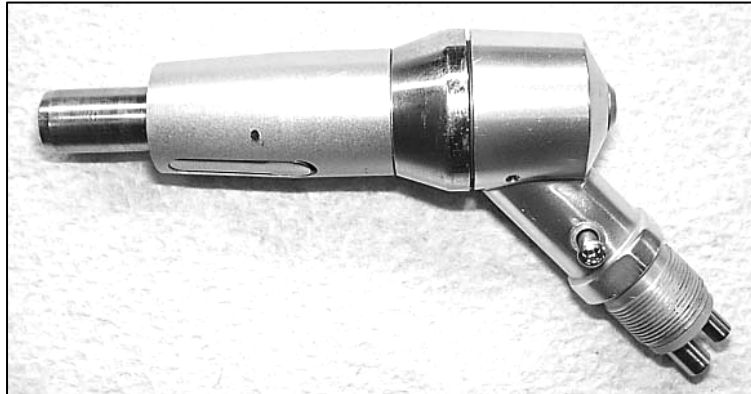


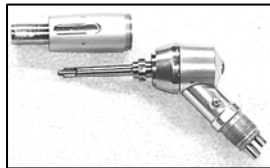
## MIDWEST SHORTY SINGLE SPEED MOTOR



The Midwest Shorty single speed motor has been in existence for many years. It is a durable handpiece and has a speed range of 0 – 5000 rpm. It has replaced the Midwest Tru-Torc and you will come across them quite often in the field. 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 A & B DISASSEMBLY



#### STEP 1

Remove the front sheath housing. Do this by placing it in a 3/4" collet. All the threads on this handpiece are regular thread, so turn counterclockwise to remove.



#### STEP 2

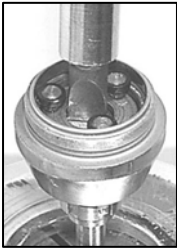
Lock the drive housing of the handpiece into a 61/64" collet. Loosen the upper turbine housing by hand and remove. Remove any spacer washer(s) and keep them in a safe place.

### SUB ASSEMBLY A DISASSEMBLY (NOSE SECTION)



#### STEP 3

Reach under the drive plate with a flat thin screwdriver. Pry the plate up. This will expose the three wide drive rings. Place them along side the drive plate on your work surface.



#### STEP 4

Now that the drive plate and wide drive rings have been removed, place a 3/16" collet into the collet holder. Insert the tip of the spindle, just above the fork, into the collet. Once the collet is tightened, use a flat head screwdriver to unscrew the spindle bolt. Then pull the various pieces apart and place on your work surface.



#### STEP 5

You can now place the nose piece in a 13/32" collet. Unscrew the sheath housing from it while simultaneously depressing the latch. This will keep the flange on the nose piece from being caught up.

