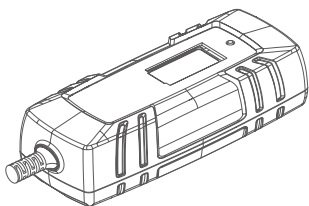


# BATTERY CHARGER

## HYSC-4000E

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.

**HYSC-4000E**



We are still constantly improving this smart battery charger, therefore, some parts of this smart 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

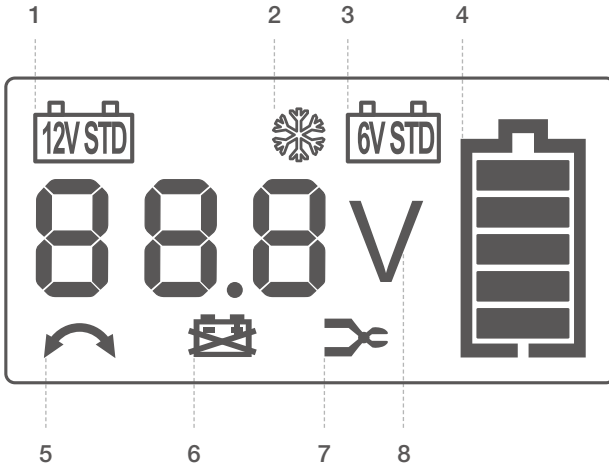
- 1) Identify polarity of battery posts. The positive battery terminal is typically marked by these letters or symbol (POS,P,+). The negative battery terminal is typically marked by these letters or symbol (NEG,N,-).
- 2) Do not make any connections to the carburetor, fuel lines, or thin metal parts.
- 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 negative battery terminal or vehicle chassis.
- 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 positive battery terminal or vehicle chassis.
- 6) When disconnecting, disconnect in the reverse sequence, removing the negative first (or positive first for positive ground systems).
- 7) A marine (boat) battery must be removed and charged on shore. To charge it on board requires equipment specially designed for marine use.

### 3. ABOUT HYSC-4000E

- 1) The HYSC-4000E is designed for charging all types of 6V lead-acid and 12V lead-acid batteries, including WET (Flooded), MF (Maintenance-Free), EFB (Enhanced Flooded Battery), GEL, 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, overheat and overcharge.
- 4) When the battery level indicator bars are flashing, it is on charging; when 5 bars are solid, the charging is completed. But do NOT break the connection immediately. It will automatically switches from full charge to maintenance status without overcharging or damaging the battery.
- 5) Following is the charger's technical specification:

<b>AC Input</b>	AC 220~240V, 50/60Hz, 70W Max
<b>DC Output</b>	DC 6V 1A, DC 12V 1A/4A
<b>Power (IN)</b>	Variable Power, 70W Max
<b>Efficiency</b>	85% Approx
<b>Back Current Drain</b>	<5mA
<b>Ambient Temperature</b>	0°C ~ +40°C
<b>Charger Type</b>	8 steps, Full-automatic Charging Cycle
<b>Battery Type</b>	All Types of 6V and 12V Lead-acid Batteries
<b>Battery Capacity</b>	1.2-40Ah (6V), 1.2-120Ah (12V), Maintains All Battery Sizes
<b>Housing Protection</b>	IP54
<b>Accessories Included</b>	Cable Clamps
<b>Other Features</b>	Norm / Cold Mode, and automatically detect 6V or 12V battery

## 8) LCD Icons:



1) 12V STD Mode

2) COLD Mode

3) 6V STD Mode

4) Battery Level Indicator

5) Reverse Polarity Connection Indicator








6) Faulty Battery Indicator (Battery voltage is lower than 1V / Battery cannot hold the charge / Battery voltage cannot reach to the threshold after charging in the required period)

7) Clamp Indicator (Open-circuit / Dirty battery posts / Dead battery / Output Short Circuit)

