

BD-04b: Check Machine Geometry (Cylindrical Square and Granite Block)

SAFETY FIRST

- Follow all Caterpillar facility safety standards when performing this task.
- A greasy surface, wires, cables, and hoses on and around the Sundstrand contribute to an existing tripping hazard.

EQUIPMENT

- Maintenance Mechanic hand tools
- dial indicator capable of measuring .0001"
- indicator extension bar
- certified granite block
- cylindrical square
- shop towel
- plastic hammer

RESOURCES

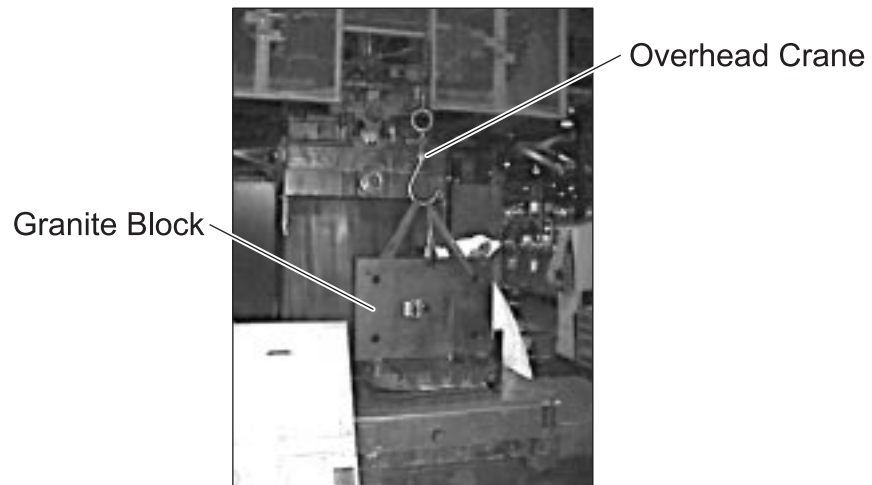
- Sundstrand Maintenance Mechanic Manual



Check Machine Geometry (Cylindrical Square and Granite Block)

1. Install the granite block.

- Rig the block to an overhead crane.



- Wipe the table and the block with a clean towel.
- Place the block on the table with shims to protect the surfaces.

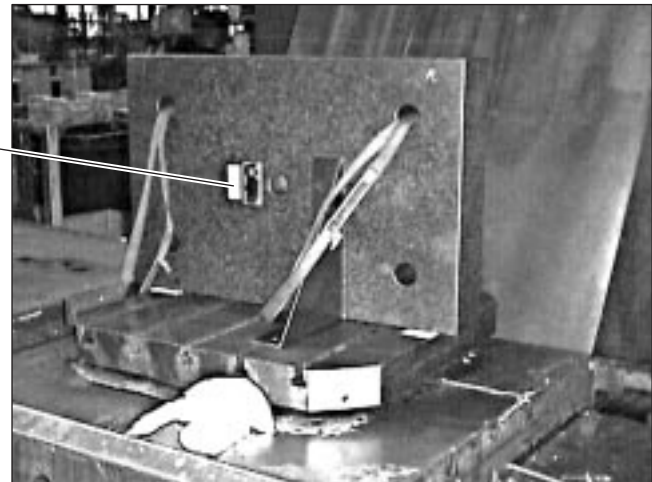


- Install the block wedges to hold the granite block in place.



- Release the block from the crane.
- Rotate the table to place the certified face (opposite of the certification sticker) of the block toward the spindle.

Granite block
Certification Sticker
(Certified side is
Opposite of Sticker)



2. Square the block toward the spindle.

- Remove any tool currently in the spindle.
- Install the extension rod for the indicator.

- Attach the indicator to the rod.
- Set up and zero the indicator on the front of the block.
- Sweep the indicator along the X-axis to the opposite end.
- Use a plastic hammer to adjust the block until the indicator reads zero on both ends of the block.

3. Determine table X-axis error.

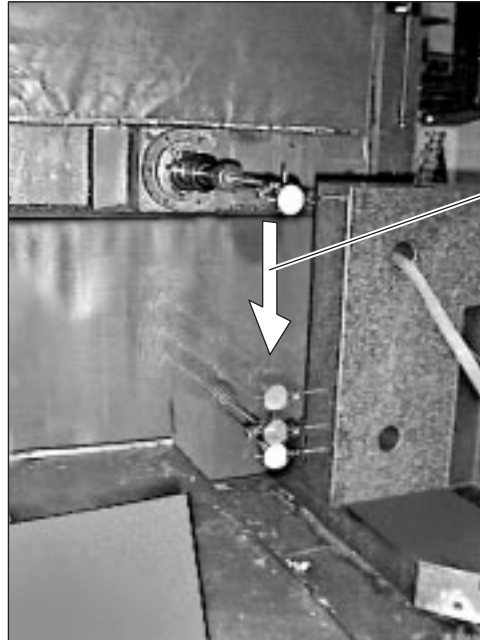
- Position the spindle so the indicator is on top of the granite block on one end.



- Zero the indicator.
- Move the X-axis so that the indicator sweeps across the block to the opposite end.
- Note any amount of variance from the indicator.
- Rotate the B-axis 180 degrees.
- Zero the indicator.
- Sweep the top of the block again, verifying the amount of error, and mark the end of the block to account for the error.

4. Measure for error on Y to X square.

- Set up the indicator on the side of the of the granite block on one end.



Sweep Y-axis to Other
End to Measure
Y to X Square

- Move the Y-axis to sweep the side of the block.
- Record any measurement exceeding .0005 inch, accounting for the error determined from step 3.

5. Measure for error on Y to Z square.

- Rotate the table 90 degrees.
- Extend the indicator fully.

