
INSTALLATION AND SERVICE INSTRUCTIONS WITH REPLACEMENT PARTS LIST

LC6000-100 CONTROLLER *Part of the Bard Free Cooling Unit System*

***NOTE: LC6000 Controller is required for operation when multiple
MULTI-TEC® W***AP wall-mount units are used.***



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GENERAL INFORMATION

FREE COOLING UNIT SYSTEM

The Bard Free Cooling Unit system is composed of MULTI-TEC wall-mounted air conditioners matched with an LC6000 first on/next on controller. The wall mounts are specifically engineered for telecom/motor control center rooms.

NOTE: *The LC6000 controller and MULTI-TEC wall-mount units are designed specifically to work together. The LC6000 controller cannot run other Bard models or 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 included shown below.

LC6000 Series



LC6000 Series
Programmable Logic
Controller



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



Remote Temperature/
Humidity Sensor*
Bard P/N 8403-079



Communication
EMI Filters
Bard P/N 8301-055

* One remote temperature/humidity sensor is included with the LC6000 controller. If the site in which the LC-6000 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.

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

These instructions 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.

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.

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.



SECTION 1:

INSTALLATION

INSTRUCTIONS

LIST OF NECESSARY MATERIALS/TOOLS

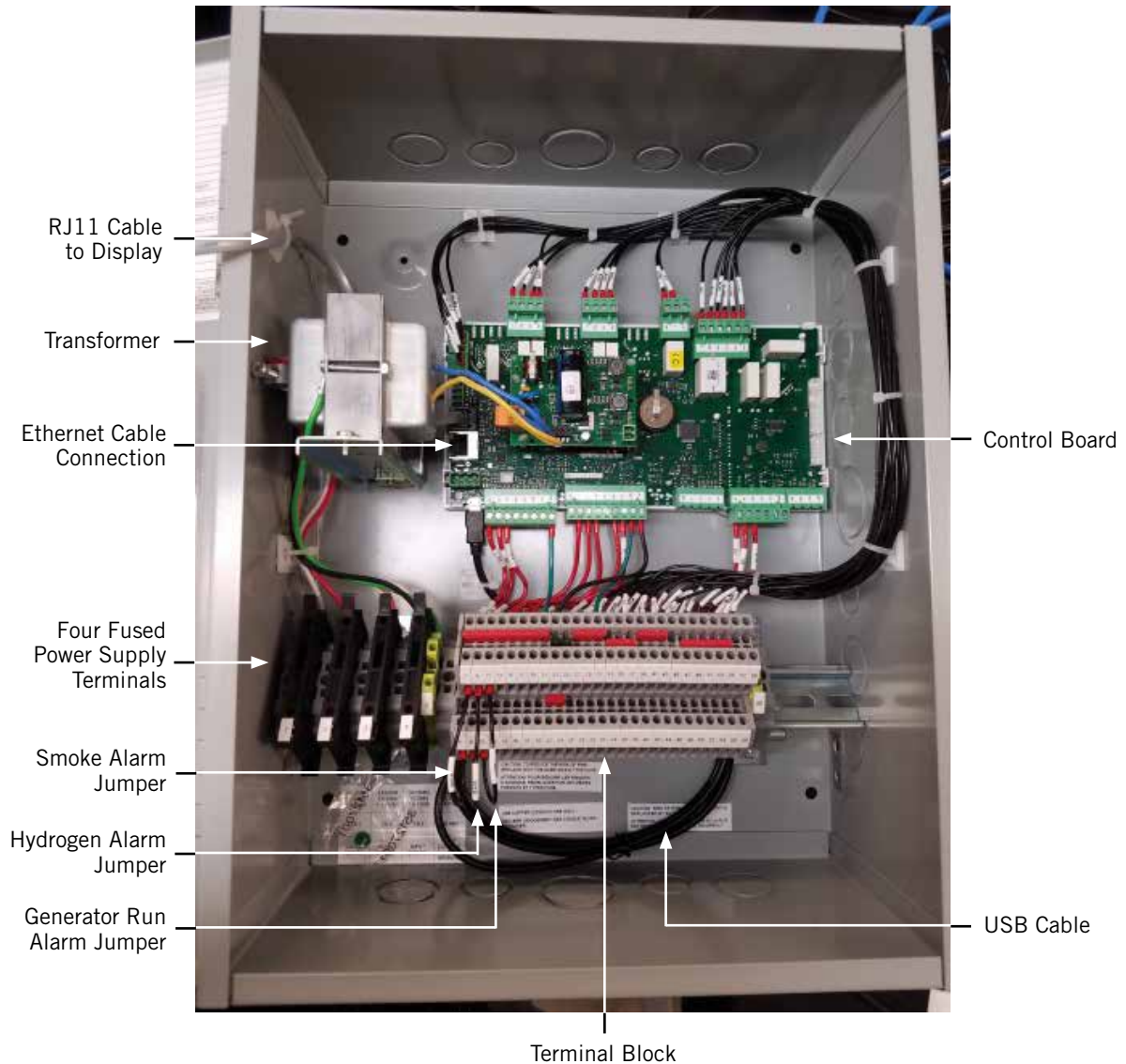
Additional hardware and miscellaneous supplies are needed for installation. These items are field supplied and must be sourced before installation. This list also includes tools needed for installation.

LIST OF MATERIALS/TOOLS

- Personal protective equipment/safety devices
- Miscellaneous hand and power tools and jobsite or shop materials
- Electrical supplies:
 - Various size circuit breakers for the shelter AC breaker box (see unit electrical specifications for requirements)
 - 16 gauge minimum, 14 gauge maximum power wire to connect controller to shelter power source
 - Communication wire: 2-wire, 18 gauge, shielded with drain
 - 5-wire, 18 gauge shielded cable with drain for remote temperature and humidity sensor
 - 18 gauge non-shielded wire for connecting smoke detector, hydrogen detector and/or generator, if applicable, to controller
 - Miscellaneous electrical supplies including rigid/flexible conduit and fittings, junction boxes, wire connectors and supports

LC6000 CONTROLLER INSTALLATION

FIGURE 1.1
Typical LC6000 Component Location



WARNING

Electrical shock hazard.

Disconnect VAC power supplies before servicing.

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

LC6000 CONTROLLER

The LC6000 controller is part of the Free Cooling Unit system by Bard. 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. The LC6000 controller is configured for first on/next on sequence.

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

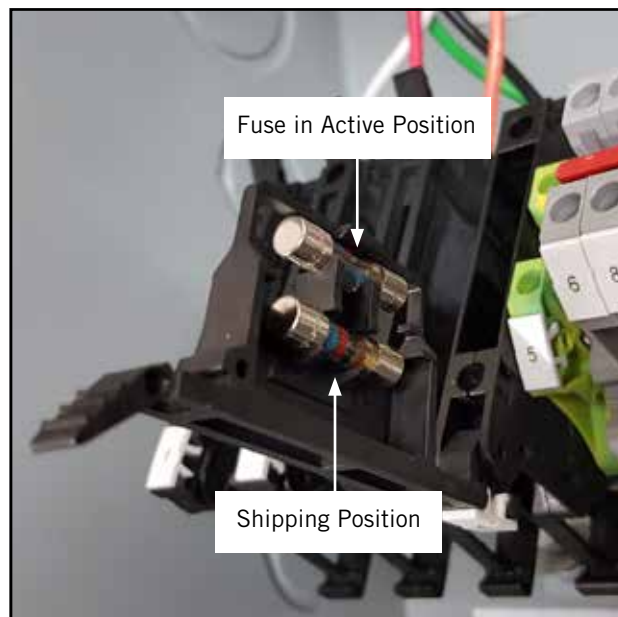
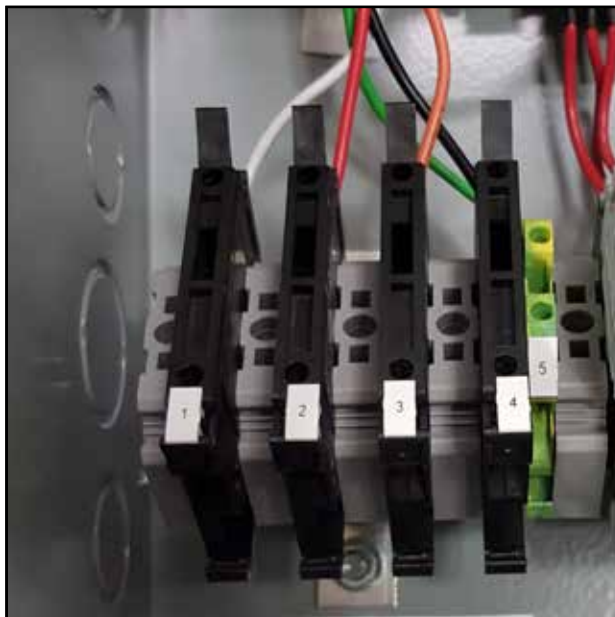
The LC6000 controller is not weatherproof and is intended for use in weathertight structure.

1. Mounting the LC6000 Controller

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 both 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 see Figure 1.2.

FIGURE 1.2
LC6000 Fused Power Supply Terminal



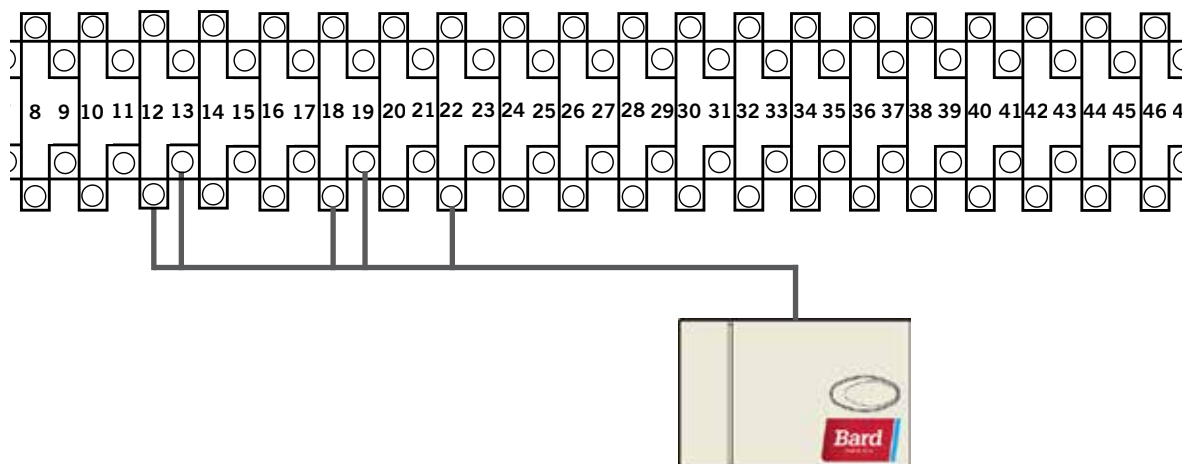
2. Installing Remote Indoor Temperature/Humidity Sensor(s)

One remote indoor temperature/humidity sensor 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 48" above the floor. The sensor should be installed on a junction box to allow for control wire conduit (see Figure 1.3). Use shielded cable to connect to controller.

FIGURE 1.3
Remote Indoor Temperature/Humidity Sensor Installation

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

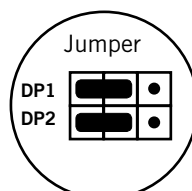
TB#	Wire Mark	Sensor	Description
18	B6	NTC OUT	Indoor Remote Sensor (Zone 1)
19	GND	NTC OUT	Ground
12	B2	OUT H	Remote Indoor Humidity Sensor: 0-1 VDC (Zone 1)
13	GND	M (GO)	Ground
22	+VDC	+ (G)	Power for B2



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.

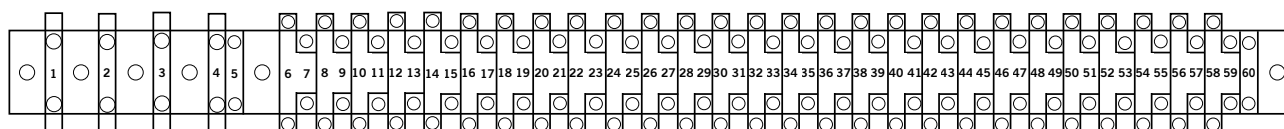
Sensor is best mounted on a junction box, and it is recommended that the cable be in conduit.



For proper operation, the remote indoor temperature/humidity sensor must be configured properly with the controller. If only the single remote indoor temperature/humidity sensor supplied with the controller is installed, the configuration setting is "0". This is the default setting. An additional remote indoor temperature-only sensor can be purchased and installed in Zone 1. Also, temperature and humidity sensors can also be purchased and installed in Zones 2 and 3 (one per zone). For information on remote indoor sensor configuration, see page 23.

FIGURE 1.4
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

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

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

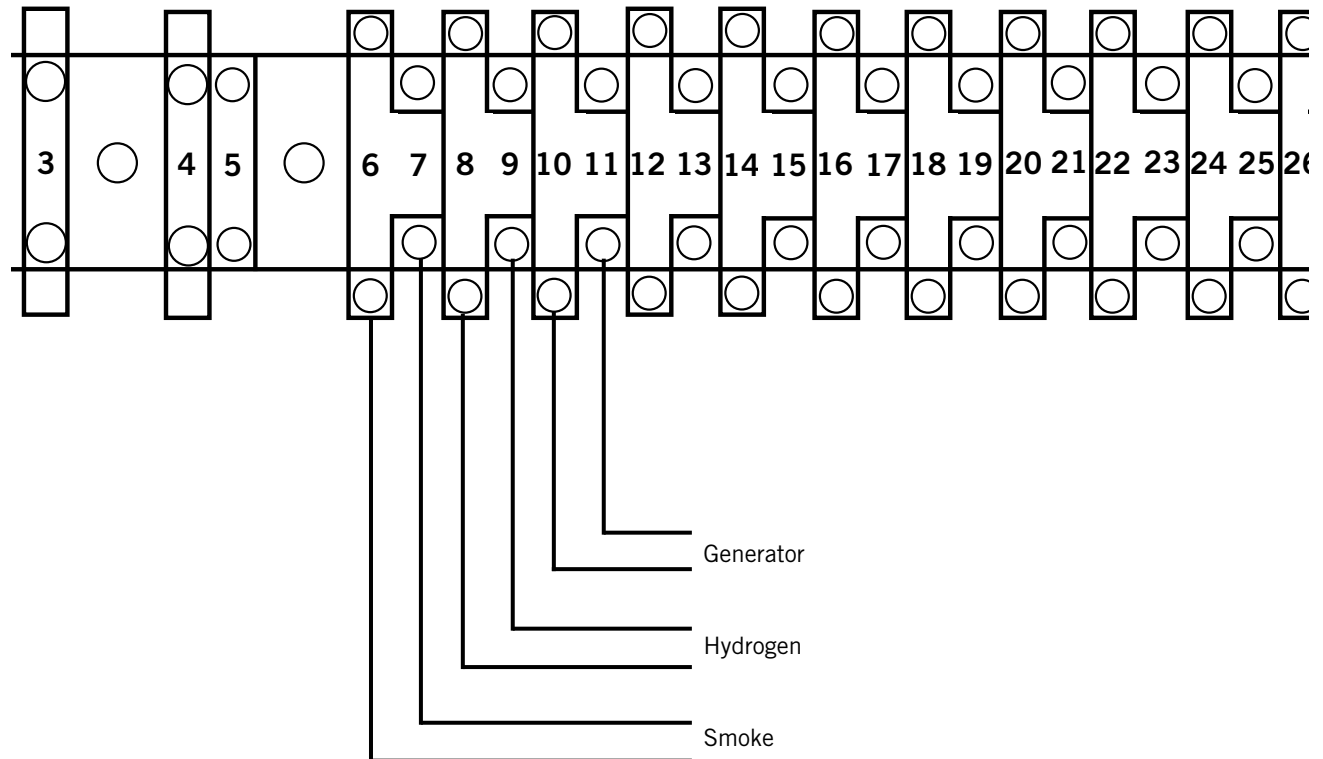
Zones 2 and 3 can also use temperature-only sensors in place of the temperature/humidity sensors. Zone 2 will connect to TB# 26 and 27. Zone 3 will connect to TB# 28 and 29. The wire connections for the temperature-only sensors are not polarity sensitive.

3. Smoke, Hydrogen and Generator Alarms

The LC6000-100 controller is shipped with smoke detector, hydrogen detector and generator run contacts. There are factory-installed jumpers across terminals #6 and #7 (smoke detector), #8 and #9 (hydrogen detector) and #10 and #11 (generator run). Remove the factory-installed jumpers before connecting to the detectors and/or generator.

