

**BDS-256**  
**Battery Diagnostic System**  
**with BDS Controller**

**Installation Instructions**



990 South Rogers Circle, Suite 11  
Boca Raton, FL 33487  
Tel: (561) 997-2299 Fax: (561) 997-5588  
[www.alber.com](http://www.alber.com)



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## Safety Information

- Except as explained in this manual, do not attempt to service Albér equipment yourself. Opening the equipment may expose you to dangerous voltages. Refer servicing beyond that described in this manual to authorized personnel.
- Do not allow liquids or moisture to get into the equipment. If liquid does get into the equipment, unplug it immediately and contact your nearest authorized service center or Albér directly.
- Ensure equipment is provided adequate ventilation. Do not block equipment ventilation openings.
- Do not exceed equipment voltage or power ratings and capabilities.
- Make sure that equipment is properly grounded.
- Do not let unauthorized persons operate the equipment.
- Do not energize the cabinet or any component with 115VAC or battery voltage until after the installation is complete.
- Use of this product in a manner not specified could compromise the designed-in safety of this product.
- **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 voltage with respect to earth ground must be verified before connecting the system. This can be done by measuring the voltage from each battery post referenced to earth ground. The voltage cannot exceed 300V.
- **WARNING:** High voltage or current may be present in the equipment. Only qualified personnel should perform the operations described in this manual.
- **WARNING:** High voltages exist inside the system components and on the equipment 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.

## Equipment Notes

- Proper installation is essential to the correct functioning of your system. If you have any questions about installation, please contact Albér for assistance.
- Only equipment that is part of the BDS system should be installed in the BDS cabinet.
- The four corners of the cabinet must be securely mounted to the floor.
- In this manual, the term *cell* refers to either cell or module, where appropriate.
- This manual describes the general installation of the BDS Battery Diagnostic System. If your particular system has features or accessories that are not addressed in this manual, please contact Albér directly.

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Albércorp  
990 South Rogers Circle, Suite 11  
Boca Raton, FL 33487

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BDS-256 Battery Diagnostic System with BDS Controller Installation Instructions,  
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# **1. System Notes**

The following are notes for a typical BDS system.

## **1.1. Wiring**

**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 voltage with respect to earth ground must be verified before connecting the system. This can be done by measuring the voltage from each battery post referenced to earth ground. The voltage cannot exceed 300V.

A BDS system, which includes a BDS Controller, DCMs, and External Load Modules, may be mounted in a 19" or 23" wide rack in a cabinet enclosure. If using such a cabinet, you must ground the cabinet and installed equipment. The cabinet has several ground lugs, of which at least one must be tied to earth ground.

The DCM and Load Module have protective earth grounding connections that must be connected to earth ground using 10AWG copper wire.

The receptacle for the AC cord from the cabinet must have protective earth connection (three prong). Do not defeat the use of the earth connection prong.

When connecting equipment via modem to a telephone line, use a minimum 26AWG Telco line cord.

## **1.2. Disconnect Device**

The three prong AC cord from the cabinet, which connects to the 115VAC receptacle, is considered the primary disconnect device.

## **1.3. Ventilation**

You must provide adequate ventilation to prevent equipment overheating. The cabinet has two ventilation fans that run when power is applied. The external load module has a fan that runs when required to cool internal circuitry. Allow at least 8" clearance on all sides of the cabinet for ventilation. Do not block ventilation ports, and ensure the equipment is operated within the temperature and humidity ranges in the *MPM-100 and BDS-256 Monitors Product Description Guide*.

## **1.4. If You Have Questions**

Proper installation is essential to the correct functioning of your system. If you have questions about installation, contact Albér at (561) 997-2299 or fax (561) 997-5588. Request BDS assistance.

## **2. Panel Controls and Indicators**

Items on the front and rear panels of the BDS Controller, the DCM, and the External Load Module, which are the discrete components in a typical BDS system, are described in the *MPM-100 and BDS-256 Monitors Product Description Guide*. Additional descriptions may appear elsewhere in this manual or related manuals.

### **2.1. Symbols**



This symbol, which may appear on equipment panels and cabinets, indicates: *CAUTION. Refer to accompanying documents.* Be sure to read and understand the documents that relate to the particular unit. If you do not understand the documentation, stop and contact Albér or an authorized Albér representative.

### 3. General Information

The BDS-256 system consists of Data Collection Modules (DCMs), External Load Modules, and a BDS Controller. Additional hardware may include a personal computer (PC), a cabinet to house the computer and BDS Controller, a LAN adaptor, DCM tower enclosures, a DCM external power supply and, if using more than one BDS Controller, a Serial Port Multiplexer.

Upon receipt of a site survey, Albér creates a customer drawing package that contains a *System Block Diagram*, a *DCM to Battery Connections* drawing, and site specific information. Refer to this package and verify all components are available before starting installation. The following steps are required for system installation.

- Prepare the computer cabinet, if included, or the BDS Controller if no PC is included. This includes unpacking, mounting, and connecting the modules.
- Mount the DCMs close to the battery, making sure they are accessible for servicing.
- Install an insulated wire tray along the length of each battery tier, making sure it does not interfere with cell replacement.
- Install the leads. Install the sense leads, test current leads, 24VAC cable, and fiber optic cable connections according to site drawings. This manual describes how to terminate the wires at the DCM and cell ends.

#### 3.1. Maximum Wire and Cable Lengths

Runs of wire, cable, and fiber optic cable have length limitations as follows:

- The maximum length for each sense lead, resistance test cable, and external load control cable is 100 feet ( $\approx 30.5$  meters).
- The maximum length for any one length of plastic fiber optic cable is 50 meters (164 feet).
- The maximum length for any one length of HCS fiber optic cable is 500 meters (1640 feet).

#### 3.2. Fiber Optic Cable

When installing the fiber optic cable in the system, do not bend the cable in a radius tighter than 35mm. Refer to the figure below.

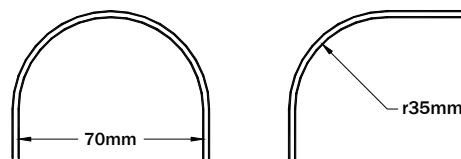


Diagram Not To Scale

**Figure 1. Minimum Bend Radius of Fiber Optic Cable.**

## 4. Communication Connections

Connection to a BDS can be via a modem or WAN (wide area network) from a remote location or on-site using the RS-232 Local port or LAN (local area network) port. Both methods let you check all battery parameters. This section explains how to set the rear panel configuration DIP switch and connect the BDS, modem, computer, and multiplexer. When connecting via modem, use a minimum 26AWG Telco line cord.

### 4.1. Modem Connection

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

### 4.2. Local Port Connection

There are two 9-pin RS-232 local ports (BDS controller front and rear panels). You may use only one port at a time. The front panel Local Port Select switch selects the front or rear port. When the switch is lit, the front port is selected. Use the rear port for connecting to a permanent Local computer; use the front port when using a portable computer.

### 4.3. Ethernet Port Connection

There are two BDS Controller options for Ethernet connection: The Controller can have a network interface and a rear panel RJ-45 connector installed. If the RJ-45 is not installed, you may purchase an Albér conversion unit that connects to the DB-9.

### 4.4. Telco Serial Port Multiplexer

**Multiple monitors on one telephone line** - When only one telephone line is available for multiple BDSs at the same location, use the Albér Telco Serial Port Multiplexer. This optional accessory is available in two configurations that can connect up to eight or sixteen BDS monitors with different power requirements.

When using the Telco Serial Port Multiplexer, you must set a DIP switch on the BDS controller. This activates a fiber optic interface that replaces the modem and connects to the multiplexer. With this option, the RJ-11 modem port is disabled but still present.

Each unit connected to the multiplexer requires a unique MUX ID. This setting is under Setup|System|Link on the BMDM program. Refer to the BMDM manual and the *Serial Port Multiplexer User's Guide*.

Part Number	Description
1000-292	8 channel Telco multiplexer 12V
1000-293	16 channel Telco multiplexer 12V

## 4.5. RS-232 Serial Port Multiplexer

**Multiple monitors on one Local computer** - When only one Local computer is available for multiple BDSs at the same location, use the RS-232 Serial Port Multiplexer. This optional accessory is available in two configurations that can connect up to eight or sixteen BDS monitors with different power requirements.

When using the RS-232 Serial Port Multiplexer, you must set a DIP switch on the BDS controller rear panel. This activates a fiber optic interface that replaces the rear RS-232 Local port and connects to the multiplexer. With this option, the BDS front panel Local port is still available; however, if you connect a Service computer to this port for servicing or setup, set the BDS Local Port Select switch to select the front port. NOTE: The rear RS-232 connector is still present but should not be used.

Each unit connected to the multiplexer requires a unique MUX ID. This setting is under Setup|System|Link. Refer to the BMDM manual and *Serial Port Multiplexer User's Guide*.

Part Number	Description
1000-290	8 channel RS-232 multiplexer 12V
1000-291	16 channel RS-232 multiplexer 12V

## 4.6. DIP Switch Configuration

For the BDS to function with a Telco or RS-232 multiplexer, you must set the configuration DIP switch on the BDS controller rear panel. The switch is factory set for BDS-256 operation with the Telco RJ-11 and RS-232 local port enabled. To change the switch, do the following.

**WARNING:** Do not use a pencil to change the DIP switch settings. Graphite residue may harm the internal BDS components.

1. Power off the BDS.
2. Change the DIP switch, positions 1 through 4, to select Modem or Telco multiplexer (Telco fiber optic).
3. Change positions 5 through 8 to select RS-232 local port or RS-232 multiplexer (Local fiber optic).
4. The new switch setting takes effect when power is applied.

Configuration DIP Switch Position	Modem		Rear Panel RS-232	
	Modem	Telco Fiber Optic	RS-232 Local Port	Local Fiber Optic
1	ON	OFF	X	X
2	ON	OFF	X	X
3	OFF	ON	X	X
4	OFF	ON	X	X
5	X	X	ON	OFF
6	X	X	ON	OFF
7	X	X	OFF	ON
8	X	X	OFF	ON

Figure 2. DIP Switch Settings

## 5. System with Local Computer

If using a computer and cabinet, install the system as follows. Refer to drawing BDS-344-B629 for details.

Place the cabinet where it will be permanently mounted. If using a BDS Controller and standard fiber optic cable, locate the cabinet so the fiber optic cable run does not exceed 164 feet (50 meters) from the BDS Controller to the DCM. Make sure the back of the cabinet is accessible.

You must completely fill the container at the bottom of the cabinet 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 115VAC or 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 to the DCMs should exit the cabinet. Two 1½" holes, through which wires may be passed, are on the left side of the cabinet. Normally, 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 115VAC outlet after installation is complete. The service required is less than 15 amps. If using an internally mounted UPS (uninterruptible power supply), plug the power strip AC cord into the UPS, pass the UPS power cord through the hole, and plug it into a 115VAC outlet after installation is complete.

Optionally, 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 BDS-183-B597.)

1. If using an optional UPS, install it towards the bottom of the rack.
2. Install the computer video display (monitor) on the cabinet top shelf. Connect the power cord to the power strip.
3. Install the computer (PC) on the shelf below the display. Connect the power cord to the power strip.
4. Connect the display to the computer.
5. Install the keyboard in the keyboard drawer and connect it to the computer.
6. Unpack the BDS Controller. If mounting it in the 19" rack, install it below the computer. Connect an RS-232C cable from the BDS Controller to a COM port on the computer. Plug the power cord into the power strip.

7. If using a modem to dial out, connect the phone line to the RJ-11 jack on the Controller rear panel. Use a minimum 26AWG Telco line cord.

If using two or more BDS Controllers with one telephone line, connect the Serial Port Multiplexer to the phone line, then connect the BDS Controllers to the Serial Port Multiplexer using fiber optic cable. Refer to the *System Block Diagram* and the Serial Port Multiplexer manual.

The BDS Controller has a rear panel DIP switch that allows the Controller to be used with up to two Serial Port Multiplexers. The DIP switch settings are as follows.

<b>DIP Switch Number:</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
Telco Port - Line	ON	ON	OFF	OFF	X	X	X	X
Telco Port - Fiber Optic to Serial Port Multiplexer	OFF	OFF	ON	ON	X	X	X	X
Rear Local Port - RS-232	X	X	X	X	ON	ON	OFF	OFF
Rear Local Port - Fiber Optic to Serial Port Multiplexer	X	X	X	X	OFF	OFF	ON	ON

**Figure 3. Configuration DIP Switch Settings**

If using two or more BDS Controllers with one local computer, connect the Serial Port Multiplexer to the local computer, then connect the BDS Controllers to the Serial Port Multiplexer using fiber optic cable. Refer to the *System Block Diagram* and to the Serial Port Multiplexer manual.

If connecting through a LAN, connect the TCP/IP adaptor to the BDS Controller RS-232 connector labeled *LAN*. Refer to the *System Block Diagram* and the network interface adaptor manual.

NOTE: Make certain the DIP switch is set for the configuration being used.

8. Installing the fiber optic and 24 volt power cables from the BDS Controller to the DCMs is the last step, but do not do this until the DCMs have been physically mounted in place.

## 6. System with No Local Computer

If a local computer and cabinet are not being used, install the BDS Controller as follows.

1. Provide UPS-protected 115VAC power to the location where each BDS Controller will be installed.
2. Unpack the BDS Controller and, if mounting it in the 19" rack or tower enclosure, install it below the computer. Connect the AC power cord to the UPS protected outlet.
3. If using a modem to dial out, connect the phone line to the RJ-11 jack on the Controller rear panel. Use a minimum 26AWG Telco line cord.

If using two or more BDS Controllers with one telephone line, connect the Serial Port Multiplexer to the phone line, then connect the BDS Controller to the Serial Port Multiplexer using fiber optic cable. Refer to the *System Block Diagram* and the Serial Port Multiplexer manual.

The BDS Controller has a rear panel DIP switch that allows the Controller to be used with up to two Serial Port Multiplexers. The DIP switch settings are as follows.

DIP Switch Number:	1	2	3	4	5	6	7	8
Telco Port - Line	ON	ON	OFF	OFF	X	X	X	X
Telco Port - Fiber Optic to Serial Port Multiplexer	OFF	OFF	ON	ON	X	X	X	X
Rear Local Port - RS-232	X	X	X	X	ON	ON	OFF	OFF
Rear Local Port - Fiber Optic to Serial Port Multiplexer	X	X	X	X	OFF	OFF	ON	ON

**Figure 4. Configuration DIP Switch Settings**

If connecting through a LAN, connect the TCP/IP adaptor to the BDS Controller RS-232 connector labeled *LAN*. Refer to the *System Block Diagram* and the network interface adaptor manual.

NOTE: Make certain the DIP switch is set for the configuration being used.

4. Installing the fiber optic and 24 volt power cables from the BDS Controller to the DCMs is the last step, but do not do this until the DCMs have been physically mounted in place.

## 7. Connecting to a Building Management System

The BDS-256 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. You may obtain a register map from Albér or download it from the Albér Web site technical library at [www.alber.com](http://www.alber.com). The connections are made via the RS-232 DB-9 connectors on the Controller rear panel. Either the Local port or LAN connection can be used. The only connections made are Tx-Pin 2, Rx-Pin 3, and GND-Pin 5.



## 8. Installing the DCMs

You will need the following tools (or equivalents) to install the DCMs:

- Panduit CT-260 crimper for fuse holders and terminals.
- Amp crimper 58074-1 handle with 58063-2 head for DB-37 sense lead harness connectors.
- 1/8" flat blade screwdriver for DCM power connectors.
- Anderson Power Products 1351G1 crimper for Anderson (current lead) connectors.

Consider the maximum wire lengths of 100 feet for sense leads, resistance test cables, and external load control cables when mounting the DCMs and the External Load Module. Locate the DCMs and External Load Module as close to the batteries as possible, and mount them to allow access for servicing.

**WARNING:** Install DCMs so that each DCM connects to the cells or modules to which it is assigned. Each DCM nameplate indicates the battery string number (for multiple string installations) and the position of the DCM within that string.

### 8.1. Power and Communications Connections to the DCMs

The DCMs communicate with the BDS Controller via fiber optic cable and form a communication ring network. The Controller has seven amplified fiber optic repeater input/output connectors, which may be used to amplify signals before a long fiber optic cable run. The maximum length of standard plastic fiber optic cable that may be used is 164 feet (50 meters). The maximum length using HCS fiber optic cable is 1640 feet (500 meters).

The transmit (TX/FO) of the BDS Controller connects to the receive (RX/FO) of a DCM. The transmit of this DCM connects to the receive of the next DCM, and so on until the transmit of the last DCM returns to the receive of the BDS Controller.

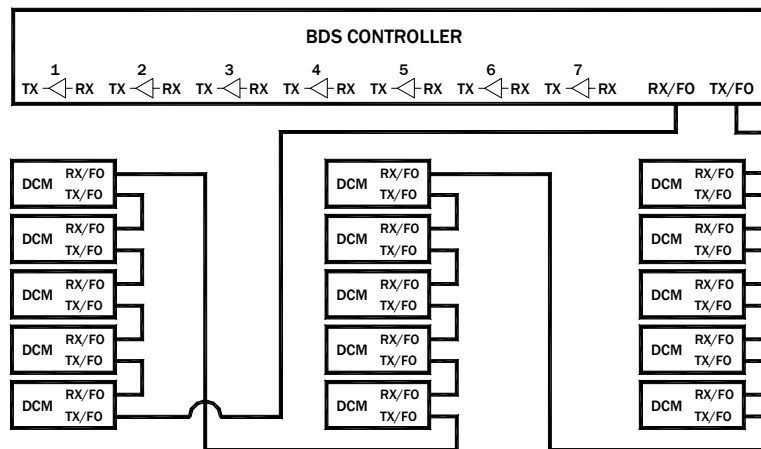
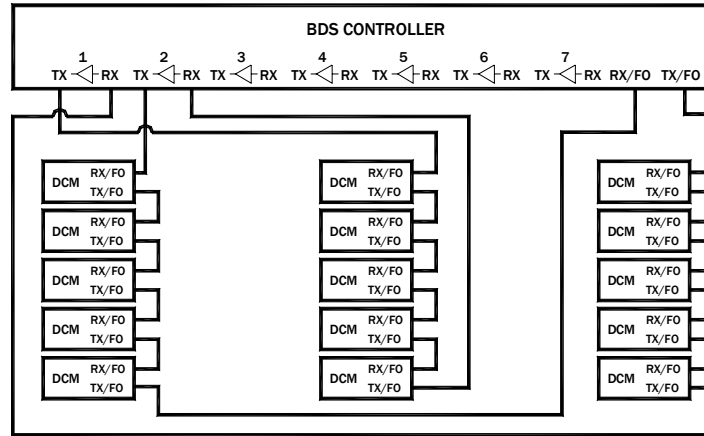


Figure 5. DCM Connection Without Repeater Amplifiers.

