Bard®
SINCE 1914
Climate Control Solutions

Literature Assembly
911-0747

Contains the following:

2100-665(G)	Wall Mount PKG A/C Manual
2100-676(D)	Multi-Tec A/C Install Instruct
2100-677(D)	Multi-Tec Quick Start Guide
2110-1442(E)	Replacement Parts Manual
7960-735	Supplemental 50HZ Instructions
2100-479	Leak Test, Evacuation, Charging
2100-034(F)	User's Guide
7960-420	Warranty Form

SERVICE INSTRUCTIONS

MULTI-TEC®
WALL-MOUNT AIR CONDITIONER

Part of the Bard Free Cooling System

Models:

W18AAPA	W42AAEA	W60AAEA	W72ABEA	W18LAPA	W60LAPA
W24AAPA	W42AAEB	W60AAEB	W72ABEB	W24LAPA	W60LAPB
W24AAPB	W42AAEC	W60AAEC	W72ABEC	W24LAPB	W60LAPC
W24AAPC	W42AAPA	W60AAEQ	W72ABEQ	W30LAPA	W60LAPQ
W30AAPA	W42AAPB	W60AAMA	W72ABMA	W30LAPB	W72LBPA
W30AAPB	W42AAPC	W60AAMB	W72ABMB	W30LAPC	W72LBPB
W30AAPC	W48AAEA	W60AAMC	W72ABMC	W36LAPA	W72LBPC
W36AAEA	W48AAEB	W60AAPA	W72ABPA	W36LAPB	W72LBPQ
W36AAEB	W48AAEC	W60AAPB	W72ABPB	W36LAPC	
W36AAEC	W48AAEQ	W60AAPC	W72ABPC	W42LAPA	
W36AAMA	W48AAMA	W60AAPQ	W72ABPQ	W42LAPB	
W36AAMB	W48AAMB			W42LAPC	
W36AAMC	W48AAMC			W48LAPA	
W36AAPA	W48AAPA			W48LAPB	
W36AAPB	W48AAPB			W48LAPC	
W36AAPC	W48AAPC			W48LAPQ	
	W48AAPQ				

NOTE: LC6000 controller is required for operation when multiple MULTI-TEC wall-mount air conditioners are used.

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

Manual : 2100-665G
Supersedes: 2100-665F
Date: 10-11-18

CONTENTS

FIGURES AND TABLES

Free Cooling System

The Bard free cooling unit system is composed of MULTI-TEC wall-mounted air conditioners matched with an LC6000 supervisory controller or Bard th-Tune stand-alone controller. If only one wall-mounted air conditioner is being used, it can be matched with either the LC6000 supervisory controller or a th-Tune stand-alone controller. 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 and MULTI-TEC wall-mount units are designed specifically to work together. The controller cannot run other brands of systems, nor can other controllers run the MULTI-TEC wall-mount units. They are a complete system, and must be used together.*

Wall-Mount Air Conditioner Units

The MULTI-TEC units are designed to supply full 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. In the event that free cooling operation cannot satisfy the load requirements, mechanical cooling will be utilized to assist in cooling the shelter.

MULTI-TEC units are available with electric heat and dehumidification options.

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.

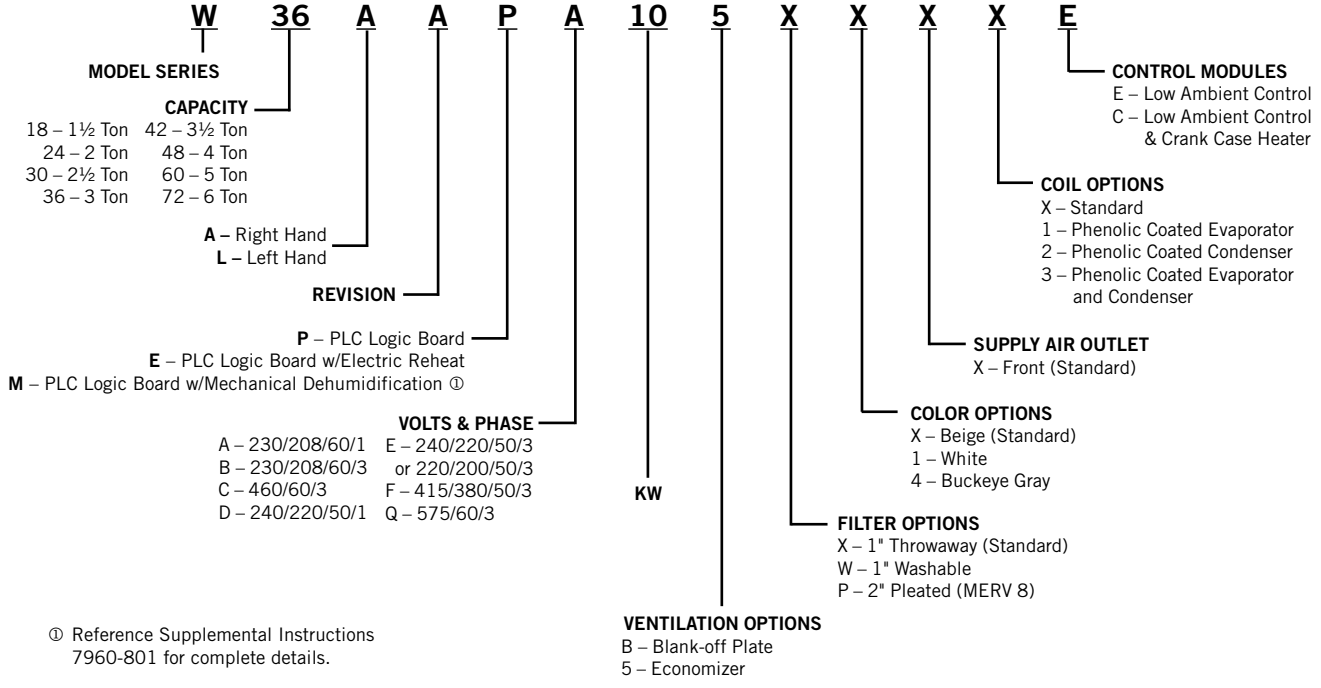
The unit is designed for use with or without duct work. Flanges are provided for attaching the supply and return ducts.

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** on page 4 for information on codes and standards.

FIGURE 1
MULTI-TEC Wall-Mount Unit Model Nomenclature



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 air duct 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.

Additional Publications

These publications can help when installing the furnace. 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

Duct Design for Residential Winter and Summer Air Conditioning and Equipment Selection ..... ACCA Manual D

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' feet 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.

FIGURE 2
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 Diagnostic Tool

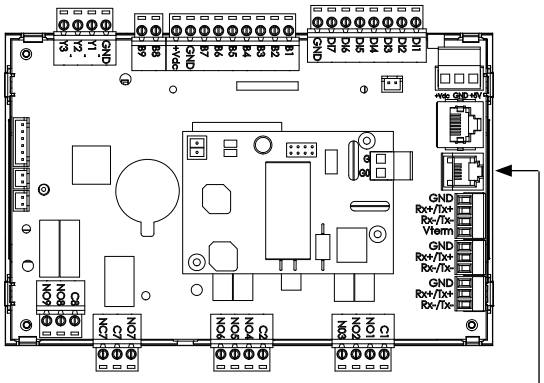
The microprocessor control used in the MULTI-TEC wall-mount air conditioners allows for complete control and monitoring through the use of the provided TEC-EYE hand-held monitor. This comprehensive service tool utilizes the latest in state-of-the-art technology including a large, easy-to-read backlit LCD graphic display.

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.

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 controller is designed to manage temperature levels to a user-defined setpoint via control output signals to the wall mount air conditioning system.

The TEC-EYE connects to the wall-mount unit control board via an RJ11 modular phone connector as shown in Figure 3.

FIGURE 3
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.

TEC-EYE Menu Structure

Quick Menu
- Data Log
- Unit Information
- Setpoints

Main Menu
- System Configuration
- Advanced System Configuration
- I/O Configuration
- On/Off
- Alarm Logs
- Settings
- Logout

In addition to the menu structure above, there are also Status and Alarm screens.

TEC-EYE Acronyms

MAT – Mixed air temperature
RAT – Return air temperature
OAT – Outdoor air temperature
OAH – Outdoor air humidity
Blower – Indoor Blower Status
Damper – Free cooling damper position status
C1 – Compressor activate status
H1 – Heater Stage 1 status
H2 – Heater Stage 2 status
ODP – Calculated outdoor dew point
FC – Free cooling status
RN – Component run time in minutes in last hour
ST – Number of start requests in last hour

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 button repeatedly.

The wall-mount unit address is displayed in the upper right corner on the Status screen (see Figure 2). The Status screen also shows the current date, time, return air temperature, mixed air temperature, outdoor air temperature, outdoor humidity and outdoor dewpoint conditions. Blower, damper and unit status are also displayed. See Table 1 for MULTI-TEC wall-mount unit status messages.

The Quick Menu is displayed in the bottom right corner of the status screen (see Figure 2). Data Log, Unit Information and Setpoints are available through the Quick Menu. Pressing the UP or DOWN keys while on the Status screen will change the Quick Menu icon displayed (see Figure 4). Press the ENTER key when the desired icon is displayed.

TABLE 1
Wall-Mount Unit Status Messages

Message	Description
Stand Alone	Orphan Mode Standby
th-TUNE Online	th-TUNE Standby
LC Online	LC Standby
Cont. Blower	Continuous Blower Active
Off by th-TUNE	Unit off by th-TUNE
Freecooling	Freecooling Active
Optimized Cool	Optimized Cooling Active
Cooling	Cooling Active
Heating	Heating Active
Active Dehum	Mechanical Dehumidification or Electric Reheat Dehumidification Active
Passive Dehum	Economizer Disable/Enhanced Latent Removal (if available)
Self Test	Self Test Running
Off by Alarm	Unit Off by Alarm Condition
Off by BMS	Unit Off by BMS
Off by LC	Unit Off by LC Master
Off by Keypad	Unit Off by Keypad
Emergency Vent.	Emergency Vent Mode Active
Emergency Cool	Emergency Cool Mode Active
Emergency Off	Emergency Off Mode Active

FIGURE 4
Quick Menu Icons

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/

Quick Menu

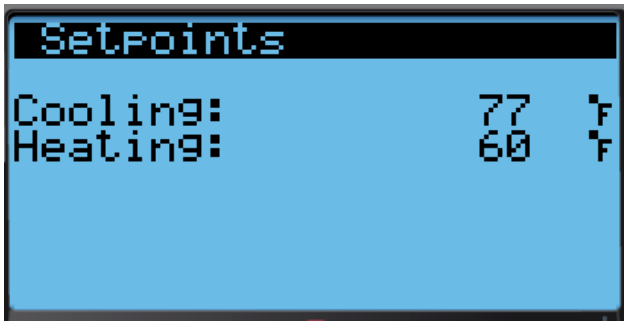
Setpoints

If at any time the unit(s) loses communication with the LC6000 controller, the unit(s) will go to stand alone mode. The setpoints are synced with the LC6000 when communication is established. The unit will save and control to these values until communication is re-established.

To change the cooling and heating setpoints:

1. From the Status screen, press UP or DOWN key until Quick Menu displays Setpoints icon. Press ENTER key.
2. Press ENTER key to scroll to the selected choice (see Figure 5).
3. Press UP or DOWN key on desired value until value displays correctly.
4. Press ENTER key to submit value and move to next parameter.
5. Press ESCAPE key until Main Menu screen is displayed.

FIGURE 5
Cooling and Heating Setpoints



Information

These screens show unit run hours, averages and software version information (see Figures 6, 7 and 8).

FIGURE 6
Last 24 Hour Tracking

FIGURE 7
Last 24 Hour Tracking

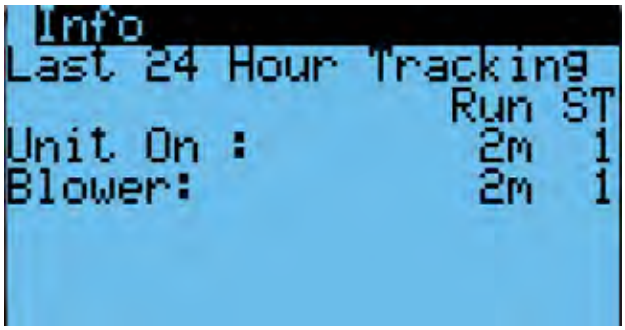
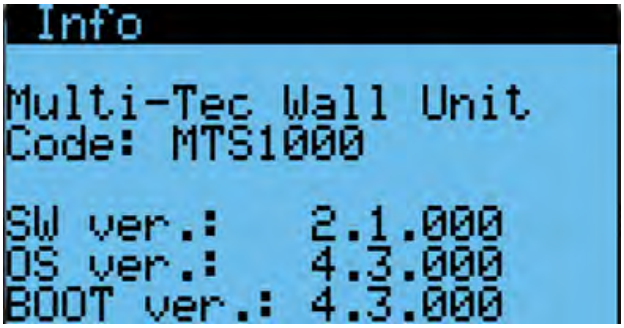


FIGURE 8
Software Version Information



Data (Alarm) Log

The alarm log screens show a log of each alarm (see Figure 9. There will be a log for when alarm occurred and if the alarm auto clears, it will show when the alarm cleared. See page 12 for instructions on clearing the alarm logs.

FIGURE 9
Alarm Log Screen Breakdown

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

TABLE 2
LC1000/TEC-EYE Passwords (Defaults)

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

Menu Screens and Password Levels

A System Config: User (2000)

B Adv Sys Config: Technician (1313)

C I-O Config: Technician (1313)

D On/Off: User (2000)

E Alarm Logs: User (2000)

F Settings

Date/Time: Technician (1313)

Language: User (2000)

Network Config: Technician (1313)

Serial Ports: Technician (1313)

Initialization

Clear Logs: User (2000)

System Default: Engineer (9254)

Restart: User (2000)

Parameter Config: Engineer (9254)

Alarm Export: User (2000)

G Logout: Used to log out of the current password level. Entering back into the menu requires password.

Addressing Wall-Mount Units

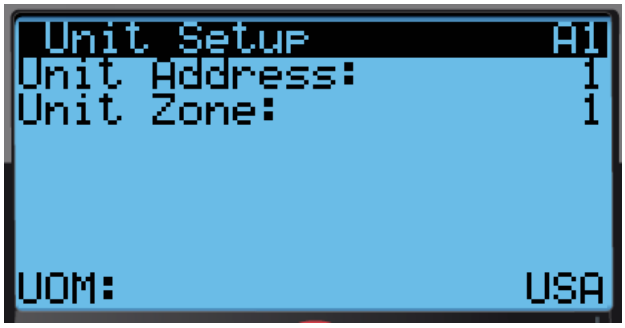
Each unit must have a unique address for the system to operate correctly with the LC controller (*Ex: 1, 2, 3, ...14 depending on the number of units*). The wall-mount unit address is displayed in the upper right corner on the Status screen on the TEC-EYE display (see Figure 2 on page 6).

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 10).
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. Bard also recommends physically labeling each unit for ease in identification.*

FIGURE 10
Unit Configuration



Setting Unit Zone

To assign zones:

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 10).
5. Press UP or DOWN keys to change value to desired zone.

Additional Features

Model/Serial Number Retain Feature

Model numbers and serial numbers will be retained through most software updates. It still remains good practice to verify the software version, model numbers and serial numbers of any wall-mount unit after a software update, as some functionality of the MULTI-TEC wall-mount unit require a specific model number.

Time/Date/Timezone Sync

On MULTI-TEC wall-mount unit models with a software version number MTS1000.2.0.0 and higher, when the wall-mount unit is connected and correctly addressed to a LC6000 supervisory controller, local time, date, and timezone information will be synced from the LC6000. This feature allows for faster set-up and correct correlation between alarm logs.

Executing a Run Test

Execute a run test on each unit to verify the equipment is functioning correctly.

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 **Run Test (A11)** screen.
5. Press ENTER key to scroll to **Run Test Enable** parameter (see Figure 11).
6. Press UP or DOWN key to change value to ON. The run test will begin.

FIGURE 11
Executing Run Test

Step	Action	Time Required
A	Open economizer damper	Damper Time (150s)
B	Close economizer Damper	Damper Time (150s)
C	Turn on compressor	Heat/Cool Time (60s)
D	Enable second stage	Heat/Cool Time (60s)
E	Open reheat valve	Heat/Cool Time (60s)
F	Turn all cooling off	--
G	Turn on electric heat	Heat/Cool Time (60s)
H	Turn on electric heat stage 2	Heat/Cool Time (60s)
I	Turn off all heating	--

Parameter Description

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 run test progresses. The following messages may appear:

1. Not Active
2. Opening Damper
3. Closing Damper
4. Compressor Stage 1
5. Compressor Stage 2
6. Reheat Valve Open
7. Cooling Off
8. Electric Heat Stage 1
9. Electric Heat Stage 2
10. Heating Off
11. Run Test Stop

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

Identifying a Unit Address

The wall-mount unit address is displayed in the upper right corner on the Status screen.

Changing Freecooling Type

The comparative enthalpy free cooling setting can be changed to dry bulb free cooling using the TEC-EYE hand-held diagnostic tool.

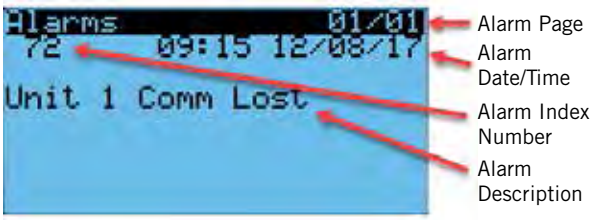
1. Press MENU key to access the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter USER password 2000.
3. Press UP or DOWN keys to scroll to **Sys Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to screen with **Freecooling Config** heading.
5. Press ENTER key to scroll to parameter type.
6. Press UP or DOWN keys to change to desired value.
7. Press ENTER key to save.
8. Press ESCAPE key until Main Menu screen is displayed.

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

Acknowledging/Clearing Alarms

Alarm conditions activate a red LED indicator that backlights the ALARM function key. As an option, an alarm condition may also be enunciated by an audible alarm signal. 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)—as shown in Figure 12.

FIGURE 12
Alarm Screen Breakdown



Clearing Alarms

After an alarm condition has been corrected, the alarm can be cleared/reset.

To clear alarms, press the ALARM key and the UP or DOWN keys to scroll to the alarm reset screen (see Figure 13). Hold down the ALARM key for 3 seconds until the screen flashes. After the screen flashes, if all alarms are able to be cleared, the screen should read NO ALARMS. If there are still active alarms, the screen will show the first indexed alarm.

FIGURE 13
Clearing Alarms

TABLE 3
Wall-Mount Unit Alarm Index

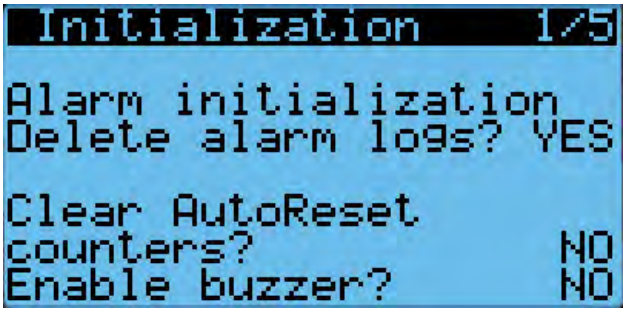
Index	Alarm Log Export Variable	PGD Displayed Alarm Description
0	Al_retain	Error in the number of retain memory writings
1	Al_Err_retain_write	Error in retain memory writings
2	Al_ReturnAIr1In	Circuit 1 Return Air Temperature Sensor Alarm
3	Al_ReturnAir1High	Circuit 1 High Return Air Temperature
6	Al_MixedAir1In	Circuit 1 Mixed Air Temperature Sensor Alarm
7	Al_MixedAir1High	Circuit 1 Mixed Air High Temperature
8	Al_MixedAir1Low	Circuit 1 Mixed Air Low Temperature
18	Al_OutdoorAirIn	Outdoor Air Temperature Sensor Alarm
19	Al_OutdoorHumIn	Outdoor Air Humidity Sensor Alarm
36	Al_LowPress1	Circuit 1 Low Pressure
38	Al_HighPress1	Circuit 1 High Pressure
40	Al_Damper1FailedtoOpen	Circuit 1 Damper Failed to Open
41	Al_Damper1FailedtoClose	Circuit 1 Damper Failed to Close
48	Al_Freeze1In	Circuit 1 Freeze Temperature Sensor Alarm
50	Al_Freeze1	Circuit 1 Freeze Condition
54	Al_Filter1	Filter 1 Dirty Filter Indicated
92	Al_Offline_THTN_1	Th-Tune Device Offline
93	Al_TempPrb_THTN_1	Th-Tune Temperature Probe Sensor Alarm
94	Al_HumPrb_THTN_1	Th-Tune Humidity Probe Sensor Alarm
95	Al_ClkBrd_THTN_1	Th-Tune Clock Board Alarm

Clearing Alarm Logs

To clear the alarm logs:

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 **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 1/5**; press ENTER key.
6. Press ENTER key to scroll to **Delete alarm logs?** (see Figure 14).
7. Press UP or DOWN key to change from **NO** to **YES**.
8. Press ENTER key to clear all alarm logs.

FIGURE 14
Clearing Alarm Logs



Alarm Adjustment

Mixed Air Alarm

The mixed air alarm is used to indicate proper operation of the economizer. An alarm will be generated when the mixed air temperature is above or below two independent setpoints.

This alarm can be adjusted by changing the alarm setpoints and/or delay. The differential low references the economizer control setpoint. For example, if the economizer setpoint is 55°F (as shown in Figure 24 on page 17) and the differential is set to 10, the lower limit for the mixed air alarm would be 45°F. The high differential references the outdoor air temperature setpoint that enables the economizer. For example, if the outdoor air temperature setpoint for economizer enable is set to 65°F and the high alarm is set to 5, the alarm would actuate at 70°F. The alarm also has a delay to help reduce nuisance alarms. With the delay set to 120 seconds, either the high mixed air or low mixed air alarm will need to be active for 120 seconds before an alarm will be generated.

To adjust these values:

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 **Alarm Config (A7)**; press ENTER key.
5. Press ENTER key to scroll to desired value **Diff Lo**, **Diff Hi** or **Del** (see Figure 15).
6. Press UP or DOWN keys to adjust value.
7. Press ENTER key to save.

FIGURE 15
Adjusting Mixed Air Alarm Values

Refrigerant Low Pressure

When the low pressure switch indicates a low pressure condition and there is an active call for cooling, the controller will generate an alarm (after a delay). The delay used by the low pressure alarm is determined by the outdoor air temperature (OAT on display). If the outdoor air temperature is below 55°F, the delay is 180 seconds (LDel on display). If the outdoor temperature is above 55°F, the delay is 120 seconds (Del on display). The unit will also have an address-based delay that will affect start up time; the default is 5 seconds multiplied by unit address. (The unit address-based delay is only when the unit is in stand alone operation.) Additionally, if the outdoor temperature sensor is not used, the delay is set to 180 seconds. The controller will try to run the refrigeration system two times before the alarm will lock the compressor out.

If 15 minutes (Two Count Del value on display) passes before the second attempt, the number of tries will be reset.

To adjust these values:

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 **Alarm Config (A7)**; press ENTER key.
5. Press ENTER key to scroll to desired value **OAT**, **Diff**, **Del**, **LDel** or **Two Count Del** (see Figure 15).
6. Press UP or DOWN keys to adjust value.
7. Press ENTER key to save.

Refrigerant High Pressure

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 status of the CCM. The alarm will stay present on the wall-mount unit until manually cleared. This operation has no configurable parameters.

Economizer Damper

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 (Open Del on display) the controller will generate a damper failed to open 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 (Close Del on display) the controller will generate a damper failed to close alarm.

To adjust these values:

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 **Alarm Config (A8)**; press ENTER key.
5. Press ENTER key to scroll to desired value **Open Del** or **Close Del** (see Figure 16).
6. Press UP or DOWN keys to adjust value.
7. Press ENTER key to save.

FIGURE 16
Adjusting Damper Alarm Values

Freezestat

When the coil temperature is below 30°F, the unit will generate a Freeze alarm on the TEC-EYE and a Freeze Temp alarm on the LC6000. This will operate the blower and turn off the compressor.

The alarm will be automatically reset when the coil temperature rises above 55°F or after a 5-minute delay while the temperature is above 30°F.

To adjust freezestat values:

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 **Alarm Config (A9)**; press ENTER key.
5. Press ENTER key to scroll to desired value **Low Temp**, **Delay**, **Reset Temp** or **Reset Del** (see Figure 17).
6. Press UP or DOWN keys to adjust value.
7. Press ENTER key to save.

FIGURE 17
Adjusting Freeze Alarm Values

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

On/Off Control

The wall-mount unit can be turned on and off with the TEC-EYE. When the unit is set to ON, the system will heat and cool the space either in standalone mode or when connected to the LC. When the unit is set to OFF, the unit will not heat or cool the space.

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 key to change the system from OFF to ON or from ON to OFF.
5. Press ESCAPE key until Main Menu screen is displayed.

Fan Control

The blower will be in continuous operation in stand alone mode. To operate the blower continuously while communicating with the LC6000 or th-TUNE single unit controller, refer to the latest version of the 2100-669 LC6000 Service Instructions manual or 2100-678 th-TUNE manual.

Temperature Control

When the unit is connected to the LC controller, it will receive all of its heating, cooling and ventilation commands from the controller.

When the unit is in stand alone operation, it will heat, cool and ventilate based on the return air temperature measurement. The return air temperature will be compared to the cooling setpoint. Based on differentials above and below the setpoint, the available cooling and heating stages will be utilized.

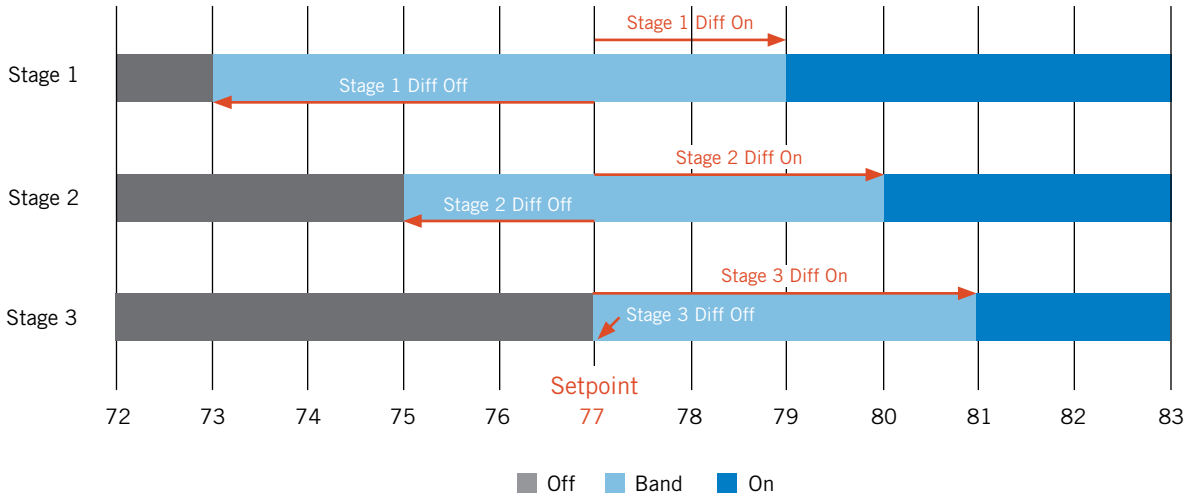
Cooling Sequence – Economizer Available
(see Figure 18)

If the return air temperature is higher than 79°F (Setpoint + Stage 1 Diff On) and outdoor conditions are acceptable for economizing, the unit will enable the economizer. If the return air temperature is higher than 80°F (Setpoint + Stage 2 Diff On), the unit will enable mechanical cooling stage 1. If the control value is higher than 81°F (Setpoint + Stage 3 Diff On), the unit will enable mechanical cooling stage 2.

Cooling Sequence – Economizer Not Available
(see Figure 18)

If the return air temperature is higher than 79°F (Setpoint + Stage 1 Diff On), the unit will enable stage 1 mechanical cooling. If the return air temperature is higher than 80°F (Setpoint + Stage 2 Diff On), the unit will enable stage 2 mechanical cooling.

FIGURE 18
MULTI-TEC Wall-Mount Unit Cooling Staging



To adjust these parameters:

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 **Cooling Setup (A2)**; press ENTER key.
5. Press ENTER key to scroll to **Stage 1 Diff On**, **Stage 1 Diff Off**, **Stage 2 Diff On**, **Stage 2 Diff Off**, **Stage 3 Diff On** or **Stage 3 Diff Off** (see Figure 19).
6. Press UP or DOWN keys to adjust value.
7. Press ENTER key to save.

FIGURE 19
Adjusting Cooling Differential Values

Heating Sequence *(see Figure 21)*

If the return air temperature is below 58°F (Setpoint + Stage 1 Diff On), the unit will enable electric heat stage 1. If the return air temperature is below 57°F (Setpoint + Stage 2 Diff On), the unit will enable electric heat stage 2. If the control value is below 56°F (Setpoint + Stage 3 Diff On), the unit will enable electric heat stage 3.

To adjust these parameters:

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 **Heating Setup (A3)**; press ENTER key.
5. Press ENTER key to scroll to **Stage 1 Diff On**, **Stage 1 Diff Off**, **Stage 2 Diff On**, **Stage 2 Diff Off**, **Stage 3 Diff On** or **Stage 3 Diff Off** (see Figure 20).
6. Press UP or DOWN keys to adjust value.
7. Press ENTER key to save.

FIGURE 20
Adjusting Heating Differential Values

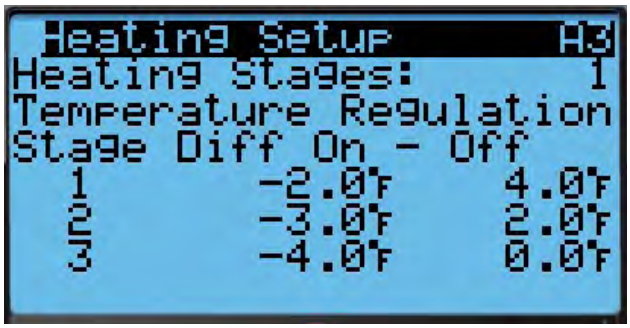
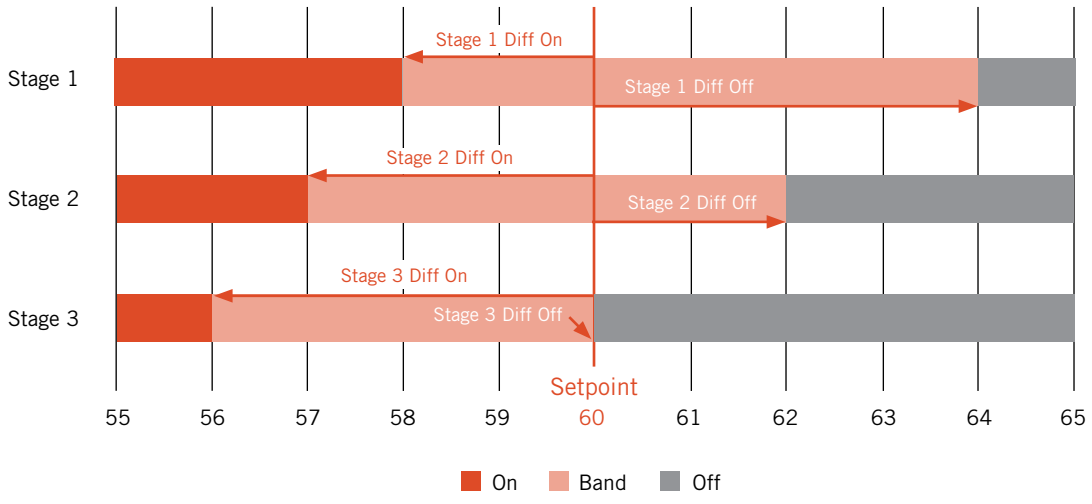


FIGURE 21
MULTI-TEC Wall-Mount Unit Heating Staging



Free Cooling

If the unit is equipped with an economizer, and conditions are acceptable for economizer operation, the MULTI-TEC wall-mount unit will utilize free cooling operation before the use of any cooling operation requiring compressor operation to reduce the energy required to cool the indoor space.

Economizer Disable

There are two methods to disable the economizer if the use of free cooling is restricted. The first method is to select None as the economizer type within the **Sys. Config.** menu. The second method requires changing the model number within the **Adv. Sys. Config.** menu to reflect a model installed with a blank-off plate (see model nomenclature in Figure 1 on page 3). Changing the wall-mount unit model number to reflect a unit with a blank-off plate will not allow for an economizer type to be selected therefore defaulting to a disabled state, along with all sensors/alarms associated with it.

Economizer Enable

The economizer will be enabled for cooling operation if the model number reflects a wall-mount unit with an economizer installed, an economizer type other than None and the conditions for the economizer type are met. The following list explains the economizer types and the parameters required for operation:

None

Economizer will not be enabled for freecooling operation.

Drybulb Only

1. Outdoor air temperature is below the Outdoor Set outdoor temperature setpoint listed within the **Sys. Config.** menu. (Outdoor Set temperature setpoint is 70°F by default.) See Figure 22.
2. LC6000 is not currently in any dehumidification mode.
3. LC6000 is not currently in any emergency mode.

