

SERVICE MANUAL

LOADALL (ROUGH TERRAIN
VARIABLE REACH TRUCK)
**506-36, 507-42, 509-42, 510-42,
510-56, 512-56, 514-56, 516-42**

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This manual contains original instructions, verified by the manufacturer (or their authorized representative).

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Foreword

The Operator's Manual


You and others can be killed or seriously injured if you operate or maintain the machine without first studying the Operator's Manual. You must understand and follow the instructions in the Operator's Manual. If you do not understand anything, ask your employer or JCB dealer to explain it.

Do not operate the machine without an Operator's Manual, or if there is anything on the machine you do not understand.

Treat the Operator's Manual as part of the machine. Keep it clean and in good condition. Replace the Operator's Manual immediately if it is lost, damaged or becomes unreadable.

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00 - General

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Introduction

A crankshaft pulley is used to drive a FEAD (Front End Accessory Drive) belt. The belt drives the coolant pump. Depending on the machine application, the belt is configured to drive engine mounted accessories, such as the alternator, cooling fan and air conditioning compressor.

Some applications have a second pulley on the crankshaft which drives a dedicated fan belt. The belt drives an engine mounted cooling fan.

Health and Safety

Turning the Engine

Do not try to turn the engine by pulling the fan or fan belt. This could cause injury or premature component failure.

WARNING! The engine has exposed rotating parts. Switch off the engine before working in the engine compartment. Do not use the machine with the engine cover open.

Notice: A drive belt that is loose can cause damage to itself and/or other engine parts.

Component Identification

Figure 230. A - With air conditioning compressor, no cooling fan

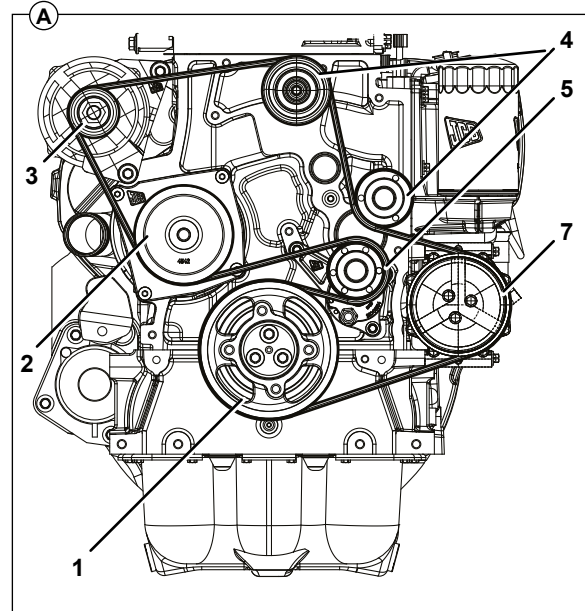
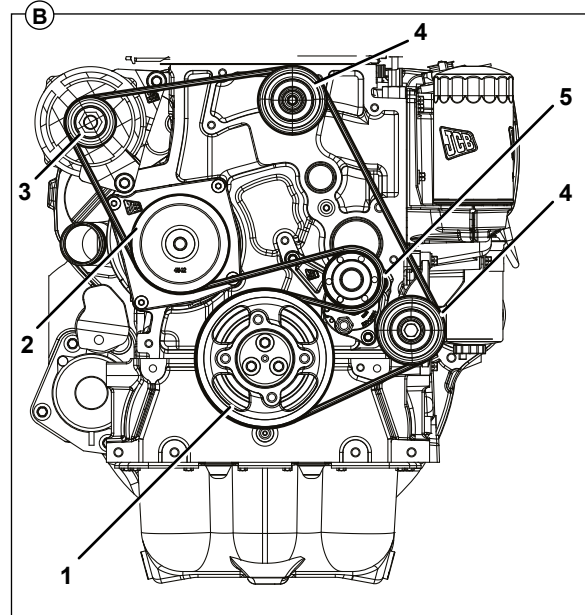


