Ural (Урал) - Днепр (Днепр) Russian Motorcycle Part XXXI-8: Disassembly of Drive Train

(Also See Part XXXI: Drive Chain Evolution,
Part XXXI-1: One-Wheel Drive (1WD),
Part XXXI-2: Two-Wheel Drive (2WD),
Part XXXI-3: Full-Time 2WD with non-Locking Diff,
Part XXXI-4: Full-Time 2WD with Locking Differential
Part XXXI-5: Full-Time 1WD with Engageable 2WD (non-Diff),
Part XXXI-6: Gears and Gear Ratios,
and Part XXXI-7: Drive Train Components)

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10 / 2018
# Final Drive (FD) Trouble-Shooting

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<th>Cause</th>
<th>Symptoms and diagnosing</th>
<th>Remedy</th>
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<td>Runout of propeller shaft</td>
<td>Play in universal joint cross due to falling out of circlip which holds the needle bearing in place</td>
<td>Remove hood and check the condition of circlip</td>
<td>Dismantle propeller shaft. Check the condition of universal joint cross. Wash the cross, bearings and universal joint fork, pack with grease.</td>
</tr>
<tr>
<td>Noise in final drive</td>
<td>1. Lack of oil in final drive casing</td>
<td>1. Check oil in casing</td>
<td>1. Add oil</td>
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<td></td>
<td>2. Backlash between the teeth of gears too small or too great (the allowance being 0.1 to 0.3 mm)</td>
<td>2. Remove final drive and send to repair shop for checkup</td>
<td>2. Readjust the backlash. If need be, replace the final drive or its separate parts</td>
</tr>
<tr>
<td>Overheating of final drive casing</td>
<td>1. Lack of, or poor lubricant</td>
<td>1. Check the quantity and quality of lubricant</td>
<td>1. Top up or replace lubricant</td>
</tr>
<tr>
<td></td>
<td>2. Wear or damage of parts</td>
<td>2. Dismantle and check in a repair shop</td>
<td>2. Repair the final drive. Replace the drive or worn parts</td>
</tr>
<tr>
<td></td>
<td>3. Play of rear brake pedal misadjusted</td>
<td>3. Play of brake pedal small or absent</td>
<td>3. Adjust the play correctly</td>
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Ural Rear Axle

• The Crankcase of the Rear Axle Has a Pair of Gears That Transmit Torque from the Transmission to the Rear Wheel
  – The Final Drive Ratio Is 1: 4.62 – 8 Teeth on Drive Gear and 37 on Driven Gear
  – Gear “Set” Is Matched at the Plant, so Replace with Matched Pairs
  – Necessary Clearances Must Be Provided Within the Rear Axle Casing
• Repair Is the Timely Replacement of Bearings, as They Wear and Change the Gap Between the Teeth of a Pair
• First Sign of Trouble in the Rear Axle Is Increased Noise When Coasting
• The Crankcase Is Filled with 100 - 150 cm³ of Transmission Oil
  – Old Ural Models Tend to Leak Oil from the Rear Axle Crankcase, Due to the Poor Quality of the Seals, but Also May Be a Sloppy Assembly or Weakening of the Seals
  – Newer Models Are Much Better, with Better Workmanship
Repair of Ural and Dnepr Final Drive

• Over Time, Gimbal and Main Transfer Might Be Accompanied by Noise and Knock
  – Sources Are Usually Worn Pair of Parts Which Formed an Increased Gap
  – The Greater the Gap, the Greater the Risk of Unexpected Failure
• Without Waiting for the Moment of Emergency, It May Be Necessary to Repair the “Noisy” Unit:
  – Remove the Transmission and Drive Shaft from the Bike
  – Arrange as Shown Below, Providing the Required Interfaces, Depending on Part Size and Adjustments
  – After Thorough Washing in Kerosene or Detergent Solution, Evaluate Their Suitability for Use, Table I
• Repair If:
  – Inner Sleeve Diameter (7) Is Greater than 46.05 mm and Clearance Hole in Crankcase Greater than 54.04 mm
  – Diameter Hole Cam Brakes Greater than 20.07 mm
  – Hub Bore Diameter Is Smaller than 33.74 mm and Bearing Less than 34.98 mm
Ural Drive Train

