VERTIV.

# Liebert® iCOM™

## Installer/User Guide

### Intelligent Communication and Monitoring for Liebert® CRV

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### Technical Support Site

If you encounter any installation or operational issues with your product, check the pertinent section of this manual to see if the issue can be resolved by following outlined procedures.

Visit https://www.vertiv.com/en-us/support/ for additional assistance.

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# 1 Getting Started with Vertiv™ Liebert® iCOM™

The Liebert® iCOM™ offers the highest capability for unit control, communication, and monitoring of Liebert® thermal management units. It is available factory installed on new units and assemblies or may be retrofitted in existing units.

## 1.1 Touchscreen Display and User Interface

The Vertiv™ Liebert® iCOM touchscreen and user interface speeds set up and installation and simplifies control of Vertiv™ Liebert® thermal management units, literally putting cooling system monitoring and management at your fingertips.

- The 9-inch, resistive, color-touchscreen display is used with a firm touch, or consider using a stylus when interacting with the touchscreen.
- User and service menus are password protected to prevent unauthorized changes to cooling unit operation.
- The touchscreen is back lit and auto-dims after a period on non-use, then turns off. Touch the screen to illuminate the main screen.
- Liebert® iCOM™ ships with default settings for efficient and effective operation of most cooling units and is easily configured to meet any need.
- Liebert® iCOM™ menus and displays are based on the options installed on the cooling units that it monitors and manages.

**Figure 1.1 Vertiv™ Liebert® iCOM™ Main Display**

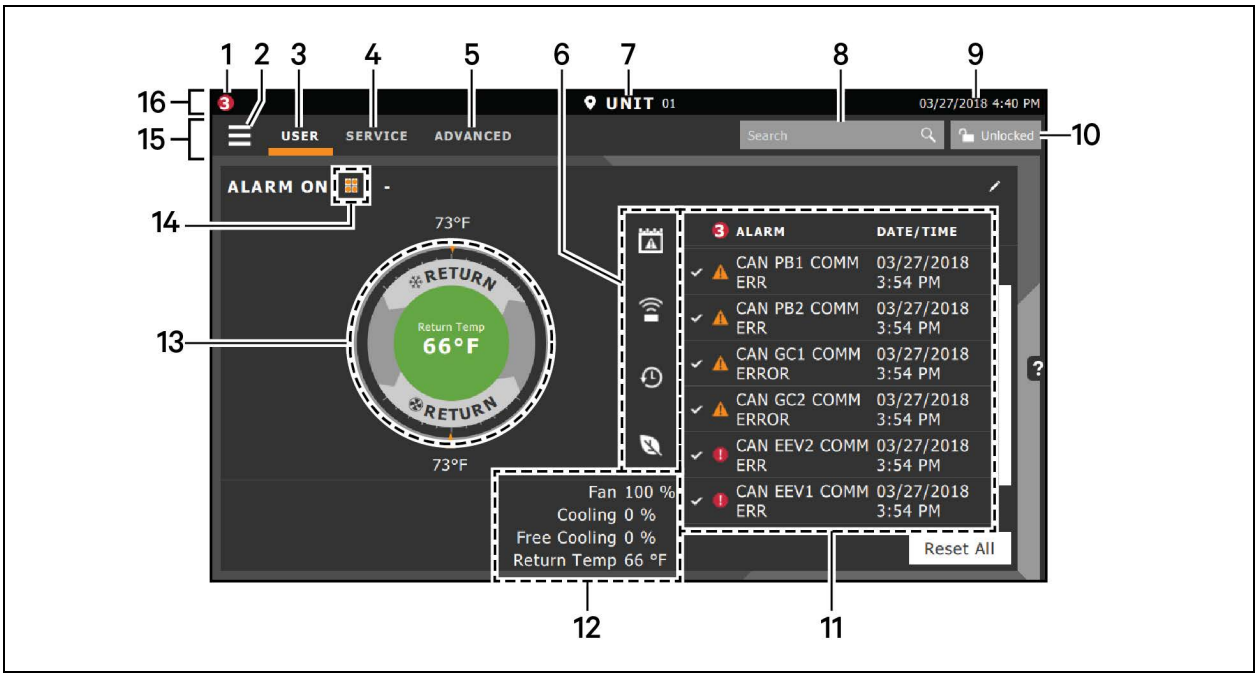



**Table 1.1 Main Display Controls and Options**

| Item | Description |
|---|---|
| 1 | Alarms Present - Displays the number of active alarms. |
| 2 | Menu Icon - When unlocked, displays a menu for user or service options depending on which icon is selected. |
| 3 | User Icon - When selected, the user options are available on the main display and menu.<br>**NOTE: You must unlock the display with the User PIN to access the menu and options.**<br>**See Powering On the Vertiv™ Liebert® iCOM™ and Logging In/Unlocking Controls on page 6 .** |
| 4 | Service Icon - When selected, the service options are available on the main display and menu.<br>**NOTE: You must unlock the display with the Service PIN to access the menu and options.**<br>**See Powering On the Vertiv™ Liebert® iCOM™ and Logging In/Unlocking Controls on page 6 .** |
| 5 | Advanced Icon - When selected, the advanced options are available on the main display and menu.<br>**NOTE: You must unlock the display with the Service PIN to access the menu and read-only options.**<br>**See Powering On the Vertiv™ Liebert® iCOM™ and Logging In/Unlocking Controls on page 6 .** |
| 6 | Cooling Unit Parameters - Status display of selected system parameter settings. See Adding and Adjusting Content on page 97 |
| 7 | Unit Identification - You may customize the unit name up to 6 characters/numbers. |
| 8 | Search Icon - Open the keyboard to search for controls and setting locations. See Searching on page 9 . |
| 9 | Date/Time |
| 10 | Lock/Unlock Icon - Indicates whether or not the user and service options are accessible.<br>• Locked icon: display is read-only<br>• Unlocked icon: user or service is logged-in and options are accessible.<br>See Powering On the Vertiv™ Liebert® iCOM™ and Logging In/Unlocking Controls on page 6 . |

**Table 1.1 Main Display Controls and Options (continued)**

| Item | Description |
|---|---|
| 11 | Secondary Content Panel - When accessing settings/configuration via the menus, the settings display in the right, secondary panel. |
| 12 | Summary of Current Unit Function - You can customize to show fan speed, cooling, percentages from any installed device, and any physical (sensor) values. |
| 13 | Status Dial - Circular display of setpoints and environmental conditions of the unit. See Touchscreen Status Dial below . |
| 14 | Teamwork Mode Icon - In a panel with "Status" content, the Teamwork Mode icon indicates the mode selected. For details and descriptions of the teamwork controls, see Teamwork Modes on page 65 . |
| 15 | Control header. Controls to access the user and service menus. See Control Header on page 6 . |
| 16 | Status Header - Displays the alarm status, unit identification, and the current date and time. |

## 1.2 Touchscreen Status Dial

The dial in the primary control panel displays read-only control sensors, setpoints, and environmental conditions for unit status at a glance. See Figure 1.2 on the next page .

The center of the dial displays sensor readings and changes color according to alarm thresholds as the readings rise and fall, see Dial Background Color Status Indication on page 5 .

Touching the center of the dial cycles through a set of sensor settings, and you can select the readings displayed, see Adding and Adjusting Content on page 97 .

**Figure 1.2 Dial Sections**

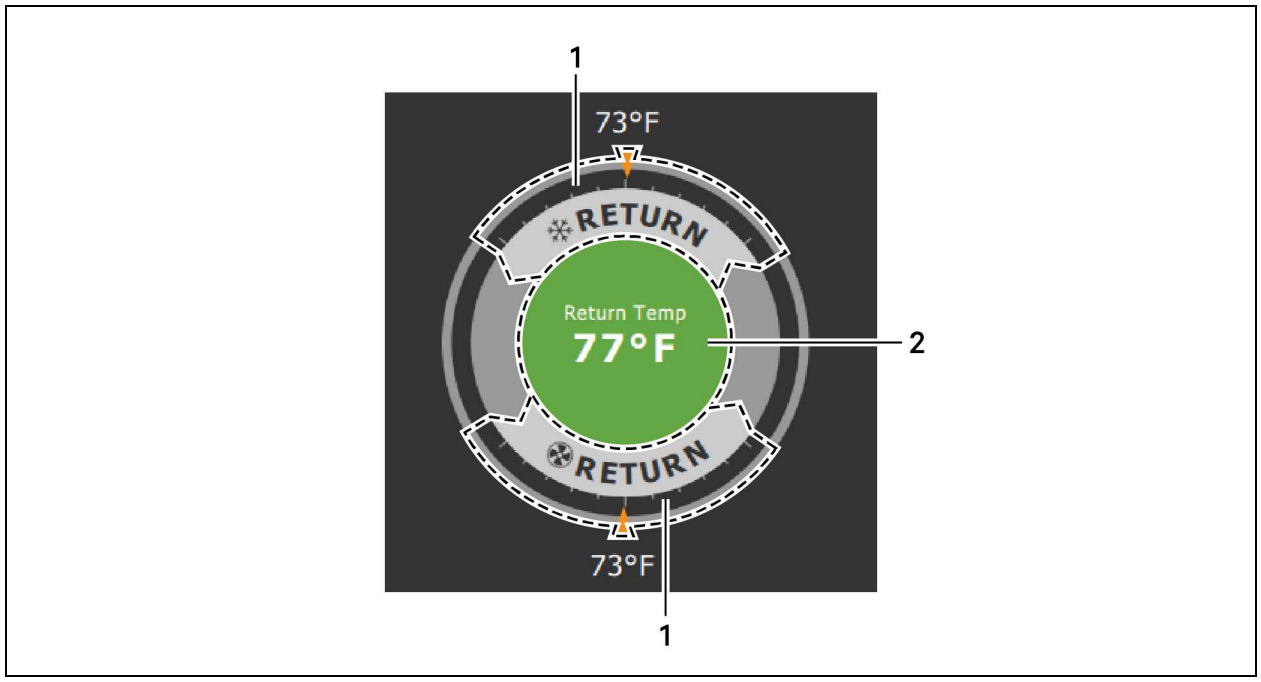


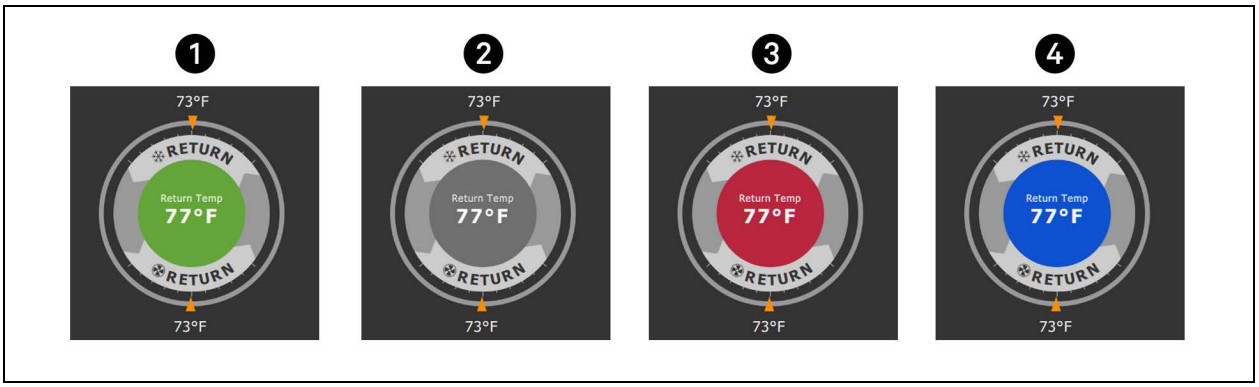

**Table 1.2 Dial Sections**

| Item | Description |
|---|---|
| 1 | Control sensor and its setpoint. The sensors and setpoints displayed depend on the configuration of your unit.<br>You may see only temperature control, or if the unit includes humidity control, that displays on the dial as well.<br>If the sensor selected for fan control is the same as that selected for temperature control, the dial displays the fan-control sensor and setpoint, as shown in **Figure 1.2** above . |
| 2 | Single or multiple sensor readings. Cycle through readings by touching the displayed reading. |

### 1.2.1 Dial Background Color Status Indication

The background color of the dial indicates whether or not the unit is powered on, and it also responds to threshold settings of the control sensor reading. See Figure 1.3 below . Table 1.3 below describes the background color displayed if the selected sensor reading has threshold limits set.

**Figure 1.3 Dial Background Colors**




| Item | Description |
|---|---|
| 1 | Sensor reading is within threshold limits. |
| 2 | Unit is powered off. |
| 3 | Sensor reading is above threshold limit or the unit is in an alarm condition. |
| 4 | Sensor reading is below threshold limit. |

**Table 1.3 Background Color Displayed by Selected Value and Threshold Limit**

| Sensor/Value Selected | Threshold Limit | Background Color |
|---|---|---|
| Return Temp | None | Green |
| | High return temperature | Red |
| Return Humidity | Low return humidity | Blue |
| | High return humidity | Red |
| Dew Point | Low dew point | Blue |
| | High dew point | Red |
| Supply Temp | Low supply temperature | Blue |
| | High supply temperature | Red |
| Average Rack Temp | Low remote temperature | Blue |
| | High remote temperature | Red |
| Max Rack Temp | Low remote temperature | Blue |
| | High remote temperature | Red |

**Table 1.3 Background Color Displayed by Selected Value and Threshold Limit (continued)**

| Sensor/Value Selected | Threshold Limit | Background Color |
|---|---|---|
| Min Rack Temp | Low remote temperature | Blue |
| | High remote temperature | Red |
| Static Pressure | Low static pressure | Blue |
| | High static pressure | Red |
| Outdoor Temp | None | Green |
| Outdoor Humidity | None | Green |

## 1.3 Control Header

The control header contains the controls to access the user and service settings. The display is locked when started initially and when restarted after a period of inactivity.

### 1.3.1 Powering On the Vertiv™ Liebert® iCOM™ and Logging In/Unlocking Controls

Liebert® iCOM™ is powered on when power is switched on at the cooling unit's disconnect switch and you activate the display by touching it.

Liebert® iCOM™ is locked when started and also locks after a period of inactivity to prevent unauthorized changes. A four digit password is required to access the user and service menus and options, and the advance menu displays as read-only when logged in at the service level.

**NOTE: The factory default inactivity period is one minute. To change the inactivity period, see Setting General Display Properties on page 95 .**

**NOTE: The factory default password for user and service log in are provided. We recommend you change passwords as necessary to prevent unauthorized changes. See Managing Access Permission and Passwords on page 84 .**

- Default user password: 1490
- Default service password: 5010

To unlock the controls:

1. On the header, touch 

.The keypad opens.
2. Touch the numbers/characters for your password, then touch  . Depending on the password entered and your level of access, the User and/or Service options, and view-only access to the Advanced menu are accessible. See Accessing the User, Service, and Advanced Menus on page 10 .

### 1.3.2 Powering On the Thermal Management Unit

**NOTE: Depending on the operating state, there are start and stop priority switches that may prevent the cooling unit from operating even though power to the unit is switched on and you have turned it on via Vertiv™ Liebert® iCOM™.**

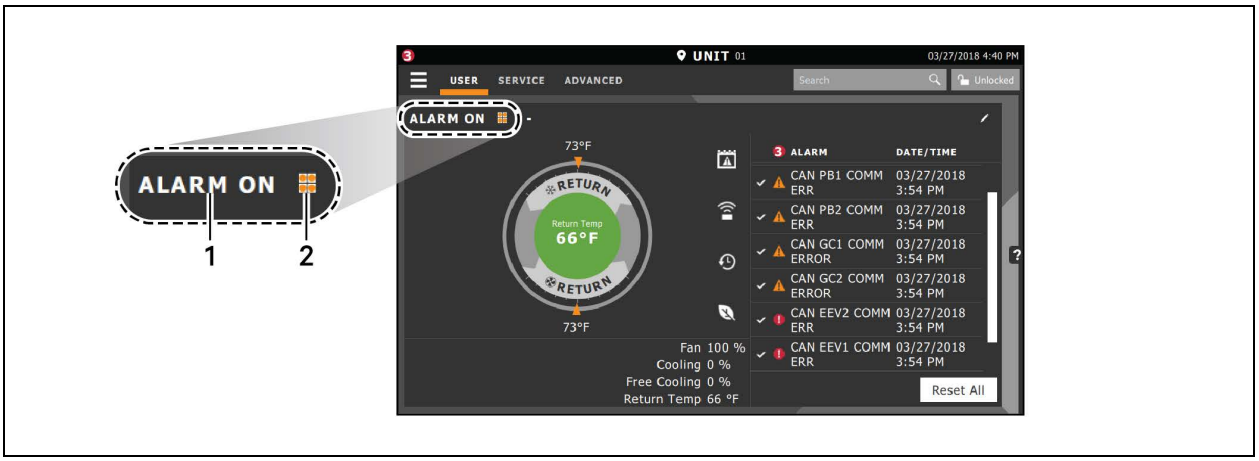
**The cooling unit operates only when all switches are closed. For example, even though you have turned on the unit through Liebert® iCOM™, if the BMS remote monitoring system is sending a command to turn off the unit, the cooling unit remains off.**

**NOTE: You must be logged in to access the menu options. See Powering On the Vertiv™ Liebert® iCOM™ and Logging In/Unlocking Controls on the previous page .**

To power-on the unit:

1. Touch USER, then ☰ >*Turn Unit On*. The TURN UNIT ON dialog opens.
2. Touch *Turn Unit On*. The cooling unit starts and the operating status is displayed as shown in Figure 1.4 below .

**Figure 1.4 Unit Status on Liebert® iCOM™ Display**




| Item | Description |
|---|---|
| 1 | Current status of the unit. See Table 1.4 below . |
| 2 | Teamwork icon. See Viewing Teamwork, Standby, and Cascade Status on page 19 . |

**Table 1.4 Cooling Unit Statuses Displayed**

| Unit Status Text | Description |
|---|---|
| ALARM OFF | An alarm forced the unit to turn off. See Viewing Unit Alarms on page 15 . |
| MANUAL | Controlled by a service technician. See Enabling Manual Mode for Diagnostics on page 87 . |
| DISPLAY OFF | Unit is turned off at the Liebert® iCOM™ display. See Powering On the Thermal Management Unit above . |
| ALARM STANDBY | In standby because of an active alarm on the unit. See Viewing Unit Alarms on page 15 . |

**Table 1.4 Cooling Unit Statuses Displayed (continued)**

| Unit Status Text | Description |
|---|---|
| STANDBY | In standby because of service-menu setting. See Assigning Cooling Units to Standby (Lead/Lag) on page 68 . |
| UNIT ON | Operating normally without alarms or warnings. |
| WARNING ON | Active warning, but still operating. See Viewing Unit Alarms on page 15 . |
| ALARM ON | Active alarm, but still operating. See Viewing Unit Alarms on page 15 . |
| REMOTE OFF | Turned off by remote shutdown terminal.<br>Occurs when a normally-closed set of 24 V contacts opens. The Remote On/Off and Display On/Off switches are in series, and the cooling unit will only turn-on if both switches are on/closed,. If one is off/open the unit turns off. |
| MONITORING OFF | Turned off by remote monitoring system.<br>Check the remote monitoring device or call Vertiv technical support for assistance. |
| RESTART DELAY | Not yet operational after a power cycle because the restart delay timer is active. |

## 1.3.3 Powering Off the Thermal Management Unit

**NOTE: You must be logged in to access the menu options. See Powering On the Vertiv™ Liebert® iCOM™ and Logging In/Unlocking Controls on page 6 .**

1. Touch 

, then  >*Turn Unit Off*. The TURN UNIT OFF panel opens.
2. Touch *Turn Unit Off*. The unit begins a power off countdown then powers off.

## 1.3.4 Logging Out

Log out occurs automatically when the display back light turns off for inactivity.

**NOTE: The factory default inactivity period is one minute. To change the inactivity period, see Setting General Display Properties on page 95 .**

- To log out manually, touch the lock icon. The icon indicates LOCKED.

## 1.3.5 Calibrating the Touchscreen

Use a firm touch or a stylus for the best response. To improve interaction with quicker and more-accurate touch response, calibrate the touchscreen.

1. On the User menu, touch *Display Options* > *Display Properties*.
2. On the UNIT DISPLAY panel, touch *Calibrate Screen* and follow the prompts to calibrate.
   - If you cannot access the calibration because of screen response, continue with step 3 .
3. At the cooling unit disconnect switch, power off the unit and then power back on.
4. Touch your finger to the screen and hold it there while the display boots.

5. When the LED begins flashing, remove your finger.
   Cross hairs appear in each corner and in the center of the display.
6. Touch the center of each cross hair ONCE ONLY. (Touching more than once interrupts the calibration and you must start over at step 3 .)
   Cross hairs disappear and the display reboots when calibration is complete.

### 1.3.6 Setting the Date and Time

The correct date and time is critical for warnings, alarms, and scheduling.

1. Touch 

, then 
 > *Display Options* > *Display Properties* > *Date & Time*.
2. Touch the date field, use the arrows to select the date, and touch *OK*.
   – or –
   Touch the time field, use the arrows to set the time, and touch *OK*.
3. Select the date and time format if necessary.
4. Touch Save.

### 1.3.7 Searching

When logged in, you can use the display search to find the location of settings options based on a term, service code, or parameter. You can also search by the line ID used in the Vertiv™ Liebert® iCOM™ before the touchscreen model. For a listing of the line IDs, see Setpoints and Alarm Settings by Line ID on page 131 .

**NOTE: You must be logged in to access the display search. See Powering On the Vertiv™ Liebert® iCOM™ and Logging In/Unlocking Controls on page 6 .**

1. In the control header, touch the search field. The keyboard opens.
2. Type the term and touch 
. A list of locations that contain the searched term opens.
3. To go to a listed location, touch an item, then touch *Go*. The panel for the selected location opens.

   – or –

   To view the service codes and parameter entries related to the searched term, touch View Parameter Directory Entries (the number of related entries is included in the option).

   The Parameter Directory opens. You may further refine the search in the directory.

## 1.4 Using Context Sensitive Help

Touching the Help icon, 
, on the right-hand side of the display opens the Help drawer with information about the panel or dialog currently on the display.

You can use search and the topic index to find further information.

To close the Help drawer, touch the close arrow, 
.

## 1.5 About Vertiv™ Liebert® iCOM™ Version

The version, build, and other firmware information for the Liebert® iCOM™ display board may be helpful when servicing or troubleshooting. To locate the firmware version of the Liebert® iCOM™ control board, see Updating Vertiv™ Liebert® iCOM™ Control Board Firmware on page 79 .

- Touch 

, then 
 > *About*. The ABOUT panel opens.

## 1.6 Accessing the User, Service, and Advanced Menus

Vertiv™ Liebert® iCOM™ operating functions that monitor and control a cooling unit are accessed via the User and Service menus.

**NOTE: You must be logged in to access the menu options. See Powering On the Vertiv™ Liebert® iCOM™ and Logging In/Unlocking Controls on page 6 .**

1. To access a menu, touch the icon for the menu you want, 

, 

 or 

, in the control header, see Control Header on page 6 . The orange bar appears below the menu name when selected indicating that this is the menu content that will be displayed.
2. Touch the menu icon, 
. The menu opens.

## 1.7 User Menu

The user menu lets you view system and unit statuses and edit some setpoints.

### User Menu Options

#### Setpoints

Opens the SETPOINTS panel. See Viewing and Editing Setpoints for the Cooling Unit on page 13 .

#### Active Alarms

Opens the ALARMS panel. See Viewing Unit Alarms on page 15 .

#### Event Log

Opens the EVENT LOG panel. See Viewing the Event Log on page 17 .

#### Sensor Data

Opens the SENSOR DATA panel. See Viewing Sensor Data on page 18 .

**Display Options**

Opens the Display Options menu:

- Customize Layout—see Customizing Main Display Views on page 96 .
- Custom Labels—see Customizing Parameter and Field Labels on page 98 .
- Date & Time—see Setting the Date and Time on page 9 .

**Total Run Hours**

Opens the RUN HOURS panel. See Managing Run Hours for a Component on page 18 .

**About**

Opens the ABOUT panel. See About Vertiv™ Liebert® iCOM™ Version on the previous page .

**Turn Unit On/Off**

Depending on unit's status, open the TURN UNIT ON or TURN UNIT OFF dialog. See Powering On the Thermal Management Unit on page 7 , or Powering Off the Thermal Management Unit on page 8 .

## 1.8 Service Menu

The service menu lets you view and edit setpoints and perform many other functions.

### 1.8.1 Service Menu Options

#### Setpoints

Opens the SETPOINTS panel. See Editing Setpoints for the Cooling Unit on page 21 .

#### Diagnostic/Service

Opens the Diagnostic/Service menu:

- Diagnostics: See Performing Diagnostics on page 87 .
- Technical Support: Contact information for the cooling unit and Vertiv™ Liebert® iCOM™ display.

#### Alarm/Event Setup

Opens the ALARMS & EVENTS panel. See Managing Events: Alarms, Warnings, and Messages on page 51 , .

#### BMS & Teamwork

Opens the BMS & Teamwork menu:

- U2U Setup: See Configuring U2U Network Settings on page 60 .
- Teamwork/Standby: See Teamwork, Standby, and Rotation for Cooling Units on page 65
- BMS Setup: See BMS and Vertiv™ Liebert® IntelliSlot Settings on page 71 .

### Scheduler

Opens the SCHEDULER panel. See Scheduling Condenser and Cooling Unit Tasks on page 38 .

### Options Setup

Opens the OPTIONS SETUP panel. See Setting General Thermal Management Unit Options on page 40 .

### Auxiliary Device Setup

Opens the Auxiliary Device Setup menu:

- Sensors: See Wired Remote Sensors on page 75 .

### Backup & Security

Opens the Backup & Security menu:

- Display Backup and Restore: See Backing Up, Importing/Exporting and Restoring Display Settings on page 82 .
- Control Backup and Restore: See Backing Up and Restoring Control Board Settings on page 83 .
- Display Upgrade: See Updating iCOM Display Firmware.
- Control Upgrade: See Updating Vertiv™ Liebert® iCOM™ Control Board Firmware on page 79 .
- Manage Permissions: See Managing Access Permission and Passwords on page 84 .

### Turn Unit On/Off

Depending on unit's status, open the TURN UNIT ON or TURN UNIT OFF dialog. See Powering On the Thermal Management Unit on page 7 , or Powering Off the Thermal Management Unit on page 8 .

# 2 User Operation

## 2.1 Viewing and Editing Setpoints for the Cooling Unit

**NOTE: User level access allows viewing and editing only a limited number of setpoints. To view or adjust all setpoints, you must have service level access. See Editing Setpoints for the Cooling Unit on page 21 .**

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, all of the options listed may not be available on your Vertiv™ Liebert® iCOM™ display.**

### 2.1.1 Editing Humidity Setpoints

1. Touch 

, then 
>*Setpoints.* > *Humidity Control.* The HUMIDITY CONTROL secondary panel opens.
2. Refer to the User Humidity Setpoint Options below and Humidity Control on page 33 to adjust the setpoint options, then touch *Save.* The setpoint is updated.
   - Touch *Cancel* to discard the changes.

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, all of the options listed may not be available on your Vertiv™ Liebert® iCOM™ display.**

#### User Humidity Setpoint Options

**Dew Point Setpoint**

Desired dew point, based on actual return air temperature and humidity, by adding moisture to or removing moisture from the air.

**Humidity Control Sensor**

Selects sensor used when calculating relative humidity.

**Humidity Control Type**

Control when staging humidification operations. Valid values are:

- Relative: Percent of humidification/dehumidification is determined by the difference between the humidity sensor reading and the humidity setpoint.
- Compensated: Percent of humidification/dehumidification is determined by considering the actual deviation from the temperature setpoint and adjusts the humidity setpoint accordingly. The recalculated humidity setpoint displays on the screen.
- Predictive: Percent of humidification/dehumidification is determined by considering the actual deviation from the temperature setpoint and adjusts the humidity sensor reading accordingly. The adjusted humidity sensor reading displays on the screen.
- Dew Point: Percent of humidification/dehumidification is determined by the difference between the dew point calculated from the humidity sensor reading and the dew point setpoint.

**Humidity Setpoint**

Desired humidity level by adding moisture to or removing moisture from the air.

**Humidity Setpoint 2**

Alternate setpoint activated by customer input (remote alarm device). When customer input connection is 2nd Setpoint, this value becomes the active humidity setpoint.

## 2.1.2 Editing Temperature Setpoints

1. Touch 

, then  > *Setpoints* > *Temperature Control*. The TEMPERATURE CONTROL secondary panel opens.
2. Refer to User Temperature Setpoint Options below , Temperature Control—Temperature Setpoints and Cooling Operation on page 23 , and Compressor Control by Cooling Requirement on page 26 to adjust the setpoint options, then touch *Save*. The setpoint is updated.
   - Touch *Cancel* to discard the changes.

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, all of the options listed may not be available on your Vertiv™ Liebert® iCOM™ display.**

### User Temperature Setpoint Options

**2nd Temperature Setpoint**

Alternate setpoint activated by customer input (remote alarm device). When customer input connection is 2nd Setpoint, this value becomes the active temperature setpoint.

**Optimized Aisle Enabled**

Read-only. Indicates that Vertiv™ Liebert® iCOM™ is configured for optimized aisle operation. See Teamwork Mode 3—Optimized Aisle Operation on page 68 .

**Temperature Control Sensor**

Selects sensor that controls cooling. Values are:

- Supply Sensor: Temperature control is based on maintaining the temperature of the discharge air from the cooling unit. See Supply Sensors on page 78 .
- Remote Sensor: Temperature control is based on the temperature reading(s) from wired remote sensor(s). See Wired Remote Sensors on page 75 .
- Return Sensor: Temperature control is based on maintaining the temperature of the air returning to the cooling unit.

**Temperature Setpoint Act**

Read-only display of adjusted temperature setpoint when the following is active:

- Customer input setpoint (remote alarm device).

**Temperature Setpoint**

Temperature that the unit maintains via cooling.

**Temperature Setpoint 2**

Alternate setpoint activated by customer input (remote alarm device). When customer input connection is 2nd Setpoint, this value becomes the active temperature setpoint.

## 2.2 Viewing Unit Alarms

The ALARMS panel lists active alarm and warning events. Table 2.1 below describes the type and state of the alarm shown by indicator dots.

**Table 2.1 Alarm Status and Type Indicators**

| Indicator | Description |
|---|---|
| Yellow dot | Warning event |
| Red dot | Alarm event |
| Circle | Event condition has cleared, but still must be acknowledged. See Acknowledging Alarms on the next page . |

### 2.2.1 To View Alarms

1. Touch 

, then  > *Alarms*. The ALARMS panel opens.
2. Touch an alarm to display the ALARM DETAILS panel.

#### Alarm Fields

**Alarm**

Name of the event.

**Date**

Date event was logged.

**Time**

Time event was logged

### 2.2.2 Alarm Detail Fields

#### Alarm

Name of the event.

#### Alarm Type

Number representing the event type.

- 1 : Warning
- 2: Alarm

#### Date/Time

Date and time the event was logged.

#### Duration

Time elapsed since event was logged.

#### Threshold

Sensor-reading at which an event is triggered.

#### Unit

Cooling unit to which the alarm applies.

#### Value

The current value to which the threshold is compared.

### 2.2.3 Silencing an Audible Alarm

Touch the screen to silence an audible alarm. If the alarm is non-latching, the alarm silences when the condition clears.

**NOTE: The audible alarm must be enabled in display options to sound. See Enabling the Audible Alarm Notification on page 56 .**

### 2.2.4 Acknowledging Alarms

Depending on the notification settings, alarms and warnings must be acknowledged or reset. An event is active as long as it is unacknowledged, with the exception of the network failure events described in Table 2.2 on the facing page . Once acknowledged, an event remains active until the situation that triggered the event is resolved, see Table 2.1 on the previous page , for event status indicators. When an event acknowledged and cleared, it is removed from the Alarms panel and the LED stops flashing red.

**NOTE: Acknowledging alarm events does not clear them. To clear an issue, it must be corrected, reset automatically by the controller or reset manually.**

### To Acknowledge Alarms

1. On the ALARMS panel, touch *Acknowledge All*. A check mark overlays the status indicator of the active alarms and warnings, and these automatically clear when the condition is no longer present.
   - If a critical event must be manually reset, the acknowledged items are listed with a Reset All button on the ALARMS panel.
2. Touch *Reset All* to manually reset the condition.

**Table 2.2 Events That Clear without Acknowledgment**

| Network Failure | Description |
|---|---|
| UNIT XX DISCONNECTED | The Liebert® iCOM™ I/O board assigned as U2U address number XX (2 up to 32) has lost communication with the group.<br>Make sure all units are powered on at the disconnect.<br>Check cable connections and network settings where applicable. |
| NO CONNECTION W/UNIT 1 | The Liebert® iCOM™ I/O board assigned as U2U address number 1 has lost communication with the group.<br>Make sure all units are powered on at the disconnect.<br>Check cable connections and network settings where applicable. |
| BMS DISCONNECT | The BMS/BAS has not completed a handshake within the time defined by the BMS/BAS.<br>Verify monitoring connections and communication to the BMS/BAS panel. |
| UNIT CODE MISSING | The factory unit code must be confirmed, saved and executed. |
| UNIT CODE MISMATCH | The factory unit code must be confirmed, saved and executed. |
| AMBIENT SENSOR FAILURE | The outdoor temperature / humidity sensor used on the air economizer unit has become disconnected or is no longer working properly. |
| CAN GC 1 or 2 COMM ERR | See **Table 4.3** on page 55 . |

## 2.3 Viewing the Event Log

The event log is a list by date/time of the last 400 events generated by Vertiv™ Liebert® iCOM™ for the thermal management unit.

- On the User menu, touch *Event Log*. The EVENT LOG for the cooling unit opens. **Table 2.3** below describes the color coded status for each event.

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, the options on your Liebert® iCOM™ display may differ.**

**Table 2.3 Event Status and Type Indicators**

| Indicator | Description |
|---|---|
| Green dot | Message |
| Yellow dot | Unacknowledged warning event. See Acknowledging Alarms on the previous page . |
| Red dot | Unacknowledged alarm event. See Acknowledging Alarms on the previous page . |
| White dot with check mark overlay | Acknowledged event, the cause still exists. |
| White circle | Acknowledged event, the cause is cleared. |

## 2.4 Viewing Sensor Data

The SENSOR DATA panel lists the standard and optional sensors monitored by Vertiv™ Liebert® iCOM™ and the current reading of each sensor.

- Touch 

, then 
> *Sensor Data*. The SENSOR DATA panel opens.

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, the options on your Liebert® iCOM™ display may differ.**

## 2.5 Managing Run Hours for a Component

You can view the run hours for components on a cooling unit, set the total run time limit and reset total run hours to zero.

1. Touch 

, then 
> *Total Run Hours*. The RUN HOURS panel opens and the current hours for each component are listed in the Total Run Hours column. To reset the total run hours to zero, see Setting Run Hours to Zero below .
2. Use the slider to set the total run time limit for each component, then touch *Save*. The limits are set.

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, the options on your Vertiv™ Liebert® iCOM™ display may differ.**

### 2.5.1 Setting Run Hours to Zero

1. On the RUN HOURS panel, touch to check each box in the *Total Run Hours* column next to the component(s) to reset. The Set to Zero button becomes available.
2. Touch *Set to Zero*. The total run hours for the selected component(s) is set to zero.

## 2.6 Viewing Teamwork, Standby, and Cascade Status

In the main User panel, the Teamwork Mode icon indicates the mode selected, Figure 2.1 below .

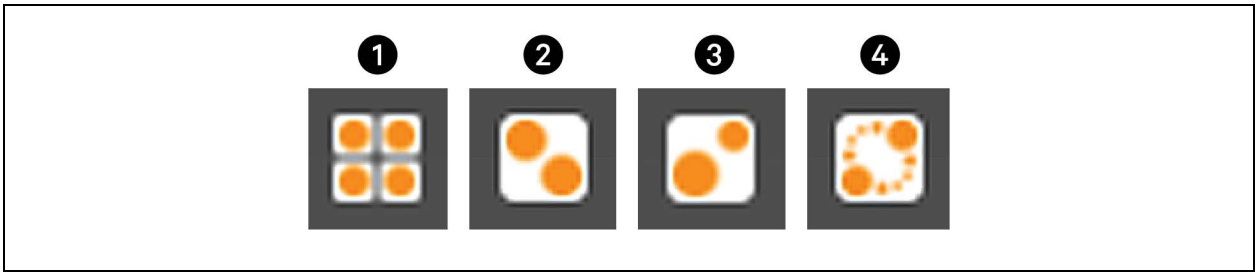
### 2.6.1 To View the Teamwork Details

Touch the Teamwork Mode icon.

The teamwork dialog opens displaying the teamwork mode, number of units in standby, and number of operating units.

**NOTE: You must be logged in with the Service PIN to edit teamwork mode. See Powering On the Vertiv™ Liebert® iCOM™ and Logging In/Unlocking Controls on page 6 .**

**Figure 2.1 Teamwork Icons**




| Item | Description |
|---|---|
| 1 | No teamwork. |
| 2 | Mode 1 - Parallel teamwork |
| 3 | Mode 2 - Independent teamwork |
| 4 | Mode 3 - Optimized aisle teamwork |

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# 3 Service Operation

## 3.1 Editing Setpoints for the Cooling Unit

Setpoints are the means by which the cooling unit operation is controlled.

**NOTE: Depending on the type of thermal managment unit, included components, and control settings of your system, all of the options listed may not be available on your Vertiv™ Liebert® iCOM™ display.**

### 3.1.1 Setpoints Options

#### Fan Control

See Configuring Fan Setpoints on page 35 .

#### High/Low Limit Control

See Configuring High/Low Limit Setpoints on page 31 .

#### Humidity Control

See Configuring Humidity Setpoints on page 32 .

#### Temperature Control

See Configuring Temperature Setpoints below .

### 3.1.2 Configuring Temperature Setpoints

1. Touch 

, then  > *Setpoints* > *Temperature Control*. The TEMPERATURE CONTROL secondary panel opens.
2. Refer to Temperature Control Options on the next page , Temperature Control—Temperature Setpoints and Cooling Operation on page 23 , and Compressor Control by Cooling Requirement on page 26 to adjust the setpoint options, then touch *Save*. The setpoint is updated.

**NOTE: Proportional band setting is dependent on the heat load and the components specific to your cooling unit. Additional tuning may be required after start up when using PI temperature control. See Considerations when Using PI Temperature Control on page 25 .**

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, all of the options listed may not be available on your Vertiv™ Liebert® iCOM™ display.**

## Temperature Control Options

### Temperature Control Sensor

Selects sensor that controls cooling. Values are:

- Supply Sensor: Temperature control is based on maintaining the temperature of the discharge air from the cooling unit. See Supply Sensors on page 78 .
- Remote Sensor: Temperature control is based on the temperature readings from wired remote/rack sensors. See Wired Remote Sensors on page 75 .
- Return Sensor: Temperature control is based on maintaining the temperature of the room air.
- Customer input setpoint (remote alarm device).

### Temperature Control Type

Control when staging cooling and heating operations. Valid values are:

- PI: Percent of cooling/heating calculated using the temperature proportional band and temperature-integration time settings. See Considerations when Using PI Temperature Control on page 25 .
- Adaptive PID: Auto-tuning PID control loop, can be set for cooling. Only available on Vertiv™ Liebert® CW (chilled water) systems.
- Intelligent: Percent of cooling/heating determined by programmed logic that simulates manual human control.

### Temperature Deadband

Widens the setpoint to prevent small temperature changes from cycling compressors and valves maximizing component life. When temperature is within the deadband, no change of the control output (heating/cooling) occurs.

### Temperature Integration Time

Adjusts amount of cooling/heating based on the length of time the temperature has deviated from the setpoint. The time selected is the amount of time it will take cooling capacity to reach 100%. For example, if three minutes is selected, cooling capacity will increase to 100% in 3 minutes.

**NOTE: Three to five minutes of integration time is adequate for most applications. See Considerations when Using PI Temperature Control on page 25 .**

### Temperature Proportional Band

Adjusts the activation point of cooling components based on deviation from setpoint by placing half of the selected value on each side of the temperature control setpoint. A smaller number causes faster reaction to temperature changes.

**NOTE: Setting this too low causes short cycling of compressors.**

**Temperature Setpoint**

Temperature that the unit maintains via cooling.

**Temperature Setpoint 2**

Alternate setpoint activated by customer input (remote alarm device). When customer input connection is 2nd Setpoint, this value becomes the active temperature setpoint.

**Temperature Setpoint Act**

Read-only display of adjusted temperature setpoint.

## 3.1.3 Temperature Control—Temperature Setpoints and Cooling Operation

Temperature control refers to the cooling unit's response to programmed setpoints and sensed room/load conditions. Temperature control is closely tied to the primary cooling source. Liebert® Thermal management units employ several types of primary cooling sources.

