Literature Assembly
911-0769

Contains the following:

2100-671(G)	Mega-Tec PKG A/C Manual
2100-705(E)	Mega-Tec A/C Install Instructions
2100-479	Leak Test, Evacuation, Charging

SERVICE INSTRUCTIONS

MEGA-TEC®
Wall-Mount Air Conditioner

Models: W090A, W120A, W150A

Bard® SINCE 1914
Climate Control Solutions

Bard Manufacturing Company, Inc.
Bryan, Ohio 43506
www.bardhvac.com

Manual: 2100-671G
Supersedes: 2100-671F
Date: 7-2-21

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Multi-Stage Cooling System

The Bard air conditioning system is composed of MEGA-TEC wall-mounted air conditioners matched with an LC6000 supervisory controller or Bard PGD/ PGDx stand-alone display. If only one wall-mounted air conditioner is being used, it can be matched with either the LC6000 supervisory controller or a stand-alone display. If more than one wall-mount unit is installed, the LC6000 controller must be matched with the air conditioning units. The wall mounts are specifically engineered for telecom/motor control center rooms.

NOTE: *The LC6000 supervisory controller or stand-alone display and MEGA-TEC Series wall-mount units are designed specifically to work together. The controller or stand-alone display cannot run other brands of systems, nor can other controllers run the MEGA-TEC Series wall-mount units. They are a complete system, and must be used together. See manual 2100-669 for more information about the LC6000 controller, manual 2100-734 for the PGD and manual 2100-740 for the PGDx.*

Wall-Mount Air Conditioner Units

The wall-mount units operate on VAC power. If equipped with an economizer, the units will supply 100% of rated cooling airflow in free cooling mode with ability to exhaust the same amount through the unit itself without any additional relief openings in the shelter.

MEGA-TEC units are fully charged with refrigerant and are available with optional electric heat and/or electric reheat dehumidification.

NOTE: *575V models take incoming field power and step-down secondary to 460V which supplies most components **except** compressors and electric heat which remain 575V. Reference wiring diagrams for more information.*

General

The equipment covered in this manual is to be installed by trained, experienced service and installation technicians.

The refrigerant system is completely assembled and charged. All internal wiring is complete.

The unit is designed for use without duct work. Flanges are provided for transition from unit to wall grilles.

These instructions and any instructions packaged with any separate equipment required to make up the entire air conditioning system should be carefully read before beginning the installation. Note particularly any tags and/or labels attached to the equipment.

While these instructions are intended as a general recommended guide, they do not supersede any national and/or local codes in any way. Authorities having jurisdiction should be consulted before the installation is made. See **Additional Publications** for information on codes and standards.

Sizing of systems for proposed installation should be based on heat loss and heat gain calculations made according to methods of Air Conditioning Contractors of America (ACCA). The supply flange should be installed in accordance with the *Standards of the National Fire Protection Association for the Installation of Air Conditioning and Ventilating Systems of Other Than Residence Type, NFPA No. 90A*, and *Residence Type Warm Air Heating and Air Conditioning Systems, NFPA No. 90B*. Where local regulations are at a variance with instructions, installer should adhere to local codes.

Shipping Damage

Upon receipt of equipment, the cartons should be checked for external signs of shipping damage. If damage is found, the receiving party must contact the last carrier immediately, preferably in writing, requesting inspection by the carrier's agent.

These units must remain in upright position at all times; do not lay on side. Do not stack units.

Additional Publications

These publications can help when installing the air conditioner. They can usually be found at the local library or purchased directly from the publisher. Be sure to consult the current edition of each standard.

National Electrical Code.....ANSI/NFPA 70

Standard for the Installation of Air Conditioning and Ventilating Systems .....ANSI/NFPA 90A

Standard for Warm Air Heating and Air Conditioning Systems .....ANSI/NFPA 90B

Load Calculation for Residential Winter and Summer Air Conditioning ..... ACCA Manual J

For more information, contact these publishers:

Air Conditioning Contractors of America (ACCA)
1712 New Hampshire Ave. N.W.
Washington, DC 20009
Telephone: (202) 483-9370 Fax: (202) 234-4721

American National Standards Institute (ANSI)
11 West Street, 13th Floor
New York, NY 10036
Telephone: (212) 642-4900 Fax: (212) 302-1286

American Society of Heating, Refrigeration and Air Conditioning Engineers, Inc. (ASHRAE)
1791 Tullie Circle, N.E.
Atlanta, GA 30329-2305
Telephone: (404) 636-8400 Fax: (404) 321-5478

National Fire Protection Association (NFPA)
Batterymarch Park
P. O. Box 9101
Quincy, MA 02269-9901
Telephone: (800) 344-3555 Fax: (617) 984-7057

ANSI Z535.5 Definitions:

DANGER: Indicate[s] a hazardous situation which, if not avoided, will result in death or serious injury. The signal word "DANGER" is to be limited to the most extreme situations. DANGER [signs] should not be used for property damage hazards unless personal injury risk appropriate to these levels is also involved.

WARNING: Indicate[s] a hazardous situation which, if not avoided, could result in death or serious injury. WARNING [signs] should not be used for property damage hazards unless personal injury risk appropriate to this level is also involved.

CAUTION: Indicate[s] a hazardous situation which, if not avoided, could result in minor or moderate injury. CAUTION [signs] without a safety alert symbol may be used to alert against unsafe practices that can result in property damage only.

NOTICE: [this header is] preferred to address practices not related to personal injury. The safety alert symbol shall not be used with this signal word. As an alternative to "NOTICE" the word "CAUTION" without the safety alert symbol may be used to indicate a message not related to personal injury.

⚠ WARNING

Electrical shock hazard.

Have a properly trained individual perform these tasks.

Failure to do so could result in electric shock or death.

⚠ WARNING

Fire hazard.

Maintain minimum 1/4" clearance between the supply flange and combustible materials.

Failure to do so could result in fire causing damage, injury or death.

⚠ WARNING

Heavy item hazard.

Use more than one person to handle unit.

Failure to do so could result in unit damage or serious injury.

⚠ CAUTION

Cut hazard.

Wear gloves to avoid contact with sharp edges.

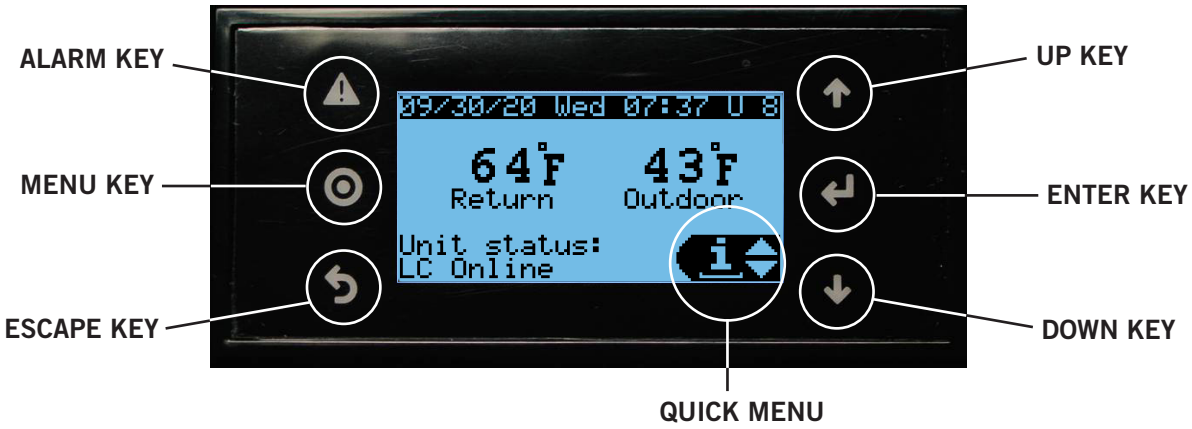
Failure to do so could result in personal injury.

IMPORTANT

When connecting this product from a remote location, ensure that the network connection is secure and reliable.

USING THE TEC-EYE™

FIGURE 1
TEC-EYE (Bard P/N 8301-059) Display and Interface (Status Screen Shown)



ALARM KEY
Allows viewing of active alarms
Silences audible alarms
Resets active alarms

MENU KEY
Allows entry to Main Menu

ESCAPE KEY
Returns to previous menu level
Cancels a changed entry

UP KEY
Steps to next screen in the display menu
Changes (increases) the value of a modifiable field

ENTER KEY
Accepts current value of a modifiable field
Advances cursor

DOWN KEY
Steps back to previous screen in the display menu
Changes (decreases) the value of a modifiable field

TEC-EYE Hand-Held Service Tool

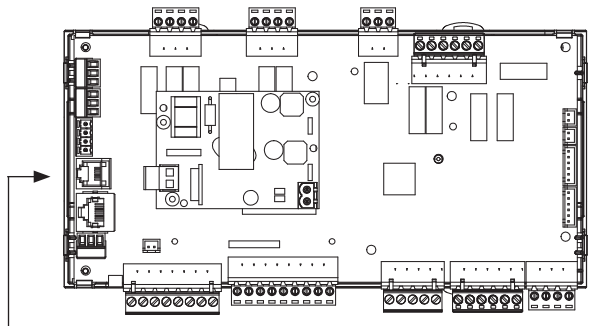
The TEC-EYE service tool is used to communicate with the MEGA-TEC unit logic board. By connecting directly to the logic board inside the unit control panel, it is possible to perform diagnostics on the unit, adjust certain settings and verify unit and economizer operation through a self test procedure. **The TEC-EYE service tool is required for unit setup and operation.** The TEC-EYE is supplied with the LC6000 controller but can also be ordered separately (Bard P/N 8301-059).

The menu driven interface provides users the ability to scroll through two menu levels: Quick Menu and Main Menu. The menus permit the user to easily view, control and configure the unit. See Figure 1 for TEC-EYE display and key functions.

The controller is completely programmed at the factory; the default setpoints and their ranges are easily viewed and adjusted from the TEC-EYE display. The program and operating parameters are permanently stored on FLASH-MEMORY in case of power failure.

The TEC-EYE connects to the wall-mount unit control board via an RJ11 modular phone connector as shown in Figure 2.

FIGURE 2
TEC-EYE Connection to Unit Control



When not being used, the TEC-EYE hand-held diagnostic tool should be stored inside or near the LC6000 controller. Do not let the TEC-EYE leave the shelter.

NOTE: *Screenshots shown in this manual reflect default settings (when applicable).*

TABLE 1
TEC-EYE Menu Structure

Menu/Screen Structure	Password Level Required
Quick Menu	
Setpoints (Orphan Mode Temperature Control)	None
Information	None
Alarm Log	None
Main Menu	
System Config	User
Adv. Sys. Config	Technician
I/O Config	Technician
Digital Inputs	Technician
Digital Outputs	Technician
Analog Inputs	Technician
Analog Outputs	Technician
Fan/Blowers	Technician
Manual EEV	Technician
On/Off	User
Alarm Logs	User
Settings	--
Date/Time	Technician
Initialization	Technician
Change Passwords	Varies
Logout	--

TABLE 2
LC6000/TEC-EYE Passwords (Defaults)

User	2000
Technician	1313
Engineer	9254
Use UP or DOWN keys and ENTER key to enter password. The passwords listed above are the default passwords. End users can change these passwords if additional security is desired.	

TEC-EYE Acronyms

MAT – Mixed air temperature
RAT – Return air temperature
SAT – Supply air temperature
OAT – Outdoor air temperature
OAH – Outdoor air humidity
Blower – Indoor blower speed
Fan – Outdoor fan speed
Damper – Free cooling

Main Status Screen

The main Status screen is the default start-up screen and also the return screen after 5 minutes of no activity. The screen can be accessed at any time by pressing the ESCAPE key repeatedly.

The wall-mount unit address is displayed in the upper right corner on the main Status screen (see Figure 1). The main Status screen also shows the current date, return air temperature (RAT), outdoor air temperature (OAT) and unit status. See Table 3 on page 8 for wall-mount unit status messages.

The Quick Menu is accessible from the main Status screen. Setpoints, Information and Alarm Log are available through the Quick Menu. Pressing the UP or DOWN keys while on the main Status screen will change the Quick Menu icon displayed (see Figure 3). Press the ENTER key when the desired icon is displayed.

FIGURE 3
Quick Menu Icons

Quick Menu

Setpoints

From this screen, the local unit heating and cooling setpoints can be changed.

Once the supervisory controller is connected, cooling and heating setpoints will be communicated and local cooling and heating setpoints will be replaced with the communicated cooling and heating setpoints.

If at any time the wall-mount unit(s) loses communication with the LC6000 controller, the wall-mount unit(s) will go into orphan mode and operate using the last communicated setpoints.

To verify or change the wall-mount unit cooling and heating setpoints in orphan mode:

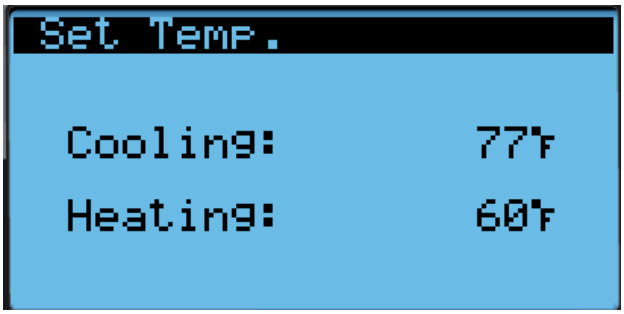
1. Connect the TEC-EYE diagnostic tool to the control board located in the unit.
2. From the Status screen, press UP or DOWN key until Quick Menu displays Setpoints icon. Press ENTER key.
3. Press ENTER key to scroll to the selected choice (see Figure 4 on page 9).
4. Press UP or DOWN key on desired value until value displays correctly.

TABLE 3
Unit Status Messages

Message	Description
Orphan Mode	This message will be shown when unit is not connected to the LC or stand-alone display. The unit is not operating when this message is shown but is ready to heat or cool based on the return air temperature. Blower will run continuously in this mode.
Standalone Mode	This message will be shown when the unit is communicating with stand-alone display. The unit is not operating when this message is shown but is ready to heat or cool based on the display temperature sensor.
LC Online	This message will be shown when the unit is communicating with the LC6000. The unit is not operating when this message is shown but is ready to respond to any call or event from the LC.
Cont. Blower	The message will be shown when the unit has been commanded to run the blower continuously by the LC6000 or the stand-alone display.
Comfort Mode	This message will be shown when the unit has been put into comfort mode by the stand-alone display.
Freecooling	This message will be shown when the unit is utilizing the economizer to cool the space.
Passive Dehum	This message will be shown when the unit is connected to the LC6000 or stand-alone display and the economizer is disabled and blower speeds have been lowered to optimize moisture removal.
Cooling	This message will be shown when the unit is operating the air conditioning system to cool the space.
Heating	This message will be shown when the unit is operating the electric heaters to warm the space.
Optimized	This message will be shown when the unit is operating both the economizer and the air conditioning simultaneously to cool the space.
Active Dehum	This message will be shown when the unit is connected to the LC6000 or stand-alone display, no heating or cooling calls are required and the air conditioner and electric heat are being used together to remove moisture from the space.
Self Test	This message will be shown when the self test has been activated and component operations are being verified.
Off by Alarm	This message will be shown when the blower, fan or expansion module are no longer communicating with the main controller. Also, when unit disable, emergency off or no return sensor is detected in orphan mode.
Emergency Vent	This message will be shown when connected to a LC6000 and the emergency vent input is activated.
Emergency Cool	This message will be shown when the space temperature is above the high temperature setpoint. This can be active in orphan mode, stand-alone mode or when connected to the LC6000.
Emergency Off	This message will be shown when unit disable input is active, or when connected to LC6000 and emergency off input is active.
Off by LC	This message will be shown when connected to the LC6000 and the system is turned off.
Off by PGDx	This message will be shown when connected to the stand-alone display and the unit is turned off.
Off by Keyboard	This message will be shown when unit has been turned off at unit.
Model Invalid	This message will be shown when a valid model number is not entered into the controller.

5. Press ENTER key to save and scroll to next parameter.
6. Press ESCAPE key until Main Menu screen is displayed.

FIGURE 4
Cool and Heat Setpoints



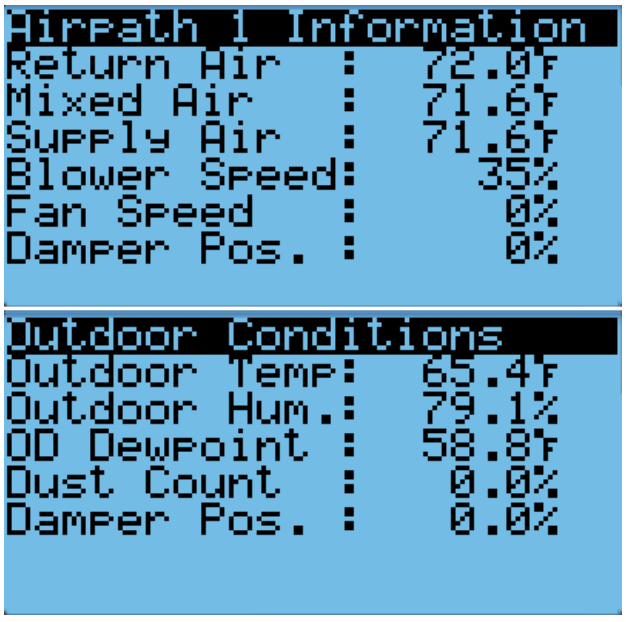
Information

The information screens are used as a quick reference to show unit A/C circuit measurements and program version.

Air Path Information

Unit air path and outdoor conditions can be found on two screens within the information menu (see Figure 5). The unit air path information and measurements provided are return air temperature, mixed air temperature (if economizer unit), supply air temperature, blower speed, fan speed and damper position (if economizer unit). Outdoor condition information and measurements provided include outdoor temperature, outdoor humidity, calculated outdoor dew point, dust concentration (if economizer unit and dust sensor enabled) and damper position (if economizer unit).

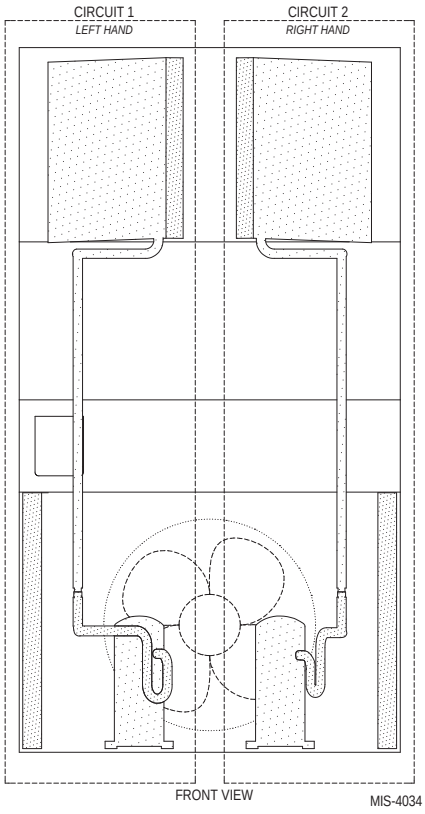
FIGURE 5
Unit Air Path Information



A/C Circuit Information

MEGA-TEC Series wall-mounted air conditioners have two separate refrigeration circuits: Circuit 1 is located on the left side of the unit and circuit 2 is on the right side (see Figure 6).

FIGURE 6
MEGA-TEC Refrigeration Circuits



Circuit 1 utilizes a 2 stage scroll compressor while circuit 2 uses a single stage compressor. Both circuits are equipped with an electronic expansion valve that is used to control superheat of each circuit. Liquid temperature and pressure are measured to provide a calculated subcooling for each circuit. Suction temperature and pressure are also measured to provide a calculated superheat for each circuit.

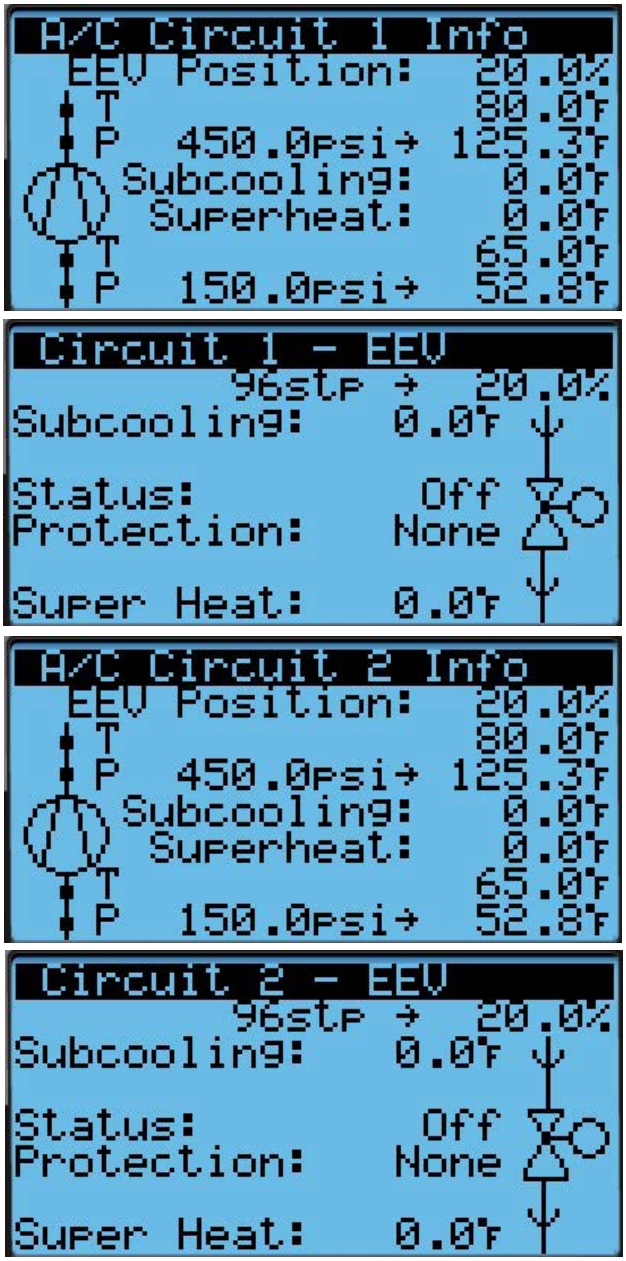
Using both circuit 1 and circuit 2, the MEGA-TEC unit can provide 35%, 80% and 100% cooling capacity. Separate refrigeration circuits also allow for operation of the unit at partial capacity if service is required on one circuit.

NOTE: *400V models have only two stages of capacity rather than three and are identical in size. Take note of this when reading this manual.*

A/C Circuit Information can be found in four screens within the information menu (see Figure 7 on page 10). The information and measurements provided are liquid line temperature, liquid line pressure, condensing

saturated temperature, suction line temperature, suction line pressures, suction saturated temperature, super heat, subcooling and electronic expansion valve position.

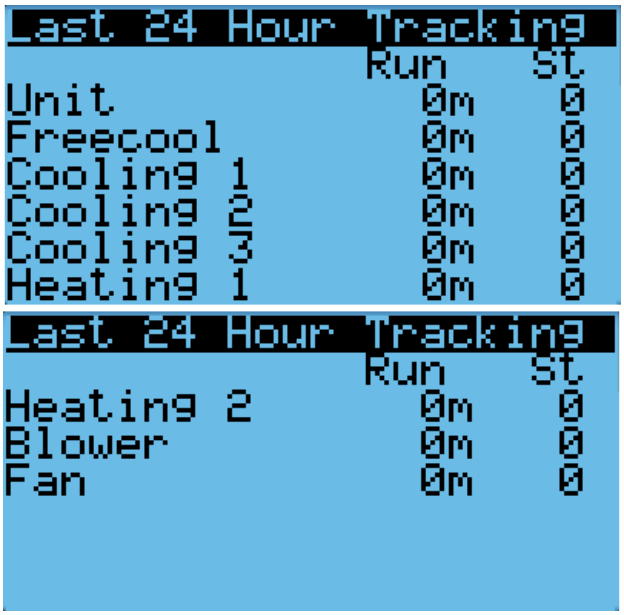
FIGURE 7
A/C Circuit Measurements



24 Hour Run Time

The Last 24 Hour Tracking screens display unit run times over the last 24 hour period (see Figure 8). The **Run** column displays the active times the component(s) were in ON state, while the **St** (Start) column shows the number of starts or times the component changed from an OFF to an ON state.

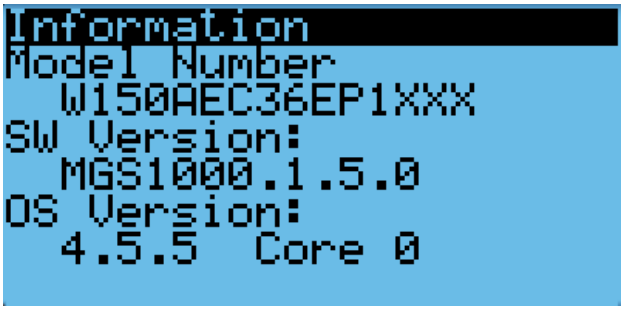
FIGURE 8
Last 24 Hour Tracking



Software Version

The Software Version screen displays all program version information for the PLC (see Figure 9). This information can be used to determine whether a software update may be required.

FIGURE 9
Software Version



NOTICE

It is important to check the software version during installation to ensure that the latest version has been installed. Current software versions and installation instructions are available on the Bard website at http://www.bardhvac.com/software-download/

Software Versioning Guide

MGS1000.X.Y.Z

Software Name: The name of the software is the base part number used to identify which product the software is used in.

TABLE 4
Software Versioning Guide

Product	Software Name
MULTI-TEC	MTS1000
FUSION-TEC (WR)	WTS1000
MEGA-TEC	MGS1000
LC6000	LCS6000

X: The letter X represents a major change to the software effecting product compatibility or function of the equipment.

Y: The letter Y represents a minor change to the software that either adds, removes or alters a feature of the equipment.

Z: The letter Z represents a change to the software that fixes existing features or user interface.

Alarm Log

The alarm log screens show a log of each alarm. There will be a log for when alarm occurred and if the alarm auto clears, it will show when the alarm cleared. See page 13 for information on clearing alarms.

Executing a Self Test

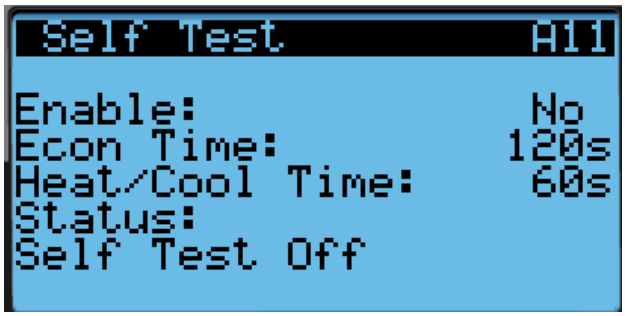
This unit has the ability to perform a self test that will operate all available unit functions in order to quickly determine unit operation. Self test parameters are not adjustable.

The self test will automatically skip sections of the test based on the model number entered into the controller. If position 10 of the model number is B (to indicate "no vent" option), steps A and B will be skipped. If positions 8 and 9 of the model number indicate a 0Z (0kw) option, steps G,H and I will be skipped. If position 8 and 9 indicate a 09 (9kw) option, step H will be skipped.

To execute a self test:

1. Press MENU key to access the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **Sys Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Self Test A11** screen.
5. Press ENTER key to scroll to **Enable** parameter (see Figure 8).
6. Press UP or DOWN key to change value to **Yes**. The self test will begin.

FIGURE 10
Executing Self Test



Self Test Parameter Descriptions

Damper Time: This is the time (in seconds) allowed for both the opening sequence and closing sequence.

Heat/Cool Time: This is the time (in seconds) allowed for cooling sequence and heating sequence.

Status: This will display what the unit is doing as the self test progresses. The following messages may appear:

Self Test Off

Initializing...

Opening Economizer

Closing Economizer

Compressor 1 On

Compressor 1 & 2 On

C1 Full Load + C2 On

Turning Comp. Off....

Electric Heat 1 On

Electric Heat 1 & 2 On

Turning Heat Off...

End

The unit will determine which items to test based on the unit model number.

Reset to Factory Defaults

To reset to factory default settings:

1. Press MENU key to go to the Main Menu screen.
2. Use UP or DOWN keys and ENTER key to enter ENGINEER password 9254.
3. Press UP or DOWN keys to scroll to **Settings**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Initialization**; press ENTER key.

5. Press UP or DOWN keys to scroll to the **DEFAULT INSTALLATION** screen.
6. Press ENTER key to scroll to **Reset to Factory Defaults:** (see Figure 11).
7. Press UP or DOWN key to change value to **YES**; press ENTER key.
8. System will restart with default values.

FIGURE 11
Restoring Factory Default Settings

The controller can only be factory reset when the USB port is not in use. When the USB port is in use, a message will appear and the option to reset factory defaults will not be available (see Figure 12).

FIGURE 12
Restoring Factory Default Settings – Remove USB Device

Configuration File

The controller will automatically save all of the configured parameters to a file that can be accessed by connecting a laptop to the controller with a micro USB cable. This file can be used to copy the setting of one board to another board.

The file is located in the main directory of the controller and is labeled "MG_Config". Copy this file to a location on the laptop and then disconnect from the first board. Connect to the second board and copy the file to the second board. Disconnect the laptop from the second board and power cycle the controller. The second board will now have the same settings as the first board.

Unit On/Off

The wall-mount unit can be turned on and off from the TEC-EYE. Turning the unit off with the following instructions will disable all unit operation.

To turn the unit on or off:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter USER password 2000.
3. Press UP or DOWN keys to scroll to **On/Off**; press ENTER key.
4. Press UP or DOWN keys to change value from **On** to **Off** or from **Off** to **On**.
5. Press ESCAPE key several times to return to Main Menu screen.

The wall-mount unit may also be turned off by certain events such as the unit disable input (if enabled), blower offline/loss of communication, fan offline/loss of communication, panel removed or the return air temperature sensor failure when not connected to the LC6000.

The unit can also be manually turned off by the PGDx and the LC6000.

Alarm Adjustment

Acknowledging Alarms

On the standard TEC-EYE included with the LC6000 controller (Bard P/N 8301-159), alarm conditions are enunciated by an audible alarm signal. On the larger TEC-EYE (Bard P/N 8301-053), alarm conditions activate a red LED indicator that backlights the ALARM function key. An alarm is acknowledged by pressing the ALARM key. This calls up alarm display screen(s) that provide a text message detailing the alarm condition(s).

Clearing Alarms

Alarms can only be cleared after the alarm condition has been corrected. To clear a single alarm, press and hold the ALARM key for 3 seconds while viewing a specific alarm screen. To clear all alarms, navigate to the screen at the end of the alarm list (shown in Figure 13) and press and hold the ALARM key for 3 seconds.

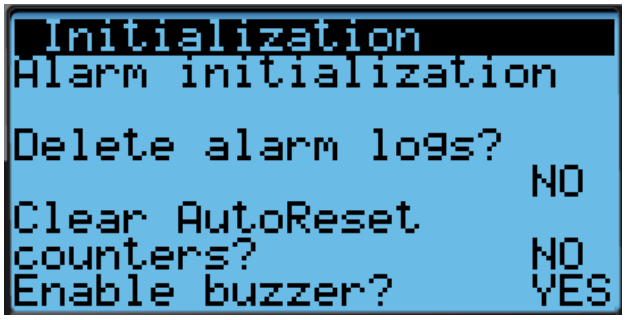
FIGURE 13
Clearing All Alarms

Clearing Alarm Logs and Counters

To clear the alarm log and alarm counters:

1. Press MENU key to go to the Main Menu screen.
2. Use UP or DOWN keys and ENTER key to enter USER password 2000.
3. Press UP or DOWN keys to scroll to **Settings**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Initialization**; press ENTER key. (**Alarm initialization** screen will be displayed.)
5. Press ENTER key to scroll to **Delete alarm logs?** (see Figure 14).
6. Press UP or DOWN key to change value to **YES**; press ENTER key.
7. Press ENTER key to scroll to **Clear AutoReset counters**?
8. Press UP or DOWN key to value to **YES**; press ENTER key.

FIGURE 14
Clearing Alarm Logs and Counters



Exporting Alarm Logs

See latest version of Supplemental Instructions manual 7960-825 for information on exporting alarm logs.

Exporting 7 Day Logs

See latest version of Supplemental Instructions manual 7960-826 for information on exporting 7 day I/O logs.

Unit Address and Zone

Each unit must have a unique address for the system to operate correctly with the LC supervisory controller (*Ex: 1, 2, 3, ...14 depending on the number of units*). The unit only needs the address to be changed for the communication to work properly.

When paired with a supervisory controller that uses zones to control groups of wall units, each unit uses the zone setting to relay to the supervisory controller what zone it is set to operate in. Up to three zones can be established with up to 14 units in a single zone. (The LC6000 supervisory controller can control up to a total of 14 units.)

To change the unit address and/or zone:

1. Press MENU key to access the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **Sys Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Unit Setup A1** screen.
5. Press ENTER key to scroll to **Unit Address (**see Figure 15).
6. Press UP or DOWN keys to change the address to a value between 1 and 14.
7. Press ENTER key to scroll to **Zone**.
8. Press UP or DOWN keys to change to the desired value (1, 2 or 3).
9. Press ENTER key to save value.

FIGURE 15
Changing Unit Address or Zone

NOTE: *Each unit must have a unique address for the communication to work properly. Unit addresses can only be used once per LC6000 regardless of number of zones. Bard also recommends physically labeling each unit for ease in identification.*

Temperature Control

Temperature Control Components

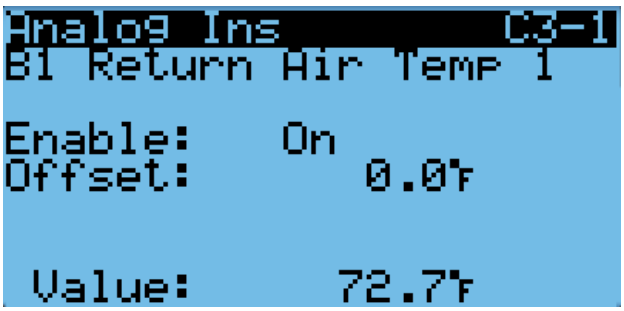
Return Air Temperature Sensor

The unit is equipped with a return air temperature sensor to monitor the space temperature when the unit is in orphan mode. The return air sensor is located in the return opening in such a way that it is exposed to the entering airstream. An alarm signal will be sent to the LC controller if the return air temperature sensor is disconnected. The temperature is measured with a 10k ohm NTC thermistor.

This sensor can be verified and adjusted by:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **I/O Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Analog Inputs**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Analog Ins C3-1**.
6. Verify the measurement displayed on screen is accurate (see Figure 16).
7. If the measurement needs to be adjusted, apply an offset value by pressing ENTER to scroll to **Offset**.
8. Press UP or DOWN keys to adjust the offset.
9. The update will not take effect until the cursor is moved out of the **Offset** parameter.
10. Once adjusted, press the ESCAPE key several times to return to Main Menu screen.

FIGURE 16
Adjusting Return Air Temperature Sensor



Return Air Temperature Sensor Alarm

When the return air temperature sensor value is out of range (-41.0 to 303.0°F), the controller will generate a sensor failure alarm to indicate the sensor is not working properly.

This alarm is fixed and cannot be adjusted.

Temperature Control Operation

The unit utilizes differentials while in orphan mode to control the space temperature. The differential values all reference the setpoint therefore allowing the control band to be easily changed using the setpoint. To change specific staging characteristics, each differential can be modified individually. There are separate setpoints and differentials for cooling and heating. Specific to the cooling differentials, the economizer will always be utilized first on a cooling call unless outdoor conditions are not acceptable for free cooling. In this case, the compressor will be activated at stage 1 in place of the economizer. All remaining stages will be shifted until the economizer becomes available again.

To change or view the unit setpoint:

1. From the Status screen, press UP or DOWN key until Quick Menu displays Setpoints icon (Set). Press ENTER key.
2. Press ENTER key to scroll to **Cool Setpoint** or **Heat Setpoint** (see Figure 4 on page 9).
3. Press UP or DOWN keys to change the value to desired heating and/or cooling setpoint.

Orphan Mode

MEGA-TEC Series wall-mount units have the capability to run without the LC6000 controller attached—this feature is called orphan mode. This keeps the shelter between 60°F and 77°F (factory default settings) by the use of the factory-installed return air sensor in each wall-mount unit. In orphan mode, no auxiliary temperature measurement devices are required for operation. The wall-mount unit automatically uses a continuous blower setting to circulate room air into the return air inlet and uses the return air temperature sensor to control room temperature.

If at any time the wall-mount unit(s) loses communication with the LC6000 controller, the wall-mount unit(s) will go into orphan mode and operate using the last communicated setpoints.

To change default setpoints, refer to ***Setpoints*** on page 7.

During installation, the ability to run in orphan mode allows deactivation of one of the existing, older wall-mount units, while keeping the shelter cool with the other unit still operating. Once the first of the Bard wall-mount units is installed and powered on, it will operate in orphan mode—keeping the climate inside the shelter stable and the installers comfortable while the remainder of the older equipment is removed and the remaining Bard wall-mount units and LC6000 controller are installed.

Additionally, should any or all of the MEGA-TEC Series wall-mount units lose communication with the LC6000 controller (such as during maintenance), they will continue to serve the shelter's needs until a repair can be made.

LC6000 Control

When the unit is connected to a LC6000 supervisory controller, the cooling and heating stages will be controlled by the LC6000. For more information on LC6000 staging, see latest version of LC6000 Service Instructions 2100-669.

Cooling

Units equipped with an economizer will use one stage of freecooling and up to three stages of mechanical cooling to cool the space. The economizer will always be prioritized first. When an economizer is not installed or the conditions outside are not desirable for cooling, the unit will use up to three stages of mechanical cooling to cool the space. All 400V units use a single capacity compressor for circuit 1, reducing the mechanical cooling stages to two. The units will use the staging differentials in Figure 17 and Figure 18 (Page 16) by default. These differentials can be configured on screen **Cool Staging B3**.

FIGURE 17
Cooling (with Economizer)

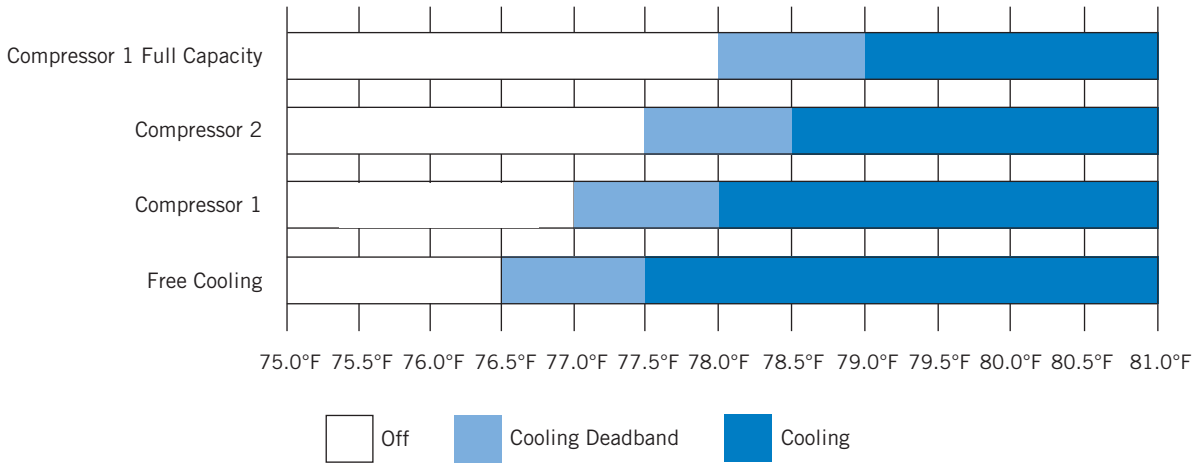


FIGURE 18
Cooling (without Economizer)

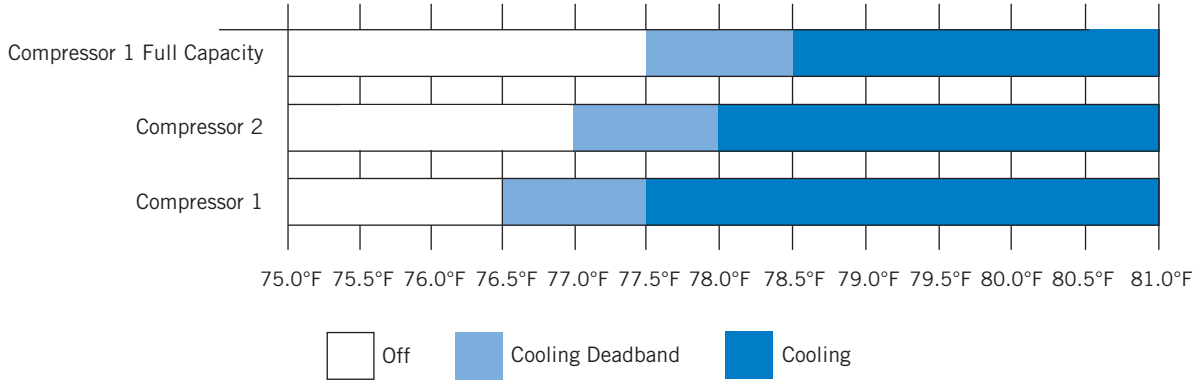
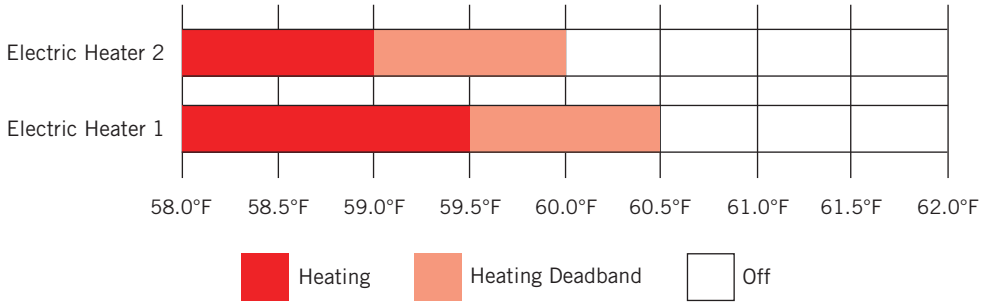


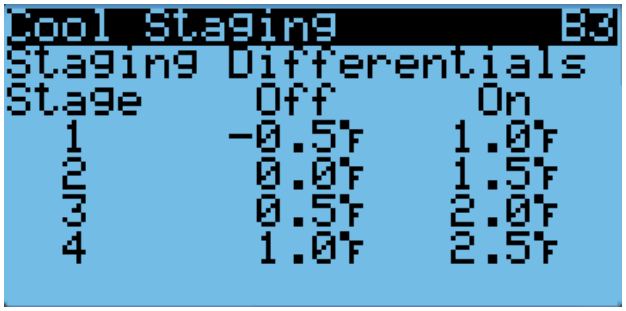
FIGURE 19
Heating



To view or adjust the cooling differentials:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter ENGINEER password 9254.
3. Press UP or DOWN keys to scroll to **Adv. Sys. Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Cool Staging B3** (see Figure 20).
5. Press ENTER key to advance the cursor to the desired value.
6. Press UP or DOWN keys to change values.

FIGURE 20
Adjusting Cooling Differentials



Heating

The unit will use up to 2 stages of electric heat to heat the space (see Figure 19). Electric heat is available as an option and the heating capacity will determine the number of stages (see **Electric Heat Option** on page 37).

To view or adjust the heating differentials:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter ENGINEER password 9254.
3. Press UP or DOWN keys to scroll to **Adv. Sys. Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Heat Staging B4** (see Figure 21).
5. Press ENTER key to advance the cursor to the desired value.
6. Press UP or DOWN keys to change values.

FIGURE 21
Adjusting Heating Differentials

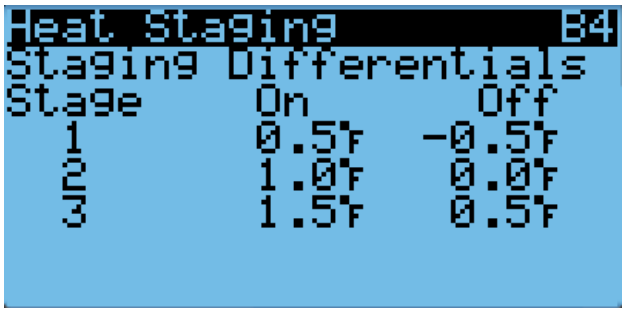
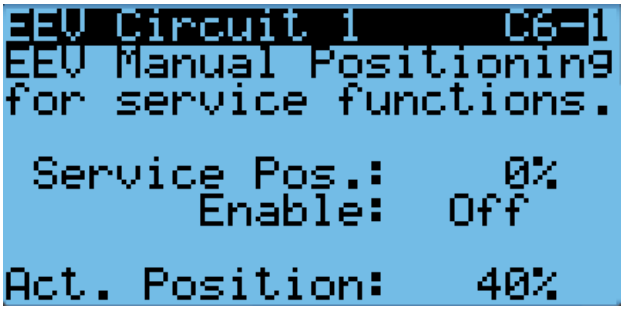


FIGURE 22
Overriding EEV Output



Electronic Expansion Valve (EEV)

EEV Components

Electronic Expansion Valve

The electronic expansion valve is a stepper motor that is controlled with a step output from the controller. The valve is capable of 480 steps represented by a 0-100% signal on the controller. The motor drives a needle valve that regulates the flow of refrigerant.

EEV Instructions for Vacuum, Reclaim, Charge Unit

The electronic expansion valve moves to the 40% open position when the unit is not actively cooling. The valve may need to be manually positioned for service or troubleshooting. The valve can be positioned by using a menu override.

To manually override the valve:

1. Turn the unit off using the TEC-EYE. See **Unit On/ Off** on page 13 for instructions on how to turn unit off using the TEC-EYE.
2. Press MENU key to go to the Main Menu screen.
3. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
4. Press UP or DOWN keys to scroll to **I/O Config**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Manual EEV**; press ENTER key.
6. Press UP or DOWN keys to scroll to **EEV Circuit 1 C6-1** or **EEV Circuit 2 C6-2.**
7. Press ENTER key to scroll to **Service Pos** (see Figure 22).
8. Press UP or DOWN keys to adjust to the desired value.
9 Press ENTER key to scroll to **Enable.**
10. Press UP or DOWN key to change **Off** to **On**.
11. Press ENTER key to save.

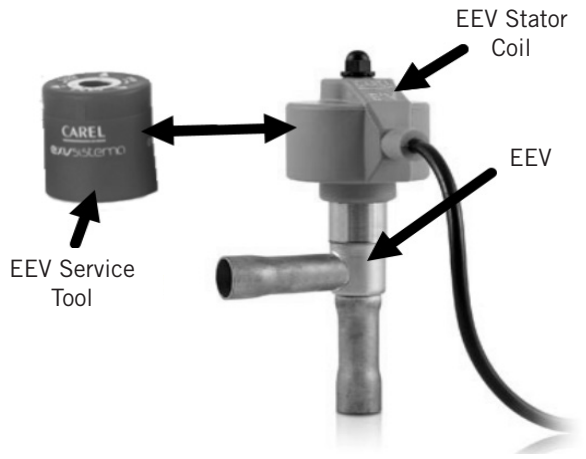
After the service or troubleshooting is completed, use TEC-EYE to disable the EEV manual positioning override and turn unit back on.

The valve can also be opened or closed using the EEV service tool (Bard Part # 2151-021). This magnetic EEV service tool (shown in Figure 23) is used to manually open the EEV. To do this, remove the EEV stator coil (red color with retaining nut on top), slide the magnetic tool over the shaft where the stator was removed and turn in a clockwise direction to open the valve to the full open position (directional arrows are provided on the tool). Opening the valve to the full open position will aid in the refrigerant reclamation and evacuation processes.

With the stator removed, the resistance should be 40 ohms +/- 10%. There are two sets of three wires that will have this resistance.

After removing the EEV service tool, reapply the EEV stator coil and retaining nut. Upon powering the unit back up, the control board will automatically drive the EEV back to the fully shut position, and then back to the 40% open position prior to starting the compressor back up. Once the compressor starts, the control board will again modulate the EEV position to control the system superheat.

FIGURE 23
Electronic Expansion Valve (EEV) and Service Tool



System Pressures

To view system pressure and temperatures during this process:

1. From the Status screen, press UP or DOWN key until Quick Menu displays Unit Information icon ( ). Press ENTER key.
2. Press UP or DOWN keys to scroll to **A/C Circuit 1 Info** and **A/C Circuit 2 Info** screens (see **Figure 7 A/C Circuit Measurements** on page 10).

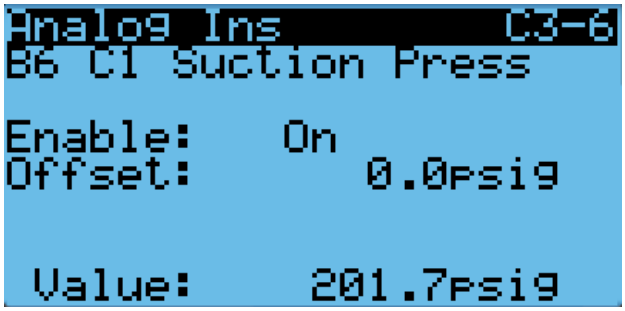
Suction Pressure Transducer

The unit has pressure transducers installed on the suction line between the evaporator coil and compressor (one on refrigerant circuit 1 and one on refrigerant circuit 2). The transducer is used for system monitoring of suction system pressures. The transducer is used with the suction temperature sensor to provide a real time superheat calculation that determines the EEV position.

This transducer reading can be verified and adjusted by:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **I/O Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Analog Inputs**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Analog Ins C3-6** (for circuit 1) or **Analog Ins C3-8** (for circuit 2).
6. Verify the measurement displayed on screen is accurate (see Figure 24).
7. If the measurement needs to be adjusted, apply an offset value by pressing ENTER to scroll to **Offset**.
8. Press UP or DOWN keys to adjust the offset.
9. The update will not take effect until the cursor is moved out of the **Offset** parameter.
10. Once adjusted, press the ESCAPE key several times to return to Main Menu screen.

FIGURE 24
Adjusting Suction Sensor/Transducer Pressure Values



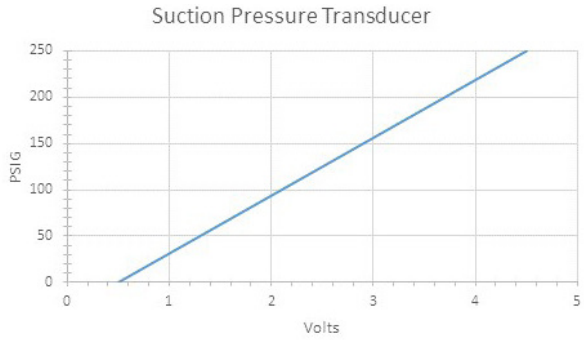
Troubleshooting the Suction Pressure Transducer

0-250 psig
-5v Nominal, .5 – 4.5v Actual
4v/250 psig = .016 volts per 1 psig

Example: 125 psig x .016 + .5 volts = 2.5 volts

Formula for Tech:
Measured Pressure x .016 + Voltage Offset = Expected Transducer Signal Voltage (see Figure 25).

FIGURE 25
Voltage to Pressure: Suction Pressure Transducer



Suction Pressure Alarm

When the suction pressure transducer value is measured out of range (0-250 PSIG) and the compressor has been operating for longer than 1 minute (verified by discharge pressure transducer), the controller will generate a sensor failure alarm to indicate the sensor is not working properly.

This alarm cannot be adjusted.

Suction Temperature Sensor

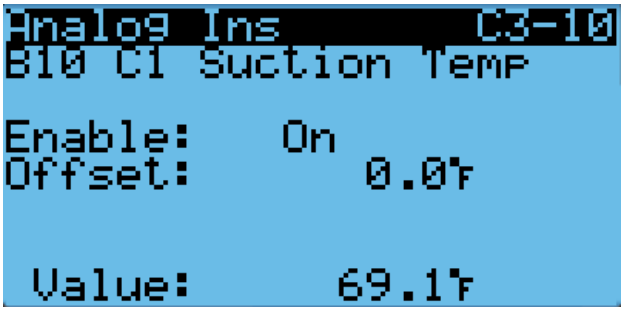
The suction temperature sensor is used to calculate superheat. The EEV uses this value to control the EEV. The temperature is measured with a 10k ohm NTC thermistor.

The suction temperature sensor measurement can be verified and adjusted by:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **I/O Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Analog Inputs**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Analog Ins C3-10** (for circuit 1) or **Analog Ins C3-11** (for circuit 2).
6. Verify the measurement displayed on screen is accurate (see Figure 26).
7. If the measurement needs to be adjusted, apply an offset value by pressing ENTER to scroll to **Offset**.

8. Press UP or DOWN keys to adjust the offset.
9. The update will not take effect until the cursor is moved out of the **Offset** parameter.

FIGURE 26
Adjusting Suction Temperature Sensor Values



Suction Temperature Alarm

When the suction temperature sensor value is out of range (-41.0 to 303.0°F), the controller will generate a sensor failure alarm to indicate the sensor is not working properly.

This alarm cannot be adjusted.

EEV Operation

EEV Superheat Control

The electronic expansion valve (EEV) will open or close to maintain the superheat setpoint while the compressor is running (see Table 5). When the compressor is not running, the valve will close to the 40% open default position.

TABLE 5
Unit Specific Superheat Setpoints

Unit	Superheat
W090A	14°F
W120A	10°F
W150A	14°F

Low superheat protection will be active once the superheat value is at or below 5°F. At this point, the control will aggressively close the valve so that superheat is maintained.

Additional EEV Alarms

Low Superheat Alarm

This alarm will become active when the calculated superheat goes below 5°F. This alarm will clear itself when the condition is no longer present.

This alarm cannot be adjusted.

Indoor Airflow

Indoor Airflow Components

Blower

The unit is equipped with a blower that is driven by an electronically commutated motor (ECM). The blower is controlled by a 0-100% signal through Modbus communication. The motor controller converts this signal to a PWM signal. The blower uses a 22" (560 mm) diameter wheel and operates up to 1500 rpm.

The blower output can be put into an override mode for verification or troubleshooting.

To put the blower into override:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **I/O Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Fans / Blowers**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Blower 1 C5-1** or **Blower 2 C5-2**.
6. Press ENTER key to scroll to Blower **Overrides**? (see Figure 27).
7. Press UP or DOWN key to change **No** to **Go**. The override will begin and the screen will change to the override screen (see Figure 27).

The override will last for 5 minutes or until the **Blower Overrides** parameter is set to **No** again.

FIGURE 27
Putting Blower Output into Override Mode

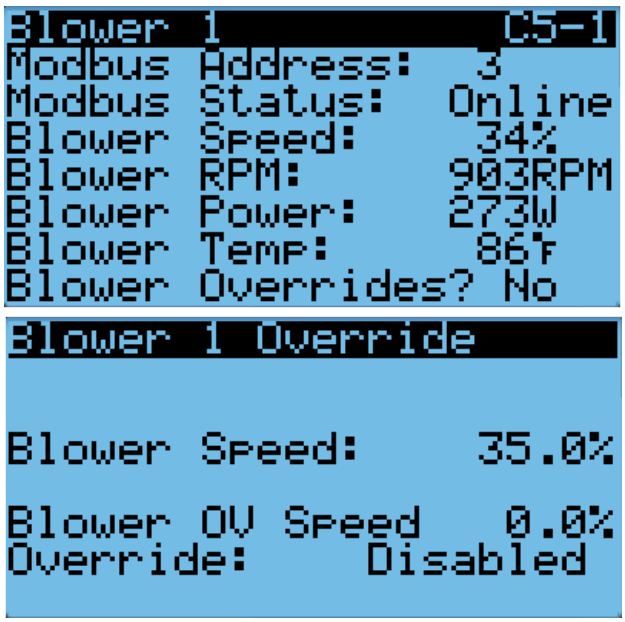


TABLE 6
Rated Airflow

	Nominal Rated CFM		Nominal Rated ESP
	High	Low	
W090A	3000	2100	0.25
W120A	4000	2800	0.30
W150A	4650	3200	0.35

TABLE 7
Indoor Blower Performance

	ESP (Inch H_20)	Dry Coil	Wet Coil
W090A	0.25	2980	2850
W120A	0.30	4160	3890
W150A	0.35	4730	4580

TABLE 8
Maximum ESP of Operation
Electric Heat Only

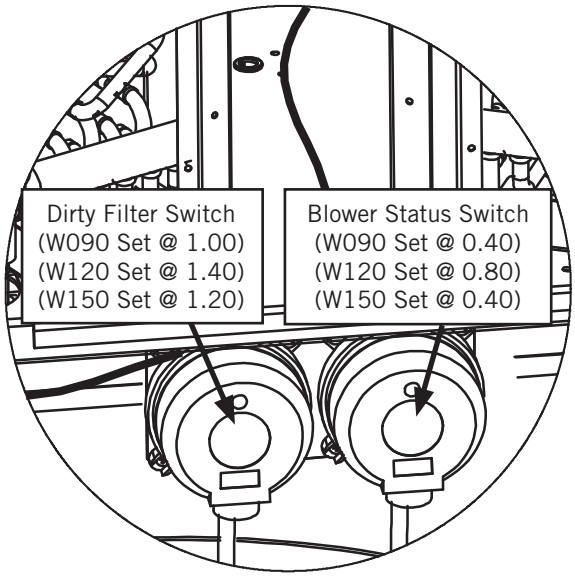
Model	Static Pressure ("WC)*
-B0Z -B09 -B18	.80" .80" .80"
-C0Z -C09 -C18	.80" .80" .80"
-E0Z -E09 -E18	.80" .80" .80"
-N0Z -N09 -N18	.80" .80" .80"
-Q0Z -Q09 -Q18 -Q36	.80" .80" .80" .80"
-V0Z -V09 -V18	.80" .80" .80"

* Unit is rated for free blow non-ducted operation with SG-10W Supply Grille and RG-10W Return Grille.

Blower Status Switch

The unit is equipped with a differential pressure airflow switch to monitor the blower (see Figure 28). If the blower is turned on and the switch doesn't open to indicate there is differential pressure between the inlet and outlet of the blower, an alarm will be generated. For switch settings, see Figure 28.

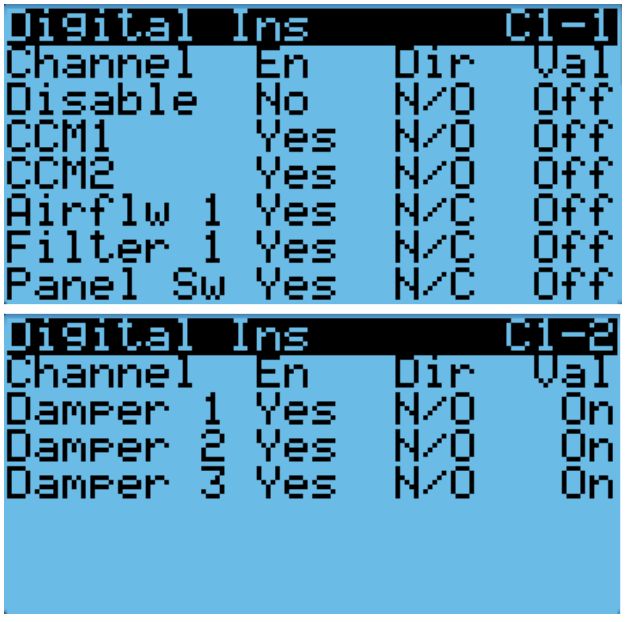
FIGURE 28
Dirty Filter Switch and Blower Status Switch



Differential airflow status can be viewed by:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **I/O Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Digital Inputs C1-1**; press ENTER key.
5. Reference **AIrflw 1** row and **Val** column (see Figure 29).

FIGURE 29
Verifying Differential Airflow Status



Blower Status Alarm

When the blower is on for 45 seconds and no airflow is detected by the airflow switch, the compressor and heating operations will be disabled. The system will wait 5 minutes before trying again. After three consecutive no airflow events, the system will generate an alarm and lockout requiring a user reset.

Filters

The unit is equipped with four (4) 20" x 24" x 2" MERV 8 filters (two per coil). The filters lift and slide into position making them easy to service. The filters can be serviced by opening the "hinged" front access panel and locking it into position. Then lift and slide into position as needed.

Dirty Filter Switch

These units are equipped with a differential pressure switch to indicate when the filter(s) needs to be replaced (see Figure 28). The dirty filter switch measures the pressure difference across the filter through silicone tubing routed to the blower and evaporator areas of the unit.

The switch circuit consists of a *normally closed* filter pressure switch. The switch will open when the pressure differential goes above the setting indicated on the dial. When the pressure difference returns below the setting on the dial, the switch will close.

Adjustment of dirty filter switch may be necessary to ensure proper operation. See Figure 30 to aid in setting the filter switch to operate at different percentages of filter blockage.

Filter switch status can be viewed by:

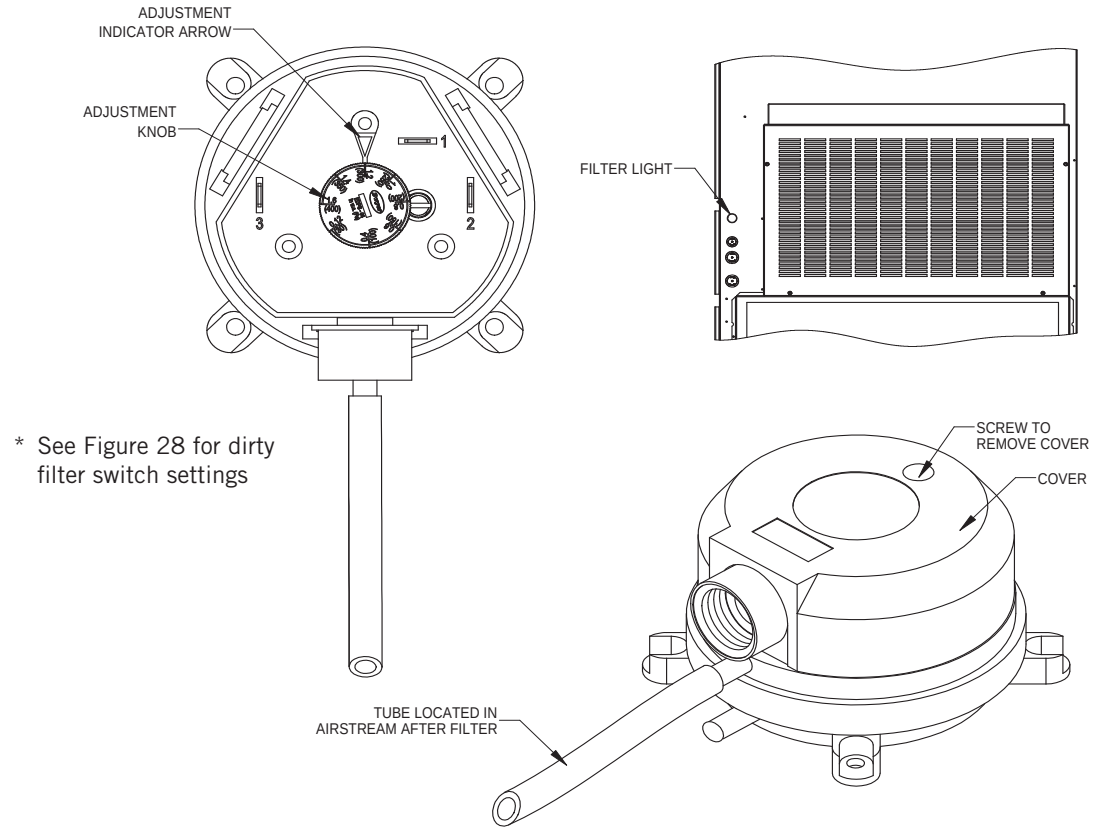
1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **I/O Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Digital Inputs C1-1**; press ENTER key.
5. Reference **Filter 1** row and **Val** column (see Figure 29).

Dirty Filter Alarm

The wall-mount unit is equipped with a differential pressure switch input to the controller. When the switch indicates a dirty filter, the controller will generate an alarm. The alarm will latch once triggered requiring a technician to acknowledge the alarm after replacing filters. Additionally, an indicator light will be turned on with the alarm and turned off when the alarm clears.

The threshold of this alarm is adjusted by changing the settings on the switch (see Figure 30).

FIGURE 30
Dirty Filter Switch and Filter Indicator Light



* See Figure 28 for dirty filter switch settings

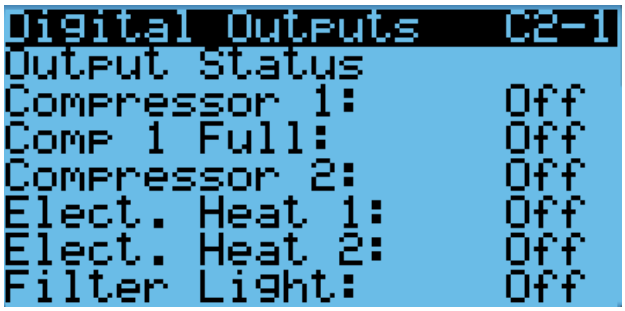
Filter Indicator Light

The wall-mount unit is equipped with a 24V indicator light mounted on side of unit that displays the current status of the filter (see Figure 30). When the light is on, the filter needs to be replaced. Once the filter(s) has been changed and the alarm has been cleared, the indicator light will turn off.

To view the status of the output:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **I/O Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Digital Outputs**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Digital Outputs C2-1**.
6. The status is displayed next to **Filter Light** (see Figure 31).

FIGURE 31
Verifying Filter Light Status

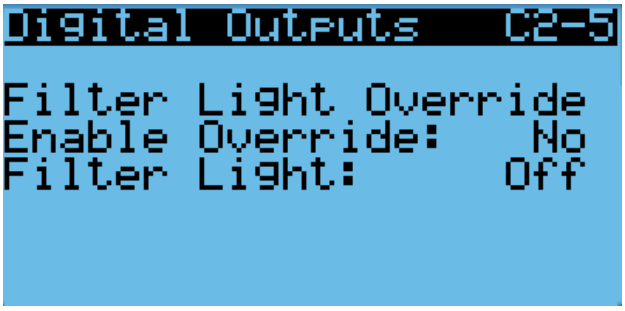


The filter light output can be put into override to aid in troubleshooting. The override will only stay active for 5 minutes.

To override the filter light output:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **I/O Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Digital Outputs**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Digital Outputs C2-5**.
6. Press ENTER key to scroll to **Enable Override** (see Figure 32).
7. Press UP or DOWN key to change value to **Yes**.
8. Press ENTER key to scroll to **Filter Light**.
9. Press UP or DOWN key to change value to **On** or **Off**.

FIGURE 32
Overriding Filter Light Output



Indoor Airflow Operation

Blower Speed Control

The blower is capable of changing speeds to best match the requirements of the system depending on which mode the system is in.

The unit will automatically adjust its blower speed based on the mode and number of stages active. In addition to the nominal speeds for each cooling stage, the controller has the option to enable high sensible operation or Balanced Climate™ operation (see Tables 9A and 9B).

TABLE 9A
Blower Speed Settings[1]
B, C, E and V Voltage Models

Mode		Unit		
		W090	W120	W150
Blower Only		35%	35%	35%
Free Cooling		45%	57%	62%
Cooling Stage 1	Balanced Climate	27.6%	32.6%	35%
	Nominal	33%	42%	43%
	High Sensible	38.5%	48.5%	47%
Cooling Stages 2 and 3	Balanced Climate	36.4%	43.8%	48%
	Nominal	45%	57%	62%
	High Sensible	52%	63%	71%
Heating Stage 1		57%	57%	57%
Heating Stage 2		57%	57%	57%
Dehumidification		57%	57%	57%
Emergency Ventilation		100%	100%	100%
Freeze Condition		45%	57%	62%

[1] Blower position percentages are communicated through Modbus and cannot be verified with meter.

TABLE 9B
Blower Speed Settings[1]
S, T, N and Q Voltage Models

Mode		Unit		
		W090	W120	W150
Blower Only		35%	35%	35%
Free Cooling		45%	57%	62%
Cooling Stage 1	Balanced Climate	27.6%	32.6%	35%
	Nominal	33%	42%	43%
	High Sensible	38.5%	48.5%	47%
Cooling Stages 2 and 3[2]	Balanced Climate	36.4%	43.8%	48%
	Nominal	45%	57%	62%
	High Sensible	52%	63%	71%
Heating Stage 1		45%	57%	62%
Heating Stage 2		45%	57%	62%
Dehumidification		45%	43.8%	48%
Emergency Ventilation		100%	100%	100%
Freeze Condition		45%	57%	62%

[1] Blower position percentages are communicated through Modbus and cannot be verified with meter.

[2] 400V units will use speeds listed for stages 2 and 3 because circuit 1 compressor is single capacity.

High Sensible Operation

In high sensible operation, the blower speed will be raised for each stage of cooling to increase the sensible cooling of the equipment. With this option enabled, the higher speeds will be used during compressor operation unless passive or active dehumidification modes are operating.

Balanced Climate Operation

In Balanced Climate operation, the blower speed will be lowered for each stage of cooling to improve the moisture removal capabilities of the equipment. With this option enabled, the lower speeds will be used during compressor operation when the indoor humidity is above the passive dehumidification setpoint.

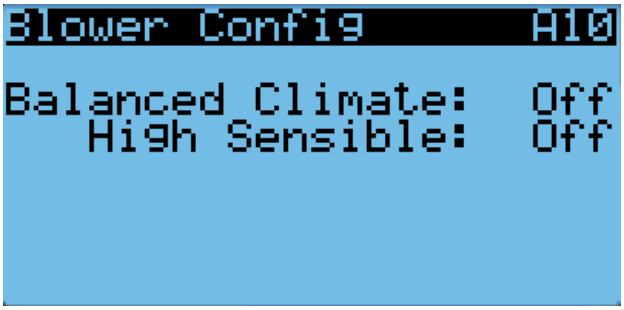
NOTE: *Blower speeds may revert back to nominal speeds during active dehumidification if electric reheat is used.*

To enable or disable either high sensible operation or Balanced Climate operation:

1. Press MENU key to access the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter USER password 2000.
3. Press UP or DOWN keys to scroll to **Sys Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Blower Config A10** screen.
5. Press ENTER key to scroll to **Balanced Climate** or **High Sensible** parameter (see Figure 33).
6. Press UP or DOWN key to change value from **Off** to **On** or **On** to **Off**.

The unit will automatically switch to the required speed for each mode. For more information on the high sensible command from LC, please see LC6000 Service Instructions 2100-669.

FIGURE 33
Enabling/Disabling High Sensible Operation or Balanced Climate Operation



Additional Indoor Airflow Alarms

Supply Air Temperature Alarm

When the supply air temperature sensor value is out of range (-41.0 to 303.0°F), the controller will generate a sensor failure alarm to indicate the sensor is not working properly.

This alarm is fixed and cannot be adjusted.

Condenser Fan

Condenser Fan Components

Condenser Fan

The unit is equipped with a condenser fan that is driven by an electronically commutated motor (ECM). This fan is controlled by a 0-100% command using Modbus serial communication. The fan operates between 100-1200 rpm.

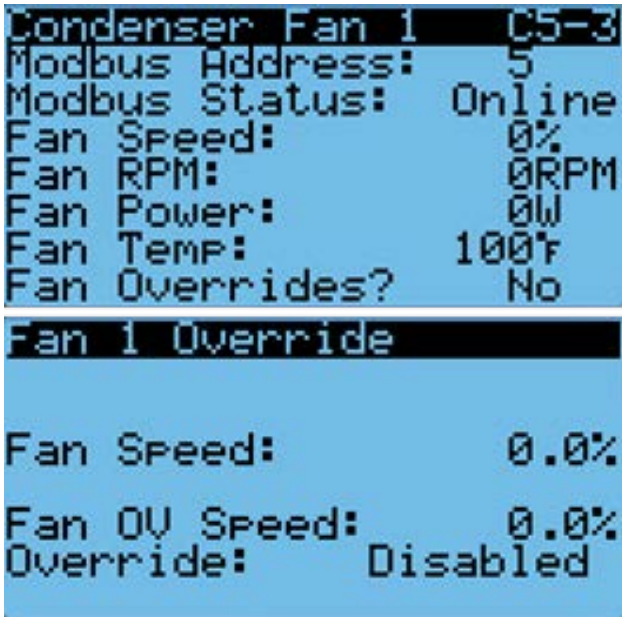
To enable fan override:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **I/O Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Fans / Blowers**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Condenser Fan 1 C5-3** (see Figure 34 on page 24).

6. Press ENTER key to scroll to the **Fan Overrides?**
7. Press UP or DOWN keys to change the value from **No** to **Go**. The override will begin and the screen will change to the override screen (see Figure 34).

The override will last for 5 minutes or until the **Fan Overrides** parameter is set to **No** again.

FIGURE 34
Enabling Fan Override



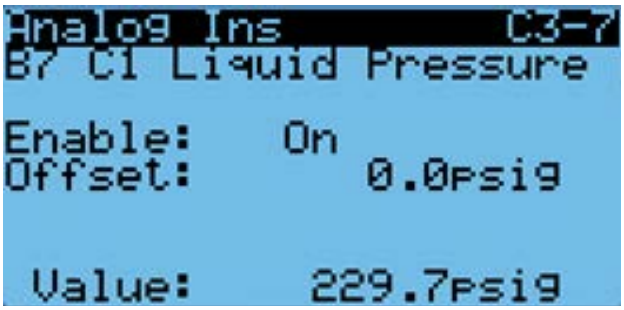
Liquid Pressure Sensor

The unit has a pressure transducer installed on the liquid line between the condenser and electronic expansion valve (EEV). The transducer is used for condenser fan speed control and for monitoring of system operation. The liquid line transducer is also referred to as the discharge or liquid pressure sensor.

The discharge/liquid pressure sensor input can be verified and adjusted by:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **I/O Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Analog Inputs**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Analog Ins C3-7** (for circuit 1) or **Analog Ins C3-9** (for circuit 2).
6. Verify the measurement displayed on screen is accurate (see Figure 35).
7. If the measurement needs to be adjusted, apply an offset value by pressing the ENTER key to scroll to **Offset**.
8. Press UP or DOWN keys to adjust the offset. The update will not take effect until the cursor is moved out of the offset parameter.
9. Once adjusted, the ESCAPE key several times to return to Main Menu screen.

FIGURE 35
Adjusting Discharge/Liquid Transducer Pressure Values



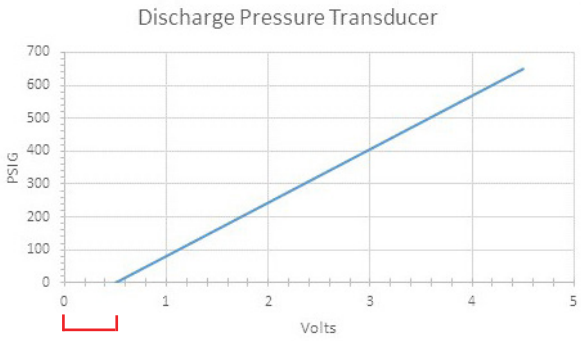
Troubleshooting the Discharge/Liquid Pressure Transducer

0-650 psig
.5 to 4.5v
4.5-.5 + 4 volt range/650 psig = .00615 volts per 1 psig

Example: 325 psig x .00615 + .5 v = 2.5 volts

Formula for Tech:
Measured Pressure x .00615 + Voltage Offset = Expected Transducer Signal Voltage (see Figure 36).

