

Alber Multi-Purpose Monitor (MPM)-100

Installation Guide



Alber

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MPM-100 Installation Guide

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This Warranty is given ONLY to purchasers who buy for commercial or industrial use in the ordinary course of each purchaser's business.

General:

Albér Corp. products and systems are, in our opinion, the finest available. We take pride in our products and are pleased that you have chosen them. Under certain circumstances, we offer with our products the following One Year Warranty Against Defects in Material and Workmanship.

Please read your Warranty carefully. This Warranty sets forth our responsibilities in the unlikely event of defect and tells you how to obtain performance under this Warranty.

**ONE YEAR LIMITED WARRANTY
AGAINST DEFECTS IN MATERIAL AND WORKMANSHIP**

ALBÉR PRODUCTS COVERED:

BDS-40, BDS 256XL, BDSU, and MPM-100.

Terms of Warranty:

As provided herein, the Albér product is warranted to be free of defects in material and workmanship for a period of twelve (12) months from date of commissioning, not to exceed eighteen (18) months from date of shipment, provided that startup is performed by Albér authorized personnel, and the product has been stored in a suitable environment prior to start-up. The start-up date will be determined only from the completed ASCOMP file provided to Albér from User and accepted by Albér. The product shipment date will be determined only from the Albér bill of lading. If any part or portion of the Albér product fails to conform to the Warranty within the Warranty period, Albér, at its option, will furnish new or factory remanufactured products for repair or replacement of that portion or part.

Warranty Extends to First Purchaser for Use. Non-transferable:

This Warranty is extended to the first person, firm, association or corporation for whom the Albér product specified herein is originally installed for use (the "User"). This Warranty is not transferable or assignable without the prior written permission of Albér.

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Albér assigns to User any warranties which are made by manufacturers and suppliers of components of, or accessories to, the Albér product and which are assignable, but Albér makes NO REPRESENTATIONS as to the effectiveness or extent of such warranties, assumes NO RESPONSIBILITY for any matters which may be warranted by such manufacturers or suppliers and extends no coverage under this Warranty to such components or accessories.

Drawings. Descriptions:

Albér warrants for the period and on the terms of the Warranty set forth herein that the Albér product will conform to the descriptions contained in the approved drawings, if any, applicable thereto, to Albér's final invoices, and to applicable Albér product brochures and manuals current as of the date of product shipment ("Descriptions"). Albér does not control the use of any Albér product. Accordingly, it is understood that the Descriptions are NOT WARRANTIES OF PERFORMANCE and NOT WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE.

Warranty Claims Procedure:

Within a reasonable time, but in no case to exceed thirty (30) days after User's discovery of a defect, User shall contact Albér at 1-800-851-4632.

User shall ship the product, with proof of purchase, to Albér freight prepaid. Albér products shipped to Albér without a return authorization number will be refused and returned freight collect to User at User's expense. Products shipped by User to Albér which have incurred freight damage due to User's improper packaging of the product will not be covered by this Warranty and any replacement parts, components or products needed will be invoiced in the full current price amount and returned freight collect to User.

Subject to the limitations specified herein, Albér will replace, without charge for Albér labor or materials, subsequent to its inspection, and return freight prepaid F.O.B. Albér's facility, the product shipped to Albér with a return authorization number and warranted hereunder which does not conform to this Warranty.

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- In the event that any provision of this Warranty should be or becomes invalid and/or unenforceable during the warranty period, the remaining terms and provisions shall continue in full force and effect.
- This Warranty shall be governed by, and construed under, the laws of the State of Florida, without reference to the conflict of laws principles thereof.
- This Warranty represents the entire agreement between Albér and User with respect to the subject matter herein and supersedes all prior or contemporaneous oral or written communications, representations, understandings or agreements relating to this subject.

Table of Contents

1. Safety Information	1-1
1.1. General.....	1-1
1.2. Emergency Shutdown Switch.....	1-6
1.3. Preventive Maintenance.....	1-6
1.4. Internal Components	1-7
1.5. Shipping, Storage, Normal Use Protection	1-7
2. System Overview	2-1
2.1. MPM Measurement Capabilities	2-1
2.2. MPM Features.....	2-1
2.3. MPM Model Number Description.....	2-1
2.4. MPM-100 Model# Communication Options A-E	2-3
3. Installation Checklist.....	3-1
3.1. Installation Checklist	3-1
3.2. Materials Received List	3-1
3.3. MPM-100 Standard Materials.....	3-1
3.4. Optional and Additional Parts.....	3-5
3.5. Required MPM-100 Installation Tools	3-10
3.6. Building Management System Integration	3-12
3.7. Panel Controls and Indicators	3-12
3.8. MPM System Specifications.....	3-16
4. Before System Installation.....	4-1
4.1. Required Drawings.....	4-1
4.2. System Configuration.....	4-1
4.3. MPM-100 Configuration Options.....	4-2
5. System Installation Considerations	5-1
5.1. Equipment Location	5-1
5.2. Power Options	5-1
5.3. Mounting Options	5-2
6. Begin System Installation.....	6-1
6.1. Identify and Verify Cells, Markings, Load Steps, Configuration, etc.....	6-1

6.2.	Fit Tab Washers.....	6-1
6.3.	Voltage Sense Lead Connection Preparation J1, (J3, J6 and J7).....	6-1
6.4.	Temperature Sensor Connection Preparation J1.....	6-4
6.5.	Intertier Sense Lead J1.....	6-5
6.6.	Alarm Contacts and Remote Alarm Reset Connection Preparation J2/J4.....	6-8
6.7.	Discharge Current Sensor Connection Preparation J5 (Shunt/CT)	6-9
6.8.	Float Charging Current Sensor Connection Preparation J5	6-10
6.9.	Wiring a power cable to the Float Charging Current Probe (FCCP).....	6-13
6.10.	Load Lead Wire Connection Preparation.....	6-14
7.	Connecting Battery Terminals and Tab Washer Installation	7-1
8.	Final Steps Communication Connections	8-1
8.1.	Modem.....	8-1
8.2.	USB.....	8-1
8.3.	RS-232	8-2
8.4.	RJ-45 Connector.....	8-3
9.	MPM-100 Drawings	9-1
10.	Index	10-1

List of Figures

Figure 1 - MPM Rear Panel with RJ45.....	3-12
Figure 2 - MPM Rear Panel with RS-232.....	3-13
Figure 3 - MPM Front Panel.....	3-13
Figure 4 - MPM Rear Panel Connectors.....	3-15
Figure 5 - BDS-1332-B1290 J1 1X60X2 Configuration.....	6-2
Figure 6 - J1 harness	6-3
Figure 7 - BDS-1332-B1290 Temperature Connections J1.....	6-5
Figure 8 - BDS-1335-A693 Intertier Connection J1, DB37	6-6
Figure 9 - BDS-1332-B1290 Connections J1, pins 36 and 18.....	6-6
Figure 10 - BDS Flex Resist w/butt Splice-10KΩ Flameproof.....	6-6
Figure 11 - BDS-1332-B1290 Intertier Connection J4.....	6-7
Figure 12 - BDS-1332-B1290 Parameter Lead Connections J2.....	6-8
Figure 13 - BDS-1332-B1290 MPM-100 Connections J4 Alarm	6-9
Figure 14 - BDS-1332-B1290 Connection J5.....	6-10
Figure 15 - MPM-100 Rear Panel.....	6-10
Figure 16 - Float cable	6-11
Figure 17 - Float Charging Current Probe Kit Connections Part Number 5610-051	6-11
Figure 18 - Multitel Float Charging Current Probe Rear Panel.....	6-11
Figure 19 - Float Charging Current Probe Connections	6-11
Figure 20 - Float Charging Current Probe Power Source.....	6-12
Figure 21 - Multitel's Float Charging Current Probe - Routing the cable	6-12
Figure 22 - Multitel's Float Charging Current Probe with Power Source and Inline Fuseholder.....	6-12
Figure 23 - Float Current Sensor	6-13
Figure 24 - Inserting the Power Connector.....	6-14
Figure 25 - BDS-1141-A510 Fuse Protected Load Lead.....	6-15
Figure 26 - BDS-123-A380 ID Full Washer Quick Connect Sense/Load Leads	7-1
Figure 27 - BDS-127-A381 ID Optional Quick "C" Clamp Leads	7-2
Figure 28 - TELCO RJ-11 Modem Connection.....	8-1
Figure 29 - RS-232 9 Pin Female to Female Cable	8-2
Figure 30 - BDS-162-A423 Serial Interconnect Cable RS-232.....	8-2
Figure 31 - RJ-45 Connector.....	8-3
Figure 32 - Full Washer Quick Connect Sense Load Leads.....	9-1
Figure 33 - Optional Quick Connect C Clamp Leads.....	9-2
Figure 34 - Current Connections.....	9-3
Figure 35 - Temperature Connections	9-4
Figure 36 - Inter-Tier Connection.....	9-5
Figure 37 - Serial Interconnect Cable	9-6
Figure 38 - Optional Quick Connect Post Clip Leads	9-7
Figure 39 - 2U Wall Mount Brackets	9-8
Figure 40 - Fuse Protected Load Lead.....	9-9
Figure 41 - In-Line Fuseholder Assembly.....	9-10
Figure 42 - Flex Resistor Lead Assembly.....	9-11
Figure 43 - Current Float Transducer Cable.....	9-12

Figure 44 - General Assembly Multi-Purpose Monitor	9-13
Figure 45 - Wiring Connections with 100 Channels Options (Sense Lead) J1 through J6	9-14
Figure 46 - Load Connections MPM 100	9-15
Figure 47 - Current Transducer Connections.....	9-16
Figure 48 - Float Current Transducer Connections	9-17

List of Tables

Table 1 - Table Safety Symbols.....	1-5
Table 2 - Installation Checklist.....	3-1
Table 3 - MPM Front Panel Indicators Close Up	3-13
Table 4 - MPM Front Panel Connector and Controls	3-14
Table 5 - Measurement Range/Inputs	3-16
Table 6 - Measurement Range/Inputs	4-1
Table 7 - Standard MPM Configuration Options Chart.....	4-2
Table 8 - Intertier Sense Lead J1	6-5

1. Safety Information

1.1. General

For Safety Class 1 equipment, e.g. equipment provided with a protective earth terminal, an uninterruptible safety earth ground must be provided from the main power source to the product input wiring terminal or supplied power cable. 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 Albér.

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. Albér assumes no liability for the customer's failure to comply with these requirements.






Note:

- Use safety equipment when working in and around the batteries.
- Never energize the device 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.

Document Symbols

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

 Warning	<p>Highlights areas related to user safety.</p> <p>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>
 Caution	<p>Highlights areas related to product or data safety.</p> <p>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>
 Note	<p>The Note symbol calls attention to important information.</p> <p>Describes additional information to help the user.</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 Albér and request monitor assistance. Except as explained in this manual, do not attempt to service Albér equipment.

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

Before Applying Power

Check configuration and drawings. Double check all connections. Verify that the system is set to match available voltage, the correct fuses are installed, and all safety precautions are taken.



Note: Notice the system's external markings described under Safety Symbols.



Warning: High voltage or current may be present inside the equipment and on the equipment terminals. Observe system's external markings and all electrical safety precautions when removing and installing equipment covers, when connecting leads, and when making adjustments. Never energize the cabinet or any component with 115VAC (or 230VAC if applicable) or battery voltage until after the installation is complete. Never exceed equipment voltage, power ratings or capabilities.

Equipment Grounding

Make sure the equipment chassis and/or other system components are properly grounded when required.

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.



Warning: Any interruption of the protective (grounding) conductor or disconnection of the protective earth terminal will cause a potential shock hazard that could result in personal injury.

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.



Warning: Do not use repaired fuses or short-circuited fuse holders. To do so could cause a shock or fire hazard. Some fuses may not be easily removed, contact Alber at 954-623-6660. Request for MPM assistance.

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.



Warning: Under certain conditions, dangerous voltages may exist even with the equipment switched off. To avoid dangerous electrical shock, do not perform procedures involving cover or panel removal.

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 check 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 Alber to ensure the safety features are maintained.

Servicing and Adjusting



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



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 Alber to ensure the safety features are maintained.

Ensure Rack/Chassis/Shelving Mounting Stability

To ensure stability of the test bay, place heavier instruments near the bottom of the rack. Check the location of all equipment (including PCs) for stability. Make sure cabinets are well mounted.

Radiated Immunity

If and when subjected to abnormally high RFI fields they may affect the operation of the equipment.

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. If using a cabinet, allow at least 8" clearance on all sides of the cabinet for ventilation. Never block ventilation ports, and ensure the equipment is operated within the temperature and humidity ranges found in the Ventilation Guide Table and within the specifications:

Temperature range:	5°C to 40°C	41°F to 104°F
Humidity range:	0% to 80% RH (non at 5°C to 31°C)	0% to 50% RH (non condensing) at 32°F to 40°C

Drawings

Drawings and Figures in this manual may be for reference only or may be superseded by later drawings. For the latest information and revision, refer to the drawings supplied with the system. Reference drawings are located in the rear of the manual.

Warning




Warning: Denotes a hazard. It calls attention to a procedure, practice, or condition, which, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a Warning symbol until the indicated conditions are fully understood and met. Refer to accompanying documents as well as OEM documentation.

Caution



Caution: symbol denotes a hazard. It calls attention to an operating procedure, or condition, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product or permanent loss of data. Do not proceed beyond a CAUTION symbol until the indicated conditions are fully understood and met. Refer to accompanying documents.

Note

 **Note:** This symbol contains important information.

Safety Symbols




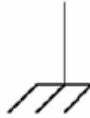
Symbol	Description
	Conforms with European standards
	Approved by Underwriters Laboratories
	Protective earth (ground) terminal
	Frame or chassis terminal

Table 1 - Table Safety Symbols

1.2. Emergency Shutdown Switch

When applicable, available and or possible, disconnect AC wall socket plug, and/or unplug all load steps immediately.



Note: Some equipment and systems may not be equipped with an individual power disconnect.

UPS (Uninterruptible Power Supply)

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.

1.3. Preventive Maintenance

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.

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.

Fans and Vents

Remove dust from fans and vents using a small brush or hand held vacuum. Immobilize fan blades to avoid over - speed when using a vacuum.

Sense Leads: When Applicable/Ring Terminals

Before cleaning the sense lead clips, ensure the system is disconnected and power to the system has been shut off.

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.



Note: Some equipment and systems may not be equipped with lead clips.

1.4. Internal Components

The MPM 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.



Warning: High voltages exist inside the MPM system components and on the terminals. Calibration must be performed only by technically qualified persons. Observe electrical safety precautions when removing and installing equipment covers and when connecting leads and making adjustments.

1.5. 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.

2. System Overview

The MPM (Multi Purpose Monitor) is a low cost, single module solution for all applications of 140 volts or less. MPMs contain data collection, controller and resistance test circuitry. The flexible MPM design handles almost any application, including telecommunications, switchgear, microwave, solar, and generator start. Albercorp can configure the MPM for more than 80 strings and cell/module configurations. Multiple MPMs together can handle large numbers of strings. What sets the full function MPM apart from other low cost monitors is its ability to provide early detection of potential issues. With its remote access capability, the MPM also offers significant maintenance savings over midpoint, ripple current, and float current monitors, which are no more than open circuit detectors that indicate that the battery has failed. Units that monitor more than 24 cells contain an expansion module, which is identified by the presence of rear panel connectors J3 through J7; otherwise, blank panels are installed.

2.1. MPM Measurement Capabilities

- Cell/module voltages (100) total
- Overall voltage
- String current (4 channels)
- Float current (4 channels)*
- Temperature (8 channels)
- Internal and resistances
- Intertier (8 channels)*
- Contact closure or binary inputs (16)



Note: *Some measurement points are optional.

2.2. MPM Features

- Dial in/dial out capability
- Auto detects discharges in real-time data
- Alarms and reports out of tolerance conditions
- Powered from DC bus or 115 VAC
- Multiple communications options

For more information, please access our website: www.alber.com.

2.3. MPM Model Number Description

The MPM can accommodate over 80 different battery configurations, which may be modified for nonstandard battery configurations. (For example, a 1x60 configuration can have 59 cells.) The MPM-100 model numbers are structured as follows.

1002-*nnnA* *xxxxxx*

MPM model.
-*nnnA*



Note: Refer to the Standard MPM Configuration Options Chart for additional information to cross reference nnn with configurations.

Position 1 (**X**xxxxx): Power

A = Unit is powered by AC wall plug. (Available only on 120V units.)

D = Unit is powered by the DC bus.

Position 2 (x**X**xxxx): Communication options A, B, C, D or E (RJ-45 or RS-232).

Communication options are explained on the next page.

Position 3 (xx**X**xxx): Method of sensing discharge current.

C = Current transducer.

S = Shunt.

Position 4 (xxx**X**xx): Float current transducer.

[blank] = No float current transducer.

F = Float current transducer.

Position 5 (xxxx**X**x): Main power line frequency.

5 = 50Hz.

6 = 60Hz.

Position 6 (xxxx**X**): Brand labeling.

A = Alber

S = OEM model

C = C&D

2.4. MPM-100 Model# Communication Options A-E

<p>Option A</p> <p>MPM Model# Communication Option A</p>	<p>This option is for an MPM that will be accessed by one PC, either locally with an RS 232 connection or via telephone connection.</p> <p>⚠ Note: For all features to operate, the phone line used for the MPM must be dedicated to the MPM.</p>
<p>Option B</p> <p>MPM Model# Communication Option B</p>	<p>This option is for one MPM that will be accessed by two or more PCs via a telephone connection.</p> <p>⚠ Note: For all features to operate, the phone line used for the MPM must be dedicated to the MPM.</p>

MPM-100 Model# Communication Options A-E (Continued)

<p>Option C</p> <p>MPM Model# Communication Option C</p>	<p>This is for one MPM that will be accessed locally by one PC via an RS 232 connection and that will also be accessed by additional PCs via a telephone connection.</p> <p>Note: If the locally RS 232 connected PC is not the Central computer, then for all features to operate, the phone line used for the MPM must be dedicated to the MPM.</p>
<p>Option D</p> <p>MPM Model# Communication Option D</p>	<p>This is for one MPM that will be accessed by two or more PCs locally.</p> <p>This option requires installation of the LAN (RJ45) option in the MPM, and this option also requires connection of the MPM to an existing LAN or installation of a LAN.</p> <p>The MPM can also be accessed by PCs via a telephone connection.</p> <p>The LAN can be set up to allow MPM access via the Internet.</p> <p>Note: If one of the PCs connected via the LAN is not the Central computer, then for all features to operate, the phone line used for the MPM must be dedicated to the MPM.</p>
<p>Option E</p> <p>MPM Model# Communication Option E</p>	<p>This is for one MPM that will be accessed by two or more PCs locally.</p> <p>This option requires installation of the LAN option in the MPM.</p> <p>This option also requires connection of the MPM to an existing LAN or installation of a LAN.</p> <p>The LAN can be set up to allow MPM access via the Internet.</p>

3. Installation Checklist

The following is a checklist of the required steps to successfully install a MPM-100 system. Some of the items may not apply because of optional accessories not purchased.

3.1. Installation Checklist

Installation Task	Reference Manual Section
Verify materials ordered/received	Materials Received List, page 3-1
Verify optional and additional Parts	Optional and Additional Parts, page 3-5
Required Tools	Required MPM-100 Installation Tools, page 3-10
System Specifications	MPM-100 System Specifications, page 3-16
Before System Installation	Before System Installation, page 4-1
System Installation Considerations	System Installation Considerations, page 5-1
Begin System Installation	Begin System Installation, page 6-1
Connecting Battery Terminals and Tab Washer Installation	Connecting Battery Terminals and Tab Washer Installation page 7-2
Final Steps Communication Connections	Final Steps Communication Connections, page 8-1





Table 2 - Installation Checklist

3.2. 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. Albér suggests you inventory all materials to ensure the order is complete. Report any shortages to Albér immediately.

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






3.3. MPM-100 Standard Materials

Part Number	Parts	Description
J1=1100-343P-50 J3=1100-345P-50 J6=1100-351P-50		1X60 MPM Poly J1/J3/J6 Harnesses Voltage sense lead connection 22AWG Refer to drawings BDS-1335-A693. BDS-1332-B1290, and BDS-1335- A693.  Note: It is possible that some wires have been removed at the factory per customer request for easy installation.
J2 = 1100-344P-50		1X60 MPM Poly J2 Harness Alarm sense lead connection Refer to drawing BDS-1332-B1290.
2025-108		Exterior USB2 Hi-speed cable For system hardware to computer Communication.




