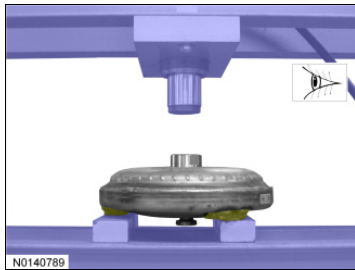
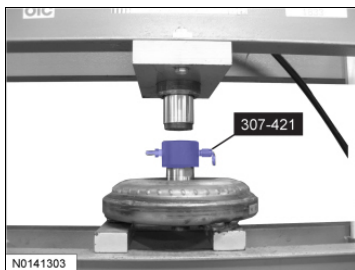


2012 F-53 Motorhome Chassis, F-59 Commercial Stripped Chassis Workshop Manual

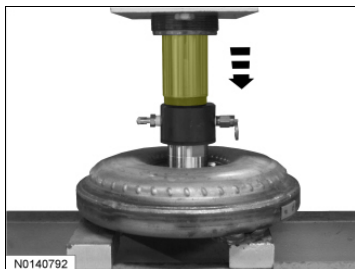
2. Transmission fluid leakage by the outside diameter of the converter impeller hub seal and the case will follow the same path that leaks by the ID of the converter hub seal follow.
 3. Transmission fluid leakage from the converter cover weld or the converter-to-flexplate stud weld will appear at outside diameter of torque converter on the back face of the flexplate and in the converter housing only near the flexplate. If a converter-to-flexplate lug, lug weld or converter cover weld leak is suspected, remove the converter and pressure check.
 4. Transmission fluid leakage from the bolts inside the converter housing will flow down the back of the torque converter housing. Leakage may be from loose or missing bolts.
 5. Engine oil leaks from the rear main oil.
5. Remove the torque converter.
 6. Using a black light, observe the torque converter housing. Inspect for evidence of dye from the pump bolts, pump seal, and torque converter hub seal. Repair as required.
 7. If the source of the leak is not evident, continue with this procedure to leak test the torque converter.
 8. Install the torque converter in the arbor press. Support the torque converter on the mounting pads.



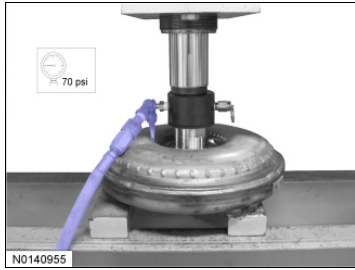
9. Install the Leak Tester, Torque Converter 307-421 into the torque converter hub.



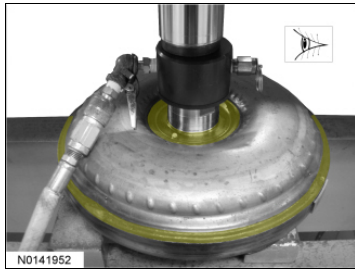
10. Secure the press. Only apply enough force from the press to seal of the Leak Tester, Torque Converter 307-421 into the torque converter hub.



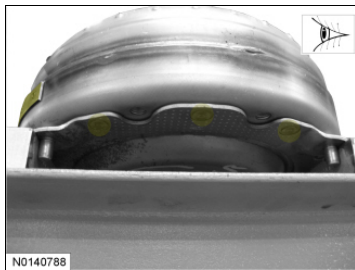
11. Connect a compressed air supply to the Leak Tester, Torque Converter 307-421.



12. With air pressure applied to the valve, inspect for leaks at the converter hub weld and seams. A soap bubble solution can be applied around those areas to aid in the diagnosis. If any leaks are present, install a new torque converter.




13. With air pressure applied to the valve, inspect for leaks at the stud or mounting pad and balance weight welds. A soap bubble solution can be applied around those areas to aid in the diagnosis. If any leaks are present, install a new torque converter.



14. After leaks are repaired, clean remaining transmission fluid dye from serviced areas.
-

Transmission Fluid Cooler

Special Tool(s)

	<p>Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool</p>
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NOTE: Backflushing and cleaning the transmission fluid cooling system along with following all the normal cleaning and inspection procedures during disassembly and reassembly prevents contamination from entering the transmission, causing a repeat repair. For additional information, refer to Transmission Fluid Cooler - Backflushing and Cleaning in this section.

