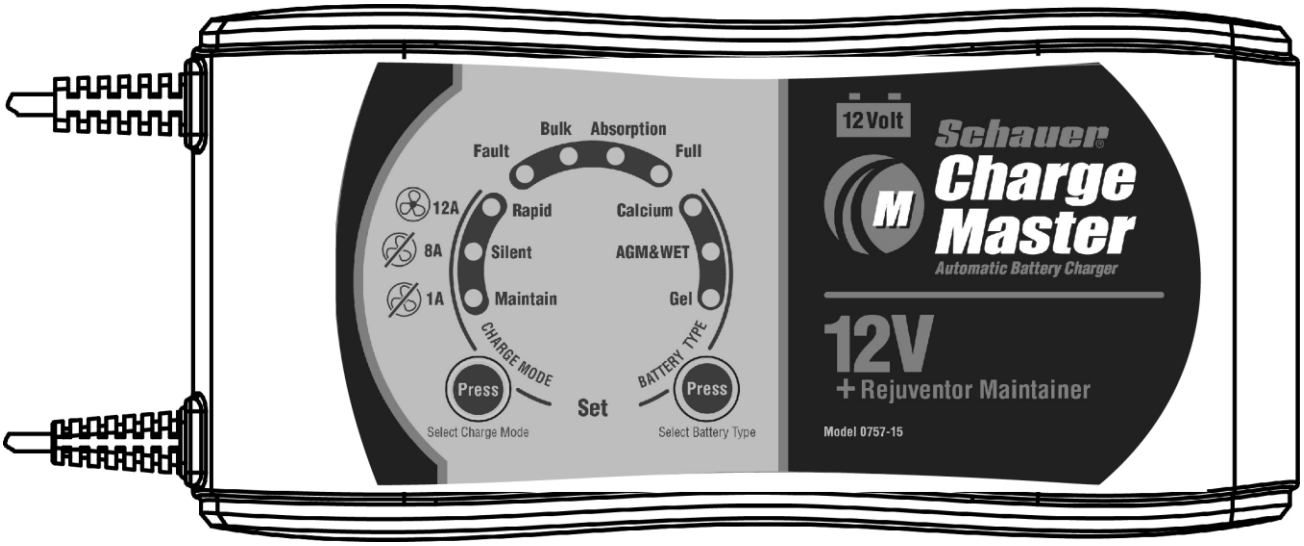
User Manual



12 Volt Battery Charger

Plus Battery maintainer and Rejuvenator

Model: CM6A 1/4/6 Amp (0757-14CEC / F12060)

&

Model: CM12A 1/8/12 Amp (0757-15CEC / F12120)

⚠	**THIS MANUAL CONTAINS IMPORTANT SAFETY AND OPERATING INSTRUCTIONS** **READ ENTIRE INSTRUCTION BEFORE USE**

CALIFORNIA ENERGY COMMISSION COMPLIANT BC

- **WARNING** - RISK OF EXPLOSIVE GASES WORKING IN VICINITY OF A LEAD-ACID BATTERY IS DANGEROUS. EXPLOSIVE GASES DEVELOP DURING NORMAL BATTERY OPERATION. IT IS IMPORTANT THAT EACH TIME BEFORE USING YOUR CHARGER, YOU READ THIS MANUAL AND FOLLOW THE INSTRUCTIONS EXACTLY.
- 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.
- Do not expose charger to rain, snow, or liquids.
- 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.
- To reduce risk of electric shock, unplug charger from AC outlet before attempting any maintenance or cleaning.
- To reduce risk of damage to electric plug and cord, pull by plug rather than cord when disconnecting charge
- An extension cord should not be used unless absolutely necessary. Use of improper extension cord could result in a risk of fire and electric shock. If extension cord must be used, make sure that pins on plug of extension cord are the same number, size and shape as those of plug on charger and that the extension cord is properly wired and in good electrical condition and that the wire size is large enough for A.C. ampere rating of charger as specified in the following table:

  RECOMMENDED MINIMUM AWG SIZE FOR
  EXTENSION CORDS FOR BATTERY CHARGERS

Length of cord (feet):	25	50	100	150
AWG size of cord:	16	16	16	14

- If charger is equipped with an input power cord, do not operate charger with damaged cord or plug - replace the cord or plug immediately.
- 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.
- Do not disassemble charger; take it to a qualified service center when service or repair is required. Incorrect reassembly may result in a risk of electric shock or fire.
- Appliances incorporating batteries which contain materials hazardous to the environment.
- Batteries contain lead and dilute sulfuric acid. Dispose of the battery in accordance with federal, state and local regulations. Do not dispose of the battery in a landfill, lake or other
- Scrap and replace the VRLA battery at or before the time indicated on the battery or in the user's manual. Usage beyond the required time of service can cause fluid leakage due to damages to the container, or cause fire due to power leakage.
- **PERSONAL PRECAUTIONS**
- The appliance is not intended for use by young children or infirm persons without supervision; young children should be supervised to ensure that they do not play with the appliance.
- **When the battery charger is charging for automobile batteries, the following steps should be done:**
- The battery terminal is not connected to the chassis has to be connected first. The other connection is to be made to the chassis, remote from the battery and fuel line. The battery charger is then to be connected to the supply mains.
- After charging, disconnect the battery charger from supply mains, and then remove the chassis connection and the battery connection, in this order.
- **For appliance with type Y attachment:**
- If the supply cord is damaged, it must be replaced by the manufacturer or its service agent or similarly qualified person in order to avoid a hazard.
- Someone should be within range of your voice or close enough to come to your aid when you work near a lead-acid battery. Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing or eyes. Wear complete eye and clothing protection. Avoid touching eyes while working near battery.
- If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eye, immediately flush eye with running cold water for at least 10 minutes and get medical attention immediately.
- NEVER smoke or allow a spark or flame in vicinity of battery or engine.

- 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.
- When working with a lead-acid battery, remove personal metal items such as rings, bracelets, necklaces, watches, etc. A lead-acid battery can produce a short-circuit current high enough to weld a ring or the like to metal, causing a severe burn.
- It is not intended to supply power to a low voltage electrical system other than in a power supply application. **Do not use battery charger for recharging dry-cell or non-rechargeable batteries** that are commonly used with home appliances. These batteries may burst and cause injury to persons and damage to property. **While charge the impropriety type of battery will cause battery serious damage.**
- **NEVER charge a frozen battery**.
- **NEVER charge the impropriety type of battery.**
- **NEVER charge the impropriety Voltage of battery.**
- **NEVER block off the ventilation louver of the charger**.
- **PREPARING TO CHARGE**
- If necessary to remove battery from vehicle to charge, always remove grounded terminal from battery first. Make sure all accessories in the vehicle are off, so as not to cause an arc. **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.
- Clean battery terminals. Be careful to keep corrosion from coming into contact with eyes. 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 caps, carefully follow manufacturer's recharging instructions.
- Study all battery manufacturers' specific precautions such as removing or not removing cell caps while charging and recommended rates of charge.
- Determine voltage of battery by contacting battery manufacturer and make sure it matches output rating of battery charger.
- **CHARGER LOCATION**
- Locate charger as far away from battery as dc cables permit.
- Never place charger directly above battery being charged; gases from battery will corrode and damage charger.
- Never allow battery acid to drip on charger when reading gravity or filling battery.
- Do not operate charger in a closed-in area or restrict ventilation in any way.
- Do not set a battery on top of charger.
- **DC CONNECTION PRECAUTIONS**
- Connect and disconnect DC output terminals only after removing charger from AC outlet.
- Never allow DC output terminals to touch each other.
- If problems arise connecting the output leads, solicit the aid of your Dealer from whom you purchased this product or the charger manufacturer for finding a suitable connection device for your application.
- **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:**
- Position AC and DC cords to reduce risk of damage by hood, door or moving engine part.
- Stay clear of fan blades, belts, pulleys, and any other parts that can cause injury to persons.
- Check polarity of battery posts POSITIVE (POS., P, +) post usually has larger diameter than NEGATIVE - (NEG., N, -).
- Determine which post of battery is grounded (connected) to chassis.
- For negative-grounded vehicle, first connect POSITIVE (RED) clip from charger to POSITIVE (POS., P, +) ungrounded post of battery. Then connect NEGATIVE (BLACK) terminal to vehicle chassis or engine block away from battery.
- For positive-grounded vehicle, connect NEGATIVE (BLACK) clip from charger to NEGATIVE (NEG., N, -) ungrounded post of battery. Connect POSITIVE (RED) clip to vehicle chassis or engine block away from battery keeping the battery terminal well removed there from.
- Do not connect any charger clips to carburetor, fuel lines, or sheet-metal body parts. Connect to a heavy

