SERVICE MANUAL

LOADER
419S

EN - 9813/6500
ISSUE 1 - 02/2017

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

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.

Contents

01 - Machine

03 - Attachments, Couplings and Load Handling

06 - Body and Framework

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Drain and Fill

Refer to Engine, Oil Filter, (PIL 15-21-00).

Clean

⚠ **Notice:** Clean the engine before you start engine maintenance. Obey the correct procedures. Contamination of the fuel system will cause damage and possible failure of the engine.

Notice: The engine and other components could be damaged by high pressure washing systems. Special precautions must be taken if the machine is to be washed using a high pressure system.

Make sure that the alternator, starter motor and any other electrical components are shielded and not directly cleaned by the high pressure cleaning system. Do not aim the water jet directly at bearings, oil seals or the engine air induction system.

Before carrying out any service procedures that require components to be removed, the engine must be properly cleaned.

Cleaning must be carried out either in the area of components to be removed or, in the case of major work, or work on the fuel system, the whole engine and surrounding machine must be cleaned.

Stop the engine and allow it to cool for at least one hour. DO NOT attempt to clean any part of the engine while it is running.

1. Make sure that the electrical system is isolated.
2. Make sure that all electrical connectors are correctly coupled. If connectors are open fit the correct caps or seal with water proof tape.
3. Cover the alternator with a plastic bag to prevent water ingress.
4. Seal the engine air intake, exhaust and breather system.
5. Make sure that the oil filler caps and dipstick are correctly installed.
6. Use a low pressure water jet and soft bristle brush to soak off caked mud or dirt.
7. Apply an approved cleaning and degreasing agent with a brush. Obey the manufacturers instructions.
8. Use a pressure washer to remove the soft dirt and oil. Important: DO NOT aim the water jet directly at oil seals or electrical and electronic components such as ECU (Electronic Control Unit)'s, alternator or fuel injectors. DO NOT place the jet nozzle closer than 600mm (24 in) to any part of the engine or after treatment system including exhaust sensor ECU (if installed).

9. When the pressure washing is complete move the machine away from the wash area, or alternatively, clean away the material washed from the machine.
10. Before working on specific areas of the engine use a compressed air jet to dry off any moisture. When the area is dry use a soft clean brush to remove any sand or grit particles that remain.
11. When removing components be aware of any dirt or debris that may be exposed. Cover any open ports and clean away the deposits before proceeding

Additional cleaning must be carried out prior to working on the high pressure fuel system, refer to: Fuel System - Clean (PIL 18-00).

Remove and Install

Air Conditioning Maintenance

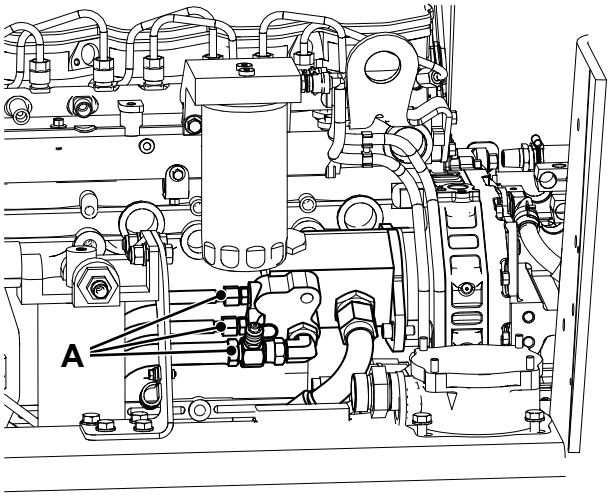
The air conditioning system is a closed loop system and contains pressurised refrigerant. No part of the system should be disconnected until the system has been discharged by a refrigeration engineer or a suitably trained person. You can be severely frostbitten or injured by escaping refrigerant.

