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TAKEUCHI®

Service manual

WHEEL LOADER SERIES TW80



ISSUE:08-09-07

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I. Preface

This machine has been manufactured in accordance with today's technical standards and all known safety regulations.

However, using it may still pose a danger.

To prevent such dangers and to avoid putting people at risk and damaging the machine, the user must know how the machine works and how it is operated.

It is therefore important to strictly adhere to the

Safety regulations

and

Instructions

for operating the machine.

As the components of the machine are undergoing continuous development, we reserve the right to make changes.

Please do not hesitate to contact us with any queries that you may have:

Order No. 8015739

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0 INTRODUCTION

Qualification of personnel

This manual has been written for service personnel trained by TAKEUCHI to complete maintenance and repair work on their wheel loaders.

Product

This manual documents a TAKEUCHI production series product with construction status complying with the date of issue.

Service

The maintenance and repair measures for machines may require different working procedures or setting and test data from that described here as a result of further technical developments to the product.

Therefore, we recommend you have your TAKEUCHI wheel loader inspected by service personnel whose practical and theoretic training is constantly brought up-to-date by our customer service personnel.

Repair work carried out by TAKEUCHI service stations is also covered by the warranty within the scope of the current contractual conditions.

Damage caused as a result of work being completed improperly and unprofessionally by personnel not authorized by the manufacturer, and any consequential costs, are excluded from any contractual liability.

This also applies to the failure to use original spare parts from TAKEUCHI.

– TAKEUCHI Service –

USER INFORMATION ON THE SERVICE MANUAL

0.1 User Information on the Service Manual

NOTE

This Service Manual is intended for service personnel trained by us.
All the work described here may only be performed by this group of personnel.

To all manual users

The use of this Service Manual should help you to localize sources of faults quicker and easier, and to eliminate them by performing the repair work described.

If your equipment becomes defect, localize the fault according to the procedures described here.

Years of experience gained by our service technicians in the repair of wheel loaders represent the basis of the contents of this Service Manual.

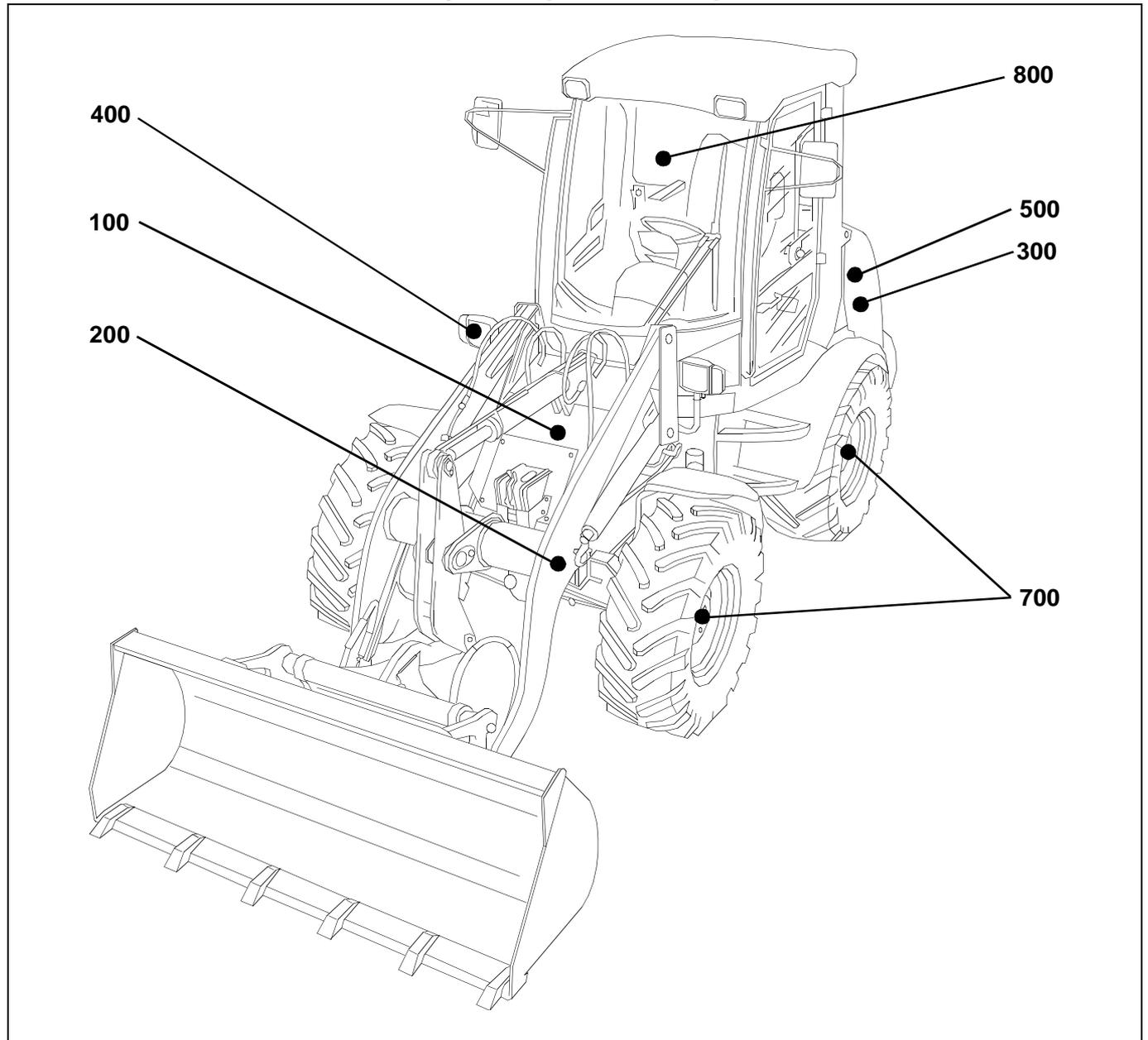
Using the manual

The manual provides a basis for:

- A quick reference of possible faults and how to clear them.
- Clear descriptions of all the adjustment and setting values.
- Chronological descriptions of the various repair work, disassembly and assembly of components.
- Overview of the tools necessary.
- Simple, unambiguous identification of spare parts.
- Quick access to overviews and circuit diagrams concerning the hydraulic and electric systems.
- Basic information on the hydraulic system, electrical installations and vehicle construction.
- Details on consumables and emissions.
- Vehicle and technical data.

