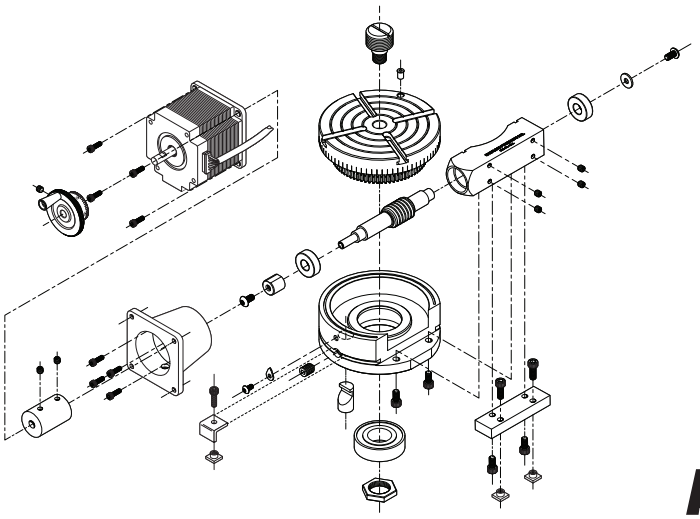


SHERLINE PRODUCTS
INCORPORATED 1974

Assembly Instructions for the CNC Rotary Table Worm

P/N 3700-CNC, 8730

Before You Begin

These instructions are for whenever you need to fix or replace parts in your rotary table.

All of the part numbers listed are in the exploded view of the CNC rotary table at the end of these instructions.

NOTE: If your stepper motor turns but your rotary table does not turn, the screw (P/N 37200) that holds the coupling adapter (P/N 37124) onto the end of the worm shaft has probably come loose. In this case, you do not need to remove the entire worm housing. Skip steps 1 thru 4 below and start on 4A.

Removing the Worm Housing

1. The following screws all have removable "Loctite" on their threads. We use Loctite # 242 Thread Locker.

   A. (2) 10-32 button head screw (P/N 37200)

   B. Preload nut (P/N 37160)

2. Use a 1" socket (possibly a 26mm socket) and loosen the preload nut (P/N 37160) under the rotary table base.
3. Remove the (2) 10-32 screws (P/N 40540) that hold the worm housing (P/N 37121) to the rotary table base (P/N 37100).
4. Wiggle the worm housing back and forth to break the silicon seal. Then remove the entire worm housing assembly.

4A. This is an alternative for tightening the screw (P/N 37200) to regain the connection between the stepper motor and the worm.

Use the handwheel (P/N 40050) to turn the stepper motor (P/N 67130). Look through the access hole in the stepper motor mount and turn until the set screw (P/N 40520) lines up with the access hole (see Figure 1).

Now follow instructions 5, 6, and 7. In order to tighten the screw (P/N 37200), you will follow instruction 9.

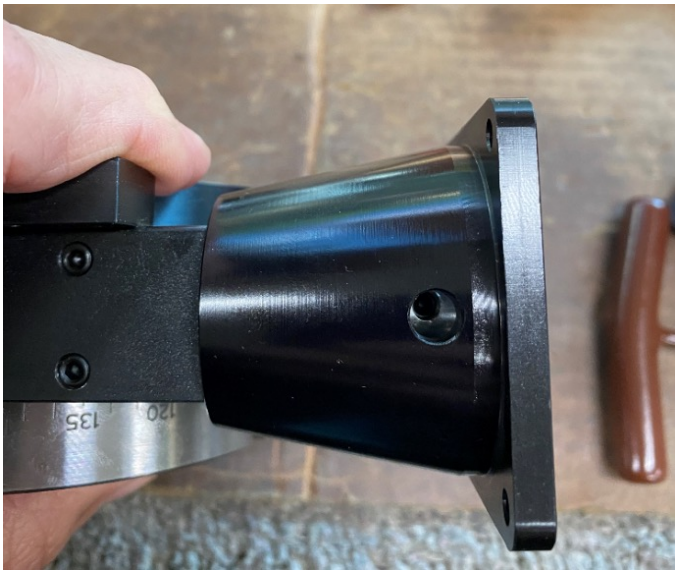


FIGURE 1—Shows the set screw aligned with the motor mount access hole.

