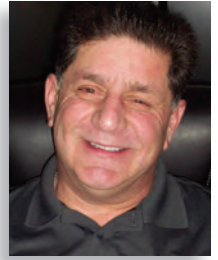


REWARD: MISSING GEARS



by Mark Puccinelli
members.atra.com

Last Seen at Joe's Transmission Shop

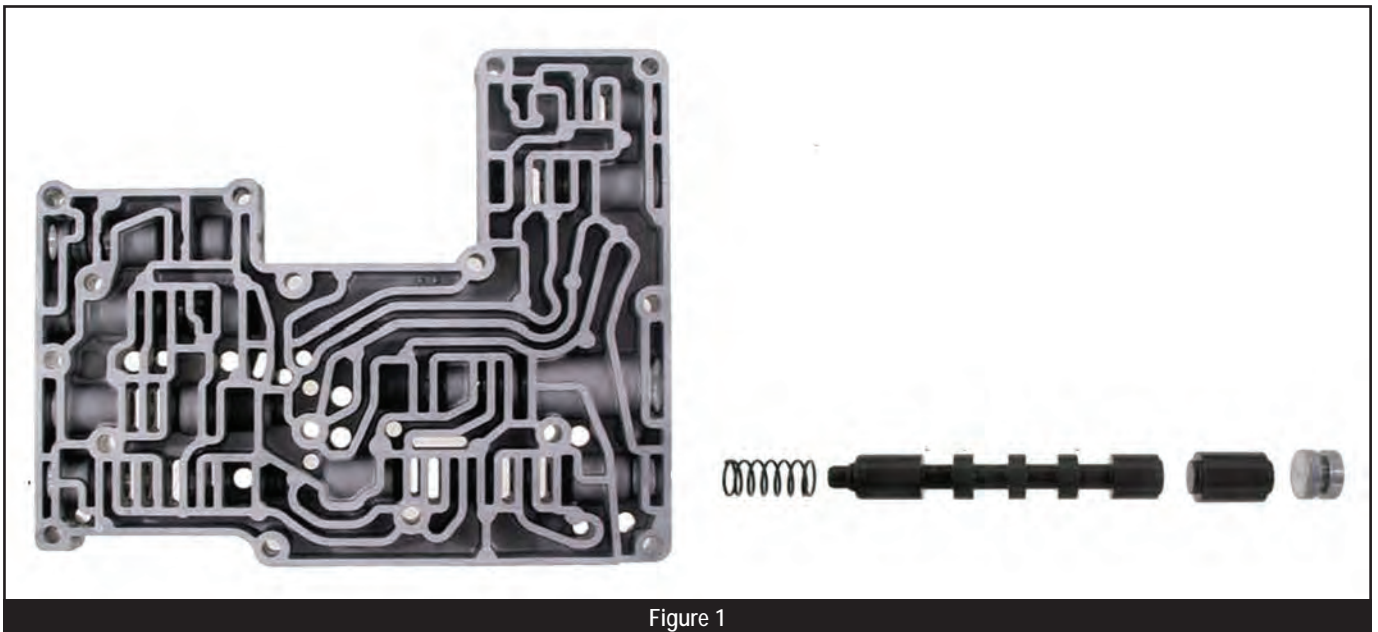


Figure 1

The Ford E4OD-4R100 has become the breadwinner transmission in a lot of shops. Although this workhorse has gone through a few changes over the years, the general diagnostic and repair processes have remained virtually the same.

An issue that's been showing up too often is when the transmission skips 2nd gear; it shifts 1-3-4. This may occur while the transmission is in service or show up after a major repair.

To diagnose this situation, you must first understand what's necessary for these units to shift into 2nd gear. There are three internal mechanical items needed:

- 2nd clutch
- One-way clutch

• 2nd clutch piston and seals
And there are four hydraulic circuit components that provide the control to shift these transmissions into 2nd gear:

- 1-2 shift valve and spring
- 1-2 clutch regulator valve
- 1-2 transition valve
- Shift solenoid 2

Now that you know what components are needed to shift into 2nd gear, the question now becomes, how can you pinpoint the reason this transmission lost 2nd gear?

One easy way is to take advantage of the similarities and differences between manual 2nd and a normal upshift into 2nd gear: The 2nd coast band is used for engine braking in manual 2nd only. The band application is controlled through the position of the

manual valve, the movement of the 1-2 shift valve, and the position of the 1-2 transition valve.

