Deltran Battery Tender®

6V/12V 4Amp 5 & 10 Bank Battery Management System

Designed for Six-cell and three-cell Flooded/AGM/GEL Lead-Acid Batteries and Four-Cell Lithium Iron Phosphate (LiFePO4) Batteries

IMPORTANT SAFETY INSTRUCTIONS

1) SAVE THESE INSTRUCTIONS – This manual contains important safety and operating instructions for battery charger models P/N 021-0133, 021-0134.
2) Do not expose charger to rain or snow.
3) Use of an attachment not recommended or sold by the battery charger manufacturer may result in a risk of fire, electric shock, or injury to persons.
4) To reduce risk of damage to electric plug and cord, pull by plug rather than cord when disconnecting charger.
5) An extension cord should not be used unless absolutely necessary. Use of improper extension cord could result in a risk of fire and electric shock. If an extension cord must be used, make sure:
   a) That pins on plug of extension cord are the same number, size, and shape as those of plug on charger;
   b) That extension cord is properly wired and in good electrical condition; and
   c) That wire size is large enough for ac ampere rating of charger as specified in Table 1

TABLE 1

Length of Cord, Feet	**25**	**50**	**100**	**150**
AWG Size of Cord	**18**	**18**	**18**	**16**

6) Do not operate charger with damaged cord or plug – replace the cord or plug immediately.
7) Do not operate charger if it has received a sharp blow, been dropped, or otherwise damaged in any way; take it to a qualified serviceman.
8) Do not disassemble charger; take it to a qualified serviceman when service or repair is required. Incorrect reassembly may result in a risk of electric shock or fire.
9) To reduce risk of electric shock, unplug charger from outlet before attempting any maintenance or cleaning. Turning off controls will not reduce this risk.
10) **WARNING – RISK OF EXPLOSIVE GASES.**
   a) WORKING IN VICINITY OF A BATTERY IS DANGEROUS. BATTERIES GENERATE EXPLOSIVE GASES DURING NORMAL BATTERY OPERATION. FOR THIS REASON, IT IS OF UTMOST IMPORTANCE THAT YOU FOLLOW THE INSTRUCTIONS EACH TIME YOU USE THE CHARGER.
   b) To reduce risk of battery explosion, follow these instructions and those published by battery manufacturer and manufacturer of any equipment you intend to use in vicinity of battery. Review cautionary marking on these products and on engine.

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11) **PERSONAL PRECAUTIONS**
   a) Consider having someone close enough by to come to your aid when you work near a battery.
   b) Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, or eyes.
   c) Wear complete eye protection and clothing protection. Avoid touching eyes while working near battery.
   d) If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eye, immediately flood eye with running cold water for at least 10 minutes and get medical attention immediately.
   e) NEVER smoke or allow a spark or flame in vicinity of battery or engine.
   f) Be extra cautious to reduce risk of dropping a metal tool onto battery. It might spark or short-circuit battery or other electrical part that may cause explosion.
   g) Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a battery. A battery can produce a short-circuit current high enough to weld a ring or the like to metal, causing a severe burn.
   h) Use charger for charging ***Lead-Acid/AGM/Lithium Iron Phosphate*** batteries only. It is not intended to supply power to a low voltage electrical system. Do not use battery charger for charging non-rechargeable batteries that are commonly used with home appliances. These batteries may burst and cause injury to persons and damage to property.
   i) NEVER charge a frozen battery.
12) **PREPARING TO CHARGE**
   a) If necessary to remove battery from vehicle to charge, always remove grounded terminal from battery first. Make sure all accessories in the vehicle are off, so as not to cause an arc.
   b) Be sure area around battery is well ventilated while battery is being charged.
   c) Clean battery terminals. Be careful to keep corrosion from coming in contact with eyes.
   d) Add distilled water in each cell until battery acid reaches level specified by battery manufacturer. Do not overfill. For a battery without removable cell caps, such as valve regulated lead acid batteries, carefully follow manufacturer's recharging instructions.
   e) Study all battery manufacturers specific precautions such as removing or not removing cell caps while charging and recommended rates of charge.
   f) Determine voltage of battery by referring to car owner's manual and make sure that output voltage selector switch is set at correct voltage. Do not use the battery charger unless battery voltage matches the output voltage rating of the charger.
13) **CHARGER LOCATION**
   a) Locate charger as far away from battery as dc cables permit.
   b) Never place charger directly above battery being charged; gases from battery will corrode and damage charger.
   c) Never allow battery acid to drip on charger when reading electrolyte specific gravity or filling battery.
   d) Do not operate charger in a closed-in area or restrict ventilation in any way.
   e) Do not set a battery on top of charger.
14) **DC CONNECTION PRECAUTIONS**
   a) Connect and disconnect dc output clips only after setting any charger switches to "off" position and removing ac cord from electric outlet. Never allow clips to touch each other.
   b) Attach clips to battery and chassis as indicated in 15(e), 15(f), and 16(b) through 16(d).

