



# Liebert® SiteLink-E™

SiteLink-2E, SiteLink-4E, and SiteLink-12E

Installation 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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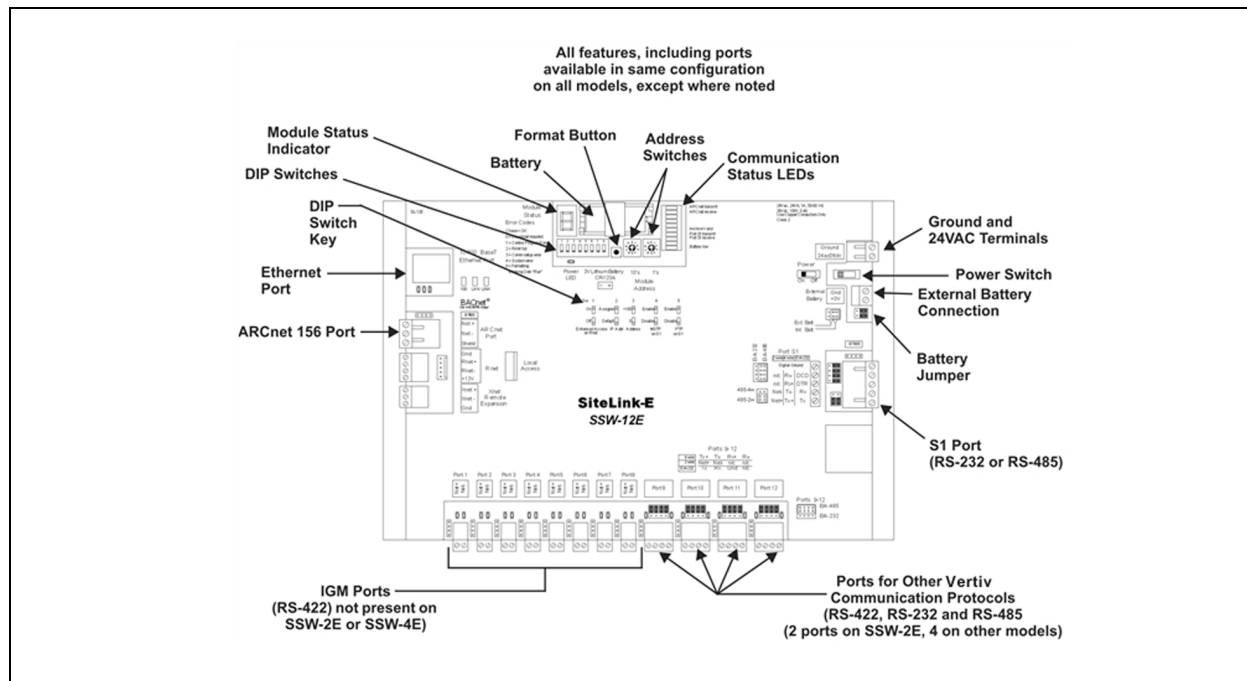


# 1 PRODUCT OVERVIEW

The Liebert SiteLink-E™ interface module is a BACnet router that provides the communications link between Liebert units and other protocols and modules. The Liebert SiteLink-E module communicates with Liebert equipment such as environmental units, UPSs, frequency converters and power distribution units.

See Figure 1.1 below for port locations. The Vertiv™ ports, Ports 1 to 12, support IGM, Velocity, ASCII, and Hironet (RS-485). Ports 9 to 12 may be RS-484 or RS-232.

**Figure 1.1 Liebert SiteLink-E layout—power and communication connections, ports and switches**



**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 that the user alone must correct.

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## 2 INSTALLING THE LIEBERT SITELINK-E MODULE

The Liebert SiteLink-E module comes in an enclosure for mounting on the wall or floor.

### 2.1 Preparations for Mounting the Module

#### 2.1.1 Choose a Location to Install the Liebert SiteLink-E

The Liebert SiteLink-E module's installation location must be easily accessible, within the allowable cable-run distances for communication wiring and have about 2 in. (51mm) on all sides for wiring and service.

- Refer to the following drawings in [Enclosure Diagrams](#) below:

[Enclosure dimensions—overall](#) on the next page

[Enclosure dimensions—Wall mount](#) on the next page

[Enclosure dimensions—Floor mount](#) on page 9

### 2.2 Enclosure Diagrams

Figure 2.1 Module dimensions, without enclosure

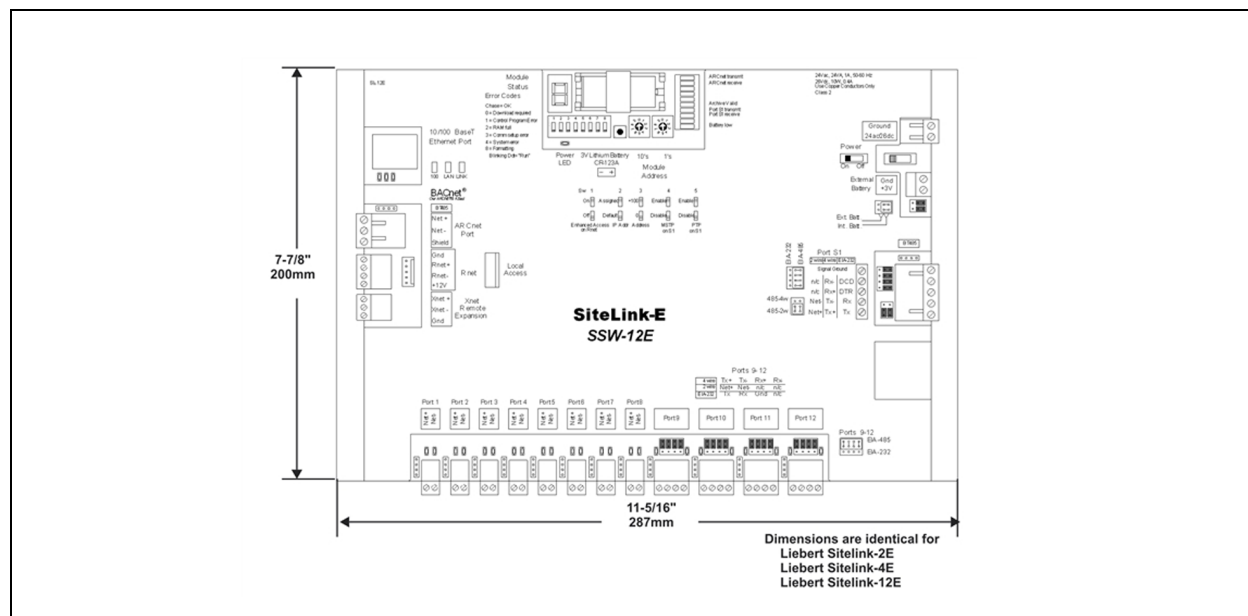
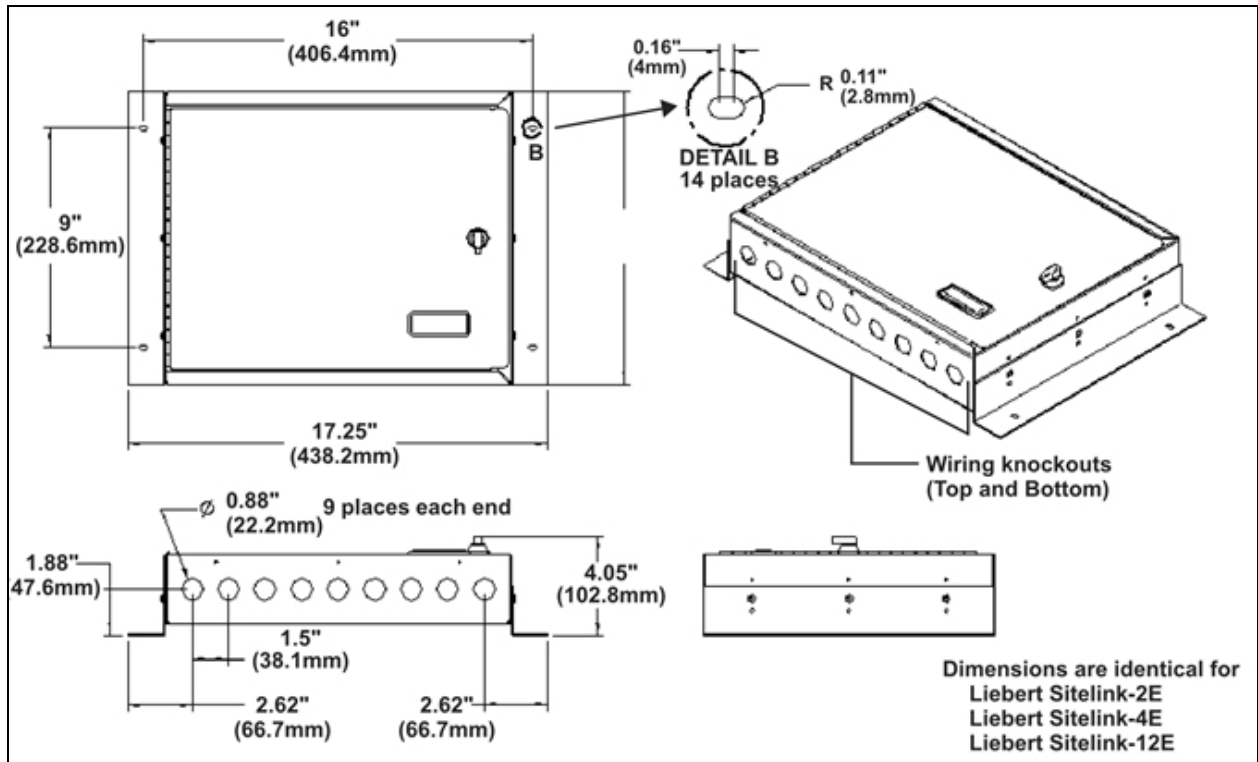






Figure 2.4 Enclosure dimensions—Floor mount



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## 3 CONNECT INPUT POWER WIRING

### 3.1 Power Wiring



**WARNING!** Risk of electric shock. Can cause injury or death. Disconnect all local and remote electric power supplies before working within. The Liebert SiteLink-E unit must be connected by a licensed and qualified electrician only. Ensure that the unit is electrically isolated for the duration of the connection operation and is secured against unauthorized startup.



**CAUTION:** Do NOT turn the module On. Turning the module On before it is checked and approved by a properly trained and qualified specialist may void the warranty. The module should be turned on by a factory-trained specialist only.

The Liebert SiteLink-E module is a Class 2 device (less than 30VAC, 0.4A). Take appropriate isolation measures when mounting the Liebert SiteLink-E module in a control panel where non-Class 2 devices (120VAC or greater) or wiring are present.

Several modules may be powered from the same transformer if:

- the modules have the same polarity
- the transformer's power rating is at least 20% greater than needed for the modules  
For example, if the transformer is rated for 50VA and two modules, each rated at 20VA, are connected, the power trunk uses a recommended 80% of the transformer's power ( $20+20=40$ ).

#### 3.1.1 Input Power Requirements

The Liebert SiteLink-E is available in 50Hz and 60Hz models. The unit has an operating range of 21.6VAC to 26.4VAC. If voltage measured at the module's power input terminals is outside this range, the module may not work properly.