gauge metal part of the frame or engine block.

- Connect charger AC supply cord to electric outlet.
- When disconnecting charger, turn switches (if supplied) to off, disconnect charger from AC power, remove clip from vehicle chassis, and then remove clip from battery terminal. 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**:
- Check polarity of battery posts. POSITIVE (POS., P, +) battery post usually has a larger diameter than NEGATIVE (NEG., N, -) post. Some batteries are equipped with 'Wing-Nut' terminals allowing for easy placement of the terminals to these posts.
- Attach at least a 24-inch long 18-gauge (AWG) insulated battery cable to NEGATIVE (NEG., N, -) battery post.
- Connect POSITIVE (RED) charger terminal to POSITIVE (POS., P, +) post of battery.
- Position yourself and free end of cable as far away from battery as possible - then connect NEGATIVE (BLACK) terminal to free end of cable.
- Do not face battery when making final connection.
- Connect charger AC supply cord to electrical outlet
- When disconnecting charger, always do so in reverse sequence of connecting procedure and break first connection while as far away from battery as practical
- A marine (boat) battery must be removed and charged on shore. To charge it on board requires equipment specially designed for marine use.

MAIN FEATURES: Smart Charge plus Maintenance and Rejuvenation

- **Easy to Use: Easy to operate and requires no technical experience.**
- **Fully controlled by Microprocessor**
- **Battery initial condition diagnose**
- **Enhanced battery rejuvenation (patented technology)**
- **Battery voltage retention analysis**
- **Peak pulses for long term maintenance**
- **Ultra lower power consumption (ECO mode)**
- **Multi Charge Stages:**
    - Qualification - Battery condition check
    - Battery rejuvenation
    - Soft Start
    - Bulk Charging
    - Absorption Charging
    - Equalizing Charging
    - Voltage analysis
    - Float Mode
    - Long term maintenance pulse charge

- **Diagnosis & Charge - Automatic diagnosis and charge:** On power up, the charger will automatically diagnoses the battery condition, and then determine if the battery charger engages the rejuvenation stage or goes into charging cycle.
- **Enhanced battery rejuvenation stage – Patented battery rejuvenation technology:** The charger has a unique and patented rejuvenation feature which uses with high voltage equalizing and peak pulse reconditioning to repair the sulphated batteries,

this feature is fully automatic and subjected to the internal impedance of the battery.

- **Charge & Maintain - Automatic Maintenance:** The battery charger could be left unattended and it is full time managed by program; when the battery is charged to "full" state, the charger automatically switches to maintain the battery. It will monitor the battery voltage and continue to peak performance with special pulse charge in long term maintenance.
- **Short circuit or Reverse polarity protection:** The charger will automatically turn off when the output short circuit or reverse polarity occurred and prevent any damage.
- **Never overcharge your battery**
- **Heavy-Duty cables**
- **Corrosion-resistant output connectors**
- **Output clips and ring terminals provided:** It comes with a quick connect fly lead and 2 different kinds of connectors, crocodile clips and a ring terminals. The ring terminals are perfect for permanent connection to your battery. You can connect the lead to the battery and tuck the lead away while you are using your vehicle and when you get back to your garage simply plug the lead back into the charger.