MPM-100 Standard Materials (Continued)

Part Number	Parts	Description
2102-017		<p>30 amp connector block-UL Andersen housing/connector block Refer to drawing BDS-1141-A510.</p>
2102-018		<p>30 amp contact Insert pin/contact for housing/connector. Refer to drawing BDS-1141-A510.</p>
1100-437BS		<p>BDS Flex resist w/butt splice 10K resistor - prevents over-current conditions. Refer to BDS-1251-A640</p> <p> Note: The sense lead resistor assemblies include a 10KΩ 1% flameproof resistor that reduces the risk of a short circuit during installation and maintenance.</p>




MPM-100 Standard Materials (Continued)

Part Number	Parts	Description
2120-028		<p>1/4" tab washer. Connector interface between harness and cell</p>
2800-129		<p>Female disconnect adapter Voltage sense splitters where single tab needs to multi connect.</p> <p> Warning: Never use for load lead wire.</p>
4301-020		<p>20 amp slo-blo ceramic load step fuse.</p>
6002-037		<p>12 gauge UL1015 red load step wire</p>






MPM-100 Standard Materials (Continued)

Part Number	Parts	Description
1100-433MPM		Inline fuseholder assembly. Refer to drawing BDS-1241-A621.
6300-010		7 foot telephone cable- UL. Modem/Telco connection cable.
MPM-100		MPM-100 Multi Purpose Monitor





3.4. Optional and Additional Parts

Part Number	Parts	Description
4000-029		<p>AC wall plug transformer 24 VDC wall plug transformer DC power-24VDC nominal output at 1.5A max. Connect to protected AC outlet with part number 6003-015/016/017.</p> <p>⚠ Note: Power source, part number 4000-026 is to be used with the assembly of the Float Charging Current Probe, please refer to BDS-1334- A692 for Float Charging Current Probe assembly.</p>
6003-015 = US 6003-016 = Euro 6003-017 = UK		<p>2 Wire Cord W/IEC-320 Plug Power for transformer part number 4000-029, to power the MPM.</p>
1400-778		<p>U Wall Mount-Bracket Mounting the MPM-100 to the wall. Use Drawing BDS-345-C655 as reference. Refer to drawing BDS-345-C655.</p>




Optional and Additional Parts (Continued)

Part Number	Parts	Description
2900-029		<p>Ambient temperature probe</p> <p>Temperature probe that hangs free for ambient temperature measurement.</p> <p>Refer to drawing BDS-159-A421.</p>
2900-010		<p>Electrolyte temperature probe</p> <p>Teflon coated probe, can be immersed in a flooded cell. Refer to drawing BDS-159-A421.</p>
4720-017		<p>Shunt</p> <p>Use Drawing BDS-158-A420</p> <p>Photos and part numbers vary with configuration requirements.</p>
2025-117		<p>RS-232 serial cable</p> <p>MPM-100 to computer communication cable (D-B9).</p>
2800-109		<p>10 gauge - 5/16" insulated ring terminal UL-used in Inline Fuse holder Assembly 1100-433MPM.</p> <p>Ring terminal provides connector interface between current transducer and harness. Refer to BDS-1241-A621.</p>






Optional and Additional Parts (Continued)

Part Number	Parts	Description
2880-005		<p>¼ " heat shrink tubing - used in Inline Fuse holder Assembly</p> <p>1100-433MPM may have 3/8" heat shrink tubing substituted.</p> <p>Helps insulate connection.</p>
J4 = 1100-344P-50		<p>1X60 MPM Polyo J4 Harness</p> <p>Additional sense lead harness, for intertier, alarm, etc. Refer to drawing BDS-1332-B1290.</p>
4303-020		<p>Bussman HFA inline fuse holder 4303-020-preassembled and used in Inline Fuse holder Assembly 1100-433MPM.</p> <p>Load step fuse holder. Refer to BDS-1241-A621.</p>
<p>2025-063</p> <p>Includes:</p> <p>2025-063P</p> <p>2025-118</p> <p>2025-120</p> <p>4000-047R1.0</p>		<p>DB-9 Conversion Kit</p> <p>Please refer to part number 4000-047R1.0, UDS-10 External Network Interface Setup User's Guide for further instructions.</p>

Optional and Additional Parts (continued)







Part Number	Parts	Description
1100-349P-1-50		<p>Current/Float cable assembly Use Drawings BDS-1281-A657 and BDS-1332-B1290.</p>
5610-051		<p>Float Charging Current Probe Kit Float current measurement transducer for a single string.</p> <p>⚠ Note: The 24VDC power source, part number 4000-026 is to be used with assembly of the Float Charging Current Probe. Refer to BDS-1334-A692 for Float Charging Current Probe Assembly. Part number 5610-050 is for dual strings and would include one more clamp on the probe.</p>
CTU-501FSY15		<p>500 amp Current Transducer CT Use Drawing BDS-1334-A692</p> <p>Note: Photos vary depending on Models.</p>

Optional and Additional Parts (Continued)



Part Number	Parts	Description
5610-016		<p>600 amp Current Transducer (CT) Use Drawing BDS-1334-A692 and BDS-1334-A692.</p> <p> Note: Photos vary depending on Models.</p>
1100-349-1		<p>Current Transducer (CT) cable assembly</p> <p> Note: Some cable assemblies are combination CT and float cable ready.</p>
2800-022		<p>Tie wraps For bundling wires and cables together.</p>

3.5. Required MPM-100 Installation Tools

The following tools (or equivalent tools) are necessary for MPM-100 installation.

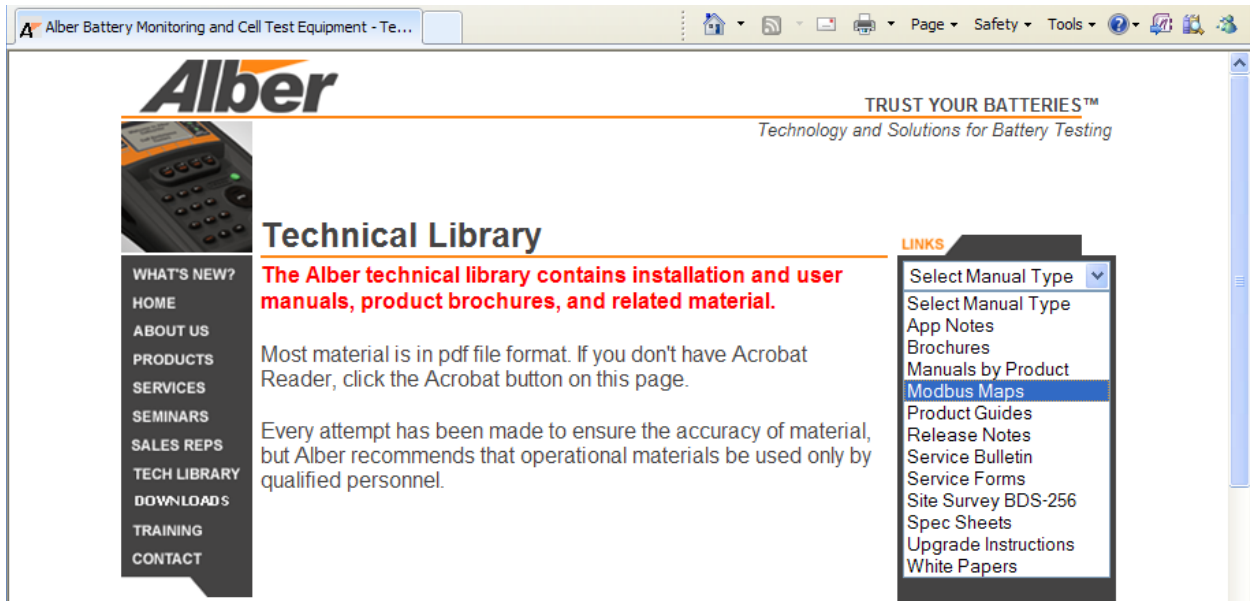
Part Number	Tools	Description
1309G2 (was 1351G1)		<p>Anderson Power Products crimping tool.</p> <p>For crimping 30 amp Anderson connectors. Available from Online Electronics at 800 335-5111 www.onlineelec.com or U.S. Airmotive, Inc. at 305 885-4991 www.usairmotive.com.</p>
CT-260		<p>Panduit CT-260 crimper</p> <p>For crimping ring terminals and parallel splices.</p>
WT-111-M		<p>Thomas and Betts WT-111-M crimper</p> <p>For crimping fuse holders.</p>
#2 Phillips-head		<p>Phillips-head screwdriver with insulated handle.</p> <p>For mounting MPM-100, and for removing or attaching panels.</p>
Flat-head stubby screwdriver		<p>Flat-head stubby screwdriver for attaching ground wires.</p>
Digital Voltmeter		<p>Digital Voltmeter for checking voltage.</p>

Required MPM-100 Installation Tools (continued)

Part Number	Hardware/Software	Description
Computers and other Hardware Components		Computers and accessories
BMDM Software		Battery monitoring software used for monitoring the battery systems and capturing data for reporting, etc.

3.6. Building Management System Integration

The MPM-100 system can connect to building management systems. This integration requires writing software that can communicate with the MPM-100. The communication protocol is MODBUS ASCII. A register map can be obtained by downloading it from <http://www.alber.com/TechLibraryModbusPage.htm> and/or calling Albér at 954-623-6660.



Building Management System Integration connects via LAN RJ-45 or RS-232 located on the rear panel.

3.7. Panel Controls and Indicators

This section describes the front and rear panels that comprise a typical MPM-100 system.

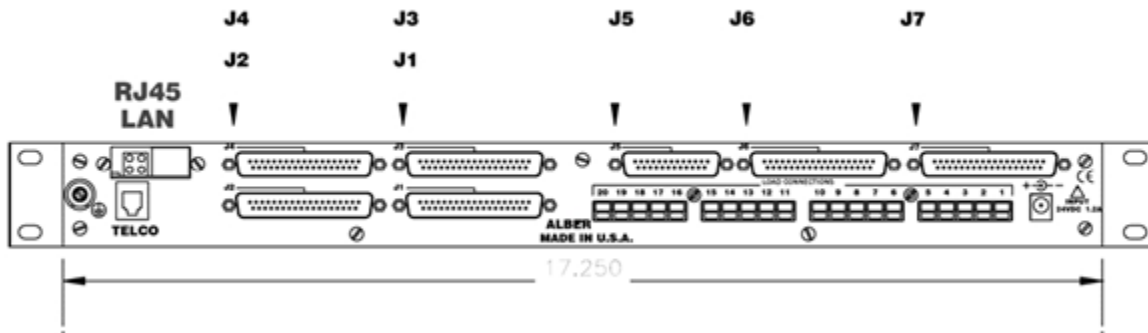


Figure 1 - MPM Rear Panel with RJ45

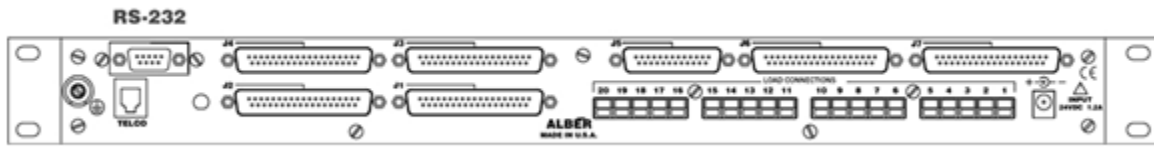


Figure 2 - MPM Rear Panel with RS-232

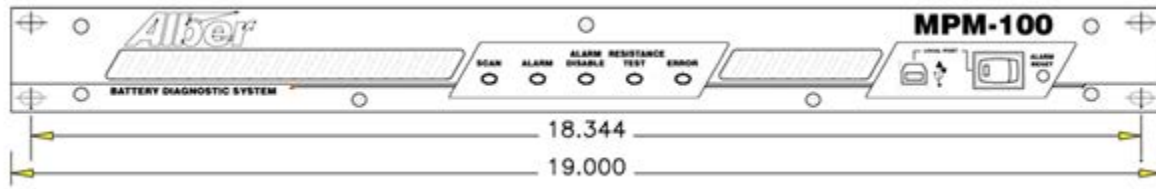
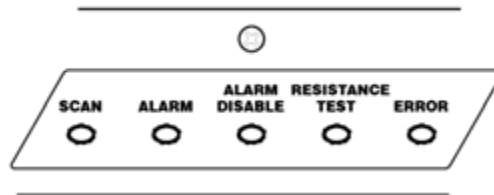


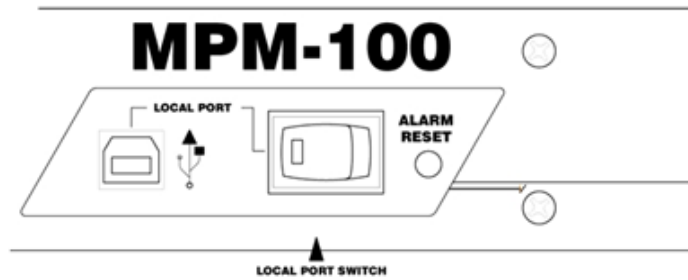
Figure 3 - MPM Front Panel



Scan	Alarm	Alarm Disable	Resistance Test	Error
Flashes Green (G) during normal operating conditions.	When Red (R) indicates alarm condition detected.	When Red (R) indicates user has disabled alarm reporting using BMDM software.	Shows Green (G) as it performs a manual or automatic resistance test.	When flashing Red (R) - indicates hardware failure is detected.

Table 3 - MPM Front Panel Indicators Close Up

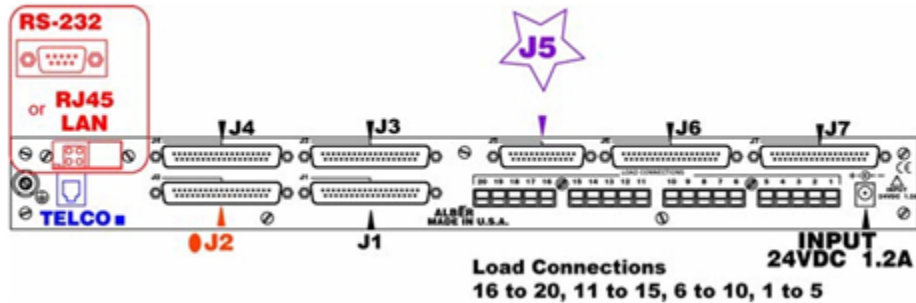
Panel Controls and Indicators (Continued)



Local Port	Local Port Switch	Alarm Reset
USB port - Connects to a laptop computer for servicing purposes.	Enables the front USB or rear RJ-45 LAN/RS-232. When the switch is lit, the front USB port is selected.	During normal operation, resets alarms. If held during power up, clears existing names in the monitor, disables alarms, disables dial out, clears data memory, and resets password to 'alber.'

Table 4 - MPM Front Panel Connector and Controls

Panel Controls and Indicators (Continued)



<p>Local Port Will be an RS-232 or an RJ45 network port (LAN). The front panel Local Port Switch enables this port.</p>	<p>J2 Provides for alarm (Parameter and System) and digital input relay connections on all MPM configurations. Two sets of dry Form C alarm contacts are also available. Do not use for current transducers if J5 is available.</p>	<p>J5* Current Transducer CT connector - optional. Provides for signal connection and +15V and -15V power for up to 4 discharge CTs and signal connection for the Float Current Sensor.</p>	<p>J1, J3, J4, J6, J7 Sense lead wiring to these connectors - Depends upon battery configuration. Cell/Jar voltage sense leads connect from J1 to the individual cells/jars. (and J3 on units with the expansion Module.)</p>
<p>TELCO RJ-11 jack. Communicates with a remote computer via telephone.</p>	<p>Load Connections 16 to 20, 11 to 15, 6 to 10, 1 to 5. The most-positive battery connection for string 1 must always be to Load Connection #1. The negative connection is determined by the battery configuration.</p>	<p>Input 24VDC 1.2A When the MPM requires AC power because of battery configuration, connect a 24VDC wall plug transformer to this connector. AC power must be from a UPS protected source.</p>	

Figure 4 - MPM Rear Panel Connectors

3.8. MPM System Specifications

Power

15 watts maximum. When monitoring 24V to 48V batteries, operates directly from the bus. When monitoring 120VDC batteries, powered off the battery or a 115VAC wall plug transformer. The transformer must be on a protected, uninterruptible power supply (UPS).

- Wall Plug Transformer: Albér part number 4000-029 (w/either 6003-015.6003-016, 6003-017)
- Input: 100 to 240VAC, 50Hz/60Hz, 1.0A maximum
- Output: 24VDC (nominal), 1.5A 36W maximum

Fuses On PC Board (Not user replaceable)

- Fuse F1/F1A: 2A FB
- Fuse F2: 1A FB
- Fuse F3: 0.5A FB

Measurement Range/Inputs Table

	Range		Tolerance
100 cell voltage channels	2V range	(0 - 4V)	0.1% ±1mV
	4V range	(0 - 8V)	0.1% ±2mV
	6V range	(0 - 8.5V)	0.1% ±2mV
	8V range	(0 - 10V)	0.1% ±10mV
	12V range	(0 - 16V)	0.1% ±10mV
One string voltage channel	0 to 150 volts		0.1% of reading ±0.1V
Eight temperature channels*	0°C to 80°C 32°F to 176°F		±1C
Eight intertier resistance channels**	0 to 5 mΩ		5% of reading ±5μΩ
Four discharge current channels*	0 to 4000A		0.1% of reading 1A (using shunt)
Four float current channels*	0 to 5000mA		±50mA
16 optically isolated contact closure inputs for normally open or normally closed.**			
Alarm reset. Normally open dry contact required.			

Table 5 - Measurement Range/Inputs

*Optional temperature and Current Transducers are required.

**Actual number of inputs are model dependent. Contact Albér for additional information 954-623-6660.

Outputs

- 3 programmable relay contacts configured to N/O or N/C
- Parameters alarm contact: one Form C alarm relay contact, 2A at 30VDC.
- Hardware failure or power failure alarm contact: one Form C alarm relay control output: N/O or N/C contact, 2A at 30VDC.
- Charger control relay: one NO dry contact, 2A at 30VDC.
- LEDs (one each): green status, red alarm, red alarm disable, green resistance test on, and red hardware error.

Measurement Range/Tolerance

Cell resistance 0 to 32,000 $\mu\Omega$ 5% of reading $\pm 1\mu\Omega$

Communication

- USB port
- Modem serial port
- RJ-45 connection or RS-232 connection
- Protocols: MODBUS and SNMP

Data Storage

- E² nonvolatile memory for calibration constants, alarm levels, telephone numbers, and setup information.
- 100 alarm events in revolving nonvolatile memory.
- 32K bytes of discharge data in nonvolatile memory.
- 1.6K bytes resistance test records.
- 1.65K bytes historical data.
- Flash memory for firmware upgrades.

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
- Pollution degree 2
- Altitude 0 to 2000 meters above sea level

Packaging

- Rack mount
- Wall mount with optional mounting brackets

Dimensions

- 19"W x 10"D x 1.75"H
- 6 lbs.

Agencies

- UL listed. File number E212234.
- CE approved.

4. Before System Installation

4.1. Required Drawings

Important Note: The following drawings are required for MPM 100 installation. The drawings in this manual may not be the most recent revision and may have been customized further that are included throughout this manual for reference only and/or may be superseded by later drawings. Refer to the Engineering Drawing Package included with the system for the newest drawings. It is recommended to review these drawings prior to installation.

Title	Identifier
Quick Connect Sense/Load Leads	BDS-123-A380
Quick Connect "C" Clamp Leads	BDS-127-A381
Current Connections, MPM-100	BDS-158-A420
Temperature Connections, MPM-100	BDS-159-A421
Serial Interconnect Cable, MPM-100	BDS-162-A423
Quick Connect Post Clip Leads	BDS-163-A424
General Assembly, 2U Wall Mount Brackets	BDS-345-C655
Fuse Protected Load Lead	BDS-1141-A510
Optional - Sub-Assembly In-line Fuseholder Assembly	BDS-1241-A621
Fabrication Detail, Flex Resistor Lead Assembly	BDS-1251-A640
Optional - Sub-Assembly Current/Float Transducer Cable	BDS-1281-A657
General Assembly, MPM-100	BDS-1298-B1263
Wiring Connections w/100 Chan. Options (Sense Lead) J1-J6	BDS-1332-B1290
Load Connections MPM-100	BDS-1333-A688
Float/Discharge Transducer Connections	BDS-1334-A692
Sub-Assembly Intertier Connection MPM-100	BDS-1335-A693

Table 6 - Measurement Range/Inputs

4.2. System Configuration



Warning: Check the configuration on MPM-100 before installation. Make sure that drawings are rechecked for configuration information. Check that the software will match. If the wrong configuration is installed onto the battery, the unit could be permanently damaged.

To determine MPM hardware configuration, cross-reference the model number using the standard MPM Configuration Options Chart. For special configurations or custom system integration for OEM applications, contact Alber at 954-623-6660.

4.3. MPM-100 Configuration Options

The following table shows the standard MPM-100 configuration options.

Model Number	Configuration	Description
12V Systems		
398	MPM-100-1x10x1*	1 string of 10 - 1v cells in series.
399	MPM-100-2x10x1	2 strings in parallel of 10 - 1v cells in series.
400	MPM-100-3x10x1	3 strings in parallel of 10 - 1v cells in series.
401	MPM-100-4x10x1	4 strings in parallel of 10 - 1v cells in series.
24V to 36V Systems		
360	MPM-100-1x20x1	1 string of 20 - 1v cells in series.
371	MPM-100-2x20x1	2 strings in parallel of 20 - 1v cells in series.
372	MPM-100-3x20x1	3 strings in parallel of 20 - 1v cells in series.
373	MPM-100-4x20x1	4 strings in parallel of 20 - 1v cells in series.
361	MPM-100-1x25x1	1 string of 25 - 1v cells in series.
362	MPM-100-2x25x1	2 strings in parallel of 25 - 1v cells in series.
363	MPM-100-3x25x1	3 strings in parallel of 25 - 1v cells in series.
364	MPM-100-4x25x1	4 strings in parallel of 25 - 1v cells in series.
402	MPM-100-1x26x1	1 string of 26 - 1v cells in series.
403	MPM-100-2x26x1	2 strings in parallel of 26 - 1v cells in series.
404	MPM-100-3x26x1	3 strings in parallel of 26 - 1v cells in series.
395	MPM-100-1x36x1	1 string of 36 - 1v cells in series.
396	MPM-100-2x36x2	2 strings in parallel of 36 - 1v cells in series.
338	MPM-100-1x12x2	1 string of 12 - 2v cells in series.
339	MPM-100-2x12x2	2 strings in parallel of 12 - 2v cells in series.
340	MPM-100-3x12x2	3 strings in parallel of 12 - 2v cells in series.
375	MPM-100-4x12x2	4 strings in parallel of 12 - 2v cells in series.
382	MPM-100-1x13x2	1 string of 13 - 2v cells in series.
383	MPM-100-2x13x2	2 string in parallel of 13 - 2v cells in series.
384	MPM-100-3x13x2	3 strings in parallel of 13 - 2v cells in series.
385	MPM-100-4x13x2	4 strings in parallel of 13 - 2v cells in series.
334	MPM-100-1x6x4	1 string of 6 - 4v modules in series.

