Alber Universal Xplorer Industrial Monitor (UXIM) Battery Monitor

Installation Guide

Vertiv Corporation
1050 Dearborn Drive
Columbus, OH 43085
Tel: (954) 377-7101
www.vertivco.com
590-2108-501A/SL-29423/4200-106

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Vertiv Customer Service

Vertiv Customer Service is available Monday to Friday, 8:00AM to 4:30PM Eastern Time.

Telephone: (954) 377-7101

Email: alber-service@vertivco.com

Website: www.vertivco.com

Corporate Office Address:

Vertiv Corporation

1050 Dearborn Drive

Columbus, OH 43085 USA

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1. Safety Information

1.1 General

The protective features of this product may be compromised if it is used in a manner not specified in this guide and/or related operation or installation instructions. This manual describes general installation of the system. If the system has features or accessories not described in this manual, contact Vertiv.

The following general safety precautions must be observed during all phases of operation, service, and repair of this product. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the product. Vertiv assumes no liability for the customer's failure to comply with these requirements.

Note	• Use safety equipment when working in and around the batteries. • Never energize the UXIM until after the installation is complete. • Never exceed equipment voltage, power ratings or capabilities.

1.2 Document Symbols

The symbols below appear in this manual or are affixed to the Vertiv device. It is important to review these symbols and to understand the type of instructional information they convey.

Warning	**Highlights areas related to user safety.** Calls attention to a procedure, practice, or condition which, if not correctly followed, could result in personal injury. Do not proceed beyond a WARNING symbol until the indicated conditions are fully understood and met. Always observe safety information when installing, setting up or operating this product.
Caution	**Highlights areas related to product or data safety.** Calls attention to an operating procedure or condition which, if not correctly followed, could result in damage to the product or permanent loss of data. Do not proceed beyond a CAUTION symbol until the indicated conditions are fully understood and met.
Note	**The Note symbol calls attention to important information.** Describes additional information to help the user.

1.3 Safety Symbols

The following symbols may appear on the system or individual equipment.

	Important Information; refer to this guide.
	Functional earth terminal.

1.4 Product Safety Practices

The following describe safety practices particular to the installation or operation of the product.

Equipment Service

Proper installation and testing are essential to the correct functioning of the system. If you have questions, contact Vertiv and request monitor assistance. Except as explained in this manual, do not attempt to service Vertiv equipment.

Any adjustment, maintenance or repair of this product must be performed by qualified personnel. Contact a Vertiv customer service engineer and request assistance. Only qualified and trained personnel may perform the operations described in this manual. All safety information must be read, understood, and strictly adhered to before installing, powering up or using the equipment or software (the "system".)

Equipment Operation

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired. Refer to this manual for the correct connection and usage of this equipment.

Fuses

For continued protection, fuses with the required rated current, voltage, and type, such as normal, slow blow, fast blow or time delay, must be used.

Equipment Access

Operating personnel must not remove equipment covers, shields or panels. Component repair, replacement, and internal adjustments must be made only by qualified service personnel.

Operating Damaged Equipment

Do not operate damaged equipment. Equipment that appears damaged or defective must be made inoperative and secured against unintended operation until repaired by qualified service personnel. Whenever it is possible that the safety protection features built into this product have been impaired, either through physical damage, excessive moisture or any other reason, remove power and do not use the product until safe operation can be verified by qualified service personnel. If necessary, contact Vertiv to ensure the safety features are maintained.

Servicing and Adjusting

Do not service or adjust alone. While in the battery circuit, do not attempt internal service or adjustment of this equipment unless another person, capable of calling for or rendering first aid and resuscitation, is present.

Substituting Parts or Modifying Equipment

Do not substitute parts or modify equipment. Due to the possibility of introducing additional hazards, do not substitute parts or perform any unauthorized modification to the product. If necessary, contact Vertiv to ensure the safety features are maintained.

Insulation Rating For Wires

Use only wire supplied with the installation kit.

Ventilation

Never block equipment ventilation ports or openings. The equipment must have adequate ventilation to prevent overheating. Ensure equipment is operated within specified temperature and humidity ranges.

2. Preventive Maintenance

This section describes preventive maintenance for the UXIM system.

2.1 Visual Inspection

Visually inspect all monitor system components for damaged or frayed power cords and cables and for damaged component panels, controls, and connectors. When damage is detected, remove the equipment from service until the damage is repaired.

2.2 System Component Cleaning

Clean system components using a soft cloth. Do not use commercial or industrial cleaners that may attack the computer display and housing. Never expose the computer or system components to water, high humidity or dampness.

 **Warning**: Before cleaning equipment, ensure the system is disconnected and power to the units has been shut off. You must disconnect the system components and the monitor system cabinet, if a cabinet is being used, from AC and/or DC power sources.

2.3 Sense Lead and Ring Terminal Cleaning

On some applications, cleaning the sense leads where they connect to the battery may be necessary. This is normally needed when monitoring flooded batteries because electrolyte can drip or splash onto the sense lead connections. Sense leads exposed to electrolyte must be neutralized. Follow the battery manufactures recommendations for cleaning battery connections.

2.4 Internal Component Replacement

The monitor system has no user replaceable components. Since high voltage exists in most of the system components, only knowledgeable users should remove the covers from components. Failure to comply with this restriction could pose a safety hazard and/or void the product warranty.

3. System Overview

The Universal Xplorer Industrial Monitor (UXIM) is a stationary battery monitor designed for use in Industrial or Utility applications. With standard configurations specifically designed for Utility Substations, make it ideal for NERC compliancy. Each monitor is considered a stand-alone system, in that no external computer is required for normal operation with standard provisions to integrate to customer owned Building Management or Enterprise Systems.

Complete and comprehensive remote monitoring capabilities include features you expect.

- Remote access via Ethernet or RS-485 using industry standard protocols such as Modbus or SNMP for simple BMS integration.
- Embedded Web servers permit Web browsing from any PC on the network for quick real-time battery viewing to inspect data in easy to interpret graphical views for all cell and string level parameters, active monitor status and state of active or latched alarms.
- Embedded email clients for alarm notifications and data delivery of battery parameters (XML format) with priority handling of message sent to responsible service technicians.
- Local service port USB connectivity to view and analyze battery systems using laptop computers.

With the UXIM, all your battery parameters are measured and constantly monitored against user defined thresholds. And what sets Vertiv monitors apart from others is the ability to provide early warning of potential battery problems by performing a proactive, patented resistance test, a proven technology to reliably predict battery performance. To complement the proactive resistance test, other parameters monitored to ensure optimal battery performance and battery life are as follows:

- Cell Level Measurements
    - Individual Cell Resistance
    - Individual Cell Voltage
    - Individual Intercell Resistance
    - Electrolyte Level (Optional)
- System Level Measurements
    - Overall Volts
    - String current (Discharge/Float)
    - Ripple Current
    - Ambient Temperatures
    - Charger Cable Resistance
    - Ground Fault Currents

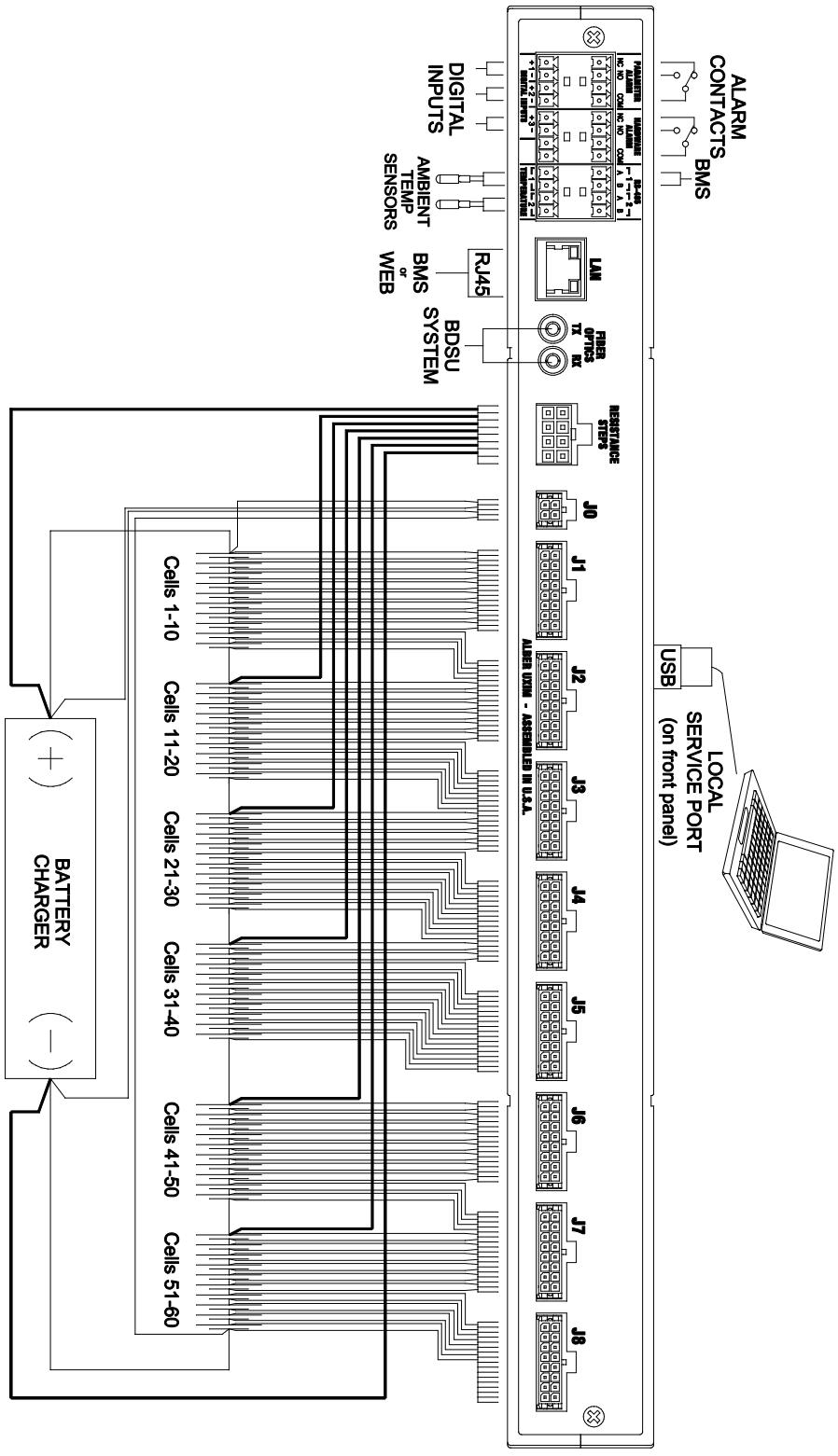


Figure 1 - Typical System Connection

4. System Installation

Note: The UXIM must be installed in a restricted access location.

