BATTERY CHARGER
OPERATOR'S MANUAL

Please save these instructions. This manual contains important safety and operating instructions. Read all instructions

CONTENTS

IMPORTANT SAFETY INSTRUCTIONS

1. This manual contains important safety and operating instructions. You may need to refer to these instructions at a later date.
2. To reduce risk of injury, charge only wet cell, lead-acid automotive type rechargeable batteries. Other types of batteries may burst causing personal injury and property damage.
3. Do not expose charger to rain or snow.
4. Use of an attachment not recommended or sold by the battery charger manufacturer may result in a risk of fire, electric shock, or injury to persons.
5. To reduce risk of damage to electric plug and cord, pull by plug rather than cord when disconnecting charger.
6. Make sure cord is located so that it will not be stepped on, tripped over, or otherwise subjected to damage or stress.
7. Do not operate charger with damaged cord or plug, replace the cord or plug immediately.
8. Do not operate charger if it has received a sharp blow, been dropped, or otherwise damaged in any way; take it to a qualified serviceman.
9. Do not disassemble charger; take it to a qualified serviceman when service or repair is required. Incorrect reassembly may result in a risk of electric shock or fire.
10. To reduce risk of electric shock, unplug charger form outlet before attempting any maintenance or cleaning. Turning off controls will not reduce this risk.
11. WARNING - RISK OF EXPLOSIVE GASES
a. WORKING IN VICINITY OF A LEAD-ACID BATTERY IS DANGEROUS. BATTERIES GENERATE EXPLOSIVE GASES DURING NORMAL BATTERY OPERATION. FOR THIS REASON IT IS OF UTMOST IMPORTANCE TO READ THIS MANUAL AND FOLLOW THE INSTRUCTIONS EXACTLY EACH TIME BEFORE USING CHARGER.
b. To reduce risk of battery explosion, follow these instructions and those published by battery manufacturer and manufacturer of any equipment you intend to use in vicinity of battery. Review cautionary marking on these products and on engine.

PERSONAL SAFETY PRECAUTIONS

1. Someone should be within range of your voice or close enough to come to your aid when you work near a lead-acid or other battery.
2. Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, or eyes.
3. Wear complete eye protection, and clothing protection. Avoid touching eyes while working near battery.
4. If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enter eye, immediately flood eye with running cold water for at least 10 minutes and get medical attention immediately.
5. NEVER smoke or allow a spark or flame in vicinity of battery or engine.
6 Be extra cautious to reduce risk of dropping a metal tool onto battery. It might spark or short circuit battery or other electrical part that may cause explosion.
7. Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a lead-acid or other battery. A lead-acid or other battery can produce a short circuit current high enough to weld a ring or the like to metal, causing a severe burn.

8. Use the charger for charging a LEAD-ACID battery only. It is not intended to supply power to a low-voltage electrical system other than in a starter motor application. Do not use battery charger for charging dry-cell batteries that are commonly used with home appliances. These batteries may burst and cause injury to persons and damage to property.
9. NEVER charge a frozen battery.

PREPARATON FOR OPERATION

PREPARING TO CHARGE

a. If necessary to remove battery from vehicle to charge, always remove the grounded terminal from battery first. Make sure all accessories in the vehicle are off, so as not to cause an arc.
b. Be sure area around battery is well ventilated while battery is being charged. Gas can be forcefully blown away by using a piece of cardboard or other non-metallic material as a fan.
c. Clean battery terminals. Be careful to keep corrosion from coming in contact with eyes.
d. Add distilled water in each cell until battery acid reaches level specified by battery manufacturer. This helps purge excessive gas from cells. Do not overfill. For a battery without cell caps, carefully follow manufacturer's recharging instructions.
e. Study all the battery manufacturer's specific precautions such as removing or not removing cell caps while charging and recommended rates of charge.
f. Determine voltage of battery by referring to car owner's manual and make sure that output voltage is set at correct voltage. If charger has adjustable charge rate, charge battery initially at lowest rate.

