SERVICE INSTRUCTIONS WITH REPLACEMENT PARTS LIST

LC6000-200 CONTROLLER

Part of the Bard Cooling System

NOTE: LC6000-200 controller is required for operation when multiple MULTI-TEC®, FUSION-TEC® WR Series and/or MEGA-TEC™ wall-mount units are used.

Bard Manufacturing Company, Inc.
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NOTICE

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

Cooling System

This Bard cooling system is composed of MULTI-TEC, FUSION-TEC WR Series and/or MEGA-TEC wall-mounted air conditioners matched with an LC6000 controller or Bard th-Tune stand-alone controller (th-Tune can only be used with MULTI-TEC units). If only one wall-mounted air conditioner is being used, it can be matched with either the LC6000 or a th-Tune stand-alone controller (if applicable). If more than one wall-mount unit is installed, the LC6000 controller must be matched with the air conditioning units. The wall-mount units are specifically engineered for equipment cooling applications.

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

LC6000-200 Series Controller and Accessories Included with Controller

(1) LC6000 Programmable Logic Controller

+

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

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

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

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

Optional Sensors:

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

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

Remote
Temperature Only Sensor
Bard P/N 8301-058

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

The equipment covered in this manual is to be installed by factory trained and certified, 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** on page 4 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.

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

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

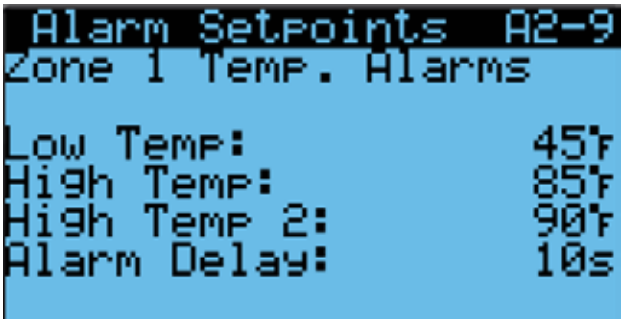
If the lowest temperature sensor value in a zone is below the low temperature setpoint, an alarm will be generated for that zone. Additionally, a relay output will be actuated from the LC controller to provide remote notification of the event.

NOTE: *This alarm is per zone. If each zone is meant to operate within the same alarm parameters, each zone will need to be set accordingly.*

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 **Zone 1**, **Zone 2** or **Zone 3**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Alarm Setpoints A2-9** (Zone 1), **Alarm Setpoints A3-9** (Zone 2) or **Alarm Setpoints A4-9** (Zone 3**)**.
6. Press ENTER key to scroll to the variable labeled **Low Temp** (see Figure 1).
7. Press UP or DOWN keys to adjust setpoint.

FIGURE 1
Adjust Alarm Setpoints



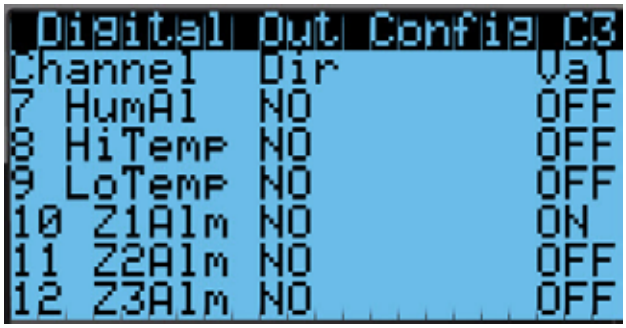
To change the direction of the remote notification relay output:

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)
6. Press UP or DOWN key to change direction.

The low temperature notification relay has dry contacts. The **Dir**, direction, is the position of the relay without a low temperature event. **NO** is normally open; **NC** is normally closed.

When the **Val** (value) is **OFF,** the relay is not in an alarm condition. When the **Val** (value) is **ON,** the relay is in an alarm condition. The relay connections for the low indoor temperature alarm are on the LC6000 terminal block; see Table 6 on page 24 for terminal block index.

FIGURE 2
Adjust Alarm Remote Notification Relay Output Direction



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, emergency cooling in this zone will become active.

There are two high temperature alarm setpoints. This is the first and there is no remote notification for this alarm.

NOTE: *This alarm is per zone. If each zone is meant to operate within the same alarm parameters, each zone will need to be set accordingly.*

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 **Zone 1**, **Zone 2** or **Zone 3**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Alarm Setpoints A2-8** (Zone 1), **Alarm Setpoints A3-8** (Zone 2) or **Alarm Setpoints A4-8** (Zone 3**)**.
6. Press ENTER key to scroll to the variable labeled **High Temp** (see Figure 1).
7. Press UP or DOWN keys to adjust setpoint.

High Temperature 2 Alarm

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 cool in this zone. Additionally, a relay output will be actuated from the LC to provide remote notification of the event.

NOTE: *This alarm is per zone. If each zone is meant to operate within the same alarm parameters, each zone will need to be set accordingly.*

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 **Zone 1**, **Zone 2** or **Zone 3**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Alarm Setpoints A2-9** (Zone 1), **Alarm Setpoints A3-9** (Zone 2) or **Alarm Setpoints A4-9** (Zone 3**)**.
6. Press ENTER key to scroll to the variable labeled **High Temp 2** (see Figure 1).
7. Press UP or DOWN keys to adjust setpoint.

To change the direction of the remote notification relay output:

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).
6. Press UP or DOWN key to change direction.

When the **Val** (value) is **OFF,** the relay is not in an alarm condition. When the **Val** (value) is **ON,** the relay is in an alarm condition. The relay connections for the high indoor temperature 2 alarm are on the LC6000 terminal block; see Table 6 on page 24 for terminal block index.

Emergency Off Alarm

If the LC gets an input from a smoke detector or similar device, 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 emergency off 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 (#6 and #7). When this jumper is removed, the alarm will become active.

To change the direction of the emergency off 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 **EM Off** and **Dir** (see Figure 3).
6. Press UP or DOWN key to change direction.

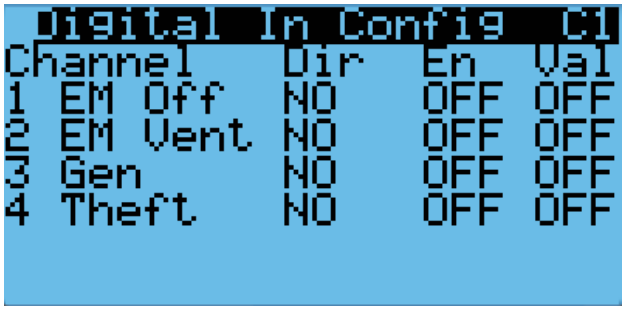
Emergency Off (EM Off) **Dir** (direction) is the position of the smoke detector contacts in the event of smoke. **NO** is normally open; **NC** is normally closed.

EM Off **En** (enable) allows the LC control to monitor the smoke detector when set to **ON**. When set to **OFF**, the LC controller ignores the smoke detector.

EM Off **Val** (value) of **ON** indicates a smoke event. A **Val** (value) of **OFF** indicates no smoke event.

Smoke detector connections (emergency off input) are on the LC6000 terminal block; see Table 6 on page 24 for terminal block index.

FIGURE 3
Adjust Emergency Off, Emergency Vent or Generator Alarm Input Direction



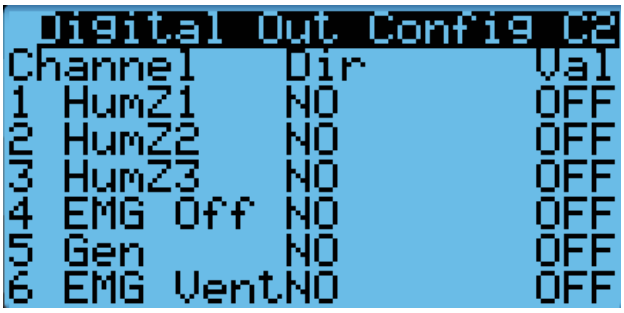
To change the direction of the remote notification relay output:

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 **EMG Off** and **Dir** (see Figure 4).
6. Press UP or DOWN key to change direction.

The smoke alarm notification relay has dry contacts. The **Dir** (direction) is the position of the relay without a smoke event. **NO** is normally open; **NC** is normally closed.

When the **Val** (value) is **ON**, the relay is in an alarm condition. The relay connections (smoke alarm) are on the LC6000 terminal block; see Table 6 on page 24 for terminal block index.

FIGURE 4
Adjust Alarm Remote Notification Relay Output Direction



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 (#10 and #11). 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 3).
6. Press UP or DOWN key to change direction.

Gen **Dir** (direction) is the position of the generator input contacts in the event of a need for generator operation. **NO** is normally open; **NC** is normally closed.

