

**MECHANICAL and ELECTRICAL
OPERATION**

ELECTRICAL AND MECHANICAL OVERVIEW

There are several adjustments and operations that the user may have to perform manually or be aware of before operating the machine.

1. SPINDLE SPEED RANGE ADJUSTMENT

In order to optimize the torque transmission between the motor and the spindle, there is a three level V-belt setting. It depends on tool diameter, material and tool as to what setting is to be selected. The speed ranges are marked at the side of the spindle head. To change the setting, one has to remove the side guard plates, loosen the motor mounting plate, slide the motor assembly forward, move the V-belt to the desired setting, push the motor back to tighten the belt (but not too tightly), relock the motor plate and remount the guard plates.

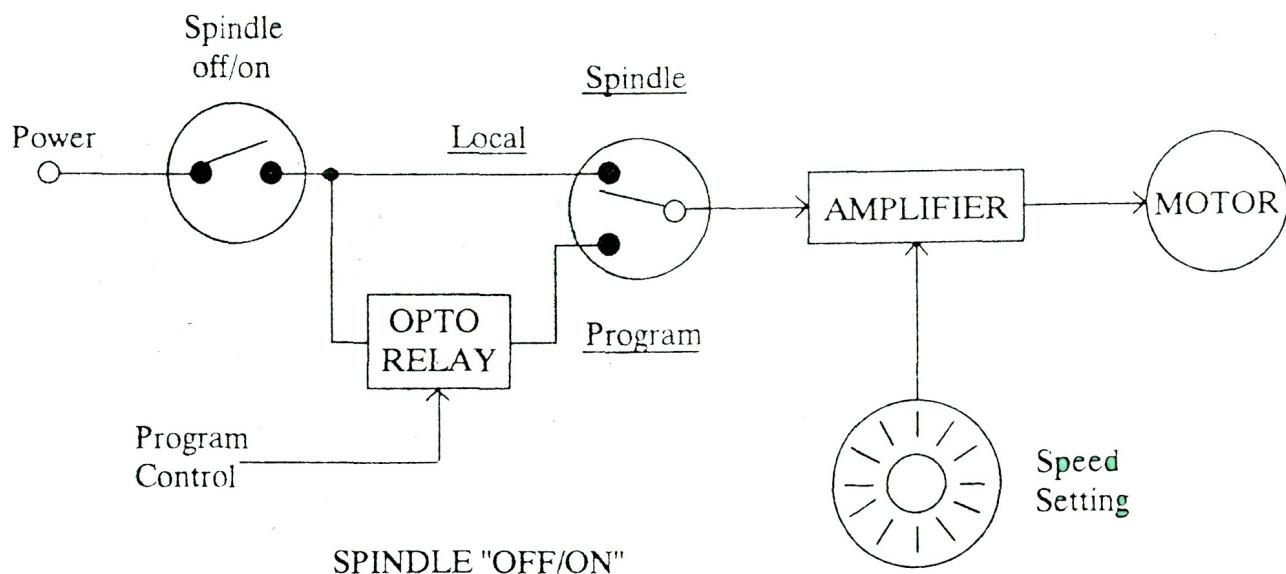
Please note that this belt setting is not designed for every day changing, but to give the user the ability to configured his required speed range.

2. SPINDLE MOTOR

The motor is 1.25 HP brushless D.C. motor. There is a 400 line encoder mounted on the rear shaft for velocity feedback and an electric brake. The motor is designed to run from 200 to 5000 rpm. Please note that the maximum HP is only delivered at maximum rpm. If the RPM is set at 2500, then the motor will only deliver 0.625 HP. If there is going to be very heavy cutting always go into low gear with the V-belt setting.

3. SPINDLE MOTOR CONTROL

This is best explained by a diagram:



The SPINDLE OFF/ON switch allows power to flow to the LOCAL setting of the SPINDLE LOCAL/PROGRAM switch or to flow through an opto relay to the PROGRAM setting of this switch. When in LOCAL the user is in charge. When in PROGRAM the program will turn the spindle OFF or ON with the opto relay. The speed of course has to be preset, before running the program.