**IMPORTANT NOTE:** Unlike the requirement for connecting DCMs to battery strings, the string and address assignments on the DCM nameplates do not determine the order in which DCMs are connected within the fiber optic ring of the system.

Another way to connect the fiber optic cables is to make an individual connection (home run) between each string to the repeaters on the BDS Controller. This is recommended, when possible, to simplify the troubleshooting of communication problems.



**Figure 6. DCM Connection Using Repeater Amplifiers.**

A pair of #16 AWG wires, supplying 24VAC power, connects from the BDS Controller to the External Load Module and to the DCMs of each string. There are four 24-volt output connectors on the BDS Controller. The first two connectors can supply a combined total of 12 amps, and the last two can supply a combined total of 12 amps. Each DCM consumes 400mA. Do not exceed the total current for either group of connections.

## **8.2. Sense Lead Harness Routing from DCMs to the Battery**

The installer normally determines the wire routing. Do not route the wires in the same conduit as other wires in the facility. 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.

## **8.3. Cell Voltage Sense Lead Connections**

Voltage sense leads connect from each DCM to the individual cells. Cut each sense lead to the appropriate length and assemble it using BDS-120-A373. The sense lead resistor assemblies include a 10K 2W 1% flameproof resistor that reduces the risk of a short circuit during installation and maintenance. Drawing *DCM to Battery Connections* has a schematic of these connections. Properly identify each sense lead to simplify the connection process. When connecting a sense lead to the same battery terminal as the load cable, the load cable must be closest to the cell post. Refer to BDS-123-A380.

NOTE: The last sense lead on a DCM connects to the same point as the first sense lead of the next DCM within a battery string. Refer to the *DCM to Battery Connections* drawing in your drawing package.

## **8.4. Intertier Connections**

**Combined Readings** defined - Internal cell resistance and intercell resistance readings are combined in one measurement.

Most battery installations have cables connecting groups of cells on different levels (tiers) within a battery string. Because these intertier cables normally have higher resistance than intercell connections, additional sense leads are used to monitor the resistance of these cables. (Refer to BDS-174-A434.) Up to ten intertier channels per DCM are provided. The software accommodates up to 15 intertier connections per battery.

**CAUTION:** The sense leads monitoring an intertier connection must be from the DCM measuring the cell that has its negative post connected to the beginning of the intertier cable.

**Dual Readings** defined - Internal cell resistance and intercell resistance readings are separate.

There are no additional sense leads required. Select the intertiers under Battery Setup in the BMDM program.

## **8.5. Internal Resistance Test Current Cable Connections**

Resistance test current cables connect from the External Load Modules to certain cells in the battery string. Cable is supplied based on an average of 35 feet per lead, unless a special length is ordered. Cut these cables to the proper length before termination.

**WARNING:** Before making any connections, ensure that the fuses are removed from the fuse holders. Do not install the fuses until the time that the entire system is commissioned.

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.

Refer to the drawing *DCM to Battery Connections* for a connection diagram. Again, verify fuses are removed from fuse holders before making any battery connections. Refer to BDS-122-A379 for resistance test current cable construction details.

Identify each cable at the External Load Module to facilitate servicing.

## **8.6. Overall Voltage Sense Leads**

Connect the Overall Voltage sense leads to DCM#1. The OV wires run from the Overall Voltage connector to the most positive and the most negative posts of the battery string. Be sure to install 10K 1% 2W flameproof resistors at the battery connection points.

### **8.7. External Load Module Control Cable Connections**

The DCM External Load Module for each string is controlled by the DCMs assigned to monitor that string. Connect the DCMs and the Module using the 15-conductor cable supplied with the installation kit. Connect the cable from the DCM Load Control connectors to the External Load Module rear panel connectors, starting with connector DCM-1.

**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.

**WARNING:** In hazardous voltage applications (where battery voltage is greater than 60VDC), remove the load cable fuse before disconnecting the load cable connector from the BDS load module.

## **9. Optional Sensors**

Optional current and temperature sensors are available for the BDS-256 system.

### **9.1. Discharge Current Sensor**

The BDS-256 can be used with either a shunt or a magnetic current transducer to measure discharge current. These items are specified at time of order.

When using a magnetic current transducer, connect to the Current Transducer connector on the first DCM in the battery string. (Refer to BDS-173-589.)

When using a shunt to measure discharge current, connect the shunt to the Overall Current connector on DCM 1.

Shunts require 2-conductor shielded cable, and current transducers require 4-conductor shielded cable. Use 10K $\Omega$ , 2 watt, flameproof resistors to protect the sense wires connected to the shunt.

### **9.2. Temperature Sensor**

Two types of temperature probes are available for the BDS. One probe hangs free for ambient temperature measurement or mounts on a cell post surface. The other, a Teflon coated probe, may be immersed in a flooded cell.

Using 4-conductor shielded cable, wire these sensors to the DCM connector marked Sense Leads 16-24 for the first temperature sensing on the DCM, and to 40-48 for the second temperature sensing on the DCM. Up to ten temperature probes may be used per battery string, and up to two temperature probes may be connected to any DCM associated with that string. (Refer to BDS-136-A397.)

### **9.3. Float Current Sensor**

There is one float current sensor channel available. Connect to the DCM rear panel Current Transducer connector on the first DCM in the battery string. This connector is shared with the discharge current sensor. Refer to BDS-1124-A493 and the Float Charging Current Probe User's Manual for termination details.

## **10. Alarm Contacts and Remote Alarm Reset**

There are two sets of Form C alarm contacts, labeled Critical and Maintenance, on the BDS Controller rear panel. Each set of connections has a COM (Common), NC (Normally Closed), and NO (Normally Open) terminal. These alarms are software configurable under the Setup selection 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.

The remote reset contact is on the BDS Controller rear panel. A connection can be made directly to a local alarm reporting system that provides active voltage from 12VDC to 32VDC for reset. 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.

## **11. BDS System Specifications**

Specification sheets for the discrete components in a typical BDS system are in the *MPM-100* and *BDS-256 Monitors Product Description Guide*.

## **12. Preventive Maintenance**

**Visual Inspection** - Visually inspect all BDS system components for damaged or frayed power cords and cables, and damaged BDS system component panels, controls, and connectors. If you detect any damage, remove the equipment from service until the damage is repaired.

**WARNING:** Before cleaning equipment, ensure the system is disconnected and power to the units has been shut off. You must disconnect the BDS system cabinet and system components (controller, DCM, load module, UPS, etc.) from any DC voltage sources and from any AC power sources.

**Cleaning System Components** - The BDS system will provide years of service if properly maintained. 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 any system component to water, high humidity, or dampness.

**Fans and Vents** - Remove dust from fans and vents using a small brush or hand held vacuum. If fans or vents have dust filters, clean the filters according to manufacturer's instructions.

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

**Internal Components** - The BDS system has no user-replaceable components. Because high voltage exists in several areas in each unit, only knowledgeable users should remove the covers or cowling from system components (controller, DCM, load module, UPS, etc.) when required. Failure to comply with this restriction could pose a safety hazard and/or void the system warranty.

**WARNING:** High voltages exist inside the BDS 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.

**UPS (Uninterruptible Power Supply)** - If you are using an optional UPS with the BDS system, be certain the UPS internal battery is functional. Follow instructions in the UPS manufacturer manual.

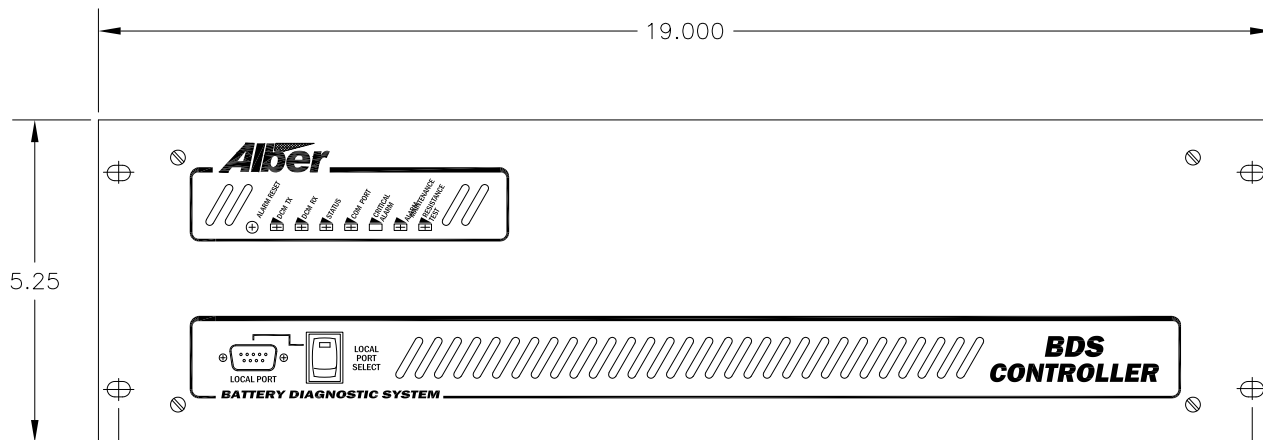
**Shipping** - Protect the BDS system from bumps and bangs during normal use or storage, and provide protection during shipment between test sites.



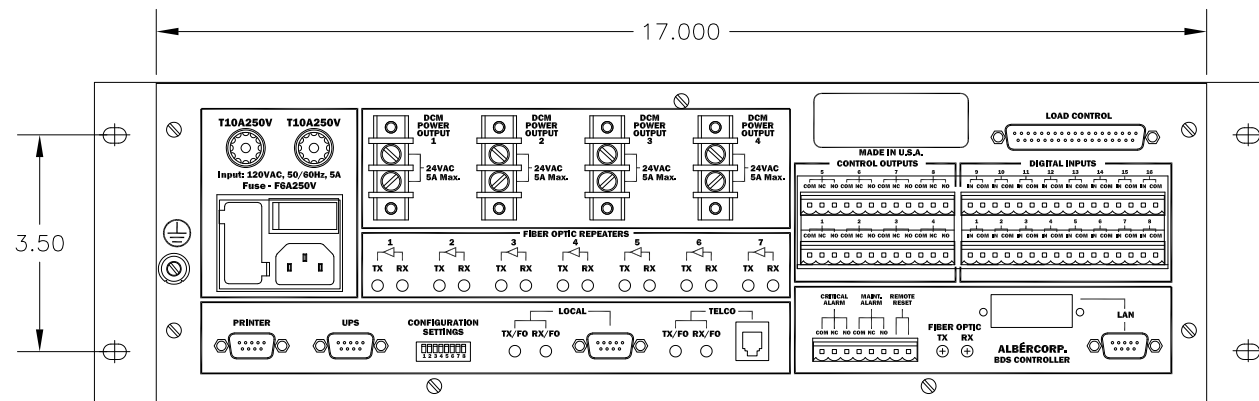


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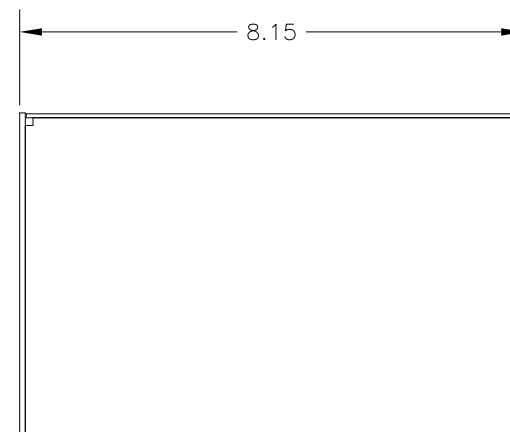
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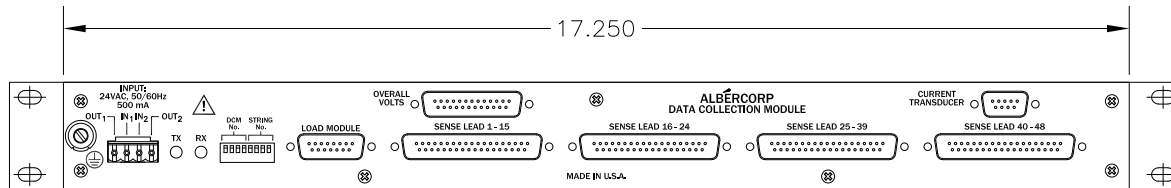
FRONT VIEW



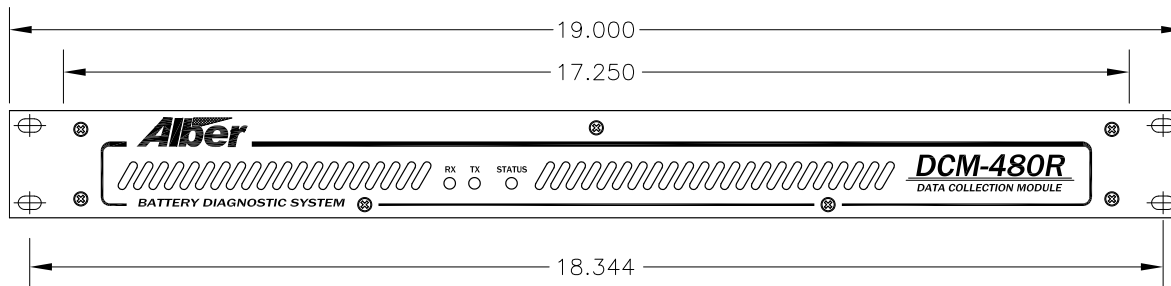
REAR VIEW



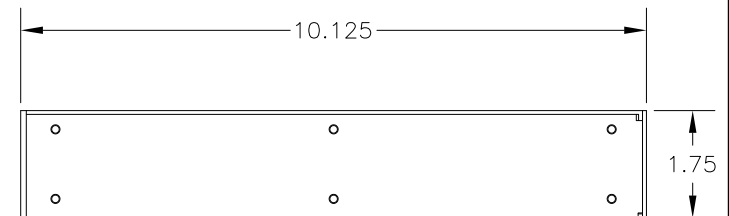
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			TOLERANCES: ANGLES: ± 0.15° FRACTIONS: ± 1/32 DECIMALS: x±05 xxt 01 xxt 005				
			SUB ASS'Y or PART No. :		<div><u>GENERAL ASS'Y</u> <u>BDS CONTROLLER</u></div>		
			MATERIAL:				
C	7/03	New Front Panel – Logo	SCALE: Half Size	DRAWN BY: J. Jones	SHEET 1 OF 1	DRAWING NUMBER BDS–183–B597	REV. C
B	4/01	UL REVISION	DATE: 2–16–00	CHECKED BY: Ed Deveau			
A	5/00	PRODUCTION REV.					
REV	DATE	CHANGE RECORD					




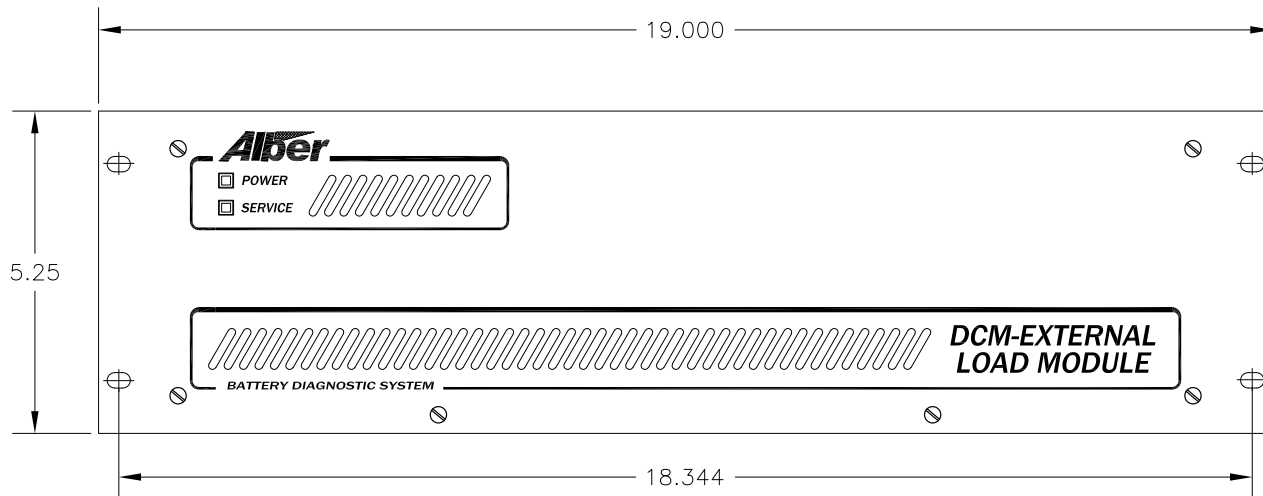
REAR VIEW



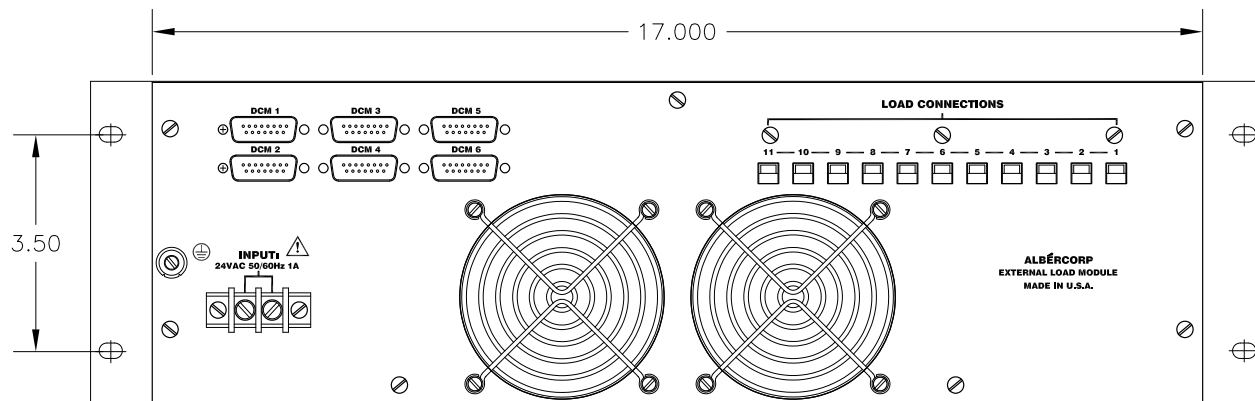
FRONT VIEW



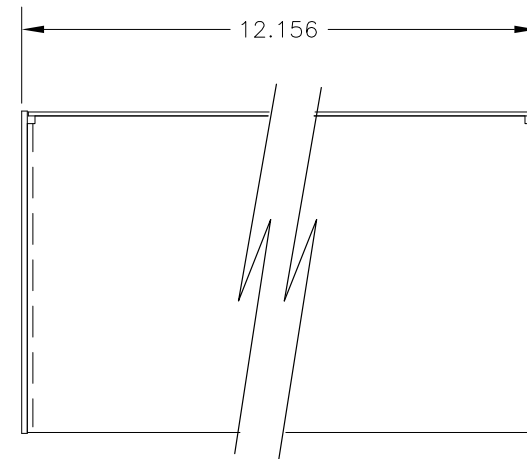
			UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES		<div>ALBÉR CORP. BOCA RATON, FL. 33487-2813</div>			
			TOLERANCES: ANGLES: ± 0 15' FRACTIONS: ± 1/32 DECIMALS: x±05 x±01 x±00 005					
D	7/03	New Front panel – Logo	MATERIAL:		<div><u>GENERAL ASS'Y</u> <u>DCM-480R</u></div>			
C	6/01	UL Revision						
B	4/00	Text Change						
A	3/00	Full Front Panel	SCALE: Half Size	DRAWN BY: J. Jones			DRAWING NUMBER	REV.
REV	DATE	CHANGE RECORD	DATE: 10-28-99	CHECKED BY: Ed Deveau				




