AUTOMATIC TRANSMISSION REBUILDERS ASSOCIATION

2000

TECHNICAL SEMINAR

Automatic Transmission Rebuilders Association

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Dennis Madden
Technical Director

Ford Contents

4R44E, 4R55E, 5R55E

Application

The 4R44E and the 4R55E are almost identical; the difference between them is in the load capacity: The 4R55E is stronger than the 4R44E.

Even though the 5R55E is a 5-speed automatic, it is mechanically the same as its 4-speed cousins, the 4R44E and the 4R55E. The difference is in the way the computer commands the upshifts. By commanding the overdrive band on while the transmission is in 1st gear, the 5R55E develops a 1.86:1 ratio. This falls between 1st gear (2.47:1) and 2nd gear (1.47:1). Here's how it works:

1st gear is still 1st gear. However, rather than applying the intermediate band for 2nd gear, the OD band applies for 2nd. It's actually an overdriven 1st gear. For 3rd gear the unit releases the OD band and applies the intermediate band. Applying the direct clutch puts the unit into 4th gear. Finally the OD band reapplies to put the transmission into 5th gear.

Confused? That's okay: As long as you remember the extra gear falls between 1st and 2nd gear, the 5R55E will be a lot easier to diagnose.

Because these units look very similar and the computer is what decides whether it's a 4 speed or 5 speed, use the vehicle application chart to verify which unit you're working on.

Transmission Application			
Year and Engine	Ranger	Aerostar	Explorer and Mountaineer
1995			
2.3L, 3.0L	4R44E		
4.0L	4R55E		4R55E
1996			
2.3L, 3.0L	4R44E	4R44E	
4.0L	4R55E	4R55E	4R55E
1997			
2.3L, 3.0L	4R44E	4R44E	
4.0L	5R55E	5R55E	5R55E
1998-on			
2.5L, 3.0L	4R44E		
4.0L	5R55E		5R55E

4R44E, 4R55E, 5R55E

4R44E and 4R55E Clutch and Band Application

Gear		Forward Clutch	Direct Drum	Intermediate Band	Overdrive Band	Coast Clutch	Low/Reverse Band	Overdrive Sprag	Low Sprag	Gear Ratios
Park										
Reverse			■			■	■	■		2.10:1
Neutral										
Drive; Overdrive Enabled	4th	■	■		■			F/W	F/W	0.75:1
	3rd	■	■					■	F/W	1.00:1
	2nd	■		■				■	F/W	1.47:1
	1st	■						■	■	2.47:1
Drive; Overdrive Disabled	3rd	■	■			■		■	F/W	1.00:1
	2nd	■		■		■		■	F/W	1.47:1
	1st	■				■		■	■	2.47:1
Manual 2		■		■		■		■	F/W	1.47:1
Manual 1		■				■	■	■	■	2.47:1

■ = Applied F/W = Freewheeling

4R44E and 4R55E Solenoid Operation

Solenoid Operation: 4R44E / 4R55E

Selector Position	Gear Range	Shift Solenoid 1	Shift Solenoid 2	Shift Solenoid 3	Coast Clutch Solenoid	Engine Braking
Park/Neutral	P/N	**On**	Off	Off	Off	No
Reverse	R	**On**	Off	Off	Off	Yes
Drive; Overdrive Enabled	4th	Off	Off	**On**	Off	Yes
	3rd	Off	Off	Off	Off	No
	2nd	**On**	**On**	Off	Off	No
	1st	**On**	Off	Off	Off	No
Drive; Overdrive Disabled	3rd	Off	Off	Off	**On**	Yes
	2nd	**On**	**On**	Off	**On**	Yes
	1st	**On**	Off	Off	**On**	No
Manual 2	2nd	**On**	**On**	Off	Off	Yes
Low	1st	**On**	Off	Off	Off	Yes

4R44E, 4R55E, 5R55E

5R55E Clutch and Band Application

Gear		Forward Clutch	Direct Drum	Intermed Band	Overdrive Band	1997 Coast Cl	1998-on Coast Cl	Low/Rev Band	Overdrive Sprag	Low Sprag	Gear Ratio
Park											
Reverse			■			■	■	■	■		2.10:1
Neutral											
Drive; Overdrive Enabled	5th	■	■		■				F/W	F/W	0.75:1
	4th	■	■						■	F/W	1.00:1
	3rd	■		■					■	F/W	1.47:1
	2nd	■			■				F/W	F/W	1.86:1
	1st	■							■	■	2.47:1
Drive; Overdrive Disabled	4th	■	■			■	■		■	F/W	1.00:1
	3rd	■		■			■		■	F/W	1.47:1
	2nd	■			■				F/W	F/W	1.86:1
	1st	■							■	■	2.47:1
Manual 2		■			■	■	■		F/W	F/W	1.86:1
Low		■				■	■	■	■	■	2.47:1

■ = Applied   F/W = Freewheeling

5R55E Solenoid Application

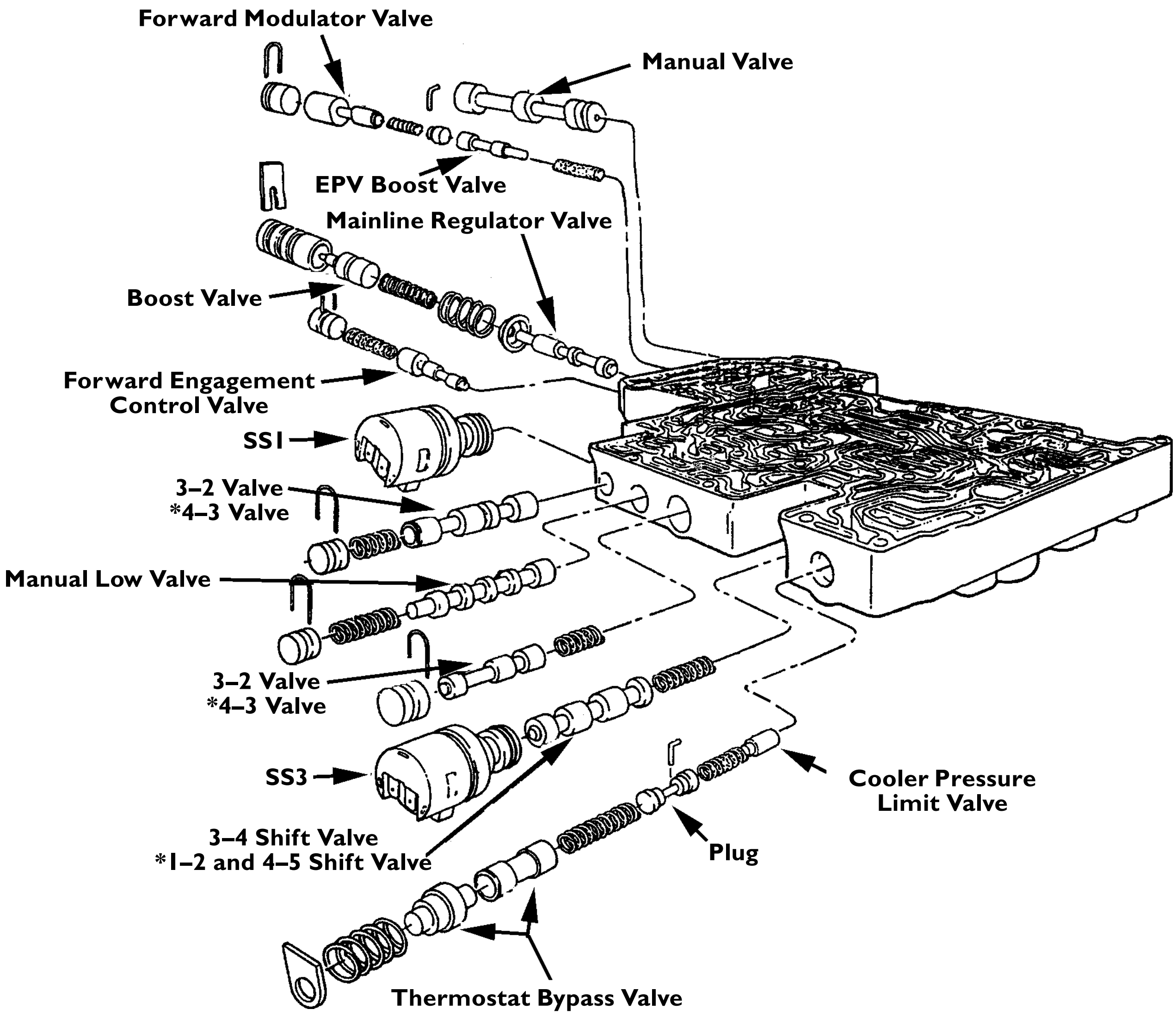
Solenoid Operation: 5R55E

Selector Position	Gear Range	Shift Solenoid 1	Shift Solenoid 2	Shift Solenoid 3	1997 Only Coast Clutch Solenoid	Engine Braking	1998-On Coast Clutch Solenoid	Engine Braking
Park/Neutral	P/N	**On**	Off	Off	Off	No	Off	No
Reverse	R	**On**	Off	Off	**On**	Yes	**On**	Yes
Drive; Overdrive Enabled	5th	Off	Off	**On**	Off	Yes	Off	Yes
	4th	Off	Off	Off	Off	No	Off	No
	3rd	**On**	**On**	Off	Off	No	Off	No
	2nd	**On**	Off	**On**	Off	No	Off	No
	1st	**On**	Off	Off	Off	No	Off	No
Drive; Overdrive Disabled	4th	Off	Off	Off	**On**	Yes	**On**	Yes
	3rd	**On**	**On**	Off	Off	No	**On**	Yes
	2nd	**On**	Off	**On**	Off	No	Off	No
	1st	**On**	Off	Off	Off	No	Off	No
Manual 2	2nd	**On**	Off	Off	**On**	Yes	**On**	Yes
Low	1st	**On**	Off	Off	**On**	Yes	**On**	Yes

Differences between 1997 and later models highlighted by dark band.

4R44E, 4R55E, 5R55E

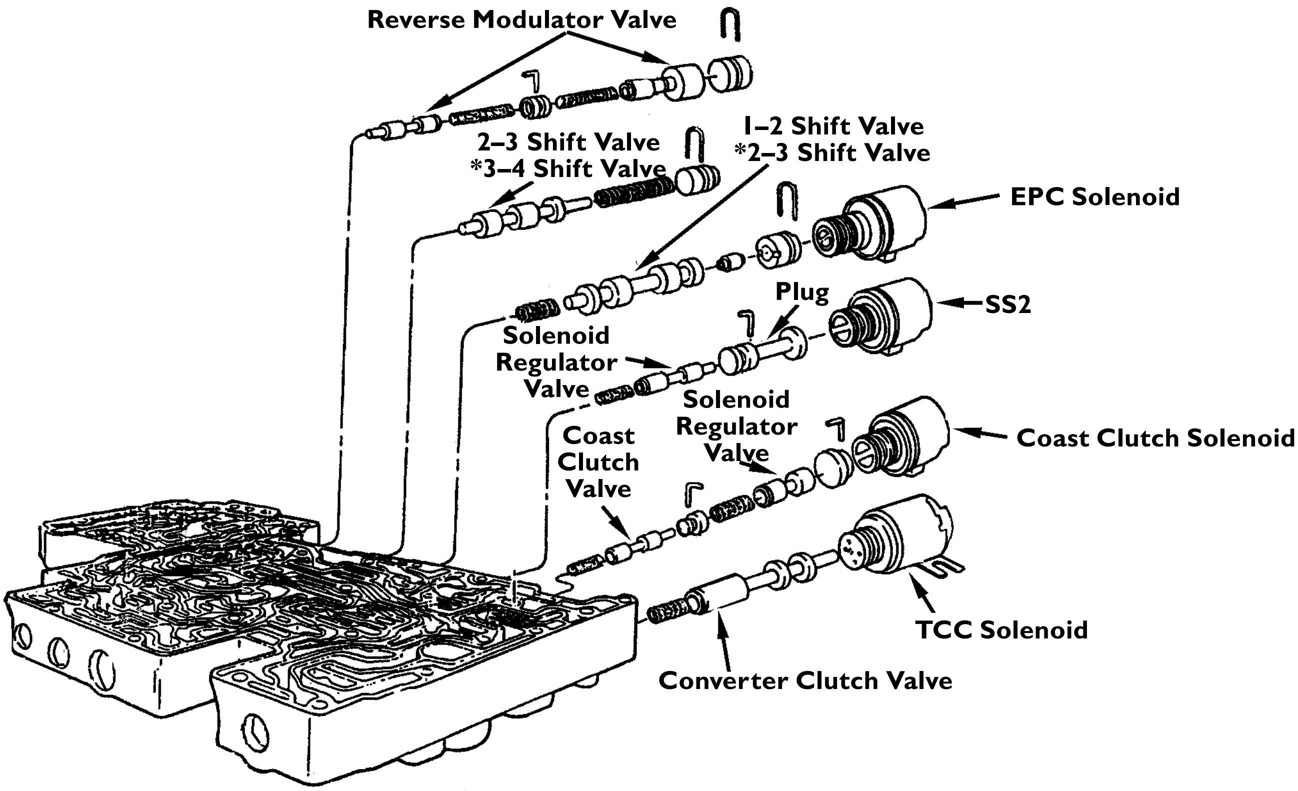
Valve Locations; Right Side



*** 5R55E Only**

4R44E, 4R55E, 5R55E

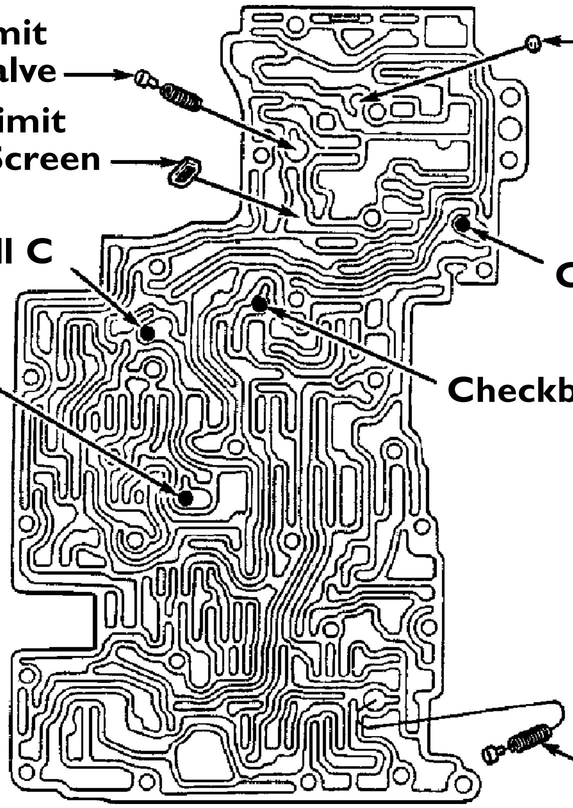
Valve Locations; Left Side



*** 5R55E Only**

4R44E, 4R55E, 5R55E

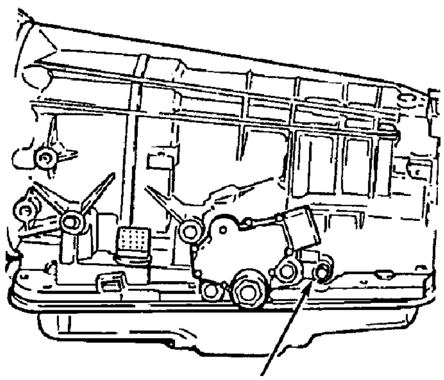
Checkball and Small Part Locations



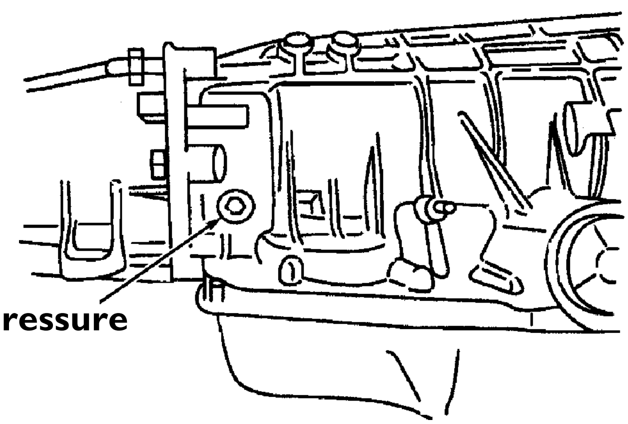
Item	Description	Function
1	Checkball A	Allows checkball C to receive pressure in reverse, manual 2 and manual low
2	Checkball B	Orifices the apply oil to the direct clutch in reverse only
3	Checkball C	Allows the 3-4 shift valve to be controlled by SS1 or Checkball A pressures (reverse, manual 2 or manual low)
4	Checkball E	Low/reverse checkball
5	Converter Relief Valve	Limits the maximum converter charge pressure
6	EPC Relief Valve	Limits the maximum EPC pressure
7	Extension Housing Lube Orifice	Limits the amount of lube oil sent to the rear bushing
8	EPC Screen	Filters EPC oil

