

Service Manual

Track excavator

803 /
803 dualpower



Machine model	803
Edition	2.4
Order no.	1000164843
Language	en



**WACKER
NEUSON**

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Technical data, dimensions and weights are only given as an indication. Responsibility for errors or omissions not accepted.

The cover features the machine with possible optional equipment.

The Operator's Manual and any amendments to it must always be available at the place of use of the machine. Possible amendments are included at the end of the Operator's Manual.

Refer to the Operator's Manual of the machine for information on labels.



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Operation

1 Operation

1.1 Information on this service manual

This service manual contains important information on how to work safely, correctly and economically with the machine. Therefore, it aims not only at new personnel, but it also serves as a reference for experienced personnel. It helps to avoid hazardous situations and reduce repair costs and downtimes.

Furthermore, the reliability and the service life of the machine will be increased by following the instructions in the service manual.

Careful and prudent working is the best way to avoid accidents!

Operational safety and readiness of the machine do not only depend on your skill, but also on maintenance and servicing of the machine. This is why regular maintenance and servicing is absolutely necessary.


Extensive maintenance and repair work must always be performed by a Wacker Neuson service center. Use only original spare parts for repairs. This ensures operational safety and readiness of your machine, and maintains its value.

- We reserve the right to improve the technical standard of our machines without adapting the service manual.
- Modifying Wacker Neuson products and fitting them with additional equipment and attachments not included in our delivery program requires Wacker Neuson's written authorization, otherwise warranty and product liability for possible damage caused by these modifications shall not be applicable.
- Subject to modifications and printing errors.

Your Wacker Neuson dealer will be happy to answer any further questions regarding the machine or the service manual.

Abbreviations/symbols

- Identifies a list
 - Subdivision within lists or an activity. Follow the steps in the recommended order

 *Identifies an activity*

 Description of the effects or results of an activity

n. s. = not shown

"Opt" = option

Stated whenever controls or other components of the machine are installed as an option.

A combination of digits, or a combination of digits and letters, for example 40/**18** or 40/**A** used for identifying the control elements, means:

Figure no. 40/control element no. 18 or position **A** in figure no. 40

Figures carry no numbers if they are placed to the left of the text.


1.2 Identification of warnings and dangers

Important indications regarding the safety of the personnel and the machine are identified in this Operator's Manual with the following terms and symbols:



Danger!


Failure to observe the instructions identified by this symbol can cause injury or death for the operator or other persons.

 *Measures for avoiding danger*



Caution!

Failure to observe the instructions identified by this symbol can cause damage to the machine.

 *Measures for avoiding danger for the machine*



Notice!

This symbol identifies instructions for a more efficient and economical use of the machine.



Environment!

Failure to observe the instructions identified by this symbol can cause damage to the environment. The environment is in danger if environmentally hazardous material (for example waste oil) is not subject to proper use or disposal.

1.3 Designated use and exemption from liability

- The machine is intended for:
 - Moving earth, gravel or rubble, and for hammer operation
 - See chapter 1.5 "Fields of application, attachments" in the Operator's Manual for more information on the use of attachments.
 - Every other application is regarded as not designated for the use of the machine. Wacker Neuson will not be liable for damage resulting from use other than mentioned above. The user alone will bear the risk.
 - Designated use also includes observing the instructions set forth in the Operator's Manual and observing the maintenance and service conditions.
- The safety of the machine can be negatively affected by performing machine modifications without proper authority and by using spare parts, equipment, attachments and optional equipment that have not been checked and released by Wacker Neuson. Wacker Neuson will not be liable for damage resulting from this.
- Wacker Neuson Linz GmbH shall not be liable for personal injury and/or damage to property caused by failure to observe the safety instructions and the Operator's Manual, and by the negligence of the duty to exercise due care when:
 - handling
 - operating
 - servicing and performing maintenance and
 - repairing the machine. This is also applicable in those cases in which special attention has not been drawn to the duty to exercise due care, in the safety instructions, the Operator's Manuals and maintenance manuals (machine/engine).
 - Read and understand the Operator's Manual before starting up, servicing or repairing the machine. Observe all safety instructions!
- The machine may not be used for transport jobs on public roads!
- Hammer operation is only allowed in specified areas.

1.4 Labels


 WACKER NEUSON		Wacker Neuson Line GmbH Flughafenstraße 7, 4023 Hürst/Eng Austria, Tel. +43 (0)722 13000 office@wackerneuson.com	
Fahrzeug-Seriennummer / serial no. / no. de série			
Fahrzeug-Modell / model / modèle		Leistung / performance	Typ / version
Betriebsgewicht / operating weight / poids en charge		Transportgewicht / transport weight / poids de transport	kW
G. Gew. / GWR / PTAC		Max. Nutzlast / max. payload / max. charge utile	kg
Zul. Achslast vorne / front GAWS / PNEE AV		Zul. Achslast hinten / rear GAWS / PNEE AR	kg
EWR-Nr. / CEE no.		Baujahr / model year / année fabr.	

Fig. 1: Type label (symbolic representation)

Serial number

The serial number is located on the type label.

The serial number is also stamped on the machine chassis.

Refer to the Operator's Manual of the machine for more information.



Fig. 2: Diesel engine type label

Diesel engine type label

The type label (arrow) is located on the cylinder-head cover (engine).

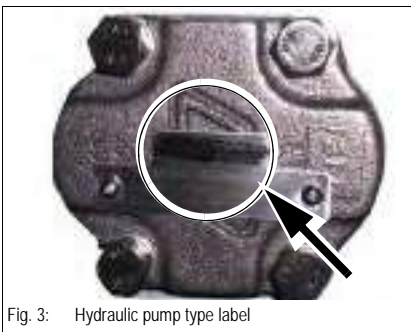


Fig. 3: Hydraulic pump type label

Hydraulic pump type label

The type label (arrow) is located on the hydraulic pump housing.

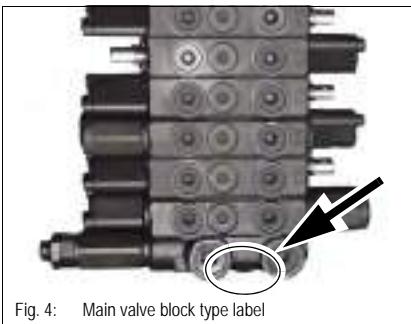


Fig. 4: Main valve block type label

Main valve block type label

The type label (arrow) is located on the lower side of the main valve block.



Fig. 5: Traveling drive type label

Traveling drive type label

The type label (arrow) is located on the traveling drive.



Fig. 6: Swivel unit type label

Swivel unit type label

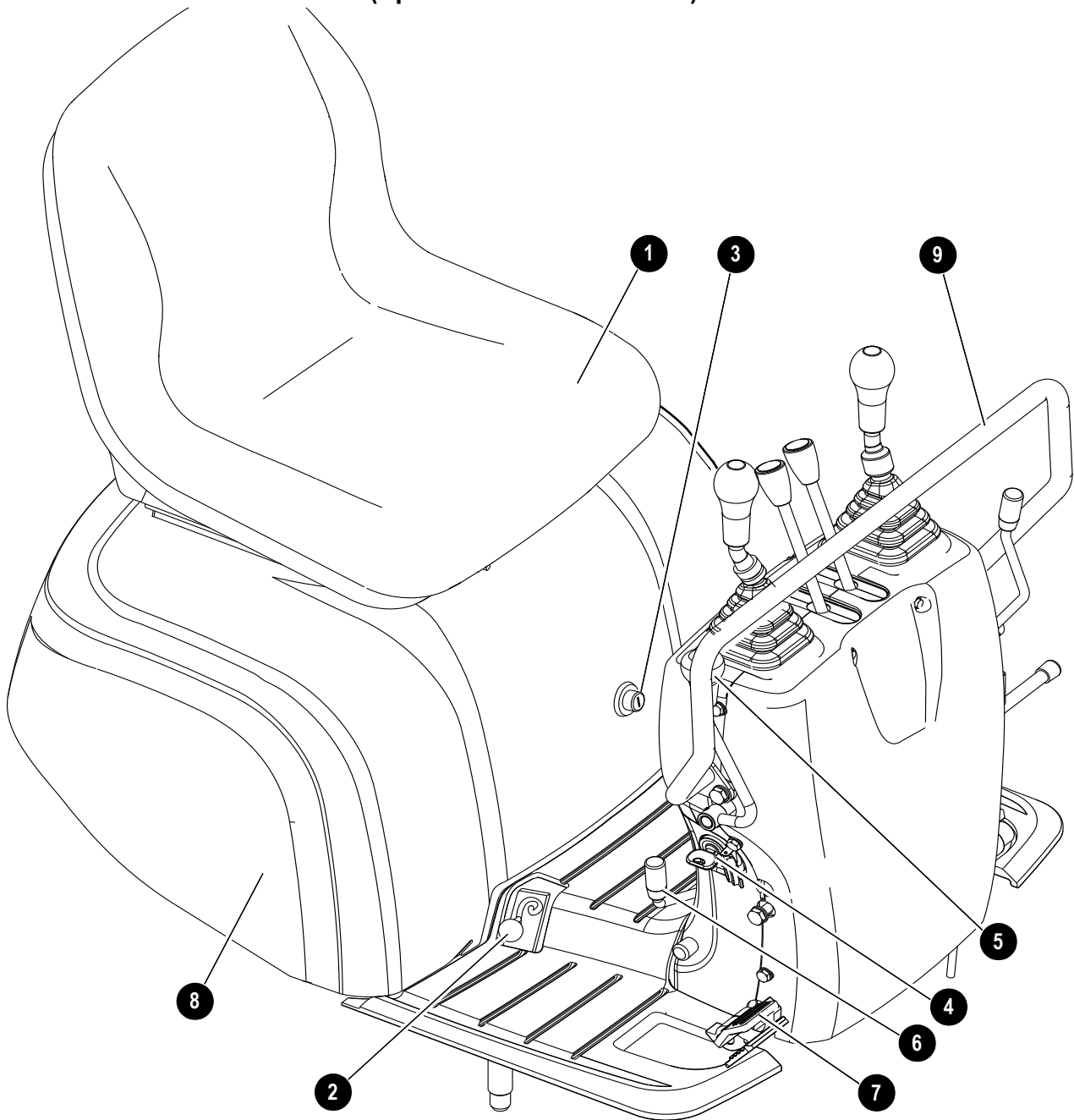
The type label (arrow) is located on the swivel unit.

1.5 Machine overview (up to serial no. AI00966)

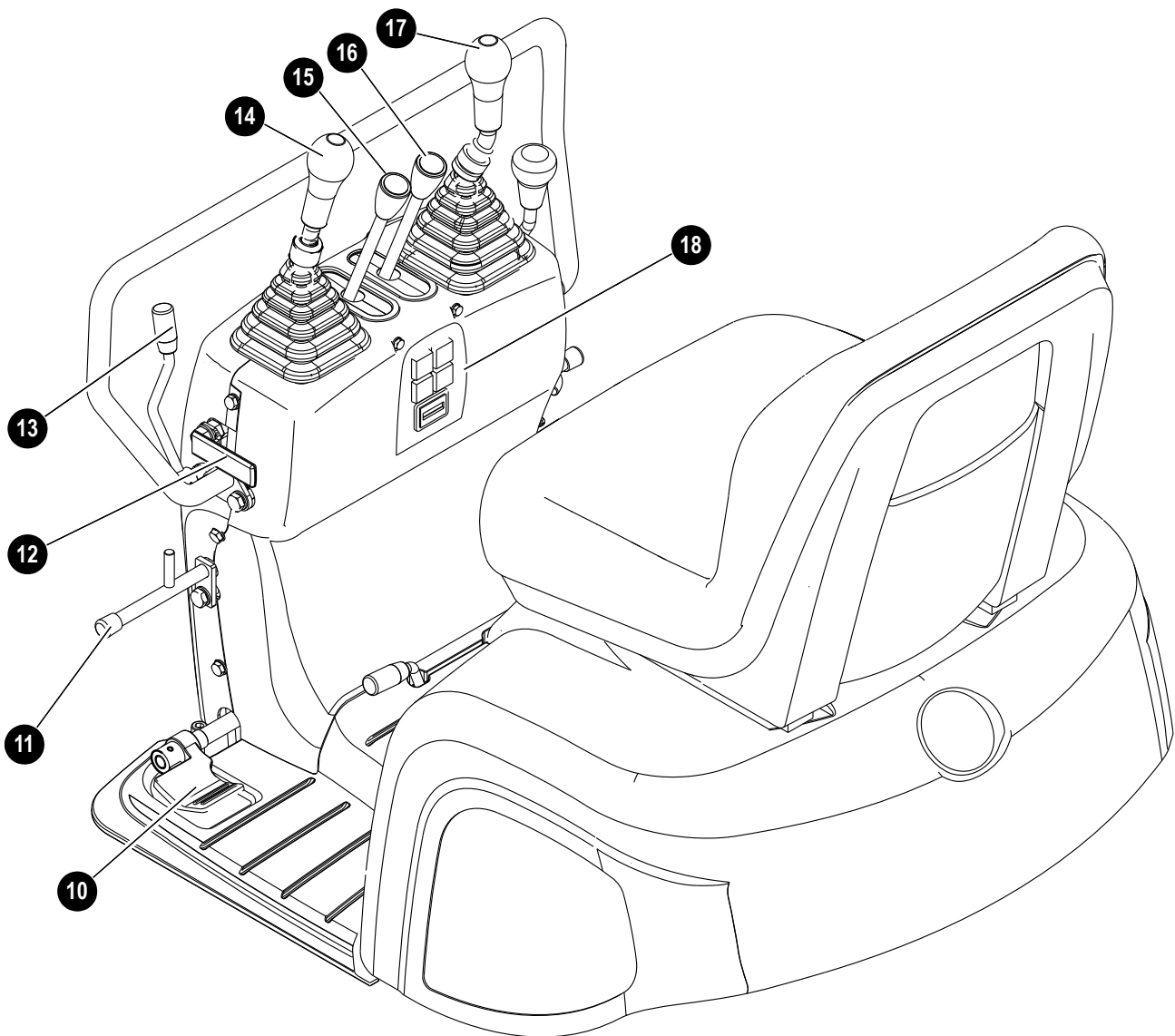


1.6 Machine overview (from serial no. AI00967)



1.7 Control stand overview (up to serial no. AI00814)

Pos.	Designation
1	Operator seat
2	Upper carriage lock
3	Engine cover lock
4	Preheating start switch
5	Stabilizer blade/telescopic undercarriage lever
6	Stabilizer blade/telescopic travel gear changeover lever
7	Auxiliary hydraulics
8	Engine cover
9	Handhold

