SERVO-MATİK
ELEKTRONİK SİSTEMLER SAN. TİC. LTD. ŞTİ.

SERVO-RED SERIES BATTERY CHARGERS

USER MANUAL

SERVO-MATİK ELECTRONIC SYSTEMS

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INTRODUCTION

This User Manual includes all the information for installation and operation of SERVO-RED series BATTERY CHARGERS.

Read the manual carefully before operating the system.

Follow all the instructions in the correct order. Read the warnings in the manual.

Make sure you read the manual carefully when you want to perform an action on the charger. Otherwise the device can be damaged.

Contact with the service center via phone number/e-mail on the first cover of this manual if a problem occurs.

CAUTION

Shock danger! Do not open the cover of the device. There are spares which the user cannot interfere in the device. Contact with the authorized technical service center in case of fault.

All maintenance/service works for the dangerous parts of the system must be done by the authorized personnel.

Use the fuses which have the same characteristic with the old one if a replacement is needed.

Prepare the necessary place for installation.

Select the appropriate cable sizes which is specified in the manual for the charger.

Do not put the device in use without grounding. Do not place things that may prevent airflow of the device.

Keep the items like bank card, hard drives which can be affected by magnetic field, at least 30 cm away from the charger.

Do not run the device in places where explosive and flammable materials exist.

Avoid direct sunlight and heaters.

Do not wear metal items like rings, watches during the installation .Use isolated tools. Bear in mind that the damages caused by user faults or bad usage will put the device out of warranty.

USER ERRORS

- Connection of abnormal loads that excedeeds device nominal power rate,
- Wrong connection of input, output and battery cables,
- Changing phase sequence of input(3 phase models),
- Changing fuse rates of input, output and batteries,
- Changing batteries, battery numbers
- Making reverse connection of batteries,
- Changing place of and device settings without information of SERVO-MATİK Electronic Systems
- Being exposed to physical damage to Device or gotten harm
- Being kept out of normal environmental conditions or worked of device.(Temperature, Humidity, Cleaning, Ventilation, Enviromental conditions, Liquid Contact)

DESIGN AND OPERATION TECHNICS

SERVO-RED BATTERY CHARGER consists of the following parts below:

-Transformer for Voltage Adjustment
-Thyristor Block,
-Control Board,
-Display Panel,
-Current Transformer,
-Mains-Regulator Selector Pacco Breaker,
-Contactor (optional)
-Dıode (optional)

Four values can be adjusted in Charger.

- Fast charge voltage
- Fast charge current
- Fast charge time
- Buffer charge voltage

When it is commanded to start charge, Device starts to fast charge with constant current by doing current restriction. Controller increases the current signal from zero to adjusted voltage value to charge in fast charge time. After fast charge device starts to buffer charge. Without doing any current restriction, it takes only buffer charge voltage. Namely, device only does voltage adjustment in this part. When battery voltage equals to buffer voltage, Device starts to buffer charge.

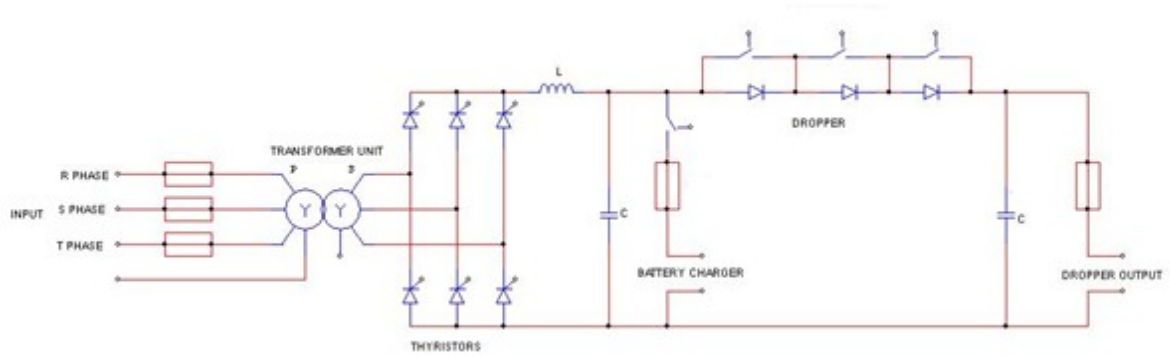


Figure 1 *Charger Schematic Diagram*

PHYSICAL FEATURES

TYPE (V&A)	A(cm)	B(cm)	C(cm)
110 V / 25 A	45	53	130
110 V / 50 A	45	53	130
110 V / 100 A	45	53	130
110 V / 200 A	53	58	152
110 V / 300 A	53	58	152
110 V / 400 A	53	58	152
220 V / 25 A	45	53	130
220 V / 50 A	45	53	130
220 V / 100 A	53	58	152
220 V / 200 A	53	58	152
220 V / 300 A	53	58	152
220 V / 400 A	53	58	152

* Given data on the table can be changeable up to the model variety.

