



2-3 Flare in the 5R55E

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	5 th	Off	Off	On	Off	Yes	Off	Yes
	4 th	Off	Off	Off	Off	No	Off	No
	3 rd	On	On	Off	Off	No	Off	No
	2 nd	On	Off	On	Off	No	Off	No
Drive; Overdrive Disabled	1 st	On	Off	Off	Off	No	Off	No
	4 th	Off	Off	Off	On	Yes	On	Yes
	3 rd	On	On	Off	Off	No	On	Yes
	2 nd	On	Off	On	Off	No	Off	No
Manual 2	1 st	On	Off	Off	Off	No	Off	No
	2 nd	On	Off	Off	On	Yes	On	Yes
Low	1 st	On	Off	Off	On	Yes	On	Yes

Differences between 1997 and later models highlighted by dark band.

Fig 1

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	4 th	Off	Off	On	Off	Yes
	3 rd	Off	Off	Off	Off	No
	2 nd	On	On	Off	Off	No
	1 st	On	Off	Off	Off	No
Drive; Overdrive Disabled	3 rd	Off	Off	Off	On	Yes
	2 nd	On	On	Off	On	Yes
	1 st	On	Off	Off	On	No
Manual 2	2 nd	On	On	Off	Off	Yes
Low	1 st	On	Off	Off	Off	Yes

Fig 2

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	5 th							F/W	F/W	0.75:1
	4 th								F/W	1.00:1
	3 rd								F/W	1.47:1
	2 nd							F/W	F/W	1.86:1
	1 st									2.47:1
Drive; Overdrive Disabled	4 th								F/W	1.00:1
	3 rd								F/W	1.47:1
	2 nd							F/W	F/W	1.86:1
	1 st									2.47:1
Manual 2								F/W	F/W	
Low										2.47:1

■ = Applied F/W = Freewheeling

Fig 3

Welcome to *Street Smart* — a new column that'll examine real-world solutions to the problems that face technicians every day. Those of us who've been working on automobiles for most of our lives know that how we go about fixing a problem might not always follow the textbook solution. Because, when you get right down to it, textbooks don't fix cars: Technicians do. And, in the real world, we often find that following the textbook only ends up leading us in circles. That's when we need to start thinking... using our *Street Smarts*.

In this issue of *Street Smart*, we're going to look at 2-3 flare problems in the 5R55E transmission. The 5R55E is a 5-speed automatic transmission, introduced by Ford in 1997. It's used with the 4.0L engine in Rangers, Aerostars, Explorers and Mountaineers.

The 5R55E is mechanically the same as the 4R44E and the 4R55E. The difference is in how the computer commands the upshifts (figures 1 and 2). I've been on the ATRA HelpLine for two years now, and in that time I've heard problems with this unit nearly every day. Is it in the transmission? Computer? Wiring?... and so on. One call we seem to hear over and over is the 5R55E with a 2-3 flare.

The call comes in like this:

"I have a 1999 Ford Explorer that has a 2-3 flare. There's a code P0733 (No 3rd Gear) in memory. I've adjusted the EPC solenoid, went through the unit and replaced both servo pistons, but I still have a flare on the 2-3 shift."

2-3 Flare in the 5R55E

Okay, let's stop and look at what's going on in the transmission. The solenoid application chart (figures 1 and 2) shows that in 1st gear, only shift solenoid 1 is energized, which applies the forward clutch. To shift into 2nd, rather than energizing solenoid 2, the computer energizes solenoid 3, applying the OD band. This actually overdrives 1st gear.

Then, to shift into 3rd gear, the computer turns shift solenoid 3 off and solenoid 2 on. So to shift into 3rd gear, the unit releases the OD band and applies the intermediate band (figures 3 and 4).

With that in mind, what could happen that would create a flare on the 2-3 shift? Unlike the 4R44E and 4R55E, the 5R55E applies the *intermediate band* for 3rd gear; *not* the direct clutch. At the same time, it releases the overdrive band. So if the OD band releases before the intermediate applies, you get a 2-3 flare. The flare is a timing issue; the intermediate band is applying too slowly.

So let's recap on what we've done so far:

1. We went through the unit. The forward clutch, direct clutch and coast clutch all air check okay.
2. We've installed new servos, and new intermediate and overdrive bands. The bands are adjusted properly and air check fine.
3. Line pressure tests are within specs (figures 5 and 6). We even bumped the pressure up a little by adjusting the EPC solenoid.
4. All shift solenoids are well between 22–48 ohms of resistance (figure 7).

Let's do more than just look at the valve body; let's disassemble it completely. Take the time to flat sand the valve body, making sure it's nice and flat. This will help prevent crossleaks. Don't just check the valves for wear, inspect the bores too, and make sure the end plugs fit snug into the valve body.

An important point to remember is

4R44E; 4R55E Clutch & Band Appl.