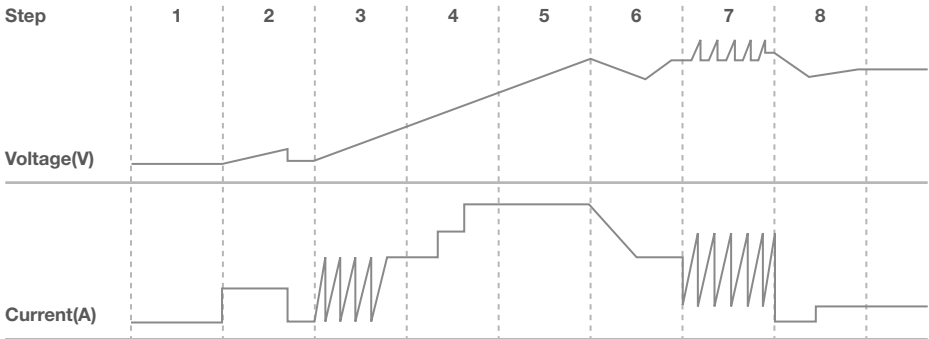
8) Battery Voltage Indicator (press & hold Mode button for 3 seconds to display the battery's voltage)

## 4. CHARGING MODES

HYSC-4000E has five modes: 1A 12V STD, 4A 12V STD, 1A 12V COLD, 4A 12V COLD, and 1A 6V STD. Do not operate the charger until you confirm the appropriate charge mode for your battery.

Mode	Icon Display	Battery Size(Ah)	Explanation
1A 12V STD	81.0 	1.2-40	Charging 12V WET/GEL/MF/EFB batteries
4A 12V STD	84.0 	1.2-120	Charging 12V WET/GEL/MF/EFB batteries
1A 12V COLD	81.0  	1.2-40	Charging 12V WET/GEL/MF/EFB batteries below 10°C (50°F) or AGM batteries
4A 12V COLD	84.0  	1.2-130	Charging 12V WET/GEL/MF/EFB batteries below 10°C (50°F) or AGM batteries
1A 6V STD		1.2-40	Charging 6V WET/GEL/MF/EFB/AGM batteries

## 5. CHARGING STEPS



**STEP 1: TESTING** (Check if battery has connected with the charger and also check battery voltage)

**STEP 2: ANALYSING-JUDGED** (Will show the vehicle battery's voltage on the screen first. Analyse if the connected battery is 12V or 6V, and will enter into the corresponding charging mode 12V STD or 6V STD in 1 minute)

**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: PULSE CHARGE** (Pulse with trickle current)

**STEP 8: MAINTAINING** (Continuously monitor the battery, and once the voltage is lower than threshold, the charger will enter trickle charge).

## 6. BATTERY LEVEL INDICATOR

Display	Explanation
 20%	The 20% bar will slowly flash when the battery level is less than 20%. When 20% is reached, the bar will be solid.
 40%	The 40% bar will slowly flash when the battery level is less than 40%. When 40% is reached, the bar will be solid.
 60%	The 60% bar will slowly flash when the battery level is less than 60%. When 60% is reached, the bar will be solid.
 80%	The 80% bar will slowly flash when the battery level is less than 80%. When 80% is reached, the bar will be solid
 100%	The 100% bar will slowly flash when the battery level is less than 100%. When 100% is reached, the bar will be solid. Meanwhile the maintenance charging is activated.

# EC Declaration of Conformity



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 : HYSC-4000E**

Satisfies the requirements of the Council Directives :

EMC directive 2014/30/EU

Low Voltage Directive 2014/35/EU

RoHS Directive 2011/65/EU

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

EN 60335-1:2012 + A11:2014

EN 62233:2008

General Manager

A handwritten signature in black ink, appearing to be 'Yoonsung Lee', written over a horizontal line.

Yoonsung Lee

Project Manager

A handwritten signature in black ink, appearing to be 'Donghoon Park', written over a horizontal line.

Donghoon Park

Date : 2018.08.01

HYUNDAI Corporation

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