

BDS-40

Battery Diagnostic System

Installation Instructions



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BDS-40 Battery Diagnostic System Installation Instructions
Part Number 4200-045 Revision 9

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1 LEGAL INFORMATION

1.1 FCC DECLARATION OF CONFORMITY

This notice is applicable to Product/System/Hardware/Equipments with the Radio Frequency RF headset communication option installed for Bluetooth®-based communication.

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

- (i) This device may not cause harmful interference, and
- (ii) This device must accept any interference received, including interference that may cause undesired operations.

1.2 REGULATORY INFORMATION

1.2.1 Type Of Service

The MPM Series and the BDS Series Vertiv Corporation. Product/System/Hardware/Equipment is designed to be used on standard device telephone lines. It connects to the telephone line by means of a standard jack called the USOC RJ11C or USOC FJ45S. Connection to telephone company provided coin service (central office implemented systems) is prohibited. Connection to party line service is subject to state tariffs.

1.2.2 Telephone Company Procedures

The goal of the telephone company is to provide the user with the best service it can. To do this, it may occasionally be necessary for the company to make changes in its equipment, operations, or procedures. If these changes might affect the Original Purchasing End User's service or the operation of the Original Purchasing End User's equipment, the telephone company will give the Original Purchasing End User notice, in writing, to allow the Original Purchasing End User to make any changes necessary to maintain uninterrupted service.

In certain circumstances, it may be necessary for the telephone company to request information from the Original Purchasing End User concerning the equipment that the Original Purchasing End User has connected to the telephone line(s). Upon request of the telephone company, provide the FCC registration number and the Ringer Equivalence Number REN; both of these items are listed on the equipment label. The sum of all the RENs on the telephone line must be less than five in order to assure proper service from the telephone company. In some cases, a sum of five may not be useable on a given line.

1.3 SERVICE

Proper installation and testing are essential to the correct functioning of the system. If the user have questions, contact Vertiv Corporation./ Vertiv at 954-377-7101 or fax 954-377-7042. Request monitor assistance. Except as explained in this manual, do not attempt to service Vertiv equipment.



WARNING:

Opening the equipment may expose personnel to dangerous voltages.

Any adjustment, maintenance, or repair of this product must be performed by qualified personnel or contact a customer engineer through Vertiv Corporation., 954-377-7101 Request assistance. Never allow unauthorized personnel to operate the equipment. Only qualified and trained personnel are to perform the operations described in this manual. Calibration must be performed by technically qualified trained personnel.

2 SAFETY INFORMATION

All safety information within must be read, understood and strictly adhered to before installing, powering up or using the equipment/software; i.e. the system.

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



WARNING:

Use of this system in a manner not specified could compromise the designed-in safety.

2.1 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 impaired if it is used in a manner not specified in the operation/installation instructions. This manual describes the general installation and use of the system. If the system has features or accessories not described in this manual, contact Vertiv Corporation. at 954- 377-7101 or fax 954- 377-7042.

2.2 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.

2.3 Ground the Equipment/Chassis

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

To minimize shock hazard, the system chassis and/or cover must be connected to an electrical protective earth ground. 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.

2.4 Fuses

For continued protection against fire, 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.

2.5 Do Not Remove Equipment Cover

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, shield and/or panel removal.

2.6 Do Not Operate Damaged Equipment



WARNING

Equipment that appears damaged or defective must be made inoperative and secured against unintended operation until it can be repaired by qualified service personnel.

Whenever it is possible that the safety protection features built into this product have been impaired, either through physical damage, excessive moisture, or any other reason, REMOVE POWER and do not use the product until safe operation can be verified by qualified service personnel. If necessary, request service and repair from Vertiv Corporation. Sales and Service Office to ensure that safety features are maintained.

2.7 Do Not Service or Adjust Alone



WARNING

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.

2.8 Do Not Substitute Parts or Modify Equipment

Due to the possible danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification to the product. If necessary, request service and repair from Vertiv Corporation. to ensure that safety features are maintained.

2.9 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.

2.10 Radiated Immunity

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

2.11 Insulation Rating for Wires

Use only when supplied with the installation kit.

2.12 Ventilation

Never block equipment ventilation openings. The equipment must have adequate ventilation to prevent equipment 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 condensing) at 5°C to 31°C	0% to 50% RH (non condensing) at 32°F to 40°C

2.13 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.

2.14 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 enclosed documents as well as OEM documentation.

2.15 Caution



CAUTION

This symbol/box 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 enclosed documents.

2.16 Note:



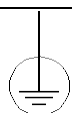
NOTE:

This symbol/box contains important information.

2.17 Safety Symbols



approved by Underwriters Laboratories



protective earth (ground) terminal



frame or chassis terminal



warning



caution



notice

3 EMERGENCY SHUTDOWN SWITCH/ DISCONNECT DEVICE

In most cases, the three prong AC cord from the cabinet, which connects to the 115VAC or 230VAC receptacle, is considered the primary disconnect device.

3.1 BDS-40 Disconnect Device

The power switch on the rear of the BDS 40 base unit is considered the primary disconnect device.



NOTE:

Different systems may have different disconnect procedures, please refer to the installation instructions or contact Vertiv Corporation.

3.2 Uninterruptible Power Supply UPS



WARNING:

The BDS system is designed to connect to UPS systems that are 600VDC or less and a maximum of 300V with respect to earth ground. The user must verify the voltage with respect to earth ground before connecting the system. Do this by measuring the voltage from each battery post referenced to earth ground. The voltage cannot exceed 300V.

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

4 Preventive Maintenance

4.1 Visual Inspection

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

4.2 Cleaning System Components

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



WARNING:

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

4.3 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.

4.4 Sense Leads (When Applicable)

Before cleaning the sense lead clips, ensure the system is disconnected and power to the system has been shut off. Clean the sense leads as required. The acid to which the sense lead clips are exposed during testing must be neutralized often, using a water and baking soda mixture. Brush this mixture onto the sense lead clip, and then rinse well with clean, cool tap water. Dry with a clean, soft cloth.



NOTE:

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

4.5 Internal Components

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

**WARNING:**

High voltages exist inside the monitor 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.

4.6 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.

5 Product Overview

The BDS-40 is a stand-alone monitor for UPS applications and is designed for use with UPS battery cabinets. What sets Vertiv Corporation monitors apart from others is their ability to provide early warning of battery problems. The monitor checks the state of health of each cell by performing a proactive resistance test, a reliable predictor of battery performance. In addition, to indicate immediate battery health and monitor status of a given location, the system reports to a Central computer i.e. a generic PC, displaying status screens.

Using polling and data transfer algorithms, the Battery Monitor Data Manager software program allows the user to manage over 1000 monitor systems from a central PC. Data is stored in the computer's database for later analysis and reporting. At any time, service personnel may call a battery location from the Central computer or a remote location, or directly connect to the monitor.