UXIM installation requires nothing more than standard hand tools, cutters, strippers and screwdrivers. If the unit is to be wall mounted, a drill will also be required.

The following is a list of the steps required for successful UXIM system installation. Some items may not apply due to system requirements.

Installation Task	Refer to Section
Verify materials ordered and received	Materials Received List, page 5-1
Items to consider before system installation	System Installation Considerations, page 6-1
Isolate the battery string	Battery String Isolation, page 6-1
Identify cell/monobloc Number 1	Cell Number 1 Identification, page 6-1
Properly install the tab washers	Installation of Tab Washers, page 7-1
Configure the unit	Unit Configuration, page 8-1
Mount the equipment	Equipment Mounting, page 9-1
Connect the sense lead harnessing	Sense Lead Harness Connection, page 10-1
Connect the fused load lead harnessing	Fused Resistance Load Lead Harness Connection, page 11-1
Connect the ambient temperature sensor	Charger Cable Resistance Reading Connection, page 12-1
Connect the digital inputs if applicable	Digital Inputs Connection, page 14-1
Connect RS-485 communications if applicable	RS-485 Communication Connection, page 15-1
Connect the fiber optic interface if applicable	Fiber Optic Communication Connection, page 16-1
Connect the Network communications if applicable	Network Communication Connection, page 17-1
Connect the alarm contacts if applicable	Parameter Alarm Connection, page 18-1
Connect the Hardware alarm contacts if applicable	Hardware Alarm Connection, page 19-1

Table 1 - Installation Task List

5. Materials Received List

The following is a list of material that may have been received with your shipment. Refer to the packing slip delivered with the equipment for a complete list of materials supplied. Vertiv suggests you inventory all materials to ensure the order is complete. Report any shortages to Vertiv immediately.

The model number is in the format of PPPP-COB, where PPPP is 1010 and C, O, and B are described below.

PPPP–	C	O	B	Description	Choices
1010	C			Communications	0 = RS-485 Only 1 = Network 2 = Fiber Optic 3 = Network and Fiber Optic
1010		O		Options	0 = None 1–9 = Reserved
1010			B	Branding	0 = OEM 1–9 = Reserved

Table 2 - Model Number Description

Part Number	Photo/Drawing	Description
1010-### ###= (options)		UXIM Battery Monitor module One module per system
1102-550-25 1102-550-50 1102-550-75 1102-550-100		25’, 50’, 75’ or 100’ Pulsed Load Lead harness One pulsed load lead harness per system

Materials Received List (continued)

Part Number	Photo/Drawing	Description
1102-553-25 1102-553-50 1102-553-75 1102-553-100 1102-554-25 1102-554-50 1102-554-75 1102-554-100 (Optional)	 	25’, 50’, 75’ or 100’ Single Ambient Temperature Sensor harness One single ambient Temperature sensor harness per system Or optionally, a double ambient temperature sensor can be ordered. Contact your Vertiv Sales representative for details. 25’, 50’, 75’ or 100’ Double Ambient Temperature Sensor harness (optional) One ambient temperature sensor per system
1102-560-25 1102-560-50 1102-560-75 1102-560-100		25’, 50’, 75’ or 100’ Sense Lead harness Eight sense lead harnesses per system
2025-108		USB cable One USB cable per system
1102-551		Fused Load Lead assembly Seven fused load lead harnesses per system
4301-015		Fuse, 15A Slo-Blo (MDA-15-R) Seven 15A Slo-Blo fuses per system
1102-552-25 1102-552-50 1102-552-75 1102-552-100		25’, 50’, 75’ or 100’ Charger Sense Lead harness One charger sense lead harness per system

Materials Received List (continued)

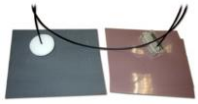
Part Number	Photo/Drawing	Description
1102-555		10K 0.1% Resistor Sense Lead Assembly 136 resistor sense leads per system
2120-164		Single Tab Washer (5/16”) 140 tab washers per system
2027-029		UXIM Configurator Software installation CD
KIT 1400-531		Flush mounting kit (Optional) Contact your Vertiv Sales representative for details.
3703–006		25’ Fiber Optic Cable Communication link between units
KIT-3703-015		Fiber Optic Polishing Kit The kit provides the user with polishing materials to terminate the ends of plastic optical fiber correctly.

Table 3 - Inventory List

6. System Installation Considerations

This section describes items that should be considered before installing the UXIM system.

6.1 Disconnect Device

The Pulsed Load Lead harness which plugs into the Resistance Steps connector is the primary disconnect device. Unplug this connector to disconnect power from the UXIM.

6.2 Equipment Location

Consider the placement of the equipment in the event service is required. For example, access to the rear of the equipment or visual access to the status lights may be needed. The equipment is convection cooled and no cooling fans are used. To maintain proper operating temperature, the equipment must not be enclosed in another cabinet without proper ventilation.

6.3 Rack Mounting

If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature specified in the Product Description Guide. Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised. Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.

6.4 Mounting Options

The equipment can accommodate two types of mounting: 19” rack mount or flush mount. Standard mounting is 19” rack mounting. If the flush mount option is used, the optional flush mounting brackets will need to be installed.

6.5 Wire Length

All harnesses lengths are standard 25’ or 50’ length and in most cases, should not require additional lengths. Distances between the battery, battery charger and the battery monitoring equipment should be considered. If longer harness lengths are required, harnesses are available in a maximum of 50’ lengths. The resistance load test-wiring limits this length to the maximum distance the UXIM can be mounted from the battery string. This manual describes all harnesses at the standard 25’ or 50’ length.

6.6 Battery String Isolation

Isolate the battery string prior to installing the system.

Important! Never attempt installation on a battery string that is in service and not fully isolated from the DC bus and load circuits.

6.7 Cell Number 1 Identification

When referring to any material in this installation guide and reference is made to an actual cell number, always consider Cell 1 as the most positive end of the battery with respect to the battery charger. As the cells increment toward the negative end of the string, increment the cell numbers as well.

7. Installation of Tab Washers

Tab washers allow connection of the monitoring system to the battery. Standard tab washers accommodate 5/16” hardware. The tab washer location and quantity depend on the system configuration. The actual placement of these tab washers in relation to the battery post and existing hardware is critical. In instances where a single load tab washer and a sense tab washer(s) is required, the load tab washer should be placed closest to the cell post and underneath the sense tab washer. The following figures illustrate some common applications.

