



Mobile Data Power Model: MDP-25.0 Installation/Operation

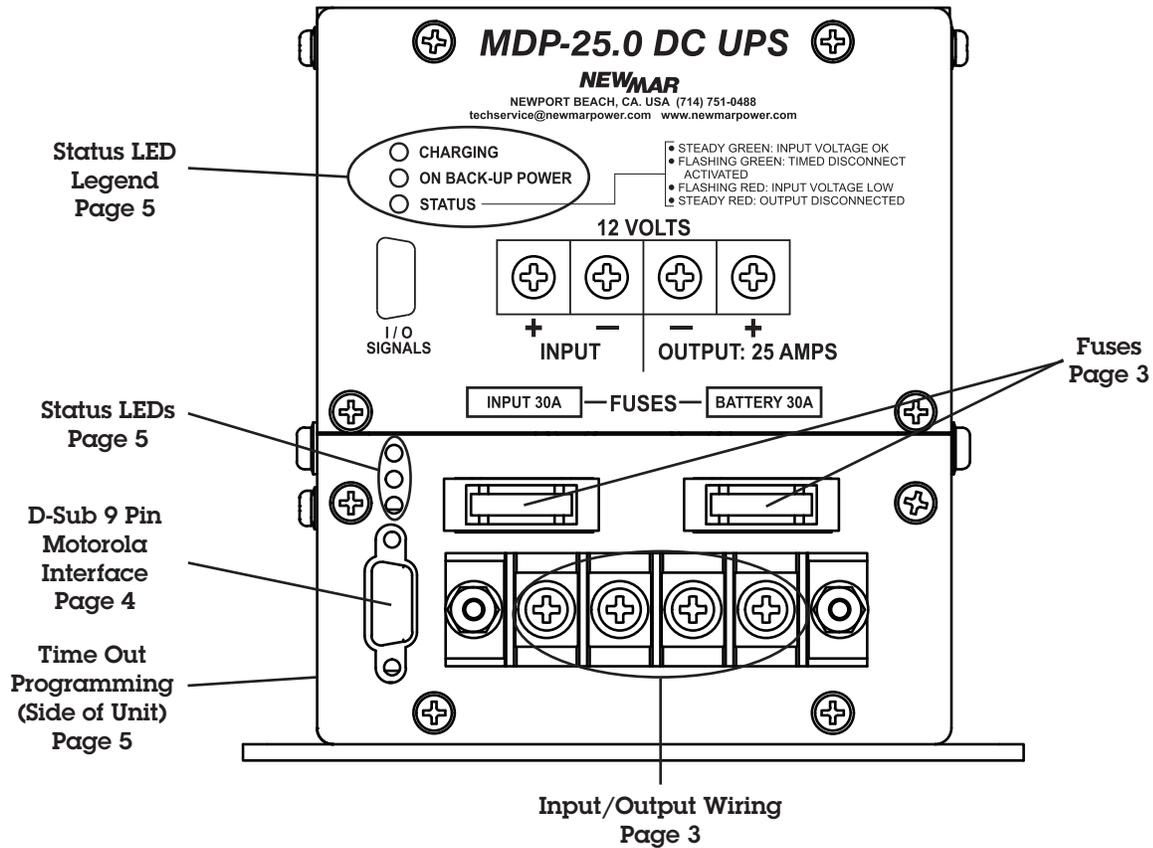
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M-MDP25.0
As of 041714



Powering the Network™
www.newmartelecom.com

Quick Reference Guide

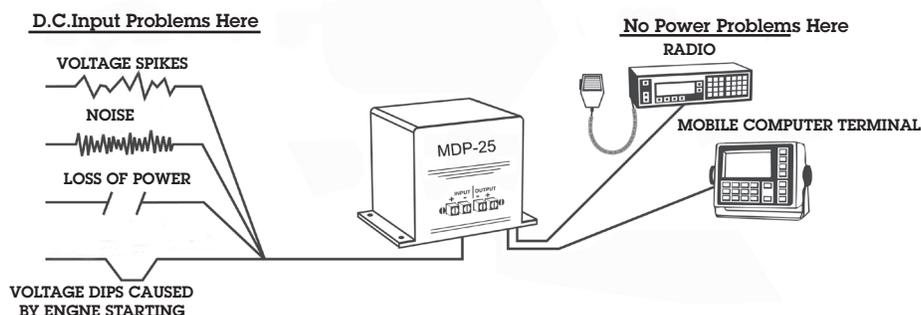


Features:

- Protects mobile computers against system crash preventing lengthy reboot sequences and loss of data due to:
 - Voltage dip during engine cranking.
 - Voltage drop and decay due to loading high power accessories and aging batteries.
- Provides supplemental voltage in milli-seconds to mobile computers when low vehicle battery is sensed, ensuring no interruption in power.
- Back-Up Battery maintains DC output voltage during dips and black-outs — preventing memory loss and system crashes in mission critical mobile electronics. Internal back-up battery automatically switches online when the vehicle's battery voltage reaches 10.0 VDC. Vehicle battery auto-reconnects when vehicle voltage reaches 11.5 VDC or higher.
- Internal Battery Charger
 - Built-in, 3-Stage temperature compensated battery charger maintains internal battery at full charge, ready to provide back up power for an extended period.
 - Noise filter eliminates electronic noise and interference, providing clean power required by mobile electronics for proper operation.
- Overvoltage transient protection prevents damage to sensitive circuitry due to voltage line spikes.
- When activated, load disconnect timer (TMR) eliminates dead vehicle batteries caused by power drain from radios and mobile data terminals that must operate while the engine is off. Allows use of accessory loads per programmed time limit (user adjustable) while preserving battery for emergency starting. Factory default is not active, see page 5.
- Built-in LVD (Low Voltage Disconnect) activates when the internal back-up battery reaches 9.6VDC; protecting the internal battery from complete discharge.
- Power conserving circuitry places internal charger in sleep mode after approximately 30 minutes once charger switches to float mode. Sleep mode duration adjustable (factory default is 6 hours), then charger comes back online to charge and float battery for a minimum of 30 minutes before sleep mode is restarted. **Note:** Sleep mode is delayed if back-up mode is detected before the 30 minutes has elapsed. Once again, when charger reaches float mode the 30 minute delay starts.
- Alerts when system is operating on battery back-up.
- Power Status indicators provide visual system operational status/disconnect timer activation/troubleshooting.
- Conformal coated printed circuit board resists corrosion.
- Rugged, rust and corrosion resistant powder coated aluminum case provides protection for components.
- All components selected for dependable performance in hostile environments.
- Two year limited warranty.

Motorola Work Station Features

- Provides output warning signals to mobile computers (such as Motorola® MW800 series work stations and video recording system cameras).
- Initiates low voltage shut down sequence in mobile computers protecting data and hard drive.



MATERIALS PROVIDED

The MDP-25.0 is supplied with the following materials:

- (4) # 8 ring lugs for 8 gauge wire
- (1) Terminal block cover (attached)
- (1) Installation/Operation Manual

Check to see that these have been included with the packaging. For any missing items, please contact Factory.

INSTALLATION

Mechanical:

Locate a flat surface close to the power line that feeds the electronics. For best results, the MDP should be within 24" of the critical electronics. The case need not be grounded, so it is acceptable to mount the unit on wood or metal. Securely mount the unit in any orientation, however horizontal is best. **Note:** In order to ease future battery replacement, it is recommended that the front of the MDP remain un-obstructed.

Power:

Input wiring:

- 1) Remove both Input and Output fuses on MDP (ATC-30 x 2) before installation. Remove terminal block cover.
- 2) Turn off the power on the input wires by disconnecting the battery or shutting off the appropriate circuit. Note, the MDP functions as an uninterruptable power source. If electronics are wired directly to the MDP output and the primary feed voltage to the MDP is via an ignition switch, when the switch is turned off the MDP will continue to power the load until its internal battery reaches a low voltage disconnect point.
- 3) Identify the positive and negative lead in the power line and cut at an appropriate location. Use the lugs supplied, wire the input to the MDP – note it is recommended that the input be fused at the source, see illustration below.