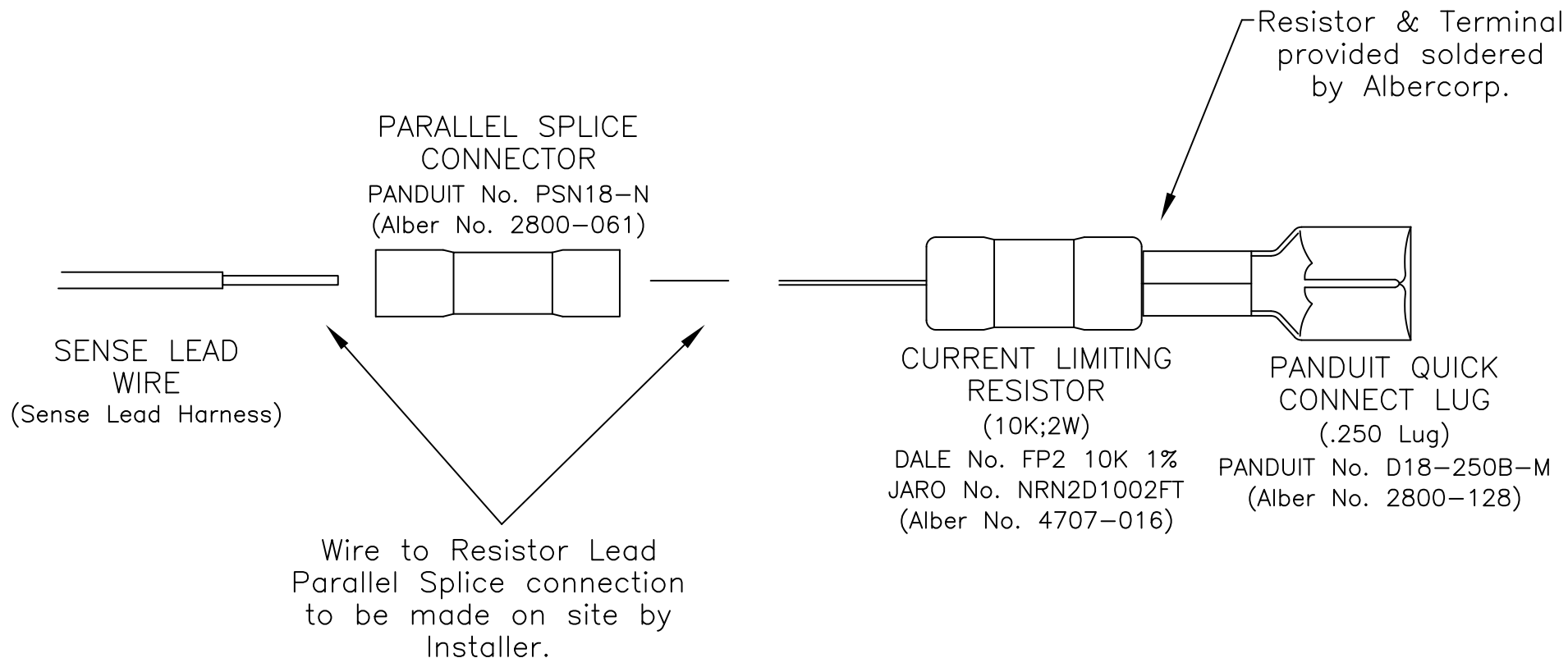
FRONT VIEW



REAR VIEW



			UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES		<div></div> <div>ALBÉR CORP. BOCA RATON, FL. 33487-2813</div>	
			TOLERANCES: ANGLES: ± 0.15° FRACTIONS: ± 1/32 DECIMALS: x±0.05 xxd 01 xxxd 005			
			SUB ASS'Y or PART No. :		<div><u>GENERAL ASS'Y</u></div> <div>BDS-256 EXTERNAL LOAD MODULE</div>	
C	7/03	New Front Panel – Logo	MATERIAL:			
B	6/01	UL Revision			<div>DRAWING NUMBER</div> <div>BDS-165-B583</div>	
A	5/00	Production Revision	SCALE: Half Size			
REV	DATE	CHANGE RECORD	DATE: 7-15-99	DRAWN BY: J. Jones	SHEET 1 OF 1	REV. C
			CHECKED BY: Ed Deveau			



**Alber**

Boca Raton, FL 33437-2813

SUB ASS'Y No. 1100-437

SCALE: 2X

DRAWN BY: *J. Jones*

DATE: 4-14-97

CHECKED BY: *Ed Deveau*

UNLESS OTHERWISE SPECIFIED, ALL  
DIMENSIONS ARE IN INCHES.  
TOLERANCES: FRACT  $\pm 1/32$   
.x  $\pm .05$  .xx  $\pm .01$  .xxx  $\pm .005$

E	11/01	Removed AWG
D	5/00	Added Mfgr/Alber P/N
C	4/00	Quick Connect Only
REV.	DATE	CHANGE RECORD

SUB ASS'Y

SENSE LEAD CONNECTION DETAILS  
BATTERY DIAGNOSTIC SYSTEM

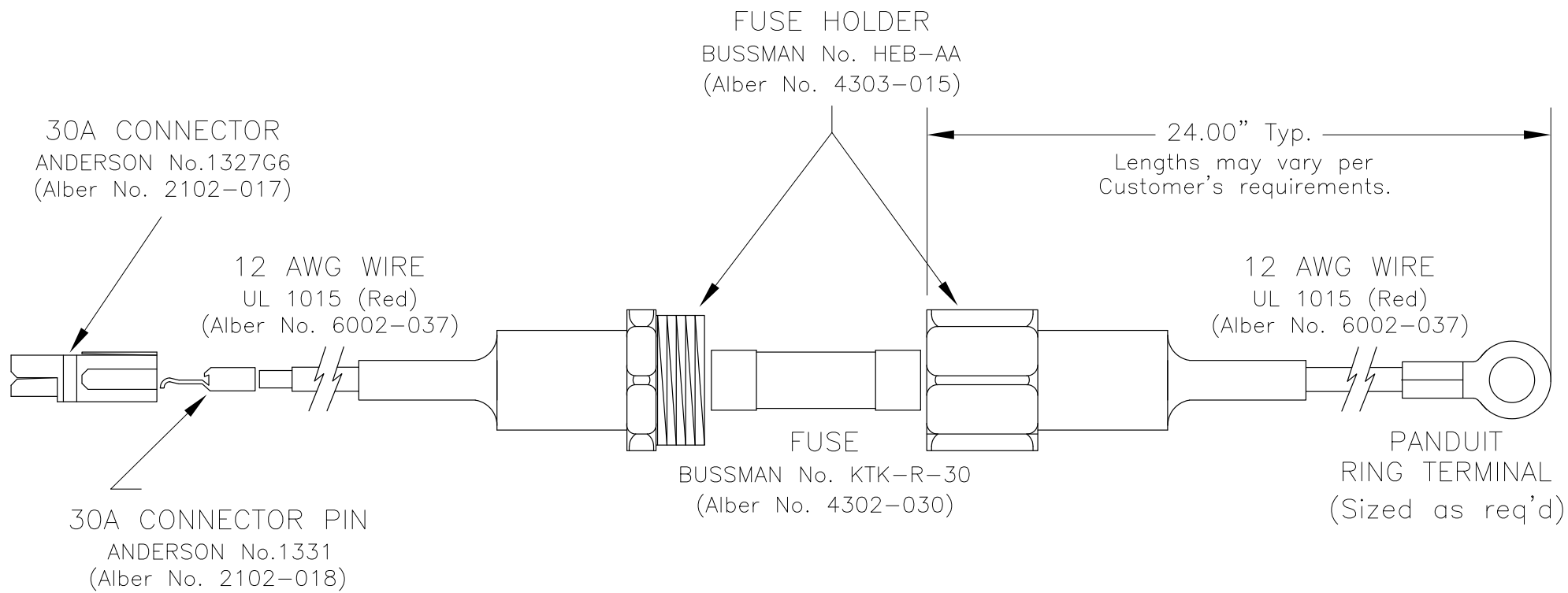
SHEET 1 OF 1

DRAWING No.

BDS-120-A373

REV.

E



NOTE: For proper crimp  
connection use:  
ANDERSON CRIMP TOOL  
1351G1

**Alber**

Boca Raton, FL 33437-2813

MATERIAL:

SCALE: Full Size

DRAWN BY: *J. Jones*

DATE: 5-22-00

CHECKED BY: *Ed Deveau*

UNLESS OTHERWISE SPECIFIED, ALL  
DIMENSIONS ARE IN INCHES.

TOLERANCES: FRACT  $\pm 1/32$   
.x  $\pm .05$  .xx  $\pm .01$  .xxx  $\pm .005$

A	6/01	UL Parts Update
REV.	DATE	CHANGE RECORD

SUB ASS'Y  
600V FUSED LOAD LEAD  
BATTERY DIAGNOSTIC SYSTEM

SHEET

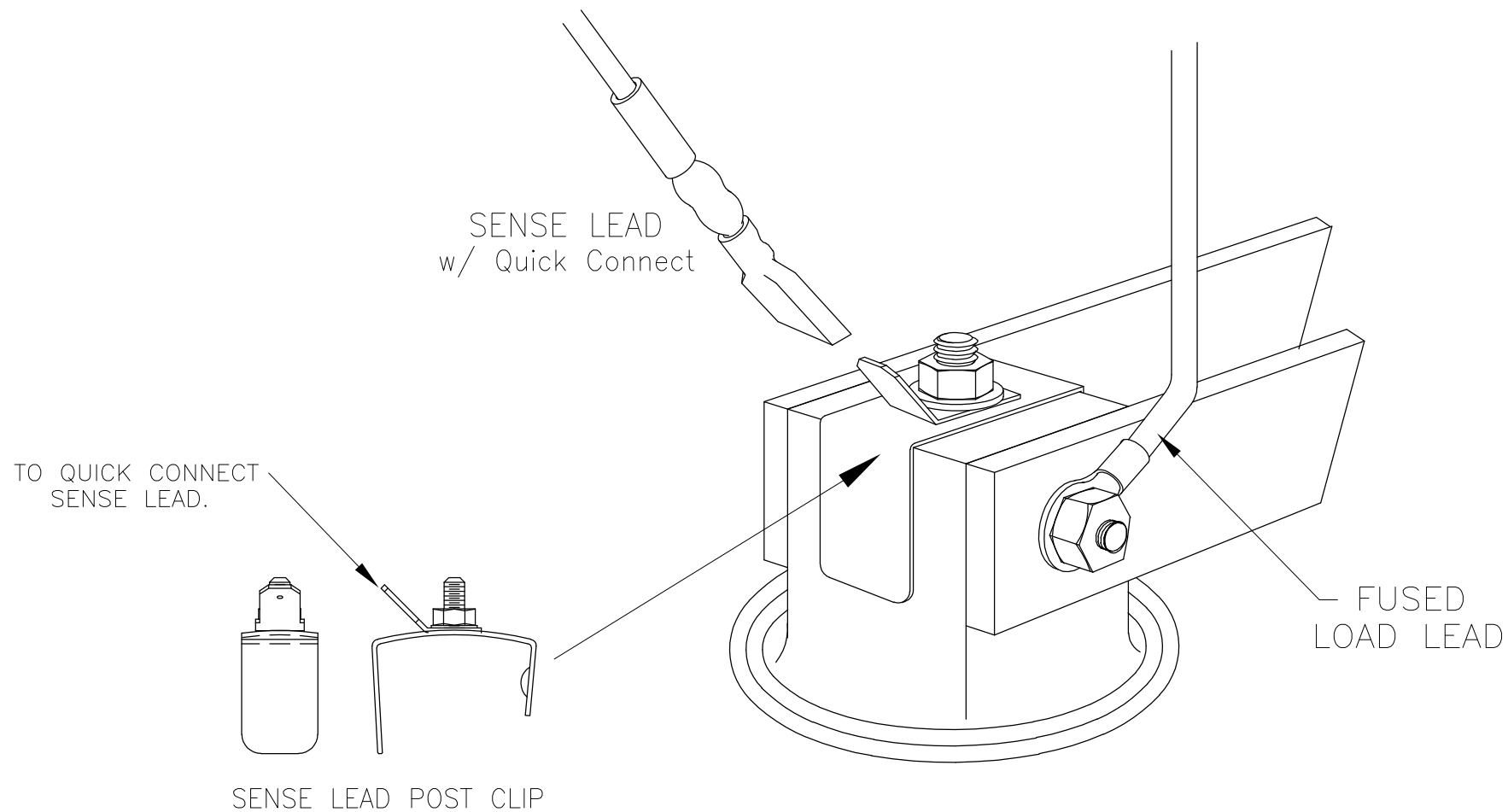
1 OF 1

DRAWING No.

BDS-193-A453

REV.

A



OPTIONAL POST CLIP CONNECTION

**Alber**

**Boca Raton, FL 33437-2813**

MATERIAL:

SCALE: N.T.S.

DRAWN BY: *J. Jones*

DATE: 2-3-99

CHECKED BY: *Ed Deveau*

UNLESS OTHERWISE SPECIFIED, ALL  
DIMENSIONS ARE IN INCHES.  
TOLERANCES: FRACT  $\pm 1/32$   
.x  $\pm .05$  .xx  $\pm .01$  .xxx  $\pm .005$

A 5/03 Added optional notes.

REV. DATE CHANGE RECORD

## INSTALLATION DETAILS

OPTIONAL QUICK CONNECT POST CLIP LEADS

BATTERY DIAGNOSTIC SYSTEM

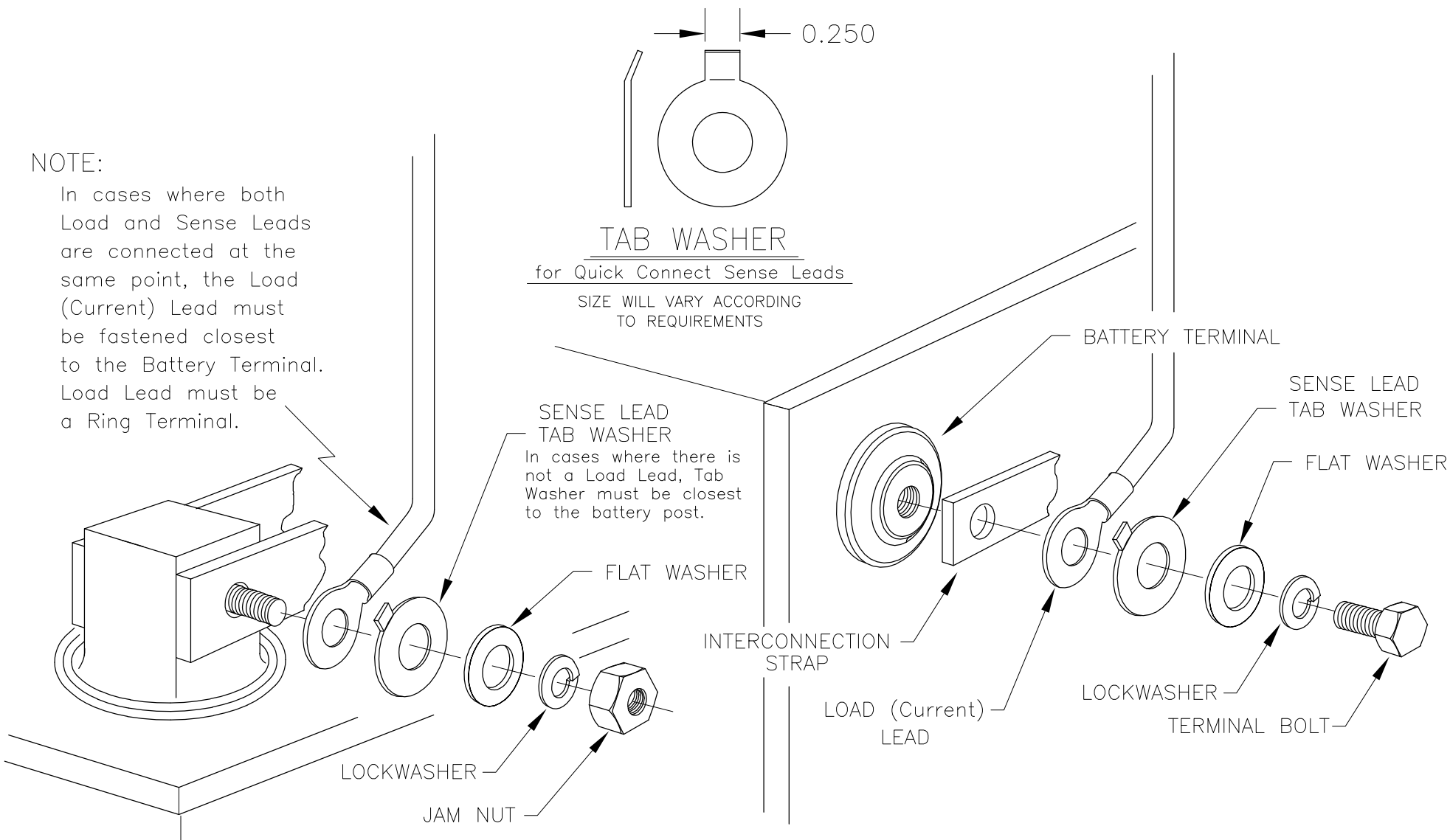
SHEET 1 OF 1

DRAWING No.  
BDS-163-A424

REV.  
A

**NOTE:**

In cases where both Load and Sense Leads are connected at the same point, the Load (Current) Lead must be fastened closest to the Battery Terminal. Load Lead must be a Ring Terminal.



