

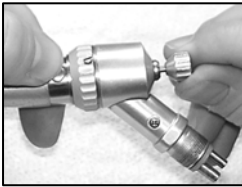
MIDWEST TRU-TORC TWO SPEED MOTOR



The Midwest Tru-Torc two speed motor has been in existence for many years. It is a durable handpiece and has a speed range of 0 – 30,000 rpm. It is no longer being made but you will come across them quite often in the field. They have been replaced by the Midwest Shorty motors. Many aftermarket replacement parts exist for this handpiece. As always, try to determine the problem before disassembling the handpiece.

Some of the most common problems and solutions are addressed in the Midwest Tru-Torc and Shorty troubleshooting guide immediately preceding this section.

SUB ASSEMBLY B DISASSEMBLY (NOSE SECTION)



STEP 1

Remove the tightening rod (40441) and front sheath. You will need to push the spindle lock button on the housing to unthread the rod. Note: the threads for this rod, and every other connection on this handpiece, are regular. Turn counterclockwise to unthread.



STEP 2

Twist the sheath lock collar and remove the sheath from the main spindle shaft.



STEP 3

Remove the front sheath housing. Do this by placing it in a 3/4" collet just below the spindle lock button as shown. Then wrap a strip of rubber around the speed change collar and motor housing and unscrew. Next, simply unscrew the speed change collar screws and remove the collar.



STEP 4

Lock the clutch housing of the handpiece into a 49/64" collet. Loosen the upper turbine housing by hand and remove. Remove any spacer washer(s) and place them on your work surface.

SUB ASSEMBLY A DISASSEMBLY (NOSE SECTION)



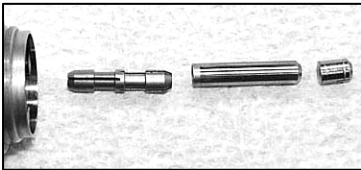
STEP 5

Line the wide drive rings up with the half moon grooves in the clutch as shown at left. Reach under the drive plate with a flat thin screwdriver. Pry the plate up by working your way around it. This will expose the three wide drive rings. Place them along side the drive plate on your work surface.



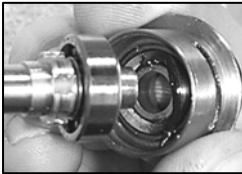
STEP 5

Now that the drive plate and wide drive rings have been removed, place a 1/4" collet into the collet holder. Insert the tip of the spindle, one inch above the fork, into the collet. Next, use a flat head screwdriver to unscrew the spindle bolt.



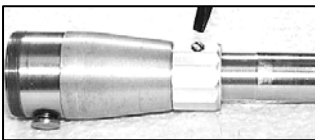
STEP 6

Once the spindle bolt has been loosened, remove the spindle from the collet. Pull the spindle bolt out of the spindle and tap the tightening rod retainer, chuck compressor and chuck out of the spindle. Many times, the chuck will be stuck up inside the spindle. You can use the tightening rod to push the chuck out.