4R44E, 4R55E, 5R55E

Mainline and EPC Pressure Testing



Mainline Pressure



EPC Pressure

Transmission	Gear Range	Mainline Pressure (PSI)		EPC Pressure (PSI)	
		Idle	WOT	Idle	WOT
4R44E 2.3L, 2.5L	OD, 2, L	75–100	225–260	20–30	110–135
	Rev	115–145	280–350	35–45	110–135
4R44E 3.0L	OD, 2, L	105–135	225–260	30–40	110–135
	Rev	150–180	280–350	45–55	110–135
4R55E 4.0L	OD, 2, L	85–100	225–260	25–35	110–135
	Rev	95–160	280–350	55–65	110–135
5R55E 4.0L OHV	OD, 2, L	80–115	225–260	25–35	110–135
	Rev	135–165	280–350	55–65	110–135
5R55E 4.0L SOHC	OD, 2, L	95–125	225–260	40–50	110–135
	Rev	100–130	280–350	55–65	110–135

4R44E, 4R55E, 5R55E

Delayed Reverse

Like the A4LD, delayed reverse engagements are common in the 4R44E, 4R55E and 5R55E. And just like the A4LD, there are ways to correct the problem. Here are the most common causes for a delayed reverse:

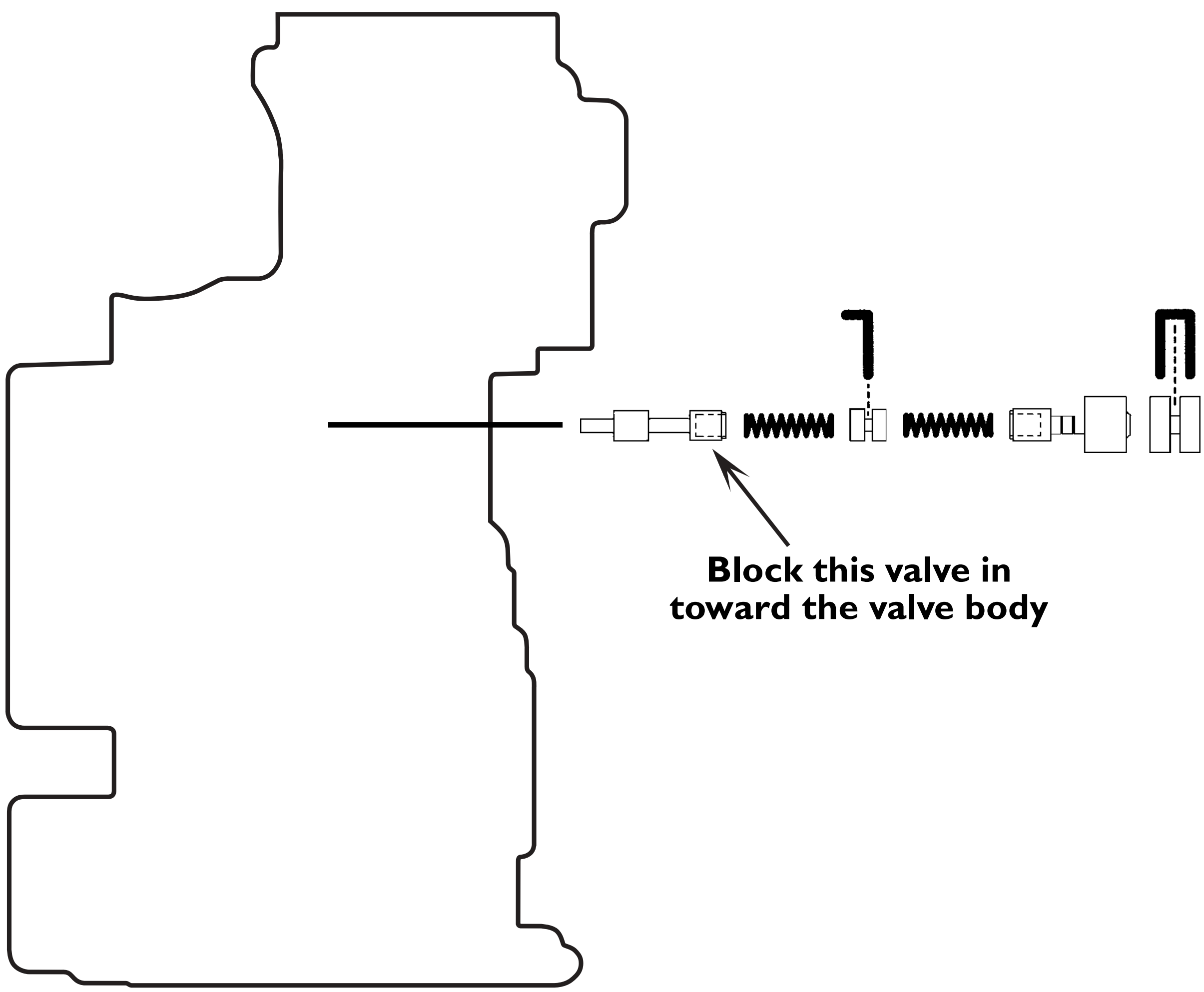
1) Low line pressure.

2) Excessive low/reverse band clearance.

3) Excessive direct clutch clearance. Direct clutch clearance should be between 0.008" – 0.010" per friction.

4) Leaks in the reverse apply circuit, such as direct drum piston seals, direct drum to center support seal rings, intermediate servo, low/reverse servo seals.

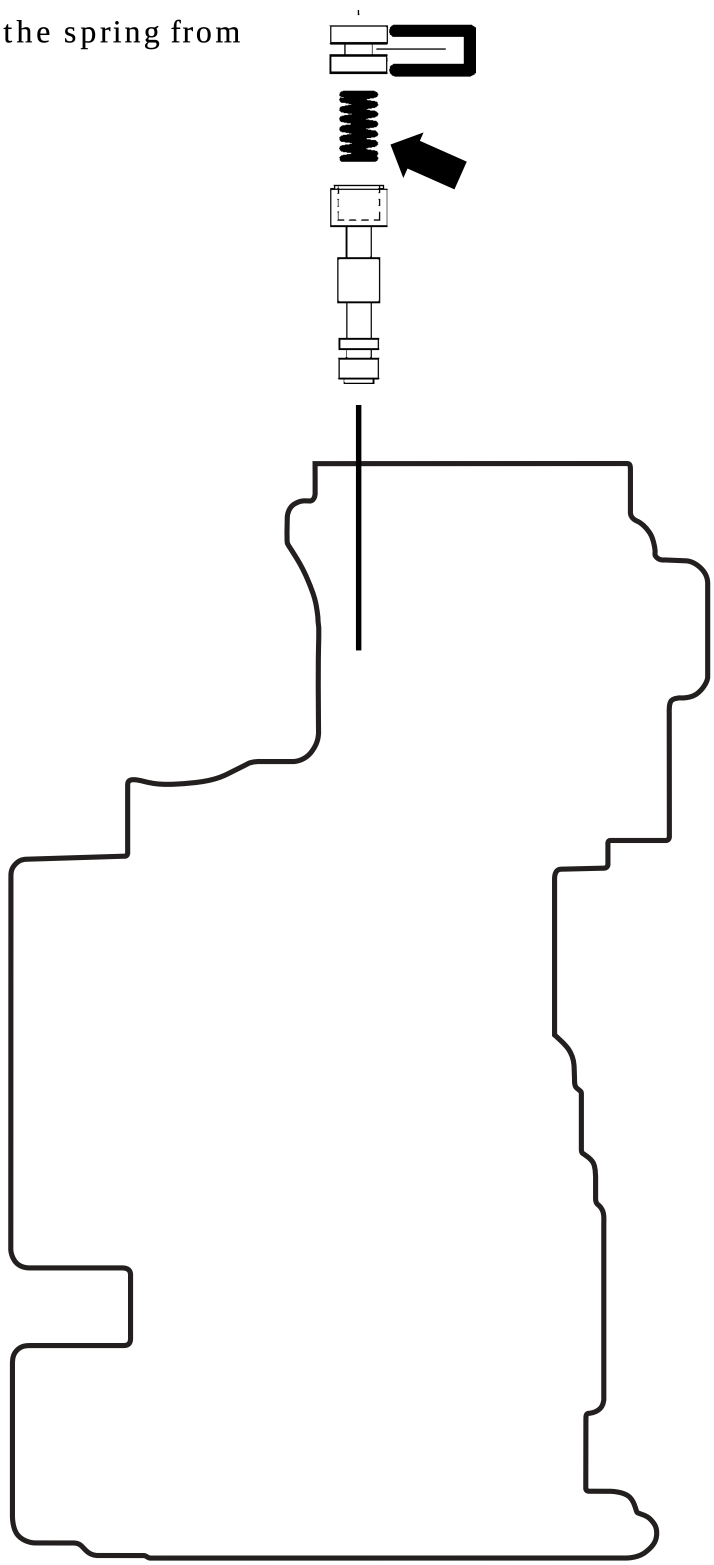
If all of these items are okay and you're still experiencing a delayed reverse engagement, try blocking the reverse modulator valve.



4R44E, 4R55E, 5R55E

Delayed Forward Engagement

To improve forward engagement, remove the spring from the engagement control valve.

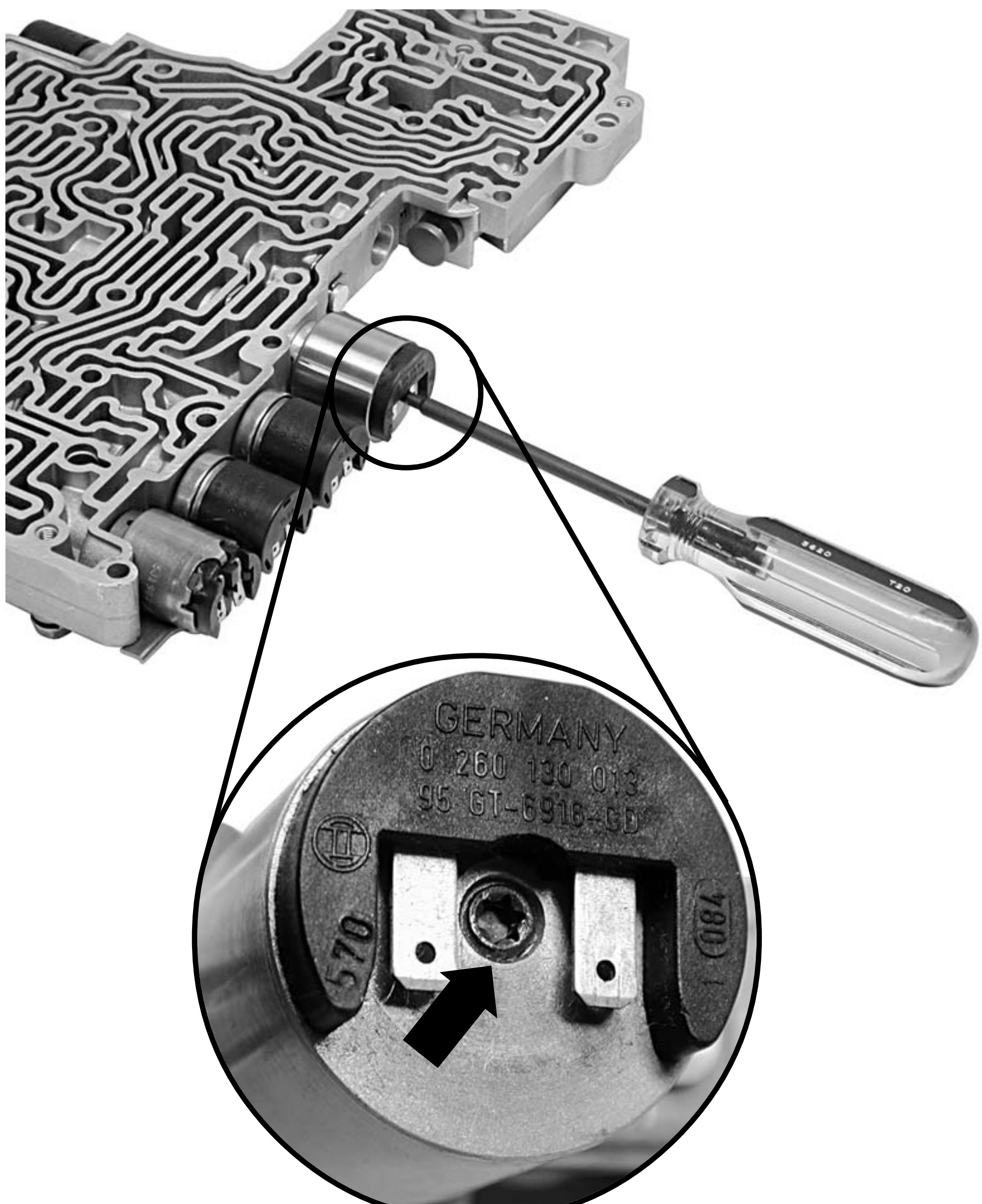


4R44E, 4R55E, 5R55E

2–3 Flare (4R44E, 4R55E); 3–4 Flare (5R55E)

A 2–3 flare on a 4R44E or 4R55E (or a 3–4 flare on the 5R55E) is often caused by low line pressure. The problem isn't that the computer doesn't vary line pressure, or that there's an underlying valve body problem. It's simply the computer doesn't command line pressure high enough to make a proper shift.

If the intermediate servo is in good shape, and you *do* get line pressure variation during throttle changes, try adjusting the pressure control solenoid adjustment screw clockwise, ¾ of a turn.

