VERTIV™

Liebert® Universal Monitor™

User Manual

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.VertivCo.com/en-us/support/ for additional assistance.

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1 INTRODUCTION

Extensive capabilities can put the Liebert Universal Monitor at the heart of your protective network. The Liebert Universal Monitor employs local alarming and remote paging services to keep personnel on-site and at remote locations apprised of the status of equipment.

The panel can interface with any device that closes an electrical contact or has a 4-20 mA signal. To improve process efficiency and troubleshooting, the panel tracks data in three types of logs: alarm, event and trend. The Liebert Universal Monitor has a local LCD interface and a remote dial-up interface.

Further, the Liebert Universal Monitor can report ambient conditions that might adversely affect the facility or equipment and also can report alarms and other events, as well as initiate responses to reduce or prevent damage.

When an alarm condition arises, the Liebert Universal Monitor displays alarm information and sounds an audible alarm; if configured, the panel also sends pager notifications and turns connected devices on or off. See Typical Sequence on page 18 for a more detailed example.

1.1 Methods of Viewing and Configuring the Liebert Universal Monitor

The Liebert Universal Monitor features remote access through two interfaces that allow users to configure the panel, silence alarms, back up logs, and perform many other functions to keep a large or small operation running smoothly and safely.

- **LCD**—liquid crystal display on the front of the panel
- **Service Terminal Interface**—accessible via computer connected directly through an RS232 port or remotely through the Liebert Universal Monitor's onboard modem

These interfaces permit easy access and configuration of the Liebert Universal Monitor, allowing users to view data, silence alarms and have full access to information stored in the panel, including logs of alarms and events.

One more interface—Liebert's SiteScan® Web enterprise monitoring system—is primarily for monitoring, though Liebert SiteScan also provides some configuration functions.

1.2 Data Logs

The three types of data logs—alarm history, event history and trend data of analog sensor readings—can be viewed on the LCD on the front of the Liebert Universal Monitor and downloaded through onboard communications ports.

1.3 Optional Features

An optional Expansion Board, which can be purchased separately, allows you to connect an additional 16 digital inputs and eight digital outputs to the Liebert Universal Monitor.

An optional Transformer Module, available only in the large enclosure, converts 115VAC or 230VAC to 24VAC.

1.4 Available Alarms

The alarms available with the Liebert Universal Monitor are:

- Discrete input alarm (for each digital input)
- High setpoint
- Low setpoint
- Battery unplugged
- Low battery
- Loss of power
- Check battery
- Internal modem fault

Two additional alarms are available with the optional Expansion Board:

- Expansion board loss of communications
- Expansion board restore of communications

1.5 Outside Enclosure Overview

The enclosure for the Liebert Universal Monitor controller board comes in two sizes:

- The **large enclosure** is designed to accommodate the Transformer Module and future components, in addition to the controller board.
- The **small enclosure** is built to hold the controller board only.

Both enclosures are 2-3/4" deep.

Both enclosures have a built-in liquid crystal display (LCD) and a key lock, as shown in the example below. The enclosures are made of metal to accommodate secure conduit fittings and protect components against environmental debris.

Figure 1.1 Small enclosure—external features
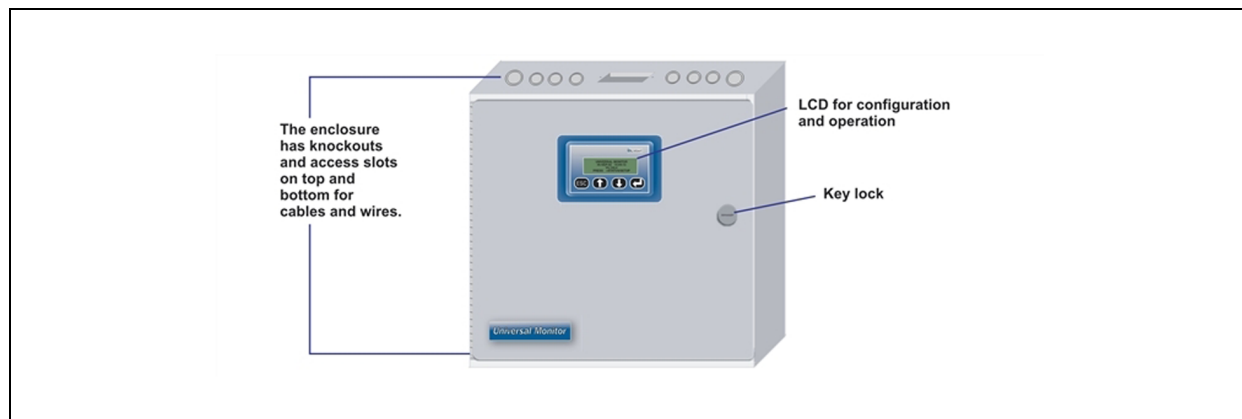
The enclosure must be secured to a wall, either flush-mounted or recessed in the wall, as described in Installation - Main Board on page 19. Knockouts and access slots on the top and bottom allow easy connection of wires and cables (see Wiring and Connections - Main Board on page 33) with either mounting type.

Figure 1.2 Large enclosure—internal features
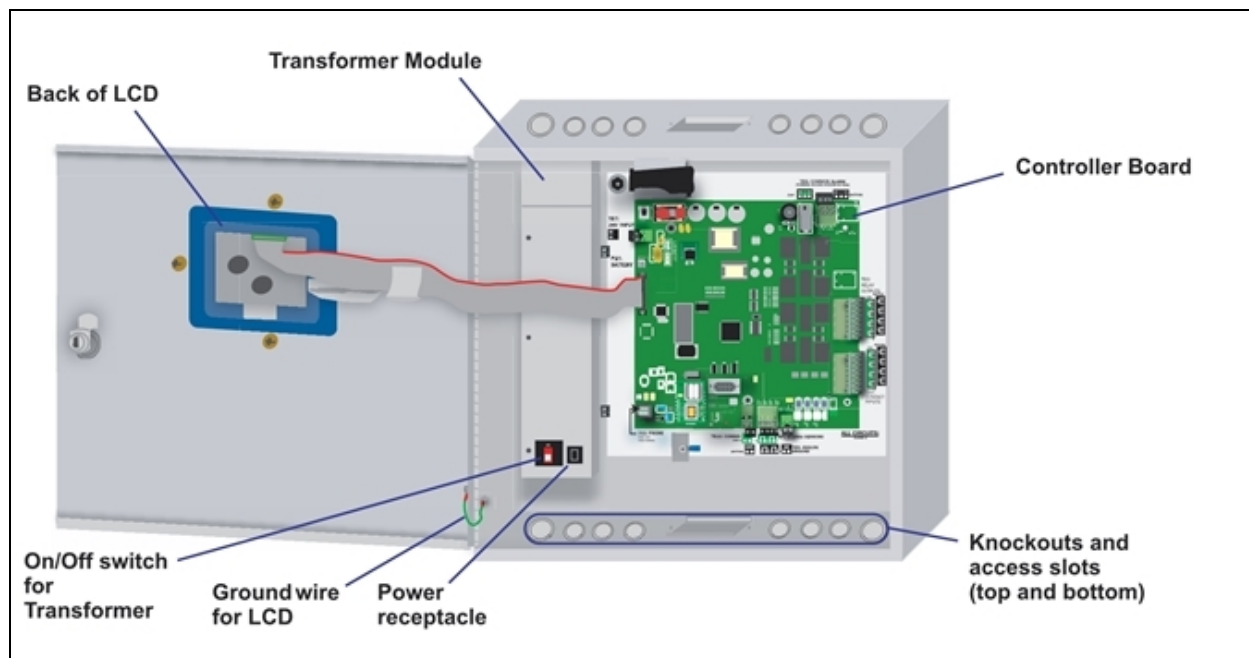
1.6 Typical Configuration

Figure 1.3 on the next page shows an example of external devices connected to the Liebert Universal Monitor controller board. There may be up to eight digital output, eight digital input and four analog input devices connected. The optional Liebert Universal Monitor Expansion Board provides additional connections for eight output and sixteen digital input devices. Remote access is available via Liebert SiteScan® Web and through the modem, which enables pager notifications and use of the Service Terminal Interface.

Figure 1.3 Typical Configuration
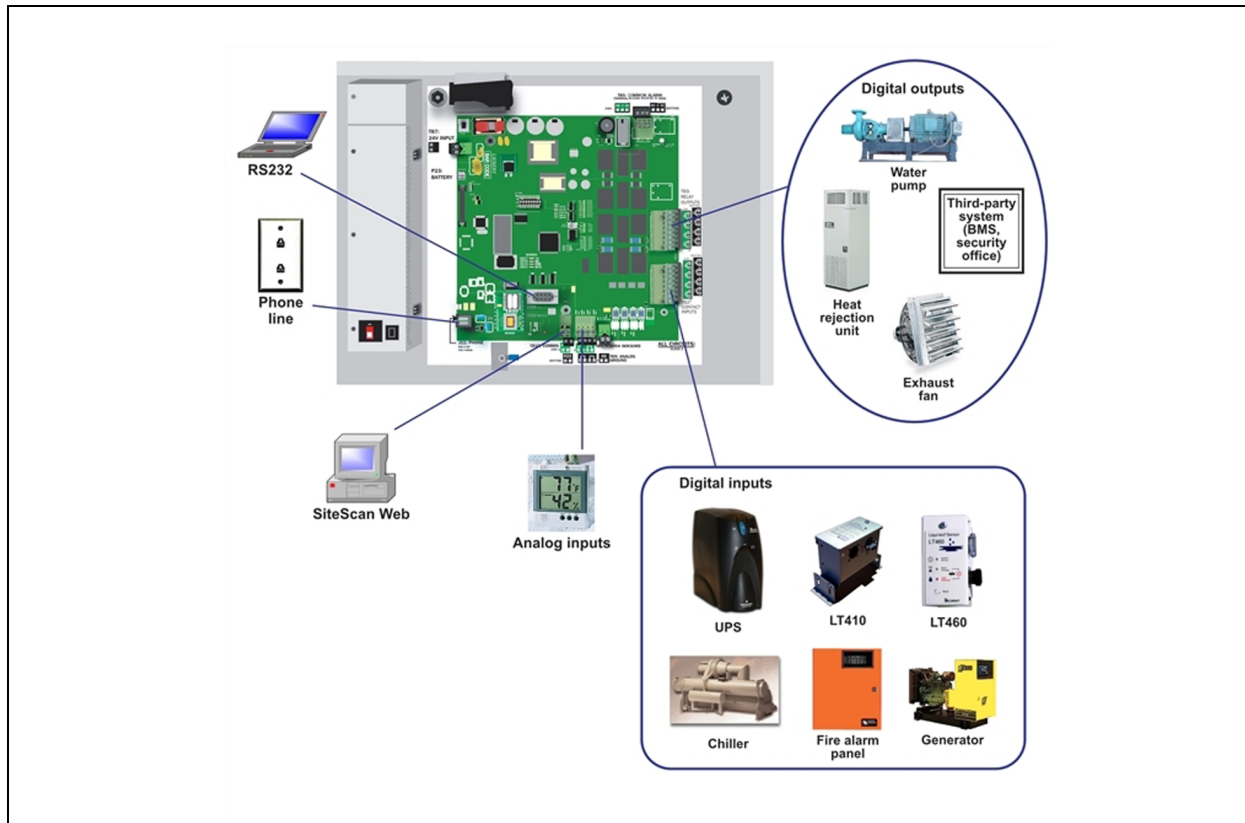
1.7 Controller Board Overview

The Liebert Universal Monitor controller board has connectors for eight digital inputs, four analog inputs and eight digital outputs, as shown below. The board comes complete with light emitting diodes (LEDs) to display the status of monitored devices, a battery pack for short-term backup, communications ports, power connections and other features necessary to monitor and protect your operation.

Table 1.1   Controller board components

Item	Description	For more information, see:
A - Power On/Off switch	Power switch for the controller board. When switched off, the battery pack is disabled.	Connect Power to the Liebert Universal Monitor on page 22
B - Battery pack	Provides battery backup during a power loss to maintain normal operation of the panel for a minimum of 10 minutes. The analog inputs will not be functional during a power loss (P/N 133455P1).	Connecting the Battery Pack on page 26 Connect Battery on page 94
C - EIA422 LEDs	Indicates the connection status between the Liebert Universal Monitor and Liebert SiteScan® Web.	LED Indicators on page 15
D - Audible horn	Provides audible notification when an alarm occurs.	N/A
E - Audible horn jumper	Jumper to disable the audible horn (factory default is enabled).	N/A
F - Common Alarm connectors	The two common alarm connections are used to connect to a secondary warning device such as a horn, light or Building Management System (BMS). When an alarm is present, the contacts close and the external warning device is activated/notified. The common alarm contacts may be configured to be reset with the Silence button/command.	Wiring and Connections - Main Board on page 33 Connecting Common Alarm Outputs on page 40 Setup System - Setup Common Alarm on page 73
G - Digital output status LEDs	Each output has an LED to indicate its status: ON/OFF (energized/de-energized).	LED Indicators on page 15
H - Manual Override Switch (outputs)	Placing the switch in the ON position will turn ON, or energize, all eight outputs simultaneously. This switch removes all automatic output control from the Liebert Universal Monitor.	Manual Output Ctrl on page 101

Table 1.1   Controller board components (continued)

Item	Description	For more information, see:
I - Digital output connectors	Each of the eight output connections is a two-state point: ON/OFF (energized/de-energized). An example of a field digital output point is a motor starter.	Wiring and Connections - Main Board on page 33 Connecting Digital Outputs on page 35 View Output Status on page 63 Setup System - Setup Output on page 83
J - Status LEDs	Indicates the operational status of the controller board.	LED Indicators on page 15
K - Digital output loss-of-power jumper	One of eight output jumpers. Each digital output has a jumper to set the *fail-safe* position of the output point when power fails. The OFF position makes the contact Normally Open (factory default). The ON position makes the contact Normally Closed. Note: The jumper position has no effect on the contact when the Liebert Universal Monitor has power.	Setting the Digital Output Jumpers on page 36 Configure Main Board Output for Loss of Power ("Fail-Safe") on page 84
L - Digital input connectors	Each of the eight input connections is a two-state point: ON/OFF (energized/de-energized). An example of a field digital input point is a leak detector.	Wiring and Connections - Main Board on page 33 Connecting Digital Inputs on page 35 View Input Status on page 62 Setup System - Setup Input on page 70
M - Digital input status LEDs	Each input has an LED to indicate its status: ON/OFF (energized/de-energized).	LED Indicators on page 15
N - Analog ground connector	Connection for an externally powered analog sensor that needs a reference to ground.	Connecting the Analog Ground on page 39
O - Analog input connectors	Each of the four input connections accepts a 4/20 mA signal. An example of a field analog input point is a temperature sensor.	Wiring and Connections - Main Board on page 33 Connecting Analog Inputs on page 37 View Input Status on page 62 Setup System - Setup Sensor on page 74
P - 12VDC/24VDC analog input jumper	One jumper to select voltage supplied for two-wire analog sensors. The jumper supplies all four analog input connectors with the same voltage. Factory default is 24VDC.	Setting the 12VDC/24VDC Analog Power Jumper on page 38
Q - Liebert SiteScan Web connector (EIA422)	Connection to monitor Liebert Universal Monitor from Liebert's SiteScan® Web graphical monitoring package.	Wiring and Connections - Main Board on page 33 EIA422 Liebert SiteScan Web Connector on page 40
R - EIA485 connector	Connection to optional Expansion Board (purchased separately). Connect maximum of one Expansion Board.	Wiring and Connections - Main Board on page 33 Connect EIA485 Connectors to Main Board on page 48

Table 1.1   Controller board components (continued)

Item	Description	For more information, see:
S - Serial interface connector (RS232/EIA574)	Connection for laptop or video terminal. Used for configuration and monitoring using the Service Terminal Interface. Requires a null modem cable for connectivity (P/N 201258P1).	RS232 Connector on page 42 Connecting to the Service Terminal Interface on page 109
T - Phone line connector	Connection for phone line. Used for pager notifications, service phone number, and configuration and monitoring using the Service Terminal Interface. Requires an RJ11 connector.	Phone Line Connector on page 42 Setup System - Setup Modem & Pagers on page 84 Setup Serv Ph Num - Enter Phone Number on page 96 Connecting to the Service Terminal Interface on page 109
U - Power receptacle (Transformer Module)	115VAC power receptacle to power laptop during configuration and diagnostics. Receptacle not available on 230VAC Transformer Module.	Termination and Mounting - Large Enclosure on page 24 Wiring and Connections - Main Board on page 33
V - Power On/Off switch (Transformer Module)	Power switch to turn power On/Off to both Transformer Module 24VAC connectors and power receptacle.	Termination and Mounting - Large Enclosure on page 24 Wiring and Connections - Main Board on page 33
W - 24VAC connector (Transformer Module)	One of the two 24VAC connectors for power (the second is also on the right side of the Transformer Module near the top). Each connector is rated for 40VA.	Termination and Mounting - Large Enclosure on page 24 Wiring and Connections - Main Board on page 33
X - Modem	On-board modem with 9600 baud rate.	Setup System - Setup Modem & Pagers on page 84
Y - Modem status LEDs	Indicates the operational status of the modem.	LED Indicators on page 15
Z - DIP switch 1	DIP switch used for resetting password to default.	Change Password on page 93
AA - LCD connector	Connection for the LCD on the enclosure door.	N/A
BB - LCD contrast adjustment	Adjustment contrast for the LCD on the enclosure door.	N/A
CC - Battery pack connector	Connection for battery pack lead.	Connecting the Battery Pack on page 26
DD - 24VAC power connector	Power connection for the controller. Requires 24VAC.	Connect Power to the Liebert Universal Monitor on page 22
EE - Transformer Module	Transformer Module used to convert 115VAC or 230VAC to 24VAC. Available only in the large enclosure.	Termination and Mounting - Large Enclosure on page 24

1.8 Optional Expansion Board Overview

The Liebert Universal Monitor Expansion Board, purchased separately, has connectors for 16 digital inputs and eight digital outputs (see below. The board has light emitting diodes (LEDs) to display the status of monitored output devices, communications ports for connection to the Liebert Universal Monitor, power connections and other features to monitor and protect your operation.

Table 1.2 Expansion board components

Item	Description	For more information, see:
A - Digital output connectors (8)	Each of the eight output connections is a two-state point: ON/OFF (energized/de-energized). An example of a field digital output point is a motor starter.	Wiring and Connections - Optional Expansion Board on page 43 Connecting Digital Outputs on page 35 View Output Status on page 63 Setup System - Setup Output on page 83
B - Digital output fuses (8)	Bussmann GMA-2 or equivalent. 250V 2A Fast Blow fuse. CAUTION: Fuses must be replaced with equivalent fuses. NOTE: Two (2) replacement fuses are shipped with the Expansion Board enclosure.	N/A
C - Digital output DIP switch	DIP switch used for setting Normally Open / Normally Closed.	Setting the Digital Output DIP Switches on page 47 Set Expansion Board Output by DIP Switch on page 84
D - Digital output status LEDs (8)	Each output has an LED to indicate its status: ON/OFF (energized/de-energized).	LED Indicators - Optional Expansion Board on page 16
E - Digital input connectors (16)	Each of the 16 input connections is a two-state point: ON/OFF (energized/de-energized). An example of a field digital input point is a leak detector.	Wiring and Connections - Optional Expansion Board on page 43 Connecting Digital Inputs on page 35 View Input Status on page 62 Setup System - Setup Input on page 70
F - General status LED (green)	Indicates the operational status of the Expansion Board.	LED Indicators - Optional Expansion Board on page 16

Table 1.2   Expansion board components (continued)

Item	Description	For more information, see:
G - EIA485 status LEDs (yellow & red)	Two LEDs indicate status of the EIA485 connection: ON/OFF (energized/de-energized).	LED Indicators - Optional Expansion Board on the next page
H - EIA485 connector	Connection to the Liebert Universal Monitor.	Connect EIA485 Connectors to Main Board on page 48 Setup Exp Board - Optional Expansion Board on page 101
I - Power status LED (green)	Indicates the power status of the Expansion Board.	LED Indicators - Optional Expansion Board on the next page
J - 24VAC power connector	Power connection for the Expansion Board. Requires 24VAC.	View Output Status on page 63 Input Power Connections - Optional Expansion Board on page 30

1.9 LED Indicators

The Liebert Universal Monitor controller board has LED indicators that show the status of inputs, outputs and the common alarm, as well as the modem and Liebert SiteScan® Web connections.
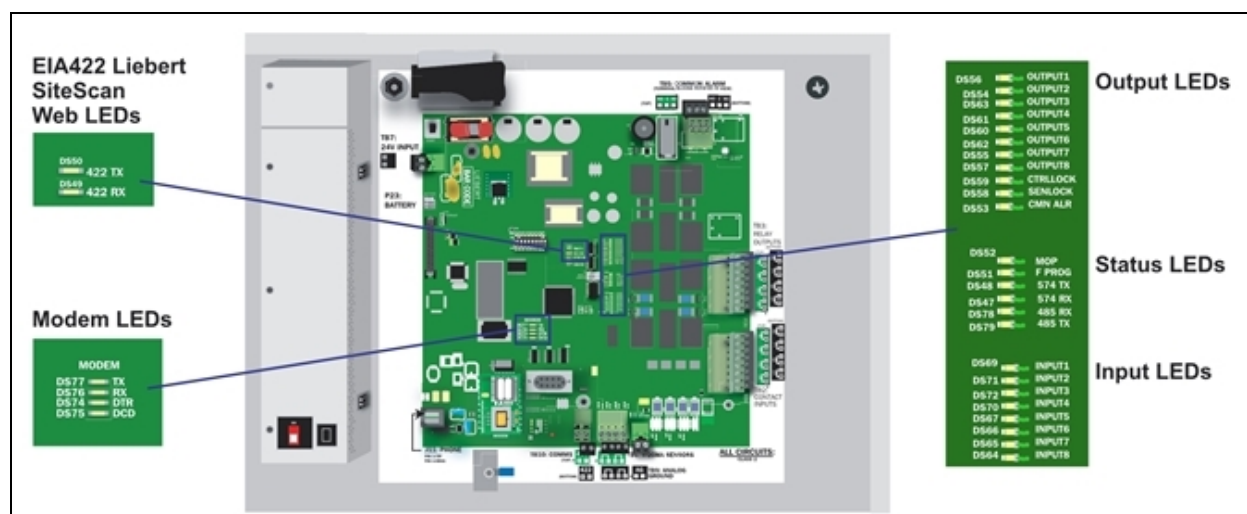
Table 1.3   LED indicators summary

LED Type	LED	Color	Description
EIA422 LEDs	422 TX	Green	Liebert Universal Monitor is transmitting information over the EIA422 port
	422 RX	Green	Liebert Universal Monitor is receiving information over the EIA422 port
Modem LEDs	TX	Green	Liebert Universal Monitor is transmitting information via the modem
	RX	Green	Liebert Universal Monitor is receiving information via the modem
	DTR	Green	Indicates data terminal is ready (DTR)—lights up when modem is dialing
	DCD	Green	Indicates data carrier is detected (DCD)—lights up when modem has connection

Table 1.3   LED indicators summary (continued)

LED Type	LED	Color	Description
Output LEDs	OUTPUT1	Green	Indicates output is ON or energized
	OUTPUT2	Green	Indicates output is ON or energized
	OUTPUT3	Green	Indicates output is ON or energized
	OUTPUT4	Green	Indicates output is ON or energized
	OUTPUT5	Green	Indicates output is ON or energized
	OUTPUT6	Green	Indicates output is ON or energized
	OUTPUT7	Green	Indicates output is ON or energized
	OUTPUT8	Green	Indicates output is ON or energized
	CTRLLOCK	N/A	Not used
	SENLOCK	N/A	Not used
	CMN ALR	Green	Indicates output is ON or energized
Status LEDs	MOP	Green	Indicates the microprocessor is operating properly (MOP)—must be on before Liebert Universal Monitor will function
	FPROG	Green	Indicates firmware is being upgraded—lights up during upgrade process
	574 TX or 232 TX	Green	Liebert Universal Monitor is transmitting information via the RS232 port
	574 RX or 232 RX	Green	Liebert Universal Monitor is receiving information via the RS232 port
	485 RX	Green	Liebert Universal Monitor is receiving information over the EIA485 port from the Expansion Board
	485 TX	Green	Liebert Universal Monitor is transmitting information over the EIA485 port to the Expansion Board
Input LEDs	INPUT1	Red	Indicates input is ON or energized
	INPUT2	Red	Indicates input is ON or energized
	INPUT3	Red	Indicates input is ON or energized
	INPUT4	Red	Indicates input is ON or energized
	INPUT5	Red	Indicates input is ON or energized
	INPUT6	Red	Indicates input is ON or energized
	INPUT7	Red	Indicates input is ON or energized
	INPUT8	Red	Indicates input is ON or energized

1.10 LED Indicators - Optional Expansion Board

The optional Expansion Board, purchased separately, has LED indicators that show the status of inputs and outputs.
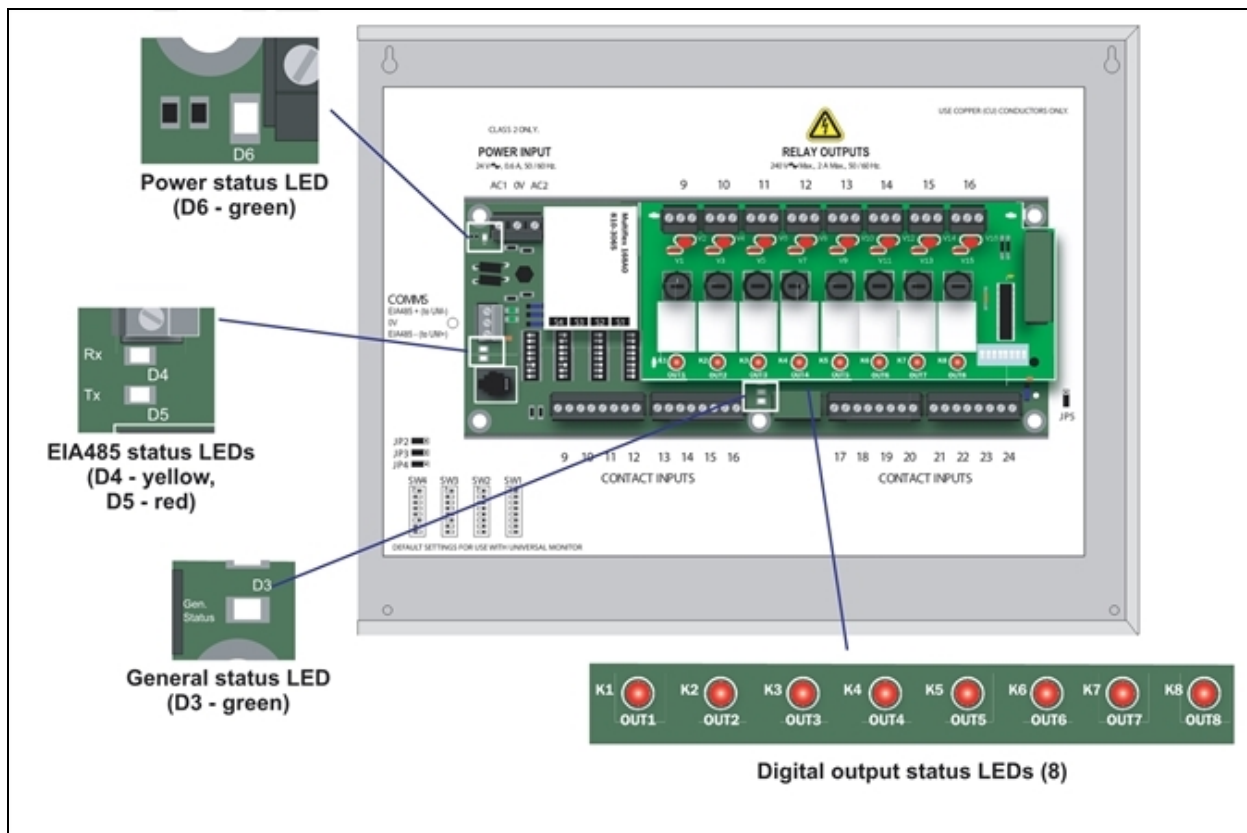
Table 1.4   LED indicators summary

LED Type	LED	Color	Description
Power status LED	24VAC Power (D6)	Green	24VAC power is being supplied to Expansion Board
EIA485 status LEDs	485 RX (D4)	Yellow	Expansion Board is receiving information over the EIA485 port from the Liebert Universal Monitor
	485 TX (D5)	Red	Expansion Board is transmitting information over the EIA485 port to the Liebert Universal Monitor
General status LED	General Status (D3)	Green	Blinks green once per second to indicate the board is powered and operational. If the light is off, the board has likely lost power.
Digital output status LEDs	OUT1	Red	Indicates output is ON or energized
	OUT2	Red	Indicates output is ON or energized
	OUT3	Red	Indicates output is ON or energized
	OUT4	Red	Indicates output is ON or energized
	OUT5	Red	Indicates output is ON or energized
	OUT6	Red	Indicates output is ON or energized
	OUT7	Red	Indicates output is ON or energized
	OUT8	Red	Indicates output is ON or energized

1.11 Typical Sequence

Figure 1.4 below shows a typical sequence of how the Liebert Universal Monitor functions after detecting a change in a monitored unit or area. Many responses depend on configuration settings. This example shows what happens when an analog sensor input reaches a high setpoint—assuming the input is defined as alarmable and is set up to trigger a response in an output—and when the condition returns to normal.

