

# **AUTOMATIC BATTERY CHARGER**



SAMLEX AMERICA®

## **MODELS**

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**SEC - 1215A**

**SEC - 1230A**

**SEC - 2415A**

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## **OWNER'S MANUAL**

Please read this manual before operating your charger.

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# Samlex America Inc.

## Automatic Battery Charger

### General Safety and Installation Instructions

#### ABOUT THE BATTERY CHARGER :

- The Samlex charger must only be used for the purposes specified.
- When working on the charger, always disconnect it from the main AC power source.
- Do not operate the charger if the housing or cables are damaged.
- The charger must be positioned and secured in such a way that it cannot fall over or fall down.
- The metal housing is connected to the ground conductor of the 120V or 230V plug.
- The connector cable from the charger must be plugged into grounded outlets only.
- The charger must be kept in a safe place, out of the reach of children.
- The charger must not be operated in a damp or wet environment.
- Ensure good ventilation.
- Servicing and repair must only be performed by a qualified technician who is familiar with the risks involved.
- Do not supply current to external circuit while charging a battery. (See caution on page 4)



## CAUTION



WRONG INSTALLATION OF ELECTRICAL UNITS ON BOATS CAN LEAD TO CORROSION OF THE BOAT. THEREFORE, PLEASE LET A BOAT ELECTRICIAN CARRY OUT THE INSTALLATION OF THE CHARGER.

#### SELECTING INPUT VOLTAGE

These units are pre-set to operate from input voltage of 115 VAC, 60HZ. The power cord has a molded 3-pin North American plug. These units can also operate from an input voltage of 230 VAC, 50 HZ. This requires change of jumper position and the AC side fuse inside the unit. The procedure for making this change is as follows:

1. Remove the 4 screws on the ammeter side of the top cover
2. Gently slide the top cover out by about 2 to 3 inches. (**CAUTION!** The top cover will be restrained from fully sliding out by the wires connecting the ammeter, LED and fan)
3. Locate the jumper wire connected to the male vertical pin marked "115 V" and the male vertical pin marked "230 V" . Remove the female quick connect terminal from the 115V position by gently pulling it upward. Now connect it to the male vertical pin marked "230 V".
4. Replace the fuse with new fuse (see internal fuse ratings on page 7)
5. Slide the top cover back and fix with the 4 screws
6. Use adapter to convert the plug to suit the 230 VAC receptacle or change the plug.  
(**CAUTION!** The new plug should have 3 poles - live, neutral and ground. Color code for the 3 wires of the power cord is: Live - Black ; Neutral - White ; Chassis ground - Green)

## **ABOUT THE CABLES:**

### **Cable routing and installation information**

- If cables have to be inserted through metal walls or other sharp-edged material, use a cable duct or cable bushing
- Do not lay cables loose or with sharp bends on electrically conductive materials (metal).
- Secure the cables properly.
- Lay cables in such a way that no one can trip over them.
- Lay cables in such a way that they are not exposed to the risk of damage.
- Do not lay 120V or 230V main cable and 12V/24V DC cable together in the same duct.
- The specified minimum cross-section must be complied with.
- Do not pull cables.

## **INTENDED USE**

The use of a high efficiency Pulse Width Modulation Switching Controller makes the installation-friendly Samlex charger very small, light and powerful. Together with the mechanical strength, over temp. and short circuit protections, ensure high operating safety. Because of these features, the charger is ideal for mobile uses in motor homes, on board motor or sailing yachts or in ambulances and emergency rescue vehicles.

