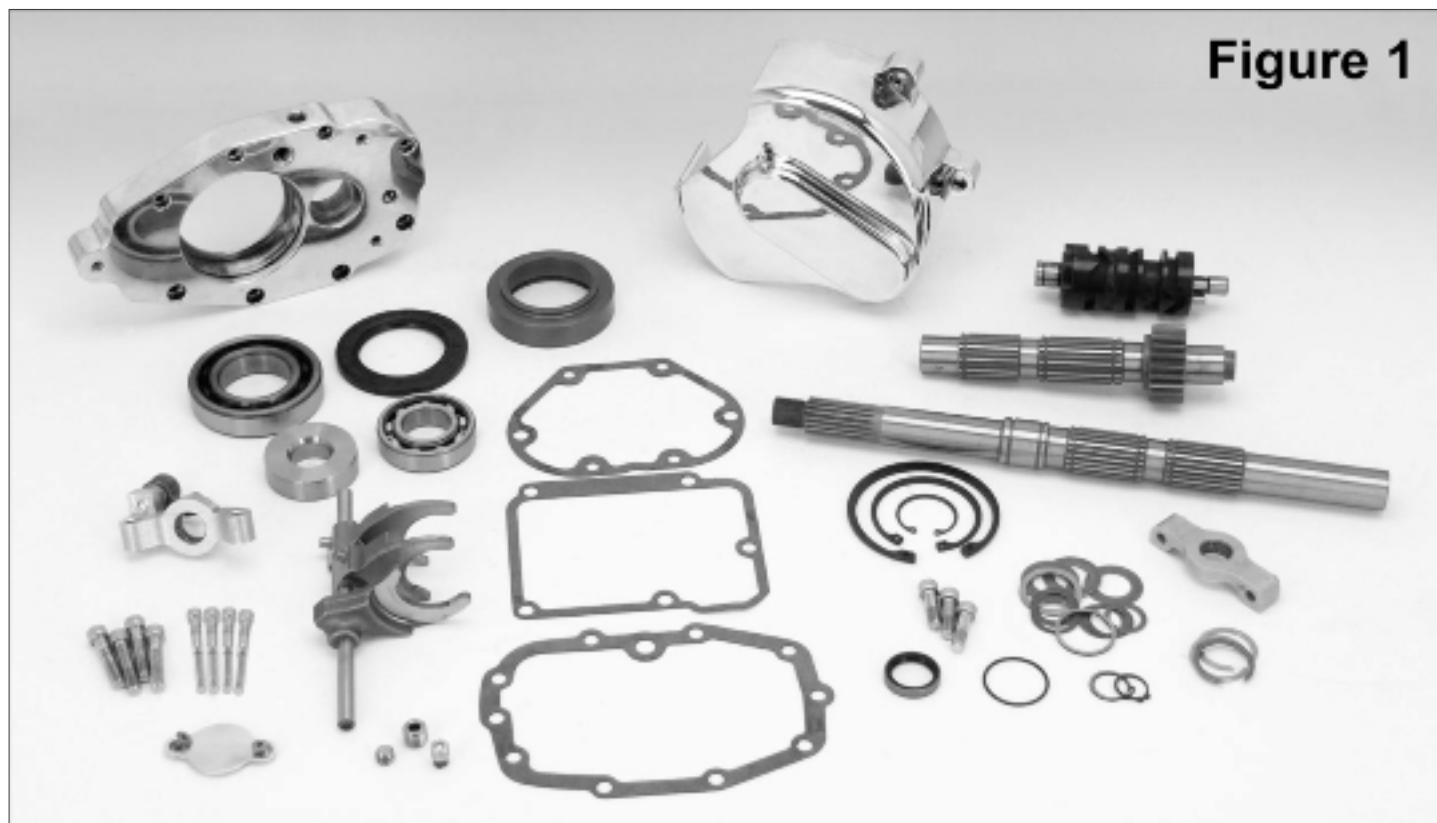




# ZPN 701802,701804

## ZODIAC'S RIGHT SIDE DRIVE (RSD) (CONVERSION) KITS

Zodiac's Right Side Drive (RSD) (conversion) kits are designed for installation into 1994 to present 5-speed Big Twin transmission and have the same gear ratios as the OEM transmission. The RSD conversion kit allows the user to run the secondary drive output from the right side of the transmission housing, instead of the conventional left side configuration. The right side secondary output allows a zero offset engine placement for proper vehicle balance when installing 280-300 and 330 tires.