1 – crankcase bushing; 2 - oil seal spring; 3 - spacer; 4 - cover; 5 - screw; 6, 35, 42 - nuts; 7, 49 - bolts; 8 - main gear assembly; 9 - sump; 10, 12 38, 48 - bearings; 11 - leading gear wheel; 13-adjusting washer; 14 - press washer; 15, 46 - spacers; 16 - bearing nut of reverse gear; 17 - spacer; 18 - wedge bolt; 19 - universal joint fork; 20 - oiler; 21-core; 22 - propshaft; 23 - shaft cover; 24 - sealing ring, 25 - lock ring; 26 - coupling disk fork; 27 - circlip; 28 - holder; 29 - coupling sleeve; 30 - elastic coupling; 31 - propeller shaft assembly; 32 - roller; 33 - washer; 34 - cotter pin; 36 - O-ring; 37 - sealing ring holder; 39 - locking ring; 40 - drain plug; 41-gasket; 43 - spring washer; 44 - hairpin; 45 - crankcase cover; 47 - adjusting washer; 50 - stop plate; 51 - nave of conducted gear wheel; 52 - driven gear; 53 - spacer ring; 54 - spacer sleeve; 55 - brake lever; 56 - washer; 57 – brake cam
<table>
<thead>
<tr>
<th>Part and #</th>
<th>Nominal Sizes and Tolerances (mm)</th>
<th>Mating Part</th>
<th>Nominal Sizes and Tolerances (mm)</th>
<th>Clearances (mm)</th>
<th>Натяг (mm)</th>
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<tbody>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Min.</td>
<td>Max.</td>
</tr>
<tr>
<td>Bevel Gear 72052-2</td>
<td>52mm -0.013</td>
<td>Cardan 6205101</td>
<td>52mm +0.030</td>
<td>0.000</td>
<td>0.043</td>
</tr>
<tr>
<td>Bevel Gear 7205202</td>
<td>20mm -0.014</td>
<td>Bevel Gear 72052-2</td>
<td>20mm -0.010</td>
<td>-</td>
<td>0.014</td>
</tr>
<tr>
<td>Bevel Gear 7205202</td>
<td>13mm +0.019/+0.007</td>
<td>Bevel Gear 72052-1</td>
<td>13mm -0.010</td>
<td>-</td>
<td>-</td>
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<tr>
<td>72051-1</td>
<td>32mm -0.011</td>
<td>Cardan 6205101</td>
<td>32mm -0.007/-0.035</td>
<td>-</td>
<td>0.004</td>
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<tr>
<td>Bushing 7205104</td>
<td>54mm +0.065/+0.045</td>
<td>Cardan 6205101</td>
<td>54mm +0.030</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Distance Bushing 7205110-A</td>
<td>28mm +0.200/+0.100</td>
<td>Main Drive Cover 7205121-Б</td>
<td>28mm +0.033</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Shock Absorber Body 7209201</td>
<td>25mm -0.025/-0.085</td>
<td>Distance Bushing 7205110-A</td>
<td>25mm +0.045</td>
<td>0.025</td>
<td>0.130</td>
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<tr>
<td>Ball Bearing 207</td>
<td>72mm +0.004/+0.017</td>
<td>Hub 7205229</td>
<td>72mm -0.008/-0.040</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Main Drive Cover 7205121-Б</td>
<td>35 +0.015/+0.010</td>
<td>Ball Bearing 207</td>
<td>35 +0.003/-0.015</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Hub 7205229</td>
<td>82mm -0.023</td>
<td>Spiral Bevel Gear 7205227</td>
<td>82mm +0.030</td>
<td>0.000</td>
<td>0.053</td>
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<tr>
<td>72053-2</td>
<td>19mm -0.0009</td>
<td>7205301-Б</td>
<td>19mm -0.023</td>
<td>-</td>
<td>0.009</td>
</tr>
<tr>
<td>Universal Joint Spider 7205311</td>
<td>10mm -0.010</td>
<td>72053-2</td>
<td>10mm +0.035/+0.015</td>
<td>0.015</td>
<td>0.045</td>
</tr>
</tbody>
</table>
Dimensions of Final Drive (FD)
• Regulate the Tightening of Inner Ring of the Radial Thrust Bearing on the Drive Gear
• When Installing Washers and Splined Fork (19) Cardan, the End of the Wedge Bolt (18) Should Not Be Buried in the Plane of the Boss on the Fork
• After Preliminary Assembly, the Wedge Bolt Is Fixed with a Nut (35), by Inserting a Washer (33) Under It, and a Cotter Pin (34)
• The Connection Can Be Considered Tightened Normally If the Drive Gear Rotates Easily Without Jamming
• After Assembling the Main Gear, Check Gear Engagement by Applying a Thin Layer of Paint to Teeth Surface of the Driving Gear. Return the Cover and Turn the Drive Gear Several Times. Then, Remove the Cover and Judge the Quality of the Engagement by the Prints of the Dye on the Teeth. The Contact Spot Should be as Shown Below. Possible Distortions and Ways to Correct Them Are Shown in the Table.
• More Important Than Lash Is Tooth Contact Area
• Get Some Dark Blue Oil Color Artists Paint or Lipstick
• Coat the Pinion Gear Lightly
• Assembly and Spin the Input Shaft Enough to Run the Ring (Crown) Gear Around a Half Dozen Times
• Open the Case and Inspect the Ring Gear for Traces of Paint About Half-Way Up the Tooth and Most Completely Across It’s Length
• Shows Pinion Gear With About 2mm at End of Each Tooth Not Covered in Paint (Lipstick)
Dnepr K-650 / MT-8 Final Drive Disassembly

• The Final Drive Should Not Be Disassembled, If Not Quite Necessary

• If Final Drive Is Disassembled
  – Re-assembly Should Take Care to Ensure Adjusting Washers (9 and 27 are Re-installed
  – Washer (27) Is Used to Adjust the Clearance between Gear Teeth
  – After All the Nuts Are Tightened, the Gears Should Turn without Obstruction, When Rotated by Hand, without Jerking or Seizure
  – Clearance between the Gear Teeth Should Be Felt by Hand When Rocking the Drive Shaft, with Hub (5) of the Driven Gear in Position

• Oil Level in the Final Drive Casing Should Reach the Upper Mark on the Dipstick
  – Channels Connecting the Dipstick with the Atmosphere Should Be Cleaned

• Propeller Shaft Universal Joint Cross (14) Is Lubricated through Fitting (15)
  – To Grease the Joint Cross, Remove the Rubber Packing Ring (19)
  – Side Towards the Middle of the Propeller Shaft
  – Use a Wrench to Unscrew the Cap (20)
  – Note That the Cap Is Left-Handed and Unscrewed Clockwise

1 - dipstick with breather; 2 - drain hole plug; 3 - final drive casing; 4 - needle roller; 5 - driven gear hub; 6 - gland cover; 7 - gland; 8 - drive pinion needle bearing; 9 - key tightening adjusting washer; 10 - nut bearing; 11 - gland; 12 - wedge bolt; 13 - universal joint cross needle bearing; 14 - universal joint cross; 15 - lubricator; 16 - propeller shaft elastic coupling; 17 - coupling disk; 18 - propeller shaft; 19 - packing ring; 20 - universal joint cap (cardan cowl); 21 - universal joint fork; 22 - locking ring; 23 - drive gear ball bearing; 24 - drive pinion; 25 - driven gear ball bearing; 26 - casing cover; 27 - adjusting washer; 28 - adjusting washer; 29 - driven gear; 30 - gasket
Repair and Adjustment of Main Transfer

• Failure of Main Transfer Gear Teeth
• "At Risk": Motorcycles with Sidecars, Whose Owners Ignore Factory Recommendations on Capacity
  – Particular Drive Models Whose Transmission Often Experience Increased load
  – Many "Ural" and "Dnepr" Owners Replace the Sidecar Final Drive to "nine" – (name comes from # of pinion teeth)
• Make No Mistake, This Is Not Simple
  – Hardest Part Is Adjusting the Gearing and the Gap Between Them
  – Procedure Requires Skill, Time and Patience
• Buy Spares as “Paired“
  – Gears are Numbered:
    Before Heat Treatment Gear Roll Pairs to Each Other and Only Then Subjected to “Pairing”
  – Avoid Buying Products of Dubious Origin!
  – In Concert with the “Pair,” Buy a New Collar Gasket
• Step 1. Not Yet Dismantled the Rear Drive
  – Drain the Oil
  – Unscrew the Cover screws
  – Remove the Collar
  – Remove the Seal
2. Remove nuts and separate it from the crankcase cover, together with the hub and the driven gear. When separating the cover, the needle bearings will fall out. Collect them and count - should be 45 pieces.