Remove

Remove the Engine, Transmission and Pump

1. Make the machine safe. Refer to (PIL 01-03).
2. Install the articulation strut. Refer to (PIL 06-27).
3. Disconnect the battery. Refer to (PIL 33-03).
4. Remove the operator station. Refer to (PIL 09-00).
5. Remove the rear bodywork. Refer to (PIL 06-00).
6. Drain the cooling system. Refer to (PIL 21-00).
7. Remove the propshafts. Refer to (PIL 27-47).
8. Remove the centre undershield. Refer to (PIL 06-06).
9. Remove the SCR (Selective Catalytic Reduction) unit. Refer to (PIL 18-30).
10. Disconnect the electrical connector from the gear pump. Refer to (PIL 30-11).
11. Disconnect the hydraulic hoses from the gear pump. Refer to (PIL 30-11).

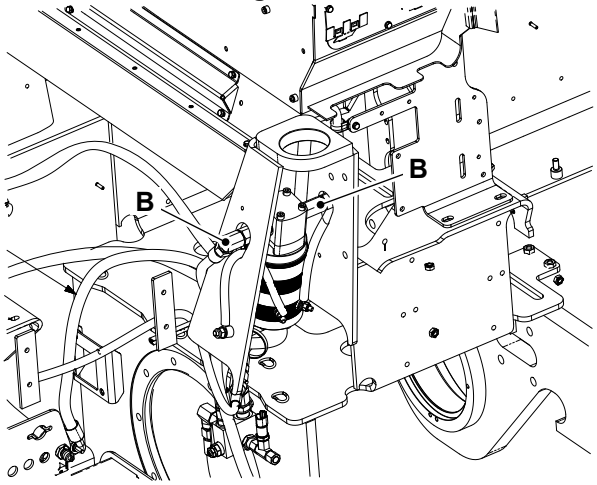
Figure 154.



A Hydraulic hoses

12. Disconnect the hoses from the emergency steer pump.

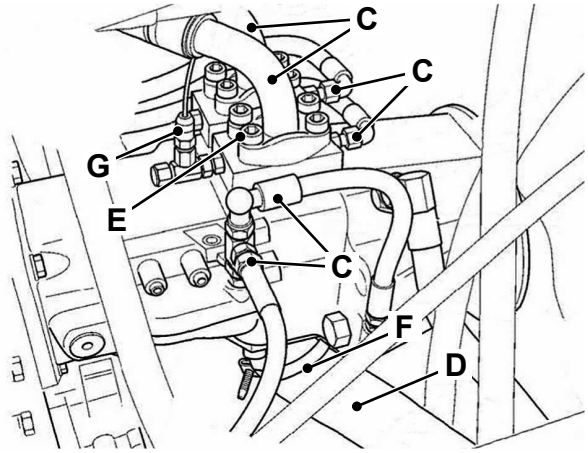
Figure 155.



B Hydraulic hoses

13. Loosen the clip.
14. Disconnect the suction hose from the main hydraulic pump.
15. Remove the bolts 1.
16. Disconnect the hydraulic hoses from the main hydraulic pump.
17. Disconnect the electrical connector from the main hydraulic pump.

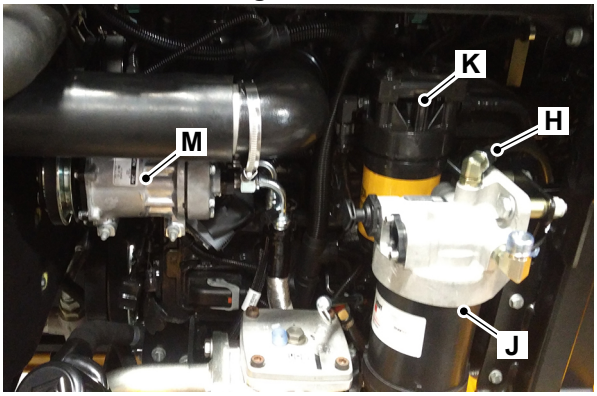
Figure 156.



C Hydraulic hoses
D Suction hose
E Bolts 1
F Clip
G Electrical connector

18. Disconnect the fuel hose from the fuel filter assembly.
19. Remove the bolts 2 (x2).
20. Remove the fuel filter assembly from the machine.
21. Remove the water separator from the engine.

