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

Hygiene

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

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

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

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

Storage

Always keep lubricants out of the reach of children.

Never store lubricants in open or unlabelled containers.

Waste Disposal

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

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

Handling

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.

- 3 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.

- 4 Avoid skin contact with oil soaked clothing.

- 5 Don't keep oily rags in pockets.

- 6 Wash dirty clothing before re-use.

- 7 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

Extinguish with carbon dioxide, dry chemical or foam. Fire-fighters should use self-contained breathing apparatus.

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

Maintenance must be done by suitably qualified personnel. Before attempting any maintenance work, make sure the machine is safe. Park on level ground. If it is necessary to work with the loader arms raised, then the loader arm safety strut must be fitted as shown in Loader Arm Safety Strut in MAINTENANCE section.

2-3-1-1

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.

Calendar equivalents:

10 Hours	=	Daily
50 Hours	=	Weekly
500 Hours	=	Six Months
1000 Hours	=	Yearly
2000 Hours	=	2 Years

Pre-start Cold Checks	Operation	10 Hr	50 Hr	100 Hr	500 Hr	1000 Hr	2000 Hr
Service Points and Fluid Levels							
ENGINE							
Oil level	- Check	•	•				
Oil and Filter ④	- Change			•	•	•	•
Air Cleaner Outer Element ⑥	- Change					•	•
Air Cleaner Inner Element	- Change						•
Fuel Filter	- Change			•	•	•	•
Fuel Filter	- Drain		•				
Coolant Quality/Level	- Check	•	•	•	•	•	•
Fuel Sedimenter	- Drain and Clean		•	•	•	•	•
Fan Belt Tension/Condition	- Check		•	•	•	•	•
Valve Clearances and Clean Breather Gauze (if fitted) ③	- Check and Adjust						•
Engine Mounting Bolts for Tightness ③	- Check			•	•	•	•
Radiator	- Clean				•	•	•
All Hoses - Condition	- Check			•	•	•	•
TRANSMISSION, AXLES AND STEERING							
Transmission Oil Level	- Check	•	•	•	•		
Transmission Oil ⑧	- Change					•	•
Transmission Filter	- Change			•	•	•	•
Axle Oil Level (incl. Hubs when applicable) ①	- Check			•	•		
Axle Oil (incl. Hubs when applicable) ⑨	- Change					•	•
Axle Oil - Limited Slip Differential	- Change				•	•	•
Tyre Pressures/Condition	- Check	•	•	•	•	•	•
Front Hub Bearings ③	- Check			•	•	•	•
Transmission Strainer	- Clean					•	•
Drive Shafts	- Security/Grease			•	•	•	•
Steer Axle Movement/Shimming ③	- Check			•	•	•	•
Steer Axle Pivots and Linkages ⑦	- Grease			•	•	•	•
Front Axle Main Pivot	- Grease	•	•	•	•	•	•
HYDRAULICS							
Oil Level ②	- Check	•	•	•	•	•	
Oil ③	- Sample/Change						•
Oil Filter	- Change			•	•	•	•
Rams - Chrome Condition	- Check			•	•	•	•

Pre-start Cold Checks		Operation	10 Hr	50 Hr	100 Hr	500 Hr	1000 Hr	2000 Hr
Service Points and Fluid Levels								
Hydraulic Oil Cooler	- Clean					•	•	•
Hydraulic Oil Strainer	- Clean							•
Hydraulic Tank Filler Cap (with integral filter)	- Change							•
Hydraulic Pump Drive Shaft	- Examine/Grease				•	•	•	•
BRAKES								
Brake System Fluid Level	- Check		•	•	•	•	•	•
Brake System Fluid ③	- Change							•
Parking Brake	- Check and Adjust				•	•	•	•
ELECTRICS								
Battery Electrolyte Level (if applicable)	- Check					•	•	•
Wiring for Chaffing/Routing	- Check			•	•	•	•	•
Battery Terminals for Condition and Tightness	- Check				•	•	•	•
BODYWORK AND CAB								
All Pins and Bushes	- Check and Grease		•	•	•	•	•	•
Door/Window Hinges	- Lubricate					•	•	•
All Cables	- Lubricate					•	•	•
Cab Heater Filter ⑥	- Clean/Change					•	•	•
Extending Dipper	- Adjust/Grease			•	•	•	•	•
Hydraclamp ③	- Check and Adjust				•	•	•	•
Door - Fit and Catches	- Check				•	•	•	•
Cab Seat - Operation	- Check				•	•	•	•
Front Mudguards - Security (if fitted)	- Check				•	•		
Windscreen Washer Fluid Level	- Check		•	•	•	•	•	•
Boom Lock Engagement	- Check		•	•	•	•	•	•
Condition of Paintwork	- Check				•	•	•	•
Stabiliser Legs (Sideshift)	- Check/Adjust			•	•	•	•	•
Machine Generally ③	- Check and Clean		•	•	•	•	•	•
Power Sideshift Wear Pads	- Grease		•	•	•	•	•	•
Power Sideshift Wear Pads	- Check						•	•
Power Sideshift Chain	- Lubricate			•	•	•	•	•
Power Sideshift Chain Tension	- Check/Adjust				•	•	•	•
ATTACHMENTS								
6-in-1 Clam Shovel	- Grease		•	•	•	•	•	•
Backhoe & Loader Quick Hitch	- Grease		•	•	•	•	•	•
Functional Test and Final Inspection		Operation	10 Hr	50 Hr	100 Hr	500 Hr	1000 Hr	2000 Hr
ENGINE								
Idle Speed ③	- Check and Adjust				•	•	•	•
Stall Speed ③	- Check				•	•	•	•
Maximum No-Load Speed ③	- Check and Adjust				•	•	•	•
Exhaust Smoke (excessive)	- Check			•	•	•	•	•
Exhaust System Security ③	- Check				•	•	•	•
Air Inlet System Security	- Check				•	•	•	•
Throttle System and Control Cable ③	- Check				•	•	•	•
TRANSMISSION, AXLES AND STEERING								
Steer Modes - Operation/Phasing	- Check		•	•	•	•	•	•
2WD/4WD Selection	- Check				•	•	•	•
Wheel Nuts Torque	- Check		•	•	•	•	•	•
Forward/Reverse and Gear Change - Operation	- Check				•	•	•	•

Functional Test and Final Inspection	Operation	10 Hr	50 Hr	100 Hr	500 Hr	1000 Hr	2000 Hr
Hydraulic Speed Control - Operation (if fitted)	- Check			•	•	•	•
Steer Circuit Pressure ③	- Check			•	•	•	•
Transmission Main Line Pressure ③	- Check				•	•	•
Transmission Dump Operation	- Check			•	•	•	•
Neutral Start Operation	- Check		•	•	•	•	•
Clutch Pack Pressures ③	- Check			•	•	•	•
HYDRAULICS							
MRV Pressure ③	- Check and Adjust			•	•	•	•
Operation All Services	- Check		•	•	•	•	•
Hose Burst Protection Valves (if fitted)	- Check			•	•	•	•
Offloader Valve Pressure ③	- Check and Adjust			•	•	•	•
Auxiliary Circuit & Pressures ③	- Check and Adjust			•	•	•	•
BRAKES							
Foot Brake - Operation	- Check	•	•	•	•	•	•
Parking Brake - Operation	- Check	•	•	•	•	•	•
Servo Operation (if fitted)	- Check			•	•	•	•
ELECTRICS							
Starter Motor	- Check			•	•	•	•
Alternator - Output	- Check			•	•	•	•
All Electrical Equipment Operation, (e.g. warning lights, beacon, alarms, horn, wipers etc)	- Check	•	•	•	•	•	•
Operation of Stop Control/E.S.O.S.	- Check	•	•	•	•	•	•
BODYWORK AND CAB							
Teeth and Side Cutters	- Check			•	•	•	•
Doors and Windows - Fitment/Leaks	- Check			•	•	•	•
Seat/Seat Belts	- Check			•	•	•	•

†Note: First 100 Hours Service only, to be completed by your JCB Distributor.

- ① **Note:** Check for leaks every 50 hours, check level if leaking.
- ② **Note:** Check the hydraulic fluid level with the loader and backhoe in the travel position.
- ③ **Note:** Jobs which should only be done by a specialist are indicated by a †.
- ④ **Note:** If operating under arduous conditions, change the engine oil and filter every 250 hours.
- ⑤ **Note:** Check generally for leaks on ALL systems, for example, hydraulic, engine (coolant, fuel and oil), transmission, brakes, axles etc. If a leak is evident find the source and repair as required. Make sure that the system is topped up with the recommended fluid after repair. Examples of machine general damage are paintwork, toe plate, glazing rubbers etc., repair any damage as required. If any of the repair or top up procedures are not detailed in this handbook, then contact your local JCB Distributor for advice.
- ⑥ **Note:** If operating in dusty working environments, change more frequently.
- ⑦ **Note:** 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.
- ⑧ **Note:** 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 (eg. water contamination).
- ⑨ **Note:** 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.

Installing

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

⚠ WARNING

Raised loader arms can drop suddenly and cause serious injury. Before working under raised loader arms, fit the loader arm safety strut.

2-1-1-6

- 1 **Empty the Shovel and Raise the Loader Arms fully.**

- 2 **Stop the Engine**

Remove the starter key.

⚠ WARNING

You could be killed or injured if the loader control is accidentally operated. Make sure no-one comes near the machine while you release the safety strut.

2-3-1-2

- 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 Strut Onto the Cylinder**

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.

Removing

- 1 **Fully Raise the Loader Arms**

To take the weight off the safety strut.

- 2 **Stop the Engine**

Remove the starter key.

⚠ WARNING

You could be killed or injured if the loader control is accidentally operated. Make sure no one comes near the machine while you remove the safety strut.

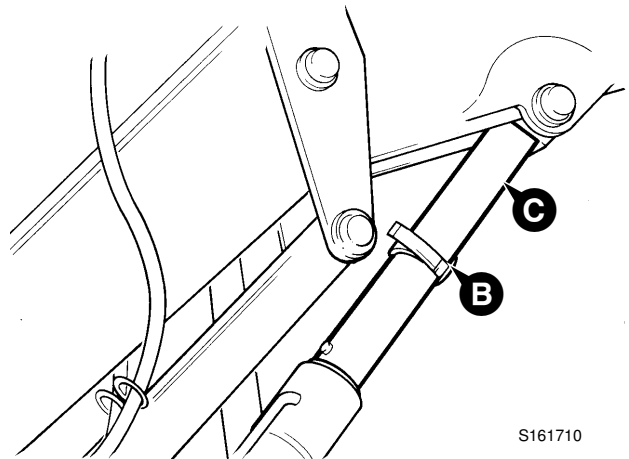
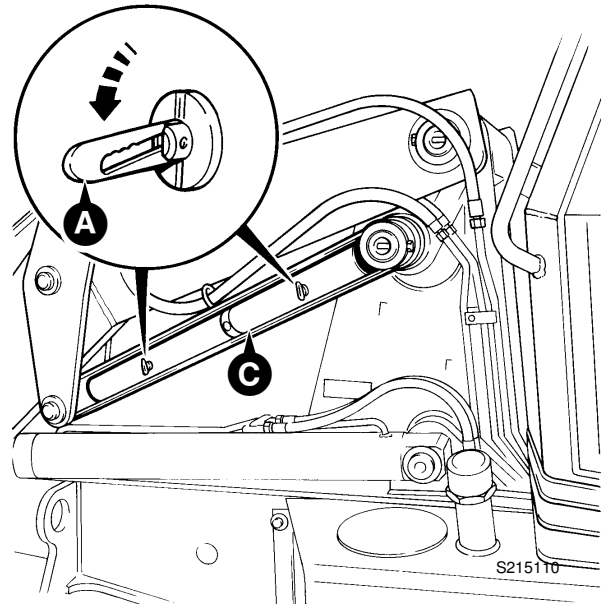
2-3-1-3

- 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**.



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

Make sure all pivot pins are correctly in place and secured by their locking devices.

Ensure that the steps and handrails are undamaged and secure.

Check for broken or cracked window glass. Replace damaged items.

Check all bucket teeth for damage and security.

Check all lamp lenses for damage.

Inspect the tyres for damage and penetration by sharp objects.

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

Park the machine on firm level ground, engage the parking brake and set the transmission to neutral. Lower the attachments to the ground and stop the engine.

Clean the machine using water and/or steam. Do not allow mud, debris etc to build upon the machine, pay particular attention to the following areas:

- 1 Backhoe hoses passing through mainframe.
- 2 Around twin slew rams.
- 3 Twin ram slew recess in chassis (centremount).
- 4 Kingpost slide rails (sideshift).
- 5 Kingpost hose tray and bottom 'shelf' (sideshift).
- 6 Recess between slew ram and kingpost casting (sideshift).

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

Do not allow mud to build up on the engine and transmission. Make sure the radiator grille is not clogged up.

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). Please 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.

5-3-1-12/2

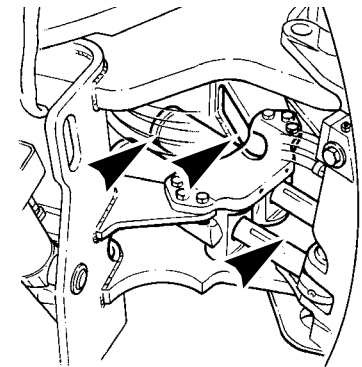
Avoid using neat detergent - always dilute detergents as per the manufacturer's recommendations, otherwise damage to the paint finish may occur.

It is important to note that excessive power washing can cause damage to the seals or bearings. Take care during routine machine washing not to direct high power water jets directly at oil seals or universal joints.

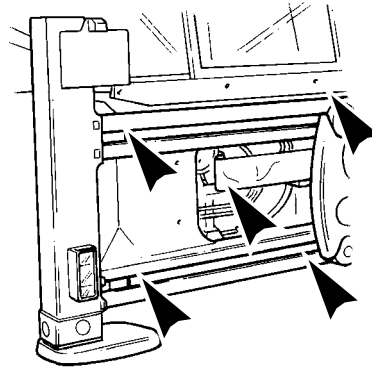
Note: The machine must always be greased after pressure washing or steam cleaning.

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

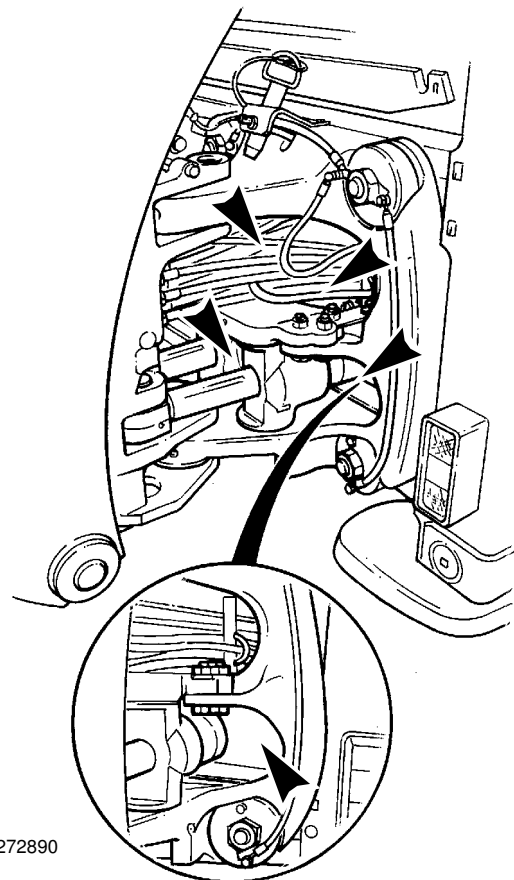
The illustrations show some of the areas that must be thoroughly cleaned as required.