So you can use manual 2nd to test the 1-2 shift valve movement and the position of the 1-2 transition valve.

Testing the Valves

IMPORTANT: Never perform this test on the road. The band doesn't have enough holding capacity for 1-2 shifts with engine load. The results will be misleading.

- Raise the vehicle's drive wheels off the ground.
- Start the engine.
- Shift the transmission into manual low.
- Slowly raise the throttle until the speedometer reads 12-18 MPH.



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A604



4R44E 4R55E



A0DE 4R70WE 4R75WE



A540HE

Chrysler solenoid repair kits:

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- S-304 Repair Kit A604 Solenoid 2000-Up
- S-305 Repair Kit A606 Solenoid 1993-Up
- D92933 4419478 92933 Wire Harness Repair Kit A604 (Input and Output Sensors) 1989-Up
- 4854 Solenoid Repair Kit 45RFE 5-45RFE, 68RFE 2004-Up
- DK22954B 4617463 Solenoid Kit A518 A618 (Includes Overdrive & Lockup | Governor Pressure Sensor) 1996-99

Filter screens

42740C	8680389	72713	Filter Misc.	Screen Filter 4T80E Solenoid 1993-03
42266B	24219045	77717	Filter Misc.	Filter 4L60E Force Motor (Late)
42266A	8683769	77714	Filter Misc.	Filter 4L60E Shift Solenoid (Small Rectangular) (Snaps on Valve Body Plate)
49565096	4431789	72712C	Filter Misc.	Screen Filter A604 Solenoid 1989-Up
49965069	4431786	92786	Filter Misc.	Screen Filter A604 Solenoid 1989-99 1989-Up
49965063	4539787		Filter Misc.	Screen Filter A606 Solenoid Screen Plate
46065096	F2VY-7H187-A		Filter Misc.	Screen Filter A0DE 4R70W/E 4R75W/E Solenoid Feed (In Valve Body) 1992-Up
46341C	E6DZ-7G308-A	96711	Filter Misc.	Screen AXOD/AXODE By-Pass Solenoid 1986-Up
45065074			Filter Misc.	Screen Filter 4R44E 5R44E EPC Limit Filter 1995-Up
45065062	E8TZ-7N113-B	56712	Filter Misc.	Screen Filter A4LD TCC Solenoid
46465060	E9TZ-7G308-B	36712E	Filter Misc.	Screen Filter E40D/4R100 Solenoids (Fits On Separator Plate)
46865101	3C3Z-7H200-AA	36111	Filter Misc.	Screen Filter 5R110W Solenoid Thimble Plate 2003-Up
45065063			Filter Misc.	Screen Filter 5R55N Solenoid Plate 1999-02
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Reward: Missing Gears

- Hold the throttle steady and shift the transmission into manual 2.

The transmission should shift into 2nd gear. If it shifts into 2nd, the 1-2 shift valve is moving properly and the 1-2 transition valve is in the correct position. The transmission shifts into manual 2nd by applying the 2nd coast band; it doesn't rely on the 2nd clutch or one-way clutch. And because it's a

manual 1-2 shift, it doesn't require any solenoid action.

If the transmission won't shift into 2nd manually *or* automatically, there are two basic areas to check:

- 1-2 shift valve and spring — either the valve is sticking or the spring's broken. It's very common for the 1-2 shift valve spring to break. To check it, remove

the 1-2 valve completely (figure 1). Don't try to check it with a pick, because a broken spring may keep some tension against the valve and you may not realize it's broken.

- 1-2 transition valve — stuck in the shifted position, holding the spring compressed (figure 2).

