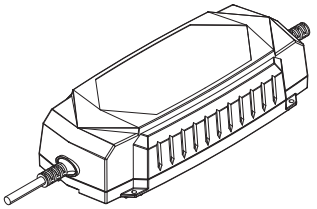
BATTERY CHARGER

HYSC-7000

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

HYSC-7000



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

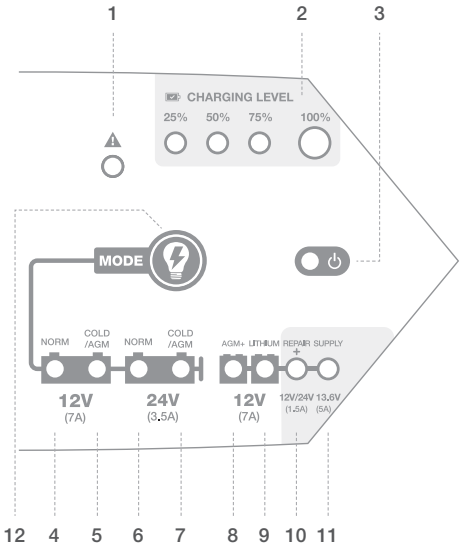
1) Identify polarity of battery posts. The positive battery terminal is typically marked by these letters or symbol (POS,P,+). The negative battery terminal is typically marked by these letters or symbol (NEG,N,-).
2) Do not make any connections to the carburetor, fuel lines, or thin metal parts.
3) 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 clamp / ring connector first to the positive battery terminal, then connect the BLACK NEGATIVE clamp / ring connector to the negative battery terminal or vehicle chassis.
5) For a positive grounded vehicle (very uncommon): connect the BLACK NEGATIVE clamp / ring connector first to the negative battery terminal, then connect the RED POSITIVE clamp / ring connector 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) Follow these steps when using 12V accessory plug: keep the vehicle hood open. Connect the end of the 12V accessory plug to the charger; insert the 12V accessory plug into the vehicle's 12V outlet. If the vehicle's ignition key has to be on in order for the 12V outlet to supply / receive power, turn the key, without starting the engine.
8) 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-7000

1) The HYSC-7000 is designed for charging all types of 12V lead-acid ,24V lead-acid and 12V lithium-ion batteries, including WET (Flooded), GEL, MF (Maintenance-Free), EFB (Enhanced Flooded Battery), AGM (Absorbed Glass Mat),AGM+ (Absorbed Glass Mat+) and LIB (Lithium Ion) 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) It has auto-memory, which returns to last selected mode when restarted (except Standby Mode).
5) When battery charging level indicator turns to 100% solid Green LED, it will automatically switches from full charge to maintenance status to maintain batteries during prolonged periods of storage without overcharging or damaging the battery.
6) The HYSC-7000 has four external holes for mounting. Mount the charger in a desired location with equipped self-drill screws. It is important to keep in mind the distance to the battery.
7) Following is the charger's technical specification:

AC Input	AC 220V-240V, 50/60Hz, 120W Max
DC Output	DC 12V 7A, DC 24V 3.5A, Temperature Controlled
Charger Type	8 steps, Full-automatic Charging Cycle
Start Voltage	> 1V
Housing Protection	IP54
Battery Type	All Types of 12V & 24V Lead-acid Batteries, and 12V Lithium Ion Batteries
Battery Capacity	14-230Ah (12V), 14-115Ah (24V), Maintains All Battery Sizes
Accessories Included	Clamp Connectors, Ring Connectors, 12V Cigarette Lighter Plug, Screws
Ambient Temperature	0˚C ~ +40˚C

