

Maintenance

Service Manual - Backhoe Loader

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Routine Maintenance

Health and Safety

Lubricants

T3-060_2

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

CAUTION

It is illegal to pollute drains, sewers or the ground. Clean up all spilt fluids and/or lubricants.

Used fluids and/or lubricants, filters and contaminated materials must be disposed of in accordance with local regulations. Use authorised waste disposal sites.

INT-3-2-14

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.

Handling

WARNING

Oil

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

INT-3-2-3

New Oil

There are no special precautions needed for the handling or use of new oil, beside the normal care and hygiene practices.

Used Oil

Used engine crankcase lubricants contain harmful contaminants.

Here are precautions to protect your health when handling used engine oil:

- 1 Avoid prolonged, excessive or repeated skin contact with used oil.
- 2 Apply a barrier cream to the skin before handling used oil. Note the following when removing engine oil from skin:
 - a Wash your skin thoroughly with soap and water.
 - b Using a nail brush will help.



- c Use special hand cleansers to help clean dirty hands.
 - d Never use petrol, diesel fuel, or paraffin for washing.
- 3 Avoid skin contact with oil soaked clothing.
 - 4 Don't keep oily rags in pockets.
 - 5 Wash dirty clothing before re-use.
 - 6 Throw away oil-soaked shoes.

First Aid - Oil

Eyes

In the case of eye contact, flush with water for 15 minutes. 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 on 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. Fire fighters should use self contained breathing apparatus.

7-3-1-3_1

Battery

T3-061

WARNING

Batteries give off an explosive gas. Do not smoke when handling or working on the battery. Keep the battery away from sparks and flames.

Battery electrolyte contains sulphuric acid. It can burn you if it touches your skin or eyes. Wear goggles. Handle the battery carefully to prevent spillage. Keep metallic items (watches, rings, zips etc) away from the battery terminals. Such items could short the terminals and burn you.

Set all switches to OFF before disconnecting and connecting the battery. When disconnecting the battery, take off the earth (-) lead first.

Re-charge the battery away from the machine, in a well ventilated area. Switch the charging circuit off before connecting or disconnecting the battery. When you have installed the battery in the machine, wait five minutes before connecting it up.

When reconnecting, fit the positive (+) lead first.

5-3-4-12

CAUTION

Do not disconnect the battery while the engine is running, otherwise the electrical circuits may be damaged.

INT-3-1-14

WARNING

Electrical Circuits

Understand the electrical circuit before connecting or disconnecting an electrical component. A wrong connection can cause injury and/or damage.

INT-3-1-4

DANGER

Electrolyte

Battery electrolyte is toxic and corrosive. Do not breathe the gases given off by the battery. Keep the electrolyte away from your clothes, skin, mouth and eyes. Wear safety glasses.

INT-3-2-1_3

CAUTION

Damaged or spent batteries and any residue from fires or spillage should be put in a closed acid proof receptacle and must be disposed of in accordance with local environmental waste regulations.

INT-3-1-12

WARNING

Battery Gases

Batteries give off explosive gases. Keep flames and sparks away from the battery. Do not smoke close to the battery. Make sure there is good ventilation in closed areas where batteries are being used or charged. Do not check the battery charge by shorting the terminals with metal; use a hydrometer or voltmeter.

INT-3-1-8

Warning Symbols

The following warning symbols may be found on the battery.

Symbol	Meaning
 <small>A289230-1</small>	Keep away from children.
 <small>A289260-1</small>	Shield eyes.
 <small>A289280</small>	No smoking, no naked flames, no sparks.
 <small>A289250</small>	Explosive Gas.
 <small>A289240</small>	Battery acid.
 <small>A289270</small>	Note operating instructions.

First Aid - Electrolyte

Do the following if electrolyte:

Gets into your eyes

Immediately flush with water for 15 minutes, always get medical help.

Is swallowed

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

Gets onto your skin

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

Service Schedules

Introduction

T3-036-2

A badly maintained machine is a danger to the operator and the people working around him. Make sure that the regular maintenance and lubrication jobs listed in the service schedules are done to keep the machine in a safe and efficient working condition.

WARNING

Maintenance must be done only by suitably qualified and competent persons.

Before doing any maintenance make sure the machine is safe, it should be correctly parked on level ground.

To prevent anyone starting the engine, remove the starter key. Disconnect the battery when you are not using electrical power. If you do not take these precautions you could be killed or injured.

8-3-1-1

Apart from the daily jobs, the schedules are based on machine running hours. Keep a regular check on the hourmeter readings to correctly gauge service intervals. Do not use a machine which is due for a service. Make sure any defects found during the regular maintenance checks are rectified immediately.

Fuel System

Important: B20 Biodiesel must only be used in engines built after January 2007 only.

If Biodiesel fuel is used there are additional service procedures which must be carried out to prevent engine damage. Failure to adhere to these additional procedures may invalidate the warranty.

For these additional procedures see **Section 1 - General Information**.

How to Use the Service Schedules

T3-012_3

In the example shown, **A** shows all service requirements to be carried out every 10 hours and **B** shows the requirements to be carried out every 500 hours.

Important: Services should be carried out at either the hourly interval or calendar interval, whichever occurs first. Refer to **Calendar Equivalents**.

Pre-start Cold Checks, Service Points and Fluid Levels

Operation	10	50	100 ⁽¹⁾	500	1000	2000	8000
ENGINE							
Coolant Quality and Level - Check	<input type="checkbox"/>						
Cooling System - Drain and Refill						<input type="checkbox"/>	<input type="checkbox"/>
Oil level - Check	<input type="checkbox"/>	<input type="checkbox"/>					
Oil and Filter ⁽²⁾⁽³⁾⁽⁴⁾ - Change				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air Cleaner Dust Valve ⁽⁵⁾ - Change				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air Cleaner Outer Element ⁽⁶⁾ - Change					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air Cleaner Inner Element - Change					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pre-Cleaner (if fitted) - Check			<input type="checkbox"/>				
Water Separator - Check for contamination and Drain		<input type="checkbox"/>					
Engine Fuel Filter - Change					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Front End Accessory Drive (FEAD) Belt Condition - Check				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Front End Accessory Drive (FEAD) Belt - Change							<input type="checkbox"/>
Engine Mounting Bolts for Tightness - Check			<input type="checkbox"/>				
All Hoses - Condition - Check		<input type="checkbox"/>					
Radiator ⁽⁷⁾ - Clean			<input type="checkbox"/>				
Crankcase Ventilation Filter - Change					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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Calendar Equivalents

T3-051

- Every 10 Hours = Daily
- Every 50 Hours = Weekly
- Every 500 Hours = Six Months
- Every 1000 Hours = Yearly
- Every 2000 Hours = 2 Years
- Every 6000 Hours = 6 Years



Section 3 - Maintenance Routine Maintenance

Service Schedules

Pre-start Cold Checks, Service Points and Fluid Levels

		Operation	10	50	100 ⁽¹⁾	500	1000	2000	6000
ENGINE									
Coolant Quality and Level	- Check		<input type="checkbox"/>						
Cooling System	- Drain and Refill							<input type="checkbox"/>	<input type="checkbox"/>
Oil level	- Check		<input type="checkbox"/>	<input type="checkbox"/>					
Oil and Filter ⁽²⁾⁽³⁾⁽⁴⁾	- Change					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air Cleaner Outer Element ⁽⁵⁾	- Change						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air Cleaner Inner Element	- Change							<input type="checkbox"/>	<input type="checkbox"/>
Water Separator and Engine Fuel Filter	- Drain			<input type="checkbox"/>					
Water Separator Fuel Filter ⁽⁶⁾	- Change					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Engine Fuel Filter ⁽⁶⁾	- Change						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Front End Accessory Drive (FEAD) Belt Condition	- Check					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Front End Accessory Drive (FEAD) Belt	- Change								<input type="checkbox"/>
Engine Mounting Bolts for Tightness	- Check				<input type="checkbox"/>				
All Hoses - Condition	- Check				<input type="checkbox"/>				
Radiator ⁽⁵⁾	- Clean					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breather Gauze	- Clean							<input type="checkbox"/>	<input type="checkbox"/>
Valve Clearances ⁽⁷⁾	- Check and Adjust							<input type="checkbox"/>	<input type="checkbox"/>
Oil Filler and Dipstick Seals ⁽⁷⁾	- Check and Adjust							<input type="checkbox"/>	<input type="checkbox"/>
Rocker Cover and Injector Seals ⁽⁷⁾	- Change							<input type="checkbox"/>	<input type="checkbox"/>
Injectors ⁽⁷⁾	- Change								<input type="checkbox"/>
Injector(s) Leak Off Rail ⁽⁷⁾	- Change								<input type="checkbox"/>
High Pressure Fuel Lines ⁽⁷⁾	- Inspect								<input type="checkbox"/>
TRANSMISSION, AXLES AND STEERING									
Transmission Oil Level	- Check		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Transmission Oil ⁽⁸⁾	- Change						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Transmission Filter	- Change				<input type="checkbox"/>				
Axle Oil Level (incl. Hubs when applicable) ⁽⁹⁾	- Check				<input type="checkbox"/>	<input type="checkbox"/>			
Axle Oil (incl. Hubs when applicable) ⁽¹⁰⁾	- Change						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Axle Oil - Limited Slip Differential	- Change					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tyre Pressures and Condition	- Check		<input type="checkbox"/>						



Section 3 - Maintenance Routine Maintenance

Service Schedules

	Operation	10	50	100⁽¹⁾	500	1000	2000	6000
Wheel Nut Security	- Check	<input type="checkbox"/>						
Front Hub Bearings	- Check			<input type="checkbox"/>				
Transmission Strainer	- Clean						<input type="checkbox"/>	<input type="checkbox"/>
Drive Shafts ⁽¹¹⁾	- Security and Grease			<input type="checkbox"/>				
Steer Axle Movement and Shimming ⁽⁷⁾	- Check			<input type="checkbox"/>				
Steer Axle Pivots and Linkages ⁽¹¹⁾	- Grease			<input type="checkbox"/>				
Front Axle Main Pivot	- Grease	<input type="checkbox"/>						
HYDRAULICS								
Oil Level ⁽¹²⁾	- Check	<input type="checkbox"/>						
Oil	- Sample, Change						<input type="checkbox"/>	<input type="checkbox"/>
Oil Filter	- Change			<input type="checkbox"/>				
Pilot Filter (if fitted) ⁽¹³⁾	- Change			<input type="checkbox"/>				
Rams - Chrome Condition	- Check			<input type="checkbox"/>				
Hydraulic Oil Cooler	- Clean				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hydraulic Oil Strainer	- Clean						<input type="checkbox"/>	<input type="checkbox"/>
Hydraulic Tank Filler Cap (with integral filter)	- Change						<input type="checkbox"/>	<input type="checkbox"/>
Hammer 1inch (diameter) Return Line Filter - if fitted	- Change			<input type="checkbox"/>				
BRAKES								
Brake System Fluid Level	- Check	<input type="checkbox"/>						
Brake System Fluid	- Change						<input type="checkbox"/>	<input type="checkbox"/>
Park Brake	- Check and Adjust			<input type="checkbox"/>				
ELECTRICS								
Battery Electrolyte Level (if applicable)	- Check				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wiring for Chaffing/Routing	- Check		<input type="checkbox"/>					
Battery Terminals for Condition and Tightness	- Check			<input type="checkbox"/>				
BODYWORK AND CAB								
All Pins and Bushes	- Check and Grease	<input type="checkbox"/>						
Door/Window Hinges	- Lubricate				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
All Cables	- Lubricate				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cab Heater Fresh Air Filter ⁽⁵⁾	- Clean/Change				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cab Air Conditioning Recirculation Filter - if fitted ⁽⁵⁾	- Clean/Change				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Section 3 - Maintenance Routine Maintenance

Service Schedules

	Operation	10	50	100 ⁽¹⁾	500	1000	2000	6000
Extending Dipper	- Adjust/Grease		<input type="checkbox"/>					
Hydraclamp	- Check and Adjust			<input type="checkbox"/>				
Door - Fit and Catches	- Check			<input type="checkbox"/>				
Cab Seat - Operation	- Check			<input type="checkbox"/>				
Front Mudguards - Security (if fitted)	- Check			<input type="checkbox"/>				
Windscreen Washer Fluid Level	- Check	<input type="checkbox"/>						
Boom Lock Engagement	- Check	<input type="checkbox"/>						
Condition of Paintwork	- Check			<input type="checkbox"/>				
Stabiliser Legs (Sideshift)	- Check/Adjust		<input type="checkbox"/>					
Machine Generally	- Check and Clean	<input type="checkbox"/>						
ROPS/FOPS	- Check					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Power Sideshift Wear Pads	- Grease	<input type="checkbox"/>						
Power Sideshift Wear Pads	- Check					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Power Sideshift Chain	- Lubricate		<input type="checkbox"/>					
Power Sideshift Chain Tension	- Check/Adjust			<input type="checkbox"/>				
ATTACHMENTS								
6-in-1 Clam Shovel	- Grease	<input type="checkbox"/>						
Backhoe & Loader Quick Hitch	- Grease	<input type="checkbox"/>						

- (1) First 100 Hours Service only, to be completed by your JCB Distributor.
- (2) If operating under arduous conditions, change the engine oil and filter every 250 hours.
- (3) The oil service interval will be affected if there is a high sulphur content in the fuel. Refer to Fuel System for more information.
- (4) On engines built from 2007 that are operated with 20% biodiesel change the engine oil and filter every 250 hours. Refer to Fuel System for more information.
- (5) If operating in dusty working environments, change more frequently.
- (6) If the engine is difficult to start or the engine has poor performance, fit new filters. For the water separator filter, use a 30 micron filter for normal conditions and a 150 micron filter for cold climate (-10°C, 14°F).
- (7) Jobs which should only be done by a specialist.
- (8) After a major transmission repair, the new oil should be run to operating temperature and changed again to remove any contamination which entered during the repair. Change the oil and filter after a further 100 hours if the oil was heavily contaminated because of, or from the failure (e.g. water contamination).
- (9) Check for leaks every 50 hours, check level if leaking.
- (10) After a hub repair, the new oil should be run to operating temperature and changed again to remove any contamination which entered during the repair. Change the oil again after a further 100 hours to remove any bedding-in wear. This is particularly important if new brake plates have been fitted.
- (11) The axles and driveshafts are factory greased with a high performance grease, if during service a standard grease is used, then the interval must be reduced to every 50 hours, contact your JCB Distributor for advice.
- (12) Check the hydraulic fluid level with the loader and backhoe in the travel position.
- (13) Joystick control (Servo) machines only.



Section 3 - Maintenance Routine Maintenance

Service Schedules

Functional Test and Final Inspection

		Operation	10	50	100 ⁽¹⁾	500	1000	2000	6000
ENGINE									
Idle Speed ⁽²⁾	- Check and Adjust				<input type="checkbox"/>				
Maximum No-Load Speed ⁽²⁾	- Check and Adjust				<input type="checkbox"/>				
Exhaust Smoke (excessive)	- Check		<input type="checkbox"/>						
Exhaust System Security ⁽²⁾	- Check				<input type="checkbox"/>				
Air Inlet System Security	- Check				<input type="checkbox"/>				
Throttle System and Control Cable ⁽²⁾	- Check				<input type="checkbox"/>				
TRANSMISSION, AXLES AND STEERING									
Steer Modes - Operation/Phasing	- Check	<input type="checkbox"/>							
2WD/4WD Selection	- Check				<input type="checkbox"/>				
Wheel Nuts Torque	- Check	<input type="checkbox"/>							
Forward/Reverse and Gear Change Operation	- Check				<input type="checkbox"/>				
Hydraulic Speed Control - Operation (if fitted)	- Check				<input type="checkbox"/>				
Steer Circuit Pressure ⁽²⁾	- Check				<input type="checkbox"/>				
Transmission Main Line Pressure ⁽²⁾	- Check					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Transmission Dump Operation	- Check				<input type="checkbox"/>				
Neutral Start Operation	- Check		<input type="checkbox"/>						
Clutch Pack Pressures ⁽²⁾	- Check				<input type="checkbox"/>				
HYDRAULICS									
MRV Pressure ⁽²⁾	- Check and Adjust				<input type="checkbox"/>				
Operation All Services	- Check		<input type="checkbox"/>						
Hose Burst Protection Valves (if fitted)	- Check				<input type="checkbox"/>				
Offloader Valve Pressure ⁽²⁾	- Check and Adjust				<input type="checkbox"/>				
Auxiliary Circuit & Pressures ⁽²⁾	- Check and Adjust				<input type="checkbox"/>				
BRAKES									
Foot Brake - Operation	- Check	<input type="checkbox"/>							
Park Brake - Operation	- Check	<input type="checkbox"/>							
Servo Operation (if fitted)	- Check				<input type="checkbox"/>				
ELECTRICS									
Starter Motor	- Check				<input type="checkbox"/>				
Alternator - Output	- Check				<input type="checkbox"/>				



Section 3 - Maintenance Routine Maintenance

Service Schedules

	Operation	10	50	100⁽¹⁾	500	1000	2000	6000
All Electrical Equipment Operation, (e.g. warning lights, beacon, alarms, horn, wipers etc.)	- Check	<input type="checkbox"/>						
Operation of Stop Control/E.S.O.S.	- Check	<input type="checkbox"/>						
BODYWORK AND CAB								
Teeth and Side Cutters	- Check			<input type="checkbox"/>				
Doors and Windows - Fitment/Leaks	- Check			<input type="checkbox"/>				
Seat/Seat Belts	- Check			<input type="checkbox"/>				

(1) *First 100 Hours Service Only, to be completed by your JCB Distributor.*

(2) *Jobs which should only be done by a specialist.*

Lubricants and Capacities

Note: New engines DO NOT require a running-in period. The engine/machine should be used in a normal work cycle immediately, glazing of the piston cylinder bores, resulting in excessive oil consumption, could occur if the

engine is gently run-in. Under no circumstances should the engine be allowed to idle for extended periods; (e.g. warming up without load).

Table 1.

ITEM	CAPACITY		FLUID/LUBRICANT	INTERNATIONAL SPECIFICATION
	Litres	UK Gal		
Fuel Tank	150	33	Diesel Oil	See Section 1 - General Information
Engine (Oil)			JCB Extreme Performance	SAE15W/40, ACEA E5/B3/A3, API CH-4/SG
Min	12	2.64	(-10°C to +50°C (14°F to 122°F))	
Max	15	3.3		
			JCB Cold Climate Engine Oil	SAE5W/40, ACEA E5/B3/A3, API CH-4/SJ
			(-20°C to +50°C (-4°F to 122°F))	
			! CAUTION: DO NOT USE ORDINARY ENGINE OIL	
Engine (Coolant) ⁽¹⁾			JCB High Performance Antifreeze and Inhibitor/ Water & Summer Coolant/Water. → Coolant Mixtures (□ 3-13)	ASTM D6210
	18.5	4.07	Dry	
	17.5	3.85	Wet	
Synchro Shuttle (2WD) ⁽²⁾	14.4	3.2	Dry	JCB Extreme Performance
	10	2.2	Wet	-32°C to 40°C (-25°F to 104°F) -5°C to 46°C (23°F to 115°F)
				10W, EL4117 SAE30, EL4118
Synchro Shuttle (4WD) ⁽³⁾	15.4	3.4	Dry	JCB Extreme Performance
	11	2.4	Wet	-32°C to 40°C (-25°F to 104°F) -5°C to 46°C (23°F to 115°F)
				10W, EL4117 SAE30, EL4118
Powershift 6 speed ⁽³⁾	16	3.5	Dry	JCB Extreme Performance
	11.5	2.5	Wet	-32°C to 40°C (-25°F to 104°F) -5°C to 46°C (23°F to 115°F)
				10W, EL4117 SAE30, EL4118
Powershift 4 speed ⁽³⁾	15.5	3.4	Dry	JCB Extreme Performance
	11	2.4	Wet	-32°C to 40°C (-25°F to 104°F) -5°C to 46°C (23°F to 115°F)
				10W, EL4117 SAE30, EL4118
Front Axle (4WD)			JCB HD90 Gear Oil (without LSD)	API-GL-5
Housing (2WS)	13	2.86	JCB Gear Oil HP Plus (with LSD)	API-GL-4
Housing (4WS) ⁽³⁾	18	3.96	Must be suitable for use with limited slip differentials (LSD).	
Hubs (x2)	2.0	0.44		
Rear Axle (4WS)			JCB Gear Oil HP Plus	API-GL-4
Housing	16.5	3.62	Must be suitable for use with oil immersed brakes and limited slip differentials (LSD).	
Hubs (x2)	2.0	0.44		
Rear Axle (2WS)	21	4.61		



Section 3 - Maintenance Routine Maintenance

Lubricants and Capacities

ITEM	CAPACITY		FLUID/LUBRICANT	INTERNATIONAL SPECIFICATION
Brake System	1.4	0.3	JCB Light Hydraulic Fluid ! CAUTION: DO NOT USE ORDINARY BRAKE FLUID	ISO VG15
Hydraulic System ⁽⁴⁾	130	28.6	JCB High Performance Hydraulic Oil (All machines except Advanced EasyControl) Above 38 °C, 100 °F JCB Hydraulic Fluid HP32 (All machines except Advanced EasyControl) Below 38 °C, 100 °F JCB Multigrade Anti Shear Hydraulic Fluid (Advanced EasyControl machines)	ISO VG46 ISO VG32 ISO 11158 cat HV DIN 51524 cat HVLP SS 155434 cat AV Denison HF-O
Grease Points	---	---	JCB HP Grease or JCB Special MPL-EP Grease ⁽⁵⁾	Lithium complex NLGI No.2 consistency including extreme pressure additives Lithium based NLGI No.2 consistency including extreme pressure additives
Extending Dipper	---	---	Waxoyl ⁽⁶⁾	
Electrical connections	---	---	As a corrosion and moisture inhibitor all exposed connections should be coated liberally with petroleum jelly.	
Power Sideshift Chains	---	---	JCB Chain Lubricant	

- (1) It is recommended that the cooling system be filled at a maximum rate of 10 litres per minute. If the fill rate is any higher than this there is a possibility of air becoming trapped in the system.
- (2) The figure quoted is TOTAL system capacity. Use the MIN and MAX marks on the dipstick when filling the system. Figures quoted within 1.0 litre (0.22 U.K. gal).
- (3) 4WS axles with limited slip differential must use JCB Special Gear Oil Plus.
- (4) The total hydraulic system capacity depends on the equipment being used. Fill with all rams closed. Watch level indicator on hydraulic tank.
- (5) JCB HP Grease is the recommended specification grease, if using JCB Special MPL-EP then the greasing must be carried out more frequently.
- (6) **WARNING:** Waxoyl contains turpentine substitute, which is inflammable. Keep flames away when applying Waxoyl. Waxoyl can take a few weeks to dry completely. Keep flames away during the drying period. Do not weld near the affected area during the drying period. Take the same precautions as for oil to keep Waxoyl off your skin. Do not breathe the fumes. Apply in a well-ventilated area.

Coolant Mixtures

T3-009_3

Check the strength of the coolant mixture at least once a year, preferably at the start of the cold period.

Replace the coolant mixture according to the intervals shown in the machine's Service Schedule.

WARNING

Antifreeze can be harmful. Obey the manufacturer's instructions when handling full strength or diluted antifreeze.

7-3-4-4_1

You must dilute full strength antifreeze with clean water before use. Use clean water of no more than a moderate hardness (pH value 8.5). If this cannot be obtained, use de-ionized water. For further information advice on water hardness, contact your local water authority.

The correct concentration of antifreeze protects the engine against frost damage in winter and provides year round protection against corrosion.

The protection provided by JCB High Performance Antifreeze and Inhibitor is shown below.

50% Concentration (Standard)

Protects against damage down to -40 °C (-39 °F)

60% Concentration (Extreme Conditions Only)

Protects against damage down to -56 °C (-68 °F)

Important: Do not exceed a 60% concentration, as the freezing protection provided reduces beyond this point.