Kits feature a Heavy Duty CNC machined billet trap door, 20ChMnT gears and shafts, roller detent shift system, one piece counter shaft & fifth gear. The use of the one-piece countershaft and 5th gear design eliminates the common weak point in other left side drive transmissions, making the Zodiac transmission useable in 180+ HP applications. The RSD kits come with hardware as shown in figure 1.

The Zodiac RSD kits should be installed by qualified mechanics with knowledge of 5-speed transmissions. If they have never serviced a 5-speed Harley they should not attempt this installation project. It is highly recommended that a genuine parts catalog (1991- up) and Factory Service Manual are available for reference for the installation. The installation instructions make frequent reference to the Factory Service Manual.

The electronic speed sensor is installed in the same position as in a stock 5-speed. However, you must sandwich a spacer washer between the underside of the sensor and the transmission case for proper sensor spacing relative to the 5th main drive gear that is triggering the sensor. As the sensor in a stock 5-speed transmission is triggered by the 4th main shaft gear, but by the 5th main shaft gear in the RSD setup you will need to use a re-calibration unit to correct the speedometer reading, or alternatively a programmable aftermarket speedometer. Re-calibration units and programmable speedometers are available through Zodiac.



Transmission oil volume is 20-24 oz. (600-700 cc) and is filled either through the speed sensor hole in the case, or the 1/4" pipe plug in the trap door. We recommend the use of Spectro 75-W140. Remove the 1/4" pipe plug from the top of the trap door and fill the transmission with 20-24 oz. (600-700 cc). Re-install the pipe plug. With the bike level and in upright position, the fluid level can be checked by removing the 1/8" pipe plug from the trap door. If the fluid level is too high, it will run out of this port. A 1/8" pipe plug is on the bottom of the door for draining the fluid.

### Special tools

The only special tools required are tools that would also be required for any 5-speed installation. For removing and installing the 1 7/8" transmission sprocket nut OEM 94660-37A or aftermarket equivalent is required. For installing the gear set into the case (see gear set installation), OEM 34902A or aftermarket equivalent is required. This is the same tool that is commonly used for removing and installing the inner bearing race (OEM 34091-85) on the mainshaft.

### Installation Instructions

Disassemble the transmission main shaft, counter shaft and gears according to the OEM workshop manual, remove the l/h main bearing, remove all gears from the main and counter shaft and clean all parts thoroughly.

### IMPORTANT

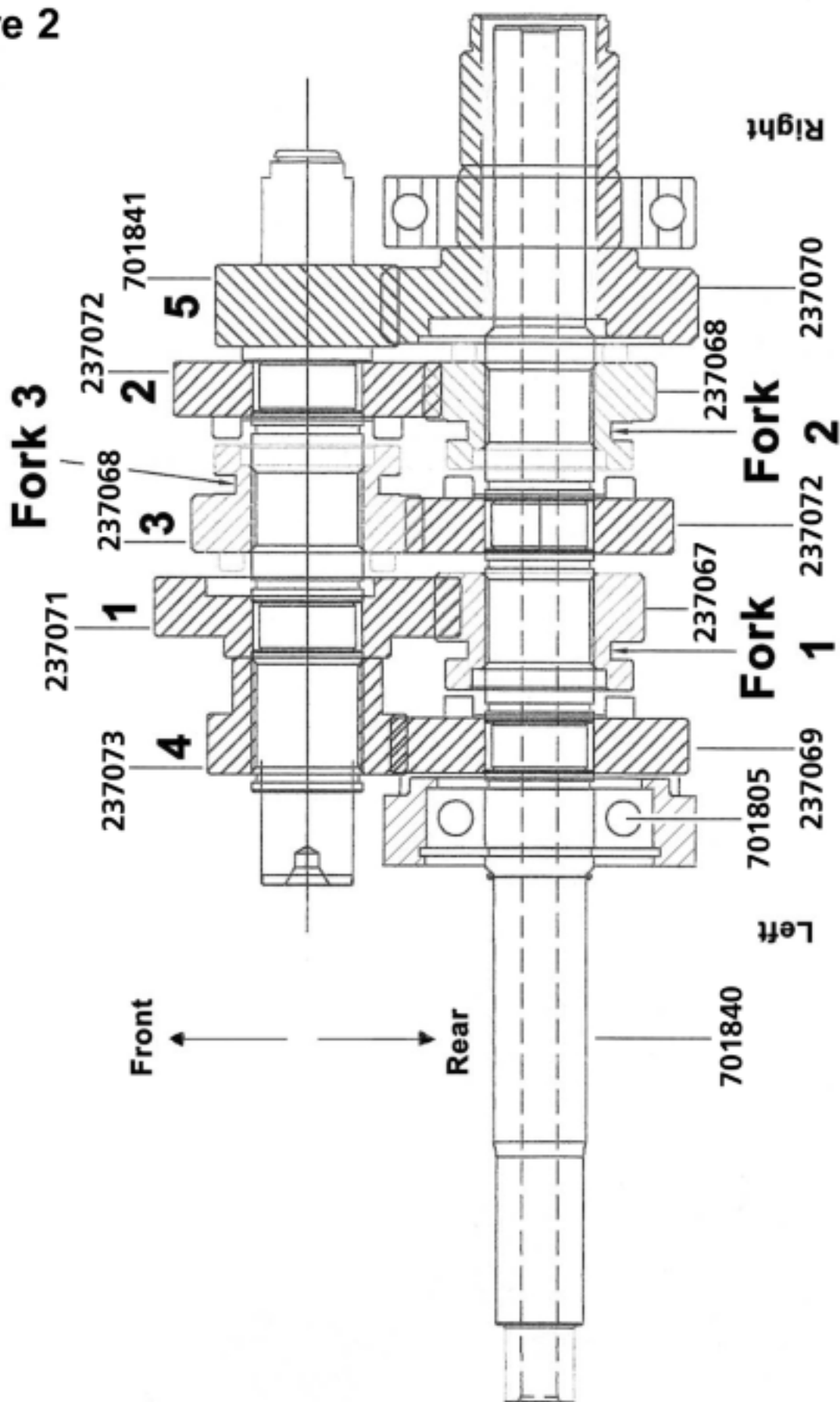
Pre-2000 style cases are ready for conversion, on 2000 up models a pre 2000 style ratchet and bushing (ZPN's 292308, 144731, 234364, 720153 and 302091) should be installed.