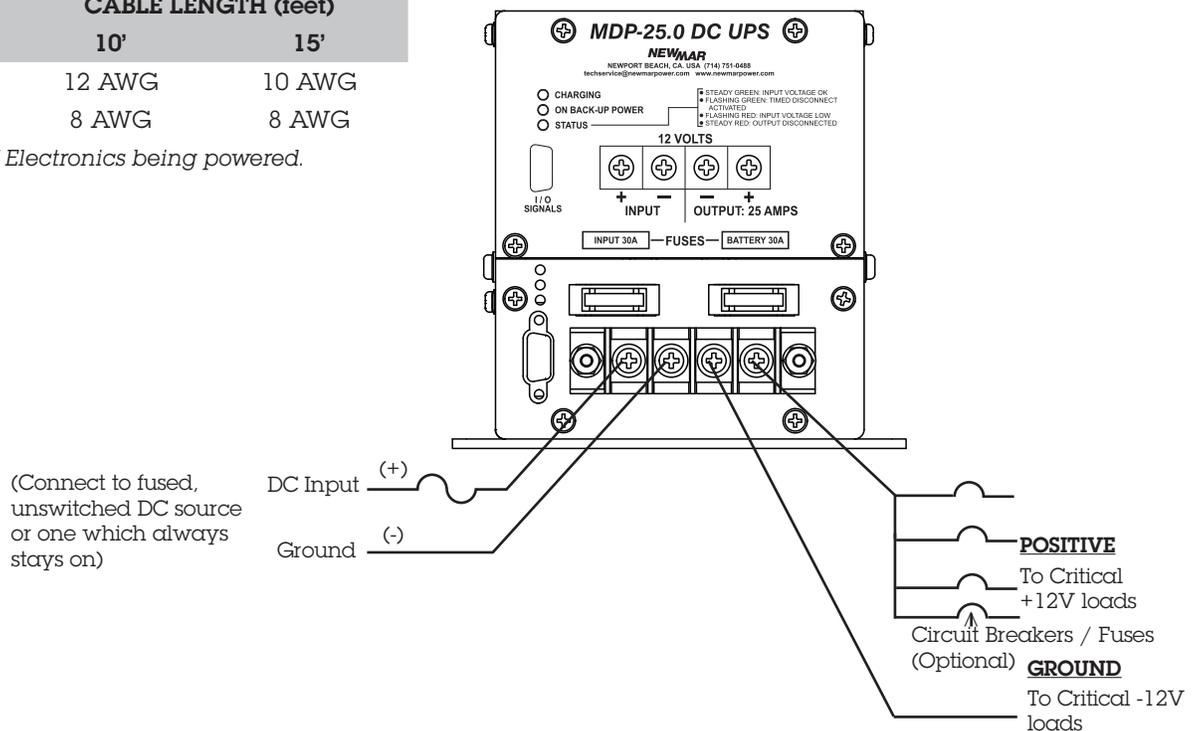
Output wiring:

Using the table below, select the proper wire size for your installation and attach to terminal block. Four rings lugs for 8 AWG wire size are included with the MDP-25.0. Replace terminal block cover to prevent accidental shorting of the terminals.

AMPS*	CABLE LENGTH (feet)	
	10'	15'
0 - 10 AMPS	12 AWG	10 AWG
10 - 25 AMPS	8 AWG	8 AWG

* Current draw of Electronics being powered.

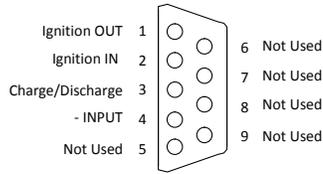
Fig. 1: Input and Output Wiring



Motorola Output Signals:

The MDP is programmed to provide early warning signals to mobile data computers designed for this input (such as Motorola® MW 800 Series workstations and video recording system cameras .) Interface signals for this output is located on the D-sub 9 pin connector per the following pin out (please contact factory for mating connector with pigtails, part number 425-5233-0):

Fig. 2: Input/Output Signals (D-Sub 9 Pin) - Motorola Apps.



