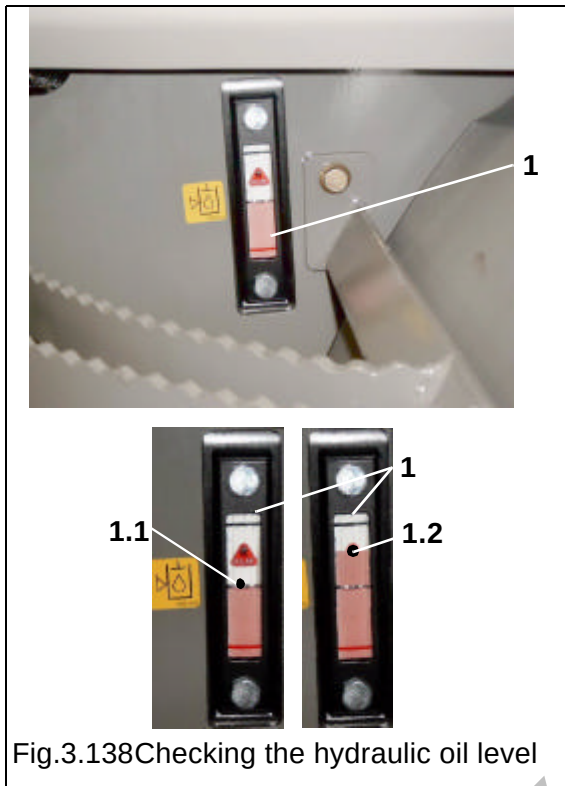


CHECKING THE HYDRAULIC CIRCUIT

3.12 Checking the Hydraulic Circuit

3.12.1 Checking the hydraulic oil

**Checking the hydraulic oil level**

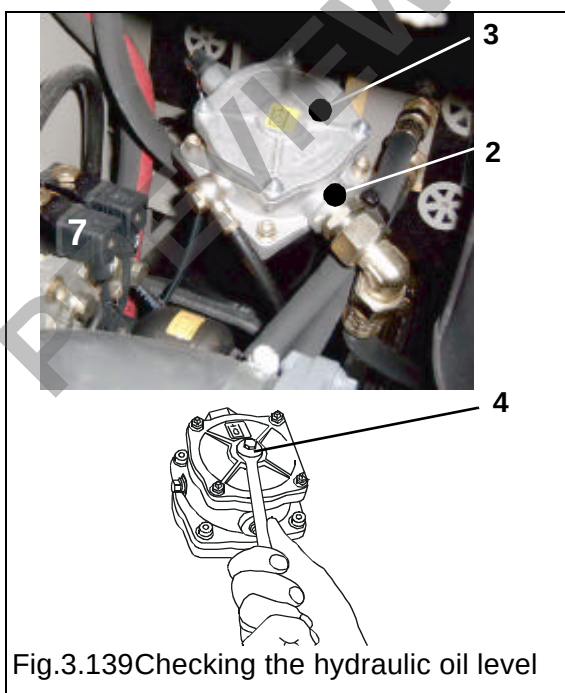
- Always check the level of hydraulic oil in the hydraulic oil tank before starting the hydraulic system up following repairs and before each venting process.
- The inspection glass (1) is located underneath the left-hand cab door behind the cab step.
- Check the hydraulic oil level in the inspection glass (1) when the hydraulic oil is cold.
- The oil level (1.1) should be in the middle of the inspection glass (1).
- In the case of insufficient oil, refill hydraulic oil through the filling filter (1.1).
- In the case of warm hydraulic oil (operating temperature), the oil level should not rise above the oil level depicted (1.2).

Filling hydraulic oil

- The hydraulic oil is filled through the hydraulic oil filter.
- The hydraulic oil filter is located in the engine compartment behind the solenoid valve control block 7.

⚠ WARNING**Machine damage!**

Only refill with the same hydraulic oil already contained in the hydraulic circuit.
Using different sorts of oil can cause machine damage.



- Loosen the bleed screw (4) on the cover (3) of the hydraulic oil filter.
- Open the cover (3) of the hydraulic oil filter (2) located behind the solenoid valve control block 7.
- Use a funnel with an extension to fill the oil in the filter.
- Only fill the quantity of hydraulic oil up to the necessary oil level (1.1).
- Close the filter cover again.
- Start the hydraulic system up and let it warm up with a load applied.
- Then check the hydraulic oil level in the inspection glass (1) again.

