Repair manual for telescopic loaders TH412

Repair Manual

DOK-ID: 1000355404 - EN
Model Year 2012
Issue 06/2015

V	volt
VI	violet
WS	white
X	Connector
X_1	Control pressure at the displacement pump
X_2	Control pressure at the displacement pump
rpm	Speed unit (revolutions per minute)
%	percent
Ø [mm^2]	wire cross section [in square millimetres]

Safety regulations for work on the hydraulic system

- Only trained specialist personnel with special knowledge and experience are permitted to work on hydraulic equipment.
- Residual pressure only decays slowly. Substantial residual pressure can exist in parts of the hydraulic system even with loader parked on a horizontal surface with lifting frame completely lowered and engine stopped.
- Depressurise the system before maintenance and repair work on the hydraulic system (see Part 4, section "Depressurising hydraulic system").
- Leaks where oil escapes must be rectified to avoid the following hazards:
  Environmental hazard
  Fire hazard
  Slipping hazard
  Explosion hazard
  Risk of injury
- Attention, risk of injury! A thin, high-pressure hydraulic oil jet can penetrate the skin! If oil penetrates the eyes or skin, contact a doctor immediately!
- Do not search for leaks with the hands! Use a piece of cardboard or paper on which exiting oil jets can be seen!
- Do not repair damaged piping and hydraulic hoses but replace them immediately with new ones, even if only moisture is visible!
- Hydraulic hoses must be replaced at the latest after six years of use. Country-specific regulations can prescribe shorter intervals and must be complied with.
- Open hydraulic connections carefully to be able to react in the event of a large quantity of discharging oil.
- Do not open damaged preloaded units (e.g. pressure reservoirs); always replace them completely.
- Only use suitable containers for collecting hydraulic oil.
- Dispose of discharged oil and oily waste in accordance with the environmental regulations.
- Handle O-rings, Q-rings and seals particularly carefully.
- Replace damaged or lost O-rings, Q-rings and seals immediately.
- Hydraulic lines must be professionally positioned and installed. The work must only be carried out by authorised specialists. Ensure that connections are not mixed up. Valves, length and quality, particularly pressure and temperature resistance of hydraulic lines must comply with the requirements.

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Part 2
Technical data, test equipment and special tools

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▷ The stated values are guide values and can vary from loader to loader.

▷ The values are provided for orientation during troubleshooting.

Displacement pump when moving forwards

The following table contains the pressure values (in bar) at the displacement pump when moving forwards and **blocked drive**.

Speed [rpm]	Pressure (in bar) at measuring point				
	G	X_2	M_A	X_1	M_B
980	23	5	23	0	23
1300	23	6	40	0	23
1600	23	8	140	0	23
1960	23	10	190	0	23
2100	24	11	220	0	24
3160	24	18	365	0	24

Displacement pump during reverse travel

The following table contains the pressure values (in bar) at the displacement pump during reverse travel and **blocked drive**.

Speed [rpm]	Pressure (in bar) at measuring point				
	G	X_2	M_A	X_1	M_B
980	23	0	23	5	23
1300	23	0	23	6	40
1600	23	0	23	8	130
1960	23	0	23	10	190
2100	24	0	24	11	220
3160	24	0	24	17	365

Displacement engine

The following table contains the pressure values (in bar) at the displacement engine with **blocked drive**.

Speed [rpm]	Pressure (in bar) at measuring point	
	G	M_1
980	23	0
1300	40	0
1600	140	0
1960	200	100
2100	220	170
3160	365	365

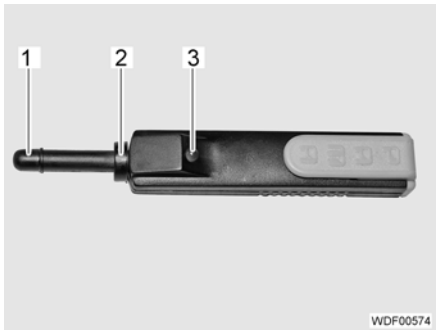
7.4 Magnetic field tester

Purpose

Electromagnetic components, e.g. solenoid valves, can be tested for function using the magnetic field tester.

Design

- battery-operated
- 1 LED indicator
- Permanent magnet for self-test



1Test probe
2Permanent magnet
3LED

Fig. 7 Magnetic field tester

7.5 Test manometer

Purpose

The test manometer indicates the pressure of the hydraulic circuit whose test connection it is connected to.

Design

- Pressure ranges: see table "Pressure range and number"
- Measuring cable (Fig. 8,2)
- Adapter (Fig. 8,1)

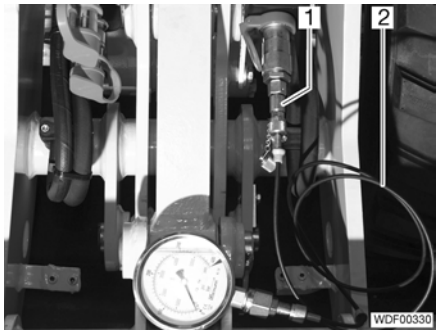


Fig. 8 Test manometer (up to 400 bar)

Pressure range and number

Pressure range	Number required
0 ... 60 bar	3
0 ... 250 bar	1
0 ... 600 bar	2

▷ All required test manometers are included in the test kit (SAP No. 1000194790, Wacker-Neuson No. 2810108).

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Part 3
Inspection, maintenance work and troubleshooting

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Final task

- Close engine cover.

2.3 Check radiator installation

▶ **WARNING**

Danger of scalding from hot coolant!

Never open the cooling system when the engine is hot or when the cooling system is pressurised.

Let the engine cool down or use protective gloves.

Requirements

Ensure the following:

- The loader is secured (see operating manual "Securing the loader").
- The engine cover is open (see operating manual "Servicing the engine").

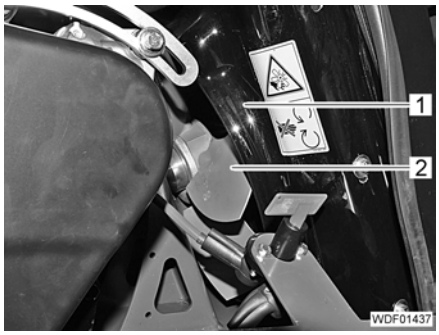


Fig. 10 Radiator fan impeller

- Check whether the fan impeller (Fig. 10,2) has sufficient clearance from other parts.
- Check fan impeller manually for ease of movement.
- Check again whether the fan impeller protrudes approx. 2/3 into the opening of the air baffle plate (Fig. 10,1).
- Check foam insulation along the radiator for damage. Risk of coolant short circuit!

If any damage has been discovered:

Rectifying damage

- Correct position of the radiator (see Part 4, section "Installing radiator").
- Supplement foam insulation if necessary.

Final task

- Close engine cover.

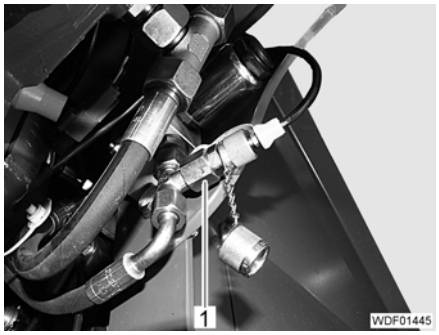


Fig. 18 Test connection "G"

- Connect test manometer to the test connection "G" (Fig. 18,1).
- Start engine.
- Read supply pressure "G" at the test manometer (setpoints, see Part 2, section "Pressure values").
- Switch off the engine.
- If the supply pressure does not reach the setpoints, the supply pump is probably defective.

If any damage has been discovered:

Rectifying damage

- Check boost pressure valve for damage and soiling.
- Check feed pump and replace if necessary (see repair manual of the displacement pump manufacturer).

▷ If the feed pump does not show any visible signs of wear, it is possibly severely damaged.

Replace the displacement pump or arrange for it to be repaired.

Completion work

- Remove testing tools.
- Attach floor pan (see Part 4, section "Replacing floor pan").
- Attach cover plate (see Part 4, section "Replacing cover plate for frame").

3.1.5 Checking signal pressure of the displacement pump

▷ Note the "Safety regulations for work on the hydraulic system" (see Part 1 "Safety").

Requirements Ensure the following:

- The floor pan has been removed (see Part 4, section "Replacing floor pan").
- The cover plate has been removed (see Part 4, section "Replacing cover plate for frame").

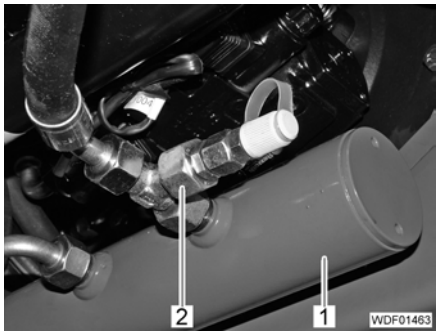


Fig. 40 Test connection P_H

Checking primary pressure

- Install T-coupling with test adapter (Fig. 40,2) in the hydraulic line between gear pump and pulsation damper (Fig. 40,1).
- Connect test manometer 0...600 bar to the test adapter.
- Move lifting frame to the limit stop using the "Lift" function.
- Read primary pressure "P_H" at the test manometer (setpoint: 220 bar).
- Adjust primary pressure and repeat check if the setpoint is not reached.

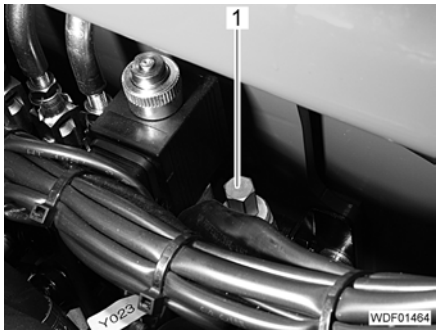


Fig. 41 Cap adjustment screw

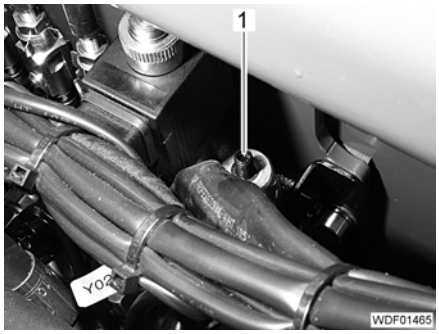


Fig. 42 Adjustment screw

Adjusting primary pressure

- Unscrew cap (Fig. 41,1) of the primary pressure limiting valve on the control valve.
- Turn adjustment screw of the primary pressure limiting valve (Fig 42,1) clockwise using an Allen key (pressure increases).
- Check primary pressure.
- If the primary pressure has changed, adjust the primary pressure limiting valve until the setpoint is reached.
- If the primary pressure has not changed, turn the adjustment screw of the primary pressure limiting valve further clockwise by one turn.
- Check primary pressure.
- If the primary pressure has changed, adjust the primary pressure limiting valve until the setpoint is reached. Then check secondary pressures.
- If the primary pressure has not changed, turn the adjustment screw of the primary pressure limiting valve anticlockwise by two turns. Then check delivery rate of the gear pump.
- Screw cap (Fig 41,1) onto the primary pressure limiting valve and tighten.

Pin	Poten-tial	Connection	Setpoint	Requirement	Ac-tual	Note
B6	+Ubatt	S084 Rocker switch	12.2 to 12.8 V on pin B7	1. Battery disconnecting switch on 2. Main fuse F017 intact 3. Ignition lock on 4. Fuse F005 intact 5. VLS rocker switch intact 6. Switch in position 2 (II)  Fig. 57 VLS switch Pos. "2"		Button, deactivates VLS and overload control (Fig. 57)
B8	+Ubatt	N001 Retract tele-scope	12.2 to 12.8 V on pin B7	1. Battery disconnecting switch on 2. Main fuse F017 intact 3. Ignition lock on 4. Fuse F001 intact 5. Joystick & electr. N001 intact 6. Button “telescope in” pressed		
C8	+Ubatt	N001 Extend tele-scope	12.2 to 12.8 V on pin B7	1. Battery disconnecting switch on 2. Main fuse F017 intact 3. Ignition lock on 4. Fuse F001 intact 5. Joystick & electr. N001 intact 6. Button “telescope out” pressed		
A3	+Ubatt	P006 stabili-ty indicator	approx. 1.0 V below +UBatt 11.2 to 12.0 V on pin B7	1. Battery disconnecting switch on 2. Main fuse F017 intact 3. Ignition lock on 4. Fuse F005 intact 5. Overload warning device intact 6. Lift capacity less than 1200 kg		
A5	+Ubatt	S116 Proximity switch Telescope	approx. 1.0 V below +UBatt 11.2 to 12.0 V on pin B7	1. Battery disconnecting switch on 2. Main fuse F017 intact 3. Ignition lock on 4. Fuse F005 intact 5. Overload warning device intact 6. Telescopic arm completely re-tracted		PNP proximity switch (inductive)
C4	Voltage signal	R023 (R014) Angle sen-sor	Lift arm com-pletely raised: 4.2 – 4.5 V on Pin B7	1. Battery disconnecting switch on 2. Main fuse F017 intact 3. Ignition lock on 4. Fuse F005 intact 5. Angle transmitter intact		Lift arm must be raised to the limit stop!
B1	Earth (ground)	Y102 VLS valve	2.5 Ω +/- 0.1 on Pin B7	VLS valve connected		Load distribution: B1, C1, C2 Measure the out-puts individually.
C1	Earth (ground)	Y102 VLS valve	2.5 Ω +/- 0.1 on Pin B7	VLS valve connected		Load distribution: B1, C1, C2 Measure the out-puts individually.

- Hold one wheel.
- Increase engine speed **slowly**.

▷ The wheel can no longer be held as soon as the differential lock engages.

- Repeat test on any wheel of the other axle.
- Switch off engine.

If any damage has been discovered:

Rectifying damage

- Check differential lock in the axle (see workshop manual of the axle manufacturer).