**Alber**

**Boca Raton, FL 33437-2813**

MATERIAL:

SCALE: N.T.S.

DRAWN BY: *J. Jones*

DATE: 5-20-97

CHECKED BY: *Ed Deveau*

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES.

TOLERANCES: FRACT  $\pm 1/32$   
 $.x \pm .05$   $.xx \pm .01$   $.xxx \pm .005$

C	5/03	Added Tab washer note.
B	9/98	Removed strap nut
A	1/98	Added Jam Nut
REV.	DATE	CHANGE RECORD

## INSTALLATION DETAILS

FULL WASHER QUICK CONNECT SENSE/LOAD LEADS

BATTERY DIAGNOSTIC SYSTEM

SHEET 1 OF 1

DRAWING No.

BDS-123-A380

REV.

C



0.647 [16.43]

0.750 [19.05]

0.510 [12.95]

NOTE: In cases where both Load and Sense Leads are connected at the same point, the Load (Current) Lead must be fastened closest to the Battery Terminal. Load Lead must be a Ring Terminal.

0.760 [19.30]

### OPTIONAL "C" CLAMP

for Quick Connect Sense Leads

FULL SCALE

TO QUICK CONNECT  
SENSE LEAD.FUSED  
LOAD LEAD.

NOTE: "C" Clamps for Load Leads will not have lugs for Quick Connect. Load Lead will be connected to "C" Clamp with screw as shown.

INTERCONNECTION  
STRAPINTERCONNECTION  
STRAPTO QUICK CONNECT  
SENSE LEAD.

# Alber

Boca Raton, FL 33437-2813

MATERIAL:

SCALE: N.T.S.

DRAWN BY: *J. Jones*

DATE: 5-20-97

CHECKED BY: *Ed Deveau*UNLESS OTHERWISE SPECIFIED, ALL  
DIMENSIONS ARE IN INCHES.TOLERANCES: FRACT  $\pm 1/32$   
.x  $\pm .05$  .xx  $\pm .01$  .xxx  $\pm .005$ 

B

5/03

Added Optional Notes.

A

11/98

Removed No-Ox Note

REV.

DATE

CHANGE RECORD

## INSTALLATION DETAILS

OPTIONAL QUICK CONNECT "C" CLAMP LEADS

BATTERY DIAGNOSTIC SYSTEM

SHEET

1 OF 1

DRAWING No.

BDS-127-A381

REV.

B

Alber P/N	Length
1101-160-50	50'
1101-160-XX	XX'

DB37(F)  
 (Cinch No. TC-37S)  
 (Alber No. 2104-071)  
 (Cinch No. SDH-37GFLCS)  
 (Alber No. 2104-074)

20	○	1	Brown
21	○	2	Red
22	○	3	Orange
23	○	4	Yellow
24	○	5	Green
25	○	6	Blue
26	○	7	Violet
27	○	8	Grey
28	○	9	White
29	○	10	Black
30	○	11	Wh/Brn
31	○	12	Wh/Red
32	○	13	Wh/Org
33	○	14	Wh/Yel
34	○	15	Wh/Grn
35	○	16	
36	○	17	
37	○	18	
	○	19	

NOTES: All wires are 24 GA, 300V,  
 UL 1007, 19 strand.  
 End to be terminated  
 at installation.

**Alber**

Boca Raton, FL 33437-2813

UNLESS OTHERWISE SPECIFIED, ALL  
 DIMENSIONS ARE IN INCHES.  
 TOLERANCES: FRACT ± 1/32  
 .x ± .05 .xx ± .01 .xxx ± .005

SUB ASSEMBLY  
CELLS 1-15 I/O HARNESS  
DCM-480

MATERIAL: Sub Ass'y No. 1101-160

SCALE: N.T.S. DRAWN BY: *J. Jones*

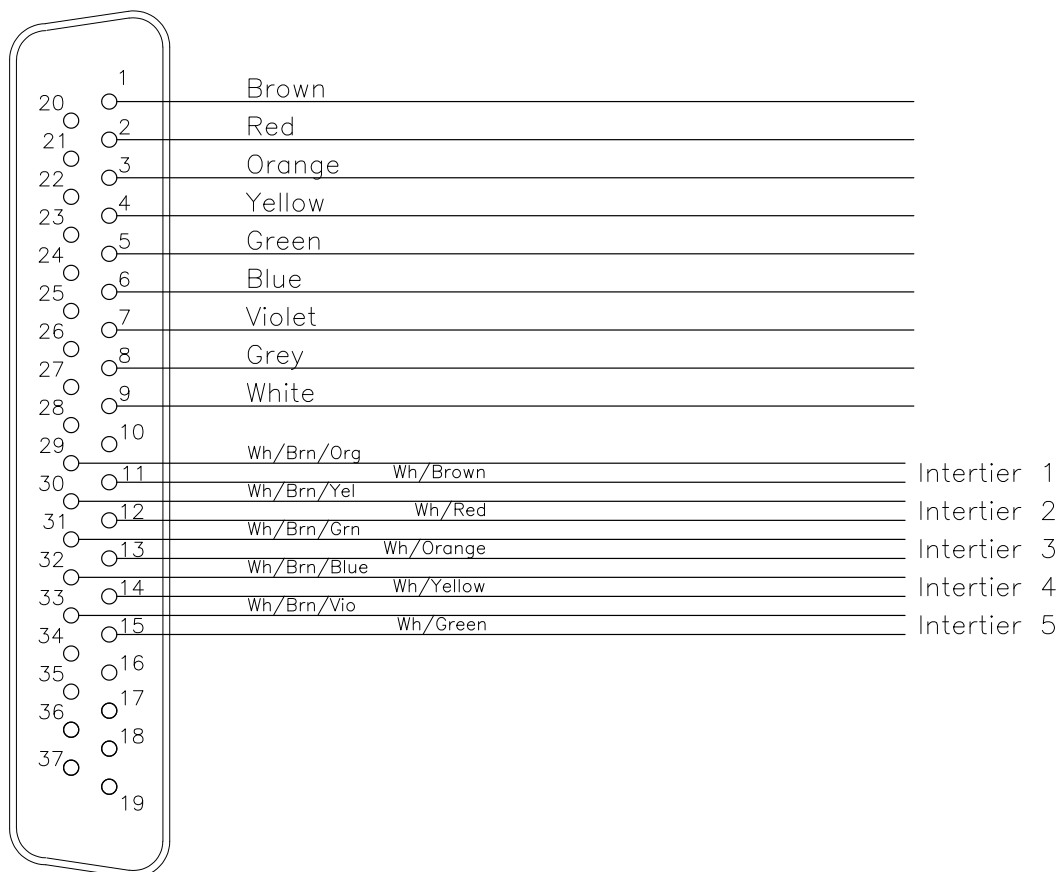
DATE: 11-2-2001 CHECKED BY: *Ed Deveau*

A	11/01	Prod. Rev. I
REV.	DATE	CHANGE RECORD

SHEET 1 OF 1	DRAWING No. BDS-1125-A494	REV. A
--------------	------------------------------	-----------

Alber P/N	Length
1101-161-50	50'
1101-161-XX	XX'

DB37(F)  
 (Cinch No. TC-37S)  
 (Alber No. 2104-071)  
 (Cinch No. SDH-37GFLCS)  
 (Alber No. 2104-074)



NOTES: All wires are 24 GA, 300V,  
 UL 1007, 19 strand.  
 End to be terminated  
 at installation.

**Alber**

Boca Raton, FL 33437-2813

MATERIAL: Sub Ass'y No. 1101-161

SCALE: N.T.S.

DRAWN BY: J. Jones

DATE: 11-2-2001

CHECKED BY: Ed Deveau

UNLESS OTHERWISE SPECIFIED, ALL  
 DIMENSIONS ARE IN INCHES.  
 TOLERANCES: FRACT ± 1/32  
 .x ± .05 .xx ± .01 .xxx ± .005

A	11/01	Prod. Rev. I
REV.	DATE	CHANGE RECORD

SUB ASSEMBLY  
CELLS 16-24 I/O HARNESS  
DCM-480

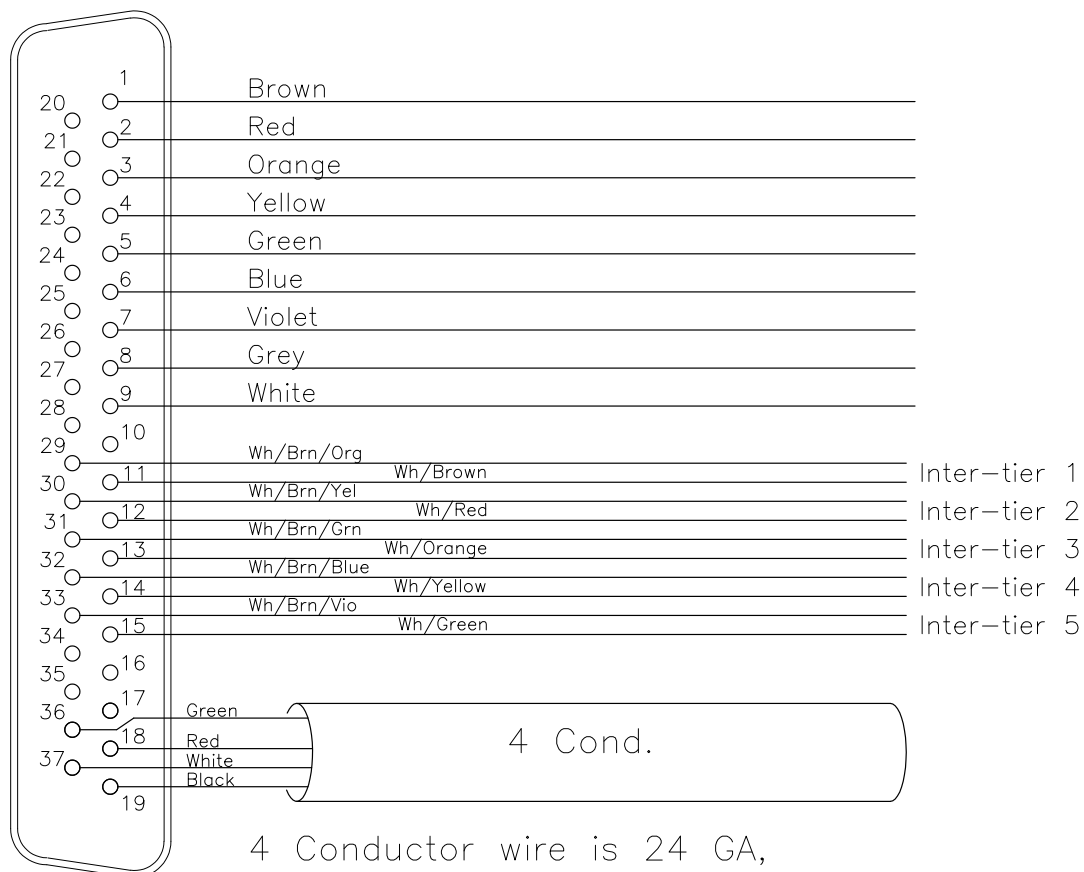
SHEET 1 OF 1

DRAWING No.  
 BDS-1126-A495

REV.  
 A

Alber P/N	Length
1101-162-50	50'
1101-162-XX	XX'

DB37(F)  
 (Cinch No. TC-37S)  
 (Alber No. 2104-071)  
 (Cinch No. SDH-37GFLCS)  
 (Alber No. 2104-074)



All wires are 24 GA, 300V,  
 UL 1007, 19 strand.  
 End to be terminated  
 at installation.

**Alber**

Boca Raton, FL 33437-2813

MATERIAL: Sub Ass'y No. 1101-162

SCALE: N.T.S.

DRAWN BY: J. Jones

DATE: 11-2-2001

CHECKED BY: Ed Deveau

UNLESS OTHERWISE SPECIFIED, ALL  
 DIMENSIONS ARE IN INCHES.  
 TOLERANCES: FRACT ± 1/32  
 .x ± .05 .xx ± .01 .xxx ± .005

A	11/01	Prod. Rev. I
REV.	DATE	CHANGE RECORD

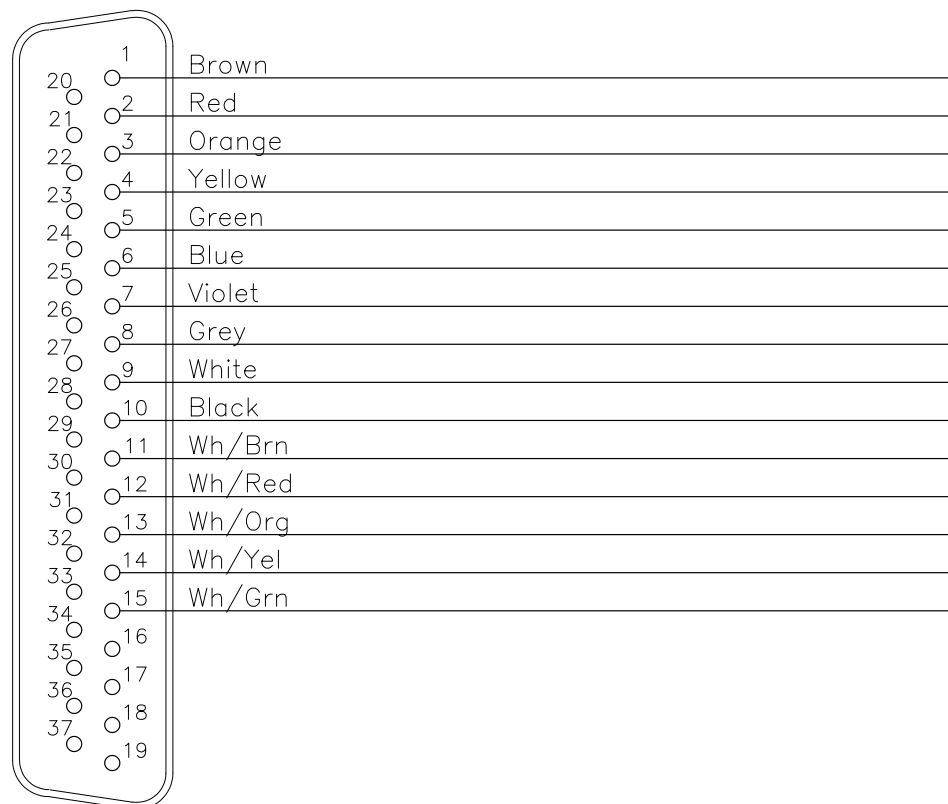
SUB ASSEMBLY  
CELLS 16-24/TEMP. HARNESS  
DCM-480

SHEET 1 OF 1

DRAWING No.  
 BDS-1127-A496  
 REV. A

Alber P/N	Length
1101-163-50	50'
1101-163-XX	XX'

DB37(F)  
 (Cinch No. TC-37S)  
 (Alber No. 2104-071)  
 (Cinch No. SDH-37GFLCS)  
 (Alber No. 2104-074)



NOTES: All wires are 24 GA, 300V,  
 UL 1007, 19 strand.  
 End to be terminated  
 at installation.

**Alber**

Boca Raton, FL 33437-2813

MATERIAL: Sub Ass'y No. 1101-163

SCALE: N.T.S.

DRAWN BY: J. Jones

DATE: 11-2-2001

CHECKED BY: Ed Deveau

UNLESS OTHERWISE SPECIFIED, ALL  
 DIMENSIONS ARE IN INCHES.  
 TOLERANCES: FRACT ± 1/32  
 .x ± .05 .xx ± .01 .xxx ± .005

A	11/01	Prod. Rev. I
REV.	DATE	CHANGE RECORD

SUB ASSEMBLY  
CELLS 25-39 I/O HARNESS  
DCM-480

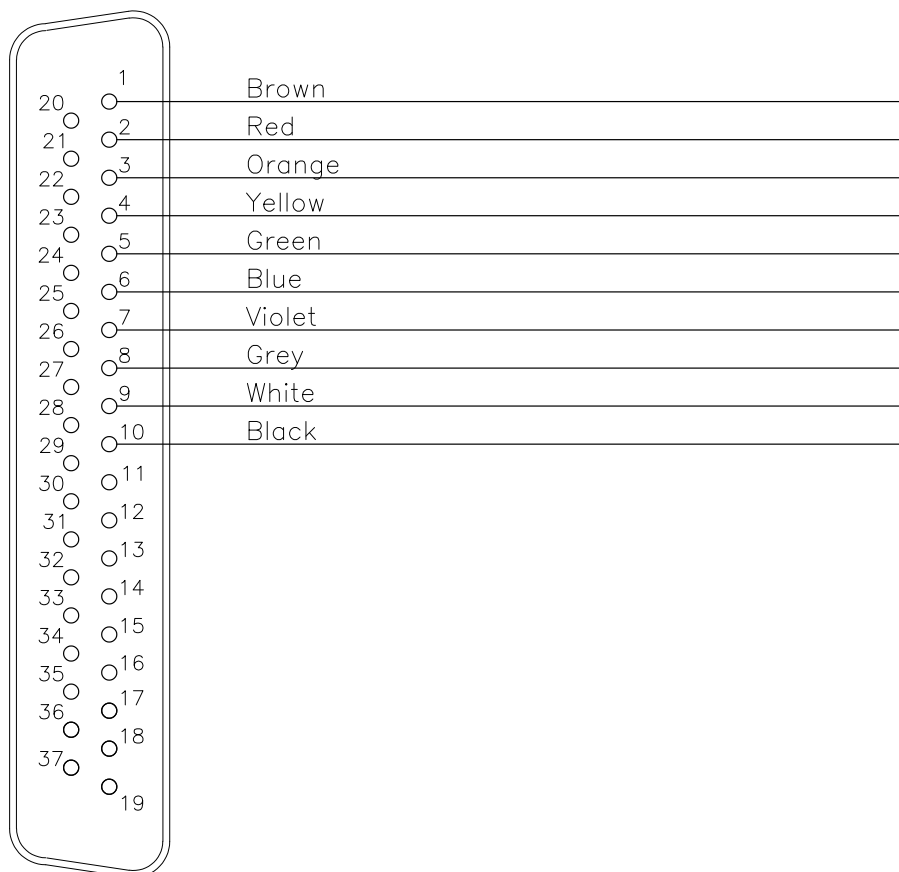
SHEET 1 OF 1

DRAWING No.  
 BDS-1128-A497

REV.  
 A

Alber P/N	Length
1101-164-50	50'
1101-164-XX	XX'

DB37(F)  
 (Cinch No. TC-37S)  
 (Alber No. 2104-071)  
 (Cinch No. SDH-37GFLCS)  
 (Alber No. 2104-074)



NOTES: All wires are 24 GA, 300V,  
 UL 1007, 19 strand.  
 End to be terminated  
 at installation.

