



**Up To Standards**

**By Mike Weinberg  
Contributing Editor**

Mitsubishi Motor Corp. has had a strong presence in the U.S. car market for many years. We work on many Mitsubishi models, but Mitsubishi has an even broader impact on our industry because of its willingness to provide powertrains and drivelines to other manufacturers. Mitsubishi-designed transmissions are found in Chrysler, Dodge cars and trucks, Hyundai vehicles and Ford light trucks.

In 1989, Mitsubishi introduced a V-6 engine in its Montero and 4WD truck models. To handle the increased torque and horsepower output, Mitsubishi introduced the V5MT1 transmission. In 1992, the transmission was upgraded with engineering and design modifications and identified as the V5MT1-3. Later in this article we will discuss the design changes between the two units.

Mitsubishi has a passion for alpha-numeric codes for transmission identification, but if you understand the codes it makes perfect sense. The first letter V identifies the type of drivetrain. V is the code for 4WD based on rear-wheel-drive. The second digit is the number of forward speeds, in this case 5. The third digit is either A for an automatic or M for a manual transmission. The fourth digit stands for the manufacturer of the unit. If the fourth digit is a number, it means that the unit was designed by the passenger-car engineering division of Mitsubishi Motor Corp. The letter T in this unit means it was produced by the truck and bus

## V5MT1: Mitsubishi's Truck Transmission

division of Mitsubishi. The 5th digit is the development order. The second design is denoted by a 6th digit as in the 1992 version V5MT1-3.

The V5MT1 is a much heavier, stronger unit than the FM145 it replaced. It's a cast-iron-case, top-loaded transmission, with detachable bellhousing and provision for power takeoff. Although this unit has a top cover, the shifter is mounted on the dual-range, 4WD chain-driven transfer case. Clutch operation is hydraulically controlled.

The top cover (shift cover) contains 3 shift rails, 3 detent balls and springs, 4 interlock balls and an interlock pin in the 3-4 shift rail (See Figure 1). This pin is one of those small items that migrate to foreign places when the cover is disassembled for inspection or repair. The detent springs are color coded for identification. The 1-2 and 5-R springs are blue and of equal length. The 3-4 spring is green and is longer than the others. Obviously, mismatching these springs will create a problem where none existed before (See Figure 2).

All 5 forward speeds are in constant mesh and synchronized. The 1-2 synchro rings are paper lined. The 5th-and-reverse synchro

*continues next page*



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\* (Close Ratio)

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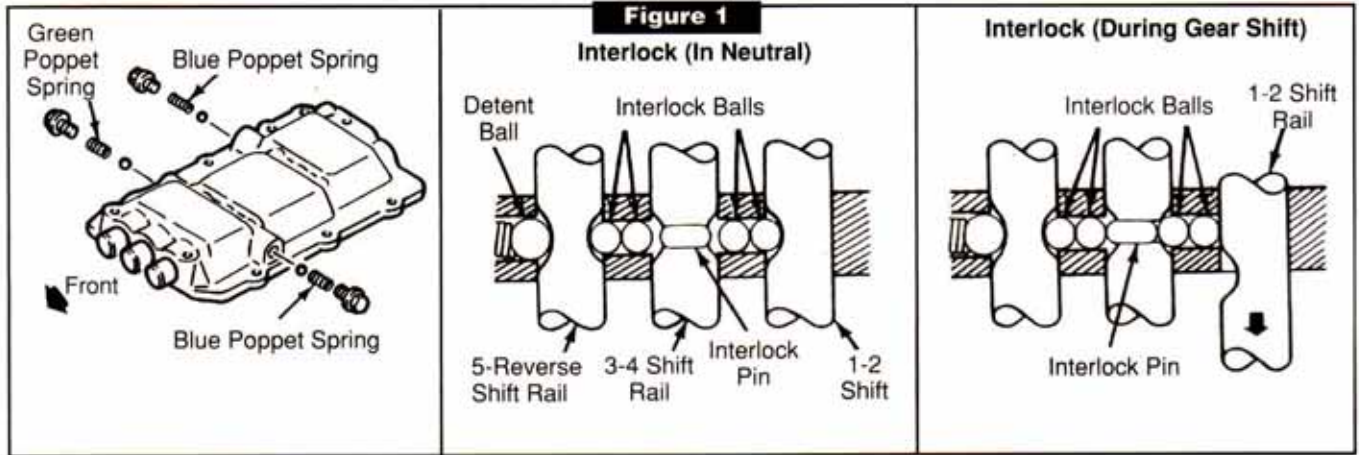
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assembly is on the mainshaft. Reverse uses a conventional idler gear, and the reverse gears are helical cut for quiet operation.

