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2017 Ford Transit-150 Service and Repair Manual

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No	INSTALL a new short block.

PINPOINT TEST B : LOSS OF COOLANT

Possible Sources

- Seal
- Coolant hose
- Engine oil cooler
- Coolant pump
- Radiator
- Heater core
- Engine front cover
- EGR (exhaust gas recirculation) cooler
- Head gasket
- Cylinder head
- Cylinder block

Visual Inspection and Pre-checks

- Check for engine coolant leaks around sealed areas, such as the coolant pump, intake manifold and cylinder heads.
- Check the coolant hoses and tubes for damage.
- Check the coolant hose and tube connections and make sure they are securely connected.

NOTE

A sweet odor accompanying white smoke is not considered normal and is indicative of coolant in the exhaust.

B1 CHECK FOR OBVIOUS SIGNS OF CONCERN

- Ignition OFF.
- Inspect the engine and cooling system for signs of coolant leaking externally. REFER to the Diagnosis and Testing procedure in the 303-03 section for the engine being diagnosed. Refer to the appropriate section in Group 303for the procedure.

Are any external coolant leaks detected?

Yes	REPAIR as necessary.

Yes	GO to B5

No	REPAIR as necessary.

B5 CHECK THE ENGINE FRONT COVER

- Remove the engine front cover. Refer to the 303-01 engine front cover procedure for the engine being diagnosed. Refer to the appropriate section in Group 303for the procedure.Check the front cover seals for damage and signs of coolant passing in to the engine oil.

Are the engine front cover seals or sealing surfaces damaged causing coolant to leak in to the engine oil?

Yes	Install new engine front cover seals or a new engine front cover. Refer to the 303-01 engine front cover procedure for the engine being diagnosed. Refer to the appropriate section in Group 303for the procedure.

No	GO to B6

B6 CHECK FOR COOLANT INTRUSION

- Remove the spark plugs. Refer the 303-07 section for the engine being diagnosed. Refer to the appropriate section in Group 303for the procedure. Inspect the spark plugs for signs of coolant intrusion.
  REFER to: Spark Plug Inspection(303-00 Engine System - General Information, General Procedures).
  Using a bore scope, inspect the cylinders and pistons for signs of coolant intrusion.

Do the spark plugs or cylinders show signs of coolant intrusion?

Yes	GO to B7

No	GO to B8

B7 CHECK THE EXHAUST GAS RECIRCULATION (EGR) COOLING SYSTEM

B9 CHECK THE ENGINE

- Remove the cylinder heads. Refer to the 303-01 cylinder head procedure(s) for the engine being diagnosed. Refer to the appropriate section in Group 303for the procedure. Inspect the head gasket(s) for signs of damage or failure. Inspect the cylinder block and cylinder head(s) for damage.
  REFER to: Cylinder Block Distortion(303-00 Engine System - General Information, General Procedures).
  and REFER to: Cylinder Head Distortion(303-00 Engine System - General Information, General Procedures).

Are the cylinder head gasket(s), cylinder head(s) or cylinder block damaged?

Yes	REPAIR as necessary.

No	Install a new long block.

PINPOINT TEST C : ENGINE EMITS SMOKE

Possible Sources

- Condensation build up in exhaust
- Air cleaner element
- Fuel injection system
- Coolant intrusion to combustion chamber
- Excessive engine oil consumption

NOTE

Black soot near the exhaust tailpipe area is a normal condition created from rich air/fuel mixture under low load conditions.

NOTE

The higher the ambient temperature, the less likely water vapor is seen exiting the tailpipe during engine startup and engine warm-up. The colder the ambient temperature, the more likely water vapor is seen exiting the exhaust tailpipe during engine startup and engine warm-up. This is a normal operating condition.

	blue or gray smoke concern, GO to Pinpoint Test A

C3 CHECK THE AIR CLEANER ELEMENT

- Check the air cleaner element.

Is the air cleaner element relatively clean and free of debris?

Yes	GO to C4

No	INSTALL a new air cleaner element.

C4 CHECK THE FUEL SYSTEM

- Check the fuel system for normal operation. REFER to the Diagnosis and Testing procedures in 303-04 Fuel Charging and Controls for the engine being diagnosed. Refer to the appropriate section in Group 303for the procedure.

Is the fuel system operating correctly?

Yes	The concern is not currently present or the fuel system is not the cause of the concern. Verify the customer concern and the characteristics of the concern.

No	REPAIR as necessary.

PINPOINT TEST D : LOSS OF POWER, POOR IDLING, RUNS ROUGH

Possible Sources

- Accessory drive concern
- Air intake system concern
- Brake system concern
- Cooling system concern
- Exhaust system concern
- Fuel system concern
- Ignition system concern

D2 CHECK FOR PREVIOUS SIMULTANEOUS BRAKE PEDAL AND ACCELERATOR PEDAL OPERATION

- Check the following Parameter Identifications (PIDs) for simultaneous brake pedal and accelerator pedal operation:
  - Access the PCM (powertrain control module) and monitor the BRKOVR_ACTION (Number of Drive Cycles where Brake Override Accelerator Action Occurred) (Undefined / Not Used) PID (parameter identification)
  - Access the PCM (powertrain control module) and monitor the BRKOVRD_POSS (Number of Drive Cycles in which Brake Override Accelerator Action Possible) (Undefined / Not Used) PID (parameter identification)
  - Access the PCM (powertrain control module) and monitor the DIST_BRKOVRD (Distance Since Brake Override Accelerator Action occurred) (km) PID (parameter identification)

Is there an indication of both pedals being applied simultaneously?