5.1 Checking and adjusting brake

▷ There are two different designs of the brake system of the loader: with **one** brake pedal and with **two** brake pedals. The differences between the designs are pointed out in the following descriptions.

Requirements

Ensure the following:

- The loader has been secured against rolling away (e.g. with wheel chocks).
- The parking brake is released.

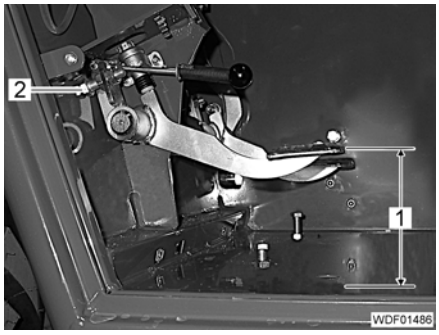


Fig. 69 Single brake pedal

Checking and adjusting single brake pedal

- Measure distance between floor pan and bottom edge of the brake pedal (1) (setpoint value: 11 cm).
- If necessary, adjust the distance using screw (2):
  - Screw in screw: distance increases.
  - Unscrew screw: distance reduces.

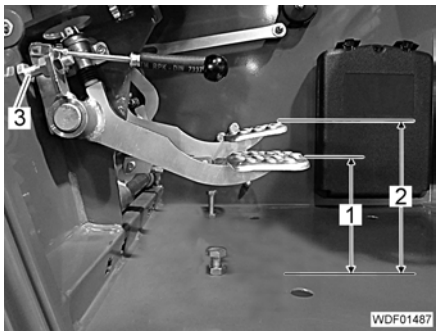


Fig. 70 Two brake pedals

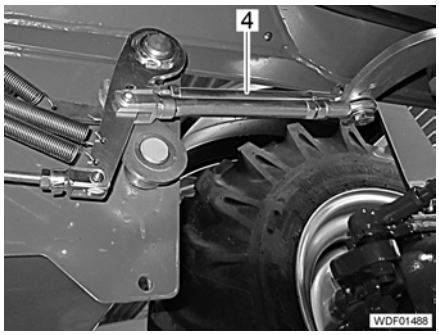


Fig. 71 Two pull rods

Checking and adjusting two brake pedals

- Measure distance between floor pan and bottom edge of the first brake pedal (1) (setpoint value: 11 cm).
- If necessary, adjust the distance using screw (3):
  - Screw in screw: distance increases.
  - Unscrew screw: distance reduces.
- Measure distance between floor pan and bottom edge of the second brake pedal (2) (setpoint value: 13.5 cm).
- If necessary, adjust the distance using pull rod (4).

8.3 Checking temperature sensor

▶ **WARNING**

Danger of burns from hot parts!

Never work on the engine when it is at operating temperature.

Let the engine cool down or wear protective gloves.

▷ Perform the test if the engine temperature warning lamp also lights when the engine is cooled down.

▷ The temperature sensor in the engine (Fig. 79) switches on the control lamp at 110 °C.

Requirements

Ensure the following:

- The loader is secured (see operating manual "Securing the loader").
- The engine cover is open (see operating manual "Opening the engine cover").

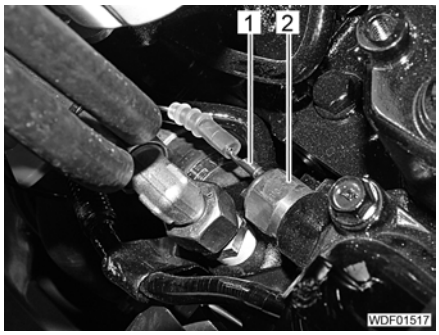


Fig. 79 Temperature sensor on the engine

Checking cooling water temperature sensor

- Remove connector (Fig. 79,1).
- If the warning lamp extinguishes, replace temperature sensor (Fig. 79,2) (see Part 4, section "Replacing engine temperature sensor").
- If the warning lamp does not extinguish, check cable for chafe marks and short circuits; replace cable if necessary.
- Attach connector to the temperature sensor.
- Switch off ignition.

Completion work

- Close engine cover.

The necessary replacement and repair procedures can be found in this part of the repair manual.

Sequence The sequence of the described work is mandatory. Comply with the specified sequence to avoid hazards.

Safety Pay attention to your own safety and that of other persons. Observe the safety instructions and warnings to avert hazards for persons and property.

Exclusion Work not described in this repair manual is not permitted to be performed.

Spare parts Only use original spare parts or spare parts which have been expressly approved by the manufacturer.

Fig. 109 Lifting out the engine

Lifting out engine

- Remove engine sump (Fig. 108,2) approx. 5 cm from the frame (Fig. 109).
- Carefully lift out motor up and to the right.
- Remove coupling flange if necessary (see section <$elemparanum "Replacing coupling flange").

10.1.3 Preparing engine for installation

▷ Before the installation of a **new** engine, you must replace and add some parts.

▷ If the required parts on the removed engine are still functional, these parts can be reused for the new engine.

Spare parts and auxiliary materials

Designation	Quantity
Coupling flange	1
Retaining bracket	2
Cross member	1
Screw connection	1
Screw connection	1
Connection	1
Connection	1
Drain plug	1
Seal	1

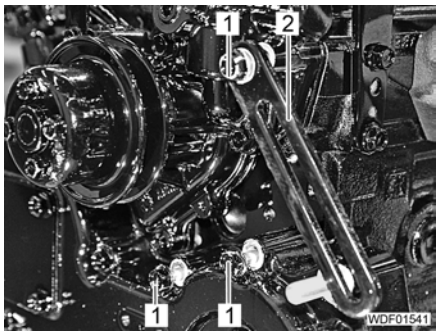


Fig. 110 Mountings for alternator

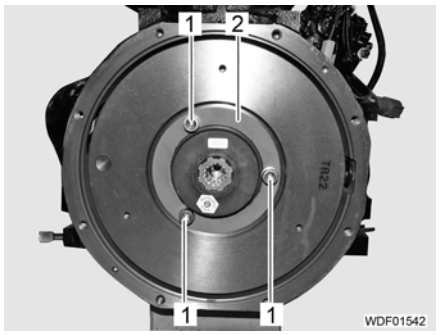


Fig. 111 Fastening of the coupling flange

Removing / attaching mountings

- Unscrew 3 bolts (Fig. 110,1) and remove clamp bracket (Fig. 110,2).
- Attach coupling flange (Fig. 111,2).
- Screw in 3 bolts (Fig. 111,1) with spring washers and tighten.

- Attach connector (Fig. 146,1) for the glow plugs.
- Attach moulded hose (Fig. 145,1) (see section <$elemparanum "Replacing hoses").

Checking air supply and oil level

- Check air filter unit for cleanliness.
- Remove valve cover (see Part 3, section "Checking and adjusting valve clearance").
- Check intake manifold for cleanliness.
- Check valve gear for completeness and correct position of the parts (see workshop manual of the engine manufacturer).
- Install valve cover (see Part 3, section "Checking and adjusting valve clearance").
- Check engine oil level (see operating manual "Checking engine oil level").
- Roughly clean engine from the outside.
- Close engine cover.

▷ Thick smoke when starting the engine is caused by residual oil in the cylinders.

If the exhaust gas opacity is not noticeably better after maximum 30 minutes, repair engine according to workshop manual of the manufacturer.

Starting engine

- Start engine.
- If persistent unusual noises occur, repair engine according to workshop manual of the manufacturer.

10.2 Radiator

10.2.1 Replacing expansion reservoir

▶ **WARNING**

Danger of injury from moving parts!

Do not open the engine cover when the engine is running unless expressly required to do so in this manual.

▶ **WARNING**

Scalding hazard from hot coolant!

Never open the cooling system when the engine is hot or when the cooling system is pressurised.

Let the engine cool down or use protective gloves.

Requirements

Ensure the following:

- The engine cover is open (see operating manual "Opening the engine cover").

Spare parts and auxiliary materials

Designation	Quantity
Expansion reservoir	1
Hose	1

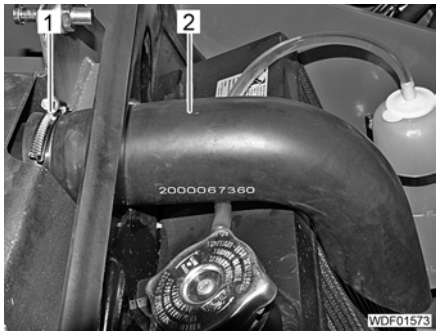


Fig. 167 Intake hose

Removing intake hose

- Slacken hose clamp (Fig. 167,1).
- Remove intake hose (Fig. 167,2).

Installing intake hose

- Attach new intake hose (Fig. 167,2) with hose clamp to the connection on the air filter case.
- Tighten hose clamp (Fig. 167,1).

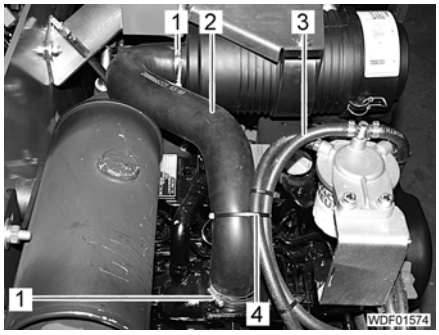


Fig. 168 Moulded hose

Removing moulded hose

- Remove the cable ties (Fig. 168,4).
- Slacken 2 hose clamps (Fig. 168,1).
- Remove moulded hose (Fig. 168,2).
- Seal air intake on the engine if necessary (e.g. with rags).

Installing moulded hose

- Attach new moulded hose (Fig. 168,2) with hose clamps to the connections on the engine and on the air filter case.
- Tighten 2 hose clamps (Fig. 168,1).
- Fix fuel lines (Fig. 168,3) to the moulded hose using cable ties (Fig. 168,4).

Completion work

- Attach engine cover (see section <$elemparanum "Replacing engine cover").

10.3.2 Replacing complete air filter

▶ **WARNING**

Danger of injury from moving parts!

Do not open the engine cover when the engine is running unless expressly required to do so in this manual.

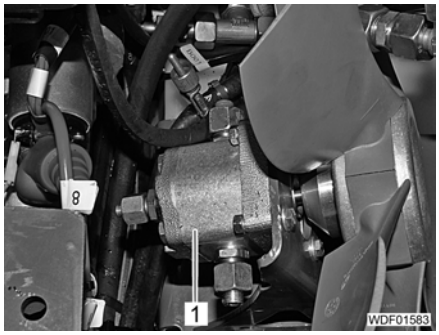


Fig. 177 Hydraulic lines on the fan motor

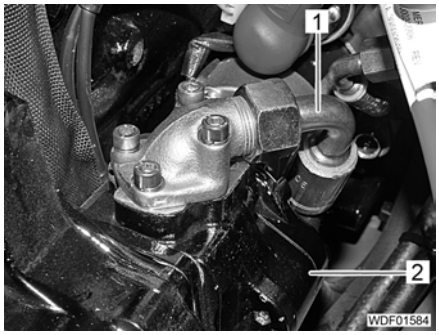


Fig. 178 Top hydraulic line on gear pump for cooling

Removing fuel tank

- Drain fuel tank.
- Unscrew 3 hydraulic lines on the fan motor (Fig. 177,1) and seal (Fig. 177).
- Unscrew top hydraulic line (Fig. 178,1) from the gear pump for cooling (Fig. 178,2) and seal.

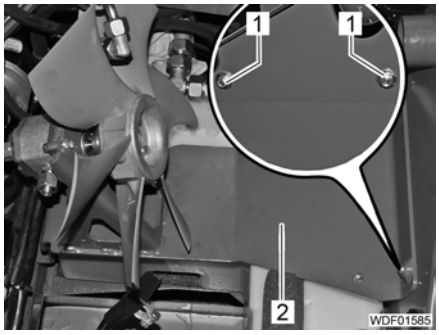


Fig. 179 Fastening mounting (front)

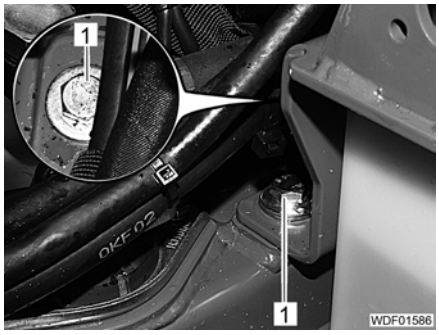


Fig. 180 Fastening mounting (rear)

- Mark position of the mounting (Fig. 179,2) on the sump.
- Unscrew 2 bolts (Fig. 179,1).
- Unscrew 2 bolts (Fig. 180,1).
- Remove mounting with fan.

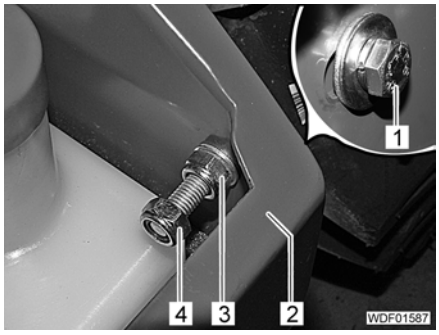


Fig. 181 Fastening engine cover retaining cable

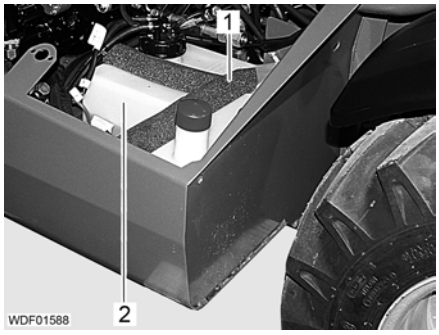


Fig. 182 Sealing and insulation material on the fuel tank

- Unscrew 2 nuts (Fig. 181,3 and 4) and pull bolt (Fig. 181,1) out of the tray (Fig. 181,2).
- Remove fuel tank (Fig. 182,2).