Temperature and Humidity (Default)

1. Outdoor air temperature is below the Outdoor Set outdoor temperature setpoint listed within the **Sys. Config.** menu. (Outdoor Set temperature setpoint is 70°F by default.) See Figure 22.
2. Outdoor relative humidity is below the OA Humid Set outdoor humidity setpoint listed within the **Sys. Config.** menu. (OA Humid Set humidity setpoint is 80% RH by default.) See Figure 22.
3. LC6000 is not currently in any dehumidification mode.
4. LC6000 is not currently in any emergency mode.

Enthalpy

1. Outdoor air temperature is below the Outdoor Set, outdoor temperature setpoint, listed within the **Sys. Config.** menu. (Outdoor Set temperature setpoint is 70°F by default.) See Figure 22.
2. Outdoor relative humidity is below the OA Humid Set outdoor humidity setpoint listed within the **Sys. Config.** menu. (OA Humid Set humidity setpoint is 80% RH by default.) See Figure 22.
3. The outdoor air dewpoint is below the OA Dew Pt Set outdoor dewpoint setpoint, listed within the **Sys. Config.** menu. (OA Dew Pt Set dewpoint setpoint is 55°F by default.) See Figure 23.
4. LC6000 is not currently in any dehumidification mode.
5. LC6000 is not currently in any emergency mode.

FIGURE 22
Economizer A4 Screen

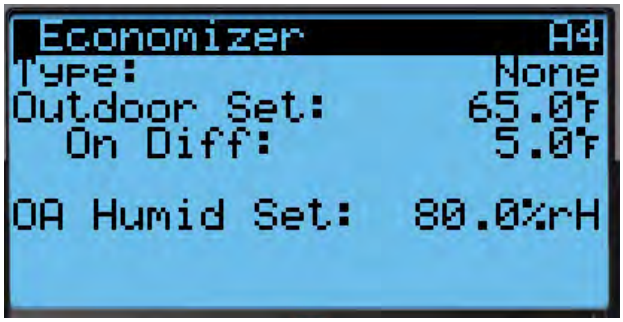


FIGURE 23
Economizer A5 Screen

Economizer Modulation

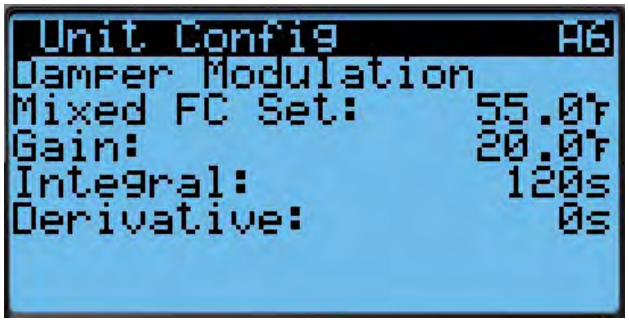
The economizer damper output will modulate between 0% and 100% to maintain a 55°F mixed air temperature when the outdoor air conditions are acceptable.

To adjust damper modulation values:

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 **Unit Config (A6)**; press ENTER key.
5. Press ENTER key to scroll to **Mixed FC Set**, **Gain**, **Integral** or **Derivative** (see Figure 24).
6. Press UP or DOWN keys to adjust parameter value.
7. Press ENTER key to save.

FIGURE 24
Adjusting Damper Modulation Values



Economizer Note

The economizer and mechanical cooling can operate simultaneously because the economizer uses the mixed air temperature sensor.

Compressor

Enable

The compressor will be enabled when stage 1 is enabled and outdoor air conditions are not acceptable for economizing. If the outdoor conditions are acceptable, the compressor will run when stage 2 is enabled.

Delays and Run Time

The compressor will have a minimum run time of 180 seconds and a minimum off time of 120 seconds. If the compressor is two stage, the second stage will have a minimum delay of 120 seconds. The 2nd stage will also have a minimum on time of 120 seconds. When communicating with the LC, the delay between compressors in units installed on the same shelter will be managed by the settings configured in the LC.

Electric Reheat Dehumidification

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.

Dehumidification will only become active if the unit is connected to the LC6000 and the appropriate conditions are present.

When the wall-mount unit receives a dehumidification call from the LC6000, the wall-mount unit will disable the economizer to force the system to use air conditioning and prevent any additional humidity from being introduced from outdoor air. The wall-mount unit will then turn on the air conditioning system which will remove moisture and cool the space. At the same time, the electric reheat coil will be energized to extend the run time of the cooling cycle and prevent cool air from being introduced to the space.

When the dehumidification command is first received both cooling and reheat will be activated.

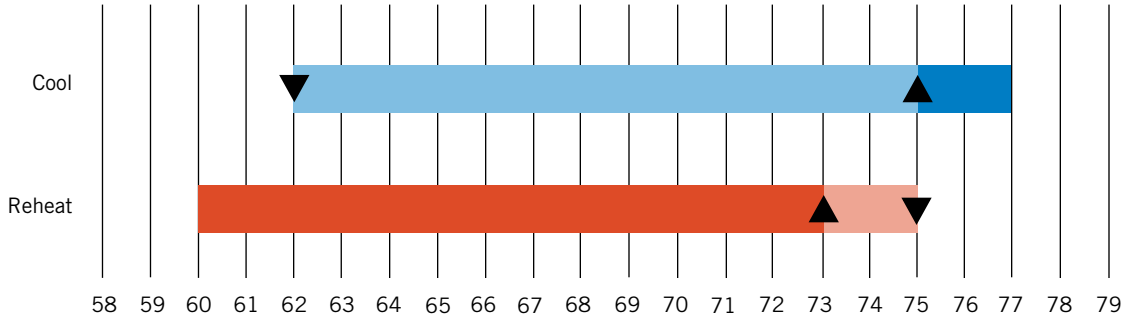
The cooling will shut off when the return air temperature is 62°F to prevent the unit from causing the system to go into heating mode (see Figure 25). The compressor will turn on again once the return temperature rises to 75°F.

The electric heat will operate to maximize cooling times which will in turn remove moisture from the space. The electric reheat will turn on when the temperature falls to 73°F and will turn back off at 75°F.

The system will continue to operate this way until the LC removes the call for active dehumidification.

A heating or cooling call will disable the dehumidification call. Dehumidification can only take place when system is not actively heating or cooling.

FIGURE 25
Dehumidification Control



For a more detailed operation description, see the 2100-669 LC6000 Service Instructions manual.

Mechanical Dehumidification

Mechanical 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.

Dehumidification will only become active if the unit is connected to the LC6000 and the appropriate conditions are present.

When the wall-mount unit receives a dehumidification call from the LC6000, the wall-mount unit will disable the economizer to force the system to use air conditioning and prevent any additional humidity from being introduced from outdoor air. The wall-mount unit will then turn on the air conditioning system which will remove moisture and cool the space. At the same time, the 3-way dehumidification valve will be opened to extend the run time of the cooling cycle and prevent cool air from being introduced to the space. The dehumidification sequence will run until the space temperature reaches the heating setpoint or cooling setpoint or the humidity setpoint is reached.

When the dehumidification command is first received both cooling and reheat will be activated.

The cooling will shut off when the return air temperature is 62°F to prevent the unit from causing the system to go into heating mode (see Figure 25). The compressor will turn on again once the return temperature rises to 75°F.

The electric heat will operate to maximize cooling times which will in turn remove moisture from the space. The electric reheat will turn on when the temperature falls to 73°F and will turn back off at 75°F.

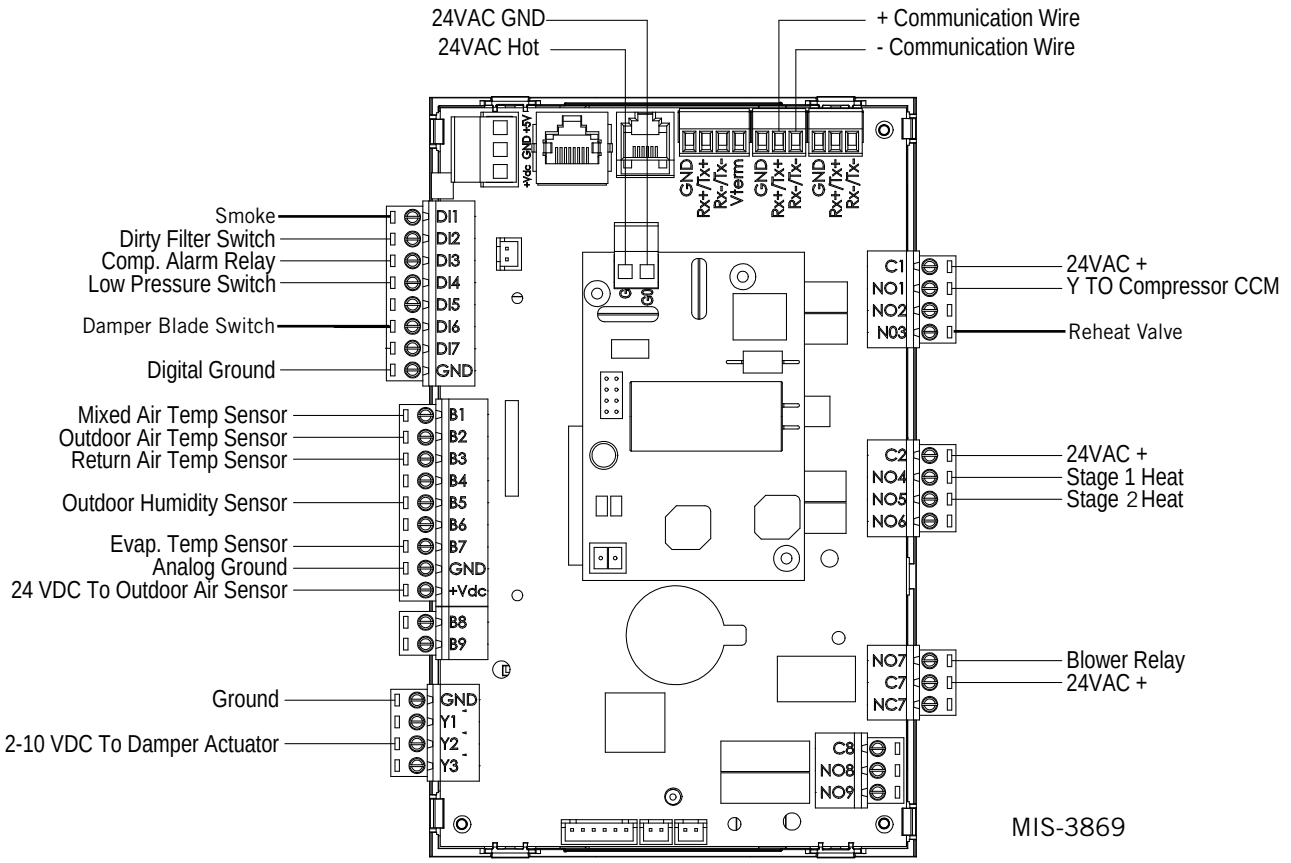
The system will continue to operate this way until the LC removes the call for active dehumidification.

The reheat coil is dependent on space load to warm the temperature back up once the compressor is disabled.

A heating or cooling call will disable the dehumidification call. Dehumidification can only take place when system is not actively heating or cooling.

For a more detailed operation description, see the 2100-669 LC6000 Service Instructions manual.

FIGURE 26
Wall-Mount Unit Control Board



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 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.

The pressure table found on page 20 shows nominal pressures for the units. 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 unit to the serial plate charge.

TABLE 4
MULTI-TEC Cooling Pressures

Air Temperature Entering Outdoor Coil °F

Model	Return Air Temp (DB/WB)	Pressure	75	80	85	90	95	100	105	110	115	120	125
W18A/L	75/62	Low Side	121	123	126	128	131	134	136	137	140	142	144
		High Side	293	312	332	353	376	400	425	452	480	510	540
	80/67	Low Side	129	132	135	137	140	143	145	147	150	152	154
		High Side	300	320	340	362	386	410	436	464	492	523	554
	85/72	Low Side	134	137	140	142	145	148	150	152	155	157	159
		High Side	311	331	352	375	400	424	451	480	509	541	573
W24A/L	75/62	Low Side	123	124	126	128	129	131	133	135	137	139	141
		High Side	314	334	355	377	401	425	451	479	507	536	567
	80/67	Low Side	132	133	135	137	138	140	142	144	146	149	151
		High Side	322	343	364	387	411	436	463	491	520	550	582
	85/72	Low Side	137	138	140	142	143	145	147	149	151	154	156
		High Side	333	355	377	401	425	451	479	508	538	569	602
W30A/L	75/62	Low Side	118	120	122	124	126	128	131	133	135	137	138
		High Side	312	333	355	378	403	428	454	483	511	540	570
	80/67	Low Side	126	128	131	133	135	137	140	142	144	146	148
		High Side	320	342	364	388	413	439	466	495	524	554	585
	85/72	Low Side	130	132	136	138	140	142	145	147	149	151	153
		High Side	331	354	377	402	427	454	482	512	542	573	605
W36A/L	75/62	Low Side	117	120	122	124	127	129	131	134	136	137	138
		High Side	323	346	370	394	419	446	473	500	528	558	587
	80/67	Low Side	125	128	130	133	136	138	140	143	145	147	148
		High Side	331	355	379	404	430	457	485	513	542	572	602
	85/72	Low Side	129	132	135	138	141	143	145	148	150	152	153
		High Side	343	367	392	418	445	473	502	531	561	592	623
W42A/L	75/62	Low Side	123	125	128	130	132	135	137	138	140	142	144
		High Side	323	346	371	395	421	447	474	501	528	558	587
	80/67	Low Side	132	134	137	139	141	144	146	148	150	152	154
		High Side	331	355	380	405	432	458	486	514	542	572	602
	85/72	Low Side	137	139	142	144	146	149	151	153	155	157	159
		High Side	343	367	393	419	447	474	503	532	561	592	623
W48A/L	75/62	Low Side	120	122	125	127	130	132	134	136	137	139	141
		High Side	330	353	377	402	428	454	482	510	540	570	601
	80/67	Low Side	128	131	134	136	139	141	143	145	147	149	151
		High Side	338	362	387	412	439	466	494	523	554	585	616
	85/72	Low Side	132	136	139	141	144	146	148	150	152	154	156
		High Side	350	375	401	426	454	482	511	541	573	605	638
W60A/L	75/62	Low Side	127	129	131	134	136	137	140	142	145	148	151
		High Side	344	362	380	401	421	444	467	492	518	545	573
	80/67	Low Side	136	138	140	143	145	147	150	152	155	158	161
		High Side	353	371	390	411	432	455	479	505	531	559	588
	85/72	Low Side	141	143	145	148	150	152	155	157	160	164	167
		High Side	365	384	404	425	447	471	496	523	550	579	609
W72A/L	75/62	Low Side	117	119	121	122	124	126	128	130	132	134	136
		High Side	332	353	376	402	427	454	483	512	542	574	607
	80/67	Low Side	125	127	129	131	133	135	137	139	141	143	145
		High Side	340	362	386	412	438	466	495	525	556	589	623
	85/72	Low Side	129	131	134	136	138	140	142	144	146	148	150
		High Side	352	375	400	426	453	482	512	543	575	610	645

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

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".*

⚠ WARNING

Electrical shock hazard.

Disconnect VAC power supply before servicing.

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

High Pressure Switch

All W**A/W**L wall-mount air conditioner series models are supplied with a high pressure switch. The high pressure switch opens at 650 psi.

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 unit.

Phase Monitor

Used only on 3-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.***

Condenser Fan Operation

NOTE: *On models equipped with a low ambient control (LAC), the condenser fan motor will have a delayed start until system refrigerant operating pressure builds up. After starting, the fan motor may or may not cycle depending upon ambient conditions. This is normal operation.*

The condenser fan motor on 230/208 volt, one and three phase, 60 HZ units is a two-speed motor that comes factory wired on high speed for peak performance. If ambient conditions permit, it can be reconnected to low speed (red wire) for lower sound level. See unit wiring diagram. (*This applies to W42, W48, W60 and W72 models only.*)

Low Ambient Control

Modulating head-pressure control that allows full speed at pressures above 315 psi. Below 315 psi, the control will slow fan speed—following internal head pressures—until a minimum RPM is reached (approx 300 RPM). Below this point, the control will shut the fan completely off until internal pressures rise. The control is preset from the factory, but should adjustment become necessary, there is an adjustment screw located on the bottom of the control behind a weatherproof cap. One full turn clockwise equals approximately +48 psi.

Compressor Control Module

The compressor control module (CCM) is standard on all models covered by this manual.

Features

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

Delay-on-Make Timer

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. Once a compressor call is lost, the time period must expire before a new call will be initiated.

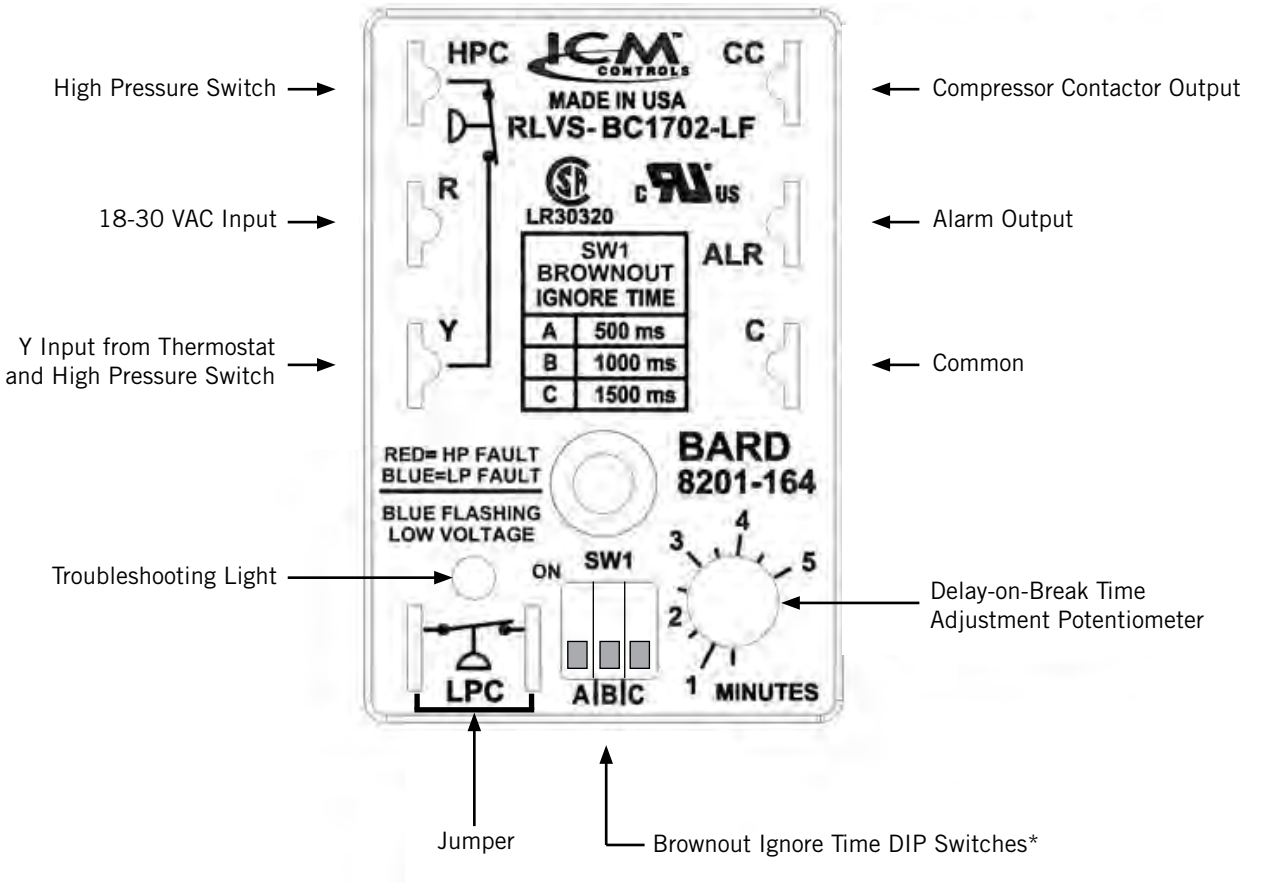
High Pressure Detection

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 again, 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 thermostat call, the compressor will be de-energized and the alarm terminal will be energized indicating an alarm. The red LED will light and stay on until power is cycled to the control or a loss of voltage is present at Y terminal for more than ½ second.

Test Mode

By rapidly rotating the potentiometer (POT) clockwise (see Figure 27), all timing functions will be removed for testing.

FIGURE 27
8201-164 Compressor Control Module



* Turn on only one switch for that specific ignore time setting

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 8201-164 is shipped with all the DIP switches in the 'off' or 'do not ignore' position (see Figure 27).

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 500 milliseconds (A DIP switch), 1000 milliseconds (B DIP switch) or 1500 milliseconds (C DIP switch); time is not cumulative—only the longest setting will apply. If the voltage recovers during the brownout time period, the compressor will start.

If a brownout condition is detected by the 8201-164, 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 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.

Pressure Service Ports

High and low pressure service ports are installed on all units so that the system operating pressures can be observed. A pressure table covering all models can be found on page 20. It is imperative to match the correct pressure table to the unit by model number.

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

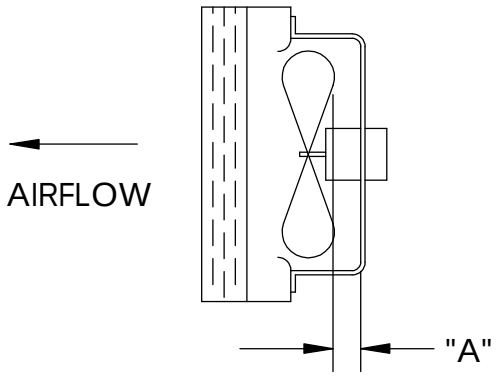
WARNING! Do NOT use a Schrader valve core removal tool with these valves. Use of such a tool could result in eye injuries or refrigerant burns!

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.

Outdoor Fan Motor

Due to design considerations of the condenser section of the wall-mount unit, placement/clearance of the motor/fan blade is critical to heat dispersal. Should a change of motor or fan blade be necessary, please view Figure 28 for proper clearance adjustment.

FIGURE 28
Fan Blade Setting



MIS-1724

Model	Dimension A
W18A/W18L W24A/W24L	1.00"
W30A/W30L W36A/W36L	1.25"
W42A/W42L W48A/W48L W60A/W60L W72A/W72L	1.75"

TABLE 5A
MULTI-TEC Optional Accessories – Right Hand

		W18A**A	W24A**A	W24A**B	W24A**C	W30A**A	W30A**B	W30A**C	W36A**A	W36A**B	W36A**C	W42A**A	W42A**B	W42A**C	W48A**A	W48A**B	W48A**C	W60A**A	W60A**B	W60A**C	W72A**A	W72A**B	W72A**C
Heater Kits	EHW2TA-A05	X	X																				
	EHW2TA-A08	X	X																				
	EHW2TA-A10	X	X																				
	EHWA24-A04B		X																				
	EHW2TA-B06			X																			
	EHWH24B-C06				X																		
	EHW3TA-A05					X			X														
	EHW3TA-A08					X			X														
	EHW3TA-A10					X			X														
	EHW3TA-A15					X			X														
	EHW30A-B06						X																
	EHW3TA-B06									X													
	EHW3TA-B09						X			X													
	EHW3TA-B15						X			X													
	EHW3TA-C06							X			X												
	EHW3TA-C09							X			X												
	EHW3TA-C12							X			X												
	EHW3TA-C15							X			X												
	EHW4TA-A05											X			X								
	EHWA05-A10B											X			X			X					
	EHWA05-A15B											X			X			X					
	EHWA05-A20B											X			X			X					
	EHW4TA-B06												X			X			X				
	EHWA05-B09B												X			X							
	EHW6TA-B06																					X	
	EHWA05-B15B												X			X			X			X	
	EHW5TA-B18																		X				
	EHW4TA-B18												X			X							
	EHW4TA-C09													X			X			X			X
	EHW4TA-C15													X			X			X			X
	EHW5TA-A05																	X			X		
	EHW60A-B09B																		X				
	EHW70A-B09B																					X	
	EHW6TA-B18																					X	
	EHW72A-A10B																				X		
	EHW72A-A15B																				X		
	EHW72A-A20B																				X		
Circuit Breaker (WMCB) and Toggle Disconnect (WMPD)	WMCB-01B			X																			
	WMCB-02A	X																					
	WMCB-02B						X																
	WMCB-03A		X																				
	WMCB-04B									X													
	WMCB-05A					X			X														
	WMCB-05B												X			X							
	WMCB-06B																		X				
	WMCB-08A											X			X								
	WMCB-09A																	X			X		
	WMPD-01C				X			X			X			X			X			X			X
	WMCB-08B																					X	

TABLE 5B
MULTI-TEC Optional Accessories – Left Hand

		W18L**A	W24L**A	W24L**B	W30L**A	W30L**B	W30L**C	W36L**A	W36L**B	W36L**C	W42L**A	W42L**B	W42L**C	W48L**A	W48L**B	W48L**C	W60L**A	W60L**B	W60L**C	W72L**A	W72L**B	W72L**C
Heater Kits	EHW2TA-A05L	X	X																			
	EHW2TA-A08L	X	X																			
	EHW2TA-A10L	X	X																			
	EHW2TA-B06L			X																		
	EHW3TA-A05L				X			X														
	EHW3TA-A08L				X																	
	EHW3TA-A10L				X			X														
	EHW3TA-A15L				X			X														
	EHW3TA-B09L					X			X													
	EHW3TA-B15L					X			X													
	EHW3TA-C09L						X			X												
	EHW3TA-C15L						X			X												
	EHW4TA-A05L										X			X			X					
	EHWA05-A10LB										X			X			X					
	EHWA05-A15LB										X			X			X					
	EHW4TA-B06L											X			X			X				
	EHWA05-B09LB											X			X							
	EHW6TA-B06L																				X	
	EHWA05-B15LB											X			X			X			X	
	EHW4TA-C09L												X			X			X			X
	EHW4TA-C15L												X			X			X			X
	EHW6TA-A05L																			X		
	EHWA60-B09LB																	X				
	EHW70A-B09LB																				X	
	EHW72A-A10LB																			X		
	EHW72A-A15LB																			X		
Circuit Breaker (WMCB) and Toggle Disconnect (WMPD)	WMCB-01B			X																		
	WMCB-02A	X																				
	WMCB-02B					X																
	WMCB-03A		X																			
	WMCB-04B								X													
	WMCB-05A				X			X														
	WMCB-05B											X			X							
	WMCB-06B																	X				
	WMCB-08A										X			X								
	WMCB-09A																X			X		
	WMPD-01C						X			X			X			X			X			X
	WMCB-09B																				X	

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 version of 2100-669 LC6000 Service Instructions manual).
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: Remove the fan shroud/ motor/motor bracket as an assembly from the condenser section. This will give clear access to the inlet side of the coil for cleaning. 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: Remove the evaporator section panel and apply specific evaporator cleaner directly to the inlet side of coil, being very careful not to overspray into insulation or surrounding panels and wiring. 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 filter; check for additional filter grilles internal to the structure.
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, turn breakers back on.
10. Enable system to LC6000 controller (see latest version of 2100-669 LC6000 Service Instructions manual).
11. Repeat steps for additional wall-mount units.

Removal of Fan Shroud

1. Disconnect all power to the unit.
2. Remove the screws holding both grilles, one on each side of unit, and remove grilles.
3. Remove nine screws holding fan shroud to condenser and bottom.
4. Unwire condenser fan motor.
5. Slide complete motor, fan blade and shroud assembly out the left side of the unit.
6. Service motor/fan as needed. Any service work requiring removal or adjustment in the fan and/or motor will require that the dimensions be checked and blade adjusted in or out on the motor shaft accordingly (see page 23 for proper clearance adjustment).
7. Reverse steps to re-install.

Troubleshooting Nidec SelecTech Series ECM Motors

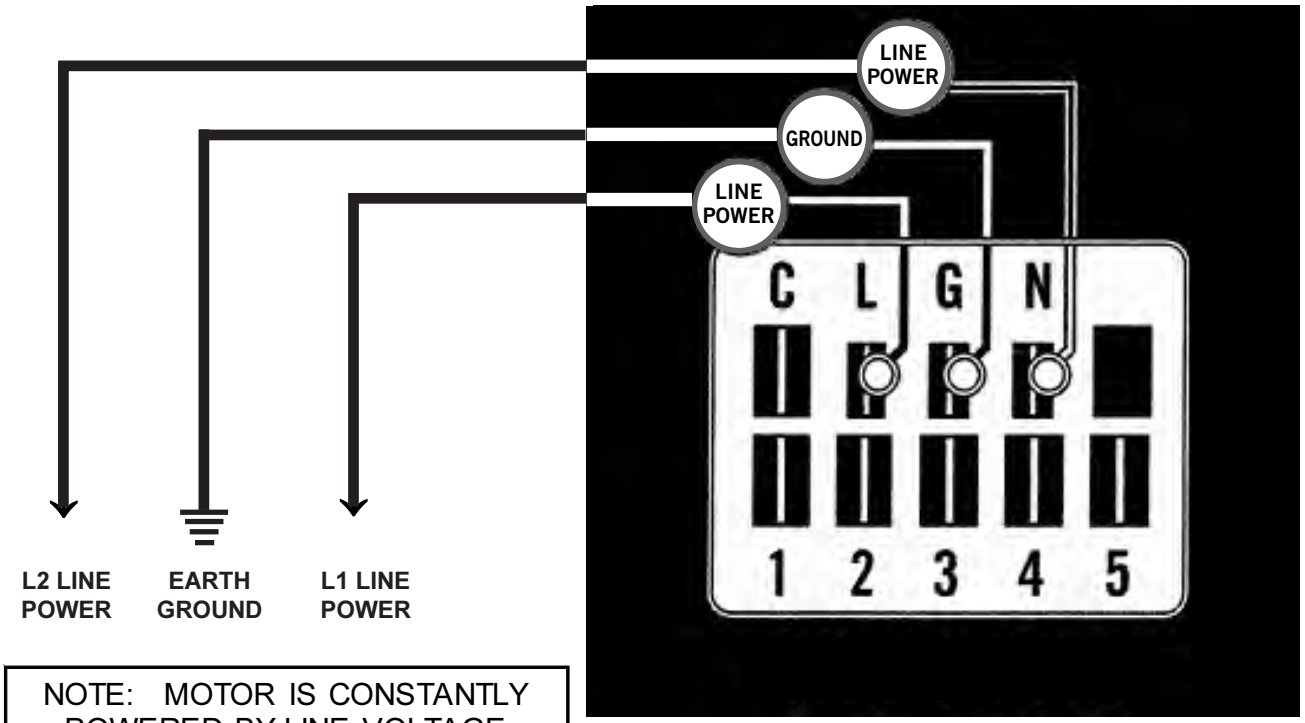
If the Motor Is Running

1. It is normal for the motor to rock back and forth on start up. Do not replace the motor if this is the only problem identified.
2. If the system is excessively noisy, does not appear to change speeds in response to a demand (Heat, Cool, Other) or is having symptoms during the cycle such as tripping limit or freezing coil, check the following:
   A. Wait for programmed delays to time out.
   B. Ensure that the motors control inputs are wired as shown in the factory-supplied wiring diagram to ensure motor is getting proper control signals and sequencing.
   C. Remove the filter and check that all dampers, registers and grilles are open and free flowing. If removing the filters corrects the problem, clean or replace with a less restrictive filter. Also check and clean the blower wheel or coil as necessary.
   D. Check the external static pressure (total of both supply and return) to ensure it is within the range as listed on the unit serial plate. If higher than allowed, additional duct work is needed.
   E. If the motor does not shut off at the end of the cycle, wait for any programmed delays to time out (no more than 90 seconds). Also make sure that there is no call for "Continuous Fan" on the "G" terminal.
   F. If the above diagnostics do not solve the problem, confirm the voltage checks in the next section below, then continue with the **Model SelecTech Communication Diagnostics**.

If the Motor Is Not Running

1. Check for proper high voltage and ground at the L/L1, G and N/L2 connections at the motor (see Figure 29). Correct any voltage issues before proceeding to the next step. The SelecTech motor is voltage specific. Only the correct voltage should be applied to the proper motor. Input voltage within plus or minus 10% of the nominal line power VAC is acceptable.

FIGURE 29
Motor Connections



NOTE: MOTOR IS CONSTANTLY POWERED BY LINE VOLTAGE

2. If the motor has proper high voltage and ground at the L/L1, G and N/L2 connections, continue with the **Model SelecTech Communication Diagnostics**.

