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Double Duty Dodge Diesel: The 68RFE P0871 Overdrive Clutch Failure



GEAR	L/R	2C	4C	UD	OD
REVERSE	OPEN	OPEN	OPEN	OPEN	OPEN
P/N	CLOSED**	OPEN	OPEN	OPEN	OPEN
1ST	CLOSED*	OPEN	OPEN	CLOSED	OPEN
2ND	OPEN	CLOSED	OPEN	CLOSED	OPEN
3RD	OPEN	OPEN	CLOSED	CLOSED	OPEN
4TH	OPEN	OPEN	OPEN	CLOSED	CLOSED
5TH	OPEN	OPEN	CLOSED	OPEN	CLOSED
6TH	OPEN	CLOSED	OPEN	OPEN	CLOSED

*L/R is closed if output speed is below 100 rpm in Drive. L/R is closed in Manual (ERS) 1st gear.

**May be open when rolling in Neutral or at low oil temperatures.

Figure 1

In 2007, Dodge introduced the 68RFE in the 3500-series truck equipped with the 6.7 Cummins diesel engine. This transmission is the heavy duty, 6-speed version of the 45RFE transmission introduced back in 1999.

What's interesting about this powertrain combination is that these trucks are truly used as work vehicles. On the other hand, the 2500 series trucks are equipped with the 5.9 diesel and the 48RE transmissions are more often

used as hotrods and dragsters.

In case you were wondering, RFE stands for *Rear Drive Fully Electronic*.

In the 3500D series, the 68RFE transmission is exposed to a harsher working environment than a 45RFE in a 1500 series truck. The harsher working environment has created some unique problems with the 68RFE that are rarely seen with the 45RFE.

Common Problems

Here are some of the more com-

mon 68RFE complaints:

- DTC P0871 when hot
- Repeated overdrive clutch failure
- Binds in 3rd gear when hot. This condition is often confused with a bindup on the 3-4 shift

What we've discovered is that all three of these conditions can relate to the same basic failure. Here's why:

Code P0871 indicates an *overdrive fluid pressure switch rationality* fault. What this means in simple terms is, when the overdrive fluid pressure

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switch should be open, it's closed; or when it's supposed to be closed, it's open (figure 1). This code can be set by either an electric or hydraulic problem.

Electrical P0871

Each clutch in the solenoid pack has its own fluid pressure switch, just like a 604.

All of the pressure switches receive a reference voltage signal from the TCM. As long as the overdrive fluid pressure switch is open, the reference voltage will remain high; that is, it'll stay at reference voltage level.

When the switch closes, it grounds the circuit. The voltage pulls down to zero volts. If the overdrive pressure switch circuit shorts to ground, the TCM will see the overdrive switch as closed; if it hasn't commanded 4th gear yet, the TCM will set the code.

Code P0871 usually sets when the overdrive switch circuit voltage remains at zero volts in 1st through 3rd gears. This usually indicates a valve body problem.

Hydraulic P0871

If a crossleak develops in the valve body and closes the overdrive pressure switch, the reference voltage will again drop to zero volts.

The question becomes how to determine whether the code was set electrically or hydraulically. Both problems — an electrical short in the overdrive switch circuit or a valve body crossleak that closes the switch — will pull the reference voltage to zero volts.

The TCM can't determine which condition caused the problem. It only sees that the overdrive switch voltage is zero when it should be at reference voltage, so it sets the code.

Diagnostics and Road Testing

Check your scan tool for event data. If the data shows that the code sets in 1st through 3rd gear, then most likely the code is being generated by a valve body problem. If the event data isn't available, you'll need to road test the truck to duplicate the code setting condition.

Remember the code definition: the overdrive pressure switch is closed in any gear other than 4th,

Cut the overdrive pressure switch circuit wire: pin 16 at the transmission connector

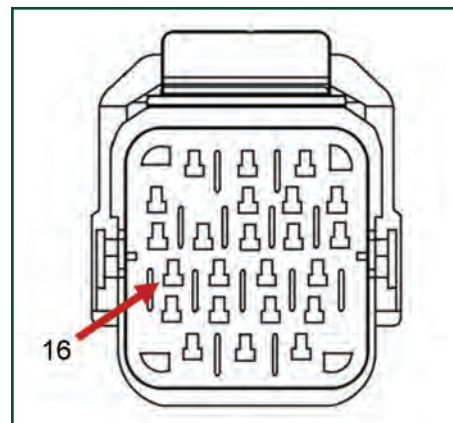


Figure 2



Figure 3

or it's open in 4th gear.

Road Test Method 1

Monitor the overdrive pressure switch PID only, using *data stream select mode*. This means the only PID the scan tool is looking at is the overdrive pressure switch. If the switch closes in 1st–3rd, it indicates a valve body problem. See road test method 2 to confirm your findings.

Road Test Method 2

Cut the overdrive pressure switch circuit wire: pin 16 at the transmission connector (figure 2). This eliminates

the possibility of a shorted circuit causing the code to set.

Since you've taken the circuit out of the equation by cutting the wire, if the code sets while in 1st through 3rd gears, the TCM has to be at fault. Always recheck the TCM event data on your scan tool to make sure the code didn't set while in 4th gear. If the transmission shifts into 4th with this wire cut the P0871 will set on the 3-4 command; that's normal, because the circuit can't pull down the way it should in 4th gear.

Road Test Method 3

Install the oil pressure test pan,



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A worn #4 checkball will feed line pressure in the overdrive circuit.