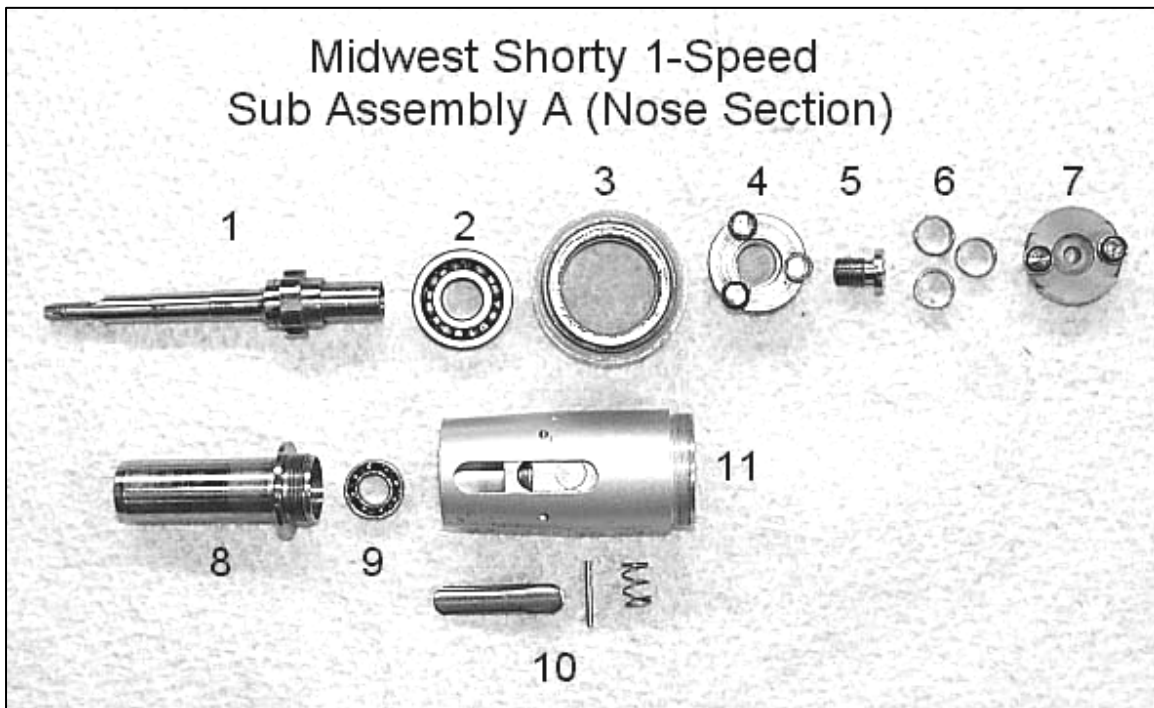


#### STEP 6

If you need to replace the latch on the sheath housing, place it over two v-blocks. Hold a small punch or pin with a set of tweezers over one end of the pin in the housing. Gently tap the pin out of the housing and remove the latch and spring. The replacement latch kit is part# 40503.

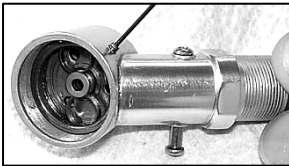
#### STEP 7

You can now place the component parts in your ultrasonic cleaner. After you clean the parts, align them like the exploded view below and replace what is needed.



Picture Number	Part Number	Description
1	40449A 40449	Spindle With Lock Gear (pictured) Spindle Without Lock Gear (not pictured)
2	40432	Main Spindle Bearing
3	40493B	Drive Housing
4	40437C	Single Speed Drive Plate
5	40494A	Spindle Bolt
6	40437	Wide Drive Rings
7	40437A	Wide Drive Ring Plate
8	40505	Nose Piece
9	40436	Front Spindle Bearing
10	40503	Latch Kit
11	40462A 40462B	Sheath Housing Without Button (pictured) Sheath Housing With Button (not pictured)

### SUB ASSEMBLY B DISASSEMBLY (MOTOR HOUSING)



#### STEP 8

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 9

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



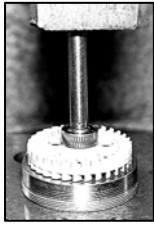
#### STEP 10

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 11

Remove the vent plug from the housing. Like all threads on this handpiece, turn counterclockwise to unscrew. Once the plug is out, replace the o-ring (404072) in the rear of the housing.



