# BATTERY CHARGER

# HYBC-10

Please read and understand all important safety and operating instructions before using this charger. In addition, please read and follow all battery and vehicle manufacturer's instructions and cautionary markings.

HYUNDAI

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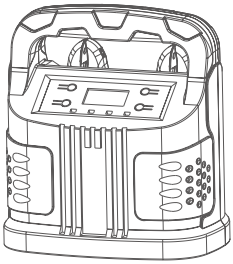

We are still constantly improving this battery charger, therefore, some parts of this battery charger may be changed in order to achieve the better quality, but the main functions and operations will not be alternated and changed. Your understanding would be greatly appreciated.

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# 1. SAFETY

**SAFETY PRECAUTIONS FOR WORKING IN THE VICINITY OF A BATTERY**

1) Batteries generate explosive gases during normal operation. Use in well-ventilated area.
2) Consider having someone close enough or within the range of your voice to come to your aid when you work near a battery.
3) Do NOT smoke, strike a match, or cause a spark in vicinity of battery or engine. Avoid explosive gas, flames and sparks.
4) Remove all personal jewelry, such as rings, bracelets, necklaces, and watches while working with a vehicle battery. These items may produce a short-circuit that could cause severe burns.
5) Be extra cautious to reduce risk of dropping a metal tool onto the battery. It might spark or short-circuit a battery or other electrical hardware which may cause an explosion or fire.
6) Wear complete eye protection, hand and clothing protection. Avoid touching eyes while working near a battery.
7) Study all battery manufacturer's specific precautions such as removing or not removing cell caps while charging and recommended rates of charge.
8) Clean battery terminals before connected with the charger. Be careful to keep corrosion from coming in contact with eyes.
9) When it is necessary to remove a battery from vehicle to charge, always remove grounded terminal from battery first. Make sure all accessories in the vehicle are off in order to prevent an arc.
10) It is NOT intended to supply power to an extra-low-voltage electrical system or to charge dry-cell batteries. Charging dry-cell batteries may burst and cause injury to persons and property.
11) NEVER charge a frozen, damaged, leaking or non-rechargeable battery.
12) If battery electrolyte contacts skin or clothing, wash immediately with soap and water. If electrolyte enters eye, immediately flood eye with running clean cold water for at least 15 minutes and get medical attention immediately.

**SAFETY PRECAUTIONS FOR USING THE CHARGER**

1) Do NOT place the charger in the engine compartment or near moving parts or near the battery; place as far away from them as DC cable permits. NEVER place a charger directly above a battery being charged; gases or fluids from battery will corrode and damage charger.
2) Do NOT cover the charger while charging.
3) Do NOT expose to rain or wet conditions.
4) Connect and disconnect DC output only after setting AC cord from electric outlet.
5) Use of an attachment not recommended or sold by the manufacturer may result in a risk of fire, electric shock or injury to persons.
6) Do not overcharge batteries by selecting the wrong charge mode.

7) To reduce the risk of damage to electric plug and cord, pull by the plug rather than the cord when disconnecting charger.
8) To reduce risk of electric shock, unplug charger from outlet before attempting any maintenance or cleaning.
9) Operate with caution if the charger has received direct hit of force or been dropped. Have it checked and repaired if damaged.
10) Any repair must be carried out by the manufacturer or an authorized repair agent in order to avoid danger.

## 2. CONNECTING TO THE BATTERY

1) Identify polarity of battery posts. The positive battery terminal is typically marked by these letters or symbol (POS,P,+). The negative battery terminal is typically marked by these letters or symbol (NEG,N,-).
2) Do not make any connections to the carburetor, fuel lines, or thin metal parts.
3) Identify if you have a negative or positive grounded vehicle. This can be done by identifying which battery post (NEG or POS) is connected to the chassis.
4) For a negative grounded vehicle (most common): connect the RED POSITIVE battery clamp first to the positive battery terminal, then connect the BLACK NEGATIVE battery clamp to the vehicle chassis or negative battery terminal.
5) For a positive grounded vehicle (very uncommon): connect the BLACK NEGATIVE battery clamp first to the negative battery terminal, then connect the RED POSITIVE battery clamp to the vehicle chassis or positive battery terminal.
6) When disconnecting, disconnect in the reverse sequence, removing the negative first (or positive first for positive ground systems).