Figure 231. B - Without air conditioning compressor, no cooling fan



- 1 Crankshaft drive pulley
- 2 Coolant pump drive pulley
- 3 Alternator drive pulley
- 4 Idler pulley
- 5 Tensioner pulley
- 7 Air conditioning compressor drive pulley

Figure 232. C - With air conditioning compressor, cooling fan pulley installed

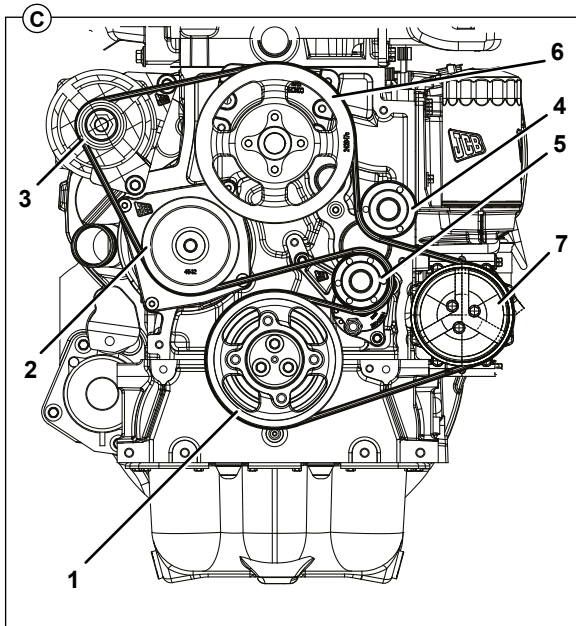
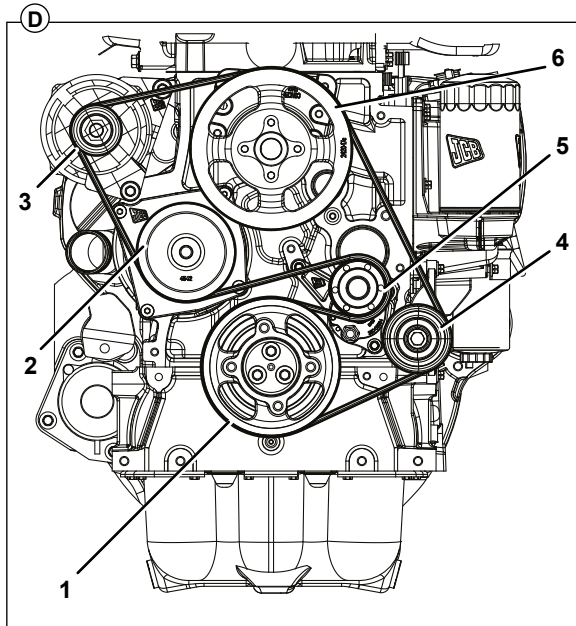


Figure 233. D - Without air conditioning compressor, cooling fan pulley installed



- 1 Crankshaft drive pulley
- 2 Coolant pump drive pulley
- 3 Alternator drive pulley
- 4 Idler pulley
- 5 Tensioner pulley
- 6 Cooling fan drive pulley
- 7 Air conditioning compressor drive pulley



03 - Drive Belt

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Introduction

The crankshaft pulley is used to drive the coolant pump via a FEAD (Front End Accessory Drive) belt. In addition to the coolant pump the drive belt can also be configured to drive the engine mounted accessories.

The belt is maintained at a constant tension by a spring loaded tensioner. To achieve the necessary belt/pulley contact area the belt is routed around idler wheels as required. The configuration varies depending on the accessories installed.

Health and Safety

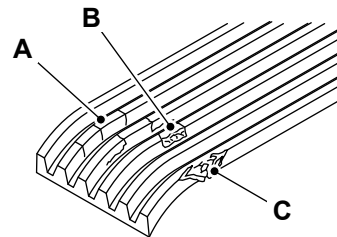
▲ **Notice:** A drive belt that is loose can cause damage to itself and/or other engine parts.

Check (Condition)

At the recommended service interval, visually inspect the drive belt for damage.