Gen **En** (enable) allows the LC control to monitor the generator input contacts when set to **ON**. When set to **OFF**, the LC controller ignores the generator input contacts.

Gen **Val** (value) of **ON** indicates the generator is in operation. A **Val** (value) of **OFF** indicates the generator is not operating.

Generator connections (generator run input) are on the LC6000 terminal block; see Table 5 on page 22 for terminal block index.

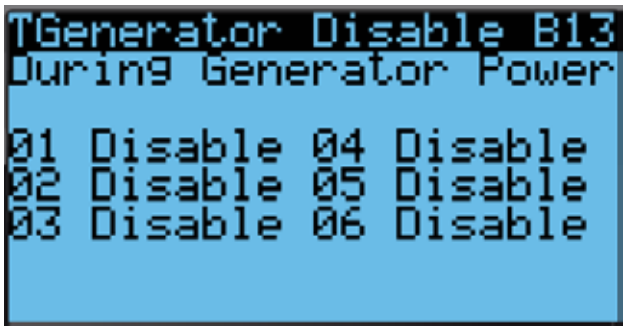
While the generator is running, the system will only allow selected units to run. This selection is customizable by the end user. This limitation is in place to match the unit power requirements to the shelter generator capacity.

The default is to not allow any units to run during a generator event. This can be adjusted to allow specific units to run during a generator event.

To change which units run when the generator run input is active:

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 System Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Generator Disable B13.** This screen displays units 1-6 (as applicable).
5. Press ENTER key to scroll to **01** (see Figure 5).

FIGURE 5
Adjust Units Running When Generator Is Active



6. Press UP or DOWN key to change **Disable** to **Enable**.
7. Press ENTER key to save the value and move cursor to **04**.
8. Press UP or DOWN keys and ENTER key to change units to **Enable** as needed.

9. Press ENTER key to scroll back to top line.

The **Generator Disable B13** screen displays units 1-6. To enable/disable units 7-14, press UP or DOWN keys to scroll to **Generator Disable B14** and follow the directions provided above.

To change the direction of the remote notification relay output:

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 4 on page 7).
6. Press UP or DOWN key to change direction.

The generator alarm notification relay has dry contacts. The **Dir** (direction) is the position of the relay without generator operation. **NO** is normally open; **NC** is normally closed.

When the **Val** (value) is **ON**, the relay is in an alarm condition. The relay connections (generator alarm) are on the LC6000 terminal block; see Table 6 on page 24 for terminal block index.

Emergency Vent Alarm

If the emergency vent terminals are activated by a hydrogen detector or similar device, 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.

Units with economizers will operate in emergency vent mode. The dampers will open at 100% and the blower will come on at full speed until the alarm is reset. Units without economizers located in the same zone will only bring on the blower at full speed.

The emergency vent 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 (#8 and #9). When this jumper is removed, the alarm will become active.

To change the direction of the emergency vent 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 **EM Vent** and **Dir** (see Figure 3 on page 6).
6. Press UP or DOWN key to change direction.

Emergency Vent (EM Vent) **Dir** (direction) is the position of the emergency vent contacts in the event of hydrogen being sensed. **NO** is normally open; **NC** is normally closed.

EM Vent **En** (enable) allows the LC control to monitor the hydrogen detector when set to **ON**. When set to **OFF**, the LC controller ignores the hydrogen detector.

EM Vent **Val** (value) of **ON** indicates a hydrogen event. A **Val** (value) of **OFF** indicates no hydrogen event.

Emergency vent connections (hydrogen detector input) are on the LC6000 terminal block; see Table 6 on page 24 for terminal block index.

To change the direction of the remote notification relay output:

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 **EMG Vent** and **Dir** (see Figure 4 on page 7).
6. Press UP or DOWN key to change direction.

The emergency vent alarm notification relay has dry contacts. The **Dir** (direction) is the position of the relay without a hydrogen event. **NO** is normally open; **NC** is normally closed.

When the **Val** (value) is **ON**, the relay is in an alarm condition. The relay connections (emergency vent alarm) are on the LC6000 terminal block; see Table 6 on page 24 for terminal block index.

Zone Unit Alarm

By default, 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:

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 on page 5).
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 15 alarms communicated from each wall unit. These items can be selected for each zone.

To select which wall unit alarms actuate zone alarms:

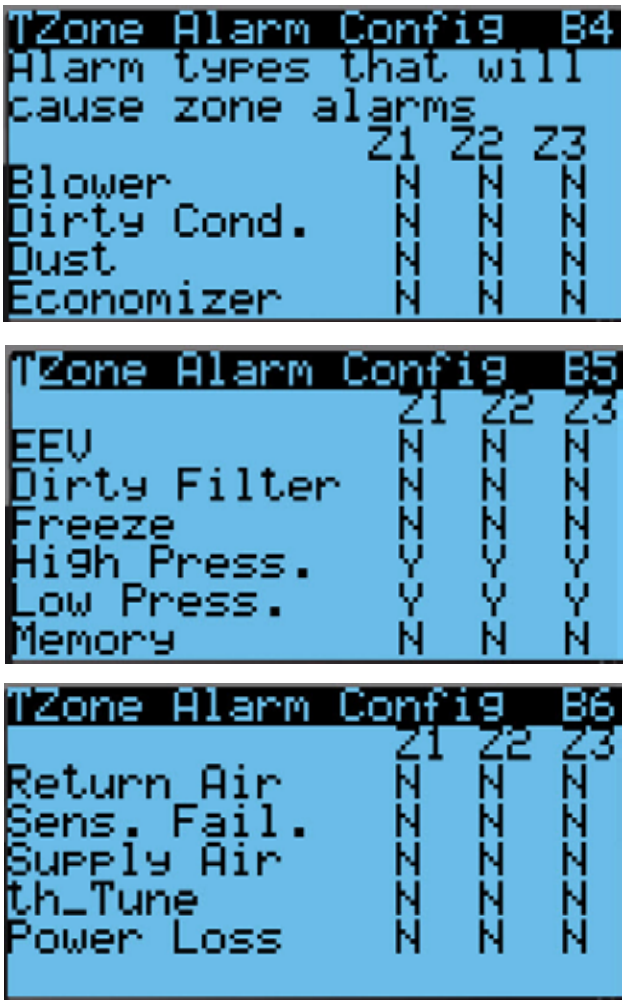
1. Press MENU key to go to the Main Menu screen.
2. Use UP or DOWN keys and ENTER key to enter TECHNICIAN password 1313.
3. Press UP or DOWN keys to scroll to **Adv Sys Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Zone Alarm Config B4**, **Zone Alarm Config B5** and **Zone Alarm Config B6**. The 15 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 6).
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 'no temperature sensors' and high and low pressure actuate the alarms.*

NOTE: *Power Loss group is also affected by communication loss.*

NOTE: *If no temperature sensors are detected by the controller for a given zone, that zone alarm output will be actuated. This is nonconfigurable.*

FIGURE 6
Adjust Zone Alarm Configuration



Humidity Alarm

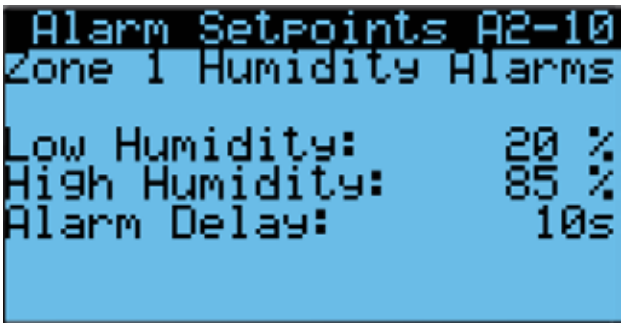
When the LC detects a high indoor humidity or low indoor humidity event in a selected zone (through an analog input from a remote sensor), an alarm will be generated. Additionally, a relay output will be actuated from the LC to provide remote notification of the event. The end user can configure the 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 **Zone 1**, **Zone 2** or **Zone 3**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Alarm Setpoints A2-10** (Zone 1), **Alarm Setpoints A3-10** (Zone 2) or **Alarm Setpoints A4-10** (Zone 3).

6. Press ENTER key to scroll to **Low Humidity**, **High Humidity** or **Alarm Delay** (delay in seconds from the time the alarm is sensed until the alarm is displayed). See Figure 7.
7. Press UP and DOWN keys to adjust setpoints or delay.

FIGURE 7
Adjust Humidity Alarm Setpoints



To adjust the direction of the remote notification relay output:

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 **HumAl** and **Dir** (see Figure 2 on page 5).
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.