If you use any other brand of antifreeze:

- Ensure that the antifreeze complies with International Specification ASTM D6210.
- Always read and understand the manufacturer's instructions.
- Ensure that a corrosion inhibitor is included. Serious damage to the cooling system can occur if corrosion inhibitors are not used.
- Ensure that the antifreeze is ethylene glycol based and does not use Organic Acid Technology (OAT).

Prepare the Machine for Maintenance

Introduction

WARNING

Maintenance must be done only by suitably qualified and competent persons.

Before doing any maintenance make sure the machine is safe, it should be correctly parked on level ground.

To prevent anyone starting the engine, remove the starter key. Disconnect the battery when you are not using electrical power. If you do not take these precautions you could be killed or injured.

8-3-1-1

Make the machine safe before you start a maintenance procedure.

You can complete most of the maintenance procedures with the loader arms lowered. Unless a maintenance procedure instructs you differently, you must lower the loader arms. Refer to **How to Make the Machine Safe (Loader Arms Lowered)**.

If you lift the loader arms to get access for maintenance, you must install the maintenance strut on the loader arm. Refer to **How to Make the Machine Safe (Loader Arms Lifted)**.

How to Make the Machine Safe (Loader Arms Lowered)

Important: You can complete most of the maintenance procedures with the loader arms lowered. Unless a maintenance procedure instructs you differently, you must lower the loader arms.

- 1 Park the machine on level, solid ground.

If necessary, refer to **Stopping and Parking the Machine** in the Operator Manual.
- 2 Lower the loader arms.
- 3 Put the attachment flat on the ground.
- 4 Stop the engine and remove the starter key.
- 5 Disconnect the battery to prevent accidental operation of the engine.
- 6 If necessary, put chocks against the two sides of the wheels before you get below the machine.

How to Make the Machine Safe (Loader Arm Lifted)

P2-3009_2

WARNING

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.

13-2-3-7_3

Installing the Loader Arm Safety Strut

Install the loader arm safety strut as detailed below before working underneath raised loader arms.

- 1 Empty the shovel and raise the loader arms fully.
- 2 Stop the engine and remove the starter key.

- 3 Release the strut.
 - a Release fastener **A**.
 - b Remove strut **C** from its stowage bracket.
- 4 Install the strut.
 - a Push strut **C** over the ram piston rod.
 - b Secure the strut in position with strap **B**.
- 5 Lower the arm onto the strut.

To prevent any chance of the loader arms creeping down and trapping your fingers, the loader arms should be carefully lowered onto the safety strut as shown.

Start the engine and slowly lower the loader arms onto the safety strut, stop the movement immediately the weight of the loader arms is supported by the safety strut.

Note: When lowering the loader, operate the control lever carefully. 'Feather' the lever to lower the loader very slowly.

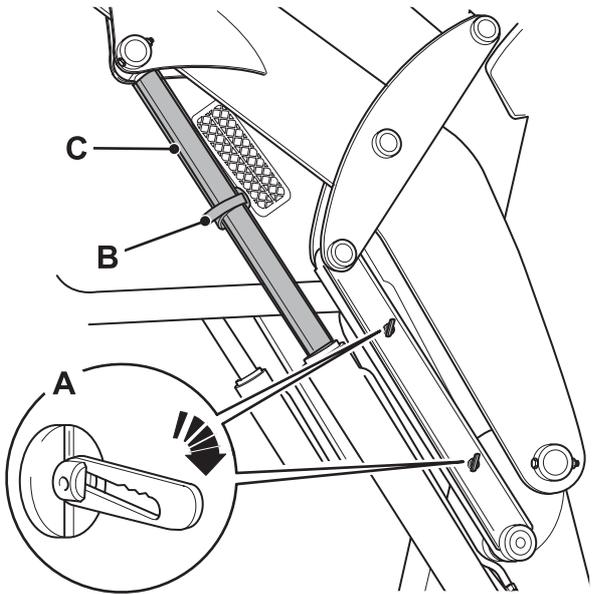


Fig 1.

C006740-1

Removing the Loader Arm Safety Strut

- 1 Fully raise the loader arms to take the weight off the safety strut.
- 2 Stop the engine and remove the starter key.
- 3 Remove the strut.
 - a Undo the strap **B**.
 - b Remove the strut **C** from the ram piston rod.
- 4 Stow the strut.

Secure the strut in its stowage position with fastener **A**.

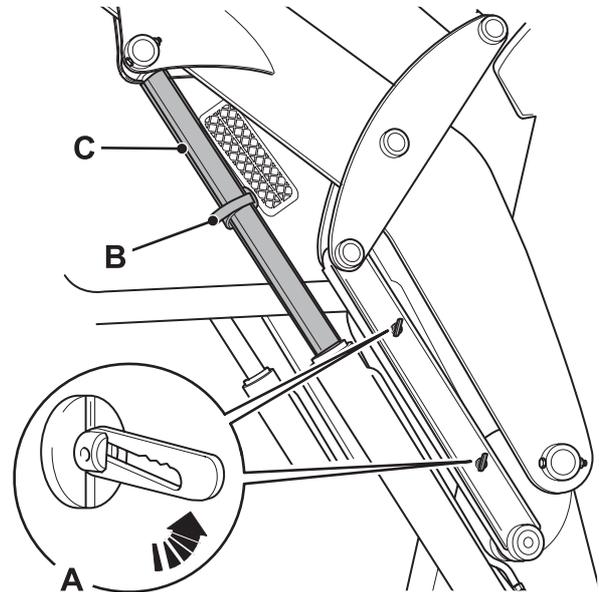


Fig 2.

Fig 3.

C006740-2

Cleaning the Machine

Introduction

T3-062_2

Clean the machine using water and or steam. Do not allow mud, debris etc. to build upon the machine.

Before carrying out any service procedures that require components to be removed:

- 1 Cleaning must be carried out either in the area of components to be removed or, in the case of major work, or work on the fuel system, the whole engine and surrounding machine must be cleaned.
- 2 When cleaning is complete move the machine away from the wash area, or alternatively, clean away the material washed from the machine.

Important: When removing components be aware of any dirt or debris that may be exposed. Cover any open ports and clean away the deposits before proceeding.

Detergents

Avoid using full strength detergent - always dilute detergents as per the manufacturer's recommendations, otherwise damage to the paint finish may occur.

Always adhere to local regulations regarding the disposal of debris created from machine cleaning.

Pressure Washing and Steam Cleaning

WARNING

When using a steam cleaner, wear safety glasses or a face shield as well as protective clothing. Steam can cause serious personal injury.

13-3-2-10_2

CAUTION

The engine or certain components could be damaged by high pressure washing systems; special precautions must be taken if the engine is to be washed using a high pressure system.

Ensure that the alternator, starter motor and any other electrical components are shielded and not directly cleaned by the high pressure cleaning system.

ENG-3-3

Important: Do not aim the water jet directly at bearings, oil seals or electrical and electronic components such as the engine electronic control unit (ECU), alternator or fuel injectors.

Use a low pressure water jet and brush to soak off caked mud or dirt.

Use a pressure washer to remove soft dirt and oil.

Note: The machine must always be greased after pressure washing or steam cleaning.

Preparing the Machine for Cleaning

- 1 Make the machine safe with the loader arms lifted. Refer to **Prepare the Machine for Maintenance**.

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

- 2 Make sure that all electrical connectors are correctly coupled. If connectors are open, fit the correct caps or seal with water proof tape.

Cleaning the Machine

WARNING

To avoid burning, wear protective gloves when handling hot components. To protect your eyes, wear goggles when using a brush to clean components.

HYD-1-3_2

WARNING

Airborne particles of light combustible material such as straw, grass, wood shavings, etc. must not be allowed to accumulate within the engine compartment or in the propshaft guards (when fitted). Inspect these areas frequently and clean at the beginning of each work shift or more often if required. Before opening the engine cover, ensure that the top is clear of debris.

5-3-1-12_3

CAUTION

Never use water or steam to clean inside the cab. The use of water or steam could damage the on-board computer and render the machine inoperable. Remove dirt using a brush or damp cloth.

8-3-4-8

Pay particular attention to:

1 Cooling pack

The cooling pack is located in front of the engine, the pack consists of the engine cooling radiator, hydraulic oil cooler, intercooler and air conditioning condenser (optional). If the cooler tubes/fins get clogged (by dirt and flies etc.) the radiator and coolers will be less efficient.

- a Remove the front grille.
- b Brush off all debris from the cooler tubes and fins. Make sure the loosened material is brushed out of the cooler enclosure.

Note: When cleaning the matrix make sure that the brush follows the same direction as the fins are to avoid damaging them. Damaged fins will reduce the cooling efficiency of the matrix.

- c Refit the radiator grille.

Note: Machines with air conditioning have a condenser matrix fitted in front of the oil cooler, the fins of the condenser matrix may get clogged. In this case, clean the tubes/fins of the condenser matrix as described above.

2 Engine

DO NOT allow mud to build up on the engine and transmission. Pay particular attention to the exhaust area, remove all combustible material.

The engine or certain components could be damaged by high pressure washing systems, special precautions must be taken if the engine is to be washed using a high pressure system.

Important: DO NOT place the jet nozzle closer than 600mm (24 in.) to any part of the engine.

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

- a Disconnect the battery.
- b DO NOT aim the jet wash directly at the fuel injector seals A. → [Fig 4. \(□ 3-18\)](#).

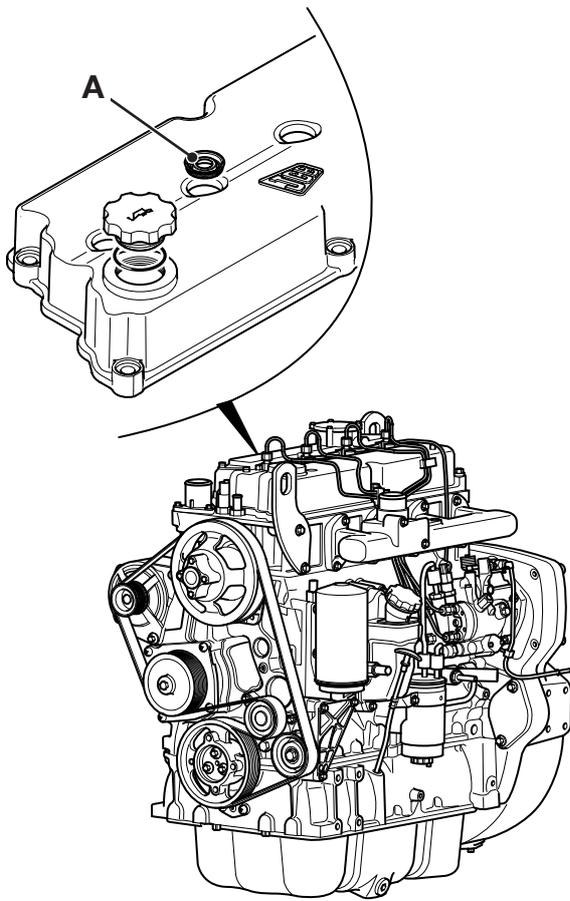


Fig 4.

- c DO NOT wash any part of the:
 - i Fuel injection pump.
 - ii Cold start device.
 - iii Electrical shut-off solenoid (ESOS).
 - iv Electrical connections.
- d Ensure that the alternator, starter motor and any other electrical components are shielded and not directly cleaned by high pressure cleaning system.

- 3 Stabiliser cavities can become clogged when operating in soft/wet ground conditions. Remove and clean away all debris that may have built up.

4 Backhoe

Pay particular attention to:

- a Backhoe hoses passing through the mainframe.
- b Around twin slew rams.
- c Twin ram slew recess in chassis (centremount).

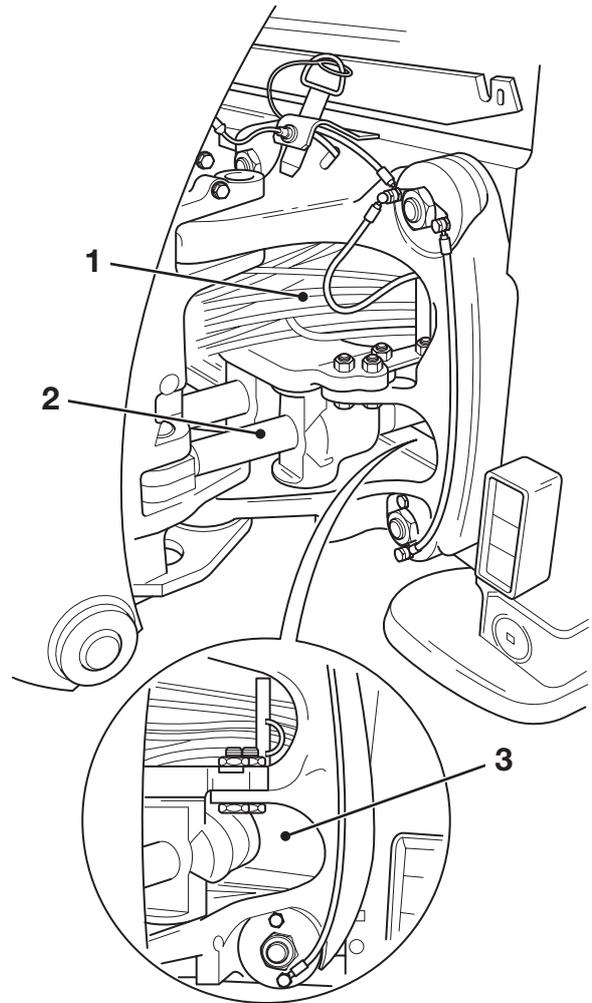


Fig 5.

- d Kingpost slide rails (sideshift).
- e Kingpost hose tray and bottom 'shelf' (sideshift).

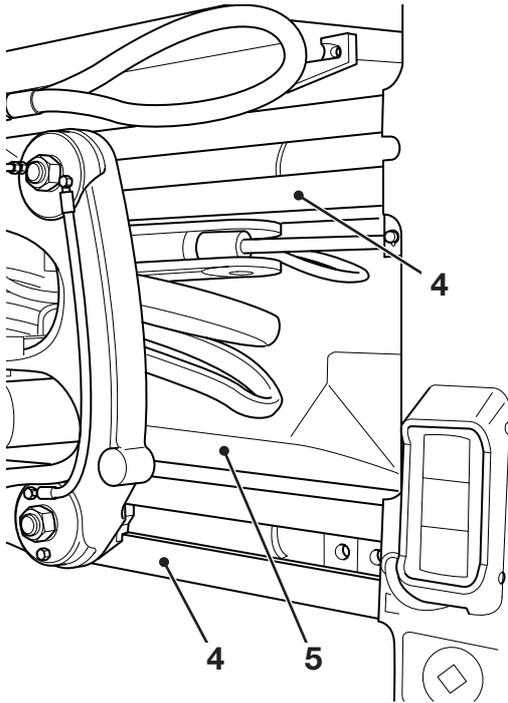


Fig 6.

- f Recess between slew ram and kingpost casting (sideshift).

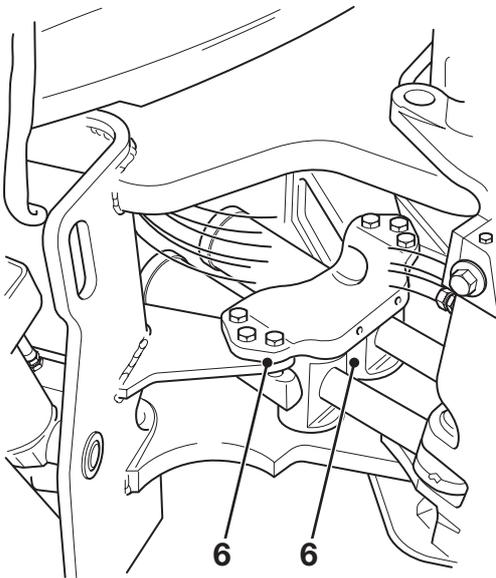


Fig 7.

Checking for Damage

Check the Machine Body and Structure

T3-063_3

Make sure that all guards and protective devices are in place, attached by their locking devices and free from damage.

Inspect all steelwork for damage. Note damaged paintwork for future repair.

Check pivot pins are correctly in place and secured by their locking devices.

Check steps and handrails are undamaged and secure.

Check for broken, cracked or crazed window glass and mirrors. Replace damaged items.

Check all lamp lenses for damage.

Check all attachment teeth are undamaged and secure.

Check all safety and instructional labels are in place and undamaged. Fit new decals where necessary.

Check the Tyres

T3-065_2

WARNING

You could be killed or injured if a machine tyre bursts. Do not use the machine with damaged, incorrectly inflated or excessively worn tyres. Recognise the speed limitation of the tyres fitted and do not operate at more than their recommended maximum speed.

13-2-1-2

Always drive with consideration for the condition of the tyres. Incorrect tyre pressures will affect the stability of the machine. Check the tyres daily for the correct tyre pressure and signs of damage. For example:

- Signs of distortion (bulges)
- Cuts or wear
- Embedded objects (nails, etc.)

Install the valve caps firmly to prevent dirt from entering the valve. Inspect for leaks when you check the tyre pressures.

Inspect the tyre valve for leaks, when you check the tyre pressures.

Check the Seat and Seat Belt

T3-008_2

WARNING

When a seat belt is fitted to your machine replace it with a new one if it is damaged, if the fabric is worn, or if the machine has been in an accident. Fit a new seat belt every three years.

2-3-1-7_1

Inspect the seat belt for signs of fraying and stretching. Check that the stitching is not loose or damaged. Check that the buckle assembly is undamaged and works correctly.

Check that the belt mounting bolts are undamaged, correctly fitted and tightened.

Check seats are undamaged and secure. Check seat adjustments for correct operation.

Check the Hydraulic Hoses and Fittings

T3-072

WARNING

Hydraulic Hoses

Damaged hoses can cause fatal accidents. Inspect the hoses regularly. Do not use the machine if a hose or hose fitting is damaged.

INT-3-3-2_4

Inspect the hoses regularly for:

- Damaged hose ends
- Chafed outer covers
- Ballooned outer covers
- Kinked or crushed hoses
- Embedded armouring in outer covers
- Displaced end fittings

Do not use the machine if a hose or hose fitting is damaged. Replace damaged hoses before you use the machine again.



Section 3 - Maintenance Routine Maintenance

Checking for Damage

Replacement hoses must be of the same size and standard.

ROPS/FOPS Structure

Checking The ROPS/FOPS Structure

⚠ WARNING

You could be killed or seriously injured if you operate a machine with a damaged or missing ROPS/FOPS. If the Roll Over Protection Structure (ROPS)/Falling Objects Protection Structure (FOPS) 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 certification.

INT-2-1-9_6

Check the structure for damage. Check that the mounting bolts are installed and undamaged. Check the bolt torques. → [Torque Settings \(3-22\)](#). Tighten them to the correct torque if necessary.

- 1 Remove the rear wheels to gain access to the rear mounting bolts **A**.
- 2 Remove the covers **C** and external trim panels **D** to gain access to the front mounting bolts **B**.

Table 2. Torque Settings

Bolts A and B	205 Nm (150 lbf ft)
-----------------------------	---------------------

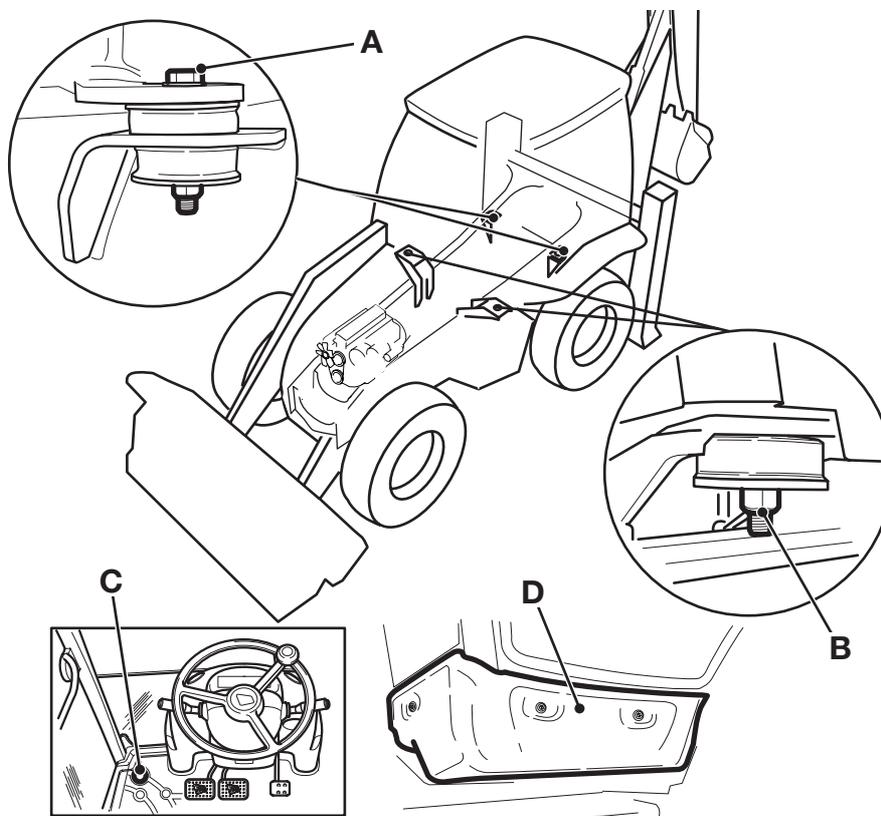


Fig 8.

Greasing

Introduction

T3-028_2

You must grease the machine regularly to keep it working efficiently. Regular greasing will also lengthen the machine's working life. Refer to the **Service Schedule** for the correct intervals.

Note: *The machine must always be greased after pressure washing or steam cleaning.*

Greasing should be done with a grease gun. Normally, two strokes of the gun should be sufficient. Stop greasing when fresh grease appears at the joint. Use only the recommended type of grease. Do not mix different types of grease, keep them separate.

In the following illustrations, the grease points are numbered. Count off the grease points as you grease each one. Refit the dust caps after greasing.

Note: *Where applicable, refer to the manufacturers manual for instructions on the maintenance of optional attachments.*

CAUTION

Waxoyl contains turpentine substitute which is flammable. Keep flames away when applying Waxoyl. Waxoyl can take a few weeks to dry completely. Keep flames away during the drying period.

Do not weld near the affected area during the drying period. Take the same precautions as for oil to keep Waxoyl off your skin. Do not breathe the fumes. Apply in a well-ventilated area.

5-3-1-9

Preparing the Machine for Greasing

Make the machine safe before you start a greasing procedure. Refer to **Prepare the Machine for Maintenance**.

Important: *You can complete most of the greasing procedures with the loader arms lowered. If you lift the loader arms to get access for greasing, you must install the maintenance strut on the loader arm.*

Loader Arms

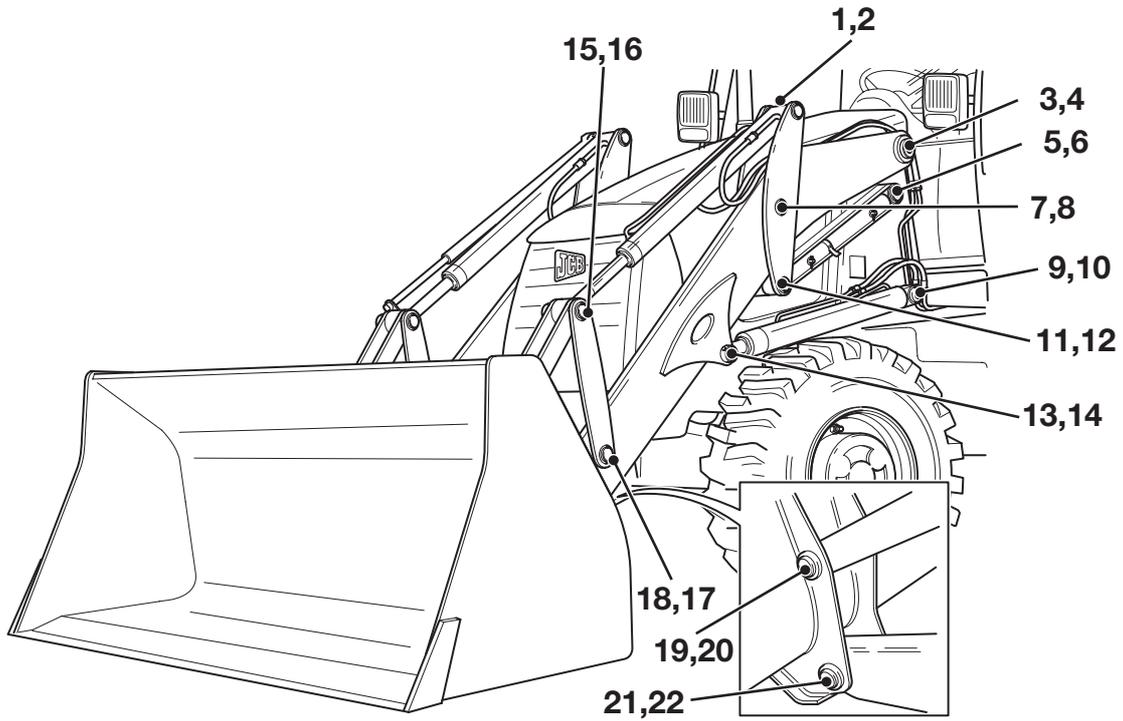


Fig 9.

