SA500-I-X RANGE
500W / DC OUTPUT UPS

FEATURES

- Battery Cut Off When Battery Low
- 3 State Battery Charging
- Configurable Maximum Current Charging Level
- Step Mains to Battery Without Voltage Dips
- Battery not Included
- Battery temperature Sensor Input (Optional Sensor)
- Battery Low Alarm
- Battery Test
- Mains Failure Alarm
- UPS Failure Alarm
- Advanced Configuration via RS232
- Ethernet or CAN Bus Connection (Optional)
- Redundance Oring Diode (Optional)



APPLICATION



SAFETY & EMC

RoHS² compliant 10 from 10 | Reach compliant | WARRANTY 3 YEARS

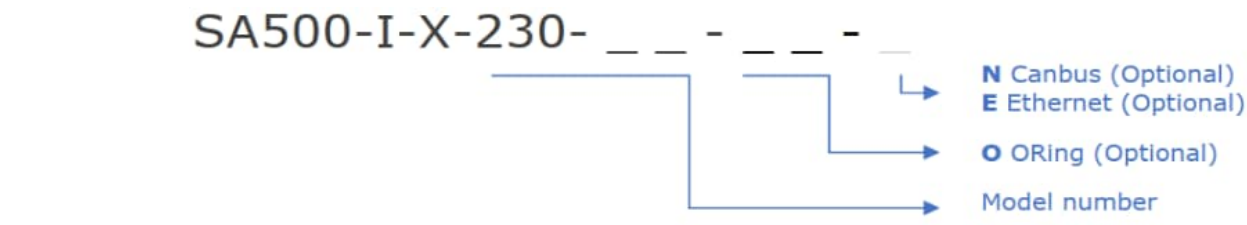
DESCRIPTION

This series consists of three models of a power supply charger which, in the presence of mains voltage, supplies regulated voltage, while at the same time charging the battery in a controlled way. The range is ideal for charging lead-acid batteries of 12V, 24V and 48V with capacities of up to 96Ah, 48Ah and 24Ah respectively. The device comprises a switched-mode power supply and a three-step battery charger circuitry. It also incorporates an alarm circuitry which acts independently, when a mains, UPS or battery condition occurs. The alarm outputs are the switched, potential-free contacts of relays.
When the mains supply is on, the output current is obtained directly from the power supply. The maximum battery charging current can be selected by user through RS-232 connection. The maximum battery charging current will be equal to the set current or equal to the rated current less the output current; the floating voltage will be equal to the output voltage. The system allows the temporary supply of an output current higher than the rated current. The average of this additional current, which is obtained from the battery, should not exceed the charging current as, otherwise, the battery would finally discharge. If the power supply has no output, due to a mains voltage outage or to a failure in the power supply, the supply failure alarm will be triggered.
When there is no mains supply, the battery comes, uninterruptedly, into operation and the output current is obtained from the battery. The output voltage will then depend on the battery discharge curve. If the battery runs flat, the low battery alarm will be triggered. It will be disconnected from the output by way of a relay to prevent a deep discharge of the battery. When the mains supply returns, the UPS may take several minutes to supply the established battery charging current. During this time, the battery is charged with a small current until the low battery status is overcome. At that moment, the low battery alarm is reset, the relay closes, and the battery starts to charge normally.
An optional temperature sensor attached to the battery can be connected to the equipment. If it is used, charging and floating battery voltages are compensated according to battery temperature.