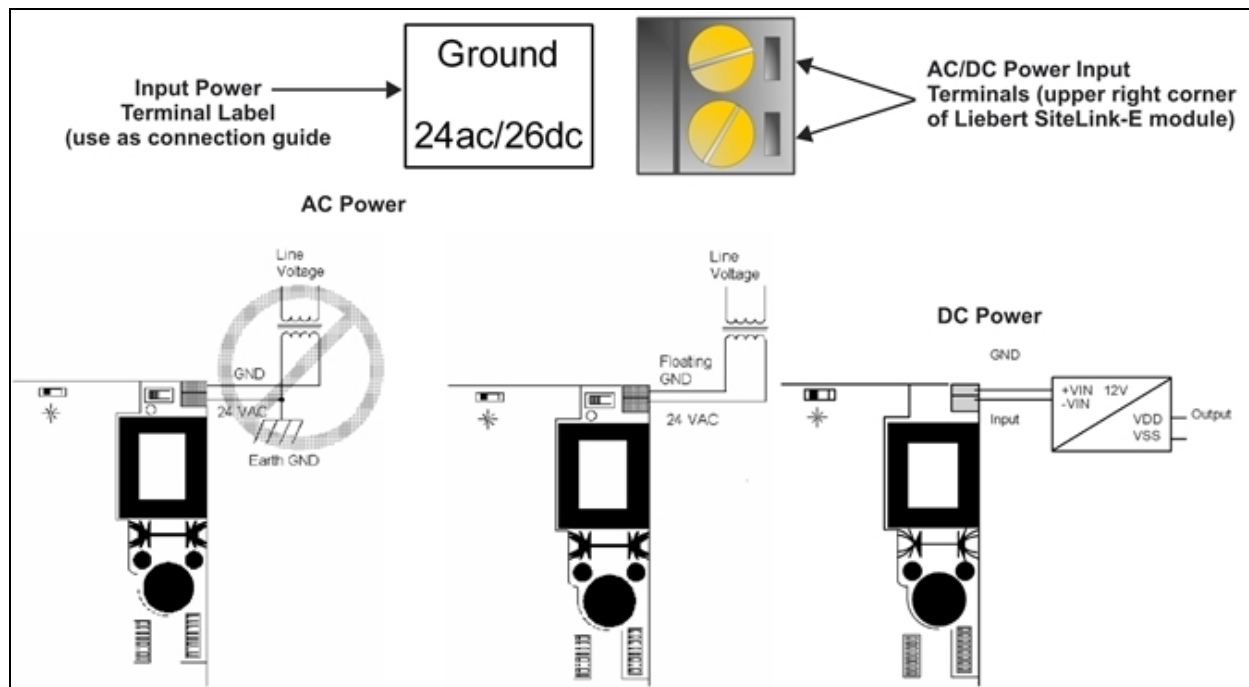
### 3.2 Connect Input Power—AC or DC

Liebert SiteLink-E modules may be powered with either alternating current or direct current within the operating range of 21.6-26.4 volts. The input power terminals are in the upper right corner of the module (see Figure 1.1 on page 5 for location).

1. Turn the Liebert SiteLink-E module's power switch Off.  
This prevents the module from being powered up before the wiring is completed and the proper voltage is verified.
2. Make sure the 24VAC power source is Off.
3. Pull the screw terminal connector from the control module's power terminals labeled 24VAC/DC and Gnd.
4. Connect the transformer wires to the screw terminal connector (see Figure 3.1 on the next page).
5. Apply power to the power supply.

6. Measure the voltage at the Liebert SiteLink-E's power input terminals to verify that the voltage is within the operating range of 21.6-26.4 VAC.
7. Insert the screw terminal connector into the Liebert SiteLink-E's power terminals.

Figure 3.1 Power connections



## 4 COMMUNICATION AND CONTROL WIRING

### NOTICE

Communication wiring must be performed in accordance with industry standards. All methods, wiring and connections must comply with local and national codes.

Communication cables must not be kinked or otherwise damaged during installation. Kinked cables must be replaced.

Communication cables must be properly supported every four feet (1.2m) or less.

### 4.1 IGM Communication

Liebert SiteLink-E uses the Information Gathering Module Network protocol to communicate to other Liebert units over the RS-422 protocol. IGM is a point-to-point protocol, where one device connects directly to another and only those two devices communicate with each other.

**NOTE: If shielded cable is used, connect the shield wire to earth (ground) at the Liebert equipment. Do not ground the shield at the Liebert SiteLink-E.**

Liebert SiteLink-E modules have up to 12 IGM ports, depending on the model. The ports are along the bottom of the module (see Figure 1.1 on page 5).

#### 4.1.1 Wiring IGM Ports

1. Connect the IGM wiring to the SiteLink-E IGM ports, using the labels above the ports as a guide (see Figure 4.1 below).
2. If using a four-wire connection, set the jumpers, located behind the terminals, as required for the protocol to be implemented. A guide is at the lower right corner of the module's housing.