For each grease point shown, there is another on the other side of the machine.

Total 22 grease points.

Backhoe and Quickhitch

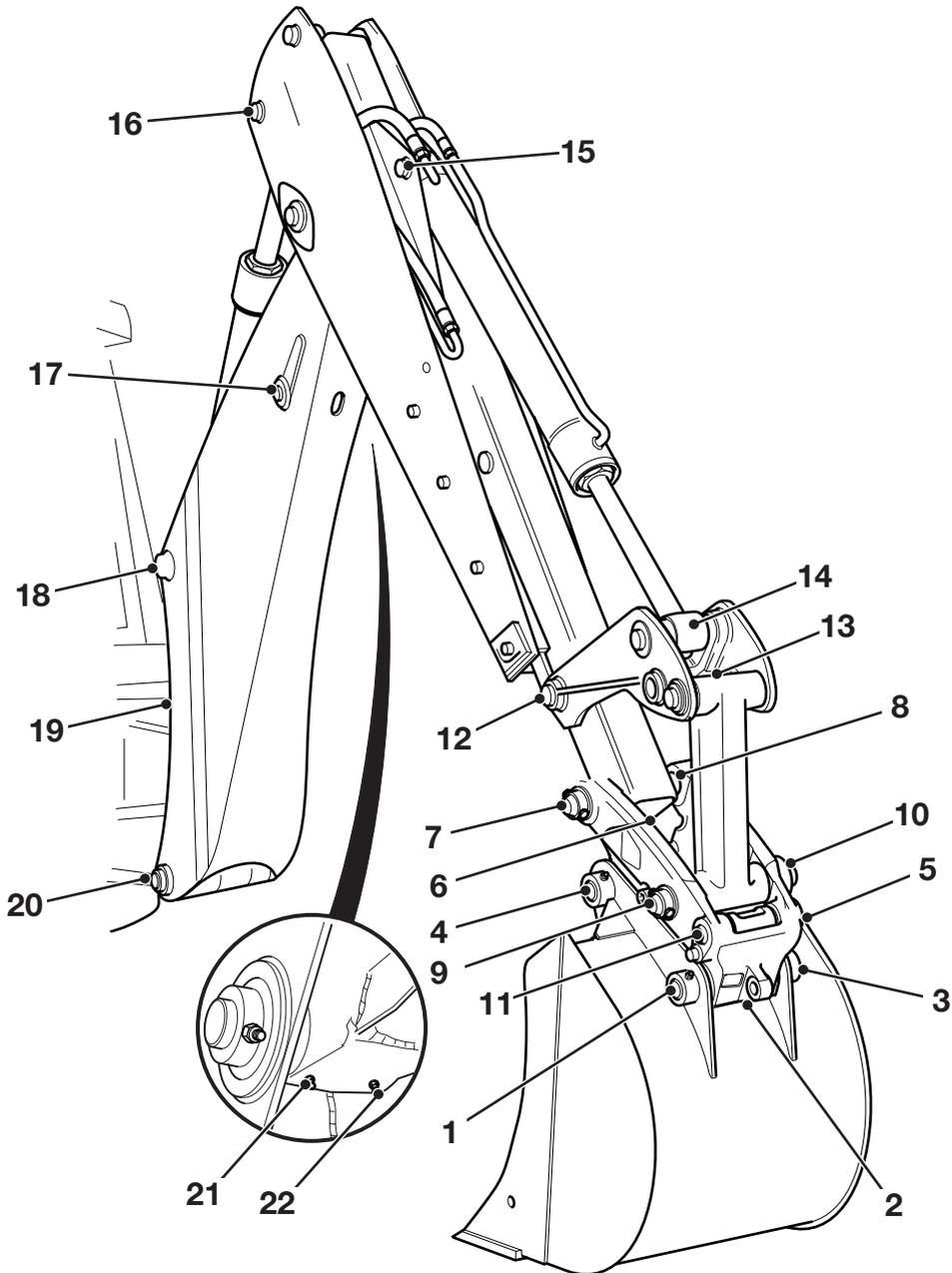


Fig 10.

22 Grease Points

Note: Figure shows a typical boom and dipper arrangement.

Front Axle (2 Wheel Drive Machines)

9 Grease Points

Note: Grease point 5 is a remote grease point mounted on the side of the mainframe chassis (near the left front wheel).

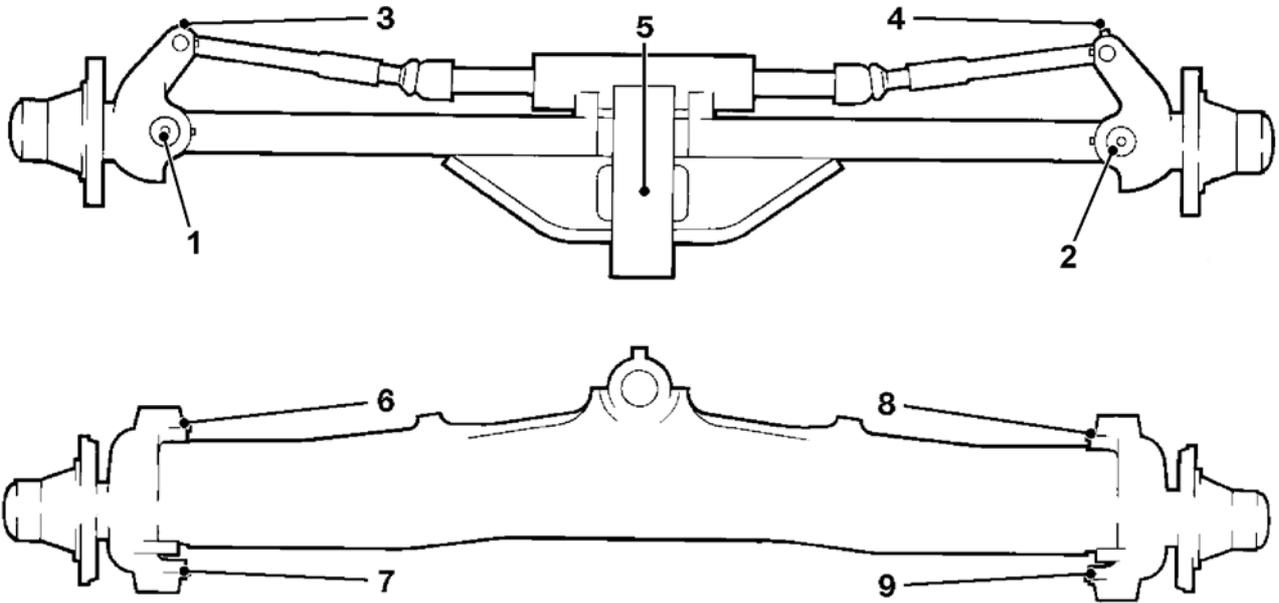


Fig 11.

Front Axle (4 Wheel Drive Machines)

5 Grease Points

Note: Grease point 5 is a remote grease point mounted on the side of the mainframe chassis (near the left front wheel).

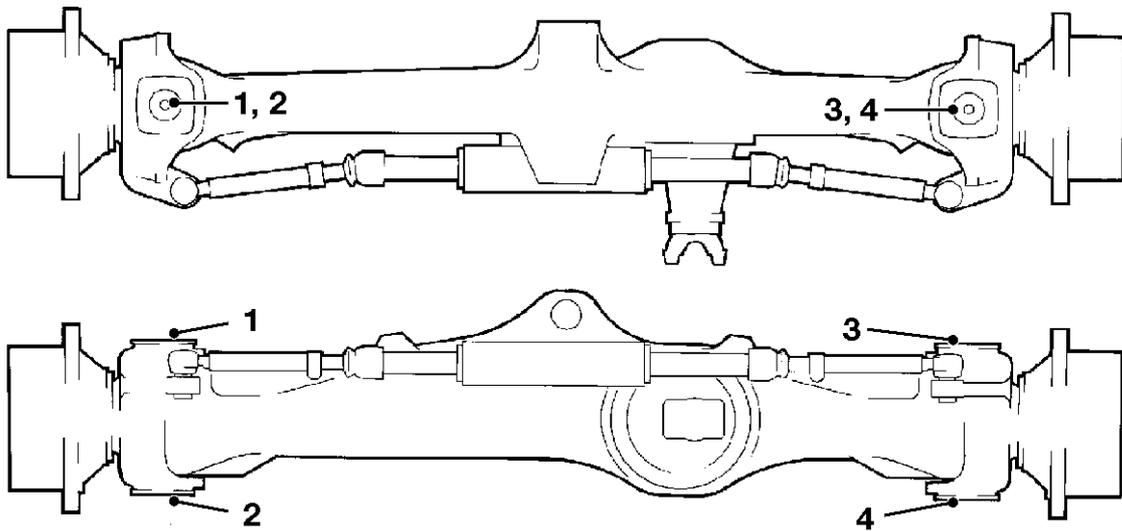


Fig 12.

Front Axle (All Wheel Drive Machines)

5 Grease Points

Note: Grease point 5 is a remote grease point mounted on the side of the mainframe chassis (near the left front wheel).

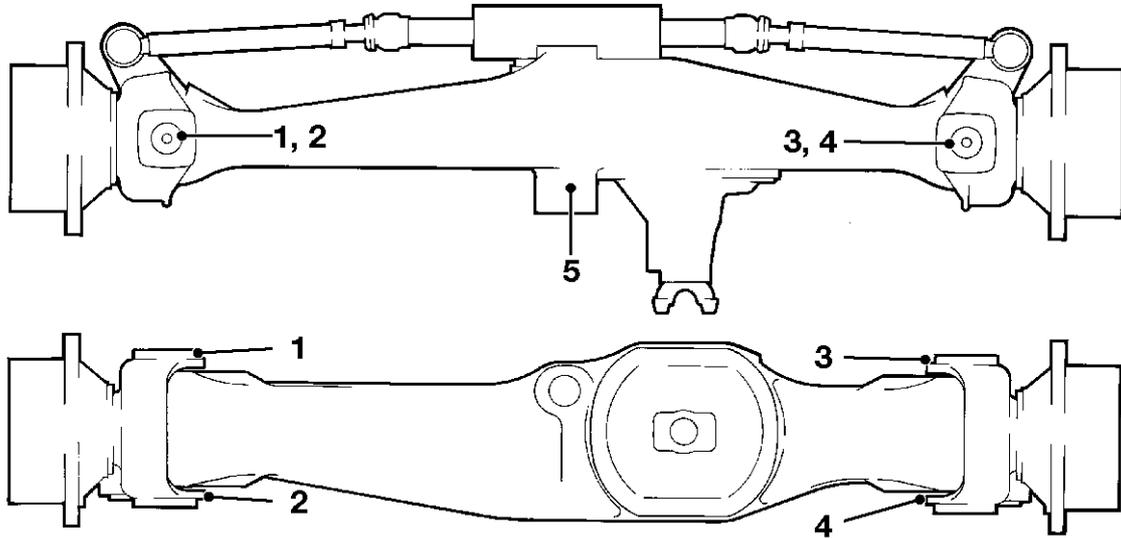


Fig 13.

Rear Axle (All Wheel Drive Machines)

4 Grease Points

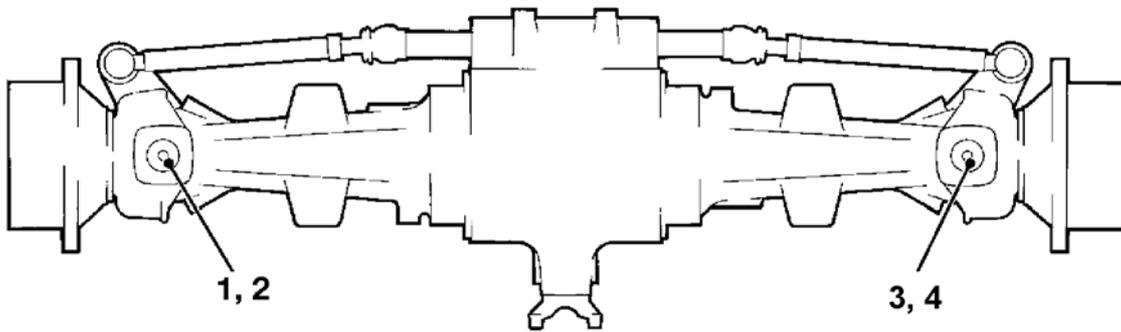


Fig 14.

Extending Dipper

⚠ CAUTION

Waxoyl contains turpentine substitute which is flammable. Keep flames away when applying Waxoyl. Waxoyl can take a few weeks to dry completely. Keep flames away during the drying period.

Do not weld near the affected area during the drying period. Take the same precautions as for oil to keep Waxoyl off your skin. Do not breathe the fumes. Apply in a well-ventilated area.

5-3-1-9

Extend the dipper. Coat the runners with Waxoyl as shown. [⇒ Fig 15. \(□ 3-28\)](#).

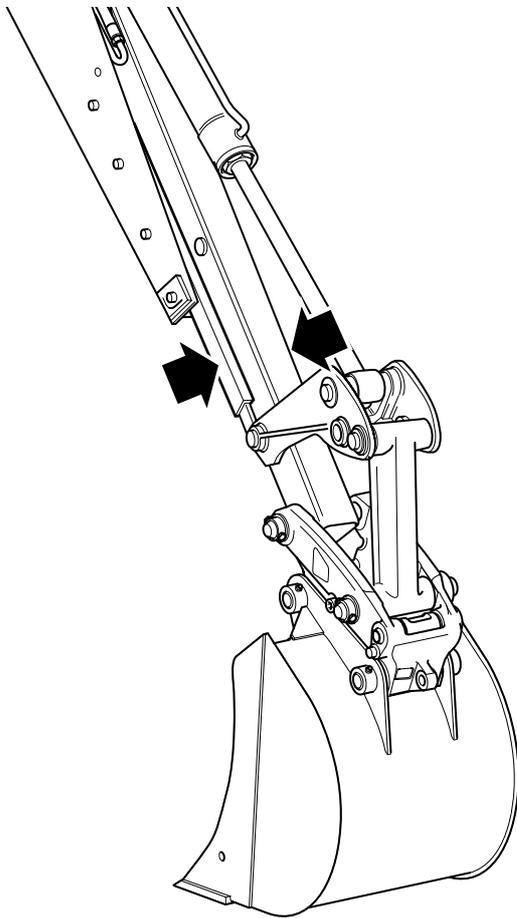


Fig 15.

Driveshafts

Front Driveshaft

3 Grease Points

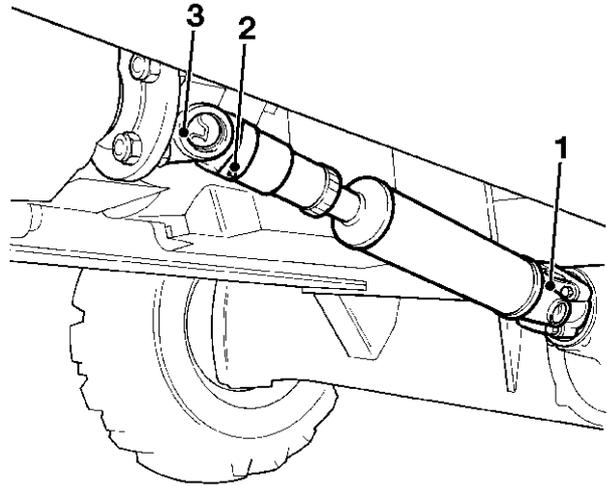


Fig 16.

Rear Driveshaft

3 Grease Points

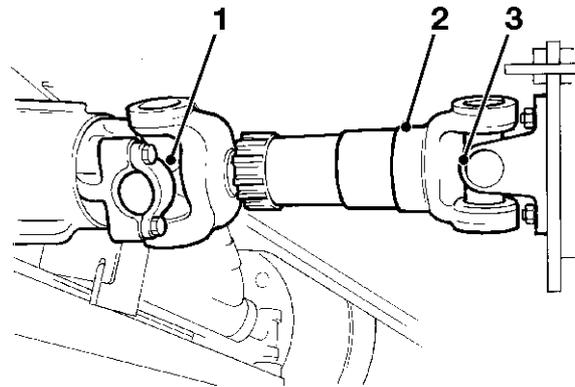


Fig 17.

6 - In - 1 Clamshovel

3 grease points each end -

Total 6 Grease Points

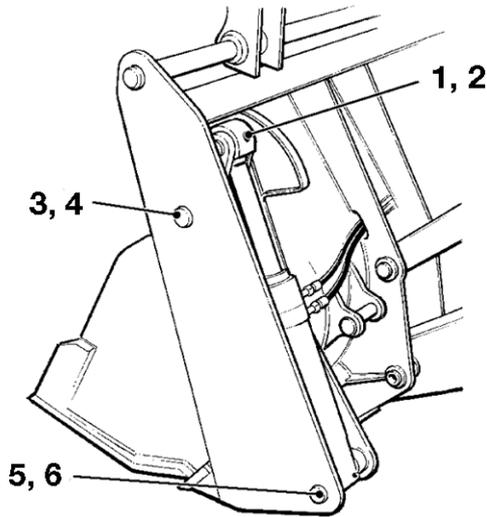


Fig 18.

Stabilisers (Centremount Machines)

3 grease points on each stabiliser -

Total 6 Grease Points

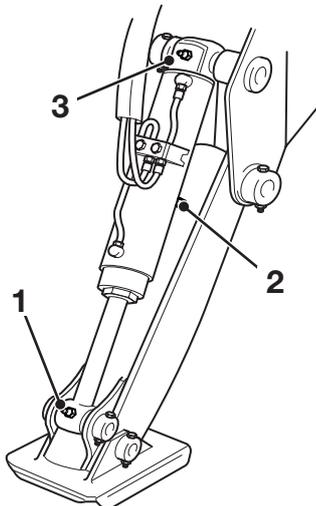


Fig 19.

Loader Quickhitch

2 grease points each end -

Total 4 Grease Points

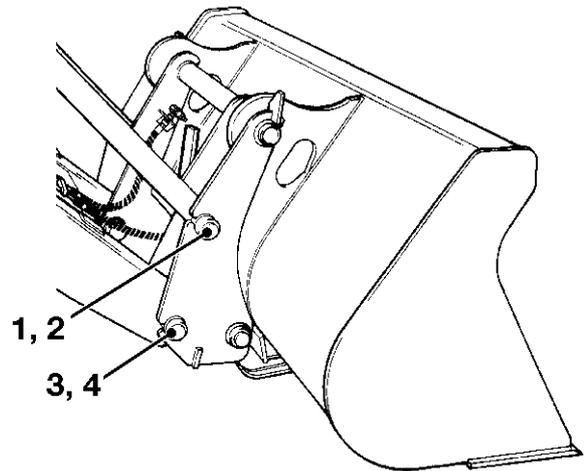


Fig 20.

Power Sideshift

Total 4 Grease Points

Note: Release the kingpost clamps and lower the excavator to the ground before greasing.

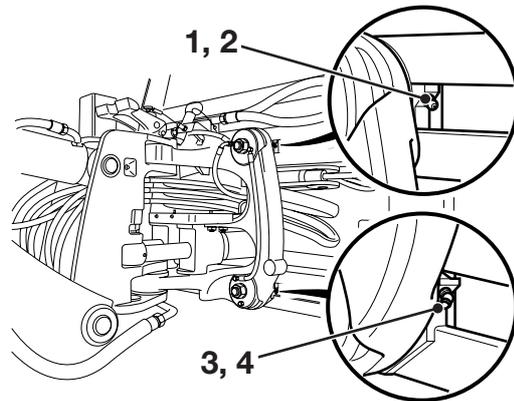


Fig 21.

Kingpost

9 Grease Points

Note: Figure shows a centremount kingpost, greasing is same for sideshift kingpost.

Note: It is recommended that grease points 2 and 3 are lubricated using a hand grease gun. The use of a power grease gun may result in the mounting plate being distorted.

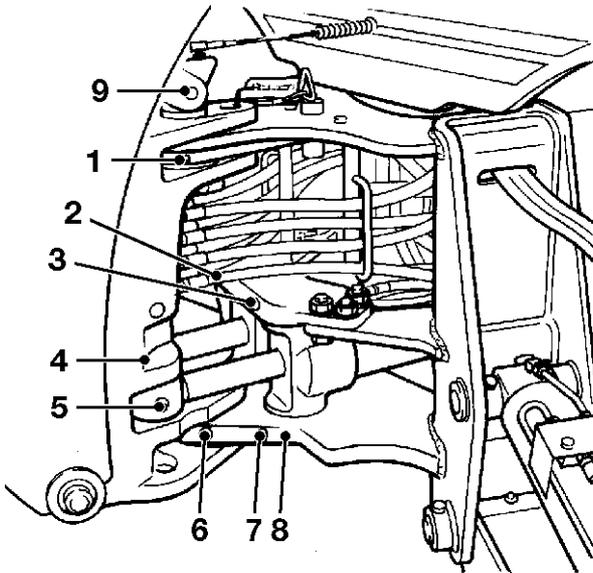


Fig 22.

Knuckle (if fitted)

For the boom and dipper grease points. → [Backhoe and Quickhitch \(□ 3-25\)](#).

2 Grease Points

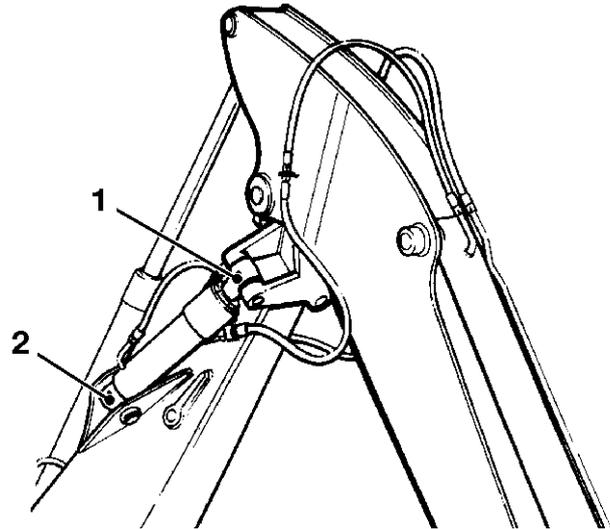


Fig 23.

Backhoe Quickhitch (Hydraulic)

CAUTION

Waxoyl contains turpentine substitute which is flammable. Keep flames away when applying Waxoyl. Waxoyl can take a few weeks to dry completely. Keep flames away during the drying period.

Do not weld near the affected area during the drying period. Take the same precautions as for oil to keep Waxoyl off your skin. Do not breathe the fumes. Apply in a well-ventilated area.

5-3-1-9

Coat the slide A with Waxoyl.

