



BATTERY CHARGERS

| Models | Amperage | No. Of Banks | Volts |
|--------|----------|--------------|-------|
| 28106 | 6 Amps | 1 Banks | 12 |
| 28210 | 5/5 Amps | 2 Banks | 12/24 |

The Marinco chargers are designed to both recharge your batteries, and extend your battery's life in applications where it is stored for long periods of time. They are multi-stage, completely automatic, lightweight, silent, battery chargers and each output produces 12 Volts DC at either a full 5 or 6 Amps (model specific), while using much less AC current than other charger types. When the charger is attached to your batteries and plugged into a standard 115 Volt / 60 Hz AC outlet, the red and green LED's let you know the unit is recharging and maintaining your batteries. Model 28210 uses Sense-Send Technology to quickly charge two batteries and will automatically start charging when the battery voltage becomes low.

WARNING THIS CHARGER SHOULD BE USED TO CHARGE ONLY LEAD ACID OR AGM TYPE BATTERIES. USE ON OTHER BATTERY TYPES MAY EXPLODE AND CAUSE PERSONAL INJURY.

Charge Pro™ Charger Instructions

IMPORTANT SAFETY INSTRUCTIONS

- A) **SAVE THESE INSTRUCTIONS** - This manual contains important safety and operating instructions for the chargers. Read the entire manual before using. Also read all instructions and cautions for and on the charger, batteries and equipment in the vicinity of the batteries.
- B) Use of an attachment not recommended by the manufacturer may result in a risk of fire, electric shock or injury to persons.
- C) To reduce the risk of damage to electric plug and cord, pull by plug rather than cord when disconnecting the chargers.
- D) 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:
 - i. That pins on plug of extension cord are the same number, size and shape as those of the plug on the charger;
 - ii. That the extension cord is properly wired and in good electrical condition
 - iii. Wire size is large enough for ac ampere rating of the charger as specified below

| Extension Cord Length Feet (M) | AWG Size of Cord |
|---------------------------------------|-------------------------|
| 25 (7.6) | 18 |
| 50 (15.2) | 16 |
| 100 (30.5) | 14 |

- E) Do not operate charger with a damaged cord or plug – replace the cord or plug immediately.
- F) Do not operate the charger if it has received a sharp blow, been dropped, or otherwise damaged in any way.
- G) Do not attempt to disassemble the charger.
- H) To reduce the risk of injury unplug charger from outlet before attempting any maintenance or cleaning. Turning off controls alone will not reduce the risk.
- I) Do not expose charger to rain or snow.

Charge Pro™ Charger Instructions

WARNING – RISK OF EXPLOSIVE GASES

- 1) **WORKING IN VICINITY OF A LEAD-ACID BATTERY IS DANGEROUS. BATTERIES GENERATE EXPLOSIVE GASES DURING NORMAL OPERATION. FOR THIS REASON, IT IS UTMOST IMPORTANCE THAT YOU FOLLOW THE INSTRUCTIONS EACH TIME YOU USE THE CHARGER.**
- 2) To reduce the risk of battery explosion, follow these instruction 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.

Personal Precautions

- A) Someone should be within voice range or close enough to come to your aid when you work near a lead-acid 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 a battery.
- D) If battery acid contacts skin or clothing, wash them immediately with soap and water. If acid enters the eye, immediately flood the eye with cold, running water for at least ten minutes and get medical attention immediately.
- E) NEVER smoke or allow a spark or flame in the vicinity of the battery.
- F) Be extra cautious to reduce risk of dropping a metal tool onto the battery. It may spark or short-circuit the battery or other electrical part that may cause an explosion.
- G) 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-circuit current high enough to weld a ring or the like to metal, causing a severe burn.
- H) 8. Use battery charger for charging a lead-acid battery only. It is not intended to supply power to a low voltage electrical system other than in a starter motor application. Do not use battery charger for charging dry cell batteries that are commonly used with home appliances. These batteries will burst and cause injury to persons and damage to property.
- I) NEVER charge a frozen battery.