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S272880

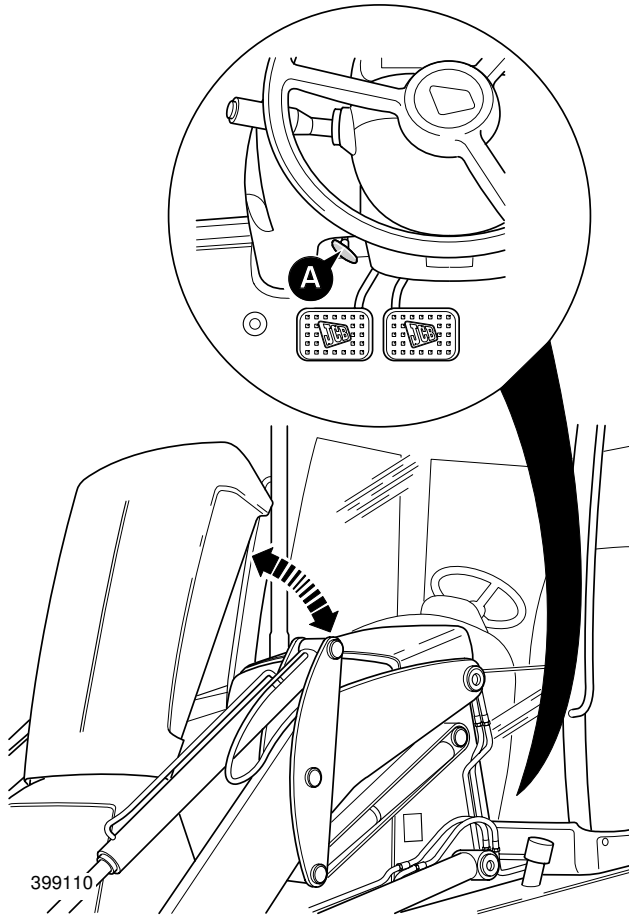


S272890

Opening and Closing the Bonnet

To release the bonnet, pull handle **A**, the bonnet will automatically open and be supported on gas struts.

To close the bonnet, push the bonnet down, make sure it is locked in place and the side panels are located correctly.



Removing and Fitting a Side Panel

⚠ WARNING

The loader arms must be raised and locked before you remove an engine side panel. Keep the arms locked up until the side panel is put back. If you do not lock the loader arms, the shovel can fall and you could be crushed. See Loader Arm Safety Strut in MAINTENANCE section.

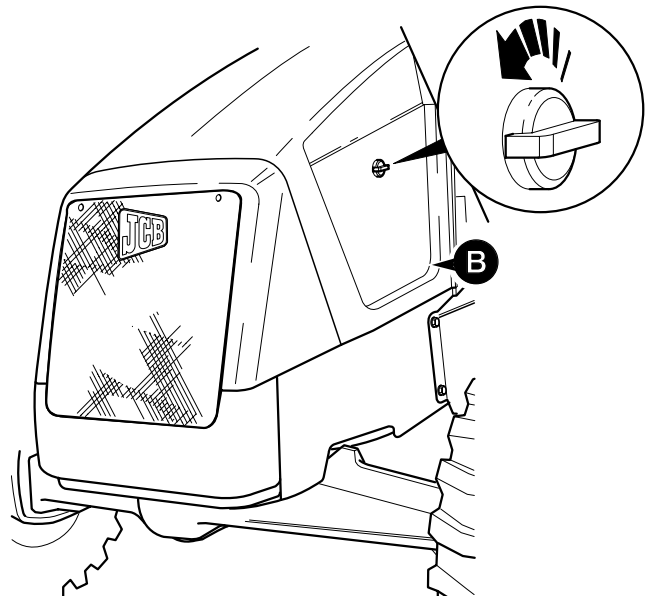
2-3-1-4/1

⚠ WARNING

Do not remove the engine side panel while the engine is running.

2-3-1-5

- 1 Raise the loader arms and fit the safety strut, see **Loader Arms Safety Strut**.
- 2 Stop the engine, and remove the starter key.
- 3 Open the bonnet.
- 4 Remove the side panel **B**, lift the side upwards and outwards.
- 5 Fit the side panel, carefully slot the side panel into position. Lower and lock the bonnet.



Checking the Seat Belt Condition and Security

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.

You must grease the machine regularly to keep it working efficiently. Regular greasing will also lengthen the machine's working life.

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

⚠ WARNING

You will be working close into the machine for these jobs. Lower the attachments if possible. Remove the starter key and disconnect the battery. This will prevent the engine being started. Make sure the parking brake is engaged.

Chock all four wheels before getting under the machine.

2-3-2-1

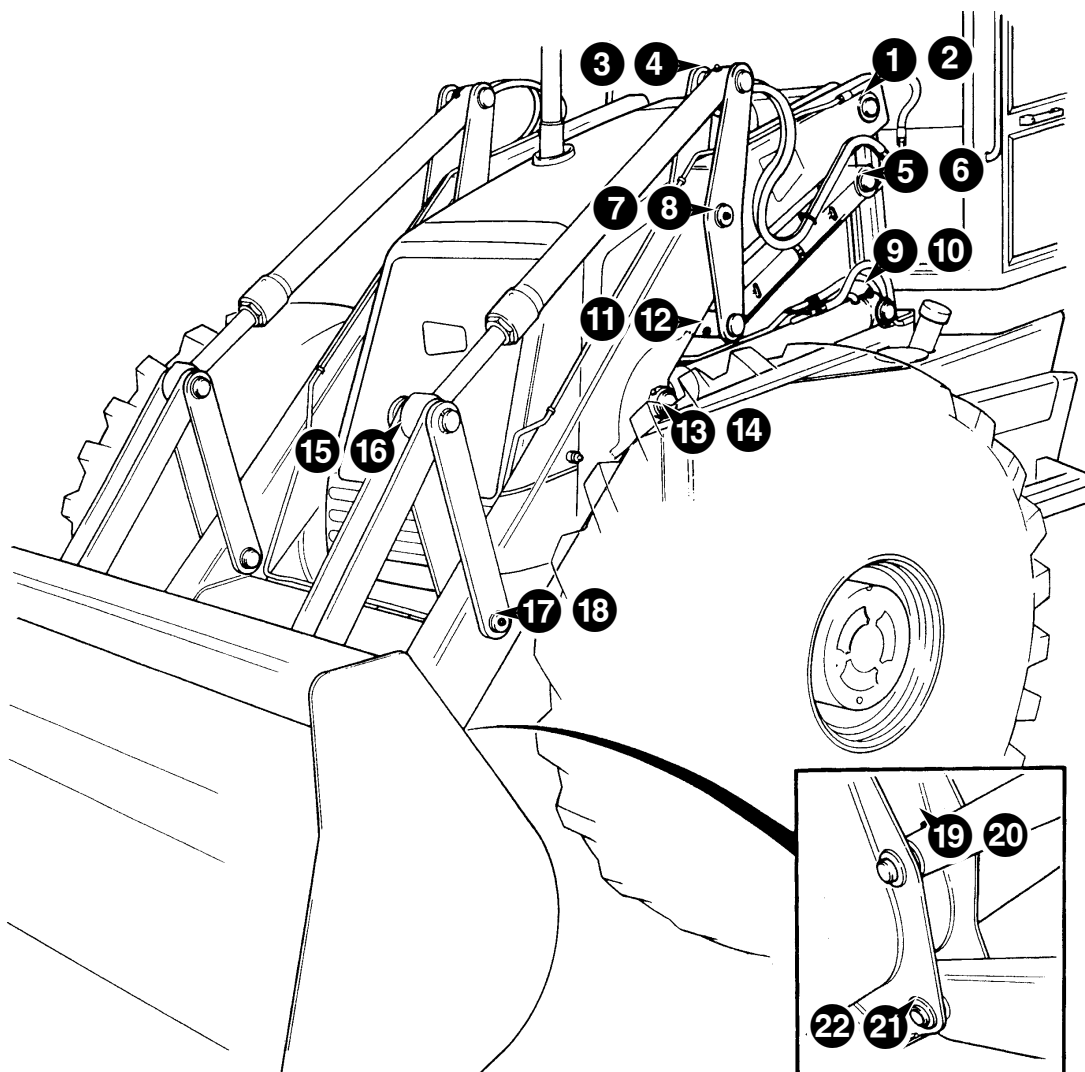
Greasing should be done with a grease gun. Normally, two strokes of the gun should be sufficient. Stop greasing when fresh grease appears at the joint.

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.

Loader Arms

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

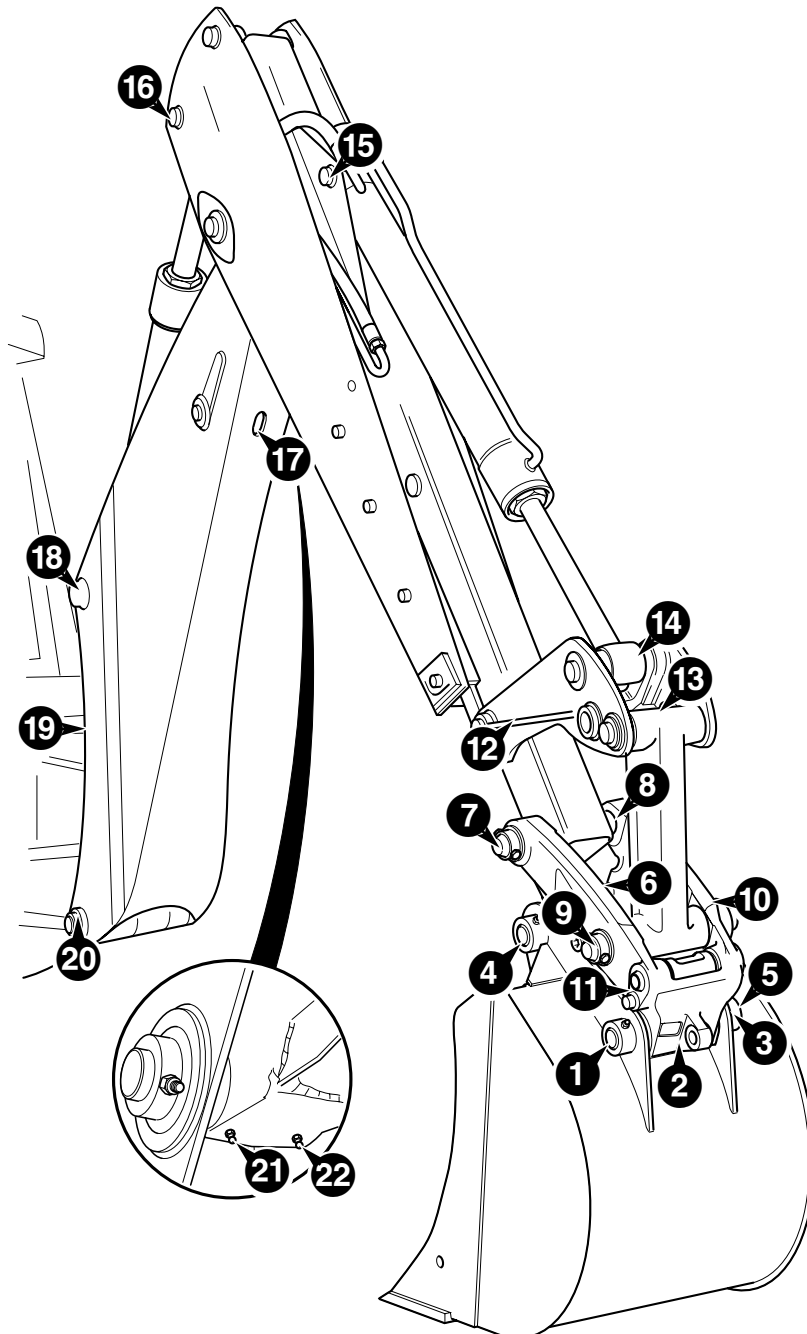
Total 22 grease points.



S260190

Backhoe & Quickhitch**22 Grease Points**

Note: Figure shows a typical boom and dipper arrangement.

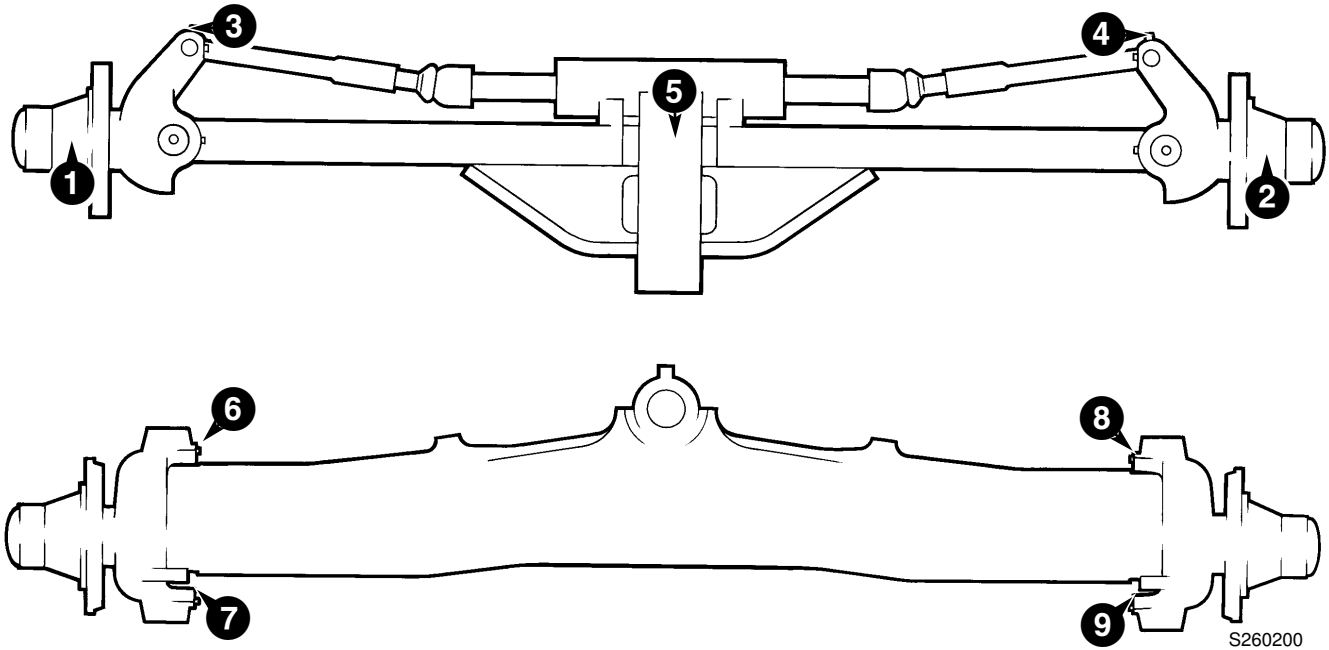


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Front Axle (2 Wheel Drive Machines)

9 Grease Points

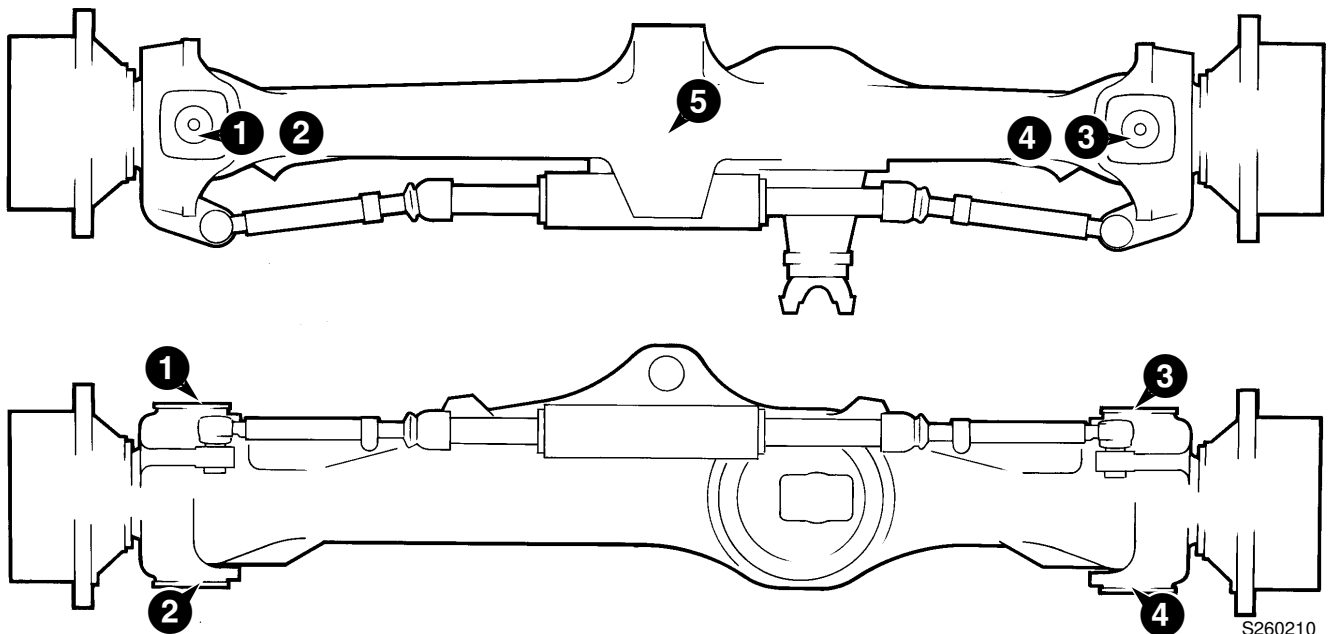
Note: Grease point 5 is a remote grease point mounted on the side of the mainframe chassis (near the left front wheel).