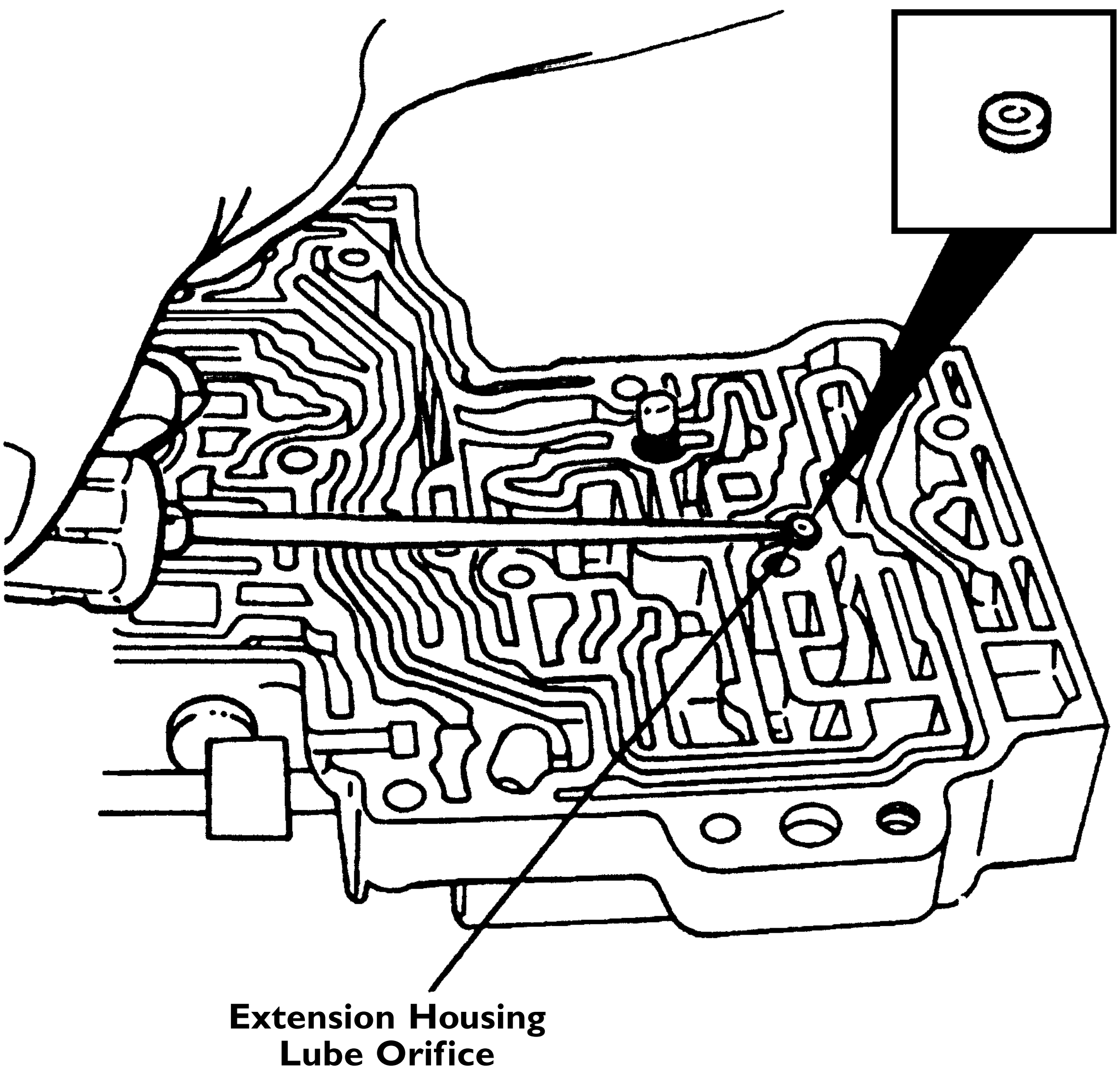


4R44E, 4R55E, 5R55E

Lube Orifice

The removable lube orifice shown here is used to limit the amount of lube oil supplied to the extension housing. Since this circuit receives mainline pressure directly, modifying the orifice or leaving it out will affect line pressure.

Never modify or omit this orifice. If the puck is missing you can use an A4LD valve body puck. Make sure the hole through the center is 0.025".



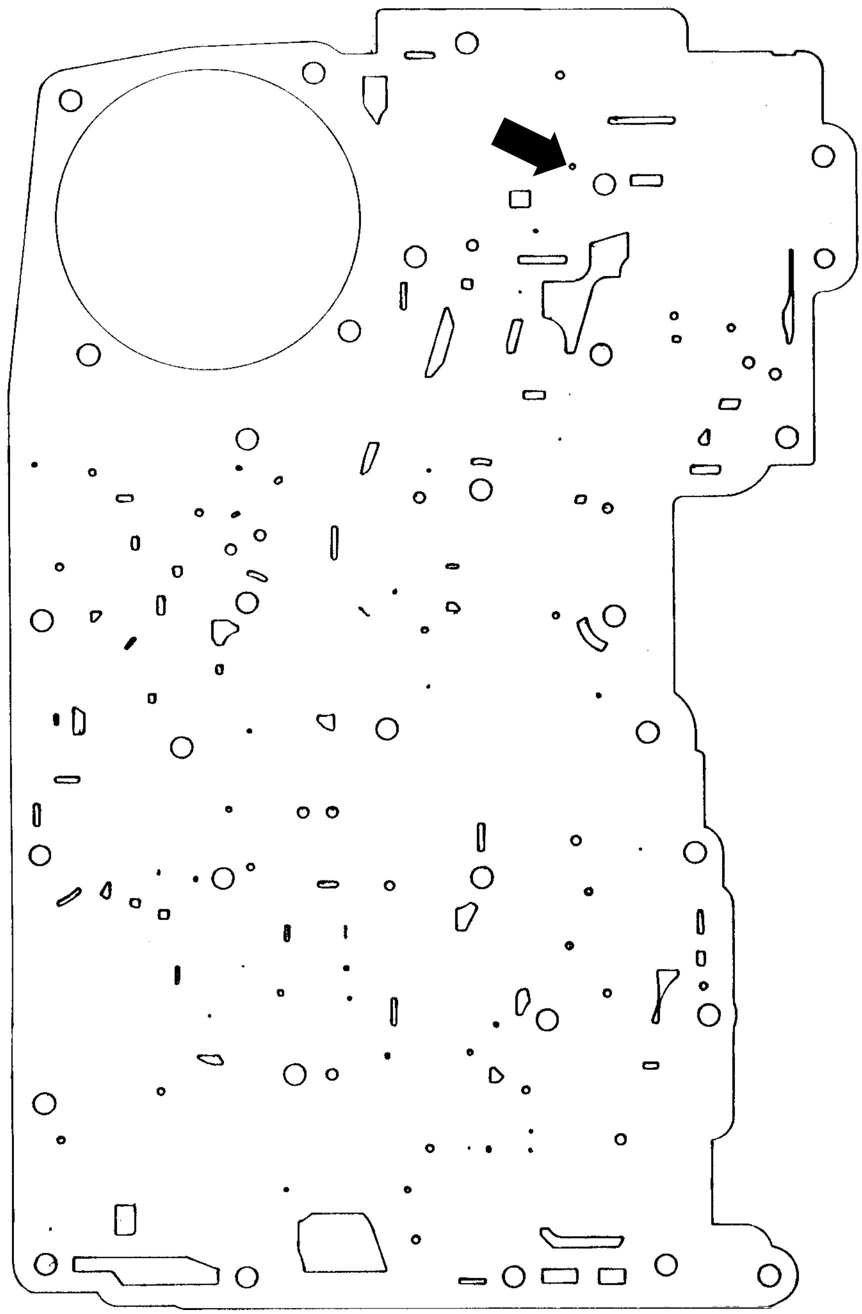
4R44E, 4R55E, 5R55E

Lube Orifice (continued)

Some valve bodies don't have a pocket for a removable orifice. In these valve bodies, the 0.025" orifice is located in the separator plate.

IMPORTANT All valve bodies must have an orifice of one type or the other.

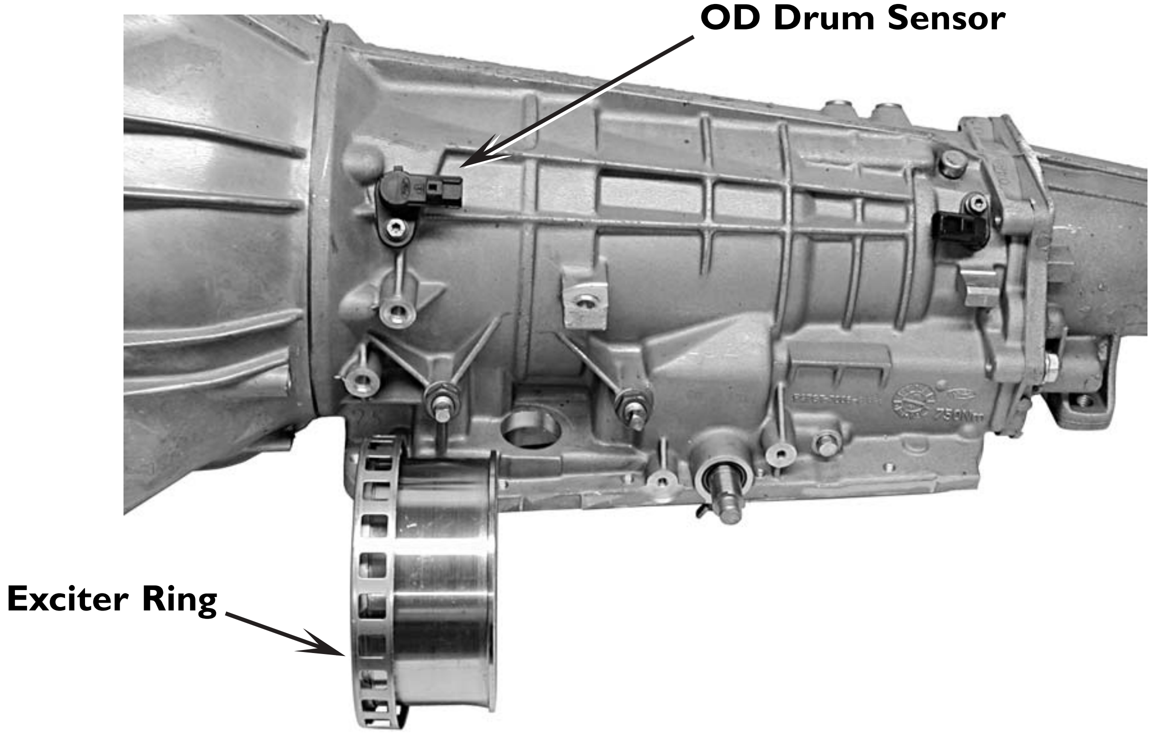
If this orifice is 0.025" in diameter, the lube orifice puck isn't necessary.



4R44E, 4R55E, 5R55E

OD Drum Sensor

Although every 97–98 5R55E was equipped with a fully functional OD drum sensor, Ford not only states that the computer was never programmed to use the signal, but also suggests disabling the sensor.



To disable the OD drum sensor properly, simply splice the two wires together that go to the sensor. This will prevent stray signals from confusing the computer.

4R44E, 4R55E, 5R55E

OD Drum Sensor (continued)

In some cases, the exciter ring can become damaged, causing noises during operation.

The best way to prevent these noises is to remove the exciter ring during every rebuild.

4R44E, 4R55E, 5R55E

Diagnostic Trouble Codes (DTC)

There are many ways to approach trouble codes. Some technicians prefer to diagnose the system completely, while others simply want a list of possibilities to throw parts at the problem. Both of these extremes have their benefits and drawbacks. The true technician knows which approach to choose for a successful diagnosis.

In this section we've tried to offer enough information to aid everyone's approach, including a brief definition of most codes associated with the 4R44E family, common causes, "quick fix" suggestions, and some computer strategies that happen due to certain codes. By strategies, we mean functions that the computer is programmed to change in the event of a trouble code.

Understanding these strategy changes can be useful for diagnosis, or at least offer an explanation when the transmission does something really strange. Very little is published about specific code strategies and even less is given to us by the manufacturer. The code strategies listed in this section are only some we know exist.

Among the first things you should check on a vehicle with electrical codes are the power and grounds supplied to the computer. Poor values in these two circuits can be the root cause of many electrical trouble codes. To keep from repeating this throughout the section, we'll assumed you've already checked these circuits and are known to be good. You must include these in your testing, whether we mention it or not.

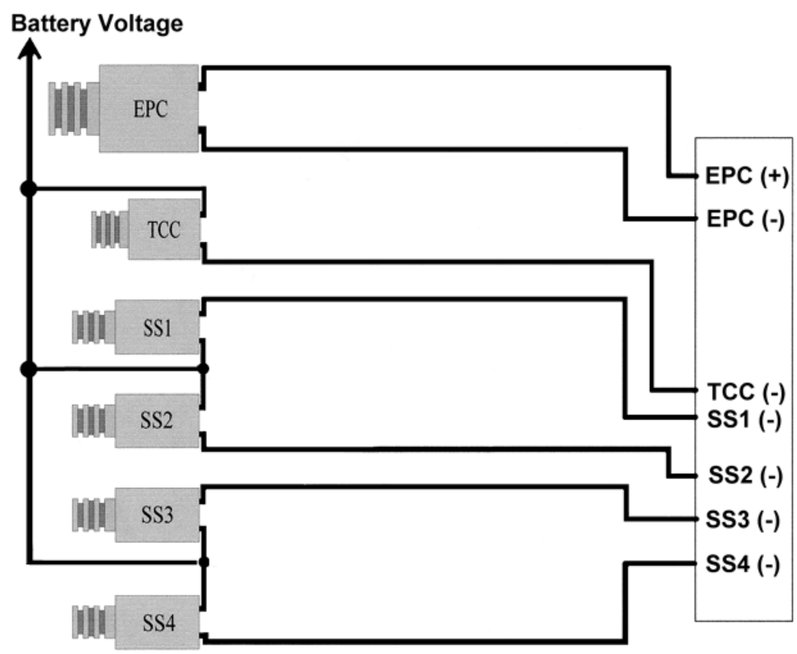
4R44E, 4R55E, 5R55E

Solenoid Circuit Failure Codes

P0743, 652: TCC solenoid open or shorted circuit.
P0750, 621: SS1 open or shorted circuit.
P0755, 622: SS2 open or shorted circuit.
P0760, 641: SS3 open or shorted circuit.
P0765, P1754, 643: SS4 open or shorted circuit.
P1746, P1747, 624: EPC solenoid open or shorted circuit.

How the Codes Set:

The computer constantly monitors current flow through each solenoid. If the current goes out of normal range, the computer will set the corresponding code.



Possible Causes:

1) Bad wire or poor connections
2) Bad solenoid
3) Bad computer

Common Causes:

1) Bad connections or wiring
2) Bad solenoid

The Quick Fix:

1) Clean and tighten related connections.
2) Replace the wire that connects the related solenoid to the computer.
3) Replace the solenoid.

DIAGNOSTIC TIP Try these suggestions one at a time. The order is simply our suggestion based on simplicity, cost or frequent helpline calls. There is no reason to follow this order.

4R44E, 4R55E, 5R55E

Solenoid Circuit Failure Codes (continued)

Strategies

When the EPC solenoid sets a solenoid circuit code, the computer turns the EPC solenoid off, causing high line pressure and hard shifts.

When the TCC solenoid sets a solenoid circuit code, the computer turns the TCC solenoid off, disabling lockup.

When a shift solenoid circuit code sets, the computer shuts the failed solenoid off. The following charts show the changes in shift patterns due to these strategies.

4R44E / 4R55E Shift Strategies

SS1 Always Off			
Gear Commanded	Actual Gear Range		
	OD	Manual 2	Manual L
1st	3rd	2nd	*1st
2nd	2nd	2nd	—
3rd	3rd	—	—
4th	4th	—	—

* With SS1 always off, the L/R band isn't applied in manual low.

SS3 Always Off			
Gear Commanded	Actual Gear Range		
	OD	Manual 2	Manual L
1st	1st	2nd	1st
2nd	2nd	2nd	—
3rd	3rd	—	—
4th	3rd	—	—

SS2 Always Off			
Gear Commanded	Actual Gear Range		
	OD	Manual 2	Manual L
1st	1st	2nd	1st
2nd	1st	2nd	—
3rd	3rd	—	—
4th	4th	—	—

SS4 Always Off			
Gear Commanded	Actual Gear Range		
	OD	Manual 2	Manual L
1st	1st	2nd	1st
2nd	2nd	2nd	—
3rd	3rd	—	—
4th	4th	—	—

SS4 always off causes no engine braking.

4R44E, 4R55E, 5R55E

Solenoid Circuit Failure Codes (continued)

5R55E Shift Strategies

SS1 Always Off

Gear Commanded	Actual Gear Range		
	OD	Manual 2	Manual L
1st	4th	3rd	3rd
2nd	5th	*	—
3rd	3rd	—	—
4th	4th	—	—
5th	5th	—	—

* Overdriven 2nd gear; 1.10:1 ratio.

SS3 Always Off

Gear Commanded	Actual Gear Range		
	OD	Manual 2	Manual L
1st	1st	3rd	1st
2nd	1st	3rd	—
3rd	3rd	—	—
4th	4th	—	—
5th	4th	—	—

SS2 Always Off

Gear Commanded	Actual Gear Range		
	OD	Manual 2	Manual L
1st	1st	3rd	1st
2nd	2nd	*	—
3rd	1st	—	—
4th	4th	—	—
5th	5th	—	—

* Overdriven 2nd gear; 1.10:1 ratio.

SS4 Always Off

Gear Commanded	Actual Gear Range		
	OD	Manual 2	Manual L
1st	1st	3rd	1st
2nd	2nd	*	—
3rd	3rd	—	—
4th	4th	—	—
5th	5th	—	—

* Overdriven 2nd gear; 1.10:1 ratio.

