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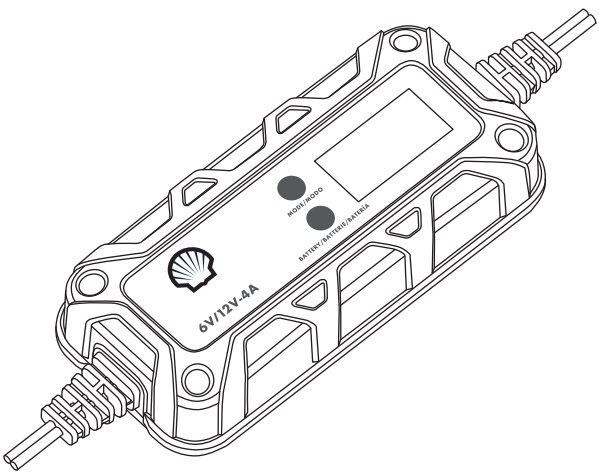


Battery Charger & Maintainer

SBC400

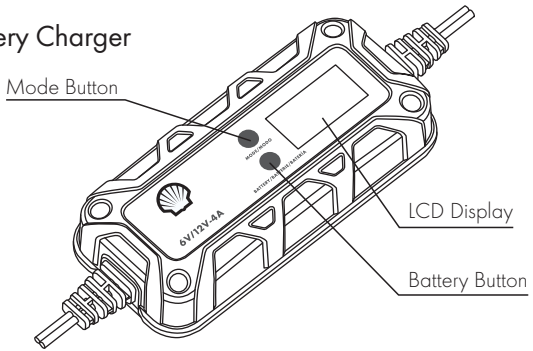
User Guide

For Your Safety

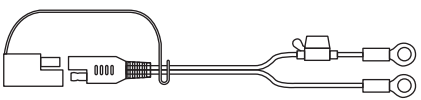
Thank you for choosing this Shell product. Please read the following instructions and keep them for future reference. This instruction manual contains important information on safe operation and use. To ensure long life and performance reliability, please operate and maintain as per the instructions on this sheet.

Product Details

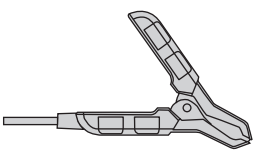
Battery Charger



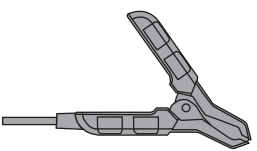
Fused Eyelet Terminal Connectors



Fused Battery Clamps

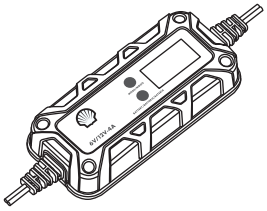


Red Battery Clamp

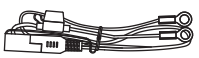


Black Battery Clamp

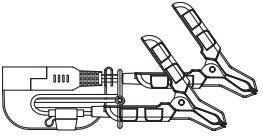
Package Includes



1 x Battery Charger



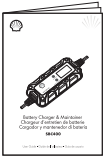
1 x Fused Eyelet Terminal Connectors



1 x Fused Battery Clamps

Thank you for your support
Merci de votre appui
Gracias por su apoyo

1 x Product Warranty Registration



Battery Charger & Maintainer
Chargeur et mainteneur de batterie
Cargador y mantenedor de batería
SBC650

1 x User Guide

Product Features

- Designed for charging 12V Li-ion batteries and all types of 6V/12V lead-acid batteries like Wet, Gel, MF, VRLA, EFB and AGM
- 11-step charging cycle optimizes charging efficiency and battery life
- Maintenance mode ensures batteries of any capacity are always ready to use
- 7 levels of safety protection

Charging Modes

The SBC400 has 10 charging modes. Some charging modes must be selected manually. It is important to understand the differences and purpose of each mode so you could select the appropriate charging mode for the battery.