CHARGER LOCATION

a. Locate charger as far away from battery as output cables permit.
b. Never place charger directly above battery being charged; gases from battery will corrode and damage charger.
c. Never allow battery acid to drip on charger when reading gravity or filling battery,
d. Do not operate charger in a closed-in area, or restrict ventilation in any way.
e. Do not set a battery on top of charger.

DC CONNECTION PRECAUTIONS

a. Connect and disconnect dc output clamps only after setting any charger switches to off position and removing ac cord from electric outlet. Never allow clamps to touch each other.
b. Attach clamps to battery posts and twist or rock back and forth several times to make a good connection. This tends to keep the clamps from slipping off terminals and helps to reduce risk of sparking.

FOLLOW THESE STEPS WHEN BATTERY IS INSTALLED IN VEHICLE. A SPARK NEAR BATTERY MAY CAUSE BATTERY EXPLOSION. TO REDUCE RISK OF A SPARK NEAR BATTERY:

a. Position ac and dc cords to reduce risk of damage by hood, door, or moving engine part.
b. Stay clear of fan blades, belts, pulleys, and other parts that can cause injury to persons.
c. Check polarity of battery posts. POSITIVE (POS, P, +) battery post usually has larger diameter than NEGATIVE (NEG, N, -) post.
d. Determine which post of battery is grounded (connected) to the chassis. If negative

post is grounded to chassis (as in most vehicles), see item "e". If positive post is grounded to the chassis, see item "f".
e. For negative-grounded vehicle, connect POSITIVE (RED) clamp from battery charger to POSITIVE (POS, P, +) ungrounded post of battery.
Connect NEGATIVE (BLACK) clamp to vehicle chassis or engine block away from battery. Do not connect clamp to carburetor, fuel lines, or sheet metal body parts. Connect to a heavy gage metal part of the frame or engine block.
f. For positive-grounded vehicle, connect NEGATIVE (BLACK) clamp from battery charger to NEGATIVE (NEG, N, -) ungrounded post of battery. Connect POSITIVE (RED) clamp to vehicle chassis or engine block away from battery. Do not connect clamp to carburetor, fuel lines, or sheet-metal body parts. Connect to a heavy gage metal part of the frame or engine block.
g. When disconnecting charger, turn switches to off, disconnect AC cord, remove clamp from vehicle chassis, and then remove clamp from battery terminal.
h. See operating instructions for length of charge information.

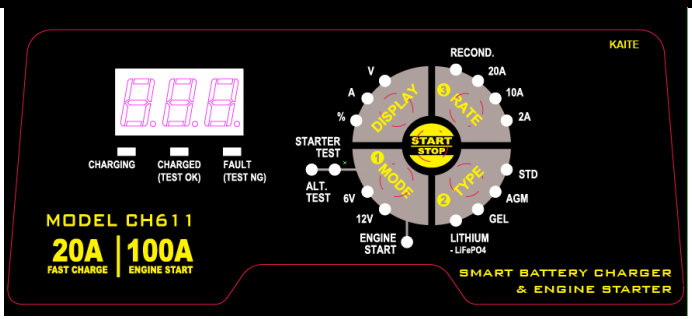
FOLLOW THESE STEPS WHEN BATTERY IS OUTSIDE VEHICLE. A SPARK NEAR THE BATTERY MAY CAUSE BATTERY EXPLOSION. TO REDUCE RISK OF A SPARK NEAR BATTERY:

a. Check polarity of battery posts. POSITIVE (POS, P, +) battery post usually has a larger diameter than NEGATIVE (NEG, N, -) post.
b. Connect POSITIVE (RED) charger clamp to POSITIVE (POS, P, +) post of battery.
c. Position yourself and free end of cable as far away from battery as possible - then connect NEGATIVE (BLACK) charger clamp to NEGATIVE (NEG, N, -) battery post.
d. Do not face battery when making final connection.
e. When disconnecting charger, always do so in reverse sequence of connecting procedure and break the first connection while as far away from battery as practical.
f. A marine (boat) battery must be removed and charged on shore. To charge it on board requires equipment specially designed for marine use.

