



INTELLIGENT BATTERY CHARGER OPERATOR'S MANUAL



MODEL NO. HB-ZN04

IMPORTANT SAFETY INSTRUCTIONS

- 1. SAVE THESE INSTRUCTIONS.** This manual contains important safety and operating instructions. You may need to refer to these instructions at a later date.
- 2. CAUTION.** To reduce risk of injury, charge only wet cell, lead-acid, automotive type rechargeable batteries. Other types of batteries may burst causing personal injury and property damage.
- 3.** Do not expose charger to rain or snow.
- 4.** 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.
- 5.** To reduce risk of damage to electric plug and cord, pull by plug rather than cord when disconnecting charger.
- 6.** Make sure cord is located so that it will not be stepped on, tripped over, or otherwise subjected to damage or stress.
- 7.** 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

- 8.** Do not operate charger with damaged cord or plug, replace the cord or plug immediately.
- 9.** 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.
- 10.** 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.
- 11.** To reduce risk of electric shock, unplug charger from outlet before attempting any maintenance or cleaning. Turning off controls will not reduce this risk.
- 12. WARNING - RISK OF EXPLOSIVE GASES**
 - a.** WORKING IN 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 EACH TIME BEFORE USING YOUR CHARGER, YOU READ THIS MANUAL AND FOLLOW THE INSTRUCTIONS EXACTLY.
 - 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.

13. PERSONAL PRECAUTIONS

- a.** Someone should be within range of your voice 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 battery.
- d.** If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enter 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 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.** Use 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 may burst and cause injury to persons and damage to property.
- i.** NEVER charge a frozen battery.

14. PREPARING TO CHARGE

- a.** If necessary to remove battery from vehicle to charge, always remove the 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. Gas can be

forcefully blown away by using a piece of cardboard or other non-metallic material as a fan.

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. This helps purge excessive gas from cells. Do not overfill. For a battery without cell caps, carefully follow manufacturer's recharging instructions.

e. Study all the battery manufacturer's 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.

If charger has adjustable charge rate, charge battery initially at lowest rate.

15. 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 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.

16. 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 posts and twist or rock back and forth several times to make a good connection. This tends to keep the clips from slipping off terminals and helps to reduce risk of sparking.

17. 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 item "e". If positive post is grounded to the chassis, see item "f".

e. For negative-grounded vehicle, connect POSITIVE (RED) clip from battery charger to POSITIVE (POS, P, +) ungrounded post of battery.

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. 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.

18. 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 the 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.

19. AC POWER CORD CONNECTION INSTRUCTIONS

The plug must be plugged into an outlet that is properly installed 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. This battery charger is for use on a nominal 230-volt circuit.

20. LENGTH OF CHARGE

The following instruction will allow you to determine how long it will take to bring a specific battery to full charge.

a. Test the battery for state of charge with a hydrometer or electronic percent-of-charge tester.

b. Determine the size of the battery in Amp-Hour or Reserve Capacity. If the ratings are not printed on the battery, contact your local battery dealer for this information. These are the only ratings that can be used to determine length to charging time.

c. Use the battery rating, the charge level of the battery, and amp setting to be used on the charger in the formula provided below.

$$\frac{\text{Amp Hour Rating of Battery} \times \text{Percent of Charged Needed}}{\text{Amp Setting Selected On Charger}} = \text{Hours to Charge}$$

d. If the battery is rated in Reverse Capacity, use the following formula to convert reverse capacity to amp-hours.

$$\frac{\text{Reverse Capacity}}{2} + 15.5 = \text{Amp-Hour Rating}$$

NOTE: The length of charge times are approximate and vary from the battery to battery.

Always follow the battery manufacturer's specific charging instructions.

21. OPERATING INSTRUCTIONS

Before using review all safety and connection directions before using charger. Failure to do so can damage battery and cause serious injury or death.

FEATURES:

6V-12V 4A Intelligent Battery charger

1. **Charging voltage: 6V/12V;**
2. **Input voltage: 230-240V 50-60HZ Input power: 60W**
2. **LED DISPLAY**
3. **Suitable for battery from 1.2 to 120AH**
4. **Suitable for WEL, GEL, AGM and MF batteries**
5. **Continuous trickle charging function**
6. **Micro-controlled unit with 7 charging stage**
7. **Fully protection: Short circuit, reverse polarity, open circuit, spark proof, over charge, overload protection**

SELECT MODE switch use:

- 6V motorcycle mode (2A) — Use this setting for charging large 6volt batteries
- 6V Motorcycle snow mode (2A) — Use this setting for charging small 6 volt batteries in winter.
- 12V Motorcycle mode (2A) — Use this setting for charging 12 volt batteries
- 12V Motorcycle snow (2A) — Use this setting for charging large 12 volt batteries in winter.
- 12V Vehicle mode (4A) — Use this setting for charging small 12 volt batteries
- 12V Vehicle snow mode (4A) — Use this setting for charging 12 volt batteries in winter.