The Data Manager string and monitor status indicators make central battery monitoring easy. Terms such as Discharging, Alarm, or Warning for string status or Active for monitor status quickly summarize events. Conditions reported to the Central computer display as a list, to identify trouble spots easily. The system also features several methods of automated reporting of alarm occurrences, such as contacting key personnel via a pager, email, or fax.

Flexibility was a major design consideration. Since the monitors are stand-alone units with no external computer needed, a primary protocol using MODBUS ASCII was selected to allow the user to incorporate the monitor into large-scale facility monitors. This allows third-party interfaces to access all the stand-alone features of the monitor, yet leaves the advanced features of the Data Manager remote communication software available for service personnel.

5.1 Normal Operating Mode

In normal mode, the system scans all parameters in one to five seconds, depending on the configuration. As readings are taken, they are compared to user-programmed alarm levels. The monitor can then call a Central computer and energize an alarm contact if a parameter exceeds a level. Front panel LEDs indicate scan and alarm status, and alarm events are stored in memory for future analysis. The BDS can be programmed for critical and maintenance alarms.

5.2 Discharge Mode

If a discharge is detected, the system goes into a data logging mode and stores battery voltages and discharge current into a discharge record.

5.3 Resistance Test Mode

A battery resistance test may be performed at user-set intervals. The test is similar to that performed by the Vertiv Cellcorder. On a BDS-40, up to ten intertiers can be configured for this measurement.

5.4 BDS-40 Features

This section describes standard and optional BDS-40 features:

- ◆ Scans all pertinent battery parameters, such as overall voltage, cell voltages, current, and temperature.
- ◆ Performs a scheduled resistance test of all cells/jars and intertiers, and stores results for trending analysis.
- ◆ Auto detects discharges based on Overall Volts or Discharge Current, and stores data for real time or accelerated time playback.
- ◆ Signals if any parameter is outside user-programmed limits, energizes a Form C relay contact, and calls a Central computer to report the alarm condition.
- ◆ Communicates with an external computer via USB, RS-232, modem, and LAN.

5.4.1 Alarm Features

The monitor may be set to call the Central computer to report an alarm condition when detected automatically. The user can program high and low alarm levels on all voltage and temperature parameters, and a high alarm level for resistance. When any parameter goes outside the normal range, the monitor stores the event in memory, the Alarm LED lights, and an alarm relay with a Form C contact energizes. The alarms may be set for latching or non-latching.

5.5 Materials

Standard Materials


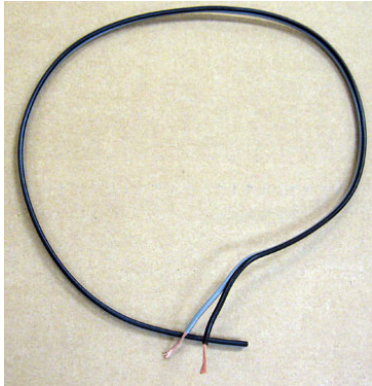
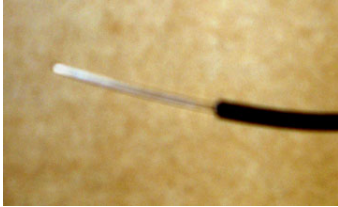





Description	Photo	Purpose
Sense Lead Harness pn 1101-710- XXA-1101 to 740-XXA		Refer to drawings that were sent with the system as harnesses are configuration dependent. The leads are labeled for easy installation. An example drawing is located at the back of the manual: Wiring Schematic, BDS-40 to (40) 12V Modules, (10 Shelf) Battery, BDS-2287-B960.

Figure 1. Sense Lead Harness

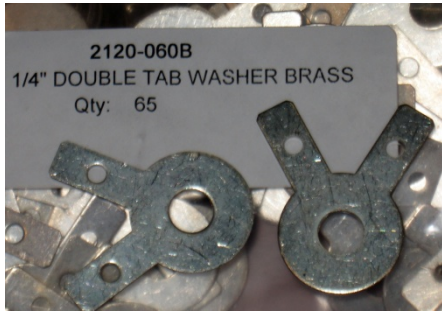


Standard Materials

Description	Photo	Purpose
2 Cond 16 GA Black Zip Cord pn 6002-080		AC power between units, 24VAC connection cord to base/plus units
Figure 2. 2 Cond 16 GA Black Zip Cord		
Fiber Optic Cable pn 3703-006		Communication link between base/plus units
Figure 3. Fiber Optic Cable		
Fiber Optic Polishing Kit pn KIT-3703-015		The kit provides the user with polishing materials to terminate the ends of plastic optical fiber correctly.
Figure 4. Fiber Optic Polishing Kit		
BDS-40 Monitoring System		Battery monitoring system
Figure 5. BDS-40 System		


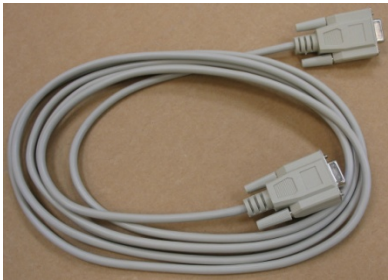
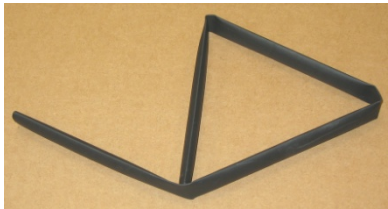
Standard Materials

Description	Photo	Purpose
2 POS/8 POS Pluggable Terminals pn 2140-011 (2) pn 2140-024 (8)		Pluggable screw terminals for power and relay connections
Figure 6. 2 POS/8 POS Pluggable Terminals		
7 foot telephone cable-UL pn 6003-010		Modem/ TELCO connection cable
Figure 7. 7' Telephone Cable-UL		
<div> NOTE: <i>The sense lead resistor assemblies include a 10KΩ 1% flameproof resistor that reduces the risk of a short circuit during installation and maintenance.</i> </div>		
USB2 Hi-speed cable pn 2025-108		For system hardware to computer communication.
Figure 8. Exterior USB Cable		

Standard Materials



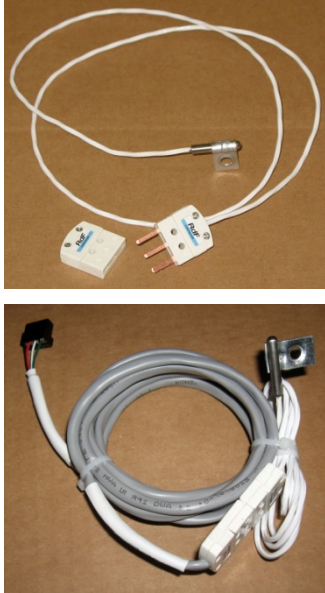
Description	Photo	Purpose
tab washers pn 2120-060B		Connector interface between harness and cell.
Figure 9. Tab Washers		
lock washers pn 2825-060		Refer to drawing BDS-1179-A581.
Figure 10. Lock Washer		
various screws pn 2825-115		NOTE: <i>Tab washer size is battery dependent, other sizes such as 3/8" and 5/16" are readily available.</i>
Figure 11. Screws		

