OPERATION AND INSTALLATION MANUAL

SA2S SERIES BATTERY CHARGERS / DC UNINTERRUPTIBLE POWER SUPPLIES

FEATURES AND OPERATION

The SA2S series is a family of 13.8Vdc 3.5A and 7A and 27.6Vdc 3.5A off-line battery chargers / DC uninterruptible power supplies which operate from 100-240Vac mains power. When connected to a valve regulated lead-acid (VRLA) battery, these units provide uninterrupted power to a DC load in the event of a mains failure.

The SA2S contains a current limited float charger, output overcurrent and short circuit protection, output and battery overvoltage protection, a self-resetting battery fuse, overtemperature protection, and mains/DC OK, battery OK and battery fuse fail alarms.

The SA2S is available in a light weight corrosion resistant aluminium chassis mount enclosure. Both models employ natural convection cooling. The SA2S series is for indoor use only.

Figure 1 is a block diagram of the SA2S that details its various functions as follows.

- A high efficiency and high reliability industrial-grade switching AC/DC converter provides 13.8Vdc @ 3.5A/7A or 27.6Vdc @ 3.5A directly to the load and to charge the battery. This converter provides a constant output float voltage. It also incorporates hiccup overcurrent and short circuit protection, output overvoltage shutdown and overtemperature protection.
- The battery is connected across the output of the AC/DC converter via a battery charge current limit circuit in parallel with a self-resetting battery fuse and blocking diode. As a result, the battery is available to supply power to the load the instant when mains power fails.
- The SA2S operates as a taper charger. If the battery is discharged and mains voltage is applied, the SA2S provides a constant 13.8Vdc or 27.6Vdc output to the load and a limited charging current to the battery.