Figure 1.4 Example of typical sequence: Analog input reaches high setpoint
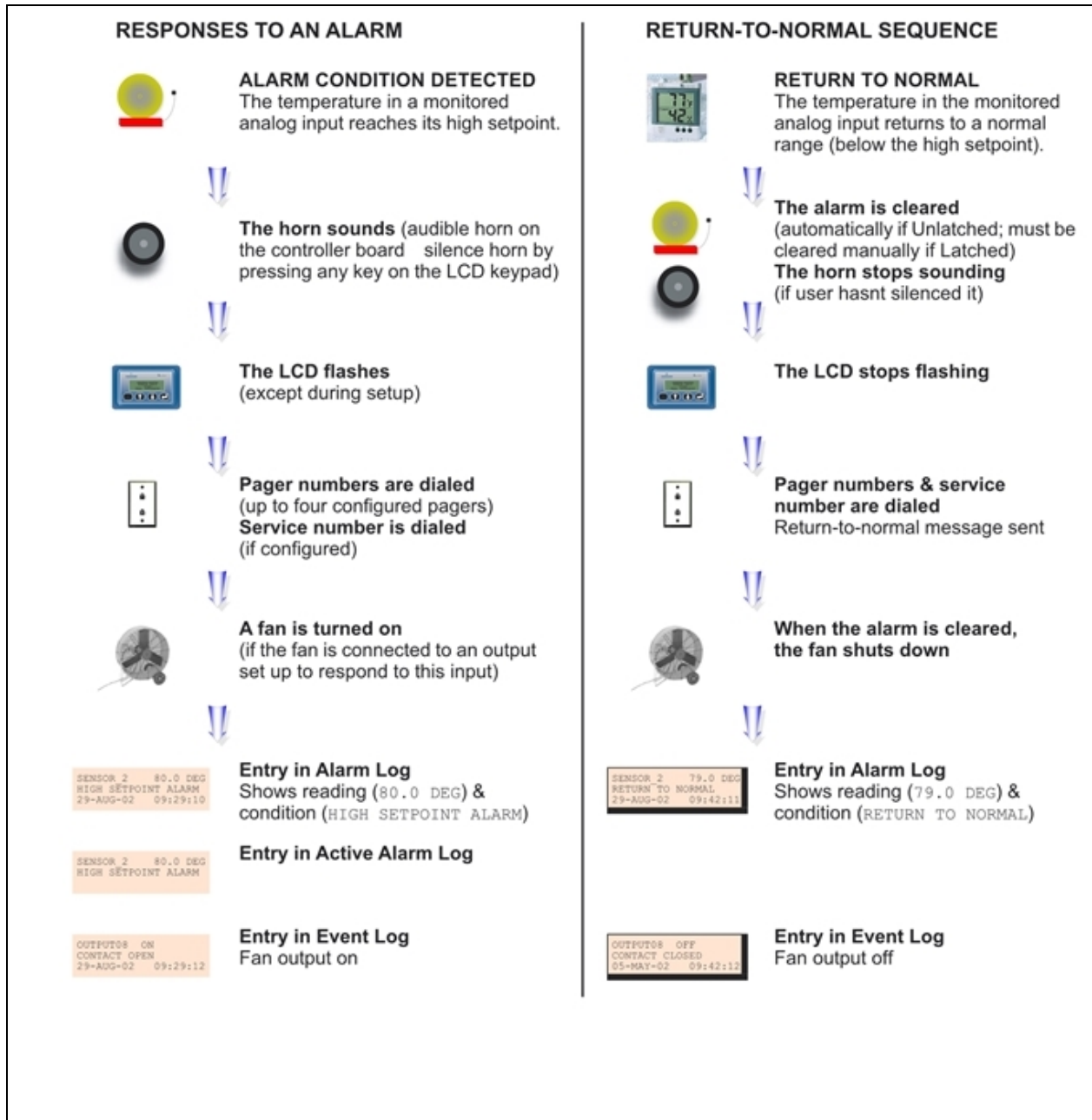
2 INSTALLATION - MAIN BOARD

This section provides instructions for installing, mounting and connecting power to the Liebert Universal Monitor. For information on the optional Expansion Board, see Installation - Optional Expansion Board on page 27.

2.1 Installation Considerations

The Liebert Universal Monitor must be installed indoors and may be mounted on the surface of a wall or flush-mounted, depending on the user's application, the location of equipment and sensors to be monitored and the type of wall the unit will be mounted on.

The Liebert Universal Monitor should be mounted where it can be easily accessed. On-site personnel would access the unit through the LCD on its front cover, service terminal connected to the RS232 port or through Liebert SiteScan®. For off-site monitoring, the Liebert Universal Monitor should be placed near communications means such as a telephone line connection that would permit remote access.

In addition to the communications connections, the site also must have electrical service and must permit connecting the unit's eight digital inputs, eight digital outputs and four analog inputs.

The wall material must be capable of supporting the weight of the Liebert Universal Monitor: see Specifications on page 105.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

2.1.1 Unpacking and Preliminary Inspection

- Before unpacking the Liebert Universal Monitor, inspect the shipping carton for damage or signs of mishandling, such as gashes or holes in the carton or severely flattened corners.
- Open the shipping crates carefully. Use care to avoid puncturing the container with sharp objects that might damage the contents.
- Inspect the Liebert Universal Monitor and all included components for damage.
- If any damage from shipping or mishandling is observed, immediately file a damage claim with the shipping agency and forward a copy to:

  Vertiv™
  1050 Dearborn Drive
  P.O. Box 29186
  Columbus, OH 43229

Packing Contents

Table 2.1 Packing manifest - Liebert
Universal Monitor main board

Standard Components
Liebert Universal Monitor - large or small enclosure User Manual Keys (2) to panel door lock Backup Battery - installed in unit (not connected or charged) RS232 Configuration Cable

2.2 Surface-Mounting the Liebert Universal Monitor

NOTE: Removing the conduit knockouts before mounting the Liebert Universal Monitor on the wall will ease installation and prevent strain on the mounting hardware and wall. It is imperative to remove the knockouts if the unit is to be flush-mounted.

After determining where to place the unit, check to ensure that you have all the hardware required to install the panel on the surface of a wall. Obtain the needed tools and material.

Required tools
- Electric drill (if surface is too hard to drive screws without pilot holes)
- Screwdriver
- Marker to denote layout of holes
- Four screws, each #10

2.2.1 Mounting the Panel

⚠ CAUTION: Check building plans and other relevant documents to determine whether mounting the Liebert Universal Monitor at the selected location might cause cutting or otherwise damaging electrical or communication wiring or pipes.

1. Mark the wall for mounting holes, using the back of the unit as a template (see Figure 2.1 on the facing page).
2. Drill holes, if required, to install the four #10 screws that will secure the Liebert Universal Monitor to the wall. Clean up the debris.
3. If the wall material is not strong enough to hold the screws securely, use wall anchors.
4. Install the top two screws—the screw heads must be small enough to slip through the larger, bottom portion of the pear-shaped mounting slot in the Liebert Universal Monitor (see inset in Figure 2.1 on the facing page). The screws must also be large enough to extend over the edges of the top of the mounting slot.
5. Hang the Liebert Universal Monitor on the screws, letting the panel slip down until the screws are in the smaller, upper portion of the slot.
6. Tighten the screws until they are snug.
7. Insert the remaining two screws in the bottom holes on the back of the panel and tighten.

Figure 2.1 Mounting dimensions
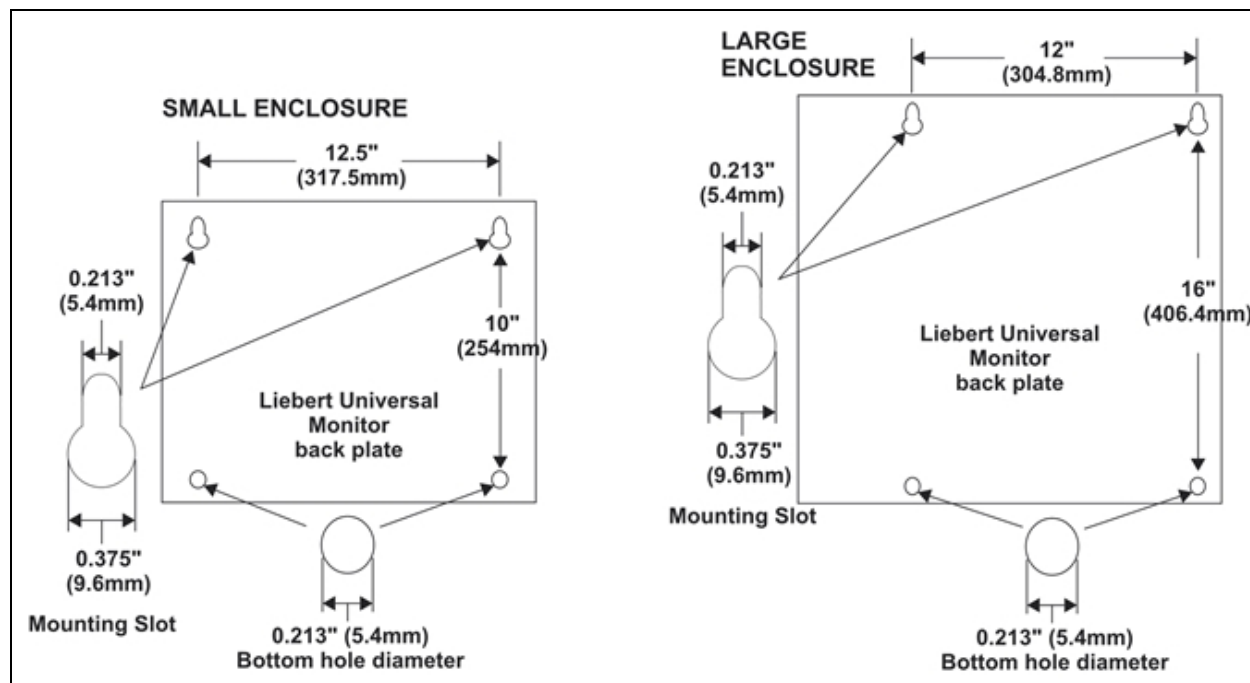
2.3 Flush-Mounting the Liebert Universal Monitor

NOTE: Removing the conduit knockouts before mounting the Liebert Universal Monitor on the wall will ease installation and prevent strain on the mounting hardware and wall. It is imperative to remove the knockouts if the unit is to be flush-mounted. The rectangular access doors on the top and bottom of the Liebert Universal Monitor must be reversed so they slide the opposite direction. Leaving the doors as shipped from the factory prevents them from being opened when the panel is flush mounted in a wall.

The Liebert Universal Monitor may be flush-mounted according to company practices—either with screws through the sides of the panel into wall supports or with hanging hardware that attaches to the back of the panel. After determining how and where to place the unit, check to ensure that you have all the hardware required to install the panel in the wall. Obtain the needed tools.

Required tools

- Saw
- Electric drill
- Screwdriver
- Marker to denote layout of the hole to accommodate the Liebert Universal Monitor
- Trim ring and associated hardware
- Mounting hardware

2.3.1 Mounting the Panel

⚠️ **CAUTION: Check building plans and other relevant documents to determine whether mounting the Liebert Universal Monitor at the selected location might cause cutting or otherwise damaging electrical or communication wiring or pipes.**

1. Mark the wall for the cutout to accommodate the panel, using the back of the unit as a template.
2. Drill a pilot hole for the saw blade, if required.
3. Use the saw to cut out the marked section of the wall (if not new construction).
4. Rest the Liebert Universal Monitor in the wall and mark where mounting screws will be inserted into the wall studs or other support member.
5. Remove the panel and drill the holes for the mounting screws or wall anchors. Clean up the debris.
6. Reverse the slide direction of the rectangular access doors on the top and bottom of the Liebert Universal Monitor. Leaving the doors as shipped from the factory prevents them from being opened when the panel is flush mounted in a wall.
7. Attach any field-supplied mounting hardware.
8. Reinsert the assembly into the wall.
9. Insert and tighten the screws or wall anchors.

2.4 Connect Power to the Liebert Universal Monitor

The Liebert Universal Monitor requires 24VAC for proper operation. Liebert recommends using the optional Transformer Module manufactured by Liebert or another UL-approved Class 2 power unit to obtain proper voltage. If the power unit is not a Class 2 circuit, it must be protected with an IEC 5 x 20mm time lag 2A fuse. For information, consult your local dealer, Vertiv™ representative or the Liebert Worldwide Support Group.

⚠️ **WARNING! Check that power is removed from wires prior to installation.**

⚠️ **CAUTION: The Liebert Universal Monitor is designed for use on properly grounded (earthed) 24VAC power, 50Hz or 60Hz. The ground wire for the power lead must be wired to the earth ground terminal (stud located next to the 24VAC terminal block). This equipment is intended to be installed by a qualified and certified electrician who must review and approve customer supplied wiring and circuit breakers, verify correct input and grounded (earthed) connections to ensure compliance with technical standards and national and local electrical codes.**

⚠️ **WARNING! Be sure that the Power On/Off switch is set to OFF before installing any wiring to this unit. The switch is in the top left corner of the unit, just below the battery pack.**

2.4.1 Input Power Connections - Small Enclosure

To connect electrical power:

1. Run conduit and electrical wiring from building to the Liebert Universal Monitor.

2. Use copper wires only; proper wiring to use for 24VAC power is 18-22 AWG stranded and shielded (18 AWG is recommended—see 4 on page 33). Strip wires 1/2".

Figure 2.2 Electrical connections to panel
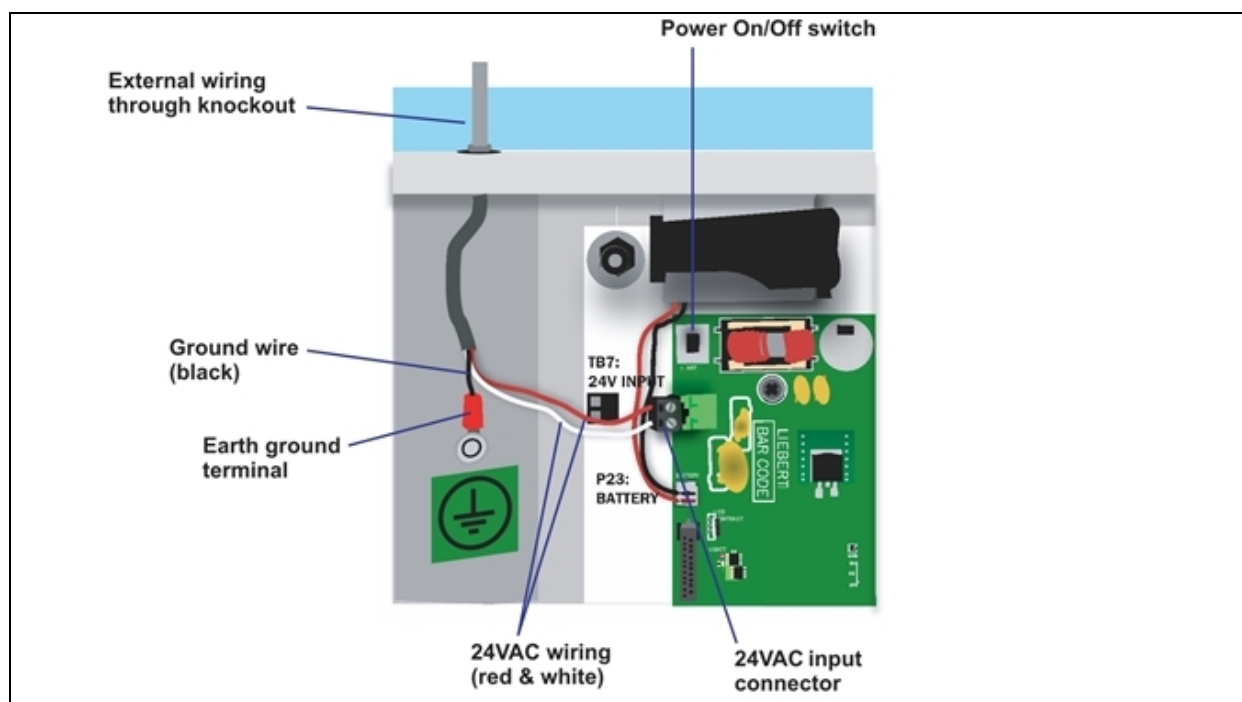
3. Secure the incoming electrical service wires to the Liebert Universal Monitor's 24VAC input by sliding the wires into TB7, the 24VAC input terminal block. There is no polarity requirement when connecting to TB7. The ground wire must be connected to the earth ground terminal located on the side of the panel (see Figure 2.2 above).

2.4.2 Termination and Mounting - Large Enclosure

⚠ CAUTION: The 115VAC/230VAC Transformer Module must be connected to a branch circuit with 15A branch circuit protection. This equipment is intended to be installed by a qualified and certified electrician who must review and approve customer supplied wiring and circuit breakers, verify correct input and grounded connections to ensure compliance with the technical standards and national and local electrical codes.

The Transformer Module shall be used only as indicated by the manufacturer.

⚠ WARNING! Be sure that the Power On/Off switch is set to OFF before installing any wiring to this unit. The switch is at the bottom of the unit.

Input Power Connections

To connect electrical power to the Transformer Module:

1. Install electrical wiring from utility power to the Transformer Module.
2. Use copper wires only; proper wiring to use for power is 14/2 AWG copper wire with ground.
3. **For the TM230 only:** strip wires 3/8" (9.6mm).

   Note: For the TM115, wires are pre-stripped 0.4" (10.2mm) at the factory.

4. Connect the wiring as follows:

TM115	TM230	Connection Type
White wire	Neutral (L2)	Neutral
Black wire	Line (L1)	Power (Line)
Green wire	Ground lead	Ground

5. Secure the incoming electrical service wires to the TM115 input wires with wire nuts as shown in Figure 2.3   on the facing page or to the TM230 connectors as shown in Figure 2.4   on the facing page.

24 VAC Output Power Connections

To connect to the 24VAC outputs:

1. Install electrical wiring from device requiring 24VAC power to the Transformer Module.
2. Use copper wire only; proper wiring to use for power is 18, 20 or 22 AWG copper wire. Strip wire 1/4".

3. There are two 24 VAC output connectors (TB1 and TB2). Terminate wires to the connector as shown in Figure 2.3   below and Figure 2.4   below. TB1 and TB2 are NOT polarity sensitive.

4. Secure the wires to the connector.

Figure 2.3 Power wiring to TM115
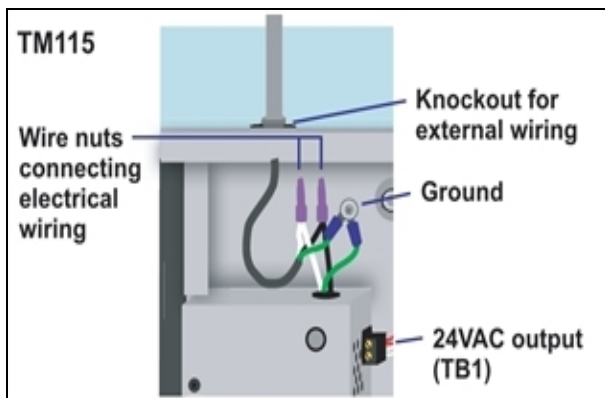
Figure 2.4 Power wiring to TM230
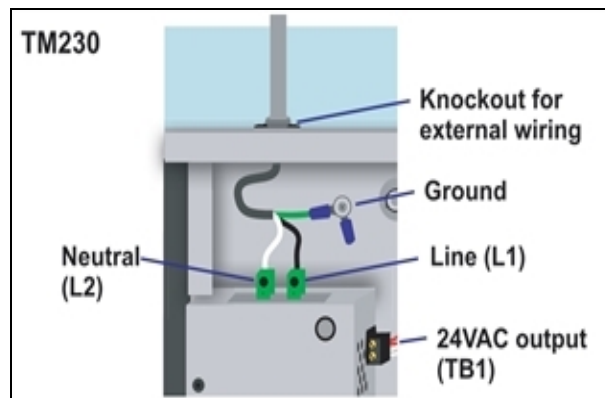
Troubleshooting - Transformer Module

A common problem and possible solution are shown in the table below. For further information or if you have other problems with the unit, consult your local dealer, Vertiv™ representative or Vertiv™ support.

Problem	Possible Solution	Replacement Fuse Part Numbers
24 VAC power not available from TB1 or TB2	Check fuse for respective output (TB1 or TB2).	LITTLEFUSE 218002 *or* BUSSMANN GDC-2A

2.4.3 Connecting the Battery Pack

After connecting AC power to the Liebert Universal Monitor, you may connect the panel's backup battery (factory-supplied) to the jumpers so it will begin charging when electrical power to the Liebert Universal Monitor is switched on.

NOTE: If the battery is not hooked up before the Liebert Universal Monitor is switched on, it will trigger an alarm.

To connect the battery pack, insert the battery leads into the jumpers as shown below. (To disconnect the battery pack, remove the battery leads from the jumpers.)
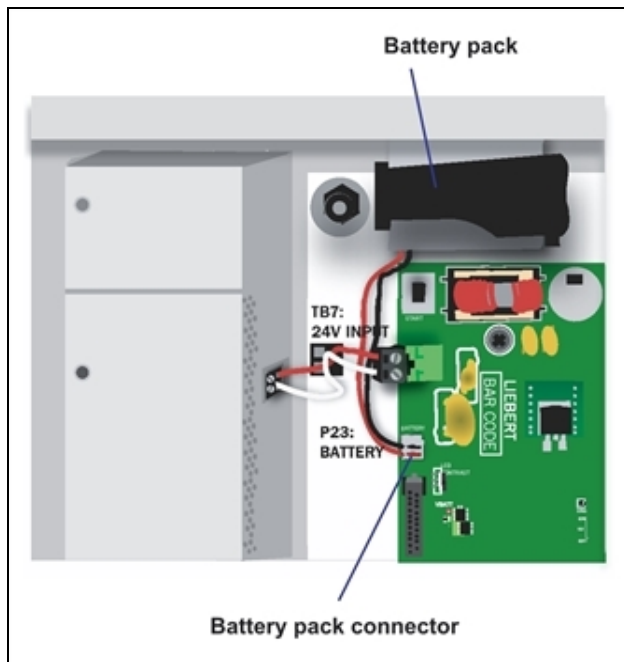
Obtaining a Replacement Battery Pack

To obtain a replacement battery pack, contact your local dealer or Vertiv™ representative. The Liebert part number is 133455P1.

⚠️ **WARNING! To prevent the risk of fire or explosion, replace only with 7.2 V rechargeable NiCad battery pack.**

⚠️ **CAUTION: Dispose of the battery properly by sending it back to Liebert Corporation or an approved battery recycling facility.**

3 INSTALLATION - OPTIONAL EXPANSION BOARD

This section provides instructions for installing, mounting and connecting power to the optional Expansion Board. The Expansion Board enclosure is identical to the Liebert Universal Monitor small enclosure.

3.1 Installation Considerations

The optional Expansion Board must be installed indoors and may be mounted on the surface of a wall or flush-mounted, depending on the user's application, the location of equipment and sensors to be monitored and the type of wall the unit will be mounted on.

The Expansion Board may be placed up to 3000 ft. (914m) from the Liebert Universal Monitor and should be mounted where it can be easily accessed. The site must have electrical service and allow for connecting 16 digital inputs and eight digital outputs.

The wall material must be capable of supporting the weight of the Expansion Board: see Optional Expansion Board Specifications on page 106.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

3.1.1 Unpacking and Preliminary Inspection

- Before unpacking the optional Expansion Board, inspect the shipping carton for damage or signs of mishandling, such as gashes or holes in the carton or severely flattened corners.
- Open the shipping crates carefully. Use care to avoid puncturing the container with sharp objects that might damage the contents.
- Inspect the Expansion Board and all included components for damage.
- If any damage from shipping or mishandling is observed, immediately file a damage claim with the shipping agency and forward a copy to:

> Vertiv Corporation
> 1050 Dearborn Drive
> P.O. Box 29186
> Columbus, OH 43229

Packing Contents

Table 3.1 Packing manifest - optional Expansion Board

Standard Components
Expansion Board - small enclosure
User Manual
Keys (2) to panel door lock
Two (2) spare fuses for output relays

3.2 Surface-Mounting the Optional Expansion Board

NOTE: Removing the conduit knockouts before mounting the optional Expansion Board on the wall will ease installation and prevent strain on the mounting hardware and wall. It is imperative to remove the knockouts if the unit is to be flush-mounted.

After determining where to place the optional Expansion Board, check to ensure that you have all the hardware required to install the panel on the surface of a wall. Obtain the needed tools and material.

Required tools

- Electric drill (if surface is too hard to drive screws without pilot holes)
- Screwdriver
- Marker to denote layout of holes
- Four screws, each #10

3.2.1 Mounting the Panel

⚠ CAUTION: Check building plans and other relevant documents to determine whether mounting the optional Expansion Board at the selected location might cause cutting or otherwise damaging electrical or communication wiring or pipes.

1. Mark the wall for mounting holes, using the back of the unit as a template (see Figure 3.1 on the facing page).
2. Drill holes, if required, to install the four #10 screws that will secure the optional Expansion Board to the wall. Clean up the debris.
3. If the wall material is not strong enough to hold the screws securely, use wall anchors.
4. Install the top two screws—the screw heads must be small enough to slip through the larger, bottom portion of the pear-shaped mounting slot in the Expansion Board (see inset in Figure 3.1 on the facing page). The screws must also be large enough to extend over the edges of the top of the mounting slot.
5. Hang the Expansion Board on the screws, letting the panel slip down until the screws are in the smaller, upper portion of the slot.
6. Tighten the screws until they are snug.
7. Insert the remaining two screws in the bottom holes on the back of the panel and tighten.

Figure 3.1 Mounting Dimensions - optional Expansion Board
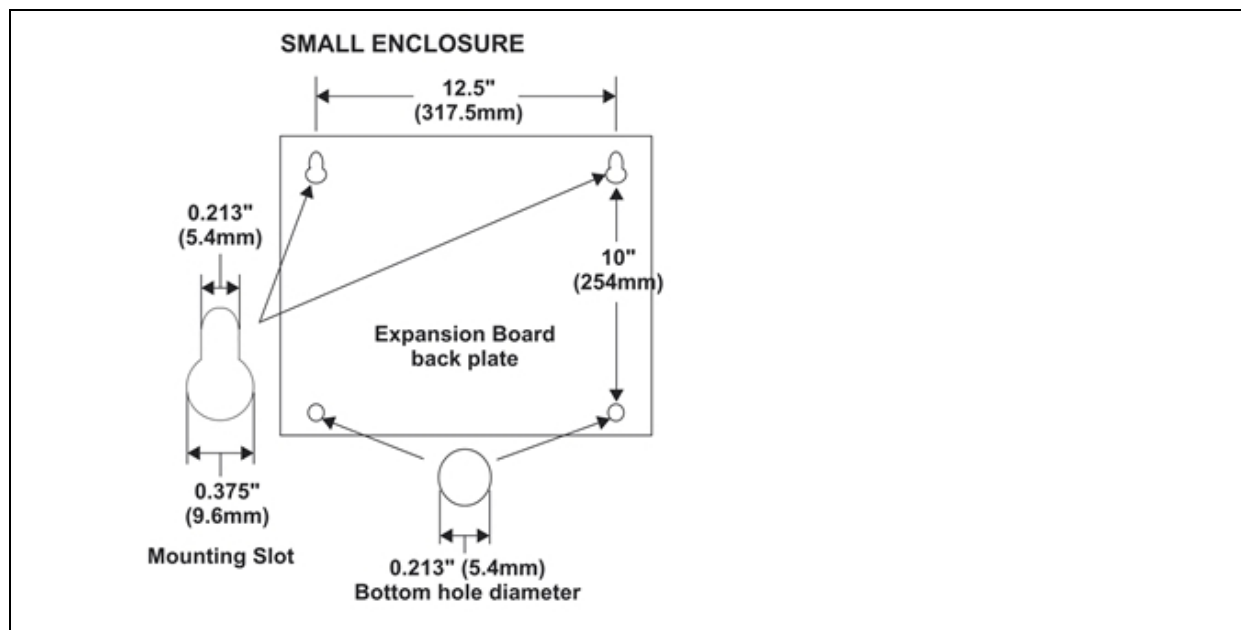
3.3 Flush-Mounting the Optional Expansion Board

NOTE: Removing the conduit knockouts before mounting the optional Expansion Board on the wall will ease installation and prevent strain on the mounting hardware and wall. It is imperative to remove the knockouts if the unit is to be flush-mounted. The rectangular access doors on the top and bottom of the Expansion Board must be reversed so they slide the opposite direction. Leaving the doors as shipped from the factory prevents them from being opened when the panel is flush mounted in a wall.

The optional Expansion Board may be flush-mounted according to company practices—either with screws through the sides of the panel into wall supports or with hanging hardware that attaches to the back of the panel. After determining how and where to place the unit, check to ensure that you have all the hardware required to install the panel in the wall. Obtain the needed tools.

