



POWER DISTRIBUTION MODULE

INSTRUCTION MANUAL



SOLAR STIK™

POWER DISTRIBUTION MODULE

Safety Symbols

To reduce the risk of electrical shock, fire, or other safety hazard, the following safety symbols have been placed throughout this manual to indicate dangerous and important safety instructions.



WARNING: This symbol indicates that failure to take a specified action could result in physical harm to the user.



CAUTION: This symbol indicates that failure to take a specified action could result in damage to the equipment.



INFO: This symbol indicates information that emphasizes or supplements important points of the main text.



REMEDY: This symbol provides possible solutions for related issues.

Disclaimer of Liability

Since the use of this manual and the conditions or methods of operation, use and maintenance of the Mil-Series Power Distribution Module are beyond the control of Solar Stik™ Inc, this company does not assume responsibility and expressly disclaims liability for loss, damage or expense, whether direct, indirect, consequential or incidental, arising out of or anyway connected with such operation, use, or maintenance.

Due to continuous improvements and product updates, the images shown in this manual may not exactly match the unit purchased.

Restrictions on Use - Please refer to the individual product manuals for the limitations on product use. Specifically, please note that the Power Distribution Module can be used for connection with life support systems or other medical equipment or devices; however, without limiting the generality of the foregoing, Solar Stik™, Inc. makes no representations or warranties regarding the use of the Power Distribution Module in connection with life support systems or other medical equipment devices.

Important Product Safety Instructions

This manual contains important safety instructions that must be followed during the installation and operation of this product. Read all instructions and safety information contained in this manual before installing or using this product.

All electrical connections must be made using proper polarized connections.

While this product is designed for indoor / outdoor operation, the USER INTERFACE (control panel) must not be exposed to rain, snow, moisture or liquids.

This Power Distribution Module is not Field Serviceable. If service or repair is needed, contact Solar Stik™ Technical Support.

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Solar Stik™ System Introduction

The Solar Stik™ System operates using Direct Current (DC) Power. All power that flows in the circuit does so through a battery bank, and flows in or out of the battery only as is necessary to keep the appliances operating... we call this “POWER ON DEMAND”. The battery becomes the “heart” of the electrical circuit, and it ensures that the entire system operates at very high levels of “Efficiency”.

Manufactured and assembled in the U.S.A., all Solar Stik™ products are constructed with an extreme focus on quality. They are designed to meet the most demanding conditions and are ideal for employment in disaster relief, mobile communications, mobile emergency operation centers, military applications, research & security sectors, construction industries, off-grid applications, and recreational uses. Congratulations on your purchase.

MIL-Series Solar Stik™ System Introduction

The Mil-Series Solar Stik™ System offers enhanced operational features such as 24VDC operation, supplemental wind power generation, programmable controls, complex power management features, and additional accessories that enhance the versatility of the system. Solar Stik™ Mil-Series products feature environmentally sealed electrical components and additional internal gaskets that aid in preventing moisture and particle-intrusion.

Power Distribution Module (PDM™) - Manual Overview

This guide is crafted to provide the user with a comprehensive understanding of the principles of operation, proper setup & use, operational tips, & safety procedures for the Mil-Series 24VDC PDM™. Successful operation depends on a thorough understanding of how the PDM™ works.

Warnings and Precautions

Explosion Hazard



WARNING: DO NOT USE this product in an environment where flammable fumes or gases may be present, such as near propane tanks or enclosed containers where fuel, fumes, or hazardous chemicals are stored. Exercise great care to avoid arcing caused by a direct short circuit across 24VDC terminals with a metal object.

Fire Hazard



WARNING: Never make direct contact across a battery terminal posts with a conductive object; A direct short will cause burns, sparks, and possibly fire and/or explosion. Always disable the Terminal Posts at the Master Breaker when not in use.