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

Temperature Control

Indoor Temperature Averaging

The LC has the ability to average all of the zone temperature sensors connected to the LC and the return air temperature sensors connected to the wall-mount unit, use only the zone temperature sensors, or use the LC sensors and any unit which has its blower run continuously. This can be set differently for each zone. This value will then be used as a **zone indoor temperature** for the LC and wall-mount unit control functions.

There are three possible sensor averaging selections:

- LC Only

  This configuration only averages the zone temperature sensors connected to the LC and enabled within the specific zone.

- Blower On

  This configuration averages any temperature sensors connected to the LC that are enabled and the return air temperature sensor of any wall-mount unit set to run in continuous blower within the specific zone.

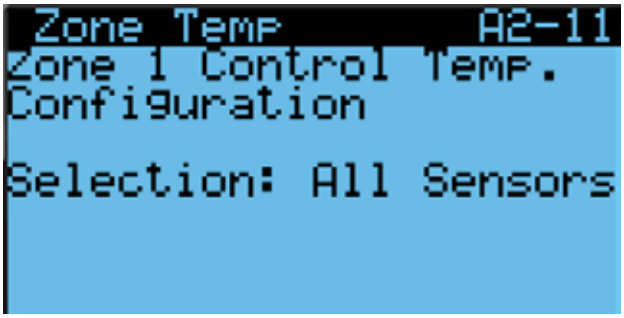
- All Sensors

  This configuration averages the zone temperature sensors connected to the LC that are enabled and all the return air temperature sensors of all wall-mount units within the specific zone, regardless of blower operation.

To change the indoor temperature averaging type:

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 1**, **Zone 2** or **Zone 3**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Zone Temp A2-11** (Zone 1), **Zone Temp A3-11** (Zone 2) or **Zone Temp A4-11** (Zone 3).
6. Press ENTER key to scroll to **Selection** (see Figure 8).
7. Press UP and DOWN keys to adjust.

FIGURE 8
Change Indoor Temperature Averaging Type



Comfort Mode

If comfort mode is activated, all of the zone setpoints will be set to 72°F for cooling and 70°F (Comfort Setoint -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 or heat to the comfort setpoint for the 60-minute duration.

Staging

Each zone is capable of three different staging methods.

FIFO (First in First Out)

The unit that is first in rotation will be the first one turned off.

LIFO (Last in First Out)

The unit that is last in rotation will be the first one turned off.

Demand Staging

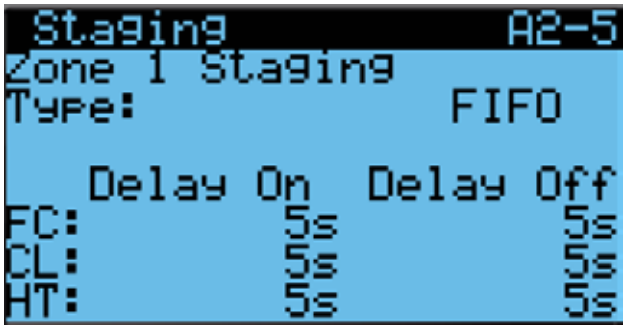
While in cooling operation, the unit with the highest return temperature will be brought on first. The unit with the lowest return temperature will be turned off first. While in heating mode, the unit with the lowest

return air temperature will be brought on first and the unit with the highest return temperature will be turned off first.

To change the staging method type:

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 1**, **Zone 2** or **Zone 3**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Staging A2-5** (Zone 1), **A3-5** (Zone 2) or **A4-5** (Zone 3**)**.
6. Press ENTER key to scroll to the variable labeled **Type** (see Figure 9).
7. Press UP or DOWN keys to adjust.

FIGURE 9
Adjust Staging Settings



Staging Delay

A delay on and off can be set for economizer (FC), cooling (CL)and heating (HT) independently for each zone. This will limit how fast the units can be staged on or off.

To adjust the on and off delay times:

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 1**, **Zone 2** or **Zone 3**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Staging A2-5** (Zone 1), **Staging A3-5** (Zone 2) or **Staging A4-5** (Zone 3**)**.
6. Press ENTER key to scroll to the variable in the table that intersects **FC**, **CL** or **HT** and **Delay On** or **Delay Off** (see Figure 9).
7. Press UP or DOWN keys to adjust.

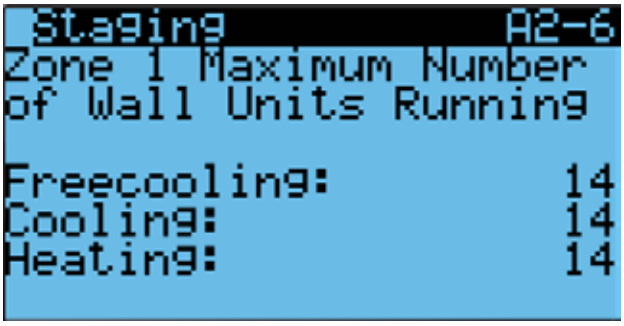
Maximum Number of Units Running

The maximum number of units that will be staged on can be configured for each zone. The number is defaulted at the total number of units capable so that they are fully utilized by default. This is configurable for economizer, cooling and heating independently.

To adjust the maximum number of units running:

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 1**, **Zone 2** or **Zone 3**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Staging A2-6** (Zone 1), **Staging A3-6** (Zone 2) or **Staging A4-6** (Zone 3**)**.
6. Press ENTER key to scroll to the variable for **Freecooling, Cooling** or **Heating** (see Figure 10).
7. Press UP or DOWN keys to adjust number of units.

FIGURE 10
Staging Maximum Number of Units Running



Rotation

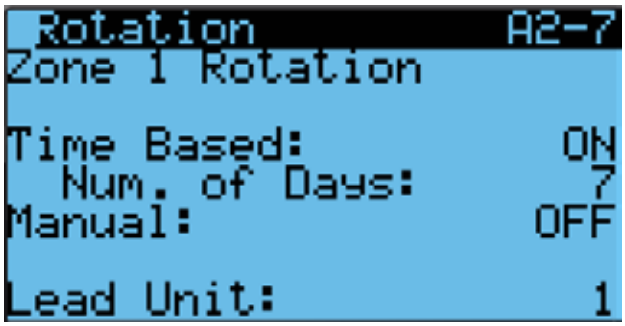
The units in each zone can be rotated based on a configurable number of days (1-7). The time is defaulted to 7 days. In addition to time-based, a manual rotation can be triggered for troubleshooting.

To change the rotation variables:

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 1**, **Zone 2** or **Zone 3**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Rotation A2-7** (Zone 1), **Rotation A3-7** (Zone 2) or **Rotation A4-7** (Zone 3**)**.

6. Press ENTER key to scroll to **Time Based** (see Figure 11). The changeover time is 12 am.
7. Press UP or DOWN key to change ON to OFF.
8. Press ENTER key to scroll to **Num. of Days**.
9. Press UP or DOWN keys to adjust the number of days.
10. Press ENTER key to scroll to **Manual**.
11. Press UP or DOWN key to change OFF to ON.

FIGURE 11
Rotation



Demand

The system will compare the zone temperature (determined by zone averaging selection) to the zone cooling and heating setpoint. A demand will be calculated to determine how many units are required.

For cooling, the zone temperature will be compared to the cooling setpoint. The controller will calculate a demand based on how far above the setpoint and how long it has been above the setpoint. The demand value (0-100%) will then be split and applied to free cooling and cooling separately shown as two demands both ranged 0-100% applied to all of the available cooling methods for that zone. For example, if the demand is at 50% and there are 10 available stages of cooling in that zone, there would be 5 stages active (50% x 10 = 5). The system will prioritize free cooling stages over compressor stages. Adding to the example, if 5 of the 10 stages for cooling are economizer, 5 units would be running economizer and no compressors running. The demand is calculated for the cooling application. However, for display purposes, the demand is split so that the user can see demand separately for free cooling and compressor.

For heating, the zone temperature will be compared to the heating setpoint. The controller will calculate a demand based on how far below the setpoint and how long it has been below the setpoint. The demand value 0-100% will the be applied to all of the available stages of heating in that zone. For example, if the demand is at 50% and there are 5 available stages of heating in that zone, there would be 2 stages active (50% x 5 = 2.5 and a half of a stage cannot be turned on).

Humidity Control

The LC can be configured to control up to three humidifiers (field supplied) with relay outputs and up to 14 units equipped with dehumidification. The indoor humidity level for each zone is compared to the dehumidification setpoint and humidification setpoint for each zone.

Dehumidification

The LC6000 controller will monitor the indoor relative humidity of each zone and compare the value to three setpoints for each zone. The three setpoints will be described as *dehumidification off*, *passive dehumidification* and *active dehumidification*. The default value for these setpoints will be 60%RH, 70%RH and 80%RH, respectively.