5. Loosen the set screw (P/N 40520) a couple turns.
6. Remove the (4) 8-32 screws (P/N 67100) that hold the stepper motor onto the stepper motor mount.
7. Remove the stepper motor. If it is hard to remove, loosen the set screw (P/N 40520) more.
8. Screw in the set screw (P/N 40520) until it is flush with the outside of the CNC Rotary Table Coupling (P/N 37123). Insert the Allen wrench through the access hole and into the set screw. You will be using the Allen wrench to keep the worm (P/N 37131) from turning, so you can loosen the (2)10-32 button head screws (P/N 37200). Break the two screws loose.
9. Instructions for tightening screw P/N 37200.

   A. At this point, insert a 3/32" Allen wrench into the set

screw through the access hole as shown in Figure 1. You will be using the Allen wrench as a brake so you can tighten the screw (P/N 37200).

FIGURE 2—The 3/32" Allen wrench inserted through the access hole is used as a brake to keep the coupling from moving while you are tightening the button head screw (P/N 37200).

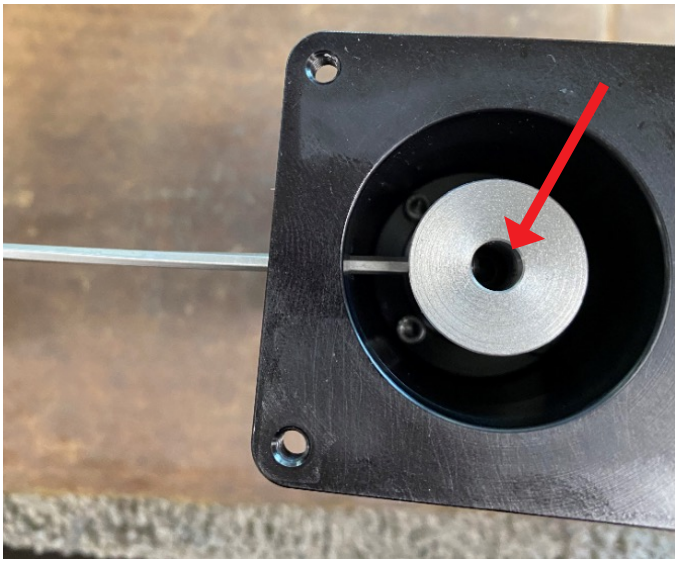


FIGURE 3—Another view of the Allen wrench through the motor mount access hole. The red arrow is pointing to the center hole of the coupling.

B. Using a 1/8" Allen wrench, insert it into the center hole of the coupling (P/N 37123) and into the Allen head of the screw (P/N 37200).

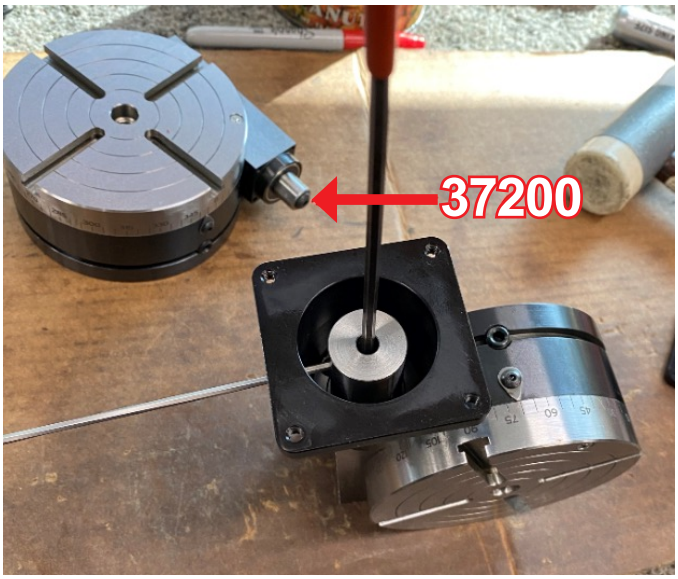


FIGURE 4—The arrow shows the location of the 10-32 x 3/8" button head socket screw (P/N 37200). The 1/8" Allen wrench is inserted through the center hole of the coupling into the button head screw (P/N 37200).