## **SAMLEX CHARGER FEATURES**

- Small, light and robust in design and manufacture.
- Fully automatic “Connect and Forget” operation
- Output current limiting and short circuit shutdown.
- Easy installation by brackets on the housing.
- 3 stage characteristic for rapid and complete battery charging.
- 3 bank charging (3 positive + terminals)
- Monitoring through ON status LED and Ammeter
- Cooling by temperature controlled fan (SEC-I230A & SEC-2415A)

## INSTALLATION

**WARNING! BEFORE PLUGGING THE UNIT TO THE AC OUTLET, PLEASE CHECK THAT YOUR LOCAL SUPPLY VOLTAGE IS 115 VAC. IF YOUR LOCAL SUPPLY VOLTAGE IS 230 VAC, CHANGE THE INTERNAL VOLTAGE SELECTION TO 230 VAC ( SEE UNDER “ SELECTING INPUT VOLTAGE ” ON PAGE 1 )**

Samlex chargers are designed for easy installation. When installing your charger, make sure to locate the charger in a place with easy access to (1) AC 115V or 230V 60Hz or 50Hz source, (2) the batteries, (3) free air circulation. Also make sure that the charger is installed in a dry area, well sheltered from weather and water spray.

Mount the charger in a vertical position, with a minimum of 4 inches space for ventilation on the top, bottom and sides. **THE CHARGER SHOULD BE MOUNTED IN A VERTICAL POSITION ONLY.**

Never store anything on top of the charger. If mounted in a compartment, ventilate the compartment with louvers or cutouts, and keep this space free of other items.

### Cables

It is recommended that two colors be used for the wires from the charger to the batteries:

Red ( + ) and Black ( - )

Proper wire size is as follows:	Length up to 15 ft :	#12 AWG
	Length up to 25 ft:	#10 AWG

## CONNECTION

1. Connect the ( + ) positive terminal of the battery to the ( + ) positive terminal of the charger. Connect the ( - ) negative terminal of the battery to the ( - ) negative terminal of the charger.

**CAUTION! REVERSING POLARITY WILL DAMAGE THE CHARGER. DAMAGE CAUSED BY REVERSING POLARITY IS NOT COVERED BY YOUR WARRANTY.**

- Up to three batteries can be connected to the 3 ( + ) positive terminals. The ( - ) negative terminal is common. **Note :** The total specified maximum charging current is shared by the 3 ( + ) positive terminals.
- Verify that the AC line input is set for proper line voltage (see page 1).
- Check wiring to verify proper connections before applying power.
- Plug in the AC input line to turn on the AC power. The red LED lights indicating availability of DC power and the ammeter indicates the condition of the battery under charging.

# OPERATION

## **IMPORTANT NOTE - VOLTAGE READINGS ON NO LOAD**

**THE OUTPUT HAS ONE COMMON NEGATIVE TERMINAL AND 3 POSITIVE TERMINALS TO ENABLE CONNECTION OF 3 BANKS OF BATTERIES. EACH POSITIVE TERMINAL HAS GOT ITS OWN ISOLATING DIODE .THE OUTPUT VOLTAGE AT THE POSITIVE TERMINAL WHICH IS NOT LOADED (I.E. A BATTERY OR ANY OTHER LOAD IS NOT CONNECTED TO IT), WILL MEASURE 0.8 V TO 1.1 VOLTS HIGHER THAT THE SPECIFIED NOMINAL FLOAT (MAINTENANCE) VOLTAGE AND NOMINAL BOOST (OVERCHARGE) VOLTAGE.**

## **CHARGING STAGES**

### **STAGE 1 - BULK CHARGE MODE**

When the battery is low, it will attempt to draw a large charging current. The charger senses the current draw and limits this to the maximum permissible value. (15A for SEC-1215A and SEC-2415A and 30A for SEC-1230A). Bulk charging takes place at this constant current. The battery voltage determines the charger's output voltage. As the battery capacity is restored, its voltage rises and its current draw gradually reduces. When the current drawn by the battery goes below the maximum permissible value, the charger will automatically make the transition to STAGE 2.

