SAN HIMA

40A BATTERY CHARGER & ENGINE STARTER USER MANUAL

SH-ACDC-40A-JS

Please read this manual carefully before operation and maintenance, follow all provided safety instructions, and keep it for future reference.

V1.1

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IMPORTANT SAFETY INSTRUCTIONS

Before using this product, read and follow all safety and operating instructions, as well as any cautionary markings from the battery and vehicle manufacturers.

Battery Safety

- Batteries produce explosive gases during normal operation. Always operate in a well-ventilated area.
- Have someone nearby to assist if needed while working around a battery.
- DO NOT smoke, light matches, or create sparks near the battery or engine. Avoid all sources of flames, sparks, and explosive gases.
- Remove all personal jewelry, including rings, bracelets, necklaces, and watches, before handling a vehicle battery. Wearing these items can cause a short circuit, resulting in serious burns.
- Exercise caution to avoid dropping metal tools onto the battery, as this may create sparks or short-circuit the battery or other electrical components, leading to fire or explosion.
- Always wear eye protection, gloves, and protective clothing. Avoid touching your eyes when working near a battery.
- Review all precautions from the battery manufacturer, including whether to remove cell caps during charging and the recommended charging rates.
- Clean the battery terminals before connecting them to the charger. Exercise caution to avoid eye contact when handling any corrosion.
- When removing a battery from a vehicle for charging, always disconnect the grounded terminal first. Ensure all vehicle accessories are turned off to prevent arcing.
- This product is designed to charge all types of 12V and 24V lead-acid batteries, including WET (Flooded), MF (Maintenance-Free), EFB (Enhanced Flooded Battery), AGM (Absorbed Glass Mat), and CAL, as well as 12V lithium-ion batteries (4-cell LiFePO4).
- This product is NOT intended for powering extra-low-voltage electrical systems or charging dry-cell batteries. Charging dry-cell batteries may cause bursting, posing risks of injury to individuals and damage to property.
- DO NOT charge a frozen, damaged, leaking, or non-rechargeable battery.
- If battery electrolyte comes into contact with skin or clothing, wash the affected area immediately with soap and water. If it gets into the eye, rinse with clean, running cold water for at least 15 minutes and seek medical attention immediately.

Charger Safety

- DO NOT position the charger in the engine compartment, near moving parts, or close to the battery. Place it as far away as the DC cable allows. DO NOT place the charger directly above the battery being charged, as gases or fluids from the battery can corrode and damage the

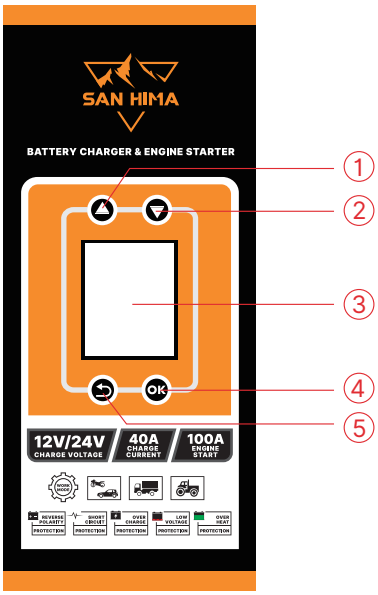
charger.

- DO NOT cover the charger while it is in use.
- DO NOT expose the charger to rain or wet conditions.
- Using attachments not recommended or sold by the manufacturer may pose a risk of fire, electric shock, or personal injury.
- Avoid overcharging batteries by selecting the correct charge mode.
- The charging start-up threshold is set at 1V.
- Grasp the plug, not the cord, when disconnecting the charger to prevent damage to the plug and cord.
- Unplug the charger from the outlet before performing any maintenance or cleaning to minimize the risk of electric shock.
- Exercise caution if the charger has been subjected to a strong impact or has been dropped. Inspect it for damage and have it repaired if necessary.
- Repairs should only be performed by the manufacturer or an authorized repair agent to prevent potential hazards.

Grounding and AC Power Cord Connections

This product is designed for use on a nominal 230-volt circuit. Ensure that the plug is connected to a properly installed and grounded outlet in accordance with local regulations and standards. The plug pins must fit securely into the receptacle (outlet). Do not use this charger with an ungrounded system. Avoid using an adapter plug, as this is not recommended.