4 Grease Points

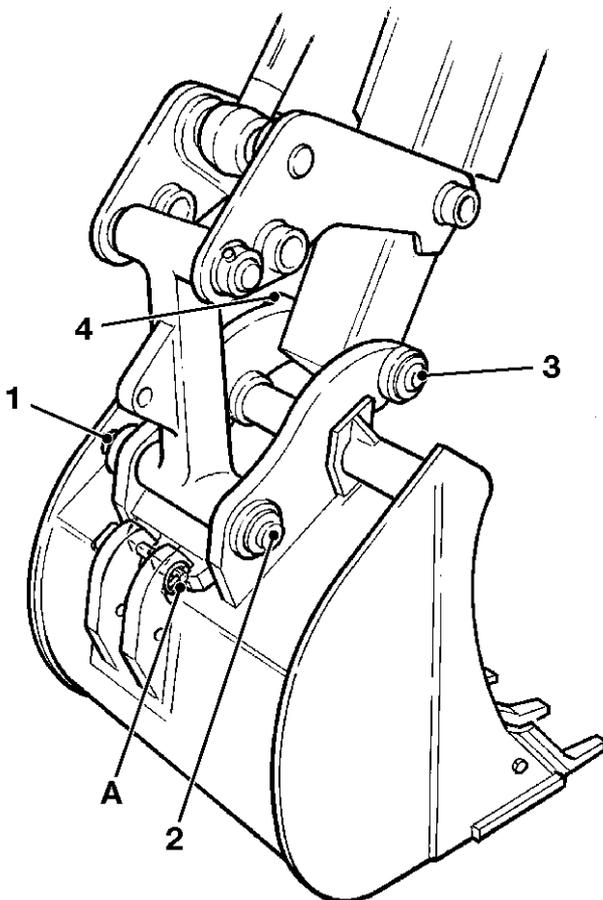


Fig 24.

Access Panels

Engine Cover

Opening and Closing (Type 1)

⚠ WARNING

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

5-2-6-5

⚠ WARNING

Touching hot surfaces can burn skin. The engine and machine components will be hot after the unit has been running. Allow the engine and components to cool before servicing the unit.

10-1-1-40

- 1 Make the machine safe with the loader arm lifted. Refer to **Prepare the Machine for Maintenance**.
- 2 To release the engine cover, pull handle **A**, the cover will automatically open and be supported on gas struts.

Note: In windy conditions fit a suitable size bolt or pin through the engine cover hinge lever mechanism to prevent the engine cover inadvertently closing.

- 3 To close the engine cover, pull the bonnet down by means of the cable **B**, push the bonnet down, make sure it is locked in place.

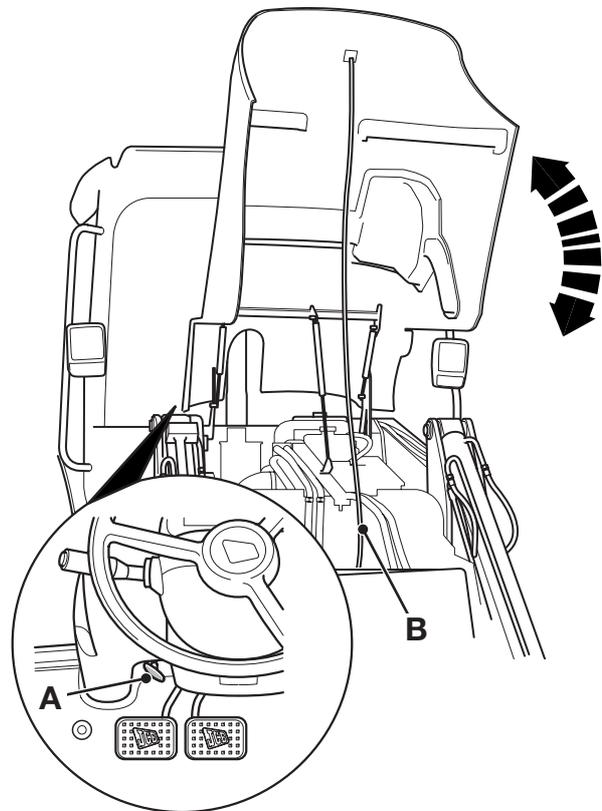


Fig 25.

Opening and Closing (Type 2)

WARNING

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

5-2-6-5

WARNING

Touching hot surfaces can burn skin. The engine and machine components will be hot after the unit has been running. Allow the engine and components to cool before servicing the unit.

10-1-1-40

- 1 Make the machine safe with the loader arms lifted. Refer to **Prepare the Machine for Maintenance**.
- 2 Unlock and remove the front engine grille.
- 3 To release the engine cover, push the lever **A** to the left, the cover will automatically open and be supported on gas struts.

Note: In windy conditions fit a suitable size bolt or pin through the engine cover hinge lever mechanism **C** to prevent the engine cover inadvertently closing.

- 4 To close the engine cover, pull the bonnet down by means of the cable **B**, push the bonnet down, make sure it is locked in place and that lever **A** returns to the original position.
- 5 Fit and lock the engine grill.

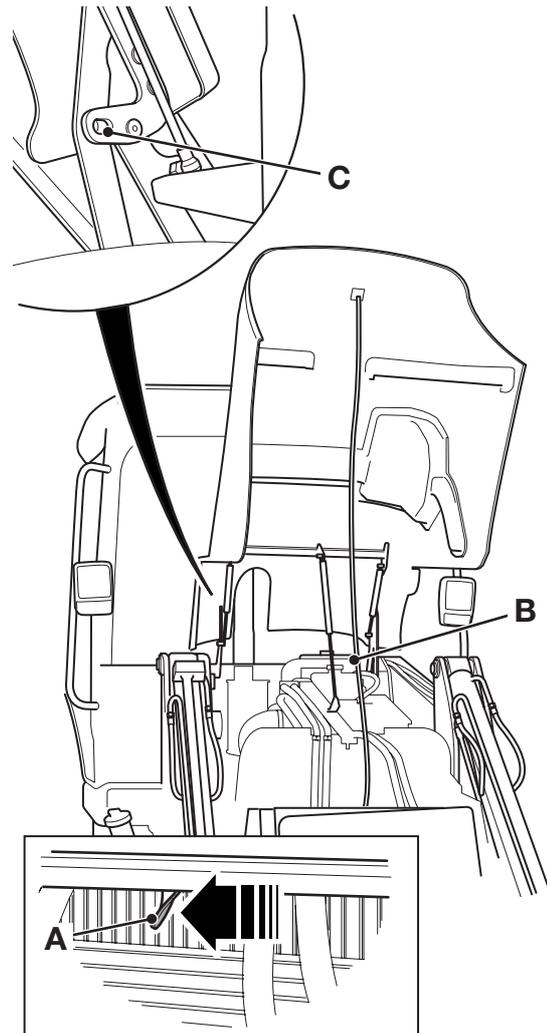


Fig 26.

Front Grille

- 1 Make the machine safe with the loader arms lifted. Refer to ***Prepare the Machine for Maintenance***.
- 2 Use the starter key **A** to unlock the front grille.
- 3 Remove the front grille **B**, lift the grille upwards and outwards.
- 4 Fit the front grille, carefully slot the grille into position. Use the starter key to lock and secure the front grille.

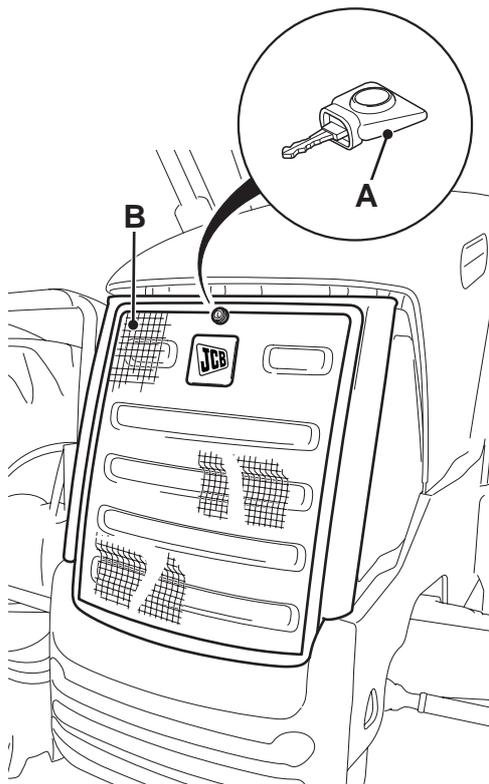


Fig 27.

T011190-1

Heater and Air Conditioning

Cleaning the Cab Heater Fresh Air Filter

Important: In dusty conditions, the filter will require cleaning/changing more often than detailed in the service schedule.

CAUTION

The filter may be filled with dust. Wear goggles and a face mask when removing the filter.

2-3-3-6

- 1 Make the machine safe with the loader arms lowered. Refer to **Prepare the Machine for Maintenance**.
- 2 Remove the cover retaining screws (2 off) and then remove the cover, item **A**.
- 3 Knock loose dust off the filter **B**. Carefully blow compressed air through all the folds of the filter, blow in the opposite direction to the arrows marked on the filter.

Note: The compressed air must be set at a pressure no greater than 7 bar (100 lb/in²).

- 4 Refit the cover **A** and secure with the retaining screws (2 off).

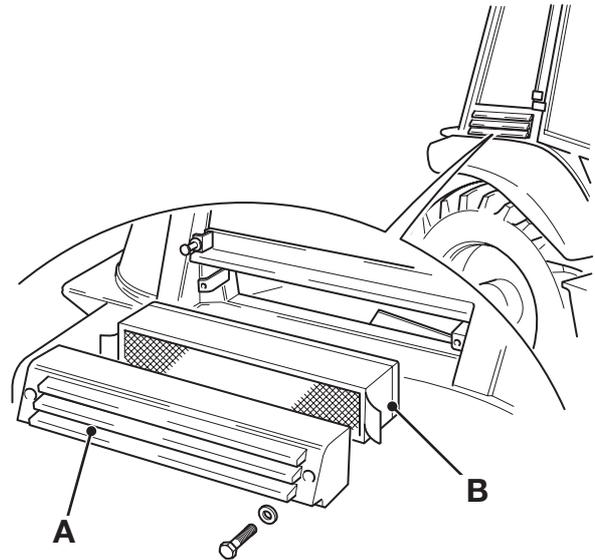


Fig 28.

Changing the Cab Heater Recirculation Filter(s) (if fitted)

Important: In dusty conditions the filter will require changing more often than detailed in the service schedule

CAUTION

The filter may be filled with dust. Wear goggles and a face mask when removing the filter.

2-3-3-6

- 1 Make the machine safe with the loader arm lowered. Refer to **Prepare the Machine for Maintenance**.
- 2 Turn the re-circulation switch **C** fully clockwise.

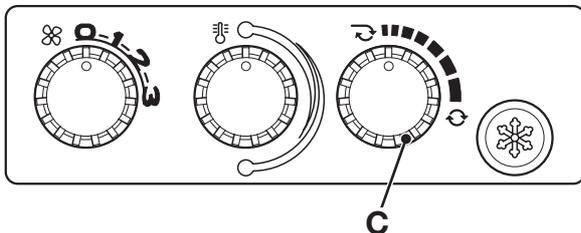


Fig 29.

399460-3

- 3 Remove screw **D**, Remove the side panel upwards out of the aperture.

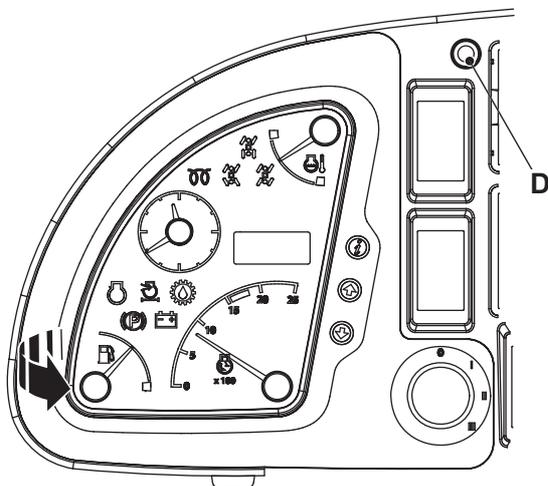


Fig 30.

T039550-5

- 4 Remove the wingnut **E**, lift and remove clamp bar **F**.

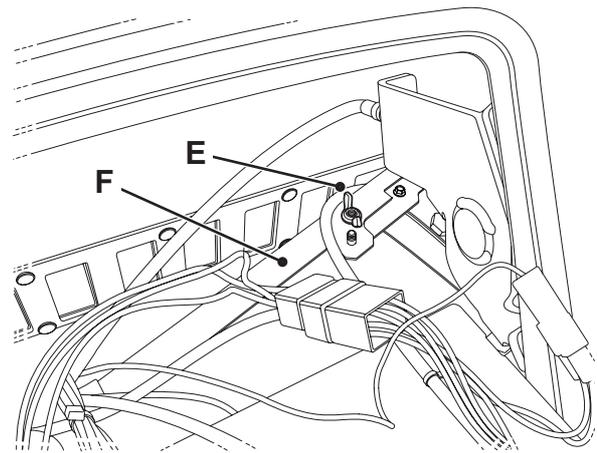


Fig 31.

T034340

- 5 Remove the filter. Note the direction of air flow on the filter.

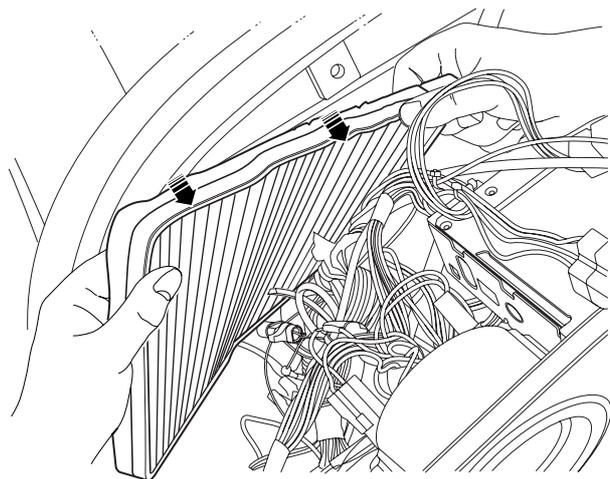


Fig 32.

T034350

- 6 Install new filter(s) in correct orientation.
- 7 Secure the filter(s) in position with clamp and wingnut.
- 8 Install the side panel back into the aperture secure in position with screw.
- 9 Test the Air conditioning system is working correctly.

Brakes

Park Brake

Introduction

⚠ WARNING

T3-071

Do not use a machine with a faulty park brake.

3-2-3-10_2

⚠ WARNING

Non approved modifications to drive ratios, machine weight or wheel and tyre sizes may adversely affect the performance of the park brake.

3-2-3-11

Make sure that you obey all health and safety precautions before you test or adjust the park brake.

If you have any queries concerning the park brake test or adjustment procedures, consult your local JCB distributor.

Testing the Park Brake

T3-087

⚠ WARNING

Before testing the park brake make sure the area around the machine is clear of people.

2-2-4-5



A339340

- The park brake must be fully engaged when the lever is vertical.
- The park brake warning light must come on when the park brake is engaged and forward or reverse is selected (starter switch at I).

- 1 Enter the machine. Fasten your seat belt (if fitted) and park the machine on a level dry surface.
- 2 Fully apply park brake.
- 3 Start the engine and raise the attachments to the appropriate travel position.
- 4 Select fourth gear.
- 5 Push down hard on foot brake pedal.
- 6 Select forward drive. The park brake warning light must illuminate.

⚠ WARNING

If the machine starts to move during the following test, immediately apply the foot brake and reduce the engine speed.

2-2-5-1

- 7 Test the park brake as follows:
 - a Move the park brake lever fractionally forward until the park brake warning light is just extinguished.
 - b Slowly release the foot brake pedal.
 - c If the machine has not moved, use the accelerator to gradually increase the engine speed to approximately 1500 RPM. The machine should not move.

Note: Do not do this test for longer than 20 seconds.

- d Reduce engine speed to idle and select neutral.
 - e Return the park brake lever to the fully on position.
 - f Lower attachments and stop the engine.
- 8 If the machine moved during the test, adjust the park brake and repeat the test. Refer to **Park Brake Adjustment**.

Park Brake Adjustment

WARNING

Over adjustment of the park brake could result in the park brake not fully releasing.

0011

- 1 Disengage the park brake (lever horizontal).

Note: Failure to disengage the park brake fully will result in excessive wear of the handbrake mechanism.

- 2 Turn handle grip **A** clockwise, half a turn.
- 3 Test the parking brake, see **Testing the Park Brake**.
- 4 If the brake fails the test, repeat steps 1, 2 and 3. If there is no more adjustment and pin **B** is at the end of its travel get the brake checked by your JCB dealer.

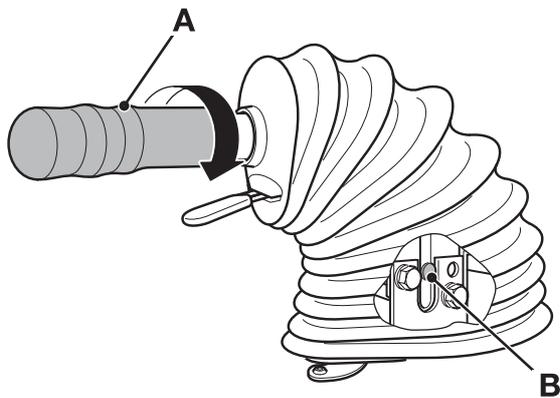


Fig 33.

A347580A-7

Foot Brake

Checking the Foot Brake Fluid Level

WARNING

Faulty brakes can kill. If you have to top up the brake reservoir frequently, get the brake system checked by your JCB Dealer. Do not use the machine until the fault has been put right.

2-3-2-5_1

- 1 Open the engine cover. → [Access Panels \(□ 3-32\)](#).
- 2 Visually check the level, MAX level is marked on the the reservoir **D**.
- 3 If necessary, add fluid as in step 4.
- 4 Remove the reservoir cap **C**.

If the level has fallen a long way below the MAX mark, get the system checked by your JCB dealer.

CAUTION

Using incorrect fluid could damage the system. See **Fluids, Capacities and Lubricants** for the correct fluid. The fluid can harm your skin. Wear rubber gloves. Cover cuts or grazes.

2-3-5-1_2

- 5 Carefully pour the recommended fluid (DO NOT USE ORDINARY BRAKE FLUID) until it reaches the correct level.
- 6 Refit the reservoir cap. Wipe up any spillage.

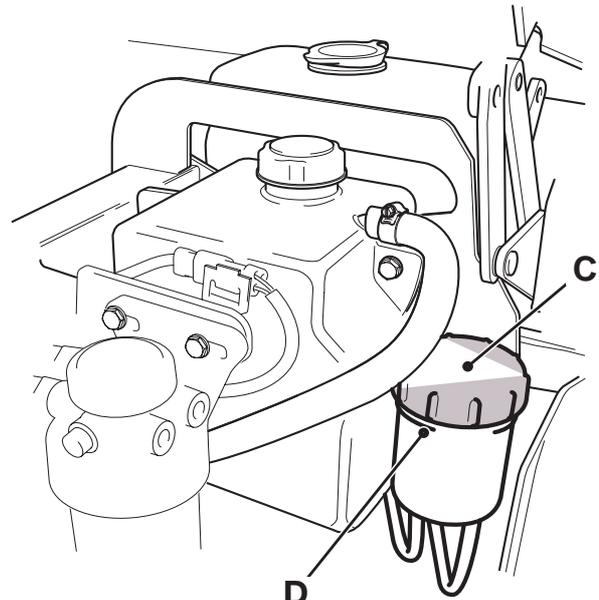


Fig 34.

Electrical System

Battery

Battery Disconnection/Connection

T3-019_3

WARNING

Keep metal watch straps and any metal fasteners on your clothes, clear of the positive (+) battery terminal. Such items can short between the terminal and nearby metal work. If it happens you can get burned.

5-2-2-4

Disconnection

- 1 Get access to the battery. See **Access Panels**.
- 2 Remove the leads. Disconnect the earth (-) terminal first.

Connection

- 1 Check the battery.
 - a If the terminal is dirty, clean the post.

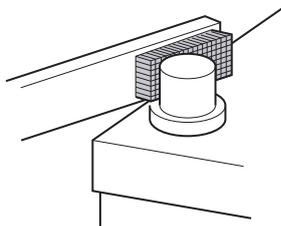


Fig 35.

- b If the terminal post is corroded and generates white powder wash the terminal with hot water. If considerable corrosion is detected, clean with a wire brush or abrasive paper.
 - c After cleaning, apply a thin coat of petroleum jelly to the terminal.
- 2 Re-connect the leads. Connect the earth (-) terminal last.
- 3 Close and lock the access panels.

Checking the Electrolyte Level

T3-020_2

Maintenance free batteries used in normal temperate climate applications should not need topping up. However, in certain conditions (such as prolonged operation at tropical temperatures or if the alternator overcharges) the electrolyte level should be checked as described below.

- 1 Get access to the battery. See **Access Panels**.
- 2 Disconnect and remove battery. See **Battery Disconnection/Connection**.

WARNING

Do not top the battery up with acid. The electrolyte could boil out and burn you.

2-3-4-6

- 3 Remove covers **A**. Look at the level in each cell. The electrolyte should be 6 mm (1/4 in) above the plates. Top up if necessary with distilled water or de-ionized water.

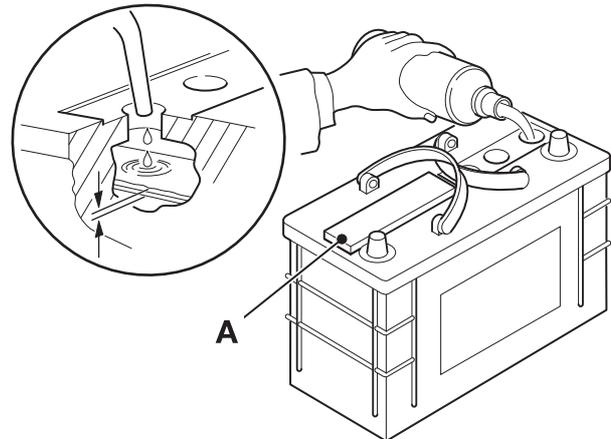


Fig 36.

- 4 Refit battery.
- 5 Close and lock the access panels.

Battery Isolator (if fitted)

To disconnect the battery from the machine electrics a battery isolator has been fitted.

CAUTION

Except in an emergency, do not use the battery isolator to switch OFF the engine. Failure to comply may result in damage to the electrical circuits.

INT-3-2-13

CAUTION

Before carrying out arc welding on the machine, disconnect the battery and alternator to protect the circuits and components. The battery must still be disconnected even if a battery isolator is fitted.

INT-3-1-13

At the end of a working cycle or if the machine is being left unattended, provided the lights are not required, the battery must be isolated. Before attempting to start the engine or use the machine electrics the battery isolator key must be fitted and switched on.

- 1 To isolate the battery turn the battery isolator key **A** in an anti-clockwise direction **B** and remove. Keep the key in a safe place and available for when the machine is next required.
- 2 To connect the battery insert the key **A** and turn in a clockwise direction **C**.