### **STAGE 2 - OVER CHARGE or BOOST CHARGE MODE**

Controlled over charge ( or boost charge ) follows bulk charging to restore full capacity in a minimum amount of time. In this mode, the charger outputs a constant voltage of 14.3V (14.9 V by changing the setting inside the charger )for 12V system or 28.6V (29.8V by changing the switch setting inside the charger )for 24 V system. As the battery approaches full capacity, its current draw further reduces. When this current is between 1.5A and 3A, the charger then automatically makes the transition to STAGE 3.

### **STAGE 3 - FLOAT or MAINTENANCE CHARGE MODE**

The charger goes into this mode if it senses a current draw of less than 1.5A to 3A. This condition will result when the battery is fully charged and needs very low current to compensate for self-discharge. The charger outputs a constant voltage of 13.8V for 12 V system and 27.6 V for 24 V system. This helps in maintaining the capacity of the battery against self-discharge.



**These chargers have been pre-set to operate in 3 stage algorithm. Please ensure that the battery is not supplying any external load when it is being charged. If the external load draws more than 1.5 to 3A, the charger will not enter Stage 3 - float or maintenance charge mode (Output 13.8V or 27.6V) and will remain in Stage 2 - boost mode (Output 14.3V / 14.9V or 28.6V / 29.8V).**

**The situation will lead to overcharging of the battery and boiling.**

**In order to charge a battery as well as supply an external load, the charger has to be internally adjusted to bypass Stage 2.**

**PLEASE CALL SAMLEX TECHNICAL SUPPORT AT (604) 525-3836 FOR ASSISTANCE IN THIS REGARD**

## OPERATION

- 1 If your battery is not fully charged, the charging meter will indicate current drawn. As the battery approaches being fully charged, the charging current will decrease.
- 2 When the meter reads zero, the battery is fully charged. These chargers are fully automatic and require no maintenance in normal operation.
- 3 An overload condition caused by an accidental, external short circuit or defective, internally shorted battery, will shut down the charger. The ON status LED will turn off. On removal of the short circuit condition, the charger will automatically resume charging.
- 4 Short-term overload caused by charging a completely discharged good battery will not damage the charger.
- 5 A boat engine or generator can be started without unplugging or disconnecting the battery charger.
- 6 Nickel-cadmium batteries and nonchargeable batteries must not be charged with the charger. The casing of these batteries can burst .

## CHANGING BOOST VOLTAGE

The boost voltage is pre-set at 14.3 V for SEC-1215A and SEC-1230A, and 28.6 V for SEC-2415A. This boost voltage can be changed to 14.9 V for SEC-1215A and SEC-1230A, and 29.8V for SEC-2415A. The procedure for this is as follows:

- 1 Remove the 4 screws on the ammeter side of the top cover
- 2 Gently slide the top cover out by about 2 to 3 inches. **(CAUTION!** The top cover will be restrained from fully sliding out by the wires connecting the ammeter, LED and fan)
- 3 Locate the slider switch marked SW 1 located near the connection for the output terminals. Slide the switch over to the other position
- 4 Replace the top cover.

## COOLING AND THERMAL OVERLOAD SHUTDOWN

**CAUTION!** KEEP THE UNITS IN A WELL VENTILATED COOL OPEN AREA. DO NOT BLOCK THE VENT HOLES ON THE SIDES OR THE SUCTION OPENINGS OF THE COOLING FAN.

SEC-1215A is cooled by convection. It does not have thermal overload shutdown.

SEC-1230A and SEC-2415A are cooled by convection as well as temperature controlled fan. Two temperature sensors mounted on the power transformer control the switching of the fan and over temperature shutdown. The fan will be switched on when the power transformer reaches 70 ° C. HENCE, AT LOWER LOADS, THE FAN MAY NOT CUT IN AND WILL BE OFF. THIS IS NORMAL. If the fan fails or if the cooling is not adequate due to poor ventilation, the second temperature sensor will shut down the unit when the power transformer reaches 100 ° C. The unit will automatically reset once the unit cools down.