Required tools

- Saw
- Electric drill
- Screwdriver
- Marker to denote layout of the hole to accommodate the optional Expansion Board
- Trim ring and associated hardware
- Mounting hardware

3.3.1 Mounting the Panel

1. Mark the wall for the cutout to accommodate the panel, using the back of the unit as a template.
2. Drill a pilot hole for the saw blade, if required.
3. Use the saw to cut out the marked section of the wall (if not new construction).

4. Rest the optional Expansion Board in the wall and mark where mounting screws will be inserted into the wall studs or other support member.

5. Remove the panel and drill the holes for the mounting screws or wall anchors. Clean up the debris.

6. Reverse the slide direction of the rectangular access doors on the top and bottom of the Expansion Board. Leaving the doors as shipped from the factory prevents them from being opened when the panel is flush mounted in a wall.

7. Attach any field-supplied mounting hardware.

8. Reinsert the assembly into the wall.

9. Insert and tighten the screws or wall anchors.

⚠ CAUTION: Check building plans and other relevant documents to determine whether mounting the optional Expansion Board at the selected location might cause cutting or otherwise damaging electrical or communication wiring or pipes.

3.4 Input Power Connections - Optional Expansion Board

The optional Expansion Board requires 24VAC for proper operation. Vertiv™ recommends using the optional Transformer Module manufactured by Liebert or another UL-approved Class 2 power unit to obtain proper voltage. If the power unit is not a Class 2 circuit, it must be protected with an IEC 5 x 20mm time lag 2A fuse. For information, consult your local dealer, Vertiv™ representative Vertiv™ Support.

⚠ CAUTION: The Expansion Board is designed for use on properly grounded (earthed) 24VAC Class 2 power, 50Hz or 60Hz. The ground wire for the power lead must be wired to the earth ground terminal (stud located next to the 24VAC terminal block). This equipment is intended to be installed by a qualified and certified electrician who must review and approve customer-supplied wiring and circuit breakers, verify correct input and grounded (earthed) connections to ensure compliance with technical standards and national and local electrical codes.

⚠ WARNING! "RISK OF ELECTRIC SHOCK" - More than one disconnect switch may be required to de-energize the equipment before servicing.

⚠ WARNING! Hazardous voltage may be present.

To connect electrical power:

1. Run 24VAC electrical power from the TB2 (or TB1) connector of the Transformer Module, as shown in Figure 3.2   on the facing page, or another 24V source to the Expansion Board in accordance with local electrical codes.

2. Use copper wires only; proper wiring to use for power is 18-22 AWG stranded and shielded (18 AWG is recommended—see Table 5.1   on page 43). Strip wires 1/2".

Figure 3.2 Electrical connections to panel
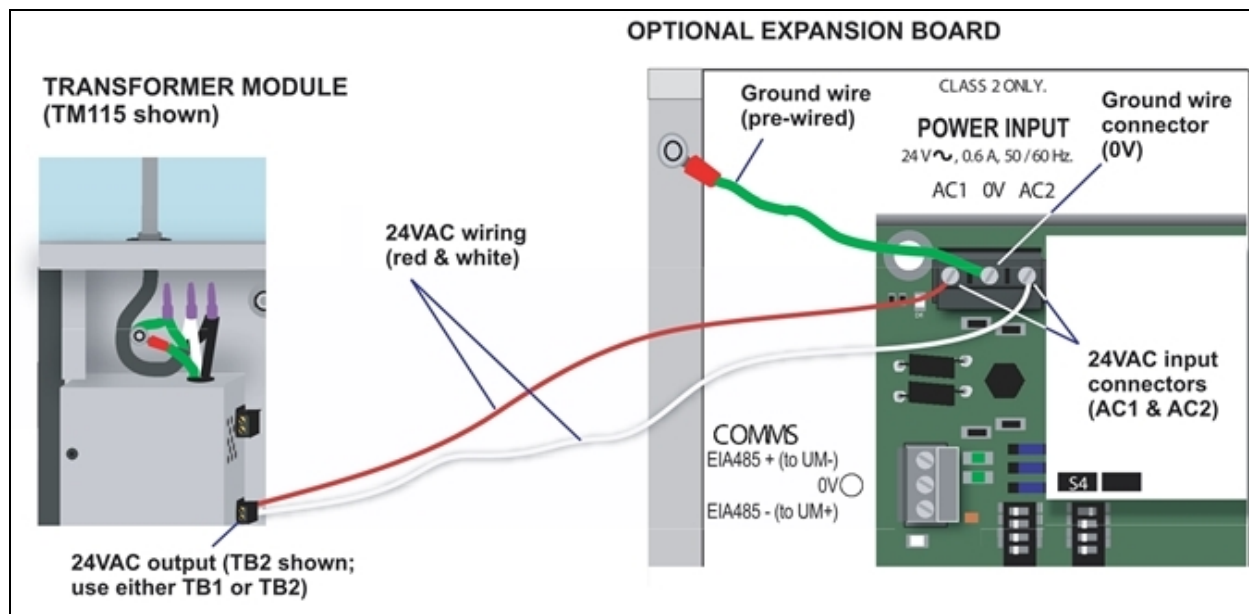
3. Secure the incoming electrical service wires to the Expansion Board's 24VAC input by sliding the wires into AC1 and AC2, the 24VAC input connectors, as shown in Figure 3.2 above. There is no polarity requirement when connecting to these connectors.

NOTE: The ground wire connection to the 0V connector is pre-wired at the factory.

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4 WIRING AND CONNECTIONS - MAIN BOARD

⚠ CAUTION: Switch OFF electric power to the Liebert Universal Monitor before installing any wiring to the unit or changing input or output connections. The Power On/Off switch is in the top left corner of the unit, just below the battery pack.

4.1 Wiring Specifications

Input and output connections to the Liebert Universal Monitor may be made in any order—it is not necessary, for example, to make all input connections before making any output connections. Use copper conductors only for all wiring.

Table 4.1 Wiring specifications - main board

Connection	Supported Wire Type	Maximum Wire Length			Rating
Digital Input	18-22 AWG Stranded & Unshielded **18 AWG* (recommended)** Non Plenum - Belden 9740 Plenum - Belden 89740	750 ft. (225m)			Dry Contact (24 VDC, 10 mA)
Digital Output	18-22 AWG Stranded & Unshielded **18 AWG* (recommended)** Non Plenum - Belden 9740 Plenum - Belden 89740	18 AWG* (recommended) @3A 50 ft. (15m) @2A 100 ft. (30m) @1A 200 ft. (60m)	20 AWG @3A 40 ft. (12m) @2A 60 ft. (18m) @1A 100 ft. (30m)	22 AWG @3A 25 ft. (7m) @2A 35 ft. (10m) @1A 75 ft. (23m)	24VAC@3A
Analog Input 2-Wire Transducer	18-22 AWG Stranded & Unshielded **18 AWG* (recommended)** Non Plenum - Belden 9740 Plenum - Belden 89740	750 ft. (225m)			4-20 mA Signal Input Selectable Power Source (12/24VDC)
Analog Input 4-Wire Transducer	18-22 AWG Stranded & Unshielded **18 AWG* (recommended)** Non Plenum - Belden 8489 Plenum - Belden 88489	750 ft. (225m)			4-20 mA Signal Input Selectable Power Source (12/24VDC)
Common Alarm Output	18-22 AWG Stranded & Unshielded **18 AWG* (recommended)** Non Plenum - Belden 9740 Plenum - Belden 89740	18 AWG* (recommended) @3A 50 ft. (15m) @2A 100 ft. (30m) @1A 200 ft. (60m)	20 AWG @3A 40 ft. (12m) @2A 60 ft. (18m) @1A 100 ft. (30m)	22 AWG @3A 25 ft. (7m) @2A 35 ft. (10m) @1A 75 ft. (23m)	24VAC @3A
Communication RS232	Null Modem Cable	50 ft. (15m)			N/A
Communication EIA422 Liebert SiteScan®	18-22 AWG Stranded & Shielded **22 AWG* (recommended)** Non Plenum - Belden 9461 Plenum - Belden 88761	1000 ft. (300m)			N/A
Communication EIA485	18-22 AWG Stranded & Shielded **22 AWG* (recommended)** Non Plenum - Belden 9461 Plenum - Belden 88761	3000 ft. (900m)			N/A

Table 4.1 Wiring specifications - main board (continued)

Connection	Supported Wire Type	Maximum Wire Length	Rating
Phone/Modem Line	4 Wire (Pins 3 & 4) RJ11 Connector	N/A	N/A
24VAC Power Connection (TB7)	18-22 AWG Stranded & Shielded **18 AWG* (recommended)** Non Plenum - Belden 8770 Plenum - Belden 88770	150 ft. (45m)	24VAC @1.3A
Power Connections (Transformer Module)			
115VAC	14 AWG Stranded & Unshielded Non Plenum - Belden 5101UE	150 ft. (45m)	115VAC @4A
230VAC	14 AWG Stranded & Unshielded Non Plenum - Belden 5101UE	150 ft. (45m)	230VAC @0.5A
* Recommended			

4.2 Connecting Digital Inputs and Digital Outputs

The digital inputs and digital outputs are found on the lower right side of the Liebert Universal Monitor's printed wiring assembly board. There are two terminal blocks for the inputs—one green, the other black. There are two terminal blocks for the outputs—one green, the other black.

To determine the proper wire size, see Table 4.1 on the previous page.

NOTE: Each terminal block is a removable, two-part assembly to permit easier connection of more than one input at a time. If making multiple connections, grasp the upper portion of a block and pull firmly to the right until the assembly pulls apart. After making the connections, push the removed piece back into the portion attached to the printed wiring assembly until the terminal block pieces lock together.

4.2.1 Connecting Digital Inputs

To connect an input:

1. Turn OFF electrical power to the Liebert Universal Monitor.
2. If necessary, remove a conduit knockout to permit wire entry into the Liebert Universal Monitor enclosure.
3. Bring the wire(s) into the Liebert Universal Monitor enclosure through a conduit knockout or access slot.
4. Loosen the appropriate screw and slip the stripped end of the wire into the terminal block.
5. Tighten the screw until it holds the wire snugly.
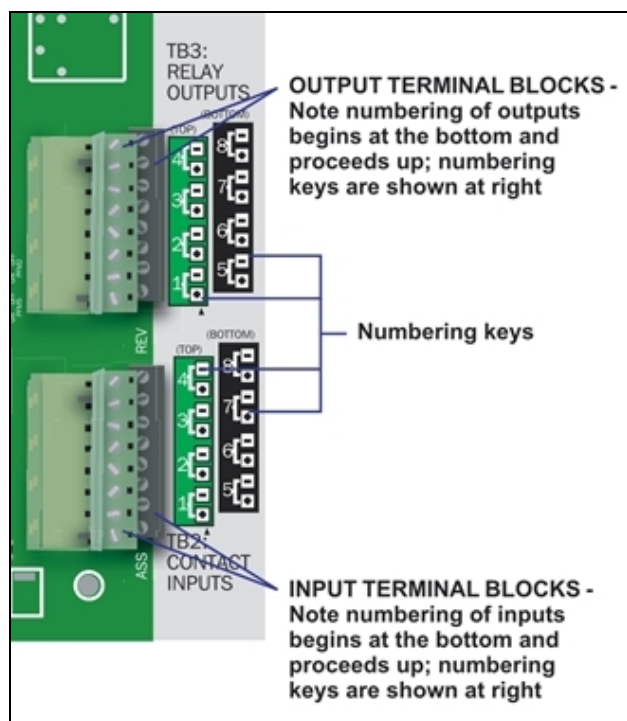
4.2.2 Connecting Digital Outputs

To connect an output:

1. Turn OFF electrical power to the Liebert Universal Monitor.
2. If necessary, remove a conduit knockout to permit wire entry into the Liebert Universal Monitor enclosure.
3. Bring the wire(s) into the Liebert Universal Monitor enclosure through a conduit knockout or access slot.
4. Loosen the appropriate screw and slip the stripped end of the wire into the terminal block.
5. Tighten the screw until it holds the wire snugly.

⚠ CAUTION: To reduce the risk of fire or electric shock, do not interconnect the outputs of different Class 2 circuits.

4.2.3 Setting the Digital Output Jumpers

Each digital output has an associated jumper to define its operation when power is interrupted and there is no battery backup to the board. This puts the Liebert Universal Monitor in a *fail-safe mode* and ensures proper functioning when the board has no power or battery backup.

The Liebert Universal Monitor comes from the factory with all digital output jumpers in the OFF position (normally open). The jumper setting for each digital output can be changed to ON (normally closed). The settings are shown in Table 4.2 below.

Table 4.2   Digital output jumper settings

Setting	Output status (power loss & no battery backup)
OFF	Normally open
ON	Normally closed

To change the output jumper setting:

1. Find the respective black output jumper on the circuit board, as shown above.
2. Decide whether your configuration requires the jumper to be OFF or ON.
3. Set the jumper as needed:
- Set the jumper to OFF by placing the black jumper on the middle and top pins.
- Set the jumper to ON by placing the black jumper on the middle and bottom pins.
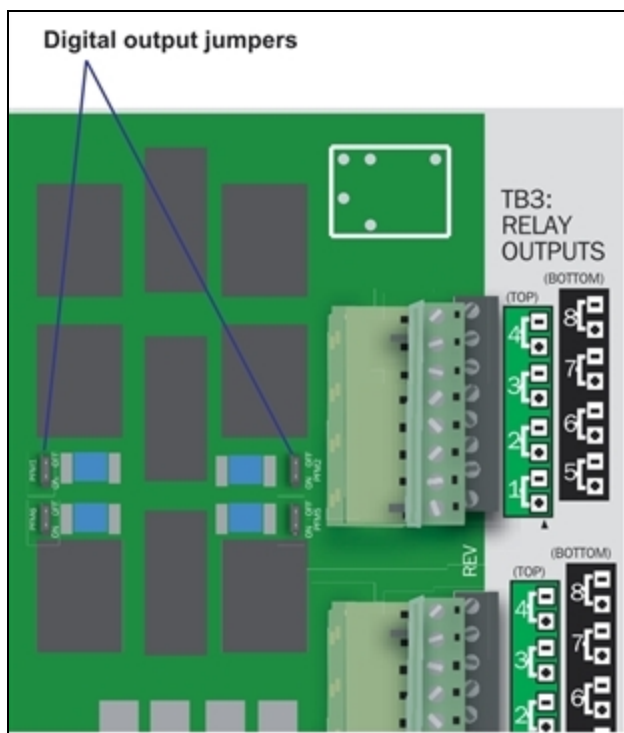
4.3 Connecting Analog Inputs

The analog input connector blocks are at the bottom center of the Liebert Universal Monitor printed circuit board. The blocks are two-part assemblies to permit easier connections. To determine the proper wire size, see Table 4.1 on page 33.

To connect an input:

1. Turn OFF electrical power to the Liebert Universal Monitor.
2. If necessary, remove a conduit knockout to permit wire entry into the Liebert Universal Monitor enclosure.
3. Bring the wire(s) into the Liebert Universal Monitor enclosure through a conduit knockout or access slot.
4. Loosen the appropriate screw and slip the stripped end of the wire into the terminal block.
5. Tighten the screw until it holds the wire snugly.
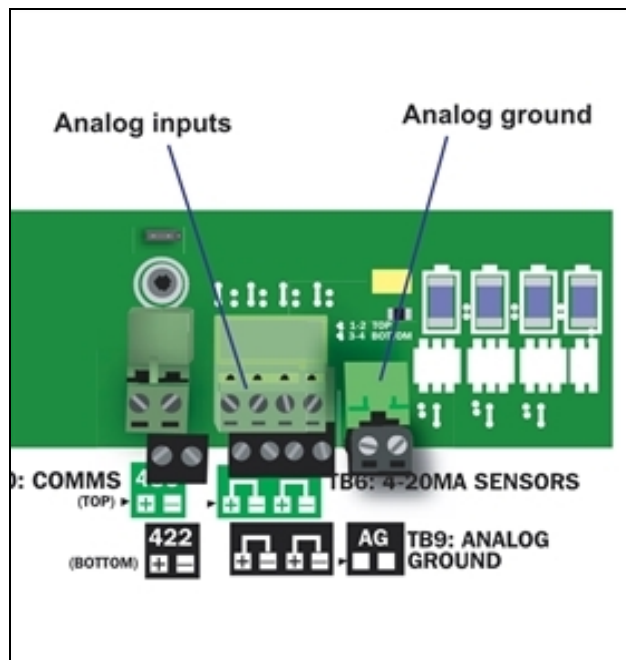
4.3.1 Setting the 12VDC/24VDC Analog Power Jumper

The analog power jumper sets the common voltage that is applied to all of the analog input connections. The jumper permits the user to modify the voltage supplied to the sensors, according to the power requirements.

The factory default position is 24VDC; it may be changed to 12VDC.

To change the analog power jumper setting:

1. Find the black analog jumper on the circuit board, as shown below. The jumper is at the bottom of the board near the middle (see Controller Board Overview on page 10).
2. Decide whether your configuration requires the jumper to be 24VDC or 12VDC.
3. Set the jumper as needed:
- Set the jumper to the 24VDC position by placing the black jumper on the middle and right pins.
- Set the jumper to the 12VDC position by placing the black jumper on the middle and left pins.
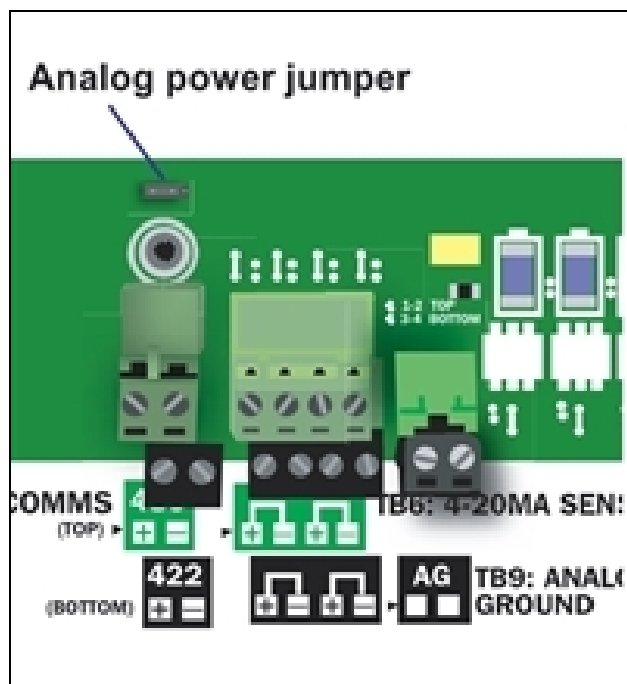
4.3.2 Connecting the Analog Ground

The Liebert Universal Monitor features an analog ground connection for four-wire sensors that have an external power source. Such a four-wire sensor requires a reference to ground because they get power from an external power source.

A two-wire transducer, which does not have an external power source, does not need to be connected to the analog ground.

The analog ground connector has two terminals, each of which can accommodate two wires. This is adequate to connect four sensors that require a reference to ground because they get power from an external power source.

Connect the analog ground to an external four-wire sensor as shown in the illustration below.
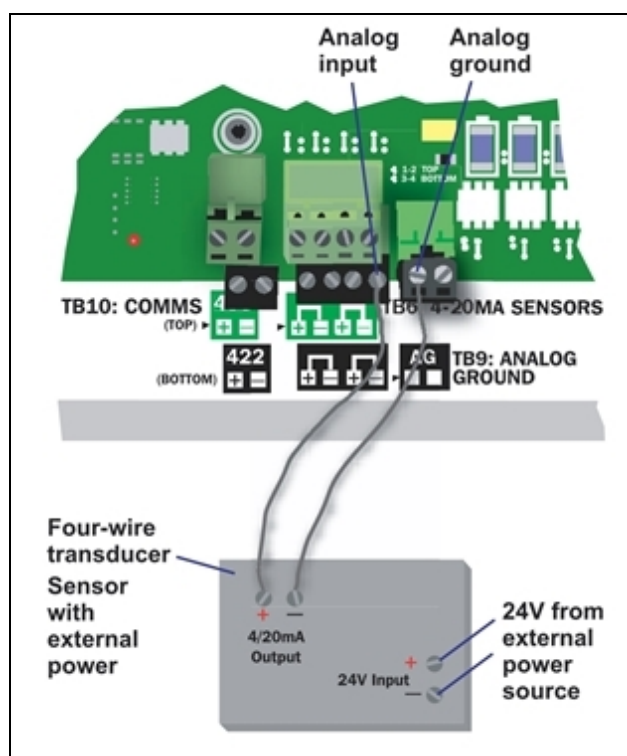
4.4 Connecting Common Alarm Outputs

The common alarm relay, found in the top right corner of the Liebert Universal Monitor, permits the user to connect auxiliary notification equipment, such as lights, horns and sirens, to the Liebert Universal Monitor. To determine the proper wire size, see Table 4.1 on page 33.

There are two connectors for the common alarm output. However, the connectors are not individual relay outputs. The connectors should be treated as a double-pole, double-throw (DPDT) relay.

The common alarm relay is energized whenever an alarm occurs.

To connect an output:

1. Turn OFF electrical power to the Liebert Universal Monitor.
2. If necessary, remove a conduit knockout to permit wire entry into the Liebert Universal Monitor enclosure.
3. Bring the wire(s) into the Liebert Universal Monitor enclosure through a conduit knockout or access slot.
4. Loosen the appropriate screw and slip the stripped end of the wire into the terminal block.
5. Tighten the screw until it holds the wire snugly.
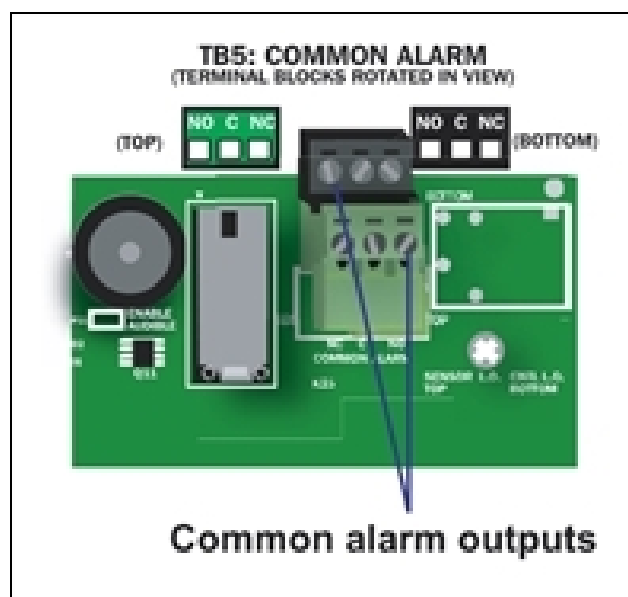
4.5 EIA422 Liebert SiteScan Web Connector

The Liebert Universal Monitor will interface with Liebert's SiteScan Web enterprise monitoring system. Liebert SiteScan can be used to monitor analog and digital equipment from a host computer and also to perform some configuration.

To connect the Liebert SiteScan host computer to the Liebert Universal Monitor:

1. Turn OFF electrical power to the Liebert Universal Monitor.
2. If necessary, remove a conduit knockout to permit wire entry into the Liebert Universal Monitor enclosure.
3. Bring the wire(s) into the Liebert Universal Monitor enclosure through a conduit knockout or access slot.

4. Loosen the appropriate screw and slip the stripped end of the wire into the terminal block.

5. Tighten the screw until it holds the wire snugly.

TB10: COMMS
(TOP)
422
(BOTTOM)

EIA422 Liebert SiteScan Web connector
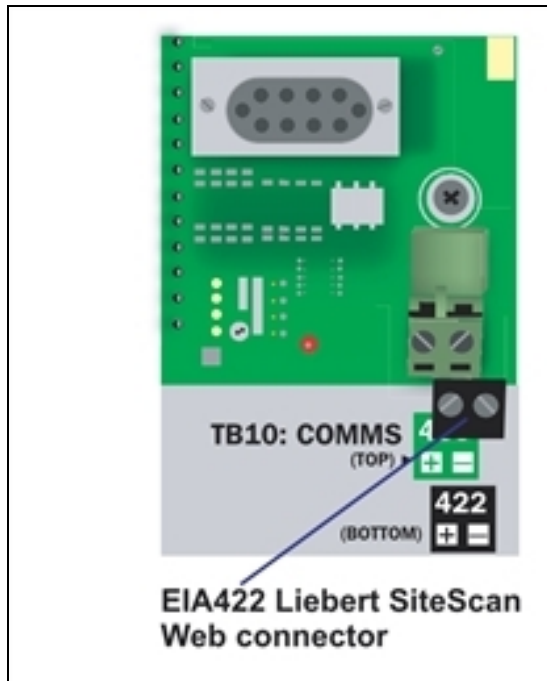
4.6 Communications Connections

The Liebert Universal Monitor Service Terminal Interface offers full configuration and monitoring capability via the RS232 port and the phone line connector (see Connecting to the Service Terminal Interface on page 109). The phone line connector is also used for pager notifications and service phone number options.
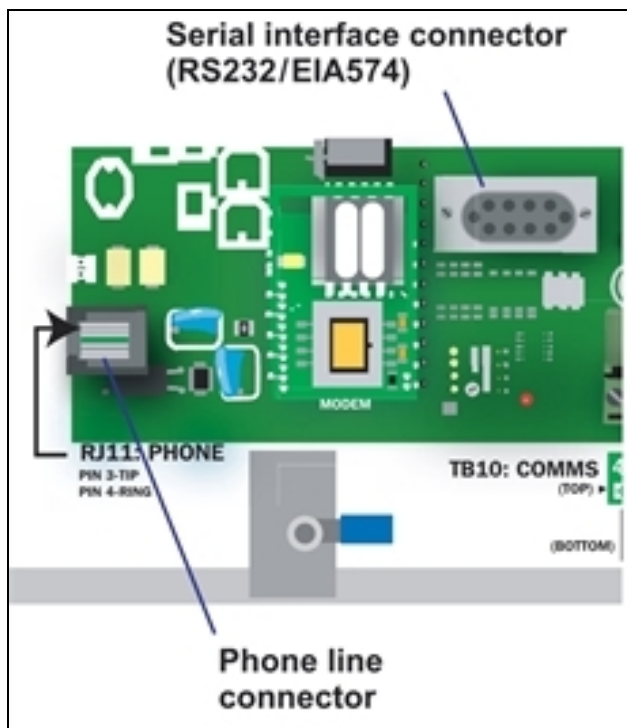
4.6.1 RS232 Connector

The RS232 port requires a null modem cable. Connect one end of the cable to the Liebert Universal Monitor's RS232 port as shown, and the other end to the COM1 port of a laptop computer or video terminal.

4.6.2 Phone Line Connector

The Phone Line Connector requires an RJ11 connector. Connect one end of the connector to the Liebert Universal Monitor's phone line connector and the other end to a telephone wall jack.

5 WIRING AND CONNECTIONS - OPTIONAL EXPANSION BOARD

⚠️ CAUTION: Remove all power before installing any wiring to the Expansion Board or changing input or output connections.

⚠️ WARNING! "RISK OF ELECTRIC SHOCK" - More than one disconnect switch may be required to de-energize the equipment before servicing.

5.1 Wiring Specifications

Input and output connections to the optional Expansion Board may be made in any order—it is not necessary, for example, to make all input connections before making any output connections. Use copper conductors only for all wiring.

Table 5.1   Wiring specifications - optional Expansion Board

Connection	Supported Wire Type	Maximum Wire Length			Rating
Digital Input	18-22 AWG Stranded & Unshielded 18 AWG* (recommended) Non Plenum - Belden 9740 Plenum - Belden 89740	750 ft. (225m)			Dry Contact (24VDC, 10 mA)
Digital Output	18-22 AWG Stranded & Unshielded 18 AWG* (recommended) Non Plenum - Belden 9740 Plenum - Belden 89740	18 AWG* (recommended) @3A 50 ft. (15m) @2A 100 ft. (30m) @1A 200 ft. (60m)	20 AWG @3A 40 ft. (12m) @2A 60 ft. (18m) @1A 100 ft. (30m)	22 AWG @3A 25 ft. (7m) @2A 35 ft. (10m) @1A 75 ft. (23m)	240VAC, 2A max.
Communication EIA485	18-22 AWG Stranded & Shielded 22 AWG* (recommended) Non Plenum - Belden 9461 Plenum - Belden 88761	3000 ft. (900m)			N/A
24 VAC Power Connection (TB1)	18-22 AWG Stranded & Shielded 18 AWG* (recommended) Non Plenum - Belden 8770 Plenum - Belden 88770	150 ft. (45m)			24VAC @0.6A
* Recommended					

5.2 Connecting Inputs and Outputs

The Liebert Universal Monitor optional Expansion Board permits the addition of 16 input and eight output devices. This section describes how to connect devices to the Expansion Board's inputs and outputs.

To determine the proper wire size, see Table 5.1 on the previous page.

NOTE: Each terminal block is a removable assembly to permit easier connection of more than one input at a time. If making multiple connections, grasp the upper portion of a block and pull firmly until the assembly pulls apart. After making the connections, push the removed piece back into the portion attached to the printed wiring assembly until the terminal block pieces lock together.