TIGHTENING TORQUES

0.9 Tightening Torques

0.9.1 Hose connections

TIGHTENING TORQUES M _A IN [Nm] FOR CONNECTIONS						
ROW	TUBE A. Ø	DN	THREAD	Test Pressure (1) [bar]	DKL (2)	DKOL (2)
L	6	5	M12x1.5	375	10-12	8-10
L	8	6	M14x1.5		12-15	10-13
L	10	8	M16x1.5		20-23	18-23
L	12	10	M18x1.5		30-35	27-32
L	15	13	M22x1.5		50-55	45-50
L	18	16	M26x1.5	240	75-85	70-80
L	22	20	M30x2.0		110-120	100-110
L	28	25	M36x2.0	150	160-180	150-160
L	35	32	M45x2.0		240-260	200-220
L	42	40	M52x2.0		320-350	300-320
					DKS (2)	DKOS (2)
S	8	5	M14x1.5	960	20-25	18-23
S	10	6	M16x1.5		30-35	27-32
S	12	8	M20x1.5		45-50	40-50
S	14	10	M22x1.5		60-70	50-60
S	16	13	M24x1.5	600	80-100	70-90
S	20	16	M30x2.0		130-150	120-140
S	25	20	M36x2.0		240-270	200-240
S	30	25	M42x2.0	375	360-400	320-360
S	38	32	M52x2.0		600-640	520-560
Counterpart: Screwed end DIN 3853 Bore form W DIN 3861 Row L+S				(1)Complies with EO nominal pressure + 50% (2)Union nuts complying with DIN 3870 Form A		

CHECKING THE ARTICULATED PENDULUM JOINT

1.4.3 Disconnecting the front carriage from the rear carriage

NOTE

The repair work described here may only be carried out in the workshop.

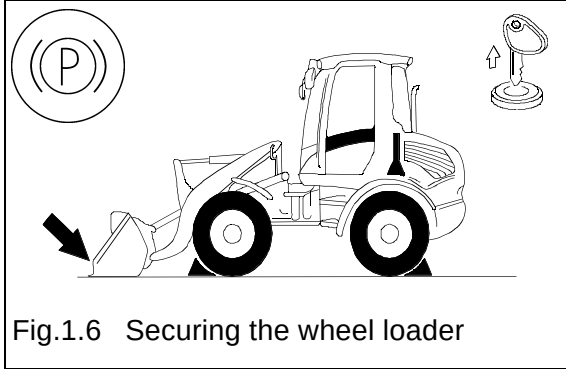


Fig.1.6 Securing the wheel loader

Securing the wheel loader

To disassemble the articulated pendulum joint, the front carriage must be separated from the rear carriage; secure the wheel loader to do this.

- Lower the attachment to its home position, refer to the operating manual.
- Stop the diesel engine and prevent it from being switched on again by removing the ignition key.
- Switch the parking brake on.
- Place wheel chocks under the wheels to secure them.
- Check the hydraulic circuit is depressurized; depressurize it, if necessary.

Disassembling the cardan shaft on the front axle**⚠ WARNING**

After disassembling the cardan shaft, the parking brake no longer affects the front axle.

Place sufficient wheel chocks under the tires to secure the front wheels.

Secure all four wheels of the wheel loader with wheel chocks.

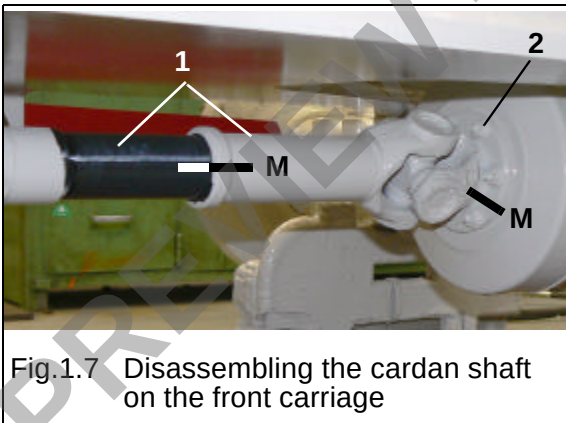


Fig.1.7 Disassembling the cardan shaft on the front carriage

- In order to be able to reassemble the cardan shaft (1) in the correct position **M** following repair, mark the cardan shaft flange position and junction point.
- Loosen the nuts (2) on the flange cardan shaft-front axle connection and screw off the nuts.
- Slide the cardan shaft (1) together sufficiently far until the front axle is free.
- To ensure the front section of the cardan shaft does not fall off, fix the cardan shaft (1) to the base frame.