When internal wear or damage has occurred in the transmission, metal particles or clutch plate material may have been carried into the torque converter and transmission fluid cooler. These contaminants are a major cause of recurring transmission troubles and must be removed from the system before the transmission is put back into use.

Transmission Fluid Cooler Flow Test

NOTE: The transmission linkage/cable adjustment, transmission fluid level and transmission line pressure must be within specification before carrying out this test. Refer to Check Transmission Fluid Level and Condition under Preliminary Inspection in this section. Refer to Line Pressure Test under Special Testing Procedures in this section. For shift linkage/cable adjustment procedures, refer to Section 307-05 .

1. Remove the transmission fluid level indicator from the transmission filler tube.
2. Place a funnel in the transmission filler tube.
3. Raise and support the vehicle.
4. Disconnect the transmission fluid cooler return tube (rear-fitting) from the transmission case.
5. Install a suitable plug into the rear case fitting.
6. Connect one end of a hose to the transmission fluid cooler return tube and route the other end of the hose up to a point where it can be inserted into the funnel at the transmission fluid filler tube.
7. Remove the supports and lower the vehicle.
8. Insert the end of the hose into the funnel.
9. Start the engine and run at idle with the transmission in NEUTRAL.
10. Once a steady flow of transmission fluid (without air bubbles) is observed, remove the hose from the funnel and place the hose in a measuring container for 15 seconds. After 15 seconds, place the hose back into the funnel and turn the engine off. Measure the amount of transmission fluid in the

container.

Temperature	Flow
44°C (111°F)	236.6 ml (8 oz) 15 sec
78°C (172°F)	473.2 ml (16 oz) 15 sec
82°C (180°F) and up	1893 ml (64 oz) 15 sec


There is a temperature valve in the pump. Transmission fluid cooler flow rates will vary according to transmission fluid temperature. The use of a scan tool determines the actual transmission fluid temperature. If adequate flow is observed into the container, the test is now complete.

11. If adequate flow is not observed, turn off the engine. Disconnect the hose from the transmission fluid cooler return line (transmission inlet).
12. Disconnect the transmission fluid cooler tube from the front case fitting and connect the hose to the case fitting (converter out) and repeat Steps 8, 9 and 10.
13. If adequate flow is not observed from the transmission, look for a plugged or crushed transmission fluid cooler tube, plugged remote filter orifice and/or transmission fluid cooler. Refer to [Section 307-02](#) for diagnosis of the transmission fluid cooler.
14. If adequate flow is still not observed, repair or installation of a new pump and/or torque converter may be required.

For the installation of new transmission fluid cooler tubes, refer to [Section 307-02](#) .

Diagnosis By Symptom

Special Tool(s)

 <p>ST2834-A</p>	<p>Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool</p>
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Diagnosis by Symptom gives the technician diagnostic information and direction and suggests possible components using a symptom as a starting point. All routines begin with any potential electrical components that can cause or contribute to the symptom described. The routines then list all possible hydraulic or mechanical components that can cause or contribute to the symptom described.

Diagnosis by Symptom Chart Directions

1. Use the Symptom Chart to select the Concerns and Symptoms that best describes the condition.
2. Refer to the routine indicated in the Diagnosis by Symptom Chart.
3. Always begin diagnosis of a symptom with:
 1. preliminary inspections.
 2. verification of conditions.
 3. checking transmission fluid levels.
 4. carrying out other test procedures as directed.
4. **NOTE:** Not all concerns and conditions with electrical components set a DTC. Be aware that the components listed may be the cause. Verify correct function of these components prior to proceeding to the hydraulic and mechanical components listed.

NOTE: When the battery is disconnected or a new battery is installed, certain transmission operating parameters can be lost. The PCM must relearn these parameters. During this learning process, slightly firm shifts, delayed or early shifts may be experienced. This operation is considered normal and will not affect the function of the transmission. Normal operation returns once these parameters are stored by the PCM.

Follow the reference/action statements. Always perform the On-Board Diagnostic (OBD) tests as necessary. Never skip steps. Repair as necessary. If the concern is still present after the electrical components have been diagnosed, proceed to the hydraulic and mechanical components listed.

5. The list contains only possible hydraulic or mechanical components that may cause or contribute to the concern. These components are listed in the removal sequence and by most probable cause. Inspect the components listed to make sure the repair is correct.