FIGURE 36
Voltage to Pressure:
Discharge/Liquid Pressure Transducer



Discharge/Liquid Pressure Transducer Alarm

When the discharge pressure sensor value is out of range (0-650 PSIG), the controller will generate a sensor failure alarm to indicate the sensor is not working properly.

This alarm is fixed and cannot be adjusted.

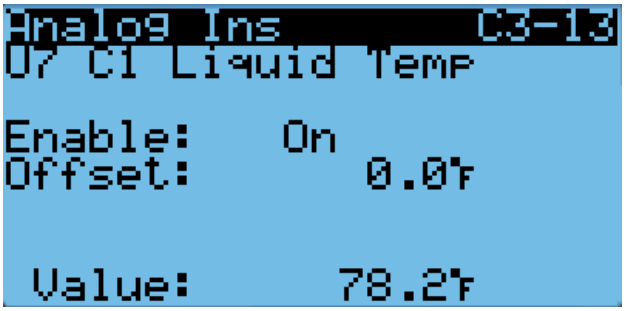
Liquid Temperature Sensor

The unit is equipped with a liquid line temperature sensor to monitor the temperature of the liquid refrigerant leaving the condenser and entering the EEV. The temperature is measured with a 10k ohm NTC thermistor.

The liquid temperature sensor can be verified and adjusted by:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **I/O Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Analog Inputs**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Analog Ins C3-13** (for circuit 1) or **Analog Ins C3-15** (for circuit 2).
6. Reference the **Value** to verify the temperature (see Figure 37).
7. If an offset needs to be applied, press ENTER key to scroll to **Offset**.
8. Press UP or DOWN keys to change the offset to desired value.
9. Press ENTER key to save.
10. Press ESCAPE key several times to return to Main Menu screen.

FIGURE 37
Adjusting Discharge/Liquid Temperature Input



Outdoor Temperature Sensor

The unit is equipped with a combination outdoor temperature and humidity sensor. The temperature is measured with a 10k ohm NTC thermistor. See page 32 for more information.

Condenser Fan Operation

Condenser Fan Speed Control

The fan will speed up or slow down to attempt to maintain a discharge/liquid pressure setpoint. The discharge/liquid pressure setpoint will vary based on the outdoor ambient conditions (see Figure 38). If the outdoor temperature sensor fails, or is disabled, the discharge/liquid pressure setpoint will be set to a nominal value of 415 psig. Because the control is dependent on the discharge pressure sensor, the controller will alter its operation if the sensor is not enabled or failed. When the liquid pressure transducer is not enabled or considered failed by the controller, a nominal speed will be used during a compressor call (see Table 10).

FIGURE 38
Condenser Fan Discharge/Liquid Temperature Setpoint

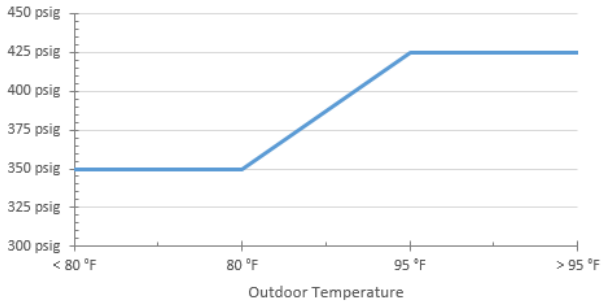


TABLE 10
Condenser Fan Nominal Speed

Unit	Outdoor Temperature	Discharge Pressure Setpoint	Nominal Discharge/Liquid Pressure Setpoint	Nominal Condenser Fan Speed
All Models	< 80°F	350 psig	425 psig	58%
	80°F – 95°F	350 – 425 psig		
	> 95°F	425 psig		

Compressor

Compressor Components

Compressor

Three Phase Scroll Compressor Start Up Information

Scroll compressors, like several other types of compressors, will only compress in one rotational direction. Direction of rotation is not an issue with single phase compressors since they will always start and run in the proper direction.

However, three phase compressors will rotate in either direction depending upon phasing of the power. Since there is a 50-50 chance of connecting power in such a way as to cause rotation in the reverse direction, verification of proper rotation must be made. Verification of proper rotation direction is made by observing that suction pressure drops and discharge pressure rises when the compressor is energized. Reverse rotation also results in an elevated sound level over that with correct rotation, as well as substantially reduced current draw compared to tabulated values.

Verification of ***proper rotation*** must be made at the time the equipment is put into service. If improper rotation is corrected at this time, there will be no negative impact on the durability of the compressor. However, reverse operation for over 1 hour may have a negative impact on the bearing due to oil pump out.

NOTE: *If compressor is allowed to run in reverse rotation for an extended period of time, the compressor's internal protector will trip.*

All three phase compressors are wired identically internally. As a result, once the correct phasing is determined for a specific system or installation, connecting properly phased power leads to the same Fusite terminal should maintain proper rotation direction.

The direction of rotation of the compressor may be changed by reversing any two line connections to the wall-mount unit.

Compressor Control Module (CCM)

Delay-on-Make Timer
Short Cycle Protection/Delay-on-Break
Test Mode
High Pressure Detection
Brownout Protection with Adjustment

The LPC terminals are jumpered in this application. Instead, the low pressure transducer is used for low pressure monitoring.

Each compressor uses an independent CCM.

Delay-on-Make Timer

In the event of power loss, a delay-on-make timer is included to be able to delay startup of the compressor. This is desired when more than one unit is on a structure so that all of the units do not start at the same time which could happen after a power loss or building shutdown. The delay-on-make time period is 2 minutes plus 10% of the delay-on-break time period. To ensure that all of the units do not start at the same time, adjust the delay-on-break timer on each unit to a slightly different delay time.

Short Cycle Protection/Delay-on-Break

An anti-short cycle timer is included to prevent short cycling the compressor. This is adjustable from 30 seconds to 5 minutes via the adjustment knob (see Figure 39). Once a compressor call is lost, the time period must expire before a new call will be initiated.

10% of this time is also considered on the delay-on-make timer (see ***Delay-on-Make Timer***).

High Pressure Detection

High pressure switch monitoring allows for a lockout condition in a situation where the switch is open. If the high pressure switch opens, the CCM will de-energize the compressor. If the switch closes, it will then restart the compressor after the delay-on-break setting has expired on the device. If the switch trips again during the same Y call, the compressor will be de-energized. The ALR terminal will be energized, signaling the unit control board that a high pressure event has occurred (see ***Refrigerant High Pressure Alarm***).

Test Mode

By rapidly rotating the potentiometer (POT) clockwise (see Figure 39), all timing functions will be removed for testing.

The conditions needed for the unit to enter test mode are as follows: POT must start at a time less than or equal to the 40 second mark. The POT must then be rapidly rotated to a position greater than or equal to the 280 second mark in less than ¼ second. Normal operation will resume after power is reset or after the unit has been in test mode for at least 5 minutes.

Brownout Protection with Adjustment

Brownout protection may be necessary if the utility power or generator power has inadequate power to prevent the voltage from dropping when the compressor starts. This is rare but can happen if the generator is undersized at the site or if the site is in a remote location far from the main power grid. Under normal circumstances, allowing the brownout to be ignored for a time period should not be needed. The 8201-169 is shipped with all the DIP switches in the 'off' or 'do not ignore' position (see Figure 39).

If ignoring the brownout is needed because of the above conditions, three preset timers can be set by DIP switches in order to delay signaling a power brownout for a specific length of time after compressor contactor is energized. This allows the compressor a time period to start even if the voltage has dropped and allows the voltage to recover. This delay only happens when the CC

terminal energizes. The delay can be set to 1 second (A DIP switch), 5 seconds (B DIP switch) or 10 seconds (C DIP switch); time is not cumulative—only the longest setting will apply. If the voltage recovers during the brownout delay period, the compressor will start.

If a brownout condition is detected by the 8201-169, the troubleshooting light will flash blue. The light will continue to flash until the cooling call is satisfied or power is removed from the Y terminal. This condition does not prevent operation, it only indicates that a brownout condition was present at some point during the cooling call. If a brownout condition is detected, CC will be de-energized and will retry after the delay-on-make timer is satisfied; this process will continue until call is satisfied.

If user chooses the "do not ignore" position (all three DIP switches "off") when the site has inadequate utility or generator power, this could lead to the compressor never starting. The control will see the brownout immediately and not start.

A common scenario and one that has been seen in the field is when a unit or units switches from utility power to generator power. With slower transfer switches, the time delay between the utility power and generator power didn't cause a problem. The units lost power, shut off and came back on line normally. With the introduction of almost instantaneous transfer switches, the millisecond long power glitch can be enough that the compressor will start to run backwards. In this scenario, the CCM will catch this and restart the units normally.

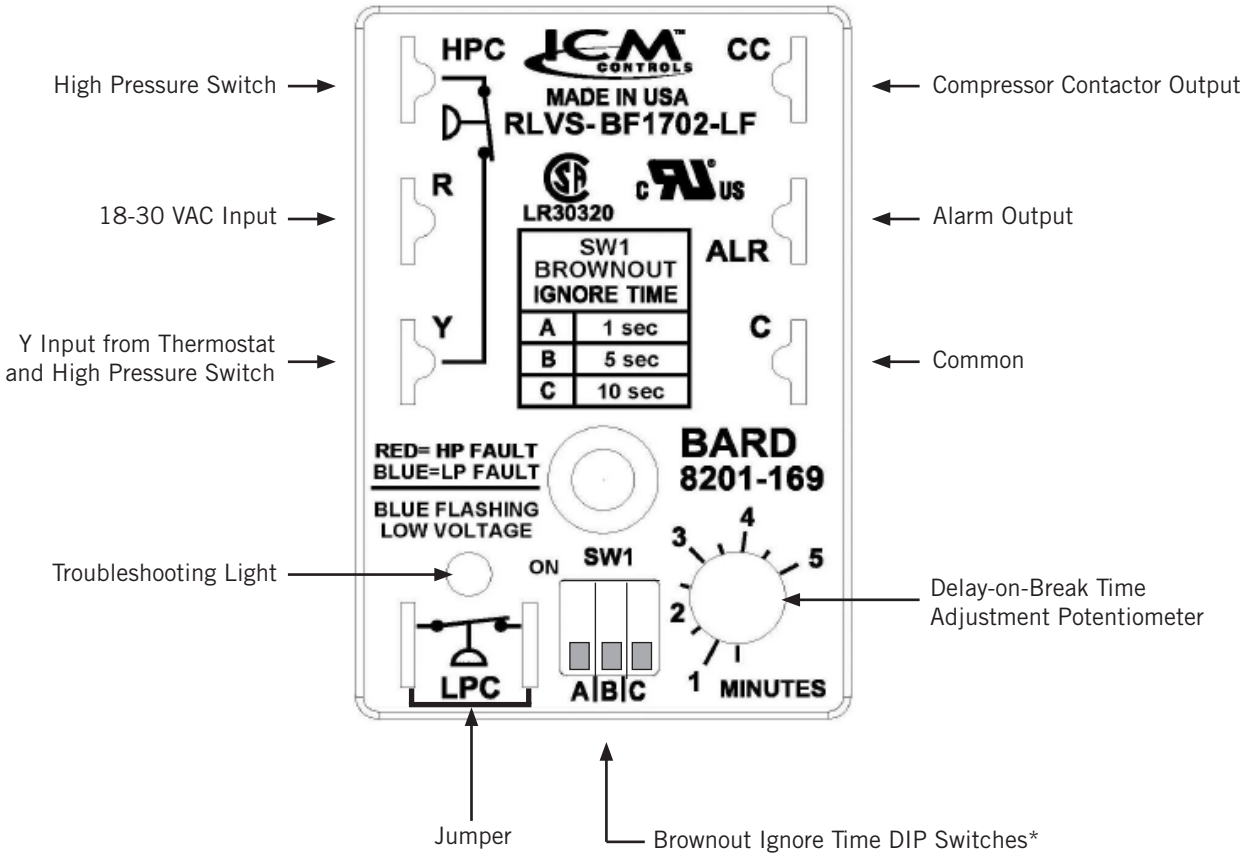
High Pressure Safety Switch

All units have a high pressure switch as a safety device. This device will open when pressure in the system reaches 650 PSIG. The switch is directly connected to the dedicated compressor control module (see ***High Pressure Detection*** on page 26).

Refrigerant High Pressure Alarm

When the wall-mount unit receives a signal from the compressor control module (CCM) indicating a high pressure event, the wall-mount unit will generate an alarm. Upon receiving the alarm, the wall-mount unit will remove the "Y" call from the CCM, resetting the

FIGURE 39
8201-169 Compressor Control Module



* Turn on only one switch for that specific ignore time setting. 10 seconds is the maximum brownout ignore time. If all switches are "off", the control is in "do not ignore".

status of the CCM. The alarm will stay present on the wall-mount unit until manually cleared with TEC-EYE hand-held diagnostic tool.

In addition to the CCM, the discharge pressure transducer is used to prevent a high pressure event. When the discharge pressure is above the discharge pressure alarm setpoint (set 30 pounds below high pressure switch, which is 650), the system will disable stage 2 of mechanical cooling.

Phase Monitor

Used only on three phase equipment, the phase monitor is a compressor protection device that will prohibit operation of the compressor if the device senses a possible reverse-rotation situation due to incorrect phasing. On a call for compressor (and only compressor), the device will check incoming phase, check for severe voltage imbalance and check for proper frequency. Under nominal conditions, a green LED light will show on the face of the monitor. If there is improper phasing, voltage imbalance or frequency deviation, the device will show a red LED light and prohibit compressor operation.

If a fault condition occurs, reverse two of the supply leads to the unit. **Do not reverse any of the unit factory wires as damage may occur.**

Crankcase Heater

All units covered in this manual are provided with compressor crankcase heat.

This crankcase heater is a band-type heater located around the bottom of the compressor. This heater is controlled by the crankcase heater relay. The heater is only energized when the compressor is not running.

Crankcase heat is essential to prevent liquid refrigerant from migrating to the compressor, preventing oil pump out on compressor start-up and possible bearing or scroll vane failure due to compressing a liquid.

IMPORTANT: *The following procedure must be followed at initial start-up and at any time power has been removed for 12 hours or longer.*

To prevent compressor damage which may result from the presence of liquid refrigerant in the compressor crankcase:

1. Make certain the room thermostat is in the “off” position (the compressor is not to operate).
2. Apply power by closing the system disconnect switch. This energizes the compressor heater which evaporates the liquid refrigerant in the crankcase.
3. Allow 4 hours or 60 minutes per pound of refrigerant in the system as noted on the unit rating plate, whichever is greater.
4. After properly elapsed time, the thermostat may be set to operate the compressor.
5. **Do not open system disconnect switch except as required for safety while servicing**.

Compressor Operation

The compressor will be enabled when the unit (in orphan mode) or LC provide a cooling call. The compressor call from the controller has several delays that may affect the start or stop time of the compressor in regards to the cooling demand. The compressor has a minimum on time of 180 seconds to prevent short cycling the compressor. The compressor also has a minimum off time of 120 seconds to prevent start ups before the pressure in the refrigeration system equalizes. When the second stage is engaged, it also has a minimum run time of 120 seconds to allow the system to stabilize before returning to single stage or shutting down.

These delays can be changed by:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **Adv System Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Comp. Safety B2**; press ENTER key.
5. Press ENTER key to scroll to **Min On Time** or **Min Off Time** (see Figure 40).
6. Press UP or DOWN keys to change the value.
7. Press ENTER key to save value and move the cursor to next parameter or top of screen.
8. Press ESCAPE key several times to return to Main Menu screen.

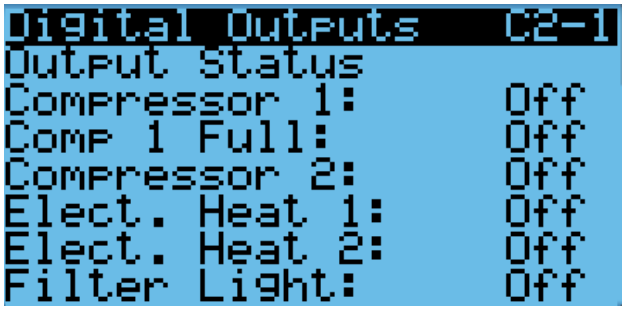
FIGURE 40
Adjusting Compressor Delays

To view the status of the compressor outputs:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **I/O Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Digital Outputs**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Digital Outputs C2-1**.

6. The status is displayed next to **Compressor 1**, **Comp 1 Full** and **Compressor 2** (see Figure 41).

FIGURE 41
Verifying Compressor Output Status



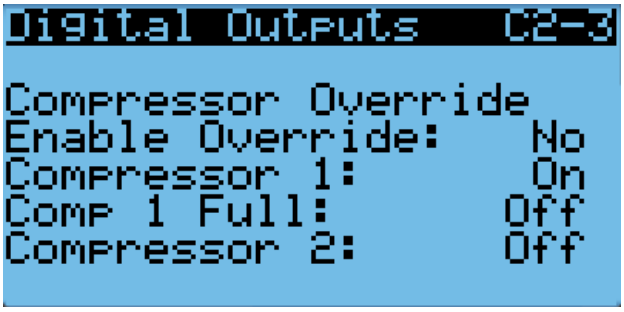
The compressor outputs can be put into override to aid in troubleshooting. The override will only stay active for 5 minutes.

To override the compressor outputs:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **I/O Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Digital Outputs**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Digital Outputs C2-3**.
6. Press ENTER key to scroll to **Enable Override** (see Figure 42).
7. Press UP or DOWN key to change value to **Yes**.
8. Press ENTER key to scroll to selected compressor output.
9. Press UP or DOWN key to change value to **On** or **Off**.

All 400V models have two compressor stages instead of three. When the model number in the controller indicates 400V, the **Comp 1 Full** reference on status and override screens will be hidden.

FIGURE 42
Overriding Compressor Outputs



Additional Compressor Alarms

Refrigerant Low Pressure Alarm

When the suction pressure transducer indicates a pressure value less than the low pressure alarm setpoint of 40 PSIG and there is an active call for cooling, the controller will disable the compressor (after a 120-second delay). ***NOTE:*** *The second call will be delayed based on the delay off value mentioned in the compressor section.* The controller will try to run the refrigeration system two (2) times within 900 seconds before the alarm will lock the compressor out. This alarm needs to be manually cleared before compressor operation will resume.

Economizer

Economizer Components

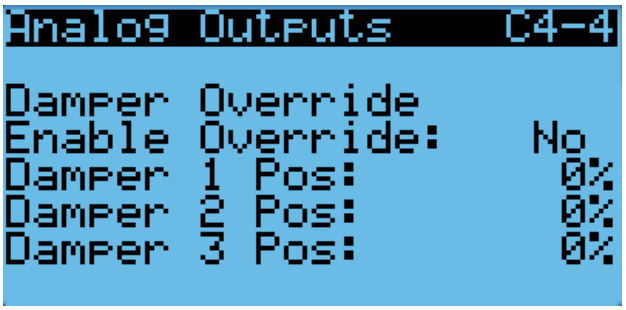
Actuator

The actuator rotates up to 90° based on a 2-10V signal sent to it by the controller. This component is what opens and closes the damper blade. The unit is equipped with three dampers powered by three separate actuators. The left intake damper (damper 1) and the right intake damper (damper 3) are each powered by a 44 in-lb actuator. The exhaust damper (damper 2) is powered by a 90 in-lb actuator. All dampers are spring return and will close the damper if power is lost.

To verify the output from the controller to the actuator:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **Analog Outputs**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Analog Outputs C4-4**.
5. To override the current position, press ENTER key to scroll to **Enable Override** (see Figure 43).

FIGURE 43
Damper Override



6. Press UP or DOWN keys to change the value to the desired output.

7. Press ENTER key to save the value and move cursor to **Damper 1 Pos**, **Damper 2 Pos** or **Damper 3 Pos**.
8. Press UP or DOWN keys to change the value to the desired position.
9. The damper position will update with the new override value and the damper will travel to that position.

NOTE: *This override will last for 5 minutes or until the* ***Enable Override*** *is changed back to* ***No****.*

Dust Sensor

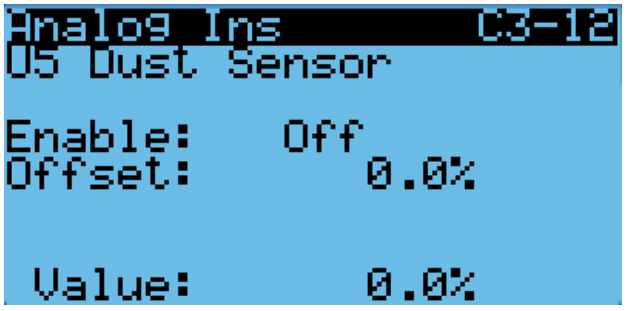
The unit has a dust sensor installed near the outdoor air inlet. The dust sensor checks for excessive particulates in the outdoor air, and will close the economizer if the dust is excessive. The sensor uses a PWM signal converted to 0-5V output to the controller.

To ensure proper performance, cleaning may be required. Vacuuming or blowing the dust off the sensor with forced air is recommended. ***Avoid inserting any objects into the sensor***.

The dust sensor can be verified by:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **I/O Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Analog Inputs**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Analog Ins C3-12**.
6. Reference the **Value** for the current sensor reading (see Figure 44).

FIGURE 44
Dust Sensor



7. To apply an offset to the current reading, press ENTER key to scroll to **Offset**.
8. Press UP or DOWN keys to adjust the value to the desired value.
9. Press ENTER key to save the value and move cursor to next parameter.

NOTE: *The sensor can be disabled if required for troubleshooting.*

10. With the cursor on the **Enable** parameter, press UP or DOWN keys to change the value from **On** to **Off**.
11. Press ENTER key to save.

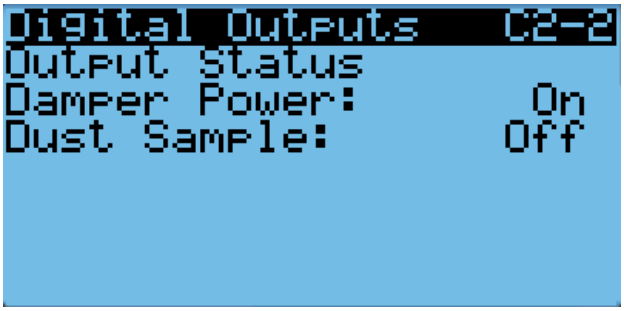
Dust Sample

With the update to the 8301-091 dust sensor and new control board 8612-064, a dust sample is used to engage a small fan in the sensor. This command is automatically engaged by the controller when the economizer is being used.

To view the status of the dust sample output:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **I/O Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Digital Outputs**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Digital Outputs C2-2**.
6. The status is displayed next to **Dust Sample** (see Figure 45).

FIGURE 45
Verifying Dust Sample Output Status



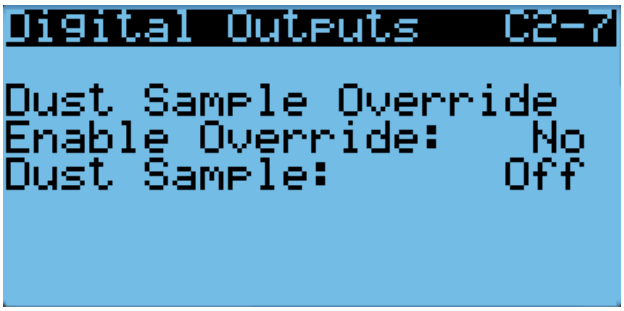
The dust sample output can be put into override to aid in troubleshooting. The override will only stay active for 5 minutes.

To override the dust sample output:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **I/O Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Digital Outputs**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Digital Outputs C2-7**.

6. Press ENTER key to scroll to **Enable Override** (see Figure 46).
7. Press UP or DOWN key to change value to **Yes**.
8. Press ENTER key to scroll to **Dust Sample** output.
9. Press UP or DOWN key to change value to **On** or **Off**.

FIGURE 46
Overriding Dust Sample Output



Dust Sensor Failure Alarm

When the sensor reads a value that is outside of the acceptable 0 to 100% range, an alarm will be generated indicating the sensor has failed. This alarm is just a notification and will not disable any other features on the controller.

This alarm is fixed and cannot be adjusted.

High Dust Limit Alarm

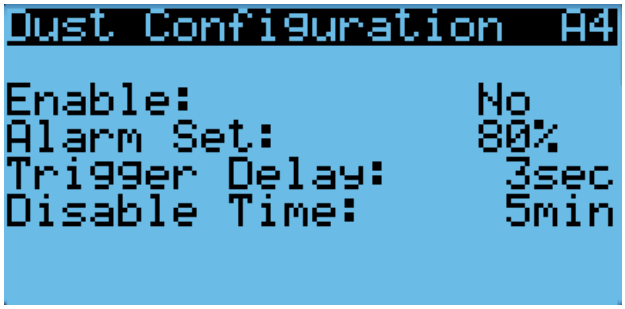
When dust content in the air is high and is a risk to prematurely reducing airflow through the filters, the unit will restrict the use of the economizer. The controller has adjustable software setpoints to indicate dust levels are too high and to disable the economizer operation for 5 minutes. Once the conditions are no longer present, the alarm will automatically clear.

To adjust the dust sensor alarm setpoint:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter USER password 2000.
3. Press UP or DOWN keys to scroll to **System Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Dust Configuration A4**.
5. Press ENTER key to scroll to **Alarm Set** (see Figure 47).
6. Press UP or DOWN keys to change to the desired value.
7. Press ENTER key to save the value.

NOTE: *When the temperature outside is measured at or below 0°F, the dust sensor alarm will be disabled to allow economizer operation.*

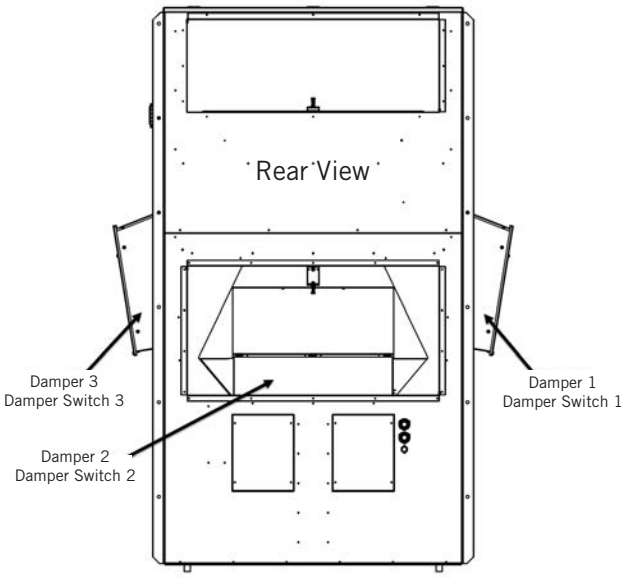
FIGURE 47
Adjusting Dust Sensor Alarm Setpoint



Damper Blades

The system utilizes three damper blades to bring in outdoor air and exhaust space air for economizer operation. Damper 1 is left intake, damper 2 is exhaust and damper 3 is right intake (see Figure 48). Damper blades are made of sheet metal and are integrated into the equipment.

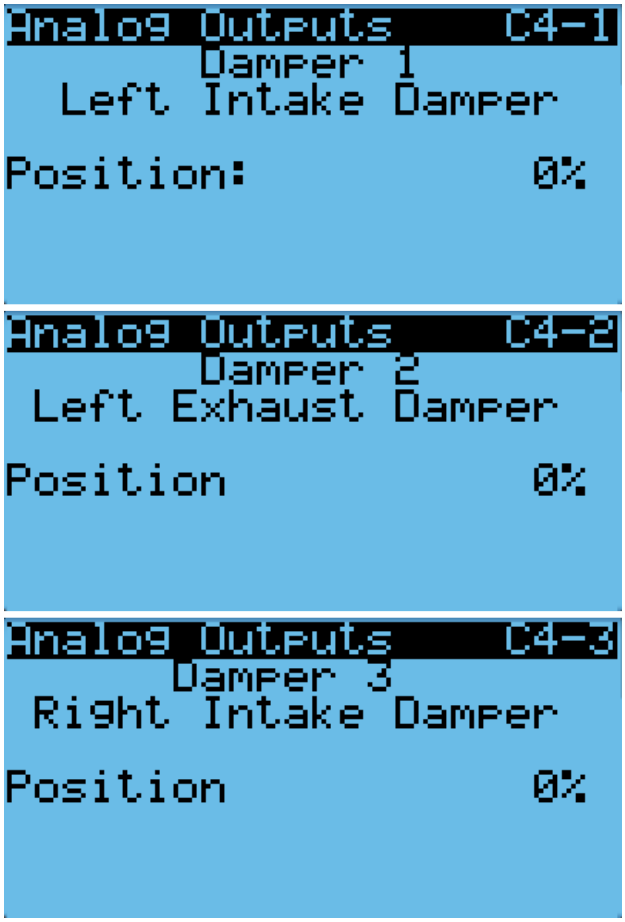
FIGURE 48
Damper Blades



To view damper blade position:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **I/O Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Analog Outputs**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Analog Outputs C4-1**, **Analog Outputs C4-2** or **Analog Outputs C4-3** (see Figure 49 on page 32).

FIGURE 49
Damper Blade Position



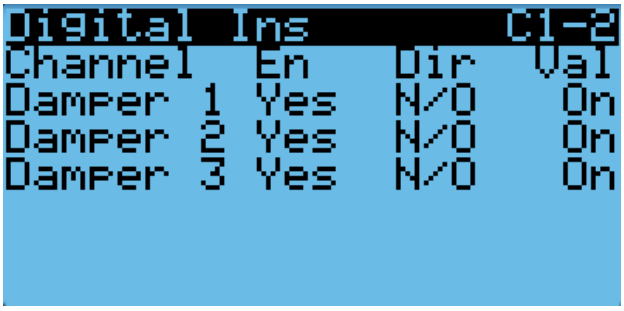
Damper Switch

The economizer utilizes three magnetic switches (one on each damper blade) to determine if the damper is operating correctly. This switch will be closed when the damper is closed and open when the damper is open.

To verify the status of the switch:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **I/O Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Digital Inputs**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Digital Ins C1-2**.
6. Reference the values for **Damper 1**, **Damper 2** and **Damper 3** (see Figure 50).
7. The input will display **ON** when the damper is closed (reflecting closed circuit on damper switch) and will display **OFF** when the damper is open (reflecting open circuit on damper switch).

FIGURE 50
Damper Switch



Damper Failed to Open Alarm

When the controller commands the economizer damper actuator to a position other than 0% and the damper switch indicates the damper is not open, after a delay of 20 seconds the controller will generate a damper failed to open alarm. This alarm is just a notification and will not disable any features on the controller.

The alarm must be cleared by a user reset.

Damper Failed to Close Alarm

When the controller commands the economizer damper actuator to the 0% position and the damper switch indicates the damper is not closed, after a delay of 300 seconds the controller will generate a damper failed to close alarm. This alarm is just a notification and will not disable any features on the controller.

The alarm must be cleared by a user reset.

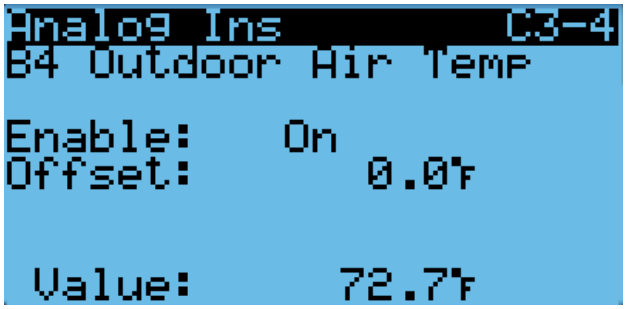
Outdoor Temperature and Humidity Combination Sensor

The unit is equipped with a combination outdoor temperature and humidity sensor to monitor outdoor conditions for the economizer operation. The temperature is measured with a 10k ohm NTC thermistor. The humidity is measured with a humidity sensor that outputs a 4-20mA signal to the controller.

The outdoor temperature can be verified by:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **I/O Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Analog Inputs**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Analog Ins C3-4**.
6. Reference the **Value** to see the input of the sensor (see Figure 51).
7. To apply an offset, press ENTER key to scroll to **Offset**.
8. Press UP or DOWN keys to change to the desired value.
9. Press ENTER key to save the value.

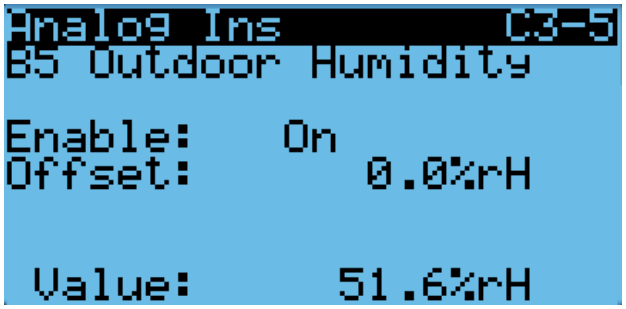
FIGURE 51
Outdoor Temperature Sensor



The outdoor humidity can be verified by:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **I/O Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Analog Inputs**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Analog Ins C3-5**.
6. Reference the **Value** to see the input of the sensor (see Figure 52).
7. To apply an offset, press ENTER key to scroll to **Offset**.
8. Press UP or DOWN keys to change to the desired value.
9. Press ENTER key to save the value.

FIGURE 52
Outdoor Humidity Sensor



Outdoor Temperature Sensor Failure Alarm

When the sensor reads a value that is outside of the acceptable -41 to 303.0° range, an alarm will be generated indicating the sensor has failed. This alarm condition will disable the economizer.

This alarm is fixed and cannot be adjusted.

Outdoor Humidity Sensor Failure Alarm

When the sensor reads a value that is outside of the acceptable 0 to 100% RH range, an alarm will be generated indicating the sensor has failed. This alarm condition will disable the economizer when the mode is set to temperature and humidity or enthalpy.

This alarm is fixed and cannot be adjusted.

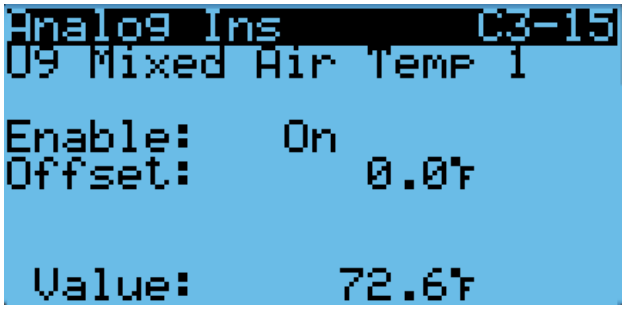
Mixed Air Temperature Sensor

The unit is equipped with a mixed air temperature sensor to monitor the mixed air temperature. The mixed air is measured where the economizer mixes return air and outdoor air. This measurement is used to determine if the economizer is controlling correctly. The sensor is a 10k ohm NTC Thermistor.

The mixed air temperature can be verified by:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **I/O Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Analog Inputs**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Analog Ins C3-15** (**Mixed Air Temp 1**).
6. Reference the **Value** to see the input of the sensor (see Figure 53).
7. To apply an offset, press ENTER key to scroll to **Offset**.
8. Press UP or DOWN keys to change to the desired value.
9. Press ENTER key to save the value.

FIGURE 53
Mixed Air Temperature Sensor



High Mixed Air Temperature Alarm

To keep the economizer from bringing in air that is too warm, an alarm will be generated when the mixed air is 2° above the return air temperature for 300 seconds. This alarm will not be generated if the mixed air temperature sensor has failed. The alarm can only be

activated during a free cooling call. The alarm is a user reset and must be cleared by the end user.

Low Mixed Air Temperature Alarm

To keep the economizer from bringing in air that is too cold, an alarm will be generated when the mixed air temperature is 5°F below the mixed air temperature control setpoint for 300 seconds. If this alarm is active, the economizer will be disabled for the current cooling call. This alarm will reference the mixed air temperature control setpoint to ensure that when the mixed air setpoint changes, the alarm dynamically changes with it. This alarm will not be generated if the mixed air temperature sensor has failed. The alarm can only be activated during a free cooling call and requires a user reset.

Economizer Operation

See Figure 90 on page 70 for ventilation airflow paths.

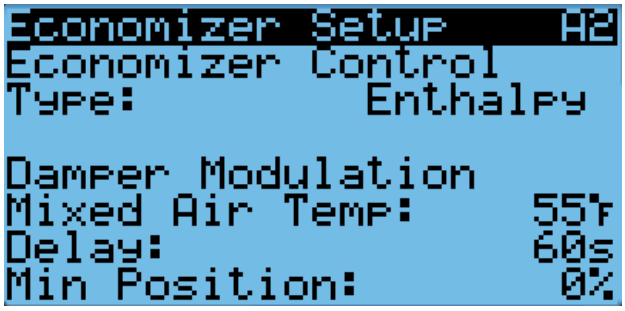
The vent option in the model number determines if the equipment has an economizer. If the value is set to "B", the controller will not use the economizer and the type on **Economizer Setup A2** will automatically change to **None**. The only exception to this is emergency ventilation will always attempt to open the dampers. This would only apply if a unit has an economizer but the controller is configured for no vent (B).

The economizer has four types of operation. The first mode is "None" where the economizer is never utilized, except for emergency purposes. The second mode is "Dry Bulb" where the outdoor temperature is the only consideration for economizer use on a free cooling call. The third mode is "TempHum" where the outdoor temperature and humidity are considered for economizer use on a free cooling call. The fourth mode is "Enthalpy" where the outdoor temperature, humidity and calculated dew point are considered for economizer operation on a free cooling call.

To change the economizer type:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter USER password 2000.
3. Press UP or DOWN keys to scroll to **System Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Economizer Setup A2**; press ENTER key.
5. Press ENTER key to scroll to **Type** (see Figure 54).
6. Press UP or DOWN keys to change the **Type** desired value to **None**, **Dry Bulb**, **TempHum** or **Enthalpy**.
7. Press ENTER key to save the value and scroll to the next parameter.

FIGURE 54
Economizer Setup



NOTE: *The following parameters are for the temperature consideration for economizer use. Applies to* ***Dry Bulb****,* ***TempHum*** *and* **Enthalpy** *type.*

8. The cursor should now be on the **Mixed Air Tamp** parameter.
9. Press UP or DOWN keys to change the parameter to the desired value.
10. Press ENTER key to save the value and scroll to the next parameter.
11. The cursor should now be on **Delay** parameter.
12. Press UP or DOWN keys to change the parameter to the desired value.
13. Press ENTER key to save the value and move to the next parameter.
14. The cursor is now on the **Min Position** parameter.
15. Press UP or DOWN keys to change the parameter to the desired value (see **Economizer Operation – Minimum Position** on page 36 for more information).
16. Press ENTER key to save the value.
17. Press the DOWN key to navigate to the **Economizer Setup A3** screen.

NOTE: *The* ***Economizer Setup A3*** *screen will not display if economizer mode is set to* ***None****. Also, the contents of the screen will change depending on which type is chosen:* ***Dry Bulb*** *(Figure 55),* ***TempHum*** *(Figure 56) or* ***Enthalpy*** *(Figure 57). The following menu shows the* ***Enthalpy*** *content which also contains parameters that would be shown on* ***Dry Bulb*** *(temperature only) and* ***TempHum*** *(temperature and humidity only).*

FIGURE 55
Economizer Setup – Dry Bulb Control

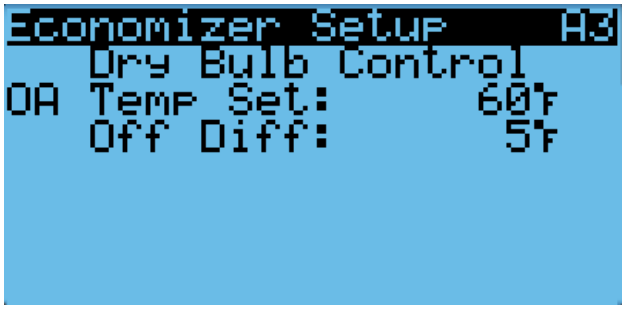


FIGURE 56
Economizer Setup – Temp/Hum Control

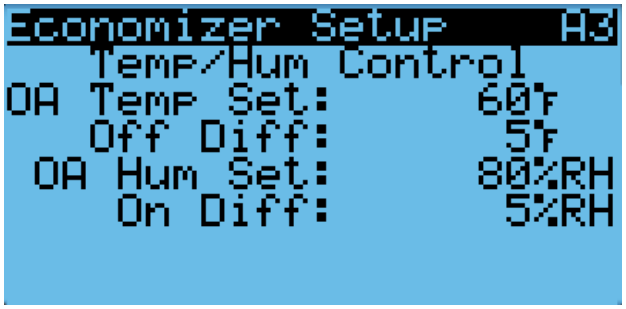
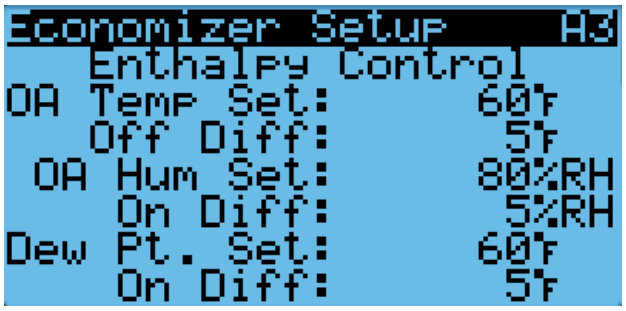


FIGURE 57
Economizer Setup – Enthalpy Control



18. Press ENTER key to scroll to **OA Temp Set** (on **Drybulb Control** and **Temp/Hum Control A3** screens, this parameter will be titled **Outdoor Set**).
19. Press UP or DOWN keys to change the temperature setpoint to desired value.
20. Press ENTER key to save the value and scroll to **Off Diff**.
21. Press UP or DOWN keys to adjust the outdoor temperature differential for which the economizer is re-enabled.
22. Press ENTER key to save the value and scroll to **OA Hum Set**.
23. Press UP or DOWN keys to adjust the humidity setpoint to desired value.
24. Press ENTER key to save the value and scroll to **On Diff**.
25. Press UP or DOWN keys to adjust the outdoor humidity differential for which the economizer is re-enabled.
26. Press ENTER key to save the value and scroll to **Dew Pt. Set**.
27. Press UP or DOWN keys to adjust the outdoor dew point setpoint for economizer operation to the desired value.
28. Press ENTER key to save the value and scroll to **On Diff**.
29. Press UP or DOWN keys to adjust the dew point differential for which the economizer is re-enabled.
30. Press ENTER key to save the value.
31. Press ESCAPE key several times to return to Main Menu screen.

See Table 11 for default settings for economizer operation.

TABLE 11
Economizer Default Settings

Mode			Consideration	Economizer Available for Cooling	Economizer Not Available for Cooling
Temp Only	Temp & Humidity	Enthalpy*	Temperature	When the outdoor air temperature is below 70°F	When the outdoor air temperature is above 75°F
			Humidity	When the outdoor humidity is below 80%	When the outdoor humidity is above 80%
			Dew Point	When the outdoor dew point is below 55°F	When the outdoor dew point is above 60°F

* In Enthalpy mode, outdoor temperature, humidity and calculated dew point are all considered for economizer operation.

When the economizer is activated during a free cooling call only, using any of the previously mentioned modes, a 0-10V analog signal will be sent to the economizer actuator. The actuator will then open and close the damper blades to maintain a mixed air temperature of 55°F. When the mixed air temperature increases, the damper will open and when the mixed air temperature decreases, the damper will close.

The economizer may be disabled by the LC if the system determines it needs to enter dehumidification mode. More information about the dehumidification sequence can be found in the latest revision of LC6000 Service Instructions 2100-669. In addition to dehum mode, the economizer may be disabled for 5 minutes (adjustable) if the dust sensor indicates the outdoor air may cause particulate buildup in the air filters. After the time has expired and on a call for cooling, the economizer will open again to sample the air. The wall-mount unit will either return to normal operation or remain locked out for another 5 minutes.

Economizer Operation – Minimum Position

The economizer has an option to set minimum position for the economizer. The minimum position will only be active while the blower is operating. To enable minimum position all the time, continuous blower must be activated for the wall unit in the LC6000. See latest version of LC6000 Service Instructions 2100-669 for continuous blower configuration.

To set the minimum position value:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter USER password 2000.
3. Press UP or DOWN keys to scroll to **System Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Economizer Setup A2**.
5. Press ENTER key to scroll to **Min Position** (see Figure 54 on page 34).
6. Press UP or DOWN keys to change to the desired value.

Miscellaneous Components

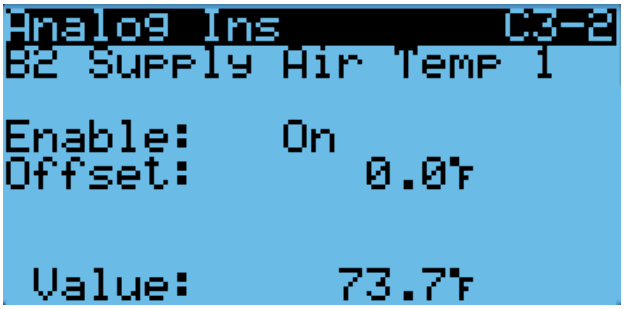
Supply Temperature Sensor

The unit is equipped with a supply air temperature sensor to monitor the leaving air temperature of the unit. The temperature is measured with a 10k ohm NTC thermistor.

The supply air temperature can be verified by:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **I/O Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Analog Inputs**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Analog Ins C3-2**.
6. Reference the **Value** to see the input of the sensor (see Figure 58).
7. To apply an offset, press ENTER key to scroll to **Offset**.
8. Press UP or DOWN keys to change to the desired value.
9. Press ENTER key to save the value.

FIGURE 58
Supply Air Temperature Sensor



Supply Temperature Sensor Failure Alarm

When the sensor reads a value that is outside of the acceptable -41.0 to 303.0° range, an alarm will be generated indicating the sensor has failed.

This alarm is fixed and cannot be adjusted.

Emergency Cooling Mode

If the shelter temperature is above the high temperature alarm setpoint on the LC, the unit will be commanded into emergency cooling mode. In this mode, the unit will operate the economizer regardless of the economizer setup, as long as the outdoor temperature is below the indoor temperature. This will stay active until the LC returns the unit to normal operation.

Emergency Cooling – Orphan Mode

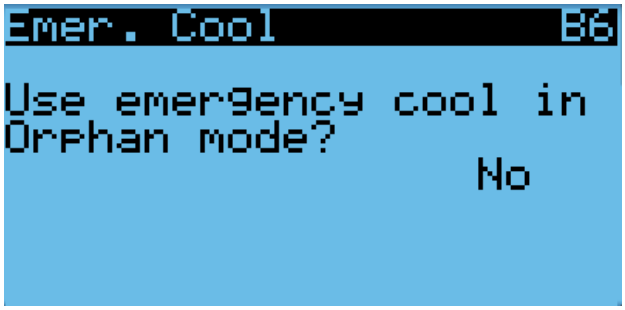
When the unit is not connected to the LC6000 and operating in orphan mode, the unit still has the capability to operate in emergency cooling mode. By default this feature is not enabled.

To enable emergency cooling in orphan mode:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **Adv System Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Emer. Cool B6**.
5. Press ENTER key to scroll to **Use emergency cool in Orphan mode?** (see Figure 59).

6. Press UP or DOWN keys to change the value.

FIGURE 59
Emergency Cool – Orphan Mode

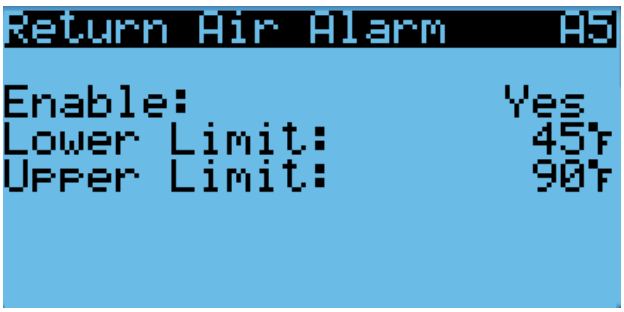


When this feature is used instead of using the zone sensor, an alarm will be triggered by the high return air temperature alarm.

To adjust the return air temperature settings:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter USER password 2000.
3. Press UP or DOWN keys to scroll to **System Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Return Air Alarm A5**.
5. Press ENTER key to scroll to **Enable, Lower Limit** or **Upper Limit** (see Figure 60).
6. Press UP or DOWN keys to disable the alarm or change the limit values.

FIGURE 60
Adjusting Return Air Alarm Settings



Emergency Ventilation Mode

If the emergency ventilation input at the LC is active, the system will go into emergency ventilation mode. In emergency ventilation mode, the economizers on the wall units will be commanded to 100%. This mode is only available when connected to the LC.

NOTE: *All units will receive the emergency ventilation command. Wall units not equipped with economizers will still engage the blower.*

Electric Heat Option

Electric Heat Components

Electric Heating Element

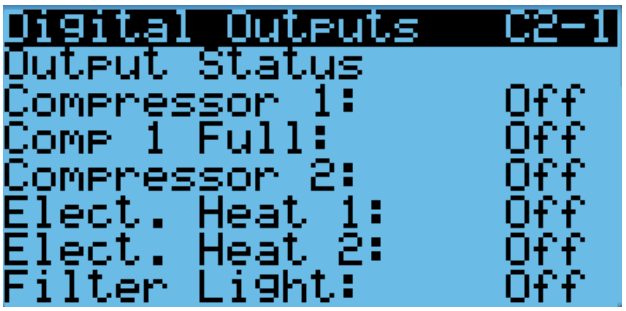
The unit can be optionally equipped with 9kw or 18kw of heat. The 9kw is a single stage heating element. The 18kw option comes equipped with two 9kw heating elements that operate in two stages. The heating elements are located downstream of the evaporator coils and can be accessed through the upper control panel door.

NOTE: *Q voltage models can also have 36kw heat by using 18kw for each circuit.*

To view the status of the electric heat outputs:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **I/O Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Digital Outputs**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Digital Outputs C2-1**.
6. The status is displayed next to **Elect. Heat 1** and **Elect. Heat 2** (see Figure 61).

FIGURE 61
Verifying Electric Heat Output Status



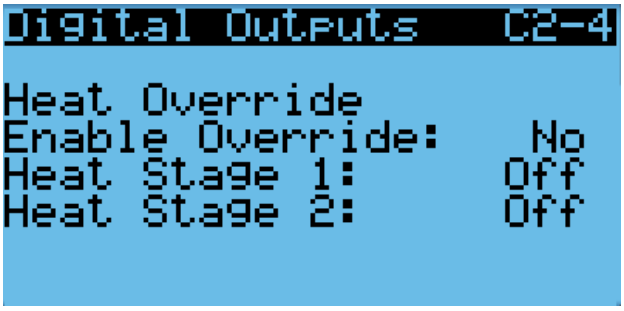
The electric heat outputs can be put into override to aid in troubleshooting. The override will only stay active for 5 minutes.

To override the electric heat outputs:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **I/O Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Digital Outputs**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Digital Outputs C2-4**.

6. Press ENTER key to scroll to **Enable Override** (see Figure 62).
7. Press UP or DOWN key to change value to **Yes**.
8. Press ENTER key to scroll to selected electric heat output.
9. Press UP or DOWN key to change value to **On** or **Off**.

FIGURE 62
Overriding Electric Heat Output



Thermal Overload

The heater assembly has a thermal overload wired in series with the heating element. This device has a cycling limit which opens at 130°F and resets at 80°F. The limit is also equipped with a redundant thermal fuse that will open at 150°F.

Electric Heat Operation

The heat strip will be activated on a call for heat. This call can be generated by the LC or the wall-mount unit operating in orphan mode or stand-alone mode.

Electric Reheat Dehumidification

The MEGA-TEC wall-mount unit can be ordered with optional electric reheat dehumidification. This feature is indicated by the letter "E" in the 6th character of the model number. Electric reheat dehumidification is only available as a factory-installed option that must be ordered with the unit. It cannot be installed in the field on an existing unit.

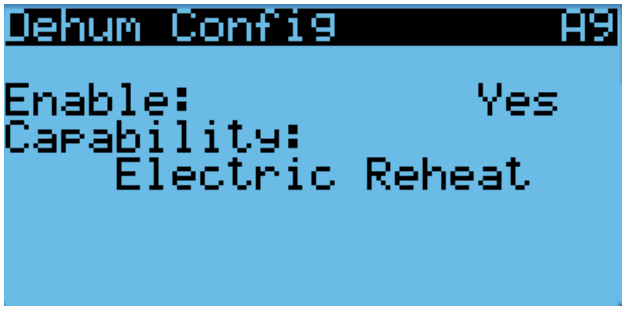
To verify the dehumidification capability of a unit and/or disable the dehumidification operation:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter USER password 2000.
3. Press UP or DOWN keys to scroll to **System Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Dehum Config A9** (see Figure 63).

NOTE: **Capability** *on this menu will show the unit's dehumidification capability based on the model number entered into the wall-mount unit's controller. This parameter will show either* **Not Available** *or* **Electric Reheat**.

5. Press ENTER key to scroll to **Enable**.
6. Press UP or DOWN keys to change the value from **Yes** to **No**.

FIGURE 63
Electric Reheat Dehumidification



An electric reheat capable unit will allow for concurrent operation of compressor and electric heat. This allows the compressor to operate which will remove moisture from the indoor air while the electric heat keeps the space temperature from dropping during this operation. The cooling capacity of the MEGA-TEC is much greater than its capacity to heat with the 18kw option. In order to extend the compressor run times and prevent the unit from overcooling the space, the cooling capacity will be limited during dehumidification operation (see Table 12).

TABLE 12
Cooling Capacity Limitation

Heat Option	Limitation	Heat Capacity*	Cooling Capacity*		
			7.5 Ton Cooling Capacity	10 Ton Cooling Capacity	12.5 Ton Cooling Capacity
18kw	Compressor 1 Full Load	61,418	45,000	60,000	75,000

* Capacities listed are nominal and don't reflect actual performance. 400V units do not have a part load capacity.

Electric Reheat Dehumidification Operation

The unit will utilize electric reheat dehumidification when it receives an active dehumidification call from the LC6000 supervisory controller. During the active dehumidification call, the unit status message will show "Active Dehum". An LC6000 equipped with and indoor humidity sensor is required to utilize dehumidification.

On a call for electric reheat dehumidification, the unit return air sensor will control the compressor and heating element operation based on the supervisory control setpoints. If the space temperature, based on the sensor attached to the supervisory control, reaches the cooling or heating setpoint, the dehumidification call is overridden until the cooling or heating call is satisfied. If communication is lost with the supervisory controller during a dehumidification call, the electric reheat function at the unit is lost and the unit will operate in orphan mode.

During a call for electric reheat, the wall unit will energize the compressor and the electric reheat coil will be energized to extend the run time of the cooling cycle, mitigating the cooling done by the compressor. If/when the temperature falls to 2° above heating setpoint, the compressor will be disabled until the temperature is increased 2° below the cooling setpoint and then the compressor will be re-energized (see Figure 64). If/when the temperature reaches 4° below the cooling setpoint, the electric heating elements will be energized. The electric heating elements will be disabled 2° below the cooling setpoint. The system will continue the dehumidification process until either the heating or cooling setpoint are reached again or the requirement for dehumidification is no longer present.

A call for electric dehumidification is ignored if there is a call for emergency vent, emergency cool or emergency off.

For more information on dehumidification staging, see latest version of LC6000 Service Instructions manual 2100-669.

Unit Disable Option

The wall-mount unit can be disabled by opening a dry set of contacts connected to Input DI1 on the PLC board. This feature can be used in addition to the emergency off feature provided by the LC6000 to ensure that the unit does not operate even when in orphan mode. This feature is disabled by default and must be enabled before the input will affect unit operation. When the input detects open contacts, all unit operation will stop and the dampers will close. This is an automatic reset feature that will resume operation as soon as the unit detects the contacts are closed again.

For applications that require the dampers to close rapidly, the 24VAC power supplied to each actuator should be removed so the actuator spring returns. In normal operation, the dampers can take up to 2 minutes to close from fully open. When the 24VAC power is removed from the actuator, the dampers will close in under 30 seconds using the spring return on the actuator.

Beginning with software version MGS1000.1.3.0, output NO9 can be wired in series with the actuators to utilize the spring return when unit disable or emergency off are active on the controller.

NOTE: *Alarm logging and trend logging will not be available if power is removed from the controller and unit offline alarms will be recorded on the LC6000.*

The unit disable input can be verified and adjusted by:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **I/O Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Digital Inputs**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Digital Ins C1-1**.
6. Reference **Disable** row and **En** column (see Figure 65 on page 40).
7. Press ENTER key to scroll to **Disable En** value.
8. Press UP or DOWN key to change value.
9. Press ENTER key to scroll to **Dir**.
10. Press UP or DOWN key to change direction (**N/O** or **N/C**), if applicable.
11. Press ESCAPE key several times to return to Main Menu screen.

FIGURE 64
Dehumidification Control (°F)

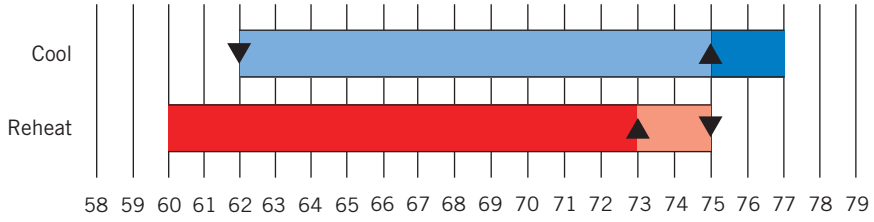
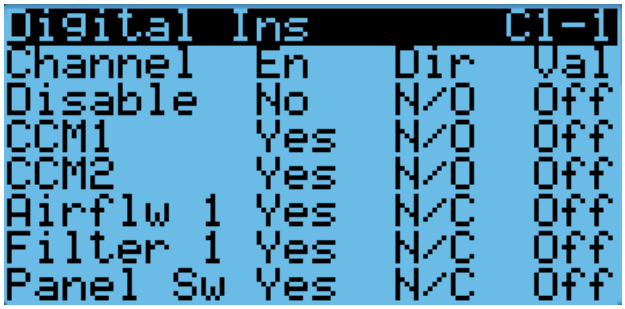


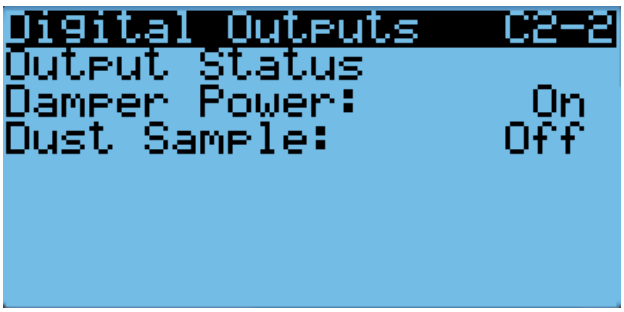
FIGURE 65
Unit Disable Option



To verify the status of the damper power output:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **I/O Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Digital Outputs**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Digital Outputs C2-2** (see Figure 66).

FIGURE 66
Verifying Damper Power Output Status

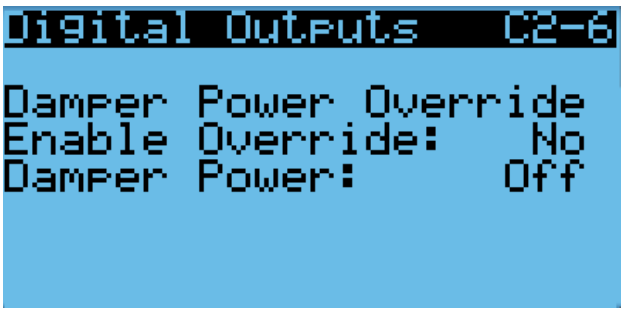


If the function of the output needs to be verified, the output can be put into override. To override the output:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **I/O Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Digital Outputs**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Digital Outputs C2-6** (see Figure 67).
6. Press ENTER key to scroll to **Enable Override**.
7. Press UP or DOWN key to change from **No** to **Yes**.
8. Press ENTER key to scroll to **Damper Power**.
9. Press UP or DOWN key to set to **On** to power the actuator or **Off** to spring return the actuator.

NOTE: *This override will only last for 5 minutes and then return to normal operation.*

FIGURE 67
Overriding Damper Output



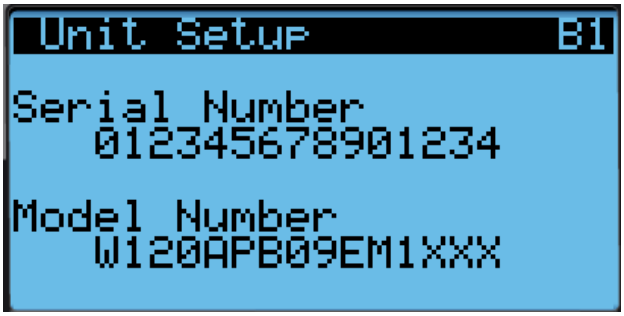
Serial/Model Number Configuration

MEGA-TEC wall-mount units configure some settings based on the model number that is input into the unit. The model and serial number are entered at the factory, and should be retained during a software update. However, after a software update, it is best practice to verify that the model number and serial number are still present and accurate. If the model number and/or serial number is missing or incorrect, they will need to be re-entered.

To update serial/model numbers:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter ENGINEER password 9254.
3. Press UP or DOWN keys to scroll to **Adv. Sys. Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Unit Setup B1** (see Figure 68).

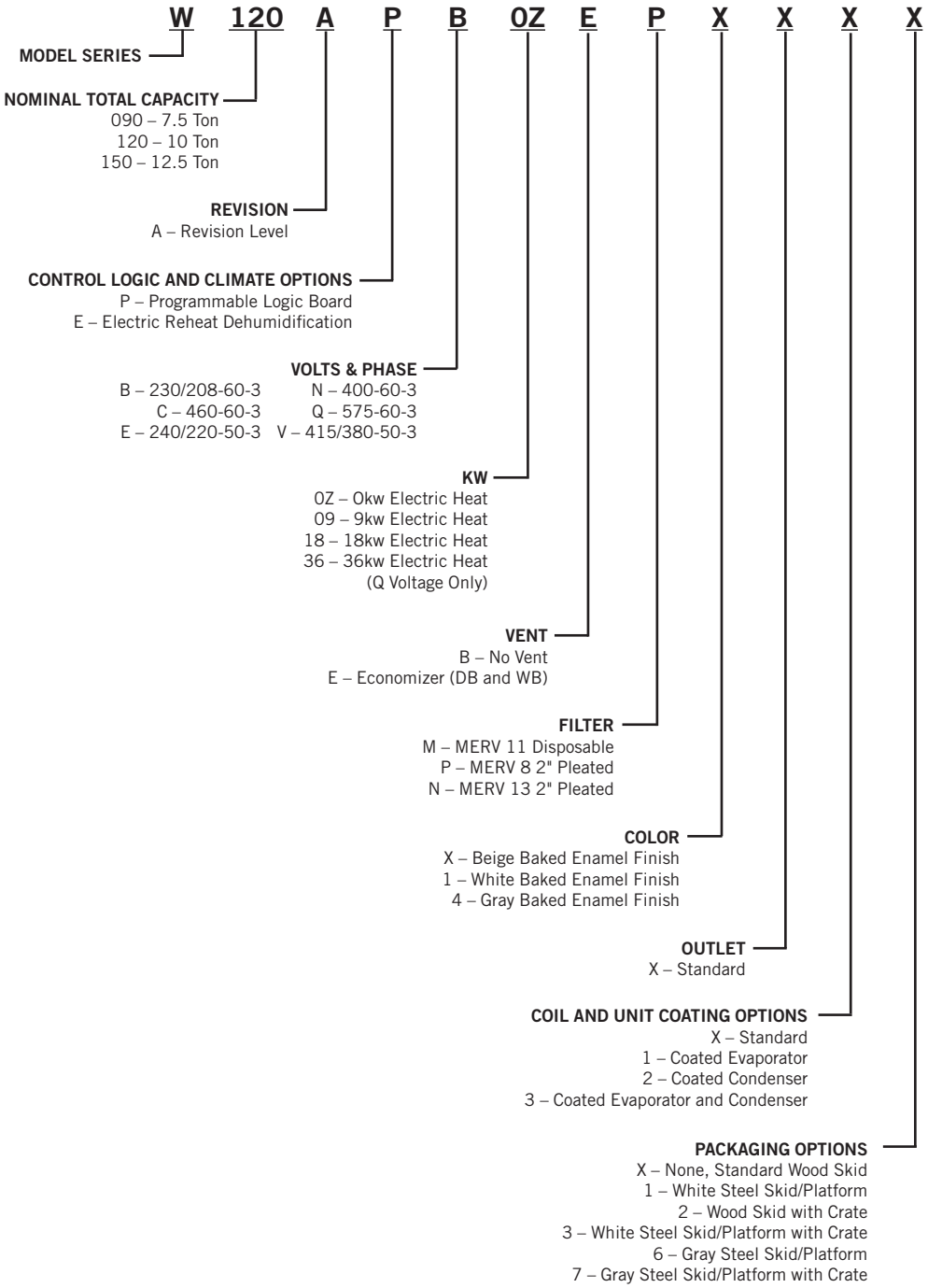
FIGURE 68
Serial/Model Number Configuration



5. Press ENTER key to advance the cursor to the digit that needs changed in the serial/model number.
6. Press UP or DOWN keys to change value of the digit.
7. Continue Steps 5 and 6 until the serial/model number(s) are correct and reflect the number on the product label.

For more information on the options and settings available for specific model numbers, see the model number breakdown in Figure 69.

FIGURE 69
MEGA-TEC Wall-Mount Unit Model Nomenclature



REFRIGERANT INFORMATION

NOTICE

These units require R-410A refrigerant and polyol ester oil.

General

1. Use separate service equipment to avoid cross contamination of oil and refrigerants.
2. Use recovery equipment rated for R-410A refrigerant.
3. Use manifold gauges rated for R-410A (800 PSI/250 PSI low).
4. R-410A is a binary blend of HFC-32 and HFC-125.
5. R-410A is nearly azeotropic—similar to R-22 and R-12. Although nearly azeotropic, charge with liquid refrigerant.
6. R-410A operates at 40-70% higher pressure than R-22, and systems designed for R-22 cannot withstand this higher pressure.
7. R-410A has an ozone depletion potential of zero, but must be reclaimed due to its global warming potential.
8. R-410A compressors use polyol ester oil.
9. Polyol ester oil is hygroscopic; it will rapidly absorb moisture and strongly hold this moisture in the oil.
10. A liquid line dryer must be used—even a deep vacuum will not separate moisture from the oil.
11. Limit atmospheric exposure to 15 minutes.
12. If compressor removal is necessary, always plug compressor immediately after removal. Purge with small amount of nitrogen when inserting plugs.

Topping Off System Charge

If a leak has occurred in the system, Bard Manufacturing recommends reclaiming, evacuating (see criteria above) and charging to the nameplate charge. If done correctly, topping off the system charge can be done without problems.

With R-410A, there are no significant changes in the refrigerant composition during multiple leaks and recharges. R-410A refrigerant is close to being an azeotropic blend (it behaves like a pure compound or single component refrigerant). The remaining refrigerant charge in the system may be used after leaks have occurred. "Top-off" the charge by utilizing the pressure charts on the inner control panel cover as a guideline.

REMEMBER: *When adding R-410A refrigerant, it must come out of the charging cylinder/tank as a liquid to avoid any fractionation and to insure optimal system performance. Refer to instructions for the cylinder that is being utilized for proper method of liquid extraction.*

Safety Practices

1. Never mix R-410A with other refrigerants.
2. Use gloves and safety glasses. Polyol ester oils can be irritating to the skin, and liquid refrigerant will freeze the skin.
3. Never use air and R-410A to leak check; the mixture may become flammable.
4. Do not inhale R-410A—the vapor attacks the nervous system, creating dizziness, loss of coordination and slurred speech. Cardiac irregularities, unconsciousness and ultimately death can result from breathing this concentration.
5. Do not burn R-410A. This decomposition produces hazardous vapors. Evacuate the area if exposed.
6. Use only cylinders rated DOT4BA/4BW 400.
7. Never fill cylinders over 80% of total capacity.
8. Store cylinders in a cool area, out of direct sunlight.
9. Never heat cylinders above 125°F.
10. Never trap liquid R-410A in manifold sets, gauge lines or cylinders. R-410A expands significantly at warmer temperatures. Once a cylinder or line is full of liquid, any further rise in temperature will cause it to burst.

Important Installer Note

For improved start-up performance, wash the indoor coil with a dishwashing detergent.

R410-A Refrigerant Charge

This wall-mount unit was charged at the factory with the quantity of refrigerant listed on the serial plate. AHRI capacity and efficiency ratings were determined by testing with this refrigerant charge quantity.

Tables 13, 14A, 14B, 15A and 15B on pages 43 – 47 show nominal pressures for the units. The use of pressure gauges should not be necessary as the measurements are available through the TEC-EYE hand-held diagnostic too. Since many installation specific situations can affect the pressure readings, this information should only be used by certified technicians as a guide for evaluating proper system performance. They shall not be used to adjust charge. If charge is in doubt, reclaim, evacuate and recharge the wall-mount unit to the serial plate charge.

Pressure Service Ports

High and low pressure service ports are installed on all wall-mount units so that the system operating pressures can be observed. Pressures are shown in Tables 13, 14A, 14B, 15A and 15B.

This unit employs high-flow Coremax valves instead of the typical Schrader type valves.

WARNING! Do NOT use a Schrader valve core removal tool with these valves. Use of such a tool could result in eye injuries or refrigerant burns!

To change a Coremax valve without first removing the refrigerant, a special tool is required which can be obtained at www.fastestinc.com/en/SCCA07H. See the replacement parts manual for replacement core part numbers.

TABLE 13
W090A Cooling Pressures (All Models)

Cooling Air Temperature Entering Outdoor Coil °F													
Model	**Return Air Temp**	**Pressure**	**75**	**80**	**85**	**90**	**95**	**100**	**105**	**110**	**115**	**120**	**125**
W090A* Stage 3[1]	75° DB	Low Side	135	135	135	136	136	137	137	138	140	142	144
	62° WB	High Side	389	379	375	375	381	391	407	427	452	483	518
	80° DB	Low Side	144	144	144	145	145	146	147	148	150	152	154
	67° WB	High Side	399	389	385	385	391	401	417	438	464	495	531
	85° DB	Low Side	149	149	149	150	150	151	152	153	155	157	159
	72° WB	High Side	413	403	398	398	405	415	432	453	480	512	550
W090A* Stage 2[2]	75° DB	Low Side	137	140	142	144	146	149	151	152	154	155	157
	62° WB	High Side	367	356	350	349	354	364	378	399	424	454	489
	80° DB	Low Side	147	150	152	154	156	159	161	163	165	166	168
	67° WB	High Side	376	365	359	358	363	373	388	409	435	466	502
	85° DB	Low Side	152	155	157	159	161	165	167	169	171	172	174
	72° WB	High Side	389	378	372	371	376	386	402	423	450	482	520
W090A* Stage 1[3]	75° DB	Low Side	139	138	138	138	139	140	141	142	144	146	149
	62° WB	High Side	389	382	378	378	382	390	402	417	437	459	487
	80° DB	Low Side	149	148	148	148	149	150	151	152	154	156	159
	67° WB	High Side	399	392	388	388	392	400	412	428	448	471	499
	85° DB	Low Side	154	153	153	153	154	155	156	157	159	161	165
	72° WB	High Side	413	406	402	402	406	414	426	443	464	487	516

Low side pressure ± 4 PSIG
High side pressure ± 10 PSIG

[1] Stage 3 is circuit 1 *fully loaded* and circuit 2 *on*.
[2] Stage 2 is circuit 1 *unloaded* and circuit 2 *on*.
[3] Stage 1 is circuit 1 *unloaded* and circuit 2 *off*.

Tables are based upon **rated CFM** (airflow) across the evaporator coil. If there is any doubt as to correct operating charge being in the system, the charge should be removed and system evacuated and recharged to serial plate charge weight.

NOTE: *Pressure table based on high speed condenser fan operation. If condensing pressures appear elevated, check condenser fan wiring. See* **Condenser Fan Operation** *on page 25.*

TABLE 14A
W120A Cooling Pressures (B, C, E, Q and V Voltage Models)

Cooling Air Temperature Entering Outdoor Coil °F													
Model	**Return Air Temp**	**Pressure**	**75**	**80**	**85**	**90**	**95**	**100**	**105**	**110**	**115**	**120**	**125**
W120A* Stage 3[1]	75° DB	Low Side	125	126	127	128	129	130	132	133	135	137	137
	62° WB	High Side	312	334	357	379	403	427	451	476	501	527	553
	80° DB	Low Side	134	135	136	137	138	139	141	142	144	146	147
	67° WB	High Side	320	343	366	389	413	438	463	488	514	540	567
	85° DB	Low Side	139	140	141	142	143	144	146	147	149	151	152
	72° WB	High Side	331	355	379	403	427	453	479	505	532	559	587
W120A* Stage 2[2]	75° DB	Low Side	136	137	137	138	140	141	142	144	145	147	148
	62° WB	High Side	289	308	330	352	374	398	423	448	474	501	528
	80° DB	Low Side	145	146	147	148	150	151	152	154	155	157	158
	67° WB	High Side	296	316	338	361	384	408	434	459	486	514	542
	85° DB	Low Side	150	151	152	153	155	156	157	159	160	162	164
	72° WB	High Side	306	327	350	374	397	422	449	475	503	532	561
W120A* Stage 1[3]	75° DB	Low Side	125	127	128	130	131	133	135	136	137	139	141
	62° WB	High Side	311	332	355	377	402	427	452	479	506	534	563
	80° DB	Low Side	134	136	137	139	140	142	144	145	147	149	151
	67° WB	High Side	319	341	364	387	412	438	464	491	519	548	577
	85° DB	Low Side	139	141	142	144	145	147	149	150	152	154	156
	72° WB	High Side	330	353	377	401	426	453	480	508	537	567	597

Low side pressure ± 4 PSIG
High side pressure ± 10 PSIG

[1] Stage 3 is circuit 1 *fully loaded* and circuit 2 *on*.
[2] Stage 2 is circuit 1 *unloaded* and circuit 2 *on*.
[3] Stage 1 is circuit 1 *unloaded* and circuit 2 *off*.

Tables are based upon **rated CFM** (airflow) across the evaporator coil. If there is any doubt as to correct operating charge being in the system, the charge should be removed and system evacuated and recharged to serial plate charge weight.