4. THE DRAWBAR

The tool holders are clamped or unclamped by pulling the drawbar handle forward. Release the handle slowly. Only change tools when the spindle is STATIONARY.

5. RPM PICKUP

There is a hall effect pickup under the spindle pulleys that detects two magnets inserted into the bottom of the spindle pulley. This gives the exact RPM of the spindle.

6. TOOLING

The spindle taper is ISO 30. It will accommodate BT30 or CAT30 tool holders. The drive pins on the spindle nose allow the BT toolholder to be oriented 2 ways while the CAT is designed for only one orientation position. This is done by reversing one of the drive pins. Since there is no automatic tool changing the user does not care. The pull studs for the tooling are supplied by Dyna.

The pull studs are not interchangeable. BT has metric threads, CAT has inch threads.

7. ELECTRONIC PROBE ASSEMBLY

This is used during SET UP and measuring Z offsets of other tools (from tool 1). It greatly simplifies these procedures. The user must enter the PROBE HEIGHT (in mm) into his controller before using it. This height must be measured by the user himself as each probe's height varies slightly. It plugs in under the controller cable.

8. EMERGENCY SWITCH

Hitting this switch deactivates all power to the machine and activates capacitive stored power to brake the spindle.

To restart, rotate the switch clockwise so it clicks out, then if necessary, go to emergency move on the axis to free the tool. It will be necessary to also restart the program from the beginning and re-establish the set up position.

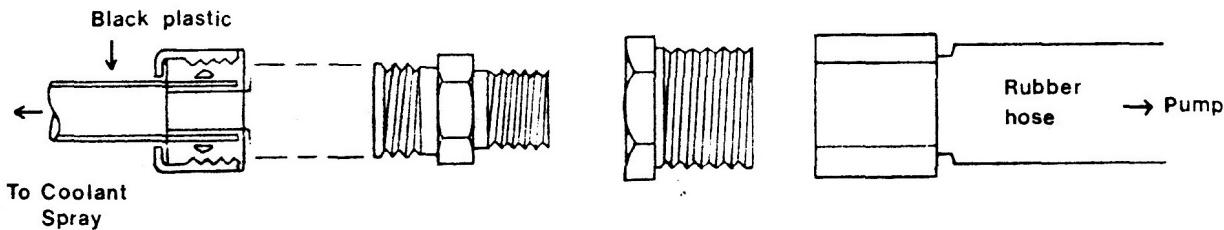
9. HALT KEY

Sometimes it is necessary to halt the program while running. Touching the lower right side of the controller-the HALT KEY- will cause the program to halt at the end of its current move, arc or function. This is not an instantaneous halt but it does allow restarting by touching the NEXT key.

10. COOLANT

The coolant pump cord is plugged into the power pack above the autolube system. The voltage is 110V AC and the switch to control this pump is on the control module marked coolant OFF/ON.

In connecting the coolant hose use the enclosed pipe fittings to go from the plastic tube to the rubber hose.



11. THE AXES

There is sufficient thrust on the axes to break a 3/8" end mill. The user should take great care when machining to keep his fingers clear even when the spindle is off and he is just positioning the tool. The maximum thrust is around 800 lbs. Each axis is identical, only the length of the screw is different. Each ball screw is preloaded at the ball nut and preloaded on the bearings. The ball screw lead is 2.5 mm. There is a belt reduction of 2.5:1 from it to the 200 steps per revolution of the stepper. This gives a step resolution of 0.0025 mm.

Also on each axis is a precision limit switch to which the axis homes to when the machine is switched on, after receiving a YES to READY? on the controller. These should be kept free of chips and debris.

This initial position is called the HOME POSITION. The procedure is called INITIALIZATION in which the controller will send each axis to the home position. The controller will measure the backlash on each axis, and this error is factored into every move.

The backlash is displayed for each axis momentarily and should remain fairly constant and repeatable for each axis. It is displayed in mm. For inches divide by 25.4.

The display will show MODE? and you are ready to run or enter a program.

