42RLE

Bearing Failure

The 42RLE replaces the 45RFE in smaller engine applications. The extension housing bearing requires a special lube tube to lubricate the rear bearing. Always use a brand new seal.
42RLE

Updates (continued)

Line Pressure Solenoid

The 42RLE applications will adopt the use of a variable line pressure solenoid in 2005 model year. The valve body will be revised to incorporate the Pressure Control Solenoid/Variable Force Solenoid and also house the line pressure sensor. New VFS (Intergrated connector on pressure transducer) Modified 45RFE VFS (New MCM VFS for 2006 model year)

- New pressure transducer
- New VLP header
- New solenoid switch valve
- New regulator spring
- Anodized valve body and transfer plate

<table>
<thead>
<tr>
<th>Pin</th>
<th>Circuit</th>
<th>Inrush I (A)</th>
<th>Cont I (A)</th>
<th>Stall I (A)</th>
<th>Crkt Name</th>
<th>Circuit Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Not Connected</td>
<td>0.2A</td>
<td>0.25A</td>
<td>0</td>
<td>F856</td>
<td>ENG – 5 VOLTS ENGINE SENSOR SEC SUP</td>
</tr>
<tr>
<td>2</td>
<td>LP +5 Volts</td>
<td>0.2A</td>
<td>0.25A</td>
<td>0</td>
<td>T38</td>
<td>TRX – LINE PRESSURE TRANSDUCER SIGNAL</td>
</tr>
<tr>
<td>3</td>
<td>LP Signal</td>
<td>0.2A</td>
<td>0.25A</td>
<td>0</td>
<td>K900</td>
<td>ENG – ENGINE CONT COMMON SENSOR</td>
</tr>
<tr>
<td>4</td>
<td>LP Return grd</td>
<td>0.2A</td>
<td>0.25A</td>
<td>0</td>
<td>T16</td>
<td>TRX – SWITCH BATTERY FEED</td>
</tr>
<tr>
<td>5</td>
<td>VFS Switched Batt</td>
<td>1.5A</td>
<td>1A</td>
<td>0</td>
<td>T118</td>
<td>TRX – VARIABLE FORCE SOLENOID FEED</td>
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<tr>
<td>6</td>
<td>VFS Solenoid</td>
<td>1.5A</td>
<td>1A</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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42RLE

Updates (continued)

Pressure Regulator Valve

The line pressure regulator valve has been revised to accommodate the Variable Line Pressure Control capability. To add this feature, the design of the case had to also change to allow for the new connectors.
Updates (continued)

Variable Line Pressure Operation

How the system works:
The Variable Line Pressure (VLP) feature requires changes to the 42RLE transmission control system. This feature uses the basic 45RFE line pressure control logic with modifications to accommodate the hardware differences. The 42RLE transmission with the VLP feature has a line pressure sensor to monitor the actual line pressure and a Variable Force Solenoid (VFS to control the line pressure).
The basic control strategy “reduces” line pressure during in-gear conditions to lower transmission oil pump load and other parasitic losses, and it, thereby, improves fuel economy. During shifts, the line pressure is raised to a programmed level to provide good hydraulic response and consistent shift quality; this also allows shifts to be made at higher input torques than were possible with fixed line pressure.

The following changes are being added to Module Strategy.

1: Line pressure targets are added to support different shifts, ensure adequate torque capacities of the clutches (both the element clutches and the torque converter clutch), and ensure adequate lubrication of the transmission.
   i. Line pressure targets for shifts: The pressure targets are adapted from the line pressure values used in the current 41TE/42RLE transmissions. This allows keeping most of the previous calibrations for the transmissions with the VLP feature.
   ii. Line pressure target in-gear: The drive gear pressure target is based on the clutch torque required to carry the input torque. The pressure target in Neutral is balanced between the fuel economy and the transmission lubrication.
   iii. Line pressure target upper limits: the upper limits for the line pressure target are adapted from the fixed line pressure values used in the 41TE/42RLE transmissions.
   iv. Line pressure target lower limit: The lower limits for the line pressure target are established to provide the desired torque capacity of the clutches and adequate lubrication for the transmission.
The following changes are being added to Module Strategy.

2: A closed-loop line pressure control algorithm is added: The algorithm compares the actual pressure with the target pressure and controls the actual pressure to the desired value. In order to maintain drivability with the faulty pressure sensor, an open-loop control algorithm is also implemented.

