ML42
ML43
Wheel Loader

SERVICE MANUAL

PART #50940189

Revision A - 05/13

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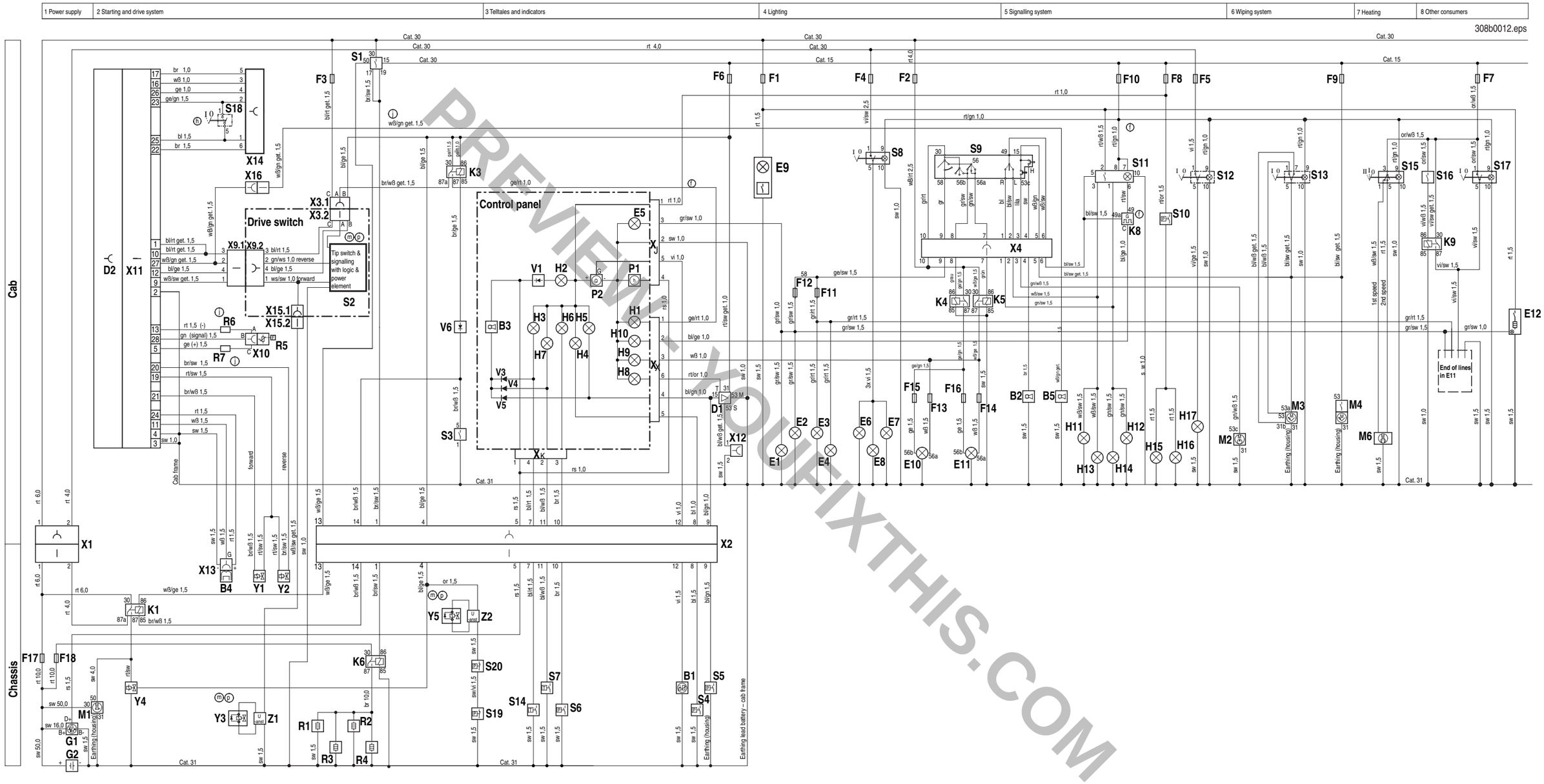