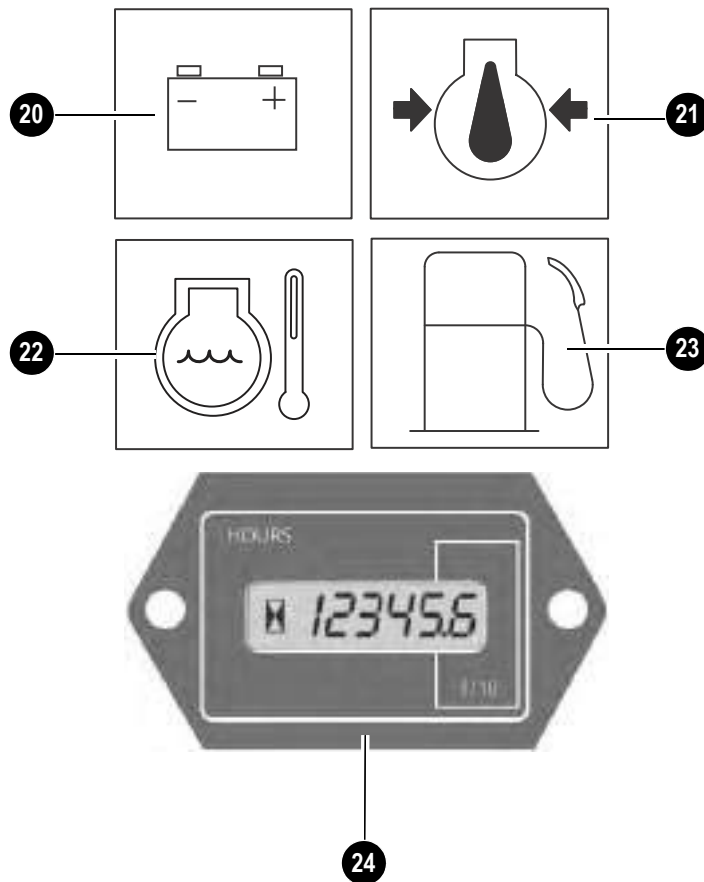


Pos.	Designation
10	Boom swivel/auxiliary hydraulics pedal
11	Footrest
12	Control lever lock
13	Throttle
14	Control lever (left)
15	Drive lever (left)
16	Drive lever (right)
17	Control lever (right)
18	Indicators

1.8 Control stand overview (from serial no. AI00815)

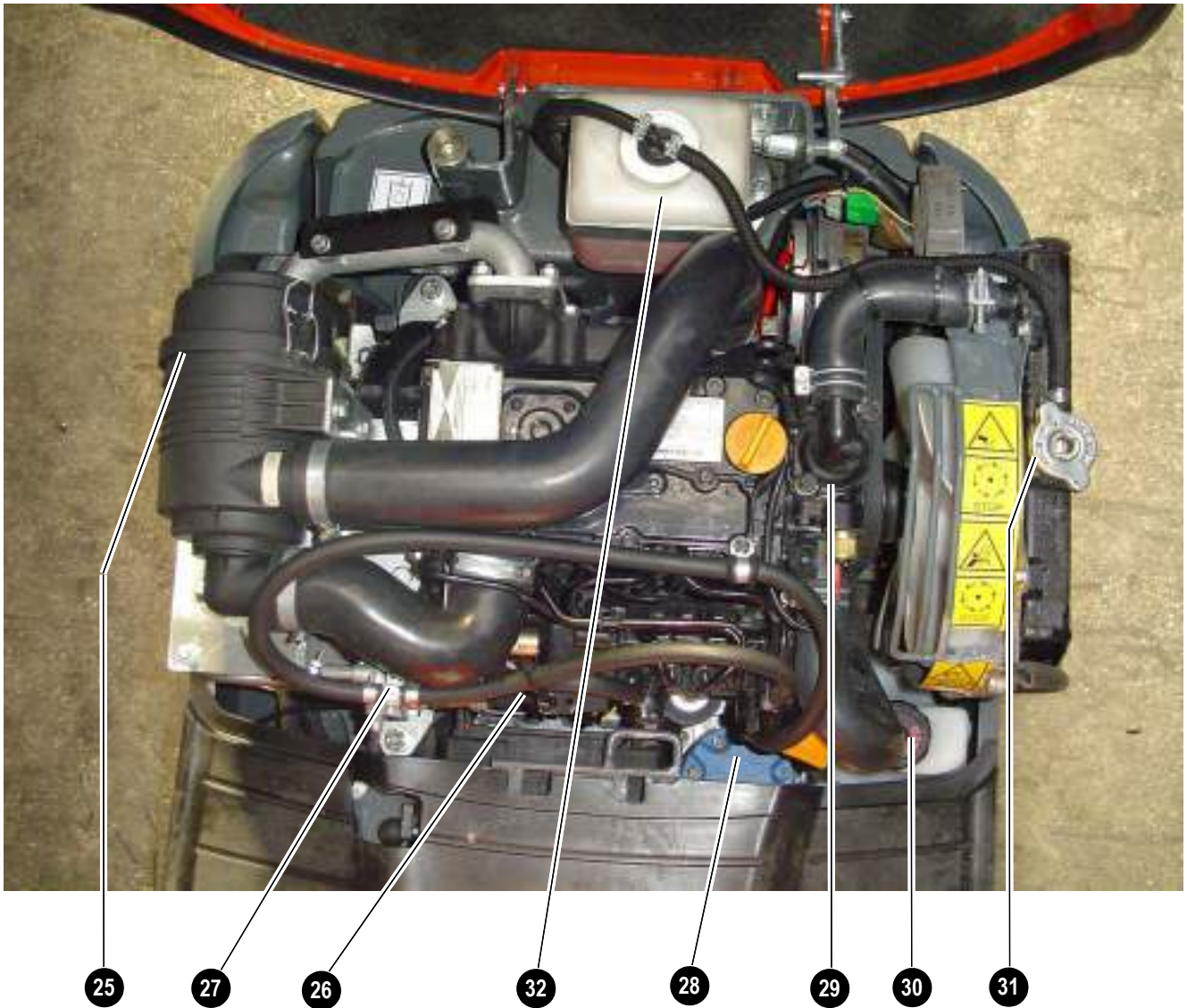

Pos.	Designation
1	Operator seat
2	Upper carriage lock
3	Engine cover lock
4	Starter
5	Stabilizer blade/telescopic travel gear lever
6	Stabilizer blade/telescopic travel gear changeover lever
7	Boom swivel pedal
8	Engine cover
9	Handhold
10	Auxiliary hydraulics pedal
11	Footrest
12	Lock lever
13	Throttle
14	Control lever (left)
15	Drive lever (left)
16	Drive lever (right)
17	Control lever (right)
18	Display element
19	Lever for switching over hammer/grab operation (option)

1.9 Display elements (overview)



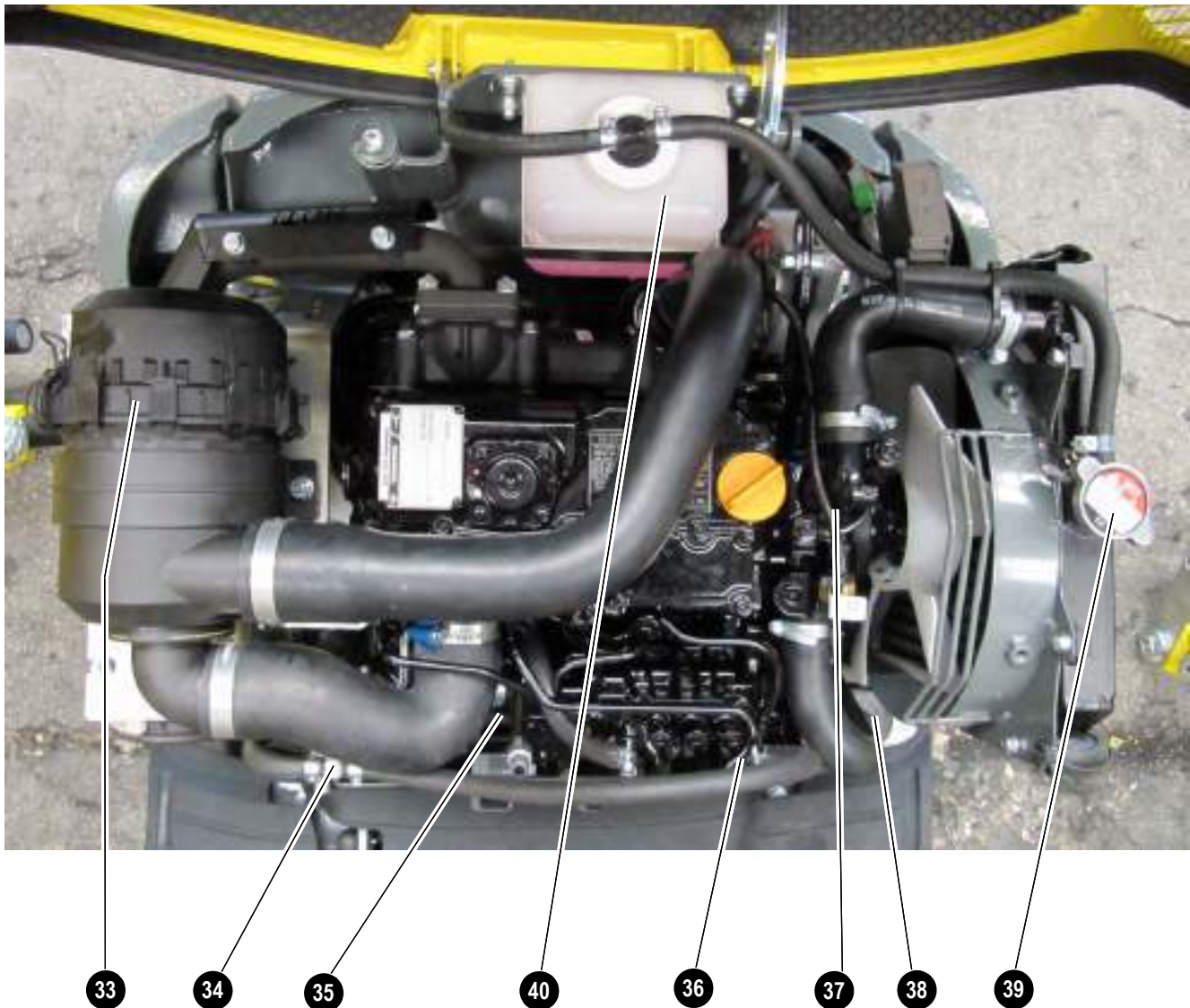
Pos.	Designation
20	Indicator light (red) – alternator charge function
21	Indicator light (red) – engine oil pressure
22	Indicator light (red) – coolant temperature
23	Indicator light (yellow) – fuel gage
24	Hour meter

1.10 Engine compartment overview (up to serial no. AI00814)



Pos.	Designation
25	Air filter
26	Throttle cable
27	Fuel filter
28	Swivel unit
29	Thermostat
30	Filler neck
31	Coolant filler inlet
32	Coolant reservoir

1.11 Engine compartment overview (from serial no. AI00815)



Pos.	Designation
33	Air filter
34	Fuel filter
35	Throttle cable
36	Swivel unit
37	Thermostat
38	Filler neck
39	Coolant filler inlet
40	Coolant reservoir

Technical data

2 Technical data

2.1 Chassis

Sturdy steel sheet chassis, rubber-mounted engine

2.2 Engine

Engine	Model 803
Product	Yanmar diesel engine
Type	3TNV70-VNS
Design	Water-cooled 4 stroke diesel engine
Number of cylinders	3
Fuel injection system	Indirect injection
Aspiration	Natural aspiration
Cooling system	Water-cooled/blowing fan
Lubrication system	Force-feed lubrication with trochoidal pump
Displacement	854 cm ³ (52.1 in ³)
Nominal bore and stroke	70 x 74 mm (2.75 x 2.91")
Output	9.6 kW (12.9 hp) at 2100 rpm
Max. torque	51.5 Nm (38 ft lbs) at 1500 rpm
Max. engine speed without load	2270 +/- 25 rpm
Idling speed	1300 +/- 25 rpm
Valve clearance (intake = outlet)	0.15 – 0.25 mm/(0.006 – 0.01") cold
Compression	32.4 +/- 1 bar (469.9 +/- 15 psi) at 250 rpm
Engine oil pressure	2.9 – 4.4 bar (42 – 64 psi) at rated output
Pressure switch for engine oil pump	0.5 +/- 0.1 bar (7.25 +/- 1.45 psi)
Thermostat opening temperature	69.5 – 72.5 °C (157 – 163 °F)
Thermal switch	107 – 113 °C (225 – 235 °F)
Firing order	1 – 3 – 2 – 1
Direction of rotation	Anticlockwise (as seen from the flywheel)
Starting aid	Glow plugs (preheating time 4 seconds)
Specific fuel consumption	272 g/kWh (lb/hph)
Max. engine droop (all 2 pumps under full load)	By about 90 rpm
Exhaust values according to	EPA TIER IV final (up to 2012)

Engine	Model 803
Product	Yanmar diesel engine
Type	3TNV74F-SNNS
Design	Water-cooled 4 stroke diesel engine
Number of cylinders	3
Fuel injection system	Indirect injection
Aspiration	Natural aspiration
Cooling system	Water-cooled/blowing fan
Lubrication system	Force-feed lubrication with trochoidal pump
Displacement	993 cm ³ (60.6 in ³)
Nominal bore and stroke	74 x 77 mm (2.9 x 3.0 in)
Output	11.5 kW at 2500 rpm (15.4 hp/2,500 rpm)
Max. torque	53 Nm at 1800 rpm (39 ft.lbs/1800 rpm)
Max. engine speed without load	2675 +/- 25 rpm (2,675 +/- 25 rpm)
Idling speed	1300 +/- 25 rpm (1,300 +/- 25 rpm)
Valve clearance (intake = outlet)	0.15 – 0.25 mm/(0.006 – 0.01") cold
Compression	32.4 +/- 1 bar (469.9 +/- 15 psi) at 250 rpm
Engine oil pressure	3 – 4.5 bar (43.5 – 65.3 psi) at rated output
Pressure switch for engine oil pump	0.5 +/- 0.1 bar (7.25 +/- 1.45 psi)
Thermostat opening temperature	71 °C (160 °F)
Thermal switch	107 °C (230 °F)
Firing order	1 – 3 – 2 – 1
Direction of rotation	Anticlockwise (as seen from the flywheel)
Starting aid	Glow plugs (preheating time 4 seconds)
Specific fuel consumption	279 g/kWh (lb/hph)
Max. engine droop (all 2 pumps under full load)	By about 110 rpm
Exhaust values according to	EPA TIER IV final (from 2012)

Fuel injection pump

Type	
Design	In-line pump
Injection pressure	118 – 128 bar (1711 – 1856 psi)
Engine speed control	Mechanical
Lubrication system	Force-feed engine oil lubrication

Engine capacities

Capacities	Model 803
Fuel tank	7 l (1.85 gal)
Engine oil (max./effect.)	2.8 l/1.3 l (0.74/0.34 gal)
Coolant (with radiator)	2.9 l (0.77 gal)
Coolant reservoir	1.1 l (0.29 gal)

Overview of capacities – see *Fluids and lubricants* on page 3-2

Engine tightening torques

Tightening torques	Model 803
Cylinder-head bolt ¹	54 – 58 Nm (M9x1.25) (40 – 43 ft lbs)
Connecting rod bearing screw ¹	22.6 – 27.5 Nm (M7x1.0) (16.6 – 20.3 ft lbs)
Main bearing screw	75.5 – 81.5 Nm (M10x1.25) (55.7 – 60 ft lbs)
Flywheel screw	80.4 – 86.4 Nm (M10x1.25) (59.3 – 63.7 ft lbs)

1. Screws must be oiled!

2.3 Hydraulic system

Hydraulics	Model 803
Pump (Tier IV final up to 2012)	Twin gear pump 2 x 5 cm ³ (2 x 0.3 in ³ /rev)
Flow rate (Tier IV final up to 2012)	2 x 11.35 l/min at 2270 rpm (2 x 3 gal/min at 2270 rpm)
Pump (Tier IV final from 2012)	Twin gear pump 2 x 4 cm ³ (2 x 0.24 in ³ /rev)
Flow rate (Tier IV final from 2012)	2 x 10.7 l/min at 2675 rpm (2 x 2.8 gal/min at 2675 rpm)
Control valve	9 sections
Main pressure limiting valve for pumps P1, P2	170 +/- 3 bar (2465.64 +/- 44 psi)
Secondary pressure limiting valve for swivel unit	70 ^{-0/+0.5} bar (1015.3 ^{-0/+7} psi) at 11.5 l/min (3 gal/min)
Secondary pressure limiting valve, stick	250 +/- 5 bar (3625.9 +/- 72.5 psi)
Hydraulic reservoir capacity	13.8 l (3.6 gal)

Auxiliary hydraulics oil flow

Pressure (bar/psi)	P1 + P2 (l/min / gal/min)
12.5/181.3	22/5.8
37.8/548.2	20.8/5.5
50/725.2	20.4/5.4
79/1145.8	19.7/5.2
140/2030.5	18.5/4.8
160/2320.6	10.5/2.7
168/2436.6	5/1.3


Notice!