BASIC CHARACTERISTICS

Models	Input Voltage Range	Nominal Output Voltage	Maximum Output Power	Maximum Output Current	Maximum Output Peak Current from Battery
SA500-I-X-230-12	110…230VAC	12V	500W	36.7A	50A 30s
SA500-I-X-230-24		24V		18.4A	30A 30s
SA500-I-X-230-48		48V		9.19A	15A 30s
SA500-I-X-230-110*		110V		4.02A	5A 30s

*References subject to special MOQs and lead times



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BASIC CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.
Input				
Input Voltage Range		110VAC		230VAC
Input Current				
Inrush Current			<30A	
Power Factor	At Full Load		0.98	
Efficiency	See Table			
Output				
Output Voltage Range		0%Von		+20%Von
Line Regulation			<0.2%	
Maximum Ripple	See Table			
Maximum Load Capacitance	See Table			

BATTERY

Parameter	Conditions	Min.	Typ.	Max.
Battery Charging Method	Bulk/Absorption/Float			
Maximum Charging Current	Configurable Range Depends on Model			
Maximum Charging Current Tolerance			10%	
Battery Temperature Compensation			2.5mV/K/cell	
Battery Test	By Capacity Measurement Discharging Over the Load			

ENVIRONMENTAL

Parameter	Conditions	Value
Storage Temperature		-25°C to 80°C
Operating Temperature	Po = nom	-25°C to 55°C
	Po = 62.5% nom	-25°C to 70°C
Maximum Relative Humidity	With No Condensation	95%
Cooling	Natural Convection	
MTBF	40°C According to IEC 61709	350.000h

PROTECTIONS

Parameter	Type
Against Overloads and Short-Circuits	Current Limiting
Battery Protection Against Deep Discharges	Battery Cut Off
Battery Protection Against Overloads	Current Limiting and Fuse
Against Input Over-Current	Fuse

SAFETY AND CERTIFICATION

Certificate Type (Safety)	Standard
Safety	IEC 62368-1
Dielectric strength Input/Output, Signals	3000VAC, 50Hz, 1min
Dielectric Strength Earth/Input	1500VAC, 50Hz, 1min
Dielectric Strength Output/Earth, Signals	500VAC, 50Hz, 1min

EMC

	Standard
Emission	EN 61000-6-4
Immunity	EN 61000-6-2

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SA500-I-X RANGE
500W / DC OUTPUT UPS

BASIC CHARACTERISTICS

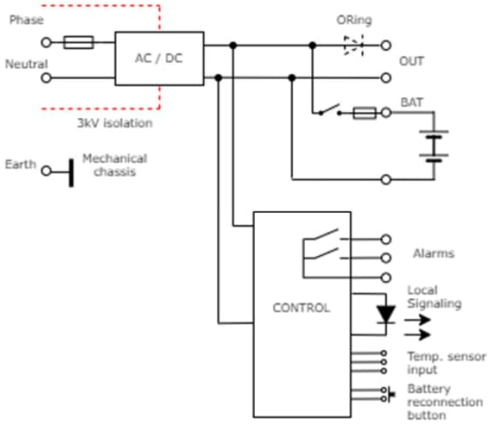
Parameter		Output/Battery					Maximum Output Current				Maximum Charging Current Selection		
	Nom [V]	Float [V]*	Const Volt [V]*	Cut Off [V]*	Max Ripple [mV]	Max Cap [mF]	Cont. [A]	1 min [A]	From Battery [A]	Effic [%]	Min [A]	Nom [A]*	Max [A]
EDS-500-5243	12	13.6	14.5	10..5	100	15	36.7	36.7	50 (30s)	90	2.5	16	20
EDS-500-5247	24	27.1	29.0	21	100	15	18.4	20	30 (30s) 32 (1s)	92	1.25	8.0	10
EDS-500-5249	48	54.2	58.0	42	150	15	9.19	10	15 (30s) 16 (1s)	93	0.63	4.0	5.0
EDS-500-5251[1]	110	124.2	132.9	96.2	300	2.7	4.02	4.5	5 (30s) 7 (1s)	93	0.3	1.75	2.2