15) **FOLLOW THESE STEPS WHEN BATTERY IS INSTALLED IN VEHICLE. A SPARK NEAR BATTERY MAY CAUSE BATTERY EXPLOSION. TO REDUCE RISK OF A SPARK NEAR BATTERY:**
   a) Position ac and dc cords to reduce risk of damage by hood, door, or moving engine part.
   b) Stay clear of fan blades, belts, pulleys, and other parts that can cause injury to persons.
   c) Check polarity of battery posts. POSITIVE (POS, P, +) battery post usually has larger diameter than NEGATIVE (NEG, N,–) post.
   d) Determine which post of battery is grounded (connected) to the chassis. If negative post is grounded to chassis (as in most vehicles), see (e). If positive post is grounded to the chassis, see (f).
   e) For negative-grounded vehicle, connect POSITIVE (RED) clip from battery charger to POSITIVE (POS, P, +) ungrounded post of battery first. Then connect NEGATIVE (BLACK) clip to vehicle chassis or engine block away from battery. Do not connect clip to carburetor, fuel lines, or sheet-metal body parts. Connect to a heavy gage metal part of the frame or engine block.
   f) For positive-grounded vehicle, connect NEGATIVE (BLACK) clip from battery charger to NEGATIVE (NEG, N, –) ungrounded post of battery first. Then connect POSITIVE (RED) clip to vehicle chassis or engine block away from battery. Do not connect clip to carburetor, fuel lines, or sheet-metal body parts. Connect to a heavy gage metal part of the frame or engine block.
   g) When disconnecting charger, turn switches to off, disconnect AC cord, remove clip from vehicle chassis, and then remove clip from battery terminal.
   h) See operating instructions for length of charge information.

16) **FOLLOW THESE STEPS WHEN BATTERY IS OUTSIDE VEHICLE. A SPARK NEAR THE BATTERY MAY CAUSE BATTERY EXPLOSION. TO REDUCE RISK OF A SPARK NEAR BATTERY:**
   a) Check polarity of battery posts. POSITIVE (POS, P, +) battery post usually has a larger diameter than NEGATIVE (NEG, N, –) post.
   b) Attach at least a 24-inch-long 6-gauge (AWG) insulated battery cable to NEGATIVE (NEG, N, –) battery post.
   c) Connect POSITIVE (RED) charger clip to POSITIVE (POS, P, +) post of battery.
   d) Position yourself and free end of cable as far away from battery as possible – then connect NEGATIVE (BLACK) charger clip to free end of cable.
   e) Do not face battery when making final connection.
   f) When disconnecting charger, always do so in reverse sequence of connecting procedure and break first connection while as far away from battery as practical.
   g) A marine (boat) battery must be removed and charged on shore. To charge it on board requires equipment specially designed for marine use.