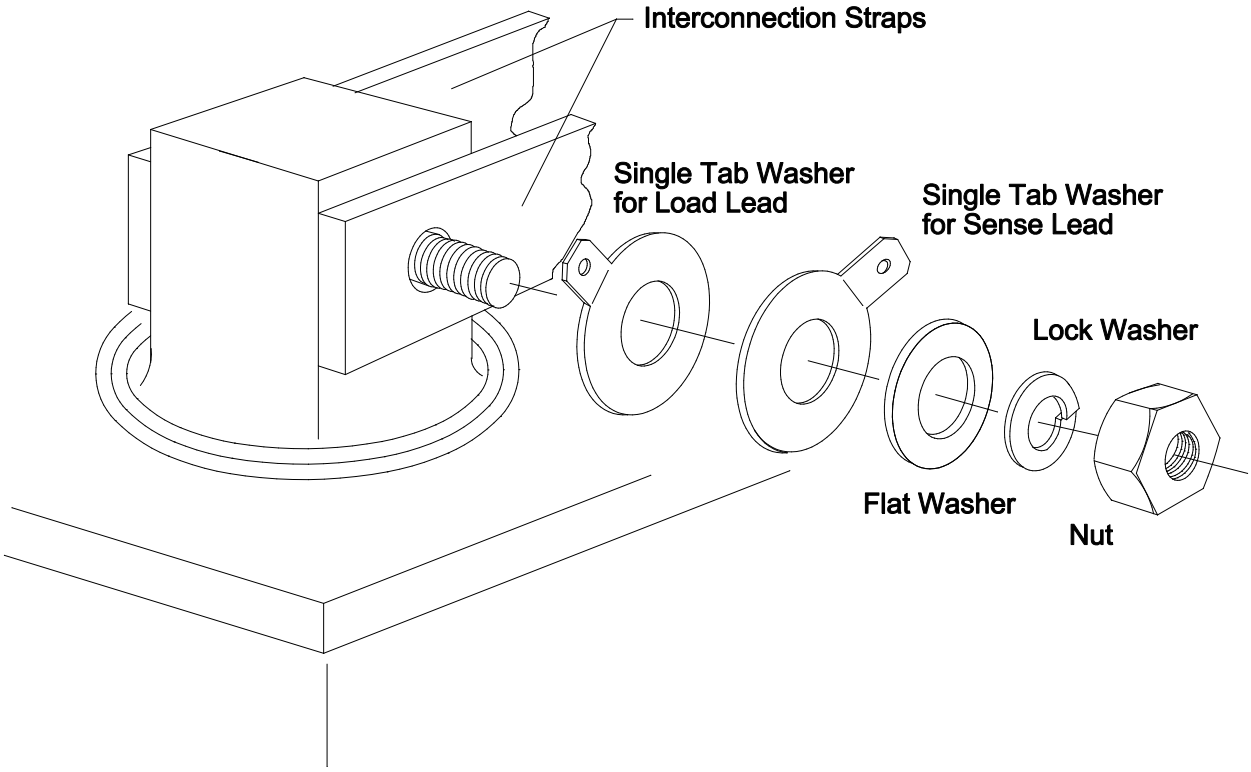


Figure 2 - Exposed Post Tab Washer Assembly

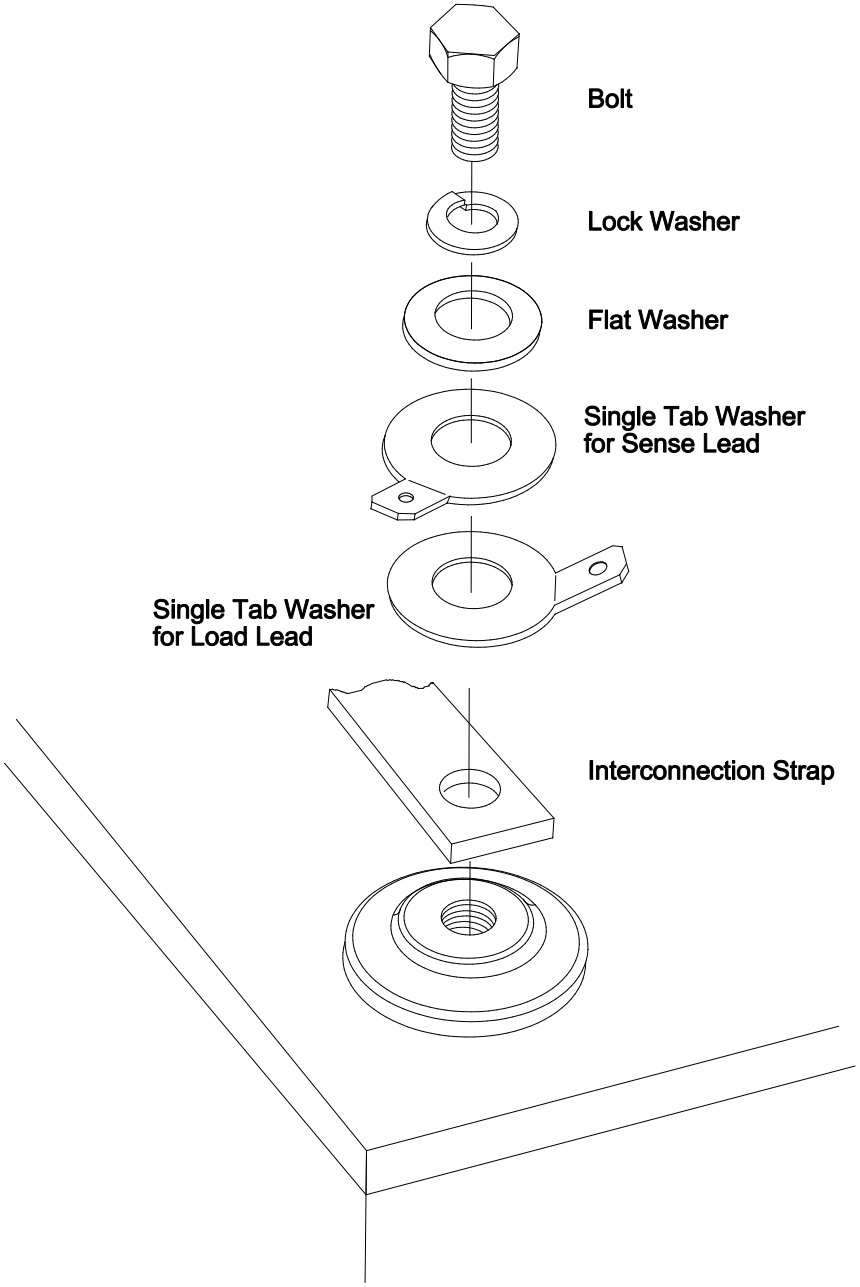


Figure 3 - Recessed Post Tab Washer Assembly

To determine tab washer placement, refer to the Configuration Connection Diagram in the back of this manual. Locate the desired configuration that will be installed. Using the wiring diagram, install the appropriate tab washer(s) on each required post.

8. Unit Configuration

8.1 Digital Input Configuration

Each digital input can be configured either for a voltage or contact closure input. Refer to the table below.

Note: Digital input configuration should only be performed by a qualified technician. Contact Technical Support for details.

Mode	Acceptable Input Range
Voltage	> 4V = False < 1V = True Maximum nondestructive input: 60Vdc
Open/Close Contact	< 2K = True

Table 4 - Digital Input Modes

Seven jumpers for digital input and one jumper for RS-485 are supplied with the UXIM for configuration. There is a pair of 2-pin jumpers associated with each digital input, which must be set according to the mode desired. The cover of the unit must be removed to gain access to these jumpers. Jumpers should only be changed by a certified Vertiv technician. Refer to the following table and drawing to identify what mode is required and where the jumpers are located.

Channel	Mode	Jumpers
Digital Input 1	Voltage	JP2 and JP3 are not installed
	Open/Close Contact	JP2 and JP3 are installed
Digital Input 2	Voltage	JP4 and JP5 are not installed
	Open/Close Contact	JP4 and JP5 are installed
Digital Input 3	Voltage	JP6 and JP8 are not installed
	Open/Close Contact	JP6 and JP8 are Installed

Table 5 - Digital Input Jumper Settings

The location of the jumpers is shown in the figure below. The factory does not have the jumpers inserted.

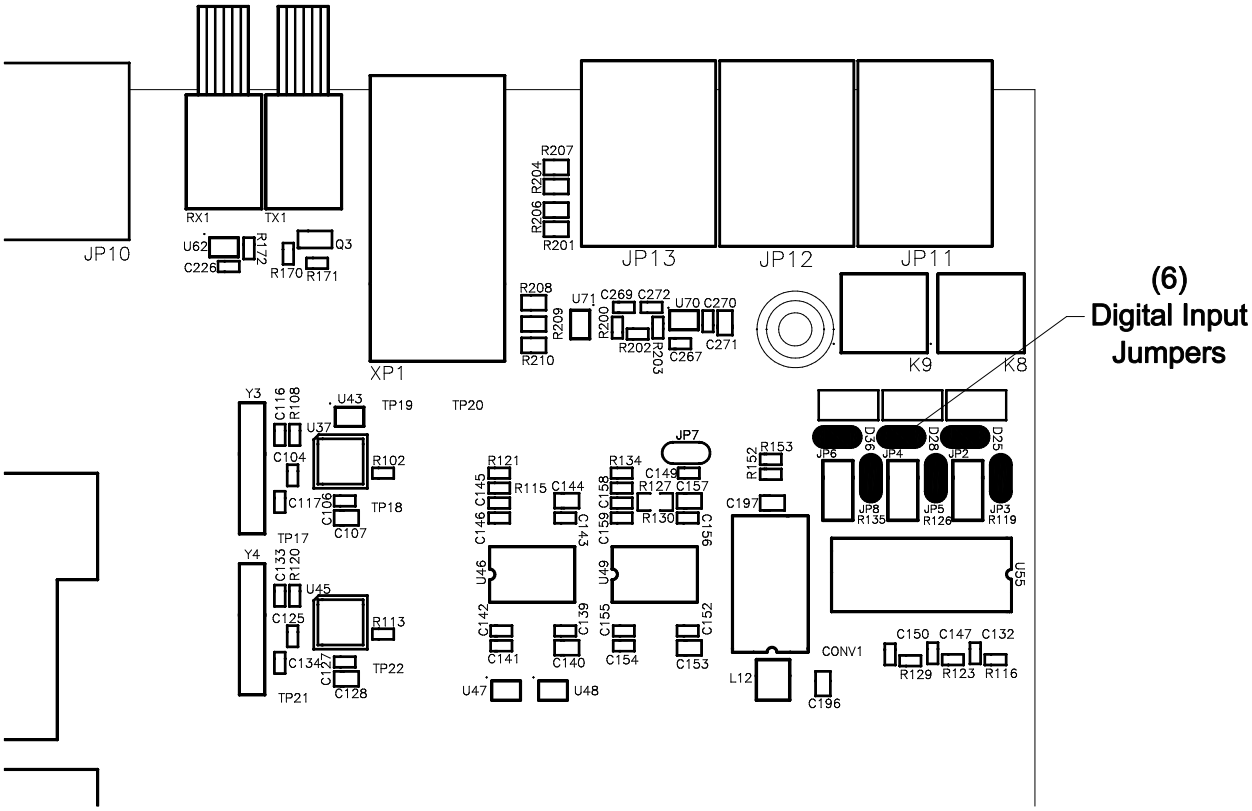


Figure 4 - Digital Input Jumper Locations

8.2 RS-485 Termination

A jumper on the circuit board is used for selecting a termination resistor for RS-485 connection. In most cases, RS-485 termination is not necessary because maximum baud rate is 19200 bps (default is 9600). RS-485 termination is recommended when intermittent communications occur. RS-485 termination is enabled when the jumper is across Pins 1 and 2 of JP7 (not the factory default setting). It is disabled when the jumper is removed across Pins 1 and 2. The location of the jumper is shown in the figure below.

Note: The factory default setting will not include the jumper inserted across Pins 1 and 2 of JP7.

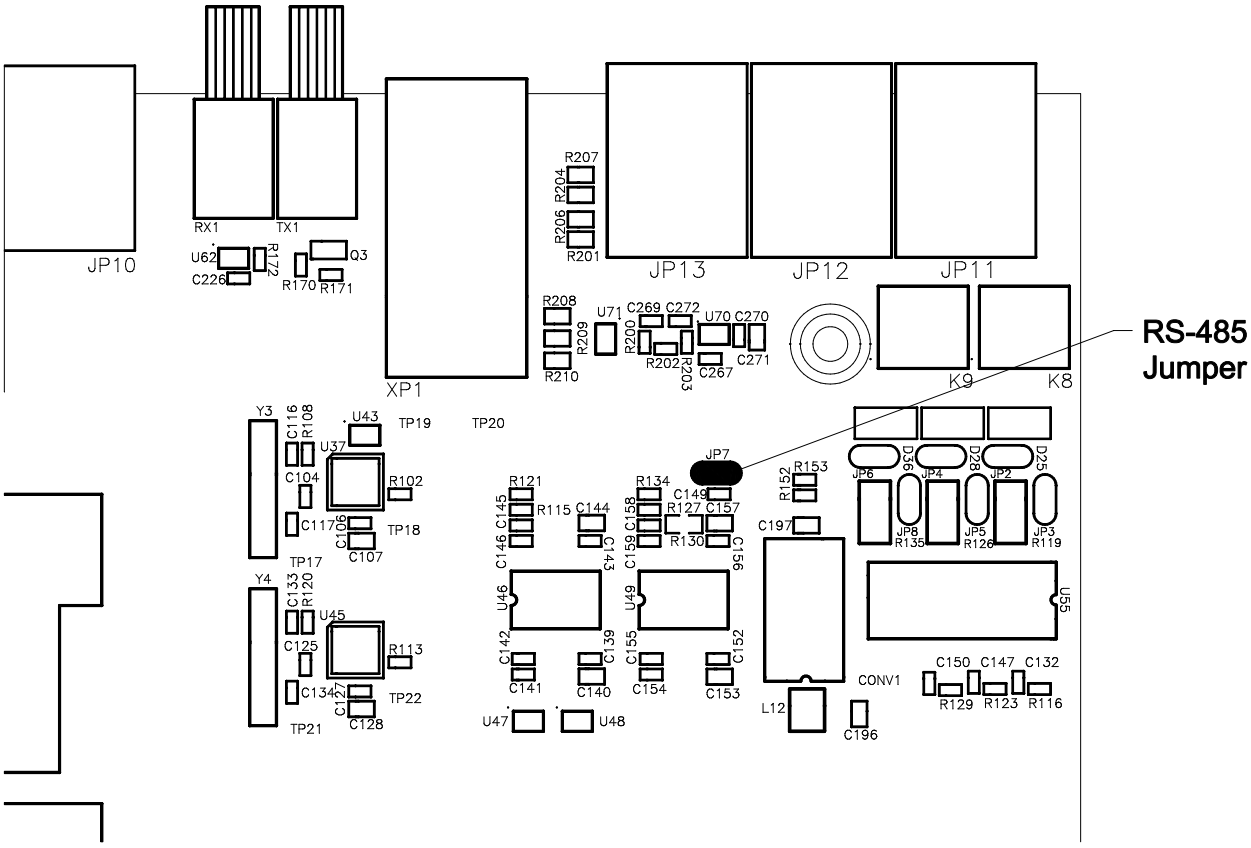


Figure 5 - RS-485 Jumper Locations

9. Equipment Mounting

The equipment can accommodate two types of mounting: 19” rack mount or flush mount. Standard mounting is 19” rack mounting. For 23” rack mounting, 1U rack reducing brackets are commercially available and would be required.

