



## User's Manual

### SR250HI Series - 250W DC UPS

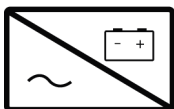


### No-Break™ DC UPS

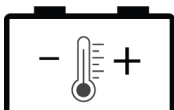
#### STANDARD FEATURES



3 Relay Alarms-Form C



Float Charger -Lead Acid Batteries



Temperature Sensor on 1.7m lead with adhesive pad: -4mV / °C /cell ±10%



ELVD : Electronic low voltage disconnect

#### OPTIONAL FEATURES

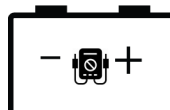


Comms:

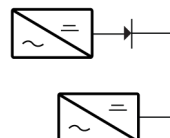
- RS232
- RS485
- Modbus RTU
- SNMP V1 & Webpages



Customizable Digital I/O



BCT: Battery Condition Test.



N+1 Redundancy



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## 1. SAFETY

The user is responsible for ensuring that input and output wiring segregation complies with local standards and that in the use of the equipment, access is confined to operators and service personnel. A low resistance earth connection is essential to ensure safety and additionally, satisfactory EMI suppression (see below).

### **HAZARDOUS VOLTAGES EXIST WITHIN A POWER SUPPLY ENCLOSURE AND ANY REPAIRS MUST BE CARRIED OUT BY A QUALIFIED SERVICEPERSON.**

#### Electrical Strength Tests

Components within the power supply responsible for providing the safety barrier between input and output are constructed to provide electrical isolation as required by the relevant standard. However EMI filtering components could be damaged as result of excessively long high voltage tests between input, output and ground. Please contact our technicians for advice regarding electric strength tests.

#### Earth Leakage

Where fitted, EMC suppression circuits cause earth leakage currents which may be to a maximum of 3.5mA.

#### Ventilation

High operating temperature is a major cause of power supply failures, for example, a 10°C rise in the operating temperature of a component will halve its expected life. Therefore always ensure that there is adequate ventilation for the equipment. Batteries in particular suffer shortened lifetimes if subjected to high ambient temperatures.

#### Water / Dust

Every effort must be made in the installation to minimise the risk of ingress of water or dust. Water will almost always cause instant failure. The effects of dust are slower in causing failure of electronic equipment but all electrical equipment should be cleaned free of any dust accumulation at regular intervals.

#### Electromagnetic Interference (EMI)

Switching power supplies and converters inherently generate electrical noise. All wiring should be as short as practicable and segregated from all equipment wiring which is sensitive to EMI. Residual noise can be reduced by looping DC wiring through ferrite cores (sleeves). These are most effective as close to the power supply as possible and as many turns of the wire taken through the core (+ and - in the same direction) as the core will accommodate.

#### External fuse protection

Fuses or circuit breakers must be used in all battery circuits to protect against short circuits. External fuses should be used for power supplies/chargers even though they are usually internally protected.

#### Connection polarity

It is critical to check the polarity carefully when connecting DC devices even with models which have non-destructive reverse polarity protection.

