



Albér Universal Battery Diagnostic System Battery Monitor (BDSU-50)

Installer/User Guide

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TABLE OF CONTENTS

| | |
|-------------------------------------------------------------------------|-----------|
| Safety Information | 7 |
| 1 Product Overview | 1 |
| 1.1 Product Description | 1 |
| 1.2 Features | 2 |
| 1.3 Measurement Capabilities (Maximum Per String) | 3 |
| 2 System Overview | 5 |
| 2.1 Universal Control Module (UXCM) | 6 |
| 2.2 Universal Battery Module (UXBM/50) | 7 |
| 2.3 Optional Accessories | 7 |
| 2.3.1 Building Management System Integration | 8 |
| 3 Operating Modes | 9 |
| 3.1 Normal Operating Mode | 9 |
| 3.2 Discharge Mode | 9 |
| 3.2.1 Acceptance/Performance Test | 9 |
| 3.2.2 Resistance Test | 9 |
| 3.3 Alarm Mode | 9 |
| 4 Model Number Descriptions | 11 |
| 4.1 UXCM Model Numbering | 11 |
| 4.2 UXBM/50 Battery Module Model Numbering | 11 |
| 4.3 UXCM Part Numbers for Standard and Optional Accessories | 18 |
| 4.4 UXBM Part Numbers for Standard and Optional Accessories | 18 |
| 5 Panel Controls and Indicators | 21 |
| 5.1 UXCM Front Panel | 21 |
| 5.2 UXCM Rear Panel | 22 |
| 6 System Installation Considerations | 23 |
| 6.1 Equipment Location | 23 |
| 6.2 Power Options | 23 |
| 6.2.1 UXCM | 23 |
| 6.2.2 UXBM/50 | 23 |
| 6.3 Mounting Options | 24 |
| 6.3.1 UXCM and UXBM/50 | 24 |
| 6.4 Wire Lengths | 24 |
| 6.5 Isolate the Battery String | 25 |
| 6.6 Identify Jars/Monobloc Number 1 | 25 |
| 6.7 Fiber Optic Cable, UXCM and UXBM/50 Communication Information | 25 |

| | |
|-------------------------------------------------------------------------------------|-----------|
| 7 Materials Received List | 29 |
| 7.1 UXBM/50 and UXCM Standard Inventory | 30 |
| 7.2 Battery Monitor Module (UXBM/50) and Controller (UXCM) Optional Inventory | 31 |
| 8 Tab Washer and Harness Installation for Cabinet Applications | 33 |
| 8.1 Tab Washer Installation Details | 33 |
| 8.2 Check Sense Lead Routing from UXBM/50 Battery Module to the Battery | 35 |
| 8.3 Sense/Load Lead Connections | 36 |
| 8.4 Intertier Connections | 36 |
| 8.5 Discharge Current Sensor (Optional) | 36 |
| 9 Installing Optional Sensors and Transducers | 37 |
| 9.1 String Current Transducer | 37 |
| 9.2 Float Current Transducer | 39 |
| 9.3 Ambient Temperature Sensor | 43 |
| 10 Connecting Modules in a Cabinet or Open rack Application | 45 |
| 10.1 Connection Descriptions for a UXCM | 45 |
| 10.2 Connection Descriptions for a UXBM/50 | 45 |
| 11 Tab Washer and Harness Installation for Open Rack Applications | 47 |
| 11.1 Tab Washer/Fused Load Lead Installation Details | 47 |
| 11.2 Check Sense Lead Routing from UXBM/50 Battery Module to the Battery | 49 |
| 11.3 Sense/Load Lead Connections | 50 |
| 11.4 UXBM/50 Battery Module Load Wire to Jar Post Connections (Open Rack) | 51 |
| 11.5 Intertier Connections | 55 |
| 12 Installing Optional Sensors and Transducers | 57 |
| 12.1 String Current Transducer | 57 |
| 12.2 Float Current Transducer | 58 |
| 12.3 Ambient Temperature Sensor | 59 |
| 13 Installing the Fiber Optic Cable on a UXCM | 61 |
| 13.1 BDSU-50 System Block Diagram | 61 |
| 14 Installing IntelliSlot® Communication Cards for UXCM | 63 |
| 14.1 Installing a IntelliSlot Unity Card | 64 |
| 14.2 Connecting the IntelliSlot Unity Card Cable | 64 |
| 14.2.1 Prepare the card for configuration | 64 |
| 14.2.2 USB | 65 |
| 15 Alarm Contacts and Remote Reset | 67 |
| Appendices | 69 |
| Appendix A: Common Terms | 69 |
| Appendix B: Specifications | 70 |

| | |
|---------------------------------------------------------------------------|----|
| Appendix C: Battery Xplorer Workstation system Requirements | 71 |
| Appendix D: Preventative Maintenance | 72 |
| Appendix E: UXBM/50 Battery Module Drawing for Cabinet Applications | 73 |
| Appendix F: Drawing for Open Rack Applications | 75 |

SAFETY INFORMATION

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.

- Use safety equipment when working in and around the batteries.
- Never energize the module until after the installation is complete.
- Never exceed equipment voltage, power ratings or capabilities.
- Use of this product in a manner not specified could compromise the designed in safety of this product.

Safety Symbols

The symbols below are affixed to the module. It is important to review these symbols and to understand the type of instructional information they convey.

Table 3.1 Safety Symbols

| SYMBOL | MEANING |
|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>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.</p> |
|  | <p>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.</p> |
|  | <p>The Note symbol calls attention to important information. Describes additional information to help the user.</p> |
|  | <p>Equipment protected throughout by double insulation or reinforced insulation.</p> |

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 equipment.

Any adjustment, maintenance or repair of this product must be performed by qualified personnel. Contact an 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.

Disconnect Device

The power switch on the rear of the UXCM is the primary disconnect device. Do not install the UXCM in such a way as to make it difficult to access or operate this switch.

Equipment Grounding

To minimize shock hazard, the system chassis must be connected to an electrical protective earth ground if/when required. When AC mains are used for the power source, the system must be connected to the AC power mains through a grounded power cable, with the ground wire firmly connected to an electrical safety ground at the power outlet.

Fuses

For continued protection, only the fuses with the required rated current, voltage, and specified type, i.e. normal slo-blo, fast blow, time delay, etc. must be used.

Equipment Access

Operating personnel must not remove equipment covers, shields, and or panels. Component repair and/or 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 your Vertiv representative to ensure the safety features are maintained.



CAUTION: 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

The power cord should only be replaced by an equivalent of the same type and rating. Contact your Vertiv representative if a replacement power cord is needed. Do not replace with an inadequately rated power cord.



CAUTION: 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. For example, all Current Transducers used with this product must be UL recognized. 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.



WARNING! This Monitor is designed for UPS systems that are 700V or less and a Maximum 350V with respect to earth ground.

If you are using an optional UPS with the system, be certain the UPS internal battery is functional. Follow instructions in the UPS manufacturer's manual.

1 PRODUCT OVERVIEW

1.1 Product Description

NOTE: This document applies to both BDSU-50 and BDSUi products.

The Universal Xplorer UXBM/50 Battery Monitor is a data acquisition module for the flexible BDSU stationary battery monitor system. This module is designed for use in high voltage UPS applications that support configurations specifically designed for UPS battery cabinets and open rack installations with up to 50 12/16V modules in series. Equipped with pre-fabricated harnesses from the factory, make this a fast and simple installation. Each system is considered a stand-alone system, in that no external computer is required for normal operation. Standard features permit the system to easily integrate to 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.
- Local USB connectivity to view and analyze battery systems using laptop computers.
- Entire battery history resides on embedded databases within monitor. This is beneficial if third party service provider's service batteries and monitoring equipment, no access to company network is needed.

With the UXBM/50, all your battery parameters are measured and constantly monitored against user defined thresholds. In addition, what sets 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 resistance proactive test, other parameters are monitored to ensure optimal battery performance and life, which are measured by the following:

- Module Level Measurements
 - Individual Module Resistance
 - Individual Module Voltage
 - Individual Module Temperature (Optional)
- System Level Measurements
 - Overall Volts
 - String current (Discharge/Float)
 - Ripple Current
 - Ambient Temperatures
 - Intertier/Inter-row/Inter-shelf Cable Resistance
 - Mid String Disconnect Switch Resistance

- Thermal runaway

1.2 Features

- Modular architecture to support virtually any battery configuration.
- Continual real time scanning of the following parameters:
 - Individual module voltage
 - Individual module temperature (Optional)
 - String discharge current
 - String float current
 - String ripple current
 - Ambient temperatures
- Automatic scheduled testing of internal resistance, intertier/inter-row and mid string disconnect switch connection measurements
- Stores discharge events to allow playback of recorded data including module voltages and temperatures, currents and ambient temperatures
- Fiber optic connectivity for BDSU system network integration
- Form C contact for battery parameter or hardware alarm
- Form C contact for thermal runaway control. Charger control relay output for thermal runaway management. (Automatically shuts down charger when thermal runaway is detected.)
- Embedded Web server for viewing battery data via Web browsers
- Embedded email manager for delivery of alerts and battery data on a defined priority to service technicians.
- Isolated RS-485 interface for third party vendor integration
- Ethernet connectivity for connection to company network
- Compact 1U, cabinet top mount enclosure or 19" rack mount optional
- USB connectivity for PC to allow real time data viewing and configuration
- Local status indicators and alarm reset
- Maintenance override - global disable of all alarms
- Self calibrating
- Supports MODBUS (via RS-485 & Ethernet) and SNMP (via Ethernet) protocols
- Expandable architecture to support entire corporate infrastructure. (UPS, telecom, utilities, genset, etc.)
- Communication via IntelliSlot architecture to support multiple communication protocols and physical connection requirements.
- USB host and peripheral connections for PC and USB memory drive connections.
- Fiber optic connectivity between modules to maintain isolation.

1.3 Measurement Capabilities (Maximum Per String)

Cell Or Monobloc Level Measurements

- Up to 50- 12V voltages or 30 - 16V volt
- 50 temperatures on negative cell post (Optional)
- 50 internal resistances

System Level Measurements

- Overall voltage
- *Discharge current
- *Float current
- *Ripple current
- 2 Ambient temperatures
- 12 intertier/inter-shelf or mid string disconnect resistance

*Optional Transducers required

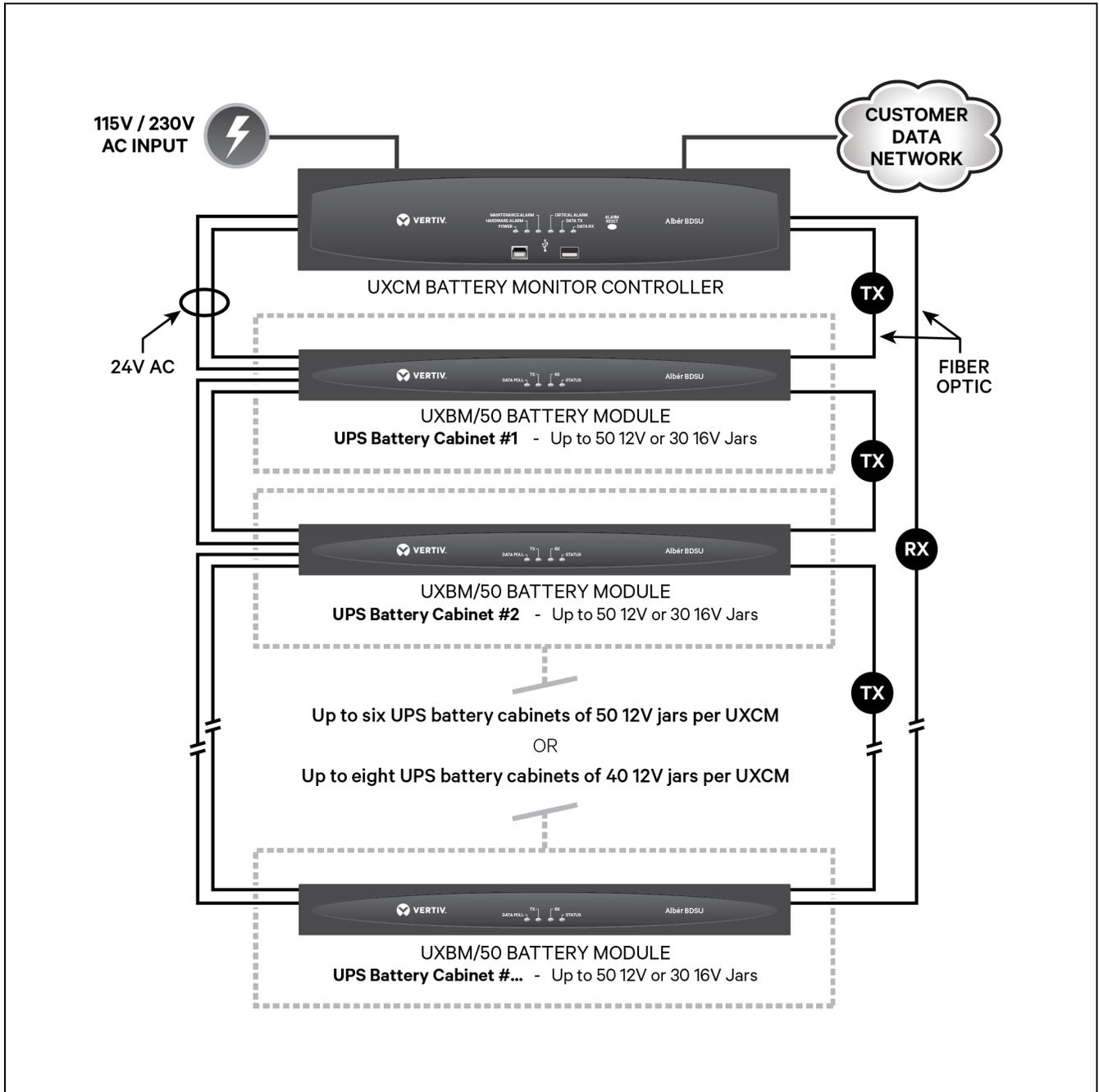
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2 SYSTEM OVERVIEW

An example of the BDSU system is shown below using the UXCM (Universal Control Module) and UXBM/50 modules. This is a flexible and modular architecture that permits virtually any battery system to be monitored. The following figure, illustrates the two modules that define a typical system, but additional module types can easily be added to monitor other battery systems that may include switch gear, generator start or telecom batteries. The BDSU architecture is the most flexible and expandable system available.

One UXCM supports monitoring of up to 320 cells or monoblocs and can be assigned up to 32 batteries or strings. As an example, two UPS's with four strings of 40 - 12V monoblocs on each UPS (battery) would measure a total of 320 monoblocs. Additional UXCM's can be added to monitor an unlimited number of strings.

Figure 2.1 Typical UXCM and UXBM/50 System Diagram



2.1 Universal Control Module (UXCM)

The UXCM allows the system to stand alone, in that no external PC is required to perform continuous monitoring. Several models of the UXCM are available, depending on the industry in which it will be used. Optional communication cards are also available, permitting the system to connect to a building management system or another type of remote monitoring service that requires an alternate protocol. The UXCM has the following features:

- Supports a network of up to eight UXBM modules, this is dependent on the type of battery Module, where a module is defined as one UXBM/50 (Battery Module). These eight UXBM modules can be distributed across multiple batteries or strings with complete isolation between them.
- Supports up to eight strings of up to 40x12V or six strings of up to 50x12V, or up to eight strings of up to 36x16V as long as the maximum 320 cell / monobloc limitation is not exceeded.
- Coordinates all monitoring and testing of battery and system parameters.
- Contains an embedded database for storage of the entire life of battery data.
- Communicates via two IntelliSlots for optional remote or local communication protocols, such as MODBUS, SNMP, SMTP, SMS, HTTP and others.
- Equipped with USB interfaces for PC use and USB memory sticks for performing data archiving and field firmware upgrades.
- 115/230 AC power
- Fiber optic connectivity for system network.

2.2 Universal Battery Module (UXBM/50)

The UXBM/50 monitors all-pertinent, related battery information with up to 50 monoblocs. The unit will function on all typical lead acid configurations used for stationary standby applications. The UXBM/50 has the following features:

- Monitors up to 50 monobloc voltages, 12V and 30 monobloc voltages, 16V
- Monitors up to 50 monobloc temperatures (optional hardware required)
- Monitors up to 50 monobloc internal resistances
- Monitor 1 to 12 intertier/Inter-shelf/inter-row or mid string disconnect switch resistances
- Monitor string level parameters such as discharge, float and ripple currents, overall voltage and ambient temperatures
- Interface to optional modules for monitoring individual monobloc temperatures
- Low voltage 24VAC powered (Supplied from UXCM)
- Charger contact for charger control connection. Charger control relay output for thermal runaway management. (Automatically shuts down charger when thermal runaway is detected.)
- Self calibrating

2.3 Optional Accessories

The following optional accessories are available.

- Float current transducers
- Individual monobloc temperature sensors
- String current CTs for AC ripple and discharge currents
- Ambient Temperature Probes

2.3.1 Building Management System Integration

The BDSU-50 system can be integrated to an existing building management system. Connection to the BDSU-50 system is made through the IntelliSlot® card. The IS-UNITY-DP card is available to allow connection via Modbus RTU, Modbus TCP, BACnet MSTP and BACnet IP. Both of these interfaces will communicate MODBUS and the Ethernet will permit SNMP and HTTP. Depending on the requirements, the appropriate option Intellislot card will need to be ordered.

