TregTS V4-b – how to set output voltage, current limit and all that jazz

Output voltage
Vout can be set with a single resistor, R11 in the circuit diagram. The reference current generated by U1 is approximately 580uA. So for every kΩ R11 has, 0.58V will be generated. Or, 58V per 100kΩ. So, if you want say 275V output, your R11 will need to be 275/0.58 kΩ which is 474kΩ nominal. You can adjust the final output +/-20% with trimmer VR1 so for this 275V get a 470kΩ resistor and trim final value.

Make sure you get a resistor that can withstand the output voltage plus a safety factor. Sellers like Mouser have a wide selection for such parts.

Remember that the maximum input voltage is 600V so the Vout is probably limited to 570V depending on the input ripple voltage.

Current limit
A single resistor need to be selected to set the current limit, R16. Current limiting occurs when the voltage across R16 gets to about 0.6V. So, for example, if you want a current limit of 180mA, your R6 will be 0.6/0.180 = 3.3Ω. Luckily, this is a standard value. If not, select the next higher value for a slightly lower current limit.

It is a good idea to use a larger resistor because of the current it may have to handle in case of a short, although the power dissipation is not high; at 400mA and 0.6V is it still only a quarter of a Watt. There's ample space on the board for a 2W metal film resistor.

Remember: for reliable short-circuit protection, don't go above 400mA limit, better stay below it.