Explosion and Fire Hazard: Lead-acid Battery Operated Device



WARNING: Follow all instructions published by the battery manufacturer and manufacturer of the equipment in which the battery is installed. Make sure the area is well ventilated. Never smoke or allow sparks or flames near lead-acid batteries. Be careful not to drop a metal object onto the battery terminals or allow a metal tool to simultaneously touch the “positive” and the “negative” terminals of the battery. This could cause burns, sparks, fire, or explosion. Remove all personal items such as rings, bracelets, necklaces, and watches when working with lead-acid batteries. The battery produces a short circuit current high enough to weld a ring or other similar objects to metal, causing a severe burn.

Correct Polarity

WARNING: Be sure that you connect any inverter to the proper DC Terminals using the correct polarity. Failure to connect to the terminals using correct polarity will blow the inverter fuse and potentially damage the unit.



CAUTION: Turn off the master breaker switch when not in use for long periods of time. It will drain the battery if left on without a source of charging current.

Explosion and Fire Hazard



WARNING: Only connect to the voltage terminals using correct polarity. Failure to do so may cause fire or explosion.

Environmental & Handling Precautions

(See figures on next page)

All Solar Stik™ components are ruggedized, yet there are a few things the operator can do to prevent failures and prolong the operational life of the Power Distribution Module.

This PDM™ functions best in sheltered locations; however, it can be operated outdoors with minimal risk under certain conditions.

Water

- The Solar Stik™ Power Distribution Module and other Solar Stik™ components are designed for outdoor operation, however, the interior components are not waterproof. During periods of inclement weather, the lid must remain closed and latched.

Impact

- All Solar Stik™ equipment is ruggedized for punishing conditions; however, equipment should not be dropped onto hard surfaces at a height greater than one foot when transporting or during operation.

Dust

- The PDM™ is designed for operation in climates where high levels of dust or other particulates may exist, however, basic care should be exercised to prevent particulates from entering the USB ports.

Setup Precautions

- Do not operate Power Management Systems in or around standing water.
- Do not lay power distribution cords (extension cords) in standing water.



Figure 1 - Water

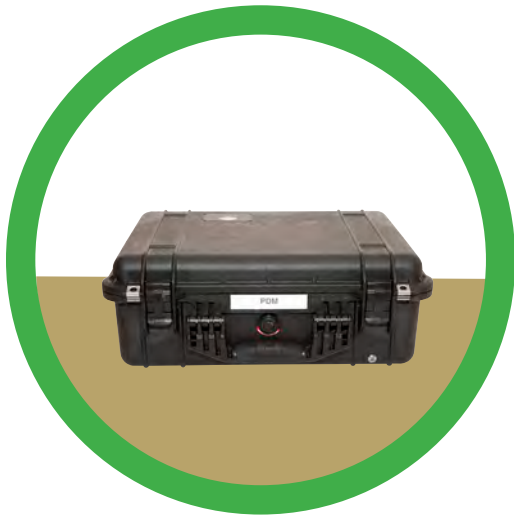


Figure 2 - Impact



Figure 3 - Dust

The Inter-Connection System

A key feature of the Solar Stik™ design is the “Inter-Connection System”. The System uses a unique set of polarized “Plug & Play” connections, called Inter-connector Plugs & Ports. These are used when connecting 24V DC components or batteries within the System’s architecture.

The Inter-connect Cable can be viewed as an “extension of the battery” through a DC circuit. In effect, it is a common “BUS”. It provides a convenient method to add or remove appliances, management devices, or even additional batteries in and out of a DC Network, or “micro-grid”.

The Inter-connection System is protected from overloads and short circuits through a network of circuit breakers strategically placed throughout the circuit. It ensures that the potential for a “reverse polarity connection” within the circuit is minimized. Mitigating against simple mistakes in the field provides significant benefits.

If a problem occurs in a leg of the Inter-connection circuit, the affected leg will disconnect from the primary network, leaving the other circuits functioning. If a major failure occurs in the circuit, then the entire network will shut down.

Additionally, the Inter-connection System allows setup and configuration of the circuit to be performed by one person in just a few minutes.

Inter-connect cables are supplied with certain Solar Stik™ System components such as PDM’s™, Expander Paks, Wind Stiks™, Power Hubs, PRO-Verters™, and PRO-Cells™.