3 OPERATING MODES

Although the monitoring system can be used as a maintenance tool, the real advantage is being able to assess the current status of the batteries at a glance. By the use of status lights and extensive graphics within the Battery software, access to pertinent status and alarm events is easy.

3.1 Normal Operating Mode

In normal operating mode, the system continuously scans all parameters within one second time frame. As readings are taken, they are compared to user programmed alarm thresholds. Each parameter is constantly compared to the previously scanned value and, if the value changes, the Change of Value (COV) is recorded and sent to the UXCM and Battery software for real time data viewing. This COV technology removes the need for polling all battery monitor systems to obtain updates. Alarm events and actual battery data are reported much faster than traditional battery monitoring schemes that require each battery monitor to be connected and then queried for new data updates.

3.2 Discharge Mode

If a discharge is detected, the system goes into a data logging mode and stores battery voltages, temperatures, and discharge currents into an embedded database. Discharge events can then be played back at real or accelerated time. The ability to analyze and review discharges can provide details about the battery, the cell or monobloc performance, and battery runtime. The collection of data and reports does support the IEEE recommended practices.

3.2.1 Acceptance/Performance Test

Real time data viewing is a required feature in order to safely monitor individual cell voltage, overall voltage, and intertier resistance during a discharge. Real time viewing and alarming lets the user proactively stop the discharge test to avoid potentially hazardous situations.

3.2.2 Resistance Test

A battery resistance test may be performed at set intervals or on demand. The test utilizes a patented technology that can identify failing cells or monoblocs, allowing service to be performed on a proactive schedule. Additional measurements can include intercell and intertier or interrow resistance measurements for identifying bad connections due to improper torquing or corrosion at the connections.

3.3 Alarm Mode

Every monitored parameter can have an assigned alarm threshold. When any parameter goes outside the normal range, the monitor stores the event in a database, the Alarm LEDs on the UXCM and the associated UXBM/50, and an alarm relay with a Form C contact energizes.

All monitored parameters can have the alarms programmed for latching or non-latching of events and control maintenance or critical alarm contact closures.

- Configurable alarm filters may be defined for only desired dates and parameters.

- Graphical pie and stacked bar charts may be used for alarm identification and analysis.
- High and low alarm thresholds levels can be assigned for each individual cell or monobloc or one global threshold for all cells or monoblocs.
- High and low alarm levels may be programmed on all system level monitored parameters.
- Total alarm summaries are available for customer, location, battery, string or specific monitored parameters.

4 MODEL NUMBER DESCRIPTIONS

System configurations typically include a UXCM, and UXBM/50 one or more depending on the number of strings being monitored.

4.1 UXCM Model Numbering

The UXCM model number is in the format PPPP-PSC-B where PPPP is 1011 and P, S, C, and B are described below.

Table 4.1 UXCM Model Number Description

| PPPP | P | S | C | B | DESCRIPTION | CHOICES | NOTES |
|-------|---|---|---|---|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| 1011- | P | | | | Input Power | 0 = 115 VAC 1 = 230 VAC | |
| 1011- | | S | | | Strings Supported | 0 = No distributed power* 1 = Power up to 2 strings 2 = Power up to 4 strings 3 = Power up to 6 strings 4 = Power up to 8 strings | Powers up to 2 USBM/50 units Powers up to 4 UXBM/50 units Powers up to 6 UXBM/50 units Powers up to 8 UXBM/50 units |
| 1011- | | | C | | Communications | 1 = Fiber optic 2 = Reserved | |
| 1011- | | | | B | Branding | 0 = OEM 1 to 9 = Reserved | |

*These options must be specified together

Example: Control module with 115VAC input, output power for 2-4 strings, fiber optic communications and OEM branding.

The following table shows typical UXCM model numbers.

Table 4.2 Typical UXCM Model Numbers

| UXCM MODELS | DESCRIPTION | INPUT POWER | COMMUNICATION | OEM |
|-------------|-------------------------------|-------------|---------------|-----|
| 1011-011-0 | Power for up to two strings. | 115 VAC | Fiber optic | Yes |
| 1011-121-0 | Power for up to four strings. | 230 VAC | Fiber optic | Yes |

4.2 UXBM/50 Battery Module Model Numbering

The UXBM/50 model number is in the format PPPP-nnn-XXX-B, where PPPP is 1009, nnn is UXBM/50 model, XXX is battery configuration and B is described below.

Table 4.3 UXBM/50 Model Number Description

| PPPP | NNN | XXX | B | DESCRIPTION | CHOICES |
|-------|-----|-----|---|--------------------------------|------------------------------|
| 1009- | 100 | | | UXBM/50 | |
| 1009- | | xxx | | Hardware configuration options | See the following tables. |
| 1009- | | | B | Branding | 0 = OEM 1 to 9 = Reserved |

NOTE: Actual battery cabinet configurations must be specified for verification of harness options when ordering a UXBM/50.

The following tables provides the cabinet and open rack application hardware configuration for each option of the UXBM/50 module:

Table 4.4 UXBM/50 Hardware Configuration Description for Option 001

| HARDWARE CONFIGURATION OPTION 001 |
|-----------------------------------------------------|
| 1X24X12V, 6 Shelves of 4 Jars |
| 1X18X12V, 2 Shelves of 9 Jars |
| 1X18X12V, 3 Shelves of 6 Jars |
| 1X24X12V, 3 Shelves of 8 Jars |
| 1X30X12V, 2 Shelves of 12 Jars or 1 Shelf of 6 Jars |
| 1X18X12V, open rack |
| 1X21X12V, open rack |
| 1X24X12V, open rack |
| 1X27X12V, open rack |
| 1X30X12V, open rack |
| 1X30X12V, 5 Shelves of 6 Jars |
| 1X30X12V, 10 Shelves of 3 Jars |
| 1X30X12V, 1 Shelf of 6 Jars, 3 Shelves of 8 Jars |

Table 4.5 UXBM/50 Hardware Configuration Description for Option 002

| UXBM/50 HARDWARE CONFIGURATION DESCRIPTION FOR OPTION 002 |
|-----------------------------------------------------------------------------|
| 1X40X12V, 10 Shelves of 4 Jars |
| 1X36X12V, 3 Shelves of 12 Jars |
| 1X40X12V, 5 Shelves of 8 Jars |
| 1X20X12V, 4 Shelves of 5 Jars |
| 1X20X12V, 3 Shelves of 6 jars and 1 shelf of 2 jars |
| 1X40X12V, 1 Shelf of 6 Jars and 2 Shelves of 12 Jars and 1 Shelf of 10 Jars |
| 1X20X12V, 1 Shelf of 2 Jars and 3 Shelves of 6 Jars |
| 1X40X12V, 2 Shelves of 15 and 1 Shelf of 10 Jars |
| 1X26X12V, 1 Shelf of 8 Jars and 2 Shelves of 9 Jars |
| 1X40X12V, 2 Shelves of 12, 1 Shelf of 9 Jars and 1 Shelf of 7 Jars |
| 1X20X12V, 1 Shelf of 7 jars, 1 shelf of 6 Jars and 1 self of 7 Jars |
| 1X40x12V, 6 Shelves of 2 Shelves 8 Jars, 2 Shelves 4 Jars, 2 Shelves 8 Jars |
| 1X40X12V, 3 Shelves of 12 Jars, 1 Shelf of 4 Jars |
| 1X40X12V, 1 Shelf of 24 Jars, 1 Shelf of 16 Jars |
| 1X17X12V, open rack |
| 1X19X12V, open rack |
| 1X20X12V, open rack |
| 1X22X12V, open rack |
| 1X23X12V, open rack |
| 1X25X12V, open rack |
| 1X26X12V, open rack |
| 1X28X12V, open rack |
| 1X29X12V, open rack |
| 1X31X12V, open rack |
| 1X32X12V, open rack |
| 1X33X12V, open rack |
| 1X36X12V, open rack |
| 1X37X12V, open rack |
| 1X40X12V, open rack |

Table 4.5 UXBM/50 Hardware Configuration Description for Option 002 (continued)

| UXBM/50 HARDWARE CONFIGURATION DESCRIPTION FOR OPTION 002 |
|------------------------------------------------------------------|
| 1X41X12V, open rack |
| 1X48X12V, open rack |
| 1X30X16V, open rack |

Table 4.6 UXBM/50 Hardware Configuration Description for Option 003

| HARDWARE CONFIGURATION OPTION 003 |
|------------------------------------------|
| 1X24X12V, 8 Shelves of 3 Jars |
| 1X24X12V, 4 Shelves of 6 Jars |

Table 4.7 UXBM/50 Hardware Configuration Description for Option 004

| UXBM/50 HARDWARE CONFIGURATION DESCRIPTION FOR OPTION 004 |
|----------------------------------------------------------------------------------------------|
| 1X36X12V, 4 Shelves of 9 Jars |
| 1x32X12V, 4 Shelves of 8 Jars |
| 1x32X12V, 3 Shelves of 8 Jars and 2 Shelves of 4 Jars |
| 1X33X12V, 1 Shelf of 15 Jars and 1 Shelf of 18 Jars |
| 1X40X12V, 4 Shelves of 4 Jars and 4 Shelves of 6 Jars |
| 1X36X12V, 1 Shelf of 10 Jars and 1 Shelf of 8 Jars, 1 Shelf of 10 Jars and 1 Shelf of 8 Jars |
| 1X32X12V, 8 Shelves of 4 Jars |
| 1X36X12V, 5 Shelves of 7 Jars and 5 Shelves of 5 Jars |

Table 4.8 UXBM/50 Hardware Configuration Description for Option 005

| UXBM/50 HARDWARE CONFIGURATION DESCRIPTION FOR OPTION 005 |
|------------------------------------------------------------------|
| 1X34X12V, 2 Shelves of 12 Jars and 1 Shelf of 10 Jars |
| 1X38X12V, 9 Shelves of 4 Jars and 1 Shelf of 2 Jars |
| 1X34X12V, open rack |
| 1X35X12V, open rack |
| 1X38X12V, open rack |
| 1X42X12V, open rack |
| 1X44X12V, open rack |
| 1X46X12V, open rack |
| 1X49X12V, open rack |
| 1X50X12V, open rack |

Table 4.9 UXBM/50 Hardware Configuration Description for Option 006

| UXBM/50 HARDWARE CONFIGURATION DESCRIPTION FOR OPTION 006 |
|--------------------------------------------------------------------------|
| 1X40X12V, 4 Shelves of 10 Jars |
| 1X40X12V, 8 Shelves of 5 Jars |
| 1X40X12V, 2 Shelves of 20 Jars |
| 1X32X12V, 2 Shelves of 9 Jars, 1 Shelf of 5 Jars and 1 Shelf of 9 Jars |
| 1X36X12V, 9 Shelves of 4 Jars |
| 1X36X12V, 4 Shelves of 8 Jars and 1 Shelf of 4 Jars |
| 1X36X12V, 1 Shelf of 5 Jars, 2 Shelves of 3 Jars and 5 Shelves of 5 Jars |
| 1X36X12V, 3 Shelves of 10 Jars, 1 Shelf of 6 Jars |

Table 4.10 UXBM/50 Hardware Configuration Description for Option 007

| UXBM/50 HARDWARE CONFIGURATION DESCRIPTION FOR OPTION 007 |
|------------------------------------------------------------------|
| 1X40X12V, 2 Shelves of 12 Jars and 2 Shelves of 8 Jars |
| 1X29X12V, 1 Shelf of 5 Jars and 3 Shelves of 8 Jars |
| 1X36X12V, 2 Shelves of 18 Jars |

Table 4.11 UXBM/50 Hardware Configuration Description for Option 008

| UXBM/50 HARDWARE CONFIGURATION DESCRIPTION FOR OPTION 008 |
|------------------------------------------------------------------|
| 1X30X12V, 3 Shelves of 8 Jars and 1 Shelf of 6 Jars |
| 1X30X12V, 6 Shelves of 4 Jars and 2 Shelves of 3 Jars |

Table 4.12 UXBM/50 Hardware Configuration Description for Option 009

| UXBM/50 HARDWARE CONFIGURATION DESCRIPTION FOR OPTION 009 |
|------------------------------------------------------------------|
| 1X30X12V, 3 Shelves of 10 Jars |
| 1X30X12V, 6 Shelves of 5 Jars |

Table 4.13 UXBM/50 Hardware Configuration Description for Option 010

| UXBM/50 HARDWARE CONFIGURATION DESCRIPTION FOR OPTION 010 |
|------------------------------------------------------------------------|
| 1X40X12V, 1 Shelf of 6 Jars, 4 Shelves of 7 Jars and 1 Shelf of 6 Jars |
| 1X33X12V, 1 Shelf of 4 Jars, 4 Shelves of 6 Jars and 1 Shelf of 5 Jars |
| 1X40X12V, 1 shelf of 4 Jars and 6 Shelves of 6 Jars |

Table 4.14 Hardware Configuration Option 011

| HARDWARE CONFIGURATION OPTION 011 |
|--------------------------------------------------|
| 1X30X12V, 3 Jars, 6 Shelves of 4 Jars and 3 Jars |
| 1X30X12V, 2 Shelves of 15 Jars |

Table 4.15 UXBM/50 Hardware Configuration Description for Option 012

| UXBM/50 HARDWARE CONFIGURATION DESCRIPTION FOR OPTION 012 |
|--------------------------------------------------------------------------|
| 1X32X12V, 3 Shelves of 2 Jars, 8 Shelves of 3 Jars and 1 Shelf of 2 Jars |
| 1X40X12V, 6 Shelves of 6 Jars and 1 Shelf of 4 Jars |
| 1X40X12V, 4 Shelves of 6 Jars and 4 shelves of 4 Jars |

Table 4.16 UXBM/50 Hardware Configuration Description for Option 013

| UXBM/50 HARDWARE CONFIGURATION DESCRIPTION FOR OPTION 013 |
|------------------------------------------------------------------|
| 1X34X12V, 3 Shelves of 9 Jars and 1 Shelf of 7 Jars |

Table 4.17 UXBM/50 Hardware Configuration Description for Option 014

| UXBM/50 HARDWARE CONFIGURATION DESCRIPTION FOR OPTION 014 |
|------------------------------------------------------------------|
| 1X40X12V, 1 Shelf of 4 Jars and 3 Shelves of 12 Jars |

Table 4.18 UXBM/50 Hardware Configuration Description for Option 015

| UXBM/50 HARDWARE CONFIGURATION DESCRIPTION FOR OPTION 015 |
|------------------------------------------------------------------|
| 1X24X16V, 8 Shelves of 3 Jars |

Table 4.19 UXBM/50 Hardware Configuration Description for Option 016

| UXBM/50 HARDWARE CONFIGURATION DESCRIPTION FOR OPTION 016 |
|------------------------------------------------------------------|
| 1X30X16V, 6 Shelves of 5 Jars |

Table 4.20 UXBM/50 Hardware Configuration Description for Option 017

| UXBM/50 HARDWARE CONFIGURATION DESCRIPTION FOR OPTION 017 |
|------------------------------------------------------------------|
| 1X30X16V, 10 Shelves of 3 Jars |
| 1X30X16V, 5 Shelves of 6 Jars |

Table 4.21 UXBM/50 Hardware Configuration Description for Option 018

| UXBM/50 HARDWARE CONFIGURATION DESCRIPTION FOR OPTION 018 |
|------------------------------------------------------------------|
| 1X2X16V, 1 Shelf of 2 Jars |

Table 4.22 UXBM/50 Hardware Configuration Description for Option 019

| UXBM/50 HARDWARE CONFIGURATION DESCRIPTION FOR OPTION 019 |
|---------------------------------------------------------------------------------------------|
| 1X34X12V, 4 Shelves of 5 Jars, 1 Shelf of 10 Jars, 1 Shelf of 9 Jars and 1 Shelf of 10 Jars |
| 1X34X12V, 4 Shelves of 8 jars and 1 Shelf of 2 Jars |

4.3 UXCM Part Numbers for Standard and Optional Accessories

The following table describes UXCM Part Numbers for the optional accessories available. The model numbers previously described do not change when options are purchased.

NOTE: These accessories are configuration dependent.

Table 4.23 UXCM Part Numbers for Standard and Optional Accessories

| NAME | PART NUMBER | DESCRIPTION |
|---------------------------|--------------|--------------------------------------------------------------------|
| Power cable zip cord | 6002-080 | Power cable for UXCM |
| UNITY Intellislot Card IP | IS-UNITY-DP | IntelliSlot Modbus RTU, Modbus TCP, BACnet MSTP or BACnet |
| Fiber Optic Cable | 3703-006 | Cable for fiber optic connection |
| 2U 19" Rack Mounting Kit | KIT-1400-529 | Rack mounting kit for 2U 19" (Optional) |
| Stacking Bracket Kit | KIT-1400-530 | Stacking Bracket kit for UXCM. One set is included with each UXCM. |

4.4 UXBM Part Numbers for Standard and Optional Accessories

The following table describes the UXBM Part Numbers for the optional accessories available. The model numbers previously described do not change when options are purchased.

NOTE: These accessories are configuration dependant.