Standard Materials

Description	Photo	Purpose
<p>Power Cord pn 6003–008 = US, pn 6003–006 = Euro, pn 6003–007 = UK</p>		Power for the Controller.
Figure 12. Controller Power Cord(s)		
<p>RS–232 serial cable pn 2025–117</p>		DB9 computer communication cable
Figure 13. RS–232 Cable		
<p>¼ " heat shrink tubing pn 2880–004 used in Inline Fuseholder Assembly may have ⅜ " heat shrink tubing substituted pn 2880–005</p>		Helps insulate connection
Figure 14. ¼" Heat Shrink Tubing		

5.5.1 Optional

Optional Materials

Description	Photo	Purpose
<p>FCCP Kit pn 5610–051 FCCP Cable pn 1101–749</p>	 <p>Figure 15. Multitel Float Charging Current Probe Kit</p>	<p>Float current measurement transducer for a single string. Please refer to drawings BDS–1189–B985</p> <div style="border: 1px solid orange; padding: 5px; margin-top: 10px;"> <p>NOTE: <i>Part number 5610–050 supports two strings and includes one more clamp on the probe.</i></p> </div>
<p>24V .5A DC Wall Mount Power Supply pn 4000–026</p>	 <p>Figure 16. AC Wall Plug Transformer</p>	<p>24V .5A DC Wall Mount Power Supply for the FCCP</p>
<p>Ambient temperature probe/assembled with cable pn 1101–745 Separate ambient probe shown in figure pn 2900–029 Cable pn 6002–094</p>	 <p>Figure 17. Ambient Temperature Probe & Assembled pn 1101–745</p>	<p>Temperature probe that hangs free for ambient temperature measurement. Refer to drawing BDS–1189–B985.</p>

Optional Materials

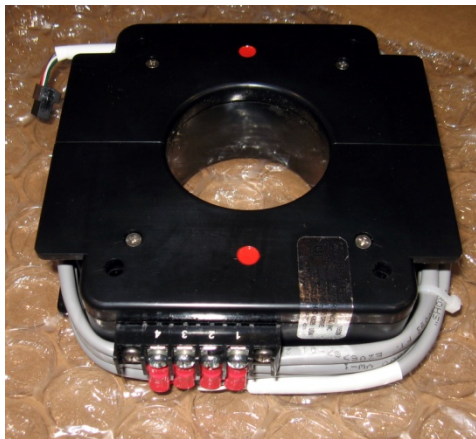
Description	Photo	Purpose
600 amp CT pn 1101-748		BDS-40 CT with Cable Assembly Use Drawing BDS-1189-B985 PHOTOS VARY DEPENDING UPON MODEL(S) CHOSEN UP TO 3000 AMPS NOTE: <i>5610-019 is the part number for the 600 amp CT and it can be ordered with a cable assembly pn 1101-748.</i>

Figure 18. 600 Amp Current Transducer CT Assembly

5.6 Tools

The following tools or equivalents may be necessary for BDS-40 System installation:

NOTE:

Most harness work and crimping has been done at the factory for ease of installation.

TOOLS








Description	Photo	Purpose
Panduit CT-260 crimper Vertiv Corporation. pn 5400-002		For parallel splices
Panduit CT-1525 crimper Vertiv Corporation. pn 5400-007		For crimping ring terminals – NOTE: <i>Most of the work has been done at the factory, but occasionally the user may need this tool.</i>




Figure 19. Panduit CT-260 Crimper

Figure 20. Panduit CT-1525 Crimper

TOOLS

Description	Photo	Purpose
Panduit CT-1550 crimper Vertiv Corporation. pn 5400-008	 Figure 21. Panduit CT-1550 Crimper	For crimping ring terminals –
Thomas and Betts crimper WT-111-M	 Figure 22. Thomas & Betts WT-111-M For Crimper	For crimping fuse holders
#2 Phillips-head screwdriver with insulated handle	 Figure 23. #2 Phillips-Head Screwdriver With Insulated Handle	For mounting BDS components, and for removing or attaching panels
Flat-head stubby screwdriver	 Figure 24. Flat-Head Stubby Screwdriver	For attaching ground wire
Digital Voltmeter	 Figure 25. Digital Voltmeter	For checking voltage

TOOLS

Description	Photo	Purpose
Molex Crimp Tool HTR 2445 A pn 5400-006		For crimping specific Molex pins on specific FCCPs
Figure 26. Molex Crimp Tool		
Computer/Printer LT pn 2025-058 DT pn 2025-054 Printer pn 2025-127		To review data, monitor alarms etc.
Figure 27. Computer/PC		
BMDM Software pn 2027-001		Help to monitor the systems and capture data for reporting, etc.
Figure 28. BMDM Software Icon		

5.7 Building Management System Integration

The BDS-40 system can be connected to building management systems. This integration requires writing software that can communicate with the BDS. The communication protocol is MODBUS ASCII. The user may obtain a register map from Vertiv Corporation. or download it from the Vertiv Web site technical library at www.vertivco.com. The connections are made via the RS-232 DB-9 connectors on the rear panel. The only connections made are TX-Pin 2, RX-Pin 3, and GND-Pin 5.

5.8 Panel Controls And Indicators

Items on the front and rear panels are described in the Product Description Guide. Additional descriptions may appear elsewhere in this manual.

5.9 BDS System Specifications

Specification sheets for the discrete components in a typical BDS system are in the BDS-40 Monitor Product Description Guide.

6 BEFORE SYSTEM INSTALLATION

6.1 Required Drawings

IMPORTANT NOTE:

The following drawings are required for BDS–40 installation. The drawings in this manual may not be the most recent revision and are included for reference only.

Drawing	Number
General Assembly, Base Unit	BDS–377–D1695
General Assembly, Plus Unit	BDS–378–D1696
Application Details	BDS–5274–B1054
Installation Details, Tab Washer Quick Connect Sense/Load Leads	BDS–1179–A581
Connection Details, Optional Sensors	BDS–1189–B985
Connection Details, Power, Data, Alarm Contact Connections	BDS–1193–B986
Mounting Detail, Cabinet Top Mounting Dimensions	BDS–1178–D1687
Wiring Schematic, BDS–40 to (40) 12V Modules, (10 Shelf) Battery	BDS–2287–B960



WARNING:

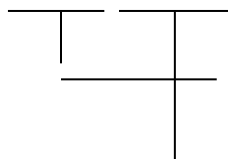
The BDS system is designed to connect to UPS systems that are 600VDC or less and a maximum of 300V with respect to earth ground. The user must verify the voltage with respect to earth ground before connecting the system. Do this by measuring the voltage from each battery post referenced to earth ground. The voltage cannot exceed 300V.

6.2 System Configurations

This section is an overview of the BDS–40 monitor configurations. The BDS–40 model numbers are structured as follows. Thus, a typical model number might be 1002–750A CRAA21.

