of the power harness wires to the terminal block as shown. See Fig. 4-6. The other end of the 20-ft harness will be routed through the return/exhaust section of the unit to the economizer. Remove the factory-installed power exhaust harness and plug(s) below the economizer (see Fig. 7) and replace with accessory harness and power exhaust plugs. Secure the harness in place so as not to interfere with the economizer or power exhaust.
   NOTE: Power exhaust modules cannot be supported by the duct. Field provided support is required.
8. Set each power exhaust module in front of the openings cut into the return duct. With the 2 and 3-module accessory packages, make sure that the module marked “Module 1” is closest to the auxiliary control panel.

9. Route the power wiring through the return duct and plug the wiring harness from the power exhaust module into the mating plug from the power harness installed in Step 6.
10. Route the control wiring from the "A" module through the return duct to the auxiliary control panel. Plug the control harness plug with 500-ohm resistor on terminal J9, pins 1 and 2 on the ECB-1 control board (see Fig. 8). For additional module accessory packages, Route the VFD (variable frequency drive) control wiring behind each support panel that separates each exhaust module and plug the control wiring into the VFD of the next module(s).
11. Caulk the mating flanges of the module and set in place.
12. In the auxiliary control box remove the red, brown and blue wires from the factory-installed power exhaust contactors. These contactors will not be used with this accessory power exhaust. Transfer these wires to terminals 11, 12, and 13 on the auxiliary control panel terminal block installed in Step 5. Follow all local and applicable electrical codes. See Fig. 4-6.
13. When installing part numbers CRPWREXH074, 076, 077 or 078 replace the control circuit breaker (CCB) in the main control box with the replacement CCB provided.
    NOTE: For the three-module, 208/230-3-60 power exhaust (part no. CRPWREXH077A00), the field-installed 8 AWG (American Wire Gage) wire must be routed from the control circuit breaker (CCB) in the main control box of the unit to the accessory terminal block (in the auxiliary control box).
14. Complete Configuration section on page 7.



NOTE: Dimensions are in inches.