Press the reducer spacer bearing assembly into the large bearing bore on the left side of your case with the snap ring facing outwards.

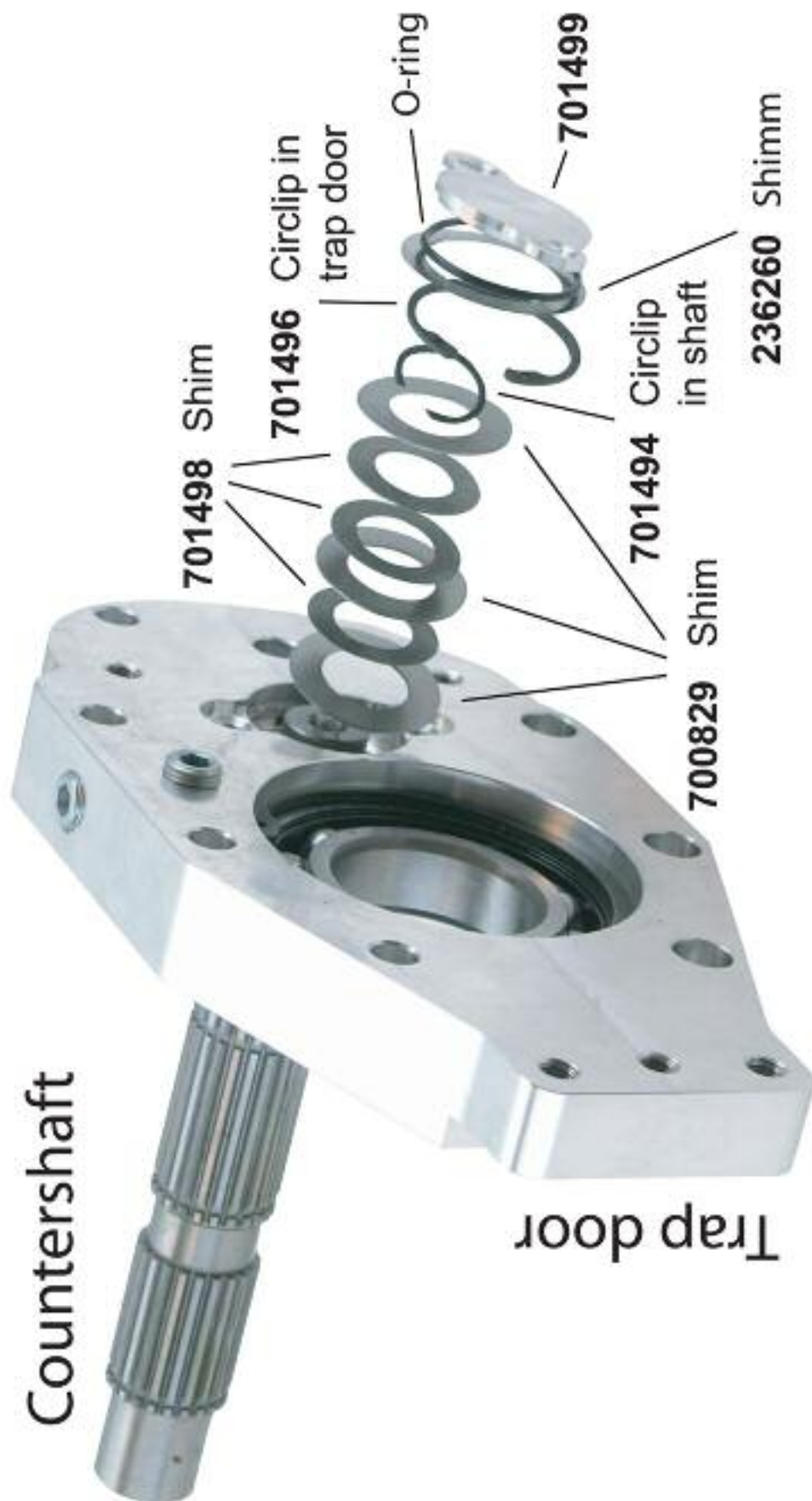
Re-arrange and re-install gears as shown in **figure 2**. Install shafts in the trap door and place shims on the counter shaft as shown in **figure 3**. Place the side door gasket (provided) onto the case dowel pins. As a 'cartridge' unit, slide the gear set into the case (**figure 4**). Draw the mainshaft through the bearing with special tool (OEM 34902A), and a 2 1/2" long black pipe spacer (**figure 5**). Install Shim 42x30x0,2mm and then the retaining ring that you removed earlier onto the end of the mainshaft; install it from the left side of the case (**figure 6**).

