



Deltran Battery Tender®
WATERPROOF
VIBRATION RESISTANT (VRW)
Battery Chargers

Power Tender Plus: Models 12V6A & 24V3A

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS: This manual contains important safety and operating instructions for the DELTRAN BATTERY TENDER® VRW Power Tender Plus Battery Chargers, both 12V6A and 24V3A models. **CAREFULLY READ THESE INSTRUCTIONS BEFORE USING THE BATTERY CHARGER.**

WARNING AND CAUTION LABEL DEFINITIONS:

⚠ WARNING

WARNING indicates a potentially hazardous situation, which, if not avoided, could result in serious injury or death.

⚠ CAUTION

CAUTION indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury.

CAUTION

CAUTION used without the safety alert symbol indicates a potentially hazardous situation that if not avoided, may result in property damage.

GENERAL PRECAUTIONS

CAUTION

WORKING WITH LEAD ACID BATTERIES AND BATTERY CHARGERS: All lead acid batteries have the potential to emit gasses that may combine into a combustible or explosive mixture. In many cases, it is possible that lead acid batteries will emit these gasses during normal discharge and charging operations. Because of this potential danger, it is important that you follow the precautions recommended by both the battery and battery charger manufacturers before using either one.

USING MANUALS: Study all of the battery manufacturer's precautions and specific recommendations for safe operation such as not removing cell caps while charging and the recommended rates of charge (charger output current).

⚠ CAUTION

CHARGER LOCATION: **LOCATE** the charger as far away from the battery as is allowed by the length of the output cable harness. **NEVER** set the charger above the battery. **NEVER** set the charger on a surface constructed from combustible material.

CHARGER VOLTAGE COMPATIBILITY: **NEVER** use a battery charger unless the battery voltage matches the output voltage rating of the charger. For example, do not use a 12-volt charger with a 6-volt battery and vice-versa.

EXCESSIVE MOISTURE: The charger body and power cords are fully waterproof. However, do not expose the AC and DC electrical connections at the ends of the power cords to rain or snow.

CHARGER ATTACHMENTS: Do not use attachments that are not recommended or sold by Deltran or its affiliates. To do otherwise may result in the risk of electric shock, fire, or possibly some other unforeseen potential personal injury situations.

HANDLING POWER CORDS: When handling electric power cords, always pull by the plug rather than by the cord. This will reduce the risk of damage to both the plug and cord, and it will minimize the likelihood of electric shock resulting from that damage.

LOCATION OF POWER CORDS: Make sure all electric power cords are located so that they cannot be stepped on, tripped over, or otherwise subjected to damage or stress.

MONITORING SEALED & NON-SEALED BATTERIES: When leaving a battery charger connected to either a sealed (AGM or GEL) or non-sealed (flooded battery) for extended periods of time (weeks, months, etc.), periodically check the battery to see if it is unusually warm. This is an indication that the battery may have a weak cell and that it could go into a thermal runaway condition. If the battery releases an excessive amount of gas or if the battery gets hotter than 130°F (55°C) during charging, disconnect the charger and allow the battery to cool. Overheating may result in plate distortion, internal shorting, drying out or other damage. For flooded batteries, also check individual cell fluid levels against manufacturer's recommendations for safe operation.

⚠ WARNING

ELECTRIC SPARK & OPEN FLAME: **NEVER** smoke or allow a source of electric spark or open flame in the vicinity of the battery or engine. (For example: Don't charge the battery next to a gas water heater.)

VENTILATION: Do not operate the charger where ventilation is restricted. The intent here is to allow sufficient airflow to minimize and dissipate the heat generated by the charger and to diffuse the gasses that may be emitted by the battery.

CHARGER MAINTENANCE: **NEVER** disassemble the charger or attempt to do internal repairs. Take it to a qualified service technician. Assembling the charger incorrectly may result in the risk of electric shock or create a fire hazard.

⚠ WARNING

EXTENSION CORDS: An extension cord should not be used unless absolutely necessary. Using improper extension cord could result in a risk of fire and electric shock. If extension cord must be used, make sure that:

- The pins on the extension cord plug have the same number, size, and shape as those of the AC power cord plug on the charger;
- The extension cord is properly wired and is in good electrical condition; and
- The wire size is as specified in Table 1 below.

TABLE 1: EXTENSION CORD

LENGTH & MINIMUM SAFE CONDUCTOR SIZE

Note: The smaller the AWG number, the larger the conductor diameter.