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	4 th						F/W	F/W	0.75:1
	3 rd							F/W	1.00:1
	2 nd							F/W	1.47:1
	1 st								2.47:1
Drive; Overdrive Disabled	3 rd							F/W	1.00:1
	2 nd							F/W	1.47:1
	1 st								2.47:1
Manual 2								F/W	1.47:1
Manual 1									2.47:1

■ = Applied F/W = Freewheeling

Fig 4

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

Fig 5

Mainline and EPC Pressure Testing 4R44E, 4R55E, 5R55E



Mainline Pressure



EPC Pressure

Figure 6

that even if a solenoid has good resistance, it can still fail a functional test or leak test. If you don't have the tools for testing solenoids, you're throwing money down the drain. With today's transmissions, not having a dynamic solenoid tester is like removing and installing a transmission using only hand tools, or without a lift.

We've had a lot of calls on 5R55E with a 2–3 flare and code P0733 (No 3rd Gear). Code P0733 takes you to pinpoint test A: Shift solenoid electrical circuit test. Remember, this unit has 3rd gear; the problem it has is a 2–3 flare.

Most of the time it turns out that shift solenoid 2 is leaking out the end, which delays the stroke of the 2–3 shift

valve (figures 8 and 9). When the computer doesn't see the RPM drop right after it energizes the solenoid, it assumes the unit didn't shift into 3rd gear, so it sets code P0733.

Replacing all the solenoids during a rebuild is one way to prevent this type of problem. But it's not really practical, due to the high price and lack of availability of most solenoids. And remember, just because a solenoid is new doesn't guarantee it'll function properly. The only way to be completely sure that all of the solenoids are working properly is to test them... electrically and mechanically.

Testing solenoids is a sure way to save time and money. It'll help you track down many problems that don't show up using a typical electrical diagnosis. And that'll help keep you from pulling units a second time. That's not just smart... that's *Street Smart!*

(See figures 8 and 9 on page 54.)

Solenoid I.D and Resistance

1. E P C	3.1-5.7 ohms	3. S S 4	22-48 ohms
2. S S 2	22-48 ohms	4. T C C	9-16 ohms
		5. S S 3	22-48 ohms
		6. S S 1	22-48 ohms

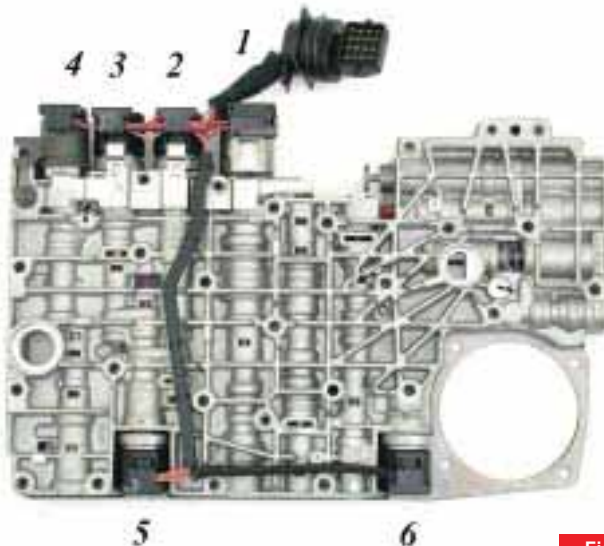
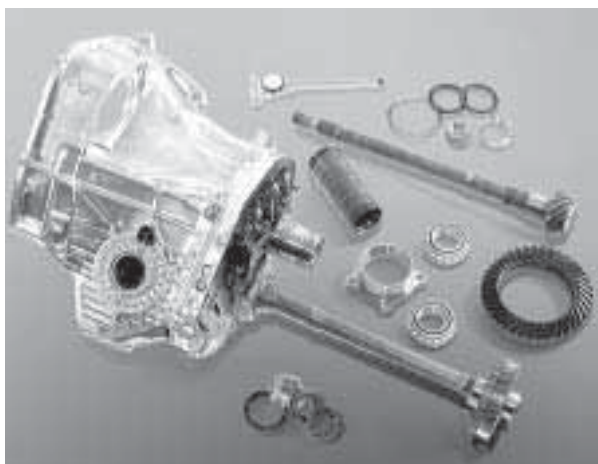


Figure 7



Subaru All Wheel Drive Differential:



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3RD GEAR (5R55E)

