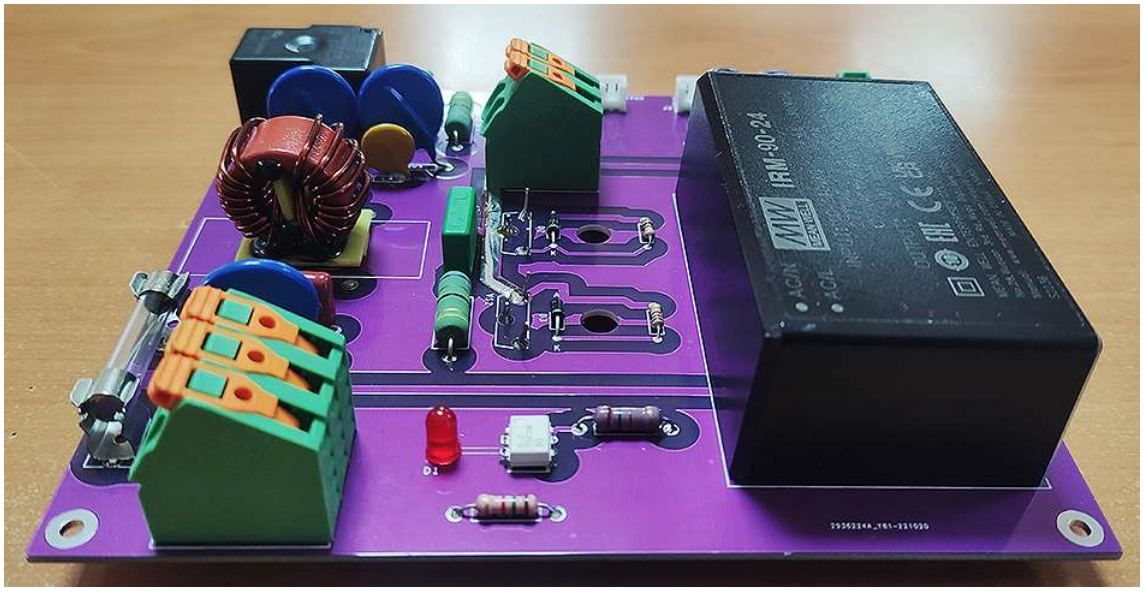
4KW SINGLE PHASE TEMPERATURE REGULATOR



- **Built-in mains filter**
- **Double protection**
- **Nominal current of 25A through two thyristors in antiparallel**
- **24VDC 90W Source available to power the control system, solenoids, motors, etc.**
- **It can be controlled in ON/OFF or PID mode from any PLC, Arduino or other digital platforms.**
- **Control signal isolated by optocoupler**
- **Zero crossing switching**
- **Input signal enabled for the connection of a safety thermostat.**
- **Alarm signal (thermostat status)**

The module has been designed to be used in a 4KW single-phase temperature regulator, and has everything necessary to guarantee reliable operation, complying with all the safety regulations required for domestic and industrial equipment.

The input has an LC network filter to attenuate unwanted harmonics, it also has varistors to protect against voltage spikes, a fuse to protect against overload or short circuit, and a safety relay that cuts off the power in the event of a deliberate increase of the temperature.

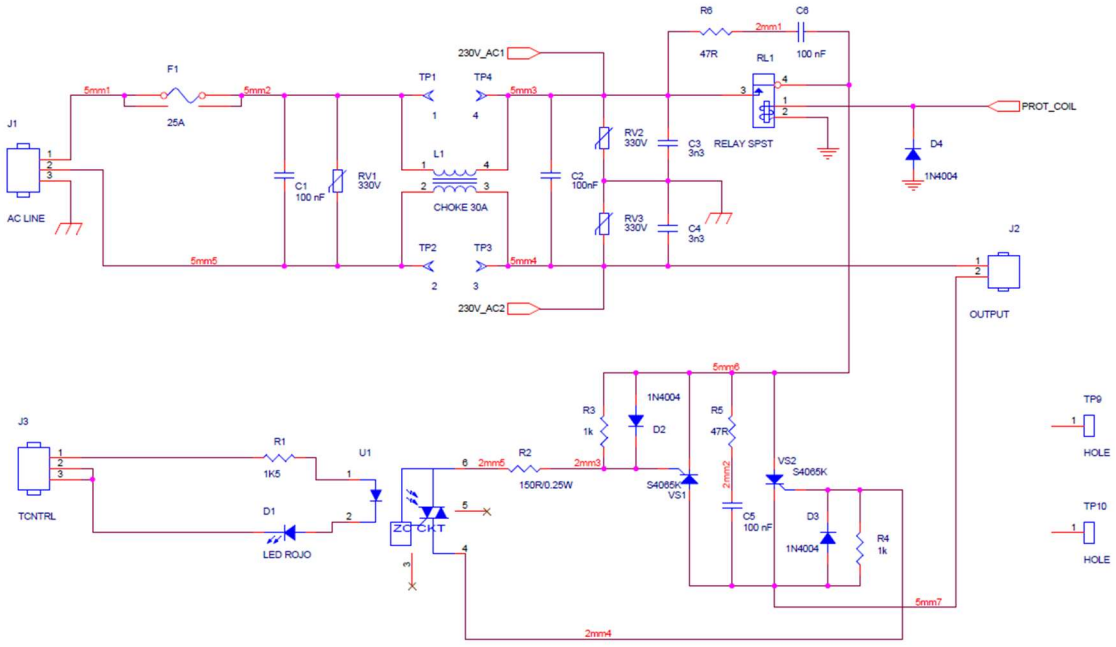


Fig.1. Regulator main circuit.

