VERTIV™

Liebert® iCOM™

Installer/User Guide

Intelligent Communication and Monitoring for Liebert® XDU

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

- The resistive touchscreen 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
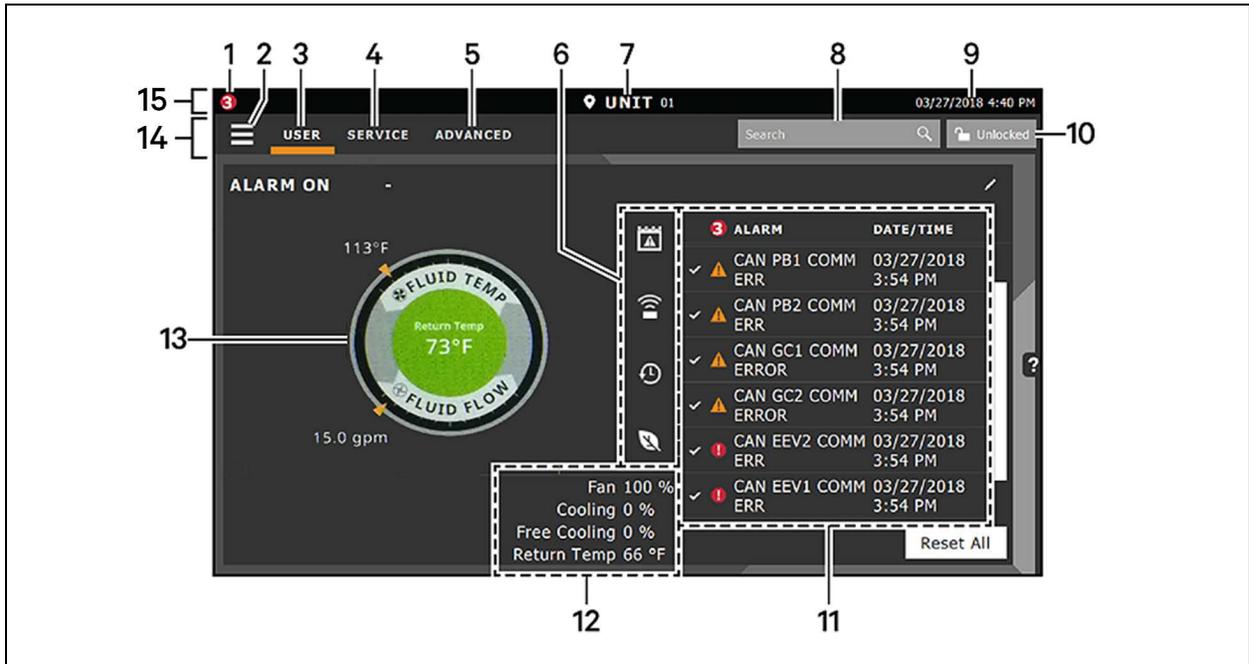
Table 1.1 Main Display Controls and Options

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. NOTE: You must unlock the display with the User PIN to access the menu and options. See Powering On the Vertiv™ Liebert® iCOM™ and Logging In/Unlocking Controls on page 5 .
4	Service icon. When selected, the service options are available on the main display and menu. NOTE: You must unlock the display with the Service PIN to access the menu and options. See Powering On the Vertiv™ Liebert® iCOM™ and Logging In/Unlocking Controls on page 5 .
5	Advanced icon. When selected, the advanced options are available on the main display and menu. NOTE: You must unlock the display with the Service PIN to access the menu and read-only options. See Powering On the Vertiv™ Liebert® iCOM™ and Logging In/Unlocking Controls on page 5 .
6	Cooling unit parameters. Status display of selected system parameter settings. See Adding and Adjusting Content on page 81
7	Unit Identification. You may customize the unit name up to six characters/numbers.
8	Search icon. Open the keyboard to search for controls and setting locations. See Searching on page 7 .
9	Date/Time.
10	Lock/Unlock icon. Indicates whether or not the user and service options are accessible. • Locked icon: display is read-only. • Unlocked icon: user or service is logged in and options are accessible. See Powering On the Vertiv™ Liebert® iCOM™ and Logging In/Unlocking Controls on page 5 .
11	Secondary content panel. When accessing settings/configuration via the menus, the settings display in the right, secondary panel.

Table 1.1 Main Display Controls and Options (continued)

Item	Description
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	Control header. Controls to access the user and service menus. See Control Header on the next page .
15	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** below .

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 the next page .

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 81 .

Figure 1.2 Dial Sections
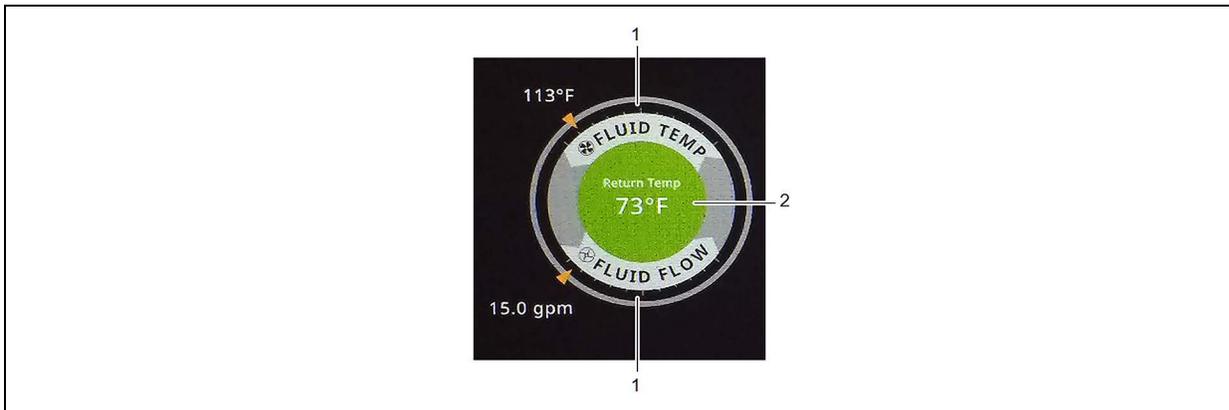
Table 1.2 Dial Sections

Item	Description
1	Control sensor and its setpoint. The sensors and setpoints displayed depend on the configuration of your unit.
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
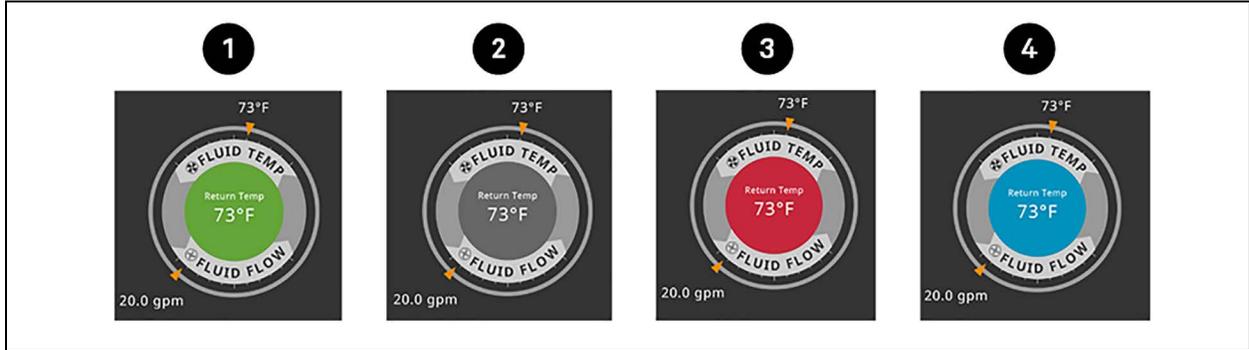
Item	Description
1	Sensor reading is within threshold limits.
2	Unit is powered off.
3	Sensor reading is above threshold limit or the unit is in an alarm condition.
4	Sensor reading is below threshold limit.

Table 1.3   Background Color Displayed by Selected Value and Threshold Limit

Sensor/Value Selected	Threshold Limit	Background Color
Return Temp	None	Blue
	High return temperature	Red
Supply Temp	Low supply temperature	Blue
	High supply temperature	Red

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 Customizing Main Display Views on page 80 .

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 74 .

- 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 8 .

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 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 above .

To power on the unit:

1. Touch , 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** on the next page .

Figure 1.4   Unit Status On Vertiv™ Liebert® iCOM™ Display
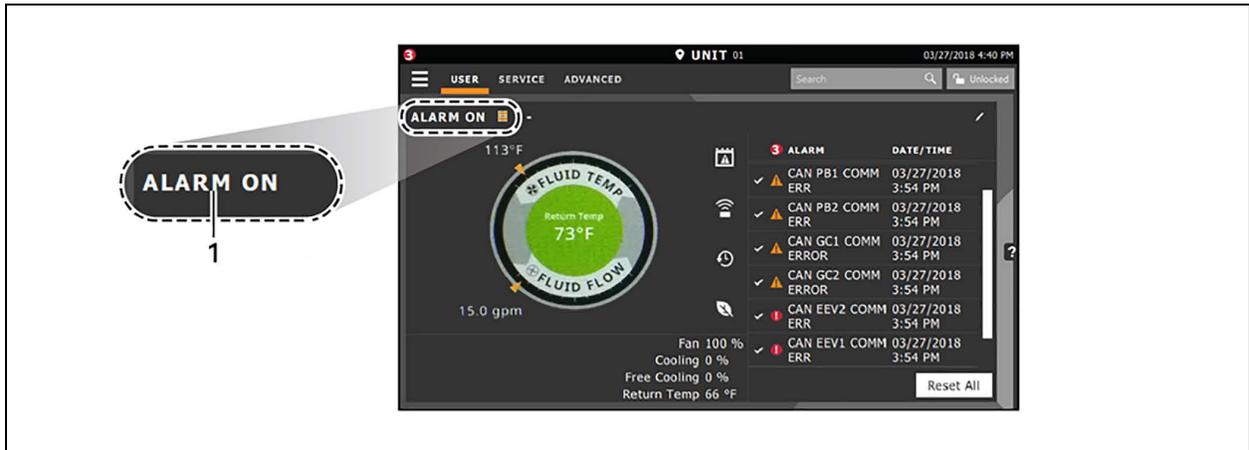
Item	Description
1	Current status of the unit. See **Table 1.4** below .

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 12 .
MANUAL	Controlled by a service technician. See Enabling Manual Mode for Diagnostics on page 75 .
DISPLAY OFF	Unit is turned Off at the Liebert® iCOM™ display. See Powering On the Thermal Management Unit on the previous page .
ALARM STANDBY	In standby because of an active alarm on the unit. See Viewing Unit Alarms on page 12 .
STANDBY	In standby because of service menu setting.
TIMER OFF	Scheduled on a timer and is in sleep mode waiting for the next start interval. See Scheduling Condenser and Cooling Unit Tasks.
UNIT ON	Operating normally without alarms or warnings.
WARNING ON	Active warning, but still operating. See Viewing Unit Alarms on page 12 .
ALARM ON	Active alarm, but still operating. See Viewing Unit Alarms on page 12 .
TIMER	Scheduled on a timer to operate, and is in operating mode.
REMOTE OFF	Turned off by remote shutdown terminal. Occurs when a normally closed set of 24V 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. Check the remote monitoring device or call Vertiv™ technical support for assistance.
BACK-DRAFT	Unit is non-operational, but EC fan is operating as a back-draft damper.
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

1. Touch [USER], then [≡] >*Turn Unit Off*. The TURN UNIT OFF panel opens.
2. Touch *Turn Unit Off*. The unit begins a power off countdown and then powers off.

1.3.4 Logging Out

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

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

1.3.5 Setting the Date and Time

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

1. Touch [USER], 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.

1.3.6 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 Liebert® iCOM™ before the touchscreen model. For a listing of the line IDs, see Setpoints and Alarm Settings by Line ID on page 89 .

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 Liebert® iCOM™ Control Board Firmware on page 71 .

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

1.6 Accessing the User, Service, and Advanced Menus

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 5 .

1. To access a menu, touch the icon for the menu you want, , or , in the control header. See Control Header on page 4 . 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.

1.7.1 User Menu Options

Setpoints

Opens the SETPOINTS panel. See Viewing and Editing Setpoints for the Cooling Unit on page 11 .

Active Alarms

Opens the ALARMS panel. See Viewing Unit Alarms on page 12 .

Event Log

Opens the EVENT LOG panel. See Viewing the Event Log on page 14 .

Sensor Data

Opens the SENSOR DATA panel. See Viewing Sensor Data on page 14 .

Display Options

Opens the Display Options menu:

- Customize Layout: See Customizing Main Display Views on page 80 .
- Custom Labels: See Customizing Parameter and Field Labels on page 82 .
- Date & Time: See Setting the Date and Time on page 7 .

Total Run Hours

Opens the RUN HOURS panel. See Managing Run Hours for a Component on page 14 .

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 5 , or Powering Off the Thermal Management Unit on page 7 .

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 1 .

Diagnostic/Service

Opens the Diagnostic/Service menu:

- Diagnostics: See Performing Diagnostics on page 75 .
- Technical Support: Contact information for the cooling unit and Liebert® iCOM™ display.

Alarm/Event Setup

Opens the ALARMS & EVENTS panel. See Managing Events: Alarms, Warnings, and Messages on page 25

BMS & Teamwork

Opens the BMS & Teamwork menu:

- BMS Setup: See BMS and Vertiv™ Liebert® IntelliSlot Settings on page 31

Scheduler

Opens the SCHEDULER panel.

Options Setup

Opens the OPTIONS SETUP panel. See Setting General Thermal Management Unit Options on page 20 .

Auxiliary Device Setup

Opens the Auxiliary Device Setup menu:

- Sensors

Backup & Security

Opens the Backup & Security menu:

- Display Backup and Restore: See Backing Up and Restoring Control Board Settings on page 73 .
- Control Backup and Restore: See Backing Up and Restoring Control Board Settings on page 73
- Display Upgrade: See Updating Liebert® iCOM™ Control Board Firmware on page 71 .
- Control Upgrade: See Updating Liebert® iCOM™ Control Board Firmware on page 71 .
- Manage Permissions: See Managing Access Permission and Passwords on page 74 .

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 5 , or Powering Off the Thermal Management Unit on page 7 .

1.9 Advanced Menu

The advanced menu provides a read-only view of the advanced set up and factory level settings.

1.9.1 Advanced Menu Options

Factory Settings

Unit code and configuration settings.

Diagnostics

Details about control and cooling operation.

Expert Settings

Parameters and settings for use by trained professionals only.

Runtime Monitoring

Details about component run times.

Control Override

Allows simulating events and override of analog outputs beyond normal limits.

Parameter Directory

A searchable list of all parameters in the user interface. See Setpoints and Alarm Settings by Line ID on page 89 .

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.

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 Temperature Setpoints

1. Touch [USER], then [≡] > *Setpoints > Temperature Control.*

   The TEMPERATURE CONTROL secondary panel opens.