Note: Only battery type and charging rate need to be selected. The voltage is automatically detected.

Battery Type & Mode		Explanation
ON		In Standby mode, the charger is connected to AC supply instead of battery.
		No Power Supply
12V	LEAD ACID 12V 4A FAST	Press BATTERY button and toggle until Lead Acid shows on LCD screen. Press MODE button to toggle until 4A appears on the screen.
		Suitable for 8-120 Ah Batteries
	LEAD ACID 12V 1A SLOW	Press BATTERY button and toggle until Lead Acid shows on LCD screen. Press MODE button to toggle until 1A appears on the screen.
		Suitable for 2-20 Ah Batteries
	AGM 12V 4A FAST	Press BATTERY button and toggle until AGM shows on LCD screen. Press MODE button to toggle until 4A appears on the screen. This is also cold weather mode. Select this mode for charging 12V batteries at temperature below 10°C/50°F.
		Suitable for 8-120 Ah Batteries
	AGM 12V 1A SLOW	Press BATTERY button and toggle until AGM shows on LCD screen, Press MODE button to toggle until 1A appears on the screen. This is also cold weather mode. Select this mode for charging 12V batteries at temperature below 10°C/50°F.
		Suitable for 2-20 Ah Batteries

Charging Modes

Battery Type & Mode		Explanation
12V	LI-ION 12V FAST 4A	For charging 12V lithium-ion batteries, including lithium iron phosphate (LiFePO4)*
		Suitable for 8-120 Ah Batteries
	AS 12V	Auto self repair mode for repairing and restoring damaged, stratified or sulfated batteries. Automatically starts when it is determined necessary.
		Any Battery Capacity
6V†	LEAD ACID 6V SLOW 1A	For charging 6V Wet Cell, Gel Cell, MF, VRLA, and other Maintenance-Free batteries.
		Suitable for 2-20 Ah Batteries
	AGM 6V SLOW 1A	Press BATTERY button (BATTERY I II III) and toggle until AGM shows on LCD screen, Press MODE button (MODE) to toggle until appears on LCD. This is also cold weather mode. Select this mode for charging 6V batteries at temperature below 10°C/50°F
		Suitable for 2-20 Ah Batteries
FORCE MODE‡		For charging Lead Acid batteries with a voltage between 0.35V and 2V. Press and hold BATTERY button (BATTERY I II III) and MODE button (MODE) at the same time for 3 seconds. The charger will operate under Force Mode for 5 minutes and then return to standard charging.

*CAUTION. USE THIS MODE WITH EXTREME CARE. THIS MODE SHOULD ONLY BE USED WITH 12-VOLT LITHIUM BATTERIES THAT HAVE A BUILT-IN BATTERY MANAGEMENT SYSTEM (BMS). DO NOT CHARGE LITHIUM-ION BATTERIES THAT ARE WITHOUT BMS. CONSULT THE LITHIUM BATTERY MANUFACTURER BEFORE CHARGING AND ASK FOR RECOMMENDED CHARGING RATES AND VOLTAGES.

†ALWAYS SELECT 1A FOR CHARGING 6V BATTERY, IN ORDER TO PREVENT ANY DAMAGES TO THE BATTERY.

‡USE FORCE MODE WITH EXTREME CARE. CLAMPS MUST BE TIGHTLY CONNECTED TO THE CORRECT POLARITIES BEFORE SELECTING FORCE MODE. SPARK PROOF AND OTHER SAFETY PROTECTIONS WILL BE DISABLED IN FORCE MODE. SPARKS WILL GENERATE WHEN CLAMPS TOUCH OR ARE CONNECTED TO EACH OTHER. IT MAY CAUSE DAMAGE TO THE PRODUCT AND THE VEHICLE'S ELECTRICAL SYSTEM IF NOT USED PROPERLY.