BREAKDOWN OF ASSEMBLY GROUPS AND CHAPTER OVERVIEW

0.2 Breakdown of Assembly Groups and Chapter Overview



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MAIN GROUPS	DESCRIPTION	PAGE
100	Front and Rear Carriage	23
200	Hoisting Gear	47
300	Hydraulic System	59
400	Electrical System	181
500	Diesel Engine	215
600	not applicable for wheel loader models with standard electric	-
700	Axles and Brakes	249
800	Operator's Cab	283

TECHNICAL DESCRIPTION OF THE WHEEL LOADER**0.3 Technical Description of the Wheel Loader****Definition of a wheel loader**

A wheel loader is a construction site machine for transporting loads close to the ground, predominantly bulk material.

A working cycle is comprised of filling, raising, transporting and depositing the material.

Deployment options

The possibility of changing attachments quickly and easily by means of a hydraulic Quick Disconnect Coupler (QDC) means that a wheel loader, which has just been used to transport bulk material, can be converted to a transport vehicle for pallets loaded with bricks or other materials.

Constructional design

The connection of the front carriage and rear carriage by means of an articulated pendulum joint ensures the wheel loader can be well maneuvered and steered on off-road terrain.

- The angular movement is $\pm 12^\circ$.
- The full lock of the steering wheel per side (jack-knifing) is 40° .

The hoisting gear for the loading movement is fitted on the front carriage.

The shovel size and the maximum load depend on the attachment selected.

The rear carriage contains the components for the drive, diesel engine, hydraulic system, electrical installations and operator's cab.

The front carriage consists of the front axle, hoisting gear and loading circuit.

Hydraulic system

The diesel engine installed in the rear carriage drives a combined pump set directly.

This pump set supplies all the hydraulic circuits with the necessary quantity of hydraulic oil. All driving and loading movements of the wheel loader are generated and controlled hydraulically. The wheel loader is equipped with a central, hydrostatic drive which acts on all four wheels.

Operator's workplace

The operator is provided with a generous sized operator's cab equipped with large windows and well-arranged operator controls.

The operator's cab is made of a welded steel frame construction and is a roll-over protected structure (ROPS) in compliance with DIN/ISO 3471.

The operator receives vehicle information via an operating and display console on the steering column.

SAFETY REGULATIONS FOR WORK ON THE WHEEL LOADER

Heating and ventilation

The interior of the cab is provided with a multistage ventilation device which draws in fresh air, filtered, from outside.

The air for the interior of the cab can be heated by continuously variable thermoregulators. Heat is supplied by means of heated engine oil from the diesel engine.

Operator's seat and joystick

An adjustable, sprung, operator's seat, complying to safety requirements, protects the operator from vehicle jolting.

The joystick (control lever) is located in the adjustable armrest to the right of the operator's seat. The joystick is used to control the movements induced by the loading circuit.

Switches in the joystick switch the drive functions such as forwards/reverse, cross-country reduction gear and differential lock.

A further control lever beside the joystick controls the functions of the Quick Disconnect Coupler (QDC) or 3rd section.

0.4 Safety Regulations for Work on the Wheel Loader

NOTE	All the safety precautions and operating instructions necessary to operate the wheel loader are provided in the relevant wheel loader operating manual.
⚠ WARNING	The safety and warning information provided in this Service Manual must be observed prior to starting the repair work and during its completion.
NOTE	It is essential to observe any overriding laws and directives applicable in your country concerning the deployment and use of construction site machines. Familiarize yourself with them and their content and check that they are observed.
NOTE	Apply warning and danger signs to the wheel loader on which repairs are to be carried out. Take applicable measures to ensure that the wheel loader cannot be started up.

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SAFETY REGULATIONS IN THE SERVICE MANUAL

0.5 Safety Regulations in the Service Manual

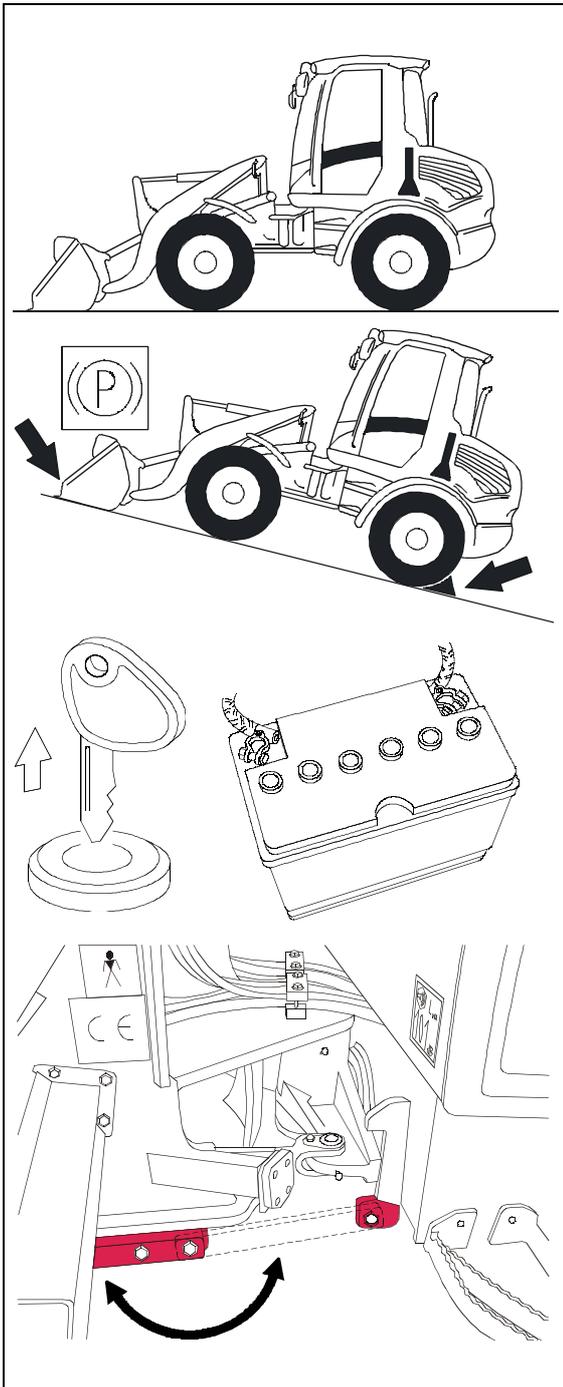
The Service Manual contains attention and warning symbols indicating risks.

