



TMC 4th Axis - Install Hardware "Ready Kit" & Test

This will take a TRAK Service person through the steps to add the wires and servo drive to a TMC that did not come with the 4Th Axis option.

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INTRODUCTION

These procedures cover the basic hardware kit installation on step 1. Additional steps help the Factory or FST with the complete 4th Axis installation on a TMC. Here are the steps along with the Dozuki Guide References:

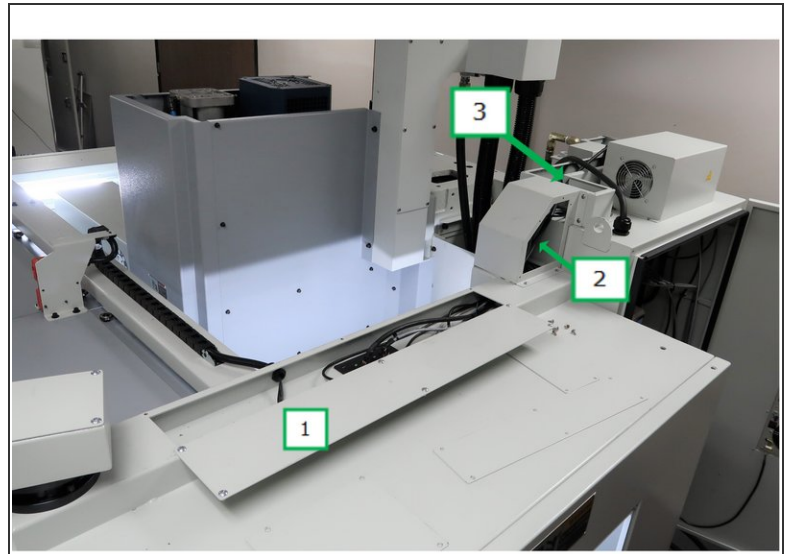
Please make sure to load software version 2.3.0 or higher prior to 4th axis installation.

1. Install on TMC - TMC 4 Axis 31538: Install Hardware "Ready Kit" & Test -- Steps 1 - 7 are the hardware "Ready Kit"; Steps 8 onward start testing the hardware install when the 4th Axis unit is available.
2. Y, Z Offset, Base Tool - TMC 4 Axis 31538: Set Y & Z Offsets & Base Tool Offset
3. Backlash - TMC 4 Axis 31538: Set Backlash

Reference Document:

A pdf version of drawing 31538 is attached to the end of this document. It covers the location of all items, how the parts are assembled, and the part numbers used to build the drive.

