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## 2017 Ford Transit Connect Service and Repair Manual

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## E5 CHECK THE ENGINE OIL PICKUP TUBE

- Remove the engine oil pan. Refer to the Removal and Installation procedure in the 303-01 section. Refer to the appropriate section in Group 303 for the procedure. INSPECT for a blocked engine oil pickup tube.
- Inspect for a blocked engine oil pickup tube.

**Is the engine oil pickup tube free from obstructions and blockage?**

<b>Yes</b>	GO to <a href="#">E6</a>
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<b>No</b>	REPAIR as necessary.
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## E6 CHECK FOR OBVIOUS SIGNS OF EXCESSIVE WEAR

- Visually inspect the engine oil pan for signs of a mechanical damage or excessive wear, such as metal flakes settled at the bottom of the engine oil pan, pieces of metal or other debris from the timing components.

**Is any sign of excessive wear or mechanical damage present?**

<b>Yes</b>	REPAIR as necessary.
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<b>No</b>	INSTALL a new oil pump. REFER to the oil pump procedure in the 303-01 section for the engine being diagnosed. CHECK the system for normal operation. If the condition is still present, GO to <a href="#">E7</a>
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## E7 CHECK THE CONNECTING ROD BEARINGS

- Remove the engine oil pan. Remove the connecting rod caps and check the bearings for signs of excessive wear or damage. Check the connecting rod bearing journal clearance. REFER to: [Connecting Rod Bearing Journal Clearance](#)(303-00 Engine System - General Information, General Procedures).  
Compare the connecting rod bearing journal clearance to the connecting rod bearing journal clearance specification in the specifications procedure for the 303-01 section of the engine being diagnosed. Refer to the appropriate section in Group 303 for the procedure.

**Are the connecting rod bearing journal clearances within specifications?**

engine aids in determining if the noise is normal or abnormal.

Once a concern is identified as an abnormal engine noise, it is critical to determine the location of the specific noise. Use the EngineEAR/ChassisEAR or stethoscope (the noise is always louder closer to the noise source) to isolate the location of the noise to one of the following areas.

- Fuel injector(s)
- Upper end of engine
- Lower end of engine
- Front of engine
- Rear of engine

### **Fuel injector noise**

A common source of an engine ticking noise can be related to the fuel injection pump (Ecoboost engine) or fuel injector(s). This is normal engine noise that can be verified by listening to another like vehicle. If the injector noise is excessive or irregular, use the EngineEAR/ChassisEAR or stethoscope to isolate the noise to a specific fuel injector.

### **Upper End Engine Noise**

A common source of upper end engine noise (ticking, knocking or rattle) includes the camshaft(s) and valve train. Upper end engine noise can be determined using the EngineEAR/ChassisEAR or stethoscope on the valve cover bolts. If the noise is loudest from the valve cover bolts, the noise is within the upper end. The EngineEAR/ChassisEAR or stethoscope can be used to further isolate the noise to the specific cylinder bank and cylinder. Removal of the valve covers is required to pinpoint the source of the noise.

### **Lower End Engine Noise**

A common source of lower end engine noise (ticking or knocking) includes the crankshaft, connecting rod(s) and bearings. Lower end noises can be determined by using the engine oil pan or lower cylinder block. If the noise is loudest from these areas, the noise is within the lower end. If an engine noise is isolated to the lower end, some disassembly of the engine may be required to inspect for damage or wear.

### **Front of Engine Noise**

A common source of noise from the front of the engine (squeal, chirp, whine or hoot) is the FEAD (front end accessory drive) components. To isolate FEAD (front end accessory drive) noise, carry out the Engine Accessory Test, REFER to: [Noise, Vibration and Harshness \(NVH\)](#)(100-04 Noise, Vibration and Harshness, Diagnosis and Testing).

Some other noises from the front of the engine (ticking, tapping or rattle) may be internal to the engine. Use the EngineEAR/ChassisEAR or stethoscope on the engine front cover to determine if the noise is internal to the engine. Removal of the engine front cover may be necessary to inspect internal engine components.

### **Rear of Engine Noise**

A common source of noise from the rear of the engine (knocking) is the flywheel/flexplate. Inspection of the flywheel/flexplate is necessary.

Some engines have timing drive components at the rear of the engine and may be the source of noise (ticking, knocking or rattle). Use the EngineEAR/ChassisEAR or stethoscope on the rear of the engine if the

**Is the noise of concern present in the like vehicle?**

<b>Yes</b>	The vehicle is operating as designed.
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<b>No</b>	GO to <a href="#">F2</a>
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**F2 CHECK FOR OBVIOUS SIGNS OF MECHANICAL DAMAGE**

- Ignition OFF.
- Visually inspect the powertrain components and all possible causes listed for obvious signs of mechanical damage.