FIGURE 1.5

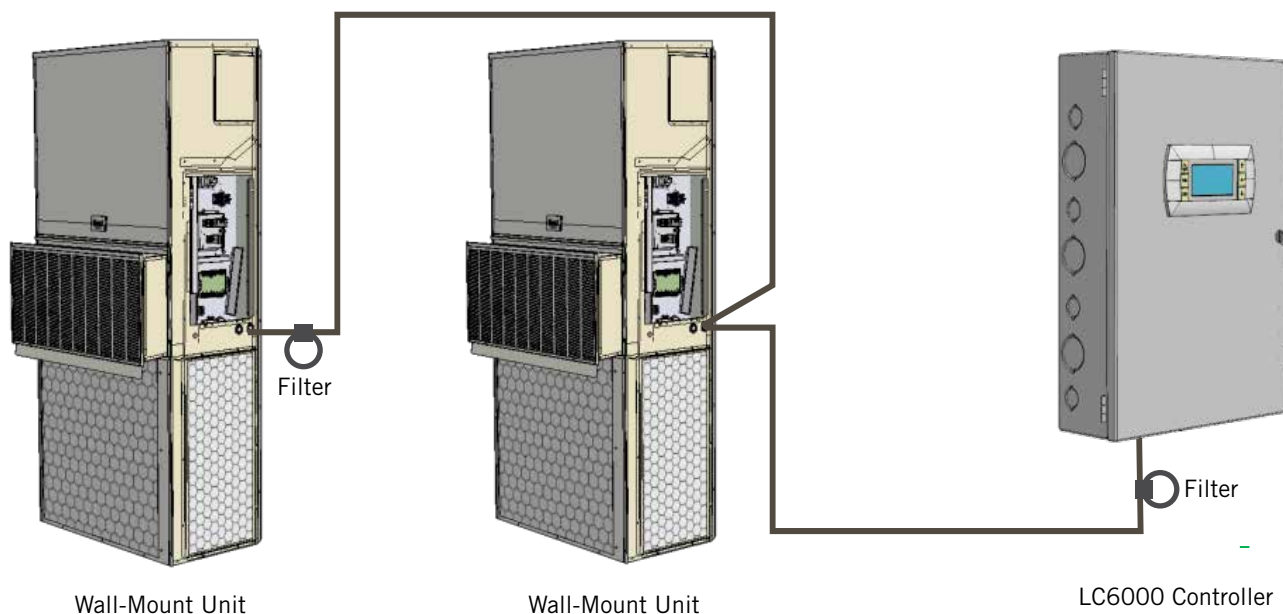
LC6000-100 Series Connection for Smoke Detector, Hydrogen Detector and Generator Run (If Applicable)



4. Communication Wiring

Connect the communication wiring from the wall-mount units to the controller in the manner shown in Figures 1.6, 1.7 or 1.8. 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 1.10 and 1.11 on pages 14 and 15). Attach communication wire filters as shown in Figures 1.6, 1.7 or 1.8. **Do not run communication wiring in same conduit as supply wiring. Route communication wiring and power supply wiring in their own separate conduits.**

FIGURE 1.6
Communication Wiring (Daisy Chain Method)



In addition to the "daisy chain" method of connecting the communication wiring shown in Figure 1.6, the wall-mount units can also be connected in the manner shown in Figure 1.7. If connecting wall-units this way, be sure to place the communication wire filters in the positions shown in Figure 1.7. See Figure 1.8 for more information on the correct placement of the communication wire filters depending on the wiring method used.

FIGURE 1.7
Communication Wiring (Alternate Method)

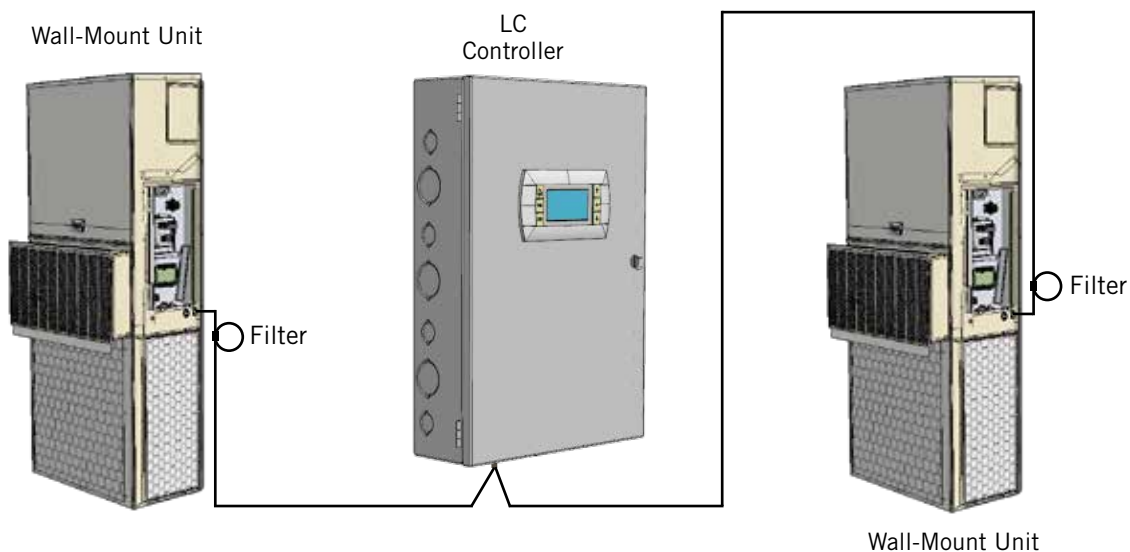
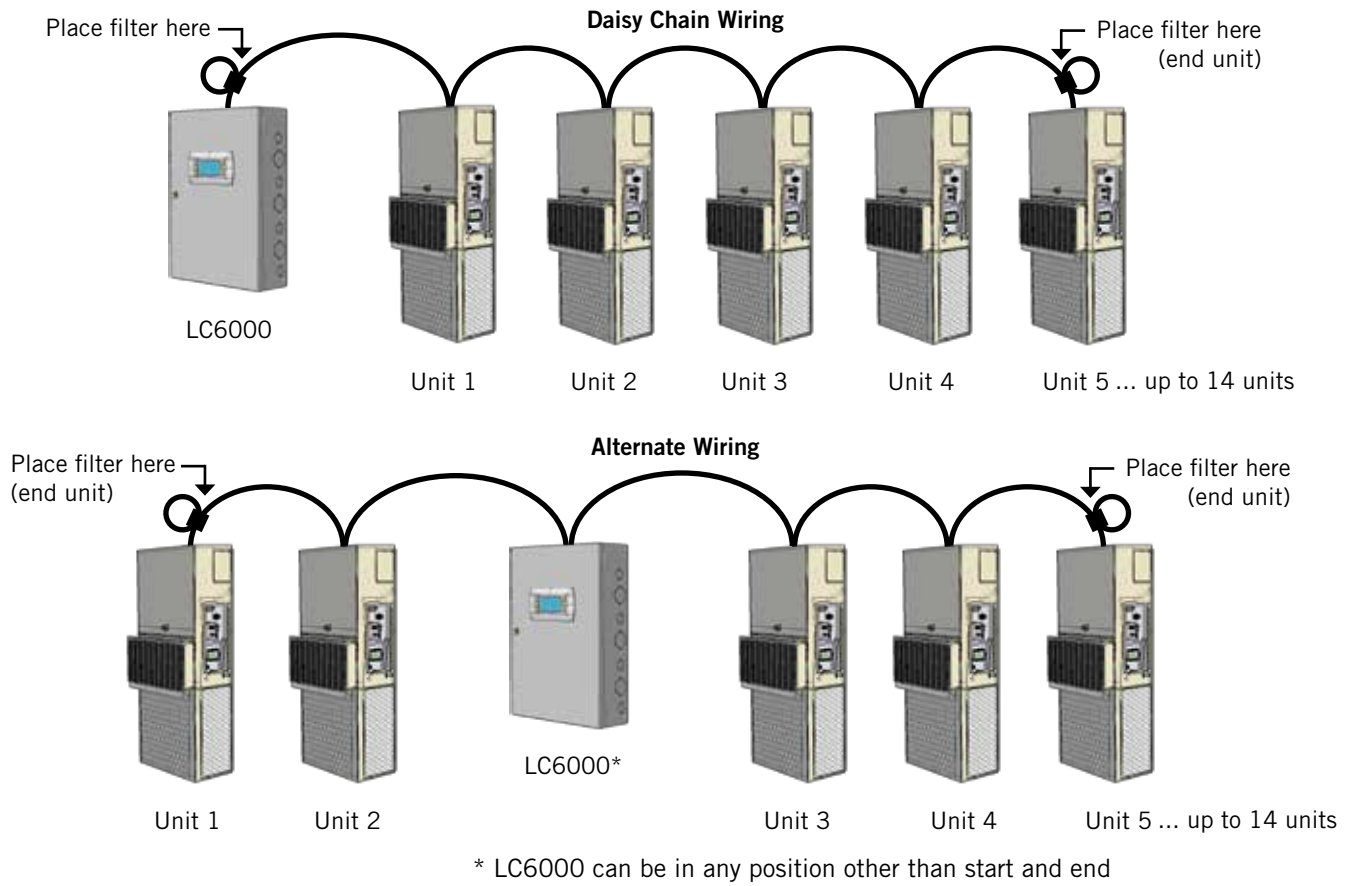


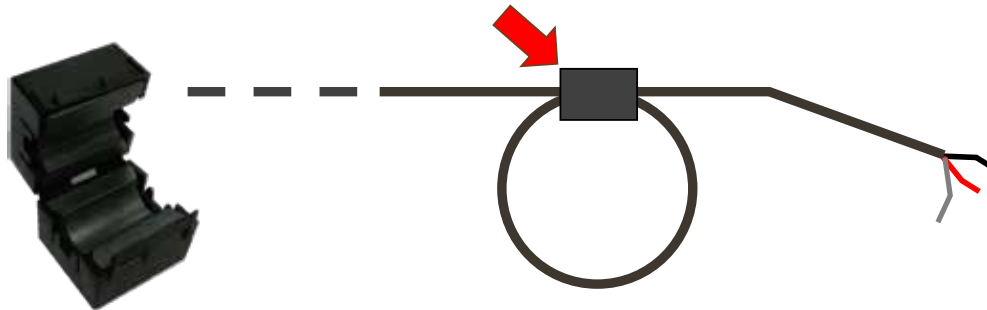
FIGURE 1.8
Placement of Communication Wire Filters (Daisy Chain and Alternate Methods)



The steps outlined on the following pages show how to connect the communication wiring using the daisy chain method shown in Figure 1.6. If using the alternate method (as shown in Figure 1.7), 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 1.8.

FIGURE 1.9
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.

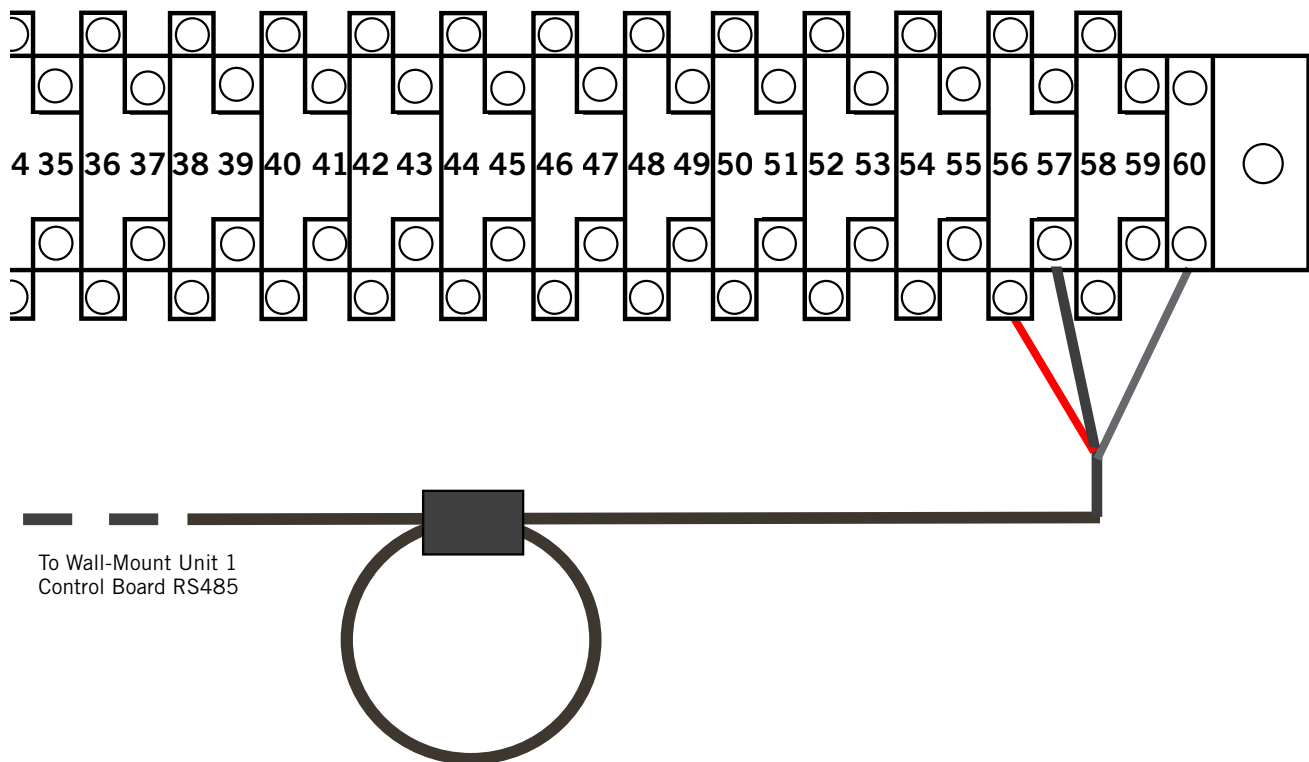
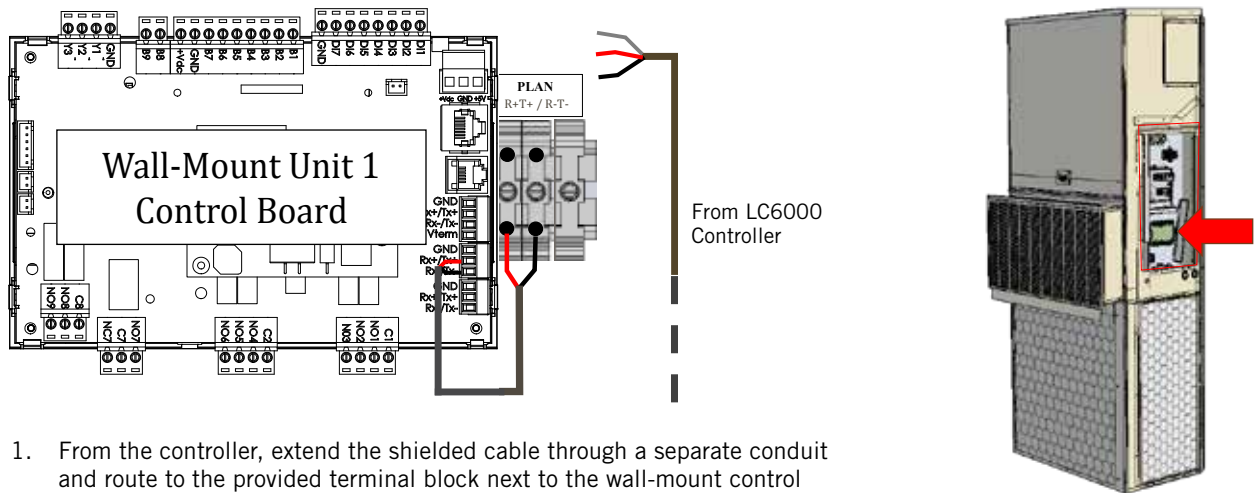
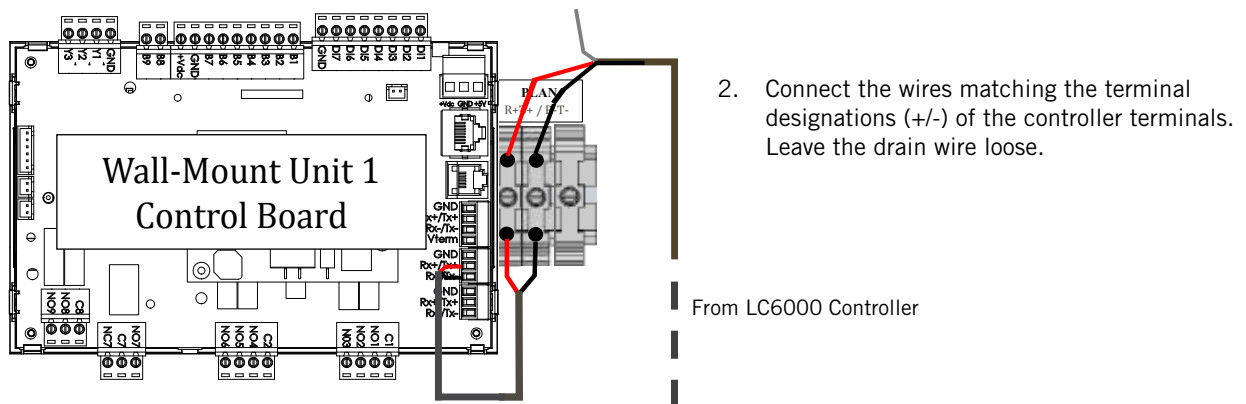


FIGURE 1.10
Communication Wiring: Termination at the First Wall-Mount Unit

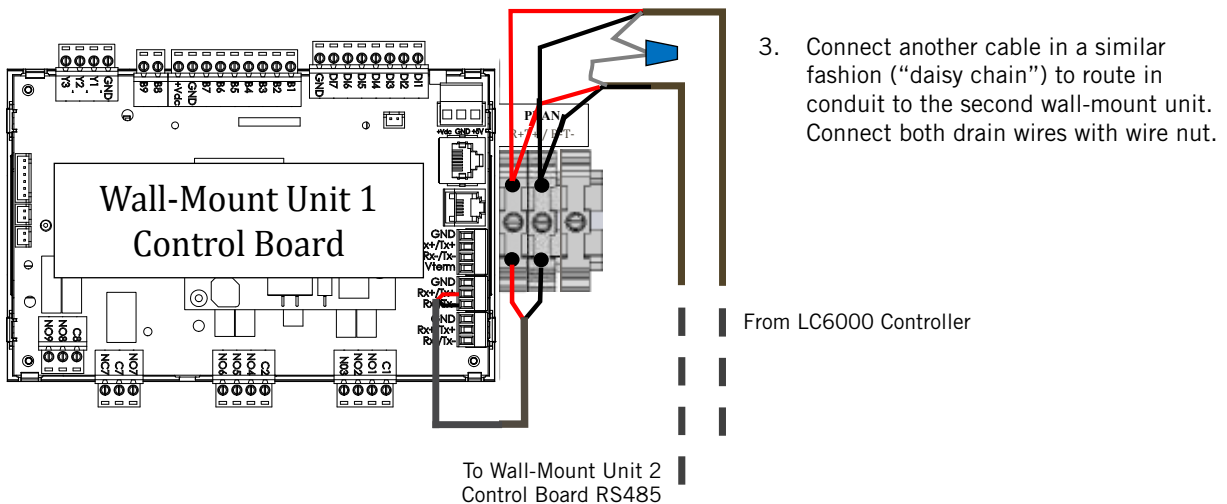


1. From the controller, extend the shielded cable through a separate conduit and route to the provided terminal block next to the wall-mount control board.