Figure 4.1 IGM connections

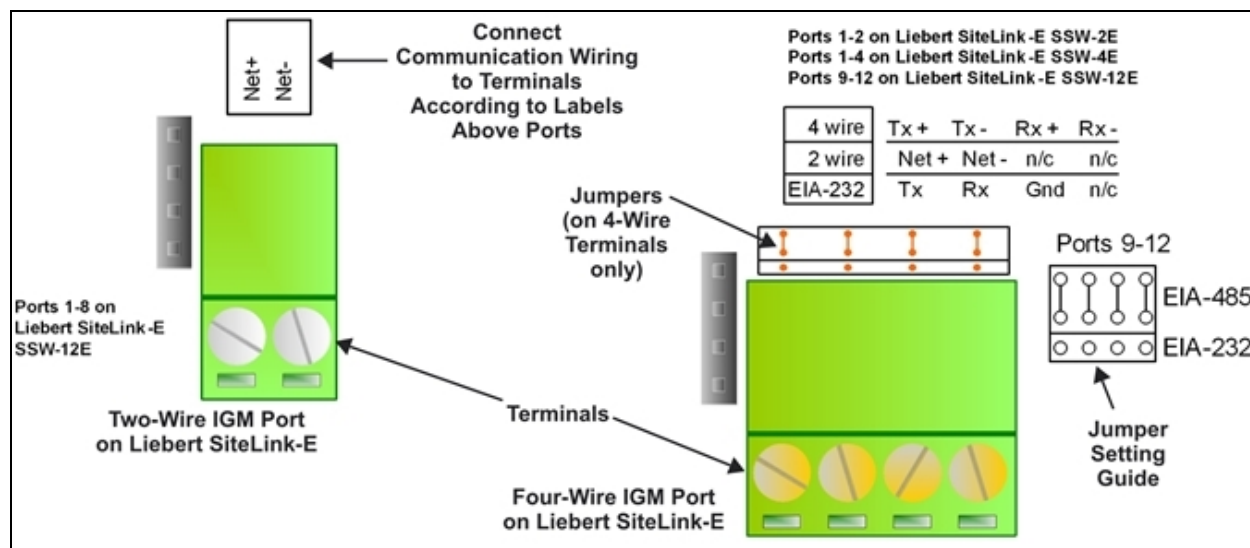
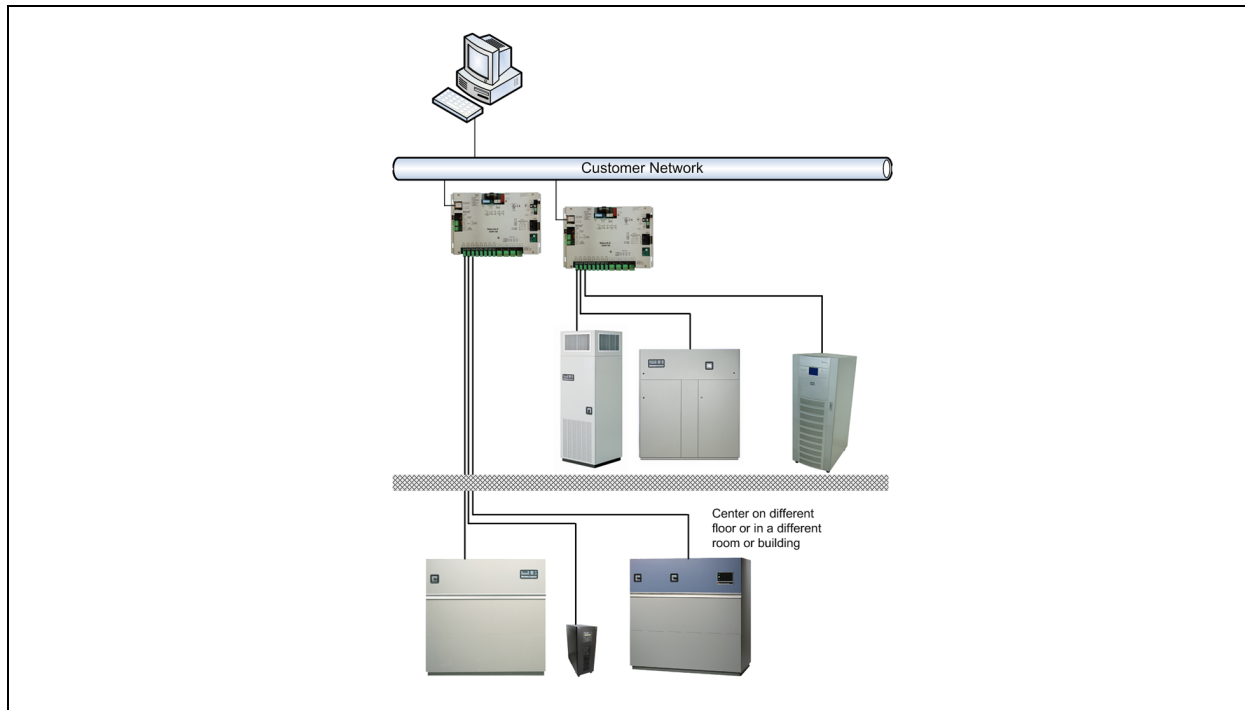


Figure 4.2 Liebert precision cooling units networked with Liebert SiteLink-E modules



## 4.2 RS-485 and ARC156 Wiring Considerations

An RS-485 network is intended to be configured as a linear bus with daisy-chained connections (star topologies are not recommended). Termination in RS-485 and ARC156 setups is usually applied to both ends of the network (see [Wiring Port S1 for RS-485 Network—Four-Wire](#) on page 16).

Repeaters often are required when connecting 32 or more RS-485 or ARC156 devices or when using ARC156 cable segments longer than 2000 feet. Refer to the BMS documentation for information on when to use repeaters.

To reduce communication and data errors, terminate each end of the network with a resistor whose value equals the network's characteristic impedance. Some third-party manufacturers provide a built-in resistor that you enable or disable with a jumper. Make sure that only devices at the end of a network have termination enabled.

**EXAMPLE:** If the network's characteristic impedance is 120 Ohms, terminate the network by placing a 120 Ohm resistor across the Net+ and Net- connectors of the Liebert SiteLink-E and a 120 Ohm resistor across the + and - connectors of the furthest third-party device.

Bias must be applied to each RS-485 network segment. To add bias to a network segment, put the bias jumper in place on the DIAG485 that is in the middle of the segment. You can use additional DIAG485s with the bias jumper removed to monitor network communication, but only one DIAG485 may have the bias jumper in place.

