


CHARGE TEK 

www.chargetek.com (805) 482-7930

Model: CT500-4
 24V/2.5A INTELLIGENT BATTERY CHARGER
 RELIABLE RUGGED WATERPROOF
 SURGE AND IGNITION PROTECTED

● **FAST/FLOAT**

● **SERVICE**

AC INPUT: 180-250VAC 50-60HZ
 MAX OUTPUT: 30VDC @ 3AMPS

**CAUTION: READ INSTALLATION MANUAL CAREFULLY.
 USE WITH LEAD ACID BASED BATTERY SYSTEMS ONLY.**

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CT500 - 4 INSTALLATION MANUAL



CHARGER OPERATION

The CT500-4 is fully automatic once installed properly. The indicator lights (LEDs) inform the user of the progress of the charging cycle and confirm proper connections. The charger monitors and charges the battery to full capacity.

ELECTRICAL CHARACTERISTICS

AC Input Voltage Range: 180-250VAC
 AC Input Current: 1.4A rms Maximum
 Max. Charging Current: 2.5A (Fast Mode)
 Max. Charging Voltage(Absorption Mode): 28.8 - 29.6VDC
 Max. Charging Voltage(Float Mode): 26.3 - 27.2VDC

LED INDICATORS

The dual color fast/float light will illuminate to indicate that the charger is properly plugged in and connected to the battery. The light will only illuminate when the unit has been connected to the battery and AC power is applied. A red color indicates bulk or fast charge and green color indicates float charge.

Should no light appear, unplug the unit and recheck battery connections to ensure proper polarity. (The red wire to the positive and the black to the negative.)

PROTECTION MODES:

If the red light marked "Service" ever illuminates, the unit should be removed and returned to the factory. This light indicates that the internal over-voltage protection shut off has been tripped and the unit will shut down.

Good battery maintenance procedures dictate that battery fluid levels be checked on a regular basis, especially in high ambient temperatures.

LIMITED WARRANTY

For two years from date of purchase, Chargetek Inc. will at its discretion repair or replace for the original consumer, free of charge any part or parts found to be defective by Chargetek in workmanship or material. All shipping charges under this warranty must be paid by the consumer. Proof of purchase is required.

There is no other expressed warranty. Implied warranties, including those of merchantability and fitness for a particular purpose are limited to two years from the date of purchase. This is the exclusive remedy and consequential damages are excluded where permitted by law.

The CT500-4 is a sophisticated 24 volt, 2.5A battery charger and can be used as either an on-board or portable unit. Charging is controlled by circuitry proprietary to Chargetek, which insures that the battery will be fully and properly recharged. The charger controls charging voltage and current to insure a complete recharge every time. It may be left connected indefinitely to the battery, maintaining full charge at all times.

The CT500-4 utilizes state of the art high frequency power processing that converts the AC line power to 24VDC efficiently and safely. The charger is completely waterproof and sealed with UL approved 94VO flame retardant epoxy. This sealing also provides extreme vibration and shock resistance since the encapsulated unit is effectively a "brick".

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409 CALLE SAN PABLO, UNIT 104 ~ CAMARILLO, CA 93012 ~ PHONE: (805) 482-7930 FAX: (805) 482-7936

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INSTALLATION

LOCATION

- ❑ Do not mount directly over or under a battery or onto a carpeted, upholstered or varnished surface.
- ❑ Install in an area where all charger electrical cords will avoid hot surfaces such as exhaust pipes and moving parts such as fan wheels.
- ❑ Operating ambient temperature is 15 to 130 degrees Fahrenheit. Storage temperature is -20 to 160 degrees Fahrenheit.
- ❑ Pick an area that will provide as much surrounding cooling clearance as possible for maximum efficiency and shortest recharge times. Maintain a 12 inch clearance around charger and never mount in the vicinity of explosives, pressurized cans or other flammable material.

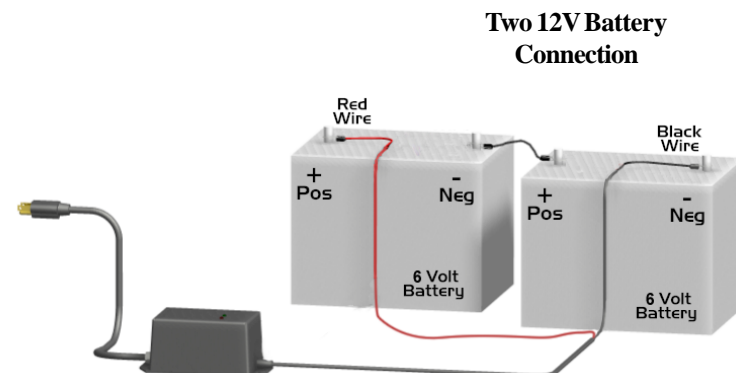
MOUNTING

- ❑ Wear safety goggles, gloves and a long sleeve shirt when drilling mounting holes near a battery.
- ❑ In most cases, #10 stainless steel mounting bolts with aircraft nuts or nylocks or #10 screws provide for solid mounting.