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.

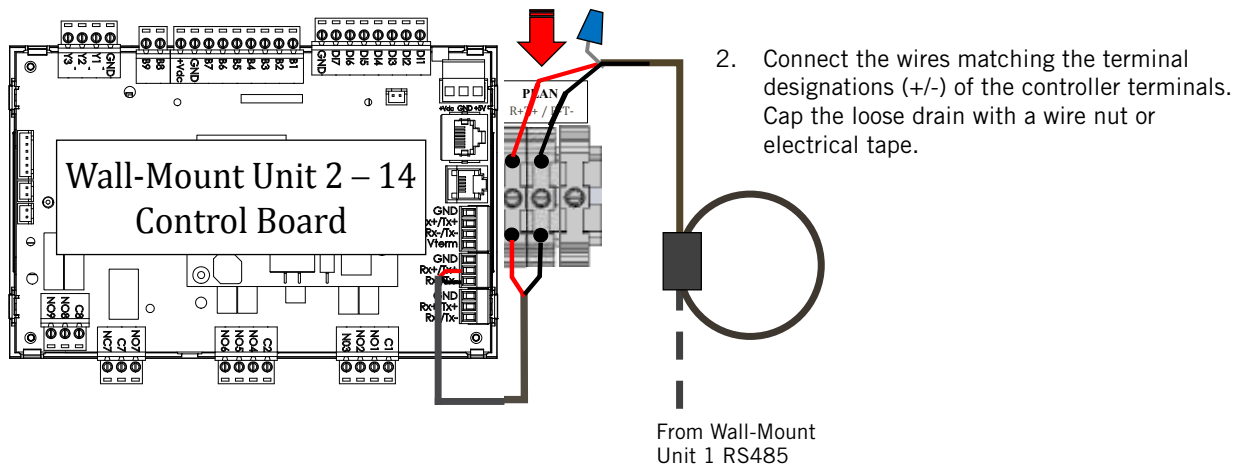
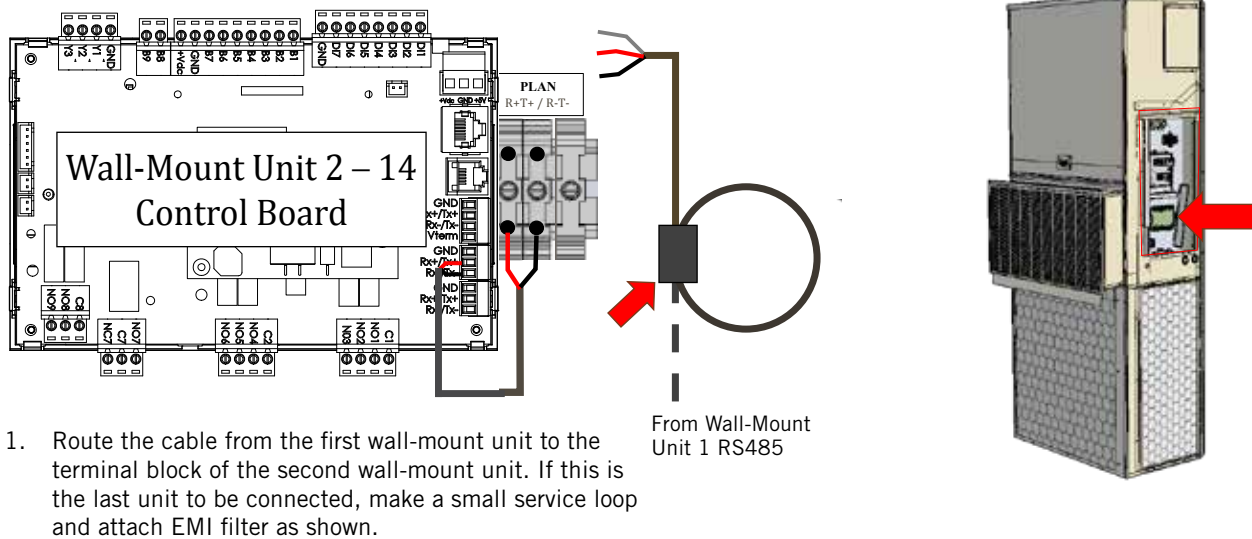


2. Connect the wires matching the terminal designations (+/-) of the controller terminals. Leave the drain wire loose.



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.

FIGURE 1.11
Communication Wiring: Termination at Additional Wall-Mount Units



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.

6. Supply Wiring

The LC6000 controller is powered by 120, 208 or 230 volts from the shelter. Field-supplied supply wiring should be minimum 16 gauge, maximum 14 gauge (see Figure 1.12). A reliable earth ground must be connected in addition to any grounding from conduit. Grounding posts are included with the controller for this purpose; install as shown in Figure 1.13. **Failing to ground the controller box properly could result in damage to the equipment.**

FIGURE 1.12
LC6000 Controller Circuit Install

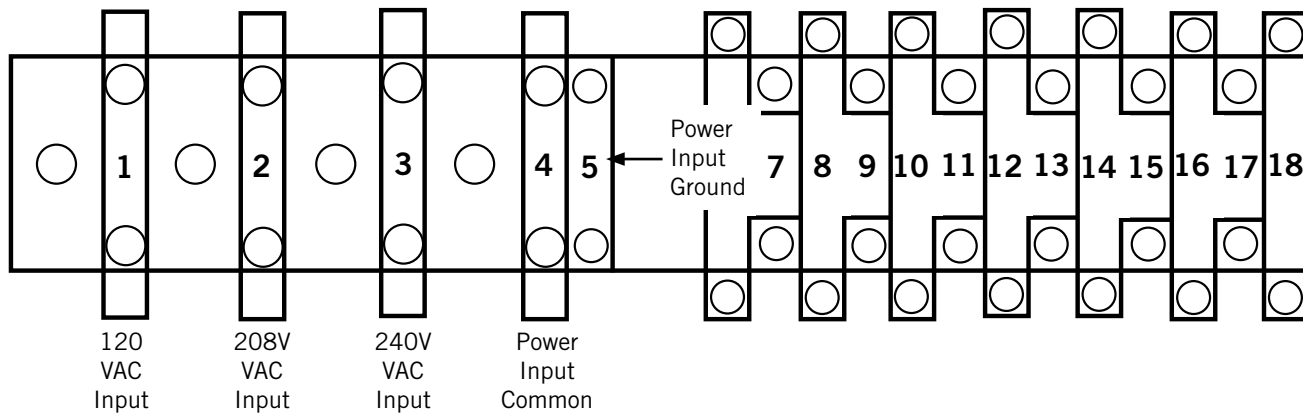


FIGURE 1.13
Controller Grounding Posts

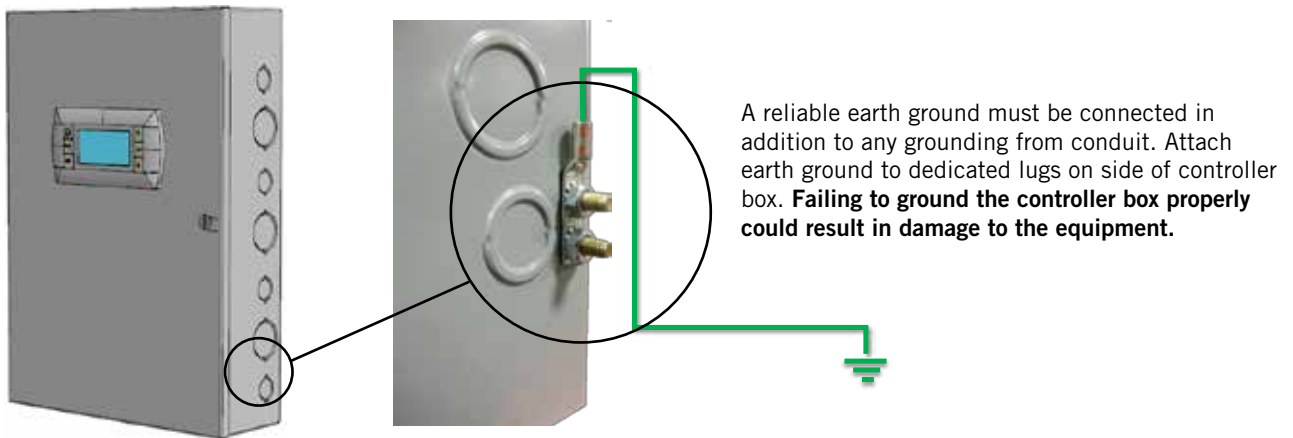
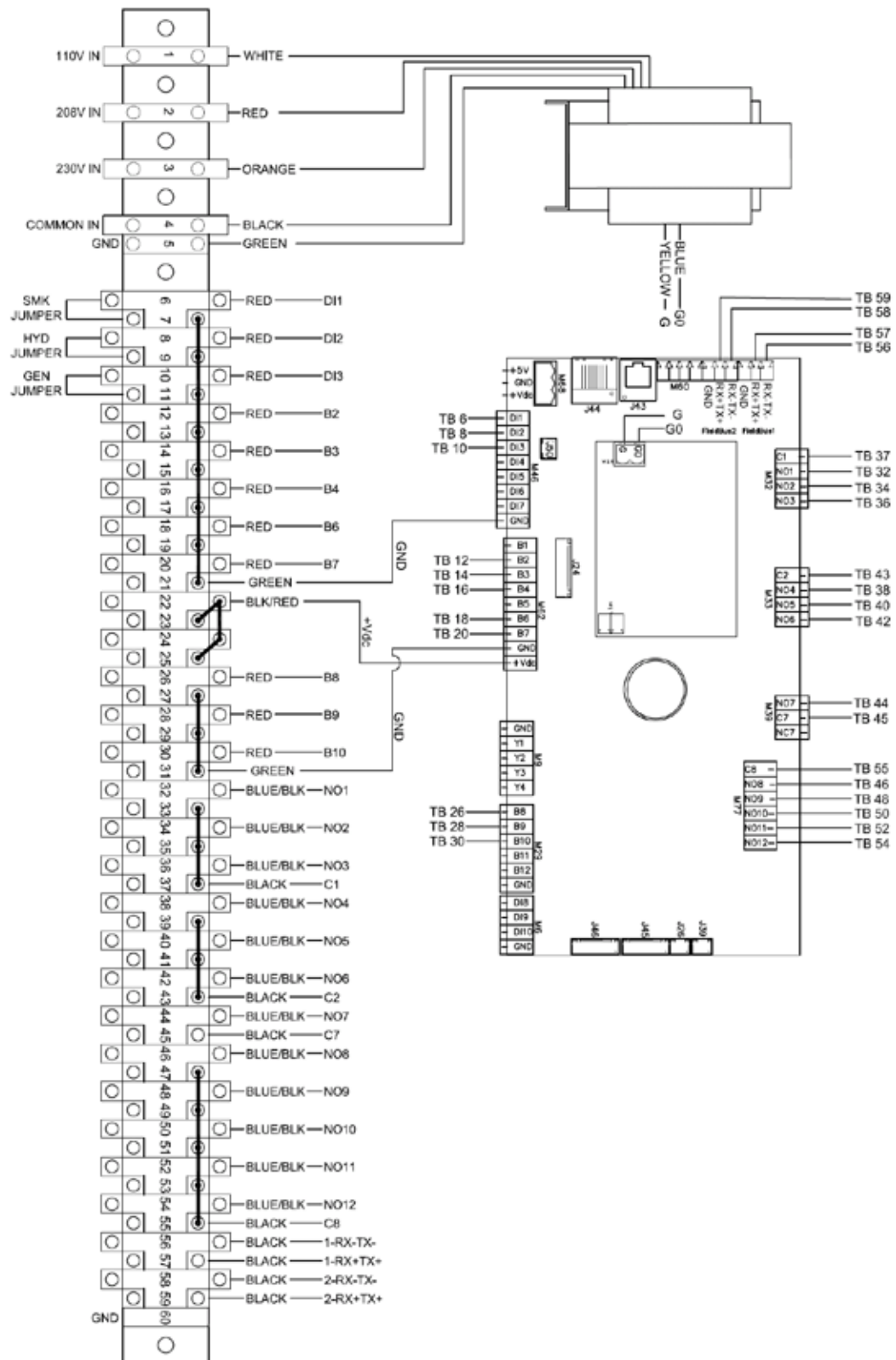


TABLE 1.1
Terminal Block Index

TB#	Wire Mark	Description	TB#	Wire Mark	Description
1	-	115 VAC Input	30	B10	Indoor Space Pressure
2	-	208 VAC Input	31	GND	Ground
3	-	240 VAC Input	32	NO1	Humidifier 1
4	-	Power Input Common	33	C1	Common
5	-	Power Input Ground	34	NO2	Humidifier 2
6	DI1	Smoke Detector Input	35	C1	Common
7	GND	Smoke Detector Common	36	NO3	Humidifier 3
8	DI2	Hydrogen Detector Input	37	C1	Common
9	GND	Hydrogen Detector Common	38	NO4	Smoke Alarm
10	DI3	Generator Run Input	39	C2	Common
11	GND	Generator Run Common	40	NO5	Hydrogen Alarm
12	B2	Indoor Remote Humidity Sensor (Zone 1)	41	C2	Common
13	GND	Ground	42	NO6	Generator Alarm
14	B3	Indoor Remote Humidity Sensor (Zone 2)	43	C2	Common
15	GND	Ground	44	NO7	Indoor Humidity Alarm
16	B4	Indoor Remote Humidity Sensor (Zone 3)	45	C7	Common
17	GND	Ground	46	NO8	High Indoor Temperature Alarm
18	B6	Indoor Temperature Sensor (Zone 1)	47	C8	Common
19	GND	Ground	48	NO9	Low Indoor Temperature Alarm
20	B7	Indoor Remote Temperature Sensor (Zone 1)	49	C8	Common
21	GND	Ground	50	NO10	Zone 1 Unit Alarm
22	VDC+	Power for B2 (Z1 Humidity)	51	C8	Common
23	VDC+	Power for B3 (Z2 Humidity)	52	NO11	Zone 2 Unit Alarm
24	VDC+	Power for B4 (Z3 Humidity)	53	C8	Common
25	VDC+	Power for B10 (Pressure)	54	NO12	Zone 3 Unit Alarm
26	B8	Indoor Remote Temperature Sensor (Zone 2)	55	C8	Common
27	GND	Ground	56	FB1R-	RS485 RX- / TX- (Fieldbus 1)
28	B9	Indoor Remote Temperature Sensor (Zone 3)	57	FB1R+	RS485 RX+ / TX- (Fieldbus 1)
29	GND	Ground	58	FB2R-	RS485 RX- / TX- (Fieldbus 2)
			59	FB2R+	RS485 RX+ / TX- (Fieldbus 2)
			60	-	Ground

FIGURE 1.14
LC6000 Wiring Diagram



SYSTEM START-UP

The LC6000 controller and TEC-EYE™ hand-held diagnostic tool will both be used to set up the Bard Free Cooling Unit system. The TEC-EYE™ diagnostic tool is shipped inside the controller.

TABLE 1.2
Controller Passwords (Defaults)

User	2000
Technician (PW1)	1313
Manufacturer (PW2)	9254
Use UP or DOWN keys and ENTER key to enter password	

LC6000 Controller

The microprocessor control used in the MULTI-TEC wall-mount air conditioners allows for complete control and monitoring through the use of the LC6000 controller.

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 wall-mount unit system.

