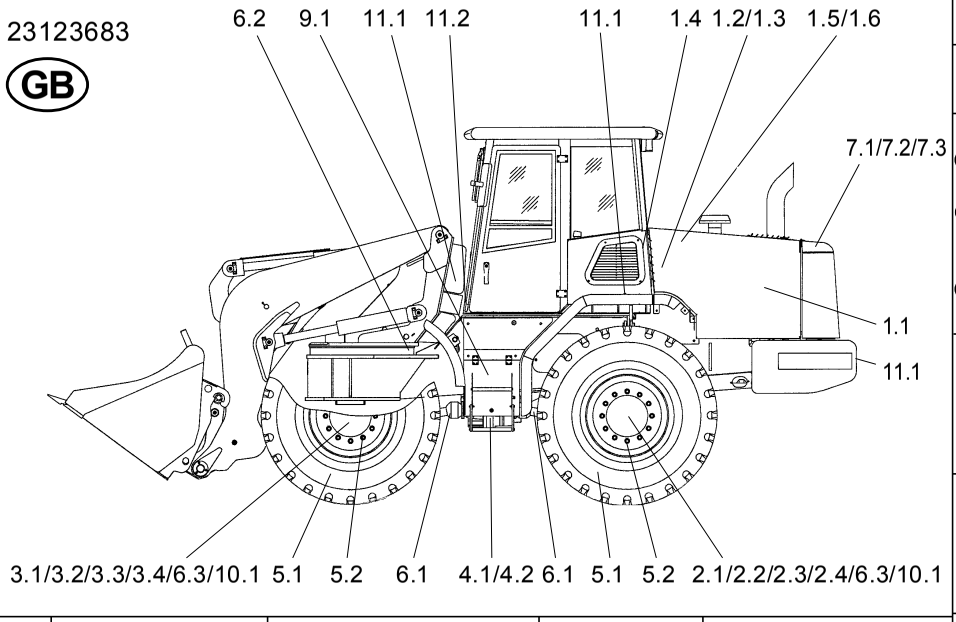
Maintenance

8 Maintenance (Maintenance Plan)



Item	Designation	Specification	Viscosity	Filling amount
* 1	Motor oil	MIL-L-2104 C = API-CD	Acc. to manufacturer	approx. 14 l with oil filter
* 2.2	Transm. oil with LS additive	MIL-L-2105 B = API-GL5-6-LS	SAE 85 W 90-LS	approx.15l
* 2.4	Transm. oil with LS additive	MIL-L-2105 B = API-GL5-6-LS	SAE 85 W 90-LS	approx. 2 x 5 l
* 3.2	Transm. oil with LS additive	MIL-L-2105 B = API-GL5-6-LS	SAE 85 W 90-LS	approx. 15 l
* 3.4	Transm. oil with LS additive	MIL-L-2105 B = API-GL5-6-LS	SAE 85 W 90-LS	approx. 2 x 5 l
* 4.2	Transm. oil	General Motors ATF type DEXRON II	ATF 22 SAE 75 W	approx. 5.2 l (upper compartment) approx. 4.3 l (lower compartment)
* 7.3	Hydraulic oil	DIN 51524 - HVLP 46	ISO VG 46, VI > 180	approx. 230 l
* 8	Grease	DIN 51825 - KPF 1/2 N-20		as required
* 9	Distilled water			as required

Key to symbols

△ First oil change, first filter replacement
▲ First check; eliminate any determined problems
○ Check; eliminate any determined problems
◇ Change
* The markings, filling and check plugs are binding

Refer to operating instructions

Caution!

STOP When carrying out maintenance work, heed the accident prevention regulations!

Grease points (indicated in red)

1. Lubricate bolts every 10 operating hours with grease (DIN 51825 - KPF 1/2 N-20).
2. Lubricate glide points as required and always after cleaning using grease (DIN 51825 - KPF 1/2 N-20).

Oil lubrication points

3. Use MIL-L-2104 C engine oil to lubricate the joints and deflection levers every 50 operating hours.

Optional equipment: Biodegradable hydraulic oil

4. Ester-based synthetic hydraulic oil, viscosity class ISO VG 46 VI > 180

⚠ **CAUTION !** The service brake must be operated with mineral oil only!

Every x operating hours 10	50	500	1500	Item	Maintenance points (Max. permissible intervals or shorter (depending on use))
				1	**Engine**
○	△	◇		**1.1**	Maintenance acc. to manufacturer's regulations (open left and right engine flaps) →
					Dry air filter system:
○				1.2	Check maintenance display (open left engine flap)
				1.3	Maintain/replace filter element / safety cartridge →
	○			1.4	Check cooler and clean if necessary
○				1.5	Check coolant level, top off if necessary →
		○	◇	1.6	Check anti-freeze, top off if necessary
				2	**Rear axle**
	○			2.1	Check axis transmission oil level (check plug) →
		△	◇	2.2	Change axis transmission oil →
	○			2.3	Check planetary gear transmission oil level (check plug) →
		△	◇	2.4	Change planetary gear oil →
				3	**Front axle**
	○			3.1	Check axis transmission oil level (check plug) →
		△	◇	3.2	Change axis transmission oil →
	○			3.3	Check planetary gear transmission oil level (check plug) →
		△	◇	3.4	Change planetary gear oil →
				4	**2-gear distribution gear**
	○			4.1	Check distribution gear oil level (check plug) →
		△	◇	4.2	Change distribution gear oil →
				5	**Wheels and tyres**
	○			5.1	Check air pressure
▲		○		5.2	Check fastening of wheel nuts (550 Nm)
				6	**Cardan shafts / ball bearing ring / axes**
	▲	○		6.1	Check fastening of cardan shafts (115 Nm)
	▲	○		6.2	Check fastening of ball bearing rings (610 Nm)
	▲	○		6.3	Check fastening of axles (385 Nm)
				7	**Hydraulic systems**
	△		◇	7.1	Replace filter inserts, observe electr. control lamp →
○				7.2	Oil level check (view glass) →
			◇	7.3	Oil change →
				8	**Grease points, indicated in red →**
				9	**Batteries ⚠ Opening the lid is prohibited!**
		○		9.1	Visual check (cleanness / battery terminals)
				10	**Brake systems**
○				10.1	Service and parking brake: Function test before starting work →
	○			10.2	Check parking brake, adjust if necessary →
				11	**Lighting system / fresh air filter**
				11.1	Function test before starting work
		○	◇	11.2	Maintaining/replacing the fresh air filter

8 Maintenance

Figures and descriptions may vary due to modifications in the construction that become possible and necessary to improve the loader and to develop it further technically. These modifications are summarised in section 13.

8.1 Notes regarding maintenance

DANGER

- The engine must be turned off.
- For work to be carried out under the bucket arm:
  - the bucket must be emptied or the attachment must be relieved,
  - the bucket arm must be mechanically propped up [e.g. by inserting the bucket arm supports (option) (1-1/arrows)],
  - the ball block valve for the working and auxiliary hydraulics (1-2/arrow) must be closed,
  - the swivel mechanism is to be blocked (1-4/arrow).
- The loader must be secured against rolling by applying the parking brake (4-11/4) and by setting the drive direction switch (4-11/6) to position „0“. In addition, wheel chocks must be placed on both sides of one of the two wheels of the front axle.