4R44E, 4R55E, 5R55E

Solenoid Circuit Failure Codes (continued)

Diagnostic Suggestions

Here's some useful data you can use to test each solenoid circuit for problems. Perform these tests at the computer connector with the computer disconnected.

1) Use the specifications chart for computer pin ID and resistance values. Check resistance between the positive and negative terminals for each solenoid. They should fall between the specs listed.
2) Check resistance between the negative terminal and chassis ground. The readings for all solenoids should read infinity (no continuity). This is testing the circuit for shorts to ground.

Solenoid	All Except 95 Explorer	95 Explorer	Resistance (Ohms)
All Solenoids (+)	Pins 71, 97	Pin 37, 57	
EPC (–)	Pin 81	Pin 38	3.1 – 5.7
TCC (–)	Pin 54	Pin 53	8.9 – 16.0
CCS (–)	Pin 28	Pin 28	22.0 – 48.0
SS1 (–)	Pin 27	Pin 51	22.0 – 48.0
SS2 (–)	Pin 1	Pin 52	22.0 – 48.0
SS3 (–)	Pin 53	Pin 55	22.0 – 48.0

CAUTION Always perform these tests with the computer disconnected.

Because the computer monitors the amperage through each of the solenoid circuits, it's able to identify an open or shorted circuit quickly and accurately. The computer is also programmed to shut the solenoid circuit off to save the computer from possible damage.

4R44E, 4R55E, 5R55E

Solenoid Circuit Failure Codes (continued)

Diagnostic Suggestions (continued)

Amperage testing is much more accurate than resistance testing. Always use amperage testing to verify resistance testing.

3) To perform an amperage test, use a jumper to connect B+ to the positive solenoid feed terminal at the computer connector. Ground the solenoid negative wire to chassis ground through an ammeter. Use the following equation to calculate the expected amperage, or simply use the chart.

$$\text{Volts} \div \text{Resistance} = \text{Amperage}$$

Calculated Amperage

System Voltage	Solenoid Resistance					
	EPC Solenoid		TCC Solenoid		Shift Solenoids	
	3.1 Ohms	5.7 Ohms	8.9 Ohms	16 Ohms	22 Ohms	48 Ohms
12.5 Volts	4.03	2.19	1.40	0.78	0.57	0.26
13.0 Volts	4.19	2.28	1.46	0.81	0.59	0.27
13.5 Volts	4.35	2.37	1.52	0.84	0.61	0.28
14.0 Volts	4.52	2.46	1.57	0.88	0.64	0.29
14.5 Volts	4.68	2.54	1.63	0.91	0.66	0.30
15.0 Volts	4.84	2.63	1.69	0.94	0.68	0.31

4R44E, 4R55E, 5R55E

Ratio Errors

P0731, 645	1st Gear Ratio Error
P0732, 646	2nd Gear Ratio Error
P0733, 647	3rd Gear Ratio Error
P0734, 648	4th Gear Ratio Error
P0735	5th Gear Ratio Error

Possible Related Codes

P1714, P0751, P1751	SS1 Functional Failure
P1715, P0756, P1756	SS2 Functional Failure
P1716, P0761, P1761	SS3 Functional Failure
P1717	SS4 Malfunction
P1762	SS3/SS4/OD Band Servo Failure

How the Codes Set

The computer constantly monitors the actual gear ratio by calculating the output speed and the engine RPM or the turbine speed sensor. When it sees a ratio that differs from the ratio it commanded, the computer sets the trouble code that represents the failure.

False Codes

False codes can be set by false signals from the transmission range sensor. For example: If the transmission range sensor signals OD range, but you're actually in manual low, the computer will expect to see an upshift.

Possible Causes

1) Internal components (see component failure chart for more detail)
2) Hydraulically bad shift solenoids
3) Sticky valves
4) Bad transmission range sensor

Common Causes

1) Low line pressure or poor line rise
2) Bad servos
3) Internal components

4R44E, 4R55E, 5R55E

Ratio Errors (continued)

The Quick Fix

For ratio errors there really is no quick fix. If you decide to throw parts at it, new OD and intermediate servos are a must. The rest is up to you. If you want to do it properly, follow the diagnostic suggestions.

Diagnostic Suggestions

Determine whether you're reading a false code or a real ratio error.

1) Drive the vehicle on the road until the code resets. Does the transmission have the gear in question?

2) Drive the vehicle on the rack with no load to see if the code sets.

Results when Code Sets		
Road Test	**Rack Test**	**Probable Cause**
Missing Gear	Missing Gear	Bad Solenoids; Sticky Valves; Internal Components
Missing Gear	Has Gear	Internal Components
Slips in Gear	Has Gear	Internal Components
Gear Feels Fine	No Code Sets	Internal Components
Gear Feels Fine	Has Gear	False Code

This chart is based on logic. For example, if you had a 4R44E setting a code P0734 (4th gear ratio error), it could be a control problem (sticky 3–4 shift valve or a bad SS3), an internal component (bad OD servo or a bad OD band) or it could be a false code (range sensor or even a computer).

- If it is missing or slipping in gear, it can't be a false code.
- If it has the gear at fault but slips it can't be a control problem or a false code.
- If it sets the code on the rack, it's very likely it's a false code, because on the rack there's no load.

Use the chart as a guide only.

4R44E, 4R55E, 5R55E

Ratio Errors (continued)

Component Failure Chart

This chart will help identify the major components that can cause each ratio code.

Code	4R44E / 4R55E	5R55E
P0731, 645	Low Sprag; Forward Clutch	Low Sprag; Forward Clutch
P0732, 646	Intermediate Band	Overdrive Band
P0733, 647	Direct Clutch	Intermediate Band
P0734, 648	Overdrive Band	Direct Clutch
P0735	N/A	Overdrive Band

Many things can set ratio codes. This chart only displays the major ones.

4R44E, 4R55E, 5R55E

TCC-Related Codes

P1740, P1743	TCC Stuck On, TCC Never Applied
P0741, P1744, 628	TCC Slip

How the Codes Set

P1740: The computer either sees no TCC apply when commanded or it sees TCC when it isn't commanded.

P1743: The computer detects lockup when it isn't being commanded.

P0741, P1744, 628: The computer sees an RPM drop indicating the converter is trying to lock up but it's slipping.

Possible Causes

1) Teflon seal ring on stator support
2) Pump volume problem
3) Bad TCC solenoid
4) Bad torque converter

Common Causes

1) Teflon seal ring on stator support
2) Pump volume problems

The Quick Fix

Try replacing the TCC solenoid.

4R44E, 4R55E, 5R55E

TCC-Related Codes (continued)

Diagnostics

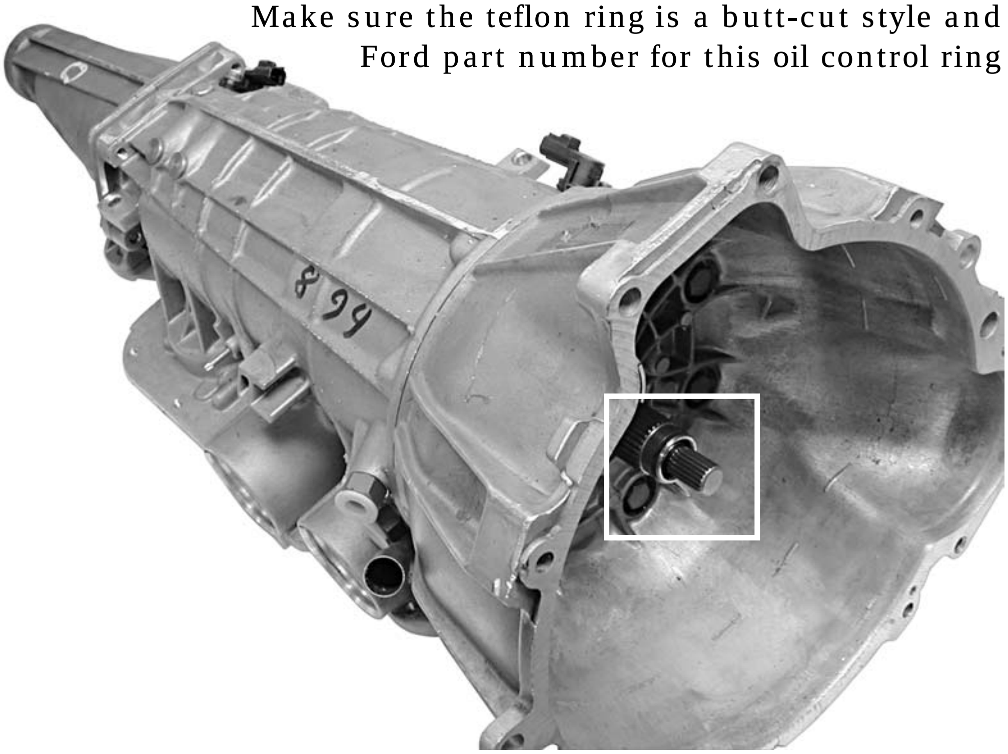
1) If the code comes back and the transmission is still in the vehicle, check cooler flow. Remove the cooler return line: At normal operating temperature, cooler flow should be at least 1 quart in 20 seconds, in drive, at idle.
2) Check line pressure. If cooler flow is less than 1 quart in 20 seconds and line pressure is normal, try enlarging the converter feed hole to 0.060".

4R44E, 4R55E, 5R55E

TCC-Related Codes (continued)

Diagnostics (continued)

3) If the code continues to set with good cooler flow and a new TCC solenoid, the problem is probably either the torque converter or the teflon ring on the stator support. Make sure the teflon ring is a butt-cut style and not a scarf cut. The Ford part number for this oil control ring is F77Z-7L323-AA.



Early, Scarf-Cut Ring

Late, Butt-Cut Ring

4R44E, 4R55E, 5R55E

Temperature Sensor Codes

P0112, 112 Intake Air Temperature (IAT) Sensor Grounded
P0113, 113 Intake Air Temperature (IAT) Sensor Open
P0114, 114 Intake Air Temperature (IAT) Sensor Out of Range

Possible Causes:

- Bad sensor
- Bad wiring

Strategies: Either high or low EPC pressure (hard or soft shifts)

P0117, 117 Engine Coolant Temperature (ECT) Sensor Grounded
P0118, 118 Engine Coolant Temperature (ECT) Sensor Open
P1116, 116 Engine Coolant Temperature (ECT) Sensor Out of Range

Possible Causes:

- Bad sensor
- Bad wiring

Strategies: No lockup

P0712, 638 Transmission Fluid Temperature (TFT) Sensor Grounded
P0713, 637 Transmission Fluid Temperature (TFT) Sensor Open
P1711, 636 Transmission Fluid Temperature (TFT) Sensor Out of Range
P1783, 657 Transmission Fluid Temperature is Too High

Possible Causes:

- Bad sensor
- Bad wiring

Strategies: High EPC pressure (hard shifts)

Degrees C	Degrees F	Sensor Resistance	Signal Voltage
0 – 20	32 – 68	100.0k – 37.0k	3.90 – 3.10
21 – 40	69 – 104	37.0k – 16.0k	3.10 – 2.20
41 – 70	105 – 158	16.0k – 5.0k	2.20 – 1.00
71 – 90	159 – 194	5.0k – 2.7k	1.00 – 0.61
91 – 110	195 – 230	2.7k – 1.5k	0.61 – 0.36
111 – 130	231 – 266	1.5k – 0.8k	0.36 – 0.22
131 – 150	267 – 302	800 – 540	0.22 – 0.10

4R44E, 4R55E, 5R55E

Throttle Position Sensor (TPS) Codes

P0121 – P0123, P1120, P1121,
P1124, P1125, 122 – 125, 167 Throttle Position Sensor (TPS) Signal Error

Possible Causes:

- Bad sensor
- Bad wiring

Various Strategies

1) High EPC pressure
2) Abnormal shift scheduling
3) TCC cycling
4) No TCC

Throttle Opening	Approx. Voltage
Idle	0.50
1/8	0.95
1/4	1.44
3/8	1.90
1/2	2.37
5/8	2.84
3/4	3.31
7/8	3.78
WOT	4.24

Mass Airflow (MAF) Sensor Codes

P0102, P0103, P1100,
P1101, 157 – 159, 184, 185 Mass Airflow (MAF) Sensor Signal Error

Possible Causes:

- Bad sensor
- Bad wiring

Various Strategies

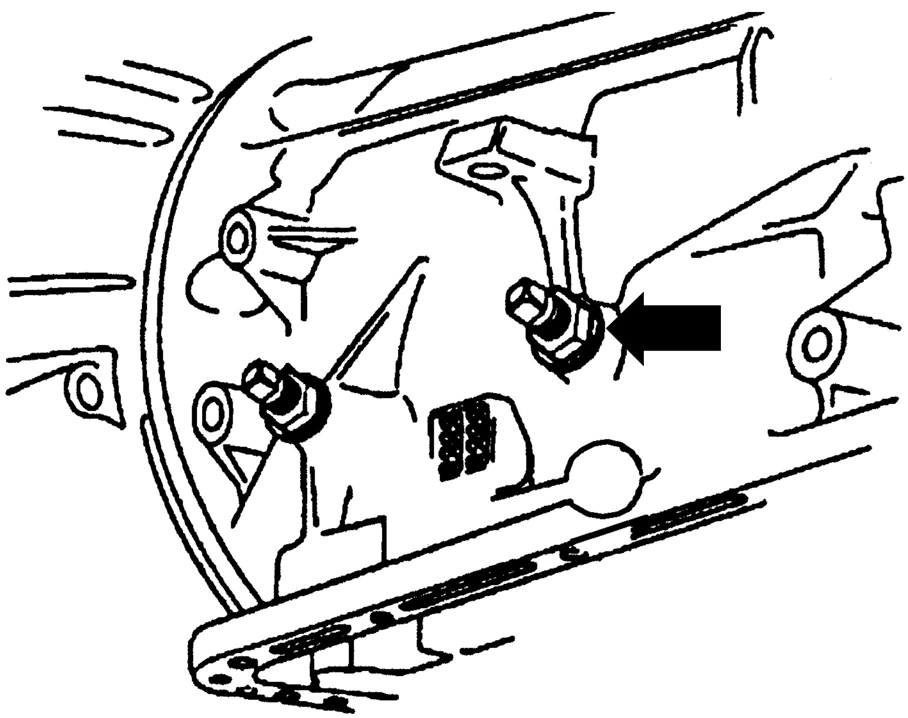
1) High EPC pressure, harsh shifts
2) Low EPC pressure, soft shifts
3) Abnormal shift scheduling
4) Incorrect TCC engagement scheduling

4R44E, 4R55E, and 5R55E

Diagnostic Code P0756 — Solenoid B Performance or Stuck Off

DTC P0756 sets when the computer commands the intermediate servo on and doesn't see a ratio change.

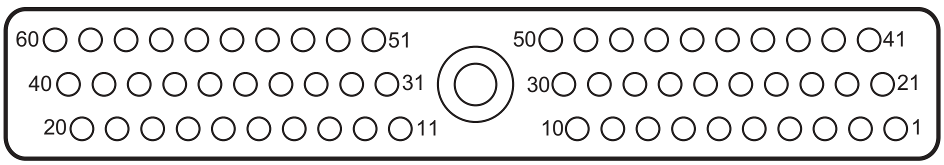
Before you jump into electrical testing or replace shift solenoid 2 (P0756 is a generic code for solenoid B. In this application the solenoid is referred to as SS2), first check to see if the intermediate band is broken. The best way to check for a broken band is to see if you can turn the band adjustment bolt in, until it's almost flush. If so, replace the band.