### 4.3 Wiring for BACnet/ARC156 Network

Network Liebert SiteLink-E modules to other Liebert Site Scan modules using the ARCnet port. Set the baud rate to 156 Kbps for all modules connected to the ARCnet156 network.

**NOTE: Use the same polarity throughout the network segment.**

1. Be sure the module's power is Off before beginning to connect wiring for the ARCnet port.
2. Check the network communication wiring for shorts and grounds.
3. Locate the BACnet terminal location in the upper left corner of the Liebert SiteLink-E module (see Figure 1.1 on page 5).
4. Connect the communication wiring to the control module's screw terminals labeled Net +, Net - and Shield using the labels near the ARCnet port as a guide. For details, see Figure 4.3 below.

**Figure 4.3 BACnet/ARC156 Network port**

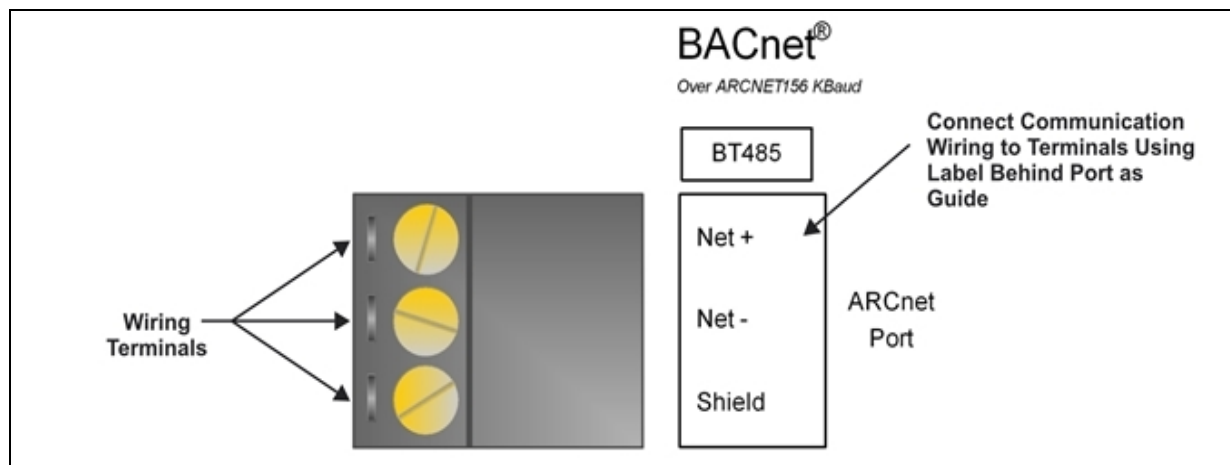
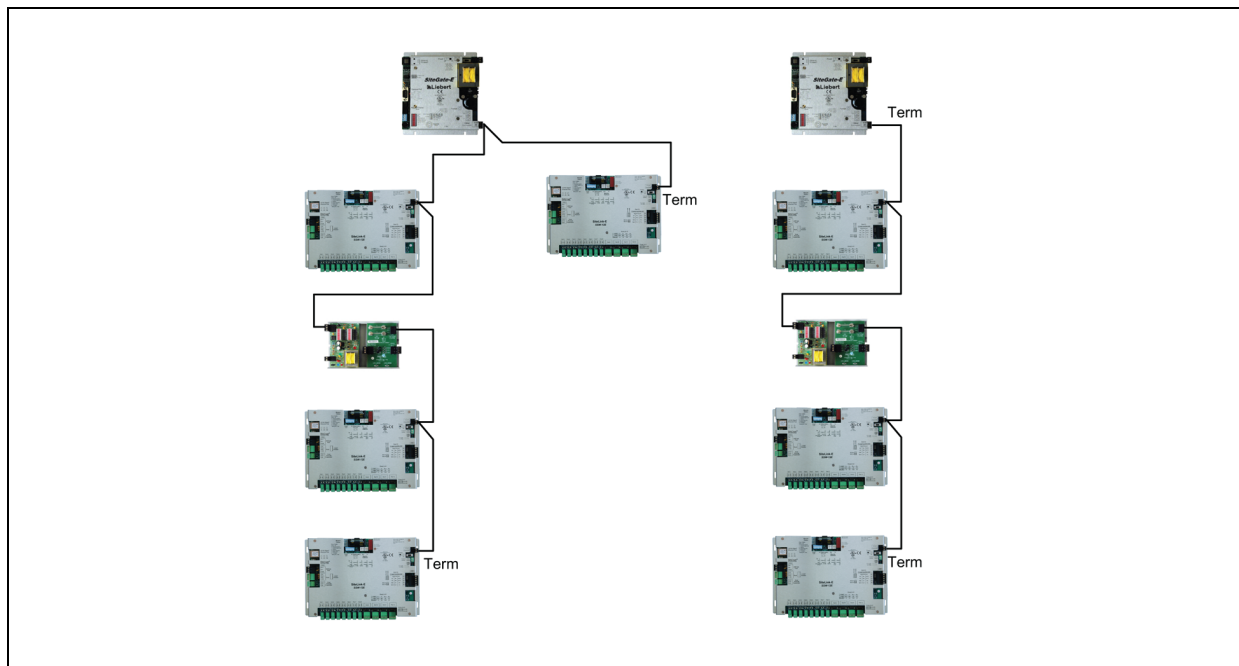


Figure 4.4 Liebert SiteLink-E modules in ARCnet network



## 4.4 Wiring Port S1

Port S1 on the Liebert SiteLink-E accommodates these connection types:

- RS-485 four-wire
- RS-485 two-wire
- RS-232

These ports and protocols enable connection to Liebert equipment or to third-party devices, such as a Building Management System.