*Given data on the table can be changeable up to the value (Voltage, current, etc.) variety.

TECHNICAL FEATURES

INPUT	Voltage	220/230/380/400 VAC
	Isolation	Input Isolation Transformer
	Cosα	>0.8
	Frequency	50Hz/60 Hz
OUTPUT	Battery Charge Voltage	Depends on the nominal voltage wished in the output
	Dropper Output Voltage	Max +-18V
	Output Current	Up to 1000 A

SCREEN	Front Panel	4x20 LCD DISPLAY
		3 phase RMS Input Voltage, Battery Charge Voltage, Battery Charge Current
GENERAL FEATURES	Technology	Full Automatic Microprocessor Control
	Control	RISC Microprocessor,,Thyristor Control
	Protection	Input Voltage Protection, Output Voltage and Current Protection, High Temperature Protection
	Cooling	Smart Temperature Controlled Cooling System
	Protection Class	IP20
	Standards	CE, ISO–9001
ENVİRONMENTAL CONDITIONS	Sound	< 60 Dbs.
	Temperature range	-10°C +50°C
	Storage Temperature	-30°C +70°C
	Relative Humidity	<95% (Non-Consending)
	Height	<3000m

INSTALLATION

UNPACKING

Contact with the technical service before using the product and the product with damaged packing material.

Carefully unpack the device, avoid damaging.

After unpacking the device, check if the device is damaged during transportation or not. To do this, W-Automat, Pacco Breaker and Compact Breaker on the device is checked and make sure the LCD panel is not damaged.

Check the device physically to make sure the electrical connections are not broken.

Do not run the device if any noise comes from inside when it is removed. In this case, please contact with the manufacturer company.

Before installation, contact with the technical service or installation must be performed by authorized personnel.

TRANSPORTATION

- Carry the device without remove its transportation pallet with a forklift where will it be installed like in Figure 2.
- Package protect the device against problems while transportation since carry the device to its location with its cargo package.
- Pay attention that the device is kept vertical position at all transportation process.
- Device must be carried at least two person.

POSITIONING

Keep the device in an air conditioned place for the cooling system of the device to operate well.

Do not place things/close holes that may prevent airflow for the device. Keep at least 50 cm place free for each side of device.

Make sure the installation place to comply with environmental conditions described in TECHNICAL FEATURES.

Do not operate the device in dusty, humid, hot and corrosive places.

Do not keep flammable/explosive materials next to the device.

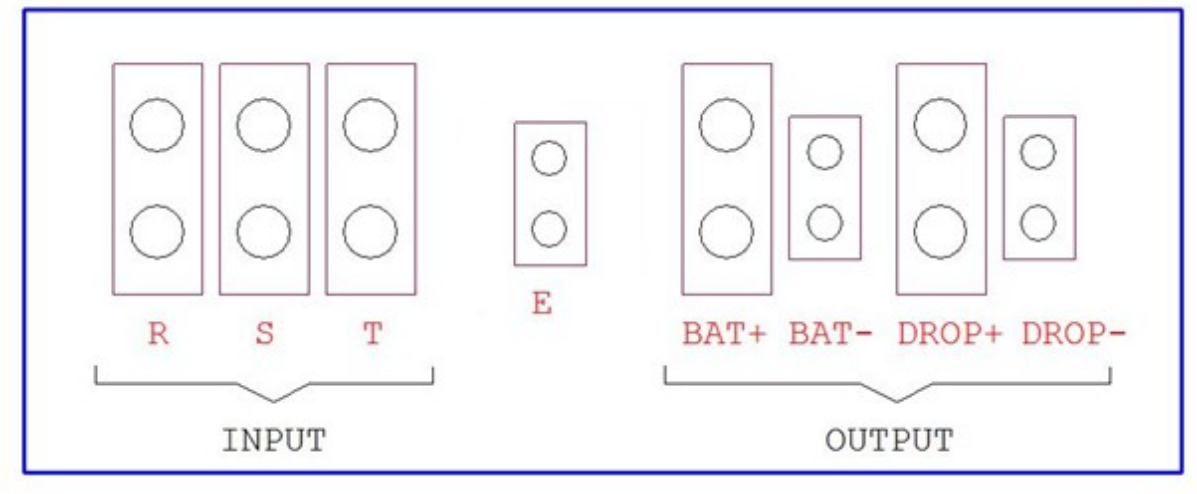
Keep the device in a dry place, avoid contact with liquids.

