HV400 HV400D Variable High Voltage Regulator User Manual

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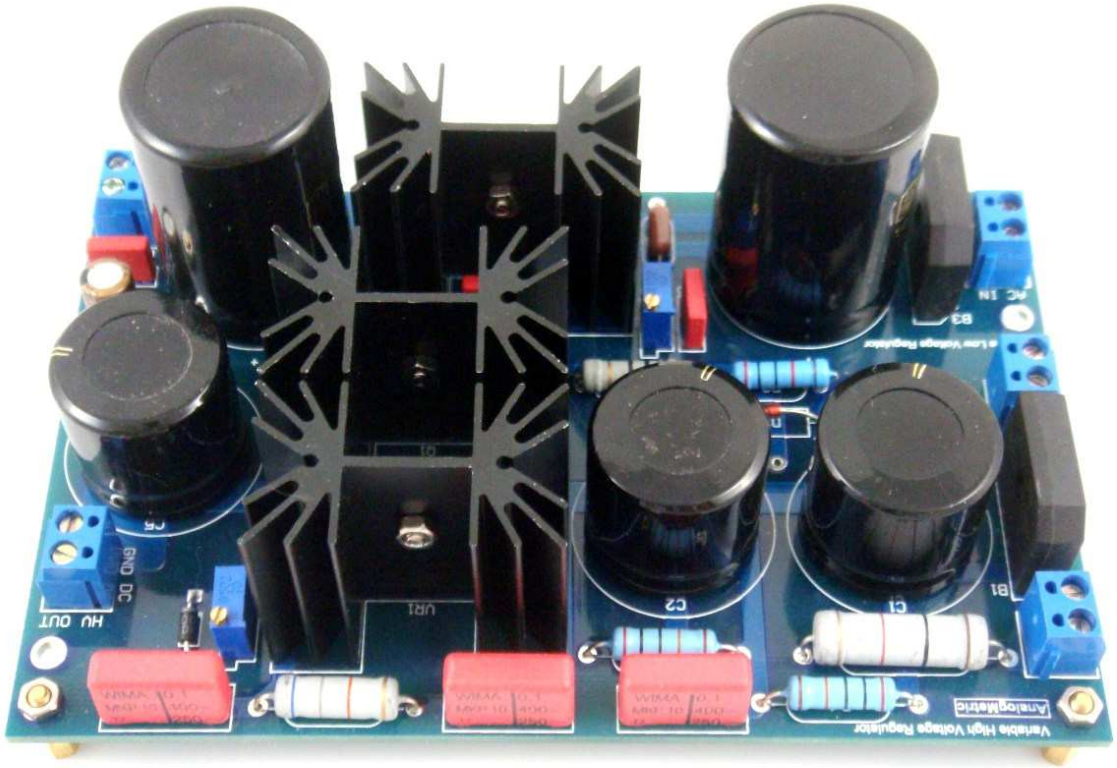


FEATURES

1. Output voltage range: 100-300V DC 100mA and 1.5-50V 5A
2. High voltage output voltage: Max. 300V DC 100mA for high voltage (HV) and 50V 5A for low voltage (LV)
3. Line regulation: < 0.06% and load regulation: <0.08%
4. Output voltages are adjusted by two resistor trimmers RV1 and RV2
5. Large reservoir capacitors for both HV and LV
6. Soft startup and reverse voltage protection.
7. Lowpass filter CRC or CLC with optional inductor 10H 150mA
8. Dedicated ground and power rails layout design
9. PCB dimension: 158mm x 98mm

PRECAUTIONS

- Do not use any body parts to touch the metal parts of the kit after power up or power off, since the high voltage capacitors may not fully discharge. It may cause serious electric shock.
- Use a power transformer with fuse (1-3A) socket to limit the supply current in case of short circuit or incorrect assembly.
- Double check the assembled components with the schematics.
- Do not attempt the measure the voltage by multimeter with hand after power up. The probes of the multimeter should be mounted by some stands to the points of the measurement before switching on the power supply.
- Turn off the power supply if you observe any smokes or hear strange sound coming out from the transformer or board. If there is short circuit, the transformer will be getting very hot shortly.

