# RE-MOTORING A UNIMAT 4 LATHE

The original motor on my Unimat 4 lathe stopped working. On investigation I found that the DC circuit board had failed and the circuit board required replacing in order to make the motor work again.

My first attempt was to see if the motor could be made to work by buying a replacement circuit board. I live in the UK so I contacted the UK agent for the Unimat – Pro Machine Tools and found that the circuit board is no longer available (and neither is an original replacement motor).

So what to do next?

I searched the internet to see whether there was any information / advice regarding the problem and found:

- This group (which I joined and found much useful information motor replacements),
- A RMweb topic on re-motoring the Unimat SL with a DC scooter motor.
- A French site called Civade with a topic on re-motoring the Unimat 3 with a DC scooter motor.

Now I had a number of options and I could:

1. Try to fix the circuit board by replacing components;
2. Buy a new motor (found these are available from EMCO Austria – model 1529EA - Varispeed Motor 230/1/50. Cost €325,00 + Tax and Delivery);
3. Buy new motor (110W DC motor) from Pro Machine Tools or Rejon (Cost £336 or £255);
4. Replace the motor with a DC scooter motor.

Based on the costs I decided that options 2 and 3 were non-starters. So option 4 it would be (I am also pursuing option 1 and this is currently ongoing).

What follows is how I used a DC scooter motor to replace the original Unimat motor.

The parts used were:

1. 24VDC 150W scooter motor (type ZY6812). Bought from PetrolScooter for £21 (see photo below).
2. 24V 15A DC power supply. Bought from Amazon for £20.
3. 9-60V 20A 600W PWM motor speed controller. Bought from Amazon for £8.


By searching the internet these parts are easily found with other suppliers such as E-bay.

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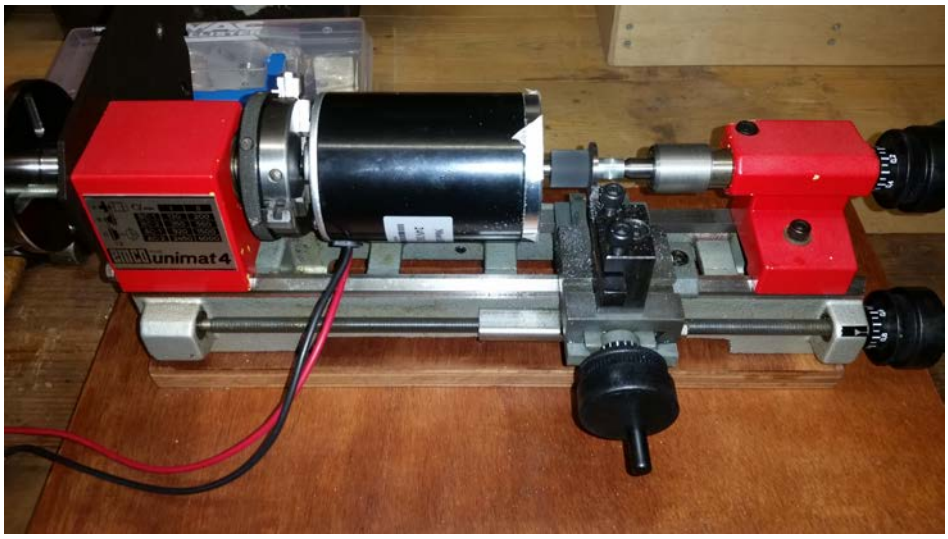
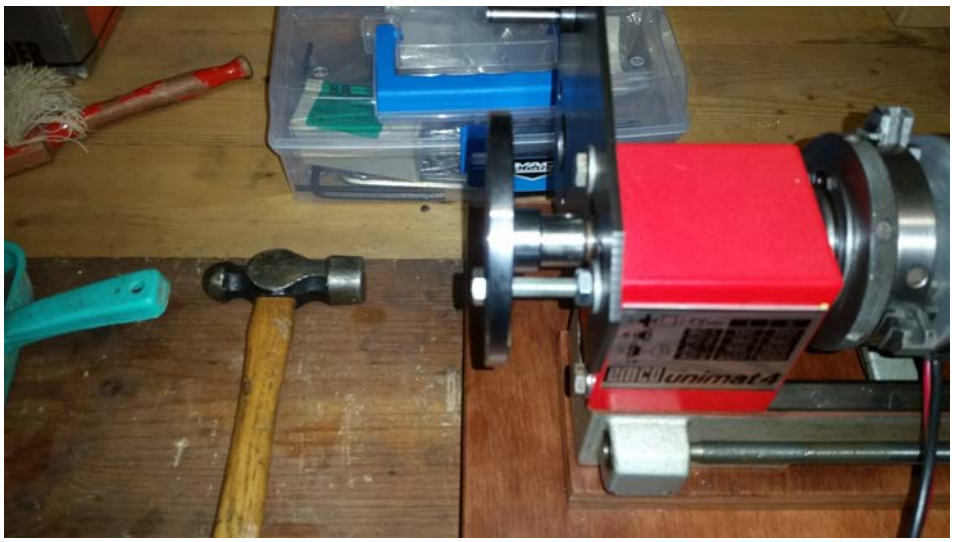
When I bought the motor it had toothed belt drive gear attached. I tried to remove gear using a gear puller and heat but it would not come off. The gear is glued on. In the end I decided to machine it off (see photos below).