[1] Default Factory Settings
*References Subject to Special MOQs and Lead Times

CONTROL

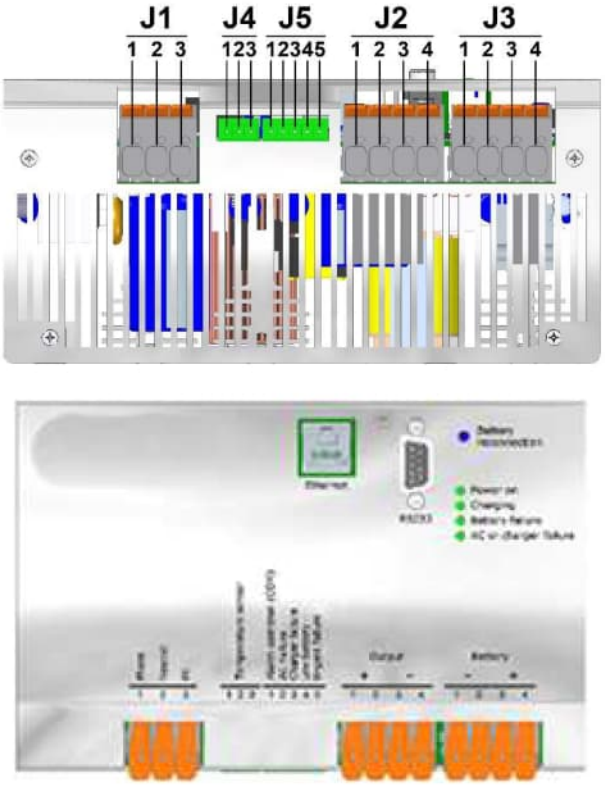
Model	Description
Battery Reconnection Button	For Starting Up Without Mains Presence
LEDs	Power On (Green) Charging (Ambar) Battery Failure (Red): 1. Led On: Battery Test Failed 2. Slow Blink: Battery Not Present 3. Fast Blink: Battery Temperature Sensor Not Present AC or Charger Failure (Red): 1. Led On: Vout Out of Range 2. Slow Blink: AC Input Out of Range
Mains Failure Alarm	Mains Out of Range. Closed Contact when Alarm
Battery Low Alarm	Battery Discharged. Closed Contact when Alarm
Urgent Failure Alarm	Maintenance Required. Closed Contact when Alarm. Alarm Cases: 1. Battery Not Present 2. Battery Test Failed 3. Charger Malfunction 4. Charger Temperature Our of Range
UPS Failure Alarm	Vout Out of Range. Closed Contact when Alarm
Alarms Spec:	Type: Solid State Relay Maximum Switching Voltage: 60V Maximum Switching Current: 0.2A

BLOCK DIAGRAM



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CONNECTIONS



CONNECTIONS

Pin No.	Configuration	Note
J1-1	Mains Line	Cable Cross Section 0.75…6 mm²
J1-2	Mains Neutral	
J1-3	Protective EARTH	
J2-1, 2	+ Vout	
J2-3, 4	-Vout	
J3-1, 2	-VBat	
J3-3, 4	+VBat	
J4-1	Temp Sensor +5V	Temperature Sensor not Included
J4-2	Temp Sensor	
J4-3	Temp Sensor GND	
J5-1	Com Alarms	Mating Connector: Phoenix Contact MC 1,5/ 5-ST-3,81 (not included)
J5-2	Mains Alarm	
J5-3	UPS Alarm	
J5-4	Low Bat.alarm	
J5-5	Urgent Failur	

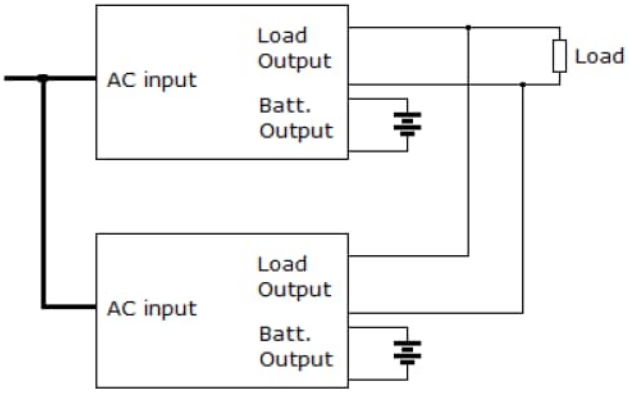
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POWER DERATING vs TEMPERATURE