If the transmission has a manual

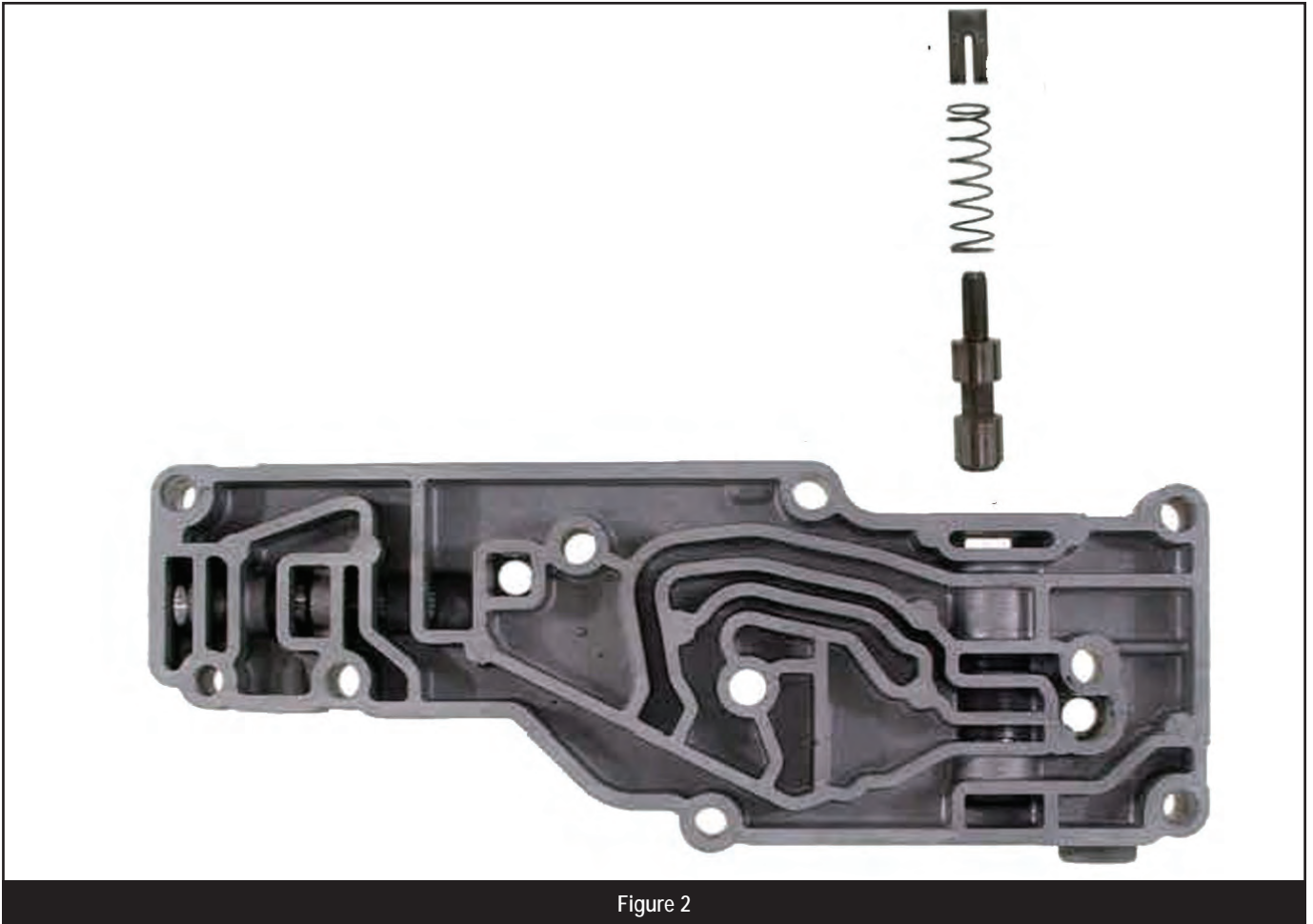


Figure 2

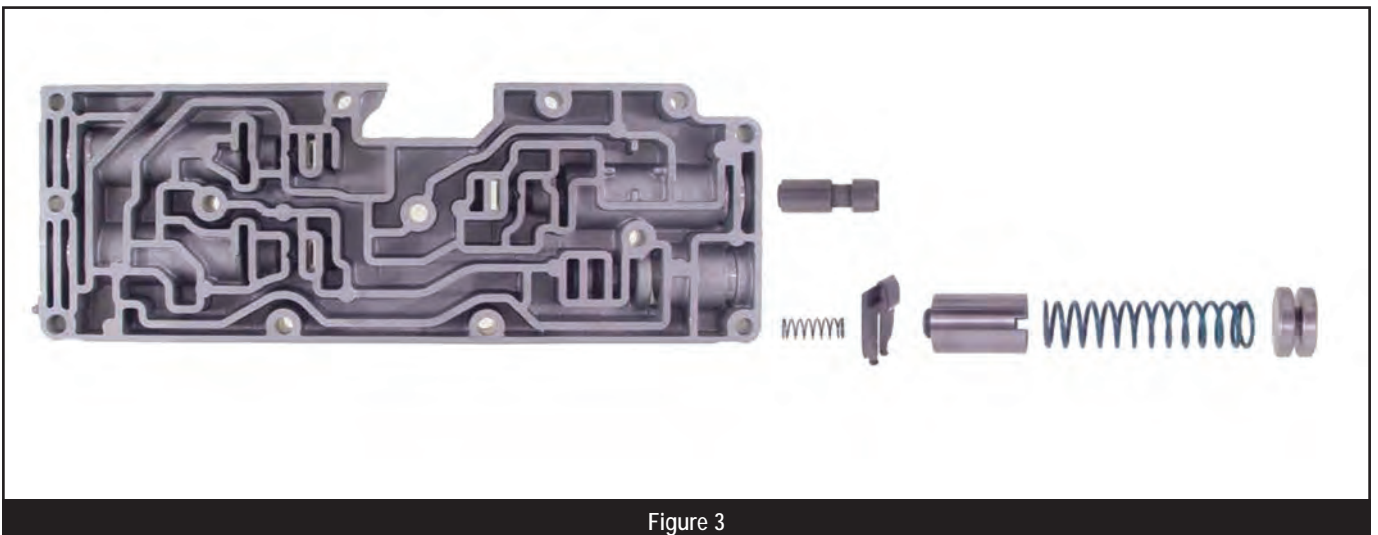


Figure 3

4 HOT SUPERIOR SOLUTIONS

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Forward Band Servo Release Spring



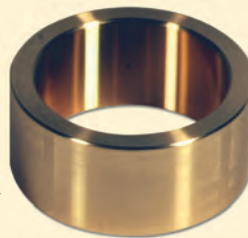
PART# K0112

The new # K0112 forward band servo release spring.

Fits all 4T65E and was developed to virtually eliminate the neutral to drive bang into gear on take off, that so many of these units experience.



722.9/NAG-2 "Chico" Drum Bushing



PART# K0109

Superior's new "Chico" drum bushing for Late 722.6/NAG-1 and 722.9/NAG-2 units. The newly designed bushing is "Made in the U.S.A.", and was designed to be a direct replacement for the bearing/seal located inside the input drum and allows the installer to "save the shaft and drum" by simply installing the new K0109. Early models use Part# K050.