8) LED Indicator



(1) Warning Indicator

(2) Battery Charging Level Indicator

(3) Standby Mode

(4) 12V (7A) NORM Mode

(5) 12V (7A) COLD/AGM Mode

(6) 24V (3.5A) NORM Mode

(7) 24V (3.5A) COLD/AGM Mode

(8) 12V (7A) AGM+ Mode

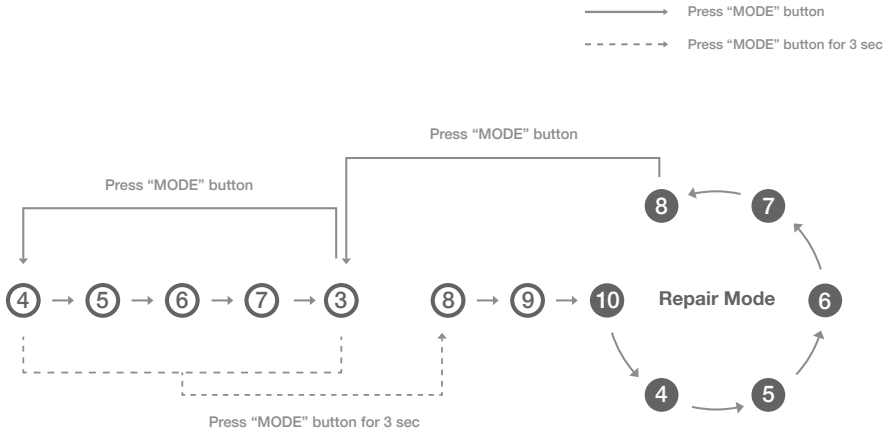
(9) 12V (7A) LITHIUM Mode

(10) 12/24V (1.5A) REPAIR Mode

(11) 13.6V (5A) SUPPLY Mode

(12) Mode button

9) Mode conversion



- For selecting Repair mode(10), press "MODE" button for choosing suitable 12V mode or 24V mode(4~8)

- When this battery charger is disconnected with battery, Supply mode(11) is available for use

4. CHARGING MODES

HYSC-7000 has nine modes: Standby, 12V NORM, 12V COLD/AGM, 24V NORM, 24V COLD/AGM, 12V AGM+, 12V LITHIUM, 12V/24V REPAIR and 13.6V SUPPLY. Some charge modes must be pressed for three (3) seconds or / and pressed to enter the mode. Do not operate the charger until you confirm the appropriate charge mode for your battery.

Mode	Indicator No.	LED light	Battery Size (Ah)	Explanation
Standby	3	Green	-	Not charging or providing any power
12V NORM	4	Green	14-230	Charging 12V WET/GEL/MF/EFB batteries
12V COLD/ AGM	5	Green	14-230	Charging 12V batteries below 10˚C (50˚F) or 12V AGM battery
24V NORM	6	Blue	14-115	Charging 24V WET/GEL/MF/EFB batteries
24V COLD/ AGM	7	Blue	14-115	Charging 24V batteries below 10˚C (50˚F) or 24V AGM batteries
12V AGM+	8	Blue	14-230	Charging 12V advanced AGM batteries that requires a higher than normal charging voltage
12V LITHIUM	9	White	14-230	Charging 12V lithium-ion batteries only, including LiFePO4
12V/24V REPAIR	10	Yellow	14-230	An advanced battery recovery mode for repairing old, idle, stratified or sulfated batteries.
	4~5	Green		
	6~7	Blue		
	8	Blue		
13.6V SUPPLY	11	Yellow	-	Converting to a DC power supply for powering 12V DC device or as a memory retainer when replacing a battery (When the charger is not connected with battery)

⚠ **CAUTION:**

- Check the battery's Voltage & Type, before using.
- If you use 24V charging mode for 12V battery, battery could be damaged.

Using 12V AGM+

This mode is designed for 12V advanced AGM batteries only. Advanced AGM batteries are typically found in startstop micro-hybrid vehicles. These batteries accept a higher than normal charging voltage. 12V AGM+ charge mode is NOT suitable for traditional AGM batteries. Consult the battery manufacturer before using this mode.

Using 12V LITHIUM

This mode is designed for 12V lithium-ion batteries only, including LiFePO4. Some lithium-ion batteries may be unstable and unsuitable for charging. Consult the lithium battery manufacturer before charging and ask for recommended charging voltage and current.

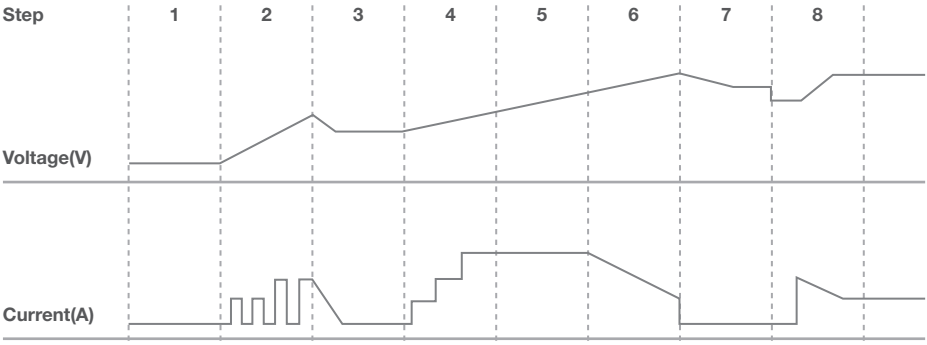
Using 12V/24V REPAIR

This mode is for LEAD-ACID batteries only. It is an advanced battery recovery mode for repairing old, idle, stratified or sulfated batteries. NOT all batteries can be recovered. For optimal results, take the battery through a full charge cycle, bringing the battery to full charge, before using this mode. When this mode is chosen, do remember press Mode button for choosing appropriate 12V Mode(s) or 24V Mode(s). One REPAIR cycle can take **up to eight (8) hours** to complete the recovery process and will enter to charge (8 steps charging cycle) when completed. This mode uses a high charging voltage and may cause some water loss in WET cell batteries. Plus, some batteries and electronics may be sensitive to high charging voltages. To minimize risks, disconnect the battery from the vehicle before using this mode.