Set up for machining – motor is powered and shaft with gear rotates. Motor held in 3 jaw chuck and between live centre.




A faceplate is used to secure the headstock spindle and prevent it rotating the motor.

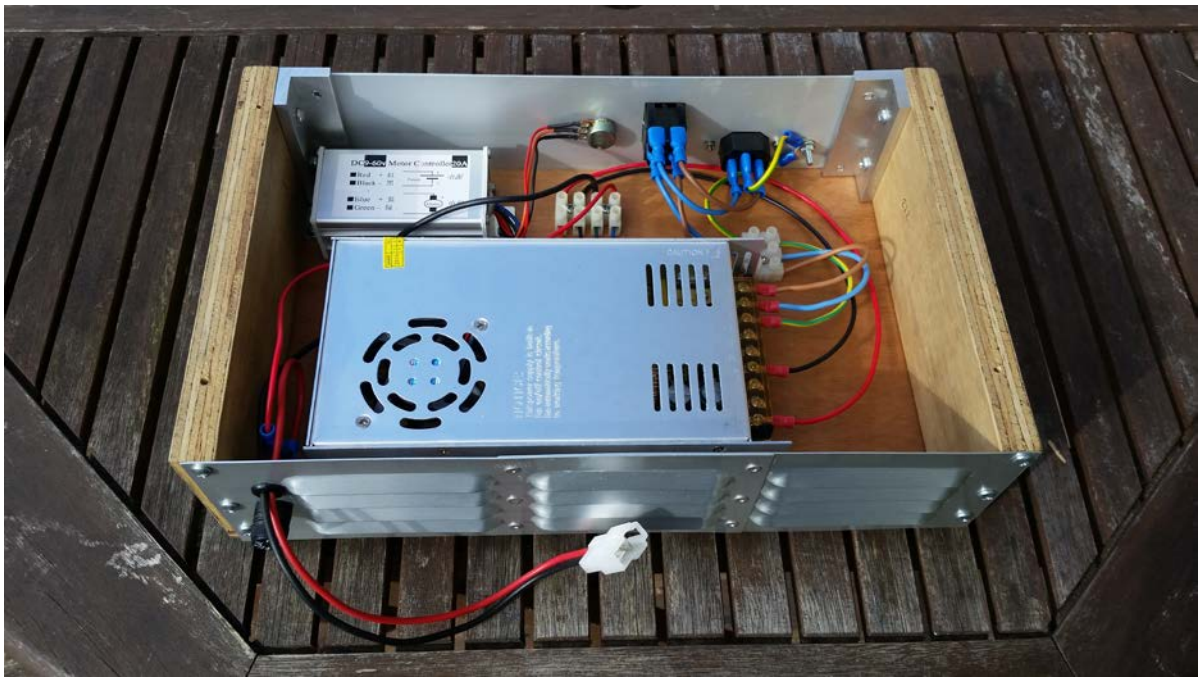
Gear before start of machining. A fixture was made that fitted over the end of the motor shaft and the live centre engaged in this as the motor shaft wasn't centre drilled.

After maching (gear was an oil impregnated powder product and produced small chips so note the additional masking tape added to prevent any chips getting inside the motor).