### Glossary of terms used in our user manuals

**PSU** = power supply unit

**BCT** = battery condition test

**ECB** = electronic circuit breaker

**ELVD** = electronic low voltage disconnect

**RPP** = reverse polarity protection

**EMI** = electromagnetic interference

**SNMP** = Simple Network Management Protocol

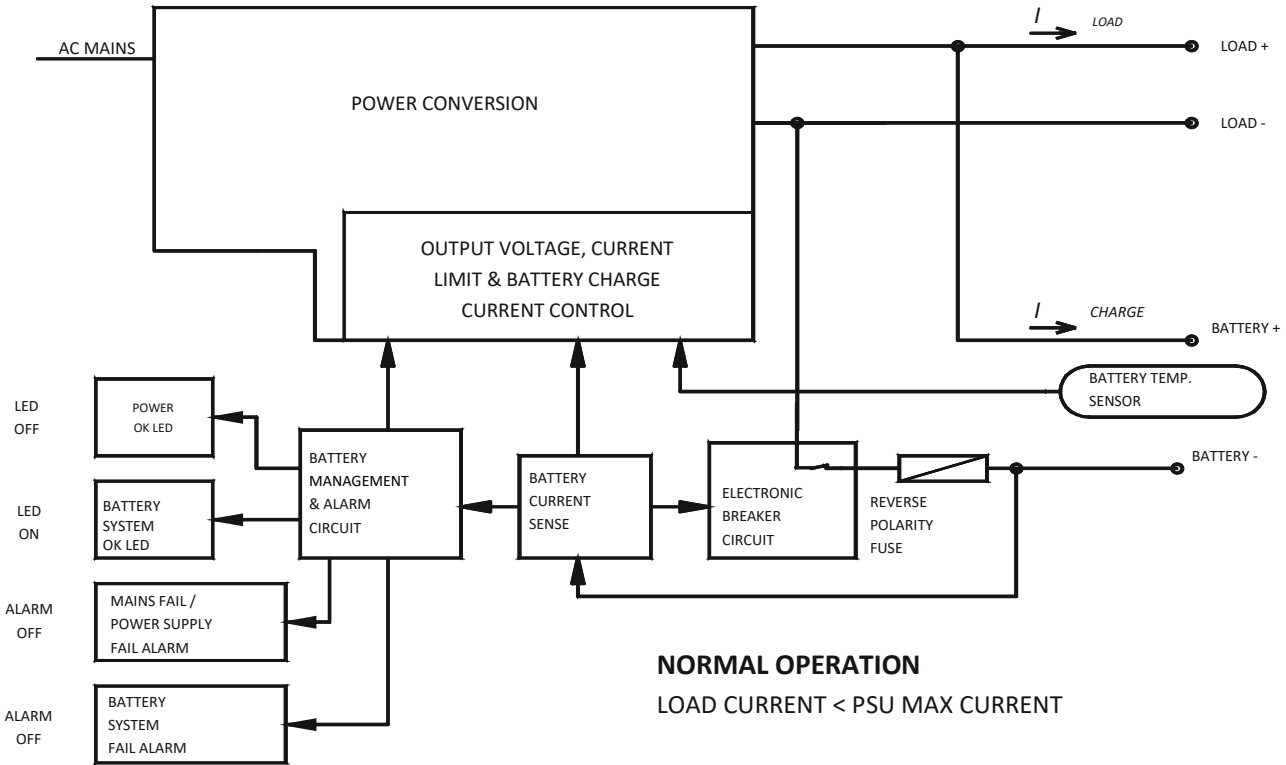
**EMC** = Electromagnetic compatibility

**DOD** = depth of discharge

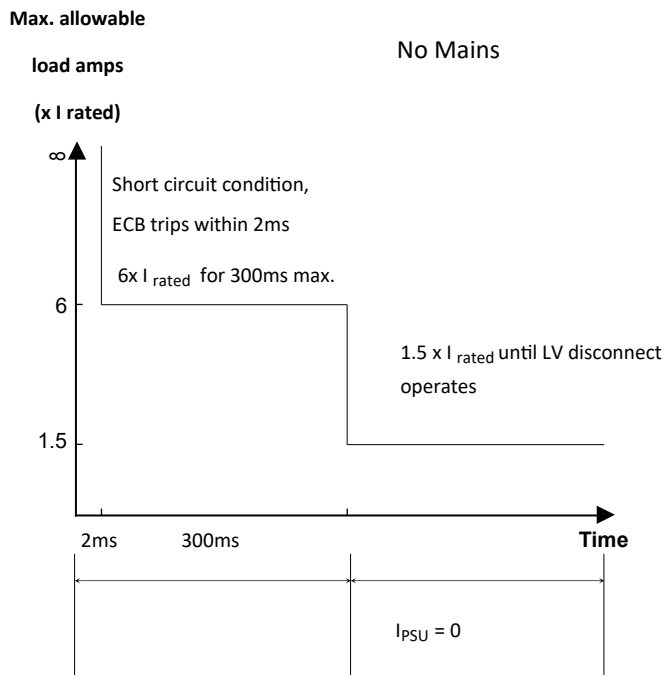
2. INTRODUCTION:

The **No-Break™ DC SR250Hi** switch mode power supply is designed to provide DC power to lead acid batteries for critical back up applications. No-Break™ DC UPS systems maximise the integrity of standby battery installations, whilst optimising the life and availability of back up batteries.