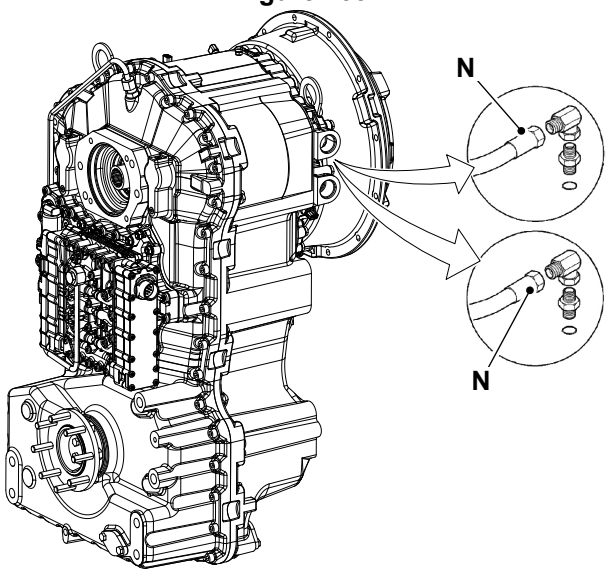
Figure 157.



H Fuel hoses
J Fuel filter assembly
K Water separator
M HVAC (Heating Ventilation Air Conditioning) compressor

22. Disconnect the HVAC hoses from the HVAC compressor.
23. Disconnect the cooler hoses from the transmission.

Figure 158.

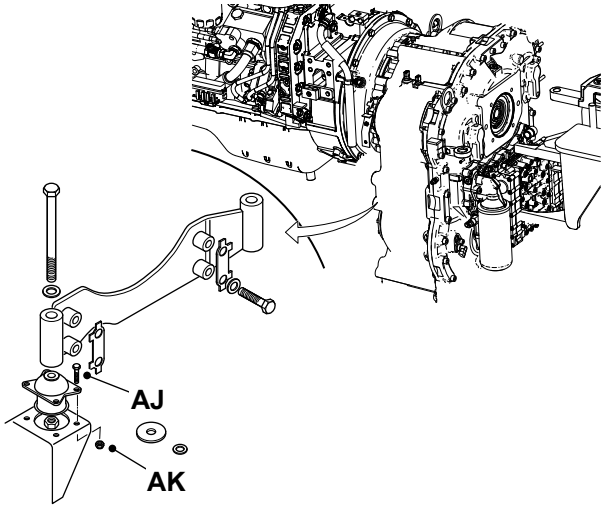


N Cooler hoses

24. Disconnect the electrical cables from the starter motor.
25. Disconnect the electrical connector from the oil level sensor.
26. Disconnect the engine earth cable from the chassis.

27. Support the engine and transmission with suitable lifting equipment.
28. Remove the engine from the front engine mount. Refer to (PIL 15-63).
29. Remove the bolts 5 (x8) and nuts 3 (x8) from the transmission mount.

Figure 159.



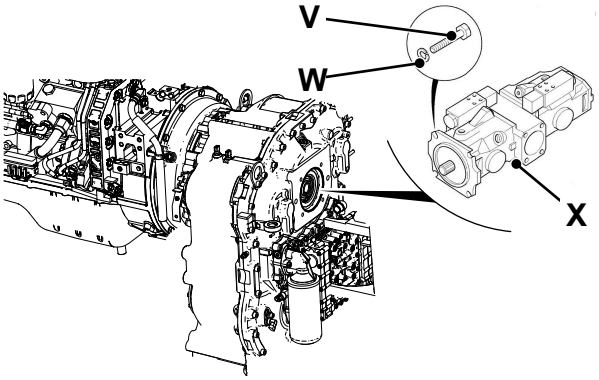
AJ Bolt 5
AK Nut 3

30. Carefully lift the engine and transmission assembly from the machine.
31. Make sure that all the connectors are released.

Separate the Transmission, Engine and Pump Assembly

1. Mount the engine, transmission and pump assembly on a suitable stand.
2. Support the pump.
3. Remove the mounting bolts 6 (x4) and washers (x4).
4. Remove the pump from the transmission system.