When the humidity level inside the shelter falls to the dehumidification off setpoint, the system will stop attempting to dehumidify the space.

When the humidity level rises to the passive dehumidification setpoint, all units with economizers will disable the use of economizers for cooling calls. This will act as passive dehumidification by forcing the use of compressor for space cooling. Availability for passive dehumidification will be determined by model number. All units with economizers will be considered.

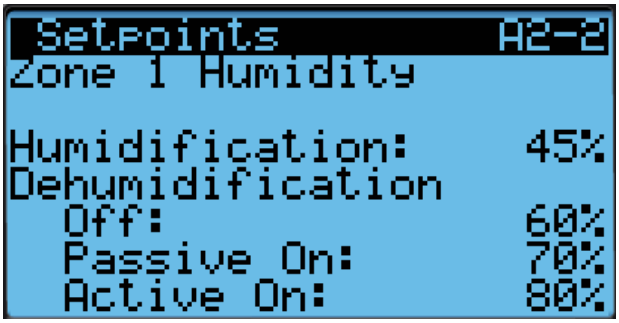
When the humidity level rises to the active dehumidification setpoint, the controller will activate staged dehumidification. The controller will then calculate a dehumidification demand based on how far above the setpoint and how long the RH level has been above the setpoint. The demand will then utilize all of the units with active dehumidification capabilities to reduce the indoor humidity level. The units will be staged on based on the existing cooling rotation for the units in the zone up to an optional maximum number of units running value. Availability for active dehumidification will be determined by model number. Units with concurrent electric reheat or mechanical dehumidification will be considered. ***NOTE:*** *Only one type of dehumidification unit will be considered depending upon configuration of the LC6000 controller.* Unit capability is determined by the model number.

To change the dehumidification 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 **Zone 1**, **Zone 2** or **Zone 3**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Setpoints A2-2** (Zone 1), **Setpoints A3-2** (Zone 2) or **Setpoints A4-2** (Zone 3).

6. Press ENTER key to scroll to **Dehumidification Off**, **Passive On** or **Active On** (see Figure 12).
7. Press UP and DOWN keys to change dehumidification setpoints to desired values.

FIGURE 12
Humidity Control Setpoints

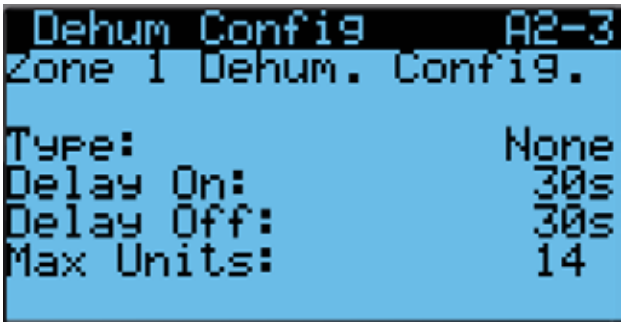


In addition to the setpoint configuration for dehumidification, each zone must be configured for the type of active dehumidification.

To change the dehumidification type:

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 1**, **Zone 2** or **Zone 3**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Setpoints A2-3** (Zone 1), **Setpoints A3-3** (Zone 2) or **Setpoints A4-3** (Zone 3**)**.
6. Press ENTER key to scroll to **Type** (see Figure 13).
7. Press UP and DOWN keys to change to desired value. Dehumidification type choices are **None**, **Electric Reheat**, **Mechanical Reheat** or **Cycling Reheat**. The units in the zone being configured will need to have the capability of the setting being selected (see unit model number).

FIGURE 13
Dehumidification Types



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 are field supplied.*

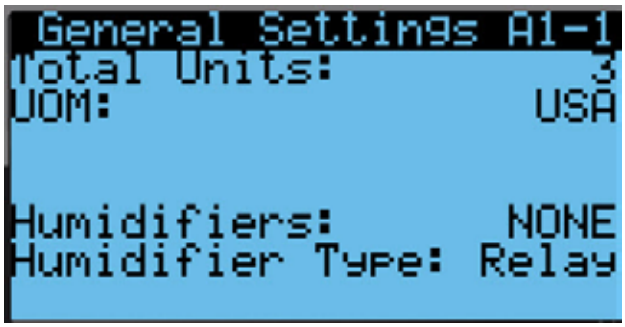
To change the humidification setpoint:

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 1**, **Zone 2** or **Zone 3**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Setpoints A2-2** (Zone 1), **Setpoints A3-2** (Zone 2) or **Setpoints A4-2** (Zone 3**)**.
6. Press ENTER key to scroll to **Humidification** (see Figure 12).
7. 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 **General**; press ENTER key.
5. Press ENTER key to scroll to **Humidifiers** (see Figure 14).
6. Press UP or DOWN keys to change value to **NONE**, **Zone 1**, **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**.

FIGURE 14
Enabling Humidifier



Continuous Blower

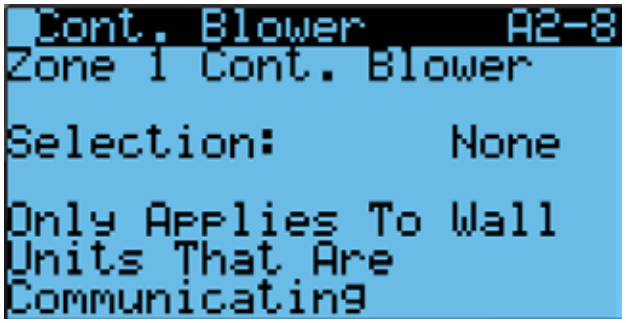
The LC will has the option in each zone to operate in continous blower. The options are None, Lead, All and Custom. When None is selected, continuous blower will be disabled on all units in that zone. When Lead is selected, only the lead unit will have continuous blower activated. When All is selected, continuous blower will be enabled on all units in that zone. When Custom is selected, only units specifically commanded on by the end user will run in that zone.

Precedence for continuous blower will be given to the LC or stand-alone controller in instances where communication with LC is lost.

To change the continuous blower 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 **Zone 1**, **Zone 2** or **Zone 3**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Cont. Blower A2-8** (Zone 1), **Cont. Blower A3-8** (Zone 2) or **Cont. Blower A4-8** (Zone 3).
6. Press ENTER key to scroll to **Selection** (see Figure 15).
7. Press UP and DOWN keys to change to desired choice.

FIGURE 15
Continuous Blower

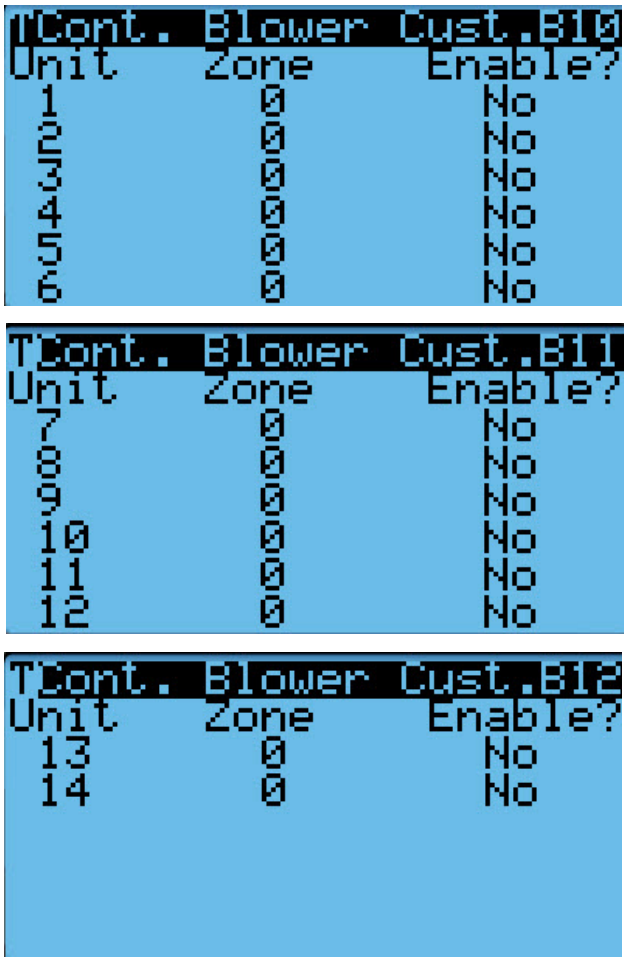


Continuous Blower Custom Configuration

When Custom is selected, only unit specifically commanded on by the end user will run in that zone. To select the units to run in continuous blower:

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 **Cont. Blower Cust. B10**, **Cont. Blower Cust. B11** or **Cont. Blower Cust. B12**. The wall-mount units are divided between these three screens.
5. Press ENTER key to scroll to the variable in the Enable column that represents the desired wall mount unit (see Figure 16).
6. Press UP or DOWN key to change value from No to Yes (to enable that unit for continuous blower) or Yes to No (to disable that unit for continuous blower).
7. Press ENTER key to save.