3. Take the rear wheel axle and insert it all the way, as shown in the photo, apply a few hammer blows to the end face of the axis. Pressed into the cover of the rear drive or together with the bearing from the cover.
4. If there are signs of wear on the ball bearing hub, remove it from the cover using a casing universal puller. Throw it away, and press in a new bearing hub.

5. Take the wrench that is used to adjust the preload spring suspension, and unscrew the nut ball bearing pinion (note: left-hand thread). Then remove the rubber ring seal, washer and spacers (if you have not removed previously, remove the fork of the universal joint with slotted shank pinion).
6. Now take out the crankcase main gear pinion with double-ball bearing. During this operation of the outer race, needle roller bearings may drop. Do not lose them.

7. Needle bearing shank should show virtually no wear and its inner race serves as a "pennant" for new top gears. Try to remove this clip with two powerful screwdrivers. If you fail, or grind on Emery part of teeth to grab hold of a stripper clip, or do cut the "grinder" part of the liner flush with the clip, and then drive out of the lot unwanted residue pinion.
8. Take the driveshaft fork (or the entire shaft assembly), a new lead pinion, double-row bearings, spacers and wedge bolt. Put on the pinion bearing, then the ring, plug and drive gimbal wedge bolt. The internal, consisting of two rings, double ball bearing cage is "sandwiched" on one side shoulder shank, and the other - with a fork cardan. This is due to the fact that one facet of a tapered wedge (it should "look" forward along the bike). When you butcher it, fork runs into bearing, rigidly fixing it on the drive gear. The thickness of the package spacers chosen so that the head of the wedge has performed at a few millimeters above the surface of the plug, and the pinion gear easily without jamming (but no perceptible end play) rotating in the bearing.

9. To achieve the greatest durability and lowest noise, adjust the engagement of the gears axially with each other.
10. And the last step - setting collar seal. Use some old screwdriver with no sharp edges - and charge her seal lip on the working surface of the hub. Yes look to spring not come off! Set the rear casing on the bike. Adjust start after replacing the gears. Coat the driven gear teeth thin layer of paint and fully assemble the transmission. Be sure to install crankcase cover gasket main gear!

Its thickness directly affects the location of the crown wheel to the master (the thicker the pad, the more gear). If you use a sealant instead of gaskets, then consider the thickness of its layer approximately 0.1-0.2 mm, subtracting it from the thickness of the spacer washers.

Turn the ring gear for a few speeds and dismantle “rear drive.” Carefully inspect the shape and location contact spots on the teeth of the driven gear.

Then adhere to the table with drawings.

If you decide that this is too difficult to choose a thickness of shims so that the gap in the gearing was minimal. This is about corresponds to the recommended manufacturers gap to 0.1-0.3 mm.
Power is delivered from the gearbox to the rear wheel by a drive shaft ("propeller shaft") and final drive with bevel gears. The drive shaft is connected to the gearbox via a flexible rubber collar that helps dampen torque impulses and a universal joint to allow suspension travel of the rear wheel (Figure 7.1-1).
The final drive is a cast housing containing a helical bevel gear set that turns the rear wheel at a lower speed than the shaft. The casing also serves as a backing plate for the brake shoes, an oil reservoir and a support for the right-hand end of the rear wheel axle. The casing has an oil drain hole at the bottom that is blanked off with a plug. Cover (34) attached to the casing has a slot and two studs used to fasten the whole drive to the swinging fork arm of the rear suspension. A fill hole is provided in the cover.

Gear backlash is adjusted via adjusting washers (35) installed between the side portion of casing cover and the inner race of ball bearing (36). For proper performance of the drive a .004 in. / 0.1 to 0.3 mm backlash is necessary between the active faces of gears.

Maintenance of propeller shaft and final drive. The daily maintenance involves tightening the nuts which fasten the final drive to the swinging fork arm. Failure to tighten the nuts in due time results in loose joints and destruction of the final drive cover.

Every 5,000 km change oil in the final drive casing. Refilling requires 0.23 pints of premium grade automotive EP gear oil, SAE 80 or 90.

Every 10,000 km, lubricate the needle bearings of the universal joint cross. Dismantle the final drive and using a grease gun stuff grease into the cross through the grease cup.
7.2 Removal and Installation of Final Drive

To remove the final drive together with the propeller shaft:
1. Set the motorcycle on the center stand and remove the rear wheel.
2. Slacken off the wing nut of the rear brake tie-rod and disconnect it.
3. Unfasten the nuts from the studs fastening the final drive to the swing arm.
4. Detach the final drive from the swinging fork arm and pull it straight back.
5. Remove the flexible joint flange off the propeller shaft to facilitate its passing through the hole in the swinging fork girder.

To reinstall the final drive, reverse the sequence of operations.

7.3 Removing and Reinstalling Propeller Shaft

To disconnect the propeller shaft from the final drive proceed as follows:
1. Uncotter the nut of the wedge bolt, unscrew the nut and using a soft mandrel knock the wedge bolt out.
2. Remove the splined fork of the shaft from the driving gear shank (by slightly knocking with a soft hammer).
3. Having disconnected the propeller shaft, wash it and inspect, paying particular attention to the universal joint. The bearings should rotate with no resistance or excessive play. If necessary, dismantle the universal joint.
7.4 Removing and Reinstalling the Rear Swing Arm
(rear wheel and final drive removed)

To remove rear swing arm:
1. Undo top and bottom bolts securing shock absorbers and remove them.
2. Unbend the tabs of the "shakeproof" lock washers at the swing arm pivots and screw out the pins.
3. Pull the swing back, and turning it, take it out of the frame.

Reinstall the rear suspension by reversing the sequence of the operations given above. When mounting the swing arm, tighten up the silent blocks fastening pins with the swing in the middle of it's arc (the swing arm should be positioned parallel to the bottom tubes of the frame). Reinstall the spring-loaded hydraulic shock absorbers.

The tightening torque of the pins is 55 foot/pounds / 75 Nm.

Tightening torque of the shock absorber bolts is:
- Top: 20 foot/pounds / 27 Nm
- Bottom: 30 foot/pounds / 40 Nm
7.5 Driveshaft and Universal Joint Repair

Dismantling and reassembling the universal joint (with the propeller shaft disconnected from the final drive). Refer to Figures 7.5-1, 7.5-3.