Table 7 - Standard MPM Configuration Options Chart

MPM-100 Configuration Options (Continued)

Model Number	Configuration	Description
335	MPM-100-2x6x4	2 strings in parallel of 6 - 4v modules in series.
336	MPM-100-3x6x4	3 strings in parallel of 6 - 4v modules in series.
337	MPM-100-4x6x4	4 strings in parallel of 6 - 4v modules in series.
378	MPM-100-1x4x6	1 string in parallel of 4 - 6v modules in series.
379	MPM-100-2x4x6	2 strings in parallel of 4 - 6v modules in series.
380	MPM-100-3x4x6	3 strings in parallel of 4 - 6v modules in series.
381	MPM-100-4x4x6	4 strings in parallel of 4 - 6v modules in series.
374	MPM-100-1x3x8	1 string in parallel of 3 - 8v modules in series.
343	MPM-100-2x3x8	2 strings in parallel of 3 - 8v modules in series.
344	MPM-100-3x3x8	3 strings in parallel of 3 - 8v modules in series.
345	MPM-100-4x3x8	4 strings in parallel of 3 - 8v modules in series.
330	MPM-100-1x2x12	1 string of 2 - 12v modules in series.
331	MPM-100-2x2x12	2 strings in parallel of 2 - 12v modules in series.
332	MPM-100-3x2x12	3 strings in parallel of 2 - 12v modules in series.
333	MPM-100-4x2x12	4 strings in parallel of 2 - 12v modules in series.
*1 volt cells are NiCd		
38-60V Systems		
392	MPM-100-1x38x1	1 string of 38 - 1v cells in series.
393	MPM-100-2x38x1	2 strings in parallel of 38 - 1v cells in series.
410	MPM-100-1x41x1	1 string of 41 - 1v cells in series.
411	MPM-100-2x41x1	2 strings in parallel of 41 - 1v cells in series.
405	MPM-100-1x22x2	1 string in parallel of 22 - 2v cells in series.
406	MPM-100-2x22x2	2 strings in parallel of 22 - 2v cells in series.
407	MPM-100-3x22x2	3 strings in parallel of 22 - 2v cells in series.
408	MPM-100-4x22x2	4 strings in parallel of 22 - 2v cells in series.
354	MPM-100-1x24x2	1 string in parallel of 24 - 2v cells in series.
355	MPM-100-2x24x2	2 strings in parallel of 24 - 2v cells in series.
365	MPM-100-3x24x2	3 strings in parallel of 24 - 2v cells in series.
366	MPM-100-4x24x2	4 strings in parallel of 24 - 2v cells in series.
350	MPM-100-1x8x6	1 string in parallel of 8 - 6v modules in series.

Table 7 - Standard MPM Configuration Options Chart (Continued)

MPM-100 Configuration Options (Continued)

Model Number	Configuration	Description
351	MPM-100-2x8x6	2 strings in parallel of 8 - 6v modules in series.
352	MPM-100-3x8x6	3 strings in parallel of 8 - 6v modules in series.
353	MPM-100-4x8x6	4 strings in parallel of 8 - 6v modules in series.
394	MPM-100-1x9x6	1 string of 9 - 6v modules in series.
346	MPM-100-1x4x12	1 string in parallel of 4 - 12v modules in series.
347	MPM-100-2x4x12	2 strings in parallel of 4 - 12v modules in series.
348	MPM-100-3x4x12	3 strings in parallel of 4 - 12v modules in series.
349	MPM-100-4x4x12	4 strings in parallel of 4 - 12v modules in series.
60-120V Systems		
367	MPM-100-1x80x1	1 string of 80 - 1v cells in series.
388	MPM-100-1x88x1	1 string of 88 - 1v cells in series.
386	MPM-100-1x90x1	1 string of 90 - 1v cells in series.
368	MPM-100-1x92x1	1 string of 92 - 1v cells in series.
369	MPM-100-1x96x1	1 string of 96 - 1v cells in series.
370	MPM-100-1x97x1	1 string of 97 - 1v cells in series.
389	MPM-100-1x100x1	1 string of 100 - 1v cells in series.
387	MPM-100-1x54x2	1 string of 54 - 2v cells in series.
409	MPM-100-1x56x2	1 string of 56 - 2v cells in series.
397	MPM-100-1x58x2	1 string of 58 - 2v cells in series.
357	MPM-100-1x60x2	1 string of 60 - 2v cells in series.
358	MPM-100-1x30x4	1 string of 30 - 4v modules in series.
391	MPM-100-2x18x6	1 string of 18 - 6v modules in series.
359	MPM-100-1x20x6	1 string of 20 - 6v modules in series.
376	MPM-100-1x15x8	1 string of 15 - 8v modules in series.
377	MPM-100-2x15x8	2 strings in parallel of 15 - 8v modules in series.
390	MPM-100-1x8x12	1 string of 8 - 12v modules in series.
412	MPM-100-1x9x12	1 string of 9 - 12v modules in series.
356	MPM-100-1x10x12	1 string of 10 - 12v modules in series.

Table 7 - Standard MPM Configuration Options Chart (Continued)

5. System Installation Considerations

This chapter describes items that should be considered before installing the BDSU system.

5.1. Equipment Location

Locate the MPM in the battery room near the batteries or outside the battery room. Consider the following when selecting the site.

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. 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.

5.2. Power Options

Consider how the MPM-100 will be powered, AC or DC and how power will be routed. Systems configured for 120V batteries are powered from AC, or from DC as a factory option; all other configurations are powered from the DC bus. For AC powered units, use a 24VAC wall plug transformer part number 4000-029; the power must be from a UPS protected source.

DC Connection

MPMs designed to monitor batteries of 48 volts or less are powered from the DC bus. MPMs that monitor 120V batteries can have an optional DC to DC converter installed at the factory. The battery being monitored supplies power to the MPM via the load lead wires. This connection is internally configured at the factory.



Note: When the MPM is powered from the DC bus the 24VDC IN connector is not used and is internally disconnected.

The most-positive battery connection must always be to Load Connection #1 on the MPM rear panel. The negative connection is determined by the battery configuration being monitored. See drawing BDS-1333-A688 Load Connections for MPM-100 included with the system.



Caution: To ensure uninterrupted power to the MPM-100 when the battery powering the MPM-100 is offline, the above connections must be to the bus side of the battery disconnect switch.

AC Connection

MPM-100 units that monitor battery strings above 48 volts are powered from an AC wall plug transformer. (part number 4000-029. 24VDC nominal output at 1.5A max.). Connect this power supply to the 24VDC IN in the rear panel connector. Power must be from a UPS protected source (so that the MPM-100 can still monitor during a power outage) capable of supplying 16 watts for the required length of time.

Sense Lead Harness

Maximum wire length is 100 feet. The resistance load test wiring, however, limits this length to the maximum distance the MPM can be mounted from the battery string.

Resistance Load Test Wiring

The #12 AWG leads used for the momentary load tests have the following length restrictions: The total length of any two adjacent load leads must be from 22 to 90 feet.

5.3. Mounting Options

The MPM can accommodate two types of mounting; 19" rack mount or table top. If the rack mount option is desired, optional brackets (included) will need to be installed. These MPM brackets can also be used for a table top installation allowing the unit to be tilted. This is useful if the equipment is mounted on top of a battery cabinet and can be tilted slightly to see the status of the unit.

The MPM-100 is normally furnished as a 19" rack mount unit, 1.75" in height (1U). If a rack is not available, you may order a 19" self-supporting wall mount bracket, part number 1400-778. Refer to drawings BDS-345-C655 and BDS-1298-B1263.

When using a cabinet, make sure that the cabinet and installed equipment is grounded. Make certain the cabinet is tied to earth ground. If the cabinet has an AC cord, the receptacle for the AC cord from the cabinet must have protective ground connection (three prongs).

Conduit

Conduit can be used to route harnesses from the MPM to the battery rack and to a wire tray to distribute the wires to each cell.

Panduit

A Panduit (or equivalent) slotted cable tray with cover is normally used to distribute wires to the cells. Suggested slotted cable trays and covers are Panduit E1X1L66 with C1L66, or E5X5L66 with C5L66.

6. Begin System Installation

6.1. Identify and Verify Cells, Markings, Load Steps, Configuration, etc.

1. Identify cell 1.
2. Identify and verify that all cells are marked correctly. Mark if necessary.
3. Verify wire routing, per drawing if provided; (conduit, panduit etc.)



Warning: Never route the wires in the same conduit with other wires in the facility. Never run the wires parallel to the battery bus. Some inverters emit large signal spikes that could cause induction problems through the connection cables.

4. Identify load step connections.
5. Double-check the configuration by following these steps and reviewing the drawing BDS-1332-B1290:
 - a. Determine the configuration, for example 4X4, 2X12, 1X20 and so on. The configuration can be identified by the model number located on the bottom side of the MPM-100 device. Reference this number to the proper configuration under section 3 of the User's Guide.
 - b. Match the configuration to the corresponding configurations at the top of this drawing.
 - c. The column where the model number is will identify the connections for that configuration.
 - d. Some configurations will not require all connections in the specified column to be connected. For example, if a 2X4X12 is specified, only the connections identified with B1 and B2 will be required. The B# represents the battery number that will be connected.
 - e. Reference the installation procedure for proper sense lead construction and terminal to the battery.



Warning: Check the configuration before installation. If the wrong configuration is installed onto the battery, the unit could be permanently damaged.

6.2. Fit Tab Washers

Fit tab washers per drawings provided with the system and manual. Remember to place extra tab washers for load steps and intertier's if applicable. Refer to Installation Details drawing BDS-123-A380 for more detailed connection information.

6.3. Voltage Sense Lead Connection Preparation J1, (J3, J6 and J7)

The J1 sense lead harness supplied has every wire available for all possible configurations. Only J1, J3, J6 and J7 are used for voltage sense leads.

Cell/Jar voltage sense leads connect from J1 to the individual cells/jars.

Use drawing BDS-1332-B1290 MPM-100 Connections J1, J2 and J5 and BDS-1335-A693 Intertier Connections MPM-100 included with the system for connector J1. A drawing is not available. Refer to the installation drawings that accompanied the system.

J3, J6 and J7 are on units with the expansion module.

Use drawing BDS-1332-B1290 included with the system. These units have the 100 channel expansion module installed.

Refer to the installation drawings that accompanied the system for specific configuration information. An example is here to review and help with drawing interpretation.

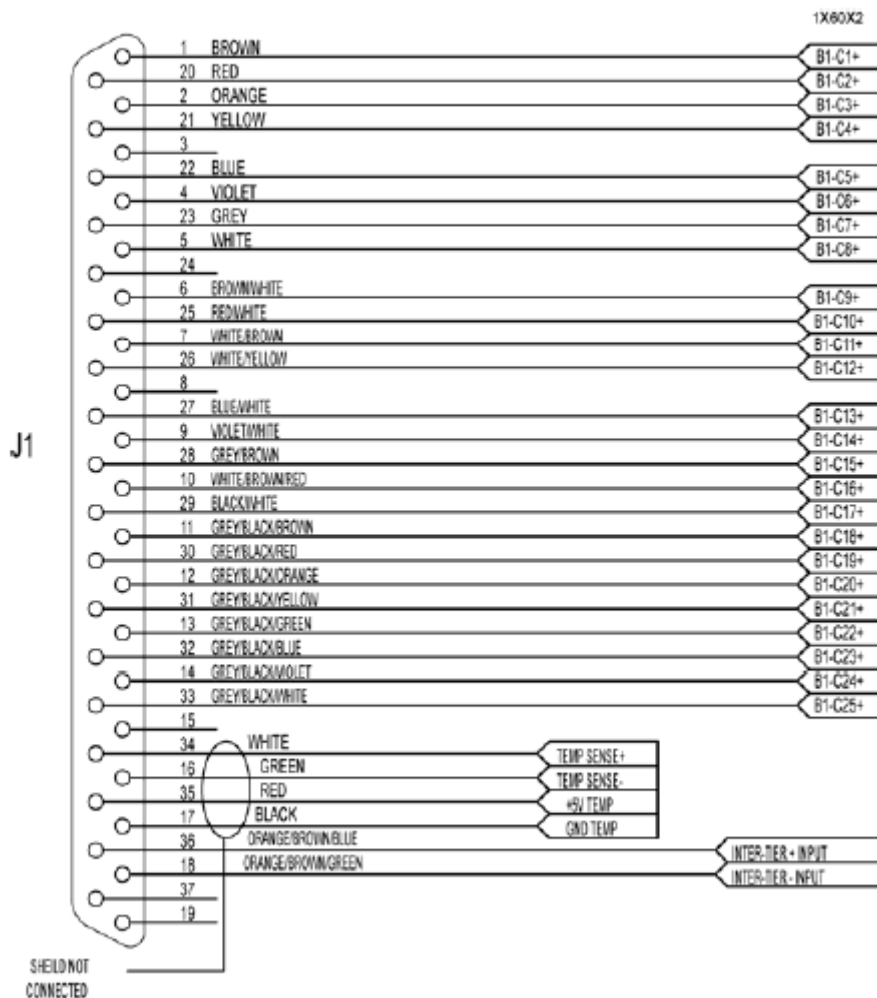


Figure 5 - BDS-1332-B1290 J1 1X60X2 Configuration

- Select the Brown wire from the J1 harness and cut it to the appropriate length to reach Battery 1, Cell 1 +.
- Next, select the Red wire from the J1 harness and cut it to the appropriate length to reach Battery 1, Cell 2 +.
- Select the Orange wire from the J1 harness and cut it to the appropriate length to reach Battery 1, Cell 3 +.
- Next, select the Yellow wire from the J1 harness and cut it to the appropriate length to reach Battery 1, Cell 4 +.
- Continue selecting the colored wires and cutting them to the appropriate lengths.

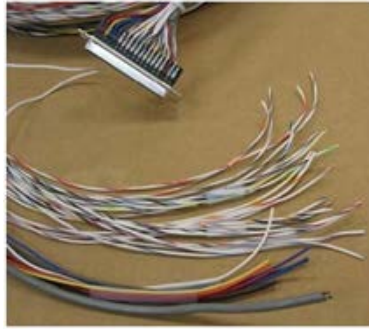


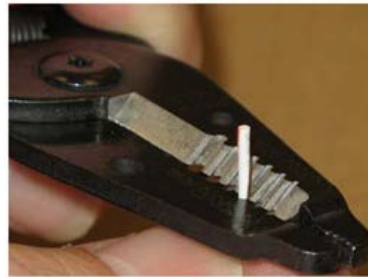
Figure 6 - J1 harness

Note: Remove the wires not required for configuration (if they have not already been removed at the factory). It may be necessary to disassemble the DB-37 connector housing and cut the unneeded wires as close as possible to the connector. Another option is to clip the unused wires off close to the back of the connector without taking the connector apart. Refer to BDS-1251-A640 for DB-37 construction details. Refer to connector J1 on these drawings BDS-1335-A693 and BDS- 1332-B1290. Use part number 1100-437BS for termination.

Strip Sense Lead Wire

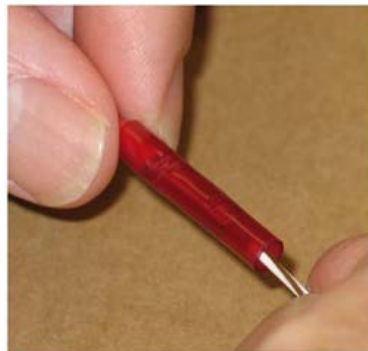
Begin assembling the 10K resistor to the sense leads by stripping the wire first, approximately $\frac{1}{4}$ ".

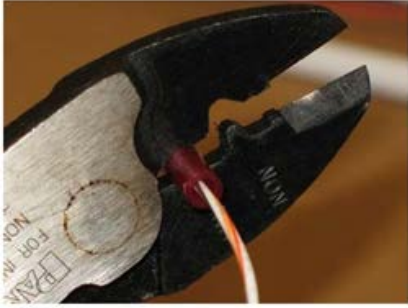
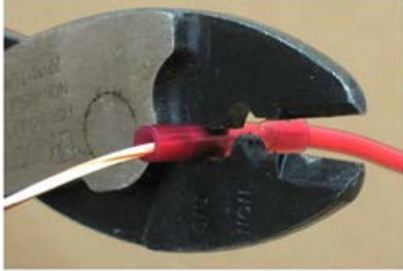

Note: We have chosen a white wire here for demonstration purposes. The first wire to strip would be Brown, then Red, etc.



Insert Sense Lead Wire into 10K Resistor Assembly

Next, place the stripped wire into the 10K resistor assembly.



<p>Crimping with Panduit Crimper</p> <p>Place the sense lead and insulated section of the 10K resistor into the first die of the Panduit crimper, making sure that the intersection is centered within the die.</p>	
<p>Crimping the 10K resistor assembly to the sense lead</p> <p>Turn the connection over and crimp again.</p>	
<p>Checking 10K resistor and sense lead connection</p> <p>Check by lightly pulling on the crimped connection.</p>	

Place sense lead and resistor close to its final destination to be connected later.



Caution: When a load lead wire connects to the same point as a voltage sense lead, the load lead wire must be the closest to the cell's post. See BDS-123-A380 ID Full Washer Quick Connect Sense/Load Leads and/or BDS-127-A381 ID Optional Quick "C" Clamp Leads for Installation Details (ID).

DB-37 Connector

On some models, certain DB connectors are not installed. Determine which drawing to refer to by examining the connector arrangement on the rear of the unit. There are potentially six DB-37 connectors available to use on the rear panel of the MPM-100. It is possible that some wires in a cable harness may not be needed. Disassemble the DB-37 connector housing and cut the unneeded wires as close as possible to the connector. Another option is to clip the unused wires off close to the back of the connector without taking the connector apart. Refer to BDS-1251- A640 for wire termination details. Refer to connector J1 on BDS-1332-B1290 and BDS-1335-A693. Use part number 1100-437BS for termination.

6.4. Temperature Sensor Connection Preparation J1

The MPM-100 has one standard channel for monitoring temperature. MPMs with 100 channel expansion modules can monitor seven additional temperature channels. To determine if an expansion module is installed, refer to section 6.1 Intertier Sense Lead.

Two types of MPM temperature probes are available. One probe (part number 2900-029) hangs free for ambient temperature measurement or mounts on a cell post surface. The other 2900-010, is a Teflon coated probe, that can be immersed in a flooded cell to monitor electrolyte temperature.

The probe is wired to connector J1, and the wires exist on the DB-37 for termination. If not using the temperature probe, disassemble the DB-37 connector housing and cut the unneeded wires as close as possible to the connector. Another option is to clip the unused wires off close to the back of the connector without taking the connector apart. Refer to BDS-1332-B1290 for Temperature Connections and BDS-159-A421 for DB-37 termination.

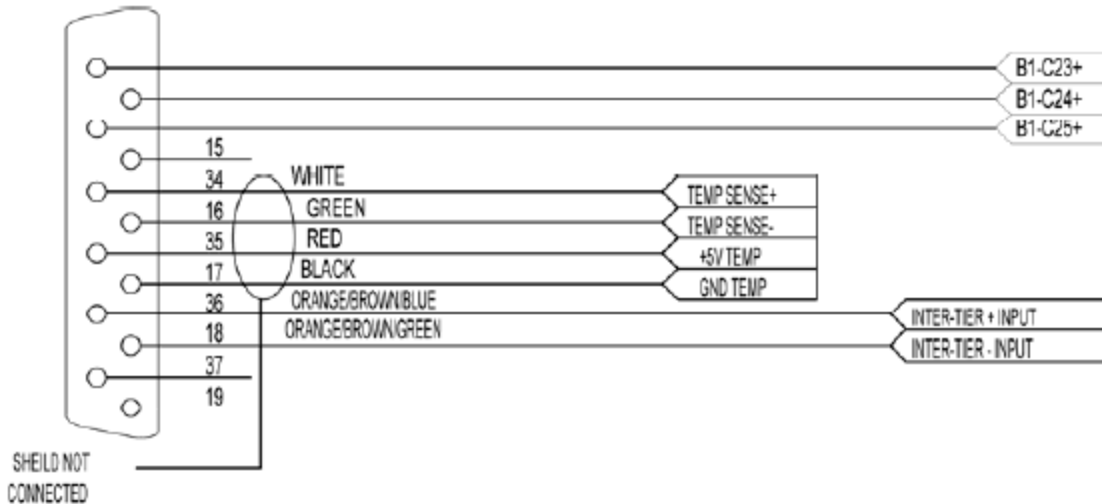


Figure 7 - BDS-1332-B1290 Temperature Connections J1

6.5. Intertier Sense Lead J1

The MPM-100 has one standard channel for monitoring intertier connection. MPMs with 60 channel expansion modules can monitor three additional intertier connections. MPMs with 100 channel expansion modules can monitor seven additional intertiers. Identify the modules as follows.

	Stand alone MPM-100	MPMs with 60 channel expansion modules	MPMs with 100 channel expansion modules
Intertier connection	One standard channel	Three additional intertiers	Seven additional intertiers
Connectors		J3 and J4 are installed, and J6 and J7 are covered. J5 may or may not be installed	J3 and J7 are installed.