1. Make the machine safe.
[Refer to: PIL 01-03.](#)
2. Stop the engine and let it cool down.
3. Renew the drive belt if it has cracks or if it is frayed or has pieces of material missing.

Figure 234.



- A** Crack in belt
- B** Missing piece of belt
- C** Frayed belt

Adjust

Adjustment is not possible with this drive belt. A spring loaded tensioning unit ensures that the FEAD (Front End Accessory Drive) belt is kept at the correct tension.

Remove and Install

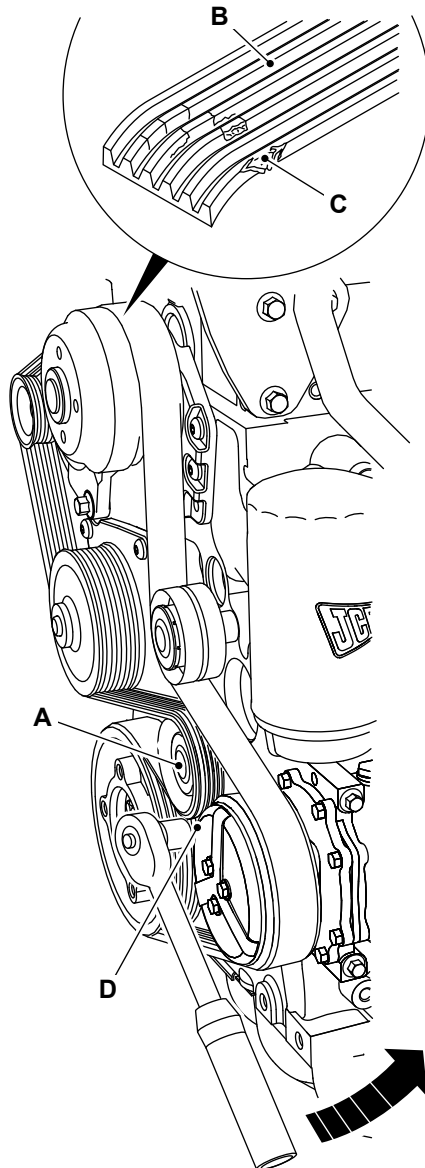
Remove

1. Make the machine safe. Refer to (PIL 01-03).
2. Stop the engine and let it cool down.
3. Use a socket of the specified size to locate on to the hexagon spigot nut, carefully rotate the tensioner against the spring force in the direction shown. Do not use excessive force or the tensioner will be damaged.

Dimension: 16mm

4. Keep holding the tensioner against the spring force and lift the belt off the drive tensioner pulley.
5. Slowly release the spring force by rotating the tensioner unit in the opposite direction.

Figure 235.



- A** Spring loaded tensioner
- B** Drive belt
- C** Example of frayed drive belt (refer to Check Condition)
- D** Spigot nut

Install

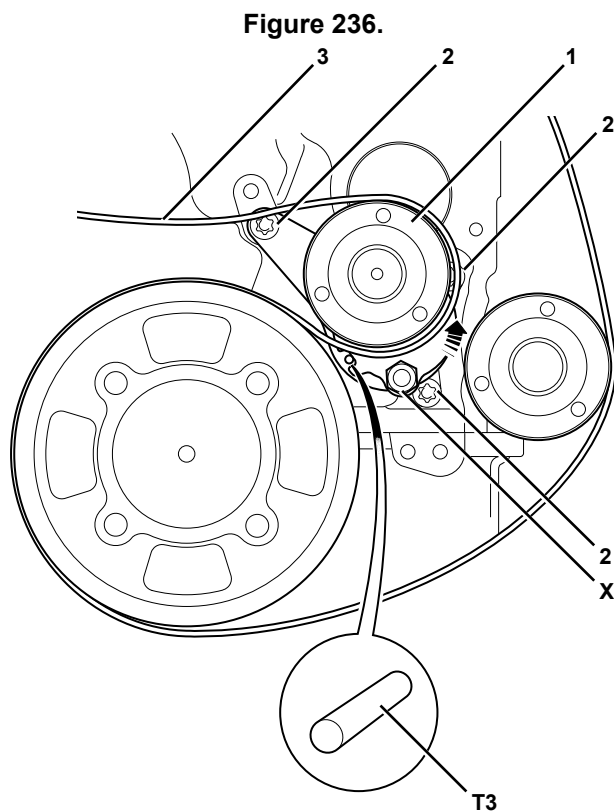
1. The installation procedure is the opposite of the removal procedure. Additionally do the following step.
2. Before you install the new belt, check that the tensioner roller and the fan pulley rotate smoothly and that there is no play in the bearings.