To dismantle the universal joint:
1. Remove the lock rings from the propeller shaft holes and from the splined fork (for the universal joint cross pins).

Fig. 7.5-1. Pressing out of the needle bearings
Fig. 7.5-2. Reassembly of the universal joint
2. Lay the fork on the hand press and press out one of the needle bearings, until the universal joint cross thrusts against the fork. The opposite needle bearing cap will protrude partially out of the fork.
3. Clamp the protruding portion of the bearing in a vice and remove it.
4. Turn the propeller shaft and press out the second needle bearing out of the fork from the opposite side through the cross.
5. Take the holders and rubber sealing collars from the universal joint cross and separate the universal joint from the propeller shaft.
6. In the same manner, press out the needle bearings from the propeller shaft splined fork, take out the holders and sealing collars, then remove the universal joint cross.

Inspect all the parts carefully, paying special attention to the mated friction surfaces.
Check the condition of:
- The flexible joint coupling
- The propeller shaft splines
- The universal joint cross needle bearings

Reassemble the universal joint as follows:
1. Smear the inner surfaces of the needle bearings with grease and pack the needles into the bearings.
2. Turn the grease nipple into the universal joint cross, inserting it into the splined fork of the universal joint with the pins with the grease nipple facing out. (Fig. 7.5-2).
3. Fit the rubber sealing collars and holders on the inserted pins of the universal joint cross.
4. Press in the needle bearings. Ensure that the universal joint cross pin enters the bearing without disturbing the needles and that the bearing is fitted not deeper than required for installation of the lock ring, to prevent the cross being gripped by the bearings.
5. Fit on the lock rings.
6. Fit the propeller shaft on the second pair of the cross pins, fit on the sealing collars and holders in the same sequence, press in the bearings and mount the lock rings.

When reassembling the propeller shaft, pay special attention to the joint of the splined fork to the pinion gear shank. The slot in the pinion gear shank is tapered to allow tightening with the wedge bolt. Therefore, when fitting the splined fork on the shank, assemble the parts so the wedge hole tapers match. Insert the wedge bolt from the side of the boss with the shear facing the shank end. With the nut tightened up, the wedge bolt head should not sink in the boss. If the bolt head sinks too far into the boss, add thicker shims between the splined fork and the ball bearing. The tightening torque of the wedge bolt is 65 ft/lb. / 8.82 Nm.
7.6 Final Drive Disassembly
(with final drive removed from motorcycle)

Dismantling and Reassembling the Final Drive
(with the propeller shaft removed) Refer to figure 7.6-1.

Required tools are:
- Replacer 345-320-3 for removing the radial ball bearing of the pinion
- Puller 345-325-3 for removing the needle bearing inner race from the pinion
- Mandrel 345-810 for mounting the collar seal

To dismantle the final drive:
1. Remove the brake shoes.
2. Drain gear oil, fill the housing with kerosene or solvent, and wash the inner cavity by rotating the drive in both directions. Drain the solvent.
3. If it is necessary to remove the brake lever, mark the position of the lever on the brake cam before removing. Unscrew the nut fastening the brake cam lever and by knocking slightly with a soft hammer, drive the cam axle out of the arm. When reassembling, ensure that the brake lever is installed at 33 degrees angle back from the vertical centerline of the final drive.

Note: Before dismantling the drive for repairs, measure the backlash in the bevel gear pair which should be within 0.10 to 0.30 mm.

4. Turn out the screws fastening the seal cover, remove the cover and the rubber seal collar together with the spring.
5. Unscrew the nuts fastening the casing cover, remove the washers and by slightly knocking against the end of the driven gear hub, remove the cover together with gasket and the driven bevel gear in assembly with the hub.

6. Remove the rollers from the hub groove (45 rollers).

7. Remove the hub with the driven gear from the casing cover, inserting the rear wheel axle into the central hole until the hub rests against the distance bushing and holding the hub by hand, knock slightly against the axle end to press the cover from the bearing.

8. Press the ball bearing from the driven gear hub through the holes in the gear using a drift for the purpose. Take care to keep the bearing from cocking, when removing.

9. Unscrew the nut fastening the pinion gear bearing by turning it clockwise (left-hand thread) and remove the sealing ring.

10. Insert the wedge into the pinion gear shank slot, remove the pinion gear together with the radial-thrust ball bearing, remove the packing and adjusting washers.

11. Take the needles out of the bearing on the pinion shank.
7.7 Repairing The Final Drive

With the final drive disassembled, inspect the parts and measure the mating surfaces. By visual inspection, determine the condition of:

- threaded joints (for damage to thread, rigidity of the joints)
- oil seals
- casing bushing, that serves as outer race for the roller bearing of the driven gear hub
- side surfaces of the distance bushing
- race of the roller bearing and the teeth of the driven gear hub meshing with the wheel hub
- ball bearings
- Bevel gearing teeth (wear, pitting, crumbling of the working surfaces of the teeth). Pay particular attention to the wear pattern of the gear teeth. If the gears have damaged teeth, both pinion (final drive driving gear) and bevel (final drive driven gear) should be replaced as a matched set, and meshing adjusted. Gear sets are selected and run-in by pairs to ensure quiet operation.
Table 7.7-1 lists tolerated wear limits of parts related to the final drive. Parts worn beyond the recommended limits should be replaced. It is a wise precaution to replace all seals and gaskets.

Table 7.7-1. Maximum tolerated limits of clearances and wear between the principal mating members of the final drive and the propeller shaft, mm

<table>
<thead>
<tr>
<th>Name of parts and mating members</th>
<th>Maximum tolerances</th>
<th>Measuring point and method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>wear on diameter</td>
<td>diameter clearance</td>
</tr>
<tr>
<td>Ring gear hub splines</td>
<td>Tooth thickness</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>Propeller shaft cross pins (journal)</td>
<td>0.05</td>
<td>On working surfaces of journals</td>
</tr>
<tr>
<td>Final drive gears</td>
<td>Tooth thickness</td>
<td></td>
</tr>
<tr>
<td>Ring gear hub bearing</td>
<td>0.15</td>
<td>0.12</td>
</tr>
</tbody>
</table>

When replacing the bevel pinion and in order to remove the bearings, make use of remover 345-325-3 for the needle bearing inner race and replacer 345-320-3 for the radial thrust ball bearing. To press out the outer race of the needle bearing from the casing, heat the bearing to a temperature of 180 F / 75 to 90 C. Begin by pressing-out the bushing which serves as the outer race of the driven ring gear hub and then knock out the needle bearing outer race through the hole thus opened up.

