

**NOTE**  
The 10,000 RPM Pulley Set (P/N 4335) does not work with the 3C Collet Headstock (P/N 30113)

**SHERLINE**  
**PRODUCTS**  
INCORPORATED 1974

## MASSO Optical Encoder Gap Correction

P/N 87813

### **CAUTION**

**Do not connect or disconnect the optical encoder connector or the ground wire with the power on or you will do irreparable damage to the optical encoder!**

**The power must be off while adjusting the encoder.**

#### **Change to the Optical Encoder Gap Gauge**

Our original gap setting for the optical encoder was .080" (2.032 mm). We have found that this gap works and is sufficient for our mills because they are not looking for the index mark, which is used on our chucker lathes for single point threading.

For our chucker lathes, and for any of our customers who have mills that are experiencing erratic RPM changes, we suggest that you change your gap width to .129" (3.27 mm). We are making new gap setting gauges (P/N 87813) that are .129" thick. You can also use a set of feeler gauges set to .120 -.130 thick.

**CAUTION:** Make sure that the power is turned off before you adjust your encoder gap.

#### **Setting the Encoder Gap Instructions Links**

##### **Written Instructions**

*Sherline/MASSO CNC Controller Initial Start Instructions* (page 10): [https://sherline.com/wp-content/uploads/2019/07/sher-masso\\_cnc\\_initial\\_inst.pdf](https://sherline.com/wp-content/uploads/2019/07/sher-masso_cnc_initial_inst.pdf)

##### **Video Instructions**

*Setting up the Optical Encoder* (about the 2:38 mark): <https://youtu.be/ynfJ38QLMoE>

*Installing the Optical Encoder* (about the 6:50 mark): <https://youtu.be/p3kM3ME01-w>

Thank you,  
Sherline Products Inc.

**Troubleshooting the 10,000 RPM Pulley with the MASSO Control**  
We have recently been informed that there is a problem with the 10,000 RPM pulley working with our MASSO control.

**NOTE:** The 10,000 RPM pulley is mechanically and electronically capable of achieving 10,000 RPM max. However, without the ability to use an oscilloscope to fine tune the encoder orientation, the maximum "programmable RPM" may be limited to 8,000 or 9,000 RPM.

#### **Stating the Problem**

What we found was that using the optical encoder headstock spacer (P/N 87816) and the encoder gap gauge (P/N 87813, .129"), the encoder orientation was fine when the maximum RPM was 2,800. However, we found the following problems when using the same encoder orientation with the 10,000 RPM pulley:

1. At RPM above 3,000-4,000, the RPM would first increase above the entered RPM value. Then instead of coming down to the entered value, the RPM would go to the maximum of 10,000. The RPM read-out on the MASSO control would read "0," while the actual RPM was at 10,000.
2. If you turned the spindle off and then tried to turn it back on, the spindle continued to go to the maximum RPM of 10,000 (regardless of the value entered).
3. The only way to reset the spindle RPM was to power the control off and back on.

#### **The Solution to the Problem**

1. Using an oscilloscope, we altered both the encoder gap and the spacer thickness until we achieved an encoder orientation that allowed the full RPM range up to 10,000 without any issues.
2. The encoder gap is .055" from the tach sticker to the encoder A & B readers on the bottom of the encoder (see Figure 1), or .005"-.010" between the tach sticker and the bottom of the encoder cover (see Figure 2).

