



All-Wheel-Drive: Mitsubishi Style

By Mike Weinberg
Contributing Editor

For many years Mitsubishi Motors has been a major player in the U.S. auto market. In partnership with Chrysler Corp., Mitsubishi produced many models that were rebadged and marketed by Chrysler to give it a broader small-car line. Mitsubishi also has provided engines and powertrain for Hyundai in its models sold in this country. With so many models using the same powertrain it is important for the transmission rebuilder to be able to identify and understand the operation of the Mitsubishi 5-speed transaxles.

On the front-wheel-drive side there are three common units. Mitsubishi likes to use complex model

numbers. The chart in Figure 1 will help identify transaxles by model number, engine size and ratio.

The transaxle to be discussed here is an ALL-WHEEL-DRIVE MODEL, the W5M33-2-NPZV, which is in the popular Chrysler Eagle Talon and the Mitsubishi Eclipse models. Understand the difference between four-wheel drive and all-wheel drive. For the purpose of this discussion, four-wheel drive means the vehicle can be operated in two-wheel drive or four-wheel drive at the driver's discretion. All-wheel drive means that power is delivered to all four wheels all the time and there is no two-wheel-drive mode. The chart in Figure 2 shows the ratios

continues next page

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Figure 1

Manual Transaxle FWD General Specifications

Items	Specifications		
Model	F5M22-1-VPKV	F5M22-2-VPZV	F5M33-2-SPZV
Applicable Engine	4G37	4G63-DOHC	4G63-DOHC (Turbo)
Type	5-speed transaxle floor shift	5-speed transaxle floor shift	5-speed transaxle floor shift
Gear Ratio			
1st	3.363	3.363	3.090
2nd	1.947	1.947	1.833
3rd	1.285	1.285	1.217
4th	0.939	0.939	0.888
5th	0.756	0.756	0.741
Reverse	3.083	3.083	3.166
Final Reduction Ratio	4.322	4.322	4.153
Speedometer Gear Ratio (driven/drive)	29/36	29/36	29/36
Oil Quantity liters (qts)	1.8 (1.9)	1.8 (1.9)	2.2 (2.3)

Manual Transaxle AWD General Specifications

Item	Specifications
Model	W5M33-2-NPZV
Applicable Engine	4G63
Type	5-speed transaxle floor shift
Gear Ratio	
1st	3.083
2nd	1.684
3rd	1.115
4th	0.833
5th	0.666
Reverse	3.166
Reduction Ratio	
Primary	1.275
Front Differential	3.866
Transfer	1.090
Speedometer Gear Ratio (driven/drive)	29/36
Oil Quantity liters (qts)	2.3 (2.43)
Transaxle	
Transfer	0.6 (.63)

Figure 2

wheels (See Figure 3). Looking deeper into the unit we find the center shaft splined to a viscous coupling and a center differential that splits torque between the front and rear wheels. The 3-4 and 5th-reverse synchro assemblies are on the input shaft, while the 1-2 synchro assembly is on the intermediate shaft.

To disassemble the unit, first remove the power transfer unit from the front of the bellhousing.

Remove the rear cover. The reverse brake cone is bolted to the inside of the rear cover. It functions to synchronize the input shaft speed during a shift into reverse for smooth, quiet engagement. If the input-shaft main bearing in the unit has failed, the excess endplay in the shaft frequently causes damage to the reverse brake cone and the cover itself. Remove the locknuts retaining the 5th-reverse synchro assembly and the 5th-speed intermediate gear and remove same. Remove the selective snap ring retaining the viscous coupling and pry the assembly off the center shaft. Locate and remove the

continues page 29

and engine application. There is another all-wheel-drive model, the WSM-G1 that is used in the Dodge Stealth and Mitsubishi 3000GT. While these units are similar in design to the Eclipse units, Mitsubishi does not support them with service parts. Like the transaxle in the Chevy Lumina with the 3.4 motor, the factory won't let you fix 'em. Your only option is to buy a complete factory unit. The factory should hear the car owner's feelings when they are informed that a simple repair has to turn into a replacement unit at mega dollars and maybe this nonsense would stop. Does "I'll never buy another one" sound familiar?

Looking at the geartrain schematic you will notice that power to the rear wheels is transferred through a center shaft to a removable transfer unit that contains a bevel gearset allowing the power flow to turn 90° to the rear