CAUTION

- Change the oil when the units are lukewarm.
- Perform maintenance work when the loader is on level ground and the bucket arm is in its lowest position.
- Replace damaged filter inserts and gaskets immediately.
- Clean force-feed lubrication nipples before lubricating.

NOTE

- For the maintenance work required, refer to the maintenance plan (page 8-1).
- Damage which is traceable to non-observance of the maintenance plan is not covered by the warranty.
- The lubricants listed in the maintenance plan can be used at ambient temperatures ranging from **-15°C** to **+40°C**.

CAUTION

For ambient temperatures below 15°C, refer to the description given in section 5.2.2, “Winter operation”.

Figure 8-1

8.2 Maintenance work

8.2.1 Engine oil level check

See the operating instructions for the engine.

8.2.2 Coolant level check

The coolant level of the engine is to be checked each time that the loader is started or at least once per day. The compensation tank (8-1/arrow) in the motor compartment is located on the right side of the loader; the filling hole is located at the engine hood (8-2/arrow). The level of coolant must be between the „Minimum“ and „Maximum“ marks.

CAUTION

If coolant needs to be added, note that the water/ anti-freeze mixing ratio is 2:1!

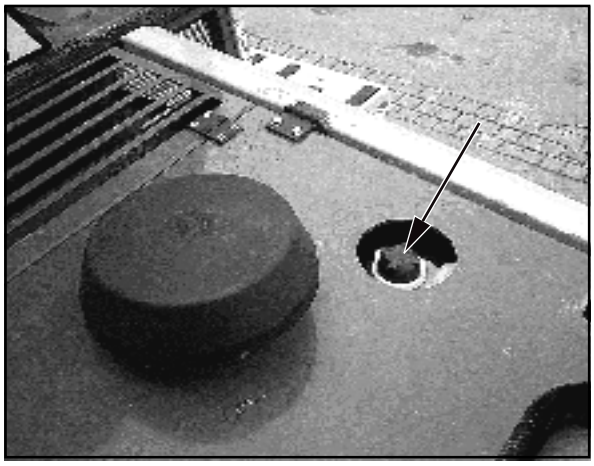


Figure 8-2

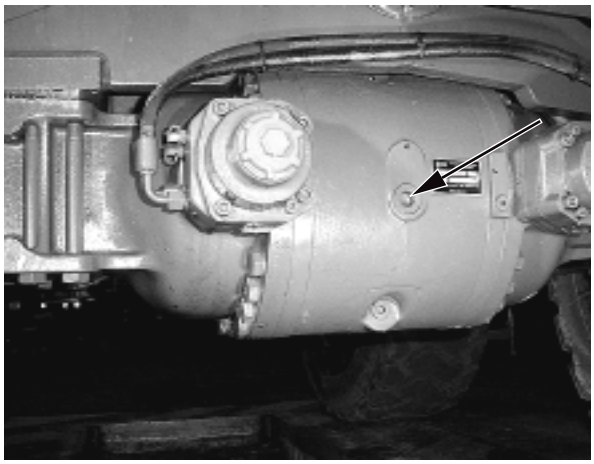


Figure 8-3

8.2.3 Oil level check for axles

8.2.3.1 Rear axle

(1) Unscrew the plug from the axle arch (8-3/arrow).

NOTE

- The oil level must reach the plug bore.
- Collect any oil that escapes.

(2) Fit a new gasket and screw the plug back in.

8.2.3.2 Planetary gear

(1) Move the loader so that the plug (8-4/2) is positioned at 3 o'clock.

(2) Unscrew the plug.

NOTE
- Collect any oil that escapes.
- The oil level must reach the plug bore.
- If necessary, fill oil into the plug bore (8-4/1) until the oil reaches the required level.

(3) Fit a new gasket and screw the plug back in.

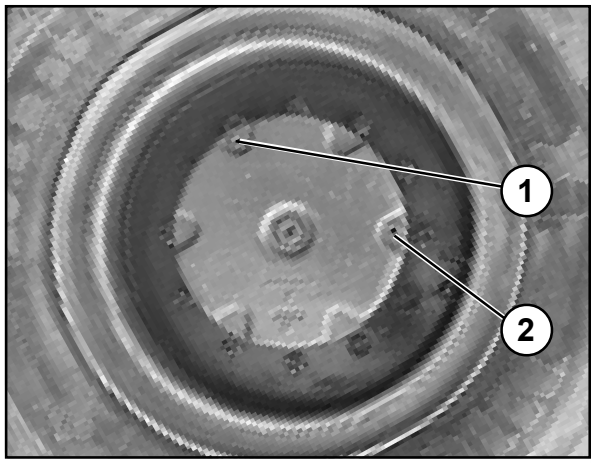


Figure 8-4

8.2.3.3 Front axle

(1) Unscrew the plug from the axle arch (8-5/arrow).

NOTE
- Collect any oil that escapes.
- The oil level must reach the plug bore.
- If necessary, fill oil into the plug bore until the oil reaches the required level.

(2) Fit a new gasket and screw the plug back in.

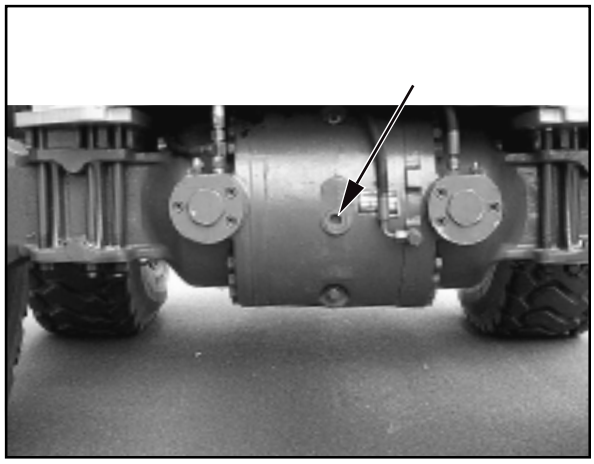


Figure 8-5

8.2.4 Oil level check (distribution gear)

(1) Remove the foot mat in the footwell of the operator's cabin.
(2) Dismantle the floor plate under the foot mat.
(3) Check the oil level using the check marking of the oil dipstick (8-6/1) for the upper oil compartment (coupling space).
(4) Unscrew the plug (8-6/4) from the lower oil compartment (spur gear space).

NOTE
- The loader must have been standing still for at least 15 minutes before you can check the oil level.
- The transmission housing temperature must be at least 60 °C (warm up if necessary).
- The oil level must reach the plug bore (8-6/4).
- If necessary, fill oil into oil filling screw 8-6/2 (upper oil compartment) or 8-6/3 (lower oil compartment) until the oil reaches the required level.
- Collect any oil that escapes.

(5) Fit a new gasket and screw the plug back in.