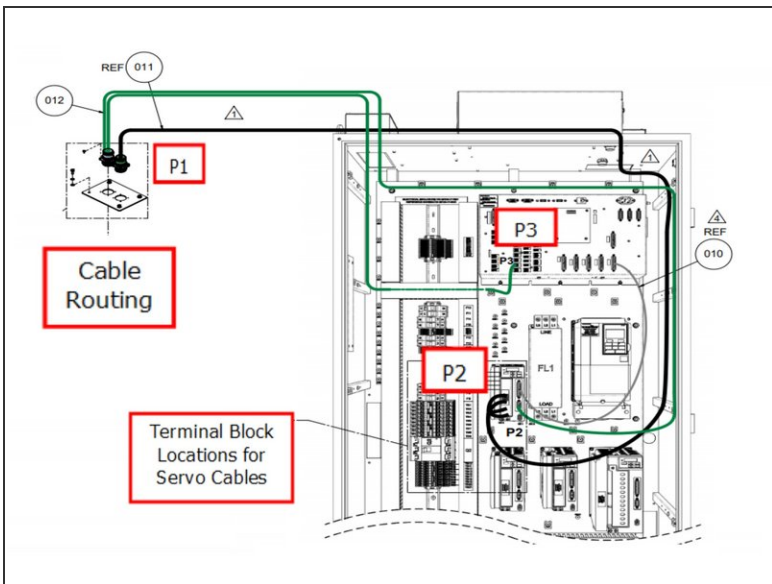
Step 1 — Access New Wire Locations



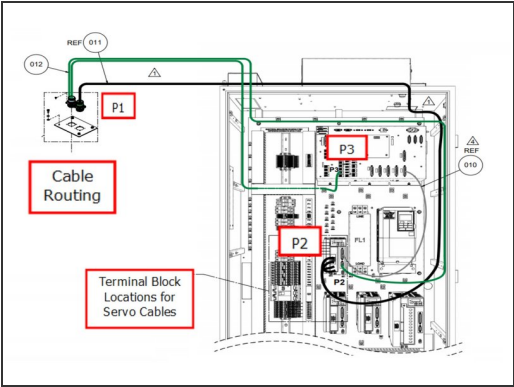
- Minor Changes need to be made to the TMC sheet metal in order to operate the 4th Axis. The cable harness mounting bracket on the right side interior ceiling needs to be punched out.
 - Three covers on the right side of the top of the mill need to be removed to allow the addition of wires. The wires coming from the 4th Axis will be routed through two openings at opposite sides of the electrical cabinet.
 - #1 has the mounting bracket, all the wires route through #2 and the power extension wire is routed through the channel above the electric cabinet #3.
- i** Document 31538 is attached at the end of this guide. It is a very complete document showing the parts and how they fit together including a part list with the part numbers and their description.

The photograph shows a close-up of a network device's internal components. On the left, a vertical terminal block is labeled with ports F7, F8, F9, T81, T82, T83, T84, T85, T86, T87, T88, T89, and Q2. The main chassis contains several modules. A red box highlights a module with an 'A-MEDIA' logo, a DVI port, and a serial port. Another red box highlights a module with a DVI port and a serial port. The device is densely packed with cables and components.

- ### Step 3 — Add Servo Power and Data Cables

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Step 4 — Logic Cable Connections



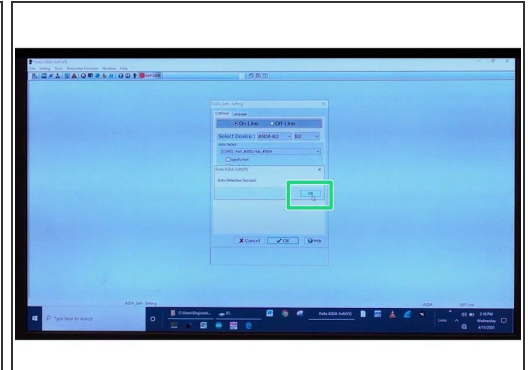
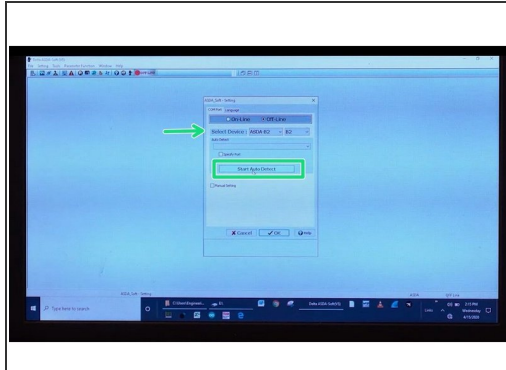
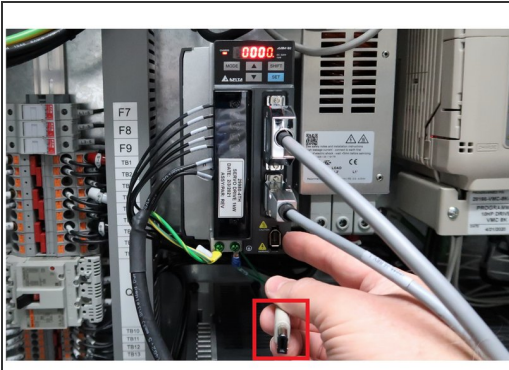
The diagram shows a mechanical assembly with three main modules: P1 (top left), P2 (bottom center), and P3 (top right). Green lines indicate the routing of logic cables. A label 'Cable Routing' points to the green lines. Another label 'Terminal Block Locations for Servo Cables' points to a terminal block on the left. Reference markers 011, 012, and 010 are shown.

LOGIC CABLE CONNECTION CHART P1 TO P3 COMPUTER MODULE P72 IN 4 TH HOME			
P1	FUNCTION	COLOR	P3
D	24DC-F65	RED	3
E	IDC24-30A6	WHITE	1
G	GND	BLACK	4


LOGIC CABLE CONNECTION CHART P1 TO P2 SERVO DRIVE			
P1	FUNCTION	COLOR	P2
A	T+	WHITE	4
B	T-	BROWN	5
R	GND	GREEN	6
S	+5V	PINK	8
L	SHIELD	BLACK	SHELL

- Cable Routing diagram, refer to drawing 31538 included at the end of this guide for further information.
- Use charts to connect wires
 - Cable #12 part # 26844-35 contains two cables, the length and connections make it clear where they are attached, to either P2 or P3.
 - Cable #11 part # 26840-32 is routed to P2.
 - Cable #10 part # 22443-8 is routed from P2 to the computer module P3.
- Replace covers as needed when all the wires have been added.