2. Refer to User Temperature Setpoint Options below , Temperature Proportional Band on page 15 , 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 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.

BMS Backup Temp Setpoint

Selects a temperature setpoint that activates in the event of a BMS timeout. The BMS timer must be configured for this setpoint to activate. See Setting BMS Backup Setpoints on page 33 .

Temperature Setpoint Act

Read-only display of adjusted temperature setpoint when one of the following is active:
- Temperature compensation
- BMS backup temperature setpoint
- Customer input setpoint (remote alarm device)

Temperature Setpoint

Supply fluid temperature that the unit maintains via fan speed change.

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 facing page .

2.2.1 To View Alarms

1. Touch [USER], 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

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.

2.2.2 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 29 .

2.2.3 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 next 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 is 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.

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 2.2   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, all of the options listed may not be available on your Liebert® iCOM™ display.

Table 2.2   Event Status/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 Liebert® iCOM™ and the current reading of each sensor.

- Touch ![USER], then ![menu] > *Sensor Data*. The SENSOR DATA panel opens.

  A secondary panel displays the DAILY SENSOR READING SUMMARY, which shows temperature, humidity, and dew point readings for the cooling unit.

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 ![USER], then ![menu] > *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.

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.

3 Service Operation

3.1 Vertiv™ Liebert® XDU Fan Control

The Liebert® XDU shall utilize two EC fans to provide the maximum rated airflow at 100% fan speed. Airflow shall help determine the leaving fluid temperature from the discharge of the XDU. Both fans shall operate simultaneously at the same speed to provide the airflow needed to maintain the control setpoint for the leaving fluid temperature. The fans are not redundant of one another.

Each fan is self-monitoring and will provide a digital signal if the fan is powered but fails to operate. On the failure of one fan, the remaining fan in operation shall continue to operate and increase speed to compensate for the failed fan.

3.1.1 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   below , illustrates temperature control using:

- 113°F (45°C) setpoint
- 30°F (17°C) proportional band
- No deadband

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

- No fan speed change is required at 113°F (45°C).
- As the fluid temperature increases, fan speed also increases along the proportional band.
- If the fluid temperature reaches 128°F (53°C), the system fans operate at 100% speed. Conversely, if the fluid temperature reaches 98°F (37°C), the system fans operate at minimum speed.

Figure 3.1 Temperature Control without a Deadband
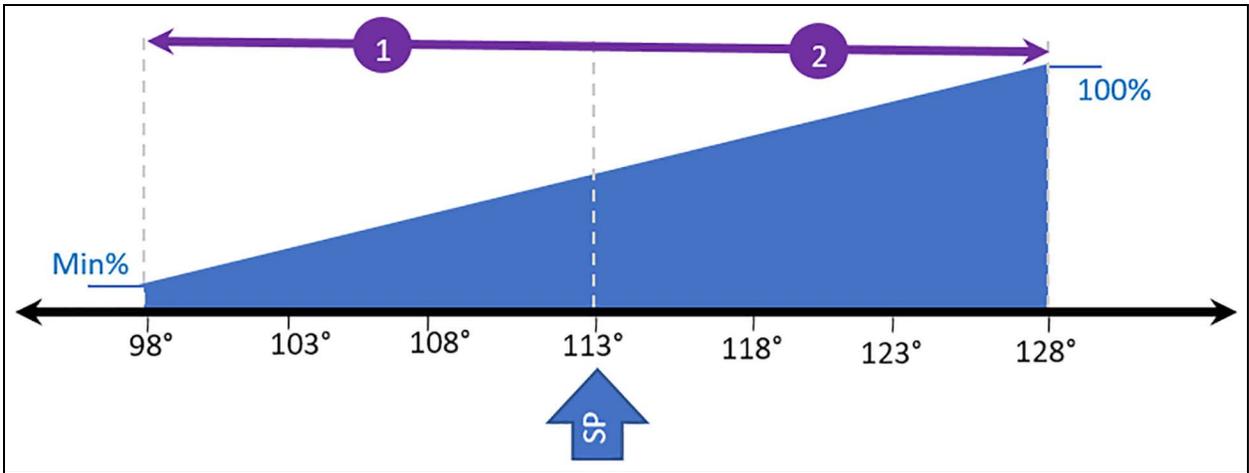
No.	Description
1	½ of proportional band.
2	½ of proportional band.

3.1.2 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** below , illustrates temperature control using:

- 113°F (45°C) setpoint
- 30°F (17°C) proportional band
- 2° deadband

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

- No fan speed change is required at 112°F to 114°F (44°C to 46°C)
- At 112°F to 114°F (44°C to 46°C), the system operates according to the temperature proportional band.

Figure 3.2 Temperature Control with a Deadband
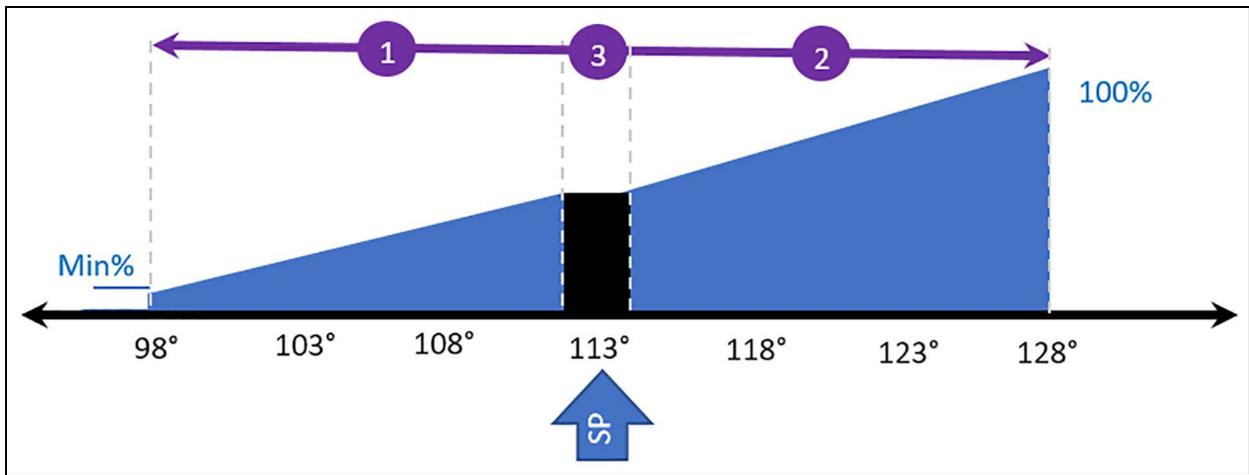
No.	Description
1	½ of proportional band
2	½ of proportional band
3	Deadband

3.1.3 Configuring Fan Setpoints

Configures fan speed control to operate independent of pumps 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.

Fan Control Options

Airflow Calibration

Maximum allowed fan output voltage.

Fluid T

Sensor monitoring the discharge fluid temperature will determine the fan speed output

Fan Control Sensor

Fluid T sensor monitoring the discharge fluid temperature will determine the fan speed output.

Fan Control Type

Selects the method of control for the fan motor.

- Proportional: Regulation based on the difference between the fan control sensor reading and the fan setpoint.
- 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 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.

Maximum Fan Speed

Maximum percentage at which the fans will operate.

Minimum Fan Speed

Minimum percentage at which the fans will operate [15%, range 1.5 -10 v, default 1.5 v].

Proportional band adjusts fan speed activation point based on a deviation from setpoint by placing half of the selected value on either side of the fan speed control setpoint. A smaller number causes a faster reaction in fan speed.

3.2 Pump Control

The Vertiv™ Liebert® XDU shall utilize variable speed pumps to supply the maximum amount of fluid flow required by the server configuration. The desired pump flow rate setpoint shall be determined by the end-user. XDU shall come with two variable speed pumps, each pump operating via its own VFD. Pumps are 100% redundant of one another.

A flow meter shall monitor the actual XDU system flow rate. The flow rate value sensed by the flow meter shall be used to control the actual pump speed to match the desired system flow rate setpoint. The flow meter is mounted on the discharge (leaving) fluid line.

3.2.1 Configuring Pump Setpoints

Configures pump speed control to operate independent of pumps loading (decoupled mode).

1. Touch , then > *Setpoints* > *Pumps Control*. The PUMPS CONTROL secondary panel opens.
2. Adjust the setpoint options, then touch *Save*. The setpoint is updated.
    * Touch *Cancel* to discard the changes.

Pump Control Options

Fluid Flow Rate @ Full Scale (%)

Flow rate corresponding to 20ma signal from the flow sensor (sensor output is 4-20ma) [Range 10-1000 lpm, default 115 lpm]

Fluid Flow Rate Setpoint (GPM)

Determines the speed output of the operating pump

Fluid Pump Initial Speed (%)

Pump speed at start-up [Range 25-100%, default 25%]

Fluid Flow Proportional Band (GPM)

Value determines how aggressive the pump shall operate as flow rate deviates from fluid flow setpoint

Fluid Flow Dead Band (GPM)

Defines the flow value where there will be no change in pump output as flow deviates from setpoint

Fluid Flow Integration Time

Serves to push or pull the flow rate back in line with set point based on how long and how far away the measured value is away from Set Point

Pump Transition Duration (sec)

Determines how long lead pump will operate while transitioning to lag pump

Pump Sequence

Determines which pump shall operate as the lead/lag. If set for Auto, pumps will operate based off run hours.

Pump Rotation Frequency (days)

Determines how often pumps will rotate from lead to lag [Range 0-30 Days, default 7 days]

Perform Pump Rotation

Forces the unit to perform a manual pump rotation

Loss of Flow Detection Delay (sec)

Delay time that must surpass in order to initiate 'Loss of Flow' alarm once loss of flow is detected

Fluid Check Speed Threshold

Defines how far the pump speed must change before 'Check Fluid System' notification is activated [Range 2-100%, default 10%]

Expected Speed Reset

Resets the expected speed 60 second timer for the 'Check Fluid System' notification

Minimum Fluid Flow Volume

Determines the minimum flow the system can move

3.3 Vertiv™ Liebert® XDU Pump Lead/Lag Control

The two pumps in the Liebert® XDU are lead/lag controlled to maintain equal runtime between the pumps, reduce corrosion, and maintain the wetted seal surfaces of the lag pump. Only one pump shall operate at any given time to provide flow. The lead/lag switchover of the two pumps is managed by the Vertiv™ Liebert® iCOM™ controller and shall switch operation of the pumps from lead to lag without the interruption of flow. This is accomplished by first ramping down the operation of the lead pump while simultaneously ramping up the speed of the lag pump. Pump lead/lag order can be manually switched via the Liebert® iCOM™ display. Pump lead/lag rotation is automatically switched after seven days of continuous pump operation by default. The selectable range for pump rotation is 0 – 30 days. See **Figure 3.3**   below .

Figure 3.3   Pump Lead/Lag Control Chart
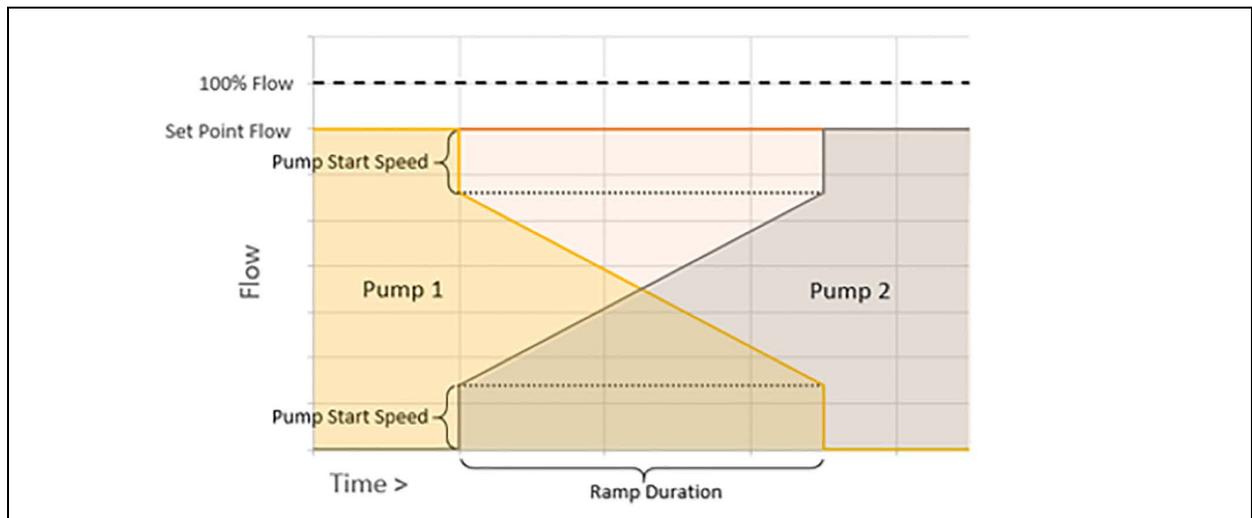
3.4 XDU Pump Monitoring

Each pump VFD shall receive a control signal that is used to monitor the health of the fluid system. After configuring the flow rate setpoint via the Liebert® iCOM™ display or remote communications and the pump speed signal reaches steady state, the iCOM™ controller shall monitor the pump speed signal against the steady state value. In the event the pump speed signal changes to a value outside (+/-) the range of the steady state value, a threshold warning shall annunciate letting the user know to check the water system.

3.5 XDU Loss of Flow Control

Flow within the system is monitored by a unit mounted flow meter and pressure transducer pair across the pump . The two measurements are required to identify the proper action to be taken and event to annunciate (loss of flow can be a result of pump malfunction or strainer clog or valve closure). Switchover due to loss of flow shall result in a loss of flow alarm. Pump switchover shall automatically occur if a pump is active but no flow is being detected.

3.6 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 Liebert® iCOM™ display.

3.6.1 Setting Miscellaneous Options

1. Touch ![SERVICE], then ![menu] > *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 page 22 .

K11 Active On

Selects the action of the activated K11 (warning) relay. Options are:

- Warning: A warning is active.
- Emergency Pwr: Emergency power is on.

Loss of Power Auto Reset Delay

Defines that amount of time that must surpass in order for the Loss of Power alarm to clear or auto-reset once power has restored after power loss to the unit. When the delay time elapses, the event resets and is cleared automatically.

Operation at Temp Control Sensor Failure

Selects cooling unit operation in the event that the control temperature sensor fails.

- Shut Down: The unit shuts down on sensor failure.
- Cooling: The unit continues operation based on the select Temp Control Sensor Failure Cooling Mode.

Single Unit Auto Restart

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

Temp Control Sensor Failure Cooling Mode

Unit operation when Cooling is selected at control temperature sensor failure.

- Hold: Holds the last call for cooling. That is, continue operating at same capacity.
- Full: Activates full cooling, 100% capacity.