Reverse the sequence of the operations, when reassembling the final drive. Prior to mounting the needles into the bearings smear the fitting points with lithium bearing grease to keep the needles from falling out when reinstalling the mating members.

The tightening torques:
- casing cover nuts 11 ft/lbs / 13.7 to 17.6 Nm
- pinion bearing nut 55 ft/lb. / 68.6 to 88.2 Nm
7.8 Final Drive with Driven Sidecar Wheel

To disassemble the final drive (model with differential):
1. Remove the two bolts attaching the propeller shaft fork to the sun gear flange and move the fork in the direction of the side-car giving access to the rear wheel axle nut.
2. Remove the wheel.
3. Remove the brake shoes.
4. Drain out the oil from the main drive gear case.
5. Remove the collar and the cover.
6. Remove the gear case cover nuts and remove the cover together with the gasket.

Differential body and gears:
1. Remove the nut from the cover together with the sun gear and seal.
2. Tap lightly to remove the differential body with seal from the cover.
3. Remove the epicycle gear with two sets of rollers and seal and spacer from the case.
4. Remove the driven conical gear with the hub.
5. Remove the needle rollers from the splines in the hub in the gear case.
6. Proceed further as described for the standard (single wheel drive) final drive assembly.

Before tightening the nut in the case cover, the sun gear flange with seal and ball bearing should be installed. The bronze ring should be positioned onto the sun gear neck next after the steel ring. After putting the main drive together, check and adjust the side play of the conical gears by tightening or loosening the nut in the case cover. When side play of .004 to 0.010 inch / 0.1 to 0.3mm is achieved, stop adjusting and fix the nut with the retainer.

Repair of the sidecar wheel shaft and drive (refer to Sidecar section)
To fit the rubber seal on the driven gear hub use mandrel 345-810.

Having completed the repairs and reassembled the final drive, check the gearing backlash and tooth contact. Backlash should be between .003 and .006 inch (0.07 to 0.16 mm). adjust it, if necessary, by inserted shims between the driven ring gear hub ball bearing and the casing cover wall and between the pinion and bearing in special situations.

**Backlash and gear mesh adjustment**
The following is a general procedure for final drive units of this type:

*NOTE: Before proceeding, allow the case and the bearing to cool down to shop temperature. If they are still hot it will give a false reading.*

1. With the ring gear installed in the case and into mesh with the pinion drive gear.
2. Attach a clamp to hold the pinion shaft securely so that it can't rotate in the case.
3. Temporarily attach a strap of metal to the output spline, leaving a short tab extending on a radial.
4. Secure a dial indicator on the case, pointing perpendicular to the tab.
5. Adjust the dial gauge to zero.
6. Gently rotate the ring gear back and forth through the limit of lash, and note the dial gauge reading.

Final drive gear backlash should be within 0.003 to 0.006 inch / .07 to 0.16 mm. If the backlash is incorrect, change the adjusting shims on the ring gear, substituting thicker or thinner shims to achieve backlash within tolerance.
If new gears or pinion bearings have been installed, gear tooth contact should also be checked:

1. Remove the ring gear and smear a coating of gear marking compound on several of the pinion teeth (lipstick can be used for this purpose).
2. Install the ring gear again. Pushing the ring gear towards the pinion, rotate the gears through several teeth to transfer the marking compound onto the other gear teeth.
3. Remove the ring gear and observe the pattern left on the teeth of the pinion.

The ideal wear pattern is with contact centered in the middle of the pinion tooth surface. If the contact pattern is towards the edges of the pinion tooth, the pinion shaft should be moved in or out of the case by changing the shim to a thicker or thinner shim.

When backlash and tooth pattern is acceptable, remove all traces of the gear marking compound and assemble the final drive.

Refer to section 7.8 for description of and repair of final drive for the Sportsman & Patrol Model Driven Sidecar Wheel.
Work on disassembly and repair gear made when removing the rear wheel of the motorcycle.

1. Remove two 17 mm nuts rear gearbox (four nuts on models with sidecar).

2. In case of withdrawal from the motorcycle gear with the rear drum loosening the adjusting nut drive drum with a 12 mm wrench.

Before removing the rear gear, it is advisable to drain the oil to avoid contamination of the workplace, and then pour in about 200 ml of kerosene. Rotating wheel, rear wash gear, then pour kerosene.
3. Unscrewing the nut, move the brake actuating lever back and remove the fittings.

4. Use open-end wrench 12 mm to loosen the two mounting bolts.
5. Remove the rear drive, shifting it to the left and back, remove the propeller shaft splines.

Before removing the brake pads, it’s best to label them to avoid confusion when installing the seats. Otherwise, after the assembly braking may worsen.

6. In case of removal gear, designed to work with drums, remove the gear housing with the brake pads.
7. Remove six 13 mm nuts or rear drive cover.

8. Resting drift of soft metal into the hub, light hammer blows separate gear case cover.
9. The final withdrawal of the gear cover is recommended on the bench, laid by blank sheet of paper. When the cover is removed the needle (in the bearings of the driven gear - 45 units) will fall out of their seats. They need to be collected and checked for abrasions, chips and other mechanical damage.

If any, or at least one, all the needles need to be replaced.

If you find damaged parts should be especially careful to check for damage other parts of the gearbox.

10. After removing the cover, remove the cardboard gasket and clean the mating plane of its remains gear and cover.
11. Take out the cotter pin castellated-nut bolt.

12. A 12 mm wrench removes the castellated nut wedge bolt fork drive shaft.
13. Hammer through a drift of soft metal to knock the wedge bolt.

Bolt has only one correct position for installation Recommend labeling it and the driveshaft yoke to follow proper assembly. In the case of improper installation of bolts likely to deform the plane landing in the fork drive shaft and the shank pinion gear.

14. Take out the wedge bolt.
15. Remove the plug from the drive shaft splines shaft pinion. If the plug is installed on the pinion shaft with an interference fit, you can pry under it with a powerful screwdriver.