Table 4.24 UXBM Part Numbers for Standard and Optional Accessories

| NAME | PART NUMBER | DESCRIPTION | REQUIREMENTS |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| Sense/load lead harness (standard) cabinet | Unique part number per configuration | Harness for monitoring internal monobloc resistance measurements as a combined measurement, including the cell plus the intercell connector. | One to six are required per UXBM/50 configuration. |
| Cabling Configuration Open Rack Configuration | 1102-564 | Harness for monitoring internal monobloc resistance measurements and intertier connector measurements. | One to six are required per UXBM/50 configuration. |
| Ambient temperature sensor (standard) | 1102-553-25 Single 1102-554-25 Dual | Ambient temperature sensor to monitor room or cabinet temperature. | One or two per string. Two is optional. |
| String / ripple current transducer (optional) | Current Transducer Interface Cable 1102-567 Standard Opening 5610-024 / 600 Amp 2.25" Diameter 5610-021 / 2000 Amp 1.25" X 4.5" Large Opening 3" X 6" 5610-023 / 3000 Amp 5610-022 / 2000 Amp | Module to measure string current during discharge and AC ripple current during float conditions. | One cable required per string with current transducer option. |
| Float current sensor (optional) | Float Current Interface Cable 1102-568 Float Current Transducer 5610-053 | Sensor to measure DC float current of string. | One per string. |
| 1U 19" Rack Mounting Kit | KIT-1400-527 | Rack mounting kit for 1U 19" (Optional) | Allows UXBM to be 19" rack mounted. |

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5 PANEL CONTROLS AND INDICATORS

This section describes the components on the front, rear and top panels of the UXCM, UXBM/50.

5.1 UXCM Front Panel

This section describes the components on the front panel of the UXCM, part number 1011-nnn-nn.

Figure 5.1 UXCM Front Panel

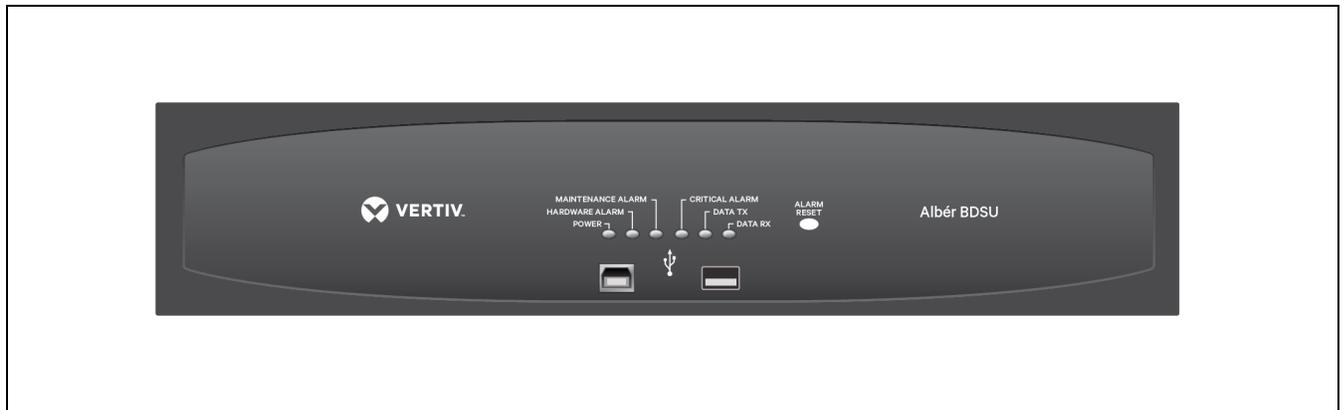


Table 5.1 UXCM Front Panel Components

| DESCRIPTION | FUNCTION |
|-------------------|---------------------------------------------------------------------------------------|
| Alarm Reset | Clears latched alarms. |
| Maintenance Alarm | Yellow when a maintenance alarm is detected. |
| Hardware Alarm | Red when a hardware problem is detected. |
| Power | Green when power is applied to the unit. |
| Critical Alarm | Red when a critical alarm is detected. |
| Data Tx | Green when transmitting data via fiber optic cable. |
| Data Rx | Green when receiving data via fiber optic cable. |
| USB Peripheral | Allows connectivity of computers for setup, configuration and real-time data viewing. |
| USB Host | Allows connectivity of USB memory devices for data archiving and firmware upgrades. |

5.2 UXCM Rear Panel

Figure 5.2 UXCM Rear Panel

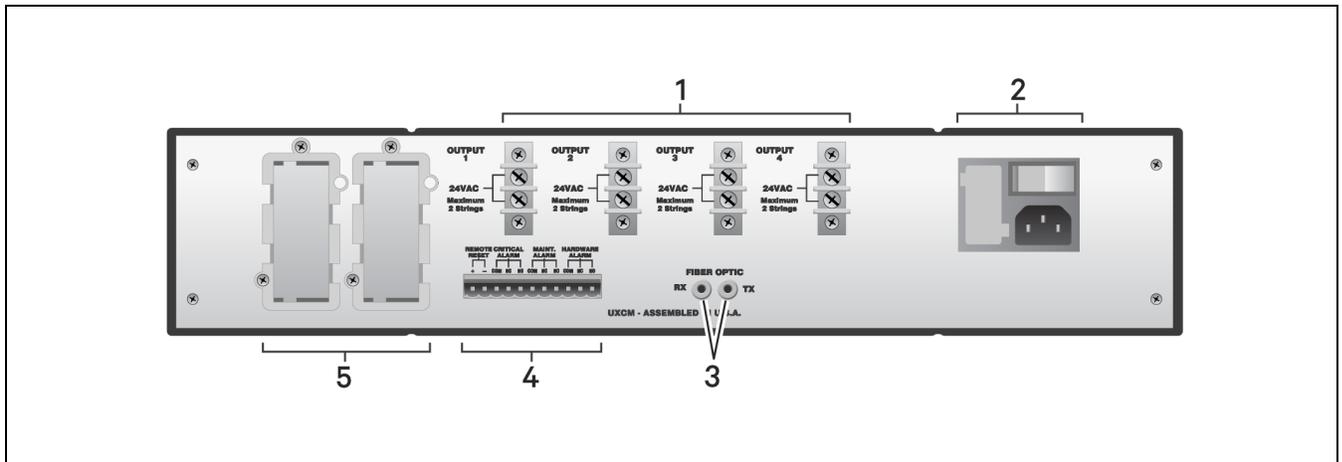


Table 5.2 UXCM Rear Panel Components

| NUMBER | DESCRIPTION | FUNCTION |
|--------|--------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| 1 | 24VAC output power connections | Power connections for UXBM/50 when a UXCM is connected to multiple strings. |
| 2 | Power switch and AC power receptacle | Turns UXCM on and off. Power cord connector and fuse holder. |
| 3 | Fiber optic connections | Used for communications to the UXBM/50. |
| 4 | Remote alarm reset input and Form C alarm relay output connections | Permits a remote alarm reset to be activated by shorting these two pins. Alarm outputs for critical, maintenance and hardware alarms. |
| 5 | Two IntelliSlots | Used for remote connectivity and optional protocol requirements. |

6 SYSTEM INSTALLATION CONSIDERATIONS

This section describes items that should be considered before installing the BDSU-50 system.

6.1 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.

6.2 Power Options

6.2.1 UXCM

There are three power options for the UXCM. The following are the service requirements for each of those types:

- 115VAC; 50/60Hz; 3.6A
- 230VAC; 50/60Hz; 1.8A
- 24VAC; 800mA

6.2.2 UXBM/50

The UXBM/50s will obtain 24VAC power from the UXCM. Verify Hardware Configuration for battery string being monitored and whether a battery cabinet or open rack installation is required. Verify the UXBM/50 battery module model number is the correct version for the type of battery being monitored. Some shipments may include different models, so make sure that each UXBM/50 is verified before installation.



CAUTION: If the wrong configuration is installed on to the battery, the system could be permanently damaged.

Locate the model number label on the rear panel of the UXBM/50 and locate the Model Number. Verify this is the correct model that each string is being connected to.

Verify the string configuration of the UXBM/50 battery module matches the string configuration of the battery being monitored. The model number is in the format PPPP-nnn-XXX-B, where PPPP is 1009, nnn is 100 Model, XXX is the battery configuration.

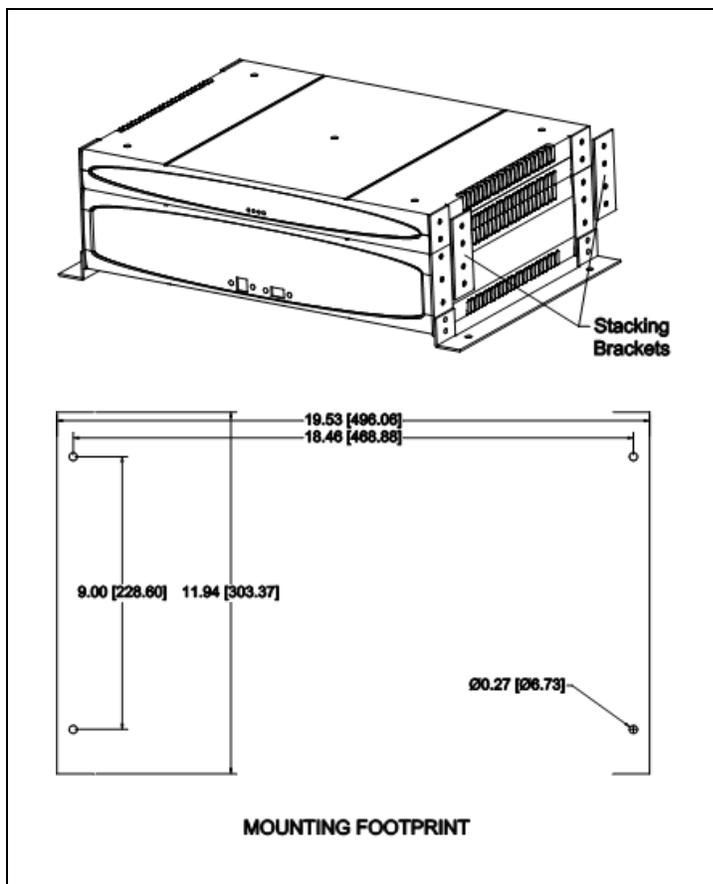
If any discrepancies or concerns are identified, contact Vertiv Technical Support before continuing the installation.

6.3 Mounting Options

6.3.1 UXCM and UXBM/50

The UXCM and UXBM/50 battery module can accommodate two types of mounting; cabinet top mount or 19" rack mount. If the rack mount option is desired, optional brackets will need to be installed. On cabinet top installations, the mounting brackets can be arranged so the UXCM or UXBM/50 battery module sits flush on the cabinet top or can be elevated by ½" to accommodate battery cabinet ventilation. Optional stacking brackets allow a UXBM/50 unit to be stacked on top of the UXCM unit to reduce the cabinet top space required. The single footprint for either unit is shown below.

Figure 6.1 UXCM and UXBM/50 Mounting Dimensions



6.4 Wire Lengths

For battery cabinet applications, all sense lead harnesses come pre-fabricated and in most cases should not require additional lengths. External sensors like ambient temperature and current transducers may need to be shortened for a more organized installation. In the event where UXBM/50 battery module sense leads need to be extended, do not extend these longer than twenty feet.

If longer sense leads are required, use of the UXBM/50 battery module for open rack application types is recommended. Contact Vertiv for further assistance.

For battery open rack applications, all sense lead harnesses come at a 35' length. Each sense lead's length and routing has to be determined by the installer. Each sense lead will be cut to the appropriate length and will require assembling a resistor flex lead assembly for termination to the monobloc. Each fused load lead will be cut to the appropriate length and will require assembling a fuse holder assembly for termination to the monobloc.

6.5 Isolate the Battery String



CAUTION: De-energize and isolate the battery string. Never attempt installation on a battery string that is in service. Before performing any work, always isolate the battery string by turning off the charging circuits and opening the circuit breakers.

6.6 Identify Jars/Monobloc Number 1

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

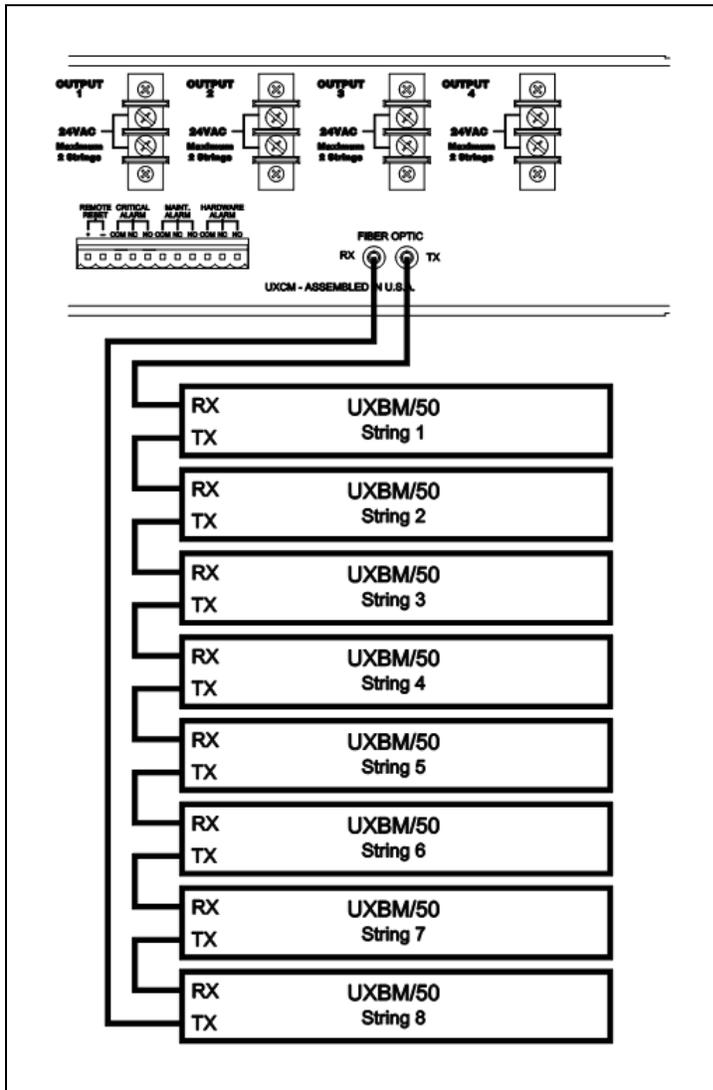
6.7 Fiber Optic Cable, UXCM and UXBM/50 Communication Information

The UXCM and the UXBM/50 battery module communicates via fiber optic cable and the system forms a communication ring network.

NOTE: The maximum length of standard plastic fiber optic cable that may be used is 250 feet or 76 meters. Proper fiber end termination; cleaving and polishing, is necessary to obtain this length.

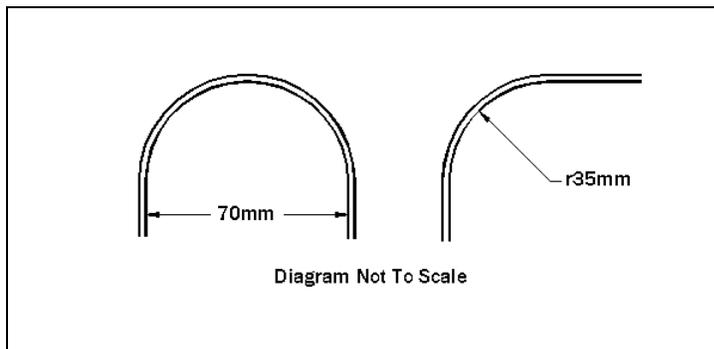
Transmit TX/FO on the UXCM connects to Receive RX/FO on the first UXBM/50 battery module. Transmit on the first UXBM/50 battery module connects to Receive on the next unit, and so on until Transmit on the last UXBM/50 unit returns to Receive on the UXCM. Refer to Figure below for details on the Fiber Optic Connection.

Figure 6.2 Fiber Optic Connection



Consider the physical facility and determine how the fiber optic and power cables connect to the UXBM/50 battery module and UXCM unit are situated. When installing the fiber optic cable, do not bend the cable in a radius tighter than 35mm.

Figure 6.3 Minimum Bend Radius of Fiber Optic Cable



NOTE: Use KIT-3703-015 to terminate fiber optic cable correctly.

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7 MATERIALS RECEIVED LIST

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

The following sections are divided into sections relative to types of hardware. This will help identify where these components will be used during the installation process.