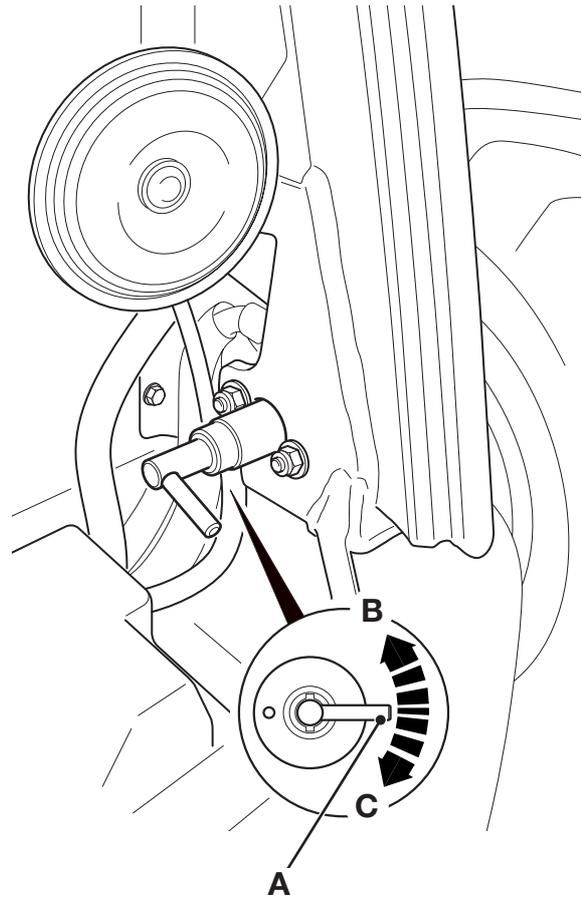


Fig 37. Later Machines

403370-4

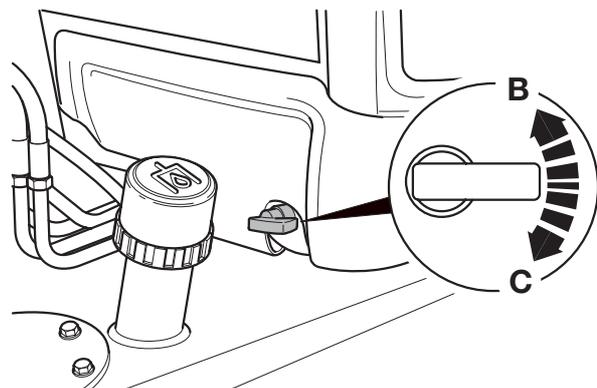


Fig 38. Early Machines

403370_C1

Jump Starting The Engine

T3-053

WARNING

Do not use a battery if its electrolyte is frozen. To prevent the battery electrolyte from freezing, keep the battery fully charged.

Do not try to charge a frozen battery or jump-start and run the engine, the battery could explode.

Batteries produce a flammable gas, which is explosive; do not smoke when checking the electrolyte levels.

When jump-starting from another vehicle, make sure that the two vehicles do not touch each other. This prevents any chance of sparks near the battery.

Set all the machine switches to their OFF positions before connecting the external power supply. Even with the starter switch set to off some circuits will be energised when the external power supply is connected.

Do not connect the booster (slave) supply directly across the starter motor. Doing this by-passes the neutral gear safety switch. If the machine is in gear, it may 'runaway' and kill or injure bystanders.

Use only sound jump leads with securely attached connectors. Connect one jump lead at a time.

The machine has a negative earth electrical system. Check which battery terminal is positive (+) before making any connections.

Keep metal watch straps and jewellery away from the jump lead connectors and the battery terminals - an accidental short could cause serious burns and damage equipment.

Make sure you know the voltage of the machine. The booster (slave) supply must not be higher than that of the machine. Using a higher voltage supply will damage your machine's electrical system.

If you do not know the voltage of your booster (slave) supply, then contact your JCB dealer for advice. Do not attempt to jump-start the engine until you are sure of the voltage of the booster (slave) supply.

4-2-2-3_1

1 The park brake should have been engaged when the machine was last parked. If it is not engaged, engage it now.

2 Set all switches in the cab to off.

DANGER

Before lowering the attachments to the ground, make sure that the machine and the area around it are clear of other people. Anyone on or close to the machine could fall and be crushed by the attachments, or get caught in the linkages.

2-2-3-4

3 Lower the loader shovel to the ground, if it is not already there. It will lower itself under its own weight when you operate the lever. Operate the lever carefully to control the rate of descent. If your machine is fitted with hose burst protection valves you will not be able to lower the shovel. In this case install the safety strut.

4 Connect the positive booster cable to the positive (+) terminal on the machine battery. Connect the other end of this cable to the positive (+) terminal of the booster supply.

5 Connect the negative (-) booster cable to a suitable point on the engine.

6 Start the engine.

WARNING

When the engine is running, there are rotating parts in the engine compartment. Before disconnecting the cables, make sure that you have no loose clothing (cuffs, ties etc.) which could get caught in rotating parts.

2-2-4-3

7 Disconnect the negative booster cable from the engine. Then disconnect it from the booster supply.

8 Disconnect the positive booster cable from the positive (+) terminal on the battery. Then disconnect it from the booster supply.



Fuses

For information about fuses see **Section C, Electrics, Fuses and Relays.**

Link Box Fuses

For information about link box fuses see **Section C, Electrics, Fuses and Relays.**



Relay Identification

For information about relays see **Section C, Electrics, Fuses and Relays.**

Engine

Oil and Filter

Checking the Oil Level

CAUTION

It is illegal to pollute drains, sewers or the ground. Clean up all spilt fluids and/or lubricants.

Used fluids and/or lubricants, filters and contaminated materials must be disposed of in accordance with local regulations. Use authorised waste disposal sites.

INT-3-2-14

WARNING

Oil

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

INT-3-2-3

- 1 Open the engine cover. → [Access Panels \(□ 3-32\)](#).
- 2 Check that the oil level is between the maximum and minimum marks on the dipstick **A**.

WARNING

Do not exceed the correct level of engine oil in the sump. If there is too much engine oil, the excess must be drained to the correct level. An excess of engine oil could cause the engine speed to increase rapidly without control.

GEN-1-18

- 3 If necessary, add the recommended oil through filler **B** to the maximum level. → [Lubricants and Capacities \(□ 3-11\)](#).
- 4 Fit filler cap and dipstick, make sure that they are fully inserted and tightened.

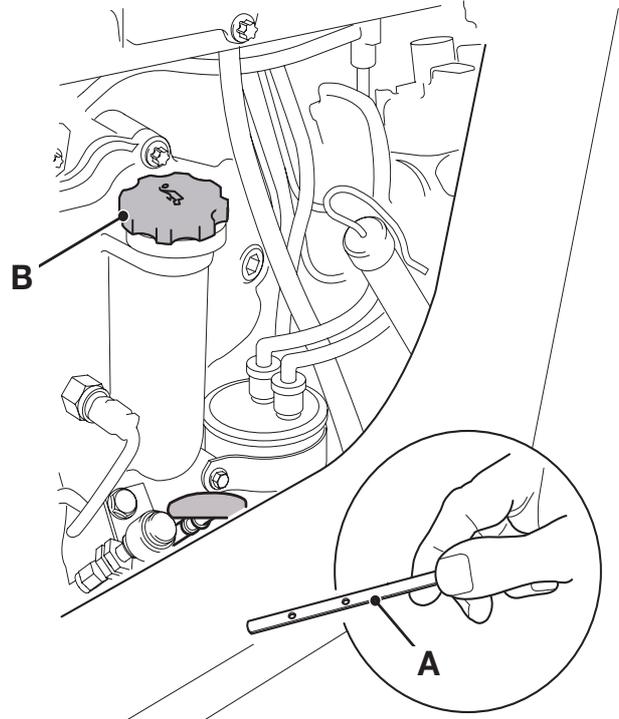


Fig 39.

Changing the Oil and Filter

T3-030_2

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

- 1 Get access to the engine. Refer to **Access Panels, Engine Cover**.
- 2 Place a container of suitable size beneath the sump drain plug **C**.

⚠ CAUTION

Oil will gush from the hole when the drain plug is removed. Hot oil and engine components can burn you. Keep to one side when you remove the plug.

13-3-1-15

- 3 Drain the engine oil.
 - a Machine with a sump plug, remove the sump drain plug **C** and its 'O' ring **D**. Let the oil drain out, then clean and refit the drain plug with a new 'O' ring. Torque the drain plug to 40-60Nm (30-44lbf ft).
 - b Machines with a drain valve, remove the dust cap **K** from the sump drain port. Attach drain tube **L**. With the free end of the tube in an oil container, screw in the drain tube assembly to open the valve.

When all the oil has drained, unscrew the drain tube assembly and fit the dust cap **K**.

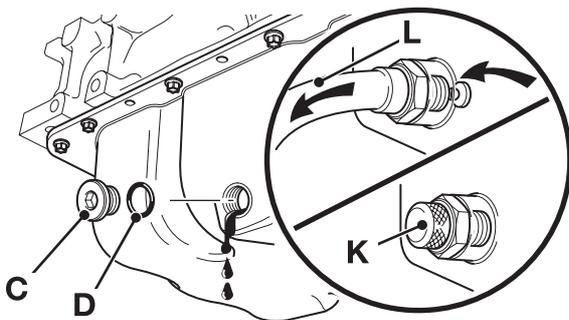


Fig 40.

C012110-1

- 4 Place a container of suitable size under drain plug **E** to catch the oil. [⇒ Fig 41. \(□ 3-46\)](#).

- 5 Loosen and remove the filter housing drain plug **E** and its 'O' ring **J**. Let the oil fully drain, then clean and refit the drain plug with a new 'O' ring. Torque the drain plug to 40-60Nm (30-44lbf ft).
- 6 Unscrew the filter canister **F**, use a chain wrench if necessary.
- 7 Clean the seal face of the filter head **G**.
- 8 Smear the seal **H** on the new filter canister **F** with clean engine oil.
- 9 Screw the filter on until it just contacts the filter head.
- 10 Turn the filter at least a further 3/4 of a turn.
- 11 Through the top filler point, fill the engine with the recommended oil to the MAX mark on the dipstick. Refer to **Checking the Oil Level**. Wipe off any spilt oil, refit the filler cap and make sure it is secure.
- 12 Operate the engine until the oil pressure low warning light has extinguished. Check for oil leakage. When the oil has cooled, check the oil level again, and if necessary top up with clean engine oil.

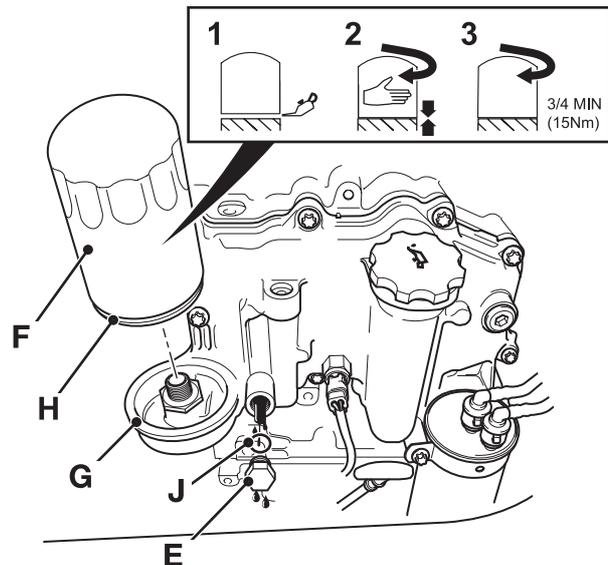


Fig 41.

C012110-5

Cooling System

Checking the Coolant Level

Visually check the coolant level daily.

Check the quality of the antifreeze mixture every year - before the cold weather starts. Change it every two years.

WARNING

The cooling system is pressurised when the coolant is hot. When you remove the cap, hot coolant can spray out and burn you. Make sure that the engine is cool before you work on the cooling system.

9-3-3-1_2

- 1 Open the engine cover. → [Access Panels \(□ 3-32\)](#).
- 2 The coolant level should be between the **MIN** and the **MAX** marks on coolant reservoir.

Note: If the level in the expansion bottle is low, then continue with steps 3 to 4.

- 3 Carefully loosen cap **A** on the coolant reservoir. Let any pressure escape before removing the cap. Fill with pre-mixed water/antifreeze until it reaches the correct level.

Note: To prevent air becoming trapped in the cooling system, do not exceed the maximum fill-rate shown. Refer to **Fluids, Lubricants and Capacities**.

- 4 Run the engine for a while to raise the coolant to working temperature and pressure. Stop the engine and check for leaks.

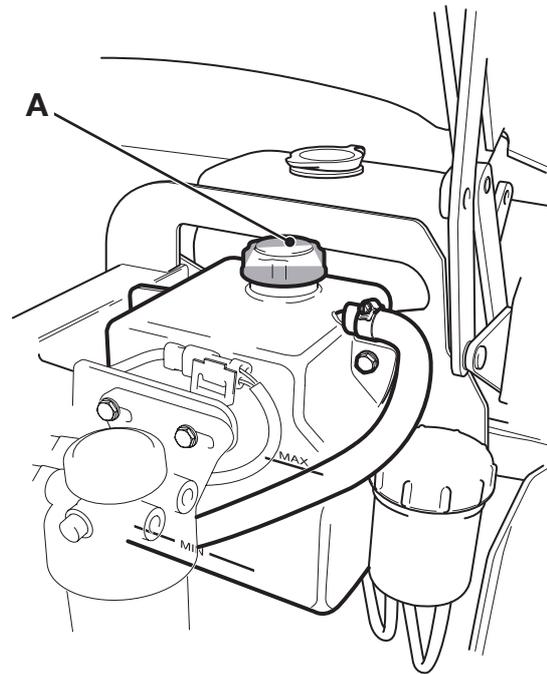


Fig 42.

Changing the Coolant

WARNING

The cooling system is pressurised when the coolant is hot. When you remove the cap, hot coolant can spray out and burn you. Make sure that the engine is cool before you work on the cooling system.

9-3-3-1_2

- 1 Open the engine cover. → [Access Panels \(□ 3-32\)](#).
- 2 Carefully loosen cap **A** on the coolant reservoir. → [Fig 42. \(□ 3-47\)](#). Let any pressure escape before removing the cap.
- 3 Place a container of suitable size beneath the radiator bottom hose.
- 4 Loosen clip **B** and disconnect the bottom hose from the radiator.
- 5 Flush the system using clean water. After flushing reconnect the bottom hose to the radiator.
- 6 Use the necessary mix of clean, soft water and antifreeze. Fill to the COLD/MIN level on coolant reservoir.

Note: It is recommended that the cooling system be filled at a maximum rate of 10 litres per minute. If the fill rate is any higher than this there is a possibility of air becoming trapped in the system.

- 7 Refit the filler cap. Make sure it is tight.
- 8 Run the engine for a while, to raise the coolant to working temperature and pressure.

Note: Make sure the cab heater control is in the hot position. This will ensure the coolant mixture circulates through the entire cooling system.

- 9 Stop the engine. Check for leaks. Check the coolant level and top up if necessary.

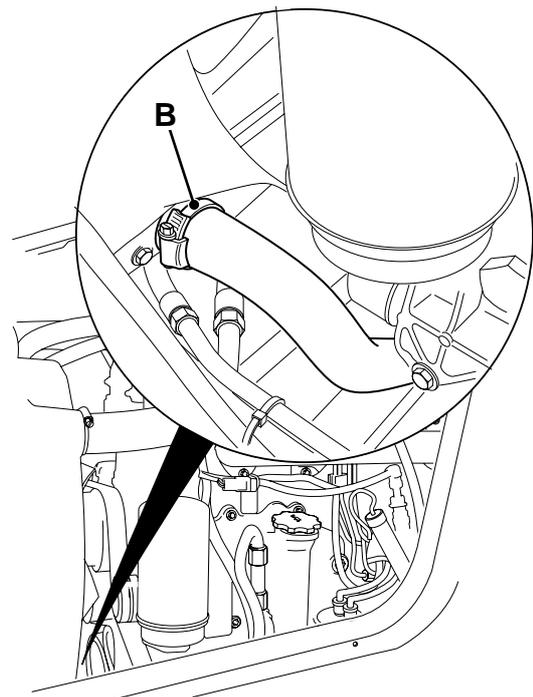


Fig 43.

Front End Accessory Drive Belt

Introduction

The front end accessory drive belt (FEAD) drives the alternator, water pump and the air conditioning compressor (if fitted).

The belt is automatically kept in tension so will not need to be adjusted.

WARNING

Make sure the engine cannot be started. Disconnect the battery before doing this job.

2-3-3-5

WARNING

Turning the Engine

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

0094

To get access to the drive belt for maintenance:

- 1 Open the engine cover. Refer to *Access Panels*.

Inspecting the Drive Belt

T3-029

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

- 1 Get access to the drive belt. Refer to *Front End Accessory Drive Belt, Introduction*.
- 2 Inspect the belt for cracks **A**, fraying **B** or missing pieces **C**. → [Fig 44](#). ([□ 3-49](#)).

Fit a new belt as required. Refer to *Changing the Drive Belt*.

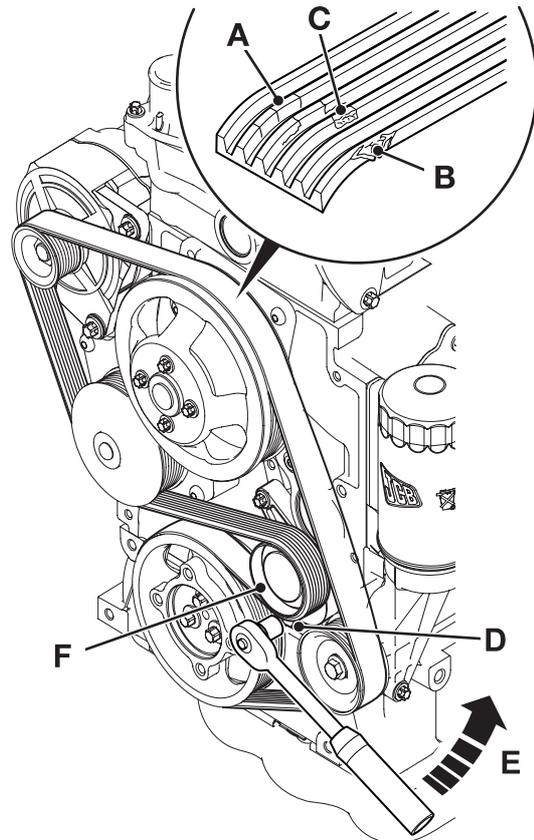


Fig 44.

763440-2

Changing the Drive Belt

- 1 Get access to the drive belt. Refer to **Front End Accessory Drive Belt, Introduction**.
- 2 Use a 16mm (5/8 in.) socket located on the hexagon spigot nut **D**, carefully rotate the tensioner against the spring force in direction **E**. Do not use excessive force or the tensioner will be damaged.
- 3 Keep holding the tensioner against the spring force and lift the belt off the tensioner pulley **F**.
- 4 Slowly release the spring force by rotating the tensioner unit in the opposite direction.
- 5 Before fitting a new belt, check that the tensioner roller and fan pulley rotate smoothly and that there is no play in the bearings.
- 6 Fit the new drive belt around the pulleys. [→ Fig 44. \(□ 3-49\)](#).
- 7 Use a 16mm (5/8 in.) socket located on the hexagon spigot nut **D**, carefully rotate the tensioner against the spring force in direction **E**. Do not use excessive force or the tensioner will be damaged.
- 8 Keep holding the tensioner against the spring force and lift the belt around the tensioner pulley **F**.

Air Filter

Changing the Air Filter Elements

CAUTION

The outer element must be renewed immediately if the warning light on the instrument panel illuminates.

2-3-3-1

Note: Do not attempt to wash or clean the elements - they must only be renewed.

Note: A new inner element must be fitted at least every third time the outer element is changed. As a reminder, mark the inner element with a felt tipped pen each time the outer element is changed.

- 1 Open the engine cover. → [Access Panels \(3-32\)](#).
- 2 Disconnect outlet hose **A**.
- 3 Depress clips **B** and lift off cover **C**. Remove outer element **D**. Take care not to tap or knock the element.
- 4 If the inner element **E** is to be changed, lift up pulls and remove inner element **E**.
- 5 Clean inside the housing **F**, and cover **C** make sure the air holes **G** are clear. Make sure the drain hole **K** is clear.
- 6 Check that the scavenge pipe (or dust valve if fitted) is securely fitted and is in good condition.
- 7 Insert the new elements **E** and **D** into the housing, pushing them firmly in so that they are fully seated.
- 8 Fit cover **C**, engage cover clips **H** with housing clips **J** and close cover, secure with clips **B**.

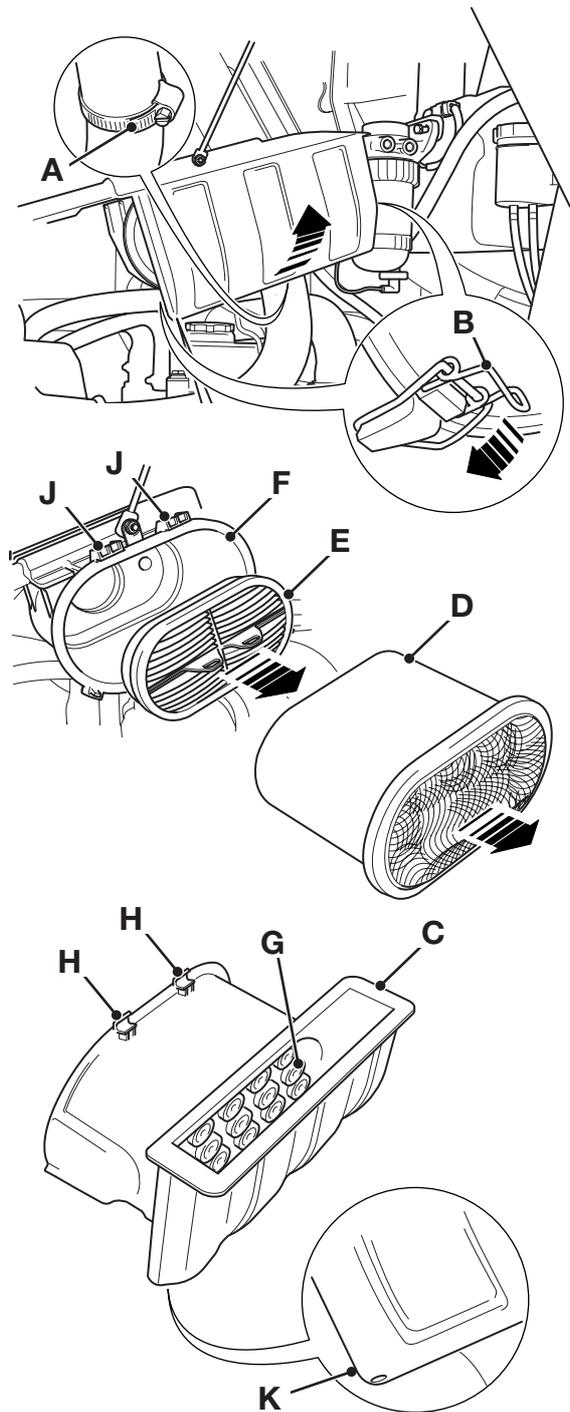


Fig 45.

Fuel System

Fuel

Important: USE THE CORRECT FUEL.

For information about fuel types and cleanliness requirements refer to **Section 1 - General Information**.

WARNING

Fuel

Fuel is flammable; keep naked flames away from the fuel system. Stop the engine immediately if a fuel leak is suspected. Do not smoke while refuelling or working on the fuel system. Do not refuel with the engine running. Completely wipe off any spilt fuel which could cause a fire. There could be a fire and injury if you do not follow these precautions.

INT-3-2-2_3

WARNING

Fine jets of fluid at high pressure can penetrate the skin. Keep face and hands well clear of pressurised fluid and wear protective glasses. If fluid penetrates your skin, get medical help immediately.

0177

CAUTION

Running the engine with air in the system could damage the fuel injection pump. After maintenance, the system must be bled to remove any air.

2-3-3-11

WARNING

Petrol

Do not use petrol in this machine. Do not mix petrol with the diesel fuel; in storage tanks the petrol will rise to the top and form flammable vapours.

INT-3-1-6

CAUTION

Consult your fuel supplier or JCB distributor about the suitability of any fuel you are unsure of.

GEN-9-2

Filling the Tank

WARNING

Lower the loader arms and switch off the engine before refuelling. Do not permit operation of the machine controls while refuelling.

2-3-3-9

At the end of every working day, fill the tank with the correct type of fuel. This will prevent overnight condensation from developing in the fuel.