9.1 Flush Mounting Kit (Optional)

If the flush mount option is required, optional angle brackets will need to be installed on each side of the unit. To connect the flush mount brackets to the unit, remove the two screws on each side that secure the rack mount brackets to the unit. Install the supplied front spacer brackets using the top mounting hole and the flat head screws from the rack mount bracket. Remove the lower flat head screw from the rear spacer bracket. Secure the flush mount bracket through both the bracket and bracket spacer using the rack mounting kit-supplied pan head screws at both the front and rear locations for each side. Flush mounted equipment footprint is shown below.

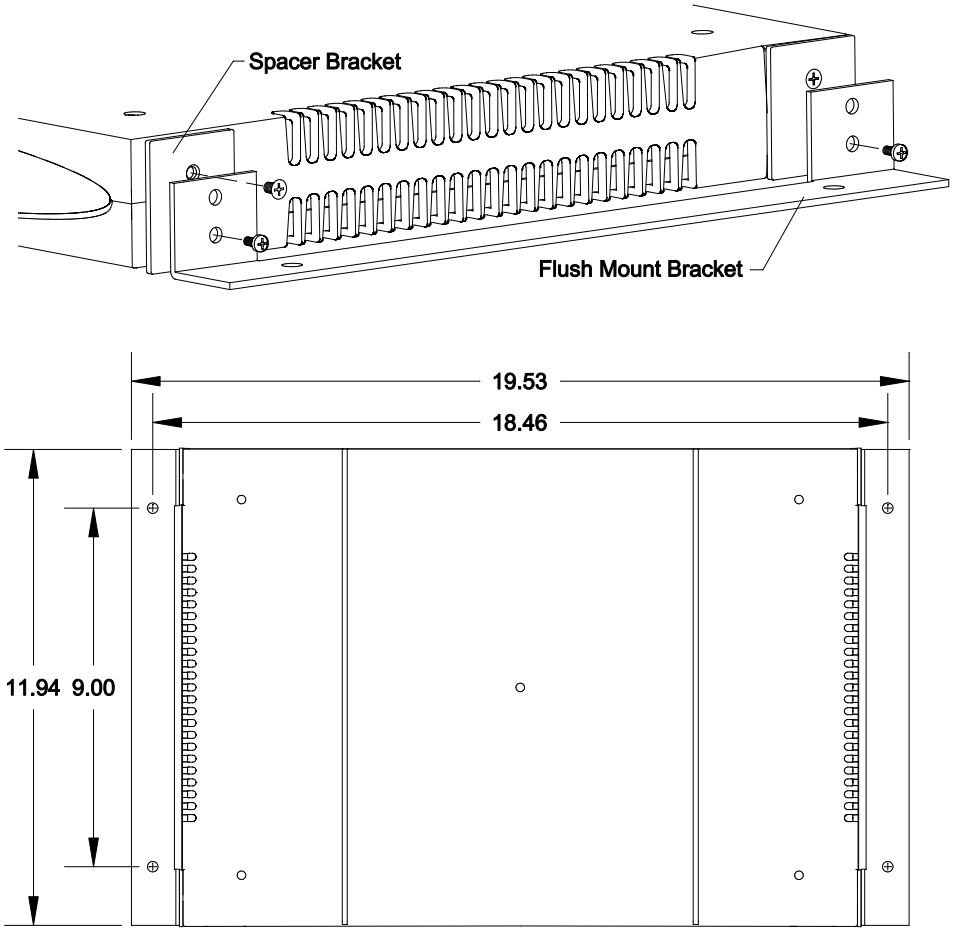


Figure 6 - Optional Flush Mount Kit Mounting

10. Sense Lead Harness Connections

Refer to the Wiring Schematic Diagram located at the rear of this manual to determine the routing path from each Sense Lead harnesses' connection point (J1-J8) on the equipment to the required cell voltage sense point on the battery. Note that wires terminating on a positive post are solid colors. Wires terminating on negative posts are white with colored stripe. For ease of future cell maintenance, leave some slack in the wiring to the cells. A write-on label is provided on each harness to mark the correct harness assembly number to appropriate equipment connector location of the harness. If the connections are removed for maintenance, the labels on the harness will be a useful reference to reconnect the cables to the correct connector. Refer to the following steps to install the proper termination to each battery connection point.

10.1 Voltage Sense Lead Connection Preparation

In order to prepare the sense lead harness connection, follow these steps:

1. Each voltage sense lead wire from the sense lead harnesses must have a 10KΩ 0.1% flameproof resistor sense lead assembly installed before connection to the tab washer.
2. After determining the routing path and required wire length from the equipment to the connection point, begin assembling the 10K resistor sense lead assembly to the sense lead harnesses by cutting each wire to the required length and strip the wire at approximately ¼" of the insulation from the end of the wire.
3. Place the stripped wire into the butt-splice of the 10KΩ 0.1% resistor sense lead assembly.
4. Place the wire and insulated section of the butt-splice into the first die of the Panduit crimper, making sure that the intersection is centered within the die.
5. Crimp the connection.
6. Check the crimped connection to make sure it is secure and holds well.
7. Connect the completed voltage sense lead to its appropriate cell sensing point tab washer.

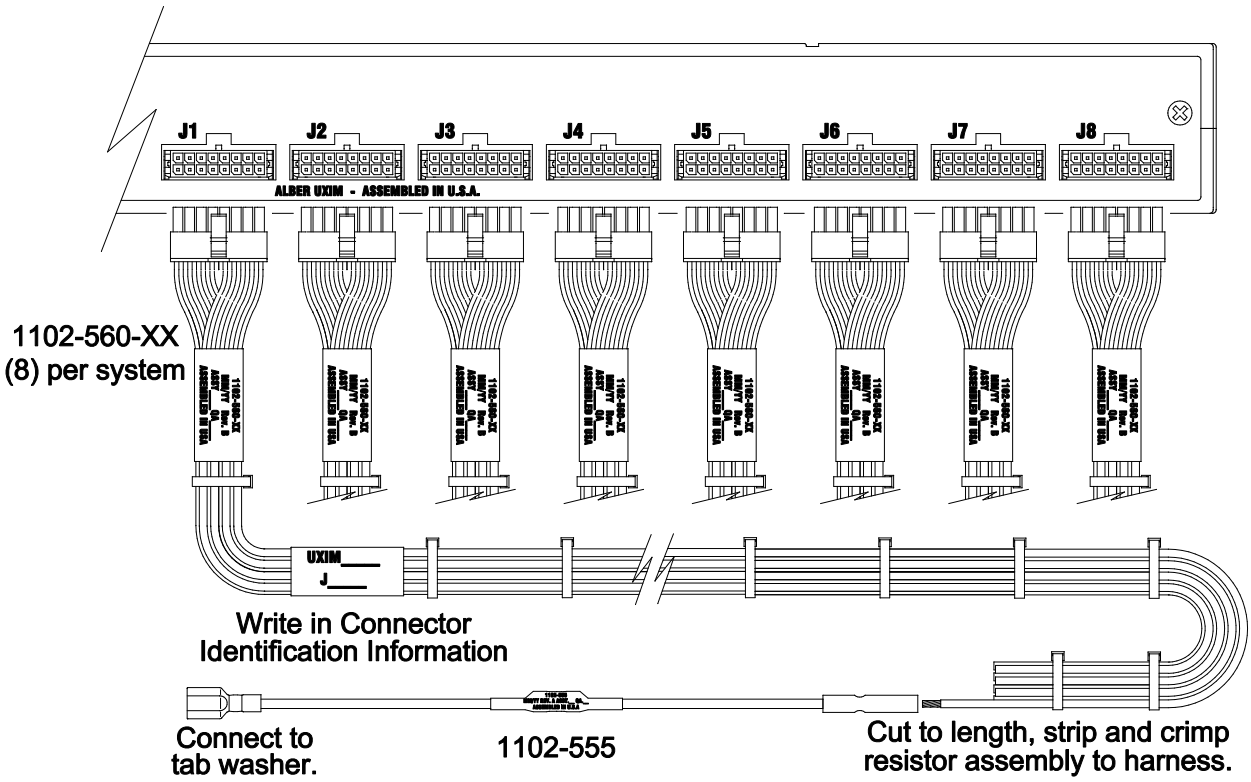


Figure 7 - Voltage Sense Lead Connections to Battery

XX= cable length

Caution: When a load lead wire connects to the same point as a voltage sense lead, the load lead wire must be the closest to the cell's post. Verify the fuse is a 15A Slo-Blo.

10.2 Systems with Dual or Multiple Positive and Negative Posts

Systems that use dual or multiple positive and negative post interconnections require connection of the sense lead harnesses using the following guidelines. The positive sense lead wires (solid colors) and negative sense lead wires (white with colored stripe) of the harness attach to the corresponding positive and negative terminals of the battery in a way that will monitor as many strap connections as possible. To achieve optimum results, it is recommended that sense leads should be connected as described in the Figure below and duplicated at each cell for consistent readings. The following illustration shows a scenario of dual and/or multiple positive and negative posts as described.