7.1 UXBM/50 and UXCM Standard Inventory

Table 7.1 UXBM/50 Battery Module and UXCM Standard Inventory List

| PART NUMBER | DESCRIPTION |
|----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1009-100-XXX | UXBM/50 Battery Module |
| 1011-XXX | UXCM Battery Monitor Controller |
| 1103-710-XXA-1103 to 740-XXA | Sense/Load Lead Harness for Cabinet Applications Refer to drawings that were sent with the system, as harnesses are configuration dependent. The leads are labeled for easy installation. |
| 1102-564-XX | Sense/Load Lead Harness for Open Rack Applications Refer to drawings that were sent with the system as harnesses are configuration dependent. |
| Ambient temperature probe/assembled with cable Single: 1102-553-08 for cabinet applications 1102-553-35 for Open Rack applications | Ambient temperature sensor to monitor room or cabinet temperature measurement. One per string. Two per string is optional |
| 6002-080 | 2 Cond 16 GA Black Zip Cord AC power between units, 24VAC connection cord to units |
| 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. |
| 4302-030 | 30 AMP SB fuse. One for each fused load lead on open rack applications. Manufacturer Part No. KTK-R30 |
| 1100-433UL Or 1100-460UL | Fuse holder for load lead termination for open rack applications. |
| 1102-555 | 10K 0.1% Resistor Sense Lead Assembly for open rack applications. |
| 2140-022 | 4 Position connector used in construction of AC power harness |
| 2140-047 | Form C Alarm contact harness connector 4-pin connector for terminating harnesses. |
| 2140-036 | 11 position connector Used for remote alarm reset and relay connections on the UXCM. |
| 2025-108 | Exterior USB Cable USB2 Hi-speed cable Used for system hardware to computer communication. |
| 2120-060B | Tab washers Connector interface between harness and monobloc. |
| 6003-006 = EU 6003-007 = UK 6003-008 = US | AC Power Cord is dependent on country. Only used on AC powered systems. |

7.2 Battery Monitor Module (UXBM/50) and Controller (UXCM) Optional Inventory

Table 7.2 UXBM/50 Battery Module and UXCM Optional Inventory List

| PART NUMBER | DESCRIPTION |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Float Current Transducer 5610-053 Float Current Interface Cable 1102-568-08 (8' cable) | Multitel Float Charging Current Probe Kit Float current measurement transducer for a single string. |
| Ambient temperature probe/assembled with cable Dual: 1102-554-08 for cabinet applications 1102-554-35 for Open Rack applications | Ambient Temperature Probe/Assembled with cable Ambient temperature sensor to monitor room or cabinet temperature measurement. Two Ambient temperature sensors per string. |
| Current Transducer Interface Cable 1102-567-08 cabinet applications 1102-567-35 Open Rack applications Standard Opening 2.25" Diameter 600 Amp 5610-024 Standard Opening 1.25" X 4.5" 2000 Amp 5610-021 Large Opening 3.00" x 6.00" 2000 Amp 5610-022 Large Opening 3.00" X 6.00" 3000 Amp 5610-023 | String /ripple current transducer (optional) Module to measure string current during discharge and AC ripple current during float conditions. One cable required per string with current transducer option. |
| LT pn 2025-058 DT pn 2025-054 Printer pn 2025-127 | Computer/Printer Help to monitor the systems and capture data for reporting, etc. |
| KIT-1400-527 | 1U 19" Rack mounting kit (Optional) Contact your Sales representative for details. |
| KIT-1400-529 | 2U 19" Rack mounting kit (Optional) Contact your Sales representative for details. |
| KIT-1400-530 | Stacking Bracket kit Contact your Sales representative for details. One set of stacking brackets are included with each UXCM. |

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8 TAB WASHER AND HARNESS INSTALLATION FOR CABINET APPLICATIONS

The UXBM/50 battery module can be connected to almost any type of battery system that is comprised of 12V, or 16V monoblocs installed in a battery cabinet. Sense and load lead lengths are pre-determined and are terminated for installation to the monoblocs. The following sections will describe each of these installations in detail. Depending on which type of battery system is being monitored, it is possible to have some special situations. It is recommended that you review section [System Installation Considerations](#) on page 23.

NOTE: Verify that the wiring schematic drawing you received with your equipment is applicable to your specific battery configuration.

8.1 Tab Washer Installation Details

Tab washer placement is required at every monobloc positive post. Extra tab washers are also required on the negative post at the beginning of all intertier or shelf locations. In addition to the intertier wiring, there is also a tab washer needed at the negative post of the last monobloc.

Tab washers are also required for the resistive load leads. The resistive lead tab washer locations are determined by the battery configuration.

Place tab washers per wiring schematic drawings provided with the system. Installer of the Tab Washer should be aware of the tab's orientation to avoid possible interference with any battery jar's protective covers when the sense, intertier or load lead wires are attached.

NOTE: Never substitute tab washers with tab washers that were not supplied within the installation kit. Using after market or other types can potentially cause an error in the resistance readings.

Figure 8.1 Tab Washer

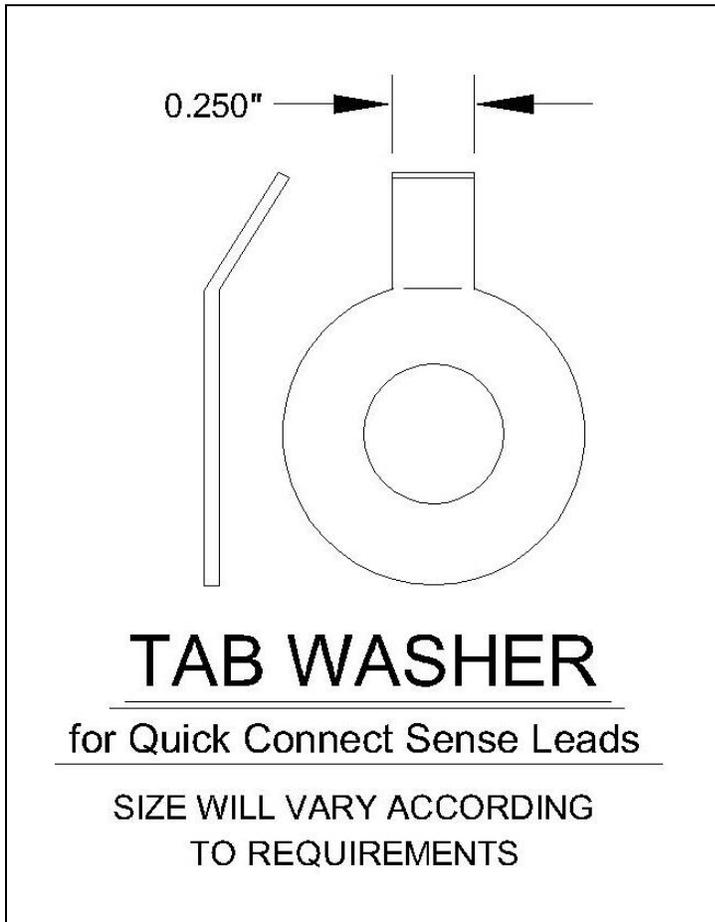
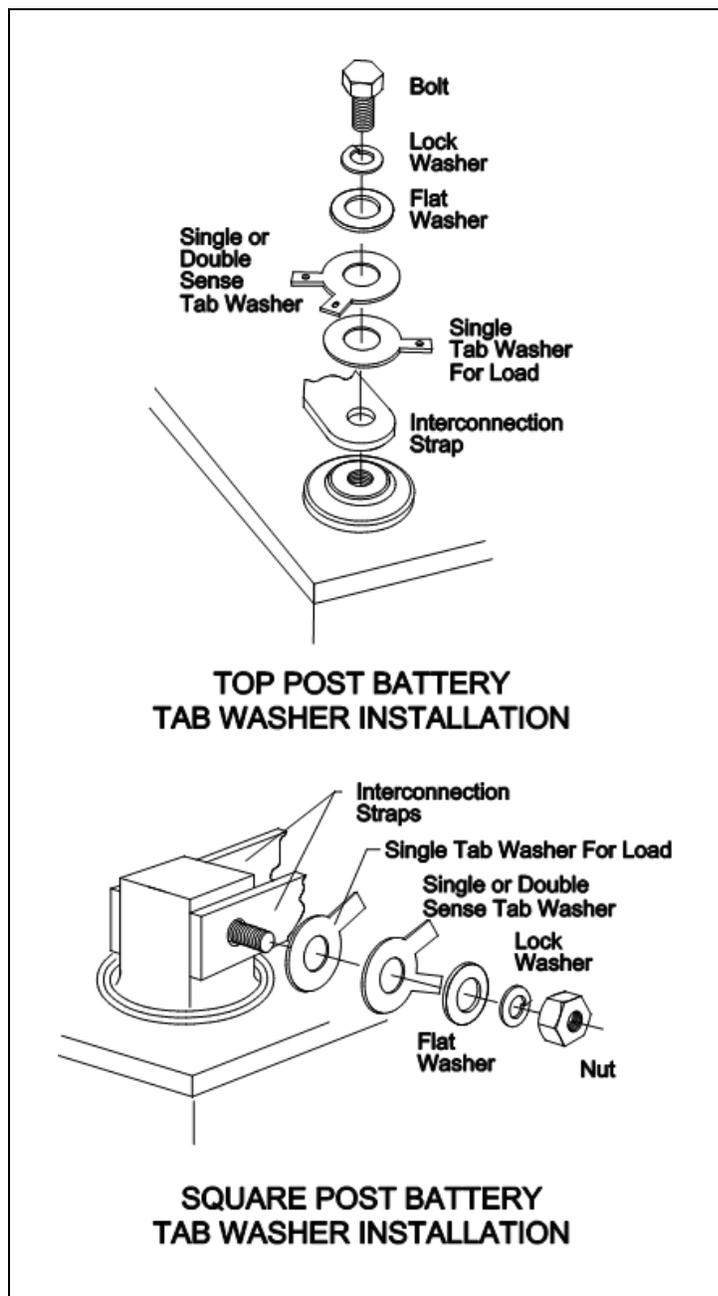


Figure 8.2 Exposed Post Power Lead and Tab Washer Assembly



8.2 Check Sense Lead Routing from UXBM/50 Battery Module to the Battery

The installer normally determines the harness/wire routing but double-checking measurements lengths and labels is advised. Please refer to Maximum Wire and Cable Lengths section for details.



CAUTION: Do not route the wires in the same conduit as other wires in the facility.

8.3 Sense/Load Lead Connections

Properly identify each sense lead to simplify the connection process. When connecting a sense lead to the same battery terminal as the load cable, the load cable must be closest to the monobloc post. See previous figure, Exposed Post Power Lead and Tab Washer Assembly.

Voltage sense leads connect from each UXBM/50 battery module to the individual monoblocs. Each sense lead has been cut to the appropriate length and terminated with 10K Ω resistor and quick connect terminal for termination to each monobloc. Connection points are determined by labeling on each lead. Wiring schematic drawings sent with the system can be used as an additional reference.

NOTE: A 10K Ω 1W .1% flameproof resistor that reduces the risk of a short circuit during installation and maintenance is preinstalled within the cable for safety.

The 18 GA load wires connect to certain monoblocs in the battery string. The cables come preassembled and the wire lengths have been predetermined and do not need cutting or terminating. Connection points are determined by labeling on each wire. Wiring schematic drawings sent with the system can be used as an additional reference.

8.4 Intertier Connections

Most battery installations have cables connecting groups of monoblocs on different levels (tiers) within a battery string. Since these intertier cables normally have higher resistance than intercell connections, additional sense leads are used to monitor the resistance of these cables.

NOTE: Intertier locations are predetermined by the battery configuration. Labels are on the cable assembly determine the landing points for intertier connections.

8.5 Discharge Current Sensor (Optional)

The UXBM/50 can be used with a magnetic Current Transducer (CT) to measure discharge current. This item can be specified at time of order. When using a magnetic current transducer, connect it to the Discharge Current Transducer connector on the rear of the unit. The current transducer provided depends on the application.

9 INSTALLING OPTIONAL SENSORS AND TRANSDUCERS

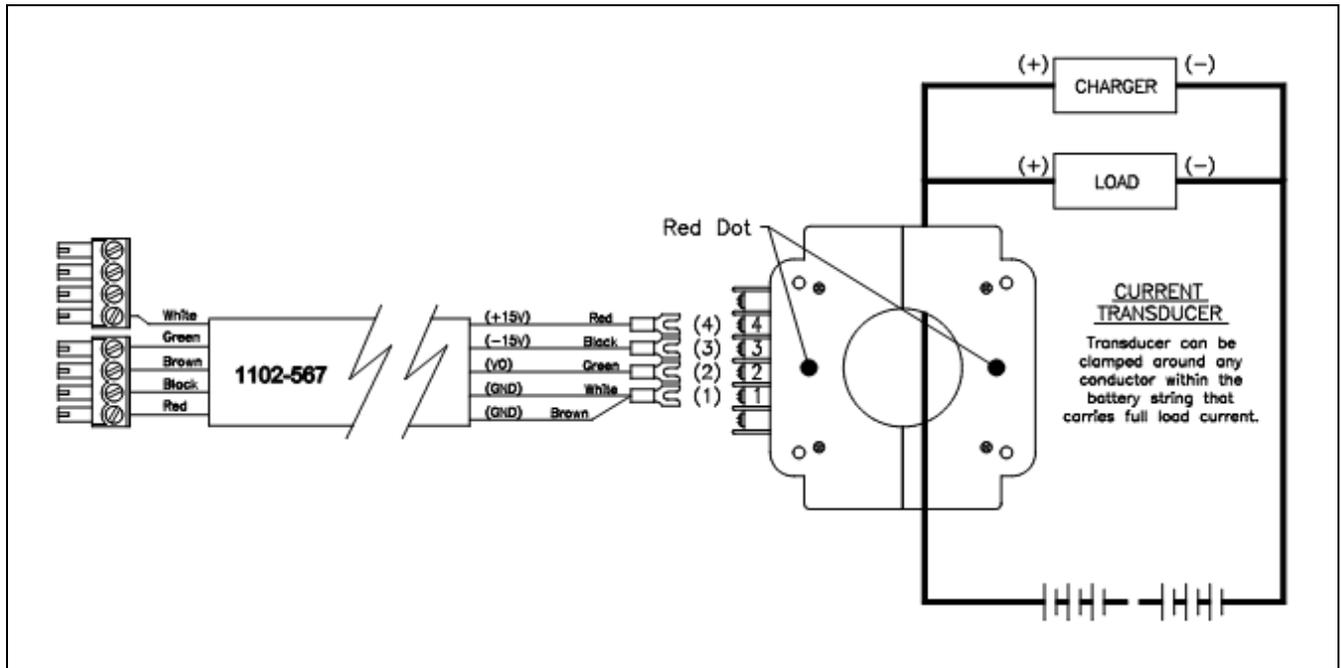
9.1 String Current Transducer

The system can be used with current transducers to measure high string currents such as charge and discharge currents. When installing this option a specific harness will be included in the installation kit. Standard cable is 1102-567-08 and is 8 feet in length. The Transducer itself is a split core design and requires to be installed across one of the battery cables that will be carrying all of the current going into or out of the battery. There are two dots on the casing that indicate the direction it needs to be installed. These two dots must always point closest to the positive end of the battery.

NOTE: If the sensor is not installed with the two dots pointing towards the positive end of the battery, discharge events will not be captured.

NOTE: If the sensor is not installed with the arrow in the correct direction (pointing towards the positive end of the battery), float current will not display properly.

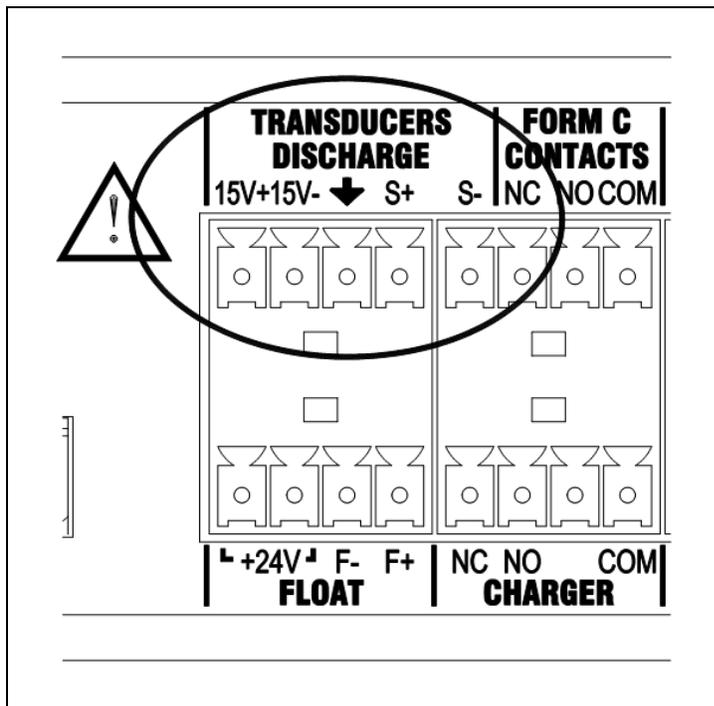
Figure 9.1 String Current Transducer Connections



When using a current transducer option, the 5-conductor shielded cable is factory connected to the current transducer. If the current transducer is not connected use the figure above to verify proper connections.

Connect the opposite end to the string current connection on a UXBM/50. See the following figure for an illustration of the connector arrangement.

Figure 9.2 String Current Connection on Rear of UXBM/50

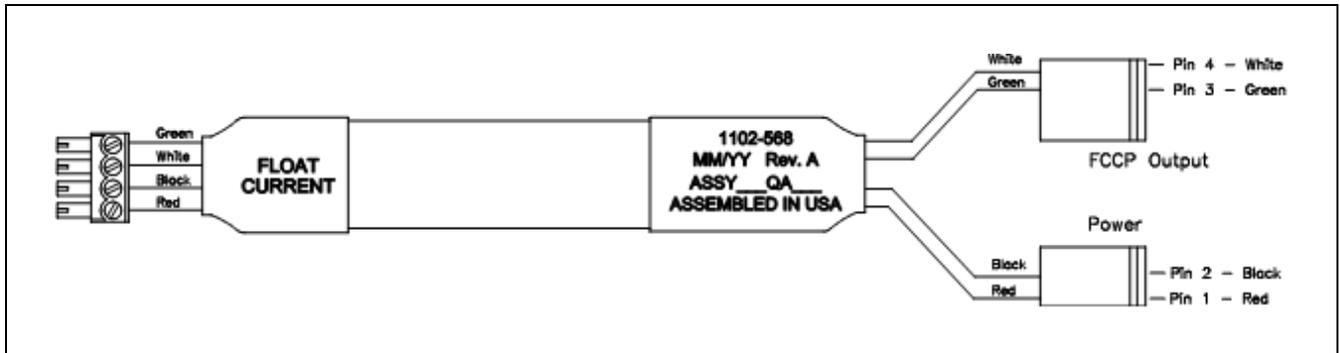


9.2 Float Current Transducer

A float current transducer can be used to measure very small charge currents. This option utilizes the Float Current Charging Probe (FCCP) made by Multitel. Although the instructions below will show proper connections to the UXBM/50 battery module, it is recommended to read the guide provided with the Multitel unit to better understand the requirements.