2.3 Maintenance Work

2.3.1 Greasing the hoisting gear

Tools and aids

- Hand-operated grease gun with hose
- Cleaning cloths

Lubricant specifications

- Grease specification: NL-GI 2 DIN 51818, Order no. 0346905

Greasing

- Clean the lubricating nipples before greasing.
- Use a grease gun with an extension hose so that no problems occur accessing the greasing points.
- If no grease can be applied at the bearing points, check the grease lines and grease gun.

NOTE

Pay attention sufficient grease comes out at the bearing or bushing.

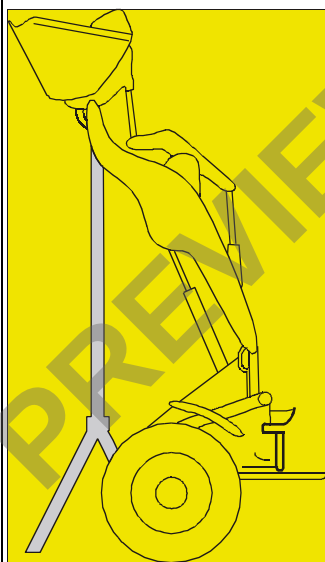
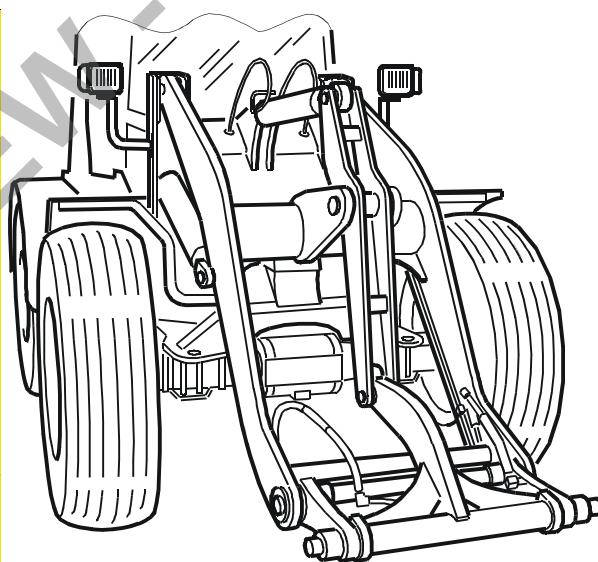
- After completing greasing, replace the protecting cap, use a new protecting cap if necessary.



DANGER

Risk of fatal injury!

If you have to work underneath the hoisting gear or the hoisting gear needs to be raised to complete the greasing work, always secure the hoisting gear with a hoisting gear support.



15 lubrication points, breakdown:

- 4x lifting cylinder
- 2x working cylinder
- 2x lifting arm
- 2x lifting arm
- 1x reversing lever
- 4x QDC

Fig.2.2 Greasing points, hoisting gear

Key to the hydraulic circuit diagram

1.1 Travel pump, variable displacement pump	4.3 Secondary valves, steering circuit
1.2 Charge pump	6.0 Hydraulic pump, loading and steering circuits
1.3 Charge pressure valve	6.1 Priority valve
1.4 Control valve, starting speed	6.2 Primary valve, loading circuit
1.5 Thermostatic valve	6.3 Feeder valves
1.6 Pressure relief valve, travel pressure	6.4 Secondary valve, loading circuit
1.7 Travel direction solenoid valves	6.5 Secondary valve with resuction
1.8 Spring assembly, variable displacement pump	6.6 Change-over valve, attachment
1.91 Secondary valve, high pressure	7.1 Brake cylinder
1.92 Secondary valve, high pressure	7.2 Brake fluid reservoir
2.0 Travel motor	7.3 Inching valve (brake inching valve)
2.1 Change-over valve	7.4 Solenoid valve, differential lock
2.2 Feeder valve	MA Gauge point, travel pressure forwards
2.3 Pressure regulator	MB Gauge point, travel pressure reverse
2.4 Regulating piston	G Gauge point, charge pressure
2.5 Solenoid valve, 1 / 2 gear	PS Gauge point, control pressure
2.6 Brake pressure cutoff	H Gauge point, loading/steering circuit
4.1 Steering unit	
4.2 Primary valve, steering circuit	