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.

SECURING THE WHEEL LOADER PRIOR TO BEGINNING WORK

0.6 Securing the Wheel Loader Prior to Beginning Work



Securing measures

- Lower the attachment to its home position.
- Stop the diesel engine and prevent it from being switched on again by removing the ignition key.
- Apply the hand brake.
- Place wheel chocks under the wheels to secure them.
- Check the hydraulic circuit is depressurized.
- Put the electrical system out of service by disconnecting the minus or plus pole of the battery.
- When working on the front carriage, front axle, brake system or steering, always install the articulation lock.

Tools and aids

Always work using the tools and aids described in the repair instructions.

⚠ WARNING

Makeshift solutions and tools often lead to injuries to personnel and damage to the equipment.

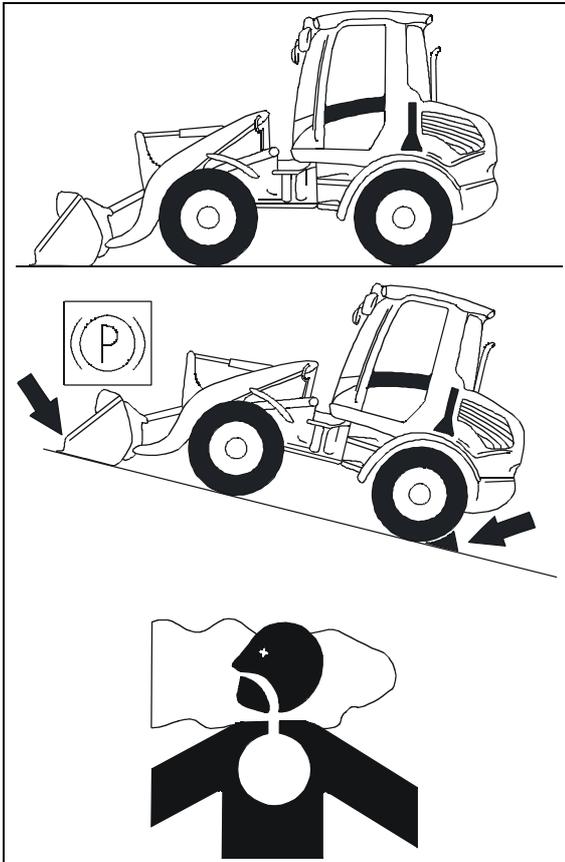
NOTE

In the descriptions of the adjustment and repair work, pay attention to the measuring instruments and test devices prescribed and to any information on the use of special tools.

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SITE WHERE REPAIR WORK IS COMPLETED

0.7 Site Where Repair Work is Completed



Working on construction sites

If repair work must be completed at the construction site, find a safe working base:

- Pay attention the wheel loader is parked on solid ground.
- Apply the hand brake.
- Place wheel chocks under the wheels to secure them.
- Protect the working area from moisture and dirt.

Working in workshops:

If the wheel loader can be repaired in a workshop, clean the wheel loader before starting the work.

⚠ DANGER

Risk of toxication!

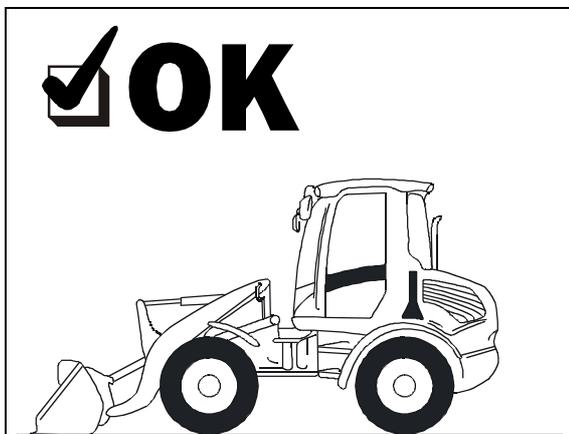
Ensure sufficient ventilation if the diesel engine is run inside closed rooms.

- Ensure sufficient ventilation of the hall if the diesel engine is run for longer periods.
- If the diesel engine is run for longer periods in the hall, a gas extractor must be installed.
- If the wheel loader is driven over an inspection pit, pay attention the wheels are a safe distance from the edges of the pit.

After completing the repair work

Restore the wheel loader to a safe operating condition.

- After starting up the wheel loader, check for leaks in the hydraulic system.
- Test the functions of the wheel loader.



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0.8 International Measuring Units

EUROPE	USA
25,40 mm	1 in (inch)
1 kg (Kilogramm)	2,205 lb (pounds)
9,81 Nm (1 kpm)	7,233 lbf x ft (pound force foot)
1,356 Nm (0,138 kpm)	1 lbf x ft (pound force foot)
1 kg / cm	5,560 lb / in (pound per inch)
1 bar (1,02 kp/cm ²)	14,233 psi (pound force per square inch lbf/in ²)
0,070 bar (0,071 kp/cm ²)	1 psi (lbf/in ²)
1 Liter	0,264 Gallon (Imp.)
4,456 Liter	1 Gallon (Imp.)
1 Liter	0,220 Gallon (US)
3,785 Liter	1 Gallon (US)
1609,344 m	1 Mile (land mile)
0°C (Celsius)	32°F (Fahrenheit)
0°C (Celsius)	273,15 Kelvin