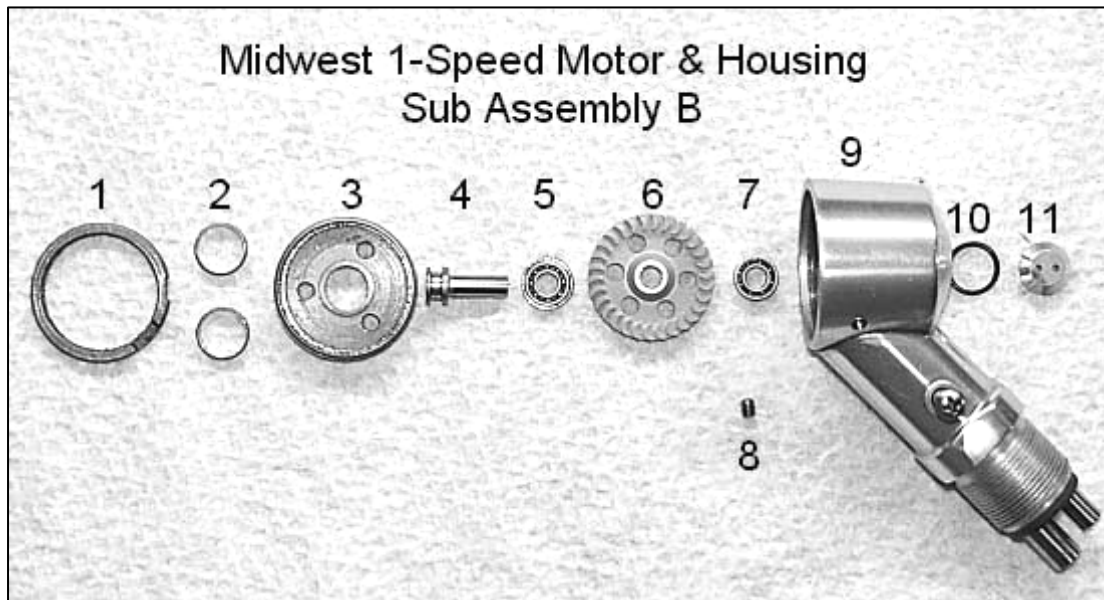
### STEP 12

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.



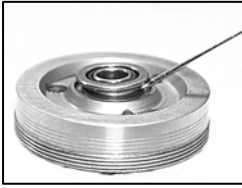
### STEP 13

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.



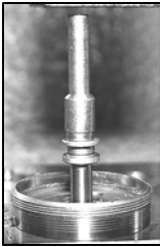
Picture Number	Part Number	Description
1	40446C	Turbine Retainer
2	40438	Narrow Drive Rings
3	40446	Drive Ring Raceway
4	40442	Turbine Spindle
5	40433	Front Turbine Bearing
6	40454	Impeller
7	40405C	Rear Turbine Bearing
8	20115	Allan Screw
9	40424	1-Speed Turbine Housing
10	404072	O-Ring
11	40501	Shorty Vent Plug (pictured)

## SUB ASSEMBLY B REASSEMBLY (MOTOR SECTION)



### STEP 14

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 15

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.

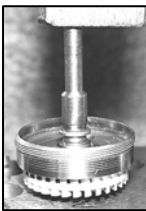


### STEP 16

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 17

If you did not replace the rear o-ring and vent plug in **STEP 11**, do so now.



### STEP 18

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 19

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.

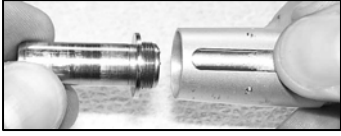


### STEP 20

Now insert the two narrow drive rings into the drive ring raceway 180 degrees apart with your drive ring tool.

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)



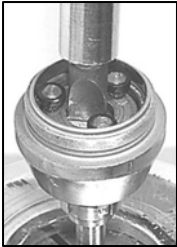
### STEP 21

Reinstall the latch kit back onto the sheath housing. Once this is done, place the front spindle bearing into the nose piece. Depress the latch and screw the nose piece back into the housing.



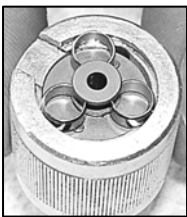
### STEP 22

Now place the main spindle bearing onto the back of the spindle. Put the drive housing on the back of the spindle over the bearing. Next, insert the single speed drive plate into the drive housing.



### STEP 23

Insert the spindle of this partial nose section into the collet. Place the spindle bolt into the rear of the spindle. With the assembly locked into the collet holder (see picture), use a flat head screwdriver to tighten the spindle bolt firmly.



### STEP 24

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 25

With the drive rings properly placed in the drive ring tool, lower the partially assembled nose section over the tool. **Line up the three wide drive rings between the three black bushings on the drive plate.** Once the two pieces are aligned, mesh them together and press the plunger on the bottom of the drive ring tool. This will correctly insert the wide drive rings and plate into the clutch housing.



### STEP 26

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 to 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 1/16<sup>th</sup> of a turn and retighten. If they still don't align, unscrew the pieces and start this step over. Forcing Sub Assembly A and B will cause the LocTite to be broken loose on the turbine.



**STEP 27**

To firmly tighten the two assemblies together, once again, place the sheath housing into the 3/4" collet. Wrap the motor housing with a strip of rubber and tighten in a clockwise motion.