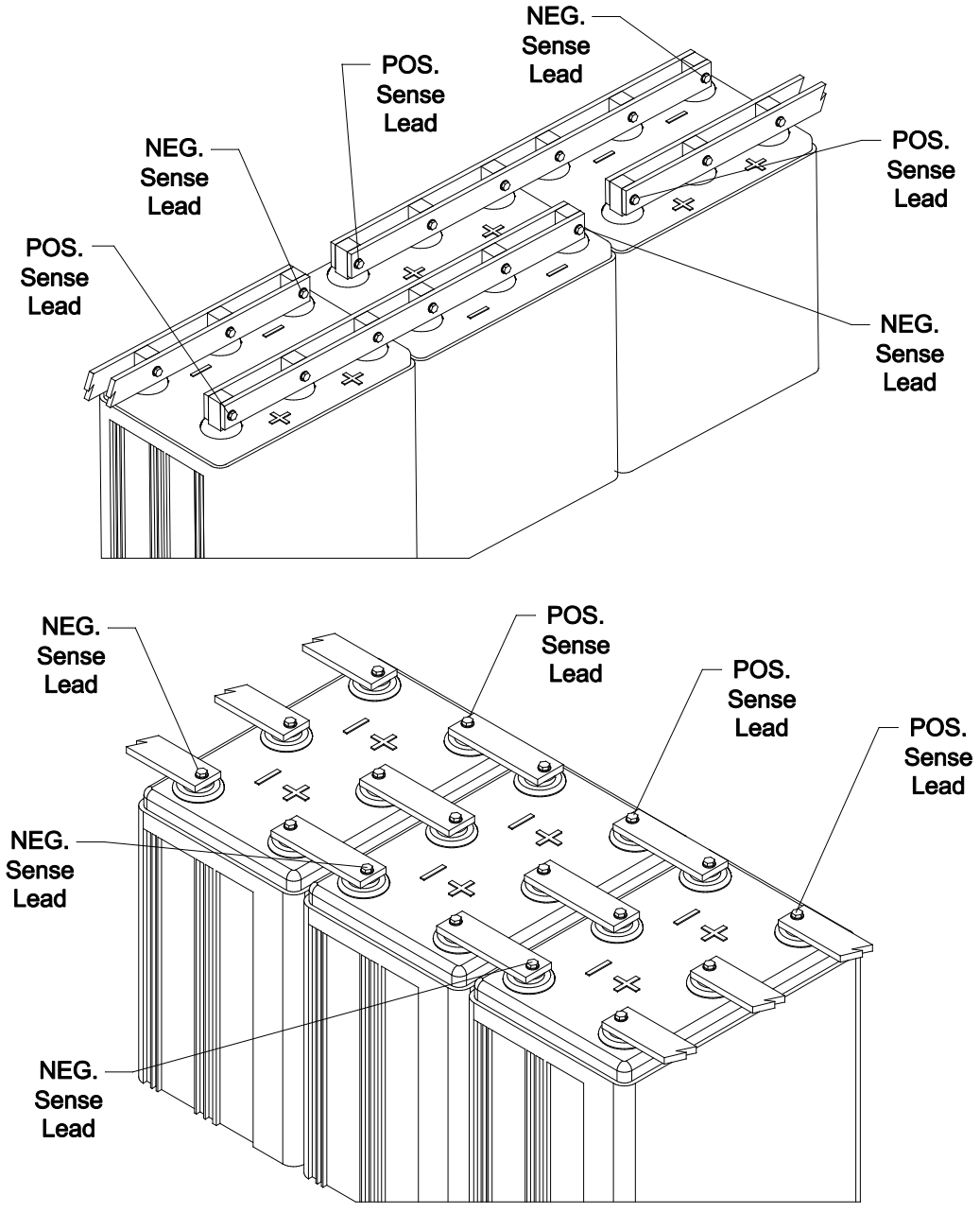


Figure 8 - Exposed Dual or Multiple Posts Connections

11. Fused Resistance Load Lead Harness Connections

There is a maximum of seven load connections available. To identify connection locations, refer to the Resistance Steps section of the UXIM Wiring Schematic drawing at the back of this manual. This drawing shows exact locations where these cables connect to the battery for each supported configuration.

Warning: Before making any connections to the battery, verify the fuses are not installed in the load lead fuse holders. Do not install the fuses until the time that the entire system is commissioned.

Each Resistance Load cable assembly is made up of seven color-coded load wires to distinguish each resistance load step for proper termination at the battery. From the UXIM, the Resistance Load cables are routed to the installation location and cut to the appropriate length. For ease of future cell maintenance, leave some slack in the wiring to the cells. The wire should be stripped to remove approximately 5/16” of insulation and crimped into the butt splice on the Fuse Holder Assembly. When connecting to the charger bus, it may be required to replace the 10K resistor leads and or load lead’s faston™ terminal with a ring terminal to complete connection to the bus. Proper location and crimp termination of these cables are critical and could cause equipment failures if done improperly.

⚠ **Note**: When installing load lead cables, cut them to the appropriate length. Do not coil these cables. Failure to cut cables to the correct length could result in inaccurate readings.

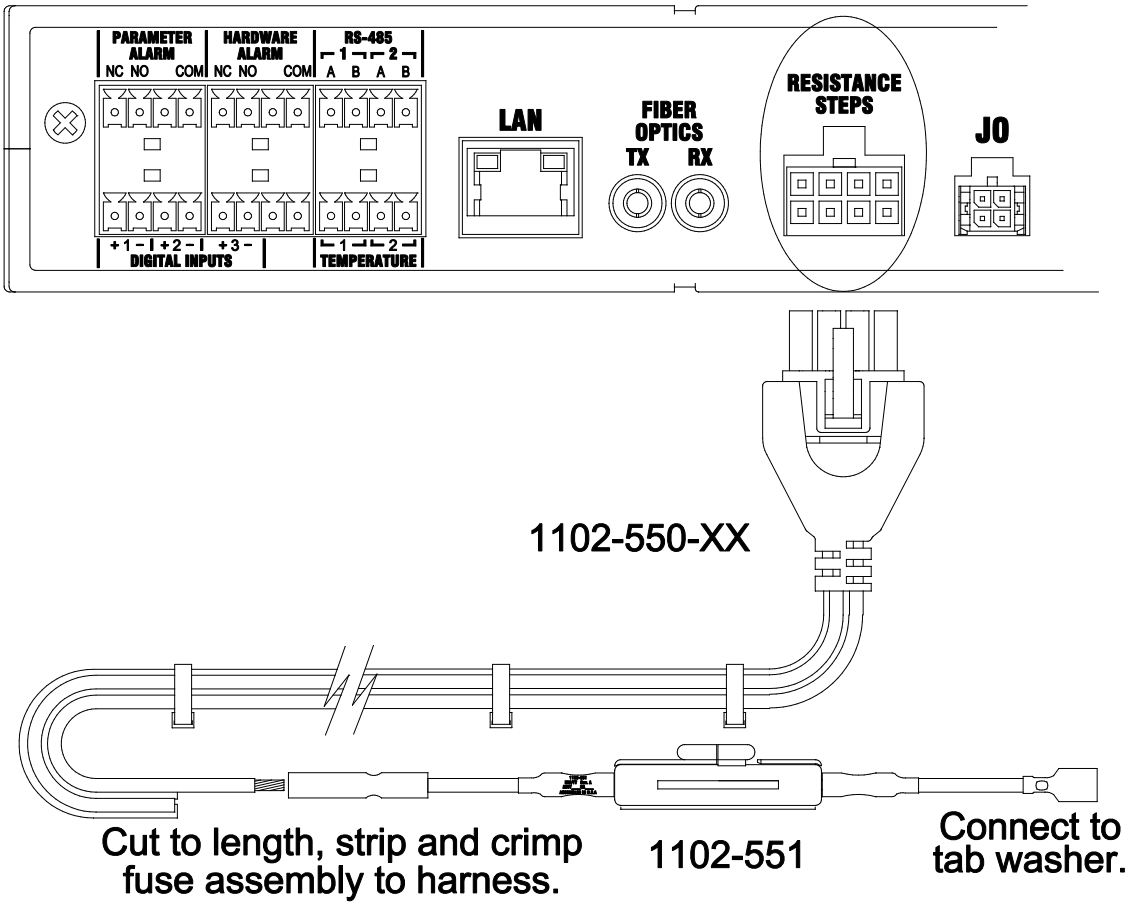


Figure 9 - Resistance Steps Connection to Battery

The fused load lead will be positioned on a single tab washer. In situations where there are sense and load leads at the same location, it is critical that the load connection be placed closest to the battery post. Before installation on the tab washer, verify that the fuse is not installed. The fuse will be installed at time of startup.

 **Note**: It is very important that the load connection is the closest connection to the post if two tab washers are used. Failure to do this could result in inaccurate resistance readings.

 **Caution**: Connecting the load wires incorrectly could cause an equipment failure if a resistance test is performed. Such failures are not covered under warranty.

 **Warning:** Do not install load lead fuses until instructed to do so in the Getting Started Guide.

12. Charger Cable Resistance Reading Connection

There is one 25', 50', 75' or 100' Charger Cable Resistance Reading harness included with each unit. From the UXIM, the Charger Cable Sense Lead cables are routed to the installation locations shown in the diagram below. After determining the routing path and the required wire length from the equipment (J0) to the connection points, begin assembling the 10K resistor sense lead assembly to the charger sense lead harness as described in Section 10.1. When connecting to the charger bus, it may be required to replace the 10K resistor leads and or load lead's faston™ terminal with a ring terminal to complete connection to the bus. Proper location and crimp termination of these cables are critical and could cause equipment failures if done improperly.