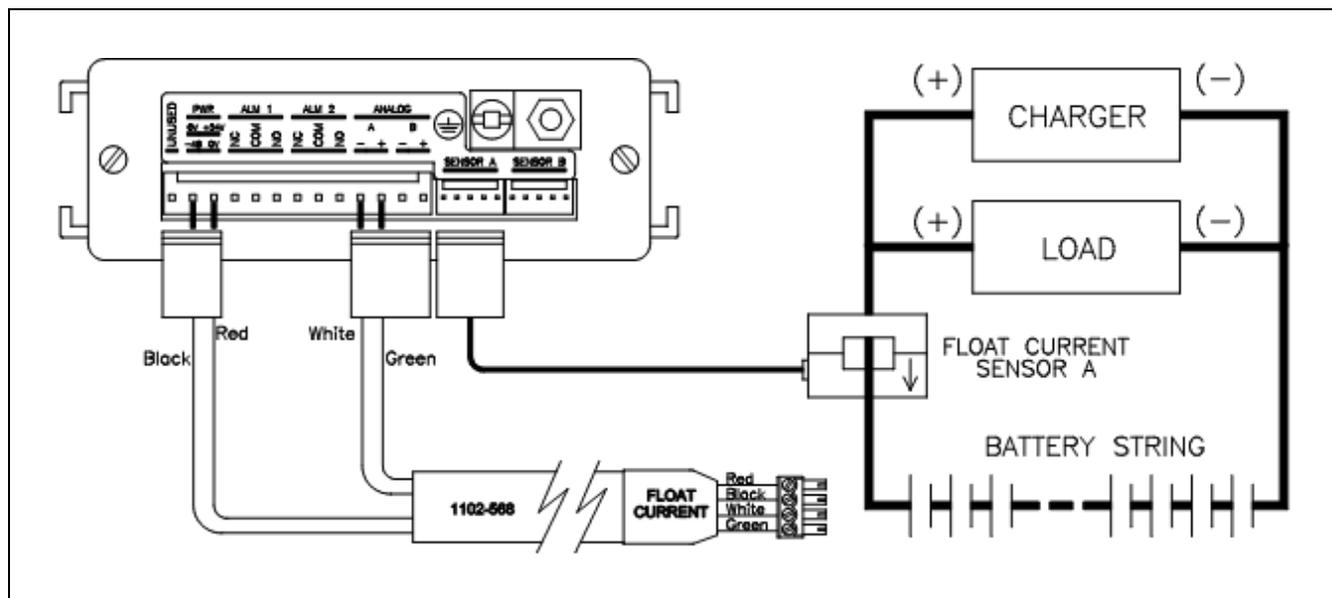
When installing this option, a specific harness will be included in the installation kit separate from the FCCP packaging.

Figure 9.3 Float Current Connection Cable



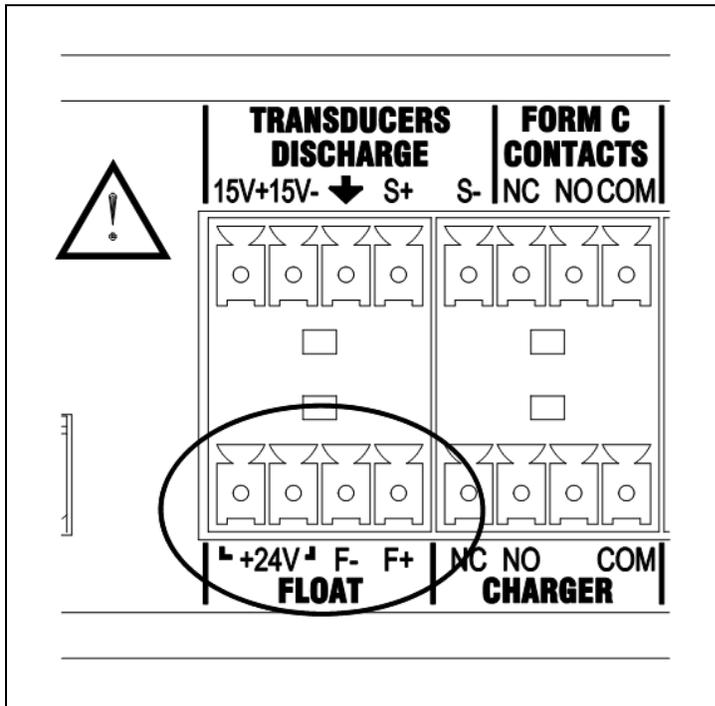
On one end of the float current connection cable are two connectors that connect directly to the control unit of the FCCP. Connect the smaller connector containing the black and red wires to the back of the FCCP Control unit as shown. Connect the remaining connector to the FCCP Analog output.

Figure 9.4 Rear View of FCCP Control Unit



Connect the other end directly into the Float Current connection on UXBM/50 battery module. See the following figure for an illustration of the connector arrangement.

Figure 9.5 Float Current Connection on Rear of UXBM/50



The sensor as shown below is a split core device and must be placed across the battery cable. There is an arrow on the casing that indicates the direction that it needs to be installed. This arrow must always point to the positive end of the battery.

NOTE: If the sensor is not installed with the arrow in the correct direction (pointing towards the positive end of the battery), float current will not display properly.

Figure 9.6 FCCP Sensor

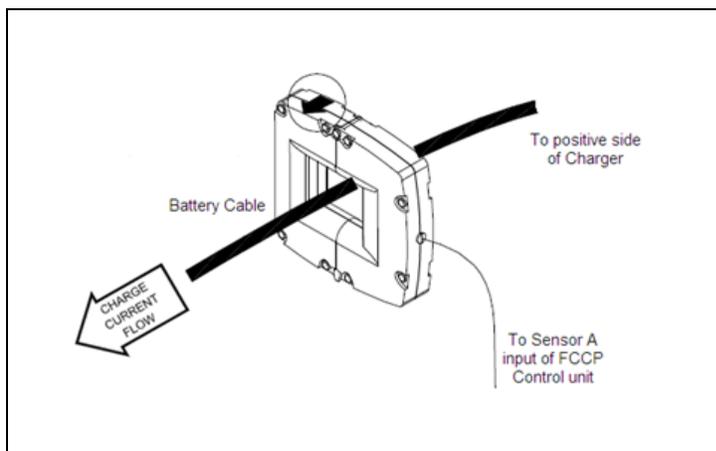


Table 9.1 Float Current Transducer Inventory List

| PART NUMBER | DESCRIPTION |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| Float Current Transducer 5610-053 | Multitel Float Charging Current Probe Kit Float current measurement transducer for a single string. |
| Float Current Interface Cable 1102-568-08 Cabinet (8' cable) | Float Current Interface Cable |
| Multitel FCCP Rear Panel | Multitel FCCP Rear Panel |

9.3 Ambient Temperature Sensor

Up to two ambient temperature sensors can be installed per string. If only one temperature sensor is installed then the cable assembly is part number 1102-553-08 for 8'. If there are two temperature sensors installed then the cable assembly is part number 1102-554-08.

To connect the temperature sensor, simply connect the four pin connector directly into the Temperature connection on UXBM/50 battery module. Place the temperature sensor in an area that will exhibit a true ambient temperature where the batteries are exposed to. When batteries are installed within a cabinet, typical a sensor is installed inside the cabinet at the bottom and the other is installed towards the top of the cabinet.

Figure 9.7 Single Temperature Sensor 1102-553-xx

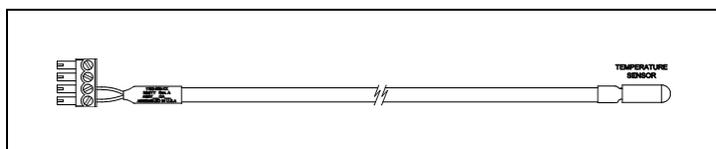


Figure 9.8 Double Temperature Sensors 1102-554-XX

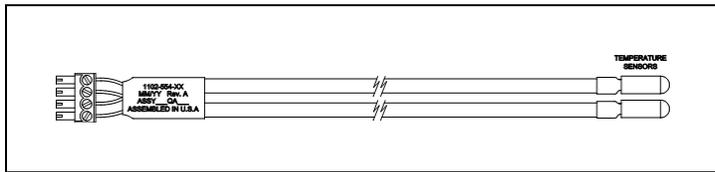
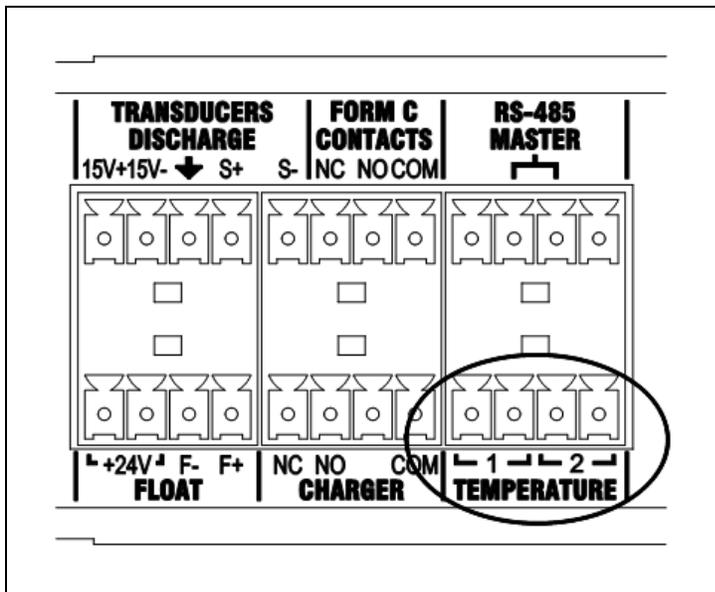


Figure 9.9 Ambient Temperature Connection on Rear of UXBM/50 Battery Module



10 CONNECTING MODULES IN A CABINET OR OPEN RACK APPLICATION

10.1 Connection Descriptions for a UXCM

This section describes the connections on the rear panel of the UXCM.

Figure 10.1 UXCM 120VAC Powered, Rear Panel, Part Number 1011-081-nn, 1011-041-nn or 1011-011-nn

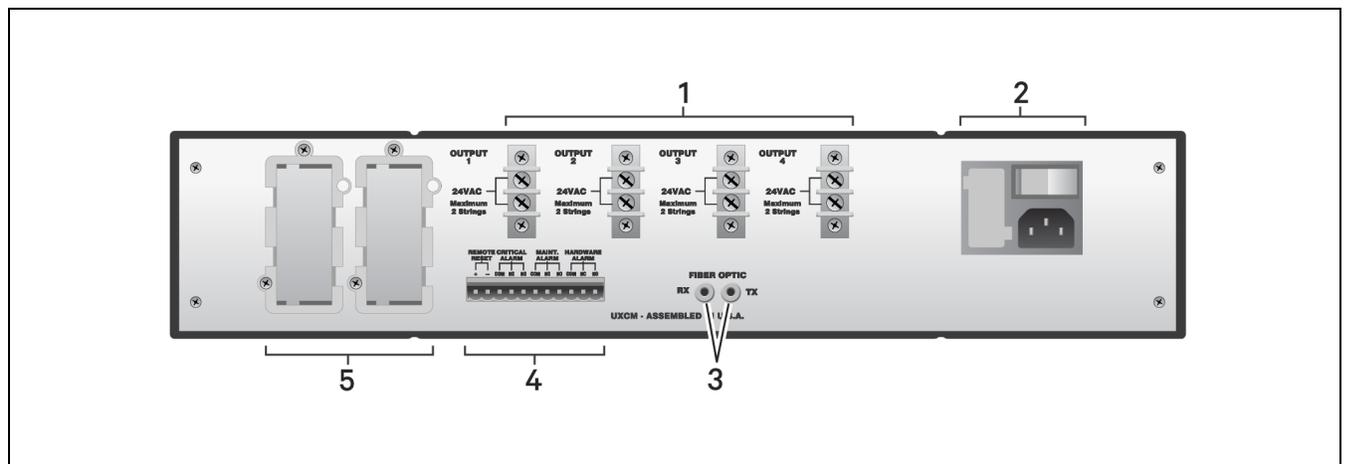


Table 10.1 UXCM Rear Panel Connections/Components

| NUMBER | DESCRIPTION | FUNCTION |
|--------|--------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| 1 | 24AC output power connections | Power connections for UXBM/50 when a UXCM is connected to multiple strings. |
| 2 | Power switch and AC power receptacle | Turns UXCM on and off. Power cord connector and fuse holder. |
| 3 | Fiber optic connections | Used for communications to the UXBM/50. |
| 4 | Remote alarm reset input and Form C alarm relay output connections | Permits a remote alarm reset to be activated by shorting these two pins. Alarm outputs for critical, maintenance and hardware alarms. |
| 5 | Two IntelliSlots | Used for remote connectivity and optional protocol requirements. |

10.2 Connection Descriptions for a UXBM/50

Each UXBM/50 battery module is supplied with specific drawings and terminated installation harnesses. For illustrative purposes, refer to drawings supplied with the system.

After the installer completes all required connections to the monoblocs, install the harness to the UXBM/50 battery module. The mating connectors on the rear of the UXBM/50 are labeled J1 to J6.

Use the following illustration and table to verify that all terminals are correctly connected to rear panel of the UXBM/50 battery module.

Figure 10.2 UXBM/50 Battery Module Rear Panel

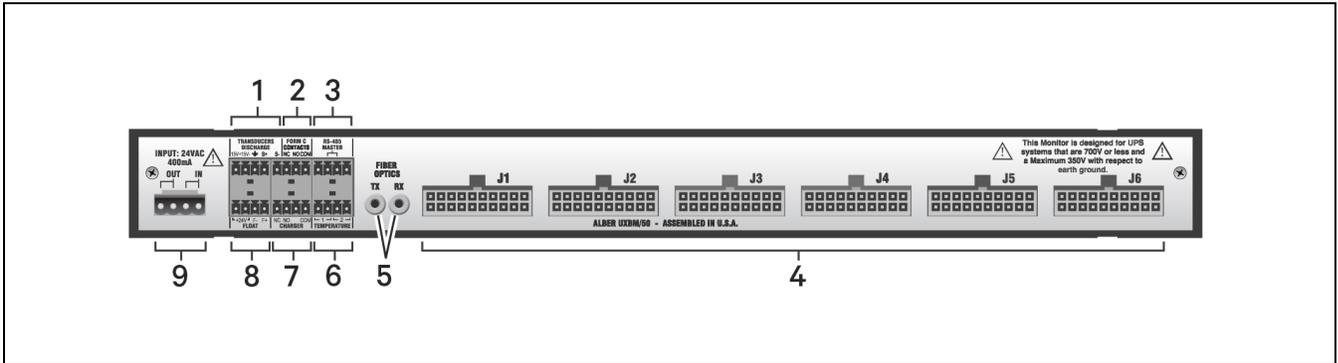


Table 10.2 UXBM/50 Battery Module Rear Panel Component Descriptions

| NUMBER | DESCRIPTION | FUNCTION |
|--------|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Discharge Transducer | Discharge transducer connection. |
| 2 | Form C Contacts | Spare Form C Contacts. |
| 3 | RS-485 Connection | Connection used for communicating to optional accessories. |
| 4 | Voltage/Test Current Inputs | Sense lead connections for making voltage/test current measurements. |
| 5 | Fiber Optic Connections | Connection used for communication to the BDSU network. |
| 6 | Ambient Temperature Inputs | Ambient temperature probe connections. |
| 7 | Charger Contact | Charger contact for charger control connection. Charger control relay output for thermal runaway management. (Automatically shuts down charger when thermal runaway is detected.) |
| 8 | Float current | Float current transducer connection. |
| 9 | Power Inputs | Power Input connections. |

! WARNING! Failure to connect the sense leads to their specified locations could result in hardware failure.

NOTE: Proceed to Installing the Fiber Optic Cable and remaining installation information.

NOTE: Depending upon the configuration, 2 to 6 sense lead harnesses will be included and require termination from the UXBM/50 battery module to each monobloc at installation. Please refer to the wiring schematic drawing that was sent with the system to determine installation termination points.

11 TAB WASHER AND HARNESS INSTALLATION FOR OPEN RACK APPLICATIONS

The UXBM/50 battery module can be connected to almost any type of battery system that is comprised of 12V, or 16V monoblocs arranged in a non-cabinet or an open rack installation where cable routing and lengths will be determined by the installer.

The following sections describe each of these installations in detail. Depending on which type of battery system is being monitored, it is possible to have some special situations. It is recommended that you review [System Installation Considerations](#) on page 23.