Warning Activates Alarm Relay

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

3.7 XDU Quick Start

3.7.1 Configuring Quick Start

In the event of a power interruption to the Vertiv™ Liebert® iCOM™ controller, the unit components and controls shut down. Normally, after power is restored, the Liebert® iCOM™ controller must fully boot, and no pump flow or air flow occurs until the controls have fully booted. Quick Start lets you determine the fan and pump output that the unit will provide before the controller fully boots. When configured, the unit can provide airflow and fluid flow within 10 seconds after power is restored to the controller. Quick Start can be applied to fan, chilled water, and pump functions. Quick Start operates only during Liebert® iCOM™ application boot, then normal controller operation resumes.

Configuring XDU Quick Start Options

QS: Use Remote Off Input

Enables/disables use of quick start feature.

Quick Start Delay (sec)

Delay time before quick start enables.

Fan Digital Output

Fan digital output status.

Fan Analog Output

Specifies the desired fan output percentage used during quick start.

Pump 1 Digital Output

Pump 1 digital output status.

Pump 1 Analog Output

Specifies the desired pump output percentage used during quick start.

Pump 2 Digital Output

Pump 2 digital output status.

Pump 2 Analog Output

Specifies the desired pump 2 output percentage used during quick start.

Quick Start Overlap Time

Amount of time quick start will continue to operate once Liebert® iCOM™ controller has fully rebooted.

Last Quick Start Duration

Last quick start duration details.

To Configure Quick Start

1. Touch [SERVICE], then [≡] > *Options Setup* > XDU Quick Start Settings.

    The QUICK START SETTINGS panel displays.

2. Refer to Configuring XDU Quick Start Options Configuring XDU Quick Start Options on the previous page , and select the configuration options for your system.

3.7.2 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 [SERVICE], 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.

3.7.3 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 [SERVICE], 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 Liebert® iCOM™ display.

Fan Settings Options

Airflow Calibration

Maximum allowed fan output voltage.

Fan Back Draft Mode

Enables/disables fan operation in back draft mode.

Fan Shutdown Delay Timer

Length of time that the fan continues to operate after the cooling unit is turned off via the display, local control or the BMS.

The delay timer does not apply when the unit is turned off remotely.

Fanspeed at Unit Start

Speed at which the fans run on unit start up.

Fanspeed at Unit Start Timer

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

Fanspeed 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.

Fanspeed Filter at 100%

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

Fanspeed Reposition Delay

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

Fanspeed 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.

Fanspeed 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 at 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 Fanspeed

Minimum speed at which the fan will operate (15%, range 1.5 -10 v, default 1.5 v).

No Power Fanspeed

Speed at which the fans operate when using emergency power.

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 14 , and Viewing Unit Alarms on page 12 .)

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/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.

To open the panel:

Touch **SERVICE**, then ☰ > *Alarm/Event Setup*.

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.

4.1.1 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 the next page .

Ack

Indicates type of acknowledgment required. See Acknowledging Alarms on page 13 . 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. This option is not available with all alarm types:

- Auto: The alarm resets automatically after acknowledgment.
- Manual: The alarm must be reset manually after acknowledgment. See Acknowledging Alarms on page 13 .

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 below).

1. Touch ![SERVICE], then ![menu icon] > *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 below .

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.

To select event type and notification:

1. Touch ![SERVICE], then ![menu icon] > *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. Table 4.2   on the next page , lists the delays and their default settings.

- 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 4.2   on the next page , lists the default types for events.

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. See Table 8.1 on page 75 , and Viewing Unit Alarms on page 12 .
Alarm	Listed with a red status dot on the ALARMS panel, the LED flashes, and the audible alarm sounds. See Table 8.1 on page 75 , Viewing Unit Alarms on page 12 , and Enabling the Audible Alarm Notification on page 29 .

Table 4.2   on the next page , lists the default settings for each event.

- Internal delay is factory set and not adjustable. It is the time delay after event trigger that notification is sent.

- Default delay may or may not be adjustable and is added to the internal delay of event notification.

- Type may be adjustable or may be fixed.

NOTE: Depending on customization, some events may not be available on your cooling unit.

Table 4.2   Event Notification Defaults

Event	Internal Delay	Default Delay/Range for Adjustment	Type
MAIN FAN OVERLOAD	2 sec	5 sec/0 – 9999 *	ALM
LOSS OF AIRFLOW	3 sec	3 sec/0 – 9999 *	ALM
HIGH ROOM TEMP	1 min. after fan on	30 sec/0 – 9999	Fixed to WRN
LOW ROOM TEMP	1 min. after fan on	30 sec/0 – 9999	Fixed to WRN
HIGH ROOM HUM	1 min. after fan on	30 sec/0 – 9999	Fixed to WRN
LOW ROOM HUM	1 min. after fan on	30 sec/0 – 9999	Fixed to WRN
HIGH TEMP SENSOR A	1 min. after fan on	30 sec/0 – 9999	Fixed to WRN
LOW TEMP SENSOR A	1 min. after fan on	30 sec/0 – 9999	Fixed to WRN
WORKING HRS EXCEEDED	0 sec	0 sec/0 – 9999	Fixed to WRN
SMOKE DETECTED	2 sec	2 sec/0 – 9999 *	ALM
WATER UNDER FLOOR	2 sec	2 sec/0 – 9999 *	ALM
LOSS OF FLOW	5 sec Reset delay: 10 sec	2 sec/0 – 9999 *	ALM
STANDBY UNIT ON	2 sec	2 sec/0 – 9999 *	ALM
NO CONNECTION w/Unit1	Internal Calc.	-	WRN
UNIT X DISCONNECTED	Internal Calc.	-	WRN
LOSS OF POWER	0 sec	no	ALM
CUSTOMER INPUT 1	2 sec	2 sec/0 – 9999 *	ALM
CUSTOMER INPUT 2	2 sec	2 sec/0 – 9999 *	ALM
CUSTOMER INPUT 3	2 sec	2 sec/0 – 9999 *	ALM
CUSTOMER INPUT 4	2 sec	2 sec/0 – 9999 *	ALM
CALL SERVICE	2 sec	2 sec/0 – 9999 *	MSG
HIGH TEMPERATURE	2 sec	2 sec/0 – 9999 *	MSG
No Power	0 sec	0 sec/0 – 9999	WRN
EC Fan Fault	0 sec	10 sec/0 – 9999	ALM
TEMP CTRL SENSOR FAIL	0 sec	3 sec/0 – 99999	ALM
HIGH REMOTE SENSOR	0 sec	30 sec/0 – 9999	WRN
POWER "A" FAILURE	0 sec	10 sec/0 – 9999	ALM
POWER "B" FAILURE	0 sec	10 sec/0 – 9999	ALM
AIRFLOW SENSOR FAILURE	0 sec	10 sec/0 – 9999	WRN
LOSS OF FLOW	0 sec	5 sec/0 – 9999	ALM
BMS DISCONNECTED	0 sec	ENABLED/DIS - ENAB	WRN

4.4 Enabling the Audible Alarm Notification

1. Touch [USER], 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 (RAD) 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 below .

RAD and customer input notifications are set in the same way as other events. See Selecting Event Type and Setting Alarm/Warning Notification on page 26 .

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 4.3   below maps the customer input to the remote alarm devices (RAD).

Table 4.3   Customer Input Terminals to Remote Alarm Device 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 [SERVICE], 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 4.4   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 4.4** below , 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 4.4** below , may not be available with your system.

Table 4.4   Customer Input Options

Input	Action/Description
Smoke	Event only
Water Alarm	Event only
Flow Alarm	Event only
Stdby Unit	Event only
C-Input 1	Event only
C-Input 2	Event only
C-Input 3	Event only
C-Input 4	Event only
Call Service	Event only
High Temp	Event only
Air Loss	Event only
Heater Alarm	Event + Heaters off
FIRE ALARM	Event + Shuts down the unit
2ND SETPOINT	No event, but switches to the second setpoint
Emergency Power	Event + Disables unit
LSI	Event + Activates humidifier-problem Alarm and stop filling bottle when full
EC FAN FAULT	Event + Set analog output to 10 V
POWER A	Event only
POWER B	Event only

5 External Monitoring and Building Management Systems

Vertiv™ Liebert® iCOM™-controlled cooling units are equipped with embedded Vertiv™ Liebert® IS-Unity-DP software to communicate with external monitoring systems including Building Management Systems (BMS), Network Monitoring Systems (NMS) and Vertiv™ Liebert® SiteScan™ Web.

Embedded Unity communicates with multiple third-party protocols to monitor and manage a range of parameters and events. The Embedded Unity software delivers:

- Velocity Protocol for Liebert® *Trellis*™, Liebert® SiteScan™ and Vertiv™ Liebert® Nform.
- Embedded 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).

5.1 BMS and Vertiv™ Liebert® IntelliSlot Settings

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

- Disconnect fail safe
- Manual fan speed control
- Allowing the BMS to change fan speed
- Backup fan control

5.1.1 Configuring BMS Communication with Embedded Unity

By default, built-in Unity function is disabled. You must enable communication with the BMS via the IS-UNITY options in Liebert® iCOM™.

To configure Modbus, BACnet, SNMP, SMS and HTTP communication, see .

To Enable Embedded Unity Function

1. Touch [SERVICE], then [≡] > *BMS > BMS Setup*.
   The BMS SETUP panel opens.

2. Select *IntelliSlot Card Settings* and one of the following in *Monitoring Protocol*:

    - *Embedded* to use built-in Unity function.
    - *Embedded & IS V4* to use built-in Unity and an additional Vertiv™ Liebert® IntelliSlot card or Vertiv™ Liebert® SiteLink connection.

3. Touch *Save & Restart (Unit Only)*.

Monitoring Address

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

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

Monitoring Protocol

Protocol used for communication with BMS. Options are:

- Velocity V3: Legacy Velocity communication card
- IGM: IGMNet communication cards
- Velocity V4: Vertiv™ Liebert® IS-UNITY card or Vertiv™ Liebert® SiteLink/Vertiv™ Liebert® Sitescan™.
- Embedded: Embedded IS-UNITY function
- Embedded & IS V4: Both Embedded Unity function and Velocity V4 for an optionally installed Liebert® IS-UNITY card or Liebert® SiteLink/Liebert® Sitescan™.

5.1.2 Setting BMS Control Settings

NOTE: If a Liebert® Sitelink/Liebert® Sitescan™ Connection and MODBUS RTU or BACnet MSTP is required simultaneously, then the purchase of the RS-485 Expansion Board is required (insert part number here).

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: Use Configure Timeout to configure the setpoints used in the event of an outage and BMS takes control. See Setting BMS Backup Setpoints on the facing page .

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 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 16 .

Handshake

Sets a 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).

5.1.3 Setting BMS Backup Setpoints

1. Touch [SERVICE], then [≡] > *BMS & Teamwork* > *BMS Setup* > *Configure Timeout* button on the lower-right of the panel. The CONFIGURE TIMEOUT secondary panel opens.
2. Adjust the values, 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 Liebert® iCOM™ display.

BMS Timeout Settings Options

BMS Backup Fan Operation

Enables/disables BMS operation of the fans during back up operation. Options are:

- Disabled
- BMS Backup Spd
- Coupled
- BMS Backup Set

BMS Backup Temp Setpoint

Temperature that the cooling unit maintains during BMS back up operation.

5.2 Communication Setup with Embedded Unity

The following sections describe the configuration options for embedded Unity function including Modbus, BACnet, SNMP, SMS, and HTTP communication.

NOTE: The Unity configuration is also accessible through the Unity web interface. For details on accessing and using the web interface, refer to the *Vertiv™ Liebert® IntelliSlot Unity Card Installer/User Guide,* available at www.vertiv.com.

IS-UNITY setup includes the following options to configure Unity function and communication:

- Connection
    - Connecting to the BMS below
    - Embedded Unity User and Password on page 38
    - Troubleshooting Unity Connection and Set Up on page 36
- Configuration
    - System Configuration on page 39
    - Local Users Configuration on page 40
    - Network Configuration on page 41
    - Web Server Configuration on page 43
    - Remote Services Configuration on page 46
    - Velocity Protocol Configuration on page 49
    - Messaging Configuration on page 50
- Protocols
    - BACnet Protocol Setup on page 55
    - Modbus Protocol Setup on page 58
    - SNMP Protocol Setup on page 60
- Unity Status Readings on page 64
- Unity Support Information on page 65

5.2.1 Connecting to the BMS

The embedded Unity software resides on the Vertiv™ Liebert® iCOM™ control board. There are two methods of connecting to a BMS, via Ethernet or RS-485.

For a network connection, connect the Ethernet cable from the BMS to P74 on the Liebert® iCOM™ control board. **Figure 5.1** on the facing page , shows the connector location.

For an RS-485 connection, connect the serial cable form the BMS to TB3 on the Liebert® iCOM™ control board. Pin 1 is the positive terminal on the right in **Figure 5.1** on the facing page .

If the optional RS-485 Expansion Board is purchased, TB1 on the Expansion Board is then used for BACnet MSTP or MODBUS RTU and TB3 on the Liebert® iCOM™ Board is used to connect directly to a Sitelink/Sitescan System.

Please see **Figure 5.2** on page 36 for TB1 Pin-outs and description.

