

Subject: High AMP Crowbar Protected PSU

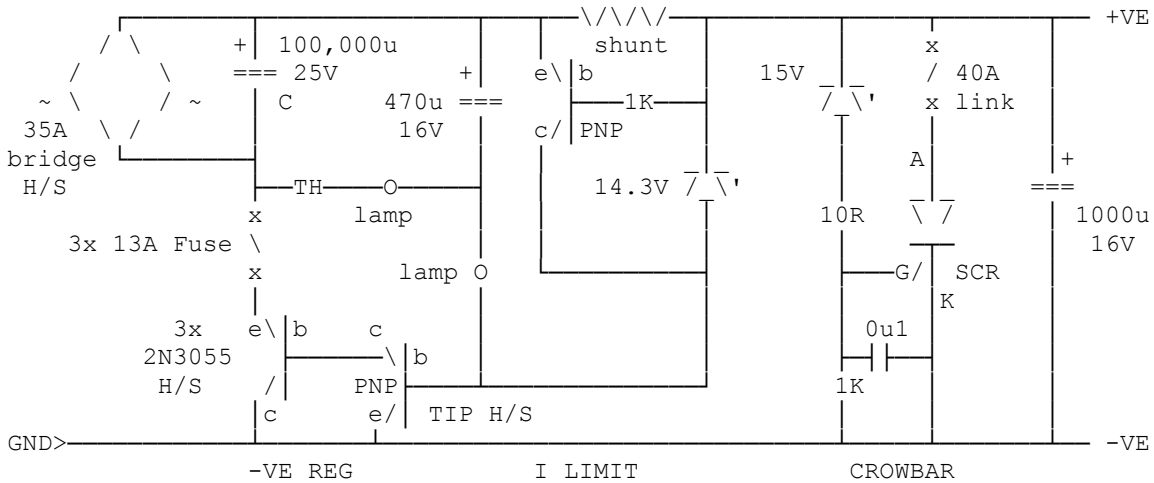
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By G8MNY

(Updated Jun 04)

This is a negative regulator design, which gives several advantages over the normal positive rail design.

- 1/ much lower transistor thermal heatsink mounting resistance,
- 2/ no hazardous exposed unregulated rail voltages on transistor cases,
- 3/ transistors can be easily mounted around an ally box to spreading the heat,
- 4/ high current -ve O/P connections can be made via the earth chassis.



AC

The transformer needed is 15V-18V @ 25A for an 18A rated PSU. The high pulse current AC wiring to bridge & to the reservoir C, should be in thick & twisted wire to keep the losses & magnetic pulse radiation down. A slow blow mains fuse of 2A should be used.

PSU

TH is a thermal switch mounted on the pass transistor heatsink (H/S) and/or rectifier, and/or transformer, a 60°C is recommended. The 2 lamps are 12V 60mA pilot lights, that give a fairly constant current into the 1 Watt zener, the 470uF decouples any hum from the zener feed supply. The 14.3V zener voltage can be made up with several zeners or conducting diodes to set the best O/P voltage or thermal stability.

TRANSISTORS

Three paralleled 2N3055 pass transistors are needed for 18A, each is fused with a current sharing emitter resistor "a 13A mains fuse", which limits the failed transistor current to a safer 26A max for the over voltage crowbar to handle under a fault condition.

The driver PNP can be any >2A TIP type device mounted on the heatsink with an insulation kit.

The pass transistors are all mounted (with thermal paste) directly on an external grounded heatsink or better still they can be mounted on different sides of an ally box making up the high current -ve rail connections as well.

CURRENT LIMIT

Another PNP monitors the voltage drop across the shunt R (0.033Ω=18A) when this is greater than 0.6V the Zener voltage is reduced to keep the current at the

limit max. Make the shunt R from a length of thick steel wire & do high current to voltage drop test to determine the R.

OVER VOLTAGE CROWBAR

The crowbar is any SCR of >26A peak (most are, e.g. 8A RMS). Thick leads are needed from Anode & Cathode to the PSU O/P terminals. The false trip protection components of 1K & 0.1uF should be mounted directly on the SCR.

The 40A fusible wire link is for protection against fire if the PSU is used for battery charging & the trip should attempt to S/C a car battery!

An alternative to the conventional crowbar circuit is a special protection zener diode, eg RS 239-494 which is a special 15V diode zener, designed to always blow up S/C & can handle pulse currents of 75A.

BELLS & WHISTLES options:-

Mains neon across the mains after a switch.

O/P LED with series 1K can be added.

O/P Voltmeter can be added, any suitable meter with a calibration R. 0-15V or with a 10V zener in series gives a more meaningful 10-15V scale.

O/P current meter can be added, by sampling the average voltage drop across the 3 13A fuses, use a 470R from each emitter. Or the voltage drop across your current limiting R shunt. Feed either to a meter calibration pot (100R), connect the other end of the calibration pot to either the -ve of the fuses or the shunt R. Put a 1mA (or better) meter movement from the slider to the fuse -ve. Calibrate the meter with a known PSU load.

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73 De John, G8MNY @ GB7CIP
/EX