Output indications for auxiliary hydraulics with unpressurized return line

2.4 Travel gear and swivel unit

Travel gear/swivel unit	Model 803
Travel speeds	1.82 kph (1.13 mph)
Hill climbing ability (no longer than 3 minutes)	30°/58 %
Track width	180 mm (7.09")
No. of track rollers on either side	2
Ground clearance	132 mm (5.2")
Ground pressure	0.24 kg/cm ² (3.4 psi)
Upper carriage swivel speed	8 rpm

2.5 Stabilizer blade

Stabilizer blade	Model 803
Width (folded in/out)	700/860 mm (27.55"/33.85")
Height	198 mm (7.8")
Max. lift over/under subgrade	197/174 mm (7.76"/6.85")

Screwable hose burst valve

Location	Thread	Gap dimension
Stabilizer blade	3/8"	0.3 mm (0.012")

2.6 Electrical system

Electrical system	
Dynamo	12 V 20 A
Starter	12 V 1.1 kW (1.5 hp)
Battery	12 V 30 Ah
Socket	For 12 V power outlet, for example; 15 A max.

Fuses behind the right-hand trim

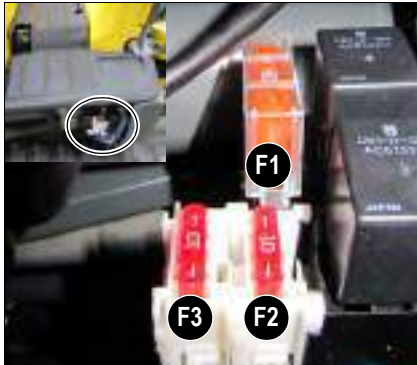


Fig. 9: Fuses (up to serial number WNCE0801CPAL0050)

Fuse no.	Rated current (A)	Protected circuit
F1	40 A	Main fuse: air-pressure sensor/output adaptation (Yanmar 3TNV74F-SNNS)
F2	10 A	Fuse: relay, indicator, cutoff solenoid
F3	10 A	Fuse: horn, working light 12 V power outlet (up to serial number WNCE0801CPAL0050, travel signal (option))
F4	10 A	12 V power outlet (from serial number WNCE0801TPAL0051)

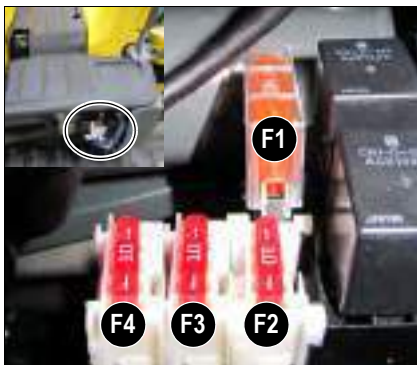


Fig. 10: Fuses (from serial number WNCE0801TPAL0051)

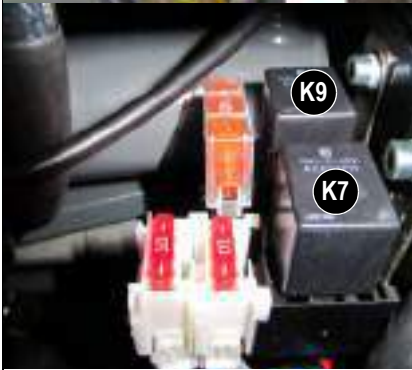
Relays behind the right-hand trim


Fig. 11: Relays

Relay no.	Protected circuit
K 7	Starting relay
K 8	Cutoff solenoid time lag relay 1s
K 9	Cutoff solenoid switching relay

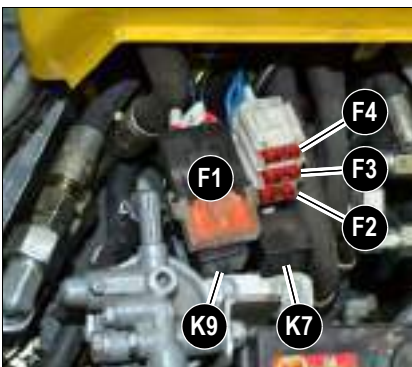
Fuses and relays with Dual Power option


Fig. 12: Fuses and relays with Dual Power option

If the machine is equipped with the Dual Power option, the fuses and relays are located under the base plate.

Fuse no.	Rated current (A)	Protected circuit
F1	40 A	Main fuse: air-pressure sensor/output adaptation (Yanmar 3TNV74F-SNNS)
F2	10 A	Fuse: relay, indicator, cutoff solenoid
F3	10 A	Fuse: horn, working light 12 V power outlet (up to serial number WNCE0801CPAL0050, travel signal (option), battery control (Dual Power option))
F4	10 A	12 V power outlet (from serial number WNCE0801TPAL0051)



Fig. 13: Relay K8

Relay no.	Protected circuit
K 7	Starting relay
K 8	Cutoff solenoid time lag relay 1s
K 9	Cutoff solenoid switching relay
K 116	Battery control

2.7 Noise levels

Sound power level	Model 803
Sound power level (L_{WA}) ¹	93 dB (A)
Operator-perceived sound pressure level (L_{PA}) ²	77 dB (A)
Uncertainty (K_{PA}) ³	1.2 dB (A)

1. ISO 6395 (EC Directives 2000/14/EC and 2005/88/EC)
2. EN ISO 4871 (EC Directives 2000/14/EC and 2005/88/EC)
3. ISO 6394 (EC Directives 84/532/EEC, 89/514/EEC, 95/27/EEC)



Notice!

Measurements performed on asphalted surface.

2.8 Vibration

Vibration	
Effective acceleration value for the upper extremities of the body (hand-arm vibration)	< Trigger value < 2.5 m/s ²
Effective acceleration value for the body (whole-body vibration)	< 0.5 m/s ²

Vibration values indicated in m/s².

2.9 Coolant compound table

Outside temperature	Coolant			
	Water	Anticorrosion agent		Antifreeze agent
Up to °C (°F)	% by volume	cm ³ /l / (in ³ /gal)	% by volume	% by volume
-37 (-34.6)	50	10 (2.6)	1	50

Use the 1:1 concentration for warm outside temperatures, too:

Protection against corrosion, cavitation and deposits

Do not mix the coolant with other coolants.

Machine filled at the factory with Eurolub SF D12 coolant (ethylene glycol basis).

2.10 Model-specific tightening torques

Model 803	Thread	Torque
		Nm (ft lbs)
Live ring	M12x1.25 10.9	130 (95.9)*
Track roller	M10 10.9	65 (47.9)*
Drive pinion	M10 10.9	65 (47.9)*
Traveling drive	M10 10.9	65 (47.9)*
Gear motor	M12 10.9	110 (81.1)*
Angled engine bracket	M10 8.8	45 (33.2)
Engine bearing	M10 8.8	45 (33.2)
Pump base	M10 8.8	45 (33.2)
Pump	M10 8.8	45 (33.2)
Swivel joint	M10 10.9	64 (47.2)*
Bumper	M14 12.9	230 (169.6)*

*) All connections with an * must be glued with Loctite S2420 or VaryBond 12-43.

2.11 General tightening torques

Tightening torques for hydraulic threaded fittings (dry assembly)

Metric hose fittings for hydraulic applications (light execution, DKOL)				
Nominal Ø	Outer Ø	Thread	Wrench size	Torque
				Nm (ft lbs)
05	6L	M12X1.5	WS 14	15 (11)
06	8L	M14X1.5	WS 17	20 (14.7)
08	10L	M16X1.5	WS 19	40 (29.5)
10	12L	M18X1.5	WS 22	50 (36.8)
12	15L	M22X1.5	WS 27	75 (55.3)
16	18L	M26X1.5	WS 32	85 (62.7)
20	22L	M30X2	WS 36	100 (73.75)
25	28L	M36X2	WS 41	180 (132.7)
32	35L	M45X2	WS 55	220 (162.3)

Galvanized and dry surface (O-ring slightly oiled). Torque tolerance: -10 %
Values determined empirically and to be applied as approximate figures.

Metric hose fittings for hydraulic applications (heavy execution, DKOL)				
Nominal Ø	Outer Ø	Thread	Wrench size	Torque
				Nm (ft lbs)
05	8S	M16X1.5	WS 19	40 (29.5)
06	10S	M18X1.5	WS 22	50 (36.8)
08	12S	M20X1.5	WS 24	60 (44.3)
10	14S	M22X1.5	WS 27	75 (55.3)
12	16S	M24X1.5	WS 30	90 (66.4)
16	20S	M30X2	WS 36	100 (73.8)
20	25S	M36X2	WS 41	180 (132.8)
25	30S	M42X2	WS 50	270 (199.1)
32	38S	M52X2	WS 60	400 (295)

Galvanized and dry surface (O-ring slightly oiled). Torque tolerance: -10 %
Values determined empirically and to be applied as approximate figures.

Threaded fittings with various seals for hydraulic applications (light execution)					
Thread	Straight pipe fitting with thread and screwed plug			Non-return valve with elastic seal	Identification aid outside Ø
	Sealing washer	Elastic seal	O-ring		
	Nm (ft lbs)	Nm (ft lbs)	Nm (ft lbs)	Nm (ft lbs)	mm (")
M10X1.0	9 (7)	18 (13)	15 (11)	18 (13)	10 (0.4)
M12X1.5	20 (15)	25 (18)	25 (18)	25 (18)	12 (0.5)
M14X1.5	35 (26)	45 (33)	35 (26)	35 (26)	14 (0.55)
M16X1.5	45 (33)	55 (41)	40 (30)	50 (37)	16 (0.6)
M18X1.5	55 (41)	70 (52)	45 (33)	70 (52)	18 (0.7)
M22X1.5	65 (48)	125 (92)	60 (44)	125 (92)	22 (0.9)
M27X2.0	90 (66)	180 (133)	100 (74)	145 (107)	27 (1.0)
M33X2.0	150 (111)	310 (229)	160 (118)	210 (155)	33 (1.3)
M42X2.0	240 (177)	450 (332)	210 (155)	360 (266)	42 (1.7)
M48X2.0	290 (214)	540 (398)	260 (192)	540 (398)	48 (1.9)
G1/8A	9 (7)	18 (13)	15 (11)	18 (13)	9.73 (0.38)
G1/4A	35 (26)	35 (26)	30 (22)	35 (26)	13.16 (0.52)
G3/8A	45 (33)	70 (52)	45 (33)	50 (37)	16.66 (0.66)
G1/2A	65 (48)	90 (66)	55 (41)	65 (48)	20.96 (0.83)
G3/4A	90 (66)	180 (133)	100(74)	140 (103)	26.44 (1.04)
G1A	150 (111)	310 (229)	160 (118)	190 (140)	33.25 (1.31)
G1 1/4A	240 (177)	450 (332)	210 (155)	360 (266)	41.91 (1.65)
G1 1/2A	290 (214)	540 (398)	260 (192)	540 (398)	47.80 (1.88)

Torque tolerance: -10 %; countermaterial: steel/aluminum

Threaded fittings with various seals for hydraulic applications (heavy execution)					
Thread	Straight pipe fitting with thread and screwed plug			Non-return valve with elastic seal	Identification aid outside Ø
	Sealing washer	Elastic seal	O-ring		
	Nm (ft lbs)	Nm (ft lbs)	Nm (ft lbs)	Nm (ft lbs)	mm (")
M12X1.5	20 (15)	35 (26)	35 (26)	35 (26)	12 (0.5)
M14X1.5	35 (26)	55 (41)	45 (33)	45 (33)	14 (0.55)
M16X1.5	45 (33)	70 (52)	55 (41)	55 (41)	16 (0.6)
M18X1.5	55 (41)	90 (66)	70 (52)	70 (52)	18 (0.7)
M20X1.5	55 (41)	125 (92)	80 (59)	100 (74)	22 (0.9)
M22X1.5	65 (48)	135 (100)	100 (74)	125 (92)	27 (1.0)
M27X2.0	90 (66)	180 (133)	170 (126)	135 (100)	12 (0.5)
M33X2.0	150 (111)	310 (229)	310 (229)	210 (155)	33 (1.3)
M42X2.0	240 (177)	450 (332)	330 (243)	360 (266)	42 (1.7)
M48X2.0	290 (214)	540 (398)	420 (310)	540 (398)	48 (1.9)
G1/8A	35 (26)	55 (41)	45 (33)	45 (33)	13.16 (0.52)
G1/4A	45 (33)	80 (59)	60 (44)	60 (44)	16.66 (0.66)
G3/8A	65 (48)	115 (85)	75 (55)	100 (74)	20.96 (0.83)
G1/2A	90 (66)	180 (133)	170 (125)	145 (107)	26.44 (1.04)
G3/4A	150 (111)	310 (229)	310 (229)	260 (192)	33.25 (1.31)
G1A	240 (177)	450 (332)	330 (243)	360 (266)	41.91 (1.65)
G1 1/4A	290 (214)	540 (398)	420 (310)	540 (398)	47.80 (1.88)

Torque tolerance: -10 %; countermaterial: steel/aluminum

Tightening torques for high-resistance threaded fittings

With coarse-pitch thread					
Thread	Screws according to DIN 912, DIN 931, DIN 933, etc.			Screws according to DIN 7984	
	8.8	10.9	12.9	8.8	10.9
	Nm (ft lbs)	Nm (ft lbs)	Nm (ft lbs)	Nm (ft lbs)	Nm (ft lbs)
M5	5.5 (4)	8 (6)	10 (7)	5 (4)	7 (5)
M6	10 (7)	14 (10)	17 (13)	8.5 (6)	12 (9)
M8	25 (18)	35 (26)	42 (31)	20 (15)	30 (22)
M10	45 (33)	65 (48)	80 (59)	40 (30)	59 (44)
M12	87 (64)	110 (81)	147 (108)	69 (51)	100 (74)
M14	135 (100)	180 (133)	230 (170)	110 (81)	160 (118)
M16	210 (155)	275 (203)	350 (258)	170 (125)	250 (184)
M18	280 (207)	410 (302)	480 (354)	245 (181)	345 (254)
M20	410 (302)	570 (420)	690 (509)	340 (251)	490 (361)
M22	550 (406)	780 (575)	930 (686)	460 (339)	660 (487)
M24	710 (524)	1000 (738)	1190 (878)	590 (435)	840 (620)
M27	1040 (767)	1480 (1092)	1770 (1305)	870 (642)	1250 (922)
M30	1420 (1047)	2010 (1482)	2400 (1770)	1200 (885)	1700 (1254)

DIN 912 – hexagon socket head cap screw; DIN 931/DIN 933 – hexagon head screw with/without shaft;
DIN 7984 – hexagon socket head cap screw with short head
All values subject to a friction coefficient of $\mu = 0.12$ and are to be used as approximate figures.

