# 240064-001 Test and Adjust Robot Z Train Point Settings

Objective:
- Ensure that the Robot Z Train Points 0 and 1 are correctly set so that wafers will be safely moved to and from the chuck.

Tools Required:
- None specified

Materials Required:
- None specified

Sequence:
- Do this when parts are replaced on the robot Z
- Do this when the system reports errors going to robot Z train points 0 or 1
- Do this before Calibrating Fine Load Position.

## Method:

1. Press <ALT>+<N>, and then select <S>, <R>, <O>, <R>, <F> to turn vacuum off.
2. Select <CALIBRATION> <ROB CALIB> <INIT ROBOT> <LOAD POSITION>.
3. Select either <LEFT CASSETTE> or <RIGHT CASSETTE>.

**NOTE**
*Either choice is good for this calibration.*

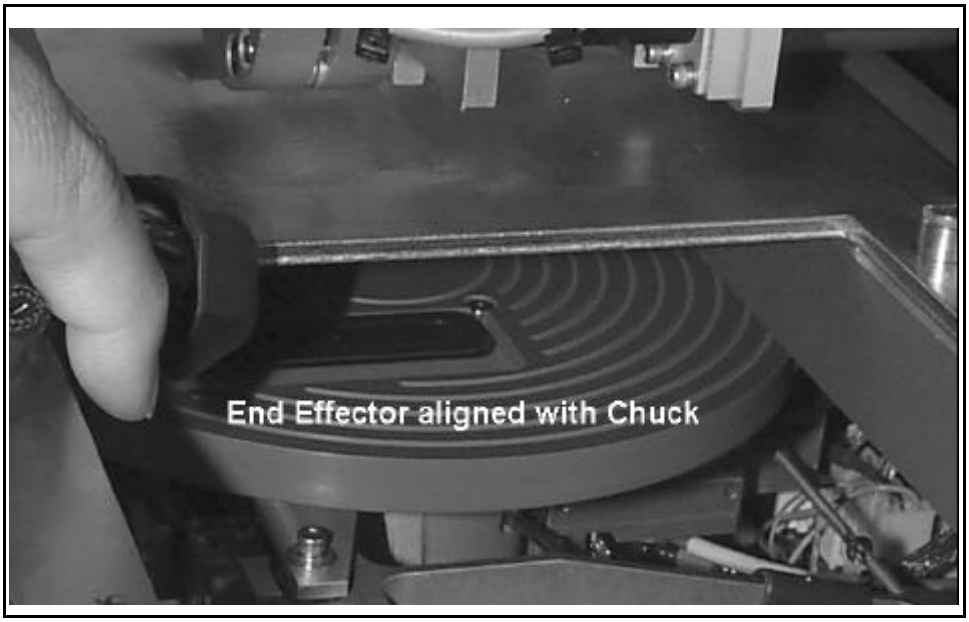
4. Select <REVIEW>, and make a hard copy of the current values of X, Y, Z, and θ for later reference.
5. Select <LOAD POSITION> and <CHUCK POS>.

   **Result:** The stage will move in the Y direction; the shoulder will rotate to either TP0 or TP4 (depending upon whether the Right or Left Cassette was selected), and the end effector will extend to TP2.

6. Use the joystick to move the stage so that the chuck is under the end effector.
7. Position the end effector fork(s) so that their relationship to the cutout portion of the chuck can be clearly determined.

   **Result:** Each end effector tine should be in the middle of its corresponding cutout on the chuck. The edge of each tine should be parallel to the edges of the chuck cutout. The edge of each fork should be clearly parallel to the edges of the chuck cutouts. It will be safe to lower the fork(s) into the cutout(s) of the chuck (see Figure 5-12).

*Figure 5-12:* **Position of End Effector forks in Chuck Cutout**




If the tines are parallel, go to step 10; otherwise, continue with step 8.

8. Follow the steps below to align the end effector with the chuck.

   a. Select <S>, <R>, <M>, <E>, <T>, and enter **1** to move the end effector away from the perimeter of the chuck.

   b. Select <THETA ANGLE>, and input values until the chuck cutouts are properly aligned with the end effector forks.

**NOTE**

*To move the theta stage counterclockwise, increase the value from the original value in step 4; to move the theta stage clockwise, decrease the value in step 4.*

9. Select <CALIBRATION>, <ROB CALIB>, <LOAD POSITIONS>, <L.CASS OR R.CASS>, <GET POSITION>, and <REVIEW> and look for the "new" theta value. Make a note of the correct theta angle position for reference later in the procedure.

