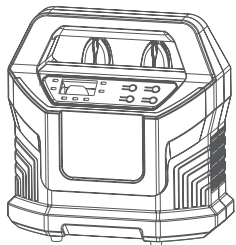


BATTERY CHARGER

HYBC-20

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.

HYBC-20



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.

Table of Contents

SAFETY	2
CONNECTING TO THE BATTERY	3
ABOUT HYBC-20	4
CHARGING MODES	5
CHARGING STEPS	7
ERROR MESSAGES	8

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-20

- 1) The HYBC-20 is designed for charging all types of 12V and 24V lead-acid batteries, including WET (Flooded), MF (Maintenance-Free), EFB (Enhanced Flooded Battery), GEL, AGM (Absorbed Glass Mat) batteries. It is suitable for charging battery capacities from 2 to 400 Amp-Hours and maintaining all battery sizes.
- 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) Automatically detect 12V or 24V battery or selected by manual within starting 10 seconds.
- 5) When the CHARGING LED is on, it is on charging; when the CHARGING 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 without overcharging or damaging the battery.
- 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, 350W Max
DC Output	DC 12V 2A/4A/6A/8A/10A/15A, DC 24V 3.5A/7.5A, DC 12V 20A 300s(Boost)
Power (IN)	Variable Power, 350W Max
Efficiency	85% Approx
Back Current Drain	<5mA
Ambient Temperature	0°C ~ +40°C
Charger Type	8 steps, Full-automatic Charging Cycle
Battery Type	All Types of 12V&24V Lead-acid Batteries
Battery Capacity	2-400Ah (12V), 14-200Ah (24V), Maintains All Battery Sizes
Housing Protection	IP20
Accessories Included	Cable Clamps

4. CHARGING MODES

HYBC-20 charger has ten (10) modes: STANDBY, 12V/2A, 12V/4A, 12V/6A, 12V/8A, 12V/10A, 12V/15A, 24V/3.5A, 24V/7.5A, 12V BOOST. Do not operate the charger until you confirm the appropriate charge mode for your battery.

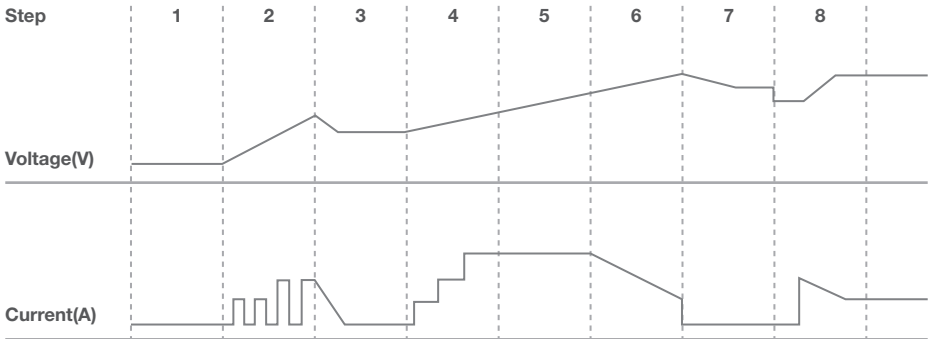
▲ CAUTION: If you choose 24V Mode for 6V/12V battery, the 6V/12V battery will be damaged!

Mode	Display	POWER LED	BOOST LED	Explanation
STANDBY	-	Blink		Not charging or providing any power. If you want charging to pause, press ON/OFF button and it will enter STANDBY mode.
12V/2A	02A	Keep on		Connected to 12V battery, it can turn into 2A by pressing CURRENT button. This mode is recommend for 2-60AH batteries.
12V/4A	04A	Keep on		Connected to 12V battery, it can turn into 4A by pressing CURRENT button. This mode is recommend for 2-120AH batteries.
12V/6A	06A	Keep on		Connected to 12V battery, it can turn into 6A by pressing CURRENT button. This mode is recommend for 10-180AH batteries.
12V/8A	08A	Keep on		Connected to 12V battery, it can turn into 8A by pressing CURRENT button. This mode is recommend for 20-240AH batteries.
12V/10A	10A	Keep on		Connected to 12V battery, it can turn into 10A by pressing CURRENT button. This mode is recommend for 40-300AH batteries.
12V/15A	15A	Keep on		Connected to 12V battery, it can turn into 15A by pressing CURRENT button. This mode is recommend for 50-400AH batteries.
24V/3.5A	3.5A	Keep on		Connected to 24V battery, it can turn into 3.5A by pressing CURRENT button. This mode is recommend for 14-115AH batteries.
24V/7.5A	7.5A	Keep on		Connected to 24V battery, it can turn into 7.5A by pressing CURRENT button. This mode is recommend for 25-200AH batteries.
BOOST	FAS	Keep on	Keep on	Connected to 12V battery, it can enter BOOST Mode by pressing BOOST button. It takes 5 minutes to charge.

Using 12V BOOST

BOOST Mode is the advanced mode that require your full attention before selecting. 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 LED is illuminated or not). After each boost, the charger has mandatory 5-minute rest for safety reason (even you press the boost button again, the charger will not work). 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: 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)

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 batter has declined storage capacity and need to be replaced.

6. ERROR MESSAGES

Warning Code on Digital Display	Reason(s)	Solution(s)
E01 (also with continuous buzzer sound)	High temperature alarming	After the internal temperature of charger reduces, the charger will automatically start charging again
E02	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
E03 (also with intermittent buzzer sound)	Charge mode is inappropriate (choose 12V Mode for 24V battery)	Choose appropriate 24V Mode for your 24V battery.
E04	Battery cannot store electric charge during charging process	Replace the battery with a new one
E05	Unsuccessful desulphation	Replace the battery with a new one
E06	Reverse connection	Connect to the correct polarities

EC Declaration of Conformity



We :

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

Declare that the product detailed below :
BATTERY CHARGERS
MODEL : HYBC-20

Satisfies the requirements of the Council Directives :
EMC directive 2014/30/EU
Low Voltage Directive 2014/35/EU
RoHS Directive 2011/65/EU
RoHS Directive 2015/863/EU

and conform with the norms :
EN 55014-1:2006/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

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