21 - Tensioner

Remove and Install

Before Removal

1. Make the machine safe. Refer to (PIL 01-03).
2. Make sure that the engine is safe to work on. If the engine has been running, let it cool before you start the service work.
3. Get access to the engine.
4. Remove the drive belt, refer to (PIL 15-18).



- 1 Drive belt tensioner pulley
- 2 Fixing bolts (x3)
- 3 Drive belt
- T3 Locking pin
- X Spigot nut

Remove

The drive belt tensioner is a non-serviceable item. If the drive belt tensioner or the idler wheel is faulty or damaged it must be renewed as a complete assembly.

1. To remove the tensioner assembly, remove the bolts and lift the tensioner pulley from the cylinder block.

Install

1. The installation procedure is the opposite of the removal procedure. Additionally do the following steps.
2. Tighten the bolts to the correct torque value.
3. Install the drive belt, refer to (PIL 15-18).
4. Make sure that the drive belt is under tension and the locking pin is removed before starting the engine. Refer to Drive Belt - Adjust (PIL 15-18).

Table 87. Torque Values

Item	Nm
2	24

Health and Safety

Oil

Oil is toxic. If you swallow any oil, do not induce vomiting, seek medical advice. Used engine oil contains harmful contaminants which can cause skin cancer. Do not handle used engine oil more than necessary. Always use barrier cream or wear gloves to prevent skin contact. Wash skin contaminated with oil thoroughly in warm soapy water. Do not use petrol, diesel fuel or paraffin to clean your skin.

