

Gearbox assembly[Éííóáðáíóëý "Íáíáíýáíñý ñíüòí. Íèàà"](#)[By Volodjushka](#)[NIVA-FAQ](#)
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It's important to remember checking the rotation of the gearbox main and input shafts in each gear during reassembly. The shafts should rotate easily without any jamming, if difficulty is experienced during rotation in a particular gear this means there are faulty components in that gear, which call for immediate replacement. Don't keep yourself from doing this or the repair job will be futile as the gearbox will not function properly or will get out of operation quickly.

Clamp the main shaft in a vice with rag-lined jaws and, using an angle grinder, make two slots in the shaft's rear end for locking-punch the rear nut:



Caution! If the main shaft is second-hand or is defective, it only makes sense to leave this operation for last, after the gearbox is completely assembled and until all the necessary checks are performed. If you cut a damaged or faulty shaft then you will not be able to return it at the parts shop for a replacement/warranty claim.

Lubricate the input shaft bearing inner race with gear oil. Place the input shaft on a piece of wood and insert the bearing. Use a hammer and a piece of suitable diameter pipe to force the bearing into place.



Install the thrust washer and lockring and use a hammer and chisel to settle the lockring into its groove:



Remove the baulk ring lockring with outer snap ring pliers and replace the defective baulk rings as needed:



When installing new baulk rings check the condition of the lockring and baulk ring contact faces. The end of the synchronizer spring must fall in the cavity between two of the gear straight teeth:



If the baulk ring "devours" or doesn't sink parallel against the persistent ring when axially compressed, the end of the synchronizer spring is incorrectly installed.

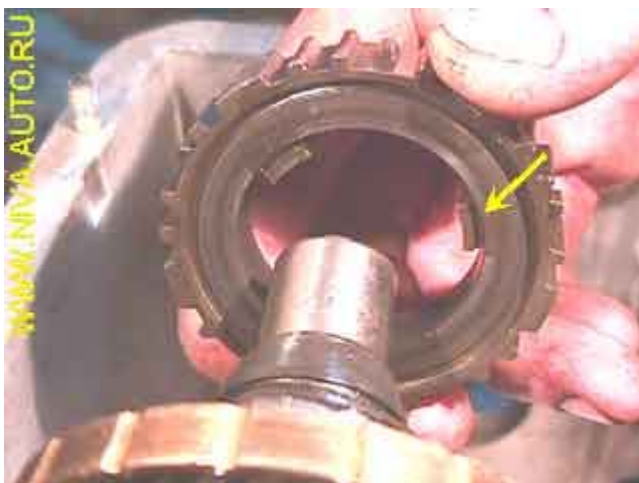
Gather up all the main shaft parts. The left picture shows all the gears, sleeves, hubs, bearings and other components next to the main shaft. The right picture shows the correct order in which all parts are installed in the main shaft:



Place the 3rd gear sprocket and its hub in the main shaft. Note the hubs are not symmetrical, one end has a chamfer (left picture), not present on the other side (see right picture):



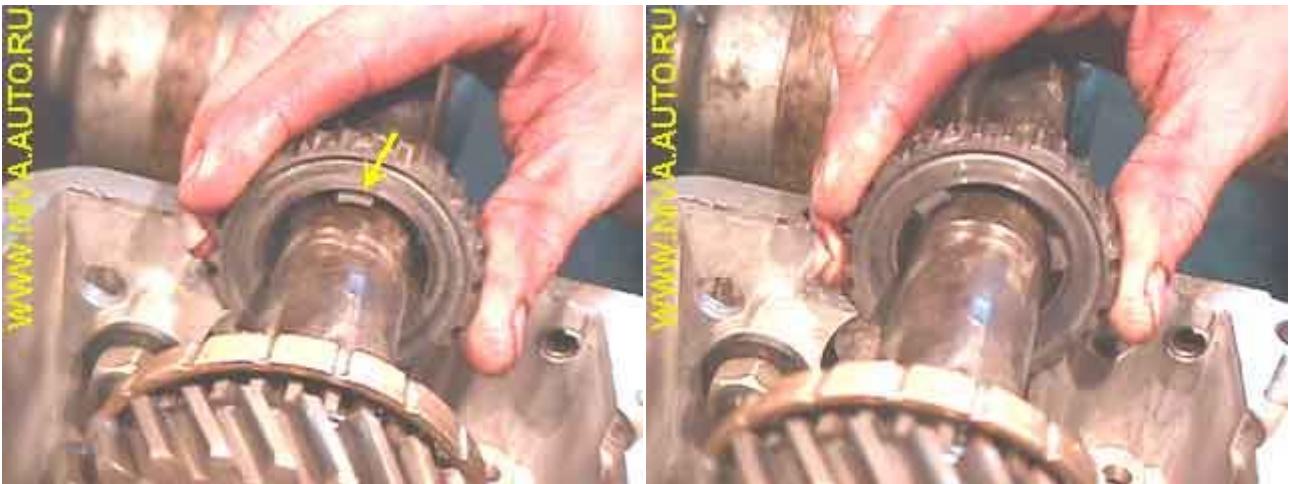
The chamfers in the hubs must be oriented to the gear side (the correct position is shown in the left picture):