AC POWER CORD CONNECTION INSTRUCTIONS

The plug must be plugged into an outlet that is properly installed in accordance with all local codes and ordinances.
DANGER. Never alter AC cord or plug provided - if it will not fit outlet, have proper outlet installed by a qualified electrician. Improper connection can result in a risk of an electric shock.

CONTROL PANEL



DIGITAL DISPLAY

The digital display shows the voltage of the battery, charge current, charging process

and fault code. **NOTE:** During normal operation, the display and indication LED will turn off for saving energy. To turn them on, press the DISPLAT BUTTON again.

DISPLAY BUTTON

Can activate the selection of charge voltage, current or charging process on the digital display until the corresponding function LED will illuminate..

MODE BUTTON

Can activate the selection of test type (Alternator & Starter test), battery voltage type (6V & 12V) or engine start function for 12V vehicle until the corresponding function LED will illuminate.

TYPE BUTTON

Can activate the selection of the battery type (GEL, STD & AGM (or at low temperature) battery) until the corresponding function LED will illuminate.

GEL is used for Gel Cell batteries; STD is used for Wet Cell, Maintenance-Free batteries and many AGM batteries; AGM is used for charging at low temperatures and for power AGM batteries.

NOTE: If you are unsure of the type of your battery, consult for your battery manufacturer.

RATE BUTTON

Can activate the selection of charge rate (2A, 10A & 20A) until the corresponding function LED will illuminate.

2A Charge Rate is used for charging the small capacity batteries used in motorcycle, ATV, snowmobile, personal watercraft, garden tractor and golf car. 10A Charge Rate is used for faster charging of small-to-large capacity automotive, marine, deep cycle and farm tractor batteries. 20A Charge Rate is used for charging of large capacity automotive, marine, deep cycle and farm tractor batteries.

START/STOP BUTTON

Can start and pause the charge process. You can change the charge rate when pause.

CHARGING/CHARGED INDICATION LEDs

Illuminate the battery is on the process of charging or full charged.

TEST OK/NG INDICATION LEDs

Illuminate the 2 kinds of vehicle test results: Good or Bad.

FAULT INDICATION LED

Illuminates or flash when a fault occurs. Refer to the section of TROUBLESHOOTING.

OPERATING INSTRUCTIONS

NOTE: Before using the charger, please review all safety and connection directions. Failure to do so can damage battery and cause serious injury or death.

CHARGING

a. Connect the charger to the battery per the above instructions.

b. Connect the charger to AC outlet.

c. Press the MODE BUTTON to select the Battery Voltage Type that you will charge.

d. Press the TYPE BUTTON to select the Battery Construction Type that you will charge.

e. Press the RATE BUTTON to select the Charge Rate.

f. Press the START/STOP BUTTON to start the charge. If you want to stop the charge or change the setting anytime, press START/STOP BUTTON again.

NOTE: If the charger does not detect a properly connected battery anytime, the FAULT INDICATION LED will illuminates or flash and the Fault Code will appear on the digital display, and charging process will stop.

g. The battery charger can be left connected to the battery at all times to provide maintenance charging. However, it is good practice to check the battery periodically.
h. When charging is completed, unplug the charger from the AC outlet first and then disconnect the batteries with charger.
When the charging begins, you can press the DISPLAY BUTTON to check the charging voltage, current or estimated percent on the digital display, which will be back to the charging voltage automatically 5 seconds later if you release the button.