Charging:

- Connect the charger to battery and AC power per instructions in sections 16 & 17 or 18.
- Select the appropriate charger voltage for your batter
- Connect the charger to the AC power, the POWER Led will be on; If the clamps are not connected to the battery, or reverse connected, or the vehicle battery voltage is less than 0.5V, the Error1 Led will be on, otherwise the Error 1 LCD will be not on.
- Select the mode and wait for 5 seconds. If the vehicle battery voltage is less than 1.5V, the Error1 Led will be on; in 6V mode, if the charger is connected to above 7.8V battery, the Error 1 Led will be on; In 12V mode, if the charger is connected to above 15.6V battery, the Error 1 Led will be on.
- For 6V Battery, if the voltage is less than 5.5V±0.2V after charging for 4 minutes or the voltage is less than 6V after repairing with high voltage for 6 hours, the battery will be regarded as bad battery, and the Error 2 LCD will be on.
- For 12V Battery, if the voltage is less than 11V±0.2V after charging for 4 minutes or the voltage is less than 12V after repairing with high voltage for 6 hours, the battery will be regarded as bad battery, and the Error 2 LCD will be on.

Charging Stage:

Automatic Micro Process Control Unit Charge:

Stage 1 —Diagnosis: Analysis the battery can be charged or not, so as to prevent charging a defective battery; If the battery voltage is 0V-0.5V, the charger regards wrong connection; 0.5V-1.5V is bad battery; 1.5V-12V, it will start the pre-charge stage; 12V-14V, it will start the Constant Current charging stage; 14V-15V is fully charged; If battery is >15V, the charger regards wrong connection.

Stage 2—Pre-charge stage: If the battery voltage is 1.5V-12V, the charger will charge the

battery with a small current to charge for better maintenance the battery;

Stage 3 — Soft start stage: Bulk charging process with a gentle (soft) charging current.

Stage 4—CC1, CC2, CC3 (Constant Current stage): Fast speed charging status.

Automatically adjust the charging current according to the battery status to benefit for battery long life;

Stage 5—CV (Constant Voltage) Absorption charging stage. The charging voltage keeps at 14.6V, but the charging current reduces gradually until the battery is fully charged.

Stage 6—resting: After the battery is fully charged, the charging will be cut off.

Stage 7—Restoring: Automatically On-off Monitoring. The charger will monitor a fully charged battery. If the battery falls below 12.8VDC, the charger will restart and enter into stage one for charging again

- When charging is complete, unplug the charger from the AC outlet.

AUTOMATIC On-off Circuit:

For the automatic charging feature, charger dc output will shut off when correct voltage is reached. Monitor charging a minimum of daily to ensure that the battery does not over-charge and battery electrolyte is correct.

22. POSSIBLE CHARGING PROBLEMS

PROBLEM	CAUSE	SOLUTION
Bad Battery	Error LCD may light when the battery voltage is less than 2V; or the battery has a faulty condition such as open, shorted cell or sulfated condition.	Have the battery tested by a qualified technician.
Battery not accepting a charge	<ul style="list-style-type: none"> • Lack of AC input power • Faulty connections to battery terminals • Wrong charge voltage selection • Battery voltage too low 	<ul style="list-style-type: none"> • Make sure that the charger is plugged into AC outlet and POWER LCD is lit. • Unplug the charger and check the battery connection; ensure that there is a good connection at the battery terminal/post and/or vehicle chassis. • Check that the correct charge voltage was selected for the battery being charged. • Ensure enough charging time was allowed to charge battery.

23. MAINTANENCE INSTRUCTIONS

This charger requires minimal maintenance. As with any appliance or tool, a few common sense rules will prolong the life of the battery charger.

ALWAYS BE SURE THE CHARGER IS UNPLUGGED BEFORE PERFORMING ANY MAINTENANCE OR CLEANING.

1. Store in a clean, dry place
2. Coil up the cords when not in use.
3. Clean the case and cords with a slightly damp cloth.
4. Clean any corrosion from the clamps with a solution of water and baking soda.
5. Examine the cords periodically for cracking or other damage and have them replaced if necessary.
6. **WARNING:** All other service should be done by qualified personnel only.

COUNTRY OF ORIGIN: CHINA

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