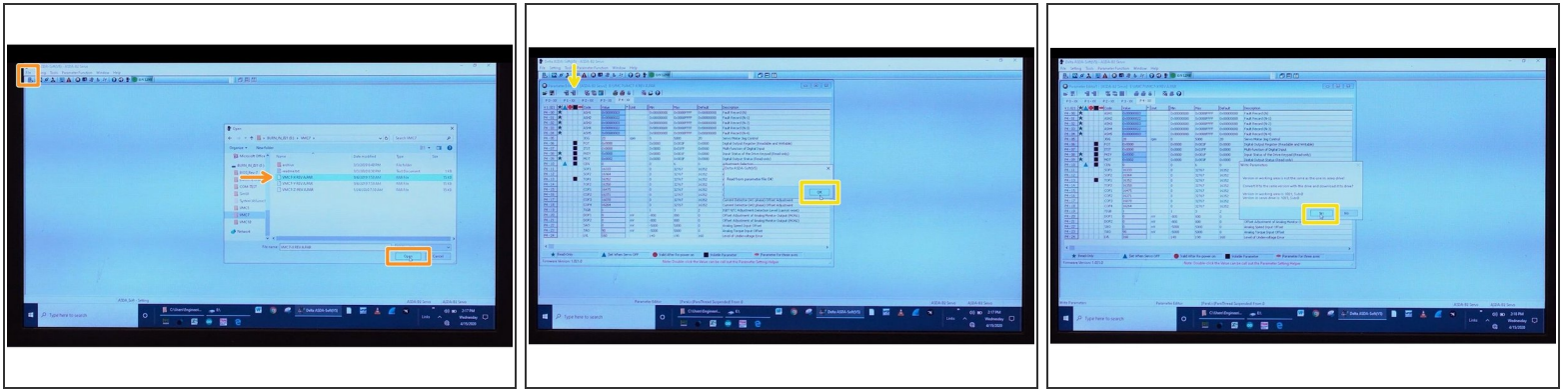
Step 5 — Program 4th Axis Servo Drive



Important Notice!

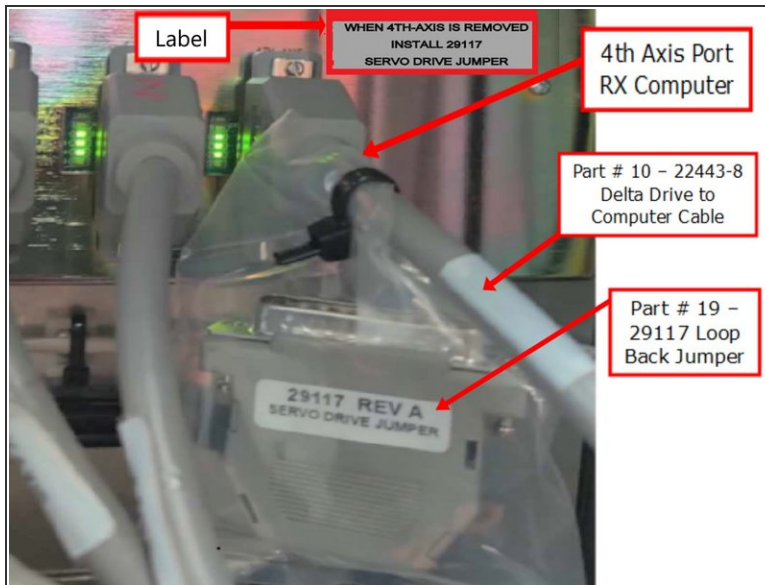
- For field installations, the servo drive is preprogrammed at our factory, so no need to complete the next two steps. TRAK factory installs will need to complete the next two steps to program the drive.
-  Prior to programming servo drives. Ensure **ESTOP is activated**. Power will be "ON" for the mill. After programming the drives, you will be able to **HOME** the machine and **RUN** the axis.
- Use a **DELTA USB-cable** to **program** one axis at a time. **Connect** the **USB-cable** to **CN3** of the servo drive. **Connect** the other end to the **laptop**.
- On the laptop open the **DELTA ASDA_Soft**. Click **start auto detect**, verify **ASDA-B2** is **selected** (Use the drop down menu to do so if not already selected). Click **OK** on the pop up window.