**Alber**

Boca Raton, FL 33437-2813

UNLESS OTHERWISE SPECIFIED, ALL  
 DIMENSIONS ARE IN INCHES.  
 TOLERANCES: FRACT ± 1/32  
 .x ± .05 .xx ± .01 .xxx ± .005

SUB ASSEMBLY  
CELLS 40-48 I/O HARNESS  
DCM-480

MATERIAL: Sub Ass'y No. 1101-164

SCALE: N.T.S. DRAWN BY: *J. Jones*

DATE: 11-4-2001 CHECKED BY: *Ed Deveau*

B 11/01 Corrected Black Wire

A 11/01 Prod. Rev. I

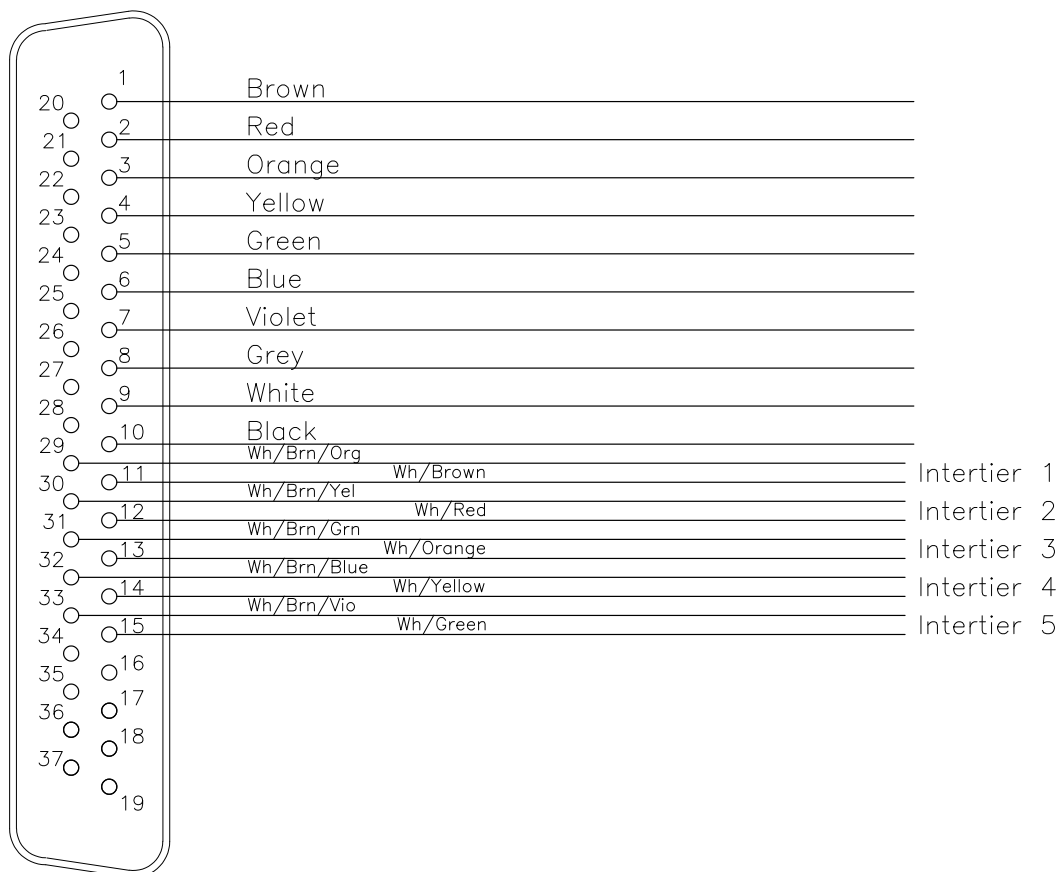
REV. DATE CHANGE RECORD

SHEET 1 OF 1

DRAWING No. BDS-1129-A498 REV. B

Alber P/N	Length
1101-165-50	50'
1101-165-XX	XX'

DB37(F)  
 (Cinch No. TC-37S)  
 (Alber No. 2104-071)  
 (Cinch No. SDH-37GFLCS)  
 (Alber No. 2104-074)



NOTES: All wires are 24 GA, 300V,  
 UL 1007, 19 strand.  
 End to be terminated  
 at installation.

**Alber**

Boca Raton, FL 33437-2813

UNLESS OTHERWISE SPECIFIED, ALL  
 DIMENSIONS ARE IN INCHES.  
 TOLERANCES: FRACT ± 1/32  
 .x ± .05 .xx ± .01 .xxx ± .005

SUB ASSEMBLY  
CELLS 40-48/IT I/O HARNESS  
DCM-480

MATERIAL: Sub Ass'y No. 1101-165

SCALE: N.T.S. DRAWN BY: J. Jones

DATE: 11-4-2001 CHECKED BY: Ed Deveau

B 11/01 Corrected Black Wire

A 11/01 Prod. Rev. I

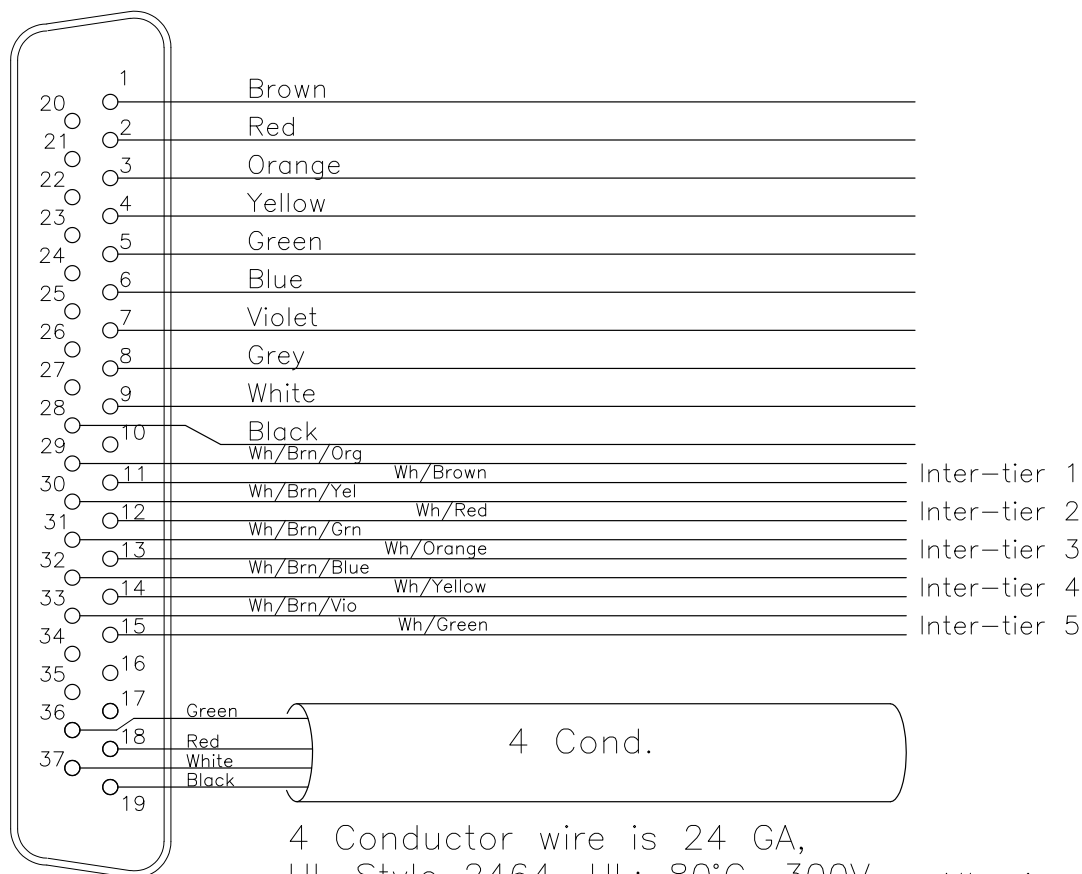
REV. DATE CHANGE RECORD

SHEET 1 OF 1

DRAWING No. BDS-1130-A499 REV. B

Alber P/N	Length
1101-166-50	50'
1101-166-XX	XX'

DB37(F)  
 (Cinch No. TC-37S)  
 (Alber No. 2104-071)  
 (Cinch No. SDH-37GFLCS)  
 (Alber No. 2104-074)



4 Conductor wire is 24 GA,  
 UL Style 2464, UL: 80°C, 300V.  
 End to be terminated  
 at installation.

All wires are 24 GA, 300V,  
 UL 1007, 19 strand.  
 End to be terminated  
 at installation.

**Alber**

Boca Raton, FL 33437-2813

MATERIAL: Sub Ass'y No. 1101-166

SCALE: N.T.S.

DRAWN BY: J. Jones

DATE: 11-2-2001

CHECKED BY: Ed Deveau

UNLESS OTHERWISE SPECIFIED, ALL  
 DIMENSIONS ARE IN INCHES.  
 TOLERANCES: FRACT ± 1/32  
 .x ± .05 .xx ± .01 .xxx ± .005

C	6/03	Changed Black Wire
B	11/01	Corrected Black Wire
A	11/01	Prod. Rev. I
REV.	DATE	CHANGE RECORD

SUB ASSEMBLY  
CELLS 40-48/TEMP. HARNESS  
DCM-480

SHEET 1 OF 1

DRAWING No.  
 BDS-1131-A500

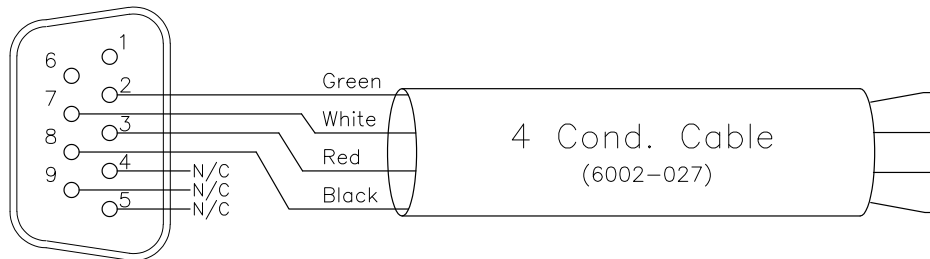
REV.  
 C



Alber P/N	Length
1101-168-50	50'
1101-168-XX	XX'

DE9(M)

(Cinch No. TE-9P)  
(Alber No. 2105-037)  
(Cinch No. SDH-9GFCS)  
(Alber No. 2104-072)



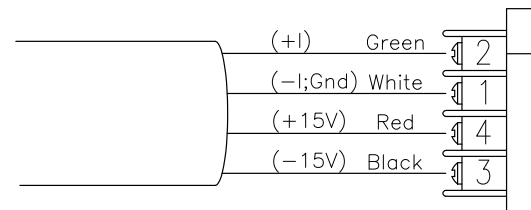
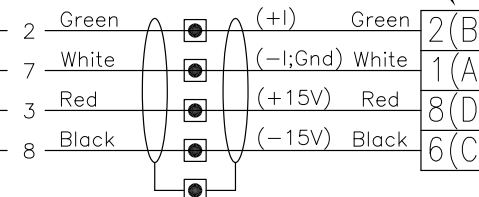
NOTE: 4 Conductor wire is 24 GA,  
UL Style 2464, UL: 80°C, 300V.  
End to be terminated  
at installation.

# OHIO SEMITRONICS CTG SERIES CURRENT TRANSDUCERS (With Connector and Cable)

- Splice wires from OS cable to 4 Cond. cable as shown.

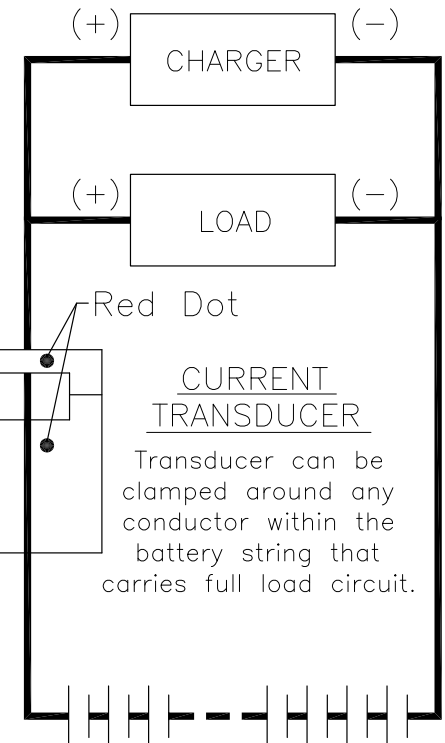
Transducer with metal shell connector has Alpha designations.

Transducer with plastic shell connector has Numerical designations.



# OHIO SEMITRONICS CTG SERIES CURRENT TRANSDUCERS (With Terminal Block)

Terminate 4 cond cable for connection directly to (4) #6-32 terminal screws.



CURRENT TRANSDUCER  
Transducer can be clamped around any conductor within the battery string that carries full load circuit.

**Alber**

Boca Raton, FL 33437-2813

MATERIAL: Sub Ass'y No. 1101-168

SCALE: N.T.S. DRAWN BY: J. Jones

DATE: 11-4-2001 CHECKED BY: Ed Deveau

UNLESS OTHERWISE SPECIFIED, ALL  
DIMENSIONS ARE IN INCHES.  
TOLERANCES: FRACT ± 1/32  
.x ± .05 .xx ± .01 .xxx ± .005

B	1/04	Added CT w/ Term. Bl.
A	11/01	Corrected Metal/Plastic error
REV.	DATE	CHANGE RECORD

## SUB ASSEMBLY CURRENT TRANSDUCER CONNECTION DCM-480

SHEET 1 OF 1	DRAWING No. BDS-1132-A501	REV. B
--------------	------------------------------	-----------

Alber P/N	Length
1101-169-50	50'
1101-169-XX	XX'

# OHIO SEMITRONICS CTG SERIES CURRENT TRANSDUCERS (With Cable)

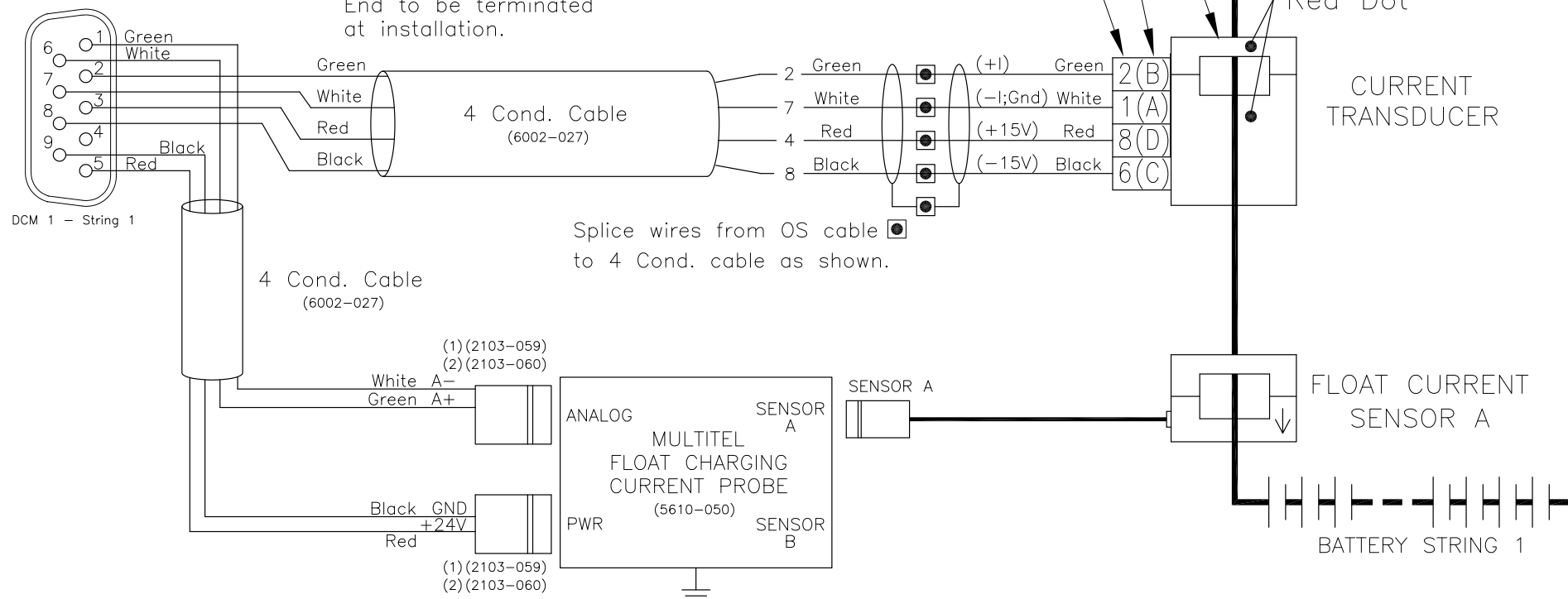
Transducer can be clamped around any conductor within the battery

Transducer with Metal Shell connector has Alpha designations.

Transducer with Plastic Shell connector has Numerical designations.

DE9(M)  
(Cinch No. TE-9P)  
(Alber No. 2105-037)  
(Cinch No. SDH-9GFCs)  
(Alber No. 2104-072)

NOTE: 4 Conductor wire is 24 GA,  
UL Style 2464, UL: 80°C, 300V.  
End to be terminated  
at installation.



**Alber**

Boca Raton, FL 33437-2813

MATERIAL: Sub Ass'y No. 1101-169

SCALE: N.T.S.