ELECTRICAL CONNECTIONS

Remove the top cover to reach the input/output connection terminals. The appropriate cable size must be chosen for the connection of three phase charger and distribution panel. . Please see Table2 for the recommended cable sizes.

THREE PHASE CHARGER CABLE SIZE CHART			
TYPE (OUTPUT V&A)	INPUT CABLE SIZE (mm2)	OUTPUT CABLE SIZE (mm2)	GROUND CABLE SIZE (mm2)
110 V / 25 A	3x2.5	2x4	1x2.5
110 V / 50A	3x2.5	2x10	1x2.5
110 V / 100A	3x2.5	2x35	1x25
110 V / 200A	3x6	2x95	1x10
110 V / 300A	3x16	2x120 (Air)	1x16
110 V / 400A	3x25	2x185 (Air)	1x25
220 V / 25A	3x2.5	2x2.5	1x2.5
220 V / 50A	3x2.5	2x10	1x2.5
220 V / 100A	3x10	2x35	1x10
220 V / 200A	3x25	2x95	1x25
220 V / 300A	3x35	2x120 (Air)	1x50
220 V / 400A	3x50	2x185 (Air)	1x70

Table2. Cable Size Chart



Fig–3 Input-Output Connections in Three Phase Charger

Before making cable connections, all the breakers/fuses must be in 'OFF' or '0' position.

Earth Connection

Connect the grounding cable to the terminal (E) .

For a Safe and Trouble Free Operation, Grounding must be done properly. Make The Earth Connection before doing any other connections. Ground-Neutral Voltage Difference must be lower than 3 Volts.

Input-Output Connection

Connect Input and Output Cables to the terminals (R), (S), (T) in the correct order.

Connect the Input Neutral Cable to the Terminal (N).

Be careful about the phase sequence when connecting the Input-Output Cables.

USER INSTRUCTIONS

- In order to silence the buzzer alarm sound, press the right arrow button three times while on the “DISPLAYS” interface.
- Refer to the user manual for connection, maintenance and detailed utilization.

START UP WITH MAINS AC POWER

1. Make sure input and battery cables are connected correctly.
2. If there is an external battery cabinet, throw its circuit breaker to “1” position.
3. Throw battery circuit breaker to “1” position. At this state, boards and panel will be supplied through battery voltage if the battery connection is made correctly as green battery LED on panel lights on (If the panel does NOT get powered on, please check the battery connections).
4. Throw input circuit breaker to “1” position. Press “ON/OFF” button on the panel and click “Enter” button when prompted about starting the charger.
5. Throw the output circuit breaker to “1” position when the “ON/OFF” LED on the top right corner of the panel lights green.