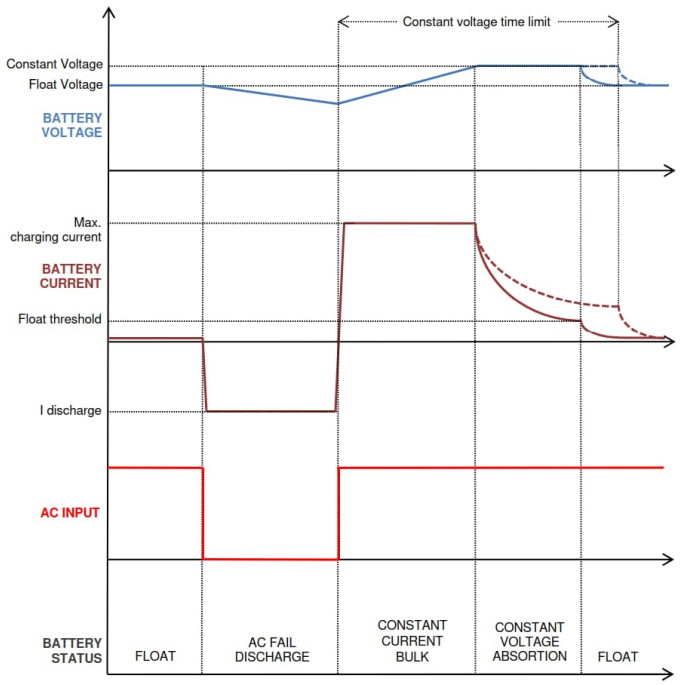


ORing FEATURE

The optional ORing feature enables the parallel connection of several power supply-chargers. In this manner, the load current is shared among the units and redundancy is introduced in the power system for high reliability. The implemented ORing is an active one, based on FET transistor, and thus minimizing power loss in this circuit.



CHARGING CHARACTERISTIC



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CANOpen COMMUNICATION PROTOCOL

The optional CAN Module enables CANopen application protocol

CAN DATA FRAME

Can protocol uses frames to send and receive data between the device and other nodes on the CAN Bus. The structure of the CAN frame is the following one:

SoF	COB-ID	RTR	Control Field	Data	CRC	ACK	EoF
1 bit	11 bits	1 bit	6 bits	0-8 bytes	16 bits	2 bits	7 bits

LSS SERVICE

LAYER Setting Service. It offers the possibility to inquire and change the settings of certain parameters of the local layers on a CANopen module via CAN Network. The parameters that can be read and/or written by using LSS service are:
Node-ID of the CANopen Slave
Bit Timing Parameters of the Physical Layer (baud rate)
LSS address
By default, CANopen devices start without CANopen Node-ID (0xFF) and baudrate of 250 kbit. Node ID must be set in order to communicate with the device.

NMT SERVICE

The Network Management is used to control the Nodes inside the network and its behavior. This service uses a master/slave relationship where the master controls the states of the slaves.

SDO SERVICE

SERVICE Data Object is used to have access to all the data defined in the Object Dictionary. SDO service allows the transmition and reception of objects of any size using a client/server communication. If SDO is not able to send all the data in one frame, it will segment it and send the data using multiframe format.

USE CASES:

LSS SERVICE: CHANGE NODE ID				
Tx/Rx	CAN Id	DLC	Message	Notes
Tx	7E5	8	04 01 00 00 00 00 00 00	SET Nodes to Configuration Mode
Tx	7E5	8	11 XX 00 00 00 00 00 00	Set Node ID to XX
Rx	7E4	8	11 __ 00 00 00 00 00 00	If __ == 00; Node Changed Correctly
Tx	7E5	8	04 01 00 00 00 00 00 00	Set Nodes to Operation Mode

SDO CASES (Node ID 0x01):

