

Nissan Sentra

5-Speed Transaxle Repair



When something works for you, you stick with it. Nissan has used the same basic five-speed manual transaxle design in the Sentra since it was introduced in 1982. Similar versions of this transaxle can also be found in 1982 310s, all Pulsars except SE models, and Stanza sedans through 1986. There have also been four-speed versions of this transaxle used in the Sentra.

Once you get past the minor external differences that were necessary to mount a transaxle in so many different vehicles, you'll find that all the transaxles in this family are nearly identical on the inside.

Even though they aren't dropping like flies, all those Nissans add up to a whole bunch of potential transaxle overhauls. Beside normal wear and tear, there are a few other things that will lead this transaxle to an early grave (or at least an early retirement).

Keeping it supplied with enough gear lube is probably the most important thing anyone can do for this transaxle. Ignore a gear lube leak for long and this transaxle will be howling at the moon faster than you

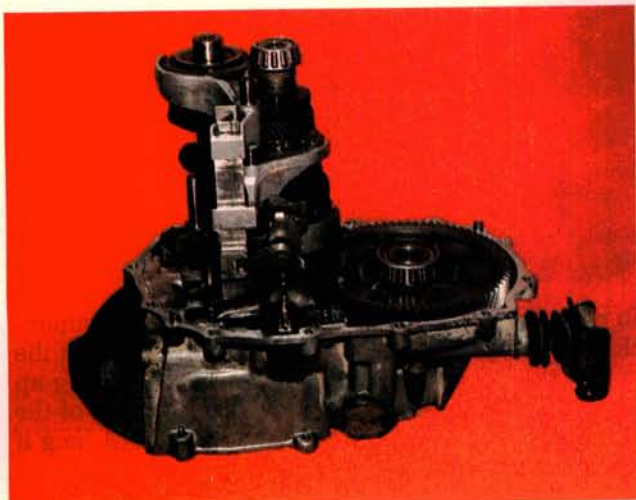
can say Lon Chaney.

Always check for leaks at the RTV seal between the case halves and at the axle seals whenever you have one of these cars up in the air for other maintenance services. Rough treatment during drive axle removal and replacement can damage the axle seals, causing a fluid leak and a cooked transaxle.

The drive axles are held into the transaxle's final drive by retaining rings. The rings should be replaced each time the axles are removed, but usually aren't. If a used retaining ring is stretched too far, it won't compress properly when the axle is slid into the transaxle splines.

The ring slips out of its groove, gets crushed, and damages the final drive and drive axle splines. Use a new retaining ring and make sure the ring is squeezed tightly into the drive axle groove before reinstalling the drive axle.

Almost as many of these transaxles have been overhauled to replace cracked or broken case halves as

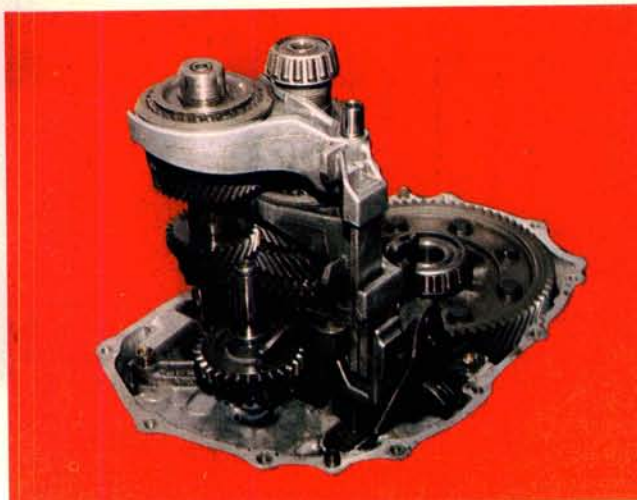


they have for any other reason. The impact from a minor front end collision can transfer through the transaxle mounts and crack the case housings. Off road excursions and close encounters with large boulders will also do expensive things to the aluminum castings.

The shift linkage between the selector lever and the transaxle can get corroded and stiff or worn out and sloppy. This was an especially big problem on first generation Sentras. Don't pull the transaxle until the linkage has been checked. What starts out feeling like a completely trashed transaxle can often be repaired with emery paper, some grease, and a few dollars worth of nylon shift bushings.