3: A clutch-slip correction and line pressure adjustment algorithm is added. When either an element clutch or the torque converter clutch slips unexpectedly, the VLP feature raises the closed-loop control target pressure to its upper limit temporarily to stop the slip and then adjusts the line pressure target calculation to prevent future slip. In the event of a faulty line pressure sensor where open-loop control is activated, this feature adjusts the open-loop VFS duty cycle calculation to correct and prevent future slip.

4: New and revised control logic is added to adapt the existing logic to variable line pressure.

5: A VLP enable bit is added to allow selection of VLP feature on an engine application basis.

6: Failsafe logic is added to detect a VLP system failure, activate alternative control strategies to maintain drivability, prevent possible further damage to the hardware, and provide diagnostic information about the fault.

7: Torque Management logic is added to ensure stable torque converter CC-On operation with throttle tip-ins. Throttle tip-ins during Torque converter CC-On operation could cause unexpected torque converter slip until the converter clutch pressure stabilizes.

8: Desired line pressures are being modified to improve the clutch capacities for certain shifts and in-gear conditions, to improve shift consistency, or to accommodate recent lab test results. Some logic is modified to improve reliability.
In 2003 the 42RLE replaced the RFE in smaller engine applications. The change was for cost savings due to weight and fuel economy. The 42RLE is a proven quality 42LE that has gone rearwheel drive. The vehicles that use the 42RLE are as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Body Model</th>
<th>Engine Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>TJ</td>
<td>4.0L and 2.4L</td>
</tr>
<tr>
<td>2003.5</td>
<td>KJ</td>
<td>3.7L</td>
</tr>
<tr>
<td>2004</td>
<td>HB and AN</td>
<td>3.7L</td>
</tr>
<tr>
<td>2004.5</td>
<td>LX</td>
<td>2.7L and 3.5L</td>
</tr>
<tr>
<td>2005</td>
<td>ND</td>
<td></td>
</tr>
</tbody>
</table>
The 4WD transfer case adapter and oil lube tube changed when the 42RLE was initially launched in the 2003 TJ with the 2.4L engine and on the 2003.5 KJ with the 3.7L. The TJ transfer case adapter has a 10 mm difference in length, but a common intermediate shaft. The lengths differ for proper fit in the different platforms.
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Updates (continued)

2WD Adapter

In the middle of 2003 the 42RLE introduced the extension assembly with shaft, bearing, and housing assembly necessary to adapt on the 2WD vehicles. The parts on this extension housing are serviced separately. A lube tube extends from the front of the extension housing to the output shaft seal to lubricate the seal and bearing.

This extension housing is used on the AN, KJ, and HB two wheel drive applications. The seal, bearing and snapring are all common.
42RLE

Updates (continued)

Transmission Case Seepage

In the 2003 KJ and TJ, transmissions, fluid may seep at the input or output sensor to case fasteners, the adapter housing bolts, and extension to lower case fasteners. If any of these fasteners are seeping, replace all fasteners with the new patch bolts. Leaks have also been found at pan bolts under the pressure tap locations and these bolts also must be replaced with the new patch bolts. The replacement bolts have a pre-applied sealer designed for a one-time use.

Patch Bolt Locations and Transmission with Missing Plug
2003 TJ applications with the 4.0L or 2.4L and the KJ with a 3.7L had modifications so the transmission could hold the 10,000 gross combined vehicle weight (GCVW) rating tow capacity rated vehicles in the park position. To achieve this, a wider 2.5 mm parking sprag was installed as well as a different parking pawl, narrower spacer, parking guide, and wider park rod. On these applications the case has been modified to make room for the larger parking assembly. If a new case is ordered, the upgraded parking assembly is included with this setup.
The input and output speed sensors were changed on the 42RLE and they are not backward compatible with any other model. The input speed sensor is common with the 45RFE, but the output speed sensor is unique. Make sure when ordering you specify which sensor you want.

Neither sensor will interchange with one another, their mounting surfaces are different.
The rear spline was lengthened and the snapring groove became wider and deeper to house a locking ring for the stub shaft. This was necessary for the 4WD applications starting with the 2003 TJ with the 2.4L and the KJ with the 3.7L engines. The shaft can be hard to remove because of this locking ring. Always install a new ring when servicing the shaft removal.
42RLE

Updates (continued)
Transmission Case, Pan and Filter

The transmission case was changed by adding a sump. The filter added an elliptical circle snorkel for added fluid pickup that was optimized so the filter is not starved during extreme maneuvers.
42RLE

Updates (continued)

Output Flange

LX Applications

In the middle of 2004, the 42RLE used in the LX 2.7L and 3.5L applications required a fixed output flange. When servicing the yoke always install a new locking nut.