3. SR250HI Series - SYSTEM BLOCK DIAGRAM



4. OPERATION OF ELECTRONIC CIRCUIT BREAKER (ECB) FOR PROTECTION OF BATTERY CIRCUIT & BATTERY



The ECB will operate on overcurrent as above & is also activated for the low voltage disconnect function on mains fail (no input power). It will reset when input power is restored, or can be manually reset by briefly shorting the **BAT-** and **LOAD-** terminals together when there is no input power.

## 5. BACK & FRONT PANEL LAYOUT



**1. AC INPUT IEC60320 - C13 10A**

**2. Digital Inputs (pins 1,2)/ Input or Output (pin 3)/ Return (pin 4) I/O terminals** are customizable and if used, the product will have a unique code.

**3. ALARMS RELAY FORM C**

**AUX :** Activated by BCT ( Battery Condition Test)

**POWER (Mains Fail):**

- Loss of mains input power. This alarm has 30 seconds delay before activation upon mains failure.
- PSU fails

**BATTERY:**

- Battery Low: 1.8V/cell (for 2V cells) - operates only when no mains power present.
- Battery Missing or fault in battery circuit wiring (alarm does not activate for up to battery detection interval time).
- BCT fail

**4. LOAD & BATTERY CONNECTION**

**5. Front Panel LEDs ( For full list of LED flash codes please refer to the next page)**

**Battery OK: LED on:** Battery present and above V batl

**Power OK: LED on:** Charger output present. **LED off:** no mains input or charger in standby mode

**Standby: LED on:** Charger in standby mode ( no output from charger)

**4. Comms Port (if installed) , for models with communications please refer to**

- RS232 (ASCII) <https://www.heliosps.com/sr-series-downloads/#rs232-rs485-commands-sr-series>
- RS485 (ASCII) <https://www.heliosps.com/sr-series-downloads/#rs232-rs485-commands-sr-series>
- Modbus RTU <https://www.heliosps.com/sr-series-downloads/#serial-modbus-rtu-sr-series>
- SNMP, Webpages <https://www.heliosps.com/sr-series-downloads/#snmp-sr-series>

**NOTES**





**Reverse polarity protection**

















If the battery is connected in reverse, the internal battery protection fuse may be ruptured and the unit should be returned to the manufacturer for repair. If the fuse is good, the voltage measured as at step 3 above should be exactly the same on both the load and battery outputs.

## 6. CONNECTION AND INITIAL TESTING

1. Check input and output voltages of system, ensure that they match the equipment. All loads should be isolated.
2. Check polarity of all wiring. Place temperature sensor probe near or on batteries.
3. Plug in ac input and turn power on. Both LEDs will light up after approx. 4 sec, "BATT OK" LED will go out after another 10 secs (since there is no battery connected). DC output voltage should appear at both load and battery outputs (ensure screws are tightened down on the connector block).
4. Turn off input power.
5. Connect battery.
6. Check that ELCB (internal electronic circuit breaker) closes by shorting together the BATTERY –ve and LOAD –ve terminals for about 2-3 sec. You will hear a relay operate and both LEDs will light up. If this does not happen, there is a fault in the wiring or the internal battery protection fuse is ruptured (see Note 2 below). The battery voltage will then appear at the load terminals and the "BATTERY OK" relay energises. The "POWER OK" LED stays on for about 30 seconds.
7. Connect load wiring to **LOAD+** and **LOAD-** terminals. Check that the load does not exceed 110% of the unit. Any peak loads which are > 110% must be connected to the B+ and B-terminals.
8. Turn on ac power.
9. After the batteries are fully charged, check that the battery continues to power up the load when the input power is turned off.