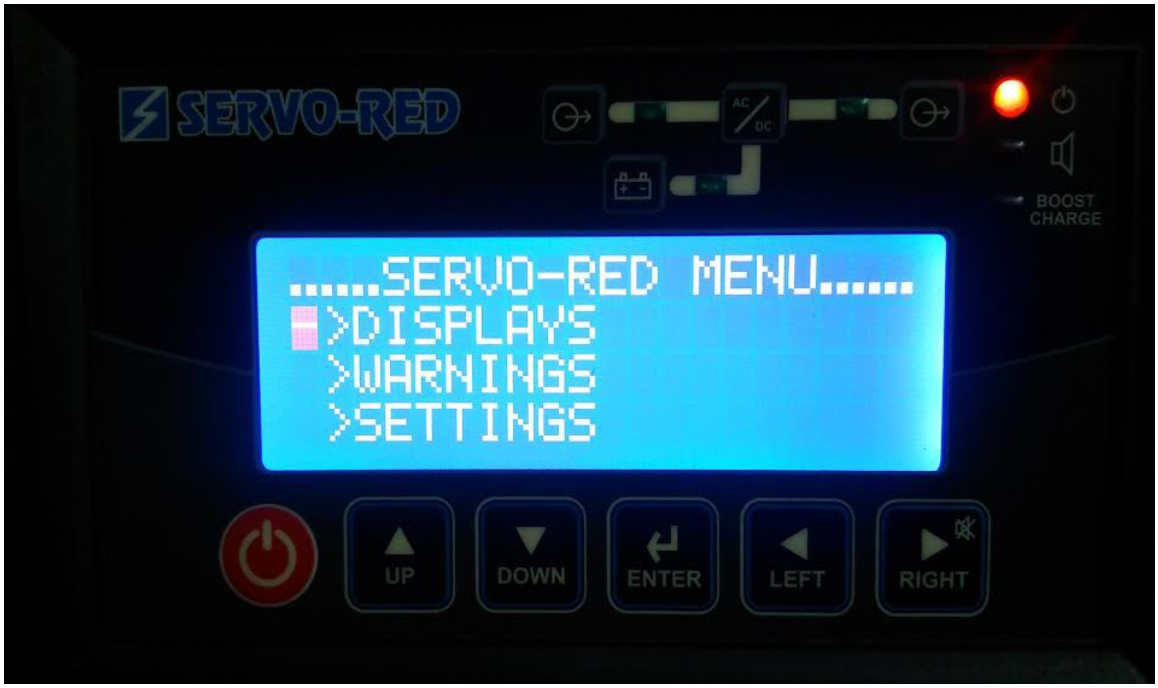
START UP WITH BATTERY POWER ONLY

1. Make sure input and battery cables are connected correctly.
2. If there is an external battery cabinet, throw its circuit breaker to “1” position.
3. Throw battery circuit breaker to “1” position. At this state, boards and panel will be supplied through battery voltage if the battery connection is made correctly as green battery LED on panel lights on (If the panel does NOT get powered on, please check the battery connections).
4. Throw the output circuit to “1” position in order to power output load through the charger.

SHUTTING DOWN

1. Shut down the load/loads connected to the charger.
2. Press the “ON/OFF” button on the panel and click “Enter” button when prompted about shutting down the charger.
3. Throw the output circuit breaker to “0” position.
4. Throw the battery circuit breaker to “0” position.
5. Throw the input circuit breaker to “0” position

LCD FRONT PANEL



Fig–5 Front Panel

UP: To the sub-menu above
DOWN: To the sub-menu below
ENTER: To enter the menu and save the set value in the memory.
LEFT: To the next menu and decrease the value.
RIGHT: To return the previous menu and increase the value
POWER: To start and stop the device

How to Use Menus

There are 6 main menus and various submenus SERVO-RED model Chargers.

MAIN MENU	DESCRIPTION
1.DISPLAYS	Input & Output values are displayed.
2.WARNINGS	Previous events/warnings are displayed.
3.SETTINGS	Adjusting charging voltages, currents and time displayed.
4.SYSTEM	Buzzer, date/time, language, password settings are done
5. CALIBRATION	Voltage and Current Calibration is displayed.
6.PARAMETERS	Tolerance and limits are displayed

DISPLAY MENU

Input Voltage & Frequency, Output Voltage, Load Percentage is displayed in this menu.

WARNINGS MENU

Changes in the operation status, operation modes, faults are displayed in this menu.16 different events/warnings for the regulator are shown in Table.xx. All the data for operation status/operation modes and faults are recorded in real time via microprocessor. Latest 1024 events/warnings are saved in the memory. It provides easy trouble shooting for user/technical service

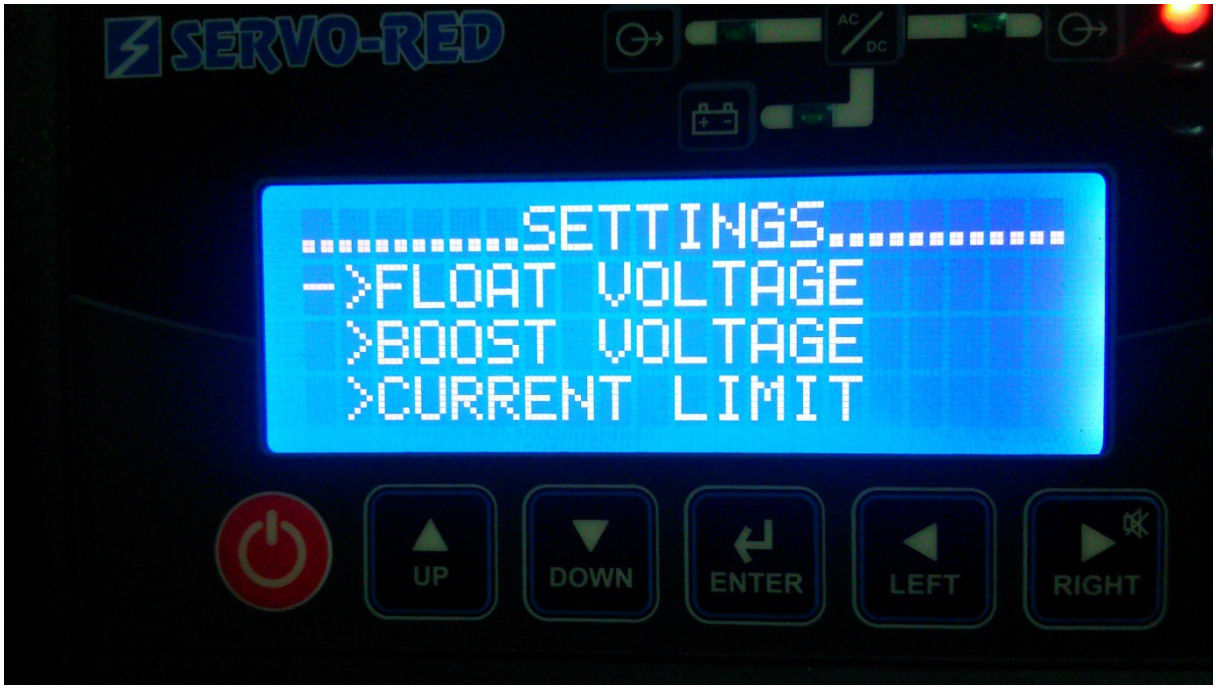
When the menu is entered, the past events are displayed in the chronological order from the present to the past by pressing down button. When the number of the events/warnings exceeds 1024, new events are saved and the oldest events are deleted.