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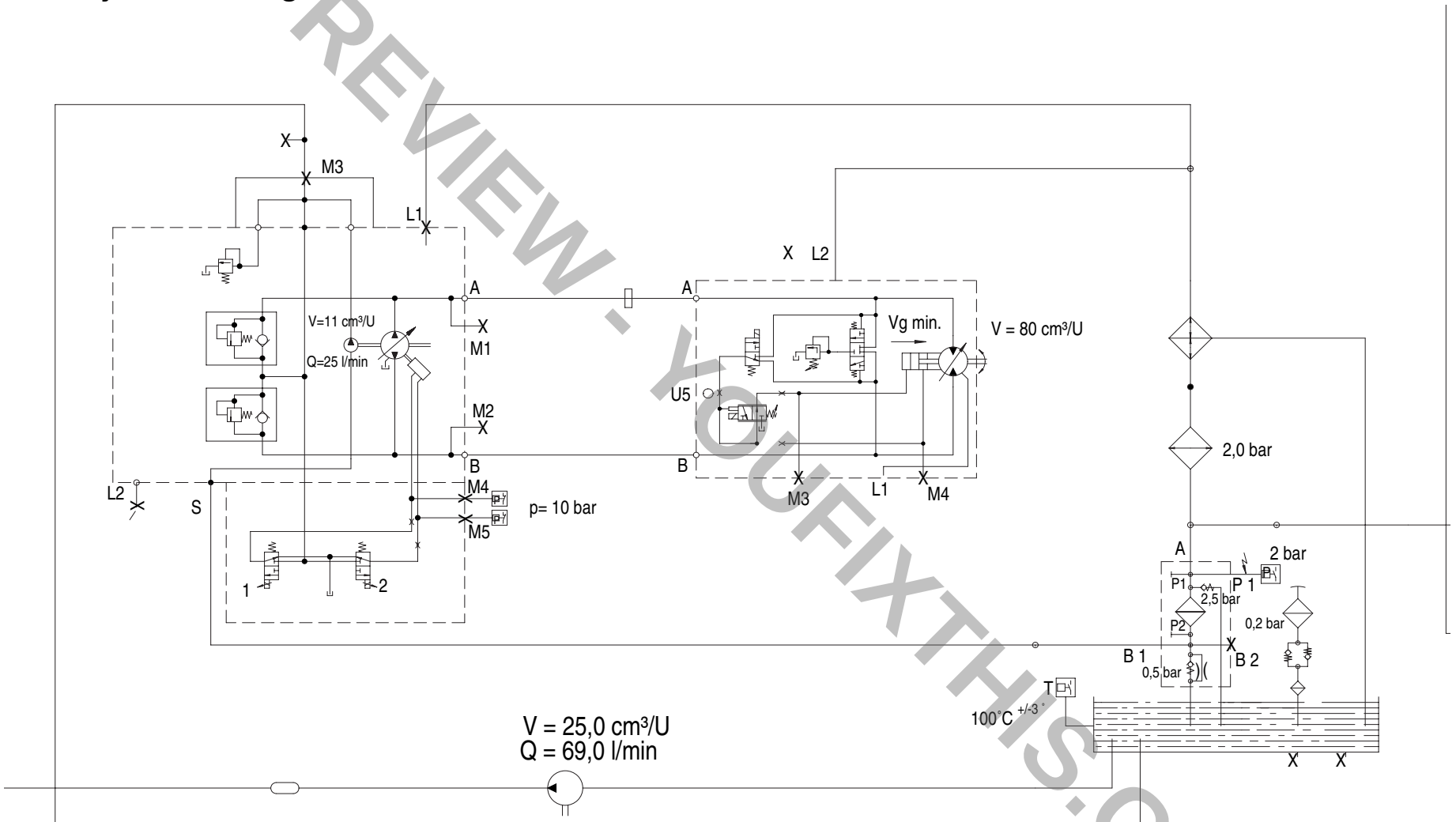
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Electrical diagram

