

Mounting and Wiring

Location

Mount the charger as close to the batteries to be charged as possible. Do not mount charger directly over the batteries as battery fumes may cause excessive corrosion. The charger is ignition protected per USCG CFR 183.410 so it is acceptable to mount the unit in areas where this standard is required. The area should be well ventilated and free from excessive moisture, exhaust manifolds and battery fumes.

Mounting

The installer must provide four suitable 1/4" screw/washer sets for mounting the charger. 2" clearance around the charger is required for proper ventilation. Mount vertically for optimum cooling. Note: "Keyholes" may be used to set charger on temporary holding screws while permanent screws are driven into round holes—not to be used as permanent mounting points by themselves.

Cooling Fan Operation

Thermally controlled fans allow continuous operation.

AC Input

Models PT-40U and PT-24-20U operates with "universal" AC input with the range of 90-264V a.c., 47-63 Hz. No switch setting is required for either 115V a.c or 230V a.c. applications.

Proper distribution breaker/fuse values, refer to Input Current Ratings.

115V = 10 Amp Circuit Breaker
230V = 5 Amp Circuit Breaker

Chassis Grounding

*Per ABYC A-31: A d.c. chassis grounding conductor shall be connected from the case of the battery charger to the engine negative terminal or its bus, and must not be more than one size under that required for the d.c. current-carrying conductors, and not less than 16 AWG.

AC Input Cord

The Phase Three Charger is provided with an IEC certified AC power cord. If, for any reason, the plug on the cord must be changed or replaced, observe color coding of AC wiring as follows:
Brown.....a.c. Hot (fused)
Blue.....a.c. Neutral
Green.....a.c. Ground (safety, earth)

Long form technical manual is available in PDF format. Visit www.newmarpower.com/manuals/manuals.html or call us at 800-854-3906.



Fan Intake Filters

Intake filters for cooling fan requires cleaning. For further instructions, please refer to the long form Installation/Operation Manual page 10, Section IV-G.

Following three Features located on left side of charger.

Battery Type Selector Switch

Set switch to match your battery type

12 Volt Models	Charge	Float
Setting	@ 50 % load	@ .5 amp load
Gel-Cell	14.0V d.c.	13.6V d.c.
Flooded/AGM	14.2V d.c.	13.4V d.c.

24 Volt Models	Charge	Float
Setting	@ 50 % load	@ .5 amp load
Gel-Cell	28.0V d.c.	27.2V d.c.
Flooded/AGM	28.4V d.c.	26.8V d.c.

Remote Monitor Panel Port (Option - 12V Only)

Provides remote indication of battery status and indicates charger On/Off status. Refer to the Installation instructions which accompany that product, model EVM-12-2 (12V only)

Temp. Compensation Sensor Port (Option)

Automatically adjusts for ideal output voltage based on battery temperature. Refer to the Installation instructions which accompany that product, model TCS-12/24.

DC Output Wiring-Three Bank Capacity

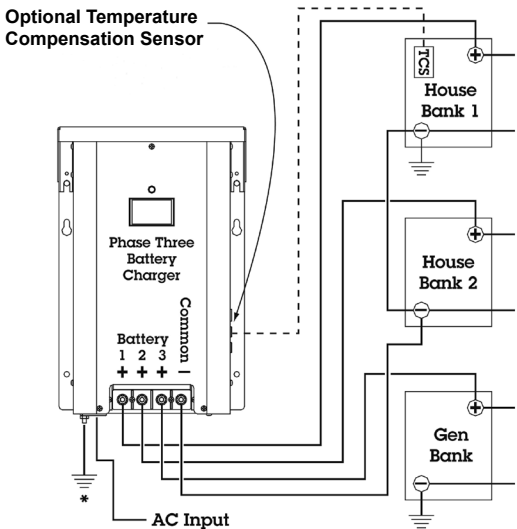
1/4" ring lugs recommended for terminating and attaching wires:

Model	Length of Wire from Charger to Batteries (in feet)		
	10'	15'	20'
Minimum Wire Gauge AWG			
PT-24-20U	#10 (6mm)	#10 (6mm)	#8 (10mm)
PT-40U	#6 (16mm)	#4 (25mm)	#2 (35mm)