LSS SERVICE: CHANGE NODE ID				
Tx/Rx	CAN Id	DLC	Message	Notes
Tx	601	8	40 04 60 01 00 00 00 00	READ Index 6004, Subindex 01
Rx	581	8	43 04 60 01 0F D4 00 00	Return Value 00 00 D4 0F = 54287 mV
Tx	601	8	2F 03 60 00 04 00 00 00	Write Index 6003 Subindex 00 to 4
Rx	581	8	60 03 60 00 00 00 00 00	Write OK

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OBJECT DICTIONARY

Idx	Sub	Type	RW	Notes
6001	00	INT32	ro	Output Power
6002	00	INT32	ro	Main Forward Power
6003	00	UINT8	rw	Output Type maximum Output Voltage in mV
6004	01	UINT32	rw	Maximum Output Voltage in mV
6004	02	UINT32	rw	Minimum Output Voltage in mV
6004	03	UINT32	rw	Nominal Output Voltage in mV
6005	01	INT32	rw	Maximum Battery Temperature in m°C
6005	02	INT32	rw	Minimum Battery Temperature in m°C
6006	00	UINT16	rw	Battery Current for Transition to Floating from Quick Charge in mA
6007	00	UINT32	rw	Output Voltage in Floating State in mV
6008	00	UINT32	rw	Output Voltage in Quick Charge State in mV
6009	01	UINT32	rw	Disconnection Voltage Lower Bound in mV
6009	02	UINT32	rw	Disconnection Voltage Lower Bound in mV
600A	00	UINT16	rw	Maximum Time of Quick Charge State in Hours
600B	00	INT16	rw	Maximum Charging Current in mA
600C	00	UINT16	rw	Maximum Number of Power Up Retries
600D	00	UINT16	rw	Time Between Power Up Retries in Minutes
600E	00	UINT16	rw	Time in Minutes for Disconnection of the Battery when AC is not Available
600F	00	UINT16	rw	Number of times a Battery can be Above Maximum Output Voltage
6010	00	UINT16	rw	Time in Seconds to Disconnect the Battery when Above the Maximum Output Voltage
6011	00	UINT16	rw	Time in Seconds to Clear a Battery Overvoltage Alarm
6012	00	UINT16	rw	Timeout in Minutes to Clear the Number of Times a Battery is over Maximum Voltage
6013	00	UINT16	rw	Time in Seconds for the end of Autonomy Alarm to Trigger
6014	00	UINT8	rw	Battery Presence
6015	00	UINT32	rw	Limit Voltage to Consider a Battery Test Failed in mV
6016	00	UINT32	rw	Capacity Discharged in a Battery Test to Finish it in mAh
6017	00	UINT16	rw	Period of the Battery Test in Weeks
6018	00	UINT16	rw	Maximum Time of an Attempt of Battery Test
6019	00	UINT16	rw	Time in Seconds in a Battery Test that Voltage must be Below v_fin to Consider the Attempt Failed
601A	00	UINT16	rw	Number of Retries of Battery Test
601B	00	UINT16	rw	Retry Time of a Failed Battery Test in Minutes
601C	00	UINT16	rw	Maximum Time in Minutes in Recovering Battery State
601D	00	UINT16	rw	Minimum Time to Consider Battery Charged from Floating State in Hours
601E	00	INT16	rw	Minimum Temperature to Apply Temperature Compensation in d°C
601F	00	INT16	rw	Maximum Temperature to Apply Temperature Compensation in d°C
6020	00	UINT8	rw	Enable Compensation
6021	00	UINT16	rw	Temperature Compensation in Quick Charge State in mV/°C
6022	00	UINT16	rw	Temperature Compensation in Floating State in mV/°C
6023	00	UINT16	rw	Time in ms that Conditions have to be Met Constantly to Change from Quick Charge to Floating State
6024	00	UINT16	rw	Number of Overloads Allowed
6025	00	UINT16	rw	Time Between Test to Overcome Overload State in Seconds
6026	00	UINT32	rw	Immediate Disconnection Voltage in mV
6027	00	INT32	ro	Current Out of the AC/DC Converter in mA
6028	00	INT32	ro	Current Sensed Charging the Battery in mA
6029	00	INT32	ro	Output Voltage in mV
602A	00	INT32	ro	Internal Temperature in m°C
602B	00	UINT32	ro	Temperature Sensed in the Battery Current Probe in m°C. if not Present, it will Return Max Value
602C	00	INT32	ro	Battery Voltage in mV
602D	00	INT32	ro	Overall Battery Current in mA. Positive Values Correspond to Charging and Negatives to Discharging
602E	00	INT32	ro	Current Sensed Discharging the Battery in mA
602F	00	UINT8	ro	Current Internal Battery Charger State