▷ If the piston rod or piston shows scratches, scoring or similar, the complete hydraulic cylinder must be replaced.

- Check piston rod and piston for damage.

Fig. 197 Compression of the sealing ring

Sealing piston

- Thoroughly clean the piston.
- Insert O-ring in the middle groove.

▷ The sealing ring is **always** somewhat widened during removal.

- Place sealing ring (Fig. 196,3) over the O-ring.
- Wind a few layers of masking tape tightly around the sealing ring (Fig. 197).
- Press sealing ring into its original shape using a clamp.

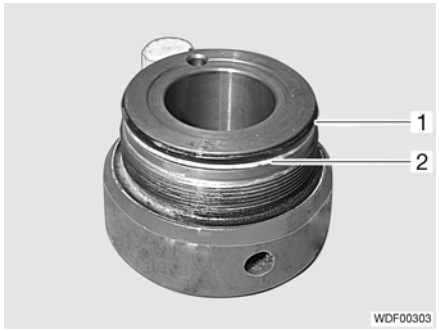


Fig. 198 Inside of the guide bush

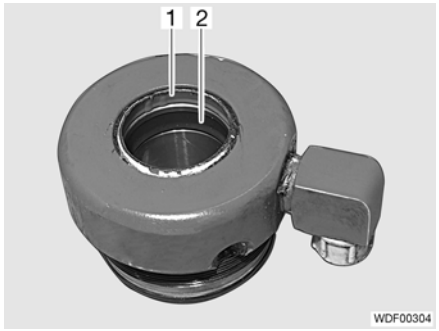


Fig. 199 Outside of the guide bush

Cleaning guide bush

- Remove O-ring (Fig. 198,1).
- Remove support ring (Fig. 198,2).
- Remove sealing ring (Fig. 199,2).
- Remove dust separator (Fig. 199,1).
- Thoroughly clean guide bush.

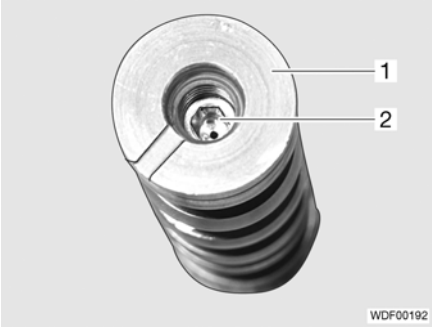


Fig. 217 Control piston

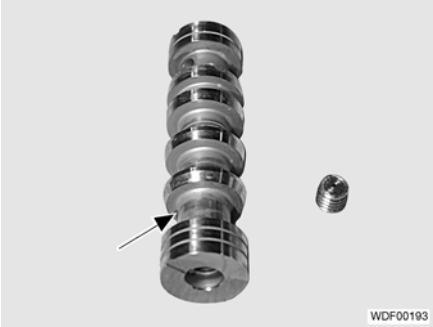


Fig. 218 Individual parts

Cleaning control piston

- Carefully screw M6 bolt from above into the control piston.
- Carefully pull out control piston and unscrew M6 bolt.

▷ Do not damage the outside surfaces of the control piston (Fig. 217,1).

▷ I necessary, hold control piston in the recesses (Fig. 218).

- Unscrew nozzle (Fig. 217,2).
- Thoroughly clean control piston and nozzle and blow out with compressed air.
- Screw nozzle into the control piston and tighten hand-tight.
- Carefully insert control piston into the priority valve.

Sealing priority valve

- Screw threaded joint (Fig. 216,1) into the priority valve and tighten hand-tight.

Completion work

- Fasten instrument panel (see section 15.4.2 "Detaching and fastening instrument panel").
- Attach steering column switch (see section 16.2.6 "Replacing steering column switch").
- Attach steering wheel (see section 15.7.2 "Replacing steering wheel").

11.3.2 Replacing priority valve

▷ Note the "Safety regulations for work on the hydraulic system" (see Part 1 "Safety").

Requirements Ensure the following:

- The hydraulic system has been depressurised (see section 11.1.1 "Depressurising hydraulic system").
- The steering wheel has been removed (see section 15.7.2 "Replacing steering wheel").

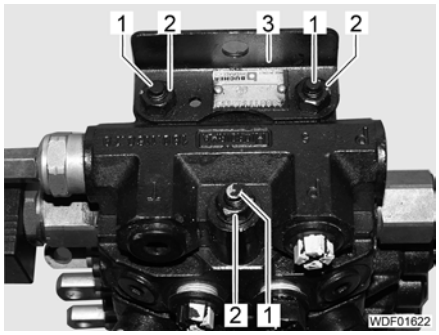


Fig. 238 Fastening of the segments

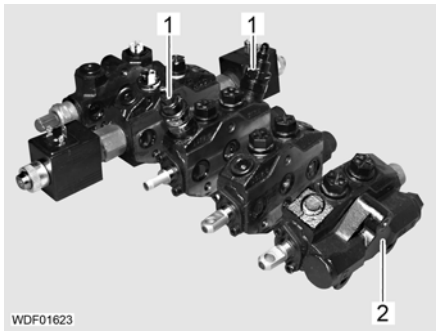


Fig. 239 Segments of the control valve

Dismantling control valve

- Unscrew 3 nuts (Fig. 238,2).
- Remove holder (Fig. 238,3).
- Carefully remove threaded rods (Fig. 238,1) downwards.
- Raise individual segments (Fig. 239).
- Remove end plate (Fig. 239,2).

▷ To avoid damage, do not clamp parts on the sealing surfaces.

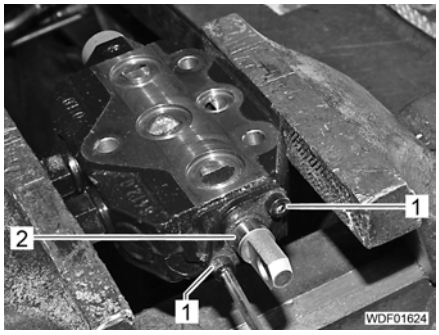


Fig. 240 Guide of the control piston

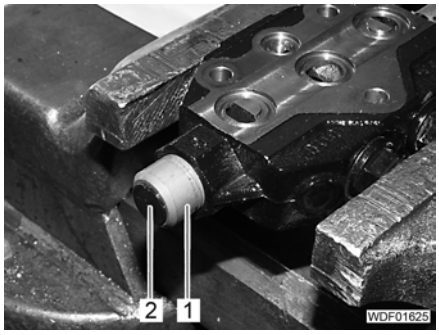


Fig. 241 Fastening of the control piston

Sealing control piston

- Unscrew 2 bolts (Fig. 240,1).
- Remove cover (Fig. 240,2) with dust ring.
- Remove plug (Fig. 241,2) from the control piston (Fig. 241,1) using a suitable aid (e.g. knife).

11.5.10 Replacing pressure limiter valve on the compensating cylinder (comfort control)

▷ Note the "Safety regulations for work on the hydraulic system" (see Part 1 "Safety").

Requirements

Ensure the following:

- The hydraulic system has been depressurised (see section 11.1.1 "Depressurising hydraulic system").
- The floor pan has been removed (see section <$elemparanum "Replacing floor pan").

Spare parts and auxiliary materials

Designation	Quantity
Pressure limiter valve	1
Pressure limiter valve	1

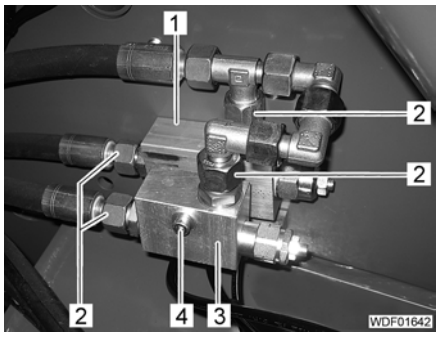


Fig. 264 Pressure limiter valve

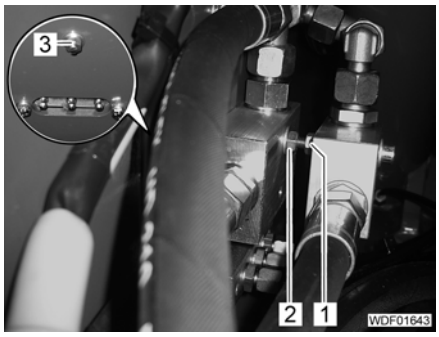


Fig. 265 Fastening of the pressure limiter valves

Removing pressure limiter valves

- Mark hydraulic lines to avoid mix-ups.
- Unscrew and seal 4 hydraulic lines (Fig. 264,2).
- Unscrew nut (Fig. 265,3).
- Remove bolt (Fig. 264,4) with pressure limiter valve (Fig. 264,3).
- Remove pressure limiter valve (Fig. 264,1).
- Unscrew nuts (Fig. 265,1 and 2) and pull bolt (Fig. 264,4) out of pressure limiter valve (Fig. 264,3).

Installing pressure limiter valves

- Insert bolt (Fig. 264,4) with washer in pressure limiter valve (Fig. 264,3).
- Screw nut (Fig. 265,1) with washers onto thread and tighten slightly.
- Screw nut (Fig. 265,2) onto thread until the distance to the nut (Fig. 265,1) is approx. 1 cm.
- Attach pressure limiter valve (Fig. 264,1) with washer to bolt.
- Attach pressure limiter valves to frame.
- Screw nut (Fig. 265,3) onto thread.
- Hold nut (Fig. 265,2) and tighten nut (Fig. 265,3).

Completion work

- Attach floor pan (see section <$elemparanum "Replacing floor pan").

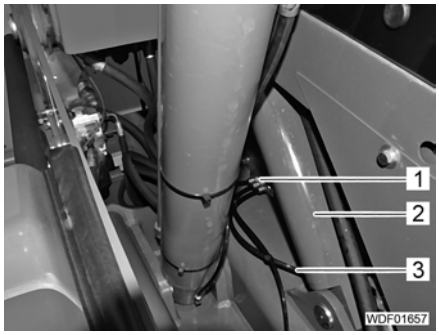


Fig. 283 Lubrication line connection

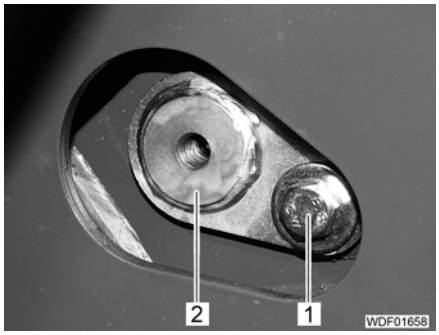


Fig. 284 Bottom side fastening

Removing bottom side compensating cylinder

- Unscrew lubrication line (Fig. 283,3) from the compensating cylinder (Fig. 283,2).
- Unscrew bolt (Fig. 284,1).
- Remove pin (Fig. 284,2) using a suitable aid (e.g. slide hammer puller).

▷ Pay attention to the connections and lines of the remote lubrication system (Fig. 283,1) while removing the compensating cylinder.

- Lift out the compensating cylinder.

▷ Pay attention to the connections and lines of the remote lubrication system (Fig. 283,1) while inserting the compensating cylinder.

Inserting compensating cylinder

- Carefully insert compensating cylinder (Fig. 283,2) from above into the frame so that the bottom bolt retainers are exactly aligned.
- Insert compensating rings if necessary.
- Lightly grease bearing and bolt.
- Drive in bolt (Fig. 284,2) so that the holes for the locking bolt are exactly aligned.
- Screw in bolt (Fig. 284,1) with washers and spring washer and tighten.
- Attach lubrication line (Fig. 283,3) and tighten union nut.

Installing rod side compensating cylinder

- Remove lifting gear.
- Align piston so that the bottom side bolt retainers are exactly aligned.
- Insert compensating rings if necessary.
- Lightly grease bearing and bolt.
- Drive in bolt (Fig. 281,1) so that the holes for the locking bolt are exactly aligned.
- Screw in bolt (Fig. 281,2) with washers and spring washer and tighten.
- Screw hydraulic lines (Fig. 279,1 and Fig. 280,1) to the connections on the compensating cylinder and tighten.

11.8 Additional hydraulics, rear hydraulics and hydraulic locking

11.8.1 Replacing hydraulic motor (power take-off shaft) (option)

▶ **WARNING**

Danger of injury from heavy parts!

Use a suitable hoist or work as two people for removing and installing the power take-off shaft.

▷ Note the "Safety regulations for work on the hydraulic system" (see Part 1 "Safety").

Requirements

Ensure the following:

- The hydraulic system has been depressurised (see section 11.1.1 "Depressurising hydraulic system").
- The upper link has been removed if necessary (see section <$elemparanum "Replacing upper link").
- The trailer coupling has been removed if necessary (see section 14.5 "Replacing trailer coupling").
- The cover of the power take-off shaft has been removed (see section <$elemparanum "Replacing power take-off shaft protection").

Spare parts and auxiliary materials

Designation	Quantity
Power take-off shaft	1
Lock nuts	2

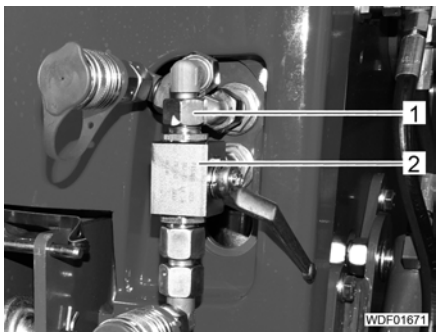


Fig. 298 Ball valve

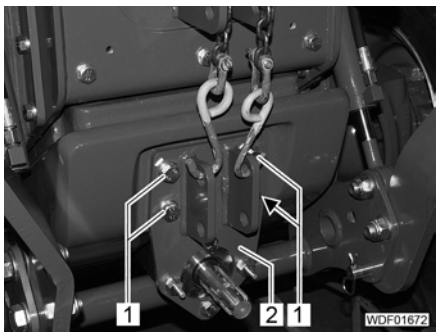


Fig. 299 Attaching the power take-off shaft

Removing power take-off shaft

- Unscrew hydraulic line (Fig. 298,1) at the ball valve (Fig. 298,2) and seal.
- Secure mounting plate (Fig. 299,2) using suitable hoist (e.g. crane) (Fig. 299).
- Unscrew 4 bolts (Fig. 299,1).
- Lower mounting plate somewhat.