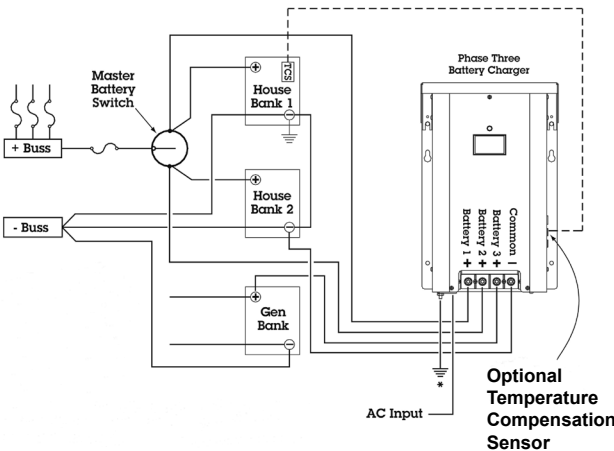
Warning: Pay careful attention to output wire polarity. Reverse polarity hook-up will severely damage the charger. Note: Install provided terminal block cover after wiring to prevent accidental shorting of terminals in the future.

Typical Wiring Schemes

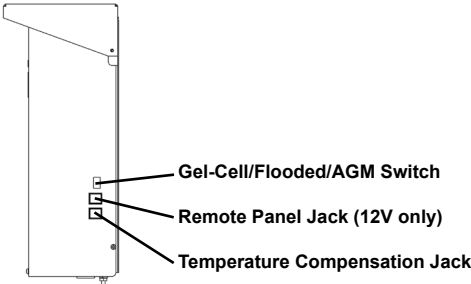
Output Wiring without Battery Switch (preferred method)



Output Wiring with Battery Switch



Temperature Compensation Sensor and Remote Panel Installation



Operation

Three Stage Charge Regimen

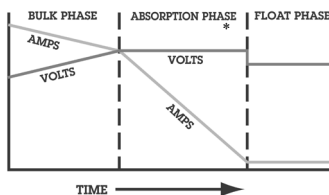
The charger utilizes the three stage charge regimen which is widely recommended by battery manufacturers for allowing the fastest possible recharge time without loss of batteries' electrolyte (gel or liquid) which may be caused by sustained charging at higher voltages. This three stage regimen is initiated each time a.c. is applied:

1) Bulk Phase: When batteries are significantly discharged the charger responds initially by delivering a high amount of d.c. current, at or near the charger's maximum rated output. It is during this stage that charging current is maintained at a high level as battery voltage increases. Bulk charging continues until battery voltage reaches the "charge" voltage level (where batteries are at about 75-80% of capacity). A current limit circuit prevents charger overload during this maximum output stage

2) Absorption Phase: During this second stage of the charge cycle, battery voltage is maintained at the "charge" voltage level. Output current begins to taper off as the battery plates become saturated. Charge voltage is maintained until the current sensing circuit detects that output current has tapered to about 5-15 % of charger rating. At this point the batteries are at about 95 % of full charge and the Phase Three charger switches to the third and final stage of the charge cycle.

3) Float Phase: For extended battery life the charger then automatically switches to a lower float voltage level. This float charge keeps batteries at peak condition without overcharging. The charger may be left in this stage for lengthy periods of time without attention (though periodic checks of electrolyte level in flooded batteries is recommended). It is not necessary or recommended to shut the charger off when this stage is reached.

Typical Charge Output Graph



* Approximately 10 hours maximum at factory settings

Input Current Ratings (@ Full Load)

PT-40U: 6.8 amps @ 115V, 3.4 amps @ 230V
PT-24-20U: 6.8 amps @ 115V, 3.4 amps @ 230V

Output Current Ratings

PT-40U: 40 amps continuous
PT-24-20U: 20 amps continuous

Temperature Rating (all models)

-20°C to + 60°C; Derate linearly from 100% @ 50°C to 60% @ 60°C

Application Notes

Start Up

1) Before powering up your charger, check for tight electrical connections to each battery. Switch off any d.c. loads on the batteries. Apply a.c. power - light above meter will illuminate. Observe the d.c. ammeter on the front panel. This meter displays the total d.c. output of the charger, through all banks. If the meter is reading mid-scale or higher, it is an indication that the batteries are in a relatively low state of charge. If the meter needle is at or near the bottom of the scale the batteries are at or nearing full charge.