4R44E, 4R55E, 5R55E

Electrical Checks

1995 Explorer 4.0L VIN-X



Computer Connector

Terminal	Circuit Description	Signal Type	Conditions	Value
1	Keep-Alive Power (KAPWR)	DC Volts	Always	Battery Voltage
2	Brake On-Off Switch (BOO)	DC Volts	Brake Released	<0.10 Volts
			Brake Applied	Battery Voltage
3	Vehicle Speed Sensor (VSS+)	AC Frequency	30 MPH	65 Hz
			55 MPH	125 Hz
4	Ignition Diagnostic Monitor (IDM)	DC Frequency	Idle	21 –31 Hz
5	Turbine Speed Sensor (TSS)	AC Frequency	880–910 RPM	118 – 122 Hz
			2200–2275 RPM	295 – 310 Hz
6	Vehicle Speed Sensor (VSS–)	DC Voltage	Always	<0.10 Volts
7	Engine Coolant Temperature Sensor (ECT)	DC Voltage	86° F	2.62 Volts
			230° F	0.36 Volts
8	Fuel Pump Monitor (FPM)	DC Voltage	Pump Off	<0.10 Volts
			Pump On	Battery Voltage
9	Mass Airflow Sensor Ground (MAF)	DC Voltage	Always	<0.10 Volts
10	A/C Cycling Clutch Switch	DC Voltage	A/C Off	<0.10 Volts
			A/C On	Battery Voltage
11	Canister Purge Solenoid (CANP)	DC Voltage	Idle	Battery Voltage
			55 MPH	<0.10 Volts
12	Fuel Injector 6 (INJ6)	Millisecond On-Time	Idle; Normal Operating Temp.	3.3 – 5.7 ms
13	Transmission Control Indicator Light (TCIL)	DC Voltage	TCIL Off	Battery Voltage
			TCIL On	<0.10 Volts
15	Fuel Injector 5 (INJ5)	Millisecond On-Time	Idle; Normal Operating Temp.	3.3 – 5.7 ms
16	Ignition System Ground (IGN GND)	DC Voltage	Always	<0.10 Volts
17	Self-Test Output (STO) and MIL	DC Voltage	MIL Off	Battery Voltage
			MIL On	<0.10 Volts

4R44E, 4R55E, 5R55E

Electrical Checks (continued)

1995 Explorer 4.0L VIN-X (continued)

Terminal	Circuit Description	Signal Type	Conditions	Value
18	Data Bus (+)	DC Voltage	Key Off; Scan Tool Removed	<0.10 Volts
			Key On; Scan Tool Removed	Battery Voltage
19	Data Bus (–)	DC Voltage	Always	<0.10 Volts
20	Computer Case Ground	DC Voltage	Always	<0.10 Volts
21	Idle Air Control Solenoid (IAC)	DC Frequency and Duty Cycle	Engine Running	Varying Voltage, Freq. and Duty
22	Fuel Pump Relay (FP)	DC Voltage	Pump Off	Battery Voltage
			Pump On	<0.10 Volts
24	Cylinder Identification (CID or CMP)	DC Frequency	Hot Idle	5 – 7Hz
25	Idle Air Temperature Sensor (IAT)	DC Voltage	86° F	2.62 Volts
			230° F	0.36 Volts
26	Reference Voltage (VREF)	DC Voltage	Key On	4.9 – 5.1V
27	Differential Pressure Feedback EGR (DPFE)	DC Voltage	Idle	0.4 Volts
			EGR Open	>0.4 Volts
29	Octane Adjust Switch	DC Voltage	Closed	<0.10 Volts
			Open	9.1 Volts
30	Manual Lever Position Switch (MLPS)	DC Voltage	P	4.2 Volts
			R	3.5 Volts
			N	2.8 Volts
			D	2.1 Volts
			2	1.4 Volts
			L	0.7 Volts
31	Fuel Flow Rate (Instrument Panel)	No Data Available		
32	Coast Clutch Solenoid	DC Voltage	Solenoid Off	Battery Voltage
			Solenoid On	<0.10 Volts
33	EGR Vacuum Regulator Solenoid	Duty Cycle	0%	0.00 – 0.75 in-Hg
			33%	0.55 – 2.05 in-Hg
			90%	5.69 – 6.95 in-Hg
34	Automatic Ride Control (ARC)	DC Voltage	Idle	4.3 Volts
35	Fuel Injector 4 (INJ4)	Millisecond On-Time	Idle; Normal Operating Temp.	3.3 – 5.7 ms
36	Spark Output (SPOUT) Signal	Variable Duty and Frequency	Engine Running	Varies with RPM and Load
37	Vehicle Power (VPWR)	DC Voltage	Key Off	<0.10 Volts
			Key On	Battery Voltage

4R44E, 4R55E, 5R55E

Electrical Checks (continued)

1995 Explorer 4.0L VIN-X (continued)

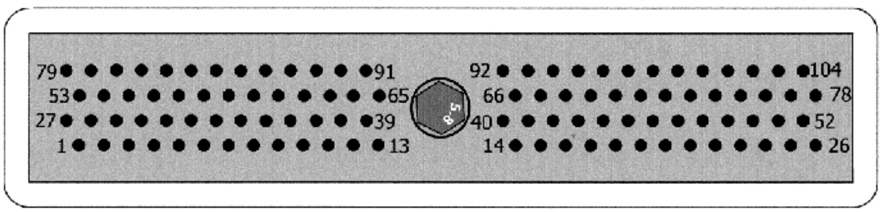
Terminal	Circuit Description	Signal Type	Conditions	Value
38	Electronic Pressure Control Solenoid (EPC)	Duty Cycle	Idle	4.2 Volts
			WOT	0.5 Volts
39	Fuel Injector 3 (INJ3)	Millisecond On-Time	Idle; Normal Operating Temp.	3.3 – 5.7 ms
40	Ground	DC Voltage	Always	<0.10 Volts
41	Transmission Control Switch (TCS)	DC Voltage	TCS and OD Off	Battery Voltage
			TCS and OD On	<0.10 Volts
43	Heated Oxygen Sensor, Left Side (HO2S-2)	DC Voltage	Engine Running	0–1V; Varies
44	Heated Oxygen Sensor, Right Side (HO2S-1)	DC Voltage	Engine Running	0–1V; Varies
46	Sensor Ground	DC Voltage	Always	<0.10 Volts
47	Throttle Position Sensor Signal (TP)	DC Voltage	Idle	0.5 – 0.9 Volts
			WOT	4.0 – 4.5 Volts
48	Self-Test Input Signal (STI)	DC Voltage	Normal	Battery Voltage
			Grounded	<0.10 Volts
49	Transmission Fluid Temperature Sensor (TFT)	DC Voltage	86° F	2.62 Volts
			230° F	0.36 Volts
50	Mass Airflow Sensor Signal (MAF)	DC Voltage	Engine Running	0–5 Volts; Incr. w/Throttle Opening
51	Shift Solenoid 1 (SS1)	DC Voltage	Solenoid Off	Battery Voltage
			Solenoid On	<0.10 Volts
52	Shift Solenoid 2 (SS2)	DC Voltage	Solenoid Off	Battery Voltage
			Solenoid On	<0.10 Volts
53	Torque Converter Clutch Solenoid (TCC)	DC Voltage	Solenoid Off	Battery Voltage
			Solenoid On	<0.10 Volts
54	Wide-Open Throttle A/C Cutoff	DC Voltage	A/C On; Idle	Battery Voltage
			A/C On; WOT	<0.10 Volts
55	Shift Solenoid 3 (SS3)	DC Voltage	Solenoid Off	Battery Voltage
			Solenoid On	<0.10 Volts
56	Profile Ignition Pickup Signal (PIP)	DC Frequency	Engine Running	Increases with Engine RPM
57	Vehicle Power (VPWR)	DC Voltage	Key Off	<0.10 Volts
			Key On	Battery Voltage
58	Fuel Injector 1 (INJ1)	Millisecond On-Time	Idle; Normal Operating Temp.	3.3 – 5.7 ms
59	Fuel Injector 2 (INJ2)	Millisecond On-Time	Idle; Normal Operating Temp.	3.3 – 5.7 ms
60	Ground	DC Voltage	Always	<0.10 Volts

4R44E, 4R55E, 5R55E

Electrical Checks (continued)

1995–97 Aerostar; 1995-on Ranger; 1996-on Explorer/Mountaineer

Because of the number of vehicles these charts cover, some of the terminals listed may not appear on the vehicle you're working on. But only terminal 64 changes function.



Computer Connector

Terminal	Circuit Description	Signal Type	Conditions	Value
1	Shift Solenoid 2 (SS2)	DC Voltage	Solenoid Off	Battery Voltage
			Solenoid On	<0.10 Volts
2	Malfunction Indicator Lamp (MIL)	DC Voltage	MIL Off	Battery Voltage
			MIL On	<0.10 Volts
3	Digital Transmission Range Sensor (TR1) 1997- on	DC Voltage	P, R and N	<0.10 Volts
			D, 2 and L	9.5 Volts
11	Purge Flow Sensor (PF)	DC Voltage	Idle	<0.10 Volts
			30 MPH	1.0 – 4.9 Volts
13	Flash EPROM Power Supply	DC Voltage	Scan Tool Removed	0.5 – 0.6 Volts
14	4x4 Low Switch	DC Voltage	Switch Off	Battery Voltage
			Switch On	<0.10 Volts
15	Data Bus (–)	DC Voltage	Scan Tool Removed	<0.10 Volts
16	Data Bus (+)	DC Voltage	Scan Tool Removed	0.5 Volts
21	Crankshaft Position Sensor (+)	AC Frequency	Engine Off	0 Hz
			Engine Running	Increases w/RPM
22	Crankshaft Position Sensor (–)	DC Voltage	Always	<0.10 Volts
24	Ground (–)	DC Voltage	Always	<0.10 Volts
25	Case Ground (–)	DC Voltage	Always	<0.10 Volts
26	Ignition Coil Driver 1	Duty Cycle	Key Off	<0.10 Volts
			Key On	Battery Voltage
27	Shift Solenoid 1 (SS1)	DC Voltage	Solenoid Off	Battery Voltage
			Solenoid On	<0.10 Volts
28	Coast Clutch Solenoid (CCS)	DC Voltage	Solenoid Off	Battery Voltage
			Solenoid On	<0.10 Volts
29	Transmission Control Switch (TCS)	DC Voltage	TCS and OD Off	Battery Voltage
			TCS and OD On	<0.10 Volts

4R44E, 4R55E, 5R55E

Electrical Checks (continued)

1995–97 Aerostar; 1995-on Ranger; 1996-on Explorer/Mountaineer

Terminal	Circuit Description	Signal Type	Conditions	Value
30	Octane Adjust Switch		Closed	<0.10 Volts
			Open	9.3 Volts
31	Power Steering Pressure Switch	DC Voltage	Wheels Straight	<0.10 Volts
			Wheels Turning	2.0 – 4.0 Volts
33	Vehicle Speed Sensor (VSS–)	DC Voltage	Always	<0.10 Volts
35	Heated Oxygen Sensor, RR (HO2S-1,2)	DC Voltage	Engine Running	0–1V; Varies
36	Mass Airflow Sensor Ground (–)	DC Voltage	Always	<0.10 Volts
37	Transmission Fluid Temperature Sensor (TFT)	DC Voltage	86° F	2.62 Volts
			230° F	0.36 Volts
38	Engine Coolant Temperature Sensor (ECT)	DC Voltage	86° F	2.62 Volts
			230° F	0.36 Volts
39	Intake Air Temperature Sensor (IAT)	DC Voltage	86° F	2.62 Volts
			230° F	0.36 Volts
40	Fuel Pump Monitor (FPM)	DC Voltage	Pump Off	<0.10 Volts
			Pump On	Battery Voltage
41	A/C Cycling Clutch Switch	DC Voltage	A/C Off	<0.10 Volts
			A/C On	Battery Voltage
47	EGR Vacuum Regulator Solenoid	Duty Cycle	0%	0.00 – 0.75 in-Hg
			33%	0.55 – 2.05 in-Hg
			90%	5.69 – 6.95 in-Hg
48	Engine RPM Output	DC Frequency	Engine Off	0 Hz
			Engine Running	Varies with RPM
49	Digital Transmission Range Sensor (TR2) 1997-on	DC Voltage	P, R and 2	<0.10 Volts
			N, D and L	9.5 Volts
50	Digital Transmission Range Sensor (TR4) 1997-on	DC Voltage	P, N and Low	<0.10 Volts
			R, D and 2	9.5 Volts
51	Ground (–)	DC Voltage	Always	<0.10 Volts
52	Ignition Coil Driver 2	Duty Cycle	Key Off	<0.10 Volts
			Key On	Battery Voltage
53	Shift Solenoid 3 (SS3)	DC Voltage	Solenoid Off	Battery Voltage
			Solenoid On	<0.10 Volts
54	Torque Converter Clutch (TCC) Solenoid	DC Voltage	Solenoid Off	Battery Voltage
			Solenoid On	<0.10 Volts
55	Keep-Alive Power (KAPWR)	DC Voltage	Always	Battery Voltage

4R44E, 4R55E, 5R55E

Electrical Checks (continued)

1995–97 Aerostar; 1995-on Ranger; 1996-on Explorer/Mountaineer

Terminal	Circuit Description	Signal Type	Conditions	Value
58	Vehicle Speed Sensor (VSS+)	AC Frequency	30 MPH	65 Hz
			55 MPH	125 Hz
59	*Overdrive Drum Speed Sensor	AC Frequency	Input Shaft Turning	Increases w/RPM
60	Heated Oxygen Sensor, RF (HO2S-1,1)	DC Voltage	Engine Running	0–1V; Varies
62	Fuel Tank Pressure Sensor	DC Voltage	0 PSI	2.6 Volts
64	Manual Lever Position Sensor (MLPS) 1995 and 96 only	DC Voltage	P	4.2 Volts
			R	3.5 Volts
			N	2.8 Volts
			D	2.1 Volts
			2	1.4 Volts
			L	0.7 Volts
	Digital Transmission Range Sensor TR3A 1997-on	DC Voltage	P, 2 and L	<0.10 Volts
			R, N and D	1.7 Volts
65	Differential Pressure Feedback EGR (DPFE)	DC Voltage	Idle	0.4 Volts
			EGR Open	>0.4 Volts
67	Evaporative Canister Purge Solenoid (EVAP)	DC Voltage	Solenoid Off	Battery Voltage
			Solenoid On	<0.10 Volts
69	Wide-Open Throttle A/C Cutoff	DC Voltage	A/C On; Idle	Battery Voltage
			A/C On; WOT	<0.10 Volts
71	PCM Power Relay	DC Voltage	Key Off	<0.10 Volts
			Key On	Battery Voltage
73	Fuel Injector 5 (INJ5)	Millisecond On-Time	Idle; Normal Operating Temp.	4.5 – 4.8 ms
74	Fuel Injector 3 (INJ3)	Millisecond On-Time	Idle; Normal Operating Temp.	4.5 – 4.8 ms
75	Fuel Injector 1 (INJ1)	Millisecond On-Time	Idle; Normal Operating Temp.	4.5 – 4.8 ms
76	Ground	DC Voltage	Always	<0.10 Volts
77	Ground	DC Voltage	Always	<0.10 Volts
78	Coil Driver 3	Duty Cycle	Key Off	<0.10 Volts
			Key On	Battery Voltage
79	Transmission Control Indicator Lamp (TCIL)	DC Voltage	TCIL Off	<0.10 Volts
			TCIL On	Battery Voltage

* When the Overdrive Drum Speed Sensor is disabled properly, there should be no signal on terminal 59.