The controller is completely programmed at the factory; the default setpoints and their ranges are easily viewed and adjusted from the controller 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.

TEC-EYE™ Diagnostic Tool

The TEC-EYE™ hand-held diagnostic tool (see Figure 1.15) is included with each controller and will be extremely valuable to technicians performing maintenance or repair procedures. The TEC-EYE™ connects to the wall-mount unit control board via an RJ11 modular phone connector.

When not being used, the TEC-EYE™ hand-held diagnostic tool should be stored inside the LC6000 controller.

LC6000 and TEC-EYE™ Menu Structure

Quick Menu

- Data Log
- Unit Information
- Setpoints

Main Menu

- System Configuration
- Advanced System Configuration
- I/O Configuration
- On/Off

FIGURE 1.15
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

BACK 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

Alarm Logs
Settings
Logout

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

Interface Acronyms

MAT – Mixed air temperature
RAT – Return air temperature
OAT – Outdoor air temperature
OAH – Outdoor air humidity
Zone 1* – Space temperature and humidity
Zone 2* – If sensor connected
Zone 3* – If sensor connected
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

* Only on LC6000 controller interface

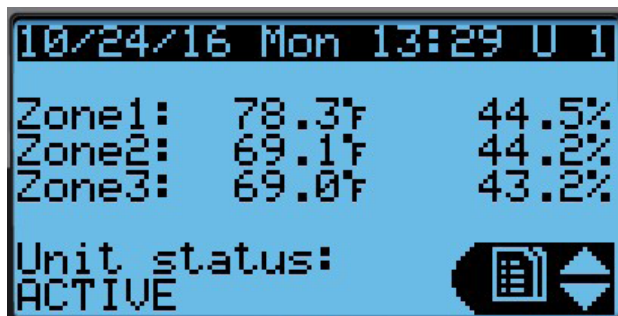
NOTE: Digital refers to On/Off whereas analog is a variable input.

Status Screen

The Status screen is the default start-up screen and also the return screen after 5 minutes of no activity on both the LC6000 and the TEC-EYE™. The screen can be accessed any time by pressing the BACK button repeatedly.

The Status screen on the LC6000 displays the current date, time, unit displayed, zones and unit status (see Figure 1.16).

FIGURE 1.16
LC6000 Status Screen



The Status screen on the TEC-EYE™ displays the wall-mount unit address in the upper right corner (see Figure 1.15). 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.

The Quick Menu is accessible from the Status screen on both the LC6000 and TEC-EYE™. 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 1.17). Press the ENTER key when the desired icon is displayed.

FIGURE 1.17
Quick Menu Icons



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 TEC-EYE for Steps 1-4 and the LC controller for the remaining steps.

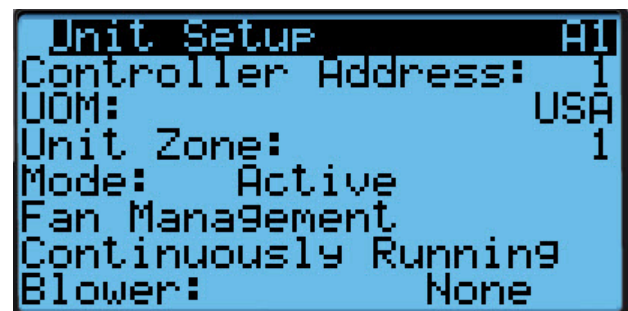
1. Address Wall Unit

The address of the unit being looked at will be listed in the upper right hand corner on the display. 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 USER password 2000.
- 4) Press UP or DOWN keys to scroll to **Sys Config**; press ENTER key.
- 5) Press ENTER key to scroll to **Controller Address** (see Figure 1.18).
- 6) Press UP or DOWN keys to change address to desired value.

NOTE: Addresses must be unique on the LC daisy chain.

FIGURE 1.18
Unit Configuration



2. Select Unit Zone

- 1) Press MENU key on TEC-EYE™ to access the Main Menu screen. Enter password if necessary (see Step 3 under **Address Wall Unit**).
- 2) Press UP or DOWN keys to scroll to **Sys Config**; press ENTER key.
- 3) Press ENTER key to scroll to **Unit Zone** (see Figure 1.16).
- 4) Press UP or DOWN keys to change value to desired zone.

3. Select Unit Mode

- 1) Press MENU key on TEC-EYE™ to access the Main Menu screen. Enter password if necessary (see Step 3 under **Address Wall Unit**).
- 2) Press UP or DOWN keys to scroll to **Sys Config**; press ENTER key.
- 3) Press ENTER key to scroll to **Mode** (see Figure 1.16).
- 4) Press UP or DOWN keys to select **Active**, **Standby**, **Active Locked** or **Standby Locked**.
- 5) Press ENTER key.
- 6) Press BACK key until back at Main Menu.

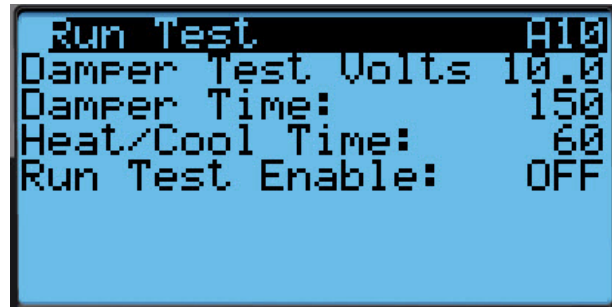
4. Run Test Units

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

- 1) Connect TEC-EYE™ wall-mount unit.
- 2) Press MENU key on TEC-EYE™ to access the Main Menu screen. Enter password if necessary (see Step 3 under **Addressing Wall Units**).
3. Use UP or DOWN keys to scroll to **Sys Config**; press ENTER key.

- 4) Use UP or DOWN keys to scroll to **Run Test (A10)** screen.
- 5) Press ENTER key to scroll to **Run Test Enable** parameter (see Figure 1.19).
- 6) Use UP or DOWN key to change value to ON. The run test will begin.

FIGURE 1.19
Executing Run Test



Run Test Approximate Timings (in Minutes)

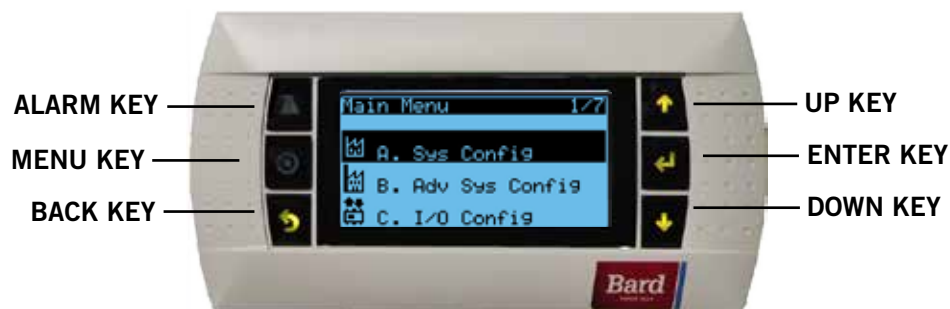
- | | |
|------|--|
| 0:00 | <ul style="list-style-type: none">• Blower starts• Damper begins to open to damper test volts parameter |
| 2:30 | <ul style="list-style-type: none">• Damper begins to close to 0 volts |
| 5:00 | <ul style="list-style-type: none">• Compressor turns on |
| 6:00 | <ul style="list-style-type: none">• Compressor turns off• Heat turns on |
| 7:00 | <ul style="list-style-type: none">• Heat turns off |
| 8:00 | <ul style="list-style-type: none">• Blower turns off |

Parameter Description

Damper Test Volts: This is the control voltage applied to the actuator during opening sequence for damper.

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

FIGURE 1.20
LC6000 Controller Display and Interface (Main Menu Shown)



LC6000 controller interface key functions are the same as shown in Figure 1.15 on page 20.

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

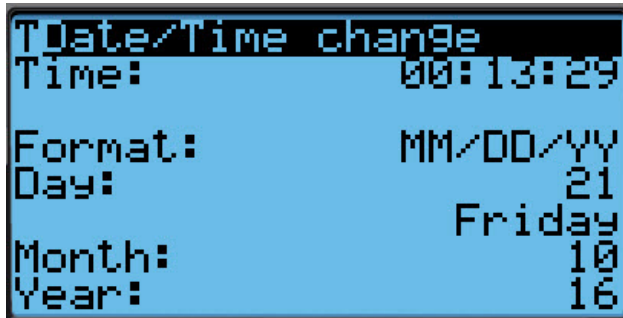
After first unit has been set up and configured, follow Steps 1-4 to set up, configure and run test the remaining units.

5. Set LC Controller Date and Time

Use the LC6000 controller (see Figure 1.20) to continue the system setup process.

- 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 ENTER key to scroll to the desired value to be changed (see Figure 1.21).
- 6) Press UP or DOWN keys to change the value.
- 7) Once date and time are set, press BACK key until back at Main Menu.

FIGURE 1.21
Setting Controller Date and Time



6. Configure Sensors

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.

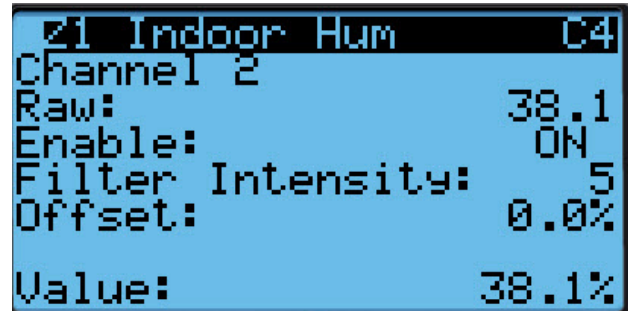
If necessary, the sensors could be calibrated at this time too. For information on calibrating the sensors, see page 39.

To enable/disable **Zone 1 Indoor 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 **Z1 Indoor Hum (C4)**.
- 5) Press ENTER key to scroll to **Enable** (see Figure 1.22).
- 6) Press UP or DOWN key to change value to ON to enable sensor (or change value to OFF to disable sensor).

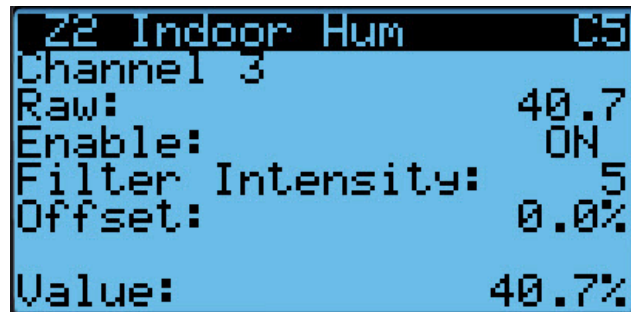
FIGURE 1.22
Enable/Disable Zone 1 Indoor Humidity Sensor



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

- 1) Press MENU key to go to the Main Menu screen.
- 2) 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 Indoor Hum (C5)**.
- 5) Press ENTER key to scroll to **Enable** (see Figure 1.23).
- 6) Press UP or DOWN key to change value to ON to enable sensor (or change value to OFF to disable sensor).

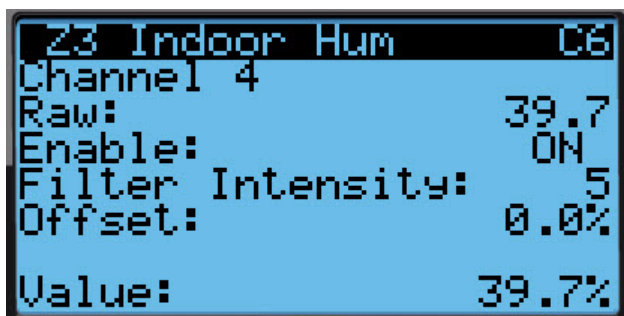
FIGURE 1.23
Enable/Disable Zone 2 Indoor Humidity Sensor



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

- 1) Press MENU key to go to the Main Menu screen.
- 2) 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 Indoor Hum (C6)**.
- 5) Press ENTER key to scroll to **Enable** (see Figure 1.24).
- 6) Press UP or DOWN key to change value to ON to enable sensor (or change value to OFF to disable sensor).

FIGURE 1.24
Enable/Disable Zone 3 Indoor Humidity Sensor

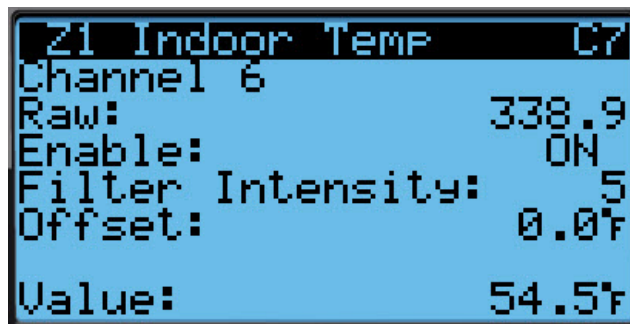


To enable/disable **Zone 1 Indoor Temperature**:

- 1) Press MENU key to go to the Main Menu screen.
- 2) Use UP or DOWN keys and ENTER key to enter USER password 2000.
- 3) Press UP or DOWN keys to scroll to **IO Config**; press ENTER key.
- 4) Press UP or DOWN keys to scroll to **Z1 Indoor Temp (C7)**.
- 5) Press ENTER key to scroll to **Enable** (see Figure 1.25).
- 6) Press UP or DOWN key to change value to ON to enable sensor (or change value to OFF to disable sensor).

FIGURE 1.25

Enable/Disable Zone 1 Indoor Temperature Sensor

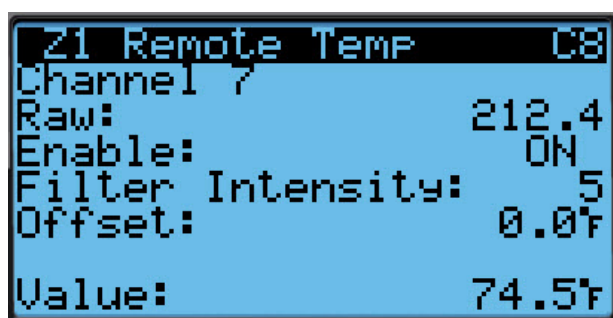


To enable/disable **Zone 1 Remote Temperature**:

- 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 1.26).
- 6) Press UP or DOWN key to change value to ON to enable sensor (or change value to OFF to disable sensor).

FIGURE 1.26

Enable/Disable Zone 1 Remote Temperature Sensor

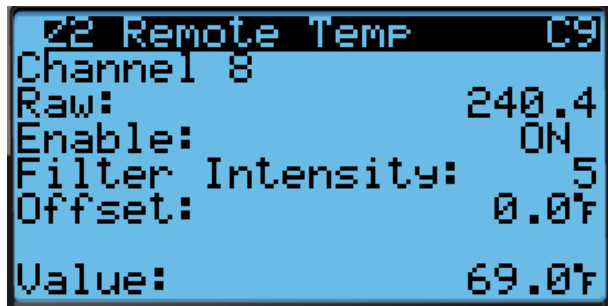


To enable/disable **Zone 2 Remote Temperature**:

- 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 1.27).
- 6) Press UP or DOWN key to change value to ON to enable sensor (or change value to OFF to disable sensor).

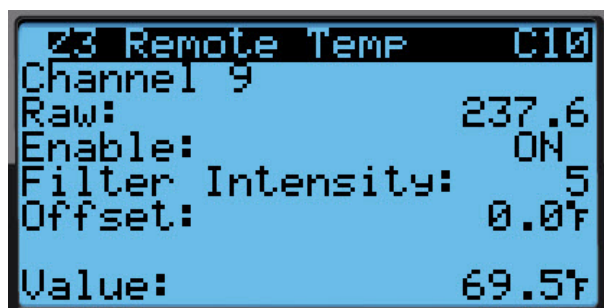
FIGURE 1.27
Enable/Disable Zone 2 Remote Temperature Sensor



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 1.28).
- 6) Press UP or DOWN key to change value to ON to enable sensor (or change value to OFF to disable sensor).

FIGURE 1.28
Enable/Disable Zone 3 Remote Temperature Sensor

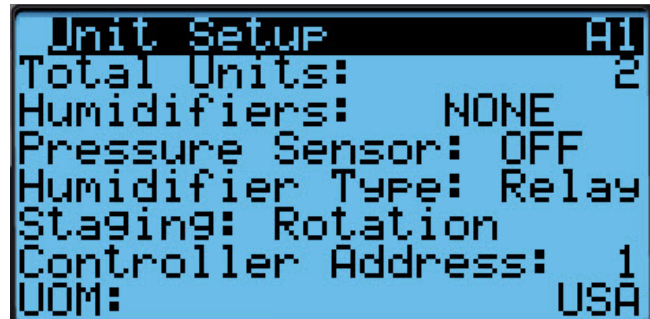


7. Enter Total Units

- 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 **Sys Config**; press ENTER key.
- 4) Press ENTER key to scroll to **Total Units** (see Figure 1.29).
- 5) Press UP or DOWN keys to adjust value to correct number of units.
- 6) Press ENTER key to save value.
- 7) Press BACK key until back at Main Menu.

FIGURE 1.29
Total Units Displayed



8. 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 LC controller information screen.

To view these screens:

- 1) Press BACK 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.