**Is any mechanical damage present?**

<b>Yes</b>	REPAIR as necessary.
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<b>No</b>	GO to <a href="#">F3</a>
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**F3 CHECK THE ENGINE OIL LEVEL**

- Check the engine oil level.

**Is the engine oil level OK?**

<b>Yes</b>	GO to <a href="#">F4</a>
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<b>No</b>	FILL the engine oil to specification.
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**F4 CHECK THE ENGINE OIL FOR CONTAMINATION**

- Check the engine oil for contamination.

**Is the engine oil free of contamination?**

<b>Yes</b>	GO to <a href="#">F5</a>
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<b>No</b>	GO to <a href="#">F8</a>
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## F8 CHECK THE COOLANT PUMP END PLAY

- Check the coolant pump for excessive end play. Inspect the coolant pump for imbalance with the drive belt off.

**Is any concern with the coolant pump present?**

<b>Yes</b>	REPAIR as necessary.
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<b>No</b>	GO to <a href="#">F9</a>
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## F9 CHECK FOR A VACUUM LEAK

### NOTE

A smoke machine may be used to identify the location of a vacuum leak.

- Inspect the vacuum hoses for leaks and check the engine for a vacuum leak.

**Is a vacuum leak present?**

<b>Yes</b>	REPAIR as necessary.
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<b>No</b>	GO to <a href="#">F10</a>
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## F10 CHECK THE AIR INTAKE SYSTEM

### NOTE

The turbocharger bypass valve closes approximately 30 seconds after cold start up creating a pop noise. This is a normal operating condition.

### NOTE

<b>Yes</b>	REPAIR as necessary.
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<b>No</b>	GO to <a href="#">F13</a>
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## F13 CHECK THE FUEL SYSTEM

### NOTE

The fuel pump module turns on before the engine starts to prime the fuel system. A whine or hum may be heard when unlocking the vehicle or opening the door with the engine off. This is a normal operating condition.

- Inspect the fuel injection system. REFER to the Diagnosis and Testing procedures in the 303-04 and 310-01 section for the engine being diagnosed. Refer to the appropriate section in Group 303 for the procedure.

### Is any concern discovered with the fuel injection system?

<b>Yes</b>	REPAIR as necessary.
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<b>No</b>	GO to <a href="#">F14</a>
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## F14 CHECK THE STARTER MOTOR

- Inspect the starter motor for damage and correct installation. REFER to the Diagnosis and Testing procedure in the 303-06 section for the engine being diagnosed. Refer to the appropriate section in Group 303 for the procedure.

### Is any concern discovered with the starter motor?

<b>Yes</b>	REPAIR as necessary.
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<b>No</b>	GO to <a href="#">F15</a>
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## F18 CHECK ENGINE OIL PRESSURE

- Check the engine oil pressure.

REFER to: [Oil Pressure Test - Flex Fuel – Ethanol/Full Hybrid Electric Vehicle \(FHEV\)/Gasoline](#)(303-00 Engine System - General Information, General Procedures).

Compare the engine oil pressure gauge to the engine oil pressure specifications in the 303-01 specifications procedure of the engine being diagnosed. Refer to the appropriate section in Group 303 for the procedure.

### Is the engine oil pressure within specification?

<b>Yes</b>	GO to <a href="#">F19</a>
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<b>No</b>	<a href="#">GO to Pinpoint Test E</a>
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## F19 IDENTIFY THE LOCATION OF THE ENGINE NOISE

- Using EngineEAR/ChassisEAR, stethoscope and accelerometers along with the VCMM (Vehicle Communication and Measurement Module), locate the engine noise.

REFER to: [Engine Noise Identification and Location](#)(303-00 Engine System - General Information, General Procedures).

### Is the noise coming from the engine?

<b>Yes</b>	If the noise is coming from the rear of the engine GO to <a href="#">F20</a> If the noise is coming from the front of the engine, GO to <a href="#">F21</a> If the noise is coming from the upper end of the engine, GO to <a href="#">F22</a> If the noise is coming from the lower end of the engine, GO to <a href="#">F25</a>
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<b>No</b>	The condition is not present at this time.
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## F20 CHECK THE FLEXPLATE OR FLYWHEEL AND CLUTCH

- If equipped, remove the torque converter nut/bolt access plug. If equipped, remove the inspection cover. If needed, remove the starter motor. Check if the torque converter nuts or bolts are loose. Visually inspect the flexplate or flywheel and clutch for damage. Using an assistant, rotate the crankshaft pulley by hand while inspecting the flexplate or flywheel and clutch and listening for unusual noises coming from between the engine and transmission. Check to be sure the flexplate or flywheel

- Perform the valve train analysis.