Figure 5.1   Control Board Connections
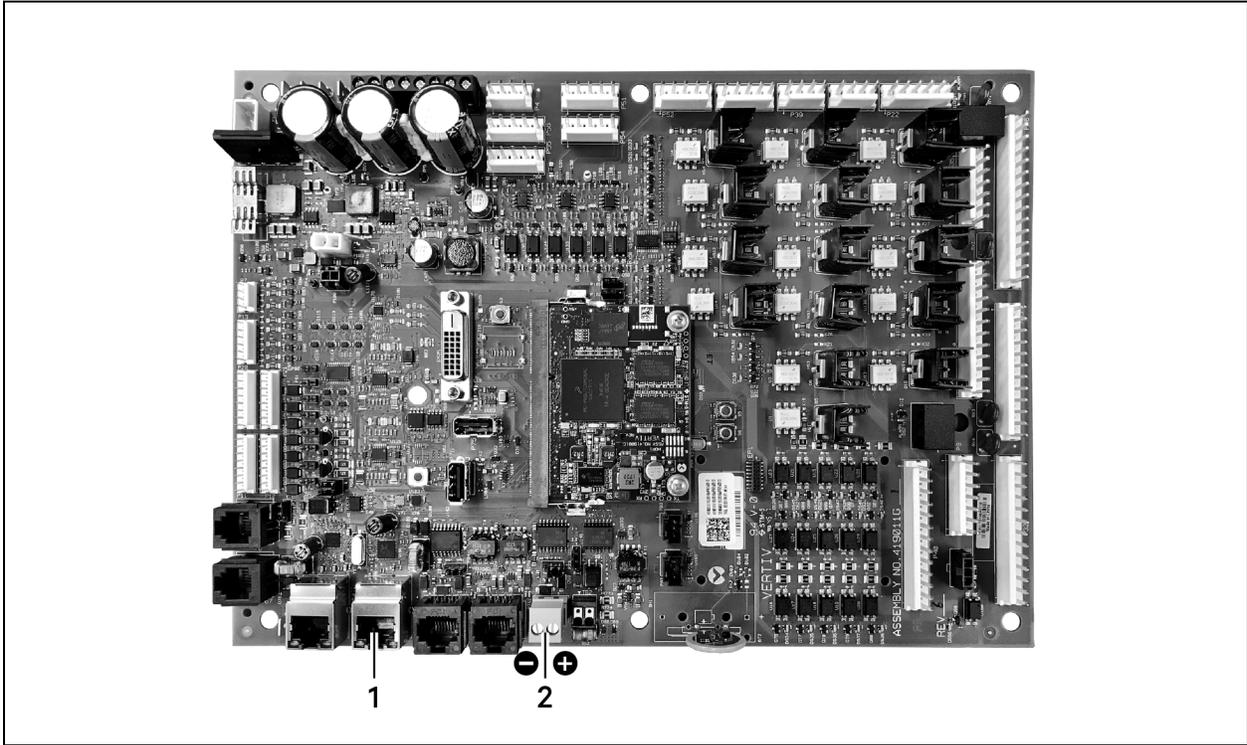
No.	Description
1	P74 Ethernet port
2	485 two wire terminal connector

Troubleshooting Unity Connection and Set Up

Figure 5.2   RS-485 Expansion Board
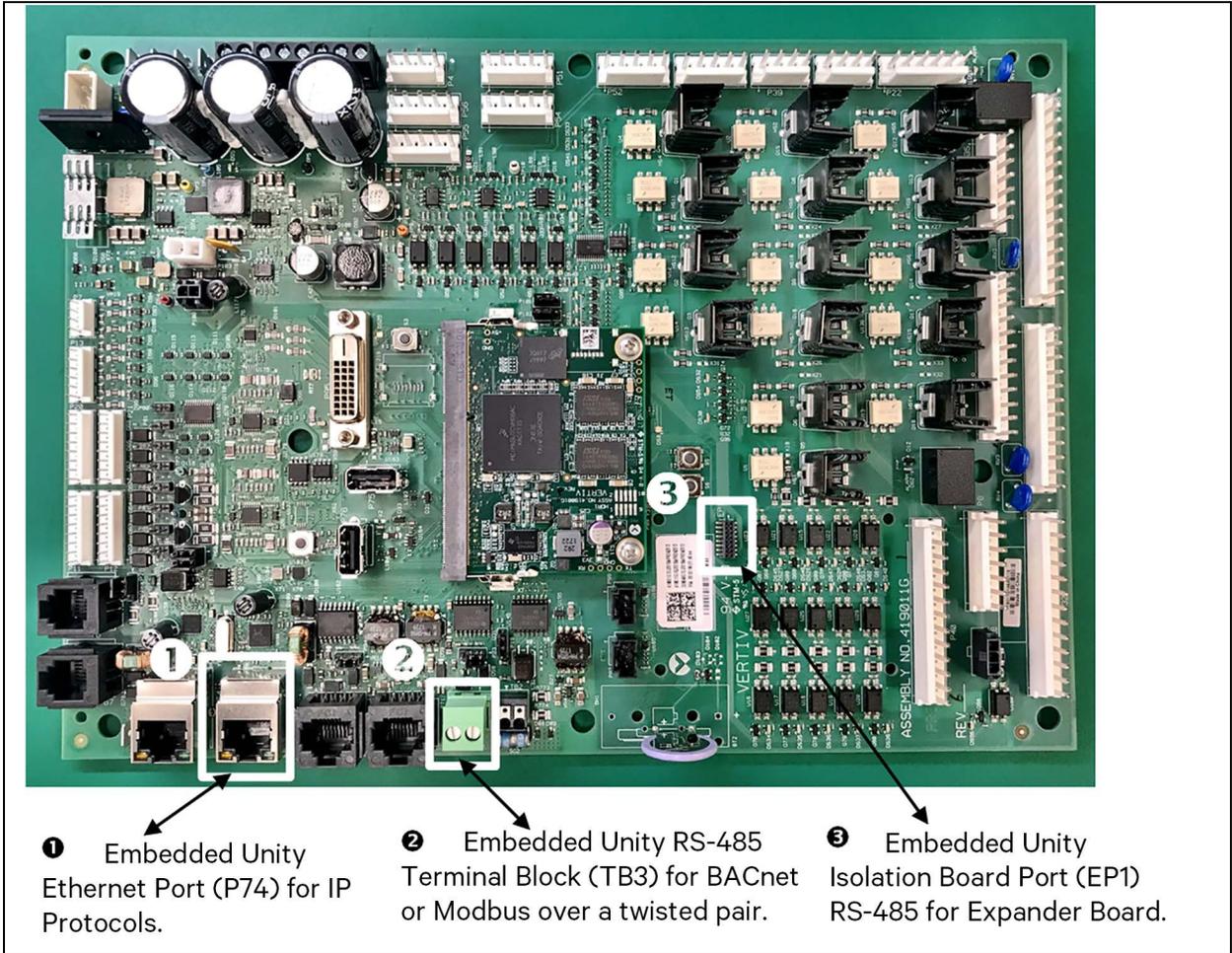
Item	Description
1	Embedded Unity Ethernet port (p74) for IP protocols
2	Embedded Unity RS-485 Terminal Block (TB3) for BACnet or Modbus over twisted pair
3	Embedded Unit isolation board port (EP1) RS-485 for expander board

The expansion board is needed only if there is a requirement to do Velocity 4 to IntelliSlot based cards and BACnet or Modbus RS-485 simultaneously. See **Figure 5.3** on the facing page for the expansion board.

Figure 5.3 Expansion Board
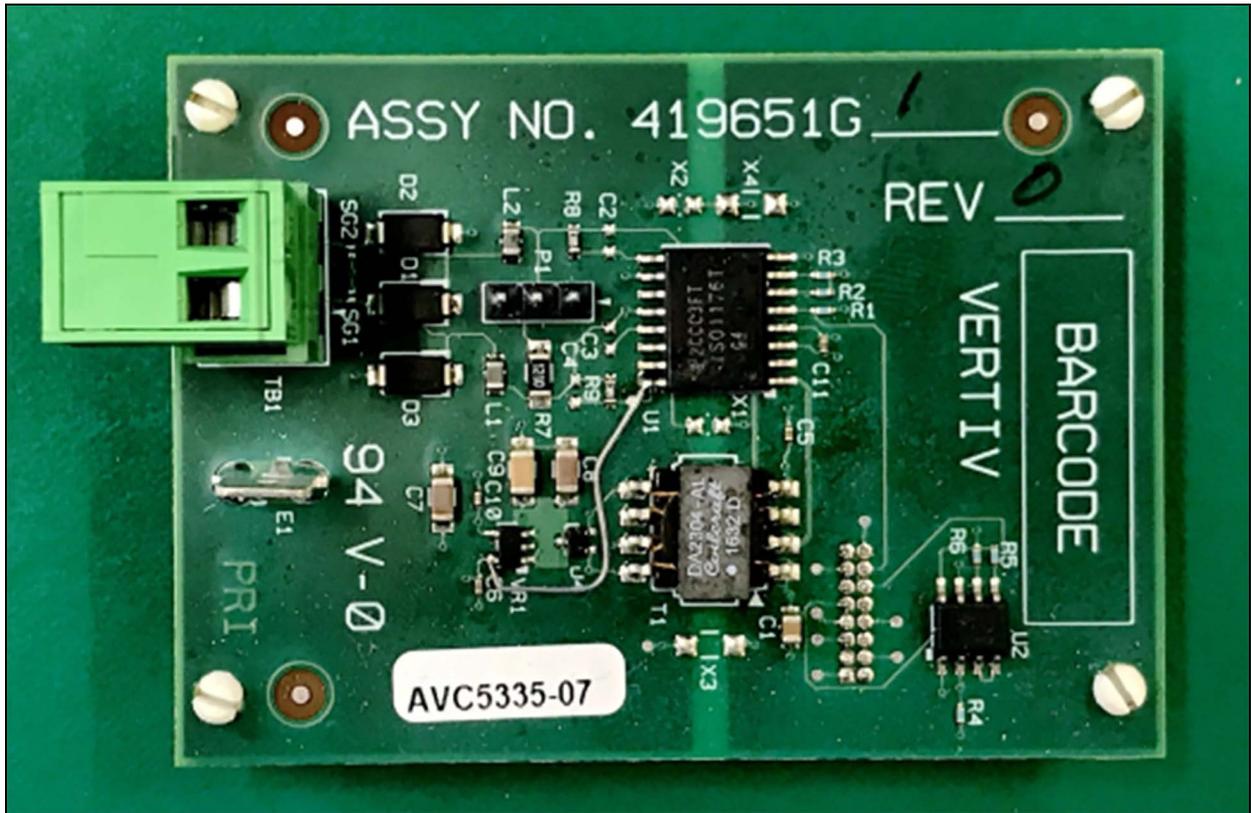
Table 5.1 below , lists problems you may encounter with the Unity software and possible solutions.

Table 5.1 Embedded Unity Troubleshooting

Problem	Possible cause	Suggested Remedy
Settings are not available in local unit Vertiv™ Liebert® iCOM™ display, show as "*IS-Unity Service is Unavailable*"	Embedded Unity is not enabled.	Make sure the correct monitoring protocol is selected in BMS Setup. See Configuring BMS Communication with Embedded Unity on page 31 .
	Unity software needs more time to boot up since most recent Liebert® iCOM™ controller or Unity reboot.	Wait no more than 10 minutes to give enough time to boot up.
	The Liebert® iCOM™ user and password for Unity are incorrect.	Enter a valid user name and password for the Liebert® iCOM™-to-Unity connection. See Embedded Unity User and Password on the next page .
	Embedded Unity has crashed.	Restart, and wait at least 5 minutes to fully boot up. See Unity Restart and Restore Defaults on page 39 .
	Unity configuration had become corrupt.	Restore to defaults, see Unity Restart and Restore Defaults on page 39 . **NOTE: All customized Unity configuration settings will be lost. Use this as a last resort.**
Ethernet to BMS network not communicating or connecting	BMS Ethernet drop is connected to the wrong RJ-45 connector on the Liebert® iCOM™ control board.	Make sure that the cable is connected to P74 on the Liebert® iCOM™ control board, and corrected if needed.

Table 5.1 Embedded Unity Troubleshooting (continued)

Problem	Possible cause	Suggested Remedy
	Ethernet cable is bad or incorrectly made.	Use a cable tester that gives a quality rating and length (sends a true data packet) to test the cable and correct as needed.
	Incorrect network settings.	Correct the IPv4 network settings, see IPv4 and IPv6 Configuration on page 42 . **NOTE: If you adjust the settings, you must restart the Unity software for the changes to take effect.**
485 twisted pair to BMS network not communicating or connecting	Incorrect polarity.	Correct the polarity. See Connecting to the BMS on page 34 .
	Incorrect protocol settings.	Verify and correct the settings. Refer to the configuration settings that apply to your system: • BACnet Protocol Setup on page 55 . • Modbus Protocol Setup on page 58 . • SNMP Protocol Setup on page 60 .
	Protocol settings have not been saved.	Save the settings, and restart Unity so the configuration is authorized/applied. See Unity Restart and Restore Defaults on the facing page .

5.2.2 Embedded Unity User and Password

Changes to the Unity configuration are authenticated with a user/password that is stored in Vertiv™ Liebert® iCOM™. The stored user name and password must match that of a user account in embedded Unity. See Local Users Configuration on page 40 , for a description of the Unity accounts.

When first accessing the Embedded Unity aspect of Liebert® iCOM™ 2, the end-user must first create a unique user name and password.

1. Touch [SERVICE], then [≡] > *BMS & Teamwork > IS-Unity Settings*.

2. Adjust the Username and Password, and touch *Save*.

5.2.3 Unity Restart and Restore Defaults

Some types of configuration changes require a restart of the embedded Unity software to take effect. Using the Restart IS-Unity option, does not affect the Liebert® iCOM™ controller.

You also have the option of restoring the configuration to factory defaults if communication problems occur and cannot be remedied with troubleshooting

To Restart Embedded Unity

1. Touch [SERVICE], then [≡] > *BMS & Teamwork > IS-Unity Settings.*

2. Touch *Restart IS-Unity*, then *Save.*

To Reset the Configuration to Factory Defaults

1. Touch [SERVICE], then [≡] > *BMS & Teamwork > IS-Unity Settings.*

2. Touch *Default IS-Unity Setup*, then *Save.*

5.2.4 System Configuration

System displays general information about the monitored and managed device. You can select the temperature units displayed, which is Celsius by default.

To Update the System Settings

1. Touch [SERVICE], then [≡] > *BMS & Teamwork > IS-Unity Setup > Configuration > System.*

2. Adjust the information, and touch *Save.* The settings are configured.

Time Service Settings

1. Touch [SERVICE], then [≡] > *BMS & Teamwork > IS-Unity Setup > Configuration > System > Time Service.*

2. Adjust the settings, and touch *Save.*

Time Service Setting Options

External Time Source

> The external source to use for time synchronization. Default is NTP Server.

Primary NTP Time Server

> URL, Hostname, or IP address of the primary NTP time source. Has a 64 character maximum.

Backup NTP Time Server

> URL, Hostname, or IP address of the back-up NTP time source. Has a 64 character maximum.

NTP Time Sync Rate

The rate at which time will be synchronized with the network time protocol server, if NTP is the external time source.

Time Zone

Time zone where the device is located.

Enable Auto-Sync to Managed Device

Enable automatic writing time to the managed device.

Managed Device Auto-Sync Rate

Rate at which time will be written to the managed device, if an external time source has been selected.

5.2.5 Local Users Configuration

Local Users offers up to 10 users and three access levels described in Table 5.2 below .

The default password for all users is *Liebert* (case sensitive).

Table 5.2   User Access Levels

Level Name	Access/ Permission Type	Description
No Access	None	The No Access level is enforced when Password Protected Site is enabled.
General User	Read-only	Able to view all tabs, folders and sub-folders of the user interface. A General User will only need to enter the assigned password if Password Protected Site is enabled, see Web Server Configuration on page 43 . By default, Local User [2] is *User* with the default password *Liebert* (both are case sensitive). The Authorization (access type) for Local User [2] is General User.
Administrator	Read/Write	Able to edit settings using the assigned password, which is always required to edit settings/configuration. By default, Local User [1] is *Liebert* with the default password *Liebert* (both are case sensitive). The Authorization (access type) for Local User [1] is Administrator. Be sure that you always have one administrator user, so you can access and modify configuration and other settings.

IMPORTANT! Record user names and passwords and save them in a secure place where they can be found if forgotten. A lost password cannot be retrieved from the IS-UNITY card. If the administrator password is lost, the card must be reset to factory defaults and reconfigured.

To Change the User Names and Passwords

NOTE: There is a 30 character maximum. All printable characters are valid except: \ : ' < > ~ ? " #

1. Touch �, then ▤ > *BMS & Teamwork > IS-Unity Setup > Configuration > Users > User [n]*.
2. Enter a new user name and password.
3. Re-enter the password to confirm it.
4. In *Authorization for User*, select the type of access, see Table 5.2 above .
5. Touch *Save*.