0.9 Tightening Torques

0.9.1 Hose connections

TIGHTENING TORQUES M_A IN [Nm] FOR CONNECTIONS						
ROW	TUBE A. \varnothing	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		

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

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 $R_m < 800 / \geq 800$ 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

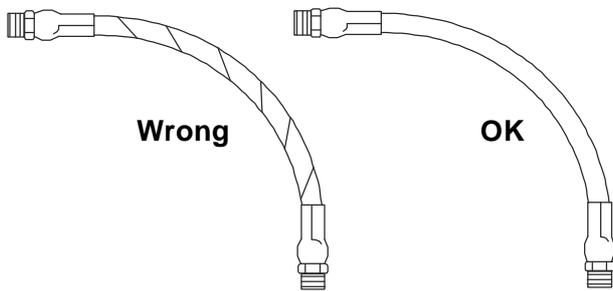
TERMINOLOGY		M5	M6	M8	M10	M12	M14	M16
Across flat dimension	S	8	10	13	15	17	19	22
Torque Figures M_A / Nm	Fkl.	on connecting material R_m steel $< 800 / > 800$ N/mm ²						
	90/80 RG	-	-	-	-	-	-	-
	100/10 RG	11/10	19/18	42/37	85/80	130/120	230/215	330/310
	100/10 FG	-	-	45/40	95/90	145/138	250/240	370/350
	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

0.9.6 Self-locking screws and nuts with hexagon head

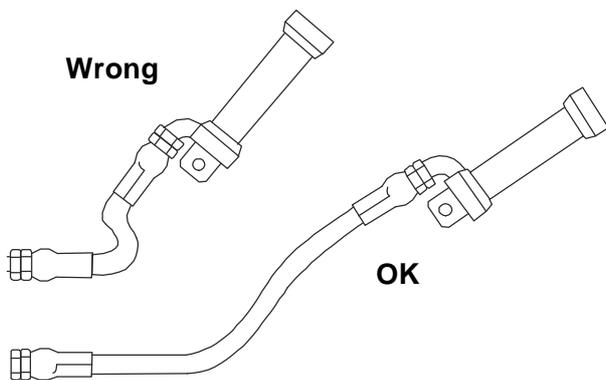
TERMINOLOGY		M5	M6	M8	M10	M12	M14	M16
Across flat dimension	S	8	10	13	15	17	19	22
Torque Figures M_A / Nm	Fkl.	on connecting material steel						
	90/80 RG	9	16	34	58	97	155	215
	100/10 RG	12	21	44	75	120	185	280
	100/10 FG	-	-	-	-	-	-	-
	12.9/12 RG	14	25	52	90	145	220	340
	12.9/12 FG	-	-	-	-	-	-	-
RG = Standard thread FG = Fine Thread	Fkl.	on connecting material gray cast iron						
	90/80 RG	7	13	28	49	83	130	195
	100/10 RG	9.5	16	36	64	105	170	260
	100/10 FG	-	-	-	-	-	-	-
	12.9/12 RG	11	19	43	72	125	200	320
	12.9/12 FG	-	-	-	-	-	-	-

POSITIONING OF HYDRAULIC HOSE

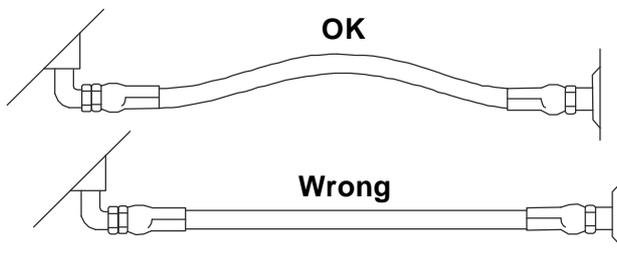
0.10 Positioning of Hydraulic Hose



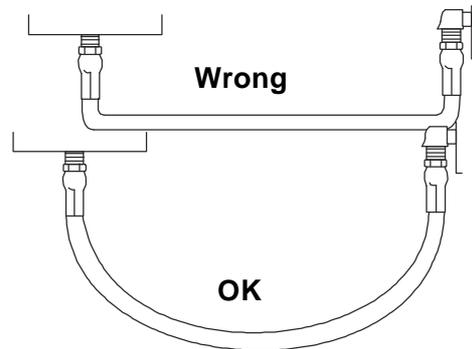
Torsion of hoses is to be avoided because the restoring torque under load may lead to detachment of the connection or cause a defect on the hose line.



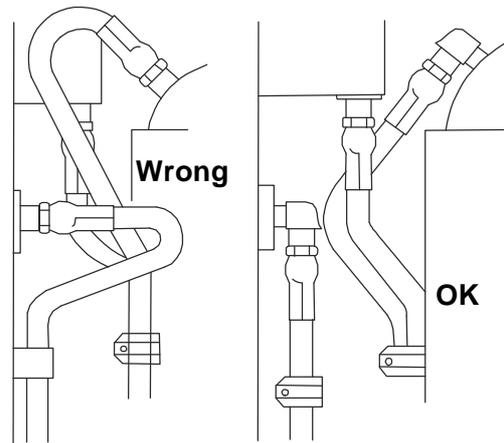
The installation of hose lines on moving parts is to be planned very carefully. Bending radius, torsional strain and a sufficient hose length are to be determined in such a way that none of them falls below the specified values.



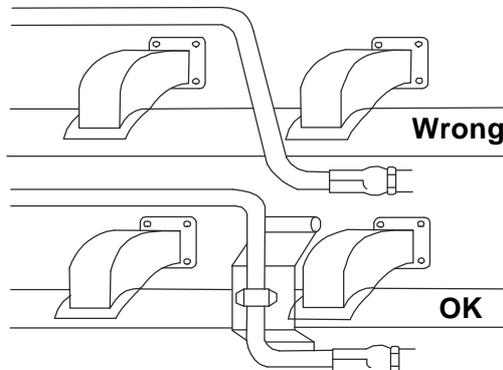
When fitting hose lines, a tensile load caused by the change of length of the hose is to be avoided in all operating conditions, this does not apply to the hose's own weight.