PROCEDURES

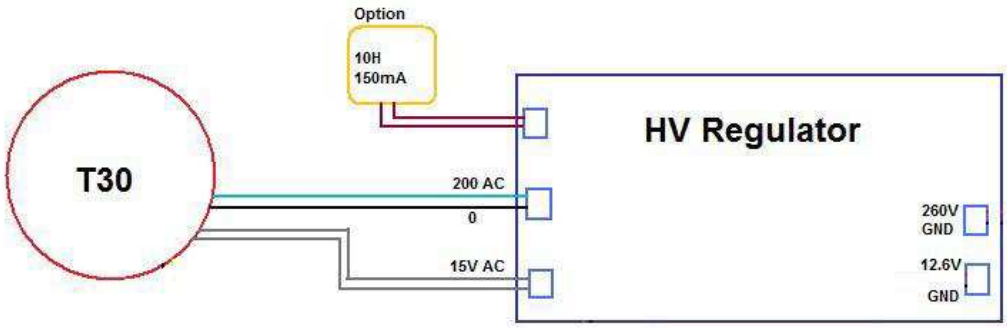
1. Solder all the resistors and two blue resistor trimmers 500 and 5k Ohms (labeled with 501 and 502) according to the part list.
2. Solder two diodes D2 and D3, and 6V Zener diode. Notice the direction of the diodes and Zener diode. There are white band marked in board corresponding to the bar of the components. The Zener diode looks similar to the silicon diode (standard diode). However, their operation direction of current flow is totally different.
3. Solder the power NPN transistor MJE5742, voltage regulators LM317/LM1805-ADJ and LM1084-ADJ. Before soldering, they are mounted to the heat sinks by the provided screws and silca insulator. Because their packages are identical, do not mix up the NPN transistor with the regulators. It will cause irreversible damage to the chips.
4. Solder the high voltage capacitors 100uF/450V and low voltage capacitors 10000uF/63V or 15000uF 63V. Notice to the polarity of the capacitors. There have "+" screen silk marked in PCB corresponding to the positive terminals of the capacitors.
5. Solder the remaining components.
6. Connect optional inductor 10H 100mA for further attenuation of the ripple voltage or leave it unconnected.
7. For HV regulator, apply 100/200/220/240/260V AC (Maximum input voltage 260V AC or 350V DC) to the connector (Blue).

   For LV regulator, apply 8/12/15/18/24/27V AC to the connector (Blue).

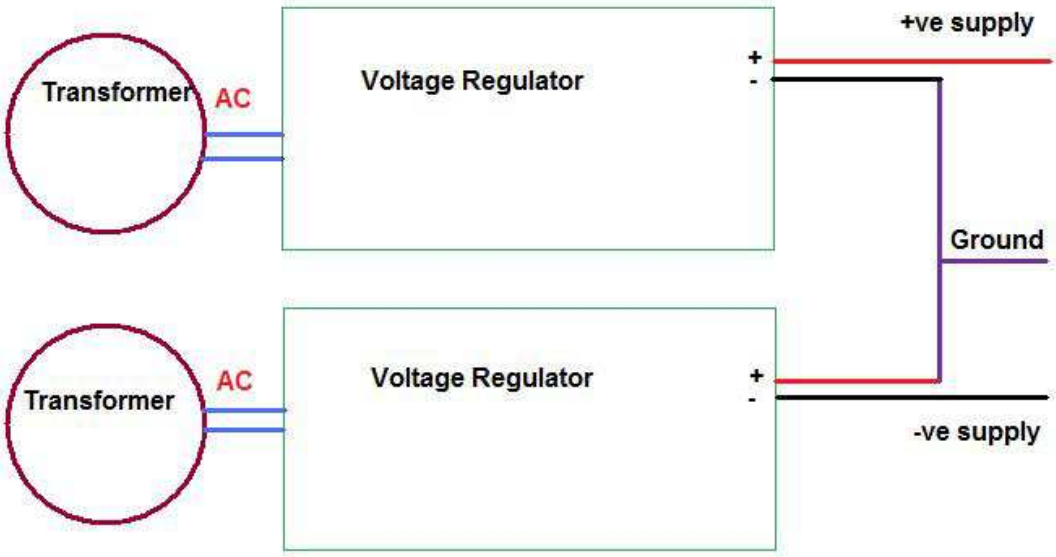
Notice: For LV regulator, the maximum input-output voltage difference regulator < 29V DC and minimum load current is 5mA (typical). For output current >3A, the input-output voltage difference is recommended < 5V DC.

To increase the power efficiency of the regulator, the input-output voltage difference should be minimized. Otherwise, the excess voltage will be dissipated as heat.

CONNECTION DIAGRAMS



Application example by connecting to T30 power transformer and 10H choke.