Step 6 — Program 4th Axis Servo Drive Cont



- Depending on the machine you are working on, select the correct program for the 4th Axis. The revisions on these programs may vary as updates occur.
 - Click **FILE**, then **OPEN**, and select the 4th Axis **TMC 4th Axis REV ?.par** (For "?" - check in machine assembly for latest rev version). File click **OPEN**, and click **OK**. Notice a window will prompt a message, "Read from parameter file OK?" Click **OK**.
 - At the top, find and click the **WRITE PARAMETERS** icon. A window will prompt you a message. Click **YES**. It will override the parameters, click **OK**.
- i** Cycle Power to have the new parameters take effect.

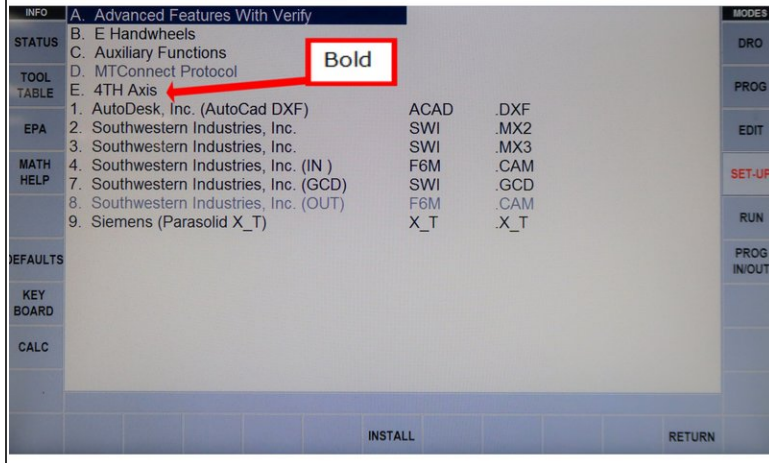
Step 7 — Replace 4th Axis Jumper with Cable



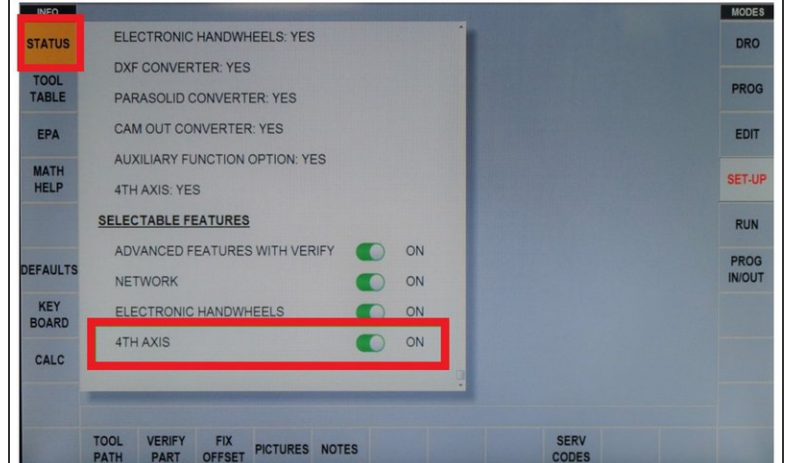
- In order to add the 4th Axis to a TMC with no 4th Axis, a jumper must be removed, and replaced with Delta Drive cable.
- Remove jumper from 4th Axis port on the computer, and place it in a bag. That bag is tie wrapped to the computer end of cable #10 part # 22443-8. Connect cable #10 from the 4th Axis Delta drive to 4th Axis port on computer.
- Attach part #22 "4th Axis removed" label directly to computer module. as shown in previous step.
- This completes the hardware installation, 4th Axis ready kit. The next step will test the 4th Axis if it is available. Otherwise, the mill is ready for the 4th Axis when available.