### 4.4.1 Wiring Port S1 for RS-485 Network—Four-Wire

**NOTE:** Use the same polarity throughout the network segment. The baud rate of the control module's port must match the baud rate of the third party device. The baud rate may be set in the module driver properties in Liebert SiteScan™ Web. See the Integration Guide for the third-party protocol.

1. Be sure that power to the Liebert SiteLink-E is Off before beginning to connect wiring.
2. Check the communication wiring for shorts and grounds.
3. Wire the Liebert SiteLink-E to the third-party device, using the labels near the Port S1 as a guide (see Figure 4.5 on page 18 for details).
4. Set the RS-232 or RS-485 jumper to RS-485.
5. Set the MS/TP on S1 DIP switch to Enable (On).
6. Set the PTP on S1 DIP switch to Disable (Off).

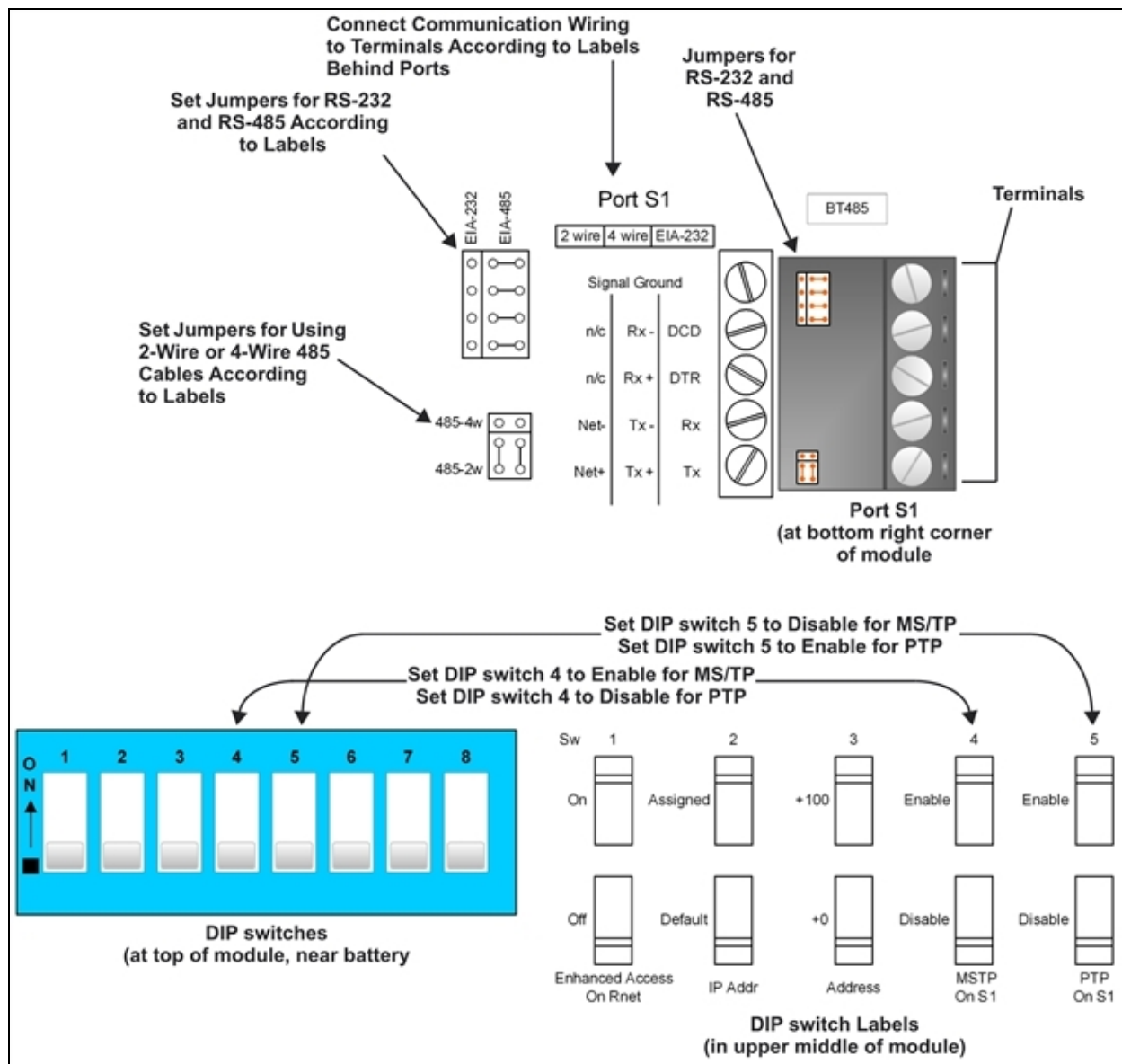


#### 4.4.2 Wiring Port S1 for RS-485—Two-Wire

For connecting the Liebert SiteLink-E Port S1 to a BMS that uses two-wire RS-485:

- Liebert recommends using shielded, 18-24AWG twisted pair wiring.
  - The distance from the Liebert SiteLink-E module to the first RS-485 device depends on the communications baud rate. This distance seldom should exceed 3,000 ft. (914.4m) at 9600 baud.
1. Be sure that power to the Liebert SiteLink-E is Off before beginning to connect wiring.
  2. Check the communication wiring for shorts and grounds.
  3. Wire the Liebert SiteLink-E to the third-party device, using the labels near Port S1 as a guide (see Figure 4.5 on the next page for details).
  4. Set the RS-232 or RS-485 jumper to RS-485.
  5. Set the MS/TP on S1 DIP switch to Enable (On).
  6. Set the PTP on S1 DIP switch to Disable (Off).

Figure 4.5 Port S1 jumpers and DIP switches



### 4.4.3 Wiring Port S1 for RS-232

**NOTE:** Use the same polarity throughout the network segment. Use the same baud rate for all control modules on the network segment.