TIGHTENING TORQUES

0.9.2 Metric headless screws with standard threads

DIMENSIONSx P	TIGHTENING TORQUE M _A [Nm]				
	4.6	5.6	8.8	10.9	12.9
M 4 x 0.7	1,02	1,37	3,3	4,8	5,6
M 5 x 0.8	2.0	2.7	6.5	9.5	11.2
M 6 x 1.0	3.5	4.6	11.3	16.5	19.3
M 8 x 1.25	8.4	11	27.3	40.1	46.9
M 10 x 1.5	17	22	54	79	93
M 12 x 1.75	29	39	93	137	160
M 14 x 2.0	46	62	148	218	255
M 16 x 2.0	71	95	230	338	395
M 18 x 2.5	97	130	329	469	549
M 20 x 2.5	138	184	464	661	773
M 22 x 2.5	186	250	634	904	1057
M 24 x 3.0	235	315	798	1136	1329
M 27 x 3.0	350	470	1176	1674	1959
M 30 x 3.5	475	635	1597	2274	2662
M 33 x 3.5	645	865	2161	3078	3601
M 36 x 4.0	1080	1440	2778	5957	4631
M 39 x 4.0	1330	1780	3597	5123	5994

0.9.3 Metric headless screws with fine threads

DIMENSIONSx P	TIGHTENING TORQUE M _A [Nm]		
	8.8	10.9	12.9
M 8 x 1	29.2	42.8	50.1
M 9 x 1	42.6	62.6	73.3
M 10 x 1	60	88	103
M 10 x 1.25	57	83	98
M 12 x 1.25	101	149	174
M 12 x 1.5	97	143	167
M 14 x 1.5	159	234	274
M 16 x 1.5	244	359	420
M 18 x 1.5	368	523	613
M 18 x 2	348	496	581
M 20 x 1.5	511	728	852
M 22 x 1.5	692	985	1153
M 24 x 1.5	899	1280	1498
M 24 x 2	865	1232	1442
M 27 x 1.5	1304	1858	2174
M 27 x 2	1262	1797	2103
M 30 x 2	1756	2502	2927
M 33 x 2	1352	3350	3921
M 36 x 2	3082	4390	5137
M 39 x 2	3953	5631	6589

CHECKING THE ARTICULATED PENDULUM JOINT

1.4.4 Checking/Disassembling the pendulum joint and replacing components



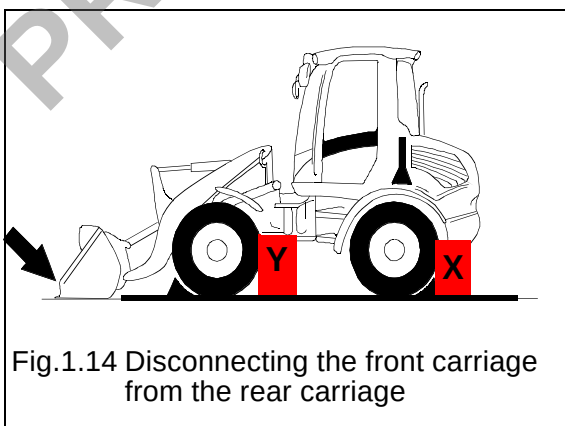
To separate the front carriage at the pendulum joint or to repair the pendulum bearing, disassemble the pendulum bearing and pull the front carriage away.

Disassembling the pendulum bearing

- Loosen (do not remove) the hexagon socket screws (4) in the bearing retaining disk (1).
- Unscrew the hexagon head screws (2) from the retaining disk (3) of the bearing journal (5).
- Remove the retaining disk (3).
- Insert a hydraulic press between the articulated pendulum joint K and rear carriage H.
- Remove the wheel chocks from the front wheels.
- Raise the hoisting gear a little and position the transport rollers underneath it.
- Use one or two hydraulic presses to force the front carriage V from the rear carriage H until the bearing journal (5) of the articulated pendulum joint K is pressed out of the rear carriage H.

Disconnecting the front carriage from the rear carriage

- Ensure the crane or hoisting system has a sufficient lifting capacity.
- Support the front and rear carriages before separating them.
- Prop the rear carriage and place jacks or blocks under the rear carriage's counterweight X.
- If necessary, prop the front carriage underneath the front carriage mounting Y.