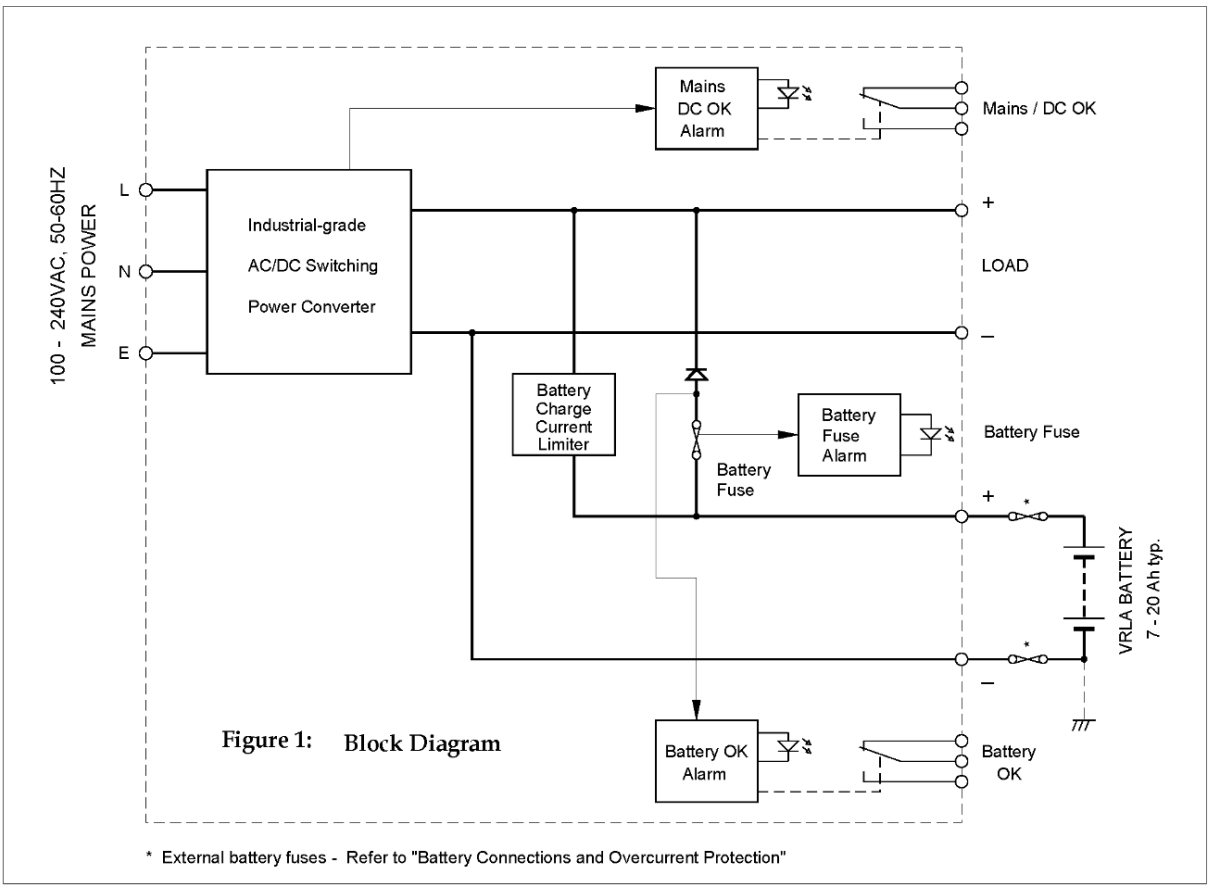


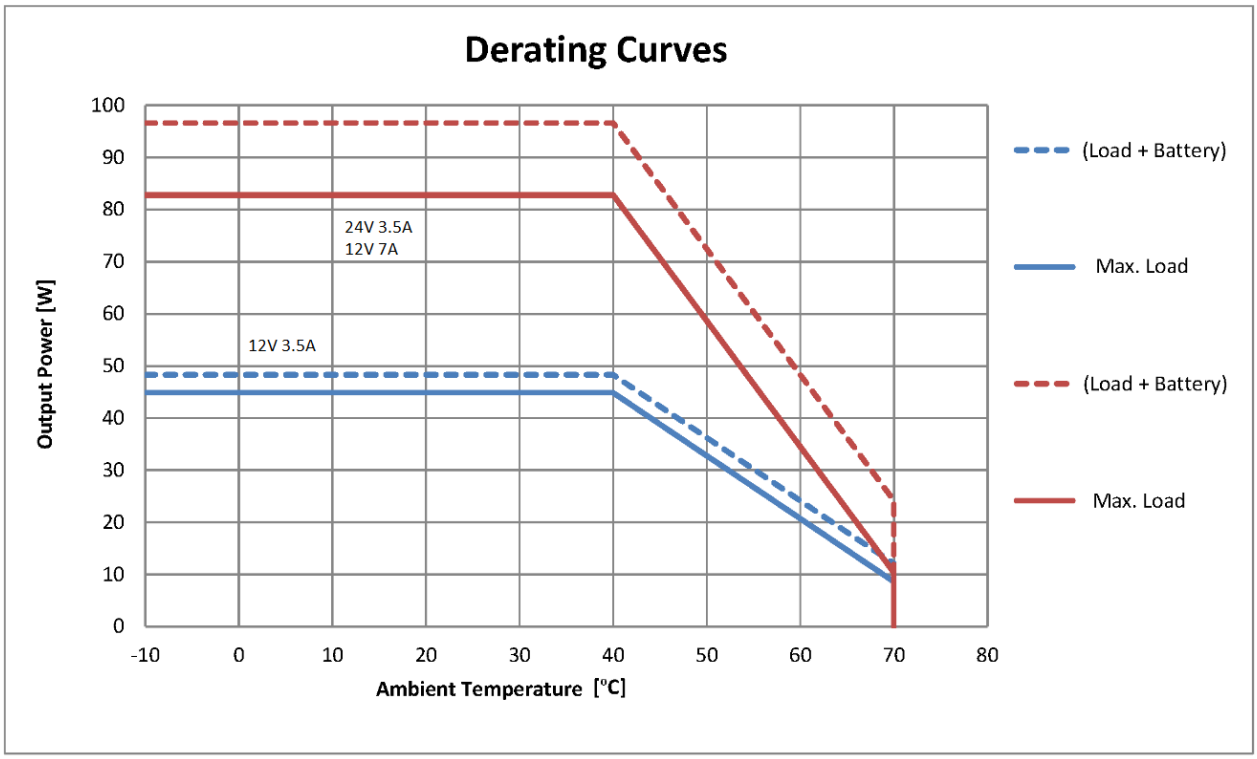
Figure 1: Block Diagram

- Output overcurrent and short circuit protection is provided by the AC/DC switching power converter and by the self-resetting battery fuse.
- The unit is protected indefinitely against battery reverse polarity by the blocking diode.
- Two alarms with separate voltage free changeover contacts and green LED's are provided.

  MAINS /DC OK indicates loss of mains power, failure of the off-line AC/DC converter, tripping of overtemperature protection and tripping of the overvoltage protection.