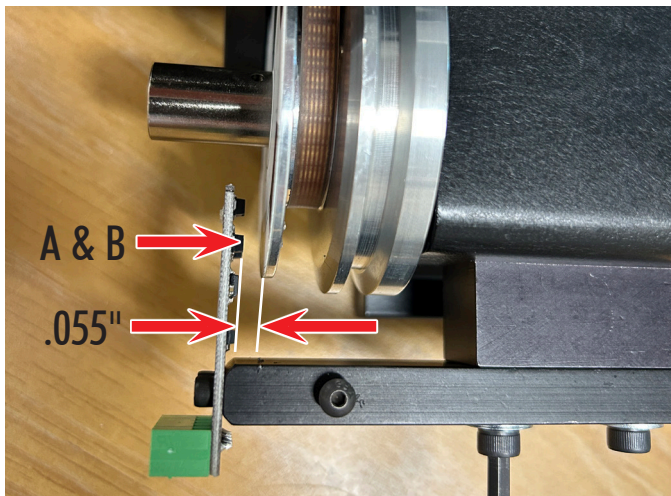


FIGURE 1—Showing .055" gap between the tach sticker and the A & B LEDs.

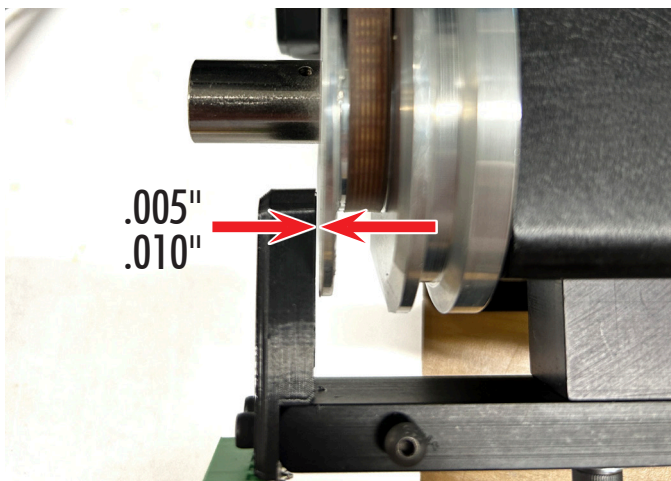


FIGURE 2—Showing the .005"-.010" gap between the MASSO encoder cover and the tach sticker.

3. The encoder headstock spacer (P/N 87816) thickness has been changed to (.790"-.795"). This is an increase of approximately .085" from the original spacer thickness.
4. Customers who are having a problem with their 10,000 RPM pulley with the MASSO control can either add a .075"-.085" spacer piece (or shim stock) under the existing headstock spacer (see Figure 3), or contact us for a new spacer (P/N 87816) that is .790"-.795". Then they will need to adjust the encoder gap to .055".

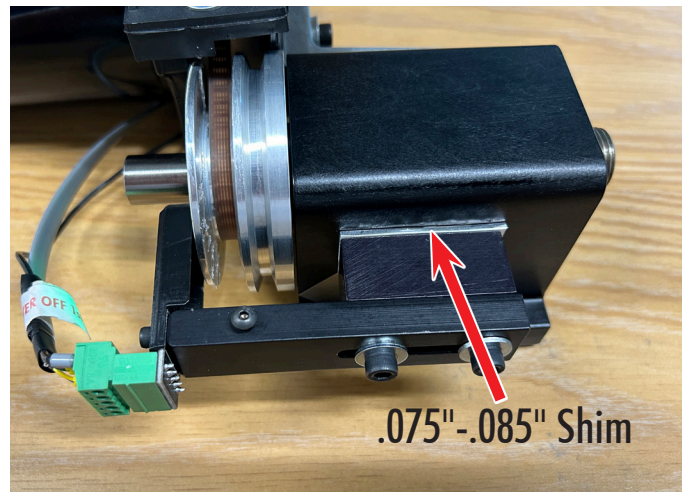


FIGURE 3—Showing the .075"-.085" shim stock installed between the headstock and the encoder headstock spacer.

5. If you have the new MASSO injection-molded optical encoder cover, no further modifications are necessary (see Figure 4). If, however, you have an older 3D-printed optical encoder cover, you will have to trim .075" from the bottom of the 3D-printed cover (see Figure 5). This is to ensure the proper gap of .005"-.010" between the cover and the tach sticker shown in Figure 2.