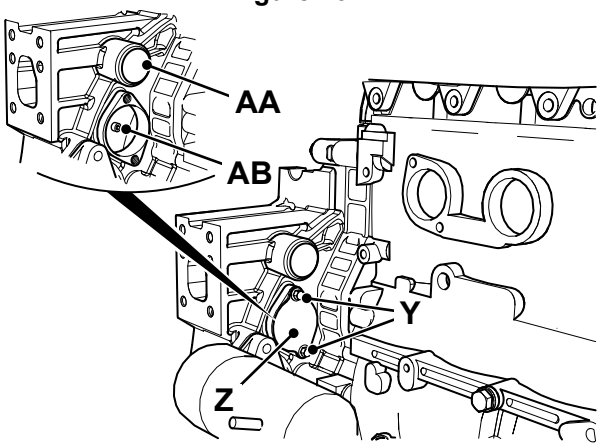
Figure 160.



V Bolt 6 (x4)
W Washer (x4)
X Pump

5. Remove the bolts 7, cover plate and plastic cover.
6. Use a suitable tool to turn the flywheel to get access to the components.
7. Remove the flywheel to the flexible coupling bolts (x4) through the cut-out in the case.

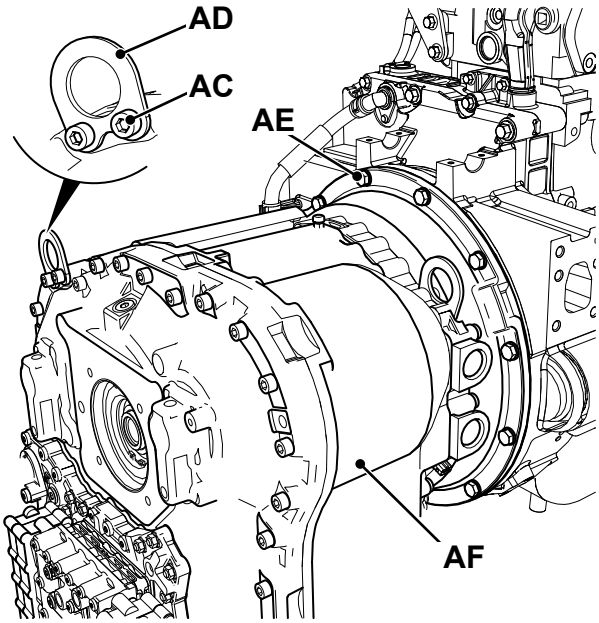
Figure 161.



Y Bolts 7
Z Cover plate
AA Plastic cover
AB Flexible coupling bolts (x4)

8. Remove the bolts 8.
9. Connect the lifting eye to the transmission case.
10. Tighten the bolts 8 to the correct torque value.
11. Connect suitable lifting equipment to the lifting eyes (x3).
12. Support the weight of the transmission.
13. Remove the bolts 9 (x12).
14. Remove the transmission from the engine.

Figure 162.



AC Bolts 8
AD Lifting eye (x3)
AE Bolts 9 (x12)
AF Transmission

Install

1. The installation procedure is the opposite of the removal procedure. Additionally do the following step.
2. Tighten the bolts to the correct torque value.

Table 68. Torque Values

Item	Nm
AB	44
AE	43

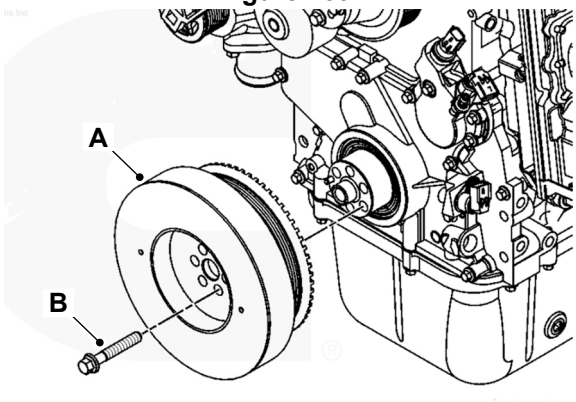
27 - Damper

Remove and Install

Remove

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, make sure the engine has cooled sufficiently before you start the removal.
3. Remove the engine drive belt. Refer to (PIL 15-18).
4. Support the damper.
5. Remove the screws (x6).
6. Remove the damper from the engine.

