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Model HPX60 Series
Automatic Battery Charger

User's Manual

Rev. 1.0
October 17, 2006

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IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS - This manual contains important safety and operating instructions for Model HPX60 Battery Chargers. Before using the battery charger, please read all instructions and cautionary markings on the battery charger, the battery, and the product using the battery.

CAUTION - To reduce the risk of electric shock:

- Do not expose unit to rain or moisture - use indoors only.
- Do not remove cover. There are no user serviceable parts inside. Refer service to qualified service personnel.
- Connect the battery charger directly to a grounding receptacle. An adaptor should not be used with this unit. This unit is equipped with a power cord having an equipment grounding conductor and a grounding plug (3-prong). The plug must be plugged into an outlet that has been properly installed and grounded in accordance with all local and national codes and ordinances.
- Disconnect charger from AC power and battery before attempting any maintenance or cleaning. Turning off controls may not reduce this risk.

WARNING

- Do not attempt to recharge non-rechargeable batteries. Charge only sealed or valve regulated, lead-acid, non-automotive, maintenance free rechargeable batteries. Attempting to charge other types of batteries may result in personal injury and battery damage.
- The enclosure will become hot during the charge cycle - DO NOT TOUCH!
- Connect or disconnect the output connectors only when the unit is disconnected from AC power or arcing and burning may result (due to the possible presence of explosive gases).

DANGER - Never alter power cord or plug provided. If it will not fit the outlet, replace the power cord with one having the correct plug or have a proper outlet installed by an electrician. Improper connection will result in the risk of an electric shock or fire.

Make sure cords are located so that they will not be stepped on, tripped over, or otherwise subjected to damage or stress. Do not operate this unit with a damaged cord or plug - replace them immediately. To reduce the risk of damage to electric plug, pull by plug rather than cord when disconnecting unit.

Do not operate charger if it has received a sharp blow, been dropped, or otherwise damaged in any way. Do not disassemble charger; incorrect reassembly will result in the risk of an electric shock or fire. Refer service to qualified service personnel.

Recharge batteries in well ventilated areas to prevent build-up of explosive gases.

Allow space around unit and adequate air circulation to reduce internal heat buildup. Do not operate in a small, enclosed space.

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INTRODUCTION



This unit is a two stage, constant voltage battery charger with current limiting, current fold back, and automatic temperature compensation of the output voltage. It is protected against shorting the output terminals and reversing the output terminals on a battery. It is equipped with an IEC-60320 type power input module with fuse holder and a spare fuse. A 6' long detachable power cord with NEMA 5-15P plug is provided for use in North America. Other power cords can be ordered with plugs designed to mate with receptacles in other countries. There is an input voltage selection switch located above the input module to select between 115 and 230 VAC. The standard output cable is 3' long with insulated boots and spring clips. There is one indicator light on the front panel. It lights green to indicate when power is applied and, when a battery is attached, that the charger is in float mode. It lights yellow when the unit is charging the battery. It lights red to indicate a fault condition (shorted or reversed output connector). The unit has a full metal enclosure to ensure field reliability.

This unit is designed to automatically switch into a single stage, float charge mode when the battery is charged. A single stage, parallel charger version is available for keeping a battery fully charged when used with a permanent or intermittent parallel load. The use of an optional low voltage cut out is recommended when using parallel loads. This unit is not designed to operate as a standalone power supply.

OPERATING INSTRUCTIONS

Before using this battery charger, make sure it is compatible with your battery. Refer to the ratings on the battery charger, the specifications in this manual, and your battery documentation. Charge only sealed of valve regulated, lead-acid, non-automotive, maintenance free rechargeable batteries. Attempting to charge other types of batteries may result in battery damage.

Determine the battery polarity. Most batteries identify the positive terminal with a "+" sign or the color red and identify the negative terminal with a "–" sign or the color black. Connect the red insulated output clip to the positive battery terminal and connect the black insulated output clip to the negative battery terminal. If the charger is provided with a polarized connector, make sure your battery connector is wired to match the output connector.