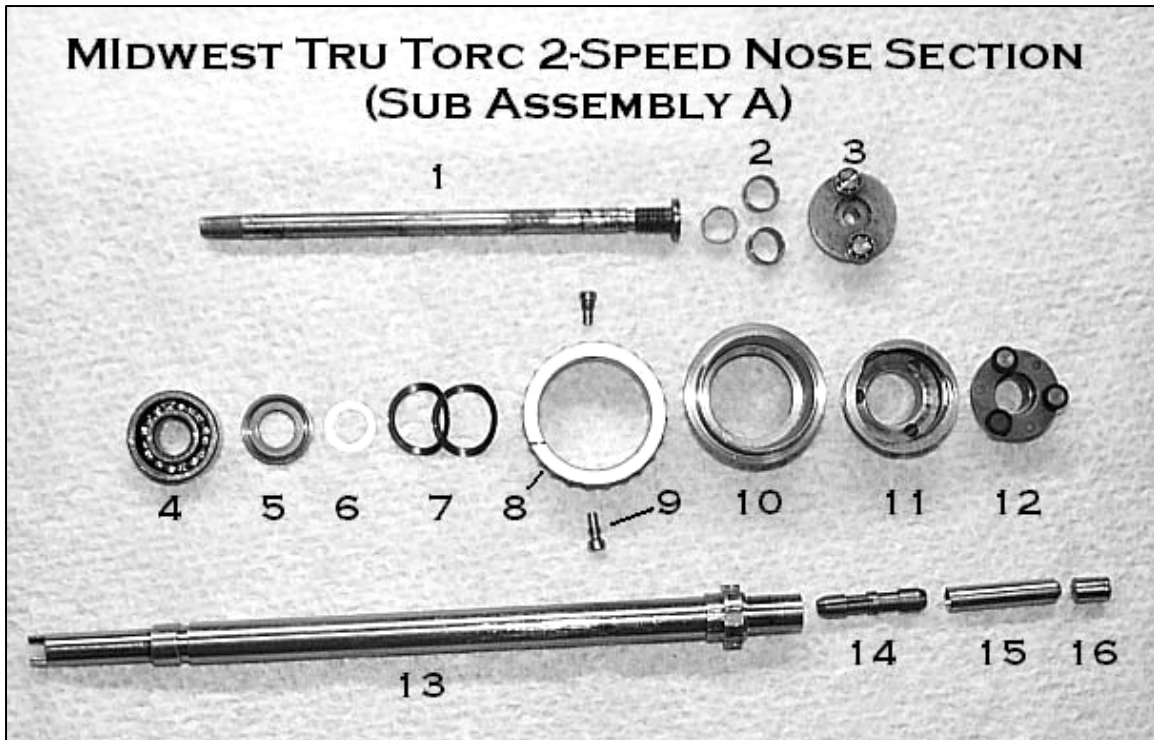
STEP 7

Now that the spindle bolt has been removed, you can pull the clutch housing off of the spindle bearing (as shown). Now align your disassembled parts on your work surface.



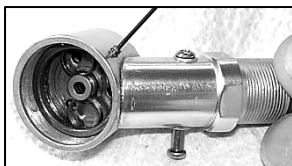
STEP 8

To completely disassemble the main housing, remove the two screws holding the sheath lock collar. Then unscrew the sheath swivel housing from the spindle housing.



Picture Number	Part Number	Description
1	40494	Tru Torc Spindle Bolt
2	40437	Wide Drive Rings
3	40437A	Wide Drive Ring Plate
4	40432	Main Spindle Bearing
5	40464	Thrust Washer
6	N/A	Main Spindle Housing (40430 Bearing is inside tip)
7	40448	Loading Springs
8	40443A	Tru Torc Speed Change Collar
9	40443	Speed Change Collar Screw
10	40493	Clutch Housing
11	40493A	Clutch
12	40437B	Drive Plate
13	40492	Main Spindle
14	40440 or 40440(A)	Chuck or Short Chuck
15	40447 or 40447(S)	Chuck Compressor or Short Chuck Compressor
16	40447A	Tightening Rod Retainer

SUB ASSEMBLY B DISASSEMBLY (MOTOR HOUSING)



STEP 9 Remove the allen screw from the side of the motor housing. You will need to use your .035" allen wrench (20115A). Once again, unscrew the screw in a counterclockwise fashion.



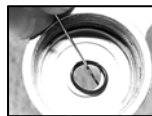
STEP 10

After you remove the screw, take the drive ring retainer out of the housing. Also remove the two narrow drive rings.



STEP 11

Insert your turbine raceway tool (00003) into the three holes in the raceway. Unscrew the raceway from the housing. If you cannot get the raceway to unscrew, put the threads of the housing in a 9/16" collet. With the housing securely held, insert the raceway tool into the raceway and unscrew.



STEP 12

Remove the bearing nut from the housing. Like all threads on this handpiece, turn counterclockwise to unscrew. Once the nut is out, you can replace the bearing (40435).

Also replace the o-ring (404072) in the rear of the housing.