5.2.1 Connecting Digital Inputs

The 16 digital inputs are found on the lower portion of the Expansion Board, as shown below. These inputs are numbered 9 through 24 (the Liebert Universal Monitor's digital inputs are numbered 1 through 8).
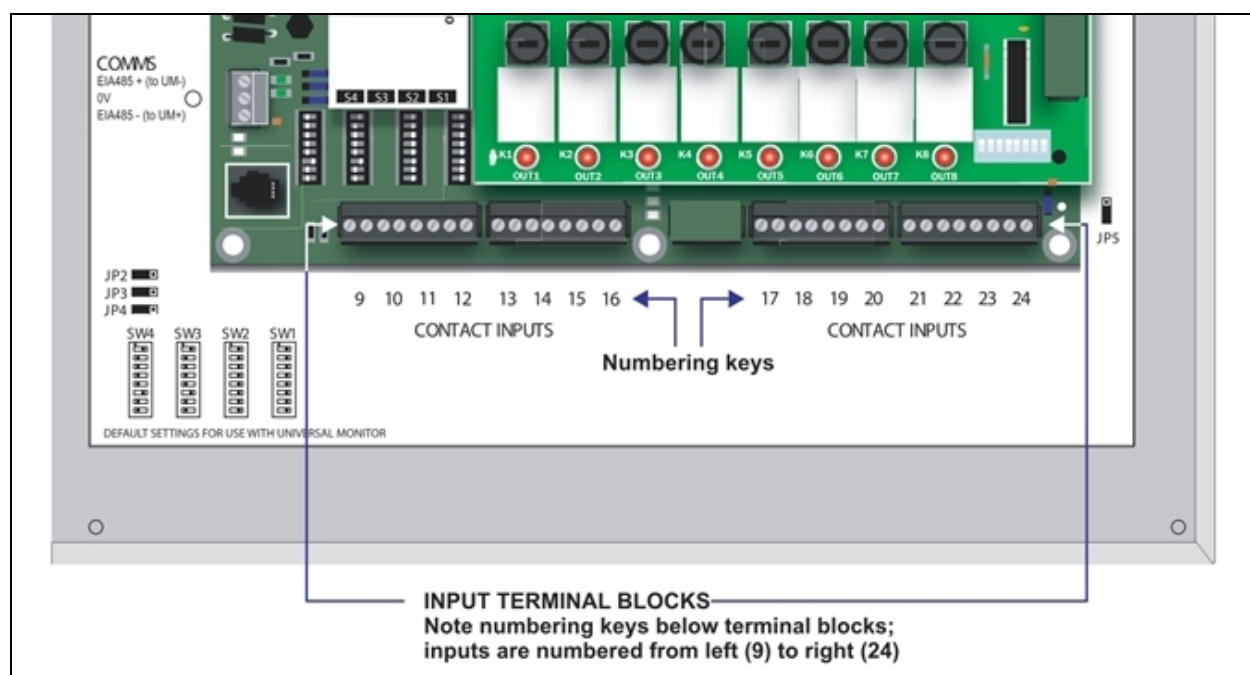
To connect an input:

1. Disconnect all electrical power from the Expansion Board.
2. If necessary, remove a conduit knockout to permit wire entry into the Expansion Board enclosure.
3. Bring the wire(s) into the Expansion Board enclosure through a conduit knockout or access slot.
4. Loosen the appropriate screw and slip the stripped end of the wire into the terminal block.
5. Tighten the screw until it holds the wire snugly.

5.2.2 Connecting Digital Outputs

The eight digital outputs are found at the top of the Expansion Board, as shown below. These inputs are numbered 9 through 16. (Note that the digital outputs on the main board of the Liebert Universal Monitor are numbered 1 - 8.)
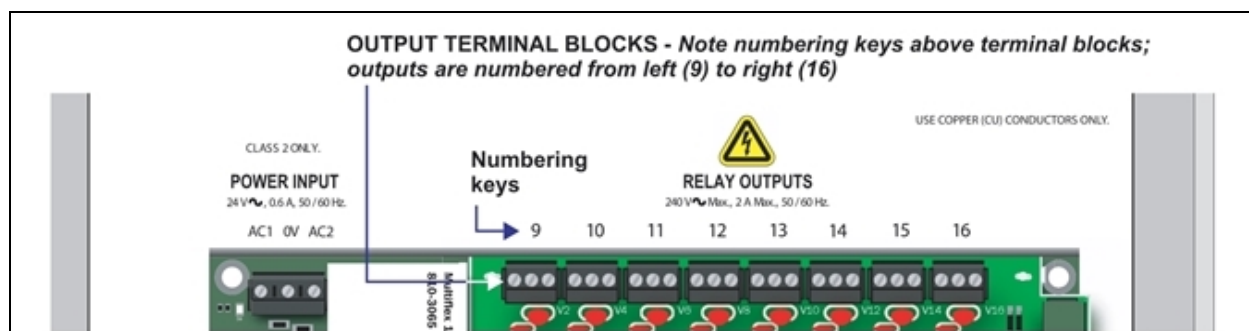
⚠️ **WARNING! "RISK OF ELECTRIC SHOCK"** - Hazardous voltage may be present. More than one disconnect switch may be required to de-energize the equipment before servicing.

⚠️ **CAUTION:** The Expansion Board is designed for use on properly grounded (earthed) 24VAC Class 2 power, 50Hz or 60Hz. The ground wire for the power lead must be wired to the earth ground terminal (stud located next to the 24VAC terminal block). This equipment is intended to be installed by a qualified and certified electrician who must review and approve customer-supplied wiring and circuit breakers, verify correct input and grounded (earthed) connections to ensure compliance with technical standards and national and local electrical codes. Segregate and install separate electrical conduits for non-class 2 circuits in accordance with local building codes.

Each output may be wired according to whether you want the output to be Normally Open or Normally Closed. The Expansion Board outputs are Form C relay contacts, each with three terminals. There are two ways to wire the outputs, as shown in Figure 5.1 below.

- One wire of the two-wire connection should always be connected to the middle terminal.
- The second wire may be connected to either the N.C. terminal or the N.O. terminal, depending on how whether you want the contact to be closed or open during a power failure:
- Connect to the N.C. terminal if you want the path to be CLOSED during a power failure, or
- Connect to the N.O. terminal if you want the path to be OPEN during a power failure.

Your choice for wiring the output contacts also determines how to set the fail-safe DIP switches for proper operation (see Setting the Digital Output DIP Switches on the facing page).

Figure 5.1 Form C output contact wiring
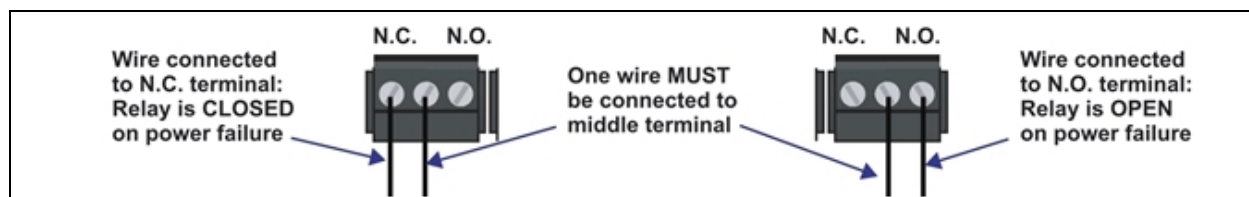
To connect an output:

1. Disconnect electrical power from the Expansion Board.
2. If necessary, remove a conduit knockout to permit wire entry into the Expansion Board enclosure.
3. Bring the wire(s) into the Expansion Board enclosure through a conduit knockout or access slot.
4. Loosen the appropriate screw and slip the stripped end of the wire into the terminal block.
5. Tighten the screw until it holds the wire snugly.

5.2.3 Setting the Digital Output DIP Switches

Each digital output on the optional Expansion Board has an associated DIP switch that can determine its operation in the event of loss of communication with the Liebert Universal Monitor or loss of power.

When the Liebert Universal Monitor calls for an Expansion Board output to be ON, it sends a command to the Expansion Board to turn the output to the ON state; this is signified by the output LED being ON. The DIP switch position determines the behavior of the output when it is ON.

The DIP switches for the outputs are on a switch bank on the right side of the Expansion Board, as shown below. Each switch corresponds to an output on the board in order from left to right—for example, DIP switch 1 corresponds to Output 9; DIP switch 2 corresponds to Output 10.
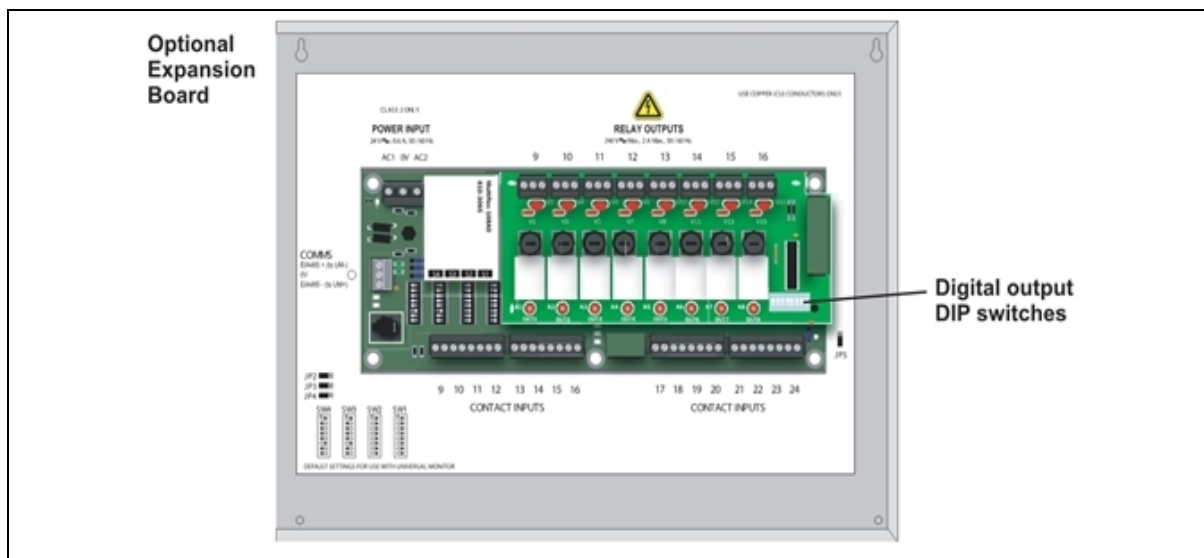
Table 5.2 below and Table 5.3 below show how to set the DIP switch for each output based on how the output is wired (see) and how you want it to perform during normal operation, when communication with the Liebert Universal Monitor is lost or when power fails.

NOTE: After a loss of communications with the Liebert Universal Monitor, there is a time delay—about five minutes—before the Expansion Board changes the state of an output.

Table 5.2 DIP switch setting - outputs wired as Normally Closed (N.C.)
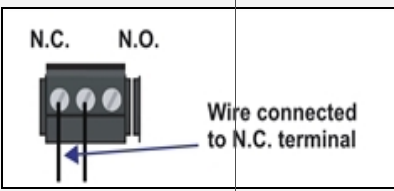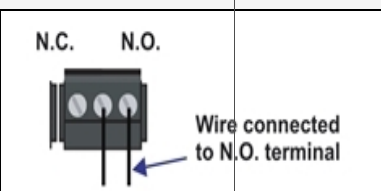
If Output DIP Switch is:	State of Output When:					
	Light is ON	Light is OFF	Communication with UM is Lost	Power Fails		
Up (ON)	Closed	Open	Closed	Closed		Wire connected to N.C. terminal
Down (OFF)	Open	Closed	Closed	Closed		

Table 5.3 DIP switch setting - outputs wired as Normally Open (N.O.)

If Output DIP Switch is:	State of Output When:					
	Light is ON	Light is OFF	Communication with UM is Lost	Power Fails		
Up (ON)	Open	Closed	Open	Open		Wire connected to N.O. terminal
Down (OFF)	Closed	Open	Open	Open		

The Expansion Board comes from the factory with all digital output DIP switches in the OFF position (normally open). The DIP switch setting for each digital output can be changed to ON (normally closed)

To change the state of any output to the factory default of NO (Normally Open) or to NC (Normally Closed), move each switch to the appropriate position:

- Move the switch down to the OFF position for **NO (Normally Open)**—the default setting.
- Move the switch up to the ON position for **NC (Normally Closed)**.

5.3 Connect to the Liebert Universal Monitor

Two steps are required to establish connection between the optional Expansion Board and the Liebert Universal Monitor.

5.3.1 Connect EIA485 Connectors to Main Board

To connect the optional Expansion Board to the Liebert Universal Monitor:

1. Turn OFF electrical power to the Liebert Universal Monitor and disconnect power from the Expansion Board.
2. If necessary, remove a conduit knockout to permit wire entry into each enclosure.
3. Bring the wire(s) into each enclosure through a conduit knockout or access slot.

4. Loosen the appropriate screw and slip the stripped end of the wire into the terminal block, connecting the cables as shown in the figure below):

- Connect the Liebert Universal Monitor 485 connector **UM-** to Expansion Board connector **EIA485+**.

- Connect the Liebert Universal Monitor 485 connector **UM+** to Expansion Board connector **EIA485-**.
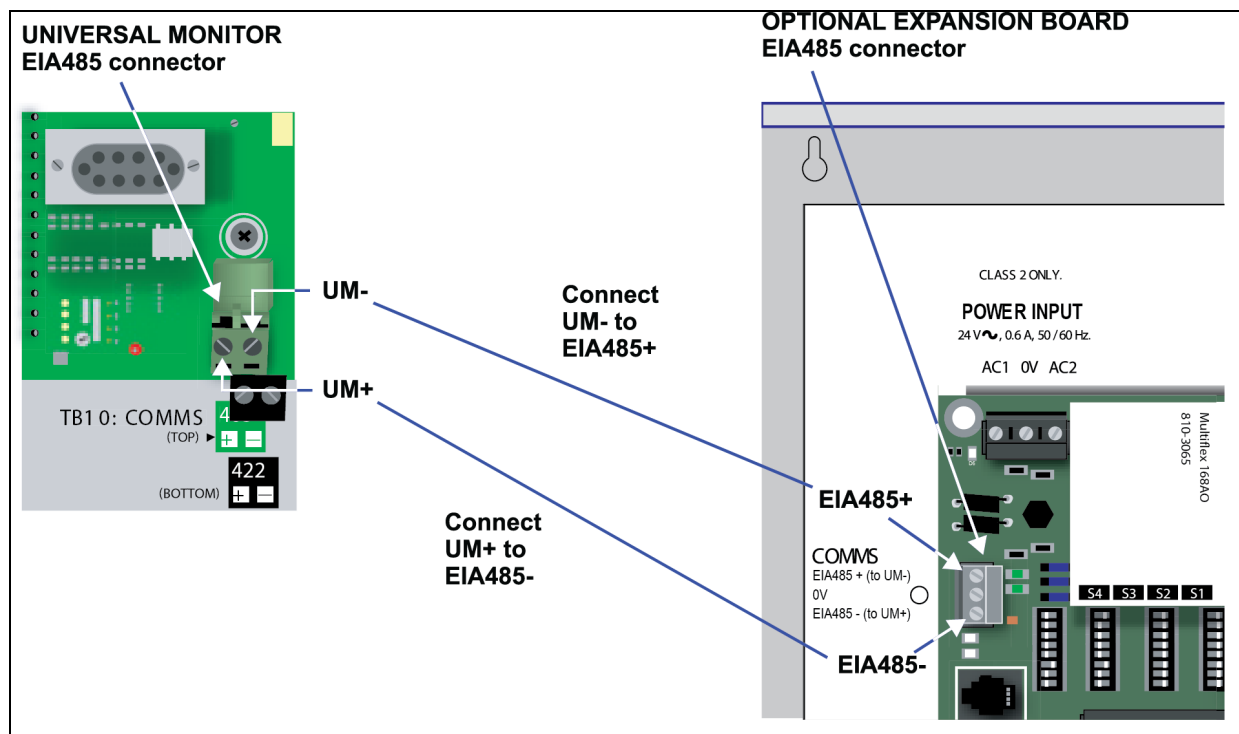
5. Tighten each screw until it holds the wire snugly.

5.3.2 Enable the Connection via Firmware

After making the cable connections described in the previous section, you must specify the Expansion Board as connected using either the LCD or Service Terminal Interface.

For instructions, refer to the appropriate section:

- LCD interface (see Setup Exp Board - Optional Expansion Board on page 101)
- Service Terminal Interface (see Connect Expansion Board)

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6 OVERVIEW OF MENUS

There are two ways to access the Liebert Universal Monitor: the LCD on the front of the enclosure and the Service Terminal Interface, which is accessible through any computer using a communications program. Many viewing and configuration tasks can be performed through either interface, but some are available only through the Service Terminal Interface.

- Step-by-step instructions for all functions appear in View Status Options on page 55 through System and Control Options on page 67. These instructions use examples of LCD screens to illustrate most functions, except those not available via the LCD.
- Examples of all Service Terminal Interface screens appear in Service Terminal Interface on page 107, along with instructions on how to connect to the Service Terminal Interface.

Table 6.1 below lists all Liebert Universal Monitor functions and shows whether they can be performed through the LCD interface and where to find information.

Table 6.1   Guide to Liebert Universal Monitor functions

Function	Can be performed via:		Where to find:	
	LCD	Service Terminal	Instructions on using function	Service Terminal screen examples
VIEW STATUS FUNCTIONS				
View Active Alarms	x	x	View Active Alarms on page 56	View Active Alarms
View Alarm Log	x	x	View Alarm Log on page 57	View Alarm Log
View Event Log	x	x	View Event Log on page 59	View Event Log
View Trend Log	x	x	View Trend Log on page 60	View Trend Log
View Input Status	x	x	View Input Status on page 62	View Input Status
View Output Status	x	x	View Output Status on page 63	View Output Status
View Pager Numbers	x	x	View Pager Numbers on page 63	View Pager Numbers
SILENCE ALARM & BACK UP LOGS FUNCTIONS				
Silence Alarm (On the LCD, press any key to silence an alarm)	x	x	Silence Alarm (Service Terminal Interface) on page 65	Silence Alarm (Service Terminal Interface only)
Back Up Log Files	—	x	Back Up Log Files (Service Terminal Interface only) on page 65	Back Up Log Files (Service Terminal Interface only)
SYSTEM & CONTROL FUNCTIONS				
Login	x	x	Login on page 67	Login Menu
Setup System	x	x	Setup System - Overview on page 70	Setup Menu
Setup Input	x	x	Setup System - Setup Input on page 70	Setup Input
Setup Common Alarm	x	x	Setup System - Setup Common Alarm on page 73	Setup Common Alarm
Setup Sensor	x	x	Setup System - Setup Sensor on page 74	Setup Sensor
Setup I/O Matrix	x	x	Setup System - Setup I/O Matrix on page 80	Setup I/O Matrix
Setup Output	x	x	Setup System - Setup Output on page 83	Setup Output
Pager Setup - Pager Number & PIN	x	x	Pager Setup - Pager Number and PIN on page 89	Pager Setup
Pager Setup - Communications Check	—	x	Pager Setup - Communications Check (Service Terminal Interface only) on page 91	Pager Setup
Modem Setup - Initialization String	x	x	Modem Setup - Initialization String on page 85	Modem Setup

Table 6.1 Guide to Liebert Universal Monitor functions (continued)

Function	Can be performed via:		Where to find:	
	LCD	Service Terminal	Instructions on using function	Service Terminal screen examples
Modem Setup - Enter Liebert Universal Monitor Phone Number	—	x	Modem Setup - Additional Features (Service Terminal Interface only) on page 86	Modem Setup
Modem Setup - Enable Modem Diagnostic Messages	—	x	Modem Setup - Additional Features (Service Terminal Interface only) on page 86	Modem Setup
Modem Setup - Change Modem Dial Prefix	—	x	Modem Setup - Additional Features (Service Terminal Interface only) on page 86	Modem Setup
Modem Setup - Change Modem Hang Up Delay After a Call	—	x	Modem Setup - Additional Features (Service Terminal Interface only) on page 86	Modem Setup
Setup System Info	x	x	Setup System - Setup System Info on page 92	Setup System Info
Change Password	x	x	Change Password on page 93	Change Password
Change Date & Time/Automatic Daylight Saving Time	x	x	Change Date & Time/Automatic Daylight Saving Time on page 94	Change Date & Time/Automatic Daylight Saving Time
Setup Site ID	x	x	Setup Site ID on page 94	Setup Site ID
Connect Battery	x	x	Connect Battery on page 94	Connect Battery
Backup and Upload Configuration File	—	x	Backup and Upload Configuration File (Service Terminal Interface only) on page 95	Backup and Upload Configuration File (Service Terminal Interface only)
Setup Serv Ph Num - Enter Phone Number	x	x	Setup Serv Ph Num - Enter Phone Number on page 96	Setup Service Phone Number
Setup Serv Ph Num - Communications Check	—	x	Setup Serv Ph Num - Communications Check (Service Terminal Interface only) on page 98	Setup Service Phone Number
Factory Defaults	x	x	Factory Defaults on page 98	Factory Defaults
Perform Firmware Update	—	x	Perform Firmware Update (Service Terminal Interface only) on page 99	Firmware Update (Service Terminal Interface only)
Initiate Remote Alarm Test	—	4	Initiate Remote Alarm Test (Service Terminal Interface only) on page 100	Initiate Remote Alarm Test (Service Terminal Interface only)
Setup Exp Board - Optional Expansion Board	4	4	Setup Exp Board - Optional Expansion Board on page 101	Connect Expansion Board
Manual Output Ctrl	4	4	Manual Output Ctrl on page 101	Override Output
Clear Alarms & Logs	4	4	Clear Alarms & Logs on page 102	Clear Alarms & Logs
Clear Active Alarms	4	4	Clear Active Alarms on page 102	Clear Active Alarms
Clear the Alarm Log	4	4	Clear the Alarm Log on page 103	Clear the Alarm Log
Clear the Event Log	4	4	Clear the Event Log on page 103	Clear the Event Log
Clear the Trend Logs	4	4	Clear the Trend Logs on page 103	Clear the Trend Logs

6.1 Opening Screen Overview

The Liebert Universal Monitor displays the Opening Screen at startup, as shown in Figure 6.1 on the facing page.

- If any alarms are active, the Current Alarm screen appears. (Pressing any key on the LCD keypad will silence the audible alarm.)
- If any analog input sensors are connected, the LCD screen will alternately display the Opening Screen and a screen showing the analog value of each sensor.

If no alarms are present, the Main Menu appears.

6.2 Main Menu Overview

The Main Menu offers access to all functions within the panel. As shown in 6.2 above, the functions are organized into three sections with step-by-step instructions.

Table 6.2 Primary Functions Overview

Section	Description
View Status Options on page 55 - View Status Options (both LCD and Service Terminal Interface)	These features are available to all users. This permits all personnel to check the status of any monitored equipment or location. From this menu, any user may: View current monitoring data—active alarms and the status of inputs and outputs View data stored in alarm, event and trend logs View pager numbers
Silence Alarm & Backup Log Files (Service Terminal Interface) on page 65 - Silence Alarm & Backup Log Files (Service Terminal Interface only)	These features—available via the Service Terminal Interface only—allow users to: Silence the audible alarm Back up the alarm, event and trend logs
System and Control Options on page 67 - System and Control Options (some functions available via Service Terminal Interface only)	These options require a password. Authorized users may: Configure the Liebert Universal Monitor Override automatic control of outputs to force an output ON or OFF Clear active alarms and delete all records in the alarm, event and trend logs

6.3 LCD Menu Overview

Figure 6.1 below is an overview of the initial screens available through the LCD interface. For comparable information about the Service Terminal Interface screens, see Overview of Menus on page 51.

Figure 6.1 LCD Menu overview
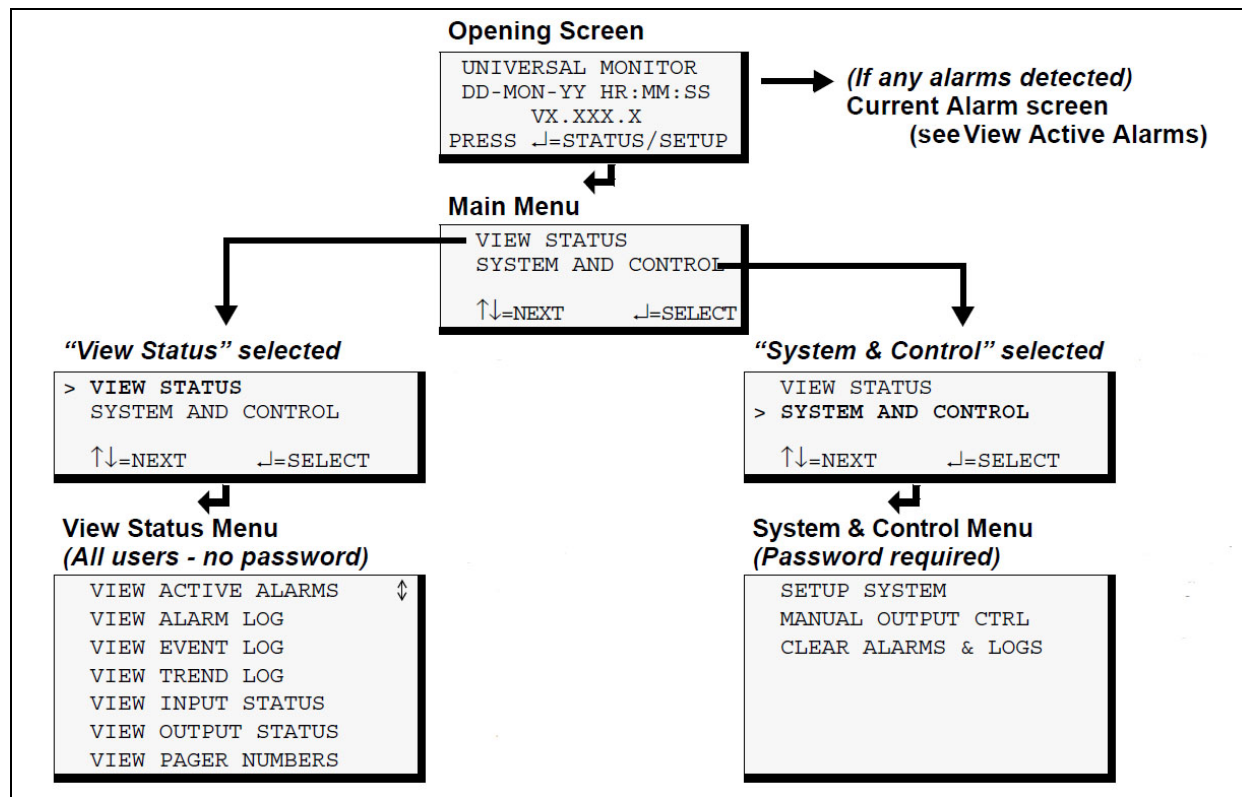
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7 VIEW STATUS OPTIONS

NOTE: For ease of understanding, this section uses the LCD interface to illustrate most instructions, except for features that are available only through the Service Terminal Interface. All Service Terminal Interface screens appear in Service Terminal Interface on page 107.

The View Status menu allows any user to view currently active alarms, monitoring data stored in the alarm, event and trend logs, the status of all inputs and outputs, and the four pager numbers. The arrows are used to scroll through the menu. The Enter key is used to select the menu item.

This section presents step-by-step instructions for each of the following options:

- View Active Alarms
- View Alarm Log
- View Event Log
- View Trend Log
- View Input Status
- View Output Status
- View Pager Numbers

Figure 7.1 on the next page shows the main options available from the View Status menu.