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The input voltage setting is displayed on the selection switch on the back of the unit. If this setting must be changed, make sure the power cord is disconnected while operating the switch. Operating the switch while power is applied may cause damage to the switch or charger. Plug the power cord into a properly grounded outlet which supplies the correct input voltage.

The charger should now be on and charging the battery and the indicator light should now be yellow. The yellow charge light will stay on until the battery is about 95% recharged. At this point the indicator will turn green and the charger will begin the float charge. The battery should be left connected to the charger for at least an additional three hours to ensure a 100% recharge. To help your battery keep its full capacity, we recommend the battery be left connected to the charger in float charge mode until ready to use. This will prevent chronic undercharging, a leading cause of premature battery failure. The float charge is low enough to prevent overcharging, but high enough to allow the battery to replace its standing losses and maintain a 100% state of charge. The battery may be left connected to the charger indefinitely, in float charge mode, without danger of overcharging.

CHARGING NOTES AND TIPS

For safer and more efficient charging, batteries should be charged with higher voltages when cold and lower voltages when warm. This unit incorporates automatic temperature compensation of the output voltage. It will increase the charge voltage in cold conditions and decrease charge voltage in warm conditions. For this feature to work properly, the battery and charger should be located in the same environment (allow the battery and charger to stabilize at room temperature before charging). Initially, the charger voltage may read a little high until its internal temperature warms during operation, thereby lowering the voltage.

Make sure that you only charge the proper voltage battery. Trying to charge a lower voltage battery will cause severe overcharging and trying to charge a higher voltage battery may damage the charger.

These battery chargers are designed to charge a battery at the C/10 rate (battery capacity divided by 10 hours). Therefore, a 40 amphours battery would require a 4 amps charge. Larger or smaller capacity batteries can be charged with these chargers with the following precautions (refer to these charger specifications & your battery documentation for proper switch and charge currents to determine compatibility with this charger):

- When charging a larger capacity battery, it is possible the current will never reduce sufficiently for the charger to enter float mode. Should this occur the battery may become damaged due to over charging. In such a case, the capacity is too great and the battery should be charged with a higher current charger or a parallel charger.
- When charging a smaller capacity battery, the battery may be undercharged because the charger switches into float charge mode too early (relative to

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capacity). Leave the battery connected to the charger for 16-24 hours to finish charging in the float charge mode, or have a unit made with a custom switch current to match the battery capacity.

Xenotronix/TLI can make custom units, or modify our existing units, to exactly match your charging needs. Call our sales department for technical information and pricing.

Following are *some* of the modifications we can perform:

- Reduce charge current to match your battery capacity
- Change switch point to match battery and charge rate
- Adjust float and charge voltages for special conditions or batteries
- Make charger into a float charger (single stage)
- Make charger into a parallel charger (for use with loads in parallel with a battery)
- Provide custom cables and connectors
- Private labeling

TROUBLESHOOTING

NO INDICATOR LIGHT - If the indicator light is dark, check to see if the receptacle is controlled by a light switch or power strip switch. If all else appears normal then the charger probably needs repair or replacement.

NO CHARGE INDICATOR, NOT CHARGING - If the charger will not go into charge mode (yellow indicator) then the battery is probably already charged. Try again with another battery which you know is not charged.

FAULT INDICATOR - If the indicator light is red then either the outputs are hooked up in reverse or shorted together – make sure of the connection to the battery. Note: A nearly completely dead battery (less than one volt) looks like a short to the charger. If you suspect the battery is dead, leave the charger on the battery to see if it will go into charge mode. The charger will deliver a small amount of current into a dead battery and may eventually go into normal charge mode and recover the battery.

CHARGER WILL NOT SWITCH INTO FLOAT MODE - If the charger will not switch into the float mode, even after 24 hours, then the battery is probably damaged and is not properly accepting the charge. Remove the charger and check the open circuit voltage of the battery - there should be about 2.15 V/cell for a properly charged battery (divide the battery voltage by two to get the number of cells). If the battery voltage looks correct then you may be trying to charge a battery which has too large a capacity for the charger (see charging notes and tips).