List for Warnings/Events/Errors for SERVO-RED CHARGER

Warning	Warning Description
INPUT LOW	DISPLAYED WHEN THE INPUT VOLTAGE IS LOW
INPUT HIGH	DISPLAYED WHEN THE INPUT VOLTAGE IS HIGH
INPUT NORMAL	DISPLAYED WHEN THE INPUT VOLTAGE IS NORMAL
INPUT FAULT	DISPLAYED WHEN THE INPUT VOLTAGE IS ERRONEOUS
FREQUENCY FAULT	DISPLAYED WHEN THE INPUT FREQUENCY IS ERRONEOUS
FREQUENCY NORMAL	DISPLAYED WHEN THE INPUT FREQUENCY IS NORMAL
BUS LOW	DISPLAYED WHEN THE BUS (BATTERY) VOLTAGE IS LOW
BUS HIGH	DISPLAYED WHEN THE BUS (BATTERY) VOLTAGE IS HIGH
BUS NORMAL	DISPLAYED WHEN THE BUS (BATTERY) VOLTAGE IS NORMAL
VDC LOW	DISPLAYED WHEN THE VDC (DROPPER) VOLTAGE IS LOW
VDC HIGH	DISPLAYED WHEN THE VDC (DROPPER) VOLTAGE IS HIGH
VDC NORMAL	DISPLAYED WHEN THE VDC (DROPPER) VOLTAGE IS NORMAL
OVERLOAD BATTERY	DISPLAYED WHEN THE LOAD IS HIGHER THAN THE RATED POWER
OVERLOAD	DISPLAYED WHEN THE LOAD 2 IS HIGHER THAN THE RATED POWER
BATTERY CURRENT OK	DISPLAYED WHEN THE LOAD IS NORMAL
LOAD NORMAL	DISPLAYED WHEN THE LOAD 2 IS NORMAL
OVERHEAT	DISPLAYED WHEN THE DEVICE TEMPERATURE IS HIGH
TEMP NORMAL	DISPLAYED WHEN THE DEVICE TEMPERATURE IS WITHIN RANGE
RECT START	DISPLAYED WHEN THE RECTIFIER IS STARTED
RECT POWER ON	DISPLAYED WHEN THE RECTIFIER POWER IS ON
RECT. NORMAL	DISPLAYED IF THERE IS NO WARNING/FAULT IN NORMAL OPERATION.
RECTIFIER STOP	DISPLAYED WHEN THE RECTIFIER IS STOPPED
RECT SOFTSTART	DISPLAYED WHEN THE RECTIFIER IS IN SOFTSTART MODE
RECT AUTO-START	DISPLAYED WHEN THE RECTIFIER IS IN AUTOSTART MODE
PHASE NORMAL	DISPLAYED WHEN THE PHASES ARE IN THE NORMAL OPERATION
PHASE FAULT	DISPLAYED WHEN THE INPUT PHASES ARE IN REVERSE ORDER
BOOST CHARGE	DISPLAYED WHEN THE DC1 (BATTERY) IS IN BOOST CHARGE MODE
FLOAT CHARGE	DISPLAYED WHEN THE DC1 (BATTERY) IS IN FLOAT CHARGE MODE