Table 8 - Intertier Sense Lead J1

The intertier cable connects one part of the battery to another, and typically goes from one row of cells/jars to the next row of cells/jars. Alber recommends monitoring the intertier connections because, during a discharge, the MPM corrects the voltage reading of the cell connected before the intertier jumper. The MPM also corrects the internal resistance of this same cell. If intertier measurement is not made, during a discharge, the cell before the intertier will measure the cell voltage minus the intertier voltage drop, and the cell resistance will be the internal cell resistance plus the intertier resistance.

Begin Intertier Connection J1

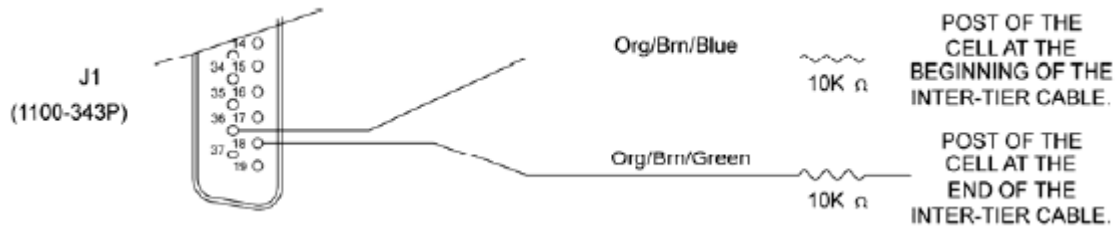


Figure 8 - BDS-1335-A693 Intertier Connection J1, DB37



Note: Beginning of the intertier cable and end of the intertier cable are relative.

The standard intertier connection is made to J1, pins 36 and 18.

1. Select the Orange/Brown/Blue wire from the J1 harness, cut it to length and strip the wire.
2. Connect a 10KΩ flameproof flex resistor with a butt splice part number 1100-437BS.
3. Connect the most-positive point of the intertier to the plus connection pin 36 of J1.
4. Select the Orange/Brown/Green wire from the J1 harness, cut it to length and strip the wire.
5. Connect a 10KΩ flameproof flex resistor with a butt splice part number 1100-437BS.
6. Connect the most-negative point of the intertier to the negative pin 18 of J1.

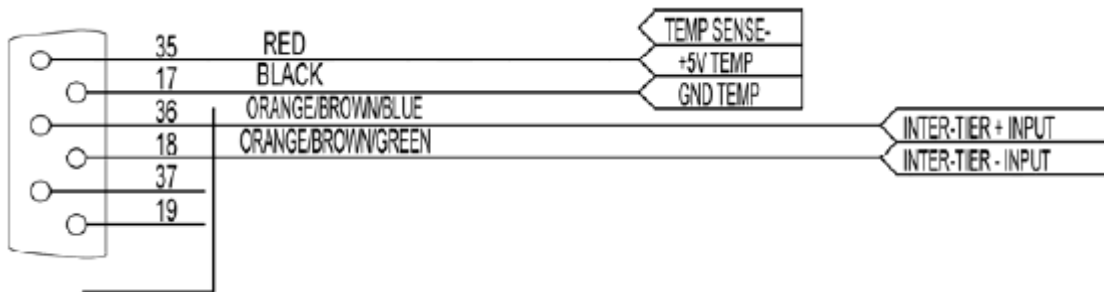


Figure 9 - BDS-1332-B1290 Connections J1, pins 36 and 18



Note: Each wire must have a 10KΩ flameproof resistor with the same construction as the voltage sense lead.



Figure 10 - BDS Flex Resist w/butt Splice-10KΩ Flameproof

Additional Intertier Channel Connection Preparation J4

For additional intertier channels, the expansion module is required as well as the J4 harness; these connections connect to J4. Refer to BDS-1332-B1290 and BDS-1335-A693 for additional intertier connections.

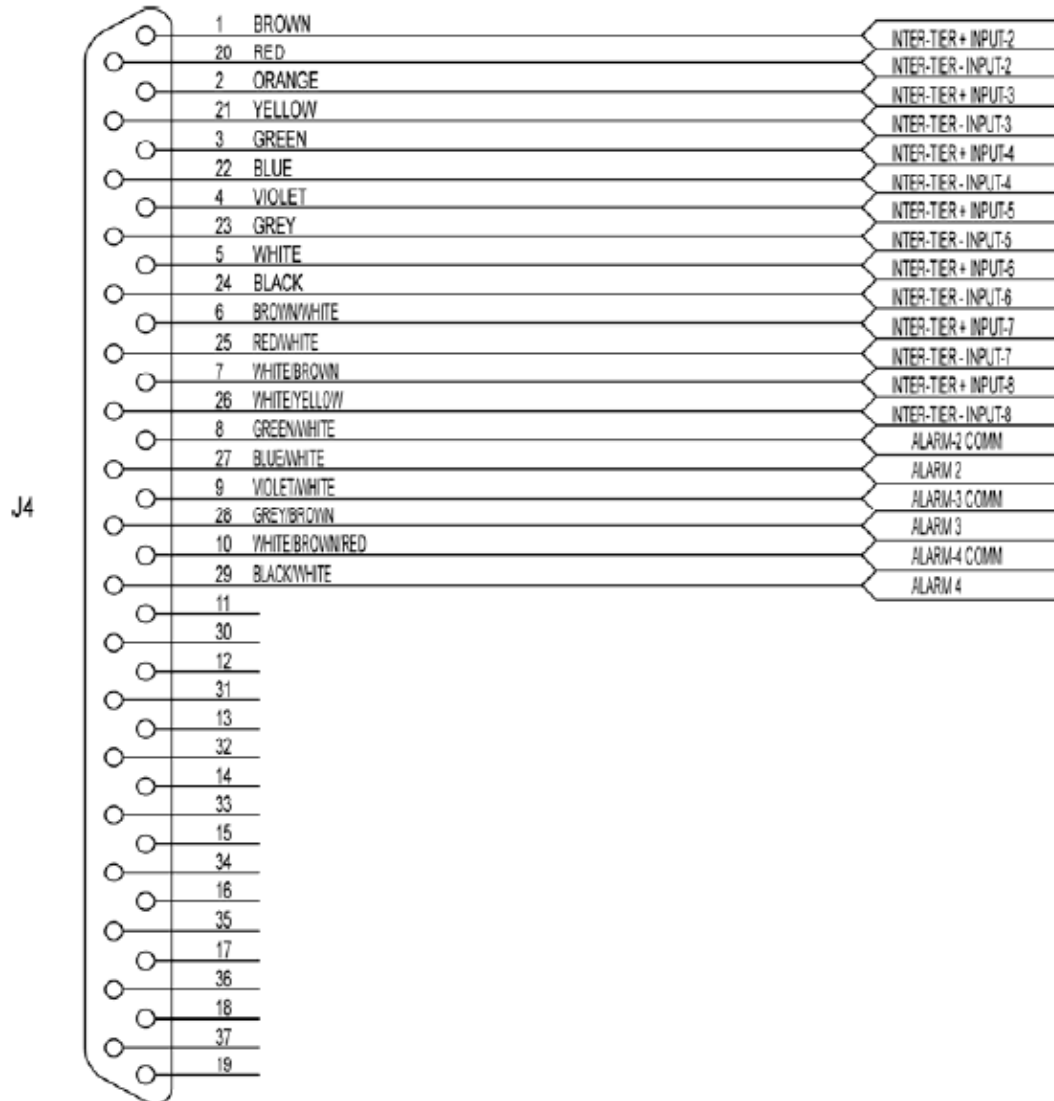


Figure 11 - BDS-1332-B1290 Intertier Connection J4

1. Select the Brown wire from the J4 harness, cut it to length and strip the wire.
2. Connect a 10KΩ flameproof flex resistor with a butt splice and place the wire close to the connection and position the tab washer.
3. Select the Red wire from the J4 harness, cut it to length and strip the wire.
4. Connect a 10KΩ flameproof flex resistor with a butt splice and place the wire close to the connection and position the tab washer.

5. Select the Orange wire from the J4 harness, cut it to length, and strip the wire.
6. Connect a 10KΩ flameproof flex resistor with a butt splice and place the wire close to the connection and position the tab washer.
7. Select the Yellow wire from the J4 harness, cut it to length, strip the wire.
8. Connect a 10KΩ flameproof flex resistor with a butt splice and place the wire close to connection and position the tab washer.

Continue as necessary until all intertier connections are matched up according to site/drawing/configuration demands.



Caution: If a current lead connects to the same point as the intertier sense lead, the current lead must be closest to the battery post. See BDS-123-A380 or BDS-127-A381 for connection details. Although these drawings show voltage sense leads, they apply to the intertier sense leads as well. Also, if connecting a voltage sense lead and an intertier sense lead on the same post; make these connections as close together as possible.

6.6. Alarm Contacts and Remote Alarm Reset Connection Preparation J2/J4

On all MPM configurations, J2 is for the alarm and digital connections. Two sets of dry Form C alarm contacts are available on connector J2. The alarms are identified as Parameter Alarm and System Alarm. The parameter alarm indicates threshold violations of all monitored parameters. The system alarm indicates system power loss or monitor hardware failure.



Warning:

Disconnect power by unplugging J2 before making any connection to the alarm circuits. See drawing BDS-1332-B1290 included with the system for wiring details.

Each set of alarm contacts is labeled:

ALARM COMM = common with pin 1 parameter and pin 22 system alarm

ALARM NO = normally open with pin 20 parameter and pin 4 system alarm

ALARM NC = normally closed with pin 2 parameter and pin 23 system alarm

The contacts may be connected directly to a facility's alarm reporting system. If more than one MPM is at a location and only one set of contacts can be monitored, the contacts may be wired in parallel as a normally-open circuit or in series as a normally-closed circuit. The alarm reset must be a normally-open dry contact that connects between J2, pins 21 and 3.

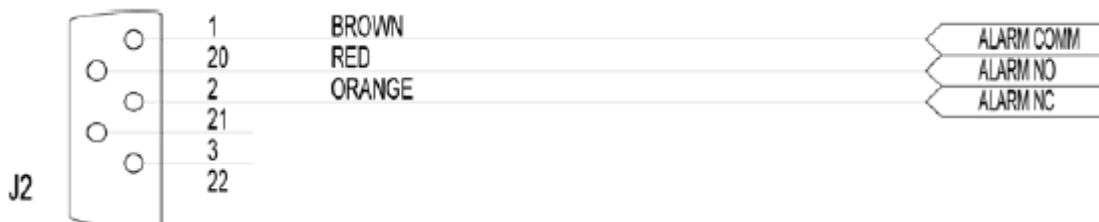


Figure 12 - BDS-1332-B1290 Parameter Lead Connections J2



Note: The alarm reset only resets the Parameter Alarm. The only way to clear a System Alarm is to correct the problem.

The MPM-100 expansion boards add three sets of alarm contacts on J4, labeled as:

- ALARM-# COMM = common
- ALARM # = normally open or normally closed, Where # = 2, 3, or 4.

These are configurable for either N/O or N/C contacts and are default from the factory as N/C. To change them to N/O, remove the lid and change jumper JP18 to JP17, JP20 to JP19 and JP16 to JP15.



Figure 13 - BDS-1332-B1290 MPM-100 Connections J4 Alarm

6.7. Discharge Current Sensor Connection Preparation J5 (Shunt/CT)

Since the MPM can monitor up to four battery strings in parallel, four discharge current channels are standard with the MPM. The current measuring device can be either a shunt or a Current Transducer (CT).

Shunt

The shunts may require special adapters for installation. Install the shunt in series with the battery string, ensuring that, after installation, no additional stress is applied to the battery post.

For a shunt connection, refer to BDS-158- A420.

CT

The transducer (ordered separately) must be the appropriate size for the load requirements. The CT only needs to be clamped around any battery string conductor carrying the full load.

Depending on the type of transducer used, refer to the appropriate drawings for termination. For a CT connection, refer to BDS-1334-A692.

If not monitoring discharge current, disassemble the DB-37 connector housing and cut the unneeded wires as close as possible to the connector.

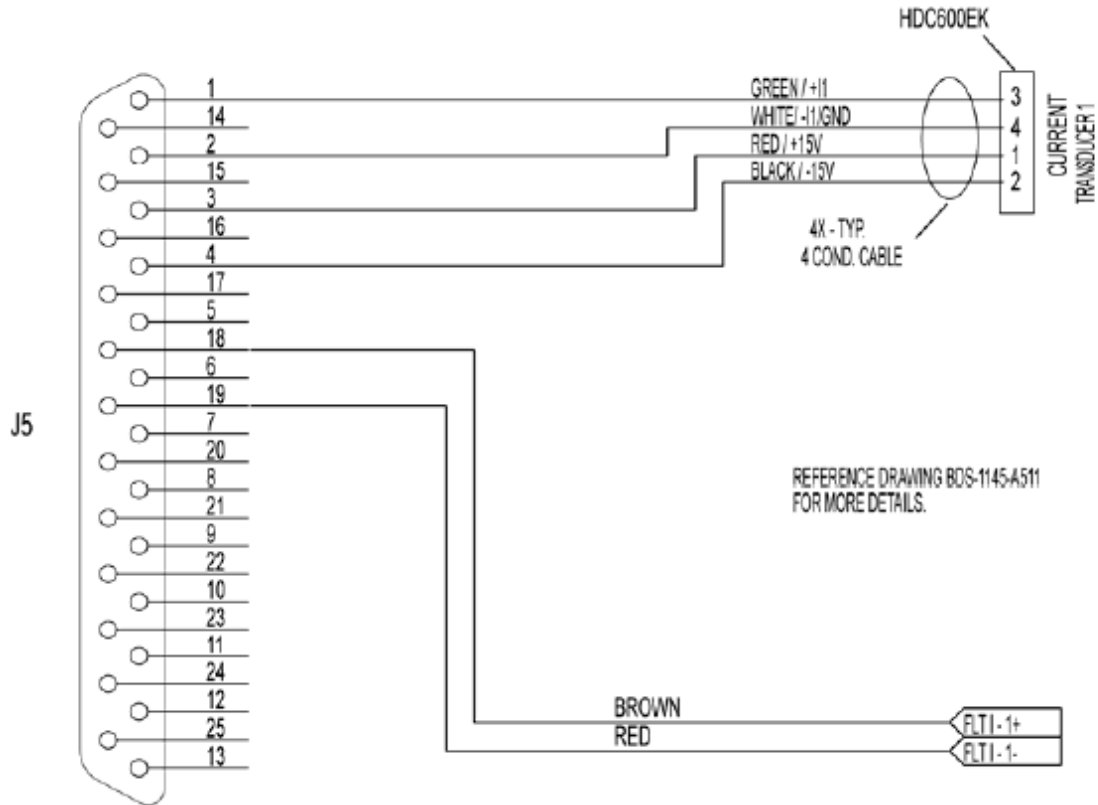


Figure 14 - BDS-1332-B1290 Connection J5

6.8. Float Charging Current Sensor Connection Preparation J5

Since the MPM can monitor up to four battery strings in parallel, four float current channels are available as an option. We are choosing the Multitel Kit for this manual. Similarities may exist in other float current kits. Please see the Float Charging Current Probe user's guide delivered with the system for possible updates and individual nuances. Please refer to Drawings BDS- 1332-B1290 and BDS-1334-A692.



Note: Power Source for the Float Charging Current Probe is part number 4000-026.



Figure 15 - MPM-100 Rear Panel



Figure 16 - Float cable



Figure 17 - Float Charging Current Probe Kit Connections Part Number 5610-051



Figure 18 - Multitel Float Charging Current Probe Rear Panel



Figure 19 - Float Charging Current Probe Connections



Figure 20 - Float Charging Current Probe Power Source

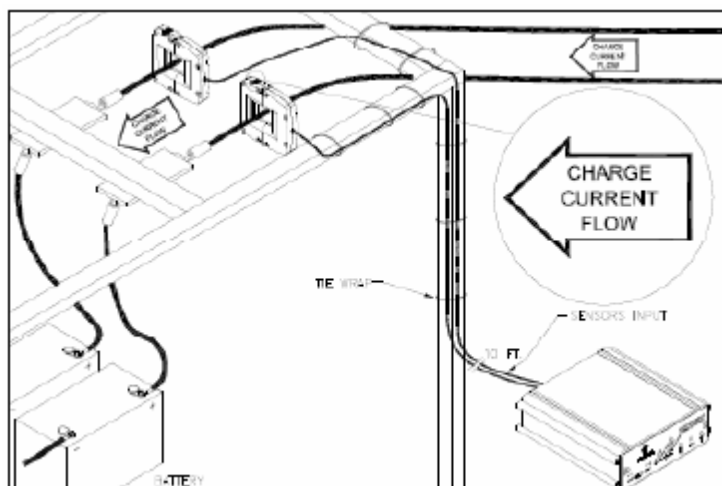


Figure 21 - Multitel's Float Charging Current Probe - Routing the cable



Figure 22 - Multitel's Float Charging Current Probe with Power Source and Inline Fuseholder



Figure 23 - Float Current Sensor

6.9. Wiring a power cable to the Float Charging Current Probe (FCCP)

Follow these steps to wire up the Float Charging Current Probe:

1. Locate the voltage source to power the Float Charging Current Probe control unit. Using a digital voltage meter, verify the voltage difference between the polarities. Should be between 18 and 60 volts DC.
2. Using shielded cables, route from the control unit's mounting location to the located and verified voltage source. If access to the rear of the control unit is restricted, be sure to leave enough cable length to attach the power connector to the rear of the control unit and then, slide the assembly into position. Leave enough cable length to allow connection to the power source.
3. Permanently secure the cable run with cable ties.
4. Install in-line fuse holders to the power source end of the shielded cable. The fuses should be as close to the power source as possible. Leave the fuses out of the fuse holder temporarily. Place the fuses in an obvious location where they can be found later.
5. Connect the power source cable to the power, paying close attention to the polarity.
6. Connect the cable ground to a system ground connection, close to the power source.
7. On the control unit, take the end of the cable and strip enough insulation and shield from the cable as necessary to crimp the connector pins and install the connector housing.



Note: To maintain the expected FCC emissions, the cable shield must come to the base of the connector housing. Be sure to only strip away as much insulation as needed to install the connector pins and housing.

8. Crimp the pins to the wires at the exposed end of the cable that goes to the control unit. Slide the crimped wires into the connector housing, making sure the polarity is correct and leave the ground conductor free.
9. Go back to the fuse holders and reinstall the fuses that were removed.
10. Plug the connector housing into the control unit and verify the unit powers up.
11. Remove the connector from the control unit and continue with the installation.

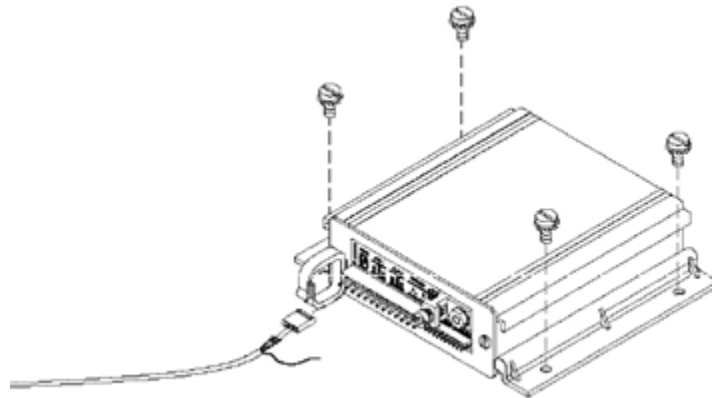


Figure 24 - Inserting the Power Connector

6.10. Load Lead Wire Connection Preparation



Warning:

Never route the wires in the same conduit with other wires in the facility. Never run the wires parallel to the battery bus. Some inverters emit large signal spikes that could cause induction problems through the connection cables.

Overall Voltage Monitoring

The overall voltage monitoring connections are made through the load lead wire connections. No additional wiring is necessary.



Caution: When a load lead wire connects to the same point as a voltage sense lead, the load lead wire must be the closest to the cell's post. See BDS-123-A380 ID Full Washer Quick Connect Sense/Load Leads and/or BDS-127-A381 ID Optional Quick "C" Clamp Leads for Installation Details (ID).

If a square post is available, the post clip connection scheme is better. See BDS-163-A424.

Disconnect Device

The first load lead wire that connects power from the batteries to the MPM-100, is considered the primary disconnect device. Connect the first load lead wire to the positive post of the first cell when making connections from the MPM-100 to the battery. To bypass the disconnect switch and maintain MPM-100 power when the string is not online connect this load lead wire directly to the DC bus when monitoring multiple strings.

Step By Step Instructions

Re-check the configuration by following these instructions:

1. Determine the configuration, for example 4X4, 2X12, 1X20 and so on. The configuration can be identified by the model number located on the bottom side of the MPM-100 device. Reference this number to the proper configuration under section 3 of the User's Guide.
2. Match the configuration to the corresponding configurations at the top of this drawing.
3. The column where the model number is will identify the connections for that configuration.
4. Some configurations will not require all connections in the specified column to be connected. For example, if a 2X4X12 is specified, only the connections identified with B1 and B2 will be required. The B# represents the battery number that will be connected.
5. Reference the installation procedure for proper sense lead construction and terminal to the battery.

Build each load lead wire using BDS-1141-A510 Fuse Protected Load Lead, observing length restrictions. All Drawings are located in the back of the manual.

