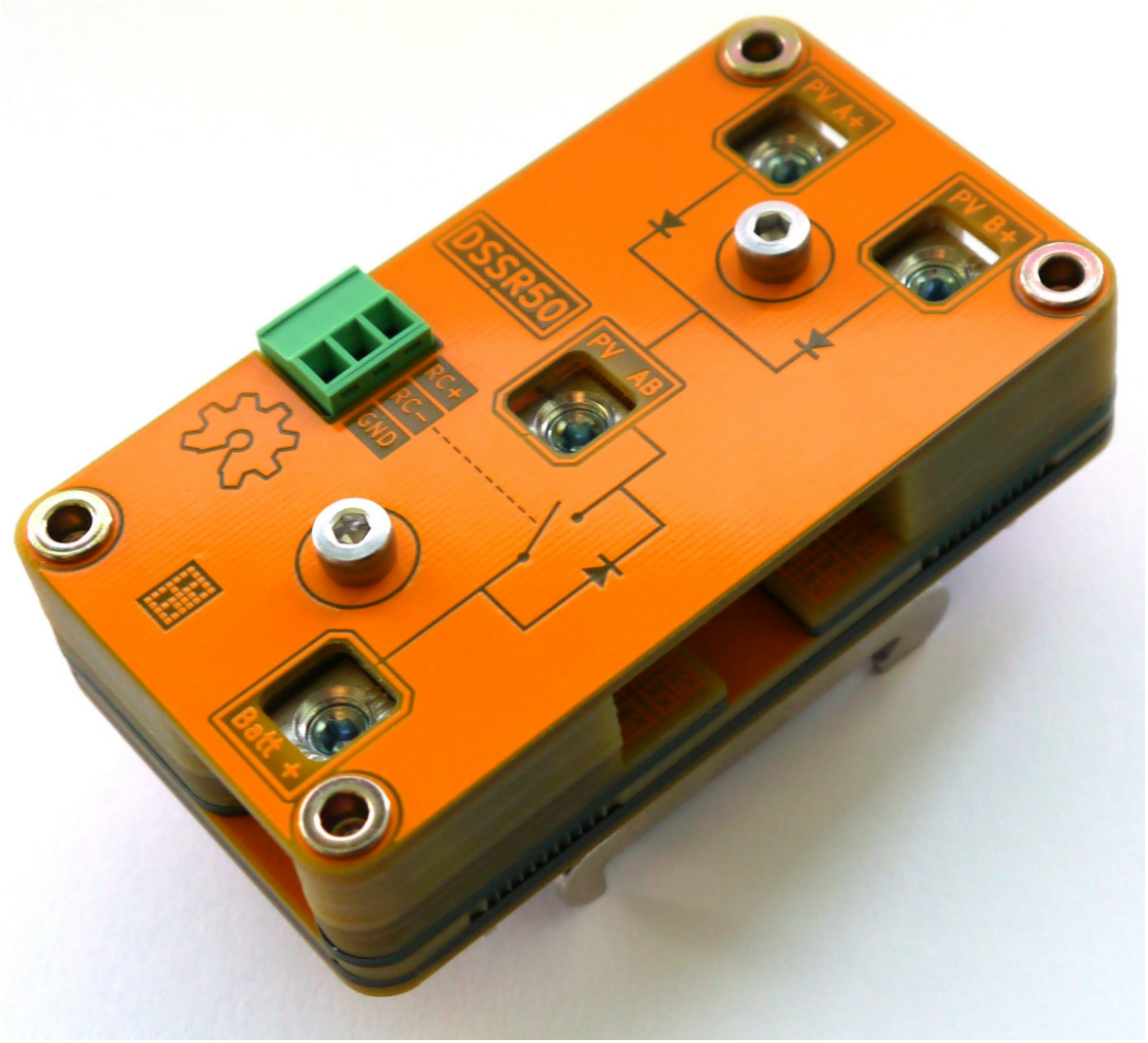

DSSR50

user manual *v0.1*

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