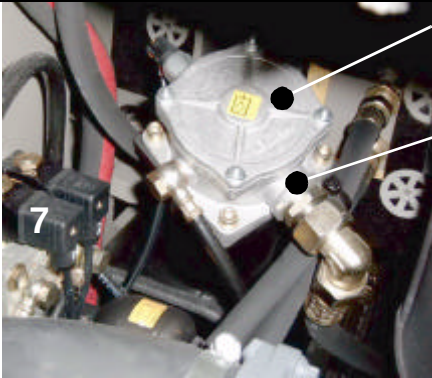
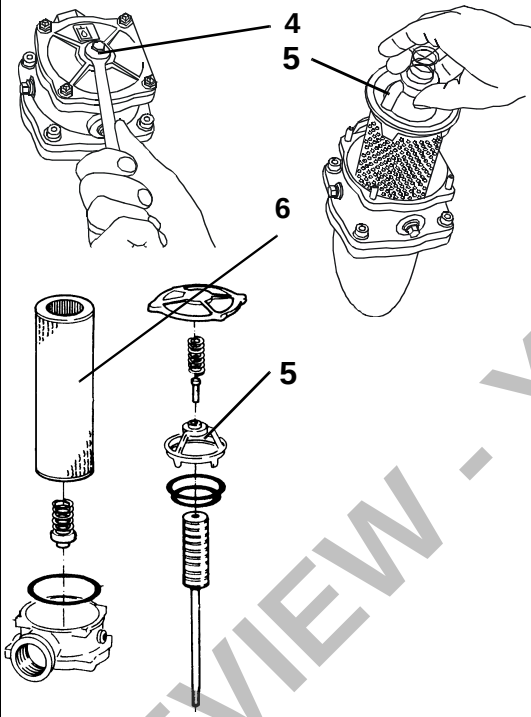


CHECKING THE HYDRAULIC CIRCUIT

Checking and replacing the hydraulic oil filter

HINWEIS

In the case of an oil change, hydraulic oil change or heavy contamination of the hydraulic oil, always replace the oil filter as a complete unit.



- Loosen the bleed screw (4) on the cover (3) of the hydraulic oil filter.
- Open the cover (3) of the hydraulic oil filter (2) located behind the solenoid valve control block 7.
- Place sufficient cleaning cloths in the area of the hydraulic oil filter.
- Pull out the filter insert via the filter holder (5).
- Separate the filter holder (5) from the filter insert (6) and replace a new filter insert.
- Dispose of the filter insert (6) according to the applicable laws.
- In the EU, the applicable disposal code no. is Filter: 15029901.
- Assemble the two components and insert the filter holder (5) with new filter insert (6) in the hydraulic oil filter (2).
- Open the filter cap (3) again.
- Tighten the bleed screw (4).
- Check the hydraulic oil level again, refer to Chapter Kapitel Checking the hydraulic oil level.

Replacing the filter cartridge on the pump set

The filter cartridge, installed on the side of the pump set, must also be replaced during the course of an oil change or filter change.

- Release the filter cartridge (9) with the clamping strap and unscrew by hand
- Clear up any escaping oil immediately with cleaning cloths.
- Dispose of the filter cartridge (9) according to the applicable laws.
- In the EU, the applicable disposal code no. is Filter: 15029901.
- Clean the sealing surface on the filter bracket.
- Lightly oil the rubber ring in the new cartridge.
- Screw the cartridge on by hand until the sealing surface is evenly applied.
- Complete one more turn by hand to tighten the filter cartridge (9) securely.
- Check the cartridge for signs of leaks while the hydraulic system is in operation.

