

## TB008 (Rev1) - AC inverter spindle motors

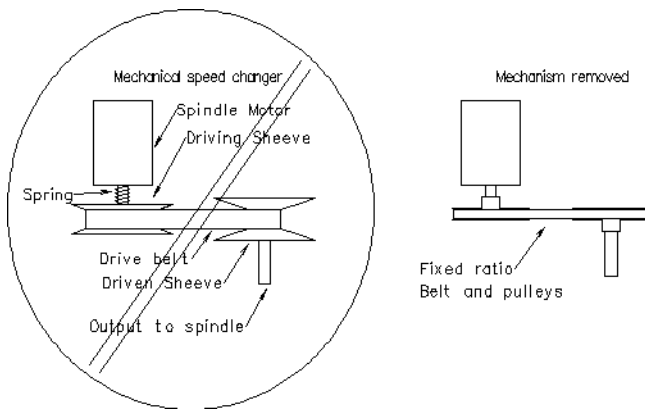
---

### Remove mechanical variable speed mechanism

AC inverters allow the speed of a standard AC induction motor to be varied electronically. The current generation of AC inverters offer extremely efficient operation, with full motor torque down to almost zero speed, at a very attractive cost. In addition, it is very easy to interface an AC inverter to a machine tool control in order to provide programmable spindle speeds capability. These factors make AC inverters a natural choice for machine tool spindle use.

Traditional variable speed spindles on machine tools usually employ spring tensioned sheaves and a mechanical hand crank to vary the spindle speed. Wide belts transfer power from the driven sheaves on the motor shaft to the driven sheaves on the spindle. The mechanical losses due to belt friction are considerable. A 3 HP motor may only deliver 2 HP to the spindle. Also, these systems are subject to accelerated wear, and the spindle speed selection is very imprecise.

While it is possible to drive such a mechanical system with an AC inverter driven motor and then vary the spindle speed by electronically changing the speed of the spindle motor, it can be extremely dangerous in some situations. If the mechanical variable speed mechanism isn't totally disabled, it may be possible to run the spindle at extreme speeds, causing the sheaves to fly apart, or to ruin the spindle bearings. It is by far a better idea to eliminate the mechanical variable speed mechanism all together. In this instance, the sheaves and crank mechanism are totally removed and replaced by a fixed ratio V-belt or multi-vee belt system with a 1:1 ratio between the motor shaft and the spindle. This allows the maximum amount of motor power to be transferred to the spindle, and also allows for more precise speed control.



---

### Document History

Rev1 Created on **1998-04-15**