Power from the 115V / 230V AC Line is applied through the J1 power connector and transmitted to the load (J2) passing through the protection elements and the regulator formed by the VS1 and VS2 thyristors.

The thyristor excitation signal from the control system is applied to connector J3. The J3 connector pins have not been connected to common or VCC, and remain floating for flexibility. The value of R1 determines the control current of the optocoupler LED, and must be modified depending on the control logic used. R1 = 1k5 adapts to the logic of the PLCs (24VDC).

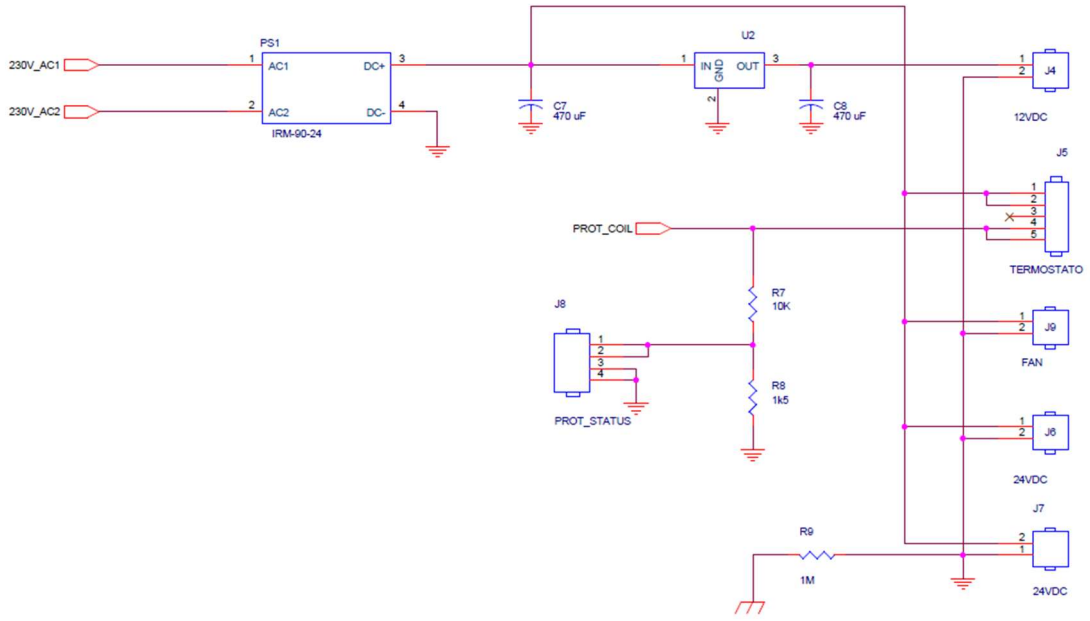


Fig.2. Control power supply.

Fig.2 shows the organization of the power supply available to the control system. In J4 we have the 12VDC 2A voltage regulator output and in connectors J6, J7 and J9 we have the 24VDC 3A output.

The protection thermostat (NC) can be connected directly to J5. The alarm signal (status) is present on connector J8. The voltage divider formed by R7 and R8 allows this signal to be adapted to the type of logic used.

For reliable operation of the regulator it is necessary that VS1 and VS2 be mounted on a heat sink. In the simplest case, an aluminum sheet with a thickness of 3 mm and whose measurements match the size of the PCB can be used. The body of the thyristors used is electrically isolated from the circuit, which makes it easy to mount on the heat sink.

It is important to note that the thermostat included in the circuit should only be used as a means of protection in case of failures in the system. Temperature regulation must be done using other sensors such as thermocouple, optical pyrometer, ntc, PT100, etc.

To obtain a precise regulation of the temperature it is recommended to use a PID control algorithm, for which it is necessary to implement a low frequency PWM modulation.