Signal Key:

- 1) Ignition OUT: to be connected to MDT interface with signal which initiates startup and shutdown sequence of computer.
- 2) Ignition In
- 3) Charge/Discharge Signal: used to signal computer that power is coming from back-up battery. Active LOW (<2V)
- 4) - Input: Ground

OPERATION

Under normal operating conditions, the electronics operate from primary battery voltage of the vehicle or vessel. This same voltage powers the internal battery charger that maintains the MDP internal battery in a fully charged state. The charger circuit operates on an input range of 10.2 - 15.5 volts, so even if the primary battery voltage decays the MDP internal battery will receive proper voltage and be maintained at full charge. The internal charger has a rapid recovery, three step output and temperature compensation sensor that varies the charge voltage based on ambient temperature to prolong battery life.

A fast acting sense circuit connects the internal battery online to the electronics any time when the input voltage drops below 10.5 volts or total interruption of voltage occurs augmenting voltage to the electronics for 3 seconds. If proper primary voltage is not restored within the 3 second time frame, input from the vehicle battery disconnects and electronics operate entirely from the MDP reserve battery (see settings sections for variations on this function).

The internal MDP battery will continue to supply power until primary vehicle or vessel battery voltage is restored (> 12.0 volts) or to the point where the MDP internal battery discharges below 9.6 volts, at which time a low voltage disconnect energizes, shutting off all power to the MDP output. When primary vehicle or vessel voltage is restored, the internal battery will begin to recharge and be available for reserve power after voltage is restored to >13.5 volts (approx 120 minutes from fully discharged state)

Important Note: The MDP function is that of an uninterruptable power source, so if electronics are wired directly to the MDP output and the primary feed voltage to the MDP is via an ignition switch, when the switch is turned off the MDP will continue to power the load until its internal battery reaches a low voltage disconnect point. Ideally the power to the MDP should be left on. If the vehicle is left for an extended period, the powered electronics should be shut off to conserve the primary battery. The MDP has a power conservation "sleep mode" that initiates and turns off the 3 stage charger when the unit senses float charge for more than 20 minutes. For long term storage, remove loads from MDP output and remove input and battery fuses.

CAUTION: DO NOT LEAVE THE BATTERY DISCHARGED FOR EXTENDED PERIODS OF TIME. IT MAY BE PERMANENTLY DAMAGED AND MAY NOT TAKE A RECHARGE.

CAUTION: IF RE-INSTALLING FUSES AFTER VEHICLE BEING 'OUT OF SERVICE', ALLOW FOR 2 HOURS TO CHARGE THE INTERNAL BATTERY BEFORE MDP IS PUT INTO SERVICE.

Status LEDs

Refer to the illustration below for location of the front panel status indicator lights:

1. 'CHARGING' Green LED activates when charge-mode begins or, INPUT power is applied for the first time and indicates Back-up battery is being charged.

Charging	
Color	Status
AMBER	Bulk/Hi Rate
GREEN	Float
OFF	Charger Off
Flashing RED	Charger Over-Temp

Status LED Legend refers to

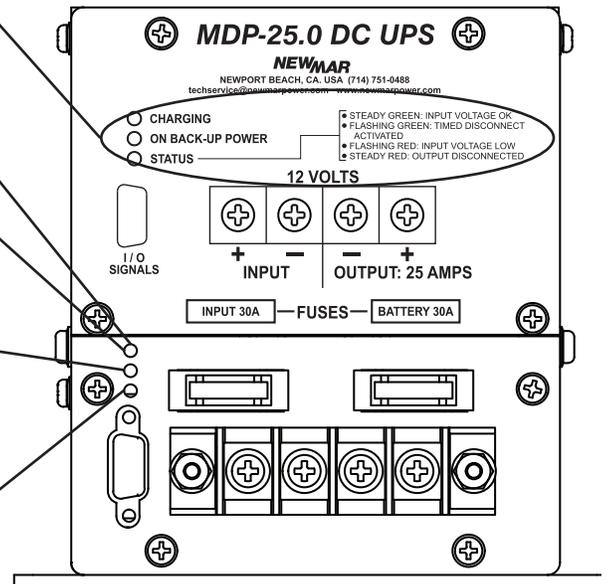
Fig. 3: Status LEDs

2. Amber 'ON BACK-UP POWER' LED indicates Back-up battery providing power to OUTPUT

On Back-Up Power	
Color	Status
AMBER	Input below 10.5 VDC

3. 'INPUT CONNECTED' Green LED activates when INPUT > 10 volts and indicates INPUT is providing power to OUTPUT.