ENGINE START

The charger can be used to engine start your 12V vehicle if the battery is low. Follow all safety instructions and precautions for charging your battery.
a. Connect the charger to the battery per the above instructions in the CHARGING A BATTERY IN THE VEHICLE section.
WARNING: Using the ENGINE START function WITHOUT a battery installed in the vehicle could cause damage to the vehicle's electrical system.
b. Connect the charger to AC outlet.
c. Press the MODE BUTTON to select the ENGINE START function.
d. Press the START/STOP BUTTON to start ENGINE START function, at this time the charger begin to charge the battery. If you want to stop or change the setting anytime, press START/STOP BUTTON again. The charger will automatically stop if the engine is not cranked within 15 minutes.
e. Crank the engine until it starts or 3 seconds pass. If the engine does not start, wait 3 more minutes to press the START/STOP BUTTON again for next cranking. This allows the charger and battery to cool down.

f. When the engine start process is finished, unplug the AC power cord before disconnecting the battery clamps from the vehicle.
NOTE: It is strongly recommended to charge the battery for 5 more minutes at the appropriate settings before using ENGINE START function. Especially during extremely cold weather, or if the battery is under 2 volts, charge the battery at ENGINE START function for 5 minutes before cranking the engine.
NOTE: If the engine does turn over but never starts, there is not a problem with the starting system; there is a problem somewhere else with the vehicle. STOP cranking the engine until the other problem has been diagnosed and corrected.
NOTE: After cranking, the charger enters a mandatory 3 minute (180 seconds) cool down state. The digital display indicates the remaining cool down time in seconds, and it starts at 180 and counts down to 0. After 3 minutes, the digital display will change from displaying the countdown to displaying the voltage.

RECONDITIONING

This function is used to manually recondition the sulfated batteries. **NOTE:** It is recommended to recharge the battery fully before reconditioning.
a. Connect the charger to the battery per the above instructions.
b. Connect the charger to AC outlet.
c. Press the MODE BUTTON to select the Battery Voltage Type.
c. Press the TYPE BUTTON to select the Battery Construction Type.
d. Press the RATE BUTTON to select the Recondition Mode.
e. Press the START/STOP BUTTON to start the Recondition Mode. If you want to stop or change the setting anytime, press START/STOP BUTTON again.
f. When finished, unplug the charger from the AC outlet first and then disconnect the batteries with charge.

Reconditioning will directly enter into the Desulfation Mode and continue for 4 hours. After reconditioning, the battery's voltage and 'End' characters will show alternatively.

TESTING

NOTE: AC MAINS POWER IS NOT REQUIRED. IF AC MAINS POWER IS DETECTED, IT WILL AUTOMATICALLY ENTER INTO CHARGING MODE.

TESTING THE 12V BATTERY

a. Ensure the battery has not been charged for at least an hour before testing, otherwise the voltage is not accurate.

b. Connect the charger to the battery per the above instructions. If the digital display does not work, it means the battery is not correctly connected or needs to be recharged immediately.

c. Check the battery's voltage reading on the digital display, and find the test result on the following chart.

VOLTAGE READING	TEST RESULT
Below 12.4V	The battery need to be recharged immediately.
12.4V - 12.6V	The battery need to be recharged as soon as possible.
Above 12.6V	The battery is at a good state of charge.

TESTING THE CHARGING SYSTEM OF 12V VEHICLES

a. Make sure the battery is fully charged.

b. Connect the charger to the battery per the above instructions. If the digital display does not work means the battery is not correctly connected or need to be recharged immediately.

c. Press the MODE BUTTON to select STARTING SYSTEM TEST(ALT., ALTERNATOR).

d. Start the engine, and hold it at 2000 RPM for 15 seconds.

e. Press the START/STOP BUTTON and check the test result on the indication LED, and refer to the following chart for the test result. The highest average charging voltage reading shows on the digital display.

INDICATION LED	TEST RESULT
TEST OK	The highest average charging voltage is between 13.3V and 15.5V. The charging system is OK.
TEST NG	The highest average charging voltage is less than 13.3V or greater than 15.5V, which indicates a charging system problem. Check the connections, wiring, alternator and regulator.

TESTING THE STARTING SYSTEM OF 12V VEHICLES

a. Make sure the battery is fully charged.

b. Connect the charger to the battery per the above instructions. If the digital display does not work, it means the battery is not correctly connected or needs to be recharged immediately.

c. Press the MODE BUTTON to select STARTING SYSTEM TEST (STARTER).

d. Crank the engine over as soon as possible. Continue cranking for a few seconds or until the engine starts.

e. Check the test result on indication LED, and refer to the following chart for the test result. The cranking voltage shows on the digital display.