The Inter-Connection System Serves Two Functions

1. Significant improvement of safety within the 24 Volt DC circuit.
2. Rapid assembly, modification, and scaling of the system architecture.

The Inter-Connector

- 100A Maximum Current
- DC connection only
- Plug mechanically “Locks” into place



Figure 4 - Inter-connector Plugs (Left - Mil-Series / Right - Pro-Series)

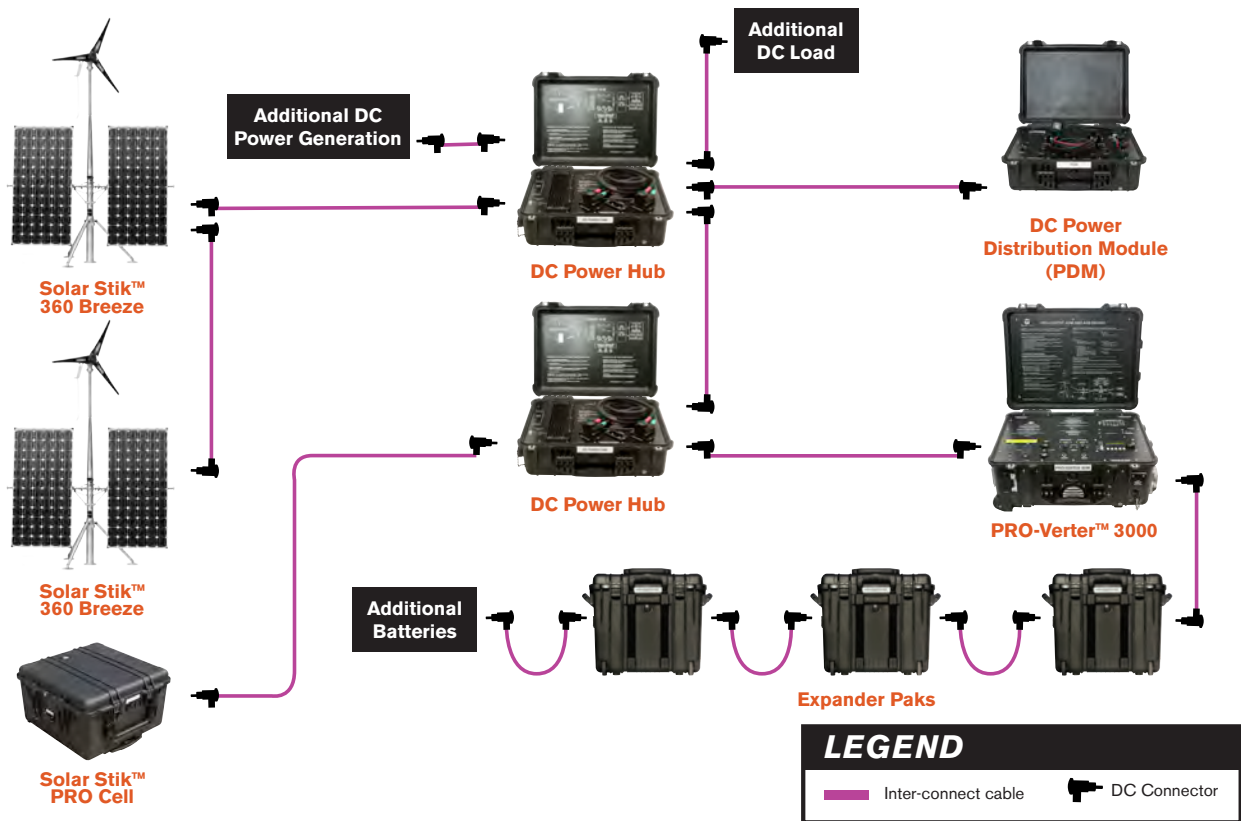


Figure 5 - Inter-connect System Example



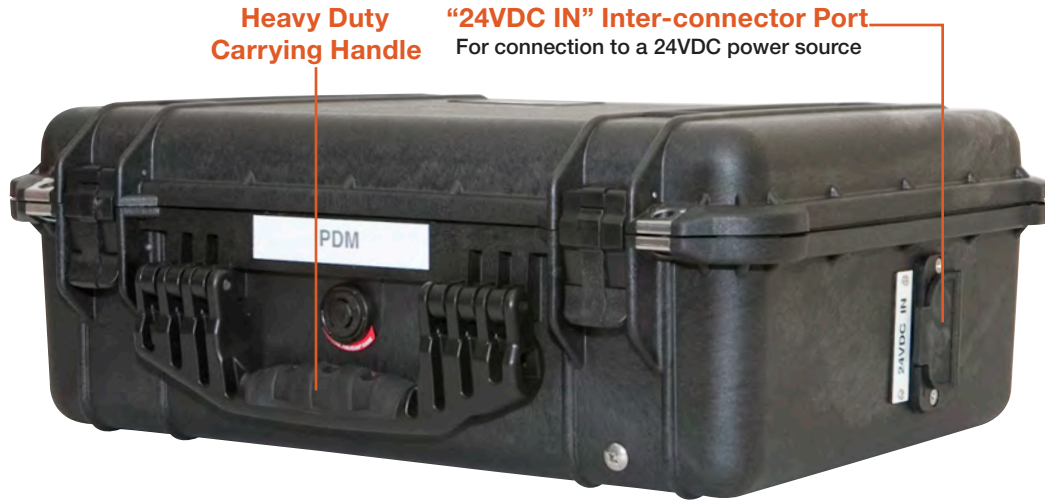
Figure 6 - Plugging In Inter-connect Cable

Power Distribution Module Features

- System Voltage Meter
- 50 Amp Master Breaker Switch
- Single “24VDC Input” Inter-connector Port
- Custom OEM PELICAN™ 1520 case
- Flexible light with clear or red lenses provides low-level lighting
- 24 Volt Post Terminals (30A current limit)
- Non-powered Inter-connect cable storage receptacles on faceplate
- 15 foot 24VDC Inter-connect Cable – for connection to 24VDC power source
- Twelve 5VDC USB Charging receptacles (2A max current each & resettable breaker)
- Twelve 12VDC Cigarette Lighter Adapter receptacles (5A max current each)



Case Exterior - View and Descriptions



Heavy Duty Carrying Handle

"24VDC IN" Inter-connector Port
For connection to a 24VDC power source



System Voltage Meter

Flexible Light with Reset Button

15' Inter-connect Cable Storage (unpowered)

5VDC USB Charger with Reset Button & LED Power Indicator

50 Amp Master Breaker/Switch

12VDC "Cigarette Lighter Adapter" Receptacles