NOTE: *Pressure table based on high speed condenser fan operation. If condensing pressures appear elevated, check condenser fan wiring. See* **Condenser Fan Operation** *on page 25.*

TABLE 14B
W120A Cooling Pressures (N Voltage Models)

Cooling Air Temperature Entering Outdoor Coil °F													
Model	**Return Air Temp**	**Pressure**	**75**	**80**	**85**	**90**	**95**	**100**	**105**	**110**	**115**	**120**	**125**
W120A* Stage 2[1]	75° DB	Low Side	126	126	126	126	127	127	128	129	130	132	133
	62° WB	High Side	424	412	406	405	410	420	435	456	482	514	551
	80° DB	Low Side	134	134	134	135	135	136	137	138	139	141	143
	67° WB	High Side	435	423	416	415	420	430	446	468	495	527	565
	85° DB	Low Side	139	139	139	140	140	141	142	143	144	146	148
	72° WB	High Side	450	438	431	430	435	446	462	484	512	545	585
W120A* Stage 1[2]	75° DB	Low Side	115	114	114	114	115	117	119	122	125	129	134
	62° WB	High Side	422	411	406	406	412	422	438	459	485	517	554
	80° DB	Low Side	123	122	122	122	123	125	127	130	134	138	143
	67° WB	High Side	433	422	417	417	422	433	449	471	498	530	568
	85° DB	Low Side	127	126	126	127	128	129	132	135	139	143	148
	72° WB	High Side	448	437	431	431	437	448	465	487	515	549	588

Low side pressure ± 4 PSIG
High side pressure ± 10 PSIG

[1] Stage 2 is circuit 1 *unloaded* and circuit 2 *on*.
[2] Stage 1 is circuit 1 *unloaded* and circuit 2 *off*.

Tables are based upon **rated CFM** (airflow) across the evaporator coil. If there is any doubt as to correct operating charge being in the system, the charge should be removed and system evacuated and recharged to serial plate charge weight.

NOTE: *Pressure table based on high speed condenser fan operation. If condensing pressures appear elevated, check condenser fan wiring. See* **Condenser Fan Operation** *on page 25.*

TABLE 15A
W150A Cooling Pressures (B, C, E, Q and V Voltage Models)

Cooling Air Temperature Entering Outdoor Coil °F													
Model	**Return Air Temp**	**Pressure**	**75**	**80**	**85**	**90**	**95**	**100**	**105**	**110**	**115**	**120**	**125**
W150A* Stage 3[1]	75° DB	Low Side	124	124	125	126	126	127	128	129	131	132	133
	62° WB	High Side	442	430	423	423	428	439	456	478	507	541	581
	80° DB	Low Side	133	133	134	134	135	136	137	138	140	141	143
	67° WB	High Side	453	441	434	433	439	450	467	491	520	555	596
	85° DB	Low Side	137	138	138	139	140	141	142	143	145	146	148
	72° WB	High Side	469	456	449	449	454	466	484	508	538	574	617
W150A* Stage 2[2]	75° DB	Low Side	136	136	137	138	139	140	141	142	144	145	147
	62° WB	High Side	363	361	364	370	381	395	414	436	463	493	528
	80° DB	Low Side	145	146	147	148	149	150	151	152	154	155	157
	67° WB	High Side	372	371	373	380	390	405	424	447	474	506	541
	85° DB	Low Side	150	151	152	153	154	155	156	158	159	161	162
	72° WB	High Side	385	384	386	393	404	419	439	463	491	524	560
W150A* Stage 1[3]	75° DB	Low Side	124	125	125	126	127	127	128	128	129	129	129
	62° WB	High Side	420	413	410	410	414	422	433	448	467	489	515
	80° DB	Low Side	132	133	134	135	136	136	137	137	138	138	138
	67° WB	High Side	431	424	420	421	425	433	445	460	479	502	528
	85° DB	Low Side	137	138	139	140	140	141	142	142	142	143	143
	72° WB	High Side	446	438	435	436	440	448	460	476	496	519	547

Low side pressure ± 4 PSIG
High side pressure ± 10 PSIG

[1] Stage 3 is circuit 1 *fully loaded* and circuit 2 *on*.
[2] Stage 2 is circuit 1 *unloaded* and circuit 2 *on*.
[3] Stage 1 is circuit 1 *unloaded* and circuit 2 *off*.

Tables are based upon **rated CFM** (airflow) across the evaporator coil. If there is any doubt as to correct operating charge being in the system, the charge should be removed and system evacuated and recharged to serial plate charge weight.

NOTE: *Pressure table based on high speed condenser fan operation. If condensing pressures appear elevated, check condenser fan wiring. See* **Condenser Fan Operation** *on page 25.*

TABLE 15B
W150A Cooling Pressures (N Voltage Models)

Cooling Air Temperature Entering Outdoor Coil °F													
Model	**Return Air Temp**	**Pressure**	**75**	**80**	**85**	**90**	**95**	**100**	**105**	**110**	**115**	**120**	**125**
W150A* Stage 2[1]	75° DB	Low Side	123	123	124	124	125	126	127	129	130	132	133
	62° WB	High Side	414	406	402	403	409	420	436	457	482	513	548
	80° DB	Low Side	131	132	132	133	134	135	136	138	139	141	143
	67° WB	High Side	425	416	412	414	420	431	447	469	495	526	562
	85° DB	Low Side	136	136	137	137	139	140	141	142	144	146	148
	72° WB	High Side	440	431	427	428	435	446	463	485	512	544	582
W150A* Stage 1[2]	75° DB	Low Side	109	110	110	111	113	114	115	116	117	119	120
	62° WB	High Side	421	411	406	406	411	421	436	455	480	509	543
	80° DB	Low Side	116	117	118	119	120	122	123	124	125	127	128
	67° WB	High Side	432	422	417	417	422	432	447	467	492	522	557
	85° DB	Low Side	120	121	122	123	125	126	127	128	130	131	133
	72° WB	High Side	447	437	431	431	437	447	462	483	509	540	576

Low side pressure ± 4 PSIG
High side pressure ± 10 PSIG

[1] Stage 2 is circuit 1 *unloaded* and circuit 2 *on*.
[2] Stage 1 is circuit 1 *unloaded* and circuit 2 *off*.

Tables are based upon **rated CFM** (airflow) across the evaporator coil. If there is any doubt as to correct operating charge being in the system, the charge should be removed and system evacuated and recharged to serial plate charge weight.

NOTE: *Pressure table based on high speed condenser fan operation. If condensing pressures appear elevated, check condenser fan wiring. See* **Condenser Fan Operation** *on page 25.*

Standard Maintenance Procedures

⚠ WARNING

Electrical shock hazard.

Disconnect all power supplies before servicing.

Failure to do so could result in electric shock or death.

⚠ CAUTION

Cut hazard.

Wear gloves to avoid contact with sharp edges.

Failure to do so could result in personal injury.

1. Disable system from LC6000 controller (see latest revision of LC6000 Service Instructions 2100-669).
2. Turn off AC breakers at wall-mount units.
3. Check inlet sides of condenser and evaporator coils for obstructions/debris—clean if necessary using a quality manufactured coil cleaning product specific for the evaporator or condenser coil.
   - Condenser coil: For inlet-side cleaning, remove condenser grilles. For outlet-side cleaning, remove condenser fan panel. Unbolt fan from mounting brackets and slide fan outward until lower locking arm drops into position. Pivot fan by lifting fan locking arm.

     IMPORTANT: *Be sure to slide fan completely outward before pivoting. Failure to do so could result in damage to the coil.*

     Follow the coil cleaner manufacturer's directions for necessary safety gear and precautions, as well as for application and use. More than one application may be necessary. Rinse thoroughly.
   - Evaporator coil: Open filter access panels and remove filters. Apply specific evaporator cleaner directly to the inlet side of coil, being very careful not to overspray into insulation or surrounding panels and wiring. For outlet-side cleaning, remove supply grille and clean from that direction. Residual cleaner and dissolved debris should drip into the drain pan and leave the unit through the condensate hose. More than one application may be necessary. Rinse thoroughly.
4. Manually spin fan and blower motors to ensure they turn freely. All motors are permanently lubricated, so no oil is necessary.
5. Inspect free cooling damper actuator and linkage.
6. Install new air filters.
7. Inspect the control panel of the system.
   - Look for insect or rodent activity and remove any nesting materials.
   - Manually push contactor closed, observe for movement—contactor points should have minimal discoloration, no spalling or other signs of arcing. Replace if doubtful.
   - Check field and factory wiring for tightness and look for signs of overheating (discoloration of terminals or wire insulation).
8. Ensure that supply and return registers are not obstructed, and more importantly, are not recycling the air to one another. Adjust supply louvers if necessary to direct discharge air away from any direct route to the return grille.
9. Re-assemble wall-mount unit, remembering to fasten fan to mounting brackets. Turn breakers back on.
10. Enable system to LC6000 controller (see latest revision of LC6000 Service Instructions 2100-669).
11. Repeat steps for additional wall-mount units.

FIGURE 70
Sensors and Peripheral Devices

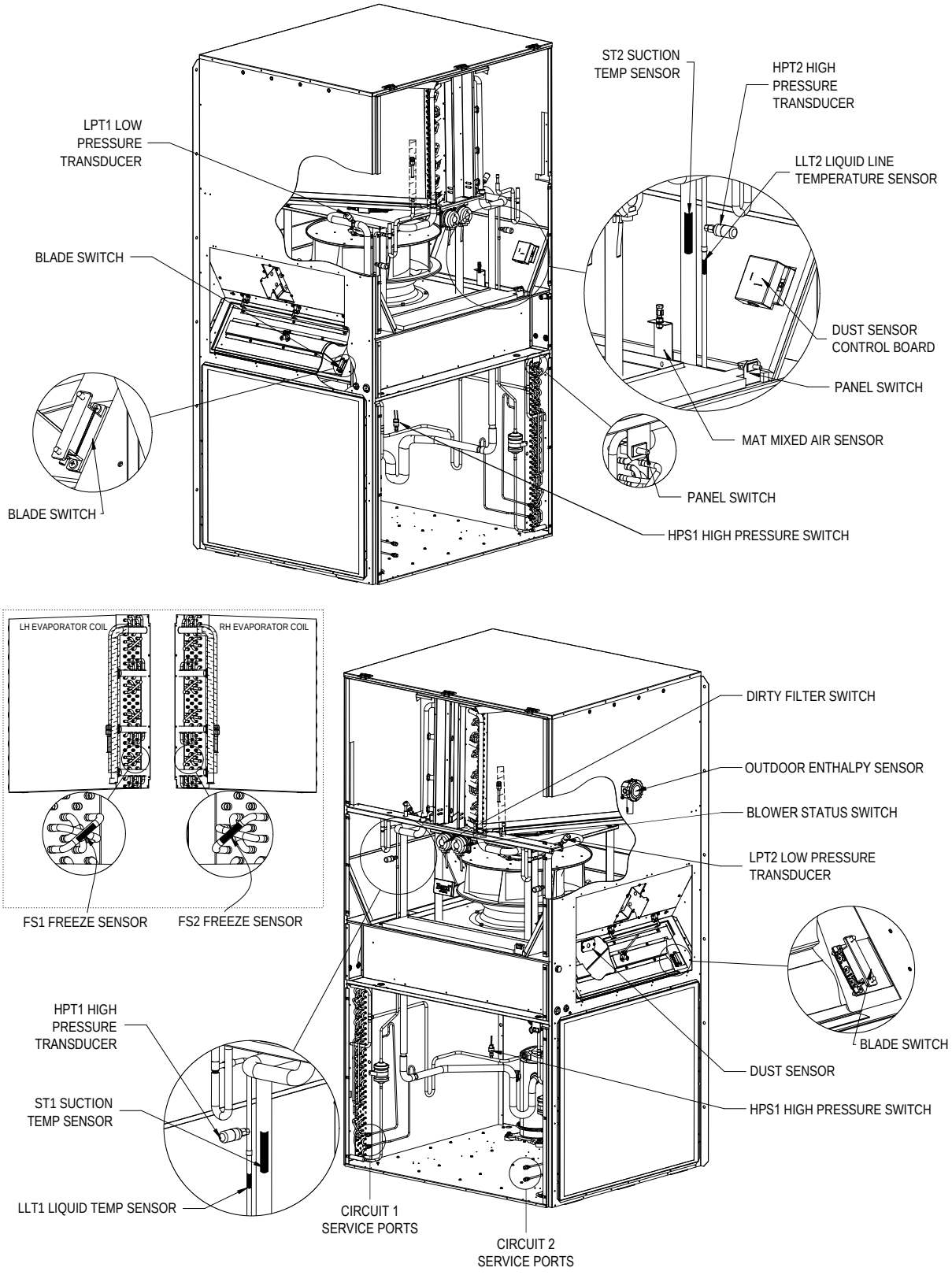
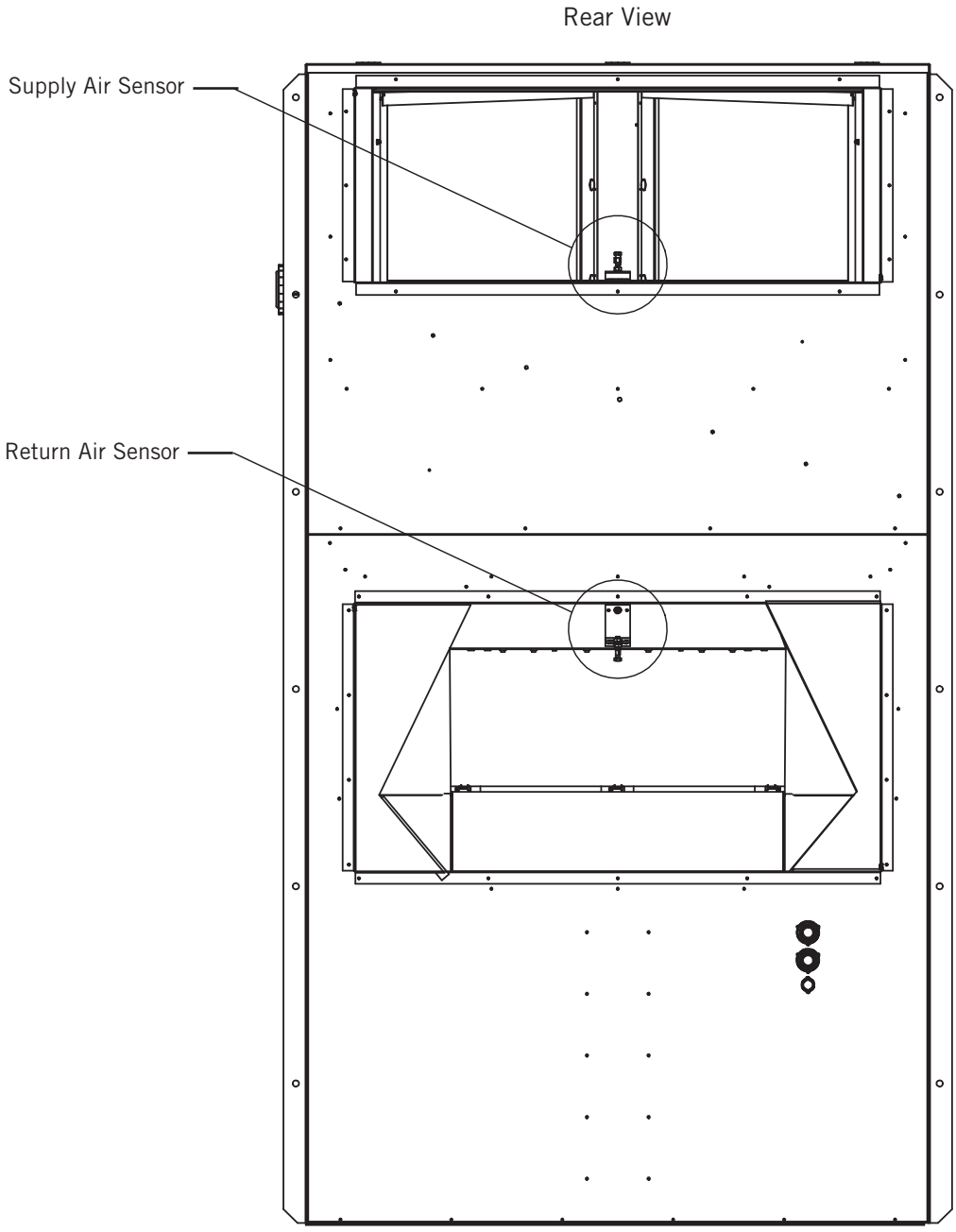


FIGURE 71
Supply and Return Air Sensors



8301-089 Outdoor Temperature/Humidity Sensor

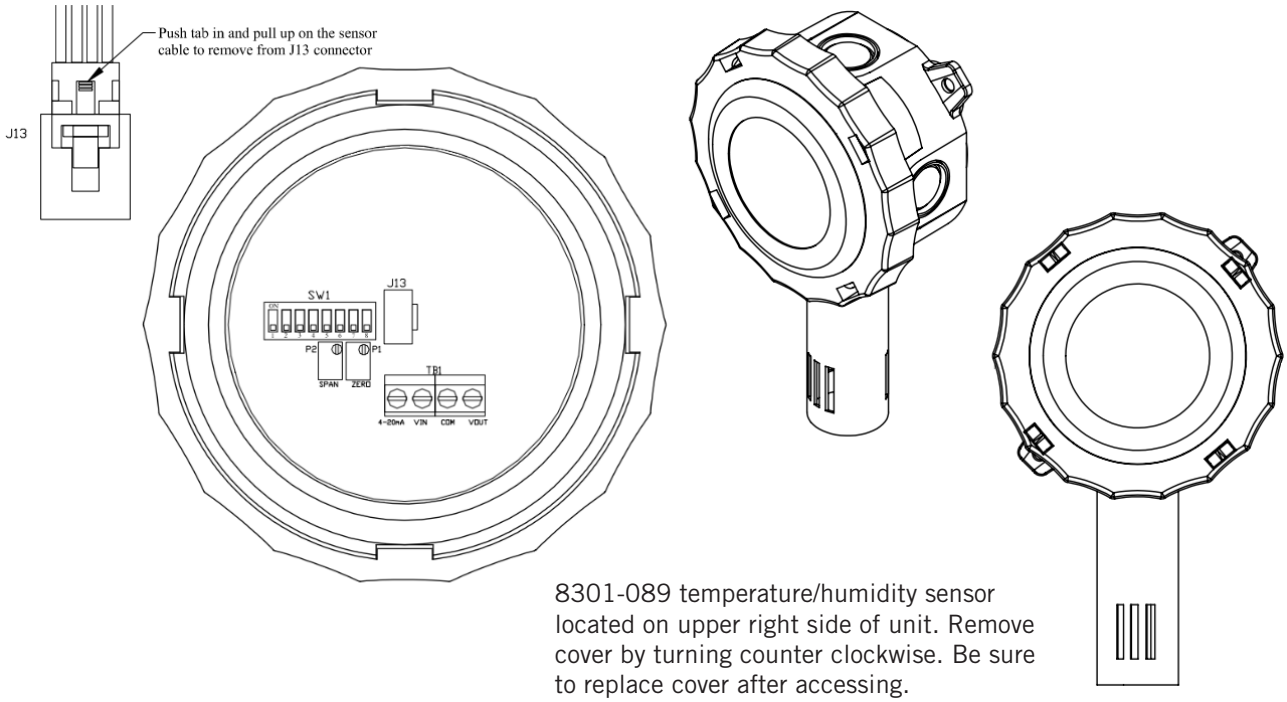
8301-089 Sensor Connections

This unit utilizes a two-wire 4-10mA signal from the 8301-089 sensor to communicate outdoor humidity and a 10KΩ Type III (AN) thermocouple from the 8301-089 sensor to communicate outdoor temperature. The humidity sensor is connected to the sensor control board via the J13 connector. The thermocouple wires are loose in the sensor housing and require a butt splice connector or wire nut to connect to the main unit wiring harness. See Figures 72 and 73 for sensor wiring and terminal location.

Tables 16 and 17 on pages 53 and 55 are correlation charts for troubleshooting the sensor with a test meter:

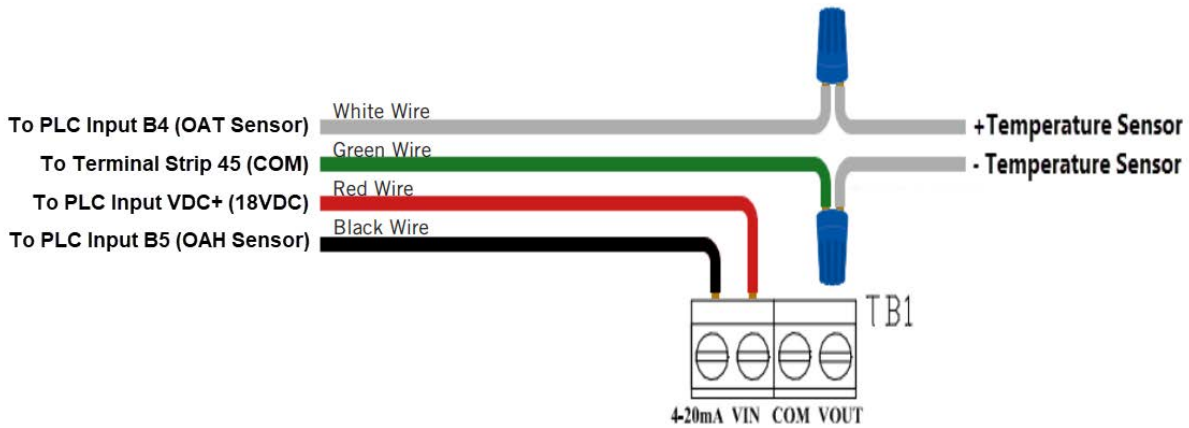
Table 16: Temperature to Thermocouple Resistance
Table 17: Relative Humidity to Humidity Sensor Current Output

FIGURE 72
8301-089 Sensor Electrical Connections and DIP Switches



8301-089 temperature/humidity sensor located on upper right side of unit. Remove cover by turning counter clockwise. Be sure to replace cover after accessing.

FIGURE 73
8301-089 Sensor Terminal Connections



8301-089 Outdoor Temperature Sensor Troubleshooting

To verify sensor operation:

1. Remove lid from outdoor temperature/humidity sensor.
2. Remove wire nuts from green and white wires (see Figure 73).
3. Use a temperature probe (preferred method) or local weather data to find ambient temperature conditions.
4. Using an ohmmeter or resistance mode on a multimeter, measure resistance across white leads leading to the temperature sensor (see Figure 74).
5. Cross reference readings with Table 16.
   A. If readings are consistent with reference temperature, check wiring or offset in PLC if outdoor temp value on PLC does not match.
   B. If readings do not match, replace sensor.

FIGURE 74
8301-089 Sensor: Temperature Probe Troubleshooting

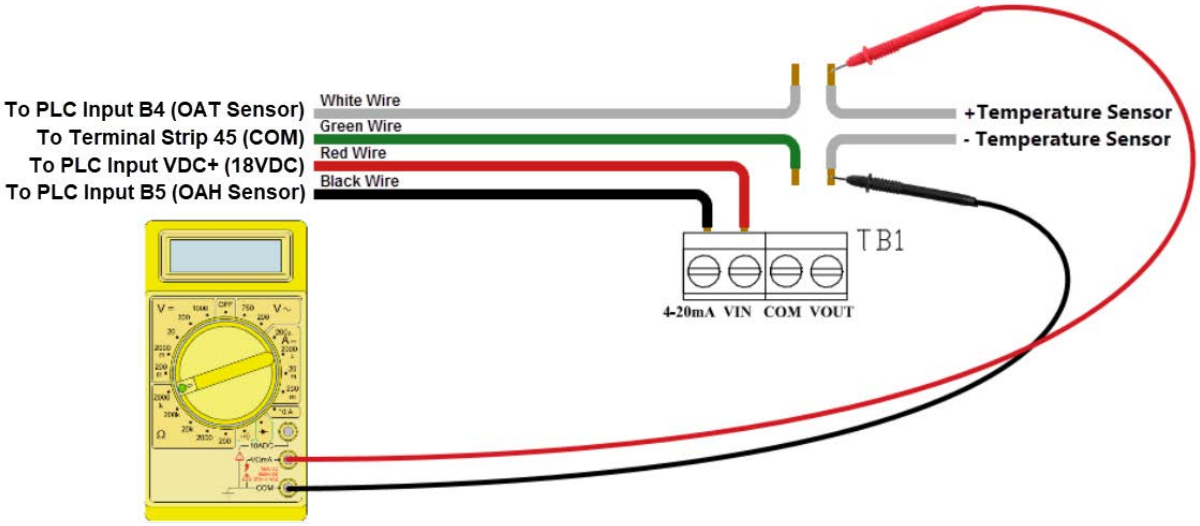


TABLE 16
8301-089 Sensor: Temperature/Resistance

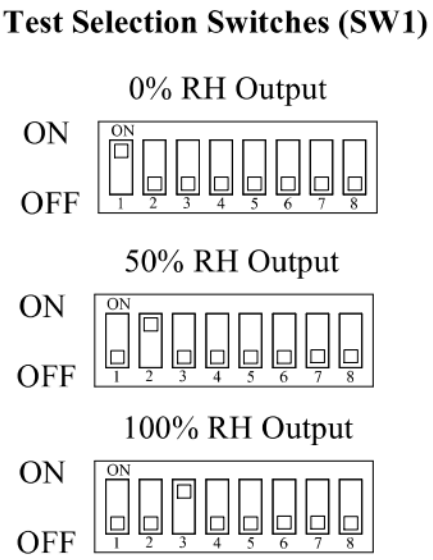
Temperature		Resistance
F	C	Ω
-25	-31.7	148,452.94
-24	-31.1	143,910.37
-23	-30.6	139,521.46
-22	-30.0	135,280.55
-21	-29.4	131,182.22
-20	-28.9	127,221.25
-19	-28.3	123,392.63
-18	-27.8	119,691.54
-17	-27.2	116,113.37
-16	-26.7	112,653.66
-15	-26.1	109,308.15
-14	-25.6	106,072.72
-13	-25.0	102,943.44
-12	-24.4	99,916.50
-11	-23.9	96,988.26
-10	-23.3	94,155.21
-9	-22.8	91,413.97
-8	-22.2	88,761.30
-7	-21.7	86,194.07
-6	-21.1	83,709.29
-5	-20.6	81,304.06
-4	-20.0	78,975.60
-3	-19.4	76,721.24
-2	-18.9	74,538.41
-1	-18.3	72,424.61
0	-17.8	70,377.48
1	-17.2	68,394.70
2	-16.7	66,474.07
3	-16.1	64,613.46
4	-15.6	62,810.82
5	-15.0	61,064.17
6	-14.4	59,371.62
7	-13.9	57,731.32
8	-13.3	56,141.52
9	-12.8	54,600.50
10	-12.2	53,106.64
11	-11.7	51,658.35
12	-11.1	50,254.11
13	-10.6	48,892.46
14	-10.0	47,571.97
15	-9.4	46,291.29
16	-8.9	45,049.09
17	-8.3	43,844.12
18	-7.8	42,675.14
19	-7.2	41,540.99
20	-6.7	40,440.51
21	-6.1	39,372.62
22	-5.6	38,336.26
23	-5.0	37,330.40
24	-4.4	36,354.06
25	-3.9	35,406.29
26	-3.3	34,486.17
27	-2.8	33,592.81
28	-2.2	32,725.36
29	-1.7	31,883.00
30	-1.1	31,064.92
31	-0.6	30,270.36
32	0.0	29,498.58
33	0.6	28,748.85
34	1.1	28,020.48
35	1.7	27,312.81
36	2.2	26,625.18
37	2.8	25,956.98
38	3.3	25,307.60
39	3.9	24,676.45
40	4.4	24,062.97
41	5.0	23,466.62
42	5.6	22,886.87
43	6.1	22,323.22
44	6.7	21,775.16
45	7.2	21,242.23
46	7.8	20,723.96
47	8.3	20,219.91
48	8.9	19,729.65
49	9.4	19,252.76
50	10.0	18,788.84
51	10.6	18,337.51
52	11.1	17,898.38
53	11.7	17,471.09
54	12.2	17,055.30
55	12.8	16,650.65
56	13.3	16,256.82
57	13.9	15,873.48
58	14.4	15,500.34
59	15.0	15,137.09
60	15.6	14,783.44
61	16.1	14,439.11
62	16.7	14,103.83
63	17.2	13,777.34
64	17.8	13,459.38
65	18.3	13,149.70
66	18.9	12,848.07
67	19.4	12,554.26
68	20.0	12,268.04
69	20.6	11,989.19
70	21.1	11,717.51
71	21.7	11,452.79
72	22.2	11,194.83
73	22.8	10,943.45
74	23.3	10698.45
75	23.9	10,459.65
76	24.4	10,226.90
77	25.0	10,000.00
78	25.6	9778.81
79	26.1	9563.15
80	26.7	9352.89
81	27.2	9147.86
82	27.8	8947.93
83	28.3	8752.95
84	28.9	8562.79
85	29.4	8377.31
86	30.0	8196.39
87	30.6	8019.91
88	31.1	7847.74
89	31.7	7679.76
90	32.2	7515.86
91	32.8	7355.94
92	33.3	7199.88
93	33.9	7047.59
94	34.4	6898.95
95	35.0	6753.88
96	35.6	6612.28
97	36.1	6474.05
98	36.7	6339.11
99	37.2	6207.37
100	37.8	6078.74
101	38.3	5953.15
102	38.9	5830.51
103	39.4	5710.75
104	40.0	5593.78
105	40.6	5479.55
106	41.1	5367.98
107	41.7	5258.99
108	42.2	5152.53
109	42.8	5048.52
110	43.3	4946.91
111	43.9	4847.63
112	44.4	4750.62
113	45.0	4655.83
114	45.6	4563.20
115	46.1	4472.67
116	46.7	4384.19
117	47.2	4297.71
118	47.8	4213.18
119	48.3	4130.55
120	48.9	4049.77
121	49.4	3970.79
122	50.0	3893.58
123	50.6	3818.08
124	51.1	3744.26
125	51.7	3672.07

8301-089 Humidity Sensor Test Value Outputs

This sensor has the ability to output fixed test signals when testing/troubleshooting sensor operation. These settings are to be used for sensor testing/ troubleshooting only and need to be removed before unit can resume normal operation. These settings allow the sensor board to output 0% RH, 50% RH and 100% RH. When these settings are active, the actual humidity sensor is ignored. DIP switches 1, 2 and 3 are used to override the output to a test signal. See Figure 75 for DIP switch/output configuration.

NOTE: *If any DIP switches are disrupted, they will need to be returned to the off state in order for the humidity sensor to return to normal operation.*

FIGURE 75
8301-089 DIP Switch/Output Configuration



8301-089 Outdoor Humidity Sensor Troubleshooting

To verify sensor operation:

1. Remove lid from outdoor temperature/humidity sensor.
2. Loosen and remove black wire from the 4-20 mA input of TB1 (see Figure 73 on page 51).
3. Use an RH meter (preferred method) or local weather data to find accurate RH reading.
4. Using an ohmmeter or amperage mode on a multimeter, measure the amperage through the black 4-20 mA wire leading to the PLC (see Figure 76).
5. Cross reference readings with Table 17.
   A. If readings are consistent with reference humidity, verify the DIP switches are all in the off position, check wiring or offset in PLC if outdoor humidity value on PLC does not match.
   B. If readings do not match, replace sensor.

FIGURE 76
8301-089 Sensor: Humidity Probe Troubleshooting

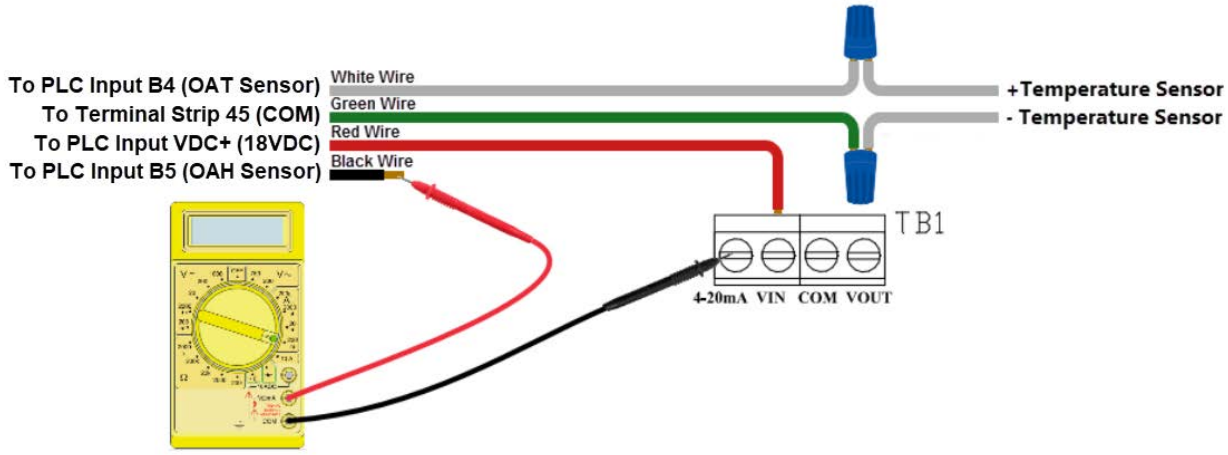


TABLE 17
8301-089 Sensor: Humidity/mA

RH%	mA Output	RH%	mA Output	RH%	mA Output
0	4.000 mA	34	9.440 mA	68	14.880 mA
1	4.160 mA	35	9.600 mA	69	15.040 mA
2	4.320 mA	36	9.760 mA	70	15.200 mA
3	4.480 mA	37	9.920 mA	71	15.360 mA
4	4.640 mA	38	10.080 mA	72	15.520 mA
5	4.800 mA	39	10.240 mA	73	15.680 mA
6	4.960 mA	40	10.400 mA	74	15.840 mA
7	5.120 mA	41	10.560 mA	75	16.000 mA
8	5.280 mA	42	10.720 mA	76	16.160 mA
9	5.440 mA	43	10.880 mA	77	16.320 mA
10	5.600 mA	44	11.040 mA	78	16.480 mA
11	5.760 mA	45	11.200 mA	79	16.640 mA
12	5.920 mA	46	11.360 mA	80	16.800 mA
13	6.080 mA	47	11.520 mA	81	16.960 mA
14	6.240 mA	48	11.680 mA	82	17.120 mA
15	6.400 mA	49	11.840 mA	83	17.280 mA
16	6.560 mA	50	12.000 mA	84	17.440 mA
17	6.720 mA	51	12.160 mA	85	17.600 mA
18	6.880 mA	52	12.320 mA	86	17.760 mA
19	7.040 mA	53	12.480 mA	87	17.920 mA
20	7.200 mA	54	12.640 mA	88	18.080 mA
21	7.360 mA	55	12.800 mA	89	18.240 mA
22	7.520 mA	56	12.960 mA	90	18.400 mA
23	7.680 mA	57	13.120 mA	91	18.560 mA
24	7.840 mA	58	13.280 mA	92	18.720 mA
25	8.000 mA	59	13.440 mA	93	18.880 mA
26	8.160 mA	60	13.600 mA	94	19.040 mA
27	8.320 mA	61	13.760 mA	95	19.200 mA
28	8.480 mA	62	13.920 mA	96	19.360 mA
29	8.640 mA	63	14.080 mA	97	19.520 mA
30	8.800 mA	64	14.240 mA	98	19.680 mA
31	8.960 mA	65	14.400 mA	99	19.840 mA
32	9.120 mA	66	14.560 mA	100	20.000 mA
33	9.280 mA	67	14.720 mA		

8620-296 Supply Air Sensor/Return Air Sensor/Mixed Air Sensor/ Suction Sensor/Liquid Sensor

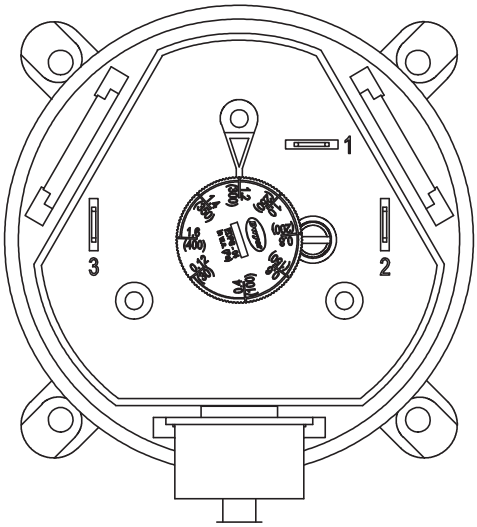
TABLE 18
8620-296 Sensor: Temperature/Resistance Curve J

Temperature °F	Resistance Ω	Temperature °F	Resistance Ω	Temperature °F	Resistance Ω	Temperature °F	Resistance Ω
-25.0	196871	13.0	56985	53.0	19374	89.0	7507
-24.0	190099	14.0	55284	52.0	18867	90.0	7334
-23.0	183585	15.0	53640	53.0	18375	91.0	7165
-22.0	177318	16.0	52051	54.0	17989	92.0	7000
-21.0	171289	17.0	50514	55.0	17434	93.0	6840
-20.0	165487	18.0	49028	56.0	16984	94.0	6683
-19.0	159904	19.0	47590	57.0	16547	95.0	6531
-18.0	154529	20.0	46200	58.0	16122	96.0	6383
-17.0	149355	21.0	44855	59.0	15710	97.0	6239
-16.0	144374	22.0	43554	60.0	15310	98.0	6098
-15.0	139576	23.0	42295	61.0	14921	99.0	5961
-14.0	134956	24.0	41077	62.0	14544	100.0	5827
-13.0	130506	25.0	39898	63.0	14177	101.0	5697
-12.0	126219	26.0	38757	64.0	13820	102.0	5570
-11.0	122089	27.0	37652	65.0	13474	103.0	5446
-10.0	118108	28.0	36583	66.0	13137	104.0	5326
-9.0	114272	29.0	35548	67.0	12810	105.0	5208
-8.0	110575	30.0	34545	68.0	12492	106.0	5094
-7.0	107010	31.0	33574	69.0	12183	107.0	4982
-6.0	103574	32.0	32634	70.0	11883	108.0	4873
-5.0	100260	33.0	31723	71.0	11591	109.0	4767
-4.0	97064	34.0	30840	72.0	11307	110.0	4663
-3.0	93981	35.0	29986	73.0	11031	111.0	4562
-2.0	91008	36.0	29157	74.0	10762	112.0	4464
-1.0	88139	37.0	28355	75.0	10501	113.0	4367
0.0	85371	38.0	27577	76.0	10247	114.0	4274
1.0	82699	39.0	26823	77.0	10000	115.0	4182
2.0	80121	40.0	26092	78.0	9760	116.0	4093
3.0	77632	41.0	25383	79.0	9526	117.0	4006
4.0	75230	42.0	24696	80.0	9299	118.0	3921
5.0	72910	43.0	24030	81.0	9077	119.0	3838
6.0	70670	44.0	23384	82.0	8862	120.0	3757
7.0	68507	45.0	22758	83.0	8653	121.0	3678
8.0	66418	46.0	22150	84.0	8449	122.0	3601
9.0	64399	47.0	21561	85.0	8250	123.0	3526
10.0	62449	48.0	20989	86.0	8057	124.0	3452
11.0	60565	49.0	20435	87.0	7869		
12.0	58745	50.0	19896	88.0	7686		

8301-057 Blower Status Switch/Dirty Filter Switch

FIGURE 77
8301-057 Air Differential Switch

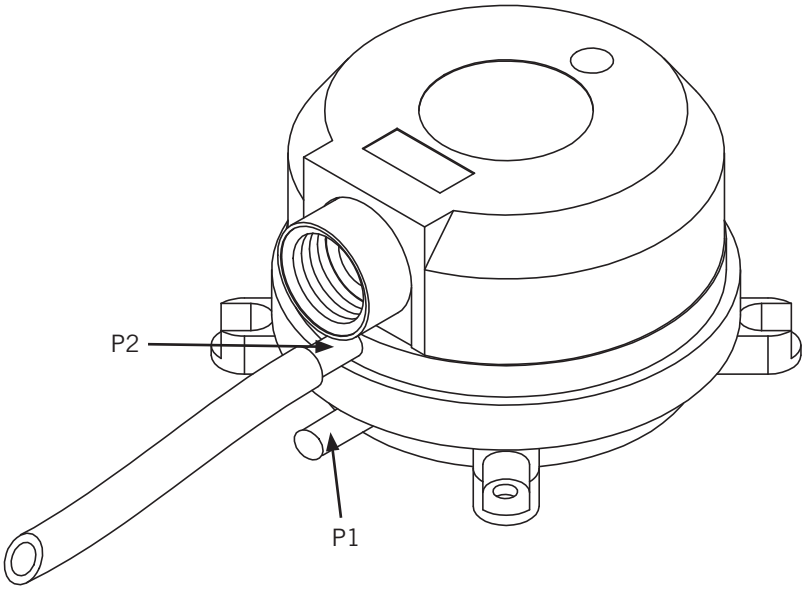
Switch Settings	
Blower Status Switch	
W090	0.40
W120	0.80
W150	0.40
Dirty Filter Switch	
W090	1.00
W120	1.40
W150	1.20



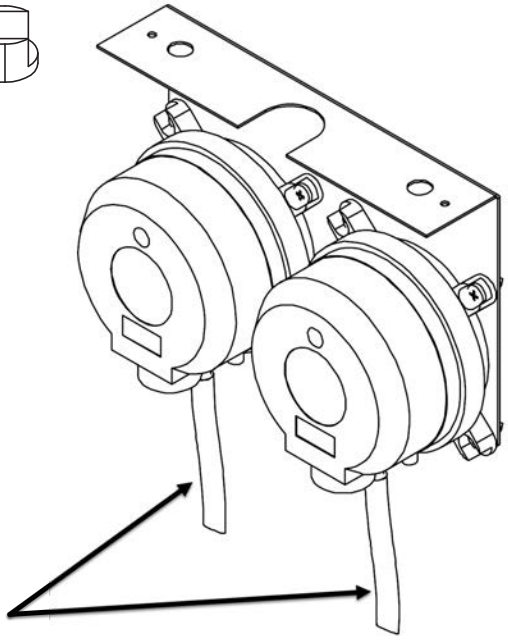
Terminals

1 – Normally Closed
2 – Normally Open
3 – Common

NOTE: *Contact position is in resting state.*



Connect hose to P2



Hoses need to be connected to the P2 port (port closest to front)

Compressor Solenoid

A nominal 24-volt direct current coil activates the internal compressor solenoid. The input control circuit voltage must be 18 to 28 VAC. The coil power requirement is 20 VAC. The external electrical connection is made with a molded plug assembly. This plug contains a full wave rectifier to supply direct current to the unloader coil.

Compressor Solenoid Test Procedures

If it is suspected that the unloader is not working, the following methods may be used to verify operation.

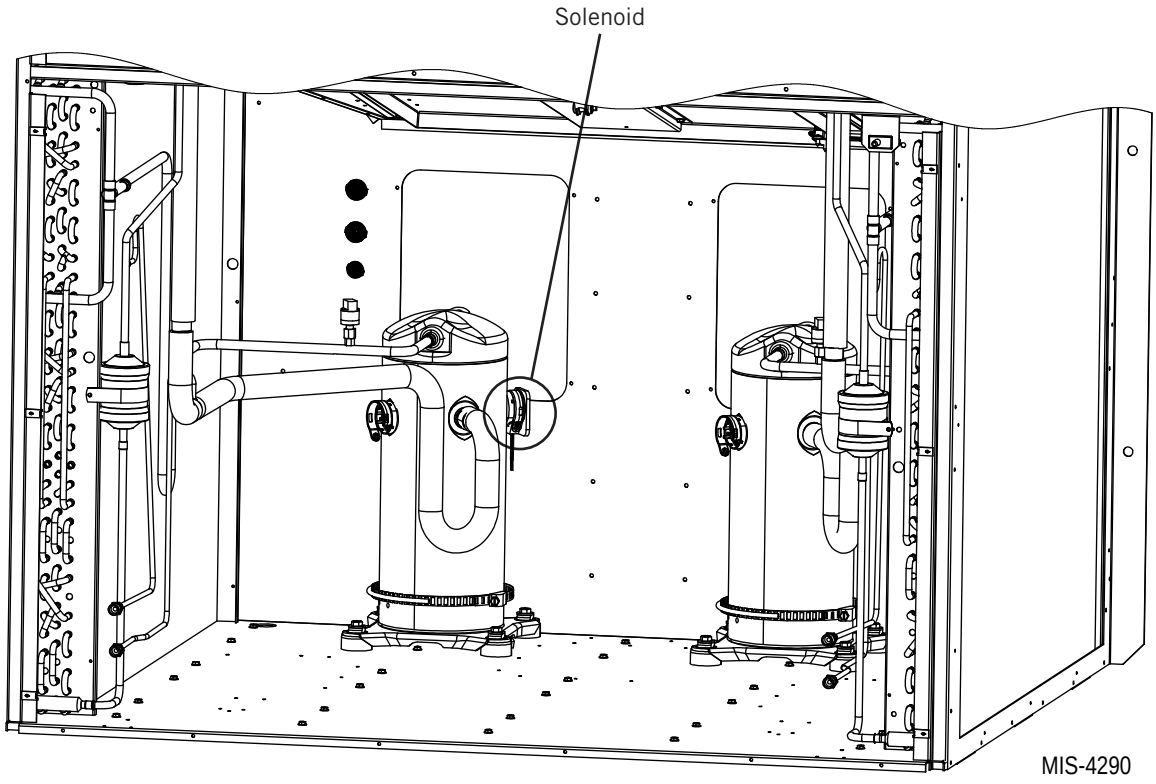
1. Operate the system and measure compressor amperage. Cycle the compressor solenoid on and off at 10-second intervals. The compressor amperage should go up or down at least 25%.
2. If Step 1 does not give the expected results, shut unit off. Apply 18 to 28 VAC to the solenoid molded plug leads and listen for a click as the solenoid pulls in. Remove power and listen for another click as the solenoid returns to its original position.
3. If clicks can't be heard, shut off power, remove the control circuit molded plug from the compressor and measure the solenoid coil resistance – 1640 ohms.
4. Next, check the molded plug.

   Voltage Check: Apply control voltage to the plug wires (18 to 28 VAC). The measured **DC** voltage at the female connectors in the plug should be around 15 to 27 VDC.

   Resistance Check: Measure the resistance from the end of one molded plug lead to either of the two female connectors in the plug. One of the connectors should read close to 0 ohms, while the other should read infinity. Repeat with other wire. The same female connector as before should read zero, while the other connector again reads infinity. Reverse polarity on the ohmmeter leads and repeat. The female connector that read infinity previously should now read close to 0 ohms.

   Replace plug if either of these test methods does not show the desired results.

FIGURE 78
Compressor Solenoid Location



8612-061 Dust (Particulate) Sensor Control Board

8612-061 Control Board Output Signal Not Responsive to Dust

1. With a voltmeter, verify 24VAC present across 24VAC pin terminals.
   A. If 24VAC is not present, trace back wires to source.
2. Inspect and re-seat the dust sensor communication cable.
   A. Carefully remove the dust sensor communication cable from the dust sensor connector on the dust sensor alarm board and the dust sensor.
   B. Inspect communication cable for the following:
      i. Wires pulled out of the connectors.
      ii. Scars in insulation exposing bare wire.
   C. If communication cable is damaged:
      i. Replace communication cable.
   D. If communication cable is not damaged:
      i. Carefully reconnect the dust sensor communication cable to the dust sensor connector on the dust sensor alarm board and the dust sensor.
3. With a voltmeter, measure voltage between the following terminals:
   A. Component U1 pin 2 and terminal block pin 4 (see Figure 79).
      i. Should read 12VAC
   B. Component U1 pin 3 and terminal block pin 4 (see Figure 79).
      i. Should read 24VAC
   C. If voltage readings are correct:
      i. Replace 8301-073 dust sensor.
   D. If voltage readings are not correct:
      i. Replace 8612-061 dust sensor alarm board.

FIGURE 79
Dust Sensor Alarm Board Power Supply Check

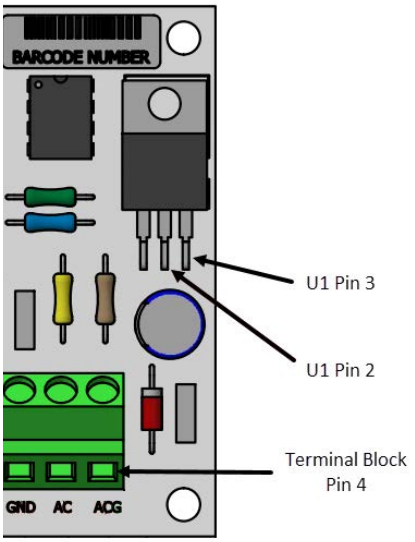
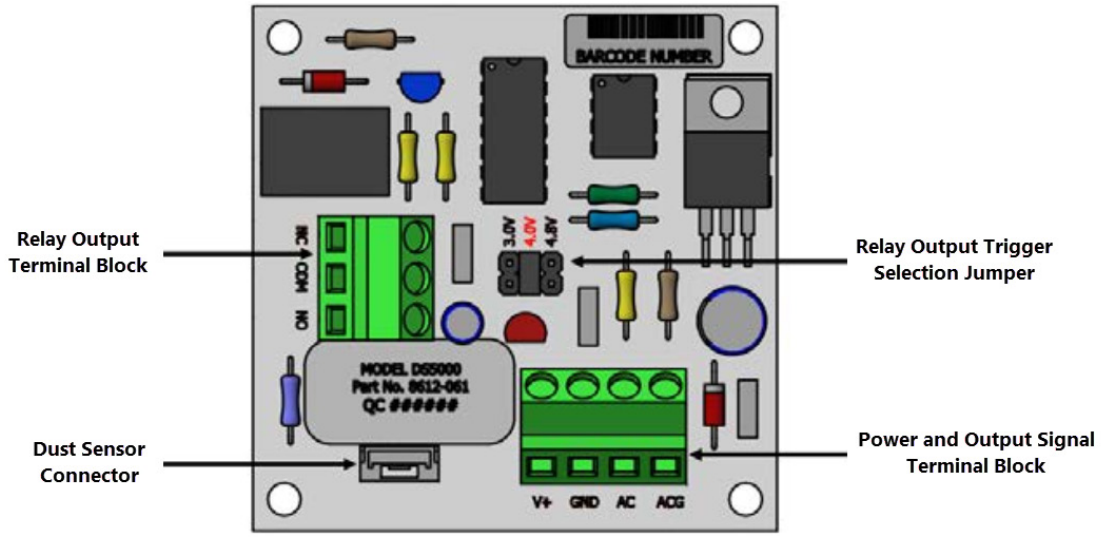


FIGURE 80
8612-061 Dust Sensor Alarm Board



8301-073 Dust (Particulate) Sensor

The following measurements are taken across V+ and GND on Dust Sensor Alarm B

TABLE 19
8301-073 Sensor: Dust/Volts

Dust	Signal
ppm	VDC
0	0.00
3	0.05
6	0.10
9	0.15
12	0.19
15	0.24
18	0.29
21	0.34
24	0.39
27	0.44
30	0.49
33	0.53
36	0.58
39	0.63
42	0.68
45	0.73
48	0.78
51	0.83
54	0.87
57	0.92
60	0.97
63	1.02
66	1.07
69	1.12
72	1.17
75	1.21
78	1.26
81	1.31
84	1.36
87	1.41
90	1.46
93	1.50
96	1.55
99	1.60
102	1.65

Dust	Signal
ppm	VDC
105	1.70
108	1.75
111	1.80
114	1.84
117	1.89
120	1.94
126	1.99
126	2.04
129	2.09
132	2.14
135	2.18
138	2.23
141	2.28
144	2.33
147	2.38
150	2.43
153	2.48
156	2.52
159	2.57
162	2.62
165	2.67
168	2.72
171	2.77
174	2.82
177	2.86
180	2.91
183	2.96
186	3.01
189	3.06
192	3.11
195	3.16
198	3.20
201	3.25
204	3.30
207	3.35

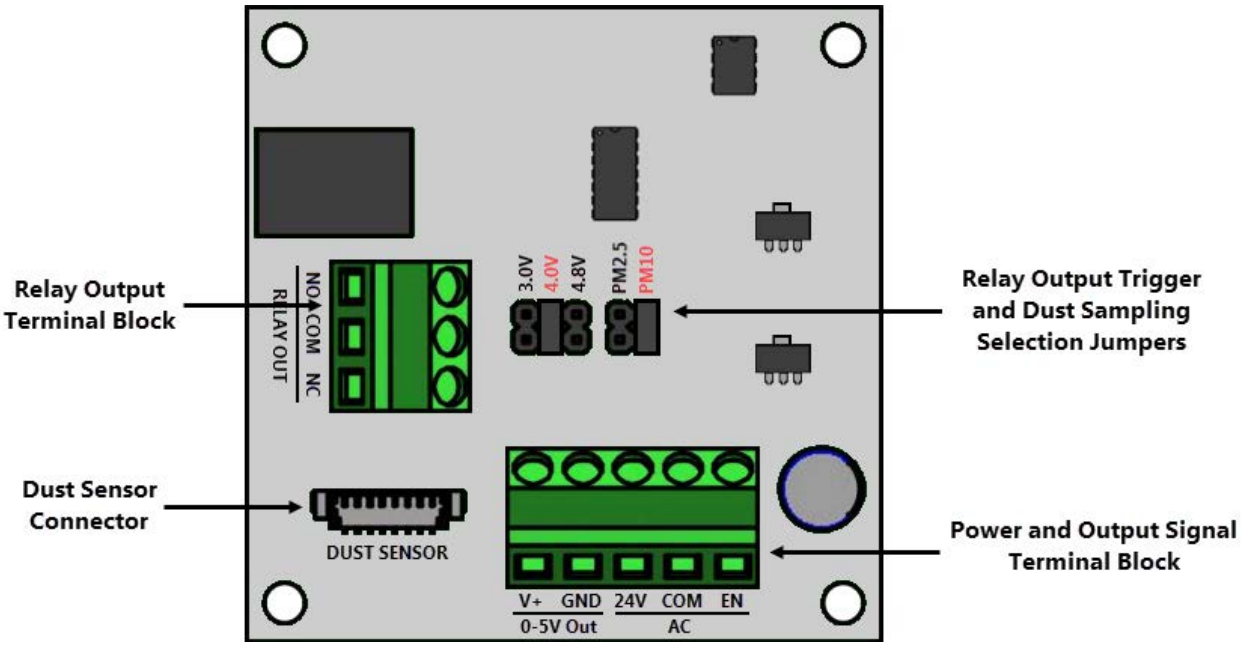
Dust	Signal
ppm	VDC
210	3.40
213	3.45
216	3.50
219	3.54
222	3.59
225	3.64
228	3.69
231	3.74
234	3.79
237	3.83
240	3.88
243	3.93
246	3.98
249	4.03
252	4.08
255	4.13
258	4.17
261	4.22
264	4.27
267	4.32
270	4.37
273	4.42
276	4.47
279	4.51
282	4.56
285	4.61
288	4.66
291	4.71
294	4.76
297	4.81
300	4.85
303	4.90
306	4.95
309	5.00

8612-064 Dust (Particulate) Sensor Control Board

8612-064 Control Board Output Signal Not Responsive

1. With a voltmeter, verify 24VAC present across 24VAC pin terminals.
   A. If 24VAC is not present, trace back wires to source.
2. Inspect and re-seat the dust sensor communication cable.
   A. Carefully remove the dust sensor communication cable from the dust sensor connector on the dust sensor alarm board and the dust sensor.
   B. Inspect communication cable for the following:
      i. Wires pulled out of the connectors.
      ii. Scars in insulation exposing bare wire.
   C. If communication cable is damaged:
      i. Replace communication cable.
   D. If communication cable is not damaged:
      i. Carefully reconnect the dust sensor communication cable to the dust sensor connector on the dust sensor alarm board and the dust sensor.

FIGURE 81
8612-064 Dust Sensor Alarm Board



8301-091 Dust (Particulate) Sensor

The following measurements are taken across V+ and GND on Dust Sensor Alarm

TABLE 20
8301-091 Sensor: Dust/Volts

Dust	Signal	Dust	Signal	Dust	Signal
µg/m3	Vdc	µg/m3	Vdc	µg/m3	Vdc
0	0.10	34	1.77	68	3.43
1	0.15	35	1.82	69	3.48
2	0.20	36	1.86	70	3.53
3	0.25	37	1.91	71	3.58
4	0.30	38	1.96	72	3.63
5	0.35	39	2.01	73	3.68
6	0.39	40	2.06	74	3.73
7	0.44	41	2.11	75	3.78
8	0.49	42	2.16	76	3.82
9	0.54	43	2.21	77	3.87
10	0.59	44	2.26	78	3.92
11	0.64	45	2.31	79	3.97
12	0.69	46	2.35	80	4.02
13	0.74	47	2.40	81	4.07
14	0.79	48	2.45	82	4.12
15	0.84	49	2.50	83	4.17
16	0.88	50	2.55	84	4.22
17	0.93	51	2.60	85	4.27
18	0.98	52	2.65	86	4.31
19	1.03	53	2.70	87	4.36
20	1.08	54	2.75	88	4.41
21	1.13	55	2.80	89	4.46
22	1.18	56	2.84	90	4.51
23	1.23	57	2.89	91	4.56
24	1.28	58	2.94	92	4.61
25	1.33	59	2.99	93	4.66
26	1.37	60	3.04	94	4.71
27	1.42	61	3.09	95	4.76
28	1.47	62	3.14	96	4.80
29	1.52	63	3.19	97	4.85
30	1.57	64	3.24	98	4.90
31	1.62	65	3.29	99	4.95
32	1.67	66	3.33	100	5.00
33	1.72	67	3.38		

Variable Speed Blower/Condenser Fan

⚠ WARNING

Electrical shock hazard.

Live terminals and connections even when device is turned off.

Wait 5 minutes after power has been removed from unit before disconnecting the voltage to the blower/fan motor as internal buss voltage may still be present.

Failure to do so could result in electric shock or death.

Maintenance

CAUTION: If control voltage or a stored speed value are still applied during power reset, motor may start automatically.

- Keep out of device danger zones.
- When working on/around the fan/blower, switch off line voltage to the unit, ensuring that it cannot be switched back on inadvertently, and wait 5 minutes before removing terminal covers.
- Wait until fan/blower comes to a complete stop before entering areas.
- After work is performed, verify all tools have been removed from unit and specifically the rotational area of the fan/blower.

FIGURE 82
Fan Terminals

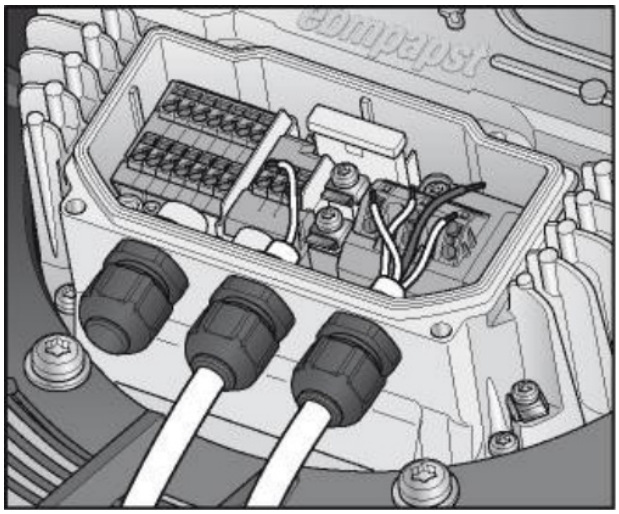


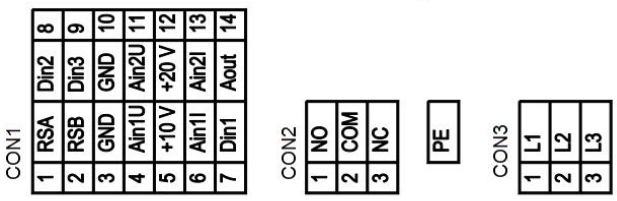
TABLE 21
Blower/Condenser Fan Troubleshooting

Issue	Possible Cause	Possible Remedy
Impeller/fan not running smoothly	Imbalance in rotating parts	Clean the device (make sure weight clips are not removed during cleaning); replace if imbalance persists after cleaning.
Motor not turning	Mechanical blockage	Switch off unit, isolate from power supply and remove blockage.
	Line voltage faulty	Check line voltage, restore power supply. ***WARNING:*** *Line Voltage error resets automatically and motor will start without warning.*
	Faulty connection	Switch off, isolate from power supply and correct connection (see connection table below).
	Broken motor winding	Replace motor.
	Inadequate cooling	Allow motor to cool down, clean or improve cooling.
	High ambient temperature	Allow motor to cool down.
	Impermissible operating point (e.g., back pressure too high)	Correct static issue, allow motor to cool down.

Connector	Terminal	Description
CON1	1 - L1	Line Power Phase 1
CON1	2 - L2	Line Power Phase 2
CON1	3 - L3	Line Power Phase 3
Housing	PE	Line Power Ground Terminal
CON3	1 - RSA	Modbus +
CON3	2 - RSB	Modbus -
CON3	3 - GND	Shield Ground

NOTE: *Some terminals are not used for this product.*

Terminal Box Connection Diagram



Modbus Troubleshooting

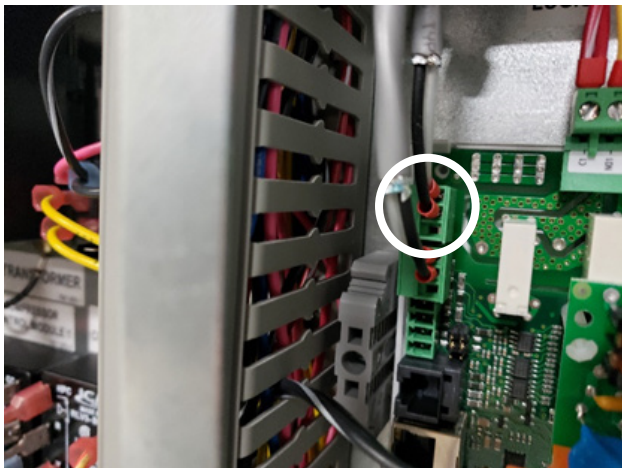
Use the following instructions if alarm 96, 97, 99, 101 or 103 occurs (see **Alarm Index** on page 67).

1. Disconnect the communication wires from the condenser fan (Figure 83) and unplug the ModBus from the expansion module (C.PCOe) as shown in Figure 84. Verify that the other end of the ModBus is plugged into the upper field bus connection (FieldBus 1) on the PLC board (see Figure 85).

FIGURE 83
Disconnect Condenser Fan Communication Wires

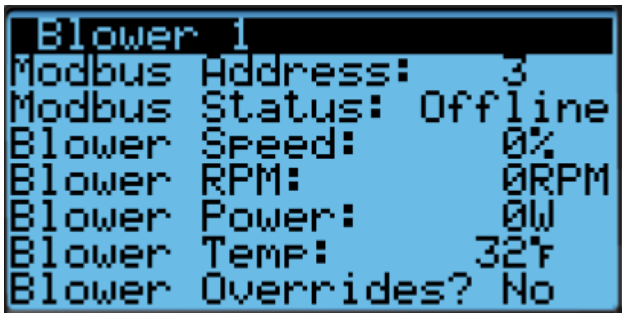
FIGURE 84
Unplug Modbus from Expansion Module

FIGURE 85
Verify Modbus is Connected to PLC Board



2. Using the TEC-EYE, check to see if the blower motor is online.

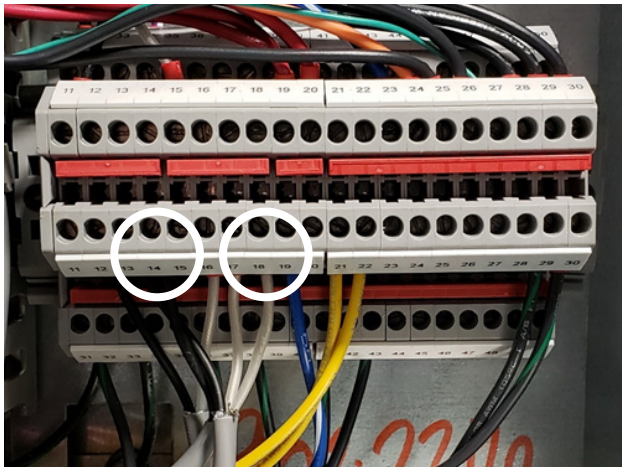
FIGURE 86
Verify Blower Motor Is Online



A. Yes. Proceed to Step 3.

B. No. Reverse the polarity of the wires coming from the blower motor at the terminal block (terminals 14 and 18, see Figure 87).

FIGURE 87
Reverse Polarity of Wires from Blower Motor



C. Check for communication, is the blower online?

i. Yes. Proceed to Step 3.

ii. No. Blower must be removed for wiring verification and/or replacement.

a. Verify high voltage to blower and check communication wires for short, open or grounded circuits. If a wiring problem is found, make corrections, re-install and verify communication. If no problems are found, replace blower motor.

3. Reconnect the communication wires at the condenser fan.

4. Is the blower still online?

A. Yes. Proceed to Step 5.

B. No. Reverse the polarity on the communication wires at the condenser fan motor (see Figure 83). Is the blower online?

i. Yes. Proceed to Step 5.

ii. No. Verify that none of the wires are open, shorted or grounded. Then disconnect communication wires at condenser fan motor. Is the blower online?

a. Yes. Replace condenser fan motor.

b. No. Return to Step 1.

5. Is the condenser fan online?

A. Yes. Proceed to Step 6.

B. No. Reverse the communication wires for the condenser motor only (at terminal block in control panel). Is condenser fan online?

i. Yes. Verify blower is still online and proceed to Step 6.

a. If blower is not online at this point, double check wiring and/or return to Step 1.

ii. No. Replace condenser fan.

6. Plug in expansion module (C.PCOe).

7. Are the blower and condenser fan still online?

A. Yes. Proceed to Step 8.

B. No. Reverse the communication wires on the communication terminal block that is plugged into the expansion module (C.PCOe). Are the blower and condenser fan online?

i. Yes. Proceed to Step 9.

ii. No. Unplug the expansion module (C.PCOe) and verify that the blower and condenser fan are online. Check wiring very carefully to confirm no shorts or grounding has occurred. If unable to establish communication with the condenser fan and blower while plugged into the expansion module (C.PCOe), but have verified that communication is consistent while not plugged in, the expansion module (C.PCOe) may be bad. Replace the expansion module (C.PCOe).

8. Is the expansion module (C.PCOe) online?

A. Yes. Proceed to Step 9.

B. No. Check that the address is set to 2 (see Figures 88 and 89).

FIGURE 88
DIP Switch Location

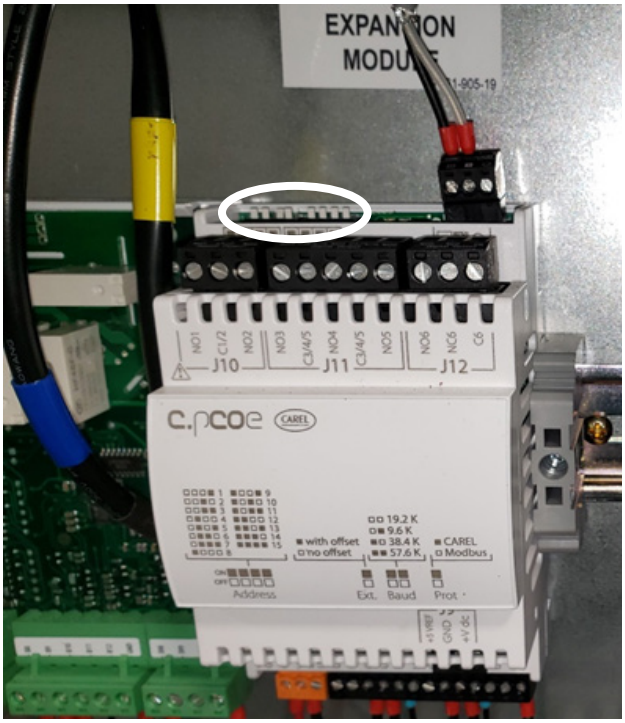
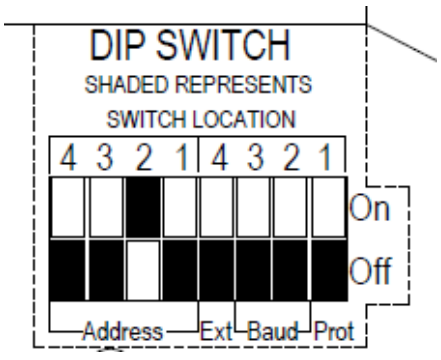


FIGURE 89
Check DIP Switch Position



c. Is the expansion module (C.PCOe) online?

i. Yes. Proceed to Step 9.

ii. No. Reverse the communication wires at the communication terminal block

that plugs into the expansion module (C.PCOe). Is the expansion module (C.PCOe) online?

a. Yes. Verify the blower and fan are still online and proceed to Step 9.

b. No. Check wiring very carefully to confirm no opens, shorts or grounding has occurred. If unable to establish communication with the expansion module (C.PCOe) with the blower and condenser fan online, with address set and polarity verified, the expansion module (C.PCOe) will need to be replaced. To verify the expansion module (C.PCOe) is faulty, the communication wires should be isolated from the blower and condenser fan and only connected to the PLC to establish if communication is possible. If the procedure above has been followed correctly, then the expansion module (C.PCOe) will remain offline. If this is not the case, then wires leading to the condenser fan and blower should be able to be reconnected and communication established.