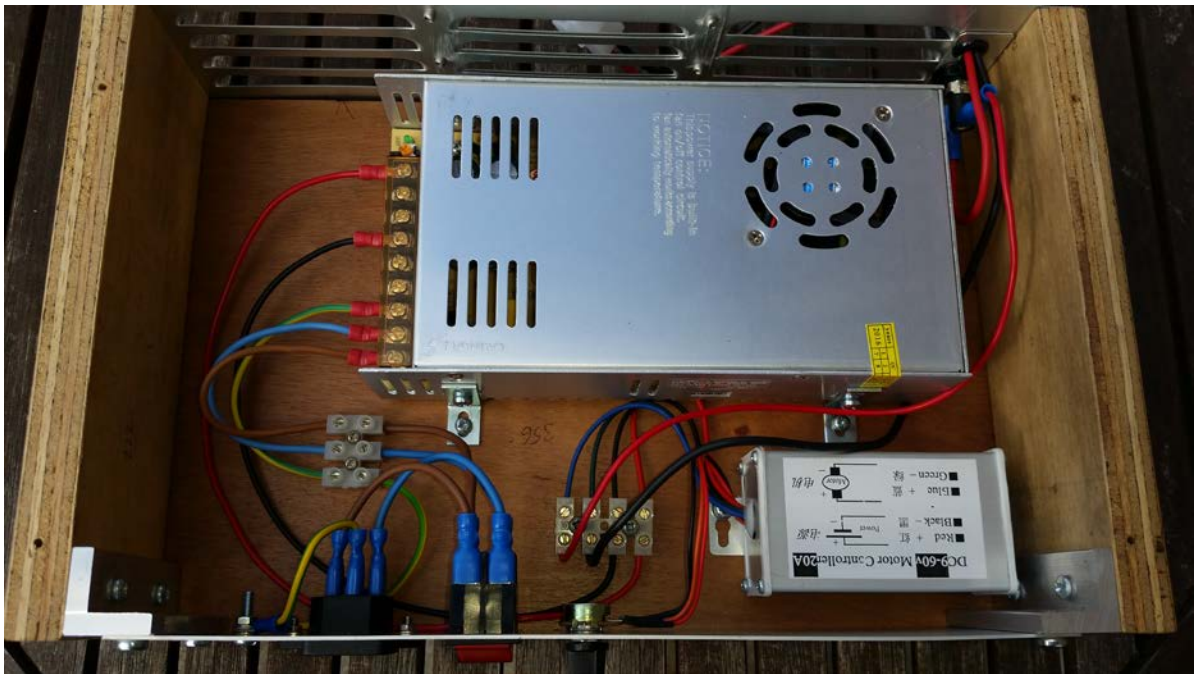
The lathe is mounted on a simple ply board (the lathe board). So where should the power supply and speed controller be mounted?

I decided to locate these underneath the lathe in a purpose made box as this avoided the possibility of swarf landing inside the power supply and causing it to fail. Also it would keep the wiring tidy and out of the way.

The photos below show the box before fitting underneath the lathe board with the power supply, the speed control and the wiring installed.



Looking from the rear. Power supply is located next to louvred panel, speed controller is in the top left hand corner.



Looking from the front.

Looking from the front. The mains enters by the black power supply socket. The red switch is the on / off switch and blue knob is for varying the speed.

The decision to use a removable mains cable was made to aid handling and storage as it comes off and can be stored separately. The lathe board was now screwed to the power supply box.


Lathe and Power supply screwed together

To complete the set-up the motor requires fixing to the motor plate. I decided to use the existing motor plate and pulleys even though I now had a variable speed motor drive.

The original motor was fixed to the motor plate using two socket head screws. The new motor is drilled and tapped for fixing but with a different hole arrangement that cannot be used with the existing arrangement.

I could drill another set of holes in the motor plate to accommodate the new motor or make an adaptor plate that fits between the motor and the motor plate. The new motor's shaft length was long enough to make the use of an adaptor plate possible.

The adaptor plate was machined from aluminium round bar.

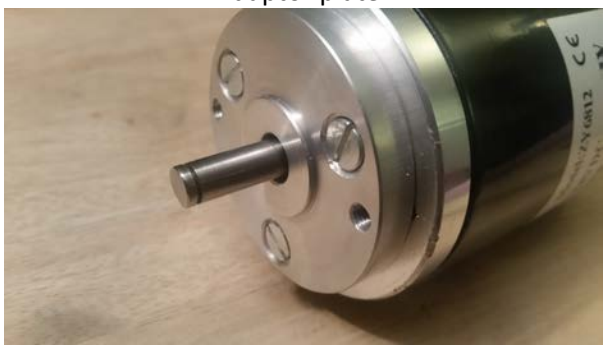
The photos below show the adaptor plate, how it fixes to the motor and how the assembly then fixes to the motor plate.