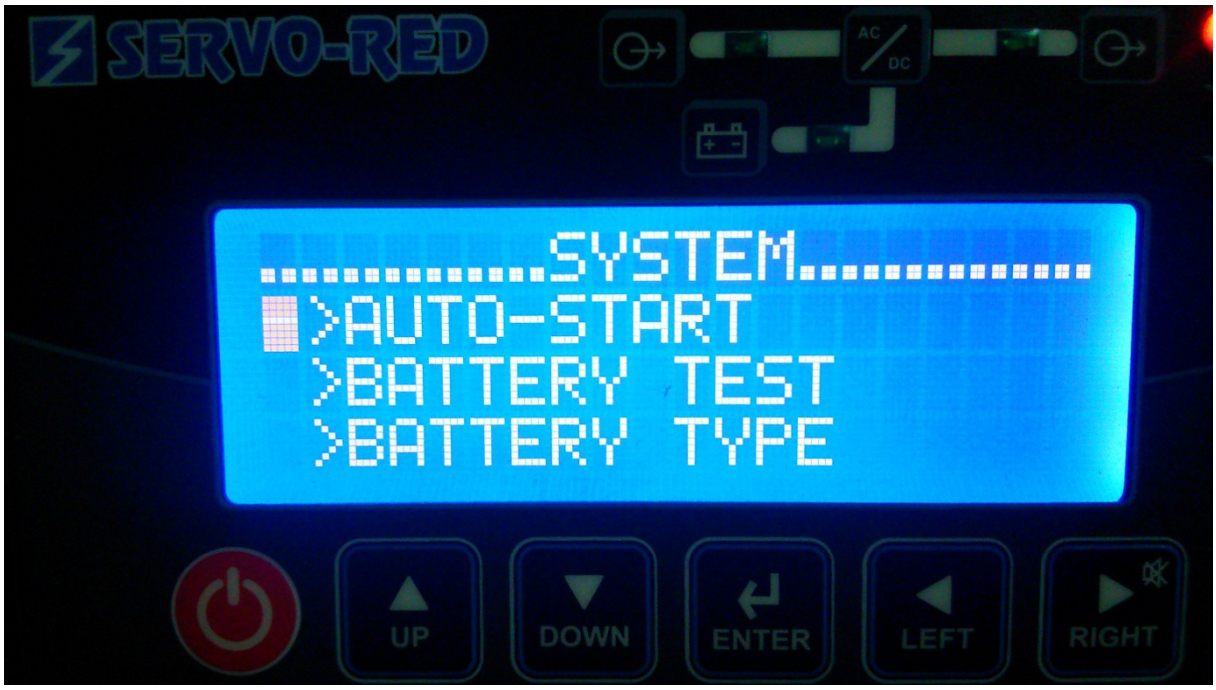
SETTINGS MENU

Adjusting charging voltages, currents and time displayed in this menu.