24VDC Terminal Posts

Power Distribution Module Function

The Power Distribution Module (PDM™) provides multi-faceted DC power distribution capability to any 24VDC Solar Stik™ System.

The PDM™ is capable of powering or recharging 24VDC, 12VDC and 5VDC appliances simultaneously through a variety of connection points available on its faceplate.

The included 15' Inter-connector cable should be used to provide power from a suitable 24VDC source such as any Inter-connector port labeled with "LOAD" or "BUS" and the PDM™'s 24VDC power input port.

Additional methods of supplying 24VDC power to the PDM™ include connection to NATO vehicle 24VDC systems using Slave cables or direct connection to a 24V battery using Solar Stik™ Omni Cables.

A system voltage meter provides an indication that 24VDC voltage is available to power the PDM™, and that the unit's 50A Master Breaker Switch is turned on.

The faceplate contains two unpowered receptacles for convenient storage of the supplied 15' Inter-connect cable.

A flexible light with reset button is available for night-time operation.

Connecting the PDM to a 24V Power Source

The Mil-Series DC Power Distribution Module includes a single 15' Inter-connect Cable for connection between its "24VDC INPUT" port and any other Mil-Series Inter-connector port with a "LOAD" designation.



Figure 7 - 15' Inter-connect Cable

The Mil-Series PDM would connect to the Inter-connector port marked “LOAD/BUS/HUB” on the Mil-Series Power Hub Inter-Connector port.