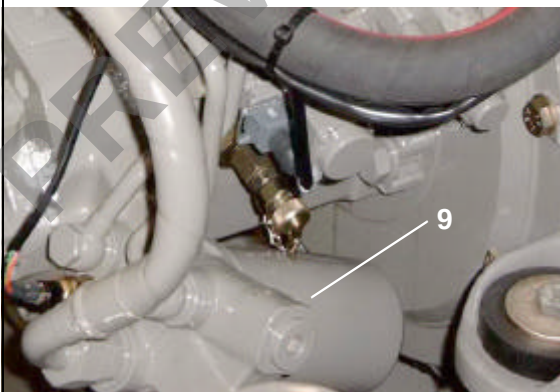


Fig.3.140 Replacing the hydraulic filter and filter cartridge

TIGHTENING TORQUES

0.9.4 RIPP screws with cheese head and hexagon socket

TERMINOLOGY		M5	M6	M8	M10	M12
Across flat dimension	S	4	5	6	8	10
Torque Figures M_A / Nm	Fkl.	on connecting material steel $R_m < 800 / \geq 800 \text{ N/mm}^2$				
	90/80 RG	-	-	-	-	-
	100/10 RG	13/11	24/20	45/42	90/85	150/140
	100/10 FG	-	-	-	-	-
	12.9/12 RG	15/13	28/24	52/50	115/105	180/160
	12.9/12 FG	-	-	-	-	-
RG = Standard thread FG = Fine thread	Fkl.	on connecting material gray cast iron				
	90/80 RG	-	-	-	-	-
	100/10 RG	10	19	39	80	120
	100/10 FG	-	-	-	-	-
	12.9/12 RG	12	22	48	95	140
	12.9/12 FG	-	-	-	-	-

0.9.5 RIPP screws and nuts with cheese head and hexagon head

TERMINOLOGY		M5	M6	M8	M10	M12	M14	M16
Across flat dimension	S	8	10	13	15	17	19	22
Torque Figures M_A / Nm	Fkl.	on connecting material R_m steel $< 800 / > 800 \text{ N/mm}^2$						
	90/80 RG	-	-	-	-	-	-	-
	100/10 RG	11/10	19/18	42/37	85/80	130/120	230/215	330/310
	100/10 FG	-	-	45/40	95/90	145/138	250/240	370/350
	12.9/12 RG	13/12	22/20	50/45	100/90	165/155	275/255	410/390
	12.9/12 FG	-	-	55/50	110/105	175/165	300/290	440/420
RG = Standard thread FG = Fine thread	Fkl.	on connecting material gray cast iron						
	90/80 RG	-	-	-	-	-	-	-
	100/10 RG	9	16	35	75	115	200	300
	100/10 FG	-	-	38	85	130	230	335
	12.9/12 RG	11	18	43	85	150	240	380
	12.9/12 FG	-	-	48	100	160	275	400

REPAIRING THE HOISTING GEAR AND HOISTING GEAR HYDRAULICS

2.4.3 Disassembling the hoisting gear

Disassembling the hoisting gear with hydraulic cylinders installed

- Place a raising harness (G1) around each of the lifting arms (LS1, LS2).
- Attach the raising harnesses to a crane and support the hoisting gear (LS).
- Before releasing the lifting cylinder **6.10**, secure it to the hoisting gear with a sling (G2).
- Unscrew all the locking screws (1.1) from the points marked by a circle in the illustration.
- Start pressing out the bearing bolts in the upper lifting cylinder **6.10**.
- Secure the lifting cylinder below the hoisting gear using the raising harness.
- Press out the bearing bolts in the working cylinder **6.11** on the reversing lever (UH).
- Lay the working cylinder on a flexible base on the hoisting gear.
- Raise the hoisting gear slightly with the crane.
- Press the bearing bolts out of the hoisting gear bearings of the front carriage.
- Before raising the hoisting gear, check that all the hydraulic connections, holders and cables have been disconnected.
- Raise the hoisting gear slowly and carefully with the crane.
- Set the hoisting gear down on a flat surface in the workshop.

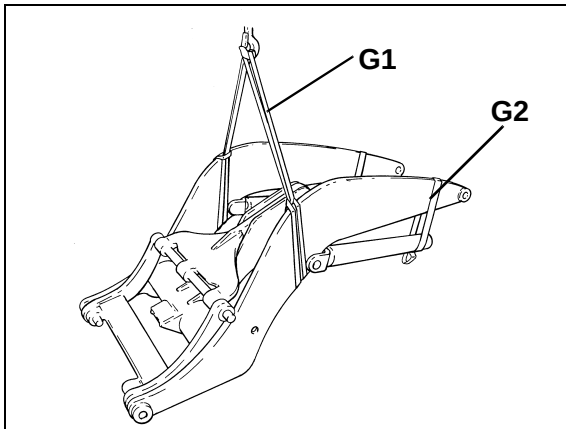
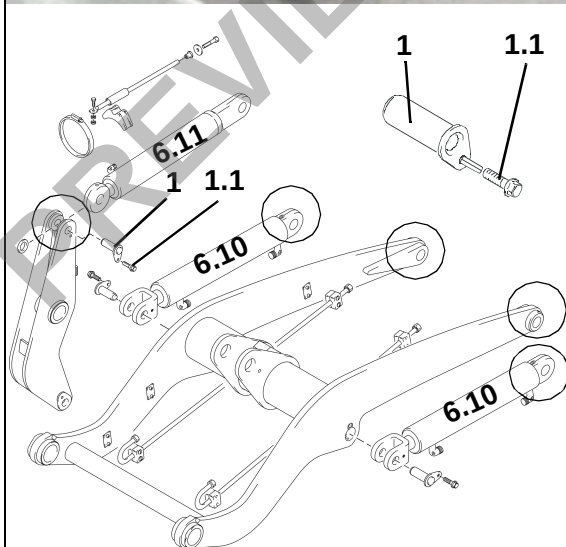


