intelitek

CNC Milling Technology

ACTIVITY 2 HARDWARE TASKS

Name	Class/Period	Date

1. Overview

In this task you will perform preliminary procedures on the milling machine, jog the cross-slide, and rotate the spindle.

2. Performance Objectives

After completing these hardware tasks, you will be able to:

- Open and close the milling center safety shield.
- Manipulate the spindle and cross-slide.
- Rotate the spindle and change spindle speed.

3. Required Materials

You need these materials to complete the hardware tasks:

- 6x00 or 8x00 CNC milling center, including computer with CNCMotion

4. Safety and Inventory Checks

Before beginning the hardware task, review the following checklist.

- ☐ Ensure that your lab station passes the safety guidelines. See the resources section for the safety guidelines.
- ☐ Complete the inventory and safety checklists for your lab station.
- ☐ If there is a tool in the spindle, ask your lab instructor to remove the tool before you proceed to the first task.

5. Task Procedures

5.1. Starting up the Milling Center

Perform the following to start up the mill:

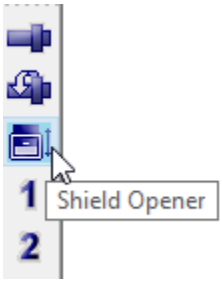
1. Ensure that the Emergency Stop button on the front panel of the mill is released and the safety shield is closed.
2. On the control panel, turn ON the power switch.
3. Run CNCMotion. If required, access the courseware and launch the application from this activity's launch button.

4. Ensure that CNCMotion is set to **On-Line** mode (**Setup > On-Line**).

5.2. Testing the Shield

1. Confirm that the Emergency Stop Button icon on the Inputs toolbar is not highlighted, indicating that the Emergency Stop button is released.

2. Carefully open the safety shield.
   - If you are using a 6x00-series milling center, click the **Shield Opener** button.



   - If using an 8x00-series milling center, open the shield manually.

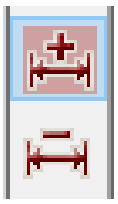
Note that the Safety Shield icon on the Inputs toolbar is now highlighted, indicating that the safety shield is open.

3. Press the Emergency Stop button. When the Emergency Stop button is pressed, the Emergency Stop Button icon on the Inputs toolbar is highlighted.
4. Close the safety shield and ensure that the Safety Shield icon on the Inputs toolbar returns to normal, indicating that the shield is properly closed.
5. Rotate the Emergency Stop button to release it.

5.3. Manipulating the Cross-Slide and Spindle

ⓘ *Note: You should have already jogged the cross-slide and spindle on your virtual machine before performing this procedure using the actual milling center.*

1. In the **Speed** area of the CNCMotion **Jog Control** window, select the slowest speed.
2. Experiment moving the cross-slide with the X and Y axis buttons. Try all step sizes as well as the continuous motion option. Note when the cross-slide reaches one of the limits and the indication of which in the Inputs toolbar.