Fig. 9 — Horizontal Discharge Mounting Opening

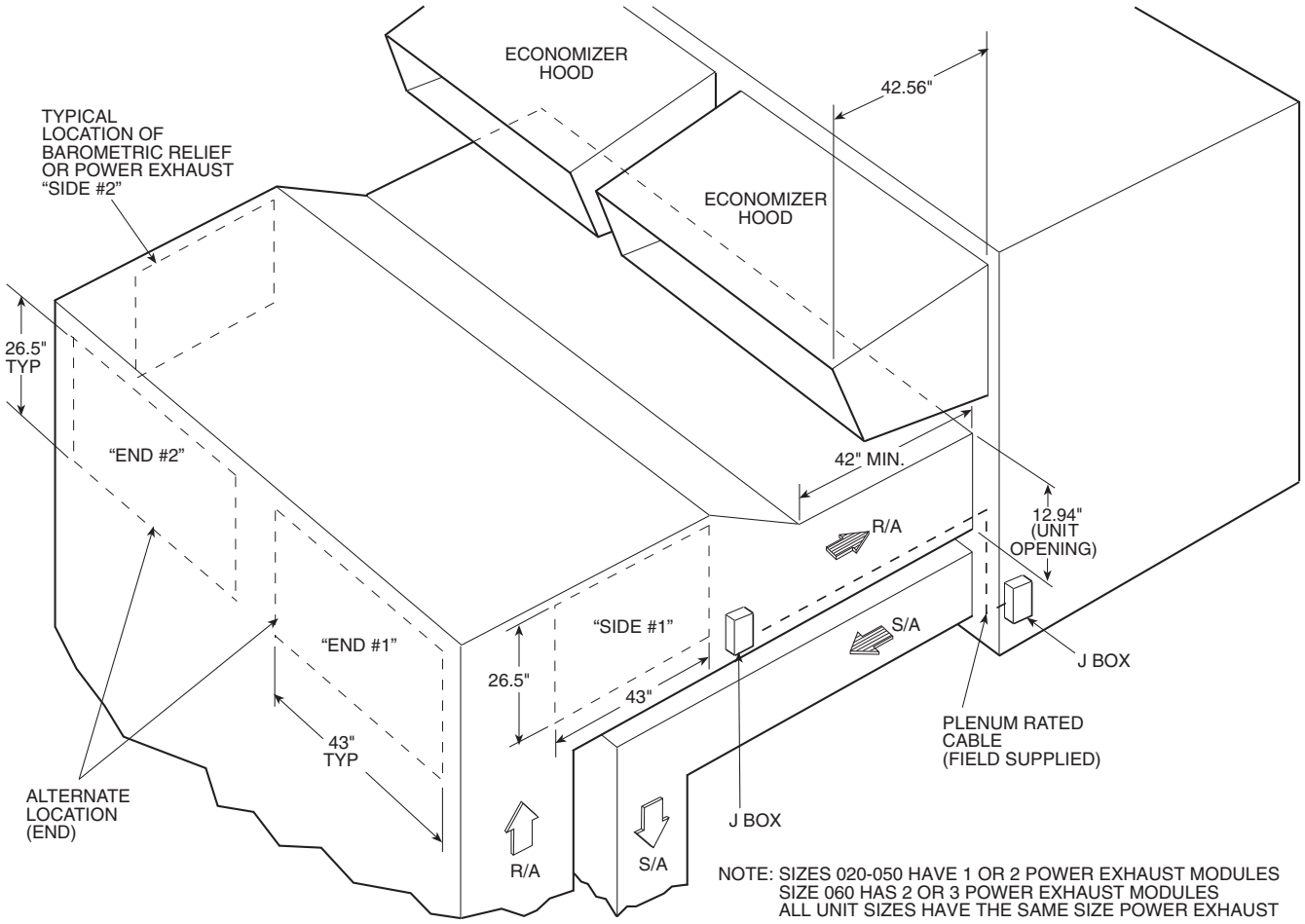


Fig. 10 — Power Exhaust Location on Side Return Duct

Configuration

1. The *Comfort*Link™ controls can now be configured to operate the power exhaust. These configurations are accomplished through the scrolling marquee display by using the Configuration menu.
2. The control system must be configured to use the power exhaust. A password may be required to edit the configurations, depending on the previous settings configured in the unit. Default password is "1111".
3. To access the configuration, use the arrow keys to scroll the red LED (light-emitting diode) on the display to the "Configuration" position and press ENTER. Use the arrow keys to scroll down until the display reads "BP", and press the ENTER key. At the Building Pressure Configuration setting, press ENTER twice. The display should be flashing 0 (none). Use the arrow keys to change the configuration to "3" (PE VFD CTRL, building pressure control via VFD controlled power exhaust) and press ENTER.
4. Use the arrow keys to scroll until the display reads "BP.S" and press ENTER twice. The display should be flashing "DSBL" (disabled). Use the arrow keys to change the configuration to "ENBL" (Enabled) and press ENTER and then ESCAPE.
5. Configuration of the power exhaust is now complete. Pressing the ESCAPE key several times will return the display to the auto scroll setting.
6. Consult the Controls and Troubleshooting Guide for complete instructions on using the *Comfort*Link control system.
7. The unit is now ready for normal operation.

Conversion Package

CRPECONV005A00 CONVERSION PACKAGE

This conversion kit contains the ECB2 economizer board. This board controls the operation of the equipment used to maintain building pressure.

⚠WARNING

Before beginning any modification, be certain that the main line electrical disconnect switch is in the OFF position. Electric shock could result. Tag disconnect switch with suitable warning labels.

1. Ensure the hood assemblies are installed.
2. Locate and remove the auxiliary control box cover (see Fig. 2).
3. Install ECB2 in auxiliary control box (see Fig. 11 and 12).
4. Locate the factory-installed wire harness for ECB2 in the control box and make the connections for J1, J2 and J5. Refer to Fig. 12.
5. Replace the auxiliary control box cover.