The cap **A** incorporates a side mounted barrel lock that is operated by the ignition/door key.

Fit the Cap

Once the key has been removed, the cap will simply rotate on the filler neck. To remove the cap from the filler neck, the key must be re-inserted and the cap unlocked.

Note: The key **MUST** be inserted in the cap when removing and fitting.

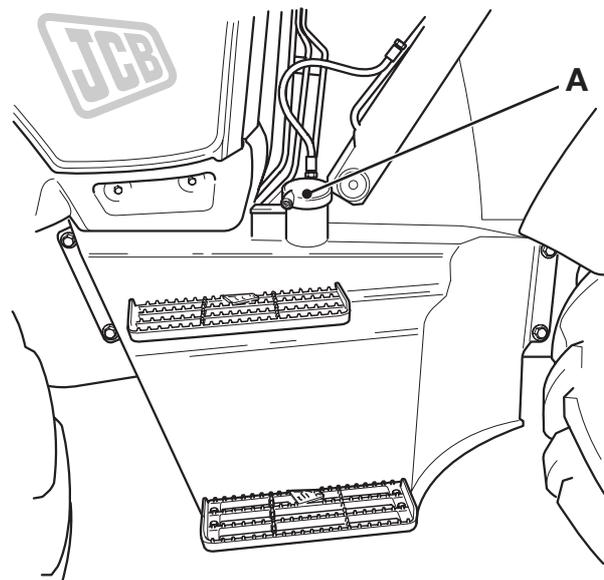


Fig 46.

Water Separator and Engine Fuel Filter

Introduction

⚠ WARNING

Make sure the engine cannot be started. Disconnect the battery before doing this job.

2-3-3-5

⚠ CAUTION

Do not allow dirt to enter the fuel system. Before disconnecting any part of the fuel system, thoroughly clean around the connection. When a component has been disconnected, for example a fuel pipe, always fit protective caps and plugs to prevent dirt ingress.

Failure to follow these instructions will lead to dirt entering the fuel system. Dirt in the fuel system will seriously damage the fuel injection equipment and could be expensive to repair.

ENG-1-7

To get access to the water separator **A** and engine fuel filter **B** for maintenance:

- 1 Open the engine cover. Refer to *Access Panels*.

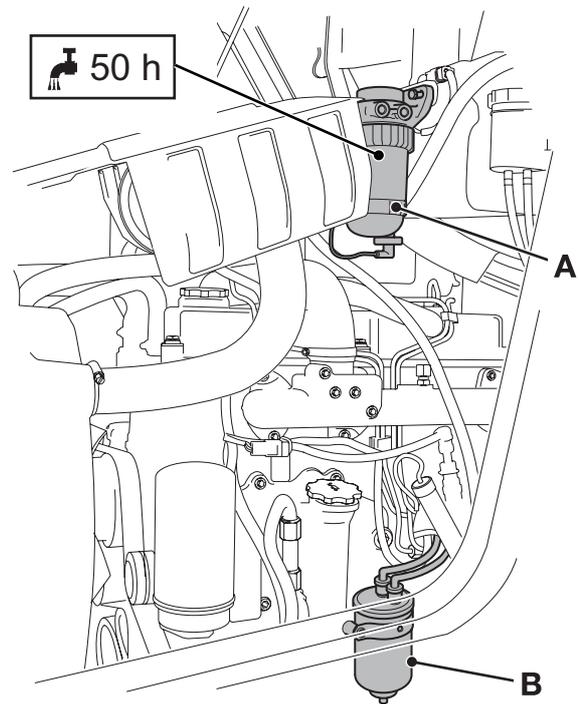


Fig 47.

C007470-3

Draining the Water Separator and Engine Fuel Filter

T3-075

If there is water in the fuel or if the cab warning light illuminates, drain the water separator and engine filter as detailed.

- 1 Get access to the Water Separator and Engine Fuel Filter. Refer to **Water Separator and Engine Fuel Filter, Introduction**.
- 2 Drain off any water in the element **A** by turning tap **B**.
- 3 Drain off any water in the water separator bowl **C** by turning tap **D**. Do not disconnect the electrical connector **E** (if fitted).
- 4 If there is sediment in the bowl after draining, support the bowl and release the locking ring **F**.
- 5 Wash the bowl in clean fuel.
- 6 Refit the bowl, secure in position with locking ring **F**.

Important: Ensure the seal is seated correctly before refitting the bowl. Refer to **Changing the Water Separator Pre-Filter**.

- 7 Make sure that the electrical connector **E** is correctly fitted.

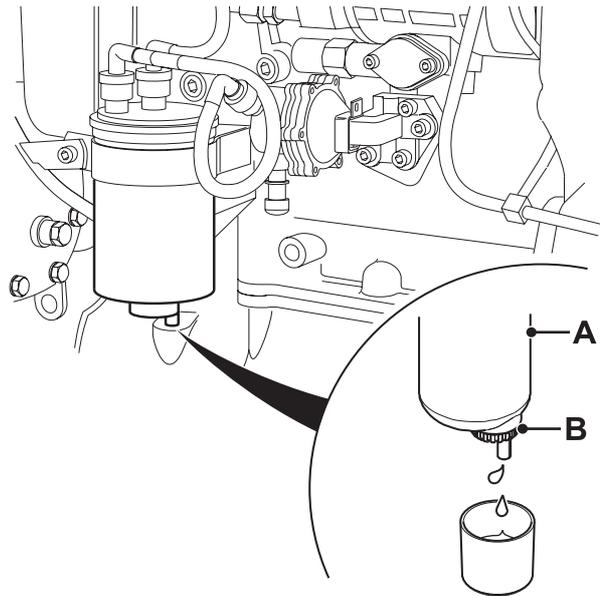


Fig 48.

C040110-1

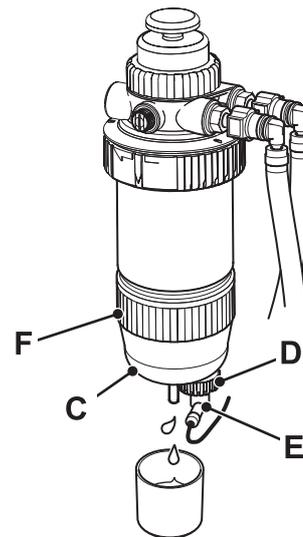


Fig 49.

C048590-1

Changing the Water Separator Pre-Filter

T3-076

- 1 Get access to the Water Separator. Refer to **Water Separator and Engine Fuel Filter, Introduction**.
- 2 Drain and remove the water separator bowl **C**. Refer to **Draining the Water Separator and Engine Fuel Filter**.
- 3 To remove the filter element **A**, release locking ring **B** and discard element.
- 4 Fit new element and secure in position with locking ring **B**.
- 5 Refit the bowl, secure in position with locking ring **B**.

Important: Ensure the seal **D** is seated correctly before refitting the bowl.

- 6 Make sure that the electrical connector **E** is correctly fitted.

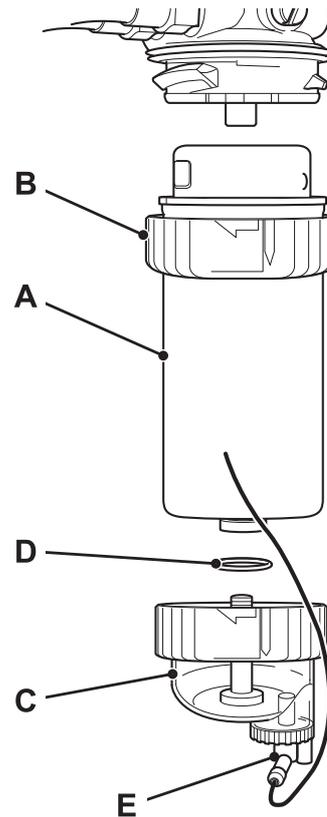


Fig 50.

C007030-5

Cleaning Water Separator Pump (if fitted)

T3-077

If the priming pump does not operate or if a fuel blockage is suspected, the hand priming pump can be removed and the pump and sedimenter cleaned.

Note: To carry out this procedure you will need a strap wrench to loosen and tighten locking ring **A**.

- 1 Get access to the Water Separator. Refer to **Water Separator and Engine Fuel Filter, Introduction**.
- 2 Thoroughly clean the outside of the filter housing and around the filter head.
- 3 To remove the pump assembly, using a suitable strap wrench release locking ring **A**, keep the assembly pressed down to contain the spring once the locking ring is free.
- 4 Carefully remove the pump assembly, take care not to lose spring **B**.
- 5 Pull out diaphragm **C** and clean as required using clean fuel.
- 6 Remove any debris in the water sedimenter and inlet connectors as required.
- 7 Make sure seal **D** is positioned correctly, lubricate diaphragm **C** with clean engine oil. Taking care not to damage diaphragm **C**, refit diaphragm and spring **B**.
- 8 Secure assembly in position, taking care not to cross thread locking ring **A**, tighten to finger tight.
- 9 With strap wrench, tighten locking ring **A** a further 1/4 of a turn.
- 10 Bleed the system and check for leaks. Refer to **Bleeding the System**.

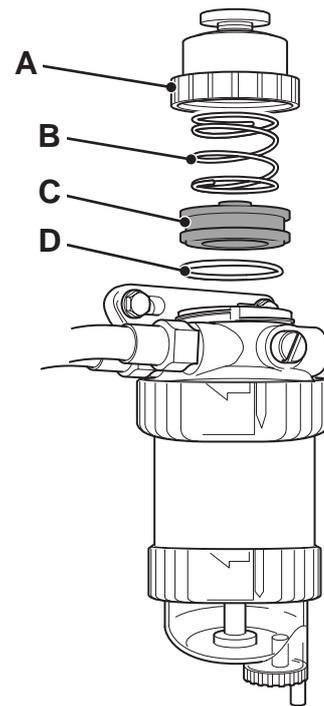


Fig 51.

812300

Changing the Engine Fuel Filter Element

Mechanical Fuel Injection System

T3-078

- 1 Get access to the Engine Fuel Filter. Refer to **Water Separator and Engine Fuel Filter, Introduction**.
- 2 Thoroughly clean the outside of the filter housing and around the filter head.
- 3 Loosen the drain tap **A** and allow the fuel to drain into a suitable container.
- 4 Mark the pipes prior to removal to ensure they are refitted in the correct position. Press fuel coupling release button **B** and disconnect fuel lines **C** and **D**.
- 5 Release the filter strap retaining screw **E** and lift the filter clear.
- 6 Install new filter element **F**. Make sure that the black dot **G** is aligned with the locating hole **H** in the strap. Torque tighten the filter strap retaining screw **E** to 24 Nm (17.7 lbf ft).
- 7 Reconnect the fuel lines **C** and **D**.
- 8 Bleed the fuel system. Refer to **Bleeding the System**.

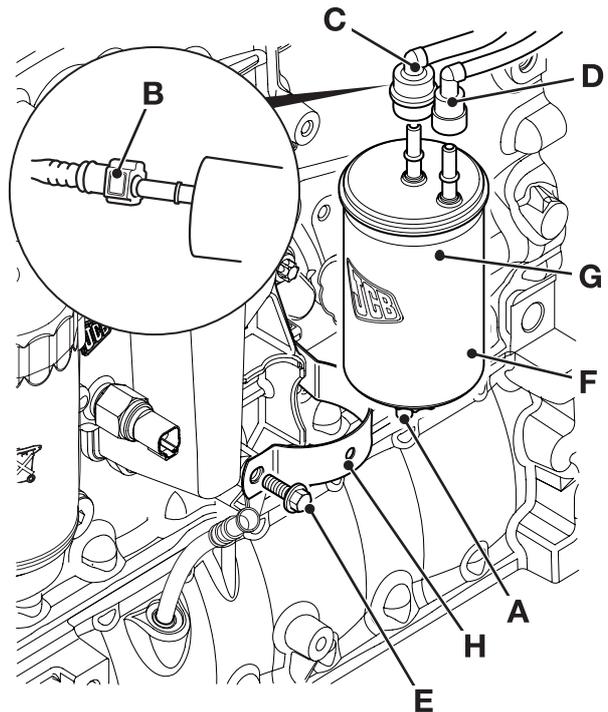


Fig 52.

C007090

Bleeding the System

Mechanical Fuel Injection System

T3-082

To bleed the engine fuel filter **A** carry out the following:

- 1 Disconnect the fuel line **B** at the injection pump.
- 2 Operate the fuel lift pump priming button **C** until air free fuel exits from the fuel filter outlet.
- 3 Reconnect fuel line **B**.
- 4 The engine is now ready to start. If the engine runs smoothly for a short time and then begins to run roughly, leave at idle until it runs smoothly.

If the engine continues to run roughly, check again for air in the fuel system.

If the fault persists contact your nearest JCB dealer.

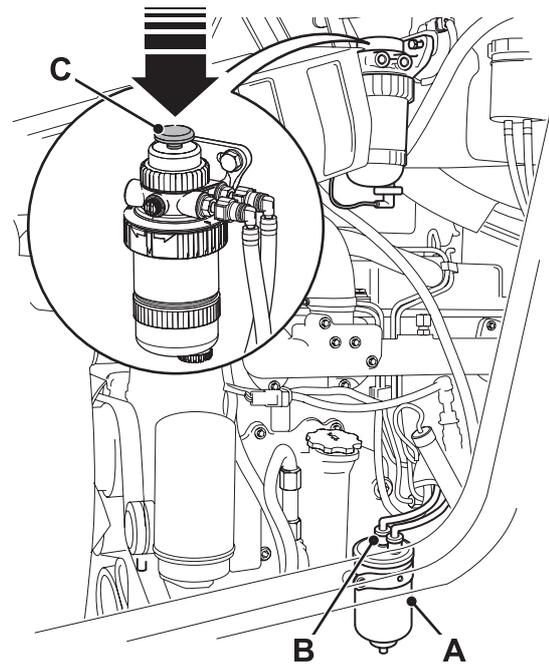


Fig 53.

763990-3

Hydraulic System

Introduction

WARNING

The temperature of the hydraulic oil will be high soon after stopping the engine. Wait until it cools (less than 40°C) before beginning maintenance.

8-3-4-10

WARNING

Fluid Under Pressure

Fine jets of fluid at high pressure can penetrate the skin. Keep face and hands well clear of fluid under pressure and wear protective glasses and gloves. Hold a piece of cardboard close to suspected leaks and then inspect the cardboard for signs of fluid. If fluid penetrates your skin, get medical help immediately.

INT-3-1-10_3

WARNING

Hydraulic Pressure

Hydraulic fluid at system pressure can injure you. Before connecting or removing any hydraulic hose, 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 hoses. Make sure the engine cannot be started while the hoses are open.

INT-3-1-11_2

CAUTION

Using incorrect fluid could damage the system. See **Fluids, Capacities and Lubricants** for the correct fluid. The fluid can harm your skin. Wear rubber gloves. Cover cuts or grazes.

2-3-5-1_2

CAUTION

Do not allow dirt to enter the system. Before disconnecting any part of the system, thoroughly clean around the connection. When a component has been disconnected, always fit protective caps and plugs to prevent dirt ingress.

Failure to follow these instructions will lead to dirt entering the system. Dirt in the system will seriously damage the systems components and could be expensive to repair.

INT-3-3-12

Releasing the Hydraulic Pressure

P2-3006

- 1 Make the machine safe with the loader arm lowered. Refer to **Prepare the Machine for Maintenance**.
- 2 Operate the controls to remove the hydraulic pressure from the service hose lines:
 - a For manually operated services, operate the controls (several times) of the service(s) to be disconnected.
 - b For electrical and servo operated services, turn the starter key to the ON position.

Operate the controls (several times) of the service(s) to be disconnected.

Important: To release the hydraulic pressure from the electrical and servo operated services the battery must be connected while you operate the controls.

- 3 Carefully remove the hydraulic tank filler cap to vent residual tank hydraulic pressure. Refer to **Hydraulic Tank Cap**.
- 4 Install the hydraulic tank filler cap.

Hydraulic Tank Filler Cap

P2-3007

The hydraulic tank breather (and filter) forms an integral part of the hydraulic tank filler cap **B**. Replace the cap (and breather filter) with a new one at the recommended interval.

The cap incorporates a side mounted barrel lock that is operated by the ignition/door key. It is important to note that seal **C** must be in good condition and correctly installed in the cap.

Fit the Cap

Insert the key and turn anticlockwise **D**, screw the cap on until resistance is felt then turn a further quarter of a turn, turn the key clockwise **E** and remove the key. With the key removed the cap will rotate and can not be undone.

Remove the Cap

Insert the key and turn anticlockwise **D**, unscrew the cap.

Note: The key must be inserted in the cap when removing and fitting.

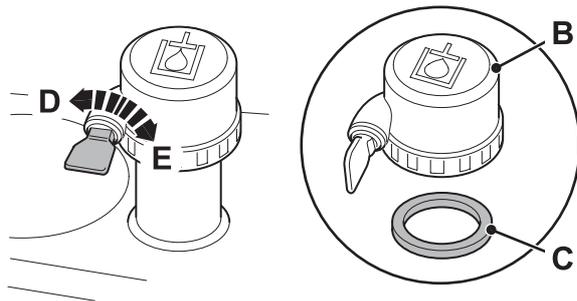


Fig 54.

329760-3

Oil and Filter

Checking the Fluid Level

WARNING

Fluid Under Pressure

Fine jets of fluid at high pressure can penetrate the skin. Keep face and hands well clear of fluid under pressure and wear protective glasses. Hold a piece of cardboard close to suspected leaks and then inspect the cardboard for signs of fluid. If fluid penetrates your skin, get medical help immediately.

INT-3-1-10_2

- 1 Position the machine on level ground. Set the loader shovel on the ground. Retract the extending dipper if fitted. Raise the boom, swing in the dipper and close the bucket. Stop the engine. Remove the starter key.
- 2 Look at the fluid level in the sight glass **A**. The level should be at the red mark (or above).

CAUTION

If the fluid is cloudy, then water or air has contaminated the system. This could damage the hydraulic pump. Contact your JCB Distributor immediately.

12-5-1-4

- 3 If the oil level is low, remove filler cap **B** and replenish with recommended hydraulic oil as required.

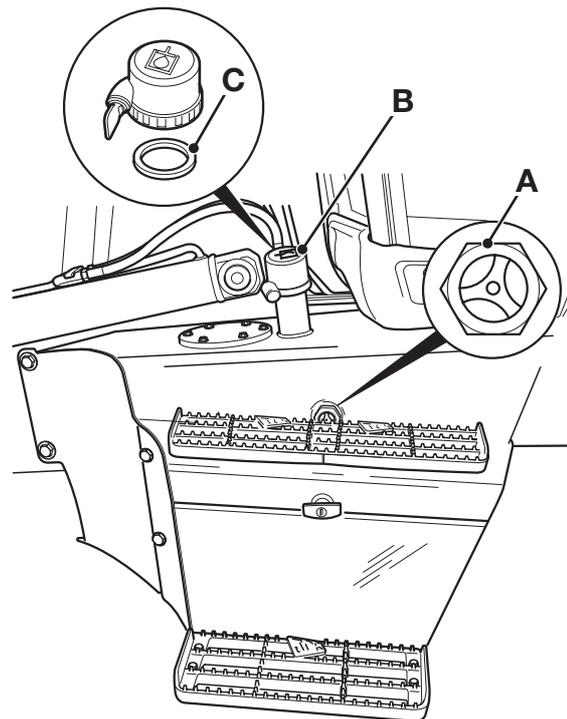


Fig 55.

Changing the Filter Element

WARNING

Fluid Under Pressure

Fine jets of fluid at high pressure can penetrate the skin. Keep face and hands well clear of fluid under pressure and wear protective glasses. Hold a piece of cardboard close to suspected leaks and then inspect the cardboard for signs of fluid. If fluid penetrates your skin, get medical help immediately.

INT-3-1-10_2

1 Position the machine on level ground. Roll the loader shovel forward and rest it on the ground. Retract the extending dipper if fitted. Close the backhoe bucket. Swing in the dipper. Lower the boom until the bucket rests on the ground. Lower the stabilisers to the ground. Stop the engine. Remove the starter key.

2 Remove the element assembly

- a** Remove screws **A**. Remove the cover plate **B** and gasket **C**.
- b** Remove spring **D**.
- c** Hold handle **E** and pull the element assembly from the hydraulic tank.

3 Remove the element from its canister.

- a** Hold canister **F**.
- b** Hold handle **E** and rotate the element **G** 90° anti-clockwise.
- c** Pull on handle **E**, the element **G** should separate from its canister **F**. Discard the old element.
- d** Remove and discard seal **H**.
- e** Clean the inside of canister **F**.

Note: New machines are fitted with a 5 micron filter element which must be replaced at the first 100 hour service with a 10 micron filter element.

4 Fit the new element.

- a** Fit a new seal **H**.
- b** Make sure that seal **J** is fitted in the new element.

- c** Push the element **G** into its canister **F** and rotate the element 90° to lock it into position. Check that the element has locked into position by pulling on handle **E**.
- d** Install the element assembly in the hydraulic tank.
- e** Fit spring **D** and gasket **C**.
- f** Fit cover plate **B** and tighten screws **A** to 24 Nm (17.7 lbf ft).
- g** Check oil level and replenish as required through filler. Fit and tighten the filler cap. → [Hydraulic Tank Filler Cap \(3-60\)](#).

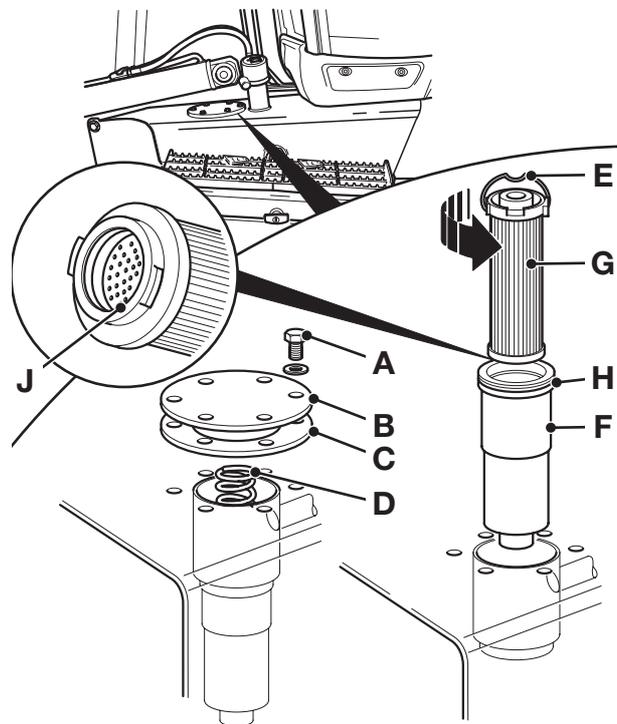


Fig 56.

Changing the Suction Strainer

WARNING

Make the machine safe before working underneath it. Park the machine on level ground, lower the attachments to the ground. Apply the park brake, put the transmission in neutral and stop the engine. Block both sides of all four wheels.

Disconnect the battery, to prevent the engine being started while you are beneath the machine.

GEN-4-1_1

- 1 Position the machine on level ground. Roll the loader shovel forward and rest it on the ground. Retract the extending dipper if fitted. Close the backhoe bucket. Swing in the dipper. Lower the boom until the bucket rests on the ground. Lower the stabilisers to the ground. Stop the engine. Remove the starter key.
- 2 Remove hydraulic tank filler cap.
- 3 Place a container beneath the hydraulic tank to catch the oil, remove drain plug and drain the hydraulic tank. Make sure the container is large enough to hold the tank contents. → [Lubricants and Capacities \(□ 3-11\)](#).
- 4 Undo clips **A** and disconnect the hydraulic return pipe.
- 5 Using a 65mm A/F spanner unscrew suction strainer **B** and discard.
- 6 Fit a new filter assembly **B**, torque tighten to 15-20 Nm (11-15 lbf ft).
- 7 Reconnect suction hose. Make sure the clips **A** are positioned 180° apart.
- 8 Refit drain plug, torque tighten to 100 Nm (74 lbf ft).
- 9 Refill hydraulic tank, fit and tighten the filler cap. → [Hydraulic Tank Filler Cap \(□ 3-60\)](#).