Length of Cord (feet)	6 to 100	101 to 150
Length of Cord (meters)	1.8 to 30.5	30.8 to 45.6
Size of Conductor (AWG)	18	16
Conductor Diameter (mm)	1.25	1.5

⚠ WARNING

Do not operate the charger with damaged AC power cords or plugs or DC output cords or accessories - replace them immediately.

PERSONAL PRECAUTIONS

⚠ WARNING

Battery posts, terminals and related accessories contain lead and lead components, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Always wash your hands after handling these devices.

⚠ WARNING

WHEN YOU WORK NEAR LEAD-ACID BATTERIES:

1. Someone should be within range of your voice or close enough to come to your aid if you have an accident;
2. Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, or eyes;
3. Wear complete eye protection and protective clothing. Avoid touching your eyes while working near a battery. If battery acid contacts your skin or clothing, wash immediately with soap and water. If acid enters an eye, immediately flood the eye with running cold water for at least 10 minutes and get medical attention as soon as possible;
4. Be extra cautious when handling metal tools around a battery. If you drop a metal tool near a battery it might spark or create a short circuit between

the battery terminals and some other metal part. Either event may cause a dangerous electrical shock hazard, a fire, or even an explosion;

5. Remove all personal metal items such as rings, bracelets, necklaces, and watches when working with a lead-acid battery. A lead-acid battery can produce a short-circuited current high enough to weld a metal ring or other piece of jewelry, causing a severe burn;
6. Use Deltran Battery Tender® VRW Power Tender Plus Battery Chargers for charging lead-acid batteries only. They are not intended to supply power to an extra low-voltage electrical system or to charge dry-cell batteries. Charging dry-cell batteries may cause them to burst and cause injury to persons and damage to property;

INFORMATION NOTE ABOUT DRY-CELL BATTERIES:

There are some wet, non-spillable, lead acid batteries on the market whose manufacturers' make the claim that they are dry-cell batteries. These batteries are sealed, gas-recombinant, starved electrolyte, possibly with AGM (Absorbed Glass Mat) type construction. It is perfectly safe to use the DELTRAN BATTERY TENDER® VRW POWER TENDER PLUS BATTERY CHARGERS to charge these types of batteries. The dry-cell battery warning is intended for non-rechargeable, alkaline and other similar types of batteries. If you have any doubt about the type of battery that you have, please contact the battery manufacturer before attempting to charge the battery.

7. **NEVER** charge a visibly damaged or frozen battery.

PREPARING TO CHARGE: First, follow all General & Personal Precautions as previously explained, and then continue.

⚠ WARNING

IF THE BATTERY MUST BE REMOVED FROM THE VEHICLE:

1. To avoid an electric arc (or spark), turn off or disconnect all of the accessories in the vehicle. Then always remove the cable that is connected to grounded terminal from battery first;
2. If necessary, clean the battery terminals. Be careful to keep the corrosion and other debris from coming in contact with your eyes;
3. If the battery is not a sealed battery, then if necessary, add distilled water to each cell until the battery acid solution reaches the level specified by battery manufacturer. Do not overfill;
4. Before inserting the charger AC power plug into the electrical outlet, check the polarity of the battery posts, and attach at least a 24 inch long 6 (AWG) insulated, battery extension cable to the negative battery post. Then connect the appropriate charger DC output connectors to the battery and the extension cable, positive to positive and negative to negative. Never allow the alligator clips or terminal rings to touch each other after they are connected to the battery charger.
5. Connect the AC power plug to the electrical outlet.

⚠ WARNING

IF THE BATTERY REMAINS INSTALLED IN THE VEHICLE:

1. DO NOT CONNECT THE CHARGER AC POWER PLUG TO THE ELECTRICAL OUTLET UNTIL ALL OTHER CONNECTIONS ARE MADE!
2. Place both the AC and DC power cords in the best position to avoid accidental damage by movable vehicle parts, i.e. hoods, doors, or moving engine parts (fan blades, belts, or pulleys).
3. Check the polarity of the battery posts. If the positive (pos, p, +) post is connected to the vehicle chassis, then the vehicle has a positive ground system. If the negative (neg, n, -) post is connected to the vehicle chassis, then the vehicle has a negative ground system. Negative ground systems are the most common.
4. For negative ground systems, connect the positive (red) alligator clip, or ring terminal to the positive battery post. Then connect the negative (black) alligator clip, or ring terminal to the vehicle chassis. Do not make the negative charger clip or ring connection to the carburetor, fuel lines, or thin, sheet metal parts. Make that connection to the engine block or a heavy gauge metal part of the frame.
5. For positive ground systems, connect the negative (black) alligator clip, or ring terminal to the negative battery post. Then connect the positive (red) alligator clip, or ring terminal to the vehicle chassis. Do not make the positive charger clip or ring connection to the carburetor, fuel lines, or thin, sheet metal parts. Make that connection to the engine block or a heavy gauge metal part of the frame.
6. Connect the AC power plug to the electrical outlet.