NOTE: Verify that the wiring schematic drawing you received with your equipment is applicable to your specific battery configuration.

11.1 Tab Washer/Fused Load Lead Installation Details

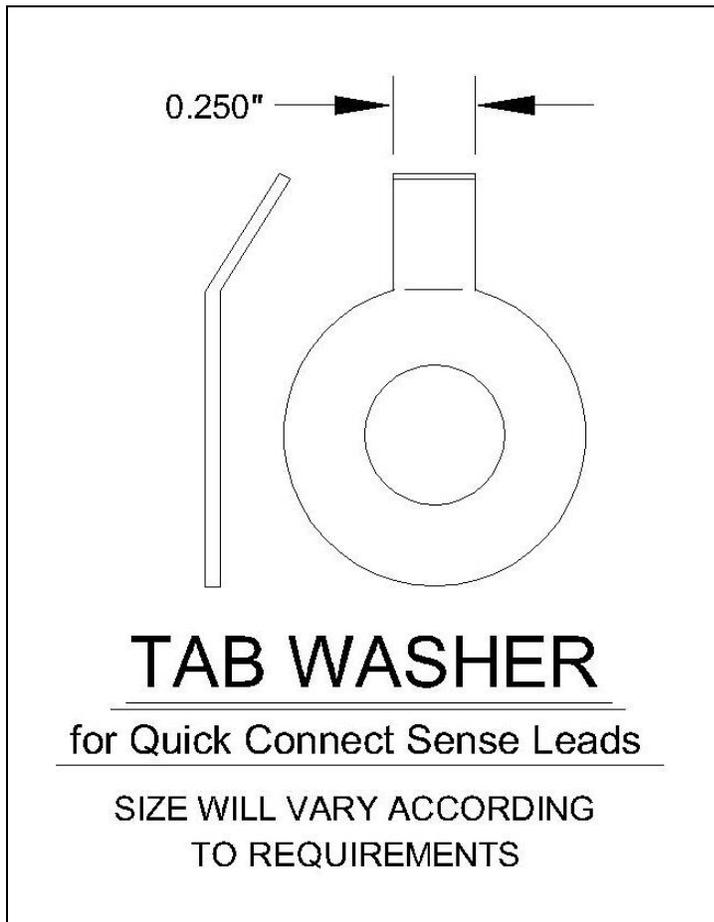
Tab washer placement is required at every monobloc positive post. Extra tab washers are also required on the negative post at the beginning of all intertier or shelf locations. An additional at the positive post at the end of the intertier or shelf locations. In addition to the intertier wiring, there is also a tab washer needed at the negative post of last monobloc.

Installation of fused holder assemblies are required for the resistive load leads. The fuse holder assembly locations are determined by the battery configuration.

NOTE: Fuse holder assembly ring terminal must be installed closest to the battery post.

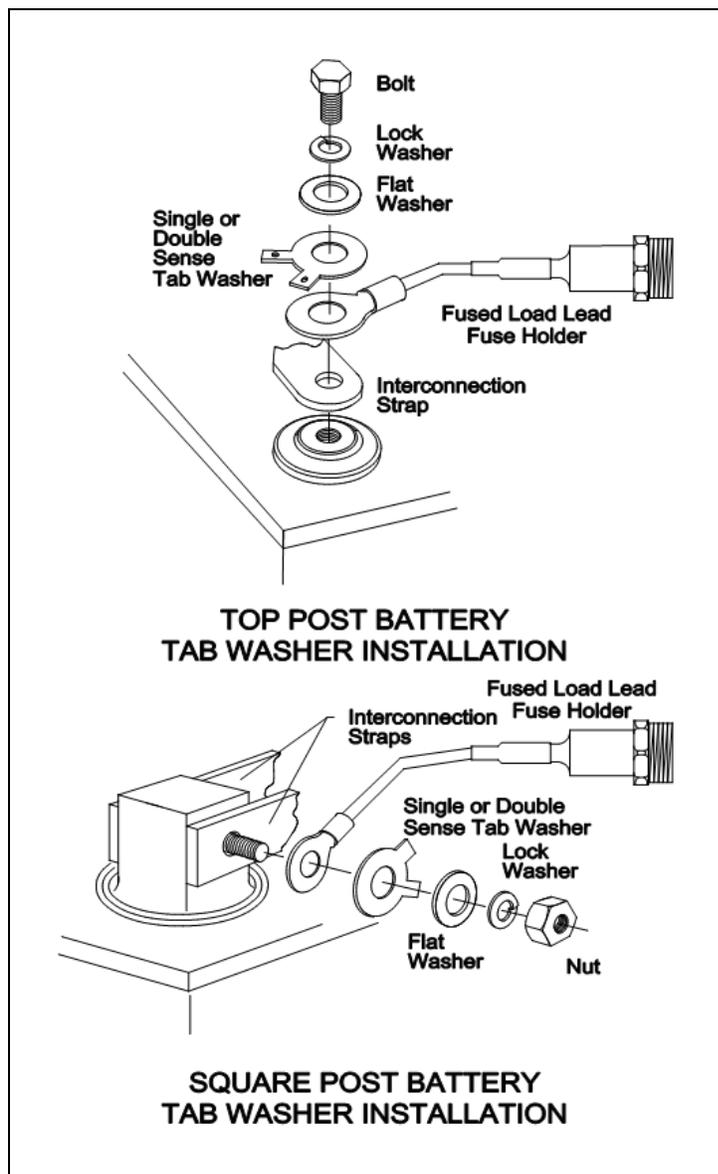
Place tab washers and fuse holder assemblies per wiring schematic drawings provided with the system. Installer of the Tab Washer should be aware of the tab's orientation to avoid possible interference with any battery jar's protective covers when the sense, intertier or load lead wires are attached.

Figure 11.1 Tab Washer



NOTE: Never substitute tab washers with tab washers that were not supplied within the installation kit. Using after market or other types can potentially cause an error in the resistance readings.

Figure 11.2 Exposed Post Power Lead and Tab Washer Assembly



11.2 Check Sense Lead Routing from UXBM/50 Battery Module to the Battery

The installer normally determines the harness/wire routing and lengths but double-checking measurements lengths is advised. When determining the length of the wires, it is recommended to provide an extra service length before cutting wires. Please refer to Maximum Wire and Cable Lengths section for details.

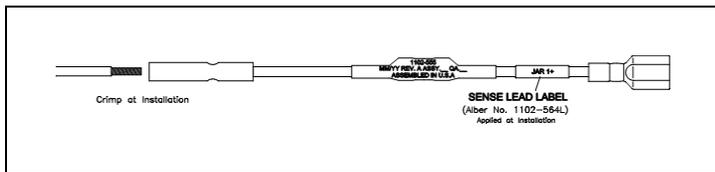
CAUTION: Do not route the wires in the same conduit as other wires in the facility.

11.3 Sense/Load Lead Connections

Properly identify each sense lead to simplify the connection process. When connecting a sense lead to the same battery terminal as the load cable, the load cable must be closest to the monobloc post. See previous figure Exposed Post Power Lead and Tab Washer Assembly.

Voltage sense leads connect from each UXBM/50 battery module to the individual monoblocs. Each sense lead's length and routing has to be determined by the installer. Each sense lead will be cut to the appropriate length and will require assembling a resistor flex lead assembly for termination to the monobloc. Refer to the figure below for proper crimp and resistor flex lead assembly details. Heat shrink labels are provided to properly mark monobloc termination points. Sense lead termination points are determined using the wiring schematic drawing sent with the system.

Figure 11.3 Sense Lead Assembly for Open Rack Applications

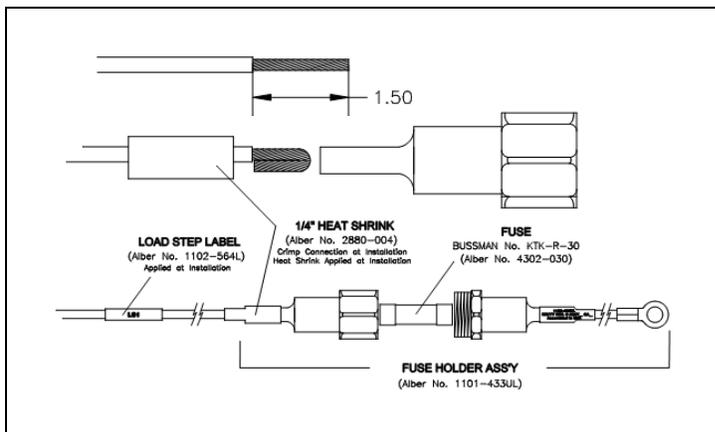


NOTE: The 10KΩ 1W .1% flameproof flex resistor assembly reduces the risk of a short circuit during installation and maintenance. It is required at cable installation for safety.

The 14 GA load wires connect to certain monoblocs in the battery string. The load wire's length and routing has to be determined by the installer. Cable is supplied based on an average of 35 feet per lead, unless a special length is ordered. Each load wire will be cut to the appropriate length and will require assembling a fuse holder assembly for termination to the monobloc. Refer to the figure below for proper crimp and fuse holder assembly details. Loadwire termination points are determined using the wiring schematic drawings sent with the system.

NOTE: Do not install fuses at this time.

Figure 11.4 Load Lead Assembly for Open Rack Applications



11.4 UXBM/50 Battery Module Load Wire to Jar Post Connections (Open Rack)

Use this table as a verification for your battery configuration. This information is provided with the battery configuration wiring schematic that was sent with the system. To use this table, determine the open rack battery configuration that the UXBM/50 battery module is being installed on. Find the column in the table that correspond with your battery configuration. For example; 1X40X12V correspond to one string of 40 12 volt jars. For a visual, compare the connector pin and load step wire with the wiring schematic sent with the system.

Table 11.1 Load Wire to Jar Post Connections List for Open Rack

| CONNECTOR PIN | LOAD STEP WIRE | BATTERY STRING CONFIGURATION | | | | | | | | | | | |
|------------------|----------------------|------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| | | 1X17X12V | 1X18X12V | 1X19X12V | 1X20X12V | 1X21X12V | 1X22X12V | 1X23X12V | 1X24X12V | 1X25X12V | 1X26X12V | 1X27X12V | 1X28X12V |
| J1-18 | LS1 | 1+ | 1+ | 1+ | 1+ | 1+ | 1+ | 1+ | 1+ | 1+ | 1+ | 1+ | 1+ |
| J1-19 | LS2 | 4+ | 4+ | 4+ | 5+ | 4+ | 4+ | 4+ | 4+ | 4+ | 4+ | 4+ | 5+ |
| J1-20 | LS3 | 7+ | 7+ | 7+ | 9+ | 7+ | 7+ | 7+ | 7+ | 7+ | 7+ | 7+ | 9+ |
| J2-18 | LS4 | 10+ | 10+ | 10+ | 13+ | 10+ | 10+ | 10+ | 10+ | 10+ | 10+ | 10+ | 13+ |
| J2-19 | LS5 | 13+ | 13+ | 13+ | 17+ | 13+ | 13+ | 13+ | 13+ | 13+ | 13+ | 13+ | 17+ |
| J2-20 | LS6 | 17- | 16+ | 16+ | 20- | 16+ | 16+ | 16+ | 16+ | 16+ | 16+ | 16+ | 21+ |
| J3-18 | LS7 | | 18- | 19- | | 19+ | 19+ | 19+ | 19+ | 19+ | 19+ | 19+ | 25+ |
| J3-19 | LS8 | | | | | 21- | 22- | 23- | 22+ | 22+ | 22+ | 22+ | 28- |
| J3-20 | LS9 | | | | | | | | 24- | 25- | 26- | 25+ | |
| J4-18 | LS10 | | | | | | | | | | | | |
| J4-19 | LS11 | | | | | | | | | | | | |
| J4-20 | Not Used | | | | | | | | | | | | |

Table 11.2 Load Wire to Jar Post Connections List for Open Rack (Continued)

| CONNECTOR PIN | LOAD STEP WIRE | BATTERY STRING CONFIGURATION | | | | | | | | | | | |
|------------------|----------------------|------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| | | 1X29X12V | 1X30X12V | 1X31X12V | 1X32X12V | 1X33X12V | 1X34X12V | 1X35X12V | 1X36X12V | 1X37X12V | 1X38X12V | 1X39X12V | 1X40X12V |
| J1-18 | LS1 | 1+ | 1+ | 1+ | 1+ | 1+ | 1+ | 1+ | 1+ | 1+ | 1+ | 1+ | 1+ |
| J1-19 | LS2 | 4+ | 4+ | 4+ | 5+ | 5+ | 5+ | 5+ | 5+ | 5+ | 5+ | 5+ | 5+ |
| J1-20 | LS3 | 7+ | 7+ | 7+ | 9+ | 9+ | 9+ | 9+ | 9+ | 9+ | 9+ | 9+ | 9+ |
| J2-18 | LS4 | 10+ | 10+ | 10+ | 13+ | 13+ | 13+ | 13+ | 13+ | 13+ | 13+ | 13+ | 13+ |
| J2-19 | LS5 | 13+ | 13+ | 13+ | 17+ | 17+ | 17+ | 17+ | 17+ | 17+ | 17+ | 17+ | 17+ |
| J2-20 | LS6 | 16+ | 16+ | 16+ | 21+ | 21+ | 21+ | 21+ | 21+ | 21+ | 21+ | 21+ | 21+ |
| J3-18 | LS7 | 19+ | 19+ | 19+ | 25+ | 25+ | 25+ | 25+ | 25+ | 25+ | 25+ | 25+ | 25+ |
| J3-19 | LS8 | 22+ | 22+ | 22+ | 29+ | 29+ | 29+ | 29+ | 29+ | 29+ | 29+ | 29+ | 29+ |
| J3-20 | LS9 | 25+ | 25+ | 25+ | 32- | 33- | 34- | 33+ | 33+ | 33+ | 33+ | 33+ | 33+ |
| J4-18 | LS10 | 29- | 28+ | 28+ | | | | 36- | 37- | 38- | 37+ | 37+ | 37+ |
| J4-19 | LS11 | | 30- | 31- | | | | | | | 39- | 40- | |
| J4-20 | Not Used | | | | | | | | | | | | |

Table 11.3 Load Wire to Jar Post Connections List for Open Rack (Continued)

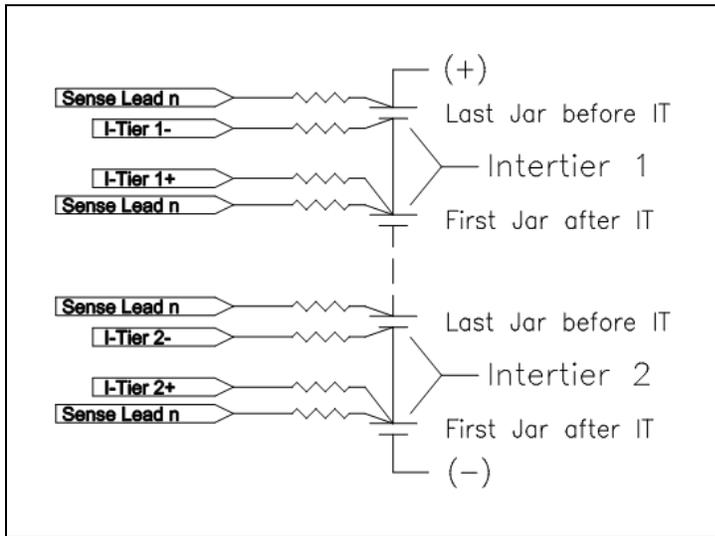
| CONNECTOR PIN | LOAD STEP WIRE | BATTERY STRING CONFIGURATION | | | | | | | | | | | | | | |
|------------------|-------------------|------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----|-----|-----|-----|
| | | 1X41X12V | 1X42X12V | 1X43X12V | 1X44X12V | 1X45X12V | 1X46X12V | 1X47X12V | 1X48X12V | 1X49X12V | 1X50X12V | 1X30X16V | | | | |
| J1-18 | LS1 | 1+ | 1+ | 1+ | 1+ | 1+ | 1+ | 1+ | 1+ | 1+ | 1+ | 1+ | 1+ | 1+ | 1+ | |
| J1-19 | LS2 | 5+ | 5+ | 6+ | 6+ | 6+ | 6+ | 7+ | 6+ | 6+ | 6+ | 6+ | 6+ | 6+ | 6+ | 4+ |
| J1-20 | LS3 | 9+ | 9+ | 11+ | 11+ | 11+ | 11+ | 13+ | 11+ | 11+ | 11+ | 11+ | 11+ | 11+ | 11+ | 7+ |
| J2-18 | LS4 | 13+ | 13+ | 16+ | 16+ | 16+ | 16+ | 19+ | 16+ | 16+ | 16+ | 16+ | 16+ | 16+ | 16+ | 10+ |
| J2-19 | LS5 | 17+ | 17+ | 21+ | 21+ | 21+ | 21+ | 25+ | 21+ | 21+ | 21+ | 21+ | 21+ | 21+ | 21+ | 13+ |
| J2-20 | LS6 | 21+ | 21+ | 26+ | 26+ | 26+ | 26+ | 31+ | 26+ | 26+ | 26+ | 26+ | 26+ | 26+ | 26+ | 16+ |
| J3-18 | LS7 | 25+ | 25+ | 31+ | 31+ | 31+ | 31+ | 37+ | 31+ | 31+ | 31+ | 31+ | 31+ | 31+ | 31+ | 19+ |
| J3-19 | LS8 | 29+ | 29+ | 36+ | 36+ | 36+ | 36+ | 43+ | 36+ | 36+ | 36+ | 36+ | 36+ | 36+ | 36+ | 22+ |
| J3-20 | LS9 | 33+ | 33+ | 41+ | 41+ | 41+ | 41+ | 47- | 41+ | 41+ | 41+ | 41+ | 41+ | 41+ | 41+ | 25+ |
| J4-18 | LS10 | 37+ | 37+ | 43- | 44- | 45- | 46- | 46+ | 46+ | 46+ | 46+ | 46+ | 46+ | 46+ | 46+ | 28+ |
| J4-19 | LS11 | 41- | 42- | | | | | | | | | | | | | 30- |
| J4-20 | Not Used | | | | | | | | | | | | | | | |

NOTE: Sense/Load Lead Harness are populated for all battery configurations. Some of the sense, load, or intertier lead wires may not be required for your application. Refer to the drawings for your specific configuration. Unused wires can be removed, cut at the harness strain relief tuck or tie wrap for possible future use if the battery configuration is modified.