Front Axle (4 Wheel Drive Machines)

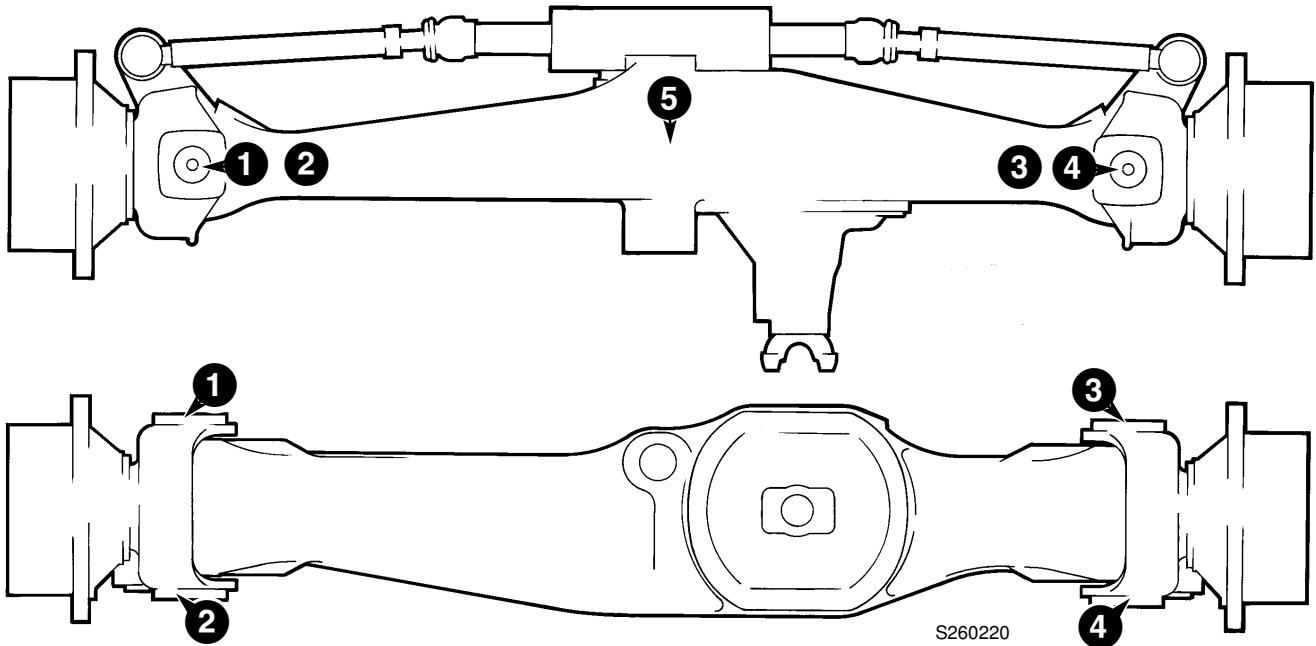
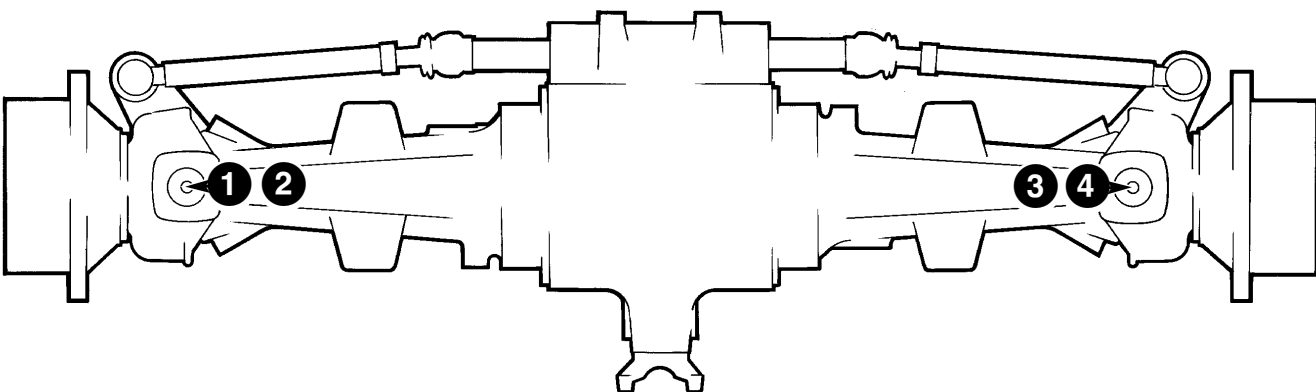
5 Grease Points

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



Front Axle (All Wheel Steer Machines)**5 Grease Points**

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

**Rear Axle (All Wheel Steer Machines)****4 Grease Points**

S260230

Extending Dipper

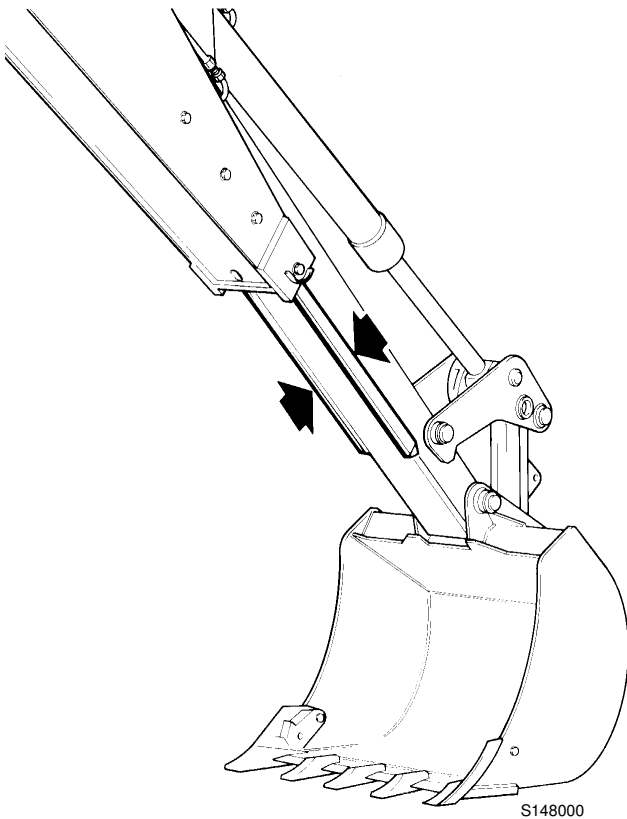
⚠ CAUTION

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.

5-3-1-9

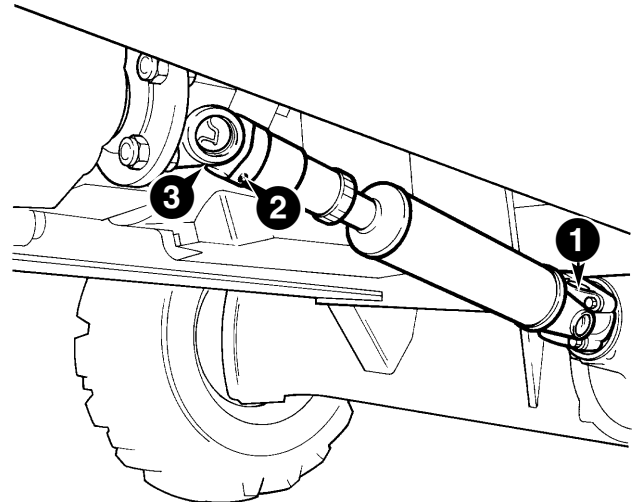
Extend the dipper. Coat the runners with **Waxoyl** as shown.



Driveshafts

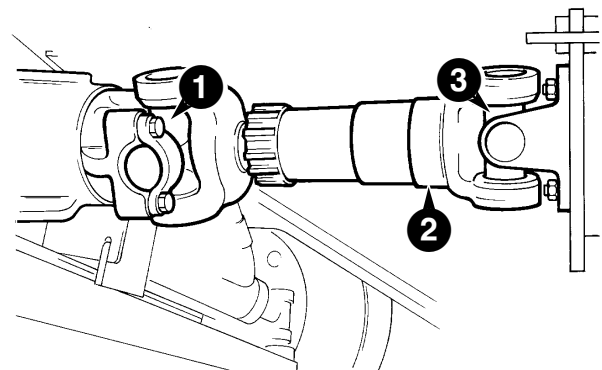
Front Driveshaft

3 Grease Points



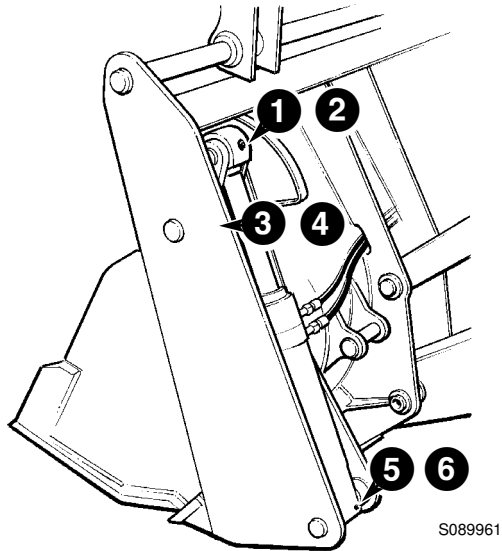
Rear Driveshaft

3 Grease Points

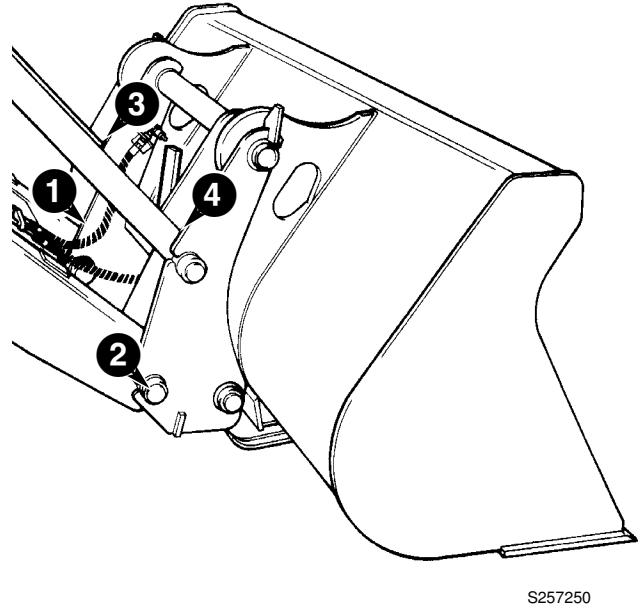


6 - In - 1 Clamshovel

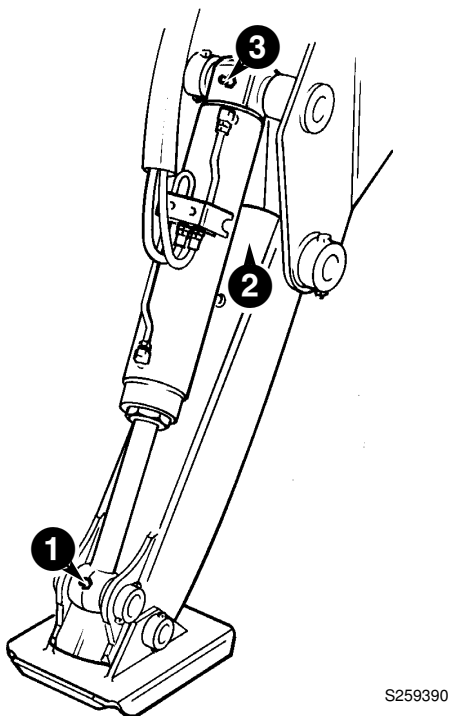
3 grease points each end -

Total 6 Grease Points**Loader Quickhitch**

2 grease points each end -

Total 4 Grease Points**Stabilisers (Centremount Machines)**

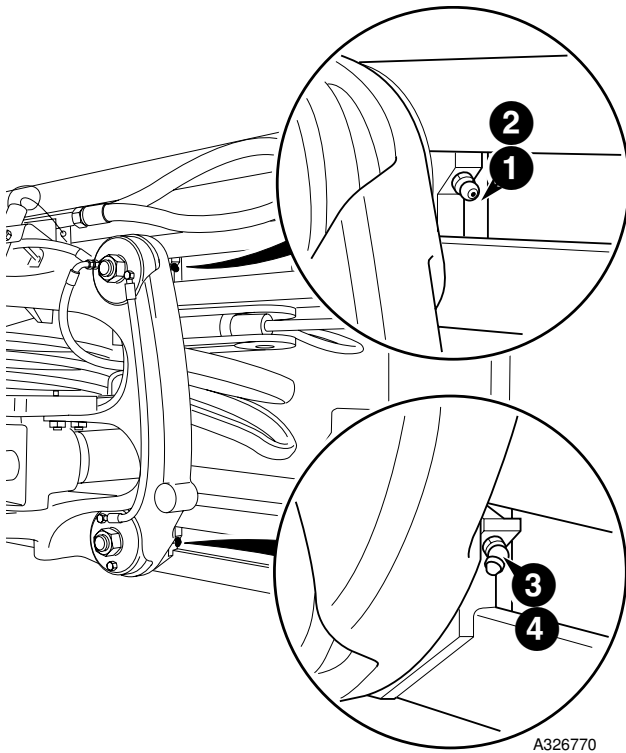
3 grease points on each stabiliser -

Total 6 Grease Points

Power Sideshift

Total 4 Grease Points

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

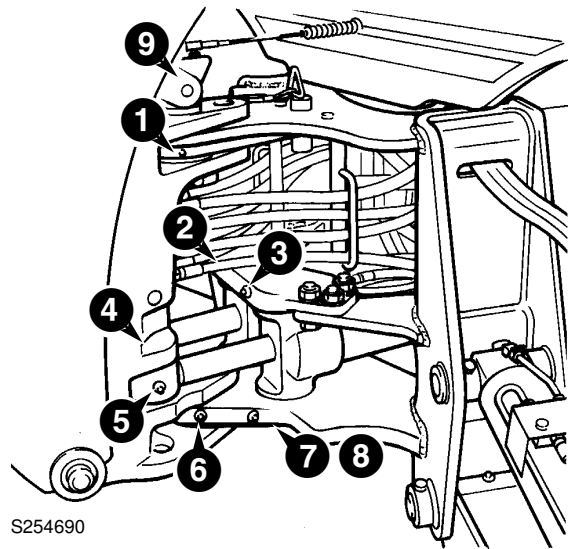


Kingpost

9 Grease Points

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

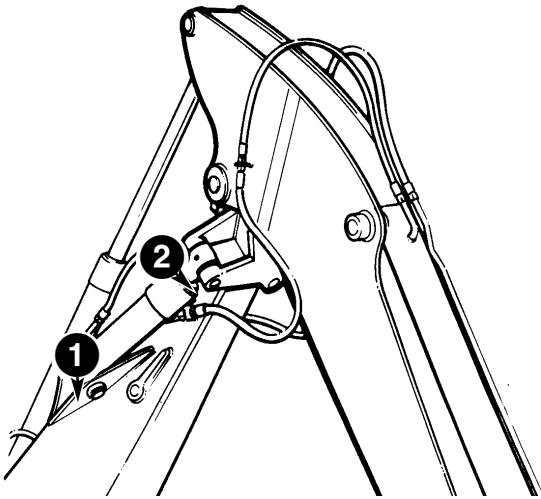
Note: It is recommended that grease points 2 and 3 are lubricated using a hand grease gun. The use of a power grease gun may result in the mounting plate being distorted.