ADDITIONAL CHARGER INFORMATION

AUTOMATIC CHARGING AND BATTERY STATUS

MONITORING: DELTRAN BATTERY TENDER® VRW POWER TENDER PLUS Battery Chargers are completely automatic and may be left connected to both AC power and to the battery that it is charging for long periods of time. However, it is prudent to periodically check both the battery and the charger for normal operation during these extended charging periods.

The charger output power, voltage, and current all depend on the condition of the battery that is being charged. DELTRAN BATTERY TENDER® VRW POWER TENDER PLUS Battery Chargers have 2 status lights (one red, and one green) that indicate the operating mode of the charger, and the condition of the battery that is connected to the charger.

The charger operates in one of the 3 primary charge modes: the bulk mode (full charge power, constant current, increasing battery voltage, battery is 0% to 75% or 80% charged), the absorption mode (high constant voltage, decreasing current, battery is 75% to 100% charged), or the storage/float maintenance mode (low constant voltage, minimal charge current, battery is 100% to 103% charged).

When the battery is fully charged, the green status indicator light will turn on and the charger will switch to a storage/maintenance charge mode. DELTRAN BATTERY TENDER® VRW POWER TENDER PLUS Battery Chargers will automatically monitor and maintain the battery at full charge.

SPECIAL FEATURES: The DELTRAN BATTERY TENDER® VRW POWER TENDER PLUS Battery Chargers have the following special features:

SHORT CIRCUIT PROTECTION: The battery charger can sustain a short circuit connection directly across its DC output terminals indefinitely without any risk of either electric shock or excessive heat.

REVERSE POLARITY PROTECTION: The battery charger is protected by an external fuse against any damage due to the DC output leads being connected to the opposite polarity battery post. No damage will result to either the battery or the battery charger.

TIME REQUIRED TO CHARGE A BATTERY:

The DELTRAN BATTERY TENDER® VRW POWER TENDER PLUS Battery Chargers charge at a rate of either 5.0 Amps (5.0 Amp-Hours per hour) or 2.5 Amps (2.5 Amp-Hours per hour). Therefore, a fully discharged 15 Amp-Hour battery will take approximately 2.4 hours or 4.8 hours respectively, to recharge to 80% capacity. Some large automotive or marine, deep cycle type batteries may take more than 24 hours to fully recharge.

WORKING WITH A DEAD BATTERY OR A BATTERY WITH A VERY LOW VOLTAGE:

If you try to charge a dead 12-volt battery with a very low voltage, below 9 volts, the DELTRAN BATTERY TENDER® VRW POWER TENDER PLUS Battery Charger supply its full power to the battery. However, there is no guarantee the recharge will be successful. There is a good chance that the battery has already been damaged, and it is important to follow all of the standard safety precautions. Check the battery often to see if it is getting very warm, or to detect a sulfur odor and/or a hissing sound. If you any of these symptoms are present, immediately remove the AC power from the battery charger. The hissing sound should stop within 30 seconds after you remove the AC power from the charger. Let the battery sit, open a window or a door to increase ventilation in the area; if available, use a fan to increase air circulation. Do not attempt to remove the DC cables from the battery until it has cooled down and the sulfur odor has dissipated.

NOTE:

If a 12 Volt, Lead-Acid battery has an output voltage of less than 9 volts when it is at rest, when it is neither being charged nor supplying electrical current to an external load, there is a good chance that the battery is defective. As a frame of reference, a fully charged 12-Volt, Lead-Acid battery will have a rest-state, no-load voltage of approximately 12.9 volts. A fully discharged 12-Volt, Lead-Acid battery will have a rest-state, no-load voltage of approximately 11.4 volts. That means that a voltage change of only 1.5 volts represents the full range of charge 0% to 100% on a 12-Volt, Lead-Acid battery. Depending on the manufacturer, and the age of the battery, the specific voltages will vary by a few tenths of a volt, but the 1.5-volt range will still be a good indicator of the battery charge %.

