TB137 (Rev2) - Setting Direction Reversal

Overview

This document describes the procedure used to correctly set Direction Reversal for a knee or bed mill. This document assumes that the motors, pulleys and belts have been correctly installed on the machine. Setting the motor for direction reversal is simple, but it does complicate the limit switch settings somewhat.

When Direction reversal is Needed

Direction reversal should only be a factor during the initial setup of a unit or if the configuration has to be redone from initial default. Example: Customer has a hard drive crash and no backup of configuration. The symptoms of a motor that needs direction reversal would be that the motor moves in the opposite direction of commanded travel. This motion is normal, smooth motion and the DRO readout reads as if the motion was correct. This is caused by the way that the motor is coupled to the ball screw. Both of the following diagrams show rotation for an axis moving in the same direction. But in the top diagram the motor is facing the ball screw and in the bottom diagram the motor is facing the same direction as the ball screw. So even though the ball screw is turning the same way in both diagrams the motor is not.
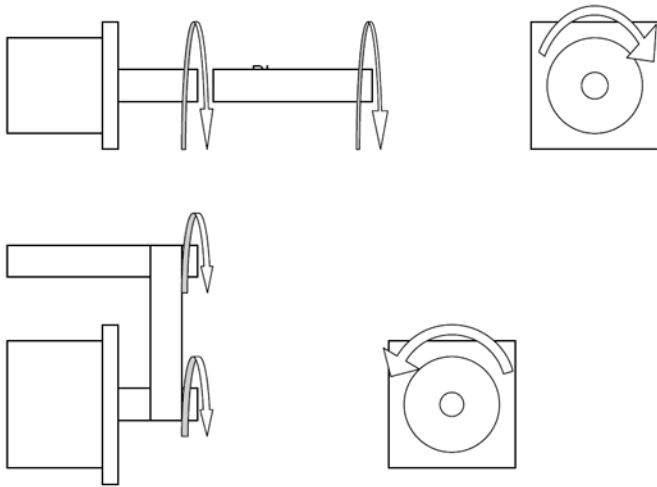
Starting at the main screen, Press **F1 - Setup**, **F3 - Config**, enter the password - default is **137**, **F2 - Machine** and **F2 - Motor**. Use the arrow keys to select the proper motor under the column Dir Rev. Use the space bar to toggle Dir Rev from N to Y. Press **F10-Save** to save changes. The motor should now go in the proper direction when commanded. Centoid DC drives are hardwired to look at the limit switches one way and one way only. So for SERVO1, QUADDRV1, SERVO3IO, DC3IO, DC3IOB, and ALLIN1DC drives, the limits need to be changed to statisfy the drive.

Limit Switch/Limit Input Adjustments

Starting at the main screen, Press **F1 - Setup**, **F3 - Config**, enter the password - default is **137**, **F2 - Machine** and **F2 - Motor**. The Limit and Home Switch inputs will need to be flipped for axes with direction reversal turned on. For example, the X-axis typically has the negative limit and home switch set to 1 and the positive set to 2. With direction reversal turned on, these will be flipped. That means that the positive limit and home switch will become 1 and the negative will be 2. Once all required inputs are changed, press **F10-Save** to save the configuration changes.

Before Direction Reversal							After Direction Reversal					
Axis Label	Limit		Home		Dir Rev.		Axis Label	Limit		Home		Dir. Rev.
	-	+	-	+		--->		-	+	-	+	
X	1	2	1	2	N		X	2	1	2	1	Y

Now that the software side is done, there is one last step. You will need to switch the plus and minus limit switch wires on the PLC for the direction reversal to be complete and operate correctly.

If the limits are correct you will be able to trip a limit, the correct limit tripped message will appear on the screen, and you will be able to slow jog off of the limit while it is tripped.

If you get the correct message when a limit is tripped but when you try to jog you get Full Power Without Motion, the limit switch is connected to the wrong input of the PLC and servo drive. The message is correct because the PLC is being told to look for the limit switch on the wrong input. To correct this, swap the limit switch to the other input for that axis and swap the numbers for the Limits and Home Switch in the setup screen.

 If you get the wrong message when a limit is tripped and when you try to jog, the axis will move a slight amount, then the limit switch is connected to the correct input but the PLC is being told to look for the limit switch on the wrong input. To correct this, swap the numbers for the Limits and Home Switch in the setup screen.

 If you get the wrong message when a limit is tripped and when you try to jog you get Full Power Without Motion, the limit switch is connected to the wrong limit of the PLC and servo drive. To correct this, swap the limit switch to the other input for that axis.

Document History

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