1002–nnn XXxxxxxx

1003–nnn XXxxxxxx required for 16V jars



The BDS–40 model. This is 1002– followed by:

750 to indicate a Base Unit or

751 to indicate a Plus Unit.

— This group of letters/numbers indicates cabinet options/configurations:

Position XXxxxxxx

Cabinet Options

Cabinet Configurations

A_xxxxxx	1X40X12, 10S of 4J
B_xxxxxx	1X40X12, 4S of 10J
C_xxxxxx	1X36X12, 4S of 9J
D_xxxxxx	1X36X12, 3S of 12J
E_xxxxxx	1X30X12, 5S of 6J

Position XXxxxxxx	Cabinet Configurations
Cabinet Options	
F_xxxxxx	1X30X12, 10S of 3J
G_xxxxxx	1X40X12, 4S,12,12,8,8
H_xxxxxx	1X40X12, 8S of 5J
I_xxxxxx	1X40X12, 5S of 8J
J_xxxxxx	1X30X12, 3J, 6S of 4J, 3J
K_xxxxxx	1X30X12, 6J, 3S of 8J
L_xxxxxx	1X20X12, 4S of 5J
M_xxxxxx	1x32X12, 4S of 8J
N_xxxxxx	4S of 8J or 3S 8J & 2S 4J
O_xxxxxx	1x29X12, 1S of 5J and 3S of 8J
P_xxxxxx	1X30X12, 4S of 8,8,8,6
Q_xxxxxx	1X20X12, 4S of 6,6,6,2
R_xxxxxx	1X30X12, 2S of 15J
S_xxxxxx	1X30X12, 3S of 10J
T_xxxxxx	1X40X12, 4S of 6,12,12,10
U_xxxxxx	1X30X12, 6S of 5J
V_xxxxxx	1X20X12, 4S of 2,6,6,6
W_xxxxxx	1X24X12, 8S of 3J
X_xxxxxx	1X40X12, 2S of 20
Y_xxxxxx	1X40X12, 2S of 15 & 1S of 10J
Z_xxxxxx	1X30X12, 6S of 4J & 2S of 3J
01xxxxxx	1X24X12, 6S of 4J
02xxxxxx	1X33X12, 1S of 33J
03xxxxxx	1X33X12, 1S of 15J & 1S of 18J
04xxxxxx	1X40X12, 1S of 6J, 4S of 7J & 1S of 6J
05xxxxxx	1X32X12, 1S of 32J
06xxxxxx	1X26X12, 1S of 8J & 2S of 9J
07xxxxxx	1X18X12, 2S of 9J
08xxxxxx	1X40X12 2S of 12, 1S of 9J & 1S of 7J
09xxxxxx	1X32X12. 2S of 9J, 1S of 5J & 1S of 9J
10xxxxxx	1X40X12, 3S of 13,13,14J

Position XXXXXXXX	Cabinet Configurations
Cabinet Options	
11xxxxxx	1X20X12, 3S of 7,6,7J
12xxxxxx	1X36X12, 9S of 4J
13xxxxxx	1X33X12V, 1S OF 4J, 4S OF 6J, 1S OF 5J
14xxxxxx	1X40X12V, 4S OF 4J, 4S OF 6J
15xxxxxx	1X36X12V, 4S OF 8J, 1S OF 4J
16xxxxxx	1X36X12V, 1S OF 5J, 2S OF 3J, 5S OF 5J
17xxxxxx	1X30X16V, 10S OF 3J
18xxxxxx	
19xxxxxx	1X34X12V, 1S OF 10J, 2S OF 12J

6.3 Location Consideration

Drawing BDS–5274–B1054 can help aid in consideration of location and placement of the system.

6.3.1 Check Service Access

Mount the system close to the battery, making sure it is accessible for servicing.

6.3.2 Maximum Wire And Cable Lengths

Install an insulated wire tray along the length of each battery tier, making sure it does not interfere with cell replacement. Install the sense leads, test current leads, 24VAC cable, and runs of wire, cable, and fiber optic cable have length limitations as follows:

- ◆ The maximum length for each sense lead, resistance test cable, and is 35 feet (≈10.7 meters).



CAUTION:

Do not wrap excess load cable into a coil. A tight coil will result in induction that can adversely affect equipment operation. Leave excess cable in loose, flat lengths.

6.3.3 Fiber Optic Cable And BDS–40 Communication Information

The BDS–40 communicates via fiber optic cable and the system forms a communication ring network.

NOTE:

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

Transmit TX/FO on the Controller connects to Receive RX/FO on a BASE/PLUS UNIT. Transmit on this base/plus unit connects to Receive on the next base/plus unit, and so on until Transmit on the last base/plus unit returns to Receive on the Controller.

IMPORTANT NOTE:

Unlike the requirement for connecting base/plus units to battery strings, the string and address assignments on the nameplates do not determine the order in which base/plus units are connected within the fiber optic ring.

Look at the system drawing and the physical facility and determine how the fiber optic and power cables to the BASE/PLUS UNITS must be situated. When installing the fiber optic cable, do not bend the cable in a radius tighter than 35mm.

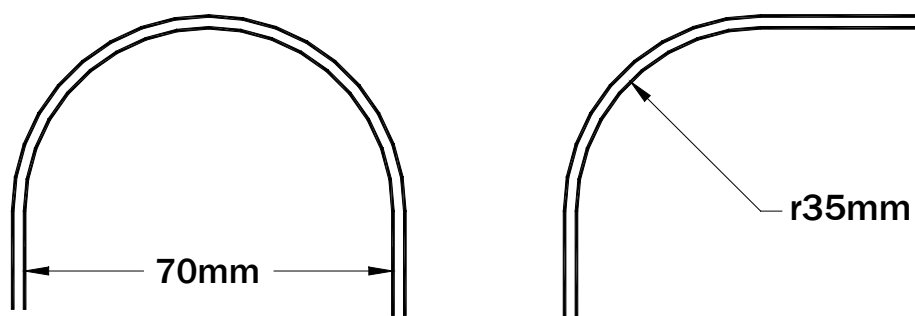


Diagram Not To Scale

Figure 29. Minimum Bend Radius Of Fiber Optic Cable

NOTE:

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

6.3.4 Sense Lead Harness Routing From BDS-40 To The Battery

The installer normally determines the wire routing.



WARNING:

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

A Panduit slotted cable tray with cover or equivalent is normally used to distribute wires to the cells.

6.3.4.1 Conduit

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

6.3.4.2 Panduit

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

7 *Begin System Installation*

Before beginning installation, review NOTES on all Drawings that came with the system, but more specifically and provided here, NOTES from BDS-5274-B1054.