  BATTERY OK is a battery low voltage alarm which indicates that the battery is becoming discharged. This alarm is also asserted if the battery fuse has tripped.
- A RED Battery Fuse LED is also provided. This illuminates if the battery fuse trips due to overload.

SA2S De-rating Curves



Sizing Example

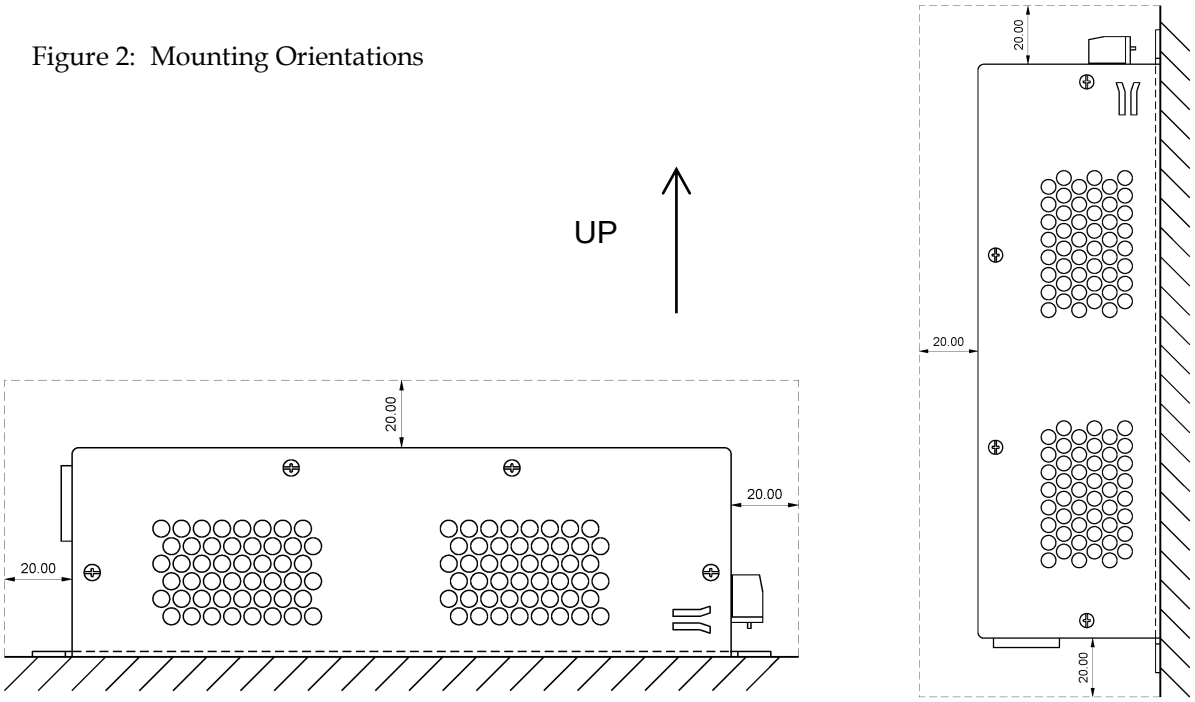
The output load power must be kept less than or equal to the maximum load power rating of the SA2S at the ambient temperature around the SA2S per the derating curves above.

For example: An installation must supply a 13.8V load of 4A and charge a backup battery in a maximum ambient temperature of 50°C. Multiplying the float voltage by the output load current gives a required output load power of 13.8V x 4A = 55.2W. Refering to the derating curve "SA2S-12-7 Max. Load", at an ambient temperature of 50°C, the maximum output load power of model SA2S-12-7 is 58.5W so it should be suitable for this application. Note that the ambient temperature in the derating curves is the temperature of the air around the SA2S with 20mm of clearance on all sides. If the SA2S is mounted inside an external enclosure, this is the temperature of the air ***inside*** the enclosure (50°C) including the temperature rise of this air resulting from the heat dissipated by the SA2S and other equipment installed in the enclosure.

INSTALLATION Mounting

The SA2S series is designed to be mounted on a flat surface. As shown below the unit can be mounted either horizontally or in the following vertical orientation without any additional protection. Clearance of 20mm must be provided on all sides to ensure proper cooling and reliable operation.

Figure 2: Mounting Orientations



If the unit is to be mounted in any other orientation, it must be installed inside a separate fire enclosure complying with AS/NZS60950.1, Cl. 4.6.2.