16. Remove pinion nut with a special radial key included in the regular tool kit motorcycle (left-hand thread). If necessary, replace the propeller shaft seal, it must either replace the assembly with a nut or extrude.
17. After removing the nut to seal, remove the shaft pinion gear. Typically, the shaft is removed quite easily without special pullers. After removing the pinion shaft in the gear case, the needle thrust bearing rollers (28 pieces) will be present. Carefully inspect them for chips, abrasions and similar mechanical damage. If damage is necessary to replace the entire needle bearing assembly. If you find damaged parts should be especially careful to check for damage other parts of the gearbox.

18. Resting soft metal drift to the edge of the driven gear bearing race. Extrude it with light hammer blows.
19. Through open after pulling out a hole just extruded outer race bearing drive shaft.

20. Remove the driven gear adjustment and spacer from the axle.
21. Resting drift of soft metal into the hub axle, extruded driven gear reducer from the crankcase.

22. Removing the gear, inspect it and the platter for damage. Pinion should have no chips, cracks or signs of discoloration. Otherwise, the gear must be replaced complete with the drive gear (a pair of gears selected and lapped at the factory and replaced with only the kit).
23. Unbend screwdriver-spreadter plate bolts driven gear.

24. A 12 mm wrench is used to remove eight bolts holding the crown wheel.
25. Using the tool head of suitable size, light hammer blows extruded hub with support disc.

26. Remove from the platter bearing and driven gear.
27. Fork lift the sidecar wheel drive, to be able to remove the sleeve from the hub.

28. Upwards remove clutch drive from the hub and pull it out of the fork, and removing the gear is taken out of the two biscuit slots fork.
29. Pliers take out the roll pin plug.

30. Hold the clutch fork so it does not budge, remove the plug from the roller grooves cover gearbox. After removing the rollers, take out cover vacant plug.
31. Expanding pliers are used to remove the snap ring hub of the drive wheel side.

32. Using the tool attachment of suitable size, light hammer blows extruded wheel drive hub sidecar.
33. After removing the hub, press out the bearing and seal the wheel hub drive side. Trouble-shooting methods for standard, backward pressing-bearing is recommended after pre-heating the seating surfaces industrial hairdryer. Remember, this method is not suitable for press-fit installation of rubber seals, as heat can cause them to perish. Pressed-balling should use mandrels suitable size, pre-lubricated bead seal with engine oil.

34. Check the condition of the bearing PTO drive shaft sidecar, which is presses into the hub of the driven gear reducer. If necessary, replace it.

Assembly

Gearbox assembly in reverse order, to build the needle bearings, must fill grease interior of the outer bearing race. Tightening torque (nuts) Transmission cover 14-18 N.m. Tightening torque of the driven gear 20-24 N.m.
Service cardan shafts collapsed is a periodic inspection of their condition and lubrication method extrusion every 5,000 km. But, unfortunately due to design flaws motorcycle model “Wolf” IMZ-8.1238, devoid damper clutch drive shaft (available in 2005) crosses, periodically (after a run of 15-18 sq km) break down and need replacement. Replacing the propeller shaft is made of frogs when removing the rear wheel of the motorcycle and remove the rear gear.

1. Special forceps extract four retainin rings cross propeller shaft.

2. Knockout of soft metal be clearly strikes so that one cage needle bearing out of the seat in the fork (also for convenience, you can use manual press).
3. Pliers (or hold down the protruding part of the bearing in a vise), take out the bearing race.

4. Rotate the drive shaft and similarly extruded crossbar second needle bearing. Remove from the fingers cross clamp and rubber O-rings. Repeat steps 2-3 for removing the remaining bearing fork. Retrieve the crossbar propeller shaft. Crossings, “passed” about 17,000 km. Traces of a large output. This crossing has to be replaced with the bearing assembly.
1. Clear the hole plugs of dirt and corrosion.

2. Installation of cross propeller shaft should begin with pressing it into the plug rear shaft gear. For convenience, first installed the curb outside cage that is best to stick with the inside of the fork. To needle bearing is not scattered, they need to apply a small amount of grease for CV joints-4 or equivalent. Cross worn on the fingers of new rubber O-ring (sold complete with a cross) and clips that need to close the O-rings.

3. After pressing the new cross is also recommended to install new retaining rings.

2. After the installation of the first bearing race installed base with rubber and metal O-rings at her napressovyyvaetsya second clip. In no case can embed clips hammer directly on cages – it shifts the needle bearings and can cause damage to the cross.

3. Repeat the procedure for the other two pressed-bearings. For pressing, make sure that the bearing was pressed deeper than necessary to install the snap-ring, as in this case is clamped cross bearings.

Check the correct installation of the crossing: the shaft must be free to go in all directions, without knocking, jamming, clicks, and other.
Repairing a 1996 Ural Sportsman, Full-Time 2WD Differential

Final Drive Disassembly

Remove nuts holding the two case halves together (6 total)

Prop Shaft to Engine

2wd Differential

Drive Case

Inside drive case

Inside Final Drive case
Repairing a 1996 Ural Sportsman, Full-Time 2WD Differential (cont.)

Remove Spacer tube by pulling out

Remove gear driven hub by pulling out

Note missing brass thrust washer

Note races were needle bearings go 45 each = 90 total
Repairing a 1996 Ural Sportsman, Full-Time 2WD Differential (cont.)

- Remove small ring
- Remove Main Ring Gear by pulling out
- *Note racer where needle bearings go
  Should be 38 bearings
  *Note Ball bearings found loose inside case
  *Not good
- 2wd Drive disassembly
  Remove 4 screws
Repairing a 1996 Ural Sportsman, Full-Time 2WD Differential (cont.)

Remove Circle clip
best to use Circle clip Pliers

Remove Spider gears and posts by pulling them out there are 4

Lift off bearing assembly
Remove splined gear hub by pushing it though backside of case
Repairing a 1996 Ural Sportsman, Full-Time 2WD Differential (cont.)

Splined Gear Hub removed

Note Brass ring

Flip case over and remove metal locking cover
bend the 3 tabs upwards
gently pry lose to remove
note small indentations to hold in place

Remove brass locking ring
by turning counter clockwise

Brass locking Ring being unscrewed

*may need to apply heat to outer case
to get lose
Repairing a 1996 Ural Sportsman, Full-Time 2WD Differential

Remove Spider gear housing and bearing by pushing through case

Spider Ring Housing and bearing

may need to apply heat to outside of case

Sun Type gear end

Sun Type gear end
Repairing a 1996 Ural Sportsman, Full-Time 2WD Differential (cont.)