STATUS INDICATOR LIGHTS: The following describes the indicator light operation:

- < **RED - FULL RECHARGE (Automatic): BULK & ABSORPTION:** When the red light is on, the battery charger is in the process of fully charging the battery.
- < **GREEN FLASHING – ABSORPTION:** When the green light is flashing, the charger is in the constant voltage absorption mode. The charger automatically switches to float maintenance when the charge current drops below 0.4 amps or 8 hours after the absorption mode begins.
- < **GREEN – CHARGE COMPLETE: FLOAT / MAINTENANCE:** When the green light is on and not flashing, and the red light is off, the battery charger is in the storage / maintenance mode. In this mode the charger will maintain the battery at full charge by attempting to keep a constant voltage across the battery terminals. If the battery becomes partially discharged due to an external current draw or excessive internal battery losses, the charger will automatically switch itself back to the full recharge mode of operation.
- < **RED & GREEN Alternating – ERROR:** When the red and green light are alternating light is flashing, the most likely cause is either a high resistance connection between the charger and a battery with a voltage less than 12 volts, or the battery is sulfated.

TROUBLESHOOTING CHECK LIST:

1. **NEITHER OF THE CHARGER LIGHTS TURN ON AFTER THE AC POWER PLUG IS CONNECTED TO THE AC ELECTRICAL OUTLET:** Check the charger AC power plug connection at the AC electrical outlet. Verify that the AC electrical outlet is functioning properly by plugging in another appliance or a voltmeter.
2. **THE CHARGER GREEN LIGHT GOES ON IMMEDIATELY (within a few seconds) WHEN AC POWER IS APPLIED TO THE CHARGER:** The charger connections at the battery may be intermittent, the output fuse may be blown, the battery may be defective, or the battery might already be fully charged. Note: Since the battery charger is not spark proof, there is no way to determine if the green light indicates that the battery is fully charged, or if the charger output cables have an open circuit, either a fractured wire, a blown fuse, or a corroded, high resistance connection between the charger rings or clamps and the battery terminals. However, when you first apply AC power to the charger, if the red light comes on but stays on for less than 3 seconds and then the green light comes on, it is very likely that the charger output circuit is open. Check fuses first.
3. **CHARGER IS CHARGING BUT THE GREEN LIGHT DOES NOT TURN ON IN A REASONABLE AMOUNT OF TIME:** The battery may be large and requires more time to fully charge than originally expected, there may be another appliance drawing electric power from the battery while it is charging, or the battery may be defective. Also, a newly purchased battery may not be fully charged and may take longer to charge initially.
4. **THE RED LIGHT COMES ON AGAIN AFTER THE GREEN LIGHT WAS ALREADY ON:** There may be another appliance drawing electric power from the battery causing its voltage to drop below the reset level. The battery charger then goes back into full charge mode. Also, the charger connections at the battery may be intermittent or the battery may be defective.

SPECIFICATION SUMMARY:

Technical Specifications (12V6A & 24V3A Models)	
Input Voltage / Frequency	100 to 132 VAC / 50 / 60 Hz
Input Current (Maximum)	1.5 Amps RMS @ 100 VAC
Output Current	5 or 2.5 Amps DC
Output Voltage	12 or 24 Volts DC
Charger Output Voltage Amplitudes throughout the entire charge algorithm, including absorption and float maintenance, are consistent with the optimum charging recommendations of the major lead-acid battery manufacturers.	
Maximum Operating Temperature	50 °C Typical
Charger Case Dimensions: Approx. 5.2 in (132 mm) L (includes 0.2' total endplate thickness) x 5.0 in (127 mm) W x 2.0 in (51 mm) H (at the highest point). Allow an additional 3 in (76.2mm) total (1.5 inch on each end of the length dimension) for safe bend of AC power cord strain relief and DC output cable harness.	
Shipping Weight: Approx. 4.0 lbs (1.82 kg) with Accessories	

Design Conformance & Revision: All Deltran charger products are 100% inspected and electrically tested prior to shipment. All Deltran battery charger designs are proprietary and subject to change without notice. Deltran makes no specific claims nor does it either make or imply any specific guarantee or warranty with respect to either the physical configuration or performance of any of the battery charger products listed herein, including suitability for purpose or merchantability.

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