Figure 163.



A Damper
B Screws (x6)

Install

1. The installation procedure is the opposite of the removal procedure. Additionally do the following step.
2. Tighten the screws to the correct torque value.
   2.1. Use the torque and angle tightening procedure. Refer to (PIL 72-00).
   2.2. Make sure that you follow the correct tightening sequence. Refer to Figure 164.

Figure 164.

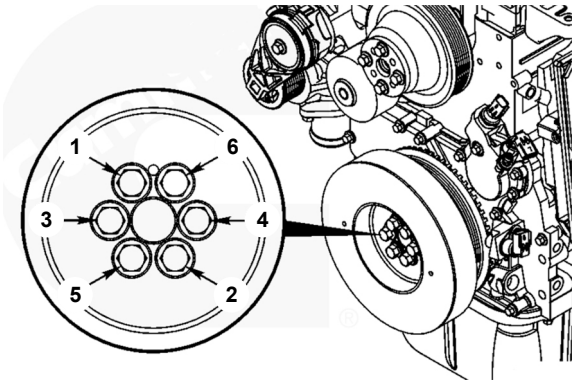


Table 69. Torque Values

Description	Torque Values
- first stage torque	50N·m
- second stage torque	90°

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

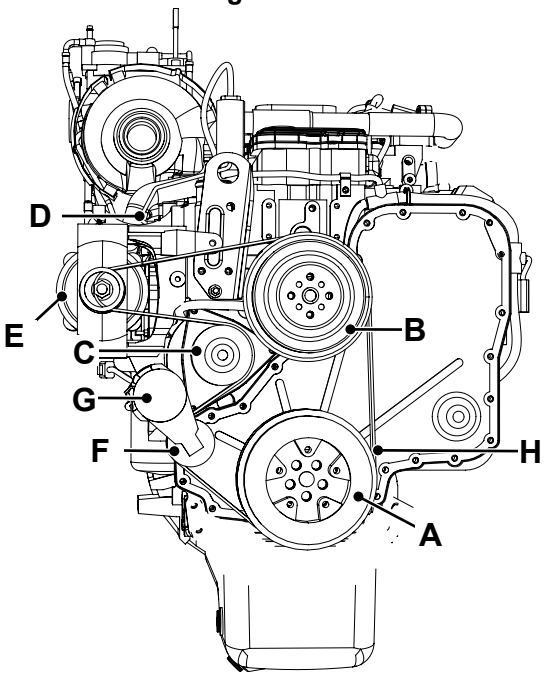
Do not try to turn the engine by pulling the fan or fan belt. This could cause injury or premature component failure.

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 165.



A Crankshaft pulley
B Fan pulley
C Water pump pulley
D Compressor installation location
E Alternator pulley
F Belt tensioner pulley
G Belt tensioner
H Vibration rubber damper

03 - Drive Belt

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Adjust 15-37
Remove and Install 15-37

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

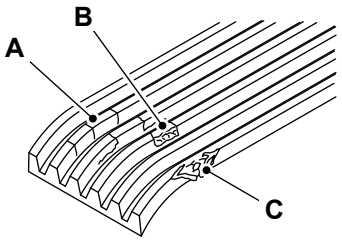
⚠ **Notice:** A drive belt that is loose can cause damage to itself and/or other engine parts.

Check (Condition)

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

1. Make the machine safe.
   Refer to: Safety (Page 01-1).
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 166.



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

There are a number of drive belt routes. This procedure does not include all of the routes. Do a diagram of the drive belt route before removal to help installation.