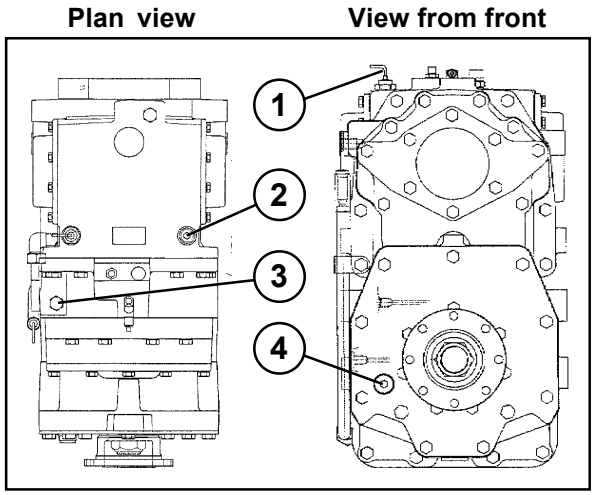


Figure 8-6

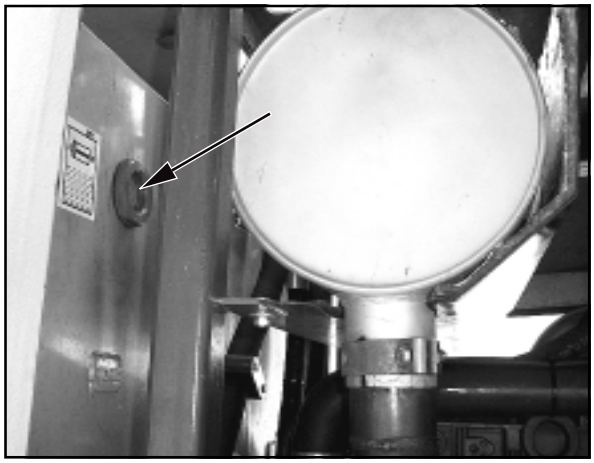


Figure 8-7

8.2.5 Oil level check of the hydraulic oil reservoir

(1) Park the loader in a level position.
(2) Bring the bucket arm to its lowest position and tip the quick-change device.
(3) Open the engine flap on the right side of the loader.
(4) Check the oil level in the sight glass.

NOTE

The oil level must be visible in the upper quarter of the sight glass (8-7/arrow). If necessary, fill oil into the filler neck (8-14/arrow).

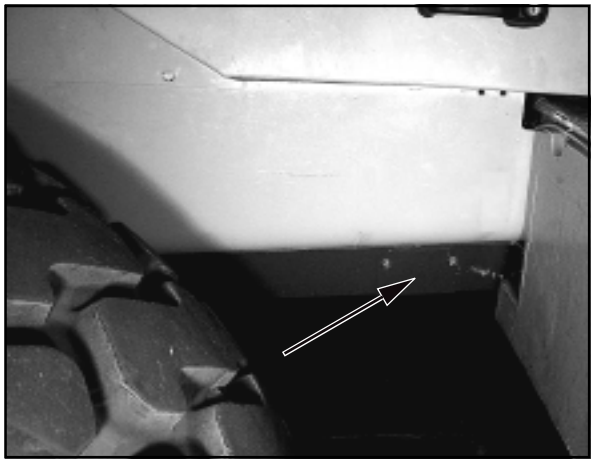


Figure 8-8

8.2.6 Oil change, engine

NOTE

Move the steering wheel of the loader all the way to the left.

(1) Place a sufficiently large oil drain pan underneath.
(2) Remove the covering plate from the lower part of the crankcase on the left side of the loader (8-8/arrow).
(3) Unscrew the covering plate of the oil drain plug.
(4) Screw the drainage nozzle with hose from the tool box (4-1/12) to the oil drain plug.
(5) Remove the cover cap from the hose.
(6) Further procedures are to be found in the Engine Operating Manual.

8.2.7 Oil change, axles

8.2.7.1 Rear axle

(1) Place a sufficiently large oil drain pan underneath.
(2) Unscrew the plugs from the axle arch (8-9/1 and 8-9/2) and drain the oil.

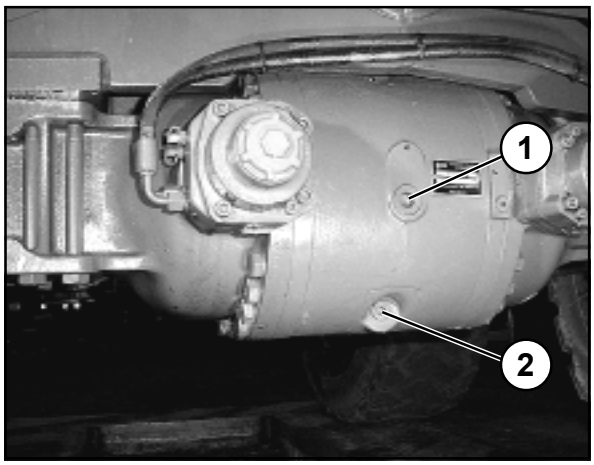


Figure 8-9

CAUTION

Waste oil must be disposed of in such a way that it will not cause pollution!

(3) Screw in the plug (8-9/2) again with a new gasket.
(4) Fill in oil via the plug bore (8-9/1) until the oil level reaches the opening.

NOTE

- Information about the quantity of oil is given in the maintenance plan (chapter 8).
- After a few minutes, when the oil level has lowered, top up the oil until the oil level reaches the marked level and remains stable.

(5) Screw in the plug (8-9/1) again with a new gasket.

8.2.7.2 Planetary gear

(1) Move the loader so that the plug (8-10/arrow) is positioned at 6 o'clock.

(2) Place an oil drain vessel with a drain channel underneath the gear.

(3) Unscrew the drain plug and let the oil drain out.

CAUTION
Waste oil must be disposed of in such a way that it will not cause pollution!

(4) Move the loader so that the plug (8-10/arrow) is positioned at 3 o'clock (8-4/2).

(5) Fill in oil via the plug bore (8-4/1) until the oil level reaches the opening.

NOTE
- Information about the quantity of oil is given in the maintenance plan (chapter 8).
- After a few minutes, when the oil level has lowered, top up the oil until the oil reaches the marked level and remains stable.

(6) Use new gaskets when screwing the plug back in.

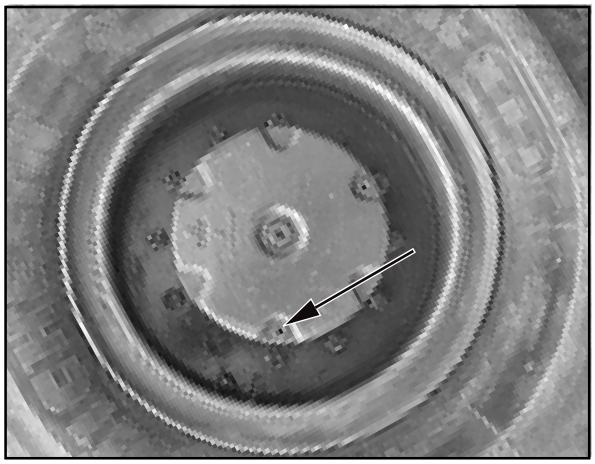


Figure 8-10

8.2.7.3 Front axle

(1) Place a sufficiently large oil drain pan underneath.