Install the 2nd gear and the 1st-2nd gear hub:



Again make sure the hub is installed in the correct position towards the 2nd gear sprocket (left picture):



Install the 1st-2nd gear sleeve, the 1st gear sprocket and the 3rd-4th gear sleeve. Check the sleeves for ease of movement in all gears:





Install the main shaft assembly in the gearbox case. Install the main shaft intermediate bearing by tapping lightly with a hammer. Install the needle bearing on the cavity of the input shaft and insert the latter through the front end of the gearbox case using only hand force.

Install the 1st-2nd and 3rd-4th shift forks with the bolt holes pointing upwards. Remember that the gearbox case is upside down.

Fit the main shaft intermediate bearing retainer plate. Examine the condition of the threads in the case and fit the oval spring washers before screwing the bolts. Tighten the bolts with the aid of an impact screwdriver and a hammer.

At this point check that the input shaft and main shaft rotate easily without jamming.

When installing the shift rails check that they move easily in their bores, without jamming. Check there's no play between the rails and their bores.

Install the 1st-2nd gear shift rail, the 1st-2nd shift fork and its fastening bolt; next install the longest of the interlock retainers:



Insert the 3rd-4th gear shift rail. Pass it through the fork hole but not all the way, rotate it until the rail hole is horizontal and install the thin interlock retainer:



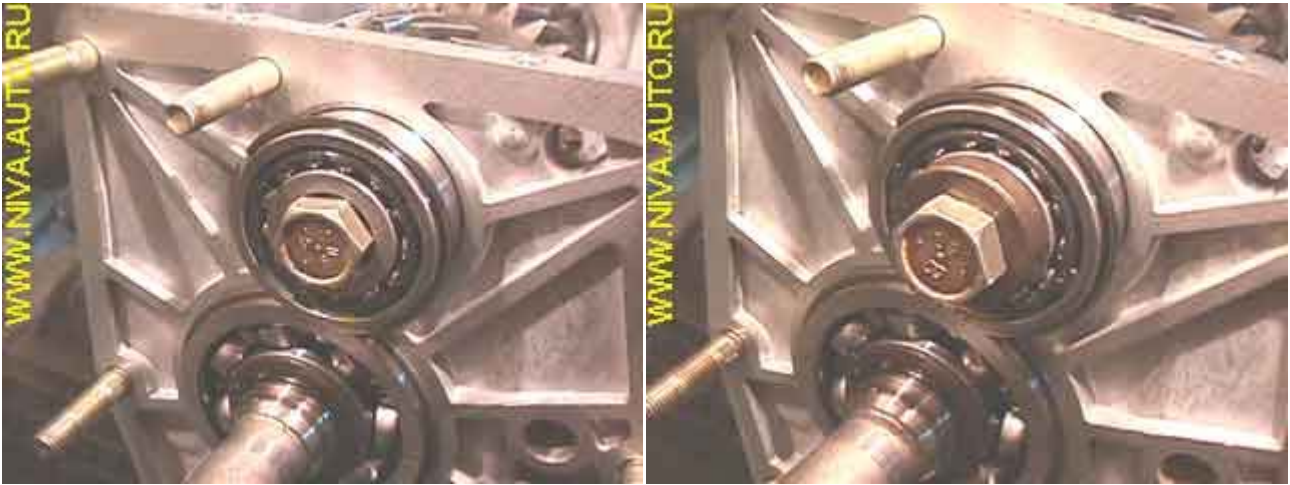
Push the rail all the way thru and tighten the fork fastening bolt, then insert the short interlock retainer.