Status LED Operation	Status
Steady GREEN	Input voltage range normal/OK
Flashing GREEN	Disconnect Timer (TMR) Activated
Flashing RED	Input voltage range abnormal
Steady RED	Output disconnected-TMR timed out



Settings: Modifications can be made to disconnect points and timer circuits, see page 6 for Time Delay Settings.

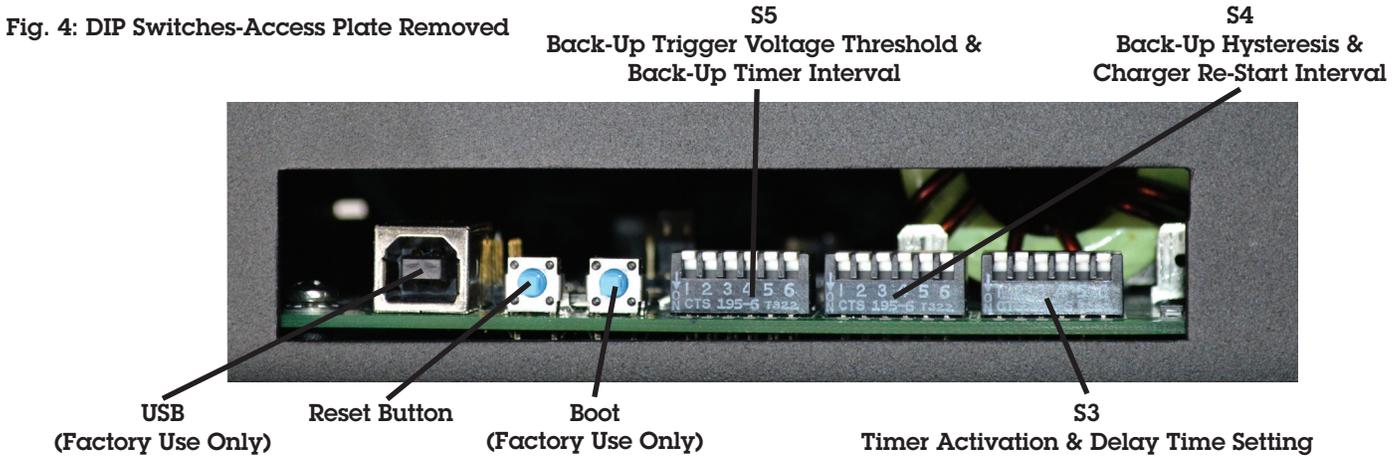
Internal Battery Charger Operation

The internal lead-acid battery is charged by a 3 stage charger with automatic temperature compensation (30 mV/° C from 25° C). When the internal battery goes through a discharge cycle the charger is automatically brought online and charges the battery. Initially the charging voltage increases to produce a constant current of approximately 1.8 amps to the battery (stage 1 - bulk rate). Once the battery voltage reaches approximately 14.2 volts, the charging current will start to reduce. The voltage will remain at 14.2 volts (stage 2 - high rate/absorption charge) until the current to the battery decreases to approximately 0.5 amps. The output voltage is then reduced to approximately 13.6 volts (stage 3-float charge) and remains there for a fixed time of approximately 1 hour after which the charger is turned off. The charger will periodically re-start to top off the battery. (The charger re-start time interval is adjustable, see Advanced Settings page 7). Complete charging cycle of fully discharged battery is approximately 3-4 hrs. Charger over-temperature protection: The battery charger circuit will automatically switch to reduced float voltage if the MDP internal temperature reaches 55° C. The over-temperature protect circuit will automatically reset once internal temperature reduces to approximately 50° C

Disconnect Timer (TMR) Operation

The MDP-25.0 incorporates an optional timed load disconnect feature (TMR). When activated the timer will begin timing when the vehicle battery drops to 12.0 VDC or less. If the ignition override feature is wired to the ignition switch (J1 pin 2, 'Ignition IN'), it will disable the TMR timed disconnect as soon as it senses 2 volts or greater. To enable the TMR feature and select a disconnect time period via the DIP switches, you must do following:

1. If the MDP-25.0 is already installed, turn off all 12 volt loads connected to the output and disconnect the 12 volt input. If unable to remove power first, make the DIP switch changes and then capture the changes by pressing the RESET button once.
2. Access the DIP switches by removing two Phillips head screws securing the access plate located on the side of the unit (left side if looking at the front of MDP).