(2) Unscrew the plugs from the axle arch (8-11/1 and 8-11/2) and drain the oil.

CAUTION
Waste oil must be disposed of in such a way that it will not cause pollution!

(3) Screw in the plug (8-11/2) again with a new gasket.

(4) Fill in oil via the plug bore (8-11/1) until the oil level reaches the opening.

NOTE
- Information about the quantity of oil is given in the maintenance plan (chapter 8).
- After a few minutes, when the oil level has lowered, top up the oil until the oil reaches the marked level and remains stable.

(5) Screw in the plug (8-11/1) again with a new gasket.

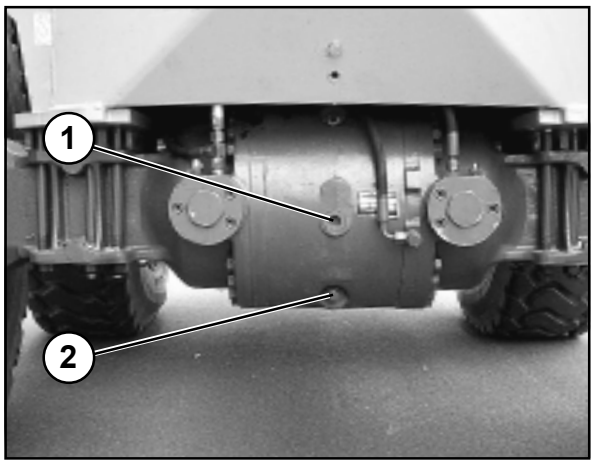


Figure 8-11

Plan view

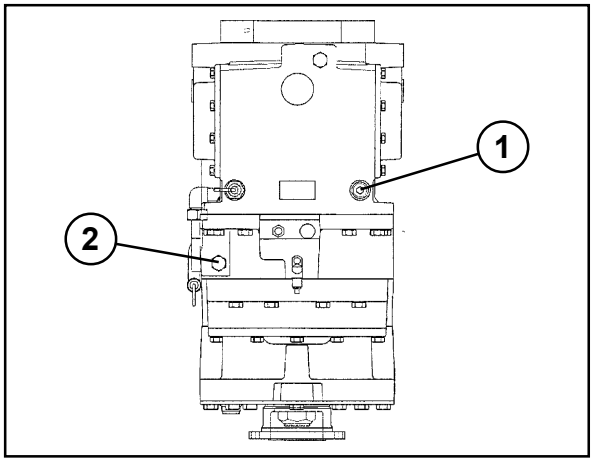


Figure 8-12

View from rear View from front

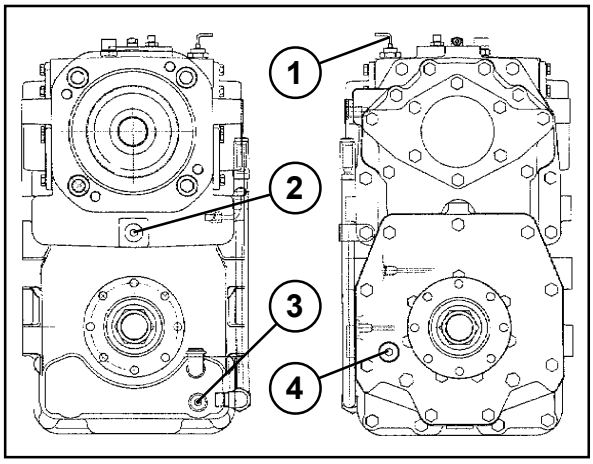


Figure 8-12a

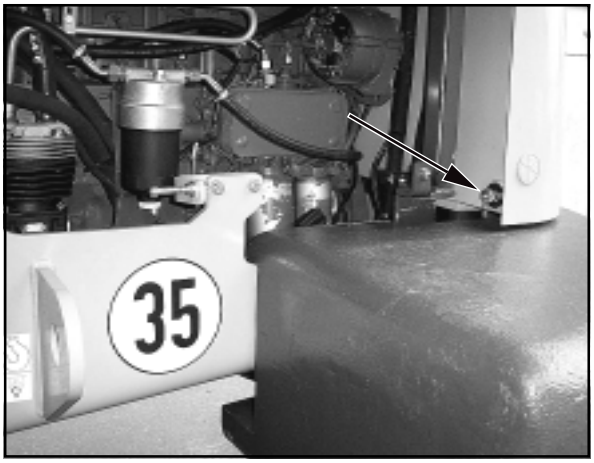


Figure 8-13

8.2.8 Oil change, distribution gear

(1) Remove the foot mat in the footwell of the operator's cabin.
(2) Dismantle the floor plate under the foot mat.
(3) Place a sufficiently large oil drain pan with a drain channel underneath.
(4) Unscrew the filling (8-12/1 and 8-12/2) and drain plugs (8-12a/2) and let oil drain from the upper oil compartment through the drain channel.
(5) Unscrew the drain (8-12a/3) and inspection plugs (8-12a/4) and drain the oil from the lower oil compartment.

CAUTION
Waste oil must be disposed of in such a way that it will not cause pollution!

(6) Screw the drain plugs (8-12a/2 and 8-12a/3) back in with new gaskets.

(7) Fill in oil through the filling plug bore of the upper oil compartment (8-12/1) until the oil reaches the mark on the dipstick (8-12a/1).

(8) Fill in oil through the filling plug bore of the lower oil compartment (82/3) until the oil reaches the lower edge of the oil inspection bore (8-12/4).

NOTE
- The transmission housing temperature must be at least 60 °C (warm up if necessary).
- Details regarding the amount of oil required are given in the maintenance plan (page 8-1).
- When the oil level has lowered – not earlier than after 15 minutes - top up the oil until the oil reaches the marked level and remains stable.

(9) Screw the filling (8-12/1 and 8-12/2) and inspection plugs (8-12a/4) back in with new gaskets..

8.2.9 Oil change, hydraulic system

(1) Have an oil pan ready (at least 250 l).
(2) Open both engine flaps.
(3) Unscrew the covering flap of the oil drain plug (8-13/ arrow).
(4) Screw the drainage nozzle with hose from the tool box (4-1/12) to the oil drain plug.
(5) Remove the cover cap from the hose.
(6) Drain the oil into the oil pan.

CAUTION
Waste oil must be disposed of in such a way that it will not cause pollution!

(7) Remove the nozzle with the hose and replace the cover cap on the hose.
(8) Screw the covering plate onto the oil drain plug.
(9) Replace the suction / return flow filter cartridge (section 8.2.10).

(10) Fill oil into the filler neck (8-14/arrow).

CAUTION
For those loaders which are fitted to run with biodegradable hydraulic oil (ester-based synthetic hydraulic oil of viscosity class ISO VG 46 VI > 180 – designation can be found on the hydraulic oil reservoir and on the dashboard), only this type of oil may be used for oil changes.
Mineral and biodegradable hydraulic oils must **never** be mixed!
Biodegradable hydraulic oil must be changed every **1000 operating hours**.
Changing the oil type from mineral oil to biodegradable oil must be performed according to the VDMA 24 569 conversion guidelines.