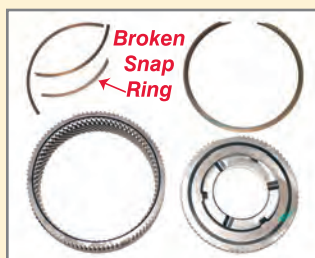


SuperTuff® Forward Clutch Hub Snap Ring



PART# K0111

The new Superior SuperTuff® Forward Clutch hub snap ring fits all C-6/E4OD/4R100 Forward clutch hub/front bearing hub. This is similar to the ever popular # K0105 (5R55W/N/S fwd hub snap ring) and is extra thick and wide to control breakage after repair. Last thing you want is to tow it in just after you rebuilt it!



SuperTuff® Bushing 6F35/6T40 Axle Tool Kit



PART# K0100

This kit includes a high-quality, 3-piece tool set designed for quick removal of the worn bushing and an indexed re-installation of the SuperTuff® bushing. The new SuperTuff® bushing is 23% wider & Teflon® coated with a lube window that allows more oil in to provide better lubrication. Kit includes (5) axle seals and (5) SuperTuff® Teflon® bushings.

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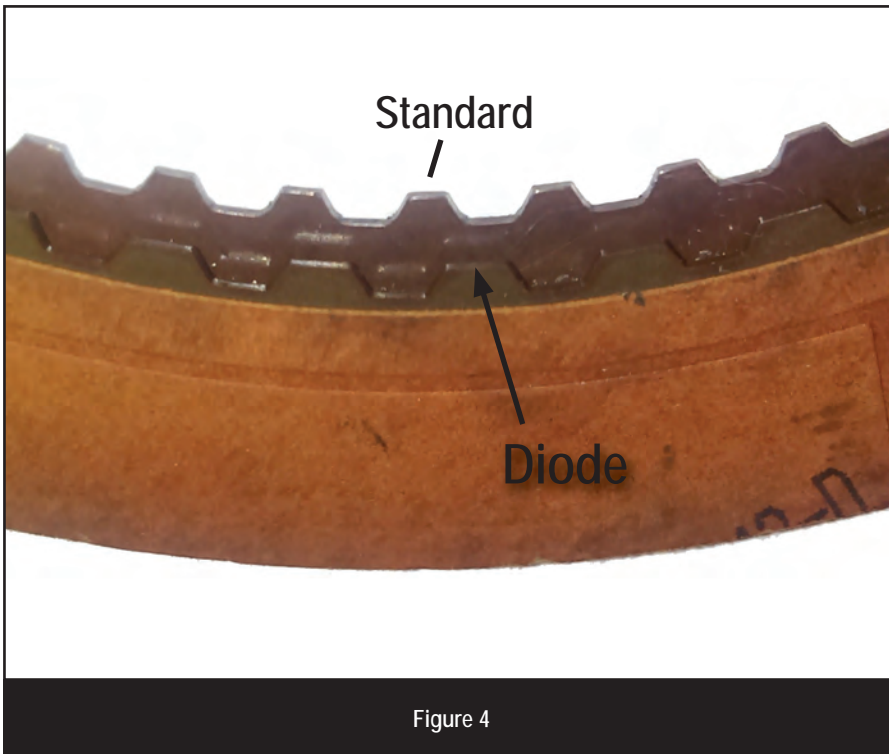