NOTES:

1. Electrical Contractor to provide UPS protected 115V AC, 60Hz or 230V AC, 50Hz input power connection to each BDS-40 Base Unit. Input voltage must be specified at time of order. Power consumption is less than 60W at 115VAC for each Base Unit. For each additional Plus Unit add 25W.
2. All BDS-40 Units will be physically mounted on top of the battery cabinet or as close to the battery as possible. All BDS-40 Plus Units are connected to a low voltage (24VAC RMS) power supply and a serial fiber optic link that originates at the BDS-40 Base Unit. A BDS-40 Base Unit can provide power and fiber optic link for up to five additional BDS-40 Plus Units, monitoring a total of six battery cabinets.
3. For Sense Lead and Load Test Lead termination details, see BDS-40 Installation Manual. Standard quoted termination hardware is tab washers.
4. Standard Sense/Load Test Lead harnesses are specific to battery cabinet manufacturer's model and battery type. Maximum distance between BDS-40 Base and Plus units is 250 Ft (76m).
5. For additional mounting information and options of the BDS-40 units, contact Albercorp. Sales.
6. A PC running Albercorp. Battery Monitor Data Manager software is needed to view real time and historical data. PC requires RS232, modem, and/or ethernet connection to BDS-40 Base Unit.

Figure 30. NOTES From Drawing BDS-5274-B1054

The following steps are required for system installation.

7.1 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; i.e. 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 referring to the drawings provided with the system.



WARNING:

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

7.2 Prepare All Batteries

7.2.1 Fit Tab Washers

Install tab washers on every positive post and on the last negative post. Every point of connection to the battery requires its own tab washer. Pay attention to detail and refer to BDS-1179-A581 when installing the washers. Negative posts that are associated with an intertier, if intertier resistances are monitored, then the installer will need to install tab washers as well.

NOTE:

Remember, fit tab washers per drawings provided with the system and manual and place extra tab washers when applicable.

Installer of the Tab Washer should be aware of the tab's orientation to avoid possible interference with any battery jar's protective covers when the sense lead wire is attached.

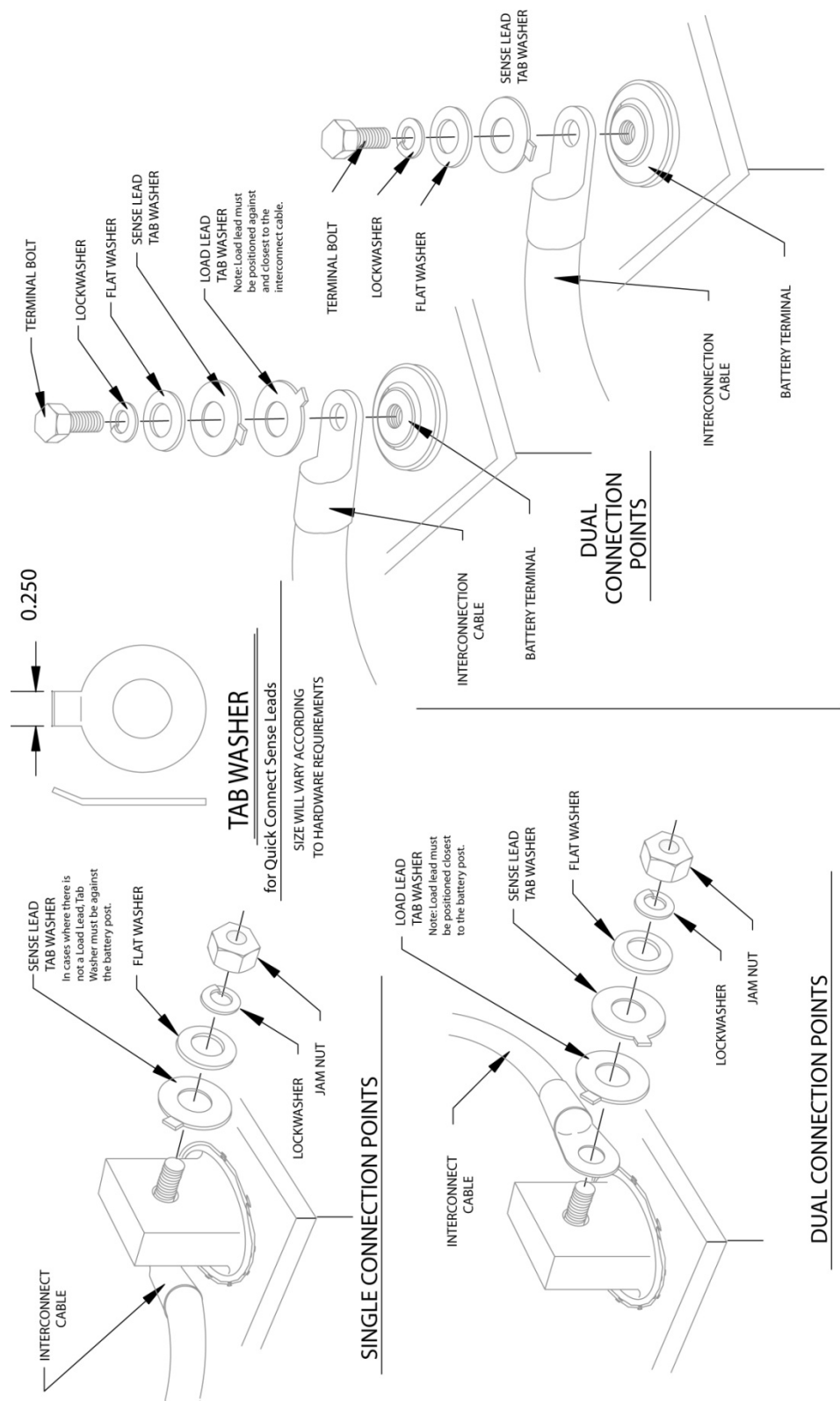


Figure 31. Snapshot BDS-1179-A581

7.2.2 Check Sense Lead Routing From BDS–40 To The Battery

The installer normally determines the harness/wire routing but double-checking measurements lengths and labels is advised. Please refer to section 6.3.2 Maximum Wire And Cable Lengths on page 19 for details.



CAUTION:

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

7.2.3 Sense Leads Connection

Voltage sense leads connect from each Plus/Base Unit to the individual cells. Each sense lead has been cut to the appropriate length, assemble it using the drawings sent with the system.

NOTE:

10K 2W 1% flameproof resistor that reduces the risk of a short circuit during installation and maintenance is preinstalled within the cable for safety.

Properly identify each sense lead to simplify the connection process. When connecting a sense lead to the same battery terminal as the load cable, the load cable must be closest to the cell post. Refer to drawing BDS–1179–A581.

7.2.3.1 Intertier Connections

Most battery installations have cables connecting groups of cells on different levels (tiers) within a battery string. Since these intertier cables normally have higher resistance than intercell connections, additional sense leads are used to monitor the resistance of these cables. Wires for one or two intertier connections are included within each sense lead with a maximum of 10 ten intertiers monitored per BDS Base or Plus.

7.2.4 Internal Resistance Load Lead Cable Connecting

The 18 GA wires of the load lead test cable connect to certain cells in the battery string. These cables come preassembled and do not need cutting or terminating.

Connect the first resistance test current cable to the positive post of the first cell. The last lead connects to the negative post of the last cell. Other connections depend on the battery configuration.