The lubricant specified for this trans is API GL-4 or GL-5. Because of the paper-lined synchro rings, a friction modifier should be added to the lube fill. One bottle of friction modifier, Mitsubishi part

#ME581050, should ensure smooth shifts.

In 1992, the V5MT1 underwent major engineering refinement and was redesignated the V5MT1-3 as we mentioned earlier. The 1-2 synchronizer was redesigned to use a double-cone ring for reduced shift effort. The double-cone design first was introduced by Borg-

Warner Powertrain Systems in the T5 worldclass design and has been used in various configurations by many manufacturers (See Figure 3). By using two sides of a steel synchro cone and inner and outer lined synchro rings, the effective braking capacity of the synchronizer is doubled using the same basic dimensions. The 3-4

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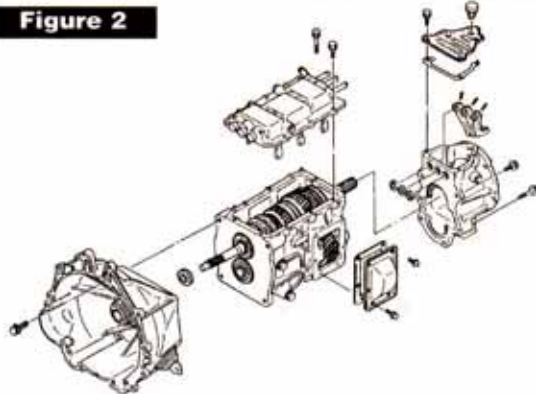
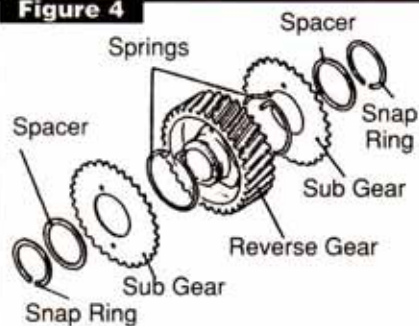
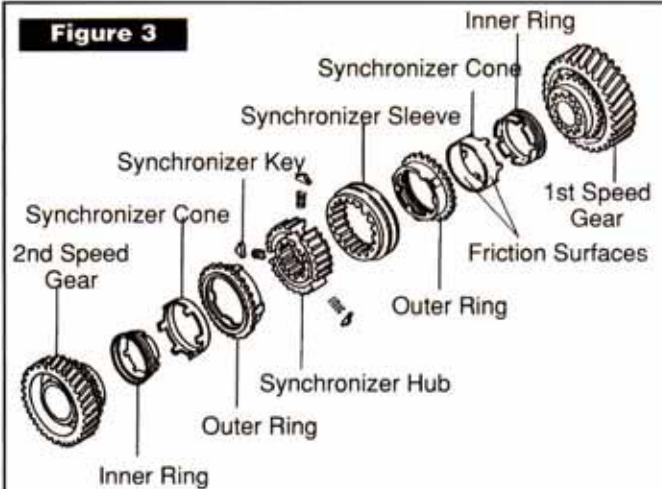
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**Figure 2****Figure 4****Figure 3**

synchro rings were changed to a friction-lined single-ring design similar to the original 1-2 synchro on the V5MT1. Reverse gear was synchronized to cut gear clash when changing direction (See Figure 4). The reverse idler gear was redesigned with two spring-loaded subgears (lash gears) on each side. Spring loading the idler preloads the gear to eliminate backlash and gear rattle that could show up as noise in forward-speed ranges.

This is a heavy-duty unit in keeping with the upgraded powertrain in the Montero and 4WD trucks. We will continue to see carmakers adding more-powerful engines, heavier-duty transmissions, and more luxury and bells and whistles to promote sales in the ferociously competitive sport/utility market. This is a relatively simple, straightforward design that should not present problems for the transmission-repair technicians of the '90s. **TD**

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An advertisement for Rockland Standard Gear. The top half shows a white race car with yellow and blue accents, with "ROCKLAND STANDARD GEAR" on the windshield and "speedline" on the front. The bottom half features a large graphic of a gear with the text "Be A Winner. Shift To Rockland Standard Gear Inc." overlaid.

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