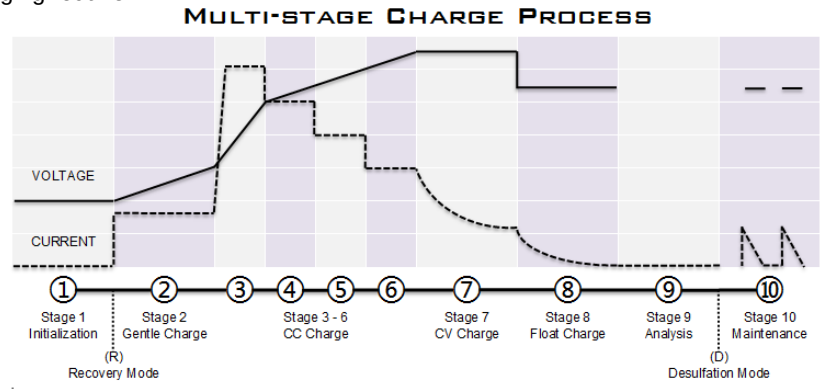
INDICATION LED	TEST RESULT

TEST OK	The cranking voltage is greater than 9.6V. The starting system is OK.
TEST NG	The cranking voltage is less than 9.6V which indicates a starting system problem. Check the battery, connections, wiring and starter.

FEATURES

MULTI-STAGE AUTOMATIC CHARGE

The charger uses a proprietary multi-stage charging process designed to optimally charge and maintain batteries. The below chart and illustration show the common charging routine.



Stage 1: Initialization

Checks the battery's condition to determine the charge process. If the battery is deeply discharged, it will enter into the Recovery Mode to refresh the batter.

Stage 2: Gentle Charge

Starts the charging process with a small current, which can warm up the batteries and avoid the battery suddenly bulk charged.

Stage 3 - 6(*): Constant Current (CC) Charge

Returns 85% of the battery capacity by charging at max rate and other rate.

(*) Stage Number differs from the max charge current.

Stage 7: Constant Voltage (CV) Charge

Brings the charge level to 95% by gradually decreasing the current, which limits battery gassing and prolong battery life.

Stage 8: Float Charge

Finalizes the charging process and brings the battery to maximum capacity.

Stage 9: Analysis

It will cut off the output and analyze whether the battery can hold the capacity. It may enter into the Desulfation Mode to deeply recover the battery.

Stage 10: Maintenance

Monitors battery condition. If battery voltage falls below its threshold, the charger restarts the charge, which effectively & efficiently ensures the battery at full charge and without the risk of overcharge.

Recovery Mode

Achieves the recovery process of deeply discharged or sulfated batteries by pulsing small current.

Desulfation Mode

Recover battery capacity from a sulfated battery by applying a specialized high voltage to soften down sulfate from the battery plates.

OVER-VOLTAGE PROTECTION

When the charger is set to charge in a different voltage than the detected voltage of the battery, this protection will be engaged. Refer to Fault Code of 'F01' in the section of TROUBLESHOOTING FAULT CODES.

REVERSE POLARITY PROTECTION

if a reverse connection is detected, the FAULT INDICATION LED will illuminate and the power will not be sent to output cables. Refer to Fault Code of 'F02' in the section of TROUBLESHOOTING FAULT CODES.

SHORT CIRCUIT PROTECTION

This protection is triggered if the charger detects less than 0.5V across the clamps, and no power will be sent to output cables. Refer to Fault Code of 'F02' in the section of TROUBLESHOOTING FAULT CODES.

BATTERY RECONDITIONING FUNCTION

If a battery is discharged deeply, it could become sulfated and unable to accept a charge. Reconditioning Function may help reverse the effects of sulfation and restore a batteries ability to accept a charge. If the charger detects a sulfated battery, it will automatically activate Recovery Mode and Desulfation Mode. If successful, normal recharging will resume after the battery is desulfated. If unsuccessful at desulfating the battery, refer to Fault Code of 'F03' in the section of TROUBLESHOOTING FAULT CODES.