Figure 7.1 Menu overview - View Status menu
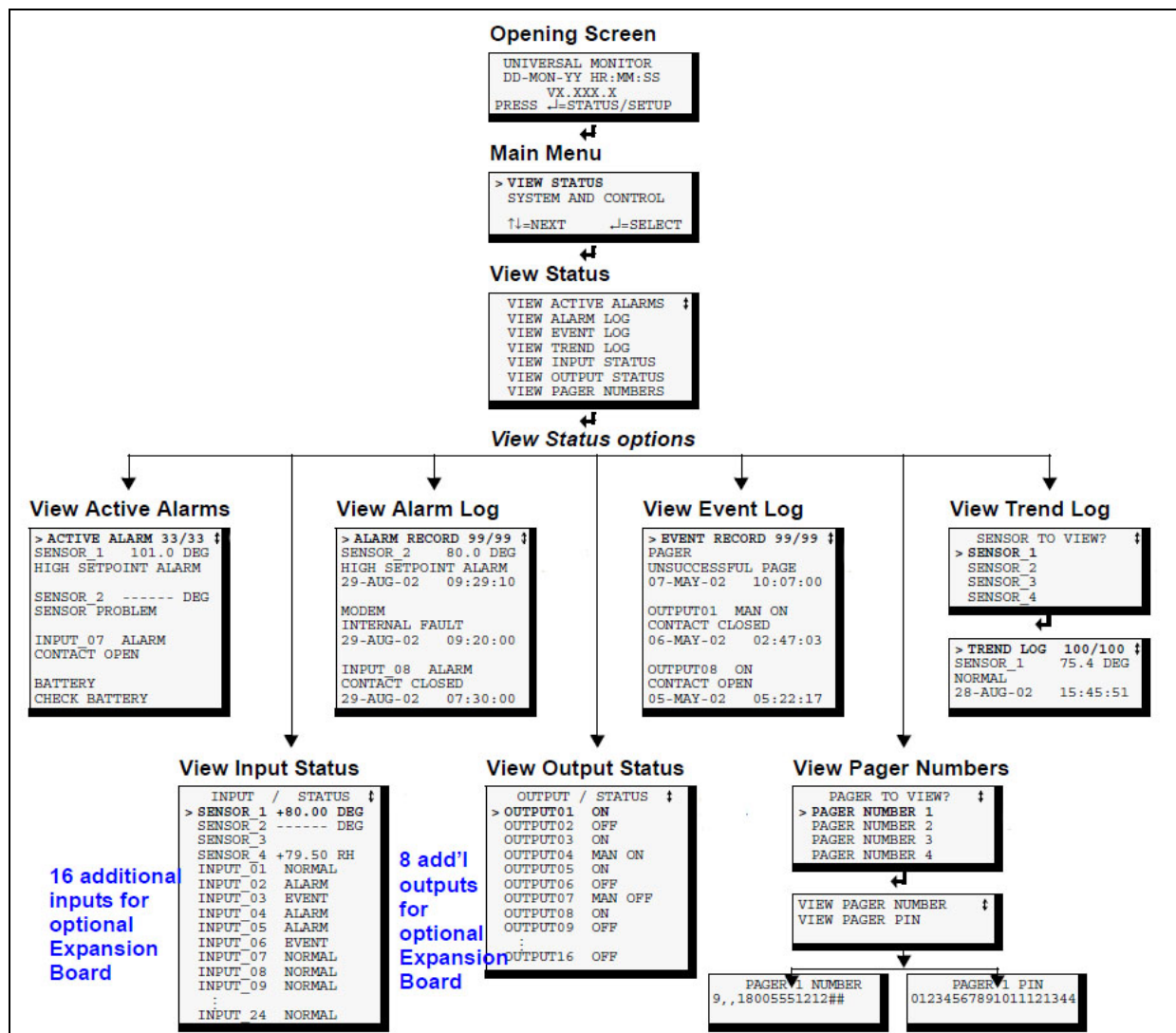
7.1 View Active Alarms

The Active Alarm screen displays all alarms that are occurring, up to a maximum of 33.

A Current Alarm screen appears automatically whenever an alarm occurs—except during setup. This screen can display only the two most recent active alarms. To view any other active alarms, use the View Active Alarms feature.

You may view active alarms at any time by using the following steps:

- From the Main Menu, use the arrows to choose **View Status**, as shown below, and then press Enter.
- From the View Status Menu, use the arrows to choose **View Active Alarms** and press Enter.

7.1.1 Active Alarms

The Active Alarms screen displays up to 33 records; it shows any active alarm and any Latched alarm that has not been cleared. Examples of alarms include inputs in alarm status, a low battery condition and a loss of connection to an analog input. When any alarms are present, the Active Alarms screen shows descriptive details for each alarm:

- the source of the alarm (for example, `SENSOR_1` or `BATTERY`)
- the status of an input or output (`101.0 DEG`)
- a brief description of the problem (`HIGH SETPOINT ALARM` or `CHECK BATTERY`)

If there are no active alarms, the screen displays the message:

> *NO ALARMS PRESENT*

Viewing Additional Screens

There may be up to 33 records of alarm data.

- To view additional records, use the arrows.
- To return to the previous screen, press the ESC key.

Clearing Active Alarms

To clear all active alarms, see Clear Alarms & Logs on page 102. Alarm records are stored in the Alarm Log.

7.2 View Alarm Log

The Alarm Log contains up to 99 records of alarms that have occurred. Records are added to this log as alarms occur.

To view the Alarm Log:

- From the Main Menu, use the arrows to choose **View Status**, then press Enter.
- From the View Status Menu, use the arrows to choose **View Alarm Log**, then press Enter.

7.2.1 Alarm Log

The Alarm Log screen displays up to 99 records showing alarm data, including input alarms and other conditions, such as loss of power or low battery. If the log contains any alarm records, the Alarm Log screen displays details for each alarm:

- the source of the alarm (for example, `SENSOR_2` or `MODEM`)
- the status of an input or output (`80.0 DEG`)
- a brief description of the problem (`HIGH SETPOINT ALARM` or `INTERNAL FAULT`)
- the date and time the alarm occurred

Table 7.1 below shows conditions that the alarm log records for digital inputs and analog inputs and in the panel itself.

Table 7.1 Alarm log conditions

SOURCE	Digital Input	Analog Input	Panel
CONDITIONS RECORDED	ALARM NORMAL	HIGH SETPOINT ALARM LOW SETPOINT ALARM RETURN TO NORMAL SENSOR PROBLEM *(denoted by dashes ------)*	LOSS OF POWER LOW BATTERY CHECK BATTERY BATTERY UNPLUGGED ALARM SILENCED MODEM INTERNAL FAULT ALARMS CLEARED EXP BRD LOSS OF COMM EXP BRD RESTORE COMM

If there are no alarms in the log, the screen displays the message:

NO ALARMS

Viewing Additional Screens

There may be up to 99 records of alarm data.

- To view additional records, use the arrows.
- To return to the previous screen, press the ESC key.

7.2.2 Backing Up the Alarm Log *(Service Terminal Interface only)*

The alarm log is stored as a file in the Liebert Universal Monitor; it can hold no more than 99 records. When the log is full, the oldest records are deleted from the end of the file as new alarm records are added at the beginning.

You may back up the alarm log file to a remote computer using the Service Terminal Interface, as described in Back Up Log Files (Service Terminal Interface only) on page 65.

To delete all records in the alarm log, see Clear Alarms & Logs on page 102.

7.3 View Event Log

In addition to alarms, the Liebert Universal Monitor tracks other changes in the Event Log to assist users with verifying operational and troubleshooting problems. Events reflect changes in the status of an input that is defined as an event or the change of state of an output (i.e., manually forced ON or OFF). Other events may be informational, such as a user login or an unsuccessful page attempt. The Event Log contains up to 99 records of events, which are added as they occur.

To view the Event Log:

- From the Main Menu, use the arrows to choose **View Status**, then press Enter.
- From the View Status Menu, use the arrows to choose **View Event Log**, then press Enter.

7.3.1 Event Log

The Event Log screen displays up to 99 recent events. If the log contains any event records, the Event Log screen displays details for each event:

- the event source (for example, `PAGER` or `OUTPUT01`)
- the status of an input or output (`MAN ON`)
- a brief description of the event (`UNSUCCESSFUL PAGE` or `CONTACT CLOSED`)
- the date and time the event occurred

Table 7.2   below shows conditions that the event log records for inputs and outputs and in the panel itself.

Table 7.2   Event log conditions

SOURCE	Digital Input	Analog Input	Digital Output	Panel
CONDITIONS RECORDED	EVENT NORMAL	HIGH SETPOINT EVENT LOW SETPOINT EVENT RETURN TO NORMAL SENSOR PROBLEM *(denoted by dashes ------)*	MAN ON MAN OFF AUTO HW MAN ON ON OFF	ALARMS CLEARED ALARM SILENCED DIAL OUT TEST PASSED DIAL OUT TEST FAILED UNSUCCESSFUL PAGE MODEM RESET TIME & DATE SET USER LOGIN

If there are no records in the log, the screen displays the message:

NO EVENTS

Viewing Additional Screens

There may be up to 99 records of event data.

- To view additional records, use the arrows.
- To return to the previous screen, press the ESC key.

7.3.2 Backing Up the Event Log *(Service Terminal Interface only)*

The event log is stored as a file in the Liebert Universal Monitor; it can hold no more than 99 records. When the log is full, the oldest records are deleted from the end of the file as new event records are added at the beginning.

You may back up the event log file to a remote computer using the Service Terminal Interface, as described in Back Up Log Files (Service Terminal Interface only) on page 65.

To delete all records in the event log, see Clear Alarms & Logs on page 102.

7.4 View Trend Log

The Liebert Universal Monitor takes readings of configured analog input sensors at regular intervals and stores them in four separate trend logs, one for each sensor. The time interval is 30 minutes. Each log contains up to 100 records.

Follow these steps to select a sensor and view its trend log:

7.4.1 Select a Sensor

To select a sensor:

- From the Main Menu, use the arrows to choose **View Status**, then press Enter.
- From the View Status Menu, use the arrows to choose **View Trend Log**, then press Enter.
- From the Sensor Selection Menu, use the arrows to choose the sensor you want to view—**Sensor_1** in the example below—and press Enter.

7.4.2 View a Trend Log

The Trend Log screen displays up to 100 records for the selected sensor. If the log contains records, the screen displays details for each reading:

- the name of the selected sensor (for example, SENSOR_1)
- the reading (75.4 DEG)
- a brief description of the reading status (NORMAL)
- the date and time of the reading

Table 7.3 below shows conditions that the trend log records for analog inputs. Each analog input has its own trend log.

Table 7.3 Trend log conditions

SOURCE	Analog Input
CONDITIONS RECORDED	LOW SETPOINT ALARM LOW SETPOINT EVENT HIGH SETPOINT ALARM HIGH SETPOINT EVENT RETURN TO NORMAL NORMAL SENSOR PROBLEM *(denoted by dashes ------)*

If there are no records in the log, the screen displays the message:

NO TRENDS

Viewing Additional Screens

There may be up to 100 records of trend data for the selected sensor.

- To view additional records, use the arrows.
- To return to the previous screen, press the ESC key.

7.4.3 Backing Up the Trend Log *(Service Terminal Interface only)*

The four trend logs are stored as files in the Liebert Universal Monitor, with a maximum of 100 records per sensor. When a log is full, the oldest records are deleted from the end of the file as new trend records are added at the beginning.

You may back up each trend log file to a remote computer using the Service Terminal Interface, as described in Back Up Log Files (Service Terminal Interface only) on page 65.

To delete all records in the trend logs, see Clear Alarms & Logs on page 102.

7.5 View Input Status

The Input Status option allows you to view the current status of all inputs: the four analog sensor inputs and the eight digital inputs. If the optional Expansion Board is used, the additional 16 digital inputs can also be viewed.

To view the Input Status:

- From the Main Menu, use the arrows to choose **View Status**, then press Enter.
- From the View Status Menu, use the arrows to choose **View Input Status**, then press Enter.

7.5.1 Input Status

The Input Status screen displays the status of each analog sensor and digital input.

Analog Sensor Inputs

The following details are displayed for analog sensor inputs:

- the name of the analog sensor input (for example, `SENSOR_1`)
- the current reading (`+80.00 DEG`)—values are updated constantly while being viewed

There are three possible states for an analog input, as shown in Table 7.4 below.

Table 7.4   Analog input states

State	Description
Functional	Reading—-for example, `+80.00 DEG or +79.50 RH`
Problem with connection	Dashes (`------`)
Not configured	Blank

NOTE: If the status displays dashes (`-----`), the Liebert Universal Monitor was unable to take a reading. There may be a connection problem. If the status is blank, the sensor is not configured as being connected.

Digital Inputs

The following details appear for digital inputs:

- the name of the digital input (for example, `INPUT_01`)
- the current status (`NORMAL`)—values are updated constantly while being viewed

There are three possible states for a digital input, as shown in Table 7.5 below.

Table 7.5   Digital input states

State	Description
NORMAL	In normal state
ALARM	In alarm status (for an input configured as alarmable)
EVENT	An event has occurred (for an input configured as an event)

Viewing Additional Input Data

All input data may be viewed by scrolling beyond the four lines that appear on the LCD at one time:

- To view all inputs, use the arrows.
- To return to the previous screen, press the ESC key.

7.6 View Output Status

The Output Status option allows you to view the current status of all eight outputs. If the optional Expansion Board is used, the additional eight digital outputs can also be viewed.

To view the Output Status:

- From the Main Menu, use the arrows to choose **View Status**, then press Enter.
- From the View Status Menu, use the arrows to choose **View Output Status**, then press Enter.

7.6.1 Output Status

The Output Status screen displays the status of each digital output.

The following details appear for digital outputs:

- the name of the output (for example, `OUTPUT01`)
- the current status (`ON`)—values are updated constantly while being viewed

There are five possible states for a digital output, as shown in Table 7.6   below.

Table 7.6   Digital output states

State	Description	
ON	Automatic	Controlled by Liebert Universal Monitor
OFF	Automatic	
MAN ON	Manually ON	This output forced ON or OFF via Manual Output Ctrl menu or Liebert SiteScan® Web
MAN OFF	Manually OFF	
HW MAN ON	Manually ON (all outputs)	All outputs forced ON via hardware switch on circuit board

Viewing Additional Output Data

All output data may be viewed by scrolling beyond the four lines that appear on the LCD at one time:

- To view all outputs, use the arrows.
- To return to the previous screen, press the ESC key.

7.7 View Pager Numbers

The Liebert Universal Monitor may be set up to dial pager numbers when an alarm is detected. Up to four pagers may be configured, as described in Setup System - Setup Modem & Pagers on page 84.

The View Pager Numbers option allows you to view the pager numbers and PINs for all configured pagers. Use the following steps to select a pager and view its information.

7.7.1 Select a Pager

To select a pager:

- From the Main Menu, use the arrows to choose **View Status**, then press Enter.
- From the View Status Menu, use the arrows to choose **View Pager Numbers**, then press Enter.
- From the Pager Selection screen, use the arrows to choose the pager you want to view—**Pager Number 1** in the example below—and press Enter.
- Use the following steps to view a pager number or PIN for the selected pager.

7.7.2 View a Pager Number

To view a pager number:

- Choose **View Pager Number** from the Pager Menu and press Enter.
- The Pager Number screen displays the number that is configured for the selected pager.

  In the example below, the telephone number is preceded by A to dial an alphanumeric pager and includes a comma (,) to pause two seconds after dialing "1" before proceeding to dial the area code and number. To change this number, see Pager Setup - Pager Number and PIN on page 89.

- Press ESC to return to the Pager Menu.

7.7.3 View a Pager PIN

To view a pager PIN:

- Choose **View Pager PIN** from the Pager Menu and press Enter.
- The Pager PIN screen displays the PIN that is configured for the selected pager. To change this number, see Setup System - Setup Modem & Pagers on page 84.
- Press ESC to return to the Pager Menu.

8 SILENCE ALARM & BACKUP LOG FILES *(SERVICE TERMINAL INTERFACE)*

This section describes two features that are available in the Service Terminal Interface:

- Silence Alarm
- Backup Log Files

8.1 Silence Alarm *(Service Terminal Interface)*

The Silence Alarm menu item allows you to silence the audible alarm and reset the Common Alarm Relay output if the common alarm is configured to reset with silence.

This menu item is available only through the Service Terminal Interface and Liebert SiteScan® Web connection.

NOTE: An alarm may also be silenced by pressing any key on the LCD keypad on the front of the Liebert Universal Monitor. The LCD does not offer Silence Alarm as a menu item.

To silence the alarm remotely through the Service Terminal Interface:

- Connect to the Liebert Universal Monitor either from a remote computer or through the RS232 port (see Connecting to the Service Terminal Interface on page 109).
- At the Main Menu, enter **8** (Silence Alarm).
- At the Silence Alarm menu, enter **1** to silence the audible alarm immediately. (To exit without silencing the alarm, enter **2** or press the Escape key.)
- A confirmation message appears: "Alarm has been silenced."

NOTE: Through Liebert SiteScan Web, this option is available via the Liebert Universal Monitor Graphic Screen.

8.2 Back Up Log Files *(Service Terminal Interface only)*

The Liebert Universal Monitor maintains three types of logs—alarm, event and trend—that may be backed up to a remote computer.

This feature is available only through the Service Terminal Interface.

To back up any of the alarm, event or trend logs:

1. Connect to the Liebert Universal Monitor either from a remote computer or through the RS232 port (see Connecting to the Service Terminal Interface on page 109).
2. At the Main Menu, enter **9** (Backup Log Files).
3. At the Backup Log Files menu, enter a number for the type of file you want to back up:
   - Enter **1** to back up the Alarm Log
   - Enter **2** to back up the Event Log
   - Enter **3** to back up the Trend Log for the first sensor (Sensor_1)
   - Enter **4** to back up the Trend Log for the second sensor (Sensor_2)
   - Enter **5** to back up the Trend Log for the third sensor (Sensor_3)
   - Enter **6** to back up the Trend Log for the fourth sensor (Sensor_4)

4. At the prompt to initiate a backup of the selected log file, enter **Y** (Yes - begin) or **N** (No - cancel). The current setting appears in brackets.

NOTE: The following instructions refer to the Microsoft® Windows® HyperTerminal program. These steps may vary for other communications programs.

5. At the top of the HyperTerminal window, click **Transfer**, then **Receive File**.
6. In the Receive File window:
    - In the Place Received File in the Following Folder box, enter the name and location of the folder where the configuration file should be placed—for example, **C:\downloads**—or click on the **Browse** button to locate the folder.
    - In the Use Receiving Protocol box, select **Xmodem** from the drop-down list.
    - Click on the **Receive** button. (To close the window without backing up the file, click on **Close** or **Cancel**.)
7. In the Receive Filename window, enter a name for the log file—**Alarm.log** in the example above.
8. When the transfer is complete, a confirmation message appears in the Service Terminal Interface window: "Backup Successful."
9. The display returns to the Backup Log Files menu. You may choose another type of log file to back up (return to **Step 3**) or press **7** (or Escape) to return to the Main Menu.

After backing up a log file, you may want to delete all records in the Universal Monitor's log of that type. See Clear Alarms & Logs on page 102 for details.

9 SYSTEM AND CONTROL OPTIONS

NOTE: For ease of understanding, this section uses the LCD interface to illustrate most instructions, except for features that are available only through the Service Terminal Interface. All Service Terminal Interface screens appear in Service Terminal Interface on page 107.

The System and Control menu allows you to configure the Liebert Universal Monitor—setting up inputs and outputs and an input/output matrix to trigger actions, the modem and pagers, and system features such as date and time. This menu also provides a vehicle for manually changing the state of an output to ON or OFF, clearing active alarms and deleting records from the Liebert Universal Monitor's alarm log, event log and trend logs.

The arrows are used to scroll through the menu. The Enter key is used to select the menu item and enter new information. Table 9.1 below shows characters that may be entered in labels and values.

Table 9.1   Valid characters for data entry

Alphanumeric	Special characters
A-Z, 0-9	space [ ] ^ _ ! " # $ % & ( ) * + - / , . ; < = > @

The System and Control options require a password to prevent unauthorized users from making changes to the system.

This section presents step-by-step instructions for each of the following:

- **Login** - enter the password
- **Setup System** - configure inputs, outputs, modem, pagers, system features
- **Manual Output Ctrl** - manually override automatic control of outputs; release the override
- **Clear Alarms & Logs** - clear active alarms; delete records from the alarm, event and trend logs

NOTE: If an alarm occurs while a user is logged on, the LCD backlight will flash and the audible alarm will sound. To obtain specific information about the alarm, you must access the Active Alarm screen (see View Active Alarms on page 56) or the Alarm Log (see View Alarm Log on page 57).

9.1 Login

Users must enter a password to access any of the system and control options. The password consists of four characters (see Table 9.1 above for valid characters). (To set up or change the password, see Change Password on page 93.)

To log in:

- From the Main Menu, use the arrows to choose **System and Control**, then press Enter.
- Use the arrows to choose **System and Control**, and press Enter. The Login menu appears.
- To enter your password:
  - Use the arrows to choose a character.
  - Press Enter to advance to the next character position.
  - When finished, press Enter again.

The System and Control Menu appears next, with these options that are described in the following sections:

- Setup System (Setup System - Overview on page 70 - Setup System - Setup System Info on page 92)
- Manual Output Ctrl (Manual Output Ctrl on page 101)
- Clear Alarms & Logs (Clear Alarms & Logs on page 102)

NOTE: If, after logging in, you press the ESC key to return to a previous screen that is not password-protected, you must log in again, including entering your password if you wish to access password-protected functions.

Figure 9.1 on the facing page shows the main options available from the System & Control menu.

Figure 9.1 Menu overview - System and Control menu
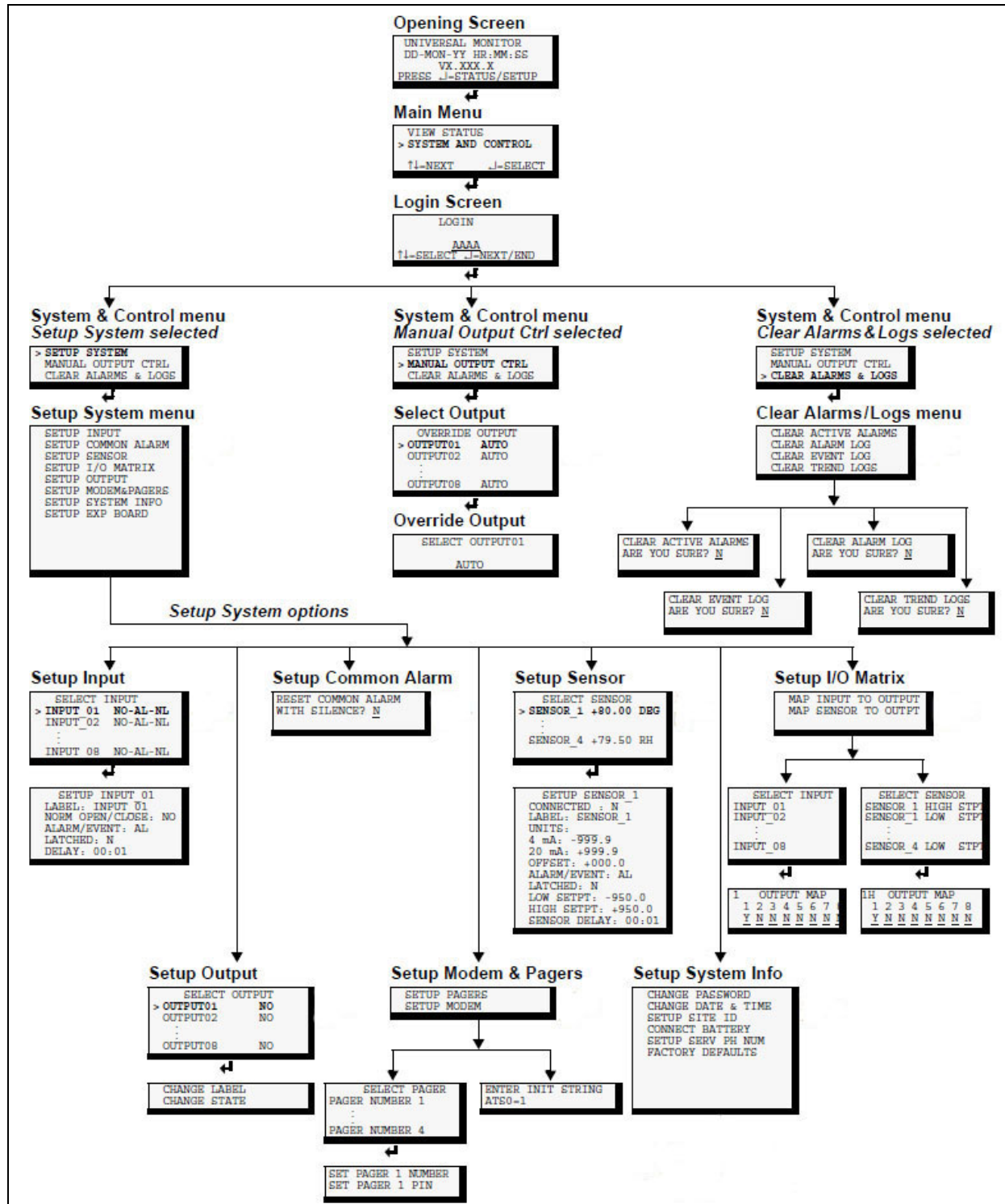
9.2 Setup System - Overview

The **Setup System** screen displays seven options that allow you to configure input and output devices and their relationships, the common alarm, the modem, pagers to be dialed when alarms occur, and a variety of system details, such as login password and system date and time:

- Setup Input
- Setup Common Alarm
- Setup Sensor
- Setup I/O Matrix
- Setup Output
- Setup Modem & Pagers
- Setup System Info
- Setup Exp Board

9.3 Setup System - Setup Input

The Liebert Universal Monitor has eight digital input points that may be configured individually. If the optional Expansion Board is used, an additional 16 digital inputs may also be configured. These inputs may have a wide variety of Liebert or other manufacturers' equipment connected for monitoring.

To configure a digital input:

Log In and Choose Setup System

- From the Main Menu, use the arrows to choose **System and Control**, then press Enter (see for help).
- Enter your password at the Login screen.
- From the System and Control Menu, use the arrows to choose **Setup System**, then press Enter.

Select a Digital Input to Configure

- From the Setup System Menu, shown below, use the arrows to choose **Setup Input** and press Enter.
- From the Select Input Menu, choose the input you want—for example, **Input_01**—and press Enter.

Table 9.2 on the facing page shows the digital input features you may change, along with the default settings: you may change the name of the input, define it as normally open or closed, and specify it as alarmable or as an event.

- Alarmable inputs may be defined as either Unlatched or Latched.
- Event status allows you to monitor a digital input's state—and use a change in state to initiate an action through an output, if desired—without triggering an alarm. Events are always Unlatched.
- You may also specify a delay before the Liebert Universal Monitor responds to an alarm or event.

Use the steps following Table 9.2 on the facing page to change the default settings for any digital input.

Table 9.2   Default settings - digital inputs

Feature	Default	Other Options
LABEL	INPUT_01	Any name (up to eight characters)
NORM OPEN/CLOSE	NO (Normally open)	NC (Normally closed)
ALARM/EVENT	AL (Alarmable)	EV (Event)
LATCHED	NL (Unlatched) / N (No)*	L (Latched) / Y (Yes)*
DELAY	00:01 (1 second)	Any time (in minutes and seconds) from 00:00 to 99:59

* **NOTE:** Different abbreviations are used to designate a digital input as Latched or Unlatched as shown below.

	Settings - Select Input Menu	When configuring an input
	(see Setup System - Setup Input on the previous page)	(see Set Up Alarmable Inputs in Latched or Unlatched Mode on the next page)
Unlatched	NL (Not Latched)	N (No, not latched)
Latched	L (Latched)	Y (Yes, latched)

9.3.1 Change Label (Name of Input)

Each input has a default label (Input_01, Input_02, etc.) that you may change to a more descriptive name for ease in recognizing alarms and events associated with the input. The label may consist of up to eight characters (see Table 9.1   on page 67 for valid characters).

- From the Setup Input Menu, choose **Label** for the selected input and press Enter.
- To change the input's label, which may consist of up to eight characters:
- Use the arrows to choose a character.
- Press Enter to advance to the next character position.
- When finished, press Enter again.

9.3.2 Define Input as Normally Open or Normally Closed

Each input may be set up as Normally Open (NO) or Normally Closed (NC). The default setting for all input points is NO (Normally Open).

If you require an input to be a supervised point, define the input as Normally Closed (NC).

- From the Setup Input Menu, choose **Norm Open/Close**, and press Enter.
- To change the normal state for this input, use the arrows to choose **NO** (Normally Open) or **NC** (Normally Closed), then press Enter.

9.3.3 Define Input as Alarmable or Event

Each digital input may be defined as Alarmable (AL) or as an Event (EV).

- For a digital input defined as alarmable, the following alarm reactions occur when the status of the monitored input device changes: the LCD flashes, the audible horn sounds, configured pager numbers will be notified and a record is entered in the Alarm Log.
- For a digital input defined as an event, the status change is recorded in the Event Log.

By default, all digital inputs are set up as AL (Alarmable).

- From the Setup Input Menu, choose **Alarm/Event**, and press Enter.
- To change the type of digital input, use the arrows to choose **AL** (Alarmable) or **EV** (Event), then press Enter.

9.3.4 Set Up Alarmable Inputs in Latched or Unlatched Mode

Alarmable input points may be set up in Latched mode (Y), which requires the user to clear the Liebert Universal Monitor alarms after an alarm has occurred, or Unlatched mode (N), in which alarms will automatically clear after a return-to-normal state. The default setting for alarmable inputs is N (Unlatched). Any input defined as an event is automatically Unlatched.

A digital input defined as Latched does not reset automatically after an alarm. It will remain in the *triggered* position even after the monitored device returns to normal. After an alarm, the user must manually reset Latched inputs, as described in Clear Active Alarms on page 102. This also means that any digital outputs linked to a Latched digital input will *remain* triggered until the input is manually reset.

A digital input defined as Unlatched will automatically track the status of the monitored device. No action by the user is required.

- From the Setup Input Menu, choose **Latched**, and press Enter.
- To change this feature, use the arrows to choose **Y** (Yes - Latched) or **N** (No - Unlatched), then press Enter.

NOTE: Only alarmable input points may be set up as Latched. If you attempt to set up an event as Latched, the message shown below appears. Press the ESC key to return to the previous screen to continue configuring the digital input.

The only way to reset latched alarms is by clearing active alarms. This step is required to return latched points to their normal state. For details, see Clear Active Alarms on page 102.

9.3.5 Set Up Delay Time

Each input may be set up with a specified time delay between the occurrence of an alarm or event—a monitored device changes state—and any response by the Liebert Universal Monitor. This feature can prevent needless responses to transient conditions.