Tap the trap door onto the dowels with a nylon hammer. Install the eight screws (4 pcs. 1/4-20 and 4 pcs. 5/16-18) into the door. Torque the 1/4-20 screws to 7-9 ft-lbs (10-12 Nm) and the 5/16-18 screws to 13-16 ft-lbs. (18-22 Nm).

Put approx. 2 oz. (60 cc) transmission oil on the gears and shafts. Position the slider gears (forks will be installed on in the next step) in a neutral position. In other words, position the slider gears in the middle of the adjacent gears so that there is no dogtooth engagement on either side. Spin the mainshaft over to make sure everything rotates freely.

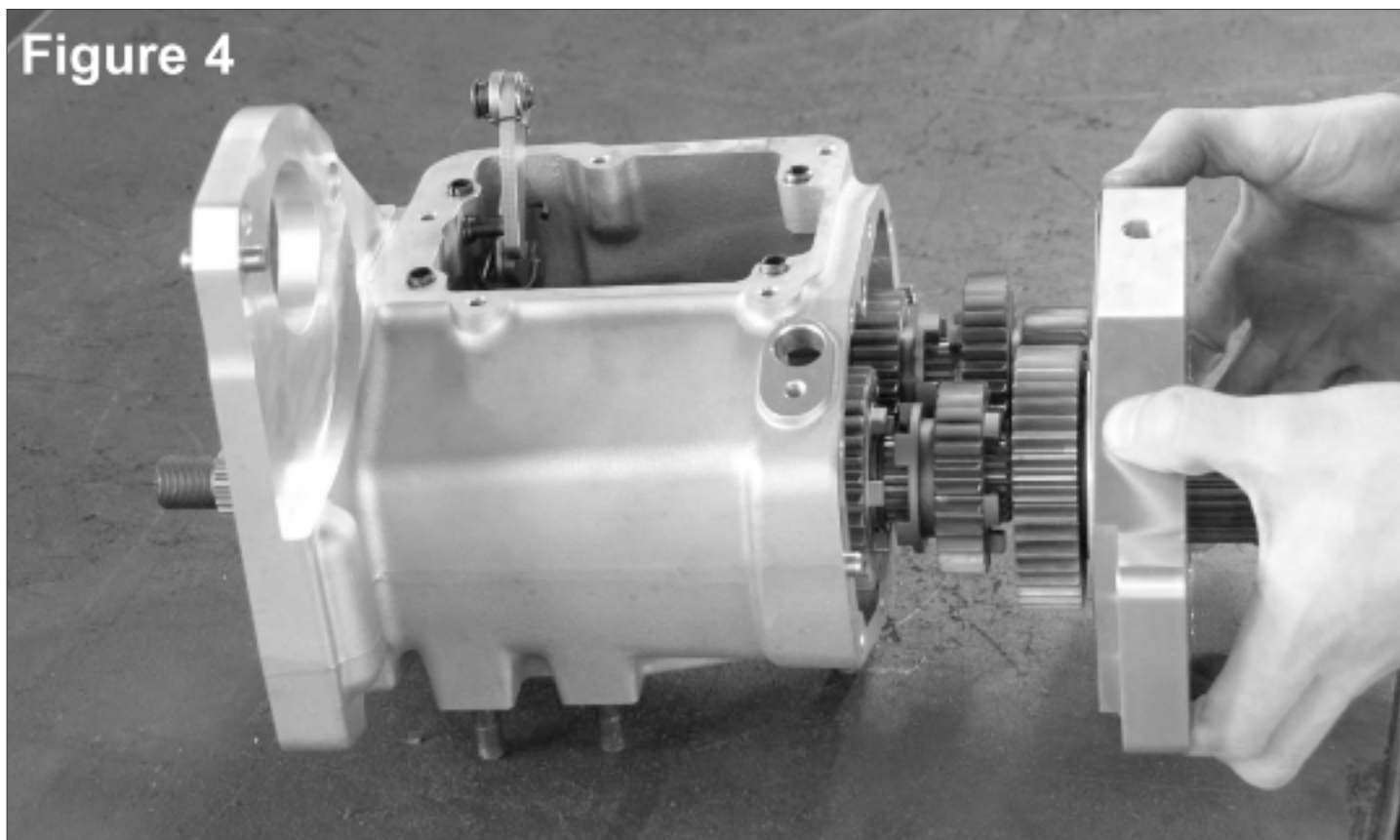


**Figure 3**

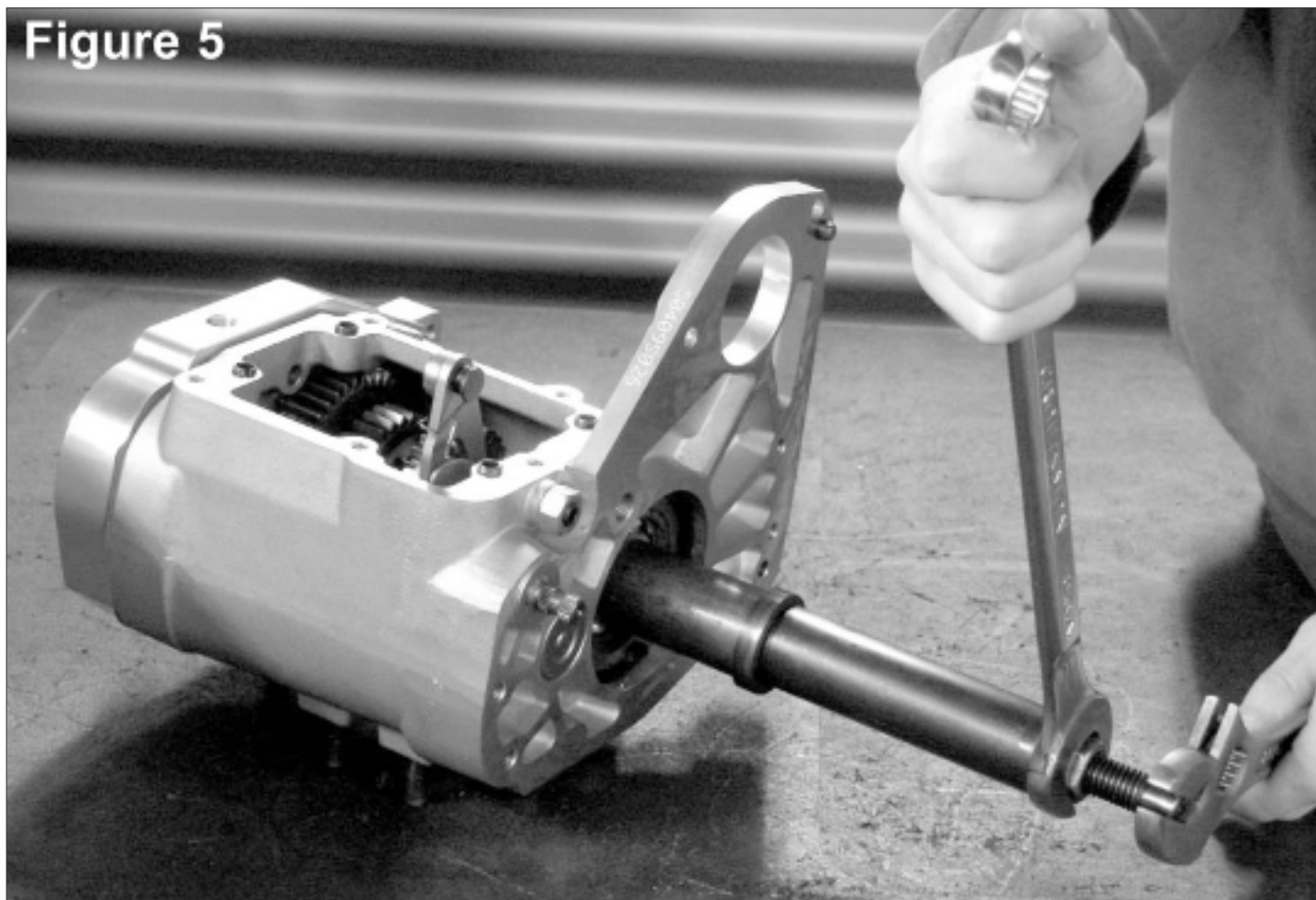


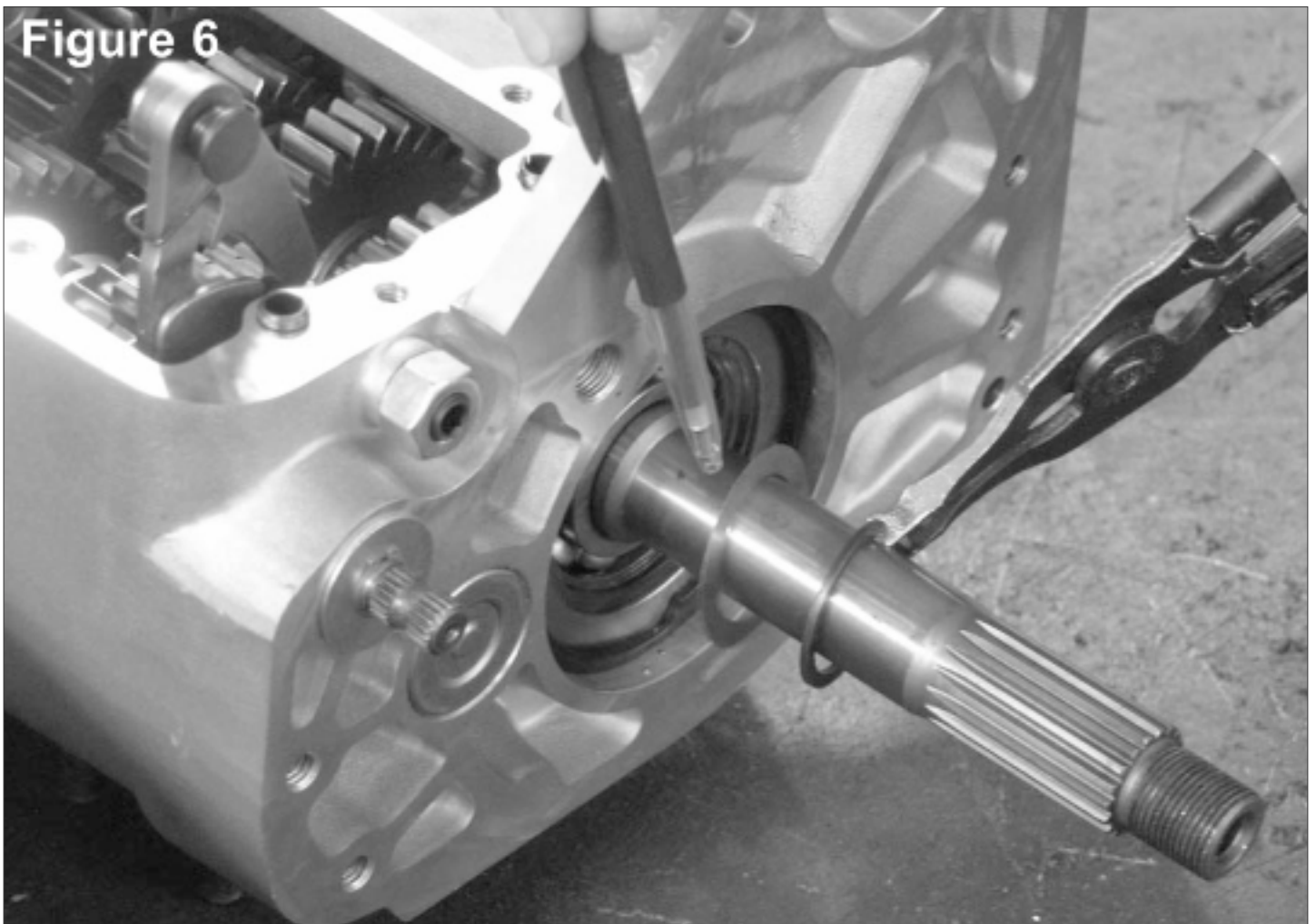