Step 8 — Confirm if 4th Axis is Enabled

Service Code 318

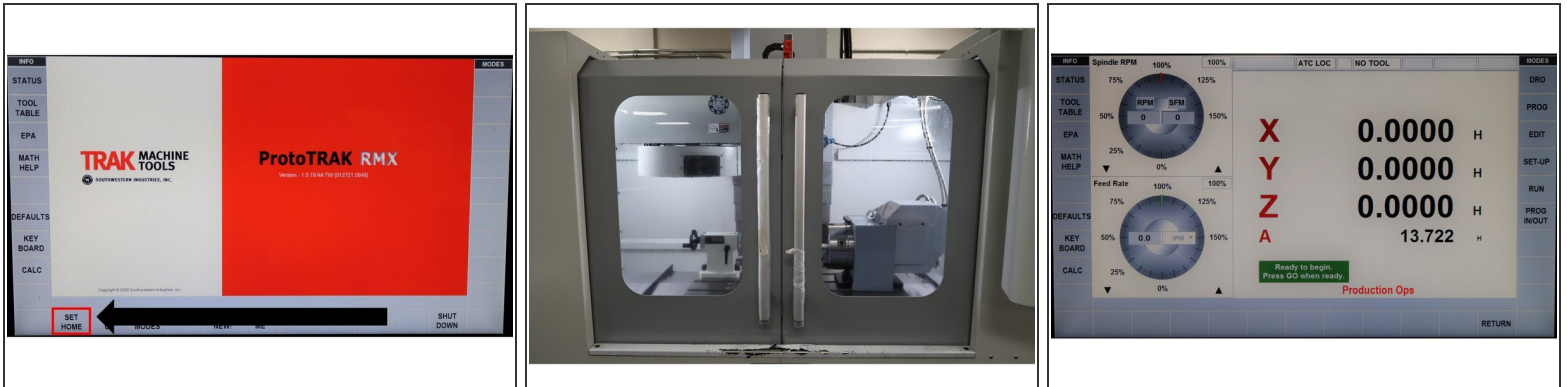


Status Screen on Pendant



- Make sure that the machine's Option Key has been programmed for this option by checking it with Service Code 318.
- Confirm if the 4th Axis is enabled for your machine by accessing the **STATUS** screen on the programming control, scrolling down to **SELECTABLE FEATURES**, and making sure that **4TH AXIS** is **ON**.
- ❗ The ProtoTRAK software will prompt a reboot of the control when the 4th Axis Option is switched from OFF to ON. If the control was turned off with the 4th Axis being in the ON position, then it should boot up with the option being ON as well.
- For factory inspectors, record results on your inspection sheet.

Step 9 — Home Routine Test



- To run the Home Routine Test, choose **SET HOME** on the control. Make sure that the Servos are on by checking if the Power Reset LED light is on.
- Make sure that the machine doors are closed.
- Once the **SET HOME** screen appears, press **GO** as instructed.
- ❗ If 4th Axis homes properly, the red LED should turn on; the home indicator block will not directly be underneath the sensor.
- If the 4th Axis homes correctly, then the Home Routine Test is successful. Fix any appropriate errors that may arise.
- For factory inspectors, record results on your inspection sheet.

Step 10 — Service Code 502 - Set Base Tool Offset

INFO CODE 502 - Set Base Tool Offset

STATUS This service code is used only on machines with a 4th axis option.

TOOL TABLE Base Tool Offset: NOT SET

EPA To set your base tool offset, load your base tool in the spindle. Touch your base tool off of the table of the machine and record this number. Enter this value.

MATH HELP

DEFAULTS

KEY BOARD

CALC

MODES

X 0.0000 **H**

Y 0.0000 **H**

Z -4.4880 **H**

A 160.000 **H**

DRO

PROG

EDIT

SET-UP

RUN

PROG IN/OUT

Enter Base Tool Offset

Base Tool Offset : -19

RETURN

- i** In order to setup the machine to allow the 4th Axis to run, the Base Tool Offset must be entered via Service Code 502.
- Press **SET-UP**, enter **Service Code 502**, and press **ABS SET**. Follow the prompt that appears on screen, and press **OK**. Enter "-19" under Base Tool Offset. Click **ABS SET**.
 - For factory inspectors, record results on your inspection sheet.
 - Once the above is complete, press **RETURN** to allow you to go into the next Service Code.

Step 11 — Service Code 506 - Set 4th Axis Offsets

The screenshots show the 'CODE 506 - Set 4th Axis Offsets' screen. The interface includes a table of axis offsets and a status message.

INFO	CODE 506 - Set 4th Axis Offsets	MODES
STATUS	Y Offset: measure distance from Y home to centerline of 4th axis.	X 0.0000 H DRO
TOOL TABLE	Z Offset: measure distance from top of table to centerline of 4th axis.	Y 0.0000 H PROG
EPA	Y Offset: NOT SET	Z -4.4880 H EDIT
MATH HELP	Z Offset: NOT SET	A 160.000 H SET-UP
DEFAULTS		RUN
KEY BOARD		PROG IN/OUT
CALC		