Spare parts and auxiliary materials

Designation	Quantity
Solenoid valve	1

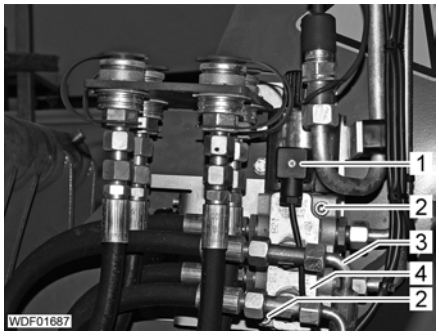


Fig. 316 Solenoid valve

Removing solenoid valve

- Mark hydraulic lines to avoid mix-ups.
- Unscrew and seal 6 hydraulic lines (Fig. 316,3).
- Unscrew screw at the connector (Fig. 316,1).
- Remove connector and protect contacts (e.g. with protective cap).
- Unscrew 2 screws at the connector (Fig. 316,2).
- Remove solenoid valve (Fig. 316,4).

Installing solenoid valve

- Attach solenoid valve (Fig. 316,4).
- Screw in 2 bolts (Fig. 316,2) with washers and nuts and tighten.
- Screw hydraulic lines (Fig. 316,3) to the connections on the solenoid valve and tighten.
- Attach connector (Fig. 316,1) to the contacts on the solenoid valve and secure with screw.

Completion work

- Check connections for function.

11.8.10 Replacing 2/2 directional control valve (two-hand operation)

▷ Note the "Safety regulations for work on the hydraulic system" (see Part 1 "Safety").

Requirements

Ensure the following:

- The hydraulic system has been depressurised (see section 11.1.1 "Depressurising hydraulic system").

Spare parts and auxiliary materials

Designation	Quantity
2/2 directional control valve	1

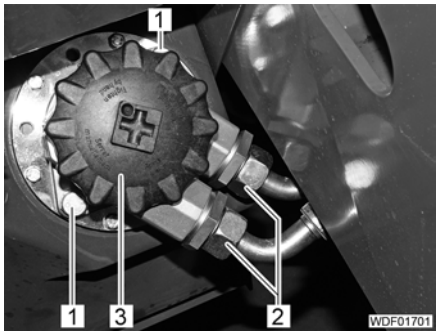


Fig. 330 Return filter

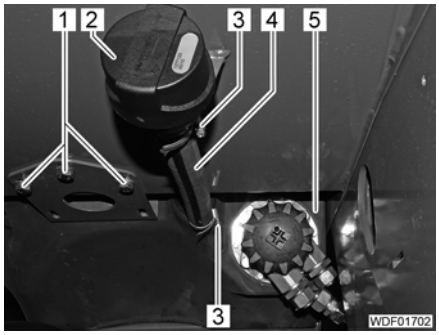


Fig. 331 Removal of the return filter

Removing return filter

- Mark hydraulic lines to avoid mix-ups.
- Unscrew and seal 2 hydraulic lines (Fig. 330,2).
- Slacken 2 hose clamps (Fig. 331,3).
- Remove hydraulic hose (Fig. 331,4) from the hydraulic oil tank (Fig. 331,5) and from the ventilation filter (Fig. 331,2).
- Slacken 3 bolts (Fig. 331,1).
- Pull out hydraulic oil tank (Fig. 331,5) somewhat from the back.
- Unscrew 2 bolts (Fig. 330,1).
- Pull return filter (Fig. 330,3) upwards out of the hydraulic oil tank.
- Seal openings immediately (e.g. with rags).

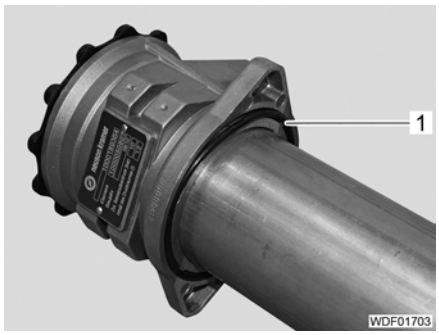


Fig. 332 Sealing

Installing return filter

- Clean contact surfaces on return filter and hydraulic oil tank.
- Apply sealant along the O-ring (Fig. 332,1).
- Insert return filter carefully from above into the hydraulic oil tank.
- Screw in 2 bolts (Fig. 330,1) with spring washers and tighten.
- Push hydraulic oil tank (Fig. 331,5) to the front and align.
- Tighten 3 bolts (Fig. 331,1).
- Attach hydraulic hose (Fig. 331,4) with hose clamps to the connections on the hydraulic oil tank and on the ventilation filter (Fig. 331,2).
- Tighten 2 hose clamps (Fig. 331,3).
- Screw hydraulic lines (Fig. 330,2) to the connections on the return filter (Fig. 330,3) and tighten.

12.2 Front axle

12.2.1 Removing front axle

▶ **DANGER**

Danger of injury from heavy part!

The front axle weighs approx. 140 kg.

Use a suitable hoist for removing and installing the front axle.

▷ Note the "Safety regulations for work on the hydraulic system" (see Part 1 "Safety").

▷ Store the axle so that it cannot tip over on a suitable handling device (e.g. forklift) to prevent damage.

Requirements Ensure the following:

- The loader has been secured against rolling away at the rear axle (e.g. with wheel chocks).
- The safety support for the lifting frame has been inserted (see operating manual "Safety support for lifting frame").
- The hydraulic system has been depressurised (see section 11.1.1 "Depressurising hydraulic system").
- The propeller shaft has been removed at the front axle (see section 12.1 "Replacing propeller shaft").
- The parking brake is released.

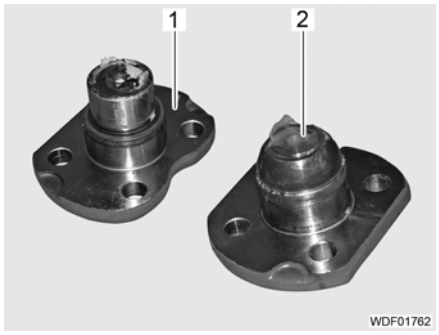


Fig. 378 Locking bolt

Attaching planetary gear carrier

- Clean propeller shaft (Fig. 373,2).
- Push propeller shaft into axle beam (Fig. 373,1).
- Clean contact surfaces in the planetary gear carrier and on the axle beam.
- Attach planetary gear carrier (Fig. 372,3) to the axle beam.
- Insert the cylindrical locking bolt (Fig. 378,1) on the top side into the planetary gear carrier.
- Screw in and tighten 4 bolts (Fig. 372,1).
- Insert the spherical locking bolt (Fig. 378,2) on the bottom side into the planetary gear carrier.
- Screw in and tighten 4 bolts (Fig. 372,1).
- Press tie rod end (Fig. 371,3) into the planetary gear carrier (Fig. 371,1).
- Screw new nuts (Fig. 371,2) onto thread and tighten.

Attaching planetary gear carrier

- Clean and lightly grease contact surface on the planetary gear carrier.
- Install new sealing ring.
- Slide planetary drive case (Fig. 369,6) onto the planetary gear carrier.
- Attach gear wheel (Fig. 370,2).
- Coat 4 bolts (Fig. 369,1) with threadlocker and screw in.
- Tighten 4 bolts until the gear wheel completely abuts the planetary drive case.
- Slide washer (Fig. 369,5) onto the propeller shaft.
- Slide spacer ring (Fig. 369,4) onto the propeller shaft.
- Insert circlip (Fig. 369,3) into the slot on the propeller shaft.
- Slide new O-ring (Fig. 369,2) onto the planetary drive case.
- Attach cover (Fig. 368,1) and evenly drive onto the collar on the planetary drive case using a suitable aid (e.g. rubber hammer).
- Screw in and tighten 2 bolts (Fig. 367,1).

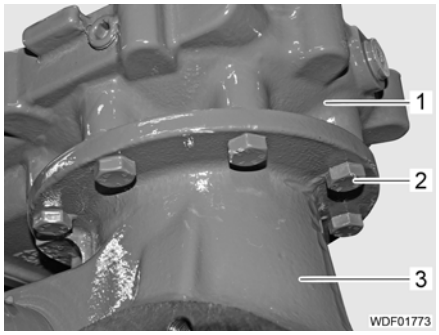


Fig. 409 Fastening of the case

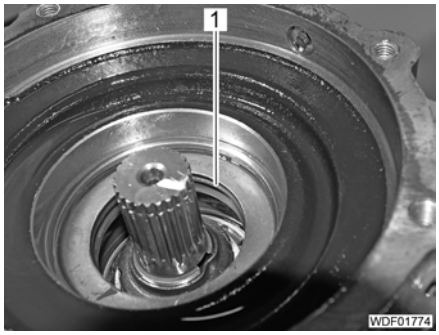


Fig. 410 Shaft sealing ring in the case

Replacing shaft sealing ring in the case

- Unscrew 7 bolts (Fig. 409,2).
- Remove case (Fig. 409,1) from the axle housing (Fig. 409,3).
- Drive shaft sealing ring (Fig. 410,1) to the outside from the case.
- Lightly grease new shaft sealing ring.
- Press new shaft sealing ring into the case from the outside.
- Clean contact surfaces on the case and on the axle housing.
- Apply sealant to contact surface.
- Attach case (Fig. 409,1) to the axle housing (Fig. 409,3).
- Screw in and tighten 7 bolts (Fig. 409,2).

Assembling cover

- Drive gear wheel (Fig. 406,2) onto the shaft.
- Drive bottom bearing (Fig. 405,2) onto the shaft using suitable aid (e.g. sleeve).
- Drive top bearing (Fig. 406,1) onto the gear wheel using suitable aid (e.g. sleeve).
- Insert circlip (Fig. 405,1).

Attaching cover

- Clean contact surfaces on the case and on the cover.
- Apply sealant to contact surface.
- Attach cover (Fig. 403,1) to the case.
- Screw in and tighten 10 bolts (Fig. 403,2).

Attaching flange

- Slide new O-ring (Fig. 402,1) onto the flange (Fig. 402,2).
- Attach flange (Fig. 401,2) to the cover.
- Screw in and tighten 5 bolts (Fig. 401,1).

Completion work

- Install axle (see section 12.3.2 "Installing rear axle").
- Fill with axle oil (see operating manual "Maintenance of the axles).

- Press brake pads (Fig. 430,1) outwards.
- Remove brake pads from the brake calliper (Fig. 430,2).

Installing brake pads

- Press new brake pads (Fig. 430,1) into the brake calliper (Fig. 430,2) from outside until the brake pads and the inside of the brake calliper are flush.
- Fold back brake lever (Fig. 429,1).
- Drive in pin (Fig. 429,2).
- Insert circlip (Fig. 429,3).

Installing brake calliper

- Attach brake calliper (Fig. 428,1) to the front axle.
- Screw in and tighten 2 bolts (Fig. 428,2).
- Depending on the configuration of the loader, attach 1 or 2 brake rods (Fig. 427,2) to the brake lever (Fig. 427,3).
  - If only 1 brake rod is present, attach the brake rod from underneath to the second hole of the brake lever.
  - If 2 brake rods are present, attach the inner brake rod from above to the first hole of the brake lever and attach the outer brake rod from underneath to the third hole of the brake lever (Fig. 427).
- Place 1 washer or 2 washers between brake rod and brake lever.
- Insert 1 bolt or 2 bolts (Fig. 427,1) from underneath through the holes.
- Screw 1 new nut or 2 new nuts onto the bolts and tighten.

Completion work

- Install brake disc (see section 13.1.1 "Replacing brake disc").

13.1.3 Replacing brake lever

▷ Keep the contact surfaces of brake disc and brake pads free of grease and oil.

▷ If the contact surfaces are contaminated with oil or grease, clean the contact surfaces thoroughly.

Requirements

Ensure the following:

- The brake calliper has been removed (see section 13.1.2 "Replacing brake pads").

Spare parts and auxiliary materials

Designation	Quantity
Brake lever	1

14.1 Frame

14.1.1 Replacing front mudguard

▷ All mudguards are replaced in the same way.

Spare parts and auxiliary materials

Designation	Quantity
Wheel cover	1

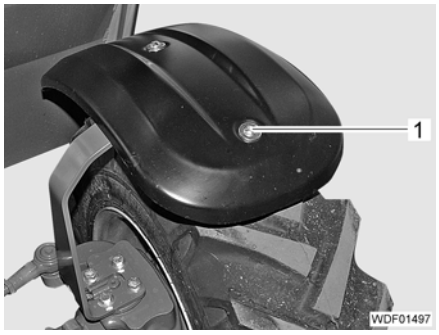


Fig. 442 Mudguards

Replacing mudguard

- Unscrew 2 bolts (1) and remove mudguard.
- Attach new mudguard and tighten 2 bolts.

14.1.2 Replacing rear view mirror

▷ This section describes the replacement of one rear view mirror. The second rear view mirror is replaced in the same way.

Spare parts and auxiliary materials

Designation	Quantity
Rear view mirror	2

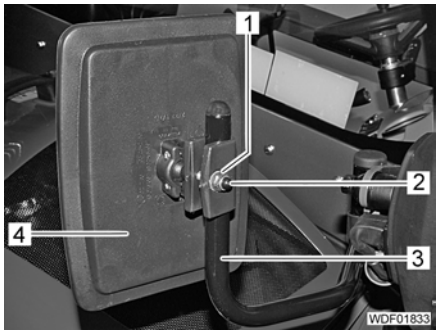


Fig. 443 Rear view mirror

Replacing rear view mirror

- Remove cap (Fig. 443,2).
- Unscrew nut (Fig. 443,1).