FIGURE 16
Continuous Blower



ADDITIONAL INFORMATION

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 ESCAPE 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 ESCAPE 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

The information menu groups all information by unit address. The LC6000 controller is capable of operating MULTI-TEC, FUSION-TEC WR Series and MEGA-TEC wall-mount units. The screens will automatically show the relevant information for each unit. For example, the FUSION-TEC WR Series and MEGA-TEC wall-mount units are equipped with a supply air temperature sensor while the MULTI-TEC units are not. The supply temperature measurement will only show when displaying information from a FUSION-TEC WR Seies or MEGA-TEC wall-mount unit. Additionally, FUSION-TEC WR Series units are equipped with an electronic expansion valve (EEV). When connected to a FUSION-TEC WR Series unit, an additional screen will show pressures and temperatures affecting the air conditioning system. MEGA-TEC wall-mount units are equipped with two electronic expansion valves with additional screens that show pressures and temperatures for each EEV.

The last of the wall-mount unit's information screens will display the model number, serial number and software version of the unit (see Figures 17, 18 and 19). This information is very important and could be needed when referencing technical documentation online or contacting Bard Technical Services.

FIGURE 17
MULTI-TEC Unit Information Screen

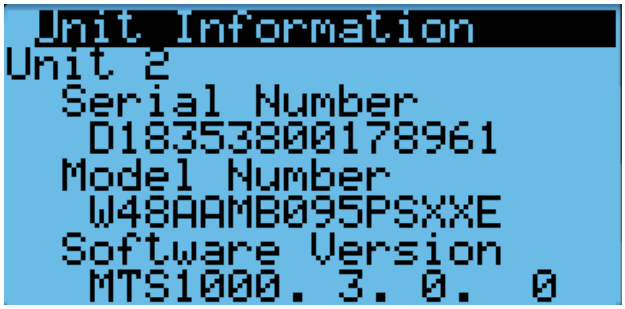


FIGURE 18
FUSION-TEC WR Series Unit Information Screen

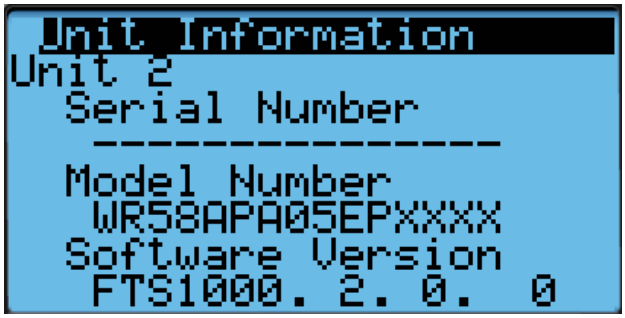
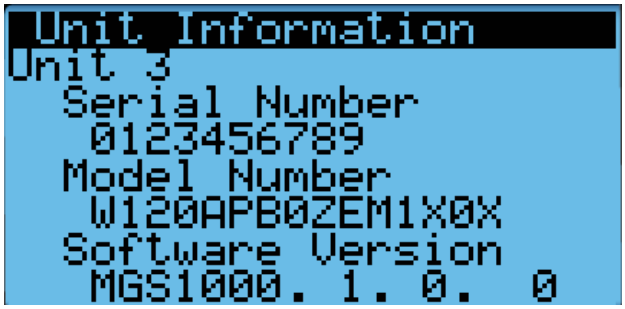


FIGURE 19
MEGA-TEC Unit Information Screen



Setpoints

Setpoints allows setting and enabling of comfort mode.

Menu Screens and Password Levels

A System Config
- General: User (2000)
- Zone 1: User (2000)
- Zone 2: User (2000)
- Zone 3: User (2000)

B Adv Sys Config: Technician (1313)

C I-O Config: Technician (1313)

D On/Off: User (2000)

E Alarm Logs: User (2000)

F Settings
- Date/Time: Technician (1313)
- Language: User (2000)
- Network Config: Technician (1313)
- Serial Ports: Technician (1313)
- Initialization
  - Clear Logs: User (2000)
  - System Default: Engineer (9254)
  - Restart: User (2000)
  - Parameter Config: Engineer (9254)
  - Alarm Export: User (2000)

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

TABLE 1
LC6000 Passwords (Defaults)

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

TABLE 2
LC6000 Status Messages

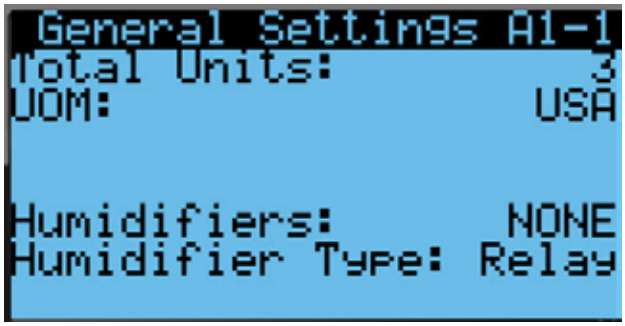
Message	Description
On	The system is on
Off by Alarm	The system has a major fault and is disabled
Off by BMS	The system has been disabled by network supervisor
Off by Keypad	The system has been turned off by local user
Emergency Cooling	The system has detected a high temperature alarm and one or more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

Additional Programming

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 **General Settings (A1-1)**; press enter key.
5. Press ENTER key to scroll to **UOM** (see Figure 20).
6. Press UP and DOWN keys to change value to **SI**.

FIGURE 20
Changing to Celsius



Configuring Number of Units

The LC is capable of operating up to 14 wall-mount units in up to 3 zones. This includes MULTI-TEC, FUSION-TEC WR Series and MEGA-TEC units. Add all units up for total number of units. Example: If there are three MULTI-TEC units in Zone 1, two FUSION-TEC WR units in Zone 2 and one MEGA-TEC unit in Zone 3, the total number of units should be set to 6.

To configure the total number of units:

1. Press MENU key to go to the Main Menu screen.
2. Press UP or DOWN keys and ENTER key to enter USER password 2000.
3. Press UP or DOWN keys to scroll to **Sys Config**; press ENTER key.
4. Press UP or DOWN keys to scroll to **General Settings (A1-1)**; press enter key.
5. Press ENTER key to scroll to **Total Units** (see Figure 20).
6. Press UP or DOWN keys to adjust value to correct number of units.
7. Press ENTER key to save value.

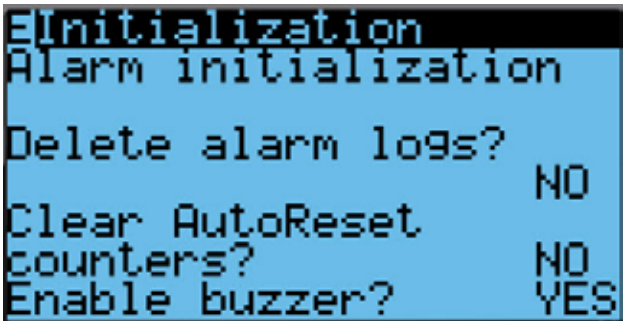
Calibrating Sensors

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.

Clearing Alarm Logs

1. Press MENU key to go to the Main Menu screen.
2. Use UP or DOWN keys and ENTER key to enter USER password 2000.
3. Press UP or DOWN keys to scroll to **Settings**; press ENTER key.
4. Press UP or DOWN keys to scroll to **Initialization**; press ENTER key.
5. Press ENTER key to scroll to **Delete Alarm Logs?** (see Figure 21).
6. Press UP or DOWN key to change value to **YES**; press ENTER key.

FIGURE 21
Clearing LC6000 Alarm Logs



Configuring Free Cooling

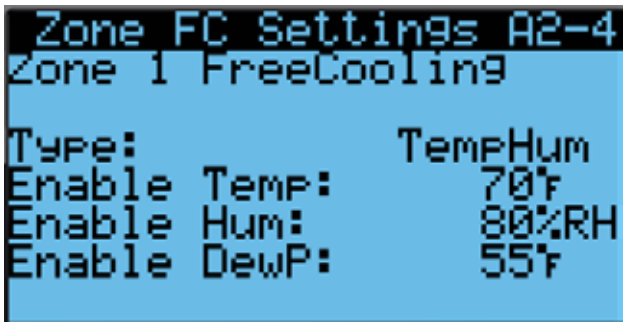
Each zone can be configured to operate the economizers with different considerations. For more information on the economizer enable setpoints, please reference the most recent version of the corresponding wall-mount unit service manual. For MULTI-TEC, see Service Manual 2100-665. For FUSION-TEC WR Series, see Service Manual 2100-688. For MEGA-TEC, see Service Manual 2100-671.

