TB033 (Rev1) - Isolating Position Problems to Control or Mechanics

Overview

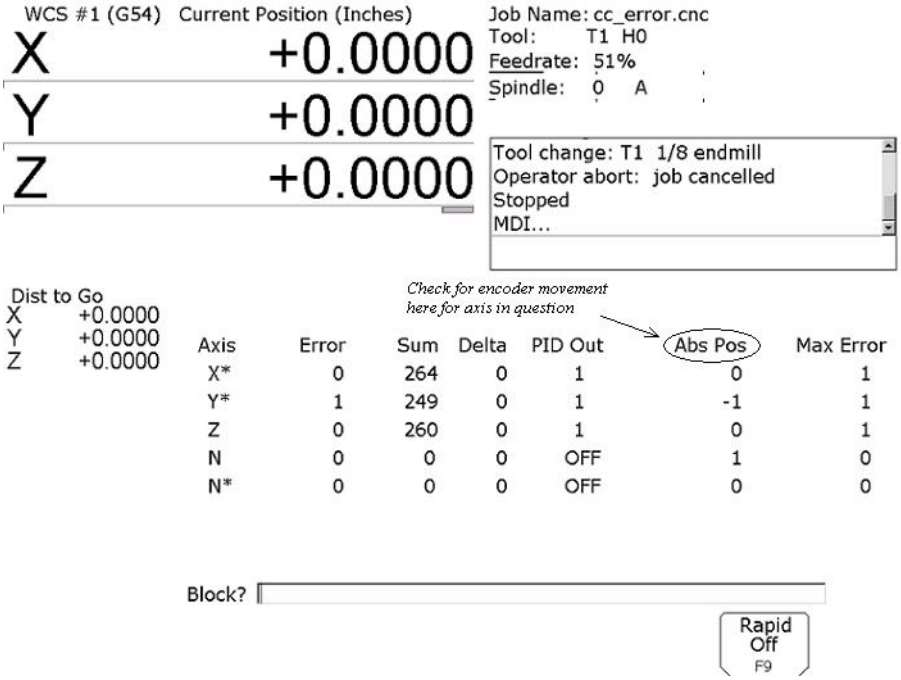
This document describes the techniques to be used when it is necessary to determine whether a position problem lies in the CNC control or whether the problem is caused by machine mechanics.

Tests

The first test is to verify extra or missing encoder counts looking at the absolute position in the PID display. The machine should be powered up and properly homed.
This example will use the X axis and assumes that the machine homes in the X+ direction. It uses the "M92 /X" command to send the table to the "X+" home position. If homing in the "X-" direction the "M91 /X" command would be used.

Steps:

- At the main menu press **ALT+P**, then press **F3 - MDI**. you should see a display similar to the one below.



- In the MDI Bock type "**M92 /X**", then press **CYCLE START**. The X axis will move to the plus home switch.
  NOTE: This is a slow move and you may want to jog the axis closer to the home position before pressing **CYCLE START**.
- When the axis stops moving check the "Abs Pos" for the axis under test, it should read zero.
- If the "Abs Pos" is zero, then the mispositioning most likely is the result of fixture or part movemet while being cut.
- If the "Abs Pos" is **NOT** zero then proceed to the next test.

The next test for isolating a position problem is basically to remove the control (the motor) from the ballscrew,

set up a reference position, perform positioning tests, and then return to the reference point and check for errors. In the steps outlined below, we will assume that the X-axis has position errors.

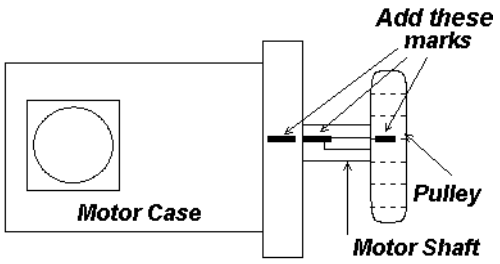
Steps:

- Power-up the control and perform the homing procedures. From the main screen in the CNC7 software, press the following keys in order to get into the following parameter screen: **F1 - Setup**, **F3 - Config**, Enter the password **137** press **Enter**, then **F2 - Machine**.
- Write down the current Lash Comp (inches) values. Change these values to 0.0000 and press **F10 - Save**
- Position the X-axis in the center of travel and set an X part zero.
- Engage the E-Stop, which will remove power from the motors.
- Remove the X-axis motor. You may leave the pulley on the shaft. Attach the motor cable if you have removed it. Release the E-stop.
- Press **F3 - MDI** and then at the Block? type **G90X0** press **ENTER**. You will be prompted to press **Cycle Start** to move.
- Mark the motor shaft and case as illustrated in Figure 1.
- Create a test program that cycles the X-axis through its travel envelope. Use **F6 - Edit**, **F9 - New** to create the test program.

  G90G1F150
  X2
  X-2
  M102
- Start the program and let it run for an hour.
- Press the **CANCEL** on the Jog keypad.
- Press **F3 - MDI** and Block? **X0** press **ENTER**
- If the marks line up, the control is positioning properly and it is a mechanical issue.
- If the marks do not line up, refer to technical bulletin TB149: Troubleshooting Motor/Encoder Problems for further troubleshooting.

***Warning: Never hit or pound on the motor shaft.**

Figure 1. The Proper Way to Mark a Motor and Shaft, Top View:



Document History