Clutch cable wear is another possible problem area, especially on older Stanzas. The pedal gets very hard to depress and it feels like the clutch is shot. A binding clutch release shaft (more common on all models) will have the same effect. Plenty of perfectly good clutches have been replaced in attempts to fix these problems.

Many of the repair operations shown in this article

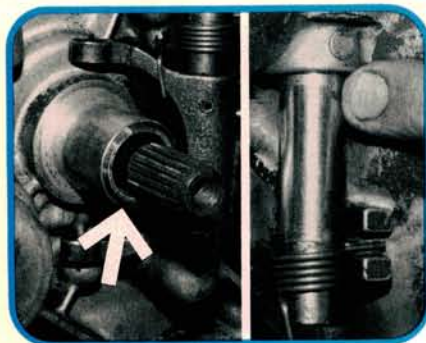


can be done with the transaxle still installed in the car. This can be a real time saver when repairing transaxles with minor internal damage, since it saves you the added time and labor of fighting the transaxle mounts back into place during reinstallation. If the overhaul falls into the major surgery category, however, you may be farther ahead to remove the transaxle and get it over with.

Use this article with a service manual, especially if you're tackling the job for the first time. Consult the manual for part number information, clearances, and torque specifications on specific models. We've included the kind of time-saving and problem-solving information on this transaxle that you won't find in a manual.

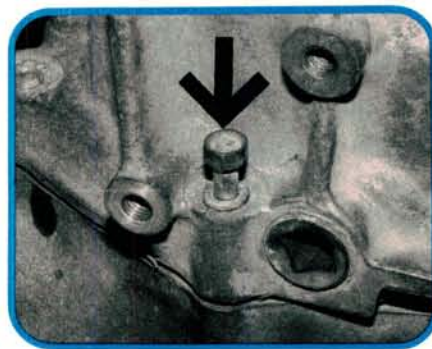
Our thanks to Kent-Moore Automotive Division for providing the special tools used during our transaxle overhaul. For information on how to purchase these tools, **circle number 200** on the reader service card.

—By Karl Seyfert



1

Take a look at the clutch housing's snout (left photo). Heavy clutch use can wear the aluminum casting, causing the release bearing to bind. Housing replacement may be the only cure in some cases. Clutch grit in the clutch shaft bushings (right photo) can cause stiff clutch pedal action.



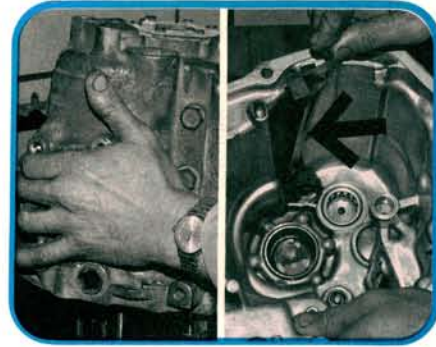
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Drain the transaxle and give it a thorough cleaning before beginning your disassembly. Check the case and seals for signs of fluid leakage or other external damage. Remove the transaxle case bolts. They're all the same length except for this longer one next to the filler plug (arrow).



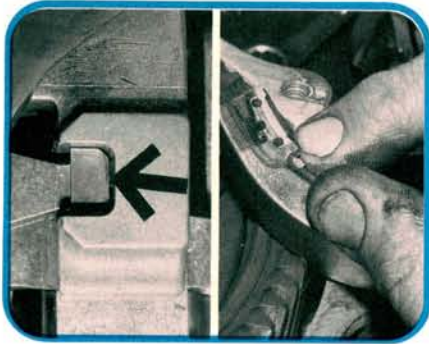
3

RTV sealer and two aligning dowel pins between the case halves do a good job of holding everything together, even after the bolts are removed. There are two spots on the transaxle case where you can safely tap with a soft-faced hammer to break the seal. Chisels and screwdrivers are off limits.