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RS-232

The equipment can be locally configured through RS-232 connection. The configuration for the RS-232 connection communication channel is the following:

- BAUD RATE: 115200
- PARITY: None
- BITS: 8
- STOP BITS: 1
- FLOW CONTROL: None

Available commands:

GENERIC COMMANDS

Command	Type	Description
Id	String	Get the ID of the Product Family
Version	String	Get the Version of the Firmware

MEASURAMENT COMMANDS

Command	Type	Description
i_converter	Float	Current out of the AC/DC Converter in mA
i_bat_charge	Float	Current Sensed Charging the Battery in mA
v_out	Float	Output Voltage in mV
temp_int	Float	Internal Temperature in m°C
temp_bat	Float or String	Temperature Sensed in the Battery Current Probe in m°C. if nor Present, it will Return "NOT CONNECTED"
v_vat	Float	Battery Voltage in mV
i_bat_discharge	Float	Current Sensed Discharging the Battery in mA
i_bat	Float	Overall Battery Current in mA. Positive Values Correspond to Charging and Negatives to Discharging

CONFIGURABLE PARAMETERS

Command	Description
v_float	Output Voltage in Floating State in mV
v_carga	Output Voltage in Quick Charge State in mV
v_fin	Limit Voltage to Consider a Battery Test Failed in mV
cap_desc	Capacity Discharged in a Battery Test to Finish it in mAh
desc_v_max	Disconnection Voltage Upper Bound in mV
desc_v_min	Disconnection Voltage Lower Bound in mV
desc_inm	Immediate Disconnection Voltage in mV
cout_nom	Nominal Output Voltage in mV
vout_max	Maximum Output Voltage in mV
vout_min	Minimum Output Voltage in mV
ilim	Maximum Charging Current in mA
comp_flot	Temperature Compensation in Floating State in mV/°C
comp_carga	Temperature Compensation in Quick Charge State in mV/°C
i_flot	Battery Current for Transition to Floating from Quick Charge in mA
comp_t_max	Maximum Temperature to Apply Temperature Compensation in d°C
comp_t_min	Minimum Temperature to Apply Temperature Compensation in d°C
t_min_flot	Minimum Time to Consider Battery Charged from Floating State in Hours
t_lim_carga	Maximum Time of Quick Charge State in Hours
periodo	Period of the Battery Test in Weeks
tlim_prueba	Maximum Time of an Attempt of Battery Test
rein	Number of Retries of Battery Test
t_rein	Retry Time of a Failed Battery Test in Minutes
tbat_alta	Maximum Battery Temperature in m°C
tbat_baja	Minimum Battery Temperature in m°C
hab_comp	Enable Compensation
bat_presence	Battery Presence