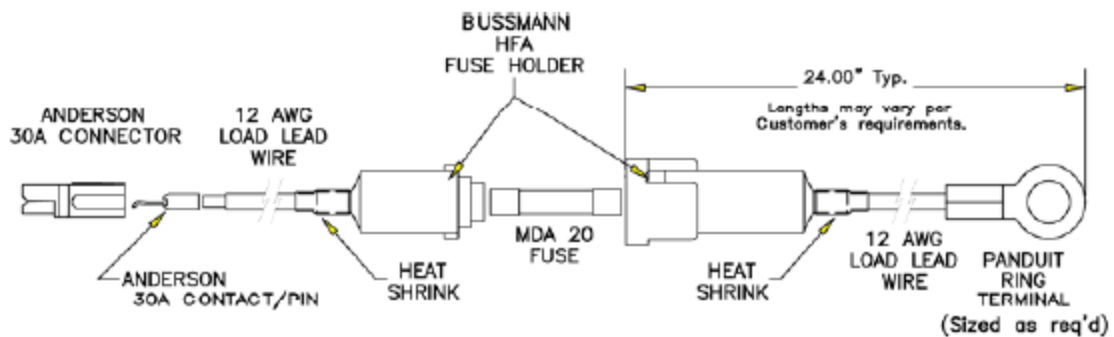


Figure 25 - BDS-1141-A510 Fuse Protected Load Lead

Strip 12 AWG Load Lead Wire

Choose the desired length of load lead wire. Strip one end of the 12 AWG load lead wire to 5/16". For ease of future cell maintenance, leave some slack in the wiring to the cells.



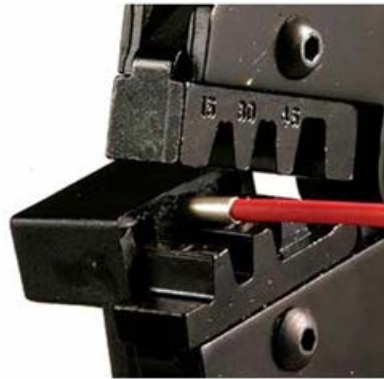
30 Die with Andersen Contact and pin

Position the contact into the #30 die with the Andersen contact pin. Center the crimp portion of the contact in the die with the rounded portion of the die up and against the seam on the contact and the tongue of the die directly opposite.



Inserting Load Lead Wire into Pin to Crimp

Place the wire inside of the contact pin. Before crimping the contacts onto the load lead wire, orient the contacts so that the contacts are all facing the correct direction, that is, so they go into the Andersen 30 amp connector/housings without twisting the wire. Notice that the contacts go into the housings one way only.



Crimping Load Lead Wire to Pin

Double check that the wire is fully inserted into the contact and crimp down firmly. Crimp with almost but not quite full force without bottoming out the tool.



Note: Don't spread the connector apart.



Good Crimp

A good connection is where the dimensions of the crimped portion are no more than an un-crimped pin. If the crimp is flattened then the pin will not readily push into the housing. Rotate the crimp 90 degrees and squeeze it again in the number three die but this time not as firmly. The idea is to make the width of the crimp just slightly less than it was prior to crimping.



Andersen Connectors

Assemble the black plastic Andersen connectors/housings together. Put the connector housings together before inserting the connector pins. The plastic housings are held together with dovetail joints. Always slide these joints together! Notice that they slide together in one direction only.



Warning: Always slide the Andersen connectors together and notice that they slide together in one direction only. Do not snap the housings together or apart as damage may occur.



Insert Andersen Contact into Connectors

Insert the contacts with their sharp edge down against the flat spring within the housing. The contacts should slide in and click.

If an audible click is not heard then they are not fully seated, the contacts need to be seated/fixed. When inserted fully the contact and its wire "float" slightly inside its housing. If it feels tight it may not be snapped in fully or the contact is wider than it originally was during crimping.

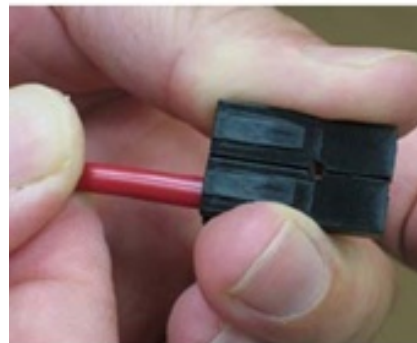







Tug on Assembled Connector

Tug slightly on the assembled connector to make sure the contacts are locked in place. If there is trouble locking the contact into the housing, then look at the side profile of the contacts. It is possible that it may need to be adjusted and/or straightened before inserting it into the housing.



Note: "Measure twice, cut once." The load delivered during a resistance test may be degraded if the load lead wire is too long. Therefore, when building the load lead wires, maintain an overall length from 22 to 90 feet round trip. Round trip consists of, for example, a connection from Load Connection 1, out to the battery, and back from the battery to Load Connection 2. If connection length is not maintained, the load will be too low or high, and resistance test results may be affected.



<p>Strip 12 AWG Load Lead Wire</p> <p> Warning: Always make sure the polarity is correct before plugging in the equipment. Do not plug in the equipment before checking that all load lead wires have been measured, cut and crimped according to system drawings.</p> <p>Strip the other end of the inline fuse holder assembly to 5/16".</p>	
<p>Thomas and Betts Crimper</p> <p>Choose die C (12 to 10) on the Thomas and Betts crimper.</p>	
<p>Crimp Fuseholder onto Inline Fuseholder Assembly</p> <p>Place about 1.5 inches of 3/8" heat shrink tubing onto the load lead wire, and secure the open end of the fuse holder on the inline fuse holder assembly into die C.</p> <p>Then place the load lead wire into the secured inline fuse holder assembly, and crimp. Turn 90° and crimp again.</p>	
<p>Checking Fuseholder:Load Lead Wire Connection</p> <p>Tug on the connection to make sure the connection will hold well.</p>	

Securing Fuseholder Load Lead Wire Connection with Heat Shrink

Pull the heat shrink tubing up to cover the wire and the fuse holder connection. Use a heat source to shrink.

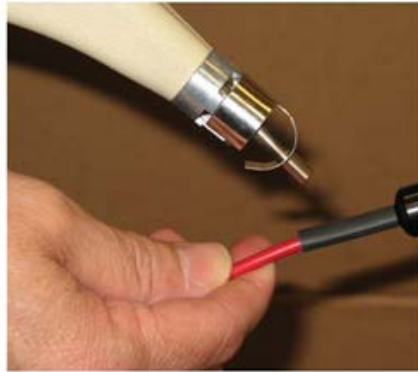


Caution: Never wrap excess load lead wire into a coil. A tight coil will result in induction that can adversely affect equipment operation. Leave excess cable in loose, flat lengths.



Warning: Before making any connections to the battery, verify the fuses have been removed from the fuse holders. Do not install the fuses until the time that the entire system is commissioned.

In hazardous voltage applications (where battery voltage is greater than 60VDC), remove the load lead wire fuse before disconnecting the load lead wire connector from the MPM.



7. Connecting Battery Terminals and Tab Washer Installation

Tab washers are washers that allow connection of the monitoring system to the battery. Some tab washers are supplied with single or double tabs. The features being installed will decide the tab washer style, where and how many tab washers are to be installed. The actual placement of these tab washers in relation to the battery post and existing hardware is critical. Reviewing the following examples will help illustrate tab washer placement.

Not all battery post will require three tabs as indicated by the figures below. Reference the detailed sections that will illustrate how many and where to install these tab washers.

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.

Always place the tab washers closest to the post or directly on top of the interconnecting strap. Torque all bolts/nuts to the manufactures specification when reassembling the connections.

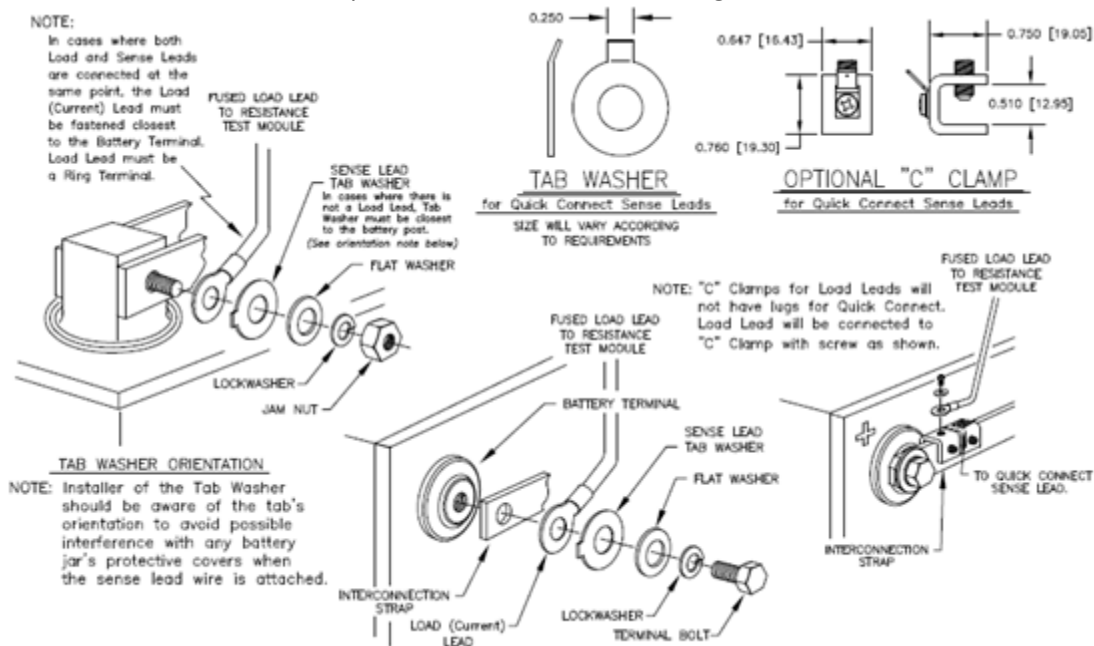


Figure 26 - BDS-123-A380 ID Full Washer Quick Connect Sense/Load Leads

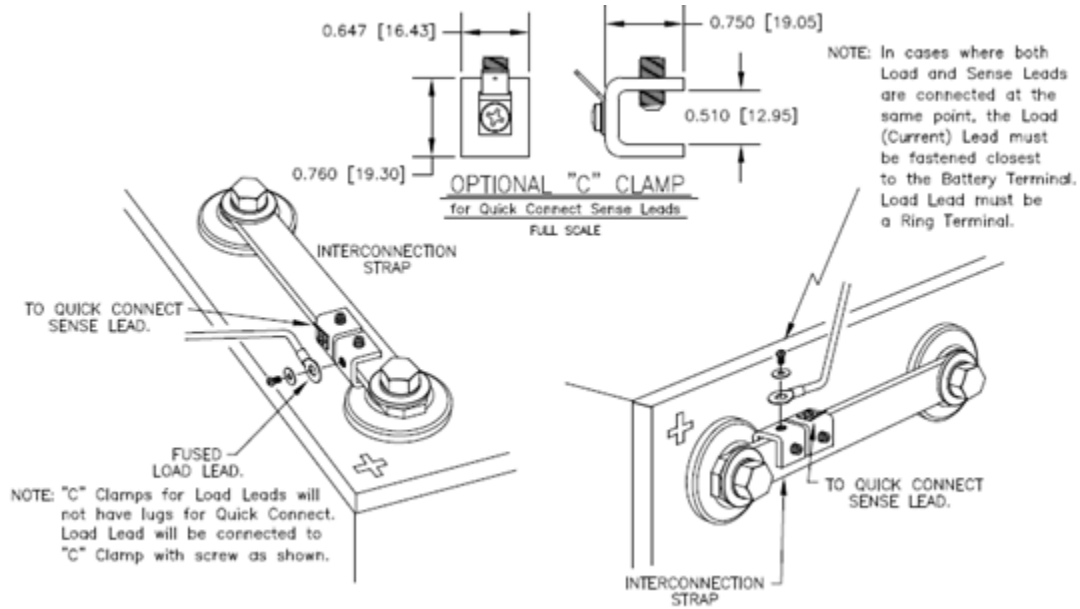


Figure 27 - BDS-127-A381 ID Optional Quick "C" Clamp Leads

When connecting the actual wires to the tab washers it is important to note that whenever a power connection (heavier gauge black or red wire) is being made, it must be connected to the tab washer closest to the battery post when more than one tab washer is used. Connect the load lead wires to positive posts, except for the last cell, where the connection is to the negative post.

Refer to BDS-1333-B688 Load Connections for MPM-100 included with the system to identify cells that will have load lead connections.



Note: If the power leads are not connected correctly, this could result in inaccurate resistance readings of the cell that these leads are connected to. Power leads must always be the closest connection to the battery post.

8. Final Steps Communication Connections

Connection to an MPM-100 can be via:

- modem
- USB (front panel)
- RJ-45 or RS-232 (rear panel)



Note: All methods allow battery parameters to be checked.

8.1. Modem

The MPM-100 can connect to a telephone line using the TELCO RJ-11 connector on the MPM rear panel. When connecting via modem, use 26AWG (minimum) TELCO line cord.

To communicate with an MPM from a remote location, connect the MPM rear panel modem connector to a telephone line. Connect the remote computer modem to the telephone line according to the computer manufacturer's instructions.

Pins 2 and 3 of the RJ-11 TELCO connector are for the tip and ring connection.



Figure 28 - TELCO RJ-11 Modem Connection



Note: A modem may not be installed on the model being used.

8.2. USB

The USB port on the front of the MPM is utilized for a temporary connection to a laptop computer. To use the USB port, connect the supplied USB cable, and switch the USB option on the Local Port Switch, so that the light indicator is on.

! **Note:** The front and rear connectors are in parallel and may not be used simultaneously. To use the RS-232 connector, make sure that the LED on the front switch is off, indicating that the front port is off and the back port is on.

8.3. RS-232

For a permanently connected computer, connect a 9-pin female to female cable (pin to pin construction) to the MPM rear panel port available and to an available port on the computer to be used.

! **Note:** The front and rear connectors are in parallel and may not be used simultaneously. To use the RS-232 connector, make sure that the LED on the front switch is off, indicating that the front port is off and the back port may be engaged.

The must not cable build a cable



connection between the MPM and the computer exceed 25 feet. For close connections, use the serial included with the system. For longer distances, using BDS-162-A423. Parts can be ordered from Albér.

Figure 29 - RS-232 9 Pin Female to Female Cable

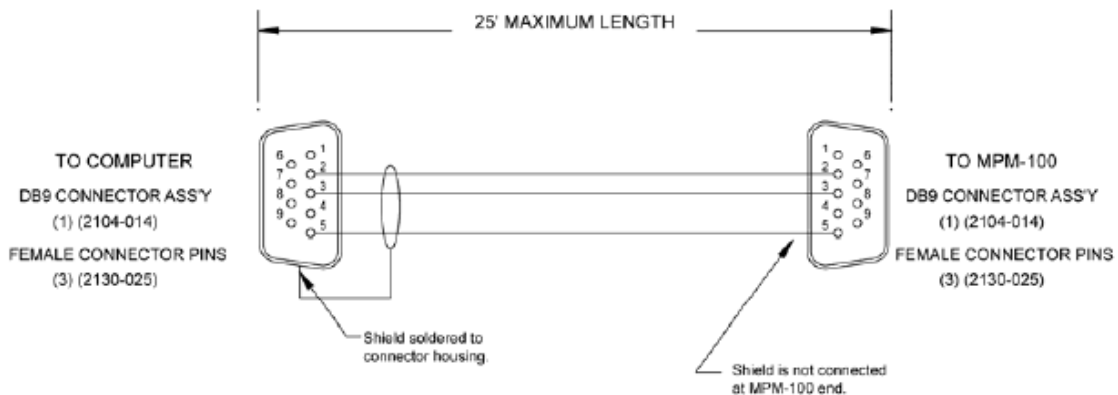


Figure 30 - BDS-162-A423 Serial Interconnect Cable RS-232

8.4. RJ-45 Connector

If the MPM-100 has a factory-installed network interface an RJ-45 connector will be installed just above the TELCO RJ-11 modem connection.

If the RJ-45 connector is not installed, an optional external network interface can be purchased; use the Alber conversion unit that connects to the DB-9. Refer to part number 4200-047, UDS-10 External Interface Network Setup User's guide.

Connect an Ethernet patch cable between the MPM-100 and the network to be utilized.



Figure 31 - RJ-45 Connector

9.MPM-100 Drawings

The following drawings are included in this guide to give more details on connecting and troubleshooting the MPM-100.