Fig.2.5 Removing the hoisting gear bolts

MAINTENANCE PROCEDURES ON THE DIESEL ENGINE

5.4 Maintenance Procedures on the Diesel Engine

5.4.1 Maintenance table

The maintenance procedures described here comply with the specifications of the engine manufacturer.

The maintenance work described here may only be carried out in the workshop.

Secure the vehicle before starting any work:

- Disassemble any attachments, refer to operating manual.
- Drive the wheel loader over an inspection pit, if necessary.
- Actuate the parking brake.
- Switch off the diesel engine and secure against being started up again (remove the ignition key).
- Secure all four wheels with wheel chocks.
- Open the engine hood, allow the diesel engine and surrounding components to cool down.
- The temperature of the engine oil must have cooled below 80 °C.



GEFAHR

Ensure there are no naked flames in the vicinity when working on the engine or fuel system! Do not smoke!

MAINTENANCE PROCEDURES										
In operating hours (max. permissible times)										
Once after initial start. 50-150	Every 10 op. h. or daily	125	250	500	1000	3000	Check	Clean		Replace
								Replace		
								Activity		
										Check the engine oil level
										Check the engine is sealed; leaks
										Air filter
										Battery and cable connections
										Check engine cooling circuit, clean if
										Check engine oil, check according to interval
										Oil filter cartridge
										Fuel filter cartridge
										Check valve play, adjust if necessary
										Check engine mount, retighten if necessary
										Check fan belt, retension, change if
										Check timing belt, change after 2500 h
										Injection valves
										Clean fuel feed pump, sieve filter
										Fuel return line

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SAFETY REGULATIONS IN THE SERVICE MANUAL

0.5 Safety Regulations in the Service Manual

The Service Manual contains attention and warning symbols indicating risks.

These attention and warning symbols are intended to make you aware of situations which could lead to personal injury and property damage.

 DANGER	Sources of danger which could lead to fatal or severe personal injury.
 CAUTION	Activities or lack of concentration during work which could lead to fatal or severe personal injury.
 WARNING	Activities or lack of concentration during work which could lead to personal injury or property damage.
NOTE	Indication of special technical features to be observed during disassembly or assembly of components to prevent machine damage.

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REPAIRING THE HYDRAULIC COMPONENTS

Disassembling the inching valve

- Stop the diesel engine and prevent it from being switched on again by removing the ignition key.
- Apply the hand brake.
- The inching valve **7.3** is located underneath the operator's cab and is linked with the inching pedal **7.1** via connecting rods.
- Lift up the rubber mat in the operator's cab.
- Unhook the restoring ring (2) and disassemble the connecting rod (1).
- Unscrew the screws (4) from the inching pedal **7.1** and remove the inching pedal.
- Place sufficient cleaning cloths in the area of the inching valve **7.3**.
- Disconnect the cable connected from the stop switch (5).
- Mark the hydraulic and brake fluid connections.
- Unscrew the banjo bolts from the brake fluid connection **BR**.
- Collect the brake fluid in a separate container.
- Unscrew the banjo bolts from the hydraulic oil connections **X1** and **T**.
- Pay attention to any escaping hydraulic oil and clear it up immediately with cleaning cloths.
- Loosen the fastening screws in the inching valve **7.3** and remove the valve