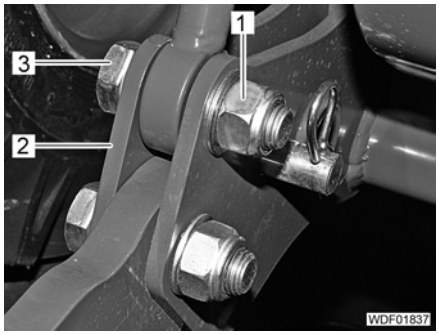


Fig. 459 Fastening of the cylinder of the rear three-point linkage

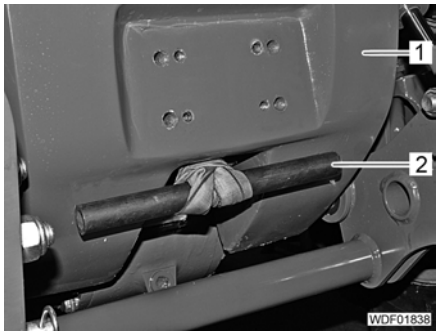


Fig. 460 Fixing of the rear weight

Removing rear weight

- Unscrew 1 nut (Fig. 459,1) (if present) on each side and remove bolt (Fig. 459,3).
- Guide suitable lifting gear (Fig. 457,2) down through the rear of the loader.
- Pull suitable lifting gear through the rear weight (Fig. 460,1) and secure with a shaft (Fig. 460,2) (∅ approx. 25 mm).

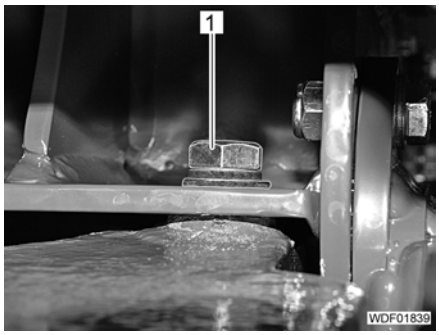


Fig. 461 Fastening of the rear weight (front)

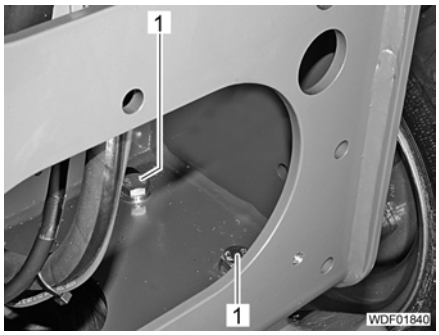


Fig. 462 Fastening of the rear weight (top)

- Unscrew 2 bolts (Fig. 461,1).
- Unscrew 4 bolts (Fig. 462,1).
- Carefully lower rear weight and remove backwards.

Attaching rear weight

- Attach rear weight (Fig. 460,1) using suitable aid (Fig. 460,2) (e.g. shaft ∅ 25 mm).
- Set down rear weight from the back carefully on the frame.
- Screw in 4 bolts (Fig. 462,1) with washers and spring washers, but do not tighten.
- Screw in 2 bolts (Fig. 461,1) with washers and spring washers, but do not tighten.
- Align rear weight.
- Tighten 6 bolts.
- Remove lifting gear.

Attaching hydraulic connections

- On each side, insert bolt (Fig. 459,3) (if present) with washer through the holder (Fig. 459,2) into the hole on the rod side of the cylinder of the rear three-point linkage.
- Screw new nut (Fig. 459,1) with washer onto the bolt and tighten so that the rear three-point linkage can still move.
- Push hydraulic valve (Fig. 458,2) backwards.

- Remove holder (Fig. 493,4).
- If necessary, unscrew bolt (Fig. 493,2) and remove rear spot lamp (Fig. 493,3).

Attaching holder

- Attach new rear spot lamp (Fig. 493,3) if necessary.
- Screw in bolt (Fig. 493,2) and tighten.
- Thread connection cable for tail light into holder.
- Attach holder (Fig. 493,4) to frame.
- Screw in 2 bolts (Fig. 493,1) with washers and spring washers and tighten.

Completion work

- Attach tail light (see section <$elemparanum "Tail light, complete, replacing").
- Check function of the lighting.

14.2.2 Replacing holder for rear view mirror

Requirements

Ensure the following:

- The complete rear view mirror has been removed (see section <$elemparanum "Replacing complete rear view mirror").
- The headlight with indicator lamp has been removed (see section <$elemparanum "Replacing complete headlight with indicator lamp").

Spare parts and auxiliary materials

Designation	Quantity
Holder	1

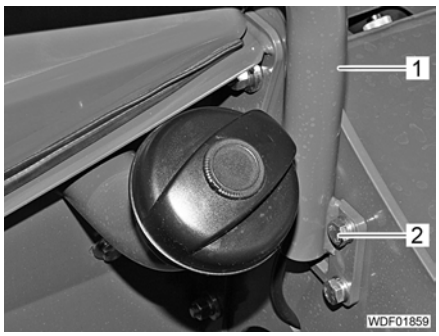


Fig. 494 Fastening of the holder

Removing holder

- Unscrew 4 bolts (Fig. 494,2).
- Remove holder (Fig. 494,1).

Attaching holder

- Attach holder (Fig. 494,1) to frame.
- Screw in 4 bolts (Fig. 494,2) with washers and spring washers and tighten.

Completion work

- Attach headlight with indicator lamp (see section <$elemparanum "Replacing complete headlight with indicator lamp").
- Attach rear view mirror (see section <$elemparanum "Rear view mirror, complete, replacing").
- Adjust rear view mirror.
- Check function of the lighting.

- Reconnect the individual cables (Fig. 507,3) (if present) to the connector of the solenoid switch.
- Reconnect the individual cables (Fig. 507,1) (if present) to the power socket.

Completion work

- Lay and fasten lines correctly.
- Check function of the removed and attached parts.

14.4.2 Replacing protective cover

▷ Always observe the instructions of the adhesive manufacturer.

▷ The protective cover is glued on. Carefully detach the protective cover from the outer tube.

▷ There are various tool holders and front connections for the loader. Depending on configuration, your loader can be different from the illustrations shown here. However, the replacement procedure is always the same in principle.

Spare parts and auxiliary materials

Designation	Quantity
Protective cover	1
Adhesive	AR

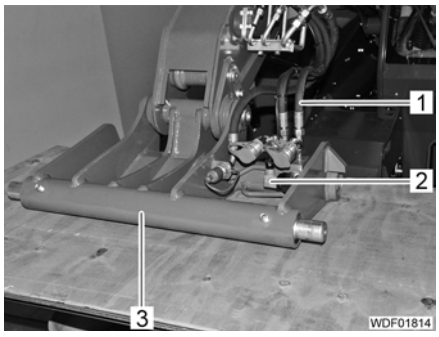


Fig. 511 Lines at tool holder (example)

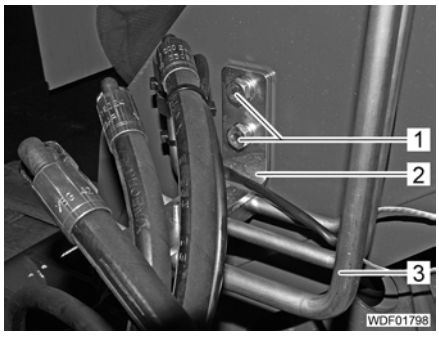


Fig. 512 Cable holder

Removing lines

- Place the tool holder (Fig. 511,3) so that it cannot tip (e.g. on a workbench).
- Mark hydraulic lines (if present) to avoid mix-ups.
- Depressurise hydraulic system (see section 11.1.1 "Depressurising hydraulic system").

▷ There are different versions of the tool holder. The removal of the lines on the respective tool holder is described in section <$elemparanum "Tool holder".

- Unscrew and seal hydraulic lines (Fig. 511,1).
- Remove connector (Fig. 511,2) (if present) and protect contacts.
- Unscrew bolts (Fig. 512,1) and remove holder (Fig. 512,2) with lines (Fig. 512,3).

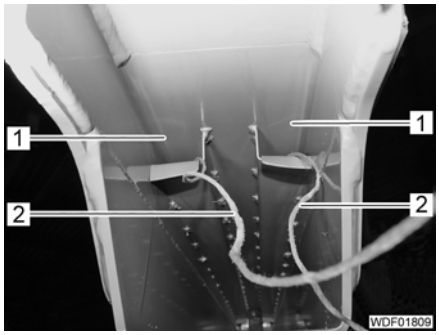


Fig. 531 Drawing in cable

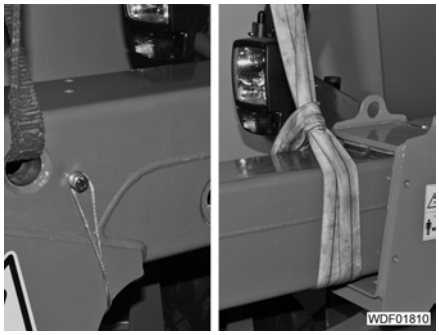


Fig. 532 Securing the inner tube

Inserting inner tube

- When a new inner tube is installed, push the drawing in cable for the hydraulic lines (Fig. 531,2) from back to front through the ducts (Fig. 531,1) at the top in the inner tube.
- Attach inner tube at the front (Fig. 531) and back (Fig. 532) using suitable lifting gear and lift horizontally.

Fig. 533 Setting down the inner tube

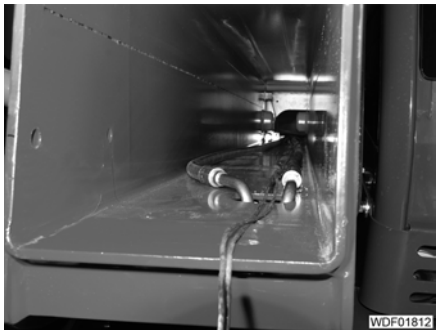


Fig. 534 Hydraulic lines in the outer tube

- Align inner tube level with the outer tube.
- Carefully insert the inner tube into the outer tube.
- Place inner tube at the front on a movable support (e.g. pallet on lift truck) (Fig. 533).
- Carefully insert inner tube completely. In doing so, ensure that the hydraulic lines in the outer tube (Fig. 534) are not damaged.

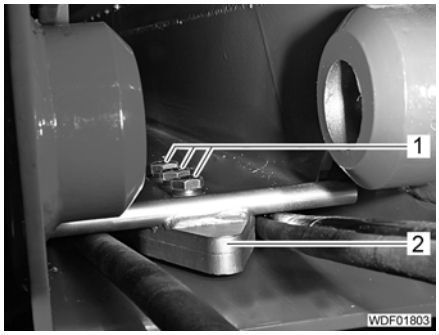


Fig. 535 Deflection plate

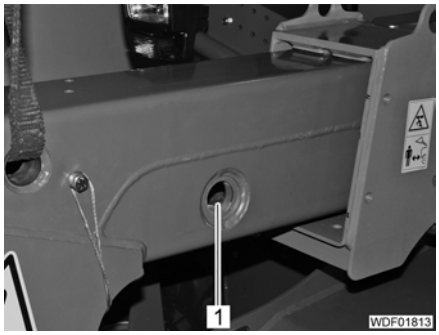


Fig. 536 Installation position for extension cylinder

Installing hydraulic lines

- Insert deflection plate (Fig. 535,2) from the back.
- Screw in 3 bolts (Fig. 535,1) with washers and spring washers and tighten.
- Pull hydraulic lines of the tilting cylinder on the drawing in cables to the front.

14.4.13 Replacing front bearing

▷ There are various tool holders for the loader. Depending on configuration, your loader can be different from the illustrations shown here.

▷ This section describes the replacement of one bearing.

The second bearing is replaced in the same way.

Spare parts and auxiliary materials

Designation	Quantity
Bearing	2
Lock nut	1
Lubricating grease	AR

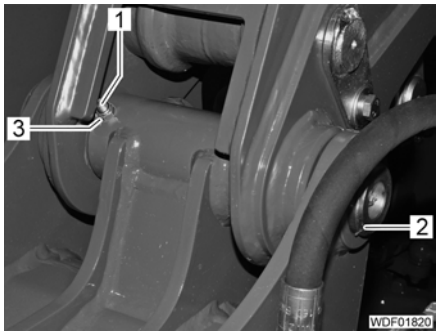


Fig. 565 Securing for pin

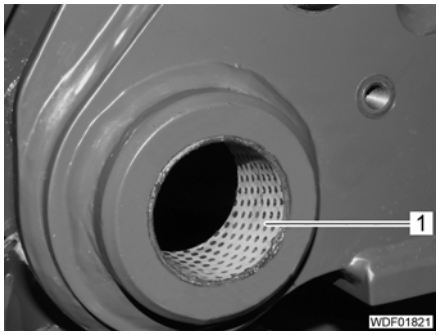


Fig. 566 Front bearing in the telescopic arm

Removing bearing

- Place the tool holder so that it cannot tip (e.g. on a workbench).
- Mark position of the hole for the locking bolt on the pin and on the tool holder to make the installation easier.
- Unscrew nut (Fig. 565,3) and remove bolt (Fig. 565,1).
- Drive out pin (Fig. 565,2) to the left.
- Raise and tip out telescopic arm so far that the bearing (Fig. 566,1) is free.
- Drive bearing outward.

▷ Drive in the bearing using a suitable tool without canting (see Part 2, section "Pin punch").

Installing bearing

- Lower and tip in telescopic arm so far that the bolt retainers are exactly aligned.
- Lightly grease bearing and pin.
- Drive in pin (Fig. 565,2) so that the markings on the pin and on the tool holder are exactly aligned.
- Insert bolt (Fig. 565,1) through the pin and secure with new nut (Fig. 565,3).