ELECTRICAL

DC WIRE CONNECTIONS

- ❑ Each output should be connected only to a standard lead-acid battery.
- ❑ DC wire connections must be made before plugging in the AC cord. The charger will not operate until DC connections are made. Do not remove DC connections while the AC cord is plugged in.
- ❑ When installing in the bilge and or battery compartment of boats, open hatches and operate bilge blowers if any for ten minutes to remove any fumes and hydrogen gas. Be certain the area is ventilated for personal health and safety
- ❑ Keep wire routing from the charger to the battery neat and secure by anchoring with cable tie to a solid surface every few inches, not to exceed 18" intervals.



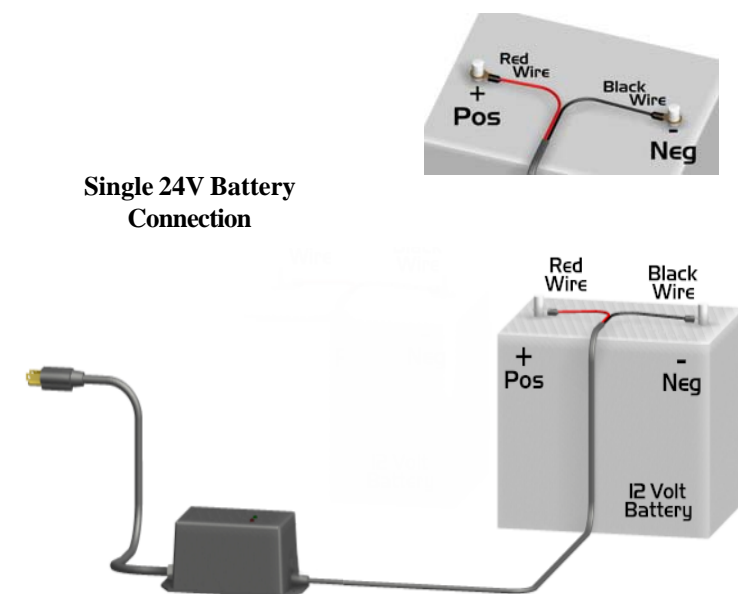
- ❑ As is true with any device connected to a battery, an in-line fuse added to the positive lead to the battery is required and will provide further protection if the DC cord is somehow damaged.
- ❑ For a single 24 volt battery, connect the charger lead set to the battery as follows; the charger red lead is connected to the battery positive terminal and the black charger lead is connected to negative terminal of the battery. When charging two 12 volt batteries connected in series connect the red lead of the charger to the positive terminal of battery #1. Connected the negative terminal of battery #1 to the positive terminal of battery #2. Connect the black lead of the charger to the negative terminal of battery #2. All connections should be clean and tight. See installation diagrams.
- ❑ When connecting two batteries in series it is imperative that the amount of discharge be equal for both batteries or excessive battery voltage during charge will occur resulting in an overvoltage battery. This will cause dangerous battery out gassing and destruction. For accurate charge balancing regardless of loading use the TPRO220 model or CT500 dual output charger.

AC Wire Connections

Note:
The CT 500-4 is equipped with a factory installed 6' grounded AC cord. Though hook up is only a matter of plugging this cord into a suitable extension cord, please follow the following precautionary steps:

- ❑ Insure that the AC cord cannot reach moving parts, lids, hoods, etc. Secure with a cable tie to solid anchor point if necessary.
- ❑ The charger will operate properly with either 220 volts 50 Hz or 220 volts 60 Hz AC input. Never use 110 volt service with this unit.