TEMPERATURE & SAFETY PROTECTION:

The charger contains the following safety protections:

- *INTERNAL OVERHEAT PROTECTION*: The battery charger is built-in with overheat and overload electronic circuit. When the charger is overheated, the charger will decrease the charging current. If temperature is decreased, the charger will resume to normal charging.
- *TIMER PROTECTION:* The charger provides the maximum charging timer management for each charging stage; this condition may occur if attempting to charge any severely discharged or heavily sulfated battery. Once the charger is timed-out, the charger will stop charging for protecting your battery and the RED LED will be FLASH fast, while this situation occurs, please check with your battery statues.
- *REVERSE POLARITY*: The charger has reverse battery protection. If a reverse battery exists (Red LED ON, while output leads are connected backwards), simply unplug charger from AC power and properly remake the connections as described in this manual.
- *SHORT CIRCUIT PROTECTION*: The charger has output short-circuit protection. If the charger output lead short condition exists (Red LED ON, while output leads are connected backwards), simply unplug charger from AC power and properly remake the connections as described in this manual. The charger employs the firm hardware and smart program to automatically detect the output connections. Once the charger detects the output short-circuit or reverse polarity, it will not deliver any output current.

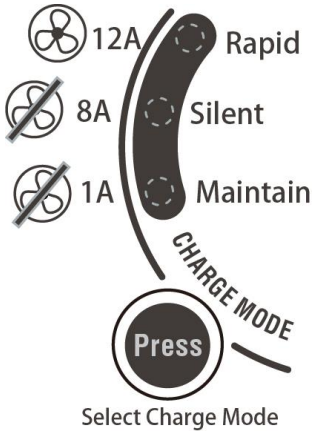
ECO MODE FOR ENERGY SAVING:

This battery charger has built in ultra-low power consumption circuit and operated with very high power efficiency, the charger will automatically go into ECO mode if load unattached.

During ECO mode, the power drawn is less than 0.7W, equal to power consumption of 0.02kWh per day; after the battery is fully charged and during long term maintenance stage, the total power consumption is around 0.06kWh per day.

RAPID CHARGE / SILENT CHARGE (NIGHT MODE) AND MAINTENANCE:

Rapid charge mode: Uses the rated maximum charging current to ensure the fastest charging time, the fan of the unit will turn on to ensure the maximum charging current.
Silent charge mode (Night mode): Charges at a slightly reduced charge rate for some quiet application such as used on Caravan at night, the cooling fan of the unit is not required.
Maintenance mode: Ideal and recommended for long term battery maintenance.



Note: Image shows 12A model

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Maintenance mode: Ideal and recommended for long term battery maintenance.

BATTERY TYPES & CAPACITY:

- Suits all Lead Acid Type Batteries. (GEL, WET, AGM, Calcium)
- Adjustable charge rate: 12V volt battery

CHARGE RATE	BATTERY SIZE (12V)			
	Deep cycle (AH)	Automotive (CCA)	Marine (MCA)	Time (Hours)
2Amp	14-40	80-240	110-330	7-24
4Amp	30-80	180-480	250-650	7-24
6Amp	40-120	240-720	330-1000	7-24
8Amp	60-160	360-1000	500-1300	7-24
12Amp	80-240	480-1440	660-2000	7-24

Some batteries may be able to handle a higher Charge Current; Check with the battery Manufacturer when charging batteries with small capacity.

ELECTRICAL PARTS:

Delivered with:

- A.C Power Cord:
  - 6 feet with UL 2pin Plug
- Output Lead:
  - 4 feet with Trailer Connector
- Extension Cord:

- 2 feet with Trailer Connector + Battery Clamp **or**
- 2 feet with Trailer Connector + Ring Connector

ENVIRONMENTAL CHARACTERISTICS:

- Operating Temperature: -10 to 40° C
- Storage Temperature: -25 to 85°C
- Operating Humidity Range: 90% RH Max
- Cooling: Fan or natural cooling depends on charge mode selection

TECHNICAL SPECIFICATIONS:

Model Number	CM6A (0757-14)	CM12A (0757-15)
Type	Smart	Smart
Input Voltage Range	100-120Vac	100-120Vac
Input Frequency	50/60Hz	50/60Hz
Output	1/ 4/ 6A @ 12V	1/ 8/ 12A @ 12V
Start Voltage	2V	2V
Charge Voltage	GEL-14.1V	GEL - 14.1V
	AGM&WET - 14.4V	AGM&WET - 14.4V
	Calcium - 14.7V	Calcium - 14.7V
Equalizing Voltage	GEL - 14.3V	GEL - 14.3V
	AGM&WET - 14.6V	AGM&WET - 14.6V
	Calcium - 15.5V	Calcium - 15.5V
Float voltage	13.6V	13.6V
Size (L*W*H)	7.44”L x 3.86”W x 2”H	8.54”Lx4.06”Wx2.28”H
Weight	1.65 lbs.	2.43 lbs.
Approvals	UL/cUL, FCC, CEC	UL/cUL, FCC, CEC

CHARGING INSTRUCTIONS:

STEP 1 - Pre Charge Check & Electrolyte Level Check

- Check the Battery Electrolyte level (Not required on sealed & Maintenance Free Batteries).

If necessary, remove the vent caps and add distilled water so the levels are halfway between the upper and lower fill lines.

- Check the Voltage Output Switch on the charger and make sure it’s on the correct voltage

STEP 2 - Connecting the Battery charger to your Battery

- If the Battery is **out of the vehicle**:
    - Connect the Red lead from the charger to the positive (+) battery terminal.
    - Connect the Black lead from the charger to the negative (-) battery terminal.

- If Battery is still **in the vehicle**, determine if the vehicle is positively or negatively earthed.
    - If Negatively Earthed (Most Common) – FIRST Connect the Red (+) battery charger lead to the positive (+) Battery post and then connect the Black (-) battery charger lead to the vehicle's chassis and away from the fuel line.

    - If Positively Earthed – FIRST Connect the Black (-) battery charger lead to the Negative (-) battery post and then connect the Red (+) battery charger lead to the Vehicle's chassis and far away from the fuel line.

STEP 3 - Connect the battery charger to Mains Power

- Connect the battery charger to the Mains Powered socket.
- The Charger will automatically start when AC power is connected and switched on. (Note: If the Fault Indicator LED illuminates Red, please check your connections as it's likely that the Positive and Negative Leads are reversed. Refer to Trouble Shooting Page for further information)

THE CHARGING PROCESS:

The charging stages and performance are as follows:

ECO Mode

If ac power is connected, and the battery is not connected, after 10 seconds, the charger will automatically go into ECO mode.

- The Green LED is fast flashing indicates the ECO mode.

Battery Initial Qualification

When the battery is connected and ac powers on, the program will automatically run qualification as the following processes:

- Detects the battery internal impedance and initial voltage.
- Determine the charging rate acceptance.
- Diagnoses the battery sulphated condition.
- Senses whether the battery is still connected into the vehicle electronic circuit.

The program will determine the next stage subjected to above result of initial qualification.

- The Red LED is ON and Yellow LED is ON, (the initial voltage is at very low level).

Enhanced Battery Rejuvenation

If the initial qualification detected that the battery was in poor condition, our unique rejuvenation process (patented in USA and Europe) will begin automatically. During the rejuvenation

process, a high voltage equalizing and peak pulse reconditioning charge is used to repair the sulphated battery, this unique patented feature will break down and dissolve the lead-sulphate crystal built up on the battery plates, balance out the high concentrations of acid, which is to extend your battery life and performance.

If the battery voltage does not reach 9V within 24 hours, the Rejuvenation process will be timed out.

- The Blue LED is flashing indicates the Rejuvenation stage.

If the program detects the battery can be normally accepted charging current, it will directly go into Soft start stage; if the battery still can not accept the charging current after 24 hours rejuvenation, it expresses the Battery Rejuvenation fails and the battery is not healthy.

- The Red LED will be ON to indicate the battery rejuvenation failure.