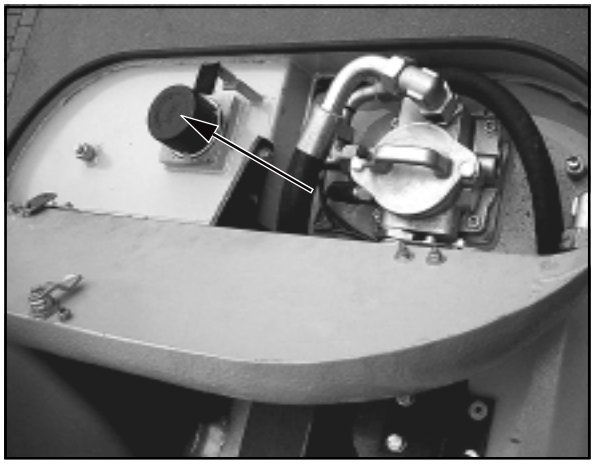


Figure 8-14

(11) Check the oil level at the sight glass (8-7/arrow).
(12) Close the filling nozzle.

8.2.10 Replacing the suction / return flow filter cartridge

CAUTION
Replace the filter insert according to the maintenance plan or when the clogging indicator lamp (4-8/13) lights up.

NOTE
The clogging indicator may light up prematurely after a cold start. It will go out when the hydraulic oil warms up.

(1) Open the maintenance flap of the hydraulic oil reservoir (8-15/1).
(2) Loosen but do not unscrew both screws of the hydraulic oil filter lid (8-15/2 or 8-16/1).
(3) Turn the hydraulic oil filter lid with the magnetic tube (8-15/4 or 8-16/2) to the left and lift it out. Collect hydraulic oil dripping off.
(4) Swing up the handle (8-16/3), slowly pull out the filter cartridge (8-16/4) and replace it with a new one.

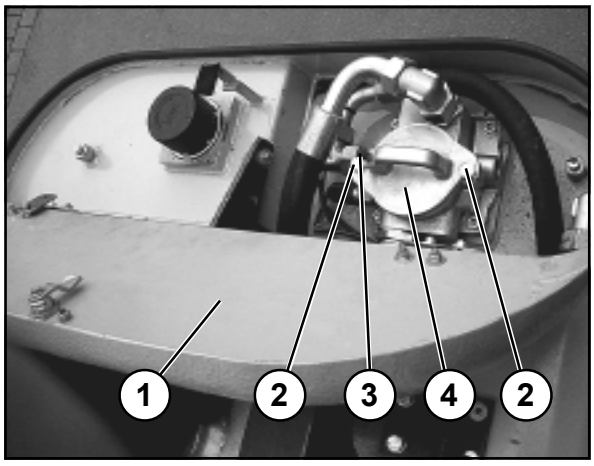


Figure 8-15

CAUTION
- Collect any hydraulic oil dripping off when you pull out the filter cartridge.
- The used hydraulic oil filter cartridge must be disposed of in such a way that it does not cause pollution.

(5) Use a clean cloth to wipe the magnet tube (8-16/2) before fitting it back in.
(6) Refit the hydraulic oil filter lid with the magnet tube and fasten it again.
(7) Connect the ventilation hose to the ventilation valve (8-15/3 or 8-16/1).
(8) Start the engine.
(9) Have an oil drain pan ready and open the ventilation valve.

NOTE
Keep the ventilation valve open until there are no more bubbles in the escaping oil.

(10) Close the ventilation valve.

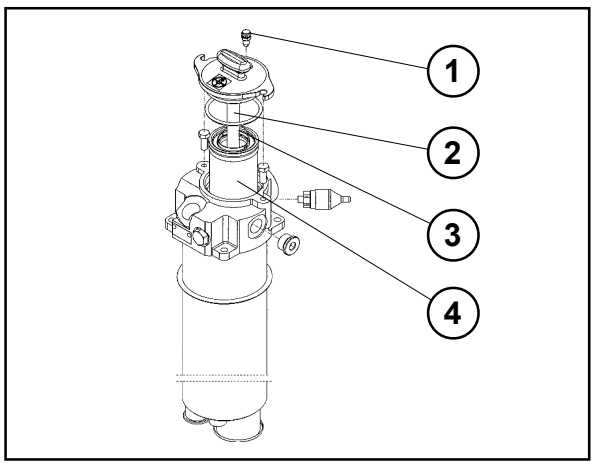


Figure 8-16

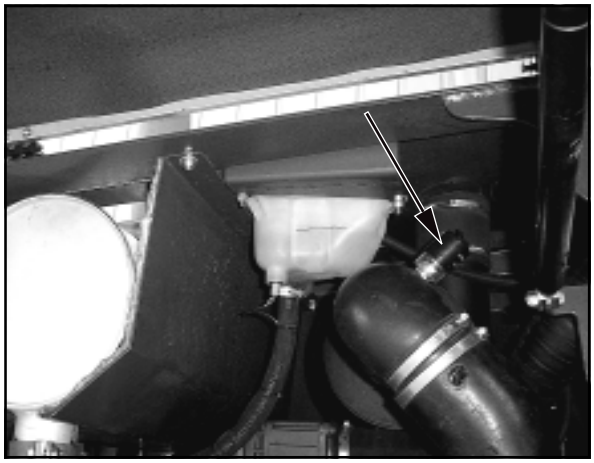


Figure 8-17

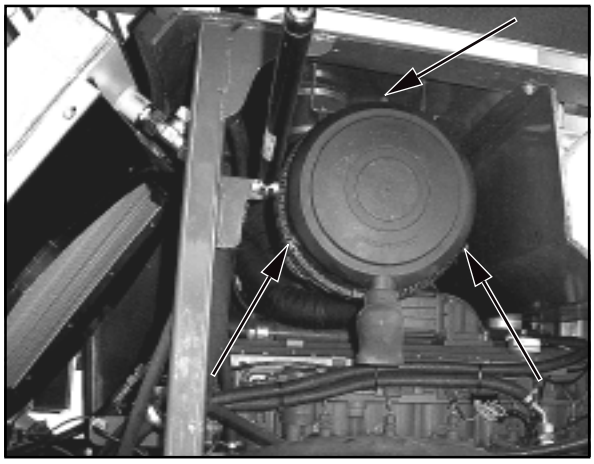


Figure 8-18

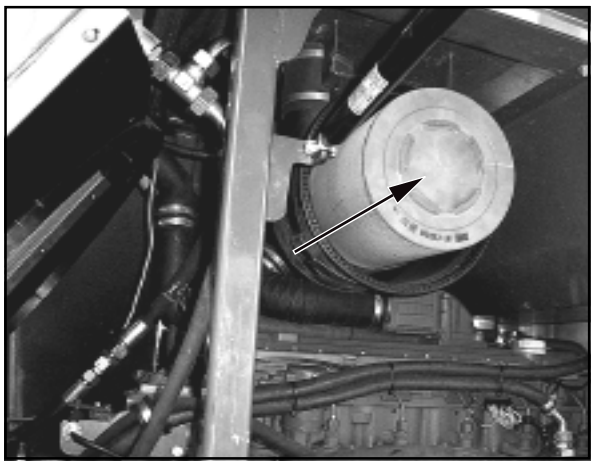


Figure 8-19

8.2.11 Maintaining/replacing the air filter

NOTE

Maintenance of the filter cartridge is necessary when either the red range is visible in the maintenance indicator (8-17/1 on the right side of the loader) or after 12 months, whichever is sooner.