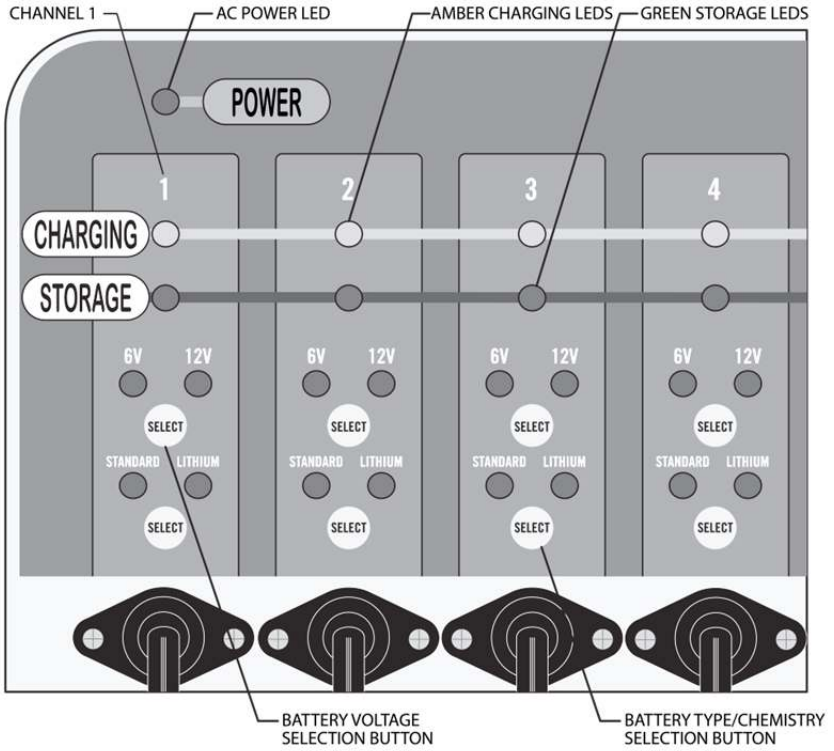


This symbol indicates separate collection for electrical and electronic equipment