C. First turn the 1/8" Allen wrench CCW to see if the 37200 screw is loose. If it is, turn CW until the 3/32" Allen wrench contacts the side of the access hole. Then tighten the screw (P/N 37200) as tight as possible.

D. Now go to the **Assembly Instructions** below and start at 13. Reassemble the stepper motor.

NOTE: If you want to add Loctite to the threads of the screw (P/N 37200), you will need to follow instructions 10, 11, and 12. Apply Loctite to the threads. Hold the coupling adapter securly, and tighten the screw (P/N 37200) again.

10. Now remove the screw (P/N 37200) that is on the "preload bearing" side of the worm housing.
11. Once the (2) screws (P/N 37200) are removed, you can remove the (4) screws (P/N 40530) that hold the motor mount (P/N 87510) onto the worm housing (P/N 37121). Then twist and pull the motor mount off.
12. Now remove the other set screw (P/N 40520) that holds the coupling (P/N 37123) onto the coupling adapter (P/N 37124). Then pull the coupling off.
13. Place the long end of a 1/8" Allen wrench into the 10-32 hole at the "preload end" of the worm shaft (P/N 37131). Tap the Allen wrench with a hammer. The worm shaft, along with the top bearing (P/N 10930) should all come out of the stepper motor side of the worm housing. All of the bearing fits are very light slip fits. They are not press fits.
14. Now remove the coupling adapter. There might be some Loctite on the adapter, so you may need to use pliers to twist it free. Once the adapter is off, you can remove the bearing from the worm shaft.

Rotary Table Assembly Instructions

1. Place the bearing and adapter onto the new worm shaft.

Apply a drop of "Loctite # 242" to the thread of the screw (P/N 37200). Screw it in tight.

2. Push the assembled worm shaft into the worm housing (and the bearing at the preload end of the worm housing).
3. Mount the coupling (P/N 37123) onto the adapter. Be sure that the "Flat" on the adapter is aligned with the set screw. Tighten the set screw.
4. Now leave the Allen wrench in the set screw and use it for leverage so you can tighten the screw (P/N 37200) that holds the adapter on to its final tension. All of the screws on the stepper motor end must be very tight to avoid any extra backlash.
5. Now it is time to tighten the screw (P/N 37200) at the "preload end" of the worm housing. The purpose of this screw is to take up any slop in the bearing and any backlash in the final worm assembly. If you overtighten this screw, you will damage the bearings.

   NOTE: Before you tighten this screw, you need to spin the worm with your fingers. Use the coupling to spin the worm. Notice how free it spins. There should not be any resistance to the spinning motion.

   Now place a drop of Loctite # 242 on the threads (not too much, or it may get into the bearings). Turn the screw in until the washer makes contact with the inner bearing race. Then just finger tighten a little to take up the bearing play. Now spin the worm again and see how it feels. If there is noticeable resistance to the turning motion, then the screw is too tight. Loosen the screw and tighten it a little. Then give the worm another spin.
6. Before you assemble the worm housing, you will need to look at all of the teeth on the rotary table top (P/N 37110). Look for any steel chips on the gear teeth or in the grease that is on the gear teeth. It only takes one little chip to lock up the whole table.
7. Apply fresh grease to the gear teeth of the rotary table top (P/N 37110).
8. Now apply fresh grease to the teeth of the worm gear.
9. Put a little line of "Silicon Caulk" on the two 1/8" grooves that are on the worm housing. This is used as a dust seal between the worm housing and the rotary table base.
10. Now set the rotary table on it's side, with the worm housing "Step" facing up.
11. Pull the rotary table top away from the base just enough so the worm housing will fit in without getting damaged.
12. Wipe clean all the mating surfaces of the worm housing, base, and table.
13. Gently lower the worm housing down into place.