Model 308 63 / 311 66 / 311 00 – standard equipment
valid from serial no.: 308 63 0001,
311 66 0001 and 311 00 0001
0 16 001 00 90 – p (03/99)

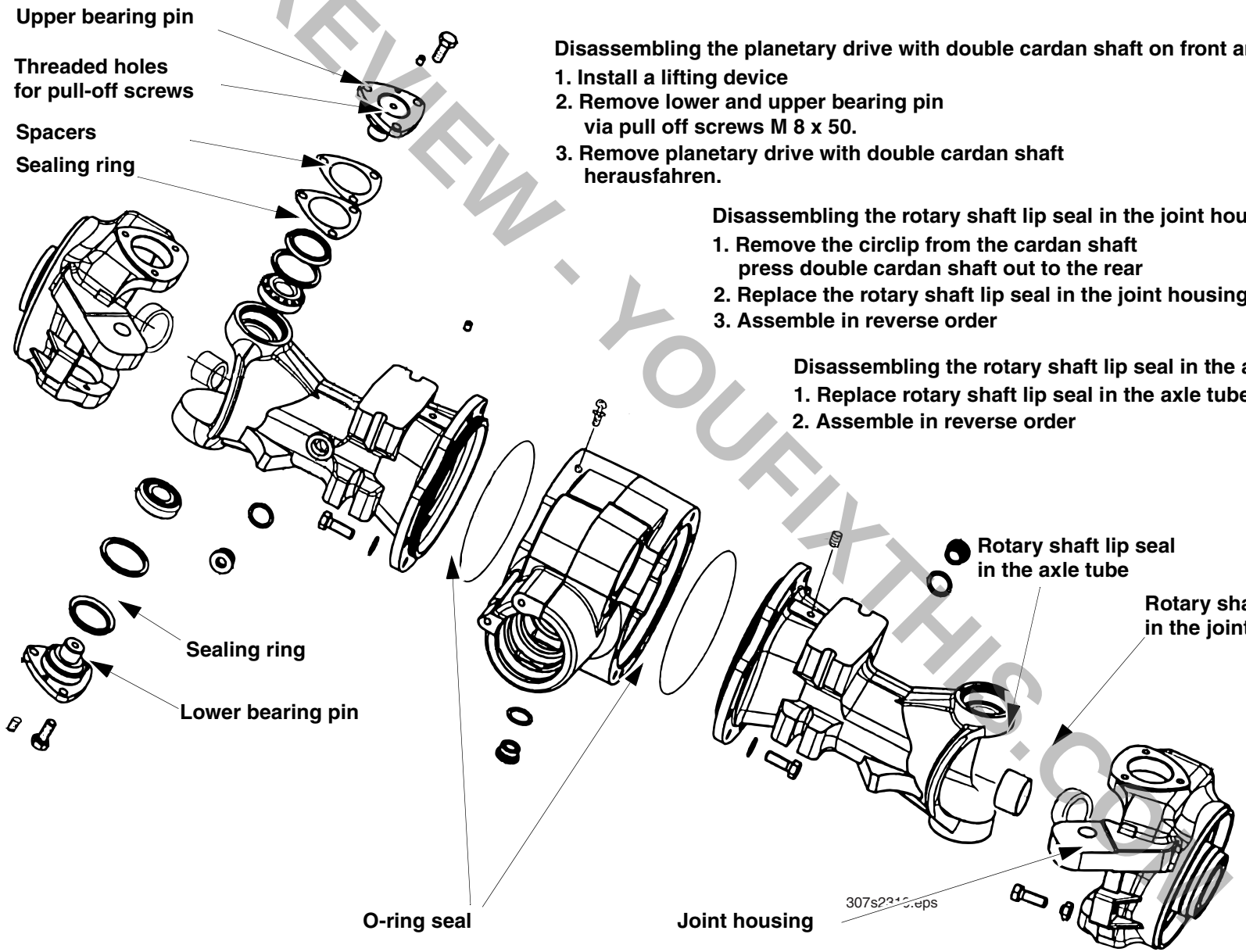
22.6 Hydraulics diagram – drive



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23.2.1 Axle body and planetary drive on front and rear axle



Disassembling the planetary drive with double cardan shaft on front and rear axle:

1. Install a lifting device
2. Remove lower and upper bearing pin via pull off screws M 8 x 50.
3. Remove planetary drive with double cardan shaft herausfahren.