Completion work

- Lubricate bearing.

Attaching rear three-point linkage

- Carefully attach rear three-point linkage (Fig. 584,2) from the back to the frame so that the holes for the locking bolts are aligned.
- Insert 5 bolts (Fig. 584,1) per side with washers through the holes.
- Screw new lock nuts with washers onto thread and tighten.
- Unscrew bolts (Fig. 582,3) on both sides.
- Attach 1 lift cylinder (Fig. 582,4) on the bottom in each case on both sides.
- Insert 1 bolt (Fig. 582,3) per side with washer into the holes on the mounting (Fig. 582,2) and on the lift cylinder.
- Screw new lock nuts (Fig. 582,1) with washers and spring washers onto the thread and tighten so that the lift cylinder can still move in the mountings.
- Screw 2 hydraulic lines (Fig. 581,1) per side to the connections on the frame and tighten.

Completion work

- Check function of the rear three-point linkage.

14.6.8 Replacing power take-off shaft protection

Spare parts and auxiliary materials

Designation	Quantity
Power take-off shaft protection	1
Threadlocker (e.g. Loctite®)	AR

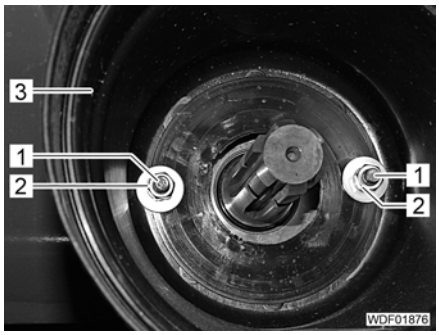


Fig. 585 Fastening of the power take-off shaft protection

Replacing protection

- Unscrew 2 nuts (Fig. 585,2).
- Remove power take-off shaft protection (Fig. 585,3).
- Attach new power take-off shaft protection (Fig. 585,3) to the threaded bolts (Fig. 585,1).
- Lightly coat threaded bolts with threadlocker.
- Screw 2 nuts (Fig. 585,2) with washers and spring washers onto thread and tighten.

▷ Do not touch the adhesive surfaces of the window glass.

▷ In the case of vertical mounting, use a spacer from the edge until the adhesive has hardened.

▷ In the case of vertical mounting, secure the window glass until the adhesive has hardened.

- Place window glass on the bead, align and press so far that the window glass terminates flat with the door.
- Let the adhesive harden (see installation instructions of the adhesive manufacturer).
- Attach seals and attachments, e.g. door handle.
- If necessary, seal individual places with sealant (e.g. silicone).

15.2.5 Replacing opening mechanism for the rear window

Spare parts and auxiliary materials

Designation	Quantity
Striker plate	1
Locking device	1
Rubber washer	1
Rubber washer	1

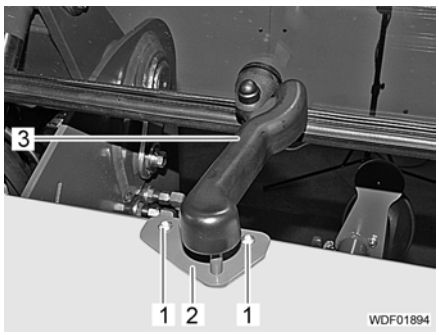


Fig. 601 Opener for rear window

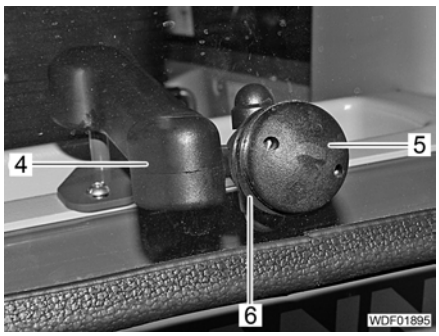


Fig. 602 Fastening of the locking device

Removing striker plate

- Detach locking device (3) upwards from the striker plate (2).
- Unscrew 2 bolts (1).
- Remove striker plate (2).

Attaching striker plate

- Attach new striker plate (2) to the cab.
- Screw in and tighten 2 bolts (1).
- Attach locking device (3) to the striker plate from above.

Removing locking device

- Detach locking device (3) upwards from the striker plate (2).
- Unscrew screw (5) using suitable aid (e.g. circlip pliers).
- Remove locking device (4).

- Attach cover (2).
- Screw in and tighten 2 bolts (1).

15.2.14 Replacing door handle

Spare parts and auxiliary materials

Designation	Quantity
Door handle	1

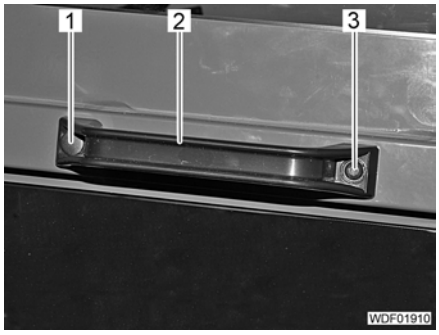


Fig. 618 Door handle

Replacing door handle

- Remove 1 cover cap (1) per side.
- Unscrew 1 screw (3) per side.
- Remove door handle (2).
- Attach new door handle (2) to the cab door.
- Screw in and tighten 2 screws (3).
- Press 2 cover caps (1) into the door handle.

15.2.15 Replacing retaining strap

Requirements

Ensure the following:

- The driver seat has been removed (see section “Replacing driver seat” on page 256).

Spare parts and auxiliary materials

Designation	Quantity
Retaining strap	1
Lock nut	1
Cover cap	2

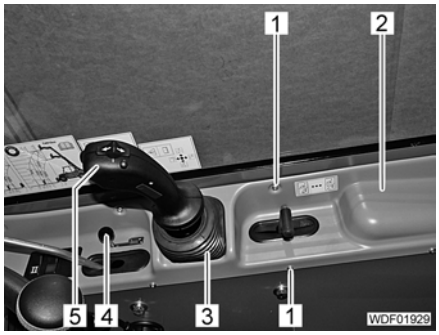


Fig. 637 Side panelling

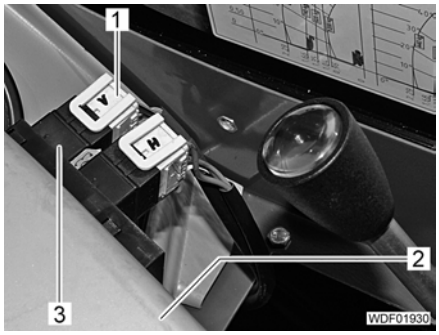


Fig. 638 Switches in the side panelling

Removing side panelling

- Carefully pull bellows (3) downwards out of the side panelling (2).
- Pull bellows up out of the guide on the multifunction lever (5) and remove upwards.
- Unscrew ball handle (4) from the locking lever.
- Unscrew 10 screws (1).
- Carefully unthread side panelling (2) upwards.
- Mark the connectors (6) to avoid mix-ups.
- Detach all connectors one after the other from the switches (8).
- Carefully remove all switches upwards out of the side panelling (7).
- Remove side panelling.

Installing side panelling

- Bring new side panelling (7) into the cab.
- Insert all switches (8) into the side panelling from above.
- Attach the connectors (6) to the corresponding switches.
- Carefully thread side panelling (2) over the operating lever.
- Align side panelling.
- Screw in 10 screws (1).
- Screw ball handle (4) onto the thread on the locking lever.
- Pull bellows (3) from above over the multifunction lever (5).
- Carefully press bellows into the guide on the multifunction lever.
- Press bellows down into the side panelling.

Completion work

- Attach rear panelling.
- Install driver seat.

15.4.6 Replacing rear panelling

Spare parts and auxiliary materials

Designation	Quantity
Cab panelling	1

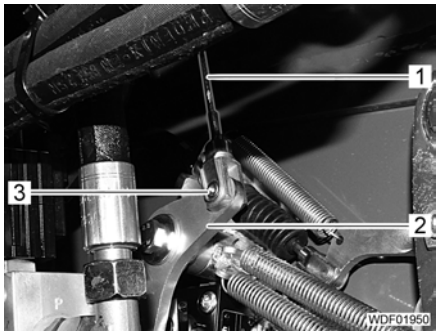


Fig. 658 Bottom fastening of the pulling cable

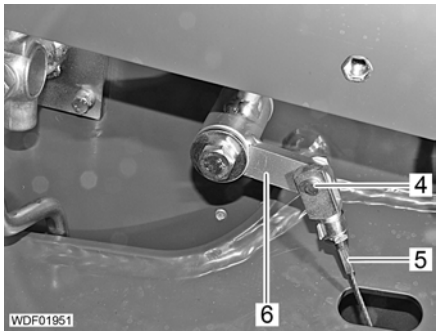


Fig. 659 Top fastening of the pulling cable

Removing pulling cable

- Release pin (3) on the fork head of the pulling cable (1) and remove.
- Remove pulling cable from the shift lever (2).
- Release pin (4) on the fork head of the pulling cable (5) and remove.
- Remove pulling cable from the operating lever (6).
- Remove pulling cable upwards.

Installing pulling cable

- Thread pulling cable (5) from above.
- Attach fork head of the pulling cable to the operating lever (6).
- Insert pin (4) through the holes in the fork head and operating lever and secure.
- Attach fork head of the pulling cable (1) to the shift lever (2).
- Insert pin (3) through the holes in the fork head and shift lever and secure.

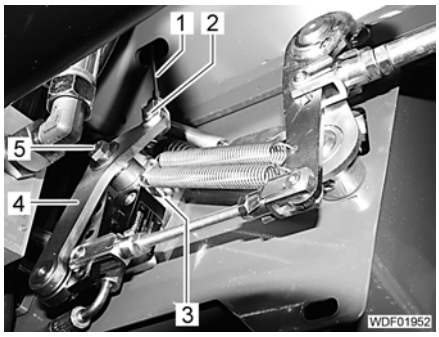


Fig. 660 Shift lever

Removing shift lever

- Release pin (2) on the fork head of the pulling cable (1) and remove.
- Remove pulling cable from the shift lever (4).
- Unscrew bolt (5).
- Remove shift lever (4).

Attaching shift lever

- Attach shift lever (4) to the spigot on the mounting (3).
- Screw in bolt (5) with large diameter washer and spring washer and tighten.
- Attach fork head of the pulling cable (1) to the shift lever.
- Insert pin (2) through the holes in the fork head and shift lever and secure.

Completion work

- Check function of the manual inching.
- Attach cover plate.

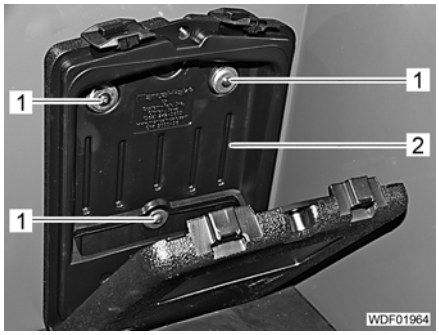


Fig. 689 Documents box

Removing documents box

- Open documents box.
- Unscrew 3 bolts (1).
- Remove documents box (2).

▷ There are two washers per bolt between documents box and cab.

Attaching documents box

- Insert 3 bolts (1) with washers into the holes of the documents box.
- Put 2 washers on each bolt.
- Attach documents box (2) to the cab wall.
- Screw in and tighten 3 bolts.
- Close documents box.

15.7 Steering column

15.7.1 Replacing steering wheel knob

Spare parts and auxiliary materials

Designation	Quantity
Steering wheel knob	1

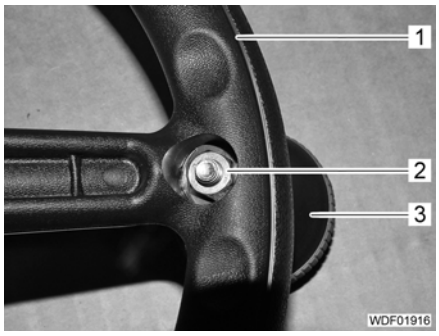


Fig. 690 Fastening for steering wheel knob

Replacing steering wheel knob

- Unscrew nut (2).
- Remove steering wheel knob (3) from the steering wheel (1).

Spare parts and auxiliary materials

Designation	Quantity
Windscreen wiper motor	1

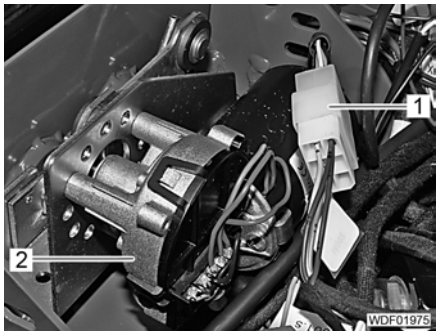


Fig. 707 Windscreen wiper motor

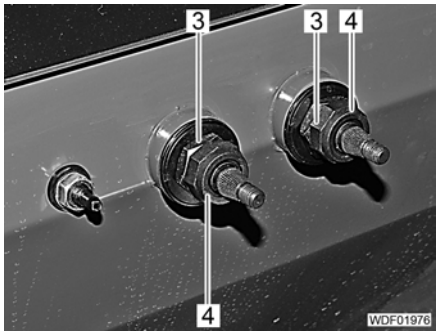


Fig. 708 Fastening for windscreen wiper motor

Removing windscreen wiper motor

- Detach connector (1).
- Unscrew 2 plastic caps (4).
- Unscrew 2 nuts (3).
- Remove windscreen wiper motor (2) from the back.

Installing windscreen wiper motor

- Insert windscreen wiper motor (2) from the inside into the holes on the cab.
- Screw 2 nuts (3) with washer and sealing ring onto the threaded pins and tighten.
- Screw 2 plastic caps (4) onto the threaded pins and tighten.
- Connect connector (1).

Completion work

- Fasten instrument panel (see section 15.4.2 "Detaching and fastening instrument panel").
- Attach windscreen wiper arm (see section 15.2.2 "Replacing windscreen wiper arm").