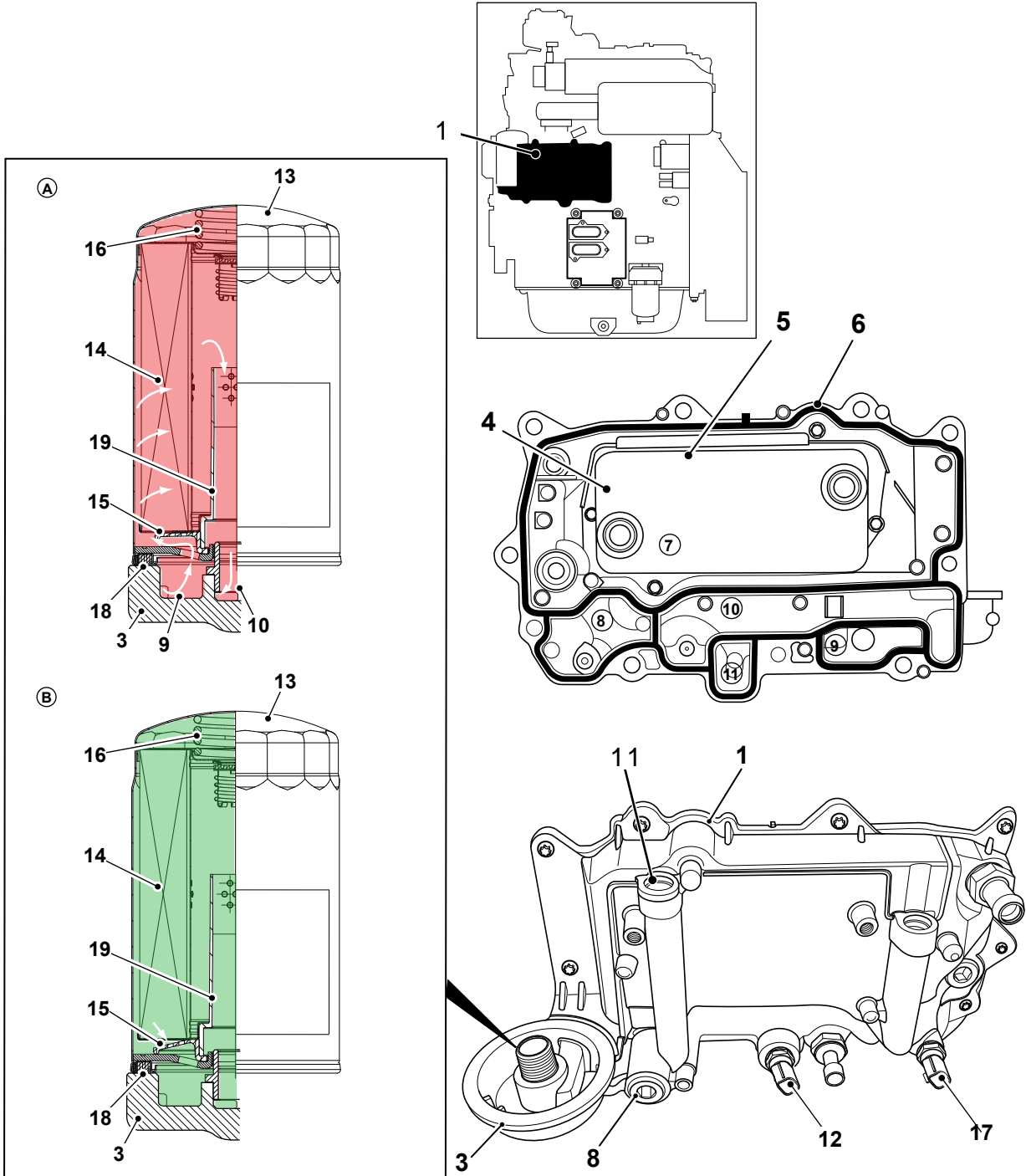
CAUTION! *It is illegal to pollute drains, sewers or the ground. Clean up all spilt fluids and/or lubricants. Used fluids and/or lubricants, filters and contaminated materials must be disposed of in accordance with local regulations. Use authorised waste disposal sites.*

CAUTION! *Oil will gush from the hole when the drain plug is removed. Keep to one side when you remove the plug.*

CAUTION! *The oil filter canister will contain some oil which could spill out when you remove the canister.*

Component Identification

Figure 237.



- 1 Oil cooler and filter housing
- 3 Oil filter head
- 5 Oil cooler matrix
- 7 Coolant gallery
- 9 Oil gallery - from cooler to filter head

- 2 Oil filler cap (not shown)
- 4 Oil gallery - from pump to cooler
- 6 Sealing gasket - housing to crankcase
- 8 Oil filter drain down plug
- 10 Oil gallery - from filter head to main oil gallery

- | | | | |
|-----------|-----------------------------------|-----------|-----------------------------------|
| 11 | Oil filler port | 12 | Oil pressure switch |
| 13 | Oil filter | 14 | Filter element |
| 15 | Anti-drain seal | 16 | Spring |
| 17 | Oil Temperature Sensor | 18 | O-ring |
| 19 | Anti-drain pipe | A | Oil filter state - engine running |
| B | Oil filter state - engine stopped | | |

Operation

At Engine Running

The oil pump delivers oil at pressure to the oil filter via a port. The anti-drain seal is forced off its seat and oil flows through a large area paper element. Filtered oil enters the inner part filter before leaving the filter head via a port.