5.2.6 Network Configuration

1. Touch ![SERVICE], then ![menu] > *BMS & Teamwork > IS-Unity Setup > Configuration > Network.*
2. Adjust the settings, and touch *Save.*

Network Setting Options

Speed Duplex

Selects the speed and duplex configuration of the card's Ethernet port. It is set to Auto by default. If it requires changing, contact the system administrator for the proper settings.

Hostname

Identifies the network node. Default is UNITY-*serial_number_of_card.*

Domain Name Suffix List

Listing of domain name suffixes for resolution of host names. If it requires changing, contact the system administrator for the proper setting.

Telnet Server

Enables/disables telnet access to the card to prevent unauthorized changes. The default setting disables telnet access.

SSHv2 Server

Enables/disables SSHv2 (Secure Shell) access to the card to prevent unauthorized changes. The default setting disables SSHv2 access.

IPv4 and IPv6 Configuration

The IPv4 and IPv6 settings determine which internet protocol will be used for communication over the network connected to the Ethernet port. IPv4 and IPv6 networks will run in parallel (dual stack network), but the protocols are different. See your network administrator to determine which protocol should be enabled and to determine the correct settings.

1. Touch [SERVICE], then [☰] > *BMS & Teamwork > IS-Unity Setup > Configuration > Network > IPv4* or *IPv6*.
2. Adjust the settings, and touch *Save*.

IPv4 Settings

IPv4 Protocol

Enables IPv4 in the card.

IP Address Method

Mode the card boots into to be a network ready device (Static, DHCP, BootP). Default is DHCP.

Static IP Address

Network address for the interface.

Subnet Mask

Network mask for the interface which divides a network into manageable segments.

Default Gateway

IP address of the gateway for network traffic destined for other networks or subnets.

DNS Server Address Source

Source of DNS server identification (None, Automatic, Configured).

Primary DNS Server

Network address of the primary DNS server.

Secondary DNS Server

Network address of the secondary DNS server.

IPv6 Settings

IPv6 Protocol

Enables IPv6 in the card.

IP Address Method

Mode the card boots into to be a network ready device (Static, Auto). Default is Auto.

Static IP Address

Network address for the interface.

Prefix Length

Prefix length for the address that divides a network into manageable segments.

Default Gateway

IP address of the gateway for network traffic destined for other networks or subnets. Default is 64.

DNS Server Address Source

Source of DNS server identification (None, Automatic, Configured). Default is Automatic.

Primary DNS Server

Primary DNS Server

Secondary DNS Server

Secondary DNS Server

Domain Name Server Test

The Domain Name Server (DNS) test checks key points of a DNS setup for a given domain.

1. Touch [SERVICE], then [≡] > *BMS & Teamwork > IS-Unity Setup > Configuration > Network > DNS Test*.
2. Adjust the settings, and touch *Save*.

DNS Test Settings

Last Query Response

Response from a DNS to the last query.

Example: *gxtwebdemo.liebert.com* resolved to *126.4.203.251*

Type of Query

Type of DNS query. (Hostname, IP Address)

Query Value

Value for the domain name server (DNS) to resolve. Example: *gxtwebdemo.liebert.com*

5.2.7 Web Server Configuration

Web Server Settings configures some security settings, such as HTTP or HTTPS, and password enabling.

1. Touch [SERVICE], then [≡] > *BMS & Teamwork > IS-Unity Setup > Configuration > Web Server*.
2. Adjust the settings, and touch *Save*.

Web Server Settings

Web Server Protocol

Select the operation mode of the web server (HTTP, HTTPS).

HTTP Port

Standard web port not encrypted. Required if HTTP is enabled as web server protocol. Default is 80. Must be set to 80 for correct Vertiv™ Liebert® iCOM™ connection.

HTTPS Port

Standard secure web port; all communication is encrypted. Required if HTTPS is enabled as web server protocol. Default is 443. Must be set to 443 for correct Liebert® iCOM™ connection.

Password Protected Site

When enabled, a log in session is required before any device information is displayed to the user. User level credentials will allow only viewing of device information. Administrator level credentials are required to make any changes.

Remote Write Access

When enabled, all web browsers have write access to data on all Unity card web pages when the user is logged in with Administrator credentials. When disabled, write access is restricted to web browsers connected on an Autoconfiguration IPv4 address. An Autoconfiguration IPv4 address is of the form 169.254.x.x, and is negotiated automatically when a direct connection is made between the Ethernet port of your PC and the Ethernet port of the Unity card. Regardless of this setting, all web browsers always have read access to the web pages (subject to the setting of the Password Protected Site parameter), and the diagnostic information file can be generated when the user is logged in with Administrator credentials (see Unity Support Information on page 65).

NOTE: When remote write access is disabled, an indicator is displayed in the upper right corner of the web page as a reminder, shown in the following figure.

NOTE: Only disable remote write access if you are absolutely sure that you do not need to administer the managed device or the Unity card through a remote web browser session.

Session Idle Timeout

The interval the software will wait before logging off a user unless there is user activity. The default is five minutes.

Certificate Configuration

When the web server protocol is configured to use HTTPS communications, all web server communication with all browsers is encrypted and validated based upon the security algorithms and validity checks specified in the SSL certificate that is currently installed in the card. By default, the card generates its own unique, self-signed SSL certificate when it is first powered up. However, many installations want to install and use SSL certificate files that were generated by their own Certificate Authority (CA).

Selections in Certificate provide commands to Upload SSL Certificate PEM Files or Generate Self-Signed SSL Certificate.

Certificate Commands

Generate Self-Signed SSL Certificate

Generates and installs a new self-signed certificate based on the mode selected for Generate Self-Signed SSL Certificate Mode. See Generating a Self-Signed SSL Certificate on the next page .

Generate Self-Signed SSL Certificate Mode

Method used to generate a self-signed SSL certificate. Options are:

- Use Default Values: The values used in place of the user configurable fields are the same as those used when the original SSL certificate was generated by the card on first power up. The default values are not displayed.
- Use Configured Settings: The user entered values in the configurable fields are used to generate the certificate.

NOTE: When using configured settings, all of the configurable fields, described below, must have an entry to successfully generate a certificate.

Common Name

Fully qualified domain name that browser clients will use to reach the card's web server when it is running with the certificate generated with the name entered here.

Organization

Organization or company identified as the owner of the generated certificate.

Organizational Unit

Organizational unit or company division of the organization identified as the owner of the generated certificate.

City or Locality

City or locality of the organization identified as the owner of the generated certificate.

State or Province

State or province of the organization identified as the owner of the generated certificate.

Country Code

Country code (two letter abbreviation) of the organization identified as the owner of the generated certificate.

Email Address

E-mail address of the contact within the organization identified as owner of the generated certificate.

Generating a Self-Signed SSL Certificate

1. Touch [SERVICE], then [≡] > *BMS & Teamwork > IS-Unity Setup > Configuration > Web Server > Certificate*.

2. In Generate Self-Signed SSL Certificate Mode, select the mode to use.

   - If you select *User Configured Settings*, make entries in all of the configurable value fields (required).

3. Touch *Save*.

4. Follow the instructions in the dialog to generate and install the certificate.

5.2.8 Remote Services Configuration

1. Touch [SERVICE], then [≡] > *BMS & Teamwork > IS-Unity Setup > Configuration > Remote Services*.

2. Adjust the settings, and touch *Save*.

The folder contains sub-folders for connectivity and diagnostics:

- Remote Services Connectivity on the facing page
- Remote Services Diagnostics on page 48

Remote Service Options and Settings

Serial Number From Device

Serial number obtained from the managed device. Identifies the device to the system unless *Device Serial Number Override* is enabled.

Reset Remote Services Config

Resets configuration of the remote service back to factory defaults.

NOTE: Does not reset the communication card configuration.

Remote Service

Enables/disables remote service connection.

Device Data Sampling

Enables/disables, data sampling of the device.

Device Serial Number

Serial number used when *Device Serial Number Override* is enabled.

Device Serial Number Override

> Enables/disables use of the serial number obtained from the managed device.

Site Equipment Tag Number

> Number from the site equipment tag.

Site Identifier

> Site identification number.

Device Instance ID

> Manufacturer's device identification number.

Service Center Country

> Country in which the device is serviced.

Remote Services Connectivity

Remote Service Connectivity Options and Settings

Connectivity Test Result

> Result of most recent connectivity test.

Test Connectivity

> Initiates connectivity test.

Evaluate Remote Services Configuration

> Attempt to connect to the remote service to verify the configuration.

Remote Service Platform URL

> URL address of the remote service platform. Do not enter the "http://" or "https://" prefix.

Connection Retry Time

> Length of time to attempt reconnection in the event of a communication failure. Range is 30 to 600 seconds.

Proxy Enable

> Enables use of remote service platform URL to connect with a proxy server.

Proxy Authentication

> Enables authentication of the proxy server.

Proxy Address

> IP or URL address of the proxy server.

Proxy IP Port Number

Port number of the proxy server. Range is 1 to 65535.

Proxy User Name

User name of the proxy server.

Proxy User Password

Password of the proxy server.

Remote Service Cloud URL

URL address of the remote service cloud. Do not enter the "http://" or "https://" prefix.

Remote Services Diagnostics

Remote Service Diagnostic Settings

Communication Status

Results of the most recent transaction.

Communication Error Count

Number of communication errors since reboot.

Last Communications Error

Most recent communication error message since reboot with date and time stamp.

Monitored Device Rule File Information

Details about the remote service rule file in effect for the monitored device.

Remote Services Operating Status

Status of the remote service.

Managed Device Status

Status of managed device's communication with the card.

5.2.9 Velocity Protocol Configuration

Velocity protocol contains four sub-folders: Managed Device, MSTP, Ethernet, and Internal.

NOTE: With the exception of changing the node ID when multiple cards are used or when disabling Velocity Protocol IP access, the settings in the Velocity Protocol sub-folders should not be modified unless directed by a Vertiv representative.

1. Touch [SERVICE], then [☰] > *BMS & Teamwork > IS-Unity Setup > Configuration > Velocity Protocol*.
2. Adjust the settings and touch *Save*.

Velocity Protocol Options

Velocity Protocol IP Access

> When disabled, prevents access from a remote, IP-based system using the Velocity Protocol.

Velocity Protocol Managed Device Options

Connection State

> Status of connection to managed device.

FDM Version

> Version of the managed device.

Product Sequence ID

> Product sequence identifier of the managed device.

LAN Type

> Type of interface connection to the managed device. Must be set to MSTP Internal for correct communication with Vertiv™ Liebert® iCOM™.

Node ID (MSTP Only)

> Identifier of the managed device on an MSTP LAN.

IP Address (IP Only)

> Address of the managed device on an IP LAN.

Velocity Protocol MSTP Options

Interface

> Type of MSTP interface.

Data Rate

> Communication rate in bps.

Max Master Address

> Maximum node ID in-use on the MSTP interface.

Network Number

> Network number of the MSTP interface. 1 to 65534.

Node ID

> Node ID of the agent card on the MSTP LAN. 0 to 127.

Velocity Protocol Ethernet Options

Velocity Protocol IP Port Number

> Port number of the IP interface, 1 to 65535.

Network Number

> Network number of the Ethernet interface, 1 to 65534.

Velocity Protocol Internal Options

Network Number

> Internal network number used on the agent card. Not available to other interfaces.

5.2.10 Messaging Configuration

Messaging enables and disables email and text messaging about events. It includes a test to determine if email and text messages can be successfully sent. Settings specify message recipients, the format or the messages, and other details.

Messaging Options

Email

> May be enabled to send email messages about events

SMS

> May be enabled to send text messages about events

E-mail Messaging Configuration

1. Touch [SERVICE] , then [≡] > *BMS & Teamwork > IS-Unity Setup > Configuration > Messaging > Email.*
2. Adjust the settings, and touch *Save.*

E-mail Settings

E-mail From Address

Sender's e-mail address. In most cases this will be the e-mail address of the person to whom replies should be sent. For example, *Support@company.com*

E-mail To Address

E-mail address of the recipient. Multiple e-mail addresses should be separated by a semicolon.

E-mail Subject Type

Subject of the email. This value will default to the event description. The subject line can be customized.

Custom Subject Text

The subject of the email can be changed

SMTP Server Address

Fully qualified domain name or IP address of the server used for relaying email messages. If using a server name, a DNS server may need to be configured under Network Settings.

SMTP Server Port

SMTP server port.

SMTP Connection

SMTP server connection type. Determines the capabilities of the SMTP server. Options are:

- Clear: Do not use encryption
- SSL/TLS: Encryption using SSL/TLS connection
- STARTTLS: SSL/TLS encryption initiated using STARTTLS.

SMTP Authentication

Enable or disable email SMTP authentication. An e-mail account must be provided for the SMTP service provider to authenticate.

NOTE: Some e-mail servers may require account configuration changes to allow communication with the Unity card. For example, Gmail only recognizes Google applications as being secure. However, they provide an account setting that allows authentication with what they consider less-secure apps. Please see your network administrator or service provider for configuration details.

SMTP Username

Username of the e-mail account to use when e-mail SMTP authentication is enabled.

SMTP Password

Password for the e-mail account to use when e-mail SMTP authentication is enabled.

Include IP Address in Message

If checked, the IP Address of the agent card will be included in outgoing messages.

Include Event Description in Message

If True, SNMP event description will be included in outgoing messages.

Include Name in Message

If checked, the agent card name will be included in outgoing messages.

Include Contact in Message

If checked, the agent card contact will be included in outgoing messages.

Include Location in Message

If checked, the agent card location will be included in outgoing messages.

Include Description in Message

If checked, the agent card description will be included in outgoing messages.

Include Web Link in Message

If checked, a web link to the agent card and web server listening port number will be included in outgoing messages.

Enable Event Consolidation

If checked, multiple events will be sent per outgoing message.

Consolidation Time Limit

If Event Consolidation is enabled, a message will be sent when Consolidation Time Limit seconds has passed since the first buffered event was received.

Consolidation Event Limit

If Event Consolidation is enabled, a message will be sent when the number of buffered events reaches the Consolidation Event Limit.

SMS Messaging Configuration

1. Touch , then > *BMS & Teamwork > IS-Unity Setup > Configuration > Messaging > SMS*.
2. Adjust the settings and touch *Save*.

SMS Settings

SMS From Address

The sender's SMS address. In most cases this will be the SMS address of the person to whom replies should be sent. For example, Support@company.com.

SMS To Address

The SMS address of the recipient. Multiple SMS addresses should be separated by a semicolon.

SMS Subject Type

Subject of the message, either default or custom.

Custom Subject Text

The subject of the message. The subject can be customized by the customer.

SMTP Server Address

Fully qualified domain name or IP address of the server used for relaying SMS messages.

NOTE: If using a server name, a DNS server may need to be configured under Network Settings.

SMTP Server Port

SMTP server port.