9. Complete Installation

Once all the installation steps have been completed, all alarms 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 the Service Instructions section of this manual.

SECTION 2:

SERVICE

INSTRUCTIONS

ALARMS

Alarm Adjustment

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). After an alarm condition is corrected, the alarm can be cleared by pressing the ALARM key for 3 seconds.

Low Temperature Alarm

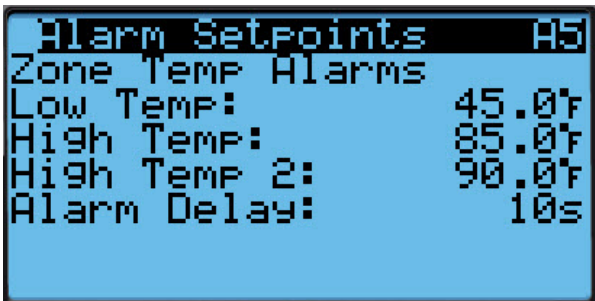
If the lowest temperature sensor value in a zone is below the low temperature setpoint, an alarm will be generated for that zone. Additionally, a relay output will be actuated from the LC controller to provide remote notification of the event.

NOTE: Changing this variable will change the temperature that the alarm will become active for all three zones.

To adjust the low temperature alarm setpoint:

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 **Sys Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Alarm Setpoints (A5)**.
5. Press ENTER key to scroll to the variable labeled **Low Temp** (see Figure 2.1).
6. Press UP or DOWN keys to adjust setpoint.

FIGURE 2.1
Adjust Alarm Setpoints



Alarm Setpoints A5	
Zone Temp Alarms	
Low Temp:	45.0°F
High Temp:	85.0°F
High Temp 2:	90.0°F
Alarm Delay:	10s

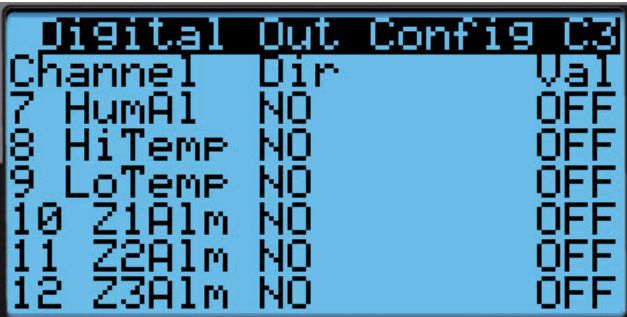
To change the direction of the remote notification relay output: (refer to Table 1.1 on page 18 for relay connection points)

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 **Digital Out Config (C3)**.
5. Press ENTER key to scroll to the variable in the table that intersects **LoTemp** and **Dir** (see Figure 2.2)
6. Press UP or DOWN key to change direction.

When the direction is set to NO, the relay output will be closed when the alarm is active and open when not active. When the direction is set to NC, the relay output will be open when alarm is active and closed when not active.

FIGURE 2.2
Adjust Alarm Remote Notification
Relay Output Direction



Digital Out Config C3		
Channel	Dir	Val
7 HumAl	NO	OFF
8 HiTemp	NO	OFF
9 LoTemp	NO	OFF
10 Z1Alm	NO	OFF
11 Z2Alm	NO	OFF
12 Z3Alm	NO	OFF

High Temperature Alarm

If the highest temperature sensor value in a zone is above the high temperature setpoint, an alarm will be generated for that zone. When this alarm is present, the standby units in this zone will become active.

NOTE: Changing this variable will change the temperature that the alarm will become active for all three zones.

To adjust the high temperature alarm setpoint:

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 **Sys Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Alarm Setpoints (A5)**.
5. Press ENTER key to scroll to the variable labeled **High Temp** (see Figure 2.1).
6. Press UP or DOWN keys to adjust setpoint.

High Temperature Alarm 2

If the highest temperature sensor value in a zone is above the high temperature 2 setpoint, an alarm will be generated for that zone. When this alarm is present, the units will emergency ventilate in this zone. Additionally, a relay output will be actuated from the LC to provide remote notification of the event.

NOTE: *Changing this variable will change the temperature that the alarm will become active for all three zones.*

To adjust the high temperature 2 alarm setpoint:

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 **Sys Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Alarm Setpoints (A5)**.
5. Press ENTER key to scroll to the variable labeled **High Temp 2** (see Figure 2.1).
6. Press UP or DOWN keys to adjust setpoint.

To change the direction of the remote notification relay output: (refer to Table 1.1 on page 18 for relay connection points)

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 **Digital Out Config (C3)**.
5. Press ENTER key to scroll to the variable in the table that intersects **HiTemp** and **Dir** (see Figure 2.2).
6. Press UP or DOWN key to change direction.

When the direction is set to NO, the relay output will be closed when the alarm is active and open when not active. When the direction is set to NC, the relay output will be open when alarm is active and closed when not active.

Smoke Alarm

If the LC gets an input from a smoke detector, an alarm will be generated and all units will be shut down. Additionally, a relay output will be actuated from the LC to provide remote notification of the event.

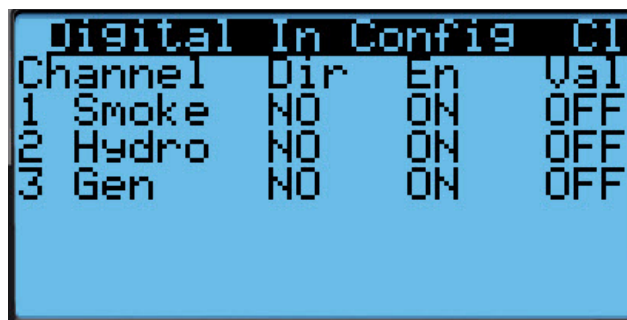
The smoke alarm input can be configured to accept either normally open or normally closed inputs. The controller is defaulted to normally open and a jumper is placed across the terminals of the input. When this jumper is removed, the alarm will become active.

To change the direction of the smoke input:

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 **Digital In Config (C1)**.
5. Press ENTER key to scroll to the variable in the table that intersects **Smoke** and **Dir** (see Figure 2.3).
6. Press UP or DOWN key to change direction.

By changing this value, the input will operate in reverse. When the direction is set to NC, the alarm will be present when the jumper is present or when the device closes the contacts to this input.

FIGURE 2.3
Adjust Smoke, Generator or Hydrogen Alarm Input Direction



Channel	Dir	En	Val
1 Smoke	NO	ON	OFF
2 Hydro	NO	ON	OFF
3 Gen	NO	ON	OFF

To change the direction of the remote notification relay output: (refer to Table 1.1 on page 18 for relay connection points)

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 **Digital Out Config (C2)**.
5. Press ENTER key to scroll to the variable in the table that intersects **Smoke** and **Dir** (see Figure 2.4 on page 30).
6. Press UP or DOWN key to change direction.

When the direction is set to NO, the relay output will be closed when the alarm is active and open when not active. When the direction is set to NC, the relay output will be open when alarm is active and closed when not active.

FIGURE 2.4
Adjust Alarm Remote Notification Relay
Output Direction

Digital Out Config C2		
Channel	Dir	Val
1 HumZ1	NO	OFF
2 HumZ2	NO	OFF
3 HumZ3	NO	OFF
4 Smoke	NO	OFF
5 Gen	NO	OFF
6 Hydro	NO	OFF

Generator Alarm

If the LC detects a generator running event (through a digital input), an alarm will be generated. Additionally, a relay output will be actuated from the LC to provide remote notification of the event. The end user will be able to configure which units are permitted to run during this event. Default will be to not allow any units to run.

The generator alarm input can be configured to accept either normally open or normally closed inputs. The controller is defaulted to normally open and a jumper is placed across the terminals of the input. When this jumper is removed, the alarm will become active.

To change the direction of the generator input:

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 **Digital In Config (C1)**.
5. Press ENTER key to scroll to the variable in the table that intersects **Gen** and **Dir** (see Figure 2.3 on page 27).
6. Press UP or DOWN key to change direction.

By changing this value, the input will operate in reverse. When the direction is set to NC, the alarm will be present when the jumper is present or when the device closes the contacts to this input.

To change the direction of the remote notification relay output: (refer to Table 1.1 on page 18 for relay connection points)

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 **Digital Out Config (C2)**.
5. Press ENTER key to scroll to the variable in the table that intersects **Gen** and **Dir** (see Figure 2.4).
6. Press UP or DOWN key to change direction.

When the direction is set to NO, the relay output will be closed when the alarm is active and open when not active. When the direction is set to NC, the relay output will be open when alarm is active and closed when not active.

Hydrogen Alarm

If the LC detects a hydrogen event (through a digital input), an alarm will be generated and the wall units will all be put into emergency ventilation by the LC. Additionally, a relay output will be actuated from the LC to provide remote notification of the event. The end user will be able to configure which zones ventilate during this event.

The hydrogen alarm input can be configured to accept either normally open or normally closed inputs. The controller is defaulted to normally open and a jumper is placed across the terminals of the input. When this jumper is removed, the alarm will become active.

To change the direction of the hydrogen input:

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 **Digital In Config (C1)**.
5. Press ENTER key to scroll to the variable in the table that intersects **Hydro** and **Dir** (see Figure 2.3 on page 29).
6. Press UP or DOWN key to change direction.

By changing this value, the input will operate in reverse. When the direction is set to NC, the alarm will be present when the jumper is present or when the device closes the contacts to this input.

To change the direction of the remote notification relay output: (refer to Table 1.1 on page 18 for relay connection points)

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 **Digital Out Config (C2)**.

5. Press ENTER key to scroll to the variable in the table that intersects **Hydro** and **Dir** (see Figure 2.4).
6. Press UP or DOWN key to change direction.

When the direction is set to NO, the relay output will be closed when the alarm is active and open when not active. When the direction is set to NC, the relay output will be open when alarm is active and closed when not active.

Zone Unit Alarm

If any of the units communicate a high pressure or low pressure alarm to the LC, the LC will actuate a relay output to provide remote notification of the event. A relay output will be actuated from the LC to provide remote notification of the event for each zone.

To change the direction of the remote notification relay output: (refer to Table 1.1 on page 18 for relay connection points)

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 **Digital Out Config (C3)**.
5. Press ENTER key to scroll to the variable in the table that intersects **Z1Alm** and **Dir**, **Z2Alm** and **Dir**, or **Z3Alm** and **Dir** (see Figure 2.2 on page 28).
6. Press UP or DOWN key to change direction.

When the direction is set to NO, the relay output will be closed when the alarm is active and open when not active. When the direction is set to NC, the relay output will be open when alarm is active and closed when not active.

The zone alarms can be configured to actuate based on 13 alarms communicated from each wall unit. These items can be selected for each zone.

To select which wall unit alarms actuate zone alarms:

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 **Adv Sys Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Zone Alarm Config (B6)**, **Zone Alarm Config (B7)** and **Zone Alarm Config (B8)**. The 13 alarms are divided between these three screens.
5. Press ENTER key to scroll to the variable in the table that intersects with each alarm and zone number (see Figure 2.5).

6. Press UP or DOWN key to change value (N or Y).
If a value of Y is entered, the wall unit alarm will trigger the zone alarm relay output. If a value of N is entered, the wall unit alarm will not trigger the zone alarm relay output.

NOTE: By default, only high and low pressure actuate the alarms.

FIGURE 2.5
Adjust Zone Alarm Configuration

		Z1	Z2	Z3
MAT Sens.		N	N	N
OAT Sens.		N	N	N
RAT Sens.		N	N	N
OAH Sens.		N	N	N

	Z1	Z2	Z3
Frz. Sens.	N	N	N
High MAT	N	N	N
Low MAT	N	N	N
Low Press.	Y	Y	Y
DAMP. Open	N	N	N
DAMP Close	N	N	N

	Z1	Z2	Z3
Coil Frz.	N	N	N
Hi Press.	Y	Y	Y
Smoke	N	N	N

Humidity Alarm

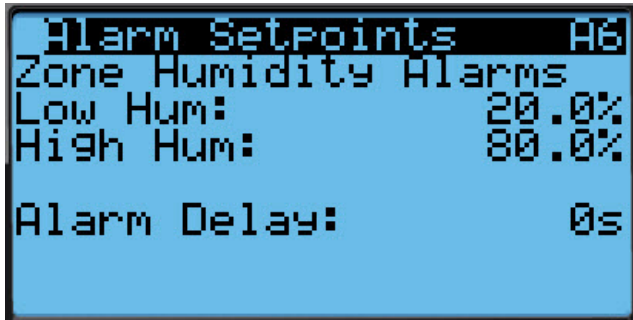
When the LC detects a high indoor humidity or low indoor humidity event (through an analog input from a remote sensor), an alarm will be generated. Additionally, a relay output will be actuated from the LC to provide remote notification of the event. The end user can configure the alarm to be actuated when the measurement is high, low or both high and low.

To adjust the humidity alarm setpoints:

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 **Sys Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Alarm Setpoints (A6)**.
5. Press ENTER key to scroll to **Low Hum**, **High Hum** or **Alarm Delay** (delay in seconds from the time the alarm is sensed until the alarm is displayed). See Figure 2.6.
6. Press UP and DOWN keys to adjust setpoint.

FIGURE 2.6
Adjust Humidity Alarm Setpoints



To adjust the direction of the remote notification relay output: (refer to Table 1.1 on page 18 for relay connection points)

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 **Digital Out Config (C3)**.
5. Press ENTER key to scroll to the variable in the table that intersects **HumAI** and **Dir** (see Figure 2.2 on page 28).
6. Press UP or DOWN key to change direction.

When the direction is set to NO, the relay output will be closed when the alarm is active and open when not active. When the direction is set to NC, the relay output will be open when alarm is active and closed when not active.

Temperature Control

Control Value Averaging

The LC will average all of the zone temperature sensors connected to the LC and the return air temperature sensors connected to the wall unit. This happens for each zone. This value will then be used as a **control value** for the LC and wall units.

Comfort Mode

If comfort mode is activated, all of the zone setpoints will be set to 72°F for cooling and 70°F (Comfort Setpoint -2) for heating. This setpoint will be active for 60 minutes.

To enable comfort mode:

1. Press UP or DOWN key while on the Status screen to select **Setpoints** () from the Quick Menu options; press ENTER key.
2. Press ENTER key to scroll to **Comfort Mode**.
3. Press UP or DOWN keys to change the duration of comfort mode.
4. Press ENTER key to scroll to **Comfort Setpoint**.
5. Press UP and DOWN keys to change the cooling setpoint for comfort mode.
6. Press ENTER key to scroll to **Comfort Enable**.
7. Press UP or DOWN key to change value from OFF to ON; press ENTER key.

The system is now in comfort mode and will cool to the comfort setpoint for the duration previously set.

Unit Staging

(see Figure 2.7)

Unit staging only determines in what order and at what temperature the units are available for cooling and heating. The LC does not turn on blowers, economizers, compressors or heat by temps and differentials set in the controller. These functions are controlled at the individual units. For additional information, see the wall-mount unit manual.

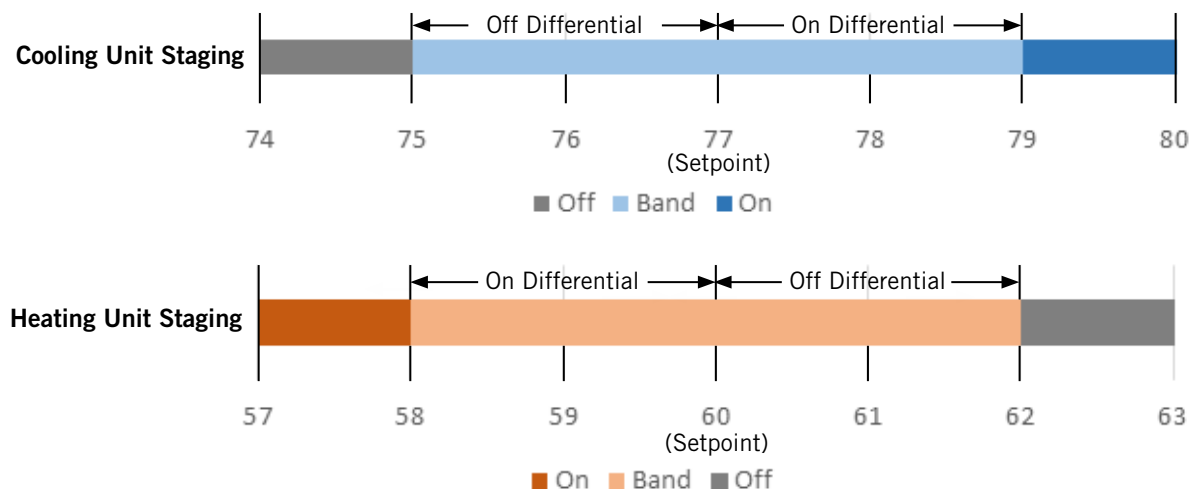
Cooling

The LC will compare the **control value** for each zone to the cooling setpoint for each zone. If the **control value** is above 79°F (Setpoint + On Differential), the LC will increase the amount of units on in that zone. If the **control value** stays above 79°F for 120 seconds (Delay On), another unit will be turned on in that zone. The LC will continue to stage units on with a 120-second delay until the **control value** is below 79°F. If the **control value** goes below 75°F (Setpoint + Off Differential), the LC will stage a unit off in that zone. If the **control value** remains below 75°F for 60 seconds (Delay Off), the LC will stage another unit off in that zone. The LC will continue to stage units off with a 60-second delay in that zone until the **control value** is above 75°F.