The type of consideration can be changed to none, drybulb, temperature and humidity, or enthalpy. The temperature, humidity and dewpoint parameters can be changed to affect at what conditions the economizers in the respective zone will operate. These settings will be communicated to the wall units while connected to the LC6000 to ensure all units operate the same.

To make changes to the free cooling 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 **Zone 1**, **Zone 2** or **Zone 3**; press ENTER key.
5. Press UP or DOWN keys to scroll to **Zone FC Settings A2-4** (Zone 1), **Zone FC Settings A3-4** (Zone 2) or **Zone FC Settings A4-4** (Zone 3**)**.
6. Press ENTER key to scroll to **Type**, **Enable Temp**, **Enable Hum** or **Enable Dewp** (see Figure 22).
7. Press UP and DOWN keys to adjust free cooling values.

FIGURE 22
Configuring Free Cooling



Enabling High Sensible Operation

The LC6000 has the option to operate the wall units in a high sensible mode that will adjust blower speeds to enhance the sensible cooling capacity of the units. This option is not enabled by default and will automatically turn off when the indoor humidity raises to the passive dehumidification setpoint. High sensible operation will resume once the indoor humidity has lowered to the dehumidification off setpoint.

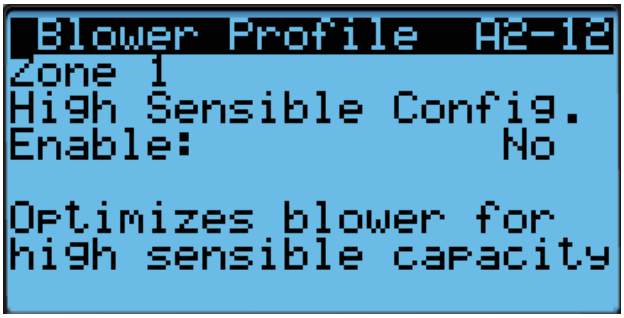
NOTE: *This mode available only on the FUSION-TEC WR Series and MEGA-TEC wall-mount units. It is not available on the MULTI-TEC wall-mount units.*

To enable high sensible operation:

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 1**, **Zone 2** or **Zone 3**; press ENTER key.

5. Press UP or DOWN keys to scroll to **Blower Profile A2-12** (Zone 1), **Blower Profile A3-12** (Zone 2) or **Blower Profile A4-12** (Zone 3**)**.
6. Press ENTER key to scroll to **Enable** (see Figure 23).
7. Press UP or DOWN key to change value to **YES**; press ENTER key.

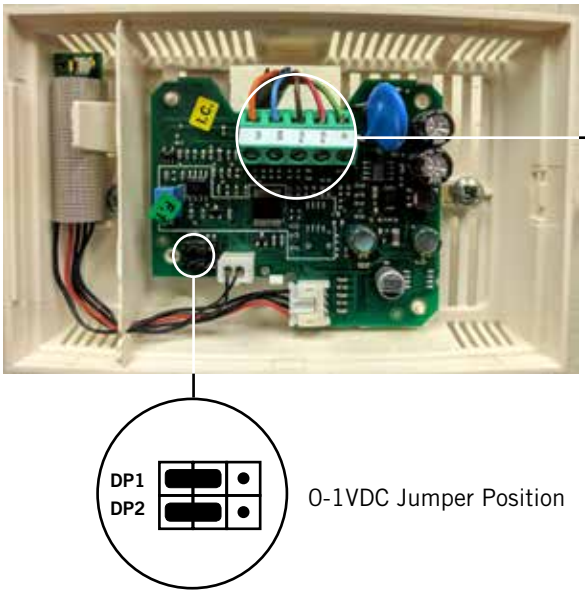
FIGURE 23
Enabling High Sensible Operation



8403-079 Remote Indoor Temperature/Humidity Sensor

Troubleshooting the temperature/humidity sensor is necessary if the temperature or humidity reading for a zone is inaccurate. Always start sensor troubleshooting by verifying connections at the sensor board and at the LC6000 terminal blocks. Improper connection will cause inaccurate readings. Next, verify continuity at both ends of wires running between the sensor and the LC6000. A severed or damaged wire will cause inaccurate readings. As a last step, verify voltage and resistance at the sensor and the LC6000 terminal block per the Tables 3 and 4. If the sensor is found to be malfunctioning, replace the sensor.

FIGURE 24
8403-079 Sensor



Sensor Terminals	Description
M(G0) - +(G)	12VDC +/– Supplies power to the sensor
M(G0) - OUT H	0-1VDC Supplies signal for zone humidity (see Voltage/Humidity chart on page 22)
NTC OUT - NTC OUT	Ohm Supplies signal for zone temperature (see Temperature/Resistance chart on page 21)

NOTE: *Sensor jumper must be positioned for 0-1 V as shown above for sensor to function properly.*

TABLE 3
8403-079 Sensor: Temperature/Resistance

Temperature		Resistance	Temperature		Resistance	Temperature		Resistance	Temperature		Resistance
C	F	KΩ	C	F	KΩ	C	F	KΩ	C	F	KΩ
-18	0	61.52	0	32	27.28	18	64	13.06	36	97	6.69
-17	1	58.66	1	34	26.13	19	66	12.56	37	99	6.46
-16	3	55.95	2	36	25.03	20	68	12.09	38	100	6.24
-15	5	53.39	3	37	23.99	21	70	11.63	39	102	6.03
-14	7	50.96	4	39	22.99	22	72	11.20	40	104	5.82
-13	9	48.65	5	41	22.05	23	73	10.78	41	106	5.63
-12	10	46.48	6	43	21.15	24	75	10.38	42	108	5.43
-11	12	44.41	7	45	20.29	25	77	10.00	43	109	5.25
-10	14	42.25	8	46	19.40	26	79	9.63	44	111	5.08
-9	16	40.56	9	48	18.70	27	81	9.28	45	113	4.91
-8	18	38.76	10	50	17.96	28	82	8.94	46	115	4.74
-7	19	37.05	11	52	17.24	29	84	8.62	47	117	4.59
-6	21	35.43	12	54	16.55	30	86	8.31	48	118	4.44
-5	23	33.89	13	55	15.90	31	88	8.01	49	120	4.30
-4	25	32.43	14	57	15.28	32	90	7.72	50	122	4.16
-3	27	31.04	15	59	14.68	33	91	7.45	51	124	4.02
-2	28	29.72	16	61	14.12	34	93	7.19	52	126	3.90
-1	30	28.47	17	63	13.57	35	95	6.94			

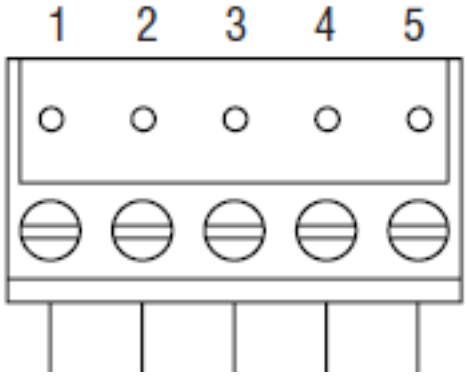
TABLE 4
8403-079 Sensor: Voltage/Humidity

Voltage DC	RH%	Voltage DC	RH%	Voltage DC	RH%	Voltage DC	RH%
1	100	0.74	74	0.49	49	0.24	24
0.99	99	0.73	73	0.48	48	0.23	23
0.98	98	0.72	72	0.47	47	0.22	22
0.97	97	0.71	71	0.46	46	0.21	21
0.96	96	0.70	70	0.45	45	0.20	20
0.95	95	0.69	69	0.44	44	0.19	19
0.94	94	0.68	68	0.43	43	0.18	18
0.93	93	0.67	67	0.42	42	0.17	17
0.92	92	0.66	66	0.41	41	0.16	16
0.91	91	0.65	65	0.40	40	0.15	15
0.90	90	0.64	64	0.39	39	0.14	14
0.89	89	0.63	63	0.38	38	0.13	13
0.88	88	0.62	62	0.37	37	0.12	12
0.87	87	0.61	61	0.36	36	0.11	11
0.86	86	0.60	60	0.35	35	0.10	10
0.85	85	0.59	59	0.34	34	0.09	9
0.84	84	0.58	58	0.33	33	0.08	8
0.83	83	0.57	57	0.32	32	0.07	7
0.82	82	0.56	56	0.31	31	0.06	6
0.81	81	0.55	55	0.30	30	0.05	5
0.79	79	0.54	54	0.29	29	0.04	4
0.78	78	0.53	53	0.28	28	0.03	3
0.77	77	0.52	52	0.27	27	0.02	2
0.76	76	0.51	51	0.26	26	0.01	1
0.75	75	0.50	50	0.25	25	0.00	0

8301-090 Outdoor Temperature/Humidity Sensor

Troubleshooting the temperature/humidity sensor is necessary if the temperature or humidity reading is inaccurate. Always start sensor troubleshooting by verifying connections at the sensor board and at the LC6000 terminal blocks. Improper connection will cause inaccurate readings. Next, verify continuity at both ends of wires running between the sensor and the LC6000. A severed or damaged wire will cause inaccurate readings. As a last step, verify voltage and resistance at the sensor and the LC6000 terminal block per the provided table. If the sensor is found to be malfunctioning, replace the sensor.