Charge Pro™ Charger Instructions

Preparing To Charge

- A) Before charging a battery with the charger, read the following precautions: 1. Do NOT operate the charger if the cables or an LED is damaged.
- B) Make sure all accessories on the product you are charging are OFF.
- C) If the battery or batteries must be removed from the product, always remove the grounded terminal from the battery first. Make sure all accessories in the product are off, so as not to cause an electrical arc.
- D) Be sure the area around the battery is well ventilated while the battery is being charged.
- E) Clean battery terminals. Be careful to keep corrosion from coming in contact with eyes.
- F) Add distilled water in each cell until battery acid reaches levels specified by the battery manufacturer, if applicable. Do not overfill. For a battery without cell caps, carefully follow the manufacturer's recharging instructions.
- G) Study all battery manufacturer's specific precautions while charging and recommended rates of charge.
- H) Determine voltage of battery by referring to product's manual, and make sure it matches output rating of battery charger.

AC Connection and Grounding Precautions

! DANGER DO NOT OPERATE THIS CHARGER WITH A TWO BLADED ADAPTER PLUG OR EXTENSION CORD. DOING SO CAN RESULT IN SERIOUS PERSONAL INJURY.

AFTER SECURING THE BATTERY CONNECTIONS, PLUG THE AC LINE CORD INTO AN AVAILABLE AC OUTLET THAT IS PROTECTED BY A GROUND FAULT CIRCUIT INTERRUPTER (GFCI) BREAKER.

GROUNDING AND AC POWER CORD CONNECTION INSTRUCTIONS:

Charger should be grounded to reduce risk of electric shock. Charger is equipped with an electric cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances.

! DANGER Never alter AC cord or plug provided – if it will not fit outlet, have proper outlet installed by a qualified electrician. Improper connection can result in a risk of an electric shock.

Charge Pro™ Charger Instructions

Choosing Charging Location

- A) The charger should have at least eight inches of unobstructed area on all sides of the unit for effective cooling. The case of this charger will become warm during operation. Because the charger is convection cooled (airflow over the back of the charger), the optimum mounting position for the charger is vertical. Mounting on its back on a horizontal surface may cause the charger to slightly reduce amperage output due to the thermal protection built in. Do not install the charger on carpeted, upholstered, or varnished surfaces.
- B) Locate charger as far away from battery as dc cables permit.
- C) Never place charger directly above battery being charged; gases from battery will corrode and damage charger.
- D) Never allow battery acid to drip on charger when reading electrolyte specific gravity or filling battery.
- E) Do not operate charger in a closed-in area or restrict ventilation in any way.
- F) Do not set a battery on top of charger.

Mounting the Charger

- A) Use corrosion resistant 3/16" dia. or # 10 bolts, backed by a flat washer, and secured to the mounting surface with a split-ring lock washer.
- B) Hold the charger to the mounting surface and mark the holes.
- C) Remove the charger and drill the mounting holes.
- D) Align the charger and assemble the mounting hardware. Secure the charger.

DC Connection Precautions

- A) Connect and disconnect dc output clips only after removing ac cord from electric outlet. Never allow the ring terminals to touch each other
- B) Check polarity of the battery posts. The POSITIVE (POS., P, +) battery post usually has a larger diameter than the NEGATIVE (NEG., N, -) post.
- C) Connect Red charger output wire to POSITIVE post, Black charger wire to NEGATIVE. See below diagrams for more details.
- D) Do not face the battery when making the final connection.
- E) When disconnecting charger, disconnect AC cord and then remove clips from battery terminal.