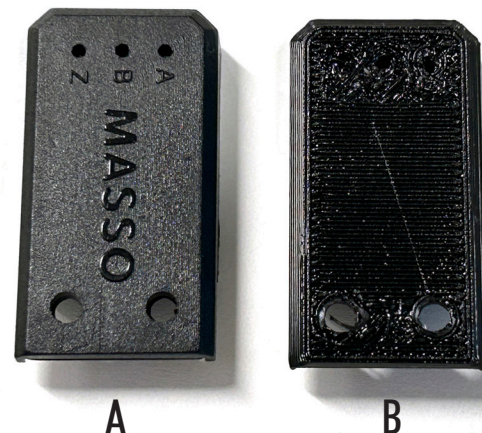


FIGURE 4—Showing the difference between the MASSO injection-molded cover (A) and the original 3D-printed cover (B).

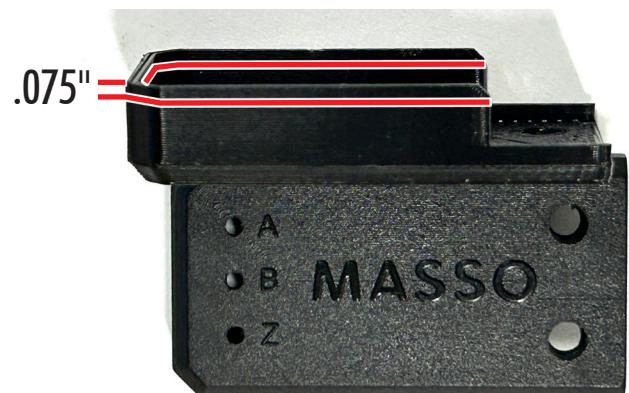


FIGURE 5—The red lines show where to trim the .075" off of the 3D-printed cover. The 3D-printed cover has been turned on its side to show where to trim.

6. Once the spacer and the gap have been reset, enter the RPM starting at 3,000 and then increase the RPM in increments of 1,000 until you reach 10,000. The RPM should climb up to the entered value and a bit higher, then come down and settle at about + or – 20 or 30 RPM of the entered value.

**NOTE:** You may find that the maximum RPM that you will be able to achieve “without the spindle racing to the max RPM of 10,000,” may be 8,000 or 9,000. See the settings changes below that may help you to achieve a higher “programmable RPM” range.

7. Setting changes:
  - A. Go to the F1 screen and click on “Main Spindle Settings”.
  - B. When the Main Spindle box opens, change the Maximum RPM to (20,000). Change the Spin Up to (8000) or (10000).

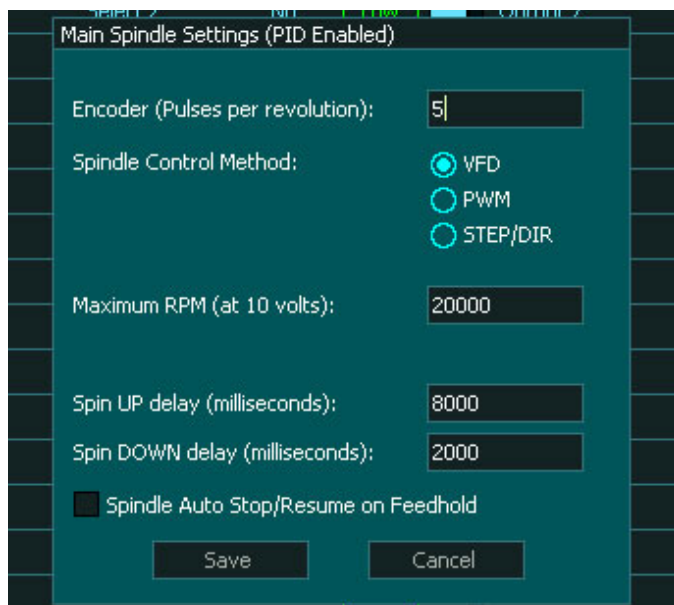


FIGURE 6—The Main Spindle Settings dialog box.