When connecting the Liebert SiteLink-E Port S1 to a third-party device that uses RS-232:

- Liebert recommends using 18-28AWG wiring.
- Most RS-232 cables are not twisted pair, but twisted-pair wiring is acceptable.
- The distance from the Liebert SiteLink-E to the RS-232 BMS interface should not exceed 50 ft. (15.2m).

To connect a third-party, RS-232 device to Port S1:

1. Be sure that power to the Liebert SiteLink-E module is Off before beginning to connect wiring.
2. Check the communication wiring for shorts and grounds.
3. Set the RS-232 or RS-485 jumper to RS-232.

Refer to Figure 4.5 on the previous page and to the labels on the Liebert SiteLink-E housing.

4. Connect the communication wiring to the control module's screw terminals labeled Tx, Rx, and Signal Ground on Port S1, and jumper the DTR and DCD terminals.

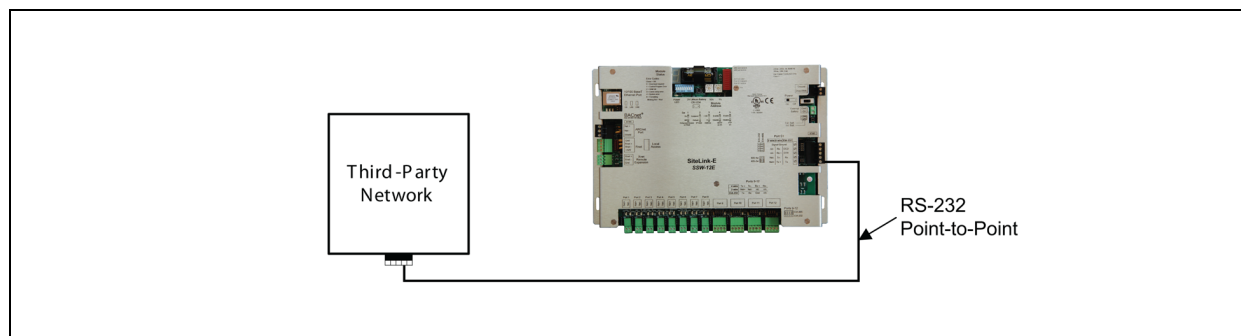
Refer to Figure 4.5 on the previous page and to the labels on the Liebert SiteLink-E housing.

5. Set the MS/TP on S1 DIP switch 4 to Disable (Off).

The DIP switches are at the top of the Liebert SiteLink-E module, near the battery; see Figure 1.1 on page 5 for the DIP switch location and Figure 4.5 on the previous page for setting positions.

6. Set the PTP on S1 DIP switch 5 to Enable (On).

**Figure 4.6 RS-232 connection to Port S1**

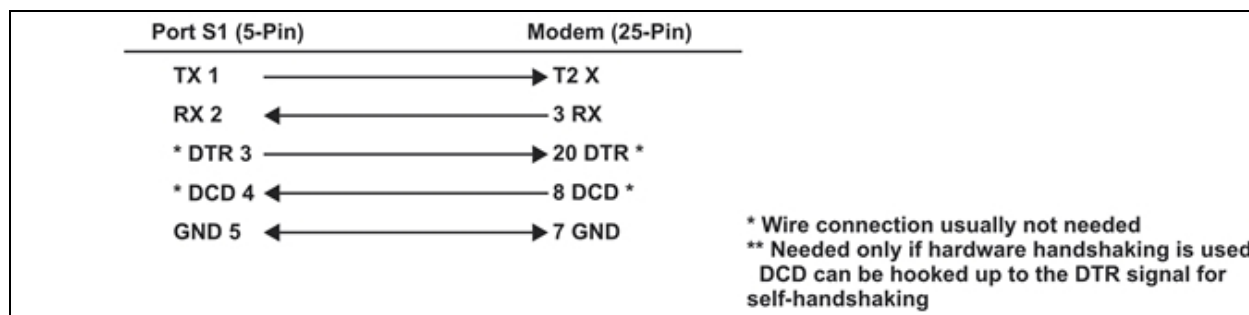


#### 4.5 Wiring a Modem for Half-Router Communication—Port S1

1. Turn Off power to the Liebert SiteLink-E.
2. Connect the modem to Port S1 using a standard modem cable connected to an S2-DB9 adapter, available from Liebert, or a cable made using the wiring diagram in Figure 4.7 below.
3. Set the PTP on S1 DIP switch to Enable (ON).

Refer to Figure 4.5 on the previous page for determining the wiring connections.

**Figure 4.7 Fabricated cable for modem in half-router communication**



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## 5 SPECIFICATIONS

Table 5.1 Specifications

<b>PHYSICAL</b>	
Module Dimensions, W x H x D, in. (mm)	11-1/4 x 7-1/2 x 1-1/4 (286 x 191 x 32)
Enclosure Dimensions, W x H x D, in. (mm)	14-1/4 x 12 x 3-9/16 (362 x 305 x 90)
Recommended Panel Depth, in. (mm)	2-3/4 (70)
Weight, Module Only, lb. (kg)	1.4 (0.64 kg)
Input Power	24 VAC ±10%, 50–60 Hz, 24 VA 26 VDC ±10%, 10W
Environmental Operating Range	-20 to 140°F (-29 to 60°C), 10–90% RH non-condensing
<b>BATTERY</b>	
Type	10-year Lithium CR123A
Life	720 hours data retention maximum
<b>SYSTEM FEATURES</b>	
Microprocessor	32-bit Motorola Power PC microprocessor with cache memory, Fast Ethernet controller, high performance 32-bit communication co-processor, ARCNET communication co-processor, and I/O expansion CAN co-processor
Memory	16Mb non-volatile battery-backed RAM (12Mb available for use) 8Mb Flash memory, 32-bit memory bus
Clock	Real-time clock, battery backup in case of power failure
<b>AGENCY</b>	
BACnet Support	Conforms to the Advanced Application Controller (B-AAC) Standard Device Profile, ANSI/ASHRAE Standard 135-2004 (BACnet) Annex L
Listings	UL-916 (PAZX); cUL-916 (PAZX7); FCC Part 15-Subpart B-Class A

The Liebert SiteLink-E communicates using BACnet and/or third-party protocols, and can connect to a variety of port types at multiple baud rates. See Table 5.2 below.