    A. You can turn the coupling to get the worm teeth and the table teeth to line up.

    B. Once the teeth are aligned, turn the worm to move the housing back and forth to line up the (2) 10-32 screw holes for mounting the worm housing to the base.

    C. Insert the (2) screws (P/N 40510) and leave them loose.

    D. When the worm housing is assembled, there will be a slight gap between the worm housing and the base. This is so you can adjust for gear wear in the future.

    E. Gently rock the worm housing back and forth until it is square to the base.

    F. Use "Very Light" finger pressure to hold the worm housing in place. Then tighten the (2) 10-32 mounting screws to secure the worm housing in place.

    G. Gently tighten the preload nut (P/N 37160) to remove any backlash from the headstock bearing (P/N 40420).

NOTE: The torque on the preload nut is less than 1 inch pound. When we assemble the table, we just tighten up the preload nut until it makes contact with the bearing (by hand). If you exceed 1 inch pound, you will lock up the table. The preload nut is basically there just to keep the bearing in place and the table top held slightly against the base.

    H. Now turn the coupling back and forth to see how tight the worm is.

    I. If it is hard to turn, you were probably exerting too much pressure on the worm housing when you tightened the worm housing screws. Loosen the (2) screws, and then retighten them without pressing down on the worm housing. Then turn the coupling again.

    J. If the worm turns smooth and easy, then you will need to make the table go through one full revolution. As you are turning the coupling, feel for tight spots. Anytime you feel a tight spot, change direction and go back and forth over that area a couple times (this tightness can be caused by too much grease on the teeth). Once you have squeezed it out by turning the worm through that area a couple times, it should smooth out.

        i. If it gets smoother, then continue turning through the first rotation.

        ii. If it gets harder to turn (or if it binds) then you will need to mark the table top to show the part of the table that was engaged with the worm gear. Then remove the worm housing and look for anything that could be causing the worm to jam.

NOTE: If you experience a few areas that are slightly tighter than the rest of the table, loosen the (2) screws (P/N 40510) and lightly tap the worm housing away from the rotary table. Then tighten the screws and turn through another full revolution. The maximum amount of play that is allowable is 2/10 of a degree. This is (2) lines on the handwheel.

    K. Once the worm backlash is set. Remove the headstock bearing preload nut (P/N 37160). Apply a small drop of Loctite # 242 Thread Locker to the threads. Retighten the preload nut.

NOTE: The torque on this preload nut is the same as the torque on the (P/N 37200) screw on the worm shaft. All you are doing is taking up the backlash in the bearing. This nut should be just finger tight.