Model SelecTech Communication Diagnostics

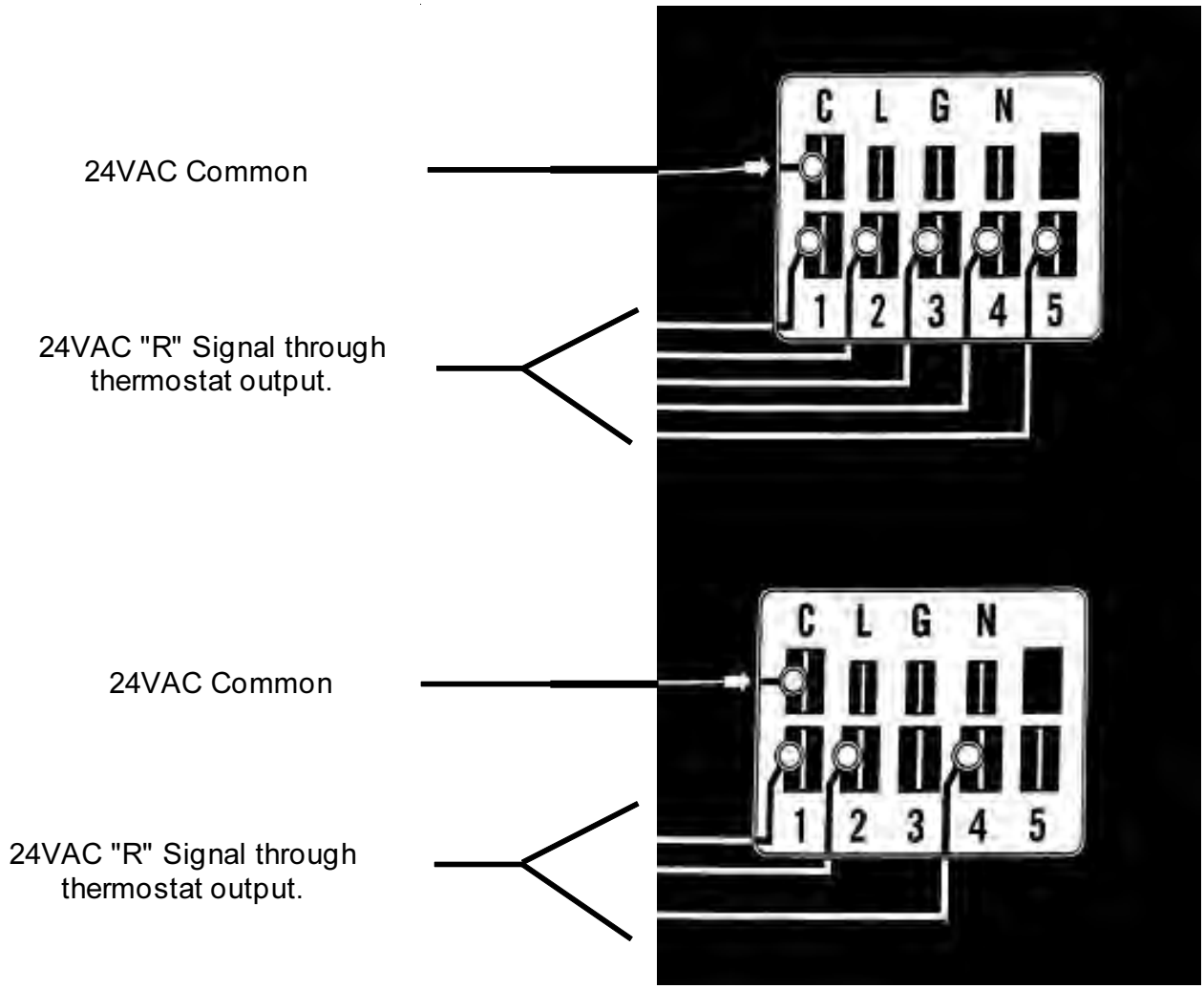
The SelecTech motor is communicated through 24 VAC low voltage (thermostat control circuit wiring).

1. Start with unit wiring diagram to confirm proper connections and voltage (see Figure 30).
2. Initiate a demand from the thermostat and check the voltage between the common and the appropriate motor terminal (1-5). ("G" input is typically on terminal #1, but always refer to wiring diagram.)

A. If the low voltage communication is not present, check the demand from the thermostat. Also check the output terminal and wire(s) from the terminal strip or control relay(s) to the motor.

B. If the motor has proper high voltage as identified on page 27 (Step 1 in **If the Motor Is Not Running**), proper low voltage to a programmed terminal and is not operating, the motor is failed and will require replacement.

FIGURE 30
Motor Connections



INSTALLATION INSTRUCTIONS

Bard Air Conditioning System

MULTI-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: 2100-676D
Supersedes: 2100-676C
Date: 3-18-19

CONTENTS

FIGURES AND TABLES

Air Conditioning System

This Bard air conditioning system is composed of MULTI-TEC wall-mounted air conditioners matched with an LC6000 supervisory controller or Bard th-TUNE stand-alone controller. If only one wall-mounted air conditioner is being used, it can be matched with either the LC6000 supervisory controller or a th-TUNE stand-alone controller (see page 3 for information on the th-TUNE). 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 and MULTI-TEC wall-mount units are designed specifically to work together. The controller cannot run other brands of systems, nor can other controllers run the MULTI-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

(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 per LC6000), 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

The MULTI-TEC units will supply 100% of rated cooling airflow in freecooling mode with ability to exhaust the same amount through the unit itself without any additional relief openings in the shelter.

MULTI-TEC units are available with optional electric heat and/or dehumidification.

Single Unit Operation

A th-TUNE stand-alone controller (Bard P/N 8403-088) can be used in place of the LC6000 controller when only one MULTI-TEC wall-mount air conditioner is being installed. If using a th-TUNE stand-alone controller instead of the LC6000 controller, the alarm logging and remote communication capabilities of the LC6000 controller will not be available. See th-TUNE manual 2100-678 for information on installing and setting up a th-TUNE stand-alone controller for single unit operation. A TEC-EYE hand-held diagnostic tool is required to program the wall-mount unit for th-TUNE stand-alone controller operation. The th-TUNE stand-alone controller and TEC-EYE diagnostic tool are available as a kit (Bard P/N 8620-264).

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.

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

Heavy item hazard.

Use more than one person to handle unit.

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

⚠ 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.

⚠ CAUTION

Cut hazard.

Wear gloves to avoid contact with sharp edges.

Failure to do so could result in personal injury.

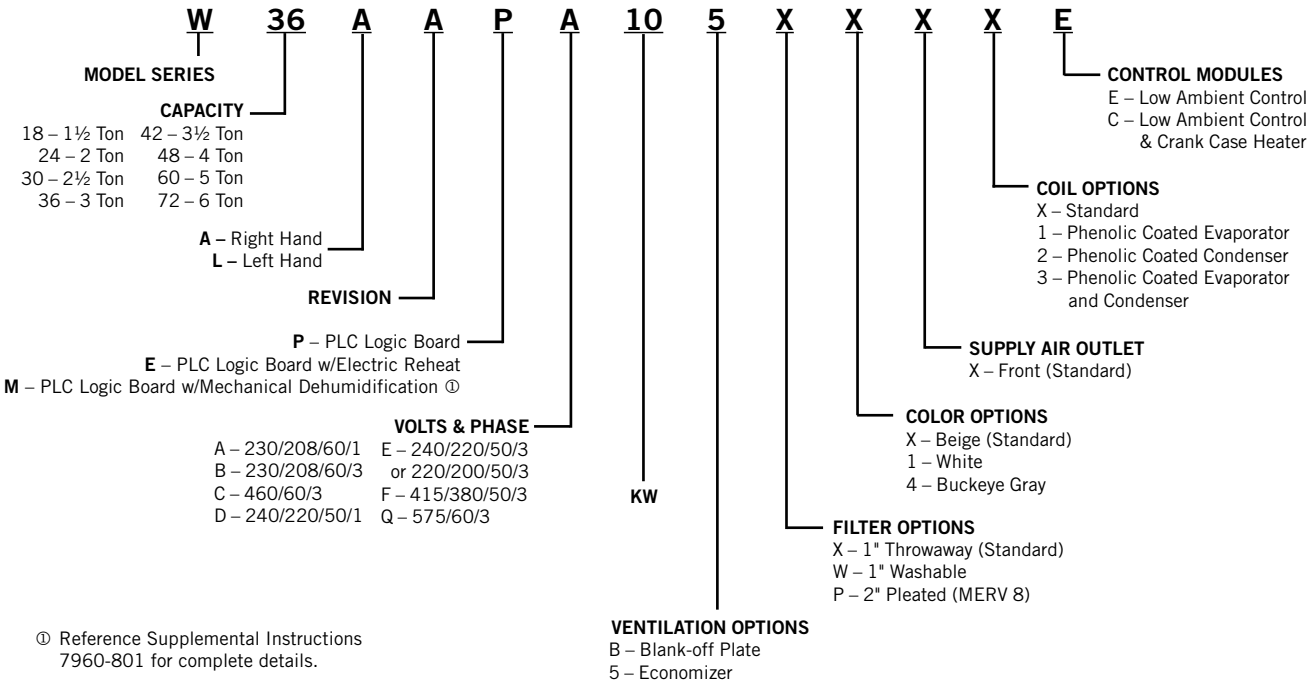
LIST OF NECESSARY MATERIALS/TOOLS

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
- Supply and return grilles
- 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
- Electrical supplies
  - Various size circuit breakers for the shelter AC breaker box (see Tables 1, 2 and 3 on pages 18, 19 and 20)
  - High-voltage wire of various gauges (see Tables 1, 2 and 3)
  - 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, 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
MULTI-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 2 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

Wall-mount air conditioners are available in both right-hand access models and left-hand access models. Right-hand access models have the heat strip access panel, external circuit breakers access panel and internal controls access panel on the right side of the unit. Left-hand access models are a mirror image of the right-hand access models, and allow two wall-mount units to be placed in relatively close proximity and yet still allow complete access for maintenance and repair.

On side-by-side installations, maintain a minimum of 20" clearance on control side to allow access to control panel and heat strips, and to allow proper airflow to the outdoor coil. For installations where units are installed with both control panels facing each other (inward), maintain a minimum of 36" clearance to allow access. 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.

Clearances Required for Service Access and Adequate Condenser Airflow

MODELS	LEFT SIDE	RIGHT SIDE	DISCHARGE SIDE
W18A, W24A, W30A, W36A	15"	20"	10'
W18L, W24L, W30L, W36L	20"	15"	10'
W42A, W48A, W60A, W72A	20"	20"	10'
W42L, W48L, W60L, W72L	20"	20"	10'

NOTE: *For side-by-side installation of two units there must be 20" between units. This can be reduced to 15" by using a W**L model (left side compressor and controls) for the left unit and W**A (right side compressor and controls) for right unit.*

See Specifications Sheet S3532.

Clearance to Combustibles

⚠ 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.

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. However, it is generally recommended that a 1" clearance is used for ease of installation and maintaining the required clearance to combustible material. See Figures 4A-D on pages 10-13 for details on opening sizes.

Minimum Clearances Required to Combustible Materials

MODELS	SUPPLY AIR DUCT FIRST 3'	CABINET
W18A, L W24A, L	0"	0"
W30A, L W36A, L	1/4"	0"
W42A, L W48A, L W60A, L W72A, L	1/4"	0"

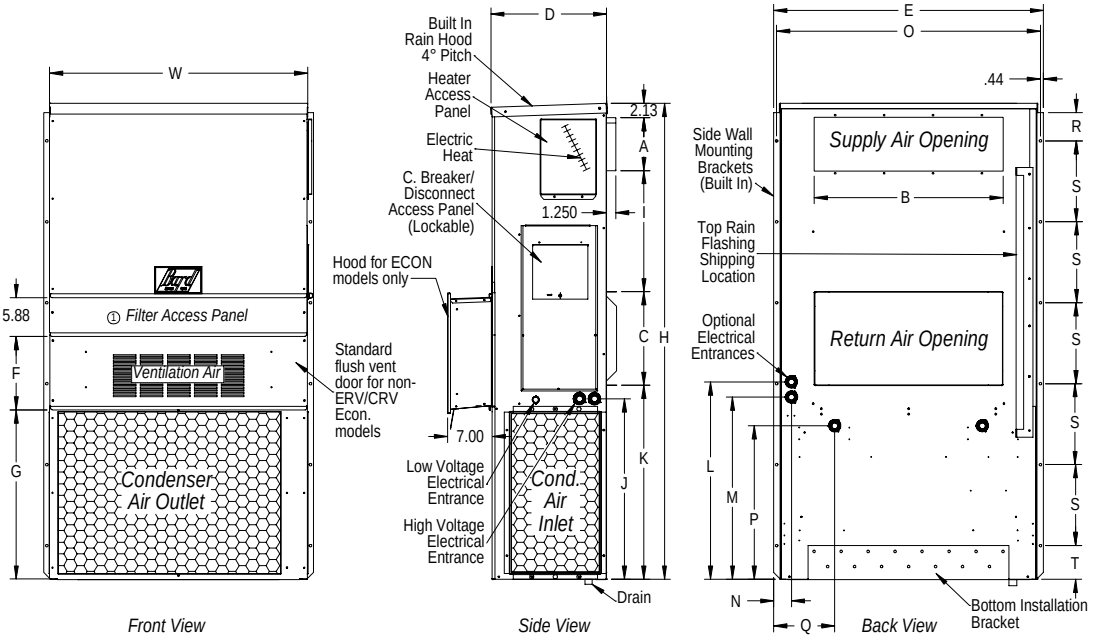
FIGURE 2

Dimensions of Basic Unit for Architectural and Installation Requirements (Nominal)

MODEL	WIDTH (W)	DEPTH (D)	HEIGHT (H)	SUPPLY		RETURN																
				A	B	C	B	E	F	G	I	J	K	L	M	N	O	P	Q	R	S	T
W18** **W24****	33.300	17.125	74.563	7.88	19.88	11.88	19.88	35.00	10.88	29.75	20.56	30.75	32.06	33.25	31.00	2.63	34.13	26.06	10.55	4.19	12.00	9.00
W30** **W36****	38.200	17.125	74.563	7.88	27.88	13.88	27.88	40.00	10.88	29.75	17.93	30.75	32.75	33.25	31.00	2.75	39.13	26.75	9.14	4.19	12.00	9.00
W42** **W48****	42.075	22.432	84.875	9.88	29.88	15.88	29.88	43.88	13.56	31.66	30.00	32.68	26.94	34.69	32.43	3.37	43.00	23.88	10.00	1.44	16.00	1.88
W60** **W72****	42.075	22.432	93.000	9.88	29.88	15.88	29.88	43.88	13.56	37.00	30.00	40.81	35.06	42.81	40.56	3.37	43.00	31.00	10.00	1.44	16.00	10.00

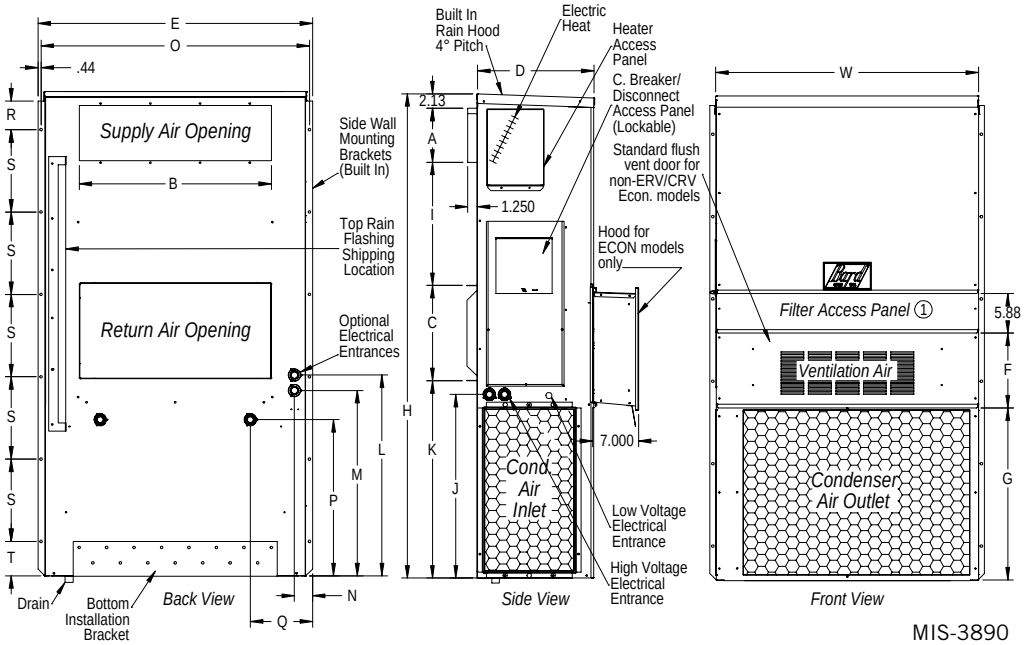
All dimensions are in inches. Dimensional drawings are not to scale.

WA RIGHT UNIT**



MIS-3889

WL LEFT UNIT**



MIS-3890

Mounting the Units

⚠ WARNING

Heavy item hazard.

Use more than one person to handle unit.

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

NOTE: *It may be best to spot some electrical knockouts (such as those located on the back of the wall-mount unit) before units are mounted and access is unavailable or limited (see Figure 2 to locate pre-punched knockouts).*

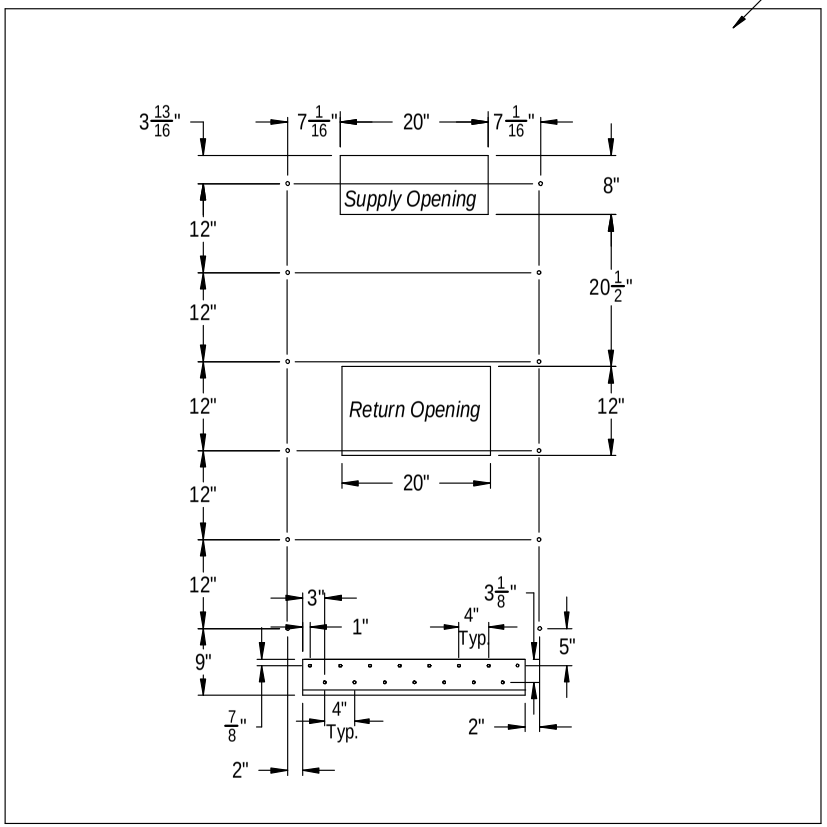
Two holes for the supply and return air openings must be cut through the wall as shown in Figures 4A-D on pages 10-13. On wood frame walls, the wall construction must be strong and rigid enough to carry the weight of the unit without transmitting any unit vibration. All walls must be thoroughly inspected 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.

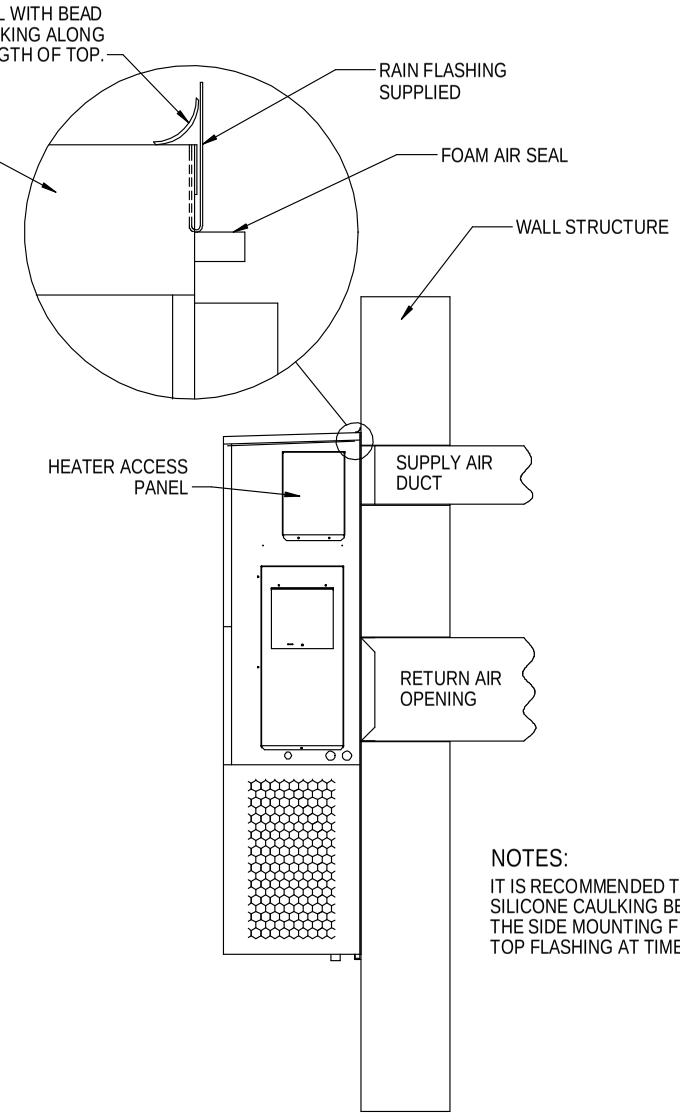
1. These units are secured by full-length mounting flanges built into the cabinet on each side which secure the unit to the outside wall surface. A bottom mounting bracket, attached to skid for shipping, is provided for ease of installation, but is not required.
2. The unit itself is suitable for 0" 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. However, it is generally recommended that a 1" clearance is used for ease of installation and maintaining the required clearance to combustible material. See Figures 4A-D for details on opening sizes.
3. Locate and mark lag bolt locations and location for optional bottom mounting bracket, if desired (see Figures 4A-D).
4. Mount bottom mounting bracket (if used).
5. If desired, hook top rain flashing (attached to front-right of supply flange for shipping) under back bend of top.
6. 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.
7. Secure optional rain flashing to wall and caulk across entire length of top (see Figures 4A-D).
8. 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.
9. A plastic drain hose extends from the drain pan at the top of the unit down to the unit base. There are openings in the unit base for the drain hose to pass through. 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.
10. Install outdoor temperature/humidity sensor (see Figure 3). Remove grommet from base and sensor. Discard shipping bracket. Place sensor extension through hole in base under condenser fan and secure to base with screw.

FIGURE 3
Outdoor Sensor Installation

FIGURE 4A
W18A, W18L, W24A, W24L
Mounting Instructions



Wall Opening and Hole Location View



Right Side View

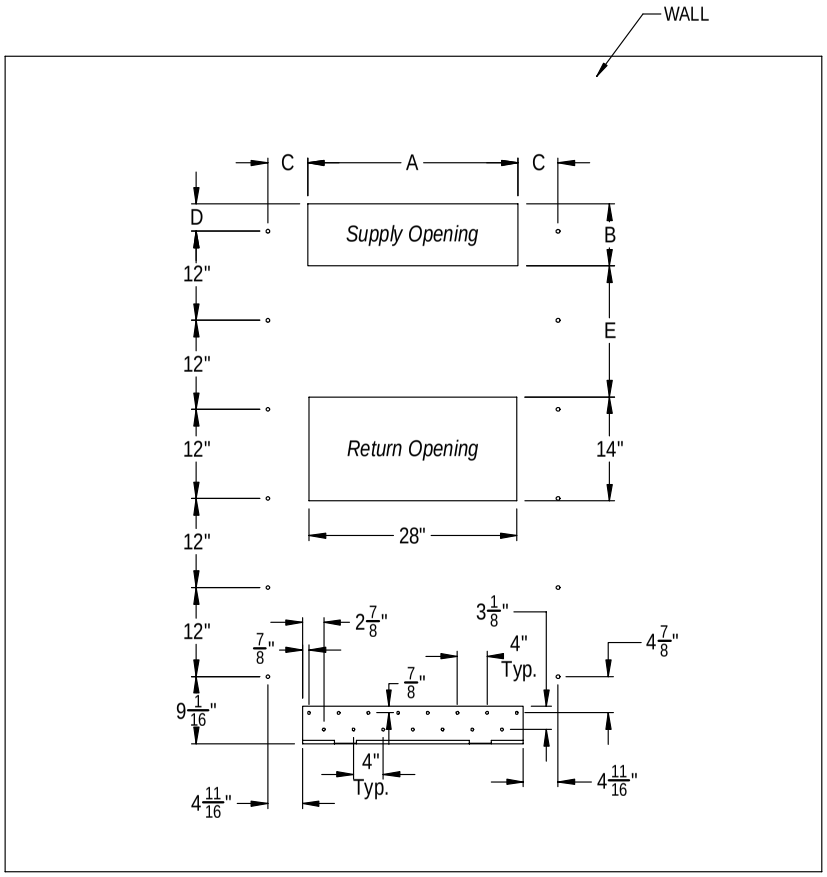
NOTES:

IT IS RECOMMENDED THAT A BEAD OF SILICONE CAULKING BE PLACED BEHIND THE SIDE MOUNTING FLANGES AND UNDER TOP FLASHING AT TIME OF INSTALLATION.

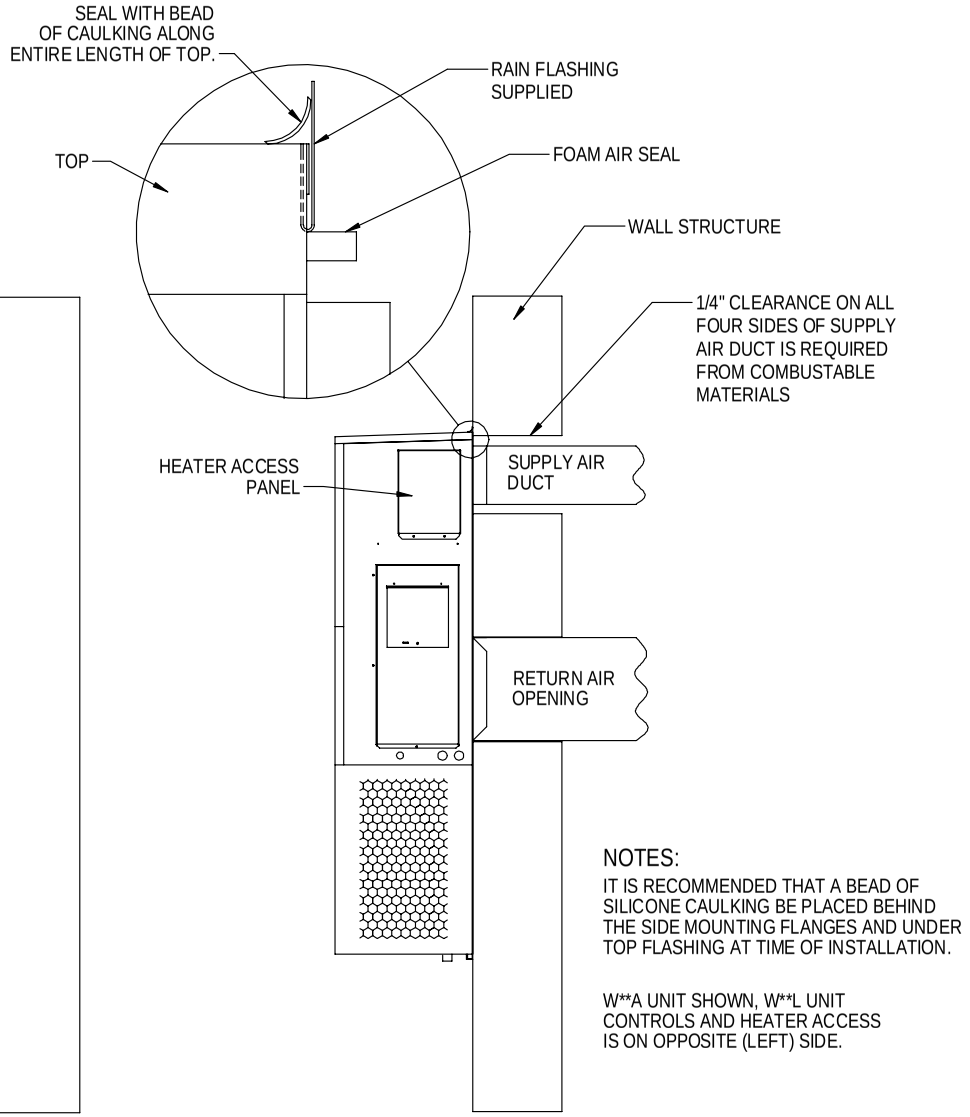
MIS-3157 A

FIGURE 4B
W30A, W30L, W36A, W36L
Mounting Instructions

	A	B	C	D	E
REQUIRED DIMENSIONS TO MAINTAIN 1/4" MIN. CLEARANCE FROM COMBUSTIBLE MATERIALS	28 3/8	8 3/8	5 3/8	3 11/16	17 5/8
REQUIRED DIMENSIONS TO MAINTAIN RECOMMENDED 1" CLEARANCE FROM COMBUSTIBLE MATERIALS	29 7/8	9 7/8	4 5/8	4 7/16	16 7/8



Wall Opening and Hole Location View



Right Side View

NOTES:

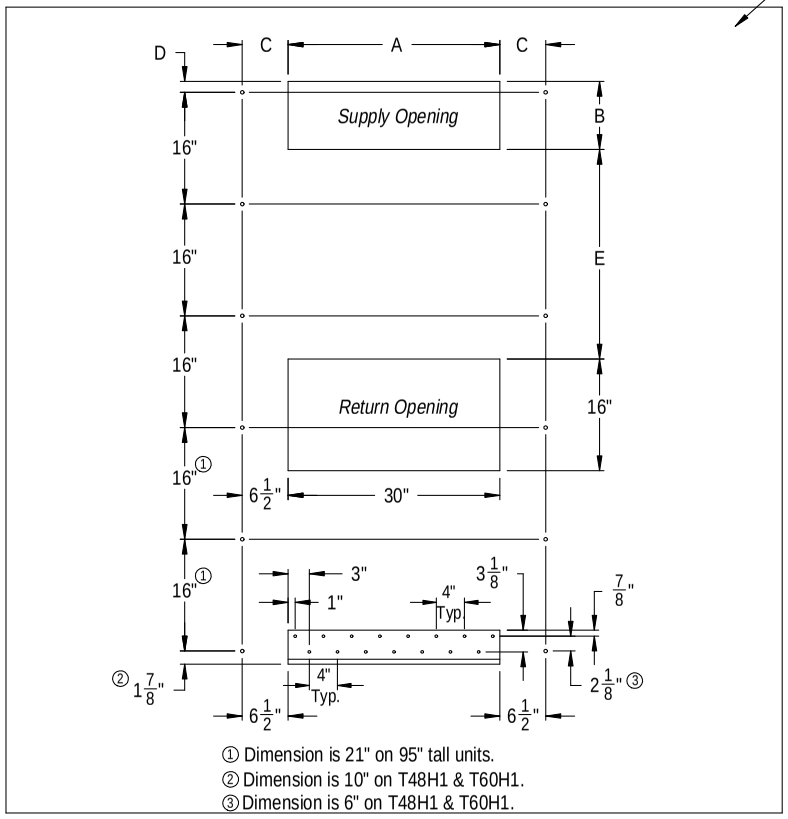
IT IS RECOMMENDED THAT A BEAD OF SILICONE CAULKING BE PLACED BEHIND THE SIDE MOUNTING FLANGES AND UNDER TOP FLASHING AT TIME OF INSTALLATION.

W**A UNIT SHOWN, W**L UNIT CONTROLS AND HEATER ACCESS IS ON OPPOSITE (LEFT) SIDE.

