

## SS-1 DC SOFT STARTER

FOR PERMANENT MAGNET MOTORS



**Operation:** \*\*\* Important\*\*\* see note \*\* at end re **Motor Polarity** and earlier revisions.

### TURN ON

The SS-1 is turned on by an active low input, (Start input to Bat -ve) and gradually ramps up the power to the motor with a PWM signal until the motor is at approx full speed. The MOSFETS are then held continuously "on" reducing switching stresses on the Mosfets and reducing heat dissipation.

### TURN OFF

When the command to stop is given, the SS-1 returns the FETS's to switching mode for a controlled ramp down to zero speed. The Isolation/Reverse Polarity relay is not disengaged until the current has reduced to almost zero. This avoids large sparks across the relay contacts when the motor is drawing its full load current. (which would shorten the life of the relay)

### OVERLOAD.

The SS-1 monitors motor current during startup and continuous operation. If an overload is detected the power supplied to the motor will decrease to zero and a re-try will be attempted. If an overload is still detected, one more try will be performed and if still overloaded the unit will shut down and remain in "Fault" mode until turned off and on again. The Status LED will blink during fault condition.

**LOW BATTERY and OVERTEMPERATURE.** In both of these cases, the power will be immediately reduced to zero, motor will coast to halt until the condition is removed and a ramp back to speed will occur.

## RATINGS

DC INPUT VOLTAGE	20-32V
DC CUTBACK VOLTAGE	18V
MAX PEAK CURRENT	60amps @ 25deg
MAX CONTINUOUS CURRENT	35A
PWM frequency	20khz
Temperature Range (35a)	0 to 50deg ambient **
Ramp time from zero to full power	approx 7 seconds factory set
Idle/Standby current . (off condition)	.1mA

\*\* Temperature. If the ambient temperature exceeds 50deg C it is advisable to add an additional cooling fin mounted under the flange on the left (looking at the front/connector end) The fin should be a right angle bracket type of 2mm aluminium with dimensions 100mm length x 100mm height. Alternatively, the unit should be mounted onto an Aluminium panel with good heat conduction between the flanges and the mount. Thermal paste is advised between the flange and the panel surface. (assuming the panel base does not experience temperature rise > 10deg above ambient from other sources.)  
**40 AMPS** operation. It is advisable to add a second Aluminium Fin on the other side Flange of the same dimensions.