4R44E, 4R55E, 5R55E

Electrical Checks (continued)

1995–97 Aerostar; 1995-on Ranger; 1996-on Explorer/Mountaineer

Terminal	Circuit Description	Signal Type	Conditions	Value
80	Fuel Pump Relay (FP)	DC Voltage	Pump Off	Battery Voltage
			Pump On	<0.10 Volts
81	Electronic Pressure Control Solenoid (EPC)	Duty Cycle	Idle	4.0 – 4.5 Volts
			WOT	0.5 – 0.8 Volts
83	Idle Air Control Solenoid (IAC)	DC Frequency and Duty Cycle	Engine Running	Varying Voltage, Freq. and Duty
84	Turbine Shaft Speed Sensor	AC Frequency	880 – 910 RPM	118 – 122 Hz
			2200 – 2275 RPM	295 – 310 Hz
85	Cylinder Identification Signal (CMP)	DC Frequency	Engine Off	0 Hz
			Engine Running	Varies w/RPM
87	Heated Oxygen Sensor, LF (HO2S-2,1)	DC Voltage	Engine Running	0–1V; Varies
88	Mass Airflow Sensor Signal (MAF)	DC Voltage	Engine Running	0–5 Volts; Incr. w/Throttle Opening
89	Throttle Position Sensor Signal (TP)	DC Voltage	Idle	0.5 – 0.9 Volts
			WOT	4.0 – 4.5 Volts
90	Reference Voltage	DC Voltage	Key On	4.9–5.1V
91	Sensor Ground	DC Voltage	Always	<0.10 Volts
92	Brake On/Off Switch Signal (BOO)	DC Voltage	Brake Released	<0.10 Volts
			Brake Applied	Battery Voltage
93	HO2S Heater; Right Front (HO2S-1,1)	DC Voltage	Heater Off	<0.10 Volts
			Heater On	Battery Voltage
94	HO2S Heater; Left Front (HO2S-2,1)	DC Voltage	Heater Off	<0.10 Volts
			Heater On	Battery Voltage
95	HO2S Heater; Left Rear (HO2S-2,2)	DC Voltage	Heater Off	<0.10 Volts
			Heater On	Battery Voltage
97	PCM Power Relay	DC Voltage	Key Off	<0.10 Volts
			Key On	Battery Voltage
99	Fuel Injector 6 (INJ6)	Millisecond On-Time	Idle; Normal Operating Temp.	4.5 – 4.8 ms
100	Fuel Injector 4 (INJ4)	Millisecond On-Time	Idle; Normal Operating Temp.	4.5 – 4.8 ms
101	Fuel Injector 2 (INJ2)	Millisecond On-Time	Idle; Normal Operating Temp.	4.5 – 4.8 ms
103	Ground	DC Voltage	Always	<0.10 Volts

4R44E, 4R55E, 5R55E

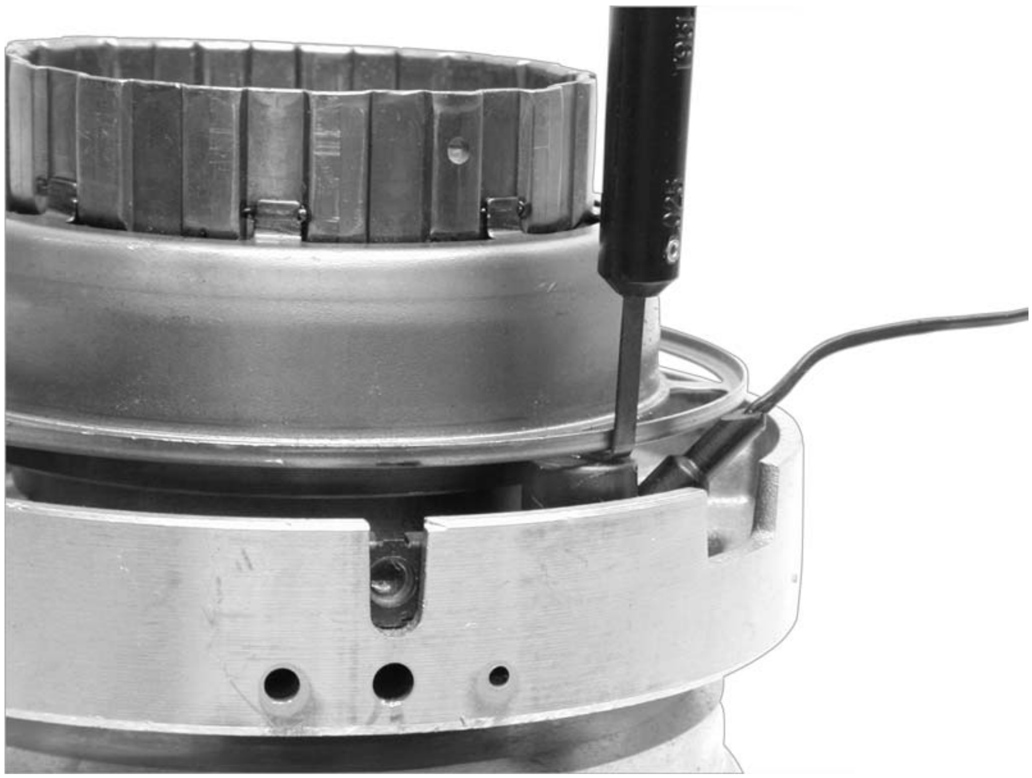
Turbine Sensor Adjustment

The exciter ring on the 4R44E, 4R55E, and 5R55E mounts to the overdrive planet. It's very delicate and is easily damaged by something as simply as washing or bumping it during teardown. If you damage the ring, you may have problems with the computer reading the turbine RPM correctly.

4R44E, 4R55E, 5R55E

Turbine Sensor Adjustment (continued)

During assembly, always check the clearance between the exciter ring and the turbine shaft sensor: The proper clearance is 0.025" to 0.072".



Ford has a tool that makes measuring this really easy. The part number for the tool is: T95L-70010-F.

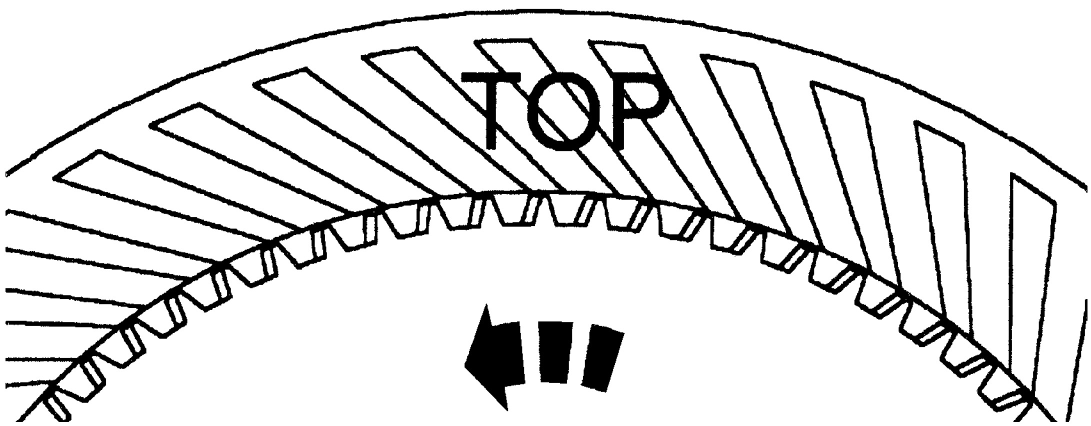
5R55E; 1997-On 4R44E

Directional Friction Installation

The friction plates in the 5R55E and 1997-and-later 4R44E transmissions are directional, and must be installed correctly to provide proper operation.

Forward Clutch

Install the friction plates into the forward drum with the word “Top” facing up, and the grooves pointing counterclockwise, from ID to OD.



Coast Clutch and Direct Clutch

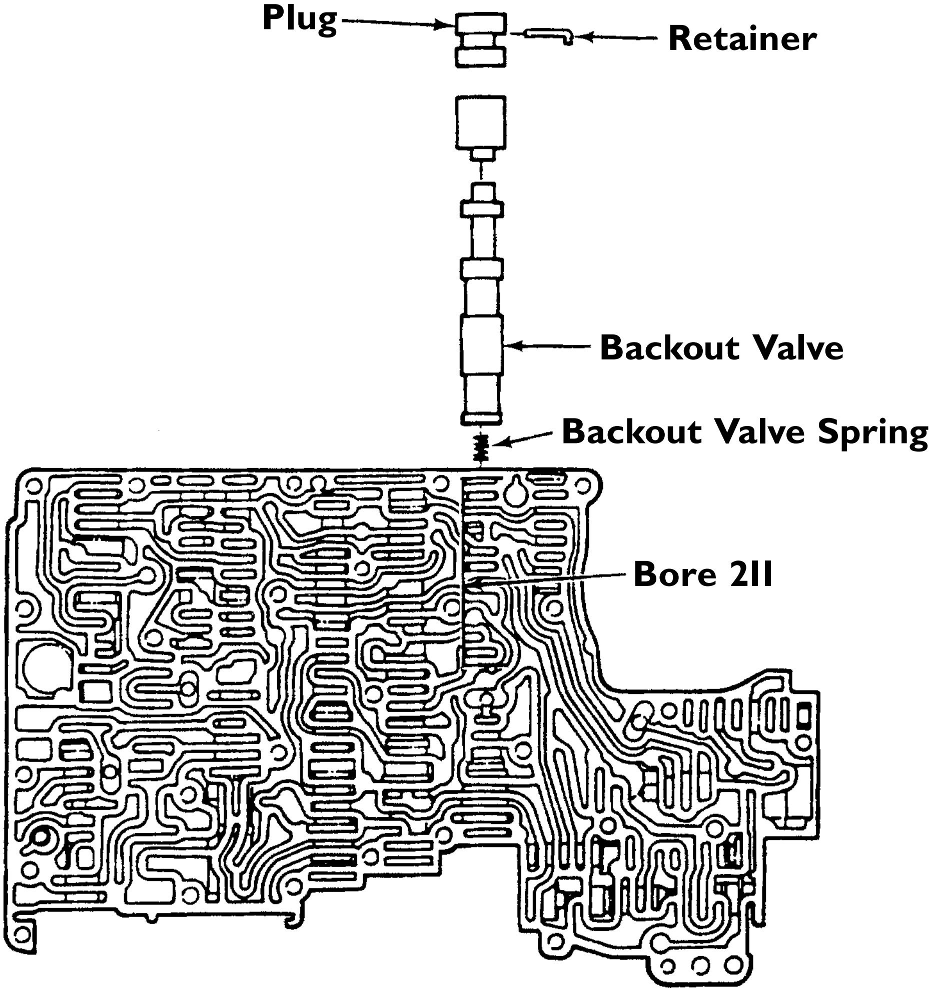
Install the friction plates into the coast clutch and direct clutch drums facing opposite the forward clutch. The word “Top” should still be facing up, but now the grooves point clockwise, from ID to OD.

A4LD

Light Throttle 2–3 Flare

Some 1990 through '93 vehicles with the A4LD transmission may exhibit a 2–3 flare at light throttle. Ford has released a stronger 2–3 backout valve spring to address this problem.

The Ford part number for the new spring is F3TZ-7D230-A



A4LD

Light Throttle 2–3 Flare (continued)

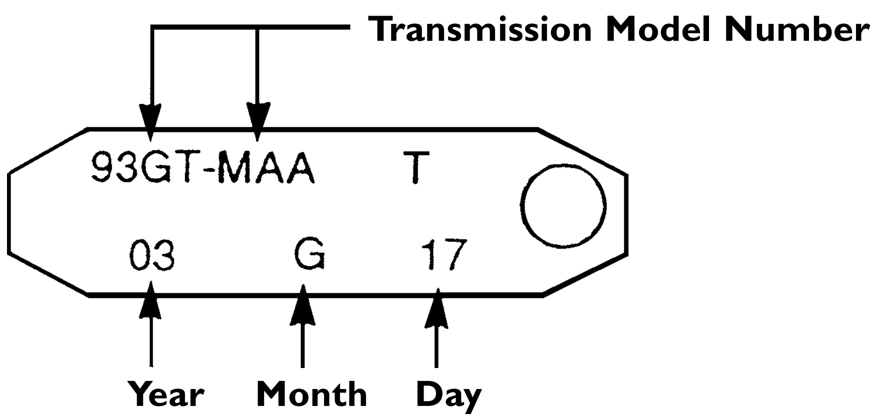
Vehicles Affected

Year and Model		Transmission Model #
1990	Aerostar RWD (Van)	90GT-FAA
	Aerostar RWD (Wagon)	90GT-FBA
	Aerostar AWD (Van)	90GT-AEA
	Aerostar AWD (Wagon	90GT-AEE
	Ranger 4x2	90GT-DAA
	Ranger 4x4	90GT-BAA
1991	Aerostar RWD (Van)	91GT-HAA
	Aerostar RWD (Wagon)	91GT-SBA
	Aerostar AWD (Van)	91GT-SDA
	Aerostar AWD (Wagon	91GT-SFA
	Ranger 4x2	91GT-LAA
	Ranger 4x4	91GT-NAA
	Explorer 4x2	91GT-BAB
	Explorer 4x4	91GT-EAB
1992	Aerostar RWD (Van)	92GT-AKA
	Aerostar RWD (Wagon)	92GT-AMA
	Aerostar AWD (Van)	92GT-ARA
	Aerostar AWD (Wagon	92GT-ATA
	Explorer 4x2	92GT-CDA
	Explorer 4x4	92GT-CFA
	Ranger 4x2	92GT-DCA
	Ranger 4x4	92GT-DEA
1993 (built before 6/21/93)	Aerostar RWD (Van)	93GT-CBA
	Aerostar RWD (Wagon)	93GT-KBA
	Aerostar AWD (Van)	93GT-EBA
	Aerostar AWD (Wagon	93GT-NBA
	Explorer 4x2	93GT-HAA
	Explorer 4x4	93GT-NAA
	Ranger 4x2 (ALT)	93GT-LAA
	Ranger 4x2 (CAL)	93GT-LBA
	Ranger 4x4 (ALT)	93GT-SAA
	Ranger 4x4 (CAL)	93GT-SBA

A4LD

Light Throttle 2–3 Flare (continued)

Look for the identification tag on the lower left extension housing bolt.



Year	Code
1990	00
1991	01
1992	02
1993	03

Month	Code	Month	Code	Month	Code
January	A	May	E	September	J
February	B	June	F	October	K
March	C	July	G	November	L
April	D	August	H	December	M

A4LD

New Design Center Support

Ford has released a new design center support that uses a needle bearing in place of the thrust washer in the #4 position. This new bearing is selective, and is available in four thicknesses.

The Ford part number for the new support is F5TZ-7A130-B.

You can use this support for the 1993–95 models with the snap shell. This is the same center support used for the 4R44E and 4R55E.

Selective Needle Bearings		
Part Number	Thickness	ID Notches
F5TZ-7L326C	0.091" – 0.096"	3
F5TZ-7L326B	0.083" – 0.090"	2
F5TZ-7L326A	0.075" – 0.082"	1
F3TZ-7L326A	0.071" – 0.075"	None

AODE and 4R70W

New 2–3 Accumulator Piston

The 2–3 accumulator piston has been replaced with a one-piece, stamped-steel piston. The new piston will retrofit earlier model transmissions.

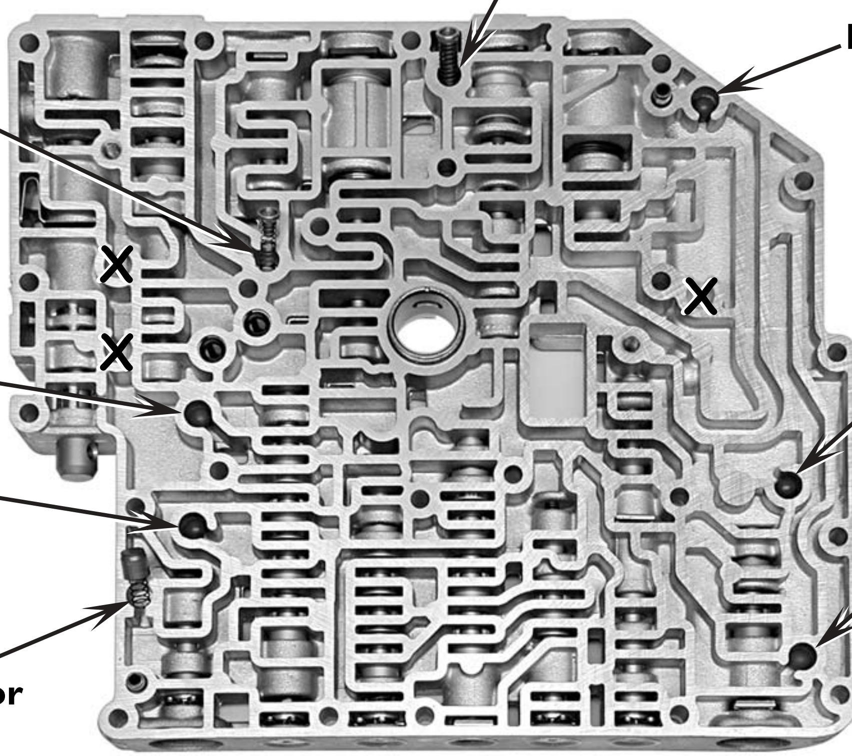
The Ford part number for the new piston is F7AZ-7H292-AB.