3. To activate TMR feature: Move S3 group number 6 switch to the "ON" position (downwards).
4. Setting time delay: S3 group numbers 1 - 4 sets the delay time per Table 1 below when the MDP senses the vehicle battery has fallen to 12 volts or less. The timer will reset or stop timing when the voltage sensed is 13.5 volts or greater, example: engine alternator charging. See Table 1 below for time delay choices.
5. Note that the TMR feature is disabled if the 'Ignition-IN' pin (Pin 2 of the D-sub 9 pin connector on front panel, see Figure 2) is connected to a voltage greater than 2 volts (i.e. +battery). Back-up function will still operate even when the timer is activated, however; the load will still be removed after the TMR timer has timed out, even if the back-up battery is able to support the output load.

Table 1: Time Delay Settings

S3	Pos 1	Pos 2	Pos 3	Pos 4	Pos 5	Pos 6
Timer Disabled	X	X	X	X	X	OFF
10 Minutes	OFF	OFF	OFF	OFF	X	ON
15 Minutes	ON	OFF	OFF	OFF	X	ON
18 Minutes	OFF	ON	OFF	OFF	X	ON
24 Minutes	ON	ON	OFF	OFF	X	ON
30 Minutes	OFF	OFF	ON	OFF	X	ON
45 Minutes	ON	OFF	ON	OFF	X	ON
1 Hr	OFF	ON	ON	OFF	X	ON
1.5 Hr	ON	ON	ON	OFF	X	ON
2 Hrs	OFF	OFF	OFF	ON	X	ON
3 Hrs	ON	OFF	OFF	ON	X	ON
4 Hrs	OFF	ON	OFF	ON	X	ON
8 Hrs	ON	ON	OFF	ON	X	ON
10 Hrs	OFF	OFF	ON	ON	X	ON
11 Hrs	ON	OFF	ON	ON	X	ON
12 Hrs	OFF	ON	ON	ON	X	ON
13 Hrs	ON	ON	ON	ON	X	ON

X = Either On or Off - it makes no difference

On = Down

Off = Up

**Advanced settings (Technician Recommended): Back-Up Timer, Trigger Threshold and Hysteresis
Factory Defaults**

Setting	Factory Default
TMR Disconnect Time	Not activated
Back-Up Timer (battery)	15 min.
Back-Up Trigger Voltage	10.5V
Back-Up Hysteresis	1V
Charger Re-Start Interval	6 hrs.

1. DIP switch group S5, switch numbers 1 - 3 are for changing the **Back-Up Timer Interval** (See Table 2). This adjustment sets the amount of time the MDP's internal back-up battery remains connected to the output/load when a low voltage event is detected.

2. DIP switch group S5, switch numbers 4 - 6 are for changing the **Back-Up Trigger Voltage Threshold** (See Table 3). This adjustment sets the voltage at where the internal battery is applied to the output/load and the input source (vehicle battery) is disconnected.

3. DIP switch group S4, switch numbers 4 - 6 are for changing the **Back-Up Hysteresis** (See Table 4). Hysteresis sets a voltage level above the back-up trigger level for the reconnection of input source and disconnection of internal battery (see table 4). Hysteresis should be set after determined the amount of voltage drop from the DC source (vehicle battery) to input terminals of the MDP, when the intended output load current is at its maximum level. *Note: Remember to take into account at least 2 amps for internal charger. The internal charger can draw approximately 2 amps from the input source to charge the internal back-up battery if it is deeply discharged.*

4. DIP switch group S4, switch numbers 1- 3 are for changing the **Charger Re-start Interval** (See Table 5). The charging time of the internal battery is not settable; it is dictated by the battery state of charge, battery condition and temperature. In order to reduce the current drain on the vehicle battery the internal battery charger turns OFF once it completes a charging cycle. However the time at which the charger will turn back on to refresh the charge on the internal battery is adjustable.