9. Replace all covers, tidy up the wiring, clear alarms and resume operations.

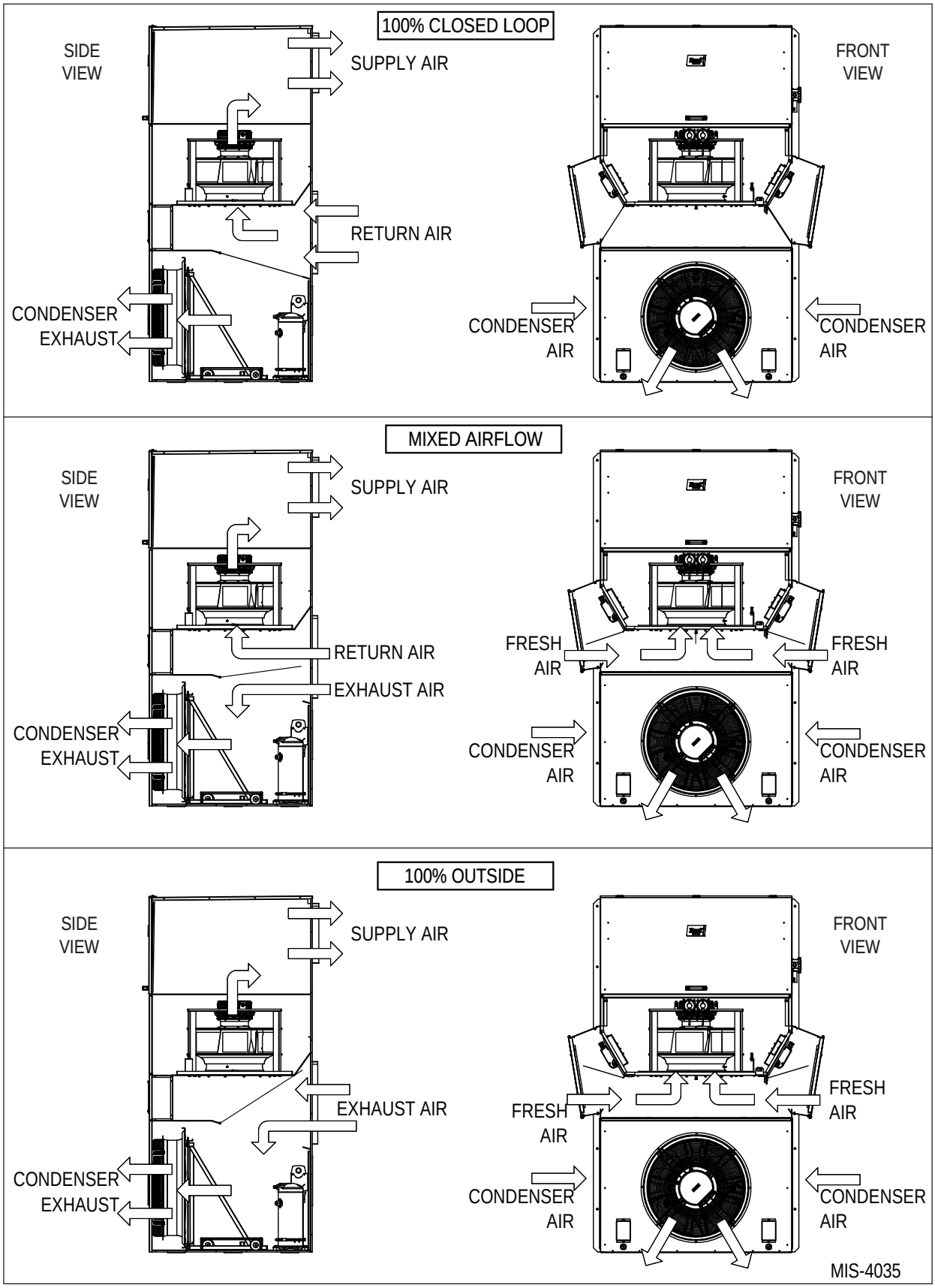
Alarm Index

Index	Alarm	Reference (to Manual Section Unless Otherwise Noted)
0	Error in the number of retain memory writings	Call Bard Technical Service
1	Error in retain memory writings	Call Bard Technical Service
2	Circuit 1 Return Air Temperature Sensor Alarm	See Temperature Control section
3	Circuit 1 High Return Air Temperature Alarm	See Temperature Control section
4	Circuit 2 Return Air Temperature Sensor Alarm	See Temperature Control section
5	Circuit 2 High Return Air Temperature Alarm	See Temperature Control section
6	Circuit 1 Mixed Air Temperature Sensor Alarm	See Economizer section
7	Circuit 1 Mixed Air High Temperature	See Economizer section
8	Circuit 1 Mixed Air Low Temperature	See Economizer section
9	Circuit 2 Mixed Air Temperature Sensor Alarm	See Economizer section
10	Circuit 2 Mixed Air High Temperature	See Economizer section
11	Circuit 2 Mixed Air Low Temperature	See Economizer section
12	Circuit 1 Supply Air Temperature Sensor Alarm	See Indoor Airflow section
13	Circuit 1 High Supply Air Temperature Alarm	See Indoor Airflow section
14	Circuit 1 Low Supply Air Temperature Alarm	See Indoor Airflow section
15	Circuit 2 Supply Air Temperature Sensor Alarm	See Indoor Airflow section
16	Circuit 2 High Supply Air Temperature Alarm	See Indoor Airflow section
17	Circuit 2 Low Supply Air Temperature Alarm	See Indoor Airflow section
18	Outdoor Air Temperature Sensor Alarm	See Economizer section
19	Outdoor Air Humidity Sensor Alarm	See Economizer section
20	Circuit 1 Dust Sensor Alarm	See Economizer section
21	Circuit 1 Dust Sensor High Dust Detection Alarm	See Economizer section
22	Circuit 2 Dust Sensor Alarm	See Economizer section
23	Circuit 2 Dust Sensor High Dust Detection Alarm	See Economizer section
24	Circuit 1 Liquid Line Temp Sensor Alarm	See Condenser Fan section
25	Circuit 2 Liquid Line Temp Sensor Alarm	See Condenser Fan section
26	Circuit 1 Liquid Line Pressure Sensor Alarm	See Condenser Fan section
27	Circuit 2 Liquid Line Pressure Sensor Alarm	See Condenser Fan section
28	Circuit 1 Discharge Temp Sensor Alarm	See Condenser Fan section
29	Circuit 2 Discharge Temp Sensor Alarm	See Condenser Fan section
30	Circuit 1 Discharge Pressure Sensor Alarm	See Condenser Fan section
31	Circuit 2 Discharge Pressure Sensor Alarm	See Condenser Fan section
32	Circuit 1 Suction Temperature Sensor Alarm	See Electronic Expansion Valve (EEV) section
33	Circuit 2 Suction Temperature Sensor Alarm	See Electronic Expansion Valve (EEV) section

Index	Description	Reference (to Manual Section Unless Otherwise Noted)
34	Circuit 1 Suction Pressure Sensor Alarm	See Electronic Expansion Valve (EEV) section
35	Circuit 2 Suction Pressure Sensor Alarm	See Electronic Expansion Valve (EEV) section
36	Circuit 1 Low Pressure	See Compressor section
37	Circuit 2 Low Pressure	See Compressor section
38	Circuit 1 High Pressure	See Compressor section
39	Circuit 2 High Pressure	See Compressor section
40	Damper 1 Failed to Open	See Economizer section
41	Damper 1 Failed to Close	See Economizer section
42	Damper 2 Failed to Close	See Economizer section
43	Damper 2 Failed to Open	See Economizer section
44	Damper 3 Failed to Open	See Economizer section
45	Damper 3 Failed to Close	See Economizer section
46	Damper 4 Failed to Open	See Economizer section
47	Damper 4 Failed to Close	See Economizer section
48	Circuit 1 Freeze Temperature Sensor Alarm	See Electronic Expansion Valve (EEV) section
49	Circuit 2 Freeze Temperature Sensor Alarm	See Electronic Expansion Valve (EEV) section
50	Circuit 1 Freeze Condition	See Electronic Expansion Valve (EEV) section
51	Circuit 2 Freeze Condition	See Electronic Expansion Valve (EEV) section
52	Circuit 1 Blower Fail Alarm	See Indoor Airflow section
53	Circuit 2 Blower Fail Alarm	See Indoor Airflow section
54	Dirty Filter 1 Alarm	See Indoor Airflow section
55	Dirty Filter 2 Alarm	See Indoor Airflow section
60	Emergency Ventilation Mode Active	See Economizer section
61	Emergency Cooling Mode Active	See Economizer section
62	Extreme High Return Temp Alarm (Heat Cutout)	
63	Unit Disable	See Unit Disable Option section
64	Circuit 1 Power Loss Detected	
65	Circuit 2 Power Loss Detected	
66	Circuit 1 Low SuperHeat	See Electronic Expansion Valve (EEV) section
67	Circuit 1 Low Evaporation Pressure	See Electronic Expansion Valve (EEV) section
68	Circuit 1 High Evaporation Pressure	See Electronic Expansion Valve (EEV) section
69	Circuit 1 High Condenser Temperature	See Electronic Expansion Valve (EEV) section
70	Circuit 1 Low Suction Pressure	See Electronic Expansion Valve (EEV) section
71	Circuit 1 EEV Motor Error	See Electronic Expansion Valve (EEV) section
72	Circuit 1 Self Tuning Error	See Electronic Expansion Valve (EEV) section
73	Circuit 1 Emergency Close	See Electronic Expansion Valve (EEV) section

Index	Description	Reference (to Manual Section Unless Otherwise Noted)
74	Circuit 1 High Delta Temperature	See Electronic Expansion Valve (EEV) section
75	Circuit 1 High Delta Pressure	See Electronic Expansion Valve (EEV) section
76	Circuit 1 Range Error	See Electronic Expansion Valve (EEV) section
77	Circuit 1 Service Position Percent	See Electronic Expansion Valve (EEV) section
78	Circuit 1 Valve ID	See Electronic Expansion Valve (EEV) section
79	Circuit 2 Low SuperHeat	See Electronic Expansion Valve (EEV) section
80	Circuit 2 Low Evaporation Pressure	See Electronic Expansion Valve (EEV) section
81	Circuit 2 High Evaporation Pressure	See Electronic Expansion Valve (EEV) section
82	Circuit 2 High Condenser Temperature	See Electronic Expansion Valve (EEV) section
83	Circuit 2 Low Suction Pressure	See Electronic Expansion Valve (EEV) section
84	Circuit 2 EEV Motor Error	See Electronic Expansion Valve (EEV) section
85	Circuit 2 Self Tuning Error	See Electronic Expansion Valve (EEV) section
86	Circuit 2 Emergency Close	See Electronic Expansion Valve (EEV) section
87	Circuit 2 High Delta Temperature	See Electronic Expansion Valve (EEV) section
88	Circuit 2 High Delta Pressure	See Electronic Expansion Valve (EEV) section
89	Circuit 2 Range Error	See Electronic Expansion Valve (EEV) section
90	Circuit 2 Service Position Percent	See Electronic Expansion Valve (EEV) section
91	Circuit 2 Valve ID	See Electronic Expansion Valve (EEV) section
92	Standalone Display Offline	See latest revision of PGD/PGDx manual
93	Standalone Temperature Probe Alarm	See latest revision of PGD/PGDx manual
94	Standalone Humidity Probe Alarm	See latest revision of PGD/PGDx manual
96	c.pCOe Offline	See Modbus Troubleshooting for MEGA-TEC
97	Offline EBM Blower 1	See Modbus Troubleshooting for MEGA-TEC
99	Offline EBM Blower 2	See Modbus Troubleshooting for MEGA-TEC
101	Offline EBM Fan 1	See Modbus Troubleshooting for MEGA-TEC
103	Offline EBM Fan 2	See Modbus Troubleshooting for MEGA-TEC
105	Circuit 1 Low Return Air Temperature Alarm	See Temperature Control section
106	Circuit 2 Low Return Air Temperature Alarm	See Temperature Control section
107	Panel Switch	See Figure 70

FIGURE 90
Ventilation Airflow Paths



I/O Layout

FIGURE 91
I/O Layout

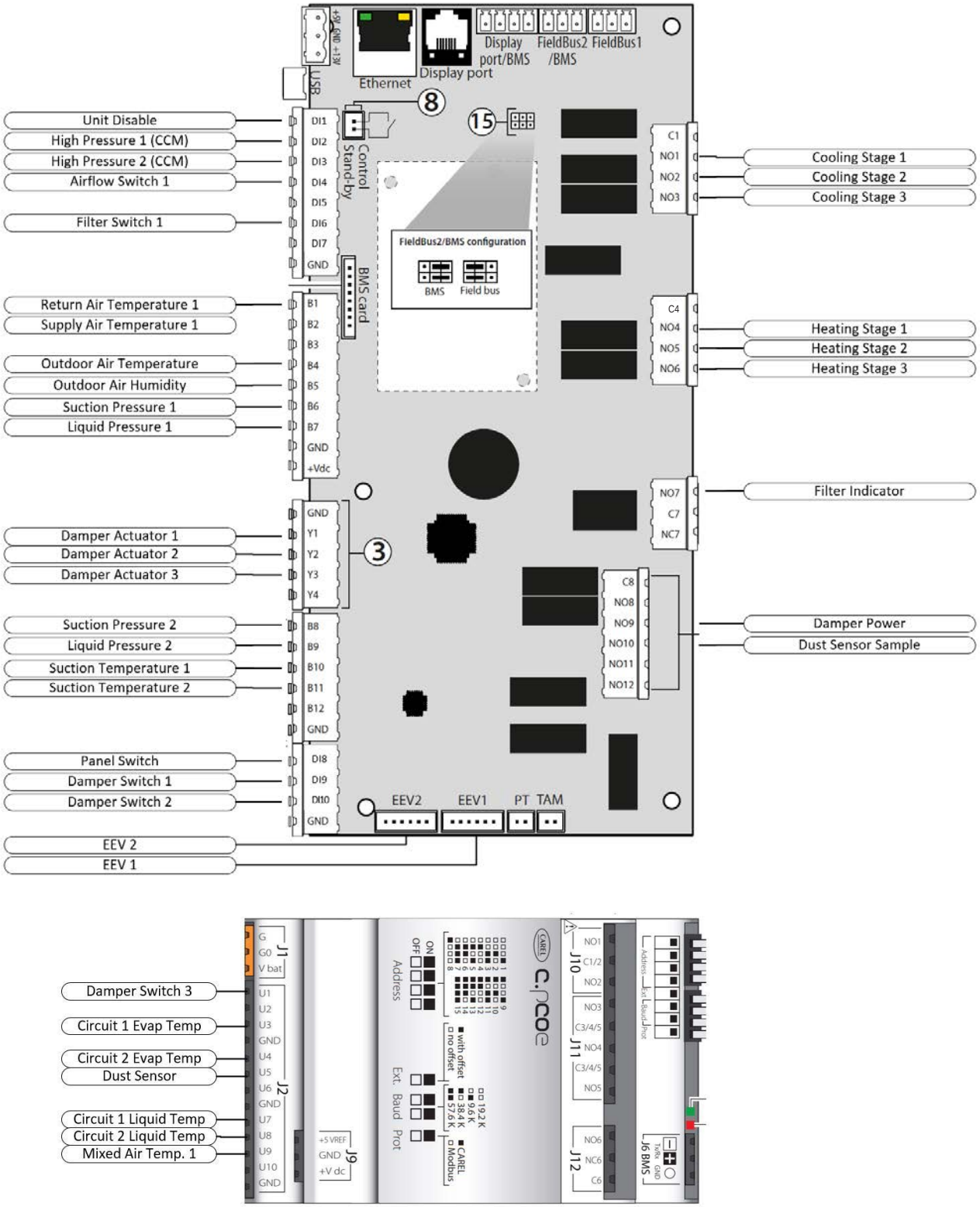
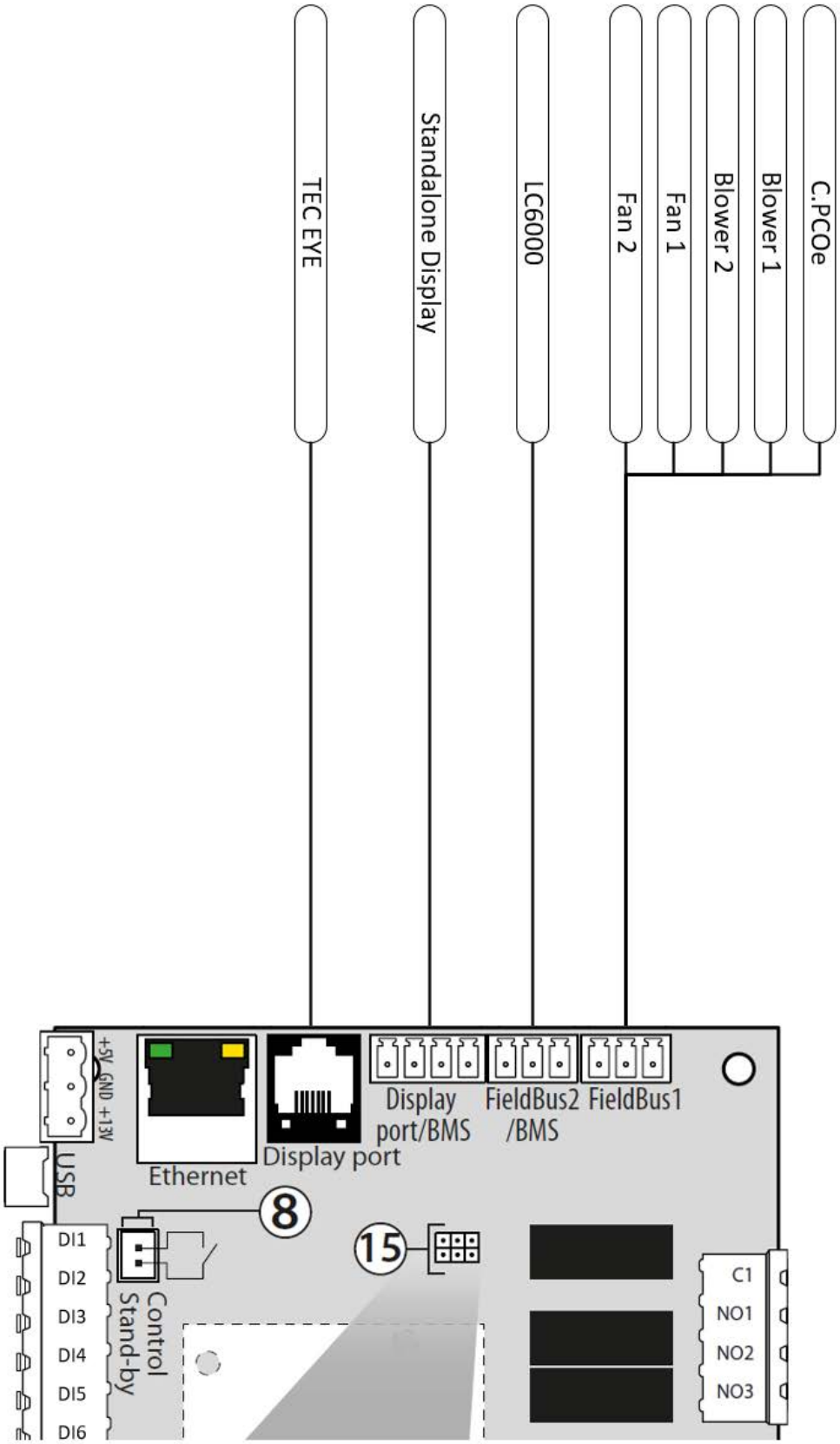


FIGURE 92
I/O Layout



INSTALLATION INSTRUCTIONS

Bard Air Conditioning System

MEGA-TEC®
Wall-Mount
Air Conditioner

LC6000-200
Supervisory
Controller

Bard® SINCE 1914
Climate Control Solutions

Bard Manufacturing Company, Inc.
Bryan, Ohio 43506
www.bardhvac.com

Manual: 2100-705E
Supersedes: 2100-705D
Date: 7-6-21

CONTENTS

FIGURES AND TABLES

Air Conditioning System

This Bard air conditioning system is comprised of MEGA-TEC wall-mounted air conditioners matched with an LC6000 supervisory controller or Bard PGD/PGDx stand-alone display. If only one wall-mounted air conditioner is being used, it can be matched with either the LC6000 supervisory controller or stand-alone controller (see **Single Unit Operation** on page 4 for information on the PGD and PGDx). If more than one wall mount is installed, the LC6000 controller must be matched with the air conditioning units. The wall-mount units are specifically engineered for telecom/motor control center rooms.

NOTE: *The LC6000 supervisory controller or stand-alone display and MEGA-TEC wall-mount units are designed specifically to work together. The controller or stand-alone display cannot run other brands of systems, nor can other controllers run the MEGA-TEC wall-mount units. They are a complete system, and must be used together.*

Controller

LC6000 controller and accessories shown below.

LC6000-200 Series Controller and Accessories Included with Controller

(1) LC6000 Programmable Logic Controller

NOTE: The *2-wire, 18 gauge shielded cable used to communicate between the controller and wall-mount units is not included and must be field supplied.*

(1) TEC-EYE™ Hand-Held Diagnostic Tool
Bard P/N 8301-059

(1) Remote Temperature/Humidity Sensor[1]
Bard P/N 8403-079

(1) 35' 5-Wire 18 Gauge Shielded Cable

(2) Communication EMI Filters
Bard P/N 8301-055

Optional Sensors:

Outside Air
Temperature/Humidity Sensor
Bard P/N 8301-090

Remote
Temperature/Humidity Sensor[1]
Bard P/N 8403-079

Remote
Temperature Only Sensor
Bard P/N 8301-058

[1] One remote temperature/humidity sensor is included with the LC6000 controller. If the site in which the LC6000 controller will be used has more than one zone (maximum three zones), additional remote temperature/humidity sensors (one sensor per zone) will need to be purchased and installed in the additional zones. One additional temperature-only sensor (Bard P/N 8301-058) may also be used in Zone 1 but will also need to be purchased separately. Additional temperature/humidity sensors require field-supplied 5-wire 18 gauge shielded cable. Temperature-only sensors require field-supplied 2-wire 18 gauge shielded cable.

Wall-Mount Air Conditioner Units

MEGA-TEC units operate on VAC power. If equipped with an economizer, the units will supply 100% of rated cooling airflow in free cooling mode with ability to exhaust the same amount through the unit itself without any additional relief openings in the shelter.

MEGA-TEC units are fully charged with refrigerant and are available with optional electric heat and/or electric reheat dehumidification.

NOTE: *575V models take incoming field power and step-down secondary to 460V which supplies most components* ***except*** *compressors and electric heat which remain 575V. Reference wiring diagrams for more information.*

NOTE: *400V models have only two stages of capacity rather than three and are identical in size. Take note of this when reading this manual.*

Single Unit Operation

A PGD or PGDx stand-alone display can be used in place of the LC6000 controller when only one MEGA-TEC wall-mount air conditioner is being installed. If using a PGD or PGDx stand-alone display instead of the LC6000 controller, the alarm logging and remote communication capabilities of the LC6000 controller will not be available. See PGD manual 2100-734 or PGDx manual 2100-740 for information on installing and setting up a stand-alone display for single unit operation.

General

The equipment covered in this manual is to be installed by trained, experienced service and installation technicians.

The refrigerant system is completely assembled and charged. All internal wiring is complete.

The unit is designed for use with or without duct work. Flanges are provided for attaching the supply and return ducts.

These instructions explain the recommended method to install the air cooled self-contained unit and the electrical wiring connections to the unit.

These instructions and any instructions packaged with any separate equipment required to make up the entire air conditioning system should be carefully read before beginning the installation. Note particularly any tags and/or labels attached to the equipment.

While these instructions are intended as a general recommended guide, they do not supersede any national and/or local codes in any way. Authorities having jurisdiction should be consulted before the installation is made. See **Additional Publications** for information on codes and standards.

Sizing of systems for proposed installation should be based on heat loss and heat gain calculations made according to methods of Air Conditioning Contractors of America (ACCA). The supply flange should be installed in accordance with the *Standards of the National Fire Protection Association for the Installation of Air Conditioning and Ventilating Systems of Other Than Residence Type, NFPA No. 90A*, and *Residence Type Warm Air Heating and Air Conditioning Systems, NFPA No. 90B*. Where local regulations are at a variance with instructions, installer should adhere to local codes.

Shipping Damage

Upon receipt of equipment, the cartons should be checked for external signs of shipping damage. If damage is found, the receiving party must contact the last carrier immediately, preferably in writing, requesting inspection by the carrier's agent.

These units must remain in upright position at all times; do not lay on side. Do not stack units.

Additional Publications

These publications can help when installing the air conditioner. They can usually be found at the local library or purchased directly from the publisher. Be sure to consult the current edition of each standard.

National Electrical Code.....ANSI/NFPA 70

Standard for the Installation of Air Conditioning and Ventilating Systems .....ANSI/NFPA 90A

Standard for Warm Air Heating and Air Conditioning Systems .....ANSI/NFPA 90B

Load Calculation for Residential Winter and Summer Air Conditioning..... ACCA Manual J

For more information, contact these publishers:

Air Conditioning Contractors of America (ACCA)
1712 New Hampshire Ave. N.W.
Washington, DC 20009
Telephone: (202) 483-9370 Fax: (202) 234-4721

American National Standards Institute (ANSI)
11 West Street, 13th Floor
New York, NY 10036
Telephone: (212) 642-4900 Fax: (212) 302-1286

American Society of Heating, Refrigeration and Air Conditioning Engineers, Inc. (ASHRAE)
1791 Tullie Circle, N.E.
Atlanta, GA 30329-2305
Telephone: (404) 636-8400 Fax: (404) 321-5478

National Fire Protection Association (NFPA)
Batterymarch Park
P. O. Box 9101
Quincy, MA 02269-9901
Telephone: (800) 344-3555 Fax: (617) 984-7057

ANSI Z535.5 Definitions:

DANGER: Indicate[s] a hazardous situation which, if not avoided, will result in death or serious injury. The signal word "DANGER" is to be limited to the most extreme situations. DANGER [signs] should not be used for property damage hazards unless personal injury risk appropriate to these levels is also involved.

WARNING: Indicate[s] a hazardous situation which, if not avoided, could result in death or serious injury. WARNING [signs] should not be used for property damage hazards unless personal injury risk appropriate to this level is also involved.

CAUTION: Indicate[s] a hazardous situation which, if not avoided, could result in minor or moderate injury. CAUTION [signs] without a safety alert symbol may be used to alert against unsafe practices that can result in property damage only.

NOTICE: [this header is] preferred to address practices not related to personal injury. The safety alert symbol shall not be used with this signal word. As an alternative to "NOTICE" the word "CAUTION" without the safety alert symbol may be used to indicate a message not related to personal injury.

⚠ WARNING

Electrical shock hazard.

Have a properly trained individual perform these tasks.

Failure to do so could result in electric shock or death.

⚠ WARNING

Fire hazard.

Maintain minimum 1/4" clearance between the supply air duct and combustible materials in the first 3' of ducting.

Failure to do so could result in fire causing damage, injury or death.

⚠ WARNING

Heavy item hazard.

Use more than one person to handle unit.

Failure to do so could result in unit damage or serious injury.

⚠ CAUTION

Cut hazard.

Wear gloves to avoid contact with sharp edges.

Failure to do so could result in personal injury.

IMPORTANT

When connecting this product from a remote location, ensure that the network connection is secure and reliable.

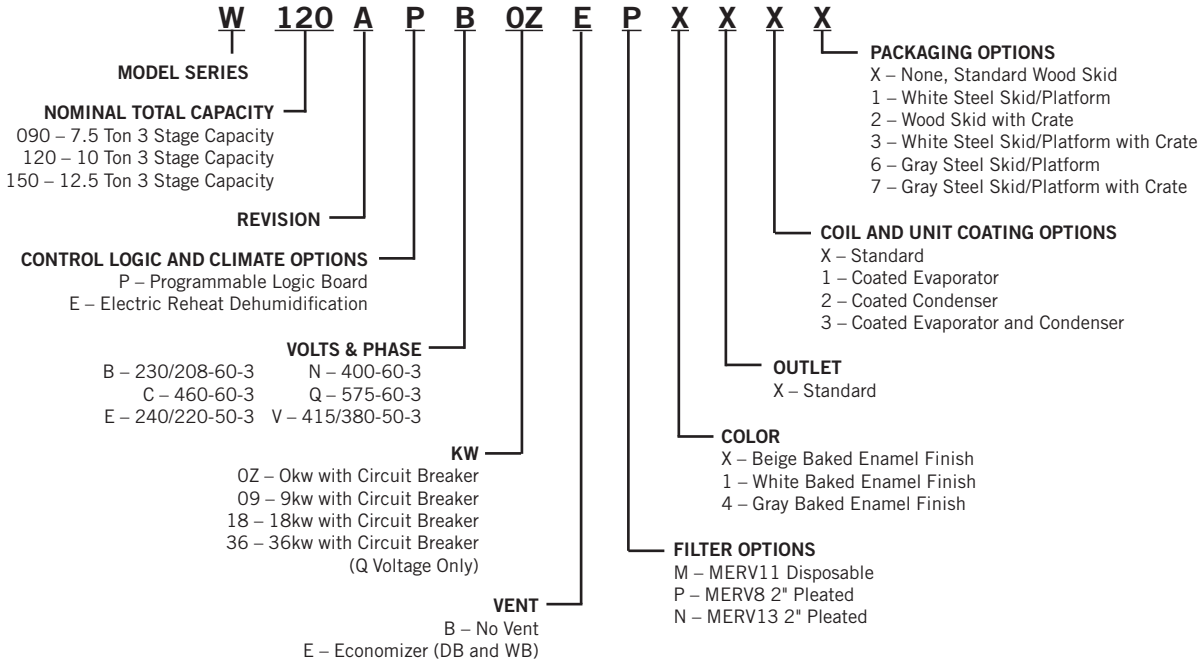
LIST OF NECESSARY MATERIALS/TOOLS

Additional hardware and miscellaneous supplies are needed for installation. These items are field supplied and must be sourced before installation. This list also includes tools needed for installation.

List of Materials/Tools

- Personal protective equipment/safety devices/ anti-static wrist straps
- SG-10W supply grille and RG-10W return grille
- Field-fabricated sleeves (if necessary)
- Fasteners sufficient for mounting the units such as 5/16" diameter anchor/lag bolts
- 7/8" diameter washers
- Fasteners appropriate for the shelter wall construction to attach the controller to the wall
- Commercial grade outdoor silicone sealant
- Miscellaneous hand and power tools and jobsite or shop materials
- Lifting equipment with the necessary capacity and rigging to safely move/install the systems. The unit is supplied with lifting lug plates on each side at top of unit. Remount in upright position for use (see page 9).
- Electrical supplies
  - Various size circuit breakers for the shelter AC breaker box (see Tables 2A or 2B on pages 15 or 16)
  - High-voltage wire of various gauges (see Tables 2A or 2B)
  - 16 gauge minimum, 14 gauge maximum power wire to connect controller to shelter power source
  - 5-wire, 18 gauge shielded cable for remote temperature and humidity sensors (2-wire, 18 gauge shielded cable for temperature-only sensors)
  - Communication wire: 2-wire, 18 gauge, shielded with drain
  - 18 gauge non-shielded wire for connecting emergency off, emergency vent and/or generator relays, if applicable, to controller
  - CAT 6 Ethernet cable of field-determined length (for remote communication, if applicable)
  - 2 hole grounding lug (to be used with supplied 1/4" bolts and nuts for grounding controller box)
  - Miscellaneous electrical supplies including rigid/ flexible conduit and fittings, 2" x 4" junction boxes (one per temperature/humidity sensor), wire connectors and supports

FIGURE 1
MEGA-TEC Wall-Mount Unit Model Nomenclature



Model Identification

Identify the specific model using the model nomenclature information found in Figure 1 and the model/serial tag found on the unit. See Figure 3 on page 8 for dimensions and critical installation requirements.

New Shelter Installation vs. Retrofit Installation

These installation instructions cover both new shelter installations and retrofit installations. Each installation is unique and may require special accommodations and modifications. Although Bard Manufacturing follows a long-established tradition of manufacturing equipment using industry standard dimensions for building penetration, it is occasionally necessary to move or enlarge supply and return openings when replacing non-standardized equipment in a retrofit application.

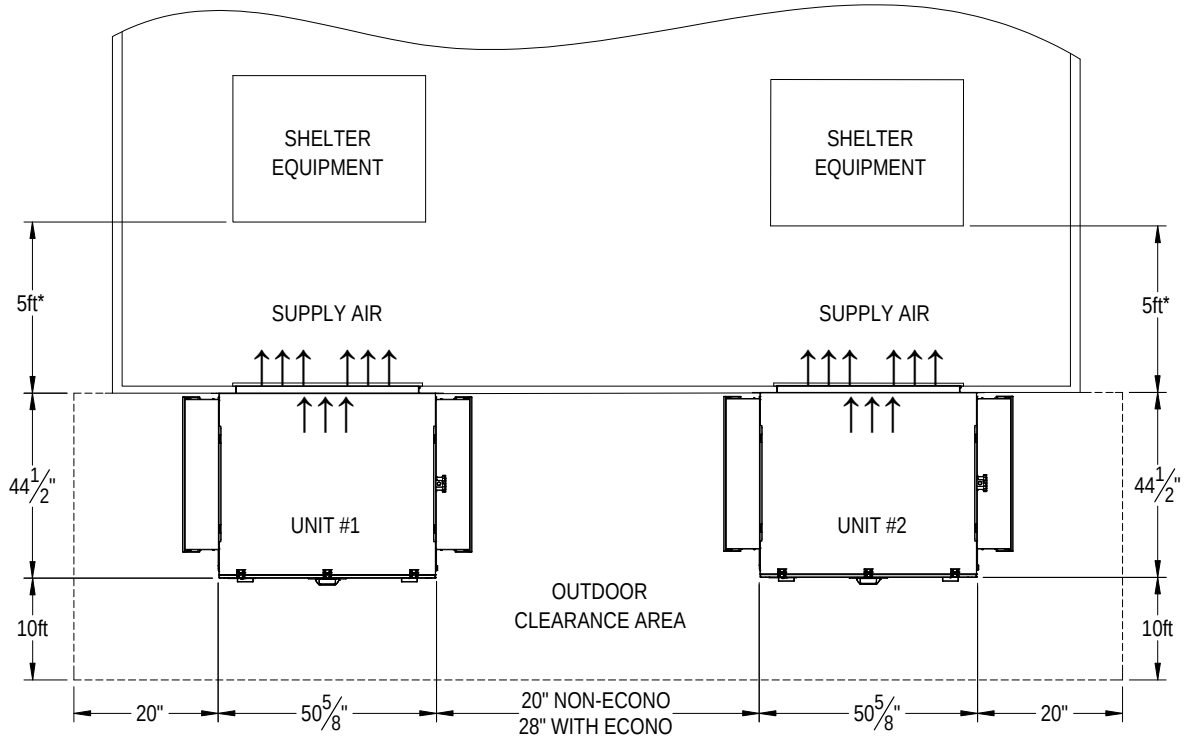
Minimum Clearance

To maintain full service access and adequate condenser airflow, side-by-side installations require 28" of clearance between units for access to the economizer (20" of clearance between units without economizers) and proper airflow of the outdoor coil (see Figure 2). Additional clearance may be required to meet local or national codes.

Care should be taken to ensure that the recirculation and obstruction of condenser discharge air does not occur. Recirculation of condenser discharge air can be from either a single unit or multiple units. Any object such as shrubbery, a building or a large object can cause obstructions to the condenser discharge air. Recirculation or reduced airflow caused by obstructions will result in reduced capacity, possible unit pressure safety lockouts and reduced unit service life.

For units with blow through condensers, such as these wall-mount units, it is recommended there be a minimum distance of 10' between the front of the unit and any barrier or 20' between the fronts of two opposing (facing) units.

FIGURE 2
Clearance Required for Service Access and Adequate Condenser Airflow



* Recommended distance between return air opening and equipment in room. Supply airstream must be able to provide adequate air circulation throughout the room.

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All national, state and local codes must be observed and followed during installation.

Clearance to Combustibles

The supply air duct flange and the first 3' of supply air duct require a minimum of 1/4" clearance to combustible material. See Figure 5 on page 10 for details on opening sizes.

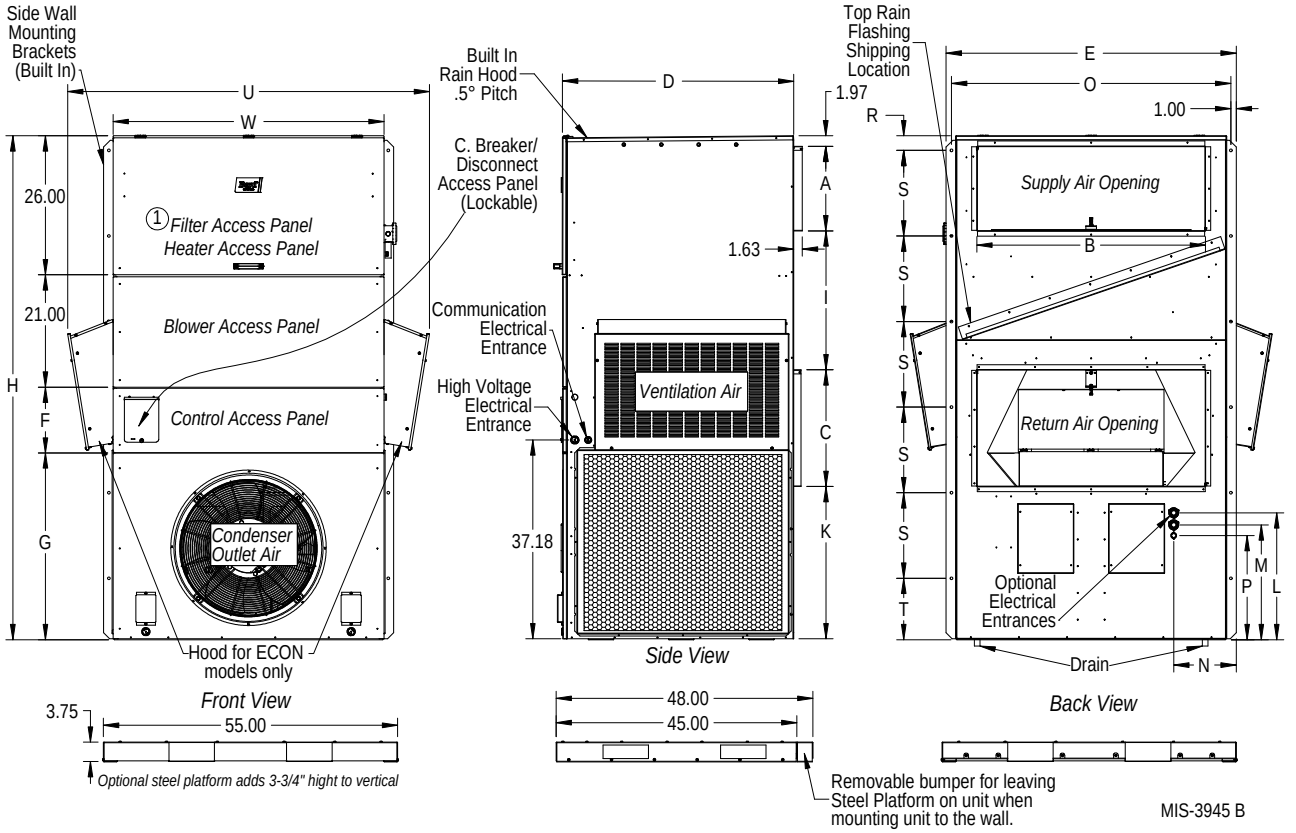
TABLE 1
Minimum Clearances Required to Combustible Materials

Model	Supply Air Duct (1st 3')	Cabinet
All Models	1/4"	0"

FIGURE 3
Unit Dimensions

Model	Width (W)	Depth (D)	Height (H)	Supply		Return																
				A	B	C	B	E	F	G	I	K	L	M	N	O	P	R	S	T	U	
All Models	50.64	43.19	94.22	15.81	42.67	21.82	42.74	54.24	12.27	34.95	25.98	28.65	23.73	21.48	11.68	52.24	19.48	2.73	16.00	11.49	67.65	

All dimensions are in inches. Dimensional drawings are not to scale.



Mounting the Units

⚠ WARNING

Unit falling hazard.

Use only sufficiently rated mechanical lifting means with proper rigging to raise the unit for mounting.

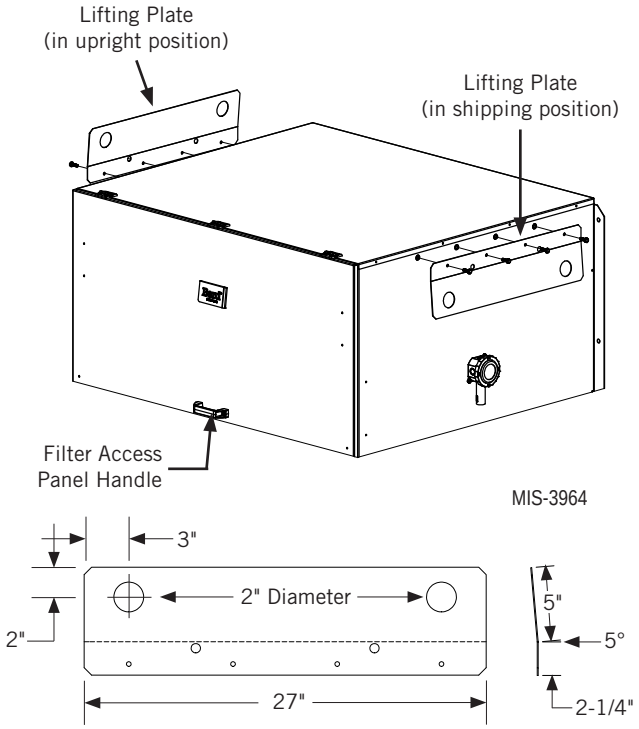
Failure to follow this warning could result in injury or death.

NOTE: *It may be best to spot some electrical knockouts (such as those located on the side and rear of the wall-mount unit) before units are mounted and access is unavailable or limited (see Figure 3 to locate pre-punched knockouts).*

Heavy duty lifting lug plates are installed on each side of the unit to allow the unit to be lifted and installed on a structure. The plates must be removed and re-installed in upright position (see Figure 4) for use and can be removed after installation.

The filter access panel handle is shipped with the unit. Attach handle to front of filter access panel using the screws included with the handle as shown in Figure 4.

FIGURE 4
Lifting Lug Plates



Two holes for the supply and return air openings must be cut through the wall as shown in Figure 5 on page 10. On wood frame walls, the wall construction must be strong and rigid enough to carry the weight of the unit without transmitting any unit vibration. All walls must be thoroughly inspected to ensure that they are capable of carrying the weight of the installed unit.

In retrofit (unit replacement) installations, the openings cut for the original equipment may not line up exactly with needs of this installation. Modifications may need to be made, such as increasing or decreasing the size of the wall cutouts. The existing bolt placement may not line up in which case the original bolts would need to be removed or cut away.

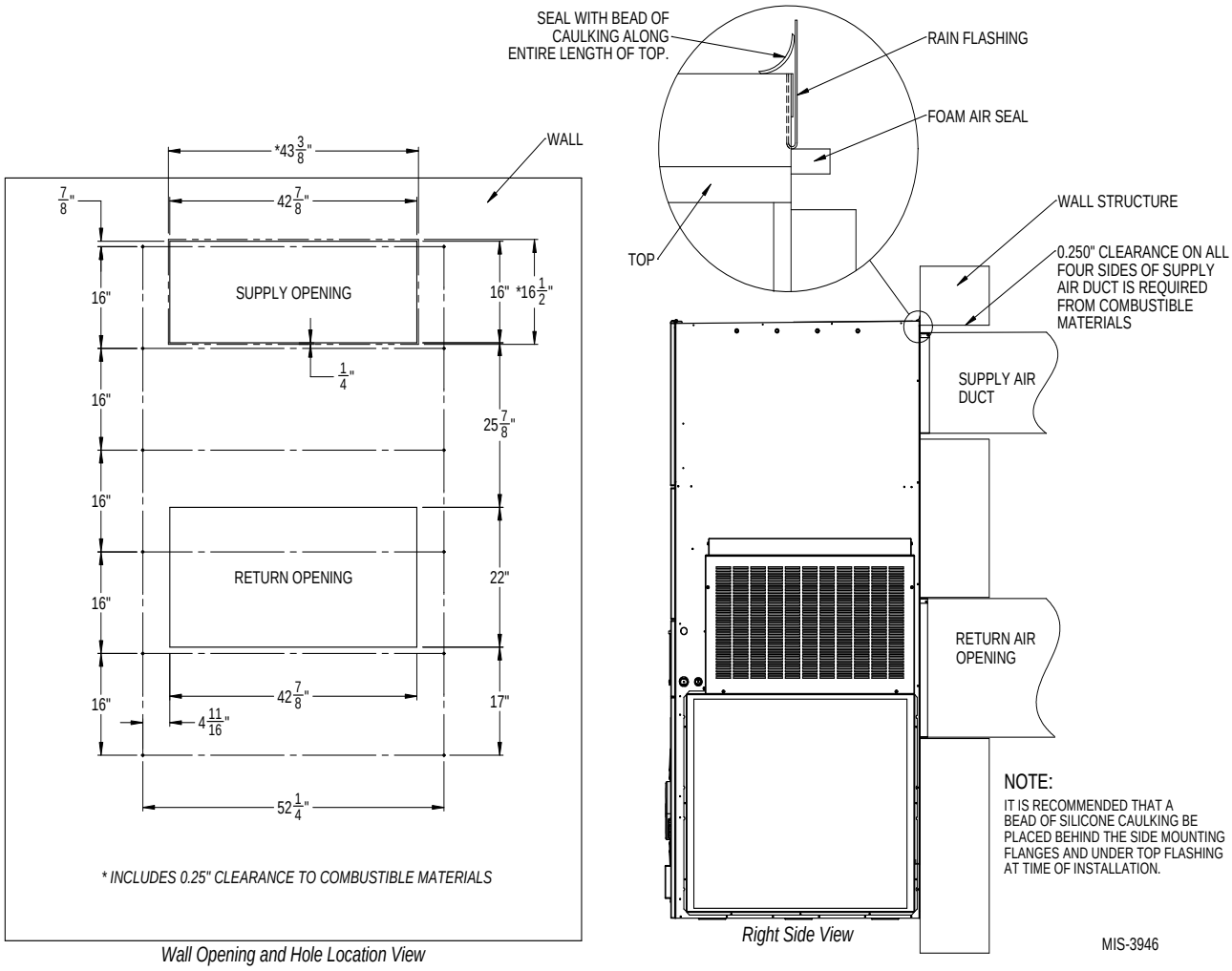
1. These units are secured by full-length mounting flanges built into the cabinet on each side which secure the unit to the outside wall surface.
2. The unit itself is suitable for 0" clearance, but the supply air duct flange and the first 3' of supply air duct require a minimum of 1/4" clearance to combustible material. See Figure 5 for details on opening sizes.
3. Locate and mark lag bolt locations and location for optional bottom mounting bracket, if desired (see Figure 5).
4. If desired, hook top rain flashing (attached to front-right of supply flange for shipping) under back bend of top.
5. Position unit in opening and secure with fasteners sufficient for the application such as 5/16" lag/anchor/carriage bolts; use 7/8" diameter flat washers on the lag bolts. It is recommended that a bead of silicone caulking be placed behind the side mounting flanges.

   NOTE: *For economizer models, mount hoods after unit is installed so as to not block unit flange holes.*
6. Secure optional rain flashing to wall and caulk across entire length of top (see Figure 5).
7. For additional mounting rigidity, the return air and supply air frames or collars can be drilled and screwed or welded to the structural wall itself (depending upon wall construction). Be sure to observe required clearance if combustible wall.
8. A plastic drain hose extends from each drain pan at the top of the unit down to the unit base. There are openings in the unit base for the drain hoses to pass through.

   NOTE: *Ensure hose doesn't kink inside of unit when pulling hose through holes in base. This could prevent proper drainage.*

Additional openings exist in the condenser fan panel section for front drainage. In the event the drain hose is connected to a drain system of some type, it must be an open or vented type system to assure proper drainage.

FIGURE 5
Mounting Instructions



Wall Opening and Hole Location View

Right Side View

FIGURE 6
Electric Heat Clearance

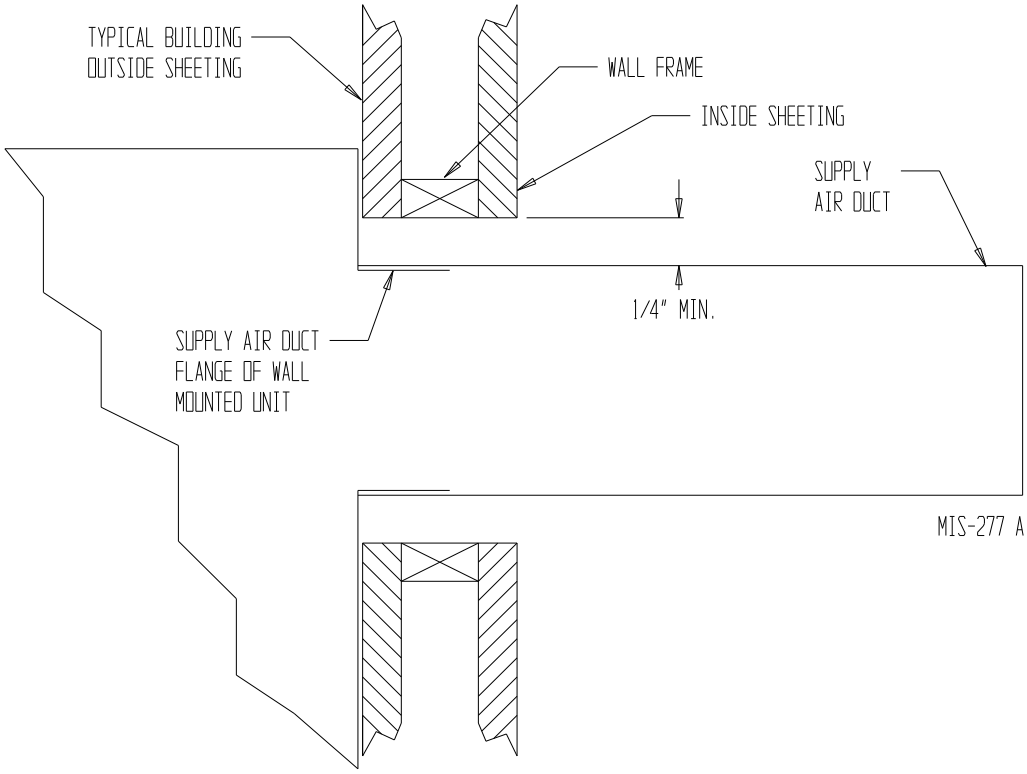
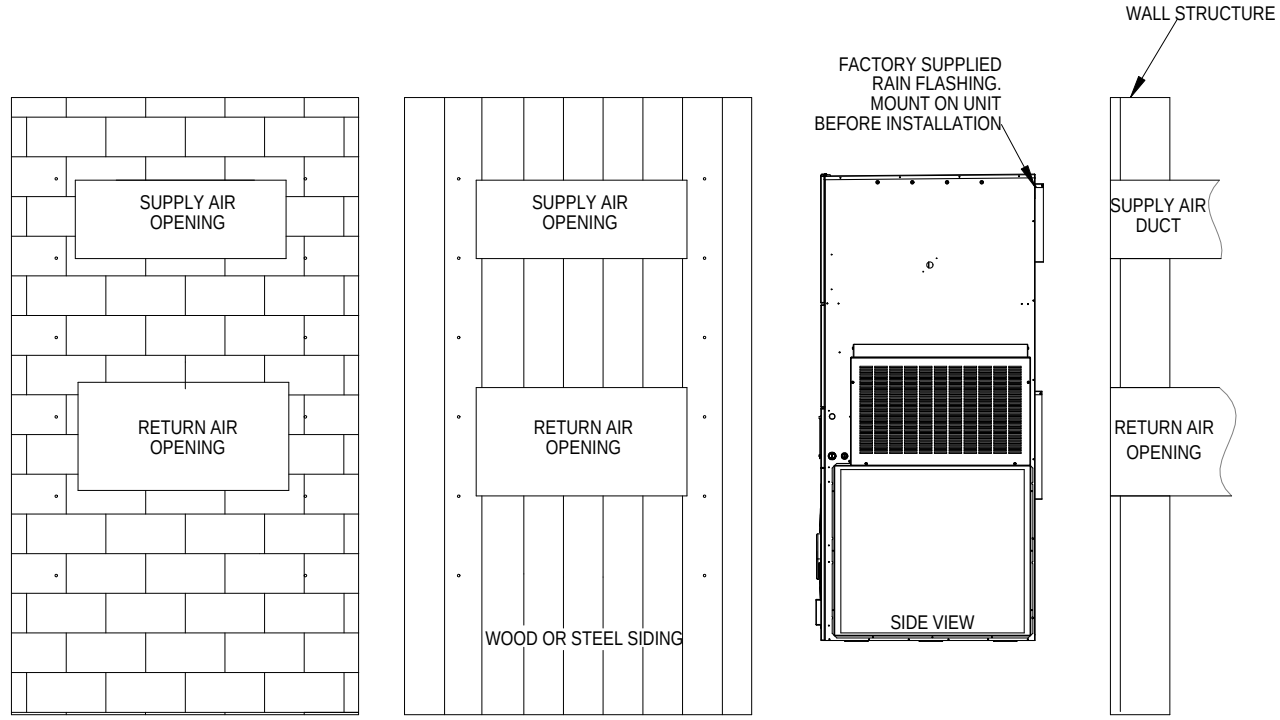


FIGURE 7
Wall Mounting Instructions



CONCRETE BLOCK WALL INSTALLATION *WOOD FRAME WALL INSTALLATION*

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FIGURE 8
Wall Mounting Instructions

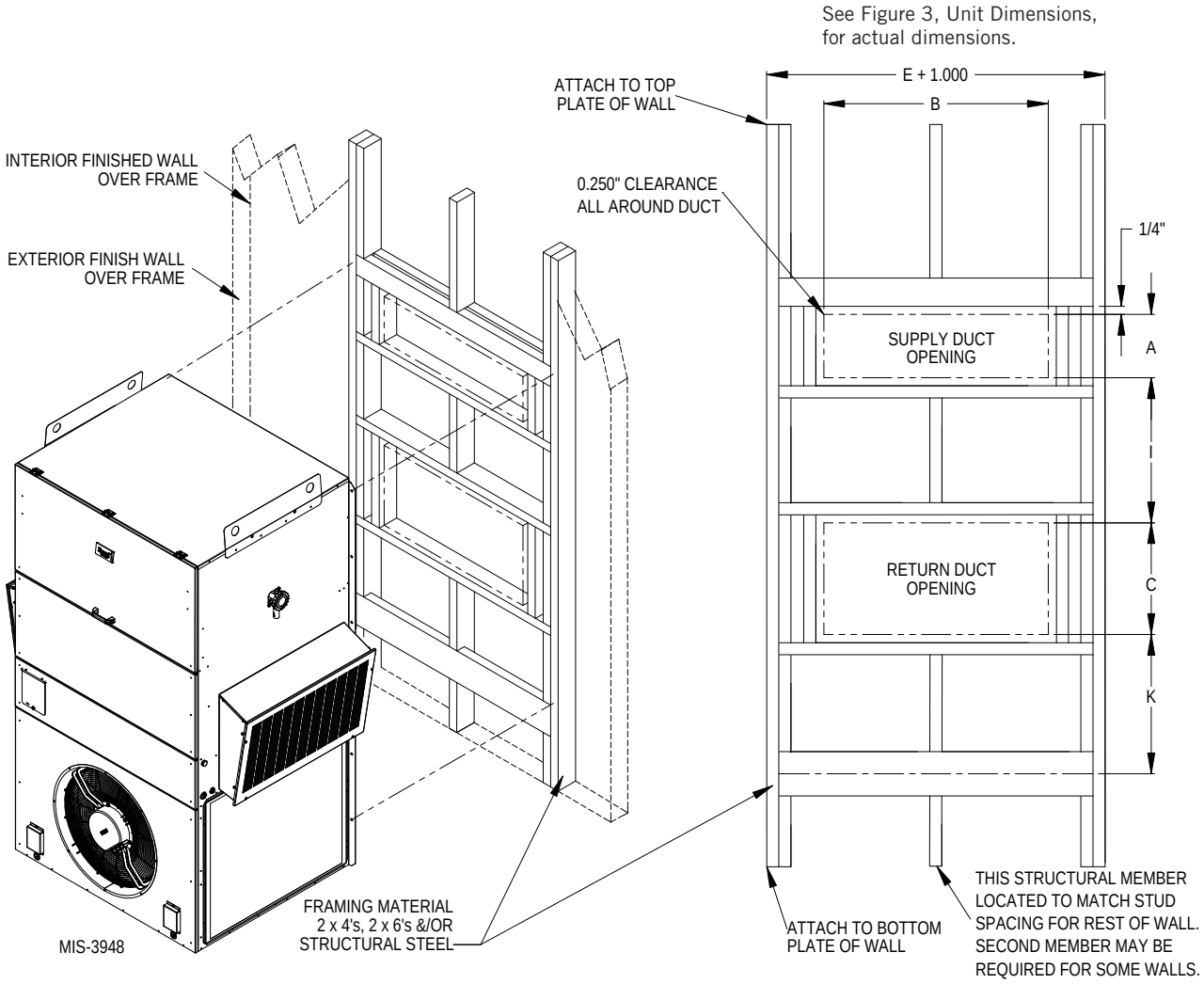
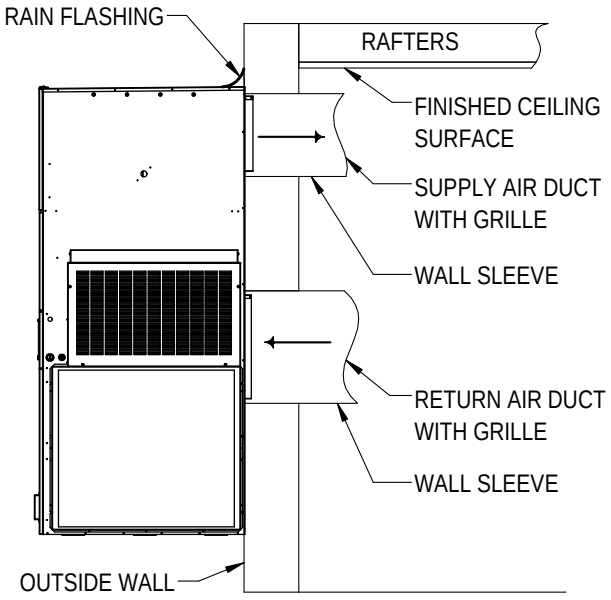
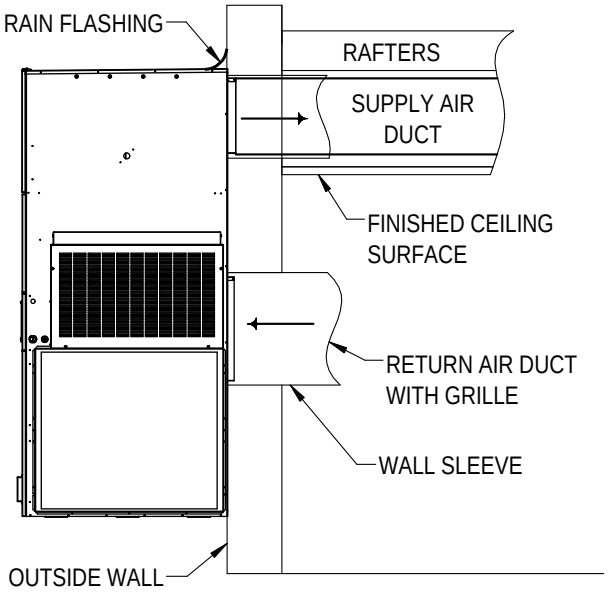


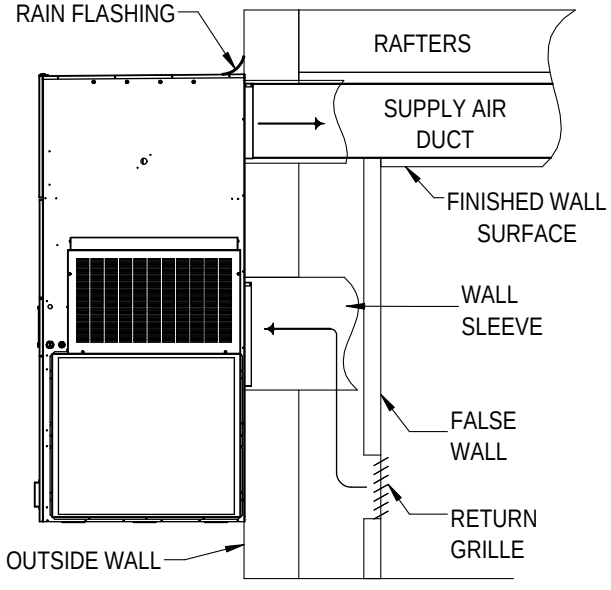
FIGURE 9
Common Wall Mounting Installations



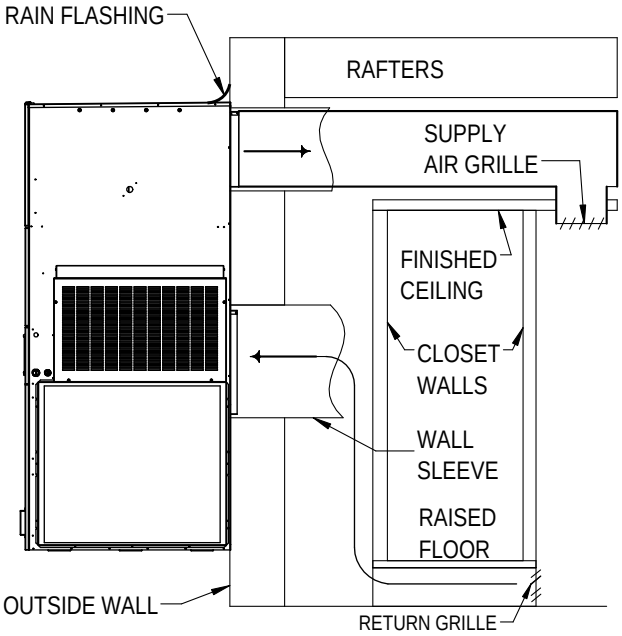
FREE AIR-FLOW
NO DUCT



DUCTED SUPPLY
RETURN AT UNIT



FALSE WALL INSTALLATION



CLOSET INSTALLATION

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⚠ WARNING

Electrical shock hazard.

Have a properly trained individual perform these tasks.

Failure to do so could result in electric shock or death.

Main Power Wiring

Refer to the unit rating plate or Tables 2A or 2B for wire sizing information and maximum fuse or circuit breaker size. Each outdoor unit is marked with a "Minimum Circuit Ampacity". The field wiring used must be sized to carry that amount of current. Depending on the installed KW of electric heat, there may be two field power circuits required. If this is the case, the unit rating plate will so indicate. All models are suitable only for connection with copper wire. Each unit and/or wiring diagram will be marked "Use Copper Conductors Only". These instructions ***must be*** adhered to. Refer to the National Electrical Code (NEC) for complete current carrying capacity data on the various insulation grades of wiring material. All wiring must conform to NEC and all local codes.

The unit rating plate and Tables 2A and 2B list fuse and wire sizes (75°C copper) for all models including the most commonly used heater sizes. Also shown are the number of field power circuits required for the various models with heaters.

The unit rating plate lists a maximum circuit breaker or fuse that is to be used with the equipment. The correct size must be used for proper circuit protection and also to assure that there will be no nuisance tripping due to the momentary high starting current of the compressor motor.

The main unit circuit breaker disconnect access is located on the front panel of the unit.

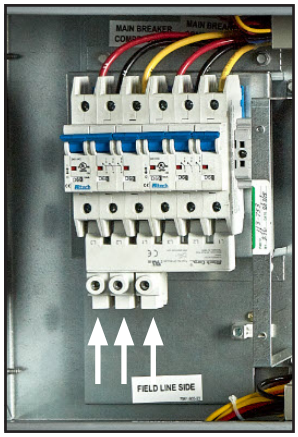
Route all field power wires in channel under the control panel. See Figure 10 to reference VAC landing points.

Route wires into unit through recommended side entrances (see Figure 11 on page 17). Optional rear entry points are also available (see Figure 12 on page 17).

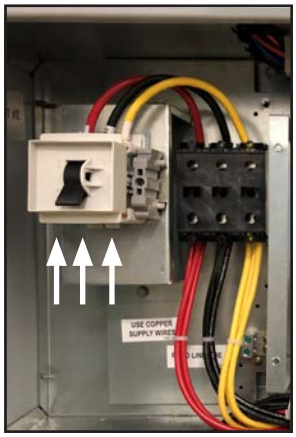
NOTE: *Field wires enter at bottom for line side connection.*

When running wires to unit from shelter, be careful to not place wiring and conduit where it will interfere with opening filter access doors.

FIGURE 10
VAC Supply Wiring Landing Points



230/208V



460V

Unit Control Voltage Wiring

NOTE: *The voltage should be measured at the field power connection point in the unit and while the unit is operating at full load (maximum amperage operating condition.*

230/208V Wiring

230/208V 3 phase equipment use dual primary voltage transformers. All equipment leaves the factory wired on 240V tap. **It is very important that the correct voltage tap is used.** For 208V operation, reconnect from 240V to 208V tap. The acceptable operating voltage range for the 240 and 208V taps are: 240V tap (253 – 216) and 208 tap (220 – 197).

460V Wiring

460V 3 phase equipment use triple primary voltage transformers. All equipment leaves the factory wired on 480V tap. **It is very important that the correct voltage tap is used.** The acceptable operating voltage range for the 480V, 415V and 380V taps are: 480V tap (429 and above), 415 Tap (395 – 428) and 380 tap (below 395). For 400V N models, use the 415V tap.

NOTE: *575V models take incoming field power and step-down secondary to 460V which supplies most components **except** compressors and electric heat which remain 575V. Reference wiring diagrams for more information.*

For communication wiring, a 2-wire, 18 gauge color-coded shielded cable with drain is recommended.

TABLE 2A
Electrical Specifications – W***AP Series

Model	Rated Volts & Phase	No. Field Power Circuits	Single Circuit				Dual Circuit							
			① Minimum Circuit Ampacity	② Maximum External Fuse or Ckt. Brkr.	③ Field Power Wire Size	③ Ground Wire	① Minimum Circuit Ampacity		② Maximum External Fuse or Ckt. Breaker		③ Field Power Wire Size		③ Ground Wire Size	
							Ckt. A	Ckt. B	Ckt. A	Ckt. B	Ckt. A	Ckt. B	Ckt. A	Ckt. B
W090APB0Z	230/208-60-3	1	46	60	8	10								
B09		1	46	60	8	10								
B18		1	59	60	6	10								
W090APC0Z	460-60-3	1	21	30	10	10								
C09		1	21	30	10	10								
C18		1	30	35	8	10								
W090APE0Z	220/200-50-3	1	46	60	8	10								
E09		1	46	60	8	10								
E18		1	59	60	6	10								
W090APQ0Z	575-60-3	1	19	25	10	10								
Q09		1	19	25	10	10								
Q18		1	25	30	10	10								
Q36		1	55	60	6	10								
W090APV0Z	415-50-3	1	23	35	8	10								
V07		1	23	35	8	10								
V14		1	29	40	8	10								
W120APB0Z	230/208-60-3	1 or 2	56	70	6	8	32	25	40	40	8	8	10	10
B09		1 or 2	56	70	6	8	32	28	40	40	8	8	10	10
B18		1 or 2	59	70	6	8	32	28	40	40	8	8	10	10
W120APC0Z	460-60-3	1	27	40	8	10								
C09		1	27	40	8	10								
C18		1	30	40	8	10								
W120APE0Z	220/200-50-3	1 or 2	55	70	6	8	32	25	40	40	8	8	10	10
E09		1 or 2	55	70	6	8	32	25	40	40	8	8	10	10
E18		1 or 2	59	70	6	8	32	28	40	40	8	8	10	10
W120APN0Z	400-60-3	1	32	40	6	8								
N09		1	32	40	6	8								
N18		1	32	40	6	8								
W120APQ0Z	575-60-3	1	24	35	8	10								
Q09		1	24	35	8	10								
Q18		1	27	35	8	10								
Q36		1	57	60	6	10								
W120APV0Z	415-50-3	1	27	40	8	10								
V07		1	27	40	8	10								
V14		1	30	40	8	10								
W150APB0Z	230/208-60-3	1 or 2	67	80	4	8	39	34	50	40	8	8	10	10
B09		1 or 2	67	80	4	8	39	34	50	40	8	8	10	10
B18		1 or 2	67	80	4	8	39	37	50	40	8	8	10	10
W150APC0Z	460-60-3	1	32	40	8	10								
C09		1	32	40	8	10								
C18		1	32	40	8	10								
W150APE0Z	220/200-50-3	1 or 2	67	80	4	8	39	29	40	40	8	8	10	10
E09		1 or 2	67	80	4	8	39	29	50	40	8	8	10	10
E18		1 or 2	67	80	4	8	39	29	50	40	8	8	10	10
W150APN0Z	400-60-3	1	34	40	8	10								
N09		1	34	40	8	10								
N18		1	34	40	8	10								
W150APQ0Z	575-60-3	1	24	35	8	10								
Q09		1	24	35	8	10								
Q18		1	30	40	8	10								
Q36		1	58	60	6	10								
W150APV0Z	415-50-3	1	32	40	8	10								
V07		1	32	40	8	10								
V14		1	32	40	8	10								

① These "Minimum Circuit Ampacity" values are to be used for sizing the field power conductors. Refer to the National Electrical code (latest version), Article 310 for power conductor sizing. ***CAUTION:*** *When more than one field power circuit is run through one conduit, the conductors must be derated. Pay special attention to note 8 of Table 310 regarding Ampacity Adjustment Factors when more than three (3) current carrying conductors are in a raceway.*

② Maximum size of the time delay fuse or circuit breaker for protection of field wiring conductors.

③ Based on 75°copper wire. All wiring must conform to the National Electrical Code and all local codes.

NOTE: *The Maximum Overcurrent Protection (MOCP) value listed is the maximum value as per UL 1995 calculations for MOCP (branch-circuit conductor sizes in this chart are based on this MOCP). The actual factory-installed overcurrent protective device (circuit breaker) in this model may be lower than the maximum UL 1995 allowable MOCP value, but still above the UL 1995 minimum calculated value or Minimum Circuit Ampacity (MCA) listed.*

IMPORTANT: *While this electrical data is presented as a guide, it is important to electrically connect properly sized fuses and conductor wires in accordance with the National Electrical Code and all local codes.*

TABLE 2B
Electrical Specifications – W***AE Series

Model	Rated Volts & Phase	No. Field Power Circuits	Single Circuit				Dual Circuit							
			① Minimum Circuit Ampacity	② Maximum External Fuse or Ckt. Brkr.	③ Field Power Wire Size	③ Ground Wire	① Minimum Circuit Ampacity		② Maximum External Fuse or Ckt. Breaker		③ Field Power Wire Size		③ Ground Wire Size	
							Ckt. A	Ckt. B	Ckt. A	Ckt. B	Ckt. A	Ckt. B	Ckt. A	Ckt. B
W090AEB18	230/208-60-3	1 or 2	100	100	3	8	56	46	60	50	6	8	10	10
W090AEC18	460-60-3	1	53	60	6	10								
W090AEE18	220/200-50-3	1 or 2	100	100	3	8	56	46	60	50	6	8	10	10
W090AEQ18	575-60-3	1	43	45	8	10								
W090AEV14	415-50-3	1	53	60	6	10								
W120AEB18	230/208-60-3	1 or 2	110	120	2	6	59	52	60	60	6	6	10	10
W120AEC18	460-60-3	1	54	60	6	10								
W120AEE18	220/200-50-3	1 or 2	110	120	2	6	59	51	60	60	6	6	10	10
W120AEN18	400-60-3	1	45	50	8	10								
W120AEQ18	575-60-3	1	43	45	8	10								
W120AEV14	415-50-3	1	53	60	6	10								
W150AEB18	230/208-60-3	1 or 2	120	120	1	6	59	55	60	60	6	6	10	10
W150AEC18	460-60-3	1	54	60	6	10								
W150AEE18	220/200-50-3	1 or 2	113	120	2	6	51	59	60	60	6	6	10	10
W150AEN18	400-60-3	1	54	60	6	10								
W150AEQ18	575-60-3	1	43	45	8	10								
W150AEV14	415-50-3	1	53	60	6	10								

① These "Minimum Circuit Ampacity" values are to be used for sizing the field power conductors. Refer to the National Electrical code (latest version), Article 310 for power conductor sizing. ***CAUTION:*** *When more than one field power circuit is run through one conduit, the conductors must be derated. Pay special attention to note 8 of Table 310 regarding Ampacity Adjustment Factors when more than three (3) current carrying conductors are in a raceway.*

② Maximum size of the time delay fuse or circuit breaker for protection of field wiring conductors.

③ Based on 75°copper wire. All wiring must conform to the National Electrical Code and all local codes.

NOTE: *The Maximum Overcurrent Protection (MOCP) value listed is the maximum value as per UL 1995 calculations for MOCP (branch-circuit conductor sizes in this chart are based on this MOCP). The actual factory-installed overcurrent protective device (circuit breaker) in this model may be lower than the maximum UL 1995 allowable MOCP value, but still above the UL 1995 minimum calculated value or Minimum Circuit Ampacity (MCA) listed.*

IMPORTANT: *While this electrical data is presented as a guide, it is important to electrically connect properly sized fuses and conductor wires in accordance with the National Electrical Code and all local codes.*

FIGURE 11
Side Communication and Power Wire Entrances (Recommended)

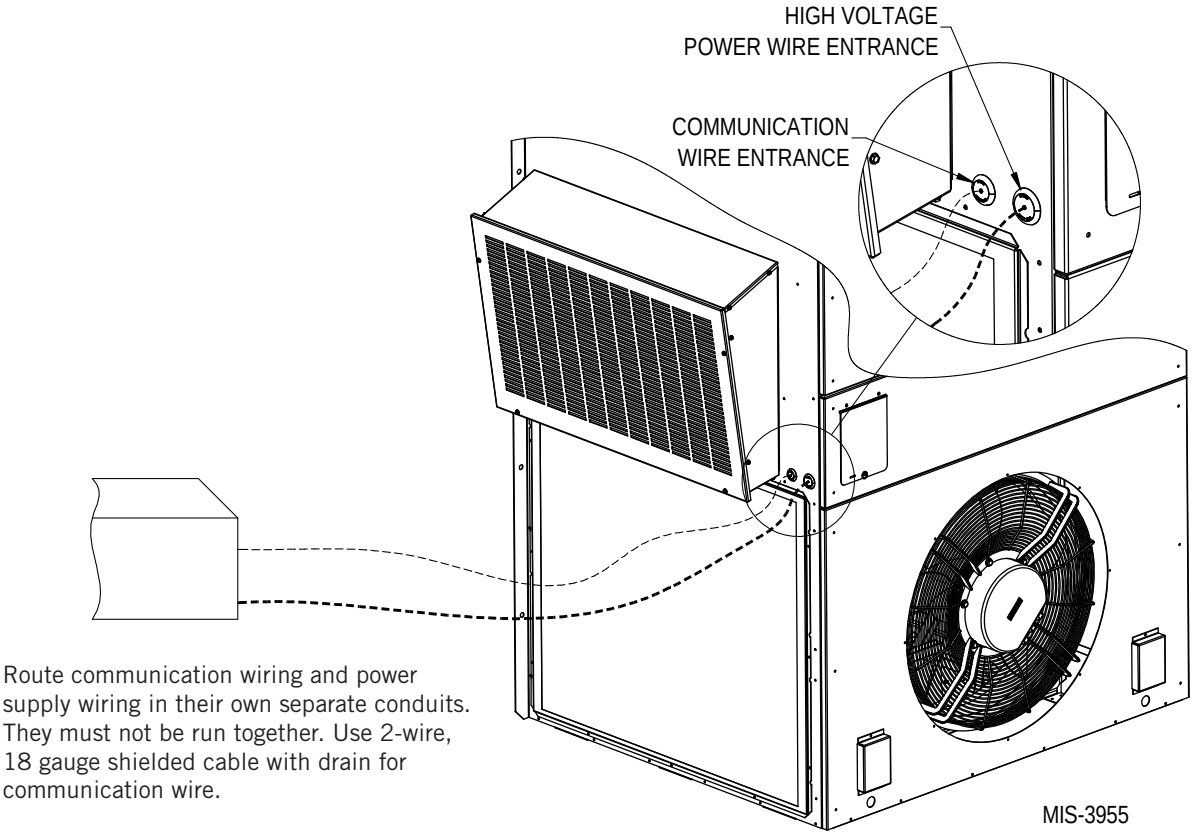
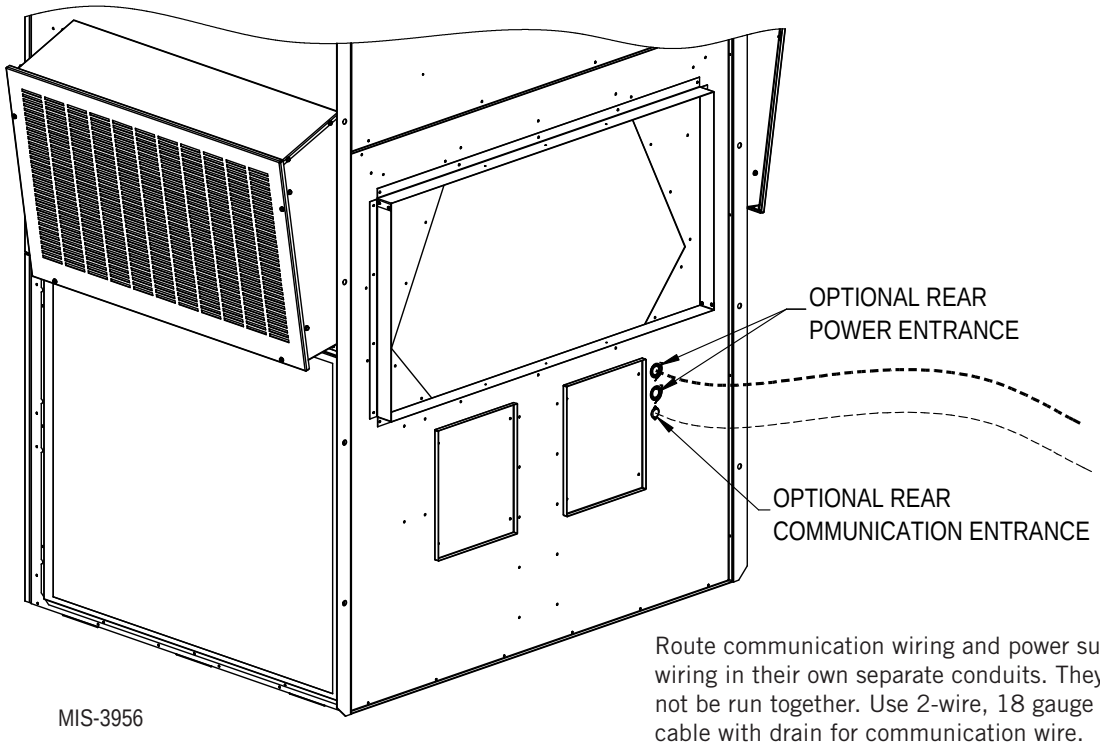


FIGURE 12
Rear Communication and Power Wire Entrances (Optional)



Route communication wiring and power supply wiring in their own separate conduits. They must not be run together. Use 2-wire, 18 gauge shielded cable with drain for communication wire.

Crankcase Heater Start Up

All units covered in this manual are provided with compressor crankcase heat.

This crankcase heater is a band-type heater located around the bottom of the compressor. This heater is controlled by the crankcase heater relay. The heater is only energized when the compressor is not running.

Crankcase heat is essential to prevent liquid refrigerant from migrating to the compressor, preventing oil pump out on compressor start up and possible bearing or scroll vane failure due to compressing a liquid.

IMPORTANT: *The following procedure must be followed at initial start-up and at any time power has been removed for 12 hours or longer.*

To prevent compressor damage which may result from the presence of liquid refrigerant in the compressor crankcase:

1. Make certain the room thermostat is in the "off" position (the compressor is not to operate).
2. Apply power by closing the system disconnect switch. This energizes the compressor heater which evaporates the liquid refrigerant in the crankcase.
3. Allow 4 hours or 60 minutes per pound of refrigerant in the system as noted on the unit rating plate, whichever is greater.
4. After properly elapsed time, the thermostat may be set to operate the compressor.
5. **Do not open system disconnect switch except as required for safety while servicing**.