At Engine Stopped

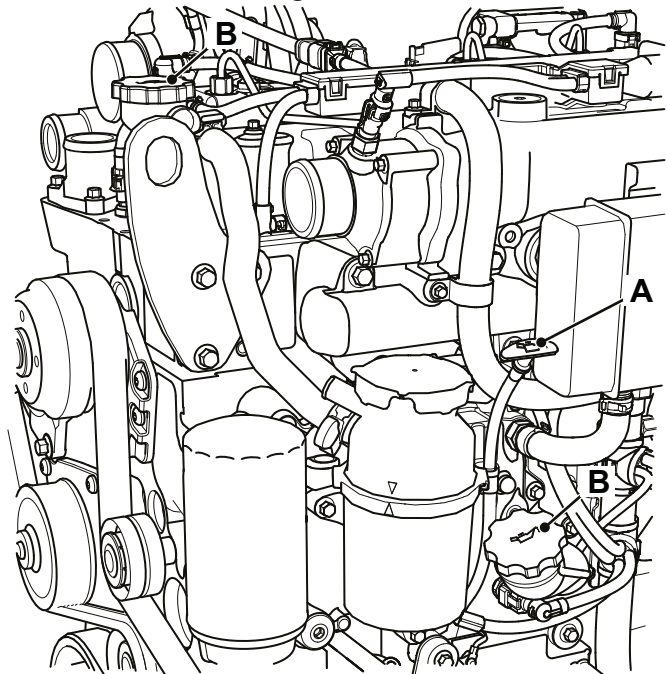
With the engine stopped oil pressure in the galleries and filter decays. The anti-drain seal falls on its seat and oil is prevented from draining from the filter assembly. The anti-drain pipe prevents approximately half the filters oil capacity from draining. These features help protect the engine from oil starvation on start up.

Check (Level)

Engine oil and oil filter replacement must be completed in accordance with the service schedules. Failure to replace the oil and filter at the recommended interval could cause serious engine failure.

1. Make the machine safe, refer to (PIL 01-03).
2. Get access to the engine.
3. Check that the oil level is between the two marks on the dipstick.
4. If necessary, add recommended oil through one of the filler points.

Figure 238.



- A** Dipstick
- B** Oil filler point

Remove and Install

Special Tools

Description	Part No.	Qty.
Oil Filter Removal Tool	892/00292	1
Data Link Adaptor (DLA) Kit	892/01174	1

Drain the oil when the engine is warm as contaminants held in suspension will then be drained with the oil.

CAUTION! Oil will gush from the hole when the drain plug is removed. Keep to one side when you remove the plug.

1. Place a container of suitable size beneath the drain plug.
2. Remove the oil sump drain plug and 'O' ring. Let the oil drain out, then clean and install the drain plug with a new 'O' ring. Tighten the plug to the correct torque value.
3. Loosen and remove the filter housing drain plug. Let the oil fully drain. Install the plug. Tighten the plug to the correct torque value.
4. Unscrew the filter canister, use special tool if necessary.
[Special Tool: Oil Filter Removal Tool \(Qty.: 1\)](#)
5. Clean the seal face of the filter head.
6. Smear the seal on the new filter canister with clean engine oil.
7. Screw in the new filter canister (hand tight only).
8. Through one of the filler points, fill the engine with the recommended oil to the MAX mark on the dipstick. Wipe off any spilt oil, install the filler cap and make sure it is secure.

9. If the engine has a dead crank feature, carry out the following procedure.
 - 9.1. Turn the ignition key to the on position.
 - 9.2. Turn the ignition key to the off position.
 - 9.3. Repeat steps 9.1 and 9.2 5 times.
 - 9.4. Wait for the ECU (Electronic Control Unit) to shutdown.
 Duration: 30s
 - 9.5. Turn the ignition key to the start position. The engine will crank for an extended time period before starting.
 Duration: 10s
10. If the engine does not have a dead crank feature, carry out the following procedure.
 - 10.1. Connect a laptop to the engine with a data link adaptor and open Servicemaster.
[Special Tool: Data Link Adaptor \(DLA\) Kit \(Qty.: 1\)](#)
 - 10.2. Perform the IMV (Inlet Metering Valve) Override test.
 - 10.3. The IMV Override test will allow the engine to be cranked for a set time period without starting allowing sufficient time to prime the oil pressure.
 Duration: 10s
11. Operate the engine at idle, make sure that the oil pressure low warning light is extinguished immediately after the engine starts. If it does not extinguish, stop the engine and investigate the cause.
12. Check for oil leakage. When the oil has cooled, check the oil level again, and if necessary top up with clean engine oil.

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