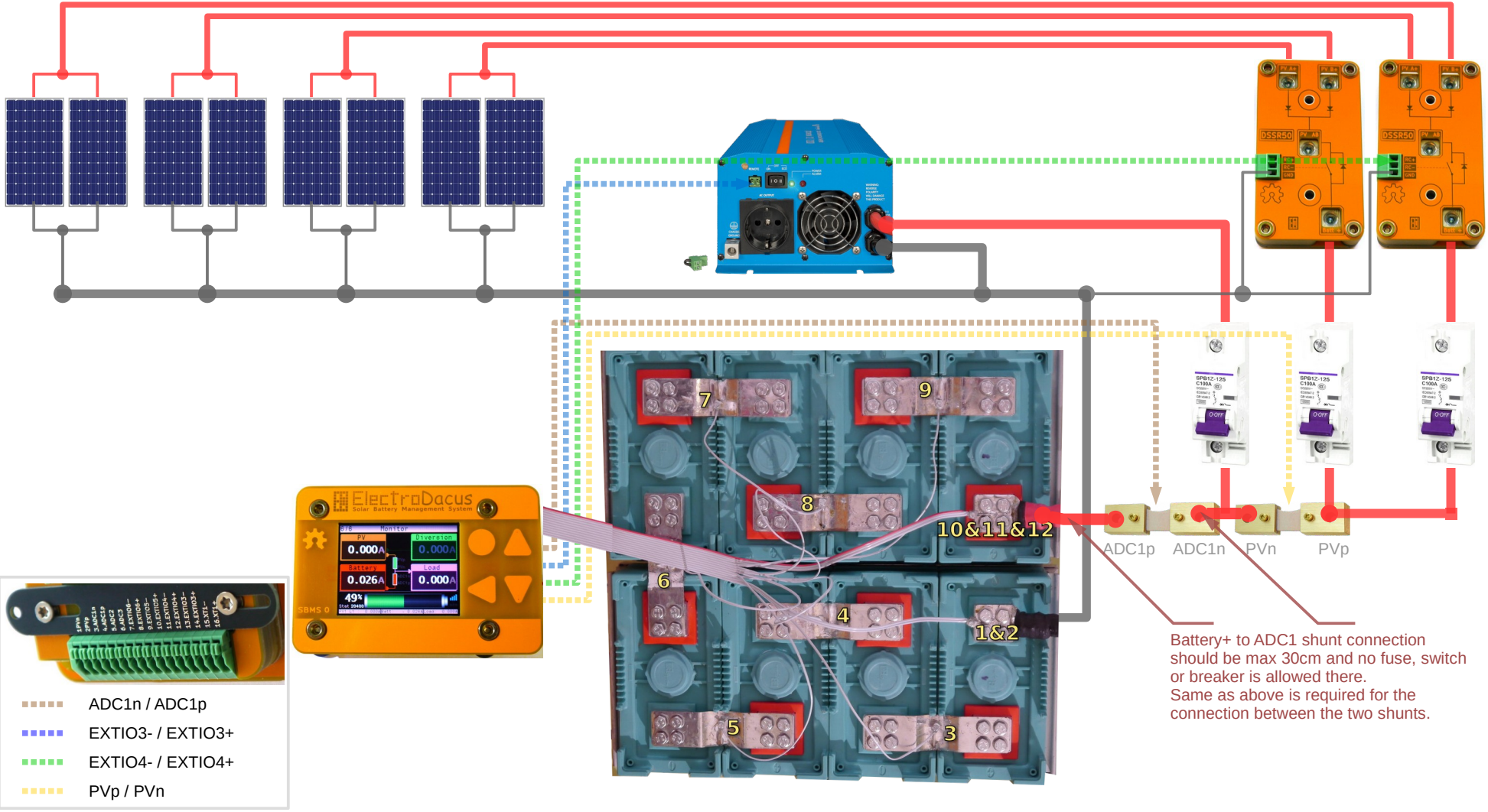
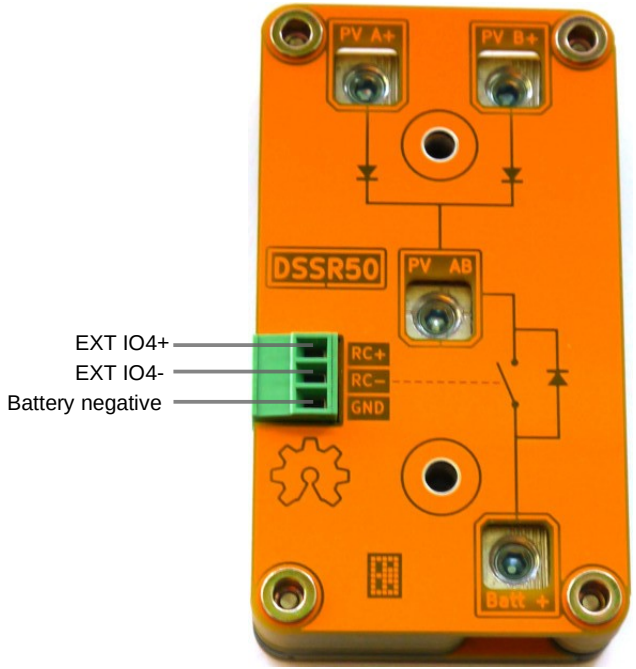