(1) Open the engine flap on the left side of the loader.

(2) Loosen the three retaining clamps of the air filter lid (8-18/arrows) and remove the air filter lid.

(3) Pull out the filter cartridge (8-19/arrow) by carefully turning it back and forth.

(4) Clean the filter cartridge.

CAUTION

- For cleaning, use a compressed air gun to which a pipe (angled at 90°) has been attached. The pipe must be sufficiently long to reach the bottom of the cartridge. Use dry compressed air of no more than 5 bar to blow out the cartridge by moving the pipe back and forth in the interior of the cartridge. Cleaning can be stopped when dust formation ceases.

- Do not use petrol or hot liquids for cleaning.

(5) Use a hand-held lamp to check the cartridge paper and the rubber gasket of the filter cartridge for damage.
If the cartridge or the gasket is damaged, replace the cartridge.

(6) Carefully insert the filter cartridge.

(7) Install the air filter lid on the filter housing in such a way that the direction arrow in the marking "**OBEN-TOP**" points upwards. This ensures that the dust removal valve faces downwards.

(8) When the indicator field becomes red (8-17/arrow), push the reset button. The field becomes clear.

CAUTION

Check all connection pipes and hoses of the air filter system for damage before starting the engine.

8.2.12 Replacing the safety cartridge

CAUTION

- The safety cartridge must not be cleaned.
- The safety cartridge must be replaced after the filter cartridge has been maintained/ cleaned 5 times, but no later than two years.
- Make sure that no dirt or dust can enter the filter housing during replacement of the safety cartridge.

(1) Remove the filter cartridge (section 8.2.11).
(2) Pierce the seal of the safety cartridge (8-20/arrow) from the inside by using a screwdriver or similar tool and pull up both strips.
(3) Hold the safety cartridge by both strips and pull it out by carefully turning it back and forth. Replace the safety cartridge and the filter cartridge by new ones.
(4) The remaining installation is performed as described in section 8.2.11 (6) - (8).

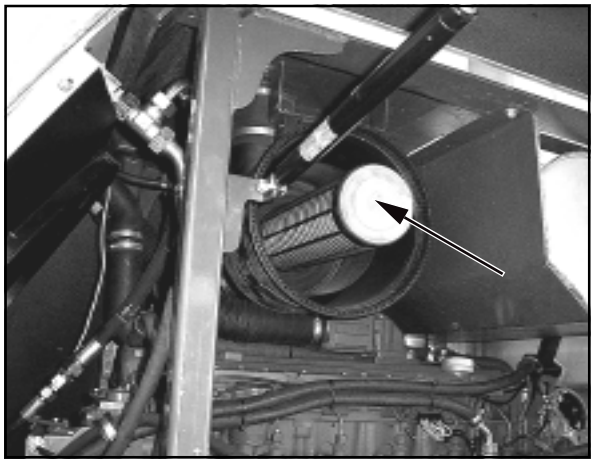


Figure 8-20

8.2.13 Replacing the fuel filter

See the operating instructions for the engine.

8.2.14 Replacing the starter batteries

NOTE

The starter batteries are maintenance-free according to DIN 72311, section 7. They are located on the left side of the cabin access area.

(1) Dismount the maintenance flap (8-22).
(2) Remove the main battery switch (8-21/2).
(3) Loosen the fastening screws (8-22/2) of the battery holders and remove them together with the retaining plates.
(4) Loosen and remove the connecting cables (8-22/1) from the batteries (size 13).

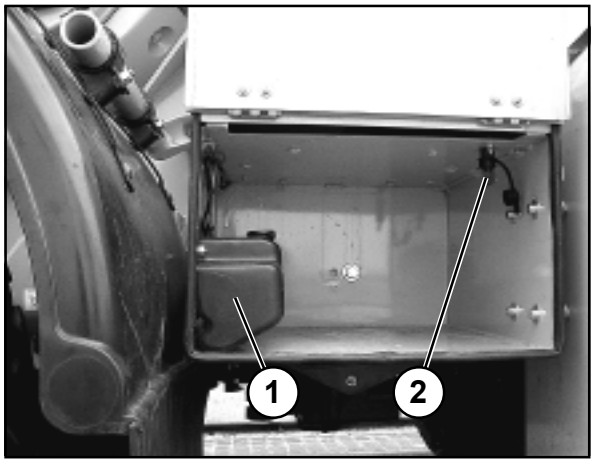


Figure 8-21

DANGER

Always remove the negative terminal first and then the positive terminal. Installation is in reverse order.

(5) Remove both batteries and replace them.
(6) Apply grease to the terminals before fastening them.
(7) Installation is in reverse order.

DANGER

Make sure the fastenings are secure.

(8) Attach the maintenance flap and close and lock it.

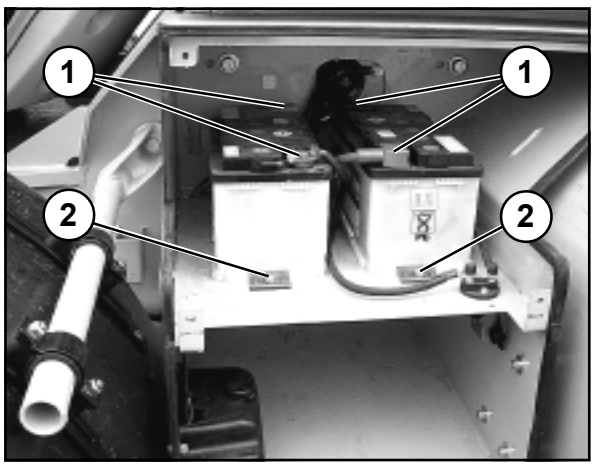


Figure 8-22

Figure 8-23

Figure 8-24

8.2.15 Cleaning the cooler

NOTE

The cooler must be checked every **50 operating hours** and cleaned when necessary. To do this, flip back the lamella plate (8-23/arrow) on the engine hood.

8.2.16 Maintaining/replacing the fresh air filter

NOTE

The fresh air filter is located at the right loader side in the vicinity of the front side window.

(1) Loosen the five fastening screws (8-24/arrows) of the compensator cover and remove the cover.
(2) Unscrew the filter cover behind together with the interior filter cartridge (4 fastening screws) and pull out.
(3) Remove the filter element and clean it with compressed air.

CAUTION

Do not use any petrol, hot fluids or industrial compressed air for cleaning.

(4) Check the filter element for damage.

NOTE

The filter element must be replaced when it is damaged, but at least every **1500 operating hours.**

(5) Insert the filter element and reinstall the filter cartridge and compensator covers.

8.2.17 Checking/adjusting the service/ spring parking brake

DANGER

- The combined service/parking brake must be checked and, if necessary, adjusted every **500 operating hours**.
- All work on the brake system must only be carried out by authorised personnel.
- Oil loss (leaks) in the brake system must be immediately reported to authorised personnel.
- Operation of the loader must be stopped immediately if the pedal can be pressed down too far or the braking effect decreases noticeably.

