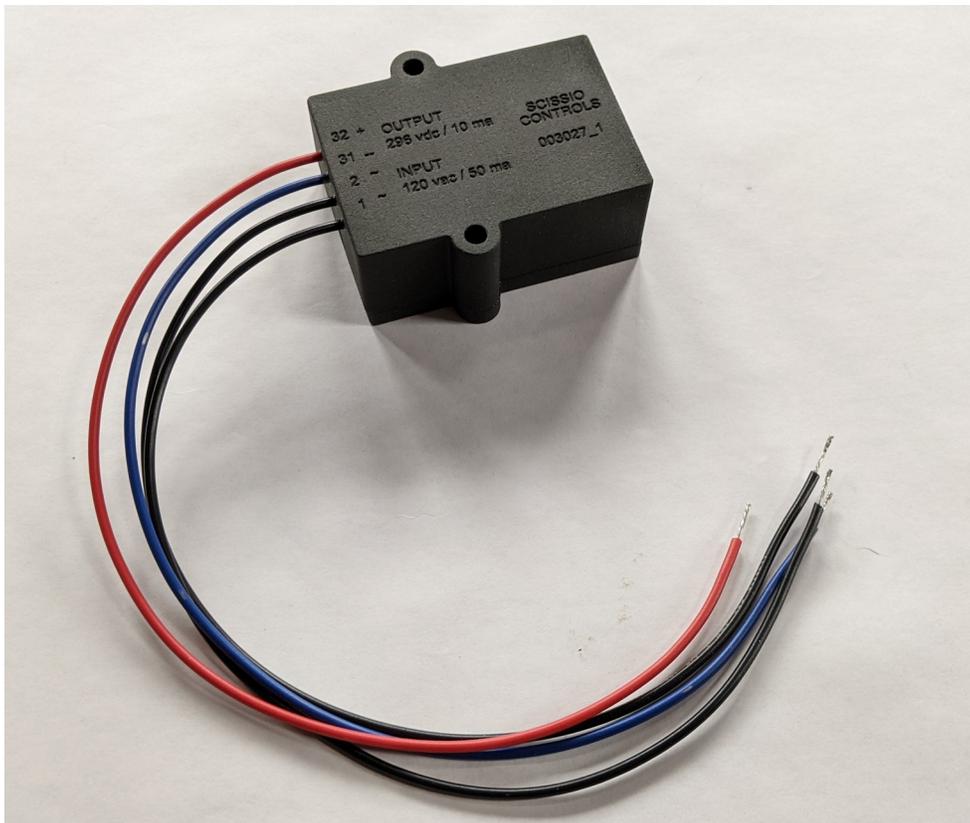


Scissio Controls
www.scissiocontrols.com

**T4 Replacement
For the Monarch 10ee Toolmaker's Lathe
Part Number 003027_1**

-- Danger Warning --

Hazardous High Voltage is present on numerous exposed components in any of the 10ee electrical compartments when the lathe is powered. In particular, hazardous high voltage is present on both the input and output terminal wires of the T4 Replacement. Do not attempt any maintenance or service of these type of components unless you are competent to do so!