7.2.5 Discharge Current Sensor (Optional)

The BDS–40 can be used with a magnetic Current Transducer CT to measure discharge current. This item can be specified at time of order. When using a magnetic current transducer CT, connect it to the Current connector on the rear of the unit. The CT provided depends on the application. Refer to BDS–1189–B985.



Two types of temperature probes are available for the BDS. One probe hangs free for ambient



7.2.7 Float Current Sensor (Optional)

There is one float current sensor channel available. Connect to the rear panel Float Current connector.

Please refer to BDS–1189–B985 for FCCP assembly for termination details and to section 6.3 of Multitel's *Float Charging Current Probe Installation Manual*, displayed here for convenience.

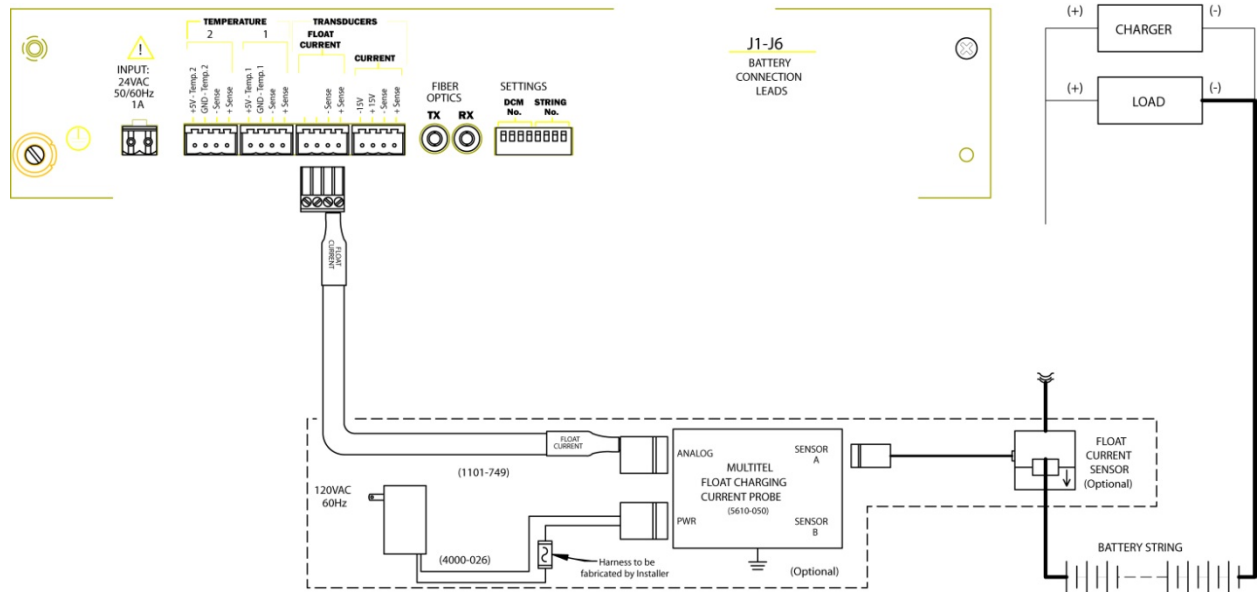


Figure 34. FCCP Snapshot Of BDS–1189–B985



Figure 35. Multitel FCCP pn 5610–051 Part Of KIT–1101–749



Figure 36. FCCP Cable



Figure 37. Multitel FCCP Rear Panel

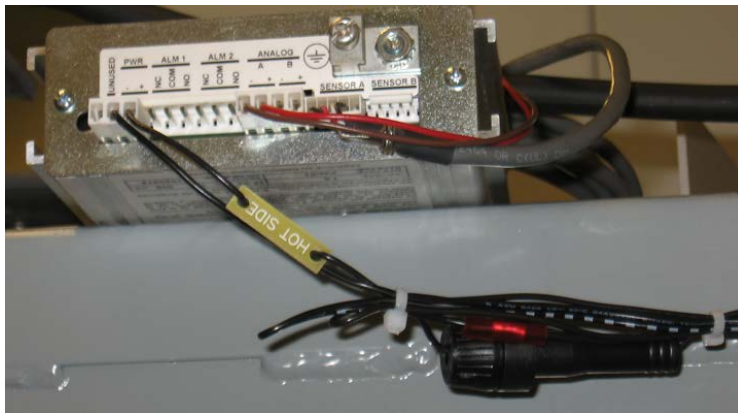


Figure 38. FCCP Connections



Figure 39. Multitel's FCCP With The Power Source And Inline Fuseholder

Figure 5 – Routing the cable

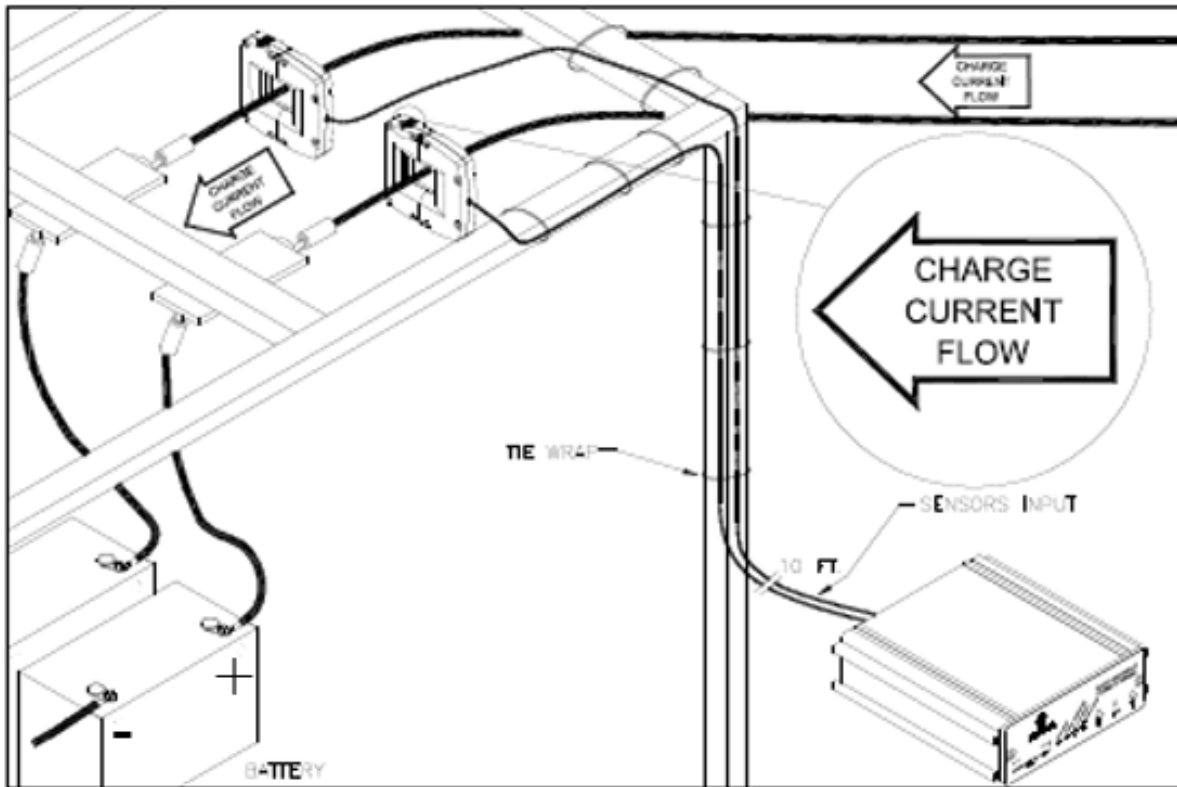


Figure 40. From Multitel's FCCP Manual–Routing The Cable

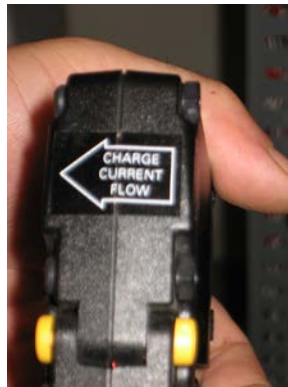


Figure 41. Float Current Sensor

NOTE:

For best results follow the manufacturer's instructions, and please refer to BDS-1189-B985 for FCCP assembly.

FLOAT CHARGING CURRENT PROBE**INSTALLATION****6.3 WIRING A POWER CABLE TO THE FCCP**

1. Locate the voltage source to power the FCCP control unit. Using a DVM, verify that the voltage difference between the polarities is between 18 and 60 volts DC.
2. Using shielded cable, 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 to slide the complete assembly into its final installation position. Leave enough cable length to allow connection to the power source.
3. Permanently secure the cable run with cable ties.
4. Install inline 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 somewhere safe where they can be found later.
5. Permanently connect the power source cable to the power source, paying close attention to polarity. Be sure to connect the cable ground to a reliable system ground connection, close to the utilized power source.