**Figure 4**



**Figure 5**





Drive the left side seal race onto the mainshaft with the two 3/8-16 blind screw holes facing out. This can be accomplished one of two ways. The easiest way is to heat the seal race in an oven for an hour at 250°F. Simultaneously put a bag of ice on the mainshaft to cool and contract it. Rapidly slide the race seal onto the mainshaft until it stops. The alternate way is to use special tool P/N H-D 34902A together with a 1 1/2" pipe spacer and drive the seal race onto the shaft as shown in **figure 7** until seated.

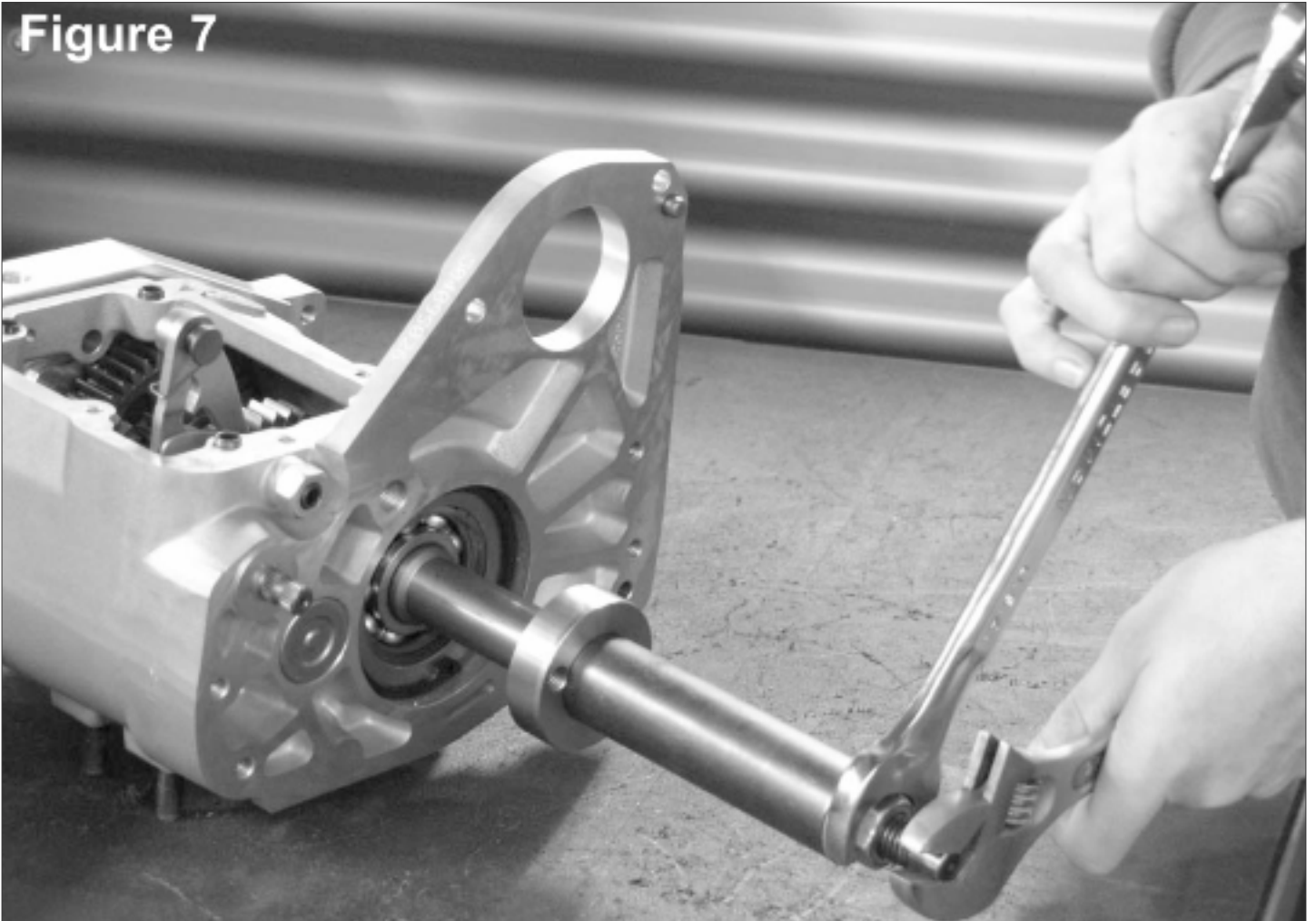
After the seal race is installed, install the provided main drive seal ZPN 022054 (OEM 12067A) over the seal race (pulley spacer) into the left side of the case like a conventional factory 5-speed. Be careful not to fold the lip of the seal over.