Table 2

S5 - Back-Up Timer	Pos 1	Pos 2	Pos 3
15 Minutes	OFF	OFF	OFF
30 Minutes	ON	OFF	OFF
1 Hr	OFF	ON	OFF
2 Hrs	ON	ON	OFF
3 Hrs	OFF	OFF	ON
4 Hrs	ON	OFF	ON
5 Hrs	OFF	ON	ON
6 Hrs	ON	ON	ON

Table 3

S5 - Back-Up Trigger	Pos 4	Pos 5	Pos 6
10.5 Volts	OFF	OFF	OFF
11.0 Volts	ON	OFF	OFF
11.2 Volts	OFF	ON	OFF
11.4 Volts	ON	ON	OFF
11.6 Volts	OFF	OFF	ON
11.8 Volts	ON	OFF	ON
12.0 Volts	OFF	ON	ON
12.2 Volts	ON	ON	ON

Table 4

S4 - Back-Up Hysteresis	Pos 4	Pos 5	Pos 6
1 Volts	OFF	OFF	OFF
1.2 Volts	ON	OFF	OFF
1.4 Volts	OFF	ON	OFF
1.6 Volts	ON	ON	OFF
1.8 Volts	OFF	OFF	ON
2.0 Volts	ON	OFF	ON
2.2 Volts	OFF	ON	ON
2.4 Volts	ON	ON	ON

Table 5

S4 - Charger Re-Start Interval	Pos 1	Pos 2	Pos 3
6 Hrs	OFF	OFF	OFF
7 Hrs	ON	OFF	OFF
8 Hrs	OFF	ON	OFF
9 Hrs	ON	ON	OFF
10 Hrs	OFF	OFF	ON
12 Hrs	ON	OFF	ON
24 Hrs	OFF	ON	ON
48 Hrs	ON	ON	ON

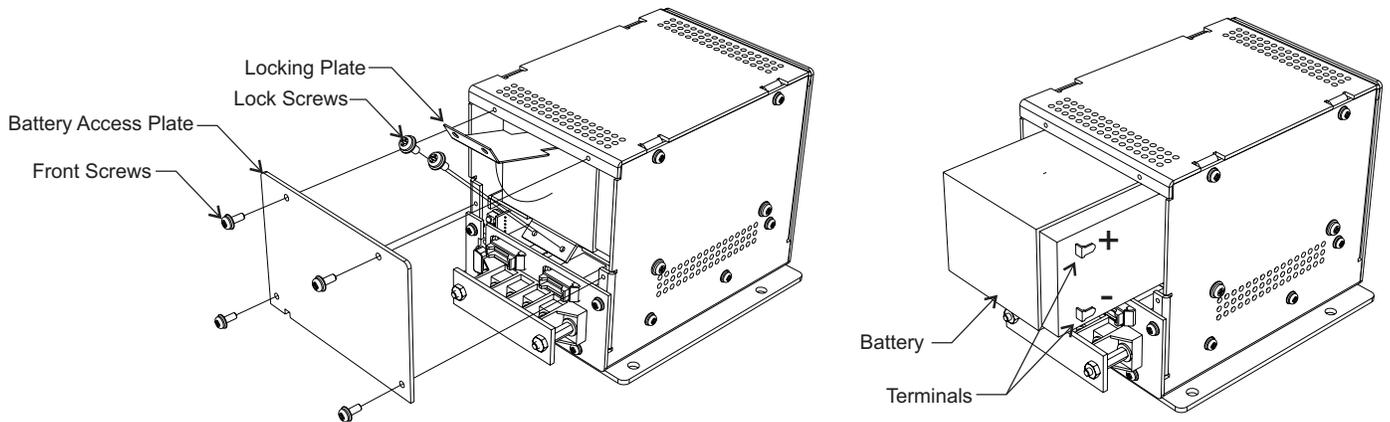
INTERNAL BATTERY CHARGING & REPLACEMENT:

The MDP internal battery is a sealed lead acid and requires no maintenance. Battery life is typically up to five years, but will vary depending on use and operating environment. The battery should be replaced no less frequently than every five (5) years to guarantee proper operation of the MDP. (Request part # 591-0712-0)

To determine the age of the battery, check the date code located on top of the battery. The four digits refer to the year and month of manufacture. For instance, a unit with a date code of "1035" was manufactured the 35th week of 2010. To replace the battery first remove power to the MDP input wiring and turn off all 12 Volt loads connected to MDP. Remove the fuse from the holder labeled "BATTERY". To access the battery, loosen and back out the four front Battery Access Plate securing screws and remove Battery Access Plate.