SMTP Connection

SMTP server connection type. Determines the capabilities of the SMTP server. Options are:

- Clear: Do not use encryption.
- SSL/TLS: Encryption using SSL/TLS connection.
- STARTTLS: SSL/TLS encryption initiated using STARTTLS.

SMTP Authentication

Enable or disable SMS SMTP authentication. An SMS account must be provided for the SMTP service provider to authenticate.

NOTE: Some messaging servers may require account configuration changes to allow communication with the Unity card. For example, Gmail only recognizes Google applications as being secure. However, they provide an account setting that allows authentication with what they consider less secure apps. Please see your network administrator or service provider for configuration details.

SMTP Username

Username of the SMS account to use when SMS SMTP authentication is enabled.

SMTP Password

Password for the SMS account to use when SMS SMTP authentication is enabled.

Include IP Address in Message

If True, the IP Address of the agent card will be included in outgoing messages.

Include Event Description in Message

If checked, SNMP event description will be included in outgoing messages.

Include Name in Message

If checked, the agent card name will be included in outgoing messages.

Include Contact in Message

If checked, the agent card contact will be included in outgoing messages.

Include Location in Message

If checked, the agent card location will be included in outgoing messages.

Include Description in Message

If checked, the agent card description will be included in outgoing messages.

Include Web Link in Message

If checked, a web link to the agent card and web server listening port number will be included in outgoing messages.

Enable Event Consolidation

If checked, multiple events will be sent per outgoing message.

Consolidation Time Limit

If Event Consolidation is enabled, a message will be sent when Consolidation Time Limit seconds has passed since the first buffered event was received.

Consolidation Event Limit

If Event Consolidation is enabled, a message will be sent when the number of buffered events reaches the Consolidation Event Limit.

Messaging Test

Tests the set up for e-mail and SMS messages. If the test fails, incorrect settings should be changed to ensure that proper notifications are sent if an event should occur.

1. Touch ![SERVICE], then ☰ > *BMS & Teamwork > IS-Unity Setup > Configuration > Messaging > Messaging Test.*

2. Enter the settings, select the type of test in *Send Test Message,* and touch *Save.*

5.2.11 BACnet Protocol Setup

1. Touch ![SERVICE], then ☰ > *BMS & Teamwork > IS-Unity Setup > Protocols > BACnet.*

2. Adjust the settings, and touch *Save.*

3. Configure the BACnet interface chosen.
   See

BACnet Settings

Managed Device Write Access

Enable or disable the BACnet server to write to the managed device.

BACnet Interface

BACnet server interface: BACnet IP or BACnet MSTP.

Device Object Instance Number

The instance number (0-4194302) of the BACnet server's device object.

Device Object Name

The name of the BACnet server's device object.

APDU Timeout

The timeout in milliseconds between APDU retries (1-65535).

APDU Retries

The number of times to retransmit an APDU after the initial attempt (0-8).

Configuring BACnet IP Protocol

1. Touch , then > *BMS & Teamwork* > *IS-Unity Setup* > *Protocols* > *BACnet* > BACnet IP.

2. Set the BACnet MSTP Node ID.

    - The Node ID defaults to 1, but must have a value from 0 to 127 that is unique among devices connected through the RS-485 interface.

3. Set the BACnet MSTP data rate.

4. Set the BACnet MSTP max master address.

5. Set the BACnet MSTP max info frames.

6. Touch *Save*.

7. Restart Unity:

    a. Touch , then > *BMS & Teamwork* > *IS-Unity Settings*.

    b. Touch *Restart IS-Unity.*, then touch *Yes*.

BACnet IP Settings

BACnet IP Port Number

The port for the BACnet server's UDP/IP connection.

Register as Foreign Device

Enable or Disable registration as a foreign device.

IP Address of BBMD

IP Address of the BACnet Broadcast Management Device (BBMD) to be accessed for Foreign Device Registration.

Foreign Device Time to Live

Time to remain in the BBMD Foreign Device table after registration.

Configuring BACnet MSTP Protocol

1. Touch , then > *BMS & Teamwork > IS-Unity Setup > Protocols > BACnet* > BACnet IP.
2. Set the BACnet MSTP Node ID.
   - The Node ID defaults to 1, but must have a value from 0 to 127 that is unique among devices connected through the RS-485 interface.
3. Set the BACnet MSTP data rate.
4. Set the BACnet MSTP max master address.
5. Set the BACnet MSTP max info frames.
6. Touch *Save*.
7. Restart Unity:

   a. Touch , then > *BMS & Teamwork > IS-Unity Settings*.
   b. Touch *Restart IS-Unity*, then touch *Yes*.

BACnet MSTP Settings

Node ID

The BACnet server's MS/TP node ID (MAC).

Data Rate

The BACnet MSTP communication rate (bits per second).

Max Master Address

The maximum node ID (MAC) in use on the MS/TP network.

Max Info Frames

Maximum number of information frames this node may send before it must pass the token.

5.2.12 Modbus Protocol Setup

1. Touch [SERVICE], then [≡] > *BMS & Teamwork > IS-Unity Setup > Protocols > BACnet*.

2. Adjust the settings, and touch *Save*.

3. Configure the BACnet interface chosen. See Configuring Modbus TCP Protocol below , or Configuring Modbus RTU Protocol on the facing page .

Modbus Settings

Managed Device Write Access

Enable or disable the Modbus server to write to the managed device

Modbus Interface

Select the Modbus interface, either Modbus TCP or Modbus RTU

Configuring Modbus TCP Protocol

The Modbus TCP permits connection to the card by:

- Any client (open) permits communication by any IP address.
- Clients on the same subnet as the Unity card.
- Clients with specific IP addresses (Trusted IP Lists); only five addresses are permitted.

To configure Modbus TCP

1. Touch [SERVICE], then [≡] > *BMS & Teamwork > IS-Unity Setup > Protocols > Modbus TCP*.

2. Adjust the settings and touch *Save*.

3. Restart Unity:

   a. Touch [SERVICE], then [≡] > *BMS & Teamwork > IS-Unity Settings*.

   b. Touch *Restart IS-Unity*, then touch *Yes*.

Modbus TCP Settings

Limit Network Access Type

IP Access List

- Open
- Same Subnet
- Trusted IP List

Port

The TCP port used by the Modbus server to listen for and respond to Modbus protocol requests based on Limit Network Access Type setting.

Maximum Client Connection Count

Displays the maximum client connection count.

Configuring Modbus RTU Protocol

1. Touch [SERVICE], then [≡] > *BMS & Teamwork > IS-Unity Setup > Protocols > Modbus RTU*.
2. Enter the Node ID and the Baud Rate.
   - The Node ID defaults to 1, but must have a value from 1 to 247 that is unique among devices connected through the RS-485 interface.
   - The default baud rate is 9600. 19200 and 38400 are also available.

NOTE: Contact your system administrator if you are uncertain about the settings.

3. Touch *Save*.
4. Restart Unity:

   a. Touch [SERVICE], then [≡] > *BMS & Teamwork > IS-Unity Settings.*
   b. Touch *Restart IS-Unity.*, then touch *Yes.*

Modbus RTU Settings

Node ID

Modbus Server ID for the interface; obtain from network administrator.

Baud Rate

Communication rate.

- 9600
- 19200
- 38400

Parity Check

The communication parity check.

- None
- Even
- Odd

5.2.13 SNMP Protocol Setup

SNMPv1/v2c and SNMPv3 are enabled by default. The protocols may be configured or their default values may be accepted. Authentication traps are not enabled by default. The default heartbeat trap interval is 24 hours. This can be disabled or the interval may be changed.

1. Touch [SERVICE], then [≡] > *BMS & Teamwork > IS-Unity Setup > Protocols > SNMP*.

2. To enable Authentication Traps, touch to select *Enabled*.

3. To change the Heartbeat Trap Interval, choose a time from the drop-down list or choose *Disabled* to prevent any heartbeat traps from being sent.

    - The interval times offered are 5 or 30 minutes, or 1, 4, 8, 12 or 24 hours.

4. For each trap, choose whether or not to disable or set the interval to one of the periods on the menu.

5. Touch *Save*.

6. Restart Unity:

    a. Touch [SERVICE], then [≡] > *BMS & Teamwork > IS-Unity Settings*.

    b. Touch *Restart IS-Unity.*, then touch *Yes*.

SNMP Settings

SNMPv3 Engine ID

Read-only. The generated SNMPv3 engine ID.

NOTE: A newly-generated ID appears only after rebooting the card.

SNMP v1/v2c Enable

Enable or disable SNMP v1/v2c.

SNMP v3 Enable

Enable or disable SNMPv3.

Authentication Traps

When enabled, an authentication trap is sent if an SNMP host tries to access the card via SNMP, but either the host address is not in the SNMP access settings or it is using the wrong community string.

Heartbeat Trap Interval

Enable or disable and set interval 5 or 30 minutes, or 1 ,4 ,8 ,12, or 24 hours.

RFC-1628 MIB

Enable or disable support for retrieval of data from the RFC-1628 MIB objects.

RFC-1628 MIB Traps

Enable or disable support for sending RFC-1628 traps.

Liebert® Global Products (LGP) MIB

Enable or disable support for getting and setting data using the Liebert® Global Products MIB.

LGP MIB Traps

Enable or disable support for Liebert® Global Products MIB traps.

NOTE: LGP traps will not be sent unless LGP MIB is enabled.

LGP MIB System Notify Trap

Enable or disable support for the LGP System Notification trap. This is a single trap sent each time an alarm or warning is added or removed from the conditions table. It provides a text description of the event in a varbind of the trap message.

NOTE: LGP System Notify traps will not be generated unless the LGP MIB is enabled.

SNMPv3 Engine ID Format Type

Selects method to build the engine ID. Valid values:

- MAC Address (default): Engine ID built from the Unity card's MAC address.
- Text: Engine ID built from text entered in SNMPv3 Engine ID Text. See Select SNMPv3 Engine ID Format below .

SNMPv3 Engine ID Text

Text on which the engine ID is built when SNMPv3 Engine ID Format Type is *Text*.

NOTE: If this field is left blank, the engine ID is built from the Unity card's MAC address.

Select SNMPv3 Engine ID Format

By default, the Engine ID is automatically generated using the MAC address. Optionally, you can select a text based ID instead.

1. Touch [SERVICE], then [≡] > *BMS & Teamwork > IS-Unity Setup > Protocols > SNMP*.

2. Select the format. Refer to SNMP Protocol Setup on the previous page , for descriptions of the settings and options.
   - In SNMPv3 Engine ID Format Type, select *MAC Address* or *Text*.
   - If you selected Text, type the text on which the generated engine ID will be based.
   - Click *Save* to confirm the changes or *Cancel* to discard them.
     The new engine ID is not displayed until after rebooting the card in Step 3 .
     The text generated engine ID is a hexadecimal representation of ASCII characters similar to that shown in **Figure 5.4**   on the next page .

NOTE: If the format type or text for the Engine ID are incomplete or invalid, the Engine ID is generated based on the MAC Address.

3. Restart Unity:

   a. Touch [SERVICE], then [≡] > *BMS & Teamwork > IS-Unity Settings*.

   b. Touch *Restart IS-Unity.*, then touch *Yes*.

Figure 5.4   SNMP Engine ID Generated Using Text Format Scheme
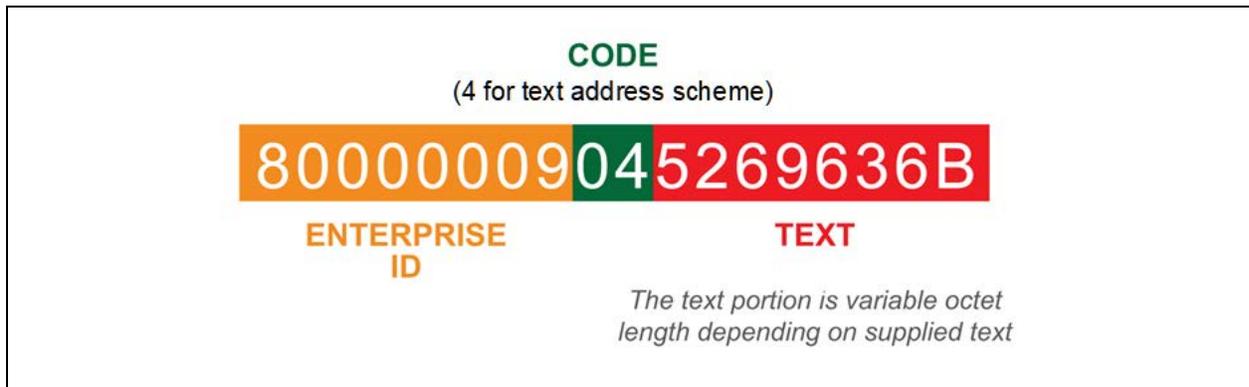
Configuring SNMPv3 Users

IS-Unity supports up to 20 SNMPv3 users. The top level is a list of all 20.

1. Touch [SERVICE], then [≡] > *BMS & Teamwork > IS-Unity Setup > Protocols > SNMP > SNMPv3 Users*, then one of the listed users.

2. Enter the information and set the permissions appropriate to the user, and touch *Save*.

3. Repeat steps 1 and 2 for additional users.

4. Restart Unity:

   a. Touch [SERVICE], then [≡] > *BMS & Teamwork > IS-Unity Settings*.

   b. Touch *Restart IS-Unity*, then touch *Yes*.

SNMPv3 User Settings

SNMPv3 User Enable

Select to enable read, write or sending notifications with the user's credentials.

SNMPv3 Username

The User name the authentication and privacy settings apply to. This string can be composed of printable characters except colon, tab, double quote, and question mark.

SNMPv3 Access Type

Read-only, Read/Write, or Traps only

SNMPv3 Authentication

Cryptographic algorithm used for authentication: None, MD5 or SHA-1

SNMPv3 Authentication Secret

Pass phrase or password used for SNMPv3 Get request. This string can be composed of printable characters with the exception of colon, tab, double quote, and question mark. The entry must be from eight to 64 characters.

SNMPv3 Privacy

Cryptographic algorithm used for encryption. Options are:

- None
- DES
- AES

SNMPv3 Privacy Secret

Pass phrase or password used for SNMPv3 Get request. This string can be composed of printable characters with the exception of colon, tab, double quote, and question mark. The entry must be from eight to 64 characters.

SNMPv3 Trap Target Addresses

Network hosts that will receive SNMPv3 traps, identified with either a network name or IP address. Multiple addresses must be separated by commas.

SNMPv3 Trap Port

Port used by the target host for receiving SNMPv3 traps; default is 162.

Configuring SNMPv1 Traps

You may configure up to 20 network hosts that receive SNMPv1 traps. The top level is a list of all 20.

1. Touch [SERVICE], then [≡] > *BMS & Teamwork > IS-Unity Setup > Protocols > SNMP > SNMPv1 Traps*, then one of the listed traps.
2. Enter the information and set the permissions appropriate to the host/trap, and touch *Save*.
3. Repeat steps 1 and 2 for additional traps.
4. Restart Unity:

    a. Touch [SERVICE], then [≡] > *BMS & Teamwork > IS-Unity Settings*.
    b. Touch *Restart IS-Unity*, then touch *Yes*.