CRPECONV006A00 CONVERSION PACKAGE

This conversion kit contains the building pressure transducer and control tubes. The transducer measures the building pressure and sends a 4 to 20 mA signal to ECB2.

⚠ WARNING

Electrical shock can cause personal injury and death. Shut off all power to this equipment during installation. There may be more than one disconnect switch. Tag all disconnect locations to alert others not to restore power until work is completed.

1. Ensure the hood assemblies are installed.
2. Locate and remove the auxiliary control box cover (see Fig. 2).
3. Install building pressure transducer (BP) in auxiliary control box (see Fig. 11 and 13).
4. Locate the factory-installed wire harness for BP in the control box and make the "+" and "-" connections. See Fig. 12.
5. Connect control tubes to BP.
6. Connect LOW tap of transducer to ambient location tap on unit using the control tube provided. Install field-supplied "tee" as required. See Fig. 13 and 14.
7. Using field-supplied 1/4-in. tubing connect HIGH tap of transducer (control tube not provided) and extend other end to a location inside building where it is desired to maintain pressure (typically a location inside near the front door).
8. Replace the auxiliary control box cover.

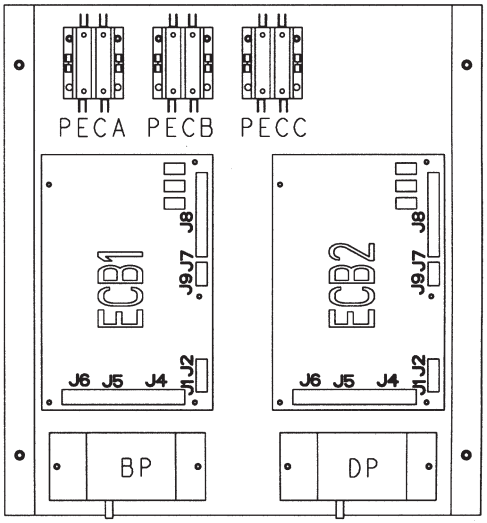
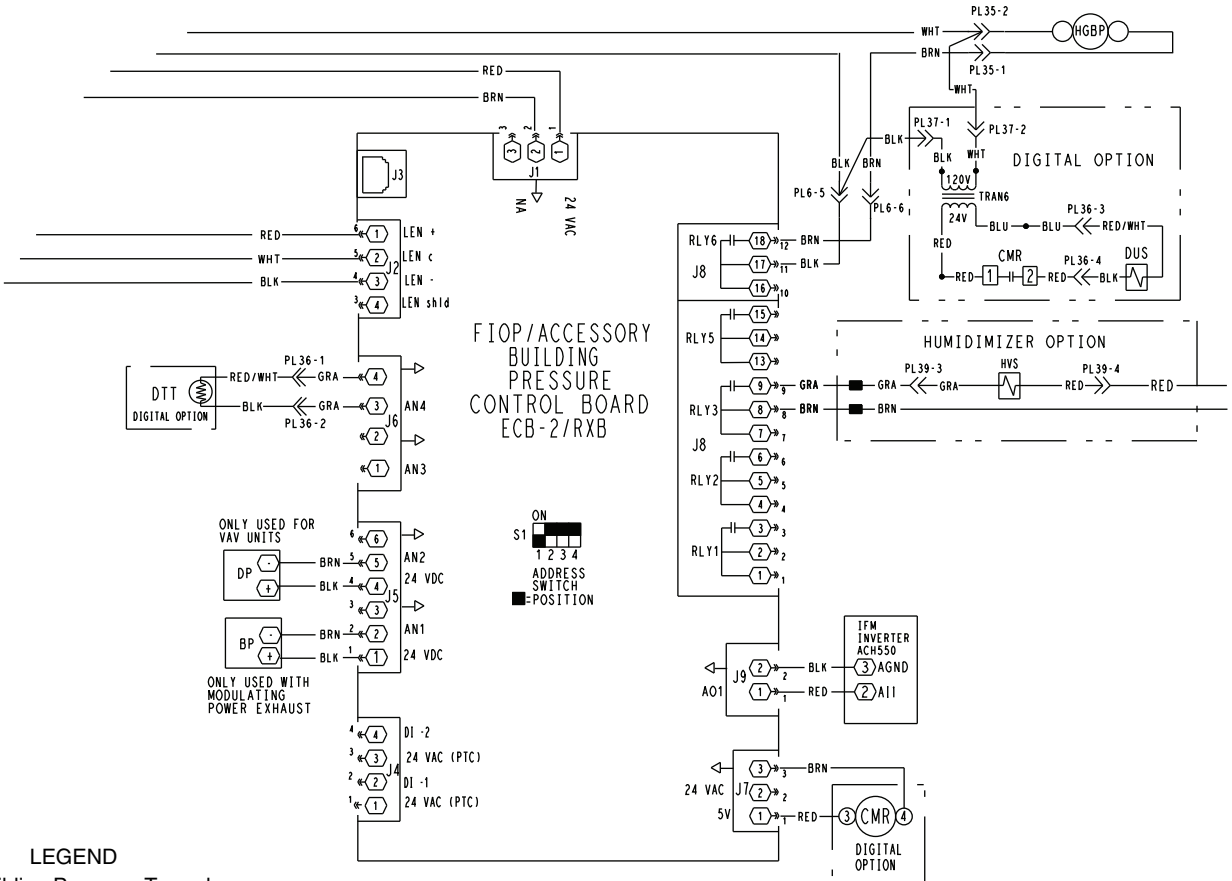