Yes	ADVISE the vehicle owner simultaneous brake pedal and accelerator pedal operation activates the brake over accelerator feature.

No	GO to D3

D3 CHECK THE AIR CLEANER

- Inspect the air cleaner.

Is the air cleaner clogged?

Yes	REPLACE the air cleaner. Check the system for normal operation.

No	GO to D4

D4 CHECK THE AIR INTAKE SYSTEM

- Check the air intake system, air cleaner and CAC (charge air cooler) components, ducts, pipes and hoses. Check that all components are installed correctly and tight. Check that all components are aligned correctly. Check for damage that could cause an air-intake leak resulting in loss of boost. For additional information, refer to the 303-12 Intake Air Distribution and Filtering section for the engine being diagnosed. Refer to the appropriate section in Group 303for the procedure.

Does the air intake system have any leaks?

No	GO to D7

D7 CHECK THE EXHAUST SYSTEM

- Check the exhaust system for restrictions or damage. Refer to the 309-00 Exhaust System section for the engine being diagnosed. Refer to the appropriate section in Group 309for the procedure.

Is the exhaust system restricted or damaged?

Yes	Repair as necessary. Refer to the 309-00 Exhaust System section for the engine being diagnosed. Refer to the appropriate section in Group 309for the procedure.

No	GO to D8

D8 CHECK FOR OVERHEATING CONCERN

- Inspect the engine and cooling system for overheating concerns. Refer to the Diagnosis and Testing procedure in the 303-03 section for the engine being diagnosed. Refer to the appropriate section in Group 303for the procedure.

Is the engine overheating?

Yes	REPAIR as necessary.

No	GO to D9

D9 CHECK THE IGNITION SYSTEM

- Inspect the ignition system. Refer to the Diagnosis and Testing procedure in the 303-07 section for the engine being diagnosed. Refer to the appropriate section in Group 303for the procedure.

Is any concern found with the ignition system?

Yes	REPAIR as necessary.

D12 CHECK FUEL PRESSURE

- Check the fuel pressure. Refer to the fuel system pressure check procedure in the 310-00 section for the engine being diagnosed. Refer to the appropriate section in Group 310for the procedure. Compare the fuel pressure to the specification listed in the 310-00 specification procedure.
- Draw a sample of the fuel. Check the fuel for contamination.

Is the fuel pressure within specifications and free of contamination?

Yes	GO to D13
No	REPAIR as necessary or DRAIN the fuel and fill the fuel tank with good fuel.

D13 CHECK THE 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 303for the procedure.

Is the engine oil pressure within specification?

Yes	GO to D14
No	For a engine oil pressure concern, GO to Pinpoint Test E

D14 CHECK THE TURBOCHARGER(S)

- Inspect the turbocharger(s) for damage that could cause loss of boost. REFER to the Diagnosis and Testing procedure in the 303-04 Turbocharge section for the engine being diagnosed. Refer to the appropriate section in Group 303for the procedure.

Are the turbocharger(s) damaged?

Yes	INSTALL a new turbocharger. REFER to the Removal and Installation procedure in the 303-04 turbocharger section for the engine being diagnosed. Refer to the appropriate section in Group 303for the procedure.

Yes	GO to D18

No	ADJUST the valve clearance. If necessary, INSTALL new camshafts, camshaft roller followers or valve tappets.

D18 CHECK THE CYLINDER HEAD GASKET

- Remove the cylinder heads. Refer to the 303-01 cylinder head procedure(s) for the engine being diagnosed. Refer to the appropriate section in Group 303for the procedure. Inspect the head gasket(s) for signs of damage or failure. Inspect the cylinder block and cylinder head(s) for damage.
  REFER to: Cylinder Block Distortion(303-00 Engine System - General Information, General Procedures). and REFER to: Cylinder Head Distortion(303-00 Engine System - General Information, General Procedures).

Are the cylinder head gasket(s), cylinder head(s) or cylinder block head damaged?

Yes	REPAIR as necessary.

No	GO to D19

D19 CHECK THE VALVE STEM SEALS

- Remove the cylinder head(s). Remove the valves from the cylinder heads and inspect the valve stem seals for damage, excessive wear and proper sealing.

Are the valve stem seals damaged?

Yes	Install new valve stem seals. REFER to the Disassembly and Assembly of Subassemblies - Cylinder Head procedure for the engine being diagnosed. Refer to the appropriate section in Group 303for the procedure.

No	GO to D20

D20 CHECK THE VALVE TRAIN

- Engine oil pressure control solenoid
- VCT (variable camshaft timing) unit(s)
- Engine oil pick-up tube plugged
- Excessive connecting rod bearing clearance
- Excessive crankshaft main bearing clearance

Visual Inspection and Pre-checks

- Verify the engine oil level is within specification.

E1 CHECK THE PCM DIAGNOSTIC TROUBLE CODES (DTC)

NOTE

This step is only necessary for symptom based diagnostics. For DTC based diagnostics, proceed to the next step.

- Ignition ON.
- Carry out the PCM KOEO and KOER self-tests.

Are any Diagnostic Trouble Codes (DTCs) present?

Yes	Refer to the Master DTC Chart to diagnose the DTC (diagnostic trouble code) present.
No	GO to E2

E2 CHECK THE VEHICLE SERVICE HISTORY

- Check the vehicle service history and make sure the correct oil used is documented.

Is the correct oil used based on the vehicle service history?

Yes	GO to E3
No	CHANGE the engine oil and filter using the correct oil specification. Refer to the Specifications in the 303-01 section for the engine being diagnosed. Refer to the appropriate section in Group 303for the procedure.

E3 CHECK THE ENGINE OIL FILTER HOUSING AND SEAL