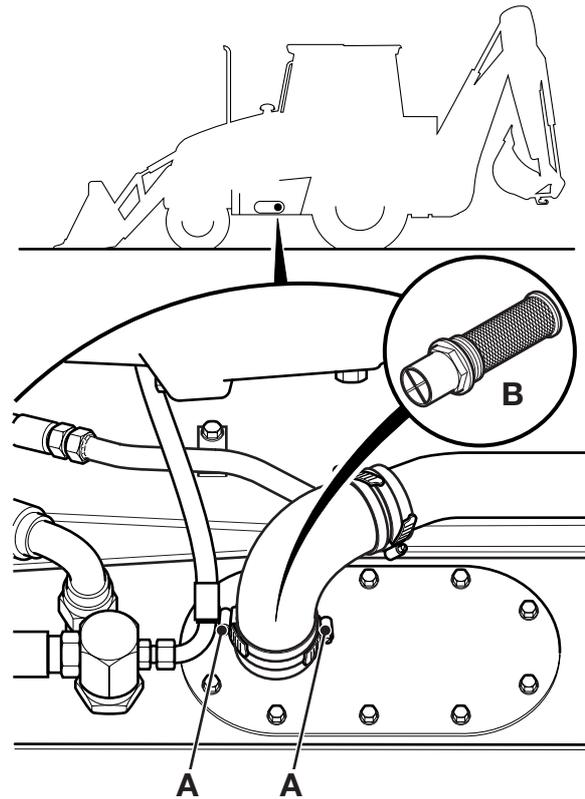


Fig 57.

Changing the Pilot Filter Element (if fitted)

Note: Applicable to joystick control (Servo) machines only.

WARNING

Make the machine safe before getting beneath it. Park the machine on level ground and lower the attachments. Stop the engine and remove the starter key. Make sure the park brake is engaged. Disconnect the battery to prevent the engine being started. Block all four wheels before getting under the machine.

3-3-1-1

- 1 Park the machine on level ground and lower the loader arms and backhoe to the ground. Engage the parking brake.
- 2 With the engine stopped, turn the starter switch to the ON position. Operate the joystick control levers to vent residual pressure.
- 3 Turn the starter switch to OFF, remove the starter key and battery isolator key. → [Battery Isolator \(if fitted\) \(□ 3-41\)](#).
- 4 Unscrew end cap **A**.
- 5 Remove element, with associated seals. Discard the old seals.
- 6 Fit new element, together with new seals.
- 7 Refit cap **A**, torque tighten to 25Nm (18lbf ft).
- 8 Run the engine and check for leaks.

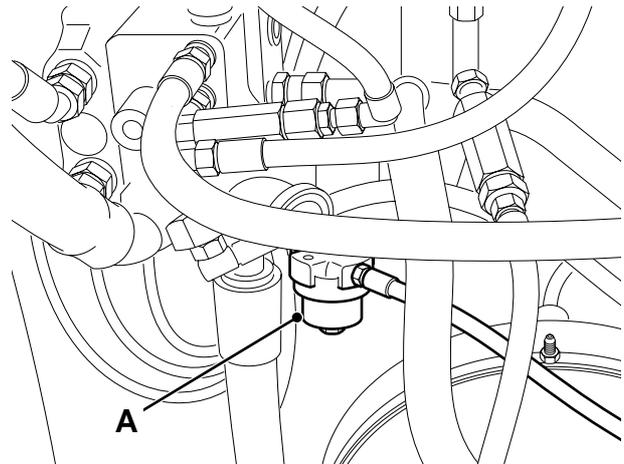


Fig 58.

Cooling Pack

Cleaning the Tubes/Fins

The cooling pack is located in front of the engine, the pack consists of the engine cooling radiator, hydraulic oil cooler, intercooler and air-conditioning condenser (optional). If the cooler tubes/fins get clogged (by dirt and flies etc.) the radiator and coolers will be less efficient.

- 1 Make the machine safe with the loader arms lifted. Refer to **Prepare the Machine for Maintenance**.
- 2 Remove the front grille.
- 3 Brush off all debris from the cooler tubes and fins. Make sure the loosened material is brushed out of the cooler enclosure.

Note: When cleaning the matrix make sure that the brush follows the same direction as the fins are to avoid damaging them. Damaged fins will reduce the cooling efficiency of the matrix.

- 4 Refit the radiator grille.

Note: Machines with air conditioning have a condenser matrix fitted in front of the oil cooler, the fins of the condenser matrix may get clogged. In this case, clean the tubes/fins of the condenser matrix as described above.

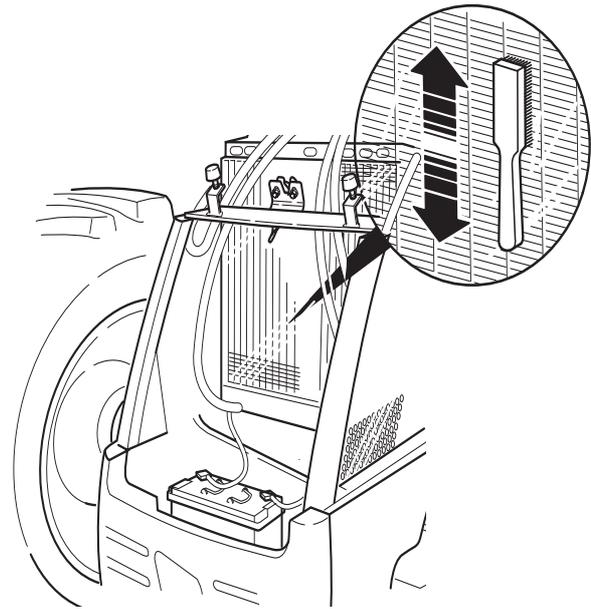


Fig 59.

Hose Burst Protection Valve (if fitted)

WARNING

If your machine has not been fitted with an approved lifting point such as a hook or shackle and hose burst check valves then it must not be used for object handling. Using a machine for object handling without these devices could lead to injury. Use the machine for earth-moving purposes only.

2-2-1-13

The hose burst protection valves (if fitted) prevent the loader or backhoe falling in the event of a hose burst. These valves may be fitted on rams which raise or lower the loader arms, the boom or the dipper.

CAUTION

If both Smooth Ride System (SRS) and Hose Burst Check Valve (HBCV) options are fitted on your machine, when the SRS is selected ON there will be no HBCV protection. Do not switch the SRS ON when the front loader shovel is above 600mm (2ft).

0112

Checking Hose Burst Protection Valve

- 1 Raise the loader arms fully. Raise the boom to about 45°. Raise the dipper to the horizontal.
- 2 Stop the engine.
- 3 Using the control levers, try to lower the loader, boom and dipper. Push the levers fully to the 'lower' position. If there is any movement, get the hydraulic system checked by your JCB dealer.

Lowering a Load

During normal operation, the engine must be running before a load can be lowered. The following paragraphs describe how to safely and correctly lower a load in the event of engine failure or a hose burst; we recommend that only a competent maintenance engineer perform the procedures.

After lowering a load do not use the machine until the manual over-ride screw has been reset (Loader HBPV) or a new end cap and valve assembly fitted (Boom HBPV) by a qualified engineer, otherwise the valve will not operate as intended.

DANGER

Do not stand underneath the raised load during the lowering procedure. Stand clear and to one side until the load has been safely lowered. Make sure that the area is clear of other people before lowering the load. If you do not follow these precautions you or others could be killed or seriously injured.

2-3-5-3

Boom and Dipper Hose Burst Protection Valve (HBPV)

- 1 Remove cap **A** and pierce the warning label.
- 2 If a hose has burst, position a suitable container to catch the oil.
- 3 Insert an Allen key into the socket head of screw **B**. Slowly turn the allen key in a clockwise direction until the load just begins move.
 - a Burst hose - Lower the boom using screw **B**, turn the screw counter-clockwise to slow or stop the load from lowering.
 - b Dead engine - Operate the control lever in the cab to lower the load.

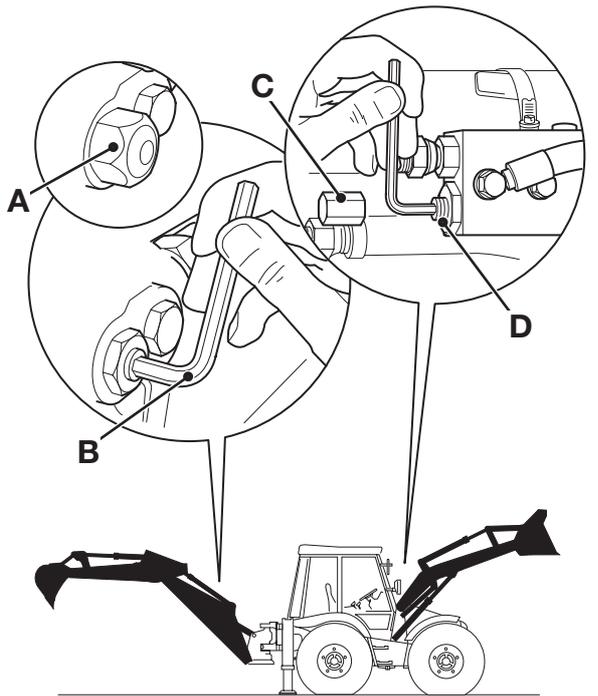


Fig 60.

C088030

Loader Hose Burst Protection Valve (HBPV)

- 1 Remove cap **C** from both HBPV check valves on the loader lift arms.
- 2 If a hose has burst, position a suitable container to catch the oil.
- 3 On the burst hose HBPV, insert an Allen key into the socket head of screw **D**. Turn the allen key in a clockwise direction so that the screw winds fully in. Repeat slowly for the opposite side as the load is now supported on this HBPV.

Note: Count the number of full turns on each screw for resetting purposes.

- 4 Operate the control lever in the cab to lower the load.

Transmission

Checking the Gearbox Oil Level

- 1 Start then operate the engine at low idle for four minutes. The delay allows the oil to fill the filter, pump, torque converter, oil cooler and hoses.
- 2 Switch OFF the engine and remove the starter key.
- 3 Open the engine cover. → [Access Panels \(□ 3-32\)](#).

Before you complete a check of the oil level, you must wait as shown on the instruction label **A**.

Note: The instruction label shows the time in seconds.

- 4 Check that the oil level is between the end of the dipstick and maximum mark on the dipstick **B**.
- 5 Add oil as necessary. Fill through the dipstick tube to the maximum dipstick level. Use only the recommended oil.

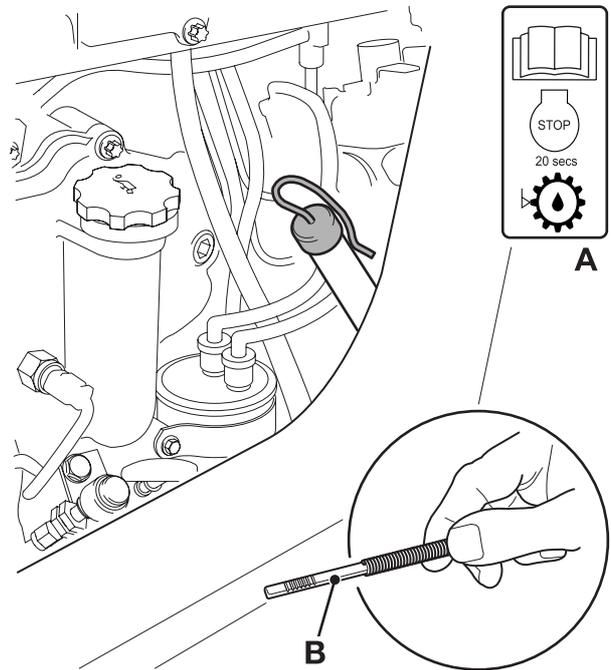


Fig 61.

C007000-2

Changing the Oil and Filter

Synchro Shuttle Transmission

The transmission oil should be drained through the suction strainer aperture to flush out any particles which fall off the strainer during its removal.

- 1 Open the engine cover. → [Access Panels \(□ 3-32\)](#).

WARNING

Make the machine safe before working underneath it. Park the machine on level ground, lower the attachments to the ground. Apply the park brake, put the transmission in neutral and stop the engine. Block both sides of all four wheels.

Disconnect the battery, to prevent the engine being started while you are beneath the machine.

GEN-4-1_1

- 2 Disconnect the battery.

CAUTION

When the strainer is removed, oil will gush out. Keep to one side when you remove the strainer.

2-3-4-1

- 3 Place a container, of suitable size beneath the suction strainer. Remove bolts **D**. Pull out the strainer **E** and its gasket **F**. Allow the oil to drain into the container. Be aware that the oil may be hot.
- 4 Clean the strainer with a suitable solvent. Follow the solvent manufacturer's instructions on safety.
- 5 Fit the strainer **E** and a new gasket **F**. Apply JCB Threadlocker and Sealer to bolts **D** before fitting and tightening them. Torque tighten the bolts to 10 Nm (7 lbf ft).
- 6 Unscrew and remove the filter **B**. Fit the new filter:
 - a Smear seal **C** with transmission oil.
 - b Screw the filter on until it just contacts the filter head.
 - c Turn the filter at least another 3/4 of a turn.

- 7 Fill the system with new oil through the dipstick/filler. Do not fill past the top mark on the dipstick.

Note: Fit only a genuine supplied JCB filter, otherwise damage to the system may be incurred through contamination.

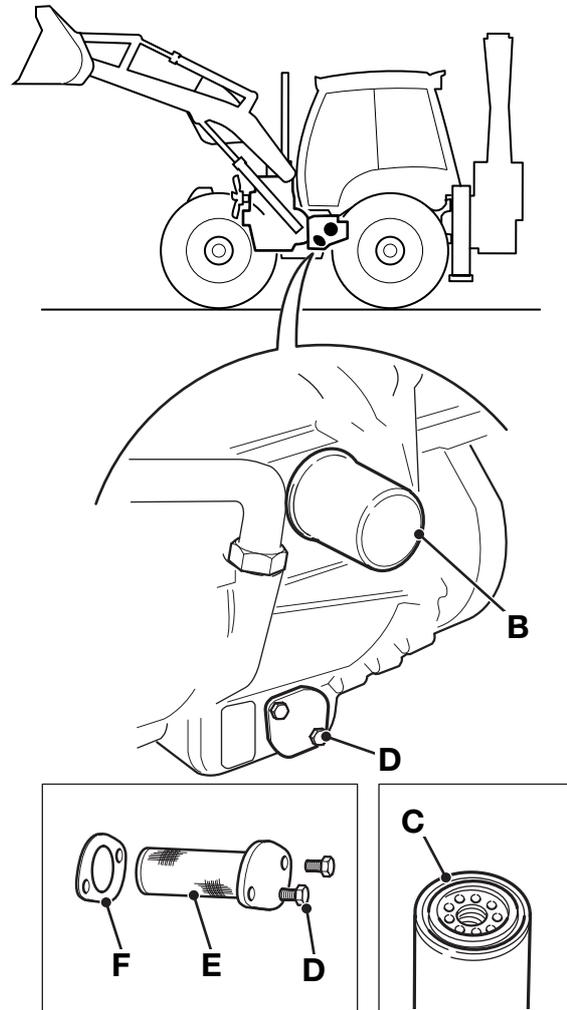


Fig 62.

Powershift Transmission

The transmission oil should be drained through the suction strainer aperture and not the drain plug, to flush out any particles which fall off the strainer during its removal.

- 1 Open the engine cover. → [Access Panels](#) (□ 3-32).

WARNING

Make the machine safe before working underneath it. Park the machine on level ground, lower the attachments to the ground. Apply the park brake, put the transmission in neutral and stop the engine. Block both sides of all four wheels.

Disconnect the battery, to prevent the engine being started while you are beneath the machine.

GEN-4-1_1

- 2 Disconnect the battery.

CAUTION

When the strainer is removed, oil will gush out. Keep to one side when you remove the strainer.

2-3-4-1

- 3 Place a container, of suitable size beneath the suction strainer. Remove bolts **D**. Pull out the strainer **E** and its gasket **F**. Allow the oil to drain into the container. Be aware that the oil may be hot.
- 4 Clean the strainer with a suitable solvent. Follow the solvent manufacturer's instructions on safety.
- 5 Fit the strainer **E** and a new gasket **F**. Apply JCB Threadlocker and Sealer to bolts **D** before fitting and tightening them. Torque tighten the bolts to 10 Nm (7 lbf ft).
- 6 Unscrew and remove the filter **B**. Fit the new filter:
 - a Smear seal **C** with transmission oil.
 - b Screw the filter on until it just contacts the filter head.
 - c Turn the filter at least another 3/4 of a turn.
- 7 Fill the system with new oil through the dipstick/filler. Do not fill past the top mark on the dipstick.

Note: Fit only a genuine supplied JCB filter, otherwise damage to the system may be incurred through contamination.

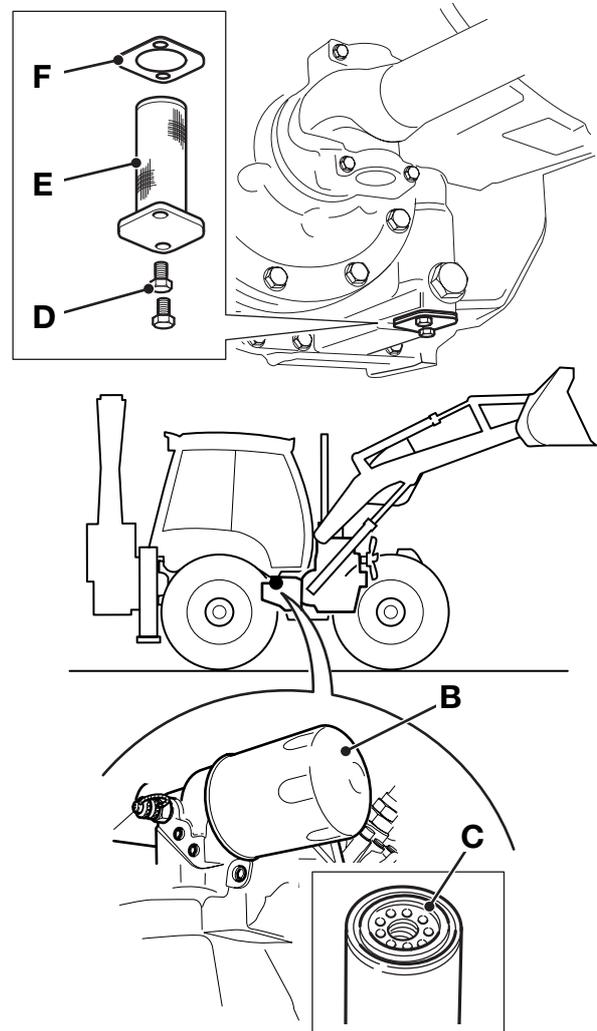


Fig 63.

Axles

Front and Rear Axle (All Wheel Steer Machines)

Checking the Differential Oil Level

⚠ WARNING

Make the machine safe before working underneath it. Park the machine on level ground, lower the attachments to the ground. Apply the park brake, put the transmission in neutral and stop the engine. Block both sides of all four wheels.

Disconnect the battery, to prevent the engine being started while you are beneath the machine.

GEN-4-1_1

⚠ CAUTION

The axle oil level must be checked with the machine level, otherwise a false indication of the amount of oil in the axle will be given.

16-3-5-3

- 1 Park the machine on level ground. Engage the parking brake. Set the transmission to neutral. Lower the attachments to the ground. Stop the engine and remove the starter key.
- 2 Clean the area around fill/level plug **A**, then remove the plug and its sealing washer. Oil should be level with the bottom of the hole. Add recommended oil if necessary.
- 3 Clean and refit the plug and its washer.

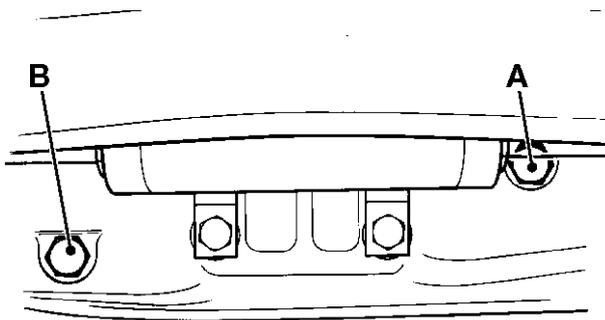


Fig 64. Front

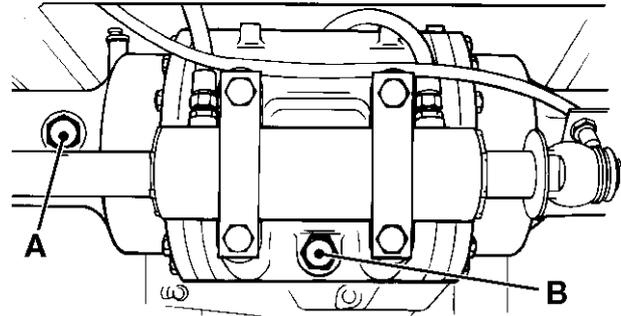


Fig 65. Rear

Changing the Differential Oil

The axle oil is used to lubricate the brake components and cool the brake plates.

It is important that the oil is changed regularly as specified in the service schedule - the lubricating properties of the oil will reduce as a result of brake wear.

Consult your JCB distributor for advice if necessary.

⚠ WARNING

Make the machine safe before working underneath it. Park the machine on level ground, lower the attachments to the ground. Apply the park brake, put the transmission in neutral and stop the engine. Block both sides of all four wheels.

Disconnect the battery, to prevent the engine being started while you are beneath the machine.

GEN-4-1_1

- 1 Park the machine on level ground. Engage the parking brake. Set the transmission to neutral. Lower the attachments to the ground. Stop the engine and remove the starter key.
- 2 Place a container of suitable size beneath plug **B** to catch the oil. Remove the drain plug **B** and its seal. Allow oil to drain out. The drain plug is magnetic. Wipe it clean. (Metallic particles should be carefully removed). Fit drain plug **B** and its washer. Tighten to 79 Nm (60 lbf ft).

- 3 Fill with recommended oil through fill/level hole **A**. Clean and refit plug **A** and its seal. Tighten to 79 Nm (60 lbf ft).

Checking the Hub Oil Levels

T3-011_2

Check each hub separately.

- 1 Park the machine on level ground with the OIL LEVEL mark horizontal. There is a tolerance of 5 mm (0.2 in) above or below the horizontal.
- 2 Engage the park brake. Set the transmission to neutral. Lower the attachments to the ground. Stop the engine and remove the starter key.
- 3 Clean the area around the fill/level plug **66-C**. Remove the plug. Oil should be level with the bottom of the hole. If necessary, add the recommended oil. Clean the plug before refitting it.

- a Place a container of suitable size beneath plug **67-C** to catch the oil.

CAUTION

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

2-3-4-2

- b Remove fill/level plugs **67-C**. Allow time for the oil to drain out.
- 3 Set OIL LEVEL marks to the horizontal.
 - a Fill the hubs with recommended axle oil, through the fill/level holes **67-C**. Oil should be level with the bottom of the fill/level hole.
 - b Clean and refit fill/level plugs **67-C**.

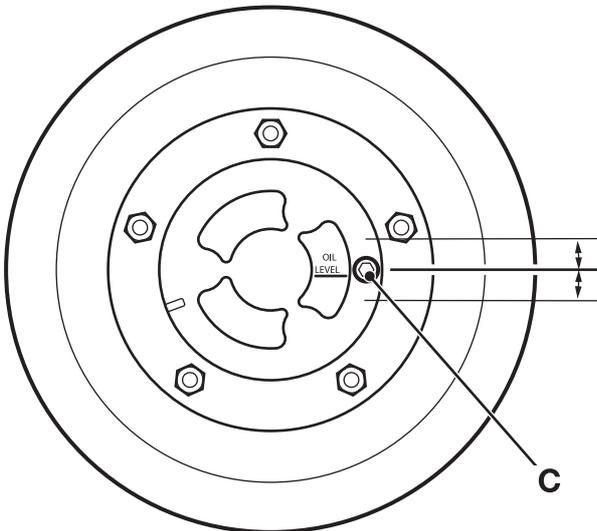


Fig 66.

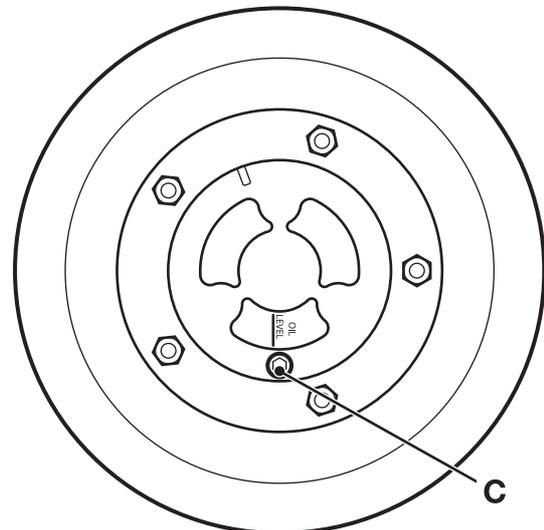


Fig 67.

Changing the Hub Oil

Change the oil in each hub separately

- 1 Set the machine level, with the wheels just clear of the ground. Manually rotate the wheels to bring the OIL LEVEL mark on the hubs to the vertical position, with the fill/level plugs **67-C** at the bottom.
- 2 Drain the oil:

Front and Rear Axle (Two Wheel Steer Machines)

The front axle procedures are the same as described on the previous pages (all wheel steer machines). Refer to the following procedures for checking and changing the oil on the rear axle.

Checking the Oil Level

CAUTION

The axle oil level must be checked with the machine level, otherwise a false indication of the amount of oil in the axle will be given.

16-3-5-3

- 1 Park the machine on level ground. Engage the parking brake. Set the transmission to neutral. Lower the attachments to the ground. Stop the engine and remove the starter key.
- 2 Clean the area around fill/level plug **A**, then remove the plug and its sealing washer. Oil should be level with the bottom of the hole. Add recommended oil if necessary.
- 3 Clean and refit the plug and its washer.

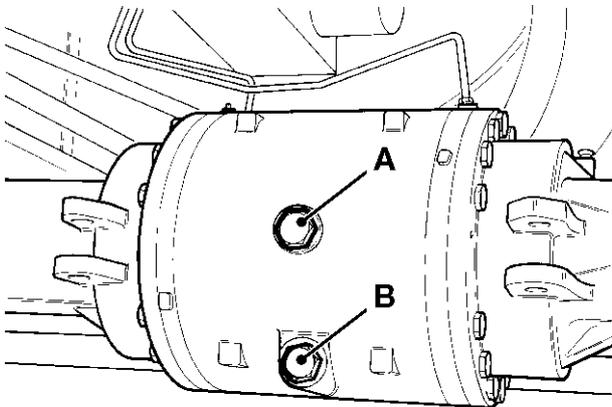


Fig 68.

Changing the Oil

The axle oil is used to lubricate the brake components and cool the brake plates.

It is important that the oil is changed regularly as specified in the service schedule - the lubricating properties of the oil will reduce as a result of brake wear.

Consult your JCB distributor for advice if necessary.

- 1 Park the machine on level ground so that the 'OIL LEVEL' mark on one hub is at the bottom. [⇒ Fig 69. \(□ 3-73\)](#). Engage the parking brake. Set the transmission to neutral. Lower the attachments to the ground. Stop the engine and remove the starter key.

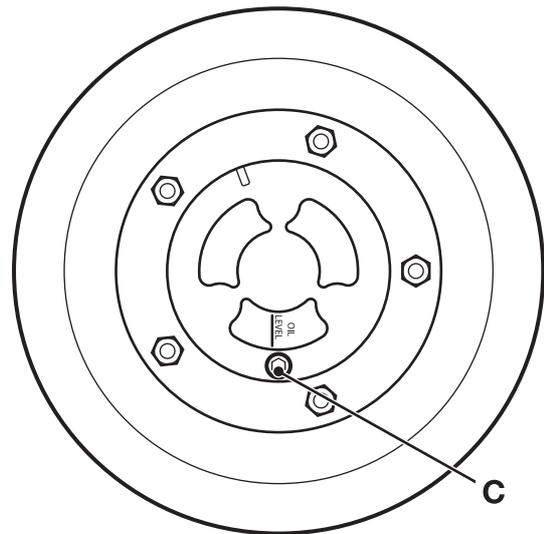


Fig 69.

- 2 Place a container of suitable size beneath fill level plug **C** to catch the oil. Remove the fill level plug **C** from the hub. Allow the oil to drain out. The drain plug is magnetic. Wipe it clean. (Metallic particles should be carefully removed). Clean and refit the hub fill level plug **C**.
- 3 Position the other wheel of the rear axle so that the 'OIL LEVEL' mark on its hub is at the bottom. Repeat step 2.
- 4 Place a container of suitable size beneath the drain plug **B** to catch the oil.

CAUTION

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

2-3-4-2

- 5 Remove the drain plug **B**. Allow the oil to drain out. The drain plug is magnetic. Wipe it clean. (Metallic particles should be carefully removed). Clean and refit the drain plug **B**.
- 6 Remove fill level plug **A**. Fill the axle with the specified quantity and recommended type of oil. Clean and refit fill level plug **A**.

Tyres and Wheels

Tyre Inflation

Introduction

WARNING

T3-066

An exploding tyre can kill. Inflated tyres can explode if over-heated or over-inflated. Follow the instructions given when inflating the tyres. Do not cut or weld the rims. Use a tyre/wheel specialist for all repair work.

2-3-2-7_2

WARNING

Wheels and tyres are heavy. Take care when lifting or moving them.

Store with care to ensure that they cannot fall and cause injury.

13-3-1-7_1

Always try to maintain your tyre pressure to the recommended settings. Using your machine with under-inflated tyres means:

- Decreasing the machines stability
- Higher tyre temperatures
- Excessive strain of the tyre fabric
- More bulging of the sidewalls
- Shortens the tyres life.

Using the machine with over inflated tyres is dangerous:

- It causes excessive tensile loads in the fabric: this makes a tyre more susceptible to cuts and punctures.

Do not cut or weld on the rim of an inflated tyre.

After checking or amending the tyre pressure always replace and secure the valve cap.

Always deflate the tyre before removing foreign obstacles from the tread.

Procedure

T3-067_2

These instructions are for adding air to a tyre which is already inflated. If the tyre has lost all its air pressure, call

in a qualified tyre mechanic. The tyre mechanic should use a tyre inflation cage and the correct equipment to do the job.

1 Prepare the wheel.

Before you add air to the tyre, make sure it is correctly fitted on the machine or installed in a tyre inflation cage. → [Fig 70.](#) ([□ 3-75](#)).

2 Prepare the equipment.

a Use only an air supply system which includes a pressure regulator. Set the regulator no higher than 1.38 bar (20 psi) above the recommended tyre pressure. For recommended tyres and pressures for your machine, see **Specifications, Tyre Sizes and Pressures.**

b Use an air hose fitted with a self-locking air chuck and remote shut-off valve.

3 Add the air.

a Make sure that the air hose is correctly connected to the tyre valve. Clear other people from the area. Stand behind the tread of the tyre while adding the air.

b Inflate the tyre to the recommended pressure. Do not over-inflate.

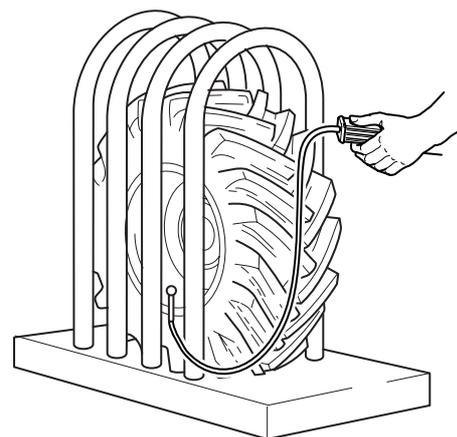


Fig 70.

A089570-1

Wheel Nuts

Checking the Wheel Nut Torques

T3-014_2

WARNING

If, for whatever reason, a wheel stud is renewed, all the studs for that wheel must be changed as a set, since the remaining studs may have been damaged.

2-3-2-8

On new machines, and whenever a wheel has been removed, check the wheel nut torques every two hours until they stay correct.

Every day, before starting work, check that the wheel nuts are tight.

Tighten the wheel nuts (in a diagonal sequence) to the torque value shown.

Table 3.

Front		Rear	
Nm	lbf ft	Nm	lbf ft
680	500	680	500

Wheel Alignment

Introduction

T3-038

⚠ DANGER

Failure to align the steering before selecting the required steer mode will cause the machine to steer incorrectly.

5-2-6-7

⚠ WARNING

Failure to phase 4-wheel steer at least once per day may mean a reduction in steering effectiveness.

5-2-1-6

The steering must be re-phased:

- 1 At least once per day.
- 2 If having difficulty in steering.
- 3 After travelling for 15 miles (24 km) or more on the road (in 2-wheel steer).

Electronic Steer Mode Selector

- 1 Stop the machine. Select the neutral position on the forward/reverse lever.
- 2 Use the switch to select 2-wheel steer 1.

Sensors on the axles prevent the steer mode from changing until the wheels straighten up or pass through the 'straight ahead' position. Because of this, there will be a short period when the indicator lights do not agree with the switch position.

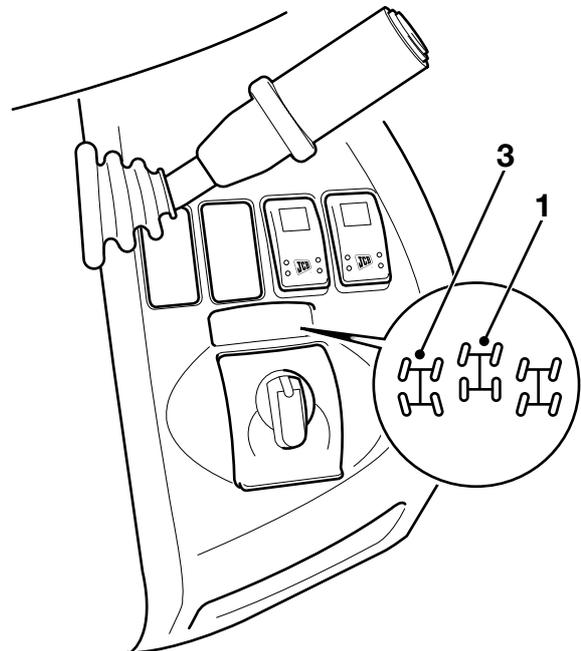
The indicator lights will still show 4-wheel steer.

- 3 Operate the machine until the rear wheels straighten up.

When the rear wheels straighten up, the machine will go into 2-wheel steer. The indicator lights will show when 2-wheel steer has engaged.

- 4 Use the switch to select 4-wheel steer 3.

The front and rear wheels are now back in phase.



714820

Wear Pads

Extradig Dipper Wear Pads

P2-3001_2

The Extradig dipper wear pads are bolt-on replaceable items. They support and guide the inner dipper section during extension and retraction. The following procedures explain how to inspect, and where applicable, adjust the pads.

There is a front and rear set of pads, each set comprises top wear pads **A** and bottom wear pads **B**.

The top wear pads **A** are not adjustable and must be replaced with new pads once they have worn to their limit. [⇒ Inspecting the Top Wear Pads \(□ 3-78\)](#).

The bottom wear pads **B** are adjustable and take up the wear on both the top and bottom pads. They must also be replaced with new pads when the top pads are changed. [⇒ Adjusting the Bottom Wear Pads \(□ 3-79\)](#).

New wear pads **A** and **B** must be replaced as a set and fitted by a qualified service engineer.

Inspecting the Top Wear Pads

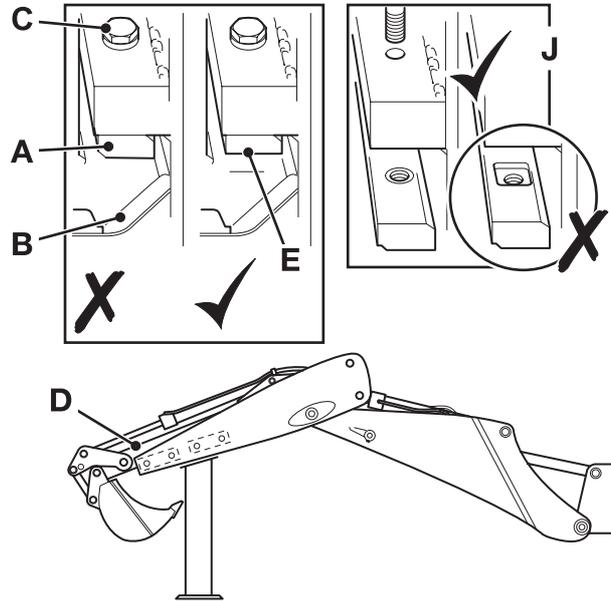


Fig 71.

C005980-3

- 1 Park the machine on level ground. Engage the park brake and put the transmission in neutral. Position the boom and dipper. [⇒ Fig 71. \(□ 3-78\)](#). Retract the Extradig dipper **D**. Make sure that the bucket is clear of the ground and the dipper is supported.
- 2 Stop the engine and remove the starter key.
- 3 Renew the pads when, or before, they are worn down to the depth of the chamfer as shown at **E**. If the pads are worn near to their limit then inspect them more frequently than recommended in the Service Schedules. To avoid damage to the dipper or wear pad make sure the pads are fitted the correct way round as shown at **J**.

Table 4. Torque Values

Item	Nm	lbf ft
C	49	36

Adjusting the Bottom Wear Pads

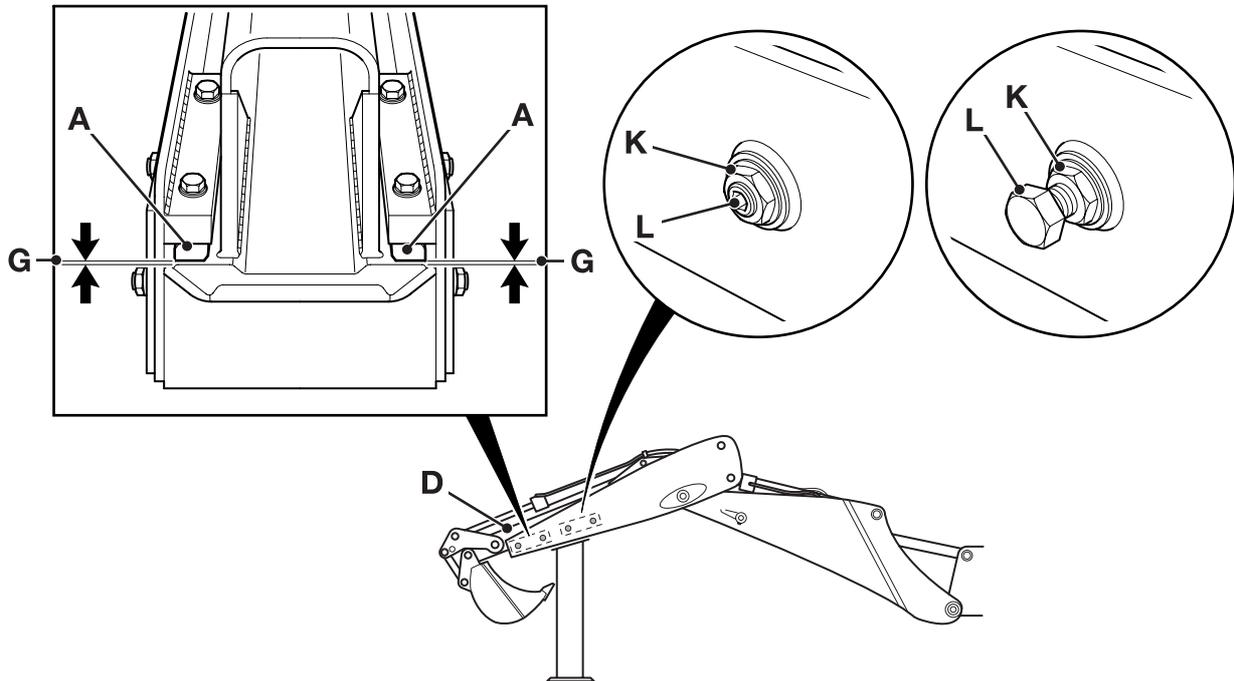


Fig 72.

795380-2

- 1 Park the machine on level ground. Engage the park brake and put the transmission in neutral. Support the boom and dipper. → [Fig 72.](#) ([□ 3-79](#)). Stop the engine.
- 2 Clean the sliding faces of the inner dipper with a suitable solvent.
- 3 Start the engine. Retract the Extradig dipper **D**. Make sure that the bucket is clear of the ground and the dipper is supported. Stop the engine.
- 4 With grease, mud etc. removed from the sliding faces visually check the gap between inner dipper and top wear pad **A**, as shown at **G**. The gap should be no greater than 1.5 mm (1/16 inch).
- 5 If the gap is greater than 1.5mm (1/16 inch) then adjust as follows:
 - a Undo adjuster locknuts **K**.
 - b Screw in adjusters **L** equally on both sides to achieve a 1.5mm (1/16 inch) gap.
 - c Tighten locknuts **K**. Visually re-check the gap is no greater than 1.5mm (1/16 inch) as shown at **G**,
 - d Make sure that the inner dipper seats central to the sides of the outer dipper.

Note: Remember to alternate sides each time an adjustment is made. When all the threads on the adjuster **L** are flush with locknut **K** and the clearance is greater than 1.5 mm (1/16 inch), then wear pads **A** and **B** must be replaced as a set and fitted by a qualified service engineer.

- 6 When the adjustments have been completed, apply Waxoyl to the runners of the inner dipper.

Table 5. Torque Values

Item	Nm	lbf ft
K ⁽¹⁾	100	74

(1) Later type only.

Note: Both the earlier and later types of adjustment are illustrated.

Stabiliser Legs (Sideshift Machines Only)

P2-3002

The wear pads support and guide the inner leg section. They ensure that during extension and retraction the inner leg is kept central and has a minimum amount of 'float'.

Upper wear pads **A** (4 off) are fitted to the top of the inner leg as shown. The upper pads are available in 3 sizes and are colour coded; 5mm (green); 6mm (red) and 7mm (blue). Lower wear pads comprise adjustable pads **B** (2 off) and fixed pads **C** (2 off).

When pads **A** and **C** have worn to a minimum thickness of 0.5 mm (0.020 in.) they must be replaced with new ones. To replace the pads, the stabiliser inner leg must be removed (contact your JCB Distributor).

It is important to note that lower pads **C** are designed to take most of the 'loading' during stabiliser leg operation, as a consequence these pads must be checked regularly for wear.

When replacing pads, it is recommended that the complete lower set of pads are replaced (items **B** and **C**). The top pads should be inspected and replaced as required.

Wear Pad Adjustment

Note: It is very important that the wear pads are adjusted at the correct service intervals, as the inner leg could contact the outer leg and scoring could occur. Scoring will dramatically reduce wear pad life.

- 1 Remove and clean away all debris that may have built up in stabiliser cavities.
- 2 As a guide, there should be approximately 1mm (0.039 in.) float between the stabiliser inner and outer leg.
- 3 Before adjusting the clearance make sure that the leg is raised clear of the ground but not fully retracted.
- 4 To adjust the clearance, screw pad **B** fully in until it just touches the inner leg and then back the pad off by one quarter of a turn.

Note: Over-tightening the adjustable pad **B** will lock the pad in position, it will not be possible to back the pad off. If this should happen, operate the stabiliser leg as normal but be aware that pads **B** and **C** will wear more rapidly.

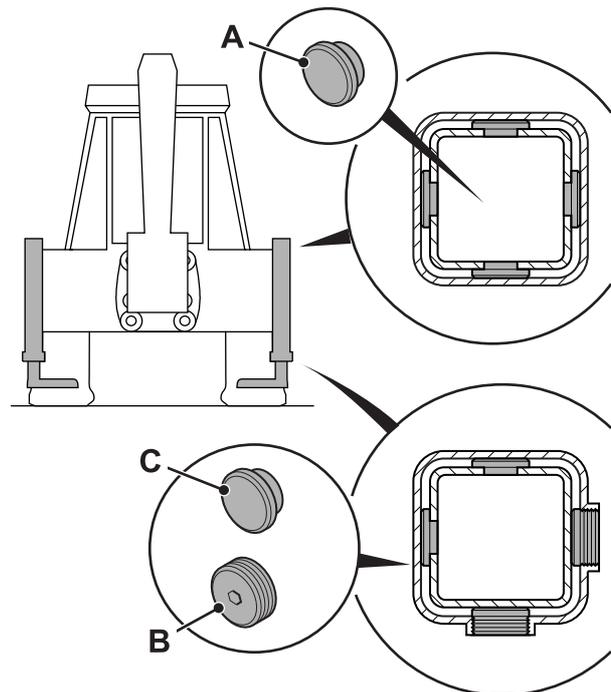


Fig 73.

273120-4

Windscreen Washer

Checking the Level

- 1 Make the machine safe with the loader arms lowered. Refer to *Prepare the Machine for Maintenance*.
- 2 Open the engine cover. → [Access Panels \(□ 3-32\)](#).
- 3 Remove the washer bottle cap **A**.
- 4 Fill the windscreen washer bottle with a suitable liquid. The liquid should contain a de-icing fluid to prevent freezing. Do not use engine coolant antifreeze.
- 5 Install the washer bottle cap **A**.

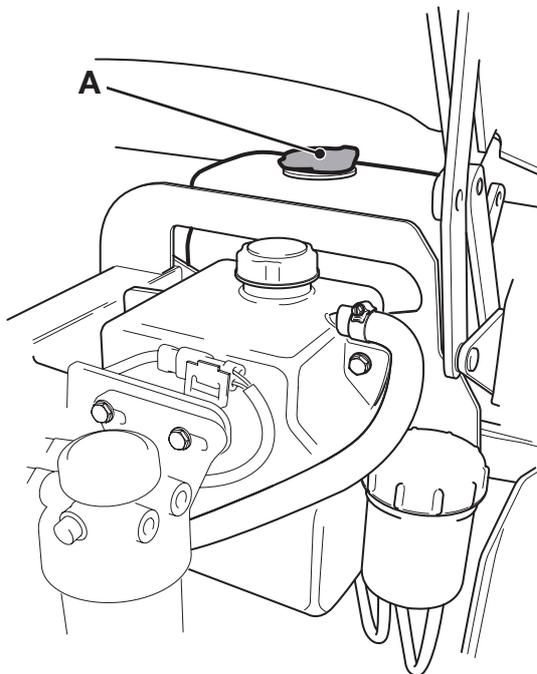


Fig 74.

Fire Extinguisher (if fitted)

T3-022

Checking the Fire Extinguisher

Check the fire extinguisher for damage, security and signs of leaking.

Check that the gauge **A** indicates that the extinguisher is charged i.e. the needle is in the GREEN segment.

Note: *If the needle is in or very near the RED segment at either end of the gauge, the extinguisher must be serviced or replaced.*

Make sure the safety pin **B** is fitted and secure.

The extinguisher should be serviced every 12 months by a suitably qualified person.

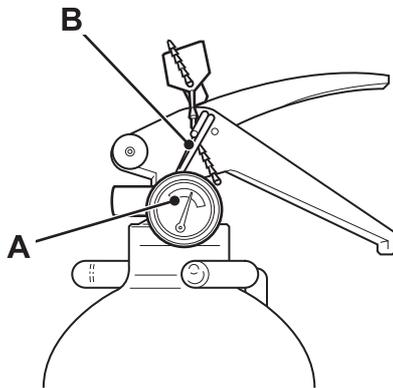


Fig 75.