FIGURE 25
8301-090 Sensor



Sensor Terminal	Description
1	Remote Outdoor Humidity Sensor: 0-10 VDC
2	+VDC
3	Ground
4	Remote Outdoor Temperature Sensor
5	Ground

TABLE 5
8301-090 Sensor: Temperature/Resistance

Temperature		Resistance	Temperature		Resistance	Temperature		Resistance	Temperature		Resistance
C	F	Ω	C	F	Ω	C	F	Ω	C	F	Ω
-32	-25.6	151,200	-10	14.0	47,540	12	53.6	17,210	34	93.2	7016
-31	-23.8	142,900	-9	15.8	45,270	13	55.4	16,480	35	95.0	6752
-30	-22.0	135,200	-8	17.6	43,110	14	57.2	15,790	36	96.8	6500
-29	-20.2	127,900	-7	19.4	41,080	15	59.0	15,130	37	98.6	6258
-28	-18.4	121,100	-6	21.2	39,140	16	60.8	14,500	38	100.4	6027
-27	-16.6	114,600	-5	23.0	37,310	17	62.6	13,900	39	102.2	5805
-26	-14.8	108,600	-4	24.8	35,580	18	64.4	13,330	40	104.0	5592
-25	-13.0	102,900	-3	26.6	33,930	19	66.2	12,780	41	105.8	5389
-24	-11.2	97,490	-2	28.4	32,370	20	68.0	12,260	42	107.6	5194
-23	-9.4	92,420	-1	30.2	30,890	21	69.8	11,770	43	109.4	5007
-22	-7.6	87,650	0	32.0	29,490	22	71.6	11,290	44	111.2	4827
-21	-5.8	83,150	1	33.8	28,160	23	73.4	10,840	45	113.0	4655
-20	-4.0	78,910	2	35.6	26,890	24	75.2	10,410	46	114.8	4490
-19	-2.2	74,910	3	37.4	25,690	25	77.0	10,000	47	116.6	4331
-18	-0.4	71,130	4	39.2	24,540	26	78.8	9602	48	118.4	4179
-17	1.4	67,570	5	41.0	23,460	27	80.6	9226	49	120.2	4033
-16	3.2	64,200	6	42.8	22,430	28	82.4	8866	50	122.0	3893
-15	5.0	61,020	7	44.6	21,440	29	84.2	8522	51	123.8	3758
-14	6.8	58,010	8	46.4	20,510	30	86.0	8194	52	125.6	3629
-13	8.6	55,170	9	48.2	19,620	31	87.8	7879			
-12	10.4	52,490	10	50.0	18,780	32	89.6	7579			
-11	12.2	49,950	11	51.8	17,980	33	91.4	7291			

TABLE 6
LC6000-200 Terminal Block Index

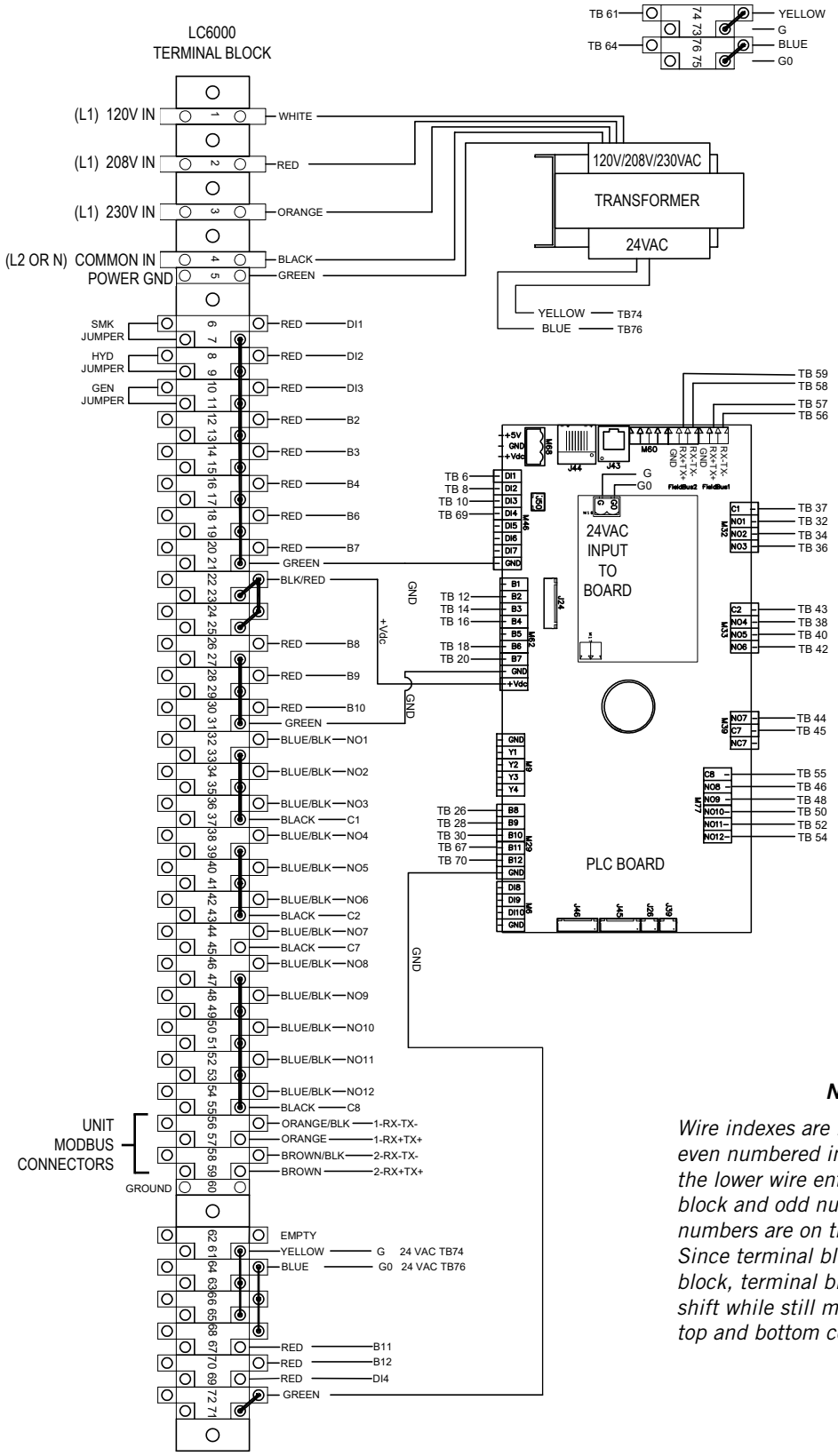
TB#	Wire Mark	Description
1	-	120 VAC Input
2	-	208 VAC Input
3	-	230 VAC Input
4	-	Power Input Common
5	-	Power Input Ground
6	DI1	Emergency Off Input
7	GND	Emergency Off Common
8	DI2	Emergency Vent Input
9	GND	Emergency Vent Common
10	DI3	Generator Run Input
11	GND	Generator Run Common
12	B2	Zone 1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