Bearsings inside Sun Type gear

Epicyclical gear end

Epicyclical gear end

Epicyclical gear

Spider gear (Satellite) Housing

Spider gear (Satellite) Housing

Bearing 113 at end of
Repairing a 1996 Ural Sportsman, Full-Time 2WD Differential (cont.)
Repairing a 1996 Ural Sportsman, Full-Time 2WD Differential (cont.)

Item: 19-34  Part# N720552-2
Ball radial- thrust double row
insides of bad bearing

New Bearing
The problem is not the final drive, the pinion, or type of metal, but rather the incorrect assembly of the universal onto the pinion. First note the cotter pin, and the flats and bevel.

Insert the pin into the hole in the pinion, so it looks like this...surprise surprise, the hole in the pinion shaft is not square to the shaft..

Replace the shims, they are needed to keep the pinion from moving backward or forward...

Place the driveshaft yoke on the shaft, without moving the shaft, with the raised boss on the right...
And tap the pin into the hole..

Tighten with a 13mm Wrench (spanner)..

until the end of the pin is flush with the raised boss..and insert a split pin..
If the pin continues into the hole, use more shims, if you cannot get it flush (not too much pressure), reduce shims.
Servicing the Rear Drive for M-72, Dnepr K-750 and Ural M-61 and M-62

• Caring for the Rear Transfer Is Mainly a Timely Lubrication of the Needle Bearing in the Universal Joint Cross, Replacing the Gear Oil in the Crankcase each 6000 kilometers, and Dealing with Small Oil Leaks

• Occasionally Required to Check Weakened Fittings:
  – In Case of Oil Leakage thru the Seals from Damaged Bearings and Gears, as Well as a Large Increase in the Gap Between the Gear Teeth Requiring Partial or Complete Disassembly of the Main Transmission

• Oil seals:
  – oil passes with decreasing elastic cuffs and the formation of cracks in it, the weakening of the spring, covering the cuff, and corrosion, and Nick on the grinding part of the hub at the site of contact with her sleeve. In the latter case, the oil is derived from the crankcase and is quite good gland. In addition, the oil follows the weakening of tightening the screws of the gland.
Rear Drive for M-72, Dnepr K-750 and Ural M-61 and M-62

3. Rear Drive Casing
4. Roller (needle) Bearing
6. Ball Bearing
7. Wedge Bolt
8, 9. Shaft Adjusting Washers
13. Cardan Fork
14. Universal Cross
15. Oil Fitting
17. Sealing Cap
27, 31. Adjusting Washer
34. Oil Drain Plug
Disassembly and Assembly of the Rear Drive for the M-72, Dnepr K-750 and Ural M-61 and M-62

http://bike78.narod.ru/base17.html

Service

Below are instructions for disassembling and assembling the main gear motorcycle M-72 and M-61, the same type with the main gears to be installed in other similar bikes. In each case the mechanism is dismantled only to the extent minimally necessary to perform the repair. So, to replace the seal 2 (see Figure 169), located by the brake pad, wrench screws that secure the lid to seal a crankcase.

Main transmission disassembled in the following order. Before dismantling the gear oil is produced from the crankcase 3, and wash the outside of kerosene. Then turned away six screws 24 that secure, cover 25 to barter in the lid is removed. Together with the lid removed gaskets 26, hub 29 with the driven bevel gear 30, a spacer washer 31 and two bronze semicircles, or 32 needles. The lid is separated from the nave with the axis of the rear wheel, which is inserted into the hub of the slots to lock the thickened axis is obtained in the spacer. Hold the hub for the entire assembly in the air, blows on the end face of the axis of the bearing is pushed the lid 28 of the hub.

Bearing can be extruded from the hub with a hammer and a long beard with a thin end diameter of 4 mm, which is inserted alternately in three existing holes in the hub. The leading five conical gear with the bearing and drive shaft assembly is removed from the sump in the following way. Metal key ring wrench cap 18 with a left hand thread provided with a rubber sealing cap 17 and nut 11 with a left hand thread. After that time, and pull the drive shaft, easily hitting the fork 13 in the direction of the cardan shaft, bevel gear extract the leading five in the collection of all items, except for the outer ring 4 and the needle bearing needle. Needle and the ring is recovered last.

Further disassembly of the site is convenient to carry in a vise. Wedge nut wrench and 7 rashplintovyyvat two turns. Impacts on the end face of the wedge nut shift. Then the nut wrench and take out a wedge. After that, the liner bevel gear 5 are pressed blows cardan fork 13 with the shaft, and then removed from the shank round series with the nut 11 located inside the gland 12, 10 cork, push the puck 9 (between the end of the nut and the outer ring of ball bearings), the adjustment 8 washers (between the end of the plug and the inner ring ball bearings) and bearing 6. On the short end of the shaft bevel gear puller are pressed inner ring needle roller bearing 4.

The assembly unit is made in reverse order with the following.

In the small bevel gear shaft napressovyyvat preloaded ball bearing 6, which has two inner rings. The approach of the rings to lock in the bearing clearance is eliminated. Then put on the shaft adjusting washer 8, 9 push the puck, the gasket 10, and the gland nut napressovyyvat fork. At the fork hammered a wedge and fix it with a nut. The hole for the wedge in the tail gear tilt, resulting in cardan fork moving in the direction of the bearing and tighten its internal ring. Leading a conical gear with adjusted bearing assembly with a drive shaft mounted in the crankcase and fixed circular nut. Pre-invest in housing needle bearing needle, sticking them to the outer ring grease. Then install the crankcase with the output gear hub and all its related components. The coupling gear teeth collected gear test probe, placing it between the teeth, or to the touch, turning a small cone with a fixed gear hub. The lateral clearance should be 0,1-0,35 mm. This gap is adjusted by moving the driven gear in the axial direction by adjusting washers 31 and 27. It is not recommended without sufficient grounds to reduce the gap in the engagement, in the case of small gap gear will work with the noise. When replacing the bearing must be remembered that the puck must have 8 previous thickness.
Riding with the 8th (8 teeth in pinion gear) in the rear axle did not bring satisfaction, especially with a rear wheel was with a rim for 16". The engine roars at maximum speed, and the speed barely reaches 90 km/h. It was decided to change the main pair in the Rear Axle of the Dnepr Sidecar Pair (8/37 with a ratio of 4.63), in the market I bought an accelerated pair (10/35 with a ratio of 3.5). The increase in speed was expected to be about 32%.