ElectroDacus
Solar Battery Management System
PV
0.000A
Diversion
0.000A
Battery
0.026A
Load
0.000A
49%
7
9
8
10&11&12
6
4
1&2
5
3
ADC1p
ADC1n
PVn
PVp
ADC1n / ADC1p
EXTIO3- / EXTIO3+
EXTIO4- / EXTIO4+
PVp / PVn
Battery+ to ADC1 shunt connection should be max 30cm and no fuse, switch or breaker is allowed there.
Same as above is required for the connection between the two shunts.

Specification

DSSR50	Solar PV charge controller when used with SBMS0
Max STC current	50A (ideal 60 cell PV panels for 24V battery, 30 to 36 cell panels for 12V)
RC- remote signal	5V to 30V (12kOhm internal so current 1 to 2.5mA depending on voltage)
RC+ remote signal	Connected to PVA+ and PVB+ trough 10 kOhm so it can supply RC-
Max PVA+ and PVB+ input voltage	51V (so any 60 or 72 cell PV panel or half cell 120 / 144)
Max PVA+ or PVB+ input	30A but total PVA + PVB should not exceed 50A with short peaks up to 60A
Max fuse or circuit breaker on Batt+	63A
Connectors max torque	$16mm^2$(6AWG) 4Nm(35in-lbf) // $6mm^2$(10AWG) 3Nm(25in-lbf)
Battery supply	8V to 32V
Dimensions	90 x 50 x 23 mm

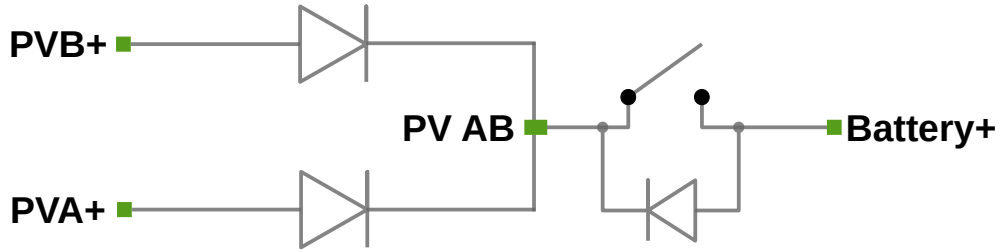
1.1 DSSR50

Connecting the remote wires on DSSR50. Typical you will connect EXT IO4 but any EXT IOX can be used as long as is set as type 1 or type 6 for the case where you are using dual PV array.
Up to 12 of this DSSR50 can be controlled by a single EXT IOX (set as type 1) and in case of dual PV array you can have max 12x DSSR50 (large array type 6) + 6x DSSR50 (small array type 1).