Motor plate showing existing fixing holes

New motor showing the 3 fixing holes

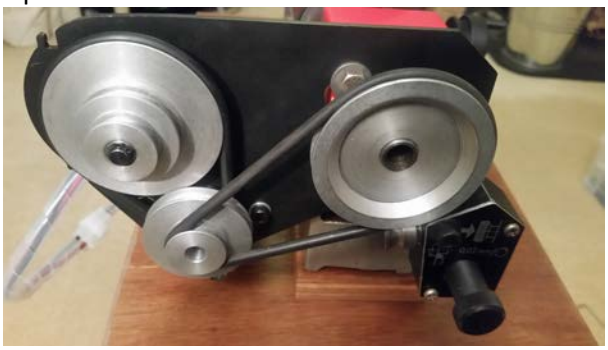
Adaptor plate

Adaptor plate fitted to motor



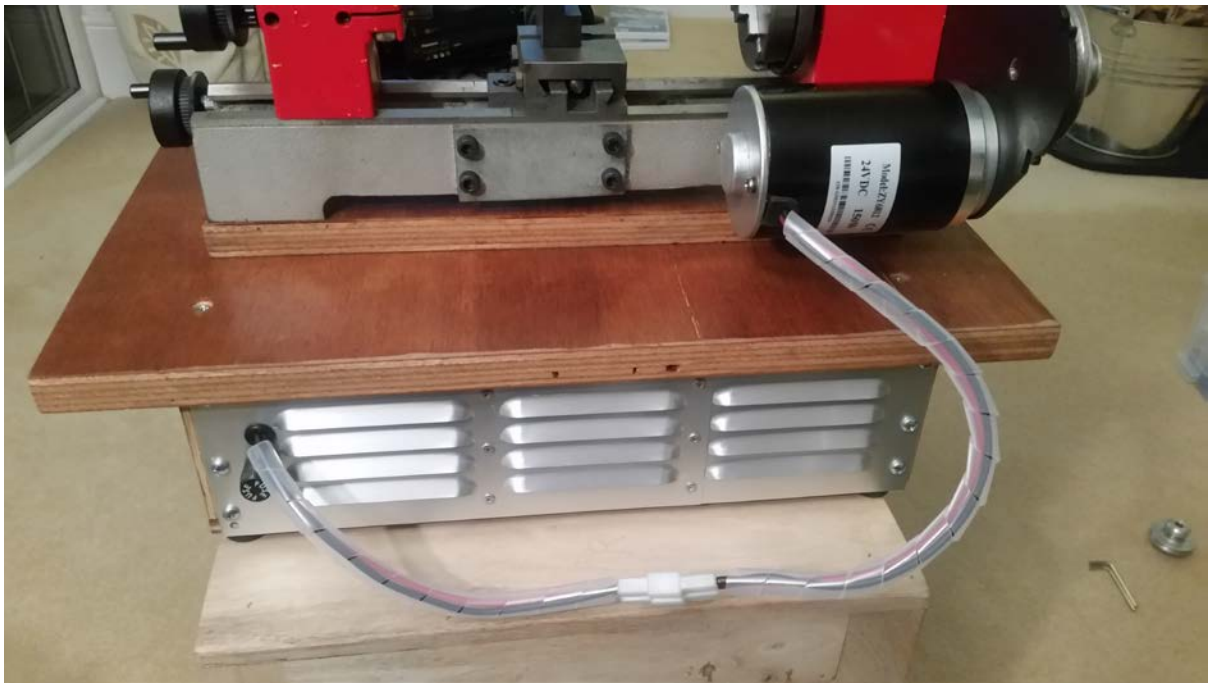
Another view of adaptor plate fitted to motor

Motor fitted to motor plate



Showing drive, intermediate and headstock pulley with drive belts in position

The final photos show the motor power connection and the mains connection. A plug was included in the DC motor connection so the wiring can be un-plugged if required.



The result is a powerful and flexible drive, but what did it cost?

The motor, power source and speed controller cost £50. There was another £30 spent on the plug sockets, mains cable, fuse holder, front plate, rear louvre plate and aluminium angle / round bar. So in all a total of £80 for superior drive to the original.

A future upgrade I am investigating is the use of a toothed drive belt system using either T5, XL or HTD3 belts and pulleys.