AX4N

Checkball and Check Valve Locations

The AX4N uses six checkballs and three check valves in the valve body. Each valve has a different weight spring. Use the graphic to identify which checkballs and which valve-and-spring combination go in which location.

Valve Body



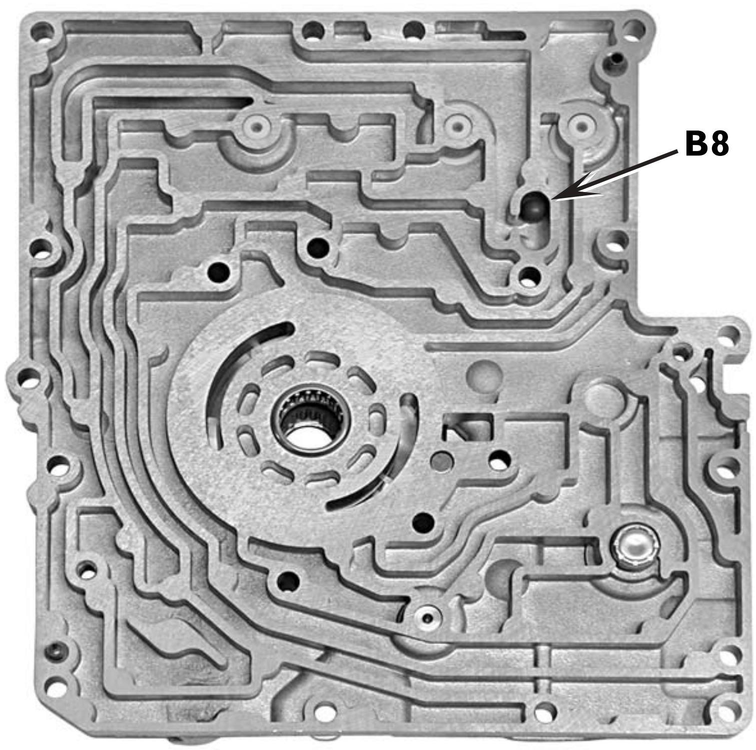
Type A Valve

Type B Valve

AX4N

Checkball and Check Valve Locations (cont)

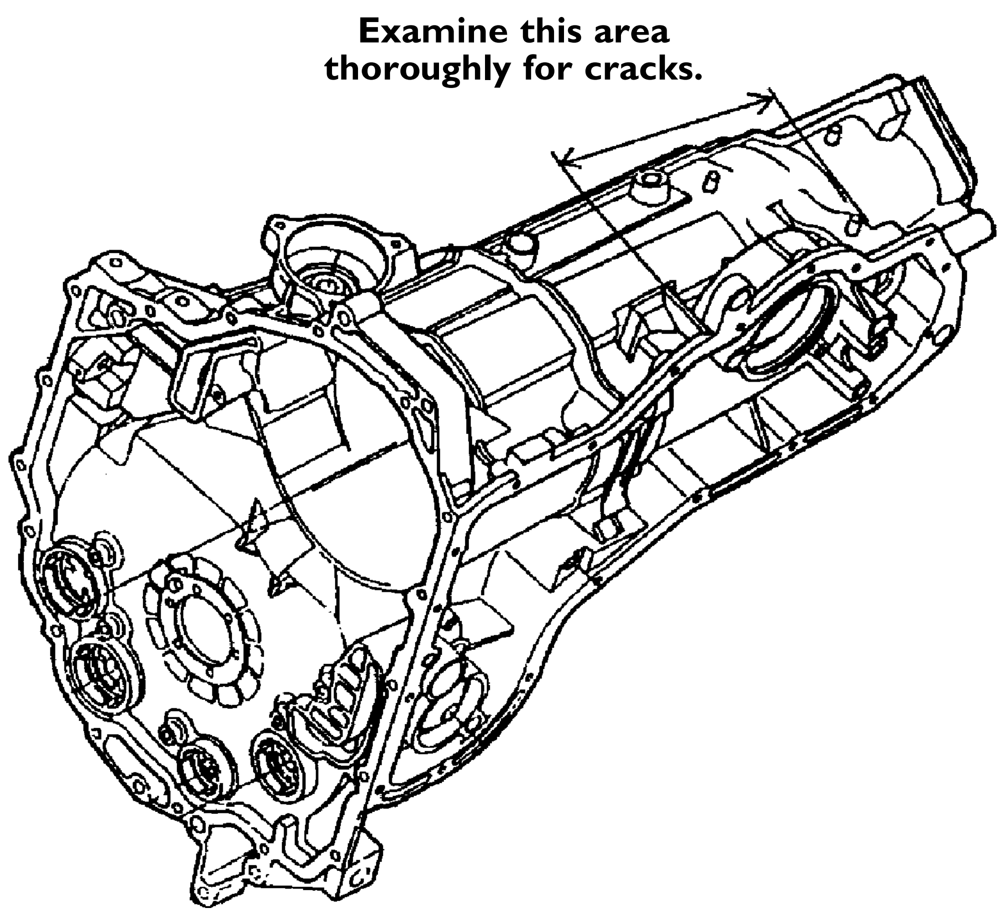
Pump



AX4N

Cracked Case; ATF Leaks

A leak from the coast servo area on these units can be due to a crack in the case. Always check the area indicated for hairline cracks; these cracks are fairly common, and may be present long before a leak occurs.



AX4S

1991 Valve Body Interchange

The 1991 AX4S valve body is unique; it's the only year Ford used a simple on-off solenoid for lockup. The problem is that these valve bodies are becoming very difficult to find, so if you have one that's no good, you're out of luck… until now.

Ford released upgrade kits to convert the 1991 valve body hydraulics to the '92 model, but still keep the simple on-off solenoid. You can use one of these kits with a 92-and-later PWM valve body, while keeping the on-off solenoid. Although this wasn't Ford's original intent, it works great.

These kits contain a clip, some checkballs, gaskets, two separator plates, a new backout valve, and instructions. The backout valve in the kit is the same as the one in the PWM-type valve body, so you won't need to replace it.

Assemble the valve body as you normally would, using the two new plates. You can now install the on-off lockup solenoid and you're back in business.

There are three kits available, based on application:

F1DZ-7A142B 3.0L
F1DZ-7A142C 3.8L
F1DZ-7A142D .... 3.8L Police

CD4E

Uncontrollable High Line Pressure

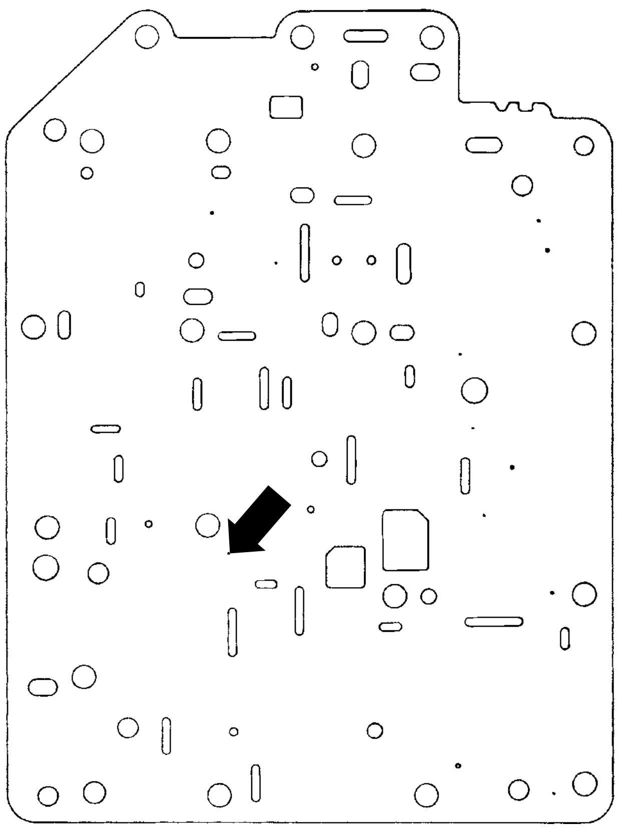
Uncontrollable high line pressure is responsible for many of the cracked forward/coast/direct clutch drum complaints. In many cases, this high line pressure problem is the result of a worn out pressure regulator valve, or regulator valve bore in the valve body. During rebuild, make sure you inspect the valve and bore carefully.

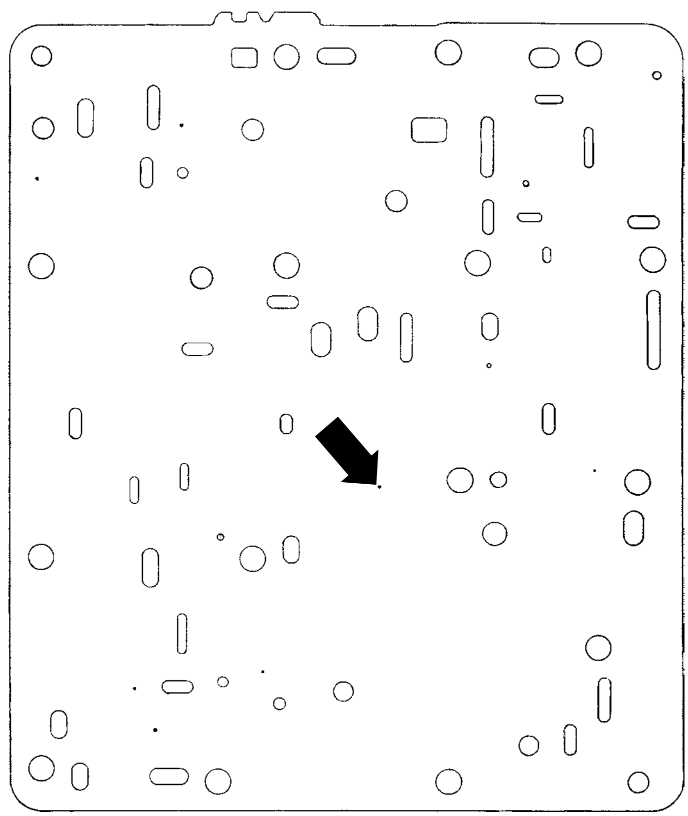
CD4E

Uncontrollable High Line Pressure (continued)

An effective countermeasure for this problem is to enlarge the PR balance holes in the separator plate. Enlarge these balance holes to 0.055".

If the valve or bore are worn excessively, enlarging the balance holes won't help the condition.





CD4E

No Forward

A CD4E that won't move forward can be caused by a misaligned rear ring gear shaft. This causes a side load on the gear train, popping the forward clutch snap ring loose.

If you run into this problem, replace the clutch drum and snap ring, naturally, but also replace the ring gear. There are two ring gears, based on which engine you have. The part numbers for these ring gears are:

F3RZ-7A153-B (2.0L)

F3RZ-7A153-A (2.5L)

CD4E

No Reverse

After a rebuild or repair, some CD4Es may not have reverse. This can be caused by installing the solenoid housing gasket backward.

To repair this condition, remove the housing, and make sure the gasket seals the oil passages properly.

Gasket Placed Properly

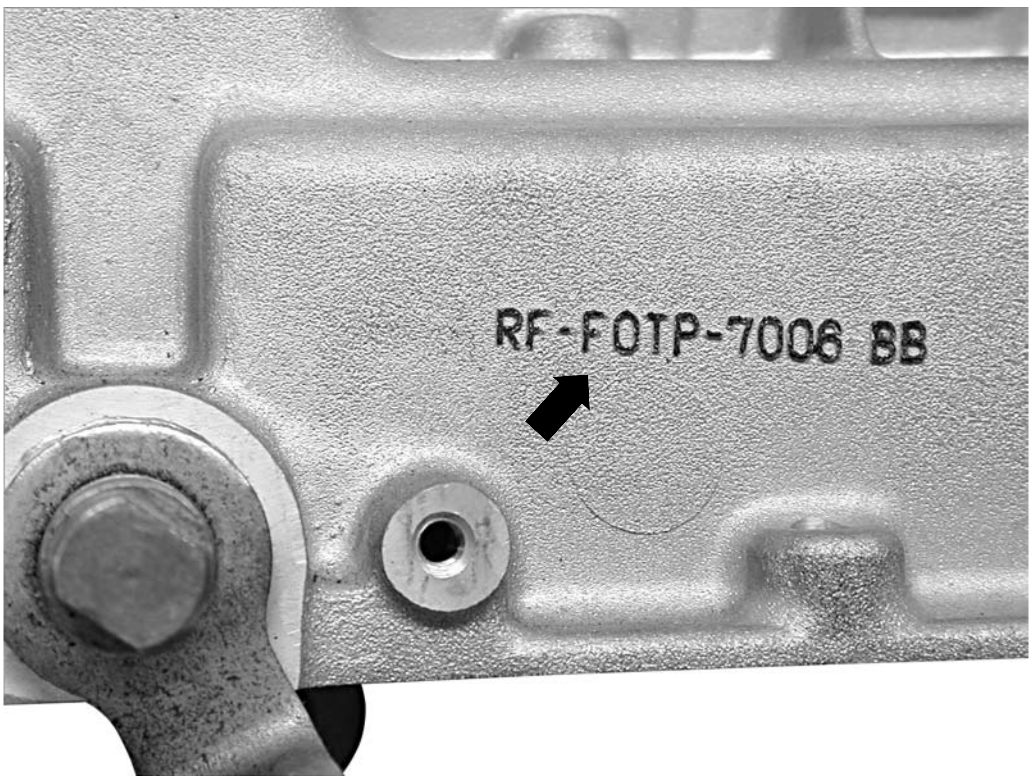
Improper Gasket Placement

E4OD/4R100

Checkball Locations

Ford has made several changes to the case and valve body on the E4OD (labeled the 4R100 starting in 1998). The first was in 1996. These models have a different case, separator plate and valve body, compared to 1990 through 95 models. Consequently, the checkball locations also changed.

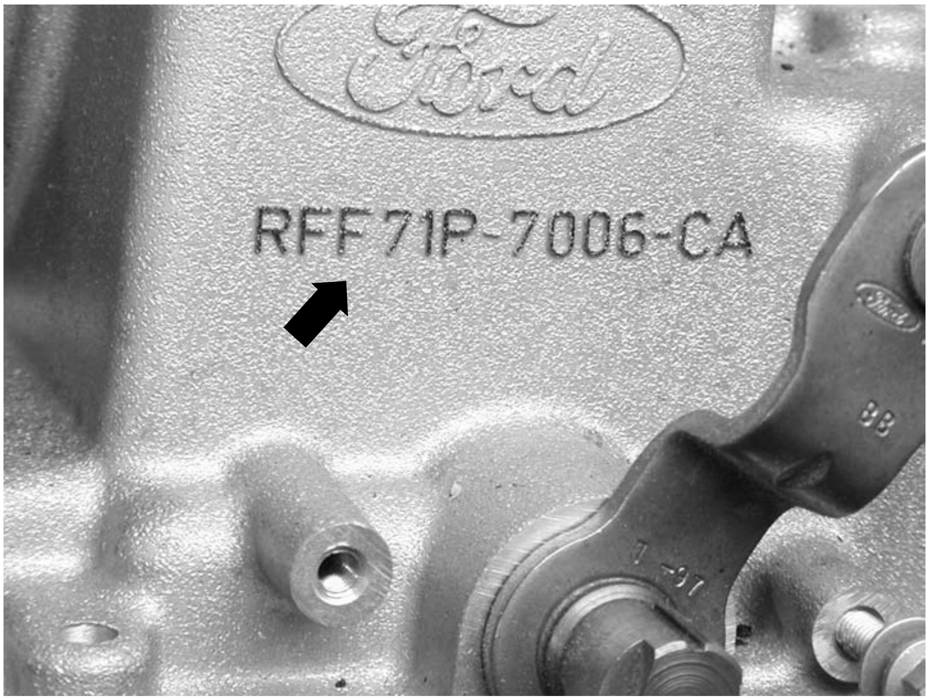
Identifying the case is easy: 1990 through 95 models had a Rough Forge number beginning with F0.