This delay is the amount of time that must elapse before the Liebert Universal Monitor acknowledges the change of state in the monitored device and takes any further action, such as dialing configured pagers. The default time delay is 1 second (displayed as 00 MIN : 01 SEC).

The time delay applies only when a monitored device changes *from* its normal state—for example, the Liebert Universal Monitor detects a closed contact that is defined as Normally Open.

When the monitored device *returns* to its normal state, the Liebert Universal Monitor acknowledges the change of state immediately.

- From the Setup Input Menu, choose **Delay**, and press Enter.
- To change the time delay in minutes and seconds (in the range of 00:00 to 99:59):
- For minutes (MIN), press and hold one of the arrow keys scroll through the numbers 00-99.
- Press Enter to advance to seconds (SEC).
- For seconds (SEC), press and hold one of the arrow keys scroll through the numbers 00-59.
- When finished, press Enter again.

9.4 Setup System - Setup Common Alarm

The audible alarm sounds after the Liebert Universal Monitor detects an alarm condition in any input that has been defined as alarmable, including digital and analog sensor inputs. Once the alarm is silenced, there are two options:

- By default, the common alarm remains energized until the input alarm is cleared.
- You may change this setting to de-energize the common alarm automatically once the alarm is silenced.

You might want to reset the common alarm with silence if an external alarm—for example, a horn—is connected to the common alarm output contacts.

You might not want to reset the common alarm contacts (let contacts reflect/track alarms) and simply silence the audible horn.

To change the common alarm setting:

Log In and Choose Setup System

- From the Main Menu, use the arrows to choose **System and Control**, then press Enter (see Login on page 67 for help).
- Enter your password at the Login screen.
- From the System and Control Menu, use the arrows to choose **Setup System**, then press Enter.

Change to Reset (Y) or Not Reset (N)

- From the Setup System Menu, use the arrows to choose **Setup Common Alarm** and press Enter.
- By default, the common alarm is set up not to reset automatically when the alarm is silenced (N). To change this setting, use the arrows to choose **Y** (Yes - reset with silence) or **N** (No - not reset), then press Enter.

9.5 Setup System - Setup Sensor

The Liebert Universal Monitor has four analog sensor input points that may be configured individually. The panel monitors connected equipment for any 4-20 mA input—for example, temperature and humidity.

To configure a sensor:

Log In and Choose Setup System

- From the Main Menu, use the arrows to choose **System and Control**, then press Enter (see).
- Enter your password at the Login screen.
- From the System and Control Menu, use the arrows to choose **Setup System**, then press Enter.

Select a Sensor to Configure

- From the Setup System Menu, shown below, use the arrows to choose **Setup Sensor** and press Enter.
- From the Select Sensor Menu, choose the sensor you want—for example, **Sensor_1**—and press Enter.

Table 9.3 on the facing page shows sensor features that may be changed, along with the default settings. By default, sensor inputs are not connected.

To activate a sensor input, you must specify it as connected and enter corresponding values for 4 and 20 mA, as well as high and low setpoints. Other features that may be altered include the name of the sensor, the abbreviation for the units, and defining the sensor as alarmable or as an event.

- Alarmable sensors may be Latched (Y) or Unlatched (N).
- Event status allows you to monitor a sensor's high and low setpoints—and use those setpoints to change the status of an output, if desired—without triggering an alarm. Events are always Unlatched.
- You may also specify a time delay before the Liebert Universal Monitor responds to an alarm or event.

Use the steps following Table 9.3 on the facing page to change the default settings for any analog sensor input.

Table 9.3 Default settings - analog sensor inputs

Feature	Default	Other Options
CONNECTED*	N (Not connected)*	Y (Connected)**
LABEL	SENSOR_1	Any name (up to eight characters)
UNITS	Blank	Any units (up to three characters)
4 mA	-999.9	Can define up to two decimal places—for example, -99.99
20 mA	+999.9	Can define up to two decimal places—for example, +99.99
OFFSET	+000.0	Can define up to two decimal places—for example, +00.00
ALARM/EVENT	AL (Alarmable)	EV (Event)
LATCHED	N (Unlatched)	Y (Latched)
LOW SETPT	-0999.9	Can define up to two decimal places—for example, -999.99
HIGH SETPT	+0999.9	Can define up to two decimal places—for example, +999.99
SENSOR DELAY	00:01 (1 second)	Any time (in minutes and seconds) from 00:00 to 99:59
* If a sensor is configured as N (Not connected), the display will show an empty reading (blank spaces). ** If a sensor is configured as Y (Connected) and is functioning properly, the display will show a reading. If the connected sensor is not functioning properly, the display will show dashes (------) indicating a problem.		

9.5.1 Identify the Sensor as Connected

To make use of an analog sensor, you must specify it as Connected (Y). By default, analog sensors are Not connected (N).

- From the Setup Sensor Menu, choose **Connected**, and press Enter.
- To change this feature, use the arrows to choose **Y** (Yes - Connected) or **N** (No - Not connected), then press Enter.

9.5.2 Change Sensor Label (Name)

Each sensor has a default label (Sensor_1, Sensor_2, etc.) that you may change to a more descriptive name. The label may consist of up to eight characters (see 9 on page 67 for valid characters).

- From the Setup Sensor Menu, choose **Label** for the selected sensor and press Enter.
- To change the sensor's label, which may consist of up to eight characters:
    - Use the arrows to choose a character.
    - Press Enter to advance to the next character position.
    - When finished, press Enter again.

9.5.3 Change Units Label

For each sensor, you may use a three-character label to specify measurement units, such as DEG (see Table 9.1 on page 67 for valid characters).

- From the Setup Sensor Menu, choose **Units** for the selected sensor and press Enter.
- To enter the units label, which may consist of up to three characters:
  - Use the arrows to choose a character.
  - Press Enter to advance to the next character position.
  - When finished, press Enter again.

9.5.4 Change 4 mA Value

For the 4 mA value, enter the smallest value for the range of the sensor—for example, 50°F for a temperature sensor with a range of 50°F to 90°F.

The default value for each sensor is -999.9. Values that can be entered range from -999.9 to +999.9.

To enter a new value:

- From the Setup Sensor Menu, choose **4 mA** for the selected sensor and press Enter.
- To change the 4 mA value:
  - Use the arrows to choose a character.
  - Press Enter to advance to the next character position.
  - When finished, press Enter again.

9.5.5 Change 20 mA Value

For the 20 mA value, enter the largest value for the range of the sensor—for example, 90°F for a temperature sensor with a range of 50°F to 90°F.

The default value for each sensor is +999.9. Values that can be entered range from -999.9 to +999.9.

To enter a new value:

- From the Setup Sensor Menu, choose **20 mA** for the selected sensor and press Enter.
- To change the 20 mA value:
  - Use the arrows to choose a character.
  - Press Enter to advance to the next character position.
  - When finished, press Enter again.

9.5.6 Change Offset Value

For the Offset value, enter an adjustment factor—for example, if the sensor reading shows 70°F when the actual temperature is 75°F, the offset might be 5°F.

The default Offset value for each sensor is +000.0. Values that can be entered range from -999.9 to +999.9.

To enter a new value:

- From the Setup Sensor Menu, choose **Offset** for the selected sensor and press Enter.
- To change the Offset value:
    - Use the arrows to choose a character.
    - Press Enter to advance to the next character position.
    - When finished, press Enter again.

9.5.7 Define Sensor as Alarmable or Event

Each sensor may be defined as Alarmable (AL) or as an Event (EV).

- For a sensor defined as alarmable, the following alarm reactions occur when the high-setpoint threshold is crossed: the LCD flashes, the audible horn sounds, configured pager numbers will be notified and a record is entered in the Alarm Log.
- For a sensor defined as an event, the high-setpoint occurrence is recorded in the Event Log.

By default, all sensors are set up as AL (Alarmable).

- From the Setup Sensor Menu, choose **Alarm/Event**, and press Enter.
- To change the type of sensor, use the arrows to choose **AL** (Alarmable) or **EV** (Event), then press Enter.

9.5.8 Set Up Alarmable Sensors in Latched or Unlatched Mode

Alarmable sensor points may be set up in Latched mode (Y), requiring the user to clear the Liebert Universal Monitor alarms after an alarm has occurred, or Unlatched mode (N), meaning that alarms will automatically clear after a return-to-normal state. The default setting for alarmable sensors is N (Unlatched). Any sensor defined as an event is automatically Unlatched.

A sensor defined as Latched does not reset automatically after an alarm. It will remain in the *triggered* position even after the monitored sensor returns to normal. After an alarm, the user must manually reset Latched sensors, as described in Clear Active Alarms on page 102. This also means that any digital outputs linked to a Latched sensor will *remain* triggered until the sensor is manually reset.

A sensor defined as Unlatched will automatically track the status of the monitored sensor. No action by the user is required.

- From the Setup Sensor Menu, choose **Latched**, and press Enter.
- To change this feature, use the arrows to choose **Y** (Yes - Latched) or **N** (No - Unlatched), then press Enter.

NOTE: Only alarmable sensors may be set up as Latched. If you attempt to set up an event as Latched, the message shown below appears. Press the ESC key to return to the previous screen to continue configuring the digital input.

The only way to reset latched alarms is by clearing active alarms. This step is required to return latched points to their normal state. For details, see Clear Active Alarms on page 102.

9.5.9 Change Low Setpoint

The Low Setpoint value is typically above the 4 mA value for the sensor. For example, if the 4 mA value is 50°F, the Low Setpoint might be 60°F. When the sensor crosses below this value, an alarm or event will occur, depending on the sensor configuration.

The default Low Setpoint for each sensor is -950.0. Values that can be entered range from:

- the 4 mA value + the Offset value (in the example, 50+5=55)

    to

- the 20 mA value + the Offset value (in the example, 90+5=95)

To determine these values, see Change 4 mA Value on page 76, Change 20 mA Value on page 76 and Change Offset Value on the previous page.

To enter a new value:

- From the Setup Sensor Menu, choose **Low Setpt** for the selected sensor and press Enter.
- To change the Low Setpoint:
    - Use the arrows to choose a character.
    - Press Enter to advance to the next character position.
    - When finished, press Enter again.

9.5.10 Change High Setpoint

The High Setpoint value is typically below the 20 mA value for the sensor. For example, if the 20 mA value is 90°F, the High Setpoint might be 85°F. When the sensor crosses above this value, an alarm or event will occur, depending on the sensor configuration.

The default High Setpoint for each sensor is +950.0. Values that can be entered range from:

- the 4 mA value + the Offset value (in the example, 50+5=55)

> *to*

- the 20 mA value + the Offset value (in the example, 90+5=95)

To determine these values, see Change 4 mA Value on page 76, Change 20 mA Value on page 76 and Change Offset Value on page 77.

To enter a new value:

- From the Setup Sensor Menu, choose **High Setpt** for the selected sensor and press Enter.
- To change the High Setpoint:
  - Use the arrows to choose a character.
  - Press Enter to advance to the next character position.
  - When finished, press Enter again.

9.5.11 Set Up Delay Time

Each sensor may be set up with a specified time delay between the triggering of a high or low setpoint—a monitored sensor crosses the high or low setpoint threshold—and any response by the Liebert Universal Monitor. This feature can prevent transient conditions from prompting unnecessary responses.

This delay is the amount of time that must elapse before the Liebert Universal Monitor acknowledges the change in the monitored sensor and takes any further action, such as dialing configured pagers. The default time delay is 1 second (displayed as 00 MIN : 01 SEC).

The time delay applies to the triggering of a high or low setpoint and also after the monitored sensor *returns* to its normal state. When the monitored device *returns* to its normal state, the specified time delay must elapse before the Liebert Universal Monitor acknowledges the return-to-normal condition.

- From the Setup Sensor Menu, choose **Sensor Delay**, and press Enter.
- To change the time delay in minutes and seconds (in the range of 00:00 to 99:59):
  - For minutes (MIN), press and hold one of the arrow keys scroll through the numbers 00-99.
  - Press Enter to advance to seconds (SEC).
  - For seconds (SEC), press and hold one of the arrow keys scroll through the numbers 00-59.

9.6 Setup System - Setup I/O Matrix

The Setup I/O Matrix menu allows you to configure the Liebert Universal Monitor's digital and analog inputs to trigger various actions in any or all of the 16 outputs—eight on the main board and another eight if the optional Expansion Board is used. Each output can be set up to respond to more than one digital or analog input, including the additional 16 inputs available via the optional Expansion Board.

Almost any mapping combination can be used. For example, you may decide to trigger an action in Output03 when Input_01 goes into alarm, or you might want to generate an action in Output04 when Sensor_1 High Setpoint goes into alarm.

To set up the mapping of inputs to outputs:

Log In and Choose Setup System

- From the Main Menu, use the arrows to choose **System and Control**, then press Enter (see Login on page 67 for help).
- Enter your password at the Login screen.
- From the System and Control Menu, use the arrows to choose **Setup System**, then press Enter.

Select Setup I/O Matrix

- From the Setup System Menu, use the arrows to choose **Setup I/O Matrix** and press Enter.
- Use the following instructions to set up the mapping of each digital input or analog sensor input to each output.

9.6.1 Set Up Mapping for a Digital Input

- Use the arrows to choose **Map Input To Output** from the Map Input/Sensor Menu, and press Enter.
- From the Select Input Menu, choose the input you want—for example, **Input_01**—and press Enter.

Map Input to a Main Board Output

- From the Select Outputs menu, select **Map to Main Board** if you want to map the selected input to an output on the Liebert Universal Monitor's main board. These outputs are identified as Outputs 1-8.
- On the Output Map screen, you may map the selected input to any of the eight outputs (1-8)— or to more than one output, if desired.

  To make changes to the mapping:

  - If needed, press Enter to advance to the position directly below the output.
  - Use the arrows to choose **Y** (Yes - Mapped to this output) or **N** (No - Not mapped), then press Enter.
  - Press Enter to advance to the next position where you want to make a change.
  - Use the arrows to choose **Y** (Yes - Mapped to this output) or **N** (No - Not mapped), then press Enter.
  - When finished, press Enter again.

Map Input to Expansion Board Output

- From the Select Outputs menu, select **Map to Exp Board** if you want to map the selected input to an output on the optional Expansion Board. These outputs are identified as Outputs 9-16.
- On the Output Map screen, you may map the selected input to any of the eight outputs (9-16)—or to more than one output, if desired.

To make changes to the mapping:

- If needed, press Enter to advance to the position directly below the output.
- Use the arrows to choose **Y** (Yes - Mapped to this output) or **N** (No - Not mapped), then press Enter.
- Press Enter to advance to the next position where you want to make a change.
- Use the arrows to choose **Y** (Yes - Mapped to this output) or **N** (No - Not mapped), then press Enter.
- When finished, press Enter again.

Default Mappings - Digital Inputs to Outputs

Table 9.4   below shows the default mapping of digital inputs to digital outputs.

Table 9.4   Default mapping of digital inputs to digital outputs

Digital input	By default, mapped to digital output:
Input_01	Output01
Input_02	Output02
Input_03	Output03
Input_04	Output04
Input_05	Output05
Input_06	Output06
Input_07	Output07
Input_08	Output08
NOTE: By default, no Expansion Board inputs are mapped to any outputs.	

9.6.2 Set Up Mapping for an Analog Sensor Input

- Use the arrows to choose **Map Sensor To Outpt** from the Map Input/Sensor Menu, and press Enter.
- From the Select Sensor Menu, choose the input you want—for example, **Sensor_1 High Stpt**—and press Enter.

Map Sensor to Main Board Output

- From the Select Outputs menu, select **Map to Main Board** if you want to map the selected sensor to an output on the Liebert Universal Monitor main board. These outputs are identified as Outputs 1-8.
- On the Output Map screen, you may map the selected sensor to any of the eight outputs (1-8)—or to more than one output, if desired.

  To make changes to the mapping:

  - If needed, press Enter to advance to the position directly below the output.
  - Use the arrows to choose **Y** (Yes - Mapped to this output) or **N** (No - Not mapped), then press Enter.
  - Press Enter to advance to the next position where you want to make a change.
  - Use the arrows to choose **Y** (Yes - Mapped to this output) or **N** (No - Not mapped), then press Enter.
  - When finished, press Enter again.

Map Sensor to Expansion Board Output

- From the Select Outputs menu, select **Map to Exp Board** if you want to map the selected sensor to an output on the optional Expansion Board. These outputs are identified as Outputs 9-16.
- On the Output Map screen, you may map the selected sensor to any of the eight outputs (9-16)—or to more than one output, if desired.

  To make changes to the mapping:

  - If needed, press Enter to advance to the position directly below the output.
  - Use the arrows to choose **Y** (Yes - Mapped to this output) or **N** (No - Not mapped), then press Enter.
  - Press Enter to advance to the next position where you want to make a change.
  - Use the arrows to choose **Y** (Yes - Mapped to this output) or **N** (No - Not mapped), then press Enter.
  - When finished, press Enter again.

Default Mappings - Analog Inputs to Outputs

By default, analog inputs are not mapped to any digital output, as shown in Table 9.5 on the facing page.

Table 9.5   Default mapping of analog inputs to digital outputs

Analog input	By default, mapped to digital output:
Sensor_1	(none)
Sensor_2	(none)
Sensor_3	(none)
Sensor_4	(none)

9.7 Setup System - Setup Output

The Liebert Universal Monitor has eight outputs that may be configured individually. If the optional Expansion Board is used, its additional eight digital outputs may be renamed. The outputs may have a wide variety of Liebert or other manufacturers' equipment connected for configured responses to input alarms and events.

To configure an output:

Log In and Choose Setup System

- From the Main Menu, use the arrows to choose **System and Control**, then press Enter (see Login on page 67 for help).
- Enter your password at the Login screen.
- From the System and Control Menu, use the arrows to choose **Setup System**, then press Enter.

Select an Output to Configure

- From the Setup System Menu, use the arrows to choose **Setup Output** and press Enter.
- From the Select Output Menu, choose the output you want—for example, **Output01**—and press Enter.

Table 9.6   below shows digital output features and default settings. You may change the name of any output. In addition, the Liebert Universal Monitor's eight outputs may be defined as normally open or closed.

Use the steps following Table 9.6   below to change the default settings for any digital output.

Table 9.6   Default settings - digital outputs

Feature	Default	Other Options
LABEL	OUTPUT01	Any name (up to eight characters)
NORM OPEN/CLOSE *(Main board only)*	NO (Normally open)	NC (Normally closed)

9.7.1 Change Label (Name of Output)

Each output has a default label (Output01, Output02, etc.) that you may change to a more descriptive name. The label may consist of up to eight characters (see Table 9.1   on page 67 for valid characters).

- From the Setup Output Menu, use the arrows to choose **Change Label** for the selected output and press Enter.
- To change the output's label, which may consist of up to eight characters:
  - Use the arrows to choose a character.
  - Press Enter to advance to the next character position.
  - When finished, press Enter again.

9.7.2 Define Main Board Output as Normally Open / Closed

Each output may be set up as Normally Open (NO) or Normally Closed (NC). The default setting for all output points is NO (Normally Open).

- From the Setup Output Menu, choose **Change State**, and press Enter .
- To change the normal state for this output, use the arrows to choose **NO** (Normally Open) or **NC** (Normally Closed), then press Enter .

9.7.3 Set Expansion Board Output by DIP Switch

If you choose **Change State** from the Setup Output Menu for an Expansion Board output (OUTPUT09-16), the screen displays a message that the state must be set by DIP switch.

Each digital output on the optional Expansion Board has an associated DIP switch that can determine its operation in the event of loss of communication with the Liebert Universal Monitor or loss of power.

To configure a digital output jumper for a loss of power:

- Move the switch down to the "OFF" position *(factory default)* for Normally Open (NO).
- Move the switch up to the "ON" position for Normally Closed (NC).

For more information, see Setting the Digital Output DIP Switches on page 47.

9.7.4 Configure Main Board Output for Loss of Power ("Fail-Safe")

Each digital output has an associated jumper that can help prevent undesired effects when the controller board loses power. For example, without the proper fail-safe jumper setting, a loss of power might close a switch that is Normally Open (NO)—perhaps shutting off a fan or closing a valve.

This fail-safe jumper setting is unrelated to configuring an output as Normally Open (NO) or Normally Closed (NC), as described in the previous section, Define Main Board Output as Normally Open / Closed above.

To configure a digital output jumper for a loss of power:

- Set the jumper in the "OFF" position *(factory default)* to make the output Normally Open (NO).
- Set the jumper in the "ON" position to make the output Normally Closed (NC).

For more information, see Setting the Digital Output Jumpers on page 36.

9.8 Setup System - Setup Modem & Pagers

To use the modem and pager features, be sure to connect the phone line connector to a telephone wall jack using an RJ11 cord, as described in Phone Line Connector on page 42.

9.8.1 Modem Setup - Initialization String

The Liebert Universal Monitor has an on-board modem that offers dial-up access to all LCD functions as well as features available only through the Service Terminal Interface (see Comparison of Functions: LCD and Service Terminal Interface on page 107). The modem also permits remote notification of alarms.

Supported Modem Settings

Supported settings vary for different types of access:

Table 9.7   Supported modem settings

For:	Modem supports:
Dial-up via terminal	9600 baud, no parity, 8 data bits, 1 stop bit
Pager access	9600 baud, even parity, 7 data bits, 1 stop bit and TAPI protocol version 1.8
International dialing	For calls involving countries that do not support country code B5 (see): Modem model MT5600SMI is required (model number is on the modem label). **+GCI=xx** (xx is the country code) must be added to the initialization string (see Step **7 in this section**).

Default Modem Settings

Table 9.8   below shows the default settings for modem options.

Table 9.8   Default settings - modem

Feature	Default	Other Options
Initialization String (Init String)	ATS0=1	Any string (up to 40 characters); for international dialing, add +GCI=xx, where xx is the country code (except B5 countries—see)
Enable Modem Diagnostic Messages	N (disable)	Y (enable)
Modem Dial Prefix	ATE0X4DT	Any string
Modem Hang Up Delay After a Call	10 seconds	Any number (up to 99 seconds)

Configuring the Modem

To configure the modem:

Log In and Choose Setup System

1. From the Main Menu, use the arrows to choose **System and Control**, then press Enter (see Login on page 67 for help).
2. Enter your password at the Login screen.
3. From the System and Control Menu, use the arrows to choose **Setup System**, then press Enter.

Select Modem Setup

4. From the Setup System Menu,use the arrows to choose **Setup Modem&Pagers** and press Enter.
5. Use the arrows to choose **Setup Modem** from the Pagers & Modem Menu and press Enter.
6. The Setup Modem Menu displays the initialization string (Init String), which may consist of up to 40 characters (see Table 9.1   on page 67 for valid characters). The default Init String is ATS0=1.

International Dialing

7. To enable international dialing involving countries that do not support country code B5 (see Table 9.9 below), you must add the appropriate country codes to the initialization string using the format:

   +GCI=xx

   where **xx** is the country code.

   (This also requires the modem model MT5600SMI; the model number can be found on the modem label.)

   Note: For countries that support B5, there is no need to add country codes to the init string.

Table 9.9 Country codes

Country	Code*	Country	Code*	Country	Code*	Country	Code*
Argentina	07	Finland	FD	Italy	FD	Philippines	B5
Australia	09	France	FD	Japan	00	Portugal	FD
Austria	FD	Germany	FD	Korea	B5	Slovak Republic	FD
Belgium	FD	Greece	FD	Liechtenstein	FD	Spain	FD
Canada	B5	Hong Kong	99	Luxembourg	FD	Sweden	FD
China	B5	Hungary	FD	Mexico	B5	Switzerland	FD
Cyprus	FD	Iceland	FD	Netherlands	FD	Taiwan	FE
Czech Republic	FD	Indonesia	99	New Zealand	7E	United Kingdom	FD
Denmark	FD	Ireland	FD	Norway	FD	United States	B5
* B5 is the default setting—initialization string +GCI=xx is not needed for these countries							

Edit the Init String

8. To enter or edit the Init String:
   - Use the arrows to choose a character.
   - Press Enter to advance to the next character position.
   - When finished, press Enter again.

9.8.2 Modem Setup - Additional Features *(Service Terminal Interface only)*

The Service Terminal Interface offers four additional options for the modem that are not available through the LCD interface:

- Enter Liebert Universal Monitor phone number
- Enable modem diagnostic messages
- Change modem dial prefix
- Change modem hang up delay after a call

To access these options:

- Connect to the Liebert Universal Monitor either from a remote computer or through the RS232 port (see Connecting to the Service Terminal Interface on page 109).
- At the Main Menu, enter 0 (zero—Setup System-Login Required).
- At the Login Menu, enter your password.
- At the Setup Menu, enter 6 (Setup Modem&Pagers).
- At the Setup Modem & Pagers menu, enter 5 to begin configuration.
- At the Change Modem Initialization String prompt, you may press Enter to bypass this option (or see Modem Setup - Initialization String on page 85 for instructions on entering the string).

Enter Liebert Universal Monitor Phone Number

This entry allows you to store the phone number that must be dialed to access the Liebert Universal Monitor for future reference. This has no effect on the Liebert Universal Monitor's modem settings or functionality—it simply places the phone number in an accessible location.

- At the Liebert Universal Monitor Phone Number prompt, enter the phone number for the Liebert Universal Monitor. The current setting appears in brackets [].
- Press Enter to proceed, or Escape to cancel the entry. If you make a change, a confirmation message appears: "Command Successful."

Enable Modem Diagnostic Messages

Enabling modem diagnostics will provide the following additional information about the modem to the computer using the Service Terminal Interface:

> Hang-up modem
>
> Modem model number
>
> No dial tone
>
> No carrier
>
> Busy
>
> No answer
>
> Pager checksum error
>
> Pager pin number error
>
> Error (indicates incorrect phone number, dial prefix or modem initialization string)
> For alphanumeric pager failures:
>
> > Paging company non answer on 1st
> >
> > Paging company non answer on 2nd
> >
> > Paging company non answer on Last
> >
> > Paging company non answer on Handshake

- At the Enable Modem Diagnostic Messages prompt, enter **Y** (Yes - enable) or **N** (No - disable). The current setting appears in brackets.
- Press Enter to proceed, or Escape to cancel the entry. If you make a change, a confirmation message appears: "Command Successful."

Change Modem Dial Prefix

- At the Change Modem Dial Prefix prompt, enter the prefix to be dialed. The current setting appears in brackets.
- For international dialing involving countries that do not support B5 (see), add country codes to the initialization string using the format **+GCI=xx**, where **xx** is the country code.
  (Note: Also requires MT5600SMI modem; model number is on modem label.)

  See Modem Setup - Initialization String on page 85 for more information.

- Press Enter to proceed, or Escape to cancel the entry. If you make a change, a confirmation message appears: "Command Successful."

Change Modem Hang Up Delay After a Call

- At the Change Modem Hang Up Delay After a Call prompt, enter the number of seconds to delay hanging up after a call. The maximum is 99 seconds. The current setting appears in brackets
- Press Enter to proceed, or Escape to cancel the entry. If you make a change, a confirmation message appears: "Command Successful."

9.8.3 Pager Setup - Pager Number and PIN

The Liebert Universal Monitor may be configured to dial numeric or alphanumeric pagers when an alarm is detected. You may enter up to four pager numbers—all configured pagers will be dialed each time an alarm occurs. For each configured pager, you must enter the pager number to be dialed and the pager's Personal Identification Number (PIN).

See Liebert Universal Monitor Specifications on page 105 for supported pager settings.

The Liebert Universal Monitor can send numeric or alphanumeric messages to supported pagers, as shown in the following example:
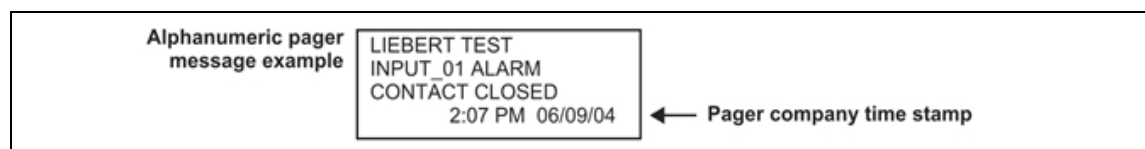
When an alarm is detected, the first pager number is dialed—up to three times, if needed. After a successful page or three dialing attempts, the next pager number is dialed, again with three attempts as needed, and so on for all configured pagers.

Table 9.10 Pager dialing results

Result of Page		Action	Message Generated
Successful		Liebert Universal Monitor dials next configured pager.	—
Unsuccessful due to:			
	Busy signal / no answer / no dial tone	Liebert Universal Monitor generates message after all three redial attempts have failed, dials next configured pager.	*Unsuccessful Page* (Event Log)
	General modem communication problem	Liebert Universal Monitor resets modem, generates message, redials pager up to three more times.	*Modem Reset* (Event Log)
	No communication with modem (internal hardware problem)	Liebert Universal Monitor generates messages, makes no further dialing attempts.	*Modem Internal Fault* (Active Alarm Report, Alarm History Log)

To configure a pager:

Log In and Choose Setup System

- From the Main Menu, use the arrows to choose **System and Control**, then press Enter (see Login on page 67 for help).
- Enter your password at the Login screen.
- From the System and Control Menu, use the arrows to choose **Setup System**, then press Enter.

Select a Pager to Configure

- From the Setup System Menu, use the arrows to choose **Setup Modem&Pagers** and press Enter.
- Use the arrows to choose **Setup Pagers** from the Pagers & Modem Menu, and press Enter.
- From the Select Pager Menu, choose the pager number you want—for example, **Pager Number 1**—and press Enter.