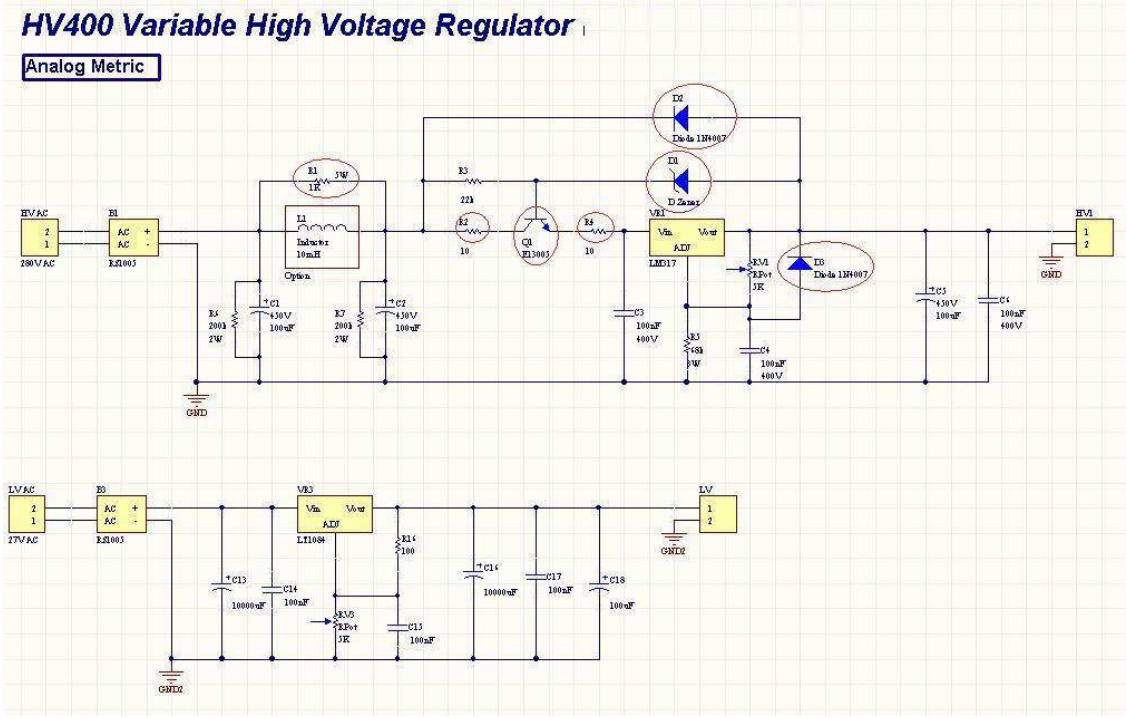
Positive and negative high voltage supply by using two HV400 modules.

CHECKLIST

1. The direction of diodes and Zener diodes.
2. The polarity of the high voltage capacitors.

TROUBLESHOOTING

The components marked by red circles are sensitive to damage and require checking with the following steps:

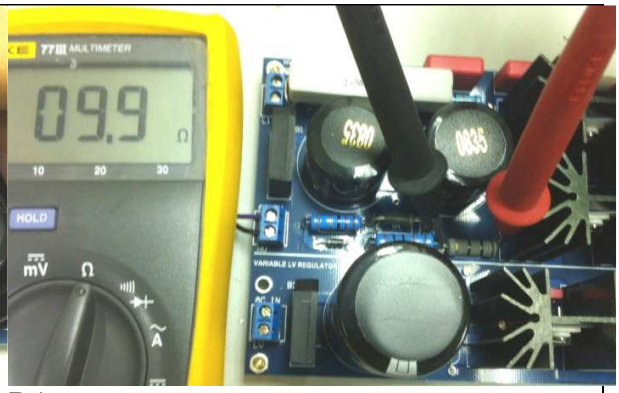


1. Measure forward voltage of 6V Zener diode and diodes:

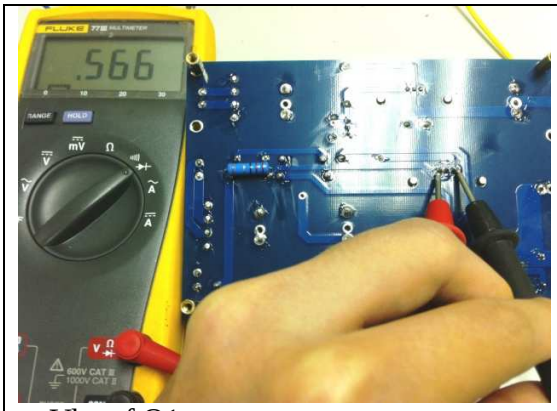
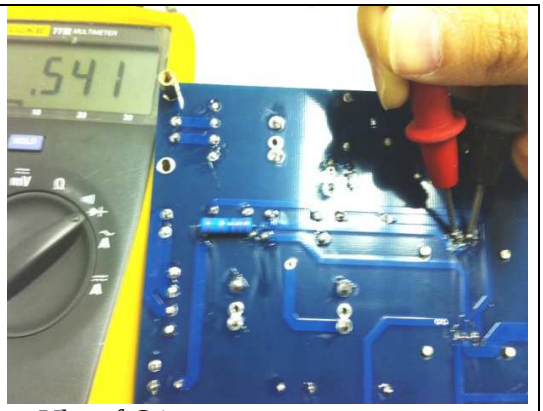
Zener diode D1 forward voltage

Diodes D2 and D3 forward voltage

2. Check the resistance of R1, R2, and R4:

	
R2	R4

3. Check Vbe and Vbc of Q1 (NPN power transistor):

	
Vbe of Q1	Vbc of Q1