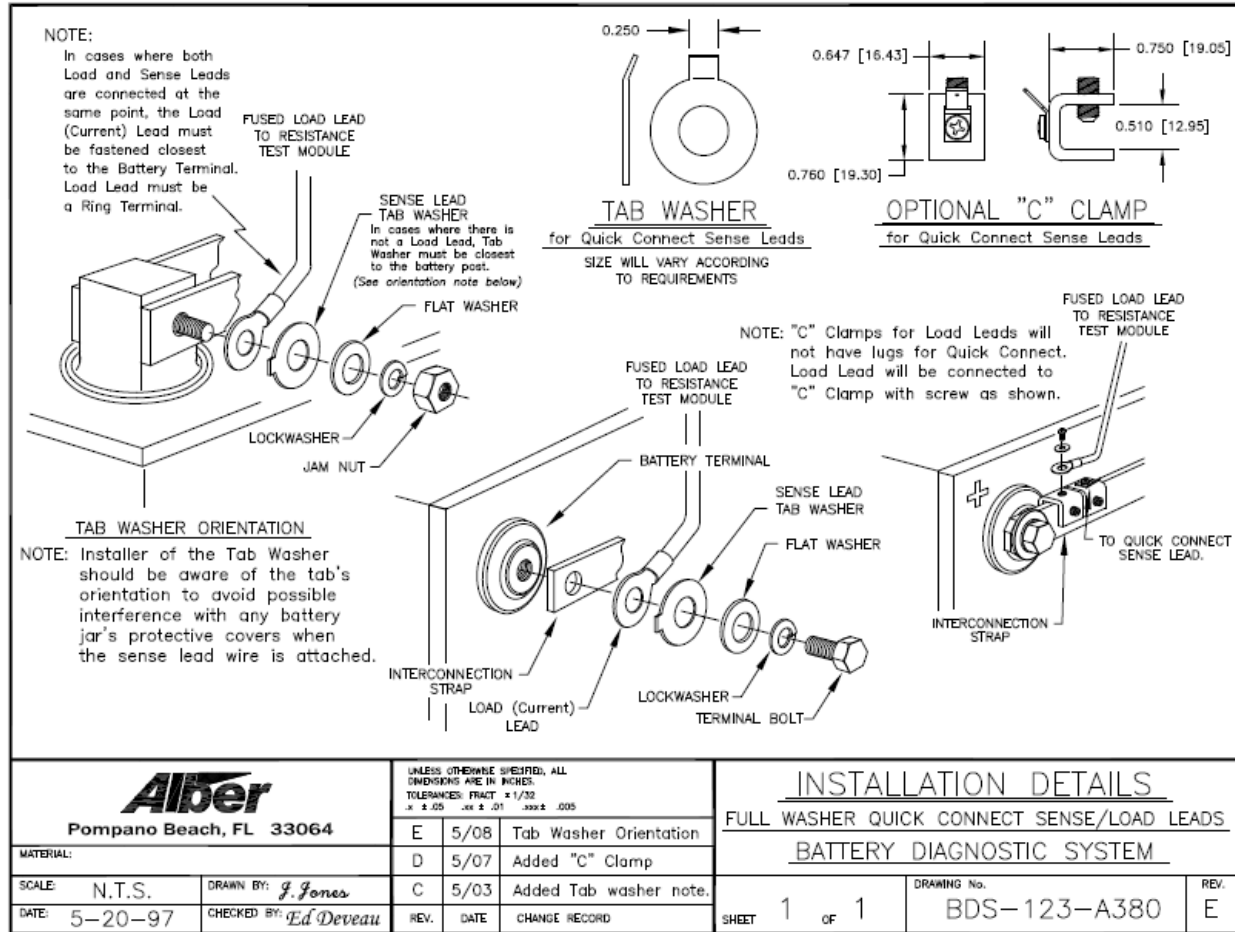


Figure 32 - Full Washer Quick Connect Sense Load Leads

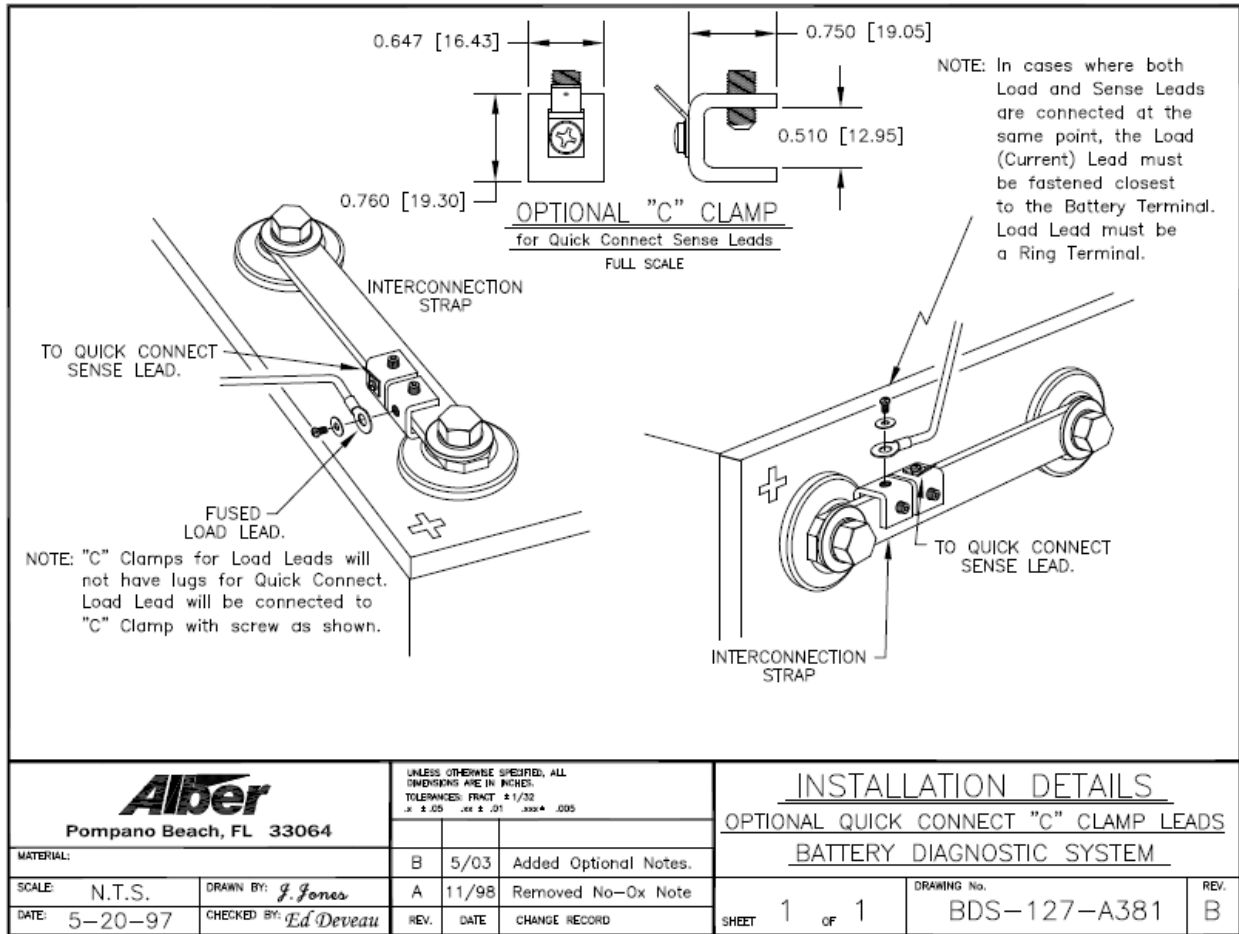
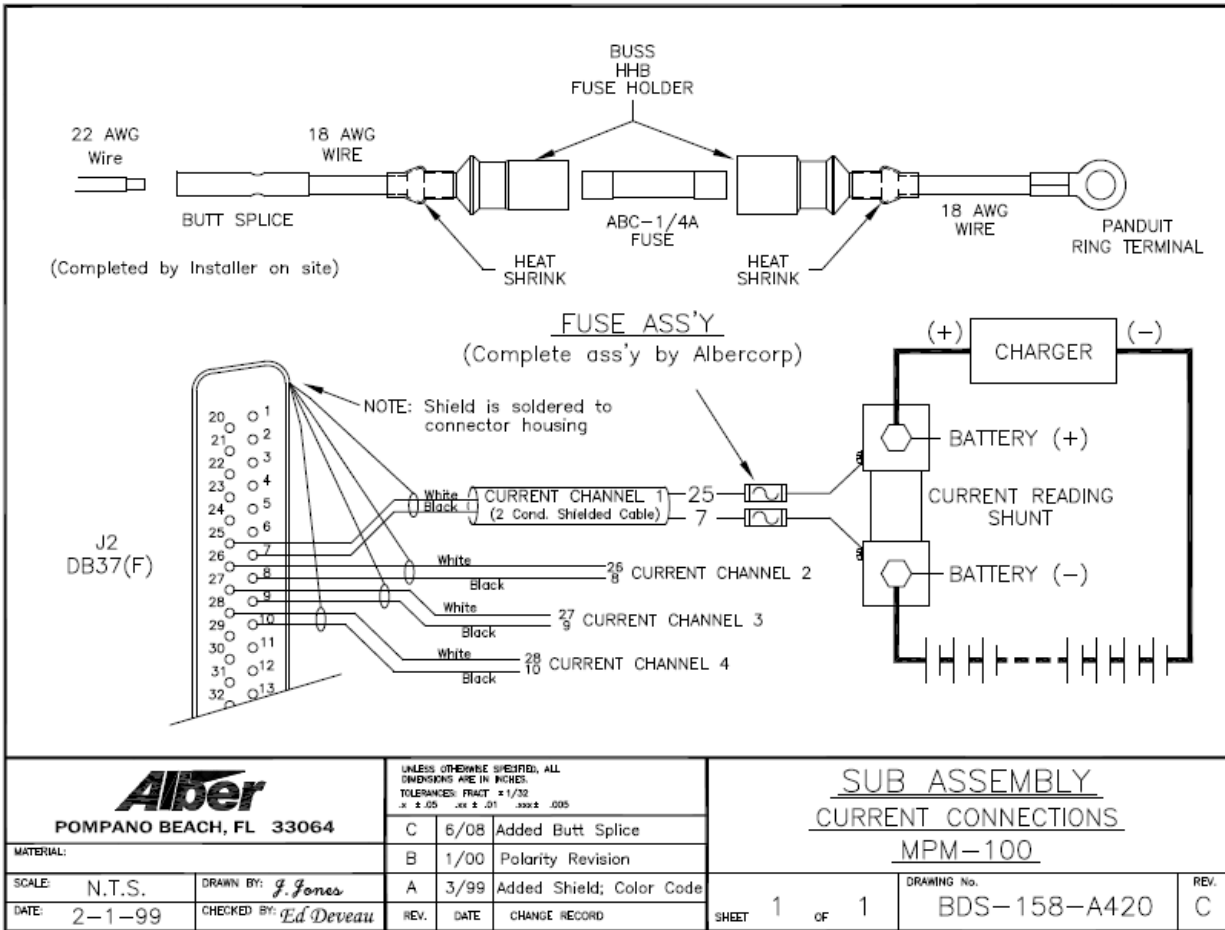


Figure 33 - Optional Quick Connect C Clamp Leads



<p>POMPAHO BEACH, FL 33064</p>		<small>UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES.</small> <small>TOLERANCES: FRACT ± 1/32</small> <small>DEC ± .05 DEC ± .01 DEC ± .005</small>		<p align="center"><u>SUB ASSEMBLY</u> <u>CURRENT CONNECTIONS</u> <u>MPM-100</u></p>													
		<table border="1"> <tr> <td>C</td> <td>6/08</td> <td>Added Butt Splice</td> </tr> <tr> <td>B</td> <td>1/00</td> <td>Polarity Revision</td> </tr> <tr> <td>A</td> <td>3/99</td> <td>Added Shield; Color Code</td> </tr> <tr> <td>REV.</td> <td>DATE</td> <td>CHANGE RECORD</td> </tr> </table>	C			6/08	Added Butt Splice	B	1/00	Polarity Revision	A	3/99	Added Shield; Color Code	REV.	DATE	CHANGE RECORD	<table border="1"> <tr> <td>DRAWING No.</td> <td>REV.</td> </tr> <tr> <td>BDS-158-A420</td> <td>C</td> </tr> </table>
C	6/08	Added Butt Splice															
B	1/00	Polarity Revision															
A	3/99	Added Shield; Color Code															
REV.	DATE	CHANGE RECORD															
DRAWING No.	REV.																
BDS-158-A420	C																
MATERIAL:				SHEET 1 OF 1													
SCALE: N.T.S.	DRAWN BY: <i>J. Jones</i>																
DATE: 2-1-99	CHECKED BY: <i>Ed Deveau</i>																