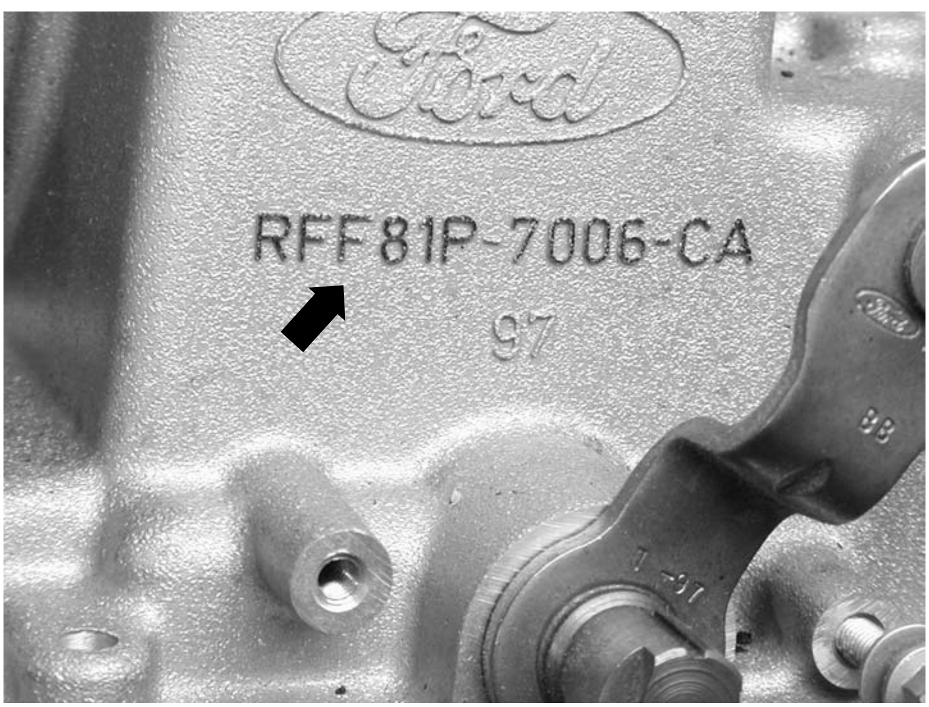
E4OD/4R100

Checkball Locations (continued)

The 1996 case has a Rough Forge number beginning with F7.



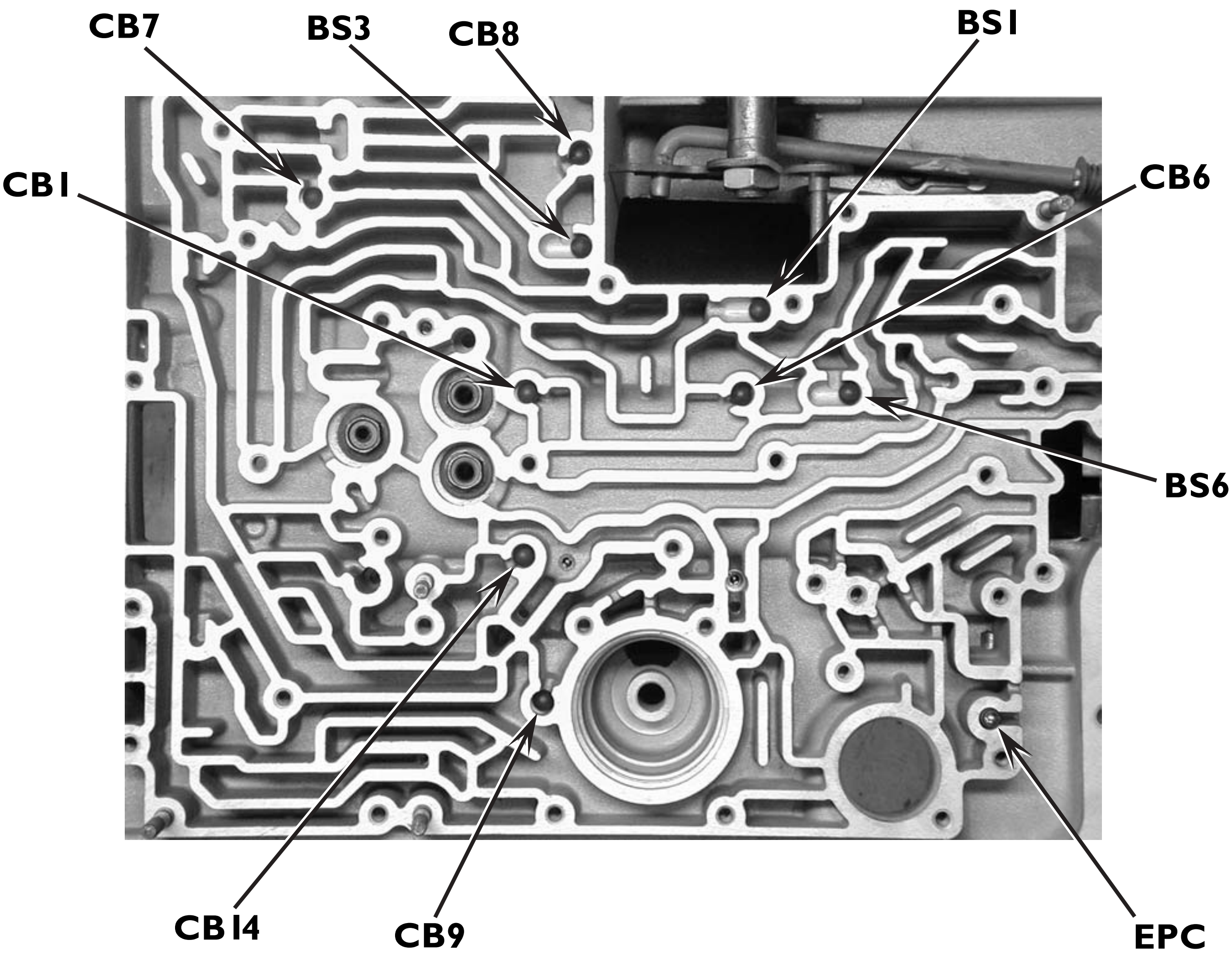
In 1998, the Rough Forge number became F8.



E4OD/4R100

Checkball Locations (continued)

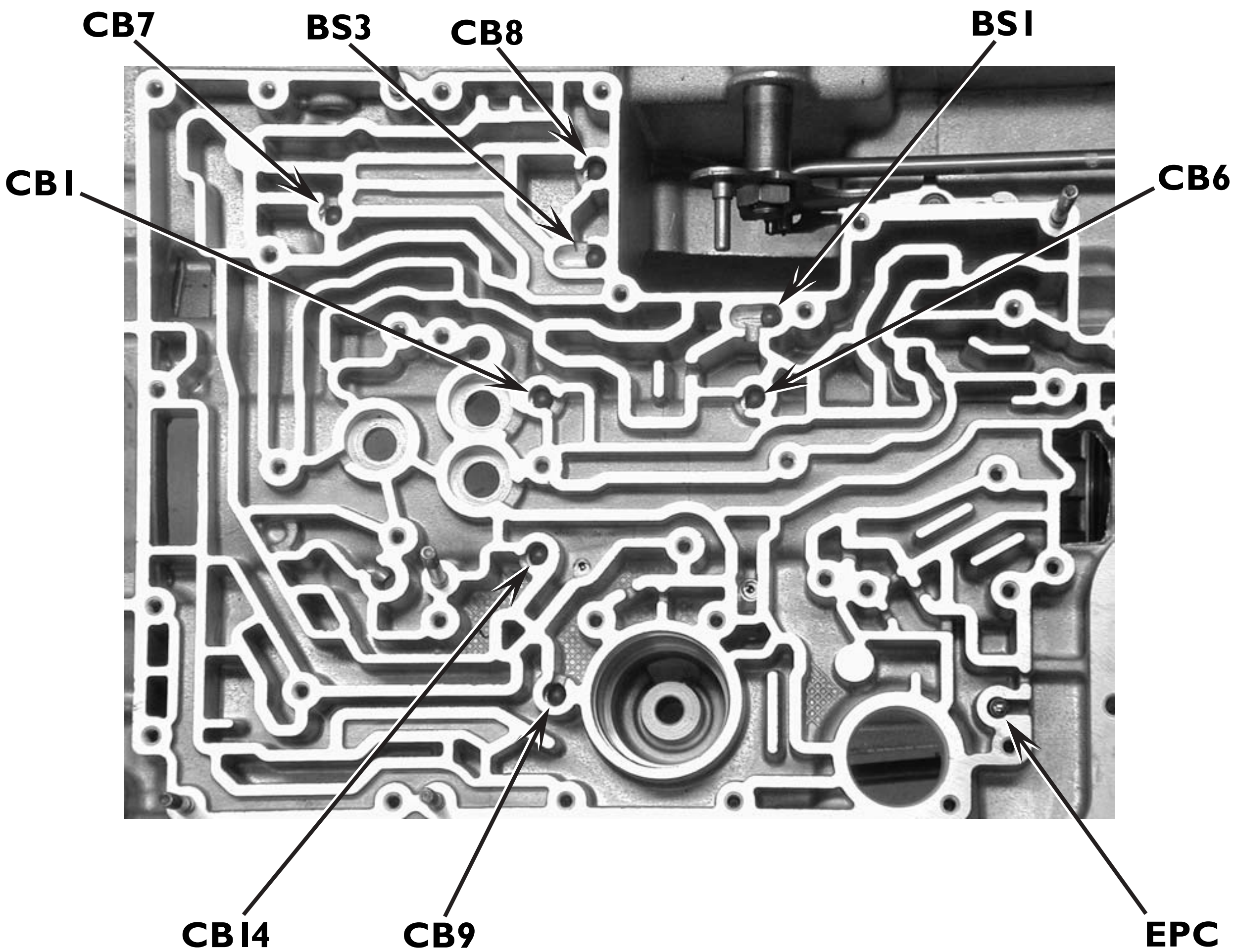
1990–95 Checkball Locations for F0 Cases



E4OD/4R100

Checkball Locations (continued)

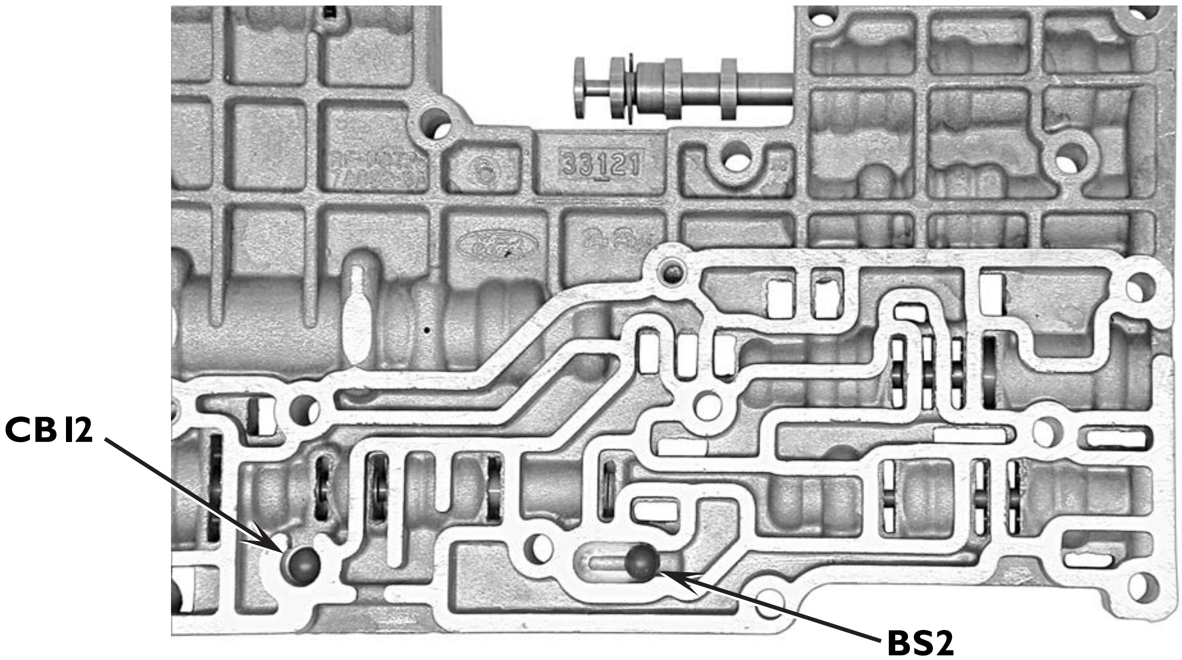
1996-On Checkball Locations for F7 and F8 Cases



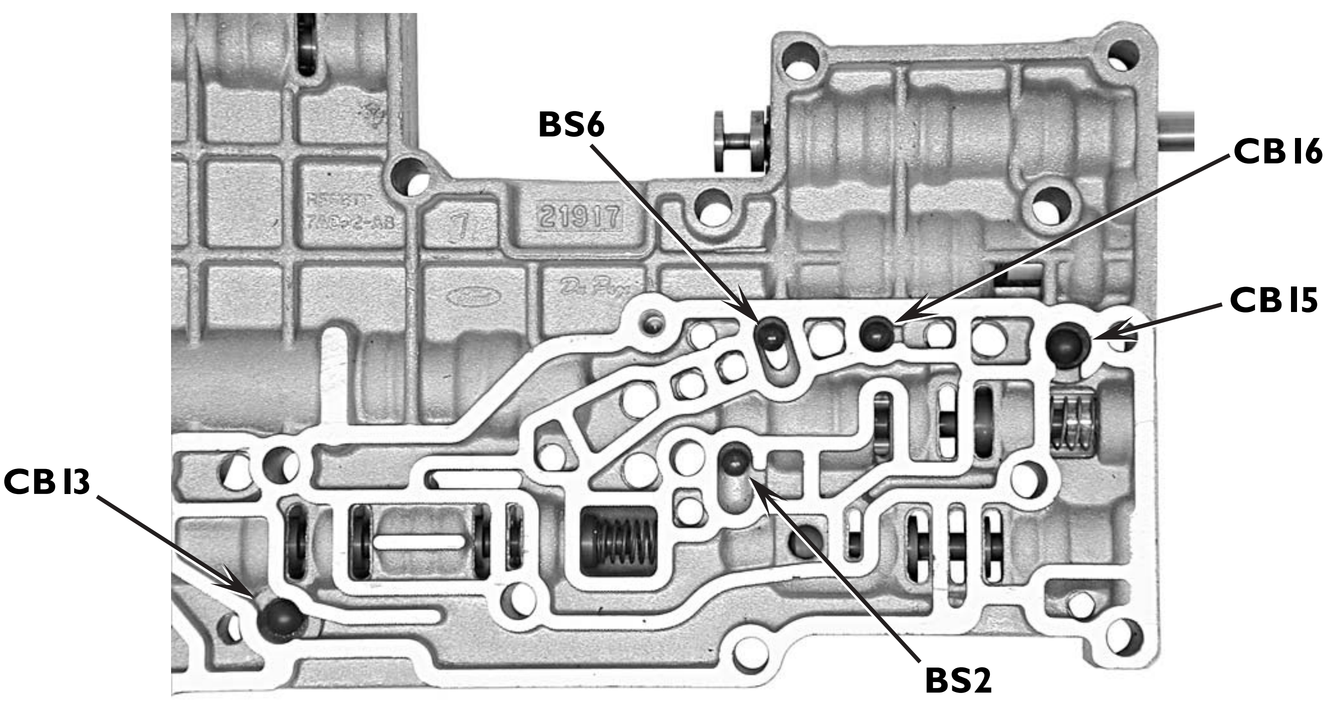
E4OD/4R100

Checkball Locations (continued)

1990–95 Valve Body Checkball Locations



1996-On Valve Body Checkball Locations



Ford

VSS Harness Repair Kit

It's not uncommon to replace the VSS on many vehicles during the rebuild, especially on those where the VSS is close to the exhaust and suffers heat damage. Although this is a great idea, an often-overlooked item is the vehicle harness connector. Ford offers a harness repair kit to replace the old VSS connector.

The Ford part number for the kit is F2PZ-14A464-A

Ford also offers these other repair kits you might find useful:

F2PZ-14A464-B .... E4OD Solenoid
F2PZ-14A464-C .... MLP
F2PZ-14A464-D .... AXODE (91/92 Top)
F2PZ-14A464-E .... AXODE (91/92 Side)
F2PZ-14A464-F .... AXOD
F2PZ-14A464-G .... AODE, AX4S (1993–on)