Running in Orphan Mode

With the AC breakers turned on, each MEGA-TEC wall-mount unit has the capability to run without the LC6000 controller connected—this feature is called orphan mode. This keeps the shelter between 60°F and 77°F (factory default settings) by the use of the factory-installed return air sensor in each wall-mount unit. In orphan mode, the wall unit uses a continuous blower setting to circulate room air into the return air inlet and uses the return air temperature sensor to control room temperature.

The wall-mount unit can be turned on and off with the TEC-EYE hand-held diagnostic tool. When ON is chosen, the wall-mount unit will heat or cool. When set to OFF using the TEC-EYE, the wall-mount unit will not heat, cool or ventilate.

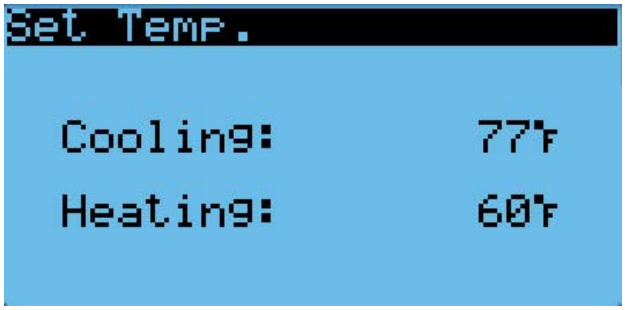
To turn the unit on or off with TEC-EYE:

1. Connect the TEC-EYE diagnostic tool to the control board located in the unit.
2. Press MENU key to go to the Main Menu screen.
3. Press UP or DOWN keys and ENTER key to enter USER password 2000.
4. Press UP or DOWN keys to scroll to **On/Off**; press ENTER key.
5. Press UP or DOWN keys to change value from **ON** to **OFF** or from **OFF** to **ON**.
6. Press ESCAPE key several times to return to Main Menu screen.

To verify or change the wall-mount unit cooling and heating setpoints in orphan mode:

1. Connect the TEC-EYE diagnostic tool to the control board located in the unit.
2. From the Status screen, press UP or DOWN key until Quick Menu displays Setpoints (SET) icon. Press ENTER key.
3. Press ENTER key to scroll to the selected choice (see Figure 13).
4. Press UP or DOWN key on desired value until value displays correctly.
5. Press ENTER key to save and scroll to next parameter.
6. Press ESCAPE key until Main Menu screen is displayed.

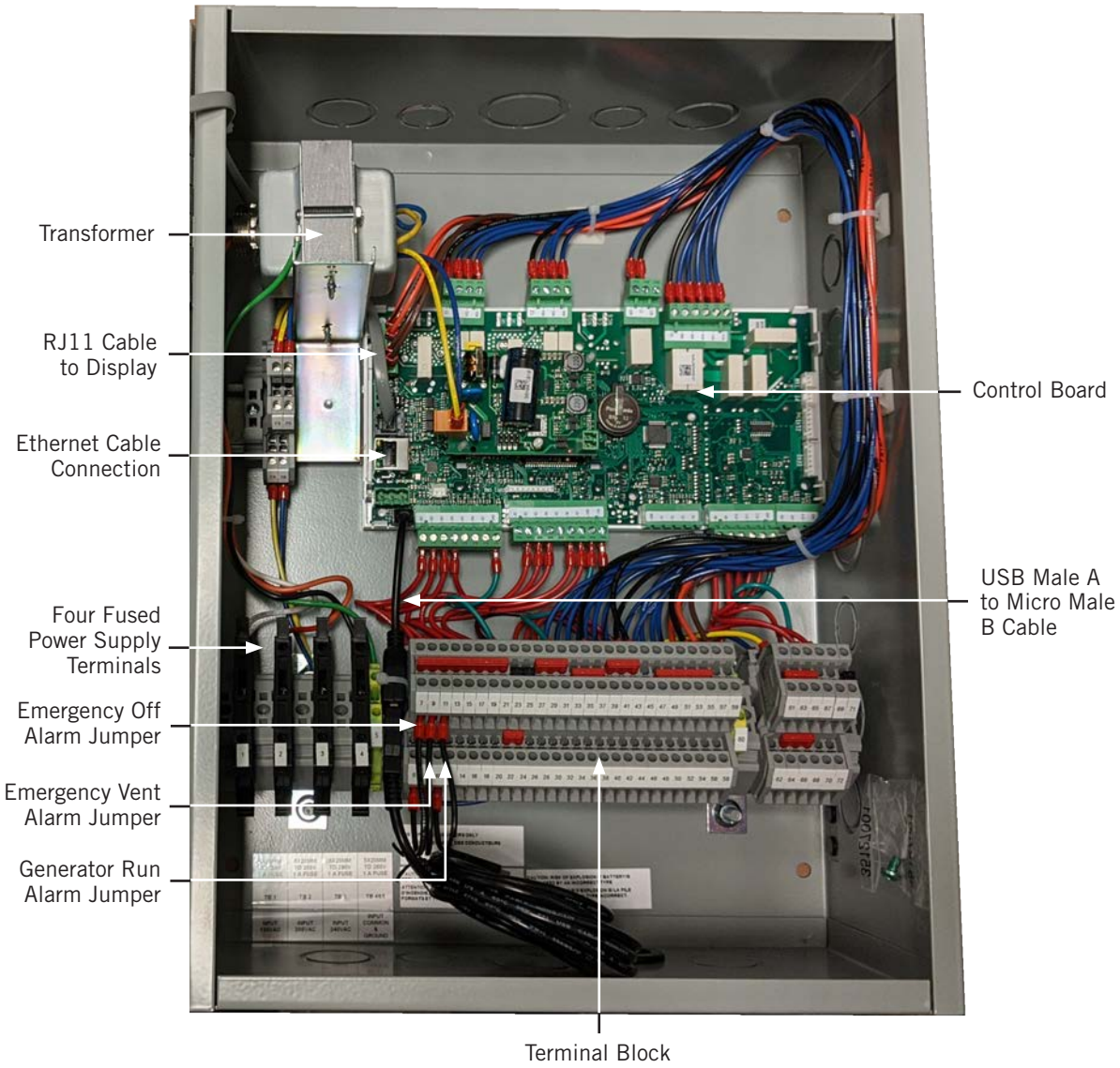
FIGURE 13
Cooling and Heating Setpoints



During installation, the ability to run in orphan mode allows deactivation of one of the existing, older wall-mount units, while keeping the shelter cool with the other unit still operating. Once the first of the Bard MEGA-TEC wall-mount units is installed, orphan mode can be enabled early in the installation—keeping the climate inside the shelter stable and the installers comfortable while the remainder of the older equipment is removed and the remaining Bard MEGA-TEC wall-mount units and LC6000 controller are installed.

Additionally, should any or all of the MEGA-TEC wall-mount units lose communication with the LC6000 controller (such as during maintenance), they will continue to serve the shelter's needs until a repair can be made.

FIGURE 14
Typical LC6000-200 Component Location



⚠ WARNING

Electrical shock hazard.

Disconnect VAC power supplies before servicing.

Failure to do so could result in electric shock or death.

IMPORTANT: *When working with circuit board components, Bard recommends the use of an anti-static wrist strap to prevent static electricity shorts to electronic controls.*

LC6000 Controller

The LC6000 controller is part of this air conditioning system. It is used to control up to fourteen (14) wall-mount air conditioners from one controller. The microprocessor control provides an easy-to-read interface with large LCD graphical display. It provides control for redundancy for the structure and equal wear on all units.

Conduit is recommended for all wiring. Route communication wiring and power supply wiring in their own separate conduits.

The LC6000 controller is not weatherproof and is intended for use in a weathertight structure.

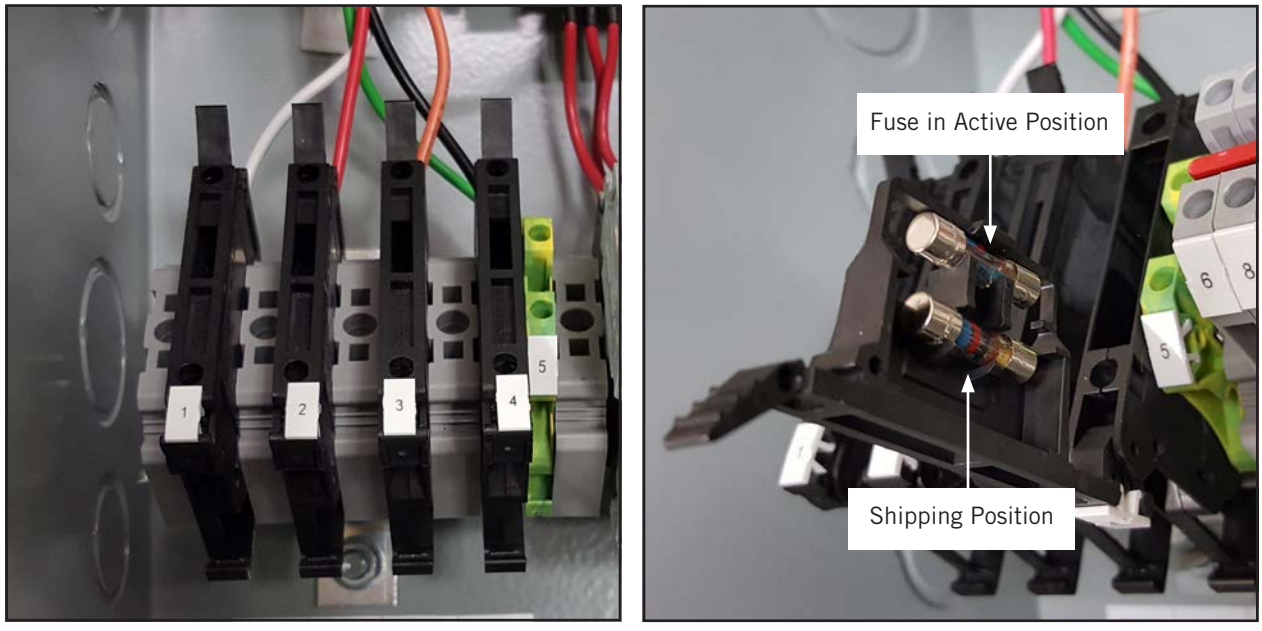
Mounting the LC6000 Controller

The dimensions of the LC controller are 16" x 12" x 6".

Because the LC6000 controller utilizes a remote temperature sensor as opposed to one located in the controller box, the controller itself can be installed in any indoor location that is suitable, preferably at eye level. Four (4) mounting holes are provided for mounting to the wall and holes for conduit connections are provided in the base, sides and top of the controller.

The LC6000 controller includes four fused power supply terminals in the terminal block. Before connecting wires to the terminal block, confirm that the fuse in each of the four fuse holders is in the proper position (active) as shown in Figure 15.

FIGURE 15
LC6000 Fused Power Supply Terminal



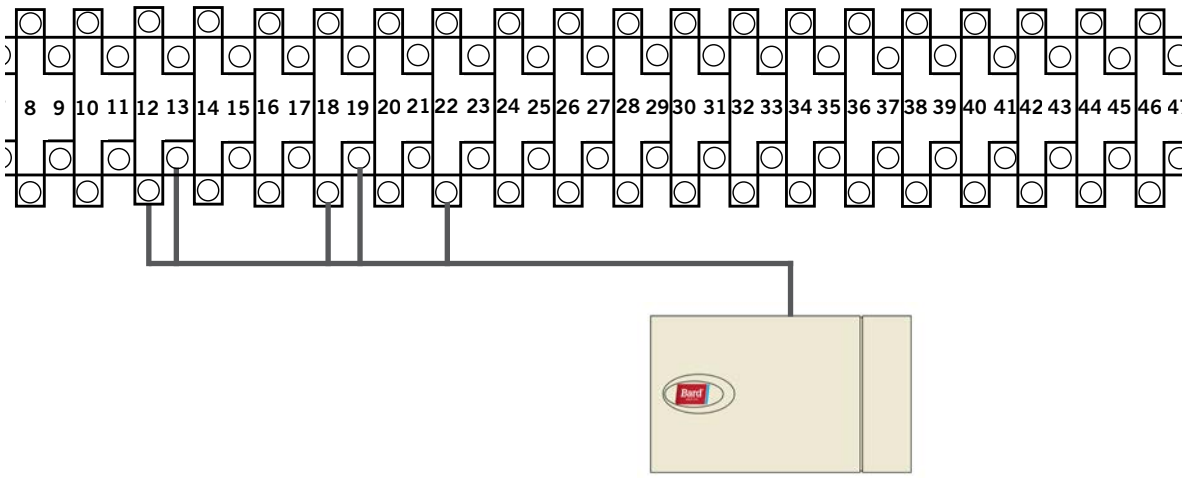
Installing Remote Indoor Temperature/Humidity Sensor(s)

One remote indoor temperature/humidity sensor and 35' of 18 gauge 5-conductor shielded cable is included with the controller. This sensor must be installed for proper operation. Mount the temperature/humidity sensor in a location least likely to be affected by open doors, rack-mounted fans, radiant heat sources, etc. Locating the sensor between both return grilles is often the best location, but every installation is unique. Location height should be approximately 60" above the floor. The sensor is best mounted on a 2" x 4" junction box and it is recommended that the cable be in conduit. Use shielded cable to connect to controller. The maximum cable length to connect the temperature/humidity sensor to the LC6000 is 98'.

FIGURE 16
Remote Indoor Temperature/Humidity Sensor Installation

1. Connect wires from the 18 gauge shielded cable to terminals #12, #13, #18, #19 and #22.

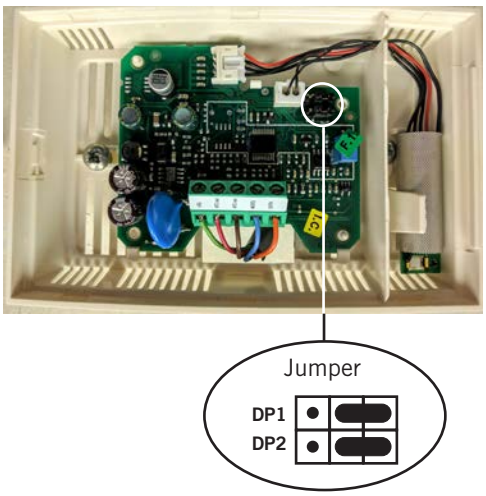
TB#	Wire Mark	Sensor	Description
18	B6	NTC OUT	Indoor Remote Sensor (Zone 1)
19	GND	NTC OUT	Ground
12	B2	OUT H	Remote Indoor Humidity Sensor: 0-1 VDC (Zone 1)
13	GND	M (GO)	Ground
22	+VDC	+ (G)	Power for B2

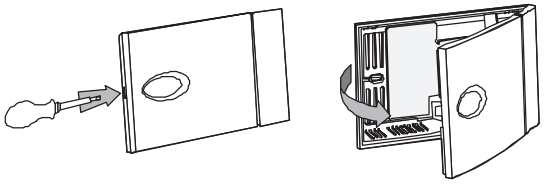


2. Connect the other end of the shielded cable to the sensor terminals. Be sure wires are connected to proper terminals as shown in table above.

   Sensor jumpers need to be positioned for 0-1 V. With sensor oriented as shown in image to right, move both jumpers to right position (DP1 and DP2 set to OFF). **This applies to all indoor temperature/humidity sensors connected to the LC controller.** See illustration mounted inside of sensor cover for further detail on jumper position.

   Earlier versions of this sensor may be mounted in a different orientation which would affect the positioning of the sensor jumpers. See page 45 for additional information on sensor orientation.

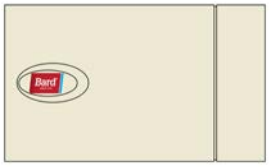




For proper operation, the remote indoor temperature/humidity sensor (and any additional sensors) must be configured properly with the controller as shown in Step 2 on page 22. An additional remote indoor temperature-only sensor can be purchased and installed in Zone 1. If the site in which the LC6000 controller will be used has more than one zone (maximum three zones per LC6000), additional remote temperature/humidity sensors (one per zone) will need to be purchased and installed in the additional zones. All installed sensors must be enabled in the controller menu (see **Configure Sensors** beginning on page 36).

FIGURE 17
Additional Remote Indoor Temperature and Temperature/Humidity Sensor Installation

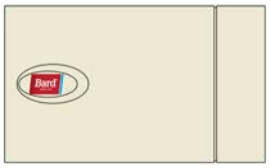
One additional temperature sensor can be added to Zone 1 and additional temperature/humidity sensors may be added to Zones 2 and 3 (one per zone). **Be sure the sensors are connected to the proper terminals on the terminal block and sensor as listed below.** The maximum cable length to connect temperature or temperature/humidity sensors to the LC6000 is 98'.



Zone 1:
Optional Remote
Temperature Sensor
Terminals 20 & 21*

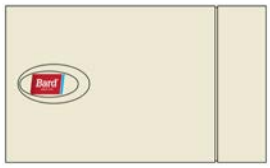
TB#	Wire Mark	Description
20	B7	Indoor Remote Sensor (Zone 1 – optional)
21	GND	Ground

* The two wire connections for the optional remote temperature sensor are not polarity sensitive.



Zone 2:
Optional Remote
Temperature/Humidity Sensor
Terminals 26, 27, 14, 15 & 23
IMPORTANT: *Note jumper position in Figure 16*

TB#	Wire Mark	Sensor	Description
26	B8	NTC OUT	Indoor Remote Sensor (Zone 2)
27	GND	NTC OUT	Ground
14	B3	OUT H	Remote Indoor Humidity Sensor: 0-1 VDC (Zone 2)
15	GND	M (GO)	Ground
23	+VDC	+ (G)	Power for B3



Zone 3:
Optional Remote
Temperature/Humidity Sensor
Terminals 28, 29, 16, 17 & 24
IMPORTANT: *Note jumper position in Figure 16*

TB#	Wire Mark	Sensor	Description
28	B9	NTC OUT	Indoor Remote Sensor (Zone 3)
29	GND	NTC OUT	Ground
16	B4	OUT H	Remote Indoor Humidity Sensor: 0-1 VDC (Zone 3)
17	GND	M (GO)	Ground
24	+VDC	+ (G)	Power for B4

Zones 2 and 3 can also use temperature-only sensors in place of the temperature/humidity sensors. Zone 2 will connect to TB# 26 and 27. Zone 3 will connect to TB# 28 and 29. The wire connections for the temperature-only sensors are not polarity sensitive.

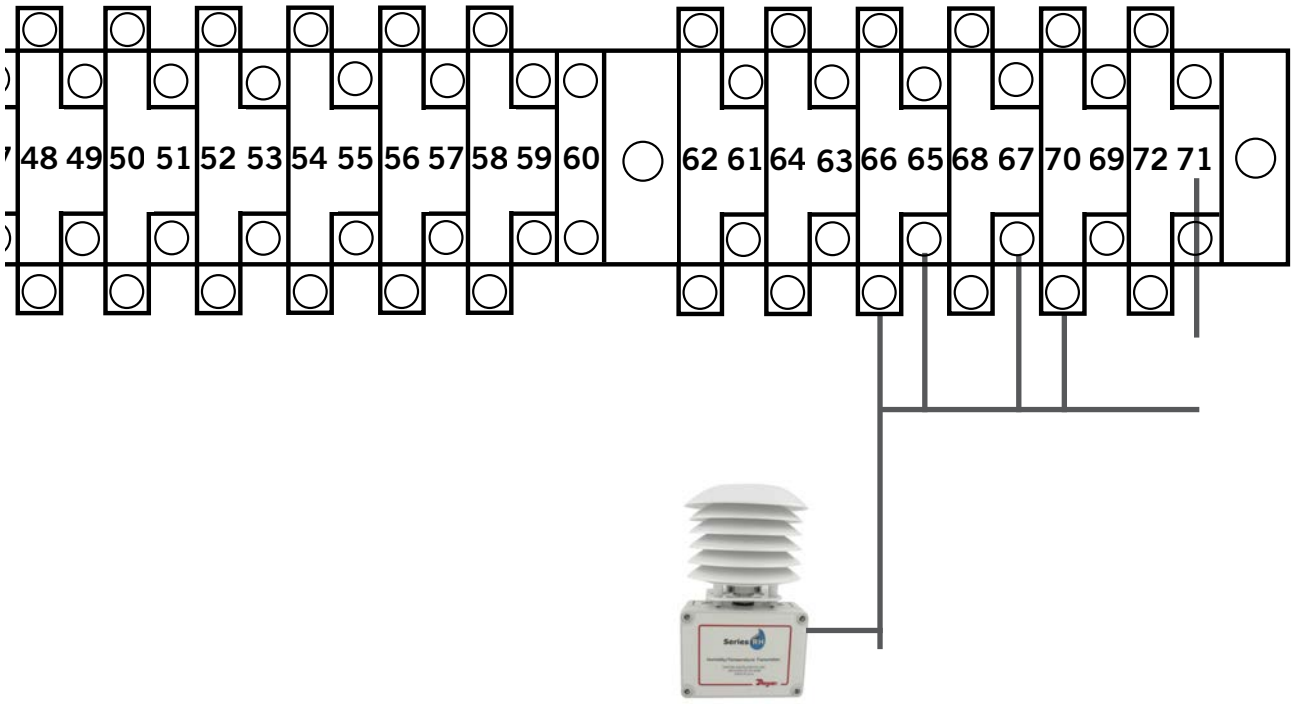
Installing Optional Outdoor Temperature/Humidity Sensor

One optional outdoor temperature/humidity sensor (8301-090) can be installed. Follow the manufacturer's mounting instructions. Use 18 gauge 5-conductor shielded cable to connect to controller. The maximum cable length to connect the temperature/humidity sensor to the LC6000 is 98'.

FIGURE 18
Remote Outdoor Temperature/Humidity Sensor Installation

1. Connect wires from the 18 gauge shielded cable to terminals #65, #66, #67, #70 and #71.

TB#	Wire Mark	Sensor	Description
70	B12	4	Remote Outdoor Temperature Sensor
71	ND	5	Ground
67	B11	1	Remote Outdoor Humidity Sensor: 0-10 VDC
66	GND	3	Ground
65	+VDC	2	+VDC

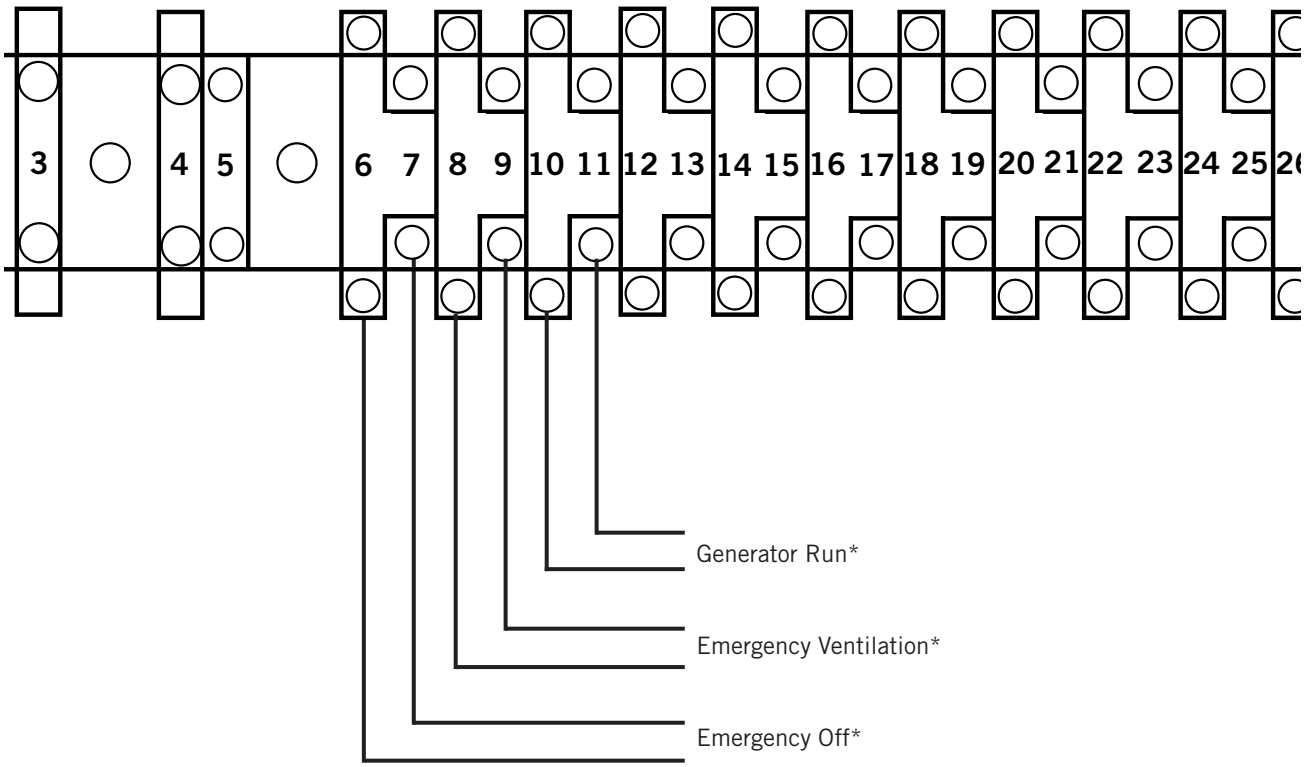


2. Connect the other end of the shielded cable to the sensor terminals. Be sure wires are connected to proper terminals as shown in table above.

Emergency Off, Emergency Ventilation and Generator Run Connections

The LC6000-200 controller is shipped with emergency off, emergency ventilation and generator run contacts. There are factory-installed jumpers across terminals #6 and #7 (emergency off), #8 and #9 (emergency ventilation) and #10 and #11 (generator run). Remove the factory-installed jumpers before making the connections.

FIGURE 19
LC6000-200 Series Connection for Emergency Off, Emergency Ventilation and Generator Run (If Applicable)



* Normally closed (NC) contacts required.

By default:
Closed = No Alarm
Open = Alarm

Communication Wiring

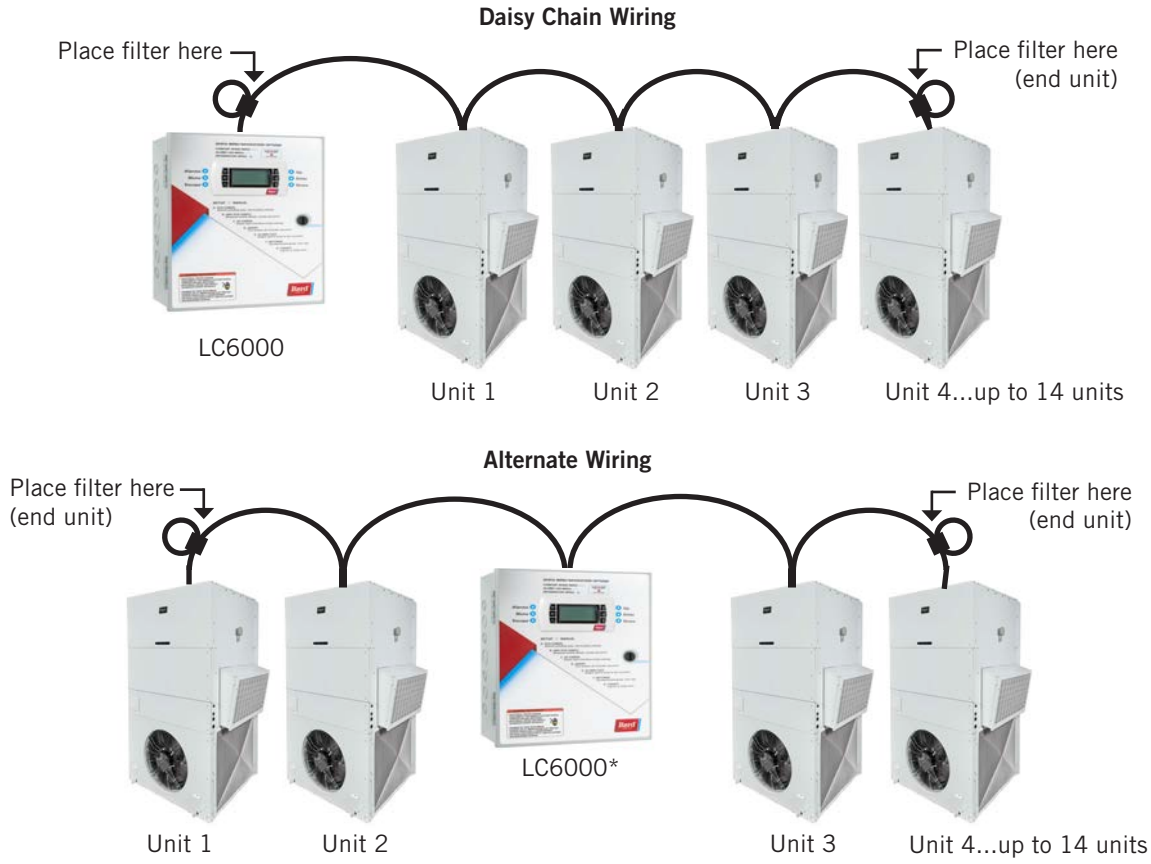
Connect the field-supplied communication wiring from the wall-mount units to the controller in the manner shown in Figures 20, 21 or 22. **The daisy chain does not need to follow the addressing order.** The communication wire should be 2-wire, 18 gauge shielded cable with drain. Any color can be used. Be sure to match "+" and "-" symbols on controller terminal blocks to prewired unit control terminal block (see Figures 24 and 25 on pages 29 and 30). Attach communication wire filters as shown in Figures 20, 21 or 22. **Do not run communication wiring in same conduit as supply wiring. Route communication wiring and power supply wiring in their own separate conduits.**

FIGURE 20
Communication Wiring (Daisy Chain Method)

In addition to the "daisy chain" method of connecting the field-supplied communication wiring shown in Figure 20, the wall-mount units can also be connected in the manner shown in Figure 21. If connecting wall-units this way, be sure to place the communication wire filters in the positions shown in Figure 21. See Figure 22 for more information on the correct placement of the communication wire filters depending on the wiring method used.

FIGURE 21
Communication Wiring (Alternate Method)

FIGURE 22
Placement of Communication Wire Filters (Daisy Chain and Alternate Methods)



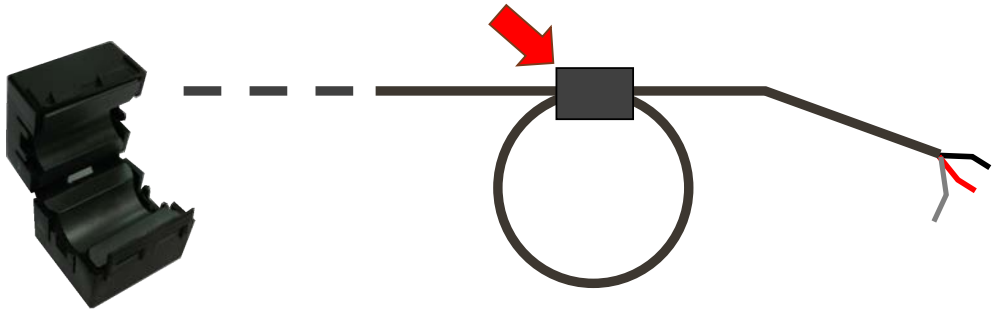
* LC6000 can be in any position other than start and end with filters placed on end units.

NOTE: *Line filters can be on either the unit or controller, whichever device is on the end of the chain. No matter how many units there are, the two end devices will only have ONE communication cable, whereas the center devices will all have TWO (as shown above). Maximum two wires in each terminal. Filters go inside the unit or controller; shown out of unit above for identification only.*

The steps outlined on the following pages show how to connect the field-supplied communication wiring using the daisy chain method shown in Figure 20. If using the alternate method (as shown in Figure 21), the connections to the controller and each wall-mount unit will be the same but the filters need to be placed in the positions shown in Figure 22.

FIGURE 23
Communication Wiring: Termination at the Controller

1. Using the field-provided shielded cable, make a small service loop after entering the controller and attach the provided EMI filter at the intersection of the loop.



2. Connect one wire to terminal #56 (negative), the other wire to terminal #57 (positive) and the drain wire to ground terminal #60.

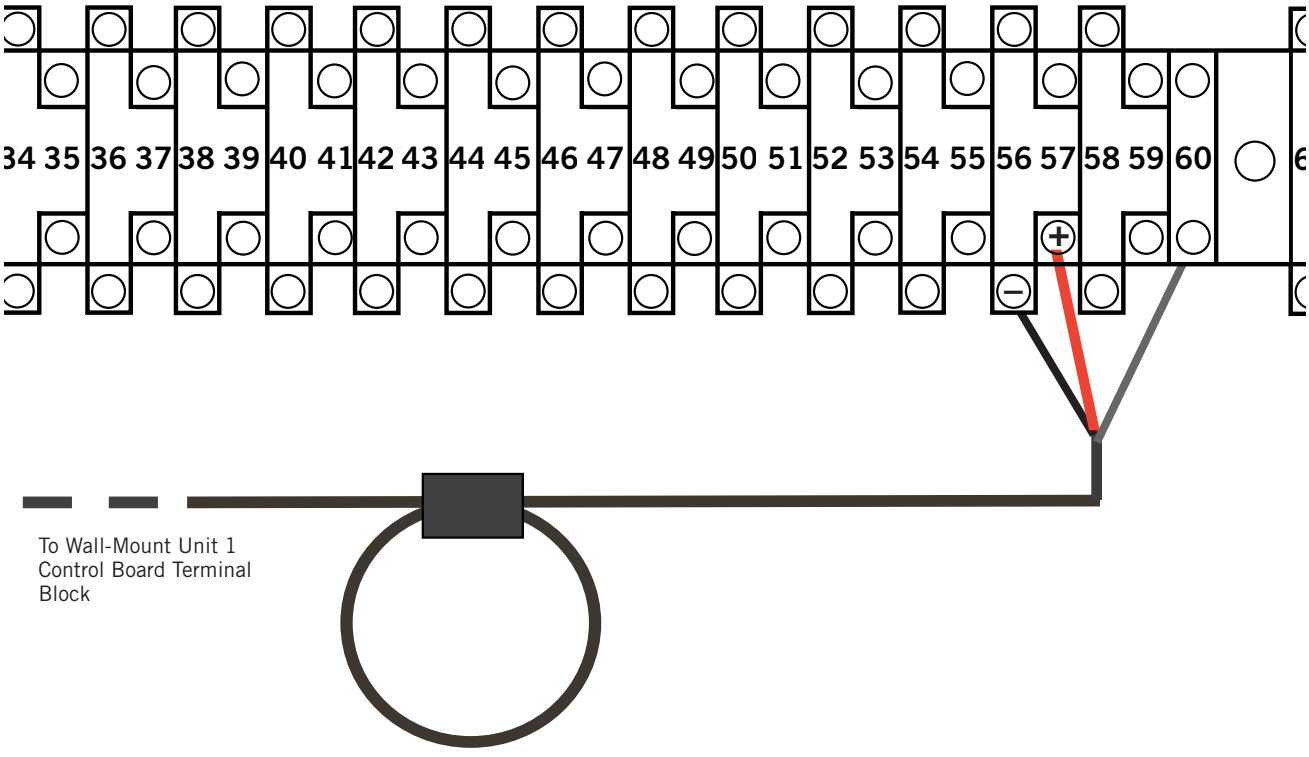
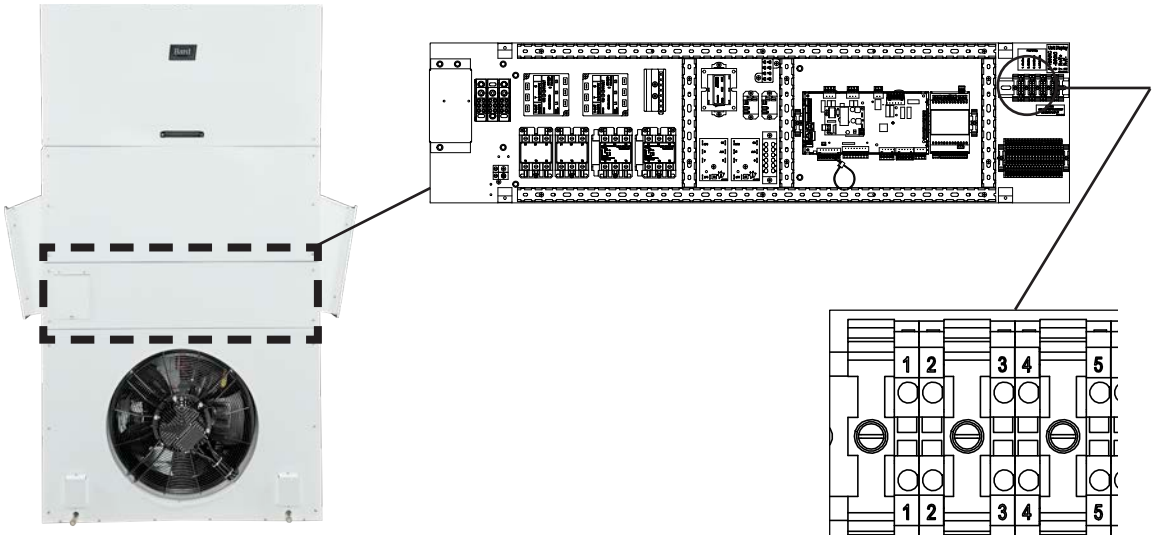


FIGURE 24
Communication Wiring: Termination at the First Wall-Mount Unit

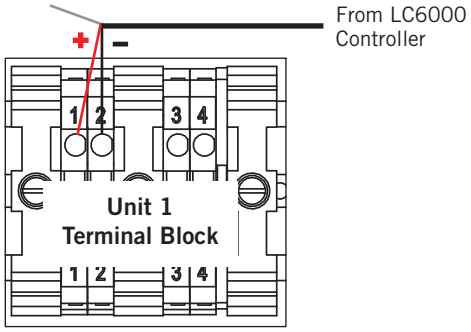


Wall-Mount Unit 1

1. From the controller, extend the field-supplied shielded cable through a separate conduit and route to terminal #1 (positive) and terminal #2 (negative) on the upper terminal block next to the wall-mount control board on the unit control panel.

   These connections are polarity-sensitive. Two-wire communication from control board is prewired to terminal block. Make sure to match "+" and "-" symbols on the Field Wiring label above the terminal block.

2. Connect the wires matching the terminal designations (+/-) of the Field Wiring label. Leave the drain wire loose.



3. Connect another cable in a similar fashion ("daisy chain") to route in conduit to the second wall-mount unit. Connect both drain wires with wire nut. Maximum two wires per terminal.

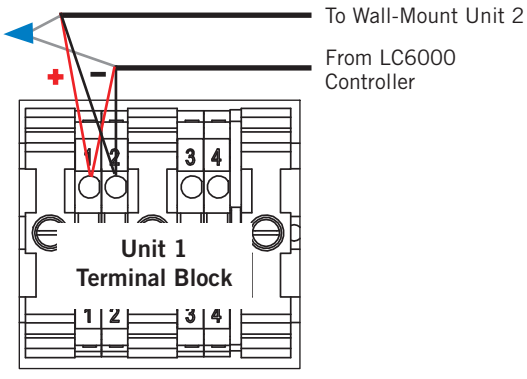
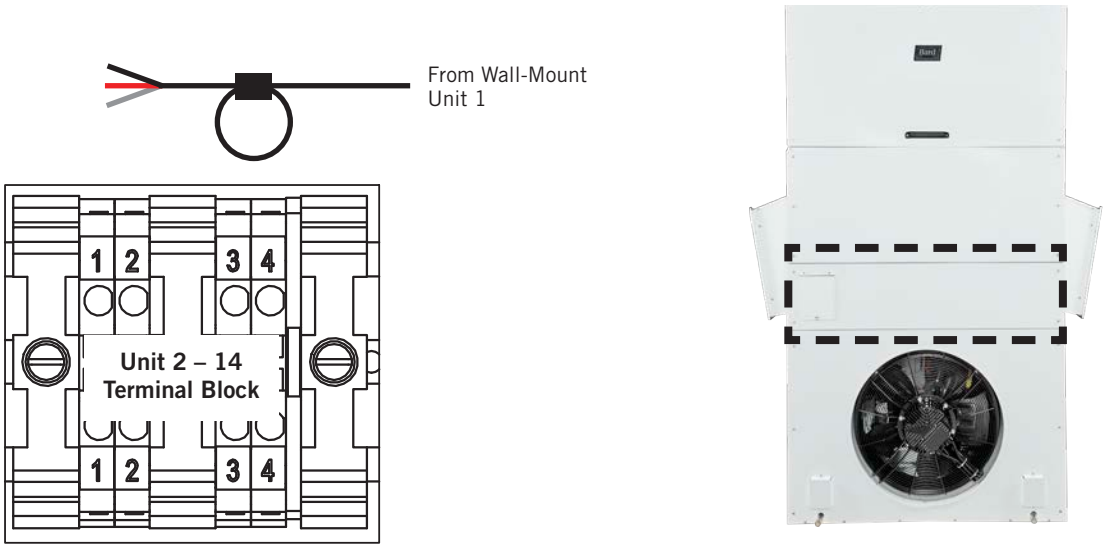
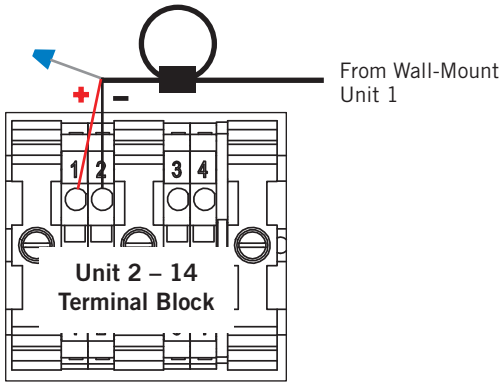


FIGURE 25
Communication Wiring: Termination at Additional Wall-Mount Units



Wall-Mount Unit 2

1. Route the cable from the first wall-mount unit to the terminal block of the second wall-mount unit. If this is the last unit to be connected, make a small service loop and attach EMI filter as shown.



2. Connect the wires matching the terminal designations (+/-) on the Field Wiring label above the terminal block. Cap the loose drain with a wire nut or electrical tape.

3. Continue daisy chaining units by connecting "+" to "+", "-" to "-" and wire nutting drain together until last unit which is capped with a wire nut. **Attach EMI filter as shown above at last unit.** Up to 14 wall-mount units can be connected and controlled by one LC6000 controller.

NOTE: *Terminals #3 and #4 are dry contacts to be used for the unit disable option.*

WARNING: *Do not apply voltage to daisy chain connection terminals #1 or #2 or terminals #3 or #4. If 24V or any voltage is applied to these terminals or to the daisy chain connection, board damage may occur.*

Supply Wiring

The LC6000 controller is powered by 120, 208 or 230 volts from the shelter. Field-supplied supply wiring should be minimum 16 gauge, maximum 14 gauge (see Figure 26). A reliable earth ground must be connected in addition to any grounding from conduit. Grounding bolts and nuts are included with the controller for this purpose; a 2 hole grounding lug must be field supplied. Install as shown in Figure 27. **Failing to ground the controller box properly could result in damage to the equipment.**

FIGURE 26
LC6000 Controller Circuit Install

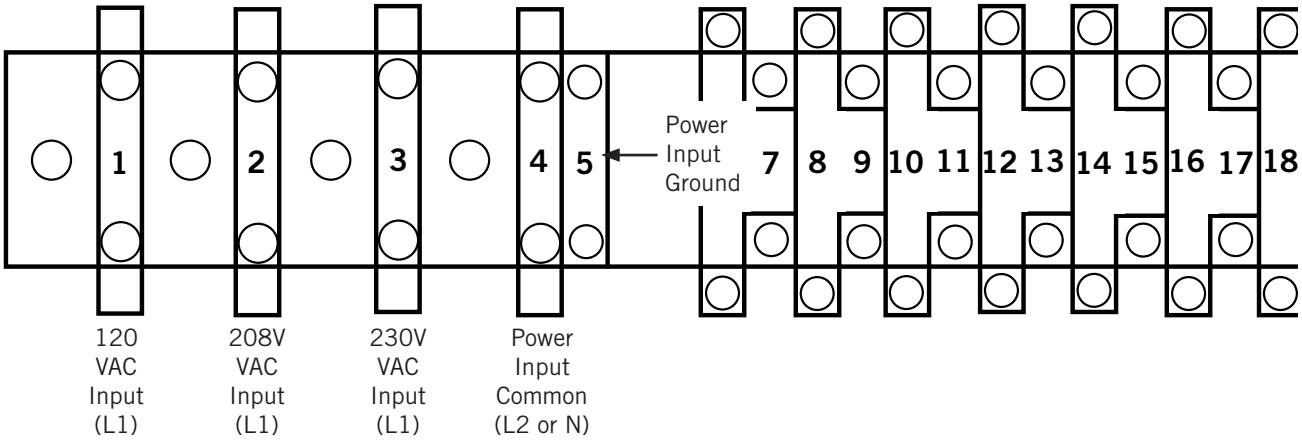
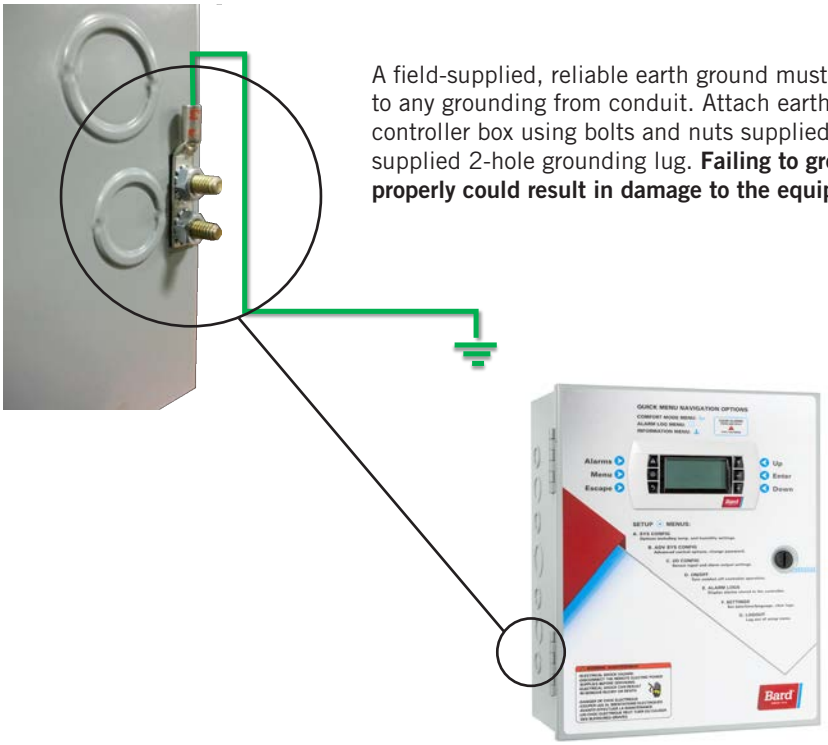


FIGURE 27
Controller Grounding Posts



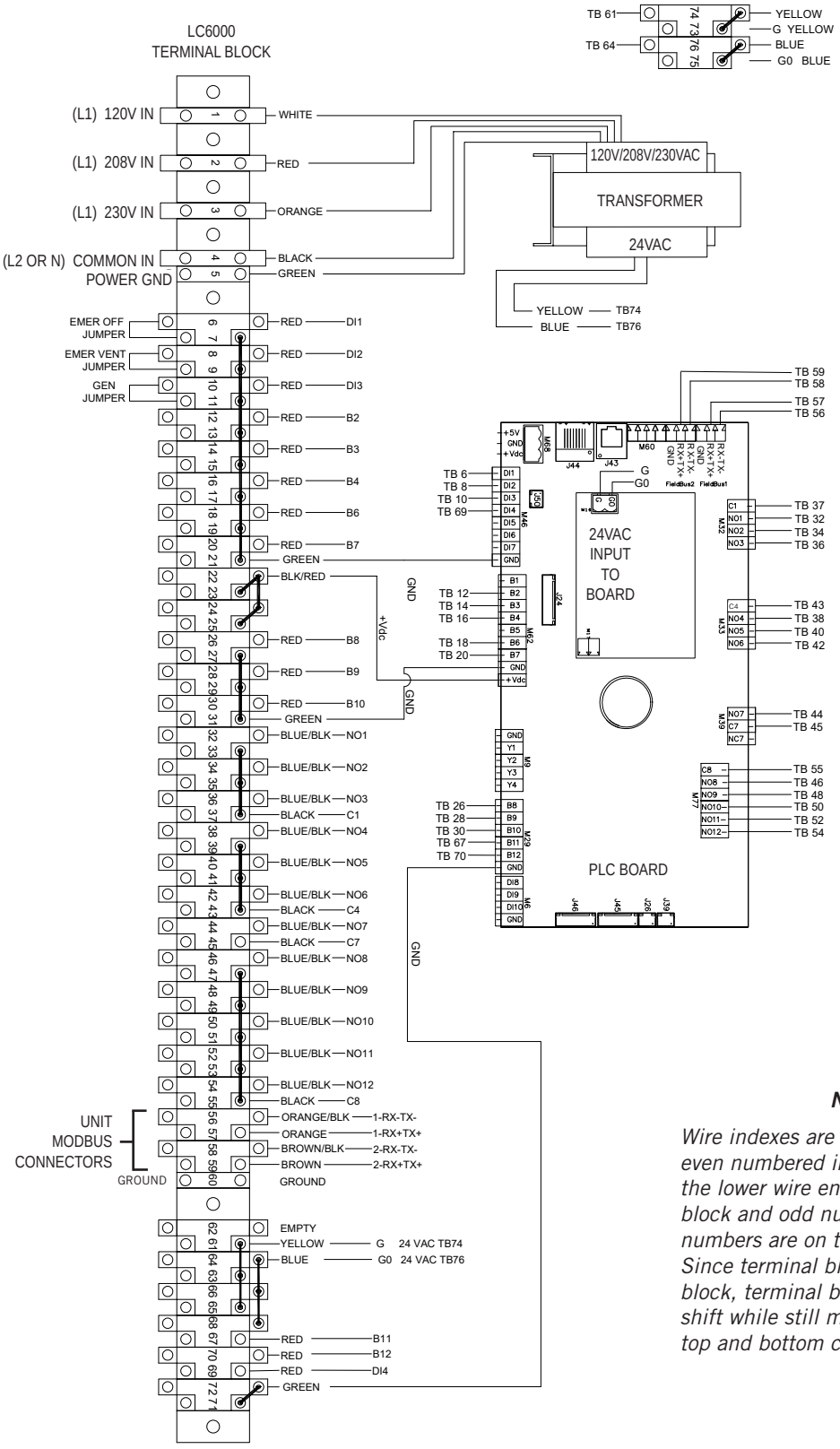
A field-supplied, reliable earth ground must be connected in addition to any grounding from conduit. Attach earth ground to side of controller box using bolts and nuts supplied with controller and field-supplied 2-hole grounding lug. **Failing to ground the controller box properly could result in damage to the equipment.**

TABLE 3
LC6000-200 Terminal Block Index

TB#	Wire Mark	Description
1	-	120 VAC Input
2	-	208 VAC Input
3	-	230 VAC Input
4	-	Power Input Common
5	-	Power Input Ground
6	DI1	Emergency Off Input
7	GND	Emergency Off Common
8	DI2	Emergency Vent Input
9	GND	Emergency Vent Common
10	DI3	Generator Run Input
11	GND	Generator Run Common
12	B2	Zone 1 Indoor Remote Humidity Sensor
13	GND	Ground
14	B3	Zone 2 Indoor Remote Humidity Sensor
15	GND	Ground
16	B4	Zone 3 Indoor Remote Humidity Sensor
17	GND	Ground
18	B6	Zone 1 Indoor Temperature Sensor
19	GND	Ground
20	B7	Zone 1 Indoor Remote Temperature Sensor
21	GND	Ground
22	VDC+	Power for B2 (Z1 Humidity)
23	VDC+	Power for B3 (Z2 Humidity)
24	VDC+	Power for B4 (Z3 Humidity)
25	VDC+	Power for B10 (Pressure)
26	B8	Zone 2 Indoor Remote Temperature Sensor
27	GND	Ground
28	B9	Zone 3 Indoor Remote Temperature Sensor
29	GND	Ground
30	B10	Indoor Space Pressure
31	GND	Ground
32	NO1	Humidifier 1
33	C1	Common
34	NO2	Humidifier 2
35	C1	Common
36	NO3	Humidifier 3
37	C1	Common
38	NO4	Emergency Off Alarm

TB#	Wire Mark	Description
39	C4	Common
40	NO5	Emergency Vent Alarm
41	C4	Common
42	NO6	Generator Run Alarm
43	C4	Common
44	NO7	Indoor Humidity Alarm
45	C7	Common
46	NO8	High Indoor Temperature Alarm
47	C8	Common
48	NO9	Low Indoor Temperature Alarm
49	C8	Common
50	NO10	Zone 1 Unit Alarm
51	C8	Common
52	NO11	Zone 2 Unit Alarm
53	C8	Common
54	NO12	Zone 3 Unit Alarm
55	C8	Common
56	FB1R-	RS485 RX- / TX- (Fieldbus 1) ***UNIT CONNECTION***
57	FB1R+	RS485 RX+ / TX- (Fieldbus 1) ***UNIT CONNECTION***
58	FB2R-	RS485 RX- / TX- (Fieldbus 2)
59	FB2R+	RS485 RX+ / TX- (Fieldbus 2)
60	--	Power Input Ground
61	24 VAC+	24 VAC Supply
62	--	Not Used
63	24 VAC+	24 VAC Supply
64	24 VAC-	24 VAC Ground
65	24 VAC+	24 VAC Supply for Outdoor Humidity Sensor
66	24 VAC-	24 VAC Ground for Outdoor Humidity Sensor
67	B11	Signal for Outdoor Humidity Sensor
68	24 VAC+	24 VAC Supply
69	D14	Bard Guard Alarm Signal
70	B12	Signal for Outdoor Temperature Sensor
71	GND	Ground for Outdoor Temperature Sensor
72	GND	Ground for Bard Guard Alarm Signal
73	G	Orange Power Connector
74	24 VAC+	24 VAC Supply
75	G0	Orange Power Connector
76	24 VAC-	24 VAC Ground

FIGURE 28
LC6000-200 Wiring Diagram



NOTE:

Wire indexes are identified such that even numbered index numbers are on the lower wire entries of the terminal block and odd numbered index numbers are on the top wire entries. Since terminal block 60 is a ground block, terminal blocks 61 thru 72 shift while still maintaining the same top and bottom configuration.

NOTE: *Screenshots shown in this manual reflect default settings (when applicable).*

The LC6000 controller and TEC-EYE hand-held diagnostic tool will both be used to set up the Bard free cooling system (the TEC-EYE is only used to set up the wall-mount units). If installing a single MEGA-TEC wall-mount unit with a PGD or PGDx stand-alone display, refer to PGD manual 2100-734 or PGDx manual 2100-740 for information on setting up a stand-alone display for single unit operation.

TABLE 4
LC6000/TEC-EYE Passwords (Defaults)

User	2000
Technician	1313
Engineer	9254
Use UP or DOWN keys and ENTER key to enter password	

TEC-EYE Hand-Held Diagnostic Tool

The microprocessor control used in the MEGA-TEC wall-mount air conditioners allows for complete control and monitoring through the use of the provided TEC-EYE hand-held monitor.

The menu driven interface provides users the ability to scroll through two menu levels: Quick Menu and Main Menu. The menus permit the user to easily view, control and configure the unit. See the latest version of MEGA-TEC Service Manual 2100-671 for more information on using the TEC-EYE.

The TEC-EYE connects to the wall-mount unit control board via an RJ11 modular connector as shown in Figure 29.

When not being used, the TEC-EYE hand-held diagnostic tool should be stored inside or near the LC6000 controller. Do not let the TEC-EYE leave the shelter.

FIGURE 29
TEC-EYE Connection to Unit Control

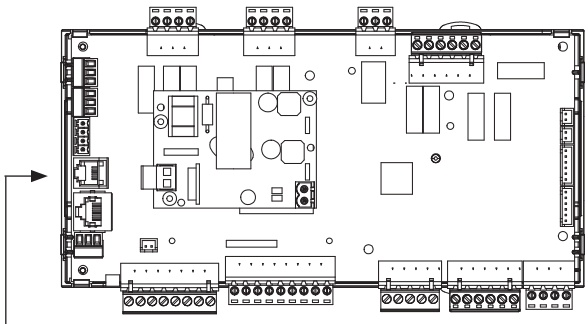
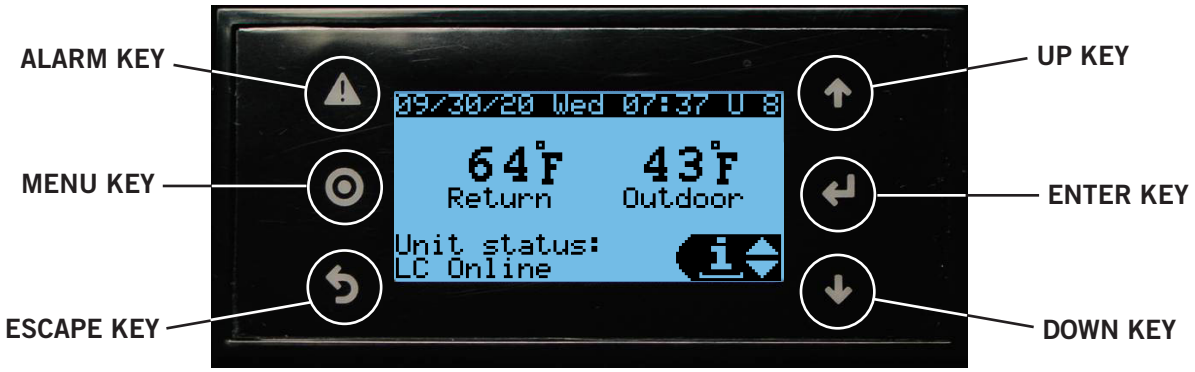


FIGURE 30
TEC-EYE (Bard P/N 8301-059) Display and Interface (Status Screen Shown)



ALARM KEY
Allows viewing of active alarms
Silences audible alarms
Resets active alarms

MENU KEY
Allows entry to Main Menu

ESCAPE KEY
Returns to previous menu level
Cancels a changed entry

UP KEY
Steps to next screen in the display menu
Changes (increases) the value of a modifiable field

ENTER KEY
Accepts current value of a modifiable field
Advances cursor

DOWN KEY
Steps back to previous screen in the display menu
Changes (decreases) the value of a modifiable field

TEC-EYE Status Screen

The Status screen is the default start-up screen and also the return screen after 5 minutes of no activity. The screen can be accessed any time by pressing the ESCAPE key repeatedly.

The wall-mount unit address is displayed in the upper right corner on the Status screen (see Figure 30). The Status screen also shows the current date, time, return air temperature, mixed air temperature, supply air temperature, outdoor air temperature and outdoor air humidity. Blower speed, condenser fan speed, damper position and unit status are also displayed. See Table 5 on page 42 for wall-mount unit status messages.

NOTICE

It is important to check the software version during installation to ensure that the latest version has been installed. Current software versions and installation instructions are available on the Bard website at http://www.bardhvac.com/software-download/

Setting Up Wall-Mount Units for Operation

The TEC-EYE hand-held diagnostic tool is needed to set up the wall-mount unit(s).

1. **Address Each Wall-Mount Unit**

   Each unit must have a unique address for the system to operate correctly with the LC controller (*Ex: 1, 2, 3, ...14 depending on the number of units*). The unit only needs the address to be changed for the communication to work properly. The wall-mount unit address is displayed in the upper right corner on the Status screen on the TEC-EYE display (see Figure 30).

   To change the unit address:

   1) Press MENU key to access the Main Menu screen.
   2) Press UP or DOWN keys and ENTER key to enter USER password 2000.
   3) Press UP or DOWN keys to scroll to **Sys Config**; press ENTER key.
   4) Press ENTER key to scroll to **Unit Address (**see Figure 31).
   5) Press UP or DOWN keys to change the address to a value between 1 and 14.

NOTE: *Each unit must have a unique address for the communication to work properly. Unit addresses can only be used once per LC6000 regardless of number of zones. Bard also recommends physically labeling each unit for ease in identification.*

FIGURE 31
Unit Configuration

In addition to setting up the address, the user may also want to set the unit zone and unit of measure.

To change these settings:

1) Press MENU key to access the Main Menu screen.
2) Press UP or DOWN keys and ENTER key to enter USER password 2000.
3) Press UP or DOWN keys to scroll to **Sys Config**; press ENTER key.
4) Press ENTER key to scroll to **Unit Zone** (see Figure 31).
5) If desired, press UP or DOWN keys to change value to desired zone.
6) Press ENTER scroll to **UOM**.
7) If desired, press UP or DOWN keys to change the value from **USA** to **SI**, **NC**, **LON**, **CAN** or **UK**. Units are preconfigured for each selection.
8) Press ENTER key to save.

Basic wall unit parameter settings are now set and the unit is ready to communicate with the LC.

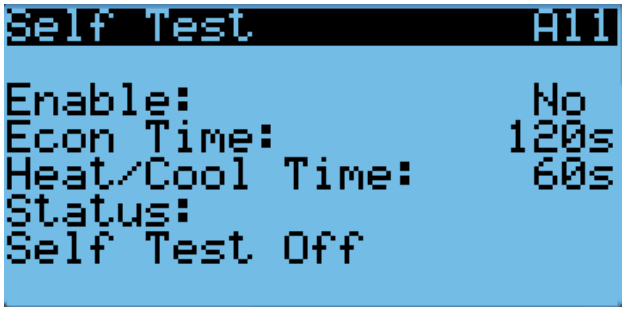
2. **Execute a Self Test on Each Unit**

   Execute a self test on each unit to verify the equipment is functioning correctly. The self test parameters are not adjustable.

   The self test will automatically skip sections of the test based on the model number entered into the controller. If position 10 of the model number is B (to indicate a blank off economizer option), the test steps associated with the economizer will be skipped. If positions 8 and 9 of the model number indicate a 0Z (0 kW) option, test steps associated with heating will be skipped. If positions 8 and 9 indicate a 09 (9 kW) option,second stage heat tests will be skipped.

1) Press MENU key to access the Main Menu screen.
2) Press UP or DOWN keys and ENTER key to enter USER password 2000.
3) Press UP or DOWN keys to scroll to **Sys Config**; press ENTER key.
4) Press UP or DOWN keys to scroll to **Self Test A11** screen.
5) Press ENTER key to scroll to **Enable** parameter (see Figure 32).
6) Press UP or DOWN key to change value to **Yes**. The self test will begin.

FIGURE 32
Executing Self Test



Self Test Parameter Descriptions

Damper Time: This is the time (in seconds) allowed for both the opening sequence and closing sequence.

Heat/Cool Time: This is the time (in seconds) allowed for cooling sequence and heating sequence.

Status: This will display what the unit is doing as the self test progresses. The following messages may appear:

Self Test Off

Initializing...

Opening Economizer

Closing Economizer

Compressor 1 On

Compressor 1 & 2 On

C1 Full Load + C2 On

Turning Comp. Off....

Electric Heat 1 On

Electric Heat 1 & 2 On

Turning Heat Off...

End

The unit will determine which items to test based on the unit model number.

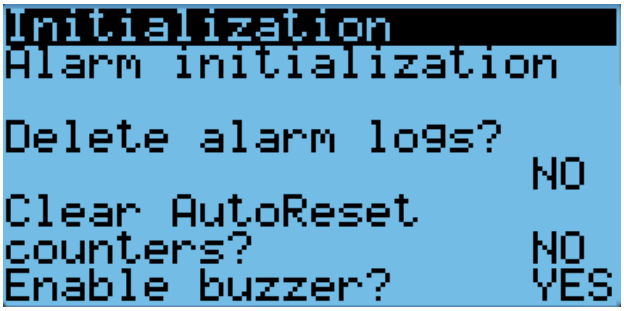
3. Clear Unit Alarm Logs on Each Unit

The wall-mount unit may have generated some alarms during startup and should be cleared after installation.

To clear the wall-mount unit alarm logs:

1) Press MENU key to go to the Main Menu screen.
2) Use UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3) Press UP or DOWN keys to scroll to **Settings**; press ENTER key.
4) Press UP or DOWN keys to scroll to **Initialization**; press ENTER key.
5) Press UP or DOWN keys to scroll to **Initialization**; press ENTER key.
6) Press ENTER key to scroll to **Delete alarm logs?** (see Figure 33).
7) Press UP or DOWN key to change **NO** to **YES**.
8) Press ENTER key to clear all alarm logs.

FIGURE 33
Clearing Unit Alarm Logs



After each of the wall-mount units have been addressed, had a self test performed and had the alarm logs cleared, the rest of the system set up can proceed.

Setting Up LC6000 for Operation

The LC6000 controller will be used for the remaining steps in the set up process.

LC6000 Status Screen

The Status screen is the default start-up screen and also the return screen after 5 minutes of no activity on the LC6000. The screen can be accessed any time by pressing the ESCAPE key repeatedly.

The Status screen on the LC6000 displays the current date, time, unit displayed, zones and system status (see Figure 34).

FIGURE 34
LC6000 Controller Display and Interface (Status Screen Shown)

LC6000 interface key functions are the same as those shown for the TEC-EYE in Figure 30 on page 34.

4. Set LC Controller Date and Time

1) Press MENU key to access the Main Menu screen.
2) Use UP or DOWN keys and ENTER key to enter USER password 1313.
3) Press the UP or DOWN keys to scroll to the **Settings** menu; press ENTER key.
4) Press UP or DOWN keys to scroll to **Date/Time** menu; press ENTER key.
5) Press UP or DOWN keys to scroll to **Date/Time change**.
6) Press ENTER key to scroll to the desired value to be changed (see Figure 35).
7) Press UP or DOWN keys to change the value.
8) Press ENTER key to save and to scroll to top of screen.
9) Press UP or DOWN keys to scroll to **Timezone** (if applicable). Follow steps 6-8 to change timezone.
10) Press ESCAPE key several times to return to Main Menu screen.

FIGURE 35
Setting Controller Date and Time

NOTE: *The LC6000 will sync the time and date configured to each of the wall-mount units once communication is established.*

5. Configure Sensors

The system will need to be configured for the number of temperature and humidity sensors installed. The system is shipped with one combination temperature and humidity sensor. Additional combination sensors may be purchased or alternatively, temperature-only sensors may be purchased instead. The LC is capable of supporting up to four indoor temperature sensors (two in zone 1, one in zone 2 and one in zone 3), three indoor humidity sensors (one per zone), one outdoor temperature sensor and one outdoor humidity sensor. The system will need to be configured for the various configurations.

If necessary, the sensors could be calibrated at this time too. For information on calibrating the sensors (adjusting the offset), see page 42.

To enable/disable **Zone 1 Indoor Humidity**:

1) Press MENU key to go to the Main Menu screen.
2) Press UP or DOWN keys and ENTER key to enter USER password 2000.
3) Press UP or DOWN keys to scroll to **IO Config**; press ENTER key.
4) Press UP or DOWN keys to scroll to **Z1 Indoor Hum C4**.
5) Press ENTER key to scroll to **Enable** (see Figure 36 on page 38).
6) Press UP or DOWN key to change value to ON to enable sensor (or change value to OFF to disable sensor).

FIGURE 36
Enable/Disable Zone 1 Indoor Humidity Sensor

To enable/disable **Zone 2 Indoor Humidity**:

1) Press MENU key to go to the Main Menu screen.
2) Press UP or DOWN keys and ENTER key to enter USER password 2000.
3) Press UP or DOWN keys to scroll to **IO Config**; press ENTER key.
4) Press UP or DOWN keys to scroll to **Z2 Indoor Hum C5**.
5) Press ENTER key to scroll to **Enable** (see Figure 37).
6) Press UP or DOWN key to change value to ON to enable sensor (or change value to OFF to disable sensor).

FIGURE 37
Enable/Disable Zone 2 Indoor Humidity Sensor

To enable/disable **Zone 3 Indoor Humidity**:

1) Press MENU key to go to the Main Menu screen.
2) Press UP or DOWN keys and ENTER key to enter USER password 2000.
3) Press UP or DOWN keys to scroll to **IO Config**; press ENTER key.
4) Press UP or DOWN keys to scroll to **Z3 Indoor Hum C6**.
5) Press ENTER key to scroll to **Enable** (see Figure 38).
6) Press UP or DOWN key to change value to ON to enable sensor (or change value to OFF to disable sensor).

FIGURE 38
Enable/Disable Zone 3 Indoor Humidity Sensor

To enable/disable **Zone 1 Indoor Temperature**:

1) Press MENU key to go to the Main Menu screen.
2) Use UP or DOWN keys and ENTER key to enter USER password 2000.
3) Press UP or DOWN keys to scroll to **IO Config**; press ENTER key.
4) Press UP or DOWN keys to scroll to **Z1 Indoor Temp C7**.
5) Press ENTER key to scroll to **Enable** (see Figure 39).
6) Press UP or DOWN key to change value to ON to enable sensor (or change value to OFF to disable sensor).

FIGURE 39
Enable/Disable Zone 1 Indoor Temperature Sensor

To enable/disable **Zone 1 Remote Temperature**:

1) Press MENU key to go to the Main Menu screen.

2) Use UP or DOWN keys and ENTER key to enter USER password 2000.

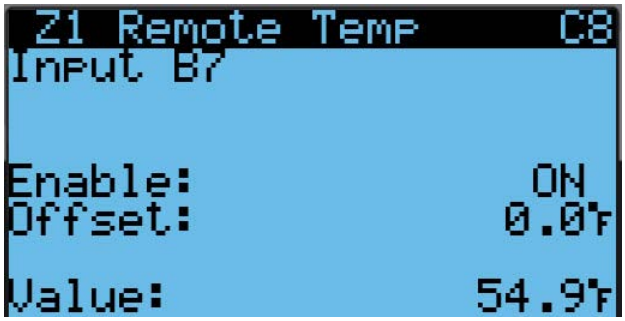
3) Press UP or DOWN keys to scroll to **IO Config**; press ENTER key.

4) Press UP or DOWN keys to scroll to **Z1 Remote Temp C8**.

5) Press ENTER key to scroll to **Enable** (see Figure 40).

6) Press UP or DOWN key to change value to ON to enable sensor (or change value to OFF to disable sensor).

FIGURE 40
Enable/Disable Zone 1 Remote Temperature Sensor



To enable/disable **Zone 2 Remote Temperature**:

1) Press MENU key to go to the Main Menu screen.

2) Use UP or DOWN keys and ENTER key to enter USER password 2000.

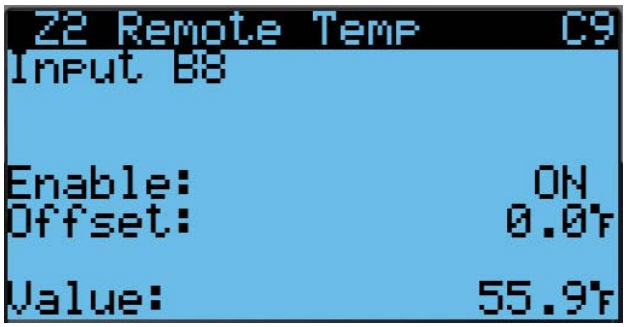
3) Press UP or DOWN keys to scroll to **IO Config**; press ENTER key.

4) Press UP or DOWN keys to scroll to **Z2 Remote Temp C9**.

5) Press ENTER key to scroll to **Enable** (see Figure 41).

6) Press UP or DOWN key to change value to ON to enable sensor (or change value to OFF to disable sensor).

FIGURE 41
Enable/Disable Zone 2 Remote Temperature Sensor



To enable/disable **Zone 3 Remote Temperature**:

1) Press MENU key to go to the Main Menu screen.

2) Use UP or DOWN keys and ENTER key to enter USER password 2000.

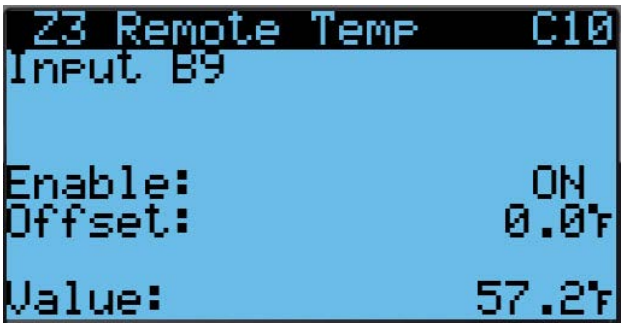
3) Press UP or DOWN keys to scroll to **IO Config**; press ENTER key.

4) Press UP or DOWN keys to scroll to **Z3 Remote Temp C10**.

5) Press ENTER key to scroll to **Enable** (see Figure 42).

6) Press UP or DOWN key to change value to ON to enable sensor (or change value to OFF to disable sensor).

FIGURE 42
Enable/Disable Zone 3 Remote Temperature Sensor



To enable/disable **Outdoor Air Humidity**:

1) Press MENU key to go to the Main Menu screen.

2) Use UP or DOWN keys and ENTER key to enter USER password 2000.

3) Press UP or DOWN keys to scroll to **IO Config**; press ENTER key.

4) Press UP or DOWN keys to scroll to **Outdoor Air Humid C11**.

5) Press ENTER key to scroll to **Enable** (see Figure 43 on page 40).

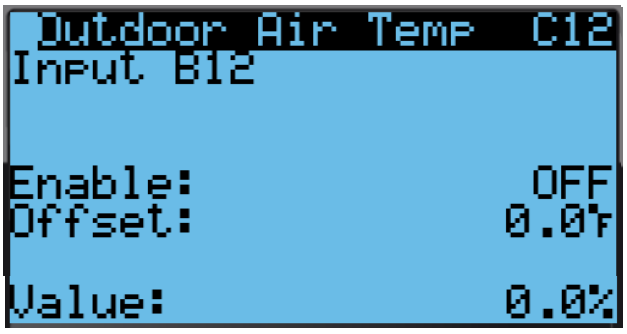
6) Press UP or DOWN key to change value to ON to enable sensor (or change value to OFF to disable sensor).

FIGURE 43
Enable/Disable Outdoor Air Humidity Sensor

To enable/disable **Outdoor Air Temperature**:

1) Press MENU key to go to the Main Menu screen.
2) Use UP or DOWN keys and ENTER key to enter USER password 2000.
3) Press UP or DOWN keys to scroll to **IO Config**; press ENTER key.
4) Press UP or DOWN keys to scroll to **Outdoor Air Temp C12**.
5) Press ENTER key to scroll to **Enable** (see Figure 44).
6) Press UP or DOWN key to change value to ON to enable sensor (or change value to OFF to disable sensor).

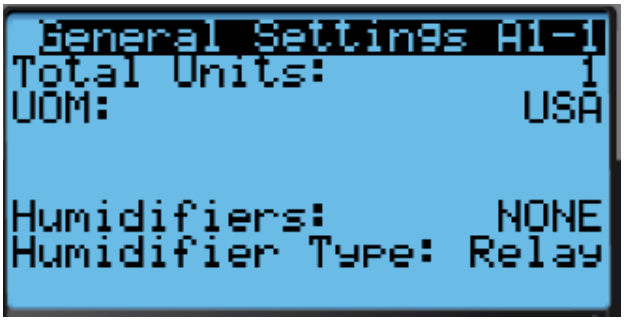
FIGURE 44
Enable/Disable Outdoor Air Temperature



6. Enter Total Number of Units

1) Press MENU key to go to the Main Menu screen.
2) Press UP or DOWN keys and ENTER key to enter USER password 2000.
3) Press UP or DOWN keys to scroll to **Sys Config**; press ENTER key.
4) Press UP or DOWN keys to scroll to **General**; press enter key.
5) Press ENTER key to scroll to **Total Units** (see Figure 45).
6) Press UP or DOWN keys to adjust value to correct number of units.
7) Press ENTER key to save value.
8) Press the ESCAPE key several times to return to Main Menu screen.