DRAWN BY: J. Jones

DATE: 11-4-2001

CHECKED BY: Ed Deveau

UNLESS OTHERWISE SPECIFIED, ALL  
DIMENSIONS ARE IN INCHES.  
TOLERANCES: FRACT ± 1/32  
.x ± .05 .xx ± .01 .xxx ± .005

B 1/03 Remov'd Shield; Rev. Pol.

A 12/02 Removed 2nd String

REV. DATE CHANGE RECORD

SUB ASSEMBLY

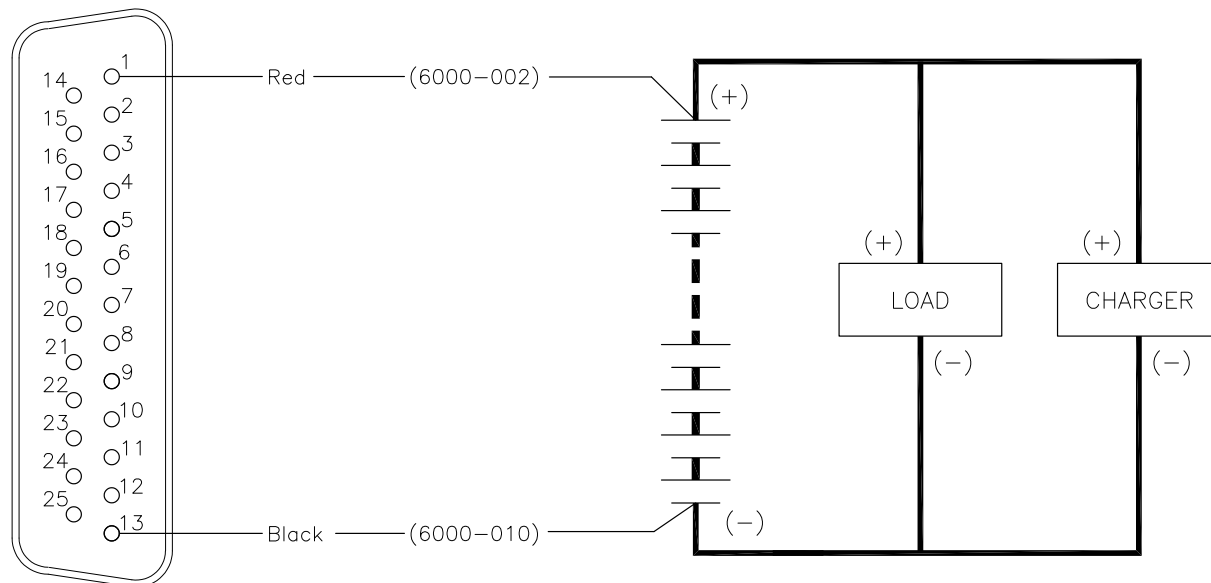
CURRENT TRANSDUCER/FLOAT CONNECTIONS

DCM-480

SHEET 1 OF 1

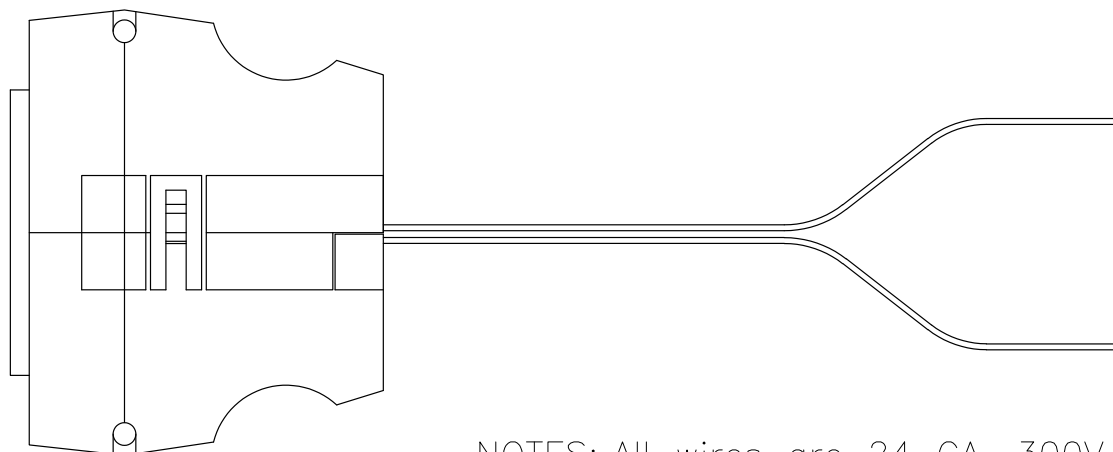
DRAWING No.  
BDS-1124-A493

REV.  
B



Alber P/N	Length
1101-167-50	50'
1101-167-XX	XX'

DB25(F)  
 (Cinch No. TB-25S)  
 (Alber No. 2104-070)  
 (Cinch No. SDH-25GFCS)  
 (Alber No. 2104-060)



NOTES: All wires are 24 GA, 300V,  
 UL 1007, 19 strand.  
 End to be terminated  
 at installation.

**Alber**

Boca Raton, FL 33437-2813

MATERIAL: Sub Ass'y No. 1101-167

SCALE: N.T.S.

DRAWN BY: *J. Jones*

DATE: 4-19-2001

CHECKED BY: *Ed Deveau*

UNLESS OTHERWISE SPECIFIED, ALL  
 DIMENSIONS ARE IN INCHES.  
 TOLERANCES: FRACT ± 1/32  
 .x ± .05 .xx ± .01 .xxx ± .005

B 11/01 Added term. info.

A 10/01 UL Production Rev.

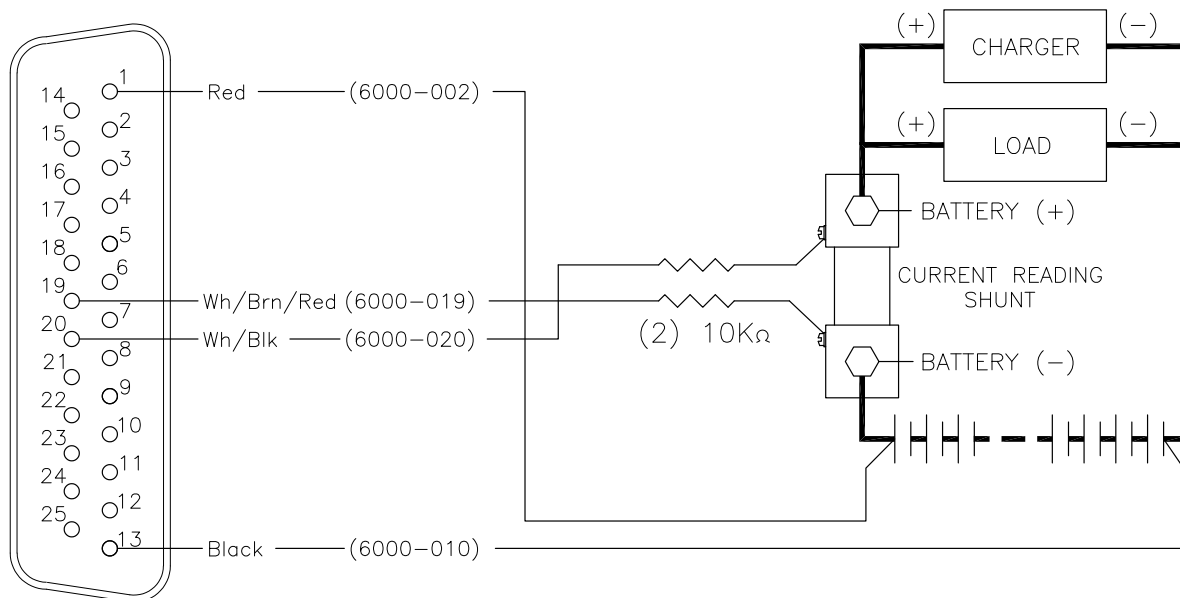
REV. DATE CHANGE RECORD

SUB ASSEMBLY  
OVERALL VOLTAGE CABLE  
DCM-480

SHEET 1 OF 1

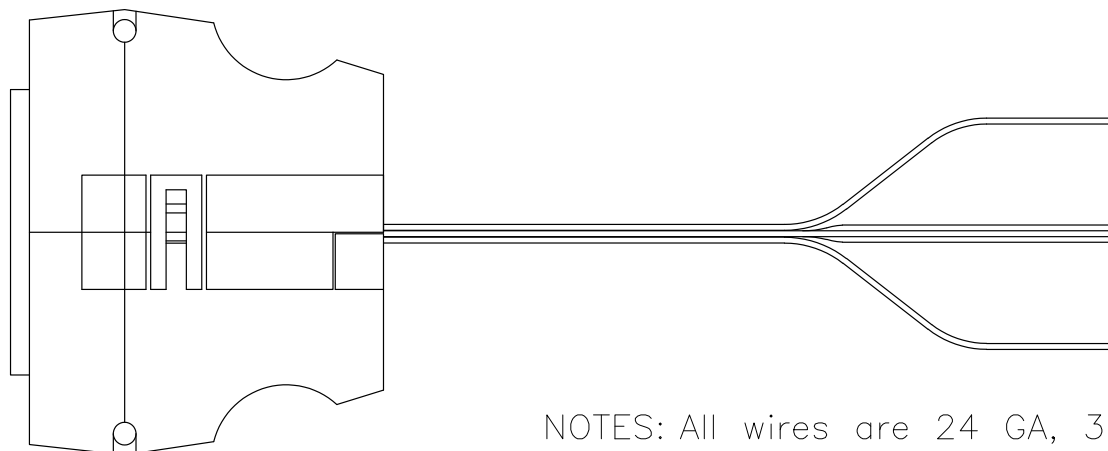
DRAWING No.  
 BDS-1116-A479

REV.  
 B



Alber P/N	Length
1101-170-50	50'
1101-170-XX	XX'

DB25(F)  
 (Cinch No. TB-25S)  
 (Alber No. 2104-070)  
 (Cinch No. SDH-25GFCS)  
 (Alber No. 2104-073)



NOTES: All wires are 24 GA, 300V,  
 UL 1007, 19 strand.  
 End to be terminated  
 at installation.

**Alber**

Boca Raton, FL 33437-2813

MATERIAL: Sub Ass'y No. 1101-170

SCALE: N.T.S.

DRAWN BY: *J. Jones*

DATE: 11-4-2001

CHECKED BY: *Ed Deveau*

UNLESS OTHERWISE SPECIFIED, ALL  
 DIMENSIONS ARE IN INCHES.  
 TOLERANCES: FRACT ± 1/32  
 .x ± .05 .xx ± .01 .xxx ± .005

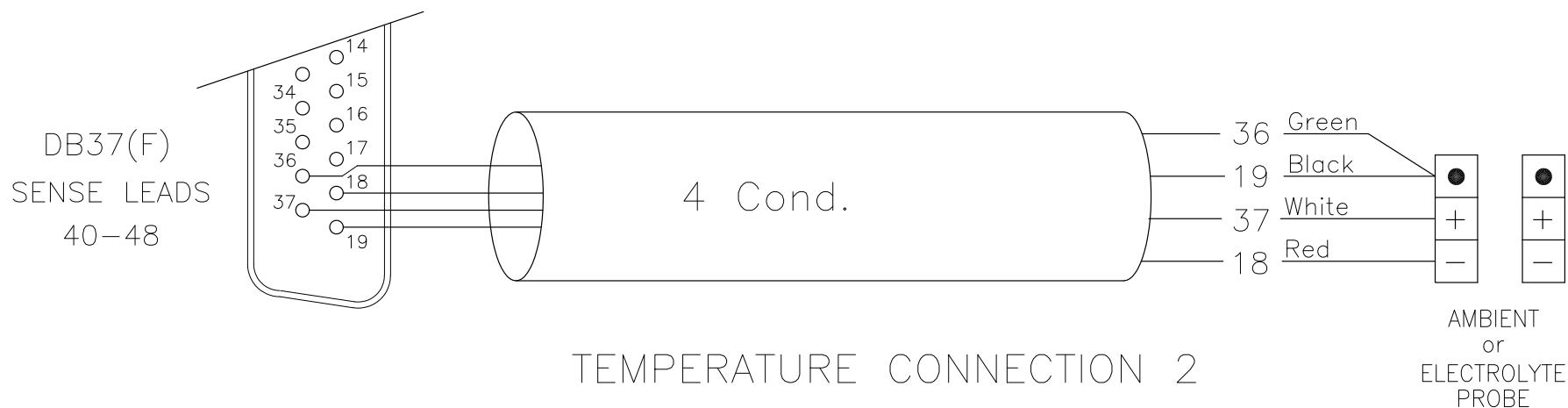
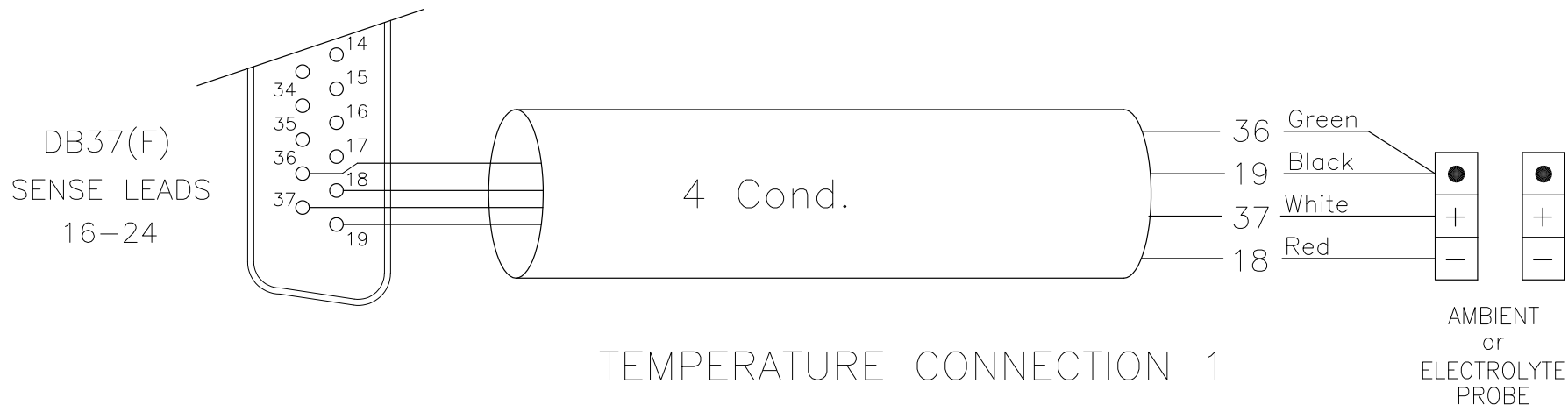
A	11/01	Added term. info.
REV.	DATE	CHANGE RECORD

SUB ASSEMBLY  
OVERALL VOLTAGE/SHUNT CABLE  
DCM-480

SHEET 1 OF 1

DRAWING No.  
 BDS-1133-A502

REV.  
 A



**Alber**

Boca Raton, FL 33437-2813

MATERIAL:

SCALE: N.T.S.

DRAWN BY: *J. Jones*

DATE: 8-26-97

CHECKED BY: *Ed Deveau*

UNLESS OTHERWISE SPECIFIED, ALL  
DIMENSIONS ARE IN INCHES.  
TOLERANCES: FRACT  $\pm 1/32$   
.x  $\pm .05$  .xx  $\pm .01$  .xxx  $\pm .005$

D	8/00	Corrected Color Code
C	7/00	Added Color Code
B	11/99	Added Temp. 2
REV.	DATE	CHANGE RECORD

SUB ASSEMBLY  
TEMPERATURE CONNECTIONS  
DATA COLLECTION MODULE

SHEET

1 OF 1

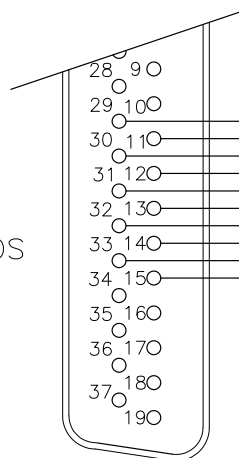
DRAWING No.

BDS-136-A397

REV.

D

DB37(F)  
SENSE LEADS  
16-24



INTERTIER 2  
INTERTIER 3  
INTERTIER 4  
INTERTIER 5

NOTE:

Color Code for Intertier  
1-5 Reference Drawing No.  
BDS-171-A434 Rev. C

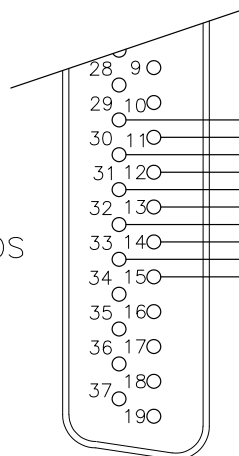
10K $\Omega$

POST OF THE  
CELL AT THE  
BEGINNING OF THE  
INTERTIER CABLE.

10K $\Omega$

POST OF THE  
CELL AT THE  
END OF THE  
INTERTIER CABLE.

DB37(F)  
SENSE LEADS  
40-48



INTERTIER 6  
INTERTIER 7  
INTERTIER 8  
INTERTIER 9  
INTERTIER 10

NOTE:

Color Code for Intertier  
6-10 Reference Drawing No.  
BDS-197-A457 Rev. A

**Alber**

Boca Raton, FL 33437-2813

MATERIAL:

SCALE: N.T.S.

DRAWN BY: *J. Jones*

DATE: 11-10-99

CHECKED BY: *Ed Deveau*

UNLESS OTHERWISE SPECIFIED, ALL  
DIMENSIONS ARE IN INCHES.