### Compressor Operation

Vertiv™ Liebert® iCOM™ controls the cooling units based on a calculated need for cooling (and heating, if included on your system). The requirement is expressed as a percentage and is calculated using the selected temperature control type.

### Temperature Proportional Band

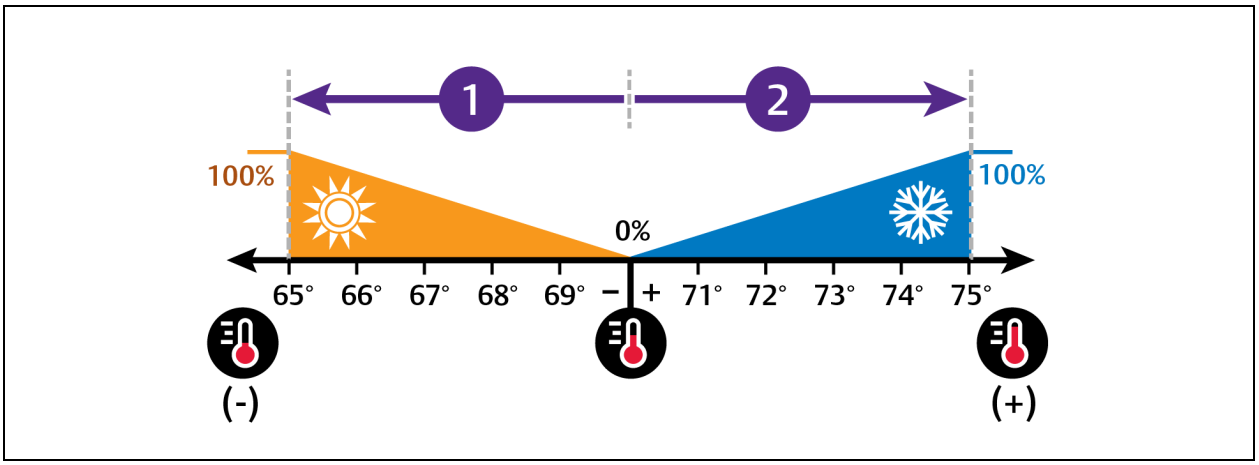
Use the proportional and deadband parameters to control how your cooling unit(s) respond based on the calculated need for cooling (or heating). Figure 3.1 on the next page , illustrates temperature control using:

- 70° setpoint
- 10° proportional band
- No deadband

The proportional band is divided evenly on each side of the setpoint:

- 0% cooling capacity is required at 70°.
- As the air temperature increases, cooling also increases along the proportional band.
- If the air temperature reaches 75°, the system operates at 100% cooling capacity.
- If air temperature rises to the end of the proportional band or further, the system operates at 100% capacity to bring the temperature down to the setpoint.
- If your unit includes reheat, the heating capacity operates in the same way as the air temperature falls below the setpoint. See Reheat Control on page 46 .

**Figure 3.1 Temperature Control without a Deadband**




| No. | Description |
|---|---|
| 1 | ½ of proportional band. |
| 2 | ½ of proportional band. |

## Temperature Deadband

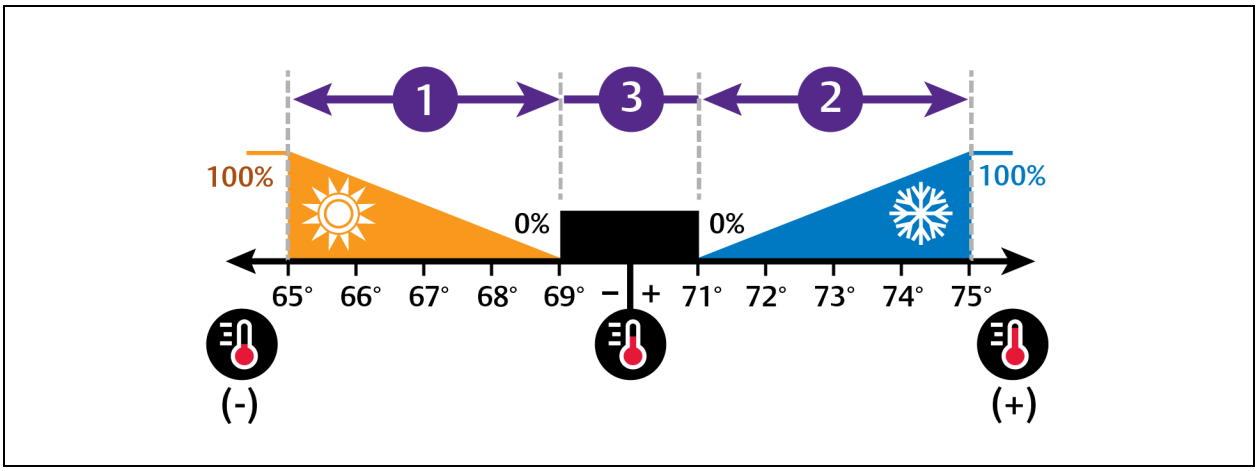
A deadband widens the setpoint to prevent small temperature changes from activating compressors and valves and cause excessive component cycling. Figure 3.2 on the facing page , illustrates temperature control using:

- 70° setpoint
- 10° proportional band
- 2° deadband

Like the proportional band, the is also divided evenly on each side of the setpoint:

- 0% cooling capacity is required from 69° to 71°.
- At 71°, the system operates according to the temperature proportional band.

**Figure 3.2 Temperature Control with a Deadband**




| No. | Description |
|---|---|
| 1 | ½ of proportional band. |
| 2 | ½ of proportional band. |
| 3 | Deadband |

## Considerations when Using PI Temperature Control

Several factors, such as room heat load, external heat gains, and component specific performance can affect the PI control loop. Adjusting the temperature proportional band and integration time can improve cooling unit performance and avoid problems detailed in Table 3.1 below .

**Table 3.1 PI Temperature Control Troubleshooting**

| Problem | Solution |
|---|---|
| Cooling is slow to activate | Decrease the proportional band slightly and monitor operation.<br>Repeat until cooling reaction time is acceptable. |
| Compressor short cycle alarm | Increase the proportional band slightly by increasing the integration time between three and five minutes and monitoring compressor run time.<br>Set the temperature deadband to 2..<br>Run time must be more than three minutes to prevent a short cycle of the compressor. |
| Excessive valve oscillation or hunting | Increase the proportional band and/or increase integration time. |

### 3.1.4 Compressor Control by Cooling Requirement

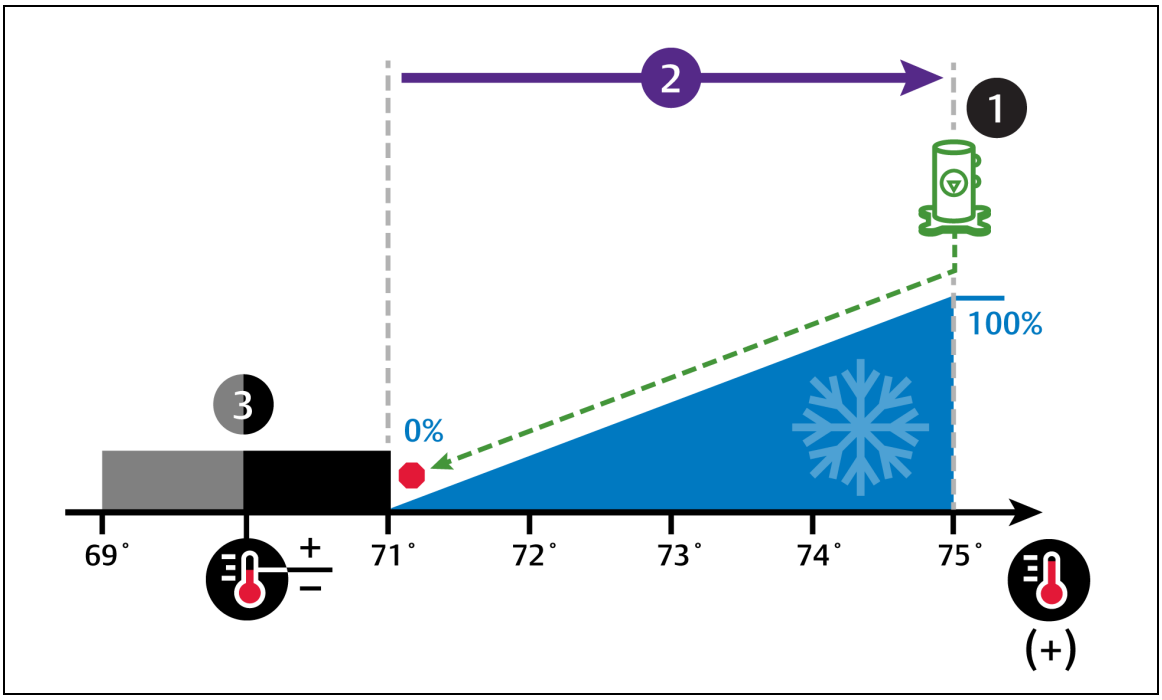
Compressor control is directly linked to temperature control in that the cooling requirement determined by the temperature proportional band determines compressor operation. Depending on the type of cooling unit, the number and type of compressors varies. The following describes compressor operation along the proportional band for the varying compressor options.

#### One Scroll Compressor without Unloaders

- 70° setpoint
- 8° proportional band
- 2° deadband

In Figure 3.3 below , the compressor starts at 75° when the cooling requirement is 100% and continues to operate until 71° is reached when cooling requirement is 0%.

**Figure 3.3 Compressor Control—One Step Capacity**




| No. | Description |
|---|---|
| 1 | Single scroll compressor. |
| 2 | ½ of proportional band. |
| 3 | Deadband |

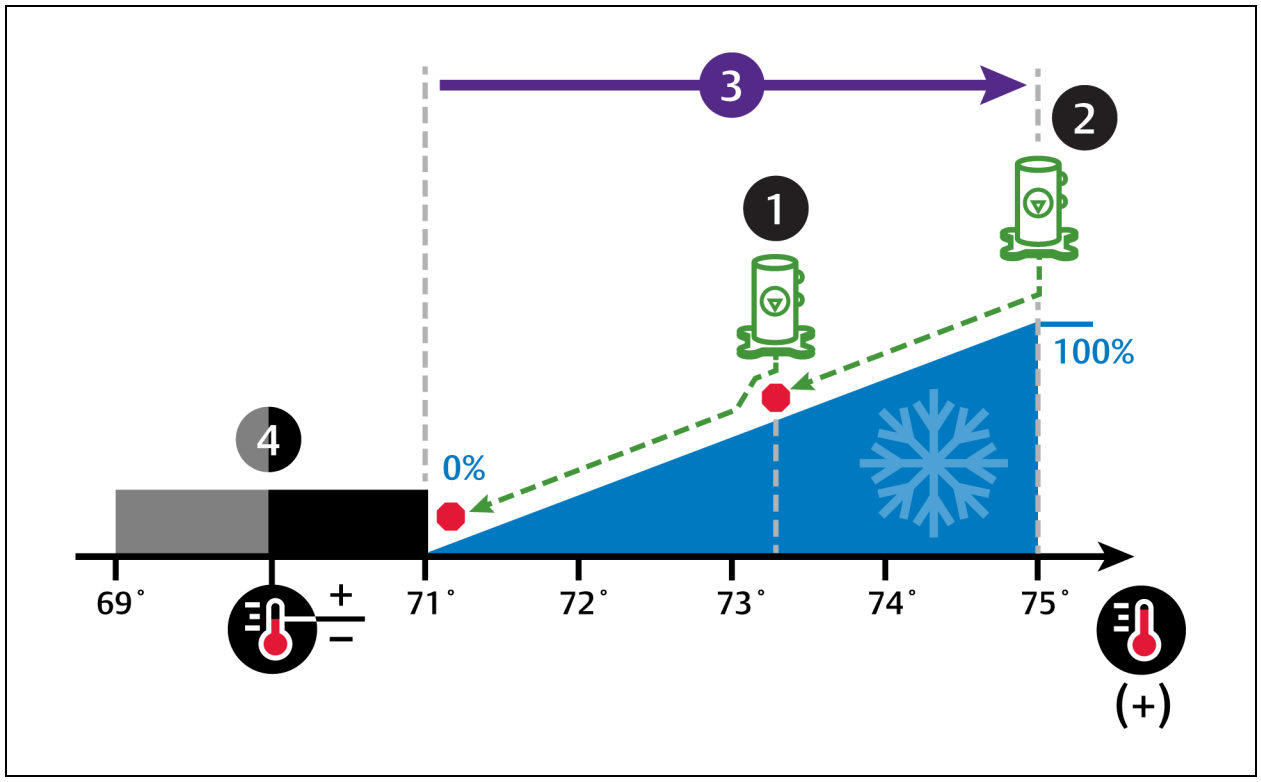
### One Scroll Compressor with Unloader

- 70° setpoint
- 8° proportional band
- 2° deadband

In Figure 3.4 below . the compressor starts unloaded at 73° when the cooling requirement is 50%.

At 75° when the cooling requirement is 100%, the compressor operates loaded until 73° is reached when cooling requirement is 50% and it returns to unloaded operation.

**Figure 3.4 Compressor Control—Two Step Capacity Using One Scroll Compressor with Unloaders**



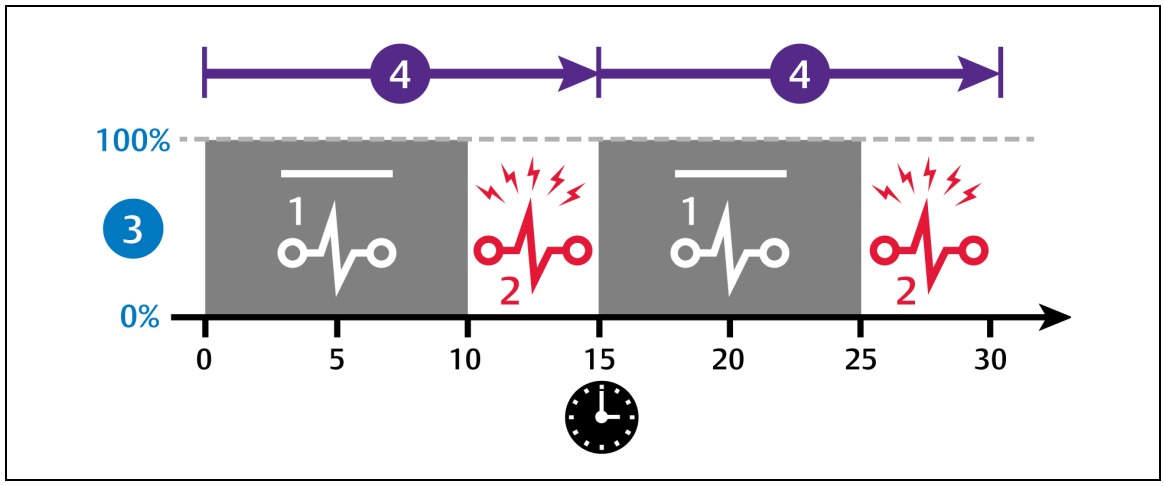

| Number | Description |
|---|---|
| 1 | Scroll compressor unloaded. |
| 2 | Scroll compressor loaded. |
| 3 | ½ of proportional band. |
| 4 | Deadband |

## Digital Scroll Compressors

Digital scroll compressors use time loaded/unloaded to modulate cooling capacity between 10% and 100% to control cooling more precisely than non-digital compressors. Capacity modulation is achieved by opening and closing a digital solenoid valve in 15 second intervals while the compressor runs continuously when the cooling requirement is 10% to 100%.

- When the valve is opened (energized, the compressor is unloaded and capacity is 0% (because the scroll plates are separated so that there is no refrigerant flowing through the compressor).
- When the valve is closed (de-energized), the compressor is loaded and capacity is 100%.
- Capacity is determined by the amount of time that the valve is closed in the 15 second interval. Figure 3.5 below illustrates solenoid valve operation when cooling requirement is 66%.
  - The valve is closed for 10 seconds (100% cooling).
  - Then valve is open for 5 seconds (0% cooling).
  - This results in 66% cooling. Essentially, the compressor is partially loaded.

**Figure 3.5 Digital Scroll Compressor Operation to Provide 66% Cooling Capacity**




| No. | Description |
|---|---|
| 1 | Solenoid de-energized. |
| 2 | Solenoid energized. |
| 3 | Percent loaded. |
| 4 | 15 second capacity modulation cycle. |

### One Digital Scroll Compressor

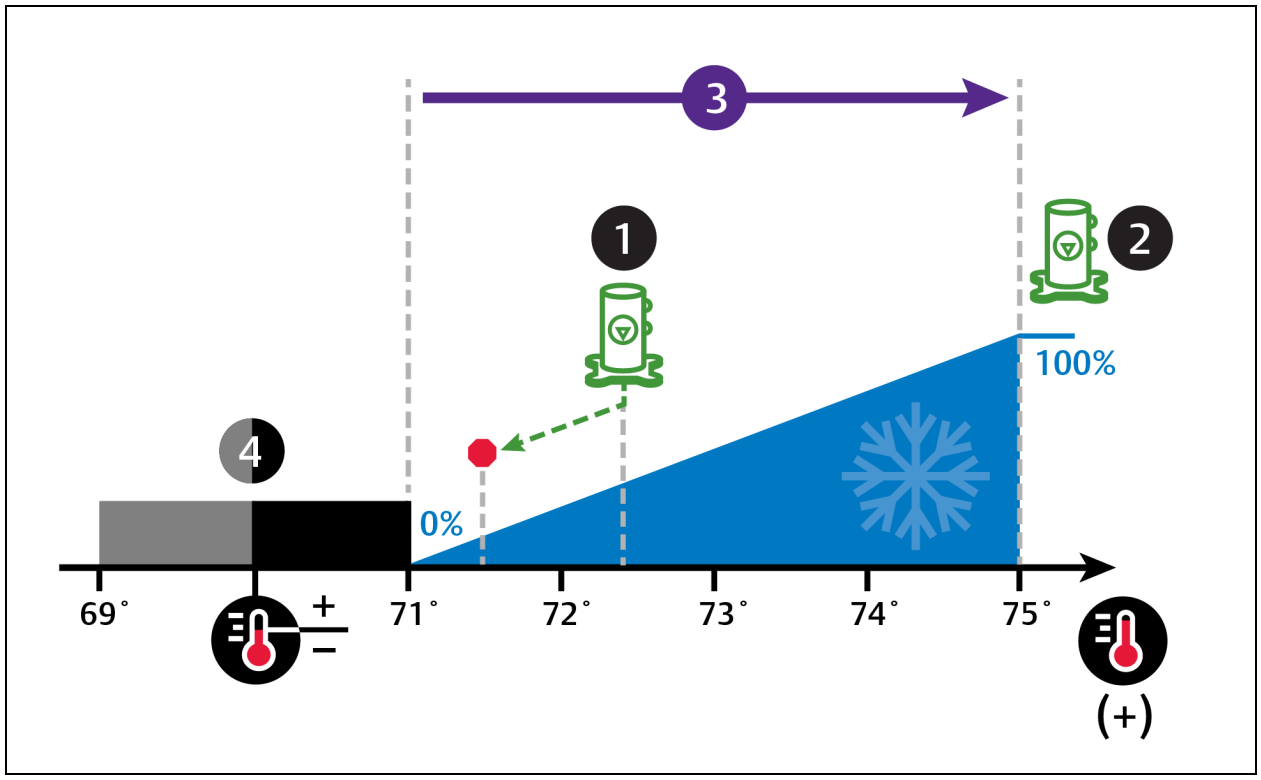
In a single digital scroll system:

- The compressor starts when the cooling demand is at least 25% (calculated from temperature proportional band) and operates at 50% capacity (valve open 7.5 seconds/closed 7.5 seconds) for an initial period set in Winter Start Delay. See Setting Low Pressure Time Delay on page 45 , after which it operates per cooling demand.
- As cooling demand increases, the length of time the valve is closed increases/capacity increases.
- At 100% cooling requirement, the valve remains closed for the entire 15 second interval and the compressor is operating loaded at 100% capacity.
- The compressor stops when cooling demand decreases to 10%.

Figure 3.6 on the next page illustrates digital scroll compressor operation with the following setpoint parameters:

- 70° setpoint
- 8° proportional band
- 2° deadband

**Figure 3.6 Compressor Control—Single Digital Scroll Compressor**




| No. | Description |
|---|---|
| 1 | Digital-scroll begins operation |
| 2 | Digital-scroll operation at 100% |
| 3 | ½ of proportional band |
| 4 | Deadband |

## 3.1.5 Configuring High/Low Limit Setpoints

Setting dehumidification low limits avoids over cooling a room during dehumidification. When a low limit is reached, the cooling source used for dehumidification is disabled. Dehumidification resumes when air temperature rises above the low limit reset value.

**NOTE: Dehumidification lockout can occur with improper low limit settings. To avoid lockout, increase heat load for efficient operation, decrease low limit settings slightly, and where applicable, decrease the reheat proportional band to allow reheat sooner.**

### To Set High and Low Limits

1. Touch 

, then  > *Setpoints* > *High/Low Limit Control*. The HIGH/LOW LIMIT CONTROL secondary panel opens.
2. Adjust the setpoint options, then touch *Save*. The setpoint is updated.
   - Touch *Cancel* to discard the changes.

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, all of the options listed may not be available on your Vertiv™ Liebert® iCOM™ display.**

### High/Low Limit Control Options

**Dehum Low Limit X**

Temperature at which dehumidification is interrupted, where X is limit 1 or 2.

**Dehumidification Low Limit Sensor**

Selects the sensor that is used for the low limit determination.

**Dehumidification Low Limit Setpoint**

Temperature below which dehumidification is disabled.

**High Return Limit**

Enables/disables use of additional fan speed based on return air temperature.

**Return Limit P-band**

Calculates fan speed based on proportional deviation from the return air temperature.

**Supply Limit Enabled**

Enables/disables use of additional fan speed based on supply air temperature.

**Supply Temp Limit Setpoint**

Supply air temperature at which use of additional fan speed is enabled.

## 3.1.6 Configuring Humidity Setpoints

1. Touch 

, then  > *Setpoints* > *Humidity Control*. The HUMIDITY CONTROL secondary panel opens.
2. Refer to Configuring Humidity Setpoints above and Humidity Control on the facing page to adjust the setpoint options, then touch *Save*.
   The setpoint is updated.
   - Touch *Cancel* to discard the changes.

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, all of the options listed may not be available on your Vertiv™ Liebert® iCOM™ display.**

### Humidity Control Options

#### Control Dew Point

Dew point setpoint.

#### Dew Point Deadband

Widens the setpoint to prevent small changes from cycling compressors and valves maximizing component life. When temperature is within the deadband, no change of the control output (humidification) occurs.

#### Dew Point P-Band

Adjusts the activation point of humidification/dehumidification components based on deviation from setpoint by placing half of the selected value on each side of the dew point setpoint. A smaller number causes faster reaction to humidity changes.

#### Dew Point Setpoint

Humidity level (based on actual return air temperature and humidity) by adding moisture to or removing moisture from the air.

#### Humidity Control Sensor

Selects sensor used when calculating relative humidity.

#### Humidity Control Type

Controls humidification/dehumidification operation. Valid value:

- PI: Percent of humidification calculated using proportional and integral terms.

#### Humidity Deadband

Widens the setpoint to prevent small changes in humidity from cycling components and also maximizes component life. When humidity is within the deadband, no humidification/dehumidification occurs.

**Humidity Integration Time**

Adjusts unit capacity based on the length of time the humidity has deviated from the setpoint. Works in conjunction with the proportional band to maintain tight setpoint control.

**Humidity Proportional Band**

Adjusts the activation point of humidifier/dehumidification components based on deviation from setpoint by placing half of the selected value on each side of the humidity-control setpoint. A smaller number causes faster reaction to humidity changes.

**Humidity Setpoint**

Humidity level by adding moisture to or removing moisture from the air.

**Humidity Setpoint 2**

Alternate setpoint activated by customer input (remote alarm device). When customer input connection is 2nd Setpoint, this value becomes the active humidity setpoint.

## 3.1.7 Humidity Control

Humidity control refers to the cooling unit's response to programmed setpoints and sensed humidity conditions.

Vertiv™ Liebert® iCOM™ controls humidity based on temperature and humidity sensor readings. The requirement is expressed as a percentage and is calculated using the selected humidity control type.

### Humidity Proportional Band

Use the proportional and deadband parameters to control how your cooling units respond based on the calculated need for humidification/dehumidification. As the return air humidity deviates from the humidity setpoint, Vertiv™ Liebert® iCOM™ responds with a humidification or dehumidification capacity of 0% to 100% in 1% increments.

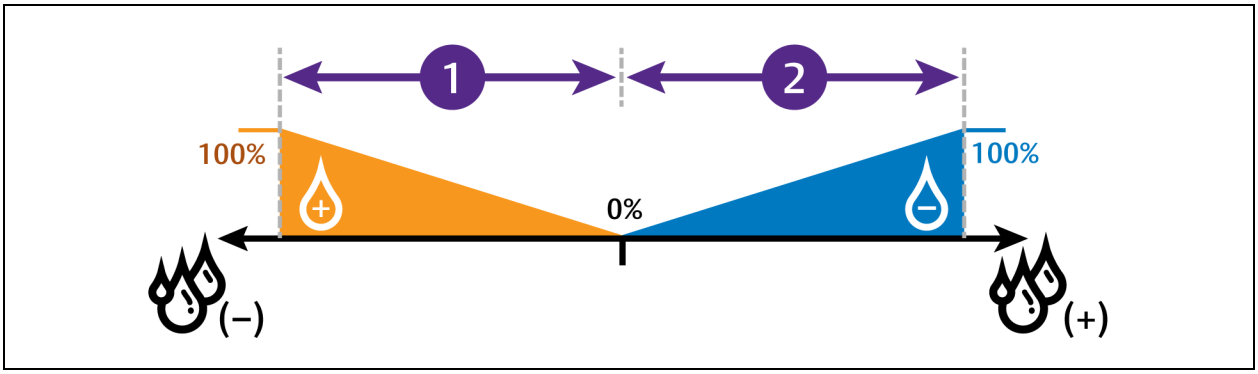
Figure 3.7 below , illustrates humidity control using:

- 50% setpoint
- 8% proportional band
- No deadband

The proportional band is divided evenly on each side of the setpoint.

- 0% humidifying capacity is required at the humidity setpoint.
- The humidifier starts operating when the humidification requirement reaches 100% and continues to operate until the humidification requirement drops to 0%. During this period, the display shows 100% humidification
- The dehumidifying capacity responds in the same way as the return air humidity rises above the setpoint. Dehumidification is accomplished by a request for cooling that activates as soon as the required dehumidifying capacity reaches 100% and continues operating until the required dehumidifying capacity drops to 0%. During this period, the digital compressor loading scales between a minimum percentage (Advanced setting: A557) and 100% depending upon required dehumidifying capacity. The display always shows 100% dehumidification.

**Figure 3.7 Humidity Control without a Deadband**




| No. | Description |
|---|---|
| 1 | ½ of proportional band. |
| 2 | ½ of proportional band. |

### Humidity Deadband

A deadband widens the setpoint to prevent small changes in humidity from activating humidifiers, compressors and valves and cause excessive component cycling.

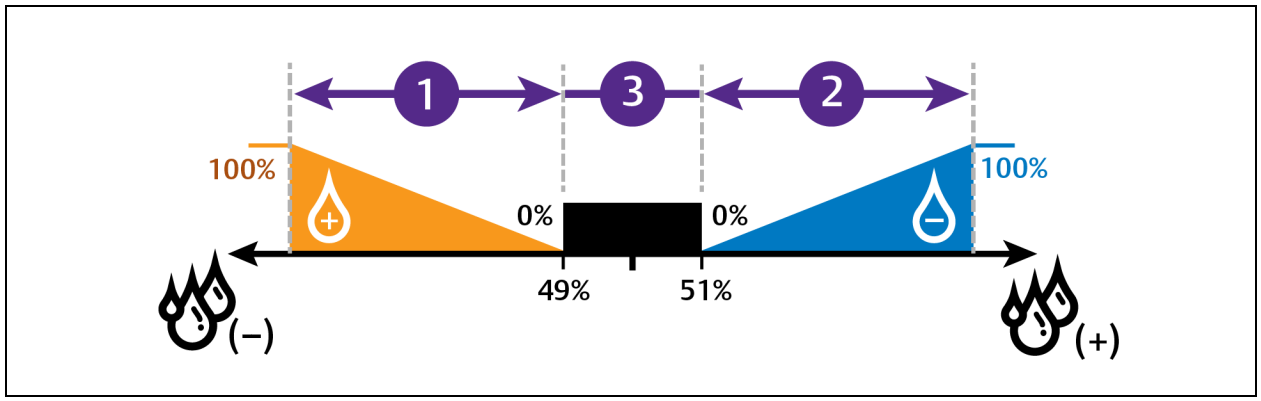
Figure 3.8 below , illustrates humidity control using:

- 50% setpoint
- 8% proportional band
- 2% deadband

Like the proportional band, the deadband is also divided evenly on each side of the setpoint.

- 0% cooling capacity is required from 49% to 51%.
- Below 49%, humidification operates according to the humidity proportional band.
- Above 51%, dehumidification operates according to the humidity proportional band.

**Figure 3.8 Humidity Control with a Deadband**




| No. | Description |
|---|---|
| 1 | ½ of proportional band. |
| 2 | ½ of proportional band. |
| 3 | Deadband |

## 3.1.8 Configuring Fan Setpoints

Configures fan speed control to operate independent of compressor loading (decoupled mode).

1. Touch SERVICE, then ☰ > *Setpoints* > *Fan Control*. The FAN CONTROL secondary panel opens.
2. Adjust the setpoint options, then touch *Save*. The setpoint is updated.
   - Touch *Cancel* to discard the changes.

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, all of the options listed may not be available on your Vertiv™ Liebert® iCOM™ display.**

### Fan Control Options

#### Fan Control Sensor

Selects the sensor that controls automatic fan speed, see Automatic Fan Speed Control on the facing page ,
– or –
Selects manual control, see Manual Fan Speed Control below .
Options are:

- Supply: Air flow/fan speed is adjusted based on reading from the supply air temperature sensor.
- Remote: Air flow/fan speed is adjusted based on reading from a wired, remote temperature sensor.
- Return: Air flow/fan speed is adjusted based on reading from the wired, return air temperature sensor.
- Manual: Air flow/fan speed is adjusted using a building management system.
- PI: Regulation is based on proportional and integral terms. Provides best temperature control and helps avoid fan speed oscillation.
- Adaptive PID: Auto-tuning PID control loop, can be set for cooling or fan speed.

#### Fan Delta

Fan temperature setpoint, it is the temperature difference compared to the cooling setpoint.

#### Fan Speed Proportional Band

Adjusts the fan speed based on the deviation from the setpoint. A smaller number causes faster reaction to temperature changes.

#### Fan Speed Integration

Adjusts fan speed based on time away from the setpoint to maintain accurate temperature control.

## 3.1.9 Manual Fan Speed Control

In Manual fan control mode, the speed of the motor can be set in one of the following ways:

- The manual (fixed) fan speed may be set via Vertiv™ Liebert® iCOM™.
- Remotely using a Vertiv™ Liebert® IntelliSlot card.

### Setting Remote Fan Speed Control

1. Touch 

, then 
> *Setpoints* > *Fan Control*, set *Fan Control Type* to *Manual*, then touch *Save*.
2. Touch 

, then 
> *BMS & Teamwork Setup* > *BMS Setup*.
3. On BMS SETUP, touch *Control Settings*. The CONTROL SETTINGS sencondary panel displays:
   - In *Fan Control Sensor*, select *Manual*.
   - Touch *Save*. BMS control of fan speed is set, and the BMS fan speed is displayed on the Fan Speed slider.

**NOTE: Set the fan speed via BMS by writing to the Fan Speed Maximum Setpoint monitoring point. For details, see SL-28170 IntelliSlot Reference Guide found at *https://www.Vertiv.com/en-us/support/*.**

**NOTE: Local adjustments to fan speed are overridden when remote/BMS fan speed control is set.**

## 3.1.10 Automatic Fan Speed Control

Vertiv™ Liebert® iCOM™ on the Vertiv™ Liebert® CRV is factory set for supply air sensor control of fan speed and cooling capacity to ensure that the iCOM™ is delivering precise cooling to the cold aisle.

Remote rack sensors allows decoupling of fan speed and cooling capacity for the preferred operating method of Liebert® iCOM™(s) in a hot/cold aisle configuration. Decoupling modulates cooling capacity based on supply-sensor readings and relies on readings from the remote rack sensors for fan control to ensure that cool air is delivered to the rack inlets on the cold aisle.

In the Setpoint screen, the controlling temperature sensor (S102) can be set to either Supply, Return or Remote. As the selection is changed from one sensor to another, the setpoint is displayed next to the corresponding sensor on the illustration, showing the sensors placement in relation to the Liebert® iCOM™.

Temperature sensors can control fan speed using one of three modes based on the type of sensor selected as the fan control sensor: supply, return, or remote, see Table 3.2 below . Control is based on the selected sensor for both fan control and temperature control and their setpoints as follows:

- Coupled: The fan control and temperature control sensor selection is the same. When coupled, fan speed is determined by the temperature setpoints.
- Decoupled: The fan control and temperature control sensor selection is different. When decoupled, fan speed is determined by the fan setpoints.

**Table 3.2 Fan Speed Controlling Sensor Options**

| | | Temperature Control Sensor selected | | |
|---|---|---|---|---|
| | | Supply Sensor | Remote Sensor | Return Sensor |
| Fan Control Sensor Selected | Supply Sensor | Coupled | N/A | N/A |
| | Remote Sensor | Decoupled (Recommended) | Coupled | N/A |
| | Return Sensor | Decoupled | Decoupled | Coupled |

To set parameters for automatic fan speed control:

1. Touch 

, then  > *Setpoints* > *Fan Control*,
   - Set *Fan Control Type* to Manual
   - Select a *Fan Control Sensor*.
   - Adjust the setpoint options, then touch *Save*.

   Sensor-based fan speed control is set.
2. Touch *Temperature Control*.
3. On the TEMPERATURE CONTROL secondary panel:
   - Select a *Temperature Control Sensor*.
   - Adjust the setpoint options, then touch *Save*.

## 3.2 Scheduling Condenser and Cooling Unit Tasks

The Scheduler configures operating conditions and modes for specific intervals. Tasks to schedule include:

- Condenser set back: See Scheduling Condenser Low Noise Operation below .
- Condenser fan reversal: See Scheduling Condenser Fan Reversal on the facing page .

### 3.2.1 Scheduling Condenser Low Noise Operation

Condenser setback schedules low noise fan operation on units equipped with Vertiv™ Liebert® MC premium efficiency control. Fans spin more slowly during specified times to reduce noise, and faster when low noise is unnecessary.

**NOTE: Low noise operation is overridden to prevent a high pressure condition.**

1. Touch 

, then  > *Scheduler* > *Condenser Setback Schedule*. The TASK PROPERTIES panel opens.
2. Adjust the schedule settings, and touch *Save*. The schedule is set up.
   - Touch *Cancel* to discard the changes.

#### Condenser Setback Task Properties Options

**Disabled Day**

Selects specific days on which noise reduction operation is disabled when the schedule is enabled.

**Interval 1**

Start and finish time of day that noise-reduction operates.

**Interval Day**

Selects days on which noise reduction operation for the interval specified in Interval 1.

**Max Speed in Low Noise Mode**

Sets the maximum speed for the condenser fan during low noise operation.

**Max Speed in Normal Mode**

Sets the maximum speed for the condenser fan during normal or high efficiency operation.

**Noise Reduction**

Enable/disable noise reduction. When checked, the schedule is run. When unchecked, the scheduling parameters are ignored.

**Status**

Indicates if low noise operation is active or inactive.

**Whole Day**

Selects whole days for which noise-reduction operation is available for the condenser fan.

## 3.2.2 Scheduling Condenser Fan Reversal

Condenser fan reversal schedules a reversal of the condenser fans, reversing air flow to help remove dust, paper, leaves and such from the suction side of the condenser coil.

1. Touch 

, then  > *Scheduler* > *Condenser Fan Reversal Schedule*. The TASK PROPERTIES panel opens.
2. Adjust the schedule settings, and touch *Save*. The schedule is set up.
   - Touch *Cancel* to discard the changes.

### Condenser Fan Reversal Task Properties Options

**Reverse Fans At Duration**

Length of time, in seconds, the fans are reversed.

**Reverse Fans Every**

Selects number of days between fan reversal.

**Reverse Fans Now**

Enables/disables immediate fan reversal.

### 3.2.3 Scheduling Sleep Times for Thermal Management Units

Unit sleep schedules turn off units during low demand as long as return temperature remains below the alarm threshold.

1. Touch 

, then  > *Scheduler* > *Unit Sleep Schedule*. The TASK PROPERTIES panel opens.
2. Adjust the schedule settings, and touch *Save*. The schedule is set up.
    - Touch *Cancel* to discard the changes.

#### Unit Sleep Schedule Task Properties Options

**Interval 1/2**

Start and finish time of day that sleep mode operates.

**Interval Day**

Selects days on which sleep mode operates for the intervals specified in Interval 1 and Interval 2.

**Sleep Mode**

Enable/disable sleep schedule. When checked, the schedule is run. When unchecked, the scheduling parameters are ignored.

**Timer Mode Type**

Selects unit operation when in sleep mode. Values are:

- Unit Off: The unit stops (fans are off).
- Deadband: The unit operates in a limited capacity (fans are on) based on an additional deadband added to the temperature deadband.

**Timer Reset**

Selects whether or not the sleep mode timer resets.

**Whole Day**

Selects specific days on which sleep mode is active for the entire day when the schedule is enabled.

## 3.3 Setting General Thermal Management Unit Options

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, all of the options listed may not be available on your Vertiv™ Liebert® iCOM™ display.**

## 3.3.1 Setting Miscellaneous Options

1. Touch 

, then  > *Options Setup* > *Misc Settings*. The MISC SETTINGS panel displays.
2. Make adjustments as needed and click *Save*. The option settings are updated.
    - Touch *Cancel* to discard the changes without saving.

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, all of the options listed may not be available on your Vertiv™ Liebert® iCOM™ display.**

### Miscellaneous Cooling Unit Settings Options

#### Auto Restart Enable

When enabled, the cooling unit returns to the status at which it was operating when input power returns after a power failure. (ON if it was powered on and OFF if it was powered off before the failure.) See Automatic Restart after Power Failure on the next page .

#### Display Off Enabled

On this cooling unit, sets whether or not the unit powers on/off when the on/off button on the Vertiv™ Liebert® iCOM™ display is used.

- No: On/off requests via the display are ignored.
- Yes: Unit powers on/off when requested via the display.

#### EEV Alarm Board

Sets the events sent to the alarm board as:

- NC. Normally closed.
- NO. Normally opened.

#### Free Cool Capacity Transition Filter

Selects how quickly capacity changes between modes of operation to avoid overshooting during the transition.

- Only a factory trained service technician should adjust this setting.

#### K11 (WA Relay) and AL Relay

Sets action of the alarm and warning relays.

- Direct: Open when power is applied to the control.
- Reverse: Closed when power is applied to the control.

#### Loss of Power Autoreset Delay

Selects the length of time that a Loss of Power event (that triggers after a power cycle that occurs when the cooling unit is operating) is active when power is restored. When the delay time elapses, the event resets and is cleared automatically.

**Restart BMS Off and Disconnected**

Selects cooling unit's response/action when BMS is disconnected.

- No: Unit remains in a monitoring-off state.
- Yes: Unit may power-on from a monitoring-off state.

**Single Unit Auto Restart**

Selects time elapsed (in seconds) before unit restarts when Auto Restart Enable is enabled.

**Warning Activates Alarm Relay**

When enabled, a warning event activates the common alarm relay.

## 3.3.2 Automatic Restart after Power Failure

Set the cooling unit to return to the status at which it was operating when input power returns after a power failure. (ON if it was powered on and OFF if it was powered off before the failure.)

1. Touch 

, then  > *Options Setup* > *Misc Settings*. The MISC SETTINGS panel displays.
2. Set *Auto Restart Enable* to *Yes*, and use the slider to set the number of seconds to delay before restart, then touch*Save*. Automatic restart is enabled.
    - Touch *Cancel* to discard the changes without saving.

## 3.3.3 Setting Fan Options

Air flow is adjustable via Vertiv™ Liebert® iCOM™ manually using a building management system (BMS) or automatically using locally installed temperature sensors.

**NOTE: Thermal management units ship with the factory setting Return Sensor for the temperature control sensor and the fan speed control sensor.**

1. Touch 

, then  > *Options Setup* > *Fan Settings*. The FAN SETTINGS panel displays.
2. Make adjustments as needed and click *Save*. The option settings are updated.
    - Touch *Cancel* to discard the changes without saving.