Disassembling the rotary shaft lip seal in the joint housing:

1. Remove the circlip from the cardan shaft press double cardan shaft out to the rear
2. Replace the rotary shaft lip seal in the joint housing.
3. Assemble in reverse order

Disassembling the rotary shaft lip seal in the axle tube:

1. Replace rotary shaft lip seal in the axle tube
2. Assemble in reverse order

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TD.1.17 Tightening torques

General tightening torques

Screw dimensions	Tightening torques in Nm[1]		
	8.8	10.9	12.9
M 4	3	4	5
M 5	5,5	8	10
M 6	10	14	16
M 8	23	34	40
M 10	46	67	79
M 12	79	115	135
M 14	125	185	220
M 16	195	290	340
M 18	280	400	470
M 20	395	560	660
M 22	540	760	890
M 24	680	970	1150
M 27	1000	1450	1700
M 30	1350	1950	2300

1. These values are valid for screws with untreated, non-lubricated surfaces.

Specific tightening torques

Description	Tightening torque
Wheel nut	420 Nm
Track-rod end (steering ram)	160 Nm
Piston rod (steering ram/track rod)	250 Nm
Front axle mounting	600 Nm

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01.8 Cylinder head

01.8.1 To remove and to fit

Special tools:

Torque spanner

14 mm extended socket spanner

To remove

Danger!

Do not remove the radiator filler cap while the engine is hot and while the coolant is under pressure, because hot coolant can be discharged. Danger of personal injury!

Caution!

When the cylinder head is removed, some coolant may enter the cylinder bores and the threaded holes for the cylinder setscrews. Remove any coolant immediately to prevent corrosion.

1 Drain the cooling system.

2 Disconnect the battery.

3 Remove the air filter/air filter hose from the induction manifold.

4 Remove the crankcase ventilation hose from the induction manifold and the crankcase.

Danger!

Use a separate spanner to prevent movement of the outlet connections of the fuel injection pump when the union nuts on injection lines are released or tightened.

5 Remove the injection lines. Fit suitable covers to all open connections on the fuel injection pump and the atomizers.

6 Remove the induction manifold and gasket.

7 Remove the exhaust manifold and gasket.

8 Remove the leak oil line which is fitted between the fuel filter and the leak-off connections on the injection nozzle holders.

9 Remove the injection nozzles – see 01.11 *Fuel system* on page 01-14. Fit suitable covers to the nozzle holders and to the leak oil line.

10 Disconnect the cable connections on the glow plugs.

11 Remove the glow plugs – see 01.14 *Glow plugs* on page 01-20.

12 Release the clips on the hose which is fitted between the coolant pump and the thermostat housing and remove the hose.

13 Disconnect the coolant temperature sensor.

14 Remove the rocker cover – see 01.5 *Valve cover* on page 01-6.

15 Remove the rocker shaft assembly – see 01.6 *Rocker-arm shaft* on page 01-7.

16 Remove the push rods and note their relative positions

.

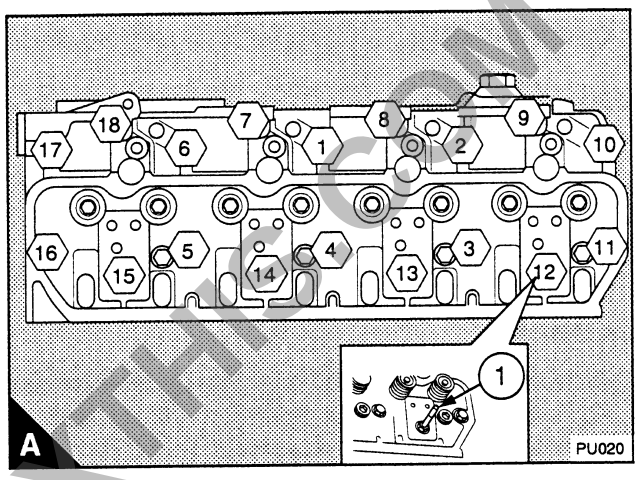


Fig. A:

17 Release the cylinder-head bolts evenly and gradually in the reverse order to that shown in figure (A). To release the 4 bolts (A1), use a 14 mm extended socket spanner. Check the bolts for damage and replace them if necessary.