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MAINTENANCE INSTRUCTIONS

FUSE REPLACEMENT - The AC input module contains the main fuse and a spare fuse. Detach the power cord. Use a flat head screwdriver or a coin to pry open the fuse drawer or holder. Replace the blown fuse with the spare. You can use the old fuse to push out the spare fuse. Now is a good time to install a new spare fuse. Replace fuses only with the same type (as indicated in this manual) and value (as indicated on the charger).

CLEANING - Unplug the charger and disconnect the battery before attempting any cleaning. If it becomes necessary to clean the enclosure, wipe the enclosure exterior with a damp cloth. If necessary, use a mild detergent. Do not use an abrasive cleanser or spray cleaners directly onto the charger. Do not immerse unit in water.

BATTERY CHARGER SPECIFICATIONS

General Conditions	25 °C (77 °F)
Operating temperature	0 to 34 °C (32 to 93 °F)
Storage temperature	-40 to 80 °C (-40 to 176 °F)
Dimensions	W 6.65" (16.9 cm) x D 5.3" (13.5 cm) x H 3.4" (8.6 cm)
Weight	7.4 lbs. (3.4 kg)
Input Fuse Type	5 x 20 mm fast acting, glass cartridge, UL/CSA approved
Power Requirements	115/230 VAC, 50-60 Hz, 0.98 A

Output Ratings (standard calibration):

Model	HPX60-12C400	HPX60-24C200
Charge Amps	4 A	2 A
Charge Voltage	14.40 VDC	28.8 VDC
Switch Amps	approx. 533 mA	approx. 267 mA
Float Voltage	13.60 VDC	27.20 VDC

Other Models (standard calibration):

Charge Amps	see marking label
Charge Voltage	2.40 V/Cell
Switch Amps	approx. Charge Amps/7.5
Float Voltage	2.267 V/Cell

Safety Agency Approval: CSA (12 V models only)

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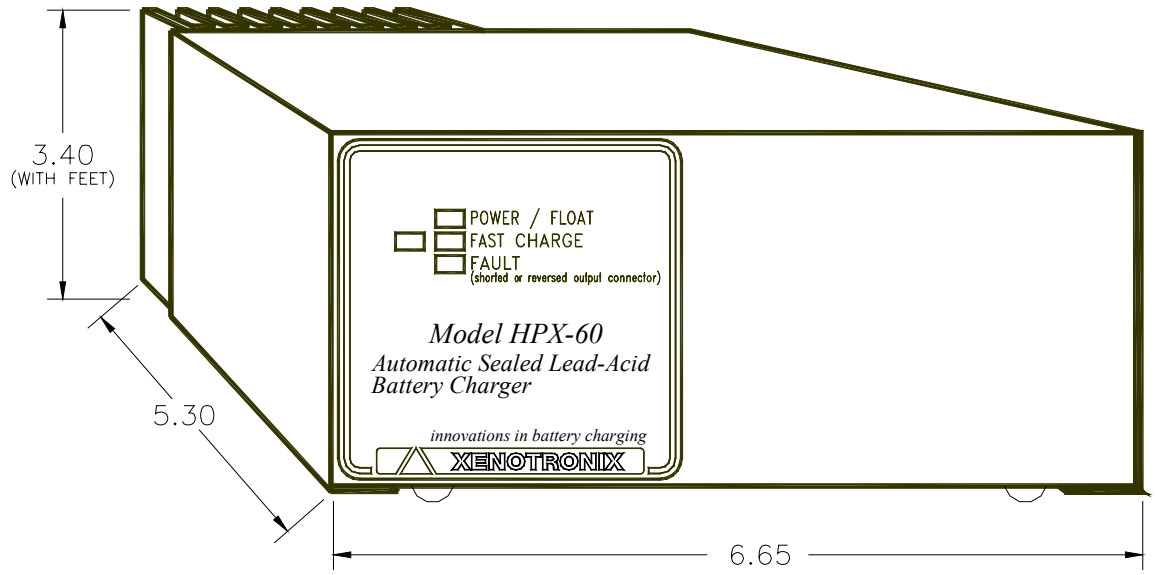
BATTERY RECOMMENDATIONS

Lead-acid batteries charged @ C/10 rate. Smaller capacity batteries may require a smaller charge current to be safely charged. Consult the battery manufacturer or Xenotronix/TLI.