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, all of the options listed may not be available on your Vertiv™ Liebert® iCOM™ display.**

### Fan Settings Options

**Airflow Calibration**

- Maximum allowed fan output voltage.

**Allow Fan Modulation with Comp**

Enables/disables fan modulation with compressor operation. Values are:

- No: Fan speed ramps to STD when a compressor starts operating.
- Yes: Fan speed modulates based on CFF while compressor operates.

**Dehumidification Fan Speed**

Maximum fan speed when dehumidification is in progress, assisting with the dehumidification process.

## Fan Back Draft Mode

Enables/disables fan operation in back draft mode.

**Fan Speed at Unit Start**

Speed at which the fans run on unit start up.

**Fan Speed at Unit Start Timer**

Length of time fans run at the speed selected in fan speed at unit start.

**Fan Speed Filter at 0%**

Decreases the rate at which the fan speed changes when close to or at the temperature setpoint to avoid undershooting the setpoint.

**Fan Speed Filter at 100%**

Increases the rate at which the fan speed changes for a quicker reaction of fan speed at high temperatures.

**Fan Speed Reposition Delay**

Length of time before fan speed can decrease, allowing temperature to stabilize before the change occurs.

**Fan Speed Reposition Mode**

Sets a one time delay that allows the fan to maintain current speed when a call to increase or decrease is made to allow the temperature to stabilize.

**Fan Speed Transition Filter**

Sets how quickly the fan speed changes between operating modes. Prevents an instant reaction when fans turn on or off and prevents unstable operation.

**Max Deceleration Rate**

Selects the rate and which the fan speed changes during deceleration.

**Maximum Fan Speed**

Maximum speed at which the fan will operate.

**MIN at CFC for EC Fan**

Cooling deviation at which the fan will operate at minimum speed.

**Minimum Fan Speed**

Minimum speed at which the fan will operate.

**No Power Fan Speed**

Speed at which the fans operate when using emergency power.

**STD at CFC for EC Fan**

Cooling deviation at which the fan will operate at maximum speed.

## 3.3.4 Setting Compressor Options

1. Touch 

, then  > *Options Setup* > *Compressor Settings*. The COMPRESSOR SETTINGS panel displays.
2. Make adjustments as needed and click *Save*. The option settings are updated.
   - Touch *Cancel* to discard the changes without saving.

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, all of the options listed may not be available on your Vertiv™ Liebert® iCOM™ display.**

### Compressor Settings Options

**Ball Valve Setpoint Offset**

Adjusts sensitivity to compressor discharge pressure or liquid pressure by increasing sensitivity. The higher the added pressure, the more the valve opens.

**Capacity Change at 0%**

Decreases the rate at which cooling capacity changes when close-to or at the temperature setpoint to avoid undershooting the setpoint.

**Capacity Change at 100%**

Increases the rate at which the cooling capacity changes for a quicker reaction of cooling at high temperatures.

**Winter Start Delay**

Length of time, in minutes, that a low pressure condition is ignored during compressor start-up. See Setting Low Pressure Time Delay on the facing page .

## Setting Low Pressure Time Delay

At compressor start up, a low-pressure condition is ignored for a set period to avoid false trips due to bubbles in the refrigerant or other misreading of the low pressure device.

**NOTE: The factory default setting is a three minute delay for air cooled units and a zero to one minute delay for water cooled units.**

1. Touch 

, then  > *Options Setup* > *Compressor Settings*.
2. Use the *Winter Start Delay* slider to select the number of minutes for the delay, and touch *Save*.

## Adjusting Ball Valve Pressure Offset

**NOTE: Only a properly trained and qualified technician should modify the motorized ball valve setting.**

The number of times the valve opens and closes is adjusted based on added pressure offset.

1. Touch 

, then  > *Options Setup* > *Compressor Settings*.
2. Use the *Ball Valve Setpoint Offset* slider to select amount of pressure added to open the valve wider, and touch *Save*.

## Compressor Sequencing for Balancing Run Times

Compressor sequencing, available in two compressor cooling units, allows assigning a lead compressor or allowing automatically leading with the compressor with the lower run hours logged.

When Auto is selected, the following applies as Vertiv™ Liebert® iCOM™ attempts to maintain equal run time of the compressors:

- If only one compressor is available because of safety delays, it is given first priority to start/stop.
- If both compressors are off, the compressor with fewer run hours in the next to start.
- If both compressors are operating, the compressor operating for the longest time since the last start is the first to shut off.

**NOTE: Automatic compressor sequencing will not power off a compressor if it is required to properly condition the space.**

To set up compressor sequencing:

1. Touch 

, then  > *Options Setup* > *Compressor Settings*.
2. Select the *Compressor Sequence* option to use, and touch *Save*.

## 3.3.5 Setting Reheat Options

If the room air temperature becomes too cold, heating is activated based on the temperature proportional band setting. Depending on the type of cooling unit, there are different types of reheat (configured at purchase/set at factory). There may also be one to three stages of reheat, which is also factory set. The only service operation available is setting the number of heat stages.

1. Touch 

, then  > *Options Setup* > *Reheat Settings*. The REHEAT SETTINGS panel displays.
2. Refer to Reheat Settings Options below , and Reheat Control below to adjust the setpoint options, then touch *Save*. The option settings are updated.
    - Touch *Cancel* to discard the changes without saving.

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, all of the options listed may not be available on your Vertiv™ Liebert® iCOM™ display.**

### Reheat Settings Options

#### Number of Electrical Heat Stages

Number of electric stages that may be activated during reheat.

- Depending on your cooling unit, the maximum setting may be 1, 2, or 3.

## 3.3.6 Reheat Control

If your cooling units are equipped with a heating option, reheat control is directly linked to temperature control in that the heating requirement determined by the temperature proportional band determines reheat operation. See Temperature Control—Temperature Setpoints and Cooling Operation on page 23 .

## Electric, Hot Gas, and Hot Water Reheat

Depending on the type of cooling unit, there may be one to three stages of electric and hot gas/hot water reheat. Table 3.3 below , shows the nine electric reheat options.

**Table 3.3 Electric, Hot Gas, and Hot Water Reheat Configurations**

| Type | Stage 1 | Stage 2 | Stage 3 |
|---|---|---|---|
| A | Electric 1 | — | — |
| B | Electric 1 | Electric 2 | — |
| C | Electric 1 | Electric 2 | Electric 3 |
| D | Hot gas | — | — |
| E | Hot gas | Electric 1 | — |
| F | Hot gas | Electric 1 | Electric 2 |
| G | Hot water | — | — |
| H | Hot water | Electric 1 | — |
| I | Hot water | Electric 1 | Electric 2 |

**NOTE: During dehumidification, hot gas/hot water are not influenced by the electric reheat setting. Hot gas is set only when the selected compressor is operating (See Setting Reheat Options on the previous page .)**

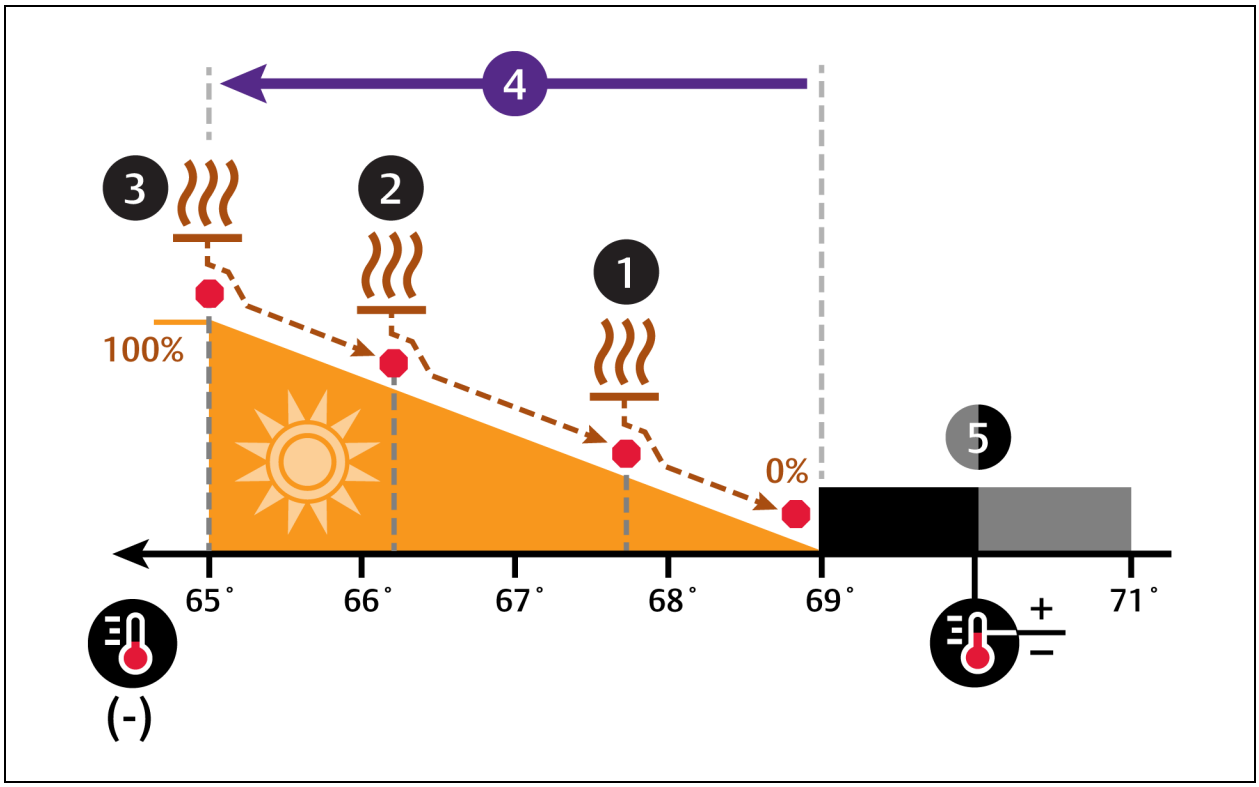
Reheat is controlled by dividing the heating half of the temperature proportional band (below the setpoint) by the number of stages. Figure 3.9 on the next page , illustrates electric reheat operation with 3 stages as follows:

- 70° setpoint
- 8° proportional band
- 2° deadband
- Three stage reheat

The proportional band is divided evenly on each side of the setpoint. The deaband is divided evenly on each side of the setpoint. The temperature proportional band below the setpoint is divided into thirds, one for each stage.

- From 70° to 69°, 0% heating is required.
- At 68.7° air temperature (heating demand 33%), Stage 1 activates and continues operating until temperature reaches 69°.
- When temperature decreases to 67.4°(heating demand 66%), Stage 2 activates, and continues until temperature reaches 68.7° (heating demand 33%).
- When temperature decreases to 67.4°(heating demand 100%), Stage 2 activates, and continues until temperature reaches 68.7° (heating demand 66%).
- When temperature decreases to 63°(heating demand 100%), Stage 3 activates, and continues until temperature reaches 67.4° (heating demand 33%).

**Figure 3.9 Temperature Control for Reheat—Three Stage Electric Reheat**




| No. | Description | No. | Description |
|---|---|---|---|
| 1 | Stage 1 reheat | 4 | ½ of proportional band |
| 2 | Stage 2 reheat | 5 | Deadband |
| 3 | Stage 3 reheat | | |

## 3.3.7 Setting Humidifier Options

The type of humidifier used depends on the cooling unit model and application requirements for your system.

**NOTE: Except for externally mounted humidifiers, humidifier operation is limited by the return air temperature. If return air temperature reaches 80°F (26°C) or higher, the humidifier is disabled. The humidifier will not resume operation until the temperature falls to 75°F (24°C) or remains below 80°F (26°C) for 20 minutes.**

1. Touch SERVICE, then ☰ > *Options Setup* > *Humidifier Settings*. The HUMIDFIER SETTINGS panel displays.
2. Make adjustments as needed and click *Save*. The option settings are updated.
   - Touch *Cancel* to discard the changes without saving.

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, all of the options listed may not be available on your Vertiv™ Liebert® iCOM™ display.**

### Humidifier Settings Options

#### Humidification System Enabled

Enables/disables group wide (network wide) humidification by the cooling units in the group. Once enabled at the system level, individual units may be enabled using the Humidification Enabled parameter.

#### Humidification Enabled

Enables/disables humidification at the unit level.

#### Humidifier Model

The type of humidifier installed.

- Vertiv™ Liebert® CRV uses a steam generating canister for humidification, selection is *SGH*.

## 3.3.8 Setting Dehumidification Options

1. Touch 

, then  > *Options Setup* > *Dehumidification Settings*. The DEHUMIDIFICATION SETTINGS panel displays.
2. Make adjustments as needed and click *Save*. The option settings are updated.
    - Touch *Cancel* to discard the changes without saving.

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, all of the options listed may not be available on your Vertiv™ Liebert® iCOM™ display.**

#### Dehumidification Settings Options

#### Capacity Increase on Dehumidification

Capacity increase permitted during dehumidification.

#### Dehumidification Enabled

Enables/disables whether or not the compressor/valve is used for dehumidification when humidity is above the setpoint.

#### Dehumidification Timer

Length of time, in minutes, the dehumidifier may operate.

## 3.3.9 Setting Water Leak Detector Options

1. Touch 

, then  > *Options Setup* > *Water Leak Detector*. The WATER LEAKAGE DETECTOR panel displays.
2. Make adjustments as needed and click *Save*. The option settings are updated.
   - Touch *Cancel* to discard the changes without saving.

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, all of the options listed may not be available on your Vertiv™ Liebert® iCOM™ display.**

### Water Leak Detector Settings Options

#### Water Detector

Type of water leak detector installed.

# 4 Managing Events: Alarms, Warnings, and Messages

Events are notifications of operating status for the cooling unit, its components, and auxiliary devices. All events are recorded in the Event Log, and alarm and warning events are also displayed on the Alarms panel (See Viewing the Event Log on page 17 , and Viewing Unit Alarms on page 15 .)

In some cases, depending on configuration, an alarm event may power off the cooling unit, but not always. However, if a standby unit is configured, all alarm events stop the faulty unit and start the standby unit. Message and warning events do not.

## 4.1 Event Properties

The ALARMS & EVENTS panel lists all events available on the system. You can view and modify events and the criteria that trigger visual and audible alarms including:

- Critical thresholds
- Time delays
- Enable/disable
- Event type
- Adding custom events

**NOTE: Not all event properties may be adjusted, depending on the criticality of the event, which is factory set.**

### 4.1.1 To Open the Panel

Touch 

, then  > *Alarm/Event Setup*.

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, the options on your Vertiv™ Liebert® iCOM™ display may differ.**

#### Alarms and Events Panel Fields

**Property**

Lists groups of events, expanding displays the events in each group. See Enabling Events and Editing Event Settings on the next page .

**Type**

Event type. See Selecting Event Type and Setting Alarm/Warning Notification on page 53 .

**Ack**

Indicates type of acknowledgment required. See Acknowledging Alarms on page 16 . This option is not available with all alarm types.

- Auto: The alarm is acknowledged automatically. It goes away if the situation that triggered alarm event is no longer true.
- Manual: The alarm goes away only when acknowledged, even if the situation that triggered the alarm event is resolved/no longer true.

**Reset**

Indicates type of reset required for the event .

- Auto: The alarm resets automatically after acknowledgment.
- Manual: The alarm must be reset manually after acknowledgment. See Acknowledging Alarms on page 16 .

This option is not available with all alarm types.

## 4.2 Enabling Events and Editing Event Settings

In the ALARMS & EVENTS panel, events are grouped into categories for easier management, for example, the factory set remote sensor alarms and humidification/dehumidification events. In some cases, touch the group heading provides edit options for the entire group, like thresholds, delays and enable/disable. Each event includes settings specific for that event and the notification option where event-type and alarm notifications are selected (See Selecting Event Type and Setting Alarm/Warning Notification on the facing page ).

1. Touch 

, then  > *Alarm/Event Setup*. The ALARMS & EVENTS panel opens.
2. Scroll or search to find the event, touch the set's heading to display the properties and values for the entire set in the EDIT panel.
   – or –
   Touch an individual alarm or event to display it's specific values in the EDIT panel.

**NOTE: To edit the event type and notification, see Selecting Event Type and Setting Alarm/Warning Notification on the facing page .**

3. Use the EDIT panel to adjust the settings for the selected event or group of events.

## 4.3 Selecting Event Type and Setting Alarm/Warning Notification

Setting notification delays and disabling visual notification prevents nuisance notifications. Customize to notify of critical events on your cooling system.

**NOTE: If the event includes a safety function, such as high pressure, low pressure, main fan overload, etc., the safety function executes regardless of event type or notification setting. However, notification timing delays still apply.**

Table 4.2 on the next page , lists the events for the Vertiv™ Liebert® CRV. Table 4.3 on page 55 , describes events for the Vertiv™ Liebert® MC Condenser.

To select event type and notification:

1. Touch 

, then  > *Alarm/Event Setup*.
2. Scroll or search to find the event and touch the alarm or event.
3. On the EDIT panel, touch *Notifications*. The EDIT panel displays the notification properties.
4. Adjust the notification properties described in the Notification Properties below , then touch *Save*. The notification is updated.
   - Touch *Cancel* to discard the changes without saving.

### 4.3.1 Notification Properties

#### Delay

Time, in seconds, to delay notification after event trigger. Depending on the event, the delay may or may not be adjusted.

- If the notification delay for the event is greater than the delay set for the event group, the group's delay includes the event's delay.

#### Enable

Enables/disables notification. Touch the switch to set On or Off.

- When disabled, events are not logged or displayed and visual/audible alarm notifications are not made.

#### Type

Logging and notification level of the event. Table 4.1 below , describes the event type and notification it generates.

**Table 4.1 Notification Types**

| Type | Description |
|---|---|
| Message | Stored in event log only. No visual or audible notification. |
| Warning | Listed with a yellow status dot on the ALARMS panel and the LED flashes.<br>See Table 10.1 on page 87 , and Viewing Unit Alarms on page 15 . |
| Alarm | Listed with a red status dot on the ALARMS panel, the LED flashes, and the audible alarm sounds.<br>See Table 10.1 on page 87 , Viewing Unit Alarms on page 15 , and Enabling the Audible Alarm Notification on page 56 . |

Table 4.2 below , describes events available with a Vertiv™ Liebert® CRV.

**Table 4.2 Events Supported by Liebert® CRV**

| | | | |
|---|---|---|---|
| BMS Disconnected | Heaters Overheated | Power Off | Unit 10 Disconnected |
| Bottom Fan Failure | High CW Temp | Power On | Unit 11 Disconnected |
| Call Service | High Return Humidity | Rack Sensor 1 Failure | Unit 12 Disconnected |
| Clogged Filters | High Return Temperature | Rack Sensor 10 Failure | Unit 13 Disconnected |
| Comp 1 High Pressure | High Supply Temperature | Rack Sensor 2 Failure | Unit 14 Disconnected |
| Comp 1 Hrs Exceeded | High Temperature | Rack Sensor 3 Failure | Unit 15 Disconnected |
| Comp 1 Low Pressure | Hp Transducer 1 Fail | Rack Sensor 4 Failure | Unit 16 Disconnected |
| Comp 1 Pumpdown Fail | Hum Disabled | Rack Sensor 5 Failure | Unit 17 Disconnected |
| Comp 1 Short Cycle | Hum Enabled | Rack Sensor 6 Failure | Unit 18 Disconnected |
| Comp Power Reduction | Hum Hrs Exceeded | Rack Sensor 7 Failure | Unit 19 Disconnected |
| Compressor Lockout | Humidifier Cylinder Worn | Rack Sensor 8 Failure | Unit 20 Disconnected |
| Cond Pump-High Water | Humidifier High Amps | Rack Sensor 9 Failure | Unit 21 Disconnected |
| Condenser 1 Failure | Humidifier Lockout | RAM / Battery Fail | Unit 22 Disconnected |
| Control Valve Failure | Humidifier Low Amps | Reheat Lockout | Unit 23 Disconnected |
| Customer Input 1 | Humidifier Low Water | Room Humidity Problem | Unit 24 Disconnected |
| Customer Input 2 | Humidifier Problem | Room Sensor Failure | Unit 25 Disconnected |
| Customer Input 3 | Loss of Airflow | Smoke Detected | Unit 26 Disconnected |
| Customer Input 4 | Loss of CW Flow | Standby Mode | Unit 27 Disconnected |
| Dehum Disabled | Loss of Flow | Supply Sensor Failure | Unit 28 Disconnected |
| Dehum Disabled 12hrs | Loss of Power | System Off Confirmed | Unit 29 Disconnected |
| Dehum Enabled | Low Memory 1 | System Off Requested | Unit 30 Disconnected |
| Dehum Hrs Exceeded | Low Return Humidity | Top Fan Failure | Unit 31 Disconnected |
| Dig Scroll1 High Temp | Low Supply Temperature | Unit 01 Disconnected | Unit 32 Disconnected |
| Dscroll 1 Sensor Fail | LP Transducer 1 Fail | Unit 02 Disconnected | Unit Code Missing |
| El Heat1 Hrs Exceeded | Lwd Sensor Fail | Unit 03 Disconnected | Unit Disabled |
| Fire Alarm | Maintenance Done | Unit 04 Disconnected | Unit Hrs Exceeded |
| Fluid Sensor Failure | Maintenance to be Done! | Unit 05 Disconnected | Unit Off |
| General Alarm | Network Failure | Unit 06 Disconnected | Unit On |
| HCB Not Connected | No Connection with Unit1 | Unit 07 Disconnected | Unit Shut Down |
| Heat Rej SPD | No Power | Unit 08 Disconnected | Water Under Floor |
| Heat Rej VFD | On-Off Key Disabled | Unit 09 Disconnected | |

Table 4.3 below , describes events available with a Vertiv™ Liebert® MC Condenser.

**NOTE: A CANbus connection between the Liebert® MC condenser and Vertiv™ Liebert® iCOM™ is required to trigger these events.**

**Table 4.3 Events Specific to Liebert® MC Condenser**

| Event | Description |
|---|---|
| CAN GC 1 or 2 | • The Liebert® iCOM™ board cannot establish communication with the Liebert® MC condenser board for 10 seconds consecutively.<br>• Alarm notification displayed for the corresponding circuit.<br>• Liebert® EconoPhase pump operation disabled for the circuit affected.<br>• When Liebert® iCOM™ re-establishes communication with the Liebert® MC board, the event is reset. |
| GC 1 or 2 Rem Shutdown | • Remote shut down requested.<br>• Compressor(s) and Liebert® EconoPhase pump(s) in the corresponding circuit are powered off.<br>• If event occurs on the lead circuit, then the lead-lag order of the compressors/tandem banks changes.<br>• When the Liebert® MC condenser remote shutdown circuit returns to inactive state (closed), the event is reset and the compressors in that circuit may be powered-on.<br>• Normal compressor lead-lag sequence resumes when both compressors are off. |
| GC 1 or 2 Board Fail | An unrecoverable failure of the Liebert® MC condenser control board has occurred causing a condenser shutdown. |
| GC Pres Sens Fail C1 or C2 | Condenser pressure sensor failure |
| GC High Cond Press C1 or C2 | High condensing pressure |
| GC Low Cond Press C1 or C2 | Low condensing pressure |
| GC 1 or 2 Amb Sens Fail | Ambient temperature-sensor failure |
| GC 1 or 2 Amb Temp Limit | High/low ambient temperature |
| GC Temp Sens Fail C1 or C2 | Refrigerant liquid line temperature sensor failure |
| GC High Cond Temp C1 or C2 | High refrigerant liquid line temperature |

**Table 4.3 Events Specific to Liebert® MC Condenser (continued)**

| Event | Description |
|---|---|
| GC Low Cond Temp C1 or C2 | Low refrigerant liquid line temperature |
| GC 1 or 2 Fan 1 through 4 FAIL | The following events may result from a fan-failure alarm. Refer to the specific fan manufacturer's literature for troubleshooting information.<br>• VSD high link current<br>• VSD drive error<br>• VSD earth to ground fault<br>• VSD electronics heat sink thermal overload<br>• VSD hall failure<br>• VSD IGBT failure<br>• VSD line fault<br>• VSD motor locked<br>• VSD motor thermal overload<br>• VSD phase failure<br>• VSD specific uncategorized alarm detected<br>• VSD electronics high-temperature condition<br>• VSD high link voltage<br>• VSD low link voltage<br>• RS-485 communications failure |
| GC 1 or 2 TVSS Failure | TVSS alarm |

## 4.4 Enabling the Audible Alarm Notification

1. Touch 

, then  > *Display Options* > *Display Properties*.
The UNIT DISPLAY panel opens.
2. Touch the *Alarm Buzzer Pattern* value, and select a pattern from the drop-down list.
   - Selecting *None* disables the audible notification.
3. Touch *Save* to save the property settings.
   - Touch *Cancel* to discard changes.

## 4.5 Remote Alarm Device and Customer Input Events

Remote alarm devices are various sensors and detectors outside the cooling unit that provide information about conditions and situations that may affect operation. Remote alarm devices include smoke detectors, filter condition, valve status.

Included in the remote alarm devices option are up to four customer input events depending on cooling unit configuration. In some cases, two additional, optional customer input events are available. See Setting Up Customer Input Events on the facing page .

Remote alarm devices and customer input notifications are set in the same way as other events. See Selecting Event Type and Setting Alarm/Warning Notification on page 53 .

### 4.5.1 Setting Up Customer Input Events

Input devices must be wired to Terminal 24 through a dry contact to locations 50, 51, 55 and 56 for alarms 1 through 4, respectively (For the terminal location, refer to the cooling unit electrical schematic and installation manual). Table 4.4 below , maps the customer input to the RAD.

**Table 4.4 Customer Input Terminals to RAD Terminals**

| Customer Input | Customer Input Terminal | RAD Number | RAD Terminal |
|---|---|---|---|
| 1 | 24 | 1 | 50 |
| 2 | 24 | 2 | 51 |
| 3 | 24 | 3 | 55 |
| 4 | 24 | 4 | 56 |

1. Touch 

, then  > *Alarm/Event Setup* > *Remote Alarm Device Input*.
The EDIT panel opens.
2. In *Customer Input X (where X is the input number)*, select the input type that best describes the wired device/input, see Table 4.5 on the next page .
3. In *Customer Input X Active When*, select whether the input is active (triggers events) when **Opened** or **Closed**.
4. Once input(s) are set, touch *Save*.
The customer-input settings are saved.

#### Customer Input Options

##### Customer Input X

Selects the customer wired input, where X is the input number. See Table 4.5 on the next page , for a description of available values.

##### Customer Input *X* Active When

Selects when the input triggers an event. Options are:

- Opened: Events are triggered when the contacts across the corresponding RAD terminal strip are open.
- Closed: Events are triggered when the contacts across the corresponding RAD terminal strip are closed.

NOTE: Depending on customization, some events listed in **Table 4.5** below , may not be available with your system.

**Table 4.5 Customer Input Options**

| Input | Action/Description |
|---|---|
| Smoke | Event only |
| Flow Alarm | Event only |
| C-Input 1 | Event only |
| C-Input 2 | Event only |
| C-Input 3 | Event only |
| C-Input 4 | Event only |
| Rht Lockout | Event + Electric heaters disabled |
| Hum Lockout | Event + Humidifier disabled |
| Rht+Hum Lock | Event + Electric heaters and humidifier disabled |
| Comp Lockout | Event + Compressor(s) disabled w/o pump down |
| Call Service | Event only |
| High Temp | Event only |
| HTRJ VFD | Activates the HEAT REJ VFD ALARM. No other function. |
| HTRJ SPD | Activates the HEAT REJ SPD ALARM. No other function. |
| FIRE ALARM | Event + Shuts-down the unit. |
| 2ND SETPOINT | No event, but switches to the second setpoint. |
| COND 1 FAIL | Event only |
| HUM | Event +<br>For internal humidifier: a.) stops filling when the bottle is full. b.) activates the HUMIDIFIER CYLINDER WORN event, and locks-out humidifier when input is active for 24 hours and steam remains below 50%.<br>For external humidifier: activates the HUMIDIFIER PROBLEM event and locks-out the humidifier. |
| C PMP Alarm A | Event + Activates COND PUMP-HIGH WATER event only. |
| C PMP Alarm L | Event + Activates COND PUMP-HIGH WATER event and locks-out the humidifier. |
| C PMP Alarm SD | Event + Activates COND PUMP-HIGH WATER event and shuts-down the cooling unit. |
| POWER A | Event only |
| POWER B | Event only |

# 5 Unit to Unit (U2U) Networking

Vertiv™ Liebert® iCOM™ controlled thermal management units connected in an Ethernet unit to unit (U2U) network are able to efficiently cool and control humidity in the conditioned space by exchanging data in several modes of operation.

U2U networking is required to set up and control the following operating features:

- Teamwork
- Standby (lead/lag)
- Rotation
- Cascading

**NOTE: The U2U network must be separate from other networks. Use a communication card, such as a Vertiv™ Liebert® IntelliSlot™ Unity, to communicate securely between your building management system or other networks.**

## 5.1 Preparing for U2U Group Set Up

Cooling units in the network will be assigned to groups, which affects how units function in teamwork, standby, rotation, and cascading operations. Especially in large rooms, it is important to consider several factors before setting up groups to balance cooling unit operation with room conditions.

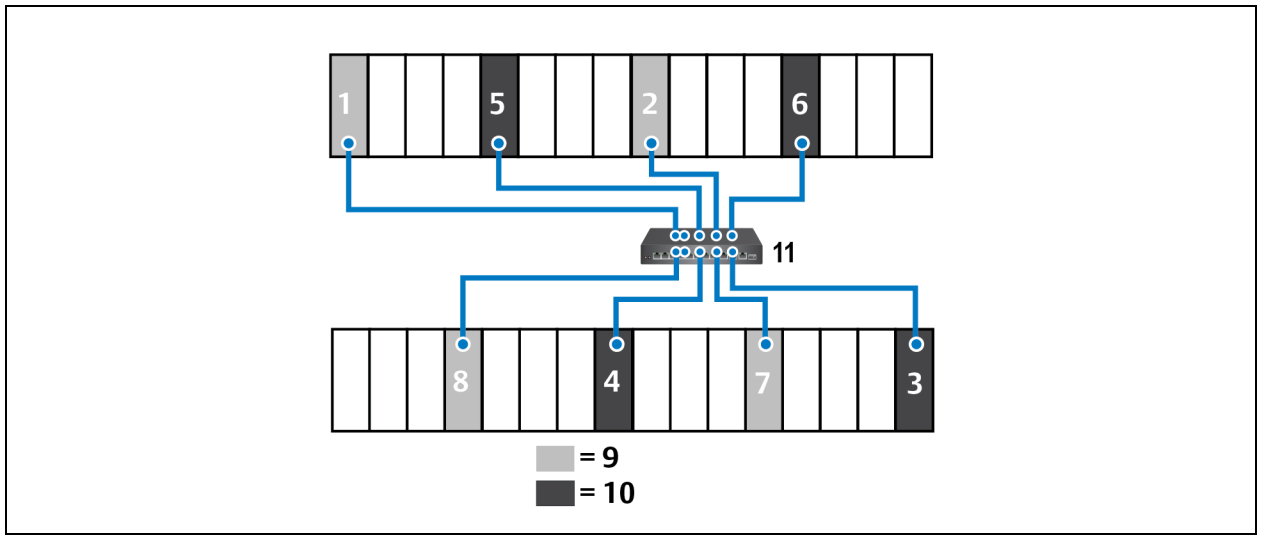
**NOTE: For ease of set up and use, we recommend using only one group unless you have multiple rooms, differing software versions, or different types of cooling units.**

1. Make a map of the room and indicate the location of all heat generating devices and cooling units to plan for proper heat load management and cooling air distribution.
2. Note the type of units by product, model, size, etc.
3. Determine the number of units to network together to ensure proper air flow and environmental control, up to 32 units.
4. Determine number of standby units.
5. Determine if using teamwork, and if so, which mode.
6. Plan U2U address assignments.
   - Refer to the U2U Display and Control-board settings on page 61 , for guidelines assigning cooling unit control board addresses and Vertiv™ Liebert® iCOM™ display board addresses.
   - Balance/Alternate unit address assignments based on room layout and because standby and teamwork operate in numeric order by unit number. Figure 5.1 on the next page , shows an example layout assignment with half of the cooling units in standby and half operating. Without a plan, adjacent units could be operating or inactive, which may not provide proper heat-load balance or efficient use of cooling capacity.
7. Read and record all programmed settings for each of the individual units. See 9.2 on page 82 .
8. Verify that network cabling and switches are provided, ready to connect, and labeled by unit at the network switch.

**NOTE: Cooling units are factory wired for stand alone operation. Do not connect the U2U network cabling before setting the U2U network configuration/groups. Network communication conflicts and unreliable display readings will result. Configure the network using Configuring U2U Network Settings on the next page , then refer to U2U Wiring Connections on page 121 , to connect the network cabling and hardware.**

**Figure 5.1 Example Layout Standby/Operating Unit Address Assignment**




| Item | Description |
|---|---|
| 1 to 8 | Assigned address of the Liebert® CRV |
| 9 | Operating units |
| 10 | Units on standby |
| 11 | Network switch |

## 5.2 Configuring U2U Network Settings

**NOTE: Always change and save the control board settings first. If you change the display settings first, you could lose access to the control board via Vertiv™ Liebert® iCOM™.**

The U2U NETWORK SETTINGS configure iCOM's unit-to-unit communication and includes information buttons,  , that display pop-up field descriptions. The panel also indicates issues with the network settings. For resolution, see Troubleshooting Network Settings Issues on page 62 .

### 5.2.1 To Configure U2U Networking

1. Touch  , then  > *BMS & Teamwork Setup* > *U2U Setup*. The U2U NETWORK SETTINGS panel opens.
2. Touch the field to edit. The keypad opens.
3. Type the entry and touch  .
4. When all fields to edit are updated, touch *Save & Restart*.

**NOTE: Depending on the changes made, the Save button updates to indicate the components that need rebooted or restarted. If the control board reboots, the cooling unit suspends operation for 60 seconds, then resumes operating.**

## U2U Display and Control-board settings

### Broadcast

Logical address at which connected units receive datagrams.

**NOTE: Messages sent to the broadcast address is typically received by all network attached hosts.**

### CB Firmware Version

Display configuration, based on the firmware version of the control board within the cooling unit, as follows:

- CR-2.03: CRV
- PA-2.01: CW/DS
- PA-2.04: DSE
- PA-2.05: DSE, PDX/PCW, Mini-Mate
- PA-2.06: CW/DS, DSE, PDX/PCW, Mini-Mate

**NOTE: CB firmware version does not alter or affect the firmware running on the control board. It only updates the display configuration. If incorrect, menus and data in the Vertiv™ Liebert® iCOM™ display will be invalid or missing.**

### Gateway

Routes data and acts as proxy server/firewall for display and control board during network set up.

### Generate U2U Compatible Broadcast

Facilitates U2U communication between the display and control board.

**NOTE: Do not uncheck. Failure to generate the compatible broadcast address results in loss of communication between the display and control board.**

### IP Address

Network address of the display and control board.

**NOTE: The last three digits must be a unique value and need not be sequential. However, we recommend that they match the U2U address for easier reference later.**

### Netmask

Divides IP addresses in subnet and specifies network available to hosts for the display and control board. Display and control board Netmask must be identical on the U2U network.

### MAC Address

Unique, read-only identifier of the display or control board Ethernet device.

**U2U Address**

For the display, a unique identifier for each display on the U2U network. Address range is 33 to 64.

For the control board, a unique identifier for each control board on the U2U network. Address range is 1 to 32 and must be consecutive from the previous control-board address in the U2U group. This is the address used for stand by/lead-lag and cascade operation, see Figure 5.1 on page 60

**NOTE: For both board and display, we recommend matching the U2U address to the last three digits of the IP address for easier reference later.**

**U2U Group**

For the display, select the zone/group to which the unit belongs.

For the control board, selects the zone/group with which the unit will be configured in teamwork/standby/rotation scenarios.

**NOTE: Units with a specific thermal area of influence should be assigned to the same zone/group, typically when a network spans separate rooms rather than by aisles. Groups are also handy when cooling units vary by cooling type, compressor type, or version of Vertiv™ Liebert® iCOM™ firmware and otherwise do not operate together efficiently or at all.**

**U2U Target Address**

The address of the control board targeted by the display.

- The unit's U2U target address must match the control board U2U address.

## 5.2.2 Troubleshooting Network Settings Issues

At the bottom of the U2U NETWORK SETTINGS panel, an Issues button indicates whether or not there are problems with the network settings. The button indicates the number of issues and changes color when a problem exists, see Table 5.1 below.

**Table 5.1 Issues Button Status Colors**

| Color | Description |
|---|---|
| Green | No problems. Number of issues is zero. |
| Red | Problem(s) detected. Number of issues displays. |

### To View Network Issues

1. When an issue is indicated, touch the Issues button on the U2U NETWORK SETTINGS panel. The ISSUES dialog opens.
2. Note the problems and *Close* the dialog, then address the issue:
   - Touch the setting to correct.
     The on screen keyboard opens.
   - Make adjustments and touch *Go*.
   - Continue making corrections until no problems are indicated.
3. Verify that U2U communication is established, then touch *Save*.

**NOTE: Depending on the changes made, the Save button updates to indicate the components that need to be rebooted or restarted. If the control board reboots, the cooling unit suspends operation for 60 seconds, then resumes operating.**

## 5.2.3 Modifying U2U Network Settings

1. Touch 

, then  > *BMS & Teamwork Setup* > *U2U Setup*.
   The U2U NETWORK SETTINGS panel opens.
2. Touch the setting to edit and make adjustments, then touch  .
3. Verify that U2U communication is established, then touch *Save*.

**NOTE: Depending on the changes made, the Save button updates to indicate the components that need to be rebooted or restarted. If the control board reboots, the cooling unit suspends operation for 60 seconds, then resumes operating.**

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# 6 Teamwork, Standby, and Rotation for Cooling Units

Vertiv™ Liebert® iCOM™ U2U communication via private network and additional hardware (see Unit to Unit (U2U) Networking on page 59 ) allows the following operating features for the cooling units:

- Teamwork
- Standby (Rotation)
- Cascade

## 6.1 Teamwork Modes

When Vertiv™ Liebert® iCOM™ controlled thermal management units are connected to a network in a group or team, use teamwork to optimize performance and efficiency, depending on the mode chosen and its application.

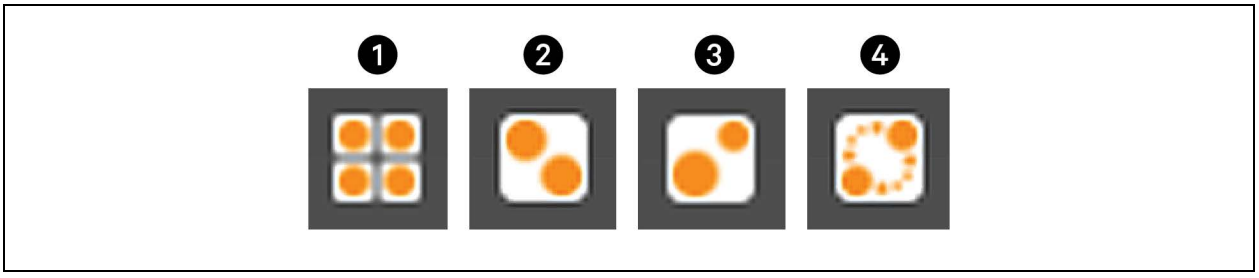
In a panel with Status content, the Teamwork mode icon indicates the mode selected, Figure 6.1 below . Touching the icon displays the Teamwork dialog from which you can access the teamwork control settings.

### 6.1.1 To Set Up Team Work

1. Touch the Teamwork mode icon, then touch *Edit* on the teamwork dialog.
   – or –
   Touch 

, then  > *BMS & Teamwork Setup* > *Teamwork / Standby* > *TeamworkMode*.
2. Select the mode from the *Teamwork Mode* drop down in the TEAMWORK MODE CONTROL panel. The TEAMWORK/STANDBY panel opens.
3. Touch *Save*. Teamwork mode is set.
   - Touch *Cancel* to discard changes.

**Figure 6.1 Teamwork Icons**




| Item | Description |
|---|---|
| 1 | No teamwork. |
| 2 | Mode 1 - Parallel teamwork |
| 3 | Mode 2 - Independent teamwork |
| 4 | Mode 3 - Optimized aisle teamwork |

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, all of the options listed may not be available on your Vertiv™ Liebert® iCOM™ display.**

## Teamwork Control Options

### Cascade Units

Stages on standby units based on room temperature/humidity load. Available in Teamwork modes 1 and 3, the options differ for each:

- Teamwork mode 1 Parallel options are:
  - Cooling: standby units cascade on with a call for cooling only.
- Teamwork mode 3 Optimized Aisle options are:
  - Fan PI: Standby units cascade on, based on the inability of active units to reach setpoint temperature or if using static pressure control, setpoint pressure while operating at full capacity.
  - Fan speed: Standby units cascade on, based on the inability of active units to reach setpoint temperature or if using static pressure control, setpoint pressure while operating at full fan speed.