6. Turn your attention to the control unit end of the cable. Strip only 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 needs to come to the base of the connector housing. Therefore, it is critical to only strip away as much insulation as needed to install the connector pins and housing.

Figure 42. Section 6.3 Of Multitel's FCCP Installation Manual Pg. 38

FLOAT CHARGING CURRENT PROBE

INSTALLATION

7. Using the tool, permanently crimp the pins to the wires exposed at the end of the shielded cable to go to the control unit. Slide the crimped wires into the connector housing, making sure to observe the correct polarity and to leave the ground conductor free.
8. Return to the fuse holders and install the fuses temporarily removed earlier.
9. Plug the connector housing into the control unit and verify that the unit becomes active. Remove the connector from the control unit and continue the installation.

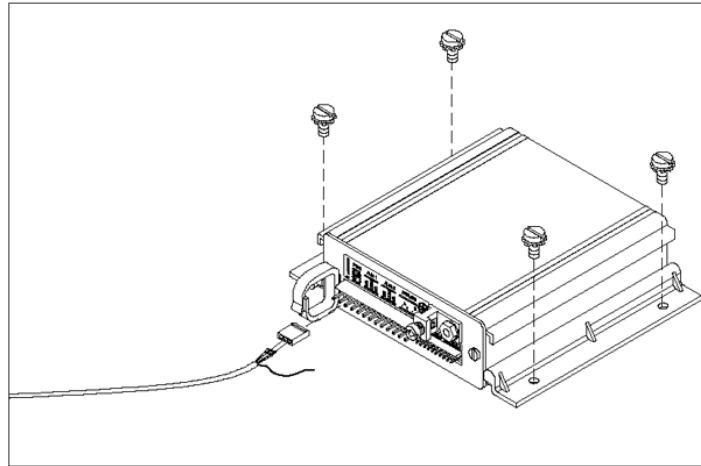


Figure 8 – Inserting the Power Connector

Figure 43. Section 6.3 Of Multitel's FCCP Installation Manual Pg. 39

7.2.8 Alarm Contacts And Remote Alarm Reset

There are two sets of Form C alarm contacts, labeled Critical and Maintenance, on the BDS-40 Base Unit rear panel. Each set of connections has a COM (Common), NC (Normally Closed), and NO (Normally Open) terminal. These alarms are BMDM program configurable under Setup on the Main Menu.

Connection can be made directly to a facility's alarm reporting system. If there is more than one BDS at the same location and only one set of contacts can be monitored, the alarm contacts can be wired in parallel. Refer to BDS-1193-B986.

The plus and minus remote reset input contacts are on the BDS-40 Base Unit rear panel. Connecting a +12VDC/GND signal to the reset input contacts will reset alarms for all strings. If there is more than one BDS at the same location, and only one set of contacts is available for reset, these inputs can be wired in parallel.

NOTE:

The ground connection is the most right connection in the 8 eight position connector.

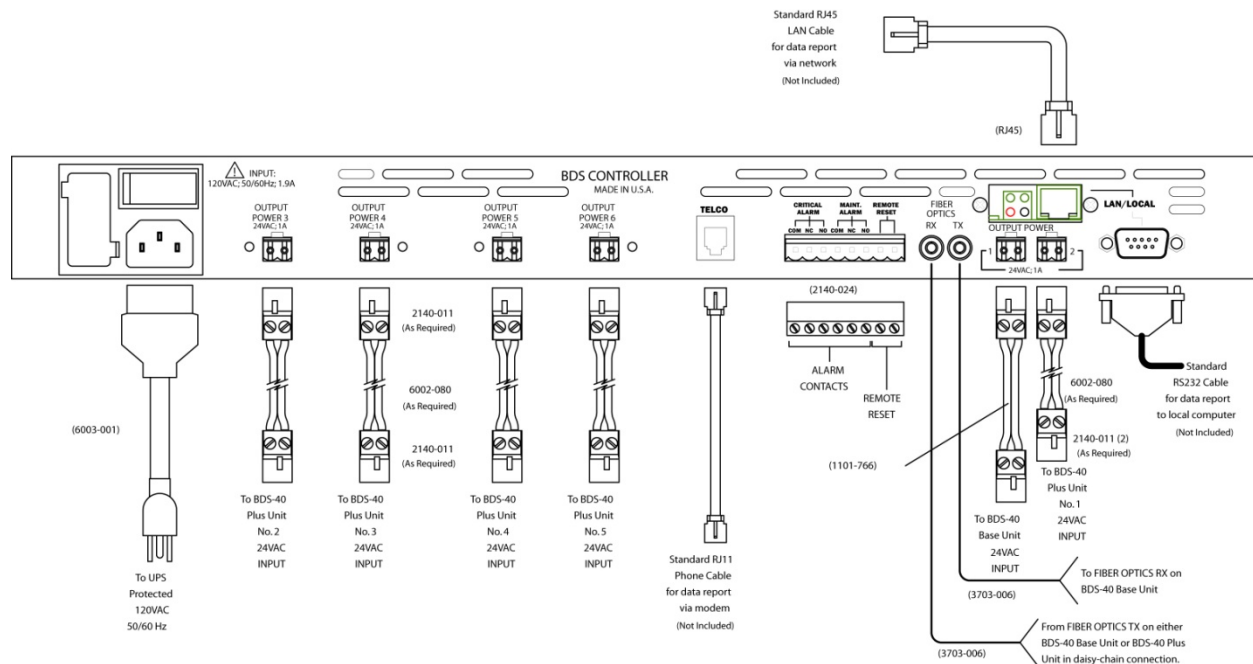


Figure 44. Snapshot BDS-1193-B986

7.3 Base To Plus Unit Fiber Optic Connection

When using a BDS-40 Base unit with one or more BDS-40 Plus units, connect the Base and Plus units as shown in the following figure. Use Application Details Drawing BDS-5274-B1054 as an example.