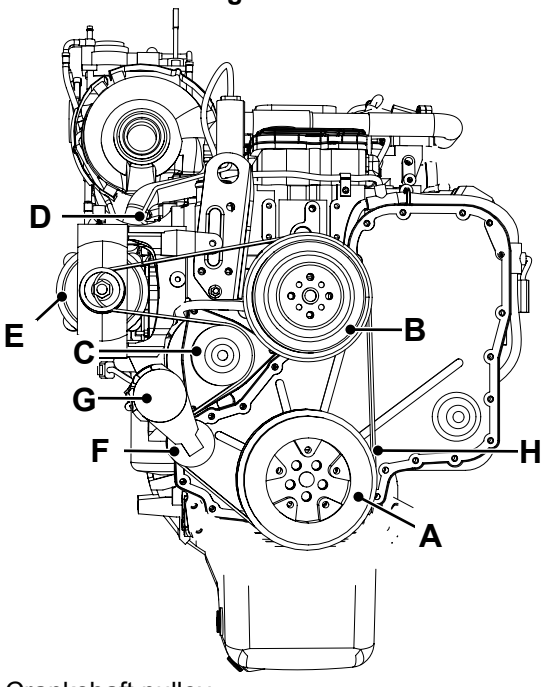
The belt tensioner is spring-loaded, it must be pivoted away from the drive belt. Do not pivot the belt tensioner in the wrong direction, this can cause damage.

Make a note that too much force in the opposite direction of wind-up or when the belt tensioner is wound-up to the positive-stop, can cause the tensioner arm to crack or break.

Remove

1. Make the machine safe. Refer to (PIL 01-03).
2. Isolate the battery. Refer to (PIL 33-03).
3. Open the engine compartment cover. Refer to (PIL 06-06).
4. Hold the tensioner against the spring force and lift the belt off the drive tensioner pulley.

Figure 167.



A Crankshaft pulley
B Fan pulley
C Water pump pulley
D Compressor installation location
E Alternator pulley
F Belt tensioner pulley
G Belt tensioner
H Vibration rubber damper

Install

1. Use the diagram to correctly route the new drive belt on the pulleys.
2. Pivot the belt tensioner in the direction of the spring tang.
3. Install the new drive belt. Put the drive belt over the water pump pulley last.
4. If it is difficult to install the drive belt, do as follows:
   - 4.1. Put the drive belt over the grooved pulleys first.
   - 4.2. Hold the belt tensioner up and slide the drive belt over the water pump pulley.
5. Slowly release the belt tensioner to apply tension to the drive belt.
6. Check the alignment of the drive belt with the belt tensioner and the other components.
7. Use the deflection method to measure the tension in the drive belt.
   - 7.1. Apply the specified force between the pulleys on the drive belt.

     Force: 110N
   - 7.2. If the deflection is more than the thickness of one drive belt per foot of pulley centre distance, adjust the drive belt tension.
   - 7.3. If there is too much movement of the drive belt, replace it.
8. Close the engine compartment cover. Refer to (PIL 06-06).
9. Run the engine and listen to hear if the drive belt squeals.
   - 9.1. Too much squeal indicates that the drive belt is slipping too much.
   - 9.2. Check the route of the drive belt to make sure it is correctly installed over each pulley.

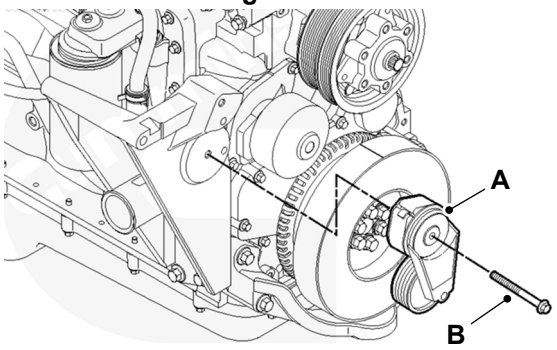
21 - Tensioner

Remove and Install

Remove

1. Make the machine safe. Refer to (PIL 01-03).
2. Open the engine compartment cover. Refer to (PIL 06-06).
3. Remove the engine drive belt. Refer to (PIL 15-18).
4. Remove the capscrew.
5. Remove the belt tensioner from the engine.
6. If necessary, remove the bracket.

Figure 168.



A Belt tensioner
B Capscrew

Install

1. The installation procedure is the opposite of the removal procedure. Additionally do the following step.
2. Tighten the capscrew to the correct torque value.

Table 70. Torque Values

Item	Nm
B	43

Our support email:

ebooklibonline@outlook.com