Start by draining the oil from the final drive, removing the lower plug. I took off the rear wheel, detached the braking rod, unscrewed the four nuts of the bridge fastening to the pendulum, slightly pulled myself, and now the bridge is in my hands. Brake shoes removed and removed to the side.

Unscrew the protective cover (hood) of the hinge, note, it is with the left thread. Then unscrew the nut and carefully, so as not to damage the thread, knocked out the wedge bolt securing the hinge. Slightly tapping the hinge mechanism with a hammer, removes it from the shaft of the drive gear.
Unscrew the six nuts of the crankcase cover. Some of the nuts were unscrewed together with the studs. Slowly tapping on the crankcase cover, disconnect the lid and the crankcase. Pulling out the lid, needles from the needle bearing fall into the crankcase. Carefully count them (45 pieces) and collect them in one place.
To remove the big gear from the crankcase cover, screw the two long bolts into place of the crank pins of the crankcase to the pendulum and slowly squeeze out the hub with the driven gear by means of them.
Clean the thread in the cover of the crankcase with a knife. Pull out the thrust washer from the hub of the driven gear.
Unscrew the aluminum nut of the shank. It is left-handed.
Pull the shaft, slightly swaying it from side to side, out of the crankcase. A needle bearing remains in the body. Take out all the needles from the bearing ring. There were 28 of them.
Remove the collar seal from the crankcase cover.
Through the holes in the hub knock out the support bearing (207) and unscrew the 8 bolts securing the driven gear to the hub. The bolts are loosened and almost untwisted. Remove the driven gear.
Wash the case of a crankcase and a cover in gasoline.
Put the new driven gear on the hub. It turns out that the old bolts do not fit the new gear. Need another thread step. Look for eight suitable bolts.
To tighten the bolts of the driven gear to the hub, it is necessary to use the wheel from the motorcycle. By inserting the hub into the grooves, it is easy to tighten the bolts to the required torque.

Then screw the bolts and install the support bearing in the hub.
If the driving gear does not go into the crank case: The inside edge, in which the two-row bearing rested, interferes. Spend extra metal so that there is a stop for the bearing, but nothing preventing the driving gear from spinning in the crankcase. The carter was again washed with gasoline and blown dry with compressed air.
Comparing the thickness of the old and new driving gears along the axis of the shaft, the new (10-tooth) is “wider” than the old (8-tooth) by 1.3 mm. Cut off excess metal, on the lathe, from the side of the double-row bearing so that the bearing could sit closer to the teeth. After the groove, install the inner race of the needle bearing on the drive shaft, established by means of a key as a double-row bearing on a place.
From an aluminum nut has extracted two old epiploons and on their place has established new, preliminary a little having greased with a motor oil lateral surfaces. They did not want to become seals until the end, they had to put them in place neatly through a wooden spacer.
Densely smeared with grease, external clip of the needle bearing in the crankcase, put all the needles there, aligning them with a finger in a circle.
Install the drive shaft into the crankcase and twist the aluminum nut. The shaft should rotate easily on the bearings. The teeth of the gear should not touch the housing. With the help of a gas wrench, finally tighten the aluminum nut.
The cardan joint is installed as follows: First put the hinge on the shaft and look into the hole of the wedge bolt. If holes in the hinge and on the shaft coincide, and it is wrong. When installing a wedge bolt, it would fall through completely into the hole.
With the help of adjusting washers, make sure that the holes do not coincide, and the hole in the hinge body is slightly in front of the hole on the shaft.
Insert a wedge bolt into the hole, towards the cross and with a hammer, hammering it in such a way that the wedge pulls the hinge onto the shaft and the hinge rests against the adjusting washers. Outside, a small part of the wedge remained, it could not go further. If the wedge passes inside the hinge body, then you need to add adjusting washers. Managed to install as many as five washers. After that, tightened the wedge bolt nut. With the drive gear finished.
After that, take the driven gear. Attach the hub with the driven gear on the housing cover.
Put lithol (grease) on the groove of the needle bearing on the hub and "paste" all 45 needles to the hub.

Put a new gasket on the crankcase and neatly insert the lid with the driven gear into the crankcase. Screw all the bolts, checking the rotation of the shaft. Everything should spin without seizing. There was a barely noticeable backlash with a variable rotation of the drive shaft to the left and to the right. If, when installing the cover, the drive shaft rotates with jamming, then it is necessary to increase the thickness of the gasket or add a second gasket. If the play, when rotating left and right, is quite noticeable, then remove the gasket, replacing it with a thin layer of sealant. Install the rear drive, fill with 125 grams of gear oil and get new sensations from the ride!
**Ural 650cc Rear-Drive Gear Wear Limits** *(2000 Ural Repair Manual)*

- **Tolerated Wear Limits and Clearances of Rear Drive Gears**
  - Parts Worn Beyond Recommended Limits Should Be Replaced
  - Replace All Seals and Gaskets at the Same Time

- **Rear Drive Gear Backlash Should Be within 0.003 to 0.006” (0.07 to 0.16 mm)**
  - If Backlash Is Incorrect, Change Adjusting Shims on Ring Gear, Substituting Thicker or Thinner Shims to Achieve Backlash within Tolerance

- **Before Tightening Nut in Case Cover, Hub Gear Flange with Seal and Ball Bearing Should Be Installed**
  - Bronze Ring Should Be Positioned onto Hub Gear Neck Next After the Steel Ring

- **After Putting Main Drive Together, Check and Adjust Side-Play of Conical Gears by Tightening or Loosening Nut in Casing Cover**
  - When Side-Play of 0.004 to 0.012” (0.1 to 0.3 mm) Is Achieved, Stop Adjusting and Fix the Nut with the Retainer

<table>
<thead>
<tr>
<th>Name of Parts and Mating Members</th>
<th>Maximum Tolerances</th>
<th>Measuring Point and Method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wear on Diameter</td>
<td>Diameter Clearance</td>
</tr>
<tr>
<td>Ring Gear Hub Splines</td>
<td>Tooth Thickness 0.75 mm</td>
<td>-</td>
</tr>
<tr>
<td>Propeller Shaft Cross Pins</td>
<td>0.05 mm</td>
<td>-</td>
</tr>
<tr>
<td>Final Drive Gears</td>
<td>Tooth Thickness</td>
<td>-</td>
</tr>
<tr>
<td>Ring Gear Hub Bearing</td>
<td>0.15 mm</td>
<td>0.12 mm</td>
</tr>
</tbody>
</table>

- On Working Surfaces of Journals