Caution!

Do not use a lever to separate the cylinder head from the cylinder block.

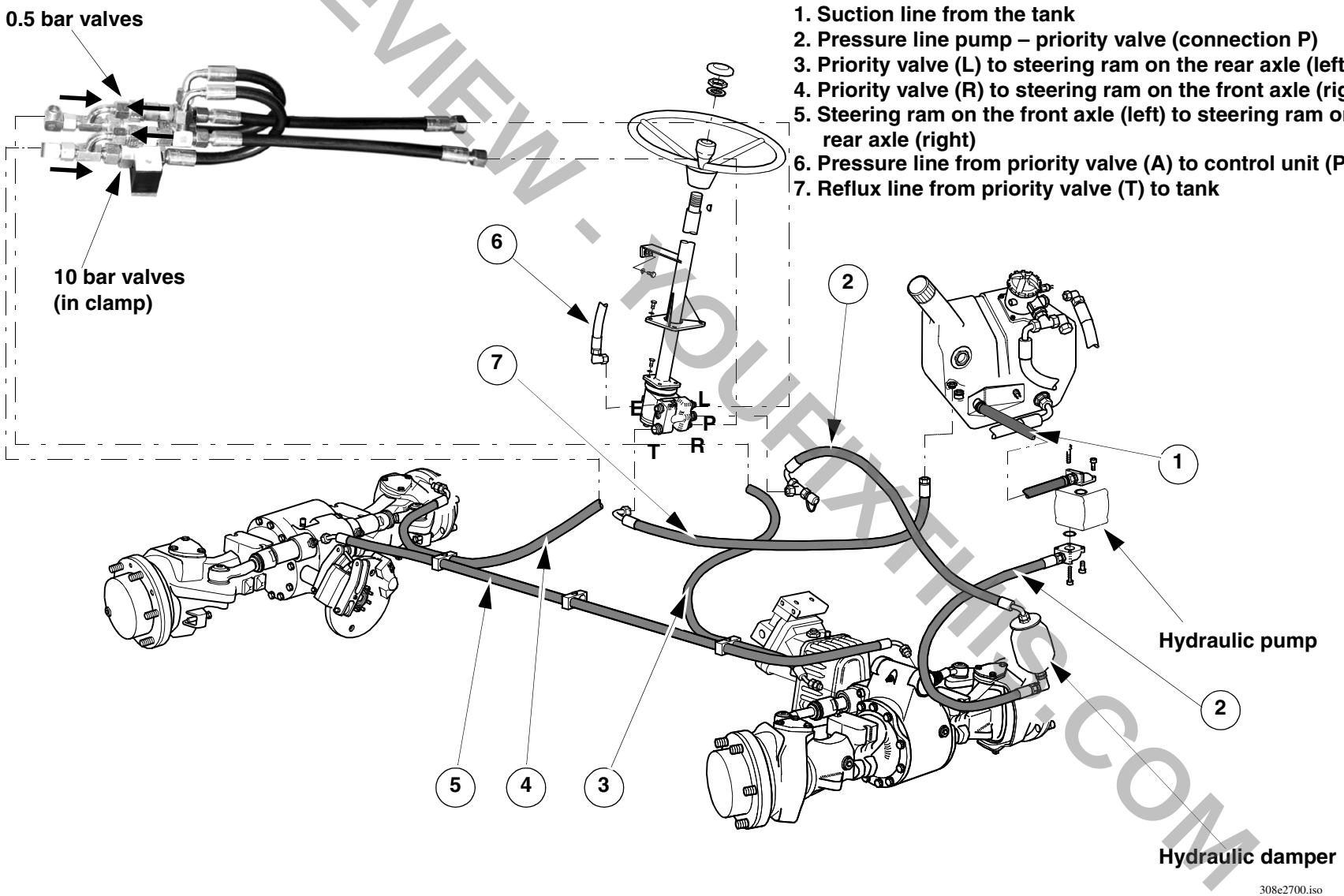
18 Remove the cylinder head and put it on a surface that will not damage the face of the cylinder head.