BATTERY DIAGNOTICS FUNCTION

The charger continuously monitors battery condition and may report certain charging failures as fault codes. Refer to Fault Code of 'F01-F04' in the section of TROUBLESHOOTING FAULT CODES. Conditions that cause the faults include: if the maximum charge time has been exceeded, etc.

OVERHEAT PROTECTION

The charger is designed to decrease the charging current and even shut itself off if overheating is detected. Once the charger cools down, it will resume charging automatically. Refer to Fault Code of 'F05' in the section of TROUBLESHOOTING FAULT CODES.

CHARGE-SETTING MEMORY FUNCTION

The microprocessor inside the charger has charge-setting memory function, which means the charger can directly enter into the charge-mode the users set last time. This function can erase the users' worry about forgetting the setting for their owner batteries and shorten the setting time for the users' convenience. It also can restart the charge after restoration of power supply.

TROUBLESHOOTING

If the FAULT INDICATION LED illuminates and the FAULT CODE occurs during using the charger, please refer to the following and fix the solution according to the fault code.. REMEMBER UNPLUG FROM THE AC OUTLET FIRST AND THEN OPERATE.

CODE	CONDITION	POSSIBLE CAUSE	SOLUTION
F01	The battery voltage is above 16V for 12V	The battery voltage is not matched with the	Confirm that battery voltage is matched

	selection or above 8V for 6V selection.	selected mode.	with the selection.
F02	The battery voltage is less than 0.5V before charging.	The battery is defective.	Replace the battery.
	The battery cannot be detected corrected.	The battery is wwconnected reversed.	Check the connection of the battery and reverse it.
		The battery clamps are disconnected with the battery.	Connect the battery firmly and correctly.
		The battery clamps are connected each other.	Connect the battery firmly and correctly.
F03	The battery voltage is less than 5.5V for 6V selection or 11V for 12V selection in 10 minutes after full charged.	The battery voltage is not matched with the selected mode.	Confirm that battery voltage is matched with the selection.
		The battery is defective.	Replace the battery.
	The battery cannot be recovered successfully.	The battery is sulfated beyond reconditioning.	Replace the battery.
F04	The charge time is beyond 50 hours	The battery is defective.	Replace the battery.
		A load may be connected to the battery.	Disconnect the load and attempt to charge again.
		The charge current is too low.	Select a higher charge rate.
F05	The temperature of the charger is too high.	High ambient temperature.	Ensure adequate ventilation. The charger will resume charging after cooling.

MAINTANENCE INSTRUCTIONS

This charger requires minimal maintenance. As with any appliance or tool, a few common sense rules will prolong the life of the battery charger.
ALWAYS BE SURE THE CHARGER IS UNPLUGGED BEFORE PERFORMING ANY MAINTENANCE OR CLEANING.

1. Store in a clean, dry place
2. Coil up the cords when not in use.
3. Clean the case and cords with a slightly damp cloth.
4. Clean any corrosion from the clamps with a solution of water and baking soda.
5. Examine the cords periodically for cracking or other damage and have them replaced if necessary.
6. **WARNING:** All other service should be done by qualified personnel only.

TECHNICAL DATA

Model	CH611 EU
Input Voltage	220 - 240V AC 50Hz
Input Power	500W MAX for Continuous Charge, 1200W Max for Engine Start
Charging Voltage (GEL/STD/AGM)	7.1/7.2/7.4VDC 14.2/14.4/14.7VDC
Charging Current	20A / 10A / 2A (output current is reduced automatically at high temperatures)
Starting Current	100A for 12V Vehicle only
Charger Type	Multi-Stage, Fully Automatic
Battery Type	6V & 12V Lead-Acid (Wet, MF, Gel, AGM)
Battery Capacity	2.2AH - 600AH
Housing Protection	IP20

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