

## HD Tool-Center-Point

The following procedure covers the methodology to recover the originally defined tool-center-point for the robot.

- Open the Origin Position program and trace the robot to origin.
- Check the alignment arrows for each axis to ensure that Origin is correct. If the origin is not correct you will not be able to use this procedure.

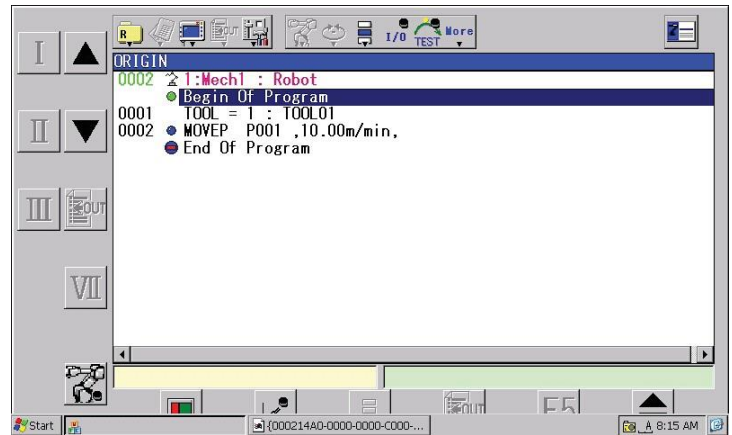


Figure 1

## Setting TW Axis

- Close all programs before starting.
- Move the robot using the Joint Coordinate motion and set the angles to those in Figure 2.
- Move the robot using Cartesian motion so that “Y” “U” and “W” are all 0.00, +/- .05 as seen in Figure 3.

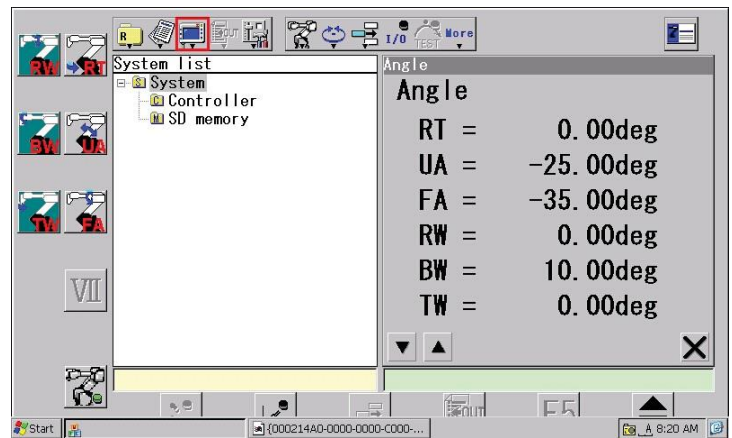





Figure 2

- Use the y-major  coordinate motion to adjust the “Y”.
- Use the z-minor  coordinate motion to adjust the “U”.
- Use the x-minor  coordinate motion to adjust the “W”.
- Change the right window so that you are viewing the Angle display of the robot. (Figure 4)

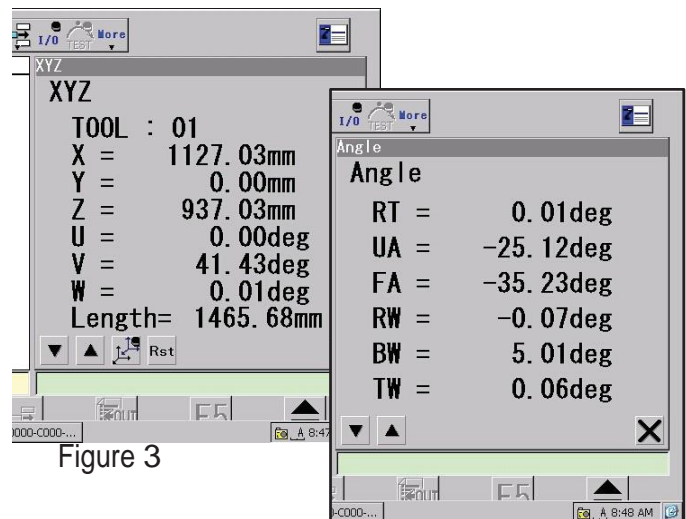


Figure 3

Figure 4

- Note the number of the TW angle. This is the TCP offset.

Before entering the TW offset, check the teach pendant to ensure that you are adjusting the Standard Tool of the robot.