KNOW YOUR AC-DC CHARGER



1. UP	4. ENTER
2. DOWN	5. RETURN
3. LCD Display	

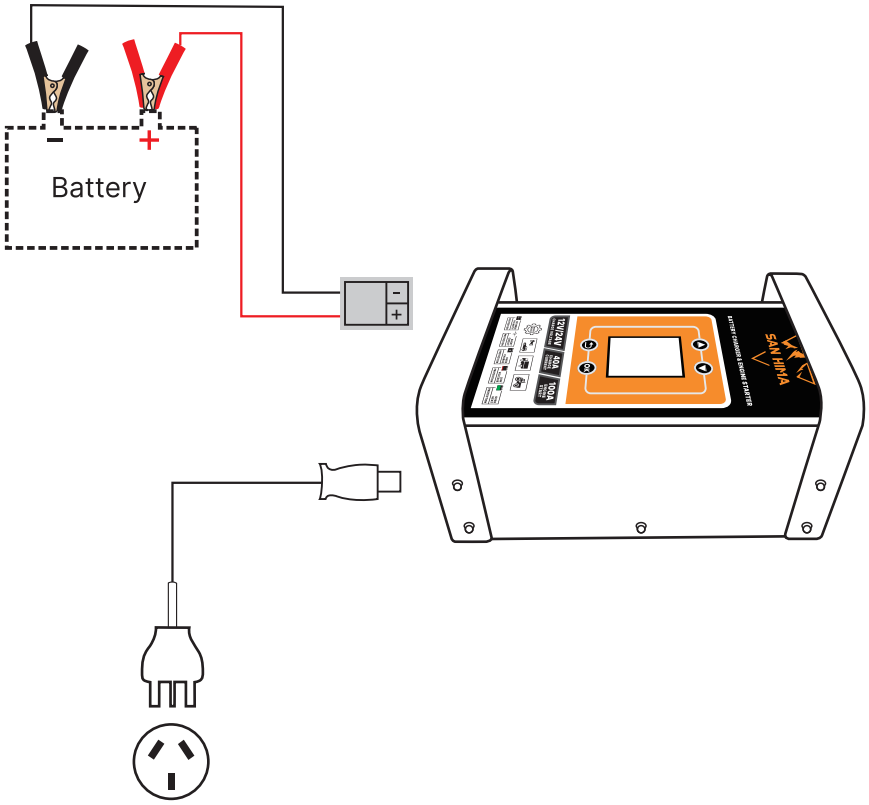
TECHNICAL SPECIFICATIONS

AC Input	220-240VAC, 50-60Hz, 1100W max
DC Output	12VDC 40A or 12VDC 100A (BOOST: 10s ON, 180s OFF), 24VDC 20A
Charger Type	6-Step Fully Automatic Charging Cycle
Start Voltage	>1V
No Load Power Consumption	1W
Battery Type	12V/24V Lead-Acid, 12V 4-Cell LiFePO4
Battery Capacity	20-750Ah (12V), 20-450Ah (24V)
Ingress Protection	IP20
Operating Temperature	0°C ~ 40°C (32°F ~ 104°F)
Storage Temperature	-40°C ~ 85°C (-40°F ~ 185°F)

BATTERY CONNECTION

- Identify the polarity of the battery terminals. The positive terminal is usually marked with the symbols or letters POS, P, or +. The negative terminal is typically marked with the symbols or letters NEG, N, or –.
- Avoid connecting to the carburetor, fuel lines, or any thin metal components.
- Determine whether your vehicle is negative or positive grounded by checking which battery terminal (NEG or POS) is connected to the chassis.
- For a negative-grounded vehicle (the most common type): First, connect the RED POSITIVE clamp to the positive battery terminal. Next, connect the BLACK NEGATIVE clamp to the negative battery terminal or the vehicle chassis.
- For a positive-grounded vehicle (rarely seen): First, connect the BLACK NEGATIVE clamp to the negative battery terminal. Next, connect the RED POSITIVE clamp to the positive battery terminal or the vehicle chassis.
- Disconnect in reverse order: remove the negative clamp first for negative-ground systems, or the positive clamp first for positive-ground systems.

- For marine (boat) batteries, remove and charge the battery onshore. Onboard charging should only be done with equipment specifically rated for marine use.



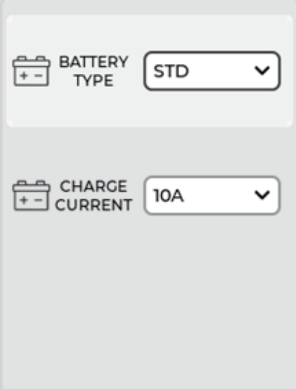
DISPLAY MESSAGES

Home Interface

The home interface features five key functions of the product: 12V/24V Charge, 12V Showroom, 12V Recovery, 12V Engine Start, and 12V Supply, all displayed for easy access. Users can navigate the interface using the UP and DOWN buttons to scroll through the options and confirm their selections with the ENTER button.