11.5 Intertier Connections

Most battery installations have cables connecting groups of monoblocs on different levels (tiers or shelves) within a battery string. Since these intertier cables normally have higher resistance than intercell connections, additional sense leads are used to monitor the resistance of these cables. These intertier sense lead wires are treated as typical monobloc voltage sense lead and will require assembling a resistor flex lead assembly for termination to the monobloc. Wires for two intertier connections are included within each sense lead harness assembly. All intertier wires are color coded twisted pairs. A typical intertier wiring schematic is shown below.

Figure 11.5 Intertier Load Lead Diagram for Open Rack Applications



NOTE: Intertier twisted pair wire must be used in sequential order regardless of where the intertier locations are in the battery string.

Use the following table to identify the intertier reference number with twisted pair wires for the applicable intertier. The UXBM/50 battery module monitors a maximum of 12 intertier locations.

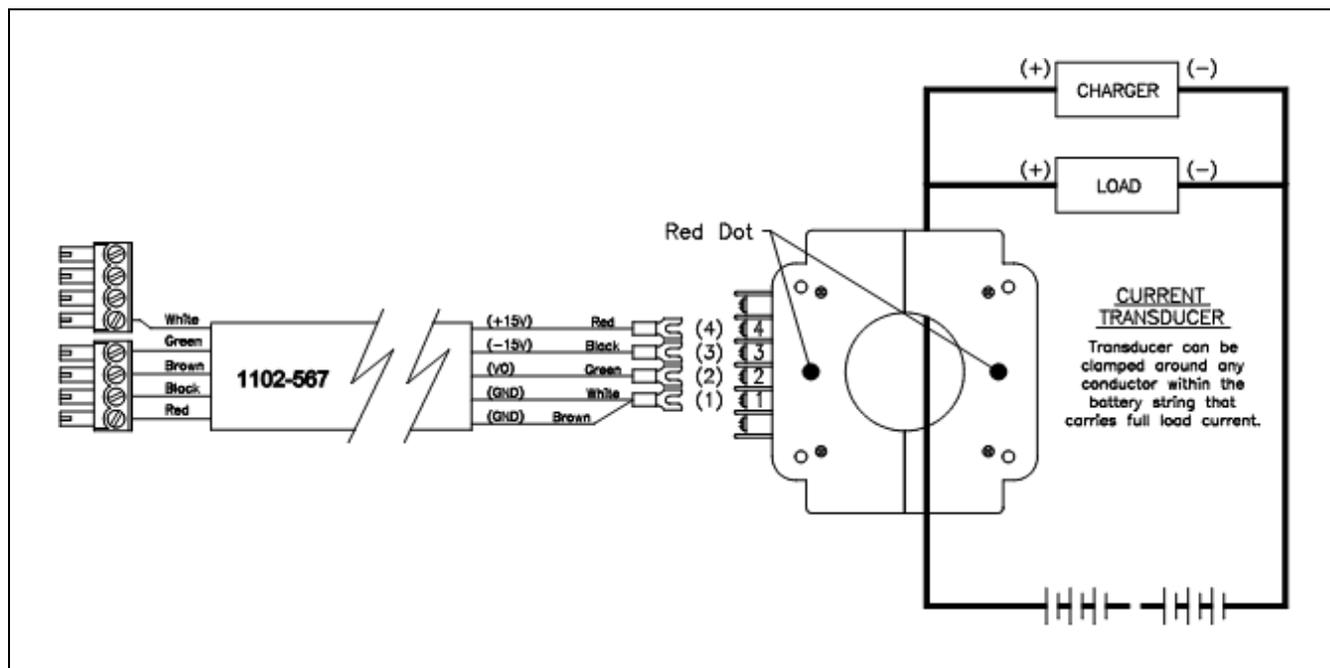
Table 11.4 Sense/Load Lead Harness Intertier Wires for Open Rack

| SENSE/LOAD LEAD HARNESS | INTERTIER REFERENCE NUMBERS | WIRE COLOR CODE | INTERTIER REFERENCE NUMBERS | WIRE COLOR CODE |
|-------------------------|-----------------------------|--------------------------------------|-----------------------------|-----------------------------------|
| J1 | Intertier Number 1 | White/Orange (+) White/Yellow (-) | Intertier Number 2 | White/Green (+) White/Blue (-) |
| J2 | Intertier Number 3 | White/Orange (+) White/Yellow (-) | Intertier Number 4 | White/Green (+) White/Blue (-) |
| J3 | Intertier Number 5 | White/Orange (+) White/Yellow (-) | Intertier Number 6 | White/Green (+) White/Blue (-) |
| J4 | Intertier Number 7 | White/Orange (+) White/Yellow (-) | Intertier Number 8 | White/Green (+) White/Blue (-) |
| J5 | Intertier Number 9 | White/Orange (+) White/Yellow (-) | Intertier Number 10 | White/Green (+) White/Blue (-) |
| J6 | Intertier Number 11 | White/Orange (+) White/Yellow (-) | Intertier Number 12 | White/Green (+) White/Blue (-) |

12 INSTALLING OPTIONAL SENSORS AND TRANSDUCERS

12.1 String Current Transducer

Figure 12.1 String Current Transducer Connections



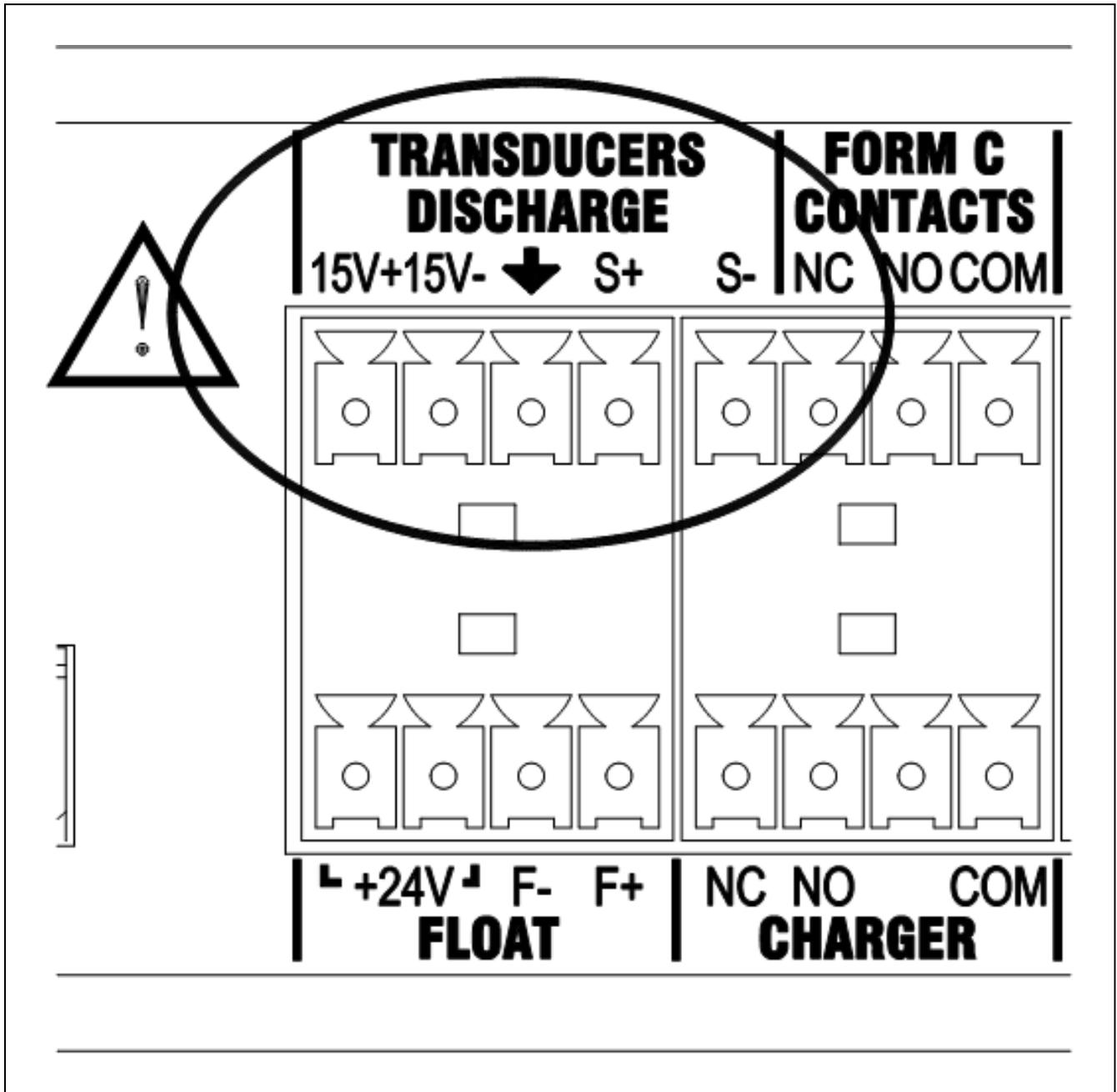
The system can be used with current transducers to measure high string currents such as charge and discharge currents. When installing this option a specific harness will be included in the installation kit. Standard cable is 1102-567-35 and is 35 feet in length. This cable may be reduced to any length and re-terminated at the connector-end for a cleaner installation. An additional heat shrink label is provided with the cable for marking after field re-termination.

The Transducer itself is a split core design and requires to be installed across one of the battery cables that will be carrying all of the current going into or out of the battery. There are two dots on the casing that indicate the direction it needs to be installed. These two dots must always point closest to the positive end of the battery.

NOTE: If the sensor is not installed with the two dots pointing towards the positive end of the battery, discharge events will not be captured.

When using a current transducer, connect the 5-conductor shielded cable to the current transducer as shown in the above figure. Connect the opposite end to the string current connection on a UXBM/50 battery module.

Figure 12.2 String Current Connection on Rear of UXBM/50



12.2 Float Current Transducer

A float current transducer can be used to measure very small charge currents. This option utilizes the Float Current Charging Probe (FCCP) made by Multitel. Although the instructions below will show proper connections to the UXBM/50 battery module, it is recommended to read the guide provided with the Multitel unit to better understand the requirements.

When installing this option, a specific harness will be included in the installation kit separate from the FCCP packaging.

The cable used for float current is 1102-568-35 and is 35 feet in length. This cable may be reduced to any length and re-terminated at the connector-end for a cleaner installation. An additional heat shrink label is provided with the cable for marking after field re-termination.

On one end of the float current connection cable are two connectors that connect directly to the control unit of the FCCP. Connect the smaller connector containing the black and red wires to the back of the FCCP Control unit as shown. Connect the remaining connector to the FCCP Analog output. Connect the other end directly into the Float Current connection on UXBM/50 battery module.

The sensor is a split core device and must be placed across the battery cable. There is an arrow on the casing that indicates the direction that it needs to be installed. This arrow must always point to the positive end of the battery.

NOTE: If the sensor is not installed with the arrow in the correct direction (pointing towards the positive end of the battery), float current will not display properly.

Table 12.1 Float Current Transducer Inventory List

| PART NUMBER | DESCRIPTION |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| Float Current Transducer 5610-053 | Multitel Float Charging Current Probe Kit Float current measurement transducer for a single string. |
| Float Current Interface Cable 1102-568-35 Open Rack (35' cable) | Float Current Interface Cable |
| Multitel FCCP Rear Panel | Multitel FCCP Rear Panel |

12.3 Ambient Temperature Sensor

Up to two ambient temperature sensors can be installed per string. If there is only one temperature sensor being installed then the cable assembly is part number 1102-553-35 for 35'. If there are two temperature sensors being installed then the cable assembly is part number 1102-554-35. These cables may be reduced to any length and re-terminated at the connector-end for a cleaner installation. An additional heat shrink label is provided with the cable for marking after field re-termination.

To connect the temperature sensor, simply connect the four pin connector directly into the Temperature connection on UXBM/50 battery module. Place the temperature sensor in an area that will exhibit a true ambient temperature where the batteries are exposed to. When batteries are installed on an open rack, typically a sensor is installed at the bottom and the other is installed towards the top of the rack.

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13 INSTALLING THE FIBER OPTIC CABLE ON A UXCM

Every UXCM module within the system must have a fiber optic cable connected to properly communicate its data. To allow the system to automatically and successfully configure itself during startup, the order in which these modules are connected is important.

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

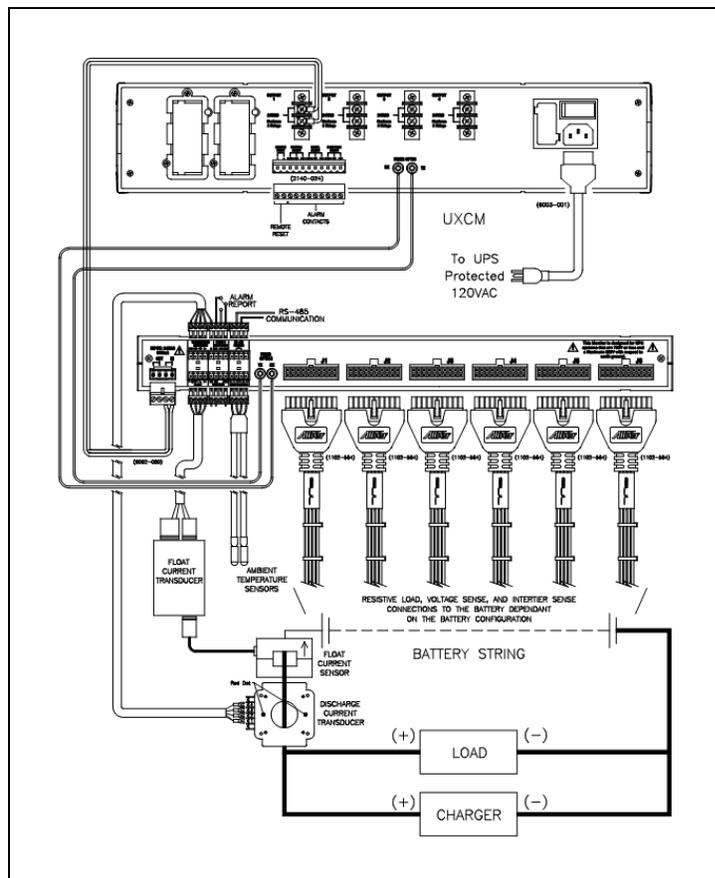
When routing and terminating the fiber optic cable, there are a couple things that should be considered. The minimum bend radius should not be less than 35mm or 1.4” and maximum length between modules cannot exceed 250’ or 76 meters. Doing so will cause degradation in the signal which will manifest itself as intermittent or no communications.

NOTE: When installing the fiber optic cable, do not bend the cable in a radius less than 1.4” or 35mm and maximum length between modules cannot exceed 250’ or 76 meters.

13.1 BDSU-50 System Block Diagram

The following diagram shows connections between one UXCM and one UXBM/50 battery module.

Figure 13.1 System Block Diagram for BDSU-50



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14 INSTALLING INTELLISLOT® COMMUNICATION CARDS FOR UXCM

Communications to the BDSU-50 system is achieved through Intellislot® cards. Unless ordered differently, the IS-UNITY-DP card is the standard card and is included with all UXCM modules. The following are the available cards.

Table 14.1 Intellislot Card Parts List

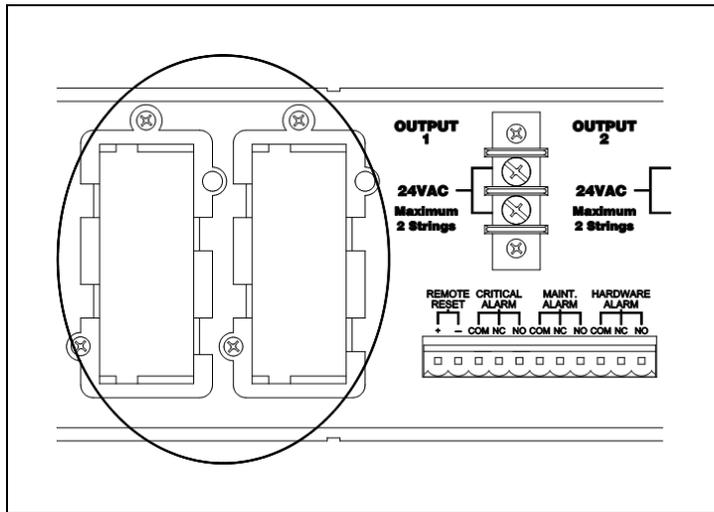
| CARD NAME | PART NUMBER | DESCRIPTION |
|----------------------|-------------|--------------------------------------------------------------|
| Power Cable Zip Cord | 6002-080 | Power cable for UXCM |
| IS-UNITY-DP | IS-UNITY-DP | Intellislot Modbus RTU, Modbus TCP, BACnet MSTP or BACnet IP |
| Fiber Optic Cable | 3703-006 | Cable for fiber optic connection |

There are two slots on the rear of the UXCM to accommodate two types of communications simultaneously. There must be at least one card with an Ethernet connector to connect to the LAN, which will permit communications to the Battery Explorer software and alternately to a BMS system.