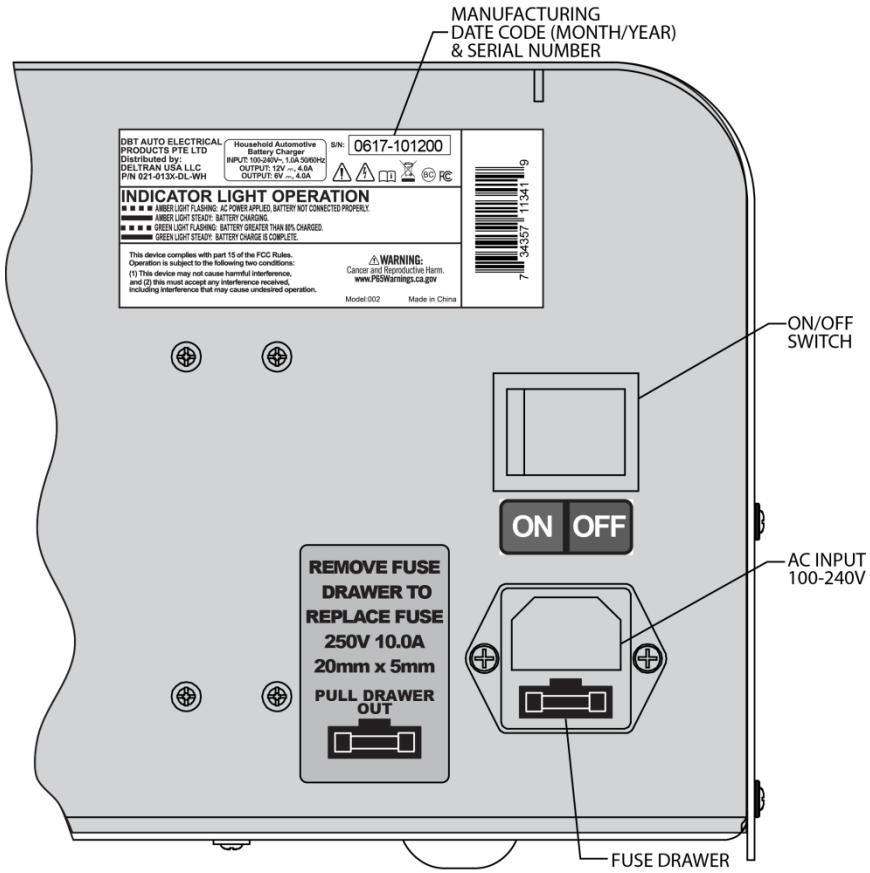
USER INSTRUCTIONS

Battery Charger Functions:

This Battery Management System has either 5 or 10 charging stations. Each one of these stations is totally independent of all others when it comes to charging and maintaining the battery that it is connected to.



FRONT OF CHARGER



BACK OF CHARGER

- **<u>Powering Up the Charger:</u>**

  1) When the On/Off switch, located on the back of the charger, is activated into the ON position, the AC Power LED on the front of the charger will illuminate and remain on.
  2) All of the individual channel LED's will also illuminate for approximately 1½ seconds before turning off.
  3) The charger is now ready to be connected to the battery/batteries.

- **<u>Connecting to a Battery/Batteries and Starting the Charging Sequence:</u>**

  1) When a channel is connected to a battery, the Charging LED and the Storage LED for that channel will illuminate for approximately 1½ seconds before turning off.
  2) The four LED's for the 6V/12V mode and the Standard/Lithium mode will also activate for approximately 1½ seconds. Then the two (2) non-active mode LED's will turn off and the two (2) active mode LED's will start to flash.
  3) You now have approximately ten (10) seconds to change the 6V/12V and Standard/Lithium active mode, if required, before the charging cycle automatically begins.
  4) After approximately ten seconds, the amber Charging LED will automatically illuminate and the charge cycle will begin.
  5) Once the charge cycle is in progress, neither the voltage mode nor chemistry mode can be changed unless the battery is disconnected from the charger (see the next sections for information on how to change the active mode of either function).

- **Battery Voltage (6V/12V) Selection Button:**
  1) The Battery Tender® charger has a "SELECT" button for each channel which allows you to switch between charging a 12-volt Standard/AGM Lead-acid or 12-volt Lithium Iron Phosphate (LiFePO4) battery or a 6-volt Standard/AGM Lead-acid battery.

     Note: For Lithium chemistry compatibility, this charger will only charge 12-volt rated Lithium Iron Phosphate (LiFePO4) batteries.
  2) If the AC power is interrupted, all charger channels connected to batteries will resume charging with the last battery voltage settings used, once power is restored.
  3) The charger can also detect if the incorrect battery voltage has been selected or if the battery is defective, once the connection has been made to the battery. Under these conditions, either the 6V or 12V LED will flash, indicating the charge cycle is prevented from starting or continuing.
  4) To reset the faulted charger channel, disconnect the output cable from the battery and then depress the select switch for the flashing LED function for approximately 5 seconds.
  5) All of the LED's for the faulted channel will then turn off.
  6) Reconnect the output cable to the battery and repeat step three (3) as stated in the **Connecting to a Battery/Batteries and Starting the Charging Sequence** section. (page 6)

- **Battery Type/Chemistry Selection Button:**
  1) The Battery Tender® charger has a "SELECT" button for each channel which allows you to switch between charging a Standard/AGM Lead-acid battery or a Lithium Iron Phosphate battery (12-Volt only LiFePO4).

     Note: For Lithium chemistry compatibility, this charger will only charge 12-volt rated Lithium Iron Phosphate (LiFePO4) batteries.
  2) If the AC power is interrupted, all charger channels connected to batteries will resume charging with the last battery chemistry settings used, once power is restored.
  3) To reset the charger channel after a charge cycle has begun or change the active mode, disconnect the output cable from the battery.
  4) All of the LED's for that channel will then turn off.