## 7. LED INDICATION

**LEGEND :**  On     Flashing     Flashing Slowly     Off

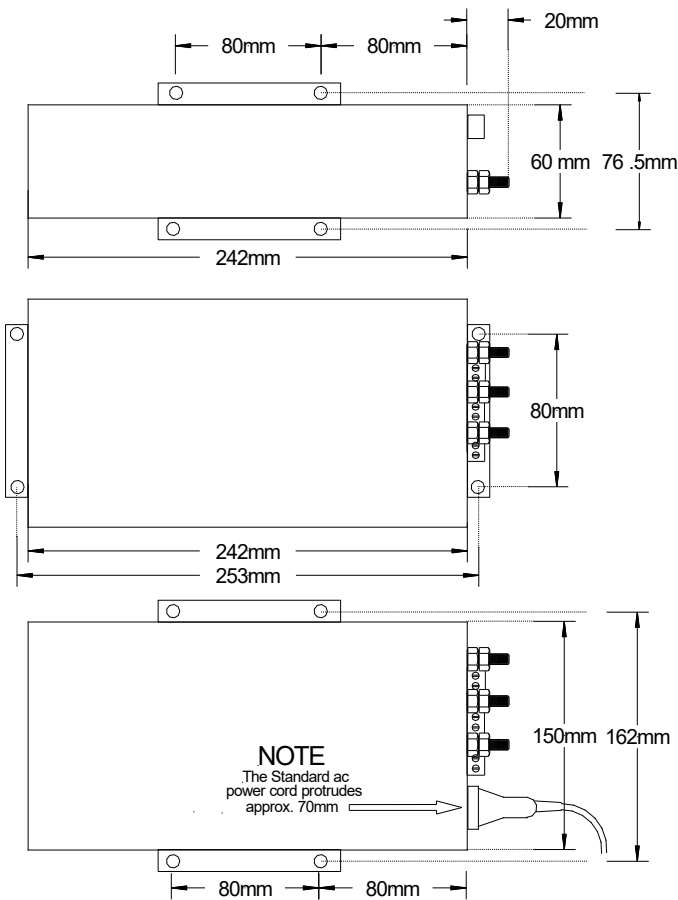
Power OK LED	Battery OK LED	Power Alarm	Battery Low Alarm	Condition
		Normal	Normal	<b>System Normal:</b> AC power is on, PSU output is OK, battery circuit is OK and battery voltage is > V Battery Low.
		Normal	Normal	Battery detection test imminent (LED begins flashing prior to test).
		Normal	Alarm	System AC power is on, PSU output is OK but either: 1. Internal battery fuse has opened (only if battery has been reverse polarity connected), <i>or</i> 2. Battery circuit open - battery missing, or fuse / circuit breaker / wiring fault.
		Alarm	Normal	Either AC power has failed, <i>or</i> PSU has failed. Battery system is OK
		Alarm	Alarm	AC Power is off / DC has failed <b>and</b> battery has discharged to ≤ V Battery Low, unit will continue delivering battery current until low level initiates ELVD.
		Alarm	Alarm	AC Power is off / DC has failed <b>and</b> ELVD has activated and disconnected battery from load. Residual current drain on battery following ELVD <1 mA.
		Normal	Normal	Battery Condition Test is in progress: LEDs flash alternately
		Normal	Alarm	Battery Condition Unserviceable: failed to maintain terminal voltage during battery condition test

Please note that the last three conditions apply only if the battery condition test option is enabled.