2) Apply a load to the charger by switching on some lights, a pump or some other d.c. appliance. Observe the charger meter. It should read approximately the same as the expected current draw of the appliance. As current is demanded from the battery system, the charger will automatically increase its output in response to the increased load demand. When load current exceeds 10-20 % of the charger's rated capacity, the charger will go into the absorption mode and remain there until current drops below 5-15 % of capacity or until the time-out circuit cycle is complete.

Constant Versus Occasional Use

In general, it is recommended that the charger be left connected continuously to the a.c. distribution system so that it will be in operation whenever a.c. is available. **Repeatedly allowing batteries to become completely discharged before recharging will greatly shorten their life. Leaving the charger on continuously will prevent this.**

While the output regulation of the charger will minimize battery gassing and water loss, monthly checks of the electrolyte level (for wet lead acid batteries) are still strongly recommended.

Proper Load Sizing

The charger is rated for continuous duty. While the charger cannot be damaged by overloads that exceed this continuous rating, excessive load demands may draw battery voltage down faster than the charger can resupply it. If battery voltage continues to drop and the output current is at maximum while the charger is in service, check to see that your average d.c. loads are not exceeding the charger's rated output.

Operation With Engine

It is perfectly acceptable to allow the charger to remain on when the engine is started and while it is running. The current limit feature of the Phase Three Charger will protect against any damage due to the high current demands of engine cranking. Output diodes prevent back-feed of current into the charger from the alternator while the engine runs.

Operation as a d.c. Power Supply or Radar Rectifier

The charger produces an extremely well-filtered d.c. output. Therefore it is able to power virtually any d.c. powered device (within the unit's rating) without the battery attached in-line (if, for instance, the battery must be removed for any purpose and a.c. is still available). All but the most sensitive d.c. powered electronic devices will function as normally as if powered by a battery. In addition, the current limiting circuitry enables the charger to handle the high start-up surges associated with inductive loads, such as d.c. motors in radar sets.

IMPORTANT SAFETY INSTRUCTIONS

1. **SAVE THESE INSTRUCTIONS** — This manual contains important safety and operating instructions for the Phase Three Battery Charger.
2. Before using this battery charger, read all instructions and cautionary markings on (1) the battery charger (2) the battery, and (3) any product powered by the battery.
3. **CAUTION** — To reduce the risk of injury, charge only 6 cell (PT-40U) or 12 cell (PT-24-20U) lead-acid rechargeable batteries (flooded, AGM, gel or sealed). Other types of batteries may burst, causing personal injury and damage.
4. Do not expose charger to rain or spray.
5. Use of an attachment not recommended or sold by NEWMAR may result in a risk of fire, electric shock or injury to persons.
6. To reduce the risk of damage to the electric plug and cord (if plugged into an a.c. outlet), pull by plug rather than cord when disconnecting the charger.
7. Make sure the cord is located so that it will not be stepped on, tripped over, or otherwise subjected to damage or stress.
8. An extension cord should not be used. Use of an improper cord could result in a risk of fire and electric shock.
9. Do not operate the charger with a damaged cord or plug; replace them immediately.
10. Do not operate the charger if it has received a sharp blow, been dropped, or otherwise damaged; take it to a qualified serviceman.
11. Do not disassemble the charger; take it to a qualified serviceman when service or repair is necessary. Incorrect reassembly may result in a risk of electric shock and fire.
12. To reduce the risk of electric shock, disconnect the charger from a.c. source before attempting any maintenance or cleaning.

WARNING—RISK OF EXPLOSIVE GASES

1. WORKING IN THE VICINITY OF A LEAD-ACID BATTERY IS DANGEROUS. BATTERIES GENERATE EXPLOSIVE GASES DURING NORMAL BATTERY OPERATION. FOR THIS REASON, IT IS OF UTMOST IMPORTANCE THAT BEFORE INSTALLING AND USING YOUR CHARGER, YOU READ THIS MANUAL AND FOLLOW THE INSTRUCTIONS EXACTLY.
2. To reduce the risk of battery explosion, follow these instructions and those published by the battery manufacturer and by the manufacturer of any equipment you intend to use in the vicinity of the battery. Review all cautionary markings on these products.

