JCB

SERVICE MANUAL
Volume 1

506-36, 507-42,
509-42, 510-56, 512-56

EN 9823/1700

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SERVICE MANUAL
Volume 2

506-36, 507-42,
509-42, 510-56, 512-56

EN 9823/1700

JCB

SERVICE MANUAL
Volume 3

506-36, 507-42,
509-42, 510-56, 512-56

EN 9823/1700

JCB

SERVICE MANUAL
Volume 4

506-36, 507-42,
509-42, 510-56, 512-56

EN 9823/1700

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03 - Safety

Contents **Page No.**

01-03-03 Safety - Yours and Others 01-3
01-03-06 Safety Warnings 01-4
01-03-09 General Safety 01-5
01-03-12 Maintenance Safety 01-6
01-03-18 Operating Safety 01-8
01-03-21 Worksite Safety 01-11
01-03-24 Risk Assessment 01-12
01-03-27 Maintenance Positions 01-13

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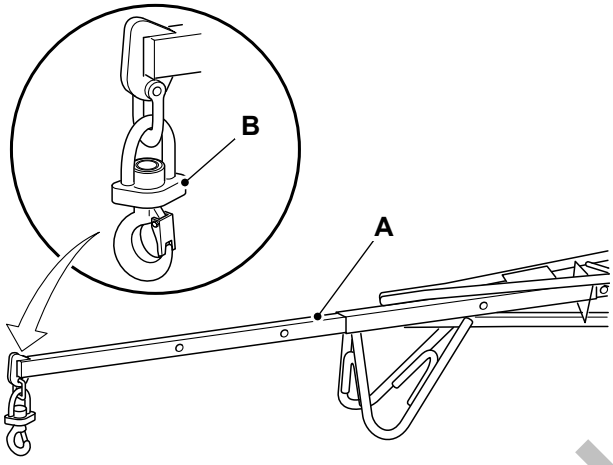
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06 - Shackle

Introduction

This a Q-fit attachment. It gives your machine greater reach and height. This attachment is supplied with test certificates for its fabrication, its hook and its shackle. The safe working load is stamped on a plate mounted on the attachment.

Figure 7.



A Roof truss jib
B Hook

Installing/Removing

The attachment is heavy. Take care when lifting and handling it. Use suitable lifting equipment. Make sure the lifting equipment is in good condition. Make sure the lifting equipment complies with all relevant regulations. Wear gloves and safety shoes.

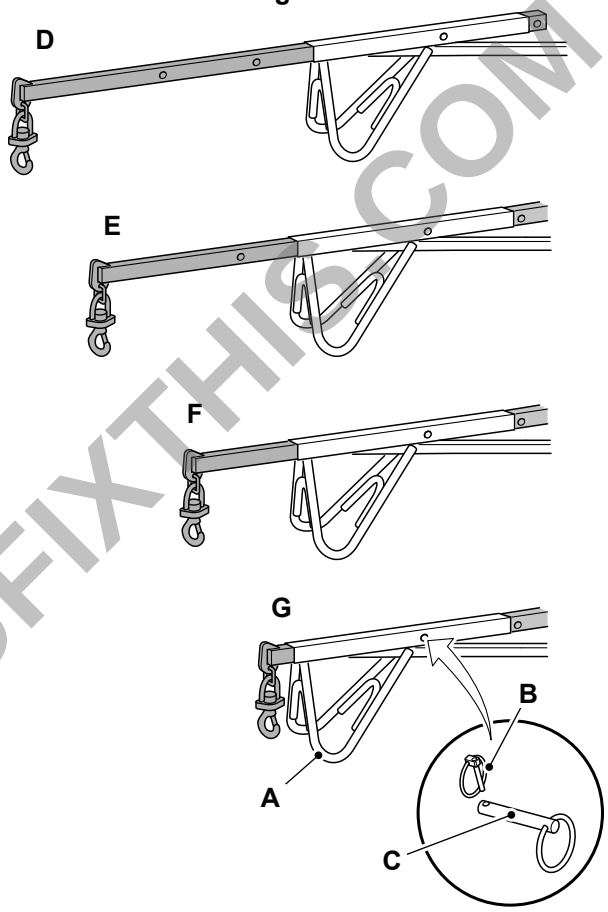
The installation will be easier if the attachment is rested on wooden blocks.

Store the attachment carefully to prevent damage and corrosion.

Extending the Jib

The jib may be extended to one of four positions:

Figure 8.



A Skid
B Lynch pin
C Pin
D Jib- fully extended
E Jib- extended position 1
F Jib- extended position 2
G Jib- fully retracted

1. Remove the load and lower the jib to the ground.
2. Make sure the skid is supporting the weight of the jib.
3. Remove the lynch pin, then pin.
4. Move the jib extension to the required position; fully extended or fully retracted.
5. Insert the pin and secure with lynch pin.

Changing the Jib Angle

The angle of the jib may be set in one of two positions.

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03 - Battery Compartment

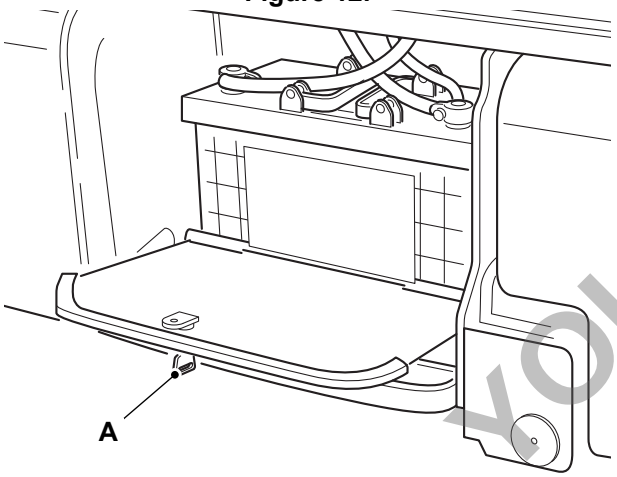
Remove and Install

Single Step Installation

Open

1. Make the machine safe.
   Refer to: PIL 01-03-27.
2. Use the key to unlock the battery compartment cover.
3. Open the battery compartment cover.

Figure 12.



A Battery compartment cover

Close

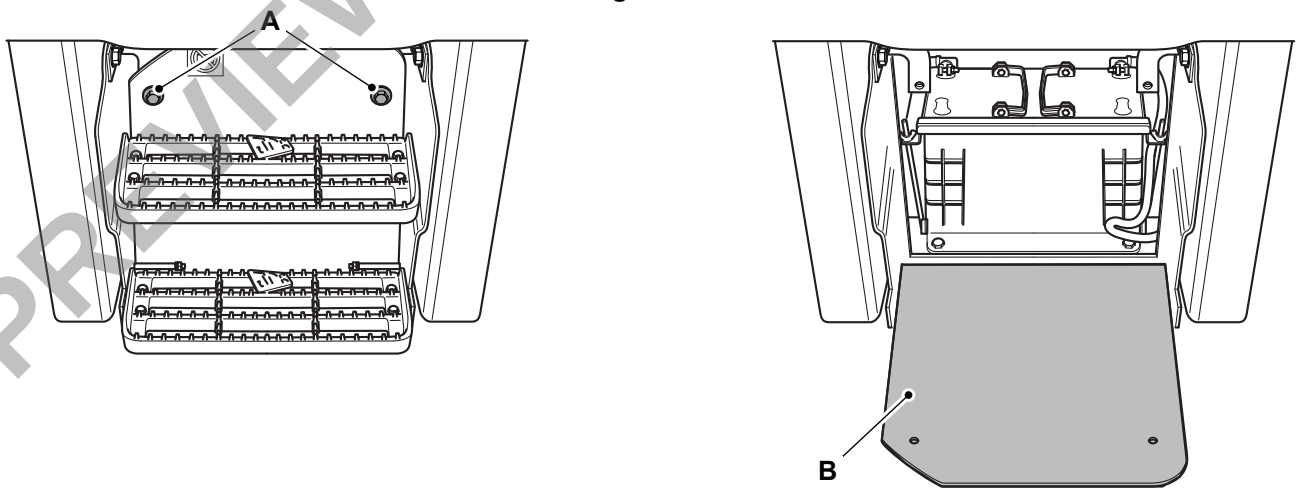
1. Close the battery compartment cover.
2. Make sure the battery compartment cover is closed correctly.
3. Use the key to lock the battery compartment cover.

Twin Step Installation

Open

1. Make the machine safe.
   Refer to: PIL 01-03-27.
2. Remove the bolts (and washers).
3. Lift the battery compartment cover to a small distance and allow the cover to pivot forward.

Figure 13.



A Bolts

B Battery compartment cover

Close

1. Position the battery compartment cover.
2. Install the bolts.
3. Tighten the bolts to the correct torque value.

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00 - Operator Station

Contents **Page No.**

09-00-00 General 09-3
09-00-03 Cab Frame 09-5
09-00-06 Operator Protective Structure 09-10

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00 - Heating, Ventilating and Air-Conditioning (HVAC)

Contents **Page No.**

12-00-00 General 12-3

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

00 - Engine

Contents **Page No.**

15-00-00 General 15-3

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

00 - Fuel and Exhaust System

Contents **Page No.**

18-00-00 General 18-3
18-00-30 Throttle Control System 18-13

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Fault-Finding

Fault

Coolant - Loss.	Table 148.	Page 21-8
Coolant - Over Temperature.	Table 149.	Page 21-8
Coolant - Under Temperature.	Table 150.	Page 21-9
Coolant - Contaminated.	Table 151.	Page 21-9

Table 148. Coolant - Loss.

Cause	Remedy
Incorrect coolant level.	Check the level.
Coolant leaking from engine radiator or cab heater.	Visually inspect the radiator heater, hoses and connection to locate the leak. If oil is present in the coolant, check for a transmission or engine oil cooler leak.
External engine coolant leak.	Visually inspect the engine and components for seal, gasket hose connection leaks. Make sure all hose clips are in good condition and torqued to the recommended figure. Make sure all spring band clamps are in good condition and apply sufficient pressure to the hoses.
Overheating or compression gases leaking, resulting in loss through the radiator overflow.	See Also: Table 149. Coolant - Over Temperature.
If installed, transmission cooler leak.	Check/replace the transmission cooler. Check for coolant in the inlet manifold and in the oil.
Lubricating oil cooler leak.	Check/replace the oil cooler. Check for coolant in the oil.
EGR (Exhaust Gas Recirculation) cooler leak (if applicable).	Check/replace the EGR cooler. Check for signs of coolant leaking into combustion chamber.
Cylinder head gasket leak.	Check/replace the head gasket.
Cylinder head cracked or porous.	Check/replace the cylinder head.
Crankcase coolant passages leaking.	Check/replace the crankcase.

Table 149. Coolant - Over Temperature.

Cause	Remedy
Incorrect coolant level (low).	Check the level. See Also: Table 148. Coolant - Loss.
External radiator matrix blocked with dirt or chaff.	Clean exterior or radiator matrix.
Air flow to the radiator inadequate or restricted.	Check/repair fan shroud, anti-recirculation sealing, shutters, fan sensors, fan speeds as required.
Coolant pump or fan drive belts loose.	Check/correct belt tension.
Radiator hose collapsed, restricted or leaking.	Check/replace hose.
Oil level overfilled.	Check oil level.
Cooling system pressure cap incorrect or faulty.	Replace cap with the correct rating for the system.
Over concentration of anti-freeze.	Remove part of the coolant from cooling system and replace with water.
Temperature sensor gauge faulty.	Check the electronic fault codes. Verify that the gauge and temperature sensor are accurate.
Thermostat faulty, incorrect or missing.	Check/replace the thermostat.
Air or combustion gases in the cooling system.	Make sure the fill rate is not exceeded and the correct vented thermostat is installed. If aeration continued, check for a compression leak through the head gasket.

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Technical Data

For: 506-36 [T2/T3] ..... Page 24-5
For: 507-42 [T2/T3], 509-42 [T2/T3], 510-56 [T2/T3], 512-56 [T2/T3] ..... Page 24-5

(For: 506-36 [T2/T3])

Single axle service brakes system

Table 163. Service brake

Type	Single circuit, oil immersed multi-plate disc.
Actuation	Hydraulic.
	Hydraulic, servo assisted.(1)
Location	Front axle, centre mounted (2 brake packs).

(1) Machines with turbo inter-cooled engines.

Table 164. Master cylinder

Type	Master cylinder.
	Master cylinder with remote servo unit.(1)
No. of Cylinders	1
Diameter	31.75 mm
Stroke	39 mm
Displacement	Minimum- 2835 cc.

(1) Machines with turbo inter-cooled engines.

Table 165. Servo unit

Type	Vacuum assisted hydraulic valve.
Vacuum cylinder diameter	175 mm
Hydraulic cylinder diameter	22.2 mm
Brake vacuum pressure	0.8 –1 bar (11.6 –14.5 psi)
Minimum oil displacement	23.6 cc
Stroke	61 mm

Table 166. Park brake

Type	Independent disc (with manually adjusted calliper) park brake in the drive to the front axle.
Actuation	Cable operated.
Location	Mounted on the gearbox.
Disc diameter	279.4 mm

(For: 507-42 [T2/T3], 509-42 [T2/T3], 510-56 [T2/T3], 512-56 [T2/T3])

Twin axle service brake system (S1)

Table 167. Service brakes

Type	Single circuit, oil-immersed multi-plate disc.
Actuation	Hydraulic, servo assisted.(1)
Location	Front axle, centre mounted (2 brake packs).
	Rear axle, centre mounted (2 brake packs).

(1) Machines installed with turbo inter-cooled engines.

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00 - Steering System

Contents **Page No.**

25-00-00 General 25-3
25-00-03 Manual Steer Mode System 25-15

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00 - General

Introduction 27-7
Technical Data 27-8
Component Identification 27-9
Operation 27-19
Diagram 27-27
Fault-Finding 27-36
Drain and Fill 27-43
Clean 27-44
Check (Condition) 27-44
Check (Level) 27-45
Check (Pressure) 27-46
Remove and Install 27-59
Disassemble and Assemble 27-62

Introduction

Semi-automatic gearboxes are a form of transmission where an integrated control system handles manipulation of the gear clutches automatically, but the driver can still take manual control of gear selection.

Many of these transmissions allow the driver to fully delegate gear shifting choice to the control system, which then effectively acts as if it is an automatic transmission. An automatic transmission uses a torque converter instead of a straight friction clutch to manage the connection between the transmission gearing and the engine.

A typical JCB semi-automatic transmission is called Powershift, it has an (A) on the gearshift to signify Automatic. In this mode the machine will gear change automatically according to road speed. The following types exist:

- PS750
- PS764
- PS766

Not all types of transmission are available on all types of machine. Check the operators manual or transmission dataplate for the type of transmission installed on your machine.

Table 215. Transmissions

Machine	Transmission Option	Transmission Option	Transmission Option
526-56	PS750	-	-
536-60	PS750	PS764	PS766
536-70	PS750	PS764	PS766
531-70	PS750	PS764	PS766
541-70	PS750	PS764	PS766
535-95	PS750	PS764	PS766
550-80	-	PS764	-
560-80	-	PS764	-
533-105	PS750	-	-
535-v125	PS750	-	-
540-v140	PS750	-	-
540-140	PS750	PS764	-
540-170	PS750	PS764	-
540-v180	PS750	-	-
540-200	PS750	PS764	-
550-140	PS750	PS764	-
550-170	PS750	PS764	-

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00 - General

Contents **Page No.**

30-00-00 General 30-3
30-00-03 Smooth Ride System (SRS) 30-18
30-00-09 Levelling System 30-19
30-00-12 Load Sense System 30-27
30-00-15 Parallel Open Centre System 30-34
30-00-30 Rear Axle Stabilization (RAS) System 30-38
30-00-36 Interlock System 30-61
30-00-49 Schematic Symbols 30-71
30-00-50 Schematic Circuit 30-75

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00 - Electrical System

Contents **Page No.**

33-00-00 General 33-3
33-00-50 Schematic Circuit 33-8
33-00-90 Earth Point 33-140

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00 - Fasteners and Fixings

Contents **Page No.**

72-00-00 General 72-3

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Technical Data

JCB recommend that you use the JCB lubricants shown as they have been verified by JCB for use on JCB machines. However, you could use other lubricants that are equivalent to the JCB standards and quality or offer the same machine component protection.

No warranty liability will be accepted for engine failures where unacceptable fuel grades (or their equivalent) have been used at any stage.

Table 526.

Item	Capacity	Fluid/Lubricant	JCB Part Number	Container Size[1]
Diesel Fuel Tank	132 L	Diesel Oil		
Engine (Oil)[2]	Min 12.5 L - Max 15 L	JCB Engine Oil EP 15W40 -10 – 50 °C (14.0 –121.9 °F)	4001/1805	20 L
		JCB Cold Climate Engine Oil EP 5W40 -20 –50 °C (-4.0 –121.9 °F)	4001/2705	
Engine (Coolant)[3]	20 L	JCB Antifreeze HP/Coolant + Water	4006/1120	20 L
Gearbox	19 L	JCB Transmission Fluid EP 10W, -32 –40 °C (-25.6 –103.9 °F)[4]	4000/2505	20 L
Front axle housing	18 L	JCB Gear oil HP plus	4000/2205[5]	20 L
Front Hubs	2 L	JCB Gear oil HP plus	4000/2205[5]	20 L
Rear axle housing	13 L	JCB Gear oil HP plus	4000/2205[5]	20 L
Rear Hubs	2 L	JCB Gear oil HP plus	4000/2205[5]	20 L
Brake system		JCB Hydraulic fluid HP 15[6]	4002/0503	5 L
Hydraulic tank [7]	128 L	JCB Hydraulic Fluid HP - Above 38 °C (100.3 °F)	4002/0805	20 L
		Below 38 °C (100.3 °F)	4002/1025	
Grease Points		JCB Special HP Grease[8]	4003/2017	0.4 kg
		JCB Special MPL-EP Grease	4003/1501	0.4 kg
Wear pad runways		JCB Waxoyl	4004/0502	5 L
Boom hoses		JCB Special Slide Lubricant	4003/1115	0.4 kg
Boom chains		JCB Chain Lubricant	4004/0237A	0.3 L

(1) For information about the different container sizes that are available (and their part numbers), contact your JCB Dealer.
(2) Do not use ordinary engine oil.
(3) It is recommended that the cooling system be filled at a maximum rate of 6L (1.6gal) per minute. If the fill rate is any higher than this then there is a possibility of air becoming trapped in the system.
(4) Friction modified oils must not be used (eg Dexron ATF type).
(5) Must be suitable for use with oil immersed brakes and limited slip differentials (LSD).
(6) Do not use ordinary brake fluid.
(7) This is nominal tank capacity. The total hydraulic system capacity depends on the equipment being used. Fill with all cylinders closed. Watch level sight glass when filling.
(8) JCB Special HP Grease is the recommended specification grease. If JCB Special MPL-EP Grease is used, all 50 h greasing operations must be carried out at 10 h intervals; all 500 h greasing operations must be carried out at 50 h intervals.

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06 - Pre-start Cold Checks, Service Points and Fluid Levels

Technical Data

Table 542.

	Operation	10 h	50 h	100 h	500 h	1,000 h	2,000 h	6,000 h
ENGINE								
Coolant quality and level	Check	☐	☐	☐	☐	☐		
Cooling system	Drain and Refill						☐	☐
Oil level	Check	☐	☐					
Oil and filter[2, 3, 4]	Change				☐	☐	☐	☐
Air filter dust valve[5]	Clean				☐	☐	☐	☐
Air filter outer element[5]	Change					☐	☐	☐
Air filter inner element	Change						☐	☐
Pre-Filter (if installed)	Check			☐				
Water separator	Check for contamination and Drain		☐	☐	☐	☐	☐	☐
Water separator fuel filter[6]	Change				☐	☐	☐	☐
Engine fuel filter[6]	Change					☐	☐	☐
FEAD belt condition	Check				☐	☐	☐	☐
FEAD belt	Change							☐
Powertrain mounting bolts for tightness	Check			☐	☐	☐	☐	☐
All Hoses - Condition	Check			☐	☐	☐	☐	☐
Radiator[5]	Clean				☐	☐	☐	☐
CCV filter (if installed)	Change					☐	☐	☐
Valve clearances[7]	Check and Adjust						☐	☐
Oil filler and dipstick seals	Change						☐	☐
Injectors[7]	Change							☐
Injector(s) leak off rail[7]	Change							☐
High pressure fuel lines[7]	Change							☐
TRANSMISSION, AXLES AND STEERING								
Transmission mount security	Check			☐				
Transmission oil level	Check	☐	☐	☐	☐			
Transmission oil[8]	Change					☐	☐	☐
Transmission oil filter	Change			☐	☐	☐	☐	☐
Axle mount security	Check			☐				
Axle(s) oil level	Check		☐	☐				
Axle(s) oil	Change				☐	☐	☐	☐

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Notes:

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HVAC System	Location (All Machines)
Evaporator matrix	Part of HVAC unit
Compressor	Fixed to engine (RHS)
Binary switch	Fixed to pipe next to compressor
Receiver drier	Fixed to chassis inside engine compartment
Condenser - cooling pack mount	Part of machine cooling pack inside engine compartment
Condenser - roof mount	Fixed to a frame fixed at the rear of the cab roof. Includes electric cooling fans

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72 - Alternator

Contents **Page No.**

15-72-00 General 15-225
15-72-03 Pulley 15-233
15-72-06 Voltage Regulator 15-234

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7. Adjust the sleeve and the locknut 2 until you get the dimension measured between the sleeve and the locknut at the time of removal.
8. If a new cable is installed make sure that the dimension between the sleeve and the locknut will be of the specified value.

   Dimension: 15 mm
9. Tighten the locknut 2.
10. Make sure that the cable clevis is is connected at the correct hole in the caliper actuating lever.
11. Make sure that the actuating lever is not being pulled by the cable when the park brake lever is in the off (horizontal) position.
12. If necessary adjust sleeve until the actuating lever is allowed to return fully to its off position.
13. Adjust the cable. Refer to (PIL 24-18-06).

Table 185. Torque Values

Item	Description	Nm
K	Bracket fixing bolts	3

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1.2. Remove the output shaft nut.

1.3. Support the output shaft from inside the case and remove the brake disc.

1.4. Remove the output shaft.

1.5. Remove and discard the oil seal.

1.6. Remove the outer taper roller bearing.

1.7. Remove the spacer and keep for assembly.

1.8. Use a suitable puller to remove the output shaft inner bearing.

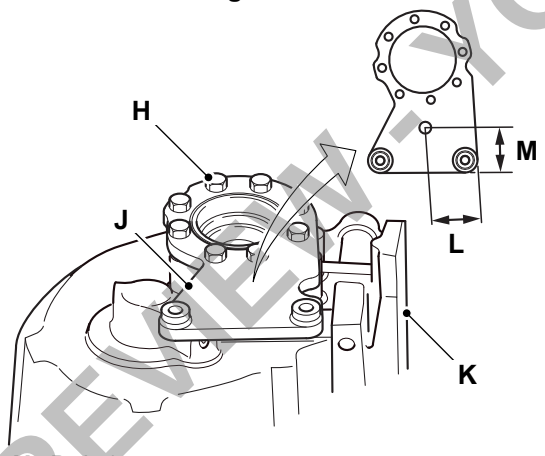
1.9. If required, the parking brake bracket can be removed at this stage. Before removal, mark the position of the bracket with respect to the case.

1.10. Note: Due to different ratio options, some gearboxes may have a larger diameter output gear. When you remove the output shaft the gear may touch the gearbox housing, preventing removal. Refer to the Section - Output Shaft Removal - Larger Diameter Gears, within this procedure.

Install

1. If removed, the park brake bracket must be installed at this stage as follows:

Figure 710.



H Bolt 1
J Park brake bracket
K Rear case
L 82 mm
M 75 mm

1.1. Put the bracket in the position marked during disassembly.

1.2. Attach the park brake bracket with the bolts 1.

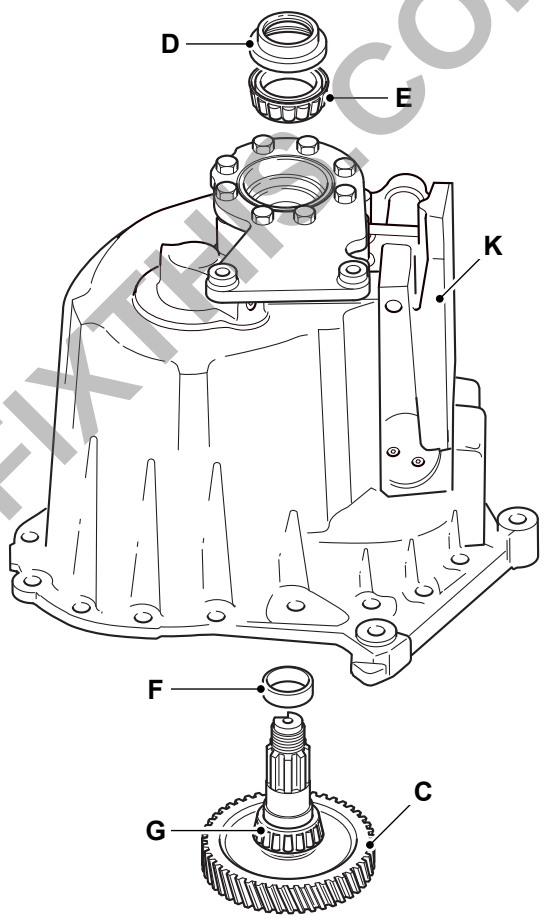
1.3. Tighten the bolts to the correct torque value.

1.4. Drill a hole of the specified diameter at the location shown to enable the installation of the service tool for checking the end float.

Dimension: 12.5 mm
Special Tool: End Float Setting Tool Kit (Qty.: 1)

2. Pre-assemble the output shaft as follows:

Figure 711.



C Output shaft
D Oil seal
E Outer taper roller bearing
F Service spacer
G Inner taper roller bearing
K Rear case

2.1. Apply oil on the inner bearing and cup and install on the output shaft.

2.2. Install the bearing cups into the case.

2.3. Install the service spacer onto the output shaft and install the output shaft into the case.

Special Tool: Spacer Kit (Qty.: 1)

2.4. Apply oil on the outer bearing and cup and install onto the output shaft.

2.5. Do not install the oil seal at this stage.

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00 - General

Operation 30-111
Diagram 30-113
Check (Pressure) 30-114
Remove and Install 30-117

Operation

The pump is a gear type and driven by the engine. The separate sections of the gear pump assembly supply hydraulic oil to the main hydraulic circuits, to the steering circuit and to the hydraulic cooling fan circuit.

The separate sections of the gear pump operate individually as described below.

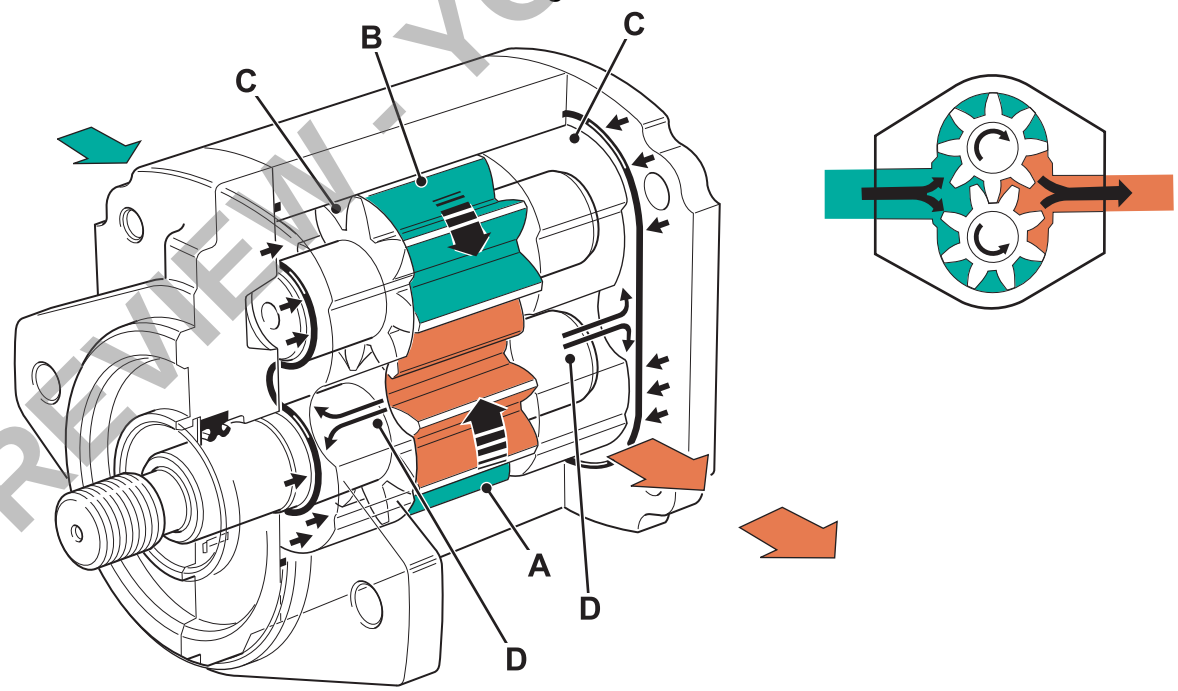
The working principle of a gear pump depends on the meshing of two spur gears. Oil is picked up on the suction side of the pump by the gears and carried round between the gear teeth and the pump body. As the gears come into mesh the oil is forced through the outlet port, or through an internal port into the integral priority valve depending on the type of pump.

Some oil is allowed to circulate behind the bushes to hold them in balance against the gears and minimise oil leakage.

Lubrication is provided by the hydraulic oil,which is directed around the unit via oil ways, by the motion of the meshing gears.

For the priority valve operation, refer to (PIL 25-03).

Figure 922.

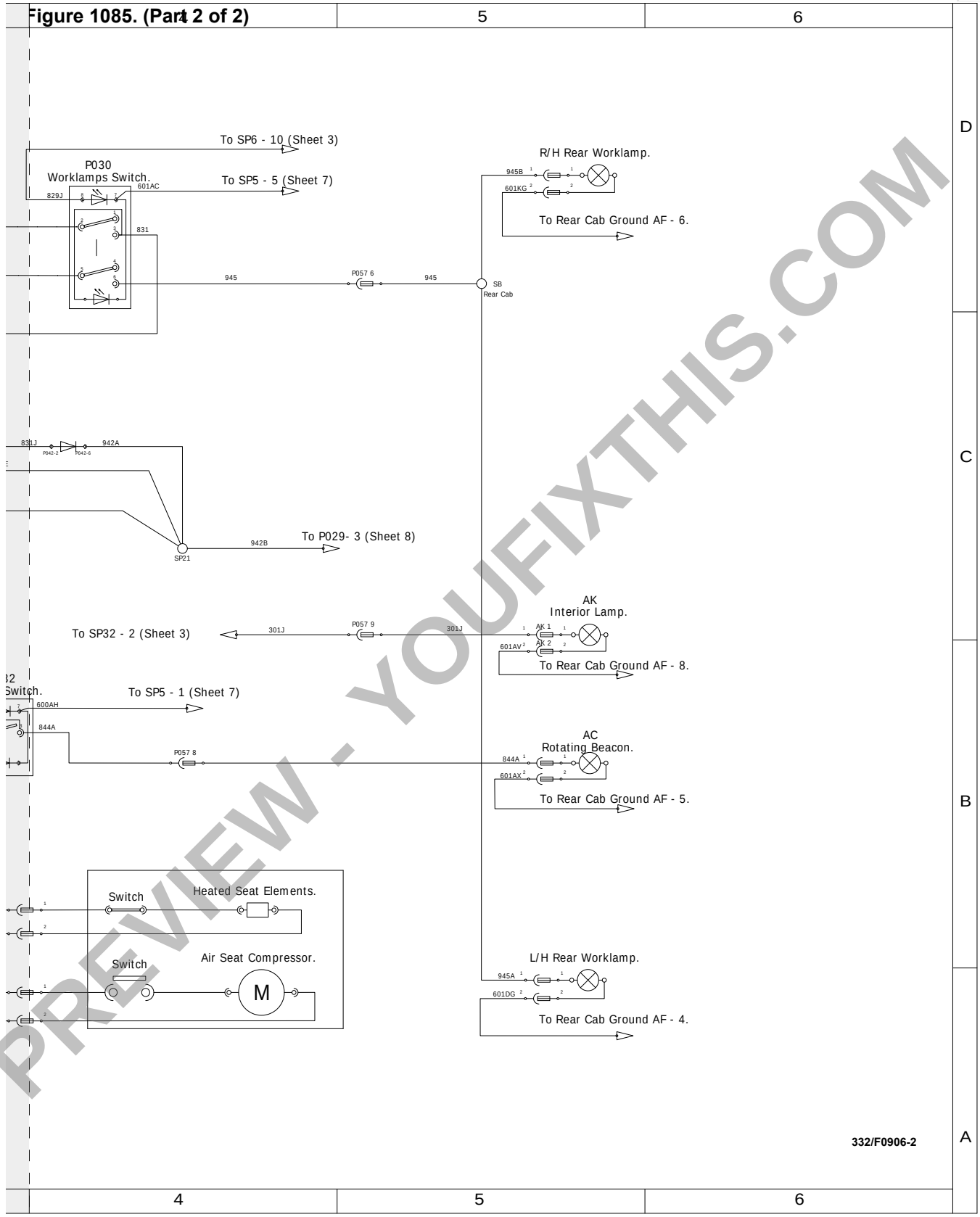


A Spur gear 1
B Spur gear 2
C Bushes 1
D Bushes 2

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Figure 1085. (Part 2 of 2)



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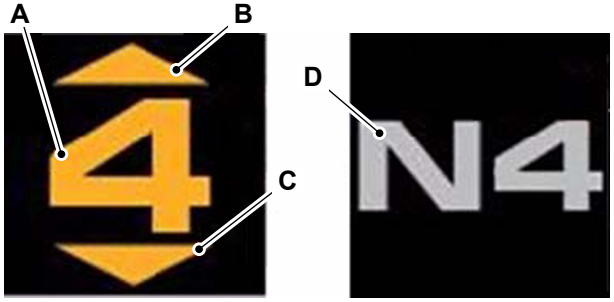
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Travel Speed

Normally displays the speed of the machine. This section is also used when a notification is activated.

Transmission FNR and Gear Information

Figure 1196.



A Active gear information
B Forward arrow icon
C Reverse arrow icon
D Neutral

Displays the gear and direction of the machine.

The current selected gear will be displayed in solid yellow.

When a gear change request is acknowledged by the transmission, but has not yet been carried out, the requested gear will be displayed in flashing yellow until the shift takes place. Requested shifts can be cancelled by shifting in the opposite direction. Both multiple changes and downshift protection can delay shifts.

The forward arrow will be shown if a forward gear is selected.

The reverse arrow will be shown if a reverse gear is selected.

If neutral is selected the icon N and the previously selected forward gear will be shown.

Transmission Status Symbols

Displays the current transmission status. There are more icons than space in the transmission icons tray, you will always have a notification when a status changes, however only the most important status icons will be displayed.

Table 468.

	Park brake active

Machine Status Symbols

Displays the status of various hydraulic systems of the machine. There are more icons than space in the machine status tray. You will always have a notification when a status changes, however only the most important status icons will be displayed.

Table 469.

	Left stabilizer deployed
	Right stabilizer deployed
	Rear axle stabilisation status - unlocked
	Rear axle stabilisation status - locked
	Stabiliser locked status - unlocked

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