Using 13.6V SUPPLY

This mode converts the charger to a constant voltage, constant current DC power supply. When the charger is not connected with battery, it can be used to power DC 12V devices. Prior to use, read your DC 12V device manual to determine if it is suitable for use with this mode. As a power supply, it can also be used to retain a vehicle's on-board computer settings during battery repair or replacement. 13.6V Supply Mode provides 13.6V at 5A with overload protection at 6A (Max). Both spark proof and reverse polarity protection are disabled in this mode. Do NOT allow the positive and negative battery clamp or ring terminal to touch or connect to each other as the charger could generate sparks.

5. CHARGING STEPS



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

STEP 2: DESULPHATION (If battery voltage is too low, programs automatically generate pulsing current to remove sulphate, **up to 5 hours**)

STEP 3: ANALYSE (Check if the battery voltage reaches to the threshold after desulphation, and charging begins if the battery voltage is OK)

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: ANALYSE (Test if the battery can hold charge)

STEP 8: MAINTENANCE (Continuously monitor the battery, and charging current will intelligently adapt to the variable battery voltage)

6. BATTERY CHARGING LEVEL INDICATOR

LED	Explanation
 25%	The 25% Charge Red LED will slowly flash when the battery level is less than 25%. When 25% is reached, the LED will be solid.
 50%	The 50% Charge Red LED will slowly flash when the battery level is less than 50%. When 50% is reached, the LED will be solid.
 75%	The 75% Charge Red LED will slowly flash when the battery level is less than 75%. When 75% is reached, the LED will be solid.
 100%	The 100% Charge Green LED will slowly flash when the battery level is less than 100%. When 100% is reached, the 100% Charge LED will be solid. The 25%, 50% and 75% Charge LEDs will turn off.

7. CHARGING TIME

Different battery capacity and residual voltage would affect the charging time. Following data is only for reference. (when discharge 12V lead-acid battery to 9V, with 5A discharge current.)

Battery Size/Ah	Approx. Time to Charge in Hours (12V)	
50	5H@14.5V	7H@14.7V
60	8H@14.4V	10H@14.7V
100	9H@14V	15H@14.5V
150	21H@14V	25H@14.8V
200	24H@14V	30H@14.7V

8. LED MESSAGES

LIGHT(S) CONDITION	CAUSE(S)	SOLUTION(S)
Solid Red Warning! LED	Reverse Polarity	Exchange the red and black clamps or ring terminals to the correct battery posts
Flashing Red Warning! LED	1) Open-circuit 2) Dirty Battery Posts 3) Dead Battery 4) Output Short Circuit	1) Connect the red and black clamps or ring terminals to the battery posts 2) Clean the battery posts 3) Replace the battery with a new one immediately 4) Disconnect red and black output terminals
Slow flashing Red Warning! LED + 12V Mode LED	Charging 24V battery with 12V Mode	Please do manually press Mode button to choose correct charge mode. **CAUTION:** If you use 24V charging mode for 12V battery, battery could be damaged
12V/24V Mode LED is on, four battery charging level indicator LEDs are flashing	Overheat protection	Just wait. After cooling down, charging will restart
Solid yellow REPAIR LED + 12V Mode LED	In 12V REPAIR mode	-
Solid yellow REPAIR LED + 24V Mode LED	In 24V REPAIR mode	-
Solid Red Warning! LED + Solid yellow SUPPLY LED	Overload in SUPPLY Mode (will automatically shut down for 30 seconds as protection)	Disconnect the external device
Quick flashing Red Warning! LED + Corresponding 12V/24V Mode LED	Battery cannot be recovered during charging	Replace the battery with a new one immediately
Only corresponding 12V/24V Mode LED + Four battery charging level indicator LEDs are all OFF	In Desulphation Process	-
Red Warning! LED light flashed x2, and stop for 3 sec (repeating)	Battery cannot be recovered through Desulphation Process or Battery cannot be recovered through Repair Mode	1) Replace with a new battery 2) If battery cannot be recovered through Desulphation Process, try REPAIR Mode for recovery

Flashing Yellow Warning! LED (for both 12V and 24 lead-acid batteries.)	Heavily Corroded Battery (voltage is less than 3V)	Replace with a new battery or try REPAIR Mode for recovery

NOTICE: following situation indicates that battery need to be replaced, although there is no abnormal result LED communication.

After full charging cycle and with 100% of battery charging level indicator, 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 or try REPAIR Mode for recovery

Correct Disposal of this product

This marking indicates that this product should not be disposed with other household wastes throughout the EU. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmental safe recycling.

EC Declaration of Conformity

CE

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-7000

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 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

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