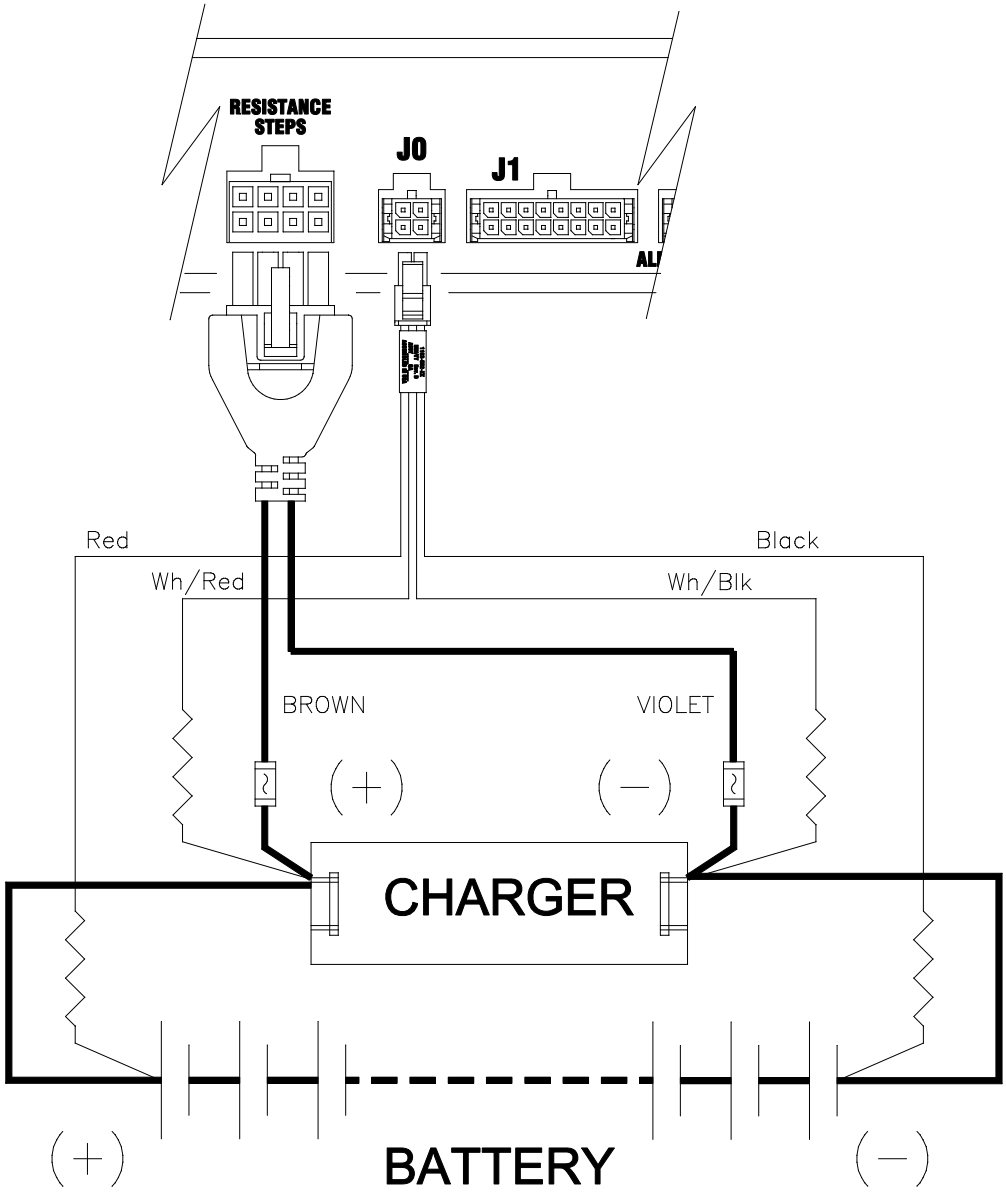
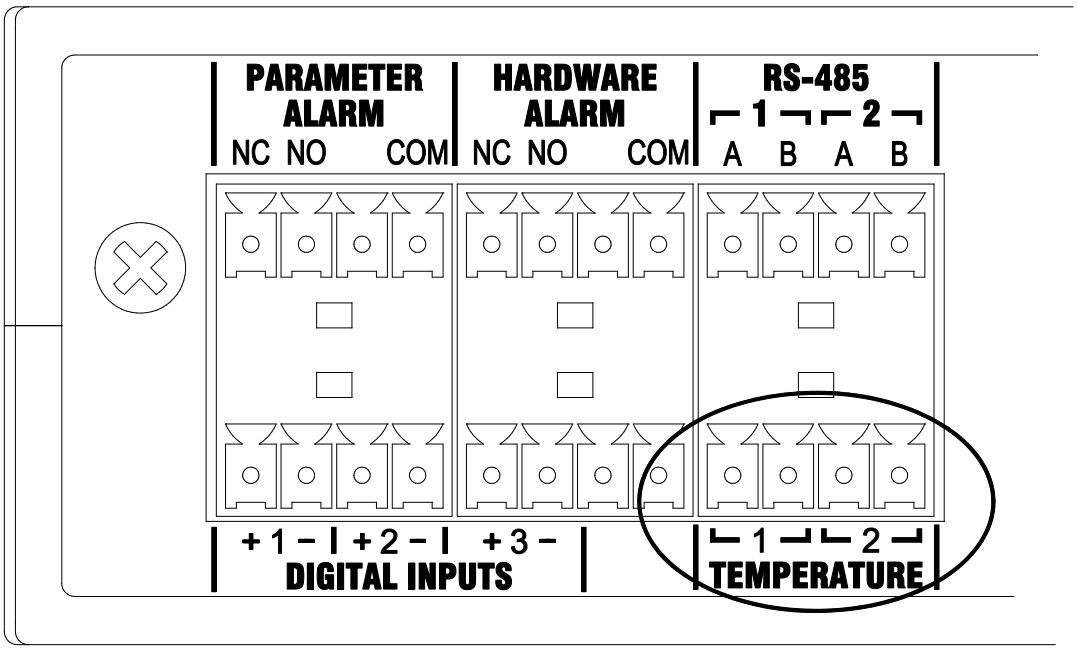


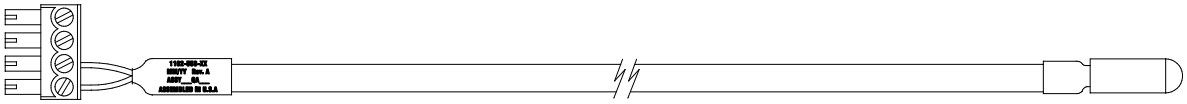
Figure 10 - Charger Control Sense Lead Connection to Battery and Charger.

13. Ambient Temperature Sensor Connection

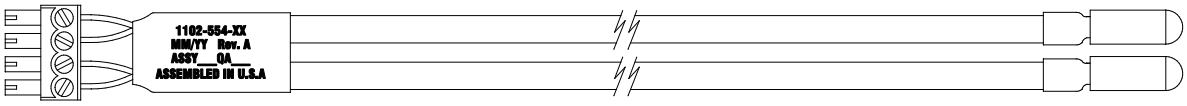
There is one ambient temperature sensor included with each unit. This sensor comes with a prefabricated harness with 25', 50', 75' or 100' of cable. Route the cable to the desired location to capture ambient room temperature and plug the connector into the rear of the unit.

Note: The UXIM device comes with one single temperature harness. A dual harness can be purchased through your Vertiv Sales representative. Either a single or dual harness can be used on the UXIM.





1102-553-XX (Standard)



1102-554-XX (Optional)

Figure 11 - 25', 50', 75' or 100' Single and Dual Ambient Temperature Harness

14. Digital Inputs Connection

There are provisions for three separate digital inputs. These can be configured to operate in two different ways. Refer to Digital Input Configuration section on page 8-1 for configuration details. To connect the device monitored, connect to one of the three inputs located on the rear of the unit. If only a switch "open/close contact" mode is being used, then polarity is not important. However, if a voltage source is being used, then the polarity will need to be correct.

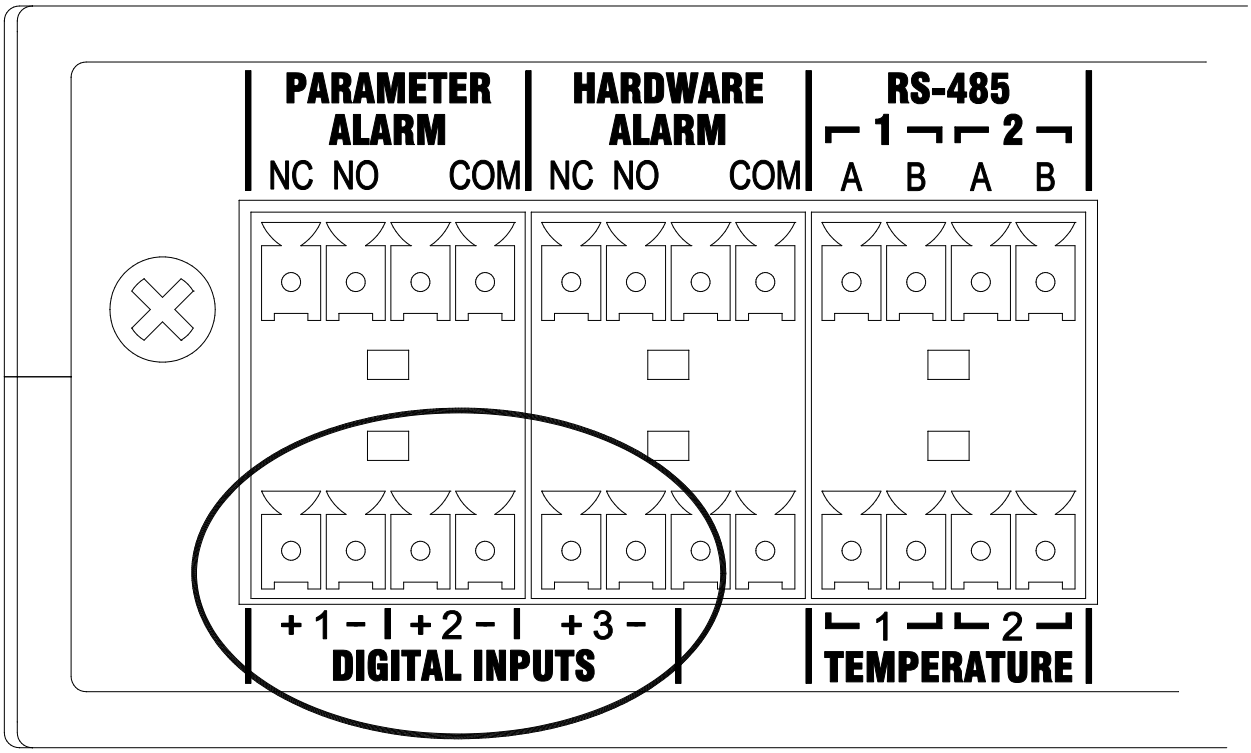


Figure 12 - Digital Inputs

Caution: Pay close attention to polarity and voltage when making these connections. Connecting the digital inputs polarity backwards or exceeding 60Vdc in voltage mode will damage the equipment.

15. RS-485 Communication Connection

There are two RS-485 ports available for communications between the UXIM and remote controllers (BMS) or accessory modules (not currently supported). Each of these ports is labeled 1 and 2. When connecting to a remote controller, connect the A & B connection of port 1 to the remote controller. When multiple units are used together and need to be connected to a remote controller, these modules can be networked together using the RS-485 (1) terminals A & B. See the figure below.