### Cascaded Units Delay

Length of time in minutes to delay the activation of a standby unit after the previously activated unit starts, to prevent staged cascaded units from starting too close together or at the same time.

### Cascaded Units Min Run

Length of time in minutes that an cascade on unit must run before powering off.

### Cascaded Units Off Delay

Length of time, in minutes, to delay powering off a cascaded unit after fan speed drops below the *Stop Next Unit at SYS Fan Speed* setting.

### Cascaded Units Quick Start

After a power cycle of the master unit, identical to Cascaded Units Delay except that it should be shorter to get units to start more quickly after a power cycle.

- This delay remains in effect until all cascaded units have been restarted, then the delay reverts to setting of Cascaded Units Delay.

### Max. Intermediate System Speed

Limits the fan speed of the group until all units in cascade are powered on. Once all units are operating, the fan speed may increase beyond this setting.

### Number of Connected Units

Number of units connected in the group if U2U networked.

### Start Next Unit at SYS Fan Speed

Fan speed at which the next cascaded unit is powered on.

**Stop Next Unit SYS Fan Speed**

Fan speed at which the next cascaded unit is powered off. Unit power off may be delayed by *Cascaded Units Off Delay*.

**Teamwork is Based On**

Select the way the sensor readings from each cooling unit in the group are used to control temperature and humidity. Options are:

- Maximum: Based on the highest reading from a sensor in the group.
- Average: Based on the average readings from the sensors in the group.

**Teamwork Mode**

Teamwork mode to use for the group.

### 6.1.2 No Teamwork—Multiple Zones in One Room

When a Teamwork mode is not used, cooling units work independently based on their own sensors. Standby and unit rotation may be used, but cascading cannot.

### 6.1.3 Teamwork Mode 1—Parallel Operation

In Teamwork mode 1, fan speed and cooling capacity are ramped up in parallel, which means that all units operate identically.

Teamwork mode 1 is best for small rooms with balanced heat loads. A master unit collects the controlling readings for temperature and humidity from all the operating (fan on) units in the group, then determines the average or worst-case reading, and sends operating instructions to efficiently distribute cooling capacity across available units.

In Teamwork mode 1, most parameters are shared and, when set in any unit, are set in all units in the group.

### 6.1.4 Teamwork Mode 2—Independent Operation

Teamwork mode 2 works well for most applications, and best in large rooms with unbalanced heat loads by preventing units in a group from operating in opposing modes, some cooling and some heating. All temperature and humidity parameters are shared by the group. The master unit monitors all available unit sensor readings and determines the demand for cooling, heating, humidification and dehumidification, then sends operating instructions to address the greatest demand.

In Teamwork mode 2, the setpoints for all units must be identical. The proportional band, deadband, and related settings may differ by unit. Fan speed is modulated per unit. Rotation and cascading is not available, so expect uneven distribution of work hours.

### 6.1.5 Teamwork Mode 3—Optimized Aisle Operation

In Teamwork mode 3, the fan speed for all units operates in parallel, which means fan speed operation is identical at each unit. However, cooling capacity operates independently for each unit.

Teamwork mode 3 takes advantage of variable-speed fan options and variable capacity component options to maintain rooms with an unbalanced load and to prevent units in a group from operating in opposing modes. All units operate in the same mode based on the average or worst case (maximum) readings from the unit sensors. A local control (cooling capacity supply sensor) provides input to manage and maintain the discharge-air temperature at each unit. In addition, fan speed and operation are controlled based on readings from the unit temperature or static-pressure sensors to control air delivery to the cold aisle.

**NOTE: Standby and lead/lag are available when using optimized aisle mode, but is not recommended because it requires less power to run all units at reduced capacity.**

## 6.2 Assigning Cooling Units to Standby (Lead/Lag)

Standby assigns some units to operate while others are on standby, meaning a unit is idle but ready to become active in the event of an alarm condition in one of the operating units or based on a rotation schedule.

When a unit is in standby mode, fan(s) are off and no cooling occurs. In multiple cooling unit systems, assigning units to standby lets you:

- Configure redundancy in case of failure scenarios (standby).
- Manage cooling unit run time (lead/lag). See Setting a Rotation Schedule on the facing page .
- Modulate for very low loads to full design load (to be temperature reactive) by cascading activation of standby units (configured when setting up teamwork mode).

The U2U network has built-in fail over conditions that are automatically employed when standby units have been assigned:

- During single cooling unit or component failure, a standby unit is activated to replace the failed unit.
- Alarm event causes unit shut down, a standby unit is activated. If the activated unit also has an alarm event, the next available standby unit is activated. If all units have an alarm event, and no more standby units are available, a unit with a non-critical alarm event will be activated.

**NOTE: Redundancy is employed if units are assigned to standby regardless of the teamwork mode selected, including no teamwork.**

### 6.2.1 To Set Up Lead/Lag Operation

1. Touch 

, then  > *BMS & Teamwork Setup* > *Teamwork / Standby*.
The TEAMWORK/STANDBY panel opens.
2. Touch *Standby*. The STANDBY CONTROL panel displays.
3. Adjust the settings, then touch *Save*.
   - Touch *Cancel* to discard the changes.

### Standby Options

#### High Temperature Threshold

Temperature at which all standby units are activated.

#### Number of Standby Units

Number of units in standby mode.

#### Standby Fan Timer at Reheat/Humidification

Length of time in minutes that the fan continues to operate after the cooling unit enters standby mode if reheat or the humidifier were operating when unit powered off.

#### Start All Standby Units by High Temperature

When enabled, all units are activated to cool when a high temperature alarm occurs.

## 6.3 Setting a Rotation Schedule

You can set a rotation schedule to switch operating and standby units to manage run time of the cooling units.

1. Touch 

, then  > *BMS & Teamwork Setup* > *Teamwork / Standby*. The TEAMWORK/STANDBY panel opens.
2. Touch *Unit Rotation*. The UNIT ROTATION CONTROL panel displays.
3. Adjust the settings, then touch *Save*. Touch *Cancel* to discard the changes.

### 6.3.1 Unit Rotation Options

#### Lead Lag Overlap Timer

Length of time in minutes that cooling units operate in parallel when one begins operating (from standby) and the other goes into standby.

#### Rotate At

Selects exact time at which rotation occurs. Adjustable, based on a 24-hour clock where minutes are 0 to 59 and hours are 0 to 23.

#### Rotate By

Number of positions by which the cooling units rotate. For example, rotate by 3 in a group of 10 units and start with unit 1 operating. At rotation, unit 1 goes to standby and unit 4 activates, then 7, 10, 2, and so on. You can select 1 to 8 units in a single rotation schedule.

### Rotate Every

Selects rotation period. Valid values are:

- 12 hours
- 24 hours

### Rotate Now

Immediately performs rotation.

### Rotation Frequency

Frequency at which rotation occurs. Options include:

- No: Rotation disabled.
- Daily: Rotation occurs every day.
- Every [Day of Week]: Rotation occurs weekly on the same day.
- Monthly [Day of Week]: Rotation occurs monthly on the same day.

## 6.3.2 Manually Rotating the Operating and Standby Units

You can rotate the operating and standby units outside of the set schedule using Rotate Now.

**NOTE: Manual rotation may only be performed at the cooling unit designated as the lead unit, "U2U Address = 1," of the group.**

**NOTE: The Rotate Now button may only be available when a Rotation Frequency is selected. See Setting a Rotation Schedule on the previous page .**

1. At the cooling unit, verify that it is the lead unit of the group:
   - Touch 

, then  > *BMS & Teamwork Setup* > *U2U Setup*.
   - In the CONTROL BOARD column, verify that the *U2U Address* is **1**.

     If it is the lead unit, continue with step 2 .

     If it is not the lead unit, find the lead unit and start at step 1 .
2. Touch 

, then  > *BMS & Teamwork Setup* > *Teamwork / Standby*. The TEAMWORK/STANDBY panel opens.
3. Touch *Unit Rotation*. The UNIT ROTATION CONTROL panel displays.
4. Touch *Rotate Now*, then touch *Save*. The operating and standby units are rotated.

# 7 External Monitoring and Building Management Systems

Vertiv™ Liebert® iCOM™-controlled cooling units are equipped with Vertiv™ Liebert® IntelliSlot™ plug-in slots for optional communication cards to communicate with external monitoring systems including Building Management Systems (BMS), Network Monitoring Systems (NMS) and Vertiv™ Liebert® SiteScan™ Web.

**NOTE: Because the Liebert® iCOM™ U2U network must be separate from other networks, use external monitoring or BMS to communicate securely between networks.**

Two cards are available to provide remote communication to Liebert® iCOM™.

1. Liebert® IntelliSlot IS-Unity-DP communication card—communicates with up to two third-party protocols to monitor and manage a range of parameters and events and requires Velocity V4 monitoring protocol (standard on firmware versions PA1.04.033 and later). Unity cards deliver:
    - Velocity Protocol for Vertiv™ Liebert® *Trellis*™, Liebert® SiteScan™ and Vertiv™ Liebert® Nform.
    - Embedded Vertiv™ Liebert® LIFE™ Technology for Remote Service Delivery
    - SNMP (v1/v2/v3) for NMS
    - HTTP/HTTPS for Web-page viewing
    - SMTP for e-mail
    - SMS for mobile messaging
    - Modbus RTU-Modbus Remote Terminal Unit communication protocol for BMS over an RS-485 serial network (Modbus RTU RS-485)
    - Modbus TCP-Modbus Transmission Control Protocol for BMS over Internet or LAN.
    - BACnet IP—BACnet over Internet Protocol for BMS over Internet or LAN.
    - BACnet MSTP—BACnet Primary-Secondary/Token Passing communication protocol for BMS over an RS-485 serial network (Modbus MSTP RS-485)
2. Liebert® IntelliSlot SiteLink-E™ Card (IS-485EXI)—provides monitoring and management via ground fault isolated connection to a Liebert® SiteLink-E.

## 7.1 BMS and Vertiv™ Liebert® IntelliSlot Settings

When communicating with a building management system (BMS) with an optional Liebert® IntelliSlot™ Unity card or via embedded Unity function, the BMS settings are identical and include:

- Disconnect fail safe
- Manual fan speed control
- Backup fan control

## 7.1.1 Configuring BMS Communication with Vertiv™ Liebert® IntelliSlot Card

Modbus, BACnet, SNMP, SMS and HTTP communication cannot be configured via iCOM. To set up third-party protocols, refer to the appropriate Liebert® IntelliSlot Card user manual avalable at https://www.Vertiv.com/en-us/support/.

**NOTICE**

Risk of loss of communication with Liebert® IntelliSlot cards. Can cause operational problems.

Do not change the monitoring address of the Liebert® IntelliSlot card (set at 3) unless directed by a technical support representative.

## 7.1.2 Setup Communication with a Card

1. Touch 

, then  > *BMS & Teamwork* > *BMS Setup*.
The BMS SETUP panel opens.
2. Select *IntelliSlot Card Settings* and refer to Vertiv™ Liebert® IntelliSlot Options below , to make selections.
3. Touch *Save*.

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, all of the options listed may not be available on your Vertiv™ Liebert® iCOM™ display.**

### Vertiv™ Liebert® IntelliSlot Options

#### Monitoring Address

Address used by an optional, installed Liebert® IntelliSlot card. Factory default is 3.

- Do not modify the monitoring address unless directed to do so by Vertiv technical support.

#### Monitoring Protocol

Protocols used for communication with BMS. Options are:

- Velocity V3: Legacy Velocity communication cards
- IGM: IGMNet communication cardss
- Velocity V4: Liebert® IS-Unity card.
- Embedded: Embedded IS-Unity function.
- Embedded & IS V4 Both Embedded Unity function and Velocity V4 for an optionally installed Liebert® IS-Unity card.

## 7.1.3 Setting BMS Control Settings

1. Touch 

, then  > *BMS & Teamwork* > *BMS Setup* > *Control Settings*. The CONTROL SETTINGS secondary panel opens.
2. Adjust the settings, and touch *Save*.The settings are configured.

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, all of the options listed may not be available on your Vertiv™ Liebert® iCOM™ display.**

## BMS Control Settings Options

### BMS is Connected To

- Velocity
- Analog Input 1-4

### BMS Fan Speed Local Override

Enables/disables local override of the fan speed set via BMS.

### Fan Control Sensor

Currently selected fan control sensor. Must be set to Manual for BMS control. See Configuring Fan Setpoints on page 35 .

### Handshake

Sets time period, in minutes, in which communication between the BMS and Vertiv™ Liebert® iCOM™ must occur.

### Maximum Fan Speed

Current fan speed setting (set via fan setpoints or by BMS).

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# 8 Configuring Auxiliary Devices

With Vertiv™ Liebert® iCOM™, you can manage and control many devices that work with your thermal management unit(s).

## 8.1 Fluid Temperature Monitoring

A fluid sensor may be connected the supply inlet pipe to monitor local and remote fluid temperature differential.

1. Touch 

, then  > *Auxiliary Device Setup* > *Sensors* > *Fluid Sensors* > *CW T*.
The SENSOR PROPERTIES panel opens.
2. Adjust the temperature offset, and touch *Save*.
The fluid-temperature sensor settings are saved.

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, all of the options listed may not be available on your Vertiv™ Liebert® iCOM™ display.**

### 8.1.1 Fluid Sensor Options

#### Current Fluid Temperature

Actual temperature reading.

#### Fluid Temperature Offset

Correction (calibration) value added to the fluid temperature reading. Used in the event that the fluid temperature-sensor readings are incorrect.

- May be a positive or negative value.

## 8.2 Wired Remote Sensors

Wired remote rack sensors can function as control sensors and subsequently provide input individually at the unit level, or at the system level for temperature control and teamwork functions.

Each wired remote rack sensor has two thermistors/probes. In Individual Sensor mode, the higher temperature reading or the average temperature reading of the two probes can be used. In Unit Sensors mode, some or all of the rack sensor's temperature readings are considered for higher (maximum) or average calculation. For example, setting three sensors as control and average for unit mode, averages the three highest temperature readings.

At the system level, using aU2U network, the same maximum or average calculations can be based on readings from all of the sensors in all of the units in group (including those in standby) using Teamwork. See Teamwork Modes on page 65 .

1. Touch 

, then  > *Auxiliary Device Setup* > *Sensors* > *Wired Remote Sensors* > *Setup*.
The set up SENSOR PROPERTIES panel opens.
2. Adjust the settings for the cooling units sensor array, and touch *Save*. Wired Remote Sensor Set Up Options on the next page , describes the setting options.

3. Touch a specific sensor. The SENSOR PROPERTIES for that sensor open.

**NOTE: The sensor number listed corresponds to the DIP switch assignment of the sensor made during installation.**

4. Touch *Name*, and use the keyboard to give the sensor a descriptive name.

**NOTE: This is the name displayed on the REMOTE SENSORS panel for non-service users.**

5. Refer to the Wired Remote Sensor—Sensor Property Options on the facing page to adjust the remaining settings, and touch *Save*. The wired-remote sensors for the cooling unit are configured.

## 8.2.1 Wired Remote Sensor Set Up Options

### Average Rack Temp

Calculated average of temperature readings from the control sensors.

### Individual Remote Sensors Mode

When controlling at the sensor level, selects the method of using the readings from the two temperature thermistors (probes) on the sensor. Options are:

- Maximum: Use the highest temperature reading of the two thermistors.
- Average: Use the average of the readings from the two thermistors.

### Max Rack Temp

Highest temperature reading from the unit remote sensors.

### REM Sensors Set to Control

Number of sensors set to control.

### Unit Remote Sensors Mode

When controlling at the unit level, selects the method of using the inlet rack temperature readings from the control sensors to control fan speed. Options are:

- Maximum: Use the highest temperature reading of the sensors set to Control.
- Average: Use the average of the readings from the sensors set to Control and included in AVG.

### Unit Remote Sensors Included in AVG

When Unit Remote Sensors Mode is *Average*, selects the number of sensors used to calculate the average temperature.

- If the number selected is smaller than the number of REM Sensors set to Control, only the highest readings are used for the calculation.

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, all of the options listed may not be available on your Vertiv™ Liebert® iCOM™ display.**

## 8.2.2 Wired Remote Sensor—Sensor Property Options

### Function

Sets the function of the sensor when Unit Remote Sensors Mode is enabled.

- Disable: Sensor readings are ignored.
- Reference: Sensor readings are considered for Max Rack Temp, but are not used in maximum/average calculations.
- Control: Sensor readings are used in maximum/average calculations.

### Left Lead Current Value

Current reading of the left sensor probe. The left probe is always a temperature reading.

### Left Lead Offset

Correction (calibration) value added to the reading. Used in the event that the sensor reading is incorrect.

- May be a positive or negative value.

### Name

Custom, descriptive name to assist in identifying the sensor's location/function in the facility, for example, the name of the rack on which it is installed. The name is limited to:

- Up to four alphanumeric characters in length.
- Upper and lower case characters.
- These special characters: & * / . + - : @ \.

### Right Lead Current Value

Current reading of the right sensor probe. May be a temperature or humidity reading, depending on the connected sensor.

### Right Lead Offset

Correction (calibration) value added to the reading. Used in the event that the sensor reading is incorrect.

- May be a positive or negative value.

## 8.3 Supply Sensors

When the supply air sensor is set as the control sensor for temperature, additional supply air configuration parameters (valve pulse, cooling filters, and return compensation) can be used to enhance the supply air control.

The valve pulse and cooling filter timer can be adjusted to prevent oscillation around the supply setpoint and still allow for rapid cooling-capacity adjustments to compensate for heat load changes. Contact Vertiv technical support for adjustments.

**NOTE: Supply control air temperature sensors are required to use Optimize Aisle Teamwork (mode 3).**

**NOTE: On units equipped with a 3P actuator type valve, response can be improved by using the feedback signal.**

# 9 Administering Firmware, Settings, and Security

## 9.1 Vertiv™ Liebert® iCOM™ Firmware Upgrades

**NOTE: The Liebert® iCOM™ Service Tool (iST) is required to update control board firmware. Contact technical support at 1-800-543-2778 for information on control board updates.**

### 9.1.1 Compatibility with Earlier Versions of Vertiv™ Liebert® iCOM™

Versions of Liebert® iCOM™-control firmware CR 2.xx.xxR are incompatible with earlier firmware versions CR 1.xx.xxR.

Contact your Vertiv representative to upgrade firmware.

### 9.1.2 Updating Vertiv™ Liebert® iCOM™ Control Board Firmware

The FIRMWARE UPGRADE panel shows the firmware version of the control board of the cooling unit. It also includes settings to use while performing the upgrade.

**NOTE: Only personnel who have completed Vertiv training should perform a control board update. The iCOM™ Service Tool (iST) is required to update control board firmware. Contact technical support at 1-800-543-2778, opt. 5 for information on control board updates.**

1. Save the Liebert® iCOM™ software to a USB flash drive formatted with a FAT32 file system.
   - Make sure that the file-name extension is all lower case. For example, .xbp not .XBP.
   - Remove all other files with the .xpb extension from the flash drive.
   - Plug the USB flash drive into the P76 USB port on the iCOM™2 internal control board.
2. At iCOM™ control:
   - Touch 

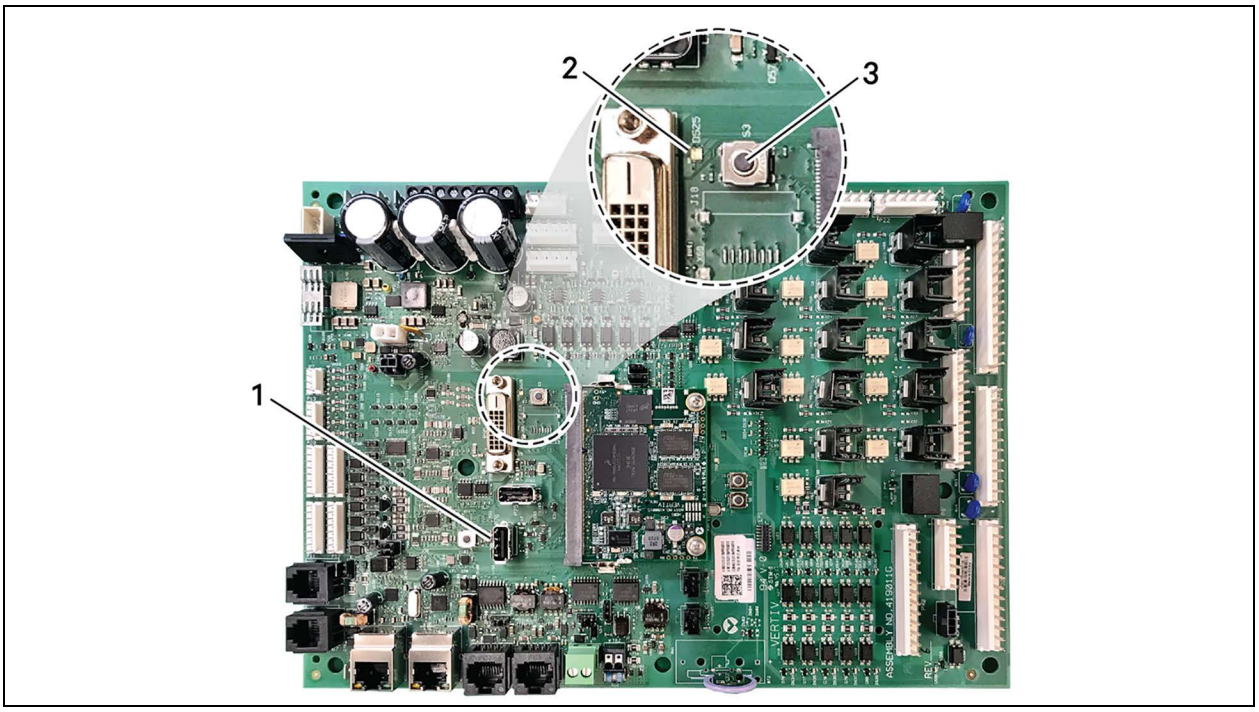
, then  > *Backup & Security* > Firmware Upgrade. The FIRMWARE UPGRADE panel opens.
   - Make sure the Lock for Upgrade is selected.
     - Refer to Control Board Firmware Upgrade Options on the next page , for the reset and retain options.

   **- or -**

   On the Vertiv™ Liebert® iCOM™ control board:

   - Insert the flash drive into the P76 USB port. After a few seconds, the DS25 LED lights up green.
   - P75 does not work for firmware upgrade.
   - To continue with the upgrade, press the S3 button near the LED within 15 seconds. The LED blinks blue to indicate that the upgrade has commenced. When the upgrade completes, the LED blinks fast green, and the board reboots with the new firmware.
3. Remove the USB flash drive after the board reboots.

**Figure 9.1 P76, S3, and DS25 LED on the Board**




| Item | Description |
|---|---|
| 1 | P76 port |
| 2 | DS25 LED |
| 3 | S3 button |

## 9.1.3 Control Board Firmware Upgrade Options

### Lock for Upgrade

When selected, the unit is locked for a firmware upgrade.

### Reset to Default Configuration

When selected, the unit is reset to the factory-default configuration during the upgrade.

### Retain Network Configuration

When selected, the current network settings and options are retained while all other settings are reset to the factory default configuration.

### Unlocking the Control Board Before Upgrade

If changes are made to the settings after the control board is locked for firmware upgrade, use the following steps to unlock the board and execute the changes.

1. In the *Lock for Upgrade* field on the FIRMWARE UPGRADE PARAMETERS panel, select *Unlock*, then select *Yes*.
2. Touch *Save*. The changes are executed.

## 9.1.4 Reverting to Firmware in Dormant Partition

The Vertiv™ Liebert® iCOM™ control board holds firmware in two partitions:

- The active partition holds the currently running firmware.
- The dormant partition holds the previously installed firmware.

Upon firmware upgrade, the new firmware writes to the dormant partition, which switches to the active partition when the upgrade is complete. If needed, you can revert to the previously installed version that is now in the dormant partition while the board boots after the upgrade.

To return to pre-upgrade firmware:

1. At boot, watch for the DS25 LED to flash red then blue for a second or two, and after it flashes red then blue, press and hold S3 for six to 10 seconds until DS25 lights solid red then release. Figure 9.1 on the previous page , shows DS25 and S3 on the board.
2. Upon releasing S3, DS25 blinks for three seconds, and you must press and release S3 during that three seconds. If completed correctly, DS25 lights solid green and the board is reverted to the pre-upgrade firmware in the dormant partition. If incorrect, DS25 is not lit and the board boots normally.

**NOTE: Use these steps to switch between active/dormant partitions (current/previous firmware) as needed. The switch can only be initiated right after a boot of the system, so power-off the unit, wait five seconds, and power on the unit, then start at step 1 above, as the system boots.**

## 9.2 Backing Up, Importing/Exporting and Restoring Display Settings

Vertiv™ Liebert® iCOM™ display settings may be saved to a local disk or USB drive. Setpoint parameters cannot be exported, only Liebert® iCOM™ display settings. Saved files may be imported to restore Liebert® iCOM™ if it is replaced or if a problem occurs and to transfer settings to another Liebert® iCOM™. Liebert® iCOM™ can also be returned to factory default settings.

- Back-up: Saves a copy of the settings in a file named with the IP address of the display board. The saved settings include network settings, unit name, panel configuration and other details of the Liebert® iCOM™ display. Use a backup file to restore the unit settings in the event of a failure.
- Restore: Copies settings from a backup file to return Liebert® iCOM™ function to exactly what it was before the problem or failure. The settings may be restored from a file on the local disk or a USB drive. When restoring from a file on USB, make sure that you use the correct backup file to restore settings, otherwise settings for the display may be incorrect.
- Export: Saves a copy of the Liebert® iCOM™ display settings for later import to another Liebert® iCOM™ for identical display settings on both systems.
- Import: Loads Liebert® iCOM™ display settings from a previously exported file to an additional Liebert® iCOM™ system for identical settings, including panel customization and custom labels, on both.

### 9.2.1 To Back Up or Restore Display Settings

1. Touch 

, then  > *Backup & Security* > *Display Backup/Restore*. The BACKUP & RESTORE panel opens.
2. Touch the *Action Type* drop-down, and select the action to perform, then touch the *Location* where the backup/import file is located or will be saved.

**NOTE: USB drives connected to Ports 1 or 2 on the Vertiv™ Liebert® iCOM™ display are automatically detected and displayed as options for Location selection.**

3. Touch the action button in the lower-right corner. A notification indicates that the back up/restore/import/export is complete.
    - Remove the USB drive from the port if used.

### 9.2.2 Resetting Display Settings to Defaults

Return the Vertiv™ Liebert® iCOM™ display to factory default settings including panel customization, display network settings, and custom labels. Reset does not affect control board network settings, setpoints, or alarm thresholds.

1. Touch 

, then  > *Backup & Security* > *Backup and Restore*. The BACKUP & RESTORE panel opens.
2. Touch the *Reset to Defaults* button in the lower-right corner, then *Continue* on the confirmation dialog. (or *Cancel* to disregard the reset). The display restarts, and the start up wizard opens to assist in configuring the reset display.

## 9.3 Backing Up and Restoring Control Board Settings

Vertiv™ Liebert® iCOM™ settings may be saved to a local disk or USB drive, and the saved files may be imported to restore Liebert® iCOM™ if it is replaced or if a problem occurs and to transfer settings to another Liebert® iCOM™.

1. Touch 

, then  > *Backup & Security* > *Control Backup/Restore*. The BACKUP & RESTORE panel opens.
2. Touch the *Action Type* drop-down, and select the action to perform.
3. Select the location, site, and system to save backup files or load restore/replicate files. See Control Board Back Up and Restore Options below , for descriptions.

**NOTE: USB drives connected to Ports 1 or 2 on the Vertiv™ Liebert® iCOM™ display are automatically detected and displayed as options for Location selection.**

4. Touch the action button in the lower right corner. A notification indicates that the back up/restore/replicate is complete.
5. Remove the USB drive from the port.

### 9.3.1 Control Board Back Up and Restore Options

#### Action Type

Selects the back-up or restore function. Options are:

- Backup: Saves a copy of the settings in a file named with the IP address of the Vertiv™ Liebert®iCOM™ control board. Use a back-up file to restore the unit settings in the event of a failure.
- Replicate: Loads only the configsafe files (general settings/setpoints) from a backup file from another system.
- Restore: Loads a back up configuration from a previously saved back up file. For example, when a control board fails and must be replaced, you can load the configuration from a back up of the failed board.

#### Location

Indicates the port to which the USB drive is connected.

#### Site

Indicates the folder you created on the USB drive to which the back-up system file is saved.

#### System

The back up file named with the IP address of the control board from which it was saved.

## 9.4 Managing Access Permission and Passwords

**NOTICE**

Risk of loss of access to Vertiv™ Liebert® iCOM™. Can cause operational problems.

When a password is changed, make sure you record the new password and inform authorized users. If problems arise, passwords can be reset by Vertiv Technical Support, visit https://www.Vertiv.com/en-us/support/.

Two four-digit passwords provide two levels of permission to access Liebert® iCOM™ menus and are set with factory-default values. You can change the value of each password so that only those provided with the current password may access the menus that it unlocks.

The factory-default password for user and service log in are:

- Default User password: 1490
- Default Service password: 5010

**NOTE: To change the password, you must use the service password currently assigned to unlock the Service menu.**

1. Touch  , then 

> *Backup & Security* > *Manage Permissions*.
The MANAGE PINS panel opens.
2. Touch the role to change, then touch the *Value* field for the password to change.
The keypad opens.
3. Type a new four digit/character password, then touch  , and touch *Save*.
The password is saved.
    - Touch *Cancel* to discard the change.

# 9.5 Configuring with the Start Up Wizard

Upon initial use of the Vertiv™ Liebert® iCOM™ display or after resetting to defaults, the Liebert® iCOM™ start-up wizard offers to guide you through first-time set up.

## 9.5.1 To Update System Information Using the Wizard

1. Touch 

, then  > *Backup & Security* > *Display Backup/Restore*, then touch *Reset to Defaults*. The display reboots.
2. On the WELCOME panel, touch *Next*. The DATE & TIME panel opens.
3. Touch each field to make your selections., then touch *Next*. The UNIT DISPLAY panel opens.
4. Touch each field to make your selections, then touch *Next*.The NETWORK panel opens.
5. Determine the use of network communications and configure as needed, then touch *Next*. The SUMMARY panel opens.
6. Review the selections and settings and, if correct, touch *Finish*.
   - If corrections are needed, touch *Previous* to return to the appropriate panels.

## 9.5.2 Start Up Wizard Options

### Calibrate Screen

Optimizes touch response. See Calibrating the Touchscreen on page 8 .

### Language

Selects the display language.

### Import

Imports previously-saved display settings. See Customizing the Vertiv™ Liebert® iCOM™ Display on page 95 .

### Next

Continues configuration using the set up wizard.

### Skip

Closes the start-up wizard and uses the factory-default settings.

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# 10 Performing Diagnostics

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, all of the options listed may not be available on your Vertiv™ Liebert® iCOM™ display.**

## 10.1 Cooling Unit Status LED

Just below the Vertiv™ Liebert® iCOM™ touchscreen display is an LED that changes color and flashes on and off to indicate cooling unit status. See Table 10.1 below , for the LED colors and meanings.

**Table 10.1 Cooling Unit LED Colors and State Meanings**

| State | Color(s) | Meaning |
|---|---|---|
| Solid | Green | Powered on and operating. |
| Solid | Amber | In diagnostic/service mode or powered-off. |
| Solid | Red | Active warning or alarm present and acknowledged. |
| Flashing | Amber/Green | In sleep or U2U standby mode and available to operate. |
| Flashing | Red/Green | Operating with an active warning or alarm. |
| Flashing | Amber/Red | Shut down (not operating) because of an unacknowledged alarm. |
| Flashing | Red | Active warning or alarm present but unacknowledged. |
| Flashing | Blue | Liebert® iCOM display is starting up or updating Liebert® iCOM firmware. |

## 10.2 Enabling Manual Mode for Diagnostics

Use manual mode to test components, validate operation, and evaluate performance.

**NOTE: When manual mode is enabled, the cooling unit does not operate normally:**

- **Fan operation depends on the diagnostic category in use.**
- **Safety routines will prevent the use of some diagnostic features.**
- **Active alarms may prevent some the use of some diagnostic functions.**
- **In most cases, all components are turned off.**

**NOTE: When manual mode is disabled, all components and the cooling unit return to normal operation. See Disabling Diagnostics Manual Mode on the next page . Manual mode will time out after 30 minutes of inactivity and normal operation resumes.**

1. Touch 

, then  > *Diagnostic/Service* > *Diagnostics* > *Manual Mode* in the Category list. The MANUAL MODE panel displays.
2. Touch the *Enable* check box in the upper-right of the *MANUAL MODE* panel. The MANUAL MODE confirmation dialog opens.
3. Touch *OK* to enable manual mode. Enable is checked and manual control for diagnostics enabled.
   - Touch *Cancel* to close the dialog and manual mode remains disabled.

### 10.2.1 Disabling Diagnostics Manual Mode

1. Touch 

, then  > *Diagnostic/Service* > *Diagnostics* > *Manual Mode* in the Category list. The MANUAL MODE panel displays.
2. Remove the check mark from the *Enable* box by touching it. Manual mode is disabled.

## 10.3 Diagnosing Evaporator Fan Issues

1. Touch 

, then  > *Diagnostic/Service* > *Diagnostics* >*Evaporator Fan* in the Category list. The EVAPORATOR FAN panel displays.
2. Refer to Diagnostics—Evaporator Fan Options below , for descriptions of diagnostic options.

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, all of the options listed may not be available on your Vertiv™ Liebert® iCOM™ display.**

### 10.3.1 Diagnostics—Evaporator Fan Options

#### Analog Output 1 – 4

0V to 10V analog output that drives the speed of the evaporator fan. Typically, the evaporator fan is Analog Output 1 by default.

#### Analog Output 1 Selection

Var SpeedDrive.

#### Current Fan Speed

Current speed of fan.

#### Fan Speed Manual Speed

Maximum fan speed during manual/diagnostic mode.

#### Low Supply Temperature Counter

Number of low-temperature alarm events.

#### Fan Motors

Enables/disables fan motor during manual/diagnostic mode.

#### Status Airflow 1/2

Indicates if the status of the Air Safety Switch is open or closed.

### Status Filter

Status of the air filter.

### Status Remote Shutdown

Indicates whether remote shutdown is on or off.

## 10.4 Diagnosing Compressor Circuit Issues

1. Touch 

, then  > *Diagnostic/Service* > *Diagnostics* > *Compressor Circuit 1* in the Category list. The COMPRESSOR CIRCUIT panel displays.
2. Refer to Diagnostics—Compressor Circuit Options below , for descriptions of diagnostic options.

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, all of the options listed may not be available on your Vertiv™ Liebert® iCOM™ display.**

### 10.4.1 Diagnostics—Compressor Circuit Options

#### Cooling Suspended Mode

Enables/disables the cooling-suspended mode and sets the fan speed to 10% when the compressor stops (low load condition).

#### Compressor 1 Capacity

Enables/disables compressor capacity during manual/diagnostics mode.

#### Compressor 1 Operation

Enables/disables compressor during manual/diagnostics mode.

#### Compressor Cycle Ramp

Capacity at which compressor runs in manual mode.

#### Compressor Mode

Selects compressor operation during manual/diagnostics mode. Options are:

- 0: Run (normal operation)
- 1: Evacuate
- 2: Charge

#### Compressor Overload

Compress overload status.

### Compressor State

Compressor status, on or off.

### Discharge Pressure

Current pressure of the compressor discharge.

### High Pressure Alarm Code

Code of high-pressure alarm. To address the alarm condition, see Resetting High Pressure Alarm Code on the facing page .

- 0: Okay.
- Non-zero: High head pressure situation.

### High Pressure Status

Status of compressor's high pressure switch.

### High Temperature Alarm Counter

Number of high temperature alarm events. To address the alarm condition, see Resetting High Temperature Alarm Counter on the facing page

### Liquid Line Solenoid Valve

Enables/Disables the valve during manual/diagnostics mode.

### Low Pressure Alarm Code

Code of low pressure alarm. To address the alarm condition, see Resetting Low Pressure Alarm Code on the facing page .

- Zero: Okay.
- Non-zero: Low suction pressure condition.

### Low Pressure Status

Status of compressor's low pressure switch.

### Status HT1

Count of times compressor is powered off for high scroll temperature.

### Suction Pressure

Current pressure of the compressor suction.

### Sump Temperature

Current temperature at the sump.

### 10.4.2 Resetting High Pressure Alarm Code

When a high pressure problem has caused a compressor to lock off, resetting the High Pressure Alarm Code to zero unlocks the compressor for operation.

**NOTE: Cycling main power of the cooling unit will also unlock the compressor.**

1. Touch 

, then  > *Diagnostic/Service* > *Diagnostics* > *Compressor Circuit 1*in the Category list.
2. On the COMPRESSOR CIRCUIT panel, touch *Set to Zero* next to High Pressure Alarm Code, then touch *Save*. The code is reset and the compressor can now operate.

### 10.4.3 Resetting Low Pressure Alarm Code

When a low pressure problem has caused a compressor to lock off, resetting the Low Pressure Alarm Code to zero unlocks the compressor for operation.

**NOTE: Cycling main power of the cooling unit will also unlock the compressor.**

1. On the Service menu, touch *Diagnostic/Service* > *Diagnostics*. The DIAGNOSTICS panel opens.
2. Touch *Compressor Circuit 1*in the Category list.
3. On the COMPRESSOR CIRCUIT panel, touch *Set to Zero* next to Low Pressure Alarm Code, then touch *Save*. The code is reset and the compressor can now operate.

### 10.4.4 Resetting High Temperature Alarm Counter

1. Touch 

, then  > *Diagnostic/Service* > *Diagnostics* > *Compressor Circuit 1*in the Category list.
2. On the COMPRESSOR CIRCUIT panel, touch *Set to Zero* next to High Temperature Alarm Counter, then touch *Save*. The code is reset and the compressor can now operate.

## 10.5 Diagnosing Humidifier Issues

1. Touch 

, then  > *Diagnostic/Service* > *Diagnostics* > *Humidifier* in the Category list. The HUMIDIFIER panel displays.
2. Refer to Diagnostics—Humidifier Options below , for descriptions of diagnostic options.

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, all of the options listed may not be available on your Vertiv™ Liebert® iCOM™ display.**

### 10.5.1 Diagnostics—Humidifier Options

#### Humidifier

Enables/disables humidification in manual/diagnostic mode.

### Humidifier Drain

Enables/disables humidifier drain.

### Local Hum PI

Current humidity PI percentage.

### Status Humidifier Problem

Current status of the humidifier. OK indicates that the status is good.

### Supply Humidity

Current supply air humidity.

### Supply Temperature

Current supply air temperature.

## 10.6 Diagnosing Digital Output Issues

1. Touch 

, then  > *Diagnostic/Service* > *Diagnostics* > *Digital Outputs* in the Category list. The DIGITAL OUTPUTS panel displays.
2. Refer to Diagnostics—Digital Output Options below for descriptions of diagnostic options.

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, all of the options listed may not be available on your Vertiv™ Liebert® iCOM™ display.**

### 10.6.1 Diagnostics—Digital Output Options

#### Alarm Relay

Enables/disables alarms during manual/diagnostic mode.

#### Q15 Output State

Enables/disables Q15 output during manual/diagnostic mode.

## 10.7 Diagnosing Analog Output Issues

1. Touch 

, then  > *Diagnostic/Service* > *Diagnostics* > *Analog Outputs* in the Category list. The ANALOG OUTPUTS panel displays.
2. Refer to Diagnostics—Analog Output Options below , for descriptions of diagnostic options.

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, all of the options listed may not be available on your iCOM display.**

### 10.7.1 Diagnostics—Analog Output Options

#### Analog Output N

Controls analog outputs during manual/diagnostic mode. *(Where N is the analog output number.)*

## 10.8 Diagnosing Customer Input Issues

1. Touch 

, then  > *Diagnostic/Service* > *Diagnostics* > *Customer Inputs* in the Category list. The CUSTOMER INPUTS panel displays.
2. Refer to Diagnostics—Customer Input Options below , for descriptions of diagnostic options.

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, all of the options listed may not be available on your Vertiv™ Liebert® iCOM™ display.**

### 10.8.1 Diagnostics—Customer Input Options

#### Input N (1-4)

Provides the status for Customer Input #1 - #4.