16.2 Switches and sensors

16.2.1 Replacing battery disconnector

Requirements

Ensure the following:

- The battery has been disconnected (see operating manual "Disconnecting and connecting battery / battery replacement").

Spare parts and auxiliary materials

Designation	Quantity
Battery disconnector	1

16.2.12 Replacing tank sensor

▶ **WARNING**

Explosion and fire hazard!

Do not smoke when handling fuel and avoid open light or flames!

Do not use petrol as an additive to the diesel fuel!

▷ Prevent environmental damage! Collect discharging fuel and dispose of it in accordance with the environmental regulations.

▷ If the fuel tank is too full, fuel can escape from the opening of the tank sensor.

Drain the fuel tank until the fuel level is underneath the opening of the tank sensor.

Requirements

Ensure the following:

- The holder for the air filter has been removed (see section 14.2.5 "Replacing holder for air filter").

Spare parts and auxiliary materials

Designation	Quantity
Tank sensor	1
Hose clamp	2

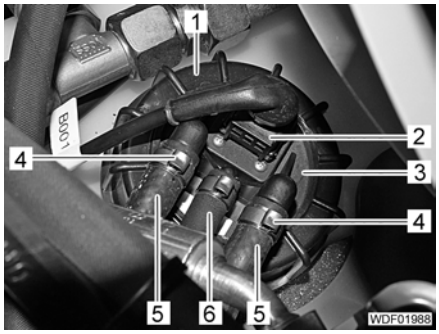


Fig. 731 Connections on the tank sensor

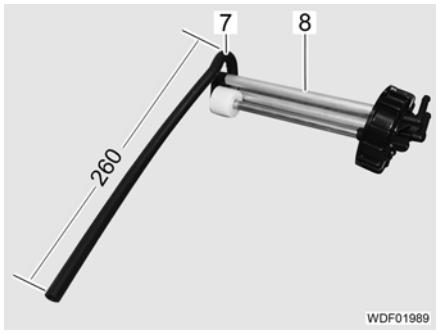


Fig. 732 Tank sensor

Removing tank sensor

- Unlock connector (2) and remove.
- Mark fuel lines (5) (inlet and outlet side) to avoid mix-ups.
- Seal fuel lines.
- Remove 2 hose clamps (4).
- Remove fuel lines from tank sensor (3).
- Unscrew union nut (1).
- Remove tank sensor.
- If necessary, remove breather hose (6) for fuel tank (see section 10.4.7 "Replacing breather hose for fuel tank").

Installing tank sensor

- If necessary, attach breather hose (6) for fuel tank (see section 10.4.7 "Replacing breather hose for fuel tank").

- Tighten bolt.
- Attach 2 connectors (2) to the connections on the horn (1).

16.4.4 Replacing warning buzzer (option)

Spare parts and auxiliary materials

Designation	Quantity
Warning buzzer	1

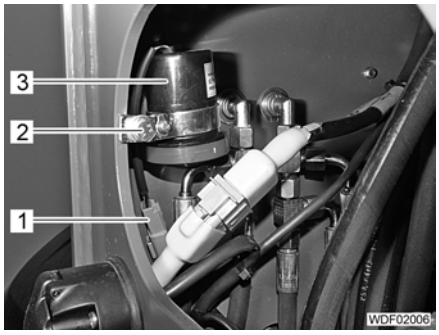


Fig. 752 Warning buzzer

Replacing warning buzzer

- Unlock connector (1) and detach.
- Unscrew bolt (2).
- Remove warning buzzer (3).
- Attach new warning buzzer (3) to frame.
- Screw in bolt (2) with washer and spring washer and tighten.
- Connect and secure connector (1).

16.4.5 Replacing power socket (12 V)

Requirements

Ensure the following:

- The instrument panel has been detached (see section 15.4.2 "Detaching and fastening instrument panel").

Spare parts and auxiliary materials

Designation	Quantity
Power socket	1

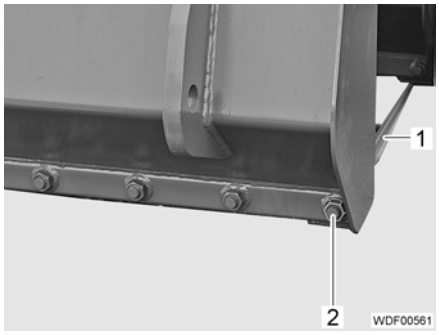


Fig. 769 Fastening of the tine

Replacing tine

- Unscrew nut (2).
- Remove tine (1).
- Insert new tine (1).
- Grease thread of the tine.
- Screw nut (2) onto the tine and tighten.

17.4 Replacing hydraulic cylinder of the silage fork

▷ Note the "Safety regulations for work on the hydraulic system" (see Part 1 "Safety").

▷ This section describes the replacement of one hydraulic cylinder.
The second hydraulic cylinder is replaced in the same way.

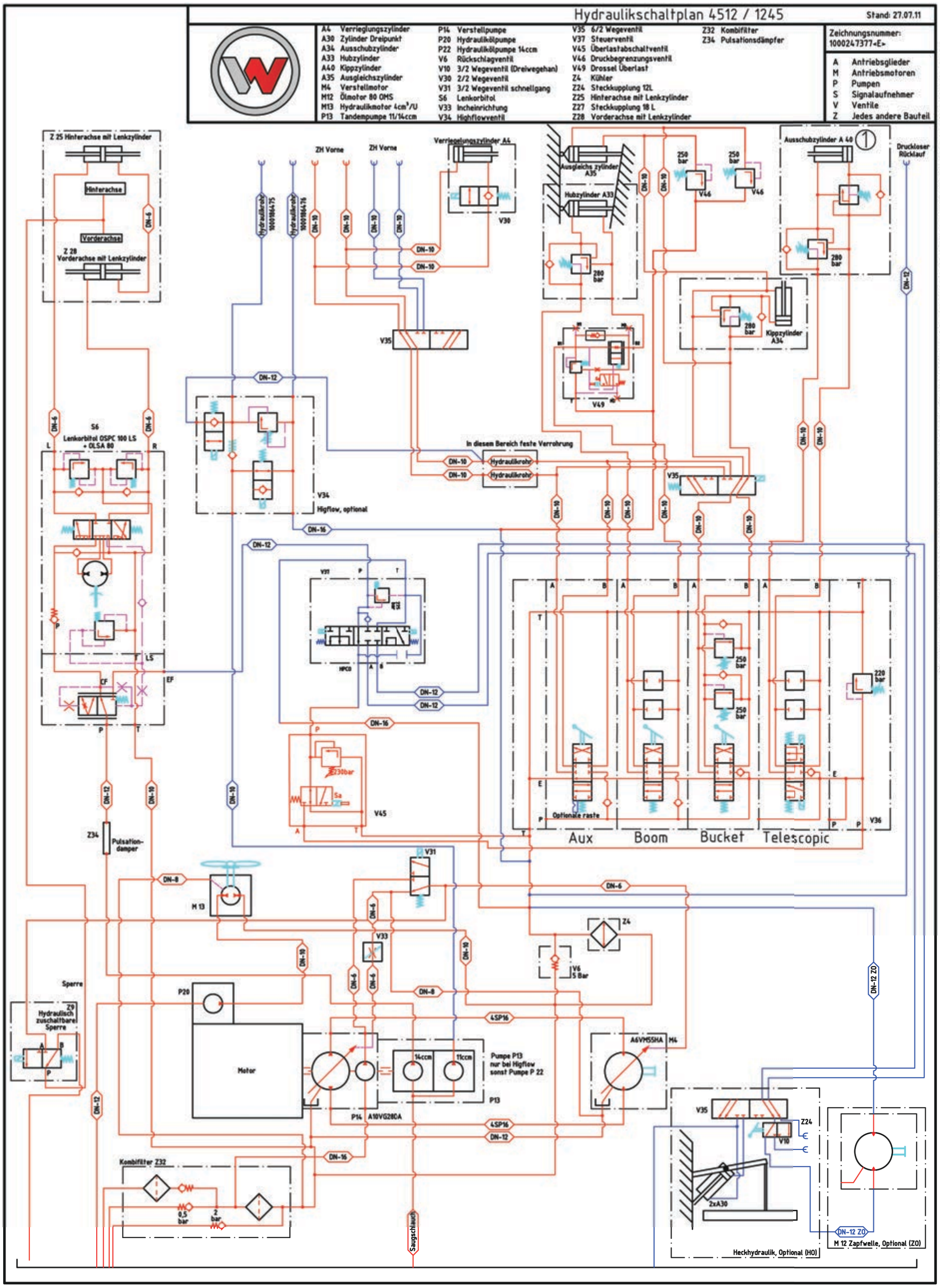
Requirements

Ensure the following:

- The hydraulic system of the silage fork has been depressurised (e.g. by uncoupling the silage fork).

Spare parts and auxiliary materials

Designation	Quantity
Hydraulic cylinder	1



Hydraulikschaltplan 4512 / 1245
Stand: 27.07.11
A4 Verrieglungszylinder
A30 Zylinder Dreipunkt
A34 Ausschubzylinder
A33 Hubzylinder
A40 Kippzylinder
A35 Ausgleichszylinder
M4 Verstellmotor
M12 Ölmotor 80 OMS
M13 Hydraulikmotor 4cm³/U
P13 Tandempumpe 11/14ccm
P14 Verstellpumpe
P20 Hydraulikölpumpe
P22 Hydraulikölpumpe 14ccm
V6 Rückschlagventil
V10 3/2 Wegeventil (Dreiwegehan)
V30 2/2 Wegeventil
V31 3/2 Wegeventil schnellgang
S6 Lenkorbitol
V33 Incheinrichtung
V34 Highflowventil
V35 6/2 Wegeventil
V37 Steuerventil
V45 Überlastabschaltventil
V46 Druckbegrenzungsventil
V49 Drossel Überlast
Z4 Kühler
Z24 Steckkupplung 12L
Z25 Hinterachse mit Lenkzylinder
Z27 Steckkupplung 18 L
Z28 Vorderachse mit Lenkzylinder
Z32 Kombifilter
Z34 Pulsationsdämpfer
Zeichnungsnummer: 1000247377<E>
A Antriebsglieder
M Antriebsmotoren
P Pumpen
S Signalaufnehmer
V Ventile
Z Jedes andere Bauteil
Z 25 Hinterachse mit Lenkzylinder
Hinterachse
Vorderachse
Z 28 Vorderachse mit Lenkzylinder
ZH Vorne
Verriegelungszylinder A4
Ausgleichs zylinder A35
Hubzylinder A33
Ausschubzylinder A 40
Druckloser Rücklauf
Kippzylinder A34
S6 Lenkorbitol OSPC 100 LS + OLSA 80
V34 Higflow, optional
In diesem Bereich feste Verrohrung
Hydraulikrohr
Aux
Boom
Bucket
Telescopic
Optionale raste
V36
V45
Z34 Pulsation-damper
M 13
Sperre
Z9 Hydraulisch zuschaltbare Sperre
Motor
P14 A10VG28DA
Pumpe P13 nur bei Higflow sonst Pumpe P 22
A6VM55HA M4
Kombifilter Z32
Saugschlauch
Heckhydraulik, Optional (HO)
M 12 Zapfwelle, Optional (ZO)

4. Abbreviations

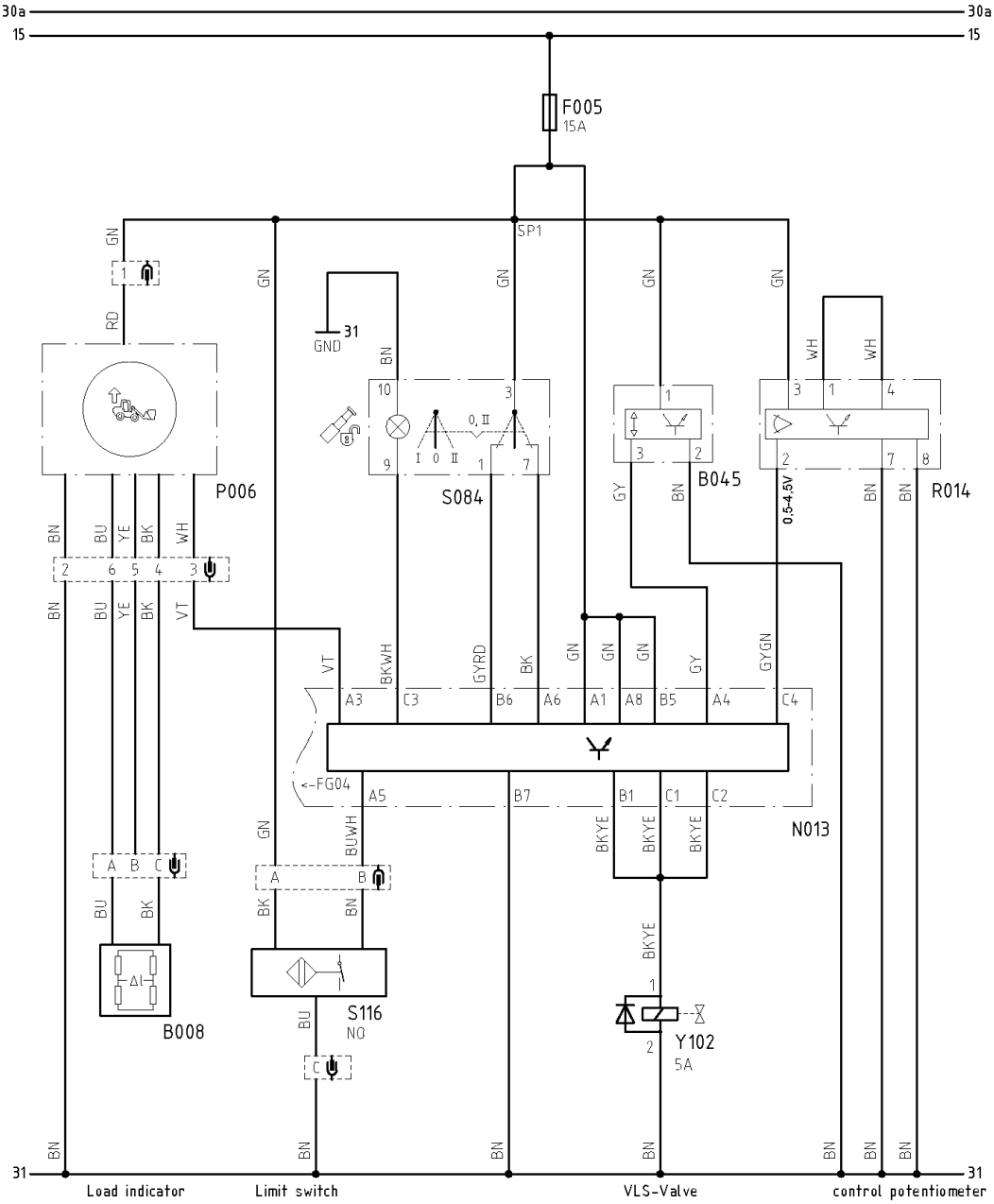
Cable colours and diameters

Abbrev.	DE	EN	FR	ES
BK	Schwarz	Black	Noir	Negro
BN	Braun	Brown	Brune	Marrón
RD	Rot	Red	Rouge	Rojo
OG	Orange	Orange	Orange	Naranja
YE	Gelb	Yellow	Jaune	Amarillo
GN	Grün	Green	Vert	Verde
BU	Blau	Blue	Bleu	Azul
VT	Violett	Violet	Violet	Violeta
GY	Grau	Grey	Grise	Gris
WH	Weiß	White	Blanc	Blanco
PK	Pink	Pink	Rose	Fucsia
GD	Gold	Gold	Or	Oro
TQ	Türkis	Turquise	Turquoise	Turquesa
SR	Silber	Silver	Argent	Color- Plata