To adjust the unit staging cooling setpoint:

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 **Sys Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Zone Setpoints (A3)**.

FIGURE 2.7
LC6000 Controller Unit Staging



- Press ENTER key to scroll to **Zone 1 Cool, Zone 2 Cool** or **Zone 3 Cool** (see Figure 2.8).
- Press UP and DOWN keys to adjust the setpoint to the desired value.

NOTE: The setpoint is a reference and can be used to quickly move the cooling range up or down.

FIGURE 2.8
Change Unit Staging Cooling Setpoint

Zone Setpoints				A3
Zone 1	Cool		77.0°F	
Zone 1	Heat:		59.9°F	
Zone 2	Cool:		77.0°F	
Zone 2	Heat:		59.9°F	
Zone 3	Cool:		77.0°F	
Zone 3	Heat:		59.9°F	

To change the unit staging cooling differentials or delays:

- Press MENU key to go to the Main Menu screen.
- Use UP or DOWN keys and ENTER key to enter USER password 2000.
- Press UP or DOWN keys to scroll to **Sys Config**; press ENTER key.
- Press UP or DOWN keys to scroll to **Unit Staging (A8)**, **Unit Staging (A10)** or **Unit Staging (A12)**.
- Press ENTER key to scroll to **On Differential**, **Off Differential**, **DelayON** or **DelayOFF** value (see Figure 2.9).
- Press UP and DOWN keys to change the value.

Changing the differentials will affect when units are staged on and off in relation to the setpoint. Changing the delays will affect how long above or below another unit is added or removed.

FIGURE 2.9
Change Unit Staging Cooling Differentials

Unit Staging				A8
Zone 1	Cool			
Direction:			Direct	
Stages:			3	
On Differential:			2.0	
Off Differential:			2.0	
DelayON:			120s	
DelayOFF:			60s	
Setpoint:			77.0	

Heating

The LC will compare the **control value** for each zone to the heating setpoint for each zone. If the **control value** is below 58°F (Setpoint + Off Differential), the LC will increase the amount of units on in that zone. If the **control value** stays below 58°F for 120 seconds (Delay Off), another unit will be turned on in that zone. The LC will continue to stage units on with a 120-second delay until the **control value** is above 58°F. If the **control value** goes above 62°F (Setpoint + On Differential), the LC will stage a unit off in that zone. If the **control value** remains above 62°F for 60 seconds (Delay On), the LC will stage another unit off in that zone. The LC will continue to stage units off with a 60-second delay in that zone until the **control value** is below 62°F.

To adjust the unit staging heating setpoint:

- Press MENU key to go to the Main Menu screen.
- Use UP or DOWN keys and ENTER key to enter USER password 2000.
- Press UP or DOWN keys to scroll to **Sys Config**; press ENTER key.
- Press UP or DOWN keys to scroll to **Zone Setpoints (A3)**.
- Press ENTER key to scroll to **Zone 1 Heat, Zone 2 Heat** or **Zone 3 Heat** (see Figure 2.8).
- Press UP and DOWN keys to adjust the setpoint to the desired value.
- Press ENTER key to save.

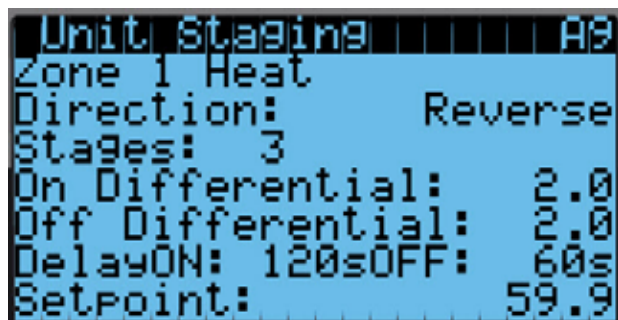
NOTE: The setpoint is a reference and can be used to quickly move the cooling range up or down.

To change the unit staging heating differentials or delays:

- Press MENU key to go to the Main Menu screen.
- Use UP or DOWN keys and ENTER key to enter USER password 2000.
- Press UP or DOWN keys to scroll to **Sys Config**; press ENTER key.
- Press UP or DOWN keys to scroll to **Unit Staging (A9)**, **Unit Staging (A11)** or **Unit Staging (A13)**.
- Press ENTER key to move the cursor to **On Differential**, **Off Differential**, **DelayON** or **DelayOFF** value (see Figure 2.10).
- Press UP and DOWN keys to change the value.
- Press ENTER key to save.

Changing the differentials will affect when units are staged on and off in relation to the setpoint. Changing the delays will affect how long above or below another unit is added or removed.

FIGURE 2.10
Change Unit Staging Heating Differentials



Unit Staging Options

The LC will turn on or off the units in each zone by using one of two user-selectable options—unit rotation or temperature priority. Unit rotation will enable units based on a sequential rotation that is intended to provide even run times for all equipment; temperature priority will enable units based on which unit has the highest demand (using the return air sensor).

To select between the two staging options:

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 **Sys Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Unit Setup (A1)**.
5. Press ENTER key to scroll to **Staging** (see Figure 2.11).
6. Press UP and DOWN key to change the value to the desired method (Rotation is default).

FIGURE 2.11
Change Unit Staging Option



Unit Rotation (Default)

The LC will rotate the order in which units are turned on in each zone. Only units with the mode "active" can be rotated. If a unit mode is set to "standby", the unit will be staged on when an active unit goes into an alarm state. The standby unit will be staged off as soon

as the alarm state is cleared on the active unit. The rotation can be activated based on time, demand and a manual rotation setting.

To change the unit rotation settings:

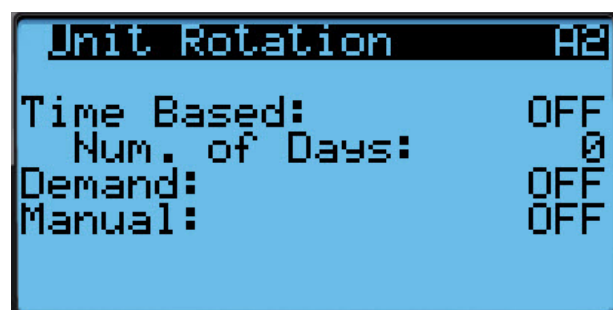
1. Press MENU key to go to the Main Menu screen.
2. Use UP or DOWN keys and ENTER key to enter USER password 2000.
3. Press UP or DOWN keys to scroll to **Sys Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Unit Rotation (A2)**.
5. Press ENTER key to scroll to **Time Based** (see Figure 2.12).
6. Press UP and DOWN key to change the value.
7. Press ENTER key to scroll to **Num of Days**.
8. Press UP and DOWN keys to change the value.
9. Press ENTER key to scroll to **Demand**.
10. Press UP and DOWN key to change the value.
11. Press ENTER key to scroll to **Manual**.
12. Press UP and DOWN key to change the value.

If time based rotation is enabled, the units will rotate based on the number of days entered into Num of Days.

If demand based rotation is enabled, the active units will rotate when there is no demand in their respective zone.

If manual rotation is enabled, unit will be rotated immediately. (**NOTE:** Value will return to off after approximately 5 seconds.)

FIGURE 2.12
Change Unit Rotation Settings



Temperature Priority

The LC will enable or disable the units in each zone based on temperature priority. The temperature priority for each wall unit will be determined by subtracting the return air temperature from the zone setpoint. This value will be communicated to the LC. The LC will then enable the unit with the highest priority value to be the next unit on. The lowest priority value of the wall units that are currently enabled will be the next unit off.

Humidity Control

The LC can be configured to control up to three humidifiers with relay outputs. The indoor humidity level for each zone is compared to the dehumidification setpoint and humidification setpoint for each zone.

Dehumidification

If the humidity level is above 70% RH (Dehumidification Setpoint), the LC will enable dehumidification for that zone. Once the humidity level drops to 65% RH (Dehumidification Setpoint minus 5% RH), the dehumidification for that zone will be disabled. Dehumidification for each zone limits the wall units to mechanical cooling only; economizer operation is ignored regardless of outdoor conditions until humidity setpoint is satisfied.

To change the dehumidification setpoint:

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 **Sys Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Zone Setpoints (A4)**.
5. Press ENTER key to scroll to **Zone 1 Dehum, Zone 2 Dehum or Zone 3 Dehum** (see Figure 2.13).
6. Press UP and DOWN keys to change dehumidification setpoint to desired value.

FIGURE 2.13

Change Dehumidification/Humidification Setpoints



Zone Setpoints			A4
Zone 1	Hum:	45.0%	
Zone 2	Hum:	45.0%	
Zone 3	Hum:	45.0%	
Zone 1	Dehum:	70.0%	
Zone 2	Dehum:	70.0%	
Zone 3	Dehum:	70.0%	

Humidification

If the humidity level is below 45% RH (Humidification Setpoint), the LC will enable humidification for that zone. Once the humidity level rises to 55% RH (Humidification Setpoint plus 10% RH), the humidification for that zone will be disabled.

NOTE: Humidifiers supplied by others.

To change the humidification setpoint:

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 **Sys Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Zone Setpoints (A4)**.
5. Press ENTER key to scroll to **Zone 1 Hum, Zone 2 Hum or Zone 3 Hum** (see Figure 2.13).
6. Press UP and DOWN keys to change humidification setpoint to desired value.

Enabling Humidifier

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 **Sys Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Unit Setup (A1)**.
5. Press ENTER key to scroll to **Humidifiers** (see Figure 2.14).
6. Press UP or DOWN keys to change value to **NONE, Z1-1, Z1-2, Z1-3, Z1&Z2 or Z1&Z2&Z3**.
7. Press ENTER to scroll to **Humidifier Type**.
8. Press UP or DOWN keys to change value to **Relay** from **Comm**.
9. Press ENTER key to save.

FIGURE 2.14
Enable Humidifier



Unit Setup		A1
Total Units:		2
Humidifiers:	NONE	
Pressure Sensor:	OFF	
Humidifier Type:	Relay	
Staging:	Rotation	
Controller Address:	1	
UOM:		USA

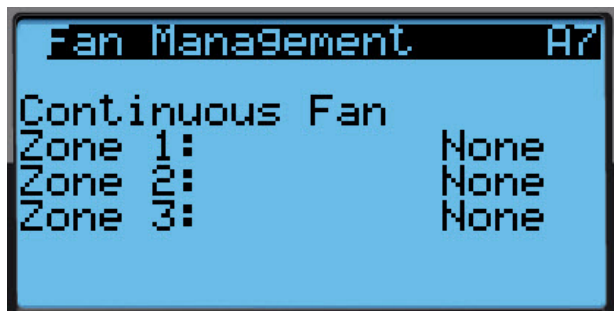
Fan Control

The LC has the capability to change the continuous fan status of all the units in a zone. The user is able to select between none, active and all. When “none” is selected, all unit blowers will only be enabled on a call for heating or cooling. When “active” is selected, the wall units with the mode active will have the blower enabled all of the time. When “all” is selected, the blower on all units (active and standby) will be enabled all the time.

To change the continuous fan status of each zone:

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 **Sys Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Fan Management (A7)**.
5. Press ENTER key to scroll to **Zone 1, Zone 2** or **Zone 3** (see Figure 2.15).
6. Press UP and DOWN keys to change the value.
7. Press ENTER key to save.

FIGURE 2.15
Change Zone Continuous Fan Status



ADDITIONAL PROGRAMMING

LC6000 Menus/Screens

Main Menu

Press the MENU key from any screen to return to the Main Menu. Press the UP or DOWN keys to scroll through the available menus. When the desired menu is highlighted, press the ENTER key to access that menu. Press the BACK key or MENU key to return to the Status screen from the Main Menu.

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 BACK button repeatedly. The LC6000 Status screen displays the current date, time, unit displayed, zone and unit status.

Quick Menu

The Quick Menu is available on the Status screen. Use UP or DOWN keys while on the Status screen to scroll between the three Quick Menu options; press ENTER key.

Data Log

The data log displays the record number, time of alarm event, date of alarm event, description of alarm event and whether the entry is the beginning or end of event. The data log will have as many screens as events occurred.

Info

Info displays wall unit status for each wall-mount unit connected to controller, last hour tracking (shelter), last hour tracking (for each wall-mount unit connected, last hour averages (zone temperatures, OA temperature and OA humidity) and additional LC6000 information.

Setpoints

Setpoints allows setting and enabling of comfort mode.

Changing to Celsius

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 **Sys Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Unit Setup (A1)**.
5. Press ENTER key to scroll to **UOM**.
6. Press UP and DOWN keys to change value to **SI**.

Calibrating Sensors

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 **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**.
6. Press UP or DOWN keys to add or subtract to the sensor offset value.
7. Press ENTER key to save.

TROUBLESHOOTING LC6000 CONTROLLER ALARMS

The LC6000 controller is designed for continuous and dependable operation. In the event that a problem is encountered with the A/C system, the system controller may be used to diagnose the cause. The system controller will display alarms for the entire system; the TEC-EYE™ hand-held tool will only display alarms for an individual unit.

The controller signals an alarm condition when the red backlight LED is illuminated behind the alarm key. An alarm indication is accompanied by a screen text message of the cause. Often the remedy is simple to determine by reading the alarm message, i.e., "Dirty Filter" (replace filter). The following guidelines are included to assist in troubleshooting the system due to operational or performance problems. If the problem can't be resolved using the alarm screens and these guidelines, contact the BARD Technical Service Department at 419.636.0439 for assistance.

Signal	Description	Possible Cause	Component to Check	Recommended Action	Device Actions
Smoke/Fire Alarm	The entire unit(s) stops working. The alarm resets automatically.	Fire/smoke detector is triggered.	Check the external fire/smoke detector.	Replace the external fire/smoke detector	Indoor Blower: Off Compressor/Condensor Fan: Off Heat: Off Damper: Closed
		Connection to the corresponding input is disconnected or the controller board is defective.	Check connection to input and controller board.	Repair connection. If the controller board is defective, replace it.	
Hydrogen Alarm	The indoor controller will activate Emergency Ventilation mode to exhaust any noxious gases from building to introduce outside fresh air. The alarm resets automatically.	Hydrogen detector is triggered.	Check the external hydrogen detector.	Replace the external hydrogen detector.	Indoor Blower: On Compressor/Condensor Fan: On Heat: On Damper: On
		Connection to the corresponding input is disconnected or the controller board is defective.	Check if the connection is ok.	Repair connection. If the controller board is defective, replace it.	
Generator Run Alarm	The indoor controller will activate an emergency ventilation mode on an input from generator run alarm which enables free cooling mode and will only allow lead unit to run in mechanical cooling as needed to satisfy any temperature. The alarm resets automatically.	Generator run is triggered. Connection to the corresponding input is disconnected or the controller board is defective.	Check if the connection is ok.	Repair connection. If the controller board is defective, replace it.	Indoor Blower: On Compressor/Condensor Fan: On Heat: On Damper: On
High Temperature Alarm	Alarm is reset automatically. Occurs when the current indoor temperature is greater than the 2nd high temperature alarm setpoint value. The default is 90°F.	The cooling capacity loss or heat load loss is too great.	Check for leakages in the refrigerant circuit. Check if heat load exceeds the design range.	Remove the leakage. Increase the cooling capacity.	Compressor/Condensor Fan: Off
		Compressor circuit failure.	Check if components connected to the compressor are ok. Check if compressor is ok. Check if the electric connection is ok.	Replace the defective components. Replace the compressor. Reconnect the cables.	
		Indoor temperature sensor failure.	Check if the sensor is shorted or has failed.	Replace the indoor temperature sensor.	
		Incorrect value set for the high temperature alarm.	Check if value is correct.	Correct the value.	

TROUBLESHOOTING LC6000 CONTROLLER ALARMS (CONT.)