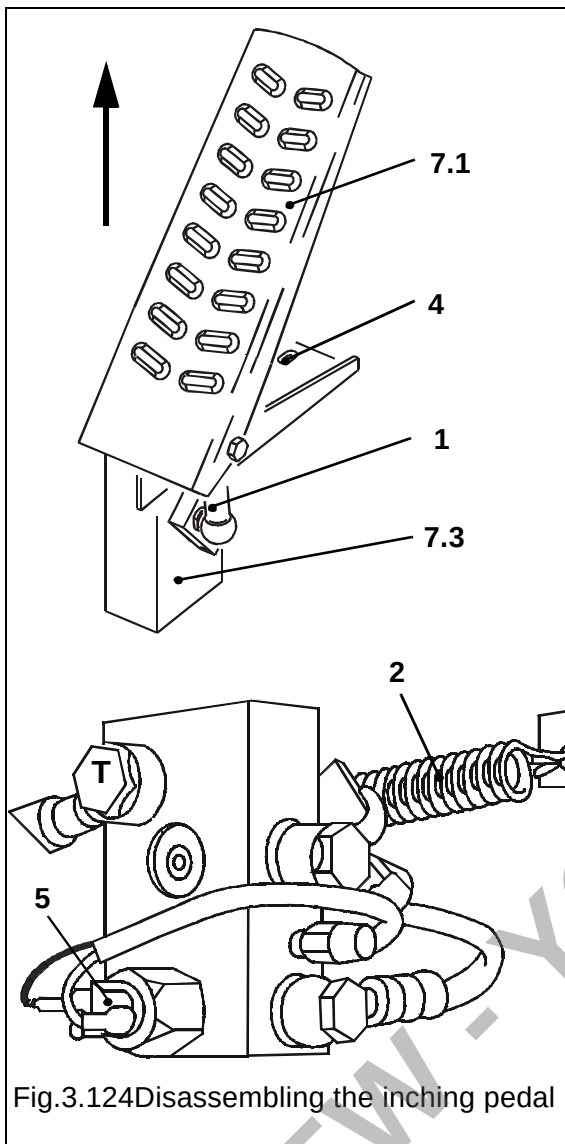


Fig.3.124 Disassembling the inching pedal

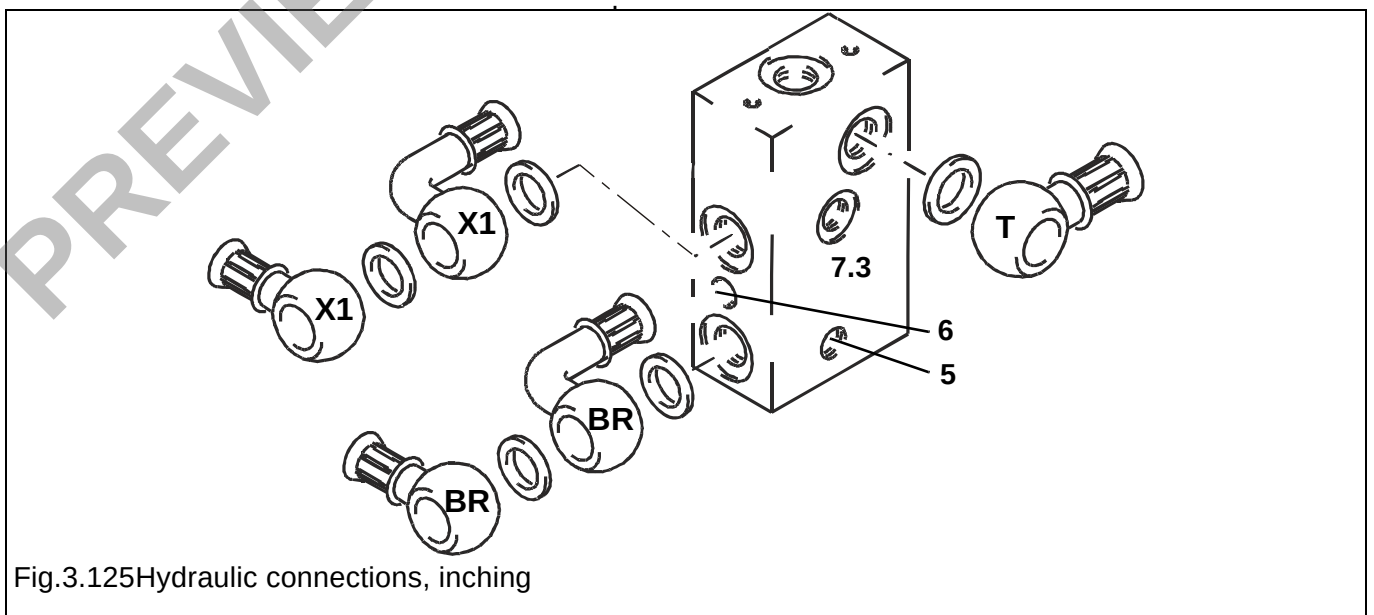


Fig.3.125 Hydraulic connections, inching

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