TOLERANCES: FRACT  $\pm 1/32$

.x  $\pm .05$  .xx  $\pm .01$  .xxx  $\pm .005$

A	7/00	Removed Term. Note
REV.	DATE	CHANGE RECORD

SUB ASSEMBLY  
INTERTIER CONNECTIONS

DCM-480

SHEET

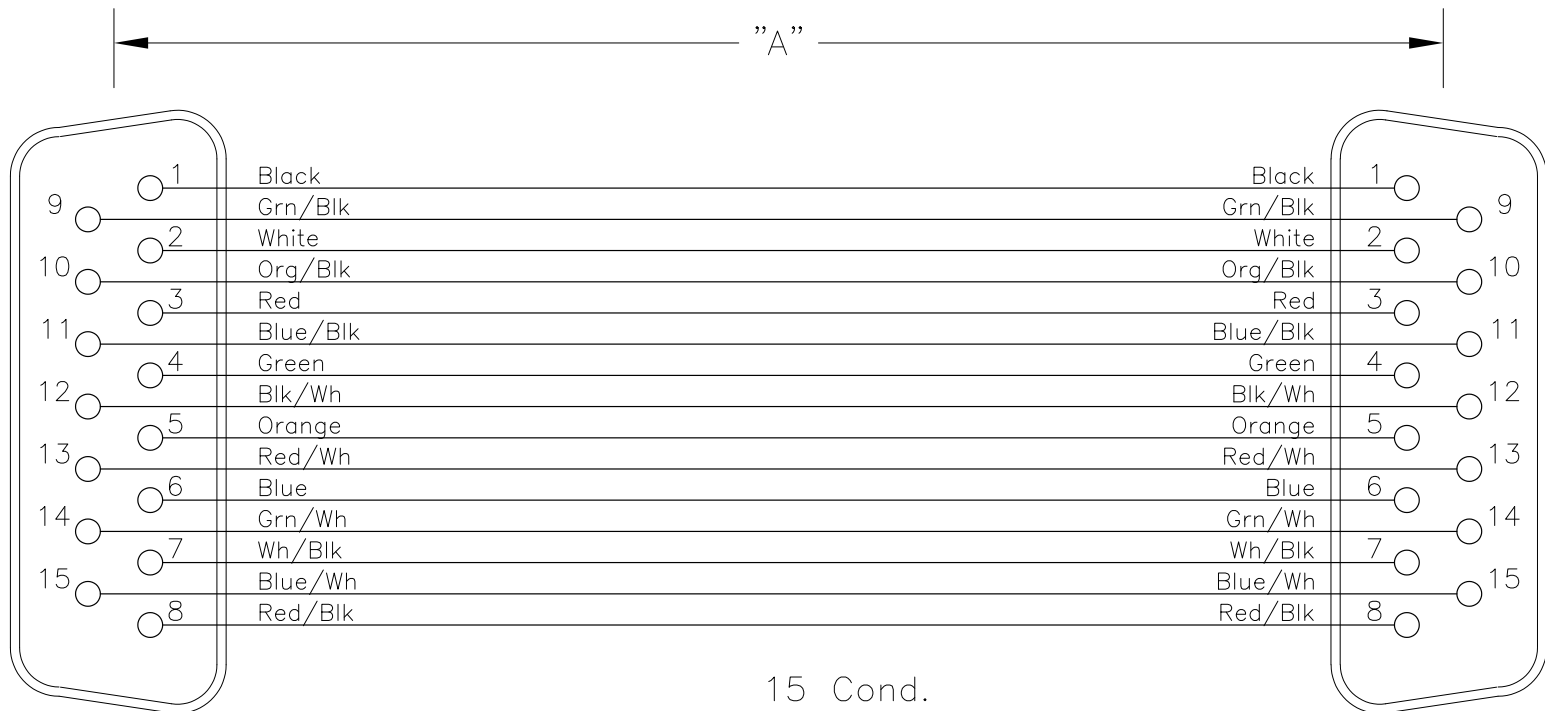
1 OF 1

DRAWING No.

BDS-174-A434

REV.

A



DA-15 (F)  
2104-030  
2104-055  
2800-002

15 Cond.  
(6002-008)

CABLE LENGTHS	
ASS'Y No.	"A" Dim.
1100-496-02	2'
1100-496-06	6'
1100-496-50	50'

DA-15 (M)  
2104-049  
2104-055  
2800-002

**Alber**

Boca Raton, FL 33437-2813

SUB ASS'Y No. 1100-496

SCALE: N.T.S.

DRAWN BY: *J. Jones*

DATE: 7-21-99

CHECKED BY: *Ed Deveau*

UNLESS OTHERWISE SPECIFIED, ALL  
DIMENSIONS ARE IN INCHES.  
TOLERANCES: FRACT ± 1/32  
.x ± .05 .xx ± .01 .xxx ± .005

C	6/00	Multiple cable lengths
B	2/00	Removed Shield Conn.
A	1/00	Corrected Hood P/N
REV.	DATE	CHANGE RECORD

SUB ASSEMBLY  
DCM TO BDS EXT. LOAD MODULE  
BDS-256

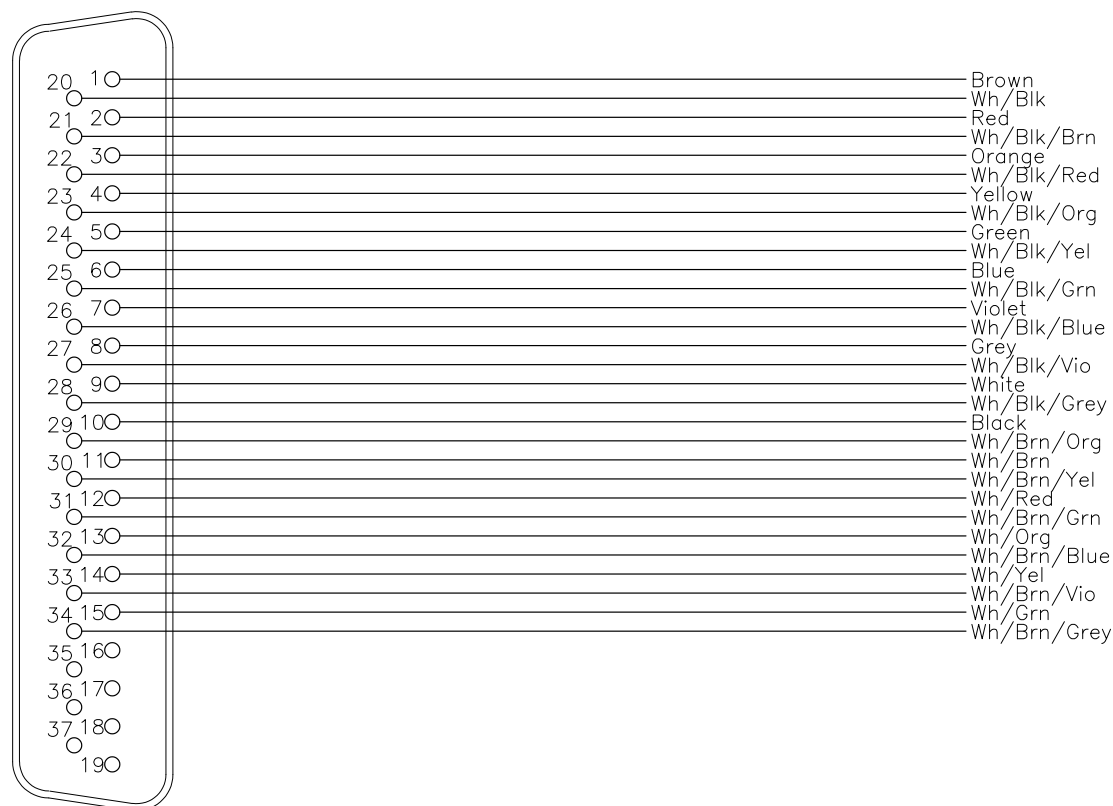
SHEET 1 OF 1

DRAWING No.  
BDS-167-A428

REV.  
C

Alber P/N	Length
1101-171-50	50'
1101-171-XX	XX'

DB37(F)  
 (Cinch No. TC-37S)  
 (Alber No. 2104-071)  
 (Cinch No. SDH-37GFLCS)  
 (Alber No. 2104-074)



NOTES: All wires are 24 GA, 300V,  
 UL 1007, 19 strand.  
 End to be terminated  
 at installation.

**Alber**

Boca Raton, FL 33437-2813

MATERIAL: Sub Ass'y No. 1101-171

SCALE: N.T.S.

DRAWN BY: *J. Jones*

DATE: 11-2-2001

CHECKED BY: *Ed Deveau*

UNLESS OTHERWISE SPECIFIED, ALL  
 DIMENSIONS ARE IN INCHES.  
 TOLERANCES: FRACT ± 1/32  
 .x ± .05 .xx ± .01 .xxx ± .005

A	11/01	Prod. Rev. I
REV.	DATE	CHANGE RECORD

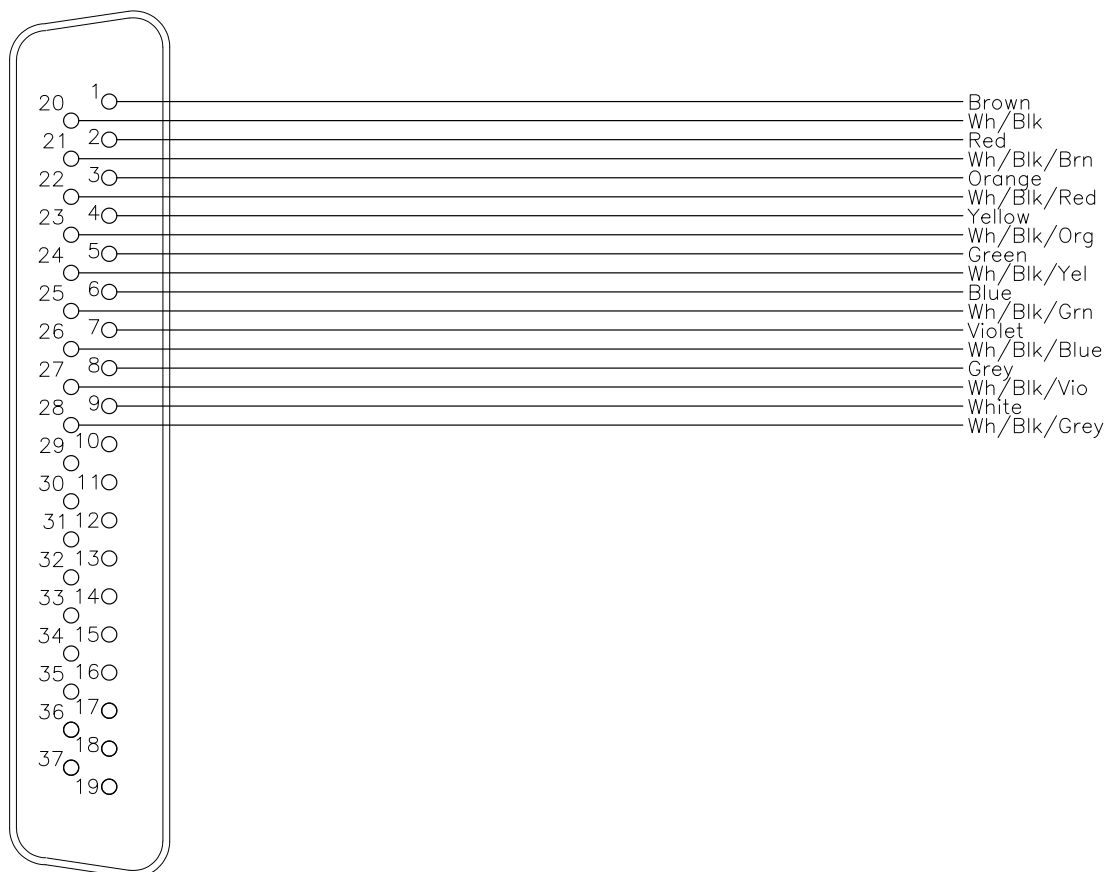
SUB ASSEMBLY  
CELLS 1-15 DUAL I/O HARNESS  
DCM-480

SHEET 1 OF 1	DRAWING No. BDS-1135-A504	REV. A
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Alber P/N	Length
1101-172-50	50'
1101-172-XX	XX'

DB37(F)  
 (Cinch No. TC-37S)  
 (Alber No. 2104-071)  
 (Cinch No. SDH-37GFLCS)  
 (Alber No. 2104-074)



NOTES: All wires are 24 GA, 300V,  
 UL 1007, 19 strand.  
 End to be terminated  
 at installation.

**Alber**

Boca Raton, FL 33437-2813

MATERIAL: Sub Ass'y No. 1101-172

SCALE: N.T.S.

DRAWN BY: J. Jones

DATE: 11-2-2001

CHECKED BY: Ed Deveau

UNLESS OTHERWISE SPECIFIED, ALL  
 DIMENSIONS ARE IN INCHES.  
 TOLERANCES: FRACT ± 1/32  
 .x ± .05 .xx ± .01 .xxx ± .005

A	11/01	Prod. Rev. I
REV.	DATE	CHANGE RECORD

SUB ASSEMBLY

CELLS 16-24 DUAL I/O HARNESS

DCM-480

SHEET 1 OF 1

DRAWING No.

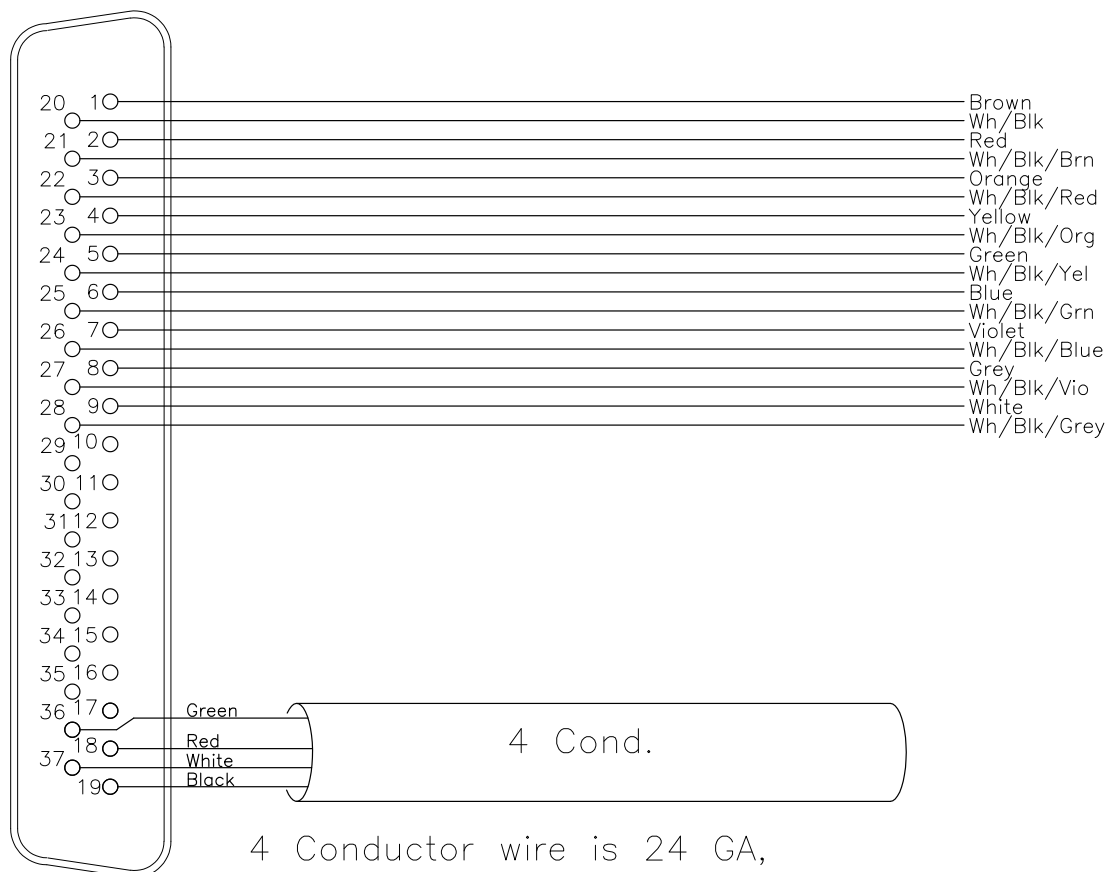
BDS-1136-A505

REV.

A

Alber P/N	Length
1101-173-50	50'
1101-173-XX	XX'

DB37(F)  
 (Cinch No. TC-37S)  
 (Alber No. 2104-071)  
 (Cinch No. SDH-37GFLCS)  
 (Alber No. 2104-074)



4 Conductor wire is 24 GA,  
 UL Style 2464, UL: 80°C, 300V.  
 End to be terminated  
 at installation.

All wires are 24 GA, 300V,  
 UL 1007, 19 strand.  
 End to be terminated  
 at installation.

**Alber**

Boca Raton, FL 33437-2813

MATERIAL: Sub Ass'y No. 1101-173

SCALE: N.T.S.

DRAWN BY: J. Jones

DATE: 11-2-2001

CHECKED BY: Ed Deveau

UNLESS OTHERWISE SPECIFIED, ALL  
 DIMENSIONS ARE IN INCHES.  
 TOLERANCES: FRACT ± 1/32  
 .x ± .05 .xx ± .01 .xxx ± .005

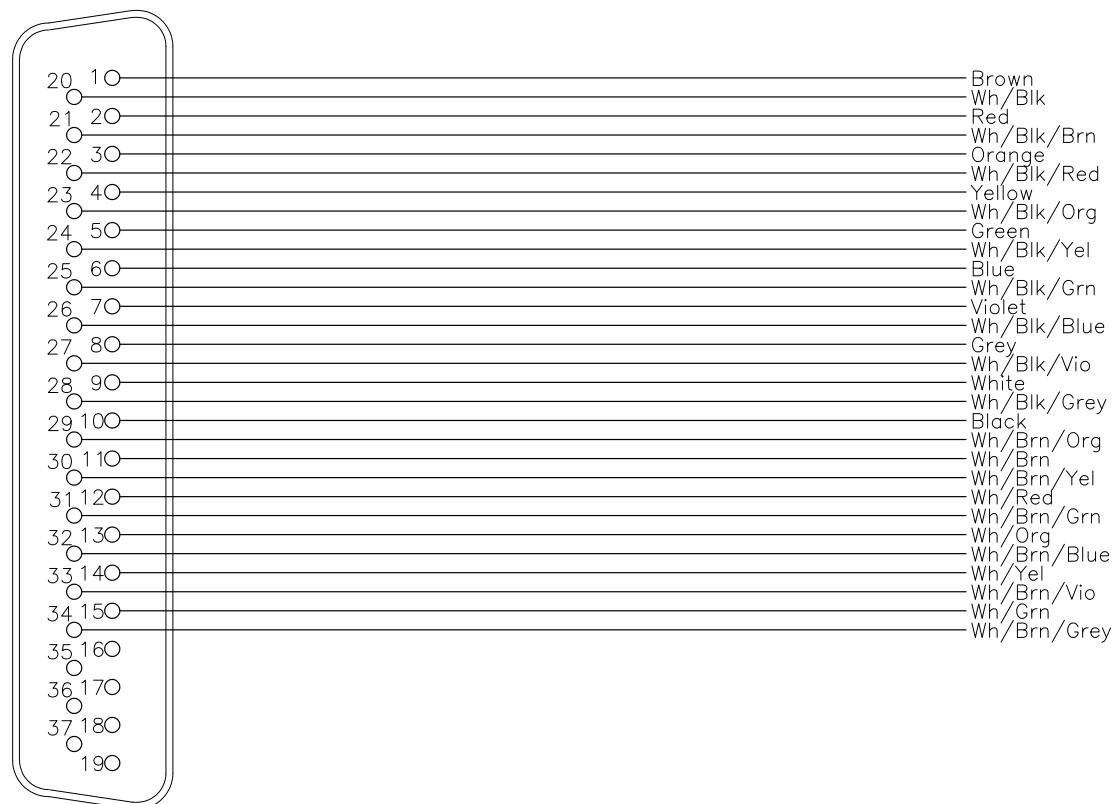
A	11/01	Prod. Rev. I
REV.	DATE	CHANGE RECORD

SUB ASSEMBLY  
 CELLS 16-24/TEMP. DUAL HARNESS  
DCM-480

SHEET 1 OF 1	DRAWING No. BDS-1137-A506	REV. A
--------------	------------------------------	-----------

Alber P/N	Length
1101-174-50	50'
1101-174-XX	XX'

DB37(F)  
 (Cinch No. TC-37S)  
 (Alber No. 2104-071)  
 (Cinch No. SDH-37GFLCS)  
 (Alber No. 2104-074)



NOTES: All wires are 24 GA, 300V,  
 UL 1007, 19 strand.  
 End to be terminated  
 at installation.