Model	Battery
HPX60-12C400	12 V, 40 AH
HPX60-24C200	24 V, 20 AH

AH = Ampere-hours.
Lead Acid Batteries are nominally rated at
2V per cell (12V = 6 cells and 24V = 12 cells).

DIMENSIONS



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Model HPX60 Series
Automatic Parallel Battery Charger

Supplemental Instructions

IMPORTANT PRECAUTIONS

Follow the battery manufacturer's recommendations when selecting a battery for use with this unit. The battery should be able to accept the full rated output current of this unit or the battery may be damaged if the load is disconnected with the battery in a discharged condition.

When using a load which is greater that the maximum continuous load specification, the battery may not charge and may begin to discharge. The use of a low voltage disconnect (LVD) is recommended.

Temperature compensation is disabled for parallel charger models. If using the charger in an ambient temperature above 35 °C (95 °F) or below 15 °C (59 °F), contact our sales department about receiving a custom model calibrated to match your battery and ambient temperature requirements exactly.

INTRODUCTION

This unit is a Parallel Charger version of the model HPX60 Battery Charger. It is designed to simultaneously float charge a battery while supporting or supplementing a parallel load. It may also be used to maintain larger capacity batteries than it would normally be able to charge.

OPERATING INSTRUCTIONS

Refer to the instructions in the main manual for connecting the battery. Connect the load in parallel with the battery and charger (note the correct polarity if required by the load).

There is one indicator on the front panel. It will light yellow when the unit is operating in the constant current mode at about 75% or more of its maximum rated current. In the constant current mode the unit is not regulating voltage and the battery may not maintain its charge. This unit should not operate continuously in the constant current mode. This unit should only go into the constant current mode intermittently as the parallel load requires, or when charging a discharged battery. The indicator light will switch from yellow to green when the unit is operating in the constant voltage mode at about 75%, or

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less, of its maximum rated current. In the constant voltage mode the unit is regulating voltage and the battery is being properly charged. When the indicator first changes from yellow to green the battery should be more than 80% charged, depending on battery size. It may take an additional 16-24 hours to finish charging the battery to 100%. To insure a full charge and to help your battery keep its full capacity, we recommend the charger be left connected to the battery at all times. There is little danger of overcharging the battery if the above precautions are followed.

If AC power is lost, then the battery must fully support the load. To prevent battery damage from over-discharging, we recommend the use of a low voltage disconnect (LVD). The LVD will cut off the load from the battery when the battery is discharged and, after AC power has been restored, the LVD will automatically reconnect the load after the battery has received a partial charge.

This charger can support a continuous load up one half of its rated output current. For example: If the unit is rated for 1 A it will support a continuous load of 0.5 A. This will leave enough power to keep the battery properly charged and to recharge a discharged battery in the event of a power failure.

If the load is not continuous, it can be greater than the maximum continuous load specification. However, when operating with a higher current load the battery may not keep its charge and may begin to discharge. The load must be shut off intermittently to insure the battery is kept charged and to allow the charger to cool down.

If the load is greater than the maximum rated output current of the charger, the battery will become discharged. Allow for adequate recharge time.

BATTERY CHARGER SPECIFICATIONS

Output Ratings (standard calibration):

Model	HPX60-012P400	HPX60-24P200
Charge Amps	4 A	2 A
Maximum Continuous Load	2 A	1 A
Voltage	13.60 VDC	27.20 VDC

Other Models (standard calibration):

Charge Amps	see marking label
Maximum Continuous Load	½ of Charge Amps
Voltage	2.267 V/Cell

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