FIGURE 45
Total Units Displayed



7. Verify Units Are Online

Once a unit is uniquely addressed, communication can be verified at the LC controller.

With the correct number of units set at the LC controller, each unit can be remotely viewed from the controller information screen.

To view these screens:

1) Press ESCAPE key to view the Status screen. (May need to be pressed more than once.)
2) Press UP or DOWN key until the Quick Menu in the lower right corner of the screen displays the Information icon ( ); press ENTER key.
3) Press UP or DOWN keys to scroll through the Information screens until the desired unit Information screen appears.

In addition to being able to remotely view the units, an alarm will be generated on the LC controller for units not communicating.

8. Select Economizer Type for Each Zone

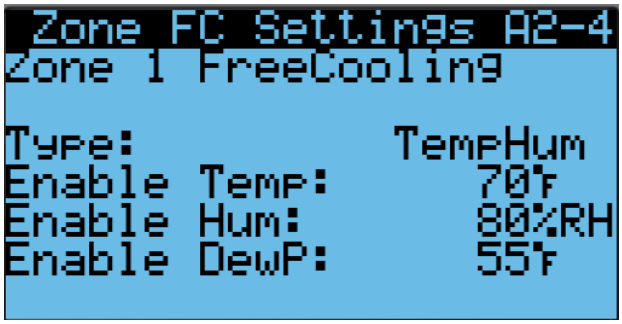
Each zone can be configured to operate the economizers with different considerations. For more information on the different economizer choices, reference the most recent version of MEGA-TEC Service Instructions 2100-671.

The type of consideration can be set to none, dry bulb, temperature and humidity or enthalpy. These settings will be communicated to the wall units while connected to the LC6000 to ensure all units operate the same.

To select economizer type for each zone:

1) Press MENU key to go to the Main Menu screen.
2) Use UP or DOWN keys and ENTER key to enter password 1313.
3) Press UP or DOWN keys to scroll to **Sys Config**; press ENTER key.
4) Press UP or DOWN keys to scroll to **Zone 1**, **Zone 2** or **Zone 3**; press ENTER key.
5) Press UP or DOWN keys to scroll to **Zone FC Settings A2-4** (Zone 1), **Zone FC Settings A3-4** (Zone 2) or **Zone FC Settings A4-4** (Zone 3**)**.
6) Press ENTER key to scroll to **Type** (see Figure 46).
7) Press UP or DOWN keys to change economizer type to **None**, **Drybulb**, **TempHum** or **Enthalpy**.
8) Press ENTER key to save.

FIGURE 46
Selecting Economizer Type



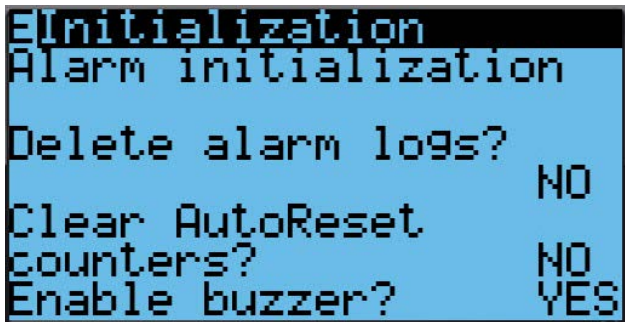
9. Clear Controller Alarm Logs

The LC6000 may have generated some alarms during startup and should be cleared after installation. Controller alarm logs must be cleared at time of installation.

To clear the LC controller alarm logs:

1) Press MENU key to go to the Main Menu screen.
2) Use UP or DOWN keys and ENTER key to enter USER password 2000.
3) Press UP or DOWN keys to scroll to **Settings**; press ENTER key.
4) Press UP or DOWN keys to scroll to **Initialization**; press ENTER key.
5) Press ENTER key to scroll to **Delete alarm logs?** (see Figure 47).
6) Press UP or DOWN key to value to **YES**; press ENTER key.
7) Press ESCAPE key several times to return to Main Menu screen.

FIGURE 47
Clearing LC6000 Alarm Logs



10. Complete Installation

Once all the installation steps have been completed, all alarms and alarm logs have been cleared and system verification and self test results were satisfactory, the installation can now be considered “complete".

Additional programming information can be found in MEGA-TEC Service Instructions 2100-671 and LC6000 Service Instructions 2100-669.

ADDITIONAL INFORMATION

Menu Screens and Password Levels

TABLE 5
TEC-EYE Menu Structure

Menu/Screen Structure	Password Level Required
Quick Menu	
Setpoints (Orphan Mode Temperature Control)	None
Information	None
Alarm Log	None
Main Menu	
System Config	User
Adv. Sys. Config	Technician
I/O Config	Technician
Digital Inputs	Technician
Digital Outputs	Technician
Analog Inputs	Technician
Analog Outputs	Technician
Fan/Blowers	Technician
Manual EEV	Technician
On/Off	User
Alarm Logs	User
Settings	--
Date/Time	Technician
Initialization	Technician
Change Passwords	Varies
Logout	--

TABLE 6
LC6000 Controller Menu Structure

Menu/Screen Structure	Password Level Required
Quick Menu	
Setpoints (Comfort Mode)	None
Information	None
System	None
Unit 1	None
Unit 2	None
Unit 3...14	None
Alarm Log	None
Main Menu	
System Config	User
Adv. Sys. Config	Technician
I/O Config	Technician
On/Off	User
Alarm Logs	User
Settings	--
Date/Time	Technician
Language	User
Network Config	Technician
Serial Config	Technician
Initialization	Varies
Logout	--

Setpoints

The *LC6000* setpoints will determine the cooling and heating setpoints when *communicating with the wall-mount units*. The *unit* cooling and heating setpoints will determine the cooling and heating setpoints when *in orphan mode*. It is important to note that once the wall-mount unit establishes communication with the LC6000, the setpoints from the LC will override the wall-mount unit setpoints. If a unit returns to orphan mode after communicating with LC, it will operate with last communicated setpoints from the LC.

If at any time the unit(s) loses communication with the LC6000 controller, the unit(s) will go into orphan mode.

Calibrating Sensors

1. Press MENU key on LC controller interface to go to the Main Menu screen.
2. Use UP or DOWN keys and ENTER key to enter USER password 2000.
3. Press UP or DOWN keys to scroll to **I/O Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to sensor to be adjusted.
5. Press ENTER key to scroll to **Offset** (see Figure 48).
6. Press UP or DOWN keys to add or subtract to the sensor offset value.
7. Press ENTER key to save.

FIGURE 48
Adjusting Sensor Offset Value

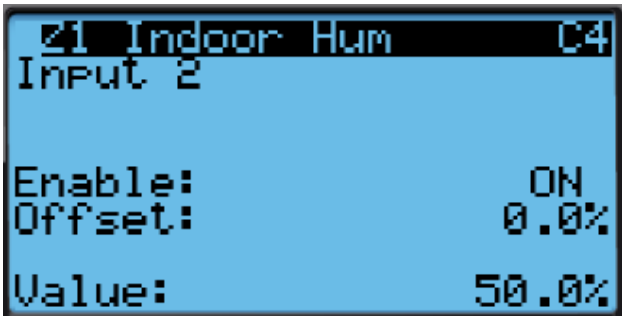


TABLE 7
Unit Status Messages

Message	Description
Orphan Mode	This message will be shown when unit is not connected to the LC or stand-alone display. The unit is not operating when this message is shown but is ready to heat or cool based on the return air temperature. Blower will run continuously in this mode.
Standalone Mode	This message will be shown when the unit is communicating with stand-alone display. The unit is not operating when this message is shown but is ready to heat or cool based on the display temperature sensor.
LC Online	This message will be shown when the unit is communicating with the LC6000. The unit is not operating when this message is shown but is ready to respond to any call or event from the LC.
Cont. Blower	The message will be shown when the unit has been commanded to run the blower continuously by the LC6000 or the stand-alone display.
Comfort Mode	This message will be shown when the unit has been put into comfort mode by the stand-alone display.
Freecooling	This message will be shown when the unit is utilizing the economizer to cool the space.
Passive Dehum	This message will be shown when the unit is connected to the LC6000 or stand-alone display and the economizer is disabled and blower speeds have been lowered to optimize moisture removal.
Cooling	This message will be shown when the unit is operating the air conditioning system to cool the space.
Heating	This message will be shown when the unit is operating the electric heaters to warm the space.
Optimized	This message will be shown when the unit is operating both the economizer and the air conditioning simultaneously to cool the space.
Active Dehum	This message will be shown when the unit is connected to the LC6000 or stand-alone display, no heating or cooling calls are required and the air conditioner and electric heat are being used together to remove moisture from the space.
Self Test	This message will be shown when the self test has been activated and component operations are being verified.
Off by Alarm	This message will be shown when the blower, fan or expansion module are no longer communicating with the main controller. Also, when unit disable, emergency off or no return sensor is detected in orphan mode.
Emergency Vent	This message will be shown when connected to a LC6000 and the emergency vent input is activated.
Emergency Cool	This message will be shown when the space temperature is above the high temperature setpoint. This can be active in orphan mode, stand-alone mode or when connected to the LC6000.
Emergency Off	This message will be shown when unit disable input is active, or when connected to LC6000 and emergency off input is active.
Off by LC	This message will be shown when connected to the LC6000 and the system is turned off.
Off by PGDx	This message will be shown when connected to the stand-alone display and the unit is turned off.
Off by Keyboard	This message will be shown when unit has been turned off at unit.
Model Invalid	This message will be shown when a valid model number is not entered into the controller.

TABLE 8
LC6000 Status Messages

Message	Description
On	The LC6000 is ready and functioning properly.
Off by BMS	The LC6000 is being turned off by the Building Management System through Modbus TCP/IP.
Off by Keyboard	The LC6000 is turned off using the (D. On/Off) Menu on the PGD. All communicating units will be inactive.
Comfort Mode	The LC6000 is set to Comfort Mode. This mode is used to temporarily override heating/cooling setpoints and maintain a default temperature of 72°F for 60 minutes.
Emergency Cooling	A high temperature has been sensed in one or more zones. All available units in that zone are sent a command for emergency cooling. (Refer to unit manual for emergency cooling sequence.)
Emergency Vent	Input signal from an external device at terminal DI2 (e.g., hydrogen detector). Units that are equipped with a ventilation option and configured will open the dampers at 100% with the blower at full speed.

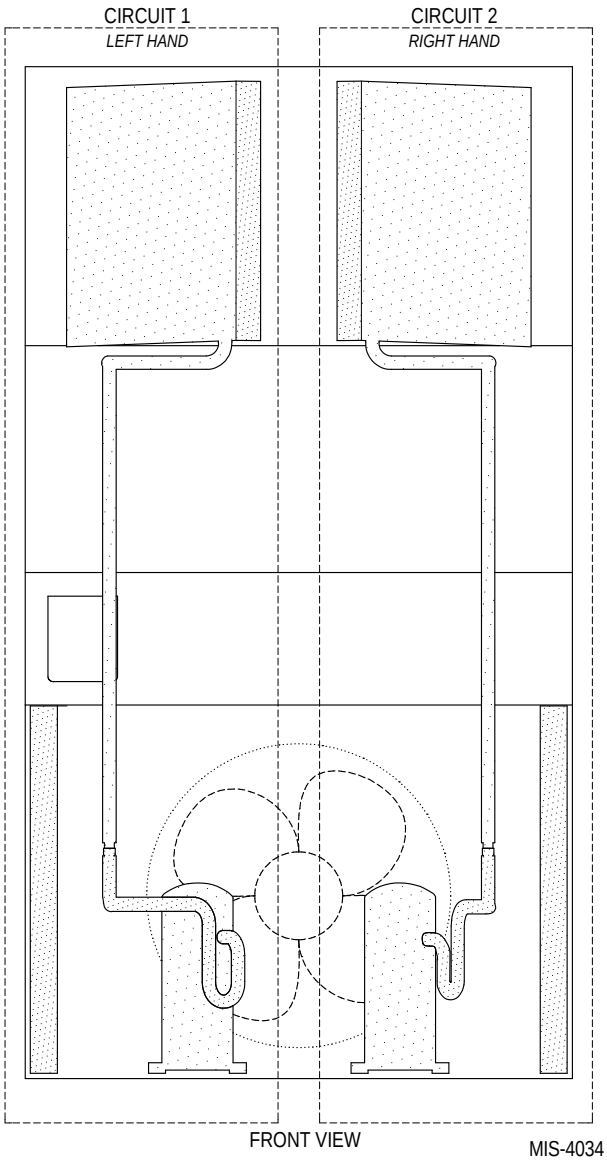
A/C Circuit Information

MEGA-TEC Series wall-mounted air conditioners have two separate refrigeration circuits: Circuit 1 is the two stage system located on the left side of the unit and circuit 2 is the single stage system on the right side (see Figure 49).

NOTE: *400V models have only two stages of capacity rather than three and are identical in size. Take note of this when reading this manual.*

For more information on the MEGA-TEC dual A/C circuits, see the latest version of Service Instructions 2100-671.

FIGURE 49
MEGA-TEC Refrigeration Circuits

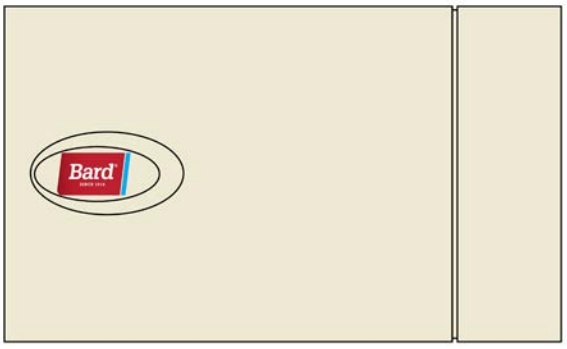


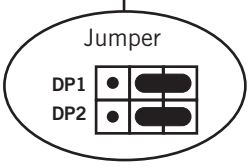
Remote Indoor Temperature/Humidity Sensor Orientation

Current versions of the remote indoor temperature/ humidity sensor need to be installed with the shielded cable wires entering the bottom of the back of the sensor to connect to the sensor terminals (see Figure 50). Earlier versions of this sensor were installed so that the sensor wires entered through the top of the back of the sensor (see Figure 51). **The orientation of the sensor affects the position of the DP1/DP2 jumpers. Depending on how the sensor is installed, be sure to confirm that the jumpers are in the proper position for the 0-1 V setting as shown in the figures below.**

This applies to all indoor temperature/humidity sensors connected to the LC controller. See illustration mounted inside of sensor cover for further detail on jumper position.

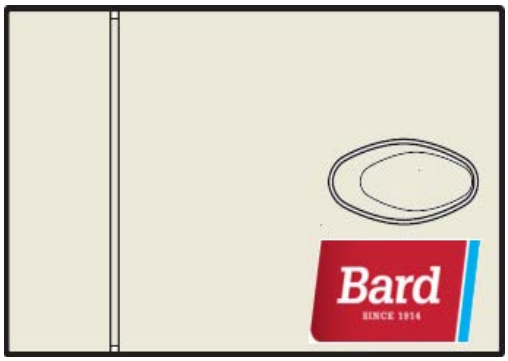
FIGURE 50
Current Sensor Orientation
(Shielded Cable Wires Enter from Bottom)

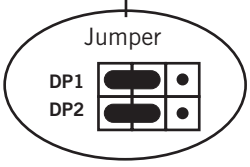




DP1 and DP2 Jumpers
Positioned for 0-1V
(Current Orientation)

FIGURE 51
Earlier Sensor Orientation
(Shielded Cable Wires Enter from Top)

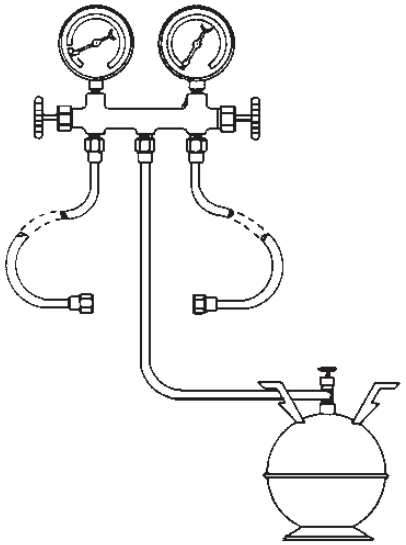




DP1 and DP2 Jumpers
Positioned for 0-1V
(Earlier Orientation)

SERVICING PROCEDURE

R-410A
LEAK TEST EVACUATION
CHARGING



Bard Manufacturing Company, Inc.
Bryan, Ohio 43506

Since 1914...Moving ahead, just as planned.

Manual No.: 2100-479
Supersedes: NEW
File: Volume I, Tab 1
Date: 03-08-07

CONTENTS

General

⚠ WARNING

The oils used with R-410A refrigerant are hydroscopic and absorb water from the atmosphere readily. Do not leave systems open to the atmosphere for more than 5 minutes. If the system has been open for more than 5 minutes, change the filter dryer immediately before evacuation. Then recharge the system to the factory specified charge.

Recovery equipment rated for R-410A refrigerant
R-410A has an ozone depletion potential of zero, but must be reclaimed due to its global warming potential.

The gauge manifold set is specially designed to withstand the higher pressure associated with R-410A. Manifold sets are required to range up to 800 psig on the high side and 250 psig on the low side with a 250 psig low side retard.

All hoses must have a service rating of 800 psig. (This information will be indicated on the hoses.)

Vacuum Pump and micron gauge must be used when evacuating a system to 500 microns.

Leak Detectors
An electronic leak detector capable of detecting HFC refrigerant can be used with R-410A refrigerant.

GAUGE MANIFOLD

⚠ WARNING

Gauge manifold must be suitable for use with R-410A refrigerant and POE oils.

A necessary instrument in checking and serving air conditioning and heat pump equipment is the gauge manifold. Its purpose is to determine the operating refrigerant pressures in order for the serviceman to analyze the condition of the system.

The valving on the manifold is so arranged that when the valves are closed (front-seated) the center port on the manifold is closed to the gauges and gauge ports. With the valves in the closed position, the gauge ports are still open to the gauges, permitting the gauges to register system pressures. Opening either valve opens the center port to that side of the manifold and system.

ATTACHING GAUGE MANIFOLD

For leak testing, purging, checking charge, charging liquid or evacuating, connect high pressure side of gauge manifold to Schrader valve on liquid or discharge line. Connect suction side of gauge manifold to Schrader valve on suction line. On heat pumps the suction line is between compressor and reversing valve.

ATTACHING MANIFOLD HOSE TO SCHRADER VALVE

WARNING

As a safety measure, it is wise to detach refrigerant hoses at the lowest pressure readings on the system. To do this:

A. Put high pressure hose “B” on first. (Unit should not be running.)

B. Put low pressure hose “A” on second. (Unit should be running.)

1. Remove cap from valve.
2. Make sure gauge manifold valves are closed.
3. If hose does not have an unseating pin, a number 395 Superior or equivalent unseating coupler must be used.
4. Make sure coupler is lined up straight with Schrader valve. Screw coupler on to valve.
5. Open gauge manifold valve slightly and purge air from hose with refrigerant.
6. Read the suction pressure on compound gauge and heat pressure on pressure gauge.
7. To remove, push end of hose tight against end of Schrader valve and hold in place while quickly unscrewing coupler nut from Schrader valve.
8. Remove coupler from Schrader valve. Replace caps on valve.

Leak Test

1. Remove gauge port cap from suction and liquid service valve ports and attach manifold gauge hoses. Connect an upright R-410A drum to center port of gauge manifold. Open refrigerant drum valve and manifold high pressure gauge valve to pressurize system to a positive pressure with refrigerant vapor. Pressurize the complete system with dry nitrogen, or CO2 until the pressure reaches 200 psig. **Do not** exceed 250 psig.
2. Close manifold high pressure gauge valve. Check all soldered joints, including those on the evaporator coil with an Electronic Leak Detector suitable for use with HFC refrigerants or R-410A. If a leak is found which requires soldering, pressure in the system must be bled off since it is impossible to solder with unit pressurized. Be sure all leaks are located and marked before bleeding pressure from system.
3. Close drum valve and disconnect from center port. Release nitrogen or CO2 into the atmosphere through suction line of gauge manifold.
4. Correct any leaks and recheck. When leaks, if any, have been repaired, system is ready to be evacuated and charged. Relieve all pressure from the system down to 0 psig.
5. Change the filter dryer. When leaks, if any, have been repaired, system is ready to be evacuated and charged. Relieve all pressure from the system down to 0 psig.

EVACUATION

Evacuation

An evacuation to 500 microns is usually sufficient to remove moisture from a system using R-22 and mineral oil lubricant. A 500 micron evacuation, however, will not separate moisture from Polyol Ester oil (POE) in R-410A systems.

In addition to a 500 micron evacuation, the liquid line filter dryer (R-410A compatible) must be replaced any time the system is open. When removing a filter dryer from a system, do not use a torch; use a tubing cutter to avoid releasing moisture back into the system.

Older R-22 leak detectors, as well as halide torch leak detectors, will not detect leaks in R-410A systems. Never use air and R-410A to leak check, as the mixture may become flammable at pressures above 1 atmosphere. A system can be safely leak-checked by using nitrogen or a trace gas of R-410A and nitrogen.

Remember: *Always use a pressure regulator with nitrogen and a safety valve down stream - set at no more than 150 psig.*

1. Evacuate system to less than 500 microns, using a good vacuum pump and an accurate high vacuum gauge. Operate the pump below 500 microns for 60 minutes and then close valve to the vacuum pump. Allow the system to stand for 30 additional minutes to be sure a 500 micron vacuum or less is maintained.

WARNING

At no time use the compressor to evacuate the system or any part of it.

2. Disconnect charging line at vacuum pump and connect to refrigerant supply. Crack the cylinder valve and purge charging line at center on manifold. Then close cylinder valve.
3. The system is now ready for the correct operating charge of Refrigerant R-410A.

R-410A System Charging

Even though R-410A has a very small fractionation potential, it cannot be ignored completely when charging. To avoid fractionation, charging of an air conditioner or heat pump system incorporating R-410A **shall be done with "liquid"** to maintain optimum system performance. To insure that the proper blend composition is charged into the system, it is important that liquid only be removed from the charging cylinder. Some cylinders supplied by manufacturers have dip tubes, which allow liquid refrigerant to be removed from the cylinder when it is in the upright position. Cylinders without dip tubes have to be tipped upside down in order for liquid to be removed. The Service Technician must differentiate between which type of charging cylinder they are using to avoid removing vapor refrigerant instead of liquid refrigerant to avoid fractionation and for safety concerns.

Connect the gauge manifold to the high and low side. Allow liquid to enter the high side only. The high side will hold 80-100% of the total charge. When liquid stops flowing, close high side port. The remainder of the charge will be added to the low side. Keep in mind two issues: first, never start the compressor with less than 55 psig of suction pressure. Secondly, make sure the liquid is throttled, thus vaporized into the low side of the system to avoid compressor damage. A throttling valve can be used to insure that liquid is converted to vapor prior to entering the system. Proper manipulation (restricting) of the manifold gauge set can also act as a throttling device to insure liquid is not entering the compressor.

CHARGING

1. **Single Package Units**—Refer to the unit serial plate for the full operating charge.

PRELIMINARY CHARGING STEPS

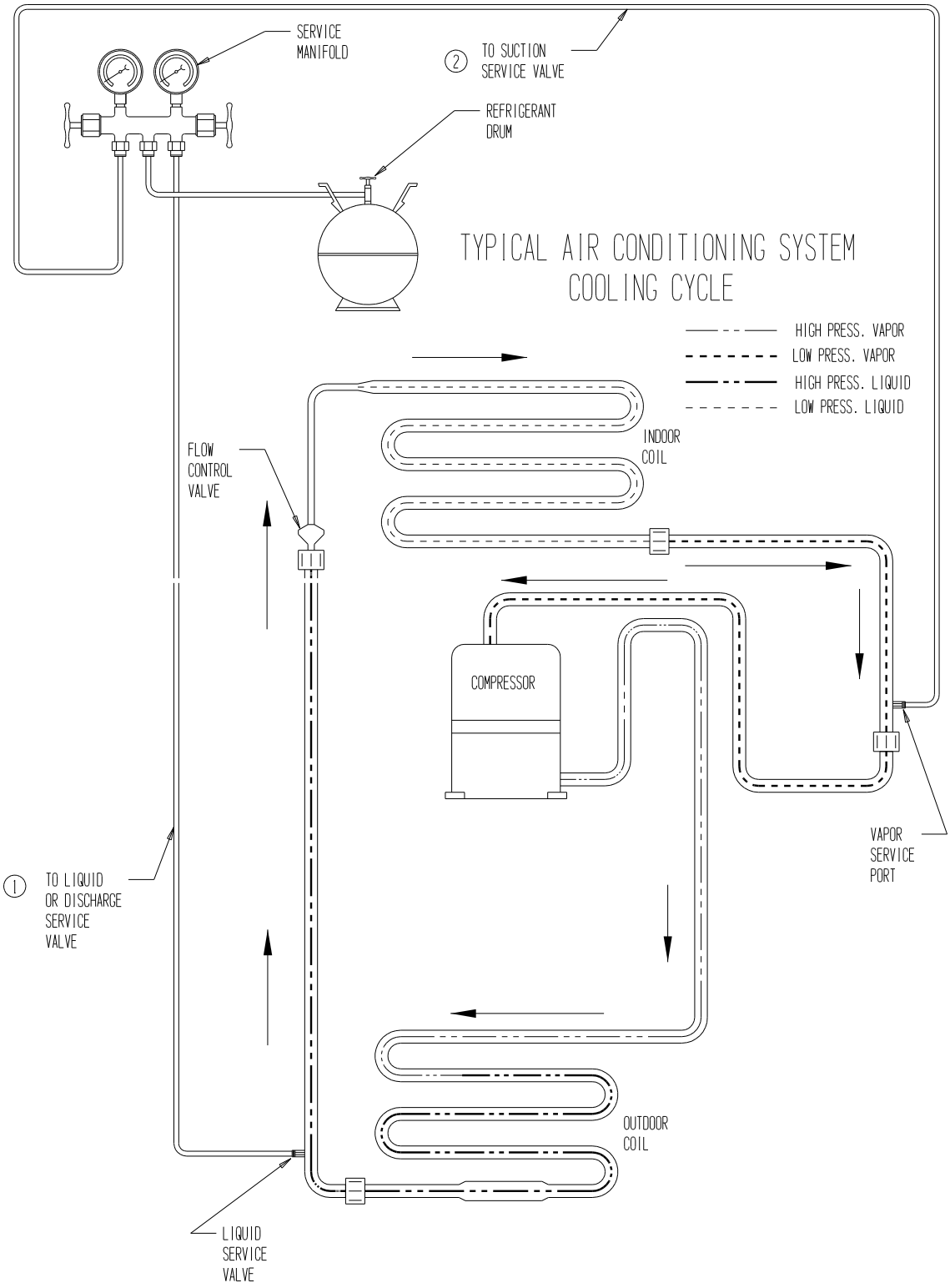
If the system has been open to the atmosphere, the filter dryer should be replaced and then evacuated. Then proceed as follows:

1. Attach a drum of proper, clean refrigerant to the center port of the charging manifold with one of the charging hoses.
2. Attach a second charging hose to the suction gauge (low pressure) side of the gauge manifold.
3. Remove the cap from the suction line valve.
4. Loosely attach the suction gauge hose to the line valve. Open the valve on the refrigerant drum and the suction valve on the charging manifold slightly to purge the air from the manifold and hoses before tightening the fitting.
5. Attach the third hose to the high pressure side of the manifold and the liquid line valve. Repeat steps 3 and 4 above.

CHARGING THE SYSTEM BY WEIGHT

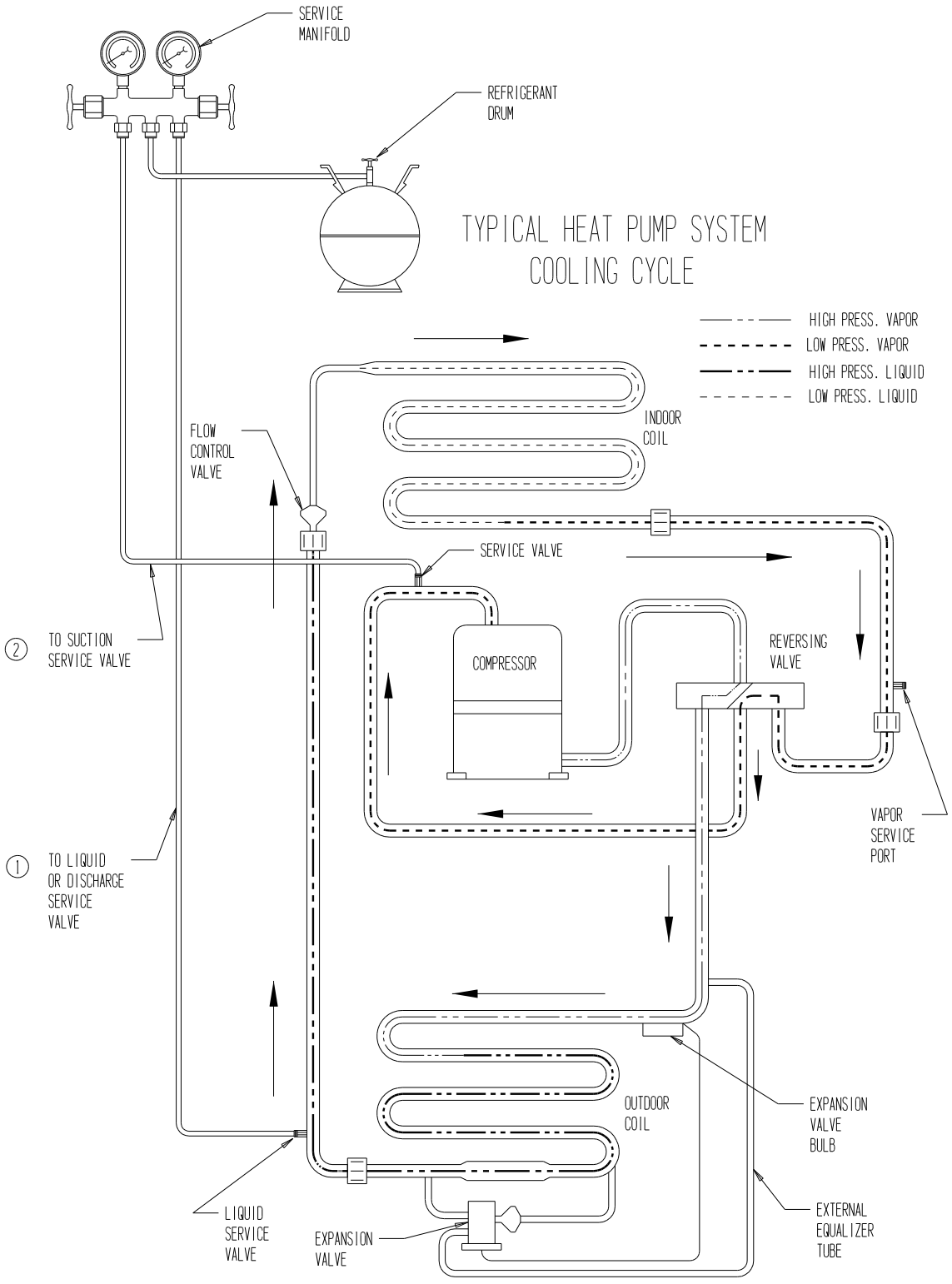
1. Connect manifold as instructed.
2. Place refrigerant drum upright on scale and determine exact weight of the refrigerant and cylinder.
3. With manifold suction valve closed and manifold discharge valve open, open refrigerant cylinder liquid valve and allow pressure in system to balance with pressure of cylinder or 80% of charge is in the unit - whichever comes first.
4. When there is approximately an 80% charge, front seat (close) the discharge manifold valve and let the system stabilize for about five minutes.
5. Start compressor by setting thermostat.
6. Finish charging with liquid by cracking the suction valve. Open the manifold low pressure valve to allow refrigerant to flow into the system. Throttle the manifold valve to keep pressure about 100 psig for R-410A.
7. When the correct weight of refrigerant has been added to the unit, close refrigerant cylinder valve and allow unit to run for 30 minutes. Refer to Start-Up Procedure and Check List for further start-up details.
8. Front seat gauge manifold valves, disconnect charging and gauge hoses and replace all valve caps.

FIGURE 1
TYPICAL AIR CONDITIONING SYSTEM COOLING CYCLE



MIS-369

FIGURE 2
TYPICAL HEAT PUMP SYSTEM COOLING CYCLE

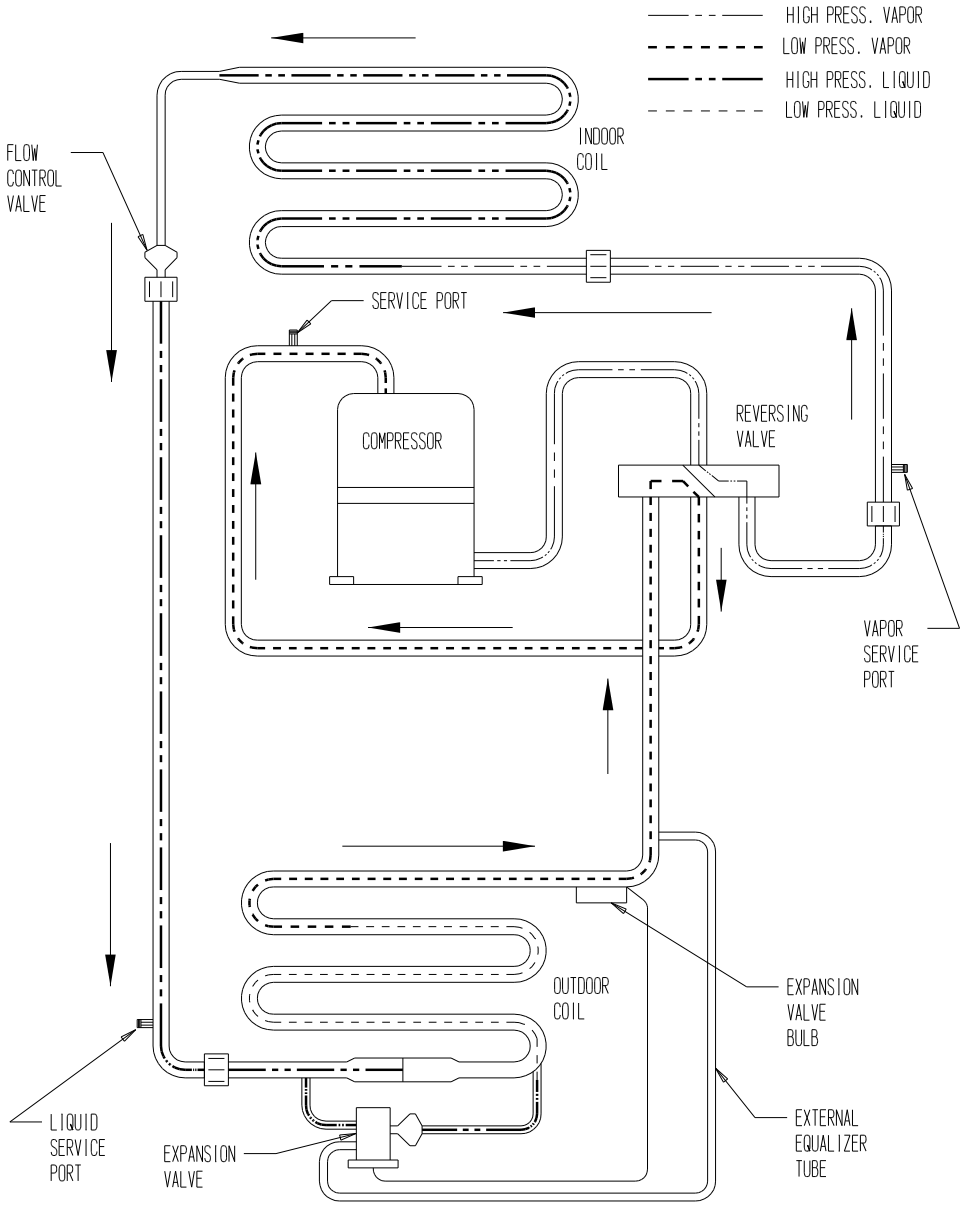


MIS-368

⚠ WARNING

To speed refrigerant flow, it may be necessary to place refrigerant drum in a pan of warm water (not greater than 130ºF). Remember to either consider the total weight of the pan of water or remove the drum for weighing frequently to keep track of the charging process.

FIGURE 3
HEATING CYCLE



MIS-289

TROUBLESHOOTING THE MECHANICAL SYSTEM

AIR CONDITIONING AND HEAT PUMP — COOLING

LOW SUCTION—LOW HEAD PRESSURE

1. Restricted airflow over indoor coil.
2. Defective indoor fan motor.
3. Low indoor temperature
4. Iced indoor coil.
5. Restricted liquid line, dryer, metering device, etc.
6. Low charge.
7. Low ambient entering air temperature. (Low entering water temperature to water coil.①)

HIGH SUCTION—LOW HEAD PRESSURE

1. Defective or broken valves.
2. IPRV valve open.
3. Defective reversing valve.

LOW SUCTION—HIGH HEAD PRESSURE

1. Partial restriction and then overcharged.

HIGH SUCTION—HIGH HEAD PRESSURE

1. High entering outdoor air temperature. (High entering water temperature.①)
2. Low airflow outdoor coil. (Low water flow.①)
3. Overcharged.
4. Air in system.
5. Restricted outdoor coil. (Restricted water coil.①)
6. High indoor air temperature.

① Water source heat pump.

HEAT PUMP — HEATING

LOW SUCTION—LOW HEAD PRESSURE

1. Restricted airflow through outdoor coil. (Restricted water flow through water coil.①)
2. Defective outdoor motor. (Defective water pump.①)
3. Low outdoor air temperature. (Low water temperature.①)
4. Frozen outdoor coil. (Frozen water coil.①)
5. Restricted liquid line, dryer, metering device, etc.
6. Low charge.
7. Low indoor air temperature.

HIGH SUCTION—LOW HEAD PRESSURE

1. Defective or broken valves.
2. IPR valve open.
3. Defective reversing valve.

LOW SUCTION—HIGH HEAD PRESSURE

1. Partial restriction and then overcharged.

HIGH SUCTION—HIGH HEAD PRESSURE

1. High entering outdoor air temperature. (High entering water temperature.①)
2. Low indoor airflow.
3. Overcharged.
4. Air in system.
5. Restricted air coil.
6. High indoor air temperature.

① Water source heat pump.

TROUBLESHOOTING CHART FOR AIR CONDITIONERS

● Generally the cause. Always make these checks first.
◆ Occasionally the cause. Make these checks only if first checks fail to locate trouble.
■ Rarely the cause. Make this check only if previous checks fail to locate trouble.

Group	Subgroup	Cause	Compressor and condenser fan motor will not start	Compressor will not start but condenser fan will run	Condenser fan motor will not start	Compressor "hums" but will not start	Compressor cycles on overload	Compressor short cycles on low pressure	Compressor runs continuously—no cooling	Compressor runs continuously—cooling	Compressor noisy	Compressor loses oil	Head pressure too high	Head pressure too low	Liquid line frosting or sweating	Suction pressure too high	Suction pressure too low	Evaporator frosting	Suction line frosting or sweating	Evaporator blower will not start	Condenser fan motor runs contactor not pulled in	Liquid refrigerant flooding back to compressor—cap tube system	Space temperature too high
Power Supply	Meter to Line Side of Contactor	Power Failure	●																	●			
		Blown Fuses or Tripped Circuit Breakers	●																	●			
		Faulty Wiring	●			●	●													●			
		Loose Terminals	●	◆		●	●													●			
		Low Voltage	◆	◆		◆	●													■			
		Single 1PH Failure of 3PH	■	◆		◆	■													■			
		Unbalanced Power Supply 3PH	■	◆		◆	●																
		Voltage Too High																					
		Open Disconnect Switch	●																				
	Load Side of Contactor to Motor Terminal	Faulty Wiring	●	●	●	●	●													●			
		Loose Terminal	●	●	●	●	●													●			
		Low Voltage	◆	◆		◆	●													■			
		Defective Contacts in Contactor	◆	◆		◆	●																
		Compressor Overload	●	●		●	◆																
		Potential Relay Fails to Open				●	●																
		Potential Relay Fails to Close		◆																			
		Run Capacitor		●			●				◆												
		Start Capacitor		●		●																	
	Control Circuit	Faulty Wiring	●							●										●			
		Loose Terminals	●																	●			
		Control Transformer	●																	●			
		Low Voltage	◆																	■			
		Thermostat	◆							●										■			●
		Contactor Coil	●																				
		Pressure Control	●																				
		Condenser Fan Relay			●																		
		Evaporator Fan Relay																		●			
Motors		Compressor Motor		●		◆	◆																
		Condenser Motor	■		●																		
		Evaporator Motor	■															◆		●			
		Compressor Off on Internal Overload																			●		
High Pressure Side of System	Compressor	Hold Down Bolts									●												
		Defective Compressor Bearings		●		●					●												
		Seized Compressor		●		◆																	
		Defective Compressor Valves					■		●		●			◆		●							◆
		Compressor Oil Level					■				●		■										
		Open or Short Motor Windings		●		◆	◆																
	System Operation	Refrigerant Charge Low	●				◆	●	●			●		●			●	◆					●
		Overcharge of Refrigerant	■			■	◆						●			◆			●			●	
		High Head Pressure	●			■	◆									●							
		High Suction Pressure					◆		◆														
		Low Suction Pressure	●			■		●				●		●				●					●
		Temperatures				■							●			◆	◆	◆				■	
		Non-Condensables (Air, etc.)	●				◆		◆				●										
		Excessive Load in Space					◆			●			◆			●							
		Liquid Valve Partially Closed													●								
	Condenser Air	Condenser Fins Dirty or Plugged	■				■		■				●										
		Condenser Fan Belt Slipping	■				■		■				●										
		Condenser Air Short Circuiting	■				■		■				◆										
		Low Condenser Air Volume	■				■		■				●										
		Condenser Air Temperature Low					■		■					●									
Low Side	Evaporator Air	Plugged or Restricted Metering Device						●	◆				◆		◆		◆	◆	◆●				◆
		Evaporator Fins Dirty or Plugged						●	●			■					◆	◆	●			◆	●
		Evaporator Belt Slipping						●	●			■					●	●	●			◆	●
		Low Evaporator Air Volume						●	●			■					●	●	◆●			◆	●
		Dirty Filters						●	●			■					●	●	■			◆	●
		Ductwork Small or Restricted						●	●			■					●	●				◆	●
General		Restrictions					■	●	◆			◆	■		●		◆	◆					
		Thermostat Setting	■						■														●
		Thermostat Location							◆	●													◆
		Stratified Air in Space						■	◆								◆	◆				■	◆
		Incorrect Refrigerant Piping									◆	●					■	■					■
		System Too Small								◆													●

TROUBLESHOOTING CHART FOR AIR TO AIR HEAT PUMPS

● Denotes common cause.

◆ Denotes occasional cause.

		Power Supply																			
		Line Voltage												Control Circuit							
		Power Failure	Blown Fuse or Tripped Breaker	Faulty Wiring	Loose Terminals	Low Voltage	Single 1PH Failure of 3PH	Unbalanced 3PH	Defective Contacts in Contactor	Compressor Overload	Potential Relay	Run Capacitor	Start Capacitor	Faulty Wiring	Loose Terminals	Control Transformer	Low Voltage	Thermostat	Contactor Coil	Pressure Control or Impedance Relay	Indoor Fan Relay
Heating or Cooling Cycles	Compressor and O.D. fan motor do not operate	●	●	●	●		◆	◆	◆	◆				●	●	●	◆	◆	●	●	
	Compressor will not run O.D. fan motor runs			●	●	●	◆	◆		●	●	●	●								
	Compressor "hums" but will not start			●	●	●	●	◆	◆		●	●	●								
	Compressor cycles on overload			●	●	●	◆	◆	◆	●	●	●	●								
	Compressor off on high pressure control																			◆	●
	Compressor noisy																				
	Head pressure too high																				
	Head pressure too low																				
	Suction pressure too high																				
	Suction pressure too low																				
	I.D. blower will not start	●	●	●	●									●	●	●	◆	◆			●
	I.D. coil frosting or icing-																				
	High compressor amps					●															
Cooling Cycle	Compressor runs continuously—no cooling																				
	Liquid refrigerant flooding back to compressor																				
Heating Cycle	Compressor runs continuously—no heating																				
	Defrost cycle initiates no ice on coil																				
	Reversing valve does not shift			●	●																
	Ice build up on lower part of O.D. coil																				
	Liquid refrigerant flooding back to compressor																				
	Auxiliary heat on I.D. blower off			●	●									●	●			◆			●
	Excessive operating costs			◆	◆													◆			
	Excessive ice on O.D. coil			◆	◆																

		Outdoor Section																			
		Compressor					Refrigerant System								Defrost Control			Rev. Valve		Check Valve	
		Discharge Line Hitting Inside of Shell	Bearings Defective	Seized	Valve Defective	Motor Windings Defective	Refrigerant Charge Low	Refrigerant Overcharge	High Head Pressure	Low Head Pressure	High Suction Pressure	Low Suction Pressure	Non-Condensables	Unequalized Pressures	Sensing Bulb Loose-Poorly Located	Cycle Too Long (Clock timer)	Defective Control, Timer or Relay	Leaking	Defective Valve or Coil	Sticking Closed	Leaking or Defective
Heating or Cooling Cycles	Compressor and O.D. fan motor do not operate																				
	Compressor will not run O.D. fan motor runs		◆	●		●								●							
	Compressor "hums" but will not start		●	●		●								●							
	Compressor cycles on overload		◆		◆	◆	●	●	◆		◆		●					◆			
	Compressor off on high pressure control							●					●		◆	●	●			●	
	Compressor noisy	◆	◆		●																
	Head pressure too high							●					●		◆	◆			◆	◆	
	Head pressure too low				●		●					●						●			◆
	Suction pressure too high				●			●	●									●			◆
	Suction pressure too low						●			◆										◆	
	I.D. blower will not start																				
	I.D. coil frosting or icing-						●					●								◆	
	High compressor amps		●	●				●	●		●		●							◆	
Cooling Cycle	Compressor runs continuously—no cooling				●		●														
	Liquid refrigerant flooding back to compressor							●	●												
Heating Cycle	Compressor runs continuously—no heating				●		●									◆	◆	●			
	Defrost cycle initiates no ice on coil						◆										●				
	Reversing valve does not shift						◆			◆									●		
	Ice build up on lower part of O.D. coil						●					◆			●	●	●				
	Liquid refrigerant flooding back to compressor							●	●												
	Auxiliary heat on I.D. blower off																				
	Excessive operating costs						●	●									●	●	●		
	Excessive ice on O.D. coil						●								●	●	●		●		

		Outdoor Section						Indoor Section								Aux. Heat
		Outdoor Fan Motor and Coil						Indoor Blower Motor and Coil						Check		
		Plugged or Restricted Meter Device (Htg)	Fins Dirty or Plugged	Motor Winding Defective	Recirculation or Air	Air Volume Low (Cooling)	Low Temperature Coil Air (Cooling)	Plugged or Restricted Metering Device (Clg)	Fins Dirty or Plugged	Motor Winding Defective	Air Volume Low	Air Filters Dirty	Undersized or Restricted Ductwork	Sticking Closed	Leaking or Defective	Auxiliary Heat Upstream of Coil
Heating or Cooling Cycles	Compressor and O.D. fan motor do not operate															
	Compressor will not run O.D. fan motor runs															
	Compressor "hums" but will not start															
	Compressor cycles on overload		◆	◆	◆	◆			◆	◆	◆	●	◆			
	Compressor off on high pressure control	◆	●	●	●	●		◆	●	●	●	●	●	●		●
	Compressor noisy															
	Head pressure too high	◆	●	●	◆	●		◆	◆	◆	●	●	◆	◆		●
	Head pressure too low						●								◆	
	Suction pressure too high														◆	
	Suction pressure too low	◆	●	●	◆		◆	◆	●	◆	●	●	◆	◆		
	I.D. blower will not start															
	I.D. coil frosting or icing-							◆	●	●	●	●	◆			
	High compressor amps								●	●	●	●	◆	◆		
Cooling Cycle	Compressor runs continuously—no cooling		◆	◆	◆	◆	◆		●	●	●	●	◆			
	Liquid refrigerant flooding back to compressor								●	●	●	●	◆	◆		
Heating Cycle	Compressor runs continuously—no heating															
	Defrost cycle initiates no ice on coil															
	Reversing valve does not shift															
	Ice build up on lower part of O.D. coil															
	Liquid refrigerant flooding back to compressor															
	Auxiliary heat on I.D. blower off									●						
	Excessive operating costs		◆	◆	◆				◆	◆	◆					
	Excessive ice on O.D. coil															

Literature Assembly
911-0769

Contains the following:

2100-034(G)	User Guide
2110-1451(L)	Replacement Parts Manual
2100-710(A)	Multi-Tec Quick Start Guide
7960-825	Exporting Alarm Logs
7960-826	Exporting 7 Day I/O Logs
7960-788	Commissioning Report
7960-420	Warranty

USER'S APPLICATION GUIDE AND TECHNICAL PRODUCT OVERVIEW

Manual: 2100-034G
Supersedes: 2100-034F
Date: 12-17-20

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Climate Control Solutions

General Information

The User's Application Guide covers a wide range of heating and cooling products manufactured by Bard Manufacturing Company. It is intended to be a general guide for care and operation of typical systems and covers the most important features you should be aware of and are responsible for as the user of the equipment.

Because our product offerings are so varied and can be equipped with many features and options, it is not possible to cover all aspects of what your specific system may be configured for. Some systems may be quite simple in features to provide basic cooling and possibly heating, while other systems may also incorporate various ventilation technologies, dehumidification circuits and many different internal controls as well as room temperature controls. Therefore, you should request a detailed operation sequence and explanation of any special features from your installer and/or service company and also have them instruct you as to any routine maintenance procedures you are responsible for.

Contents

Overview

The User's Application Guide and Technical Product Overview covers the following products:

WALL MOUNT
Air Conditioners
and Heat Pumps

I-TEC®
Air Conditioners
and Heat Pumps

Q-TEC™
Air Conditioners
and Heat Pumps

The User's Application Guide and Technical Product Overview covers the following topics:

- Documentation provided by Bard for proper use of your new product.
- Unit installation guidelines.
- Routine unit maintenance.
- Unit operation.
- Unit troubleshooting.

Please use this guide as a general overview regarding unit application, maintenance and troubleshooting. Refer to product installation instructions and supplemental documentation provided with the unit or go to www.bardhvac.com for detailed individual product information.

Documentation

There are two sources of valuable information for your new Bard product:

- Documentation provided with your unit, normally located inside the unit control panel during shipping. This information should be saved once the unit is installed for future maintenance reference or to answer questions about equipment after installation.
- Documentation provided on the internet at www.bardhvac.com. This may be accessed from a desktop computer at the office, a laptop or an internet-capable cell phone at the worksite. Up-to-date documentation is available, along with specification sheets and other valuable resources regarding your new Bard product.

Unit Literature Assembly – Documentation Provided with Your Unit

Bard products are shipped with documentation that when used by a technician with cooling and heating knowledge, can ensure that your product is installed safely, performs optimally and achieves the longest life cycle possible.

Shipped literature includes the following:

- User Manual (this document)
- Installation Instructions
- Replacement Parts Manual
- Wiring Diagrams
- Warranty Information

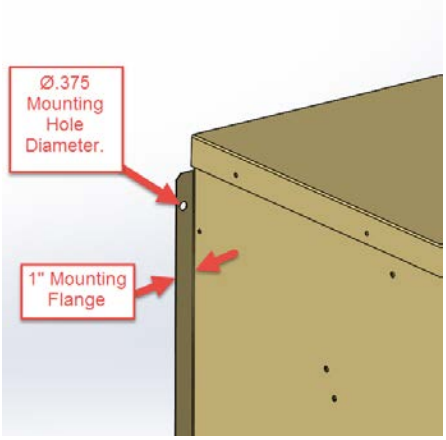
Installation plays a key part in unit functionality, performance and safety. Product securing and placement, duct design and supply/return location, electrical routing and condensate and defrost drainage all play key roles in making sure a unit will perform per the design specifications.

WALL MOUNT Products – Mounting the Product on a Wall Surface

Outdoor products are normally mounted to an exterior wall surface, including brick, cement block, metal or wood construction. These products are labeled as "WALL MOUNT" units. **Before installation begins, the wall surface should be inspected by a construction professional to ensure it will support the weight of the unit and accessory items.** Approximate weights are available from the product specification sheet, and a safety factor should be designed into the installation. Typical fasteners to attach the unit to the wall using the integrated mounting flanges on both sides of the unit include tap cons, bolts, studs and other fastening devices. The selection of the fasteners to be used needs to be reviewed by a construction professional and decided upon based on the wall construction and fastener strength required. It is important to follow all guidelines and procedures covered in the installation instructions manual provided for the product.

Built-In Mounting Flange Detail:

Outdoor WALL MOUNT products include a mounting flange that is part of the cabinet construction. Ø.375" holes are provided for unit mounting unless specified otherwise in installation instructions.



Specification Sheets:

Unit specification sheets provided at www.bardhvac.com include basic unit weights and dimensions (see example below). Ventilation options and other accessories must be added into the total weight of the unit.

Specification Sheet Example

w/Filter (Rated-Wet Coil)	
Filter Sizes (inches) STD.	16x25x1
Basic Unit Weight-LBS.	318
Barometric Fresh Air Damper	3.5
Blank-Off Plate	1.0
Motorized Fresh Air Damper	10.0
Commercial Room Ventilator	69.0
Economizer	69.0
Energy Recovery Ventilator	50.0

WALL MOUNT Products – Clearances for Outdoor Condenser Fan Airflow

Unit placement and avoidance of obstructions outside the structure are very critical to unit performance. **Avoid installing the unit in areas that will obstruct outdoor condenser fan airflow or create "pockets" of heated air being exhausted from the condenser coil.** Solid construction fences should not be placed directly in front of the unit without provisions for condenser airflow. Solid exterior walls need to be spaced as far away from units as possible to avoid pockets of heated air causing condenser air recirculation.

Solid barriers located too close to the face or side surfaces (condenser fan inlet and outlet) of the WALL MOUNT can both impede airflow and force heated air to short circuit (be returned) from the condenser outlet to the condenser inlet. Either condition will effectively raise the condensing temperature and pressure reducing cooling capacity and efficiency. In extreme cases, the unit may fail to operate due to high refrigerant pressures inside the unit, and compressor and/or fan motor failure may occur. Clearances given in installation instructions ensure components can be serviced and maintenance can be performed when needed.

National and local electrical codes must be reviewed before unit installation.

Always use common sense when installing products, follow unit clearances given in the installation instructions and contact local Bard distributors when additional knowledge is needed regarding unit clearances for proper unit functionality.

WALL MOUNT Products – Clearances for Indoor Supply and Return Airflow

The Bard unit should be placed in an area where the supply (leaving conditioned air) and return (unit air intake) air paths will be unrestricted. Avoid placing objects in the structure within 24" of the return (unit air intake) grille. Avoid placing objects directly in the path of the supply (conditioned) air grille. This will inhibit the "throw" of the supply air throughout the structure and reduce the cooling and/or heating ability of the unit; in extreme cases, this may cause evaporator coil freezing issues. Supply air must be able to freely circulate conditioned air throughout the structure. Adjustment of supply grille deflectors is often necessary to ensure proper room circulation.

Ducted applications should not exceed the rated duct static pressures given in the unit specification sheets. Special requirements for duct construction and distances to combustible materials need to be followed per the installation instructions when electric heating is used.

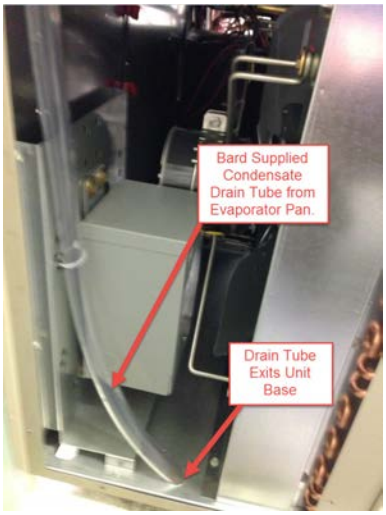
WALL MOUNT Products – Condensate and Defrost Drainage

Condensate drainage for air conditioning units needs to be planned before installation. Your new Bard WALL MOUNT product includes provisions to allow condensate water to exit the bottom of the unit. If condensate water is to be routed away from the unit, adequate drain sizing needs to be provided to allow proper drainage for condensate water generation. During normal air conditioning operation, large amounts of condensate water is generated inside the unit as moisture is extracted from the supply air. This is collected in an evaporator pan and drained to either a drainage system (indoor products) or outside the unit cabinet (outdoor products). Evaporator drain traps are not necessary for any of our wall mounted outdoor products, and the use of "standing water" U-shaped traps may be prone to freezing in certain climate zones.

Defrost water drainage from heat pump units needs to be planned before installation. During seasons requiring heating operation, the unit will need to warm the condenser coil to remove frost build-up (defrost). **Outdoor heat pump products include holes in the unit base under the condenser coil for proper water drainage when in the heating defrost cycle. Avoid placing the unit on a pad or blocking the base drainage holes under the condenser coil without proper allowances (6" recommended) for water drainage due to damage caused by freezing conditions.** Without proper drainage, defrost water may freeze causing ice build up and damage the lower portion of the condenser coil.

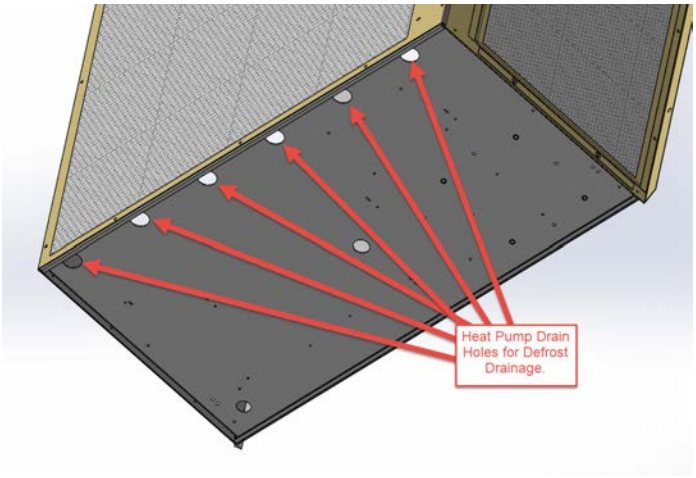
Condensate Water Drainage:

Unit condensate water exits the base of the unit during cooling operation.



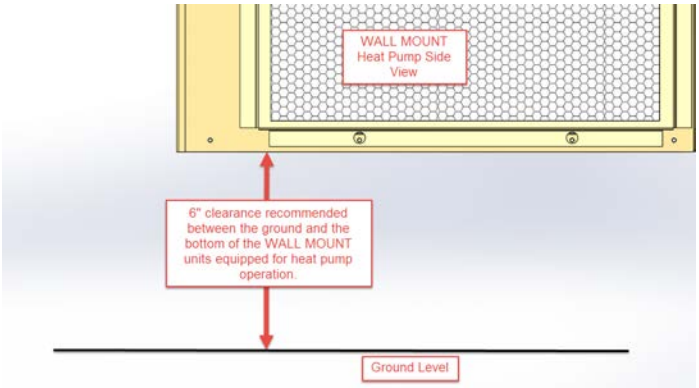
Defrost Water Drainage:

Holes are provided in the front of the unit base for heat pump condensate water drainage.



Defrost Water Drainage:

6" clearance is recommended under WALL MOUNT Heat Pump products to allow proper defrost water drainage.



I-TEC and Q-TEC Products – Installing the Product Inside a Room

I-TEC

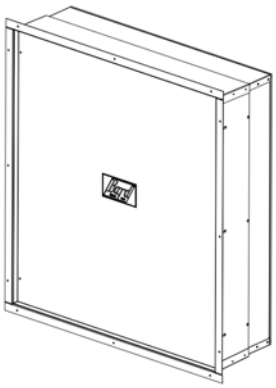
Q-TEC

Indoor products are normally supported by the floor surface and are adjacent to an interior wall surface, including brick, cement block, metal or wood construction. These products are normally labeled as "I-TEC" or "Q-TEC" units. **Before installation begins, the floor surface should be inspected by a construction professional to ensure it will support the weight of the unit and accessory items.** Approximate weights are available from the product specification sheet, and a safety factor should be designed into the installation.

A sheet metal sleeve is normally installed in the wall allowing vent and condenser fan air to enter and exit the unit. Different sleeve depths are available for installation into various wall depths. Typical fasteners to attach the sleeve to the outside surface of the wall include tap cons and other fastening devices. The I-TEC or Q-TEC unit is then slid up to the wall surface and connected to the sleeve using screws. Trim kits are available to enclose gaps between the wall surface and the unit. A louver grille is used to cover the external wall opening and fasteners used during sleeve installation.

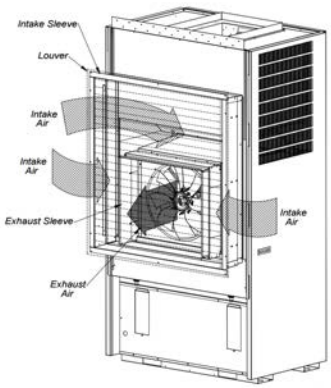
Wall Sleeve:

Wall sleeves allow for outdoor air to enter and exit the unit inside the room.



Air Paths:

Air paths through the unit allow for cooling operation and fresh air to enter the structure (I-TEC shown).



Louver Installation:

Outdoor louvers provide an esthetically pleasing look to the installation and cover the unit opening (I-TEC shown).

I-TEC and Q-TEC Products – Clearances for Outdoor Condenser Fan Airflow

Solid barriers located too close to the face of the outdoor louver of the I-TEC or Q-TEC can both impede airflow and force heated air to short circuit (be returned) from the condenser outlet to the condenser inlet. Either condition will effectively raise the condensing temperature and pressure reducing cooling capacity and efficiency. In extreme cases, the unit may fail to operate due to high refrigerant pressures inside the unit, and compressor and/or fan motor failure may occur. It is recommended to allow 15' (457.2 cm) in front of unit louver for proper condenser airflow. Always use common sense when installing products, follow unit clearances given in the installation instructions and contact local Bard distributors when additional knowledge is needed regarding unit clearances for proper unit functionality.

I-TEC and Q-TEC Products – Clearances for Indoor Supply and Return Airflow

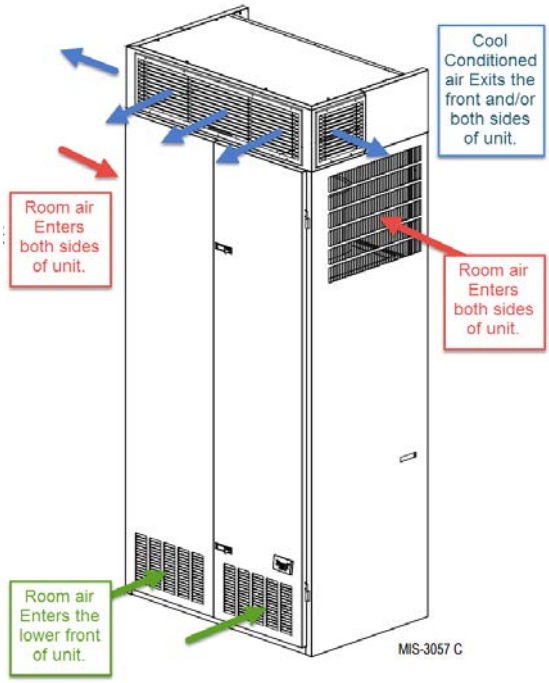
The Bard unit should be placed in an area where the supply (leaving conditioned air) and return (unit air intake) air paths will be unrestricted. Avoid placing objects inside the room within 24" of the return (unit air intake) louvers or grille. Avoid placing objects directly in the path of the supply (conditioned) air grilles. This will inhibit the "throw" of the supply air throughout the structure and reduce the cooling and/or heating ability of the unit and in extreme cases may cause evaporator coil freezing issues. Ducted applications should not exceed the rated duct static pressures given in the unit specification sheets. Special requirements for duct construction and distances to combustible materials need to be followed per the unit installation instructions when electric heating is used.

I-TEC Air Path

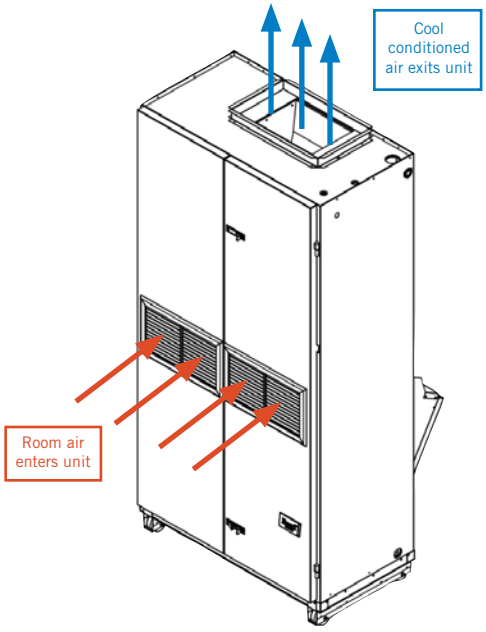
The I-TEC product has been engineered for extremely quiet unit operation and has multiple air paths for air entering and exiting the unit. Room air enters the upper sides to be conditioned (cooled) inside the unit and exits the unit top. The unit will either be ducted to supply registers or have a supply air plenum box installed. A supply air plenum box allows quiet operation without ducting the air leaving the unit. Room air also enters the bottom of both front doors during ventilation operation.

Q-TEC Air Path

The Q-TEC product has been engineered for efficient, economical unit operation and has a mid-mounted front grille for air entering the unit. The unit will either be ducted to supply registers or have a supply air plenum box installed. A supply air plenum box allows quiet operation without ducting the air leaving the unit.



Typical I-TEC Installation



Typical Q-TEC Installation

The I-TEC and Q-TEC product installation instructions contain additional information regarding unit air paths and required clearances. This information may be accessed at www.bardhvac.com.

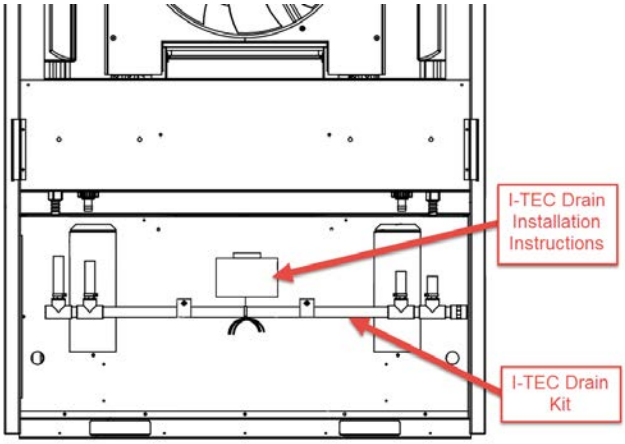
I-TEC and Q-TEC Products – Condensate Drainage

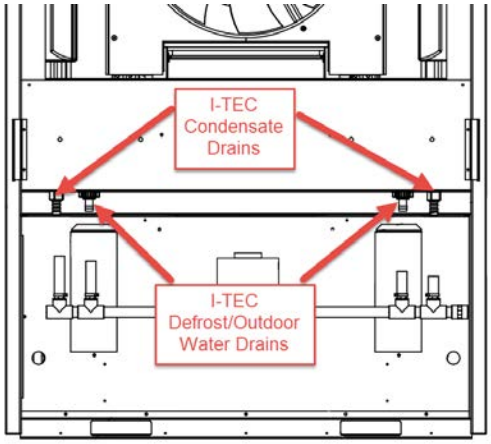
Condensate drainage for Bard indoor cooling units is a very important part of unit installation. During normal air conditioning operation, large amounts of condensate water are generated inside the unit as moisture is extracted from the supply air. This is collected in an evaporator pan and needs to be drained to an external drainage system. Your new Bard product includes provisions to allow condensate water to exit the unit and fittings will need to be field supplied to connect the unit drain to the building. Adequate drain sizing needs to be provided to allow proper drainage for condensate water generation and restriction in drain lines should be avoided. Evaporator drain traps are not necessary unless required by local codes.

Defrost water for heat pump operation and outdoor water entering the condenser area also needs to be drained out of the unit. The I-TEC product uses a combined defrost and outdoor water drainage system. The Q-TEC has a combined defrost and evaporator drain connection unless an optional in-wall drain box is used. Outdoor water exits the Q-TEC through the wall sleeve. Follow all instructions provided in the unit installation instructions regarding drain connections and sleeve installation to avoid water leakage inside the building or structure.

I-TEC Drain System:

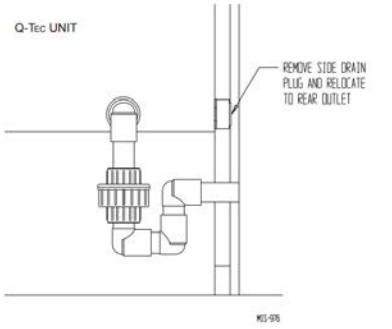
The I-TEC drainage system consists of a manifold drain kit that combines all drains behind the unit to allow connection to the building system.



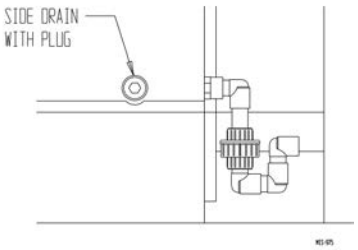


Q-TEC Drain System:

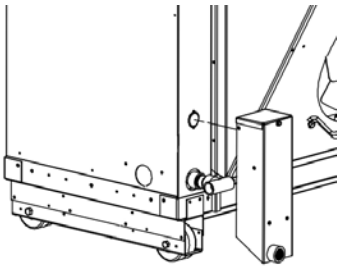
The Q-TEC drainage system consists of a lower right side or lower right rear connection fitting. An optional in-wall drain box may also be purchased as an accessory that allows separate evaporator and defrost water drainage.



Lower Right Side Drain



Lower Right Rear Drain



Optional In-Wall Drain Box

All Products – Power Supply Verification

It is very important to follow all electrical and mechanical safety guidelines and instructions provided in the product installation instructions. Failure to do so may result in death, injury or product damage.

A proper power supply to your new Bard unit is very important. Be sure to verify the following with a multi-meter or other power measuring device before applying power to your Bard product.

Field-Supplied Voltage

Electrical voltage ratings and proper voltage operating ranges are provided in the unit specification sheets and installation instructions. It is important that power supplied to the unit stay in the specified operating voltage range. Voltage above or below the minimum operating value given could result in improper unit startup, unit shutdown, low unit performance, improper thermostat and unit controller operation, compressor damage and premature failure of functional parts. As a general guideline, it is always best if the power source for the unit supplies the nominal electrical rating value given in the specification sheets, installation instructions and unit serial plate for the product being used. To do so will provide the best unit performance possible from your new Bard product.

Single and Three Phase Power

Bard products are available in single and three phase power options. It is important to connect the proper phase listed on the unit serial plate. Three phase power is often used to reduce energy usage, and units rated for 3 phase operation are equipped with a phase monitor safety device. The phase monitor will not allow unit operation with improper phase connection and a red LED light on the monitor indicates phase wiring issues. Connecting 3 phase power to a single phase unit will result in component damage and improper unit operation. Connecting single phase power to a 3 phase unit will also result in component damage and improper unit operation.

Hertz (Frequency)

Bard products are available in 50hz and 60hz power options. It is important to connect power with the proper hz value listed on the unit serial plate. 60hz power is often used in the United States and Canada and units rated for 50hz operation are normally for international sales outside of this area. Connecting 50hz power to a 60hz unit not rated for 50hz operation may result in component damage and improper unit operation. Some equipment may be rated for 50/60hz operation. Review the unit specifications and installation instructions for further information regarding the power requirements of the unit.

The product installation instructions and unit specification sheets contain additional information regarding unit electrical data. This information may be accessed at www.bardhvac.com.

Unit Maintenance

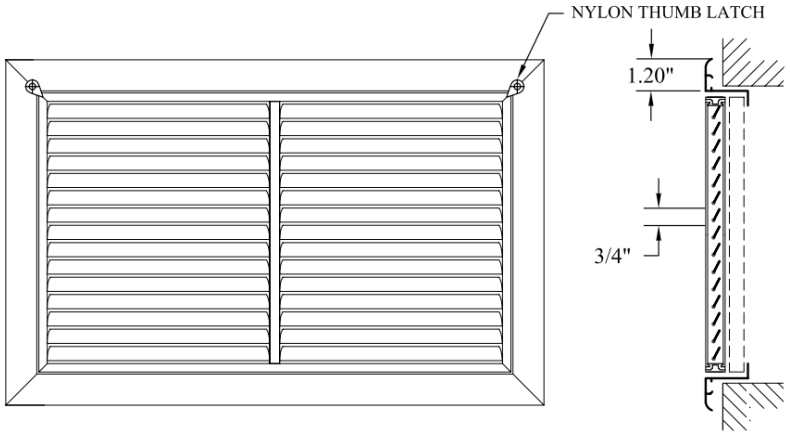
All Products – Filters and Filter Servicing

All Bard products contain air filters that must be cleaned or replaced on a regular basis.

Keeping air filter(s) clean is the single most important responsibility of the user of the equipment. Each type of system must be equipped with an air filter(s) in the indoor circulating air system to clean the air, keep the system itself clean for peak efficiency and capacity and prolong the useful life of the equipment. DO NOT operate the system without the proper air filters. Filters should be inspected at least monthly and replaced or cleaned (depending on type) as needed. The useful life of an air filter can vary widely depending upon application and use of the equipment, and it is critical to monitor filter condition and establish an acceptable maintenance schedule. Failure to do so will increase operating and repair costs, decrease capacity and efficiency and shorten the service life of the equipment. A common symptom of a dirty filter in the cooling mode is a freeze-up of the indoor coil. The air filters used may be a disposable (throwaway) type or may be a cleanable type that can be thoroughly cleaned, rinsed and reused many times. It is important to make sure that the correct filter size and type for your system is always used. If there is any question as to acceptable filter size or type, review the installation instructions for the specific equipment involved, if available. Otherwise, consult with your installing dealer or service company. Most equipment can have the filters inspected and serviced by the user with no problems. In some instances, because of equipment design or specific installation conditions, it may be necessary to have this procedure done by a qualified service company. Have your installer or service company show you where the filter(s) are and demonstrate the service procedure or make arrangements for them to provide this service on an as-needed basis.