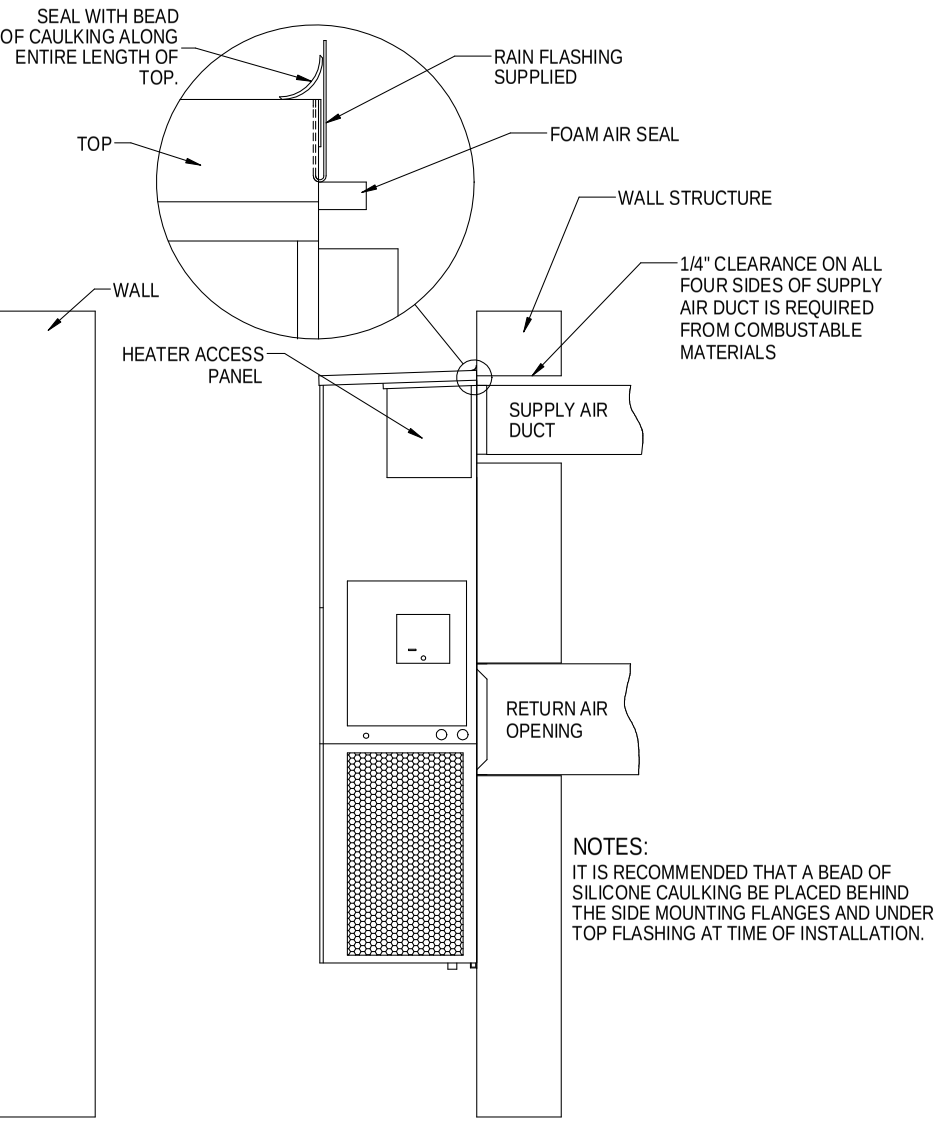
MIS-3820

FIGURE 4C
W42A, W42L, W48A, W48L
Mounting Instructions

	A	B	C	D	E
REQUIRED DIMENSIONS TO MAINTAIN 1/4" MIN. CLEARANCE FROM COMBUSTIBLE MATERIALS	30 1/2	10 1/2	6 1/4	1 1/4	29 3/4
REQUIRED DIMENSIONS TO MAINTAIN RECOMMENDED 1" CLEARANCE FROM COMBUSTIBLE MATERIALS	32	12	5 1/2	2	29



Wall Opening and Hole Location View

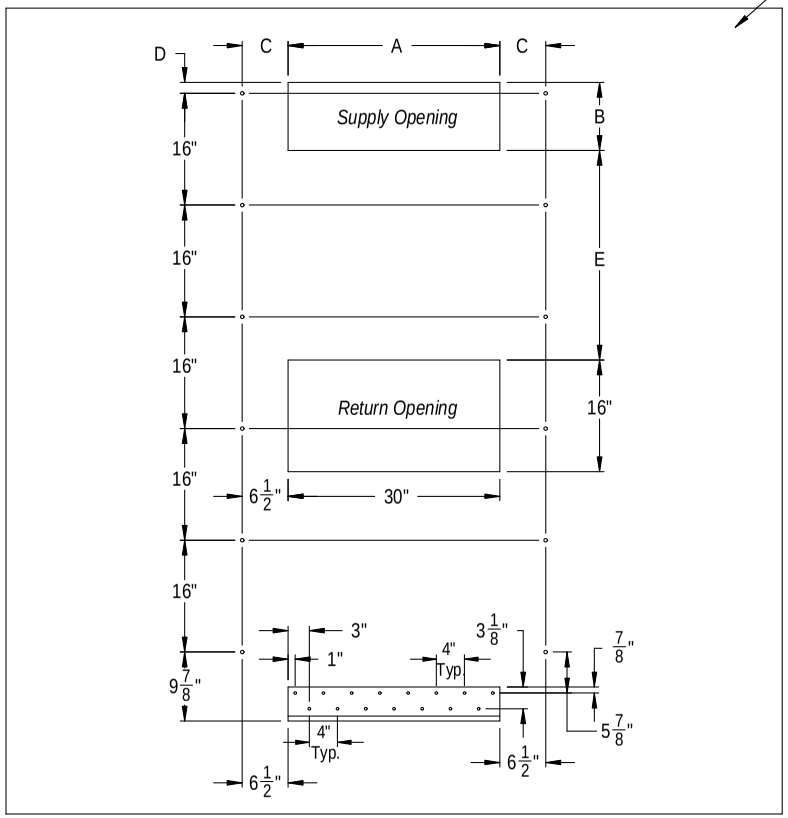


Right Side View

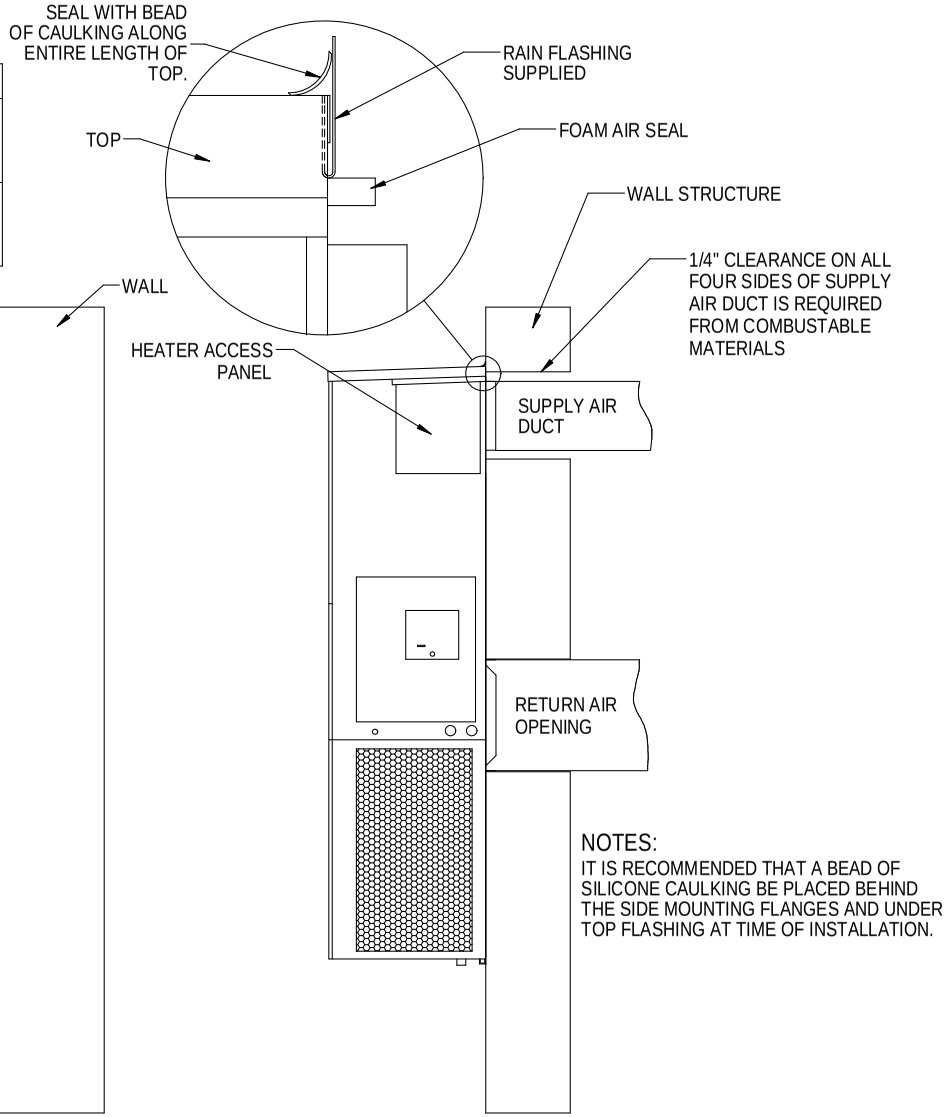
MIS-416 E

FIGURE 4D
W60A, W60L, W72A, W72L
Mounting Instructions

	A	B	C	D	E
REQUIRED DIMENSIONS TO MAINTAIN 1/4" MIN. CLEARANCE FROM COMBUSTIBLE MATERIALS	30 1/2	10 1/2	6 1/4	1 1/4	29 3/4
REQUIRED DIMENSIONS TO MAINTAIN RECOMMENDED 1" CLEARANCE FROM COMBUSTIBLE MATERIALS	32	12	5 1/2	2	29



Wall Opening and Hole Location View



Right Side View

NOTES:
IT IS RECOMMENDED THAT A BEAD OF SILICONE CAULKING BE PLACED BEHIND THE SIDE MOUNTING FLANGES AND UNDER TOP FLASHING AT TIME OF INSTALLATION.

MIS-3789

FIGURE 5
Electric Heat Clearance

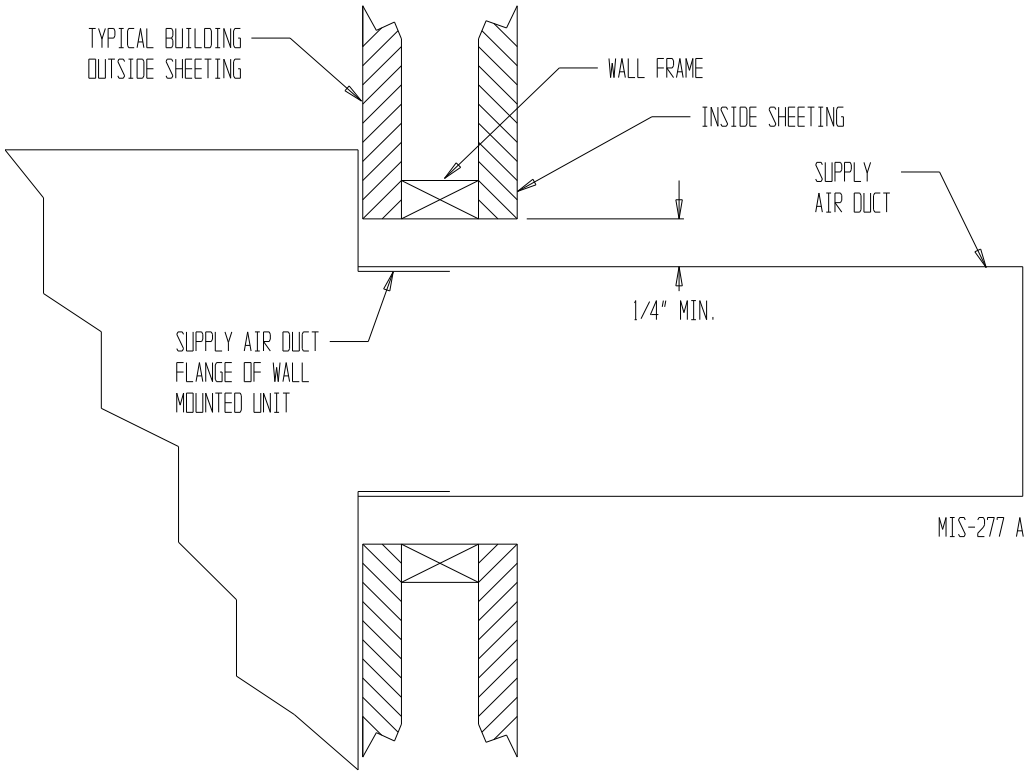
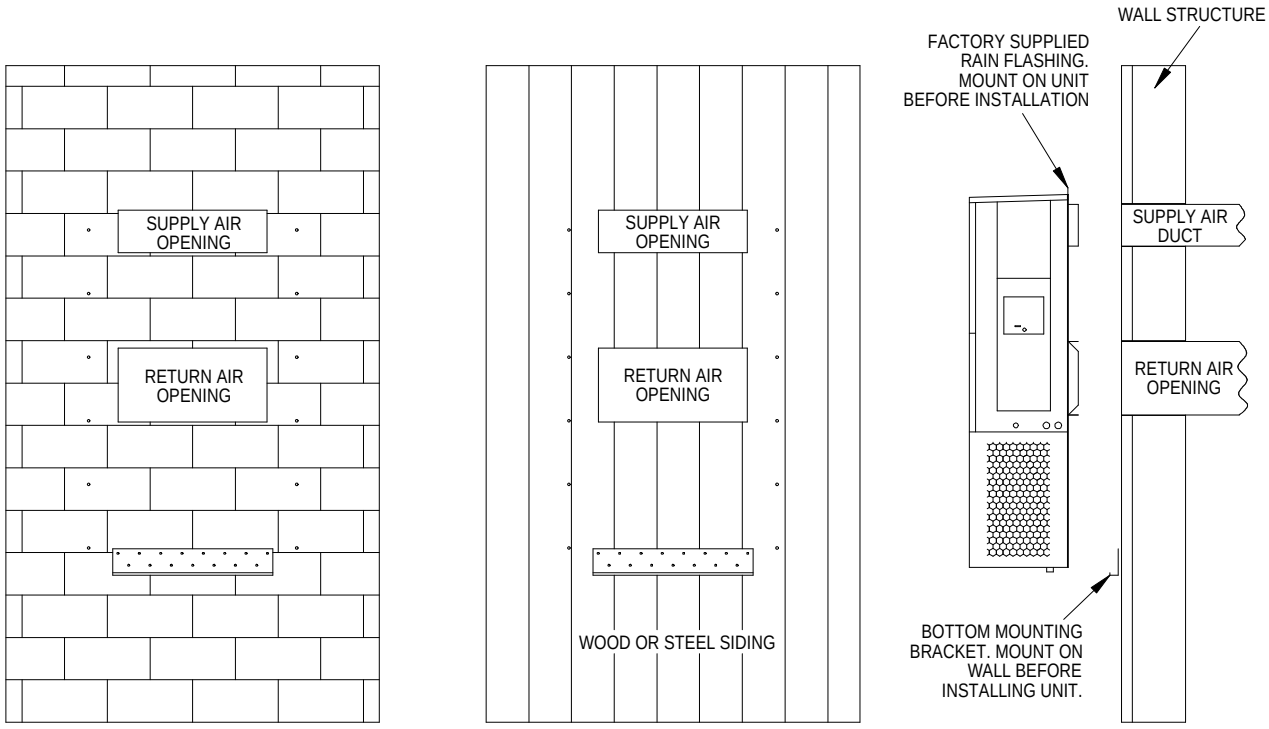


FIGURE 6
Wall Mounting Instructions



CONCRETE BLOCK WALL INSTALLATION *WOOD FRAME WALL INSTALLATION* *SIDE VIEW* MIS-548 A

FIGURE 7
Wall Mounting Instructions

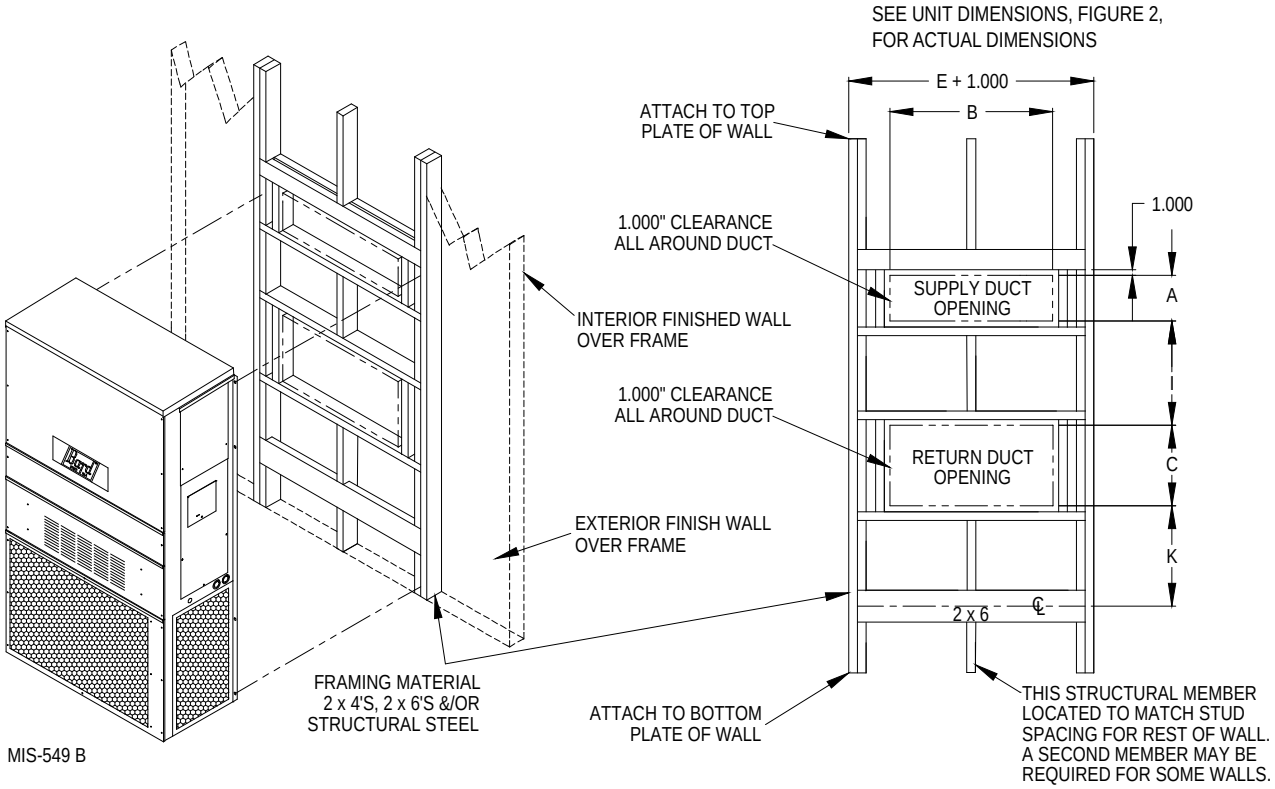
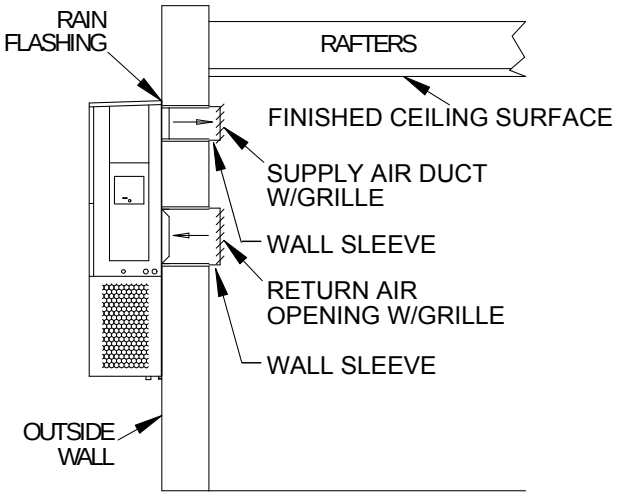
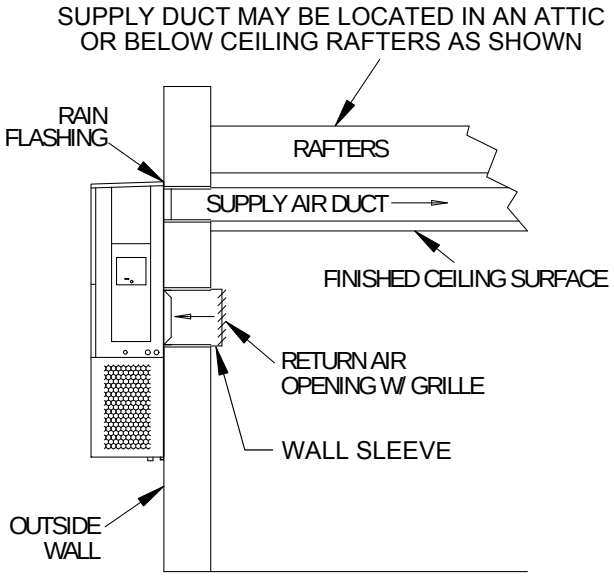


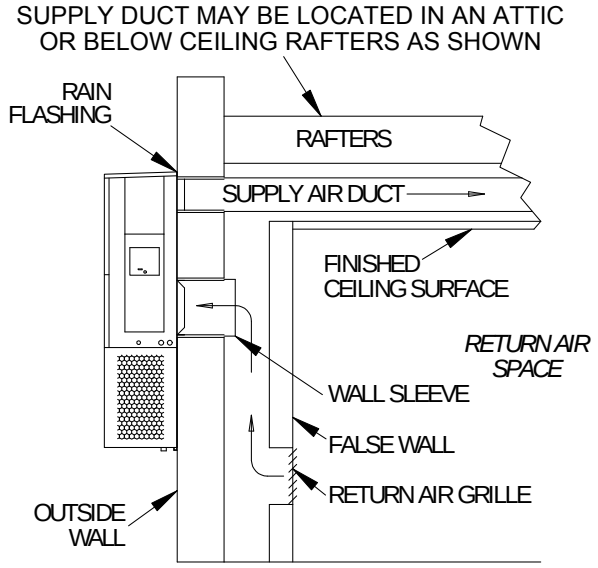
FIGURE 8
Common Wall Mounting Installations



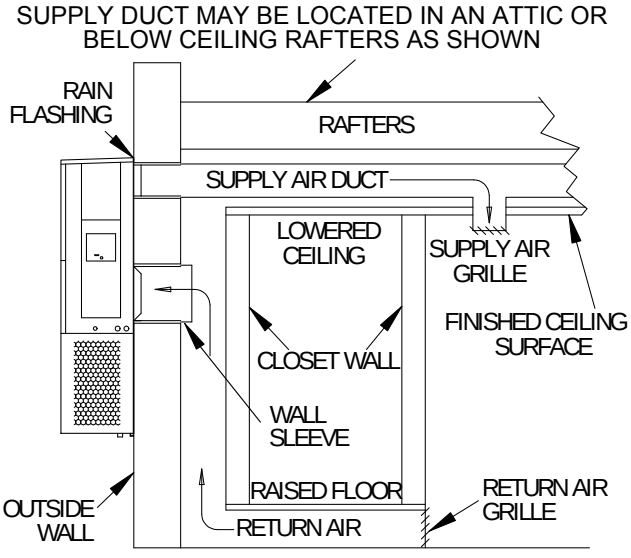
FREE AIR FLOW
NO DUCT



DUCTED SUPPLY
RETURN AT UNIT



FALSE WALL INSTALLATION



CLOSET INSTALLATION

MIS-550 C

⚠ 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 Table 1 (page 18), Table 2 (page 19) or Table 3 (page 20) 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 1, 2 and 3 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.

Route all field wires to the right of the wire shield as shown in the circuit routing label found in Figure 9 (and also on the wall-mount units).

See Figure 10 to reference VAC landing points.

The disconnect access door on this unit may be locked to prevent unauthorized access to the disconnect. To convert for the locking capability, bend the tab located in the bottom left-hand corner of the disconnect opening under the disconnect access panel straight out. This tab will now line up with the slot in the door. When shut, a padlock may be placed through the hole in the tab preventing entry.

FIGURE 9
Circuit Routing Label

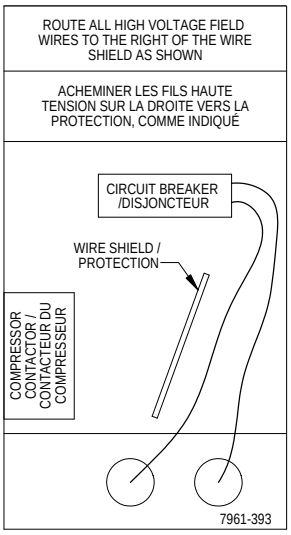
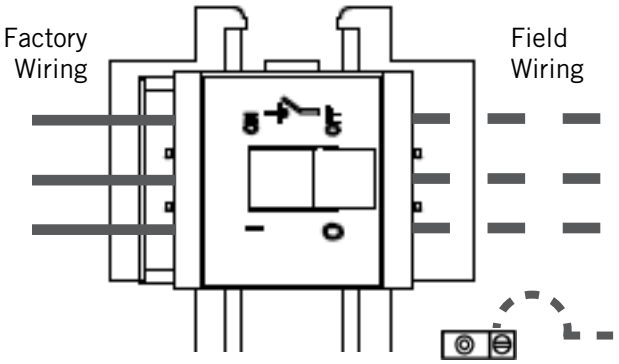


FIGURE 10
VAC Supply Wiring Landing Points



NOTE: Right-hand access model wiring landing points are shown here; left-hand access models will mirror this image.

LOW VOLTAGE WIRING

230/208V 1 phase and 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).

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.*

For low voltage wiring, an 18 gauge copper, color-coded cable is recommended.

TABLE 1

*Electrical Specifications – W**A*P Series*

MODEL	Rated Volts & Phase	No. Field Power Circuits	Single Circuit				Multiple Circuit											
			③ Minimum Circuit Ampacity	① Maximum External Fuse or Ckt. Brkr.	② Field Power Wire Size	② Ground Wire	③ Minimum Circuit Ampacity			① Maximum External Fuse or Ckt. Breaker			② Field Power Wire Size			② Ground Wire Size		
							Ckt. A	Ckt. B	Ckt. C	Ckt. A	Ckt. B	Ckt. C	Ckt. A	Ckt. B	Ckt. C	Ckt. A	Ckt. B	Ckt. C
W18AAPA00, A0Z	230/208-1	1	16	20	12	12												
A05		1	30	30	10	10												
A08		1	46	50	8	10												
A10		1	56	60	6	10												
W24AAPA00, A0Z	230/208-1	1	21	30	10	10												
A04		1	25	30	10	10												
A05		1	30	30	10	10												
A08		1	46	50	8	10												
A10		1	56	60	6	10												
W24AAPB00, B0Z	230/208-3	1	15	20	12	12												
B06		1	22	25	10	10												
W24AAPC00, C0Z	460-3	1	9	15	14	14												
C06		1	11	15	14	14												
W30AAPA00, A0Z	230/208-1	1	26	35	8	10												
A05		1	32	35	8	10												
A08		1	47	50	8	10												
A10		1	58	60	6	10												
A15		1 or 2	84	90	4	8	58	26		60	30		6	10		10	10	
W30AAPB00, B0Z	230/208-3	1	19	20	12	12												
B06		1	24	25	10	10												
B09		1	33	35	8	10												
B15		1	51	60	6	10												
W30AAPC00, C0Z	460-3	1	9	15	14	14												
C06		1	12	15	14	14												
C09		1	17	20	12	12												
C12		1	21	25	10	10												
C15		1	26	30	10	10												
W36AAPA00, A0Z	230/208-1	1	29	35	8	10												
A05		1	32	35	8	10												
A08		1	47	50	8	10												
A10		1	58	60	6	10												
A15		1 or 2	84	90	4	8	58	26		60	30		6	10		10	10	
W36AAPB00, B0Z	230/208-3	1	23	30	10	10												
B06		1	24	30	10	10												
B09		1	33	35	8	10												
B15		1	51	60	6	10												
W36AAPC00, C0Z	460-3	1	11	15	14	14												
C06		1	12	15	14	14												
C09		1	17	20	12	12												
C12		1	21	25	10	10												
C15		1	26	30	10	10												
W42AAPA00, A0Z	230/208-1	1	32	50	8	10												
A05		1	32	50	8	10												
A10		1	58	60	6	10												
A15		1 or 2	84	90	4	8	58	26		60	30		6	10		10	10	
A20		1 or 2	110	125	2	6	58	52		60	60		6	6		10	10	
W42AAPB00, B0Z	230/208-3	1	25	35	8	10												
B06		1	25	35	8	10												
B09		1	33	35	8	10												
B15		1	51	60	6	10												
B18		1	60	60	6	10												
W42AAPC00, C0Z	460-3	1	12	15	14	14												
C09		1	17	20	12	12												
C15		1	26	30	10	10												
W48AAPA00, A0Z	230/208-1	1	34	50	8	10												
A05		1	34	50	8	10												
A10		1	58	60	6	10												
A15		1 or 2	84	90	4	8	58	26		60	30		6	10		10	10	
A20		1 or 2	110	125	2	6	58	52		60	60		6	6		10	10	
W48AAPB00, B0Z	230/208-3	1	26	35	8	10												
B06		1	26	35	8	10												
B09		1	33	35	8	10												
B15		1	51	60	6	10												
B18		1	60	60	6	10												
W48AAPC00, C0Z	460-3	1	12	15	14	14												
C09		1	17	20	12	12												
C15		1	26	30	10	10												
W48AAPQ00, Q0Z	575-3	1	12	15	14	14												
Q15		1	24	25	10	10												
W60AAPA00, A0Z	230/208-1	1	38	60	8	10												
A05		1	38	60	8	10												
A10		1	60	60	6	10												
A15		1 or 2	86	90	3	8	60	26		60	30		6	10		10	10	
A20		1 or 2	112	125	2	6	60	52		60	60		6	6		10	10	
W60AAPB00, B0Z	230/208-3	1	27	40	8	10												
B06		1	27	40	8	10												
B09		1	35	40	8	10												
B15		1	53	60	6	10												
B18		2	N/A	N/A	N/A	N/A	35	28		40	30		8	10		10	10	
W60AAPC00, C0Z	460-3	1	14	20	12	12												
C09		1	18	20	12	12												
C15		1	27	30	10	10												
W60AAPQ00, Q0Z	575-3	1	13	20	12	12												
Q15		1	24	25	12	12												
W72ABPA00, A0Z	230/208-1	1	58	60	6	10												
A05		1	58	60	6	10												
A10		1 or 2	62	70	6	8	58	26		60	30		6	10		10	10	
A15		1 or 2	88	90	3	8	58	52		60	60		6	6		10	10	
A20		1 or 3	114	125	2	6	58	52	52	60	60	60	6	6	6	10	10	10
W72ABPB00, B0Z	230/208-3	1	40	60	8	10												
B06		1	40	60	8	10												
B09		1	40	60	8	10												
B15		1	55	60	6	10												
B18		2	N/A	N/A	N/A	N/A	40	28		60	30		8	10		10	10	
W72ABPC00, C0Z	460-3	1	18	25	10	10												
C09		1	18	25	10	10												
C15		1	27	30	10	10												
W72ABPQ00, Q0Z	575-3	1	14	20	12	12												
Q15		1	24	25	10	10												

See footnotes under TABLE 2

TABLE 2

*Electrical Specifications – W**L*P Series*

MODEL	Rated Volts & Phase	No. Field Power Circuits	Single Circuit				Dual Circuit							
			③ Minimum Circuit Ampacity	① Maximum External Fuse or Ckt. Brkr.	② Field Power Wire Size	② Ground Wire	③ Minimum Circuit Ampacity		① Maximum External Fuse or Ckt. Breaker		② Field Power Wire Size		② Ground Wire Size	
							Ckt. A	Ckt. B	Ckt. A	Ckt. B	Ckt. A	Ckt. B	Ckt. A	Ckt. B
W18LAPA00,A0Z	230/208-1	1	16	20	12	12								
A05		1	30	30	10	10								
A08		1	46	50	8	10								
A10		1	56	60	6	10								
W24LAPA00, A0Z	230/208-1	1	21	30	10	10								
A05		1	30	30	10	10								
A08		1	46	50	8	10								
A10		1	56	60	6	10								
W24LAPB00, B0Z	230/208-3	1	15	20	12	12								
B06		1	22	25	10	10								
W24LAPC00, C0Z	460-3	1	9	15	14	14								
C06		1	11	15	14	14								
W30LAPA00, A0Z	230/208-1	1	26	35	8	10								
A05		1	32	35	8	10								
A08		1	47	50	8	10								
A10		1	58	60	6	10								
A15		1 or 2	84	90	4	8	58	26	60	30	6	10	10	10
W30LAPB00, B0Z	230/208-3	1	19	20	12	12								
B09		1	33	35	8	10								
B15		1	51	60	6	10								
W30LAPC00, C0Z	460-3	1	9	15	14	14								
C09		1	17	20	12	12								
C15		1	26	30	10	10								
W36LAPA00, A0Z	230/208-1	1	29	35	8	10								
A05		1	32	35	8	10								
A10		1	58	60	6	10								
A15		1 or 2	84	90	4	8	58	26	60	30	6	10	10	10
W36LAPB00, B0Z	230/208-3	1	23	30	10	10								
B09		1	33	35	8	10								
B15		1	51	60	6	10								
W36LAPC00, C0Z	460-3	1	11	15	14	14								
C09		1	17	20	12	12								
C15		1	26	30	10	10								
W42LAPA00, A0Z	230/208-1	1	32	50	8	10								
A05		1	32	50	8	10								
A10		1	58	60	6	10								
A15		1 or 2	84	90	4	8	58	26	60	30	6	10	10	10
W42LAPB00, B0Z	230/208-3	1	25	35	8	10								
B06		1	25	35	8	10								
B09		1	33	35	8	10								
B15		1	51	60	6	10								
W42LAPC00, C0Z	460-3	1	12	15	14	14								
C09		1	17	20	12	12								
C15		1	26	30	10	10								
W48LAPA00, A0Z	230/208-1	1	34	50	8	10								
A05		1	34	50	8	10								
A10		1	58	60	6	10								
A15		1 or 2	84	90	4	8	58	26	60	30	6	10	10	10
W48LAPB00, B0Z	230/208-3	1	26	35	8	10								
B06		1	26	35	8	10								
B09		1	33	35	8	10								
B15		1	51	60	6	10								
W48LAPC00, C0Z	460-3	1	12	15	14	14								
C09		1	17	20	12	12								
C15		1	26	30	10	10								
W48LAPQ00, Q0Z	575-3	1	12	15	14	14								
Q15		1	24	25	10	10								
W60LAPA00, A0Z	230/208-1	1	38	60	8	10								
A05		1	38	60	8	10								
A10		1	60	60	6	10								
A15		1 or 2	86	90	3	8	60	26	60	30	6	10	10	10
W60LAPB00, B0Z	230/208-3	1	27	40	8	10								
B06		1	27	40	8	10								
B09		1	35	40	8	10								
B15		1	53	60	6	10								
W60LAPC00, C0Z	460-3	1	14	20	12	12								
C09		1	18	20	12	12								
C15		1	27	30	10	10								
W60LAPQ00, Q0Z	575-3	1	13	20	12	12								
Q15		1	24	25	12	12								
W72LBPA00, A0Z	230/208-1	1	58	60	6	10								
A05		1	58	60	6	10								
A10		1 or 2	62	70	6	8	58	26	60	30	6	10	10	10
A15		1 or 2	88	90	3	8	58	52	60	60	6	6	10	10
W72LBPB00, B0Z	230/208-3	1	40	60	8	10								
B06		1	40	60	8	10								
B09		1	40	60	8	10								
B15		1	55	60	6	10								
W72LBPC00, C0Z	460-3	1	18	25	10	10								
C09		1	18	25	10	10								
C15		1	27	30	10	10								
W72LBPQ00, Q0Z	575-3	1	14	20	12	12								
Q15		1	24	25	10	10								

① Maximum size of the time delay fuse or circuit breaker for protection of field wiring conductors.
② Based on 75°C copper wire. All wiring must conform to the National Electrical Code and all local codes.
③ 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 current carrying conductors are in a raceway.