Figure 4

1-2 shift, it proves that the 1-2 shift and transition valves are okay.

The areas to check first when you have a manual 1-2 shift but no auto 1-2 shift are:

- 1-2 shift valve spring
- 1-2 clutch regulator valve
- Shift solenoid 2 — Confirm the electrical command and install another solenoid pack.

The 1-2 clutch regulator valve can be a problem on these transmissions. It regulates oil flow to the 2nd clutch after the 1-2 shift valve. If it sticks closed, you won't have oil flow to the 2nd clutch, so no 2nd gear.

What often happens is the hard coating peels off the valve, causing it to stick. There are steel replacement valves available to replace these damaged valves.

The 1-2 clutch regulator valve bore can also become distorted from wear and warp (figure 3). If you overtighten the valve body bolts the problem gets worse.

In some cases the valve will be free while the accumulator body is on the bench. Once you bolt the accumulator body to the case, the bore collapses or distorts and the valve seizes in the bore.

To confirm this:

- Remove the 1-2 accumulator springs, piston, and 1-2 clutch

regulator retainer and spring. Leave the 1-2 clutch regulator valve in the bore.

- Bolt the accumulator body to the case.
- Slide a piece of hard nylon tubing, with the end tapered, into the spring pocket of the clutch regulator valve and check for valve movement.

If the valve sticks when you bolt the accumulator body to the case, try flat sanding the accumulator body. If that doesn't help, replace the accumulator body

These are the most common causes for a transmission that shifts 1-2 manually but not automatically. Here are a few other, less common areas to check:

Valve Body Gaskets or Checkballs

Always lay the new gaskets over the separator plate, one at a time, and make sure the gaskets aren't covering any of the separator plate holes. If any of the holes are being covered, you have the wrong gaskets.

A missing or mislocated checkball can also cause no 2nd on certain models. So always verify the checkball locations before bolting the valve body onto the case.

Internal 2nd Clutch Problems

While hydraulic issues are the most common cause for a lost 2nd gear, they're not the only possibility. There are a couple clutch problems that can also cause it: improper 2nd clutch stackup or using the wrong clutches for the one-way clutch.

2nd Clutch Stackup — The 2nd clutch stackup is different for the E4OD than for a 4R100. The main difference is the thickness of the pressure plate and steels.

Here's the stackup for the 4R100:

Pressure Plate — 0.324" (1)

Steels — 0.128" (3)

And here's the stackup for the E4OD:

Pressure Plate — 0.410" (1)

Steels — 0.082" (2), and 0.128" (1)

Note: Some early E4ODs coupled to 6-cylinder engines only used two friction plates. These models used a 0.578" pressure plate.

Keep in mind that the pressure plate always goes into the case first. If you install it last, you'll end up with no 2nd gear.

2nd Clutch Diode vs Standard One-Way Clutch — When working on units with a 2nd clutch diode, check the friction plates on 2nd clutch race. There's a small difference in the clutch ID between the diode versus the standard one-way clutch; the ones for a standard one-way clutch have a slightly larger inner diameter (figure 4).

If you install clutches meant for a standard one-way clutch in a transmission that uses a diode one-way clutch, you'll end up losing 2nd gear.

It's a real problem when a transmission loses 2nd gear. But with a little care and a basic understanding of how these transmissions operate, you should be able to ferret out these problems and take care of them once and for all.



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