# TROUBLESHOOTING

## **SYMPTOMS WHEN THE CHARGER IS POWERED AND CONNECTED TO THE BATTERY**

### **THE RED LED IS OFF**

The DC side fuse may have blown due to wrong polarity of battery connection. Ensure positive of the battery is connected to the positive of the charger and the negative of the battery is connected to the negative of the charger. Check the DC side fuses inside the charger and replace, if blown

The battery may be shorted. In this condition, the unit is shut down by the short circuit protection circuit. Remove the battery connection. If the LED now comes on, the battery is shorted. If the LED still does not come on, check there is AC power in the receptacle. If there is power, check the AC side fuse inside the unit. If the fuse is not blown, call technical support.

### **THE RED LED IS ON BUT THE AMMETER SHOWS NO READING**

The battery is fully charged. If the battery is not fully charged, the connection to the battery may be loose or open. Check tightness and continuity of the battery connection.

### **THE BATTERY IS GETTING OVER CHARGED OR BOILS**

The unit is also feeding external circuit (s) in parallel with the battery. The current drawn by the external circuit(s) is preventing the unit from reverting to the float condition (see under “caution” on page 4). Disconnect the external load when charging battery.

## **SYMPTOMS WHEN THE CHARGER IS POWERED AND DISCONNECTED FROM THE BATTERY**

### **THE RED LED IS OFF**

Check there is AC power in the receptacle. If there is power, check the AC side fuse inside the unit. If the fuse is not blown, check the DC side fuse. If the dc side fuse is not blown, the output may be shorted. In this condition, the charger is shut down by the short circuit protection circuit. Check that the output terminals are not shorted. If the terminals are not shorted, call technical support

### **AC SIDE FUSE BLOWS AS SOON AS POWER IS TURNED ON**

The AC input is selected for 115 VAC but the unit is plugged into 230 VAC. Always check that the charger is set for the correct AC mains voltage



If the AC input voltage is correct, the charger is defective. Call technical support

## **DC SIDE FUSE BLOWS AS SOON AS THE BATTERY IS CONNECTED**

Wrong polarity. Ensure positive of the battery is connected to the positive of the charger and the negative of the battery is connected to the negative of the charger

## **SYMPTOMS WHEN THE CHARGER IS POWERED AND IS BEING USED AS A DC POWER SUPPLY**

### **THE VOLTAGE DROPS WHEN LOAD IS SWITCHED ON**

The load is trying to draw current more than the current limit value of the charger. Once the load current reaches the current limit value, the current limit circuit is activated and the output voltage drops. Some loads like motors, compressors, incandescent lamps, halogen lamps, heating elements, relays, coils, capacitors etc. draw very large inrush/starting currents, which may reach up to 10 times their normal operating currents. Ensure that the starting / inrush current or the maximum operating current of the load is lower than the current limit value of the charger

### **INTERNAL FUSE RATINGS**

Both the AC side and DC side have fuses that are located inside the charger. Disconnect the AC power when checking or changing the fuses. Open the charger as follows:

1. Remove the 4 screws on the ammeter side of the top cover
2. Gently slide the top cover out by about 2 to 3 inches. (**CAUTION!** The top cover will be restrained from fully sliding out by the wires connecting the ammeter, led and fan)
3. The fuses will now be accessible

The fuse ratings are as under:

	<u>SEC-1215A</u>	<u>SEC-1230A</u>	<u>SEC-2415A</u>
115 V : AC Input	4A/125V	8A/250V	8A/250V
DC Output	20A/32V	20A/32V (2)	10A/32V (2)
230V: AC Output	2A/250V	4A/250V	4A/250V
DC Output	20A/32V	20A/32V (2)	10A/32V (2)