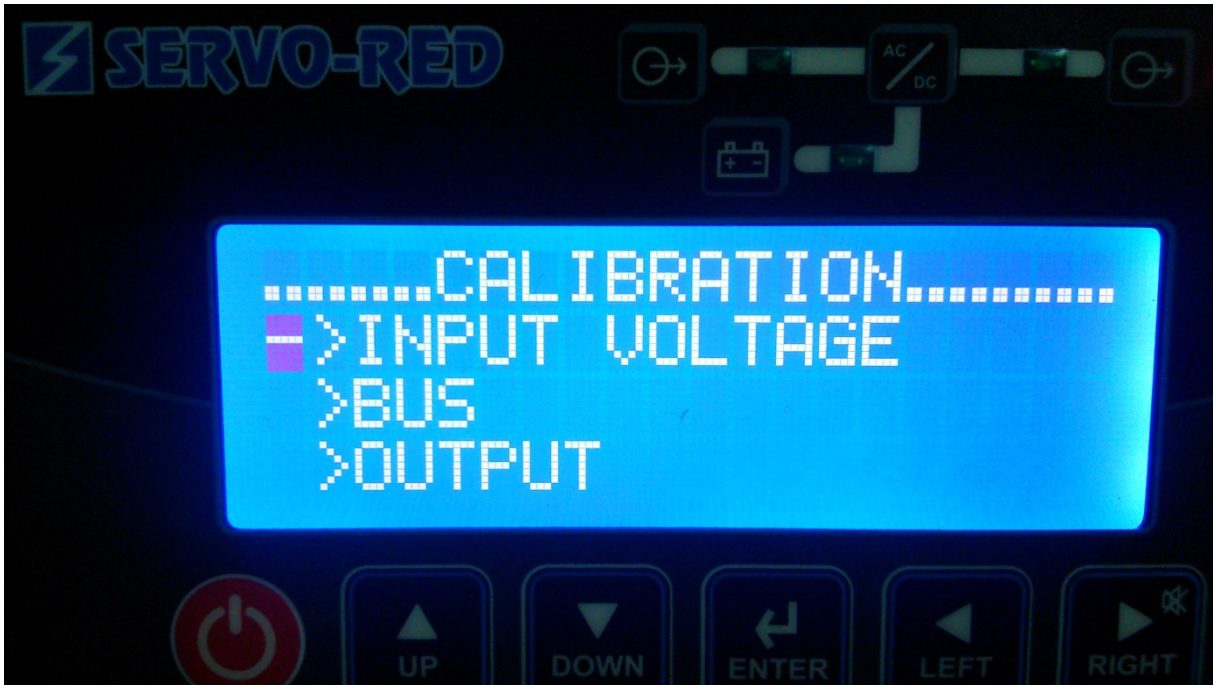
SYSTEM MENU

Buzzer, date/time, language, password settings are done.



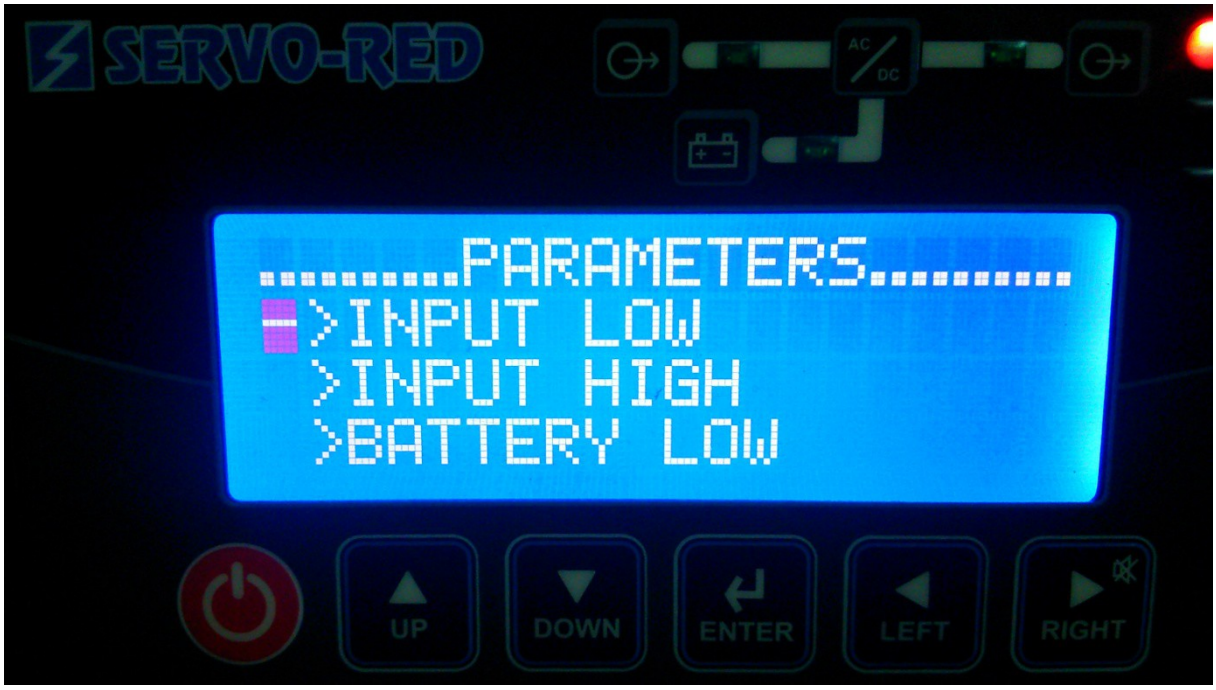
CALIBRATION MENU

Voltage and Current Calibration is displayed in this menu.



PARAMETERS MENU

Tolerance and limits are displayed in this menu.



MAINTENANCE&SERVICE

Manufacturer accepts that the user has enough knowledge and technical experience on the device and the user guarantees that the device will not be used in critical applications which can cause loss of life/injury. All the installation/maintenance/service works must be done by authorized personnel. User manual has been prepared considering the condition that all installation/maintenance/service works will be done by authorized personnel except turning on and off. All the intervention must be done by the authorized personnel which has a deep knowledge on the design. The covers of the device is only allowed to be opened when a maintenance / repair and operation work is to be done. Trouble shooting and repair services is supposed to be done by authorized personnel who has expertise in this field. A detailed trouble shooting is not necessary for authorized personnel. Rules and cautions are for protecting users from possible dangers. The system is designed to operate safely if the safety, operation and service rules are applied properly by experienced and well trained personnel. All the safety precautions is taken for the parts which may cause danger of shock. When the regulator is used in specified environment conditions, it will serve continuously for years thanks to its design principals. When the covers are open, there is a danger of contacting the points with power despite the precautions taken. To avoid danger of electricity shock, do not touch that places and be informed about the parts which is with power. When the device is running, the covers must be closed.