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27 Steering

27.1 Steering circuit for 318 / 418 / 418 Telescopic model: 308 63 / 311 66 / 311 00



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01.15Troubleshooting

01.15.1 Problems and possible causes

Problem	Possible causes	
	Checked by operator	Checked by workshop
Starter turns too slowly	1, 2, 3, 4	
Engine does not start	5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 17	34, 35, 36, 37, 38, 42, 43, 44
Engine not easy to start	5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19	34, 36, 37, 38, 40, 42, 43, 44
Insufficient output	8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20, 21	34, 36, 37, 38, 39, 42, 43, 44, 63
Interrupted engine operation	8, 9, 10, 12, 13, 15, 20, 22	34, 36, 37, 38, 39, 40, 41, 43
High fuel consumption	11, 13, 15, 17, 18, 19, 21, 22	34, 36, 37, 38, 39, 40, 42, 43, 44, 63
Black smoke	11, 13, 15, 17, 19, 21, 22	34, 36, 37, 38, 39, 40, 42, 43, 44, 63
Blue or white smoke	4, 15, 21, 23	36, 37, 38, 39, 42, 44, 45, 52, 58, 62
Oil pressure too low	4, 24, 25, 26	46, 47, 48, 50, 51, 59
Engine knocks	9, 13, 15, 17, 20, 22, 23	36, 37, 40, 42, 44, 46, 52, 53, 60
Irregular engine revs	7, 8, 9, 10, 11, 12, 13, 15, 16, 18, 20, 22, 23	34, 38, 40, 41, 44, 52, 60
Vibrations	13, 18, 20, 27, 28	34, 38, 39, 40, 41, 44, 52, 54
Oil pressure too high	4, 25	49
Engine temperature too high	11, 13, 15, 19, 27, 29, 30, 32, 65	34, 36, 37, 39, 52, 55, 56, 57
Pressure in crankcase too high	31, 33	39, 42, 44, 45, 52
Compression too low	11, 22	37, 39, 40, 42, 43, 44, 45, 53, 60
Engine starts and stops right after	10, 11, 12	

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TD Specifications

TD.1 Wheel loader 318 / 418

TD.1.1 Frame

Sturdy steel sheet frame, rubber-mounted engine

TD.1.2 Engine

Engine	318 (model 308 63)	418 (model 311 66)
Product	Perkins diesel engine	
Model	704-30	
Design	Vertical, water-cooled 4-stroke diesel engine	
No. of cylinders	4	
Displacement	2955 cm^3	
Nominal bore and stroke	97 x 100 mm	
Compression ratio	17.5:1	
Power	37 kW at 2300 min^{-1}	44 kW at 2300 min^{-1}
Max. torque	175 Nm at 1600 min^{-1}	210 Nm at 1600 min^{-1}
Specific fuel consumption	215 g/kWh	
Fuel injection system	Direct fuel injection	
Firing order	1 – 3 – 4 – 2	
Starting aid	Glow plug	
Max. inclined position (engine no longer supplied with oil):	25 % in all directions Observe tilting limit of the vehicle!	
Oil pressure	4.2 bar	
Valve tip clearance	Intake, exhaust valve 0.35 mm, engine at cold temperature respectively	

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00.12 Maintenance plan 318 / 418, models 308 63 / 311 66 (overview)

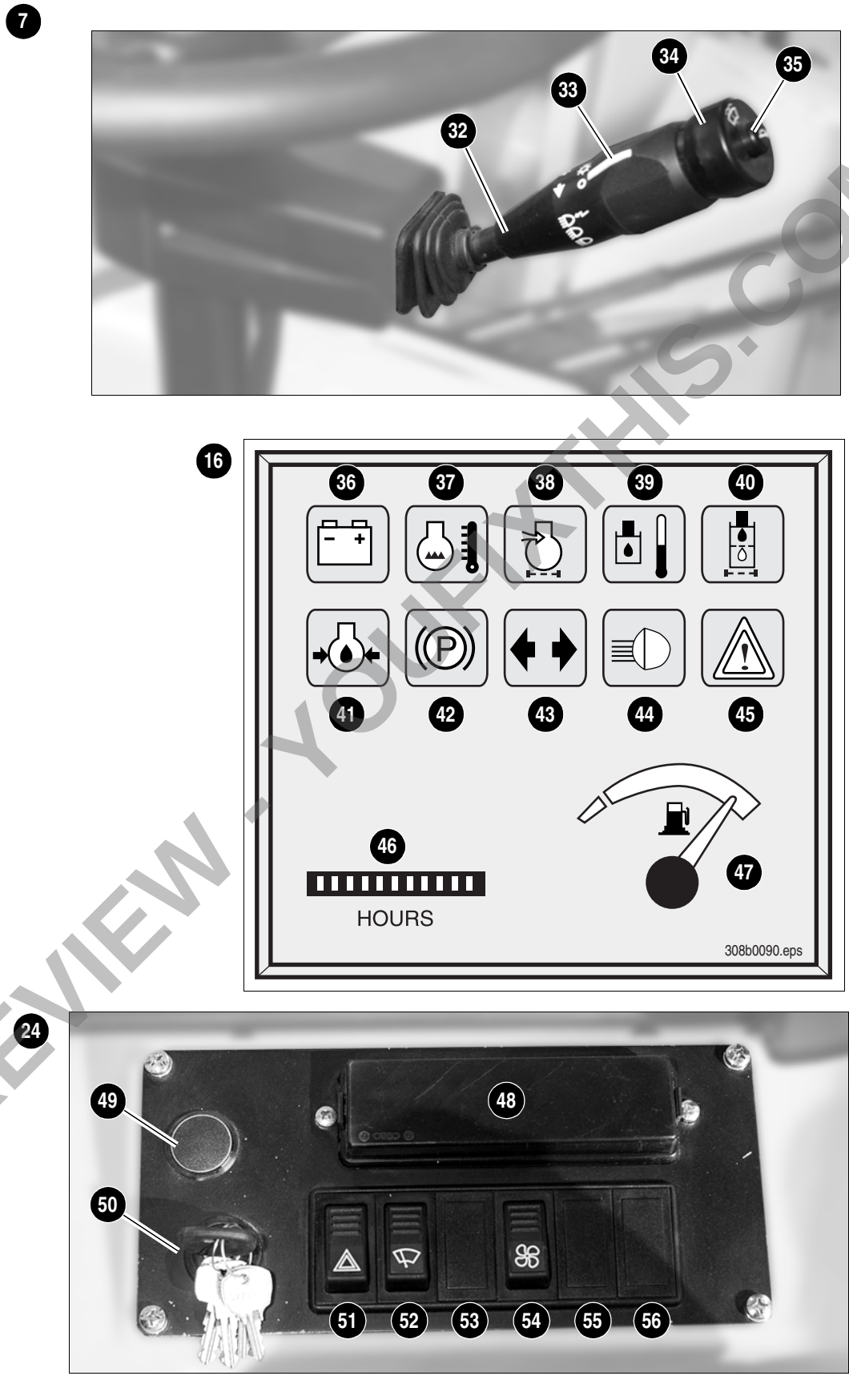
Work description For service and maintenance work on the diesel engine/implement, please refer to the operation and maintenance manual of the engine/implement manufacturer as well.		Maintenance plan/service hours					
	Ref. no. in lubrication plan	Maintenance work every 10 hours (daily)	Delivery inspection	"A" every 50 hours every week	1st Inspection[1] at 100 hours	"B" every 600 hours[2] 2nd Inspection	"C" every 1200 hours yearly
Oil and filter changes ( ):							
Carry out the following oil and filter changes (check oil levels after test run):							
• Engine oil					●	●	●
• Engine oil filter					●	●	●
• Fuel filter						●	●
• Air filter insert[3]							●
• Gearbox oil in front and rear axle differentials/gearbox					●		●
• Gearbox oil in front and rear axle planetary drives, left and right side					●		●
• Hydraulic oil [4]							●
• Hydraulic oil filter insert [3]					●		●
• Breather – hydraulic oil tank							●
Inspection work ( ):							
Check the following material. Refill if necessary:							
• Engine oil		●	●	●			
• Coolant [5]		●	●	●	●	●	●
• Hydraulic oil		●	●	●	●	●	
• Brake fluid [5]		●	●	●	●	●	●
• Gearbox oil in front and rear axle differentials/gearbox			●			●	
• Gearbox oil in front and rear axle planetary drives, left and right side			●			●	
Check cooler for engine and hydraulic oil for contamination. Clean if necessary[6]		●		●	●	●	●
V-belt: check condition and pre-tension. Retighten or replace if necessary[7]			●	●	●	●	●
Ventilate the crankcase[8]							
Check glow plugs. Replace if necessary						●	●
Check the fuel/water separator. Drain water if necessary				●	●	●	●
Check valve tip clearance (engine timing). Set if necessary					●		●
Battery: check electrolyte level and charge condition						●	●
Check and set parking brake pads. Replace if necessary						●	●
Check and set service brake pads. Replace if necessary						●	●
Tyre check (damage, air pressure, tread depth)		Visual check	●	●	●	●	●
Check screws and nuts or screw connections for tightness on the following assemblies/components. Retighten if necessary							
• Engine and engine bearing					●		●
• Steering system					●		●
• Hydraulic system					●		●
• Loader unit (pin locking)					●		●
• Axle mounting, axle suspension					●		●
• Counterweight (attachment)					●		●
• Attachment screws of cardan shafts					●		●
• Tank attachment (hydraulic oil and fuel tanks)					●		●
• Attachment screws of cab					●		●
• Wheel nuts					●		●