Figure 8 -Connecting PDM to Power Hub “LOAD” port

The PDM™ can also be used with any Mil-Series Power Pak by connecting it to the “24VDC/WIND/LOAD” Port, or with any regulated 24VDC circuit such as a 24VDC vehicle.



Figure 9 -Connecting PDM to Mil-Series Power Pak “LOAD” port

The PDM can be connected to NATO 24VDC using Solar Stik™ Inter-connect-to-NATO Slave cable (6’ or 25’ cable sold separately – Item # 240046 & 240047)



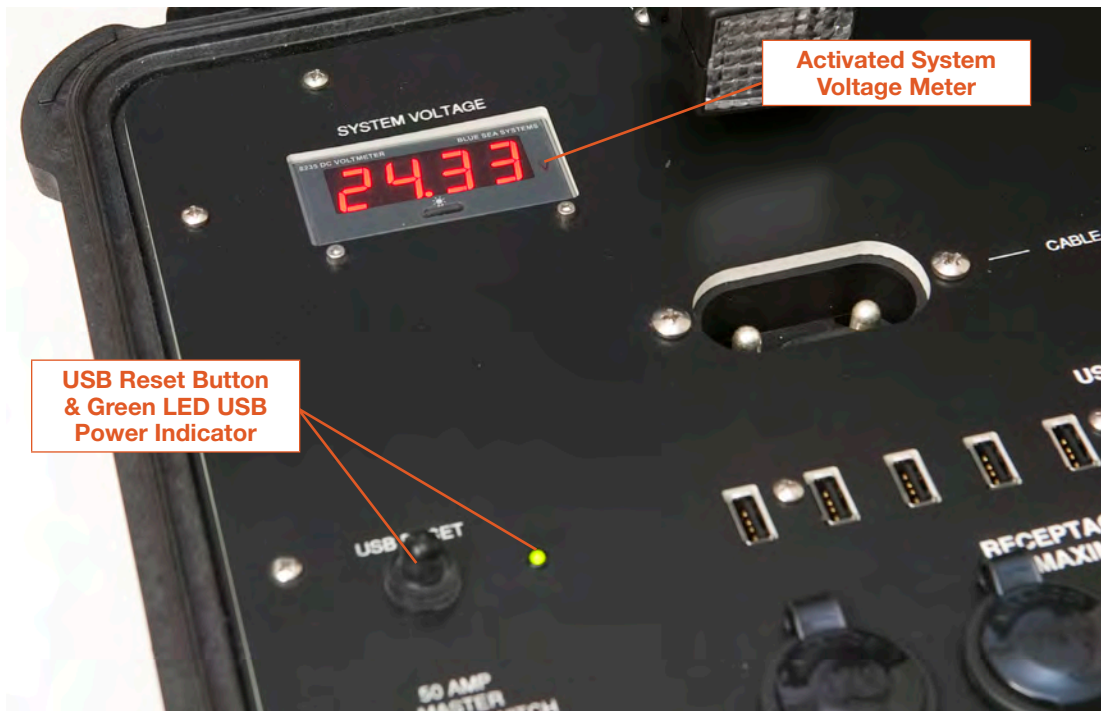
Figure 10 -NATO 24VDC to PDM

Normal Operating Voltage

The Power Distribution Module operates at 24VDC power levels. Normal operating Voltage ranges from 21.0 VDC to 29.0 VDC.

50 Amp “Master” Breaker/Switch

Following connection to a viable 24VDC power source and activation of the PDM’s™ 50A Master Breaker Switch, the unit will power up and its System Voltage Meter will illuminate.



NOTE: The PDM™ should be turned off when not in use to conserve energy and prolong battery life.