Outdoor Unit Wall Mount Room Air Filters

Wall mount filters are normally accessed from the outside of the building. Bard does offer a return air grille with a filter frame built-in for indoor filter access. The return air filter grille is not acceptable as the only source of filtration if vent options are installed in the wall mount unit.



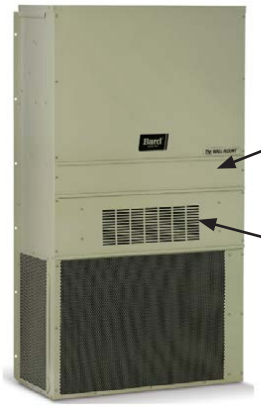
Return Air Filter Grille:

Bard offers the RFG return air filter grille, which may be used in applications where outdoor air is not brought into the structure through vent options. If vent options are used, the filter tray inside the Bard Wall Mount unit must be used.

The product installation instructions contain additional information regarding unit maintenance. This information may be accessed at www.bardhvac.com.

WALL MOUNT Products – Filters and Filter Servicing

The built-in filter tray and room air filters in the wall mount are located in the middle of the cabinet below the indoor blowers. Units with vent options will have a washable screen behind the vent intake panel.



Filter Door:
The unit room air filter is located behind this panel for units without a vent hood.

Vent Intake Panel

Vent Intake Panel

Vent Hood Door:
The unit indoor filter is located behind this panel for units with a vent hood. The hood contains a washable pre-filter that needs to be cleaned regularly.

Filter Door:
The unit room air filter is located behind this panel.

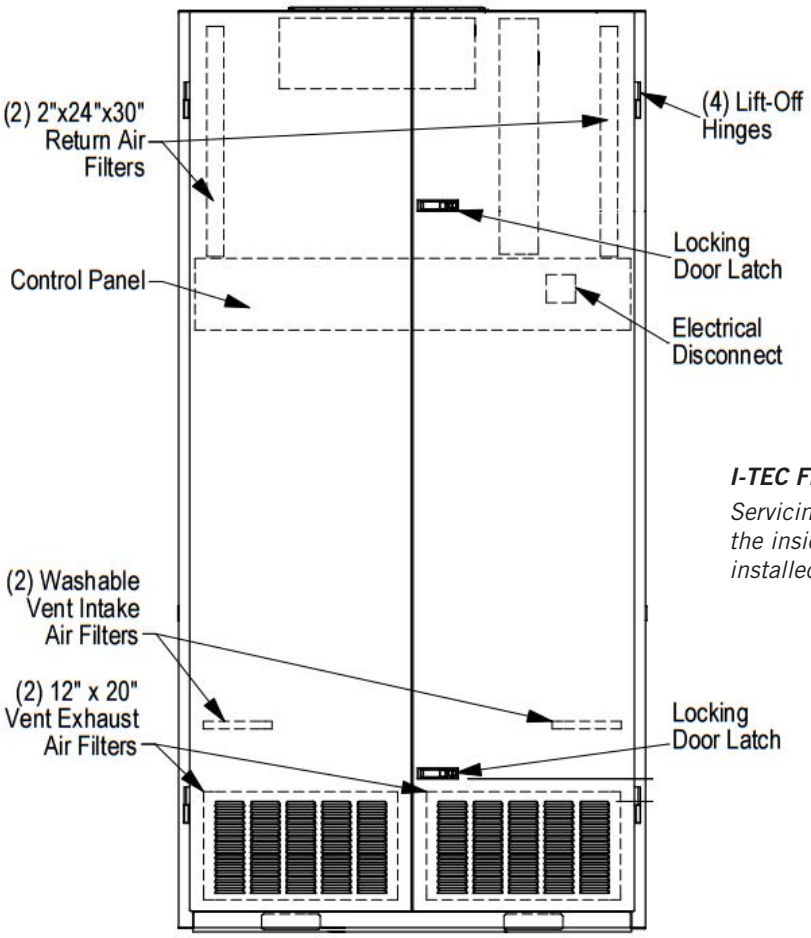
I-TEC Indoor Products – Filters and Filter Servicing

The I-TEC indoor air conditioners and heat pumps have multiple filters that must be maintained and inspected when servicing the unit. Filters play an important part in proper unit operation and prevent dirt and dust buildup inside the I-TEC and the room the unit is installed in. To access the unit filters, open the front hinged doors by unlocking the door latches. The doors fold outward and are on hinges with lift-off pins. Use care when opening doors. If doors are lifted off of the hinge pins, use care as the dense insulation used for sound reduction causes the doors to be heavy.

The upper section of the unit contains two 2" x 24" x 30" throwaway filters as standard with every unit. MERV ratings of the filter are available up to MERV13. These filters filter the air used for cooling inside the classroom or structure and should be changed regularly.

If the unit has an air intake vent option installed, two 1" x 12" x 20" filters are located in the lower section of the front doors behind the louvers. These filters help keep the vent option clean and operating properly.

Two washable filters are also installed in the air intake vent option. These should be inspected during servicing and cleaned when necessary. The washable filters are used to remove dirt and dust from outdoor air that is entering the vent area. If at any time these filters are damaged, they must be replaced with Bard-approved filters.



I-TEC Filter Locations:

Servicing the filters in your unit will help keep the inside of the unit clean and also the area it is installed in.

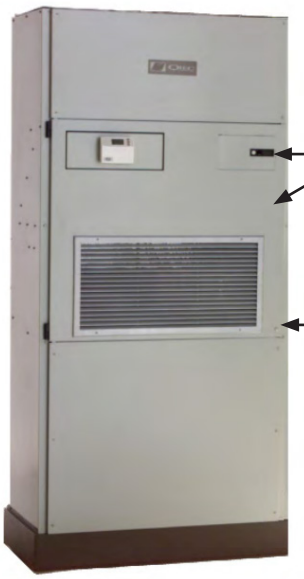
The I-TEC product installation instructions contain additional information regarding unit maintenance. This information may be accessed at www.bardhvac.com.

Q-TEC Indoor Products – Filters and Filter Servicing

The Q-TEC indoor air conditioners and heat pumps have two room air filters that must be replaced when servicing the unit. Filters play an important part in proper unit operation and prevent dirt and dust buildup inside the Q-TEC and the room the unit is installed in. To access the unit filters, open the front hinged door by unlocking the door latch. The door folds outward and is on hinges with lift-off pins. Use care when opening doors. If the door is lifted off of the hinge pins, use care as the insulation and louver grille cause the door to be heavy.

The upper section of the Q-TEC contains two 1" throwaway filters standard with every unit. These filters filter the air used for cooling inside the classroom or structure and should be changed regularly.

QWS Unit



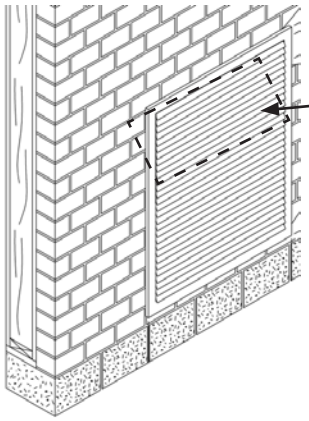
Q-TEC Filter Location:

The Q-TEC room air filters are located behind this hinged door. Unlock door latch and remove screw to open door.

Screw location

QH/QA Unit

Filter locations



Pre-filter location

The Q-TEC will have a permanent pre-filter installed inside the wall sleeve if air intake vent options are inside the unit. The pre-filter must be inspected and cleaned when necessary. The easiest way to remove the pre-filter is through the outdoor louver. Clean the pre-filter with soapy water.

The Q-TEC product installation instructions contain additional information regarding unit maintenance. This information may be accessed at www.bardhvac.com.

All Products – Coil Cleaning

The outdoor coil must be kept clean and free of any airborne debris, which can accumulate over time. Large volumes of air are circulated over the coil, and airborne debris such as lint, dust, materials shed from trees, paper or other types of airborne material that can become airborne can collect on the entering coil surface. The outdoor coil must dissipate heat during the cooling mode and for a heat pump, also absorb heat during the heating mode. If the coil is dirty and matted with debris, the airflow across the coil will be reduced causing poor performance, increased operating run time and associated utility bills and in extreme conditions can shorten the useful life of the equipment.

Depending on the specific equipment involved, the surface that can accumulate debris can be on the opposite side that is exposed to view when standing in front of the machine. Closely review the machine when operating to see which direction or path the airflow takes as it moves through the machine. If the air inlet side of the coil is hidden, try to observe the back (hidden) side by looking into the side grilles, using a flashlight if necessary. While the user of the equipment needs to be aware of the potential of clogging of the outdoor coil surface, actual cleaning of the outdoor coil should not be attempted under most circumstances. If the user should attempt this procedure on their own, never do so without first having the installing dealer or service company instruct you in the proper procedure and technique.

WARNING: Do not open or enter the equipment without first turning off the electrical service disconnect. Failure to do so can result in personal injury due to moving parts and/or electric shock hazard resulting in death.

Other conditions that can cause reduction of airflow across the outdoor coil are flowers, shrubbery or other growth too near the outdoor coil air inlet and outlet openings. These living things, especially as they mature and grow, will be just as effective in blocking the airflow and create the same problems as will stacking things against the equipment. These conditions can be easily managed and controlled by the user, as they do not require actually entering into the equipment enclosure, which should only be done by qualified service technicians.

Equipment Corrosion Protection

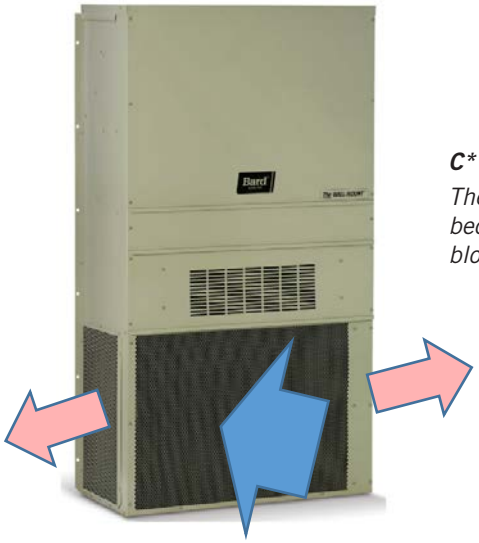
1. Avoid having any lawn sprinkler spray directly on the equipment, especially if from a brackish water source.
2. In coastal areas or corrosive environments, locate equipment as far away from the corrosion source as feasible. Units exposed directly to salt spray should be coated by a secondary protective coating operation to reduce corrosion on copper tubing, fasteners, motors and other metal parts. Coils should be ordered with a corrosion protective coating. Contact Bard for coating options.
3. Frequent cleaning and waxing of the cabinet using a good automobile polish will help extend its original appearance and protect painted surfaces.

The product installation instructions contain additional information regarding unit coil cleaning. This information may be accessed at www.bardhvac.com.

All Products – Condenser Airflow

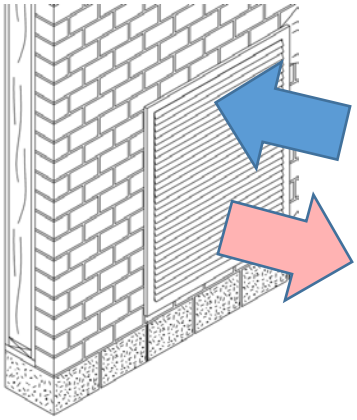
W**A, W**H, T**H, T**S, W*RV Wall Mount Units:

These units are called "blow through condenser airflow" units because they draw cool outdoor air from the sides and blow the warm condenser air exiting the coil through the front grille.



C**H Wall Mount Units:

These units are called "draw through condenser airflow" units because they draw cool outdoor air in the front through the coil and blow the exiting warm condenser air through the unit sides.



I-TEC and Q-TEC Units:

These units draw the cool outdoor air through the top section of the wall louver and exhaust the warmer condenser air out of the lower section of the louver. I-TEC units also draw a small amount of air through the outer right and left side of the louver.

Air-to-Air Cooling Products (Air Conditioners)

The cooling mode operates similar to a refrigerator, removing heat from inside the conditioned space and rejecting it outside of the space being controlled. There are three main parts of the system:

1. The evaporator (indoor) coil where cold refrigerant absorbs heat from the air, which circulates from the conditioned space through the machine and is returned to the space at a lower temperature and with some of the humidity (moisture) removed. The moisture exits through a condensate drain system. A motor/blower assembly moves the indoor air through the system.
2. The compressor, which is a sealed pump that moves the refrigerant through the system.
3. The condenser (outdoor) coil where the heat that was absorbed from the indoor space is discharged to the outdoor environment. A motor/fan system moves the outdoor air across the condenser coil. A properly sized air conditioner cannot cool a structure off rapidly and instead will pull down the temperature slowly. It also will remove a certain amount of moisture (humidity) from the circulating airstream in the process. It may take several hours to pull down a hot, moist building or structure on initial startup or anytime the system has been turned off for a long period of time. It is generally best to set the thermostat at a comfortable temperature and let it control the system as needed, rather than turning it on and off.

Moisture (humidity) removal with a conventional air conditioner (cooling) unit, or heat pump when operating in the cooling mode, is not directly controlled and is a by-product of the unit operating to control temperature in response to the temperature (thermostat) control device. **Oversized equipment can easily control temperature but will have short run-times, thus reducing its ability to remove moisture from the circulating air stream.**

There are also many additional influences that can affect humidity levels within the conditioned space such as laundry appliances, cooking, showers, exhaust fans and any other items that can generate moisture or affect its removal from the space. Therefore, while operation of the air conditioning or heat pump system in the cooling mode will remove some amount of moisture as it reduces the air temperature, precise humidity regulation in the conditioned space cannot be assured and additional equipment such as a dedicated dehumidifier may be required.

Air-to-Air Cooling and Heating Products (Heat Pumps)

A heat pump is a refrigerant-based system that has additional components and controls that both heats and cools using a compressor for both modes of operation. Most heat pumps will also be equipped with some amount of electric heat to supplement the heating capacity of the compressor system on an as-needed basis. This operation is entirely automatic and is controlled by the indoor thermostat and possibly also an outdoor thermostat.

Cooling Mode

The cooling mode of a heat pump is exactly the same as that described for an air conditioner in the above section.

Heating Mode

The system operates in reverse cycle, meaning that it absorbs and moves heat from the outdoors and transfers it indoors to be rejected into the circulating air stream. Even though it seems cold to humans, there is usable heat that can be extracted efficiently from the outdoor air down to 0ºF, although the colder the air is there is less heat to extract and the operating efficiency is diminished.

Defrost Cycle

When operating in the heating mode, the outdoor coil will be colder than the outdoor air that is forced over it by the fan system. When the outdoor air temperature is above approximately 40°F, moisture can accumulate on the coil and it will drain down and out the base of the unit. As the air temperature gets below approximately 40°F, the coil temperature will start to drop below 32°F, and frost or ice will begin to form on the coil.

An automatic defrost system keeps track of system run time when the outdoor coil temperature is in the freezing zone and will initiate a defrost cycle at the appropriate time. The unit continues to operate during the defrost cycle, but the outdoor fan motor will stop and the reversing valve will shift positions to flow hot refrigerant gas through the outdoor coil to melt the accumulated frost. Water will start to drain freely from the unit, and steam may be emitted from the unit.

The length of the defrost cycle will vary depending upon actual outdoor temperature, humidity levels and amount of accumulated frost. It could range from 1-2 minutes up to but not exceeding 8 minutes. When the defrost cycle

terminates, the reversing valve will shift back to heating mode and the outdoor fan will restart. There is typically a large puff of steam emitted as the fan restarts. When the heat pump shifts from cool to heating mode, from heating to cooling mode and especially during defrost cycles, there will be a pressure transfer sound heard as the reversing valve redirects the flow of refrigerant. This is commonly described as a hissing noise and is a normal sound for this type equipment.

For air source heat pumps, it is important to keep heavy snow from accumulating around the machine to the point of blocking the inlet and outlet openings to the outdoor coil section. For wall mounted or other equipment that is elevated, this should not be a factor; but for equipment installed on or near the ground, this can be an issue in areas prone to heavy and/or blowing snow. The air source heat pump cannot operate effectively and efficiently when snowbound just as a car cannot function well in heavy snow conditions.

Water-to-Air Cooling and Heating Products (Geothermal Heat Pumps)

These types of heat pumps are also commonly referred to as water source or geothermal systems. Just like the air source heat pump, they are refrigerant-based systems that both heat and cool using a compressor for both modes of operation. The primary difference is that the system uses water or antifreeze-protected water solution instead of an air-cooled outdoor heat transfer coil, and there is no outdoor motor/fan system but instead a water pump to provide adequate water flow to the system.

Cooling Mode

The cooling mode of a water-to-air heat pump is exactly the same as that described for an air conditioner in the previous Air Conditioner section, except that the outdoor coil uses water instead of air for the heat transfer medium.

Heat Mode

The system operates in reverse cycle, meaning that it acquires and moves heat from the water supply flowing through the water to refrigerant coil and transfers it indoors to be rejected into the circulating air stream.

Most water-to-air heat pumps (but not all) will also be equipped with some amount of electric heat to supplement the heating capacity of the compressor system on an as-needed basis. This operation is entirely automatic and is controlled by the indoor thermostat.

Because of the design of water-to-air heat pumps and the water temperatures involved, no defrost system is required as in air-to-air heat pumps.

Water Supply Systems

Depending upon the type and application of the water-to-air heat pump, the water side of the system could be one of the following:

1. Individual closed loop buried in a trench or vertical bore hole(s).
2. Individual loop submerged in a pond.
3. Water supplied from a well and discharged into pond, stream, ditch or another well.
4. Water supplied from a boiler/tower system, typically only in larger multi-unit installations.

Dehumidification and Ventilation Operation

Dehumidification (Air-to-Air or Water-to-Air Systems)

Many Bard systems, typically those used in schools or other commercial applications, have a dedicated dehumidification capability by having a special additional refrigeration circuit (factory-installed option only) in addition to the basic system. These special systems, sometimes also referred to as hot gas reheat, are designed to control humidity on demand from a humidity controller much the same as the basic cooling and/or heating system is controlled by a wall thermostat. Consult your installer and/or service company to determine if your installation has any of these devices and for any instructions or maintenance requirements you should be aware of as the user.

Ventilation Options (Air-to-Air or Water-to-Air Systems)

All Bard systems are available with factory-installed vent options. Most units can have ventilation field installed after unit installation.

Ventilation has multiple purposes:

- Outside air intake for occupied structures
- Positive pressurization
- Energy savings when outdoor air can be used for cooling
- Agricultural use of bringing in outdoor air and exhausting room air
- Equipment and electronics ventilation

Review product specifications and manuals for more details regarding available ventilation options and features. Product documentation is shipped with the product and also available at www.bardhvac.com.

All Units – Troubleshooting

Your Bard product is made to operate for many trouble-free years if installed properly and maintenance practices are followed. Be sure to verify that all filters are clean, and condenser coils are free of dirt and debris. Often these items may look clean at first, but upon closer inspection, show signs of dirt and debris build-up. New units on new structures may have dirt and dust in filters from the building construction process.

Thermostats and unit controllers often contain vent holes for proper sensor measurement inside the device. Make sure the thermostat or controller are not full of dirt and dust from building construction or years of use.

Verify all requirements in the installation instructions and specification sheets are met. Unit voltages, airflow clearance requirements and clean unit power without brownouts or spikes play a critical role in unit performance. If 208 VAC power is supplied to the unit, the 208V tap must be used on the 24 VAC transformer located inside the control panel. Common sense must also be used when installing the unit in an environment that may put the unit at risk of improper operation.

Helpful Hints and Good Operating Practices

The following information will help you enjoy the full comfort and benefits of your Bard cooling and heating system, maximize the performance and efficiency and help extend the life of your system.

1. Always keep the equipment in peak operating condition with routine scheduled maintenance, especially for the air filters, and to assure a clean outdoor coil.
2. For most efficient operation, set the thermostat at the temperature you prefer and then let it take control. If any changes to the settings are required, they should be made in small adjustments and the system be allowed time to respond. Rapid changes either up or down should not be done.
3. Setting the thermostat very high does not make the system heat faster and setting it very low does not make it cool faster.
4. It is not recommended to turn the system "Off" then back "On" when you need it. This can allow temperature and humidity to build up in warm weather conditions and force the system to run continuously to try and catch up. If the building is to be unoccupied for a lengthy period, it is best to adjust the thermostat to a reasonable higher (or lower—depending on the season) setting rather than turning it completely off. Upon return, the inside conditions will not be totally out of control and recovery time to desired conditions would be much shorter.
5. Airflow inside the room or building is very important. Keep all supply registers open and all returns free and unrestricted. Avoid placing objects in areas that will hinder unit airflow. The heating and cooling system is designed to have a certain amount of airflow for proper operation. Therefore, closing off registers, in unused rooms as an example, could reduce airflow below acceptable levels and should not be done without review by your service company who can assess the overall situation and advise you accordingly.
6. Heat pumps, especially air-to-air heat pumps, may have the system (compressor) run continuously at lower outdoor temperatures, and this is normal. The heat pump (compressor) mode is controlled by the beginning stages of the thermostat and delivers the most efficient heat. As the outdoor temperature drops off, the heat pump mode heat will also diminish (because there is less heat in the outdoor air to absorb) and must be supplemented by additional electric heat stages, which are not as efficient as the heat pump. The thermostat automatically controls everything and the backup heat will only operate on demand as needed to maintain the desired temperature.
7. The thermostat or controller is the user's primary connection to the system so it is very important to have a thorough understanding of how it works and how to use it properly. Have your installer or service company explain and demonstrate proper operation of the controls.
8. Make sure you thoroughly understand how the heating and cooling system itself is intended to operate and what to expect from it. Have your installer or service company explain and demonstrate proper operation of the heating and cooling system.

REPLACEMENT PARTS MANUAL

MEGA-TEC® Wall Mount Air Conditioner

Models:

W090AEB W090AEC W090AEE W090AEV W090AEQ
W090APB W090APC W090APE W090APV W090APQ
W120APB W120APC W120APE W120APN W120APV W120APQ
W120AEB W120AEC W120AEE W120AEN W120AEV W120AEQ
W150APB W150APC W150APE W150APN W150APV W150APQ
W150AEB W150AEC W150AEE W150AEN W150AEV W150AEQ

Contents

General Notes

- Revised and/or additional pages may be issued from time to time.
- A complete and current manual consists of pages shown in the following contents section.

Important

- Contact the installing and/or local Bard distributor for all parts requirements. Make sure to have the complete model and serial number available from the unit rating plates.

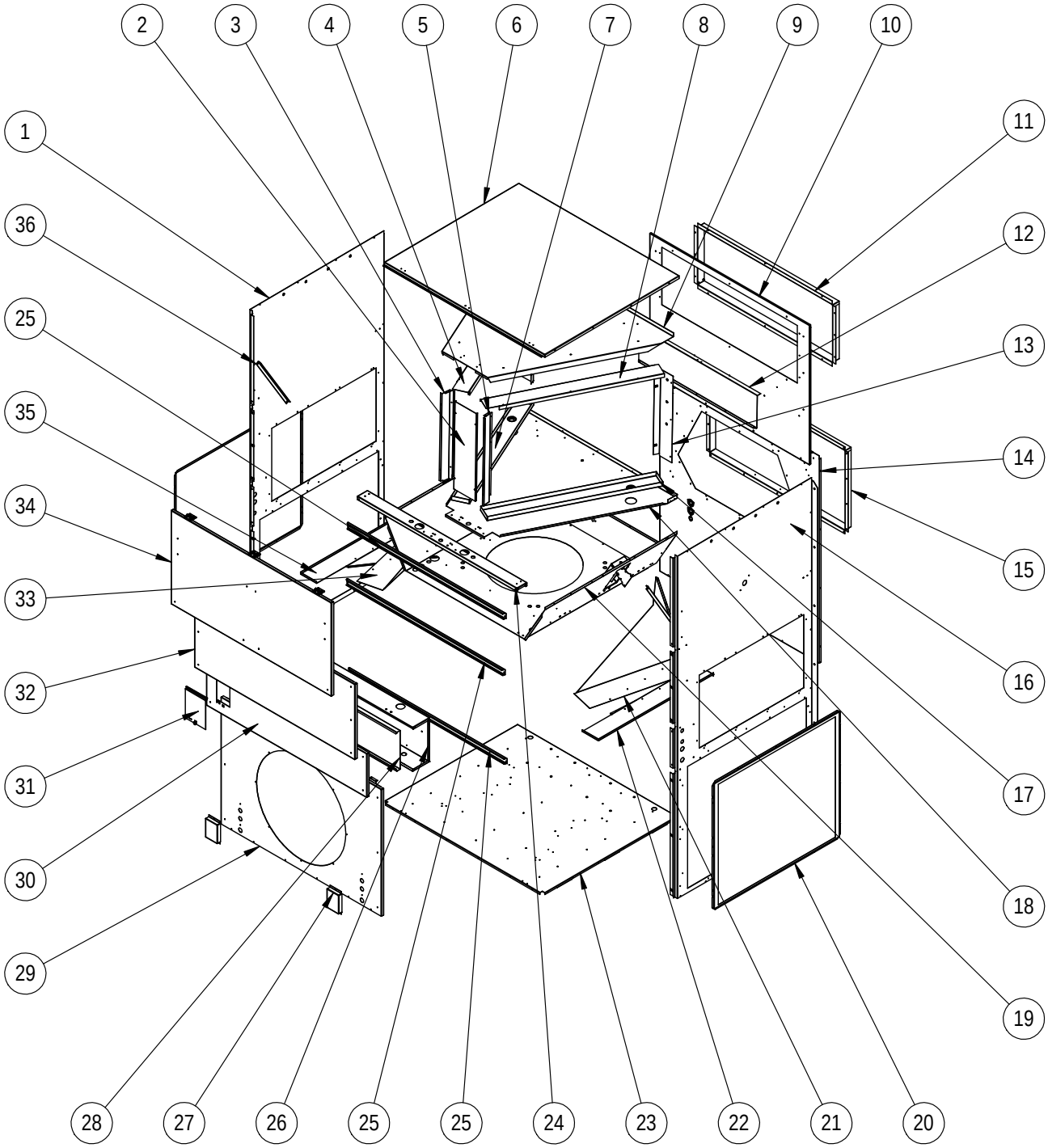
Bard® SINCE 1914
Climate Control Solutions

Bard Manufacturing Company, Inc.
Bryan, Ohio 43506

www.bardhvac.com

Manual: 2110-1451L
Supersedes: 2110-1451K
Date: 6-18-21

CABINET COMPONENTS



SEXP-897

This drawing to be used for reference for pages 3 and 4

Dwg No.	Part Number	Description	W090A****E	W120A****E	W150A****E	W090A****B	W120A****B	W150A****B
1	501-1038-* ①	Left Side Assembly (Economizer)	X	X	X			
1	501-1118 ②	Left Side Assembly (Economizer)	X	X	X			
1	501-1041-* ①	Left Side Assembly (Non-Economizer)				X	X	X
1	501-1116 ②	Left Side Assembly (Non-Economizer)				X	X	X
2	113-723	Evaporator Front Fill	X	X	X	X	X	X
3	141Y488	Left Front Evaporator Bracket	X	X	X	X	X	X
4	137X909	Filter Channel - RH	X	X	X	X	X	X
5	141X488	Right Front Evaporator Bracket	X	X	X	X	X	X
6	507-379-* ①	Top	X	X	X	X	X	X
6	507-401 ②	Top	X	X	X	X	X	X
7	523-160	Left Drain Pan	X	X	X	X	X	X
8	137Y909	Filter Channel - LH	X	X	X	X	X	X
9	137-905	Evaporator Top Fill	X	X	X	X	X	X
10	509-400	Upper Back	X	X	X	X	X	X
10	509-463 ②	Upper Back	X	X	X	X	X	X
11	111-293	Supply Air Frame	X	X	X	X	X	X
12	137-914	Insulation Shield	X	X	X	X	X	X
13	541-483	RH Rear Evaporator Support	X	X	X	X	X	X
NS	541-484	LH Rear Evaporator Support	X	X	X	X	X	X
14	509-401	Lower Back (Economizer)	X	X	X			
14	509-465 ②	Lower Back (Economizer)	X	X	X			
14	509-403	Lower Back (Non-Economizer)				X	X	X
14	509-464 ②	Lower Back (Non-Economizer)				X	X	X
15	111-294	Return Air Frame	X	X	X	X	X	X
16	S501-1037-* ①	Right Side Assembly (Economizer)	X	X	X			
16	S501-1119 ②	Right Side Assembly (Economizer)	X	X	X			
16	S501-1042-* ①	Right Side Assembly (Non-Economizer)				X	X	X
16	S501-1117 ②	Right Side Assembly (Non-Economizer)				X	X	X
17	523-159	Right Drain Pan	X	X	X	X	X	X
18	521-577	Evaporator Partition	X	X	X	X	X	X
19	521-578	Blower Partition (Economizer)	X	X	X			
19	521-580	Blower Partition (Non-Economizer)				X	X	X
20	118-123-* ①	Side Grille	2	2	2	2	2	2
20	118-152 ②	Side Grille	2	2	2	2	2	2
21	537-908-8	RH Internal Deflector (Economizer)	X	X	X			
21	135X391	RH Internal Deflector (Non-Economizer)				X	X	X
22	137X906	RH Condensor Partition	X	X	X	X	X	X
22	137X1003 ②	RH Condensor Partition	X	X	X	X	X	X
22	121-581	Condensor Partition (Non-Economizer)				X	X	X
22	121-634 ②	Condensor Partition (Non-Economizer)				X	X	X
23	527-570	Base Assembly	X	X	X	X	X	X
23	527-602 ②	Base Assembly	X	X	X	X	X	X
24	141-481	Evaporator Partition Front Support	X	X	X	X	X	X
25	135-390-* ①	Service Panel Rain Channel	3	3	3	3	3	3
25	135-411 ②	Service Panel Rain Channel	3	3	3	3	3	3
26	517-420	Control Panel Box (Economizer)	X	X	X			
26	517-439 ②	Control Panel Box (Economizer)	X	X	X			
26	517-435	Control Panel Box (Non-Economizer)				X	X	X
26	517-440 ②	Control Panel Box (Non-Economizer)				X	X	X

Continued on page 4

① Exterior cabinet parts are manufactured with various paint color options. To ensure the proper paint color is received, include the complete model and serial number of the unit for which cabinet parts are being ordered.

② Cabinet components are manufactured from stainless steel Code "S"

CABINET COMPONENTS

Dwg No.	Part Number	Description	W090A****E	W120A****E	W150A****E	W090A****B	W120A****B	W150A****B
		Continued from page 3						
27	S157-031-* ①	Refrigerant Service Port Cover	X	X	X	X	X	X
27	S157-032 ②	Refrigerant Service Port Cover	X	X	X	X	X	X
28	133-300	Inner Control Panel Cover (230V)		X	X		X	X
28	133-312	Inner Control Panel Cover (460V)	X	X	X	X	X	X
28	133-313	Inner Control Panel Cover (230V)	X			X		
28	133-314	Inner Control Panel Cover (575V)	X	X	X	X	X	X
29	S553-715-* ①	Condenser/Fan Access Panel	X	X	X	X	X	X
29	S553-753 ②	Condenser/Fan Access Panel	X	X	X	X	X	X
NS	167-030-* ①	Venturi Ring	X	X	X	X	X	X
NS	167-031 ②	Venturi Ring	X	X	X	X	X	X
30	533-299-* ①	Control Panel Access Panel	X	X	X	X	X	X
30	533-343 ②	Control Panel Access Panel	X	X	X	X	X	X
31	S153-716-* ①	Circuit Breaker Access Panel	X	X	X	X	X	X
31	S153-719 ②	Circuit Breaker Access Panel	X	X	X	X	X	X
32	S553-714-* ①	Blower Access Service Panel	X	X	X	X	X	X
32	S553-752 ②	Blower Access Service Panel	X	X	X	X	X	X
33	537-919-8	LH Internal Deflector (Economizer)	X	X	X			
33	135Y391	LH Internal Deflector (Non-Economizer)				X	X	X
34	S553-713-* ①	Air Filter/Evaporator Access Door	X	X	X	X	X	X
34	S553-751 ②	Air Filter/Evaporator Access Door	X	X	X	X	X	X
35	137Y906	LH Condensor Partition	X	X	X	X	X	X
35	137Y1003 ②	LH Condensor Partition	X	X	X	X	X	X
36	113-733	Evap Door Hinge Arm	2	2	2	2	2	2
NS	113-732	Evap Door Arm Bracket	2	2	2	2	2	2
NS	113X726	Evap Door Support Guide - LH Side	X	X	X	X	X	X
NS	113Y726	Evap Door Support Guide - RH Side	X	X	X	X	X	X
NS	113-750-* ①	Rain Flashing	X	X	X	X	X	X
NS	113-791 ②	Rain Flashing	X	X	X	X	X	X
NS	113-748	Lifting Bracket	2	2	2	2	2	2
NS	113-846 ②	Lifting Bracket	2	2	2	2	2	2
NS	400-0426	Front Door Lifting Handle	2	2	2	2	2	2
NS	143-231	Rear Cover Plates (Lower Back)	2	2	2	2	2	2
NS	143-233 ②	Rear Cover Plates (Lower Back)	2	2	2	2	2	2
NS	5252-033	Bard Nameplate	X	X	X	X	X	X

① Exterior cabinet parts are manufactured with various paint color options. To ensure the proper paint color is received, include the complete model and serial number of the unit for which cabinet parts are being ordered.

② Cabinet components are manufactured from stainless steel Code "S"

NS – Not Shown

Refer to drawing on page 2

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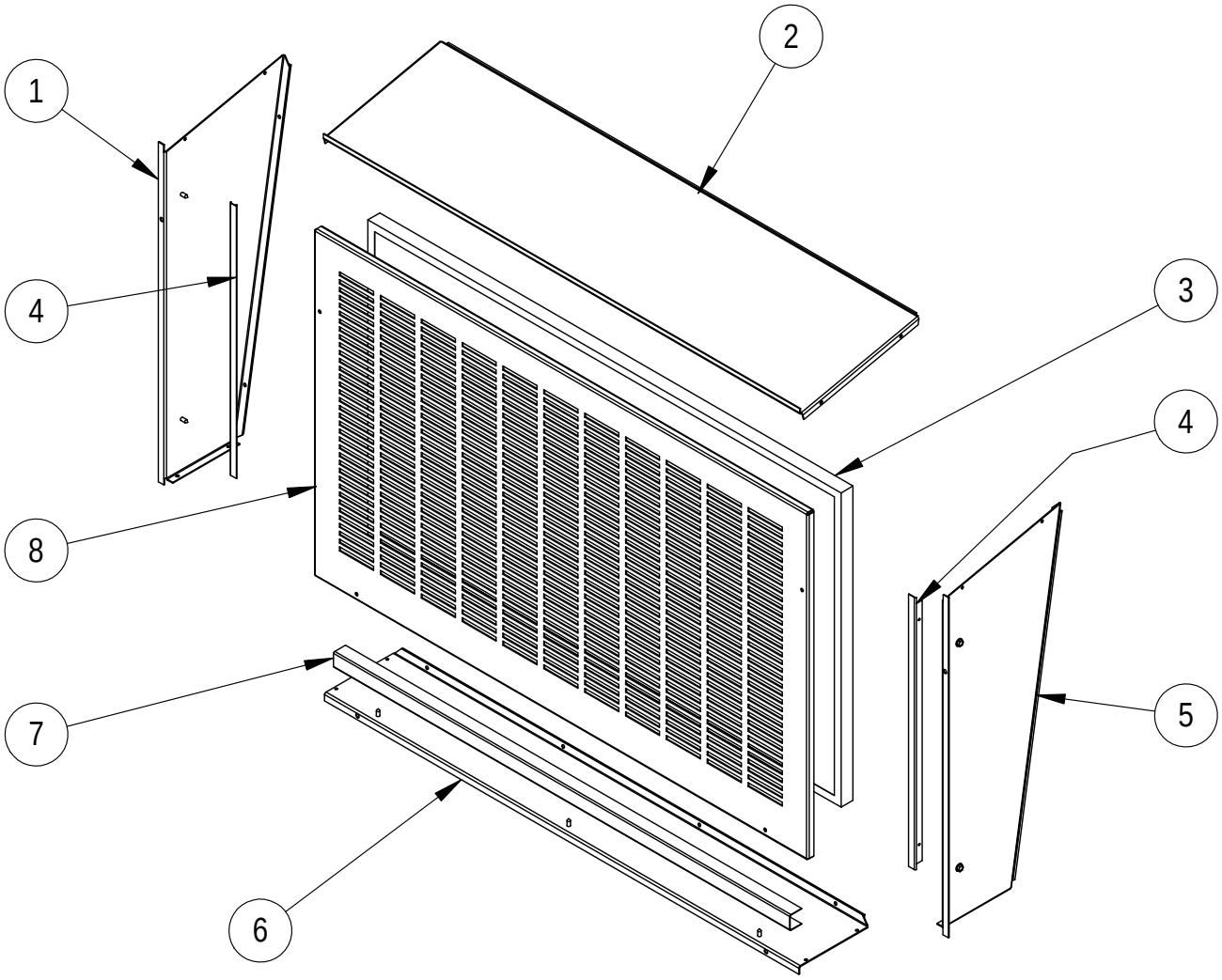
ECONOMIZER INTAKE HOODS



SEXP-899

Dwg No.	Part Number	Description	W090A****E	W120A****E	W150A****E
1	101-1039-* ①	Left Side	X	X	X
1	101-1120 ②	Left Side	X	X	X
2	107-380-* ①	Econ Hood Top	X	X	X
2	107-402 ②	Econ Hood Top	X	X	X
3	7003-081	Mist Eliminator	X	X	X
4	105-1342	Side Filter Angle	X	X	X
4	105-1525 ②	Side Filter Angle	X	X	X
5	101-1040-* ①	Right Side	X	X	X
5	101-1121 ②	Right Side	X	X	X
6	127-571-* ①	Econ Hood Bottom	X	X	X
6	127-603 ②	Econ Hood Bottom	X	X	X
7	113-725	Mist Eliminator Support	X	X	X
7	113-901 ②	Mist Eliminator Support	X	X	X
8	119-122-* ①	Front Grille	X	X	X
8	119-153 ②	Front Grille	X	X	X

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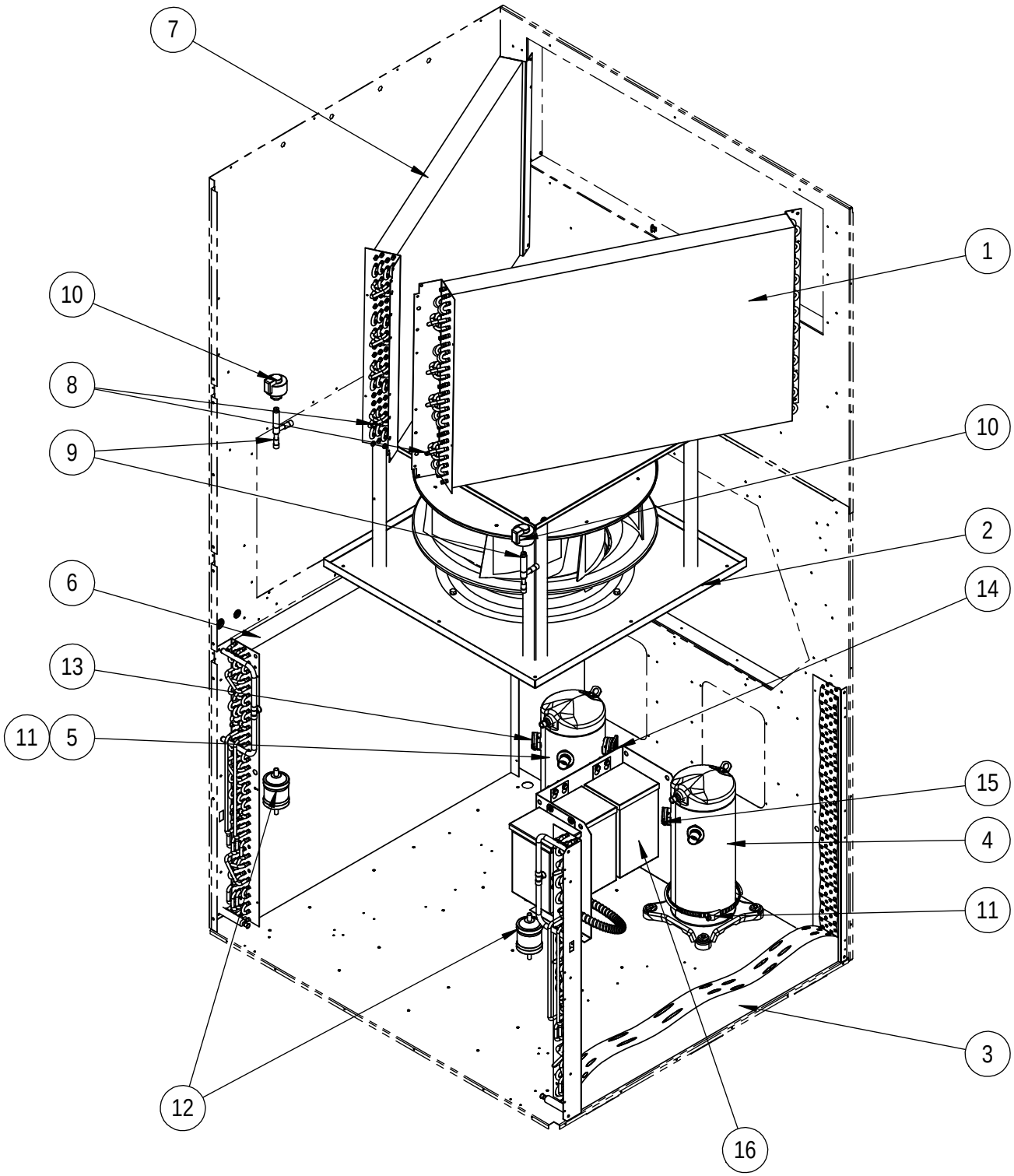
② Components are manufactured from stainless steel Code "S"

SYSTEM COMPONENTS



SEXP-898 A

Dwg. No.	Part Number	Description	W090A*B	W090A*C	W090A*E	W090A*V	W090A*Q	W120A*B	W120A*C	W120A*E	W120A*N	W120A*V	W120A*Q	W150A*B	W150A*C	W150A*E	W150A*N	W150A*V	W150A*Q
1	917-0351BX	Right Evaporator Coil (Green Hydrophillic Coated)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1	917-0362BX	Right Evaporator Coil (Phenolic Coated)	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
2	S5154-008-001	Indoor Blower Assembly	X		X			X		X				X		X			
2	S5154-009-001	Indoor Blower Assembly		X		X	X		X		X	X	X		X		X	X	X
3	5051-220BX	Right Condenser Coil	X	X	X	X	X	X	X	X	X	X	X						
3	5054-220BX	Right Condenser Coil (Phenolic Coated)	O	O	O	O	O	O	O	O	O	O	O						
3	917-0420	Right Condenser Coil												X	X	X	X	X	X
4	8000-333	1-Stage Compressor (ZP42K5E-TF5-130)	X		X														
4	8000-334	1-Stage Compressor (ZP42K5E-TFD-130)		X		X													
4	8000-420	1-Stage Compressor (ZP42K5E-TFE-130)					X												
4	8000-429	1-Stage Compressor (ZP57K5E-TF5-130)						X		X									
4	8000-430	1-Stage Compressor (ZP57K5E-TFD-130)							X			X							
4	8000-431	1-Stage Compressor (ZP57K5E-TFE-130)											X						
4	8000-404	1-Stage Compressor (ZP67KCE-TF5-130)												X		X			
4	8000-405	1-Stage Compressor (ZP67KCE-TFD-130)													X			X	
4	8000-418	1-Stage Compressor (ZP67KCE-TFE-130)																	X
4	8000-460	1-Stage Compressor (ZP61K5E-TF7-130)									X								
4	8000-461	1-Stage Compressor (ZP67KCE-TF7-130)															X		
5	8000-383	2-Stage Compressor (ZPS40K6E-TF5-130)	X		X														
5	8000-384	2-Stage Compressor (ZPS40K6E-TFD-130)		X		X													
5	8000-445	2-Stage Compressor (ZPS40K6E-TFE-130)					X												
5	8000-397	2-Stage Compressor (ZPS60K5E-TF5-130)						X		X									
5	8000-399	2-Stage Compressor (ZPS60K5E-TFD-130)							X			X							
5	8000-432	2-Stage Compressor (ZPS60K5E-TFE-130)											X						
5	8000-446	2-Stage Compressor (ZPS67KCE-TF5-250)												X		X			
5	8000-447	2-Stage Compressor (ZPS67KCE-TFD-250)													X			X	
5	8000-448	2-Stage Compressor (ZPS67KCE-TFE-130)																	X
5	8000-460	1-Stage Compressor (ZP61K5E-TF7-130)									X								
5	8000-461	1-Stage Compressor (ZP67KCE-TF7-130)															X		
6	5051-219BX	Left Condenser Coil	X	X	X	X	X	X	X	X	X	X	X						
6	5054-219BX	Left Condenser Coil (Phenolic Coated)	O	O	O	O	O	O	O	O	O	O	O						
6	917-0419	Left Condenser Coil												X	X	X	X	X	X
7	917-0352BX	Left Evaporator Coil (Green Hydrophillic Coated)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7	917-0363BX	Left Evaporator Coil (Phenolic Coated)	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
8	8620-296	Freeze Stat Sensor (910-2059 FS1)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8	8620-296	Freeze Stat Sensor (910-2085 FS2)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
9	5651S245	Electronic Expansion Valve	2	2	2	2	2												
9	5651S248	Electronic Expansion Valve						2	2	2	2	2	2	2	2	2	2	2	2
10	5651-246	EEV Cable and Stator	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
11	8605-017	Compressor Crankcase Heater	2		2			2		2				2		2			
11	8605-018	Compressor Crankcase Heater		2		2			2		2	2			2		2	2	
11	8605-021	Compressor Crankcase Heater					2						2						2
12	5201-022	Refrigerant Filter Drier	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
13	3000-1606	LH Compressor Power Plug	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
14	3000-1604	LH Compressor Staging Solenoid Plug	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X
15	3000-1605	RH 1-Stage Compressor Power Plug	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
16	910-2087	575V Transformer/Junction Box Assy. *(see page 28)*					X						X						X
NS	7004-065	Air Filter 2" MERV 8 (20 x 24 x 2)	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
NS	7004-066	Air Filter 2" MERV 11 (20 x 24 x 2) ①	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
NS	7004-067	Air Filter 2" MERV 13 (20 x 24 x 2) ①	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4

NS – Not Shown

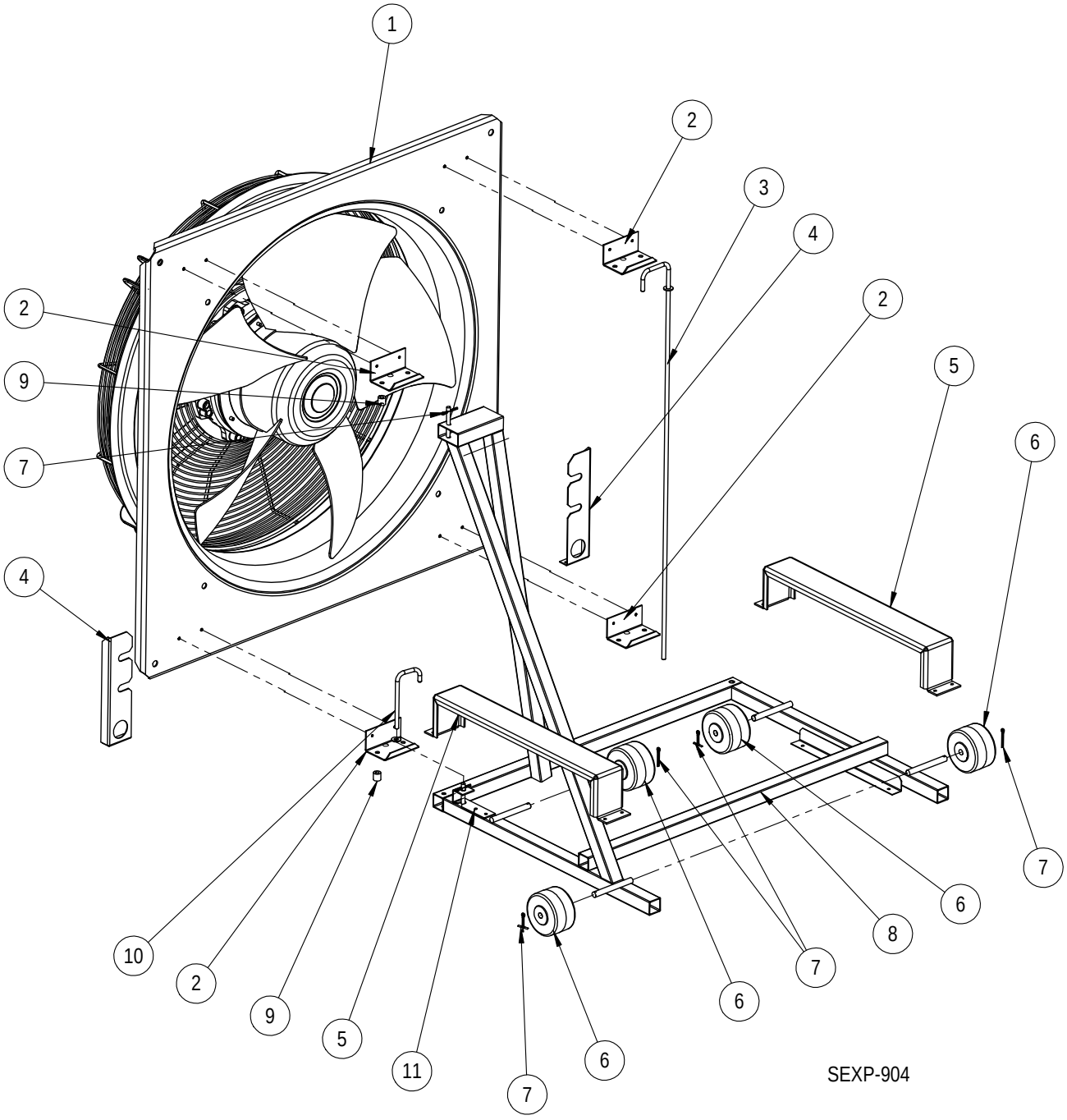
① – Optional on these models

X – Standard Components

O – Optional Components

NOTE: *Refrigerant pressure switches, transducers and system temperature sensors can be found on pages 12 & 13.*

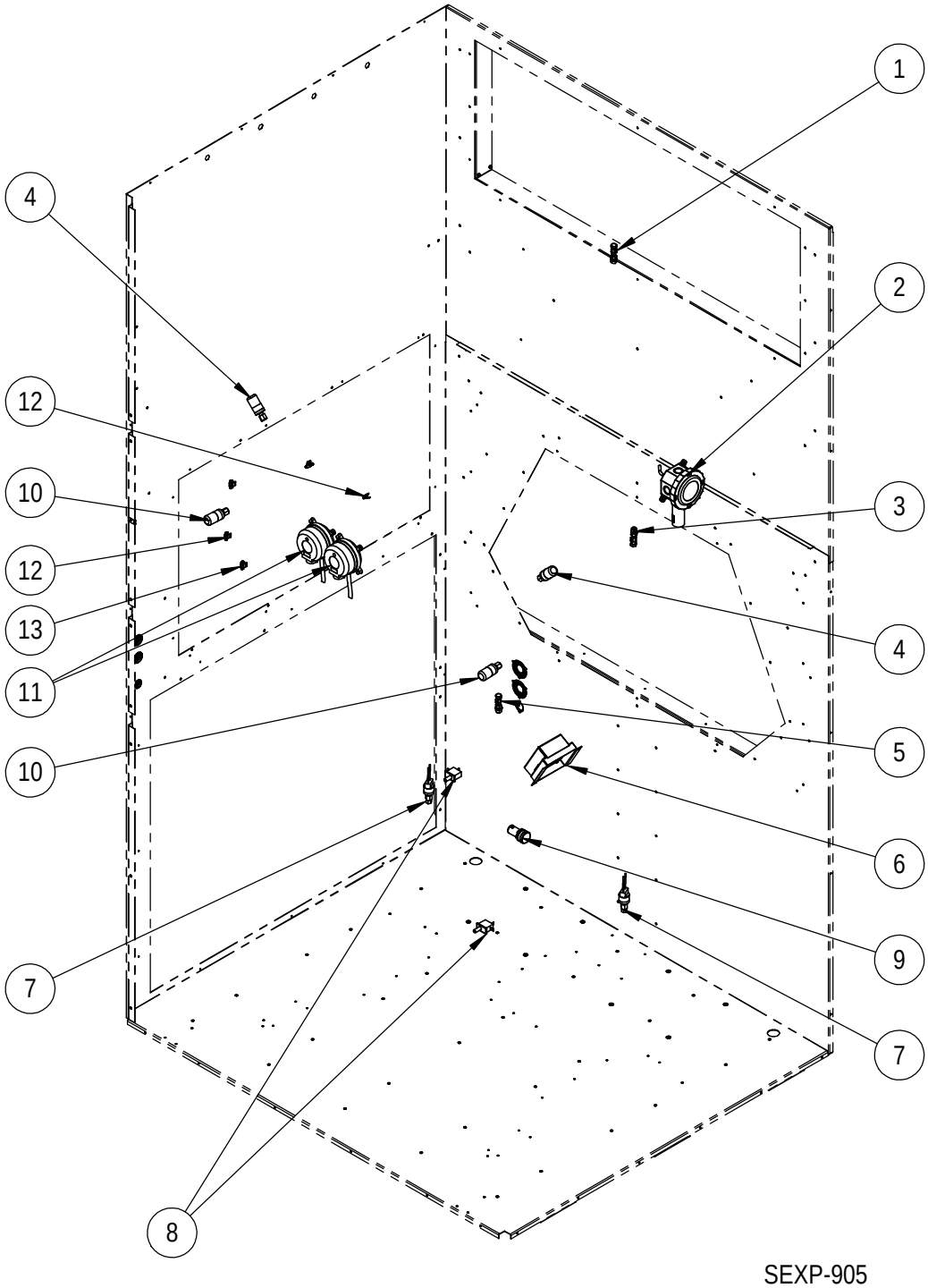
FAN SYSTEM COMPONENTS



Dwg No.	Part Number	Description	W090A*B	W120A*B	W150A*B	W090A*C	W120A*C	W150A*C	W090A*E	W120A*E	W150A*E	W120A*N	W150A*N	W090A*V	W120A*V	W150A*V	W090A*Q	W120A*Q	W150A*Q
1	S922-0001-001	Fan & Motor Assembly	X	X	X				X	X	X								
1		(includes Dwg. No. 2, 3 & 10)																	
1	S922-0001-003 ①	Coated Fan & Motor Assembly	X	X	X				X	X	X								
1		(includes Dwg. No. 2, 3 & 10)																	
1	S922-0002-001	Fan & Motor Assembly				X	X	X				X	X	X	X	X	X	X	X
1		(includes Dwg. No. 2, 3 & 10)																	
1	S922-0002-003 ①	Coated Fan & Motor Assembly				X	X	X				X	X	X	X	X	X	X	X
1		(includes Dwg. No. 2, 3 & 10)																	
2	113-737	Fan Hinge Bracket	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
2	113-898 ①	Fan Hinge Bracket	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
3	5401-008	Anti-Pivot Rod	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4	113X729	RH Gauge Port Bracket	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4	113X836 ①	RH Gauge Port Bracket	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5	113-735	Wheel Retention Rail	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
5	113-840 ①	Wheel Retention Rail	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
6	1171-035	Plastic Wheel, 3" Diameter	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
7	1012-353	Cotter Pin	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
8	8200-056	Fan Slide Welded Frame	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8	8200-058 ①	Fan Slide Welded Frame	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
9	5451-029	Nylon Sleeve	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
10	5401-007	Fan Stop Rod	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
11	113-752	Fan Safety Lock Bracket	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
11	113-839 ①	Fan Safety Lock Bracket	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
12	113Y729	LH Gauge Port Bracket	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
12	113Y836 ①	LH Gauge Port Bracket	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
NS	113-738	Wheel Guide Angle	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
NS	113-841 ②	Wheel Guide Angle	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
NS	113-736	Fan Attachment Angle	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
NS	113-842 ②	Fan Attachment Angle	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4

① Used with stainless steel cabinet option

NS – Not Shown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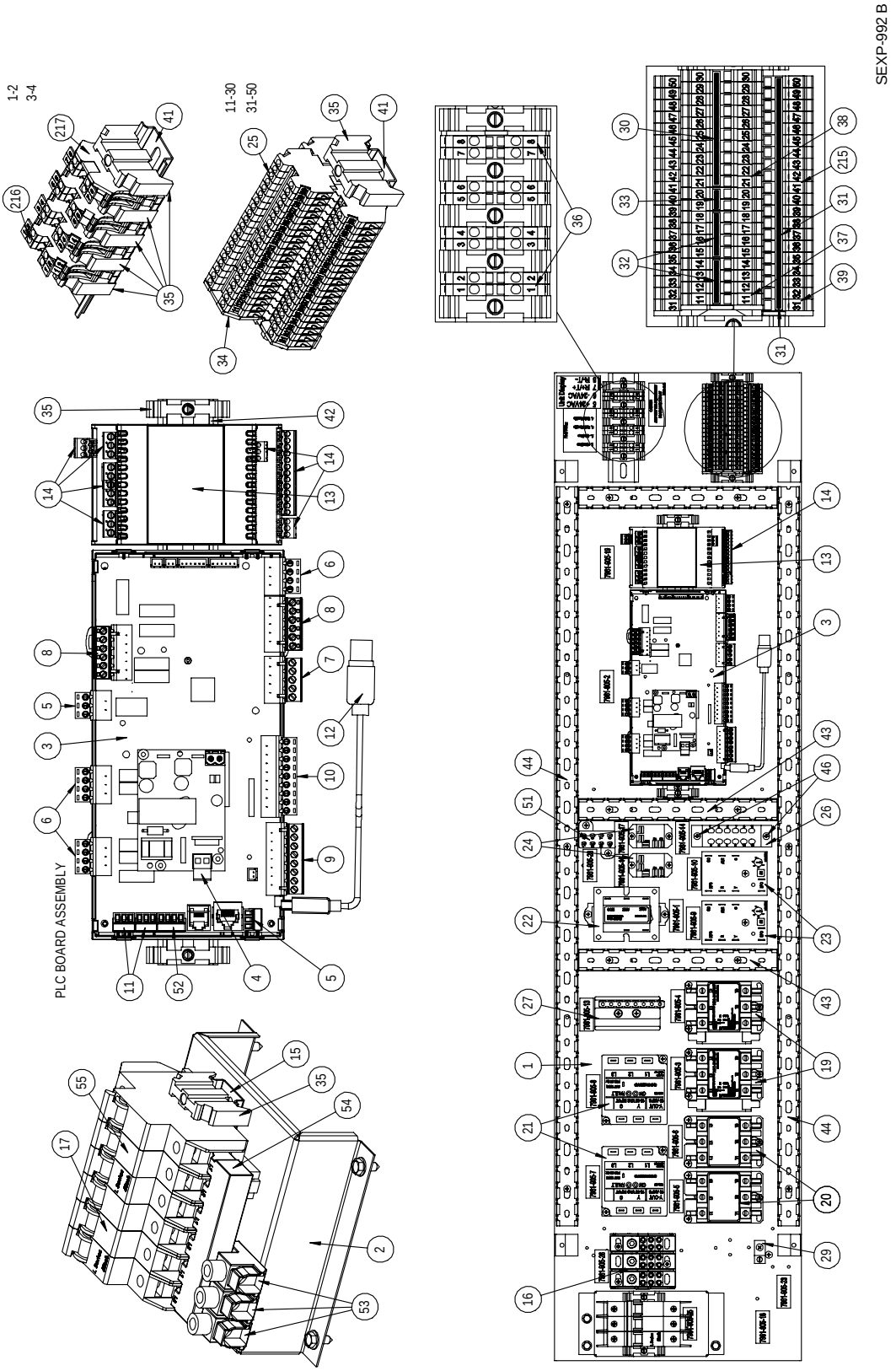
SEXP-905

Dwg No.	Part Number	Description	W090A****E	W120A****E	W150A****E	W090A****B	W120A****B	W150A****B
1	8620-296	Supply Air Sensor (910-2052 SAT)	X	X	X	X	X	X
2	8301-089	Temp and Humidity Sensor	X	X	X	X	X	X
3	8620-296	Return Air Sensor (910-2054 RAT)	X	X	X	X	X	X
4	8406-158	Low Pressure Transducer (Blue)	2	2	2	2	2	2
5	8620-296	Mixed Air Sensor (910-2053 MAT)	X	X	X			
6	8301-091	Dust Sensor	X	X	X			
NS	8612-064	Dust Sensor Board	X	X	X			
7	8406-142	High Pressure Switch	2	2	2	2	2	2
8	8406-156	Door Switch	2	2	2	2	2	2
9	8611-199	Dirty Filter Light	X	X	X	X	X	X
10	8406-157	Liquid Line Pressure Transducer (Red)	2	2	2	2	2	2
11	8301-057	Filter Switch w/Adjustment	X	X	X	X	X	X
11	8301-057	Blower Fail Switch w/Adjustment	X	X	X	X	X	X
12	8620-296	Suction Line Temperature Sensor (910-2084 ST1)	X	X	X	X	X	X
12	8620-296	Suction Line Temperature Sensor (910-2076 ST2)	X	X	X	X	X	X
13	8620-310	Liquid Line Temperature Sensor (910-2086 LLT1)	X	X	X	X	X	X
13	8620-310	Liquid Line Temperature Sensor (910-2077 LLT2)	X	X	X	X	X	X

NS – Not Shown

CONTROL PANEL – B (230V/208V) & E (220V/200V) VOLTAGES



This drawing to be used for reference for pages 15, 16 and 17

CONTROL PANEL – B (230V/208V) & E (220V/200V) VOLTAGES

Dwg No.	Part Number	Description	W090APB0Z W090APE0Z	W090APB09	W090APB18 W090APE18	W090AEB18	W090AEE18
1	117-404	Control Sub Panel	X	X	X	X	X
2	113-814	Circuit Breaker Riser	X	X	X		
2	113-734	Circuit Breaker Riser				X	X
3	8301-076-002*	UPC3 - MEGA-TEC 1.0.0	X	X	X	X	X
4	8611-183	2-Pin Circuit Board Connector	X	X	X	X	X
5	8611-147	3-Pin Circuit Board Connector	2	2	2	2	2
6	8611-148	4-Pin Circuit Board Connector	3	3	3	3	3
7	8611-217	5-Pin Circuit Board Connector	X	X	X	X	X
8	8611-218	6-Pin Circuit Board Connector	2	2	2	2	2
9	8611-185	8-Pin Circuit Board Connector	X	X	X	X	X
10	8611-149	9-Pin Circuit Board Connector	X	X	X	X	X
11	8611-192	3-Pin Circuit Board Connector	2	2	2	2	2
12	8301-075	USB Micro Cable Female to Male	X	X	X	X	X
13	8301-081	C.PCOE Expansion PLC Board	X	X	X	X	X
14	8611-226	Terminal Block Kit for C.PCOE	X	X	X	X	X
15	8611-240	35MM DIN Rail 3"	X	X	X	X	X
16	8607-070	Power Terminal Block		X	X		
17	8615-110	Circuit Breaker 60A 3-Pole	X	X	X	X	X
19	8401-037	Contactor 3-Pole 30 Amp	2	2	2	2	2
20	8401-035	Contactor 25 Amp 3-Pole		X	2	2	2
21	8201-126	3 Phase Line Monitor 50/60 HZ	2	2	2	2	2
22	8407-065	Transformer 208/240-24 75VA	X	X	X	X	X
23	S8201-169	Compressor Control Module	2	2	2	2	2
24	8201-130	Relay, SPDT, Pilot Duty	2	2	2	2	2
25	8607-058	Double Level Terminal Block	20	20	20	20	20
26	8607-060	Terminal Block Insul. 12-Position	X	X	X	X	X
27	8607-061	Terminal Block 16-Position	X	X	X	X	X
29	8611-006	Terminal	X	X	X	X	X
30	8611-203	Jumper 10-Position	X	X	X	X	X
31	8611-224	Jumper 20-Position	X	X	X	X	X
32	8611-195	Jumper 4-Position	2	2	2	2	2
33	8611-194	Jumper 2-Position	X	X	X	X	X
34	8611-221	End Cover	X	X	X	X	X
35	8611-144	End Clamp for DIN Rail	11	11	11	11	11
36	8607-056	Terminal Designation (1-10)	2	2	2	2	2
37	8607-055	Terminal Designation (11-20)	2	2	2	2	2
38	8607-054	Terminal Designation (21-30)	2	2	2	2	2
39	8607-053	Terminal Designation (31-40)	2	2	2	2	2
41	8611-223	35MM DIN Rail 5"	2	2	2	2	2
42	8611-228	35MM DIN Rail 13"	X	X	X	X	X
43	8611-229-0902	3-1/4" X 1" Cable Duct X 9.13"	3	3	3	3	3
44	8611-229-3400	3-1/4" X 1" Cable Duct X 34"	2	2	2	2	2
51	8607-072	Terminal Block 8-Position	X	X	X	X	X
52	8611-255	4-Pin Circuit Board Connector	X	X	X	X	X
53	8615-088	Jumper Bar Main Lugs				3	3
54	8615-090	Two Circuit Bus Bar 3-Pole				X	X
55	8615-109	Circuit Breaker 50A 3-Pole				X	X
215	8607-059	Terminal Designation (41-50)	2	2	2	2	2
216	8611-150	Terminal Block	8	8	8	8	8
217	8611-151	End Cap	4	4	4	4	4

* Replacement part will have a letter attached to the end of the part number to designate software version (Example: 8301-076-002A). A software upgrade of all PLCs onsite (units and controllers) should accompany any PLC replacement. Latest revisions of software, change log and instructions are available on the Bard website at http://www.bardhvac.com/software-download/

Wiring diagram reference listed under **ELECTRIC HEAT COMPONENTS** on pages 22 – 25.

CONTROL PANEL – B (230V/208V) & E (220V/200V) VOLTAGES

Dwg No.	Part Number	Description	W120APB0Z W120APE0Z	W120APB09	W120APB18 W120APE18	W120AEB18	W120AEE18
1	117-404	Control Sub Panel	X	X	X	X	X
2	113-734	Circuit Breaker Riser	X	X	X	X	X
3	8301-076-002*	UPC3 - MEGA-TEC 1.0.0	X	X	X	X	X
4	8611-183	2-Pin Circuit Board Connector	X	X	X	X	X
5	8611-147	3-Pin Circuit Board Connector	2	2	2	2	2
6	8611-148	4-Pin Circuit Board Connector	3	3	3	3	3
7	8611-217	5-Pin Circuit Board Connector	X	X	X	X	X
8	8611-218	6-Pin Circuit Board Connector	2	2	2	2	2
9	8611-185	8-Pin Circuit Board Connector	X	X	X	X	X
10	8611-149	9-Pin Circuit Board Connector	X	X	X	X	X
11	8611-192	3-Pin Circuit Board Connector	2	2	2	2	2
12	8301-075	USB Micro Cable Female to Male	X	X	X	X	X
13	8301-081	C.PCOE Expansion PLC Board	X	X	X	X	X
14	8611-226	Terminal Block Kit for C.PCOE	X	X	X	X	X
15	8615-090	35MM DIN Rail 3"	X	X	X	X	X
16	8615-088	Jumper Bar Main Lugs	3	3	3	3	3
17	8615-108	Circuit Breaker 40A 3-Pole	2	2	2		
17	8615-110	Circuit Breaker 60A 3-Pole				2	2
19	8401-037	Contactor 3-Pole 30 Amp	2	2	2	2	2
20	8401-035	Contactor 25 Amp 3-Pole		X	2	2	2
21	8201-126	3 Phase Line Monitor 50/60 HZ	2	2	2	2	2
22	8407-065	Transformer 208/240-24 75VA	X	X	X	X	X
23	S8201-169	Compressor Control Module	2	2	2	2	2
24	8201-130	Relay, SPDT, Pilot Duty	2	2	2	2	2
25	8607-058	Double Level Terminal Block	20	20	20	20	20
26	8607-060	Terminal Block Insul. 12-Position	X	X	X	X	X
27	8607-061	Terminal Block 16-Position	X	X	X	X	X
29	8611-006	Terminal	2	2	2	2	2
30	8611-203	Jumper 10-Position	X	X	X	X	X
31	8611-224	Jumper 20-Position	X	X	X	X	X
32	8611-195	Jumper 4-Position	2	2	2	2	2
33	8611-194	Jumper 2-Position	X	X	X	X	X
34	8611-221	End Cover	X	X	X	X	X
35	8611-144	End Clamp for DIN Rail	11	11	11	11	11
36	8607-056	Terminal Designation (1-10)	2	2	2	2	2
37	8607-055	Terminal Designation (11-20)	2	2	2	2	2
38	8607-054	Terminal Designation (21-30)	2	2	2	2	2
39	8607-053	Terminal Designation (31-40)	2	2	2	2	2
41	8611-223	35MM DIN Rail 5"	3	3	3	3	3
42	8611-228	35MM DIN Rail 13"	X	X	X	X	X
43	8611-229-0902	3-1/4" X 1" Cable Duct X 9.13"	3	3	3	3	3
44	8611-229-3400	3-1/4" X 1" Cable Duct X 34"	2	2	2	2	2
51	8607-072	Terminal Block 8-Position	X	X	X	X	X
52	8611-255	4-Pin Circuit Board Connector	X	X	X	X	X
53	8615-088	Jumper Bar Main Lugs		3	3	3	3
54	8615-090	Two Circuit Bus Bar 3-Pole		X	X	X	X
215	8607-059	Terminal Designation (41-50)	2	2	2	2	2
216	8611-150	Terminal Block	8	8	8	8	8
217	8611-151	End Cap	4	4	4	4	4

* Replacement part will have a letter attached to the end of the part number to designate software version (Example: 8301-076-002A). A software upgrade of all PLCs onsite (units and controllers) should accompany any PLC replacement. Latest revisions of software, change log and instructions are available on the Bard website at http://www.bardhvac.com/software-download/

Wiring diagram reference listed under **ELECTRIC HEAT COMPONENTS** on pages 22 – 25.

Refer to drawing on page 14

CONTROL PANEL – B (230V/208V) & E (220V/200V) VOLTAGES

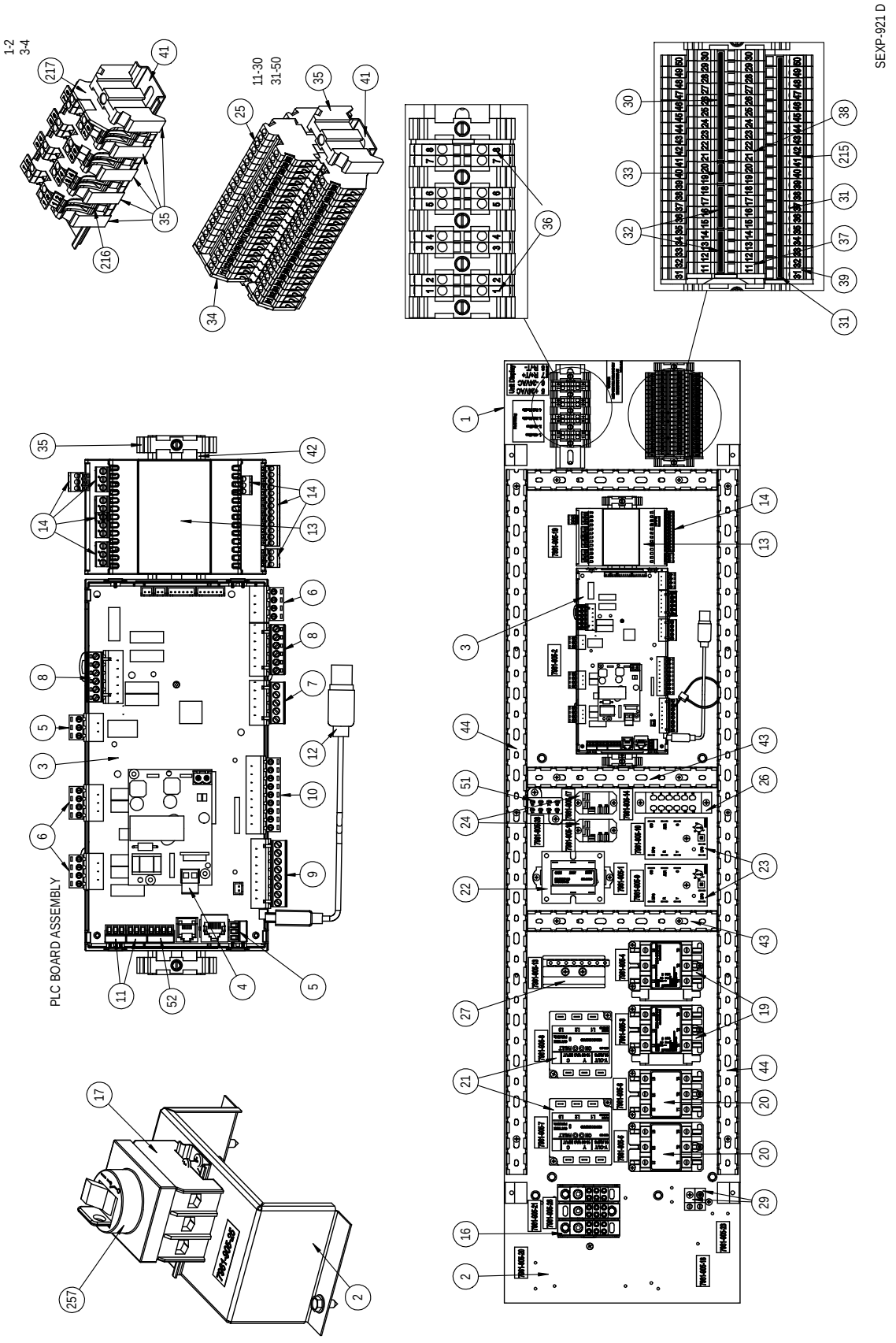
Dwg No.	Part Number	Description	W150APB0Z W150APE0Z	W150APB09	W150APB18	W150APE18	W150AEB18	W150AEE18
1	117-404	Control Sub Panel	X	X	X	X	X	X
2	113-734	Circuit Breaker Riser	X	X	X	X	X	X
3	8301-076-002*	UPC3 - MEGA-TEC 1.0.0	X	X	X	X	X	X
4	8611-183	2-Pin Circuit Board Connector	X	X	X	X	X	X
5	8611-147	3-Pin Circuit Board Connector	2	2	2	2	2	2
6	8611-148	4-Pin Circuit Board Connector	3	3	3	3	3	3
7	8611-217	5-Pin Circuit Board Connector	X	X	X	X	X	X
8	8611-218	6-Pin Circuit Board Connector	2	2	2	2	2	2
9	8611-185	8-Pin Circuit Board Connector	X	X	X	X	X	X
10	8611-149	9-Pin Circuit Board Connector	X	X	X	X	X	X
11	8611-192	3-Pin Circuit Board Connector	2	2	2	2	2	2
12	8301-075	USB Micro Cable Female to Male	X	X	X	X	X	X
13	8301-081	C.PCOE Expansion PLC Board	X	X	X	X	X	X
14	8611-226	Terminal Block Kit for C.PCOE	X	X	X	X	X	X
15	8611-240	35MM DIN Rail 3"	X	X	X	X	X	X
16	8607-070	Power Terminal Block		X	X	X		
17 17	8615-109 8615-110	Circuit Breaker 50A 3-Pole Circuit Breaker 60A 3-Pole	X	X	X	X	2	2
19	8401-037	Contactor 3-Pole 30 Amp	2	2	2	2	2	2
20	8401-035	Contactor 25 Amp 3-Pole		X	2	2	2	2
21	8201-126	3 Phase Line Monitor 50/60 HZ	2	2	2	2	2	2
22	8407-065	Transformer 208/240-24 75VA	X	X	X	X	X	X
23	S8201-169	Compressor Control Module	2	2	2	2	2	2
24	8201-130	Relay, SPDT, Pilot Duty	2	2	2	2	2	2
25	8607-058	Double Level Terminal Block	20	20	20	20	20	20
26	8607-060	Terminal Block Insul. 12-Position	X	X	X	X	X	X
27	8607-061	Terminal Block 16-Position	X	X	X	X	X	X
29	8611-006	Terminal	X	X	X	X	X	X
30	8611-203	Jumper 10-Position	X	X	X	X	X	X
31	8611-224	Jumper 20-Position	X	X	X	X	X	X
32	8611-195	Jumper 4-Position	2	2	2	2	2	2
33	8611-194	Jumper 2-Position	X	X	X	X	X	X
34	8611-221	End Cover	X	X	X	X	X	X
35	8611-144	End Clamp for DIN Rail	11	11	11	11	11	11
36	8607-056	Terminal Designation (1-10)	2	2	2	2	2	2
37	8607-055	Terminal Designation (11-20)	2	2	2	2	2	2
38	8607-054	Terminal Designation (21-30)	2	2	2	2	2	2
39	8607-053	Terminal Designation (31-40)	2	2	2	2	2	2
41	8611-223	35MM DIN Rail 5"	2	2	2	2	2	2
42	8611-228	35MM DIN Rail 13"	X	X	X	X	X	X
43	8611-229-0902	3-1/4" X 1" Cable Duct X 9.13"	3	3	3	3	3	3
44	8611-229-3400	3-1/4" X 1" Cable Duct X 34"	2	2	2	2	2	2
51	8607-072	Terminal Block 8-Position	X	X	X	X	X	X
52	8611-255	4-Pin Circuit Board Connector	X	X	X	X	X	X
53	8615-088	Jumper Bar Main Lugs		3	3	3	3	3
54	8615-090	Two Circuit Bus Bar 3-Pole		X	X	X	X	X
55	8615-108	Circuit Breaker 40A 3-Pole	X	X	X	X		
215	8607-059	Terminal Designation (41-50)	2	2	2	2	2	2
216	8611-150	Terminal Block	8	8	8	8	8	8
217	8611-151	End Cap	4	4	4	4	4	4

* Replacement part will have a letter attached to the end of the part number to designate software version (Example: 8301-076-002A). A software upgrade of all PLCs onsite (units and controllers) should accompany any PLC replacement. Latest revisions of software, change log and instructions are available on the Bard website at http://www.bardhvac.com/software-download/

Wiring diagram reference listed under **ELECTRIC HEAT COMPONENTS** on pages 22 – 25.