Knuckle (if fitted)

Refer to Backhoe greasing for the boom and dipper grease points.

Total 2 Grease Points.



S256440

Backhoe Quickhitch (Hydraulic)**⚠ CAUTION**

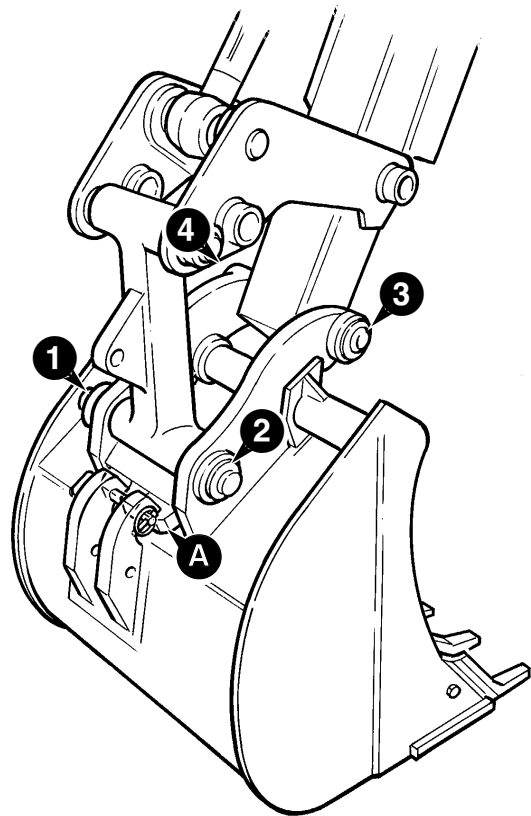
Waxoyl contains turpentine substitute, which is inflammable. Keep flames away when applying Waxoyl. Waxoyl can take a few weeks to dry completely. Keep flames away during the drying period.

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.

5-3-1-9

Coat the slide **A** with Waxoyl.

4 Grease Points



S211750

Tyre Inflation

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.

 WARNING

An exploding tyre can kill, inflated tyres can explode if overheated. Do not cut or weld the rims. Use a tyre/wheel specialist for all repair work.

2-3-2-7

- 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.
- 2

Prepare the Equipment

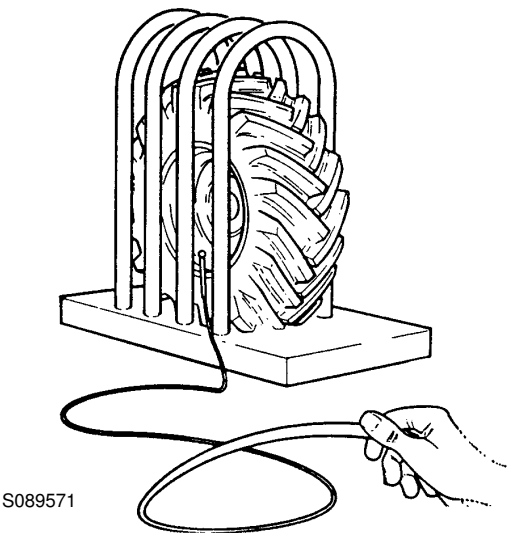
Use only an air supply system which includes a pressure regulator. Set the regulator no higher than 1.38 bar (20 psi) above the recommended tyre pressure. See Section F, **Technical Data** for recommended tyres and pressures for your machine.

Use an air hose fitted with a self-locking air chuck and remote shut-off valve.
- 3

Add the Air

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.

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



Checking the Wheel Nut Torques

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.

The correct torques are shown in the table below.

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

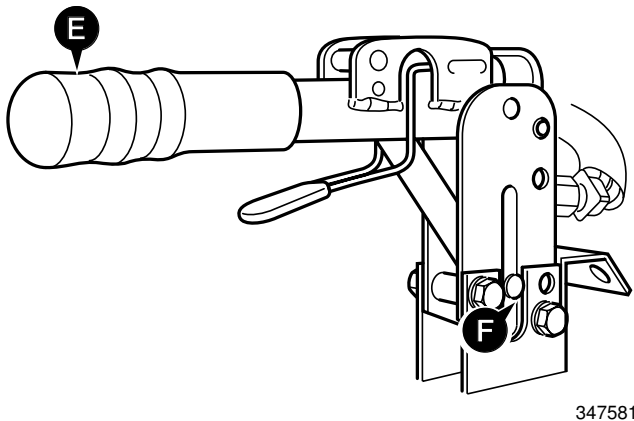
 WARNING

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

Parking Brake Adjustment

- 1 Disengage the parking brake (lever horizontal).
- 2 Turn handle grip **E** clockwise, half a turn.
- 3 Test the parking brake, see Section G, **Service Procedures**.
- 4 If the brake fails the test, repeat steps 1, 2 and 3. If there is no more adjustment and pin **F** is at the end of its travel get the brake checked by your JCB Dealer.



Checking the Foot Brake Fluid Level

⚠ WARNING

Faulty brakes can kill. If you have to add oil to the brake reservoir regularly 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 Park the machine on firm level ground, engage the parking brake and set the transmission to neutral. Raise and block the loader arms. Lower the backhoe to the ground and stop the engine.
- 2 Remove the reservoir cap **A** and check the level. The MAX and MIN marks are marked on the side of the reservoir **B**. If necessary, add fluid as in Step 3.

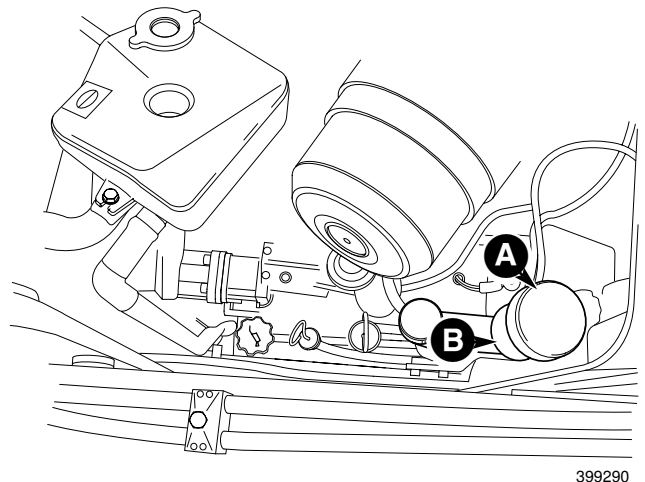
If the level has fallen below the MIN mark, get the system checked by your JCB Dealer.

⚠ WARNING

Using incorrect brake fluid could damage the system. See **Service Capacities and Lubricants** in **MAINTENANCE** Section. The fluid can harm your skin. Wear rubber gloves. Cover cuts and grazes.

4-3-2-3

- 3 If required, carefully pour the recommended fluid (DO NOT USE ORDINARY BRAKE FLUID) until it reaches the correct level.
- 4 Refit the reservoir cap. Wipe up any spillage.



Changing the 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: Do not run the engine with the dust valve J removed.

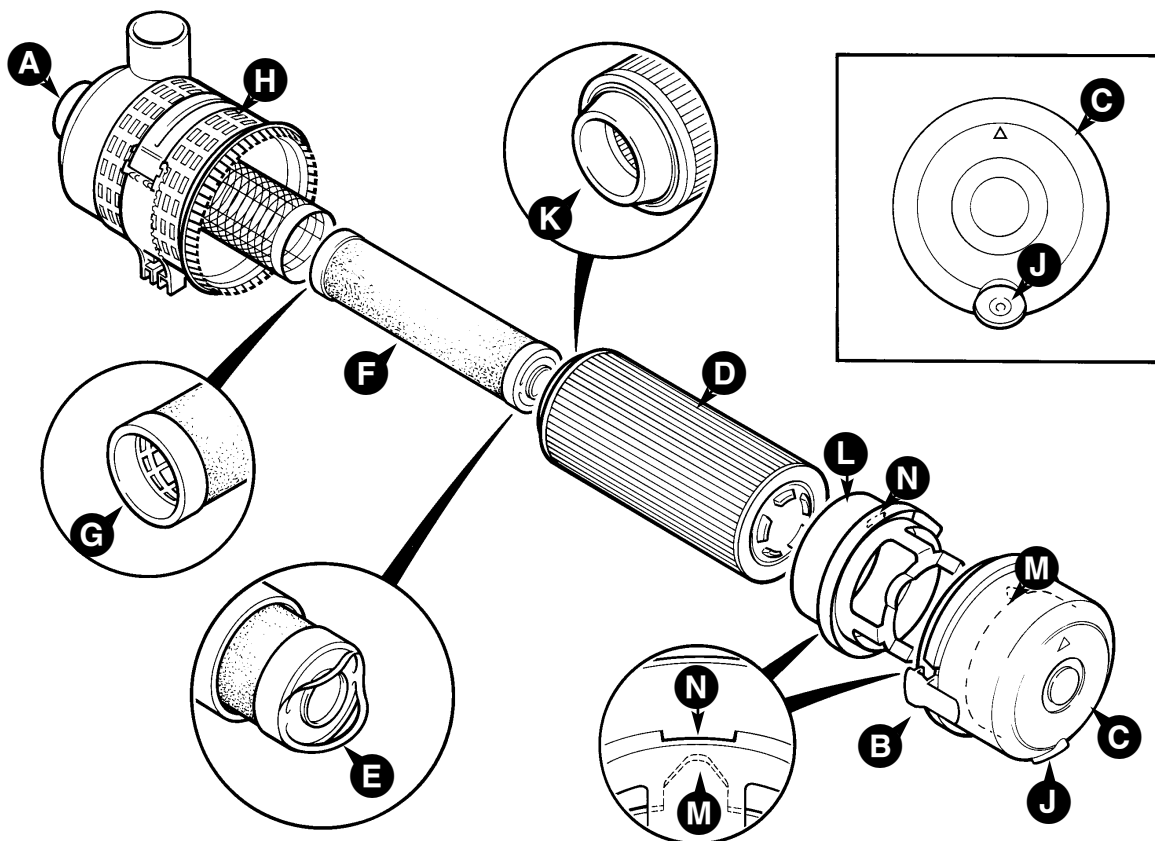
Note: A new inner element must be fitted at least every third time the outer element is changed. As a reminder, mark the inner element with a felt tipped pen each time the outer element is changed.

- 1 Stop the engine.
- 2 Remove the engine side panel (left hand side).
- 3 If changing the inner element, cover the end of the hose to prevent rain and dirt from getting into the engine.

- 4 Depress clips B and lift off cover C. Remove outer element D. Take care not to tap or knock the element. If the inner element is to be changed, lift up pulls E and remove inner element F. On turbocharged engines, remove pulsation ring L.
- 5 Clean inside the canister H, pulsation ring L, cover C and dust valve J.
- 6 Insert the new elements into the canister, pushing them firmly in so that seals G and K are fully seated. On turbocharged engines, assemble the pulsation ring L into the cover, making sure that tongue M fits into slot N. Fit cover C with dust valve J at the bottom. Push the cover firmly into position and make sure it is secured by clips B.

Note: Pulsation ring L is not fitted in this application.

- 7 Refit the induction hose to stub pipe A. Make sure that the wire is connected to the **Air Filter Blocked** switch.



S257910

Checking the Oil Level

- 1 Make sure the park brake is engaged and the transmission set to neutral. Lower the loader arms and backhoe to the ground, switch OFF the engine and remove the starter key.
- 2 Open the bonnet, **see Engine Panels, Opening and Closing the Bonnet.**
- 3 Check that the oil level is between the two marks on the dipstick **A**.
- 4 If necessary, remove the side panel and add oil through filler **B**. Make sure that the dipstick and filler cap are fully inserted and tightened.
- 2 Make sure the park brake is engaged and the transmission set to neutral. Lower the loader arms and backhoe to the ground, switch OFF the engine and remove the starter key.
- 3 Open the bonnet, **see Engine Panels, Opening and Closing the Bonnet.**
- 4 Drain the oil:

⚠ 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

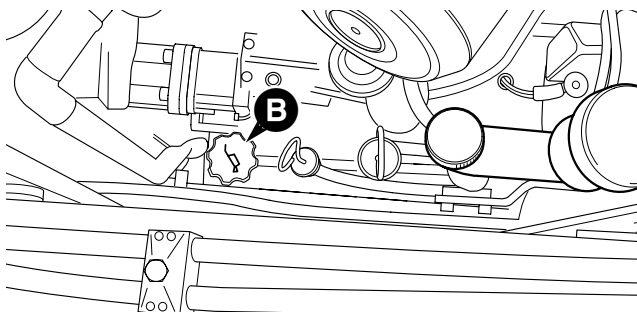
Changing the Oil and Filter

- 1 Drain the oil when the engine is warm as contaminants held in suspension will then be drained with the oil. Park the machine on firm ground.

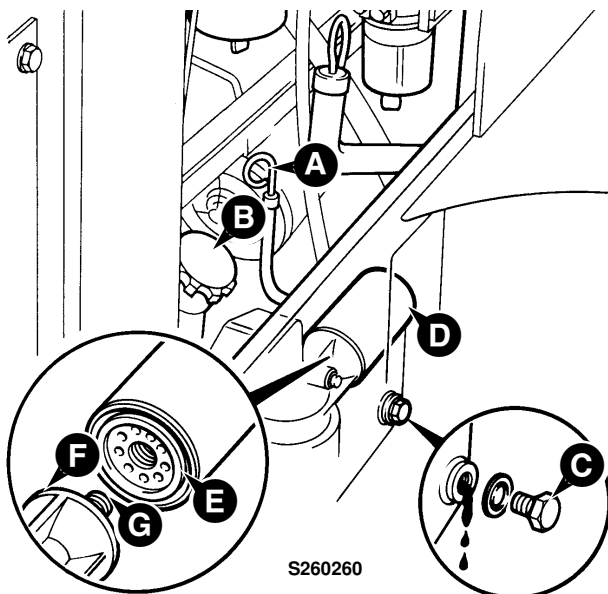
⚠ WARNING

Make the machine safe before getting beneath it. Lower the attachments to the ground; engage the parking brake; remove the starter key, disconnect the battery.