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CONFIGURABLE PARAMETERS

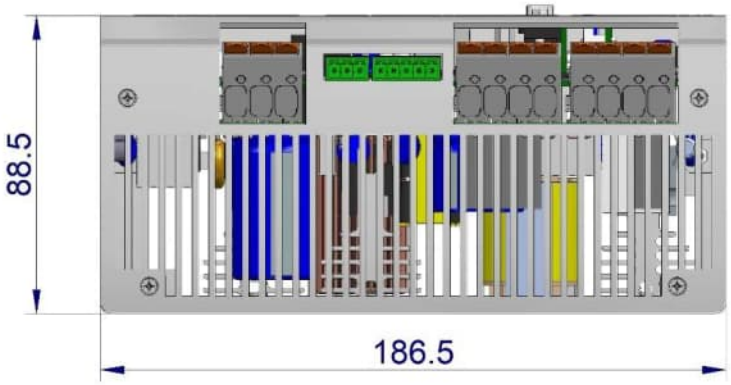
Command	Description
time_between_overload_retries	Time Between Test to Overcome Overload State in Seconds
RCVcte_TempPasoFlot	Time in ms that Conditions Have to be Met Constantly to Change from Quick Charge to Floating State
PrbBat_TTensLim	Time in Seconds in a Battery Test that Voltage must be Below v_fin to Consider the Attempt Failed
TFinAutDesc	Time in Minutes for Disconnection of the Battery When AC is not Available
TempAlarmFinAut	Time in Seconds for the end of Autonomy Alarm to Trigger
PowerUP_TempReint	Time Between Power Up Retries in Minutes
PowerUP_NumReint	Maximum Number of Power Up Retries
TAlarmOnBatTensMax	Time in Seconds to Disconnect the Battery When Above the Maximum Output Voltage
TAlarmOffBatTensMax	Time in Seconds to Clear a Battery Overvoltage Alarm
NumReint_BatTensMax	Number of Times a Battery can be Above Maximum Output Voltage
TempEspFin_BatTensMax	Timeout in Minutes to Clear the Number of Times a Battery is over Maximum Voltage
number_of_overload_retries	Number of Overloads Allowed
maximum_recovering_battery_time	Maximum Time in Minutes in Recovering Battery State

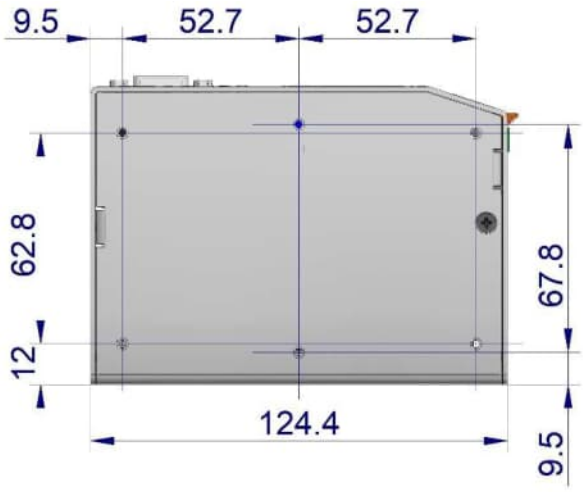
INSTALLATION

Make the connection according to the table figure.
If the battery charging current required is different from the factory set, this can be charged through RS-232 connection
FOR SAFETY REASONS IT IS REQUIRED:
To incorporate an easily accessible means of disconnecting from the mains supply.
Upon replacing the mains fuse, make sure one of the same rating is used and with the power supply disconnected from the mains.
To provide the equipment with a protective enclosure, in compliance with the Electrical Safety Regulations and Directives in the country when it is installed.
To use a mains connection cable with a cross section of at least 0.75mm².

DIMENSION & PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Dimensions		186.5 x 87 x 124.4mm
Weight		1490gr

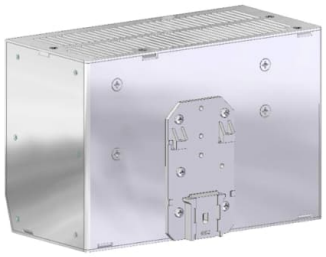




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ACCESSORIES

Description	Code
DIN Rail Clip Set	NP-9441
Mounting Brackets Set	NP-9442
Temperature Sensor (cable 2m)	NP-9433



NP-9441



NP-9442



NP-9433

The sensor may increase the battery life, specially when it suffers relevant periods of time with ambient temperature >35°C or <15°C.
The sensor must be installed in the battery housing. It has a mounting hole od diameter 5mm.

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