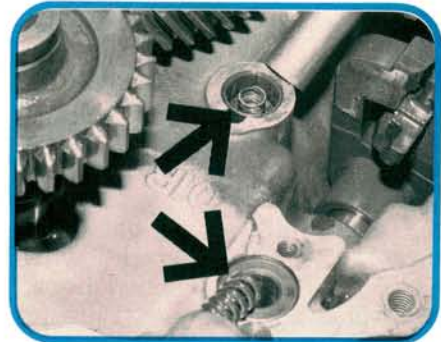
4

To remove the transaxle case, lift and turn it counter-clockwise to the eleven o'clock position. Now tilt the case to the left to keep the oil gutter from hanging up on the fifth gear shift fork. Note the position of the gutter (right photo). The transaxle won't last long if it's left out.



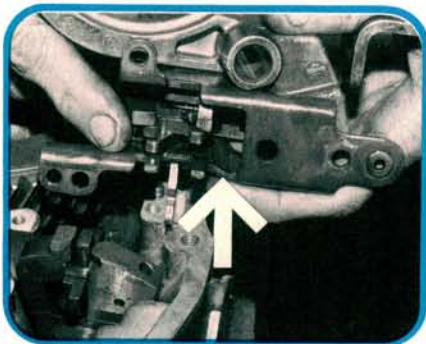
5

Slide the shifter shaft out of the shift forks and check it for wear. Remove the fifth and third/fourth gear shift forks, noting the location of the shifter caps (left arrow). Early transaxles used three caps. Later models omitted the cap on the fifth gear selector. Check the forks for wear (right photo).



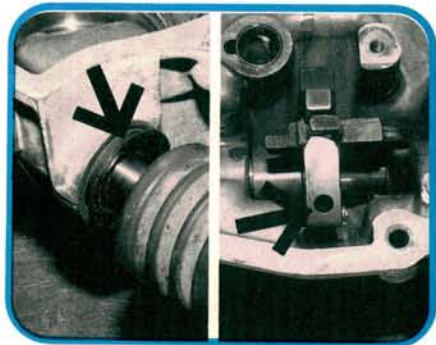
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Remove the shift control mounting bolts, then remove the shift control along with the first/second shift fork. Remove the shift detent check ball, check ball plug, check ball spring, and fork shaft support spring (arrows) from their holes in the clutch housing.



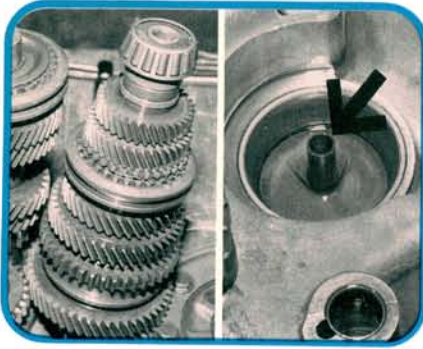
7

The stamped steel shift control assembly and aluminum shift forks can be a source of trouble. If the transaxle is hard to shift and your inspection of the other transaxle parts doesn't turn up anything else, one of these parts is probably distorted. Distortion is very difficult to detect with a visual inspection.



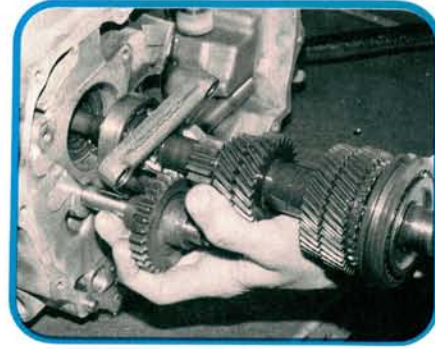
8

The striking rod seal can be replaced by removing the retaining pin and linkage outside the transaxle (left arrow). We left the striking rod and the rest of the shift linkage where they were, since they almost never cause problems. Early transaxles had a select check ball and spring in this hole (right arrow).



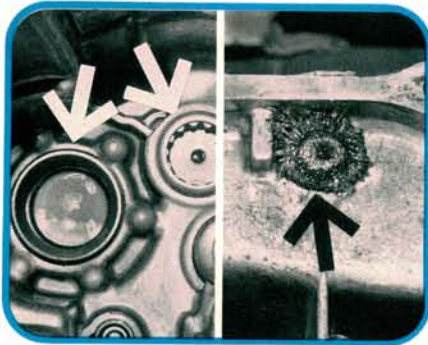
9

Carefully tilt the mainshaft away from the input shaft (left photo), then lift it up. If the main shaft is tilted too far, the plastic oil channel (arrow right photo) that's mounted under the mainshaft bearing race may break off. Lift out the final drive assembly and set it aside.