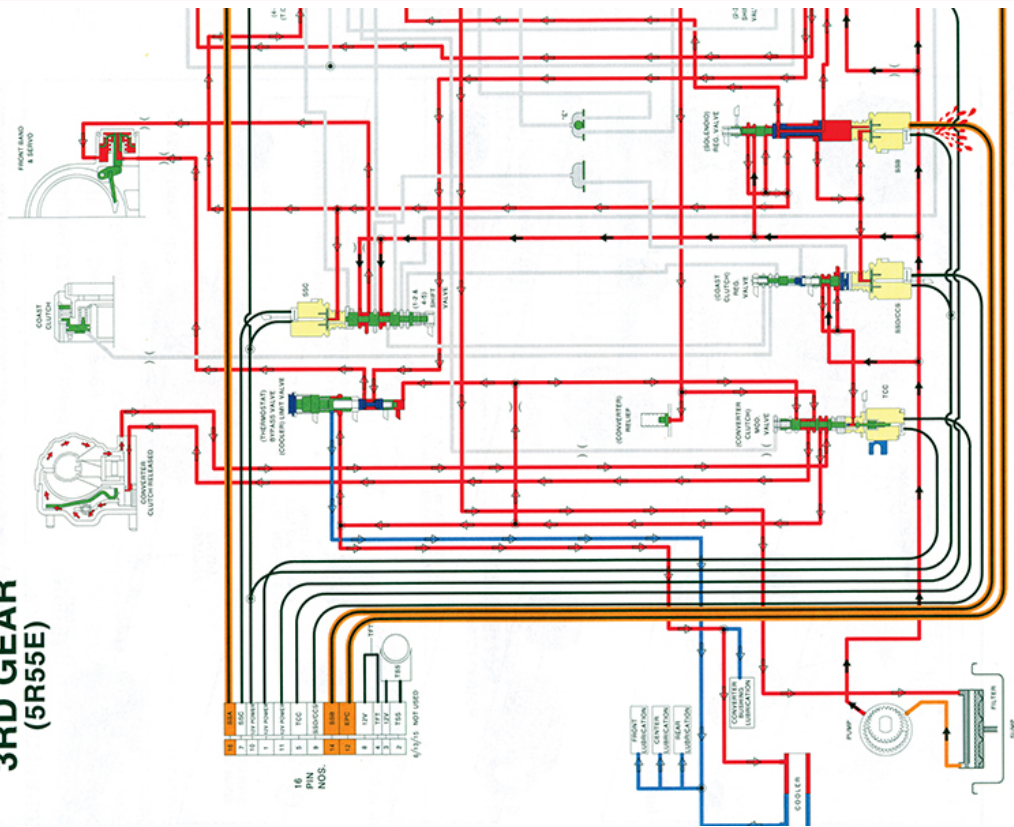


Figure 9

2ND GEAR (5R55E)

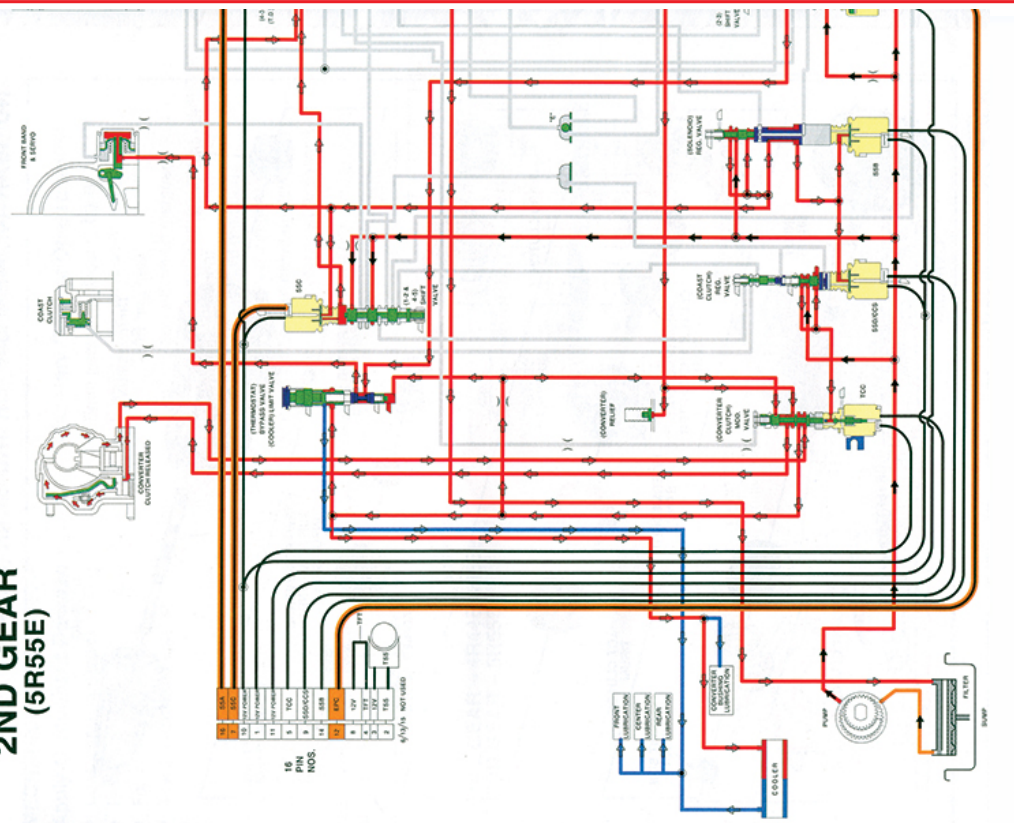


Figure 8