PERSONAL PRECAUTIONS

1. Someone should be within range of your voice or close enough to come to your aid when you work near a lead-acid battery.
2. Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing or eyes.
3. Wear complete eye protection and clothing protection. Avoid touching your eyes while working near a battery.
4. If battery acid contacts skin or clothing, wash immediately flood the eye with running cold water for at least 10 minutes and get medical attention immediately.
5. NEVER smoke or allow a spark or flame in the vicinity of the battery or engine.
6. Be extra cautious to reduce the risk of dropping a metal tool onto the battery. It might spark or short-circuit the battery or other electrical part and cause an explosion.
7. Remove personal metal items such as rings, bracelets, necklaces and watches when working with a lead-acid battery. A lead-acid battery can pro-

duce a short-circuit current high enough to weld a ring or the like to metal, causing a severe burn.

8. Use the battery charger for charging gel-cell, AGM or flooded lead-acid batteries only. Do not use the charger for charging dry-cell batteries that are commonly used with home appliances. These batteries may burst and cause injury to persons and damage to property.
9. NEVER charge a frozen battery.

PREPARING TO CHARGE

1. Be sure the area around the battery is well ventilated.
2. Clean battery terminals. Be careful to keep corrosion from coming in contact with eyes.
3. Add distilled water in each cell until battery acid reaches level specified by battery manufacturer. This helps purge excessive gas from cells. Do not overfill. For a battery without cell caps, carefully follow manufacturer's recharging instructions.
4. Study all battery manufacturer's specific precautions such as removing or not removing cell caps while charging and recommended rates of charge.
5. To change the battery chemistry, move selector switch and power cycle the unit.

GROUNDING AND a.c. POWER CORD CONNECTION

The charger should be grounded to reduce the risk of electric shock.

(For marine applications only) **EXTERNAL CONNECTIONS TO THE CHARGER SHALL COMPLY WITH UL RECOMMENDATIONS AND/OR UNITED STATES COAST GUARD ELECTRICAL REGULATIONS (33CFR183, SUB-PART I)**

(For marine applications only) **THE INSTALLATION AND PROTECTION OF VESSEL WIRING ASSOCIATED WITH BATTERY CHARGERS SHALL COMPLY WITH ABYC STANDARDS; E-11) AC & DC ELECTRICAL SYSTEMS ON BOATS, AND A-31) BATTERY CHARGING & INVERTERS.**

Limited Warranty

NEWMAR warrants that this product will be from defects in material and workmanship for two years from the date of purchase.

In the event of a product failure caused by defect of material or workmanship you return the entire product with original packing if possible, freight pre-paid, to the place of purchase or to NEWMAR, 15272 Newsboy Circle, Huntington Beach, California 92649. If this product is determined to be defective by NEWMAR, we will repair the product and ship it back to you without charge. If non-repairable within 30 days, we will ship an equivalent or better replacement product or provide you with a refund of your purchase price. If you have any questions concerning this Limited Warranty, contact us at the below address or call Customer Service at 1-714-751-0488.

Expanded Version of this Manual Available On-Line

This manual is intended to provide for a quick and easy installation reference and operation guide. A more fully detailed manual with expanded explanations and specifications is also available on-line. Simply go to the NEWMAR web site (address below) and click on **PDF Library** to view or print the manual.

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PHASE THREE™

THREE STAGE SMART CHARGER

INSTALLATION / OPERATION MANUAL



Models:

**12 Volt
PT-40U**

**24 Volt
PT-24-20U**

Features

- Three step "smart" charging: bulk, absorption, float
- Gel cell/lead-acid switch selects optimum charge/float voltages based on battery type
- Multiple output banks charge independently based on demand
- "Universal" 115/230V a.c., 50-60 Hz input
- Current limiting prevents damage from overload
- Thermally controlled cooling fans allow continuous operation at full-rated power
- High charge voltage time-out circuit prevents overcharge during continuous high amperage demand
- Use as a power supply without battery; allows use of d.c. loads (when a.c. is available) if batteries are removed.
- Built to last- rugged stainless steel and aluminum case powder coated with marinized internal circuitry; optional-use dripshield provided.

Optional Accessories

- Temperature compensation sensor (model TCS-12/24) fine tunes output voltage based on battery temperature
- Remote panel (model EVM) allows remote monitoring of battery and charger "On" status (12 volt only)

M-PT2420U/40USF-FIL As of 03312025 Rev B