10. Select <S>, <R>, <M>, <E>, <T>, and enter **2** to fully extend the end effector onto the chuck.

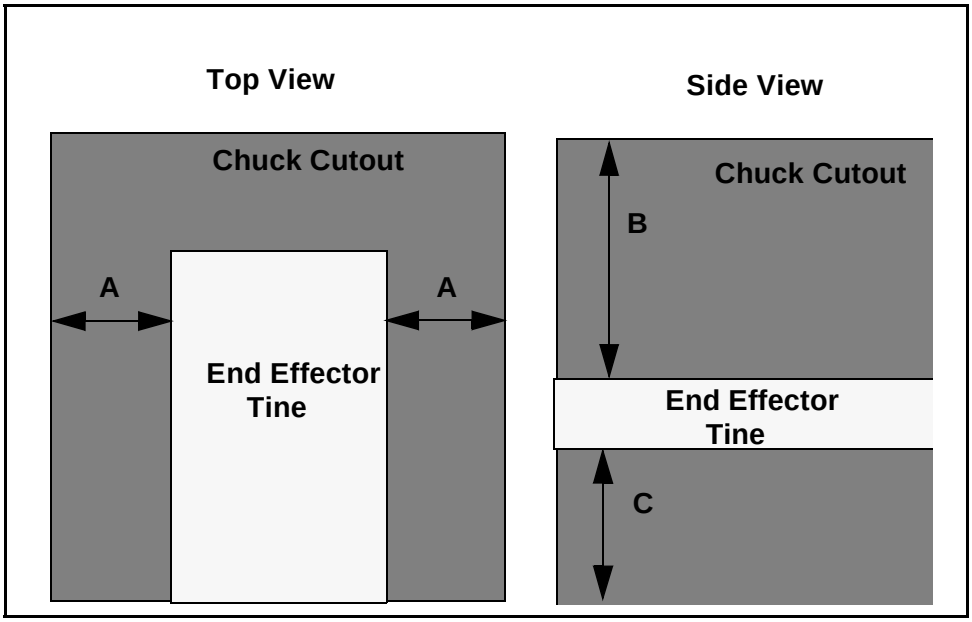
11. Select <S>, <R>, <M>, <Z>, and <DOWN 1 STEP>.

**NOTE**

*Each step will move the robot Z six mils (0.006"). **Move the robot one step at a time until you are familiar with its movements**.*

12. Repeat step 11 until the end effector is at a position below the vertical center of the chuck cutout, but not so low that it will scrape the bottom of the cutout when it withdraws (see Figure 5-13).

*Figure 5-13:* **Train Point 1**




**NOTE**

*The goal is to ensure that the wafer will make contact with the chuck. This robot Z position will be the robot Z Train Point 1.*

13. Select <GET POSITION> <REVIEW><RESTORE ROBOT>.

    **Result:** The Robot Z returns to its home position.

14. Make a note of the "new" robot Z position.

15. Press <ALT>+<N> for SuperDiag; then select <S>, <R>, <M>, <Z>, <S>, and enter **1**.

**NOTE**

*This step may generate the error "Robot Z no sensor signal at this train point".*

If an error is generated, do not SAVE. This error indicates that the top half of the Robot Z TP0/1 flag is not blocking the TP0/1 sensor when Robot Z is at the chosen position.

To correct, perform "Test and Adjust Z Down (ZDN) Sensor" on page 4. When finished, move Robot Z to TP1 position, and repeat step 15.

16. To set Robot Train Point 0, select <MOVE ABS>, and enter the value of the TP1 position (see step 14) minus 20 steps. (Numerically, this value should be 20 less than TP1.)

    **Result:** With Robot Z at this position, the bottom half of the double flag should be blocking the TP0/1 sensor, and "ZDN" LED on the Robot PCB should be on.

17. Select <S>, <R>, <M>, <Z>, <S>, and enter **0**.

**NOTE**

*CALIB.VAR is not updated*

**Result:** If error occurs (as in step 15), the position of flag may need to be slightly adjusted. You would then need to verify TP0 again.

18. Return to <CALIBRATION> <ROB CALIB.> <SAVE>.

**NOTE**

*TP1 is saved. CALIB.VAR is only updated if it is edited as follows:*

    a. Edit c:\ED0xxx\SYS\CALIB\CALIB.VAR file and change the value of TP0.

    b. Press <CTRL>+<Q> to exit C:\ESCORT and MENU3.

    c. From KLA menu, select <CALIBRATION> <SYS CALIB>.

       **Result:** The system is updated; a new CALIB.VAR file is downloaded.

19. To ensure that the correct values for TP0 and TP1 are saved in CALIB.VAR, follow the steps below:

    a. Initialize the autoloader.

    b. Use the <GO TRAIN PT> command to cycle robot Z between train points.

    c. Use <RPT POSITION> to verify.

**NOTE**

*During the lab step 15, step 17, and step 18 have no effect. The only way to save training points is to edit CALIB.VAR under c:\EDxxxx\SYS\CALIB\.*