- Set up the indicator on top of the granite block.



Sweep Z-axis to Other
End to Measure
Y to Z Square

- Sweep the top of the block moving the Z-axis, accounting for the error determined from step 3.
- Set up the indicator to sweep the end face.
- Move Y-axis to sweep end face.

6. Check for Z to X square.

- Rig the granite block to the crane.
- Wipe the block and table with a shop towel.

- Ask someone to assist you and carefully lay the block flat onto the table, using the overhead crane.



Install Keyway Bolt to Secure Table

Slide Granite Block Against the Table Rests



- Remove the rigging, insert a keyway bolt to secure the block and slide the block into place on the table.
- Move the spindle to the front of the block.
- Setup and zero the indicator on the front.
- Sweep the indicator along the X-axis to the opposite end.

Tighten Bolt When Indicator is Zero Across the Front



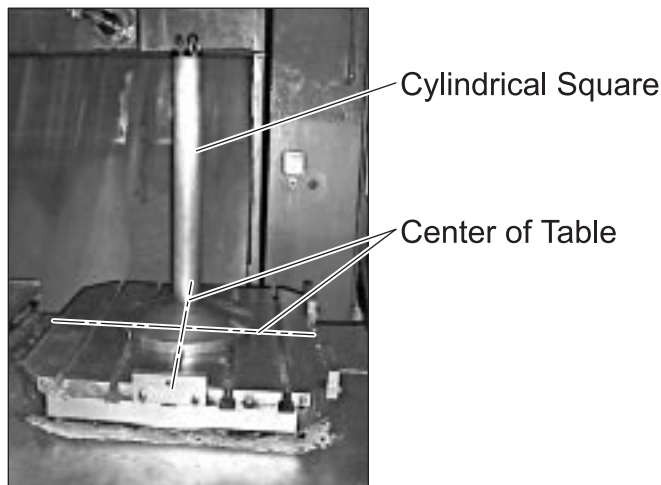
Sweep X-axis to Other End

- Use a plastic hammer to adjust the block until the indicator reads zero on both ends of the block, then tighten the keyway bolt.
- Set up the indicator on the side of the block to measure along Z.
- Traverse Z and record any readings that exceed .0005 inch.

7. **Remove the granite block.**
8. **If Z to X square, from step 6, is found to be out of tolerance, perform the procedure to adjust the wing base.**
9. **Perform the procedure to shim or grind the roller pack bearings to achieve the desired squareness.**
10. **Clean up and store the testing equipment.**

Cylindrical Square

11. **Place the cylindrical square on the table.**

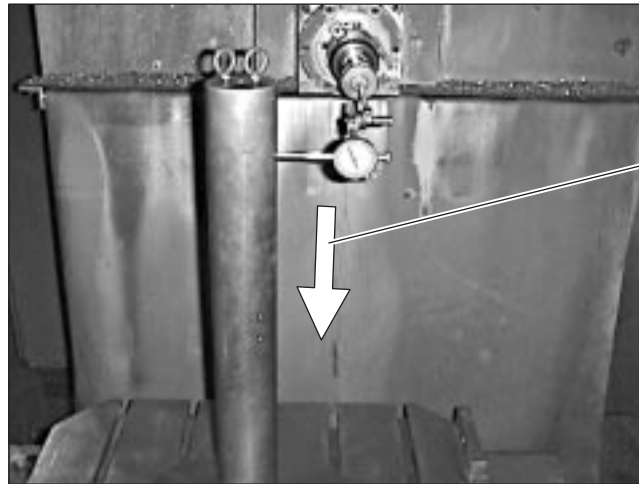


12. **Determine table X-axis error.**
 - Position the spindle so the indicator is on top of the table at one end.
 - Zero the indicator.
 - Move the X-axis so that the indicator sweeps across the table to the opposite end.
 - Note any amount of variance from the indicator.

- Rotate the B-axis 180 degrees.
- Zero the indicator.
- Sweep the top of the table again, verifying the amount of error, and mark the end of the table to account for the error.

13. Measure for error on Y to X square.

- Set up the indicator on the side of the cylindrical square on one end.

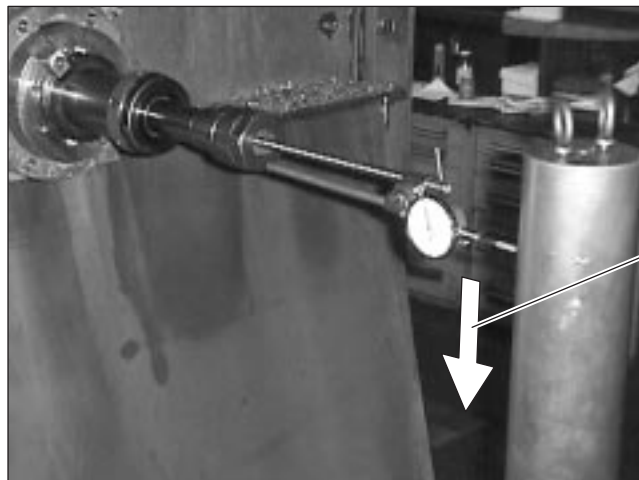


Sweep Y-axis Down
to Determine
Y to X Square

- Move the Y-axis to sweep the side of the square.
- Record any measurement exceeding .0005 inch, accounting for the error determined from step 11.

14. Measure for error on Y to Z square.

- Rotate the table 90 degrees.
- Extend the indicator fully.
- Set up the indicator on the front of the cylindrical square.



Sweep Y-axis Down
to Determine
Y to Z Square

- Sweep the front of the square moving the Y-axis, accounting for the error determined from step 11.

15. Perform the procedure to shim or grind the roller pack bearings to achieve the desired squareness.

16. Clean up and store the testing equipment.