Function	Explanation
CHARGE 	Charge a 12V or 24V lead-acid battery or 12V lithium-ion battery (4-cell LiFePO4).
SHOWROOM 	Charge a 12V battery in a car without starting the engine for use in car showrooms.
RECOVERY 	Apply a positive pulse voltage to charge a 12V lead-acid battery that has been inactive or fully discharged.
ENGINE START 	Supply extra amps to crank an engine with a weak or run-down 12V lead-acid battery.
SUPPLY 	Provide a stable output to enable 12V equipment to operate normally during checks and repairs.

Type And Rate Selection Interface

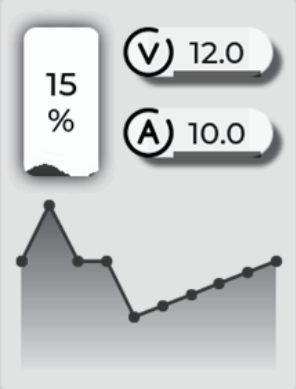


Before charging, select the correct battery type and charging rate. The interface provides options for four battery types: 12V/24V STD (Standard Lead-Acid), 12V/24V AGM (Absorbed Glass Mat), 12V/24V CAL, and 12V LFP (4-cell LiFePO4). Users can also choose from four charging rates: 10A, 20A, 30A, and 40A. Press the UP or DOWN button to select, then press the ENTER button to confirm.

Recommended Charging Rates by Battery Capacity

Rates	Battery Size (Ah)
10A	20~150
20A	50~450
30A	60~450
40A	≥100

Charge Interface

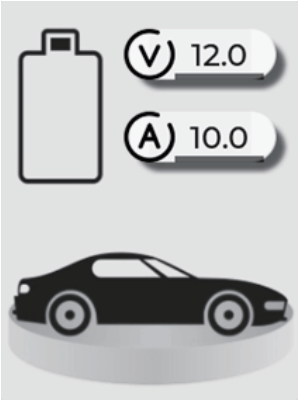


During charging, the interface displays the battery's charging percentage, voltage, current, and current curve. To exit charging, press the RETURN button.

Stages	Explanation
Desulphation	If the battery voltage is low, the charger automatically generates a pulsing current for up to 5 minutes to remove sulfate.
Soft Start	Charge the battery with an echelon constant current.
Bulk	Charge with a constant maximum current until the battery voltage reaches the specified threshold.
Absorption	Deliver a gradually decreasing current charge while keeping the charging voltage close to the gassing voltage.

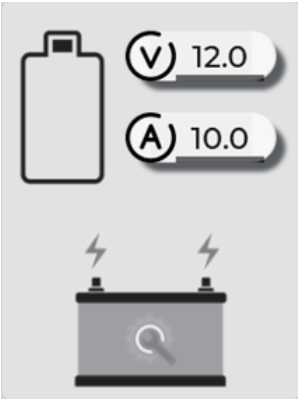
Analysis	Pause output and test the battery's ability to hold a charge.
Float	In maintenance mode, the charger reduces output voltage to approximately 13.6V/27.2V, helping sustain the battery's charge while preventing electrolyte loss from gassing.

Showroom Interface



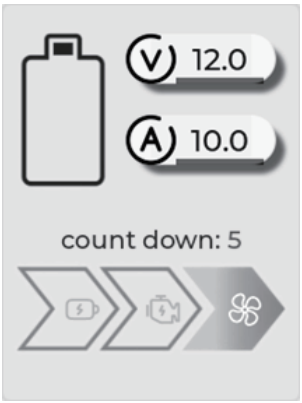
This function charges a 12V car battery in the showroom and powers the on-board computer without the need to start the engine.

Recovery Interface



This function is only for 12V lead-acid batteries and includes an advanced battery recovery mode to restore old, idle, stratified, or sulfated batteries. Please note that not all batteries can be recovered. One repair cycle may take up to eight (8) hours to complete. This mode operates at a high charging voltage, which may cause water loss in WET cell batteries. Additionally some batteries and electronics may be sensitive to high charging voltages. To minimize risks, disconnect the battery from the vehicle before activating this mode. Note that spark protection is disabled during this mode. DO NOT remove the clips while charging, and DO NOT let the positive and negative clamps touch or connect to each other to prevent sparks.

Engine Start Interface



This product can be used to start your car if the battery is low, and is only compatible with 12V lead-acid batteries. Adhere to all safety instructions and precautions when charging. Always wear full eye protection and protective clothing. Follow the procedures below.

WARNING: Using the ENGINE START without a battery installed in the vehicle will damage the vehicle's electrical system.