  5) Reconnect the output cable to the battery and repeat step three (3) as stated in the **Connecting to a Battery/Batteries and Starting the Charging Sequence** section.

- **Automatic Lithium Iron Phosphate (LifePO4) Recovery Mode:**
  If you try to charge a dead 12-volt Lithium Iron Phosphate battery (LiFePO4) with a very low voltage, 4 to 8 Volts, the charger will automatically switch into the Recovery Mode. When in this mode, the Lithium LED will flash and the 12V LED and the amber Charging LED will be solid. If battery recovery is successful, the charger will automatically switch back to the normal charge cycle.
  There is a three (3) hour time limit for this recovery process. If not successful, the Charging amber LED and the Storage green LED will toggle back and forth. It will continue this sequence until the battery is disconnected and the voltage select button is depressed for approximately five seconds, or the charger is disconnected from the AC source. If this happens, there is a good chance that the battery has already been damaged due to the low voltage and cannot be recovered.

- **Power LED:**
  When the On/Off switch located on the back of the charger is activated into the ON position, the AC power LED on the front will illuminate and remain on.

- **Battery Safety Timer:**
  The charger has a safety timer fault that will activate if the battery does not reach its optimal voltage. If this occurs the battery may be defective; take the battery to the dealer to be tested.
  In this fault mode, the Amber Charging and Green Storage LED's will toggle back and forth.
  To reset the charger channel, disconnect the battery and hold down the Voltage select button for approximately five seconds, or disconnect the charger from the AC source.

- **Charger Cooling Fan Operation:**
  The fan is electronically controlled and will turn on when the charger reaches a preset temperature or a preset amperage output level. The fan will continue to run and adjust its speed to keep the charger at the correct temperature. The fan will also turn off automatically once the correct temperature has been reached. Always leave an open space at both ends of the charger to allow the fan to pull air into and through the charger and exit at the opposite end. The fan contains a filter which can be removed and cleaned by simply

removing the fan guard from the charger cover. REMOVE the AC plug from the power source before attempting this procedure.

- **Automatic Charging And Battery Status Monitoring:**
  Battery Tender® Shop chargers are completely automatic and may be left connected to both AC power and to the batteries being charged for long periods of time. The output power, voltage, and current of each channel depends on the condition of the battery it is charging. Battery Tender® chargers have several status LED indicators that provide a visual means to determine the operating mode of the charger and, hence, the condition of the battery connected to the charger.
  The two battery level status LED indicator lights (Charging Amber LED and Storage Green LED) are available to determine whether the charger is operating in one of the four primary charge modes:

  1) **Qualification/Initialization mode-** The Monitor Circuit verifies appropriate battery voltage levels and good electrical continuity between the battery and the charger DC output.
  2) **Bulk mode-** (full charge, constant current, battery is 0% to 80% charged)
  3) **Absorption mode-** (high constant voltage, battery is 80% to 100% charged).
  4) **Storage/float maintenance mode-** (low constant voltage, battery is 100% to 103% charged).

  When the battery is fully charged, the battery level status (Storage) Green LED indicator will turn solid green and the charger will switch to a storage/float maintenance charge mode. The Battery Tender® charger will automatically monitor and maintain the battery at full charge.

- **Attention: The Battery Tender® Charger Has Spark Free Circuitry:**
  The Battery Tender® charger will not produce an output voltage until it senses at least 2 volts from a Standard/AGM Lead acid battery or 4 volts from a Lithium Iron Phosphate battery. It must also be connected to a battery with the correct polarity before it will start charging. Therefore, if the output cable alligator clips incidentally come in contact with one another, there will be no electrical spark.

NOTE:

THE OUTPUT CLIPS MUST BE CONNECTED TO A BATTERY BEFORE THE CHARGER CAN PRODUCE AN OUTPUT VOLTAGE.