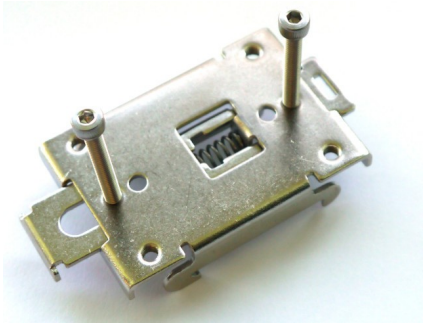
1.2 DSSR50

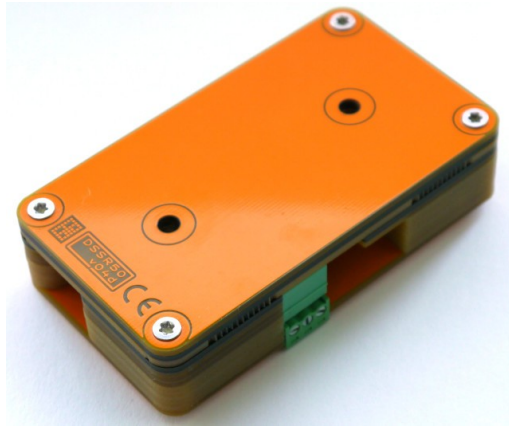
Below there is a simplified diagram of how DSSR50 works.
Current can flow only from PVA+ / PVB+ to Battery+ and not the other way around and since that is an ideal diode there is almost no voltage drop on it so no heat. The diode shown in parallel with the switch is the mosfet body diode.
The PVA+/PVB+ to Battery+ path is max 1.6mOhm Voltage drop across with 25A on PVA+ and PVB+ so 50A on Batt+ output will be 80mV and drop in the form of heat will be 4W (measured with ambient temperature of +25C and the PV AB connector temperature was +65C)
*Assuming a 27V battery voltage * 50A = 1350W and at this level 4W will be lost as heat thus transfer efficiency is 99.7%*