Once the plate is removed, you will see the battery is secured in position by a Locking Plate. Loosen and back out the two Locking Plate locking screws. Lift Locking Plate up from bottom and remove battery. When the terminals are exposed, disconnect the push on connectors and remove the battery. Reinstall the new battery by lifting up on the Locking Plate and sliding the battery partially back into the compartment, re-attach the terminals (confirm proper polarity or damage can result) and push the battery all the way back in until the Locking Plate can shut properly. Dispose of the old battery properly. Re-tighten the two battery retaining bracket securing screws. Re-install the battery access plate and re-install and tighten the four battery access screws. Although the battery is sealed, it is a Lead-Acid type, so there are restrictions on its disposal.

Fig. 5: Internal Battery Charging & Replacement



CAUTION: Observe correct battery polarity!

TEST / TROUBLESHOOTING

Refer to the status LED indicator legend on page 5, which provides diagnostics of what stage the MDP is currently operating.

1) Testing Battery Back-up Function:

With a load connected to MDP output remove input fuse and confirm load is powered without interruption from MDP internal battery: The two GREEN LED's ("CHARGING" & "INPUT CONNECTED") should extinguish and the AMBER "Back-up Power" LED will illuminate.

2) Start-up:

When connecting or reconnecting input power to the MDP it is normal for the "INPUT CONNECTED" LED & "BACK-UP POWER" LED to both illuminate for 2-3 seconds.

3) Charging LED:

- a) It is normal for the CHARGING LED to extinguish when the three stage charger goes in to sleep mode. (Sleep mode reduces MDP input current draw when the internal battery is full charged.)
- b) If fuses blow repeatedly, this usually indicates a shorted component. Contact NEWMAR for further trouble shooting advice. Always verify that the replaced fuses are of the correct rating. Use standard ATC fuses. Do not use slow-blow fuses.
- c) Flashing Red LED - internal charging temperature exceeds 50° C.

FACTORY CONTACT INFORMATION

If a problem persists after you have applied the above-outlined solutions, or if you have any questions about the installation and proper operation of the MDP-25.0, please contact NEWMAR's Technical Services Manager:

Phone: 714-751-0488 - From the hours of 7:00 A.M. to 4:30 P.M. weekdays, P.S.T.

Fax: 714-957-1621

Email: techservice@newmarpower.com

We are happy to consult with you to resolve any problems or questions you may have. If during consultation, it appears the MDP-25.0 must be returned to the factory for repair we will issue a Return Materials Authorization at that time.

SPECIFICATIONS:

INPUT: Stand-by: 12 VDC, 12.2 -> 15.5 VDC, 11.5 minimum input required for start up,
Maximum Input Current: 28.5 Amps (25 Amps max. Load + 3.5 Amps Charger)
Stand-by Current: <40 mA (no load on output, internal battery charged, 3 Stage charger in sleep mode)

OUTPUT: 12 VDC Filtered, Voltage Spike Protected with Back-Up Battery 25 amps Max.

BACK-UP POWER: 12.0 VDC Nominal, from 7 AH internal battery:
5 amps for 60 Minutes
10 amps for twenty Minutes
25 amps for six Minutes

(All the above assuming fully charged battery @ 25° C)

BATTERY: Sealed Lead Acid, Rechargeable 7.0 AH, 5 Years Typical Life - User Replaceable

INTERNAL CHARGER: 2 Amps, 3 Stage, Temperature Compensated

FILTERING: Audio through 200 MHz

VOLTAGE SPIKE PROTECTION: Transient Energy Capability; 100 Joules, 4,000 amps Max

OPERATING TEMPERATURE: 0 - 50° C

SIZE/WEIGHT: 5.75" H x 6.0" W x 8.5" D (14.6 x 15.24 x 51.59 cm) / 9.4 lbs. (4.3 kg)



DIMENSIONAL DRAWINGS:

