SERVICE MANUAL

DUMPER
1T-1 High Tip

EN - 9813/8850 - ISSUE 1 - 07/2018

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.

Contents

09 - General Safety

Introduction

Training

To operate the machine safely you must know the machine and have the skill to use it. You must abide by all relevant laws, health and safety regulations that apply to the country you are operating in. The operator's manual instructs you on the machine, its controls and its safe operation; it is not a training manual. Ensure that you receive the correct training before operating any machinery. Failing to do so will result in incorrect operation of the machine and you will be putting yourself and others at risk. In some markets, and for work on certain jobsites, you may be required to have been trained and assessed in accordance with an operator competence scheme. Make sure that you and your machine comply with relevant local laws and jobsite requirements – it is your responsibility.

Care and Alertness

All the time you are working with or on the machine, take care and stay alert. Always be careful. Always be alert for hazards.

Clothing

You can be injured if you do not wear the correct clothing. Loose clothing can get caught in the machinery. Keep cuffs fastened. Do not wear a necktie or scarf. Keep long hair restrained. Remove rings, watches and personal jewellery.

Alcohol and Drugs

It is extremely dangerous to operate machinery when under the influence of alcohol or drugs. Do not consume alcoholic drinks or take drugs before or while operating the machine or attachments. Be aware of medicines which can cause drowsiness.

Feeling Unwell

Do not attempt to operate the machine if you are feeling unwell. By doing so you could be a danger to yourself and those you work with.

Mobile Phones

Switch off your mobile phone before entering an area with a potentially explosive atmosphere. Sparks in such an area could cause an explosion or fire resulting in death or serious injury.

Switch off and do not use your mobile phone when refuelling the machine.

Lifting Equipment

You can be injured if you use incorrect or faulty lifting equipment. You must identify the weight of the item to be lifted then choose lifting equipment that is strong enough and suitable for the job. Make sure that lifting equipment is in good condition and complies with all local regulations.

Raised Equipment

Never walk or work under raised equipment unless it is supported by a mechanical device. Equipment which is supported only by a hydraulic device can drop and injure you if the hydraulic system fails or if the control is operated (even with the engine stopped).

Make sure that no-one goes near the machine while you install or remove the mechanical device.

Raised Machine

Never position yourself or any part of your body under a raised machine which is not correctly supported. If the machine moves unexpectedly you could become trapped and suffer serious injury or be killed.

Lightning

Lightning can kill you. Do not use the machine if there is lightning in your area.

Machine Modifications

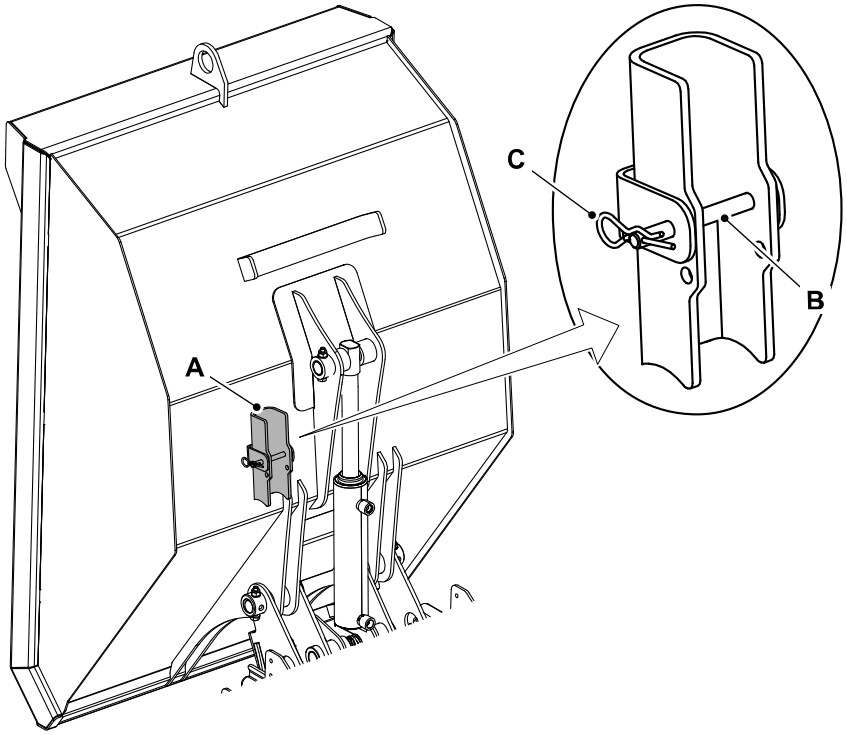
This machine is manufactured in compliance with prevailing legislative requirements. It must not be altered in any way which could affect or invalidate its compliance. For advice consult your JCB dealer.

Installation of the Maintenance Strut (Dumper Tipped)

A maintenance strut is provided to support the dumper body in the tipped position when maintenance is being carried out.

The maintenance strut is stowed on the underside of the dumper body when not in use secured in position by a pin and R clip. Refer to Figure 4.

Figure 4.



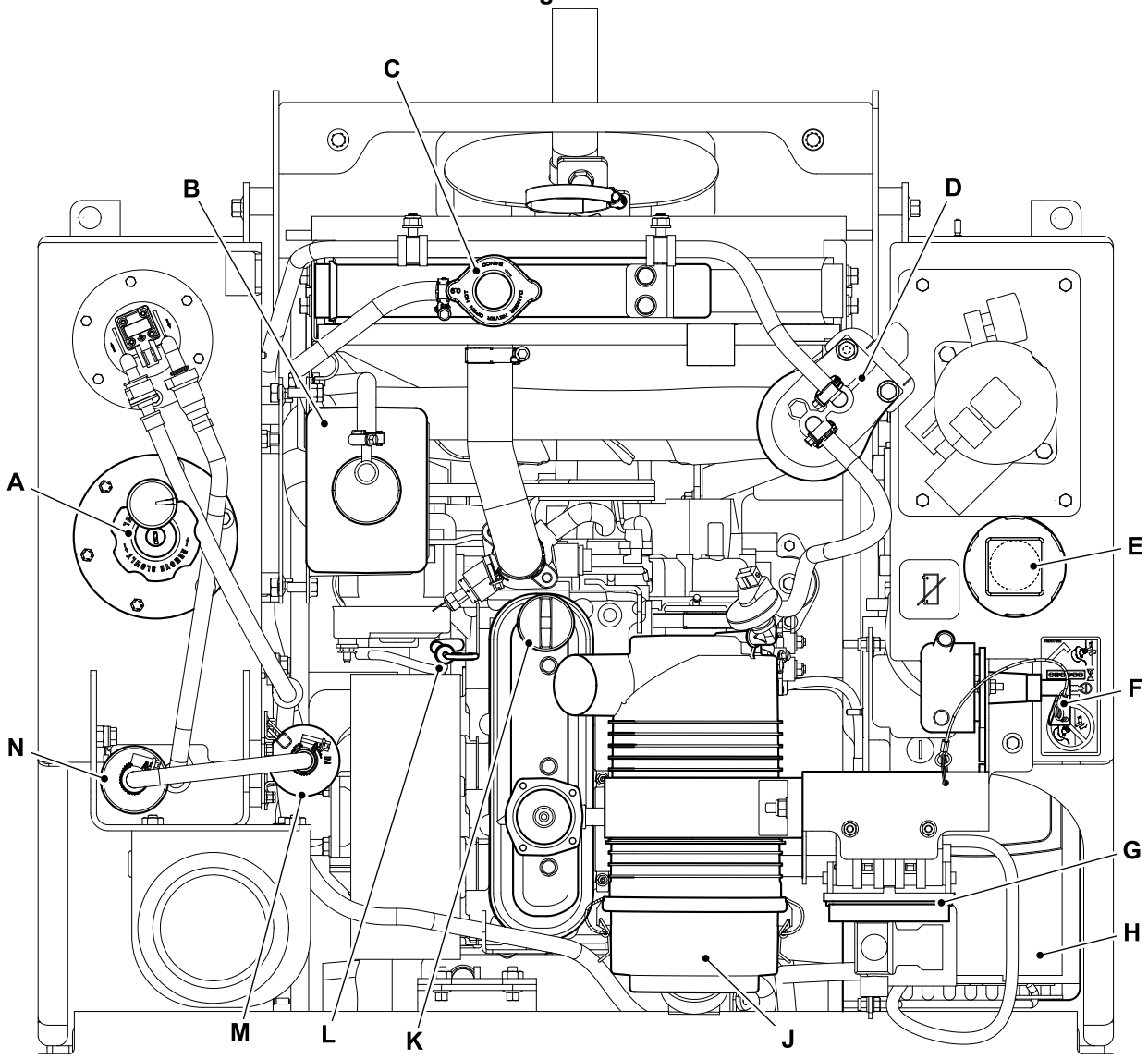
A Maintenance strut- stowage position
B Pin
C R clip

1. Fully tip the dumper body.
2. Remove the maintenance strut from its stowage position and place over the piston rod of the ram. Refer to Figure 5.
3. Install the pin to the support and secure with the R clip.
4. Carefully lower the dumper body until the weight is supported on the maintenance strut.

15 - Service Point Locations

Introduction

Figure 7.



A Fuel tank filler cap
B Coolant expansion bottle
C Radiator cap
D Main fuel filter
E Hydraulic tank filler cap
F Battery isolator
G Primary fuse box
H Battery
J Air filter
K Engine oil filler cap
L Engine oil dipstick
M Electrical fuel feed pump
N Fuel Pre-filter

00 - General

Check (Condition)

Check the Machine Body and Structure

1. Make the machine safe.
   Refer to: PIL 01-03.
2. Make sure that all the guards and protective devices are in place, attached by their locking devices and free from damage.
3. Inspect all steelwork for damage. Pay particular attention to the following:
   3.1. Inspect all the lifting point welds.
   3.2. Inspect all the pivot point welds.
   3.3. Inspect the condition of all the pivot pins.
   3.4. Check that the pivot pins are correctly in place and secured by their locking devices.
4. Check the steps and the handrails for damage. Make sure that the steps and the handrails are properly secured.
5. Check for broken, cracked or crazed window glass and mirrors. Replace any damaged items.
6. Check all the lamp lenses for damage.
7. Check all the attachment teeth for damage. Make sure that all attachment teeth are properly secured.
8. Check all the safety and instructional labels are in place and are free from damage.
9. Install new labels where necessary. Make a note of the damaged paintwork for future repair.

Check the ROPS/FOPS Structure

⚠ **WARNING** You could be killed or seriously injured if you operate a machine with a damaged or missing ROPS/FOPS/FOGS. If the ROPS/FOPS/FOGS has been in an accident, do not use the machine until the structure has been renewed. Modifications and repairs that are not approved by the manufacturer may be dangerous and will invalidate the ROPS/FOPS/FOGS certification.

A failure to do these precautions can cause death or injury to the operator.

1. Make the machine safe.
   Refer to: PIL 01-03.
2. Carry out a thorough inspection of the operator's station.
3. Any damage must be repaired before the machine is used again.
4. Make sure that all of the ROPS (Roll-Over Protective Structure)/FOPS (Falling Object Protective Structure) mounting bolts are undamaged and in position.
5. Make sure that the ROPS/FOPS mounting bolts are tightened to the correct torque setting.

Install

1. The installation procedure is the opposite of the removal procedure.

15 - Articulated Joint

Introduction

Transport Position

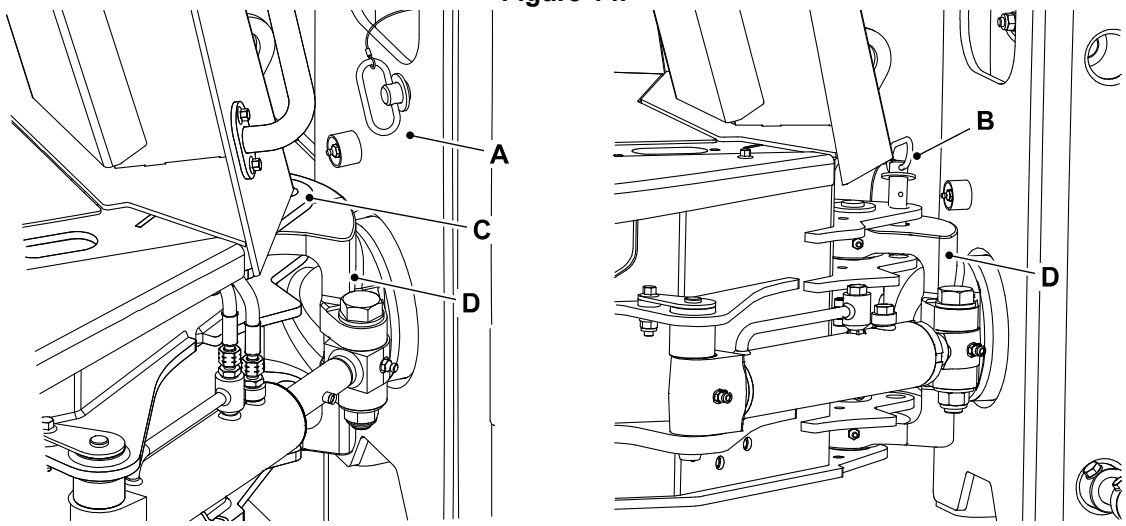
⚠ **WARNING** Make sure the articulation lock is in the transport position before you transport the machine. The articulation lock must also be in the transport position if you are carrying out daily checks or doing any maintenance work in the articulation danger zone. If the articulation lock is not in the transport position you could be crushed between the two parts of the chassis.

The articulation lock prevents the machine movement when lifting the machine or during transport or maintenance.

1. Steer the machine to put the front and rear wheels in a straight line.
2. Set the drive lever in the neutral position.

   Refer to: PIL 01-03-27.
3. Stop the engine and remove the ignition key.
4. Remove the locking pin from its drive (stowage) position. Refer to Figure 14.
5. Install the locking pin. Refer to Figure 14.
6. Adjust the locking pin around until the hole in the articulation joint aligns with the hole in the rear chassis. Refer to Figure 14.
7. If necessary, turn the steering wheel slightly to align the holes.
8. Install the locking pin and secure with the clip. Make sure that the pin is correctly secured to prevent the articulation lock becoming insecure. Refer to Figure 14.

Figure 14.



A Locking pin and stowage position
C Locking hole
B Locking pin in installed position
D Articulation joint

Drive (Stowage) Position

⚠ **WARNING** Always make sure the articulation lock has been removed before attempting to drive the machine. The machine cannot be steered with the articulation lock installed.

1. Stop the machine.
2. Set the drive lever in the neutral position.

   Refer to: PIL 01-03-27.
3. Stop the engine and remove the ignition key.
4. Remove the locking pin that secures the articulation joint in the transport position.
5. Position the locking pin in its drive (stowage) position.

21 - Bearing

Remove and Install

Refer to Articulated Joint - Remove and Install PIL 06-33-00 .

00 - General

Introduction

When you carry tools onto the machine, you must keep three points of contact with the machine at all times. If necessary, lift the tools on to the machine in intervals. Put the tools down before you adjust your grips on the machine. Do not try to adjust your grips on the machine while holding tools.

00 - General

Introduction

The exterior light guards provide protection from rocks, falling objects and can also protect against acts of vandalism.

00 - General

Check (Condition)

1. Check that the seat adjustments operate correctly.
2. Check the seat is undamaged.
3. Check the seat mounting bolts are undamaged, correctly installed and tight.
4. Make sure the seat is clear from unwanted materials and hazards at all times.

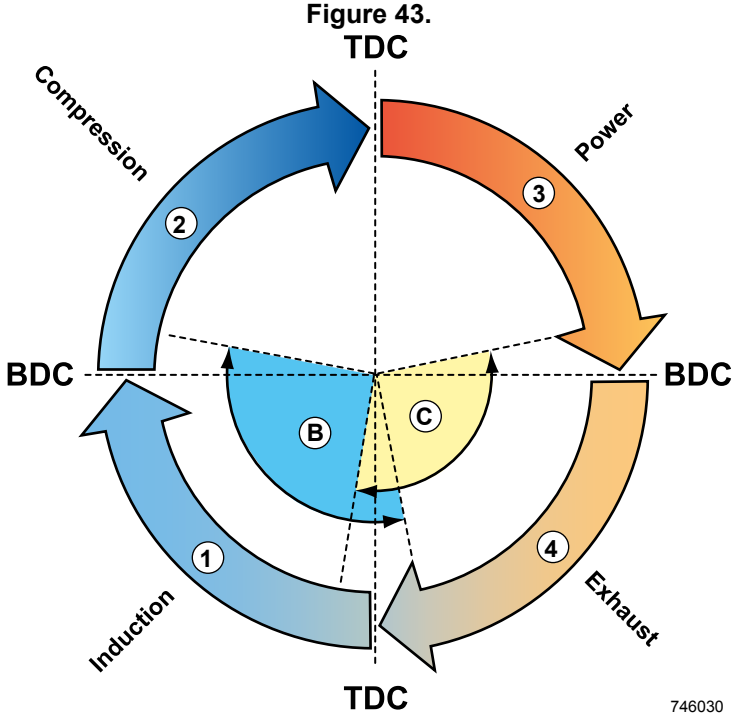
Install

1. The installation procedure is the opposite of the removal procedure.

Acronyms Glossary

DC	Direct Current
DTI	Dial Test Indicator
ECM	Engine Control Module
ECU	Electronic Control Unit
ESOS	Engine Shut-Off Solenoid
FEAD	Front End Accessory Drive
RPM	Revolutions Per Minute
TDC	Top Dead Centre

Figure 43.



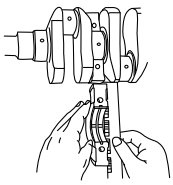
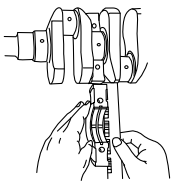
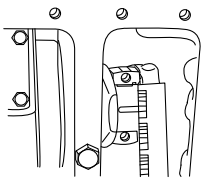
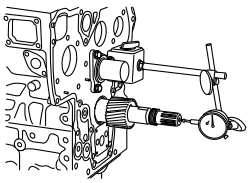
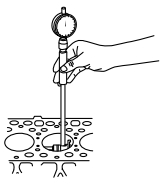
1 Induction stroke
2 Compression stroke
3 Power stroke
4 Exhaust stroke
A Camshaft
B Camshaft lobe - Inlet valve operation
C Camshaft lobe - Exhaust valve operation
BDC Bottom dead centre
TDC TDC

Table 24. Lubricating Oil - Pressure Low

Cause	Remedy
Oil level incorrect.	Check oil level.
Incorrect lubricating oil (specification of viscosity).	Make sure the correct lubricating oil is being used. Check for reduced viscosity from dilution with fuel. Fuel dilution in lubricating oil can originate from a defective high pressure fuel pump driveshaft seal. Review oil and filter change period. If operating in arduous applications, change more frequently.
Pressure switch or gauge fault.	Verify the pressure switch is functioning correctly.
Lubricating oil filter blocked.	Change lubricating oil filter. Review oil and filter change period. If operating in arduous applications, change more frequently.
Lubricating oil filter drain down valve not installed.	Change lubricating oil filter.
Suction pump pressure relief valve stuck open.	Check/replace seal.
Oil pump pressure relief valve stuck open.	Replace oil pump assembly.
Lubricating oil pump worn.	Replace oil pump assembly.

Table 25. Lubricating Oil - Pressure High

Cause	Remedy
Incorrect lubricating oil (specification of viscosity).	Make sure the correct lubricating oil is being used.
Pressure switch or gauge fault.	Verify the pressure switch is functioning correctly.
Engine running too cold.	Check and if necessary replace the engine thermostat.
Oil pump pressure relief valve stuck closed.	Replace oil pump assembly.

Component		Calibration Data	
Illustration	**Description**	**Factory Specification**	**Allowable limits**
	Oil clearance between crankshaft journal and crankshaft bearing 2	0.034 –0.095 mm	0.2 mm
	Crankshaft journal outside diameter	47.934 –47.95 mm	-
	Crankshaft bearing 2 inside diameter	47.984 –48.029 mm	-
Crankshaft journal and crankshaft bearing 3			
	Oil clearance between crankshaft journal and crankshaft bearing 3	0.034 –0.098 mm	0.2 mm
	Crankshaft journal outside diameter	51.921 –51.94 mm	-
	Crankshaft bearing 3 inside diameter	51.974 –52.019 mm	-
Crankpin and crankpin bearing			
	Oil clearance between crankpin and crankpin bearing	0.029 –0.091 mm	0.2 mm
	Crankpin outside diameter	39.959 –39.975 mm	-
	Crankpin bearing inside diameter	40.004 –40.05 mm	-
Crankshaft			
	Crankshaft side clearance	0.15 –0.31 mm	0.5 mm
Cylinder			
	Cylinder bore inside diameter (Standard size)	72 –72.019 mm	72.15 mm
	Cylinder bore inside diameter (Oversize)	72.5 –72.519 mm	72.65 mm

(1) A = Valve face angle, B = Valve seat angle, C = Valve seat width.
(2) D = TDC, E = BDC, F = Inlet valve open, G = Exhaust valve open, H = Exhaust valve close, J = Inlet valve close.
(3) K = Valve spring length, L = Valve spring tilt.

Table 29. Lubrication System Calibration Data

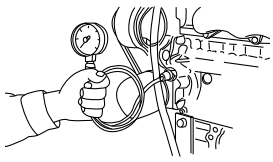
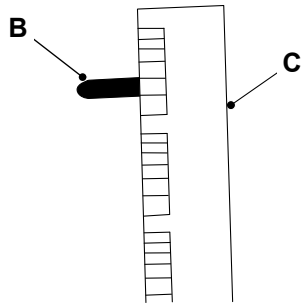
Component		Calibration Data	
Illustration	**Description**	**Factory Specification**	**Allowable limits**
	Engine oil pressure at idle speed	More than 0.49 bar (7.1 psi)	-
	Engine oil pressure at rated speed	1.96 –4.41 bar (28.4 –63.9 psi)	1.47 bar (21.3 psi)

Figure 58.

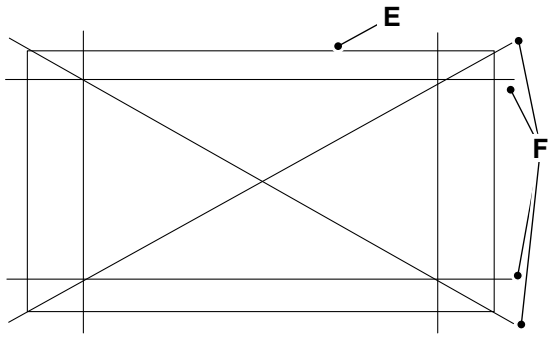


B Crushed plastigauges
C Scale

Cylinder Head Surface Flatness Check

1. Clean the cylinder head surface.
2. Place a straight edge on the four sides of the cylinder head and two at a diagonal as shown in the figure.

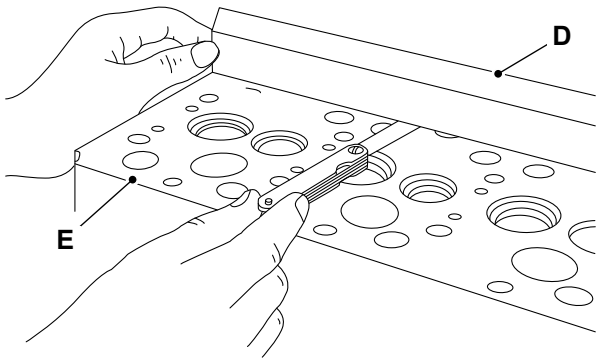
Figure 59.



E Cylinder head
F Straight edge positions

3. Measure the clearance with a thickness gauge.
4. Make sure that the clearance between the straightedge and cylinder head surface is within the specified dimension. Refer to (PIL 15-00).
   - 4.1. If the measurement exceeds the allowable limit, correct it with a surface grinder.
   - 4.2. You must check the valve recessing after grinding the cylinder surface. Refer to (PIL 15-30).
5. Do not place the straight edge on the combustion chamber.

Figure 60.

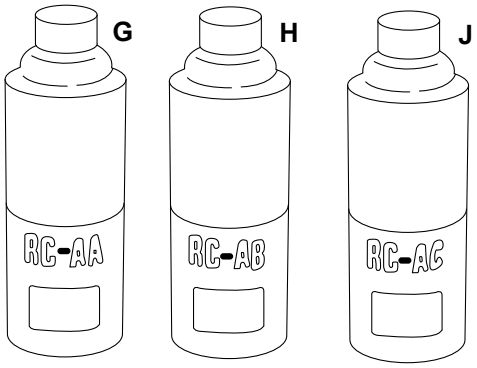


D Straight edge
E Cylinder head

Cylinder Head Flaw Check

1. Prepare an air spray red check.
2. Clean the surface of the cylinder head with detergent.
3. Spray the cylinder head surface with the red permeative liquid.
4. Leave it for the specified duration after spraying.
   Duration: 5 –10 min
5. Wash away the red permeative liquid on the cylinder head surface with detergent.
6. Spray the cylinder head surface with white developer.
7. If flawed, it can be identified as red marks.

Figure 61.



G Red permeative liquid
H Detergent
J White developer

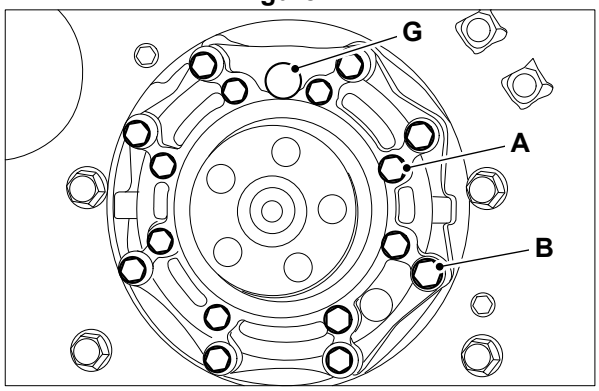
Remove and Install

This procedure is part of the engine disassembly task. The correct sequence of removal of engine components is given in the engine disassembly task. Refer to: PIL 15-00-00.

Remove

1. Remove the screws from the bearing case cover.
2. Remove the bearing case cover.

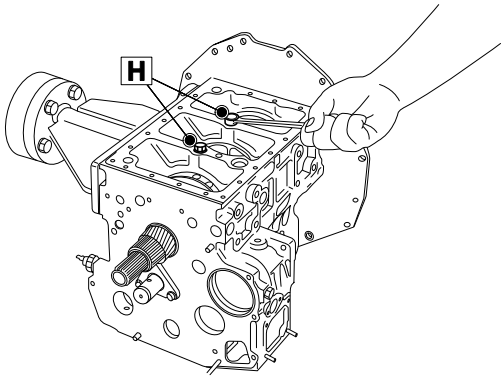
Figure 72.



A Bearing case cover mounting screw (inside)
B Bearing case cover mounting screw (outside)
G Top mark 'UP'

3. Remove the main bearing case screw.
4. Pull out the crankshaft assembly.
5. Take care not to damage the crankshaft bearing 1.

Figure 73.



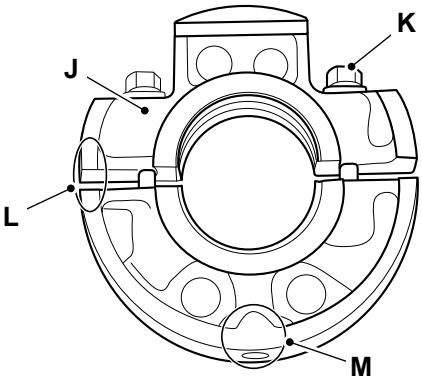
H Main bearing case screw

6. Remove the main bearing case assembly.
   6.1. Remove the screw 3 (x2) from each main bearing case.
   6.2. Remove the main bearing case assembly.

Install

1. The installation procedure is the opposite of the removal procedure. Additionally do the following steps.
2. Install the main bearing case assembly.
   2.1. Clean the oil passage in the main bearing case.
   2.2. Apply clean engine oil on the bearings.
   2.3. Install the main bearing case assemblies in the original positions. Make a note that the diameters of main bearing cases vary, install them in order of makings (A, B for 3 cylinders and A, B, C for 4 cylinders) from the gear case side.

Figure 74.



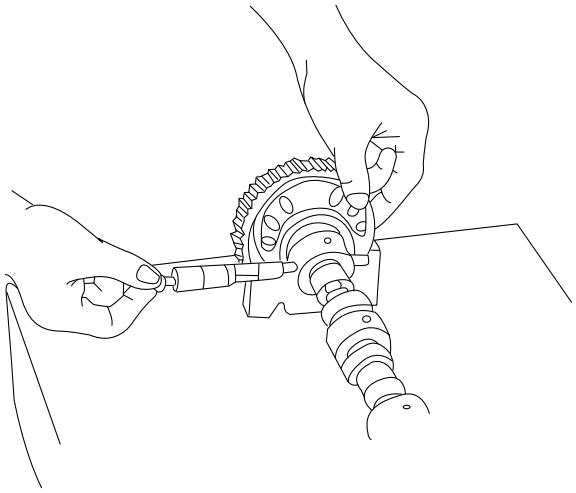
J Main bearing case assembly
K Main bearing case screw
L Alignment number
M Alignment marking

   2.4. Match the alignment numbers and mark on the main bearing case.

Figure 75.

J Main bearing case assembly
K Main bearing case screw
N Thrust bearing

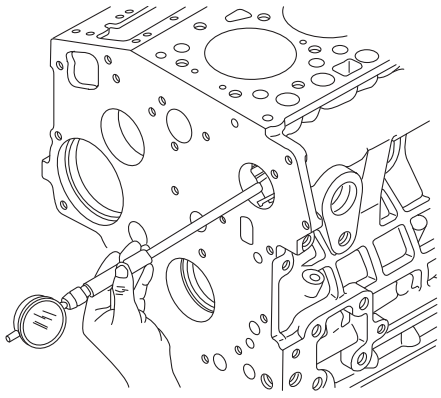
Figure 88.



3. Measure the crankcase bore inside diameter for camshaft with a cylinder gauge.
4. Make sure that the cylinder block bore inside diameter is within the specified limits.

   Refer to: PIL 15-00-00.

Figure 89.



5. Calculate the oil clearance.
6. Make sure that the oil clearance is within the specified limits.

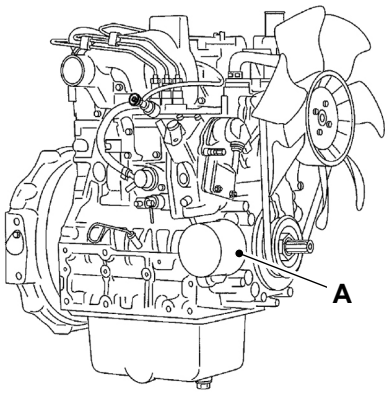
   Refer to: PIL 15-00-00.
7. If the oil clearance exceeds the allowable limit, replace the camshaft.

Remove and Install

Remove

1. Make the machine safe.
   Refer to: PIL 01-03-27.
2. Open the engine compartment cover.
3. 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.
4. Drain the engine oil.
   Refer to: PIL 15-00-00.
5. Remove the oil filter with the filter wrench.
6. Remove and discard the gasket.

Figure 94.



A Oil filter

Install

1. Apply a thin layer of engine oil onto the new cartridge gasket.
2. Install the new oil filter.
   2.1. Tighten the oil filter with hand.
   2.2. Over tightening of oil filter may cause deformation of rubber gasket.
3. Check the engine oil level and top up to the correct level.
   Refer to: PIL 15-00-00.

30 - Valve

Contents **Page No.**

15 - Valve Guide

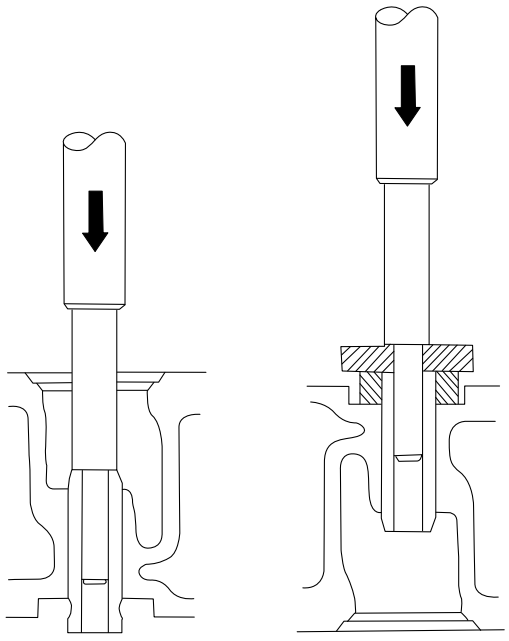
Remove and Install

This procedure is part of the engine disassembly task. The correct sequence of removal of engine components is given in the engine disassembly task. Refer to: PIL 15-00-00.

Remove

1. Remove the cylinder head.
   Refer to: PIL 15-06-00.
2. Remove the valve guide with suitable valve guide tool.
   Refer to: PIL 78-94.
3. Discard the valve guide.

Figure 113.



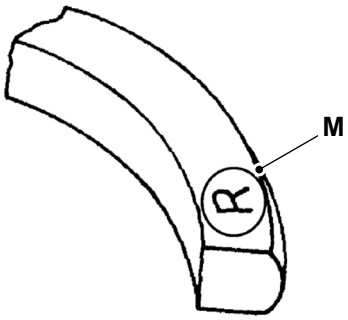
A **B**

A When removing
B When installing

Install

1. The installation procedure is the opposite of the removal procedure. Additionally do the following steps.
2. Check the condition of the valve guide and bore.
3. Apply clean engine oil to valve guide.
4. Install the new valve guide with suitable valve guide tool.
   Refer to: PIL 78-94.
   4.1. Do not hit the valve guide with a hammer.
5. Ream the inside diameter of the valve guide precisely to the specified dimension.
   Refer to: PIL 15-00-00.

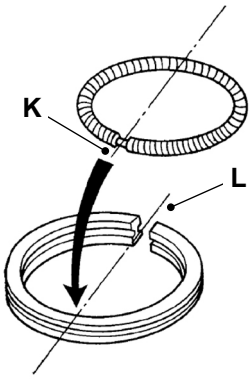
Figure 124.



M Manufacturer's mark

3. When installing the oil ring onto the piston, place the expander joint on the opposite side of the oil ring gap.

Figure 125.



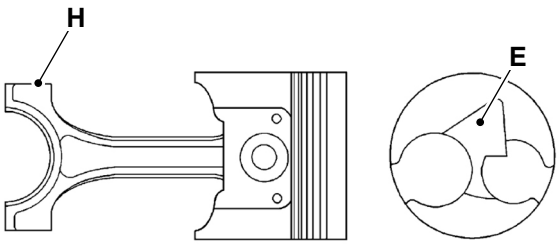
K Expander joint
L Oil ring gap

4. Apply engine oil to the piston pin.
5. Install the connecting rod to the piston as follows.
   5.1. Immerse the piston in hot oil at specified temperature for specified duration.

   Temperature: 80 °C (175.9 °F)
   Duration: 10 –15 min

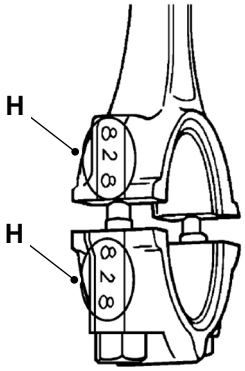
   5.2. Install the piston pin to the piston.
   5.3. Make sure that the mark on the connecting rod is aligned with the fan shaped concave.

Figure 126.



E Fan shaped concave
H Mark

Figure 127.



H Mark

5.4. DO NOT change the combination of connecting rod and piston.

09 - Push Rod

Introduction

Push rods are used in a reciprocating engine to open and close the valves. They are moved by the cams on the camshaft. One end is pushed up by the cam and the other end makes contact with the rocker arms which rotates and pushes the valve open.

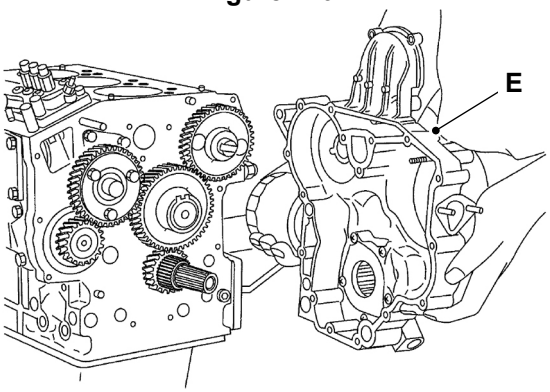
Remove and Install

This procedure is part of the engine disassembly task. The correct sequence of removal of engine components is given in the engine disassembly task. Refer to: PIL 15-00-00.

Remove

1. Remove all the bolts form the gear case.
2. Remove the gear case.

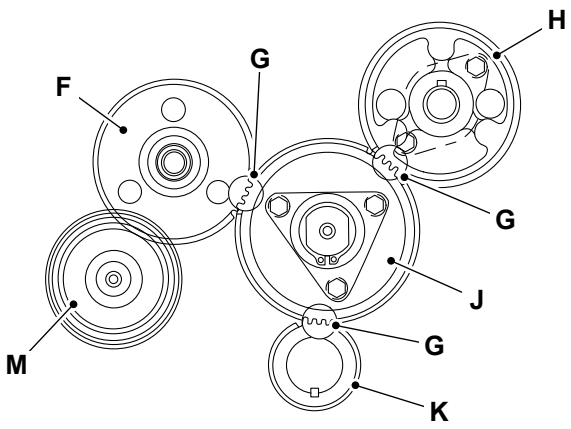
Figure 140.



E Gear case

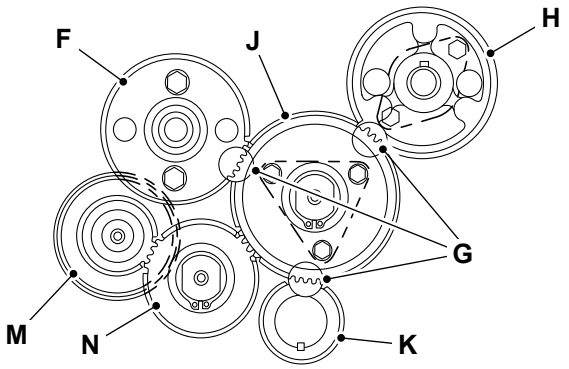
3. Remove the idle gear as applicable. Refer to Figure 141. Refer to Figure 142.

Figure 141. Engine with Single Idler Gear



F Fuel cam gear
G Alignment mark
H Cam gear
J Idler gear 1
K Crank gear
M Governor gear

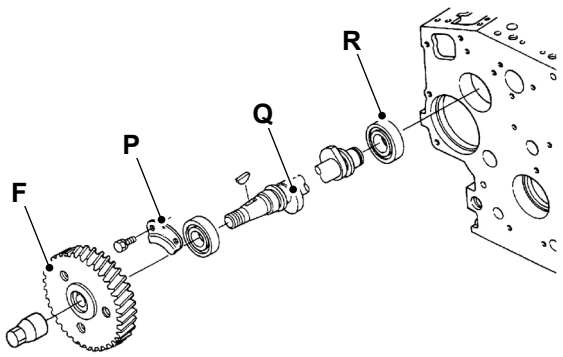
Figure 142. Engine with Double Idler Gear



F Fuel cam gear
G Alignment mark
H Cam gear
J Idler gear 1
K Crank gear
M Governor gear
N Idler gear 2

4. Remove the fuel camshaft stopper.
5. Pull out the fuel cam gear with the fuel camshaft.
6. Remove the camshaft stopper bolt.

Figure 143.



F Fuel cam gear
P Fuel camshaft
Q Ball bearing
R External snap ring

7. Remove the cam gear with the camshaft.
8. Remove the external snap ring from the governor shaft.

   8.1. For engine with three lever type fork lever, do not remove fork lever and the max torque limiter.

9. Remove the governor gear with the governor shaft.

63 - Mount

Contents **Page No.**

00 - General

Introduction

The alternator is a three phase generator having a rotating field winding and static power windings.

When the ignition switch is turned on, the current from the battery flows by way of the No Charge warning light to the field winding. This creates a magnetic field which supplements the residual magnetism in the rotor poles. As the engine is started, the FEAD (Front End Accessory Drive) belt drives the rotor and the alternating current is generated in the power windings as they are cut by the rotating magnetic field. Output is controlled by a solid state regulator which varies the field current in accordance with electrical demand.

00 - General

Introduction

The electric starter motor is either a permanent-magnet or a series-parallel wound direct current electric motor with a starter solenoid mounted on to it. When the current from the battery is applied to the solenoid, through the key-operated ignition switch, the solenoid engages a lever that pushes out the drive pinion on the starter driveshaft and meshes the pinion with the starter ring gear on the flywheel of the engine.

The solenoid also closes high current contacts for the starter motor, which begins to turn. Once the engine starts, the key-operated ignition switch is opened, a spring in the solenoid assembly pulls the pinion gear away from the ring gear, and the starter motor stops. The starter motor pinion is clutched to the drive shaft through an overrunning clutch which permits the pinion to transmit drive in only one direction. Drive is then transmitted through the pinion to the flywheel ring gear, but if the pinion remains engaged (as for example because the operator fails to release the key as soon as the engine starts, or if there is a short and the solenoid remains engaged), the pinion will spin independently of the drive shaft, this prevents the engine driving the starter.

The starter motor is only designed for intermittent use, the electrical components are designed only to operate for a time period of 20 s before overheating.

G Terminal nut 2
H Snap ring
J Overrunning clutch
K Armature
L Brush spring
M Connecting lead
N Rear end frame
P Gasket
Q Brake spring
R Brake shoe
S End frame cap
T Screw
U Yoke
V Brush
W Brush holder
X Bolt
AA Joint of solenoid switch
AB Bushing
AC Drive lever
AD Collar
AE Teeth of pinion gear
AF Armature shaft

00 - General

Introduction

A solenoid refers to a variety of transducer devices that convert energy into linear motion. The term also refers to a solenoid valve, which is an integrated device containing an electromechanical solenoid which actuates a hydraulic valve, or a solenoid switch.

00 - Fuel and Exhaust System

Contents **Page No.**

03 - Tank

Contents **Page No.**

18 - Injection

Contents **Page No.**

15 - Pump

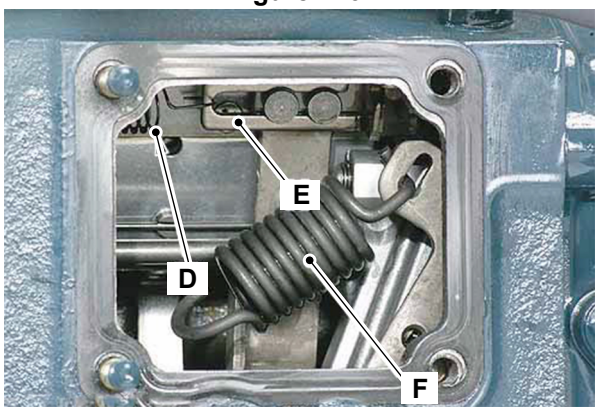
Remove and Install

This procedure is part of the engine disassembly task. The correct sequence of removal of engine components is given in the engine disassembly task.

Remove

1. Disconnect the start spring on the thrust lever side.

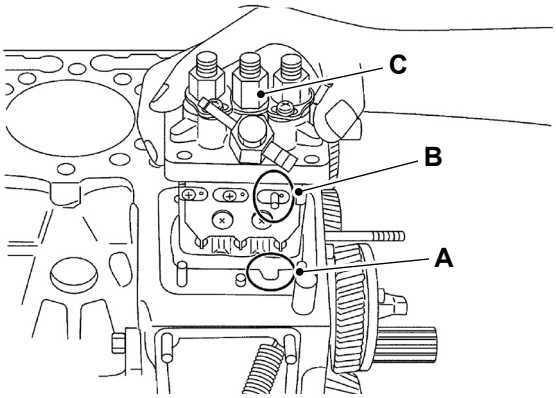
Figure 226.



D Start spring
E Thrust washer
F Governor spring

2. Align the control rack pin with the notch on the crankcase.
3. Remove the injection pump.

Figure 227.



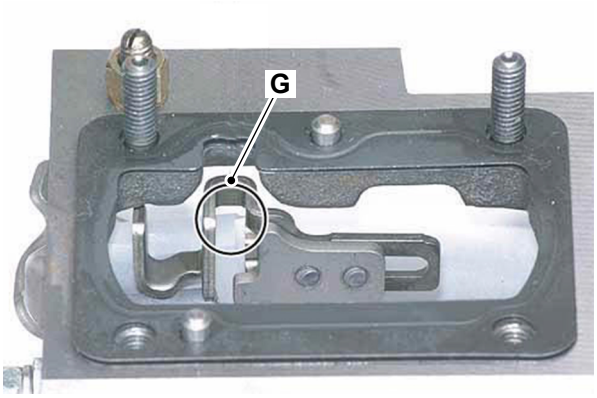
A Notch
B Control rack pin
C Injection pump

4. Remove the injection pump shims.
5. Make a note that it is not recommended to disassemble the injection pump.

Install

1. The installation procedure is the opposite of the removal procedure. Additionally do the following steps.
2. Insert the control rack pin firmly into the groove of the thrust lever of fork lever.

Figure 228.



G Groove

3. Make sure that you use the same number of new gasket shims with the same thickness.

   3.1. Make a note that the addition of removal of specified shim delays or advances the injection timing by the specified degrees.

   Dimension: 0.05 mm
   Angle: 0.5 °

03 - Inlet Manifold

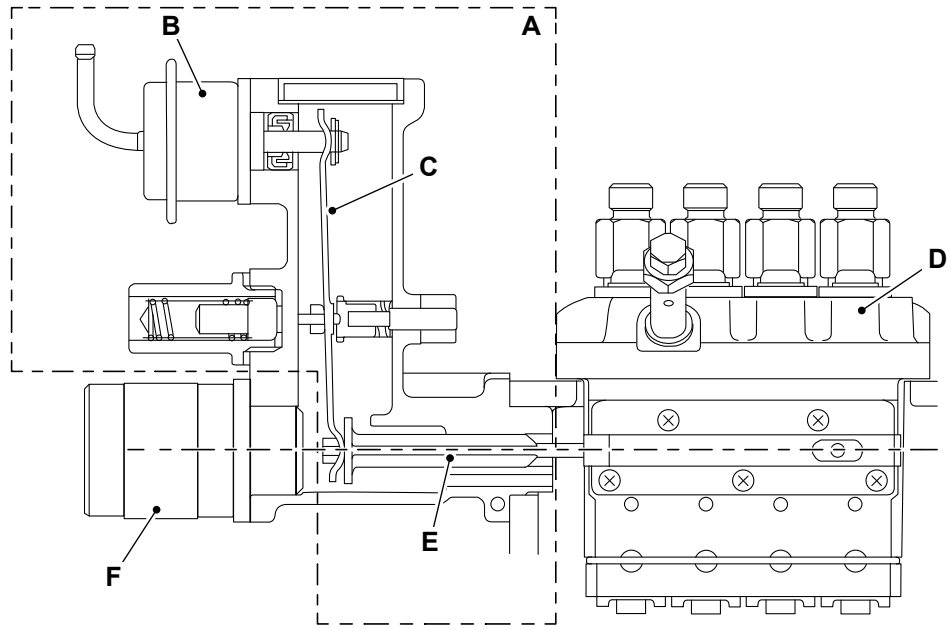
Introduction

The inlet manifold (or intake manifold) supplies combustion air to the cylinders in compression ignition engines or the air/fuel mixture for spark ignition engines (except most direct injection spark ignition engines). Even distribution of the air or air/fuel is important to optimize the efficiency and performance of the engine.

The manifold is required to be air tight under pressure and vacuum conditions and can be required to provide mounting points for sensors, grid heaters, throttle bodies and other components depending on the engine type and specification.

Component Identification

Figure 237.



A Boost compensator assembly
B Actuator
C Plate
D Injection pump assembly
E Guide
F ESOS (Engine Shut-Off Solenoid)

00 - Cooling System

Contents **Page No.**

00 - General

Introduction

The cooling pack contains the following major components:

- Radiator.
- Cooling fan.
- CAC (Charge Air Cooler).
- Condenser for air-conditioning (if installed).
- Oil cooler (if installed).

12 - Thermostat

Contents **Page No.**

00 - Brake System

Contents **Page No.**

00 - Steering System

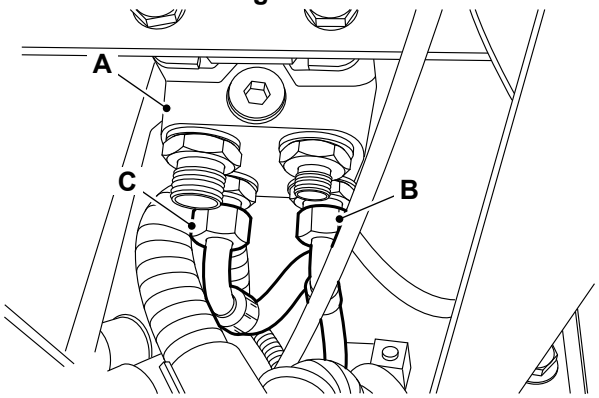
Contents **Page No.**

Remove and Install

Remove

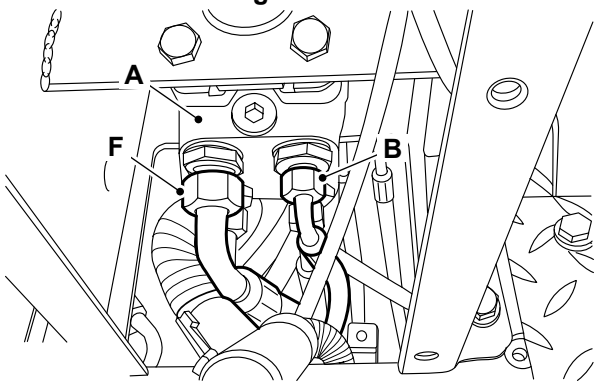
1. Make the machine safe.
   Refer to: PIL 01-03-27.
2. Isolate the battery.
   Refer to: PIL 33-03-03.
3. Discharge the hydraulic pressure.
   Refer to: PIL 30-00-00.
4. Remove the steering column cover.
   Refer to: PIL 09-30-09.
5. Disconnect the hoses from the steer unit.

Figure 263.



A Steer unit
B Steering hoses
C Feed hose

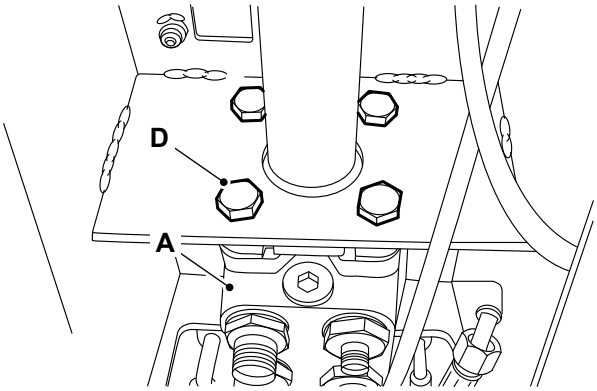
Figure 264.



A Steer unit
B Steering hoses
F Return hose

6. Put a label on the hoses to help installation.
7. Plug all the open ports and hoses to prevent contamination.
8. Remove the steering column assembly.
   Refer to: PIL 25-12-00.
9. Collect the spacers (x4).
10. Remove the bolts (x4).

Figure 265.



A Steer unit
D Bolts

11. Remove the steer unit.

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. Check the hydraulic oil level and top up as required.
   Refer to: PIL 30-00-00.

Table 54. Torque Values

Item	Description	Nm
D	Bolts	60

00 - General

Introduction

Hydrostatic

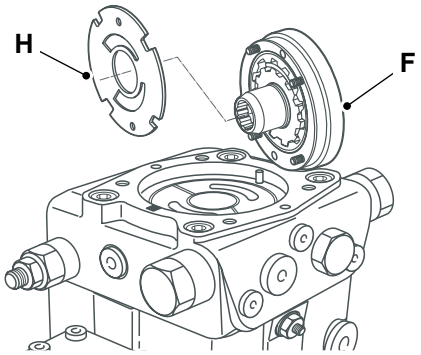
The hydraulic drive motors for the front and rear wheels are self contained hydraulic motors and hub units. These drive motors are directly attached to the chassis, so no conventional axles are required.

The variable displacement axial piston pump type is a swashplate design intended for closed circuit hydrostatic drives. The flow is proportional to the input drive speed and displacement. By adjusting the swashplate, it is possible to infinitely vary the flow. Flow from the hydraulic pump is balanced against the demand on the motor by valves within the motor and the swash plate moves to give maximum torque at the wheels regardless of the speed of the machine.

31 - Wheel Drive Pump

Contents **Page No.**

Figure 292.



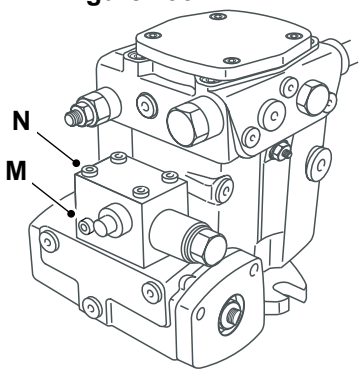
F Charge pump
H Wear plate

5.8. Check the sealing ring, unloading channel and the fixing ring for wear and dirt. Repair as required.

6. Remove the control unit seals as follows:

6.1. Remove the bolts from the control unit valve.

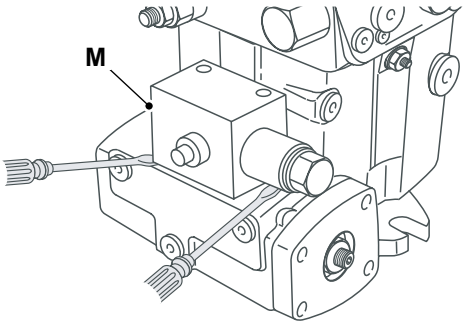
Figure 293.



M Control unit valve
N Bolts

6.2. Remove the control unit valve from the wheel drive pump.

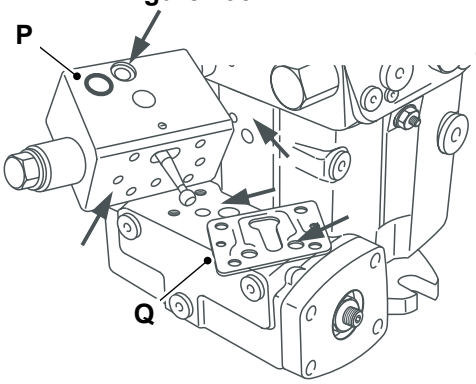
Figure 294.



M Control unit valve

6.3. Remove the O-ring 4 and the gasket.

Figure 295.



P O-ring 4
Q Gasket

6.4. Check the sealing surfaces for wear.

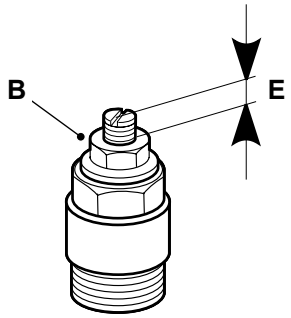
Assembly

1. The assembly procedure is the opposite of the disassembly procedure.

2. Assemble the charge pump seal to the wheel drive motor as follows:

2.1. Make sure that you install the new O-ring 1, O-ring 2 and O-ring 3.

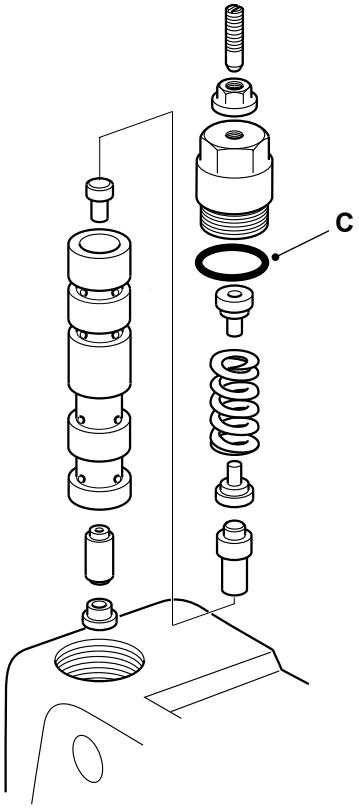
Figure 318.



B Locknut
E Position of locknut on cut-off valve

4. Disassemble the cut-off valve and remove the seal.

Figure 319.

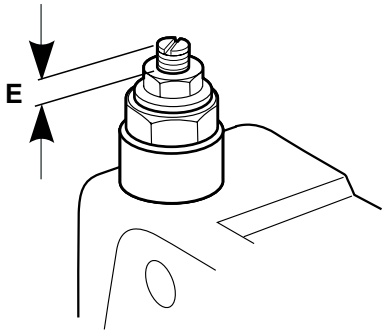


C Seal

Install

1. The installation procedure is the opposite of the removal procedure. Additionally do the following step.
2. Tighten the cut-off valve to the correct torque value.
3. Adjust the locknut to original recorded position.

Figure 320.



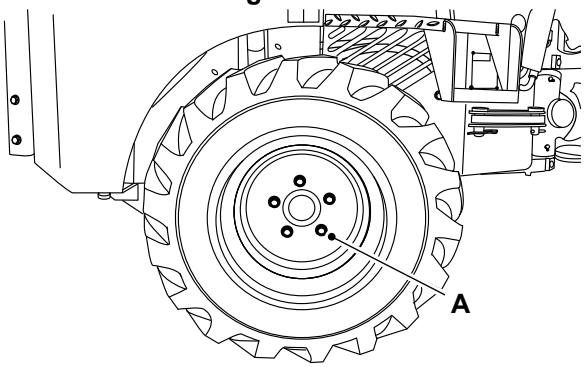
E Position of locknut on cut-off valve

4. Tighten the locknut to the correct torque value.
5. Check the valve setting.

Table 62. Torque Values

Item	Description	Nm
A	Cut-off valve	160
B	Locknut	25

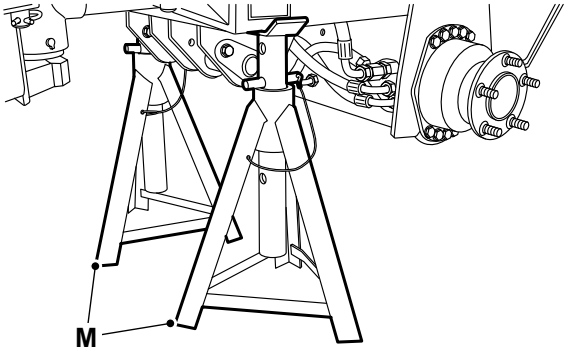
Figure 333.



A Wheel nut

4. Use a suitable jack to raise the machine.
5. Support the machine with suitable axle stands.

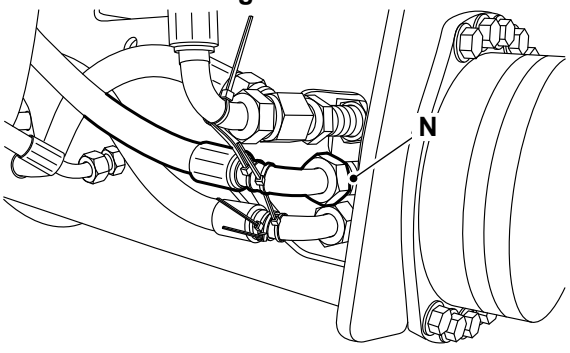
Figure 334.



M Axle stand

6. Remove the wheel.
   Refer to: PIL 27-29-00.
7. Disconnect the hydraulic hose 1.

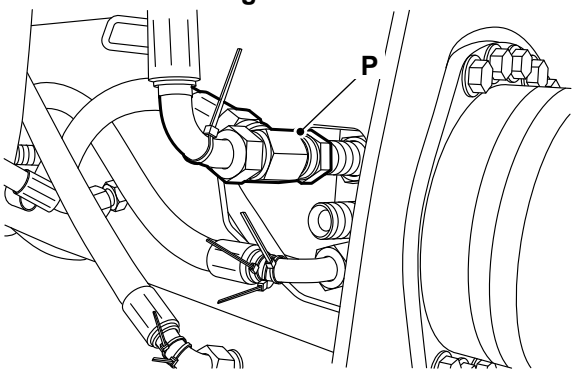
Figure 335.



N Hose 1

8. Disconnect the hydraulic hose 2.

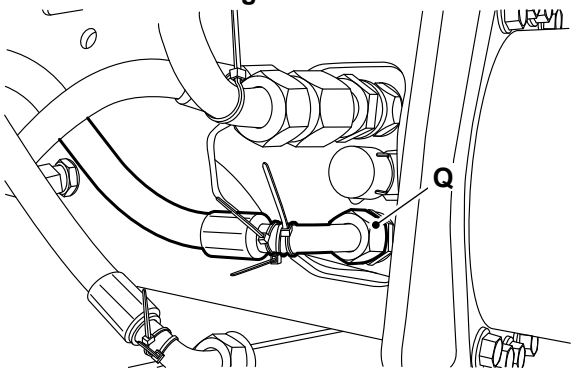
Figure 336.



P Hose 2

9. Disconnect the hydraulic hose 3.

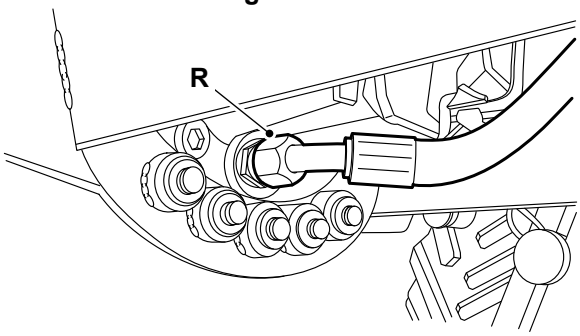
Figure 337.



Q Hose 3

10. Disconnect the hydraulic hose 4.

Figure 338.



R Hose 4

10.1. The return adaptor is located on top of the wheel motor on the right side and on the bottom of the wheel motor on the left side.

11. Put a label on the hoses to help installation.
12. Plug all the open ports and hoses to prevent contamination.
13. Remove the bolts.
14. Remove the rear wheel motor from the chassis.

00 - General

Contents **Page No.**

- Red Blood Cell = 8 microns (0.008 mm, 0.000315 in)
- Human Hair = 70 microns (0.07 mm, 0.00275 in)
- Grain of Salt = 100 microns (0.1 mm, 0.00394 in)

The smallest particle visible to the naked eye is 40 microns (0.00157) approximately. Standards will often be quoted to ISO (International Standards Organisation) for which literature can be obtained.

Check (Condition)

Hydraulic Oil Contamination

The contamination in the hydraulic system is a major cause of malfunction of hydraulic components. The contamination is any foreign material in the hydraulic oil. It can enter the hydraulic system in several ways:

- When the oil is drained or any line disconnected.
- When a component is disassembled.
- From normal wear of the hydraulic components.
- From damaged or worn seals.
- From a damaged component in the hydraulic system.

All hydraulic systems operate with some contamination. The design of the components in this hydraulic system permits efficient operation with a small amount of contamination. An increase in the amount of contamination can cause problems in the hydraulic system. The following list includes some of these problems:

- Cylinder rod seals leak.
- Control valve spools do not return to neutral.
- Movement of control valve spools is difficult.
- Hydraulic oil becomes too hot.
- Pump gears, housing and other parts wear rapidly.
- Relief valves or check valves held open by dirt.
- Quick failure of components that have been repaired
- Cycle times are slow, machine does not have enough power.

If any of the above problems are found on the machine, check the hydraulic oil for contamination.

Types of Contamination

There are two types of contaminations:

1. Microscopic
2. Visible

Microscopic Contaminations

Microscopic contamination occurs when very fine particles of foreign material are in suspension in the hydraulic oil.

The microscopic particles are too small to see or feel. The microscopic contamination can be found by identification of the following problems or by testing in a laboratory.

- Cylinder rod seal leak.
- Control valve spools do not return to neutral.

50 - Schematic Circuit

Introduction

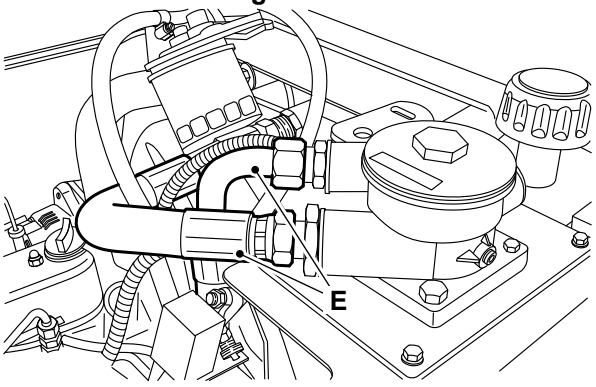
A schematic wiring diagram is a simplified pictorial representation of the machines hydraulic circuit. It shows the components of the circuit as simplified hydraulic symbols, and the connections between the different components. The schematic diagram is used to troubleshoot problems and to make sure that all the connections have been made and that everything is present. Detailed schematics for individual systems are given in the relevant PIL section.

Remove and Install

Remove

1. Make the machine safe.
   Refer to: PIL 01-03-27.
2. Isolate the battery.
   Refer to: PIL 33-03.
3. Remove the engine compartment cover.
   Refer to: PIL 06-06-06.
4. Drain the hydraulic tank.
   Refer to: PIL 30-00-00.
5. Disconnect the hydraulic return hoses.

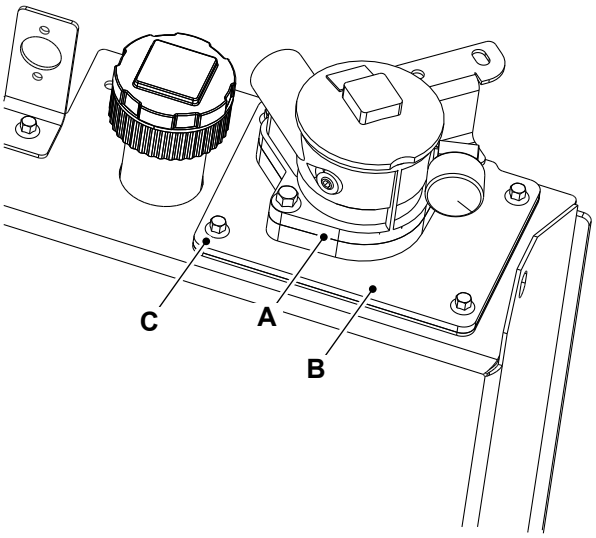
Figure 357.



E Hydraulic return hoses

6. Remove the screws (x4).
7. Remove the main filter assembly with the mounting bracket.

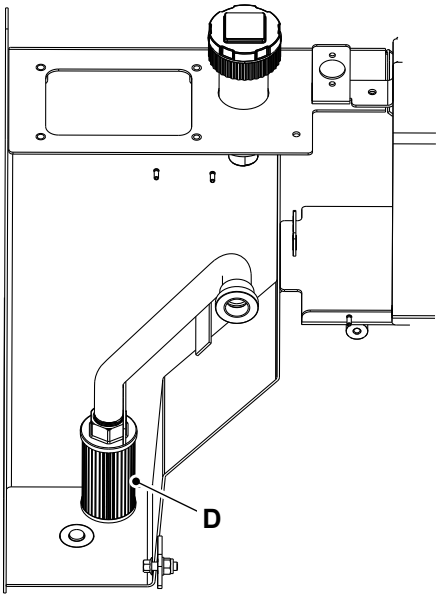
Figure 358.



A Filter assembly
B Bracket
C Screw

8. Use a suitable ladder to access the suction strainer.
9. Remove the suction strainer.

Figure 359.



D Suction strainer

Install

1. The installation procedure is the opposite of the removal procedure.

00 - General

Introduction

The hydraulic gear pump is mounted directly onto the rear of the engine. The pump is directly driven by the engine.

The speed at which the pump is driven governs the speed at which the system will operate.

Check (Condition)

Consumables

Description	Part No.	Size
Surface Cleaning Fluid	4103/1204	1 L

1. Make the machine safe.

   Refer to: PIL 01-03-27.

2. Extend each ram fully.

3. Clean the piston, gland, piston rod and tube with cleaning solvent.

   Consumable: Surface Cleaning Fluid

4. Visually examine each ram for score marks, dents, leaks or similar defects.

5. Check the condition of the tube as follows.

   5.1. Illuminate the inside of the tube.

   5.2. Inspect the inside of the tube for deep grooves and other damage. If damaged, replace the tube.

   5.3. Remove small scratches on the inside of the tube with a medium grain emery cloth. Use the emery cloth with a rotary motion.

   5.4. Inspect the gland end of the tube for sharp edges that will cut the gland O-ring.

   5.5. Remove the sharp edges from the tube as required.

6. Check the condition of the piston rod as follows.

   6.1. Make sure that the piston rod is straight.

   6.2. If the piston rod is not straight, install a new piston rod.

   6.3. Inspect the piston for damage and wear.

   6.4. If the piston is damaged or worn, replace it.

7. Check the condition of the gland as follows.

   7.1. Inspect the gland for rust.

   7.2. Remove rust and clean as required.

00 - General

Introduction

The valve block consists of hydraulic servo operated spools that control the lift arm and dumper tip functions.

A MRV (Main Relief Valve) controls the maximum pressure generated in the hydraulic circuits.

03 - Quick Release Coupling

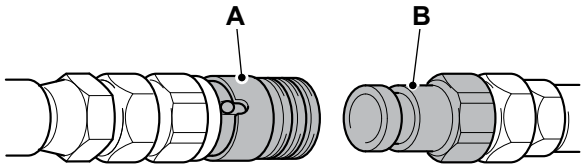
Introduction

The flat face quick release couplings allow the operator to remove and install attachments swiftly and efficiently. Generally, your machine pipework will have female couplings installed, and the optional attachment hoses will have male couplings installed.

The quick release couplings will be trouble free and relatively easy to connect and disconnect, if they are kept clean and used correctly. The recommendations listed below must always apply when using flat face quick release couplings.

Read the correct connecting and releasing procedures before you install or remove any optional attachment connected with quick release couplings.

Figure 386.



A Female coupling
B Male coupling

Essential Do's

- Before connecting or removing any hydraulic hose, the residual hydraulic pressure trapped in the service hose line must be vented. Make sure the hose service line has been vented before connecting or removing the hoses.
- Always wipe the two mating faces clean before connecting.
- Use caps and plugs when the couplings are disconnected.
- Always align the external locking ball (if used) with the notch in the locking sleeve and then pull the locking sleeve back fully to disconnect.
- If a coupling sticks, first check that pressure has been released. Make sure the locking ball and notch in the locking sleeve are aligned, pull back the sleeve and twist the couplings apart. Sticking is normally caused by dirt in the coupling or physical damage due to abuse.
- Connect and disconnect the new couplings two or three times to work the PTFE seals. Sometimes a new coupling will stick if the seal has not been worked.
- When connecting the couplings, only apply the spanner or grips to the hexagon and nowhere else.
- Avoid damage to the coupling faces. Burrs and scratches cause damage to the seals and cause leaks. They can also impede connection and disconnection of the couplings.

50 - Schematic Circuit

Introduction

A schematic wiring diagram is a simplified pictorial representation of the machines electrical circuit. It shows the components of the circuit as simplified electrical symbols, and the power and signal connections between the devices. The wiring diagram is used to troubleshoot problems and to make sure that all the connections have been made and that everything is present.

Use the schematics together with the correct electrical harness drawings to reference the connector pin details.

This section may contain more than one set of electrical schematics for different machine variants.

Understanding Electrical Schematics

Use the applicable schematic set to trace wires and connections between electrical devices. In most cases it will be necessary to trace wires across more than one schematic sheet.

The example identifies the information contained on the diagrams. It also shows how to follow wires from one diagram sheet to another.

The harness inter-connector codes and device harness connector codes are the same as used on the applicable harness drawings.

Splices are not normally accessible. Splices are inside the harness sheath and not visible on the outside. Wires are welded together at a splice, there are no individual connector components.

Figure 391. (Part 2 of 2)

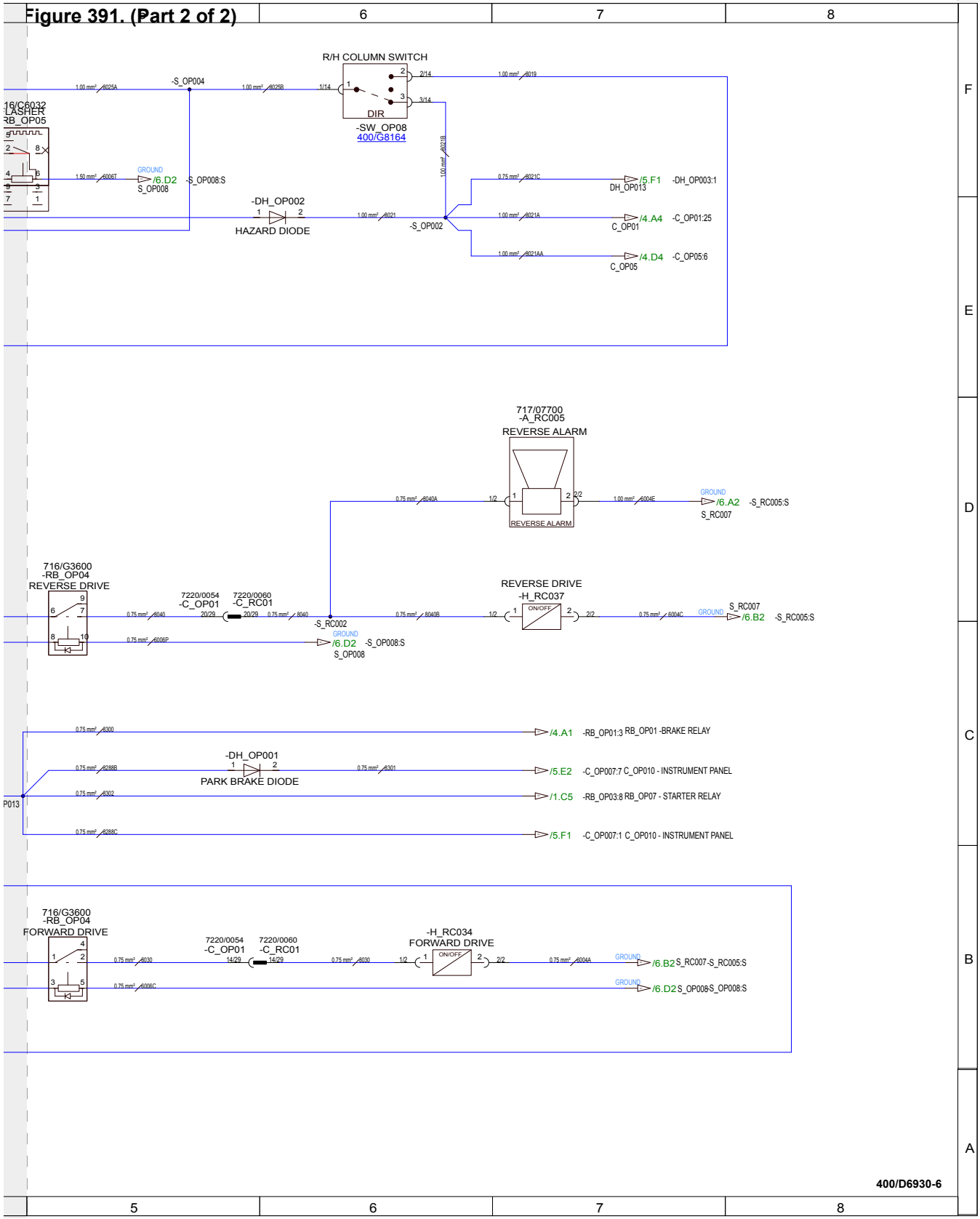


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Figure 394. Instrument Panel and LiveLink (400/D6930 Sheet 5 of 6)

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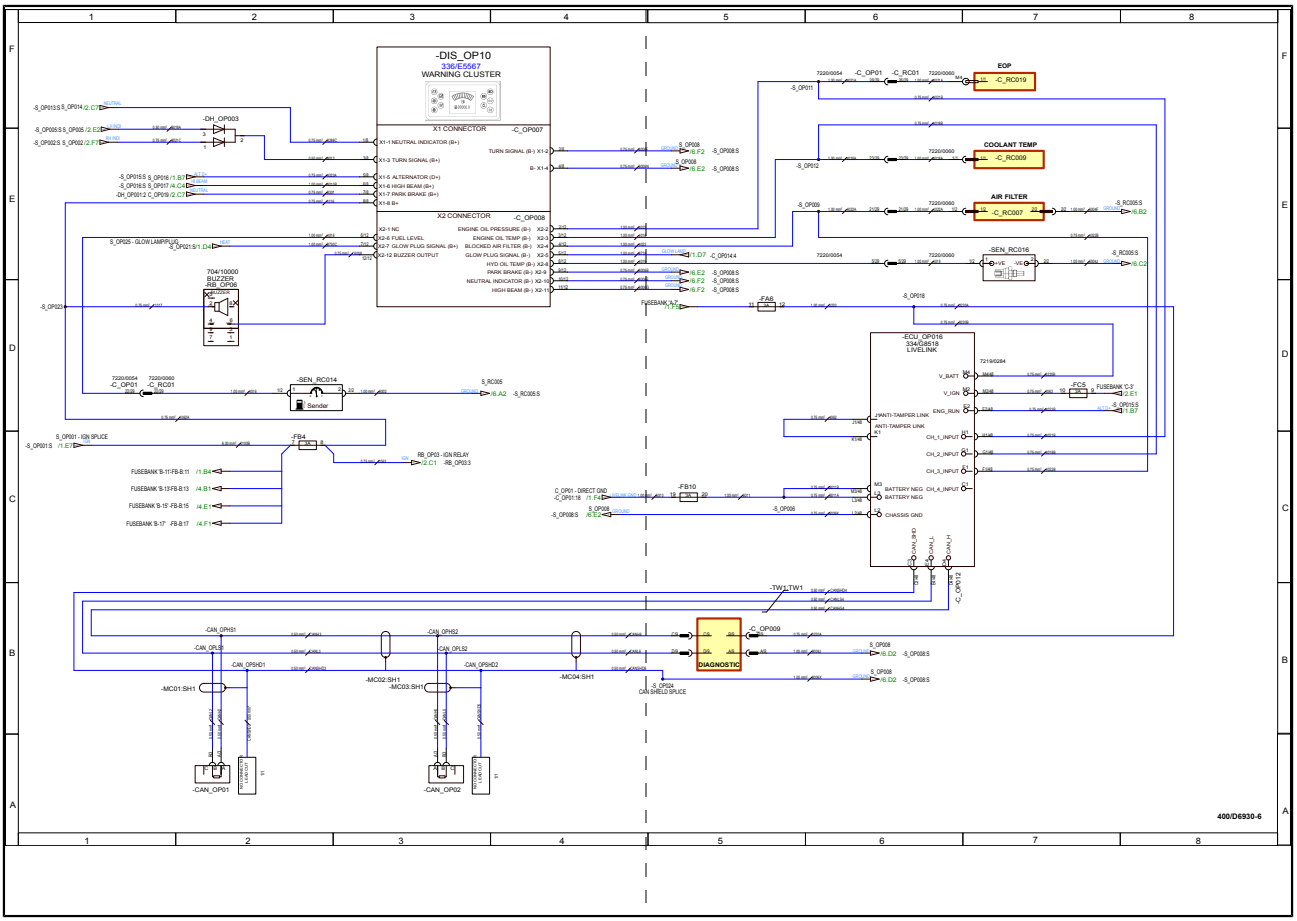
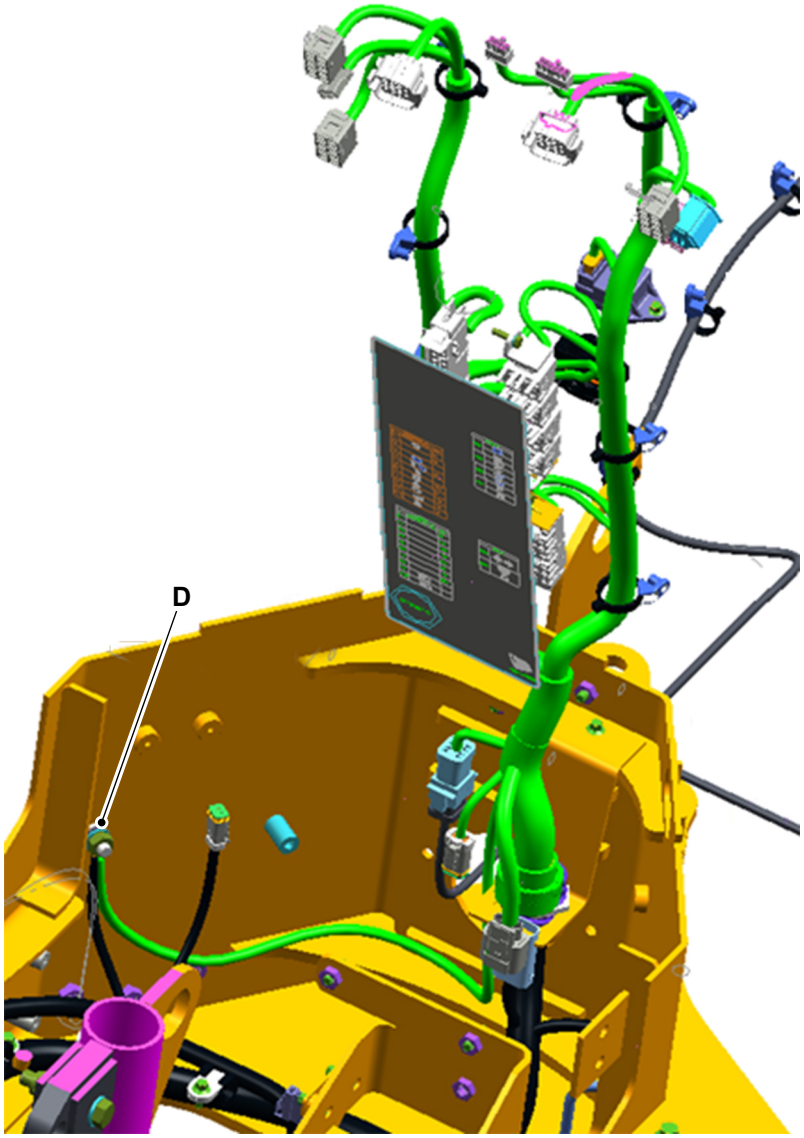


Figure 398.



D Rear chassis earth point - Front (T_OP001)

2. When reconnecting, attach the positive (+) lead first.

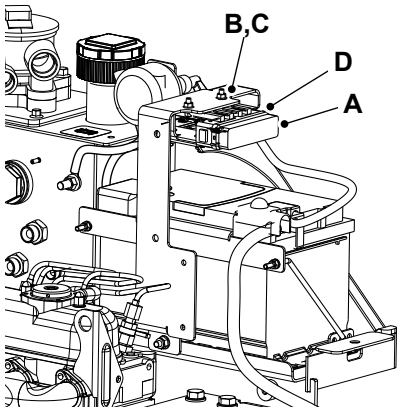
09 - Primary Fusebox

Remove and Install

Remove

1. Make the machine safe.
   Refer to: PIL 01-03-27.
2. Install the articulation lock.
   Refer to: PIL 06-27-15.
3. Open the engine compartment cover.
   Refer to: PIL 06-06-06.
4. Isolate the battery.
   Refer to: PIL 33-03.
5. Disconnect the electrical connections from the primary fusebox.
6. Remove the nut (x2) and bolt (x2).
7. Remove the primary fusebox with bracket from the machine.

Figure 408.



A Primary fusebox
B Nut (x2)
C Bolt (x2)
D Bracket

Install

1. The installation procedure is the opposite of the removal procedure.

Measuring Resistance

1. Make sure that there is no power to the part of the circuit you are about to measure.
2. Connect one probe at one end of the component or wire to be checked and the other probe at the other end. It does not matter which way round the two probes are placed.
3. Select the correct range on the multimeter.
   - 3.1. On the digital multimeter. Turn the switch to position C and check that the W sign at the right hand side of the display window is on. If the F sign is on instead, press the blue button G to change the reading to Ω. Touch the meter lead probes together and press the REL3 key on the meter to eliminate the lead resistance from the meter reading.
   - 3.2. On the AV0 meter, move the right hand slider switch to position B, and the left hand slider switch to the appropriate Ohms (Ω) range.
   - 3.3. On an analogue meter, move the dial to the appropriate Ohms (Ω) range.

Measuring Continuity

1. Make sure that there is no power to the part of the circuit you are checking for continuity.
2. Connect one probe to one end of the component or wire to be checked and the other probe to the other end. It does not matter which way round the two probes are placed.
3. Select the correct range on the multimeter.
   - 3.1. On the digital multimeter, turn the switch to position C and check that the beeper symbol appears at the left hand side of the display window. If the F sign is on instead, press the button labelled F. If there is continuity in the circuit, the beeper will sound. If there is no continuity (open circuit), the beeper will not sound.
   - 3.2. On the AV0 meter, move the right hand slider switch to position B, and the left hand slider switch to position C. If there is continuity (i.e. very low resistance) between two points the buzzer will sound.
   - 3.3. On an analogue meter, turn the dial to the lowest Ohms (Ω) range. If there is continuity (i.e. very low resistance) between two points the needle will move across fully (or almost fully) to the right hand side of the scale.

Measuring Frequency

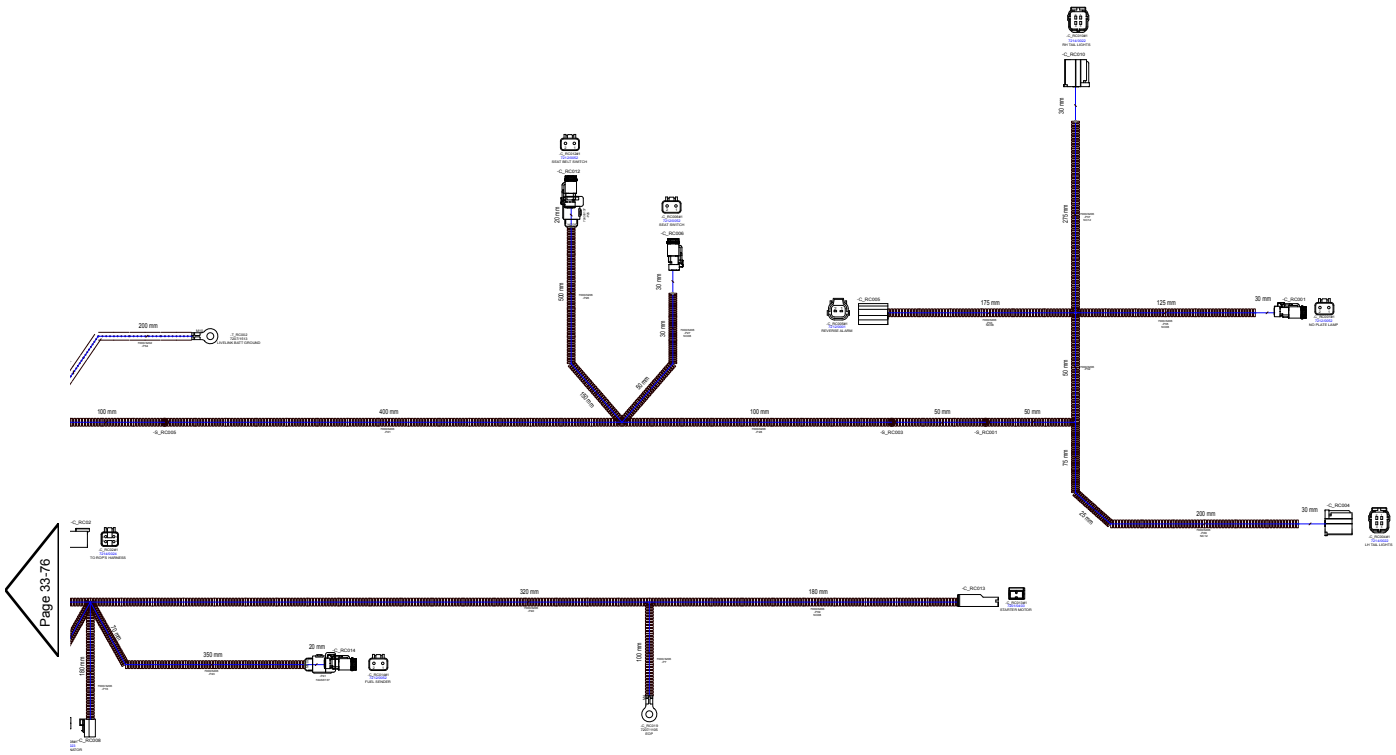
The AVO meter and the analogue meter are not capable of measuring frequency, therefore a digital multimeter must be used.

1. Insert the black plug into the COM socket on the meter and attach the probe to the nearest suitable earth point on the chassis, for example, the battery negative terminal.
2. Insert the red probe into socket J.
3. Turn the selector switch to position A and depress G repeatedly until F is highlighted on the top row of the display.
4. Press button H once.
5. Touch or connect the red probe to the frequency source to be measured. Press and hold the button if an average reading is required.

Testing a Diode or a Diode Wire

A diode wire is a diode with male connector installed on one end and a female connector installed on the other end. The diode is sealed in heatshrink sleeving. To test a Diode or a Diode Wire.

1. On the digital multimeter:
   - 1.1. Turn the switch to position D.
   - 1.2. Press the HOLD button and check that the H sign appears at the top right hand side of the display window.
   - 1.3. Connect the black probe to the end of the diode with a band or to the male connector of the diode wire. Connect the red probe to the other end of the diode or diode wire. If the beeper does not sound the diode or diode wire is faulty.
   - 1.4. Connect the red probe to the end of the diode marked with a band, or to the male connector of the diode wire, the black probe should be connected to the other end of the diode or diode wire. If the beeper sounds or the meter does not read O.L., the diode or diode wire is faulty.
   - 1.5. Press the HOLD button and check that the H sign disappears from the right hand side of the display window.
2. On the AV0 meter:
   - 2.1. Move the right hand slider to position A, and the left hand slider switch to position C.
   - 2.2. Connect the black probe to the end of the diode marked with a band, or to the male connector of the diode wire, the red probe should be connected to the other end of the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200 mm
100 mm
400 mm
100 mm
50 mm
50 mm
175 mm
125 mm
30 mm
200 mm
30 mm
320 mm
180 mm
350 mm
30 mm

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Figure 428. Operator Panel Harness - 400/N8869 (Sheet 1 of 4)

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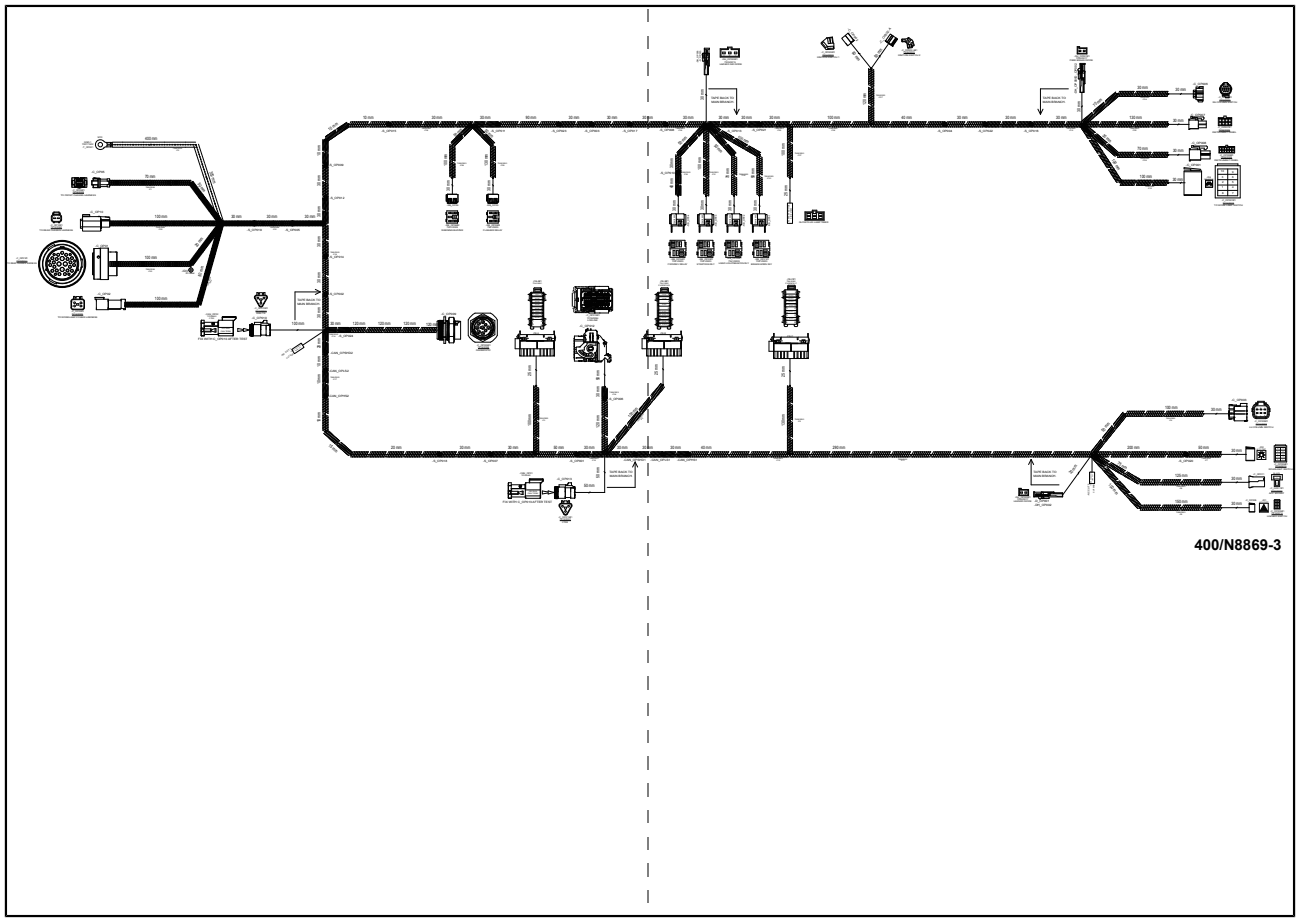

-FB-A FUSEBOX A

ID	Tag	Size	Colour	Destination	Cable	Cavity Seal
1	3500	3.00 mm²	YE	-RB_OP03:2	-W1	
2	3505	0.75 mm²	YE	-S_OP010:S	-W1	
3						
4	3506	2.00 mm²	YE	-RB_OP02:1	-W1	
5						
6	3507	2.00 mm²	YE	-S_OP022:S	-W1	
7	3001C	3.00 mm²	YE	-S_OP003:S	-W1	
8	3700	1.50 mm²	YE	-C_OP011:1	-W1	
9						
10	3007	2.00 mm²	YE	-C_OP005:3	-W1	
11						
12	3220	1.00 mm²	YE	-S_OP018:S	-W1	
13	0102B	4.00 mm²	YE	-C_OP002-A:7	-W1	
14	1004	2.50 mm²	YE	-RB_OP03:6	-W1	
14	1003	1.00 mm²	YE	-C_OP014:5	-W1	
15						
16	1005	2.00 mm²	YE	-C_OP01:7	-W1	
17						
18						
19						
20						

7241/0001 10 Way Sec Fusebox Housing
Additional Components
7241/0002;1 # 10 Way Sec Fusebox Retainer

-FB-B FUSEBOX B

ID	Tag	Size	Colour	Destination	Cable	Cavity Seal
1	8031	1.50 mm²	YE	-C_OP004:3	-W1	
2	8052B	1.00 mm²	YE	-S_OP019:S	-W1	
3						
4	8078	1.00 mm²	YE	-S_OP007:S	-W1	
5						
6						
7	0100B	6.00 mm²	YE	-S_OP001:S	-W1	
8	1062A	0.75 mm²	YE	-S_OP023:S	-W1	
8	1062	0.75 mm²	YE	-RB_OP03:3	-W1	
9						
10						
11						
12	1020	2.00 mm²	YE	-C_OP01:4	-W1	
13						
14	1051	1.00 mm²	YE	-RB_OP01:1	-W1	
15						
16	1050	2.00 mm²	YE	-S_OP020:S	-W1	
17						
18	1080	1.50 mm²	YE	-S_OP017:S	-W1	
19	6010	1.00 mm²	YE	-C_OP01:18	-W1	
20	6011	1.00 mm²	YE	-S_OP006:S	-W1	

7241/0001 10 Way Sec Fusebox Housing
Additional Components
7241/0002;1 # 10 Way Sec Fusebox Retainer

-FB-C FUSEBOX C

ID	Tag	Size	Colour	Destination	Cable	Cavity Seal
1						
2						
3	0100A	6.00 mm²	YE	-S_OP001:S	-W1	
4	1006	2.00 mm²	YE	-C_OP005:1	-W1	
5						
6	1008	0.75 mm²	YE	-C_OP01:15	-W1	
7						
8	1099	1.50 mm²	YE	-C_OP006:4	-W1	
9						
10	1063	0.75 mm²	YE	-C_OP012:M2	-W1	
11						
12						
13						
14	1014	1.00 mm²	YE	-S_OP014:S	-W1	
15						
16						
17	0102	1.00 mm²	YE	-C_OP002-A:8	-W1	
18	8730	1.00 mm²	YE	-S_OP021:S	-W1	
19						
20						

7241/0001 10 Way Sec Fusebox Housing
Additional Components
7241/0002;1 # 10 Way Sec Fusebox Retainer

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Figure 433. Worklamp Power Harness - 400/N7241 (Sheet 1 of 1)

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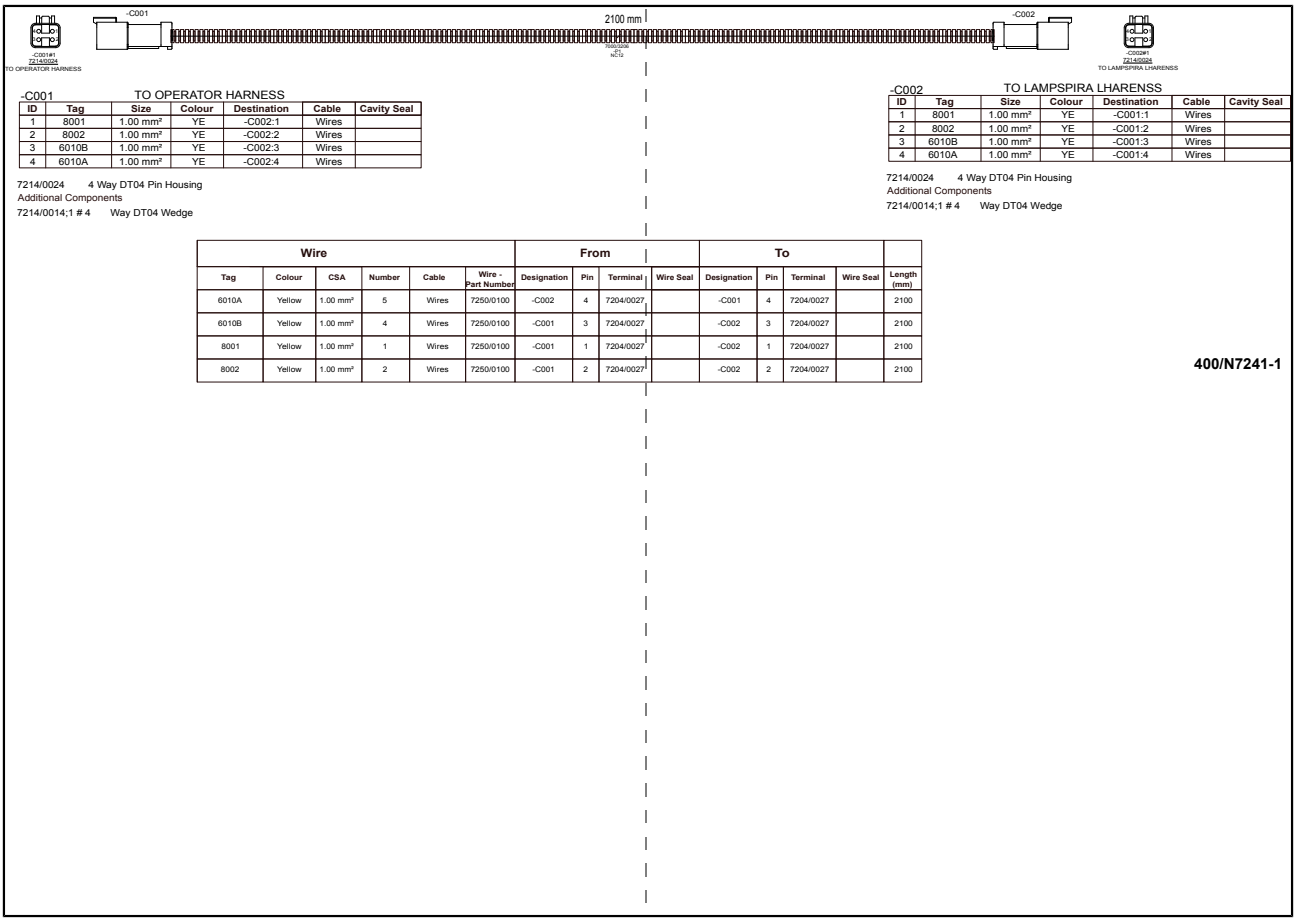

-C001 TO OPERATOR HARNESS

ID	Tag	Size	Colour	Destination	Cable	Cavity Seal
1	8001	1.00 mm²	YE	-C002:1	Wires	
2	8002	1.00 mm²	YE	-C002:2	Wires	
3	6010B	1.00 mm²	YE	-C002:3	Wires	
4	6010A	1.00 mm²	YE	-C002:4	Wires	

7214/0024 4 Way DT04 Pin Housing
Additional Components
7214/0014;1 # 4 Way DT04 Wedge

-C002 TO LAMPSPIRA LHARENSS

ID	Tag	Size	Colour	Destination	Cable	Cavity Seal
1	8001	1.00 mm²	YE	-C001:1	Wires	
2	8002	1.00 mm²	YE	-C001:2	Wires	
3	6010B	1.00 mm²	YE	-C001:3	Wires	
4	6010A	1.00 mm²	YE	-C001:4	Wires	

7214/0024 4 Way DT04 Pin Housing
Additional Components
7214/0014;1 # 4 Way DT04 Wedge

Wire						From				To				
Tag	Colour	CSA	Number	Cable	Wire - Part Number	Designation	Pin	Terminal	Wire Seal	Designation	Pin	Terminal	Wire Seal	Length (mm)
6010A	Yellow	1.00 mm²	5	Wires	7250/0100	-C002	4	7204/0027		-C001	4	7204/0027		2100
6010B	Yellow	1.00 mm²	4	Wires	7250/0100	-C001	3	7204/0027		-C002	3	7204/0027		2100
8001	Yellow	1.00 mm²	1	Wires	7250/0100	-C001	1	7204/0027		-C002	1	7204/0027		2100
8002	Yellow	1.00 mm²	2	Wires	7250/0100	-C001	2	7204/0027		-C002	2	7204/0027		2100

400/N7241-1

J	Engine air filter blocked	Illuminated if the engine air filter is blocked. If the air filter warning light comes on, stop the machine and switch off the engine. After a short pause start the engine. If the warning light has extinguished carry on operating the machine in the normal manner. If the warning light is still illuminated after the engine has been started check that the engine air filter elements are not blocked.
K	Neutral	Illuminates when the transmission is in neutral.
L	Fuel Level Gauge	Indicates the level of diesel fuel in the tank. Do not let the tank run dry, or air will enter the fuel system. Do not run the machine if the indicator needle goes into the red area.
M	Hourmeter	The hour meter records the engine operating hours

57 - Electronic Diagnostic

Contents **Page No.**

03 - Screws

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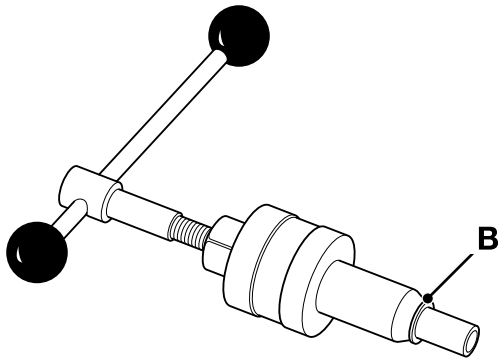
00 - General

Check (Condition)

1. Carefully inspect all rollers, cages and cups for wear, chipping, or nicks to determine the condition of the bearings for further use.
2. Do not replace a bearing cone or cup individually. Replace the mating cup and the cone at the same time.
3. After inspection, lubricate the bearings with a suitable clean oil.
4. Wrap the bearings in clean lint free cloth or paper to protect them until you install the bearings again.

Figure 452.

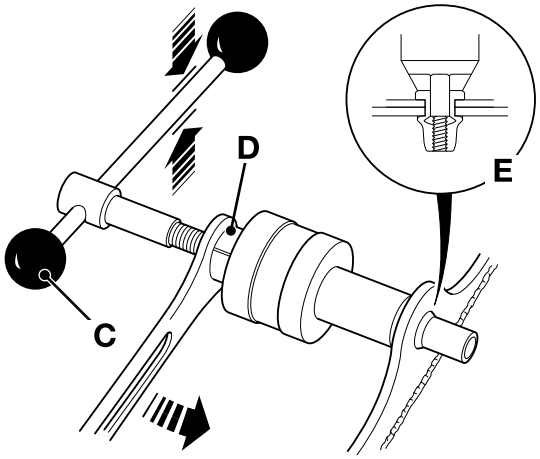


B Head of threaded insert

5. Insert the threaded insert (assembled to the tool) into the hole drilled in step 1.

6. Hold handle and at the same time draw the mandrel into the installation tool by turning nut. The threaded insert will contract in length and form an upset (smooth bulge) seating itself against the body/ framework. Note: The thread of the threaded insert must not be stripped, take care when upsetting the threaded insert.

Figure 453.



C Handle
D Nut
E Body/Framework

7. Remove the installation tool.

- Throw away oil-soaked shoes

Battery

Warning Symbols

The following warning symbols may be found on the battery.

Figure 454.

A Keep away from children
B Shield eyes
C No smoking, no naked flames, no sparks
D Explosive gas
E Battery acid
F Note operating instructions

First Aid - Oil

Eyes

In the case of eye contact, flush with water for 15min. If irritation persists, get medical attention.

Swallowing

If oil is swallowed do not induce vomiting. Get medical advice.

Skin

In the case of excessive skin contact, wash with soap and water.

Spillage

Absorb with sand or a locally approved brand of absorbent granules. Scrape up and remove to a chemical disposal area.

Fires

⚠ **WARNING** Do not use water to put out an oil fire. This will only spread it because oil floats on water.

Extinguish oil and lubricant fires with carbon dioxide, dry chemical or foam.

First Aid - Electrolyte

Eyes

In the case of eye contact, flush with water for 15 min. always get medical attention.

Swallowing

Do not induce vomiting. Drink large quantities of water or milk. Then drink milk of magnesia, beaten egg or vegetable oil. Get medical help.

Skin

Flush with water, remove affected clothing. Cover burns with a sterile dressing then get medical help.

First Aid - DEF (if applicable)

Do not drink or inhale DEF (Diesel Exhaust Fluid). If large quantities of DEF have been swallowed a doctor should be called immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person.

Avoid prolonged or repeated skin contact. After contact with skin wash thoroughly with plenty of soap and water. If irritation develops seek medical advice.

Avoid contact with eyes, skin and clothing. Wear chemical resistant gloves, overalls and safety goggles complying with an approved standard. If in contact with eyes, rinse immediately with plenty of clean water. If irritation occurs seek medical attention. Always wash hands and arms thoroughly after handling before eating, drinking, smoking or using the lavatory.

00 - General

Introduction

It is most important that you read and understand this information and the publications referred to. Make sure all your colleagues who are concerned with lubricants read it too.

Hygiene

JCB lubricants are not a health risk when used properly for their intended purposes.

However, excessive or prolonged skin contact can remove the natural fats from your skin, causing dryness and irritation.

Low viscosity oils are more likely to do this, so take special care when handling used oils, which might be diluted with fuel contamination.

Whenever you are handling oil products you should maintain good standards of care and personal and plant hygiene. For details of these precautions we advise you to read the relevant publications issued by your local health authority, plus the following.

Storage

Always keep lubricants out of the reach of children. Never store lubricants in open or unlabelled containers.

Waste Disposal

All waste products should be disposed of in accordance with all the relevant regulations.

The collection and disposal of used oil should be in accordance with any local regulations. Never pour used engine oil into sewers, drains or on the ground.

Subsection	Commercial name	Product Number	Colour	Shelf life	Drying Time	Comments
Direct glazing	Sika activator	4104/2100	Clear	365 d	10 min minimum drying time	HIGHLY FLAMMABLE. A cleaning and activating agent specifically formulated for the treatment of bonded faces in direct glazing applications prior to applying the direct glazing adhesive.
Direct glazing	Sika remover 208 (use 4104/3600)	4104/1900	Transparent	-	-	A cleaning agent for removing contaminates on painted surfaces and glass.
Direct glazing	Sika cleaner 205 (use 4104/3600)	4104/1200	Clear	-	-	A cleaning agent for removing contaminates on painted surfaces and glass.
Direct glazing	Sika primer 209 (use 4104/3500)	4104/2300	Black	270 d	Application temperature 10 –35 °C (50.0 –95.0 °F)	Used to prime painted surfaces and plastic substrates prior to bonding with Sikaflex products.
Direct glazing	Sika aktivator	4104/2400	Clear	365 d	10 min at more than 15 °C (59.0 °F) or 30 min at less than 15 °C (59.0 °F)	Used to clean and give improved adhesion on glass, ceramic-coated glass, the cut face of old polyurethane adhesive beads, polyurethane coated windows glass and paints.
Active wipe for surface	Terostat 8560 AC-25	4104/3400	Colourless	270 d	Minimum 30 s and maximum 1 h	Applied with a clean cloth to the surface, the adhesive may then be applied after the drying time. Applied to glass or ceramic coating but only in the bonding area.
Direct glazing	Terostat 8519 P	4102/3500	Black	0.1 L bottle = 365 d. 0.01 L and 0.035 L bottle = 540 d	Approx. 2 min	Used to promote adhesion in direct glazing to glass and glass ceramics.
Cleaner	Teroson FL cleaner	4104/3600	Clear	730 d	Depending on conditions between 2 – 10 min.	Used for degreasing and cleaning of substrates prior to application of adhesives and sealants.

Subsection	Commercial name	Product Number	Colour	Shelf life	Technical data	Comments
Low strength	Loctite 572	4102/1100	White opaque	730 d	40 –100 bar (579.7 –1,449.3 psi) break-away torque	Used where slow cure is required to permit component alignment. PTFE (Polytetrafluoroethylene) filler.
Gasketing medium strength	Loctite 509 Gasket Eliminator Flange Sealant	4102/3200	Blue to green	0.2 mm gap filling	72 h full strength on steel	Easy disassembly, used as form-in-place gasket.
Gasketing medium strength	Loctite 574[(1)]	4102/1200	Red	730 d	2 h working strength	Does not creep or relax after curing, no bolt re-tightening is required. Oil resistant. Ideal for formed in-situ gaskets.
	Permabond A136					
Sealant for gaskets	Loctite FAG 2 / Loctite 5922	4102/2600	Black	365 d	Resists pressures up to 345 bar (5,000.0 psi)	Used to dress new or worn gaskets. Dries slowly, sets to pliable film for easy dismantling.
Rubber jointing compound	Dow corning 781	4102/0900	Clear or translucent	270 d	16.7 bar (242.0 psi) tensile strength	A synthetic rubber joint sealant suitable for joints between non-porous surfaces such as glass and metal, metal and metal where relatively large gap filling properties are required. Suitable for vertical and overhead applications under normal atmospheric conditions. Joint movement approx.+/-12.5%. Cure time to 6 mm depth in 24 h.
	Loctite superflex clear RTV3					
	EVOstick standard industrial clear silicone sealant					
	Dunlop high modulus silicone sealant DP2205					
Epoxy resin	Loctite fast epoxy sealant	4102/2400	Slightly coloured transparent	- /	-	0.05 L container requires special bi-mixer (gun) so it is mixed as dispensed, 0.024 L is mixed by hand.

24 - Maintenance Schedules

Contents **Page No.**

00 - General

Introduction

The tools shown are the special tools required for completing the procedures described in this manual. These tools are available from JCB Service or in some instances can be manufactured locally.

The tools are divided into three categories:

- Special Tool = Only available from JCB.
- Recommended Tool = Available from JCB but other tool manufacturers/suppliers may offer a tool with the same characteristics.
- General Tool = A tool which is widely available.

Tools other than those listed will be required. It is expected that such general tools will be available in any well equipped workshop or be available locally from any good tool supplier.

Before you start work, make sure that all safety precautions are observed in accordance with the information contained within the relevant support documentation.