## SPECIFICATIONS

	<b>SEC-I215A</b>	<b>SEC-I230A</b>	<b>SEC-2415A</b>
Input Voltage (Pre-set)	98-132 Volts, 60 Hz	207-253 Volts, 60Hz	98-132 Volts, 60 Hz
(Internal Jumper Change)	207-253 Volts, 50 Hz	98-132 Volts, 50 Hz	207-253 Volts, 50 Hz
Input Frequency	50-60 Hz	50-60 Hz	50-60 Hz
Output Voltage, Boost	14.3V( Pre-set) *14.9V	14.3V( Pre-set) *14.9V	28.6V( Pre-set) *29.8V
Output Voltage, Float	13.8V	13.8V	27.6V
Output Amps	15A	30A	15A
Operating Temp. Range	0-55 C	0-55 C	0-55 C
Weight	1.9kg / 4.2 lbs.	2.4kg / 5.28 lbs.	2.4kg / 5.28 lbs.
Housing Dimensions L X W X H Inches Cms	$8 \times 3\frac{1}{4} \times 8\frac{3}{8}$ 20.3 x 8.25 x 21.3	$8 \times 3\frac{1}{4} \times 8\frac{3}{8}$ 25.4 x 8.25 x 21.3	$8 \times 3\frac{1}{4} \times 8\frac{3}{8}$ 25.4 x 8.25 x 21.3
Protections	Short Circuit Overload	Short Circuit Overload Over temperature	Short Circuit Overload Over temperature
Output Banks	3	3	3

\* Note : Switch position, located on the circuit board, must be changed to increas eBoost voltage to 14.9V (SEC-I215A & SEC-I230A) or 29.8V (SEC-2415A). See “changing Boost Voltage” on page 5.

**Specifications are subject to change without notice.**

# 1 YEAR Limited Warranty

SEC-1215A/SEC-1230A/SEC-2415A manufactured by Samlex America, Inc. ( the “ Warrantor “ ) is warranted to be free from defects in workmanship and materials under normal use and service. This warranty is in effect for 1 year from the date of purchase by the user ( the “ Purchaser “ )

For a warranty claim, the purchaser should do the following :

1. Prepare a written statement of the nature of the defect to the best of the Purchaser's knowledge, and include the date of purchase, the place of purchase, and the Purchaser's name, address and telephone number.
2. Call Samlex America, Inc. 1-800-561-5885 or 1 (604) 525-3836 and request a Returning Merchandise Authorization Number ( RMA ).
3. Return the defective part or unit along with the statement at the Purchaser's expense to the Warrantor ; Samlex America Inc., #110 - 17 Fawcett Road, Coquitlam, B.C. V3K 6V2 Canada. The RMA number must be marked clearly on the outside of the packaging.

If upon the Warrantor's examination, the defect proves to be the result of defective material or workmanship, the equipment will be repaired or replaced at the Warrantor's option without charge, and returned to the Purchaser at the Warrantor's expense.

No refund of the purchase price will be granted to the Purchaser, unless the Warrantor is unable to remedy the defect after having a reasonable number of opportunities to do so.

Warranty service shall be performed only by the Warrantor. Any attempt to remedy the defect by anyone other than the Warrantor shall render this warranty void.

There shall be no warranty for defects or damages caused by faulty installation or hook-up, abuse or misuse of the equipment including exposure to excessive heat, salt or fresh water spray, or water immersion.

No other express warranty is hereby given and there are no warranties which extend beyond those described herein. This warranty is expressly in lieu of any other expressed or implied warranties, including any implied warranty of merchantability, fitness for the ordinary purposes for which such goods are used, or fitness for a particular purpose, or any other obligations on the part of the Warrantor or its employees and representatives.

There shall be no responsibility or liability whatsoever on the part of the Warrantor or its employees and representatives for injury to any persons, or damage to person or persons, or damage to property, or loss of income or profit, or any other consequential or resulting damage which may be claimed to have been incurred through the use or sale of the equipment, including any possible failure of malfunction of the equipment, or part thereof.

The Warrantor assumes no liability for incidental or consequential damages of any kind.



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