2-3-2-2



399290



S260260

- a Place a container of suitable size beneath the drain plug.
- b Remove drain plug **C** and its 'O' ring. Let the oil drain out, then clean and refit the drain plug with a new 'O' ring. Tighten to 34 Nm (25 lbf ft).
- 5 Change the filter:
 - a Unscrew the filter canister **D**. Remember that it will be full of oil.
 - b Check that adapter **G** is secure.
 - c Clean the filter head **F**.
 - d Add clean engine lubricating oil to the new filter canister. Allow enough time for the oil to pass through the filter element.
 - e Smear the seal **E** on the new filter with oil. Screw in the new filter canister - hand tight only.
- 6 Fill the engine to the max mark on the dipstick with new oil through the filler. See **Service Capacities and Lubricants** for recommended oil grades. Wipe off any spilt oil. Check for leaks. Make sure the filler cap is correctly refitted.
- 7 Make sure the engine will not start and turn the starter switch to operate the starter motor until the oil pressure light is extinguished. (To make sure the engine will not start, remove the engine shut-off solenoid fuse, housed in the fuse box).
- 8 Insert the engine shut-off solenoid fuse and operate the engine. Check for leaks. When the engine has cooled, check the oil level.

Checking the Coolant

⚠ WARNING

The cooling system is pressurised when the coolant is hot. Hot coolant will burn you. Make sure the engine is cool before checking the coolant level or draining the system.

2-3-3-3

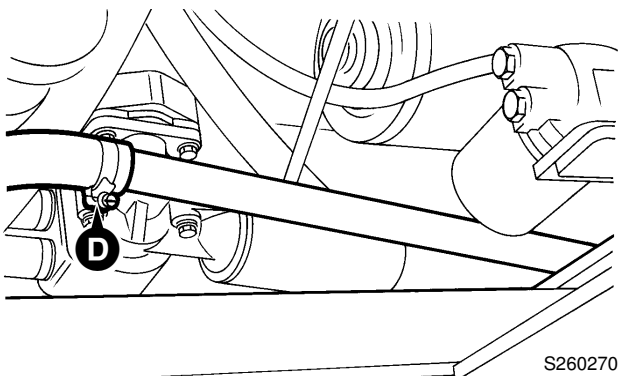
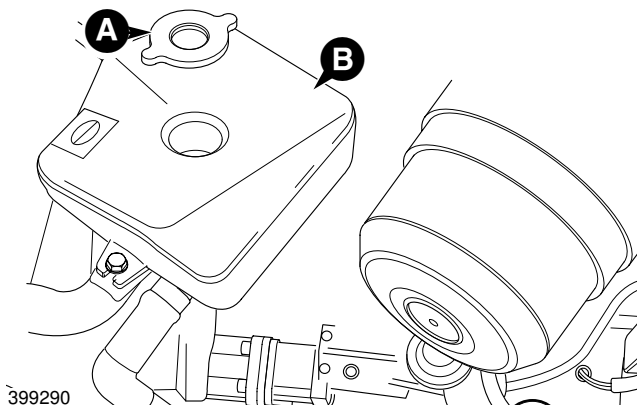
- 1 Make sure the park brake is engaged and the transmission set to neutral. Lower the loader arms and backhoe to the ground, switch OFF the engine and remove the starter key.
- 2 Open the bonnet, **see Engine Panels, Opening and Closing the Bonnet.**
- 3 The coolant level should be between the COLD/MIN and the HOT/MAX marks on coolant reservoir **B**. Fill with pre-mixed water/antifreeze if necessary.

Changing the Coolant

⚠ WARNING

The cooling system is pressurised when the coolant is hot. Hot coolant will burn you. Make sure the engine is cool before checking the coolant level or draining the system.

2-3-3-3



- 1 Make sure the park brake is engaged and the transmission set to neutral. Lower the loader arms and backhoe to the ground, switch OFF the engine and remove the starter key.
- 2 Open the bonnet, **see Engine Panels, Opening and Closing the Bonnet.**
- 3 Carefully loosen cap **A**. Let any pressure escape. Remove the cap.

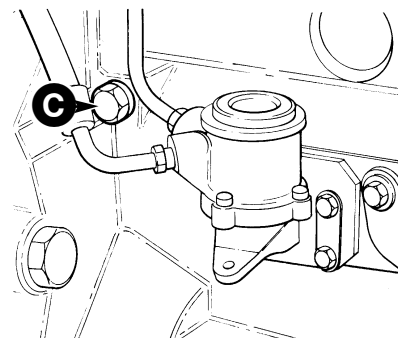
⚠ CAUTION

Keep your face away from the drain hole when removing the drain plug.

2-3-3-4

- 4 Remove drain plug **C** and let the coolant drain out. Make sure the drain hole is not blocked.
- 5 Disconnect the radiator hose at **D** and allow the coolant to drain. Flush the system using clean water.
- 6 Clean and refit plug **C**. Make sure it is secure. Reconnect the radiator hose
- 7 Use the necessary mix of clean, soft water and antifreeze, **see Coolant Mixtures**. Fill to the COLD/MIN level on coolant reservoir **B**.
- 8 Start the engine and run at idle to circulate the coolant, top up with coolant as necessary.
- 9 Refit the filler cap. Make sure it is tight.
- 10 Run the engine for a while, to raise the coolant to working temperature and pressure. Stop the engine. Check for leaks.

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



Adjusting the Fan Belt

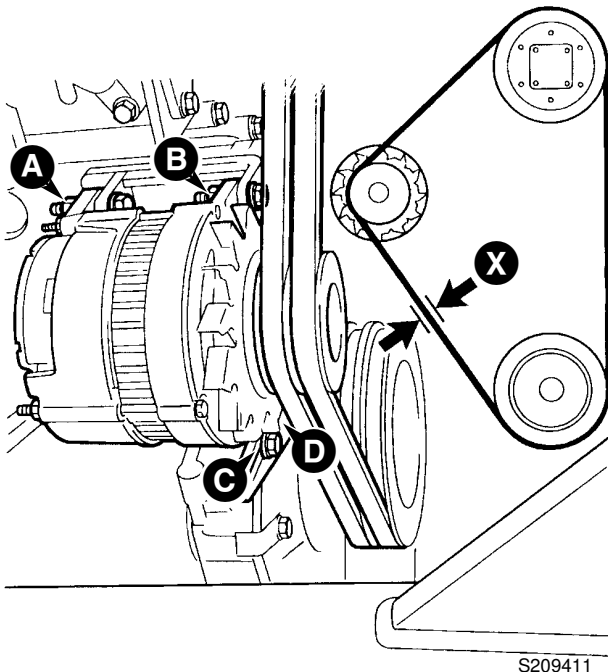
WARNING

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

2-3-3-5

- 1 Park the machine on firm level ground, engage the parking brake and set the transmission to neutral. Raise and block the loader arms. Lower the backhoe to the ground and stop the engine.
- 2 Loosen pivot fastening bolts **A** and **B**. Loosen adjustment link fastening bolts **C** and **D**.
- 3 Position the alternator so that there is 10 mm (3/8 in) slack at point **X**.
- 4 Tighten bolts **C** and **D**, then bolts **A** and **B**.

Note: If a new belt is fitted, the belt tension must be checked again after the first 20 hours of operation.

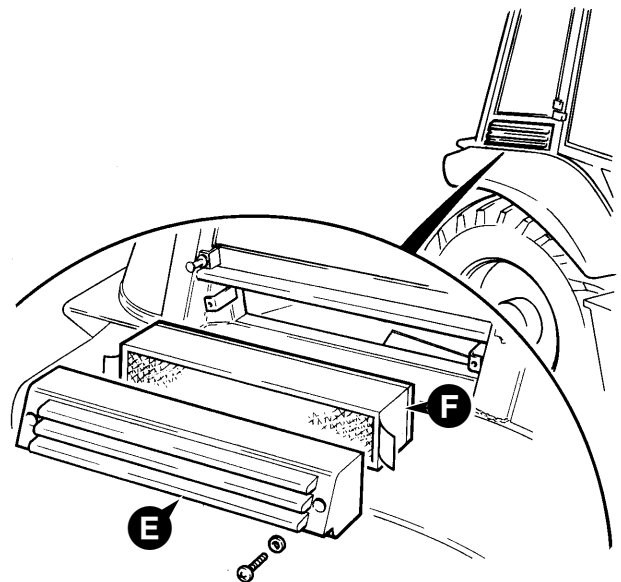


Cleaning the Cab Heater Filter

- 1 Park the machine on firm level ground, engage the parking brake and set the transmission to neutral. Lower the attachments to the ground and stop the engine.
- 2 Remove the cover retaining screws (2 off) and then remove the cover, item **E**.
- 3 Knock loose dust off the filter **F**. 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 **E** and secure with the retaining screws (2 off).



S254720

Types of Fuel

Use good quality diesel fuel to get the correct power and performance from your engine. The recommended fuel specification for engines is given below.

Cetane Number:	45(minimum)
Viscosity:	2.5/4.5 centistokes at 40 °C (104 °F)
Density:	0.835/0.855 kg/litre (0.872/0.904 lb/pint)
Sulphur:	0.5% of mass (maximum)
Distillation:	85% at 350 °C (662 °F)

Cetane Number

Indicates ignition performance. Fuel with a low cetane number can cause cold start problems and affect combustion.

Viscosity

Is the resistance to flow. If this is outside limits, the engine performance can be affected.

Density

Lower density will reduce engine power. Higher density will increase both engine power and exhaust smoke.

Sulphur

High sulphur content can cause engine wear. (High sulphur fuel is not normally found in North America, Europe or Australia.) If you have to use high sulphur fuel you must also use a highly alkaline engine lubricating oil; or change the normal oil more frequently.

Low sulphur fuels are commonly used throughout the world. These fuels contain fewer lubrication additives. The fuel injection pumps fitted to the engine (with exception of 160TW, Euro 1 engine) are lubricated by the fuel; therefore using low sulphur fuel may, in the long term, affect the pump.

If you have to use low sulphur fuel you are advised to use a lubrication additive as recommended by your fuel supplier.

Distillation

This indicates the mixture of different hydrocarbons in the fuel. A high ratio of lightweight hydrocarbons can affect the combustion characteristics.

Fuel Standards

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

Low Temperature Fuels

Special winter fuels may be available for engine operation at temperatures below 0 °C (32 °F). These fuels have a lower viscosity. They also limit wax formation in the fuel at low temperatures. (Wax forming in the fuel can stop the fuel flowing through the filter.)

Flow improvers may also be available. These can be added to the fuel to reduce wax formation.

Fatty Acid Methyl Ester Fuels as a replacement for Diesel Fuels

Fuel resources such as Rape Methyl Ester and Soybean Methyl Ester, collectively known as Fatty Acid Methyl Esters are being used as alternatives and extenders for mineral oil.

Fatty Acid Methyl Esters must conform to certain standards to be of acceptable quality, just as mineral oils do at present.

Consult your JCB distributor for advice about the use of Fatty Acid Methyl Ester fuels, as improper application may impair engine performance.

Petrol

WARNING

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

Advice

If you have to use non-standard fuels, contact your JCB distributor for advice on engine adjustments and oil change periods.

WARNING

Diesel fuel is flammable; keep naked flames away from the machine. Do not smoke while refuelling the machine or working on the engine. Do not refuel with the engine running. There could be a fire and injury if you do not follow these precautions.

INT-3-2-2

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.

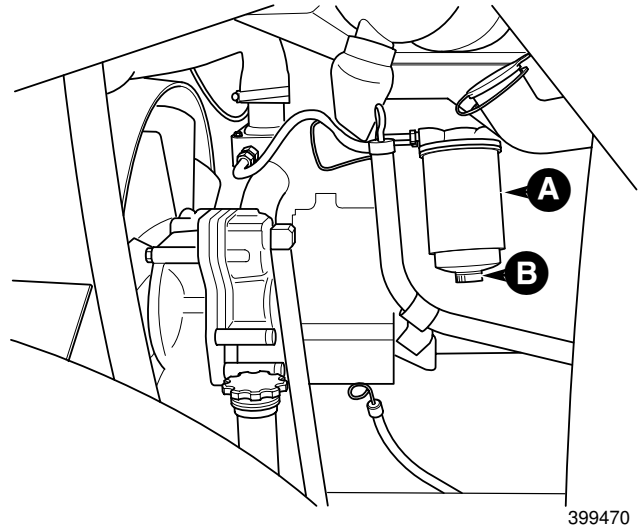
2-3-3-9

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 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 reinserted and the cap unlocked.



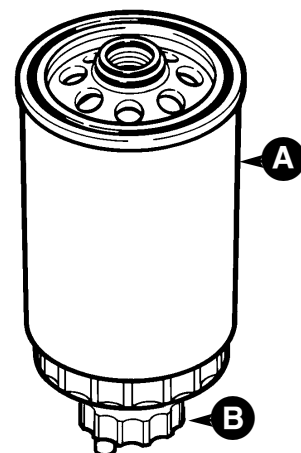
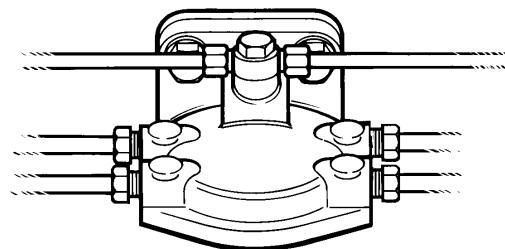
399470

Draining the Filter

- 1 Park the machine on firm level ground, engage the parking brake and set the transmission to neutral. Raise and block the loader arms. Lower the backhoe to the ground and stop the engine.
- 2 Drain off any water in the element **A** by turning tap **B**

Changing the Filter Element

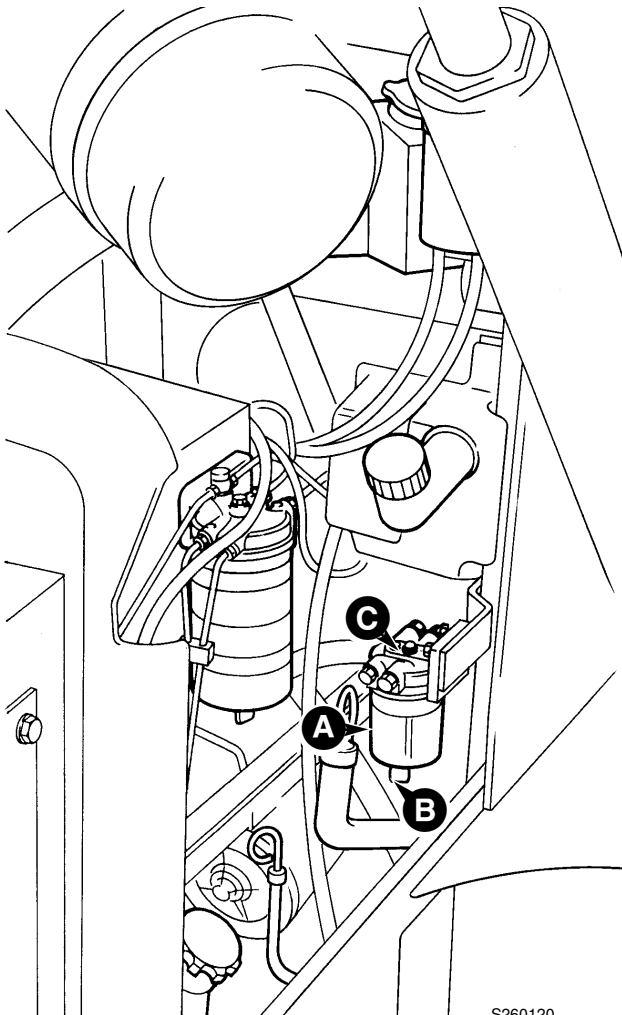
- 1 Park the machine on firm level ground, engage the parking brake and set the transmission to neutral. Lower the loader arms and backhoe to the ground, stop the engine.
- 2 Unscrew the filter element **A**. The element is hand tight but may require a strap wrench to remove. The filter will be full of fuel.
- 3 To assist with bleeding, fill the new filter element with fuel before fitting. Install new element **A** hand tight only. Check for leaks.
- 4 Bleed the System.