Next install the countershaft: First the rear end, then the front end. Fit the countershaft intermediate bearing. Note that this bearing has a split inner race, formed by a bushing and a ring:



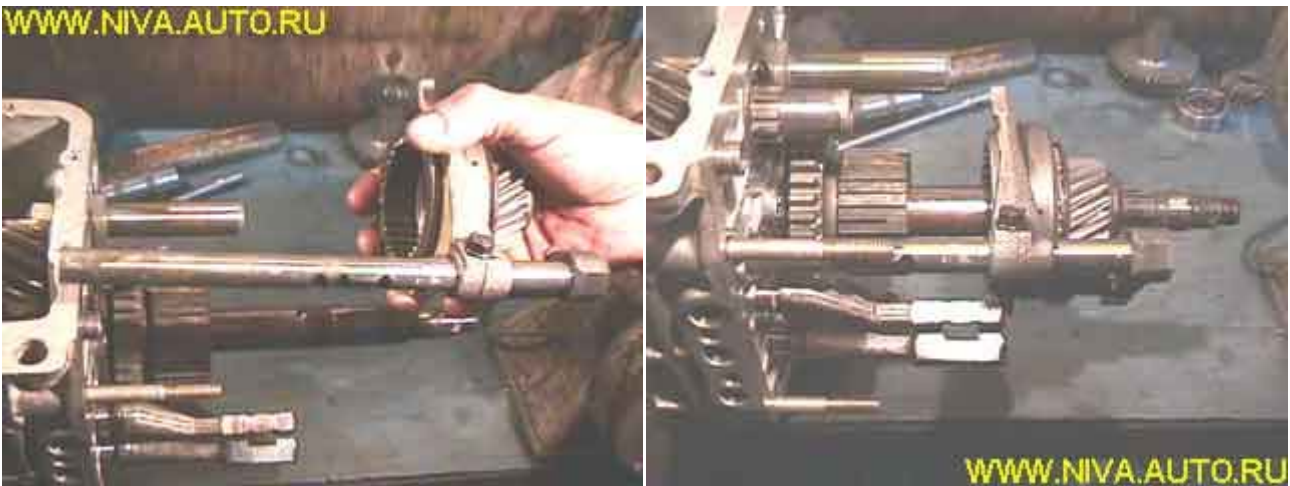
The bushing must be oriented to the inner side of the case.

Install the countershaft front bearing. Use the bolt to drive the bearing into its final position, but don't tighten the bolt all the way:



Install the Woodruff key in its slot in the main shaft, then the reverse driven gear and the 5th/reverse gear hub.

Gather all the 5th gear components. Bolt the shift fork to the shift rail, place the sleeve on the fork and insert the 5th gear sprocket into the sleeve. Simultaneously insert the 5th gear through the end on the main shaft and insert the shift rail in its bore in the gearbox case. Continue inserting the 5th gear until there is less than 35 mm between the upper end of the rail and the reverse idler gear shaft. Fit the reverse idler gear to the fork and slide the assembly until it touches the end of the 5th/reverse gear hub, then rotate the sleeve so it can be inserted through the hub splines. Place the inner race ring in the countershaft intermediate bearing and install the 5th/reverse gear cluster on the splines at the rear end of the countershaft.





Move the 5th/reverse gear assembly all the way to the end and rotate the shaft.

Caución! For the last few years VAZ installed an additional spacer bushing in the 5th/reverse shift rail:



Insert a piece of soft metal between the 1st gear sprockets and using a torque wrench tighten the 5th/reverse gear cluster bolt to 66,6 - 82,3 N·m (6,8 - 8,4 kg·m):



Insert the piece of soft metal on the other side and also use the torque wrench to tighten the countershaft front bolt to 79,4 - 98 N·m (8,1 - 10 kg·m):



Rotate the gearbox shafts.