L. Turn the worm shaft and see if it still moves as free as it did before you tightened the preload nut.

M. Use the (4) 8-32 screws (P/N 40530) and remount the motor mount to the worm housing.

N. Turn the coupling until the set screw lines up with the access hole in the motor mount.

O. Put the Allen wrench through the hole and into the set screw.

P. Now insert the stepper motor shaft into the coupling with the flat on the shaft facing the set screw in the coupling.

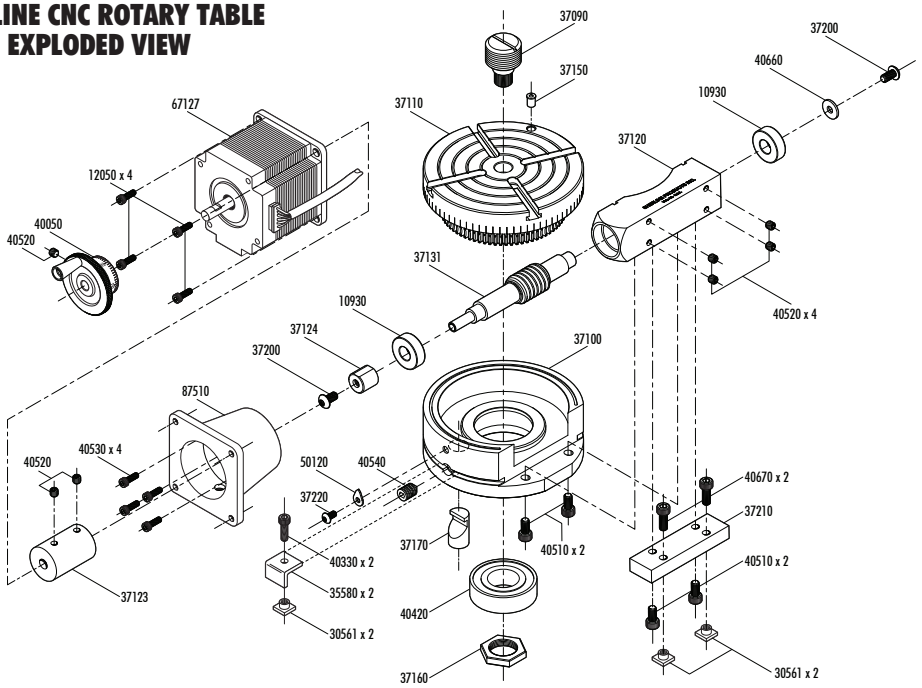
Q. Push the stepper motor into position. Tighten the set screw just finger tight. Now insert the (4) 8-32 screws to mount the stepper motor to the motor mount. Tighten them firmly. Now loosen the set screw in the coupling to relieve any end force that may have been exerted on the coupling. Then retighten the set screw.

R. Tighten the locking screw (P/N 40540) so the table can't move. Now use the handwheel to check the amount of backlash (2/10 of a degree, or "2 lines"). If the backlash is 2/10 or less, unlock the table, and turn the table through a full revolution.

S. If all is good, hook up the stepper motor and put the table through some test moves.

Thank you,
Sherline Products Inc.

SHERLINE CNC ROTARY TABLE EXPLODED VIEW



NO. REQ.	PART NO.	DESCRIPTION	NO. REQ.	PART NO.	DESCRIPTION
2	10930	3/8" Bearing	1	40050	1-5/8" handwheel assembly
4	30560	10-32 T-nut	2	40330	10-32 x 5/8" SHCS
2	35580	Hold-down clamp	1	40420	Headstock bearing
1	37090	Chuck adapter	4	40510	10-32 x 3/8" Socket head cap screw (SHCS)
1	37100	Rotary table base	7	40520	10-32 x 3/16" cup point set screw
1	37110	Rotary table top	4	40530	5-40 x 3/8" SHCS
(1)	37121	CNC rotary table worm housing (Not sold sep.)	1	40540	5/16-18 x 3/4" cone point set screw
(1)	37131	CNC rotary table worm shaft (Not sold sep.)	1	40660	3/16" I.D. washer
1	37122	CNC rotary table worm housing assembly	2	40670	10-32 x 1/2" SHCS
1	37123	CNC rotary table coupling	1	50120	Pointer
1	37124	CNC rotary table coupling adapter	4	67100	8-32 x 3/8" SHCS
1	37150	Oiler	1	67127	2 Amp, 100-oz., 23 frame size stepper motor
1	37160	Preload nut	1	87041	120 VAC power supply (24 VDC, 1 amp output)
1	37170	Lock pin	1	87100	Control unit with keypad/electronics (not shown)
2	37200	10-32 x 3/8" button head socket hd. screw	1	87250	Motor-to-keypad 6' extension cable (not shown)
1	37210	Hold-down tab	1	87350	Remote (limit) switch/daisy-chain 1/2 cable
1	37220	6-32 x 1/4" button head socket hd. Screw	1	87510	CNC rotary table stepper motor mount