Battery Connections and Overcurrent Protection

The SA2S is intended be used with valve regulated lead acid batteries (AGM or gel) of capacities typically between 7Ah and 20Ah. Larger batteries can be accommodated; however, the battery charging time will be longer.

It is recommended that batteries be installed according to AS2676.2:1992. In particular, one or both of the battery leads must be protected against overcurrent by a fuse or circuit breaker located close to the battery. Refer to figure 1. If the negative terminal of the battery is solidly earthed, then a fuse or circuit breaker is only required in the positive terminal. If neither terminal of the battery is earthed, then a fuse or circuit breaker is required in both terminals. It is recommended that the positive terminal of the battery not be earthed. These protective devices must be sized to interrupt the short circuit current of the battery.

Initial Startup

1. Connect the battery and ensure that the external battery fuse in the positive battery lead is not installed and that all loads are either disconnected or turned off.
2. Apply mains voltage to the input.
3. Measure the voltage at the output terminals of the unit. This voltage should be 13.8Vdc or 27.6Vdc.
4. Measure the voltage drop across the fuse holder in the positive battery lead. This voltage should be less than ±2.5Vdc or ±5.0Vdc. If the voltage is above this limit, the battery polarity is reversed and should be corrected before proceeding.
5. Install the fuse in the battery positive lead.
6. Measure the voltage across the battery. This should gradually rise indicating that the battery is charging.
7. Confirm that both green LEDs on the unit are ON indicating no alarms.
8. Turn on loads or connect loads to the unit.