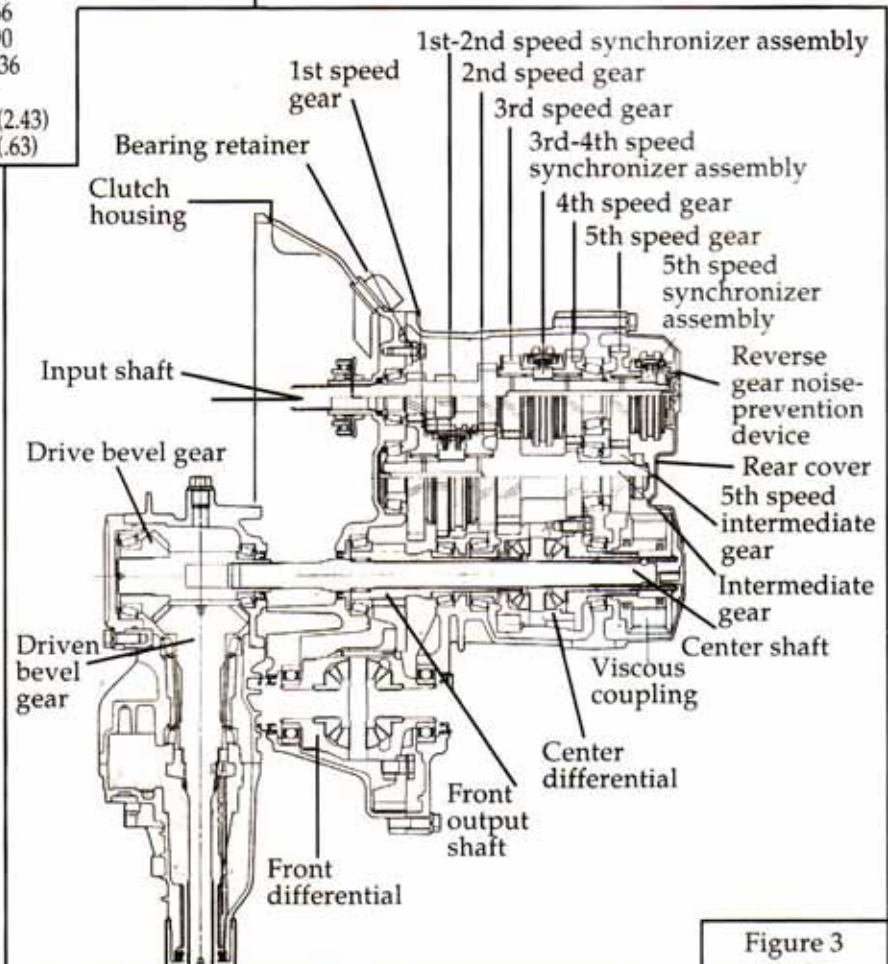
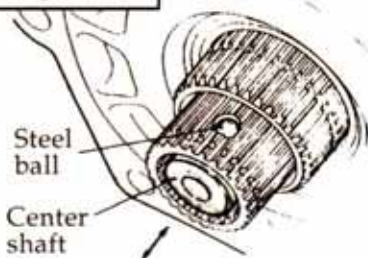


Figure 3

Figure 4



steel ball (See Figure 4) that retains the center shaft, and remove the center shaft from the case. Remove the transaxle-case adapter. Remove the bolt that retains the transaxle to the clutch housing and you are ready for subassembly removal. From the transaxle case forward the unit is almost identical with the front-wheel-drive unit.

The center differential should be disassembled and inspected. Pay careful attention to the spaces under the side gears. Excess wear here will create noise and ultimately cause the diff to fail.

On disassembly of the synchros, match-mark them for correct reassembly and the direction they face on the shafts. The 3rd-speed gear is unique in that it has a subgear attached to it with a cone spring and a snap ring. Make note of the direction the cone spring faces for proper reassembly (See Figure 5). The subgear acts as a cushion device to take the backlash out of the gear train and reduce neutral rollover noise and gear rattle.

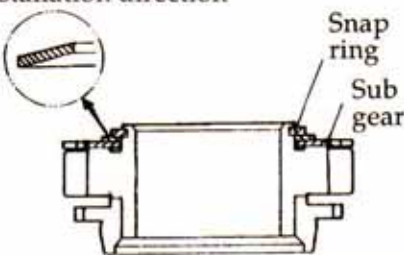
The transfer unit houses a bevel gearset supported by tapered bearings and four different selective spacers. If the unit needs repair for worn bearings or a bevel gearset, be careful to note shim sizes and placement. The geartrain must be patterned as with a hypoid differential, making sure that the tooth contact is centered on both the drive and coast sides. The procedure for setting gear depth and preload is not complicated, but it is a whole lot easier if you have a factory manual at hand. The diagram in Figure 6 shows you shim placement.

At this time I have been unable to find any information on a reli-

Up To Standards

Cone spring installation direction

Figure 5



able way to test the viscous coupling. When such a test becomes available the proper procedure will be published here.

There is a huge buying trend toward sport/utility 4WD vehicles, and more car models are being produced with all-wheel drive. This is the future, and understanding the operation of these units will make repair easier and more profitable. **TD**

Spacer for adjusting drive bevel gear mount

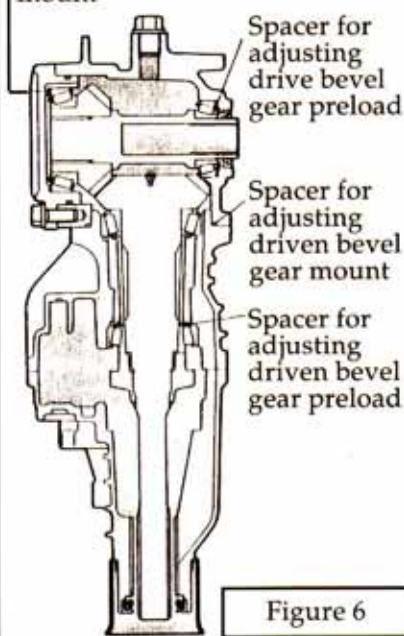


Figure 6

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