Enter a Pager Number

- From the Setup Pager Menu, choose **Setup Pager Number** for the selected pager and press Enter.
- See Table 9.11 below for guidelines on entering the pager number, which may consist of up to 40 characters. To enter the pager number:
- Use the arrows to choose a character.
- Press Enter to advance to the next character position.
- When finished, press Enter again.

Table 9.11 Guidelines for dialing pagers

Device type	Required entries	Example
Numeric pager	The first character must be "N".	N18005551212
Alphanumeric pager	The first character must be "A".	A18005551212
Remote modem	The first character must be "M".	M18005551212
Device type	Optional entries	Example
All types of devices	Use "9" if needed to access an outside line—place after first character (N, A or M).	A918005551212
	Use "W" to wait for a second dial tone before dialing if the phone system has two dial tones (initial tone and a second tone for outside line)—place after "9" (before the number to be dialed).	A9W18005551212
	Use "," (comma) to pause two seconds.	N1,8005551212
Numeric pager	Use "#" as the last character to terminate page string if required by paging company.	N18005551212 ,,,,1234567#

Enter a Pager PIN Number

- From the Setup Pager Menu, choose **Setup Pager PIN**, and press Enter.
- To enter the pager PIN, which may consist of up to 20 characters (see Table 9.1 on page 67 for valid characters):
    - Use the arrows to choose a character.
    - Press Enter to advance to the next character position.
    - When finished, press Enter again.

NOTE: For international dialing, you might need to add country codes in the modem initialization string. See Modem Setup - Initialization String on page 85.

9.8.4 Pager Setup - Communications Check *(Service Terminal Interface only)*

The Service Terminal Interface offers two additional options for pager setup, which are not available through the LCD interface:

- Enable communications check
- Enter time to perform communications check

To access these options:

- Connect to the Liebert Universal Monitor either from a remote computer or through the RS232 port (see Connecting to the Service Terminal Interface on page 109).
- At the Main Menu, enter **0** (zero—Setup System-Login Required).
- At the Login Menu, enter your password.
- At the Setup Menu, enter **6** (Setup Modem&Pagers).
- At the Setup Modem & Pagers menu, enter a number (**1-4**) to select a pager.
- At the Enter Pager Number prompt, you may press Enter to bypass this option (or see Pager Setup - Pager Number and PIN on page 89 for instructions on entering the pager number).
- At the Enter Pager PIN Number prompt, you may press Enter to bypass this option (or see Pager Setup - Pager Number and PIN on page 89 for instructions on entering the pager PIN).

Enable Communications Check

Enabling this function permits a daily communications test between the Liebert Universal Monitor and the selected pager. Once each day the Liebert Universal Monitor dials the pager at a specified time and sends this message: "UNIVERSAL MONITOR COMM CHECK." (The time of the test is specified at the next prompt, Enter Time To Perform Communications Check on the next page.)

- At the Enable Communications Check prompt, enter **Y** (Yes - enable) or **N** (No - disable). The current setting appears in brackets.
- Press Enter to proceed, or Escape to cancel the entry. If you make a change, a confirmation message appears: "Command Successful."

Enter Time To Perform Communications Check

This function schedules the daily communications test between the Liebert Universal Monitor and the selected pager, as described in the previous section.

- At the Enter Time To Perform Communications Check prompt, enter the time to initiate the communications check, using the format HH:MM (hours and minutes in military time), ranging from 00:00 for midnight to 23:59 for 11:59 p.m. The current setting appears in brackets.
- Press Enter to proceed, or Escape to cancel the entry. If you make a change, a confirmation message appears: "Command Successful."

9.9 Setup System - Setup System Info

The Setup System Info options allow users to:

- **Change Password**—used for access to system setup functions
- **Change Date & Time/Automatic Daylight Saving Time**—used to set the Liebert Universal Monitor's date and time and to enable automatic time change for Daylight Saving Time
- **Setup Site ID**—the Liebert Universal Monitor's location to differentiate among sites if more than one Liebert Universal Monitor is in use
- **Connect Battery**—stops the Liebert Universal Monitor battery from backing up the panel
- **Backup and Upload Configuration File** *(Service Terminal Interface only)*—permits the user to copy the Liebert Universal Monitor's configuration settings and to upload the file to the Liebert Universal Monitor
- **Setup Serv Ph Num**—enables alarm notification to the telephone number entered (in addition to the four pager numbers).
- **Restore Defaults**—returns the Liebert Universal Monitor to its factory settings
- **Perform Firmware Update** *(Service Terminal Interface only)*—changes the Liebert Universal Monitor's firmware to newest version
- **Initiate Remote Alarm Test** *(Service Terminal Interface only)*—used to test auxiliary alarm

To change any Setup System Info features:

Log In and Choose Setup System

- From the Main Menu, use the arrows to choose **System and Control**, then press Enter (see Login on page 67 for help).
- Enter your password at the Login screen.
- From the System and Control Menu, use the arrows to choose **Setup System**, then press Enter.

Select Setup System

- From the Setup System Menu, shown below, use the arrows to choose **Setup System Info** and press Enter.
- Use the steps following Figure 9.2 on the facing page to access any of the Setup System Info options.

Figure 9.2 on the facing page offers a quick look at the Setup System Info screens available via the LCD interface.

Figure 9.2 Menu overview - Setup System Info menu
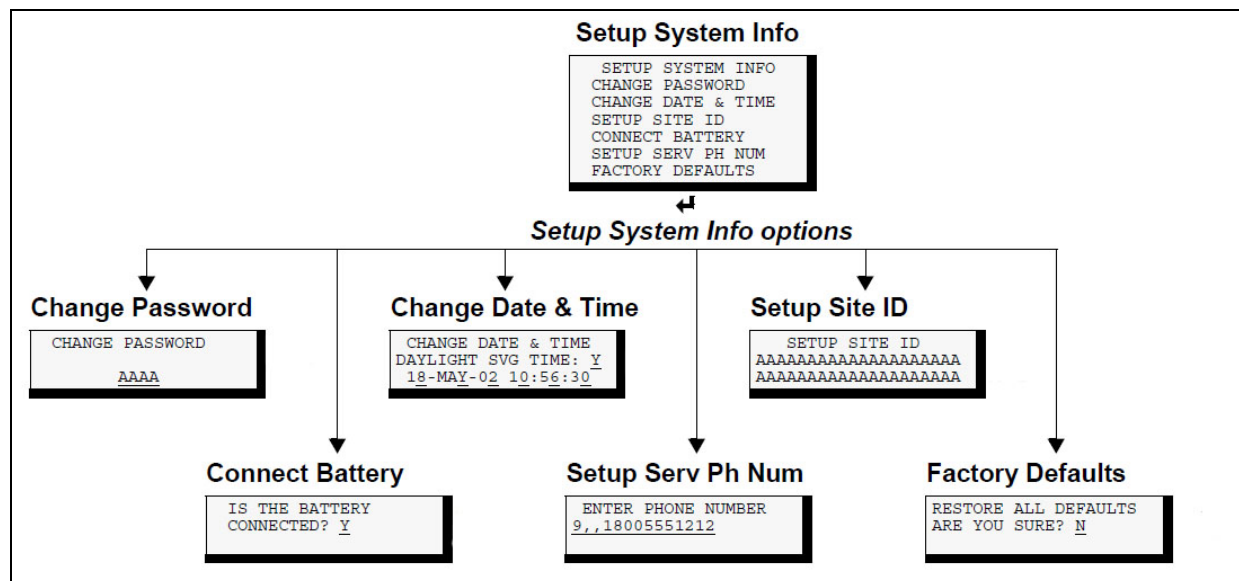
9.9.1 Change Password

A password is required to access the Liebert Universal Monitor system and control options, as described in Login on page 67. The password consists of four characters (see Table 9.1 on page 67 for valid characters). The default password is AAAA.

Change the Password

To change the password:

- From the Setup System Info Menu, use the arrows to choose **Change Password**, then press Enter.
- To change your password:
  - Use the arrows to choose a character.
  - Press Enter to advance to the next character position.
  - When finished, press Enter again.

Reset Password to the Factory Default ("AAAA")

To reset the password to the factory default of AAAA:

- Locate DIP switch 1 on the unit's circuit board (see Controller Board Overview on page 10) and move all switches to the OFF position (down).
- Move the second switch to the ON position, then to the OFF position.
- Move the seventh switch to the ON position, then to the OFF position.
- Move the eighth switch to the ON position, then to the OFF position.

The password should now be AAAA.

9.9.2 Change Date & Time/Automatic Daylight Saving Time

The Liebert Universal Monitor has a built-in real-time clock that is backed up by an encapsulated lithium battery and set up to adjust automatically for daylight saving time twice a year. The Setup System Info menu allows you to change the date or time or automatic adjustment at any time.

To change the daylight saving time setting, date or time:

- From the Setup System Info Menu, use the arrows to choose **Change Date & Time**, then press Enter.
- To change the daylight saving time setting:
    - To the right of **Daylight Svg Time?** use the arrows to choose **Y** (Yes - automatically adjust for daylight saving time) or **N** (No), then press Enter.
- The format of the date and time is **DD-MMM-YY HR:MM:SS**. To change the date or time:
    - Press Enter to advance to the next character position you want to change.
    - Use the arrows to choose from available entries.
    - Press Enter to advance to the next character position.
    - When finished, press Enter again.

9.9.3 Setup Site ID

You may enter a Site ID to identify the Liebert Universal Monitor's location, using a name that may consist of up to 40 characters (see 9 on page 67 for valid characters). The Site ID will appear with each alarm.

To enter or change the Site ID:

- From the Setup System Info Menu, use the arrows to choose **Setup Site ID**, then press Enter.
- To enter a Site ID:
    - Use the arrows to choose a character.
    - Press Enter to advance to the next character position.
    - If the Site ID is less than 40 characters, you may enter an underscore (_) character to indicate the end of the name.
    - When finished, press Enter again.

9.9.4 Connect Battery

By default, the Liebert Universal Monitor checks the battery and sounds an alarm when the power fails, the battery runs low or the battery needs to be checked. The battery's main purpose is to provide enough power to the modem to notify pagers of a power loss.

NOTE: The battery will continue to power and provide full operation of the Liebert Universal Monitor with the exception of powering the analog inputs (sensors). The battery will provide backup for a minimum of 10 minutes.

Using the following procedure to disconnect the battery will disable battery alarm features only. The battery itself will continue to provide backup. If battery backup is not desired, the battery must be unplugged from the circuit board. This can be done by removing the battery leads from the jumpers (see Connecting the Battery Pack on page 26).

The default is to connect the battery. However, there may be times that you want to disconnect the battery so that it does not provide backup.

Table 9.12 on the facing page shows battery problems that will affect operation.

Table 9.12   Battery alarms

Result of Battery		Message Generated
Battery falls below a minimum charge.	Battery will not provide battery backup.	LOW BATTERY
Battery is connected to the circuit board but not recognized by the circuit board.	Battery will not provide battery backup.	CHECK BATTERY
Battery is unplugged from the circuit board.	Battery will not provide battery backup	BATTERY UNPLUGGED
Utility power (24 VAC) to the circuit board is too low to power the board.	Liebert Universal Monitor board will not be able to function properly.	LOSS OF POWER

To connect or disconnect the battery:

- From the Setup System Info Menu, use the arrows to choose **Connect Battery**, then press Enter.
- Use the arrows to choose **Y** (Yes - the battery is connected) or **N** (No - the battery is not connected), then press Enter.

9.9.5 Backup and Upload Configuration File *(Service Terminal Interface only)*

This operation may be performed only through the Service Terminal Interface. It permits the user to make a copy of the Liebert Universal Monitor configuration settings and save it as a file on the computer connected through the RS232 port. Should the need arise, the user can upload the configuration file from the computer to the Liebert Universal Monitor, instead of re-entering the settings manually.

To access these options:

1. Connect to the Liebert Universal Monitor either from a remote computer or through the RS232 port (see Connecting to the Service Terminal Interface on page 109).
2. At the Main Menu, enter **0** (zero—Setup System-Login Required).
3. At the Login Menu, enter your password.
4. At the Setup Menu, enter **7** (Setup System Information).
5. At the Setup System Information Menu, enter **5** (Backup & Upload Configuration File). The Backup & Upload Configuration File menu appears.
6. Enter **1** to back up the configuration file from the Liebert Universal Monitor to the computer and proceed to **Step 8**,

> *OR*

7. Enter **2** to upload the configuration file from the computer to the Liebert Universal Monitor and proceed to **Step 13**. **NOTE:** This will replace the current configuration settings in the Liebert Universal Monitor with the most recent backup.

Back Up the Configuration File

8. At the prompt to Initiate a Backup of Configuration File, enter **Y** (Yes - begin) or **N** (No - cancel). The current setting appears in brackets.

NOTE: The following instructions refer to the Microsoft Windows HyperTerminal program. These steps may vary for other communications programs.

9. At the top of the HyperTerminal window, click on **Transfer**, then on **Receive File**.

10. In the Receive File window:
   - In the Place Received File in the Following Folder box, enter the name and location of the folder where the configuration file should be placed—for example, **C:\downloads**—or click on the **Browse** button to locate the folder.
   - In the Use Receiving Protocol box, select **Xmodem** from the drop-down list.
   - Click on the **Receive** button. (To close the window without backing up the file, click on **Close** or **Cancel**.)

11. In the Receive Filename window, enter a name for the file—for example, **UMconfig.sav**.

12. When the transfer is complete, a confirmation message appears in the Service Terminal Interface window: "Backup Successful."

Upload the Configuration File

13. At the prompt to Initiate an Upload of Configuration File, enter **Y** (Yes - begin) or **N** (No - cancel). The current setting appears in brackets.

NOTE: The following instructions refer to the Microsoft Windows HyperTerminal program. These steps may vary for other communications programs.

14. At the top of the HyperTerminal window, click on **Transfer**, then on **Send File**.

15. In the Send File window:
   - In the Filename box, enter the full path of the file to be uploaded—for example, **UMconfig.sav**—or click on the **Browse** button to locate the file.
   - In the Protocol box, select **Xmodem** from the drop-down list.
   - Click on the **Send** button. (To close the window without sending the file, click on **Close** or **Cancel**.)

16. When the transfer is complete, a confirmation message—"Upload Successful"—appears in the Service Terminal Interface window and the Liebert Universal Monitor reboots with the new configuration.

9.9.6 Setup Serv Ph Num - Enter Phone Number

The Service Phone Number (Serv Ph Num) is used for remote monitoring by Vertiv™ Services. The number is designed to allow remote monitoring services to connect to the Liebert Universal Monitor. All alarms will be sent to this number. When an alarm occurs, this number is dialed before any of the four pager numbers.

To use the service phone number features, be sure to connect the phone line connector to a telephone wall jack using an RJ11 cord, as described in Phone Line Connector on page 42.

Table 9.13   Service phone number dialing results

Result of Dialing		Action	Message Generated
Successful		—	—
Unsuccessful due to:			
	Busy signal / no answer / no dial tone	Liebert Universal Monitor generates message after all three redial attempts have failed, dials next configured pager.	*Unsuccessful Page* (Event Log)
	General modem communication problem	Liebert Universal Monitor resets modem, generates message, redials up to three more times.	*Modem Reset* (Event Log)
	No communication with modem (internal hardware problem)	Liebert Universal Monitor generates messages,makes no further dialing attempts.	*Modem Internal Fault* (Active Alarm Report, Alarm History Log)

To set up the service phone number:

- From the Setup System Info Menu, use the arrows to choose **Setup Serv Ph Num**, then press Enter.
- See Table 9.14   below for guidelines on entering the phone number, which may consist of up to 40 characters. To enter the phone number:
- Use the arrows to choose a character.
- Press Enter to advance to the next character position.
- When finished, press Enter again.

Table 9.14   Guidelines for dialing service phone number

Device type	Required entries	Example
Remote modem	The first character must be "M".	M 18005551212
Device type	Optional entries	Example
All types of devices	Use "9" if needed to access an outside line—place after first character (M).	M9 18005551212
	Use "W" to wait for a second dial tone before dialing if the phone system has two dial tones (initial tone and a second tone for outside line)—place after "9" (before the number to be dialed).	M9W 18005551212
	Use "," (comma) to pause two seconds.	M1 ,8005551212

9.9.7 Setup Serv Ph Num - Communications Check (Service Terminal Interface only)

The Service Terminal Interface offers two additional options for setting up the Service Phone Number (Serv Ph Num) that are not available through the LCD interface:

- Enable communications check
- Enter time to perform communications check

To access these options:

- Connect to the Liebert Universal Monitor either from a remote computer or through the RS232 port (see Connecting to the Service Terminal Interface on page 109).
- At the Main Menu, enter 0 (zero—Setup System-Login Required).
- At the Login Menu, enter your password.
- At the Setup Menu, enter 7 (Setup System Information).
- At the Setup System Information Menu, enter 6 (Setup Service Phone Number).
- At the Setup Service Phone Number menu, enter 1 to begin the setup.
- At the Enter Service Phone Number prompt, you may press Enter to bypass this option (or see Setup Serv Ph Num - Enter Phone Number on page 96 for instructions on entering the number).

Enable Communications Check

Enabling this function permits a daily communications test between the Liebert Universal Monitor and the selected service phone number. Once each day the Liebert Universal Monitor dials the service phone number at a specified time and sends this message: "UNIVERSAL MONITOR COMM CHECK." (The time of the test is specified at the next prompt, Enter Time To Perform Communications Check on page 92.)

- At the Enable Communications Check prompt, enter Y (Yes - enable) or N (No - disable). The current setting appears in brackets.
- Press Enter to proceed, or Escape to cancel the entry. If you make a change, a confirmation message appears: "Command Successful."

Enter Time To Perform Communications Check

This function schedules the daily communications test between the Liebert Universal Monitor and the selected service phone number, as described in the previous section.

- At the Enter Time To Perform Communications Check prompt, enter the time to initiate the communications check, using the format HH:MM (hours and minutes in military time), ranging from 00:00 for midnight to 23:59 for 11:59 p.m. The current setting appears in brackets.
- Press Enter to proceed, or Escape to cancel the entry. If you make a change, a confirmation message appears: "Command Successful."

9.9.8 Factory Defaults

At any time, you may restore all default values for settings in the Liebert Universal Monitor as it was shipped.

NOTE: This action will overwrite any configuration settings. You may want to back up your settings before restoring the factory defaults. See Backup and Upload Configuration File (Service Terminal Interface only) in Setup System Info for details on backing up settings using the Service Terminal Interface.

The password is the sole exception when reverting to the factory default settings. The password can be reset to the factory default of AAAA only through the DIP switches. For details, see Change Password on page 93.

9.9.9 Perform Firmware Update *(Service Terminal Interface only)*

This function, which may be performed only through the Service Terminal Interface, upgrades the Liebert Universal Monitor's firmware to the newest version.

NOTE: This action will overwrite any configuration settings. You may want to back up your settings before restoring the factory defaults. See Backup and Upload Configuration File (Service Terminal Interface only) in Setup System Info for details on backing up settings using the Service Terminal Interface.

- Connect to the Liebert Universal Monitor either from a remote computer or through the RS232 port (see Connecting to the Service Terminal Interface on page 109).
- At the Main Menu, enter **0** (zero—Setup System-Login Required).
- At the Login Menu, enter your password.
- At the Setup Menu, enter **7** (Setup System Information).
- At the Setup System Info menu, enter **8** (Perform Firmware Update).
- At the Perform Firmware Update menu, enter **1** to proceed with an update.

To perform the update:

1. At the Perform Firmware Update prompt, enter **Y** (Yes - begin) or **N** (No - cancel). The current setting appears in brackets.

NOTE: The following instructions refer to the Microsoft Windows HyperTerminal program. These steps may vary for other communications programs.

2. The firmware update is a two-step process—this step describes how to upload the file **prog###.s19** (where **###** is a number—for example, prog118.s19) to the Liebert Universal Monitor:

    a. At the top of the HyperTerminal window, click on **Transfer**, then on **Send File**.
    b. In the Send File window:

    In the Filename box, enter the full path of the file to be uploaded—**prog###.s19**—or click on the **Browse** button to locate the file.

    In the Protocol box, select **Xmodem** from the drop-down list.

    Click on the **Send** button. (To close the window without sending the file, click on **Close** or **Cancel**.)

    When the transfer is complete, a confirmation message appears in the Service Terminal Interface window.

3. Next, follow these steps to upload the file **flash###.s19** (where **###** is a number—for example, flash607.s19) to the Liebert Universal Monitor:

    a. At the top of the HyperTerminal window, click on **Transfer**, then on **Send File**.

    b. In the Send File window:

    In the Filename box, enter the full path of the file to be uploaded—**flash###.s19**—or click on the **Browse** button to locate the file.

    In the Protocol box, select **Xmodem** from the drop-down list.

    Click on the **Send** button. (To close the window without sending the file, click on **Close** or **Cancel**.)

    When the transfer is complete, a confirmation message—"Firmware Update Successful"— appears in the Service Terminal Interface window and the Liebert Universal Monitor reboots with the new firmware update.

9.9.10 Initiate Remote Alarm Test *(Service Terminal Interface only)*

The service phone number is used for remote monitoring by Vertiv™ Services. The Service Terminal Interface may be used to test communications between the Liebert Universal Monitor and the service modem. This test will send a "DIAL OUT TEST PASSED" message to the service phone number.

The test is used to simulate an alarm to verify the proper configuration and functioning of the modem and other communications required for receiving alarms. This simulated alarm bypasses the normal alarm sequence—the LCD will not flash, the horn will not sound and there will be no record in the Alarm Log. A message is sent to the service phone number only if the alarm system is set up correctly.

To initiate the remote alarm test:

- Connect to the Liebert Universal Monitor either from a remote computer or through the RS232 port (see Connecting to the Service Terminal Interface on page 109).
- At the Main Menu, enter **0** (zero—Setup System-Login Required).
- At the Login Menu, enter your password.
- At the Setup Menu, enter **7** (Setup System Information).
- At the Setup System Info menu, enter **9** (Initiate Remote Alarm Test).
- At the Initiate Remote Alarm Test menu, enter **1** to initiate the remote alarm.
- At the Simulate An Alarm Condition prompt, enter **Y** if you wish to proceed or **N** if you want to cancel the alarm simulation.
- After the "Command Successful" message appears, disconnect from the modem—at the top of the HyperTerminal window, click on **Call**, then on **Disconnect**.
- Wait for the Liebert Universal Monitor to dial out to send a test message.
- To verify whether the test was successful, check the Event Log (see View Event Log on page 59) for one of these two messages: *Dial out test passed* or *Dial out test failed*.

NOTE: Also verify that a message was received at the Service Phone Number.

If the test is NOT successful, check the following:

- Modem configuration (see Modem Setup - Initialization String on page 85)
- Pager configuration (see Pager Setup - Pager Number and PIN on page 89)

9.10 Setup Exp Board - Optional Expansion Board

By default, the optional Expansion Board is configured as Not connected (N). After connecting power to the board and connecting it to the Liebert Universal Monitor, you must specify the Expansion Board as Connected (Y), as described in this section.

NOTE: Before specifying the Expansion Board as Connected, be sure to connect power to the board and connect it to the Liebert Universal Monitor. For more information, see:
Input Power Connections - Optional Expansion Board on page 30
Connect EIA485 Connectors to Main Board on page 48

To change the Expansion Board connection setting:

Log In and Choose Setup System

- From the Main Menu, use the arrows to choose **System and Control**, then press Enter.
- Enter your password at the Login screen.
- From the System and Control Menu, use the arrows to choose **Setup System**, then press Enter.

Identify the Expansion Board as Connected (Y) or Not Connected (N)

- From the Setup System Menu, use the arrows to choose **Setup Exp Board** and press Enter.
- To change this setting, use the arrows to choose **Y** (Yes - Connected) or **N** (No - Not connected), then press Enter.

9.11 Manual Output Ctrl

The Manual Output Ctrl feature allows you to manually change the state of any digital output to ON or OFF, overriding automatic control by the Liebert Universal Monitor (the default setting for all outputs). This menu also allows you to release the manual override, returning any output to automatic control.

There are two ways to override automatic control of outputs:

- Use the Manual Output Ctrl menu, as described in this section, to turn any output ON or OFF.
- Use the switch on the Liebert Universal Monitor board (see Controller Board Overview on page 10) to force all eight outputs ON at the same time. (**Note:** This has no effect on the optional Expansion Board outputs.)

After an output is forced manually ON or OFF through the Manual Output Ctrl menu, it remains in that state until returned to automatic control through this menu.

Table 9.15 below summarizes the four types of control, including the abbreviated message that appears on the LCD and in log reports.

Table 9.15 Automatic / manual control - output points

Message	Description	
AUTO	Automatic	Controlled by Liebert Universal Monitor
MAN ON	Manually ON	This output forced ON or OFF via Manual Output Ctrl menu
MAN OFF	Manually OFF	
HW MAN ON	Manually ON (all outputs)	All outputs forced ON via hardware switch on circuit board

To force an output point ON or OFF or return it to automatic control:

Log In and Choose Manual Output Ctrl

- From the Main Menu, use the arrows to choose **System and Control**, then press Enter (see Login on page 67 for help).
- Enter your password at the Login screen.
- From the System and Control Menu, use the arrows to choose **Manual Output Ctrl**, then press Enter.

Select an Output

The Select Output menu, shown below, display the current status of all eight outputs.

- Use the arrows to choose the output you want—for example, **Output01**—and press Enter.

Turn Output ON or OFF / Return to Automatic

- From the Override Output menu, use the arrows to choose one of these options:
    - **Auto** (return to automatic control)
    - **Man ON** (manually turn this output ON)
    - **Man OFF** (manually turn this output OFF)
- Press Enter.

9.12 Clear Alarms & Logs

The Clear Alarms & Logs menu allows you to clear active alarms or delete all records from any of the Liebert Universal Monitor three logs: alarm, event and trend logs.

To clear alarms or logs:

Log In and Choose Clear Alarms & Logs

- From the Main Menu, use the arrows to choose **System and Control**, then press Enter (see Login on page 67 for help).
- Enter your password at the Login screen.
- From the System and Control Menu, use the arrows to choose **Clear Alarms & Logs**, then press Enter.
- Use the following steps to clear alarms or delete log records.

9.12.1 Clear Active Alarms

To clear all active alarms:

- From the Clear Alarms/Logs Menu, use the arrows to choose **Clear Active Alarms**, then press Enter.
- Use the arrows to choose **Y** (Yes - clear all active alarms) or **N** (No - do not clear alarms), then press Enter.

Clearing active alarms is the only means to reset latched alarms. This step is required to return latched points to their normal state. To set up a digital input or an analog sensor input as latched, see:

- Set Up Alarmable Inputs in Latched or Unlatched Mode on page 72
- Set Up Alarmable Sensors in Latched or Unlatched Mode on page 78

9.12.2 Clear the Alarm Log

The alarm log contains up to 99 records of alarms that have occurred. You may want to clear the log after backing up the file or simply to free up space.

NOTE: Before deleting the records in the alarm log, you may want to back up the file to a remote computer using the Service Terminal Interface, as described in Back Up Log Files (Service Terminal Interface only) on page 65.

To delete all records from the alarm log:

- From the Clear Alarms/Logs Menu, use the arrows to choose Clear Alarm Log, then press Enter.
- Use the arrows to choose Y (Yes - clear the alarm log) or N (No - do not clear the alarm log), then press Enter.

NOTE: Clear active alarms is the only means to reset Latched alarms. This action must be taken to return Latched points to their normal state.

9.12.3 Clear the Event Log

The event log contains up to 99 records of events detected by the Liebert Universal Monitor. You may want to clear the log after backing up the file or simply to free up space.

NOTE: Before deleting the records in the event log, you may want to back up the file to a remote computer using the Service Terminal Interface, as described in Back Up Log Files (Service Terminal Interface only) on page 65.

To delete all records from the event log:

- From the Clear Alarms/Logs Menu, use the arrows to choose Clear Event Log, then press Enter.
- Use the arrows to choose Y (Yes - clear the event log) or N (No - do not clear the event log), then press Enter.

9.12.4 Clear the Trend Logs

The Liebert Universal Monitor maintains a separate trend log for each configured analog input sensor. Each log contains up to 100 records of data collected at regular intervals. You may want to clear the logs after backing up the files or simply to free up space.

Using the Clear Trend Logs command will clear all four trend logs maintained by the Liebert Universal Monitor. There is no method of clearing records from individual logs.

NOTE: Before deleting the records in the trend logs, you may want to back up the files to a remote computer using the Service Terminal Interface, as described in Back Up Log Files (Service Terminal Interface only) on page 65.

To delete the records from ALL four trend logs:

- From the Clear Alarms/Logs Menu, use the arrows to choose Clear Trend Logs, then press Enter.
- Use the arrows to choose Y (Yes - clear all trend logs) or N (No - do not clear the trend logs), then press Enter.