STEP 13

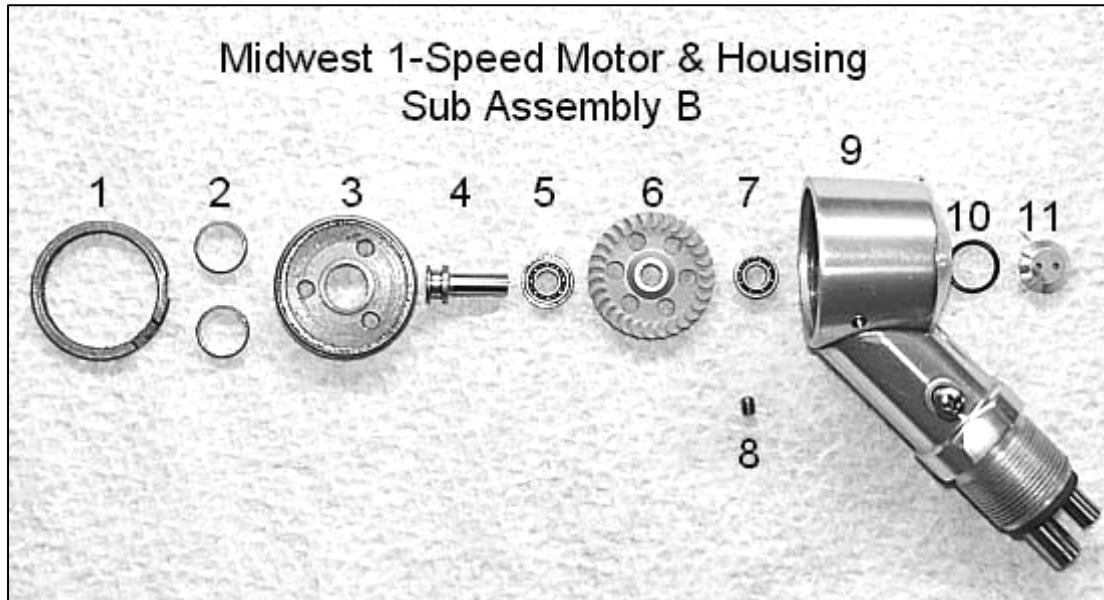
To disassemble the turbine, place the drive ring raceway over the largest hole on your work block (as shown). Then put your Lares disassembly tool (00024L1) into the end of the motor spindle. Press the spindle and tool through the raceway.



STEP 14

Now turn the partially disassembled raceway over (see picture). The front motor bearing must be removed from the raceway. Use your Lares assembly tool (00024L2) to punch the bearing out of the raceway.

Always replace these motor bearings when performing an overhaul. Place all of your dirty or fouled parts in the ultrasonic cleaner.



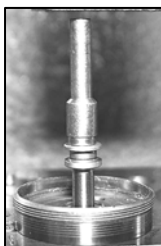
Picture Number	Part Number	Description
1	40446C	Turbine Retainer
2	40437	Narrow Drive Rings
3	40446	Drive Ring Raceway
4	40442	Turbine Spindle
5	40433	Front Turbine Bearing
6	40454	Impeller
7	40405C	Rear Turbine Bearing
8	20115	Allan Screw
9	40424	1-Speed Turbine Housing
10	404072	O-Ring
11	40450 40501	Tru-Torc Bearing Nut & Bearing (40435)(not pictured) Shorty Vent Plug (pictured)

SUB ASSEMBLY B REASSEMBLY (MOTOR SECTION)



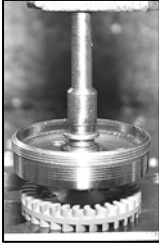
STEP 15

Place the turbine raceway upside down on your work surface. Insert the front turbine bearing into the appropriate hole (as shown). With the bearing partially inserted, place a small dab of Loctite on the tip of a needle and apply sparingly under the flange of the bearing. Press the bearing firmly into the drive ring raceway and let sit.



STEP 16

After the Loctite has cured, center the raceway, bearing side down, over Hole# 7 in your work block (picture at left). Place the turbine spindle over the hole in the bearing with the fat side up. Put your Lares assembly punch in the top of the spindle and press the spindle into the bearing.

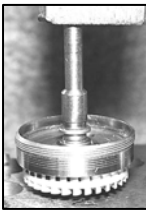


STEP 17

Now center the impeller over Hole#6 in your work block. Place the small end of the turbine spindle into the impeller (as shown). Using the same Lares punch, press the spindle into the impeller.

STEP 18

If you did not replace the rear o-ring and tightening rod bearing in **STEP 12**, do so now.



STEP 19

Place the rear turbine bearing (40405C) into Hole # 2 of your work block. Be sure the balls in the bearing are face down. Put the small end of the turbine spindle into the bearing. Use the Lares punch to press the partial turbine assembly into the bearing.