Fig. 11 — Auxiliary Control Box Layout



LEGEND

BP — Building Pressure Transducer
DP — Discharge Pressure Transducer
HGBP — Hot Gas Bypass
PL — Plug Assembly

Fig. 12 — Auxiliary Control Box ECB2 Wiring

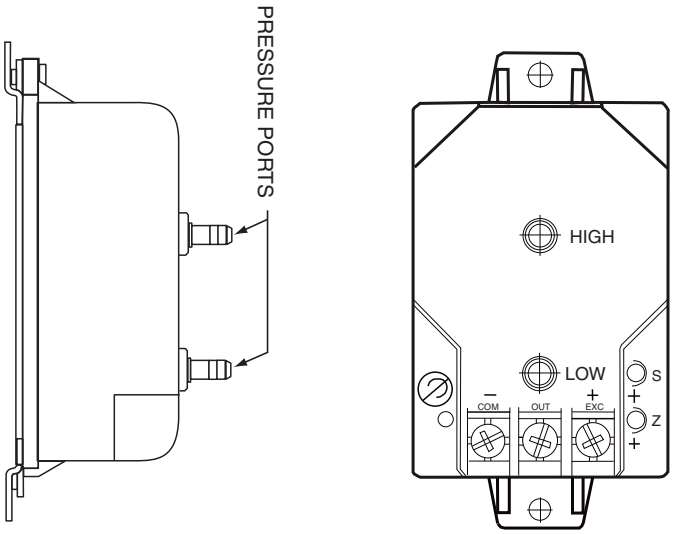


Fig. 13 — Building Pressure (BP) Transducer

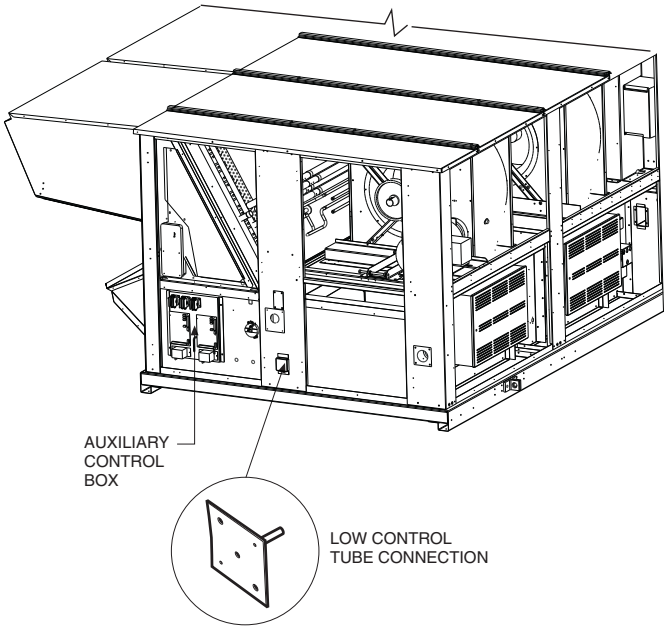


Fig. 14 — Ambient Location Tap (48/50A Series Units)

Drive Programming

Table 4 shows all program parameters for each of the operating modes. Refer to Troubleshooting section before attempting to change programming in the exhaust fan VFD.

⚠ CAUTION

It is strongly recommended that the user NOT change any programming without consulting Carrier service personnel. Unit damage may occur from improper programming.

TO ENTER PASSWORD AND CHANGE PROGRAM VALUES:

1. Press MODE.
2. The display will read "00" and the upper right-hand decimal point will be blinking. This will activate the PASSWORD prompt (if the password has not been disabled).
3. Use the UP and DOWN buttons to scroll to the password value (the factory default password is "111") and press the MODE button. Once the correct password value is entered, the display will read "P01", which indicates that the PROGRAM mode has been accessed at the beginning of the parameter menu (P01 is the first parameter).
   NOTE: If the display flashes "Er", the password was incorrect, and the process to enter the password must be repeated.
4. Press MODE to display present parameter setting. The upper right decimal point blinks. Use UP and DOWN buttons to scroll to the desired parameter number.
5. Once the desired parameter number is found, press the MODE button to display the present parameter setting. The upper right-hand decimal point will begin blinking, indicating that the present parameter setting is being displayed. Use the UP and DOWN buttons to change setting. Press MODE to store new setting.
6. Press MODE to store the new setting and also exit the PROGRAM mode. To change another parameter, press the MODE button again to re-enter the PROGRAM mode (the parameter menu will be accessed at the parameter that was last viewed or changed before exiting). If the MODE button is pressed within two minutes of exiting the PROGRAM mode, the password is not required to access the parameters.
7. After two minutes, the password must be entered in order to access the parameters again.

TO CHANGE PASSWORD

Enter the current password then change P44 to the desired password.

TO RESET FACTORY DEFAULTS

To recognize a factory reset, the exhaust fan VFD controller must see a change in P48.

1. Cycle power from the exhaust fan VFD.
2. Enter PROGRAM mode by entering password.
3. Scroll to P48 by using UP and DOWN buttons and then press MODE. One of the 12 mode numbers will appear. (Modes 1, 2 and 4 are used for these units.)
4. Restore factory defaults by changing the value in P48 using UP and DOWN buttons and then storing the value by pressing MODE.
5. Press MODE again to re-display the value of P48.
6. Change the value of P48 to the desired factory default mode (see Table 4) using UP and DOWN buttons then press MODE. The Motormaster V control is now restored to factory settings.