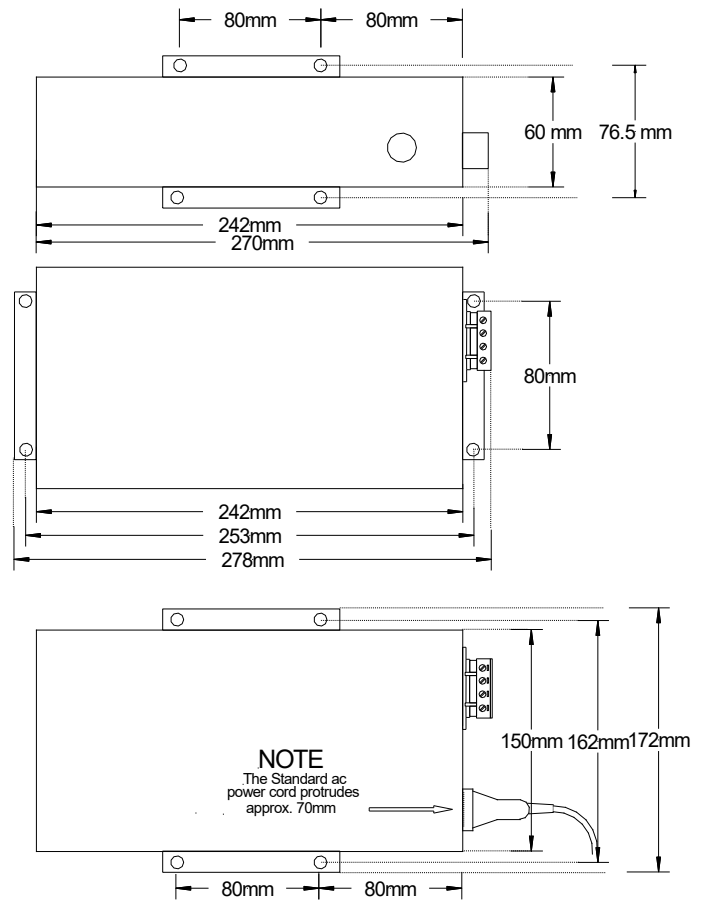
8. SR250HI DC SETTINGS

Parameter	Nominal Voltage					Default Value
	12V	24V	30V	36V	48V	
<b>V out</b> = Output voltage	13.8	27.6	34.5	41.4	55.2	2.3V/cell
<b>V pres</b> = Voltage threshold for battery detection & battery condition test (BCT). If voltage drops to this level during BCT then the test is aborted and a <b>BATLOW</b> alarm generated	12.2	24.4	30.5	36.6	48.8	2.03V/cell
<b>V shutd</b> = Output voltage of PSU during battery detection & BCT	11.5	23	28.8	34.5	46	1.92V/cell
<b>V batl</b> = Battery voltage when <b>BATLOW</b> alarm generated during mains fail	11	22	27.6	33	44	1.84V/cell
<b>V disco</b> = Battery disconnect voltage during mains fail	10	20	25	30	40	1.66V/cell
<b>Bccl</b> = Maximum charge current as % of rated PSU rated current						100% * <sup>4</sup>
<b>Comms</b> = communications mode of PSU: F = continuous data stream of status M = responds only to request made by a controller						F
<b>BatDetect</b> = Battery detection interval time, active only when no battery charge current is detected (the unit may not detect a missing battery for up to this time)						60 min
<b>BCT</b> jumper: if fitted automatic BCT is enabled						Not fitted
<b>BCT</b> = length of battery condition test						20 min
<b>Ret</b> = retest option: N = after a failed BCT further scheduled BCTs are inhibited Y = after a failed BCT further scheduled BCTs will be allowed						Y
* <sup>3</sup> <b>CC</b> = Length of charge cycle in minutes/hours/days. ie. time between battery condition tests						40m/23h/027d
* <sup>3</sup> <b>MfiBCT</b> = time before mains fail check during BCT. A mains fail during a BCT will stop the BCT. If set longer than BCT time no mains fail check will occur.						030 min

9. MOUNTING DETAILS



Stud terminal output



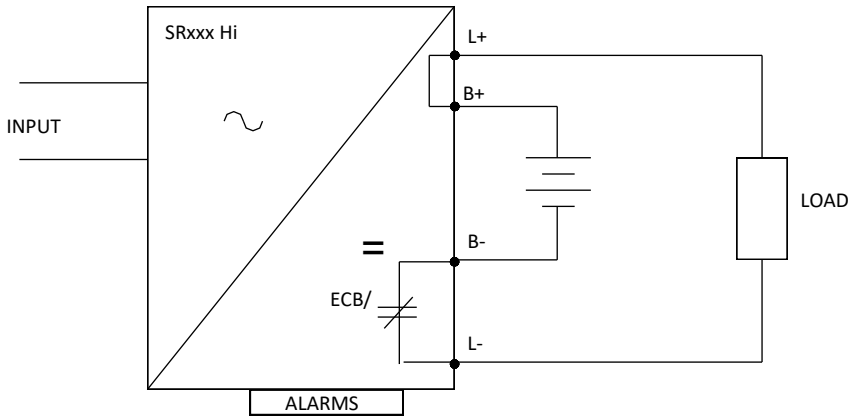
Screw terminal output



10. SR250HI CONNECTIONS - Typical Examples

- Standard *No-Break™* DC charger and battery bank

This is the basic connection which is most commonly used, and provides adequate protection for the majority of systems requiring DC back up in the event of a mains power failure.