5VDC USB Power Ports

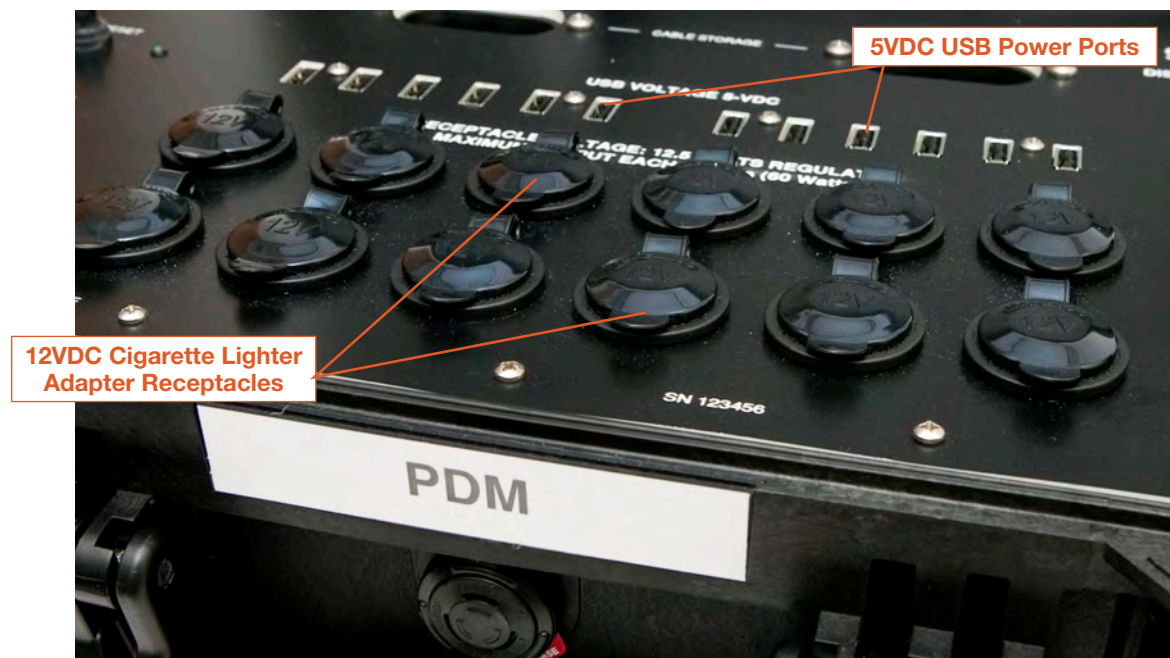
The Power Distribution Module provides twelve 5VDC Universal Series Bus (USB) ports that can be used for powering or recharging USB-powered devices. Each USB port is surge protected to prevent device damage due to “hot-swapping” and can provide up to 2A of charging current (10 watts of power) to each attached device.

A green LED illuminates on the PDM™ faceplate to indicate the presence of 5VDC USB power. A pushbutton reset switch is provided to reset the USB power supply in the event of an overload.

The USB power ports are not capable of transferring data between connected devices or the PDM™.

12VDC Cigarette Lighter Adapter (CLA) Receptacles

The Power Distribution Module is also equipped with an array of twelve 12V DC CLA receptacles for powering or recharging 12 volt DC appliances. Each receptacle provides regulated 12.5 Volts DC power output and is capable of supplying up to 5 amps of current (60 watts of power) to each attached device.



24VDC Terminal Posts

The Power Distribution Module has 24VDC terminal posts located on its faceplate that can be used to power or recharge a connected 24VDC appliance.