REFER to: [Valve Train Analysis - Flex Fuel – Ethanol/Full Hybrid Electric Vehicle \(FHEV\)/Gasoline\(303-00 Engine System - General Information, General Procedures\)](#).

. Compare the camshaft lift to the specifications in the 303-01 section for the engine being diagnosed.

Refer to the appropriate section in Group 303for the procedure.

**Is the camshaft lift and valve clearance within specifications?**

<b>Yes</b>	GO to <a href="#">F24</a>
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<b>No</b>	ADJUST the valve clearance. If necessary, INSTALL new camshafts, camshaft roller followers or valve tappets.
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**F24 CHECK THE CYLINDER HEAD AND VALVES**

- Remove the cylinder head(s). Remove the valves from the cylinder heads and inspect the valves and valve guides for excessive wear or damage.

REFER to: [Valve Stem Diameter\(303-00 Engine System - General Information, General Procedures\)](#).

REFER to: [Valve Guide Inner Diameter\(303-00 Engine System - General Information, General Procedures\)](#).

Compare the measurement to the valve stem-to-guide clearance specification in 303-01 specifications for the engine being diagnosed. Refer to the appropriate section in Group 303for the procedure.

**Are the valve clearances within specifications?**

<b>Yes</b>	GO to <a href="#">F29</a>
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<b>No</b>	INSTALL new cylinder head(s) and valves.
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**F25 CHECK THE BALANCE SHAFTS FOR DAMAGE OR EXCESSIVE WEAR**

- If equipped, remove the balance shaft assembly. Inspect the balance shaft assembly for excessive wear or damage. Check the bearing surfaces for excessive wear or damage.

**Is damage or excessive wear found on the balance shaft assembly or the bearings?**

<b>Yes</b>	If debris from the balance shaft or bearings appear to have entered the engine oil, GO to <a href="#">F26</a> INSTALL a new balance shaft assembly.
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- Remove the crankshaft main bearing caps and check the bearings for signs of excessive wear or damage. Check the crankshaft main bearing clearance.  
REFER to: [Crankshaft Main Bearing Journal Clearance](#)(303-00 Engine System - General Information, General Procedures).  
Compare the crankshaft main bearing journal clearance to the crankshaft main bearing journal clearance specification in the specifications procedure for the 303-01 section of the engine being diagnosed. Refer to the appropriate section in Group 303for the procedure.

**Are the crankshaft main bearing journal clearances within specifications?**

<b>Yes</b>	GO to <a href="#">F29</a>
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<b>No</b>	INSTALL a new long block.
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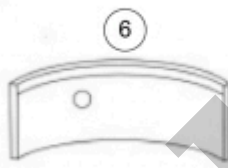
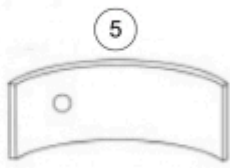
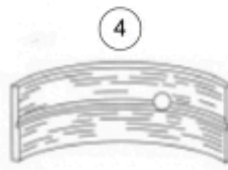
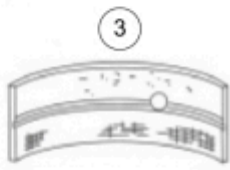
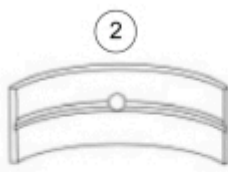
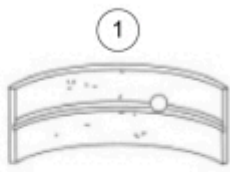
**F29 CHECK THE PISTON TO CYLINDER WALL CLEARANCE**

- Remove the engine. Remove the piston and connecting rod assemblies from the engine. Inspect the pistons, piston rings and cylinder walls for signs of piston slap. Inspect the pistons.  
REFER to: [Piston Inspection](#)(303-00 Engine System - General Information, General Procedures).  
Check the piston ring end gap. REFER to: [Piston Ring End Gap](#)(303-00 Engine System - General Information, General Procedures).  
Measure the cylinder bore taper. REFER to: [Cylinder Bore Taper](#)(303-00 Engine System - General Information, General Procedures).  
. Measure the piston diameter. REFER to: [Piston Diameter](#)(303-00 Engine System - General Information, General Procedures).  
Calculate the piston-to-cylinder bore clearance and compare the specification to the specification procedure in the 303-01 section for the engine being diagnosed. Refer to the appropriate section in Group 303for the procedure.

**Is the piston-to-cylinder wall clearance within specification?**

<b>Yes</b>	INSTALL new piston rings.hone the cylinder walls.
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<b>No</b>	INSTALL a new short block.
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