SNMPv1 Trap Settings

SNMP Trap Target Addresses

Configure network hosts that will receive alert notifications (SNMP Traps). The host can be identified as either an IP address or the host's network name.

SNMP Trap Port

Port used by the target host for receiving notifications; default is 162.

SNMP Trap Community String

String identifying a secret known only by those hosts that want to be notified of device status changes.

Configuring SNMPv1/v2c Access

Unity supports up to 20 network hosts that access data using SNMPv1/v2c. The top level is a list of all 20.

1. Touch [SERVICE], then [≡] > *BMS & Teamwork > IS-Unity Setup > Protocols > SNMP > SNMPv1v2c Access*, then one of the listed access options.
2. Enter the information and set the permissions appropriate to the network host, and touch *Save*.
3. Repeat steps 1 and 2 for additional users.
4. Restart Unity:

   a. Touch [SERVICE], then [≡] > *BMS & Teamwork > IS-Unity Settings*.
   b. Touch *Restart IS-Unity*, then touch *Yes*.

SNMPv1/v2c Access Settings

SNMP Access IP Address

Configure network hosts interested in device information access. The host can be identified as either an IP address or the host's network name.

SNMP Access Type

SNMPv1/v2C access type: Read-only or Read/Write.

SNMP Access Community String

SNMP Community String.

5.3 Unity Status Readings

The read-only Status page displays the system status of IS-Unity and a list of events that affect its status.

To view the statuses, touch [SERVICE], then [≡] > *BMS & Teamwork > IS-Unity Setup > Status*.

5.4 Unity Support Information

Support displays information about IS-Unity for troubleshooting.

1.   Touch ![SERVICE], then ![menu] *> BMS & Teamwork > IS-Unity Setup > Support.*

2.   Adjust the settings, and touch *Save.*

5.4.1 Support Folder Settings

Agent Date and Time

> Date and time setting for the card.

Agent Model

> The card's model (Unity Platform).

Agent App Firmware Version

> The card's firmware version (2.0 or higher).

Agent App Firmware Label

> The card's firmware label.

Agent Boot Firmware Version

> The card's Boot firmware version.

Agent Boot Firmware Label

> The card's boot firmware label.

Agent Serial Number

> The card's serial number.

Agent Manufacture Date

> The card's manufacture date.

Agent Hardware Version

> The card's hardware version.

GDD Version

> The card's GDD version, current when the card's firmware was installed; the GDD is a proprietary reference document for device data.

FDM Version

The card's FDM version; the FDM is a data model document that defines data supported by devices that use the Velocity Protocol.

Product Sequence ID

The card's product sequence identifier.

Device Assigned Label

Displays the label assigned to the device.

5.4.2 Configuring Active Networking Settings

Status of the currently active IP network settings for IS-Unity along with some previous values for troubleshooting IP communication issues.

1. Touch , then > *BMS & Teamwork > IS-Unity Setup > Support > Active Networking*.
2. Adjust the settings, and touch *Save*.

Active Networking Settings

Ethernet MAC Address

Ethernet MAC Address for the Embedded-Unity Ethernet interface.

IPv4 Address

Presently used IPv4 network address.

IPv4 Default Gateway

Presently used IPv4 network address of the gateway for network traffic destined for other networks or subnets.

Primary DNS

Presently used IPv4 Primary DNS.

Secondary DNS

Presently used IPv4 Secondary DNS.

Last DHCP/BOOTP Address

Last known IPv4 address assigned by DHCP.

Last DHCP Lease

Lease time of last known DHCP address.

IPv6 Global Address

Shows if DHCPv6 or Static address is presently being used.

Stateless Address AutoConfiguration

IPv6 SLAAC is assigned automatically from Router Advertisement, if "A" flag is set, combining Prefix with EUI-64 MAC.

Link Local

Presently used IPv6 Link Local Address.

IPv6 Default Gateway

Presently used IPv6 network address of the gateway for network traffic destined for other networks or subnets.

Primary DNS Server

IPv6 Primary DNS.

Secondary DNS Server

Presently used IPv6 Secondary DNS.

Last DHCPv6

Last known IPv6 address assigned by DHCPv6.

Last DHCPv6 Lease

Lease time of last known DHCPv6 address.

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6 Configuring Auxiliary Devices

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

6.1 Power Monitoring

Up to six power meters may be connected to each cooling unit. Power meters are factory programmed to monitor individual components or whole cooling units. For efficient data center control, power meters provide monitoring of:

- Connection status
- Input under voltage
- Input RMS voltage leg to leg and leg to ground
- Input current per phase
- Energy consumption in kilowatt hours
- Instantaneous power in watts
- Power consumption

6.1.1 To Setup Power Monitoring

1. Touch [SERVICE], then [≡] > *Auxiliary Device Setup > Modbus Devices > Power Meters > Device X* (where X is the device number). The DEVICE X panel opens.
2. Adjust the power meter settings and touch Save. The power monitoring 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 Liebert® iCOM™ display.

Power Monitoring Device Options

Address

Modbus address for the power meter.

Connection Status

Read only. The connection status of the Modbus. Valid values:

- 0 : Off
- 1 : Connected
- 2: Unknown
- 3: Comm Error
- 4: Disconnect
- 5: Cfg Error

Device Enable

Enables/disables the Modbus power meter.

Device X

Editable field to describe the device.

SysType

Read-only, The type of feedback from the power meter. Valid values are:

- 0: 3Ph+N
- 1: 1Ph+N
- 2: 2Ph+N
- 3: 3Ph

Type

Read-only. The type of power meter.

7 Administering Firmware, Settings and Security

7.1 Vertiv™ Liebert® iCOM™ Firmware Upgrades

NOTE: The Liebert® iCOM™ Service Tool (iST) is required to update control board firmware. Contact technical support at 1-800-222-5877 for information on control board updates.

7.2 Liebert® iCOM™ Firmware Upgrades

NOTE: The Liebert® iCOM™ Service Tool (iST) is required to update control-board firmware. Contact technical support at 1-800-222-5877 for information on control-board updates.

7.2.1 Compatibility with Earlier Versions of Liebert® iCOM™

Versions of Liebert® iCOM™ control firmware PA2.05.31R are incompatible with earlier firmware versions PA1.XX.XXXSTD.

The firmware versions PA2.05.31R and later cannot communicate with earlier versions. The Vertiv™ Liebert® DSE and Vertiv™ Liebert® PDX/PCW will not operate with PA1.XX.XXXSTD installed.

Contact your Vertiv representative to upgrade firmware.

7.2.2 Updating 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 Liebert® iCOM™ Service Tool (iST) is required to update control board firmware. Contact technical support at 1-800-222-5877 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.
2. At the Liebert® 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.
3. On the 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.
4. Remove the USB flash drive after the board reboots.

Figure 7.1   P76, S3, and DS25 LED on the Board
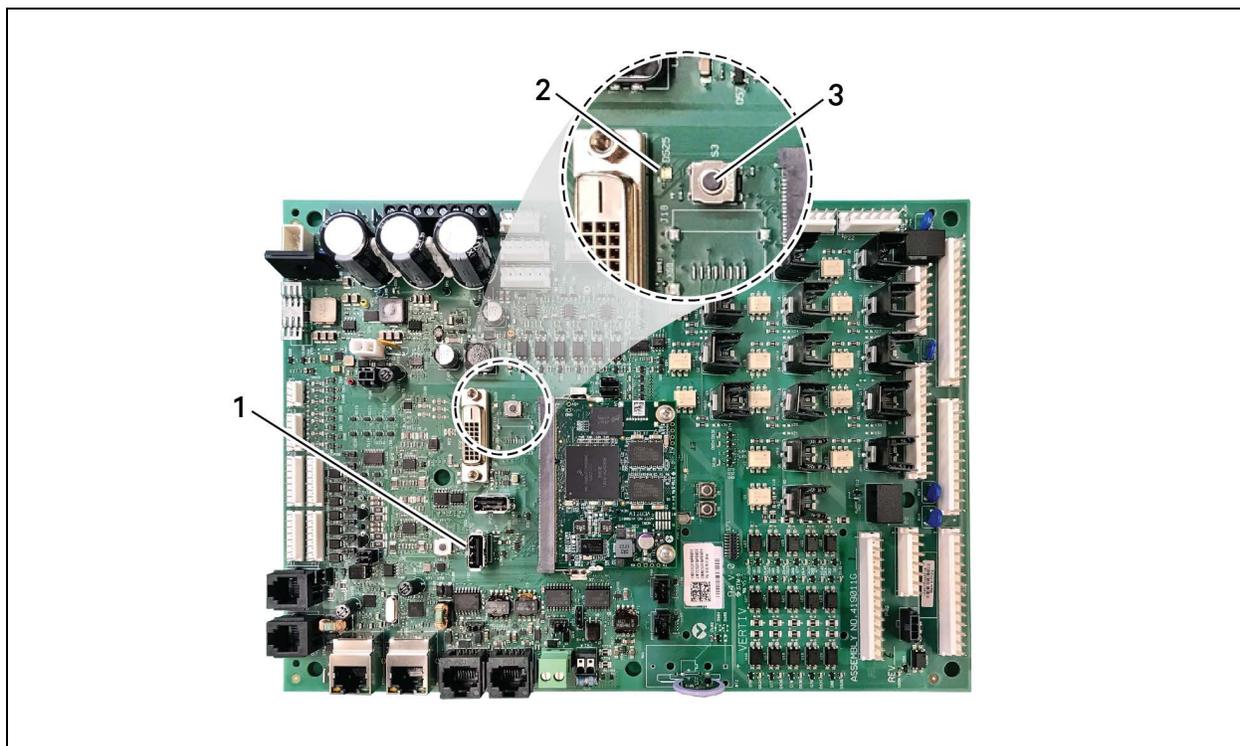
Item	Description
1	P76 port
2	DS25 LED
3	S3 button

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.

7.2.3 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 7.1** 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 3 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.

7.3 Backing Up and Restoring Control Board Settings

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

1. Touch [SERVICE], 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 back-up files or load restore/replicate files. See Control Board Back Up and Restore Options below , for descriptions.

NOTE: USB drives 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.

7.3.1 Control Board Back Up and Restore Options

Action Type

Selects the back up or restore function. Options are:

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

7.4 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 login 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.

8 Performing Diagnostics

8.1 Cooling Unit Status LED

Just below the Liebert® iCOM™ touchscreen display is an LED that changes color and flashes on and off to indicate cooling unit status. See Table 8.1   below , for the LED colors and meanings.

Table 8.1   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 stand-by 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 iCOM™ firmware.

8.2 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 timeout after 30 minutes of inactivity and normal operation resumes.

1. Touch [SERVICE], 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.

8.2.1 Disabling Diagnostics Manual Mode

1. Touch [SERVICE], 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.

8.3 Diagnosing Evaporator Fan Issues

1. Touch [SERVICE], 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.

8.3.1 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.

Fan Speed

Current speed of fan.

Motor Overload/EC Fan Fault

Indicates status of input feedback. If cooling unit has EC fans, it is the EC-fan fault input. If cooling unit has standard fans (no variable speed drive), it is the motor overload input.

Motors

Enables/disables fan motor during manual/diagnostic mode.

Status Airflow Loss

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.

8.4 Diagnosing Digital Output Issues

1. Touch ![SERVICE], then ![menu] > *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.

8.4.1 Diagnostics—Digital Output Options

Alarm Relay

Enables/disables alarms during manual/diagnostic mode.

K11 Relay

Enables/disables warnings during manual/diagnostic mode.

Q15 Output State

Enables/disables Q15 output during manual/diagnostic mode.

8.5 Diagnosing Analog Output Issues

1. Touch ![SERVICE], then ![menu] > *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 Liebert® iCOM™ display.

8.5.1 Diagnostics—Analog Output Options

Analog Output N

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

8.6 Diagnosing Customer Input Issues

1. Touch [SERVICE], 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.

8.6.1 Diagnostics—Customer Input Options

Input N

Status and description of customer input sensors. *(Where N is the input number.)*

8.7 Diagnosing Water Leak Detection Issues

1. Touch [SERVICE], then [≡] > *Diagnostic/Service > Diagnostics > Water Detection* in the Category list. The WATER DETECTION panel displays.

2. Refer to Diagnostics—Water Leak Detection 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 Liebert® iCOM™ display.

8.7.1 Diagnostics—Water Leak Detection Options

LWD Value

Current percentage of resistance measured from the leakage water detection sensor. See Setting Water Leak Detector Options. Range of values across:

*   0%: Maximum resistance, sensor is dry.
*   100%: Minimum resistance, sensor is wet.

9 Customizing the Vertiv™ Liebert® iCOM™ Display

9.1 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 5 **.**

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.

9.1.1 Unit Display Options

Alarm Buzzer Pattern

Selects or disables the audible alarm notification. See Enabling the Audible Alarm Notification on page 29 .

Allow System On/Off

Enables/disables powering on/off the entire system of networked units from the 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 without logging in and accessing the User/Service menus.

9.2 Customizing Main Display Views

The default 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 5 .

9.2.1 Moving Content

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

1. Touch ![USER], then ![menu].

2. Touch ![pencil] 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.

9.2.2 Resizing Content

You can resize content objects on the main display.

1. Touch ![USER], then ![menu].

2. Touch ![pencil] 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 **Figure 9.1** on the facing page .

Figure 9.1 Add/Remove Content Icons and Resizing Handles
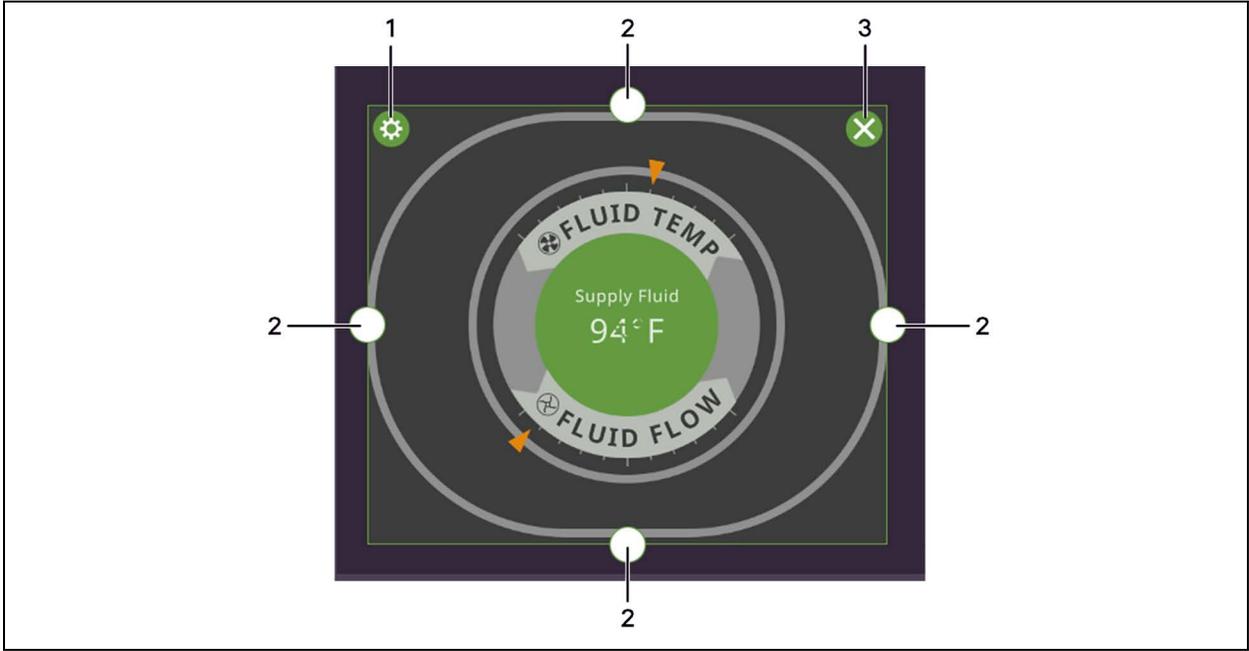
Item	Description
1	Content adjustment icon
2	Resizing handles
3	Remove content icon

9.2.3 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 **Table 9.1** below .