(1) Check the pedal travel.
(2) Check the entire system for proper functioning and absence of leaks (visual test).

NOTE

The combined service/parking brake is maintenance-free and therefore does not require any further check.

8.2.18 Lubrication points

NOTE

The lubrication points are marked in red on the loader.

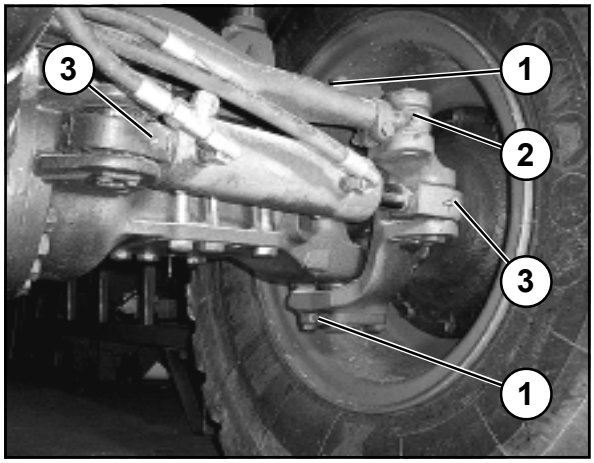


Figure 8-25

8.2.18.1 Rear axle

CAUTION

- The spindle bolts (8-25/1),
- the track rod bearings (8-25/2), and
- the steering cylinder bearings (8-25/3) must all be lubricated **every 50 operating hours**.

NOTE

Lubricate the axle spindle bolts (top and bottom), the track rod bearings and the steering cylinder bearings on both sides of the axle.

8.2.18.2 Rear axle pivot bolts

CAUTION

- The rear axle pivot bolts (8-26/arrows) must be lubricated **every 10 operating hours.**
- Release the rear axle from load before lubricating the rear axle pivot bolts.

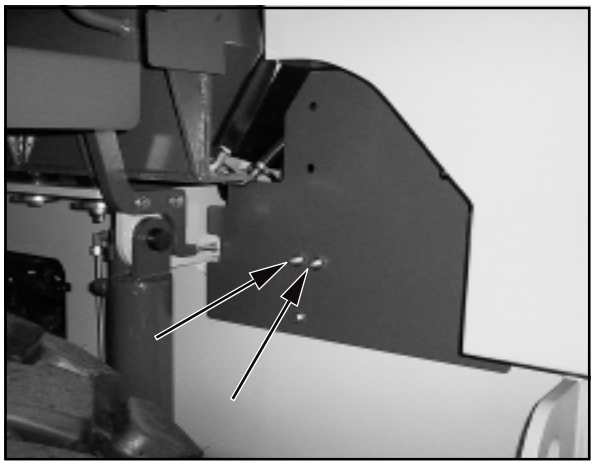


Figure 8-26

8.2.18.3 Front axle

CAUTION

- The spindle bolts (8-27/1),
- the track rod bearings (8-27/2), and
- the steering cylinder bearings (8-27/3)

must all be lubricated **every 50 operating hours**.

NOTE

Lubricate the axle spindle bolts (top and bottom), the track rod bearings and the steering cylinder bearings on both sides of the axle.

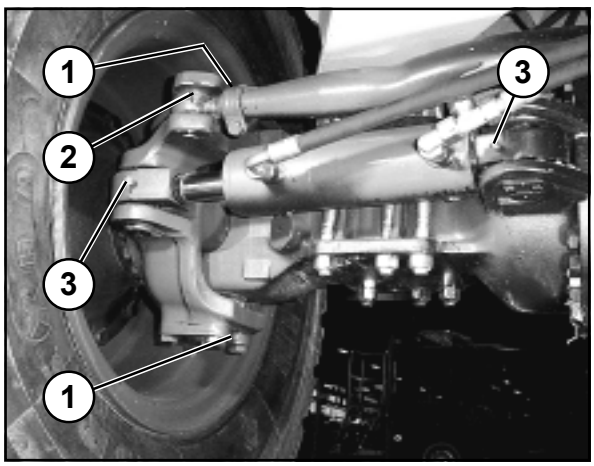


Figure 8-27

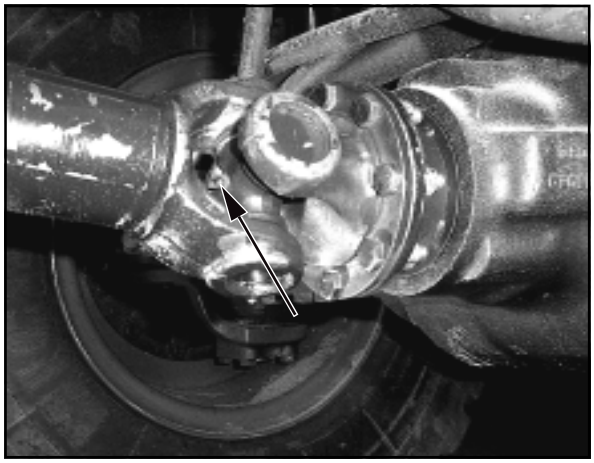


Figure 8-28

8.2.18.4 Rear cardan shaft

CAUTION

The cardan shaft must be lubricated **every 50 operating hours** (8-28/arrow and 8-29/arrow).

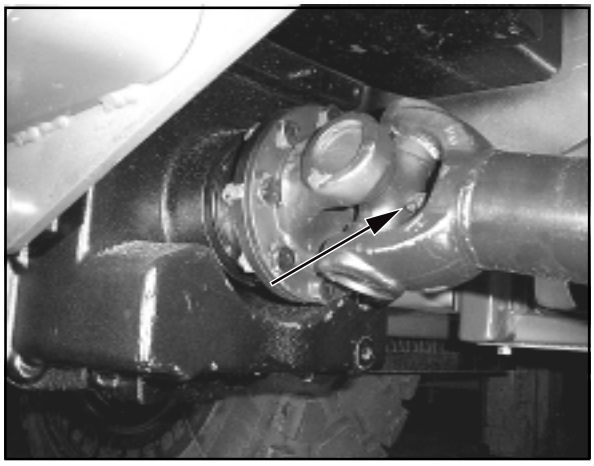


Figure 8-29

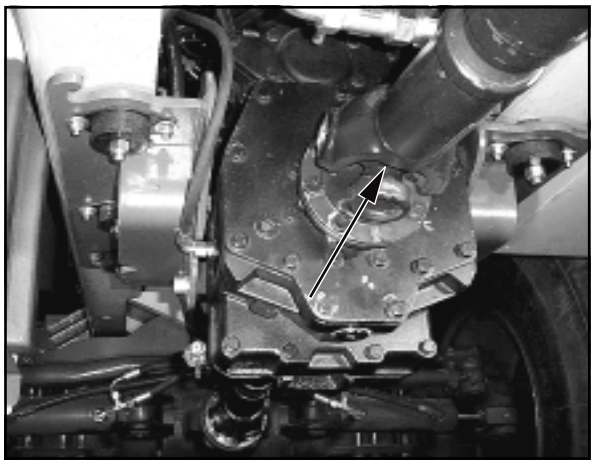


Figure 8-30

8.2.18.5 Front cardan shaft

CAUTION

The cardan shaft must be lubricated **every 50 operating hours** (8-30/arrow and 8-31/arrow).