**Alber**

Boca Raton, FL 33437-2813

MATERIAL: Sub Ass'y No. 1101-174

SCALE: N.T.S.

DRAWN BY: J. Jones

DATE: 11-2-2001

CHECKED BY: Ed Deveau

UNLESS OTHERWISE SPECIFIED, ALL  
 DIMENSIONS ARE IN INCHES.  
 TOLERANCES: FRACT ± 1/32  
 .x ± .05 .xx ± .01 .xxx ± .005

A	11/01	Prod. Rev. I
REV.	DATE	CHANGE RECORD

SUB ASSEMBLY  
CELLS 25-39 DUAL I/O HARNESS  
DCM-480

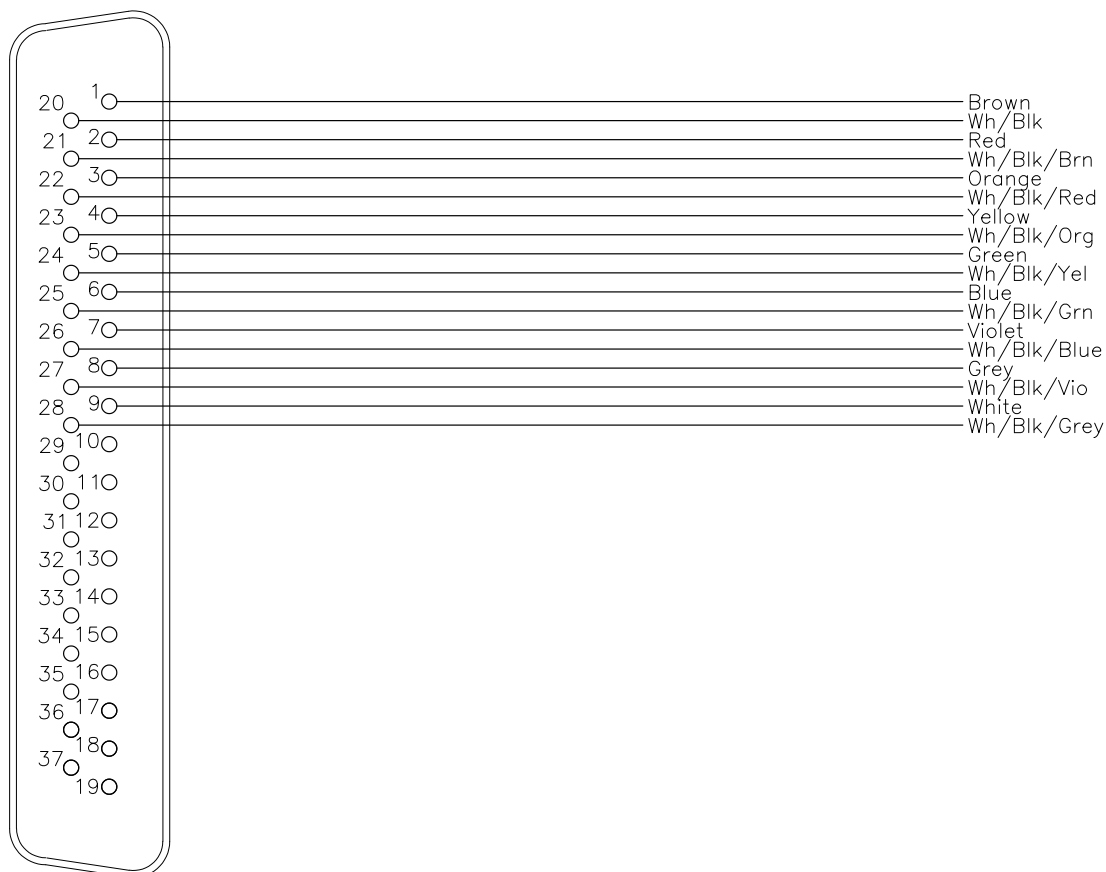
SHEET 1 OF 1

DRAWING No.  
 BDS-1138-A507

REV.  
 A

Alber P/N	Length
1101-175-50	50'
1101-175-XX	XX'

DB37(F)  
 (Cinch No. TC-37S)  
 (Alber No. 2104-071)  
 (Cinch No. SDH-37GFLCS)  
 (Alber No. 2104-074)



NOTES: All wires are 24 GA, 300V,  
 UL 1007, 19 strand.  
 End to be terminated  
 at installation.

**Alber**

Boca Raton, FL 33437-2813

MATERIAL: Sub Ass'y No. 1101-175

SCALE: N.T.S.

DRAWN BY: *J. Jones*

DATE: 11-2-2001

CHECKED BY: *Ed Deveau*

UNLESS OTHERWISE SPECIFIED, ALL  
 DIMENSIONS ARE IN INCHES.  
 TOLERANCES: FRACT ± 1/32  
 .x ± .05 .xx ± .01 .xxx ± .005

A	11/01	Prod. Rev. I
REV.	DATE	CHANGE RECORD

SUB ASSEMBLY  
CELLS 40-48 DUAL I/O HARNESS  
DCM-480

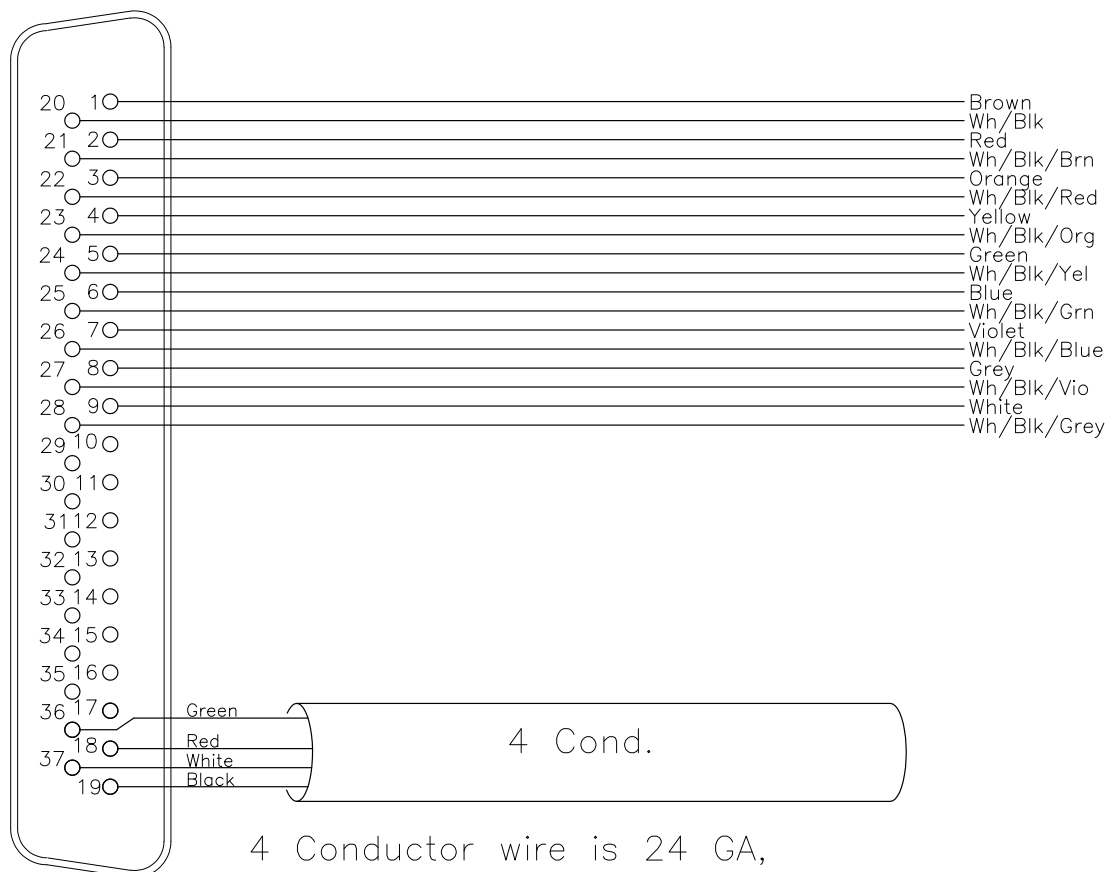
SHEET 1 OF 1

DRAWING No.  
 BDS-1139-A508

REV.  
 A

Alber P/N	Length
1101-176-50	50'
1101-176-XX	XX'

DB37(F)  
 (Cinch No. TC-37S)  
 (Alber No. 2104-071)  
 (Cinch No. SDH-37GFLCS)  
 (Alber No. 2104-074)



4 Conductor wire is 24 GA,  
 UL Style 2464, UL: 80°C, 300V.  
 End to be terminated  
 at installation.

All wires are 24 GA, 300V,  
 UL 1007, 19 strand.  
 End to be terminated  
 at installation.

**Alber**

Boca Raton, FL 33437-2813

MATERIAL: Sub Ass'y No. 1101-176

SCALE: N.T.S.

DRAWN BY: J. Jones

DATE: 11-2-2001

CHECKED BY: Ed Deveau

UNLESS OTHERWISE SPECIFIED, ALL  
 DIMENSIONS ARE IN INCHES.  
 TOLERANCES: FRACT ± 1/32  
 .x ± .05 .xx ± .01 .xxx ± .005

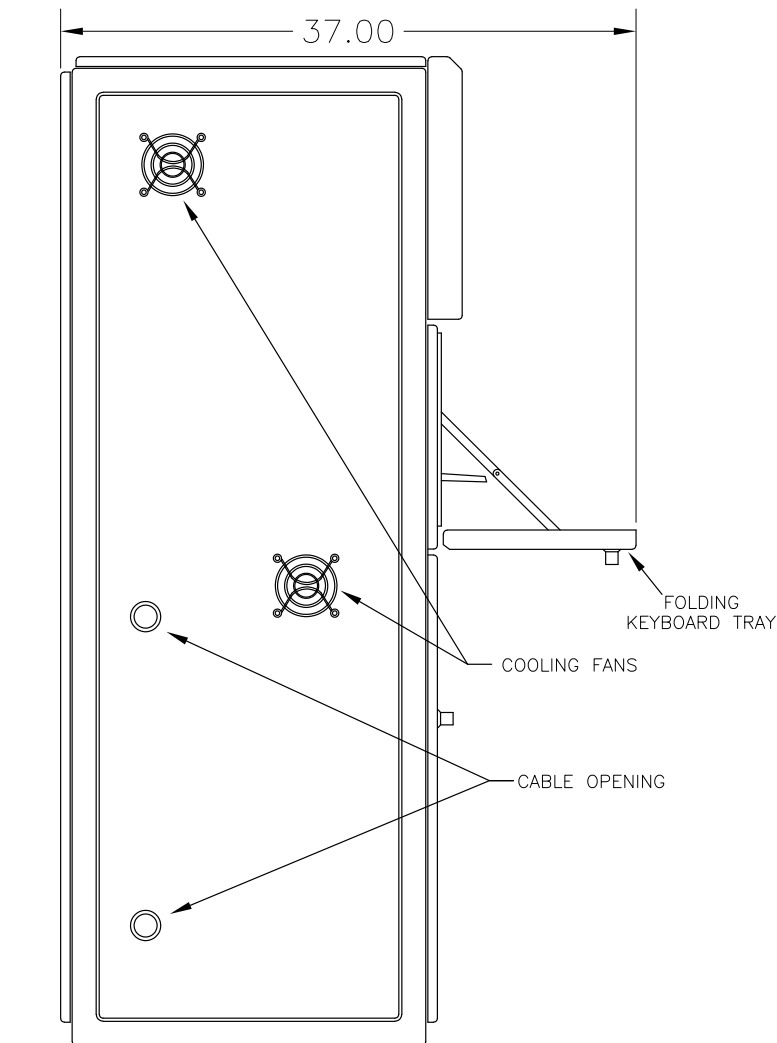
A	11/01	Prod. Rev. I
REV.	DATE	CHANGE RECORD

SUB ASSEMBLY  
CELLS 40-48/TEMP. DUAL HARNESS  
DCM-480

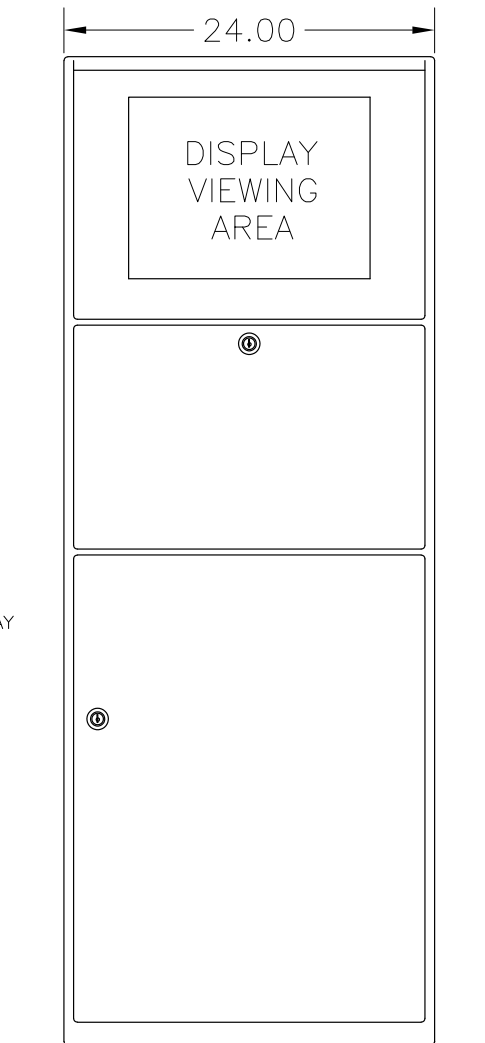
SHEET 1 OF 1

DRAWING No.  
 BDS-1140-A509

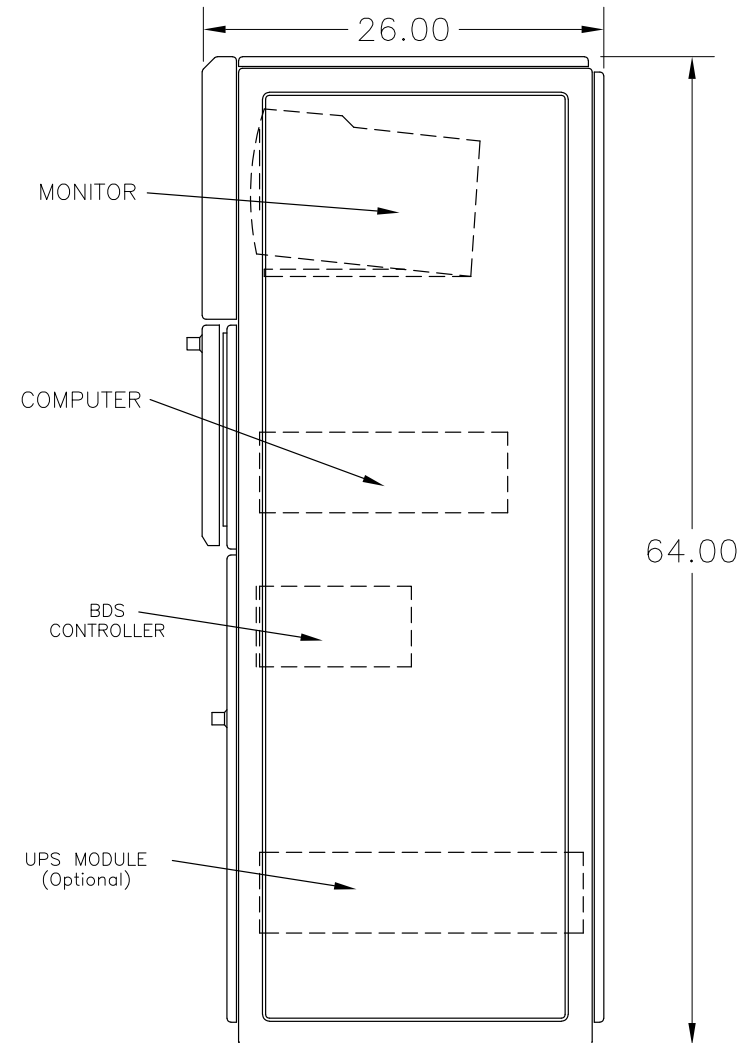
REV.  
 A




LEFT SIDE VIEW



FRONT VIEW



RIGHT SIDE VIEW

			UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES		<div>ALBÉR CORP. BOCA RATON, FL. 33487-2813</div>		
			TOLERANCES: ANGLES: ± 0.15' FRACTIONS: ± 1/32 DECIMALS: x ±05 xxd 01 xxx 005				
			SUB ASS'Y or PART No. : 1100-262		<div>GENERAL ARRANGEMENT</div> <div>BDS-256 MONITOR CABINET</div> <div>BATTERY DIAGNOSTIC SYSTEM</div>		
			MATERIAL:				
			SCALE: 1/8" = 1.00"	DRAWN BY: J. Jones	DRAWING NUMBER BDS-344-B629		
			DATE: 2-21-2001	CHECKED BY: Ed Deveau			
REV	DATE	CHANGE RECORD			SHEET 1 OF 1		REV.