S233870

Draining the Sediment Bowl

- 1 Park the machine on firm level ground, engage the parking brake and set the transmission to neutral. Lower the loader arms and backhoe to the ground, stop the engine.
- 2 Look in bowl **A**. If it contains sediment, do Steps 3 to 6. If there is water but no sediment, drain off the water by opening tap **B**. Make sure tap **B** is turned off and secure.
- 3 Support bowl **A**; unscrew nut **C**. Remove the bowl.
- 4 Wash the bowl. Use clean fuel.
- 5 Refit the bowl, make sure gasket is seated correctly.
- 6 Bleed the System.



S260120

Bleed the System

⚠ CAUTION

Running the engine with air in the system could damage the fuel injection pump. After maintenance, remove air from the system as detailed below.

2-3-3-7

- 1 Park the machine on firm level ground, engage the parking brake and set the transmission to neutral. Lower the loader arms and backhoe to the ground and stop the engine.
- 2 Set the starter key to the IGN position.

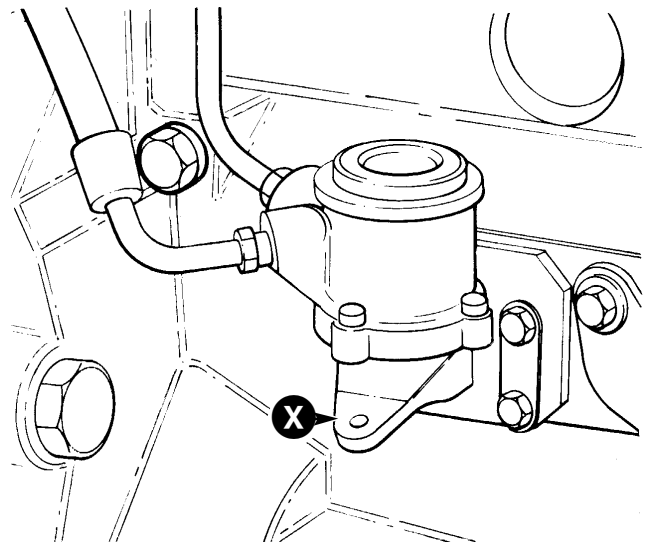
⚠ WARNING

Hot oil and engine components can burn you. Make sure the engine is cool before doing this job.

2-3-3-2

- 3 Operate the fuel lift pump priming lever **X** slowly, for approximately two minutes. The engine is now ready to start. If the engine runs smoothly for a short time, and then begins to run roughly or stops, check again for air in the fuel system. Check all seals and connections, especially in the low pressure side of the system.

Note: If no fuel is moved when the fuel lift pump priming lever **X** is operated, then the pump diaphragm may have rested in a 'maximum lift' position. To move the diaphragm, use the starter key to turn the engine, then try the priming lever again.

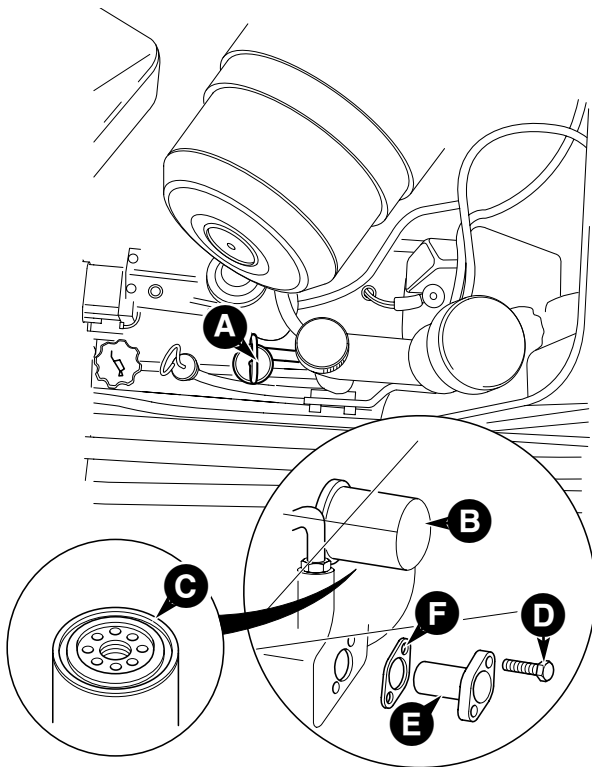


S148060

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Checking the Oil Level

- 1 Make sure the park brake is engaged and the transmission set to neutral. Lower the loader arms and backhoe to the ground, switch OFF the engine and remove the starter key.
- 2 Open the bonnet, **see Engine Panels, Opening and Closing the Bonnet.**
- 3 Switch OFF the engine and remove the starter key, fill the transmission to maximum mark on dipstick/filler **A**. Use only the recommended oil.
- 4 Start and run the engine slowly for a period not exceeding five minutes. This allows the oil to fill filter, pump, torque converter, oil cooler and hoses.
- 5 Switch OFF the engine and remove the starter key, wait approximately 20 seconds. Check the oil level and if required, fill to dipstick level.



Changing the Oil and Filter

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

⚠ WARNING

Make the machine safe before getting beneath it. Lower the attachments to the ground; engage the parking brake; remove the starter key, disconnect the battery.

2-3-2-2

- 1 Park the machine on level ground. Engage the parking brake. Lower the attachments to the ground. Stop the engine. Remove the starter key. Disconnect the battery.

⚠ CAUTION

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

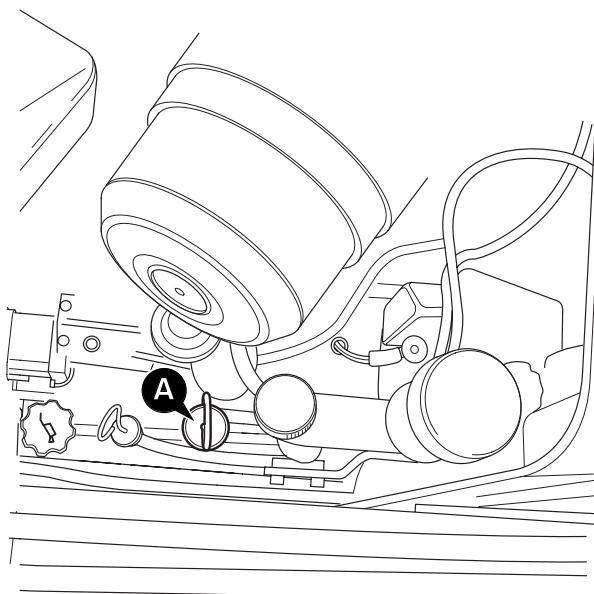
2-3-4-1

- 2 Place a container, of suitable size beneath the drain plug. Remove bolts **D**. Pull out the strainer **E** and its gasket **F**. Allow the oil to drain into the container.
- 3 Clean the strainer with a suitable solvent. Follow the solvent manufacturer's instructions on safety.
- 4 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).
- 5 Unscrew and remove the filter **B**. Fit the new filter:
 - 5.1 Smear seal **C** with transmission oil.
 - 5.2 Screw the filter on until it just contacts the filter head.
 - 5.3 Turn the filter at least another 3/4 of a turn.
- 6 Fill the system with new oil through the dipstick/filler **A**. 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.

Checking the Oil Level

- 1 Make sure the park brake is engaged and the transmission set to neutral. Lower the loader arms and backhoe to the ground, switch OFF the engine and remove the starter key.
- 2 Open the bonnet, see **Engine Panels, Opening and Closing the Bonnet.**
- 3 Switch OFF the engine and remove the starter key, fill the gearbox to maximum mark on dipstick/filler **A**. Use only the recommended oil.
- 4 Start and run the engine slowly for a period not exceeding five minutes. This allows the oil to fill filter, pump, torque converter, oil cooler and hoses.
- 5 Switch OFF the engine and remove the starter key, wait approximately 20 seconds. Check the oil level and if required, fill to dipstick level.



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Changing the Oil and Filter

When draining JCB 760 Series Powershift gearboxes it is recommended that the oil is drained through the cover plate **A** to make sure that the debris collected in the transmission sump is flushed out. Draining oil through the sump plug will filter oil through the strainer and not flush out the debris.

WARNING

Make the machine safe before getting beneath it. Lower the attachments to the ground; engage the parking brake; remove the starter key, disconnect the battery.

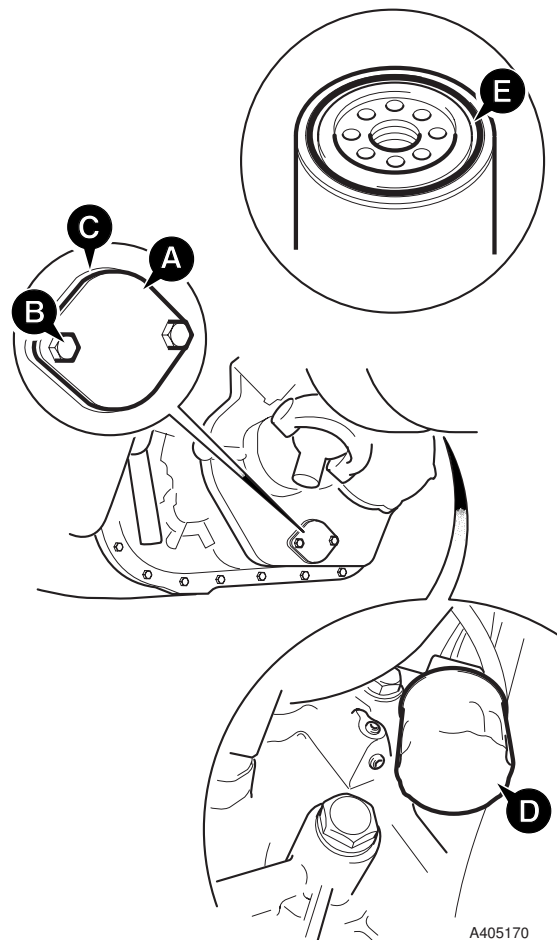
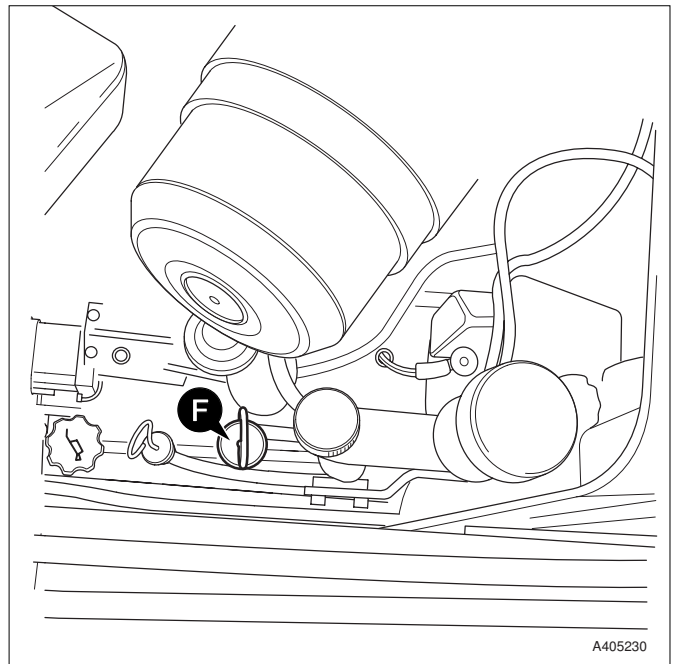
2-3-2-2

- 1 Park the machine on firm level ground, apply the park brake. Lower the loader arms, open the engine bonnet, raise the loader arms and fit the safety strut. Lower the excavator to the ground, switch OFF the engine and remove the starter key.
- 2 Apply the parking brake and disconnect the battery, remove the engine side panels.
- 3 Place a container of suitable size beneath the transmission to catch the oil.
- 4 Remove bolts **B**. Pull off cover plate **A** and gasket **C**, allow the oil to drain into the container. Be aware that the oil may be hot.

Note: When the cover is removed oil will gush out. Keep to one side when you remove the cover plate.

- 5 Fit cover plate **A** and a new gasket **C**. Apply JCB Threadlocker and Sealer to bolts **B** before fitting them. Torque tighten the bolts to 28 Nm (20.5 lbf ft.).
- 6 Unscrew and remove the filter **D**. Fit the new filter:
 - 6.1 Smear seal **E** with transmission oil.
 - 6.2 Screw the filter on until it just contacts the filter head.
 - 6.3 Turn the filter at least another 3/4 of a turn.
- 7 Fill the system with new oil through the dipstick/filler **F**. Do not fill past the top mark on the dipstick.
- 8 On completion check for oil leaks.

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



Checking the Fluid Level

⚠ WARNING

Fine jets of hydraulic fluid at high pressure can penetrate the skin. Do not use your fingers to check for hydraulic fluid leaks. Do not put your face close to suspected leaks. Hold a piece of cardboard close to suspected leaks and then inspect the cardboard for signs of hydraulic fluid. If hydraulic fluid penetrates your skin, get medical help immediately.

INT-3-1-10/1

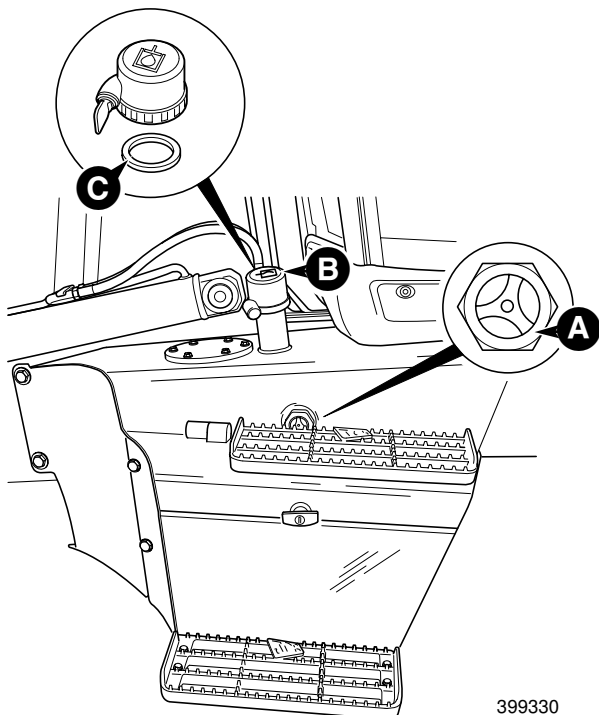
- 1 Position the machine on level ground. Set the loader shovel on the ground. Retract the extending dipper if fitted. Raise the boom, swing in the dipper and close the bucket. Stop the engine. Remove the starter key.
- 2 Look at the fluid level in the sight glass **A**. The level should be at the red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

⚠ CAUTION

If the fluid in the tube appears cloudy, then water or air has entered the system. The hydraulic pump could be severely damaged if the machine is operated. Contact your JCB distributor immediately.