Device lifetime is identified and announced on 13/6/2014 dated and 29029 numbered Official Gazzete After Sales Services Regulation Appendix is 5 years.

Authorized service stations and spare part shops address', phone numbers and other informations can be get from +90 533 663 33 04 numbered customer support line.

PERIODICAL MAINTENANCE

When the device is run in specified environment conditions and appropriate place, the device does'nt need charger maintenance. We recommend a regulator preventive maintenance once in two years.

FAULT IDENTIFICATION

Only authorized personnel can do the maintenance and service works for the device. Please contact with the service in case of problem/fault.
There is events/warnings displayed on the LCD when a fault occurs, please describe the fault that you see on the display when you contact with the service.

BEFORE CONTACTING SERVICE

Read the user manual carefully.

Check the connections of input/output of the device.

In case of fault, restart the device via "ON/OFF" button.

Identify the problem clearly.

TROUBLESHOOTING

When a fault occurs, please make the necessary controls below before contacting service.

Make sure the input/output connections are done properly as described in the manual.

Make sure the grounding is done properly as described in the manual.

Make sure the input/output fuses are OK.

(1) Front panel does not start	
Diagnosis/Possible Cause	*Solution*
Input Fuse is OFF	Check the fuse, replace it if needed.
ON/OFF breakers might be turned OFF or broken	Check the breaker.
Mains not available	Make the grid connections checked via authorized personnel.
LCD Fault	Restart the LCD via ON/OFF switch.
Internal fault	Contact with the service

(2) There is over temperature warning displayed on LCD	
Diagnosis/Possible Cause	*Solution*
Ventilation holes can be clogged.	Check all ventilation holes. Clean the dust on the ventilation holes if needed.
Temperature is high at the operating place.	Place the device in an appropriate/cooler place.
There may be fault on temperature sensors.	Contact with the service
Cooling fans may be broken or internal fault	Contact with the service
If Sensor is put to the battery cabin	Check the battery cabin

(3) Setting Voltage is Lower Than Its Set Value	
Diagnosis/Possible Cause	*Solution*

There may be overload situation.	Check the load
Setting Voltage might have been set lower.	Check setting voltage set value via service menu
Internal fault	Contact with the service

(4) Displayed values are normal, there is no output power	
Diagnosis/Possible Cause	*Solution*
Output breaker may be OFF or broken	Check the breaker, change it if needed.
Internal fault	Contact with the service

(5) All LEDs ON	
Diagnosis/Possible Cause	*Solution*
Microprocessor fault	Contact with the service

(6) There is abnormal noise inside the device	
Diagnosis/Possible Cause	*Solution*
Internal fault	Contact with the service

(7) Overload warning on the LCD	
Diagnosis/Possible Cause	*Solution*
An overcurrent may be drawn by the device/devices at the output.	Reduce the output load, connect suitable load for the device.
High inrush currents can be drawn by the loads like engine loads.	Check the load current
Internal fault	Contact with the service

WARRANTY CONDITIONS

1) Warranty conditions are declared on the perform invoice of the product. Warranty period begins at the date of invoice and valid for ……. year for international markets. Extended warranties are based on contracts between the manufacturer and buyer.

2) All equipments of the device include in our companies warranty.

3) If the device damaged during the warranty period, repairing duration will be added to warranty time. Maximum duration of repairing is 30 work days. This period will start form announce to service station and in the case of lack of service station announcement to seller, branch, dealer, importer or manufacturer. If the repairing period take longer than 15 days; the importer or manufacturer should provide another device with the same specification up to delivery date for costumer.

4) During the warranty period in the case of facing with any prblem caused by materials or workmanship or unsuitable assembly, full repairments also equipment replacement will be done without any charge.

In spite of use repairment right by consumer if fort he device;

- From delivery date to costumer; with the condition of being in warranty period; During one year; if the same fault repeats more than 2 times or different faults be accurred more than 4 times or sum of fault condition numbers during mentioned warranty period reach more than 6 times which lead to failure to use device,
- Exceed maximum time period for repairment,
- In the case of service station and in the case of lack of service station announcement to seller, branch, dealer, importer or manufacturer prepare a report Express that the device could not be repaired; costumer could change the device free or ask for refund completely or according to fault severity.

5) Failures caused by misuse, use not according to user manuel, are not covered by warranty.

6) In the case of face with any problem related with warranty it could be applied to General Directorate of Consumer Protection and Competition of ministry of customs and trade Ministry of Turkey Republic.