Charge Pro™ Charger Instructions

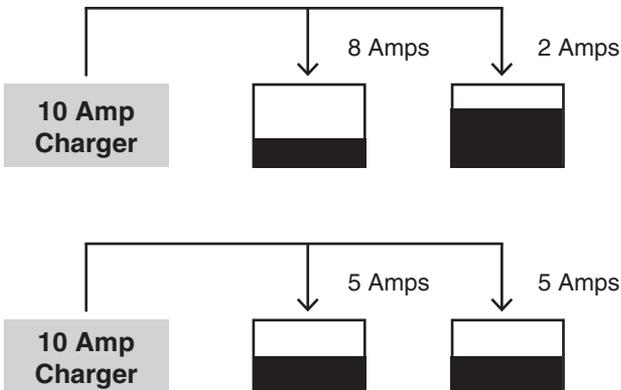
Charge Cycle

- A) Soft Start – Charger verifies connections are good and the battery is capable of accepting a charge. Batteries with very low voltage (near dead) will be slowly charged to not harm the battery. When the battery voltage reaches 10V for 30 seconds the charger switches to the next stage.
- B) Bulk Stage – the charger uses constant current and charges the battery to 14.3 volts. When the battery holds the voltage of 14.3 volts for 30 seconds the charger switches to the next stage.
- C) Absorption Stage - the charger uses constant voltage to charge the battery until the charge current drops just below the rated current for 30 seconds. At this point the charger will switch to the next stage.
- D) Float Stage – the charger finishes the charge cycle by keeping the battery at 13.3 volts for a period of time and determines the battery is charged and shuts down.
- E) Maintenance – the charger will monitor the battery and if the battery voltage drops below 12.8 volts or if 14 days have passed since the last charge the charge cycle will start automatically.

OPERATING THE CHARGER – 5/5 Amp output

Model 28210 quickly charges two batteries using Sense-Send Technology. The charger senses the power needed per battery and sends the allocated power needed.

If the two batteries connected to the charger have different discharged levels the charger will send the majority of the power available to the battery needing the most power and a lower amount to the battery needing less power. This results in faster charging.

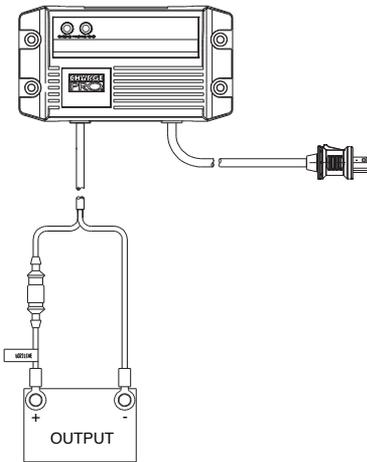


If the two batteries have drained equally the charger will send the same amount of power to each battery.

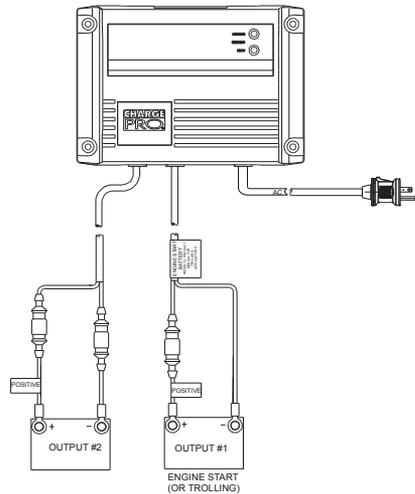
Charge Pro™ Charger Instructions

LED Indicators

| ON | OFF | Condition |
|-------------|-------|--|
| Red | Green | Charger is in the “Soft Start” or “Bulk Stage” and the battery is being charged. If the red LED stays on for more than 24 hours refer to Problem 1 in the troubleshooting section. |
| Red & Green | None | Charger is in the “Absorption Stage” and delivering constant voltage to the battery. If the red and green light stay on for more than 24 hours refer to problem 2 in the troubleshooting section. |
| Green | Red | The charger has moved to the “Float Stage” and is topping off the charge to the battery and keeping the battery ready to use. The green light indicates your battery is ready to use. If the green light stays on when your battery is known to be low, refer to Problem 3 in the troubleshooting section. |

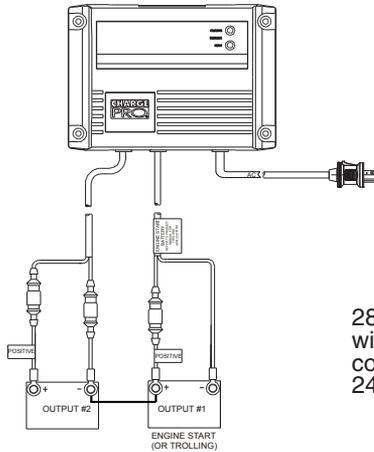


28106 (6 amp) connection with 1 12V battery.