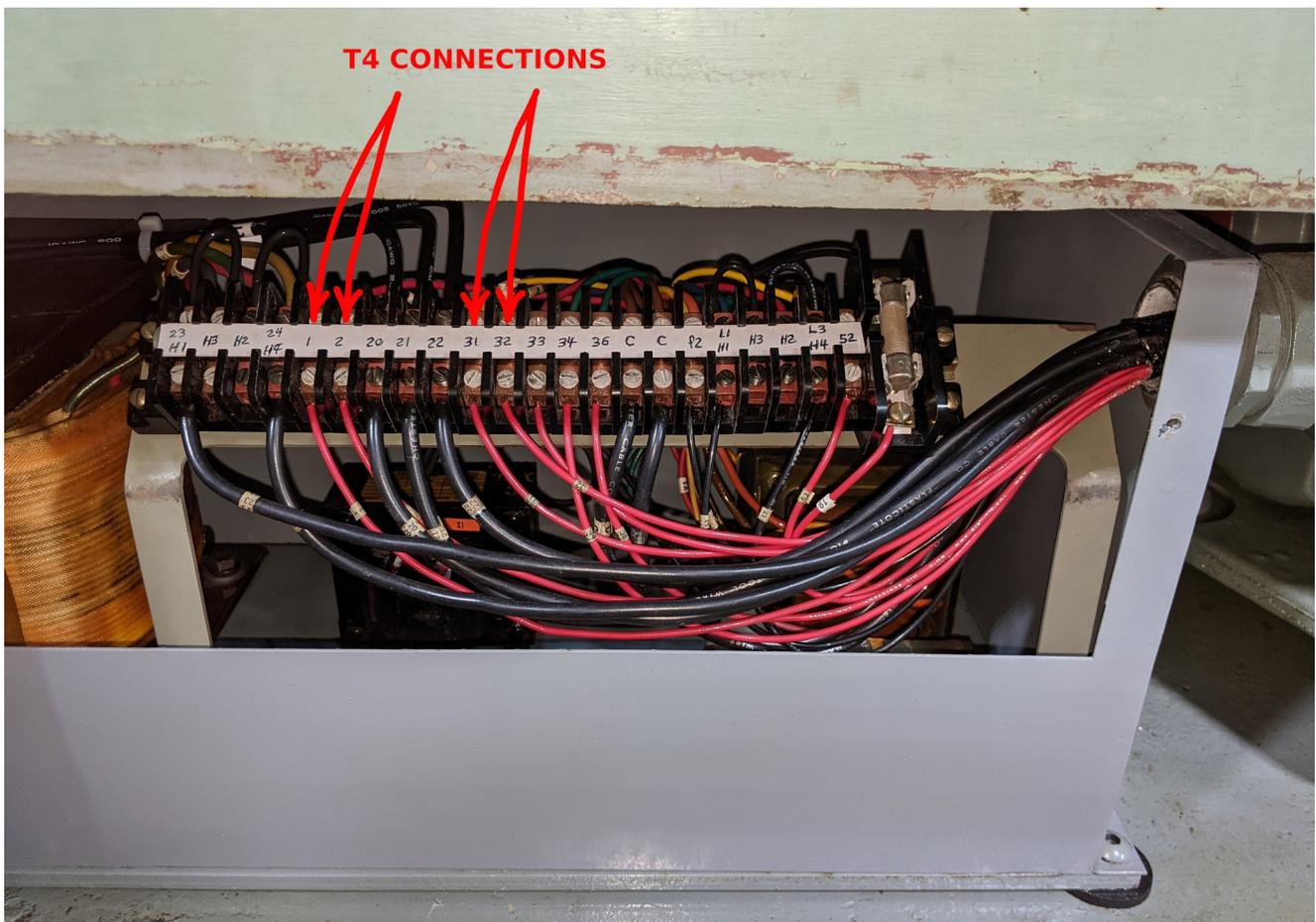
Scissio T4 Replacement

The transformer capacitor combination identified in original Monarch documentation as T4 appears as a component of the variable speed DC drive in certain models of the Monarch 10ee toolmaker's lathe. These lathes have become known as "Modular Drive" machines, and Monarch built them from about 1960 to 1983. The T4 transformer is typically located in the rear transformer compartment of the lathe on the right hand side below and somewhat behind the transformer compartment terminal block.

The T4 Replacement is a drop in replacement for the original T4 transformer capacitor combination. The replacement has a pair of mounting holes that are sized to accommodate 10-24 x 1 3/4 mounting screws. These holes are spaced such that the replacement may be fixed without modification using two of the threaded holes of the original T4 footprint on the base plate.

The four T4 Replacement terminal wires are identified by Monarch 10ee circuit number on the case and by color as indicated in the table below. In the lathe, connect each wire to the matching numbered terminal on the transformer compartment terminal block.

<u>Circuit</u>	<u>Wire</u>	<u>Function</u>
1	Black	120 vac input
2	Black	120 vac input
31	Blue	Negative 296 vdc output
32	Red	Positive 296 vdc output



Monarch 10ee Rear Transformer Compartment Terminal Block
Showing Connection Locations for the T4 Replacement

Electrical Specifications

Input voltage (1-2)	120 vac
Input current	50 ma
Output voltage (31-32)	296 vdc
Output current	10 ma

Note: Output is current limited and may be briefly shorted without damage.

Mechanical Specifications

Size	3.12 in L x 2.75 in W x 1.30 in H
Mounting holes	2 x 0.22 in dia x 2.25 in apart
Mounting screws (recommended size)	10-24 x 1 3/4 in L
Lead length	12 in
Weight	10 oz

Operational Discussion

In the original design, T4 is wound with an auxiliary pony winding that is connected to a metal cased 1 uf 660 volt motor run type capacitor. The function of the pony winding and capacitor are to introduce a harmonic into the transformer secondary and produce a quasi square wave output. The purpose of this is to provide a wave form to the Spindle Module that is conditioned for rectification into a dc voltage. A square wave is better for this than a more rounded sin wave. Downstream in the control circuit, a rectifier in the drive Spindle Module converts this quasi square wave into a DC voltage for use as a rather poor voltage reference. In the original design, the output voltage from T4 measured across circuits 31 and 32 falls in the range of 270 vac to 300 vac.

The Scissio T4 replacement accomplishes its function in the drive by producing a regulated and highly stable 296 volt dc output directly instead of the original poorly regulated and poorly conditioned square wave which the Spindle Module must subsequently rectify. With the T4 Replacement, the Spindle Module no longer performs the rectification function, and its internal rectifier simply passes the high quality dc reference voltage generated by the T4 Replacement.

In the overall drive circuit, the function of the original T4 and the T4 replacement are substantially the same regardless of the details of where the rectification for the voltage reference happens to be performed. The T4 replacement does produce a higher quality voltage reference, however this may not translate into any measurable improvement in overall drive performance.