Signal	Description	Possible Cause	Component to Check	Recommended Action	Device Actions
Low Temperature Alarm	Alarm can be reset automatically. Occurs when the current indoor temperature is less than the indoor temperature setpoint value minus the temperature alarm offset. The default is 45°F.	Heating capacity loss.	Check if the heaters are ok. Check for leaks around the unit.	If heaters have failed, replace them. Seal the leaks.	The controller will activate a relay output for remote communication.
		Indoor temperature sensor failure.	Check for a short in the sensor or if it has failed.	Replace the indoor temperature sensor.	
		Incorrect value set for the high temperature alarm.	Check if the value is correct.	Correct the value.	
Remote Indoor Temperature Sensor Failed Alarm	The alarm is activated if the sensor is faulty, a sensor wire is loose or an out-of-range value is read.	The alarm is activated if the sensor is faulty, a sensor wire is loose or an out-of-range value is read.	Check the remote indoor temperature/humidity sensor wiring.	Replace the remote indoor temperature/humidity sensor.	
Spare Remote Indoor Temperature Sensor Failed Alarm	The alarm is activated if the sensor is faulty, a sensor wire is loose or an out-of-range value is read.	The alarm is activated if the sensor is faulty, a sensor wire is loose or an out-of-range value is read.	Check the spare remote indoor temperature sensor wiring.	Replace the spare remote indoor temperature sensor.	
Zone 2 Remote Indoor Temperature Sensor Failed Alarm	The alarm is activated if the sensor is faulty, a sensor wire is loose or an out-of-range value is read.	The alarm is activated if the sensor is faulty, a sensor wire is loose or an out-of-range value is read.	Check the Zone 2 remote indoor temperature/humidity sensor wiring.	Replace the Zone 2 remote indoor temperature/humidity sensor.	
Zone 3 Remote Indoor Temperature Sensor Failed Alarm	The alarm is activated if the sensor is faulty, a sensor wire is loose or an out-of-range value is read.	The alarm is activated if the sensor is faulty, a sensor wire is loose or an out-of-range value is read.	Check the Zone 3 remote indoor temperature/humidity sensor wiring.	Replace the Zone 3 remote indoor temperature/humidity sensor.	
Zone 2 Remote Indoor Humidity Sensor Failed Alarm	The alarm is activated if the sensor is faulty, a sensor wire is loose or an out-of-range value is read.	The alarm is activated if the sensor is faulty, a sensor wire is loose or an out-of-range value is read.	Check the Zone 2 remote indoor temperature/humidity sensor wiring.	Replace the Zone 2 remote indoor temperature/humidity sensor.	
Zone 3 Remote Indoor Humidity Sensor Failed Alarm	The alarm is activated if the sensor is faulty, a sensor wire is loose or an out-of-range value is read.	The alarm is activated if the sensor is faulty, a sensor wire is loose or an out-of-range value is read.	Check the Zone 3 remote indoor temperature/humidity sensor wiring.	Replace the Zone 3 remote indoor temperature/humidity sensor.	
Indoor Humidity Alarm	Alarm is activated if indoor humidity level goes above or below setpoints.	High outdoor humidity level during economizer operation.	Check economizer operation.	Change Economizer Type to Temp and Humidity to limit economizer during high humidity.	

SECTION 3:

APPENDICES

APPENDIX 1: LC6000 CONTROLLER ARCHITECTURE

CAUTION: The Bard Free Cooling Unit System has been pre-programmed with what is widely considered to be the best settings for efficiency and operation. Any changes to internal programming through the LC6000 controller or the TEC-EYE™ not covered within this manual may cause the systems to operate improperly, cause internal damage to the HVAC units, cause the shelter to overheat or other very serious consequences. Although complete controller programming architecture for the LC6000 controller has been provided, going outside the boundaries of what has been covered in this manual is not recommended.

Screen	Menu Item	Range	Default Value	Description
STATUS SCREEN				
	Zone 1 Temperature	-999.9 to 999.9	-	Average temperature for Zone 1
	Zone 1 Humidity	-999.9 to 999.9	-	Humidity for Zone 1
	Zone 2 Temperature	-999.9 to 999.9		Average temperature for Zone 2
	Zone 2 Humidity	-999.9 to 999.9		Humidity for Zone 2
	Zone 3 Temperature	-999.9 to 999.9		Average temperature for Zone 3
	Zone 3 Humidity	-999.9 to 999.9		Humidity for Zone 3
	Unit Status	Active, Waiting, Unit On, Off by Alarm, Off by pLan, Off by BMS, Off by Clock, Off by Input, Off by Keyboard, Off by Manual	-	Unit status
Press UP or DOWN Key to Icon, then ENTER Key				
QUICK MENU				
	Data Log 			Heading
	Data Logger Record			
	Record Number	0-99	-	Record number (located in upper right hand corner)
	Time	00:00 - 23:59	-	Time of the alarm event
	Date	00/00/00 - 12/31/99	-	Date of the alarm event
	Description	Text	-	Description of the alarm event
	Event	Start/Stop	-	Describes if entry is beginning or end of event
NOTE: Data Log will have as many screens as events occurred using same format.				
Press BACK Key				
Press DOWN Key				
Press ENTER Key				
	Info 			
	Wall Unit Status			Heading
	Unit Number	Unit 1 thru Unit 14	-	Address of unit being viewed
	RAT	-999.9 to 999.9	-	Return air temperature measured by wall unit
	MAT	-999.9 to 999.9	-	Mixed air temperature measured by wall unit

Screen	Menu Item	Range	Default Value	Description
	OAT	-999.9 to 999.9	-	Outdoor air temperature measured by wall unit
	OAH	-999.9 to 999.9	-	Outdoor air humidity measured by wall unit
	Blower	On/Off	-	Status for wall unit blower
	Damper	0-100%	-	Damper output for economizer
	FC	Visible/ Not Visible	-	Displays when freecooling is being utilized
	C1	Visible/ Not Visible	-	Displays when compressor stage 1 is being utilized
	C2	Visible/ Not Visible	-	Displays when compressor stage 2 is being utilized
	H1	Visible/ Not Visible	-	Displays when heat stage 1 is being utilized
	H2	Visible/ Not Visible	-	Displays when heat stage 2 is being utilized
NOTE: Wall Unit Status will have as many screens as wall units connected using same format.				
Press DOWN Key				
	Info			Heading
	Last Hour Tracking			Description of content
	Shelter			Designates following information is for shelter
	Unit On Run	0-59	-	Number of minutes in last hour
	Unit On ST	0-59	-	Number of starts in last hour
	Hum Zone 1 Run	0-59	-	Number of minutes in last hour
	Hum Zone 1 ST	0-59	-	Number of starts in last hour
	Hum Zone 2 Run	0-59	-	Number of minutes in last hour
	Hum Zone 2 ST	0-59	-	Number of starts in last hour
	Hum Zone 3 Run	0-59	-	Number of minutes in last hour
	Hum Zone 3 ST	0-59	-	Number of starts in last hour
	Alarm Run	0-59	-	Number of minutes in last hour
	Alarm ST	0-59	-	Number of starts in last hour
Press DOWN Key				
	Info			Heading
	Last Hour Tracking			Description of content
	Unit Number	Unit 1 thru Unit 14		Description of unit being viewed
	Freecool Run	0-59	-	Number of minutes in last hour
	Freecool ST	0-59	-	Number of starts in last hour
	Cooling 1 Run	0-59	-	Number of minutes in last hour
	Cooling 1 ST	0-59	-	Number of starts in last hour
	Cooling 2 Run	0-59	-	Number of minutes in last hour
	Cooling 2 ST	0-59	-	Number of starts in last hour
	Heat 1 Run	0-59	-	Number of minutes in last hour
	Heat 1 ST	0-59	-	Number of starts in last hour

LC6000 CONTROLLER ARCHITECTURE (CONT.)

Screen	Menu Item	Range	Default Value	Description
	Heat 2 Run	0-59	-	Number of minutes in last hour
	Heat 2 ST	0-59	-	Number of starts in last hour
	NOTE: Last Hour Tracking wall unit will have as many screens as wall units connected using same format.			
	Press DOWN Key			
	Info			Heading
	Last Hour Averages			Description of content
	Zone 1	-999.9 to 999.9	-	Average temperature of zone 1 sensors
	Zone 2	-999.9 to 999.9	-	Average temperature of zone 2 sensors
	Zone 3	-999.9 to 999.9	-	Average temperature of zone 3 sensors
	OA Temperature	-999.9 to 999.9	-	Average outdoor air temperature
	OA Humidity	-999.9 to 999.9	-	Average outdoor air humidity
	Press DOWN Key			
	Bard LC6000-100			
	Code		LC6000	Software code
	SW version		1.0.005	Software version number
	OS version		4.0.003	Operating system version number
	Boot version		4.0.003	Boot version number
	Press BACK Key			
	Press DOWN Key			
	Press ENTER Key			
	Set (Setpoints) 			
	Comfort Mode	0-99	60 min	Sets the duration of comfort mode
	Comfort Setpoint	-999.9 to 999.9	72.0°F	Sets the comfort mode setpoint
	Comfort Enable	On/Off	Off	Enables comfort mode
	Press BACK Key			
	Press MENU Key			
	Insert Password	0000-9999		Password entry for settings access
MAIN MENU				
A	SYS CONFIG			
A1	Unit Setup			
	Total Units	1-14	1	Number of units connected to LC
	Humidifiers	None, Z1-1, Z1-2, Z1-3, Z1&Z2, Z1&Z2&Z3	None	Number and arrangement of humidifiers
	Pressure Sensor	Off/On	Off	
	Humidifier Type	Comm/Relay	Relay	Type of humidifier control
	Staging	Rotation/Temp Priority	Rotation	Type of staging control
	Controller Address		1	Address of LC used for BMS functions
	UOM	NC/SI/USA/UK/ CAN/LON	USA	Used to select units of variables
	Press DOWN Key			

Screen	Menu Item	Range	Default Value	Description
A2	Unit Rotation			
	Time Based	On/Off	Off	Enables rotation based on time
	Num. of Days	0-999	0	Number of days when time-based rotation is enabled
	Demand	On/Off	On	Enables demand-based rotation
	Manual	On/Off	Off	Manually rotates units
	Press DOWN Key			
A3	Zone Setpoints			Heading
	Zone 1 Cool	-999.9 to 999.9	77.0	Zone 1 cooling setpoint
	Zone 1 Heat	-999.9 to 999.9	60.0	Zone 1 heating setpoint
	Zone 2 Cool	-999.9 to 999.9	77.0	Zone 2 cooling setpoint
	Zone 2 Heat	-999.9 to 999.9	60.0	Zone 2 heating setpoint
	Zone 3 Cool	-999.9 to 999.9	77.0	Zone 3 cooling setpoint
	Zone 3 Heat	-999.9 to 999.9	60.0	Zone 3 heating setpoint
	Press DOWN Key			
A4	Zone Setpoints			Heading
	Zone 1 Hum	-999.9 to 999.9	45.0	Zone 1 humidification setpoint
	Zone 2 Hum	-999.9 to 999.9	45.0	Zone 2 humidification setpoint
	Zone 3 Hum	-999.9 to 999.9	45.0	Zone 3 humidification setpoint
	Zone 1 Dehum	-999.9 to 999.9	45.0	Zone 1 dehumidification setpoint
	Zone 2 Dehum	-999.9 to 999.9	45.0	Zone 2 dehumidification setpoint
	Zone 3 Dehum	-999.9 to 999.9	45.0	Zone 3 dehumidification setpoint
	Press DOWN Key			
A5	Alarm Setpoints			
	Zone Temp Alarms			
	Low Temp	###.# - 999.9	45°F	Setpoint for low temperature alarm
	High Temp	###.# - 999.9	85°F	Setpoint for high temperature alarm
	High Temp 2	###.# - 999.9	90°F	Setpoint for high temperature 2 alarm
	Alarm Delay	0-999	10 sec	Alarm delay
	Press DOWN Key			
A6	Alarm Setpoints			
	Zone Humidity Alarms			
	Low Hum	-999.9 - 999.9	20.00%	Setpoint for low humidity alarm
	High Hum	-999.9 - 999.9	80.00%	Setpoint for high humidity alarm
	Alarm Delay	0-999	0 sec	Alarm delay
	Press DOWN Key			
A7	Fan Management			
	Continuous Fan			
	Zone 1	None/Active/All	None	Used to select continuous fan operation for zone 1
	Zone 2	None/Active/All	None	Used to select continuous fan operation for zone 2
	Zone 3	None/Active/All	None	Used to select continuous fan operation for zone 3

LC6000 CONTROLLER ARCHITECTURE (CONT.)

Screen	Menu Item	Range	Default Value	Description
Press DOWN Key				
A8	Unit Staging			
	Zone 1 Cool			
	Direction	Direct/Reverse	Direct	
	Stages		3	
	On Differential		2.0	
	Off Differential		2.1	
	Delay Up		120 sec	
	Delay Dn		60 sec	
	Setpoint		68.0°F	
Press DOWN Key				
A9	Unit Staging			
	Zone 1 Heat			
	Direction	Direct/Reverse	Reverse	
	Stages		3	
	On Differential		2.0	
	Off Differential		2.0	
	Delay Up		120 sec	
	Delay Dn		60 sec	
	Setpoint		32.0°F	
Press DOWN Key				
A10	Unit Staging			
	Zone 2 Cool			
	Direction	Direct/Reverse	Direct	
	Stages		2	
	On Differential		2.0	
	Off Differential		2.00	
	Delay Up		120 sec	
	Delay Dn		60 sec	
	Setpoint		77.1°F	
Press DOWN Key				
A11	Unit Staging			
	Zone 2 Heat			
	Direction	Direct/Reverse	Reverse	
	Stages		2	
	On Differential		2.0	
	Off Differential		2.0	
	Delay Up		120 sec	
	Delay Dn		60 sec	
	Setpoint		32.0°F	
Press DOWN Key				
A12	Unit Staging			
	Zone 3 Cool			

Screen	Menu Item	Range	Default Value	Description
	Direction	Direct/Reverse	Direct	
	Stages		2	
	On Differential		2.0	
	Off Differential		2.0	
	Delay Up		120 sec	
	Delay Dn		60 sec	
	Setpoint		77.0°F	
Press DOWN Key				
A13	Unit Staging			
	Zone 3 Heat			
	Direction	Direct/Reverse	Reverse	
	Stages		2	
	On Differential		2.0	
	Off Differential		2.0	
	Delay Up		120 sec	
	Delay Dn		60 sec	
	Setpoint		32.3°F	
Press DOWN Key				
A14	Wall Unit Diffs			
	CL1 On			
	CL1 Off			
	CL2 On			
	CL2 Off			
	CL3 On			
	CL3 Off			
	HT1 On			
	HT1 Off			
	HT2 On			
	HT2 Off			
	HT3 On			
	HT3 Off			
Press DOWN Key				
A16	Alarm Delays			
	Airflow		45 sec	
End of SYS CONFIG				
	Press BACK Key			
	Press DOWN Key			
B	ADV SYS CONFIG			
B1	Compressor Safety			Heading
	Timers			Descriptive Text
	Min On	0-32767	180 sec	Minimum on time for compressor to stay on

LC6000 CONTROLLER ARCHITECTURE (CONT.)

Screen	Menu Item	Range	Default Value	Description
	Min Off	0-32767	120 sec	Minimum off time for compressor to stay off
	Min On Same	0-32767	120 sec	Minimum on time for stage 2 compressor to stay on
	Unloader Del	0-32767	120 sec	Delay before unloader becomes active
	Press DOWN Key			
B2	Wall Unit Alarm			
	Refrigerant Low Pressure Alarm Setup			
	Outside Setpoint	-999.9 to 999.9	55.0°F	Outdoor temperature setpoint for low pressure delay time increase
	Differential	-999.9 to 999.9	5.0°F	Degrees above setpoint before delay time decreases
	Above Set Del	0-999	120 sec	Delay for when OAT is above setpoint
	Below Set Del	0-999	180 sec	Delay for when OAT is below setpoint
	Auto Reset Time	0-999	900 sec	Time between low pressure attempts before lockout
	Press DOWN Key			
B3	Humidifier Zone 1			Heading
	Modulating Setup			Descriptive text
	Set	0-100%	45	Humidifier setpoint for modulating control
	Gain	-999.9 to 999.9	10	Proportional band for modulating control
	Integration	0-999	120	Integration time for modulating control
	Derivative	0-999	0	Derivative time for modulating control
	Press DOWN Key			
B4	Humidifier Zone 2			Heading
	Modulating Setup			Descriptive text
	Set	0-100%	45	Humidifier setpoint for modulating control
	Gain	-999.9 to 999.9	10	Proportional band for modulating control
	Integration	0-999	120	Integration time for modulating control
	Derivative	0-999	0	Derivative time for modulating control
	Press DOWN Key			
B5	Humidifier Zone 3			Heading
	Modulating Setup			Descriptive text
	Set	0-100%	45	Humidifier setpoint for modulating control
	Gain	-999.9 to 999.9	10	Proportional band for modulating control
	Integration	0-999	120	Integration time for modulating control
	Derivative	0-999	0	Derivative time for modulating control
	Press DOWN Key			

Screen	Menu Item	Range	Default Value	Description
B6	Zone Alarm Config			Heading
	Events that will cause zone alarms			Descriptive text
	Z1 MAT Sens	Y/N	N	Wall unit alarm mixed air sensor failure
	Z2 MAT Sens	Y/N	N	Wall unit alarm mixed air sensor failure
	Z3 MAT Sens	Y/N	N	Wall unit alarm mixed air sensor failure
	Z1 OAT Sens	Y/N	N	Wall unit alarm outdoor air temperature sensor failure
	Z2 OAT Sens	Y/N	N	Wall unit alarm outdoor air temperature sensor failure
	Z3 OAT Sens	Y/N	N	Wall unit alarm outdoor air temperature sensor failure
	Z1 RAT Sens	Y/N	N	Wall unit alarm return air temperature sensor failure
	Z2 RAT Sens	Y/N	N	Wall unit alarm return air temperature sensor failure
	Z3 RAT Sens	Y/N	N	Wall unit alarm return air temperature sensor failure
	Z1 OAH Sens	Y/N	N	Wall unit alarm outdoor air humidity sensor failure
	Z2 OAH Sens	Y/N	N	Wall unit alarm outdoor air humidity sensor failure
	Z3 OAH Sens	Y/N	N	Wall unit alarm outdoor air humidity sensor failure
	Press DOWN Key			
B7	Zone Alarm Config			Heading
	Z1 Frz Sens	Y/N	N	Wall unit alarm freeze stat sensor failure
	Z2 Frz Sens	Y/N	N	Wall unit alarm freeze stat sensor failure
	Z3 Frz Sens	Y/N	N	Wall unit alarm freeze stat sensor failure
	Z1 High MAT	Y/N	N	Wall unit alarm high mixed air temperature
	Z2 High MAT	Y/N	N	Wall unit alarm high mixed air temperature
	Z3 High MAT	Y/N	N	Wall unit alarm high mixed air temperature
	Z1 Low MAT	Y/N	N	Wall unit alarm low mixed air temperature
	Z2 Low MAT	Y/N	N	Wall unit alarm low mixed air temperature
	Z3 Low MAT	Y/N	N	Wall unit alarm low mixed air temperature
	Z1 Low Press	Y/N	Y	Wall unit alarm low refrigerant pressure
	Z2 Low Press	Y/N	Y	Wall unit alarm low refrigerant pressure
	Z3 Low Press	Y/N	Y	Wall unit alarm low refrigerant pressure

LC6000 CONTROLLER ARCHITECTURE (CONT.)