**NOTICE**: If battery clamps are reversely connected to battery terminals, the ERROR light will be on.
Exchange the battery clamps to solve this problem

# 3. ABOUT HYBC-10

1) The HYBC-10 is designed for charging all types of 12V lead-acid , including WET (Flooded), GEL, MF (Maintenance-Free), EFB (Enhanced Flooded Battery), AGM (Absorbed Glass Mat) batteries.
2) Built-in intelligent microprocessor makes charging faster, easier and safer.
3) This charger has safety features, including spark proof, protection for reverse polarity, short circuit, overcurrent, overcharge and overheat.
4) Auto-memory: after power on, the display window of charger will show the last selected mode (except BOOST mode). The charger will enter charging mode in 5 seconds around.
5) When the CHARGE LED is on, it is on charging; when the CHARGE LED is off and FULL LED is on, the charging is completed. But do NOT break the connection immediately. It will automatically switches from full charge to maintenance status to maintain batteries during prolonged periods of storage.
6) It shows present voltage when VOLTAGE button is pressed.
7) Following is the charger's technical specification:

| | |
|---|---|
| **AC Input** | AC 220~240V, 50/60Hz, 280W Max |
| **DC Output** | DC 6V 2A/5A, DC 12V 2A/5A/10A, DC 12V 15A 300s(Boost) |
| **Efficiency** | 85% Approx |
| **Power** | 280W Max |
| **Start Voltage** | > 3V |
| **Charger Type** | 8 steps, Full-automatic Charging Cycle |
| **Battery Type** | All Types of 6V and 12V Lead-acid Batteries |
| **Battery Capacity** | 2-150Ah (6V), 2-300Ah (12V), Maintains All Battery Sizes |
| **Boost Mode** | 300s for 12V Lead-acid Batteries |
| **Housing Protection** | IP20 |
| **Ambient Temperature** | 0˚C ~ +40˚C |

# 4. CHARGING MODES

HYBC-10 charger has seven (7) modes: STANDBY, 6V/2A, 6V/5A, 12V/2A, 12V/5A, 12V/10A and BOOST. Do not operate the charger until you confirm the appropriate charge mode for your battery.

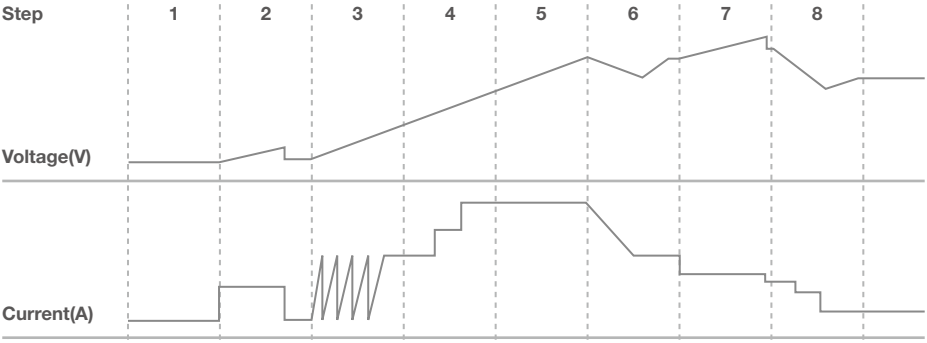
| Mode | Display | POWER LED | Explanation |
|---|---|---|---|
| STANDBY | - | ON | Not charging or providing any power. If you want charging to pause, press ON/OFF button and it will enter STANDBY mode. |
| 6V/2A | 02A | OFF | Connected to battery, it can turn into 2A by pressing CURRENT button. This mode is recommended for 2-60AH batteries. |
| 6V/5A | 05A | OFF | Connected to battery, it can turn into 5A by pressing CURRENT button. This mode is recommended for 10-150AH batteries. |
| 12V/2A | 02A | OFF | Connected to battery, it can turn into 2A by pressing CURRENT button. This mode is recommended for 2-60AH batteries. |
| 12V/5A | 05A | OFF | Connected to battery, it can turn into 5A by pressing CURRENT button. This mode is recommended for 10-150AH batteries. |
| 12V/10A | 10A | OFF | Connected to battery, it can turn into 10A by pressing CURRENT button. This mode is recommended for 40-300AH batteries. |
| BOOST | FAS | OFF | Connected to battery, it can enter BOOST mode by pressing BOOST button. It takes 5 minutes to charge. |