Table 4 — Program Parameters for the Operating Mode

PARAMETERS	DESCRIPTION	MODE	DEFAULT
P01	Line voltage: 01 = low line, 02 = high line	01	01
P02	Carrier freq: 05 + 10k Hz	05	02
P03	Startup mode: 02 = start on power up	02	01
P04	Stop mode: 03 = Ramp to stop	03	01
P05	Standard speed source: 03 = 0 - 10 VDC	03	01
P06	TB-14 output: 01 = none	NA	01
P08	TB-30 output: 01 = none	NA	02
P09	TB-31 output: 01 = none	NA	01
P10	TB-13A function sel: 01 = none	NA	01
P11	TB-13B function sel: 01 = none	NA	01
P12	TB-13C function sel: 01 = none	NA	01
P13	TB-15 output: 01 = none	NA	01
P14	Control: 01 = Terminal strip	NA	01
P15	Serial link: 01 = Disable	01	01
P16	Units editing: 01 = Tenths of units	01	02
P17	Rotation: 01 = forward only, 03 = reverse only	01	01
P19	Acceleration time: sec	10	20
P20	Deceleration time: sec	10	20
P21	DC brake time: 0	NA	0
P22	DC brake voltage 0%	NA	0
P23	Min freq	15	0
P24	Max freq	60	60
P25	Current limit: %	125	18
P26	Motor overload: %	100	100
P27	Base freq: 60 or 50 Hz	60	60
P28	Fixed boost: 0.5% at low frequencies	0.5	1
P29	Accel boost: 0%	NA	0
P30	Slip compensation: 0%	NA	0
P31	Preset spd #1: Hz	NA	0
P32	Preset spd #2: Hz	NA	0
P33	Preset spd #3: Hz	NA	0
P34	Preset spd 4: Hz	NA	0
P35	Preset spd 5: Hz	NA	0
P36	Preset spd 6: Hz	NA	0
P37	Preset spd 7: Hz	NA	0
P38	Skip bandwidth: Hz	NA	0
P39	Speed scaling: Hz	NA	0
P40	Frequency scaling 50 or 60 Hz	NA	60
P41	Load scaling: %	NA	200
P42	Accel/decel #2: sec	NA	20
P43	Serial address	NA	1
P44	Password:111	111	111
P45	Speed at min signal	NA	0
P46	Speed at max feedback: 60 or 50 Hz	NA	60
P47	Clear history? 01 = maintain (set to 02 to clear)	01	01
P48	Program selection: Program 1 – 12	NA	01
P61	PI Mode: 05 = 01 = no PID	NA	01
P62	Min feedback = 0 (0V *10)	NA	0
P63	Max feedback = 50 (5V * 10)	NA	100
P64	Proportional gain = 3.5%	NA	5
P65	Integral gain = .2	NA	0
P66	PI accel/decel (setpoint change filter) = 10	NA	20
P67	Min alarm	NA	0
P68	Max alarm	NA	0
P74	Analog input filter	2	2
P75	Sleep mode threshold	12	0
P76	Sleep delay	300	30
P77	Sleep bandwidth	NA	0

LEGEND

NA — Not Applicable
PI — Proportional Integral
PID — Proportional Integral Derivative

TROUBLESHOOTING

Troubleshooting the exhaust fan VFD control requires a combination of observing system operation and VFD display information.

The exhaust fan VFD also provides real time monitoring of key inputs and outputs. The collective group is displayed through parameters P50 to P56 and all values are read only. These values can be accessed without entering a password.

1. Press MODE twice and P50 will appear.
2. Press MODE again to display value.
3. To scroll to P51-P56 from P50, use UP and DOWN buttons then press MODE to display the value.

- **P50: FAULT HISTORY —** Last 8 faults
- **P51: SOFTWARE version**
- **P52: DC BUS VOLTAGE —** in percent of nominal, usually rated input voltage x 1.4
- **P53: MOTOR VOLTAGE —** in percent of rated output voltage
- **P54: LOAD —** in percent of drives rated output current
- **P55: VDC INPUT —** in percent of maximum input: 100% will indicate full scale which is 5 v
- **P56: 4-20 mA INPUT —** in percent of maximum input: 20% = 4 mA, 100% = 20 mA

Fault Lockout

If a fault lockout (LC) has occurred, view the fault history in P50 to find the last fault. Once P50 is displayed, use the arrow buttons to scroll through the last 8 faults. Any current faults or fault codes from the fault history can be analyzed using Table 5.