Smart Charging Mode

There are following stages:

- *Soft start Charging Mode (C.C. Mode)*
  - Blue Charging LED is flashing.
  - Gently ramps up the battery voltage to 11V, if the battery voltage doesn't reach 11V within 6 hours, the charger will engage a safety timer protection and RED faulty LED will start flash.
- *Bulk Charging Mode (C.C. Mode)*
  - Blue Charging LED is ON.
  - The battery can be charged about 80%.
  - The charger delivers an almost constant current of the maximum output until the battery voltage reaches the preset voltage value within 24 hours, if the battery voltage doesn't reach preset voltage value within 24 hours, the charger will engage a safety timer protection and RED faulty LED will start flash.
- *Absorption Mode (C.V Mode)*
  - Green absorption charging LED is ON.
  - The battery can charge up to almost 100%.
  - The charging current tapers and the charging voltage are kept constant at the preset value without overcharging.
- *Equalization charging*
  - Blue Bulk LED and Green Equalization LED both flashing.
  - A well proven process that carefully equalize the battery to store it's full capacity, the Equalization stage for Calcium battery selection is automatic. The equalization stage for AGM & WET and GEL battery only occurs if the in Initial start voltage is below 11 Volts.
- *Analysis Mode (Battery retention test Mode)*
  - The charging is interrupted for a short period for battery voltage measured
  - If the battery voltage falls too quickly, the battery is probably faulty.

        - The Yellow Charging LED is ON (if above situation occurred)
    - *Float Mode (Safe voltage level of 13.6V)*
        - Full Green LED is ON.
        - The Float Mode allows the charger to effectively be left connected to your batteries; it works at a safe level of 13.6V, and ready for use.
    - *Maintenance mode (Special pulse for long term maintenance)*
        - Full Green LED is ON.
        - The program engages a special charging waveform and monitors the battery voltage variety, if the battery voltage sinks, the special pulses will keep the battery in optimal state, if the battery voltage drops even lower, the battery charger will switch into Bulk charging stage. The maintenance mode allows the charger can be connected to the battery over the course of a season; if possible; check the electrolyte liquid level in the battery.

STEP 4 - Disconnecting the Battery charger from Battery

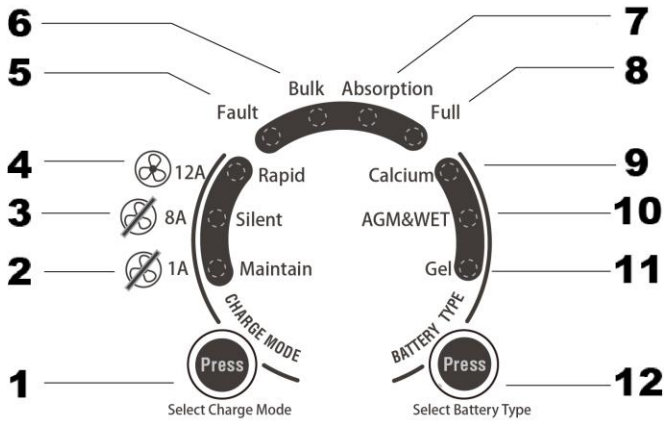
- If the Battery is out of the vehicle.
    - Switch OFF and Remove the AC Power Plug from the outlet.
    - Remove the Black lead and then the Red lead.
    - Check electrolyte levels if possible.

(As they may need topping up with distilled water after charging)

- If the Battery is in the vehicle.
    - Switch OFF and Remove the AC Power Plug from the outlet.
    - Remove the lead from the vehicle chassis.
    - Remove the lead from the battery.
    - Check electrolyte levels if possible.

(As they may need topping up with distilled water after charging)

LED STATUS INIDICATOR TABLE:



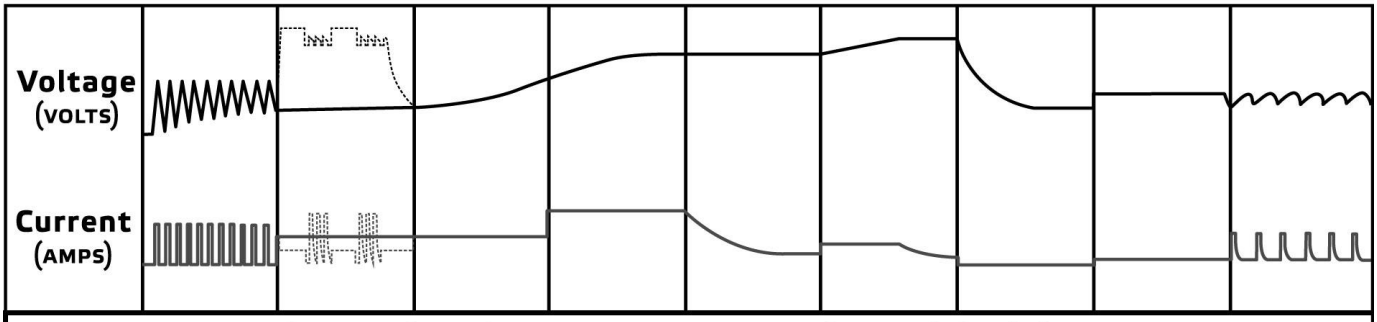
LED	Status	Descriptions
1. Press to select the charge rate		
2. Green	ON	Maintenance charge mode is selected
3. Green	ON	Silent charge mode is selected
4. Green	ON	Rapid charge mode is selected

LED	Status	Descriptions
5. Fault LED – Red		
RED	ON	Short circuit / Reverse polarity or Rejuvenation failed if Bulk LED also flashing fast
RED	Flashing	Over temperature protection mode / Soft start charging timed out if Blue bulk LED also flashing fast / Bulk charging LED timed out if Blue Bulk LED also ON

LED	Status	Descriptions
6. Blue	Flash / ON	Fast Flash – Rejuvenation / Slow Flash – Soft start charging ON – Bulk charging
7. Green	Flash / ON	Flashing indicates Equalization charge or ON indicates Absorption charging
8. Green	Flash / ON	Flashing if Analysis failed or ON if fully charged – Float / Maintenance mode

LED	Status	Descriptions
9. Green	ON	Calcium battery type is selected
10. Green	ON	AGM or WET battery type is selected
11. Green	ON	GEL battery type is selected
12. Press to select the Battery type		

CHARGING CURVE



CHARGING / MAINTAINING PROCESS

	QUALIFICATION	REJUVENATION	SOFT START	BULK CHARGE	ABSORPTION	EQUALISATION	ANALYSIS	FLOAT	MAINTENANCE
	Checks battery condition to determine whether the rejuvenation stage or charge cycle is required.	Automatic stage for batteries in poor condition. Breaks down sulphation using new patented technology.	Increases your battery life by gently starting to charge the battery until the battery reaches a set voltage.	Reduces charging time by delivering maximum charge until the battery reaches a set voltage.	Uses constant voltage and ensures the battery receives a full charge without overcharging the battery.	Restores full capacity to batteries by removing acid stratification.	Checks the battery condition to ensure it is fully charged.	Maintains the battery at 100% charge.	Special pulse charge for long-term maintenance to ensure the battery is in optimal condition.

TROUBLE SHOOTING

Types of Problems	***Indication***	***Possible Causes***	***Suggested Solution***
Charger does not work?	No Indicator lights on	- No AC power	- Check AC connections and make sure Power Point is switched ON
Charger has no DC output?	Fault RED LED is ON.	- Output is short circuited - Reverse polarity connection to Battery	- Check DC connection between charger and battery and make sure they are not short circuiting. - Check that the crocodile clips haven't fallen off the battery. - Check that the crocodile clips / ring terminals are connected to the correct polarity.
No Charging Current?	Fault RED LED is Flashing	- Battery is severely sulphated - Battery has a damaged cell - Overheat protection mode	- Check the Battery condition, age etc. - Battery may need replacement. - Move battery & Charger to cooler environment
Full / Float light won't come on?	Fault RED LED is Flashing Or Full LED is Flashing	- Battery capacity too large for the battery charge and it has timed out. - Battery is defective - Battery is severely sulphated	- Check the charger specification matches the battery capacity. - Battery cannot be charged and must be replaced. - Charge rate selected might be too low, switch charger off and on and try a higher charge rate setting providing it doesn't exceed the maximum charge limit for your battery.

MAINTENANCE

The charger is maintenance free. If the power cord is damaged, the charger must be left to the reseller for maintenance. The case should be cleaned occasionally. The charger should be disconnected from the power while cleaning.