Run hoses in elbows of sufficient diameters in order to prevent kinks or a tear-out under pressure. Narrow elbows flatten the hose and thus obstruct the free flow. In addition, the life expectancy of the hose is shortened considerably.



The hose length can be kept shorter when using elbow fittings, adapters and hose clamps, which has the additional advantage of a clear arrangement and better appearance. Special attention has to be paid of course to the bending and change of length of the hose.



In case of high ambient temperatures hose lines must be installed in such a way that a safe distance is kept to hot components. Use a heat protection or a fire protecting hose.

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1 FRONT AND REAR CARRIAGE

1.1 General Data

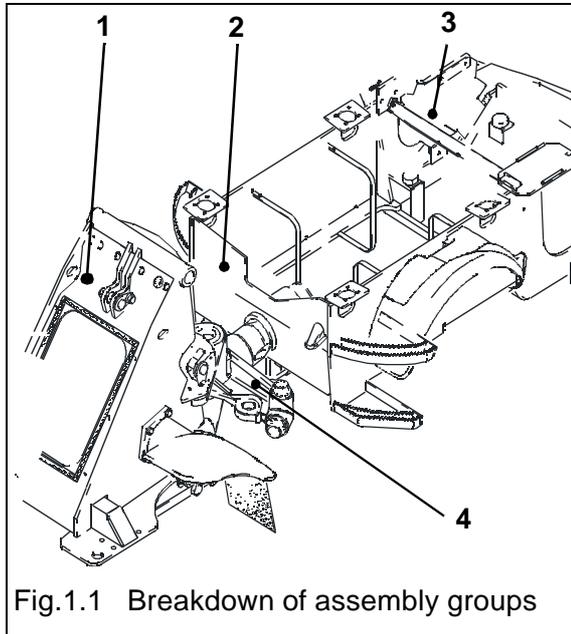


Fig.1.1 Breakdown of assembly groups

Breakdown of assembly groups

The vehicle (chassis) assembly is comprised of:

- 1 Front carriage
- 2 Rear carriage
- 3 Counterweight
- 4 Articulated pendulum joint

These four components form the wheel loader chassis.

1.2 Front Carriage

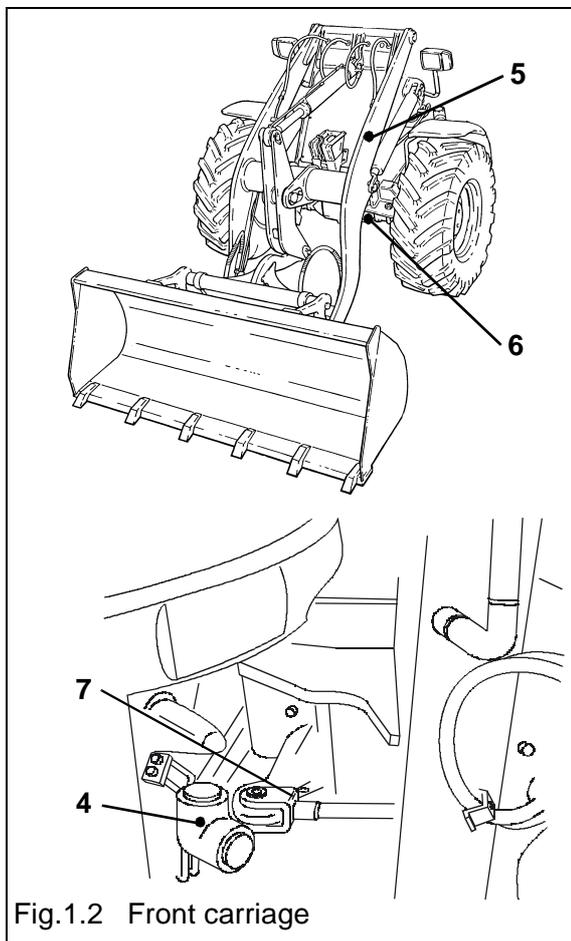


Fig.1.2 Front carriage

Design

The front carriage (1) is made of a steel construction.

The front carriage forms the base for the hoisting gear (5) with hydraulic cylinders.

The front axle (6) is located below the front carriage.

The articulated pendulum joint (4) connects the front and rear carriages.

The articulation of the front carriage produces the corner steering of the wheel loader.

Articulation is produced by the steering cylinder (7) extending and retracting.

1.3 Repairing the Front Carriage

Check the screw fittings between the front axle and front carriage within the scope of a vehicle inspection or visit to the workshop.

NOTE

Tighten the screw connections according to the prescribed torque.
Refer to the Tightening Torques table for the required torques.

1.4 Checking the Articulated Pendulum Joint

Design

The articulated pendulum joint (4) is comprised of two individual joint components:

- articulated joint,
- pendulum joint.

The articulated joint enables the front carriage to be turned 40° to each side.

The pendulum joint enables an angular movement of $\pm 12^\circ$ between the front and rear carriage.

Maintenance work

The articulated pendulum joint must be greased at regular intervals.

- Check the greasing condition of the articulated pendulum joint.
- Use a grease gun to grease the six greasing points (4.1) of the articulated pendulum joint daily.
- At the same time, check the greasing condition of the steering cylinder.
- Grease the greasing points (7.3) of the steering cylinder once a month.