## 10.9 Diagnosing Dehumidifier Issues

1. On the Service menu, touch *Diagnostic/Service* > *Diagnostics*.
   The DIAGNOSTICS panel opens.
2. Touch *Dehumidification* in the Category list. The DEHUMIDIFIER panel displays.
3. Refer to Diagnostics—Dehumidifier Options below for descriptions of diagnostic options.

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, all of the options listed may not be available on your Vertiv™ Liebert® iCOM™ display.**

### 10.9.1 Diagnostics—Dehumidifier Options

#### 12h Dehum Counter

Number of dehumidification time outs.

#### Dehumidification Envelope

Current status of dehumidification envelope.

- Active: Dehumidification is disabled because the Dehum Timer has timed out.

## 10.10 Managing Brown Out Protection

1. On the Service menu, touch *Diagnostic/Service* > *Diagnostics*. The DIAGNOSTICS panel opens.
2. Touch *Brown Out Protection* in the Category list. The brown out protection panel displays.
3. Refer to Diagnostics—Brown Out Protection Options below for descriptions of diagnostic options.

**NOTE: Depending on the type of thermal management unit, included components, and control settings of your system, all of the options listed may not be available on your Vertiv™ Liebert® iCOM™ display.**

### 10.10.1 Diagnostics—Brown Out Protection Options

#### [Digital Input] Delay

Sets on/off and off/on delay for all digital inputs designated as follows:

- REM: Remote shut down.
- CI N: Customer input, where N is the number assigned to customer input.
- T FAN: Top fan.
- HP: High pressure.
- LP: Low pressure.
- EHO: Heater safety thermostat.
- B FAN: Bottom fan.

#### Enable Brown Out Protection

Enables/disables brownout protection during manual/diagnostic mode.

# 11 Customizing the Vertiv™ Liebert® iCOM™ Display

## 11.1 Setting General Display Properties

**NOTE: You must be logged in to adjust the settings. See Powering On the Vertiv™ Liebert® iCOM™ and Logging In/Unlocking Controls on page 6 .**

1. Touch 

, then  > *Display Options* > *Display Properties*. The DISPLAY PROPERTIES panel opens.
2. Touch a value to select the setting from the drop-down list.
3. Touch *Save* to save the property settings.
   - Touch *Cancel* to discard changes.

### 11.1.1 Unit Display Options

#### Alarm Buzzer Pattern

Selects or disables the audible alarm notification. See Enabling the Audible Alarm Notification on page 56 .

#### Allow System On/Off

Enables/disables powering on/off the entire system of networked units from the Vertiv™ Liebert® iCOM™ display.

#### Backlight Brightness

Selects the brightness of the display back light.

#### Inactivity Timer

Time to elapse before display locks and dims.

#### Language

Selects the display language.

#### LED Brightness

Percentage brightness of the display.

#### Measurement System

Selects the units of measurement. Options are:

- Imperial (°F)
- Metric (°C)

### Skin

Selects the color/background format of the user interface. Options are:

- Dark blue
- White
- Dark grey

### Touch Beep

Enable/disable sound when display is touched.

### Touch Shockwave

Enable/disable visual shockwave when display is touched.

### Turn Unit On/Off without Password

When enabled, a Power On/Off button displays in the upper-right corner of the Vertiv™ Liebert® iCOM™ main display so personnel can turn the unit on or off with out logging-in and accessing the User/Service menus.

## 11.2 Customizing Main Display Views

The default Vertiv™ Liebert® iCOM™ display view is essentially a layout of two panels, one with status content and the other with alarms content. You can create custom display views by adding, changing, moving, and resizing the content objects.

**NOTE: You must be logged in to customize the view. See Powering On the Vertiv™ Liebert® iCOM™ and Logging In/Unlocking Controls on page 6 .**

### 11.2.1 Moving Content

You can drag and drop content objects anywhere you like on the main display.

1. Touch 

, then  .
2. Touch  in the upper right corner of the display and just below the control header.
3. Touch an object to select it (highlighted green), and drag it to the new location.

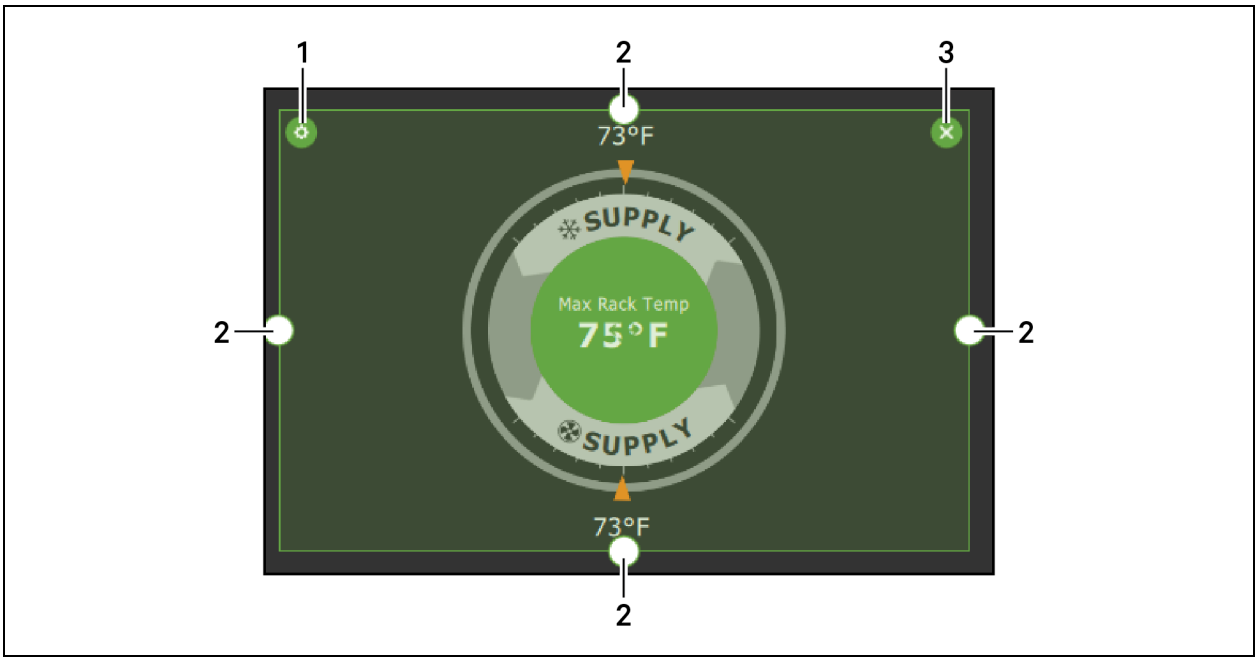
### 11.2.2 Resizing Content

You can resize content objects on the main display.

1. Touch 

, then  .
2. Touch  in the upper right corner of the display and just below the control header.
3. Touch an object to select it (highlighted green), touch and drag a handle to re-size the object, see Add/Remove Content Icons and Resizing Handles on the facing page .

**Figure 11.1 Add/Remove Content Icons and Resizing Handles**




| Item | Description |
|---|---|
| 1 | Content adjustment icon |
| 2 | Resizing handles |
| 3 | Remove content icon |

## 11.2.3 Adding and Adjusting Content

You can add a variety of content to the main display.

1. Touch  , then  .
2. Touch  in the upper right corner of the display and just below the control header, then touch  . A menu of content options opens, described in Main/User Display Content Options on the next page .
3. Touch the Move icon next to the content and drag it onto the display, the use the re-size handles to adjust as needed.
4. To adjust the content object or the way the it displays, touch  , see Add/Remove Content Icons and Resizing Handles above .

**Table 11.1 Main/User Display Content Options**

| Content | Description |
|---|---|
| Separator | Separating line to place between content sections. You can adjust the thickness and orientation of the separator. |
| Dial | Status dial. Select the sensor readings displayed in the center of the status dial when you touch to scroll through the readings. |
| Setpoint Readout | Displays the current reading of a connected sensor, for example: Return-temperature at 72°F. |
| Setpoint Bar | Displays a bar graph for a selected setpoint with customizable empty and full limits. For example, if a temperature setpoint bar is empty at 60°F and full at 80°F, and the reading is 70°, the graph will be filled half way. |
| Sensor Bar | For remote sensors only, functions the same as the setpoint bar, but only offers connected remote sensors, and displays the customer-assigned name of the sensor next to the graph. |
| Shortcut | Shortcut opens panels directly instead of browsing through menus. You can select the destination of the shortcut, whether or not an icon displays, and the size, label, and frame of the shortcut. |
| Alarms | Alarms panel. You can select whether or not the information may be exported. |
| Event Log | Event log panel. You can select whether or not the information may be exported. |
| Run Hours | Run hours panel. Summary of the component run hours and limits. |
| EconoPhase Diagram | Liebert® EconoPhase operating diagram. |
| EconoPhase Status | Compressor/econophase status bar. Indicates the operating mode and the percentage at which the component is operating. |

### 11.2.4 Removing Content

You can easily remove content from the main display.

1. Touch 

, then  .
2. Touch  in the upper right corner of the display and just below the control header.
3. Touch an object to select it (highlighted green), then touch  , see Add/Remove Content Icons and Resizing Handles on the previous page .

## 11.3 Customizing Parameter and Field Labels

You can customize header labels for parameters in the menus and you can customize field names.

**NOTE: You can export labels for back up or to use a text editor to customize the labels. See Exporting, Importing and Customizing Labels Using a Text Editor on page 100 .**

1. Before going to the customization panel, use the search box and on-screen keyboard to find the label(s) that you want to customize. Once you know where they are, you'll be able to find them in the categories on the Customize Labels panel.
2. Touch 

, then  > *Display Options* > *Custom Labels*. The CUSTOM LABELS panel opens. The labels are divided into categories that represent the names of menus, sub-menus, and screen panels.

3. Locate the category that contains the label(s) to customize that you determined in step 1, and touch to expand it.

4. In the Custom Text column, touch the text box to edit, make changes and touch  .
   See Figure 11.2 below, for an example of changing the column names for Property and Value (in the Analog Inputs panel) to Input and Configuration.
   - Touch *Cancel* to discard the change.

5. When finished editing labels, make sure the Enable Custom Labels is selected (or your updates will not display), and touch *Save*.
   The label(s) are updated. Figure 11.3 on the next page, shows the Analog Input Properties panel with the custom labels that replaced Property and Value.

**Figure 11.2 Custom Text for the Analog Input Properties Labels**

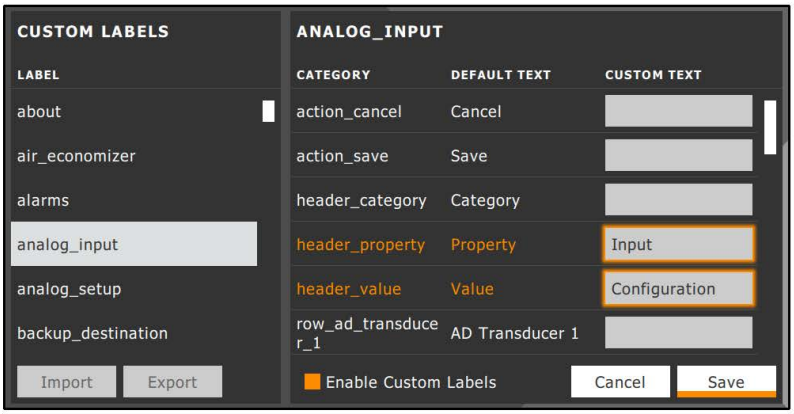
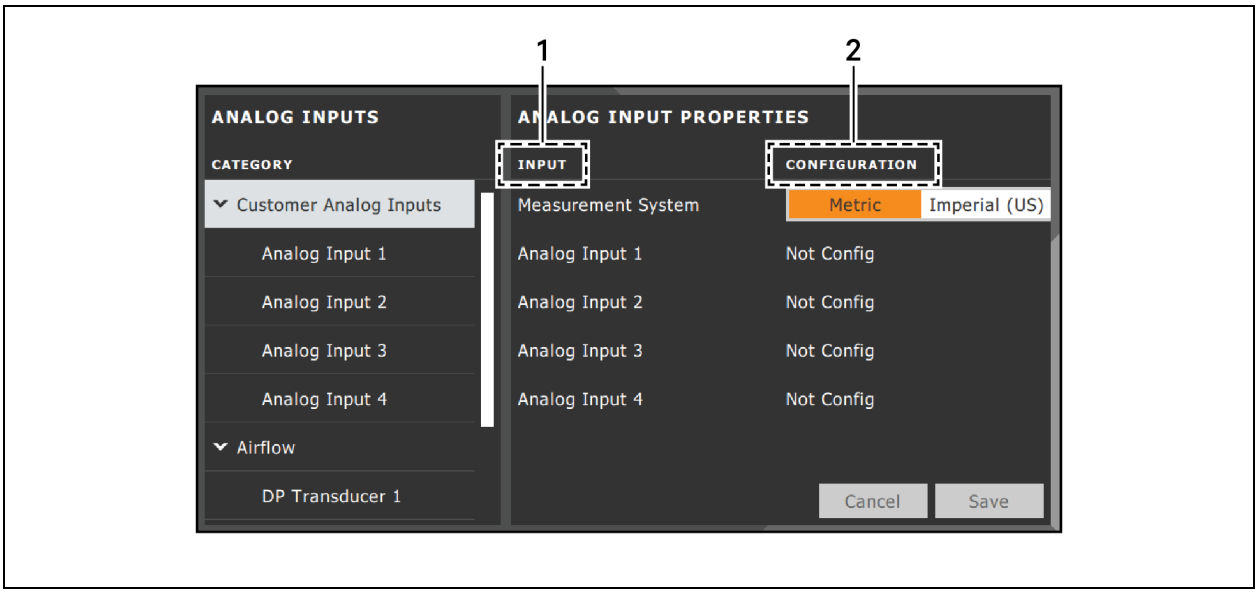


**Figure 11.3 Customized Label Text on Analog Input Properties Panel**




| Item | Description |
|---|---|
| 1 | Former Parameter heading is now Input. |
| 2 | Former Value heading is now donfiguration. |

## 11.3.1 Exporting, Importing and Customizing Labels Using a Text Editor

You can export custom label settings to a text file for back up or to modify the labels using a text editor. The text file is exported and imported using a USB drive.

1. Insert a USB drive into an open USB port on the rear of the touchscreen display, then navigate to the Custom Labels panel and touch *Export*. The EXPORT FILE dialog opens, and the connected USB drive is automatically detected.
   - If you are prompted No USB devices are available, check the connection or try reinserting the drive.
2. Touch *Name* and type a descriptive name for the file, then touch *Go*.
3. Touch *Export* and wait at least 15 seconds, then you can remove the USB drive.
4. Insert the USB drive into a PC or laptop and locate the file, which is named with the Name you entered and the extension cl.txt. For example, if you named your export MyLabels, the file will be MyLabels.cl.txt.

5. Open the file in a text editor. The file contains all of the labels available for customization listed with the menu/panel on which the label is located, the label identifier, and an equal sign (=) as shown in the following example:

**NOTE: You must use an editor that interprets Linux line endings, otherwise all of the lines will run together. For example, Microsoft WordPad will interpret the Linux line endings but Microsoft Notepad will not.**

```
analog_input/row_customer_analog_inputs=Unit A Inputs
analog_input_properties/header_property=Property
analog_input_properties/header_value=Value
```

6. To customize, type a new label name to the right of =, and save the text file.
   The following example will result in the same custom labels shown in Figure 11.3 on the previous page .

```
analog_input/row_customer_analog_inputs=Unit A Inputs
analog_input_properties/header_property=Input
analog_input_properties/header_value=Configuration
```

7. Remove the USB drive with the updated/saved text file from the PC/laptop, insert it into an open USB port on the rear of the touchscreen display, then navigate to the Custom Labels panel and touch *Import*.
8. Locate the updated text file in the drop-down list, and touch *Import*.
   The dialog closes and the customizations display on the menus and panels that you updated.

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# 12 Vertiv™ Liebert® iCOM™ Hardware Installation

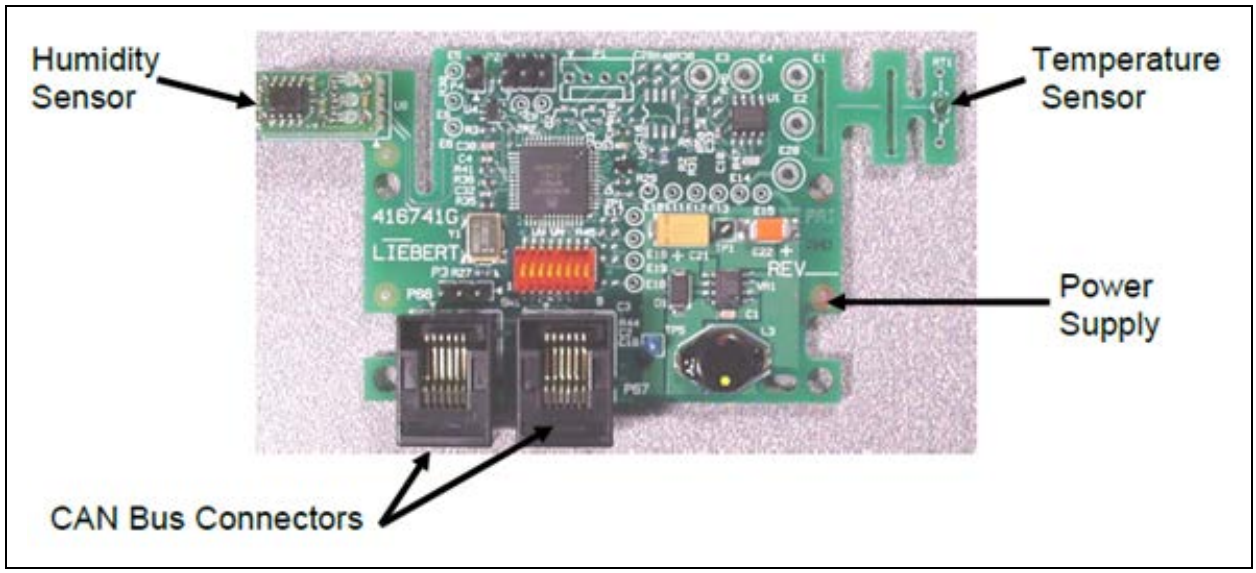
Your unit includes the Liebert® iCOM™ controller. This section describes the installation of connections and cabling to fully utilize the Liebert® iCOM™ features.

## 12.1 Return Air Temperature/Humidity Sensor

The return temperature/humidity sensor is located in the unit return air section and is supplied on all Liebert systems with Vertiv™ Liebert® iCOM™ controls. The assembly connects to plug connection P67 on the Liebert® iCOM™ internal control board on all Vertiv™ Liebert® CRV systems.

Troubleshooting is accomplished by observing a green LED located on the sensor internal control board. If the LED is solid green, the sensor is communicating properly with the Liebert® iCOM™ controller. If the LED is continuously flashing green, the sensor is not communicating properly and the P3 CANbus termination should be verified that it is properly terminated. No LED indicates the sensor does not have power present.

**Figure 12.1 Temperature/Humidity Sensor Internal Control Board**




### 12.1.1 P67: Return Air Temperature—Humidity Board

P67-1: CAN communication

P67-6: CAN communication

**Figure 12.2 Standard Return Air Sensor**

**Figure 12.3 Optional Remote Sensor A, B, C**

**Figure 12.4 Temperature/Humidity Sensor with Dip Switch/Jumper Settings**

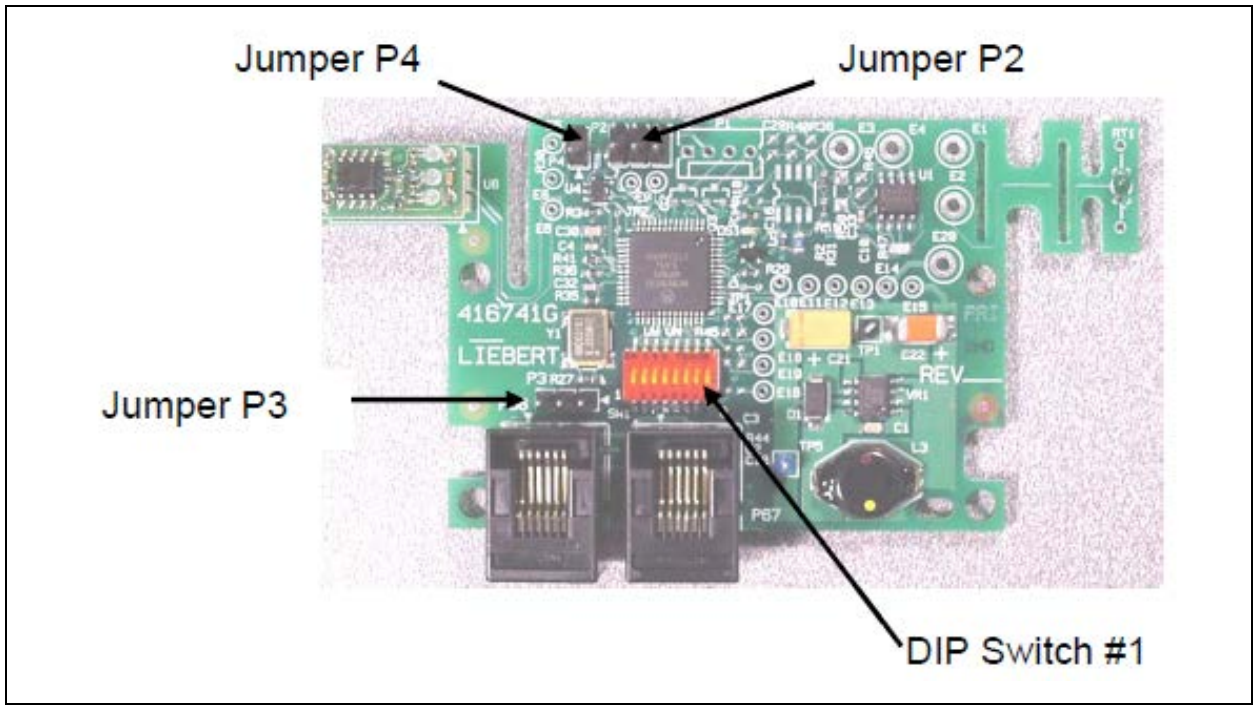



**Table 12.1 Temperature/Humidity Sensor Dip Switch Settings**

| Sensor | Pos. #1 | Pos. #2 | Pos. #3 | Pos. #4 | Pos. #5 | Pos. #6 | Pos. #7 | Pos. #8 |
|---|---|---|---|---|---|---|---|---|
| Return T/H Sensor | Off | Off | Off | Off | Off | Off | Off | Off |
| Optional Sensor A | On | Off | Off | Off | On | Off | Off | Off |
| Optional Sensor B | Off | On | Off | Off | On | Off | Off | Off |
| Optional Sensor C | On | On | Off | Off | On | Off | Off | Off |

**Table 12.2 Temperature/Humidity Sensor Jumper Settings**

| Jumper Label | Type | Position |
|---|---|---|
| P2 | BDM Header | *Open |
| P3 | CANbus Termination | *Shunt on Pins 2 and 3 |
| P4 | Programming | *Open |
| E10-E13 | Serial Port | *Open |
| *Factory default positions and settings. | | |

### 12.1.2 Jumper P3 CANbus Termination

The correct position of this jumper is dependent on your system configuration. If the sensor is physically the first or last node in the CANbus device loop, the jumper must be terminated or shunted across pins #2 and #3 (default position). If the sensor is a middle node in the CANbus device loop, the jumper must be unterminated or shunted across pins #1 and #2.

## 12.2 Installing Wired Remote Sensors

Up to 10 remote sensor modules, installed in the monitored racks and connected to the cooling unit, provide control and reference input to Vertiv™ Liebert® iCOM™ and building management systems. Using remote, rack sensors combats cooling problems related to recirculation air, uneven rack loading, and air distribution.

Each Liebert® iCOM comes with three 2T sensors standard. Although using and adding additional remote sensors is optional, we recommend attaching one remote sensor to each rack that the unit is intended to cool because they allow more efficient and effective operation of the cooling unit.

The sensor array consists of 2T sensors that each have two temperature probes on a 6 ft. (1.8 m) probe connection cable, Figure 12.5 below , and requires several steps to prepare, connect, and begin monitoring the racks:

- Set DIP switches in each sensor.
- Terminate final sensor on CANbus link.
- Install sensors on racks.
- Install CANbus cabling between sensors.
- Connect CANbus cable to the cooling unit.
- Configure the sensors in Liebert® iCOM™.

**NOTE: The 2T sensor shown in Figure 12.5 below , may differ slightly for your system, depending on equipment installed.**

**Figure 12.5 2T Sensor for Rack Monitoring**

### 12.2.1 Setting DIP Switches and Labeling 2T Sensors

Tools required:

- Small, non-conductive tool to set switches.
- Small, Phillips-head screw driver to open 2T housing.

Each sensor requires a unique address in the CANbus loop connected to the cooling unit. We recommend that you set the DIP switch sensor number setting to correspond to the sensor's location on the CANbus run. If settings are incorrect, the control will not operate properly.

The DIP switches in 2T sensors included with each Liebert® iCOM™ are factory-set according to Table 12.3 below . If adding additional 2T sensors, use the steps that follow to set the DIP switches.

**Table 12.3 DIP Switch Settings for Factory-Supplied Rack Sensors**

| 2T Sensor Number/Address | DIP Switch position | | | | | | | | Factory Termination Setting |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| 1 | Off | Off | On | Off | On | Off | Off | Off | Unterminated |
| 2 | On | Off | On | Off | On | Off | Off | Off | Unterminated |
| 3 | Off | On | On | Off | On | Off | Off | Off | Terminated |

**NOTE: Sensors are connected in a daisy chain via CANbus cabling to the cooling unit control board. You can extend the sensor network (up to 10) by adding sensors to the end of the chain and adjusting the termination settings. Do not run individual wires from the sensors to the cooling unit.**

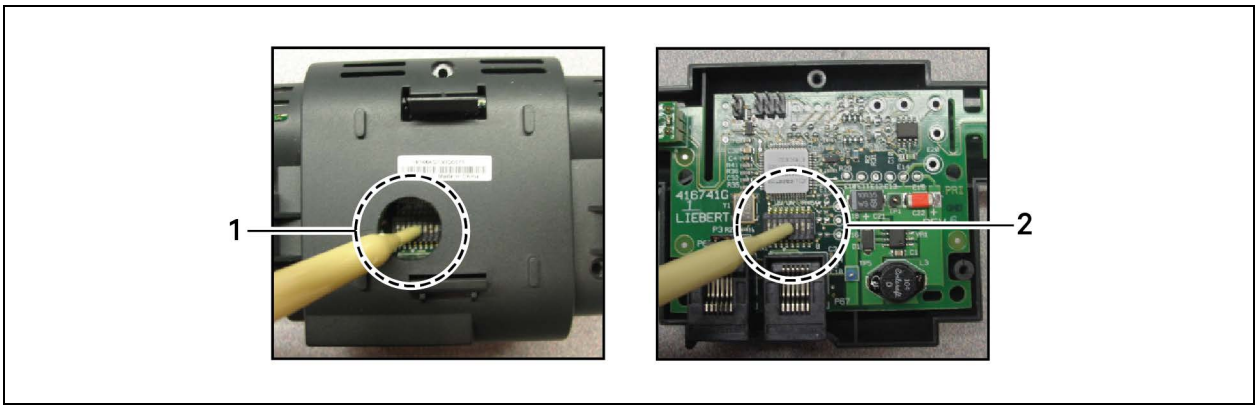
1. Apply numbered stickers to the sensor housing that corresponds to the sensor's position in the chain.
2. Locate the DIP-switch hole on the rear of the sensor housing, Figure 12.6 below .

   – or –

   If the hole is not present, or the settings are difficult to make through the hole, remove the cover by removing the Phillips-head screws (typically 3). See Figure 12.6 below .

**NOTE: Use the non-conductive DIP-switch tool (included) or a similar tool to set switches. Do not insert any metal object into the sensor case.**

**Figure 12.6 DIP Switch Opening/DIP Switches Inside of 2T Sensor**




| Item | Description |
|---|---|
| 1 | Hole in sensor housing |
| 2 | Cover removed |

3. Referring to Table 12.4 below , and using the non-conductive tool, set the DIP switches for each sensor to its number in the chain (from sticker applied in step 1 ).
   Figure 12.7 below , shows a representation of the DIP switches.
4. Confirm that the DIP switches are set correctly for each sensor, and replace the housing cover if necessary.

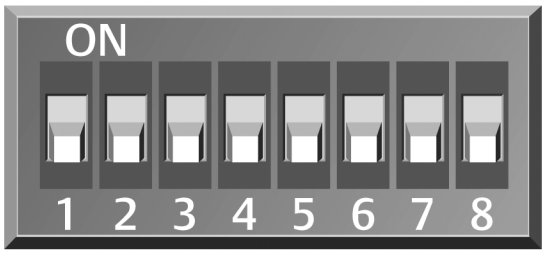
**Table 12.4 DIP Switch Settings for Wired Remote Sensors**

| 2T sensor number/address | DIP-switch position | | | | | | | | Factory Setting |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| Factory-supplied sensors | | | | | | | | | |
| 1 | Off | Off | On | Off | On | Off | Off | Off | Unterminated |
| 2 | On | Off | On | Off | On | Off | Off | Off | Unterminated |
| 3 | Off | On | On | Off | On | Off | Off | Off | Terminated |
| Optional added sensors | | | | | | | | | |
| 4 | On | On | On | Off | On | Off | Off | Off | Unterminated |
| 5 | Off | Off | Off | On | On | Off | Off | Off | Unterminated |
| 6 | On | Off | Off | On | On | Off | Off | Off | Unterminated |
| 7 | Off | On | Off | On | On | Off | Off | Off | Unterminated |
| 8 | On | On | Off | On | On | Off | Off | Off | Unterminated |
| 9 | Off | Off | On | On | On | Off | Off | Off | Unterminated |
| 10 | On | Off | On | On | On | Off | Off | Off | Unterminated |

The last 2T sensor in the array must be terminated. If more than the 3 factory-supplied sensors are installed, sensor #3 must be unterminated and the last sensor must be terminated.

**NOTE: Up is on, down is off on the DIP switch.**

**Figure 12.7 DIP Switches in 2T Sensor**

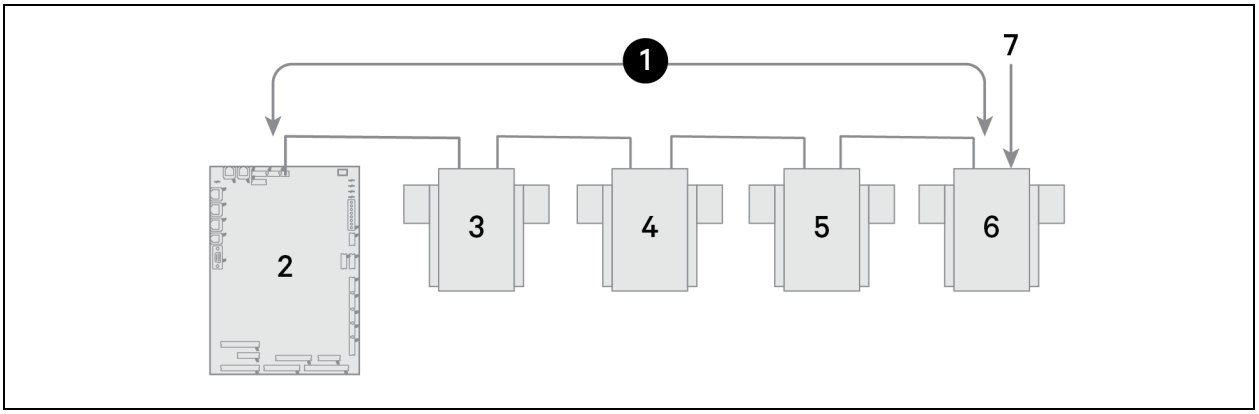


### 12.2.2 Terminating the Last Sensor on the CANbus Link

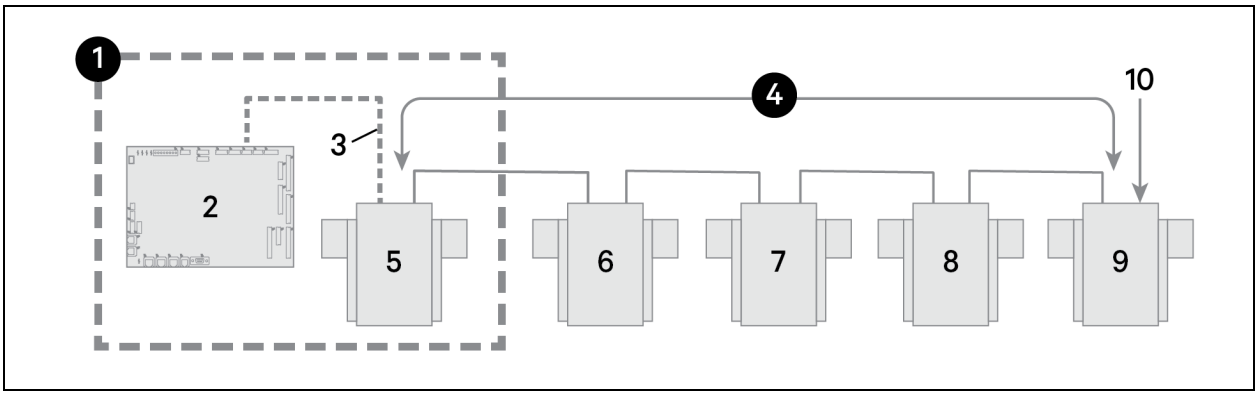
The 2T sensor need not be installed in the numeric order of their address/sensor number (although it may be easier for later maintenance). However, the last sensor in the chain must be terminated. All others must remain unterminated. We also recommend that you make a record of the sensor numbers along with the name/number of the rack on which they are installed. Figure 12.8 below , shows an example CANbus arrangement.

**NOTE: To add sensors, unterminate final sensor, add sensors to the chain, and terminate the new final sensor.**

**Figure 12.8 Example Sensor CANbus Arrangement**




| Item | Description |
|---|---|
| 1 | CANbus communication loop |
| 2 | Liebert® iCOM™ control board |
| 3 | 2T sensor |
| 4 | 2T sensor |
| 5 | 2T sensor |
| 6 | 2T sensor |
| 7 | Terminated sensor |



| Item | Description |
|---|---|
| 1 | Inside the Liebert®iCOM™ unit |
| 2 | Liebert® iCOM™ control board |
| 3 | Factory wiring |
| 4 | CANbus communication loop |
| 5 | Unit temperature/humidity sensor |
| 6 | 2T sensor |
| 7 | 2T sensor |
| 8 | 2T sensor |
| 9 | 2T sensor |
| 10 | Terminated sensor |

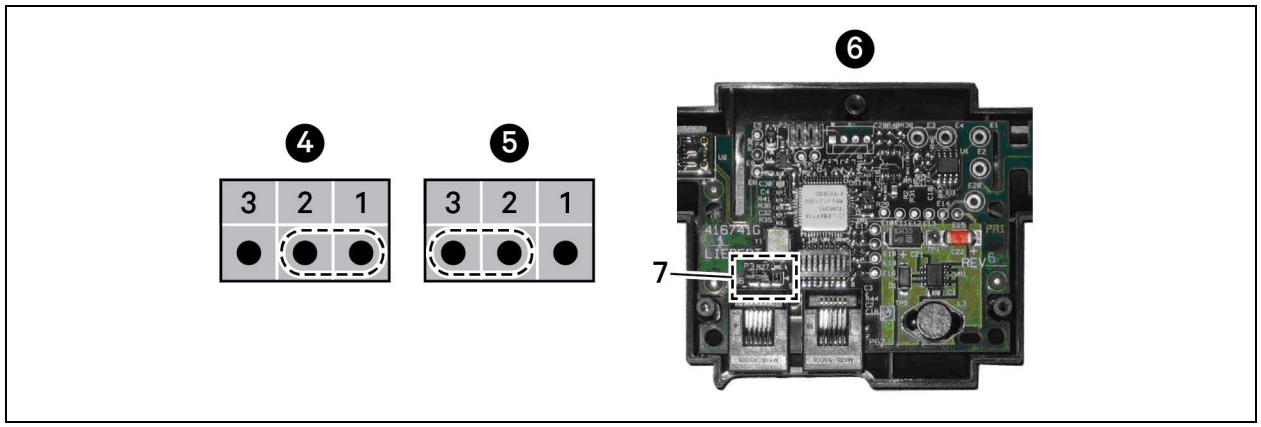
To terminate the last sensor:

1. Locate the sensor that will be last on the network.

**NOTE: The last sensor on the network will be the sensor with only one CAN cable after all sensors are connected to the CANbus network. See Connect the CANbus Cable and Ground on page 119 .**

2. Open the sensor's case by removing the Phillips head screws (typically 3) on the rear of the housing to access the jumper used for terminating.
3. Remove the black jumper from pins 1 and 2 on the P3 pin connector, and install it on pins 2 and 3 as shown in Figure 12.9 on the facing page .
4. Replace the sensor cover. The 2T sensor is terminated in the CANbus link.

**Figure 12.9 Termination Jumper on 2T Circuit Board**




| Item | Description |
|---|---|
| 1 | Position 1 (P3 jumper) |
| 2 | Position 2 (P3 jumper) |
| 3 | Position 3 (P3 jumper) |
| 4 | Unterminated |
| 5 | Terminated |
| 6 | Rear of sensor, cover removed |
| 7 | P3 termination jumper |

### 12.2.3 Routing CANbus Cable and Preparing for Sensor Installation

Depending on the Vertiv™ Liebert® iCOM™ model number, the CANbus cables may enter the cooling unit from differing locations to connect to the return air temperature sensor.

- For 300 mm (24 in.): CR019 and CR032 models, the CANbus cable may enter through the top or bottom. See Preparing for Sensor Cabling of Vertiv™ Liebert® CRV 300 mm (12 in.) Units—CR019 and CR032 on the next page .
- For 600 mm (12 in.): CR020, CR035, and CR040 models, the CANbus cable enters through the top of the unit. See Preparing for Sensor Cabling of Vertiv™ Liebert® CRV 600 mm (24 in.) units—CR020, CR035 and CR040 on page 114 .

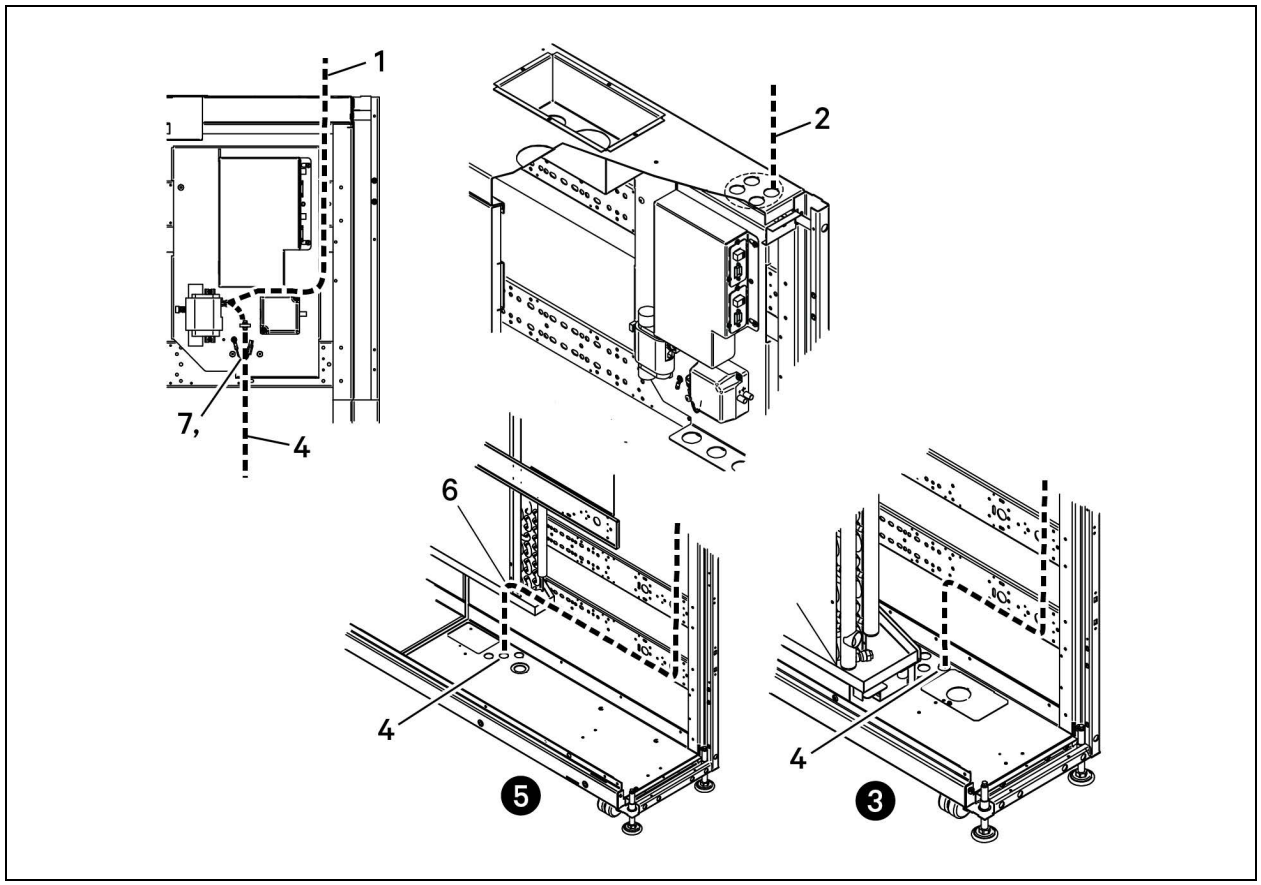
**NOTE: Connecting the CANbus sensors requires entering the high voltage electrical compartment in the unit. Consider hiring a certified electrician.**

## Preparing for Sensor Cabling of Vertiv™ Liebert® CRV 300 mm (12 in.) Units—CR019 and CR032

**WARNING! Risk of electric shock. Can cause equipment damage, injury or death. Open all local and remote electric power supply disconnect switches and verify with a voltmeter that power is off before working within any electric connection enclosures. Service and maintenance work must be performed only by properly trained and qualified personnel and in accordance with applicable regulations and manufacturers' specifications. Opening or removing the covers to any equipment may expose personnel to lethal voltages within the unit even when it is apparently not operating and the input wiring is disconnected from the electrical source.**

1. Verify that all power entering the unit is disconnected.
2. Open the rear door on the back of the unit and remove the filters to access the unit disconnect switch.
3. Turn the high voltage disconnect switch to Off.
4. Locate the 10 ft. (3 m) CANbus cable that shipped with the 2T sensors in the box on the unit skid.
5. Determine whether routing through top or bottom of unit, and locate low-voltage field wiring entry points, shown in CANbus Wire Routing for Vertiv™ Liebert® CRV 300 mm (12 in.) Units—CR019 and CR032 on the facing page .
   - Route the cable through the low-voltage-access, 7/8 in. knockout using the proper strain relief.
   - Once inserted through knockout, route the cable to the Vertiv™ Liebert® IntelliSlot bracket inside the unit.