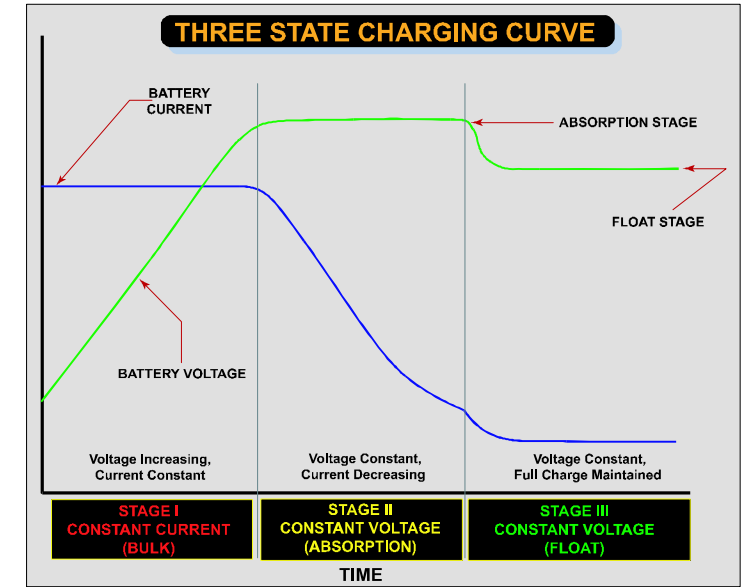
CAUTION:
Never connect the AC plug into an electrical outlet when you are wet or barefoot.



SAFETY INSTRUCTIONS

CAUTION: *The following are important safety instructions. Save these instructions.*

- ❑ Charge only lead acid, (maintenance free or refillable), or "gel-cell" rechargeable batteries. Other types of batteries may burst causing personal injury and damage
- ❑ Never smoke or allow sparks or flame in the vicinity of a battery.
- ❑ Someone should be within range of your voice and close enough to come to your aid when you are working near a battery.
- ❑ Wear eye protection and clothing protection. Avoid touching eyes while working near a battery.
- ❑ Have plenty of fresh water and soap nearby in case battery acid contact's skin, clothing or eyes.
- ❑ If battery acid contact's skin or clothing, wash immediately with soap and water. If acid enters eyes, immediately flood eyes with running cold water for at least ten minutes and get immediate medical attention.
- ❑ Never operate a charger with a damaged cord or plug. Wearing of AC and DC cords, accidentally nicking or cutting the cords could result in sparking and cause injury.
- ❑ Never operate a charger that has been damaged in any way or try to disassemble. Return to factory when service or replacement is required. Incorrect reassembly may result in a risk of electrical shock or fire.
- ❑ Become familiar with all instructions, specifications and cautionary markings on chargers, batteries and equipment used. Only adults should install and operate the charger. Children should be kept out of reach of the charger and batteries it is charging.
- ❑ When using an extension cord the CT 500-2 requires a quality grounded extension cord of at least 16 awg wire size for cords up to 50' and a minimum of 14 awg for cords up to 150'.
- ❑ Never unplug a cord by pulling on the cord itself. Always grasp the plug when disconnecting the charger.
- ❑ Even though the CT500-2 is waterproof and designed for harsh environments, do not operate submerged.
- ❑ Never charge a frozen battery. If the battery has an odor or is visibly damaged disconnect charger and consult factory.
- ❑ Study battery manufacturer's precautions such as removing or not removing cell caps while charging.
- ❑ Keep batteries full. Add distilled water in each cell until it reaches levels specified by battery
- ❑ Keep battery terminals clean. Always unplug charger before cleaning and be careful to keep corrosion from coming in contact with eyes.
- ❑ Remove 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 circuit high enough to weld a ring, etc. to metal, causing a severe burn.



THREE STATE CHARGE CYCLE

The CT500-4 employs a three state charge routine. This is the charging procedure most lead-acid battery manufacturers recommend to return full capacity efficiently and extend battery life. Please refer to the figure Three State Charging Curve diagram.

STAGE I: CONSTANT CURRENT CHARGING OR BULK CHARGE MODE

Assuming the battery is starting in a discharged state, the charging is operating in constant current mode, where the charger current is maintained at a constant value and the battery voltage is allowed to rise as it is being recharged. Approximately 80% of battery capacity is returned in the constant current region.

STAGE II: ABSORPTION MODE

When the battery voltage reaches approximately 2.45 volts per cell, or 29.4 volts for a 24V battery, the charger voltage is held constant at this level and the battery current is allowed to reduce. This voltage is maintained until the charging current reduces substantially indicating a full charge. At this point the battery is fully charged.

STAGE III: FLOAT MODE

Float mode is the final stage of the charging routine. Float mode is where the voltage on the battery is maintained at approximately 2.25 volts per cell, or 27.0 volts for a 24V battery. This voltage will maintain the full charge condition in the battery without boiling out electrolyte or overcharging the battery. When the charger is in this mode all lights on the CT500-4 should be green.