2-3-4-3

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



Hydraulic Tank Cap

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

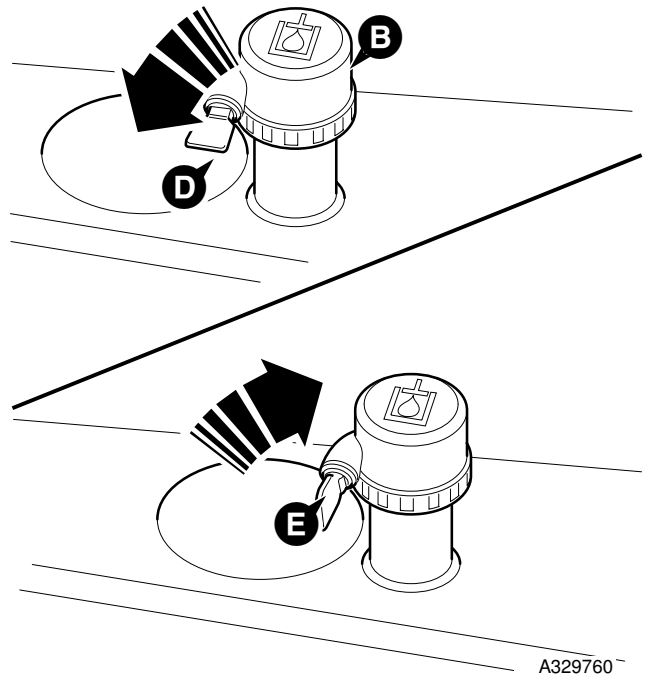
The cap incorporates a side mounted barrel lock that is operated by the ignition/door key. It is important to note that seal **C** must be in good condition and correctly installed in the cap.

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.



Changing the Filter Element

WARNING

Fine jets of hydraulic fluid at high pressure can penetrate the skin. Do not use your fingers to check for hydraulic fluid leaks. Do not put your face close to suspected leaks. Hold a piece of cardboard close to suspected leaks and then inspect the cardboard for signs of hydraulic fluid. If hydraulic fluid penetrates your skin, get medical help immediately.

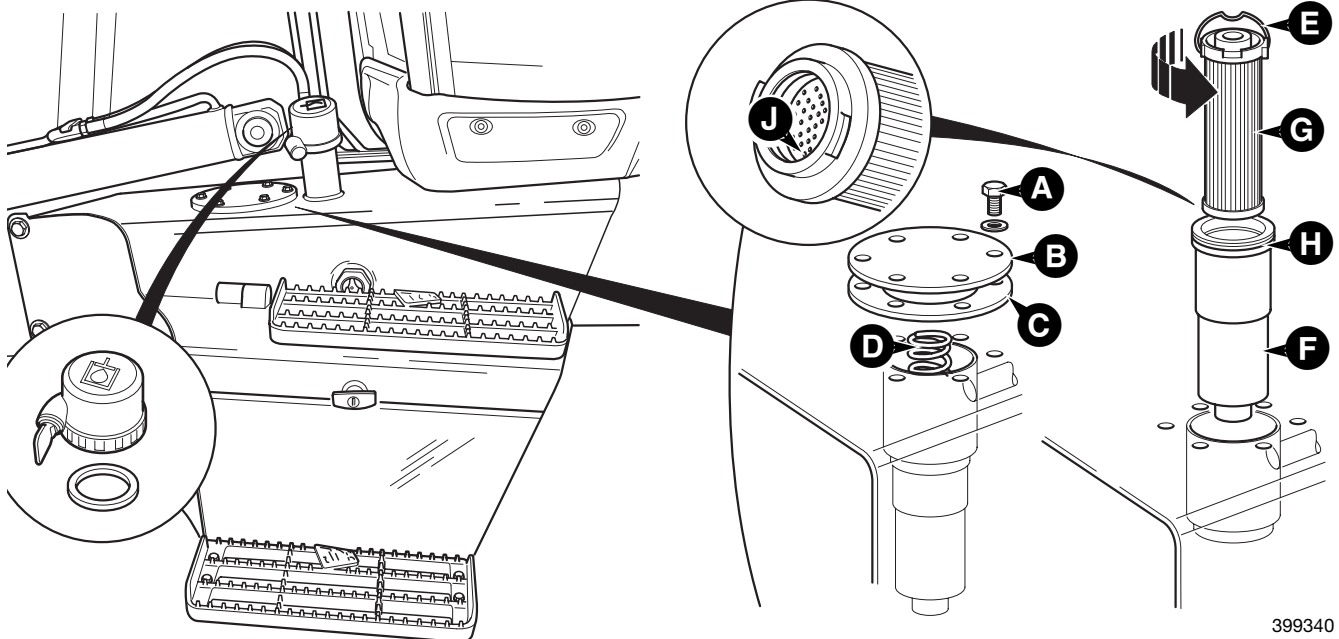
INT-3-1-10/1

- 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 the element assembly
 - a Remove screws **A**. Remove the cover plate **B** and gasket **C**
- * **Note:** If gasket **C** is a rubber type it can be reused provided it is undamaged. If the gasket is a cork type it must be discarded and a new gasket fitted on assembly.
- 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**.

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**, (see 'Note' at step 2).
- f Fit cover plate **B** and tighten screws **A** to 21 Nm (15.5 lbf ft).
- g Check oil level and replenish as required through filler. Fit and tighten the filler cap as described on previous page.



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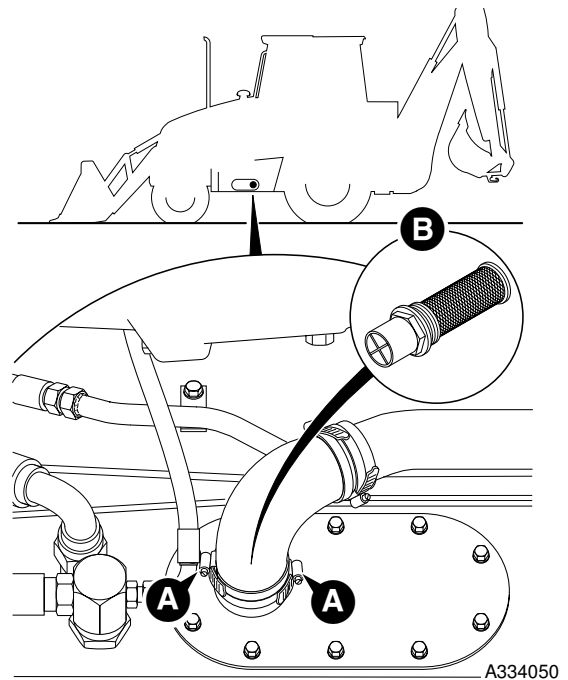
Changing the Suction Strainer

⚠ WARNING

Make the machine safe before getting beneath it. Lower the attachments to the ground; engage the parking brake; remove the starter key, disconnect the battery.

2-3-2-2

- 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 and disconnect the battery.
- 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, see **Service Capacities and Lubricants**.
- 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, see **Hydraulic Tank Cap**.



Checking the Differential Oil Level

⚠ WARNING

Make the machine safe before getting beneath it. Lower the attachments to the ground; engage the parking brake; remove the starter key, disconnect the battery.

2-3-2-2

⚠ 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.

Changing the Differential Oil

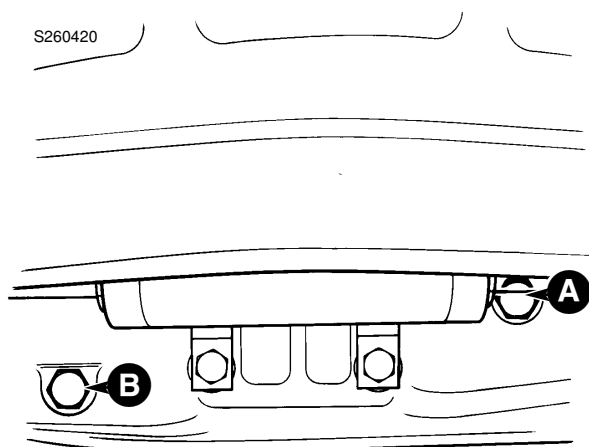
⚠ WARNING

Make the machine safe before getting beneath it. Lower the attachments to the ground; engage the parking brake; remove the starter key, disconnect the battery.

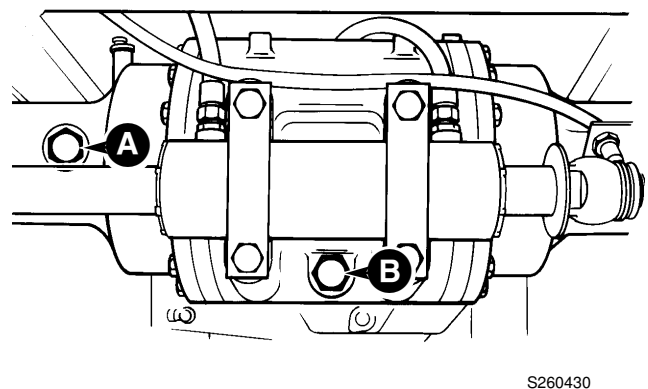
2-3-2-2

- 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).

FRONT



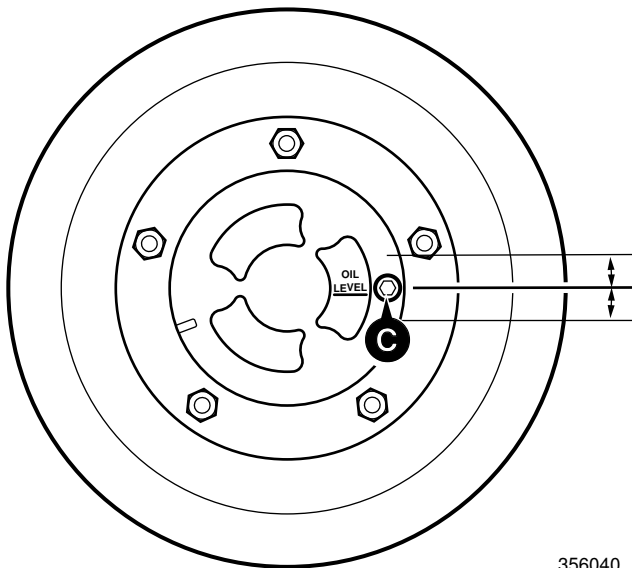
REAR



Checking the Hub Oil Levels

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 parking 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 **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.



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Changing the Hub Oil

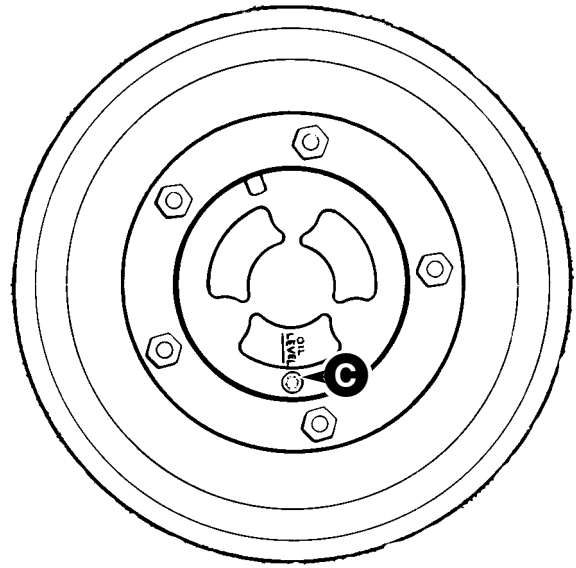
The axle oil is used to lubricate the brake components and cool the brake plates.

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.

Change the oil in each hub separately

- 1 Set the machine level, with the tyres 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 **C** at the bottom.
- 2
 - a Place a container of suitable size beneath plug **C** to catch the oil.
 - b Remove fill/level plugs **C**. Allow time for the oil to drain out.
- 3
 - a Set **OIL LEVEL** marks to the horizontal.
 - b Fill the hubs with recommended axle oil, through the fill/level holes **C**. Oil should be level with the bottom of the fill/level hole.
 - c Clean and refit fill/level plugs **C**.



S209320

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.

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, as shown in fig. 1. 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 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.

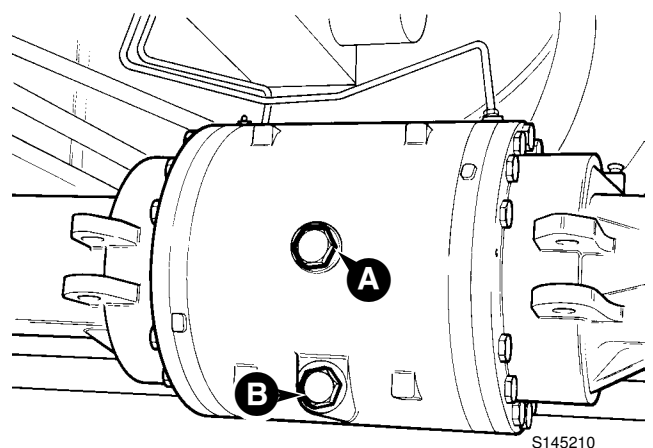
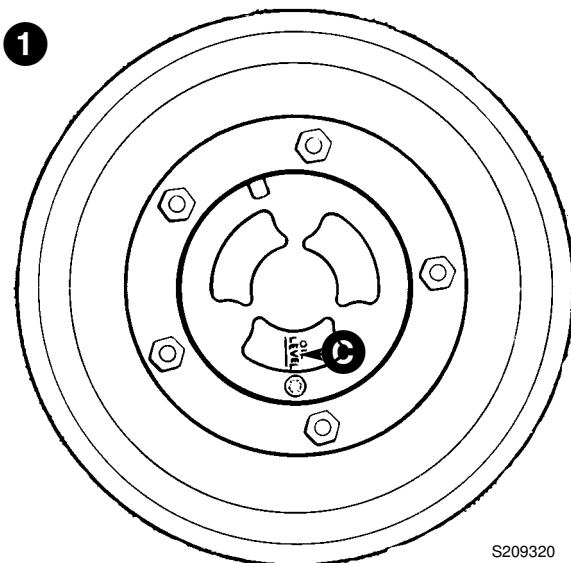
⚠ CAUTION

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

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**.

- 5 Remove fill/level plug **A**. Fill the axle with the specified quantity and recommended type of oil. Clean and refit fill/level plug **A**.



Warning Symbols

The following warning symbols may be found on the battery.

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

 CAUTION

Do not disconnect the battery while the engine is running, otherwise the electrical circuits may be damaged.
INT- 3- 1-14

 WARNING

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

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

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

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 in the cab to OFF before disconnecting and connecting the battery. When disconnecting the battery, take off the earth (-) lead first.

When reconnecting, fit the positive (+) 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.

First Aid - Electrolyte

Do the following if electrolyte:

GETS INTO YOUR EYES

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

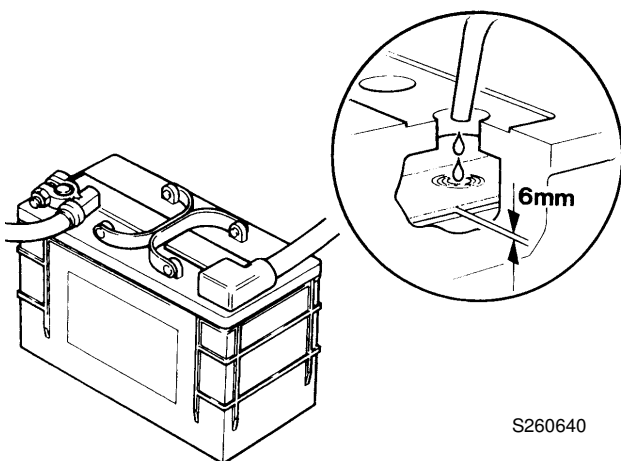
IS SWALLOWED

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.