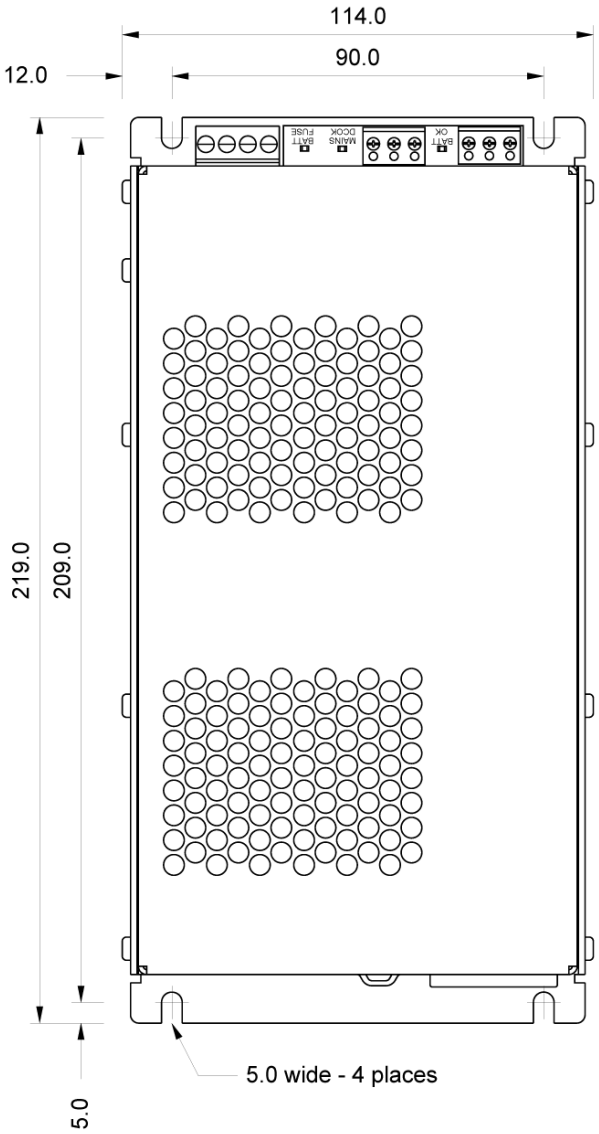
SPECIFICATIONS

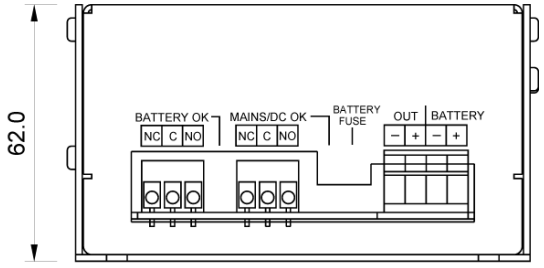
MODEL		SA2S-12-3.5	SA2S-12-7	SA2S-24-3.5
INPUT	NOMINAL VOLTAGE [V]	100-240VAC 1ø		
	CURRENT [A]	1.3 max.	2.8 max.	2.8 max.
	NOMINAL FREQUENCY [Hz]	50-60		
	INRUSH CURRENT [A]	65 max. (cold start - 230Vac)	130 max. (cold start - 230Vac)	100 max. (cold start – 230Vac)
	POWER FACTOR	Conforms to EN61000-3-2, Class A		
OUTPUT (AC Mains Operation)	VOLTAGE [VDC]	13.8		27.6
	RATED TOTAL OUTPUT CURRENT [A]*1	3.5 max.	7.0 max.	3.5 max.
	LOAD CURRENT [A]	3.25 max.	6.0 max.	3.0 max.
	BATTERY CHARGING CURRENT [A]	0.25 typ.	1.0 typ.	0.5 typ.
	LINE REGULATION [%]	0.2 typ.		
	LOAD REGULATION [%]	2.0 typ.		
	RIPPLE AND NOISE [mVp-p]*2	100 max.		150 max.
	OVERVOLTAGE SHUTDOWN	16V +10%/-5% (Hiccup - Auto recovery)		32V ±10% (Hiccup – Auto recovery)
	OVERLOAD / OVERCURRENT PROTECTION	> 120% of rated total output current, (Hiccup - Auto recovery)		
	SHORT CIRCUIT PROTECTION	Hiccup (Auto recovery when the fault is removed)		
	OVERTEMPERATURE PROTECTION [ºC]	< 75°C Ambient Temp. (Auto recovery)		
OUTPUT (Battery Operation)	VOLTAGE DROP BATTERY TO OUTPUT [V]	0.47 typ.	0.55 typ.	0.47 typ.
	OUTPUT OVERLOAD PROTECTION	Self-resetting battery fuse		
	BATTERY REVERSE POLARITY PROTECTION	Indefinite		
DISPLAYS AND ALARMS	MAINS / DC OK	LED (Green) ON=OK, Voltage-free Changeover Contact (30V, 7A) Alarm on loss of mains, failure or overload of AC/DC Converter and tripping of overtemperature protection		
	BATTERY OK	LED (Green) ON=OK, Voltage-free Changeover Contact (30V, 7A) Alarm on battery low voltage or on tripping of self-resetting battery fuse.		
	BATTERY FUSE FAIL	LED (RED) ON=FAIL, Alarm on tripping of self-resetting battery fuse.		
ISOLATION	INPUT - OUTPUT	3000VAC, 4242 VDC, 1 minute		
	INPUT - GROUND	1893VAC, 2677 VDC, 1 minute		
	OUTPUT - GROUND	500VAC, 707 VDC, 1 minute		
SAFETY AND EMC	SAFETY	AS/NZS 60950.1, Class I NSW Office of Fair Trading Certificate of Approval NSW26927		
	EMC	AS/NZS CISPR22, Class B		
ENVIRONMENT AND OTHERS	OPERATING TEMPERATURE	-10 to 70ºC, (Refer to DERATING CURVE)		
	OPERATING HUMIDITY	5-90% RH (Non-condensing)		
	CASE SIZE	219 x 114 x 62mm (LxWxH)		
	CASE MATERIAL	Aluminium		
	WEIGHT [kg]	0.6	0.9	0.9
	COOLING METHOD	Natural Convection		

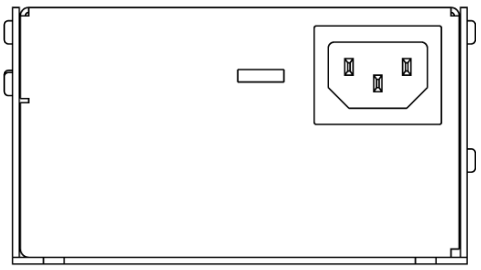
*1 Sum of load + battery charging current

*2 Using a 20MHz oscilloscope at the output terminals.

MECHANICAL OUTLINE







NOTES :

1. AC Mains Termination:
   10A IEC60320 C14 Appliance Inlet
2. Output and Battery Terminations:
   4W Pluggable Screw Terminal Block
   Suitable for up to 2.5 sq. mm wire.
3. Alarm Terminations: 3W Screw Terminal Blocks
   Suitable for up to 1.5 sq. mm wire.