Figure 34 - Current Connections

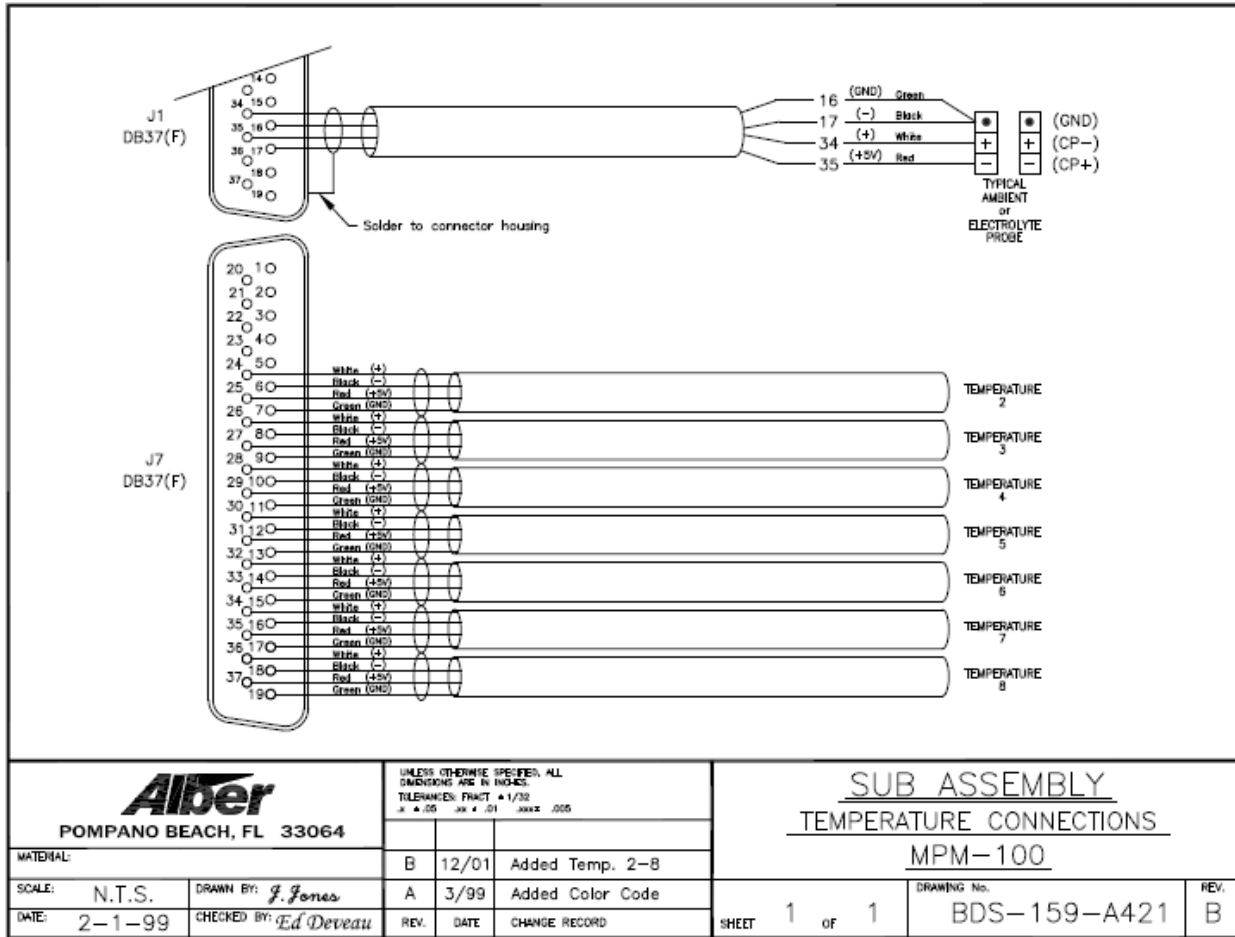


Figure 35 - Temperature Connections

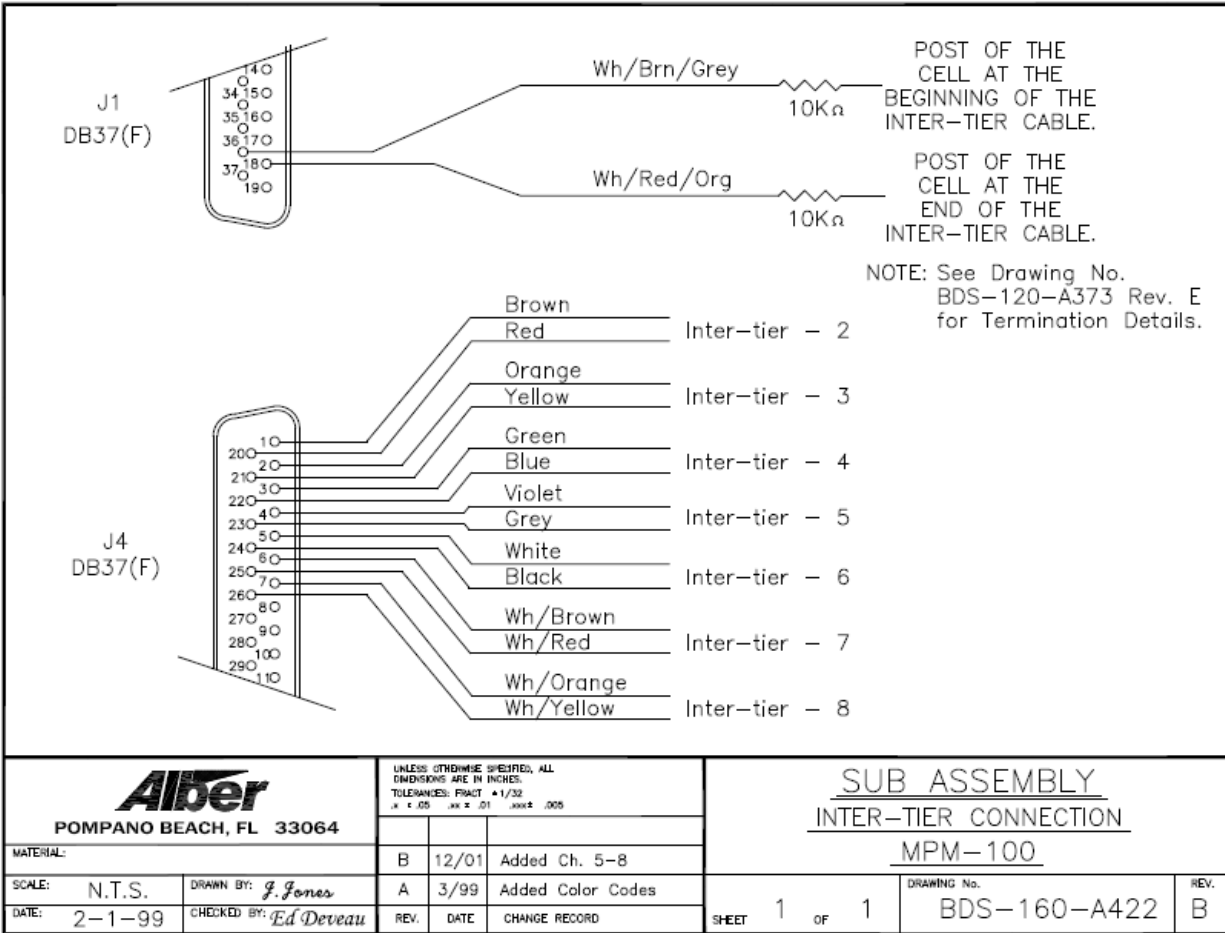


Figure 36 - Inter-Tier Connection

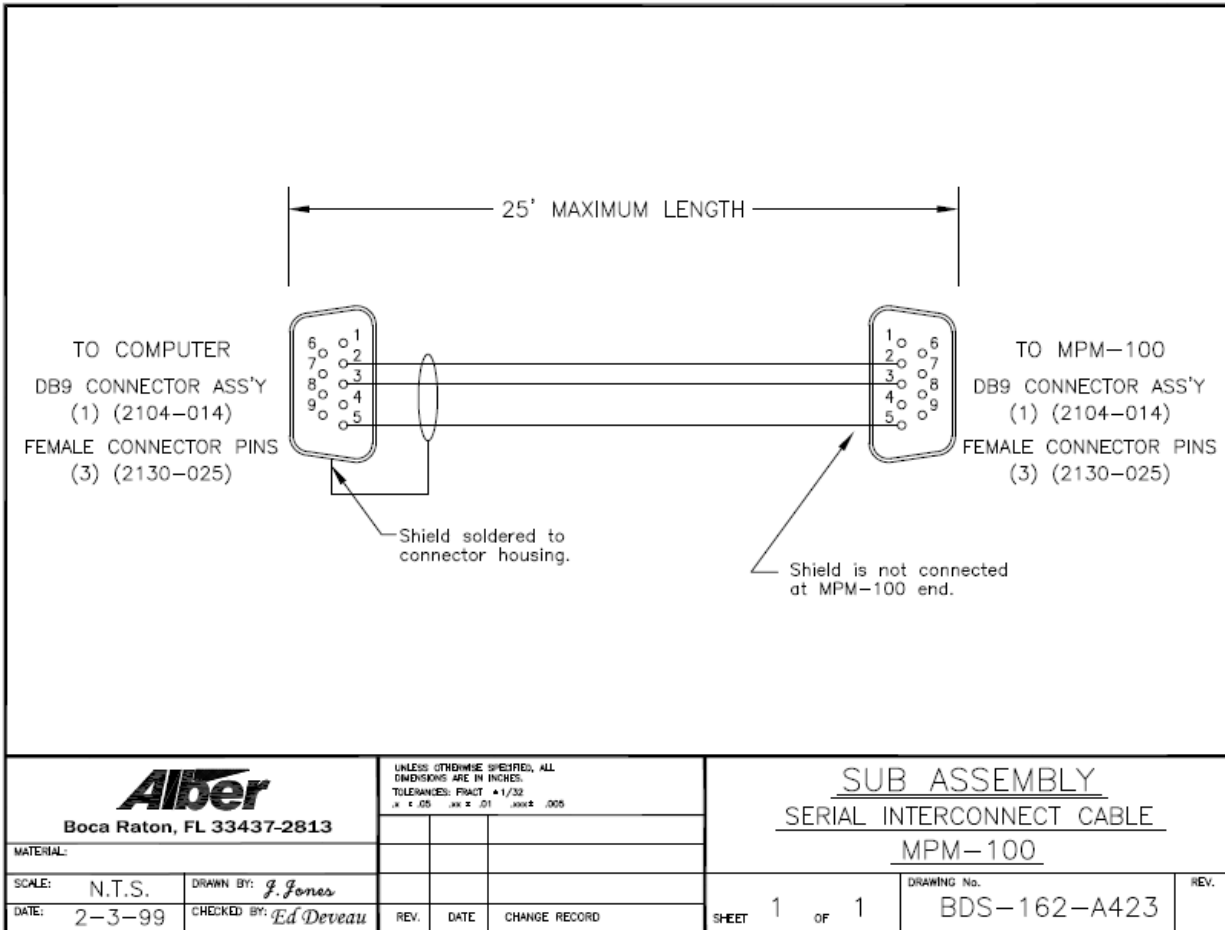


Figure 37 - Serial Interconnect Cable

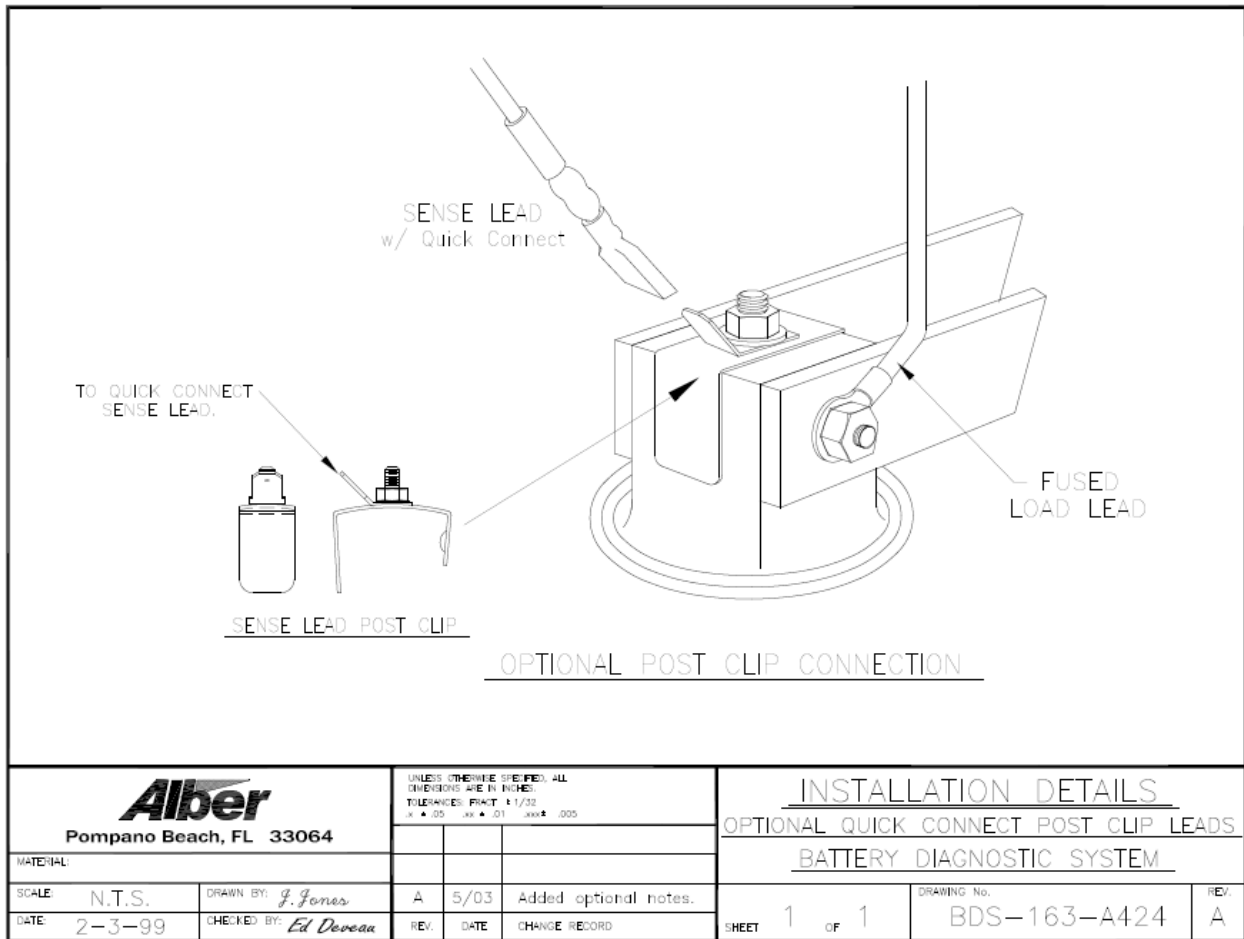


Figure 38 - Optional Quick Connect Post Clip Leads

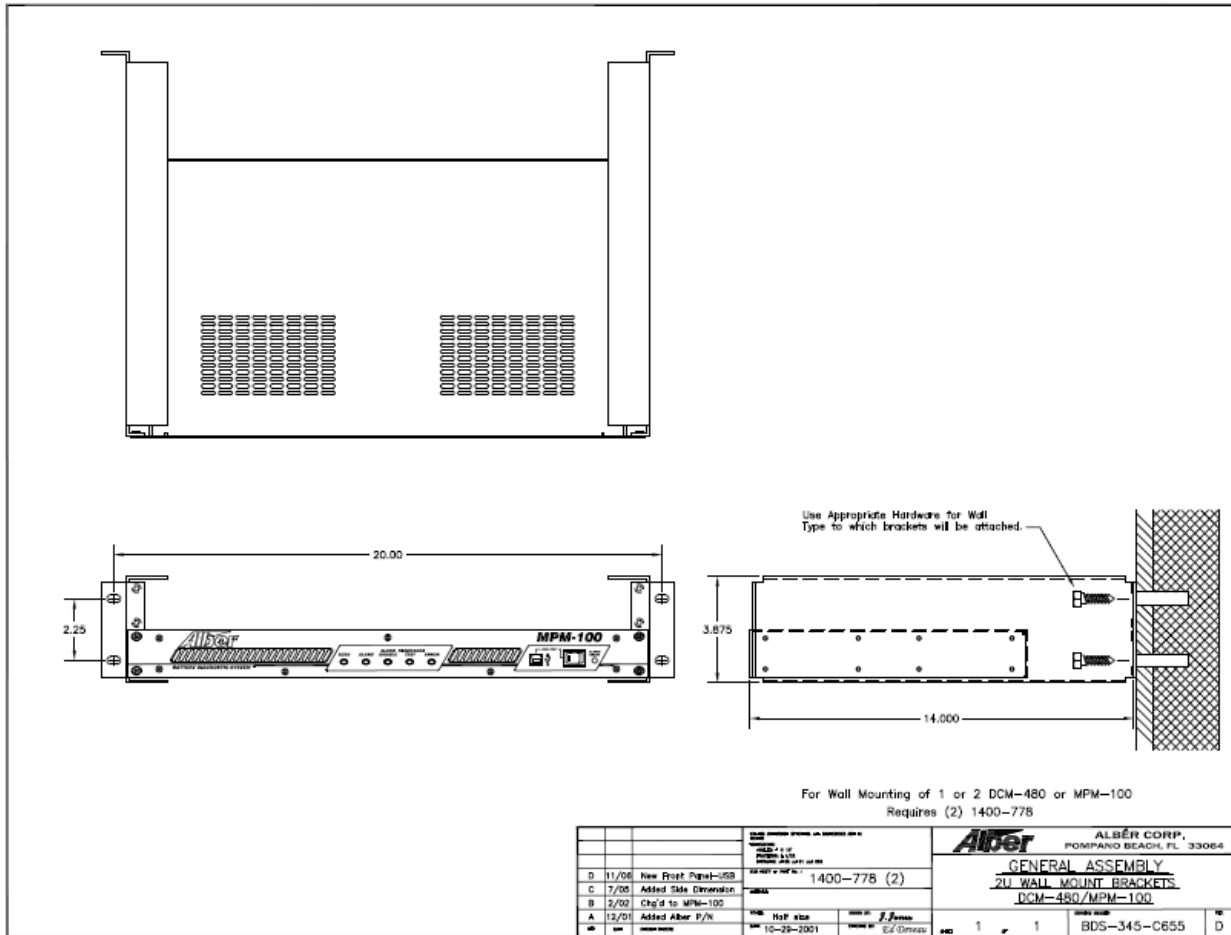


Figure 39 - 2U Wall Mount Brackets

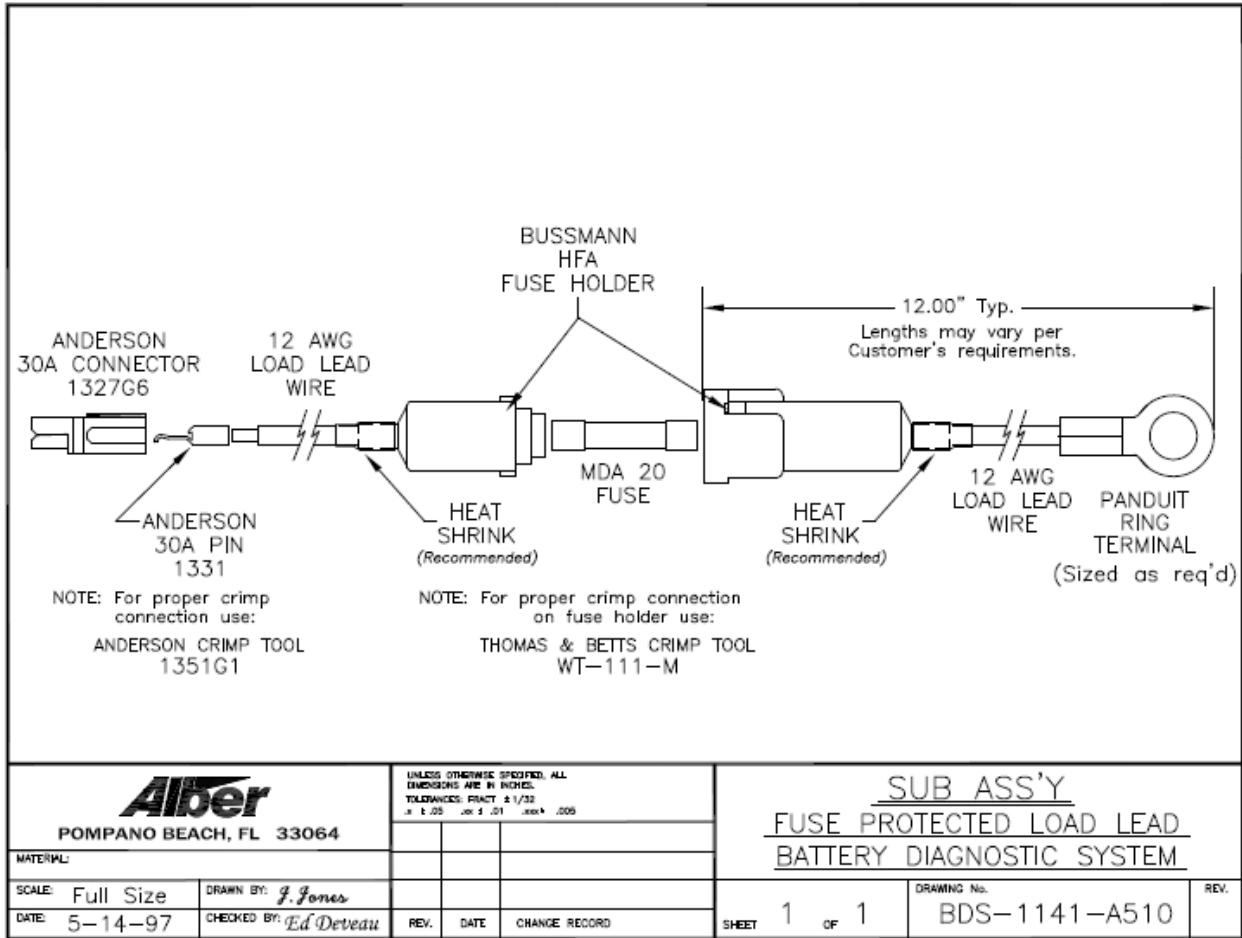


Figure 40 - Fuse Protected Load Lead

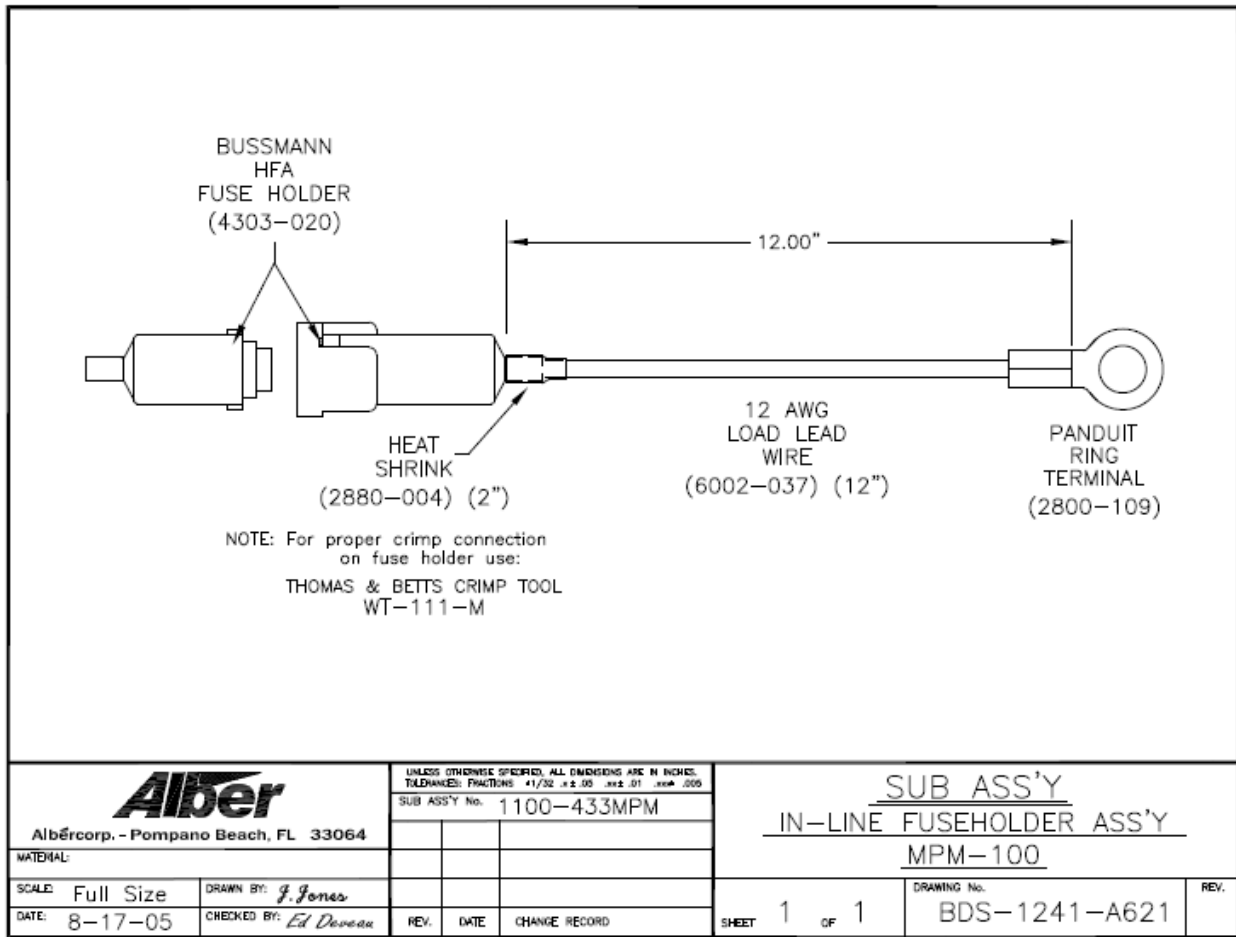


Figure 41 - In-Line Fuseholder Assembly

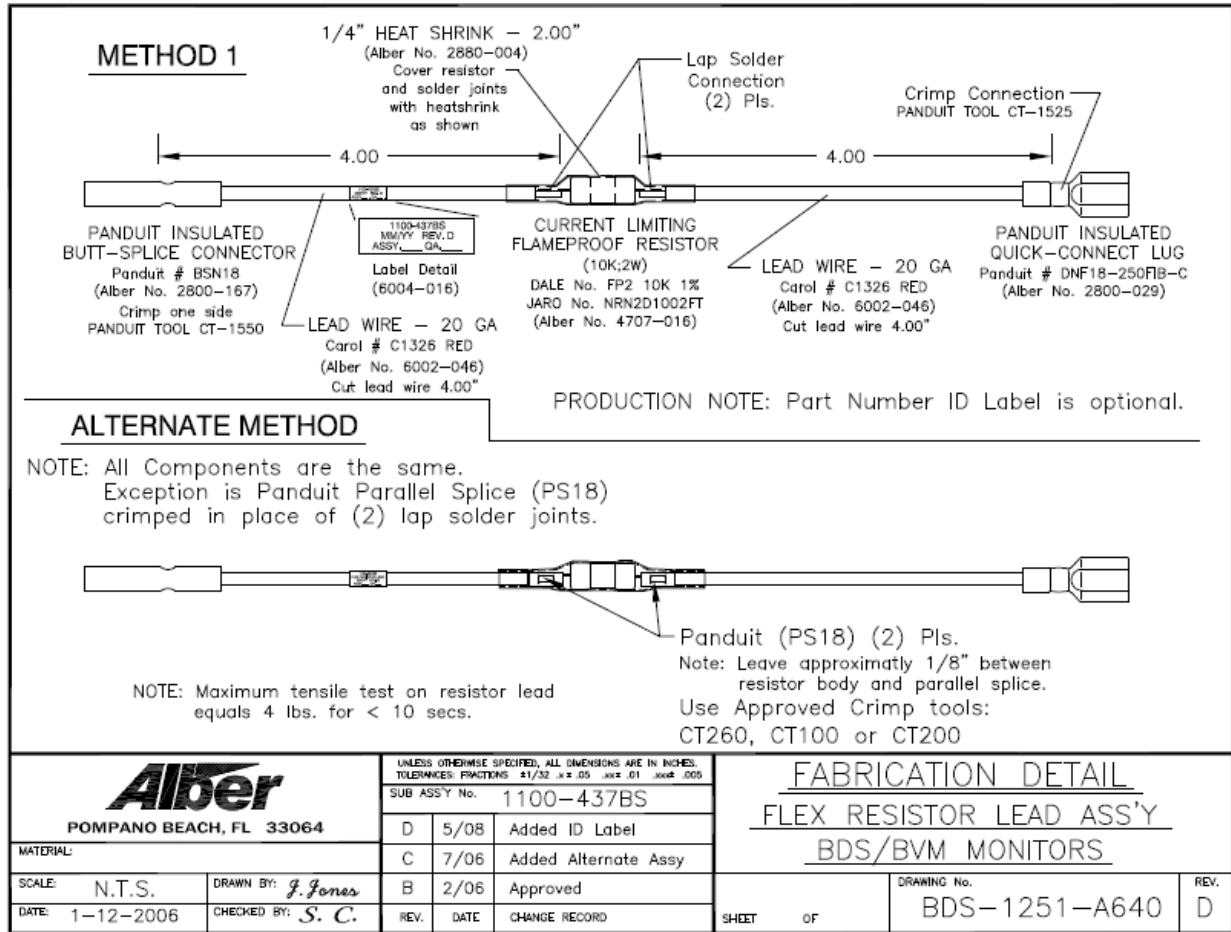


Figure 42 - Flex Resistor Lead Assembly

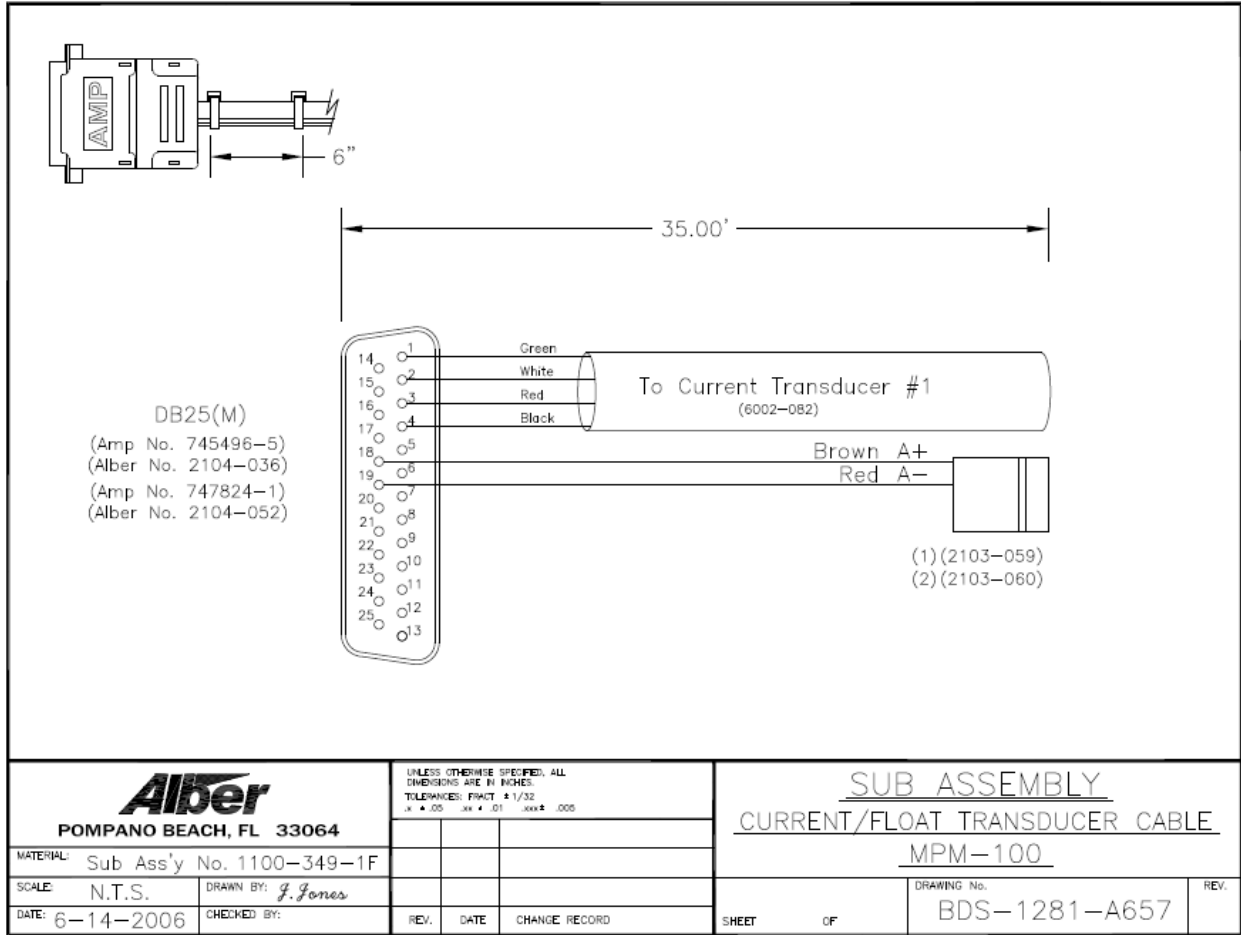


Figure 43 - Current Float Transducer Cable

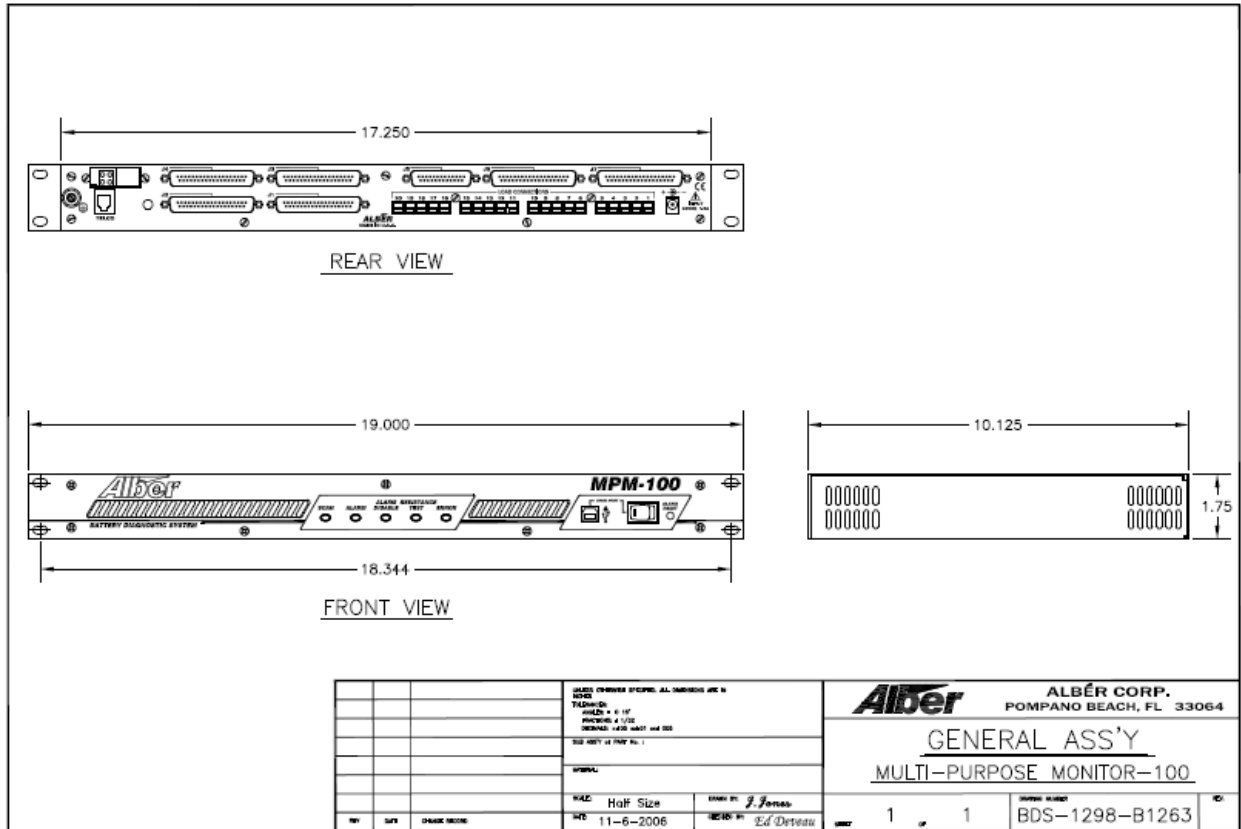


Figure 44 - General Assembly Multi-Purpose Monitor

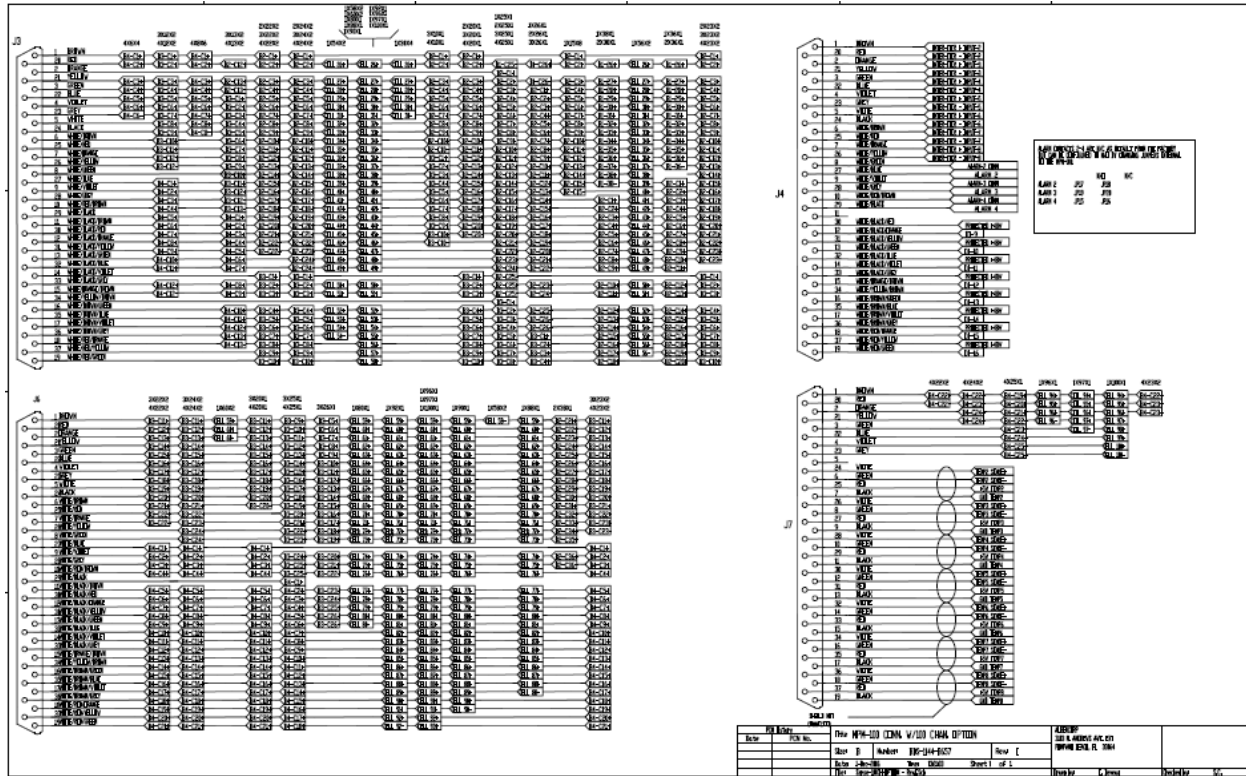


Figure 45 - Wiring Connections with 100 Channels Options (Sense Lead) J1 through J6

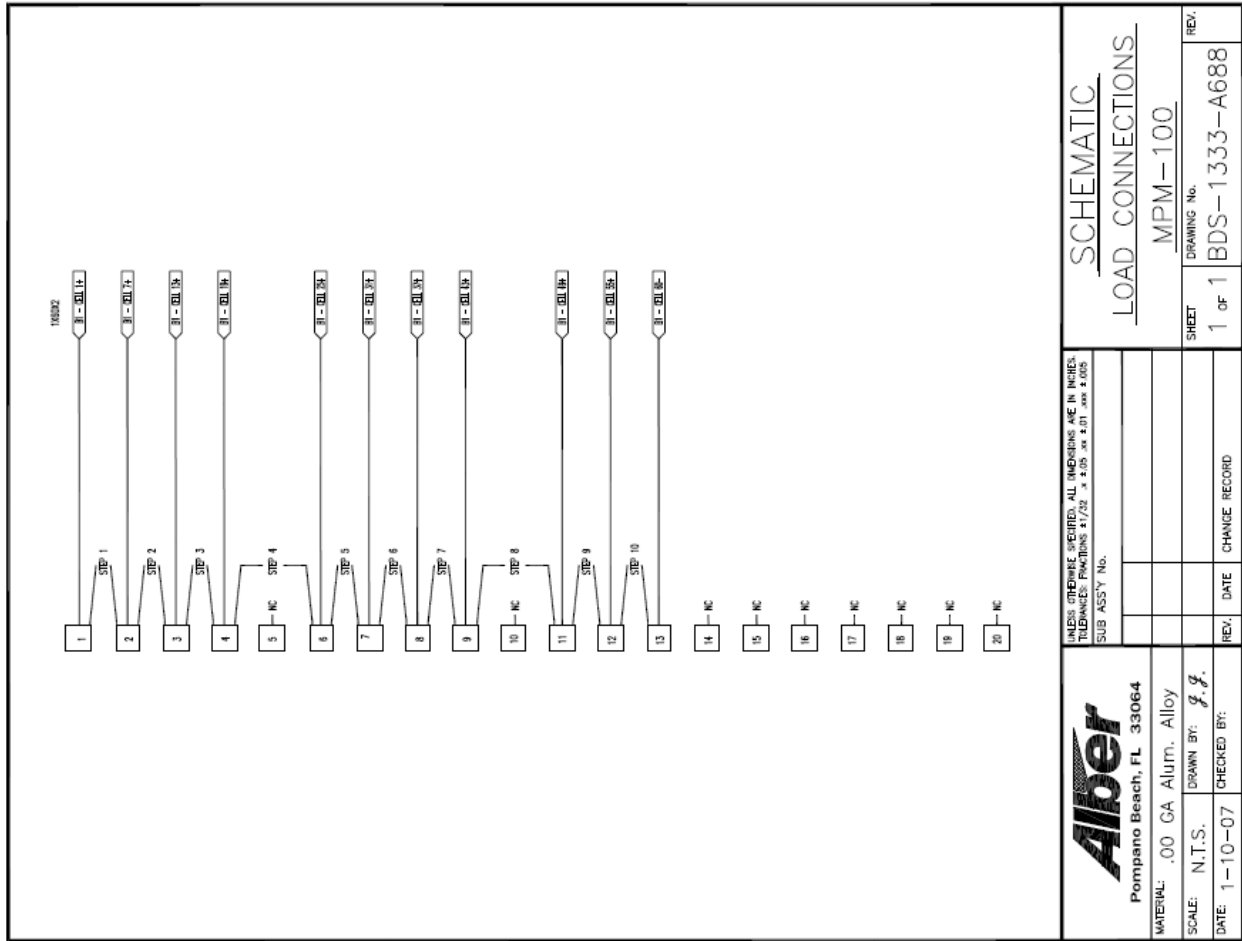


Figure 46 - Load Connections MPM 100

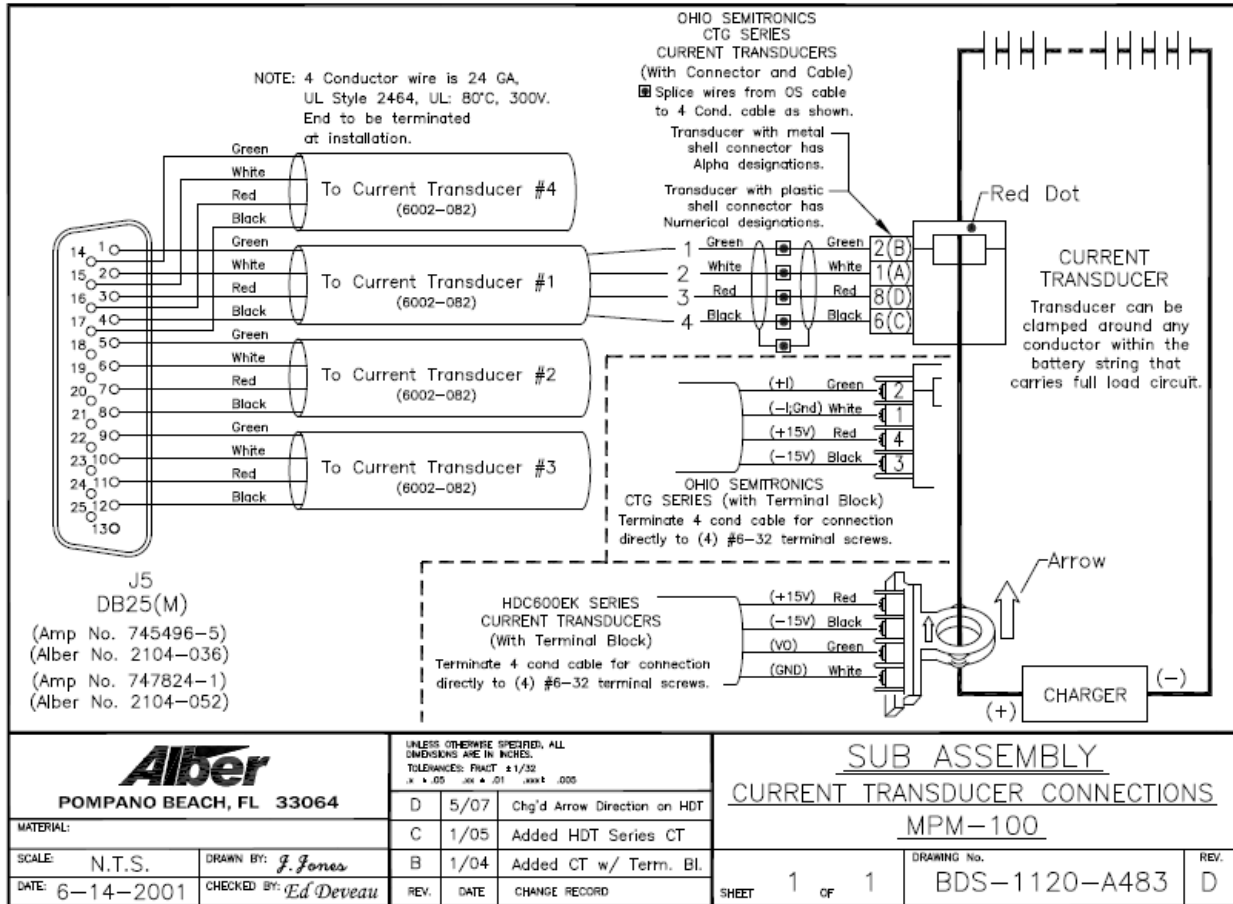


Figure 47 - Current Transducer Connections

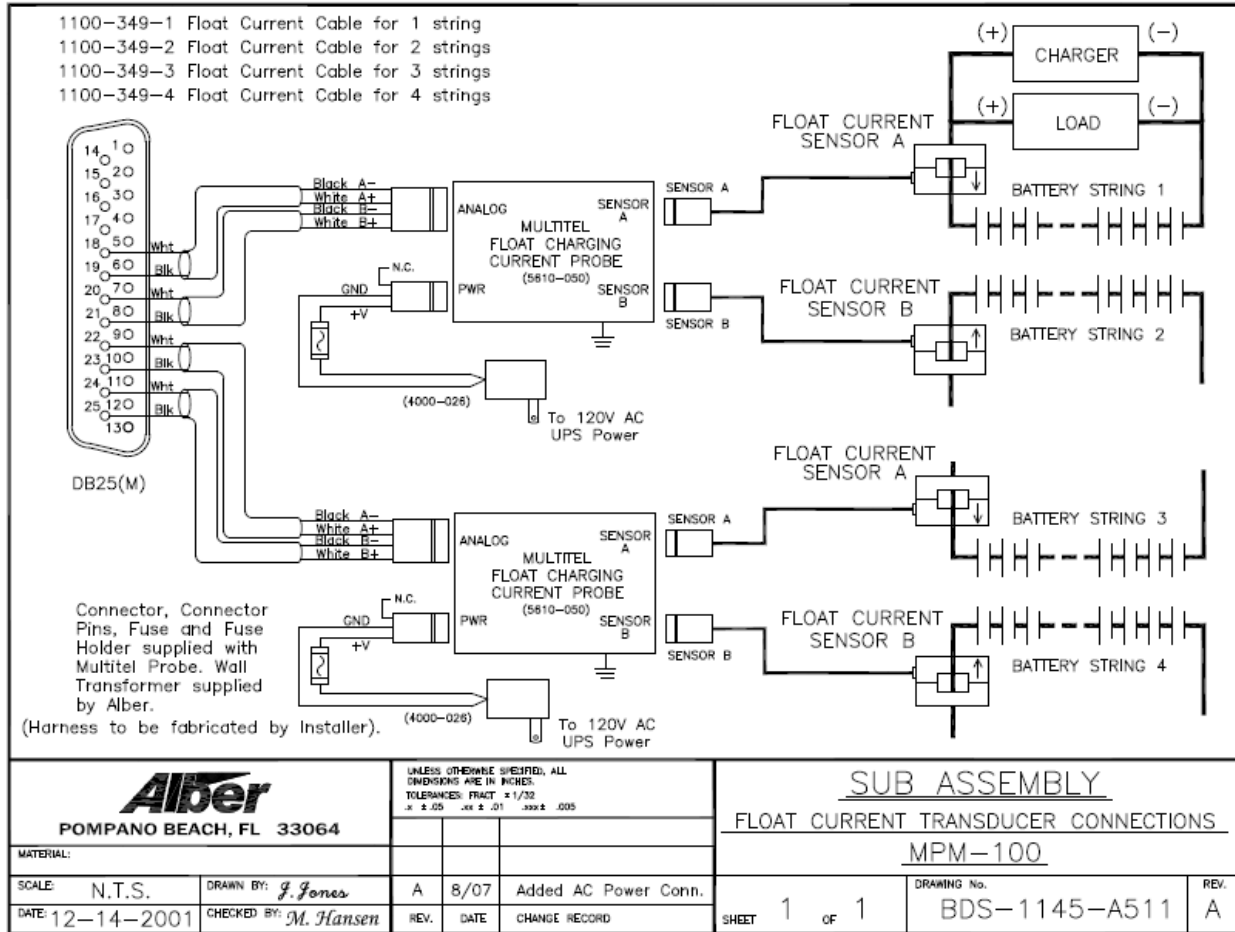


Figure 48 - Float Current Transducer Connections

10. Index

- 10 gauge - 5/16" insulated ring terminal 3-6
- 2 Wire Cord W/IEC-320 Plug 3-5
- 30 amp connector block-UL 3-2
- 30 amp contact 3-2
- 500 amp Current Transducer 3-8
- 600 amp Current Transducer 3-9
- AC Connection 5-1
- AC wall plug transformer 3-5
- Alarm 3-13
 - Alarm Contacts 6-8
 - Alarm Disable 3-13
 - Alarm Reset 3-14
- Ambient temperature probe 3-6
- Andersen
 - Connectors 6-17
 - Contact into Connectors 6-17
- AWG
 - Load Lead Wire 6-18
- Battery monitoring software 3-11
- BDS Flex resist w/butt splice 10K resistor 3-2
- BDS-162-A423 Serial Interconnect Cable RS-232
 - 8-2
- Before Applying Power 1-2
- Begin Intertier Connection J1 6-6
- Brackets
 - 2U Wall Mount 9-8
- Building Management System Integration 3-12
- Cable
 - Current Float Transducer 9-12
- Cable
 - RS-232 9 Pin Female to Female 8-2
 - Serial Interconnect 9-6
- Caution 1-1
- Charging Current Probe Power Source 6-12
- Cleaning System Components 1-6
- Communication Connections 8-1
- Conduit 5-2
- Configuration Options 4-2
- Connection
 - Inter-Tier 9-5
 - TELCO RJ-11 Modem 8-1
- Connection Preparation 6-14
- Connections
 - Current 9-3
 - Current Transducer 9-16
 - Float Current Transducer 9-17
 - Load 9-15
 - Temperature 9-4
 - Wiring 9-14
- Connector
 - RJ-45 8-3
- Crimper 6-18
- Crimping connectors 6-16
- CT 6-9
- Current Connections 9-3
- Current Transducer (CT) cable assembly 3-9
- Current/Float cable assembly 3-8
- Data Storage 3-17
- DB-37 6-4
 - connector housing 6-9
- DB-9 Conversion Kit 3-7
- DC Connection 5-1
- Disconnect Device 6-14
- Document Symbols 1-1
- Drawings 9-1
- Electrolyte temperature probe 3-6
- Emergency Shutdown Switch 1-6
- Ensure Rack 1-4
- Equipment
 - Grounding 1-2