With fine-pitch thread					
Thread	Screws according to DIN 912, DIN 931, DIN 933, etc.			Screws according to DIN 7984	
	8.8	10.9	12.9	8.8	10.9
	Nm (ft lbs)	Nm (ft lbs)	Nm (ft lbs)	Nm (ft lbs)	Nm (ft lbs)
M8X1.0	25 (18)	37 (28)	43 (32)	22 (16)	32 (24)
M10X1.0	50 (37)	75 (55)	88 (65)	43 (32)	65 (48)
M10X1.25	49 (36)	71 (52)	83 (61)	42 (31)	62 (46)
M12X1.25	87 (64)	130 (96)	150 (111)	75 (55)	110 (81)
M12X1.5	83 (61)	125 (92)	145 (107)	72 (53)	105 (77)
M14X1.5	135 (100)	200 (148)	235 (173)	120 (89)	175 (129)
M16X1.5	210 (155)	310 (229)	360 (266)	180 (133)	265 (195)
M18X1.5	315 (232)	450 (332)	530 (391)	270 (199)	385 (284)
M20X1.5	440 (325)	630 (465)	730 (538)	375 (277)	530 (391)
M22X1.5	590 (435)	840 (620)	980 (723)	500 (369)	710 (524)
M24X2.0	740 (546)	1070 (789)	1250 (922)	630 (465)	900 (664)
M27X2.0	1100 (811)	1550 (1143)	1800 (1328)	920 (679)	1300 (959)
M30X2.0	1500 (1106)	2150 (1586)	2500 (1844)	1300 (959)	1850 (1364)

DIN 912 – hexagon socket head cap screw; DIN 931/DIN 933 – hexagon head screw with/without shaft;
DIN 7984 – hexagon socket head cap screw with short head
All values subject to a friction coefficient of $\mu = 0.12$ and are to be used as approximate figures.

2.12 Dimensions model 803 (up to serial no. AI00966)

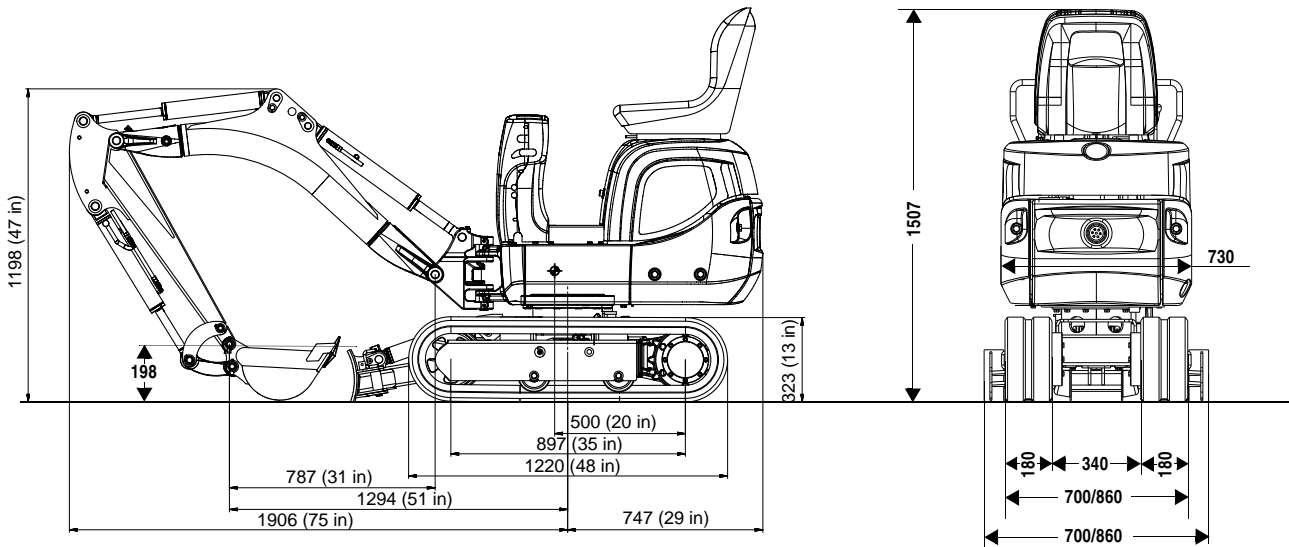
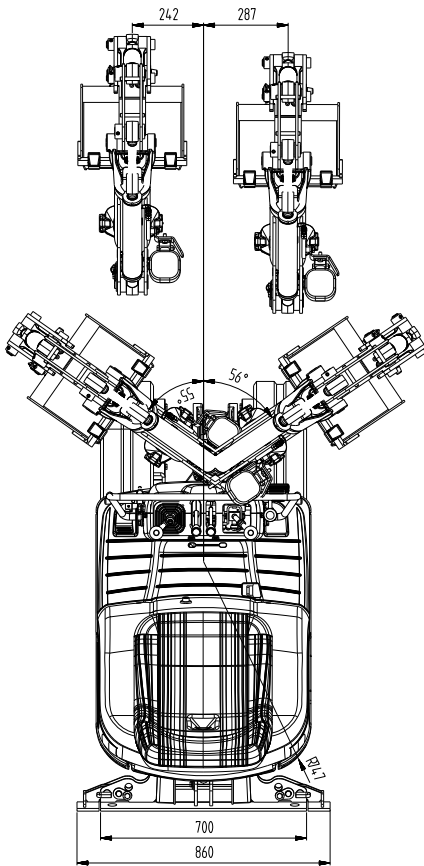


Fig. 14: Machine dimensions (model 803)



Main data	Model 803
Operating weight	935 kg (2061 lbs.)
Height (transport position)	1507 mm (4'-11")
Upper carriage width	730 mm (2'-5")
Width of telescopic travel gear (retracted/extended)	700/860 mm (2'-4"/2'-10")
Width of stabilizer blade (folded in/out)	700/860 mm (2'-4"/2'-10")
Transport length	2747 mm (9')
Max. digging depth	1731 mm (5'-8")
Stick length	890 mm (2'-11")
Max. vertical digging depth	1349 mm (4'-5")
Max. digging height	2863 mm (9'-5")
Max. tilt-out height	2035 mm (6'-8")
Max. digging radius	3074 mm (10'-1")
Max. reach at ground level	3028 mm (9'-11")
Max. breakout force at bucket tooth	8.99 kN (2021 lbf)
Max. tearout force	4.51 kN (1014 lbf)
Min. tail end slewing radius	747 mm (2'-5")
Max. tail end lateral projection (90° rotation of upper carriage)	
Telescopic travel gear retracted/extended	397/317 mm (1'-4"/1")
Stabilizer blade folded in/out	397/317 mm (1'-4"/1")
Max. boom displacement to bucket center (right side)	287 mm (0' 11")
Max. boom displacement to bucket center (left side)	242 mm (0'-10")

2.13 Dimensions model 803 with ROPS rollbar (from serial no. AI00967)

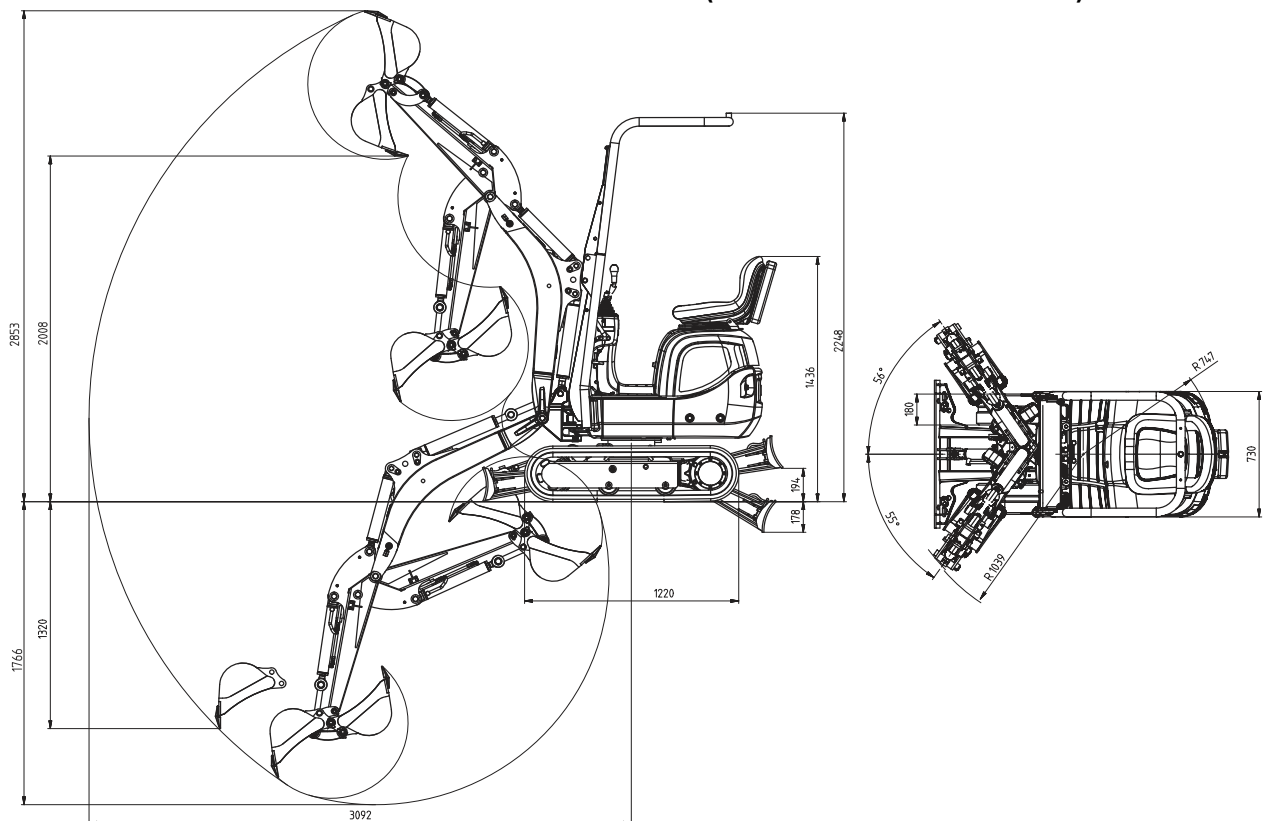


Fig. 15: Machine dimensions (model 803)

Main data	Model 803
Operating weight	1087 kg (2396 lbs)
Transport weight	990 kg (2182 lbs)
Height (transport position)	2248 mm (7'-5")
Upper carriage width	730 mm (2'-5")
Width of telescopic travel gear (retracted/extended)	700/860 mm (2'-4 1/2'-10")
Width of stabilizer blade (folded in/out)	700/860 mm (2'-4 1/2'-10")
Transport length	2747 mm (9')
Max. digging depth	1766 mm (5'-10")
Stick length	890 mm (2'-11")
Max. vertical digging depth	1320 mm (4'-4")
Max. digging height	2853 mm (9'-4")
Max. tilt-out height	2008 mm (6'-7")
Max. digging radius	3092 mm (10'-2")
Max. reach at ground level	3046 mm (10")
Max. breakout force at bucket tooth	8.99 kN (2021 lbf)
Max. tearout force	4.51 kN (1014 lbf)
Min. tail end slewing radius	747 mm (2'-5")
Max. tail end lateral projection (90° rotation of upper carriage)	
Retracted/extended telescopic travel gear	397/317 mm (1'-4"/1')
Stabilizer blade folded in/out	397/317 mm (1'-4"/1')
Max. boom displacement to bucket center (right side)	287 mm (0' 11")
Max. boom displacement to bucket center (left side)	242 mm (0'-10")

2.14 Dimensions model 803 without ROPS rollbar (from serial no. AI00967)

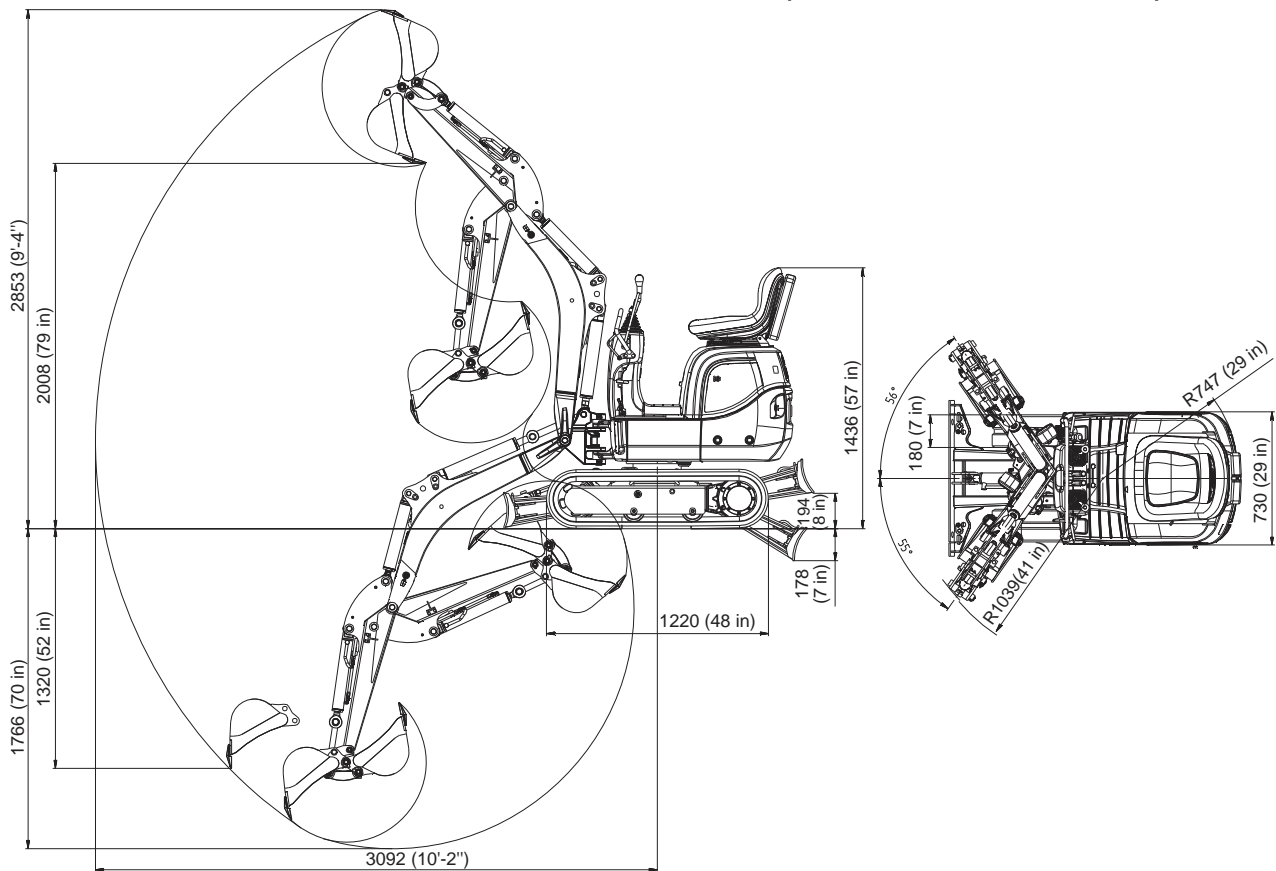


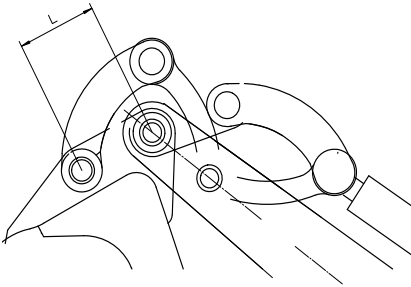
Fig. 16: Machine dimensions (model 803)