Screen	Menu Item	Range	Default Value	Description
	Z1 Damp Open	Y/N	N	Wall unit alarm damper failed to open
	Z2 Damp Open	Y/N	N	Wall unit alarm damper failed to open
	Z3 Damp Open	Y/N	N	Wall unit alarm damper failed to open
	Z1 Damp Close	Y/N	N	Wall unit alarm damper failed to close
	Z2 Damp Close	Y/N	N	Wall unit alarm damper failed to close
	Z3 Damp Close	Y/N	N	Wall unit alarm damper failed to close
	Press DOWN Key			
B8	Zone Alarm Config			Heading
	Z1 Coil Frz	Y/N	N	Wall unit alarm freeze stat
	Z2 Coil Frz	Y/N	N	Wall unit alarm freeze stat
	Z3 Coil Frz	Y/N	N	Wall unit alarm freeze stat
	Z1 High Press	Y/N	Y	Wall unit alarm high refrigerant pressure
	Z2 High Press	Y/N	Y	Wall unit alarm high refrigerant pressure
	Z3 High Press	Y/N	Y	Wall unit alarm high refrigerant pressure
	Z1 Smoke	Y/N	N	Wall unit alarm smoke detected
	Z2 Smoke	Y/N	N	Wall unit alarm smoke detected
	Z3 Smoke	Y/N	N	Wall unit alarm smoke detected
	Press DOWN Key			
B9	Change Password			Press ENTER twice to reset system passwords
End of ADVANCED SYS CONFIG				
	Press BACK Key			
	Press DOWN Key			
C	I/O CONFIG			
C1	Digital In Config			Digital Input Configuration
	Channel 1 Smoke			Channel 1 Smoke
	Dir	NO/NC	NO	Used to change direction of input
	En	On/Off	On	Used to enable/disable input
	Val	On/Off	-	Shows current value of input
	Channel 2 Hydro			Channel 2 Hydrogen
	Dir	NO/NC	NO	Used to change direction of input
	En	On/Off	On	Used to enable/disable input
	Val	On/Off	-	Shows current value of input
	Channel 3 Gen			Channel 3 Generator
	Dir	NO/NC	NO	Used to change direction of input
	En	On/Off	On	Used to enable/disable input
	Val	On/Off	-	Shows current value of input
	Press DOWN Key			
C2	Digital Out Config			Digital Output Configuration
	Channel 1 Hum Z1			Channel 1 Humidity Zone 1
	Dir	NO/NC	NO	Used to change direction of output

Screen	Menu Item	Range	Default Value	Description
	Val	On/Off	-	Shows current value of output
	Channel 2 Hum Z2			Channel 2 Humidity Zone 2
	Dir	NO/NC	NO	Used to change direction of output
	Val	On/Off	-	Shows current value of output
	Channel 3 Hum Z3			Channel 3 Humidity Zone 3
	Dir	NO/NC	NO	Used to change direction of output
	Val	On/Off	-	Shows current value of output
	Channel 4 Smoke			Channel 4 Smoke
	Dir	NO/NC	NO	Used to change direction of output
	Val	On/Off	-	Shows current value of output
	Channel 5 Gen			Channel 5 Generator
	Dir	NO/NC	NO	Used to change direction of output
	Val	On/Off	-	Shows current value of output
	Channel 6 Hydro			Channel 6 Hydrogen
	Dir	NO/NC	NO	Used to change direction of output
	Val	On/Off	-	Shows current value of output
	Press DOWN Key			
C3	Digital Out Config			Digital Output Configuration
	Channel 7 Hum Al			Channel 7 Humidity Alarm
	Dir	NO/NC	NO	Used to change direction of output
	Val	On/Off	-	Shows current value of output
	Channel 8 Hi Temp			Channel 8 High Temperature
	Dir	NO/NC	NO	Used to change direction of output
	Val	On/Off	-	Shows current value of output
	Channel 9 Lo Temp			Channel 9 Low Temperature
	Dir	NO/NC	NO	Used to change direction of output
	Val	On/Off	-	Shows current value of output
	Channel 10 Z1 Alm			Channel 10 Zone 1 Alarm
	Dir	NO/NC	NO	Used to change direction of output
	Val	On/Off	-	Shows current value of output
	Channel 11 Z2 Alm			Channel 11 Zone 2 Alarm
	Dir	NO/NC	NO	Used to change direction of output
	Val	On/Off	-	Shows current value of output
	Channel 12 Z3 Alm			Channel 12 Zone 3 Alarm
	Dir	NO/NC	NO	Used to change direction of output
	Val	On/Off	-	Shows current value of output
	Press DOWN Key			
C4	Z1 Indoor Hum			Zone 1 Indoor Humidity Sensor
	Channel 2			
	Raw	-999.9 to 999.9	-	Shows the raw input of the sensor
	Enable	On/Off	On	Enable/disable the input
	Filter Intensity	0-10	5	Filter intensity 0 low 10 high
	Offset	0-100%	0.0%	Offset applied to value

LC6000 CONTROLLER ARCHITECTURE (CONT.)

Screen	Menu Item	Range	Default Value	Description
	Value	-999.9 to 999.9	-	Variable input display value
	Press DOWN Key			
C5	Z2 Indoor Hum			Zone 2 Indoor Humidity Sensor
	Channel 3			
	Raw	-999.9 to 999.9	-	Shows the raw input of the sensor
	Enable	On/Off	On	Enable/disable the input
	Filter Intensity	0-10	5	Filter intensity 0 low 10 high
	Offset	0-100%	0.0%	Offset applied to value
	Value	-999.9 to 999.9	-	Variable input display value
	Press DOWN Key			
C6	Z3 Indoor Hum			Zone 3 Indoor Humidity Sensor
	Channel 4			
	Raw	-999.9 to 999.9	-	Shows the raw input of the sensor
	Enable	On/Off	On	Enable/disable the input
	Filter Intensity	0-10	5	Filter intensity 0 low 10 high
	Offset	0-100%	0.0%	Offset applied to value
	Value	-999.9 to 999.9	-	Variable input display value
	Press DOWN Key			
C7	Z1 Indoor Temp			Zone 1 Indoor Temperature Sensor
	Channel 6			
	Raw	-999.9 to 999.9	-	Shows the raw input of the sensor
	Enable	On/Off	On	Enable/disable the input
	Filter Intensity	0-10	5	Filter intensity 0 low 10 high
	Offset	-999.9 to 999.9	0.0°F	Offset applied to value
	Value	-999.9 to 999.9	-	Variable input display value
	Press DOWN Key			
C8	Z1 Remote Temp			Zone 1 Remote Temperature Sensor
	Channel 7			
	Raw	-999.9 to 999.9	-	Shows the raw input of the sensor
	Enable	On/Off	On	Enable/disable the input
	Filter Intensity	0-10	5	Filter intensity 0 low 10 high
	Offset	-999.9 to 999.9	0.0°F	Offset applied to value
	Value	-999.9 to 999.9	-	Variable input display value
	Press DOWN Key			
C9	Z2 Remote Temp			Zone 2 Remote Temperature Sensor
	Channel 8			
	Raw	-999.9 to 999.9	-	Shows the raw input of the sensor
	Enable	On/Off	On	Enable/disable the input
	Filter Intensity	0-10	5	Filter intensity 0 low 10 high
	Offset	-999.9 to 999.9	0.0°F	Offset applied to value
	Value	-999.9 to 999.9	-	Variable input display value
	Press DOWN Key			

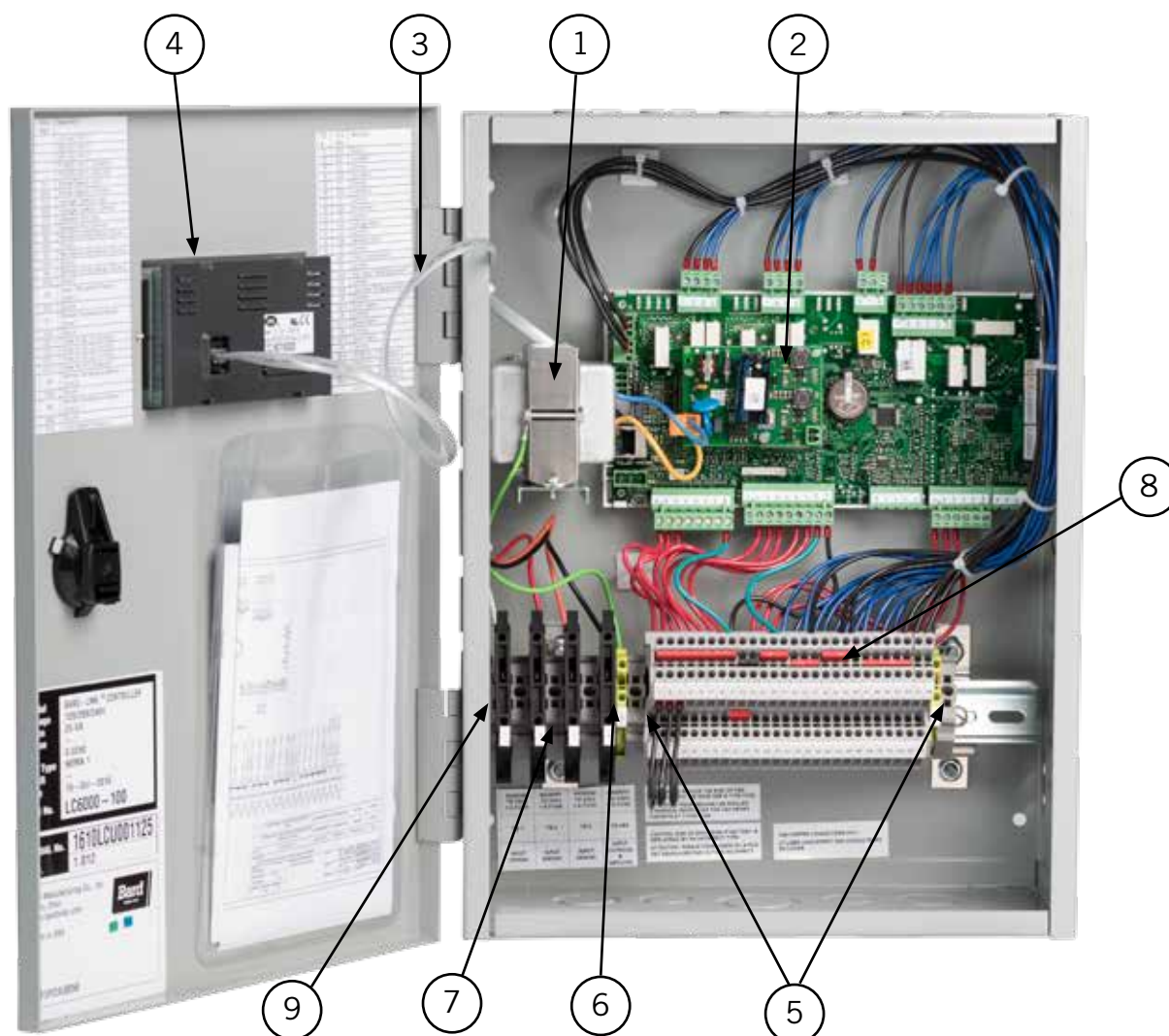
Screen	Menu Item	Range	Default Value	Description
C10	Z3 Remote Temp			Zone 3 Remote Temperature Sensor
	Channel 9			
	Raw	-999.9 to 999.9	-	Shows the raw input of the sensor
	Enable	On/Off	On	Enable/disable the input
	Filter Intensity	0-10	5	Filter intensity 0 low 10 high
	Offset	-999.9 to 999.9	0.0°F	Offset applied to value
	Value	-999.9 to 999.9	-	Variable input display value
End of I/O CONFIG				
	Press BACK Key			
	Press DOWN Key			
D	ON/OFF			Heading
	Unit On/Off	On/Off	-	Used to turn system on or off
End of ON/OFF				
	Press BACK Key			
	Press DOWN Key			
E	ALARM LOGS			
	Record Number	0-99	-	Record number (located in upper right corner)
	Time	00:00 to 23:59	-	Time of alarm event
	Date	00/00/00 - 12/31/99	-	Date of alarm event
	Description	Text	-	Description of alarm event
	Event	Start/Stop	-	Describes if entry is beginning or end of event
	NOTE: Alarm log will have as many screens as events occurred using same format.			
	Press DOWN Key			
End of ALARM LOGS				
	Press BACK Key			
	Press MENU Key			
	Press DOWN Key			
F	SETTINGS			
	Date/Time			
	Date/Time Change			
	Time	00:00 to 23:59		Enter new time
	Format	MM/DD/YY, DD/MM/YY, YY/MM/DD	MM/DD/YY	Sets the display format of the date
	Day	0-31		Enter new day
	Month	0-12		Enter new month
	Year			Enter new year
	Press DOWN Key			
	Timezone			
	Current			Displays current timezone
	New Timezone			Enter new timezone

LC6000 CONTROLLER ARCHITECTURE (CONT.)

Screen	Menu Item	Range	Default Value	Description
	Update Timezone	No/Yes	No	Set to yes to apply new timezone
	Press DOWN Key			
	Info			
	System Info			
	Board Type	-	-	-
	Board Size	-	Small	Board size
	Board Temp			Board temperature
	Ret Mem Writes			Retain memory writes
	Main Task			
	Press DOWN Key			
	Work Hours			
	Unit			
	Press DOWN Key			
	Blackout Info			
	Current Time	HH/MM/SS	-	Displays current time
	Power Off Time	HH/MM/SS	-	Displays power off time
	Length Last Time Off	Days, Hours, Min		Displays length of last time off
	Press BACK Key			
	Press DOWN Key			
	Language			
	Language	English, Italiano, Deutsch, Francais, Espanol	English	Press ENTER to change or BACK to confirm
	Press MENU Key			
	Press DOWN Key to SETTINGS			
	Press ENTER Key			
	Press DOWN Key to Initialization			
	Initialization			
	Alarm Initialization			
	Delete Alarm Logs?	No/Yes	No	Yes will delete all alarm logs
	Clear Autoreset Counters?	No/Yes	No	Yes will clear automatic reset counters
	Enable Buzzer?	Yes/No	Yes	Sounds buzzer for alarms when enabled
	Press DOWN Key			
	Default Installation			
	Wipe Retain Mem	No/Yes	No	Yes will apply factory settings
	Wipe NVRAM Mem	No/Yes	No	Yes will erase saved files
	Wipe Both Mem	No/Yes	No	Yes wipes both retain and NVRAM
	Press DOWN Key			
	Unit Configuration			
	Params Import/ Export			Parameters Import/Export
	Import/Export	Import/Export	Import	Selects the import or export operation

Screen	Menu Item	Range	Default Value	Description
	Memory Type	Internal Flash Memory/USB	Internal Flash Memory	Selects memory location
	File Name			Selects file name to be imported or exported
	Confirm	No/Yes	No	Yes will begin import or export
	Press DOWN Key			
	Alarm Export			
	Memory Type	Internal Flash Memory/USB	Internal Flash Memory	Selects memory location
	File Name			Selects file name to be imported or exported
	Confirm	No/Yes	No	Yes will begin import or export
	End of SETTINGS			
	Press BACK Key			
	Press DOWN Key			
G	LOG OUT			Used to log out and force password entry

APPENDIX 2: LC6000 REPLACEMENT PARTS LIST



Dwg. No.	Part Number	Description	LC6000
1	8407-069	Transformer	X
2	8301-076-001	Micro PC – Medium, programmed for LC6000	X
3	2150-021	Communication Cable	X
4	8301-053	Panel mounting display flush, pGDEvolution 132x64, black buttons with cable	X
5	8607-052	Grounded Terminal Block	2
6	8614-059	1.0 Amp Fuse	4
7	8607-039	Fused Terminal Block	4
8	8607-057	Terminal Block	54
9	8611-144	End Clamp (for din rail)	6
NS	8301-055	EMI Ferrite Filter	2
NS	8301-058	Remote Temperature Sensor ①	X
NS	8403-079	Remote Temperature/Humidity Sensor	X
NS	8301-059	TEC-EYE™ (Service Tool), 5 ft. telephone cable	X

NS – Not Shown

① – Optional