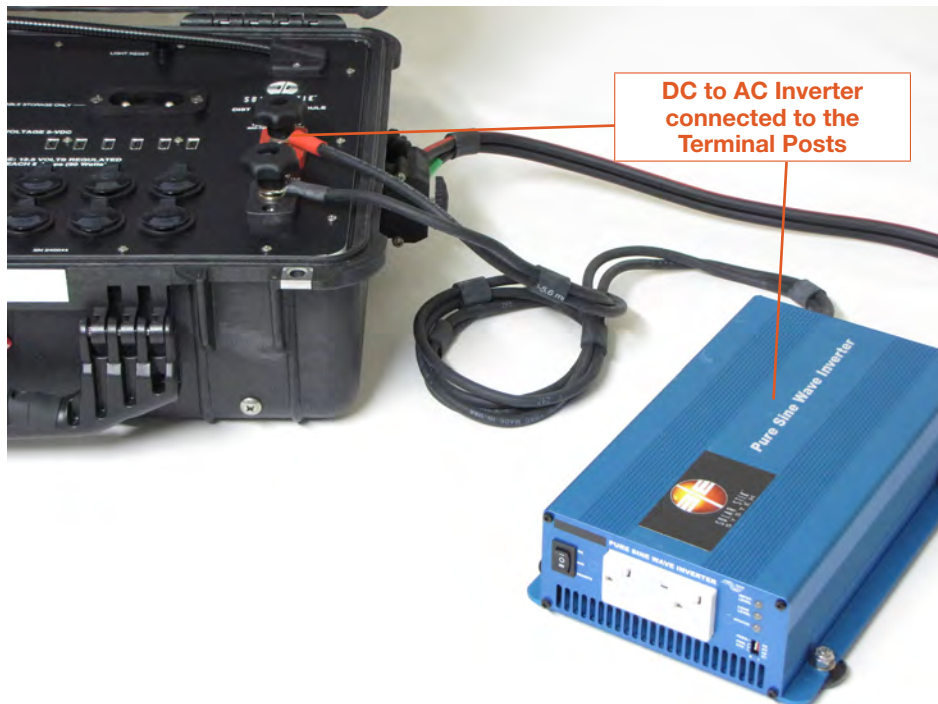
The 24VDC terminal posts can provide up to 30 amps of current (over 700 watts of power).



NOTE: A pair of color-coded (red-black) Ring Terminal Cables is included as standard accessories.



24VDC Terminal Posts



Environmental Impacts and the User Interface

The Power Distribution Module User Interface is NOT waterproof; however it can easily withstand exposure to moisture for short durations (dew or mist only. NO rain).

The PDM™ is designed for operation in climates where high levels of dust or other particulates may exist, however, basic care should be exercised to prevent particulated from entering the USB ports.

Water Intrusion - Draining the PDM™

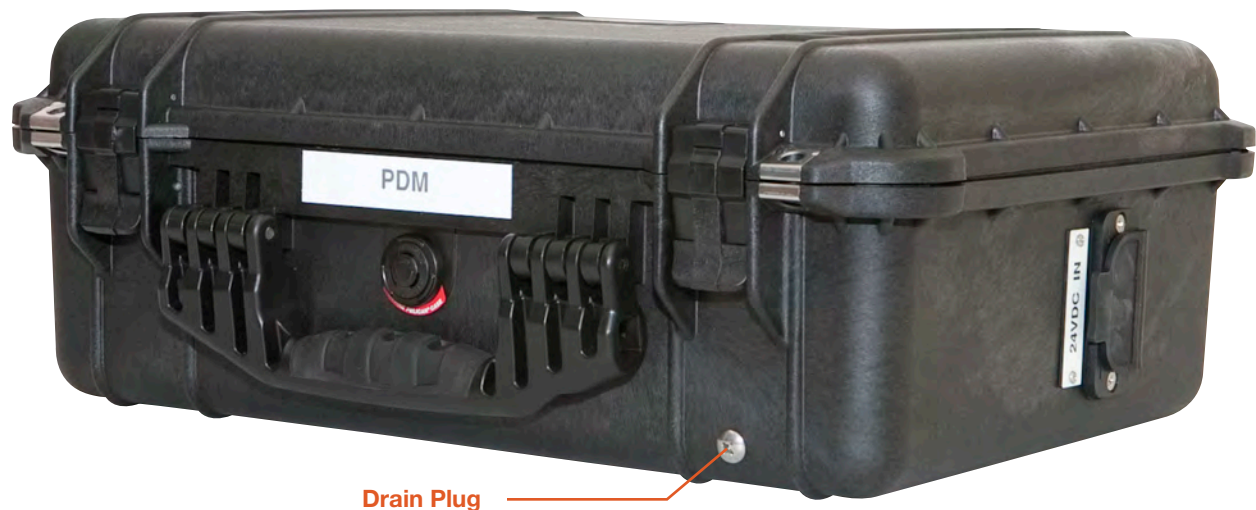
The PDM™ is only weather resistant when the lid is closed. If liquid is spilled onto the user interface, it will likely accumulate in the case. If this occurs, the water must be drained from the PDM™ BEFORE attempting to move it.