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 3

*Electrical Specifications – W**A*E 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. C	Ckt. A	Ckt. B	Ckt. C	Ckt. A	Ckt. B	Ckt. C	Ckt. A	Ckt. B	Ckt. C
W36AAEA15	230/208-1	1 or 2	104	110	2	6	52	52		60	60		6	6		10	10	
W36AAEB15	230/208-3	1 or 2	66	70	4	8	21	48		30	50		10	8		10	10	
W36AAEC15	460-3	1	34	35	8	10												
W48AAEA15	230/208-1	1 or 2	110	110	2	6	58	52		60	60		6	6		10	10	
W48AAEB15	230/208-3	1 or 2	69	70	4	8	24	49		30	50		10	8		10	10	
W48AAEC15	460-3	1	34	35	8	10												
W60AAEA15	230/208-1	1 or 3	114	120	2	6	36	52	52	40	60	60	8	6	6	10	10	10
W60AAEB15	230/208-3	1 or 2	72	80	4	8	26	50		30	50		10	8		10	10	
W60AAEC15	460-3	1	36	40	8	10												
W72ABEA15	230/208-1	1 or 3	134	140	1/0	6	58	52	26	60	60	30	6	6	10	10	10	10
W72ABEB15	230/208-3	1 or 2	83	90	4	8	38	52		40	60		8	6		10	10	
W72ABEC15	460-3	1	40	45	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.

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

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

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.

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.

Running in Stand Orphan Mode

With the AC breakers turned on, each MULTI-TEC wall-mount unit has the capability to run without the LC6000 controller or th-TUNE 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 11).
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.

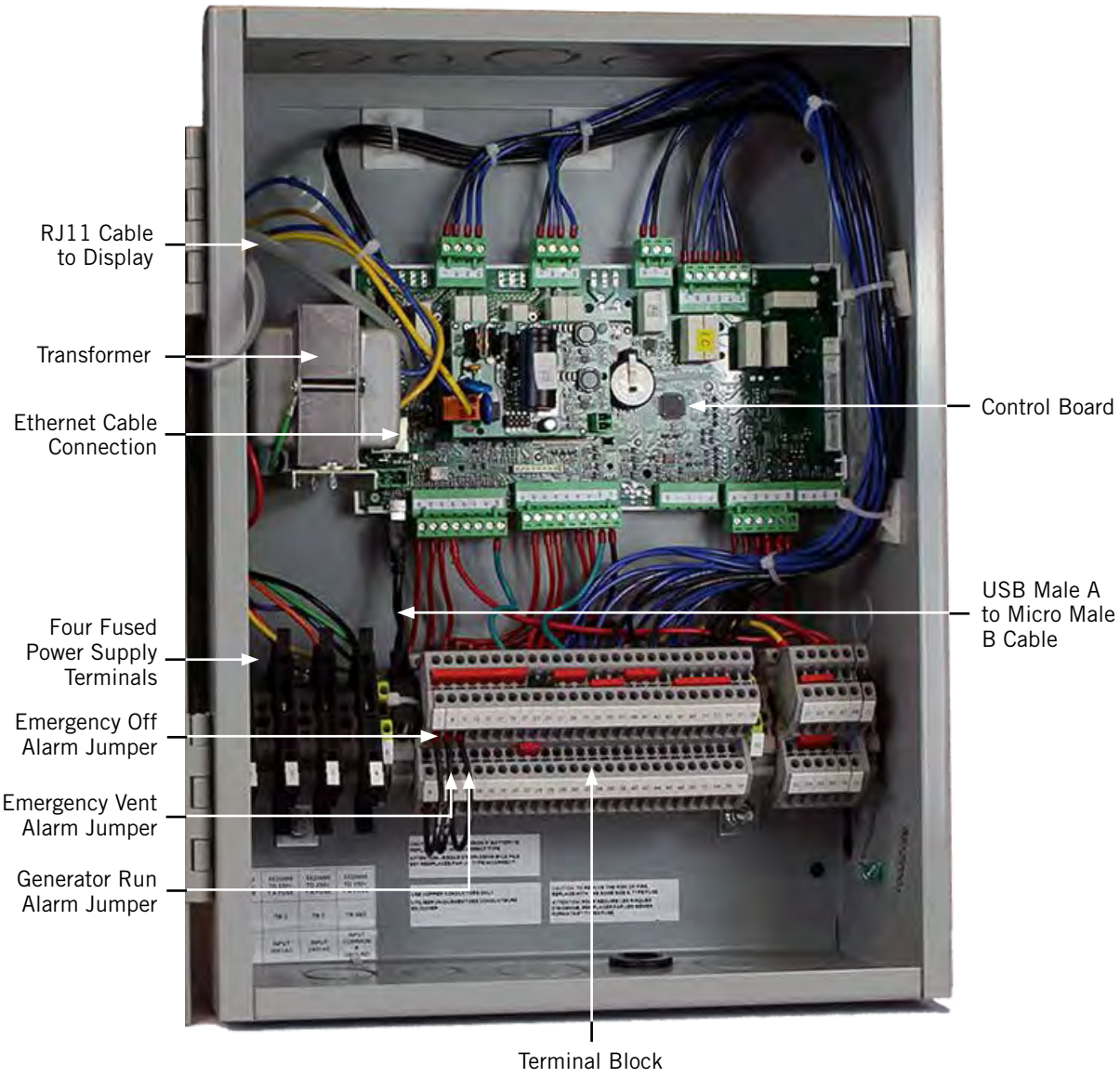
FIGURE 11
Cooling and Heating Setpoints

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 MULTI-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 MULTI-TEC wall-mount units and LC6000 controller are installed.

Additionally, should any or all of the MULTI-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.

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

FIGURE 12
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 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.

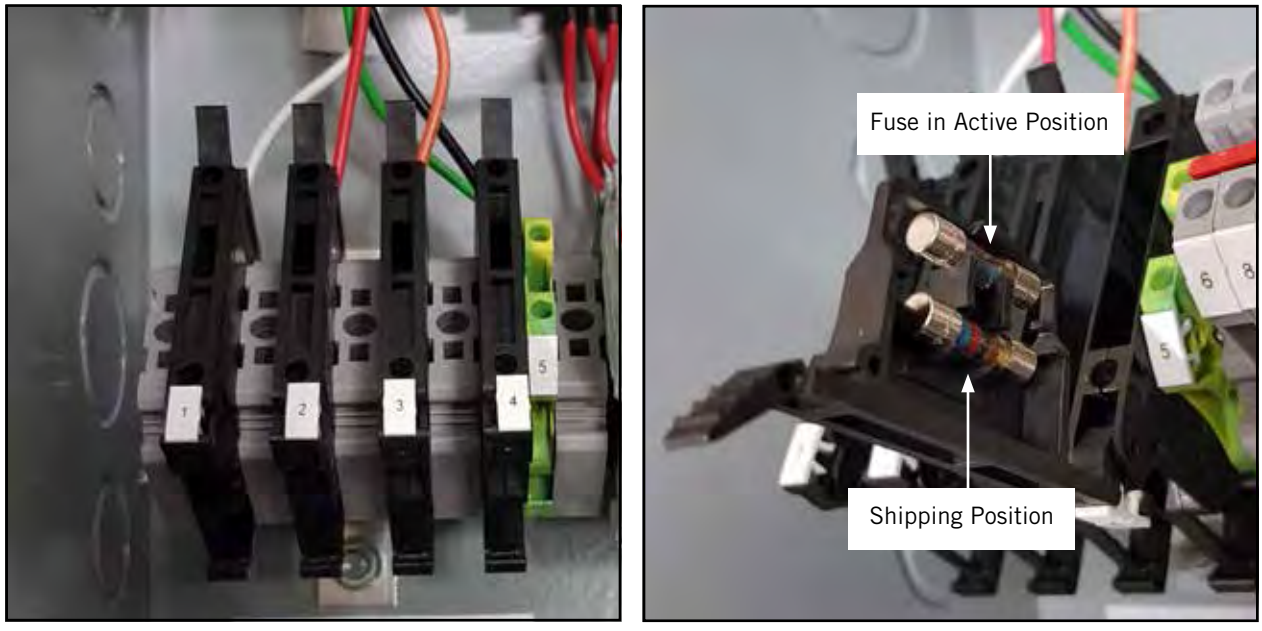
Mounting the LC6000 Controller

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 13.

FIGURE 13
LC6000 Fused Power Supply Terminal



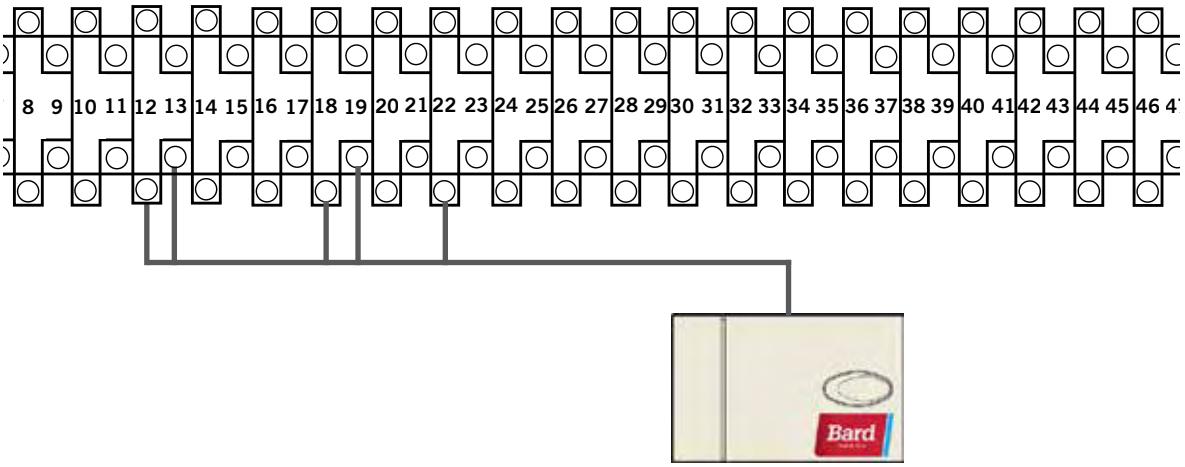
Installing Remote Indoor Temperature/Humidity Sensor(s)

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 should be installed on a 2" x 4" junction box to allow for control wire conduit. Use shielded cable to connect to controller.

FIGURE 14
Remote Indoor Temperature/Humidity Sensor Installation

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

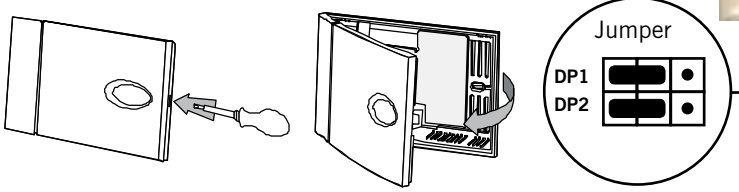
TB#	Wire Mark	Sensor	Description
18	B6	NTC OUT	Indoor Remote Sensor (Zone 1)
19	GND	NTC OUT	Ground
12	B2	OUT H	Remote Indoor Humidity Sensor: 0-1 VDC (Zone 1)
13	GND	M (GO)	Ground
22	+VDC	+ (G)	Power for B2



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 left position (DP1 and DP2 set to OFF). **This applies to all temperature/humidity sensors connected to the LC controller.**

   Sensor is best mounted on a junction box, and it is recommended that the cable be in conduit.



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 24. 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 39).

FIGURE 15
Additional Remote 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.**

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 14*

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 14*

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.

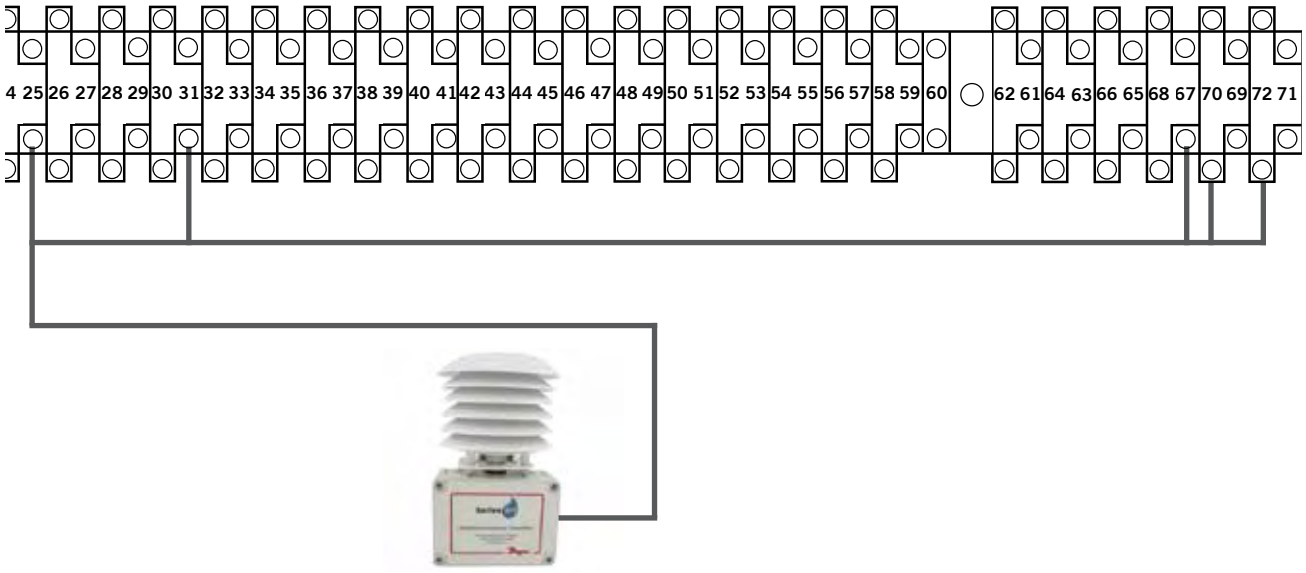
Installing Optional Outdoor Temperature/Humidity Sensor

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.

FIGURE 16
Remote Outside 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

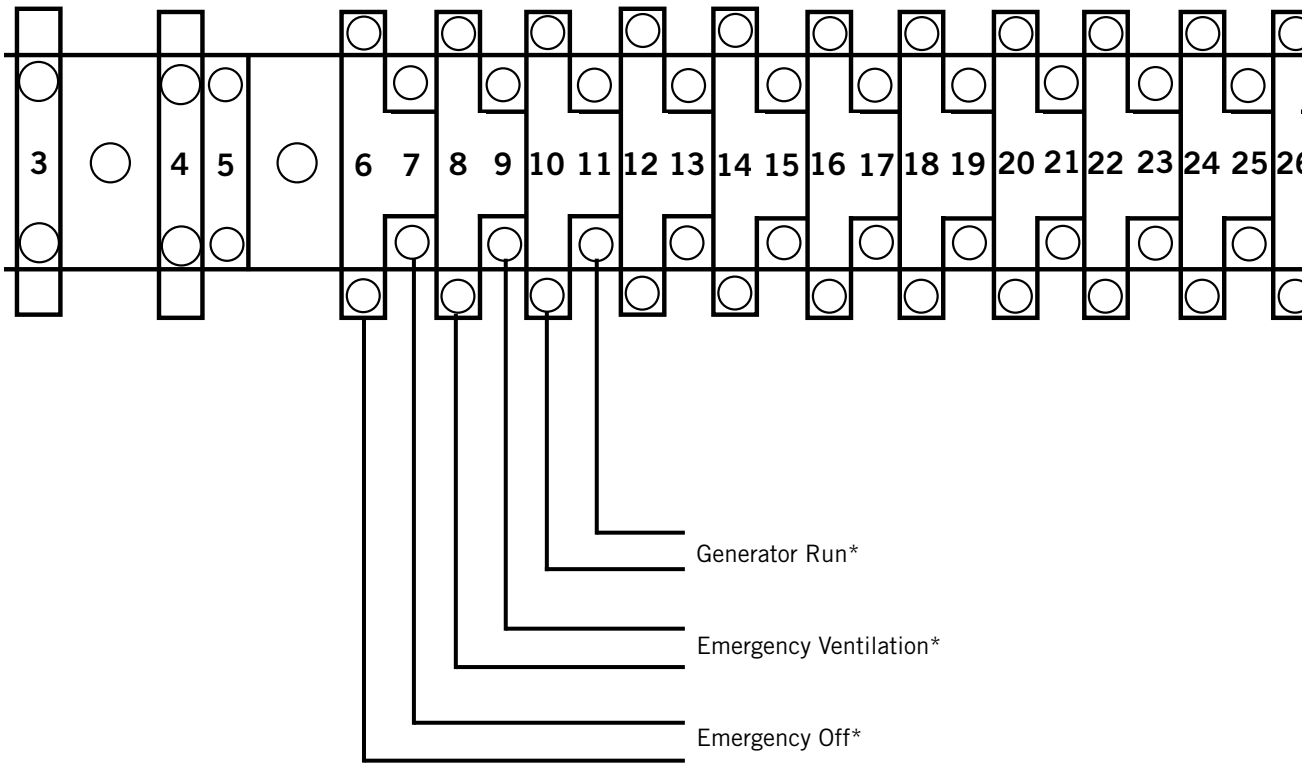


2. Connect the other end of the shielded cable to the sensor terminals. Be sure wires are connected to proper terminals as shown in table above.

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 17
LC6000-200 Series Connection for Emergency Off, Emergency Ventilation and Generator Run (If Applicable)



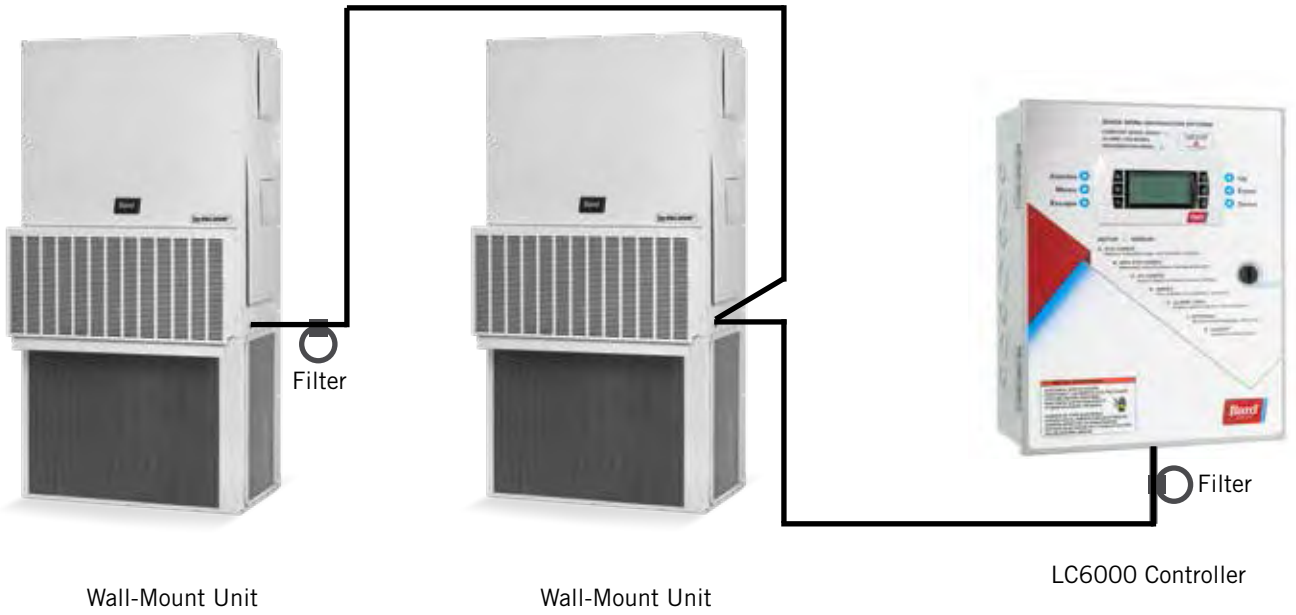
* Normally closed (NC) contacts required.

By default:
Closed = No Alarm
Open = Alarm

Communication Wiring

Connect the communication wiring from the wall-mount units to the controller in the manner shown in Figures 18, 19 or 20. **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 22 and 23 on pages 31 and 32). Attach communication wire filters as shown in Figures 18, 19 or 20. **Do not run communication wiring in same conduit as supply wiring. Route communication wiring and power supply wiring in their own separate conduits.**

FIGURE 18
Communication Wiring (Daisy Chain Method)



In addition to the "daisy chain" method of connecting the communication wiring shown in Figure 18, the wall-mount units can also be connected in the manner shown in Figure 19. If connecting wall-units this way, be sure to place the communication wire filters in the positions shown in Figure 19. See Figure 20 for more information on the correct placement of the communication wire filters depending on the wiring method used.

FIGURE 19
Communication Wiring (Alternate Method)

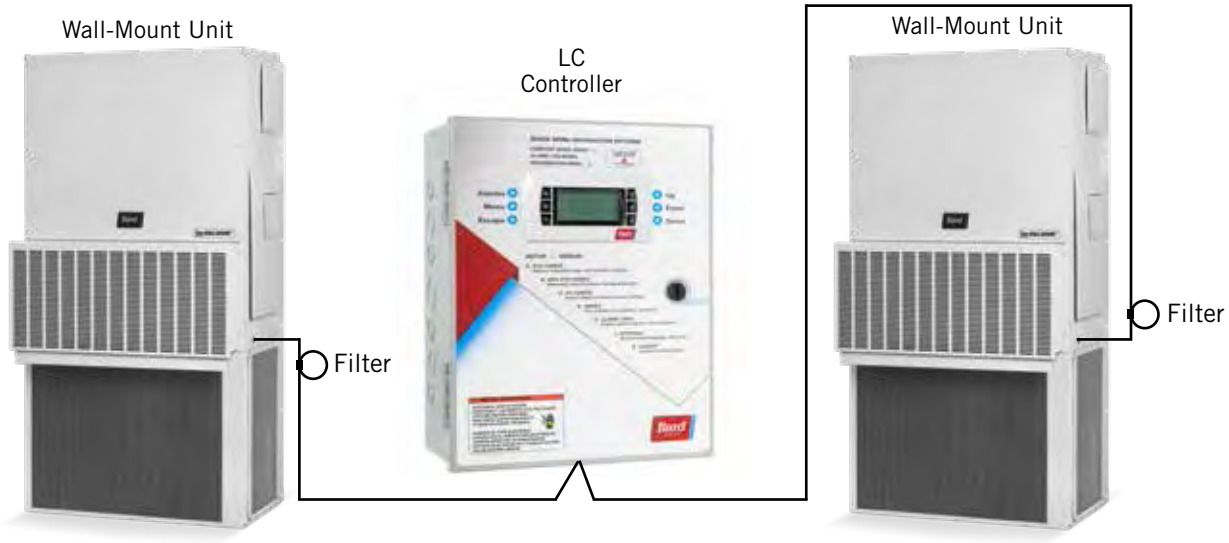
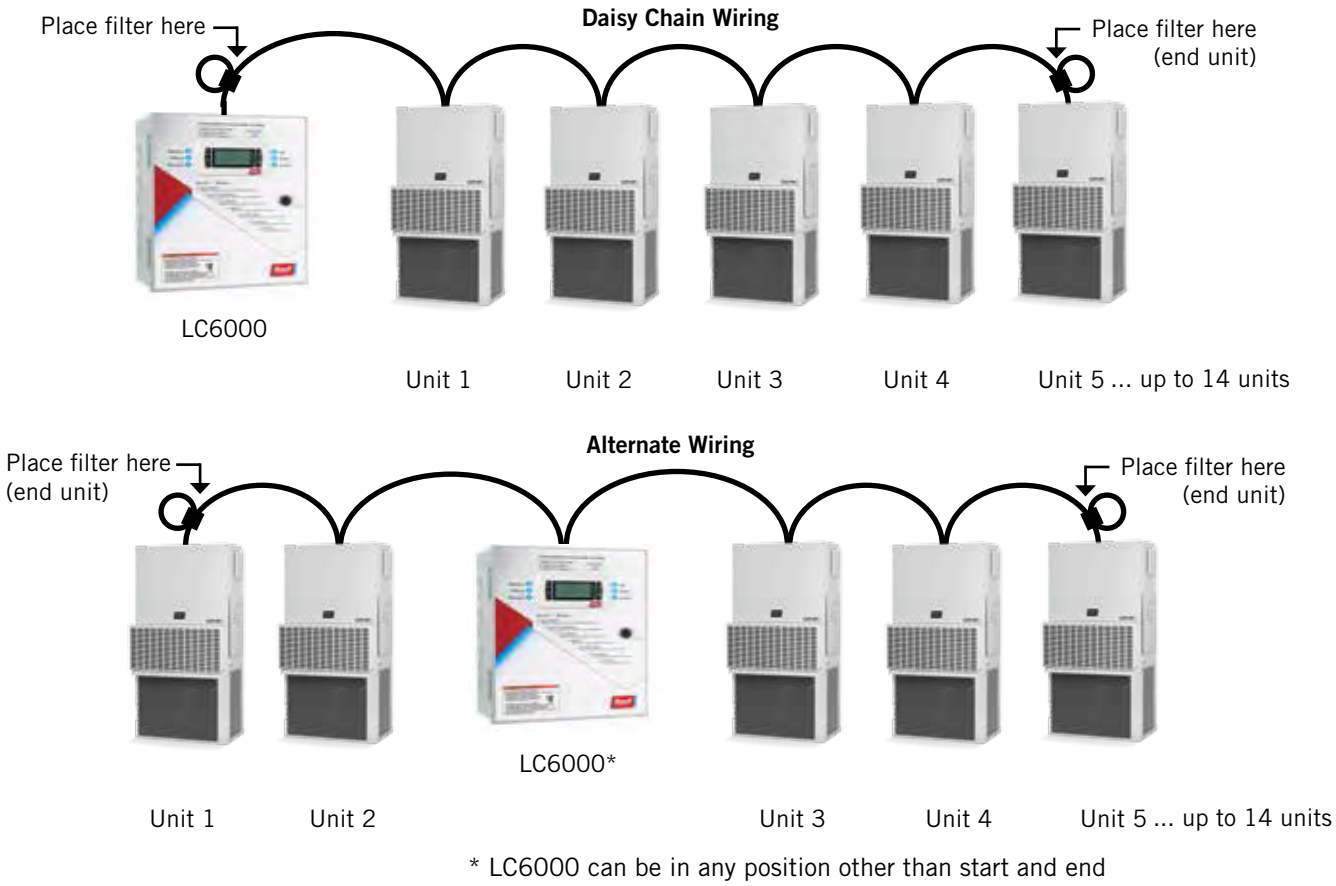


FIGURE 20
Placement of Communication Wire Filters (Daisy Chain and Alternate Methods)



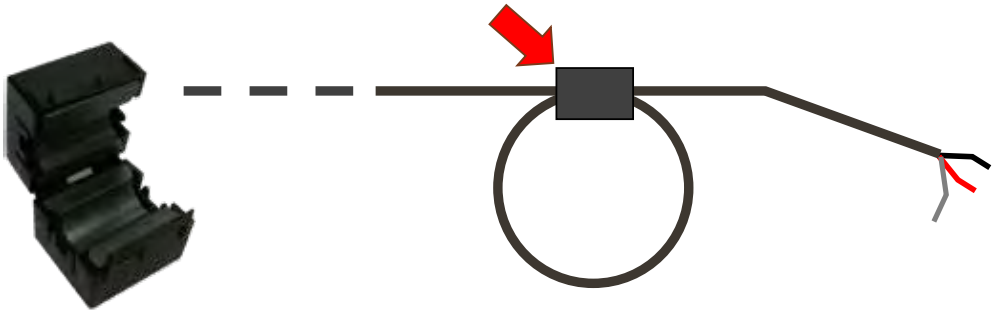
* LC6000 can be in any position other than start and end

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 communication wiring using the daisy chain method shown in Figure 18. If using the alternate method (as shown in Figure 19), 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 20.

FIGURE 21
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.

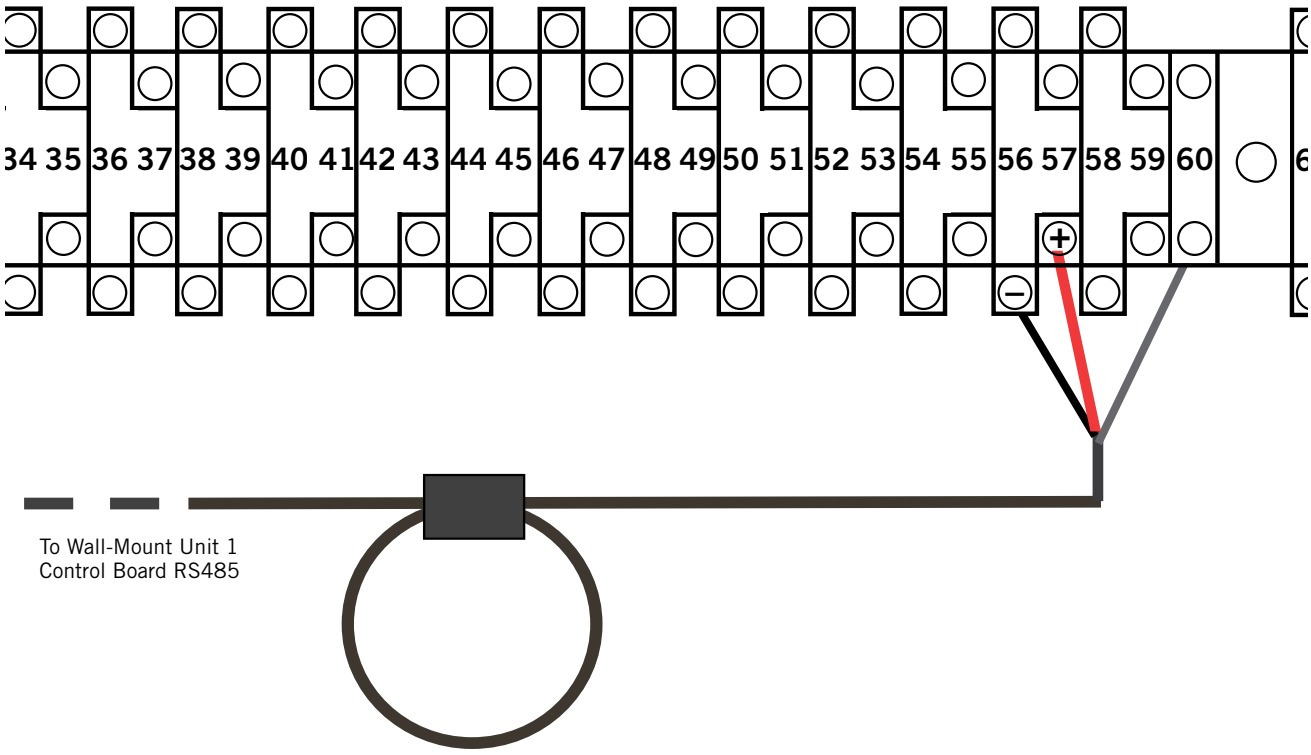
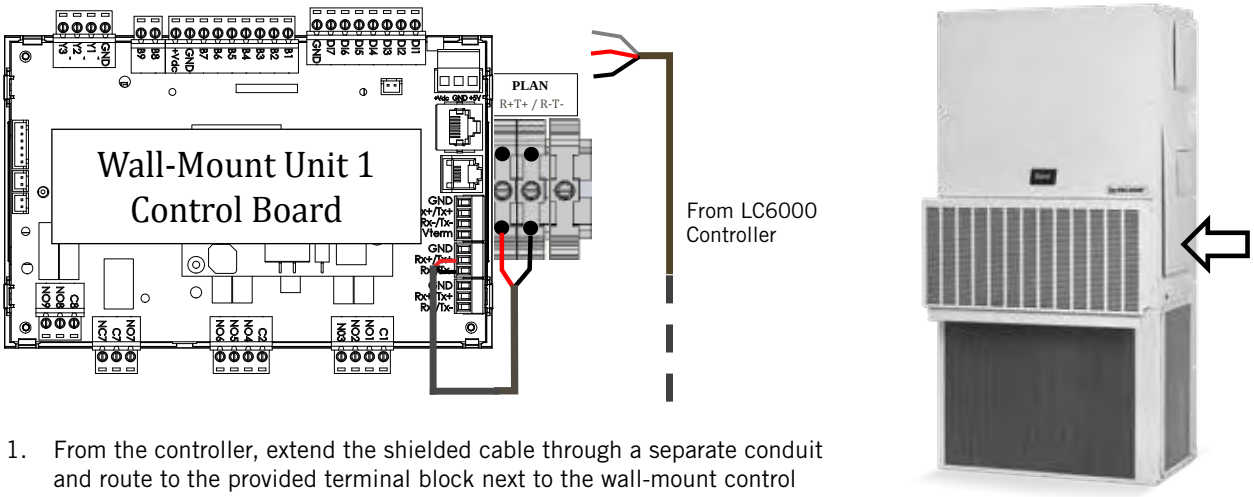
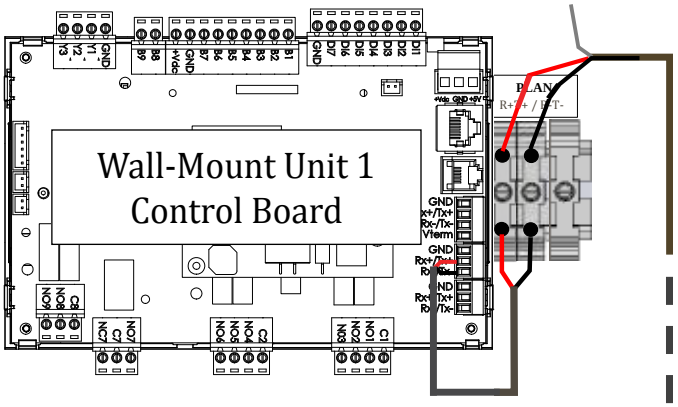


FIGURE 22
Communication Wiring: Termination at the First Wall-Mount Unit

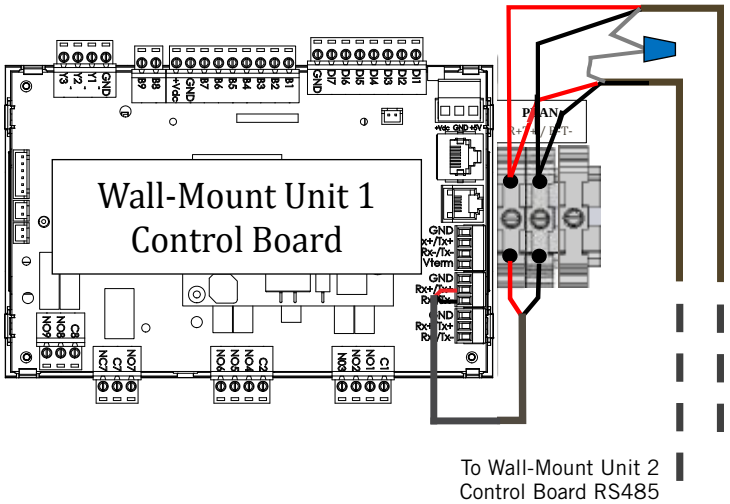


1. From the controller, extend the shielded cable through a separate conduit and route to the provided terminal block next to the wall-mount control board.