TO DISABLE AUTOMATIC CONTROL MODE AND ENTER MANUAL SPEED CONTROL:

1. Change P05 to “01- keypad”.
2. Push UP and DOWN arrow button to set manual speed.
3. Set P05 to proper value to restore automatic control according to Table 4.

TO PROVIDE MANUAL START/STOP CONTROL

With power removed from VFD, remove start command jumper and install a switch between the appropriate start terminals.

EPM Chip

The drive uses a electronic programming module (EPM) chip to store the program parameters. This is an EEPROM memory chip and is accessible from the front of the VFD. It should not be removed with power applied to the VFD.

The drive is programmed to automatically restart after a fault and will attempt to restart three times after a fault (the drive will not restart after CF, cF, GF, F1, F2-F9, or Fo faults). If all three restart attempts are unsuccessful, the drive will trip into FAULT LOCKOUT (LC), which requires a manual reset.

Table 5 — Fault Codes

CODE	DESCRIPTION	RESET METHOD	PROBABLE CAUSE	CORRECTIVE ACTION
AF	High Temperature Fault	Automatic	Ambient temperature is too high; Cooling fan has failed (if equipped).	Check cooling fan operation.
CF	Control Fault	Manual	A blank EPM, or an EPM with corrupted data has been installed.	Perform a factory reset using Parameter 48 – PROGRAM SELECTION. See Drive Programming section.
cF	Incompatibility Fault	Manual	An EPM with an incompatible parameter version has been installed.	Either remove the EPM or perform a factory reset (Parameter 48) to change the parameter version of the EPM to match the parameter version of the drive.
F1	EPM Fault	Manual	The EPM is missing or damaged.	Install EPM or replace with new EPM.
F2—F9 Fo	Internal Faults	Manual	The control board has sensed a problem.	Consult factory.
GF	Data Fault	Manual	User data and Carrier defaults in the EPM are corrupted.	Restore factory defaults by toggling P48 to another mode. Then set P48 to desired mode to restore all defaults for that mode. See Drive Programming section. If that does not work, replace EPM.
HF	High DC Bus Voltage Fault	Automatic	Line voltage is too high; Deceleration rate is too fast; Overhauling load.	Check line voltage — set P01 appropriately.
JF	Serial Fault	Automatic	The watchdog timer has timed out, indicating that the serial link has been lost.	Check serial connection (computer). Check settings for P15. Check settings in communication software to match P15.
LF	Low DC Bus Voltage Fault	Automatic	Line voltage is too low.	Check line voltage — set P01 appropriately.
OF	Output Transistor Fault	Automatic	Phase to phase or phase to ground short circuit on the output; Failed output transistor; Boost settings are too high; Acceleration rate is too fast.	Reduce boost or increase acceleration values. If unsuccessful, replace drive.
PF	Current Overload Fault	Automatic	VFD is undersized for the application; Mechanical problem with the driven equipment.	Check line voltage – set P01 appropriately. Check for dirty coils. Check for motor bearing failure.
SF	Single-Phase Fault	Automatic	Single-phase input power has been applied to a three-phase drive.	Check input power phasing.
Drive displays "---" even though drive should be running	Start Contact is Not Closed	Automatic	Start contact is missing or not functioning.	Check fan relay.
VFD flashes "---" and LCS	Start Contact is Not Closed	Automatic	Start contact not closed.	Check FR for closed contact.
VFD flashes 57 (or 47) and LCS	Speed Signal Lost	Automatic	Speed signal lost. Drive will operate at 57 (or 47) Hz until reset or loss of start command. Resetting requires cycling start command (or power).	Transducer signal lost. Check VDC signal between TB5 and TB2. Should be in range of 0.5V to 4.5V. 5VDC output should be present between TB6 and TB2.

LEGEND

EPM — Electronic Programming Module
FR — Fan Relay
LCS — Loss of Control Signal
TB — Terminal Block
VFD — Variable Frequency Drive