To check the standard tool go to:

*Set > Robot > Tool > Standard Tool (Figure. 5)*

- Next select the tool icon, this will bring up the tool window. Move down until the correct tool is highlighted and select it.

*Set > Robot > Tool > Tool*

- Move the cursor down to the TW and input the number determined by looking at the angle TW position. (Figure 6)
- Select OK to save this value, exit back to the main screen.

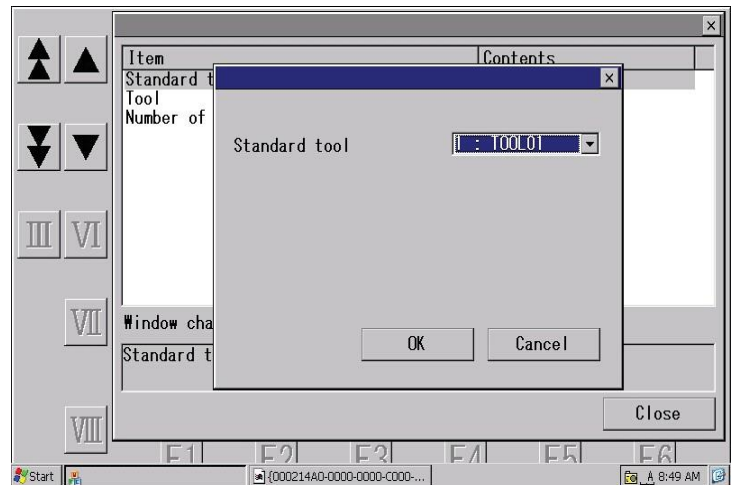


Figure 5

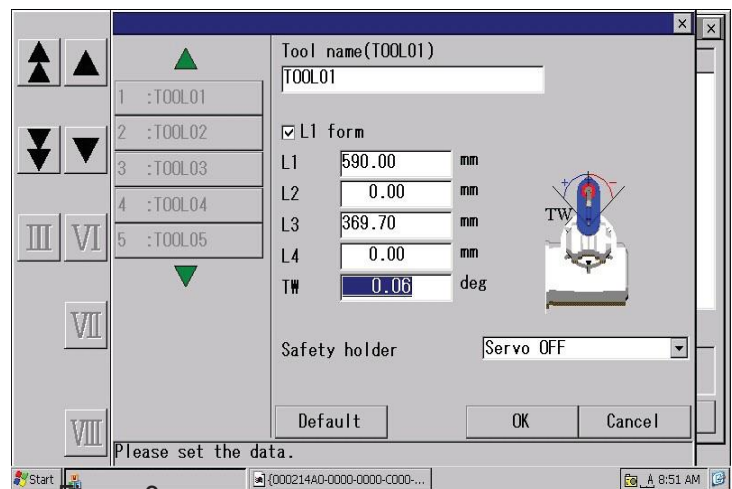





Figure 6

## Setting L2 Dimension

- Before setting the L2 dimension first you must go into the tool settings and make sure that the L2 and L4 dimension is set to 0.00.
- Return the robot back to the Origin position.
- Bring up the XYZ Display and set the U to 90.00 degees, and the W to -180 degrees or 180 degrees. (Figure 7)
- Use the z-minor  coordinate motion to adjust the "U".
- Use the x-minor  coordinate motion to adjust the "W".
- Set up a pointer and move the robot with Cartesian motion using "X" "Y" and "Z" so that the pointer and the torch are aligned. (Figure 8)
- Using the change window button move to the right window and using the cursor turn on the Relative position Icon. (Figure 9)
- Move the cursor to the RST Icon and select it. This will reset the relative position and put 0.00 in all of the positions.
- Rotate the torch 180 degrees using z-minor  coordinate motion.