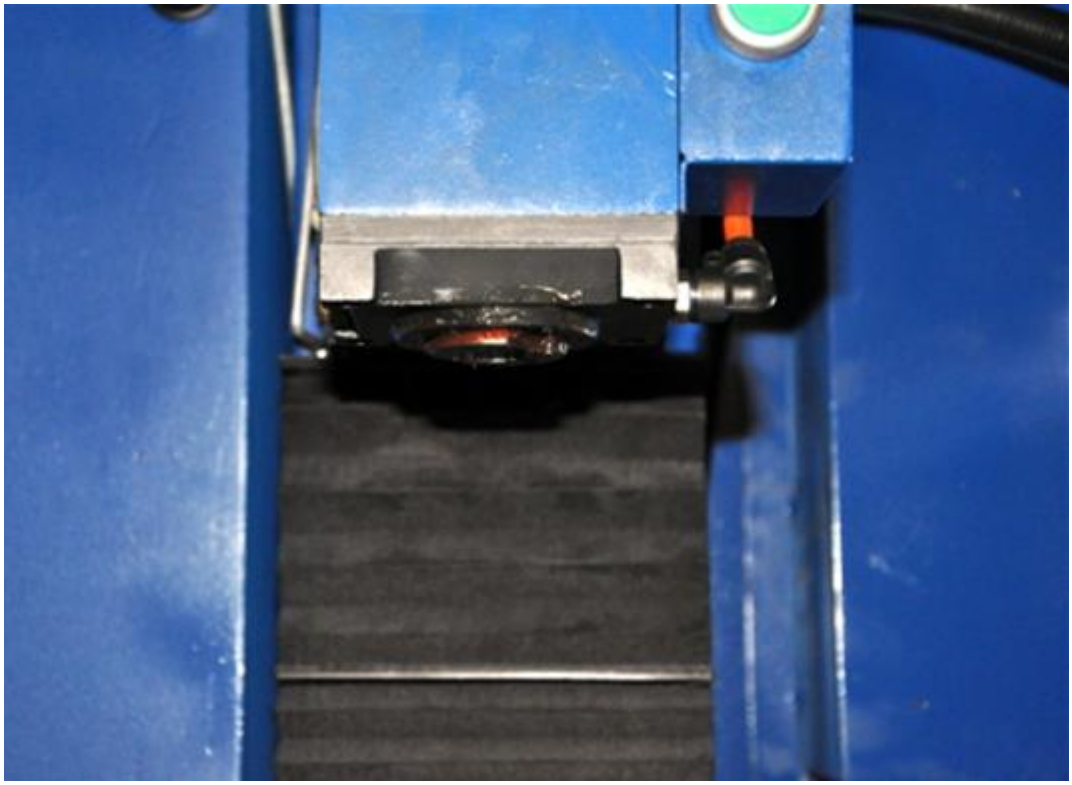


Positive limit reached

3. In the Jog Control window, select the fastest speed, and set the Step Size to continuous.
4. Carefully click the upward pointing **Z** arrow to move the spindle away from the cross-slide. Continue moving the spindle higher until the motor cuts out and the spindle can't be raised any further. Notice that the positive limit switch icon on the Inputs toolbar is highlighted. This means that the limit switch on the positive end of the Z-axis has been hit.
5. Carefully click the downward pointing Z arrow to lower the spindle an inch or two (about 5 cm). Ensure that the spindle is not in danger of striking any of the hardware.

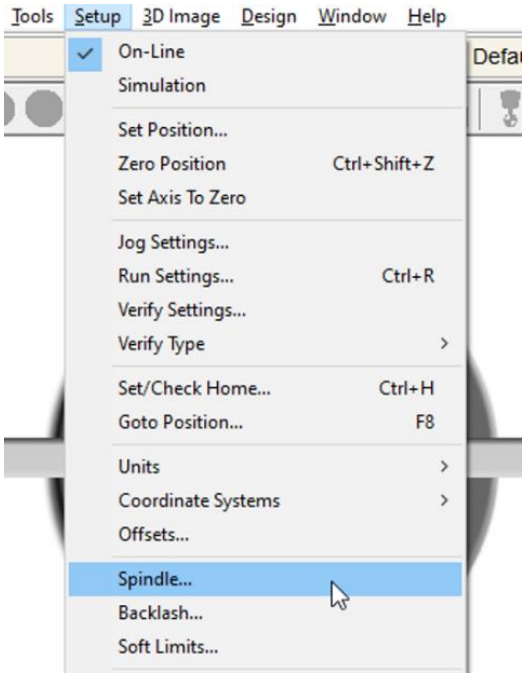
5.4. Activating the Spindle

1. Ensure that there is no tool in the spindle (as shown in the image) and that the spindle is not in danger of impacting the hardware.

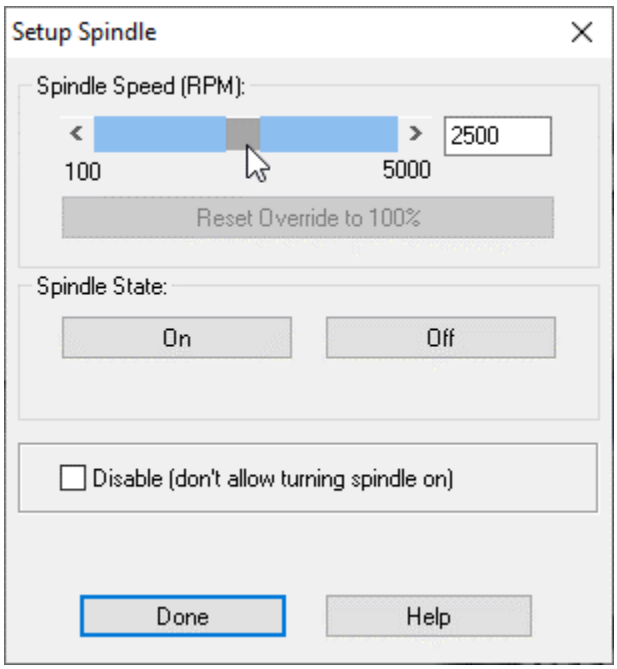


2. Ensure that the safety shield is closed and that no axis limits are hit. The spindle will not turn on otherwise.

3. From the **Setup** menu, select **Spindle**.



4. Drag the Spindle Speed slider about halfway between Min and Max.



5. Be prepared to press the Emergency Stop button if there is any danger of the spindle impacting the hardware.

6. Click the Spindle State **On** button in the Setup Spindle dialog box. The spindle will begin rotating.

7. Drag the Spindle Speed slider in both directions and watch the effect on the speed at which the spindle is rotating. In addition, turn the spindle on and off in the Setup Spindle dialog box and notice that the Spindle icon toggles on and off in the Outputs toolbar.

8. Click the Spindle State **Off** button in the Setup Spindle dialog box to stop spindle rotation.

6. Authentic Skills Assessment

Have your instructor verify that your work meets the requirements in the Performance Objectives and sign below. Keep this hardware task sheet for future reference.

Instructor Signature	Date

7. Inventory and Shutdown

Perform the following shutdown procedure:

1. Tidy your workstation and store away any loose mill components.
2. Open the safety shield.
3. Switch off the power button on the left side of the machine.