 - Service 1-2
- Equipment Access 1-3
- Equipment Location 5-1
- Error 3-13
- European standards 1-5
- Exterior USB2 Hi-speed cable 3-1
- FCCP
 - power cable 6-13
- Female disconnect adapter 3-3
- Fit Tab Washers 6-1
- Flex Resistor Lead Assembly 9-11
- Float cable 6-11
- Float Charging Current Probe Kit 3-8

- Float Charging Current Probe Kit Connections 6-11
- Full Washer Quick Connect Sense Load Leads 9-1
- Fuse Protected Load Lead 9-9
- Fuseholder
 - Assembly 6-18
- Fuseholder assembly 3-4
- Fuseholder Load Lead Wire Connection 6-18
- Fuses 1-2
- heat shrink tubing 3-7
- Indicators 3-12
- Inline fuse holder 3-7
- In-Line Fuseholder Assembly 9-10
- Inserting
 - Power Connector 6-14
- Installation Checklist 3-1
- Insulation Rating For Wires 1-4
- Internal Components 1-7
- Intertier Sense Lead J1 6-5
- Leads
 - C Clamp 9-2
 - Full Washer Quick Connect Sense Load 9-1
- Load Connections 3-15
- Local Port 3-14
- Local Port Switch 3-14
- Materials Received List 3-1
- Measurement Capabilities 2-1
- Modem 8-1
 - Connection 8-1
- Mounting Options 5-2
- Mounting Stability 1-4
- MPM
 - Communication Options 2-3
 - Drawings 9-1
 - Features 2-1
 - Model Number Description 2-1
 - Standard Materials 3-1
 - System Specifications 3-16
- MPM-100
 - Rear Panel 6-10
- Multi Purpose Monitor 2-1, 3-4
- Multi-Purpose Monitor
 - General Assembly 9-13
- Normal Use Protection 1-7
- Note 1-1
- Operating Damaged Equipment 1-3
- Optional Quick 7-2
- Optional Quick Connect C Clamp Leads 9-2
- Optional Quick Connect Post Clip Leads 9-7
- Overall Voltage Monitoring 6-14
- Panduit 5-2
- Panel Controls 3-12
- Polyo J1/J3/J6 Harnesses 3-1
- Polyo J2 Harness 3-1
- Polyo J4 Harness 3-7
- Power Options 5-1
- Preventive Maintenance 1-6
- Product Safety Practices 1-1
- Quick Connect C Clamp Leads 9-2
- Radiated Immunity 1-4
- red load step wire 3-3
- Remote Alarm Reset 6-8
- Required Drawings 4-1
- Resistance Load Test Wiring 5-2
- Resistance Test 3-13
- Ring Terminals 1-6
- RJ-45 Connector 8-3
- RS-232 8-2
- RS-232 9 Pin Female to Female Cable 8-2
- RS-232 Serial Cable 3-6
- Safety
 - Information 1-1
 - Symbols 1-5
- Scan 3-13
- Sense lead clip 1-6
- Sense Lead Connection Preparation 6-1
- Sense Lead Harness 5-1
- Sense Leads 1-6
- Serial Interconnect Cable
 - RS-232 8-2
- Servicing
 - Adjusting 1-3
- Shelving 1-4
- Shipping 1-7
- Shunt 3-6, 6-9
- Slo-blo ceramic load step fuse 3-3
- Storage 1-7
- Strip Sense Lead Wire 6-3
- Substituting Parts or Modifying Equipment 1-4
- Symbols
 - Caution 1-1
 - Note 1-1
 - Warning 1-1

System Configuration 4-1	U Wall Mount-Bracket 3-5
System Overview 2-1	Underwriters Laboratories 1-5
Tab Washer 3-3	Uninterruptible Power Supply 1-6
Installation 7-1	UPS 1-6
Tab Washers 7-1	USB 8-1
TELCO RJ-11 Modem Connection 8-1	Ventilation 1-4
Temperature Connections 9-4	Verify materials
Tie wraps 3-9	ordered and received 3-1
Tools	Warning 1-1
crimper 3-10	Washer Quick Connect Sense Load Leads 7-1
Digital Voltmeter 3-10	