Learning Objectives

- Diagnose common manual transmission problems.
- Remove a standard transmission from a vehicle.
- Disassemble and inspect a manual transmission.
- Assemble a manual transmission.
- Install a manual transmission.
- Adjust manual transmission linkage.
- Cite and observe safety rules for transmission service.
Common Transmission Problems

- Worn shift forks or damaged synchronizers
- Leaking gaskets
- Leaking front seal
- Damaged and noisy gear teeth
- Worn or bent shift mechanism
- Worn and noisy bearings
- Worn thrust washers
- Damaged or cracked case
- Cracked or damaged extension housing
- Leaking rear seal
1. When using a transmission jack, it is necessary to get help from another mechanic to lift the transmission.

2. When replacing a gear on the output shaft, you do not have to replace the matching gear set on the input shaft.
Transmission Removal

Use a hoist and transmission jack
Transmission Disassembly

Using a dummy shaft, drive out the countershaft.
Transmission Disassembly

Remove the input and output shaft assemblies
3. A grinding sound or gear clashing noise when shifting is frequently caused by incorrect transmission linkage adjustment.

4. When a transmission jumps out of gear, the driver’s shift lever does not “pop” into reverse while driving.
Inspect Synchronizers

Check shift forks and synchronizers for wear
Inspect Synchronizers

Ridges must be sharp—if worn, gear clash may occur
Measuring Synchronizer Ring Clearance

Blocking ring wear reduces clearance
Inspect and Assemble Shift Mechanism

- Cover gasket surface must be clean and dry
- Check shift fork wear points
- Replace all O-ring seals
- Shift gate surfaces check for wear
- Shift rail check for wear
Linkage Adjustment

Crossover alignment tool, make from 1/4" (6.4 mm) diameter rod

3rd overdrive rod

1st–2nd rod

Reverse rod

Adjustable swivels

Adjustable swivel
5. Lubricant leaks in a manual transmission are caused by ruptured gaskets, worn seals, loose fasteners, or damage to the case, housings, or covers.

6. When removing a transmission, use a transmission jack stand because it allows you to stand while working.
Removing the Oil Seal

- Oil seal removal tool
- Old seal pulled out
- Extension housing
Installing a New Seal

Coat the outside of the seal with nonhardening sealer before installing.
7. When a manual transmission is noisy, check fluid (lubrication level) not the transmission bearings first.

8. If there is noise in only one gear of a transmission, then the problem is probably due to components related to that gear.
Removing a Bearing

A special puller may be needed
Installing a New Bearing

Use a driver to install new bearings
9. The wobbling action of the shaft due to worn shift bearings or bushing will make a new seal leak.

10. If there is noise in all gears of a transmission, something common to all of the gears is at fault.
Transmission Disassembly

Remove the rear extension housing

Light blows may be needed to free gasket

Remove the rear extension housing
Checking Run-out

Check runout if gear wear is uneven. Dial indicator movement equals runout.
Learning Objectives

- Diagnose common manual transmission problems.
- Remove a standard transmission from a vehicle.
- Disassemble and inspect a manual transmission.
- Assemble a manual transmission.
- Install a manual transmission.
- Adjust manual transmission linkage.
- Cite and observe safety rules for transmission service.