**BOOST mode is advanced charging mode that require your full attention before selecting.**

**Using 12V BOOST**

To operate BOOST, the charger must be connected to a 12V lead-acid battery with the battery clamps connected. For optimal results, allow boost to complete its 5-minute charge. After 300-second boost, digital tube will show “000”, and your are ready to start your vehicle (whether FULL light is illuminated or not). If unsuccessful when starting your vehicle, let the battery rest for 15 minutes and try boost again. Most vehicles will start with one (1) boost. Do not use boost more than two (2) times within a 24-hour period. If two (2) boosts cannot successfully start your vehicle, have your battery replaced or evaluated by a local battery store.

# 5. CHARGING STEPS




**STEP 1: DIAGNOSIS** (Check if battery has connected with the charger and also check battery voltage)
**STEP 2: ANALYSE** (Check if battery can reach to the threshold after charging for a period)
**STEP 3: DESULPHATION** (Desulfation process by pulsing)
**STEP 4: SOFT START** (Charge with echelon constant current)
**STEP 5: BULK** (Charge with constant maximum current until battery voltage is reached to the threshold)
**STEP 6: ABSORPTION** (Provide gradually declining current charge for maximum battery voltage)
**STEP 7: TRICKLE CHARGE** (Finalize the charging process and bring the battery to maximum capacity)
**STEP 8: MAINTENANCE** (Continuously monitor the battery, and charging current will intelligently adapt to the variable battery voltage)

**NOTICE:** After full charging cycle, use this battery to start matched vehicle's engine. If engine cannot be activated (exclude the problem of vehicle itself), it indicates this battery has declined storage capacity and need to be replaced.

# 6. ERROR MESSAGES

When ERROR LED is on and the digital display shows following messages, it means the charger detects the fault. Therefore, the user should solve the fault before use. If the user could not solve problems, please consult the professional person.

**E01**: Temperature inside charger is too high.

**E02**: No-load or the battery voltage is rather low.

**E03**: Choose 6V charging modes for 12V batteries.

**E04**: Battery cannot hold charge (dead battery).

**E05**: Battery cannot reach to the threshold after charging for a period (dead battery).

**E06**: Reverse connection.

# EC Declaration of Conformity

CE 2018

We :

**HYUNDAI Corporation**
25, Yulgok-ro 2-gil, Jongno-gu, Seoul 03143 Korea

Declare that the product detailed below :
**BATTERY CHARGER FOR LEAD ACCUMULATOR**
**MODEL : HYBC-10**

Satisfies the requirements of the Council Directives :
EMC directive 2014/30/EU
Low Voltage Directive 2014/35/EU
RoHS Directive (EU) 2015/863

and conform with the norms :
EN 55014-1:2006/+A1:2009/+A2:2011
EN 55014-2:2015
EN 61000-3-2:2014
EN 61000-3-3:2013

EN 60335-2-29:2004 + A2: 2010 to be used in conjunction with EN 60335-1:2012 + A11:2014 and EN 62233: 2008

General Manager

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Project Manager

**Donghoon Park**

**Date : 2018.08.01**

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Made in P.R.C

HYUNDAI