Operating Instructions

Charging the Vehicle

Note: This product is designed for charging 12V Li-ion batteries and all types of 6V/12V lead-acid batteries like Wet, Gel, MF, VRLA, EFB and AGM. It is suitable for charging 2 to 120 Ah batteries and for maintaining batteries of any capacities.

Before connecting to the battery

1. Check the battery chemistry and voltage before charging it with our product. The battery information can be found in the vehicle's owner's manual.
2. Turn off the power loads such as headlamps, air-conditioning and radio before charging the battery.

Charging setup

1. Connect the battery clamps or eyelet terminal connectors to the DC connector of the battery charger.
2. Plug the charger into an outlet. The LCD display will turn on and show "ON".
3. Manual selection (For auto-selection, go to step 4)
   - Battery type selection
     Press "BATTERY" (BATTERY / BATTERIE / BATERÍA) to select LEAD ACID or AGM or LI-ION.
   - Charging rate selection
     Press "MODE" (MODE / MODO) to toggle to the appropriate charging rate. For 6V battery, always select 1A to prevent any damages to the battery.
4. Connect the black battery clamp or eyelet terminal connector to the negative (NEG, N, −) battery terminal.
5. Connect the red battery clamp or eyelet terminal connector to the positive (POS, P, +) battery terminal.
6. Auto-selection
   - The charger will automatically detect the battery voltage.
   - The charger has a memory function and will automatically return to the last selected battery type and charging rate.
   - For first time use, the charger will set to LEAD ACID and 1A.
   - To change the battery type or voltage, follow the instruction of **Mode change**.
7. The charger will now go through the pre-programmed charging steps. The LCD display will display the charging information and status. See Display Messages section for a complete list of messages.

8. When charging is finished and the battery is confirmed to be in good condition, the display will show "FL". The charger will go into the maintenance step and will trickle charge the battery as needed. The charger can be disconnected from the battery at any time.
9. When disconnecting the battery charger, unplug the charger from the outlet first. Remove the black clamp and then the red clamp or directly remove the eyelet terminal connectors.

Mode change

Voltage selection

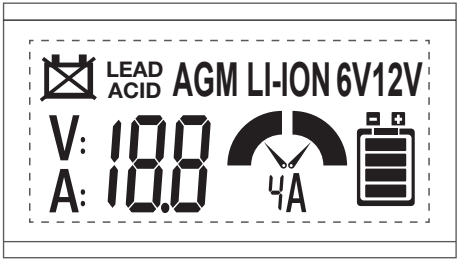
If the charger fails to detect a 12V battery, press and hold "MODE" MODE MODO button for 3 seconds, the charging mode will be changed from 6V to 12V.

Battery type selection

- Press and hold "BATTERY" BATTERY BATERIA button for 3 seconds.
- If charging is in 6V mode, change from LEAD ACID to AGM.
- If charging is in 12V mode, change from LEAD ACID to AGM or LI-ION.

Operating Instructions

Display Messages



Display Item	Directions	Display Item	Directions
V: 18.8 A:	Charging voltage and amperage	LI-ION	LiFePO4, Lithium
	Charging status		Defective battery
1A	1A Slow charge rate	FL	Battery fully charged
4A	4A Fast charge rate	ER	Error detected
LEAD ACID	All Sealed Lead Acid (SLA) (Wet, MF, Flooded and Gel)	AS	Automatic self repair
AGM	AGM (EFB)	ON	Power On/Standby

Operating Instructions

Charging Steps

The charger is programmed with eleven smart charging steps. It will go through some or all steps in order to extend your battery's life and maximize its performance.

Standby

The charger is ready to charge.

Qualification

The charger will check the battery condition, such as voltage, state-of-charge and health, to determine whether the battery is good for charging. If the battery is slightly sulfated, the charger will rejuvenate and recover the battery. As a safety measure, charging process will begin only if the battery is above 2V.