10

Remove the input shaft bearing retainer bolts. A notch in the retainer also holds the reverse idler shaft. Turn the clutch housing on its side and drive the input shaft and front bearing out of the housing by tapping on the input shaft with a soft-faced hammer. Remove the reverse idler gear and its spacer.



11

Check the transaxle bearings and races for wear. Dirty or low gear lube level will usually kill the rear input and mainshaft bearings (left arrows) first. Clean the case halves in a parts washer. The magnetic drain plug (right arrow) should give you an idea of how much wear to expect.



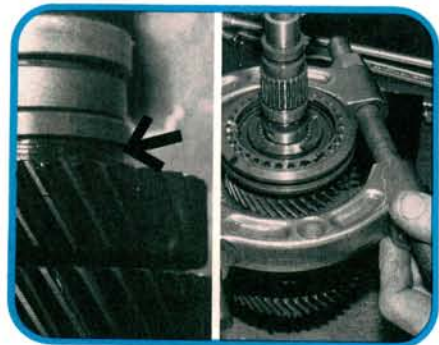
12

Check input shaft and mainshaft gear end play before disassembly. Mainshaft first gear end play should be 0.18-0.31 mm (0.0071-0.0122 in). End play for the mainshaft second, third, and fourth gears should be 0.20-0.40 (0.0079-0.0157 in). Input fifth gear end play should be 0.18-0.41 mm (0.0071-0.0161 in).



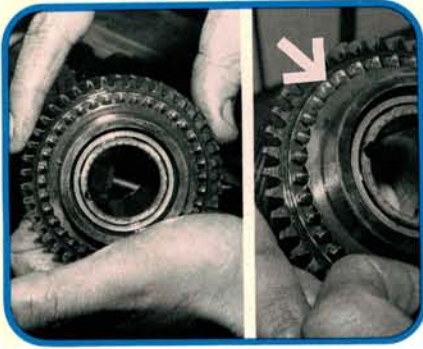
13

You'll need a press and the right size bearing splitters to disassemble the input shaft and mainshaft without damaging the gear teeth. Start by pressing off the rear mainshaft bearing. Mount the bearing splitter as shown to avoid damaging the selective C-ring holder.



14

The first/second and third/fourth synchronizer hubs, as well as the fifth main gear, are all press fitted to the mainshaft. Attach the splitter under the flange on fifth gear (left arrow) to remove it. Push both synchronizer hubs off the mainshaft by mounting the splitter behind third gear, then first gear (right photo).



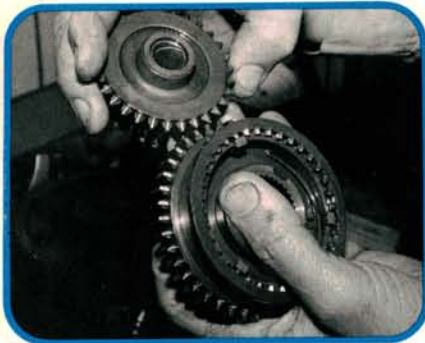
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Inspect the mainshaft gears for wear and chipping. Gear edges that feel sharp to the touch (left photo) will sing under acceleration. First gear had been pretty badly hammered. Careless shifting had knocked the edges of several small gear engagement teeth (right photo).



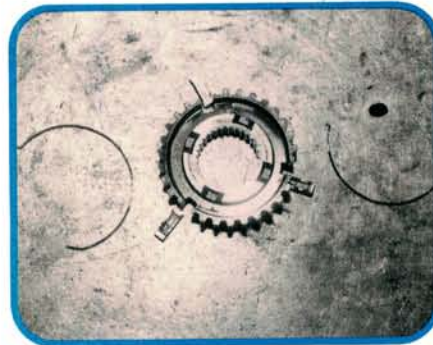
16

A dime can be used for a quick check of synchro ring clearance. Standard clearance for all synchro rings is 1.0-1.35 mm (0.039-0.0531 in). A new dime is about 0.050 inch thick and a worn one is close to the other end of the specification. Maximum wear limit is 0.7 mm (0.028 in). Measure the clearance in several spots.



