

VARYING THE SPEED OF YOUR LATHE

Motor Technologies Ltd, an Auckland based company, has developed a speed control” package” for use on most domestically operated wood lathes.

It comprises of an industrial type electric motor frequency controller (the **V8001**) and a three phase motor capable of running off a domestic 230 volt 10 amp plug.

Control of a domestic type single phase AC induction motors is difficult and is normally confined to fan applications where the load has “variable torque” characteristics.

Common devices, for this application, are the triac type, which in effect, vary the *voltage* to the motor, relying on the *slip* of the motors *rotor*, against the driven load, for speed control.

Where high torque is required this method is obviously of no use to the wood turner.

With the use of modern day semi conductors and rapid switching devices, the latest industrial AC Variable Speed Drives (VSDs) for electric motors have many features.

These drives control the motor by varying the *frequency* (hertz) which is proportional to the output speed of the motor.

VSDs in the 1980s and 90s lacked torque on the lower frequency ranges which was overcome by over-sizing the motor but now with the new generation “flux vector” type VSDs this has been overcome.

Flux vector control is touted by manufactures in the industry as : “*giving your AC machine almost the electrical characteristics of a DC motor*”

It is a direct result of these fast switching semi conductors, IGBTs and microprocessors.

DC motors were favoured in industry where speed control was required as they do have good torque in the low speed range when coupled to an appropriate DC drive.

The **V8001** is a sensorless flux vector type VSD.

It connects to a *domestic three pin outlet* yet delivers 230v three phase to the motor.

It has all the “bells and whistles” of an industrial type VSD.

For the wood turner the **V8001** is a “retro-fit “ solution where speed control is required.

Whilst not a woodturner himself Brent Wray of Motor Technologies Ltd (MTL), has listened to the requirements of wood turners in the Auckland region and is now able to offer this package to the craft.

He is quick to remind you that this is the *retro fit* option and there will be occasions when one will be required to change belt ratios on an existing lathe, but NOT OFTEN !

The package consists of the **V8001 pre wired** to a 1 horsepower (0.75kw) totally enclosed *three phase motor*.

The new motor is necessary as the *existing single phase motor is not suitable* for use with the V8001.

Provided an existing lathe motor is “not out of the Ark”, an equivalent motor with similar foot print and shaft height dimensions can be provided.

MTL configures the *motor* to the *controller*, setting the “woodturning” parameters into the V8001.

This includes a maximum torque setting and the activation of the ingenious *auto tune* function within the V8001 which detects the electrical characteristics of the connected motor!

The acceleration and the controlled run down times for the motor are also set.

The controlled run down is done with DC injection, the lathe will stop in exactly the same time each time it is switched off!

As a safe guard against the motor overheating (it uses its own cooling fan) a minimum low speed of 10 hertz is preset.

This has not effected the requirements of the many wood turners who own these machines!

A reversing switch is an optional extra (for sanding) if required.

A **major benefit** of the V8001 is its **power saving** ability!

A typical 1 horse power single phase motor running a lathe at no load or at idle draws 4 amps from the power supply. It will never be less.

The V8001 connected to a one horsepower motor draws *less than one amp* on no load!

The controller is therefore optimizing its power requirements to the motor with the change of load throughout a wood turning session.

Installation time is as long as it takes to unbolt the existing motor and set up the controller in an accessible place, out of the direct firing line of wood chips and dust, about half an hour!

The V8001 measures 114 W X 298 H X 206 deep.

It has an polycarbonate IP 20 enclosure and its own forced air cooling fan.

The facia has “run” and “stop” pushes and four other “function” buttons that need not be touched!

The run stop buttons are overridden if a reversing switch is fitted.

The speed control knob or speed potentiometer is adjacent to the operating pushes.

A remote control station (off, on, & speed pot) connected by a multi cored cable is available.

A four segment 10mm red digital display is also on the front of the V8001.

This can monitor the drive /motor functions but is set up to monitor frequency or hertz, which as described earlier, is proportional to speed.