Soft Start

If the battery is at a very low state of charge, small charging voltage and current will be applied in order to prepare the battery for the next charging step.

Pulse

The battery undergoes the desulfation process to break down the sulfate and to restore the battery capacity.

Recondition

This stage reactivates the battery for bulk charging after desulfation.

Bulk Charging 1

The battery is charged at a constant current of 4A. This stage will charge the battery to approximately 75% of full charge.

Bulk Charging 2

The battery is charged at a constant current of 3A. This stage will charge the battery to approximately 80% of full charge.

Bulk Charging 3

The battery is charged at a constant current of 2A or 1A if slow charging rate is selected. This stage will charge the battery to approximately 85% of full charge.

Absorption

The charger switches to constant voltage charging. Charging current is gradually reduced allowing the battery to absorb more power until it achieves the 100% charged state.

Operating Instructions

Analysis

Charging stops when the battery is charged to its full capacity. The charger will check if the charging process is successful. Voltage test will be carried out to determine the state of charge of the battery. Based on the result, the charger will decide whether the battery will go to the next charging step or if it is a dead battery.

Maintenance

The battery is charged at constant voltage to maintain its full charged state without overcharging or damaging the battery.

Charging Time

The estimated time to charge a battery is shown below. The charging time is based on a 50% discharged battery and is for reference purposes only. Actual charging time depends on the battery capacity, the depth of discharge (DOD), age and condition of battery.

Battery Capacity (Ah)	Charging Time (Approx.)		
	6V/1A	12V/1A	12V/4A
2	1h 15m	1h 15m	-
4	2.5h	2.5h	-
8	5h	5h	1h 15m
10	6.5h	6.5h	1.5h
15	10h	10h	2.5h
20	13h	13h	3.5h
40	-	-	7.5h
80	-	-	15h
100	-	-	19h
120	-	-	22.5h

Troubleshooting Table

Problem	Possible Cause	Solution
LCD display does not turn on	Charger is not plugged into the outlet properly.	Make sure the charger is plugged into the outlet securely.
	AC outlet is not supplying power.	Turn the switch on if the outlet is connected to a switch.
		Check for open fuse or circuit breaker.
Cannot select voltage	Voltage is auto detected when the charger is connected to the power and the car battery.	Charger is normal and will recharge the car battery.
Charger does not detect a 12V battery and charges at 6V	Battery is over discharged which leads to the auto voltage detection to fail.	Select voltage manually by following the instruction of mode change. Press and hold "MODE" button MODE for 3 seconds. The LCD will display 12V.
"ER" shown on the LCD display	Battery clamps are connected to the wrong polarity.	Reconnect the clamps with correct polarity.
	Charger is connected to a 24V battery.	Disconnect the charger from the battery. The charger works on 6V and 12V batteries only.
LCD display does not show charging status	Battery clamps are loose or not connected to the battery.	Reconnect battery clamps to the battery.
	Fuse on the eyelet terminal connectors may be blown.	Replace the fuse with correct amperage.
"ER" and Defective Battery icons appears at the same time	Battery voltage does not hold and drops quickly after fully charged.	The battery is defective. Take the battery to the dealer.
	Battery voltage rose too fast	
	The battery has high capacity and is charging at a low rate. It takes more than 72 hours to charge.	Use fast charging 4A to charge high capacity battery.
Defective Battery and charging status icons appears at the same time	The voltage of the Lead Acid battery is too low for standard charging.	Use Force Mode to charge the battery. See instruction in the Charging Modes.
"ER" icon and 6V/12V appears at the same time	The voltage of the Li-ion battery is too low for recharging.	Battery is over-discharged. Replace it with a new battery.