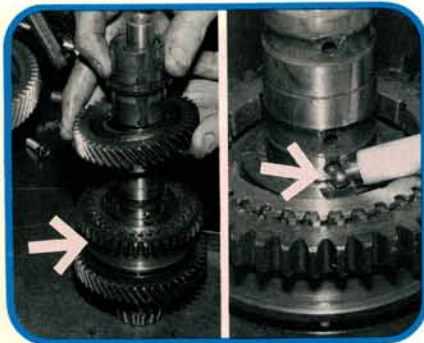
17

Check the synchronizer hubs, shifting inserts, and coupling sleeves for wear. The first/second coupling sleeve is also the reverse main gear. Check its teeth, along with those on the reverse idler gear for wear. Judging by the ground off teeth, this transaxle's owner must have done lots of rolling reverse shifts.



18

Replace any worn parts, then reassemble the synchronizer hubs and coupling sleeves. The spread springs must be hooked to the shifting sleeves in the position shown. Make sure the spread spring on the front side of the hub isn't hooked to the same shifting insert as the rear spread spring.



19

Reassembly of the mainshaft is the reverse of disassembly. Make sure the first/second coupling sleeve fork groove (left arrow) faces toward first gear. Steel balls locate the second/third and fourth gear (right arrow) bushings on the mainshaft. If the balls won't fit, the gears aren't on right.



20

Install the mainshaft thrust washer after the mainshaft fifth gear has been reinstalled. Reinstall the selective C-rings above the thrust washer. Clearance between the C-rings and their groove in the mainshaft should be 0-0.1 mm (0-0.004 in). Reinstall the mainshaft rear bearing.



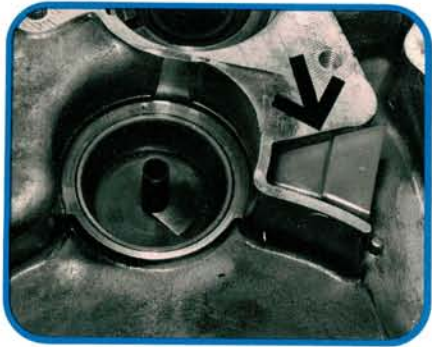
21

Remove the rear input shaft snap ring, then press off the fifth input gear and synchronizer hub. Inspect the parts for wear. The synchronizer hub and coupling sleeve are machined on both sides, although only one side is used for fifth gear. Flip both parts over to use the fresh side.



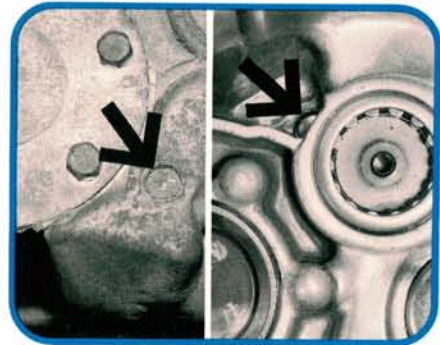
22

Use the press to reinstall the fifth input gear and synchronizer hub on the input shaft. Reinstall the stopper plate and snap ring, then measure the clearance at the input shaft groove. Allowable clearance is the same as mainshaft C-ring clearance. Four different selective snap rings are available.



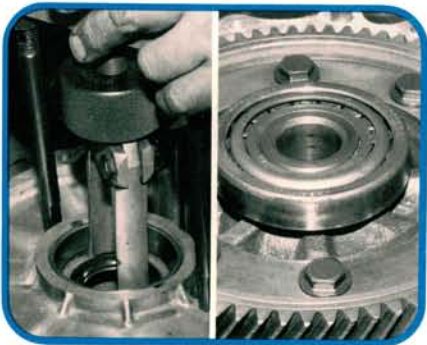
23

Use the proper puller if the front mainshaft bearing and race are being replaced. There's very little room between the plastic oil channel and the underside of the bearing race. Always reinstall the oil channel with its oil groove facing toward the oil collector pocket above it (arrow).