Main data	Model 803
Operating weight	1029 kg (2268 lbs)
Transport weight	932 kg (2055 lbs)
Height (transport position)	1436 mm (4'-9")
Upper carriage width	730 mm (2'-5")
Width of telescopic travel gear (retracted/extended)	700/860 mm (2'-4"/2'-10")
Width of stabilizer blade (folded in/out)	700/860 mm (2'-4"/2'-10")
Transport length	2747 mm (9')
Max. digging depth	1763 mm (5'-9")
Stick length	890 mm (2'-11")
Max. vertical digging depth	1320 mm (4'-4")
Max. digging height	2853 mm (9'-4")
Max. tilt-out height	2008 mm (6'-7")
Max. digging radius	3090 mm (10'-2")
Max. reach at ground level	3046 mm (10")
Max. breakout force at bucket tooth	8.99 kN (2021 lbf)
Max. tearout force	4.51 kN (1014 lbf)
Min. tail end slewing radius	747 mm (2'-5")
Max. tail end lateral projection (90° rotation of upper carriage)	
Retracted/extended telescopic travel gear	397/317 mm (1'-3"/1')
Stabilizer blade folded in/out	397/317 mm (1'-3"/1')
Max. boom displacement to bucket center (right side)	287 mm (0'-11")
Max. boom displacement to bucket center (left side)	242 mm (0'-10")

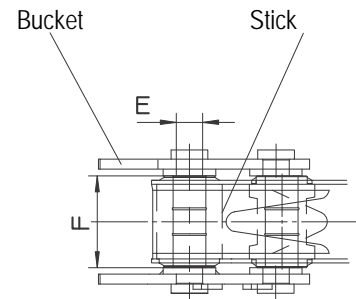
2.15 Lift capacity table 803 RD

Refer to the Operator's Manual of the machine for specific data.

2.16 Kinematics



E	Pin diameter	25 mm (0.98")
F	Stick width	100 mm (3.9")
L	Pin distance from bucket mount	165 mm (6.5")



Maintenance

3 Maintenance

3.1 Fluids and lubricants

Component/application	Fluid/lubricant	Specification	Season/temperature	Capacities ¹
Diesel engine	Engine oil	API: CG-4/CH-4/CI-4 ACEA: E3, E4, E5	-15 °C (5 °F) +40 °C (104 °F)	2.5 l (0.66 gal)
		ACEA E3, E4, E5 (SAE10 W 40) ²		
Hydraulic oil reservoir	Hydraulic oil	HVLP46 ³	Year-round ⁴	13.8 l (3.64 gal)
		HVLP46 ⁵		
	Biodegradable oil ⁶	PANOLIN HLP Synth 46		
		BP BIOHYD SE-46		
Grease	Roller and friction bearings	KPF2N-20 ⁷	Year-round	As required
	Live ring gears			
	Live ring (ball bearing race)			
	Grease zerks			
Battery terminals	Acid-proof grease ⁸	FINA Marson L2	Year-round	As required
Fuel tank	Diesel fuel	2-D ASTM D975 – 94 (USA)	Depending on outside temperatures Summer or winter diesel fuel	7 l (1.85 gal)
		1-D ASTM D975 – 94 (USA)		
		EN 590 : 96 (EU)		
		ISO 8217 DMX (International)		
		BS 2869 – A1 (GB)		
Engine cooling system	Coolant	Distilled water and antifreeze ASTM D4985 (reddish) ⁹	Year-round	2.9 l (0.77 gal)
		Distilled water and antifreeze ASTM D6210 (violet) ¹⁰		
Ball socket ISO/SAE controls	Lubricant	Gleitmo 800	Year-round	As required

1. The capacities indicated are approximate values; the oil level check alone is relevant for the correct oil level
Capacities indicated are no system fills
2. According to DIN 51511
3. According to DIN 51524 section 3
4. Depending on local conditions – *see Hydraulics oil grade* on page 3-4
5. According to DIN 51524 section 3
6. Hydraulic ester oils (HEES)
7. KP2N-20 according to DIN 51502 EP multipurpose calcium sulphonate complex grease
8. Standard acid-proof grease
9. Up to serial number WNCE0801EPAL00899
10. From serial no. WNCE0801VPAL00900

Oil grades for the diesel engine, depending on temperature

Engine oil grade	Ambient temperature (°C/°F)														
	°C	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	
API: CG-4/CH-4/ CI-4 ACEA: E3, E4, E5	SAE 10W														
					SAE 20W										
	SAE 10W-30														
	SAE 10W-40														
	SAE 15W-40														
						SAE 20									
								SAE 30							
									SAE 40						
		°F	-4	5	14	23	32	41	50	59	68	77	86	95	104

Additional oil change and filter replacement (hydraulic system)



Caution!

An additional oil change and filter replacement can be required depending on how the machine is used. Failure to observe these replacement intervals can cause damage to hydraulic components.

☞ *Observe the following intervals*

Application	Hydraulic oil	Hydraulic oil filter insert
Normal work (excavation work)	Replace the first time after 500 o/h, then every 1000 o/h	Replace the first time after 50 o/h, then every 500 o/h
Percentage of hammer work	20%	300 o/h
	40%	
	60%	100 o/h
	Over 80 %	



Notice!

Please refer to the maintenance plan on page 3-8 for additional maintenance.
















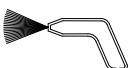
Oil grades for the hydraulic system, depending on temperature

Hydraulics oil grade	Ambient temperature (°C/°F)														
	°C	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	50
HVLP ¹		ISO VG32													
			ISO VG46												
				ISO VG68											
	°F	-4	5	14	23	32	41	50	59	68	77	86	95	104	122

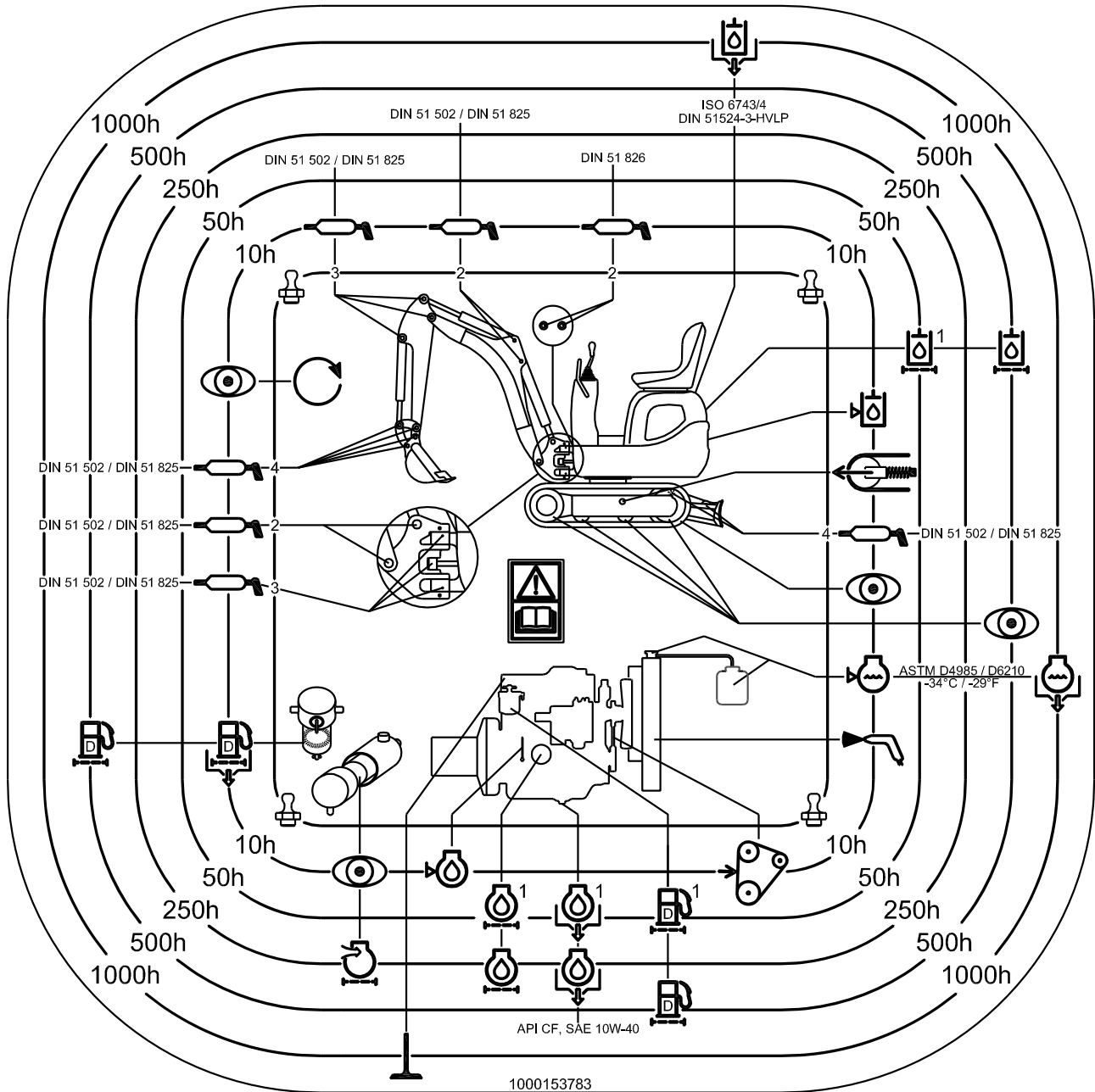
1. According to DIN 51524 section 3

3.2 Maintenance label

Explanation of symbols on the maintenance label

Symbol	Assembly	Explanation
	General	Visual check
	General	Grease instructions
	Fuel system	Drain condensation water
	Fuel system	Replace the fuel filter, clean the fuel prefilter
	Radiator	Check the coolant level
	Radiator	Drain and add new coolant
	Engine	Check valve clearance. Adjust if necessary
	Engine	Check the engine oil level
	Engine	Change the engine oil
	Engine	Replace the oil filter
	Engine	Check the V-belt tension
	Travel gear	Check track tension
	Hydraulic system	Check oil level
	Hydraulic system	Change the hydraulic oil
	Hydraulic system	Replace the hydraulic oil filter, replace the breather filter
	Radiator fins	Clean

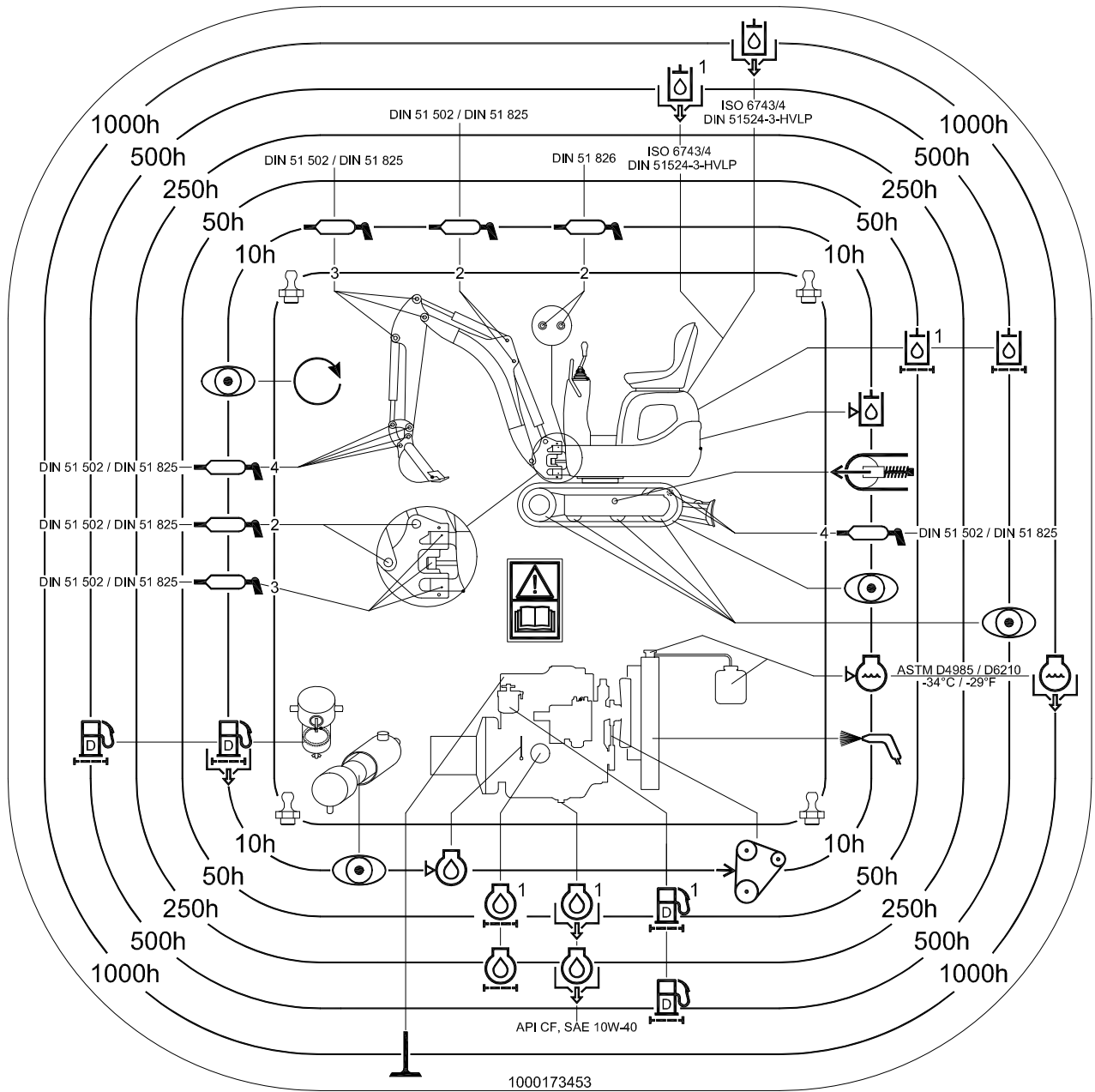
Maintenance label (up to serial number AF02412)