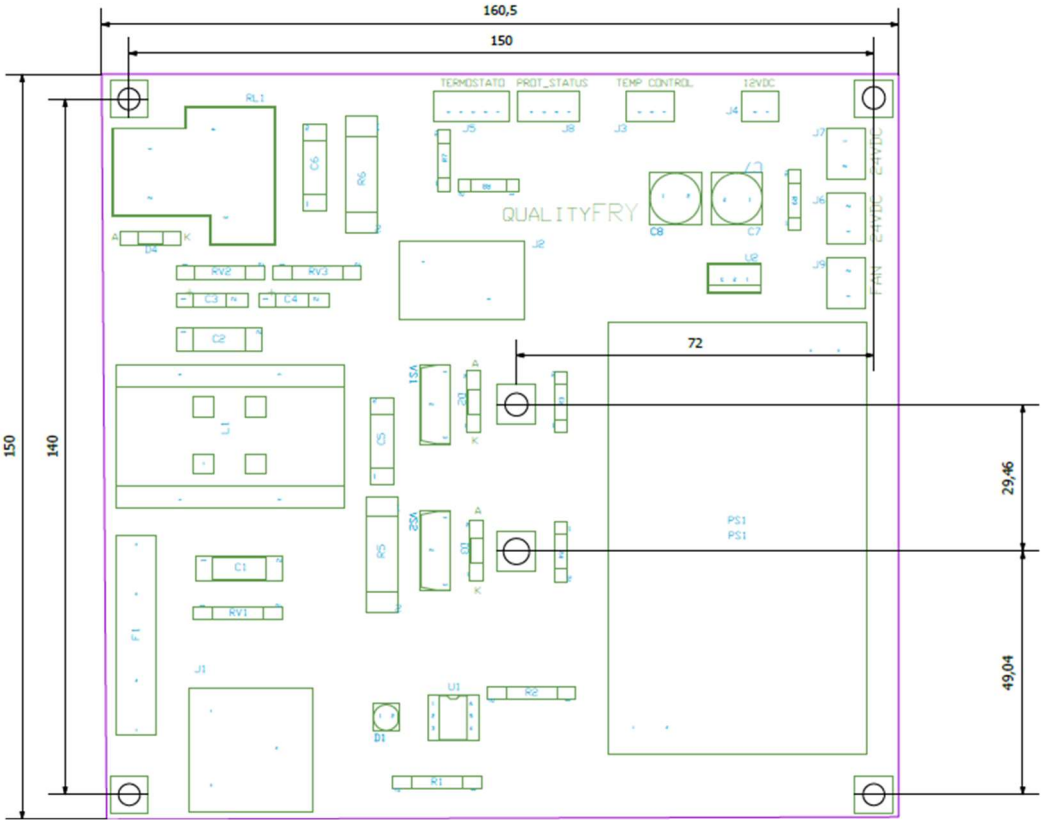


Fig.3. Board outline.

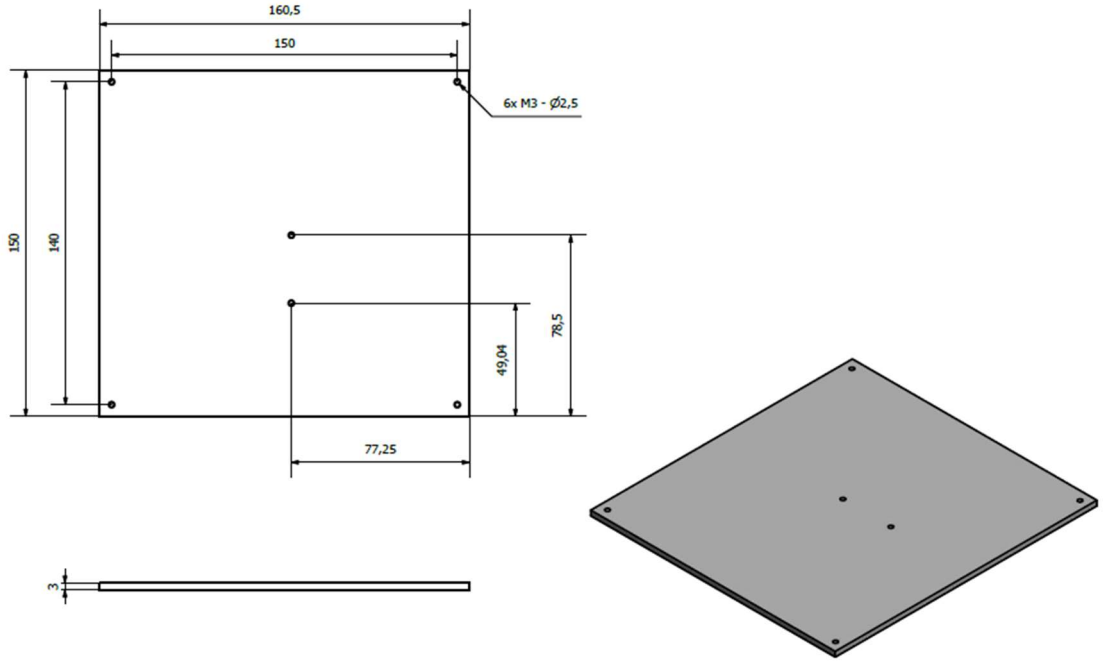


Fig.4.Heatsink.