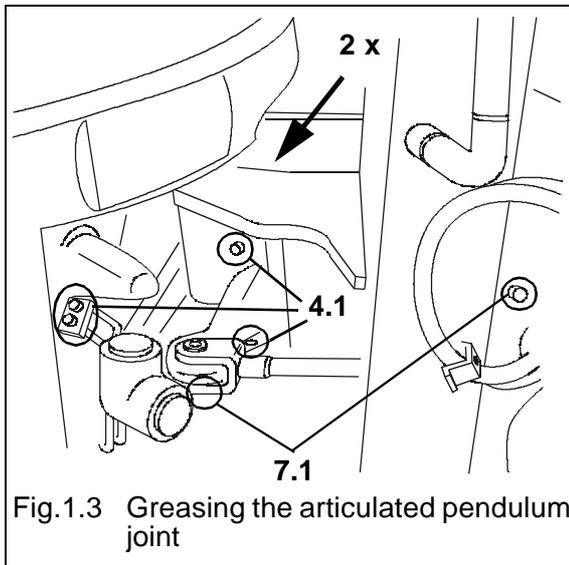


Fig.1.3 Greasing the articulated pendulum joint

1.4.1 Faults in the articulated pendulum joint

Faults

- If noises occur in the articulated joint when turning the steering wheel, check the wheel loader's articulated joint.
- If noises occur during angular movements of the wheel loader or the angular movements are jerky, check the pendulum bearing.
- Complete the cleaning and greasing measures on each of the bearings.
- If these measure do not eliminate the noises, the respective bearing is defect and must be replaced, if necessary, refer to chapter Checking/Disassembling the articulated joint and replacing components.

CHECKING THE ARTICULATED PENDULUM JOINT

1.4.2 Checking the assembly dimensions

The compensating disks in the articulated joint could be worn as a result of wear or deficient greasing.

If this happens, or the articulated joint causes noises when turning the steering wheel, check the assembly dimension.

NOTE

Before checking and restoring the assembly dimensions of the articulated joint, park the wheel loader on a level surface and secure it.

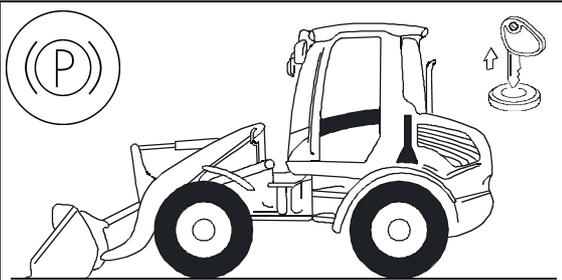


Fig.1.4 Securing the wheel loader

Checking the assembly dimension, left

Determine dimension **X** = #### between the top and bottom bore holes **B** in the front carriage.

- To determine the dimensions, articulate (steer) the front carriage fully to the right when on a level surface.
- Then secure the wheel loader.
- Clean the section around the articulated joint.
- First, determine dimension **X1** from the top edge of the top bore hole **B** to the bottom edge of the bottom bore hole **B** in the front carriage using applicable sliding calipers.
- Measure the material thickness **X2** of the top and bottom bore hole **B** in the front carriage mounting.
- From the previously measured total dimension **X1**, subtract the material thickness of the **two** bolt holes **X2**.
- Note down dimension **X** calculated in this way.

Checking the assembly dimension, right

Carry out the same measurement on the opposite side of the articulated joint.

- To do this, start the wheel loader and articulate it fully to the left.
- Then secure the wheel loader again.
- Carry out the measurement as described previously and determine dimension **X** for this side.

Determining assembly dimension deviation

Use the dimensions to determine the deviations, refer to example calculation:

- 1. Left dimension $X = 287.7 \text{ minus } 287 = 0.7 \text{ mm}$
- 2. Right dimension $X = 287.5 \text{ minus } 287 = 0.5 \text{ mm}$
- Add the two values calculated and divide the result by 2.
- The value established determines the thickness of the shim **A** to insert.
 - **A** from 0.1 to 0.5 mm = 0.5-mm shim.
 - **A** over 0.5 mm = 1.0-mm shim.

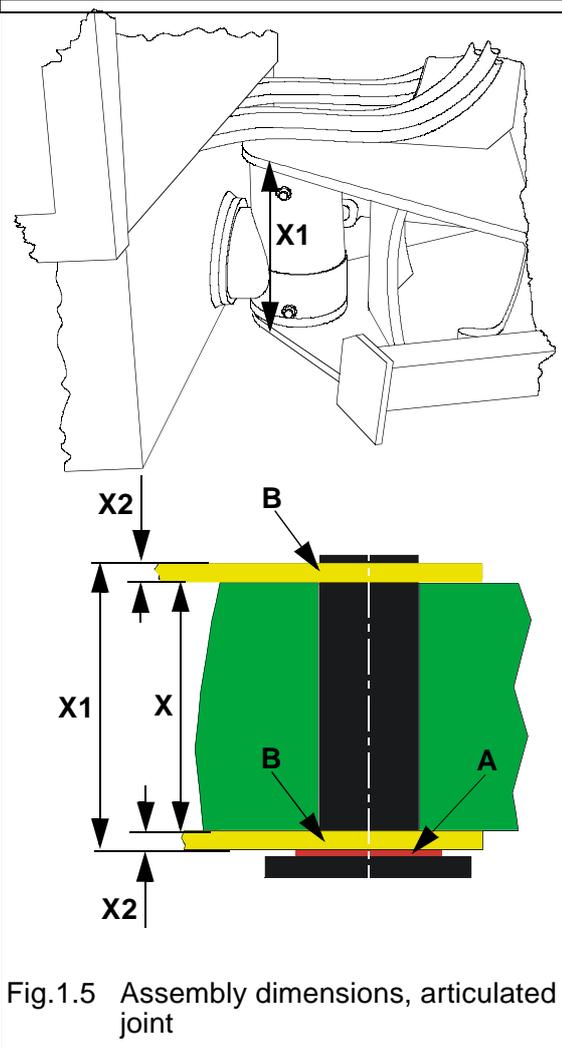


Fig.1.5 Assembly dimensions, articulated joint

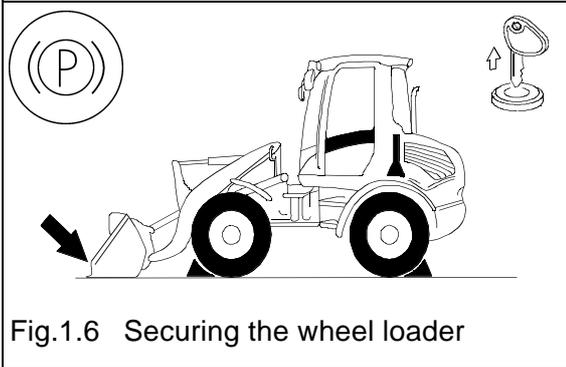
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CHECKING THE ARTICULATED PENDULUM JOINT

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.