Diagnosis by Symptom Chart

Concerns and Symptoms	Routines
-----------------------	----------

Engagement Concerns	
• No Forward Only	201
• No Reverse Only	202
• Harsh Reverse Only	203
• Harsh Forward Only	204
• Delayed/Soft Reverse Only	205
• Delayed/Soft Forward Only	206
• No Forward and No Reverse	207
• Harsh Forward and Harsh Reverse	208
• Delayed Forward and Delayed Reverse	209
Shift Concerns	
• Some/All Shifts Missing	210
• Timing Concern - Early/Late (Some/All)	211
• Timing Concern - Erratic/Hunting (Some/All)	212
• Feel Concern - Soft/Slipping (Some/All)	213
• Feel Concern - Harsh (Some/All)	214
• No 1st Gear in Drive, Engages in a Higher Gear	215
• No 1st Gear in Manual 1st	216
• No Manual 2nd Gear in Manual 2nd	217
• No Manual 3rd Gear in Manual 3rd	218
• Soft/Slipping 1-2 Shift	226
• Soft/Slipping 2-3 Shift	227
• Soft/Slipping 3-5 Shift	228
• Soft/Slipping 4-6 Shift	229
• Soft/Slipping 5-6 Shift	230

• Soft/Slipping 6-5 Shift	231
• Soft/Slipping 6-4 Shift	232
• Soft/Slipping 5-3 Shift	233
• Soft/Slipping 3-2 Shift	234
• Soft/Slipping 2-1 Shift	235
• Harsh 1-2 Shift	236
• Harsh 2-3 Shift	237
• Harsh 3-5 Shift	238
• Harsh 4-6 Shift	239
• Harsh 5-6 Shift	240
• Harsh 6-5 Shift	241
• Harsh 6-4 Shift	242
• Harsh 5-3 Shift	243
• Harsh 3-2 Shift	244
• Harsh 2-1 Shift	245
• Harsh 6-5 Coast Downshift in Tow/Haul	246
• Harsh 5-3 Coast Downshift in Tow/Haul or to Manual 3rd	247
• Harsh 3-2 Coast Downshift in Tow/Haul or to Manual 2nd	248
• Harsh 2-1 Coast Downshift in Tow/Haul or to Manual 1st	249
Torque Converter Operation Concerns	
• Does Not Apply	250
• Always Applied/Stalls Vehicle	251
• Cycling, Shudder, Chatter	252
• Erratic Scheduling	253

Other Concerns	
• Selector Lever Efforts High	254
• External Leaks	255
• Vehicle Driveability Concerns	256
• Noise/Vibration - Forward or Reverse	257
• Engine Will Not Crank	258
• No Park Range	259
• Transmission Overheating	260
• Transmission Fluid Venting or Foaming	261
• Unexpected Elevated Idle Speed	262
• No Tow/Haul Mode	263
• Reverse Lamps Do Not Illuminate	264
• Failure Mode Effect Management	265
• Power Take-Off (PTO) Concerns	266
• Engagement Schedule Update ◆ Dead battery ◆ Battery disconnected ◆ Calibration updated	267

Diagnostic Routines

No Forward Only

Possible Component	Reference/Action
201 - ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> • PCM, external vehicle wiring harnesses, transmission internal harness, Pressure Control Solenoid A (PCA) 	<ul style="list-style-type: none"> • CARRY OUT On-Board Diagnostic (OBD) tests. REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual for diagnosis and testing of the PCM.
	<ul style="list-style-type: none"> • <u>GO to Pinpoint Test E</u> .