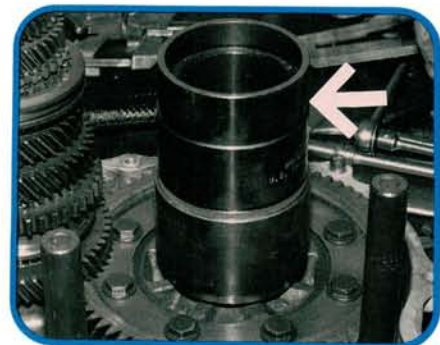
24

Drive out this welch plug (left arrow) from the inside of the case to replace the rear input shaft bearing. Removing the plug exposes a corner of the bearing (right arrow) so that it can be pushed out of the case with a punch. Too much RTV on the welch plug may block off the supply of oil to the bearing.



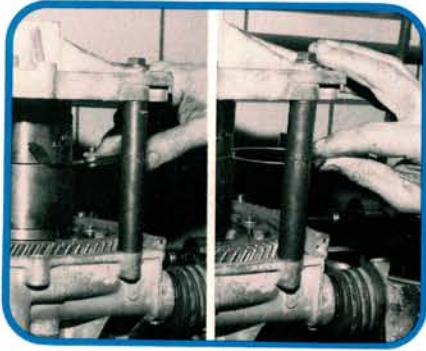
25

Differential side bearing preload needs to be checked and adjusted if new side bearings, a differential case, or either of the transaxle case halves has been replaced. Remove the side bearing race and selective shim from the transaxle case (left photo). Place the race on the differential side bearing (right photo).



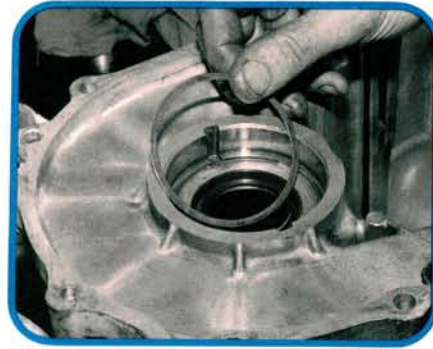
26

This dedicated Kent-Moore differential preload shim selector (arrow) mounts between the side bearing race and the transaxle case. The selector's four spacers and long bolts are placed evenly around the clutch housing, then torqued to 16-21 Nm (12-15 ft-lb).



27

Rotate the final drive several times to seat the side bearings. Measure the widest gap around the tool using a feeler gauge (left photo). The gap measurement is the correct preload shim thickness. Preload shims can also be used for measuring the gap (right photo). Eleven different preload shims are available.



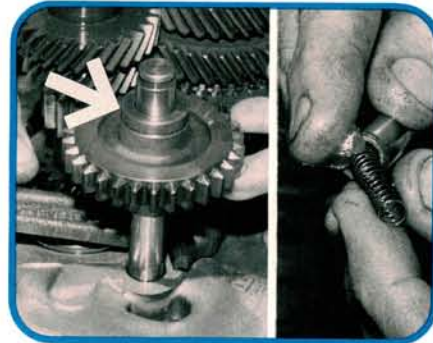
28

Remove the shim selector gauge assembly, then reinstall the selected preload shim and side bearing race in the transaxle case. If new side bearings were installed, temporarily install the transaxle case over the final drive. Torque the case bolts to 16-21 Nm (12-15 ft-lb).



29

Slide the Kent-Moore Preload Adapter into the final drive, then rotate it at least ten times to seat the side bearings. Attach an inch-pound torque wrench to measure the turning torque. Readings should be between 4.9 and 74 Nm (43-65 in-lb) with no binding, and with no more than 1.0 Nm (8.7 in-lb) variance.



30

Input shaft and mainshaft reinstallation is the reverse of removal. Don't forget to reinstall the reverse idler gear and spacer (left photo) before reinstalling the input shaft. Reinstall the shift control bracket, detent parts, and forks. A dab of grease holds the fork shaft support spring (right photo) during reinstallation.



31

Apply RTV to the clutch housing mating surface, then reinstall the transaxle case and bolts (again). If the mainshaft, bearings, or case halves were replaced, the mainshaft bearing preload must be checked and adjusted. Remove the transaxle case cover, spacer, and adjusting shim.



32

Use a depth micrometer to measure the distance between the case face and the rear surface of the mainshaft outer bearing race. A chart in the service manual converts the measured distance to the correct adjusting shim, including the right amount of bearing preload. Reinstall the shim first, then the spacer and case cover.