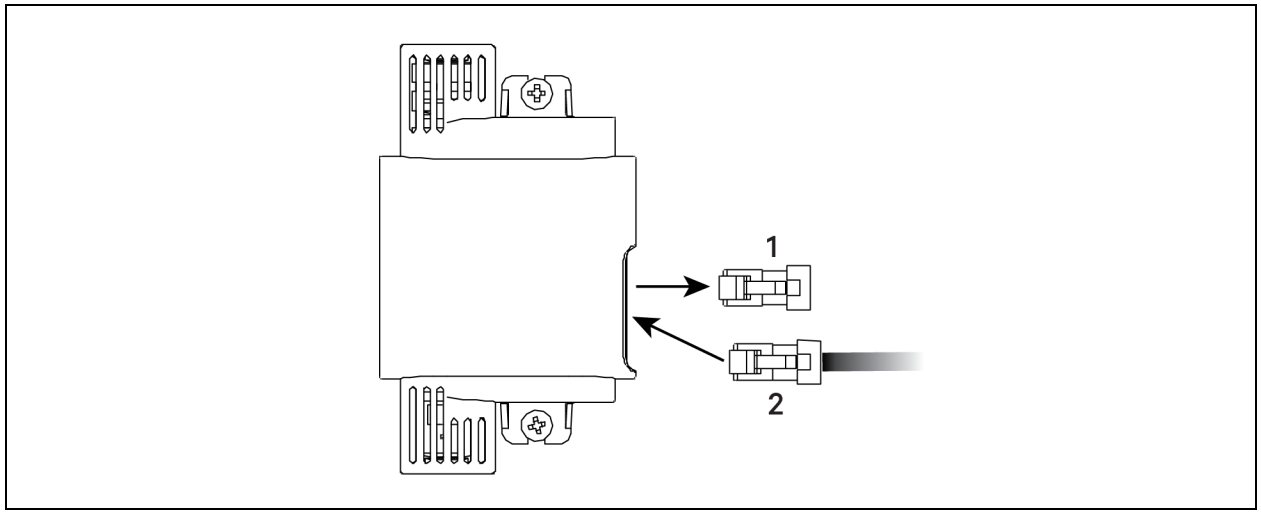
**Figure 12.10 CANbus Wire Routing for Vertiv™ Liebert® CRV 300 mm (12 in.) Units—CR019 and CR032**




| Item | Description |
|---|---|
| 1 | Top-entry field routing of CANbus wiring |
| 2 | Top-entry field routing of low-voltage wiring |
| 3 | Liebert® CW unit |
| 4 | Bottom-entry field routing of low-voltage and CANbus |
| 5 | Liebert® DX unit |
| 6 | CANbus and low-voltage wiring route in Liebert® DX unit |
| 7 | Ground connector (factory installed) |

6. Remove the termination plug from the temperature sensor (which is installed on the Vertiv™ Liebert® IntelliSlot bracket), and discard the plug, and connect the cable to the open CANbus port, Figure 12.11 below .
7. Connect the CANbus ground to the factory-supplied ground connector.

**Figure 12.11 Remove Termination Plug and Insert CAN Cable**



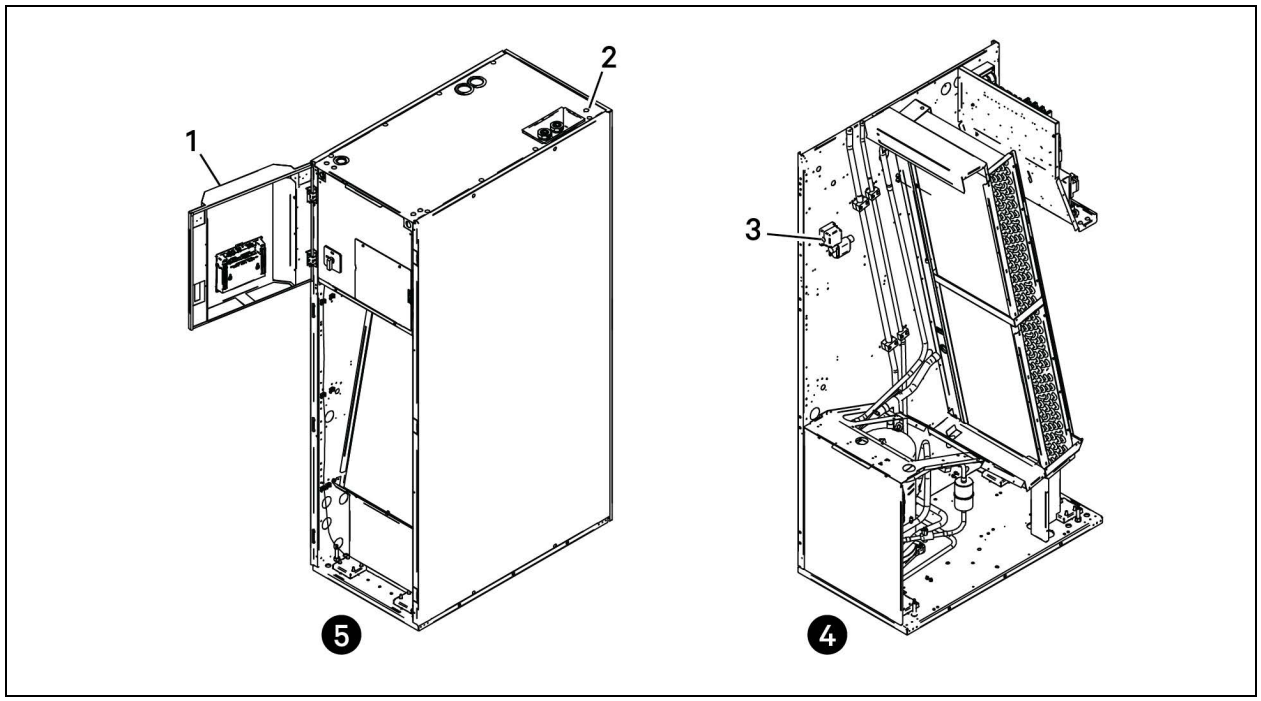

| Item | Description |
|---|---|
| 1 | Termination plug |
| 2 | CAN cable |

## Preparing for Sensor Cabling of Vertiv™ Liebert® CRV 600 mm (24 in.) units—CR020, CR035 and CR040

**WARNING! Risk of electric shock. Can cause equipment damage, injury or death. Open all local and remote electric power supply disconnect switches and verify with a voltmeter that power is off before working within any electric connection enclosures. Service and maintenance work must be performed only by properly trained and qualified personnel and in accordance with applicable regulations and manufacturers' specifications. Opening or removing the covers to any equipment may expose personnel to lethal voltages within the unit even when it is apparently not operating and the input wiring is disconnected from the electrical source.**

1. Verify that all power entering the unit is disconnected.
2. Open the top, display door on the front of the unit, Figure 12.12 on the facing page .
3. Turn the high voltage disconnect switch to off.
4. Locate the 10 ft. (3 m) CANbus cable that shipped with the 2T sensors in the box on the unit skid.
5. At the top of the cabinet, route the cable through the 7/8 in. knockout using the proper strain relief, then route the cable to the return air temperature sensor inside the unit, Figure 12.12 on the facing page .

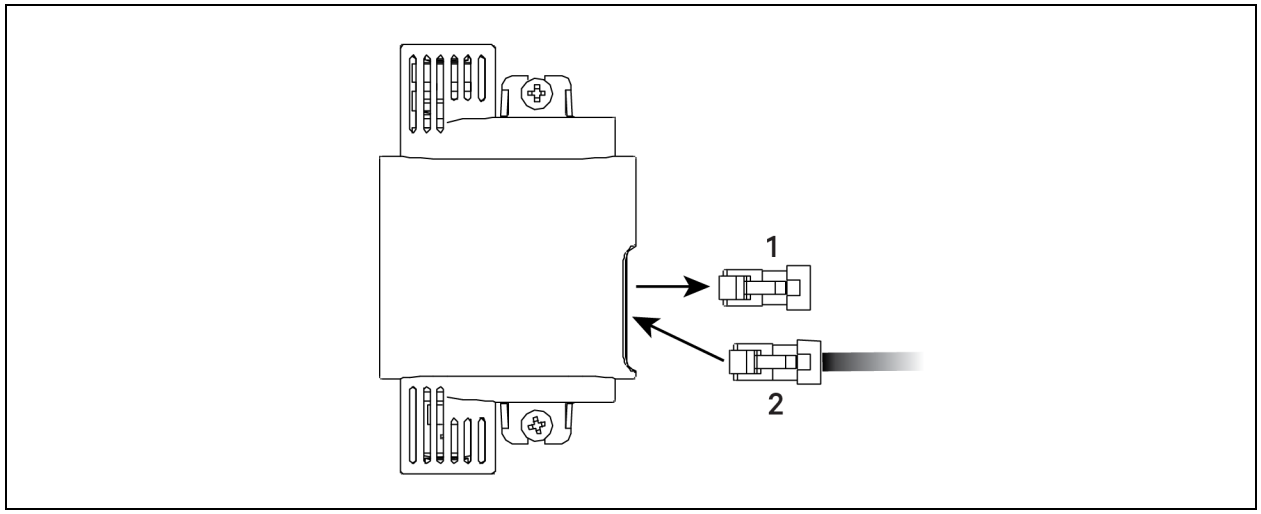
**Figure 12.12 CANbus Top Entry Wiring for Vertiv™ Liebert® CRV 600 mm (24 in.) units—CR020, CR035, and CR040**




| Item | Description |
|---|---|
| 1 | Top/Display door |
| 2 | Cable-connection top entry |
| 3 | Temperature sensor |
| 4 | Rear view |
| 5 | Front view |

6. Remove the termination plug from the temperature sensor, and discard the plug, and connect the cable to the open CANbus port, Figure 12.13 below .
7. Connect the CANbus ground to the factory-supplied ground connector.

**Figure 12.13 Remove Termination Plug and Insert CAN Cable**




| Item | Description |
|---|---|
| 1 | Termination plug |
| 2 | CAN cable |

## 12.2.4 Installing 2T Sensors in the Racks to Monitor

Tools required:

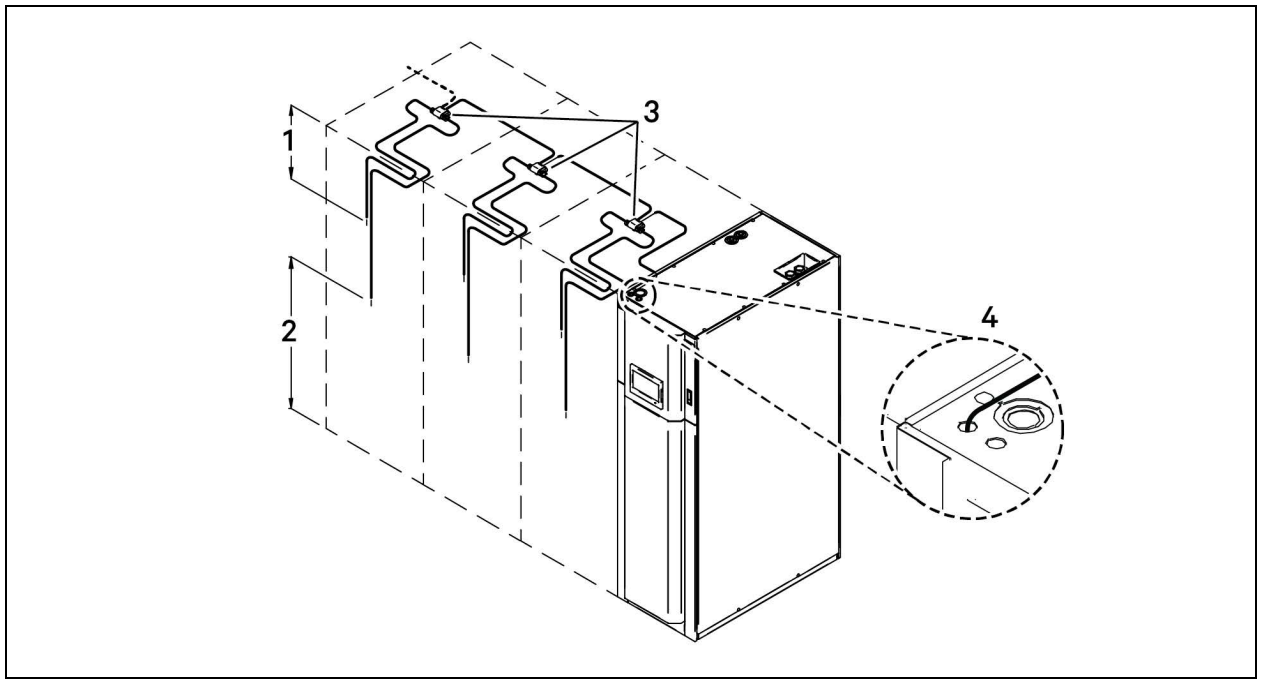
- Medium, flat head screw driver to open electric panel dead front
- Cutting tool to trim cable ties

To install the sensors on the racks:

**NOTE: Do not leave sensor probes coiled on top or coiled inside of a rack. Do not install a sensor in the hot aisle, or if a sensor is installed in the hot aisle, make sure that it is set to "reference" to ensure that its readings are not used for fan or cooling control.**

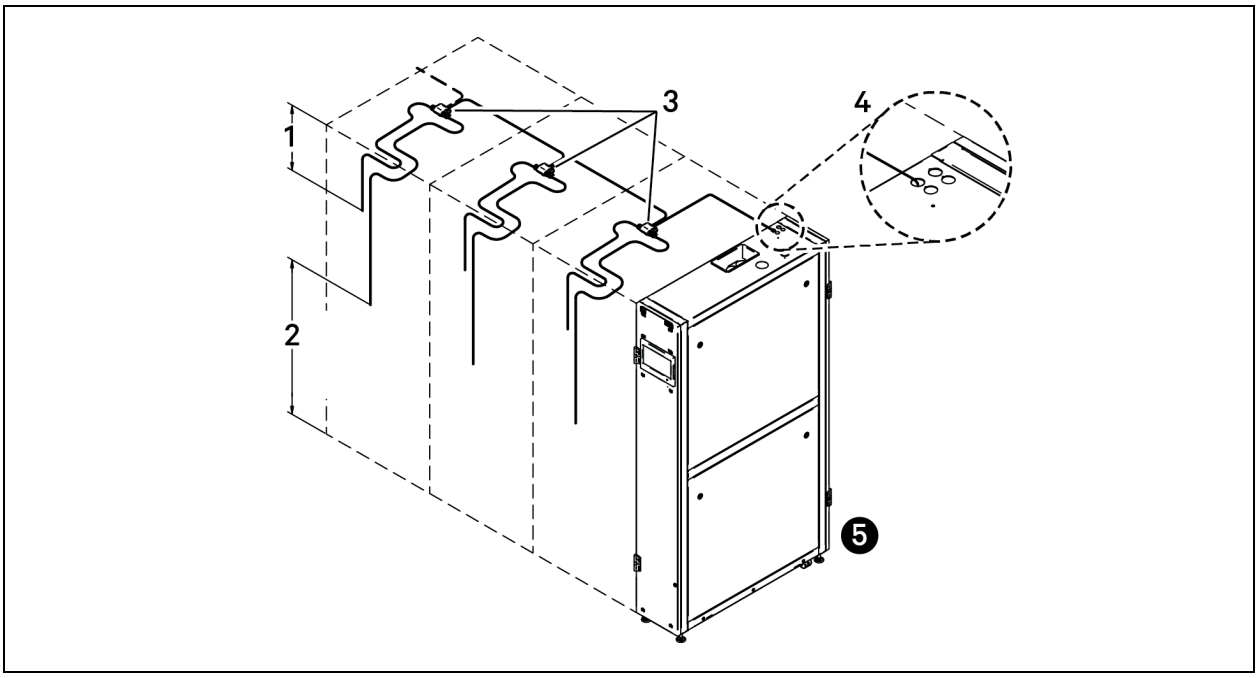
1. Install the rack temperature sensors on the rack adjacent to the Vertiv™ Liebert® CRV as shown in Figure 12.14 below or Figure 12.15 on the next page .

**Figure 12.14 Rack Sensor Placement for 600 mm (24 in.) Models**




| Item | Description |
|---|---|
| 1 | First probe, 12 in. (305 mm) from top |
| 2 | Second probe, in approximate center of rack and in front of the equipment |
| 3 | 2T sensors with labels visible |
| 4 | Cable-connection top entry point<br>(use a field-supplied and field-installed protective bushing) |

**Figure 12.15 Rack Sensor Placement for 300 mm (12 in.) models**




| Item | Description |
|---|---|
| 1 | First probe, 12 in. (305 mm) from top |
| 2 | Second probe, in approximate center of rack and in front of the equipment |
| 3 | 2T sensors with labels visible |
| 4 | Cable-connection top entry point.<br>Use a field-supplied and field-installed protective bushing. |
| 5 | Cable-connect bottom entry, refer to Preparing for Sensor Cabling of Vertiv™ Liebert® CRV 600 mm (24 in.) units—CR020, CR035 and CR040 on page 114 , and use a field-supplied and field-installed protective bushing. |

**NOTE: Both probes on the 2T sensor must be installed on the same rack.**

2. Install the 2T sensor probes the front door of the rack (inside or outside the door):
    a. Using a cable tie, secure the sensor wire so that a probe is approximately 12 in. (305 mm) from the top and in the center of the front door.
    This sensor monitors hot air coming over the top of the rack from the hot aisle.

**NOTE: Do not wrap cable ties around the actual sensor probe. If the rack has no door, secure the probes to the rack at the side of the front opening.**

    b. Use a cable tie to secure the sensor wire of the second probe to the front door so that it is centered in front of the heat-generating equipment drawing air.

    If the cabinet is completely filled with equipment, determine the center based on cabinet width and height.

    c. With probes in place, use cable ties to route the wires neatly up the rack door and into the rack leaving enough slack in the wire so that the rack door opens and closes without binding or pinching the wire.
    d. Using the supplied, hook and loop fastener, connect the 2T sensor housing to the rack in an easily accessible location and with the sensor number visible.
3. Repeat step 2 until all sensors are installed.

### 12.2.5 Connect the CANbus Cable and Ground

**WARNING! Risk of electric shock. Can cause equipment damage, injury or death. Open all local and remote electric power supply disconnect switches and verify with a voltmeter that power is off before working within any electric connection enclosures. Service and maintenance work must be performed only by properly trained and qualified personnel and in accordance with applicable regulations and manufacturers' specifications. Opening or removing the covers to any equipment may expose personnel to lethal voltages within the unit even when it is apparently not operating and the input wiring is disconnected from the electrical source.**

Cabling considerations:

- For cable up to 150 ft. (45 m) long, no special considerations are needed.
- Cable 150 ft. (45 m) and higher, please consult the factory.
- The CANbus cable network requires a ground wire.

**To connect the cables:**

1. Connect CANbus cable and a ground wire between each sensor for the cooling unit, Figure 12.16 below , taking the following precautions:

**NOTE: Remember that the last sensor on the chain must be terminated as described in Terminating the Last Sensor on the CANbus Link on page 109 .**

- Use only approved hangers, and do not secure cables in a way that could damage them.
- Limit bends to less than four times the diameter of the cable.
- When securing and hanging, avoid deforming the cable.
- Keep cables away from devices that may cause interference such as high voltage wires, machinery, fluorescent lights and electronics.

**NOTE: High voltage sources much be at least 12 in. (305 mm) from CAN wires.**

- Avoid stretching cables.
- Avoid using excess cable between sensors.
- Make sure that cables have the correct pin-out. Mismatched pins at the RJ2 connection will damage the CAN device.

2. Connect the ground connection between each sensor, Figure 12.16 below .

**Figure 12.16 CANbus and Ground Connection on 2T Sensor**

# 12.3 Installing the U2U Network

## 12.3.1 Required Network Equipment

Ethernet cable CAT5 or greater.

- Maximum cable length is 328 ft (100 m).
- An Ethernet repeater is required for cable lengths greater than 328 ft (100 m).

Network switch

- IEEE 802.3; IEEE 802.3u
- 10/100 Mbps speed
- Multiple 10/100 RJ 45 ports, one shared.
- RJ 45 up link port

**NOTE: Up to 32 cooling units may be connected in a U2U network.**

## 12.3.2 Planning Wiring Runs

When planning the layout of the conditioned space, consider the following:

- Good wiring practices.
- An Ethernet repeater is required for cable lengths greater than 328 ft. (100 m).
- A private network that only connects and manages the cooling units is required.
- Keep control and communication cables away from power cables to prevent electromagnetic interference.
- Keep cables away from noise introducing device such as machines, fluorescent lights, and electronics.
- Do not bend cables to less than four times the diameter of the diameter of the cable.
- Do not deform cables when hanging or securing in bundles.
- Do not exceed 25 lb. (11 kg) of tension when pulling cables to avoid stretching.
- Do not damage cables when securing them. Use only approved hangers, such as telephone wire/RG 6 coaxialwire hangers.

## 12.3.3 U2U Wiring Connections

**NOTICE**

Cooling units are factory wired for stand alone operation. Do not connect the U2U network cabling before setting the U2U network configuration/groups. Network communication conflicts and unreliable display readings will result.

Before you begin, refer to Preparing for U2U Group Set Up on page 59 , and Configuring U2U Network Settings on page 60 .

– or –

Contact Vertiv Technical Support at 1-800-543-2778 or https://www.Vertiv.com/en-us/support/.

### U2U Network Requirements

The network must be private.

- Isolate from other network traffic.
- Switches connecting the units must be dedicated to Vertiv™ Liebert® iCOM™ communication only.
- Do not connect the U2U network to the building or IT network. If the U2U network experiences a failure, the cooling units continue to operate independently.

Liebert® iCOM™ supports up to 64 nodes on the U2U network. The following are considered nodes:

- Input/output board (one in each cooling unit)
- Large wall mount display

Small touchscreen displays on the cooling unit are not considered nodes because they are directly connected to the input/output board in the unit, not the network.

Of the 64 nodes, up to 32 may be cooling unit input/output boards connected as a group. Table 12.5 below , provides U2U network configuration examples.

**Table 12.5 Example Liebert® iCOM™ U2U Network Configurations**

| Configuration Example | No. of Input/Output Boards (Cooling Units) | No. of Wall Mount Displays | Private Switch Required? |
|---|---|---|---|
| A | 2 | 0 | No |
| B | 2 | 1 | Yes |
| C | 3 | 0 | Yes |
| D | 8 | 1 | Yes |
| E | 32 | 5 | Yes |
| F | 32 | 32 | Yes |

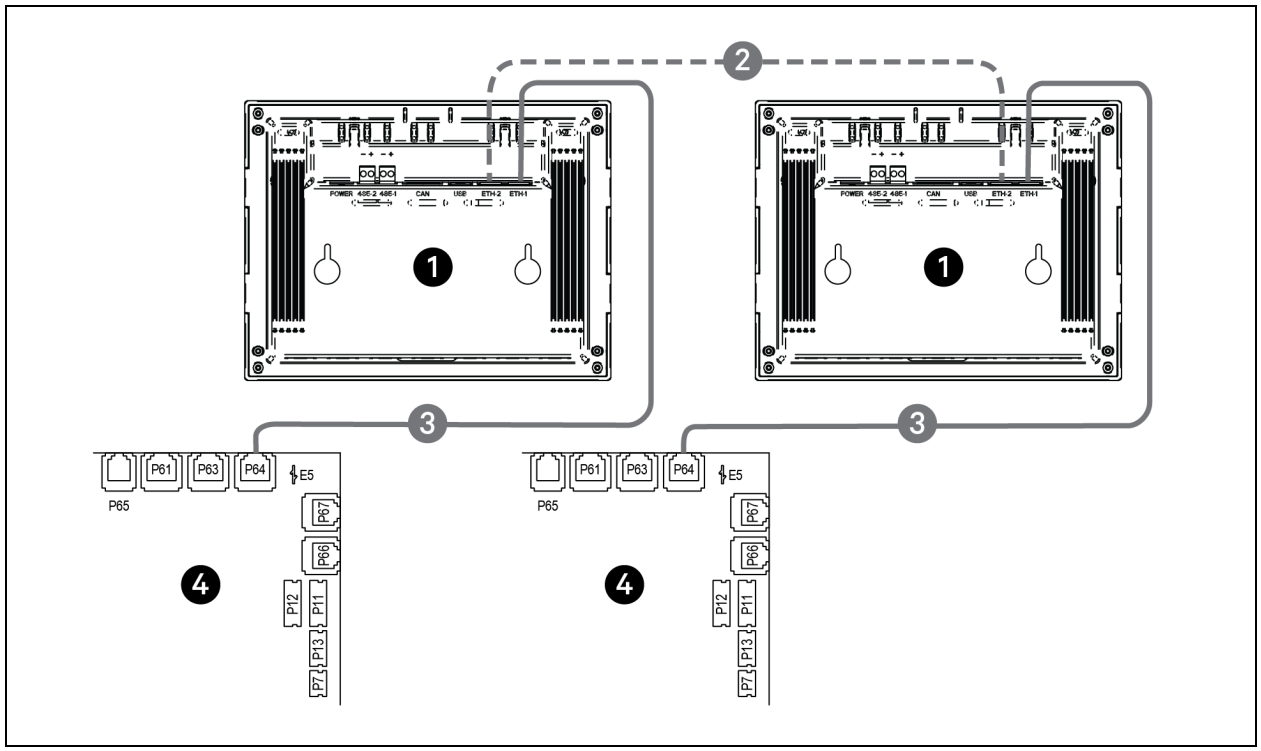
## 12.3.4 Wiring Cooling Units without Wall Mount Displays

**NOTE: Cooling units are factory wired for stand alone operation. Do not connect the U2U network cabling before setting the U2U network configuration/groups. Network communication conflicts and unreliable display readings will result.**

**NOTE: Before you begin, refer to Preparing for U2U Group Set Up on page 59 , and Configuring U2U Network Settings on page 60 .**

- Connect a crossover CAT5 cable to the ETH-2 connector on the rear of each display as shown in Figure 12.17 below .

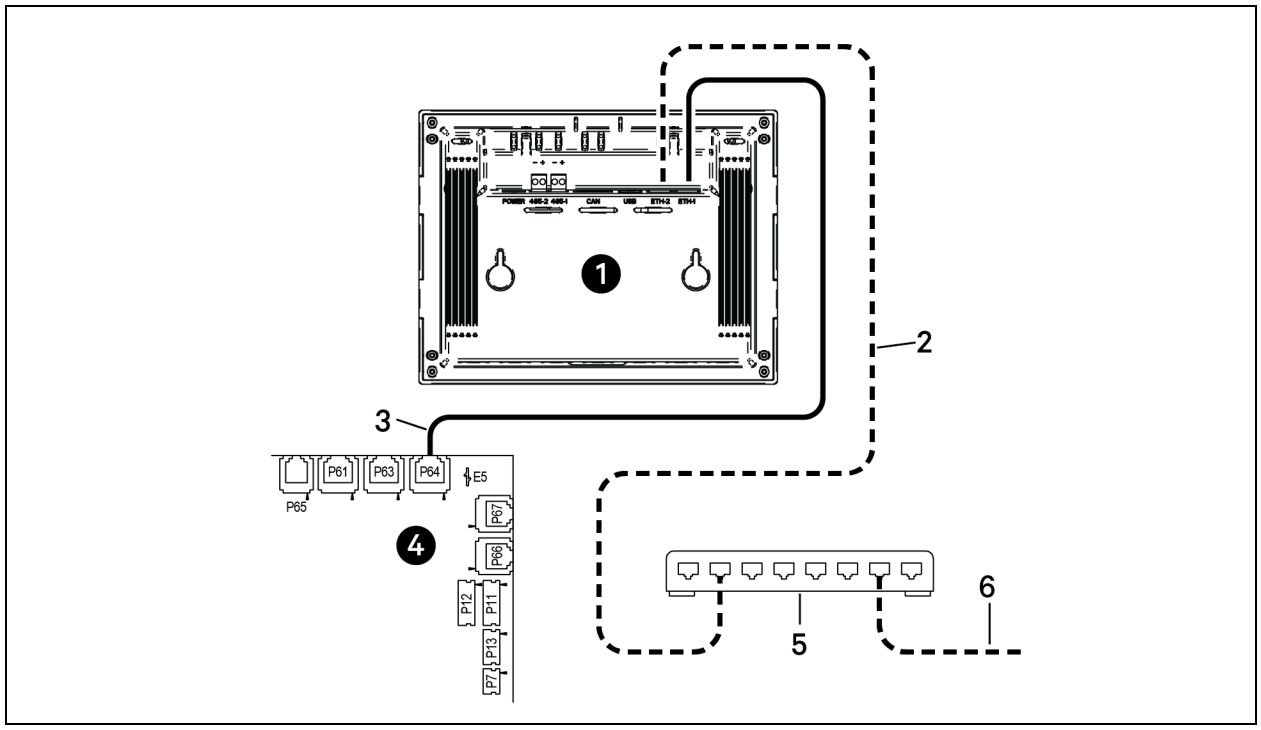
**Figure 12.17 Connection Between Only Two Cooling Units, No Network Switch Needed**




| Item | Description |
|---|---|
| 1 | Touchscreen (rear view) |
| 2 | Ethernet cable (field supplied) |
| 3 | Ethernet cable (factory supplied) |
| 4 | Liebert® iCOM™ I/O board |

- On each unit, connect one plug on the CAT5 cable to ETH-2 on the rear of the display, and the other to the network switch, see Figure 12.18 below .

**Figure 12.18 Connecting Two or More Units with a Network Switch**

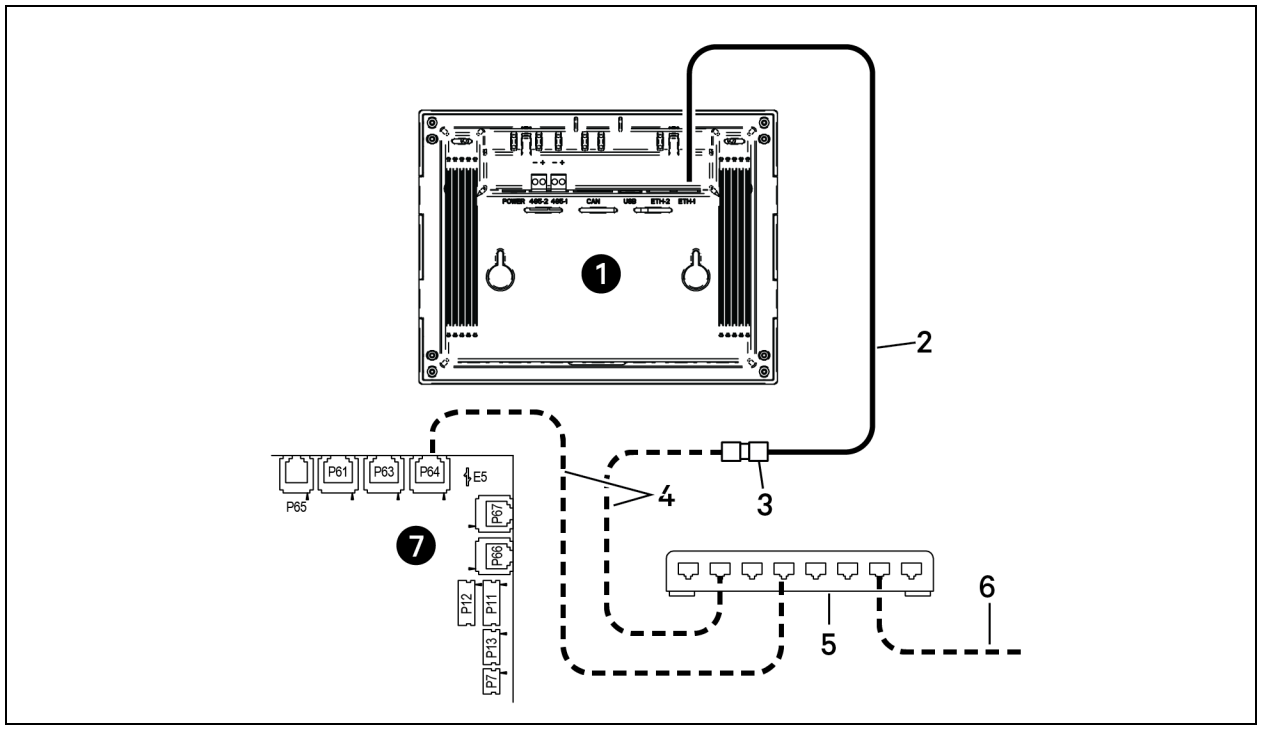



| Item | Description |
|---|---|
| 1 | Touchscreen (rear view) |
| 2 | Ethernet cable (field-supplied) |
| 3 | Ethernet cable (factory-supplied) |
| 4 | Liebert® iCOM™ I/O board |
| 5 | Network switch (field-supplied) |
| 6 | to ETH-2 on rear of other cooling unit touch screens |

To connection 12-in (300mm) units, refer to Connecting 12-in. (300 mm) Units below

1. Unplug the red cable from P64 at the I/O board, connect it to the crossover coupler provided.
2. Connect a field-supplied, straight-through Ethernet cable to the crossover coupler and the network switch.
3. Connect a second field supplied, straight through Ethernet cable to P64 and the network switch.

**Figure 12.19 Connecting 12-in. (300 mm) Units**

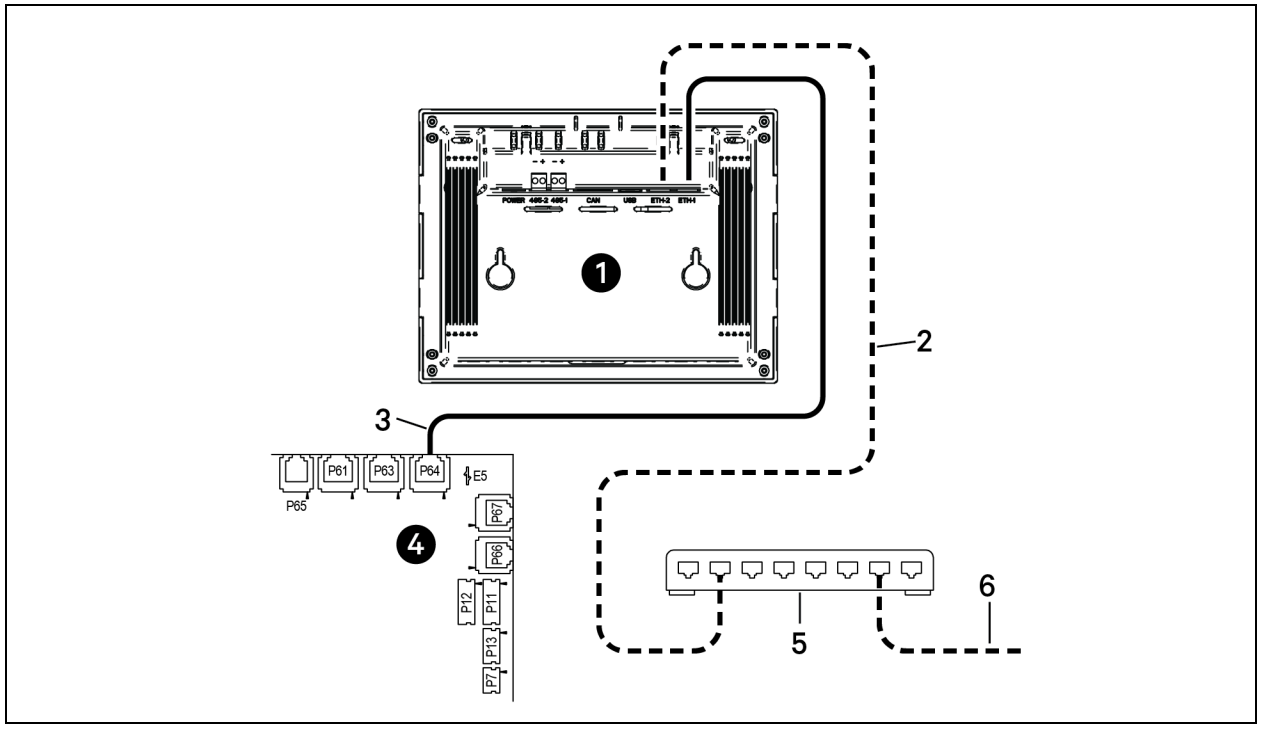



| Item | Description |
|---|---|
| 1 | Touchscreen (rear view) |
| 2 | Ethernet cable (factory-supplied) |
| 3 | Coupler (factory-supplied) |
| 4 | Straight-through Ethernet cables |
| 5 | Network switch (field-supplied) |
| 6 | to ETH-2 on rear of other cooling unit touch screens |
| 7 | Liebert® iCOM™ I/O board |

**To connect 600 mm (24 in.) units:**

- On each unit, connect one plug on the CAT5 cable to ETH-2 on the rear of the display, and the other to the network switch, Figure 12.20 below .

**Figure 12.20 Connecting 600 mm (24 in.) units**




| Item | Description |
|---|---|
| 1 | Touchscreen (rear view) |
| 2 | Ethernet cable (field supplied) |
| 3 | Ethernet cable (factory supplied) |
| 4 | Liebert® iCOM™ I/O board |
| 5 | Network switch (field supplied) |
| 6 | to ETH-2 on rear of other cooling unit touchscreens |

### 12.3.5 Wiring Cooling Units with Wall Mount Displays

**NOTE: Cooling units are factory wired for stand-alone operation. Do not connect the U2U network cabling before setting the U2U network configuration/groups. Network communication conflicts and unreliable display readings will result.**

**NOTE: Before you begin, refer to Preparing for U2U Group Set Up on page 59 , and Configuring U2U Network Settings on page 60 .**

Large, wall-mount displays may be used to remotely configure, control, and monitor all cooling units connected on the U2U network.

- Each display requires 120 VAC or 230 VAC input power.
- An AC-adapter wall plug is factory supplied.

**To connect wiring:**

1. On each wall mount display (32 maximum), connect one plug of a straight through Ethernet cable to port P64 on the rear of the display.
2. Connect the other end to the U2U network switch.

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# Appendices

## Appendix A: Technical Support and Contacts

### A.1 Technical Support/Service in the United States

Vertiv Group Corporation

24x7 dispatch of technicians for all products.