**Table 5.2 Communication ports, protocols and settings**

Port	Protocol	Port Type(s)	Baud Rate(s)	Maximum Cable Length, ft (m)
Ethernet Port	BACnet/IP Modbus/IP SNMP v1 <b>NOTE:</b> Most protocols can run simultaneously. There may be exceptions depending on the protocols selected, particularly on the 12-port configuration.	Ethernet	10 Mbps 100 Mbps	328 (100)
BACnet	BACnet/ARC156 <sup>1</sup>	RS-485 (two-wire)	156 kbps	2000 (610)
S1 <sup>2</sup>	BACnet MS/TP	RS-485 (two-wire)	9600 bps 19.2 kbps 38.4 kbps 76.8 kbps (default)	3000 (914.4) for 9600 baud
	Third-party	RS-232	Various	50 (15.24)
		RS-485 (two-wire)		3000 (914.4) for 9600 baud
		RS-422 (RS-485 four-wire)		
BACnet PTP	RS-232	9600 bps 19.2 kbps 38.4 kbps (default) 57.6 kbps 115.2 kbps	50 (15.24)	
Ports 1-8	IGM	RS-485	7812 bps	3000 (914.4)
	Velocity	RS-485	38,400 bps	3000 (914.4)
	ASCII			
	Hironet	RS-485	19,200 bps	3000 (914.4)
Ports 9-12	IGM	RS-422	7812 bps	1000 (300)
	IGM	RS-232	7812 bps	50 (15.24)
	Velocity	RS-485	38,400 bps	3000 (914.4)
	ASCII			
	Hironet	RS-485	19,200 bps	3000 (914.4)
Local Access	Enhanced Access	Rnet	115.2 kbps	3 (.914)

1. ARC156 is a unique implementation of the industry standard ARCNET.  
2. Port S1 supports only one protocol and one wire type at a time.

## APPENDICES

### Appendix A: Communication Protocol and Wiring Considerations

#### A.1 Differences Between RS-485 and RS-422

Third-party manufacturers sometimes specify a device as either RS-485 or RS-422.

RS-485 and RS-422 terminology is interchangeable, but there is at least one wiring difference: Each can have two-wire or four-wire connections, but an RS-422 connection needs four wires for two-way communication.

An RS-422 four-wire network actually consists of two RS-422 two-wire, one-directional networks communicating between the same devices.

The one-directional networks must be used because an RS-422 transmitter cannot turn off automatically after transmission. An RS-422 transmitter that is On—even when not sending data—will prevent another transmitter from effectively sending data.

An RS-485 transmitter, by contrast, can turn On and Off between transmissions. This makes a two-wire connection preferable for many reasons, including the fact that two-wire networking allows for daisy-chaining with no need to designate any devices as master, as four-wire requires.

The only advantage of four-wire over two-wire is that four-wire allows full duplex communications. However, few protocols need full duplex communications, meaning there is little practical reason to run four-wire RS-485. There are voltage and driver load differences between RS-485 and RS-422, but the differences are negligible in normal use.

Liebert recommends using a two-wire connection **unless**:

- you are communicating with a device that uses RS-422 or
- the third-party device does not support two-wire RS-485.

Use of the two terms—RS-422 and RS-485—can be confusing in engineering drawings. When drawings include Liebert SiteLink-E wiring details, Liebert suggests labeling any occurrences of RS-422 as “RS-422 (RS-485 four-wire).”

## A.2 Termination

You can reduce reflections that cause communication and data errors on RS-485/RS-422 networks by terminating a data cable with a value equal to its characteristic impedance. Although termination is often unnecessary on networks where the baud rates are slow or the cables are short, termination becomes important as the baud rate increases.

Resistors acting as terminators typically have 120-130 ohms, although twisted-pair cable impedances can be as low as 100 ohms. Liebert recommends 120 ohm terminating resistors on RS-485/RS-422 networks. You must apply a value that closely matches the cable impedance as near as possible to the ends of the network segment.

**NOTE: Some third-party manufacturers provide a resistor within a device, using a jumper to disable the termination option if termination is not required. If you are using one of these devices, make sure that only devices that require termination are set to have termination.**

## A.3 Bias

Data collisions occur when two devices enable their transmitters at the same time; these are likely to occur on RS-485/RS-422 networks. A master/slave protocol has one master and many slaves. The slaves are always listening and respond only when they hear their address in the master's request for information. When the master is not transmitting, the network will float, enabling noise to falsely trigger one of the slaves' receivers, since the receiver's output is undefined when the receiver's input voltage is between 200mV and -200mV (known as the **undefined state**).

You can apply bias to the network to ensure that the network assumes a defined state even when all device transmitters are off.

When bias is used with terminators, the float network state's voltage exceeds 200mV. This means that:

- The receivers are biased in the **mark state** (OFF, logic 1) when the network is idle or when the transmitter sends a logic 1.
- During the transmission of a logic 0 (less than -200mV), the network will be in the **space state** (ON, logic 0).

Liebert's DIAG boards can serve as bias on RS-485/RS-422 networks. Apply bias in the middle of the network, and apply termination only at the two end devices.







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