   Note that the terminal block label is clearly marked “+” and “-”. These connections are polarity-sensitive. Two-wire communication from control board is prewired to terminal block. Make sure to match "+" and "-" symbols on controller terminal blocks.

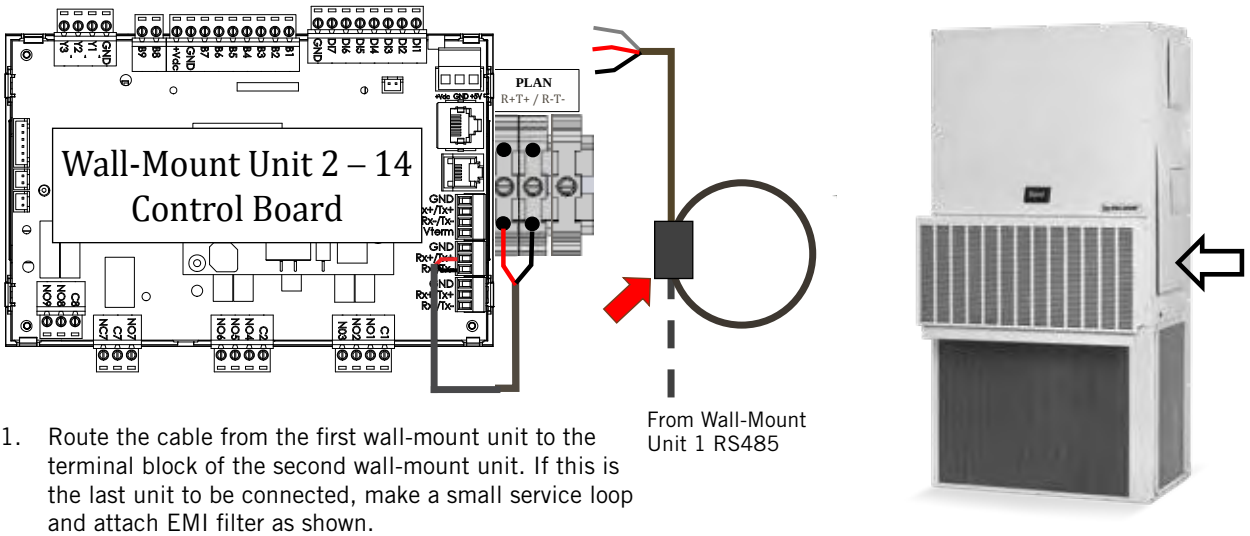


2. Connect the wires matching the terminal designations (+/-) of the controller terminals. Leave the drain wire loose.

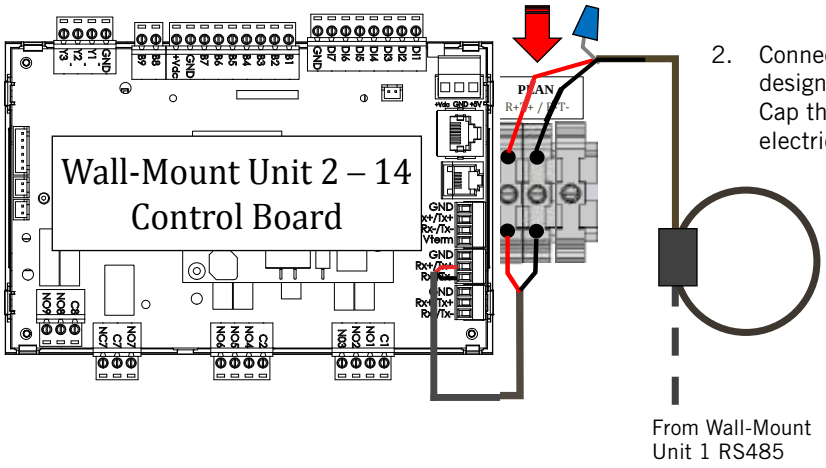


3. Connect another cable in a similar fashion (“daisy chain”) to route in conduit to the second wall-mount unit. Connect both drain wires with wire nut. Maximum two wires per terminal.

FIGURE 23
Communication Wiring: Termination at Additional Wall-Mount Units



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 (+/-) of the controller terminals. 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.

Supply Wiring

The LC6000 controller is powered by 120, 208 or 240 volts from the shelter. Field-supplied supply wiring should be minimum 16 gauge, maximum 14 gauge (see Figure 24). 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 25. **Failing to ground the controller box properly could result in damage to the equipment.**

FIGURE 24
LC6000 Controller Circuit Install

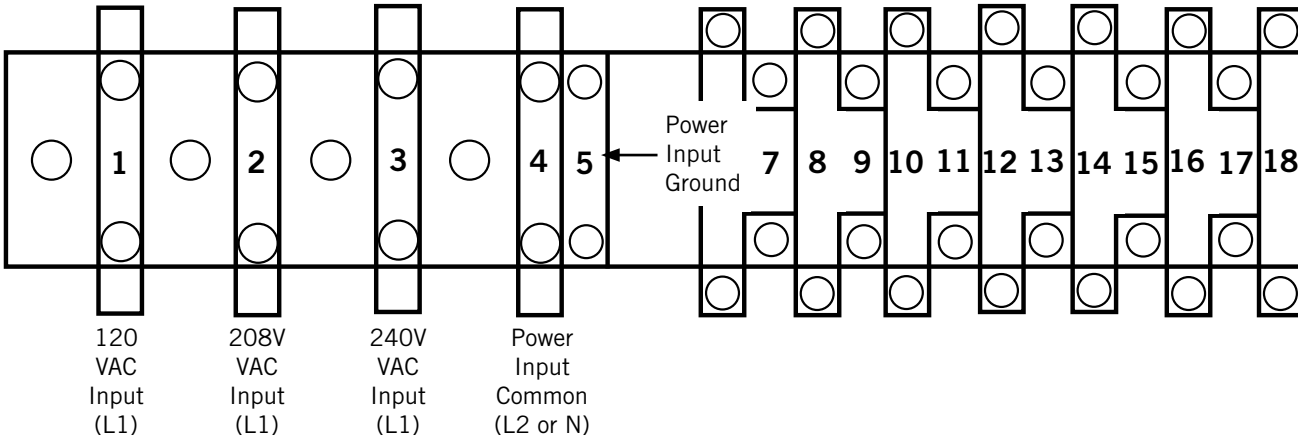
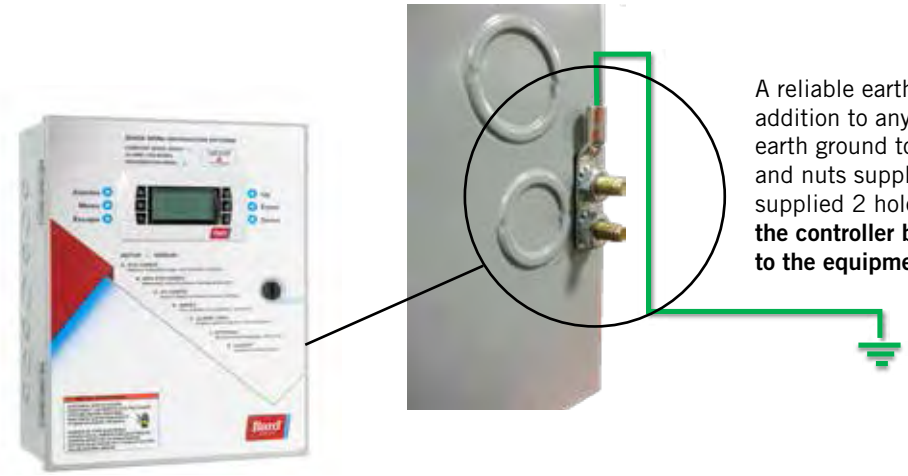


FIGURE 25
Controller Grounding Posts



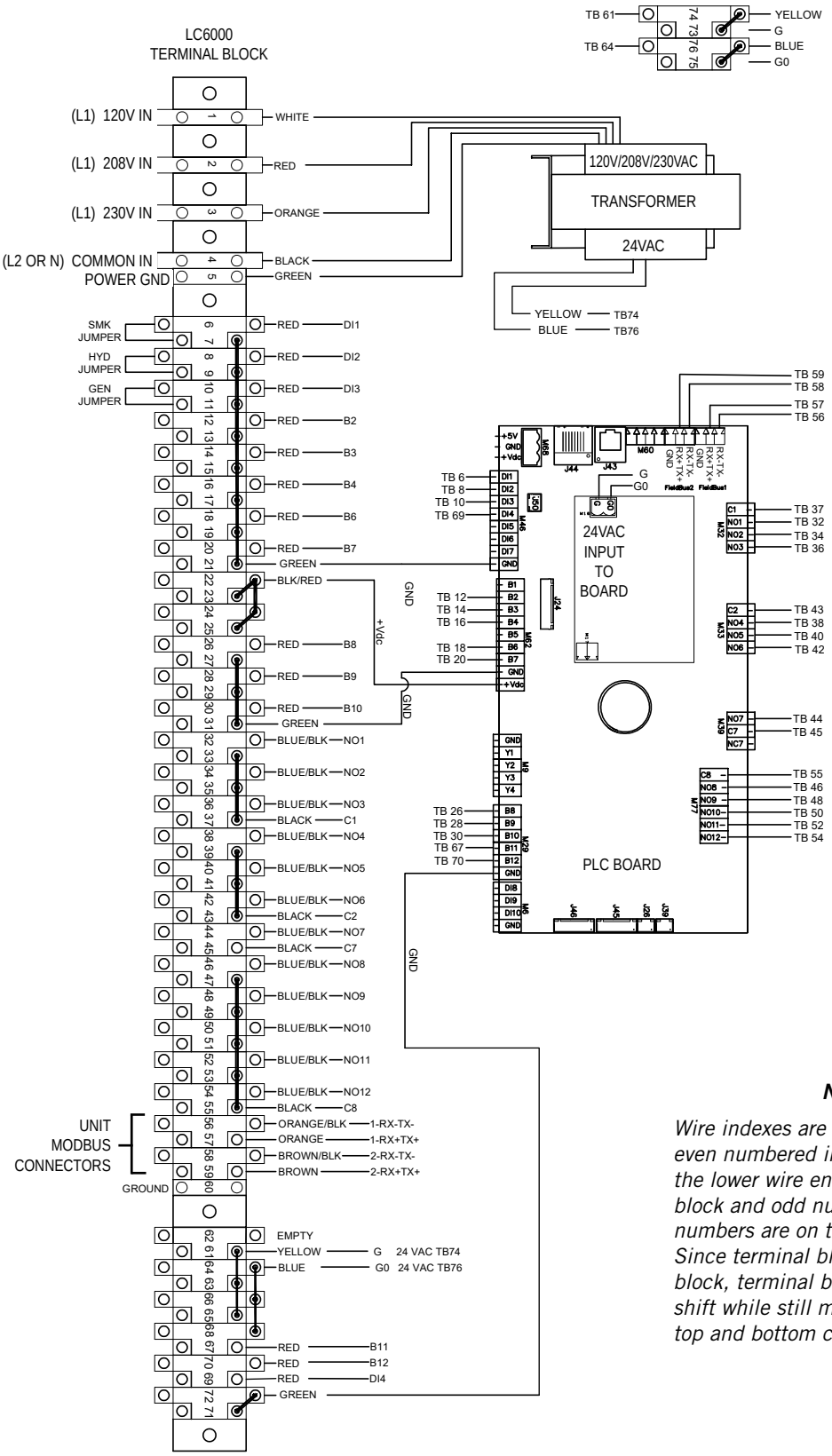
A reliable earth ground must be connected in addition to any grounding from conduit. Attach earth ground to side of controller box using bolts and nuts supplied with controller and field-supplied 2 hole grounding lug. **Failing to ground the controller box properly could result in damage to the equipment.**

TABLE 4
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	C2	Common
40	NO5	Emergency Vent Alarm
41	C2	Common
42	NO6	Generator Run Alarm
43	C2	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 26
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 air conditioning system (the TEC-EYE is only used to set up the wall-mount units).

TABLE 5
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 MULTI-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 MULTI-TEC Service Manual 2100-665 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 27.

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 27
TEC-EYE Connection to Unit Control

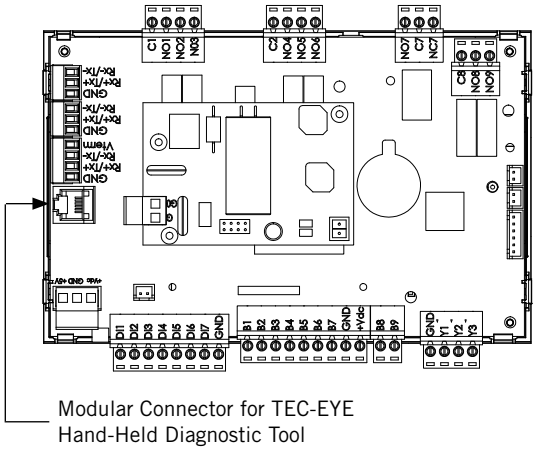


FIGURE 28
TEC-EYE (Bard P/N 8301-059) Display and Interface (Status Screen Shown)

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 28). The Status screen also shows the current date, time, return air temperature, mixed air temperature, outdoor air temperature, outdoor humidity and outdoor dew point conditions. Blower, damper and unit status are also displayed. See Table 6 on page 45 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, change log 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**

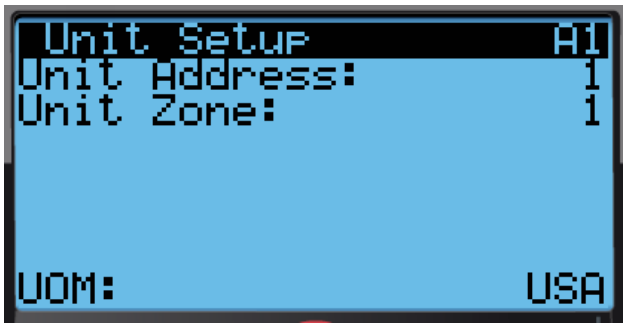
   Each unit must have a unique address for the system to operate correctly with the LC controller (*Ex: 1, 2, 3, ...14 depending on the number of units*). The unit only needs the address to be changed for the communication to work properly. The wall-mount unit address is displayed in the upper right corner on the Status screen on the TEC-EYE display (see Figure 28).

   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 29).
   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. Bard also recommends physically labeling each unit for ease in identification.*

FIGURE 29
Unit Configuration



In addition to setting up the address, the user may also want to set the unit zone and unit of measure. Unit addresses can only be used once per LC6000 regardless of number of zones.

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 29).
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 Run Test on Each Unit**

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

   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 **Run Test A11** screen.

5) Press ENTER key to scroll to **Run Test Enable** parameter (see Figure 30).

6) Press UP or DOWN key to change value to **ON**. The run test will begin.

FIGURE 30
Executing Run Test

Step	Action	Time Required
A	Open economizer damper	Damper Time (150s)
B	Close economizer Damper	Damper Time (150s)
C	Turn on compressor	Heat/Cool Time (60s)
D	Enable second stage	Heat/Cool Time (60s)
E	Open reheat valve	Heat/Cool Time (60s)
F	Turn all cooling off	--
G	Turn on electric heat	Heat/Cool Time (60s)
H	Turn on electric heat stage 2	Heat/Cool Time (60s)
I	Turn off all heating	--

Parameter Description

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 run test progresses. The following messages may appear:

1. Not Active
2. Opening Damper
3. Closing Damper
4. Compressor Stage 1
5. Compressor Stage 2
6. Reheat Valve Open
7. Cooling Off
8. Electric Heat Stage 1
9. Electric Heat Stage 2
10. Heating Off
11. Run Test Stop

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

3. Clear Unit Alarm Logs on Each Unit

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 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.

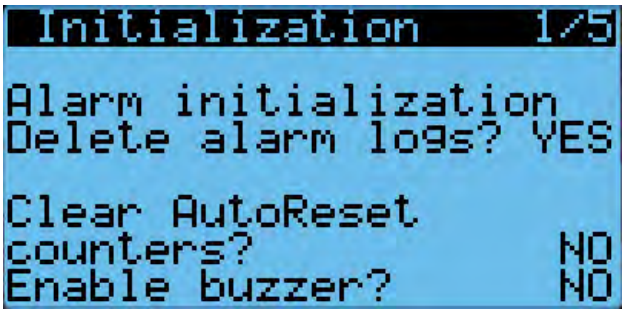
5) Press UP or DOWN keys to scroll to **Initialization 1/5**; press ENTER key.

6) Press ENTER key to scroll to **Delete alarm logs?** (see Figure 31).

7) Press UP or DOWN key to change **NO** to **YES**.

8) Press ENTER key to clear all alarm logs.

FIGURE 31
Clearing Unit Alarm Logs



After each of the wall-mount units have been addressed, had a run 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).

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 2000.

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 32).

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.

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

FIGURE 32
Setting Controller Date and Time

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 utilizing five temperature sensors and four humidity sensors. 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 44.

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 33).

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

FIGURE 33
Enable/Disable Zone 1 Indoor Humidity Sensor

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 28 on page 36.

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 35).
6) Press UP or DOWN key to change value to ON to enable sensor (or change value to OFF to disable sensor).

FIGURE 35
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 36).

FIGURE 36
Enable/Disable Zone 3 Indoor Humidity Sensor

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

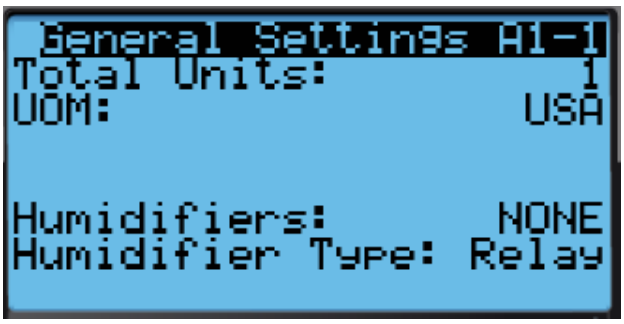
5) Press ENTER key to scroll to **Total Units** (see Figure 43).

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 43
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 MULTI-TEC Service Instructions 2100-665.

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 44).

7) Press UP or DOWN keys to change economizer type to **None**, **Drybulb**, **TempHum** or **Enthalpy**.

8) Press ENTER key to save.

FIGURE 44
Selecting Economizer Type

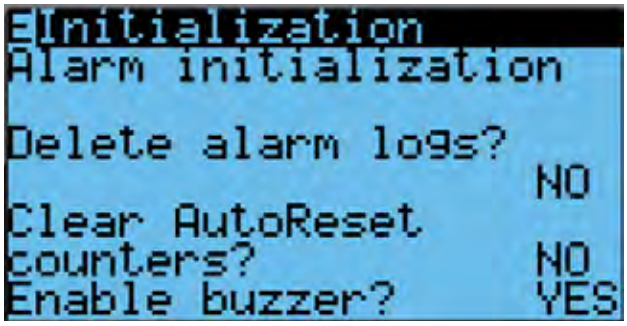
9. Clear Controller Alarm Logs

The LC6000 controller 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 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 45).
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 45
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 run test results were satisfactory, the installation can now be considered “complete".

Additional programming information can be found in MULTI-TEC Service Instructions 2100-665 and LC6000 Service Instructions 2100-669.

Menu Screens and Password Levels

MULTI-TEC Wall-Mount Units

A System Config: User (2000)

B Adv Sys Config: Technician (1313)

C I-O Config: Technician (1313)

D On/Off: User (2000)

E Alarm Logs: User (2000)

F Settings

Date/Time: Technician (1313)

Language: User (2000)

Network Config: Technician (1313)

Serial Ports: Technician (1313)

Initialization

Clear Logs: User (2000)

System Default: Engineer (9254)

Restart: User (2000)

Parameter Config: Engineer (9254)

Alarm Export: User (2000)

G Logout: Used to log out of the current password level. Entering back into the menu requires password.

LC6000 Controller

A System Config

General: User (2000)

Zone 1: User (2000)

Zone 2: User (2000)

Zone 3: User (2000)

B Adv Sys Config: B1-B13 Technician (1313)

C I-O Config: C1-C10 Technician (1313)

D On/Off: User (2000)

E Alarm Logs: User (2000)

F Settings

Date/Time: Technician (1313)

Language: User (2000)

Network Config: Technician (1313)

Serial Ports: Technician (1313)

Initialization

Clear Logs: User (2000)

System Default: Engineer (9254)

Restart: User (2000)

Parameter Config: Engineer (9254)

Alarm Export: User (2000)

G Logout: Used to log out of the current password level. Entering back into the menu requires password.

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 stand alone mode*. LC6000 setpoints will override stand alone setpoints.

If at any time the unit(s) loses communication with the LC6000 controller, the unit(s) will go into stand alone 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 46).
6. Press UP or DOWN keys to add or subtract to the sensor offset value.
7. Press ENTER key to save.

FIGURE 46
Adjusting Sensor Offset Value

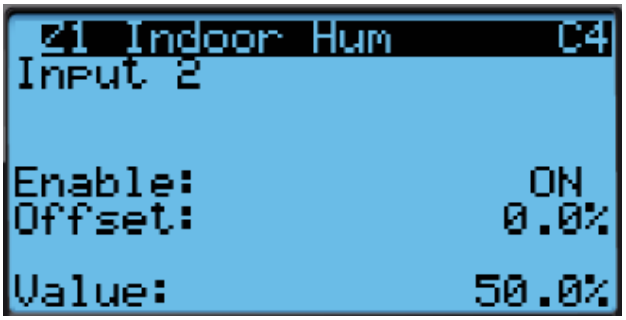


TABLE 6
MULTI-TEC Wall-Mount Unit Status Messages

Message	Description
Stand Alone	Orphan Mode Standby
th-TUNE Online	th_TUNE Standby
LC Online	LC Standby
Cont. Blower	Continuous Blower Active
Off by th-TUNE	Unit off by th-TUNE
Freecooling	Freecooling Active
Optimized Cool	Optimized Cooling Active
Cooling	Cooling Active
Heating	Heating Active
Active Dehum	Mechanical Dehumidification or Electric Reheat Active
Passive Dehum	Economizer Disable/Enhanced Latent Removal (if available)
Self Test	Self Test Running
Off by Alarm	Unit Off by Alarm Condition
Off by BMS	Unit Off by BMS
Off by LC	Unit Off by LC Master
Off by Keypad	Unit Off by Keypad
Emergency Vent	Emergency Vent Mode Active
Emergency Cool	Emergency Cool Mode Active
Emergency Off	Emergency Off Mode Active

TABLE 7
LC6000 Status Messages

Message	Description
On	The system is on
Off by Alarm	The system has a major fault and is disabled
Off by BMS	The system has been disabled by network supervisor
Off by Keypad	The system has been turned off by local user
Emergency Cooling	The system has detected a high temperature alarm and one or more zones are emergency cooling
Emergency Vent	The system has detected hydrogen and one or more zones are in emergency ventilation

MULTI-TEC®/LC6000 Free Cooling Unit System
Quick Start Guide

This quick start guide is designed to lead the installer through the steps necessary for setting up the MULTI-TEC/LC6000 Free Cooling Unit System. See the latest versions of MULTI-TEC/LC6000 System Installation Instructions 2100-676, MULTI-TEC Service Instructions 2100-665 or LC6000 Service Instructions 2100-669 for more detailed information on the installation, service and maintenance of the MULTI-TEC/LC6000 system.

The LC6000 controller and TEC-EYE™ hand-held diagnostic tool will both be used in this installation. The TEC-EYE diagnostic tool is shipped inside the controller. Use password 1313.

SYSTEM SET-UP

Set up and configuration must be done to each 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 (UOM)

The address of the unit being looked at will be listed in the upper right hand corner on the status screen. The available addresses are 1-14.

1. Connect TEC-EYE to wall-mount unit.
2. Press MENU key to access the Main Menu screen.
3. Press UP or DOWN keys and ENTER key to enter password 1313.
4. Press UP or DOWN keys to scroll to **Sys Config**; press ENTER key.
5. Press ENTER key to scroll to **Unit Address**.
6. Press UP or 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.*
7. Press ENTER key to save and scroll to **Unit Zone**.
8. If desired, press UP or DOWN keys to change the value to the desired zone.
9. Press ENTER key to scroll to **UOM**.
10. 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.
11. Press ENTER key to save.

Execute a run test on each unit to verify the equipment is functioning correctly (TEC-EYE)

1. Use UP or DOWN keys to scroll to **Run Test A11** screen.
2. Press ENTER key to scroll to **Run Test Enable** parameter.
3. Use UP or DOWN key to change value to **ON**. The run test will begin.

See Installation Instructions 2100-676 if additional information on run testing units is needed.

Clear unit alarm logs

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 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 1/5**; press ENTER key.
6. Press ENTER key to scroll to **Delete Alarm Logs?**
7. Press UP or DOWN key to 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.

Set LC Controller Timezone and Date/Time (LC Controller)

1. Press MENU key to access the Main Menu screen.
2. Use UP or DOWN keys and ENTER key to enter 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 ENTER key to scroll to the desired value to be changed.

6. Press UP or DOWN keys to change the value.
7. Press ENTER key to save.
8. Press the ESCAPE key several times to return to Main Menu screen.

Configure sensors (LC Controller)

The LC is capable of utilizing four temperature sensors and three humidity sensors. The controller must be configured to match the sensors for the shelter. The available sensors are Zone 1 Indoor Humidity, Zone 2 Indoor Humidity, Zone 3 Indoor Humidity, Zone 1 Indoor Temperature, Zone 1 Remote Temperature, Zone 2 Remote Temperature and Zone 3 Remote Temperature.

The Zone 1 Indoor Humidity and Zone 1 Indoor Temperature sensors are enabled by default. The additional indoor humidity and indoor temperature sensors are disabled by default.

See Installation Instructions 2100-676 if information is needed on configuring (enabling/disabling) sensors.

If necessary, the sensors could be calibrated at this time too. For information on calibrating the sensors, see page 42 in manual 2100-676.

See LC6000 Service Instructions manual 2100-669 for information on setting up the smoke, hydrogen 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 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 **General**; press ENTER key.
5. Press ENTER key to scroll to **Total Units**.
6. Press UP or DOWN keys to adjust value to correct number of units.
7. Press ENTER key to save.
8. Press ESCAPE key until back at Main Menu.

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 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.

Clear controller alarm logs (LC Controller)

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 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 ENTER key to scroll to **Delete Alarm Logs?**
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.

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”.

REPLACEMENT PARTS MANUAL

MULTI-TEC® WALL-MOUNT AIR CONDITIONER

Part of the Bard Free Cooling Unit System

Models:

W30AAPA	W36AAEA	W36AAPC
W30AAPB	W36AAEB	W36AAPD
W30AAPC	W36AAEC	W36AAPE
W30AAPD	W36AAPA	W36AAPF
W30AAPF	W36AAPB	

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.