The figure below shows the rear of the UXCM and location of where these two cards are installed. Either slot can be used if only one card is used.

Each card will have a quick start or manual associated with it and should be referenced when installing and setting up.

Figure 14.1 IntelliSlot® Card Slots on the UXCM



14.1 Installing a IntelliSlot Unity Card

To install an IntelliSlot unity card (non-adaptor version) in the UXCM:

1. Locate the IntelliSlot option bay on your UXCM. The plastic cover will need to be removed from the slot.
2. Insert the IntelliSlot unity card into the IntelliSlot bay.
3. Secure the card with the supplied screws.
4. Connect an Ethernet cable.

NOTE: The IntelliSlot unity card ships with DHCP service enabled. The MAC address is on a sticker on the top of the card. To assign a static IP address or hostname, use terminal emulation software to configure the card.

14.2 Connecting the IntelliSlot Unity Card Cable

Connect a configuration cable (null modem) to the DB-9 port on the card and to a COM port on your computer. The configuration cable is sold separately.

14.2.1 Prepare the card for configuration

Use terminal emulation software, such as Microsoft® HyperTerminal, to open a connection to the card with settings in the following table:

Table 14.2 Intellislot Card Communication Settings

| DESCRIPTION | SETTINGS |
|--------------|----------|
| Baud Rate | 9600 |
| Data Bits | 8 |
| Parity | None |
| Stop Bits | 1 |
| Flow Control | None |

To configure the card for Boot/IP settings:

1. Press **Enter** to display the Main Menu.
2. Select **IP Network Settings**, then **Boot/IP Settings** and follow the instructions to enter an IP Address, Netmask and Gateway.
3. Press **Esc** to return to the Main Menu.
4. Select **Exit** and **Save** to save your changes and reboot the card.

You can use any of the following interfaces to configure the Intellislot unity card. Each configuration section provides instructions using the Terminal Emulation (Serial or TCP/IP Connection) / Telnet Interface, along with a brief description of how to access the same function through the Web Interface.

Table 14.3 Configuration Interfaces

| INTERFACE | DESCRIPTION | AVAILABLE FUNCTIONS | CONNECTION METHODS |
|---------------------------------------|------------------------------------------------------------------------|---------------------------------------|------------------------|
| Terminal Emulation (Serial or TCP/IP) | Use terminal emulation software—for example, HyperTerminal. | Configuration | Serial Cable or TCP/IP |
| Telnet | Use a command prompt—enter “telnet” and the IP address or hostname. | Configuration | TCP/IP |
| Web | Use a Web browser—for example, Microsoft® Windows® Internet Explorer®. | Configuration, Monitoring and Control | TCP/IP |

NOTE: The Terminal Emulation and Telnet interfaces present the same menus and choices.

14.2.2 USB

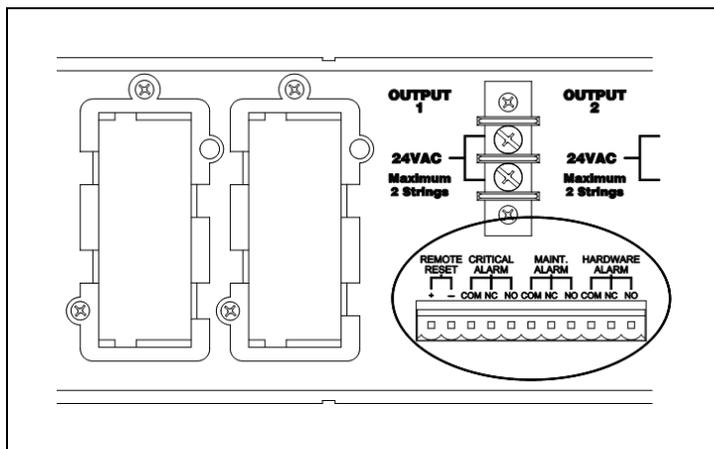
Use the front panel USB port for connecting a portable computer for service or data analysis.

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15 ALARM CONTACTS AND REMOTE RESET

There are three sets of Form C alarm contacts, labeled Critical, Maintenance and Hardware Alarm on the UXCM rear panel. Each set of connections has a Common - COM, Normally Closed - NC, and Normally Open - NO terminal. Connection can be made directly to the facility's alarm reporting system via these connections. These contacts can be connected in series or parallel, depending on the requirements for the facility's NC or NO. In addition, if multiple UXCMs are used, they also can be connected in the same series or parallel configuration if needed.

Figure 15.1 Alarm Contacts and Remote Reset



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APPENDICES

Appendix A: Common Terms

Table A.1 Common Terminology

| TERM | DEFINITION |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UXCM | The Albér Universal Xplorer Control Module. |
| UXBM/50 | The Albér Universal Xplorer Battery Module. |
| Battery | Two or more cells connected together electrically in series or parallel. |
| Cell | The basic electrochemical unit, characterized by an anode and a cathode, used to receive, store and deliver electrical energy. |
| Current transducer | The component that measures current. |
| DC resistance measurement | A test method that places a load across a group of cells and measures the instantaneous voltage response to calculate the battery's state of health. |
| Discharge rate | The rate, in Amperes or Watts, at which current or power is delivered by a battery. |
| Float current | The current drawn by a cell that is being float charged. |
| Intercell connector | An electrical conductor used to connect adjacent cells on the same rack. |
| Intertier connector | An electrical conductor used to connect two cells on different steps of the same rack. |
| Internal ohmic measurement | A measurement of the electronic and ionic conduction path within a cell or unit using techniques commonly known as impedance, conductance or resistance tests. |
| Jar | The container that holds a cell or a group of cells. A battery container can be a single cell or multicell unit, also called a monobloc. |
| Monobloc or multicell unit | A multicell container in which cells are installed. (Multicell Unit US, Monobloc outside the US) |
| Ohmic value | The unit of measure that indicates resistance of a conductor (intercell or intertier) or a cell / monobloc. |
| Ripple current | A type of electrical noise characterized by a uniform waveform riding in the DC circuit, normally expressed as peak, peak to peak, or RMS (Root Mean Square) voltage or current. |
| String | A number of cells connected together in series to form a battery. |

Appendix B: Specifications

Table A.2 UXCM Specifications

| | | |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| Operating Environment | Temperature Range: 5°C to 40°C (41°F to 104°F) Humidity Range: 0% to 80% RH (non-condensing) at 5°C to 31°C 0% to 50% RH (non-condensing) at 32°C to 40°C Indoor use only Installation Category II Altitude: 0 to 2000 meters above sea level | |
| Alarms | One hardware failure contact Two Form C: - Assignable as Maintenance or Critical - Programmable for latching or non-latching | |
| Electrical Requirements | | |
| Input Power | AC Powered Option: 1011-OXX-XX - 115VAC ±10%, 50 to 60Hz, 3.6 Amps AC Powered Option: 1011-1XX-XX - 230VAC ±10%, 50 to 60Hz, 1.8 Amps | |
| Communication | Ethernet RS-485 SNMP TCP/IP MODBUS USB Web server | |
| Communication with UXBM/50 | 1mm plastic optical fiber Maximum rate/range between nodes is 56Kbps at 250 feet or 76 meters. | |
| Memory | Nonvolatile memory for all configuration settings and data | |
| Fuses | Fast-Acting, 6 Amp 250V (115VAC) Fast-Acting, 3 Amp 250V (230VAC) | |
| Packaging | 2 U chassis Device dimensions: 17.00"W x 3.49"H x 12.00"D Weight: 18.25 lbs. Cabinet top mount enclosure or 19" rack mount (optional) | |
| Agency | | |
| Approvals | CE and CSA Approved | UL listed. File number E212234 |

Table A.3 UXBM/50 Specifications

| | |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Measurement Range/Tolerance | <p>Monobloc Voltage</p> <ul style="list-style-type: none"> • 12V range 0 to 18V 0.1% ±12mV • 16V range 0 to 24V 0.1% ±16mV <p>Internal Cell Resistance</p> <ul style="list-style-type: none"> • 0 to 32,000μΩ, 5% of reading ±2μΩ <p>Monobloc Temperature (Optional)</p> <ul style="list-style-type: none"> • 0°C to 80°C ±1°C (32°F to 176°F) <p>String voltage</p> <ul style="list-style-type: none"> • 0 to 700V, 0.2% of reading ±0.5V <p>Discharge current</p> <ul style="list-style-type: none"> • 0 to 4000A ±5% of full scale (using CT) <p>Float current</p> <ul style="list-style-type: none"> • 0 to 5000mA ±50mA. |
| Input Power | 24VAC 600mA |
| Communication with UXBM/50 | 1mm plastic optical fiber Maximum rate/range between nodes is 56Kbps at 250 feet or 76 meters. |
| Packaging | ABS plastic housing Device dimensions: 17.00"W x 1.74"H x 12.00"D Weight: 8.50 lbs. |

*Optional current transducer required. Transducer accuracy affects overall current reading accuracy.

Appendix C: Battery Xplorer Workstation system Requirements

This information outlines the prerequisites and system requirements for installing Battery Xplorer workstation components.

C.1 General Installation Prerequisites

The following are prerequisites for the Battery Xplorer workstation. Before you install or upgrade:

- Backup your Battery Xplorer workstation and have an emergency repair disk.
- Close all non-essential software and services.

Workstation requirements

The following hardware requirements are recommended as a baseline for the best performance.

NOTE: Hardware requirements are based on new Battery Xplorer implementations and the availability of current hardware configurations. Contact Technical Support for details on what additional machines can be used.

Hardware requirements

The following table identifies the recommended hardware for a Battery Xplorer workstation.

Table A.4 Workstation Hardware Requirements

| ITEM | DESCRIPTION |
|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Processor | Intel Pentium 4 with 2 GHz or better |
| RAM | 1 GB or better |
| Display setting | 1024 x 768 pixels minimum resolution Note: The Battery Xplorer is designed for a minimum screen resolution of 1024 x 768, using the highest color quality of 32 bit. |
| Disk space | Application - 500 MB Temporary Space Requirements - 50 MB |
| Other hardware required for the application | UXCM - Hardware monitor firmware UXBM/50 - Battery module firmware |

Software requirements

Battery Xplorer workstation is designed to operate on the Microsoft® Windows® operating system.

Table A.5 Workstation Software Requirements

| ITEM | DESCRIPTION |
|--------------------------|----------------------------------------------------------------|
| Operating System | Microsoft® Windows® version 7 and higher |
| Battery Xplorer Software | Battery Xplorer application |
| MDAC | Microsoft Data Access Components (MDAC) version 2.8 or higher. |

NOTE: Contact Technical Support for use with 64-bit operating systems.

Appendix D: Preventative Maintenance

D.1 Visual Inspection

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

D.2 Cleaning System Components

Clean system components using a soft cloth, slightly moistened with water. 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.

D.3 Sense Leads: When Applicable/Ring Terminals

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 using a water and baking soda mixture. Brush this mixture on to the sense lead clip then rinse well with clean, cool tap water and dry with a clean, soft cloth.

D.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.

D.5 Shipping, Storage, Normal Use Protection

Protect the system from physical impact during normal use or storage, and when necessary, provide protection during shipment between test sites.

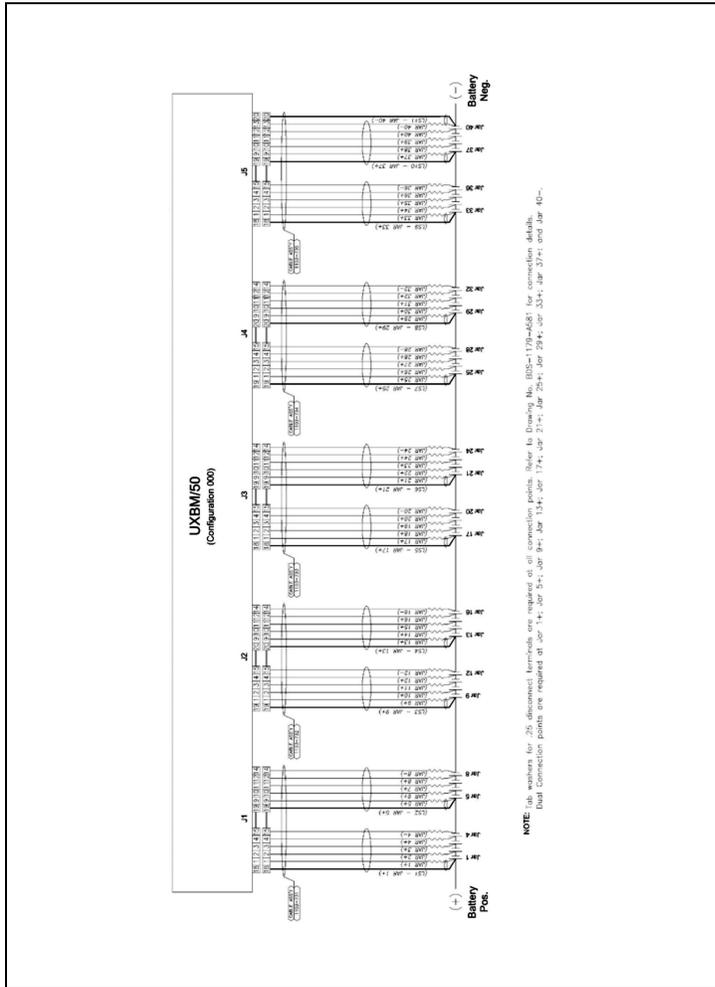
D.6 Maintaining and Servicing System

After performing any maintenance or servicing on the system, ensure the power cord is securely connected to an electrical safety ground at the power outlet. Also, inspect the system for damaged or frayed cables, connectors, component panels and controls.

Appendix E: UXBM/50 Battery Module Drawing for Cabinet Applications

The following UXBM/50 battery module drawing is for reference only. A package of full size drawings will be part of the materials received with the UXBM/50 battery module.

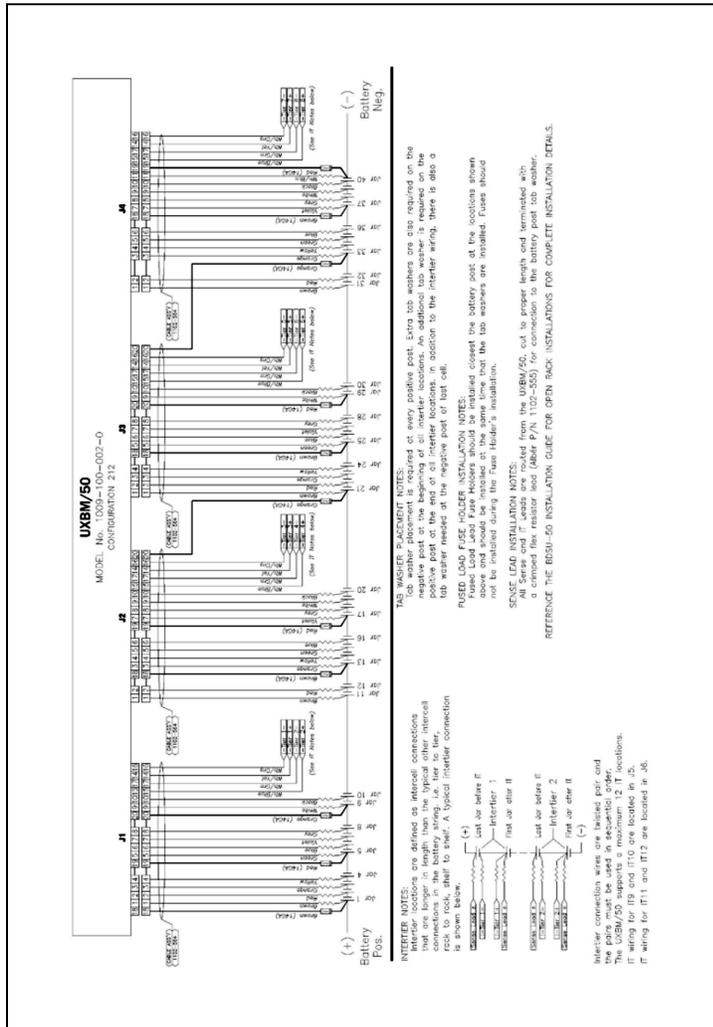
Figure A.1 UXBM/50 Battery Module Wiring Schematic Diagram for Cabinet Applications



Appendix F: Drawing for Open Rack Applications

The following UXBM/50 battery module drawing is for reference only. A package of full size drawings will be part of the materials received with the UXBM/50 battery module.

Figure A.2 UXBM/50 Battery Module Wiring Schematic Diagram for Open Rack Applications



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590-1805-501A; 4200-113;4200-114; SL-29199