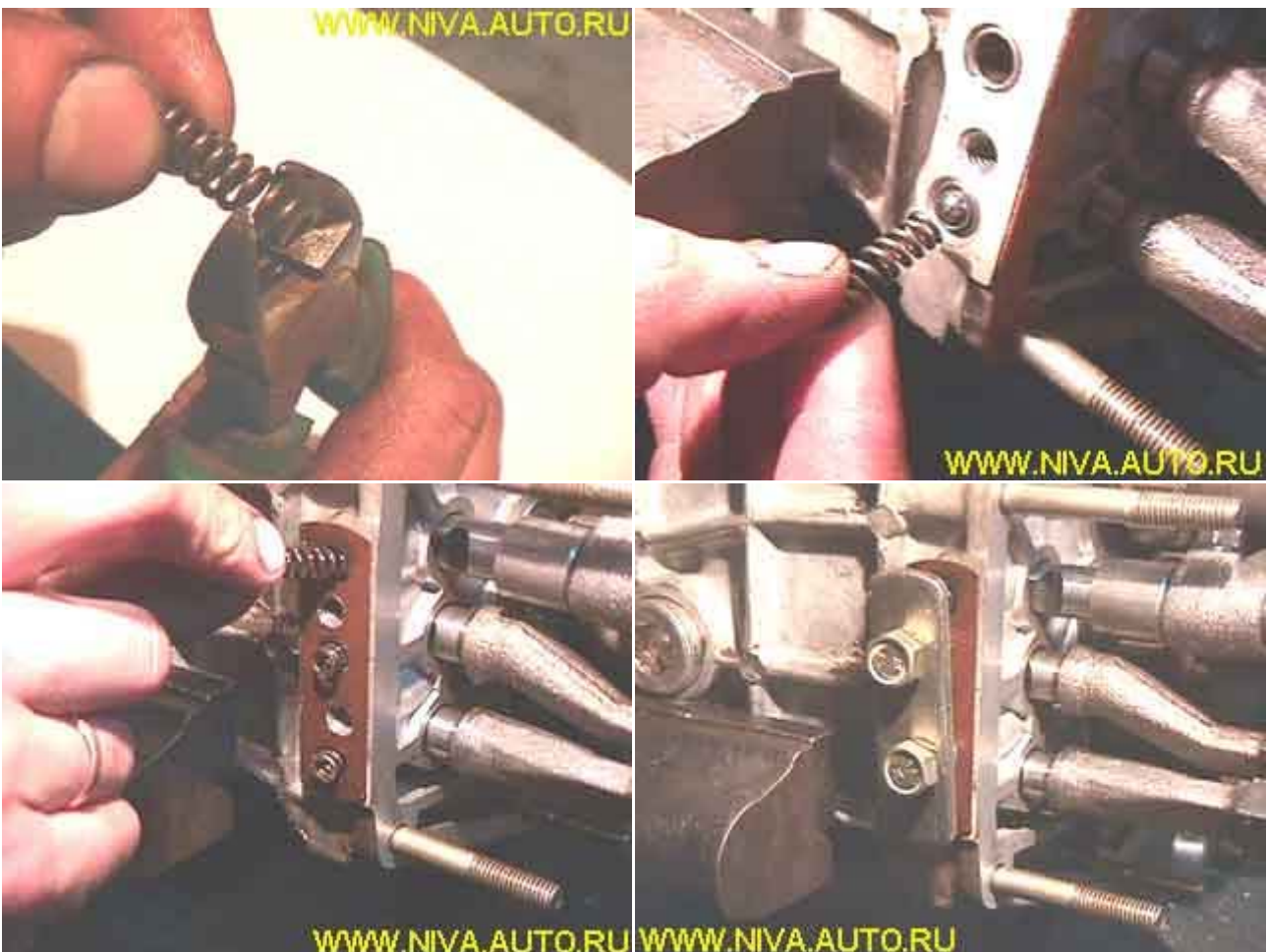
If the shift forks are defective (excessive play between the forks and sleeves) it may happen that the gap between the shift gates is so little that the sleeve and hub won't couple together. The left picture shows a normal assembly, note in the right pics that the 5th/reverse rail rubs against the 3rd-4th rail:



Install the oil slinger with the concave part facing the rear end of the main shaft, then insert the spacer bushing and the main shaft rear bearing inner race. The right picture shows the correct position in which the race must be installed:



Gather up the detent mechanism. If the springs have lost a little of their resilience it is possible to open their coils to approximately 1 mm using side cutting pliers. Insert the detent balls followed by the springs (remember the longest spring must be installed in the 5th/reverse shift rail). Install a new gasket before installing the cover and tighten the two cover bolts:



Check the engagement of all gears, from 1st to 5th and rotate the shafts in each gear:



The engagement of all gears should be precise, without jamming. The input shaft shouldn't jam while rotating. Caution! When selecting 5th gear, hold the 5th gear sprocket with one hand to prevent it from being displaced by the 5th/reverse gear cluster as nothing holds it in place in the main shaft.