STEP 20

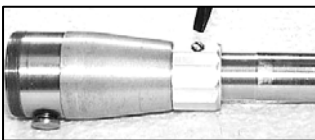
Insert the raceway tool into the three holes in the raceway. Carefully begin to thread the raceway into the motor housing. A good tip is to turn the raceway counterclockwise until a click is heard. Then begin to thread the pieces together. Once started, thread the raceway securely into the housing until it bottoms out.



STEP 21

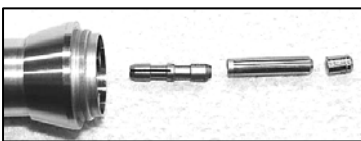
Now insert the two narrow drive rings into the drive ring raceway 180 degrees apart. Then place the turbine retainer ring over the drive rings. Make sure the small cut out portions line up with the hole where the allen screw enters the housing and where the air exhaust ports are (as shown).

SUB ASSEMBLY A REASSEMBLY (NOSE SECTION)



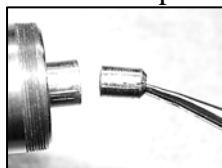
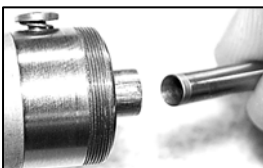
STEP 22

Reinstall the sheath lock bushing & collar pieces onto the main spindle housing. Then insert the main spindle back into the main housing. Push the spindle bearing (40432) onto the end of the spindle. If you had removed the front spindle bearing, place it onto the spindle before inserting the spindle into the main housing.



STEP 23

First insert the chuck into the opening on the end of the spindle. Follow this with the chuck compressor and then the tightening rod retainer. Be sure that the chuck compressor is inserted with the hollowed out end, going in

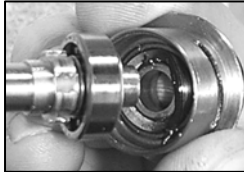


first (far left Picture). Make certain that the rod retainer piece is inserted with the flat end first (near left picture).



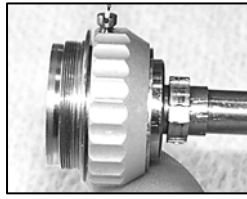
STEP 24

Now insert the clutch into the clutch housing. Turn the assembly over and place 2 dabs of green grease onto the back of the clutch 180° apart from each other. This is where you will now place the two loading springs.



STEP 25

At this point, hold the spindle assembly and clutch assembly horizontally and opposite each other (far left). Press them together and hold tightly while screwing the spindle bolt into the spindle as shown (near left).



STEP 26

Insert the spindle half way into the 3/16" collet. Now tighten the spindle bolt, tightly, into the spindle (far left picture). Remove from the collet. At this point you can slip the speed change ring onto the clutch housing and insert the screws (as shown above).



STEP 27

It is now time to install the three wide drive rings. Insert the wide drive ring plate into your wide drive ring tool (00017). Follow that by spacing the three drive rings evenly in the tool (as shown). Grooves are pre cut into the tool and will properly space the wide drive rings.



STEP 28

With the drive rings properly placed in the drive ring tool, lower it over the nose section (far left). **Make sure the three black bushings are out of the way of the grooves where the three drive rings are to be inserted.** Once the two pieces are aligned, slowly lift the tool off of the drive ring plate. Use a small flat screwdriver to press the three drive rings into the clutch (as shown above). This will correctly insert the wide drive rings and plate into the clutch housing.

This tool does not insert the drive ring into a 2-Speed the way it does on a 1-Speed. The tool will align them, then, using a finger, keep them in place and use the screw driver to slip each one down separately.



STEP 29

You now have two properly assembled Shorty halves. Sub Assembly A and Sub Assembly B. Place any spacing washers that may have been present back onto the outer edge of the clutch housing. Now mesh the two drive plate bearings into the two narrow drive rings in the motor housing. Once these are correctly aligned, begin to thread the two halves together. Be sure not too cross-thread the pieces. If the pieces seem to stop threading together right before they look properly seated, STOP. You may not have the drive plate bearings aligned exactly inside the narrow drive rings. Back the pieces a part 1/16th of a turn and retighten. If they still don't align, unscrew the pieces and start this step over.



STEP 30

To firmly tighten the two assemblies together, once again, place the sheath housing into the $\frac{3}{4}$ " collet. Insert the spindle into the housing. Wrap the motor housing with a strip of rubber and tighten firmly in a clockwise motion.