1000153783





Maintenance label (from serial number AF02413)



3.3 Maintenance plan (overview) Work description For servicing and maintenance on the attachment, please refer to the operation and maintenance manual of the attachment manufacturer. Fluid and filter changes (): Perform the following oil and filter changes (check oil levels after test run):	Maintenance plan/operating hours (o/h)	Authorized service center
	Customer	
	Every 2000 o/h	
	Every 1000 o/h once a year	
	Every 500 o/h	
	Every 250 o/h	
	Every 50 o/h	
	Maintenance (once a day)	
<ul style="list-style-type: none"> • Engine oil ¹ • Engine oil filter ² • Fuel filter ³ • Water separator • Coolant • Hydraulic oil filter insert ⁴ • Hydraulic oil⁵ • Drain condensation water from the hydraulic oil reservoir (from serial no. AH02272) • Air filter element (up to serial no. AI00875) • Air filter element according to dirt indicator (from serial no. AI00876) ⁶ 		
Inspection work (): Check the following material. Refill if necessary:		
• Engine oil		
• Engine coolant		
• Fuel		
• Hydraulic oil		
Check the function of the pedals (up to serial no. AI00975) <ul style="list-style-type: none"> • Clean, lubricate or repair the pedals 		
Check the function of the pedals, they must flip back automatically (from serial no. AI00976) <ul style="list-style-type: none"> • Clean, lubricate or repair the pedals, check the torsion springs 		
Clean water ducts ⁷		
Check radiator for engine and hydraulic oil for dirt. Clean if necessary		
Check cooling systems and hoses for leaks and pressure (visual check)		



3.3 Maintenance plan (overview)	Maintenance plan/operating hours (o/h)							
	Maintenance (once a day)	Every 50 o/h	Every 250 o/h	Every 500 o/h	Every 1000 o/h once a year	Every 2000 o/h	Customer	Authorized service center
Work description For servicing and maintenance on the attachment, please refer to the operation and maintenance manual of the attachment manufacturer.								
Air filter (damage)	●						●	
Remove dust from dust valve	●						●	
Prefilter with water separator: drain water	●						●	
• Clean		●					●	
Check V-belt condition and tension	●						●	
Replace the V-belt			●					●
Check the exhaust system for damage and condition	●						●	
Check the rollbar for damage	●						●	
Check valve clearance. Adjust if necessary					●			●
Clean and adjust the fuel injection pump ⁸					●			●
Check and adjust the injection pressure of the injection nozzles, clean the injection needles/nozzles					●			●
Check and adjust injection time ⁹					●			●
Empty the fuel tank and check for dirt			●					●
Check battery electrolyte. Add distilled water if necessary		●		●			●	
Check alternator, starter and electric connections, bearing play and function			●	●				●
Check preheating system and electric connections			●	●				●
Pressure check of primary pressure limiting valves ¹⁰		●			●			●
Check tracks for cracks and cuts	●						●	
Check track tension. Retighten if necessary	●						●	
Check bearing play of tread rollers, track carrier rollers, front idlers			●					●
Check piston rods for damage	●						●	
Check the threaded fittings of the safety devices (for example rollbar, etc.) for tightness	●						●	
Check the threaded fittings for tightness				●				●

3.3 Maintenance plan (overview)	Work description	Maintenance plan/operating hours (o/h)							Authorized service center
		Maintenance (once a day)	Every 50 o/h	Every 250 o/h	Every 500 o/h	Every 1000 o/h once a year	Every 2000 o/h	Customer	
	Check pin lock	●							●
	Check line fixtures	●							●
	Check indicator lights for correct function	●							●
	Couplings, dirt pile-up on hydraulic system dust caps	●							●
	Check insulating mats in engine compartment for damage/condition		●						●
	Check labels and Operator's Manual for completeness and condition		●						●
	Lights and acoustic warning system ¹¹		●						●
	Check lubricant on live ring ¹²		●		●				●
	Check gearing of swivel unit pinion								●
Lubrication service ():									
Lubricate the following assemblies/components – see <i>Maintenance label</i> on page 3-5:									
	• Stabilizer blade	●							●
	• Swiveling console	●							●
	• Swiveling cylinder	●							●
	• Boom	●							●
	• Stick	●							●
	• Attachments	●							●
	• Teeth of live ring							●	
	• Live ring (ball bearing)	●							●
	• Ball sockets (ISO/SAE changeover option)								●
Functional check ():									
Check the function of the following assemblies/components. Rectify if necessary:									
	• Lights and acoustic warning system	●							●
	• Check pedal function	●							●

Authorized service center	Maintenance plan/operating hours (o/h)						
	Customer	Every 2000 o/h	Every 1000 o/h once a year	Every 500 o/h	Every 250 o/h	Every 50 o/h	Maintenance (once a day)
	●						●
	●						●
	●						●
	●						●

Check for tightness, leaks and chafing: pipes, flexible lines and threaded fittings of the following assemblies and components. Rectify if necessary:

- Visual check
- 🔧 Engine, hydraulic system and hydraulic components
- 🔧 Cooling circuit
- 🔧 Traveling drive

1. Drain engine oil the first time after 50 o/h, then every 250 o/h
2. Replace the engine oil filter the first time after 50 o/h, then every 250 o/h
3. Replace the fuel filter the first time after 50 o/h, then every 500 o/h
4. Replace the hydraulic oil filter insert the first time after 50 o/h, then every 500 o/h
5. Replace the hydraulic oil the first time after 500 o/h, after 1000 o/h the second time, then every 1000 o/h
6. According to the dirt indicator, every 1000 o/h or once a year at the latest. (Replace after 50 o/h when in extensive use in environments with acidic air, such as acid production facilities, steel and aluminum mills, chemical plants and other nonferrous-metal plants)
7. Clean the water ducts every other 1000 o/h servicing
8. Clean and adjust the fuel injection pump every other 1000 o/h servicing
9. Check and adjust injection time every other 1000 o/h servicing
10. Check the first time after 50 o/h, then every 500 o/h
11. Check once a week
12. Check the first time after 50 o/h, then every 500 o/h

3.4 Service package

Please refer to the 803 spare parts catalogue for the article numbers of the 2 available service packages (for 50 and 500 operating hours).

3.5 Introduction

Operational readiness and the service life of machines are heavily dependent on maintenance. It is therefore in the interest of the machine owner to perform the mandatory maintenance. Bear in mind the following points before performing servicing and maintenance:

- Chapter 2 "SAFETY INSTRUCTIONS" in the Operator's Manual
- The Operator's Manuals of the attachments.

Perform the prescribed inspections and rectify any disorders before putting the machine into operation.

Secure the open engine cover and other open covers appropriately. Do not open the engine cover and other covers on slopes or in strong wind.

When using compressed air, dirt and debris can be blown into your face. Therefore, wear safety glasses, protective masks and clothing when using compressed air.

3.6 Safety-relevant parts

Daily servicing and maintenance, and maintenance according to maintenance plan "A" must be performed by a specifically trained person. All other maintenance must be performed by trained and qualified personnel only.

The following maintenance plans indicate the maintenance to be performed.

This is necessary to ensure optimal functioning.

– see *Maintenance plan (overview)* on page 3-8.

Immediately repair or replace parts that are already damaged or not working properly before they are due for replacement.



Notice!

Safety-relevant parts may only be repaired or replaced by a Wacker Neuson dealer or a Wacker Neuson service center.

Parts	Interval
Hydraulic hoses	Replace hydraulic hoses every 6 years from the date of manufacture, even if they do not seem to be damaged.
Seat belt	No replacement necessary. Replace the seat belt after an accident.

3.7 Fuel system

Specific safety instructions

- Extreme caution is essential when handling fuel – increased fire hazard!
- Never perform work on the fuel system near open flames or sparks!
- Do not smoke when working on the fuel system or when refueling!
- Before refueling, stop the engine and remove the starting key!
- Do not refuel in closed rooms!
- Wipe away fuel spills immediately!
- Keep the machine clean to reduce the fire hazard!

Refueling

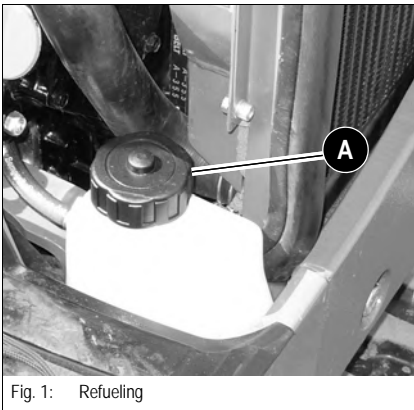


Fig. 1: Refueling

Filler inlet **A** for the fuel tank is located under the engine cover, on the left in travel direction.



Danger!

All work involving fuel carries an increased

Fire and poisoning hazard!

- ☞ *Do not refuel in closed rooms*
- ☞ *Never perform work on the fuel system near open flames or sparks*



Environment!

Use a suitable container to collect the fuel as it drains and dispose of it in an environmentally friendly manner!



Notice!

Do not run the fuel tank completely dry. Otherwise, air is drawn into the fuel system. This requires bleeding the fuel system – see *Bleeding the fuel system* on page 3-15.



Notice!

Fill up the tank with the correct fuel type at the end of each working day. This prevents condensation water from forming in the fuel tank over night. Do not fill the tank completely but leave some space for the fuel to expand.

Stationary fuel pumps

General

Only refuel from stationary fuel pumps. Fuel from barrels or cans is usually dirty.

Even the smallest particles of dirt can cause

- Increased engine wear
- Malfunctions in the fuel system and
- Reduced effectiveness of the fuel filters

Refueling from barrels

If refueling from barrels cannot be avoided, note the following points (see fig. 2):

- Barrels must neither be rolled nor tilted before refueling
- Protect the suction pipe opening of the barrel pump with a fine-mesh screen
- Immerse it down to a max. 150 mm (5.9 in) above the bottom of the barrel
- Only fill the tank using refueling aids (funnels or filler pipes) with integral microfilter
- Keep all refueling containers clean at all times

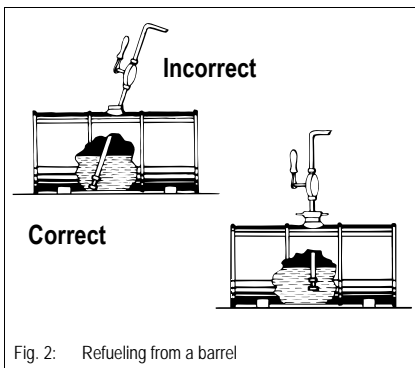


Fig. 2: Refueling from a barrel

Diesel fuel specification

Use only high-grade fuels

Grade	Use
<ul style="list-style-type: none"> • 2-D ASTM D975 – 94 • 1-D ASTM D975 – 94 	USA
<ul style="list-style-type: none"> • EN 590: 96 	EU
<ul style="list-style-type: none"> • ISO 8217 DMX 	International
<ul style="list-style-type: none"> • BS 2869 – A1 • BS 2869 – A2 	England
<ul style="list-style-type: none"> • Sulfur content < 0.05 % • Cetane number > 45 	

Bleeding the fuel system



Danger!

If the fuel, as it drains, comes into contact with hot engine parts or the exhaust system, there is an increased

Fire hazard!

⚠ *Never bleed the fuel system if the engine is hot!*

Bleed the fuel system in the following cases:

- After removing and fitting the fuel filter, prefilter or the fuel lines back on again
- After running the fuel tank empty
- After running the engine again, after it has been out of operation for a longer period of time

Bleed the fuel system as follows:

- Fill the fuel tank
- Turn the starting key to the first position
- Wait about 5 minutes while the feed pump bleeds the fuel system automatically
- Start the engine
- Check for leaks after starting the engine
- Let the fuel system run by performing a test run of 5 minutes at idling speed

If the engine runs smoothly for a while and then stops, or if it does not run smoothly:

- Stop the engine
- Raise the lock lever
- Remove the starting key
- Bleed the fuel system again as described above
- Have this checked by authorized personnel if necessary

Fuel prefilter with water separator

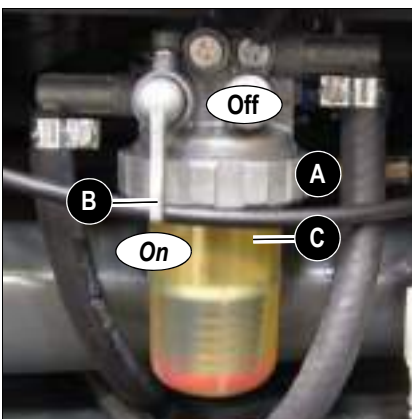


Fig. 3: Fuel prefilter

Check the fuel prefilter as follows:

- ⚠ *Remove the right-hand chassis cover in order to be able to see the water separator.*
- ⚠ *If the red indicator ring rises to position C*
- ⚠ *Unscrew thread A*
 - ➔ Empty the receptacle
 - ➔ Fit the receptacle back on again
- ⚠ *Screw thread A back on again*
- ⚠ *Bleed the fuel system – see chapter Bleeding the fuel system on page 3-15*

Interrupt fuel supply as follows:

- ⚠ *Turn ball-type cock B to the OFF mark*
 - ➔ Fuel supply is interrupted
- ⚠ *Turn ball-type cock B to the ON mark*
 - ➔ Fuel supply is open again



Environment!

Thread **A** is fitted with a hose. Collect the water as it drains with a suitable container and dispose of it in an environmentally friendly manner.

Replacing the fuel filter



Fig. 4: Fuel filter



Danger!

If the fuel, as it drains, comes into contact with hot engine parts or the exhaust system, there is an increased

Fire hazard!

⚠ *Never change the fuel filter if the engine is hot!*



Environment!

Use a suitable container to collect the fuel as it drains and dispose of it in an environmentally friendly manner!

- ⚠ *Open the engine cover*
- ⚠ *Close stop cock **B** (horizontal)*
- ⚠ *Unscrew the union nut*
- ⚠ *Remove the transparent housing*
- ⚠ *Remove the old filter insert*
- ⚠ *Put the new filter insert in place*
- ⚠ *Fit the housing back on again (apply a thin coat of oil or diesel fuel to the sealing surface)*
- ⚠ *Open stop cock **B** (vertical)*
- ⚠ *Bleed the fuel system – see [chapter Bleeding the fuel system](#) on page 3-15*
- ⚠ *Check the filter for tightness after a short test run.*
- ⚠ *Dispose of the old filter insert in an environmentally friendly manner*
- ⚠ *Close and lock the engine cover*

3.8 Engine lubrication system



Caution!