1. Ensure a proper connection between the charger and battery until CHARGE icon is lit.

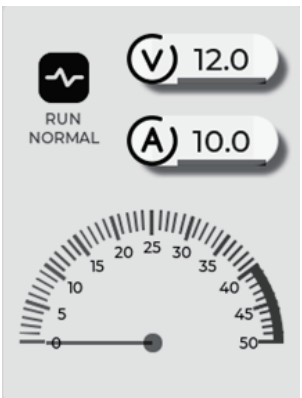
NOTE: During very cold temperatures or if the battery voltage is below 11 volts, charge the battery for 5 minutes prior to cranking the engine.

2. Crank the engine until it starts or for a maximum of 5 seconds. If the engine does not start, wait 3 minutes before trying again to allow the charger and battery to cool down.
3. If the engine fails to start, use the charge function for an additional 5 to 10 minutes before cranking the engine again.
4. Once the engine has started, press the UP button to exit ENGINE START mode before removing the battery clamps from the vehicle.

NOTE: If the engine turns over but does not start, the issue may lie elsewhere in the vehicle's system. STOP cranking the engine until the problem has been diagnosed and corrected.

Stages	Explanation
	**Charge and Wait for Cranking:** The charger supplies a low current to the battery until the engine is cranked, at which point it delivers the necessary amps for starting. It automatically detects when the engine is attempting to crank. Do not disconnect the clip during this process, as doing so may result in serious injury or damage.
	**Cranking:** Upon detecting engine cranking, the charger delivers up to 100 amps to assist in starting the vehicle for a maximum of 10 seconds. Do not disconnect the clip during this time, as it may result in serious injury or damage.
	**Cool Down:** After cranking, the charger enters a mandatory cool-down period of 180 seconds, counting down from 180 to 0. Once the cool-down phase is complete, the charger turns to the charging state.

Supply Interface



The SUPPLY FUNCTION converts the charger into a constant voltage, constant current DC power supply, suitable for powering 12VDC devices. Before use, consult the manual for your 12VDC device to ensure compatibility. As a power supply, it can also maintain the vehicle's on-board computer settings during battery repair or replacement, and is only for 12V lead-acid batteries. It provides a maximum output of 40A. Please note that spark protection is disabled in this mode. DO NOT allow the positive and negative battery clamps to touch or connect, as this may result in sparks.

Stages	Explanation
	**Normal** Normal output state
	**Overload** Output current drops to 0 if it exceeds the specified range or if a short circuit occurs. The OVERLOAD condition will automatically reset after 30 seconds.

Troubleshooting

LCD Display	Explanation	Solution
	The charger is overheated and will resume operation once it cools down.	Wait for the internal fan to cool the device. Do not turn off the charger until the overheating issue is resolved.
	The battery is either not connected to the charger or is connected incorrectly.	Check connections. Ensure the battery is securely connected to the charger with the correct polarity.
	The battery may be defective and unable to accept a charge.	Replace the battery.

WARRANTY

San Hima ("Manufacturer") hereby provides a warranty to the original purchaser ("User") that its battery charger & engine starter, when purchased from the manufacturer, an authorized distributor, or dealer, shall be free from defects in material and/or workmanship during normal usage. This warranty is applicable from the date of sale and remains in effect for a duration of 1 YEAR (the "Warranty Period"). It is important to note that this warranty exclusively extends to the original purchaser and is specific to the San Hima battery charger & engine starter. San Hima, at its discretion, will either replace the product or issue a refund, provided that the fault is found to have been caused by a design or manufacturing defect that results in the battery charger & engine starter's failure to perform as described. This limited warranty stands as the sole warranty applicable to this product, setting forth all the responsibilities assumed by San Hima in this regard.

Exclusion:

It is strongly advised that the installation and operation of the battery charger & engine starter be carried out by adequately qualified technicians; failure to do so will result in the warranty being voided. Additionally, for enhanced clarity, this warranty expressly excludes coverage for defects, failures, and damages arising from the following:

- inadequate ventilation and insufficient maintenance.
- improper installation and storage.
- incorrect handling and transportation.
- unauthorized repair or modifications.
- intentional or accidental misuse, abuse, and neglect.
- contamination with hazardous substances, radiation, and water (unless explicitly stated otherwise by the Manufacturer to be waterproof).
- exposure to extreme hot or cold temperatures.
- force majeure events, including but not limited to fires, floods, earthquakes, hurricanes, severe weather conditions, wars, and acts of terrorism.
- usage on permanent sites or in commercial displays.

CLAIMS:

If a San Hima product is suspected of being defective, you'll need to provide proof of purchase(e.g. a screenshot of the order) and a picture and a video of the damaged goods in their entirety to sales@sanhima.com. If the product is found to be defective and covered by this limited warranty, the remedy is replacement or refund, at San Hima's option. No charges will be accepted for external labour or materials.