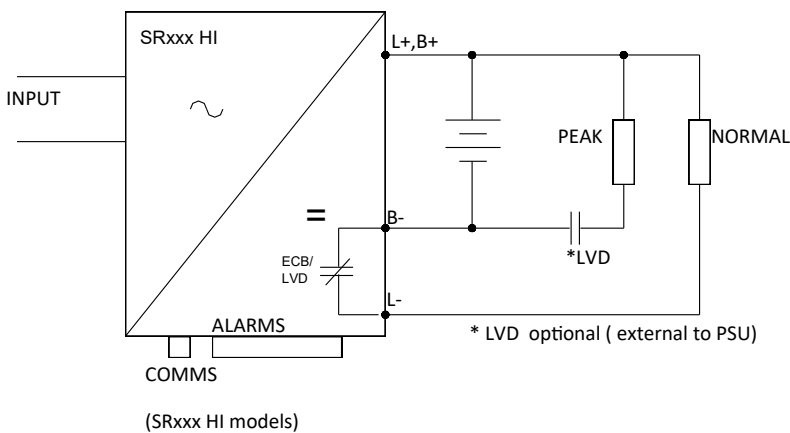


Alarms Available	
Input Fail	YES
Battery Missing	YES
Battery Low	YES
Battery Condition Test Fail	YES

**Note:** On stud connected output models the L+/B+ is one stud labelled “+ COMMON”

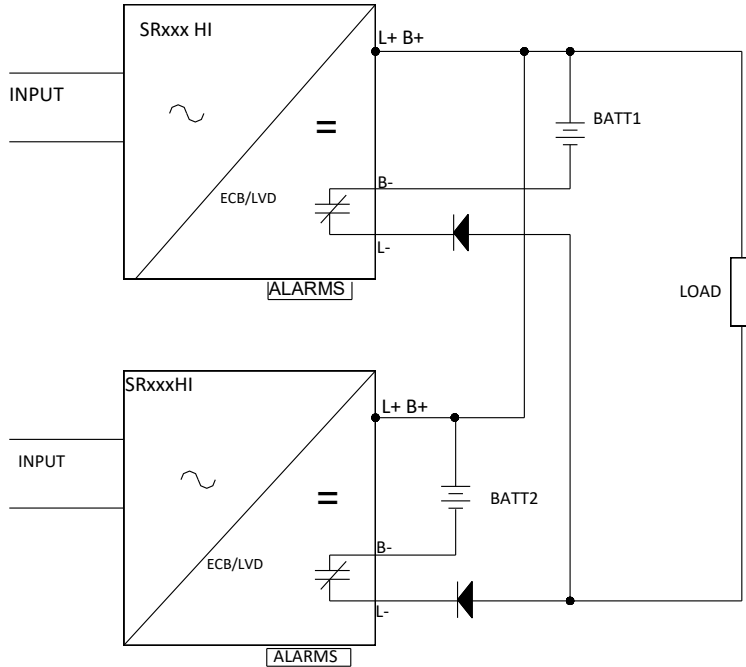
- Peak load connection using *No-Break™* DC charger

Peak loads which may exceed 1.5 x max. charger output can be connected to bypass the internal overcurrent trip circuit.



Alarms Available	
Input Fail	YES
Battery Missing	YES
Battery Low	YES
Battery Condition Test Fail	YES

- N+1 connection using two complete *No-Break™* DC systems with each one capable of supplying the loads- positive common



Alarms available	
Power OK	YES
Battery missing	YES
Battery low	YES
Battery condition test fail * <sup>1</sup>	YES

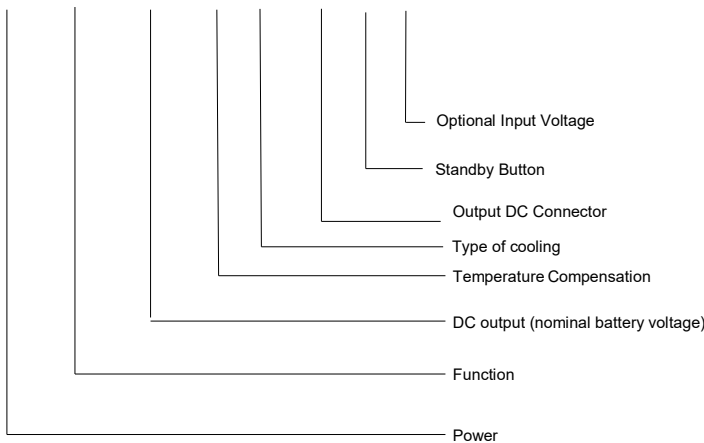
\*<sup>1</sup> interlock circuit required for automated BCT