If the engine oil level is too high or too low, or if an oil change is overdue, this can cause

Engine damage and loss of output!

☞ Have the oil changed by a Wacker Neuson service center
– see [chapter 3.3 Maintenance plan \(overview\)](#) on page 3-8

Checking the oil level



Notice!

Check the oil level once a day.
We recommend checking it before starting the engine. After stopping a warm engine, wait at least 5 minutes before checking.

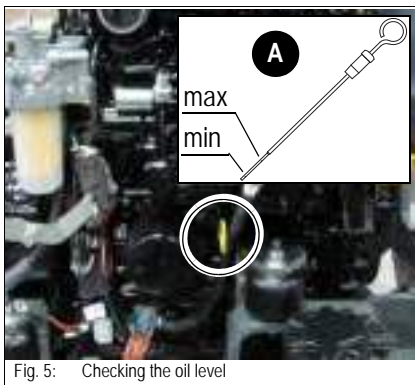


Fig. 5: Checking the oil level

- Park the machine on level ground
- Stop the engine
- Raise the lock lever
- Remove the starting key
- Let the engine cool down
- Open the engine cover
- Clean the area around the oil dipstick with a lint-free cloth
- Pull out oil dipstick **A**
- ☞ Wipe it with a lint-free cloth
- ☞ Push it back in as far as possible
- ☞ Withdraw it and read off the oil level
- ☞ Close and lock the engine cover



Notice!

The oil level must be between the MAX and MIN marks. However if necessary, add oil at the latest when the oil reaches the MIN mark on the oil dipstick **A**.

Adding engine oil



Caution!

Too much, not enough or incorrect engine oil can cause engine damage! For this reason:

- ☞ Do not add engine oil above the MAX mark of oil dipstick 6/A
- ☞ Do not fill in engine oil below the MIN mark of oil dipstick 6/A
- ☞ Use only the specified engine oil



Environment!

Use a suitable container to collect the engine oil as it drains and dispose of it in an environmentally friendly manner!



Caution!

Adding the engine oil too fast via filler inlet **B** in the cylinder-head cover can cause engine damage.

- ☞ Add the engine oil slowly so it can go down without entering the intake system.

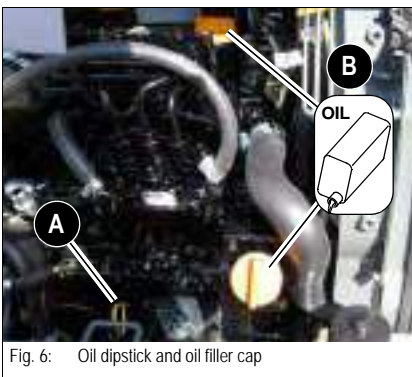


Fig. 6: Oil dipstick and oil filler cap

- Clean the area around oil filler cap **B** with a lint-free cloth
- Open filler cap **B**
- Pull out oil dipstick **A** and wipe it with a lint-free cloth
- Add engine oil
- Wait about 3 minutes until all the oil has run into the oil sump
- Check the oil level – see *Checking the oil level* on page 3-18
- Add oil if necessary and check the oil level again
- Close filler cap **B**
- Push oil dipstick **A** back in as far as possible
- Completely remove all oil spills
- Close and lock the engine cover

Changing engine oil

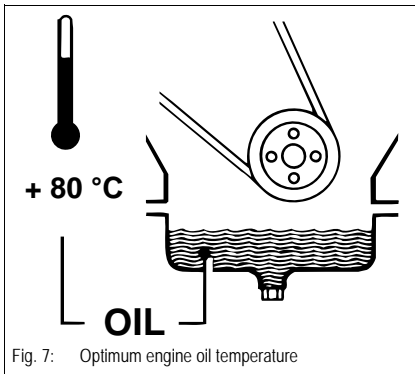


Fig. 7: Optimum engine oil temperature



Danger!

Caution when draining hot engine oil –

Burn hazard!

- ☞ Wear protective gloves
- ☞ Use suitable tools



Environment!

Use a suitable container to collect the engine oil as it drains and dispose of it in an environmentally friendly manner!

☞ Change the engine oil as follows:

- Park the machine on level ground
- Let the engine run until reaching operating temperature (oil temperature about 80 °C)
- Stop the engine
- Place a container under the opening to collect the oil as it drains
- Unscrew the oil drain plug
- Completely drain the oil
- Add engine oil – [see chapter Adding engine oil](#) on page 3-19
- Screw the oil drain plug back on again
- Start the engine and let it run briefly at low speed
- Stop the engine
- Wait a moment until all the oil has run into the oil sump
- Check the oil level again
- Add oil if necessary and check again
- Completely remove all oil spills from the engine
- Close and lock the engine cover

Replacing the engine-oil filter cartridge

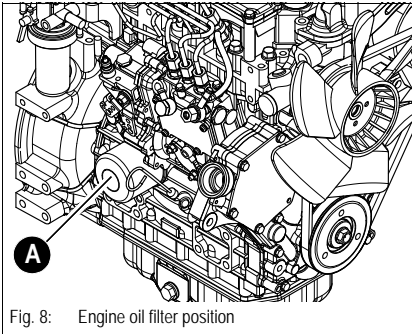


Fig. 8: Engine oil filter position



Danger!

Caution when draining hot engine oil –

Burn hazard!

☞ *Wear protective gloves*



Environment!

Collect the drained engine oil in a suitable container.

Dispose of used oil and filters in an environmentally friendly manner!

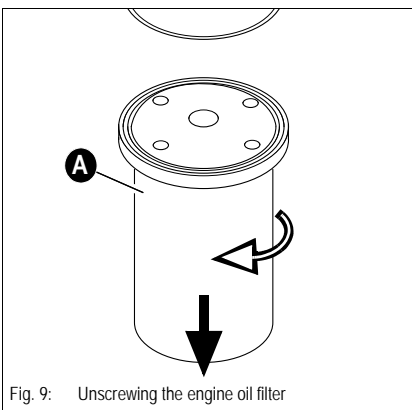


Fig. 9: Unscrewing the engine oil filter

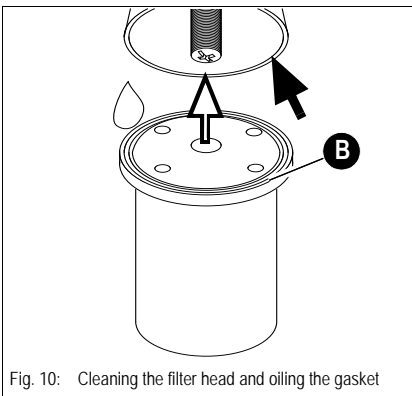


Fig. 10: Cleaning the filter head and oiling the gasket

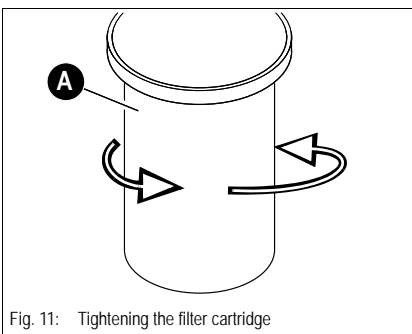


Fig. 11: Tightening the filter cartridge

☞ *Change the filter as follows:*

- Stop the engine
- Place a suitable container underneath the oil filter to collect the oil as it drains
- Clean the area around the oil filter
- Slowly loosen oil filter cartridge **A** using a commercially available oil filter wrench
- Let the oil drain into the container
- Remove the filter cartridge once the oil is completely drained
- Ensure that the thread adapter is correctly placed in the filter head

- Clean the filter head inside with a lint-free cloth
- Apply a thin coat of fresh engine oil to rubber seal **B** of the new oil filter cartridge
- Tighten the new filter cartridge by hand until the gasket makes contact

- Tighten oil filter cartridge **A** by hand by about a further half revolution
- Ensure that the oil level is correct!
- Let the engine run briefly
- Stop the engine
- Check the seal of oil filter cartridge **A** and retighten by hand
- Check the oil level and add engine oil if necessary
- Completely remove all oil spills from the engine
- Dispose of the used oil filter in an environmentally friendly manner
- Close and lock the engine cover

3.9 Cooling system

The radiator is located in the engine compartment, on the right of the engine.
The coolant reservoir is also located in the engine compartment, behind the engine

Specific safety instructions

- Dirt on the radiator fins reduces the radiator's heat dissipation capacity!
To avoid this:
 - ☞ Clean the outside of the radiator at regular intervals. Use oil-free compressed air (2 bar max.) to clean. Maintain a certain distance from the radiator to avoid damage to the radiator fins. Refer to the maintenance plans in the appendix for the cleaning intervals
 - ☞ In dusty or dirty work conditions, clean more frequently than indicated in the maintenance plans
- An insufficient coolant level reduces the heat dissipation capacity as well and can cause engine damage! Therefore:
 - ☞ Check the coolant level at regular intervals. Refer to the maintenance plans in the appendix for the intervals
 - ☞ If coolant must be added frequently, check the cooling system for leaks and/or contact your dealer!
 - ☞ Never add cold water/coolant if the engine is warm!
 - ☞ After filling the coolant reservoir, make a test run with the engine and check the coolant level again after stopping the engine
- The use of the wrong coolant can destroy the engine and the radiator. Therefore:
 - ☞ Add enough antifreeze compound to the coolant – but never more than 50 %.
According to specified standard
– see [chapter 3.1 Fluids and lubricants](#) on page 3-2
 - ☞ Observe the coolant compound table
– see [chapter 2.9 Coolant compound table](#) on page 2-8
 - ☞ Do not use cooler cleaning compounds if an antifreeze compound has been added to the coolant – otherwise this causes sludge to form, which can damage the engine
- Once you have filled the coolant reservoir:
 - ☞ Test run the engine
 - ☞ Stop the engine
 - ☞ Let the engine cool down
 - ☞ Check the coolant level again



Environment!

Use a suitable container to collect the coolant as it drains and dispose of it in an environmentally friendly manner!

Checking the coolant level/adding coolant

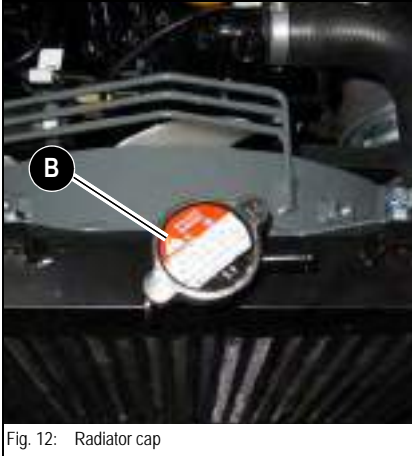


Fig. 12: Radiator cap



Danger!

Never open the coolant reservoir and never drain coolant if the engine is warm since the cooling system is under high pressure.

Burn hazard!

- ☞ Wait at least 15 minutes after stopping the engine!
- ☞ Wear protective gloves and clothing
- ☞ Open filler cap **B** to the first notch and release the pressure
- ☞ Ensure that the coolant temperature is sufficiently low so you can touch the radiator plug with your hands



Danger!

Coolant is flammable and poisonous.

Accident hazard!

- ☞ Keep away from flames
- ☞ Avoid eye contact with coolant
 - If coolant comes into contact with the eyes
 - ➔ Immediately rinse with clean water and seek medical assistance



Notice!

Do not add a different coolant to the one in the reservoir.

- Only use the coolant prescribed by Wacker Neuson
 - see *Fluids and lubricants* on page 3-2.

Checking the coolant level

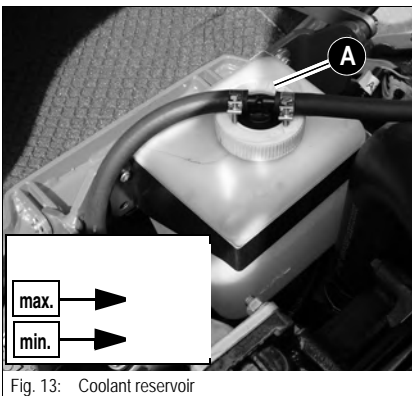


Fig. 13: Coolant reservoir

- ☞ Park the machine on level ground
- ☞ Stop the engine!
- ☞ Raise the control lever base
- ☞ Remove the key and carry it with you
- ☞ Let the engine and the coolant cool down
- ☞ Open the engine cover
- ☞ Check the coolant level on the transparent coolant reservoir **13/A** and on radiator **12/B**
 - ☞ If the coolant level is below the lower mark or if there is no coolant at the radiator's filler inlet:
 - ➔ Add coolant
- ☞ Close and lock the engine cover

i Notice!

Check the coolant level once a day.
We recommend checking it before starting the engine.

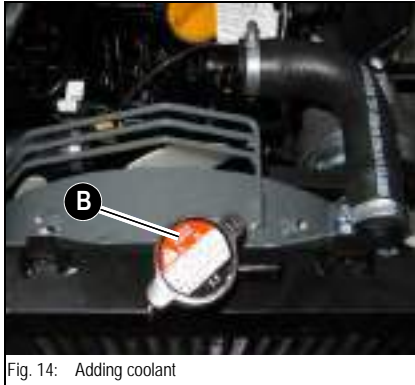


Fig. 14: Adding coolant

Adding coolant

After the engine has cooled down:

- ☞ Release overpressure in the radiator
 - ☞ Carefully open the cap to the first notch and fully release the pressure
- ☞ Open filler cap **14/B**
- ☞ Add coolant up to the lower edge of the filler inlet (radiator)
- ☞ Close filler cap **14/B**
- ☞ Fill up the coolant reservoir
- ☞ Start the engine and let it warm up for about 5 – 10 minutes.
- ☞ Stop the engine
- ☞ Remove the key and carry it with you
- ☞ Let the engine cool down
- ☞ Check the coolant level again
 - ➔ The coolant level must be above the sheet-metal bracket of the coolant reservoir
- ☞ If necessary, add coolant and repeat the procedure until the coolant level remains constant
- ☞ Close and lock the engine cover

⚠ Caution!

Do not add a different coolant to the one in the reservoir.

- ☞ Only use the coolant recommended by Wacker Neuson
– see [chapter 2.9](#) Coolant compound table on page 2-8.

i Notice!

Check the coolant every year before the cold season sets in!

Draining coolant

Danger!

Never open the coolant reservoir and never drain coolant if the engine is warm since the cooling system is under high pressure

Burn hazard!

- ☞ Wait at least 10 minutes after stopping the engine!
- ☞ Wear protective gloves and clothing
- ☞ Open filler cap **14/B** to the first notch and release the pressure


Notice!

Do not add a different coolant to the one in the reservoir.

- Only use the coolant prescribed by Wacker Neuson
 - see *Fluids and lubricants* on page 3-2.