1-800-543-2378

Liebert® Thermal Management Products

1-800-543-2378

Liebert® Channel Products

1-800-222-5877

Liebert® AC and DC Power Products

1-800-543-2378

### A.2 Locations

United States

Vertiv Headquarters

505 N. Cleveland Ave.

Westerville, OH, 43082, USA

Europe

Via Leonardo Da Vinci 8 Zona Industriale Tognana

35028 Piove Di Sacco (PD) Italy

Asia

7/F, Dah Sing Financial Centre

3108 Gloucester Road

Wanchai, Hong Kong

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# Appendix B: Setpoints and Alarm Settings by Line ID

These tables list the parameters by the line identification assignments employed before the Vertiv™ Liebert® iCOM™ touchscreen. The tables include range/options of the parameter, the factory-default setting, and a description of the parameter function.

The line IDs are not listed in the User or Settings menus, only in the parameter directory. You can search the parameter list to find the line ID and it's associated label and value in the Liebert® iCOM™ user interface.

## B.1 To Search the Parameters List

1. Log in at the Service level, then touch 

>  > Parameter Directory.
2. Enter a line ID or term in the Search field, and touch  .

## B.2 Line IDs for Setpoint Parameters

**Table B.1 User Menu Setpoints by Line ID**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| U102 | Temperature Setpoint Act | 32 - 113°F<br>0.0 - 45.0°C | 73°F<br>23.0°C | Selects the temperature that the cooling unit will maintain by applying cooling and/or reheats. Temp Set value is the temperature that has been set by the User to control the temperature. Temp Act value is a read-only value that indicates if another routine, such as supply compensation, has internally modified the temperature controlling value. If compensation has not be activated, the ACT and SET values will always match. |
| | Temperature Setpoint | 41 - 104°F<br>5.0 - 40.0°C | 73°F<br>23.0°C | |
| | TempSetUsr | 41 - 104°F<br>5.0 - 40.0°C | 73°F<br>23.0°C | |
| U103 | Temperature Control Sensor | Supply Sensor<br>Remote Sensor<br>Return Sensor | Return Sensor | Selects the sensor that will control the cooling capacity; either chilled water valve, compressors, free cooling valve, or air economizer. Unloading type compressors can be set to any type of sensor; however, fixed style compressors can only be set to Return or Remote sensors. |
| U104 | Humidity Dew Point Setpoint | 41 - 65°F<br>5.0 - 18.3°C | 48°F<br>8.9°C | Selects a humidity level that the cooling unit will maintain by removing or adding moisture to the air. The humidity setpoint will be represented in % RH or Dew Point value depending on what the humidity control type is set for. |
| | Humidity Setpoint | 20 - 80%RH | 50%RH | |
| U105 | Humidity Control Sensor | Remote Sensor<br>Return Sensor | Return Sensor | Defines which humidity value the setpoint will be compared with. The return sensor is equipped with Temp/Humidity sensor and can calculate the dew point based on Liebert® iCOM™'s internal lookup table. If a sensor other than the return sensor is selected, the iCOM will calculate the correct %RH based on the sensor selected and its actual temperature reading. |

**Table B.1 User Menu Setpoints by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| U106 | Humidity Control Type | Relative<br>Compensated Predictive Dew Point | Predictive | Selects the humidity control calculation. If set to Relative, the unit will control the humidity without considering any temperature deviations. If set to Predictive and Absolute, the control will consider the temperature deviation from temperature setpoint so that a constant level of moisture is kept in the area based on the humidity sensor reading and the temperature deviation from setpoint. Dew Point allows the Liebert® iCOM™ controller to calculate the actual dew point of the space and to control the humidity based on a user entered dew point temperature. |
| U107 | Fan Setpoint | 41 - 104°F<br>5.0 - 40.0°C | 73°F<br>22.8°C | Required anytime the fan operates from a different sensor than that used for the temperature setpoint.<br>For example, The temperature setpoint is set to Supply Air and the fan control is set to Remote Air. This is considered Optimized Aisle control, which decouples the fan and cooling capacity modulation. The remote sensor setpoint would modulate the fan speed and the supply sensor setpoint would modulate the cooling. |
| U108 | Fan Control Sensor | Supply Sensor<br>Remote Sensor<br>Return Sensor<br>Manual | Disabled | Determines which sensor will control the speed of the fan. If set to Manual, then the fan control can be set through the local Liebert® iCOM™ display or through the BMS system via one of the various Liebert® IntelliSlot monitoring cards. |
| U110 | Optimized Aisle Enabled | Disabled Enabled | Disabled | This read-only value indicates if the Liebert® iCOM™ controller is setup in a Optimized Aisle configuration. To enable optimized aisle via the Liebert® iCOM™ display, the Supply Air sensor must be set to control the cooling capacity and the remote sensor must be set to control the fan speed. This allows the cooling unit to maintain rack temperatures while still maintaining an even under floor air temperature when controlling unbalanced rooms. |
| U113 | 2nd Temperature Setpoint | 41 - 104°F<br>5.0 - 40.0 °C | 73°F<br>23.0 °C | Allows for a dry contact through the customer input connections. When a customer input connection is set for 2nd temperature setpoint and that input is triggered, then the value set in this parameter sets the active temperature setpoint the unit will maintain. If the unit is configured for Decoupled mode, then this setpoint will only affect the temperature control setpoint; it will not affect the fan control setpoint. |
| U114 | Supply Temp Limit Setpoint | 41 - 81°F<br>5.0 - 27.0°C | 41°F<br>5.0°C | Selects the minimum discharge air temperature. When the actual sensor reading approaches this parameter, the cooling capacity will be limited to avoid going below the Supply Limit Temperature value. This parameter must be enabled in the Service Menu / Setpoints menu prior to setting a supply limit setpoint. |
| U116 | BMS Backup Temp Setpoint | 41 - 104°F<br>5.0 - 40.0°C | 73°F<br>23.0°C | Selects a temperature setpoint that will be activated in the event of a BMS time out or a customer input signal. The BMS timer and/or the customer input must be configured for this parameter to activate. If the unit is operating in De- coupled mode, then this setpoint will only affect the temperature control setpoint; it will not affect the fan control setpoint. |

**Table B.1 User Menu Setpoints by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| U117 | BMS Backup Fan Setpoint | 41 - 104°F<br>5.0 - 40.0°C | 73°F<br>23.0°C | Selects a temperature setpoint when the backup fans will be activated in the event of a BMS time out or a customer input signal. The BMS timer and/or customer input must be configured in order for this parameter to activate. If the unit is operating in Decoupled mode, then this setpoint will only affect the temperature control setpoint; it will not affect the fan control setpoint. |
| | BMS Backup Fan Speed | 0 - 100% | 100% | |
| U119 | Return Compensation Setpoint | 41 - 104 °F 5.0 - 40.0°C | 73 °F 23.0 °C | Allows the return air sensor to be used even when in Supply or Remote temperature control mode. Return Compensation modifies the temperature setpoint to ensure that the return air temperature is kept above a specific temperature. If the return compensation value is set to 80 °F and the actual return temperature falls to 75 °F, then the controlling temperature setpoint will be increased and will reflect in the "Control Temp Act" parameter. |

**Table B.2 Service Menu Setpoints by Line ID**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| S102 | Temperature Control Sensor | Supply Sensor<br>Return Sensor<br>Remote Sensor | Return Sensor | Selects which sensor will be controlling and influencing the cooling capacity. Cooling Capacity is either the Chilled Water Valve, Compressor, Free Cooling Valve, or Air Economizer. Unloading type compressors can be set to any sensor type, however fixed style compressors can only be set to Return or Remote control sensor. |
| S103 | Temperature Setpoint | 41 - 104°F<br>5.0 - 40.0°C | 73°F<br>23.0°C | Selects a temperature that the cooling unit will maintain by applying cooling and/or reheats. The temperature setpoint value that has been set by the User to control the temperature. |
| | Temperature Setpoint Actual | 32 - 113°F<br>0.0 - 45.0°C | 73°F<br>23.0°C | The temperature setpoint actual value is a read-only value that indicates if another routine, such as supply compensation has internally modified the Temperature controlling value. If compensation has not been activated, the ACT and SET will always match. |
| S104 | Temperature Control Type | Proportional PI<br>Adaptive PID<br>Intelligent | PI | Sets the type of control to be followed: Proportional, PI, Adaptive PID (auto-tuning), Intelligent |
| S105 | Temperature User Low Limit | 41 - 104°F<br>5.0 - 40.0°C | 41°F<br>5.0°C | Defines the temperature range below setpoint; temperature setpoint cannot be adjusted below this value. If the setpoint value has been adjusted lower than this setting, then the setpoint will automatically default back to its previous setting. |
| | Temperature User High Limit | 41 - 104°F<br>5.0 - 40.0°C | 104°F<br>40.0°C | Defines the temperature range above setpoint; temperature setpoint cannot be adjusted above this value. If the setpoint value has been set higher than this setting, then the setpoint will automatically default back to its previous setting. |
| S106 | Temperature Proportional Band | 4 - 200°F<br>2.2 - 111.0 K | 12°F<br>6.7 K | Adjusts the activation points of compressors/chilled water valves or rate of changed based on the actual sensor values deviation from setpoint. The smaller this number, the faster the compressors/chilled water values will increase capacity. Too small of a number may cause the unit to short cycle compressors or excessively reposition the valve. |
| | Temperature Integral Time | 0.0 - 15.0 min | 5.0 min | Adjusts the capacity of the units based on time away from setpoint so that accurate temperature control can be maintained. The proportional and integral time settings work together to maintain setpoint. Large p-band and small integral time is typical when controlling to supply air. |

**Table B.2 Service Menu Setpoints by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| S107 | Temperature Derivative Time | 0 - 900 sec | 0 sec | |
| S108 | AutoSet Enable | No Yes | Yes | Sets the temperature and humidity proportional bands automatically based on the type of unit when this parameter is set to YES and if teamwork modes are selected. To change the proportional bands, this parameter must be set to NO. If supply or remote sensors are used, then this value is always set to NO. |
| S109 | Temperature Deadband | 0 - 36°F<br>0 - 20.0 K | 2°F<br>1.1 K | Avoids overshooting of the setpoint and cycling between cooling and reheats. The value entered in this field will be split in half by the temperature setpoint. |
| S110 | Supply Limit Enabled | No<br>Yes | No | Chilled water units may be set up with the supply air sensor to maintain a minimum air temperature under the raised floor to help prevent condensation. In order to avoid supply temperatures that are too low, the Supply Limit can influence the opening of three-point or analog actuators or the output of analog values. The control compares the deviation from the return air setpoint & the supply limit setpoint, and calculates the output to the actuator from the smaller deviation. |
| | Supply Limit Setpoint | 41 - 81°F<br>5.0 - 27.0°C | 41°F<br>5.0°C | |
| S111 | Heater Deadband | 0 - 36°F<br>0 - 20.0 K | 0°F<br>0.0 K | Changes the amount of deviation below the temperature setpoint that the heaters will cycle ON and OFF. This value is added to the heating side of the normal temperature deadband. |
| S113 | Enable Temperature Compensation | No Return<br>Supply Ret+Sup | No | Temperature compensation allows for a second or even a third sensor to be used that that will influence the units cooling or heating. Return compensation can be used when the supply or remote sensors are being used for control. Then the return sensor is then monitored to maintain a minimum return temperature. Supply compensation can be used only when Optimized Aisle (TW3) is enabled. The supply sensor will not only be used for controlling cooling capacity but will also monitor the cold aisle temperature to ensure that the cold aisle temperature setpoint is met. |
| S114 | Return Compensation Setpoint | 41 - 104°F<br>5.0 - 40.0°C | 73°F<br>23.0°C | The temperature setpoint where compensation begins to operate by increasing the supply air setpoint. |
| S115 | Return Compensation Band | 0 - 18°F<br>0.0 - 10.0 K | 0°F<br>0.0 K | The return compensation band/value will determine how quickly the cooling capacity is adjusted as the return temperature drops below the return compensation setpoint. |
| | Return Compensation Value | 0 - 18°F<br>0.0 - 10.0 K | 0°F<br>0.0 K | |
| S116 | Supply Compensation Value | 0 - 18°F<br>0.0 - 10.0 K | 0°F<br>0.0 K | The Supply Compensation value determines how much the supply temperature setpoint will be reduced when the units fan speed is at 100% and the cold aisle is not able to maintain temperature setpoint. Any modifications to the supply temperature setpoint will be shown at the temperature setpoint on parameter S103 as the actual active control point. |
| S118 | Compressor Capacity Filter at 0 % | 0.01 - 99.99<br>%/s | 0.60 %/s | Controls the rate of change during compressor load changes to avoid overshoots. The filter value depends on the current control deviation from setpoint. On the setpoints (at 0% call for cooling), it's typically set lower (slow). |

**Table B.2 Service Menu Setpoints by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| | Compressor Capacity Filter at 100% | 0.01 - 99.99 %/s | 4.00 %/s | At the end of the proportional band (at 100% call for cooling), it is typically set higher (faster). |
| S119 | Capacity Transition Filter | 0.01 - 99.99 %/s | 4.00 %/s | This parameter should only be adjusted by a factory-service trained technician. The transition capacity filter controls how quickly the capacity changes between different modes of operation. This filter helps with the transition to avoid overshoot. |
| S120 | CW Capacity Filter @ 0% | 0.01 - 99.99 %/s | 0.10 %/s | The CW capacity filter controls the rate of change during a valve position adjustment to avoid overshoots. The filter value depends on the current control deviation from setpoint. On the setpoint (at 0% call for cooling), it is typically set lower (slower). |
| S121 | CW Capacity Filter @ 100% | 0.01 - 99.99 %/s | 0.60 %/s | At the end of the p-band (at 100% call for cooling), i is typically set higher (faster). |
| | BMS Backup Temp Setpoint | 41 - 104°F 5.0 - 40.0°C | 73°F 23.0°C | Selects a temperature setpoint that will be activated in the event of a BMS time out. The BMS timer must be configured for this parameter to be active. |
| S122 | 2nd Temperature Setpoint | 41 - 104°F 5.0 - 40.0°C | 73°F 23.0°C | Selects a temperature setpoint that will be activated in the event of a customer input signal configured as the second setpoint. The customer input must be configured for the parameter to activate. |
| S124 | Humidity Control Sensor | Remote Sensor Return Sensor | Return Sensor | Defines which humidity sensor the humidity setpoint is compared with. The return sensor is equipped with a Temp/Hum sensor and can calculate the dew point based on Liebert® iCOM™'s internal lookup table. If a sensor other than the return sensor is selected, the Liebert® iCOM™ will calculate the corresponding RH% based on that sensors actual temperature. |
| S125 | Dew Point Setpoint | 41 - 65°F 5.0 - 18.3°C | 48°F 8.9°C | Selects a humidity level that the cooling unit will maintain by removing or adding moisture to the air. The humidity setpoint will either be set in percent RH or as a Dew Point value depending on what the humidity control type is set for. |
| | Humidity Setpoint | 20 - 80% | 0.5 | |
| S126 | Humidity Control Type | Relative Compensated Predictive Dew Point | Predictive | Selects the humidity control calculation. Setting this parameter to Relative (%RH) will control the humidity without considering any temperature deviations. Predictive and Absolute control considers the temperature deviation from temperature setpoint so that a constant level of moisture is kept in the area based on the humidity sensor reading and the temperature deviation from setpoint. Compensated is recalculated with the actual deviation from temperature setpoint. 1° Celsius is equal to 3 % RH, indirect proportional. If temperature increases, the humidity setpoint is decreased and vice versa. |
| | Humidity Control Mode | Supply Return | Return | |
| S127 | Dew Point Proportional Band | 2 - 18°F 1.1 - 10.0 K | 8°F 4.4 K | Adjusts the activation points of the humidifier and compressors based on the actual sensor values deviation from setpoint. The smaller this number, the faster the compressors and humidifier will increase capacity. Too small of a number may cause the unit to short cycle or overshoot setpoint. |
| | Humidity Proportional Band | 1 - 20% | 0.2 | |
| S128 | Humidity Integration Time | 0.0 - 25.0 min | 0.0 min | Adjusts the capacity of the unit based on a time away from setpoint so that accurate humidity control can be maintained. If the integration time is set to 0, the |

**Table B.2 Service Menu Setpoints by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| | | | | humidity control operates as a proportional only control. When integration time is set, the control mode changes to PI control |
| S129 | Humidity Deadband | 0 - 18°F<br>0.0 - 10.0 K | 4°F<br>2.2 K | Prevents overshooting of the setpoint and cycling between humidification and dehumidification. The value entered in this field will be split in half by the temperature setpoint. |
| S130 | Dehum Supply Temperature Setpoint | 41 - 104°F<br>5.0 - 40.0°C | 54 °F<br>12.2°C | Allows for a target temperature setpoint to be activated when a call for dehumidification is enabled instead of the traditional method of over cooling the space by increasing cooling to 100% and lowering fan speed if equipped. Must be in supply air control mode. When a call for dehumidification is active, the supply or remote sensor setpoint will be lowered to this parameter. This parameter should be set below the accepted dew point threshold of your space. Used only when supply dehumidification is enabled. |
| | Actual Dehum Temperature Setpoint | 41 - 104°F 5.0 - 40.0°C | 50°F 10.0°C | |
| S131 | Dehum Setpoint Adjustment | 0 - 18°F<br>0.0 - 10.0 K | 9°F<br>5.0 K | Sets the amount of that the Dehum Temp Setpoint is adjusted once the reheats activate. For example, if the unit is equipped with a reheat device, this parameter will increase the dehumidification temperature as the call for reheats are increased until the reheat call is at 100%. When the reheats are at 100%, the full Dehum Setpoint Adjustment will be applied. |
| | Dehum Setpoint Filter | 0.01 - 0.10 K/s | 0.02 K/s | |
| S132 | Dehum Reheat/LL Sensor | Supply Sensor<br>Remote Sensor<br>Return Sensor | Return Sensor | Sets the sensor and temperature start point that the reheat will be deactivated and dehumidification will be stopped due to over cooling the space in a call for dehumidification. |
| | Dehum Reheat/LL Setpoint | 41 - 104°F<br>5.0 - 40.0°C | 71°F<br>21.7°C | |
| S133 | Dehum/Reheat Low Limit 1 Temp Hysteresis | -30.0°F - -2.0°F<br>-16.7K - -1.1K | -5°F<br>-2.5 K | Dehum/Reheat Low Limit 1 |
| | Dehum/Reheat Low Limit 2 Temp Hysteresis | -30.0°F - -2.0°F<br>-16.7K - -1.1K | -7 °F<br>-3.9 K | Dehum/Reheat Low Limit 2 |
| S13A | Dehum Reheat Proportional Band | 2 - 54°F<br>2.0 - 30.0 K | 14 °F<br>7.8 K | Sets the reheat proportional band for reheat operation independently of the temperature proportional band. This parameter can be used to activate the reheats at different points below the temperature setpoint. |
| S13B | Estimated Aisle Temp | 41 - 104°F<br>5.0 - 40.0°C | 75°F<br>23.9°C | Sets an estimated cold aisle temperature when humidity control sensor is set to remote and no remote temperature sensors are installed at the unit. This estimated temperature will be used to determine the humidity versus using an actual temperature in the cold aisle that may fluctuate during modes of dehumidification or load changes of the IT equipment. This provides a stable control point to reference the actual measured dew point from the return sensor. |
| S135 | DT1<br>(Room/Outdoor) Type | 0 - Disabled<br>1 - Contact<br>2 - EFC<br>3 - Temp<br>4 - Set | Temp | Sets the activation point of the ambient dry bulb outdoor temperature as it relates to either an indoor actual temperature or temperature setpoint. |
| S136 | DT1 | 2 - 72°F<br>1.0 - 40.0 K | 5°F<br>3.0 K | Field adjustable setpoint or temperature |

**Table B.2 Service Menu Setpoints by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| | (Room/Outdoor) Value | | | |
| S137 | DT2 (Room/FC Fluid) Type | Disabled<br>Contact Temp<br>Set | Disabled | Determines the method to activate the water circuit on Dual Cool and Free Cool units. It may be set to CONTACT, TEMP, or SET. CONTACT uses a dry contact to activate the free cooling circuit. TEMP uses a sensor reading that can be compared to the return temp to see whether free cooling is possible. SET compares the temperature set to the free cooling sensor to determine free cooling availability. |
| S138 | DT2 (Room/FC Fluid) Value | 0 - 36°F<br>0.0 - 20.0 K | 12°F<br>6.7K | Sets the delta T between the actual temperature and fluid temperature that must be met before free cooling will occur. |
| S139 | Minimum Chilled Water Temp Enable | No<br>Yes | Disabled | Enables the temperature at which free cooling can operate independently without assistance of the compressor circuit(s). |
| S140 | Minimum Chilled Water Temp Value | 32 - 68°F<br>0.0 - 20.0°C | 45°F<br>7.0°C | Sets the water temperature at which 100% free cooling can be provided to handle the full room load. When the fluid temperature is below this setting, then the compressors will no longer turn ON until the water temperature is above the minimum CW temperature. |
| S141 | Lockout FC at Fluid Below | 6 - 50°F<br>-15.0 -<br>+10.0°C | 32°F<br>0.0°C | Prevents frost from building up on the free cooling pipes when the outdoor ambient temperature is extremely low by turning off the free cooling circuit when the water temperature is too low. |
| S146 | Fan Control Sensor | Supply Sensor<br>Remote Sensor<br>Return Sensor<br>Manual | Return Sensor | Controls the fan speed for modulation. If MANUAL is selected, then the fan speed can be controlled from the local display or through a building management system. |
| S147 | Fan Setpoint | 41 - 104°F<br>5.0 - 40.0°C | 73°F<br>22.8°C | Activated when a temperature sensor is being used to control the fan speed. If the same sensor is used for temperature control and fan speed control, then this value will reflect the same setpoint as the temperature control setpoint. Manual mode uses fan speed STD for control. |
| S148 | Fan Temperature Control Type | Proportional PI<br>Adaptive PID | PI | Sets the type of control the unit will use to control fan speed. PI control gain is set in the Temp Prop/Integral parameter. PI control will operate the fan speed so that the actual temperature of the fan control sensor is equal to the fan temp setpoint. If PROPORTIONAL only is selected, the fan will change only based on the deviation from setpoint which will allow the actual temp to settle higher than setpoint. |
| 149 | Fan Temperature Control Prop Band | 4 - 200°F<br>2.0 - 111.0 K | 36°F<br>20.0 K | Adjusts the fans peed rate of change based on the actual sensor values deviation from setpoint. The smaller this number, the faster the fans will increase speed. Too small of a number may cause the fans to increase or decrease speed and overshoot setpoint. |
| | Fan Temperature Control Integration Time | 0.0 - 15.0 min | 1.0 min | Adjusts the fans of the unit based on time away from setpoint so that accurate temperature control can be maintained. The proportional and integral work together to maintain setpoint. Large p-band with small integral time is a typical way to achieve stable control. |
| S150 | Fan CFF Hysteresis | 0 - 20% | 0.02 | Modifies the reaction of the fan speed when fan speed is being dictated by the Call for Cooling. Adding the Hysteresis may result in a lagged response to changes in fan speed. |

**Table B.2 Service Menu Setpoints by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| | Fan Deadband | 0 - 36°F<br>0 - 20.0 K | 1°F<br>0.6 K | Avoids overshooting of the setpoint. The value entered in this field will be split in half by the fan speed setpoint |
| S151 | Airflow Calibration | 3.0 - 10.0 V | 10.0 V | Allows the front display to be scaled to show the actual percentage of airflow independent of the voltage operating the fan speed. This value cannot be set above/below the Analog Output High/Low Limit for the fan set in the Advanced Menu. This also includes the service menu fan speed parameters. |
| S152 | Fan Speed VSD Setpoint Minimum | 0 - 100% | 0.7 | Sets the range for the variable fans. Minimum sets the minimum speed that the fan will operate at. Fan speed is modulated between MIN and STD based on which sensor is set as the controlling sensor, setpoint, and the PI settings. If the controlling sensor is set to manual, then the STD setting will control the current fan speed. This parameter is also adjustable through the BMS. |
| | Fan Speed VSD Setpoint Standard | 0 - 100% | 1 | |
| S153 | Fan Speed VSD Setpoint Dehum | 0 - 100% | 70% | Sets the fan speed when a call for dehumidification is active. This allows the units fan speed to be ramped lower to help with any over cooling due to the dehumidification process. This also allows the coil to remove additional moisture even faster |
| | Fan Speed VSD Setpoint No Power | 0 - 100% | 100% | |
| S154 | Allow Fan Modulation on Compressors | No Yes | Yes | Provides the option to set the fan to fixed speed if unit is equipped with compressors. Once this parameter is set at the local display, it must be removed at the local display to re-engage fan speed control. |
| S155 | High Return Limit Enable | Disabled Local Team | No | Sets a control point that will increase the fan speed if the return temperature exceeds the limit set in the High Return Temperature Limit parameter. If set to DISABLED, no limit will be applied to the return air temperature. If set to LOCAL, then only the local units return temperature will be monitored for applying the limit. If set to TEAM, then the highest networked unit return temperature will activate the limit on all connected units. |
| S15A | High Return Temperature Limit | 41 - 104°F<br>5.0 - 40.0°C | 85°F<br>29.4°C | Sets the temperature limit that will increase the fan speed to decrease the return temperature. Some compressors may require this limit to prevent extremely high temperatures that could potentially cause degradation of the compressor oil, that could decrease the overall compressor life expectancy. |
| S15B | Return Limit Proportional Band | 0 - 36°F | 20°F | Sets the rate of fan speed increase as the actual return temperature approaches the limit set in the High Return Temperature limit parameter. |
| S157 | Fan Startup Time | 0 - 600 sec | 3 sec | Determines the speed of the fan at system startup. The fan will operate at the set speed (%) until the set time has elapsed; at this point the fan will assume normal operation. |
| | Fan Startup Speed | 0 - 100% | 100% | |
| S158 | Fan Speed Filter at 0% | 0.01 - 99.99%/s | 0.20%/s | This parameter should only be adjusted by factory service trained technician. Fan Cap Filter at 0/100% controls the rate of change during fan speed changes to avoid overshoots. The filter value depends on the current control deviation from setpoint. On the setpoint (at 0%), its typically set lower (slower). At the end of the P-band (at 100%) its typically set higher (faster). The value is given as a % control output per second change. This parameter sets the rate of changed based on where actual temperature is when compared to setpoint. |
| S159 | Fan Speed Filter at 100% | 0.01 - 99.99 %/s | 1.00%/s | This parameter should only be adjusted by factory service trained technician. The transition fan speed filter controls how quickly the fan speed changes between different modes of operation. This filter helps with the transition to avoid overshoots. |
| | Fan Speed Transition Filter | 0.50 - 99.99 | 1.00%/s | |

**Table B.2 Service Menu Setpoints by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| | | %/s | | |
| S160 | Fan Speed Reposition Mode | Decel Both | Decel | This parameter should only be adjusted by factory service trained technician. The fan speed reposition mode/delay is a one time delay as the fan speed is requested to change direction. This delay will be applied only when the fan speed is commanded from an increasing to decreasing state or decreasing to increasing state. This allows the fan to hold its current position while the temperature stabilizes. |
| | Fan Speed Reposition Delay | 0 - 300 sec | 0 sec | |
| S161 | Max Deceleration Rate | 0.01 - 99.99 %/s | 0.10 %/s | This parameter should only be adjusted by the factory service trained technician. Only slows the decreasing of the variable fan speed. The control will use the slower of this parameter and the fan speed filter. |
| S162 | BMS Backup Fan Setpoint | 41 - 104°F<br>5.0 - 40.0 °C | 73°F<br>23.0 °C | Selects a fan speed setpoint that will be activated in the event of a BMS time out. The BMS timer must be configured for this parameter to activate. |
| | BMS Backup Fan Speed | 0 - 100% | 1 | |
| S163 | BMS Backup Fan Operation | Disabled BMS Backup Spd<br>Coupled BMS Backup Set | Disabled | Sets the default operation of the fan speed control when a BMS time out occurs. Default is disabled which will keep the fan speed at the last value before the disconnect occurred. STD speed will ramp the fan to the STD speed setting. This will drive the fan speed to its maximum speed. The control will use the slower value. COUPLED will set the fan speed to follow the cooling capacity. BACKUP SET will use the BMS Backup Setpoint to drive fan speed. |
| S164 | Allow BMS to Change Fan Speed | No Yes | Yes | Enables or disables BMS fan speed control. When this parameter is disabled, the BMS will not have write capability to this point. |
| S165 | BMS is connected to | Velocity Ana In 1<br>Ana In 2<br>Ana In 3<br>Ana In 4 | Velocity | If the BMS is connected to Analog Input (1-4), it is used for manually writing to and controlling the unit fan speed using a low voltage control signal. If the BMS is set to Velocity (V3 or V4), it is used for manually writing to and controlling the unit fan speed via the velocity protocol. |
| | BMS Analog Input Signal Type | 0-5V<br>0-10V<br>4-20mA<br>None | None | |
| | BMS Analog Input current value | 0 - 100% | 100% | |
| S166 | High Temp Limit Approach | Disabled Supply Return | Return | Sets the sensor to be used to increase the fan speed value above the fan speed setpoint STD to the value set in the Analog Output high limit. |
| S16A | High Temp Limit Approach at | 0 °F / +10°F<br>0 K / +5.5 K | 2°F<br>1.1 K | Sets the temperature differential below the high supply and high return temperature limit where the fan speed would increase from fan speed setpoint STD to fan speed MAX. |
| S16B | FC / AirEco Ramp Up w/ CFC | 0 - No<br>1 - Yes | 0 (No) | Sets the selection to decouple the fan output from the call for cooling. |

**Table B.2 Service Menu Setpoints by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| S168 | Fan Back Draft Control | Disabled Enabled | Disabled | Enables/disables fan back draft control. This feature allows EC fans (only) to operate at very low speeds to prevent airflow from cycling through the unit due to a high under floor static pressure than above the floor static pressure. VFDs cannot be used with this feature due to motor and/or bearing degradation that may occur at the low fan speeds required to support this feature. |
| S169 | VSD Setpoint Back Draft | 0.1 - 5.1 V | 1.5 V | The variable speed device setpoint is set as a voltage reference. The lower the voltage, the slower the fans will spin. This parameter is set based on the application. Higher under floor static pressure may require a higher setting to prevent airflow through the unit. |
| S171 | Not Selectable Zone 1 Low | 0.0 - 5.0 V | 3.5 V | The not selectable zone 1 and 2 are zones that the EC fans cannot operate within due to vibration harmonics that the fans may introduce to the unit. These parameters will be set from the factory based on model type and should not need adjusted in the field. |
| S172 | Not Selectable Zone 2 Low | 0.0 - 5.0 V | 0 V | The not selectable zone 1 and 2 are zones that the EC fans cannot operate within due to vibration harmonics that the fans may introduce to the unit. These parameters will be set from the factory based on model type and should not need adjusted in the field. |
| | Not Selectable Zone 2 High | 0.0 - 5.0 V | 0 V | |
| S173 | Stop BDR when System is OFF | No Yes | No | The above is true when S173 Stop BDR when System is OFF is set to YES. If set to NO, the BDR mode will not be interrupted, unless BDR is disabled or the unit is restarted. |
| S175 | Display Off and BDR | Off Back Draft | Off | When the back draft damper is enabled, different modes can activate this feature. Remote Off, Display Off, BMS Off, and Local Off can all be set to activate te back draft damper operation. This is done by pressing the ON/OFF key at the unit to put the unit in a Display Off condition |
| S176 | BMS Off and BDR | Off Back Draft | Off | When the back draft damper is enabled, different modes can activate this feature. Remote Off, Display Off, BMS Off, and Local Off can all be set to activate the back draft damper operation. This is done by sending a remote OFF signal from BMS to the unit to be remotely OFF. |
| S177 | LOC Off and BDR | Off Back Draft | Off | When the back draft damper is enabled, different modes can activate this feature. Remote Off, Display Off, BMS Off, and Local Off can all be set to activate the back draft damper operation. This is done by sending local OFF signal to the unit by pressing the ON/OFF key. |
| S179 | SCR Control Type | None Tight Standard | None | Sets the control type for the SCR reheats. If set to Standard, then the reheats will modulate when the temperature is below setpoint based on the control settings. If set to Tight, then one compressor will be locked on and the reheats will modulate to offset the cooling capacity. |
| S180 | Start 1st Compressor at | -100 / +100% | 0% | Sets activation point of the first compressor. This parameter can be used when set to Tight control with SCR. |
| S181 | Stop 1st Compressor at | -200 / +50% | -200% | Sets the deactivation point of the first compressor. This parameter can be used when set to Tight control with SCR. |
| S182 | 1st Compressor stop delay | 0 - 30 min | 20 min | Sets the delay when the stop compressor setpoint for the first compressor is met. |
| S183 | Start 2nd Compressor at | -100 / +100% | 100% | Sets activation point of the second compressor. This parameter can be used when set to Tight control with SCR. |
| S184 | Stop 2nd | -200 / +50% | 0% | Sets the deactivation point of the second compressor. This parameter can be |

**Table B.2 Service Menu Setpoints by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| | Compressor ats | | | used when set to Tight control with SCR. |
| S185 | 2nd Compressor stop delay | 0 - 30 min | 0 min | Sets the delay when the stop compressor setpoint for the second compressor is met. |
| S186 | Cycle Time | 1.0 - 200.0 sec | 1.0 sec | Set at the factory and should be changed only by an authorized Vertiv/Liebert technician. |
| S187 | SCR Factor | 1.0 - 10.0 | 1 | Set at the factory and should be changed only by an authorized Vertiv/Liebert technician. |
| S188 | Actual SCR request | 0 - 100% | 0% | Displays the actual SCR reheat being requested. |
| S190 | Static Pressure Fan Control | Disabled Limit Control | Disabled | Enables/disables the use of static pressure control for fan modulation. |
| S191 | Static Pressure Setpoint inWC | 0.010 - 1.003 inWC | 0.020 inWC | Sets the static pressure setpoint to be used by the control to modulate the fan control. |
| | Static Pressure Setpoint Pa | 2 - 250 Pa | 5 Pa | |
| S192 | Static Pressure Deadband in WC | 0.010 - 1.003 inWC | 0.020 inWC | Sets the static pressure deadband. |
| | Static Pressure Deadband Pa | 2 - 250 Pa | 5 Pa | |
| S193 | SP Pause Time at Deadband minimum | 0 (Disabled) - 180 sec | 30 sec | Sets the minimum and maximum pause times when the static pressure crosses into the deadband border. The fan speed will stop increasing or decreasing based on the time set in these parameters. |
| | SP Pause time at Deadband maximum | 2 - 180 sec | 60 sec% | |
| S194 | SP Pulse Time inside Deadband | 2 - 15 sec | 3 sec | Sets the pulse time that the speed filter will be performed to the fan analog output. |
| S195 | Static Pressure Prop Band inWC | 0.010 - 1.003 inWC | 0.020 inWC | Sets the proportional band for which the fan speed modulation output calculation is based upon in relation to the difference between the pressure reading the SP Setpoint. |
| | Static Pressure Prop Band Pa | 2 - 250 Pa | 5 Pa | |
| S196 | SP During Dehum | Disabled Enabled | Disabled | Sets the use of static pressure control if dehumidification becomes active. It set to Disabled then the static pressure routines will become inactive and the fan will be allowed to ramp to the dehumidification speed set in Fan Speed Dehum/No Power. If set to Enabled, then the static pressure routines shall remain active during the call for dehumidification. |
| S197 | Static Pressure Teamwork Mode | Average Minimum | Average | There are modes available for static pressure teamwork functionality: Average and Minimum. When selecting Average Mode, the average of the lowest static pressure sensor readings in the system will be average to generate a shared static pressure value for all units in the team. The number of static pressure sensors to be averaged is set in line S198 SP Sensors in Avg for TW. When this line is set to a value lower than the number of units in the team, the lowest static pressure |

**Table B.2 Service Menu Setpoints by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| | | | | readings will be averaged. |
| S198 | SP Sensors in Avg for TW | 1 - 32 | 2 | Sets the number of sensors used when averaging sensors in the teamwork. |
| S199 | Operation on Sensor Failure | SP Off<br>Freeze Speed | SP Off | This parameter determines what action to take if the static pressure sensor fails (non-teamwork). If SP OFF is selected, then the control will use S146 Fan Control Sensor to control the fan when the sensor is lost. If "Freeze Speed" is selected, then the control will keep the fan speed in its last known position. Situations that need to override the fan speed such as Freeze Protection can still change the fan speed. |
| S1A1 | Static Pressure Upper Range inWC | 0.010 - 1.003 inWC | 0.030 inWC | The control calculates the Upper Range by using S191 SP Setpoint and S192 SP Deadband, the results on lines show both values, inWC and Pa. |
| | Static Pressure Upper Range Pa | 2.5 - 250.0 Pa | 7.5 Pa | |
| S1A2 | Static Pressure Lower Range inWC | 0.000 - 0.993 inWC | 0.010 inWC | The control calculates the Lower Range by using S191 SP Setpoint and S192 SP Deadband, the results on lines show both values, inWC and Pa. |
| | Static Pressure Lower Range Pa | 0.0 - 247.5 Pa | 2.5 Pa | |
| S1A4 | Enable Static Pressure Control Override | None Remote Sensor Return Sensor | None | |
| S1A5 | SP Requested Speed up to | 41 - 104°F<br>5.0 - 40.0°C | 86°F<br>30.0°C | |
| S1A6 | STD Speed at | 41 - 104°F<br>5.0 - 40.0°C | 95°F<br>35.0°C | |
| S1A7 | Override Integration Time | 0.0 - 15.0 min | 0.0 min | |
| S1A8 | Control Slew Rate Filter | 0.50 - 99.99<br>%/s | 1.00%/s | |
| S1A9 | Current Override Temperature | °F<br>°C | invalid | |
| S1B1 | Current Override Value | 0 - 100% | 0% | |
| S1B9 | Create SuperSaver Signal | 0 - No<br>1 - Local<br>2 - U2U<br>Group AVG 3 - U2U<br>Group MAX 4 - U2U<br>Group MIN | 0 (No) | |

**Table B.2 Service Menu Setpoints by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| S1C1 | Deadband Low Value | 5 - 95% | 20% | |
| S1C2 | Deadband High Value | 10 - 100% | 90% | |
| S1C3 | Update SuperSaver Signal every | 30 - 300 sec | 120 sec | |
| S1C4 | Update SuperSaver Signal by | 1 - 10% | 1% | |
| S1C5 | SuperSaver Max Limit | 0 - 100% | 100% | |
| S1C6 | Current SuperSaver Request | 0 - 100% | 0% | |
| | Current SuperSaver Signal | 0 - 100% | 0% | |
| S1C7 | U2U Aggregated Signal | 0 - 100% | 0% | |
| XDU.006 | Calibration Leaving Air Temperature | +/-18°F | 0°F | Calibrate supply air leaving temperature sensor reading. |
| XDU.008 | Calibration Entering Fluid Temperature | +/-18°F | 0°F | Calibrate entering fluid temperature sensor reading. |
| XDU.007 | Calibration Leaving Fluid Temperature | +/-18°F | 0°F | Calibrate Leaving Fluid Temperature sensor reading. |
| XDU.009 | Fluid Flow Rate @ Full Scale (20mA) | 10 - 1000 l/m | 115 l/m | Fluid flow rate at full scale (20mA). |
| XDU.010 | Fluid Flow Rate Setpoint | 5.0 - 1000.0 l/m | 50.0 l/m | Display readout showing current fluid flow rate. |
| XDU.011 | Fluid Pump Initial Speed | 30 - 100% | 50% | Fluid pump initial speed percentage. |
| XDU.012 | Fluid Flow Proportional Band | 1.0 - 1000 l/m | 20.0 l/m | Fluid flow proportional band. |
| XDU.013 | Fluid Flow Deadband | 0.0 - 100.0 l/m | 10.0 l/m | Fluid flow deadband. |
| XDU.014 | Fluid Flow Integration Time | 0 - 300 sec | 60 sec | Fluid flow integration time. |
| XDU.018 | Pump Transition Duration | 0 - 30 sec | 15 sec | Overlap timer for when pumps are rotating from one another. |
| XDU.021 | Pump Sequence | 0 - Auto<br>1 - Pump 1 | (0) Auto | Specifies which is the lead pump. If configured for auto, pumps will rotate for equal run time purposes based off a set schedule. |

**Table B.2 Service Menu Setpoints by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| | | 2 - Pump 2 | | |
| XDU.027 | Pump Rotation Frequency | 0 - 30 days | 7 days | Allows end user to define how often pumps should rotate. |
| XDU.035 | Flow Switch Time Delay | 1 - 9999 sec | 20 sec | |
| XDU.052 | Minimum Fluid Flow Volume | 1.0 - 1000.0 l/m | 5.0 l/m | Allows end user to specify minimum fluid flow. |
| XDU.053 | Perform Pump Rotation | 0 - No<br>1 - Yes | (0) No | Allows end user to force a pump rotation. |