### Forks and shift drum installation

Install the three forks onto three gears. Note that there are two forks that are quite similar in shape but are marked with '1' and '2' dots. The 3rd fork looks completely different and carries '3' dots.

Fork '3' goes onto the 3rd countershaft gear. Fork '2' goes onto the 2nd main gear, and fork '1' on the 1st main gear with the 4" dowel pin tucked inward. See **figure 2**.

When using conversion kit, OEM Fork rod **MUST** be shortened to 178mm.

**Figure 7**

Slide the fork rod through the forks. Move each fork back and forth to check that it moves freely. Assemble the left side pillow block (the one with the spring loaded detent arm) to the drum. Install the shim provided and the retaining ring just like a stock left side drive 5-speed; see your Factory Service manual. The shim for the drum has been pre-matched to the drum and pillow block assembly and complies with Zodiac endplay specifications.

Install the drum and pillow block assembly onto the top case dowels using the 4 pcs. OEM 1/4"-20x1-1/4" cap screws and blue Loctite. The detent lever faces downward into the case.

Install your own shifter arm (not provided with kit) onto the splines of the ratchet pawl and tighten down the pinch bolt. Bench-shift the transmission to make sure that the fork actuation is correct. To bench shift any transmission, you must simultaneously rotate the mainshaft as you are shifting.

Install the top cover of your choice. If the top cover is not a stock-style cover, then make sure that the top cover allows the detent arm on the right side pillow block to actuate freely. Check if the neutral switch works properly with an Ohmmeter.

Re-install transmission, primary drive and other removed according to the Factory Service Manual.



## Bill of Materials

ZPN	Description	Qty. in 300 Kit ZPN 701804	Qty. in 330 Kit ZPN 701802
022054	Oil seal mainshaft	2	2
193036	Belt pulley 32T 3/4" offset BT 94up	-	1
234897	S&S Socket head Plug 1/8"-NPT	1	1
236260	Steel fillring 24 x 36 x 0.5mm	1	1
236897	1/4" UNF plug zinc plated	1	1
239900	Needle bearing main drive gear 5spd OEM 35051-89	1	1
239902	Mainshaft case bearing 5spd OEM 8996A	1	1
239907	Needle bearing shift drum	1	1
239908	Needle bearing shift drum support RSD #9114	2	2
700829	Steel gear washer 20 mm x 35 mm x 1 mm	3	3
701493	Cir-clip Bearing spacer in transmission housing	1	1
701494	Cir-clip counter shaft bearing	1	1
701495	Bearing shims trapdoor 5 speed RSD	1	1
701496	Cir-clip trapdoor bear 5 speed RSD 37X1.2	1	1
701498	Bearing shims trapdoor 5 speed RSD	3	3
701499	Bearing cover Trapdoor 5 speed RSD	1	1
701500	Trapdoor RSD 5-spd w/o bearings	1	1
701501	Shifter fork #1 RSD 5-speed	1	1
701502	Shifter fork #2 RSD 5-speed	1	1
701503	Shifter fork #3 RSD 5-speed	1	1
701504	RSD Pillow block RSD 5-spd w bearing	1	1
701505	L/H Pillow block RSD 5-spd W bearing	1	1
701506	Bearing spacer mainshaft RSD	1	1
701508	Bearing spacer l/h transmission housing RSD	1	1
701510	19 MM Pulley cover spacer	-	1
701514	Bearing race mainshaft RSD 5-speed	1	1
701515	Clutch pushrod 330 for RSD kit	-	1
701805	Mainshaft bearing for RSD trapdoor	1	1
701840	Mainshaft for RSD	1	1
701841	Counter shaft for RSD 5 speed	1	1
701842	Shift Drum 5 speed for RSD	1	1
720154	Thrust washer #33206-80	3	3
720178	Magnetic pipe plug 1/8 NPT OEM 739A	1	1
	5/16-18x1.000" Allen head screw	3	-
	5/16-18x1.750" Allen head screw	-	3
	10-24UNC x 5/16" Socket head screw	2	2
	O-ring bearing cover Trapdoor RSD 5 speed	1	1
	Gasket trapdoor 5 speed 79-up, OEM 35652-79B	1	1
	Transmission topcover gasket OEM 34904-86C	1	1