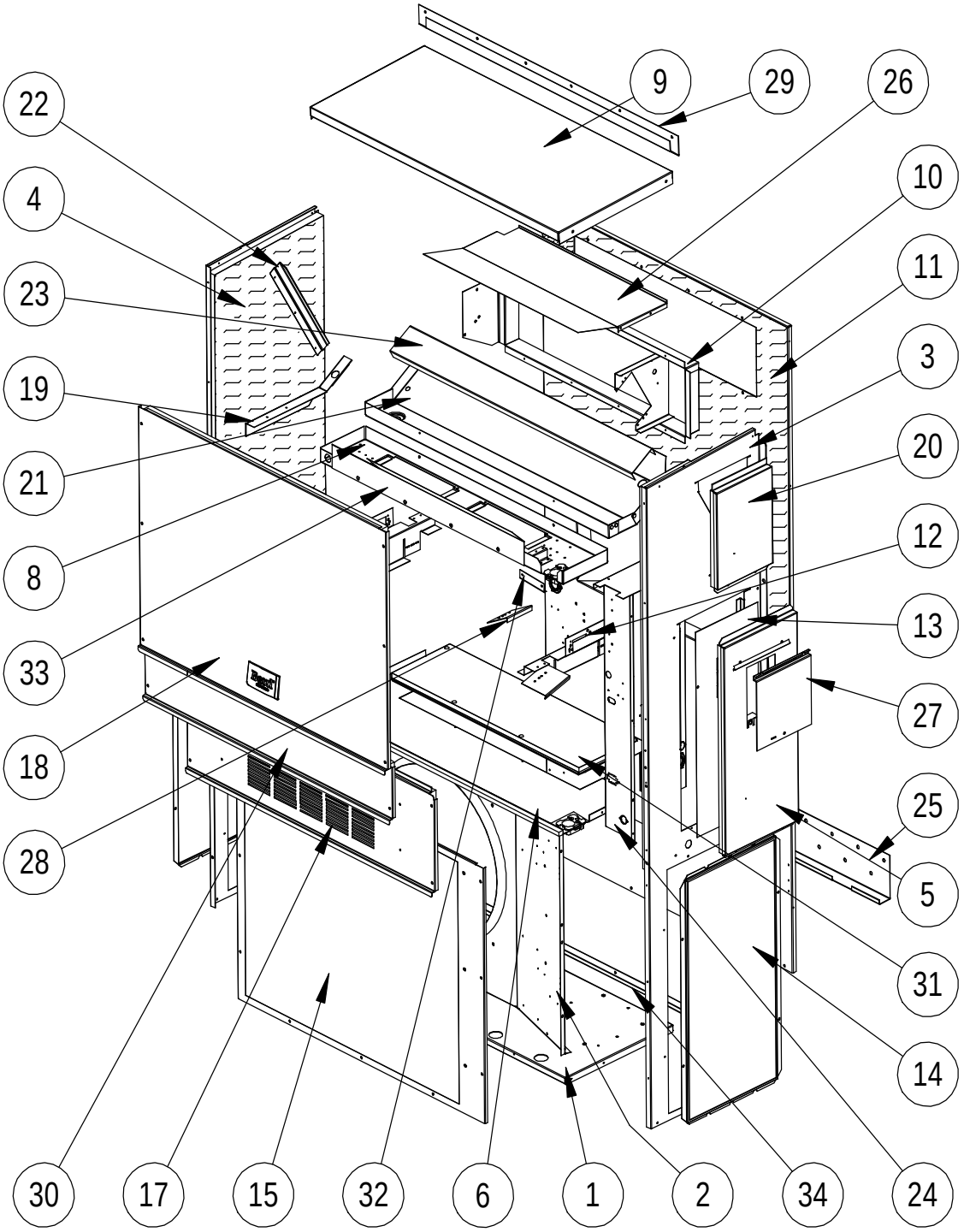
Bard® SINCE 1914
Climate Control Solutions

Bard Manufacturing Company, Inc.
Bryan, Ohio 43506

www.bardhvac.com

Manual: 2110-1442E
Supersedes: 2110-1442D
Date: 6-18-19

CABINET COMPONENTS



SEXP-878

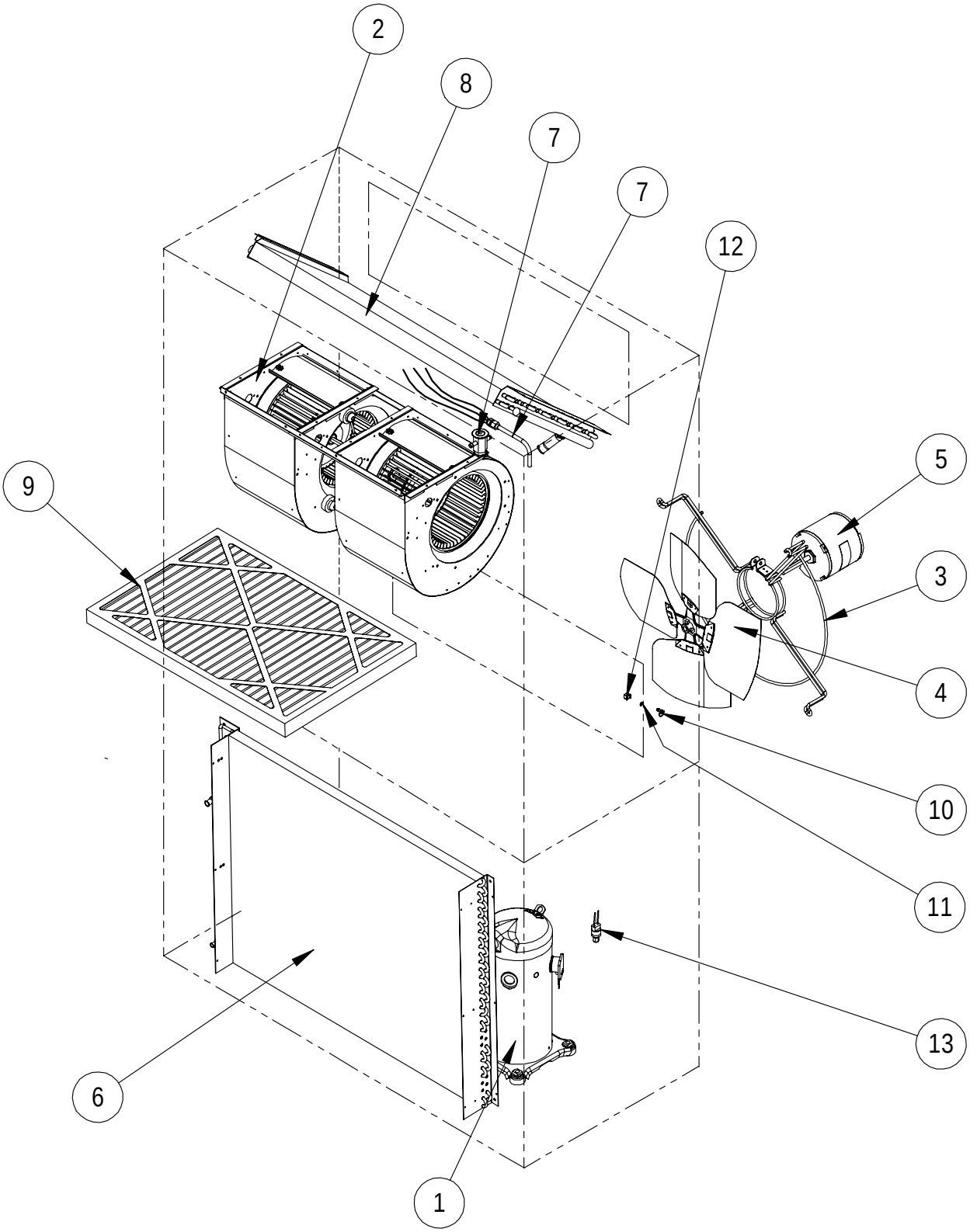
Dwg No.	Part Number	Description	W30AAPA, B, D	W30AAPC, F	W36AAEA, B	W36AAEC	W36AAPA, B, D, E	W36AAPC, F
1	S127-523	Lower Base	X	X	X	X	X	X
1	S127-568 ②	Lower Base	X	X	X	X	X	X
2	125-081	Fan Shroud	X	X	X	X	X	X
2	125-083 ②	Fan Shroud	X	X	X	X	X	X
3	S501-977-* ①	Right Side	X	X	X	X	X	X
3	S501-1032 ②	Right Side	X	X	X	X	X	X
3	S501-1014 ③	Right Side	X	X	X	X	X	X
4	S501-934-* ①	Left Side	X	X	X	X	X	X
4	S501-995 ②	Left Side	X	X	X	X	X	X
4	S501-940 ③	Left Side	X	X	X	X	X	X
5	S533-228 ①	Control Panel Cover (Outer)	X	X	X	X	X	X
5	S533-235 ②	Control Panel Cover (Outer)	X	X	X	X	X	X
5	S533-236 ③	Control Panel Cover (Outer)	X	X	X	X	X	X
6	S521X527	Condenser Partition	X	X	X	X	X	X
6	521-552 ②	Condenser Partition	X	X	X	X	X	X
8	121X467	Blower Partition	X	X	X	X	X	X
9	S507-308-* ①	Top	X	X	X	X	X	X
9	S507-319 ②	Top	X	X	X	X	X	X
9	S507-320 ③	Top	X	X	X	X	X	X
10	S111X247	Outlet Air Frame Assembly	X	X	X	X	X	X
11	S508-343	Back	X	X	X	X	X	X
11	S508-388 ②	Back	X	X	X	X	X	X
11	S508-345 ③	Back	X	X	X	X	X	X
12	113X480	Filter Bracket	2	2	2	2	2	2
13	S132-296	Control Panel Cover (Inner)	X		X		X	
13	S132-297	Control Panel Cover (Inner)		X		X		X
14	118-124-* ①	Side Grille	2	2	2	2	2	2
14	118-140 ②	Side Grille	2	2	2	2	2	2
14	118-139 ③	Side Grille	2	2	2	2	2	2
15	118-103-* ①	Condenser Grille	X	X	X	X	X	X
15	118-108 ②	Condenser Grille	X	X	X	X	X	X
15	118-113 ③	Condenser Grille	X	X	X	X	X	X
17	S553-523-* ①	Vent Option Door	X	X	X	X	X	X
17	S553-549 ②	Vent Option Door	X	X	X	X	X	X
17	S553-550 ③	Vent Option Door	X	X	X	X	X	X
18	S514-241-* ①	Upper Front	X	X	X	X	X	X
18	S514-238 ②	Upper Front	X	X	X	X	X	X
18	S514-239 ③	Upper Front	X	X	X	X	X	X
19	105X850	Side Support	X	X	X	X	X	X
20	S543-175-* ①	Right Side Cover Plate (Outer)	X	X	X	X	X	X
20	S543-185 ②	Right Side Cover Plate (Outer)	X	X	X	X	X	X
20	S543-184 ③	Right Side Cover Plate (Outer)	X	X	X	X	X	X
21	S123-127	Drain Pan	X	X	X	X	X	X
21	S123-141 ②③	Drain Pan	X	X	X	X	X	X
22	147-044	Evaporator Support	X	X	X	X	X	X
23	137-685	Bottom Evaporator Fill	X	X	X	X	X	X
24	Control Panel Assembly	See Control Panel Assy. Drawing & Parts List Assy.	X	X	X	X	X	X
25	113-140	Bottom Mounting Bracket	X	X	X	X	X	X
26	135X123	Heat Shield	X	X	X	X	X	X
27	S153-218 ①	Disconnect Access Door	X	X	X	X	X	X
27	S153-405 ②	Disconnect Access Door	X	X	X	X	X	X
27	S153-387 ③	Disconnect Access Door	X	X	X	X	X	X
28	137-259	Fill Plate	X	X	X	X	X	X
29	113-149-* ①	Top Rain Flashing	X	X	X	X	X	X
29	113-360 ②	Top Rain Flashing	X	X	X	X	X	X
29	113-149-4 ③	Top Rain Flashing	X	X	X	X	X	X
30	S553-524-* ①	Filter Door	X	X	X	X	X	X
30	S553-709 ②	Filter Door	X	X	X	X	X	X
30	S553-554 ③	Filter Door	X	X	X	X	X	X
31	S536-498	Cond. Partition Block Off Plate	X	X	X	X	X	X
31	536-877 ②	Cond. Partition Block Off Plate	X	X	X	X	X	X
32	105-1302	Grommet Retainer	X	X	X	X	X	X
33	135-329	Air Baffle	X	X	X	X	X	X
34	105-1393	Close Off Angle	X	X	X	X	X	X
34	105-1439 ②	Close Off Angle	X	X	X	X	X	X
NS	BOP-3	Blank Off Plate	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 Exterior cabinet parts are manufactured from stainless steel Code "S"

③ Exterior cabinet parts are manufactured from aluminum Code "A"

FUNCTIONAL COMPONENTS

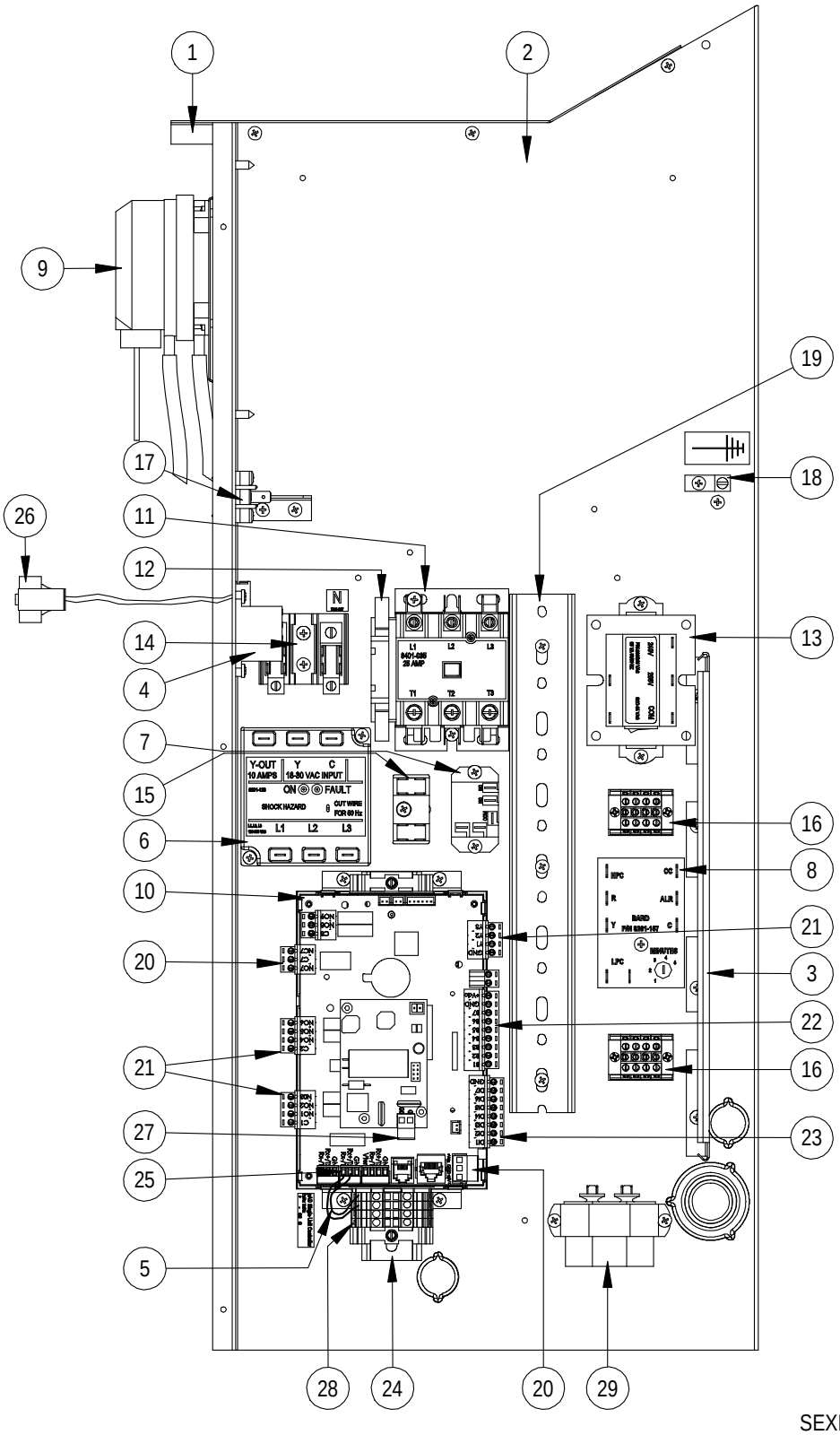


SEXP-177 A

Dwg No.	Part Number	Description	W30AAPA	W30AAPB	W30AAPC	W30AAPD	W30AAPF	W36AAEA	W36AAEB	W36AAEC	W36AAPA	W36AAPB	W36AAPC	W36AAPD	W36AAPE	W36AAPF
1	8000-346	Compressor	X													
1	8000-347	Compressor		X												
1	8000-348	Compressor			X		X									
1	8000-301	Compressor				X										
1	8000-309	Compressor						X			X					
1	8000-310	Compressor							X			X			X	
1	8000-311	Compressor								X			X			X
1	8000-312	Compressor												X		
2	S900-231	Blower Assembly	X	X		X	X	X	X		X	X		X	X	X
2	S900-232	Blower Assembly			X					X			X			
3	8200-001	Fan Motor Mount	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3	8200-050 ①	Stainless Steel Fan Motor Mount	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4	5151-045	Fan Blade	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4	5151C045 ①	Coated Fan Blade	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5	8103-029	Condenser Motor	X	X		X	X	X	X		X	X		X	X	X
5	8103-030	Condenser Motor			X					X			X			
6	5051-203BX	Condenser Coil	X	X	X	X	X									
6	5054-203BX	Condenser Coil - Coated	X	X	X	X	X									
6	5051-202BX	Condenser Coil						X	X	X	X	X	X	X	X	X
6	5054-202BX	Condenser Coil - Coated						X	X	X	X	X	X	X	X	X
7	800-0456	Distributor Assembly						X	X	X	X	X	X	X	X	X
7	800-0457	Distributor Assembly	X	X	X	X	X									
8	917-0275BX	Evaporator Coil w/Distributor Assy.	X	X	X	X	X									
8	917-0285BX	Evaporator Coil - Coated w/Distributor Assy.	X	X	X	X	X									
8	917-0274BX	Evaporator Coil w/Distributor Assy.						X	X	X	X	X	X	X	X	X
8	917-0287BX	Evaporator Coil - Coated w/Distributor Assy.						X	X	X	X	X	X	X	X	X
9	7004-019	Air Filter 1" Throw-Away (16x30x1)	X	X	X	X	X	X	X	X	X	X	X	X	X	X
9	7003-031	Air Filter 1" Washable ② (16x30x1)	X	X	X	X	X	X	X	X	X	X	X	X	X	X
9	7004-026	Air Filter 2" Pleated ② (16x30x2)	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10	1171-022	1/4" Turn Fastener	X	X	X	X	X	X	X	X	X	X	X	X	X	X
11	1171-024	1/4" Turn Retainer	X	X	X	X	X	X	X	X	X	X	X	X	X	X
12	1171-023	1/4" Receptacle	X	X	X	X	X	X	X	X	X	X	X	X	X	X
13	8406-142	High Pressure Switch (Screw On)	X	X	X	X	X	X	X	X	X	X	X	X	X	X
NS	8406-140	Low Pressure Switch (Screw On)	X	X	X	X	X	X	X	X	X	X	X	X	X	X
NS	CMA-28	Low Ambient Control (Screw On) ②	X	X	X	X	X	X	X	X	X	X	X	X	X	X
NS	5201-021	Filter Drier	X	X	X	X	X	X	X	X	X	X	X	X	X	X
NS	5451-024	Tubing Isolation Grommet	2	2	2	2	2	2	2	2	2	2	2	2	2	2
NS	6031-009	Coremax Valve Core	2	2	2	2	2	2	2	2	2	2	2	2	2	2
NS	1171-028	Filter Door Clip	2	2	2	2	2	2	2	2	2	2	2	2	2	2
NS	1171-057	Filter Door Screw	2	2	2	2	2	2	2	2	2	2	2	2	2	2
NS	1171-027	Filter Door Screw Retainer	2	2	2	2	2	2	2	2	2	2	2	2	2	2
NS	8605-019	Crankcase Heater	X	X		X	X	X	X		X	X		X	X	X
NS	8605-020	Crankcase Heater			X					X			X			

NS – Not Shown
① – Used with stainless steel cabinet option
② – Optional on these models

CONTROL PANEL



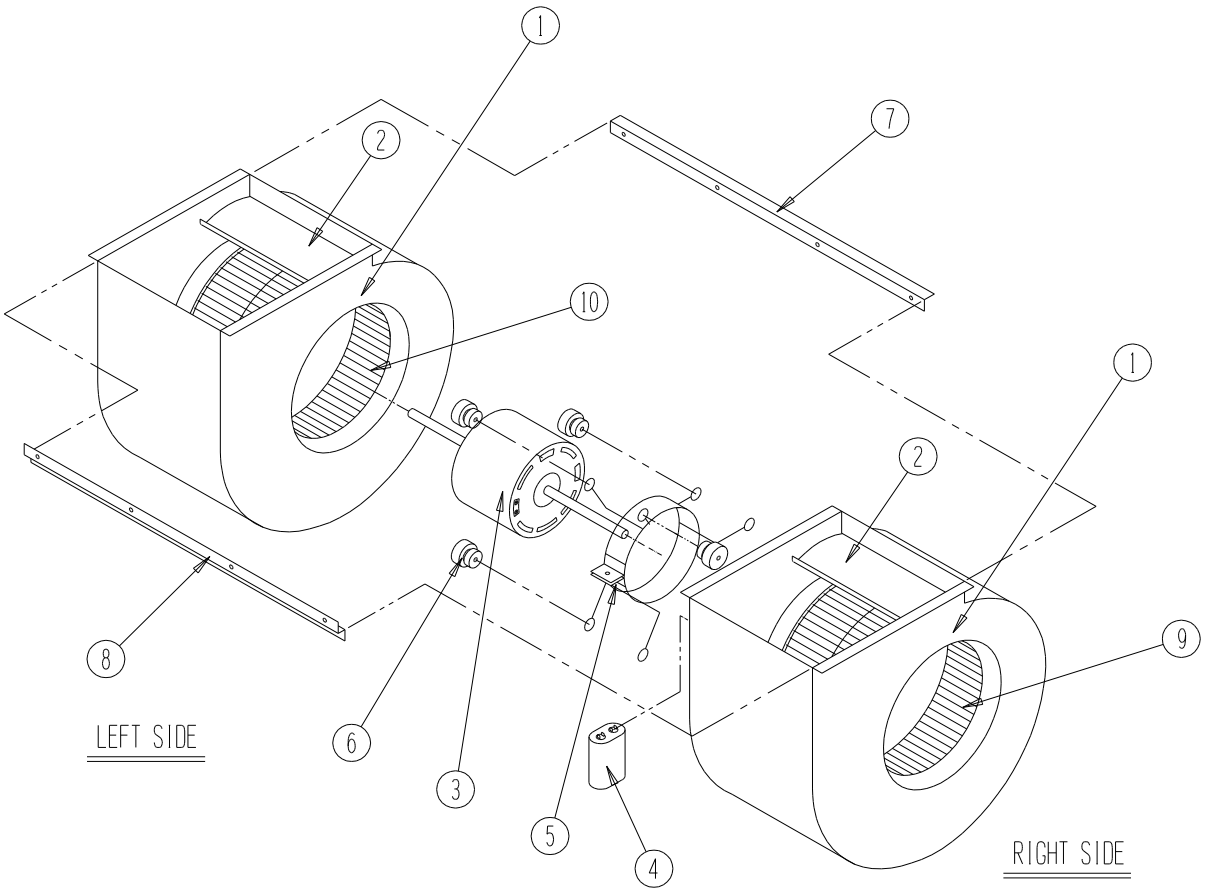
Dwg No.	Part Number	Description	W30AAPA	W30AAPB	W30AAPC	W30AAPD	W30AAPF	W36AAEA	W36AAEB	W36AAEC	W36AAPA	W36AAPB,E	W36AAPC	W36AAPD	W36AAPF
1	117X137	Control Panel Top	X	X	X	X	X	X	X	X	X	X	X	X	X
2	117X395	Control Panel	X	X	X	X	X	X	X	X	X	X	X	X	X
3	135-122	Wire Shield	X	X	X	X	X	X	X	X	X	X	X	X	X
4	8201-130	Blower Relay	X	X	X	X	X	X	X	X	X	X	X	X	X
5	3020-004	Communications Sheathed Cable	X	X	X	X	X	X	X	X	X	X	X	X	X
6	8201-126	3 Phase Line Monitor 50/60 Hz		X	X		X		X	X		X	X		X
7	8201-130	Alarm Relay	X	X	X	X	X	X	X	X	X	X	X	X	X
8	8201-164	Compressor Control Module	X	X	X	X	X	X	X	X	X	X	X	X	X
9	8301-057	Filter Switch w/Adjustment	X	X	X	X	X	X	X	X	X	X	X	X	X
10	8301-068-001*	UPC3-MULTI-TEC 2.0.0	X	X	X	X	X	X	X	X	X	X	X	X	X
11	8401-035	Contactor 3-Pole 25 Amp		X	X		X		X	X		X	X		X
11	8401-038	Contactor 2-Pole 40 Amp	X			X		X			X			X	
12	8401-039	Aux. NC Contact		X	X		X		X	X		X	X		X
13	8407-048	Transformer 208/240-24 75VA	X	X		X	X	X		X	X		X	X	X
13	8407-050	Transformer 480/24VAC 75VA			X				X			X			
14	8607-013	Terminal Block 2 Term. 240V					X								X
15	8607-017	Terminal Block 240V 2 Terminal	X	X	X	X	X	X	X	X	X	X	X	X	X
16	8607-037	Terminal Block 4 Position	X	X	X	X	X	X	X	X	X	X	X	X	X
17	8607-041	Park Terminal	X	X	X	X	X	X	X	X	X	X	X	X	X
18	8611-006	Ground Terminal	X	X	X	X	X	X	X	X	X	X	X	X	X
19	8611-140-1200	2-1/4" x 1" Cable Duct x 12"	X	X	X	X	X	X	X	X	X	X	X	X	X
20	8611-147	3-Pin Circuit Board Connector	X	X	X	X	X	X	X	X	X	X	X	X	X
21	8611-148	4-Pin Circuit Board Connector	X	X	X	X	X	X	X	X	X	X	X	X	X
22	8611-149	9-Pin Circuit Board Connector	X	X	X	X	X	X	X	X	X	X	X	X	X
23	8611-185	8-Pin Circuit Board Connector	X	X	X	X	X	X	X	X	X	X	X	X	X
24	8611-189	35MM DIN Rail 9"	X	X	X	X	X	X	X	X	X	X	X	X	X
25	8611-192	Small 3-Pin Circuit Board Connector	X	X	X	X	X	X	X	X	X	X	X	X	X
26	910-1935	Evap. Temp. Sensor Assembly	X	X	X	X	X	X	X	X	X	X	X	X	X
27	8611-183	2-Pin Circuit Board Connector	X	X	X	X	X	X	X	X	X	X	X	X	X
28	8611-150	DIN Rail Terminal Block	X	X	X	X	X	X	X	X	X	X	X	X	X
29	8552-052	Compressor Capacitor	X					X			X				
29	8552-002	Outdoor Motor Capacitor		X	X		X		X	X		X	X		X
29	8552-062	Compressor Capacitor				X								X	
NS	3000-1224	Compressor Plug/Harness	X			X		X			X			X	
NS	3000-1231	Compressor Plug/Harness		X	X		X		X	X		X	X		X
NS	8615-037	Circuit Breaker 30A 2 Pole (Opt.) ①				X									
NS	8615-038	Circuit Breaker 35A 2 Pole (Opt.) ①	X					X			X			X	
NS	8615-054	Circuit Breaker 20A 3 Pole (Opt.) ①		X											
NS	8615-052	Circuit Breaker 30A 3 Pole (Opt.) ①							X			X			
NS	8615-067	Toggle Disconnect (Opt.) ①			X		X			X			X		X
NS	4207-100A	Wiring Diagram	X			X		X			X			X	
NS	4207-200A	Wiring Diagram		X					X			X			
NS	4207-300A	Wiring Diagram			X					X			X		
NS	4207-600A	Wiring Diagram					X								X
NS	8301-075	USB Micro Cable Female to Male	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: 8301-068-001**A**). 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/

① Circuit breakers listed are for units without electric heat, "OZ" models. Hot gas bypass models not available without electric heat. See heater replacement parts manual for units with electric heat.

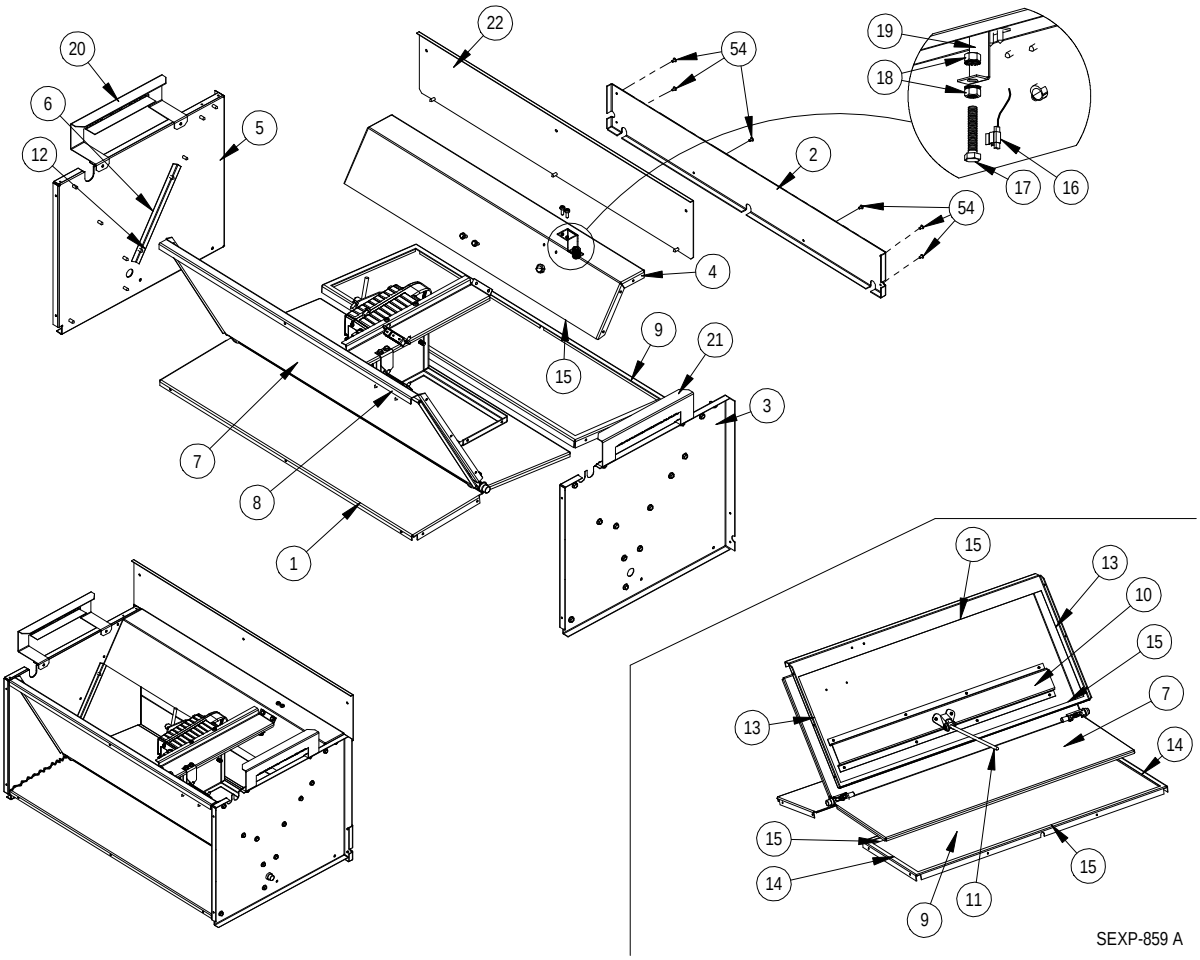
NS = Not Shown

BLOWER ASSEMBLY



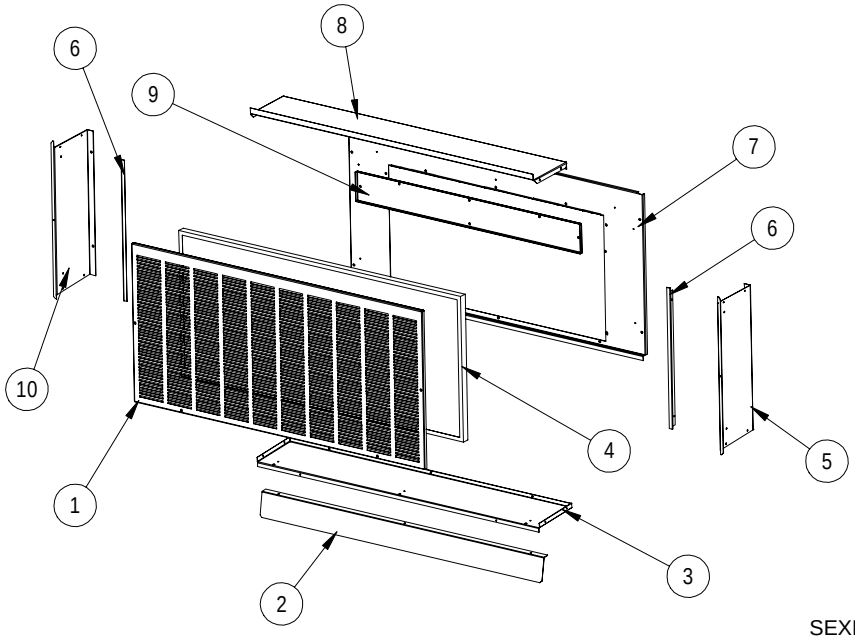
SEXP-346

Dwg No.	Part Number	Description	S900-231	S900-232
1	151-111	Housing	2	2
2	144-174	Diffuser	2	2
3	8105-029	Blower Motor (230/208)	X	
3	8105-033	Blower Motor (460)		X
4	8552-002	Capacitor	X	X
5	8200-031	Motor Mount	X	X
6	5451-011	Grommets	6	6
7	105-870	Back Brace	X	X
8	103-401	Front Brace	X	X
9	5152-090	Wheel CW	X	X
10	5152-091	Wheel CCW	X	X



Dwg. No.	Part Number	Description
1	137-738	Lower Front Partition
2	137-745	Lower Rear Fill
3	S101-979	Right Side
4	S137-865	Upper Rear Partition
5	S101-978	Left Side
6	S105-1344	Blade Seal Angle
7	S139-324	Blade
8	S137-867	Upper Front Partition
9	S137-740	Lower Rear Partition
10	141-430	Blade Support
11	8602-044	1/4 x 9" Rod
12	S1921-067-0800	29-9/16" Damper Blade Seal
13	S1921-067-1004	13" Damper Blade Seal
14	S1921-067-0802	10-11/16" Damper Blade Seal
15	S1921-067-2504	29-3/8" Damper Blade Seal
16	8408-044	Sensor 10K Ohm Curve J w/ 5/16" Clip
17	1012-052	Hex Head Bolt 5/16 - 18x1-3/4" 0.0005 Zinc w/ Yellow Chromate
18	1012-210	5/16" Nut 0.0005 Zinc w/ Yellow Chromate
19	113-541	Sensor Bracket
20	113-542	Filter Bracket
21	113-543	Filter Bracket
22	137-746	Upper Rear Fill
23	8602-040	Rod Bracket
NS	537-751	Condenser Cover Plate Assembly