Securing the wheel loader

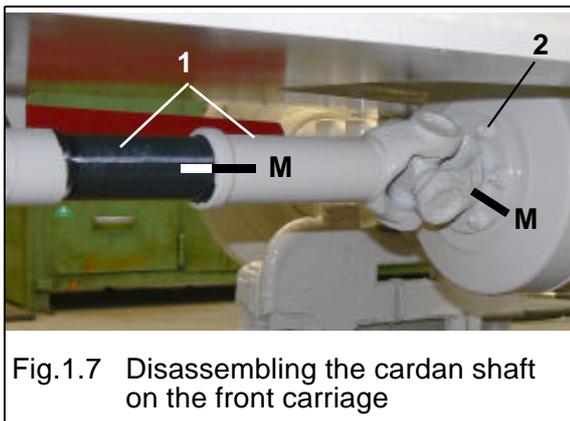
To disassemble the articulated pendulum joint, the front carriage must be separated from the rear carriage; secure the wheel loader to do this.

- 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.



- 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.

CHECKING THE ARTICULATED PENDULUM JOINT

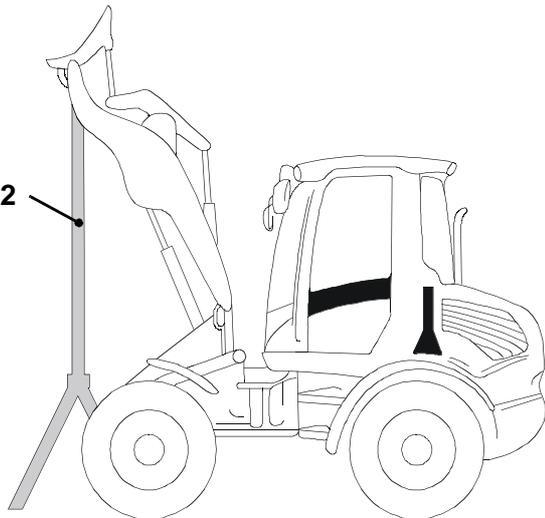
Opening access to the control block

This work is necessary when the hoisting gear is to remain installed on the front carriage.

⚠ DANGER

Risk of fatal injury!

If work on the front carriage and control block of the loading circuit require the hoisting gear is raised, always prop it up with a hoisting gear support.



- Start the diesel engine and raise the hoisting gear until the hoisting gear arms can be held by a sufficiently dimensioned hoisting gear support (2).
- In addition, prop up the lifting cylinder with a cylinder support (special tool) (1).
- Stop the diesel engine and prevent it from being switched on again by removing the ignition key.
- Unscrew the screws from the front carriage cover.
- Remove the front carriage cover (3) over the control block and set it down outside the working area.

Fig. 3.1 Supporting the hoisting gear

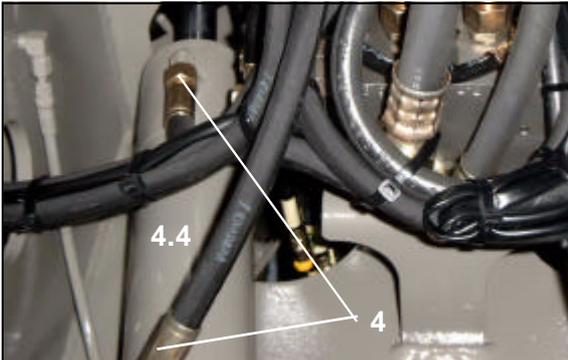
CHECKING THE ARTICULATED PENDULUM JOINT

Disassembling the front carriage's hydraulic connections

NOTE

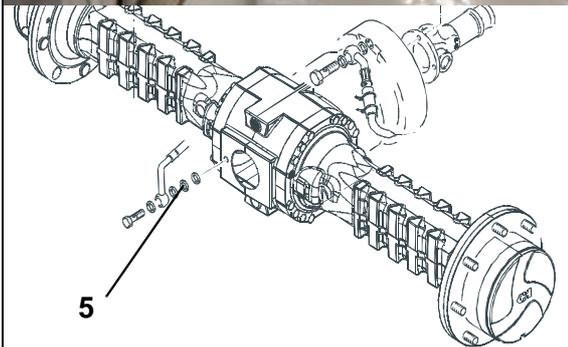


When hydraulic components, such as hydraulic hoses, hydraulic cylinders or valves are unscrewed, hydraulic oil escapes from the openings. Collect escaping hydraulic oil in suitable containers or clear up with cleaning cloths. Pay attention that hydraulic oil never escapes onto open ground.



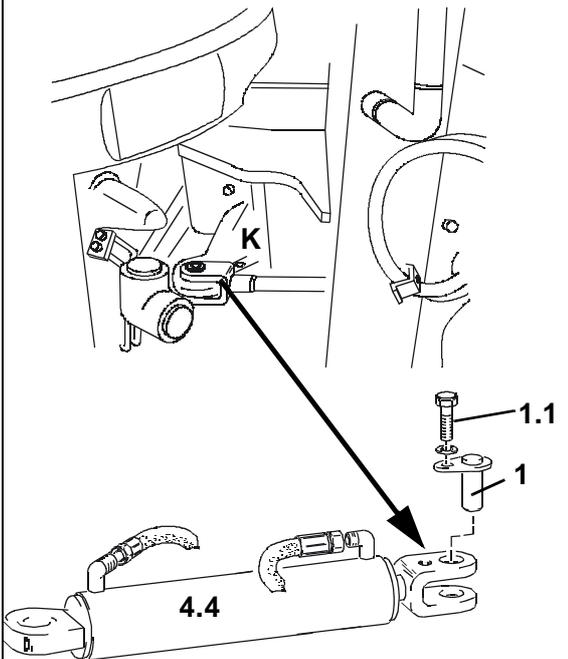
- Mark all the hydraulic hoses and cables to ensure easy reassembly later.
- Open all the hose clamping devices and clips so that laying the hoses will not be obstructed.
- Seal the hoses and connections using seal plugs and caps.
- Clear up any escaping oil immediately with cleaning cloths.