Examples of multicolored wires:
BK/YE black/yellow
WH/RD white/red

Example cable cross section:
BK-1,5 black 1,5mm²
Wires without indicated dimensions are standard wires with 1,0 mm².

Rev. 700002694 Version 05	TH412	Überlastkontrolle, Vertikal Lift System Loadmoment control, VLS	FG08



This chapter contains detailed information for the electrical system of the loader.

Connector pin assignment

Plug connectors connect electrical cables with each other or to electrical components which are permanently installed (e.g. temperature sensor).

The connector pin assignments are listed in tables.

The contacts are shown from the cable side (left picture).

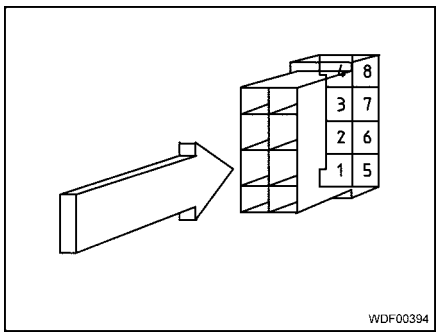


Fig. 773 Display of the contacts

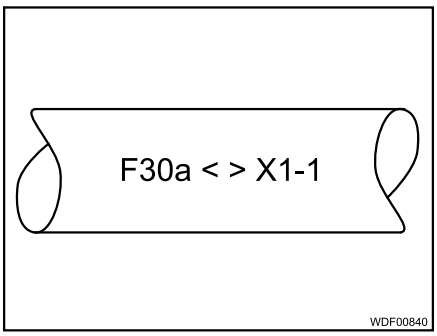


Fig. 774 Printing (example)

Contact assignment

The assignment of the contacts of electrical components (e.g. of the control unit) is listed in tables.

Printing

The wires of the cable harnesses are printed (right picture). The printing shows the start and destination connection of the wire. The example (right picture) shows a wire which goes from the main fuse F30a to the connector X1, contact 1. If multiple start or destination connections are possible, only one of the possibilities is printed.

The telescopic loader consists of a vehicle frame, the drive and the axles.

The vehicle frame contains all the drive and control units of the standard equipment of the loader. The lifting frame and the cab are attached to the frame.

21.1 Engine

A diesel engine produces the required power.

The diesel engine drives both the displacement pump for the drive hydraulics as well as the gear pump for the working and steering hydraulics.

The following picture shows the operating and drive side of the engine.

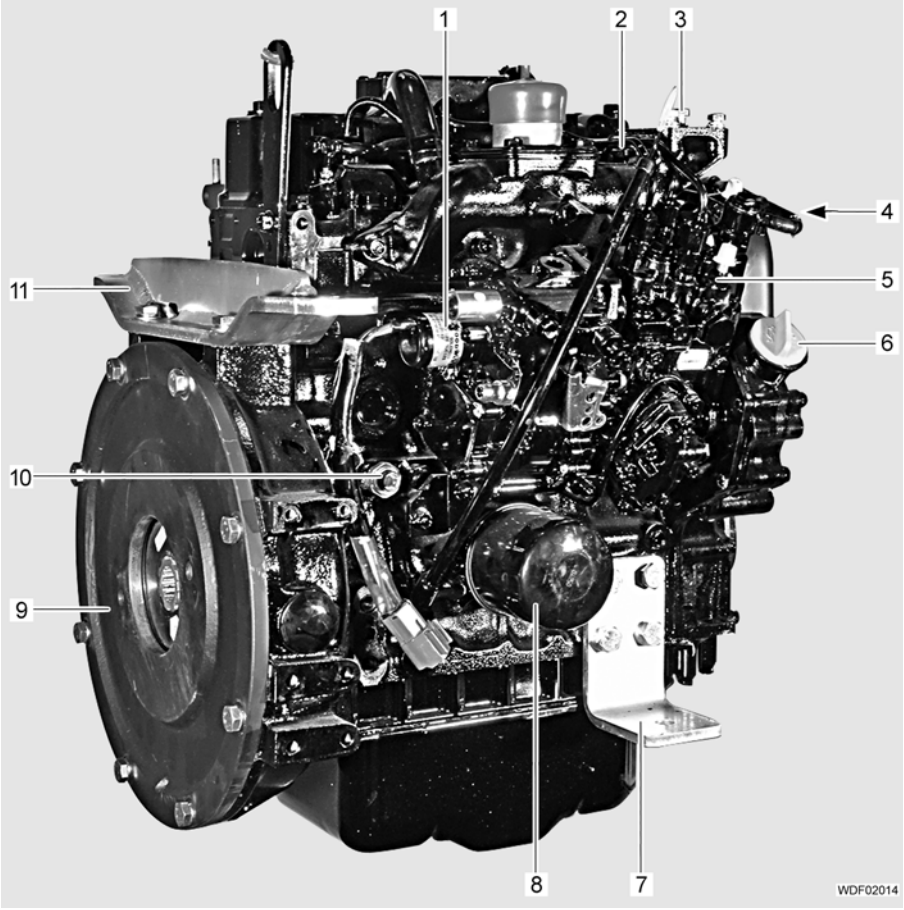


Fig. 776 Operating and drive side of the engine

1 Stop solenoid
2 Injection line
3 Oil dipstick
4 Temperature sensor
5 Injection pump
6 Oil filler neck
7 Engine mounting
8 Oil filter
9 Coupling flange
10 Oil pressure switch
11 Engine mounting

This part of the repair manual summarises the documents of the suppliers of assemblies or components.

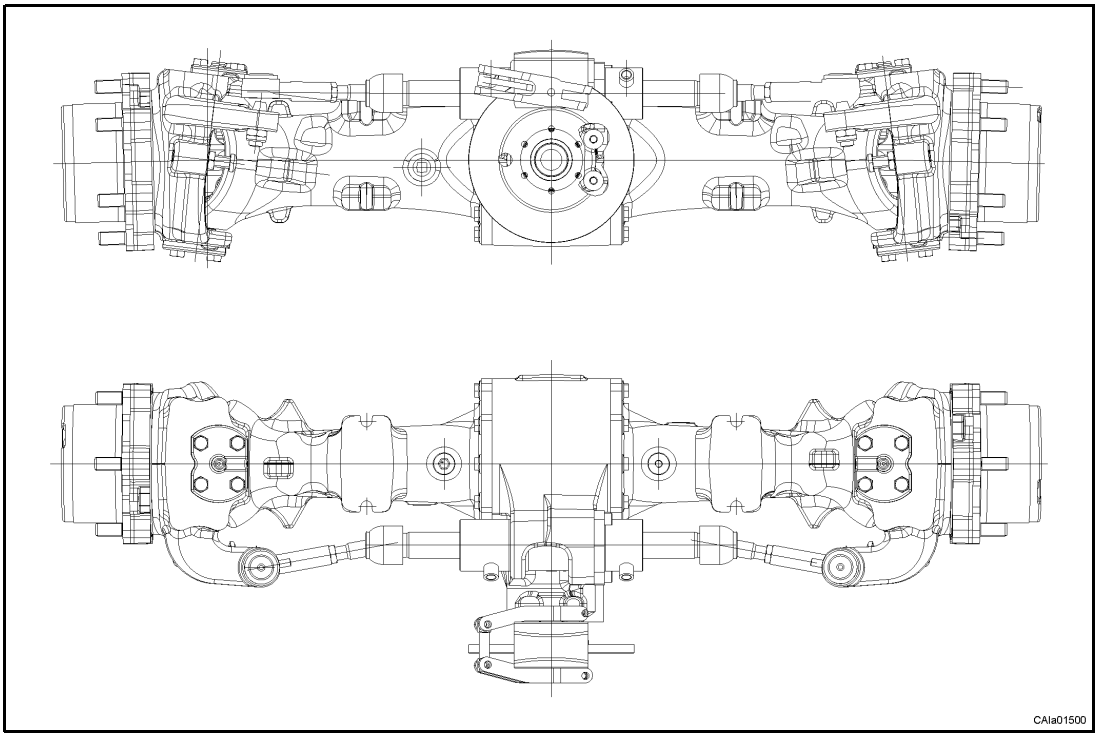
Supplement the necessary documents and keep them up to date.

If you need additional documents, contact the Customer Service of the loader manufacturer (see "Service Address") or the Customer Service of the supplier.

Recommended documents are:

- Operating manual of the engine manufacturer
- Workshop manual of the engine manufacturer
- Repair instructions of the displacement pump manufacturer
- Repair instructions of the displacement engine manufacturer
- Workshop manuals of the axle manufacturer
- Installation instructions of the electrical components

CARRARO DRIVETECH



MANUALE DI RIPARAZIONE
REPAIR MANUAL

ASSALE ANTERIORE - *FRONT AXLE*
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ROAD

Road Deutschland GmbH
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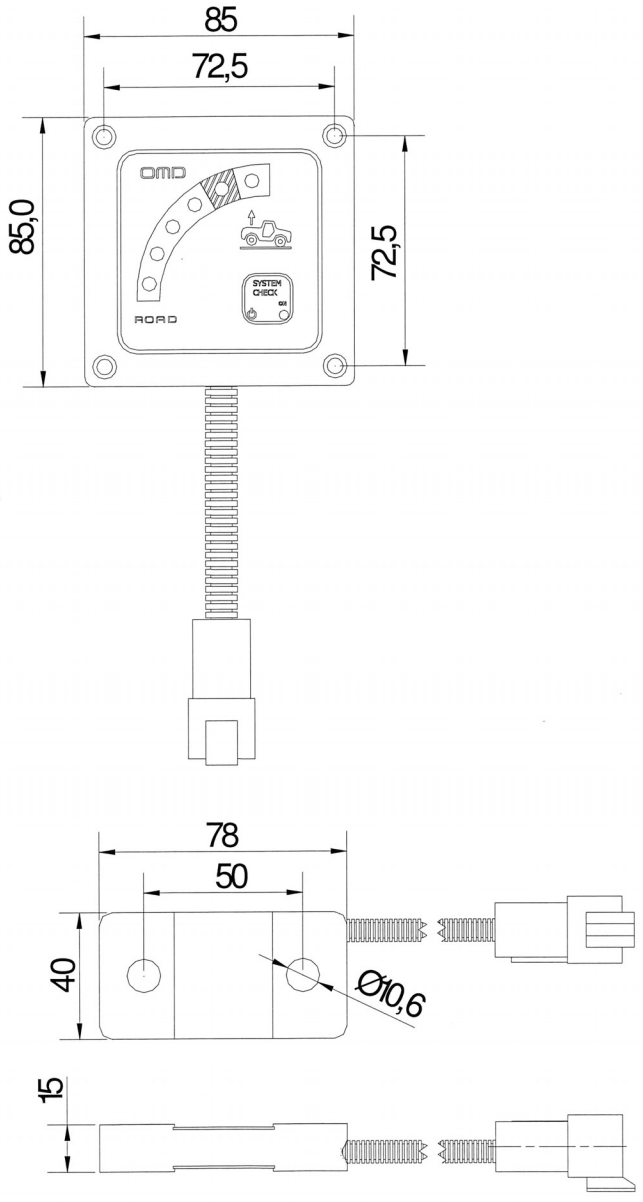
Elektronische Lastanzeige OMD

Montage- und Bedienungsanleitung

6. Abmessungen



3. Abbreviations

Wiring color codes

Abbrev.	DE	EN	FR	ES
BK	Schwarz	Black	Noir	Negro
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GD	Gold	Gold	Or	Oro
TQ	Türkis	Turquise	Turquoise	Turquesa
SR	Silber	Silver	Argent	Color- Plata

examples of multi-colored cables:
BKYE black/yellow
WHRD white /red

examples of cable cross-sections:
BK-1,5 black 1,5mm²
cables without diameter identified are standard size 1,0mm².

The circuit diagram has optional features in addition to its basic equipment.
*StVZO – German Road Traffic Licensing Regulations