3. Touch the Move icon next to the content and drag it onto the display, then use the re-size handles to adjust as needed.

4. To adjust the content object or the way the it displays, touch ⬙ , see **Figure 9.1** above .

Table 9.1 Main Use 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. You can 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.

Table 9.1   Main Use Display Content Options (continued)

Content	Description
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	EconoPhase operating diagram.
EconoPhase Status	Compressor/Econophase status bar. Indicates the operating mode and the percentage at which the component is operating.

9.2.4 Removing Content

You can easily remove content from the main display.

1. Touch ![USER], then ![menu icon] .

2. Touch ![pencil icon] 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 ![X icon] , see **Figure 9.1**   on the previous page .

9.3 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 .

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 ![USER], then ![menu icon] > *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 [icon]. See **Figure 9.2** 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 9.3** below , shows the Analog Input Properties panel with the custom labels that replaced Property and Value.

Figure 9.2 Custom Text for the Analog Input Properties Labels
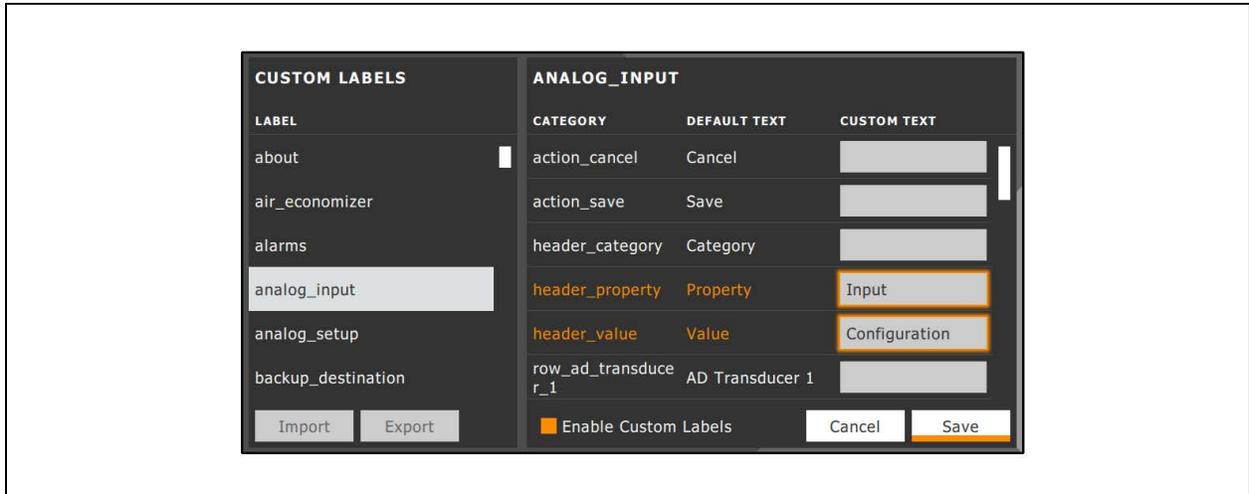
Figure 9.3 Customized Label Text on Analog Input Properties Panel
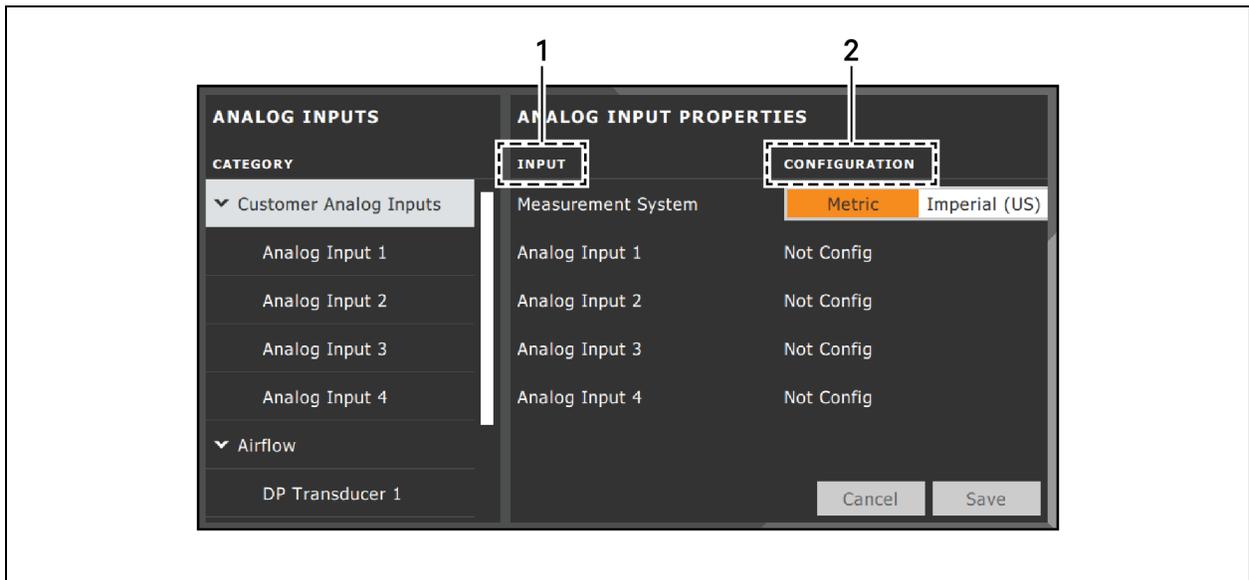
Item	Description
1	Former Parameter heading is now Input.
2	Former Value heading is now Configuration.

9.3.1 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 re-inserting 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 9.3** 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.

10 Hardware

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

10.1 Fluid Temperature Sensor

The Vertiv™ Liebert® XDU shall come standard with supply and return fluid temperature thermistors. The Liebert® iCOM™ controller shall monitor the supply and return fluid temperature at the unit. A single thermistor shall be used to monitor the supply fluid temperature and a separate thermistor shall monitor the return fluid temperature. Thermistors come pre-mounted and pre-configured from the factory.

10.2 Inlet and Outlet Air Sensors

The Liebert® XDU shall come standard with an Inlet Air Temperature/Humidity and Discharge Air Temperature sensor. The Liebert® iCOM™ controller shall monitor the Inlet and Outlet Air sensors. These sensors are intended for reference only and cannot be used for control. The sensors shall come pre-mounted and pre-configured from the factory.

10.3 Vertiv™ Liebert® Liqui-tect Leak Detection

Liebert® Liqui-tect Leak Detection Sensors install quickly and work simply for reliable detection of conductive aqueous fluid leaks. The sensors feature supervised operation: circuit failure or loss of power are detected and indicated as alarm conditions, providing a completely self-monitored leak detection system.

10.3.1 Point Leak-Detention Sensor

The point leak-detection sensor should be placed at critical point(s) on the floor. Two corrosion-resistant, gold-plated probes sense the presence of aqueous liquids. When a leak is detected, dual Form-C relay outputs can simultaneously signal a local alarm panel and a remote monitoring system.

10.3.2 Zone Leak-Detection Sensor

The zone leak-detection sensor provides zone protection using the easy-to-install and quick-drying Liebert® leak detection cable. LEDs on the top cover provide visual indication of the sensor status. A reset button provides optional manual acknowledgment of alarms. Dual Form-C relay outputs simultaneously signal the local alarm panel and remote monitoring system. The sensor is available in packaged kits with 20, 25, 30, 35 or 45 feet of leak detection cable and hold-down clips. Note that additional cable cannot be added to packaged kits.

The leak-detection sensors are field wired to the low voltage terminal connection points of the electric panel. Each leak-detection sensor kit includes complete installation instructions. Consult factory service for questions regarding the installation, connection, and operation of these sensors.

LED Operation

System Normal (Green):

- ON continuously when power is applied to sensor.

Alarm Pending (Yellow):

- ON continuously during leak detect filter delay and cable fault delay.
- FLASHING (with Leak Detected LED) to indicate cable fault condition.

Leak Detected (Red):

- FLASHING to indicate leak detected alarm.
- FLASHING (with Alarm Pending LED) to indicate cable fault condition.

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

1-800-543-2778

Liebert® Channel Products

1-800-222-5877

Liebert® AC and DC Power Products

1-800-543-2378

A.2 Locations

United States

Vertiv Headquarters

1050 Dearborn Drive

Columbus, OH, 43085, 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.

To search the parameters list:

1. Log in at the Service level, then touch ![ADVANCED] > ![menu] > Parameter Directory.

2. Enter a line ID or term in the Search field, and touch ![enter].

B.1 Line IDs for Setpoint Parameters

Table B.1   User Menu Setpoints by Line ID

Line ID	Parameter Name	Range	Default Setting	Description
U107	Fan Setpoint	41 - 104°F 5.0 - 40.0°C	73 °F 22.8 °C	Required anytime the fan operates from a different sensor than that used for the temperature setpoint. 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 Remote Sensor Return Sensor 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 IntelliSlot monitoring cards.

Table B.2   Service Menu Setpoints by Line ID

Line ID	Parameter Name	Range	Default Setting	Description
S146	Fan Control Sensor	Supply Sensor Remote Sensor Return Sensor 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 5.0 - 40.0°C	73°F 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 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.

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

Line ID	Parameter Name	Range	Default Setting	Description
S149	Fan Temperature Control Prop Band	4 - 200°F 2.0 - 111.0 K	36°F 20.0 K	Adjusts the fan speed 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 increase/decrease to 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 Deadband	0 - 36°F 0 - 20.0 K	1 °F 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	Fanspeed VSD Setpoint Minimum	0 - 100%	0.7	Sets the range for the variable fans. Min sets the minimum speed at which the fan will operate. 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.
	Fanspeed VSD Setpoint Standard	0 - 100%	1	
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 at 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 percent.
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

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

Line ID	Parameter Name	Range	Default Setting	Description
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 1 = Pump 1 2 = Pump 2	(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.
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 1 = Yes	(0) No	Allows end user to force a pump rotation

B.2 Line IDs for Alarm Setting Parameters

Table B.3   Service Menu Alarm Settings by Line ID

Line ID	Parameter Name	Range	Default Setting	Description
S2G8	Event: TSA SENSOR FAIL	MESSAGE WARNING ALARM	ALARM	TSA Sensor Fail
617	Event Delay Time (sec)	1 - 9999 sec	10 sec	XDU pump inverter fail 1.
	Event Enabled	Disabled Enabled	Enabled	
	Event: PUMP INVERTER FAIL 1	MESSAGE WARNING ALARM	ALARM	
618	Event Delay Time (sec)	1 - 9999 sec	10 sec	XDU pump inverter fail 2.
	Event Enabled	Disabled Enabled	Enabled	
	Event: PUMP INVERTER FAIL 2	MESSAGE WARNING ALARM	ALARM	
619	Event Delay Time (sec)	1 - 9999 sec	10 sec	XDU pump flow fail 1.
	Event Enabled	Disabled Enabled	Enabled	
	Event: PUMP FLOW FAIL 1	MESSAGE WARNING ALARM	ALARM	
620	Event Delay Time (sec)	1 - 9999 sec	10 sec	XDU pump flow fail 2.
	Event Enabled	Disabled Enabled	Enabled	
	Event: PUMP FLOW FAIL 2	MESSAGE WARNING ALARM	ALARM	

Table B.3   Service Menu Alarm Settings by Line ID (continued)

Line ID	Parameter Name	Range	Default Setting	Description
621	Event Delay Time (sec)	1 - 9999 sec	10 sec	XDU fluid flow check filter.
	Event Enabled	Disabled Enabled	Enabled	
	Event: CHECK WATER SYSTEM	MESSAGE WARNING ALARM	WARNING	
622	Event Delay Time (sec)	1 - 9999 sec	10 sec	The current XDU supply fluid temperature is above the threshold.
	Event Enabled	Disabled Enabled	Enabled	
	Event: HIGH SUPPLY WATER TEMP	MESSAGE WARNING ALARM	WARNING	
623	Event Delay Time (sec)	1 - 9999 sec	10 sec	The current XDU return fluid temperature is above the threshold.
	Event Enabled	Disabled Enabled	Enabled	
	Event: HIGH RETURN WATER TEMP	MESSAGE WARNING ALARM	WARNING	
624	Event Delay Time (sec)	1 - 9999 sec	10 sec	XDU pump operation with no flow.
	Event Enabled	Disabled Enabled	Enabled	
	Event: PUMP OPERATION WITH NO FLOW	MESSAGE WARNING ALARM	ALARM	
625	Event Delay Time (sec)	1 - 9999 sec	10 sec	XDU supply fluid sensor failure.
	Event Enabled	Disabled Enabled	Enabled	
	Event: SUPPLY FLUID SENSOR FAILURE	MESSAGE WARNING ALARM	ALARM	
626	Event Delay Time (sec)	1 - 9999 sec	10 sec	XDU return fluid sensor failure.
	Event Enabled	Disabled Enabled	Enabled	
	Event: RETURN FLUID SENSOR FAILURE	MESSAGE WARNING ALARM	ALARM	
627	Event Delay Time (sec)	1 - 9999 sec	10 sec	XDU fluid flow sensor failure.
	Event Enabled	Disabled Enabled	Enabled	
	Event: FLOW SENSOR FAILURE	MESSAGE WARNING ALARM	ALARM	
628	Event Delay Time (sec)	1 - 9999 sec	-	Current working hours of fluid pump 1 are above the threshold.
	Event Enabled	Disabled Enabled	Enabled	
	Event: PUMP 1 HOURS EXCEEDED	MESSAGE WARNING ALARM	WARNING	
629	Event Delay Time (sec)	1 - 9999 sec	-	Current working hours of fluid pump 2 are above the threshold
	Event Enabled	Disabled Enabled	Enabled	
	Event: PUMP 2 HOURS EXCEEDED	MESSAGE WARNING ALARM	WARNING	

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