Refer to drawing on page 14

CONTROL PANEL – C (460V), N (400V), Q (575V) & V (415/380V) VOLTAGES



This drawing to be used for reference for pages 19, 20 and 21

CONTROL PANEL – C (460V), N (400V), Q (575V) & V (415/380V) VOLTAGES

Dwg No.	Part Number	Description	W090APC0Z	W090APC09	W090APC18	W090APQ0Z	W090APQ09	W090APQ18	W090APQ36	W090APV0Z	W090APV09	W090APV18	W090AEC18	W090AEV18	W090AEQ18
1	117-404	Control Sub Panel	X	X	X	X	X	X	X	X	X	X	X	X	X
2	113-808	Circuit Breaker Riser	X	X	X	X	X	X	X	X	X	X	X	X	X
3	8301-076-002*	UPC3 - MEGA-TEC 1.0.0	X	X	X	X	X	X	X	X	X	X	X	X	X
4	8611-183	2-Pin Circuit Board Connector	X	X	X	X	X	X	X	X	X	X	X	X	X
5	8611-147	3-Pin Circuit Board Connector	2	2	2	2	2	2	2	2	2	2	2	2	2
6	8611-148	4-Pin Circuit Board Connector	3	3	3	3	3	3	3	3	3	3	3	3	3
7	8611-217	5-Pin Circuit Board Connector	X	X	X	X	X	X	X	X	X	X	X	X	X
8	8611-218	6-Pin Circuit Board Connector	2	2	2	2	2	2	2	2	2	2	2	2	2
9	8611-185	8-Pin Circuit Board Connector	X	X	X	X	X	X	X	X	X	X	X	X	X
10	8611-149	9-Pin Circuit Board Connector	X	X	X	X	X	X	X	X	X	X	X	X	X
11	8611-192	3-Pin Circuit Board Connector	2	2	2	2	2	2	2	2	2	2	2	2	2
12	8301-075	USB Micro Cable Female to Male	X	X	X	X	X	X	X	X	X	X	X	X	X
13	8301-081	C.PCOE Expansion PLC Board	X	X	X	X	X	X	X	X	X	X	X	X	X
14	8611-226	Terminal Block Kit for C.PCOE	X	X	X	X	X	X	X	X	X	X	X	X	X
16	8607-070	Power Teminal Block 3-Pole	X	X	X	X	X	X	X	X	X	X	X	X	X
17	8615-095	600V 40A Toggle Disconnect	X	X	X	X	X	X	X	X	X	X	X	X	X
19	8401-037	Contactor 3-Pole 30 Amp	2	2	2	2	2	2	2	2	2	2	2	2	2
20	8401-041	Contactor 40 Amp 3-Pole		1	2		1	2	2		1	2	2	2	2
21	8201-126	3 Phase Line Monitor 50/60 HZ	2	2	2	2	2	2	2	2	2	2	2	2	2
22	8407-065	Transformer 208/240-24 75VA	X	X	X	X	X	X	X	X	X	X	X	X	X
23	S8201-169	Compressor Control Module	2	2	2	2	2	2	2	2	2	2	2	2	2
24	8201-130	Relay, SPDT, Pilot Duty	2	2	2	2	2	2	2	2	2	2	2	2	2
25	8607-058	Double Level Terminal Block	20	20	20	20	20	20	20	20	20	20	20	20	20
26	8607-060	Terminal Block Insul. 12-Position	X	X	X	X	X	X	X	X	X	X	X	X	X
27	8607-061	Terminal Block 16-Position	X	X	X	X	X	X	X	X	X	X	X	X	X
29	8611-006	Terminal	2	2	2	2	2	2	2	2	2	2	2	2	2
30	8611-203	Jumper 10-Position	X	X	X	X	X	X	X	X	X	X	X	X	X
31	8611-224	Jumper 20-Position	X	X	X	X	X	X	X	X	X	X	X	X	X
32	8611-195	Jumper 4-Position	2	2	2	2	2	2	2	2	2	2	2	2	2
33	8611-194	Jumper 2-Position	X	X	X	X	X	X	X	X	X	X	X	X	X
34	8611-221	End Cover	X	X	X	X	X	X	X	X	X	X	X	X	X
35	8611-144	End Clamp for DIN Rail	11	11	11	11	11	11	11	11	11	11	11	11	11
36	8607-056	Terminal Designation (1-10)	2	2	2	2	2	2	2	2	2	2	2	2	2
37	8607-055	Terminal Designation (11-20)	2	2	2	2	2	2	2	2	2	2	2	2	2
38	8607-054	Terminal Designation (21-30)	2	2	2	2	2	2	2	2	2	2	2	2	2
39	8607-053	Terminal Designation (31-40)	2	2	2	2	2	2	2	2	2	2	2	2	2
41	8611-223	35MM DIN Rail 5"	2	2	2	2	2	2	2	2	2	2	2	2	2
42	8611-228	35MM DIN Rail 13"	X	X	X	X	X	X	X	X	X	X	X	X	X
43	8611-229-0902	3-1/4" X 1" Cable Duct X 9.13"	3	3	3	3	3	3	3	3	3	3	3	3	3
44	8611-229-3400	3-1/4" X 1" Cable Duct X 34"	2	2	2	2	2	2	2	2	2	2	2	2	2
51	8607-072	Terminal Block 8-Position	X	X	X	X	X	X	X	X	X	X	X	X	X
52	8611-255	4-Pin Circuit Board Connector	X	X	X	X	X	X	X	X	X	X	X	X	X
215	8607-059	Terminal Designation (41-50)	2	2	2	2	2	2	2	2	2	2	2	2	2
216	8611-150	Terminal Block	8	8	8	8	8	8	8	8	8	8	8	8	8
217	8611-151	End Cap	4	4	4	4	4	4	4	4	4	4	4	4	4
257	8615-096	Switch Cover Plate	X	X	X	X	X	X	X	X	X	X	X	X	X

* Replacement part will have a letter attached to the end of the part number to designate software version (Example: 8301-076-002A). A software upgrade of all PLCs onsite (units and controllers) should accompany any PLC replacement. Latest revisions of software, change log and instructions are available on the Bard website at http://www.bardhvac.com/software-download/

Wiring diagram reference listed under **ELECTRIC HEAT COMPONENTS** on pages 22 – 25.

CONTROL PANEL – C (460V), N (400V), Q (575V) & V (415/380V) VOLTAGES

Dwg No.	Part Number	Description	W120APC0Z	W120APC09	W120APC18	W120APN0Z	W120APN09	W120APN18	W120APQ0Z	W120APQ09	W120APQ18	W120APQ36	W120APV0Z	W120APV09	W120APV18	W120AEC18	W120AEN18	W120AEQ18	W120AEV18
1	117-404	Control Sub Panel	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2	113-808	Circuit Breaker Riser	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3	8301-076-002*	UPC3 - MEGA-TEC 1.0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4	8611-183	2-Pin Circuit Board Connector	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5	8611-147	3-Pin Circuit Board Connector	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
6	8611-148	4-Pin Circuit Board Connector	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
7	8611-217	5-Pin Circuit Board Connector	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8	8611-218	6-Pin Circuit Board Connector	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
9	8611-185	8-Pin Circuit Board Connector	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10	8611-149	9-Pin Circuit Board Connector	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
11	8611-192	3-Pin Circuit Board Connector	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
12	8301-075	USB Micro Cable Female to Male	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
13	8301-081	C.PCOE Expansion PLC Board	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
14	8611-226	Terminal Block Kit for C.PCOE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
16	8607-070	Power Teminal Block 3-Pole	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
17	8615-095	600V 40A Toggle Disconnect	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X
17	8615-094	600V 60A Toggle Disconnect													X			X	
19	8401-037	Contactor 3-Pole 30 Amp	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
20	8401-041	Contactor 40 Amp 3-Pole		1	2		1	2		1	2	2		1	2	2	2	2	2
21	8201-126	3 Phase Line Monitor 50/60 HZ	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
22	8407-065	Transformer 208/240-24 75VA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
23	S8201-169	Compressor Control Module	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
24	8201-130	Relay, SPDT, Pilot Duty	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
25	8607-058	Double Level Terminal Block	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
26	8607-060	Terminal Block Insul. 12-Position	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
27	8607-061	Terminal Block 16-Position	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
29	8611-006	Terminal	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
30	8611-203	Jumper 10-Position	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
31	8611-224	Jumper 20-Position	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
32	8611-195	Jumper 4-Position	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
33	8611-194	Jumper 2-Position	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
34	8611-221	End Cover	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
35	8611-144	End Clamp for DIN Rail	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
36	8607-056	Terminal Designation (1-10)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
37	8607-055	Terminal Designation (11-20)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
38	8607-054	Terminal Designation (21-30)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
39	8607-053	Terminal Designation (31-40)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
41	8611-223	35MM DIN Rail 5"	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
42	8611-228	35MM DIN Rail 13"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
43	8611-229-0902	3-1/4" X 1" Cable Duct X 9.13"	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
44	8611-229-3400	3-1/4" X 1" Cable Duct X 34"	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
51	8607-072	Terminal Block 8-Position	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
52	8611-255	4-Pin Circuit Board Connector	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
215	8607-059	Terminal Designation (41-50)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
216	8611-150	Terminal Block	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
217	8611-151	End Cap	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
257	8615-096	Switch Cover Plate	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

* Replacement part will have a letter attached to the end of the part number to designate software version (Example: 8301-076-002A). A software upgrade of all PLCs onsite (units and controllers) should accompany any PLC replacement. Latest revisions of software, change log and instructions are available on the Bard website at http://www.bardhvac.com/software-download/

Wiring diagram reference listed under **ELECTRIC HEAT COMPONENTS** on pages 22 – 25.

Refer to drawing on page 18

CONTROL PANEL – C (460V), N (400V), Q (575V) & V (415/380V) VOLTAGES

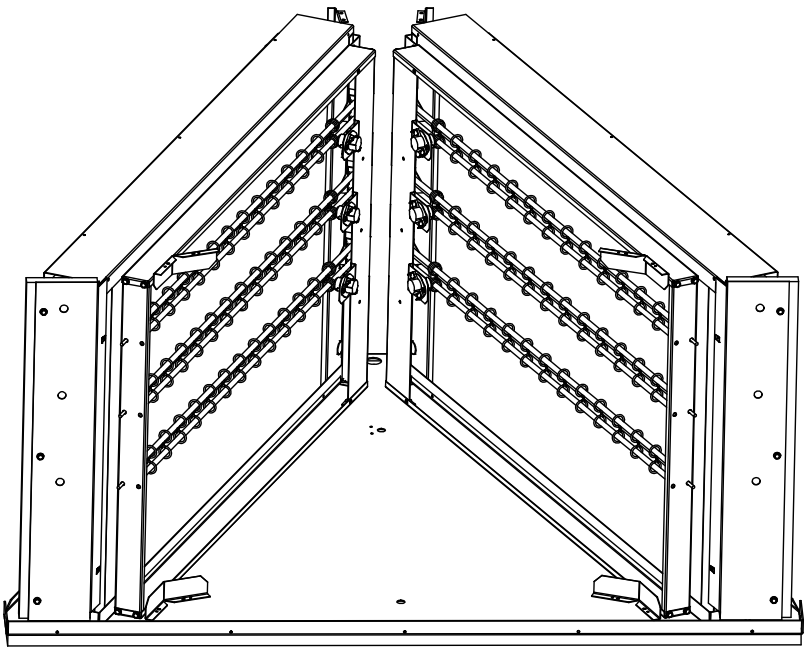
Dwg No.	Part Number	Description	W150APC0Z	W150APC09	W150APC18	W150APN0Z	W150APN09	W150APN18	W150APQ0Z	W150APQ09	W150APQ18	W150APQ36	W150APV0Z	W150APV09	W150APV18	W150AEC18	W150AEN18	W150AEQ18	W150AEV18
1	117-404	Control Sub Panel	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2	113-808	Circuit Breaker Riser	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3	8301-076-002*	UPC3 - MEGA-TEC 1.0.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4	8611-183	2-Pin Circuit Board Connector	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5	8611-147	3-Pin Circuit Board Connector	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
6	8611-148	4-Pin Circuit Board Connector	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
7	8611-217	5-Pin Circuit Board Connector	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8	8611-218	6-Pin Circuit Board Connector	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
9	8611-185	8-Pin Circuit Board Connector	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10	8611-149	9-Pin Circuit Board Connector	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
11	8611-192	3-Pin Circuit Board Connector	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
12	8301-075	USB Micro Cable Female to Male	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
13	8301-081	C.PCOE Expansion PLC Board	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
14	8611-226	Terminal Block Kit for C.PCOE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
16	8607-070	Power Teminal Block 3-Pole	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
17	8615-095	600V 40A Toggle Disconnect	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
19	8401-037	Contactor 3-Pole 30 Amp	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
20	8401-041	Contactor 40 Amp 3-Pole		1	2		1	2		1	2	2		1	2	2	2	2	2
21	8201-126	3 Phase Line Monitor 50/60 HZ	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
22	8407-065	Transformer 208/240-24 75VA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
23	S8201-169	Compressor Control Module	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
24	8201-130	Relay, SPDT, Pilot Duty	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
25	8607-058	Double Level Terminal Block	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
26	8607-060	Terminal Block Insul. 12-Position	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
27	8607-061	Terminal Block 16-Position	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
29	8611-006	Terminal	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
30	8611-203	Jumper 10-Position	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
31	8611-224	Jumper 20-Position	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
32	8611-195	Jumper 4-Position	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
33	8611-194	Jumper 2-Position	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
34	8611-221	End Cover	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
35	8611-144	End Clamp for DIN Rail	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
36	8607-056	Terminal Designation (1-10)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
37	8607-055	Terminal Designation (11-20)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
38	8607-054	Terminal Designation (21-30)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
39	8607-053	Terminal Designation (31-40)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
41	8611-223	35MM DIN Rail 5"	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
42	8611-228	35MM DIN Rail 13"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
43	8611-229-0902	3-1/4" X 1" Cable Duct X 9.13"	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
44	8611-229-3400	3-1/4" X 1" Cable Duct X 34"	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
51	8607-072	Terminal Block 8-Position	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
52	8611-255	4-Pin Circuit Board Connector	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
215	8607-059	Terminal Designation (41-50)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
216	8611-150	Terminal Block	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
217	8611-151	End Cap	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
257	8615-096	Switch Cover Plate	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

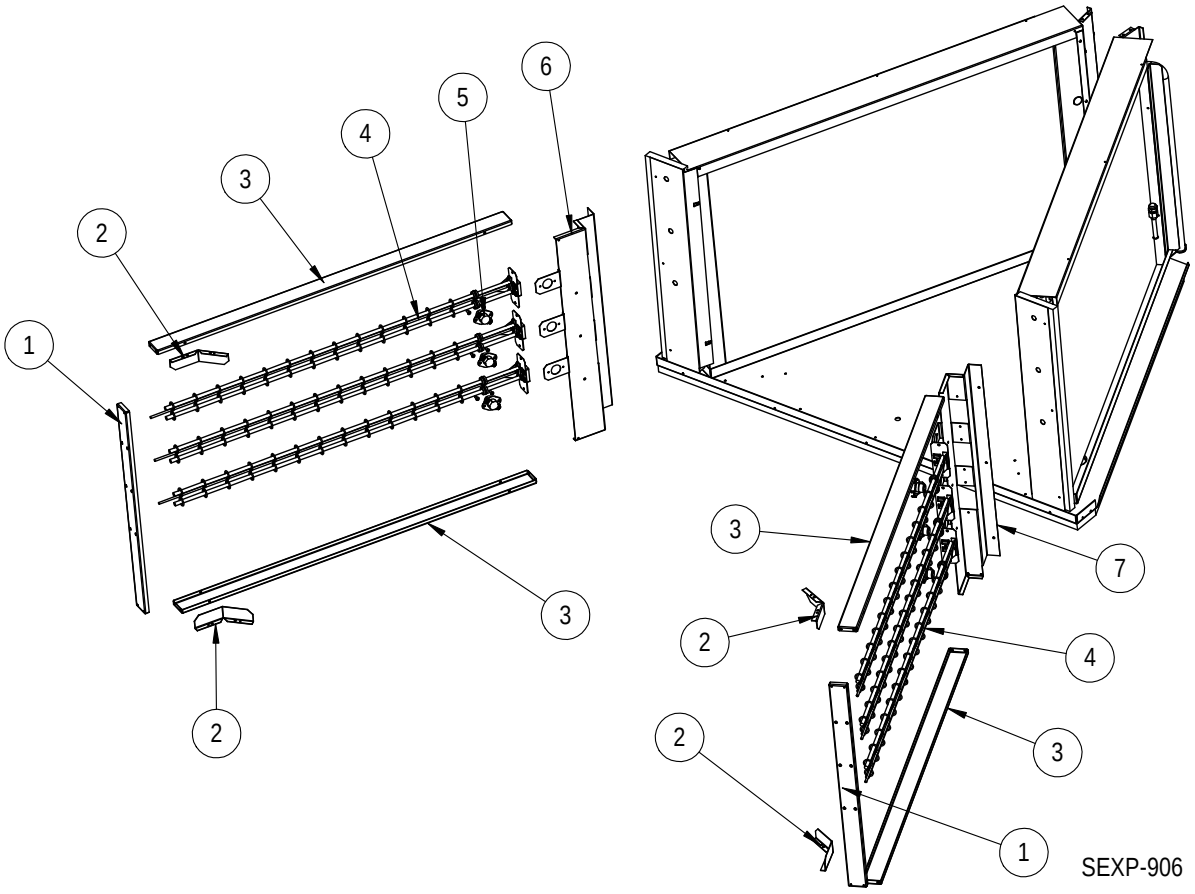
* Replacement part will have a letter attached to the end of the part number to designate software version (Example: 8301-076-002A). A software upgrade of all PLCs onsite (units and controllers) should accompany any PLC replacement. Latest revisions of software, change log and instructions are available on the Bard website at http://www.bardhvac.com/software-download/

Wiring diagram reference listed under **ELECTRIC HEAT COMPONENTS** on pages 22 – 25.

Refer to drawing on page 18

ELECTRIC HEAT COMPONENTS





This drawing to be used for reference for pages 23, 24 and 25

Dwg No.	Part Number	Description	W090APB0Z	W090APB09	W090APB18	W090AEB18	W090APC0Z	W090APC09	W090APC18	W090AEC18	W090APE0Z	W090APE09	W090APE18	W090AEE18	W090APV0Z	W090APV09	W090APV18	W090AEV18	W090APQ0Z	W090APQ09	W090APQ18	W090APQ36	W090AEQ18
1	113-759	Heater Assembly Frame, Rear		X	2	2		X	2	2		X	2	2		X	2	2		X	2		2
1	113-905	Heater Assembly Frame, Rear																				2	
2	113-770	Heater Package Guides		2	4	4		2	4	4		2	4	4		2	4	4		2	4	4	4
3	113-758	Heater Assembly Frame Top/Bottom		2	4	4		2	4	4		2	4	4		2	4	4		2	4	4	4
4	8604-151	Heater Element, 3KW, 208/240V, 2-Term		3	6	6						3	6	6									
4	8604-152	Heater Element, 3KW, 460V, 2-Term						3	6	6						3	6	6					
4	8604-153	Heater Element, 3KW, 575V, 2-Term																		3	6		6
4	8604-161	Heater Element, 6KW, 575V, 2-Term																				6	
5	8402-190	Limit Control		3	6			3	6			3	6			3	6						
5	8402-192	Limit Control																		3	6		
5	8402-198	Limit Control				6				6				6				6				6	6
5	8402-215	Limit Control																					
5	8402-216	Limit Control																					
6	113X756	Right Heater Frame Front			X	X			X	X			X	X			X	X			X		X
6	113X904	Right Heater Frame Front																				X	
7	113Y756	Left Heater Frame Front		X	X	X		X	X	X		X	X	X		X	X	X		X	X		X
7	113Y904	Left Heater Frame Front																				X	
NS	4212-200	Wiring Diagram	X								X												
NS	4212-201	Wiring Diagram		X								X											
NS	4212-202	Wiring Diagram			X								X										
NS	4212-210	Wiring Diagram				X								X									
NS	4212-300	Wiring Diagram					X								X								
NS	4212-301	Wiring Diagram						X								X							
NS	4212-302	Wiring Diagram							X	X							X	X					
NS	4212-700	Wiring Diagram																	X				
NS	4212-701	Wiring Diagram																		X			
NS	4212-702	Wiring Diagram																			X	X	X

NS – Not Shown

ELECTRIC HEAT COMPONENTS

Dwg No.	Part Number	Description	W120APB0Z	W120APB09	W120APB18	W120AEB18	W120APC0Z	W120APC09	W120APC18	W120AEC18	W120APE0Z	W120APE09	W120APE18	W120AEE18	W120APN0Z	W120APN09	W120APN18	W120AEN18	W120APV0Z	W120APV09	W120APV18	W120AEV18	W120APQ0Z	W120APQ09	W120APQ18	W120APQ36	W120AEQ18
1	113-759	Heater Assembly Frame, Rear		X	2	2		X	2	2		X	2	2		X	2	2		X	2	2		X	2	2	2
2	113-770	Heater Package Guides		2	4	4		2	4	4		2	4	4		2	4	4		2	4	4		2	4	4	4
3	113-758	Heater Assembly Frame Top/Bottom		2	4	4		2	4	4		2	4	4		2	4	4		2	4	4		2	4	4	4
4	8604-151	Heater Element, 3KW, 208/240V, 2-Term		3	6	6						3	6	6													
4	8604-152	Heater Element, 3KW, 460V, 2-Term						3	6	6						3	6	6		3	6	6					
4	8604-153	Heater Element, 3 KW, 575V, 2-Term																						3	6	6	6
5	8402-190	Limit Control		3	6	6		3	6	6						3	6										
5	8402-192	Limit Control										3	6							3	6						
5	8402-198	Limit Control																						3	6	6	
5	8402-215	Limit Control												6				6				6					6
6	113X756	Right Heater Frame Front			X	X			X	X			X	X			X	X			X	X			X	X	X
7	113Y756	Left Heater Frame Front		X	X	X		X	X	X		X	X	X		X	X	X		X	X	X		X	X	X	X
NS	4212-200	Wiring Diagram	X								X																
NS	4212-201	Wiring Diagram		X								X															
NS	4212-202	Wiring Diagram			X	X							X	X													
NS	4212-300	Wiring Diagram					X												X								
NS	4212-301	Wiring Diagram						X												X							
NS	4212-302	Wiring Diagram							X	X											X	X					
NS	4212-304	Wiring Diagram													X												
NS	4212-305	Wiring Diagram														X											
NS	4212-306	Wiring Diagram															X	X									
NS	4212-700	Wiring Diagram																					X				
NS	4212-701	Wiring Diagram																						X			
NS	4212-702	Wiring Diagram																							X	X	X

NS – Not Shown

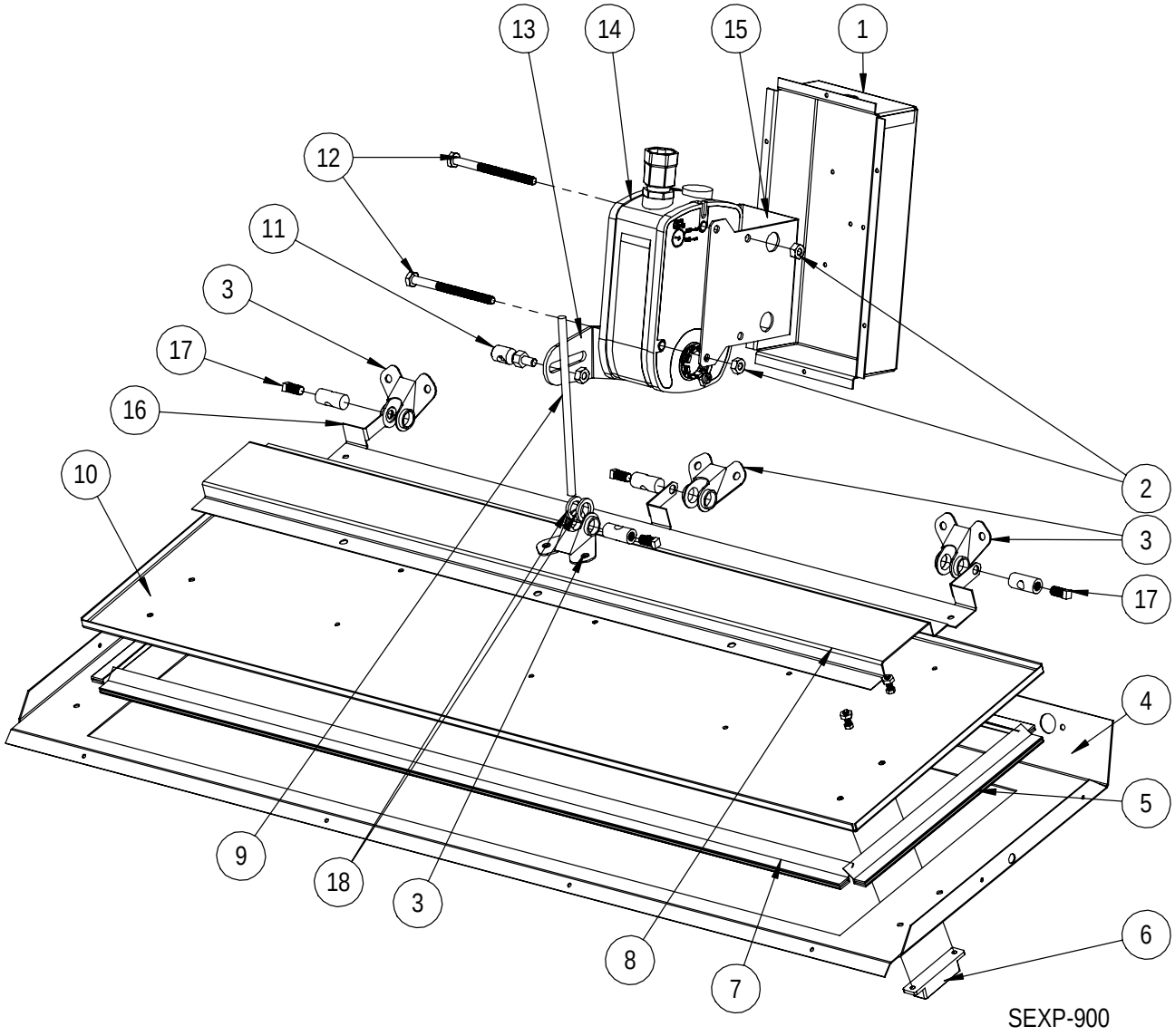
Refer to drawing on page 22

Dwg No.	Part Number	Description	W150APB0Z	W150APB09	W150APB18	W150AEB18	W150APC0Z	W150APC09	W150APC18	W150AEC18	W150APE0Z	W150APE09	W150APE18	W150AEE18	W150APN0Z	W150APN09	W150APN18	W150AEN18	W150APV0Z	W150APV09	W150APV18	W150AEV18	W150APQ0Z	W150APQ09	W150APQ18	W150APQ36	W150AEQ18
1	113-759	Heater Assembly Frame, Rear		X	2	2		X	2	2		X	2	2		X	2	2		X	2	2		X	2	2	2
2	113-770	Heater Package Guides		2	4	4		2	4	4		2	4	4		2	4	4		2	4	4		2	4	4	4
3	113-758	Heater Assembly Frame Top/Bottom		2	4	4		2	4	4		2	4	4		2	4	4		2	4	4		2	4	4	4
4	8604-151	Heater Element, 3KW, 208/240V, 2-Term		3	6	6						3	6	6													
4	8604-152	Heater Element, 3KW, 460V, 2-Term						3	6	6						3	6	6		3	6	6					
4	8604-153	Heater Element, 3 KW, 575V, 2-Term																						3	6	6	6
5	8402-190	Limit Control		3	6			3	6			3	6			3	6			3	6						
5	8402-192	Limit Control																						3	6	6	
5	8402-198	Limit Control																									6
5	8402-215	Limit Control				6				6				6				6				6					
6	113X756	Right Heater Frame Front			X	X			X	X			X	X			X	X			X	X			X	X	X
7	113Y756	Left Heater Frame Front		X	X	X		X	X	X		X	X	X		X	X	X		X	X	X		X	X	X	X
NS	4212-200	Wiring Diagram	X								X																
NS	4212-201	Wiring Diagram		X								X															
NS	4212-210	Wiring Diagram			X								X														
NS	4212-215	Wiring Diagram				X																					
NS	4212-216	Wiring Diagram												X													
NS	4212-300	Wiring Diagram					X												X								
NS	4212-301	Wiring Diagram						X												X							
NS	4212-302	Wiring Diagram							X	X											X	X					
NS	4212-304	Wiring Diagram													X												
NS	4212-305	Wiring Diagram														X											
NS	4212-306	Wiring Diagram															X	X									
NS	4212-700	Wiring Diagram																					X				
NS	4212-701	Wiring Diagram																						X			
NS	4212-702	Wiring Diagram																							X	X	X

NS – Not Shown

Refer to drawing on page 22

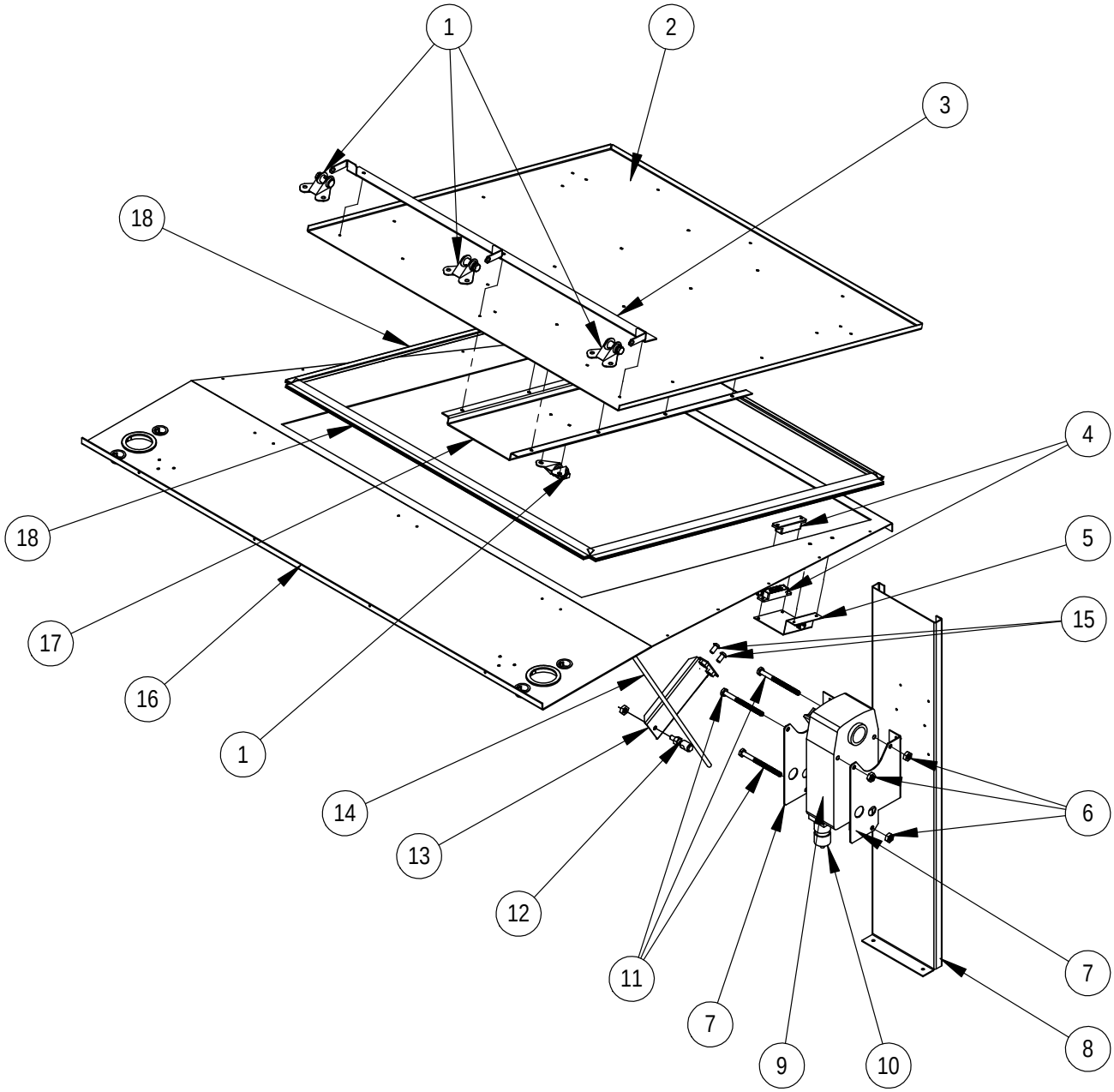
RIGHT AND LEFT INTAKE DAMPER ASSEMBLIES



Dwg. No.	Part Number	Description	W090A****E W120A****E W150A****E
1	135-388	Recessed Actuator Box	2
2	1012-201	1/4"-20 Steel Keps Nut	4
3	8602-040	BKP-24 Butterfly Pivot	8
4	137-904	Intake Partition	2
5	1921-067-0900	9" Damper Blade Seal	4
6	8406-150	Blade Switch	2
7	1921-067-3012	30-3/4" Damper Blade Seal	4
8	141-486	Damper Blade Support	2
9	8602-042	1/4" X 6" Rod	2
10	139-396	Damper Blade	2
11	8602-008	Ball Joint	2
12	1012-174	1/4"-20 x 3-1/4" Bolt	4
13	8602-078	Crank Arm	2
14 14 14	910-2082 910-2083 8602-098	Direct Coupled Actuator w/Crank Arm (Right Side) Direct Coupled Actuator w/Crank Arm (Left Side) Actuator Only	X X X
15	113-727	Actuator Mounting Bracket	2
16	113-730	Hinge Bracket	2
17	1012-343	1/4'-28 x 1/2" Bolt	6
18	1012-348	1/2" x 3/4" Nylon Flat Washer	2

NOTE: *Quantities listed above are totals for both right and left intake damper assemblies.*

EXHAUST DAMPER ASSEMBLY



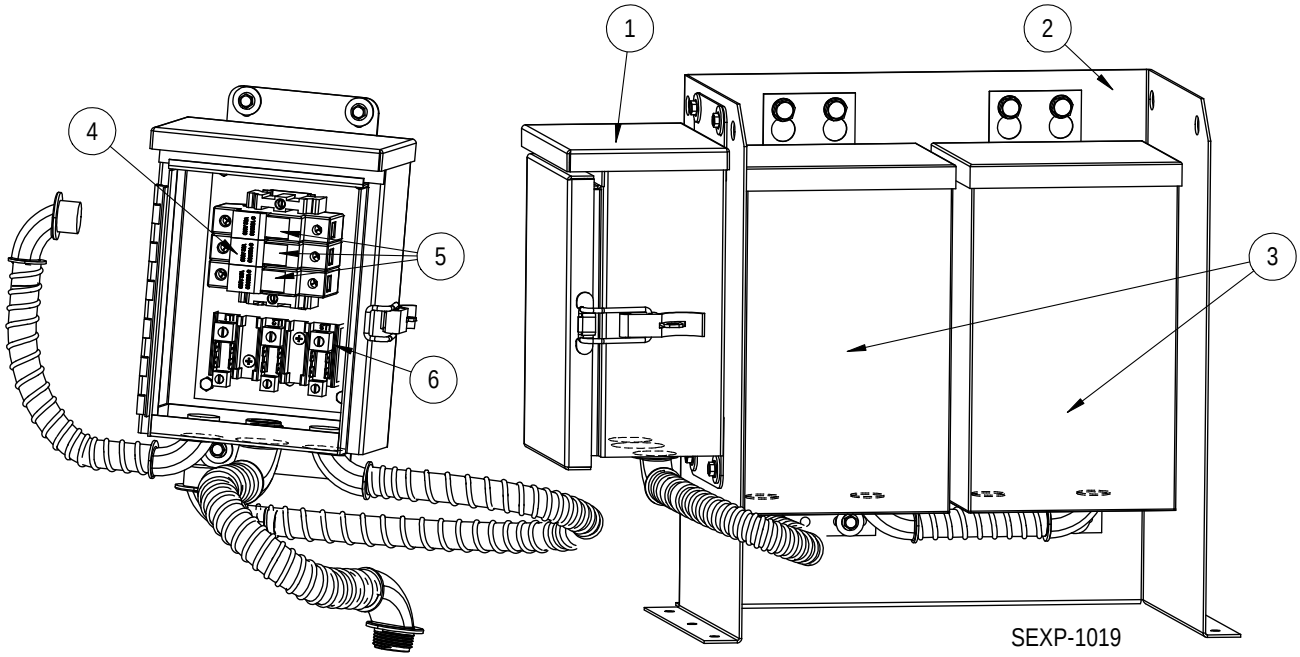
SEXP-901

Dwg. No.	Part Number	Description	W090A****E	W120A****E	W150A****E	W090A****B	W120A****B	W150A****B
1	8602-040	BKP-24 Butterfly Pivot	4					
2	539-395	Exhaust Damper Blade	X					
2	539-450 ①	Exhaust Damper Blade	X					
NS	113-747	Exhaust Damper Blade Stiffening Angle	2					
NS	113-899 ①	Exhaust Damper Blade Stiffening Angle	2					
3	113-731	Hinge Bracket	X					
3	113-793 ①	Hinge Bracket	X					
4	8406-150	Blade Switch	X					
5	113-743	Blade Switch Bracket	X					
5	113-900 ①	Blade Switch Bracket	X					
6	1012-201	1/4"-20 Steel Keps Nut	3					
6	1012-365 ①	1/4"-20 Steel Keps Nut	3					
7	113-728	Actuator Mounting Bracket	2					
7	113-844 ①	Actuator Mounting Bracket	2					
8	141-485	Actuator Mounting Plate	X					
8	141-543 ①	Actuator Mounting Plate	X					
9	8602-093	Actuator 2-10V 88 IN/LB	X					
10	8602-100	Terminal Strip Cover	X					
11	1012-174	1/4"-20 x 3-1/4" Bolt	3					
11	1012-366 ①	1/4"-20 x 3-1/4" Bolt	3					
12	8602-008	Ball Joint	X					
13	139-399	Actuator Arm	2					
13	139-438 ①	Actuator Arm	2					
14	8602-097	1/4" x 16-5/8" Rod	X					
NS	1012-348	1/2" x 3/4" Nylon Flat Washer	2					
15	1012-351	1/4"-20 X 1/2" BTNHD Cap Screw	2					
16	S121-579	Condenser Partition (Economizer)	X					
16	521-635 ①	Condenser Partition (Economizer)	X					
16	S121-581	Condenser Partition (Non-Economizer)					X	
16	521-634 ①	Condenser Partition (Non-Economizer)					X	
17	141-487	Exhaust Actuator Support	X					
17	141-544 ①	Exhaust Actuator Support	X					
18	1921-067-2513	25-13/16" Damper Blade Seal	4					

① Used with stainless steel cabinet option

NS – Not Shown

910-2087 575V Transformer/Junction Box Assembly



Dwg No.	Part Number	Description	W090A*Q	W120A*Q	W150A*Q
1	8614-063	Junction Box w/Hinged Cover	X	X	X
2	113-774	Transformer Bracket	X	X	X
3	8407-003	Stepdown Transformer 480/240V 1.5 kVA	2	2	2
4	8614-062	3-Pole Fuse Holder	X	X	X
5	8614-046	5 Amp Class CC Fuse	X	X	X
6	8607-014	3 Terminal Block 240V	X	X	X

Quick Start Guide

MEGA-TEC®/LC6000 Air Conditioning System

This quick start guide is designed to lead an installer through the steps necessary for setting up a Bard air conditioning system composed of MEGA-TEC wall-mount units paired with an LC6000 controller. See the latest versions of MEGA-TEC/LC6000 System Installation Instructions 2100-705, MEGA-TEC Service Instructions 2100-671 and LC6000 Service Instructions 2100-669 for more detailed information on the installation, service and maintenance of this Bard air conditioning system.

If installing a single MEGA-TEC wall-mount unit with a PGD or PGDx stand-alone display, refer to PGD manual 2100-734 or PGDx manual 2100-740 for information on setting up a stand-alone display for single unit operation.

The TEC-EYE™ hand-held diagnostic tool and LC6000 controller will both be used in this installation. The TEC-EYE diagnostic tool is shipped inside the controller and a cable is included to connect it to the wall-mount unit control board.

NOTICE

It is important to check the software version during installation to ensure that the latest version has been installed. Current software versions, change log and installation instructions are available on the Bard website at http://www.bardhvac.com/software-download/

SYSTEM SET-UP

Set up and configuration must be done to each MEGA-TEC wall-mount unit using the TEC-EYE hand-held diagnostic tool. Use the LC6000 controller for the remaining steps.

IMPORTANT: *When working with circuit board components, Bard recommends the use of an anti-static wrist strap to prevent static electricity shorts to electronic controls.*

Address each wall unit and select unit zone and unit of measure (TEC-EYE)

The address of the unit being set up will be listed in the upper right hand corner on the status screen. The available addresses are 1-14.

1. Remove outer and inner unit control panel doors.
2. Connect TEC-EYE to wall-mount unit control board.
3. Press MENU key to access the Main Menu screen.
4. Press UP/DOWN/ENTER keys to enter password 1313.
5. Press UP/DOWN keys to scroll to **Sys Config**; press ENTER key.
6. Press ENTER key to scroll to **Unit Address.**
7. Press UP/DOWN keys to change address to value between 1 and 14.

   NOTE: *Each unit must have a unique address for the communication to work properly. Bard also recommends labeling each unit for ease in identification.*
8. Press ENTER key to save and scroll to **Zone**.
9. If desired, press UP/DOWN keys to change the value to the desired zone (1, 2 or 3).
10. Press ENTER key to scroll to **UOM** (unit of measure**)**.
11. Press UP/DOWN keys to change the value from **USA** to **SI**, **NC**, **LON**, **CAN** or **UK**. Units are preconfigured for each selection.
12. Press ENTER key to save.

Execute a self test on each unit to verify the equipment is functioning correctly (TEC-EYE)

1. Use UP/DOWN keys to scroll to **Self Test A11**.
2. Press ENTER key to scroll to **Enable** parameter.
3. Use UP/DOWN key to change value to **Yes**. The run test will begin.

See most recent version of Installation Instructions 2100-705 if additional information on run testing units is needed.

Clear unit alarm logs on each unit (TEC-EYE)

Units may have alarms logged due to testing. Unit alarm logs must be cleared at time of installation.To clear the wall-mount unit alarm logs:

1. Press MENU key to go to the Main Menu screen.
2. Use UP/DOWN/ENTER keys to enter password 1313.
3. Press UP/DOWN keys to scroll to **Settings**; press ENTER key.
4. Press UP/DOWN keys to scroll to **Initialization**; press ENTER key.
5. Press ENTER key to scroll to **Delete alarm logs?**.
6. Press UP/DOWN key to change value to **YES**; press ENTER key.

After first unit has been set up and configured, follow the above steps to set up and configure the remaining units.

The LC6000 controller will be used for the remaining steps in the set-up process.

Set LC Controller Date/Time (LC Controller)

1. Press MENU key to access the Main Menu screen.
2. Use UP/DOWN/ENTER keys to enter password 1313.
3. Press the UP/DOWN keys to scroll to the **Settings** menu; press ENTER key.
4. Press UP/DOWN keys to scroll to **Date/Time** menu; press ENTER key.

5. Press UP/DOWN keys to scroll to **Date/Time change**.
6. Press ENTER key to scroll to the desired value to be changed.
7. Press UP/DOWN keys to change the value.
8. Press ENTER key to save and scroll to top of screen.
9. Press UP/DOWN keys to scroll to **Timezone** (if applicable). Follow steps 6-8 to change timezone.
10. Press the ESCAPE key several times to return to Main Menu screen.

Configure sensors (LC Controller)

One remote temperature/humidity sensor is included with the controller. An additional remote indoor temperature sensor can be installed in Zone 1. Additional remote temperature/humidity sensors or temperature-only sensors (one per zone) can be installed in Zones 2 and 3 (if applicable). One optional outdoor temperature/humidity sensor can also be installed. The controller must be configured to match the installed sensors. The Zone 1 Indoor Humidity and Zone 1 Indoor Temperature sensors are enabled by default. The additional humidity and temperature sensors are disabled by default.

See Installation Instructions 2100-705 for information on configuring (enabling/disabling) sensors. If necessary, the sensors can be calibrated at this time too. For information on calibrating the sensors, see manual 2100-705.

See LC6000 Service Instructions manual 2100-669 for information on setting up emergency off, emergency ventilation and generator relays (if applicable).

Enter total number of units (LC Controller)

1. Press MENU key to go to the Main Menu screen.
2. Use UP/DOWN/ENTER keys to enter password 1313.
3. Press UP/DOWN keys to scroll to **Sys Config**; press ENTER key.
4. Press UP/DOWN keys to scroll to **General**; press ENTER key.
5. Press ENTER key to scroll to **Total Units**.
6. Press UP/DOWN keys to adjust value to correct number of units.
7. Press ENTER key to save.

Verify units are online (LC Controller)

Once a unit is uniquely addressed, communication can be verified at the LC controller.

With the correct number of units set at the LC controller, each unit can be remotely viewed from the LC Information screens.

To view these screens:

1. Press ESCAPE key to view the Status screen. (May need to be pressed more than once.)
2. Press UP/DOWN key until the Quick Menu in the lower right corner of the screen displays the Information icon (); press ENTER key.
3. Press UP/DOWN keys to scroll through the Information screens until the desired unit Information screen appears.

In addition to being able to remotely view the units, an alarm will be generated on the LC controller for units not communicating.

Select economizer type for each zone (LC Controller)

Each zone can be configured to operate the economizers with different considerations. For more information on the different economizer choices, reference MEGA-TEC Service Manual 2100-671. The type of consideration can be changed to none, dry bulb, temperature and humidity or enthalpy. These settings will be communicated to the wall units while connected to the LC6000 to ensure all units operate the same.

To select free cooling type for each zone:

1. Press MENU key to go to the Main Menu screen.
2. Use UP/DOWN/ENTER keys to enter password 1313.
3. Press UP/DOWN keys to scroll to **Sys Config**; press ENTER key.
4. Press UP/DOWN keys to scroll to **Zone 1**, **Zone 2** or **Zone 3**; press ENTER key.
5. Press UP/DOWN keys to scroll to **Zone FC Settings A2-4** (Zone 1), **Zone FC Settings A3-4** (Zone 2) or **Zone FC Settings A4-4** (Zone 3**)**.
6. Press ENTER key to scroll to **Type**.
7. Press UP/DOWN keys to change economizer type to **None**, **Drybulb**, **TempHum** or **Enthalpy**.
8. Press ENTER key to save.

Clear controller alarm logs (LC Controller)

The LC6000 may have alarms logged due to bench testing. Controller alarm logs must be cleared at time of installation. To clear the LC controller alarm logs:

1. Press MENU key to go to the Main Menu screen.
2. Use UP/DOWN/ENTER keys to enter password 1313.
3. Press UP/DOWN keys to scroll to **Settings**; press ENTER key.
4. Press UP/DOWN keys to scroll to **Initialization**; press ENTER key.
5. Press ENTER key to scroll to **Delete alarm logs?**
6. Press UP/DOWN key to change value to **YES**; press ENTER key.
7. Press ESCAPE key several times to return to Main Menu screen.

Once all the installation steps have been completed, all alarms and alarm logs have been cleared and system verification and run test results were satisfactory, the installation can now be considered “complete”.

SUPPLEMENTAL INSTRUCTIONS

Exporting Alarm Logs on LC6000-200 Controller

These instructions detail the process for exporting alarm logs on the LC6000-200 controller.

Tools and Supplies Needed

- Laptop computer
- USB cable
- Personal anti-static grounding strap

INSTRUCTIONS

IMPORTANT: *Bard recommends the use of personal grounding straps to prevent static electricity shorts to electronic controls.*

To export an alarm log:

1. Press MENU key to go to the Main Menu screen.
2. Use UP or DOWN keys and ENTER key to enter USER password 1313.
3. Press UP or DOWN keys to scroll to **Settings**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Initialization**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Alarm Export**; press ENTER key.
6. Press ENTER key to scroll to **File Name** (see Figure 1).

NOTE: *Make sure **Memory type** is set as **INTERNAL FLASH MEMORY** to ensure proper download.*

FIGURE 1

7. Press UP or DOWN key to change the AL_EXPORT number, if desired.
8. Press ENTER key to scroll to **Confirm?**
9. Press UP or DOWN key to change value to **YES**; press ENTER key.
10. After download is complete, the **Operation done** screen will appear (see Figure 2).

FIGURE 2

Bard Manufacturing Company, Inc.
Bryan, Ohio 43506

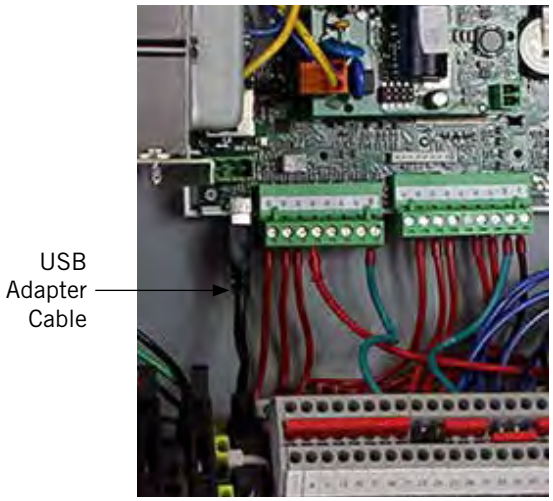
www.bardhvac.com

Manual: 7960-825
Supersedes: ***NEW***
Date: 12-17-18

NOTE: *Do not connect the LC6000 control board to the laptop using the USB cable before exporting as this will cause a* ***Cannot access file*** *message to appear and the log will not be saved. If this happens, remove USB connection, press ESCAPE key and redo Step 8.*

11. Connect one end of USB cable to the short USB adapter cable on LC6000-200 control board (see Figure 3). Connect other end of USB cable to laptop.

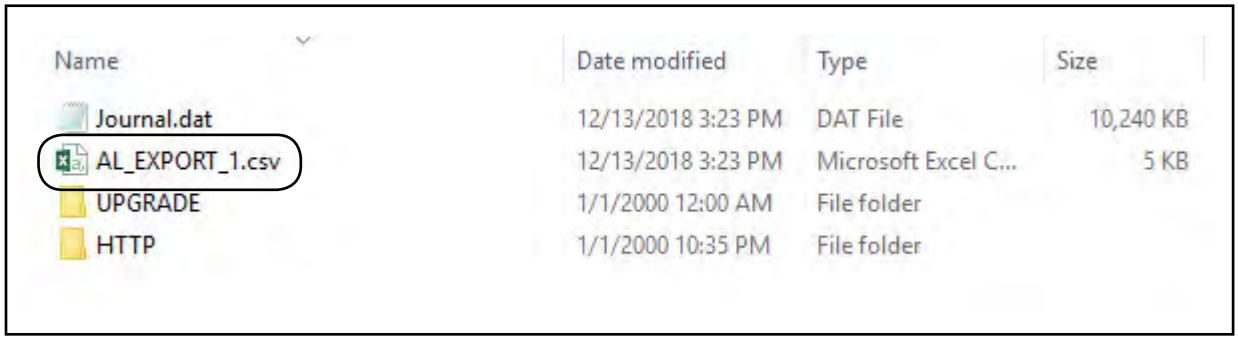
FIGURE 3



12. Once the connection has been made between control board and laptop, the laptop screen should display as shown in Figure 4. The LC6000 will export the alarm log as an Excel file.

This completes the software update process.

FIGURE 4



SUPPLEMENTAL INSTRUCTIONS

Exporting 7 Day I/O Logs on LC6000-200 Controller

These instructions detail the process for exporting 7 day I/O logs on the LC6000-200 controller.

Tools and Supplies Needed

- Laptop computer
- USB cable
- Personal anti-static grounding strap

INSTRUCTIONS

IMPORTANT: *Bard recommends the use of personal grounding straps to prevent static electricity shorts to electronic controls.*

To export an alarm log:

1. Press MENU key to go to the Main Menu screen.
2. Use UP or DOWN keys and ENTER key to enter USER password 1313.
3. Press UP or DOWN keys to scroll to **Settings**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Initialization**; press ENTER key.
5. Press UP or DOWN keys to scroll to **I/O Log Export**; press ENTER key.
6. Press ENTER key to scroll to **File Name** (see Figure 1).

NOTE: *Make sure **Memory type** is set as **INTERNAL FLASH MEMORY** to ensure proper download.*

FIGURE 1

7. Press UP or DOWN key to change the LC_LOG number, if desired.
8. Press ENTER key to scroll to **Confirm?**
9. Press UP or DOWN key to change value to **YES**; press ENTER key.
10. After download is complete, the **Operation done** screen will appear (see Figure 2).

FIGURE 2

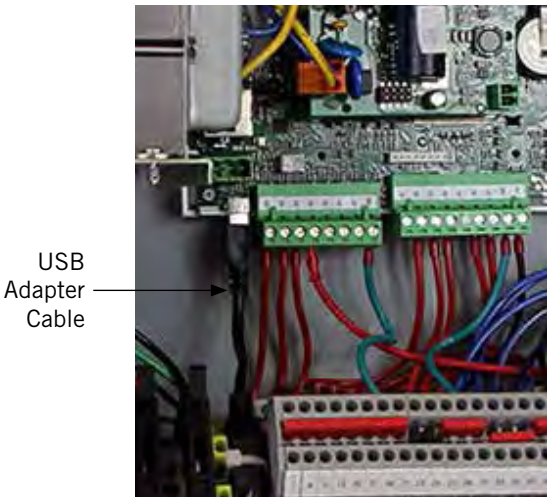
Bard Manufacturing Company, Inc.
Bryan, Ohio 43506
www.bardhvac.com

Manual: 7960-826
Supersedes: ***NEW***
Date: 12-17-18

NOTE: *Do not connect the LC6000 control board to the laptop using the USB cable before exporting as this will cause a* ***Cannot access file*** *message to appear and the log will not be saved. If this happens, remove USB connection, press ESCAPE key and redo Step 8.*

11. Connect one end of USB cable to the short USB adapter cable on LC6000-200 control board (see Figure 3). Connect other end of USB cable to laptop.

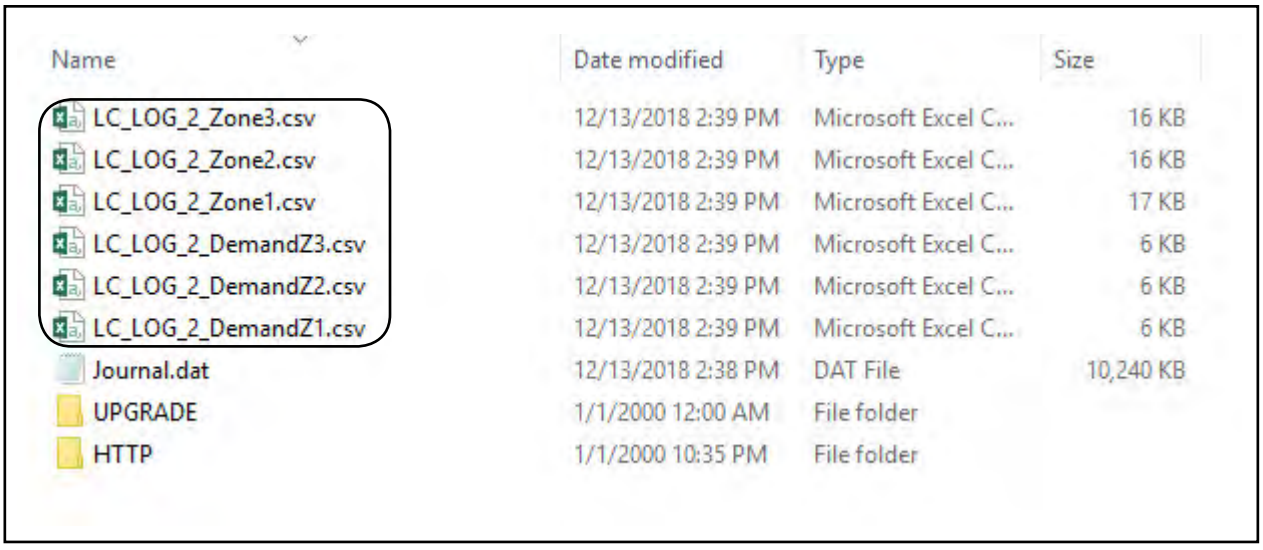
FIGURE 3



12. Once the connection has been made between control board and laptop, the laptop screen should display as shown in Figure 4. The LC6000 will export the I/O logs as Excel files.

This completes the software update process.

FIGURE 4



Jobsite Startup and Commissioning Report

Shelter (Name/Number): _____

Commissioned By (Name): _____

Installation By (Company): _____

Installer Address/Phone No.: _____

Date Commissioned: _____

Shipping Inspection – Inspect each unit for the following:		
Yes	No	Do any of the units have visible damage from falling over during transit?
Yes	No	Are any of the Condenser Coils located at the upper front of each unit Damaged?
Yes	No	Are any of the Condenser fan assemblies located in the top of each unit damaged?
Yes	No	Inspect the lower front door and side panels of each unit. Are all door panels intact and air/water tight?
Yes	No	Inspect the blower wheel/housing by looking into the supply opening of each unit. Is the blower wheel centered and able to spin inside the blower housing?
Yes	No	Inspect all accessories including supply and return louvers. Are they free of damage?

Model and Serial Numbers of HVAC units		
Unit	Model Number	Serial Number
#1		
#2		
#3		
#4		

Model and Serial Number of Controller	
Model Number	Serial Number

HVAC Unit Installation – Verify the following:		
Yes	No	Verify rain flashing is installed at the top of each unit. Has caulk or sealant been applied per installation instructions to avoid water intrusion into each unit?
Yes	No	Verify all high voltage wire routing requirements are met. Are all conduit connections tightened and sealed for weatherization?
Yes	No	Verify all communication wire routing requirements are met. Are all conduit connections tightened and sealed for weatherization?
Yes	No	Are all HVAC Unit outdoor service and airflow clearances on the sides, front, bottom, and top met?
Yes	No	A 24” minimum distance is needed between the supply and return openings and equipment in the room. Are all HVAC Unit indoor supply and return clearances met?

Controller and Unit Communication Wiring – Verify the following:

Yes	No	Are EMI filters installed on the 2 wire shielded cable ran from the controller to the units?
Yes	No	A continuity check between the 2 communications wires with a multimeter will verify proper “+” and “-“connections have been made for the 2 wire shielded cable. This may be checked at the unit or controller. No continuity should be observed. If continuity is observed, check communications wire “+” and “-“connections for reversal. Has a continuity check been performed with a multimeter?
HVAC Unit #1 Setup – Verify the following:		
Yes	No	Is unit addressed as #1 using the TEC-EYE service tool?
Yes	No	Indoor blower, economizer, compressor, condenser fan, electric heat is operational?
		High Pressure (psi) measurement from TEC-EYE service tool.
		Low Pressure (psi) measurement from TEC-EYE service tool.
		Measure Voltage at unit circuit breaker with Multimeter. If power is below 220 Volts, disconnect power and move red wire on low voltage transformer to 208V terminal.
HVAC Unit #2 Setup – Verify the following:		
Yes	No	Is unit addressed as #2 using the TEC-EYE service tool?
Yes	No	Indoor blower, economizer, compressor, condenser fan, electric heat is operational?
		High Pressure (psi) measurement from TEC-EYE service tool.
		Low Pressure (psi) measurement from TEC-EYE service tool.
		Measure Voltage at unit circuit breaker with Multimeter. If power is below 220 Volts, disconnect power and move red wire on low voltage transformer to 208V terminal.
HVAC Unit #3 Setup – Verify the following:		
Yes	No	Is unit addressed as #3 using the TEC-EYE service tool?
Yes	No	Indoor blower, economizer, compressor, condenser fan, electric heat is operational?
		High Pressure (psi) measurement from TEC-EYE service tool.
		Low Pressure (psi) measurement from TEC-EYE service tool.
		Measure Voltage at unit circuit breaker with Multimeter. If power is below 220 Volts, disconnect power and move red wire on low voltage transformer to 208V terminal.
HVAC Unit #4 Setup – Verify the following:		
Yes	No	Is unit addressed as #4 using the TEC-EYE service tool?
Yes	No	Indoor blower, economizer, compressor, condenser fan, electric heat is operational?
		High Pressure (psi) measurement from TEC-EYE service tool.
		Low Pressure (psi) measurement from TEC-EYE service tool.
		Measure Voltage at unit circuit breaker with Multimeter. If power is below 220 Volts, disconnect power and move red wire on low voltage transformer to 208V terminal.
Jobsite Temperature Measurements – Record the following:		

		Outdoor Ambient Temperature
		Indoor Room Temperature
Controller Setup – Verify the following:		
Yes	No	Are all hard wired alarms (NOC) and/or Ethernet cable connected and functional?
Yes	No	Are all remote indoor temperature and humidity sensors connected and operational?
Yes	No	Is the time and date set in the controller?
Yes	No	Warm the indoor temperature and humidity sensor with a blow dryer or heat gun. Be careful not to overheat and damage the sensor. Do all units operate?
Yes	No	Clear all alarms in the controller. Do all alarms stay inactive (alarms clear)?
Yes	No	Are the supply and return grilles the correct model for the product?
Yes	No	Are all supply grille fins adjusted to force air towards the room floor?
		Record indoor temperature displayed on the controller.
		Record indoor humidity displayed on the controller.
		Power Supply Voltage at unit controller measured with Multimeter.
Controller Software Version:		
Final Jobsite review – Verify the following:		
Yes	No	Are all installation tools including driver bits, pliers, and screwdrivers accounted for?
Yes	No	Are all HVAC unit panels secured including control panel, filter, and front doors?
Yes	No	Are all alarms cleared from the controller?
Yes	No	If the site is monitored, have external parties received notification the job is complete?

Warranty Registration
Trained installers and contractors are eligible for an extended warranty. Go to www.bardhvac.com and select “Distributor Access”. Log into the extended warranty program using your username and password provided at the end of the training class. Standard warranty registration is available at www.bardhvac.com under “Warranty Registration”. ***When completed, store this document in the shelter with manuals for future reference.***

3D Barcode for Extended Warranty

3D Barcode for Standard Warranty

Bard®
SINCE 1914
Climate Control Solutions

Limited Warranty

For units applied within the United States, Puerto Rico, US Virgin Islands, Guam, Canada and Mexico

Limited Warranty To Original Purchaser:
Bard Manufacturing Company, Inc. Bryan, Ohio 43506 warrants to you, the original purchaser, that your Bard product will be free from defects in materials and workmanship when used under normal conditions from the installation date through the time periods outlined in the "Duration of Warranty" section (see reverse side).

Proof Of Purchase:
You must be able to show us the date on which you purchased your product when you make a claim under this warranty. Your owner's registration card filed online at www.wallmountwarranty.com or your contractor's invoice, bill of sale, or similar document is sufficient at time of warranty claim. If you can not show us the actual date of purchase, the time periods in this warranty will start on the date that we shipped your Bard product from our factory.

What This Warranty Does Not Cover: (Also see Duration of Warranty on reverse side.)
This warranty does not cover defects or damage caused by:

1. Alterations not approved by us; improper installation (including over or under sizing), improper repairs, or servicing; or improper parts and accessories not supplied by us.
2. Misuse or failure to follow installation and operating instructions (including failure to perform preventative maintenance) or limitations on the rating plate. This includes failure to use low ambient controls on all applications requiring compressor operation in cooling mode below 60F outdoor ambient.
3. Any corrosion from operation in a corrosive atmosphere (examples: acids, halogenated hydrocarbons or environmental conditions).
4. Parts that must be replaced periodically (such as filters, oil nozzles, mist eliminators, ERV belts, pile seals, etc.).
5. Improper fuel or electrical supply (such as low voltage, voltage transients, power interruption, and units on generators with no brownout protection).
6. Accidents or other events beyond our reasonable control (such as storm, fire, or transportation damage).
7. Defects that happen after
   (a) Anyone has tampered with the product.
   (b) The product has been improperly serviced according to accepted trade practices;
   (c) The product has been moved from its original place of installation; or,
   (d) The product has been damaged by an event beyond Bard's control (See also No. 5 above).
8. Consequential damages (such as increased living expenses while the product is being repaired). Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.
9. This warranty has certain limitations for units installed on over-the-road trucks, vans and trailers. (See reverse side.)
10. Cost of service call at installation site to diagnose causes of trouble, labor to replace defective component or transportation costs for replacement parts.
11. This Limited Warranty does not apply to products installed or operated outside of the US, Puerto Rico, US Virgin Islands, Guam, Canda and Mexico. Units operated in coastal areas where the operating environment is exposed to airborne saline particles (typically 5 miles from coast line) must have corrosion protection or warrenty claims will be declined on corrosion-based cabinet and part failures.
12. Bard does not endorse, approve or certify any online sales of its products through auction websites, online retailers, liquidators or any other method of online sales direct to consumers. Bard will not honor the factory warranty of any Bard equipment purchased over the Internet.

Your Responsibilities:
You are responsible for -

1. Preventative maintenance of the product (such as cleaning and replacement of filters, nozzles and other consumable parts).
2. Insuring that the instruction manual is followed for care and use of your product.
3. Insuring that your product is installed by a competent, qualified contractor, following all local and national codes, and industry standards.

What We Will Do About A Defect:
We will either repair or replace the defective part only. Replacement parts may be reconditioned parts. The warranty for the repaired or replaced part will last only for the remainder of the warranty period for the original part. For Heat Exchangers that are no longer available, we will give you credit equal to the then current retail price of an equivalent Heat Exchanger.

Defective parts and a properly completed Bard parts warranty form must be returned to a Bard distributor for submitting to Bard to be eligible for a warranty credit or replacement. Credits are issued to the Bard distributor.

We will not pay or be responsible for labor or defective/replacement part transportation costs or delays in repairing or failures to complete repairs caused by events beyond our reasonable control.

What You Must Do

1. Tell your heating and air conditioning contractor as soon as you discover a problem and have the contractor make repairs.
2. Pay for all transportation, related service labor, diagnostic charges, refrigerant, refrigerant recovery and related items.

Service
If your product requires service, you should contact the contractor who installed it or the contractor that has been providing the product's preventative maintenance and repair service. You may find the installing contractor's name on the product or in your Owner's packet. If you do not know who that is, you should contact a competent, qualified contractor to make the repairs. If in doubt, you should contact the nearest distributor that handles Bard products (www.bardhvac.com). Please note that contractors and distributors that handle Bard products are independent contractors and distributors, and therefore, are not under the direction of Bard Manufacturing Company, Inc.

Only Warranty
This is the only warranty that we make. There are no other express warranties. All implied warranties are limited in duration to the duration of the applicable written warranty made above.
Some states do not allow limitations on how long an implied warranty lasts, so the above limitation or exclusion may not apply to you.

Other Rights
This warranty gives you specific legal rights and you may have other rights which vary from state to state.

Duration Of Warranty is limited to defects arising during the periods shown in the following table:

Model Number Series: Includes all Models in each Series & which may have additional characters. (Example: W12-70A includes W36A w/additional characters.)	— Number of Years from Installation Date ① —			
	Compressor ⑤	Sealed System Components ②⑤⑦	All Other Functional Parts ③	Heat Exchangers
AIR CONDITIONERS W12A, W17A, W18A, W24A, W30A, W36A, W42A, W48A, W60A, W70A, W72A, W090A, W120A, W150, W180A, W17L, W18L, W24L, W30L, W36L, W42L, W48L, W60L, W70L, W72L, WA3S, WA4S, WA5S, WL3S, W4LS, WL5S, D25A, D28A, D35A, D36A, D42A, D48A, D60A, D25L, D28L, D35L, D36L, D42L, D48L, D60L, Q24A, Q30A, Q36A, Q42A, Q48A, Q60A, I30A, I36A, I42A, I60A	5	5	5	N/A
AIR SOURCE HEAT PUMPS W18H, W24H, W30H, W36H, W42H, W48H, W60H, C24H, C30H, C36H, C42H, C48H, C60H, T24H, T30H, T36H, T42H, T48H, T60H, T24S, T30S, T36S, T42S, T48S, T60S, Q24H, Q30H, Q36H, Q42H, Q43H, Q48H, Q60H, I30H, I36H, I42H, I48H, I60H, I36Z, I48Z, I60Z	5	5	5	N/A
ENVIRONMENTAL CONTROL UNITS W3RV, W4RV, W5RV, W6RV, W3LV, W4LV, W5LV, W6LV	5	5	1	N/A
EQUIPMENT SHELTER UNITS W**A2P, W**AAP, WR**, D**AAP, HR**, H12A, H72A	5	5	1	N/A
GEOTHERMAL/WATER SOURCE HEAT PUMPS QW2S, QW3S, QW4S, QW5S	5	5	5	N/A
CHILLED WATER QC50 (No Compressor)	N/A	5	5	N/A
GAS/ELECTRIC WALL-MOUNT W24G, W30G, W36G, W42G, W48G, W60G, WG3S, WG4S, WG5S	5	5	5	10
OIL FURNACES ECM "V" Blower Models FC085, FH085, FH110, FLF075, FLF110, FLR075, FLR100, FLR130 PSC "D" Blower Models FC085, FH085D, FH110D, FLF085, FLF110, FLR085, FLR110, FLR140 SOF: SOF175, SOF265	N/A N/A N/A	N/A N/A N/A	10 ⑥ 5 1	LIFETIME ④ LIFETIME ④ 10
ACCESSORIES Factory/Field Installed Bard Ventilation and Heater Packages Bard branded Thermostats/Temperature Controllers LC1000, LC1500, LC2000, LC5000, LC6000, LV1000, MC4002, DC3003, TEC40, BG1000, PGD, PGDX Humidistats, CO_2 Controllers and all other field installed accessories not listed separately	N/A N/A N/A N/A	N/A N/A N/A N/A	5 5 1 1	N/A N/A N/A N/A

① For equipment that does not have an online warranty registration, the warranty period starts when the product was shipped from the factory.

② Heat transfer coils (refrigerant to air coils for air source and coaxial coils for water source units) are covered for leaks for 5 years. Physical damage to air side coils resulting in leaks or insufficient airflow, or fin deterioration due to corrosive atmosphere (such as acids, halogenated hydrocarbons or coastal environmental conditions) are not covered. Leaks in coaxial coils due to freezing of the coils are not covered. Copper coaxial coils for QW are not warranted for ground water/open loop installations.

③ Functional parts warranty is 1-year for all telecommunication, electric switch stations, pump stations and similar applications. This also applies to all OTR (over the road) applications.

④ Limited lifetime warranty on Heat Exchangers applies to original purchaser in private, owner occupied residences. Subsequent owners and commercial uses are warranted for 20 years from date of installation.

⑤ All OTR (over the road) applications that are moved from one location to another:
Factory Warranty applies up to the point of initial start-up and test at all OEM manufacturing locations or subsequent outfitting facility. Once it goes into OTR service, the warranty expires immediately for compressor and sealed system components. This OTR exemption does not apply to relocatable classrooms, construction or office trailers.

⑥ Standard warranty for non-registered Oil Furnaces is 5-year parts. Must be registered at www.wallmountwarranty.com within 90 days of installation for the 10-year parts coverage to be in effect.

⑦ Factory coated coils have a "5" year warranty in corrosive environments that are listed as approved.

Internet Resources

Recognized as a leader in the HVAC industry, Bard combines quality products and outstanding service with innovation and technological advances to deliver high-performance heating and cooling products around the world. Please visit www.bardhvac.com ***for additional information regarding warranty and product information.***