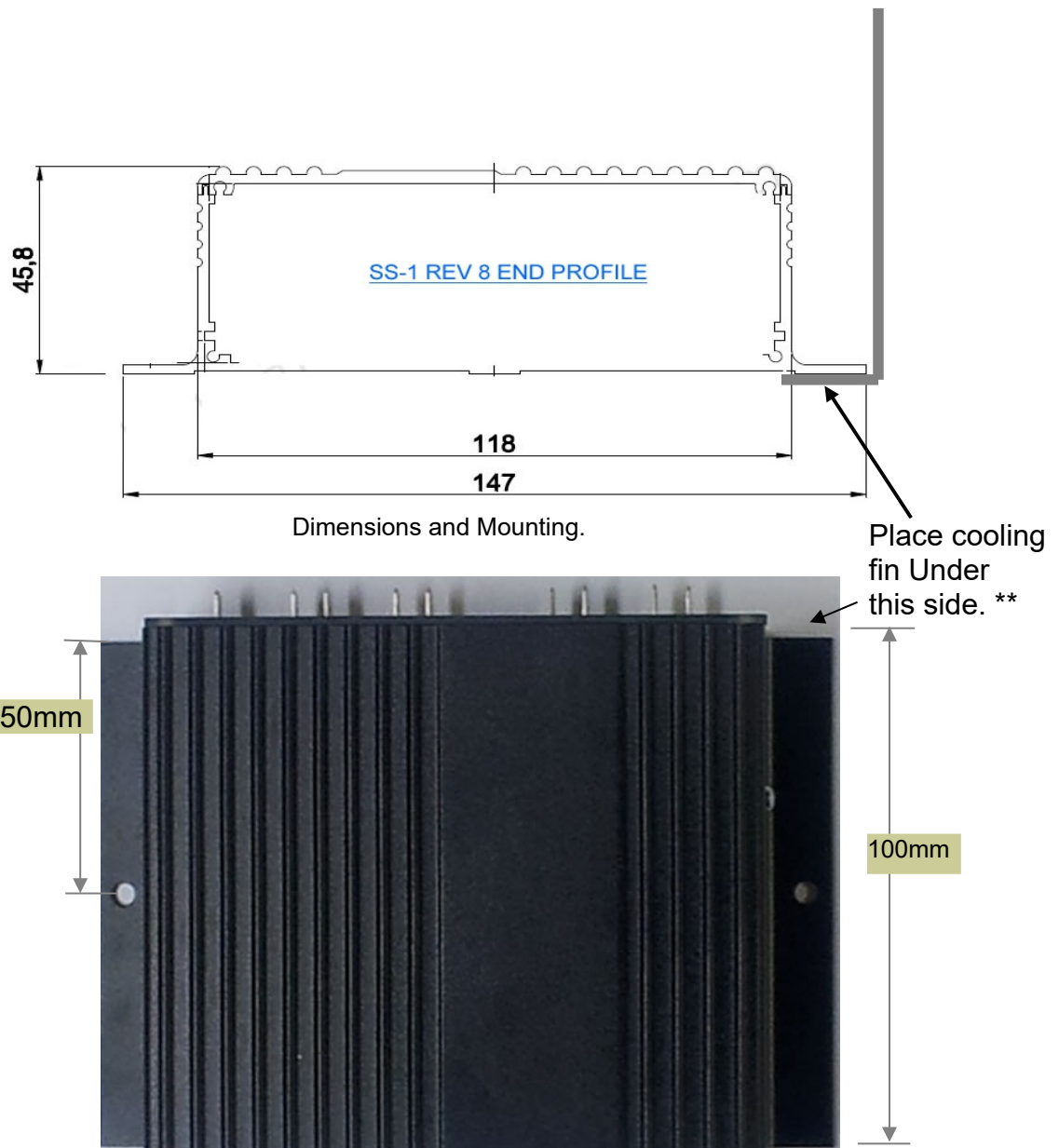
Cooling Fin for  
Tamp>50deg

## PROTECTIONS

- Battery Reverse Polarity
- Over Temperature
- Under Voltage
- Overload/current

# motronic

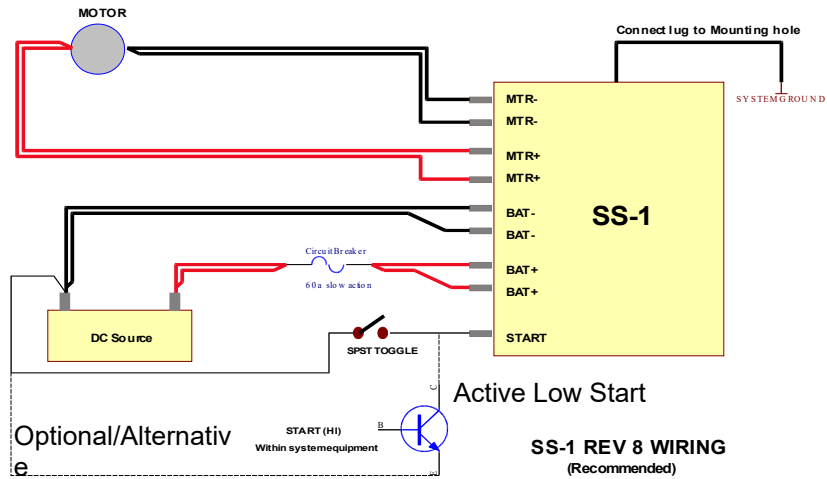
P/L ABN 58 007 348 849  
Page 3 of 5



Note: IMAGES APPLY TO REV 8 and REV 9

# motronic

P/L ABN 58 007 348 849  
Page 4 of 5



**\*\* Motor Polarity.** If Replacing a previous Revision (old body style) With Rev 8 and after, the motor polarity is reversed from all preceeding versions.

Pre Rev 8 bodies are shown below. Rev 8 and after bodies are shown above in this note. The installer must determine the correct polarity for the operation of the unit in the OEM equipment.



Rev 1-7 old style

# motronic

P/L ABN 58 007 348 849

Page 5 of 5

## Revision List

- Rev1.0 Increased overall length to 123mm from 80mm
- Rev1.1 Corrected the position of the input connectors on drawing.  
Idle/Standby current added.
- Rev 1.2 Frequency changed from 20khz to 10khz added "coast" to ramp down image.  
Added explanation about overload and low bat volts and over temperature.  
Voltage Range amended to 20v-32v. Over voltage deleted. (Not offered in this version)
- Rev 1.3 -Ambient Temp reduced to 50deg C  
-Wiring changed to show 'on/off(start) connects to B- input rather than Bat negative at battery.
- Rev 6 20/4/2010 -Changed the overload sense information from 'continuous' to 'during startup'. Frequency changed from 10khz to 20khz
- Rev 8 30/9/2013 Updated drawings and images and some information about start up method and Dimensions.
- Rev 9 1/7/2014 Minor PCB changes. Added internal heatsink to promote improved heat dissipation Added note about extra cooling fin if Tamb >50deg.