Enter 4th axis offsets, please select Y or Z axis below

Y Offset : -15

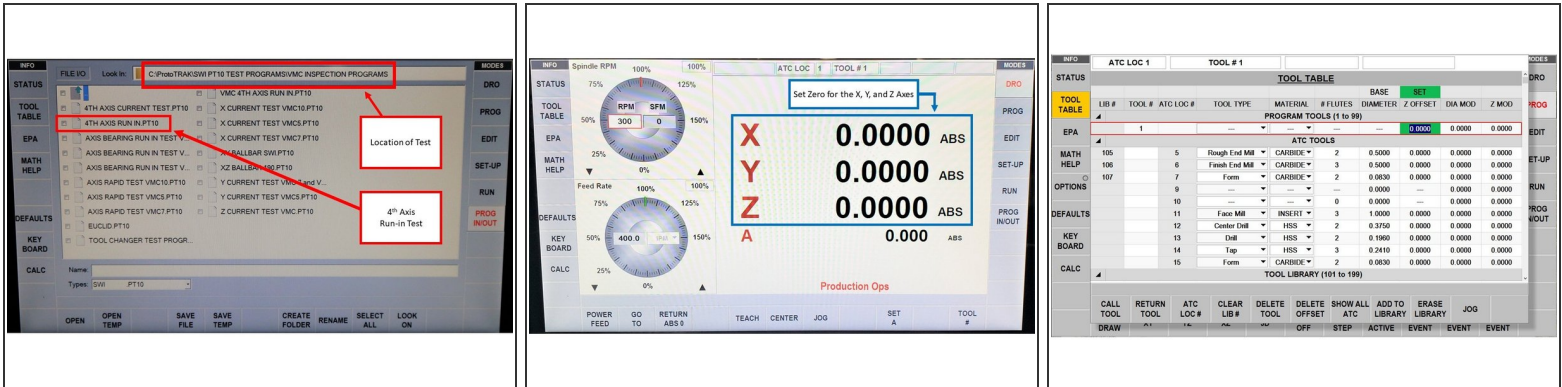
Z Offset : 6

Y Z RETURN

In order to set up the Y Offset and Z Offset, it must be entered via Service Code 506.

- Go into **Service Code 506**. Press **Y**, and enter the following value = **-15**. Click **ABS SET**.
- Press **Z**, and enter the following value = **6**. Click **ABS SET**.
- For factory inspectors, record results on your inspection sheet.
- Once the above steps had been completed, press **RETURN** twice. You should see a gray display.

Step 12 — Run-In Test



- ❗ The Run-in Test allows users to verify that the 4th Axis can run a test program without any errors. Before running the program, make sure that the chuck is empty.
- Access the Run-in Test by pressing **PROG IN/OUT**. Open the file named **4TH AXIS RUN IN.PT10**. Click **OPEN**.
- Go to **DRO Mode**, press **Go To**, and then press **Y and Z Offset**. Turn on the EHW, and jog the Y-Axis until the value is 0. Repeat this process for the Z-Axis as well. Once completed, hit **RETURN** twice back to **DRO Mode**.
 - In addition, make sure that the X-Axis is centered.
- Zero out all the axes by pressing the desired axis, and press **ABS SET**.
- Next, press **TOOL TABLE** on the left side of the screen. Press **NOT SET** (orange), then **INC SET** to set it to the proper Z height (which turns green). Input "0" under Z Offset, and press **INC SET** (which turns green). This step must be completed; otherwise, the program will not run. To exit, press **TOOL TABLE**.
- Once the coordinates had been set to zero, click **RUN, START, GO, YES** (you do not have to load any tools), and then **GO**. The 4th Axis Run-in Test should begin. Verify if the program runs without any error. When program is done, press **YES**, and then **GO**. The screen will display *Run over*.
- ❗ Program will run the 4th Axis clockwise and then counterclockwise. For factory inspectors, record results on your inspection sheet.

Step 13 — Conclusions



- **FST Staff:**

- If the 4th Axis is to be installed by FST in the field, then leave it enabled. If the 4th Axis is to be removed for later use, turn off the 4th Axis in the status screen, turn mill off, remove servo drive cable, and replace with jumper. Cable should be tie banded to the jumper. Reboot the mill, and verify that the 4th Axis is disabled.

- **Trak Factory Inspector:**

- The 4th Axis should be returned to the packaging for shipping when done. The 4th Axis option needs to be disabled on the TMC for shipping, turn off the axis in the status screen, turn mill off, remove servo drive cable, and replace with jumper. Cable should be tie banded to the jumper. Reboot the mill, and verify that the 4th Axis is disabled.