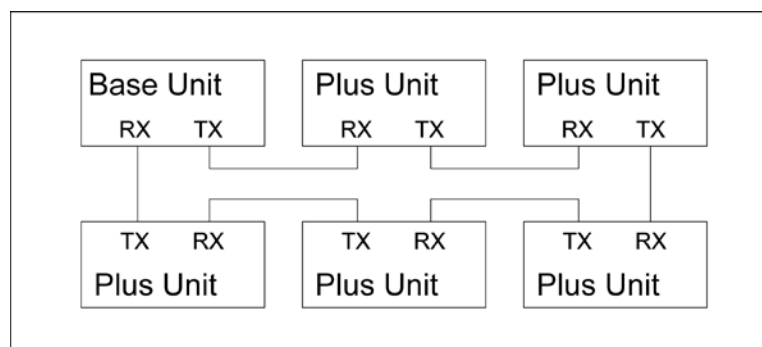


Figure 45. Base to Plus Unit Connection

Connect TX from the Base unit to RX of the first Plus unit. Continue the sequence until TX of the final Plus unit connects to RX of the Base unit. A maximum of five Plus units may be connected to a Base unit.

8 Final Steps Connecting To Battery Terminals

8.1 Connect Cell Voltage Sense Lead Harness To BDS-40

The BDS-40 system is normally supplied with specific drawings and terminated installation harnesses. For illustrative purposes, refer to drawings supplied with the system.

After the user installs the tab washers, install the harness to the BDS-40. The cable connectors on the rear of the BDS-40 are labeled J1 to J5.



WARNING:

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

8.2 Installing The Cable Hood

After all cables are connected to the Base or Plus unit, secure the cable hood to the rear of the unit using four #10-32 screws (supplied). This hood closes the rear of the unit and protects the cables and connectors from damage or inadvertent removal.

NOTE:

If using a computer and cabinet, place the cabinet where it will be permanently mounted. Keep the back of the cabinet accessible for servicing. Prepare the computer and cabinet, if included, and the Controller. This includes unpacking, mounting, and connecting the modules.

9 Final Steps Communication Connections

9.1 Use With Local Computer

If using a computer and cabinet, place the cabinet where it will be permanently mounted.

NOTE:

If using a cabinet(s), make sure the back of any cabinet is fully accessible to service and securely anchor all four corners of all cabinets used to the floor.

If the cabinet is not screwed into the floor then, fill the container at the bottom of all cabinets with ballast. This provides stability to help prevent the cabinet from tipping over. The recommended ballast is all-purpose sand; Sure-Mix® All Purpose Sand or equivalent) available at most home improvement stores.

**WARNING:**

Do not energize the cabinet or any component with battery voltage until after the installation is complete.

Look at the system drawing and the physical facility and determine how the fiber optic and power cables must be situated. If a cabinet is used, pass the AC power cord for the power strip mounted inside the cabinet through the lower left hole and plug it into a UPS-protected outlet after installation is complete.

NOTE:

The electrical service required is less than 10 amps at 115VAC or 5A at 230VAC.

When using an internally mounted Uninterruptible Power Supply/UPS, plug the power strip AC cord into the UPS and plug it into an AC outlet after installation is complete. If using an optional UPS, install it near the bottom of the rack.

Optionally, if using a cabinet, pass conduit through the lower left hole and mount an outlet box inside the cabinet. This must be done by a qualified electrician and meet NEC requirements.

Install the remaining components as follows. Refer to the drawings provided with the system.

**WARNING:**

The BDS system is designed to connect to UPS systems that are 600VDC or less and a maximum of 300V with respect to earth ground. The user must verify the voltage with respect to earth ground before connecting the system. Do this by measuring the voltage from each battery post referenced to earth ground. The voltage cannot exceed 300V.

- ◆ Install the computer monitor on top of the cabinet or the highest shelf to be used.
 - Connect the power cord to the power strip.
- ◆ Install the computer/PC on the shelf below the video display.
 - Connect the power cord to the power strip.
 - Connect the monitor to the computer.
- ◆ Install the keyboard in the keyboard drawer and connect it to the computer.
- ◆ Connect an RS-232 cable (one to one) from the computer to the rear panel of the BDS-40 Base Unit.

9.2 Use With No Local Computer

If not using a local computer and cabinet, install the BDS-40 Base Unit as follows.

- ◆ Provide UPS-protected AC power to the location where each Base Unit will be installed.
 - Connect the AC power cord to the UPS protected outlet.
- ◆ If using a modem to dial out, connect the phone line to the RJ-11 jack on the rear panel.
 - Use a minimum 26AWG TELCO line cord.
- ◆ If connecting to a LAN, connect the customer-supplied network cable to the RJ-45 connector.

9.3 Communications Connections

Communication connections to the BDS can be via:

1. a modem,
2. the USB (front panel)
3. RJ-45 and RS-232 (rear panel).

All methods allow battery parameters to be checked. Connection to a BDS can be via a modem or Wide Area Network/WAN from a remote location or on-site using the RS-232 Local port, Local Area Network/LANport or USB port. Any method lets the user check all battery parameters. When connecting via modem, use 26AWG (minimum) Telco line cord. Refer to BDS-1193-B986.

9.3.1 Modem

The BDS can connect to a telephone line using the **TELCO** RJ-11 connector on the rear panel. To communicate with a BDS from a remote location, connect the BDS rear panel modem connector to a telephone line. Connect the remote computer's modem to the telephone line according to the computer manufacturer's instructions.

When connecting via modem, use 26AWG (minimum) **TELCO** line cord. Pins 2 and 3 of the RJ-11 **TELCO** connector are for the tip and ring connection.



Figure 46. TELCO RJ-11 Modem Connection

9.3.2 USB

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



Figure 47. USB Cable



Figure 48. Laptop

9.3.3 RS-232

Use the 9-pin RS-232 Local port on the rear panel of the Controller for connecting to a permanent Local computer or a building management system.

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

The connection between the BDS and the computer must not exceed 25 feet.



Figure 49. RS-232 9 Pin Female to Female Cable

9.3.4 RJ-45

If the network option is installed, there is an RJ-45 connector installed on the rear panel.

Connect an Ethernet patch cable between the controller and the network to be utilized.



Figure 50. RJ-45

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