- **Time Required To Charge A Battery:**
  Each channel of this Battery Tender® Shop charger charges at a maximum rate of 4.0 Amps per hour. Therefore, at 4.0 Amps, a fully discharged 12V 40 Amp-Hour battery will take approximately 8 hours to recharge to 80% capacity.

- **Working With a Dead Battery or a Battery with a Very Low Voltage:**
  If you try to charge a dead battery having a voltage below 2 volts from a Standard/AGM Lead-acid battery or 4 volts from a Lithium Iron Phosphate battery, the Battery Tender® charger will not start. An internal safety circuit prevents the charger from generating any output voltage unless it senses at least 2 volts from a Standard/AGM Lead-acid battery or 4 volts from a Lithium Iron Phosphate battery at the charger output.

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 %.

- **LED Status Indicating Lights:**

  - **Charger Power Amber Light Not On:**
  - A/C On/Off switch not in correct position.
  - Power cord not connected to A/C power.
  - A/C power fuse defective.

  - **Voltage/Chemistry Mode Lights Not On:**
    This indicates one or more of the following conditions.
  - Channel output cable not sufficiently connected to the battery.
  - Channel output cable fuse defective.
  - Battery voltage extremely low.
  - No or insufficient A/C power supplied to charger.
  - Channel defective.

  - **Alternating Storage Green & Charging Amber Light:**
    This indicates one or more of the following conditions.
  - A reversed polarity connection to the battery.
  - Battery Lithium Recovery Mode time limit exceeded.
  - Bulk Charge Mode time limit exceeded.

  - **Charging Amber Light On Steady:**
    Whenever the amber Charging LED is on steady, a battery is connected properly and the charger is charging the battery. The amber LED will remain on until the charger completes the charging stage.

  - **Storage Green Light Flashing:**
    When the green Storage LED is flashing and the Amber Charging LED is solid, the battery is greater than 80% charged and may be removed from the charger and used if necessary. Whenever possible, leave the battery on charge until the green Storage LED is solid.

  - **Storage Green Light on Steady:**
    When the green Storage LED burns steady, the charge is complete and the battery can be returned to service if necessary. It can also stay connected to maintain the battery for an indefinite period of time.

- **Troubleshoot Guide:**

1) The charger does not turn on and none of the LED's illuminate.
   a. Check to make sure the AC outlet is supplying power by plugging in a lamp, an appliance, or a voltage meter.
   b. Check the fuse located on the back of the charger.

2) The **Green Storage LED** comes on immediately when charging a discharged battery.
   a. The battery is probably defective; take the battery to the dealer to be tested.

3) The **Green Storage LED** never comes on when charging a battery.
   a. The battery may be defective; take the battery to the dealer to be tested.
   b. The battery has an excessive current draw; remove or disconnect the battery from the equipment.

4) **12V Green LED** is flashing.
   a. The battery is damaged.
   b. Incorrect battery voltage is selected.

5) **6V Green LED** is flashing.
   a. The battery is damaged.
   b. Incorrect battery voltage is selected.

6) **Amber Charging & Green Storage LED's** are toggling.
   a. There is a reverse polarity connection to the battery.
   b. The charger's safety timer has expired due to the battery not reaching its optimal voltage. The battery may be defective; take the battery to the dealer to be tested.
   c. The Lithium Recovery Mode has timed out.

- **Warranty:**
  This product is covered by a 3 Year general limited warranty

DISTRIBUTED BY:
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- **Battery Charger Radio Frequency Warnings:**

FCC WARNING

Title 47 Subpart, 15.105(b)
Note: This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio television reception, which can be determined by tuning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help

Canadian ICES-001: Industrial, Scientific, and Medical (ISM) Radio Frequency Generators

This product has been tested with the listed standards and found to be compliant with the Code of Industry Canada ES-001 and the measurement Procedure according to CISPR 11.

CAN ICES-1/NMB-1