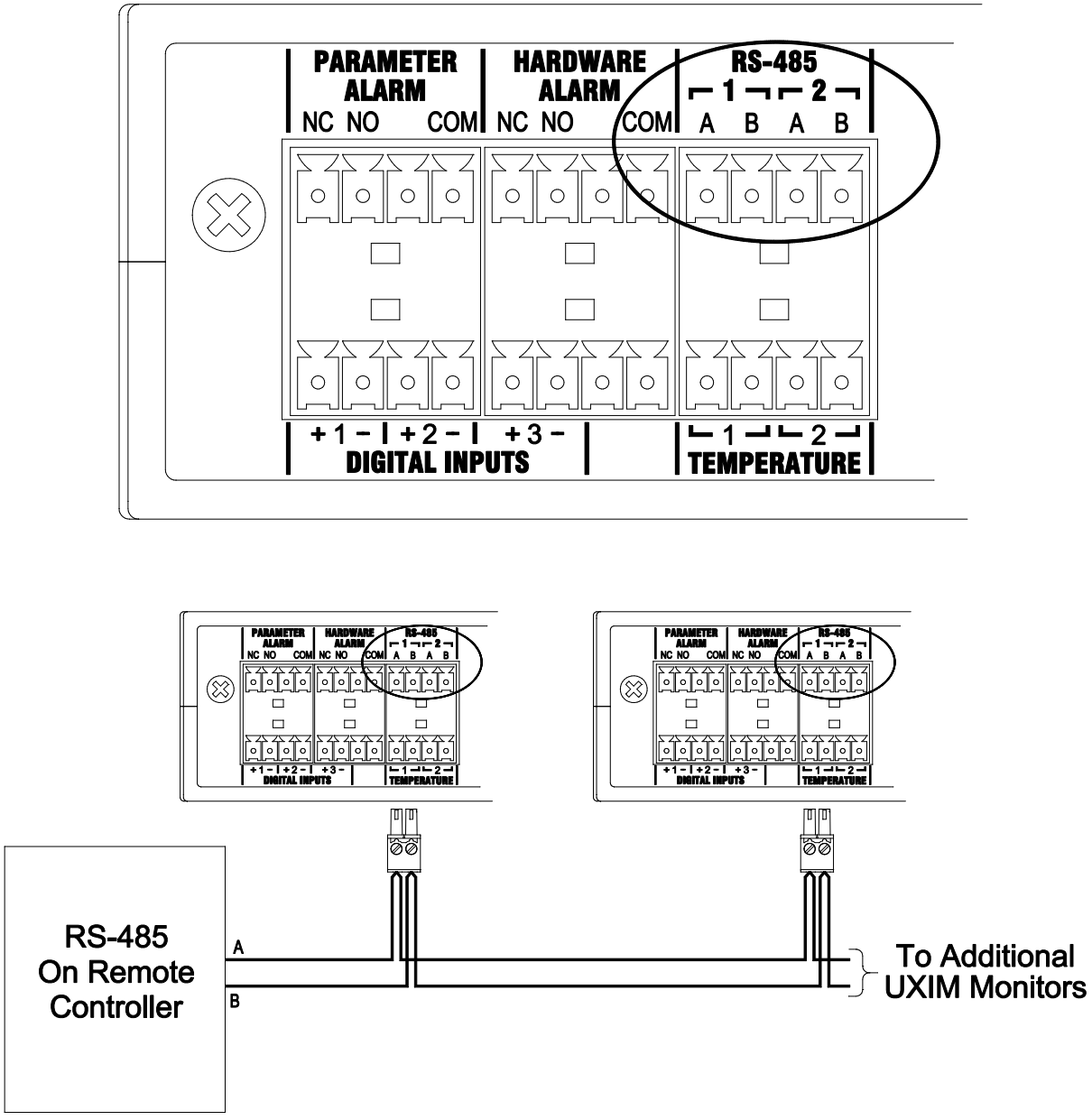


Figure 13 - RS-485 Connections

16. Fiber Optic Communication Connection

The Fiber Optic ports are an optional communications port used to connect to a BDSU Linker module - UXCM. When integrated with a UXCM, the UXIM will inherit a host of advanced features outlined in the BDSU Product Description Guide.

To connect to a UXCM, use the supplied fiber optic cable (if option is installed) and connect the TX of the UXCM to the RX of the UXIM and then the TX of the UXIM to the RX of the UXCM.

When cutting the fiber optic cable to length, the ends must be properly cut and polished to achieve reliable communications. Follow the instructions supplied with the polishing kit.

When routing and terminating the fiber optic cable, the following should be considered.

- The minimum bend radius should not be less than 35mm or 1.4”
- The maximum length between modules cannot exceed 250’ or 76 meters. Exceeding 250’ will cause degradation in the signal which will manifest itself as intermittent or no communications.

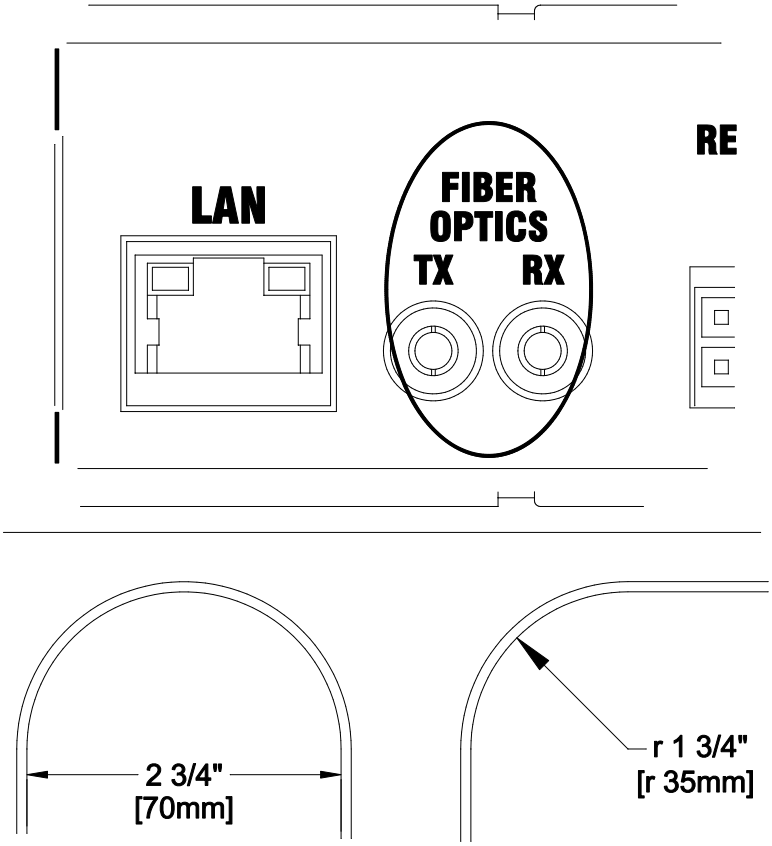


Diagram Not To Scale

Figure 14 - Minimum Fiber Optic Bend Radius

17. Network Communication Connection

The LAN network connector allows the UXIM to be connected to a Eithernet network. From an existing network, connect the network cable to the LAN connector on the UXIM.

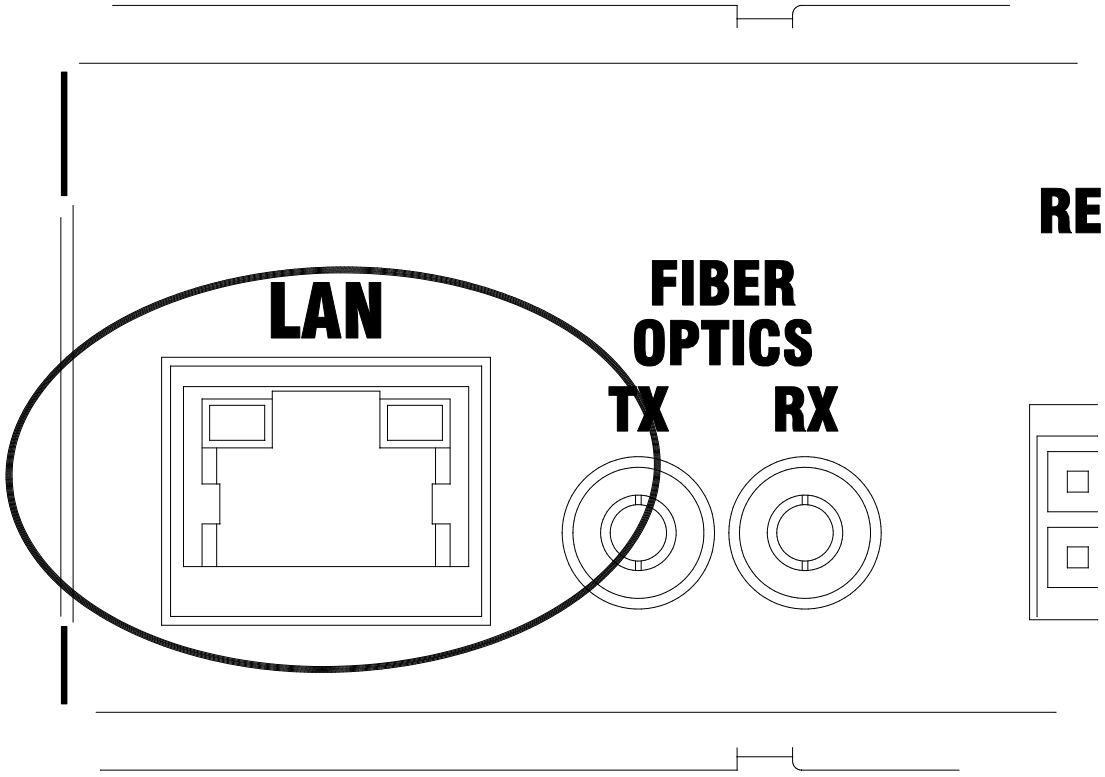


Figure 15 - Network Connection

17.1 Network Protocols Supported

There are several protocols supported by the network interface and will require specific ports to be opened up on the network. The following lists the supported protocols that can be used:

- TCP 502 (Modbus)
- TCP 3002 (Application debug port)
- TCP 9999 (Telnet setup)
- TCP 10001 (TCP to serial pass through)
- UDP 69 (TFTP), only to load code updates
- UDP 161 (SNMP)
- UDP 162 outbound (SNMP traps)

18. Parameter Alarm Connection

The Parameter Alarm Form C alarm provides notification if a monitored parameter exceeds any of the programmed thresholds. This contact has three connections:

- NC (normally closed)
- NO (normally open)
- COM (common)

Connection can be made directly to the facility's alarm reporting system. If multiple units are used, then these contacts can be connected in series or parallel, depending on the requirements for the facility's wiring of NC (normally closed)or NO (normally open).

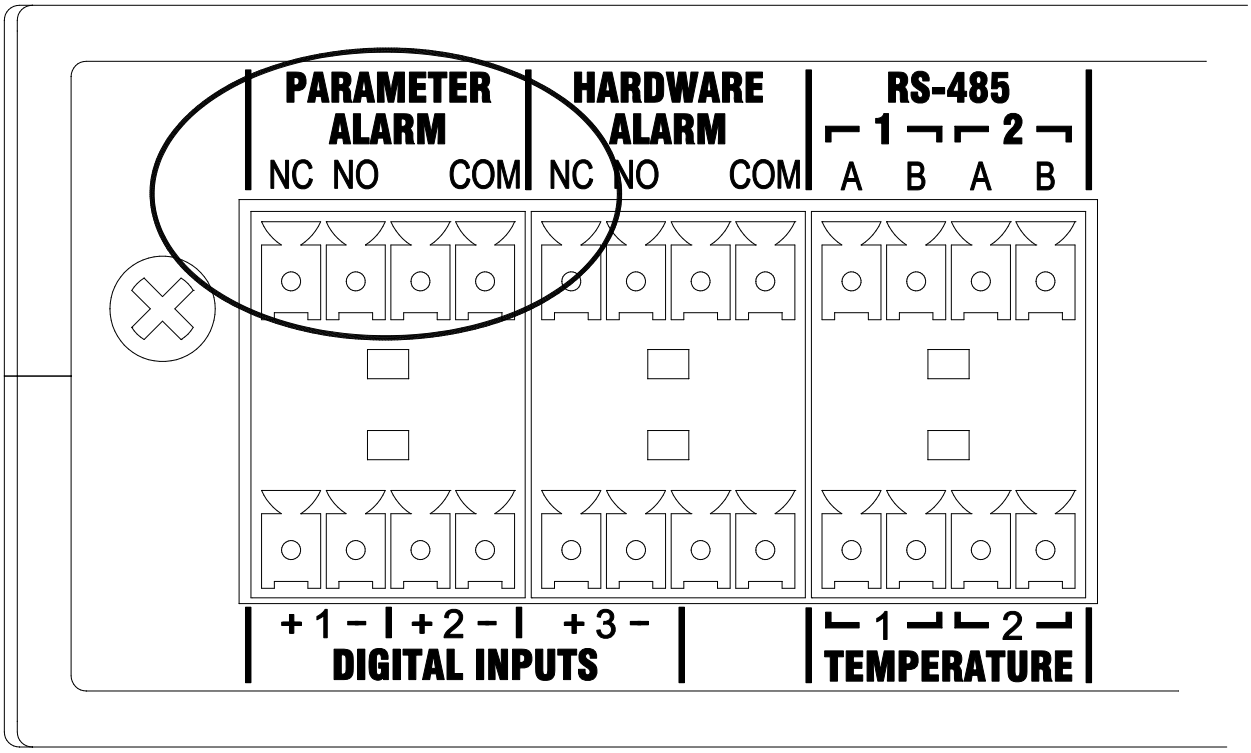


Figure 16 - Alarm Contacts

19. Hardware Alarm Connection

The Hardware Alarm Form C alarm contact provides notification if a hardware failure has been detected within the UXIM. This contact has three connections:

- NC (normally closed)
- NO (normally open)
- COM (common),

Connection can be made directly to the facility's alarm reporting system. If multiple units are used, then these contacts can be connected in series or parallel, depending on the requirements for the facility's wiring of NC (normally closed)or NO (normally open).

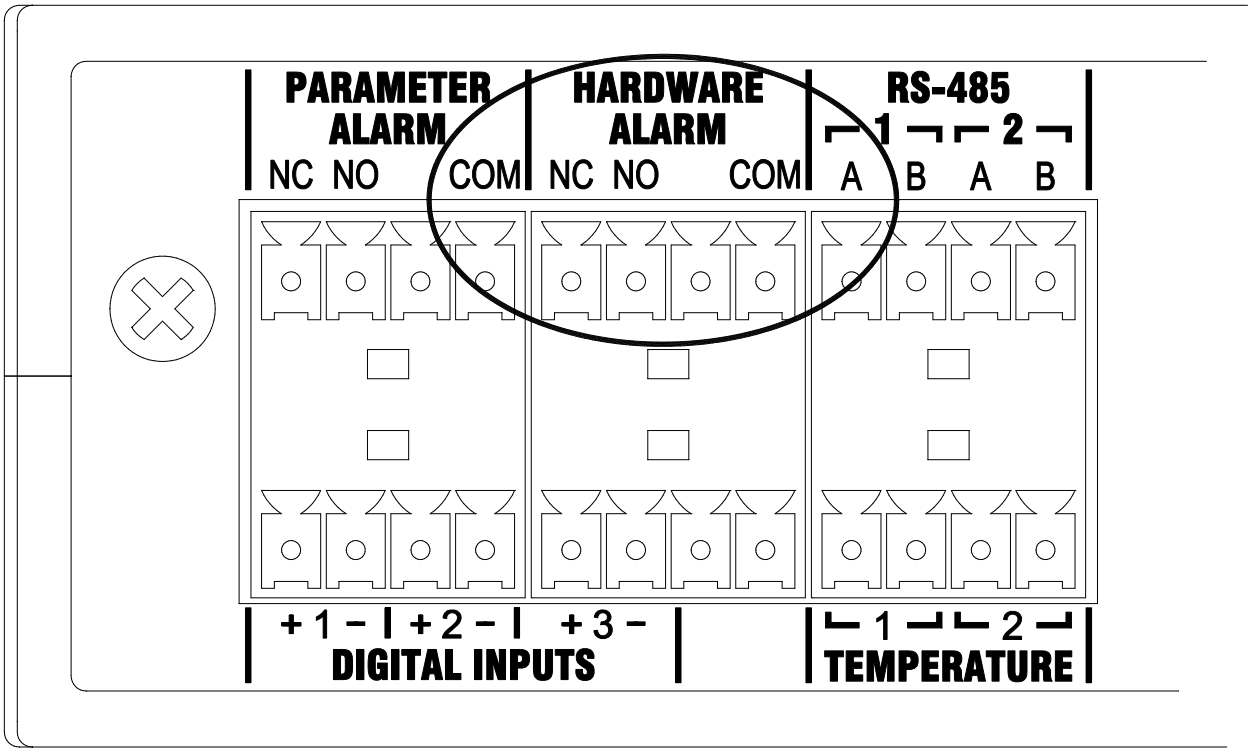


Figure 17 - Hardware Alarm Contacts

20. UXIM Specifications

20.1 UXIM System Specifications

Safety Approvals

- UL61010-1
- EN61010-1
- IEC61010-1

EMC Approvals

- EN61326-1
- FCC part 15 class A

Operating Environment

- Temperature Range: 0ºC to 40ºC (32ºF to 104ºF)
- Humidity Range: 0% to 80% RH (non-condensing) at 5ºC to 31ºC, 0% to 50% RH (non condensing) at 31ºC to 40ºC
- Indoor Use Only
- Measurement Category O (500V Transient Rating)
- Pollution Degree 2
- Altitude: 0 to 2000 meters above sea level

Alarms

- 2 - Form C relay contact, 2A at 30Vdc

Input Power

- DC Power, 85 to 150VDC, 11.3W max.

Communications

- RS485/1 - MODBUS
- RS-485/2 - Proprietary for optional accessories
- Ethernet -TCP/IP MODBUS, SNMP, SMTP
- USB
- Fiber optic for BDSU integration

Packaging

- 1U chassis
- 17.00"W x 1.75"H x 12.00"D
- 4.0 lbs.
- Wall or 19" Rack Mount

20.2 Cell Measurements

This section describes cell measurement specifications.

Parameter	Tolerance
Cell Voltage	0 to 3V, 0.1% ±2mV
Internal Cell Resistance	0 to 32,000μΩ, 5% of reading ±2μΩ
Intercell Resistance	0 to 5000μΩ, 5% of reading ±5μΩ
Intertier/charge cable Resistance	0 to 5000μΩ, 5% of reading ±5μΩ
Cell/Monobloc Temperature	0°C to 80°C ±0.1°C (32°F to 176°F)

Table 6 - Cell Measurement Specifications

20.3 System Measurements

This section describes system measurement specifications.

Parameter	Tolerance	Number Of Inputs
String Voltage	85Vdc to 150 Vdc ± .5%	Calculated
String Current	0 to 2000ADC ±1% of full scale	Calculated
Ripple Current	0 to 250 Amperes RMS, ±5% of full scale	Calculated
Float Current	0 to 5000mADC, ±50mA	Calculated
Ambient Temperature	0°C to 80°C±0.1°C (32°F to 176°F)	1

Table 7 - System Measurement Specifications

21. UXIM Drawings

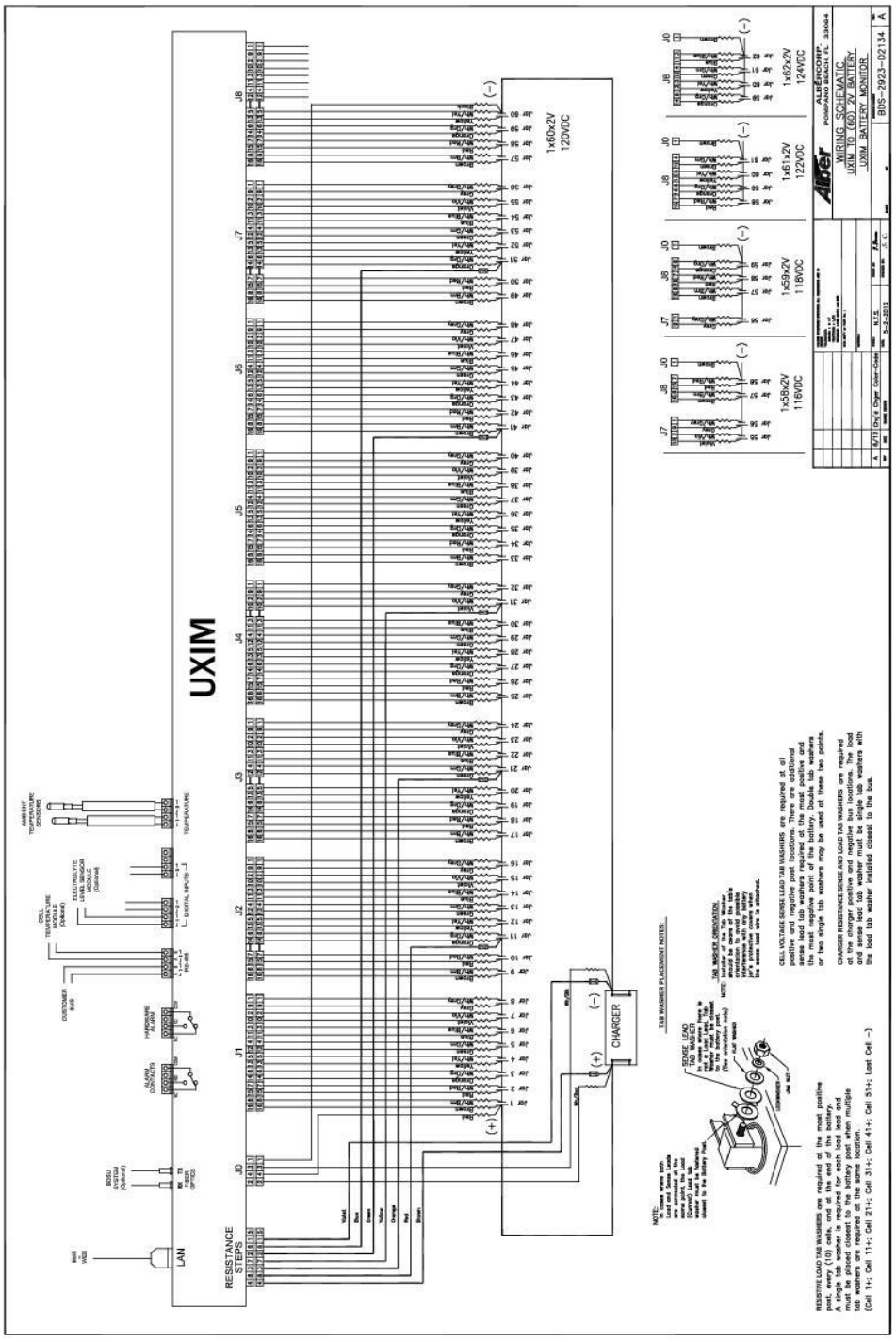


Figure 18 - UXIM Wiring Schematic Diagram

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