Figure 8-31

8.2.18.6 Ball bearing ring

The grease filling is to avoid friction and to provide sealing and protection against corrosion. Therefore, the ring must be lubricated **every 10 operating hours** until grease becomes visible on the outside. When lubricating the ball bearing ring, swivel the bucket arm by 20° at a time. Then lubricate all four grease nipples (8-32/arrows) at each stage. It is absolutely necessary to lubricate the machine before and after a longer period of inactivity.

Figure 8-32

DANGER

- Before you start lubricating, mechanically support the bucket arm [e.g. by inserting the bucket arm support (optional) (1-1/arrows)], apply the parking brake (4-11/4) and set the drive direction switch (4-11/6) to the „0“ position.
- **During** swivelling, no-one may be present in the swivel area of the bucket arm.

8.2.18.7 Bucket assembly

CAUTION

The support bolts/lubrication points of the bucket assembly must be lubricated **every 10 operating hours**.

2x item 8-33/1 Tip lever / pivot arm
2x item 8-33/2 Pivot arm / reversing rod
2x item 8-33/3 Tip lever / quick-change device
2x item 8-33/4 Bucket assembly / quick-change device

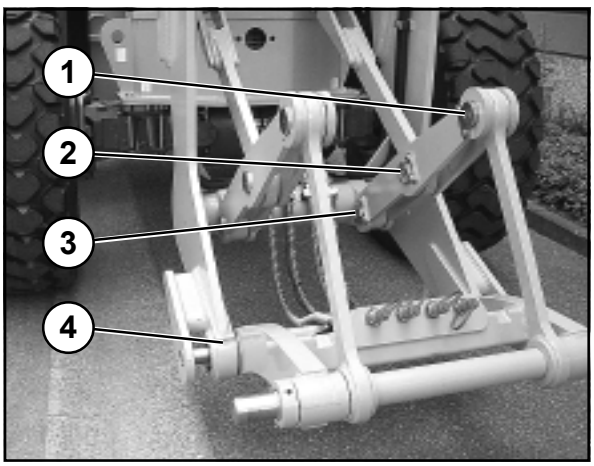


Figure 8-33

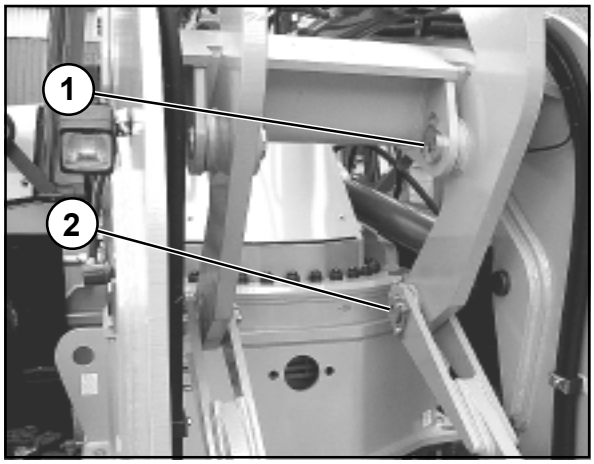


Figure 8-34

2x Item 8-34/1 Pivot arm / bucket assembly
2x Item 8-34/2 Reversing lever / reversing rod

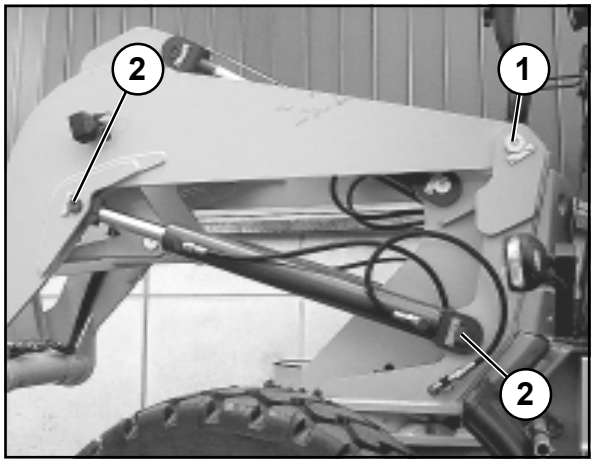


Figure 8-35

2x item 8-35/1 Bucket assembly / swivel unit
4x item 8-35/2 Lift cylinder

Figure 8-36

4x item 8-36/arrows Tip cylinder

8.2.18.8 Engine flaps

CAUTION

The hinges of the engine flaps (8-37/arrows) must be lubricated **every 50 operating hours**.

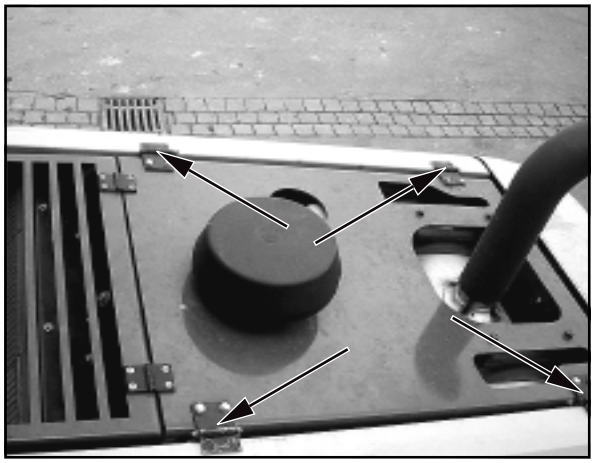


Figure 8-37

8.2.18.9 Multi-purpose bucket

CAUTION

The bearing bolts of the multi-purpose bucket must be lubricated **every 10 operating hours**.

NOTE

The bolt (8-38/arrow) must be lubricated on both sides of the multi-purpose bucket.

Figure 8-38

NOTE

The bolts (8-39/arrows) must be lubricated on both sides of the multi-purpose bucket.

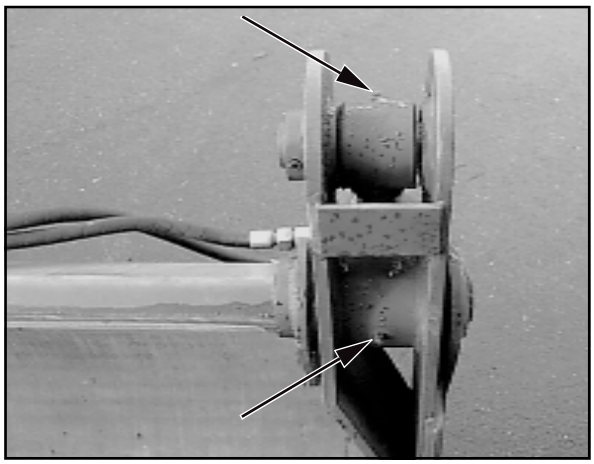


Figure 8-39