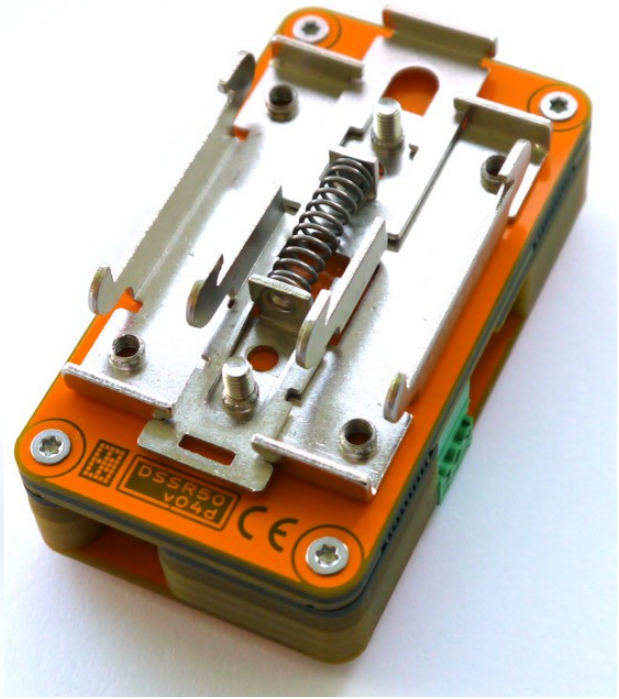


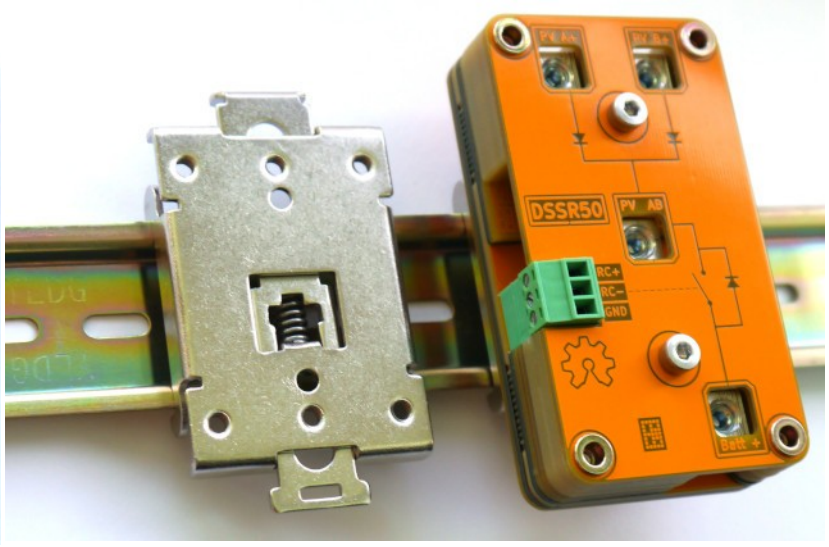
1.4 DSSR50 Mechanical installation.

Size of the DSSR50 v04d is 90x50x23mm.
The metal bracket for installing the DSSR50 on 35mm DIN rail is not included. Just search for "SSR bracket 35mm DIN rail"
You will also need two M4 bolts with the ones in below photo being 30mm long.
Of course you do not need to use DIN rail and bracket and you can just use M4 or #8 screws to install on any flat surface.
Distance between the two mounting screws is 47.5mm



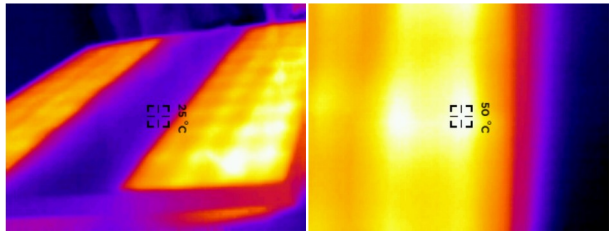






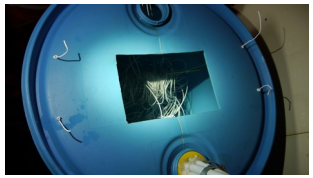
3.1 Options for diversion heating.

For standard water tanks look for 36V usually 1200W rated heating element they have two 600W heating elements in parallel so idea for two DSSR20 each with two large 60 cell PV panels.
Another option for open barrel water heater is just a calculated 18AWG wire calculated long enough to have 2Ohm.
A PV panel used as heater is also a very nice solution with the advantage that it always naturally works at max power point unlike restive heating. I experimented with two 60 cell 240W rated panels bypassing a group of 20 cells so that 40 cells in series are used to heat from two 60 cell PV panels exposed outside. Multiple diodes in series can also be used in the same way as PV cells are basically large diodes.



Above photos are of the two PV panels I use as heaters since November 2019 and they work great as expected.
You can see the yellow wire soldered in the PV panel connection box to disable the middle 20 cells of the panels leaving the ideal 40 cells in series.
Max PV panel temperature here is 50C but the most I see was about +55C so very reasonable.

The lower 3 images are of my older experiment with a 200liter (55gallon) plastic barrel filed with water and heated to max 55C using three 18AWG loops of wires tho the water was circulated trough a long loop heating my concrete floor that before I installed heating elements directly in to floor.



3.2 Options for diversion cooling.

For cooling peltier elements can be used tho I did not had time to experiment with they should work tho it will involved quite a lot of DIY work as there is nothing quite close to what is needed to do this properly.
The closest thing you will find is in the photo below a set of 6 peltier probably 12706 and you will connect all of them in series so you get 5 to 6V above them to work efficient then this will take about 2A meaning that you will need about 4 of this sets for one 60 cell PV panel and 8 of them for two 60 cell PV panels.
The small fan will be fairly loud and ineffective so you may want this outside and then have isolated pipes moving the cold liquid inside (I will use some glycol mix just in case so it will not freeze).
Assuming a max of 500W from the two panels with a COP of 1 attainable you will have 500W of cooling power and on the hot side 1000W of heat will need to be dissipated tho it will be loud and with this small high speed fans thus a custom solution may be better.

HW files for DSSR20 and DEXT16 (soon to be available).

HW :