The electronics are mounted under the faceplate, and therefore, are at the highest internal location.

If water has intruded, and splashes around inside the case during transport, damage to the sensitive electronics will occur.

To drain water from the case, locate the drain plug on the low side of the front of the Pak. Remove the screw and water will evacuate the case. Once complete, the Pak will still need to be opened and dried out thoroughly. If no water has impacted the electronics, the unit can be returned to service.

If water has impacted the electronics, do not return the unit to service and notify Solar Stik™ Tech Support at the first opportunity.



Storing the 15' Inter-connect Cable

The 15' Inter-connect cable can be coiled and stored using the inactive ports on the faceplate



Transport

The PDM transports like a briefcase, and is safe for all modes of transportation, including land, sea, and air. There are no restrictions regarding travel.



Technical Specifications

Specifications

USB	(12) Interior USB Ports 2 amps (5VDC) output per port
12V Receptacle	(12) Interior 12V receptacles at 60 watts each (12.5 volts regulated)
Normal Operating Voltage	21.0 to 29.0 volts DC
Post Terminals	24 volt post terminals (interior) with ergonomic twist knobs
Case	Custom Pelican™ 1520 case with spares/cord pouch
Inter-connect Ports	(1) Exterior 24VDC Inter-connector port
Breakers	- 50 amp Master circuit breaker supports maximum load of 1200 watts - Full circuit protection with resettable breakers on User Interface
Meters	Digital “System” voltage meter indicates supply Voltage
Operating temperatures	00 °C to +40 °C (32 °F to +104 °F)
Weight	27 lb (12.2 kg)
Dimensions	19.78” x 15.77” x 7.41” (50.2 x 40 x 18.8 cm)
Cables	15’ (4.6 m) Mil-Series Inter-connect Cable
Warranty	1 year “materials and workmanship”

Warranty

Solar Stik™, Inc. warrants the complete Power Distribution Module (PDM™) against workmanship and assembly defects for one year.

In order to simplify and expedite your repair, warranty service may be arranged through Solar Stik™, Inc. Simply notify us, and at our discretion, we will repair the Power Distribution Module at our facility, or send out a warranty technician to your location.

Depending on the environment in which the Power Distribution Module is employed, normal wear and tear to a certain degree will occur. Solar Stik™, Inc. will not cover normal wear and tear of the product or costs related to the removal, installation, or troubleshooting of the customer's electrical systems. There is No Warranty against the following:

1. The Power Distribution Module if it has been misused, neglected, improperly installed, physically altered or damaged, either internally or externally, or damaged from improper use or use in an unsuitable environment.
2. The product if it has been subjected to fire, water, generalized corrosion, biological infestations, or input voltage that creates operating conditions beyond the maximum or minimum limits listed in the manufacturer's individual product specification, including high voltage input from generators and lightning strikes.
3. The Power Distribution Module, if repairs have been done by any one other than Solar Stik™, Inc. In no event will Solar Stik™, Inc. be liable for any special, indirect, incidental, or consequential damages, losses, costs or expenses however arising whether in contract or tort including without restriction any economic losses of any kind, any loss or damage to property, any personal injury, any damage or injury arising from or as a result of misuse or abuse, or the incorrect installation, integration, or operation of the product.

Pelican™ Case Warranty

Pelican™ Warranty applies to repairs/replacement of the Pelican Case only – The Expander Pak is constructed into a Pelican™ Case. Most case replacement of broken parts or repairs can be performed in the field; however, if entire case requires replacement, labor costs may be incurred.





SOLAR STIK™

Please Consult the Solar Stik™ Website for additional education on 12 or 24 volt DC and 120 volt AC systems. Available for download are:

- Watts, Volts, & Amps... Basic Electricity
 - Solar School
 - Battery School
 - Inverter School
- ...and more!

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