Electrical system: wire and earthing lead connections, chafing on wiring harness, battery terminals			●	●	●	●	●
Lubrication ( ):[9]							
Lubricate the following assemblies/components:							
• Rear axle oscillation-type bearing							●
• Loader unit (see lubrication plan)							
• Lift frame bearing	1		●	●	●	●	●
• Lift ram bearing	2		●	●	●	●	●
• Tilt ram bearing	3		●	●	●	●	●
• Tilt rod bearing	4		●	●	●	●	●
• Tilt lever bearing	5		●	●	●	●	●
• Quickhitch facility: lock pins	6		●	●	●	●	●
• Quickhitch facility: bearing on lift frame	7		●	●	●	●	●
• Hinges, joints and fittings (eg door holders)						●	●
Functional check(?):							
Check the function of the following assemblies/components. Rectify if necessary:							
• Service and parking brake		●	●	●	●	●	●
• Steering system		●	●	●	●	●	●
• Light system		●	●	●	●	●	●
Leakage check ( ):							
Check for tightness, leakage and chafing: pipes, flexible lines and screw connections of the following assemblies and components. Rectify if necessary:							
• Air intake line (air filter – engine)			●	●	●	●	●
• Engine lubrication (engine – filter)			●	●	●	●	●
• Fuel lines			●	●	●	●	●
• Cooling system (coolant and hydraulic oil)			●	●	●	●	●
• Brake system			●	●	●	●	●
• Steering system (flexible lines and rams)			●	●	●	●	●
• Hydraulic system / loader unit (flexible linea and rams) [10]			●	●	●	●	●

1. Work to be carried out once only after the first 100 service hours. Must be carried out by an authorized workshop for warranty claims to be acknowledged.
2. Work after the first 600 service hours (2nd Inspection) must be carried out by an authorized workshop for warranty claims to be acknowledged.
3. Clean/replace the filter insert as indicated by the telltale in the instrument panel, however replace at least every 12 months or 1200 service hours.
4. When using biodegradable oil: Drain the condensation water in the hydraulic oil tank every 600 service hours, in any case before the cold season.
5. Replace every 2 years
6. Depending on operation and dust conditions, it may necessary to clean the cooler more frequently.
7. Replace under all circumstances every year or every 1200 service hours.
8. Every 2 yeary
9. Lubricate implement as per manufacturer's instructions!
10. Replace flexible lines every 6 years (UVV, DIN 20066 T5)

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BA.1.2 Overview of instrument panel, multifunctional lever



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