Specifications

Input: 100 - 120V ~ 60Hz 70W
Output: 12V ⎓ 4A 12V ⎓ 1A 6V ⎓ 1A
Battery Type: 6V & 12V Lead-acid batteries including Wet, GEL, AGM, VRLA and MF, and 12V Li-ion (LiFePO4) batteries.
Battery Capacity: 2-120 Ah; maintain all sizes
AC Cable Length: 70 in/180 cm
DC Cable Length: 60 in/152.4 cm
Operating Temperature: -10°C to 45°C/14°F-113°F
Storage Temperature: -20°C to 55°C/-4°F-131°F
Product Dimensions: 6.76 x 3.06 x 1.54 in/171.7 x 77.7 x 39.1 mm
Product Weight: 1.08±0.04 lb/490±20 g

Accessories:
Cable with Clamps: 27 in/68.6 cm
Cable with Eyelet Terminals: 24 in/61 cm
Fuse in the Battery Clamps and Eyelet Terminal Connectors: 7.5A

~ The symbol indicates alternating current (AC)
⎓ The symbol indicates direct current (DC)

Safety Instructions

Failure to follow the instructions may cause serious injury, death or property damage

WARNING: Risk of electric shock, explosion and fire

WARNING: Risk of explosive gases

Working in the vicinity of a Lead-acid battery is dangerous. Battery generates explosive gases during normal operation. To reduce the risk of battery explosion, follow all the instructions in this user guide and those published by the battery manufacturer and the manufacturer of any equipment you intend to use in the vicinity of a battery. Review cautionary markings on these products and on the engine.

- This product is compatible with 12V Li-ion (LiFePO4) batteries, 6V & 12V lead acid including Wet, Gel, MF, VRLA and AGM batteries. Do not use this product to charge other types of battery as it may result in injury, death or property damage.
- Disconnect the battery clamps or eyelet terminal connectors only after disconnecting the AC power cord.
- Do not use an adapter plug with this product.
- It is not recommended to use an extension cord with this product.
- The product may become warm under extended high-power operation.
- Do not disassemble, modify or repair this product.
- Do not destroy product by crushing or cutting.
- Do not expose the product to fire, rain, snow, sunlight and heat.
- Keep this product away from water and other liquids.
- Keep this product in a dry place. Do not allow the product to get wet.
- Use the product in a well-ventilated area. Do not operate in explosive atmospheres such as areas of flammable gas, dust and liquid.
- Do not overcharge battery.
- Handle the product with care. Do not use the product when it is damaged. Do not operate with damaged cable or clamp.
- Clean this product only with a dry cloth. Avoid using cleaning product with rough or chemical substances.
- The product should not be charged while in contact with flammable material like textiles.
- Use the accessories that are provided in the package. Shell is not responsible for any damage or injury when using accessories that are not provided by us.
- Connect the charger only with the clamps or eyelet terminal connectors provided in this package.

Safety Instructions

- Do not disconnect the product from the outlet by pulling the cord.
- Do not put cables on or near moving parts such as hoods, doors, fans and belts.
- Do not allow the clamps to touch each other.
- Keep out of reach of children.

Personal Precautions

- Wear adequate eye protection and protective clothing when working near a car battery.
- Do not smoke or allow a spark or flame near the battery or engine.
- Remove all metal objects such as rings, bracelets, and watches.
- Have plenty of fresh water and soap nearby in case of battery acid contact with eyes, skin or clothing.
- If battery acid comes in contact with the skin or clothing, immediately wash with soap and water. If the acid enters the eye, immediately flush eye with running cold water for at least 10 minutes and seek immediate medical attention.
- Beware not to drop metal items on the battery. It might cause sparks or short-circuit the battery.
- Consider having someone nearby to come to your aid in case of emergency.
- Be very cautious not to drop metal tools onto the battery. It might cause sparks or short-circuit the battery or other electrical part that may cause explosion.
- Incompatible or damaged car batteries may explode when used with this product.