	<ul style="list-style-type: none"> • REPAIR as required. CLEAR the DTCs. ROAD TEST and CARRY OUT the OBD test again.
Selector Lever Cable	
<ul style="list-style-type: none"> • Selector lever cable system damaged, misaligned 	<ul style="list-style-type: none"> • INSPECT and REPAIR as necessary. REFER to <u>Section 307-05</u> .
Incorrect Line Pressure	
<ul style="list-style-type: none"> • Low pressure 	<ul style="list-style-type: none"> • CHECK pressure at line tap. CARRY OUT Line Pressure Test. REFER to <u>Special Testing Procedures</u> in this section. FOLLOW the pressure diagnosis test as required.
Solenoid Body Assembly	
<ul style="list-style-type: none"> • Bolts not tightened to specification 	<ul style="list-style-type: none"> • TIGHTEN to specification.
<ul style="list-style-type: none"> • Transmission fluid filter gasket damaged, blown out, leaking 	<ul style="list-style-type: none"> • INSTALL a new transmission fluid filter gasket.
<ul style="list-style-type: none"> • Contamination 	<ul style="list-style-type: none"> • DISASSEMBLE and CLEAN.
<ul style="list-style-type: none"> • PCA damaged, stuck or bore damaged. Manual valve damaged, stuck or bore damaged 	<ul style="list-style-type: none"> • If damaged or parts are missing, INSTALL a new PCA or solenoid body assembly. If misassembled, REASSEMBLE correctly.
Overdrive One-Way Clutch (OWC)	
<ul style="list-style-type: none"> • Mechanical diode engaged in both directions, struts missing, OWC damaged 	<ul style="list-style-type: none"> • INSPECT for rotation in one direction only. Mechanical diode should overrun in the opposite direction. INSTALL new if damaged or fails inspection.
Center Support	
<ul style="list-style-type: none"> • Feed bolt not tightened to specification 	<ul style="list-style-type: none"> • TIGHTEN to specification.
<ul style="list-style-type: none"> • Forward clutch seal rings damaged 	<ul style="list-style-type: none"> • REPAIR as necessary.
<ul style="list-style-type: none"> • Support damaged or leaking 	<ul style="list-style-type: none"> • REPAIR as necessary.
Forward Clutch Assembly	
<ul style="list-style-type: none"> • Seals, piston damaged 	<ul style="list-style-type: none"> • REPAIR as necessary.
<ul style="list-style-type: none"> • Friction elements damaged or worn 	<ul style="list-style-type: none"> • REPAIR as necessary.
<ul style="list-style-type: none"> • Return springs damaged 	<ul style="list-style-type: none"> • REPAIR as necessary.
Low/Reverse OWC	

<ul style="list-style-type: none"> • Mechanical diode engaged in both directions, struts missing, OWC damaged 	<ul style="list-style-type: none"> • INSPECT for rotation in one direction only. Mechanical diode should overrun in the opposite direction. INSTALL new if damaged or fails inspection.
--	--

No Reverse Only

Possible Component	Reference/Action
202 - ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none"> • PCM, external vehicle wiring harnesses, transmission internal harness, Pressure Control Solenoid A (PCA) 	<ul style="list-style-type: none"> • CARRY OUT On-Board Diagnostic (OBD) tests. REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual for diagnosis and testing of the PCM. GO to Pinpoint Test E . REPAIR as required. CLEAR the DTCs. ROAD TEST and CARRY OUT the OBD test.
Selector Lever Cable	
<ul style="list-style-type: none"> • Selector lever cable system damaged, misaligned 	<ul style="list-style-type: none"> • INSPECT and REPAIR as necessary. REFER to <u>Section 307-05</u> .
Incorrect Line Pressure	
<ul style="list-style-type: none"> • Low pressure 	<ul style="list-style-type: none"> • CHECK pressure at line tap. CARRY OUT Line Pressure Test. REFER to <u>Special Testing Procedures</u> in this section. FOLLOW the pressure diagnosis test as required.
Solenoid Body Assembly	
<ul style="list-style-type: none"> • Bolts not tightened to specification 	<ul style="list-style-type: none"> • TIGHTEN to specification.
<ul style="list-style-type: none"> • Transmission fluid filter gasket damaged, blown out, leaking 	<ul style="list-style-type: none"> • INSTALL a new transmission fluid filter gasket.
<ul style="list-style-type: none"> • Contamination 	<ul style="list-style-type: none"> • DISASSEMBLE and CLEAN.
<ul style="list-style-type: none"> • PCA damaged, stuck or bore damaged. Manual valve damaged, stuck or bore damaged 	<ul style="list-style-type: none"> • If damaged or parts are missing, INSTALL a new PCA or solenoid body assembly. If misassembled, REASSEMBLE correctly.
Center Support	
<ul style="list-style-type: none"> • Feed bolt not tightened to specification 	<ul style="list-style-type: none"> • TIGHTEN to specification.
<ul style="list-style-type: none"> • Direct clutch seal rings or bearing damaged 	<ul style="list-style-type: none"> • REPAIR as necessary.