Miller 1456-6, and attach a 100-PSI gauge or transducer to the overdrive clutch port. If you don't have the test pan, make a trip to your local hardware store and pick up some 1/16" pipe thread brass fittings for 1/8" plastic tubing. You can run the gauge tubing or the wiring for a transducer out the filler tube (figure 3).

Road test and monitor the pressure in the overdrive circuit. While the transmission is in 1st through 3rd gears, the overdrive clutch circuit should remain at 0 PSI. If you see pressure on the overdrive clutch circuit while the transmission is in 1st through 3rd gears, the code is being set hydraulically.

The majority of P0871 problems occur when the switch is closed hydraulically in 3rd gear: a valve body problem.

Valve Body Problems

- A worn #4 checkball will feed line pressure in the overdrive circuit.
- Wear in the solenoid switch valve bore can cause P0871 to set by feeding the overdrive circuit and closing the switch. There are aftermarket repair kits available to fix this (figure 4).

While there are other possible valve body problems that can set code P0871, they haven't been resolved yet. If the code still sets after repairing the switch valve bore, the only other solution available is to replace the valve

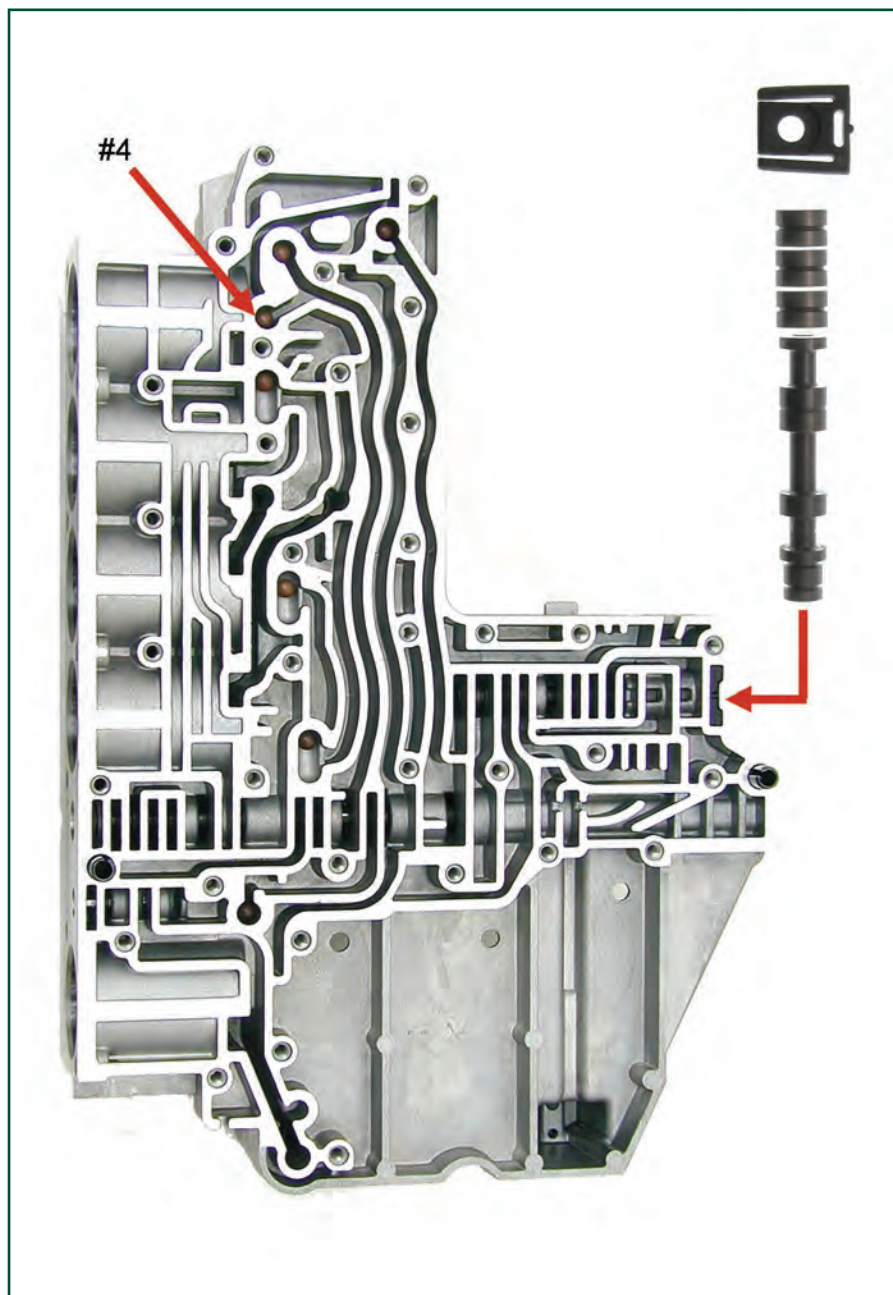


Figure 4

body with a new one. Dodge sells a replacement valve body with the solenoid pack for \$479.

If the overdrive pressure switch is closing from a valve body problem, the pressure will also apply the overdrive clutch when it's supposed to be off. This will cause a bindup in 3rd gear and cause the clutch to drag and burn out.

68RFE vs. 45RFE Work Environment

Vehicles equipped with a 68RFE are generally being used as work trucks. They pull large trailers all the time, while the 1500 series truck with a 45RFE may pull the family ski boat

once a month. A transmission that's subjected to constant high line pressure, high torque demands, and repeat hot-cold temperature cycles is going to succumb to metallurgic fatigue. This is why the 68RFE is showing up with problems that 45RFEs rarely exhibit.

The RFE series transmission is a well-built unit. As with any transmission repair, paying attention to the details before, during, and after the repair is the key to the customer's and your success.



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