TB#	Wire Mark	Description
39	C2	Common
40	NO5	Emergency Vent Alarm
41	C2	Common
42	NO6	Generator Run Alarm
43	C2	Common
44	NO7	Indoor Humidity Alarm
45	C7	Common
46	NO8	High Indoor Temperature Alarm
47	C8	Common
48	NO9	Low Indoor Temperature Alarm
49	C8	Common
50	NO10	Zone 1 Unit Alarm
51	C8	Common
52	NO11	Zone 2 Unit Alarm
53	C8	Common
54	NO12	Zone 3 Unit Alarm
55	C8	Common
56	FB1R-	RS485 RX- / TX- (Fieldbus 1) ***UNIT CONNECTION***
57	FB1R+	RS485 RX+ / TX- (Fieldbus 1) ***UNIT CONNECTION***
58	FB2R-	RS485 RX- / TX- (Fieldbus 2)
59	FB2R+	RS485 RX+ / TX- (Fieldbus 2)
60	--	Power Input Ground
61	24 VAC+	24 VAC Supply
62	--	Not Used
63	24 VAC+	24 VAC Supply
64	24 VAC-	24 VAC Ground
65	24 VAC+	24 VAC Supply for Outdoor Humidity Sensor
66	24 VAC-	24 VAC Ground for Outdoor Humidity Sensor
67	B11	Signal for Outdoor Humidity Sensor
68	24 VAC+	24 VAC Supply
69	D14	Bard Guard Alarm Signal
70	B12	Signal for Outdoor Temperature Sensor
71	GND	Ground for Outdoor Temperature Sensor
72	GND	Ground for Bard Guard Alarm Signal
73	G	Orange Power Connector
74	24 VAC+	24 VAC Supply
75	G0	Orange Power Connector
76	24 VAC-	24 VAC Ground

TABLE 7
LC6000-200 to Sensor Connection Index

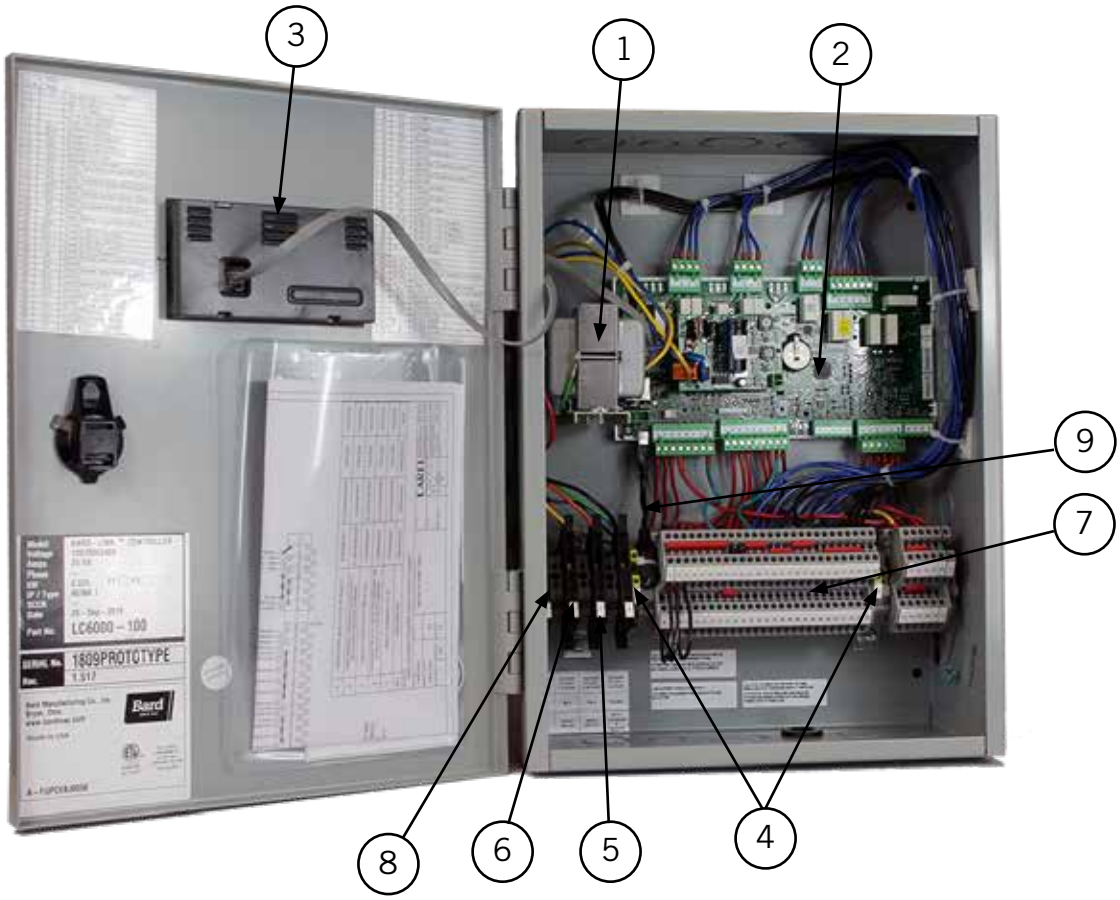
LC6000		Sensor	Terminal	Description
TB#	Wire Mark			
12	B2	8403-079 (Indoor Temp/Hum)	OUT H	Zone 1 Indoor Remote Humidity Sensor
13	GND	8403-079 (Indoor Temp/Hum)	M (GO)	Ground
14	B3	8403-079 (Indoor Temp/Hum)	OUT H	Zone 2 Indoor Remote Humidity Sensor
15	GND	8403-079 (Indoor Temp/Hum)	M (GO)	Ground
16	B4	8403-079 (Indoor Temp/Hum)	OUT H	Zone 3 Indoor Remote Humidity Sensor
17	GND	8403-079 (Indoor Temp/Hum)	M (GO)	Ground
18	B6	8403-079 (Indoor Temp/Hum)	NTC OUT	Zone 1 Indoor Temperature Sensor
19	GND	8403-079 (Indoor Temp/Hum)	NTC OUT	Ground
20	B7	8301-058 (Indoor Temp Only)	NTC OUT	Zone 1 Indoor Remote Temperature Sensor
21	GND	8301-058 (Indoor Temp Only)	NTC OUT	Ground
22	VDC+	8403-079 (Indoor Temp/Hum)	+ (G)	Power for B2 (Z1 Humidity)
23	VDC+	8403-079 (Indoor Temp/Hum)	+ (G)	Power for B3 (Z2 Humidity)
24	VDC+	8403-079 (Indoor Temp/Hum)	+ (G)	Power for B4 (Z3 Humidity)
26	B8	8403-079 (Indoor Temp/Hum)	NTC OUT	Zone 2 Indoor Remote Temperature Sensor
27	GND	8403-079 (Indoor Temp/Hum)	NTC OUT	Ground
28	B9	8403-079 (Indoor Temp/Hum)	NTC OUT	Zone 3 Indoor Remote Temperature Sensor
29	GND	8403-079 (Indoor Temp/Hum)	NTC OUT	Ground
65	24 VAC+	8301-090 (Outdoor Temp/Hum)	2	24 VAC Supply for Outdoor Humidity Sensor
66	24 VAC-	8301-090 (Outdoor Temp/Hum)	3	24 VAC Ground for Outdoor Humidity Sensor
67	B11	8301-090 (Outdoor Temp/Hum)	1	Signal for Outdoor Humidity Sensor
69	D14	Bard Guard	14	Bard Guard Alarm Signal
70	B12	8301-090 (Outdoor Temp/Hum)	4	Signal for Outdoor Temperature Sensor
71	GND	8301-090 (Outdoor Temp/Hum)	5	Ground for Outdoor Temperature Sensor
72	GND	Bard Guard	15	Ground for Bard Guard Alarm Signal

FIGURE 26
LC6000-200 Wiring Diagram



NOTE:

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



Dwg. No.	Part No.	Description	
1	8407-074	Transformer	X
2	8301-076-001 ①	UPC3-LC6000 1.1.0 ②③	X
3	8301-053	pGDEvolution Panel Display	X
4	8607-052	Grounded Terminal Block	2
5	8614-059	1.0 Amp Fuse	4
6	8607-039	Fused Terminal Block	4
7	8607-057	Terminal Block Double Level	54
8	8611-144	End Clamp (for Din Rail)	6
9	8301-075	USB Micro Cable Female to Male	X
NS	8301-055	EMI Ferrite Filter	2
NS	8403-079	Remote Temperature/Humidity Sensor	X
NS	8301-058	Remote Temperature Sensor ④	X
NS	8301-090	Outdoor Temperature/Humidity Sensor ④	X
NS	8301-059	TEC-EYE (Service Tool), 5' Telephone Cable	X

① Replacement part will have a letter attached to the end of the part number to designate software version (Example: 8301-076-001**A**). A software upgrade of all PLCs onsite (units and controllers) should accompany any PLC replacement. Latest revisions of software, change log and instructions are available on the Bard website at http://www.bardhvac.com/software-download/

② uPC3 PLC board digital output ratings. Type: A (SPST) with a rating of AC 230V 3(1)A 100k cycles, 250 Vac FLA 1A, LRA 6A Definite Purpose 30k cycles, 250 Vac, 3A resistive, 50k cycles, C300 pilot duty, 30k cycles. (EN60730-1, UL60730)

③ Batteries for the control boards are field supplied. Supplier part number is BR2032.

④ Optional NS – Not Shown