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## Section 7: Spindle

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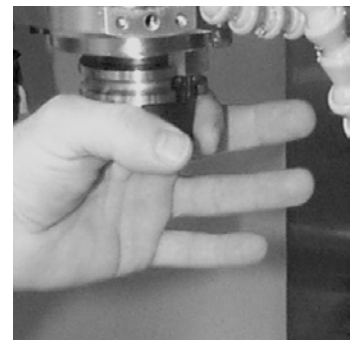
### Manual Operations Manually Loading and Unloading a Holder

A tool can be manually loaded or unloaded into the spindle by using the TOOL IN/OUT button. The control must be in the COMMAND mode (ENTER NEXT COMMAND), Auto Mode or the MDI (manual data input) mode to use this button. The button will not activate the tool in-out piston if the spindle is rotating.

- 1) The tool holder must be held in the left hand with the thumb and the first finger grasping the holder below the “V” flange. No other fingers should have contact with the holder or the tool in the holder. The area below the “V” flange is called the safe zone (See Figure 7-1).
- 2) When unloading a tool from the spindle, grasp the tool in the safe zone and depress the TOOL IN/OUT button (See Figure 7-2). Keep the TOOL IN/OUT button depressed until the tool is completely out of the spindle.
- 3) When loading a tool into the spindle, grasp the tool in the safe zone and depress the TOOL IN/OUT button. Place the holder into the spindle after depressing the TOOL IN/OUT button, not before. The keys on the nose of the spindle must fit into the key ways on the tool holder flange. Release the TOOL IN/OUT button to lock the tool into the spindle.



**Figure 7-1** Spindle safe zone area.



**Figure 7-2** Grasp spindle in safe zone area.

**Note:** When loading a holder into the spindle, inspect the taper for chips and dents. Remove any chips or dents from the taper with a flat stone.

**Note:** Confirm the retention knob is securely tightened before placing the tool in the spindle.

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### Spindle, RPM Established from MDI

The spindle RPM can be established from the MDI (manual data input) mode. When the RPM is established the spindle can be turned on using the SPINDLE ON/OFF button and the SHIFT button.

- 1) Press the MANUAL button while in the command mode to enter the MDI mode.
- 2) Type the code S# (where # is the desired RPM. EX: S1400 ) then press the ENTER button.
- 3) The waiting message will now be flashing. At this point press the START button which will only execute a belt range change, if required, and register the RPM to memory.
- 4) Press the MANUAL button to exit the MDI mode.

VMC 2216, 4020, 4020HT, and 6030 RPM ranges are as follows:

Low range: 45 - 2500

High range: 2501 - 1000

VMC 20 RPM range is as follows:

Low range: 75 - 1250

High range: 1251 - 5000

VMC 2216, 4020, and 6030 with the 15000 RPM spindle has a single RPM range from 300 - 15000 RPM.

VMC 15 may have AUTO HI/LOW or MANUAL belt change. The RPM selected will automatically select the low or high range.

**Note:** Use the spindle override potentiometer to vary the RPM manually; M3 = CW SPINDLE ON, M4 = CCW SPINDLE ON, M5 = SPINDLE OFF.

The last RPM setting used by the control is active when the spindle is turned on manually unless it is changed in the MDI mode.

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**Using the Spindle  
ON/OFF Button****Spindle On**

After establishing the RPM from MDI, or at any time in any mode of operation, the spindle can be turned on manually by using the SPINDLE ON/OFF button and the SHIFT button.

- 1) Depress one of the SHIFT buttons, and while it is depressed press the SPINDLE ON/OFF button. The spindle will turn on in the forward direction.

**Note:** If the spindle does not turn on it may be that the SPINDLE ON/OFF button was pressed before the SHIFT button, or one of the buttons is not pressed properly. The buttons must be pressed directly in the center of each square.



**WARNING:** The spindle will turn on at the last programmed RPM.

**Spindle Off**

When the spindle is on, from any mode of operation, press the SPINDLE ON/OFF button alone, to turn the spindle off.

See also “SPINDLE REVERSED WHILE USING JOG”.

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**Spindle, Loading a  
Holder from the ATC**

When tool holders are in the ATC (automatic tool changer), they can be loaded into the spindle by using the MDI (manual data input) mode.

- 1) Type the command MD then press the ENTER button, or press the MANUAL button at the command mode, to get into the manual data input mode.
- 2) Type M6T# (where # is the Turret location of the tool to be loaded into the spindle) then press the ENTER button.

**EXAMPLE:** M6 T1

- 3) The waiting message will flash. At this point press the START button to make the exchange.
- 4) Press the MANUAL button to exit the MDI mode.

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**Spindle, Unorient to  
Turn by Hand**

To turn the spindle by hand, for setup purposes, the spindle must be unoriented. This is not necessary on the VMC 15.

- 1) From the command mode type MD and then press the ENTER button.
- 2) Type S.2 and then press the ENTER button. This places the machine in High belt.
- 3) After the waiting message appears on the screen press the START button.
- 4) The spindle will turn on, then off, when the START button is pressed.
- 5) Press the MANUAL button.
- 6) The spindle will now be free to turn by hand. Steps one through five above, put the machine in the high belt range and the M3 turns the spindle on which releases the orientation.

**Note:** Release of the spindle orientation, without regard to the belt range, may also be accomplished by pressing the SPINDLE ON/OFF button.

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## Spindle, Orient

The spindle will orient to the same position each time it is instructed to orient. This position is the same position the spindle must locate to load tools from the turret. Orientation is accomplished by the following methods.

- Method 1**
- 1) Type the command MD then press the ENTER button, or press the MANUAL button at the command mode, to get into the manual data input mode.
  - 2) Type the code M19 then press the ENTER button.
  - 3) The waiting message will flash. At this point press the START button to execute the orientation.
  - 4) Press the MANUAL button to exit the MDI mode.
- Method 2**
- 1) Type TC,1, at the command mode, then press the ENTER button. This is the command to open the ATC which will first orient the spindle, then open up the ATC.
  - 2) Press the MANUAL button to return the turret to the parked position.
- Method 3**
- 1) Type the command MD then press the ENTER button, or press the MANUAL button at the command mode, to get into the manual data input mode.
  - 2) Type the code M6 then press the ENTER button.
  - 3) The waiting message will flash. At this point press the START button which will execute a tool change and orient the spindle.
  - 4) Press the MANUAL button to exit the MDI mode.

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**Spindle Reversed  
While Using Jog**

- 1) From the command mode type MD then press the enter button.
- 2) Type S# M4 (where # is the desired RPM). The waiting message will flash, then press the START button.
- 3) Press the START button for the spindle to start.
- 4) Press the SLIDE HOLD button.
- 5) Press the JOG button to get into the JOG mode. (See SLIDE HOLE, JOG AWAY FROM)

**Note:** Press the MANUAL button to get out of the jog mode, and press the MANUAL button again, in the slide hold mode, to exit the MDI mode.

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