5-3-4-3/1



Checking the Electrolyte Level

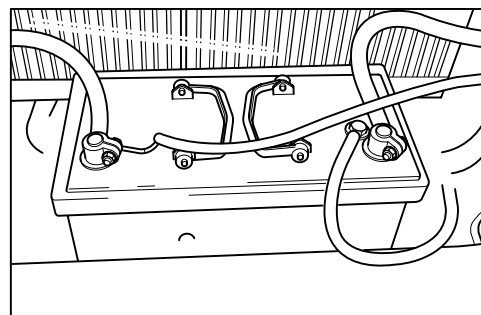
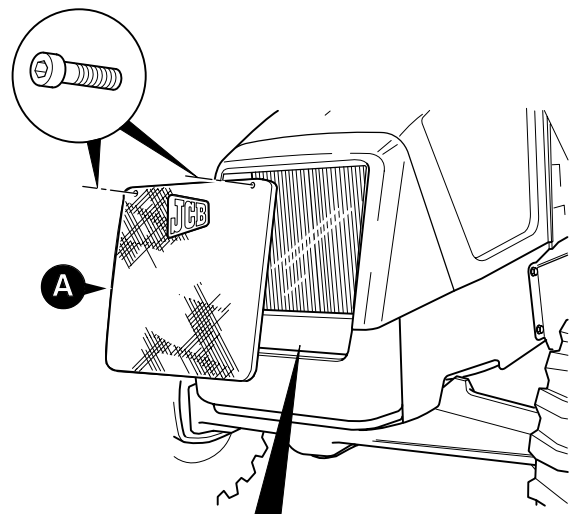
Maintenance free batteries used in normal temperate climate applications should not need topping up. However, in certain conditions (such as prolonged operation at tropical temperatures or if the alternator overcharges) the electrolyte level should be checked as described below.

⚠ WARNING

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

2-3-4-6

- 1 Park the machine on firm level ground, engage the parking brake and set the transmission to neutral. Lower the backhoe to the ground, raise the loader arms and fit the safety strut, see Loader Arm Safety Strut. Switch OFF the engine and remove the starter key.
- 2 Remove the front grille **A**.
- 3 Remove battery cell covers. 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-ionised water.



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Battery Isolator

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

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.

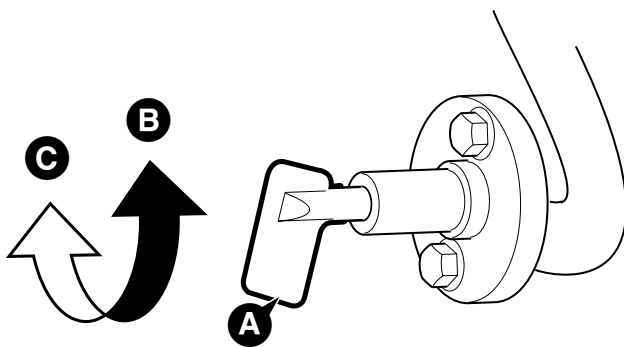
- 1 To isolate the battery turn the battery isolator key **A** in an anti-clockwise direction **B** and remove. Keep the key in a safe place and available for when the machine is next required.
- 2 To connect the battery insert the key **A** and turn in a clockwise direction **C**.

⚠ 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 the battery isolator is fitted.

INT-3-1-13

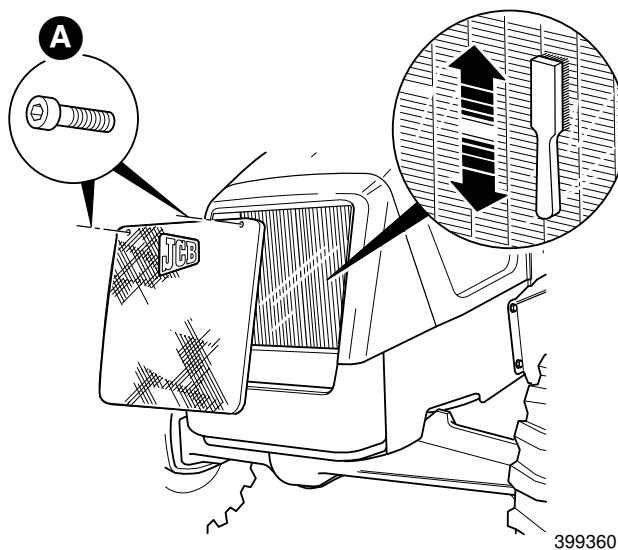


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Cleaning the Tubes/Fins

The hydraulic oil cooler is in front of the engine radiator. If the hydraulic oil cooler tubes/fins get clogged (by dirt and flies etc) the radiator and cooler will be less efficient.

- 1 Park the machine on firm level ground, engage the parking brake and set the transmission to neutral. Raise and block the loader arms. Lower the backhoe to the ground and stop the engine.
- 2 Unscrew bolts **A**. Lift off the radiator grille.
- 3 Brush off all debris from the cooler tubes and fins. Make sure the loosened material is brushed out of the cooler enclosure.
- 4 Refit the radiator grille. Tighten bolts **A** evenly.



Wear Pads

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.

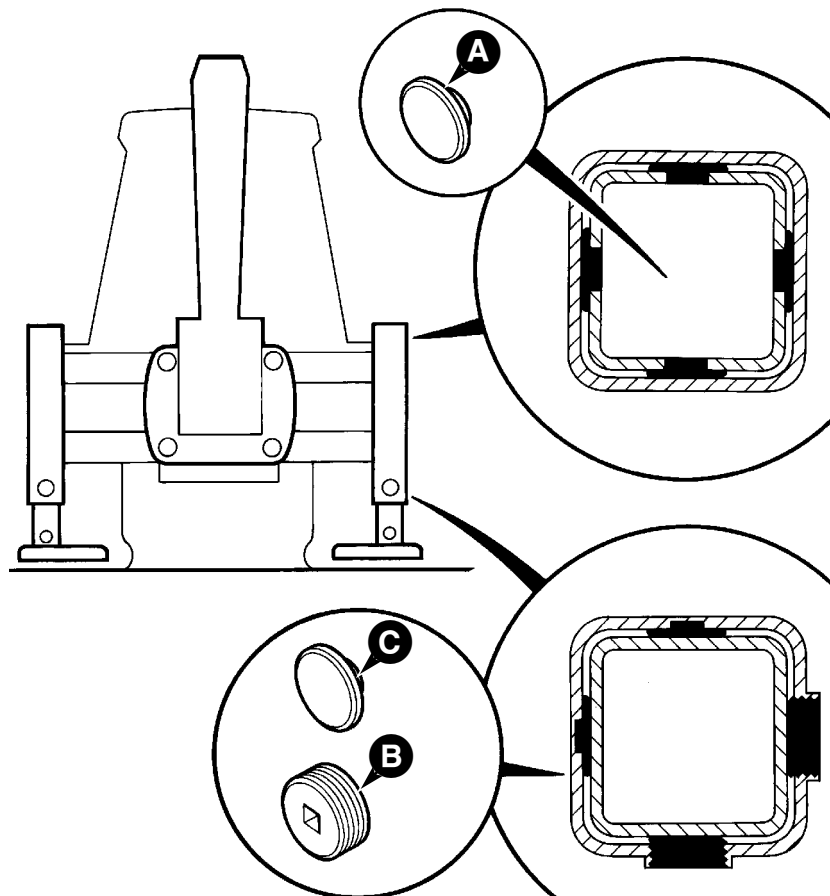
Remove and clean away all debris that may have built up in stabiliser cavities.

As a guide, there should be approximately 1mm (0.039 in.) float between the stabiliser inner and outer leg.

Before adjusting the clearance make sure that the leg is raised clear of the ground but not fully retracted.

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.



S273120

⚠ WARNING

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

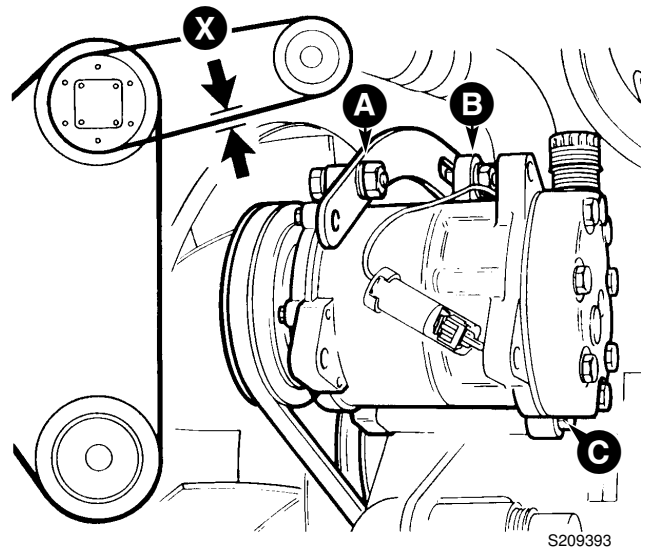
4-3-4-1/2

Adjusting the Compressor Drive Belt**⚠ WARNING**

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

2-3-3-5

- 1 Park the machine on firm level ground, engage the parking brake and set the transmission to neutral. Raise and block the loader arms. Lower the backhoe to the ground and stop the engine.
- 2 Loosen bolts **A**, **B** and **C**. Position the compressor so that there is 10 mm (3/8 in) slack at point **X**.
- 3 Tighten bolt **A**, then bolts **B** and **C**.



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.

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 distributor.

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)

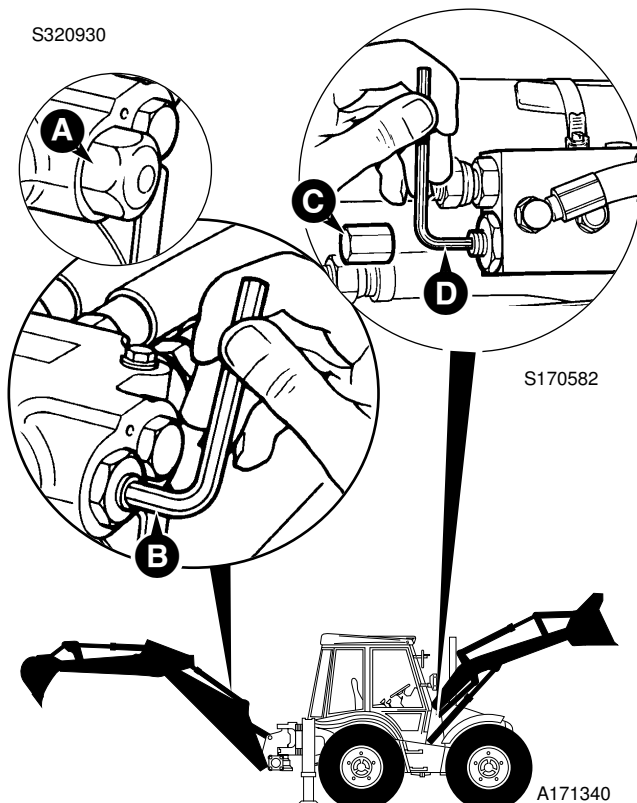
- 1 Remove cap **A** and pierce the warning label.
- 2 If a hose has burst, position a suitable container to catch the oil.
- 3 Insert a 6mm allen key into the socket head of screw **B**. Slowly turn the allen key in a clockwise direction until the load just begins move.
Burst hose - Lower the boom using screw **B**, turn the screw counter-clockwise to slow or stop the load from lowering.
Dead engine - Operate the control lever in the cab to lower the load.

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 a 5mm 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.



ITEM	CAPACITY Litres UK Gal		FLUID/LUBRICANT	INTERNATIONAL SPECIFICATION
Fuel Tank	150	33	Diesel Oil	ASTM D975-66T Nos. 1D, 2D
Engine (Oil) ①				
2 Wheel Steer Machines				
- Build AR	11.0	2.4	JCB Super Multigrade 15W/40 -10°C to +50°C (14°F to 122°F)	SAE15W/40 CF-4/SG
- Build AK	10	2.2		
4 Wheel Steer Machines				
- Build AK	10.0	2.2	JCB Super Multigrade 10W/30 -15°C to +40°C (5°F to 104°F)	SAE10W/30 CF-4/SG
Engine (Coolant)	23.0	5.1	JCB Four Seasons Antifreeze & Summer Coolant/Water (see Coolant Mixtures)	ASTM D3306, BS6580
Syncro Shuttle (2WD) ②	14.4	3.2	JCB Extreme Performance (Below 40 °C, 104 °F)	SAE10W
Syncro Shuttle (4WD) ②	15.4	3.4	JCB Extreme Performance (Below 40 °C, 104 °F)	SAE10W
Powershift 6 speed ②	16	3.5	JCB Extreme Performance (Below 40 °C, 104 °F)	SAE10W
Powershift 4 speed ②	15.5	3.4	JCB Extreme Performance (Below 40 °C, 104 °F)	SAE10W
Front Axle (4WD)				
Housing (2WS)	13	2.86	JCB HD90 Gear Oil (without LSD)	API-GL-5
Housing (4WS) ⑥	18	3.96	JCB Special Gear Oil Plus (with LSD)	API-GL-4
Hubs (x2)	2.0	0.44	Must be suitable for use with limited slip differentials (LSD).	
Rear Axle (4WS)				
Housing	18	3.96	JCB Special Gear Oil Plus Must be suitable for use with oil immersed brakes and limited slip differentials (LSD).	API-GL-4
Hubs (x2)	2.0	0.44		
Rear Axle (2WS)	23	5.0		
Brake System	1.4	0.3	JCB Light Hydraulic Fluid ⚠ CAUTION: DO NOT USE ORDINARY BRAKE FLUID	ISO VG15
Hydraulic System ③	130	28.6	JCB High Performance Hydraulic Oil (Above 38 °C, 100 °F)	ISO VG46
			JCB Hydraulic Fluid HP32 (Below 38 °C, 100 °F)	ISO VG32

ITEM	CAPACITY Litres UK Gal	FLUID/LUBRICANT	INTERNATIONAL SPECIFICATION
Grease Points	---	JCB HP Grease or JCB Special MPL-EP Grease ④	Lithium complex NLGI No.2 consistency including extreme pressure additives Lithium based NLGI No.2 consistency including extreme pressure additives
Extending Dipper	---	Waxoyl ⑤	
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 **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). Engines of new machines are filled at the factory with JCB 10W/30 Multigrade oil. This oil should be drained after the first 100 hours operation and the engine filled with the appropriate recommended grade as shown in the lubrication chart. JCB 10W/30 Multigrade should also be used for the first 100 hours operation whenever a new or reconditioned engine is fitted to the machine. After the first 100 hours operation, it is essential that the 10W/30 oil is replaced by the lubricant recommended. The figure quoted is TOTAL system capacity. Use the MIN and MAX marks on the dipstick when filling the system. Figures quoted within ± 0.5 litre (0.11 U.K. gal).
- ② **Note:** 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 **Note:** The total hydraulic system capacity depends on the equipment being used. Fill with all rams closed. Watch level indicator on hydraulic tank.
- ④ **Note:** JCB HP Grease is the recommended specification grease, if using JCB Special MPL-EP then the greasing must be carried out more frequently.
- ⑤ **⚠ 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.

GEN-1-3

- ⑥ **Note:** 4WS axles with limited slip differential must use **JCB Special Gear Oil Plus**.

Coolant Mixtures

WARNING

Antifreeze can be harmful. Obey the manufacturers instructions when handling neat or diluted antifreeze.

7-3-4-4

The protection provided by JCB Four Seasons Antifreeze and Summer Coolant is shown below. If any other anti-freeze is used, refer to the manufacturer's instructions and ensure that a corrosion inhibitor is included. DO NOT use solutions of more than 60% or less than 50% or damage to the cooling system will occur.

55% Solution - Maintains circulation down to -36 deg C (-33 degF), protects against damage down to -41 deg C (-42 degF)

The strength of the anti-freeze solution must be checked at least once a year, preferably at the beginning of the cold period. It is an advantage to leave the anti-freeze in all the year round as it gives continued protection against corrosion. Always renew the anti-freeze every two years. A 50% anti-freeze mixture must be used even if frost protection is not needed. This gives protection against corrosion and raises the coolants boiling point.

It should be noted that serious damage to the cooling system can occur if corrosion inhibitors are not used.