Install a new O-ring in the bellhousing bore and refit the clutch release bearing guide tube. If a mandrel isn't available, use an old main shaft bearing to press the guide tube into the bellhousing:



Install a new oil seal into the guide tube bore and place the spring (thrust) washer with the tapered side facing upwards:



Apply grease to the oil seal working surface, fit a new bellhousing gasket and refit all the bellhousing fastening nuts without tightening. Use the torque wrench to tighten the 17mm wrench nuts to 31,8 - 51,4 N·m (3,25 - 5,25 Kg·m) and the 13mm wrench nut to 15,7 - 25,5 N·m. Tighten the nuts evenly: Right to left the middle ones and the remainers in a criss-cross pattern.



Install the main shaft oil seal in the rear cover and apply grease to the working surface. If the rear cover bearings were removed for some reason, use a hammer wooden handle to drive them into the cover bores:



If the black plastic cover was removed from the rear cover, apply some RTV sealant and reinstall it back in place.

Fit a new gasket and install the rear cover. Shift the gearbox into reverse gear, turn the cover clockwise in order to clear the gear cluster and finally turn it counterclockwise until it's in the correct position:



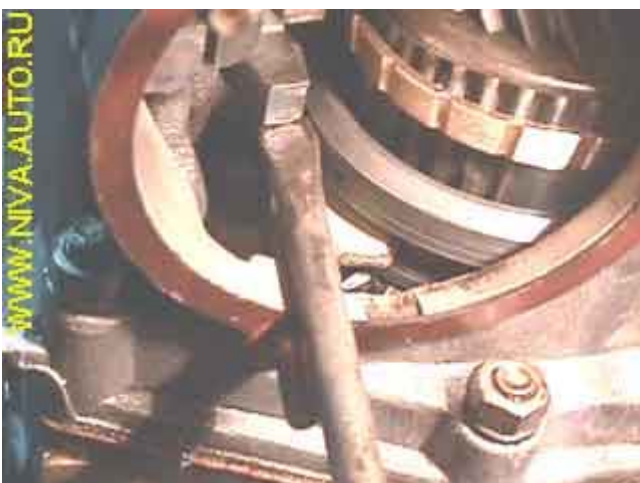
Hold the main shaft rear bearing by inserting your fingers through the hole for the shifting mechanism and push the rear cover all the way while rotating the main shaft until it contacts the gearbox case:



Caución! Never use a hammer to install the rear cover. Doing so could destroy the bearing plastic roller cages.

Tighten evenly the 13mm wrench nuts to 15,7 - 25,5 N m (1,6 - 2,6 Kg m) in a criss-cross pattern.

Shift the gearbox into neutral. Lubricate the shifting mechanism and reinstall it by moving the lever extension side-to-side until it falls between the shift gates:



Check the engagement of all gears while rotating the shafts.

If the slots for locking the rear nut weren't cut, now it's time to do so:



Install the output flange and locking washer, making sure its tabs fall between the flange splines:



Thoroughly clean the shaft and rear nut threads. Apply a few drops of thread-locking compound (Loctite 242 or similar) to both threads:



Fit a bolt to the flange to prevent it from rotating and tighten the rear nut to 66,6 - 82,3 N·m (6,8 - 8,4 Kg·m):



Check the engagement of all gear while rotating the input shaft.

Rest the rear end of the main shaft on an anvil and use a hammer and chisel to lock-punch the rear nut into the previously made slots:



Use the chisel to bend the lock washer over two opposite nut faces and then use tongue-and-groove pliers to finally compress the lock washer over the nut:



Detailed view of the rear nut, perfectly locked in place:



Reinstall the exhaust receiver bracket to the rear cover. Reinstall the reverse light indicator switch, remembering to fit the copper sealing washer.

Fasten the gearbox mount crossmember to the rear cover (two studs with 13mm wrench nuts) and fit the rubber collar to the shifting mechanism:



Apply a small amount of grease to the release bearing directing tube, input shaft splines and to the release bearing yoke spherical support:



Install the release bearing-yoke assembly in the bellhousing. The left picture shows the correct fitting of the yoke to the bearing, the right picture shows how it looks already installed in the bellhousing:



Install the bottom cover gasket, the left picture shows where the straight-cut corner should point to. Fill the gearbox case with 1.6-1.7 liters of the factory-recommended gear oil:



Fit the bottom cover and tighten all its ten 6mm nuts evenly and squarely to prevent warping and quickly turn the gearbox to its normal position. After adding the oil a small amount can leak from the case breather, that's why the gearbox shouldn't be left sitting upside down.

[Volodjushka](#), 13.03.03.