FREECOOLING AIR HOOD



SEXP-752A

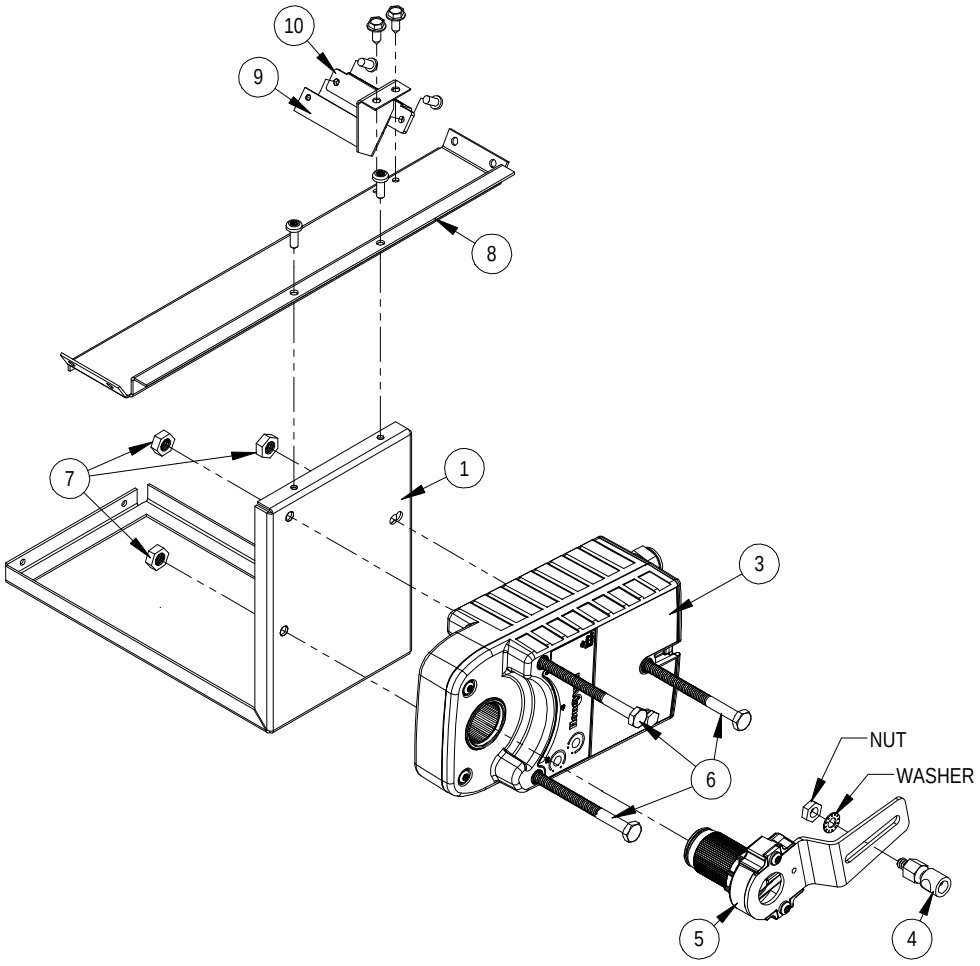
Dwg. No.	Part Number	Description
1	115-284-* ①	Hooded Front Door
1	115-291 ②	Hooded Front Door
1	115-290 ③	Hooded Front Door
2	113-538-* ①	Bottom Divider Bracket
2	113-568 ②	Bottom Divider Bracket
2	113-571 ③	Bottom Divider Bracket
3	S127-495-* ①	Hood Bottom
4	7003-079	Mist Filter 36-1/4" x 15-7/8" x 7/8"
5	S101-984-* ①	Right Side
5	S101-1033 ②	Right Side
5	S101-1013 ③	Right Side
6	105-1346	Side Filter Angle
6	105-1346 ②	Side Filter Angle
6	105-1370 ③	Side Filter Angle
7	553-660-* ①	Hood Mounting Door
7	553-712 ②	Hood Mounting Door
7	553-703 ③	Hood Mounting Door
8	S107-346-* ①	Hood Top
8	S107-354 ②	Hood Top
8	S107-353 ③	Hood Top
9	553-613	Filter Door
9	553-632 ②	Filter Door
9	553-636 ③	Filter Door
10	S101-873-* ①	Left Side
10	S101-997 ②	Left Side
10	S101-882 ③	Left Side
	920-0375	Complete Hood Assembly - Beige
	920-0376	Complete Hood Assembly - White
	920-0377	Complete Hood Assembly - Buckeye Gray
	920-0422	Complete Hood Assembly - Stainless Steel
	920-0411	Complete Hood Assembly - Aluminum

① Exterior cabinet parts are manufactured with various paint color options. To ensure the proper paint color is received, reference the following codes:

Beige -X Buckeye Gray -4 White -1

② Exterior cabinet parts are manufactured from stainless steel Code "S"

③ Exterior cabinet parts are manufactured from aluminum Code "A"



SEXP-879

Dwg. No.	Part Number	Description
1	141-466	Actuator Support Plate
3	8602-067	Direct Coupled Actuator
4	8602-008	Ball Joint
5	8602-068	Belimo Actuator Crank Arm 1/2"
6	1012-174	1/4" - 20x3 - 1/4 Hex Cap Screws
7	1012-201	1/4-20 Steel Keps Hex Nut Zinc
8	141-464	Actuator Support Bar
9	113-655	Blade Switch Bracket
10	8406-150	Lever Switch SPDT Sealed Pilot Duty
11	1012-178	4-40 x 5/8" Phillips Pan Head Machine Screw, Zinc Plated
12	1012-231	4-40 Steel Keps Hex Nut Zinc
NS	910-2014	Outdoor Temperature Sensor

SUPPLEMENTAL INSTRUCTIONS

50 HZ ELECTRICAL DATA

Model	Rated Volts and Phases	Operating Voltage Range	No. Field Power Circuits	① Minimum Circuit Ampacity	② Maximum External Fuse or Ckt. Brkr.	③ Field Power Wire Size	③ Ground Wire Size
W24AA-D0Z	240/220-1	198 - 254	1	16	20	12	12
D05	240/220-1		1	28	30	10	10
D08	240/220-1		1	44	45	8	10
W24A/LA-F0Z	415/380-3	342 - 456	1	9	15	14	14
F05			1	11	15	14	14
W30AA-D0Z	240/220-1	198 - 254	1	19	30	10	10
D05			1	29	30	10	10
D10			1	55	60	6	10
W30AA-F0Z	415/380-3	342 - 456	1	10	15	14	14
F07			1	17	20	12	12
F12			1	26	30	10	10
W36AA-D0Z	240/220-1	198 - 254	1	24	35	8	10
D05			1	29	35	8	10
D10			1	55	60	6	10
W36AA-E0Z	240/220-3	198 - 254	1	21	30	10	10
E06			1	21	30	10	10
E12			1	39	40	8	10
W36A/LA-F0Z	415/380-3	342 - 456	1	12	15	14	14
F07			1	17	20	12	12
F12			1	26	30	10	10
W42AA-E0Z	240/220-3	198 - 254	1	22	30	10	10
E09			1	31	35	8	10
E15			1	49	50	8	10
W42A/LA-F0Z	415/380-3	342 - 456	1	13	15	14	14
F07			1	17	20	12	12
* F14			1	30	30	10	10
W48AA-E0Z	240/220-3	198 - 254	1	24	35	8	10
E09			1	31	35	8	10
E15			1	49	50	8	10
W48A/LA-F0Z	415/380-3	342 - 456	1	13	15	14	14
F07			1	17	20	12	12
* F14			1	30	35	8	10
W60AA-E0Z	240/220-3	198 - 254	1	29	40	8	10
E09			1	35	40	8	10
E15			1	53	60	6	10
W60A/LA-F00	415/380-3	342 - 456	1	16	20	12	12
F07			1	18	20	12	12
* F14			1	32	35	8	10
W72A/LA-F00	400/380-3	342 - 440	1	23	30	10	10
F07			1	23	30	10	10
F14			1	34	35	8	10

① These "Minimum Circuit Ampacity" values are to be used for sizing the field power conductors. Refer to the National Electric Code (latest version), Article 310 for power conductor sizing.
② Maximum size of the time delay fuse or "D" type circuit breaker for protection of field wiring conductors.
③ Based on 75°C copper wire. All wiring must conform to all local and national electrical codes.

* F14 only offered on W**A units.

CAUTION: *When more than one field power circuit is run through one conduit, the conductors must be derated. Pay special attentionto Note 8 of Table 310 regarding Ampacity Adjustment Factors when more than three conductors are in a raceway.*

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 all existing local codes.

Bard® SINCE 1914
Climate Control Solutions

Bard Manufacturing Company, Inc.
Bryan, Ohio 43506

www.bardhvac.com

Manual: 7960-735
Supersedes: ***NEW***
Date: 8-25-15

INDOOR BLOWER PERFORMANCE 50 HZ – CFM DRY/WET

Speed	W24		W30				W36				W42			
	Single		High		Low		High		Low		High		Low	
ESP Inch H20 (Pa)	Dry Coil	Wet Coil	Dry Coil	Wet Coil	Dry Coil	Wet Coil	Dry Coil	Wet Coil	Dry Coil	Wet Coil	Dry Coil	Wet Coil	Dry Coil	Wet Coil
0.0 (0)	840 (0.4)	810 (0.38)	1200 (0.57)	1145 (0.54)	780 (0.37)	770 (0.36)	1160 (0.55)	1085 (0.51)	800 (0.38)	795 (0.38)	1645 (0.78)	1610 (0.76)	1495 (0.71)	1415 (0.67)
0.1 (25)	795 (0.38)	770 (0.36)	1150 (0.54)	1095 (0.52)	770 (0.36)	765 (0.36)	1110 (0.52)	1045 (0.49)	780 (0.37)	770 (0.36)	1580 (0.75)	1560 (0.74)	1410 (0.67)	1360 (0.64)
0.2 (50)	750 (0.35)	720 (0.34)	1085 (0.51)	1030 (0.49)	765 (0.36)	755 (0.36)	1050 (0.50)	985 (0.46)	750 (0.35)	740 (0.35)	1510 (0.71)	1460 (0.69)	1340 (0.63)	1300 (0.61)
0.3 (75)	695 (0.33)	665 (0.31)	1015 (0.48)	955 (0.45)	745 (0.35)	730 (0.34)	980 (0.46)	915 (0.43)	715 (0.34)	705 (0.33)	1440 (0.68)	1380 (0.65)	1270 (0.60)	1205 (0.57)
0.4 (100)	625 (0.29)	600 (0.28)	935 (0.44)	875 (0.41)	705 (0.33)	690 (0.33)	895 (0.42)	840 (0.40)	665 (0.31)	650 (0.31)	1340 (0.63)	1300 (0.61)	1185 (0.56)	1120 (0.53)
0.5 (125)	530 (0.25)	505 (0.24)	845 (0.40)	790 (0.37)	650 (0.31)	625 (0.29)	805 (0.38)	745 (0.35)	585 (0.28)	565 (0.27)	1255 (0.59)	1145 (0.54)	915 (0.43)	830 (0.39)

Speed	W48				W60				W72					
	High		Low		High		Low		High		Medium		Low	
ESP Inch H20 (Pa)	Dry Coil	Wet Coil	Dry Coil	Wet Coil	Dry Coil	Wet Coil	Dry Coil	Wet Coil	Dry Coil	Wet Coil	Dry Coil	Wet Coil	Dry Coil	Wet Coil
0.0 (0)	1660 (0.78)	1610 (0.76)	1455 (0.69)	1410 (0.67)	1745 (0.82)	1670 (0.79)	1280 (0.60)	1210 (0.57)	1870 (0.88)	1790 (0.84)	1720 (0.81)	1670 (0.79)	1655 (0.78)	1600 (0.76)
0.1 (25)	1585 (0.75)	1550 (0.73)	1390 (0.66)	1340 (0.63)	1695 (0.80)	1625 (0.77)	1230 (0.58)	1160 (0.55)	1815 (0.86)	1740 (0.82)	1670 (0.79)	1630 (0.77)	1620 (0.76)	1550 (0.73)
0.2 (50)	1510 (0.71)	1470 (0.69)	1330 (0.63)	1280 (0.60)	1635 (0.77)	1565 (0.74)	1160 (0.55)	1090 (0.51)	1755 (0.83)	1690 (0.80)	1625 (0.77)	1590 (0.75)	1565 (0.74)	1515 (0.72)
0.3 (75)	1430 (0.67)	1330 (0.63)	1245 (0.59)	1185 (0.56)	1575 (0.74)	1495 (0.71)	1080 (0.51)	1015 (0.48)	1700 (0.80)	1635 (0.77)	1590 (0.75)	1550 (0.73)	1525 (0.72)	1480 (0.70)
0.4 (100)	1305 (0.62)	1245 (0.59)	1140 (0.54)	1095 (0.52)	1495 (0.71)	1410 (0.67)	1015 (0.48)	955 (0.45)	1650 (0.78)	1595 (0.75)	1545 (0.73)	1505 (0.71)	1475 (0.70)	1430 (0.67)
0.5 (125)	1180 (0.56)	990 (0.47)	890 (0.42)	855 (0.40)	1415 (0.67)	1330 (0.63)	920 (0.43)	890 (0.42)	1600 (0.76)	1540 (0.73)	1500 (0.71)	1465 (0.69)	1430 (0.67)	1340 (0.63)

OUTDOOR FAN MOTOR – 50 HZ

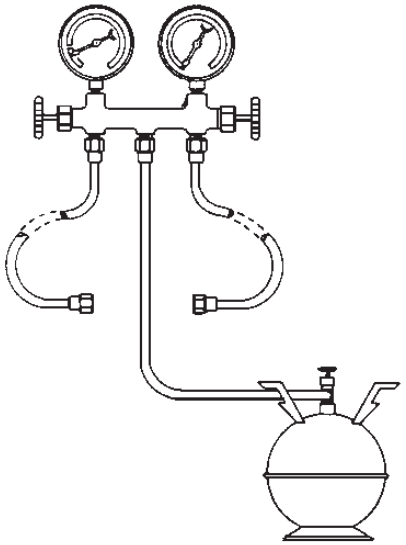
Models W42AA-E, W42AA-F, W42LA-F, W48AA-E, W48AA-F, W48LA-F, W60AA-E, W60AA-F and W60LA-F have a condenser fan motor with a red and black speed tap. These units are shipped from the factory with the red lead connected. At no time is the black lead to be connected for 50HZ application.

WIRING – MAIN POWER

The disconnect means must have contact separation of 3 mm or greater in all poles.

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 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 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 dryer (R-410A compatible) must be replaced any time the system is open. When removing a 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 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 close high side port. The remainder of the charge will be added to the low side. Keep in mind two issues: 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

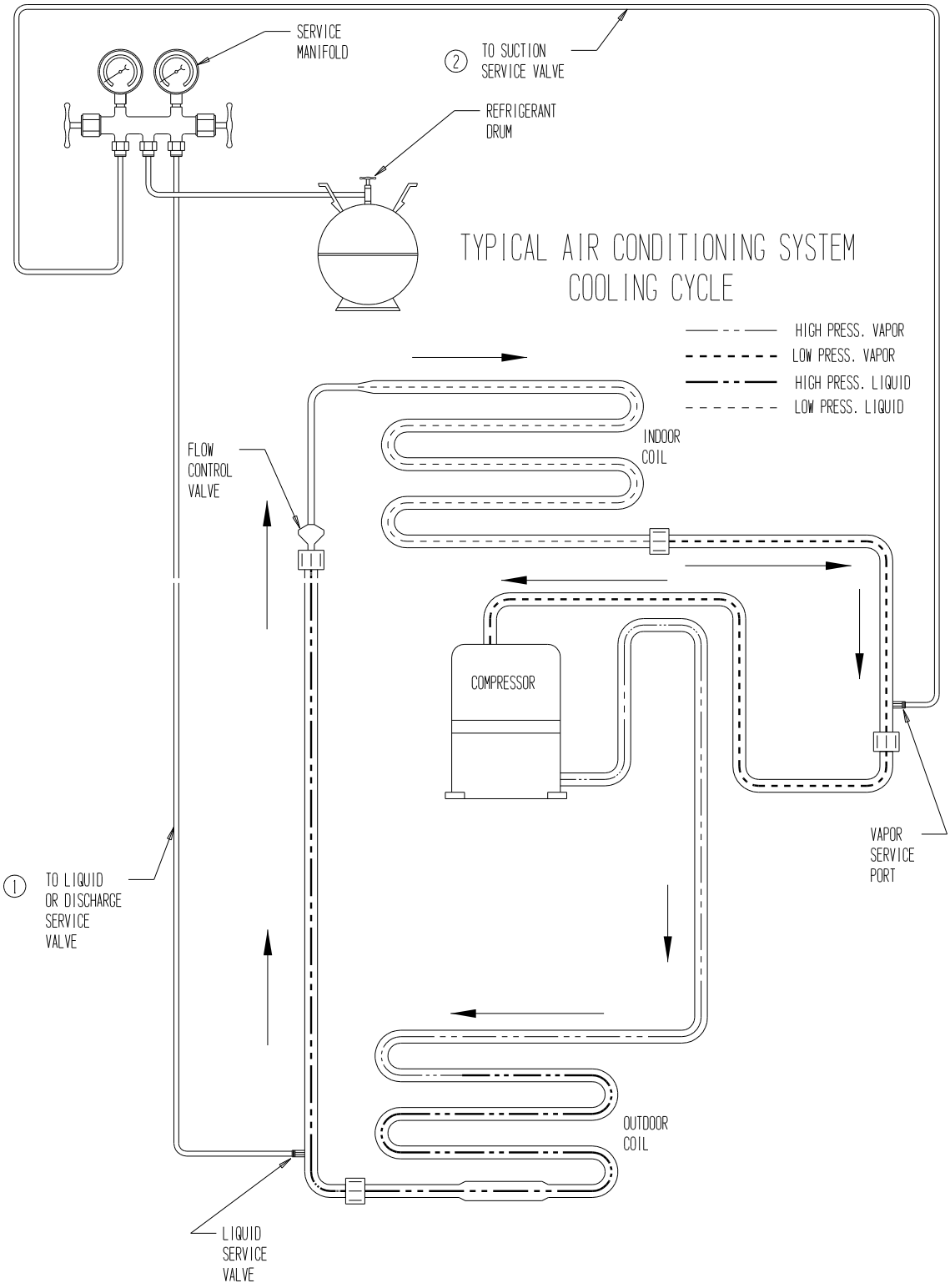
If the system has been open to the atmosphere, the dryer should be replaced and then evacuated. Then proceed as follows:

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
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

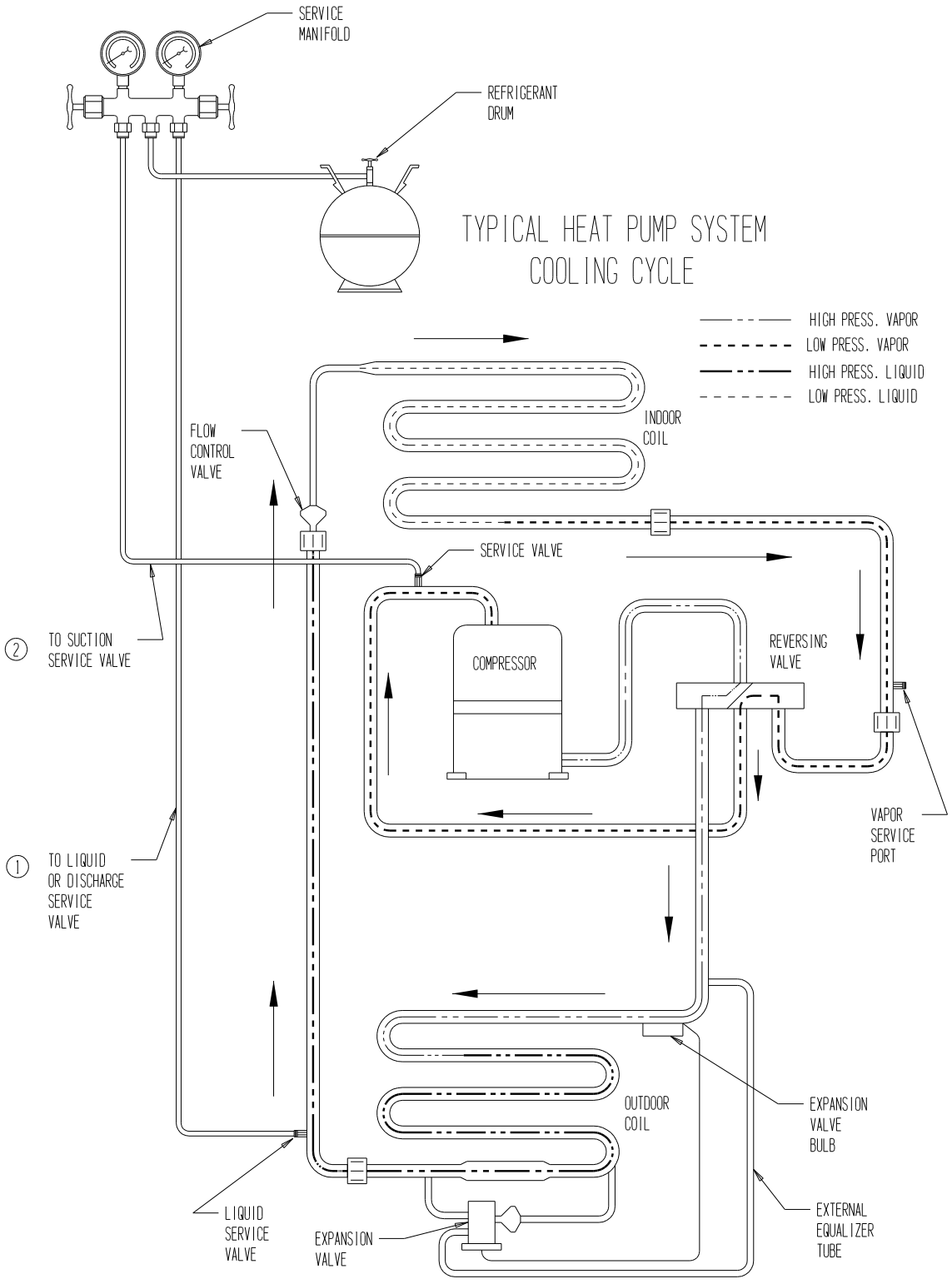
1. Connect manifold as instructed.
2. Place refrigerant drum upright on scale and determine exact weight of the refrigerant and cylinder.
3. With manifold suction valve closed and manifold discharge valve open, open refrigerant cylinder liquid valve and allow pressure in system to balance with pressure of cylinder or 80% of charge is in the unit - whichever comes
4. When there is approximately an 80% charge, front seat (close) the discharge manifold valve and let the system stabilize for about 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 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

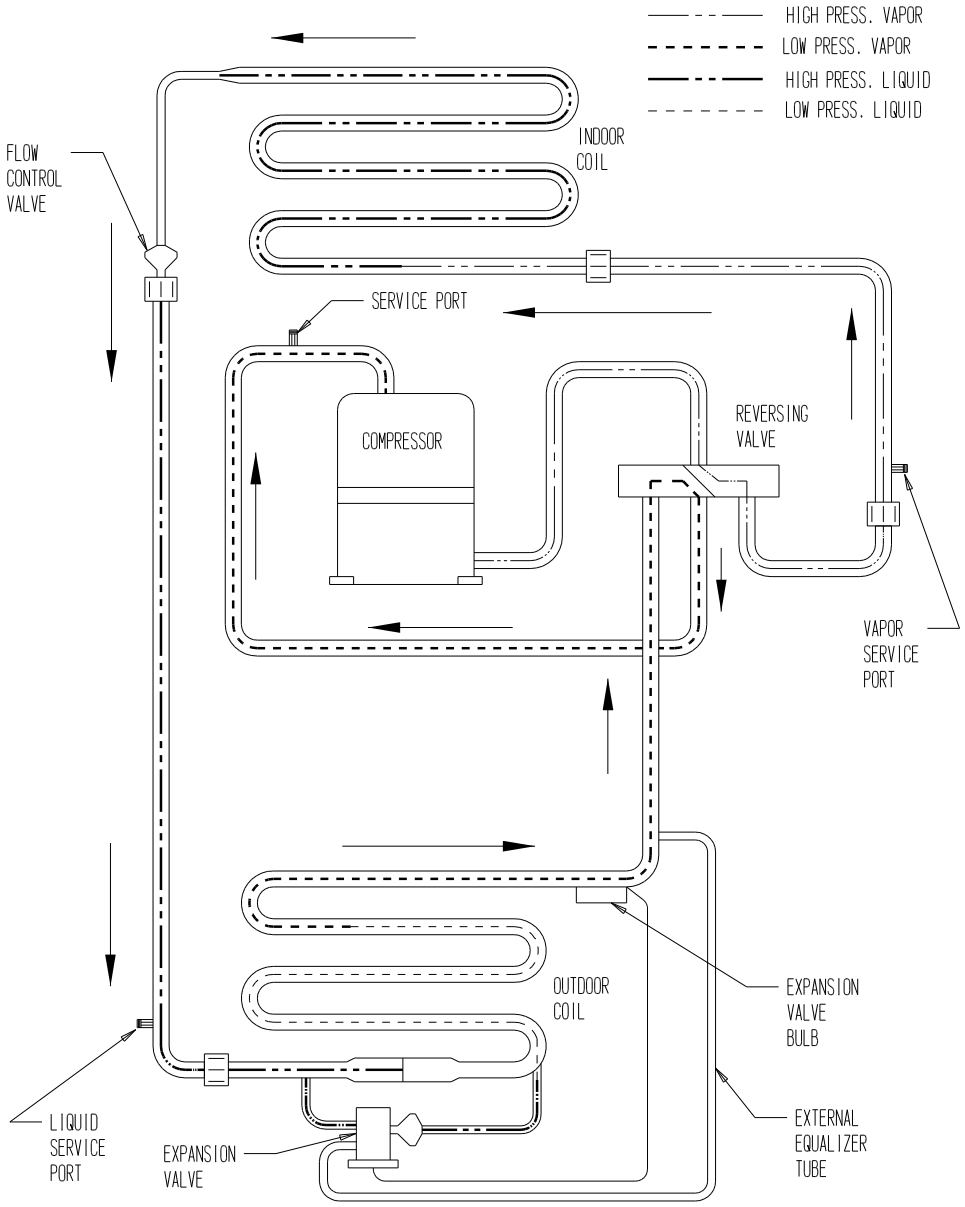


MIS-368

⚠ 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 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 outdoor coil. (Low water .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 through outdoor coil. (Restricted water 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 .
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.

	Power Supply																											Motors				High Pressure Side of System																				Low Side						General					
	Meter to Line Side of Contactor								Load Side of Contactor to Motor Terminal										Control Circuit									Motors				Compressor						System Operation									Condenser Air					Evaporator Air											
	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	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	Faulty Wiring	Loose Terminals	Control Transformer	Low Voltage	Thermostat	Contactor Coil	Pressure Control	Condenser Fan Relay	Evaporator Fan Relay	Compressor Motor	Condenser Motor	Evaporator Motor	Compressor Off on Internal Overload	Hold Down Bolts	Defective Compressor Bearings	Seized Compressor	Defective Compressor Valves	Compressor Oil Level	Open or Short Motor Windings	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 Fins Dirty or Plugged	Condenser Fan Belt Slipping	Condenser Air Short Circuiting	Low Condenser Air Volume	Condenser Air Temperature Low	Plugged or Restricted Metering Device	Evaporator Fins Dirty or Plugged	Evaporator Belt Slipping	Low Evaporator Air Volume	Dirty Filters	Ductwork Small or Restricted	Restrictions	Thermostat Setting	Thermostat Location	Stratified Air in Space	Incorrect Refrigerant Piping	System Too Small
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																							●												◆			●				●										◆	●	●	●	●	●		●	◆	◆	■	●

TROUBLESHOOTING CHART FOR AIR TO AIR HEAT PUMPS

● Denotes common cause.

◆ Denotes occasional cause.

Cycle	Symptom	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			◆	◆																

Cycle	Symptom	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						●								●	●	●		●		

Cycle	Symptom	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 of 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															

USER'S GUIDE

For all Packaged Systems (Air Conditioners and Heat Pumps)

WA & WL - Series Air Conditioners
WH & SH - Series Air Source Heat Pumps

IH - Series Air Source Heat Pumps

QA - Series Air Conditioners
QH - Series Air Source Heat Pumps
QW - Series Water Source Heat Pumps

PA - Series Air Conditioners
PH - Series Air Source Heat Pumps

MANUAL 2100-034 REV. F
SUPERSEDES REV. E
FILE VOL. I, TAB 6

TABLE OF CONTENTS

GENERAL INFORMATION

This manual is generic in nature and 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 others 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.

This manual will address the basic items that should apply to all systems, and will then be separated into specific types of products to cover things unique to those product types.

AIR FILTERS

Keeping clean air filter(s) 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, to keep the system itself clean for peak efficiency and capacity, and to 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 COIL

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 must 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 that the airflow moves through the machine, and if the air inlet side of the coil is hidden, try to observe the back (hidden) side by looking into the side grilles, using 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.

See section on Air-to-Air Heat Pumps for additional information concerning blockage due to heavy snow conditions, if applicable.

ROUTINE EQUIPMENT OUTDOOR MAINTENANCE

1. Avoid having any lawn sprinkler spray directly on the equipment, especially if from a brackish water source.
2. In coastal areas locate equipment the furthest distance away from the coastline as feasible.
3. Frequent cleaning and waxing of the cabinet using a good automobile polish will help extend its original appearance.

BASIC OPERATING PRINCIPLES

AIR CONDITIONERS

COOLING MODE

The cooling mode operates similar to a refrigerator, removing heat from inside the conditioned space and rejects 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 air

stream 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.

HEAT PUMP (Air-to-Air)

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.

HEAT PUMP (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 0 degrees F, 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 there may be steam emit 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 10 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.

HEAT PUMP (Water-to-Air)

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 heats and cools 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 above section for Air Conditioners, except that the outdoor coil uses water instead of air for the heat transfer medium.

HEAT PUMP (HEATING 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 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.

VENTILATION

Many Bard systems have the capability of various ventilation packages available (either factory or field installed) directly into the basic system. These systems can be described as follows:

1. Barometric fresh air damper
2. Motorized fresh air damper
3. Commercial room ventilator
4. Economizer
5. Energy recovery ventilator

All of these ventilation systems, if installed, are different and are used for different reasons. They may also have different control strategies. 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.

DEHUMIDIFICATION CIRCUITS

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.

AUTOMATIC CONTROL SYSTEMS

THERMOSTATS

There are many types of thermostats available to properly control your system, and these can vary in features and some functions depending upon the type of system (air conditioner, heat pump, etc.) installed and any special options (ventilation, supplemental heat, etc.) that may be installed.

Approved compatible thermostats are available from Bard Manufacturing Company for all applications, and since these can vary in numerous features and functions, it is not possible to adequately discuss them all in this User's Guide. Many installers also install thermostats other than those offered by Bard, and must determine proper compatibility prior to installation.

In addition, many schools and similar institutions may utilize central energy management systems (EMS) or direct digital control (DDC) systems.

In all circumstances have your installer, Service Company or building administrator or maintenance department personnel instruct you as to proper operation of your specific thermostat or temperature control system.

HUMIDISTATS (HUMIDITY CONTROLLERS)

All systems with dedicated dehumidification (hot gas reheat) circuits also require a humidity controller (also called humidistat or de-humidistat) in addition to a thermostat for proper control.

The devices may or may not be adjustable, and if adjustable should only be adjusted by the person(s) responsible for overall building control conditions. Normal settings would be somewhere between

50 and 60% Relative Humidity (RH) and typically affords acceptable human comfort conditions for most individuals, and under no circumstances should be set lower than 40% as overcooling of the conditioned space and/or freeze-ups of the indoor coil may occur.

INSUFFICIENT COOLING OR HEATING

In extremely hot or cold weather your system will continue to deliver its normal supply of conditioned air. If the unit operates but fails to provide sufficient comfort, check the following before calling your Service Company:

1. Be sure the thermostat setting is correct.
2. Check the air filters, and replace or clean if dirty.
3. Make sure that air can circulate freely throughout the conditioned space, and that all supply registers and return air grilles are not blocked.
4. Make sure that the outdoor coil is not blocked with any foreign matter, or otherwise restricted with any growth or other items.

FAILURE TO OPERATE

Check the following before calling your Service Company:

1. Be sure the thermostat setting is correct.
2. Check the air filters, and replace or clean if dirty.
3. Make sure that the power supply, and gas or water supplies if applicable, are “On”.
4. Make sure that air can circulate freely throughout the conditioned space, and that all supply registers and return air grilles are not blocked.
5. Make sure that the outdoor coil is not blocked with any foreign matter, or otherwise restricted with any growth or other items.

LUBRICATION REQUIREMENTS

All indoor and outdoor air-moving motors are permanently lubricated, and require no re-oiling. If an Energy Recovery Ventilator (ERV) is installed in your system, have your Service Company inspect annually and perform maintenance as outlined in the ERV Installation and Operating Instructions.

PERIODIC MAINTENANCE

Periodic maintenance must be conducted on your system to insure maximum performance, especially during peak operating periods and conditions.

1. Keeping the air filters clean and recognizing the importance of a clean outdoor coil are key elements. These are user responsibilities, either all or at least in part, and if they cannot be fulfilled by the user, arrangements should be made with your Service Company.
2. There is a condensate drain system for all air conditioners and heat pumps, and this must be kept open and free to convey the condensate generated by the operation of the equipment to a suitable location, typically either an internal drain or outdoor location. Depending upon the specific installation, the user would at least be aware of the dram mechanism and know what to expect.
   If any questions, it should be reviewed and discussed with your installer and/or Service Company.

3. All heating and cooling systems should have periodic inspections made by a trained professional, who has the experience, knowledge, training, licensing, certifications, and the necessary tools and equipment required to do these tasks properly and in accordance with approved or mandated procedures.
4. The maintenance procedures and frequency of routine service can vary depending upon actual type of equipment in use, type of building or facility, and other factors that can impact how often a machine must be serviced.
5. Proper and routine maintenance and service will protect your investment and help extend the service life of the product, and also help ward off more extensive and expensive repairs.

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 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” and 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 upon 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. Keep all supply registers open and all returns free and unrestricted. 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 access 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 1st stage 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 the 2nd stage electric heat, which is not as efficient as the heat pump. The thermostat automatically controls everything, and the backup electric heat will only operate on demand as needed to maintain the desired temperature.
7. The thermostat 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. Since there are many different types of controls available, and can vary depending upon what type of heating/cooling system you may have. 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.

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, 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	N/A	N/A	10 ⑥	LIFETIME ④
PSC "D" Blower Models FC085, FH085D, FH110D, FLF085, FLF110, FLR085, FLR110, FLR140	N/A	N/A	5	LIFETIME ④
SOF: SOF175, SOF265	N/A	N/A	1	10
ACCESSORIES				
Factory/Field Installed Bard Ventilation and Heater Packages	N/A	N/A	5	N/A
Bard branded Thermostats/Temperature Controllers	N/A	N/A	5	N/A
LC1000, LC1500, LC2000, LC5000, LC6000, LV1000, MC4002, DC3003, TEC40, BG1000	N/A	N/A	1	N/A
Humidistats, CO_2 Controllers and all other field installed accessories not listed separately	N/A	N/A	1	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.***