Disassembling the hydraulic connections to the steering cylinder and front axle



- Unscrew the hose connections (4) from the steering cylinder 4.4.
- Place oilpans under the front axle.
- Unscrew the differential lock connection (5) from the front axle.
- Seal the connection bore holes in the front axle and the hose line with seal plugs.

Disassembling the steering cylinder from the articulated pendulum joint



- If you have discovered damage to the pendulum joint and must disassemble it, the steering cylinder need not be disassembled.
- If you have discovered damage to the articulated joint and must disassemble it, disassemble the steering cylinder on the articulated joint.
- Unscrew the safety screw (1.1) in the piston rod bolt (1) out of the piston rod.
- Press the piston rod bolt (1) out of the articulated pendulum joint.
- Support the steering cylinder 4.4 in the front carriage.

Fig.1.8 Disassembling the steering cylinder and front axle hydraulic connections

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CHECKING THE ARTICULATED PENDULUM JOINT

Disassembling the hydraulic connections from the control block

Due to the arrangement of the control block loading circuit in the front carriage, the hydraulic connections of the hoses connected to the rear carriage must be disassembled.

- The following hose connections must be disassembled from the control block **SB**.
 - P-connection **P**
 - T-connection **T**
 - LS-connection **LS**
 - 6 x pilot connections **VS**
- The hydraulic connections **A** and **B** to the hydraulic cylinders and QDC remain assembled.
- Mark the hydraulic connections and unscrew them from the control block.
- Seal the hoses and connections using seal plugs and caps.
- Clear up any escaping oil immediately with cleaning cloths.

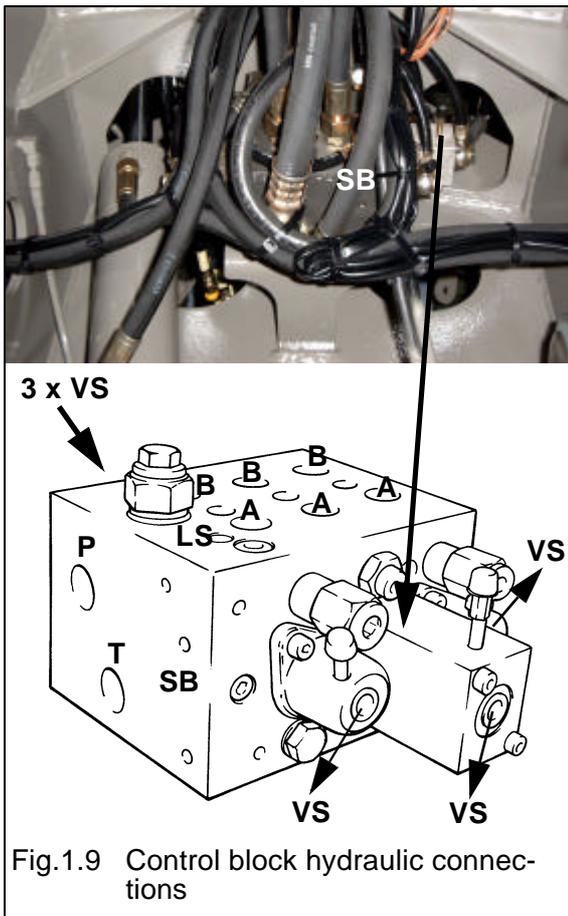


Fig.1.9 Control block hydraulic connections

Disconnecting the electrical connections

Before beginning work on the electrical installation, always remove the positive pole from the battery using an insulated wrench.

- Mark the cables so that they can be correctly assigned again during reassembly.
- Disconnect the electrical connections from the headlights (10).
- Loosen the fastening screw in the ground strap and remove the ground strap.
- Remove the cable from the signal horn.
- Pay attention to clamps and cable ties which all have to be opened or released.
- Bundle the cables together, tie them and fix the bundle to the hose bundle.

NOTE

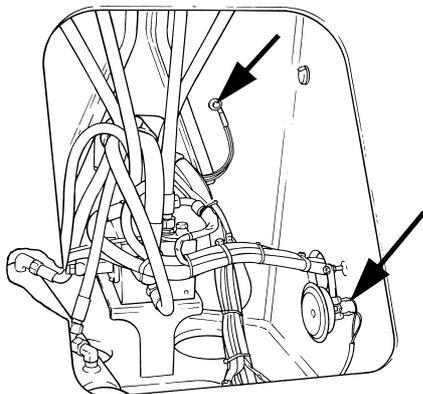
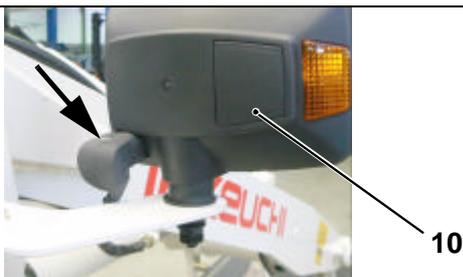


Fig.1.10 E connections, front carriage

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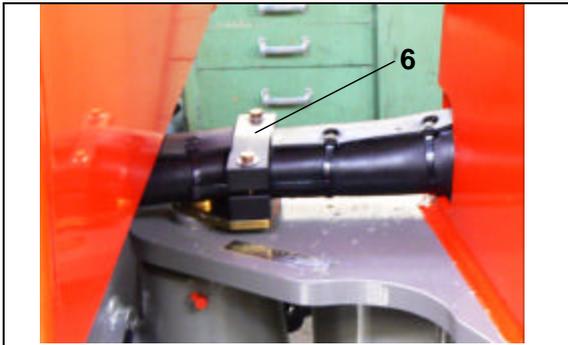


Fig.1.11 Hose and cable holder

Removing the hydraulic hoses and cables

- Open the hose clamping device and pull out the hoses and cables with casing.
- Loosen the central hose clamping device (6) over the articulated joint.
- Pull the hydraulic hoses out of the front carriage.
- Bind the hoses together and fix the hose bundle to the cab side panel.