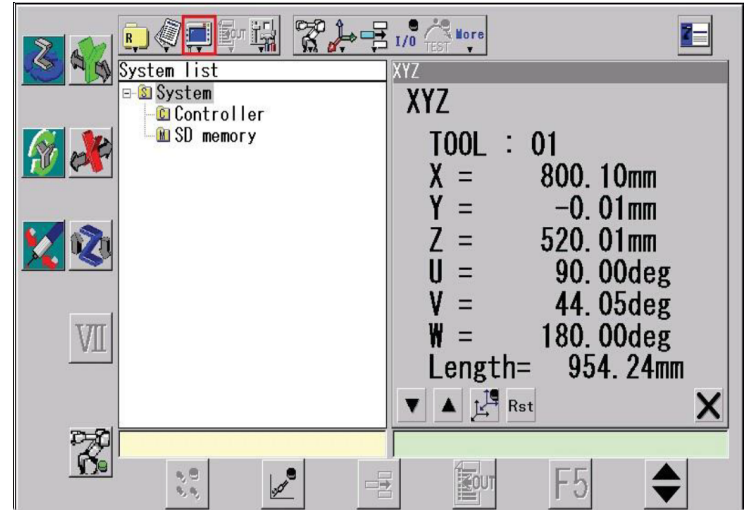


Figure 7

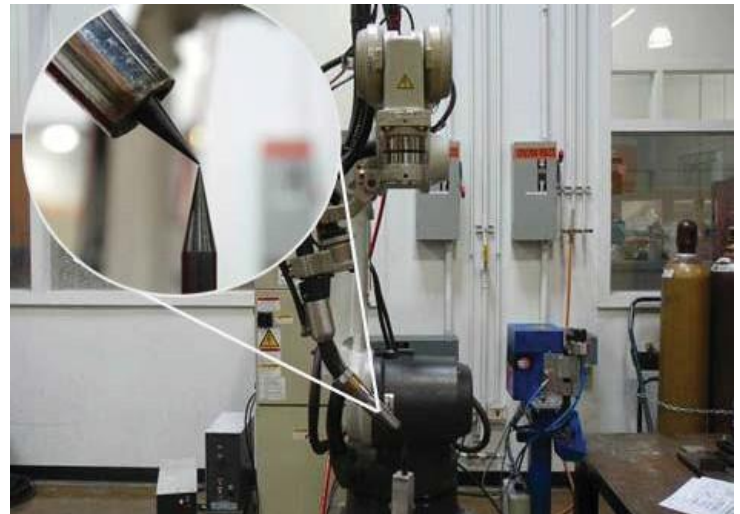


Figure 8

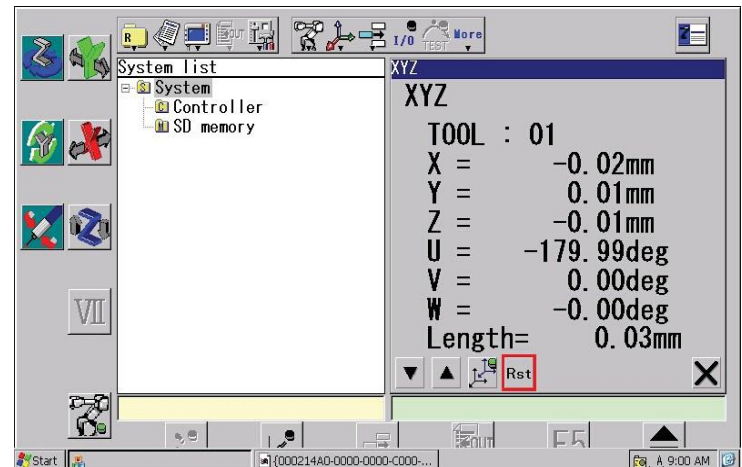


Figure 9

- If the torch and pointer align then L2 is zero. If not, using the major X and Y Cartesian coordination motions, re-align the torch with the pointer.
- Note the number in the “Y” dimension (Figure 10). Divide the Y dimension by two and enter that number in the L2 field of the Standard Tool.

$$\text{Calculation: } L2 = (1.15 / 2) * -1$$

- If the Y-dimension is negative then enter L2 as a positive. If it is positive, then enter L2 as a negative number (Figure 11).