## B.3 Line IDs for Alarm Setting Parameters

**Table B.3 User Menu Alarm Settings by Line ID**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| U202 | Return Sensor Alarms | Disabled Enabled | Enabled | Enables or disables the return sensor alarms. When enabled, the return temperature and humidity values will be compared to a high and low setting. |
| U203 | High Return Temperature | 34 - 210°F<br>1.0 - 99.0°C | 100°F | Allows a user to adjust the point at which the actual return temperature activates a High Temperature Alarm. |
| U204 | Low Return Temperature | 34 - 210°F<br>1.0 - 99.0°C | 65 °F | Allows a user to adjust the point at which the actual return temperature activates the Low Temperature Alarm. |
| U205 | High Return Humidity | 1.0 - 99.0% | 65.0% | Allows a user to adjust the point at which the actual return humidity activates the High Humidity Alarm. |
| U206 | Low Return Humidity | 1.0 - 99.0% | 35.0% | Allows a user to adjust the point at which the actual return humidity activates the Low Humidity Alarm. |
| U207 | Sensor A Alarms | Disabled Enabled | Disabled | Enables or disables the alarms for reference Sensor A. When enabled, the Sensor A temperature and humidity values will be compared to a high and low setting. |
| U208 | High Temperature Sensor A | 34 - 210°F<br>1.0 - 99.0°C | 90°F | Allows a user to adjust the point at which the actual Sensor A temperature activates a High Temperature Alarm. |
| U209 | Low Temperature Sensor A | 34 - 210°F<br>1.0 - 99.0°C | 55°F | Allows a user to adjust the point at which the actual Sensor A temperature activates a Low Temperature Alarm. |
| U210 | High Humidity Sensor A | 1.0 - 99.0% | 70.0% | Allows a user to adjust the point at which the actual Sensor A humidity activates a High Humidity Alarm. |
| U211 | Low Humidity Sensor | 1.0 - 99.0% | 30.0% | Allows a user to adjust the point at which the actual Sensor A humidity activates a Low Humidity Alarm. |

**Table B.3 User Menu Alarm Settings by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| U213 | Supply Sensor Alarms | Disabled Enabled | Disabled | Enables or disables the supply sensor alarms. When enabled, the supply temperature value will be compared to a high and low setting. |
| U214 | High Supply Temperature | 34 - 210°F<br>1.0 - 99.0°C | 75 °F | Sets the temperature at which the High Supply Temperature Alarm is activated. |
| U215 | Low Supply Temperature | 34 - 210°F<br>1.0 - 99.0°C | 50°F | Sets the temperature at which the Low Supply Temperature Alarm is activated. |
| U219 | Remote Sensor Alarms | 0 - Disabled<br>1 - Com Set<br>2 - Sep Set | Disabled | Enables or disables the remote sensor alarms. When enabled, the remote temperature values will be compared to a high and low setting. |
| U220 | High Remote Temperature | 34 - 210°F<br>1.0 - 99.0°C | 90°F | Enables or disables remote sensor temperature alarms. When enabled, the high and low remote temperature alarm will allow a user to adjust the point at which the actual remote temperature activates a High or Low temperature alarm. This parameter is used when common alarm points will be shared by all sensors. Otherwise, the remote sensors can be set individually. |
| | Low Remote Temperature | 34 - 210°F<br>1.0 - 99.0°C | 55°F | |
| U224-U233 | High Remote 01-10 | 34 - 210°F<br>1.0 - 99.0°C | 90°F | Sets the high and low remote temperature sensor alarm points individually for each sensor when the parameter separate thresholds is set to disabled. |
| | Low Remote 01-10 | 34 - 210°F<br>1.0 - 99.0°C | 55°F | |
| U235 | Static Pressure Messages | Disabled Enabled | Disabled | Enables or disables static pressure messages. |
| U236 | High Static Pressure (inWC) | 0.010 - 1.405 inWC | 1.284 inWC | Sets the pressure at which the High Static Pressure Alarm is activated (inWC, Pa) |
| | High Static Pressure (Pa) | 2 - 350 Pa | 320 Pa | |
| U237 | Low Static Pressure (inWC) | 0.000 - 1.395 nWC | 0.000 inWC | Sets the pressure at which the Low Static Pressure Alarm is activated (inWC, Pa) |
| | Low Static Pressure (Pa) | 0 - 348 Pa | 0 Pa | |
| U238 | SP Messages During Unit Off | No<br>Yes | No | Enables or disables Static Pressure messages when the unit is OFF |
| U239 | SP Messages on Fan Adjust | No<br>Yes | No | Enables or disables the static pressure messages when the fan as been adjusted due to special events. These events include an adjustment for heating, humidification, dehumidification, motor overload, EC fan fault, or loss of airflow. |
| U240 | SP Transducer High Range (inWC) | 0.000 - 1.405 inWC | 1.284 inWC | Sets the pressure range at which the High Static Pressure Out of Range alarm is activated. |

**Table B.3 User Menu Alarm Settings by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| | SP Transducer High Range (Pa) | 0 - 350 Pa | 320 Pa | |
| U241 | SP Transducer Low Range (inWC) | 0.000 - 1.395 inWC | 0.000 inWC | Sets the pressure range at which the Low Static Pressure Out of Range alarm is activated. |
| | SP Transducer Low Range (Pa) | 0 - 348 Pa | 0 Pa | |

**Table B.4 Service Menu Alarm Settings by Line ID**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| S202 | Return Sensor Alarms Enable | Disabled Enabled | Enabled | Enables or disables the return temperature and humidity sensor alarms. |
| | Return Sensor Alarms Init Delay | 10 - 9999 sec | 90 sec | |
| S203 | High Return Temperature Alarm | 34 - 210°F<br>1.0 - 99.0°C | 100°F | Sets the temperature threshold for the High/Low Return Temperature alarms. |
| | Low Return Temperature Alarm | 34 - 210°F<br>1.0 - 99.0°C | 65°F | |
| S204 | High Return Humidity Alarm | 1.0 - 99.0% | 0.65 | Sets the humidity threshold for the High/Low Return Temperature alarms. |
| | Low Return Humidity Alarm | 1.0 - 99.0% | 0.35 | |
| S205 | Sensor A Alarms Enable | Disabled Enabled | Disabled | Enables or disables the alarms associated with Sensor A and sets the time delay before the alarm is annunciated. |
| | Sensor A Alarms Init Delay | 10 - 9999 sec | 90 sec | |
| S206 | Sensor A Low Temperature Alarm | 34 - 210°F<br>1.0 - 99.0°C | 55°F | Sets the temperature threshold when Sensor A High/Low Temperature alarm will occur. |
| | Sensor A High Temperature Alarm | 34 - 210°F<br>1.0 - 99.0°C | 90°F | |
| S207 | Sensor A Low Humidity Alarm | 1.0 - 99.0% | 30.0% | Sets the temperature threshold when Sensor A High/Low Humidity alarm will occur. |
| | Sensor A High Humidity Alarm | 1.0 - 99.0% | 70.0% | |
| S208 | Warning Activates Alarm Relay | No Yes | Yes | When set to Yes, a Warning event type will activate the Alarm Relay, in addition to an Alarm event type. |

**Table B.4 Service Menu Alarm Settings by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| S209 | K11 (WA Relay) Active On | 0 - Dehum<br>1 - Warning<br>2 - Emergency Pwr<br>3 - Free cooling<br>4 - FC Start | Warning | The Warning Relay (WA Relay) can be activated for different purposes; during a Call of Dehumidification, during a 'Warning' event- type, when unit is on Emergency Power and a Customer Input Alarm is configured for Emergency Pwr during free cooling or during free cooling (FC) Start. |
| S210 | K11(WA Relay) and AL Relay | Direct Reverse | Direct | Determines whether the K11 (WA Relay) is Direct or Reverse acting. |
| S211 | Water Alarm Shuts Down Unit | No<br>Yes | No | The controller can be configured to shut the following down during an active Water Alarm:<br>• Shutdown the entire unit<br>• Shutdown humidification operation |
| | Water Alarm Hum Fill Down | No<br>Yes | No | |
| S21A | Loss of Flow Compressor Timer | 0 - 180 sec | 0 sec | Allows setting a maximum pump down time during a loss of flow condition to prevent causing a high pressure alarm due to pump down with no water/glycol flow to the condenser. Hidden unless pump down is enabled, Applies only to water/glycol cooled systems. |
| S21B | Loss of Flow Threshold | 0 - 100% | 0.1 | Sets the threshold for call for cooling loss of flow. |
| S213 | Supply Sensor Alarms Enable | Disabled<br>Enabled | Disabled | Enables or disables the supply sensor alarms. If the unit is not equipped with a supply temperature sensor, then this parameter will show Disabled. A user may also select the time delay before the alarm will become active. |
| | Supply Sensor Alarms Init Delay | 10 - 9999 sec | 90 sec | |
| S214 | High Supply Temperature | 34 - 210°F<br>1.0 - 99.0°C | 75°F | Sets the high and low supply temperature threshold that the alarms will be triggered at. |
| | Low Supply Temperature | 34 - 210°F<br>1.0 - 99.0°C | 50°F | |
| S215 | Dew Point Alarms Enable | Disabled<br>Enabled | Disabled | Enables or disables the Return Air Dew Point alarm. Dew point alarms can be enabled with any |

**Table B.4 Service Menu Alarm Settings by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| | | | | humidity control type. Dew point alarms may be used with or without humidification or dehumidification options selected. A user may adjust the time delay before the alarm is activated. |
| | Dew Point Alarms Init Delay | 10 - 9999 sec | 90 sec | |
| S216 | High Dew Point | 34 - 210°F<br>1.0 - 99.0°C | 59°F | Sets the high/low dew point threshold. |
| | Low Dew Point | 34 - 210°F<br>1.0 - 99.0°C | 39°F | |
| S217 | Sensor A Dew Point Alarms Enable | Disabled Enabled | Disabled | Enables or disables the optional Sensor A Dew Point alarm. Dew point alarms can be enabled with any humidity control type. Dew point alarms may be used with or without humidification or dehumidification options selected. A user may adjust the time delay before the alarm is activated. |
| | Sensor A Dew Point Alarms Init Delay | 10 - 9999 sec | 90 sec | |
| S218 | High Dew Point Sensor A | 34 - 210°F<br>1.0 - 99.0°C | 62°F | Sets the high/low Sensor A dew point thresholds. |
| | Low Dew Point Sensor A | 34 - 210°F<br>1.0 - 99.0°C | 36°F | |
| S219 | Remote Sensor Alarms Enable | 0 - Disabled<br>1 - Com Set<br>2 - Sep Set | Disabled | Disable prevents remote temperature sensor alarms from occurring. Com set (common settings) allows remote alarm activation based on a common alarm setting. Sep set (separate settings) allows the user to program unique temperature alarm settings. A user may adjust the time delay before the alarm is activated. |
| | Remote Sensor Alarms Init Delay | 10 - 9999 sec | 180 sec | |
| S220 | High Remote Temperature | 34 - 210°F<br>1.0 - 99.0°C | 90°F | Sets the high/low Remote Sensor alarm thresholds. |
| | Low Remote Temperature | 34 - 210°F<br>1.0 - 99.0°C | 55°F | |
| S222 | EEV Alarmboard | 0 - NO<br>1 - NC | 1 (NC) | |

**Table B.4 Service Menu Alarm Settings by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| S22A | Operation on Sensor Failure | 0 - Cooling<br>1 - Shutdown | 0 (Cooling) | Selects function to occur if the temperature control sensor fails: Full - Full, CFC Hold - hold last CFC. |
| | Operation on Sensor Failure Cooling Mode | 0 - Full<br>1 - Hold | 0 (Full) | |
| S224 - S233, S23A, | Customer Input 1 - 11 | 0 - Smoke<br>1 - Water Alarm<br>2 - C PMP Alarm<br>3 - Flow Alarm<br>4 - Stdby G Pump<br>5 - Stdby Unit<br>6 - C-Input 1<br>7 - C-Input 2<br>8 - C-Input 3<br>9 - C-Input 4<br>10 - Rht Lockout<br>11 - Hum Lockout<br>12 - Rht+Hum Lock<br>13 - Comp Lockout<br>14 - Call Service<br>15 - High Temp<br>16 - Air Loss<br>17 - FC Lockout<br>18 - Heater Alarm<br>19 - Flow AL SD<br>20 - Flow AL LC | 1 (Water Alarm) for inputs 1-4<br>38 (Not Used) for inputs 5-11 | Selects the device and operation of the customer inputs. Each event reflects a different alarm scenario and possible action to the unit. A user may select whether the customer input is normally open or normally closed. If the parameter is configured for Factory STD, then it indicates that this input is factory configured and is not configurable in the field. |
| S224 - S233, S23A,<br>(Cont'd) | Customer Input 1 - 11 (Cont'd) | 21 - Comp Lock PD<br>22 - Enable FC<br>23 - HTRJ VFD<br>24 - HTRJ SPD<br>25 - Fire Alarm<br>26 - 2nd Setpoint<br>27 - Emergency Pwr<br>28 - LSI<br>29 - Cond 1 Fail<br>30 - Cond 2 Fail<br>31 - D-Scroll Red<br>32 - Swap Valve<br>33 - EC Fan Fault<br>34 - Eco Airflow<br>35 - Damper Switch<br>36 - Power A<br>37 - Power B<br>38 - Not Used<br>39 - Flow AL LFC<br>40 - Hand Mode<br>41 - Fan Overrd.<br>42 - Cool Overrd | 1 (Water Alarm) for inputs 1-4<br>38 (Not Used) for inputs 5-11 | Selects the device and operation of the customer inputs. Each event reflects a different alarm scenario and possible action to the unit. A user may select whether the customer input is normally open or normally closed. If the parameter is configured for Factory STD, then it indicates that this input is factory configured and is not configurable in the field. |

**Table B.4 Service Menu Alarm Settings by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| S224 - S233, S23A, (Cont'd) | Customer Input Active Open/Closed | Closed Open | Closed | A user may select if the customer input is active when contacts are open or closed. |
| S236 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Main fan overload. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: MAIN FAN OVERLOAD | MESSAGE WARNING ALARM | ALARM | |
| S237 | Initial Loss of Airflow Delay | 10 - 600 sec | 30 sec | Loss of airflow. |
| | Event Delay Time (sec) | 10 - 9999 sec | 30 sec | |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: LOSS OF AIRFLOW | MESSAGE WARNING ALARM | ALARM | |
| S238 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Clogged filters. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: CLOGGED FILTERS | MESSAGE WARNING ALARM | WARNING | |
| S239 | Event Delay Time (sec) | 10 - 9999 sec | 30 sec | High room temperature. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: HIGH ROOM TEMP | MESSAGE WARNING ALARM | WARNING | |
| S240 | Event Delay Time (sec) | 10 - 9999 sec | 30 sec | Low room temperature. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: LOW ROOM TEMP | MESSAGE WARNING ALARM | WARNING | |
| S241 | Event Delay Time (sec) | 10 - 9999 sec | 30 sec | High room humidity, |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: HIGH ROOM HUM | MESSAGE WARNING ALARM | WARNING | |
| S242 | Event Delay Time (sec) | 10 - 9999 sec | 30 sec | Low room humidity. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: LOW ROOM HUM | MESSAGE WARNING ALARM | WARNING | |
| S243 | Event Delay Time (sec) | 10 - 9999 sec | 30 sec | High temperature sensor A. |
| | Event Enabled | Disabled Enabled | Disabled | |
| | Event: HIGH TEMP SENSOR A | MESSAGE WARNING ALARM | WARNING | |
| S244 | Event Delay Time (sec) | 10 - 9999 sec | 30 sec | Low temperature sensor A. |
| | Event Enabled | Disabled Enabled | Disabled | |
| | Event: LOW TEMP SENSOR A | MESSAGE WARNING ALARM | WARNING | |

**Table B.4 Service Menu Alarm Settings by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| S245 | Event Delay Time (sec) | 10 - 9999 sec | 30 sec | High humidity sensor A. |
| | Event Enabled | Disabled Enabled | Disabled | |
| | Event: HIGH HUM SENSOR A | MESSAGE WARNING ALARM | WARNING | |
| S246 | Event Delay Time (sec) | 10 - 9999 sec | 30 sec | Low humidity sensor A. |
| | Event Enabled | Disabled Enabled | Disabled | |
| | Event: LOW HUM SENSOR A | MESSAGE WARNING ALARM | WARNING | |
| S249 | Event Delay Time (sec) | — | — | Compressor 1 overload. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: COMP 1 OVERLOAD | MESSAGE WARNING ALARM | ALARM | |
| S250 | Event Delay Time (sec) | — | — | Compressor 2 overload. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: COMP 2 OVERLOAD | MESSAGE WARNING ALARM | ALARM | |
| S251 | Event Delay Time (sec) | — | — | Circuit 1 high pressure. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: CIRCUIT 1 HIGH PRESS | MESSAGE WARNING ALARM | ALARM | |
| S252 | Event Delay Time (sec) | — | — | Circuit 2 high pressure. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: CIRCUIT 2 HIGH PRESS | MESSAGE WARNING ALARM | ALARM | |
| S253 | Event Delay Time (sec) | — | — | Circuit 1 low pressure |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: CIRCUIT 1 LOW PRESS | MESSAGE WARNING ALARM | ALARM | |
| S254 | Event Delay Time (sec) | — | — | Circuit 2 low pressure. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: CIRCUIT 2 LOW PRESS | MESSAGE WARNING ALARM | ALARM | |
| S255 | Event Delay Time (sec) | — | — | Circuit 1 pumpdown failure. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: CIRCUIT 1 PUMPD. FAIL | MESSAGE WARNING ALARM | ALARM | |
| S256 | Event Delay Time (sec) | — | — | Circuit 2 pumpdown failure. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: CIRCUIT 2 PUMPD. FAIL | MESSAGE WARNING ALARM | ALARM | |

**Table B.4 Service Menu Alarm Settings by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| S257 | Event Delay Time (sec) | — | — | Digital scroll 1 high temperature. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: DIG SCROLL1 HIGH TEMP | MESSAGE WARNING ALARM | ALARM | |
| S258 | Event Delay Time (sec) | — | — | Digital scroll 2 high temperature. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: DIG SCROLL2 HIGH TEMP | MESSAGE WARNING ALARM | ALARM | |
| S259 | Event Reset Type | 0 - AR<br>1 - MR | 0 (AR) | Electric heat high. Temp AR - Auto Reset, MR - Manual Reset. |
| | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: EL HEAT HIGH TEMP | MESSAGE WARNING ALARM | ALARM | |
| S262 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | |
| | Event Enabled | Disabled Enabled | Enabled | Working hours exceeded. |
| | Event: UNIT HRS EXCEEDED | MESSAGE WARNING ALARM | WARNING | |
| S263 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Smoke detected. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: SMOKE DETECTED | MESSAGE WARNING ALARM | ALARM | |
| S264 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Water under floor. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: WATER UNDER FLOOR | MESSAGE WARNING ALARM | ALARM | |
| S265 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Cond pump high water. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: COND PUMP-HIGH WATER | MESSAGE WARNING ALARM | ALARM | |
| S266 | Event Delay Time (sec) | 0 = AR<br>1 = MR | 0 (AR) | Loss of flow AR , Auto Reset MR - manual reset. |
| | Event Enabled | 10 - 9999 sec | 10 sec | |
| | Event Number 107 Enabled | Disabled Enabled | Enabled | |
| | Event: LOSS OF FLOW | MESSAGE WARNING ALARM | ALARM | |

**Table B.4 Service Menu Alarm Settings by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| S267 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Standby glycol pump ON. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: STANDBY GLYCOL PUMP ON | MESSAGE WARNING ALARM | ALARM | |
| S268 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Standby unit ON. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: STANDBY UNIT ON | MESSAGE WARNING ALARM | ALARM | |
| S269 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Humidifier problem. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: HUMIDIFIER PROBLEM | MESSAGE WARNING ALARM | ALARM | |
| S270 | Event Delay Time (sec) | 10 - 9999 sec | 300 sec | No connection with unit 1. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: NO CONNECTION W/ UNIT1 | MESSAGE WARNING ALARM | WARNING | |
| S271 | Event Delay Time (sec) | — | — | Unit X disconnected. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: UNIT 01 DISCONNECTED | MESSAGE WARNING ALARM | WARNING | |
| S272 | Event: Loss of power Autoreset Delay | 60 - 3600 sec | 300 sec | Loss of power. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: LOSS OF POWER | MESSAGE WARNING ALARM | WARNING | |
| S275 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Customer Input 1 |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: CUSTOMER INPUT 1 | MESSAGE WARNING ALARM | ALARM | |
| S276 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Customer Input 2 |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: CUSTOMER INPUT 2 | MESSAGE WARNING ALARM | ALARM | |
| S277 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Customer Input 3 |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: CUSTOMER INPUT 3 | MESSAGE WARNING ALARM | ALARM | |

**Table B.4 Service Menu Alarm Settings by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| S278 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Customer Input 4 |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: CUSTOMER INPUT 4 | MESSAGE WARNING ALARM | ALARM | |
| S279 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Call service. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: CALL SERVICE | MESSAGE WARNING ALARM | ALARM | |
| S280 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | High temperature. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: HIGH TEMPERATURE | MESSAGE WARNING ALARM | ALARM | |
| S281 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Loss of air blower 1. |
| | Event Enabled | Disabled Enabled | Disabled | |
| | Event: LOSS OF AIR BLOWER 1 | MESSAGE WARNING ALARM | ALARM | |
| S282 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Reheat lockout. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: REHEAT LOCKOUT | MESSAGE WARNING ALARM | WARNING | |
| S283 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Humidifier lockout. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: HUMIDIFIER LOCKOUT | MESSAGE WARNING ALARM | WARNING | |
| S284 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | FC lockout. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: FC LOCKOUT | MESSAGE WARNING ALARM | WARNING | |
| S285 | Compressor Lockout Option | 0 - ALL<br>1 - 1 (A)<br>2 - 2 (A)<br>3 - 1B<br>4 - 2B<br>5 - 1A + 2A<br>6 - 1B + 2B<br>7 - 1A + 1B<br>8 - 2A + 2B | 0(ALL) | Compressor(s) lockout. |
| | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | |
| | Event Enabed | Disabled Enabled | Enabled | |
| | Event: COMPRESSOR (S) LOCKOUT | MESSAGE WARNING ALARM | WARNING | |

**Table B.4 Service Menu Alarm Settings by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| S27B | Edit Cust Input 1 | (20 digits)<br>0-9<br>A-Z<br>a-z<br>&* / . + - _ : @ \ | CUSTOMER INPUT 1 | Edit Customer Input 1 text. |
| S27C | Edit Cust Input 2 | (20 digits)<br>0-9<br>A-Z<br>a-z<br>&* / . + - _ : @ \ | CUSTOMER INPUT 2 | Edit Customer Input 2 text. |
| S27D | Edit Cust Input 3 | (20 digits)<br>0-9<br>A-Z<br>a-z<br>&* / . + - _ : @ \ | CUSTOMER INPUT 3 | Edit Customer Input 3 text. |
| S27E | Edit Cust Input 4 | (20 digits)<br>0-9<br>A-Z<br>a-z<br>&* / . + - _ : @ \ | CUSTOMER INPUT 4 | Edit Customer Input 4 text. |
| S288 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Compressor 1 short cycle. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: COMP 1 SHORT CYCLE | MESSAGE WARNING ALARM | WARNING | |
| S289 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Compressor 2 short cycle. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: COMP 2 SHORT CYCLE | MESSAGE WARNING ALARM | WARNING | |
| S290 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Emergency power. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: EMERGENCY POWER | MESSAGE WARNING ALARM | WARNING | |
| S291 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Condenser 1 failure. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: CONDENSER 1 FAILURE | MESSAGE WARNING ALARM | WARNING | |
| S292 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Condenser 2 failure. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: CONDENSER 2 FAILURE | MESSAGE WARNING ALARM | WARNING | |
| S293 | Event Delay Time (sec) | 10 - 9999 sec | 15 sec | EC fan fault. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: EC FAN FAULT | MESSAGE WARNING ALARM | ALARM | |

**Table B.4 Service Menu Alarm Settings by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| S294 | Event Delay Time (sec) | 10 - 9999 sec | 30 sec | High supply temperature. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: HI SUPPLY TEMPERATURE | MESSAGE WARNING ALARM | WARNING | |
| S295 | Event Delay Time (sec) | 10 - 9999 sec | 30 sec | Low supply temperature. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: LO SUPPLY TEMPERATURE | MESSAGE WARNING ALARM | WARNING | |
| S296 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Reduced eco airflow. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: REDUCED ECO AIRFLOW | MESSAGE WARNING ALARM | WARNING | |
| S297 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Eco high temperature override. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: ECO HI TEMP OVERRIDE | MESSAGE WARNING ALARM | WARNING | |
| S298 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Temperature control sensor fail. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: TEMP CTRL SENSOR FAIL | MESSAGE WARNING ALARM | ALARM | |
| S2A2 | Event Delay Time (sec) | 10 - 9999 sec | 30 sec | High dew point |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: HIGH DEW POINT | MESSAGE WARNING ALARM | WARNING | |
| S2A3 | Event Delay Time (sec) | 10 - 9999 sec | 30 sec | Low dew point |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: LOW DEW POINT | MESSAGE WARNING ALARM | WARNING | |
| S2A4 | Event Delay Time (sec) | 10 - 9999 sec | 30 sec | High dew point Sensor A. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: HI DEW POINT SENSOR A | MESSAGE WARNING ALARM | WARNING | |
| S2A5 | Event Delay Time (sec) | 10 - 9999 sec | 30 sec | Low dew point Sensor A. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: LOW DEW POINT SENSOR A | MESSAGE WARNING ALARM | WARNING | |

**Table B.4 Service Menu Alarm Settings by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| S2A6 | Event Delay Time (sec) | 10 - 9999 sec | 30 sec | High remote sensor. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | — | MESSAGE WARNING ALARM | WARNING | |
| S2A7 | Event Delay Time (sec) | 10 - 9999 sec | 30 sec | Low remote sensor. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | — | MESSAGE WARNING ALARM | WARNING | |
| S2A8 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Power A failure. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: POWER 'A' FAILURE | MESSAGE WARNING ALARM | ALARM | |
| S2A9 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Power B failure. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: POWER 'B' FAILURE | MESSAGE WARNING ALARM | ALARM | |
| S2B1 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Airflow sensor failure. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: AIRFLOW SENSOR FAIL | MESSAGE WARNING ALARM | WARNING | |
| S2B2 | Event Delay Time (sec) | 10 - 9999 sec | 30 sec | Humidity control sensor failure. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: HUM CTRL SENSOR FAILURE | MESSAGE WARNING ALARM | WARNING | |
| S2B6 | Event Delay Time (sec) | 10 - 9999 sec | 120 sec | Low static pressure. |
| | Event Enabled | Disabled Enabled | Disabled | |
| | Event: LOW STATIC PRESSURE | MESSAGE WARNING ALARM | WARNING | |
| S2B7 | Event Delay Time (sec) | 10 - 9999 sec | 120 sec | High static pressure. |
| | Event Enabled | Disabled Enabled | Disabled | |
| | Event: HIGH STATIC PRESSURE | MESSAGE WARNING ALARM | WARNING | |
| S2B8 | Event Delay Time (sec) | 10 - 9999 sec | 150 sec | Static pressure 1 out of tange. |
| | Event Enabled | Disabled Enabled | Disabled | |
| | Event: STATPR 1 OUT OF RANGE | MESSAGE WARNING ALARM | WARNING | |

**Table B.4 Service Menu Alarm Settings by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| S2B9 | Event Delay Time (sec) | 10 - 9999 sec | 150 sec | Static pressure 2 out of range. |
| | Event Enabled | Disabled Enabled | Disabled | |
| | Event: STATPR 2 OUT OF RANGE | MESSAGE WARNING ALARM | WARNING | |
| S2C1 | Event Delay Time (sec) | 10 - 9999 sec | 150 sec | Static pressure 3 out of range. |
| | Event Enabled | Disabled Enabled | Disabled | |
| | Event: STATPR 3 OUT OF RANGE | MESSAGE WARNING ALARM | WARNING | |
| S2C2 | Event Delay Time (sec) | 10 - 9999 sec | 150 sec | Static pressure 4 out of range. |
| | Event Enabled | Disabled Enabled | Disabled | |
| | Event: STATPR 4 OUT OF RANGE | MESSAGE WARNING ALARM | WARNING | |
| S2C3 | Event Delay Time (sec) | 10 - 9999 sec | 120 sec | Static pressure 1 sensor failure. |
| | Event Enabled | Disabled Enabled | Disabled | |
| | Event: STAT PR 1 SENS FAIL | MESSAGE WARNING ALARM | ALARM | |
| S2C4 | Event Delay Time (sec) | 10 - 9999 sec | 120 sec | Static pressure 2 sensor failure. |
| | Event Enabled | Disabled Enabled | Disabled | |
| | Event: STAT PR 2 SENS FAIL | MESSAGE WARNING ALARM | ALARM | |
| S2C5 | Event Delay Time (sec) | 10 - 9999 sec | 120 sec | Static pressure 3 sensor failure. |
| | Event Enabled | Disabled Enabled | Disabled | |
| | Event: STAT PRES 3 SENS FAIL | MESSAGE WARNING ALARM | ALARM | |
| S2C6 | Event Delay Time (sec) | 10 - 9999 sec | 120 sec | Static pressure 4 sensor failure. |
| | Event Enabled | Disabled Enabled | Disabled | |
| | Event: STAT PRES 4 SENS FAIL | MESSAGE WARNING ALARM | ALARM | |
| S2D1 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Compressor 1A overload. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: COMP 1A OVERLOAD | MESSAGE WARNING ALARM | ALARM | |
| S2D2 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Compressor 1B overload. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: COMP 1B OVERLOAD | MESSAGE WARNING ALARM | ALARM | |

**Table B.4 Service Menu Alarm Settings by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| S2D3 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Compressor 2A overload. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: COMP 2A OVERLOAD | MESSAGE WARNING ALARM | ALARM | |
| S2D4 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Compressor 2B overload. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: COMP 2B OVERLOAD | MESSAGE WARNING ALARM | ALARM | |
| S2D5 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Compressor 1A high temperature. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: COMP 1A HIGH TEMP | MESSAGE WARNING ALARM | ALARM | |
| S2D6 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Compressor 1B high temperature. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: COMP 1B HIGH TEMP | MESSAGE WARNING ALARM | ALARM | |
| S2D7 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Compressor 2A high temperature. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: COMP 2A HIGH TEMP | MESSAGE WARNING ALARM | ALARM | |
| S2D8 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Compressor 2B high temperature. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: COMP 2B HIGH TEMP | MESSAGE WARNING ALARM | ALARM | |
| S2D9 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Compressor 1A short cycle. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: COMP 1A SHORT CYCLE | MESSAGE WARNING ALARM | WARNING | |
| S2E1 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Compressor 1B short cycle. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: COMP 1B SHORT CYCLE | MESSAGE WARNING ALARM | WARNING | |
| S2E2 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Compressor 2A short cycle. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: COMP 2A SHORT CYCLE | MESSAGE WARNING ALARM | WARNING | |

**Table B.4 Service Menu Alarm Settings by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| S2E5 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Compressor 2B short cycle. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: COMP 2B SHORT CYCLE | MESSAGE WARNING ALARM | WARNING | |
| S2E6 | Event Delay Time (sec) | 10 - 9999 sec | 60 sec | GCB ambient temperature differential. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: GCD AMBIENT TEMP DIFF | MESSAGE WARNING ALARM | WARNING | |
| S2E7 | – | – | – | C1 freeze protection. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: C1 FREEZE PROTECTION | MESSAGE WARNING ALARM | ALARM | |
| S2E8 | – | – | – | C2 freeze protection. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: C2 FREEZE PROTECTION | MESSAGE WARNING ALARM | ALARM | |
| S2E9 | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | Damper failure. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: DAMPER FAILURE | MESSAGE WARNING ALARM | ALARM | |
| SF2F | – | – | – | BMS disconnected. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: BMS DISCONNECTED | MESSAGE WARNING ALARM | WARNING | |
| S2F9 | Phase Loss MB01 shuts unit down | 0 - No<br>1 - Yes | 1 (Yes) | Power 1 phase loss. |
| | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: POWER 1 PHASE LOSS | MESSAGE WARNING ALARM | ALARM | |
| S2G1 | Phase Loss MB02 shuts unit down | 0 - No<br>1 - Yes | 1 (Yes) | Power 2 phase loss. |
| | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: POWER 2 PHASE LOSS | MESSAGE WARNING ALARM | ALARM | |
| S2G2 | Phase Loss MB03 shuts unit down | 0 - No<br>1 - Yes | 1 (Yes) | Power 3 phase loss. |
| | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | |

**Table B.4 Service Menu Alarm Settings by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: POWER 3 PHASE LOSS | MESSAGE WARNING ALARM | ALARM | |
| S2G3 | Phase Loss MB04 shuts unit down | 0 - No<br>1 - Yes | 1 (Yes) | Power 4 phase loss. |
| | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: POWER 4 PHASE LOSS | MESSAGE WARNING ALARM | ALARM | |
| S2G4 | Phase Loss MB05 shuts unit down | 0 - No<br>1 - Yes | 1 (Yes) | Power 5 phase loss. |
| | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: POWER 5 PHASE LOSS | MESSAGE WARNING ALARM | ALRM | |
| S2G5 | Phase Loss MB06 shuts unit down | 0 - No<br>1 - Yes | 1 (Yes) | Power 6 phase loss. |
| | Event Delay Time (sec) | 10 - 9999 sec | 10 sec | |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: POWER 6 PHASE LOSS | MESSAGE WARNING ALARM | ALARM | |
| S2G6 | Event Delay Time (sec) | 10 - 9999 sec | 60 sec | Flow sensor fail C1. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: FLOW SENSOR FAIL C1 | MESSAGE WARNING ALARM | WARNING | |
| S2G7 | Event Delay Time (sec) | 10 - 9999 sec | 60 sec | Flow sensor fail C2. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: FLOW SENSOR FAIL C2 | MESSAGE WARNING ALARM | WARNING | |
| S2G8 | Event Delay Time (sec) | 10 - 9999 sec | 60 sec | TSA sensor fail. |
| | Event Enabled | Disabled Enabled | Enabled | |
| | Event: TSA SENSOR FAIL | MESSAGE WARNING ALARM | ALARM | |
| 617 | Event Delay Time (sec) | 1 - 9999 sec | 10 sec | XDU pump inverter fail 1. |
| | Event Enabled | DisabledEnabled | Enabled | |
| | Event: PUMP INVERTER FAIL 1 | MESSAGEWARNINGALARM | ALARM | |
| 618 | Event Delay Time (sec) | 1 - 9999 sec | 10 sec | XDU pump inverter fail 2. |
| | Event Enabled | DisabledEnabled | Enabled | |
| | Event: PUMP INVERTER FAIL 2 | MESSAGEWARNINGALARM | ALARM | |

**Table B.4 Service Menu Alarm Settings by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| 619 | Event Delay Time (sec) | 1 - 9999 sec | 10 sec | XDU pump flow fail 1. |
| | Event Enabled | DisabledEnabled | Enabled | |
| | Event: PUMP FLOW FAIL 1 | MESSAGEWARNINGALARM | ALARM | |
| 620 | Event Delay Time (sec) | 1 - 9999 sec | 10 sec | XDU Pump flow fail 2. |
| | Event Enabled | DisabledEnabled | Enabled | |
| | Event: PUMP FLOW FAIL 2 | MESSAGEWARNINGALARM | ALARM | |
| 621 | Event Delay Time (sec) | 1 - 9999 sec | 10 sec | XDU fluid flow check filter. |
| | Event Enabled | DisabledEnabled | Enabled | |
| | Event: CHECK WATER SYSTEM | MESSAGEWARNINGALARM | WARNING | |
| 622 | Event Delay Time (sec) | 1 - 9999 sec | 10 sec | The current XDU supply fluid temperature is above the threshold. |
| | Event Enabled | DisabledEnabled | Enabled | |
| | Event: HIGH SUPPLY WATER TEMP | MESSAGEWARNINGALARM | WARNING | |
| 623 | Event Delay Time (sec) | 1 - 9999 sec | 10 sec | The current XDU return fluid temperature is above the threshold. |
| | Event Enabled | DisabledEnabled | Enabled | |
| | Event: HIGH RETURN WATER TEMP | MESSAGEWARNINGALARM | WARNING | |
| 624 | Event Delay Time (sec) | 1 - 9999 sec | 10 sec | XDU Pump operation with no flow. |
| | Event Enabled | DisabledEnabled | Enabled | |
| | Event: PUMP OPERATION WITH NO FLOW | MESSAGEWARNINGALARM | ALARM | |
| 625 | Event Delay Time (sec) | 1 - 9999 sec | 10 sec | XDU supply fluid sensor failure. |
| | Event Enabled | DisabledEnabled | Enabled | |
| | Event: SUPPLY FLUID SENSOR FAILURE | MESSAGEWARNINGALARM | ALARM | |
| 626 | Event Delay Time (sec) | 1 - 9999 sec | 10 sec | XDU return fluid sensor failure. |
| | Event Enabled | DisabledEnabled | Enabled | |
| | Event: RETURN FLUID SENSOR FAILURE | MESSAGEWARNINGALARM | ALARM | |
| 627 | Event Delay Time (sec) | 1 - 9999 sec | 10 sec | XDU fluid flow sensor failure. |
| | Event Enabled | DisabledEnabled | Enabled | |
| | Event: FLOW SENSOR FAILURE | MESSAGEWARNINGALARM | ALARM | |

**Table B.4 Service Menu Alarm Settings by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| 628 | Event Delay Time (sec) | 1 - 9999 sec | - | Current working hours of fluid pump 1 are above the threshold. |
| | Event Enabled | DisabledEnabled | Enabled | |
| | Event: PUMP 1 HOURS EXCEEDED | MESSAGEWARNINGALARM | WARNING | |
| 629 | Event Delay Time (sec) | 1 - 9999 sec | - | Current working hours of fluid pump 2 are above the threshold. |
| | Event Enabled | DisabledEnabled | Enabled | |
| | Event: PUMP 2 HOURS EXCEEDED | MESSAGEWARNINGALARM | WARNING | |

## B.4 Line IDs for Cascade Operation Parameters

**Table B.5 Service Menu Cascade Parameters by Line ID**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| S515 | Cascade Units | No<br>Yes<br>Cool/Heat<br>Cooling<br>Fan PI<br>Fan Speed | No | User may select the method to which the next standby unit will stage ON.<br>• No: Disabled<br>• Yes : Enabled via TW Mode 1<br>• Cool/Heat: Enabled via TW Mode 1<br>• Cooling: Enabled via TW Mode 1<br>• Fan PI: Enabled via TW Mode 3<br>• Fan Speed : Enabled via TW Mode 3 |
| S516 | Cascaded Units Delay | 0 - 30 min | 10 min | Once a standby unit receives an ON command from the Master (U2U 1), the amount of time that must surpass prior to the standby unit staging ON |
| S517 | Cascaded Units Quick Start | 0 - 30 min | 2 min | This control delay time is used (shorter time than S516) after the Master (U2U 1) has restarted after a power cycle. The timer changes back to using S516 when the time of power cycle is equal to S517 min/sec.<br>**NOTE: This setting is not required. If set to a value of 0, then S517 Cascade Units Quick Start is disabled.** |
| | Cascaded Units QS Delay | 15 - 1800 sec | 120 sec | |
| S518 | Cascaded Units Control Delay | 0 - 30 min | 5 min | Once a standby unit has been cascaded on, the amount of time that must surpass before the normal unit control is used. |
| S519 | Cascaded Units OFF Delay | 0 - 360 min | 0 min | This timer starts to count down once a cascaded on system has received an off request from the master; the cascaded unit will stop after this timer and S520 have elapsed. |
| S520 | Cascaded Units Min Run | 2 - 360 min | 30 min | The minimum on time the cascaded system will run before staging off, once energized. |
| S521 | Start Next Unit at SYS Fan Speed | 50 - 100% | 100% | When the System (network) fan speed operates at or above S521, S516 timer is started. Once S516 has elapsed, the next single unit will energized.<br>**NOTE: Fan speed must be at or continuously above the value set in S521. The timer restarts any time the fan speed falls below the value set in S521.** |

**Table B.5 Service Menu Cascade Parameters by Line ID (continued)**

| Line ID | Parameter Name | Range | Default Setting | Description |
|---|---|---|---|---|
| S522 | Max. Intermediate System Speed | 50 - 100% | 100% | Defines the value to which the System (network) fan speed may increase to when not all units in the network are in operation |
| S523 | Stop Next Unit at SYS Fan Speed | 20 - 70% | 70% | when the current system (network) fan speed operates at or below S523, two timers must elapse before the cascaded on unit turns off; S519 and S520. |
| S524 | Cascaded Units OFF Master Delay | 0 - 360 min | 1 min | In the event of the Virtual Master taking control; the new Master unit shall control the staging off of currently operating units for the amount of time set in S524. After S524 time has elapsed, S519 value is used. |

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