## 11. MODEL CODING AND OPTIONS

### SR250HI 12 T F X LU - 485+

Optional Interface Port

485 = RS485 232 = RS232 LAN+=SNMP-Webpages 485+=Modbus RTU



U = 110VAC Input voltage DC= 90-135VDC

Turns output on/off

X = Pluggable connector S = Stud

F = Fan (12V Model only) Blank = No fan

T = Yes Blank = No

12, 24, 30, 36, 48V

HL = DC PSU/charger - 2 terminal output ( see separate datasheet)

Hi = *No-Break™* DC UPS - 3 terminal output (separate battery output )

250W

## 12. TECHNICAL SPECIFICATIONS

Output power	250W
Input Voltage	180V - 264VAC & 88V-132VAC 45-65Hz
Output Voltages	12V, 24V, 30V, 36V, 48 VDC
Voltage Adj. Range	85% - 120% of Vnominal
Overcurrent protection	Constant current limit under overload and short circuit conditions
Isolation	Input – earth – 2.5KVdc Output – earth - 500Vdc
Efficiency	> 85%
Operating temperature	-20 to 50 °C ambient at full load
Humidity	0 - 95% relative humidity non - condensing
Cooling	Natural convection except for 12 V model (fan)
LVD	Low Voltage Disconnect
LED Indication	Green: Batt OK Green: Power OK Red: Standby
Alarms Relay	Form C contacts 30VDC,2A/110VDC,0.3A,125VAC, 0.5A AUX (Activated by BCT) POWER (main fails, PSU fails) BATTERY (batt missing , batt low, BCT fail)
Temp. Compensation	Temperature sensor on 1.7m lead with adhesive pad: -4mV/ °C / cell ± 10%
Battery Charge Current Limit	Customizable on request.
Reverse Polarity	Battery reverse connection will open internal fuse (and produce alarm)
Battery Monitoring	Detects for presence of battery on start up, then every 60 minutes when charge current < 200mA
Battery Circuit Protection	Electronic circuit breaker (ECB) operates under the following conditions:
	- <i>Low Battery Volts</i> : Battery Voltage drops to 1.67V/cell
	<i>Overload</i> : Max load must not exceed 110% of rated current. Peak loads must be connected to B+ & B- terminals. (Not suitable for N+1 connection)
	<i>Short Circuit</i> : <2ms, backed up by fuse
Standby Mode	Turns off DC output of PSU & allows load to run off battery
Line Regulation	< 0.2% over AC input range
Load Regulation	< 0.4% open circuit to 100 % load
Noise	< 1% output voltage
Thermal Protection	Yes, self-resetting
Hold-up Time	15 - 20 ms (nom - max. Vin) without battery

AC input connector	IEC60320— C13 10A input socket (similar to PCs etc)
DC Connections	Plug-in style socket & mating screw terminal block: (max. wire 2.5mm <sup>2</sup> / way) or M6 brass stud
Alarm connections	Plug in screw terminal block
Enclosure	Zinc plated & powder coated steel
Dimensions	242W x 150D x 61H (± 1mm)
Weight	1.8 Kg

## STANDARDS

EMC	To CISPR 22 / EN55022 class A
Safety	To IEC950 / EN60950 / AS/NZS3260

### 13. CUSTOMISED MODELS

Model code	BASE MODEL	SPECIAL FEATURES
<b>CSR171</b>	<b>SR250HI24TFXL</b>	BCT enabled 1hr/ 7days
<b>CSR159</b>	<b>SR250HI12TFSL</b>	BCT enabled 20mins/ 28days, V pres = 12V
<b>CSR200</b>	<b>SR250HI12TFSL</b>	No fan, rated output at 50degC = 210W

### 14. TERMS OF WARRANTY

Helios Power Solutions warrants this product for 24 months from date of shipment against material and workmanship defects. Liability under this warranty is limited to the replacement or repair of the defective product as long as the product has not been damaged through misapplication, negligence, or unauthorized modification or repair.