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10 SPECIFICATIONS

10.1 Liebert Universal Monitor Specifications

NOTE: If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

	Small Enclosure	Large Enclosure	
	UMS02400	115VAC UML11500	230VAC UML23000
Power Requirements	24VAC ±10% of nominal; 50/60 Hz, 1.3A, 30VA	115VAC ±10% of nominal; 60Hz, 4A, 460VA	230VAC ±10% of nominal; 50Hz, 0.5A, 115VA
Dimensions W x D x H, in. (mm)	14-1/4 x 2-3/4 x 12 (361.95 x 69.85 x 304.8)	18 x 2-3/4 x 18 (457.2 x 69.85 x 457.2)	
Weight (Assembled)	7.68 lb. (3.48 kg)	20.56 lb. (9.33 kg)	
Enclosure Type	NEMA 1		
Liquid Crystal Display (LCD)	Four line, 20 character, backlit		
Mounting Surface	Building Wall or Structural Member		
Ambient Operating Environment	32°F to 104°F (0°C to 40°C) 0% RH to 95% RH (non-condensing)		
Processor Specifics			
Model	Motorola XC68HC812A4		
Clock speed	16MHz		
Total RAM	256Kb		
Total FLASH	4M		
Total EEPROM	4K		
A/D Resolution (Analog IN)	12 Bit		
Modem Type Embedded	14.4K bps		
Clock Type	Real-Time Clock		
Clock battery backup type	Lithium Cell (non-replaceable)		
Clock battery life	7 years, constant, no power		
Modem battery backup type	Nickel Cadmium (replaceable)		
Modem battery life	10 minutes at full load		
Communications			
Local Communications	RS232		
Remote Communications Modem (9600-N-8-1) Supported pagers	Baud rate 9600 bps, Parity=None, Data bits=8, Stop bits=1 9600 E-7-1 supports TAPI protocol version 1.8		
Liebert SiteScan® Web	IGM Protocol, EIA422		
Expansion Board (optional)	EIA485		
Agency Listings	No Transformer Module	With Transformer Module	
	(UMS02400)	115VAC (TM115)	230VAC (TM230)
UL	UL3121	UL1012	UL1585

CE	Yes	Yes
FCC Compliance	CFR 47 Part 15	N/A
Inputs & Outputs (Quantity)		
Digital Inputs (8)	Dry Contact Closure 24 VDC, 10 mA	
Analog Inputs (4)	4-20 mA signal input with selectable power source of 12 VDC or 24 VDC	
Digital Outputs (8)	24 VAC, 3A	
Common Alarm Outputs (2)	24 VAC, 3A	

10.2 Optional Expansion Board Specifications

NOTE: If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

	UMEXP
Power Requirements	24 VAC ±10% of nominal; 50/60 Hz, 0.6A, 15VA Class 2
Dimensions W x D x H, in. (mm)	14-1/4 x 2-3/4 x 12 (361.95 x 69.85 x 304.8)
Weight (Assembled)	7.68 lb. (3.48 kg)
Enclosure Type	NEMA 1
Mounting Surface	Building Wall or Structural Member
Ambient Operating Environment	32°F to 104°F (0°C to 40°C) 0% RH to 95% RH (non-condensing)
Inputs & Outputs (Quantity)	
Digital Inputs (16)	Dry Contact Closure 24 VDC, 10 mA
Digital Outputs (8)	240 VAC, 2A

APPENDICES

Appendix A: Service Terminal Interface

The Service Terminal Interface allows access to all functions of the Liebert Universal Monitor, including some that are not possible through the LCD interface. This interface is accessible through any computer using a communications program such as Microsoft® Windows® HyperTerminal.

This appendix provides directions for connecting to the Service Terminal Interface, an overview of each type of function and sample screens for each menu available through the Service Terminal Interface. References to more detailed instructions about each function are provided.

A.1 Comparison of Functions: LCD and Service Terminal Interface

Table A.1 below lists all functions for viewing and configuring the Universal Monitor and shows whether they can be performed through the LCD interface and where to find information.

Table A.1 Guide to Universal Monitor functions

Function	Can be performed via:		Where to find:	
	LCD	Service Terminal	Instructions on using function	Service Terminal screen examples
VIEW STATUS FUNCTIONS				
View Active Alarms	x	x	View Active Alarms on page 56	View Active Alarms
View Alarm Log	x	x	View Alarm Log on page 57	View Alarm Log
View Event Log	x	x	View Event Log on page 59	View Event Log
View Trend Log	x	x	View Trend Log on page 60	View Trend Log
View Input Status	x	x	View Input Status on page 62	View Input Status
View Output Status	x	x	View Output Status on page 63	View Output Status
View Pager Numbers	x	x	View Pager Numbers on page 63	View Pager Numbers
SILENCE ALARM & BACK UP LOGS FUNCTIONS				
Silence Alarm (On the LCD, press any key to silence an alarm)	x	x	Silence Alarm (Service Terminal Interface) on page 65	Silence Alarm (Service Terminal Interface only)
Back Up Log Files	—	x	Back Up Log Files (Service Terminal Interface only) on page 65	Back Up Log Files (Service Terminal Interface only)
SYSTEM & CONTROL FUNCTIONS				
Login	x	x	Login on page 67	Login Menu
Setup System	x	x	Setup System - Overview on page 70	Setup Menu
Setup Input	x	x	Setup System - Setup Input on page 70	Setup Input
Setup Common Alarm	x	x	Setup System - Setup Common Alarm on page 73	Setup Common Alarm
Setup Sensor	x	x	Setup System - Setup Sensor on page 74	Setup Sensor
Setup I/O Matrix	x	x	Setup System - Setup I/O Matrix on page 80	Setup I/O Matrix
Setup Output	x	x	Setup System - Setup Output on page 83	Setup Output
Pager Setup - Pager Number & PIN	x	x	Pager Setup - Pager Number and PIN on page 89	Pager Setup

Table A.1   Guide to Universal Monitor functions (continued)

Function	Can be performed via:		Where to find:	
	LCD	Service Terminal	Instructions on using function	Service Terminal screen examples
Pager Setup - Communications Check	—	x	Pager Setup - Communications Check (Service Terminal Interface only) on page 91	Pager Setup
Modem Setup - Initialization String	x	x	Modem Setup - Initialization String on page 85	Modem Setup
Modem Setup - Enter Universal Monitor Phone Number	—	x	Modem Setup - Additional Features (Service Terminal Interface only) on page 86	Modem Setup
Modem Setup - Enable Modem Diagnostic Messages	—	x	Modem Setup - Additional Features (Service Terminal Interface only) on page 86	Modem Setup
Modem Setup - Change Modem Dial Prefix	—	x	Modem Setup - Additional Features (Service Terminal Interface only) on page 86	Modem Setup
Modem Setup - Change Modem Hang Up Delay After a Call	—	x	Modem Setup - Additional Features (Service Terminal Interface only) on page 86	Modem Setup
Setup System Info	x	x	Setup System - Setup System Info on page 92	Setup System Info
Change Password	x	x	Change Password on page 93	Change Password
Change Date & Time/Automatic Daylight Saving Time	x	x	Change Date & Time/Automatic Daylight Saving Time on page 94	Change Date & Time/Automatic Daylight Saving Time
Setup Site ID	x	x	Setup Site ID on page 94	Setup Site ID
Connect Battery	x	x	Connect Battery on page 94	Connect Battery
Backup and Upload Configuration File	—	x	Backup and Upload Configuration File (Service Terminal Interface only) on page 95	Backup and Upload Configuration File (Service Terminal Interface only)
Setup Serv Ph Num - Enter Phone Number	x	x	Setup Serv Ph Num - Enter Phone Number on page 96	Setup Service Phone Number
Setup Serv Ph Num - Communications Check	—	x	Setup Serv Ph Num - Communications Check (Service Terminal Interface only) on page 98	Setup Service Phone Number
Factory Defaults	x	x	Factory Defaults on page 98	Factory Defaults
Perform Firmware Update	—	x	Perform Firmware Update (Service Terminal Interface only) on page 99	Firmware Update (Service Terminal Interface only)
Initiate Remote Alarm Test	—	x	Initiate Remote Alarm Test (Service Terminal Interface only) on page 100	Initiate Remote Alarm Test (Service Terminal Interface only)
Setup Exp Board - Optional Expansion Board	x	x	Setup Exp Board - Optional Expansion Board on page 101	Connect Expansion Board
Manual Output Ctrl	x	x	Manual Output Ctrl on page 101	Override Output
Clear Alarms & Logs	x	x	Clear Alarms & Logs on page 102	Clear Alarms & Logs
Clear Active Alarms	x	x	Clear Active Alarms on page 102	Clear Active Alarms
Clear the Alarm Log	x	x	Clear the Alarm Log on page 103	Clear the Alarm Log
Clear the Event Log	x	x	Clear the Event Log on page 103	Clear the Event Log
Clear the Trend Logs	x	x	Clear the Trend Logs on page 103	Clear the Trend Logs

A.2 Connecting to the Service Terminal Interface

This section describes how to set up and connect to the Service Terminal Interface.

Connection Methods

There are two ways to access the Service Terminal Interface:

- **Direct**—Use a null modem cable to connect a computer's COM1 port to the Universal Monitor's RS232 port,

     OR

- **Remote**—Use a remote computer's modem to dial the telephone number of the phone line connected to the Universal Monitor.

Both methods require a communications program, such as HyperTerminal, to connect to the Service Terminal Interface.

Refer to Table A.2   below for step-by-step instructions to set up each type of connection. Note that the remote connection does not require setting up the COM1 port.

Table A.2   Steps to set up a direct or remote connection

	Direct	Remote
Create a Connection below	4	4
Set Up the COM1 Port - Direct Connection Only	4	N/A
Set Up the Connection's Properties	4	4
Connect to the Service Terminal Interface	4	4

The instructions in this section refer to the HyperTerminal program—they may vary for other communications programs.

Create a Connection

Before connecting to the Service Terminal Interface, you must create a connection and specify the method to be used for connection, as described in the following steps.

1. Start the HyperTerminal program—to do this, click on the **Start** button, then on **Programs**, then **Accessories**, then **Communications**, and finally **HyperTerminal**.
2. At the top of the HyperTerminal window, click on **File**, then on **New Connection.**
3. In the Connection Description window, enter a name for the connection—for example, **Universal Monitor**. This becomes the file name (with the extension ".**ht**").
4. Click **OK** to close the window. The Connect To window opens.

5. In the Connect To window, select the appropriate connection method from the Connect Using drop-down list:

Direct Connection via RS232

- To set up a direct connection via the Universal Monitor's RS232 port, select **COM1** as shown above left.
- This opens the COM1 Properties window. Proceed to **Step** 6 (next section).

Remote Connection via Modem

- To make a remote connection through the Universal Monitor's modem, select your computer's modem—**HSP56 MicroModem** in the example shown above right.
- Enter the area code and phone number of the Universal Monitor's modem.
- Proceed to **Step 8** in Set Up the Connection's Properties (skip **Steps** 6 and 7).

Set Up the COM1 Port - Direct Connection Only

The following steps apply only to setting up a direct connection to the Service Terminal Interface via the Universal Monitor's RS232 port. If you are setting up a remote connection via modem, skip to **Step** 8 (next section).

COM1 Port Setup

6. In the COM1 Properties window, make the following selections:
   - Bits per second: **9600**
   - Data bits: **8**
   - Parity: **None**
   - Stop bits: **1**
   - Flow control: **None**
7. Click **OK**. When the connection is open, the connection name appears in the title bar of the HyperTerminal window. To complete the setup, continue with **Step** 8 (next section).

Set Up the Connection's Properties

The following steps are needed for both direct and remote connection to the Universal Monitor.

Properties Setup

8. Open the Properties window by clicking on **File**, then on **Properties**.
9. In the Properties window, click on the **Settings** tab and choose the following settings:
   - Function, arrow, and ctrl keys act as: **Terminal keys**
   - Backspace key sends: **Ctrl+H**
   - Emulation: **ANSIW**
   - Telnet terminal ID: **VT100**
   - Backscroll buffer lines: **500**
   - Play sound when connecting or disconnecting: **Unchecked**

ASCII Setup

10. In the Properties window, click on the **ASCII Setup** button.
11. In the ASCII Setup window, choose the following settings:
    - ASCII Sending: place a check mark in the **Send Line Ends With Line Feeds** box.
    - ASCII Receiving: place a check mark in the **Wrap Lines That Exceed Terminal Width** box.
    - Click **OK**.

The setup is now complete. To use the new connection, proceed to the next section, Connect to the Service Terminal Interface below.

Connect to the Service Terminal Interface

After creating and setting up a connection, use a communications program such as HyperTerminal to access the Universal Monitor's Service Terminal Interface.

1. Verify communications connections between the remote computer and the Universal Monitor:
    a. **For direct connection (via RS232 port):** Connect a null modem cable from the computer's COM1 port to the Universal Monitor's RS232 port (for location, see RS232 Connector on page 42).
    b. **For remote connection (via modem):** Verify modem connections between the remote computer and the Universal Monitor. The remote computer should have connectivity through a telephone line, high-speed cable or an Ethernet. The Universal Monitor must have a telephone line connected to its RJ11 port (for location, see Phone Line Connector on page 42).
2. Start the HyperTerminal program—click on the **Start** button, then on **Programs**, then **Accessories**, then **Communications**, and finally **HyperTerminal**.
3. Open the Universal Monitor connection created in Create a Connection on page 109. To do this, click on **File**, then on **Open.**
4. In the Open window, select the file name and then click on the **Open** button.
5. Follow the steps below to display the Main Menu of the Service Terminal Interface:
    a. **For direct connection (via RS232 port):** Press Enter (or Escape) to initiate communication and bring up the Main Menu.
    b. **For remote connection (via modem):**

       The Connect window opens. Click the **OK** button.

       In the Connect window, click **Dial.**

       If the dialing attempt is successful, the Main Menu appears.

For more information on the Universal Monitor's options:
- See Overview of Menus on the next page for examples of the Service Terminal Interface screens.
- See Table A.1 on page 107 to locate step-by-step instructions for each Universal Monitor function.

A.3 Overview of Menus

The Main Menu offers choices for viewing the status of the Universal Monitor, silencing the audible alarm and backing up the unit's log files. It also allows access to the System and Control features, which require a password.

View Status Overview

The View Status features are available to all users. This permits all personnel to check on the status of any equipment or location being monitored. These options allow any user to:

- View current monitoring data—active alarms and the status of all inputs and outputs
- View data stored in alarm, event and trend logs
- View pager numbers

Silence Alarm and Backup Log Files

Two Main Menu options—Silence Alarm and Backup Log Files—are unique to the Service Terminal Interface. As with the View Status options, these features do not require a password:

- **Silence Alarm**—silence the Universal Monitor's audible alarm and reset the Common Alarm Relay output.
- **Backup Log Files**—make backup copies of the Universal Monitor's Alarm Log, Event Log and Trend Logs and save the copies to a computer.

Setup Menu Overview

The Setup Menu options require a password. Authorized users may:

- Configure the Universal Monitor—this includes setting up digital and analog inputs, digital outputs, the modem, up to four pagers, and system features such as setting the date and time

  Three system features—**Backup and Upload Configuration File**, **Firmware Update** and **Initiate Remote Alarm Test**—are unique to the Service Terminal Interface.

- Override automatic control of outputs to force an output ON or OFF
- Clear active alarms and delete all records in the alarm, event and trend logs

A.4 View Status Menus

The View Status menu allows any user to view currently active alarms, monitoring data stored in the alarm, event and trend logs, the status of all inputs and outputs, and the four pager numbers.

Main Menu

After connecting to the Service Terminal Interface, the Main Menu appears

View Active Alarms

For details on this feature, see View Active Alarms on page 56.

View Alarm Log

For details on this feature, see View Alarm Log on page 57.

View Event Log

For details on this feature, see View Event Log on page 59.

View Trend Log

For details on this feature, see View Trend Log on page 60.

View Input Status

For details on this feature, see View Input Status on page 62.

View Output Status

For details on this feature, see View Output Status on page 63.

View Pager Numbers

For details on this feature, see View Pager Numbers on page 63.

A.5 Silence Alarm & Back Up Log Files *(Service Terminal Interface only)*

This section presents two options from the Main Menu that are available via the Service Terminal Interface only.

Main Menu

After connecting to the Service Terminal Interface, the Main Menu appears.

Silence Alarm *(Service Terminal Interface only)*

For details on this feature, see Silence Alarm (Service Terminal Interface) on page 65.

Back Up Log Files *(Service Terminal Interface only)*

For details on this feature, see Back Up Log Files (Service Terminal Interface only) on page 65.

A.6 Setup Menu

The Setup menu allows the user to configure the Universal Monitor—setting up inputs and outputs and an input/output matrix to trigger actions, the modem and pagers, and system features such as date and time. This menu also provides a vehicle for manually changing the state of an output to ON or OFF, clearing active alarms and deleting records from the Universal Monitor's alarm log, event log and trend logs.

Main Menu

After connecting to the Service Terminal Interface, the Main Menu.

- Choose 0 to access the features illustrated in this section.

Login Menu

The System and Control options require a password to prevent unauthorized users from making changes to the system. After choosing 0 in the Main Menu, the Login Menu appears.

- Enter the password, and the Setup Menu appears, as shown in the following section.

Setup Menu

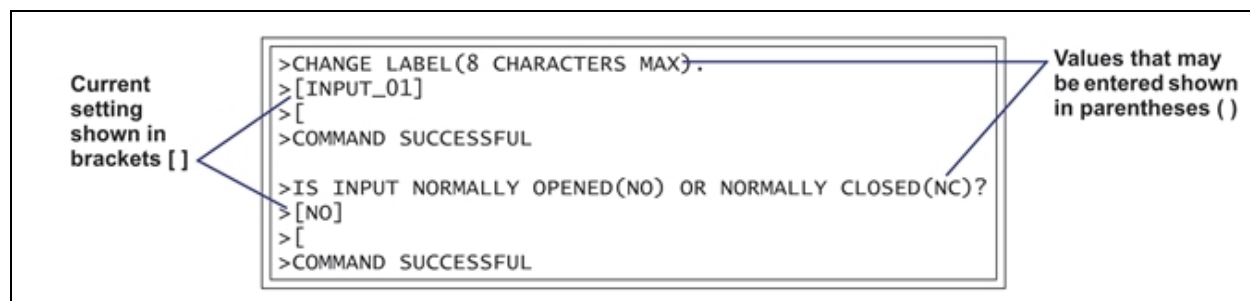Setup System Information features are:

- **Change Password**
- **Change Date & Time/Automatic Daylight Saving Time**
- **Setup Site ID**
- **Connect Battery**
- **Backup and Upload Configuration File (Service Terminal Interface only)**
- **Setup Service Phone Number**
- **Factory Defaults**
- **Firmware Update (Service Terminal Interface only)**
- **Initiate Remote Alarm Test (Service Terminal Interface only)**

Note that three of these system features—Backup and Upload Configuration File, Firmware Update and Initiate Remote Alarm Test—are unique to the Service Terminal Interface.

Tips on Using the Service Terminal Interface

Use the following tips when making changes in the Service Terminal Interface:

- Data that can be entered is shown in parentheses ( ) in prompt line.
- The current setting is shown in brackets [ ] in the line below the prompt
- To accept the current setting, press the Enter key.
- To change the current setting, enter the value and then press Enter.
- Pressing Escape will exit the current setup function or take you to the previous menu screen.


```
Current                >CHANGE LABEL(8 CHARACTERS MAX):        Values that may
setting                >[INPUT_01]                             be entered shown
shown in               >[                                      in parentheses ( )
brackets [ ]           >COMMAND SUCCESSFUL

                       >IS INPUT NORMALLY OPENED(NO) OR NORMALLY CLOSED(NC)?
                       >[NO]
                       >[
                       >COMMAND SUCCESSFUL
```

Setup Input

For details on this feature, see Setup System - Setup Input on page 70.

Setup Common Alarm

For details on this feature, see Setup System - Setup Common Alarm on page 73.

Setup Sensor

For details on this feature, see Setup System - Setup Sensor on page 74.

Setup I/O Matrix

For details on this feature, see Setup System - Setup I/O Matrix on page 80.

Setup Output

For details on this feature, see Setup System - Setup Output on page 83.

Setup Modem & Pagers

For details on this topic, see Setup System - Setup Modem & Pagers on page 84.

Pager Setup

For details on this feature, see Pager Setup - Pager Number and PIN on page 89 and Pager Setup - Communications Check (Service Terminal Interface only) on page 91.

Modem Setup

For details on this feature, see Modem Setup - Initialization String on page 85 and Modem Setup - Additional Features (Service Terminal Interface only) on page 86.

Setup System Info

This section presents Service Terminal Interface screens for choices 1 through 9 in the Setup System Information menu shown below. For details on this topic, see Setup System - Setup System Info on page 92.

Change Password

For details on this feature, see Change Password on page 93.

Change Date & Time/Automatic Daylight Saving Time

For details on this feature, see Change Date & Time/Automatic Daylight Saving Time on page 94.

Setup Site ID

For details on this feature, see Setup Site ID on page 94.

Connect Battery

For details on this feature, see Connect Battery on page 94.

Backup and Upload Configuration File *(Service Terminal Interface only)*

For details on this feature, see Backup and Upload Configuration File (Service Terminal Interface only) on page 95.

Setup Service Phone Number

For details on this feature, see Setup Serv Ph Num - Enter Phone Number on page 96 and Setup Serv Ph Num - Communications Check (Service Terminal Interface only) on page 98.

Factory Defaults

For details on this feature, see Factory Defaults on page 98.

Firmware Update *(Service Terminal Interface only)*

For details on this feature, see Perform Firmware Update (Service Terminal Interface only) on page 99.

Initiate Remote Alarm Test *(Service Terminal Interface only)*

For details on this feature, see Initiate Remote Alarm Test (Service Terminal Interface only) on page 100.

Connect Expansion Board

For details on this feature, see Setup Exp Board - Optional Expansion Board on page 101.

Override Output

For details on this feature, see Manual Output Ctrl on page 101.

Clear Alarms & Logs

For details on this topic, see Clear Alarms & Logs on page 102.

Clear Active Alarms

For details on this feature, see Clear Active Alarms on page 102.

Clear the Alarm Log

For details on this feature, see Clear the Alarm Log on page 103.

Clear the Event Log

For details on this feature, see Clear the Event Log on page 103.

Clear the Trend Logs

For details on this feature, see Clear the Trend Logs on page 103.

Appendix B: Default Settings Quick Reference Guide

This appendix provides a quick reference to default settings for the Universal Monitor and the optional Expansion Board. These settings also appear throughout the manual.

Table B.1   Universal Monitor - default settings for inputs and outputs

DEFAULT SETTINGS - DIGITAL INPUTS (FROM Table 9.2 on page 71)		
Feature	Default	Other Options
LABEL	INPUT_01 - INPUT_08	Any name (up to eight characters)
NORM OPEN/CLOSE	NO (Normally open)	NC (Normally closed)
ALARM/EVENT	AL (Alarmable)	EV (Event)
LATCHED	NL (Unlatched) / N (No)*	L (Latched) / Y (Yes)*
DELAY	00:01 (1 second)	Any time (in minutes and seconds) from 00:00 to 99:59
* NOTE: Different abbreviations are used to designate a digital input as Latched or Unlatched.		
DEFAULT SETTINGS - ANALOG SENSOR INPUTS (FROM Table 9.3 on page 75)		
Feature	Default	Other Options
CONNECTED*	N (Not connected)*	Y (Connected)**
LABEL	SENSOR_1 - SENSOR_4	Any name (up to eight characters)
UNITS	Blank	Any units (up to three characters)
4 mA	-999.9	Can define up to two decimal places—e.g., -99.99
20 mA	+999.9	Can define up to two decimal places—e.g., +99.99
OFFSET	+000.0	Can define up to two decimal places—e.g., +00.00
ALARM/EVENT	AL (Alarmable)	EV (Event)
LATCHED	N (Unlatched)	Y (Latched)
LOW SETPT	-0999.9	Can define up to two decimal places—e.g., -999.99
HIGH SETPT	+0999.9	Can define up to two decimal places—e.g., +999.99
SENSOR DELAY	00:01 (1 second)	Any time (in minutes and seconds) from 00:00 to 99:59
* If a sensor is configured as N (Not connected), the display will show an empty reading (blank spaces). ** If a sensor is configured as Y (Connected) and is functioning properly, the display will show a reading. If the connected sensor is not functioning properly, the display will show dashes () indicating a problem.		
DEFAULT MAPPING OF DIGITAL INPUTS TO DIGITAL OUTPUTS (FROM Table 9.4 on page 81)		
Digital input	By default, mapped to digital output:	
Input_01	Output01	
Input_02	Output02	
Input_03	Output03	
Input_04	Output04	
Input_05	Output05	
Input_06	Output06	
Input_07	Output07	
Input_08	Output08	
DEFAULT MAPPING OF ANALOG INPUTS TO DIGITAL OUTPUTS (FROM Table 9.5 on page 83)		
Analog input	By default, mapped to digital output:	
Sensor_1	(none)	

Table B.1   Universal Monitor - default settings for inputs and outputs (continued)

Sensor_2	(none)	
Sensor_3	(none)	
Sensor_4	(none)	
DEFAULT SETTINGS - DIGITAL OUTPUTS (FROM Table 9.6 on page 83)		
Feature	Default	Other Options
LABEL	OUTPUT01 - OUTPUT08	Any name (up to eight characters)
NORM OPEN/CLOSE	NO (Normally open)	NC (Normally closed)

Table B.2   Universal Monitor - other default settings

JUMPER SETTINGS		
Feature	Default	Other Options
Digital output loss-of-power jumpers	OFF - Normally Open	ON - Normally Closed
NOTE: Jumper position has no effect when the Universal Monitor has power.		
12VDC/24VDC analog input jumper	24VDC	Acceptable voltage for all four two-wire analog sensors
P20 jumper	Not jumpered (not connected)	—
422 TERM jumper	Default: jumpered (connected)	—
485 TERM jumper	Default: jumpered (connected)	—
Audible horn	Enabled	May be disabled via the audible horn jumper
Manual Override switch	Off (outputs controlled by programming)	On (Turn on all output relays)
DEFAULT SETTINGS - MODEM (FROM)		
Feature	Default	Other Options
Initialization String (InitString)	ATS0=1	Any string (up to 40 characters); for international dialing, add +GCl=xx, where xx is the country code (except B5 countries—see and)
Enable Modem Diagnostic Messages	N (disable)	Y (enable)
Modem Dial Prefix	ATE0X4DT	Any string
Modem Hang Up Delay After a Call	10 seconds	Any number (up to 99 seconds)
DIP SWITCH SETTINGS		
Feature	Default	Other Options
8-position DIP switch	All are OFF (down)	May be used to reset password to factory default (see Change Password on page 93)

Table B.2 Universal Monitor - other default settings (continued)

OTHER SETTINGS		
Feature	Default	Other Options
Change state of outputs - automatic or manual control	AUTO (automatic control)	Force an output ON / OFF via Manual Output Ctrl menu Force all outputs ON via hardware switch
Password	AAAA	Any 4 characters (see Table 9.1 on page 67 for valid characters)
Reset common alarm with silence	N (not reset)	Y (reset with silence)
Battery connected	Y (connected)	N (not connected)

Table B.3 Expansion Board - default settings for inputs and outputs

DEFAULT SETTINGS - DIGITAL INPUTS (FROM Table 9.2 on page 71)		
Feature	Default	Other Options
LABEL	INPUT_09 - INPUT_24	Any name (up to eight characters)
NORM OPEN/CLOSE	NO (Normally open)	NC (Normally closed)
ALARM/EVENT	AL (Alarmable)	EV (Event)
LATCHED	NL (Unlatched) / N (No)*	L (Latched) / Y (Yes)*
DELAY	00:01 (1 second)	Any time (in minutes and seconds) from 00:00 to 99:59
* NOTE: Different abbreviations are used to designate a digital input as Latched or Unlatched.		
DEFAULT MAPPING OF DIGITAL INPUTS TO DIGITAL OUTPUTS (FROM Table 9.4 on page 81)		
Digital input	By default, mapped to digital output:	
Input_09	(none)	
Input_10	(none)	
Input_11	(none)	
. . .	(none)	
Input_24	(none)	
NOTE: By default, no Expansion Board inputs are mapped to any outputs.		
DEFAULT SETTINGS - DIGITAL OUTPUTS (FROM Table 9.6 on page 83)		
Feature	Default	Other Options
LABEL	OUTPUT09 - OUTPUT16	Any name (up to eight characters)

Table B.4 Expansion Board - other default settings

CONNECTION TO UNIVERSAL MONITOR (see Setup Exp Board - Optional Expansion Board on page 101)		
Feature	Default	Other Options
SETUP EXP BOARD (IS THE EXPANSION BOARD CONNECTED?)	N (Not connected)	Y (Connected)
DIP SWITCH SETTINGS		
Feature	Default	Other Options
S1 Digital output DIP switches	Off (NO - Normally Open)	On (NC - Normally Closed)
OTHER SWITCH SETTINGS		
Feature	Default For all switches: 1 = ON, 0 = OFF	Other Options
SW1 (factory configured)	11111111	—
SW2 (factory configured)	11111111	—
SW3 (factory configured)	10000100	—
SW4 (factory configured)	10000100	—
JUMPER SETTINGS		
Feature	Default	Other Options
JP2 (factory configured)	Left two pins jumpered	—
JP3 (factory configured)	Left two pins jumpered	—
JP4 (factory configured)	Left two pins jumpered	—
JP5 (factory configured)	Bottom two pins jumpered	—

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