28210 connection used with 2 independent batteries (5/5 amps). Output 1 and 2 maybe connected in parallel for a 12V 10 amp output.

Charge Pro™ Charger Instructions



28210 connection used with 2 12V batteries connected in series for a 24V System.

Specifications

| Model: | 28106 | 28210 |
|---|---|--|
| Input voltage: | 115 V 50/60 Hz AC | |
| Input Amps (Max): | 2.0 Amps | 2.5 Amps |
| Input Voltage Range: | 90-265A AC 50/60Hz | |
| Banks: | 1 | 2 |
| Output Volts: | 12V DC | 12/24V DC |
| Absorption Charge voltage (per bank): | 14.3 V +/- 0.20 V | |
| Float Charge Voltage (per bank): | 13.3 V +/- 0.20 V | |
| Charging current: | 6 amp | 10 amp |
| Rechargeable battery type: | Any 12 V lead acid batteries (Flooded and AGM) | |
| Battery Charge capacity (based on 50% drained battery): | Group 24 through 31 (up to 120 Amp-Hours) | |
| AC Cable Length: | 6 Ft (1.8M) | |
| DC Cable Length: | 4 Ft (1.2M) | |
| Protection type: | IP68 (casing) | |
| Dimensions: | 3.5" L x 6.4" W x 2.3" 89mm L x 198mm W x 58mm D | 5.5" L x 7.8" W x 2.4" 140mm L x 198mm W x 58mm D |
| Weight | 4.0 pounds (1.8 kg) | 5.6 pounds (2.5 kg) |

Charge Pro™ Charger Instructions

| Display | Operating condition | Solution |
|--|---|--|
| Red LED stays on for more than 24 Hrs. | One or more defective or damaged cells | Load test the battery and replace if necessary. |
| | Charger has reduced its output voltage below the normal level due to a DC overload or a DC short. | Remove the source of the overload or short. Disconnect the charger's black (NEGATIVE) terminal from the battery. Reapply AC power and the green LED only should now light. |
| | On-board DC systems are drawing more current than the charger can replace. | Turn off all DC equipment while charging. |
| The red and green LED's stay on for more than 24 Hrs. | On-board DC systems are drawing between 1.5 – 3.5A. | Turn off all DC equipment while charging. |
| | One or more defective or damaged cells. | Load test the battery and replace if necessary. |
| | Extremely low AC voltage at the battery charger | Apply a higher AC voltage source or reduce the length of the extension cord. |
| | | Check battery manufacturer's specs on battery charging. |
| Green LED stays on when the battery is known to be low. | Open DC output fuse. | Replace DC output fuse with a 10 amp fuse for model 28106, 15 amp fuse for model 28210 output. |
| | Faulty or contaminated terminal connections. | Clean and tighten or repair all terminal connections. |
| | One or more defective or damaged cells. | Load test the battery and replace if necessary. |
| Neither of the LED's turn on when the AC power is applied | No AC power available at the charger | Connect AC power or reset the AC breaker on the main panel |
| | Component failure | Go to www.marinco.com under the resources tab, refer to FAQ section. |

Charge Pro™ Charger Instructions

MAINTAINING THE CHARGER

Periodically clean both battery terminals with baking soda and tighten all connections. No other maintenance on the charger is required.

FCC Class B EMC Notice

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 when the equipment is operated in a commercial environment. 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 communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning this 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.

Charge Pro™ Charger Instructions

WARRANTY Statement

LIMITED WARRANTY

For two (2) years from the date of purchase, Maringo will, at its discretion, repair or replace for the original consumer, free of charge, any part or parts found upon examination by Maringo to be defective in material or workmanship or both. All transportation charges under this warranty must be borne by the consumer. Proof of purchase is required. Proof of purchase must be a computerized receipt. Handwritten receipts are not accepted.

Warranty Claim

Thank you for contacting Maringo regarding the product concerns as related to Form, Fit and Function.

Maringo offers an online warranty (RMA) request form on our website. www.marinco.com in the resources tab. Please fill in the online form titled Maringo Warranty Request.

For more information and installation guides, visit our website: www.marinco.com

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