Cautions

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Please note that changes or modifications of this product is not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

C ETL US LISTED

Intertek

3109300

CONFORMS TO UL STD.1236
CERTIFIED TO CSA STD.
C22.2 No. 107.2
CONFORMS TO UL STD.1310
CERTIFIED TO CSA STD.
C22.2 No.223

FC

CAN ICES-3(B)/NMB-3(B)

BC

IP65

Made in China

Shell Five (5) Years Limited Warranty

Shell warrants that this product (the "Product") will be free from defects in material and workmanship for a period of five (5) years from the date of purchase (the "Warranty Period"). For defects reported during the Warranty Period, Shell will, at its discretion, and subject to Shell's product support analysis, either repair or replace defective Product. Replacement parts and products will be new or serviceably used, comparable in function and performance to the original part and warranted for the remainder of the original Warranty Period. SHELL'S LIABILITY HEREUNDER IS EXPRESSLY LIMITED TO REPLACEMENT OR REPAIR OF THE PRODUCT. TO THE MAXIMUM EXTENT PERMITTED BY LAW, SHELL SHALL NOT BE LIABLE TO ANY PURCHASER OF THE PRODUCT OR ANY THIRD PARTY FOR ANY SPECIAL, INDIRECT, CONSEQUENTIAL OR EXEMPLARY DAMAGES, INCLUDING BUT NOT LIMITED TO, LOST PROFITS, PROPERTY DAMAGE OR PERSONAL INJURY RELATED IN ANY WAY TO THE PRODUCT HOWSOEVER CAUSED, EVEN IF SHELL HAD KNOWLEDGE OF THE POSSIBILITY OF SUCH DAMAGES. THE WARRANTIES SET FORTH HEREIN ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS, IMPLIED, STATUTORY OR OTHERWISE, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND THOSE ARISING FROM COURSE OF DEALING, USAGE OR TRADE PRACTICE. IN THE EVENT THAT ANY APPLICABLE LAWS IMPOSE WARRANTIES, CONDITIONS OR OBLIGATIONS THAT CANNOT BE EXCLUDED OR MODIFIED, THIS PARAGRAPH SHALL APPLY TO THE GREATEST EXTENT ALLOWED BY SUCH LAWS.

This Limited Warranty is made solely for the benefit of the original purchaser of the Product from Shell or its approved reseller or distributor and is not assignable or transferable. To make a warranty claim, the purchaser must: (1) request and obtain a return merchandise authorization ("RMA") number and return location information (the "Return Location") from Shell Support by emailing shellsupport@camelionna.comor by calling 1.833.990.2624 ; and (2) send the Product, including RMA number and receipt to the Return Location provided. DO NOT SEND IN PRODUCT WITHOUT FIRST OBTAINING AN RMA FROM SHELL SUPPORT. THE ORIGINAL PURCHASER IS RESPONSIBLE (AND MUST PREPAY) ALL PACKAGING AND TRANSPORTATION COSTS TO SHIP PRODUCTS

Shell Five (5) Years Limited Warranty

FOR WARRANTY SERVICE. NOTWITHSTANDING THE ABOVE, THIS LIMITED WARRANTY IS VOID AND DOES NOT APPLY TO PRODUCTS THAT: (a) were misused, mishandled, subjected to abuse or careless handling, accident, improperly stored, or operated under conditions of extreme voltage, temperature, shock, or vibration beyond Shell's recommendations for safe and effective use; (b) improperly installed, operated or maintained; (c) are/were modified without the express written consent of Shell; (d) have been disassembled, altered or repaired by anyone other than Shell; (e) had defects which were reported after the Warranty Period. THIS LIMITED WARRANTY DOES NOT COVER: (1) normal wear and tear; (2) cosmetic damage that does not affect functionality; or (3) Products where the Shell serial and/or lot number is missing, altered, or defaced.

For any questions regarding your warranty or product contact Shell Support at:

shellsupport@camelionna.com

1-833-990-2624
Monday - Friday 9 am - 5 pm
Eastern Standard Time

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Battery Charger & Maintainer

SBC400

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