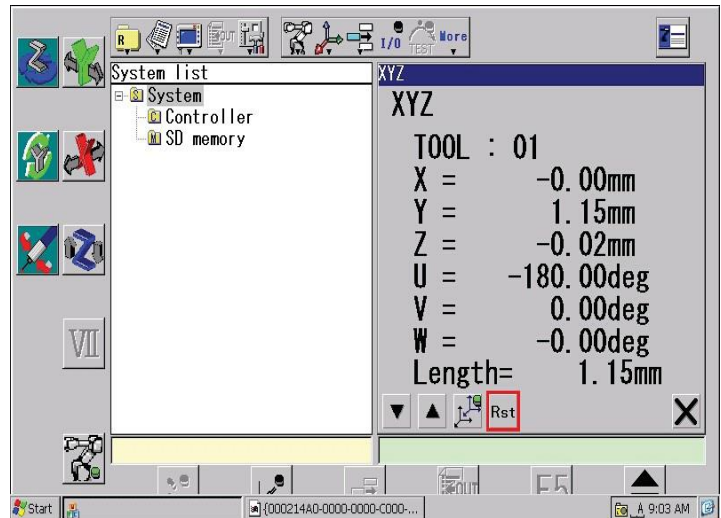


Figure 10

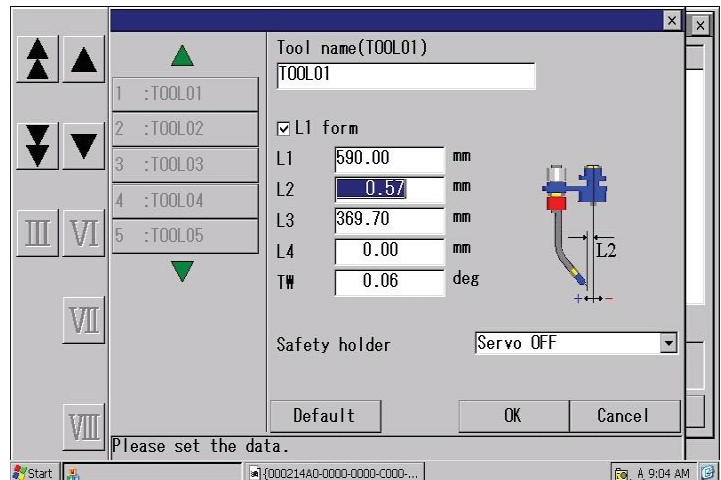



Figure 11

## Setting L1 Dimension

- The robot should be in the same position where the L2 sequence ended. (Figure 12)
- Rotate the y-minor  so that the nozzle is pointing straight down.
- The torch will no longer be aligned. If the torch is:

To the right: Raise the value of L1

To the left: Lower the value of L1

Below the starting point: Lower the value of L1

Higher than starting point: Raise the value of L1.

- Return the torch to the original position in Figure 12.
- Open the Standard tool and adjust the L1 dimension accordingly. Repeat the process starting with increments of 10mm until the robot rotates without become misaligned.



Figure 12



Figure 13

## Setting L3 Dimension

- Rotate the wrist so that the wire is level, most of the time you can use the nozzle to determine this but sometimes you may need to use some other location on the torch.
- Make sure that the relative position is turned off.
- If the “V” value is 90 degrees , then the L3 dimension is correct.
- If the “V” value is not 90 degrees, change the L3 value and check it again.
- If the “V” value is greater than 90 degrees, lower the value of L3.
- If the “V” vlaue is less than 90 degrees, raise the value of L3.
- After exiting from the tool menu, the “V” value will change. Continue adjusting the “V” value until it is 90.00deg.



Figure 14

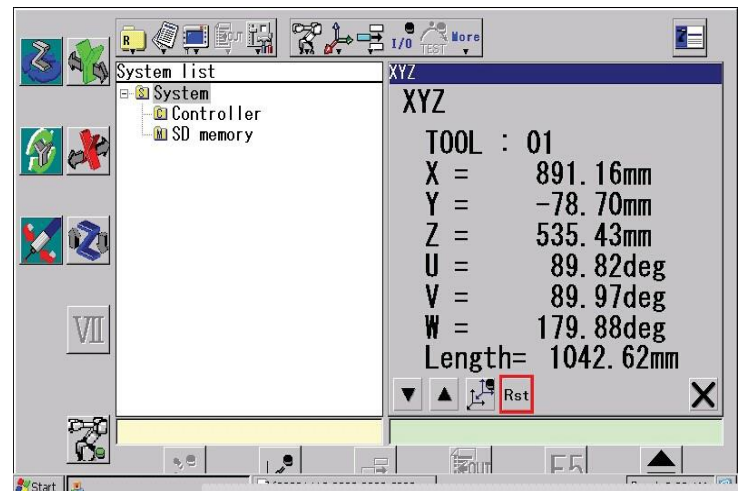



Figure 15

## Setting L4 Dimension

- Set up a pointer and move the robot with Cartesian motion using “X” “Y” and “Z” so that the pointer and the torch are aligned.
- Using the change window button move to the right window and using the cursor turn on the Relative position Icon.
- Move the cursor to the RST Icon and select it. This will reset the relative position and put 0.00 in all of the positions.
- Rotate the torch 180 degrees using z-minor  coordinate motion.
- If the torch and pointer align then L4 is zero. If not, using the major X and Y Cartesian coordination motions, re-align the torch with the pointer.
- Note the number in the “X” dimension. Divide the Y dimension by two and enter that number in the L4 field of the Standard Tool.