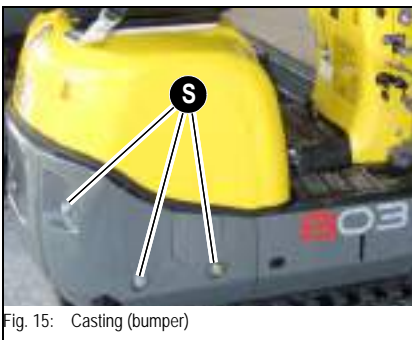


Fig. 15: Casting (bumper)

After the engine has cooled down:

- ☞ Release overpressure in the radiator
- ☞ Open the cap to the first notch and fully release the pressure
- ☞ Open filler cap **14/B**
- ☞ Remove the left-hand articulation screw of the rollbar (option)
- ☞ Remove screws **S**
- ☞ Remove the casting and the rollbar element (option)
- ☞ Open the drain plug on the lower side of the radiator and drain the coolant
- ☞ Close the drain plug again
- ☞ Fill up the radiator with suitable coolant
 - see *chapter 3.1 Fluids and lubricants* on page 3-2
- ☞ Check the coolant level
 - see *chapter Checking the coolant level* on page 3-23

3.10 Air filter (up to serial no. AI00875)



Caution!

The air filter element will be damaged if it is washed or brushed out!
Bear in mind the following to avoid premature engine wear or damage:

- ☞ *Do not clean the air filter element.*
- ☞ *Replace the air filter element according to the indicator or maintenance plan.*
- ☞ *Never reuse damaged air filter elements.*
- ☞ *Ensure cleanliness when replacing the air filter element!*

Replace air filter element **B** as indicated in the maintenance plan!



Caution!

Air filter elements degrade prematurely when in service in acidic air for longer periods of time. This risk is present, for example, in acid production facilities, steel and aluminum mills, chemical plants and other nonferrous-metal plants

- ☞ *Replace air filter element **B** after 50 operating hours at the latest!*

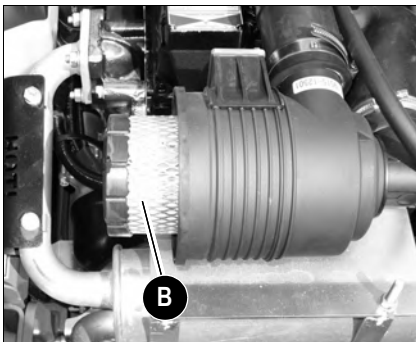


Fig. 16: Indicator for air filter contamination

General instructions for maintenance of the air filter element:

- Store air filter elements in their original packaging and in a dry place!
- Do not knock the air filter element against other objects as you install it!
- Check air filter attachments, air intake hoses and the air filter element for damage, and immediately repair or replace if necessary!
- Check the screws at the induction manifold and the clamps for tightness!
- Check the function of the dust valve, replace if necessary!
- Compress the discharge slot of the dust valve
- Clean the discharge slot if necessary
- Close and lock the engine cover

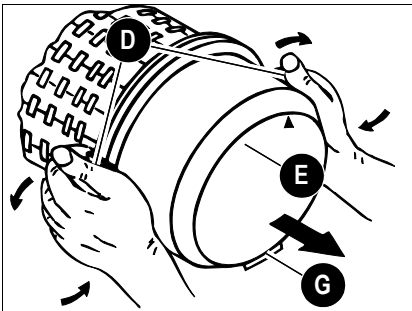
Replacing air filter elements


Fig. 17: Removing the housing section

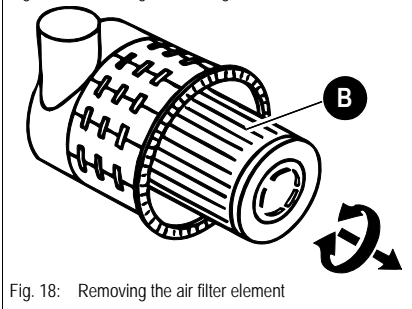



Fig. 18: Removing the air filter element

- Replace the outside air filter element **B** as follows:
 - ☞ Stop the engine
 - ☞ Raise the lock lever
 - ☞ Remove the starting key and carry it with you
 - ☞ Let the engine cool down
 - ☞ Open the engine cover
 - ☞ Remove dirt and dust from the air filter element and the area around the air filter
 - ☞ Open bow clips **D** on housing section **E**
 - ☞ Remove housing section **E**
 - ☞ Carefully remove air filter element **B** with slightly turning movements
 - ☞ **Ensure that all contamination (dust) inside the housing section and dust valve has been removed**
 - ☞ Clean the parts with a clean lint-free cloth, do not use compressed air
 - ☞ Check the air filter element for damage, only install intact air filter elements
 - ☞ Carefully insert a new air filter element **B** in housing section **F**
 - ☞ Position housing section **E** (ensure that it is properly seated)
 - ☞ Close bow clips **D**


Notice!

Ensure that dust valve **G** shows downward once it is installed!

3.11 Air filter (from serial no. AI00876)

Caution!

The air filter element will be damaged if it is washed or brushed out!
Bear in mind the following to avoid premature engine wear or damage:

- ☞ Do not clean the air filter element.
- ☞ Replace the air filter element according to the indicator or maintenance plan.
- ☞ Never reuse damaged air filter elements.
- ☞ Ensure cleanliness when replacing the air filter element!



Fig. 19: Indicator for air filter contamination

The air filter elements must be replaced:

- If "Service" (red mark) is displayed on dirt indicator **A**
- According to the maintenance plan

**Caution!**

Air filter elements degrade prematurely when in service in acidic air for longer periods of time. This risk is present, for example, in acid production facilities, steel and aluminum mills, chemical plants and other nonferrous-metal plants

- ☞ *Check air filter elements every 50 operating hours at the latest, and replace it if necessary!*

General instructions for air filter maintenance:

- Store air filter elements in their original packaging and in a dry place!
- Do not knock the air filter element against other objects as you install it!
- Check air filter attachments, air intake hoses and air filter elements for damage, and immediately repair or replace if necessary!
- Check the screws at the induction manifold and the clamps for tightness!
- Check the function of the discharge slot of the dust valve **D**, clean and replace it if necessary.
 - ☞ Squeeze the discharge slot of dust valve **D**.
 - ☞ Clean the discharge slot if necessary.



Fig. 20: Dust valve

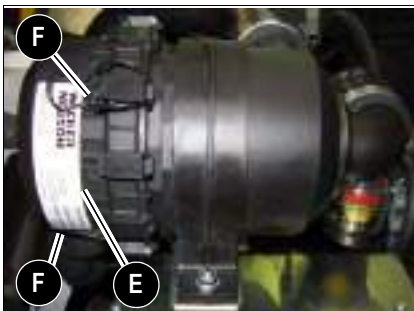
Replacing air filter elements

Fig. 21: Removing the housing section



Fig. 22: Removing the outside air filter

Replace the outside air filter element **B as follows:**

- ☞ Stop the engine
- ☞ Raise the lock lever
- ☞ Remove the starting key and carry it with you
- ☞ Let the engine cool down
- ☞ Open the engine cover
- ☞ Remove dirt and dust from the air filter element and the area around the air filter
- ☞ Open bow clips **F** on housing section **E**
- ☞ Remove housing section **E**
- ☞ Carefully remove air filter element **B** with slightly turning movements
- ☞ **Ensure that all dirt (dust) inside the housing section and cover **E**, including dust valve **D**, has been removed**
 - ☞ Clean the parts with a clean lint-free cloth, do not use compressed air
- ☞ Check the new outside air filter **B** for damage and carefully insert it in the housing section (install only intact air filter elements)
- ☞ Position housing section **E** (ensure that it is properly seated)
- ☞ Close bow clips **F** on housing section **E**

**Notice!**

Ensure that dust valve **D** shows downward once it is installed!

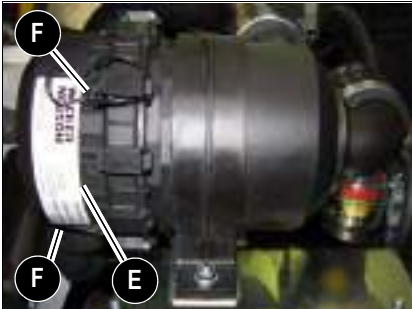


Fig. 23: Removing the housing section



Fig. 24: Removing the outside air filter

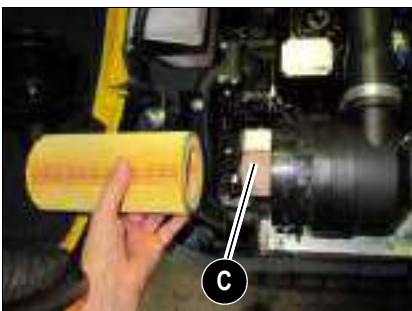


Fig. 25: Inside air filter

Replace the inside air filter element **C** as follows:

- ☞ Stop the engine
- ☞ Raise the lock lever
- ☞ Remove the starting key and carry it with you
- ☞ Let the engine cool down
- ☞ Open the engine cover
- ☞ Remove dirt and dust from the air filter element and the area around the air filter
- ☞ Open bow clips **F** on housing section **E**
- ☞ Remove housing section **E**
- ☞ Carefully remove outside air filter **B** with slightly turning movements

- ☞ Carefully pull out inside air filter **C** with slightly turning movements
 - ☞ Cover the air supply at the end of the filter with a clean lint-free cloth to prevent dust from entering the engine
- ☞ **Ensure that all dirt (dust) inside the housing section and cover **E**, including dust valve **D**, has been removed**
 - ☞ Clean the parts with a clean lint-free cloth, do not use compressed air
 - ☞ Remove the cloth from the air supply
- ☞ Check the new inside air filter **C** for damage and carefully insert it in the housing section (install only intact air filter elements)
- ☞ Carefully insert outside air filter **B** in the housing section
- ☞ Position housing section **E** (ensure that it is properly seated)
- ☞ Close bow clips **F** on housing section **E**
- ☞ Close and lock the engine cover

Notice!

Ensure that dust valve **D** shows downward once it is installed!

3.12 V-belt



Danger!

Only check or retighten/replace the V-belt when the engine is stopped –

Injury hazard!

- ☞ Stop the engine before performing inspection work in the engine compartment!
- ☞ Disconnect the battery or the battery master switch
- ☞ Let the engine cool down



Caution!

Cracked and stretched V-belts cause engine damage

- ☞ Have the V-belt replaced by a Wacker Neuson service center

Check the V-belt once a day or every 10 operating hours, and retension it if necessary. Retighten new V-belts after about 15 minutes of running time.

Checking V-belt tension

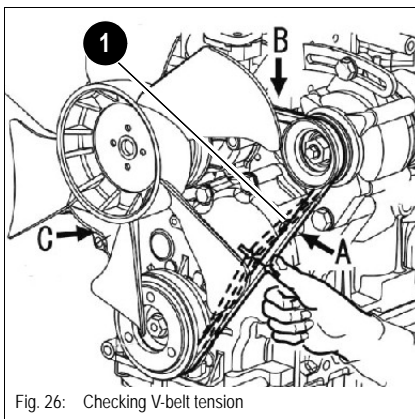


Fig. 26: Checking V-belt tension

- ☞ Stop the engine
- ☞ Lock the control levers
- ☞ Remove the key and carry it with you
- ☞ Disconnect the battery or the battery master switch
- ☞ Let the engine cool down
- ☞ Open the engine cover
- ☞ Carefully check V-belt **1** for damage, cracks or cuts
- ☞ Replace the V-belt if it touches the base of the V-belt groove or the disks of the pulley
 - If the V-belt is damaged:
 - ☞ Have the V-belt replaced by authorized personnel
- ☞ Press with your thumb about 100 N to check the deflection of the V-belt between the crankshaft disk and the fan wheel **position C**. A new V-belt should have a deflection of 6 to 8 mm, a used V-belt (after about 5 minutes running time) should have a deflection of 7 to 9 mm.
- ☞ Retighten the V-belt if necessary
- ☞ Close and lock the engine cover

Retensioning the V-belt



Caution!

Overtensioning the V-belt can damage the V-belt, the V-belt guide and the water pump bearing.

Avoid contact of oil, grease or similar substances with the V-belt.

☞ *Checking V-belt tension*

– see *Checking V-belt tension on page 3-30*

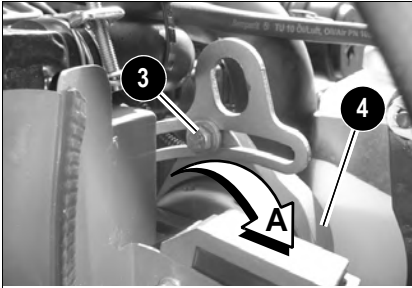


Fig. 27: Retensioning the V-belt

- ☞ *Stop the engine*
- ☞ *Raise the control lever base*
- ☞ *Remove the key and carry it with you*
- ☞ *Disconnect the battery or the battery master switch*
- ☞ *Let the engine cool down*
- ☞ *Open the engine cover*
- ☞ *Loosen fastening screw 3 and the articulation screw of dynamo 4*
- ☞ *Use a suitable tool to push the dynamo in the direction of arrow A until reaching the correct V-belt tension (fig. 27)*
- ☞ *Keep the dynamo in this position, and at the same time retighten fastening screw 3*
- ☞ *Tighten the articulation screw of the dynamo*
- ☞ *Check V-belt tension again and adjust it if necessary*
- ☞ *Connect the battery or the battery master switch*
- ☞ *Close and lock the engine cover*

3.13 Pressure check

General



Fig. 28: Plug instead of measurement connection

- Run the machine warm before checking the pressure! Hydraulic oil temperature: 50 °C min. (operating temperature)
- In order to measure the secondary pressure limiting valves of the swivel unit, replace the plug in the measurement connection thread by a measurement connection (no.1000161137).
- Ensure utmost cleanliness of all measuring points and connections, micro measuring lines and pressure gages that are connected for checking pressure => even the slightest traces of dirt, for example a grain of sand, can impair tightness and cause leaks



Fig. 29: Secondary pressure limiting valve measurement connection

Checking the secondary pressure limiting valve (SPLV)

- ☞ The plug and the measurement connection have conical threads and must be sealed with Teflon tape.
- ☞ Lock the upper carriage
- ☞ Connect the measuring instrument
- ☞ Actuate the swivel unit at full work engine speed.
- ☞ Check and make a note of the pressure value

Checking pressure drop

- ☞ Actuate the swivel unit at full work engine speed.
- ☞ Swiftly reduce engine speed from maximum to minimum
- ☞ Check and make a note of the pressure value
- ➔ The pressure should not drop by more than 10 %.

Pressure check of gear pump P2



Fig. 30: Primary pressure limiting valve measurement connection

Hydraulic supply of rotation, left-hand drive and stick functions

Checking primary pressure limiting valve 1 (PPLV 1)

- ☞ Install a pressure gage with a T-fitting (EVL 8L no.1000015515) and a measurement connection (8L no.1000015578) temporarily in the stick circuit.
- ☞ At maximum engine speed, actuate the stick cylinder as far as it will go to either side
- ☞ Check and make a note of the pressure value.

Checking pressure drop

- ☞ At maximum engine speed, actuate the stick cylinder as far as it will go to either side
- ☞ Swiftly reduce engine speed from maximum to minimum -> pressure drop
- ☞ Check and make a note of the pressure value.
- ➔ Pressure drop should not exceed the specified value by more than 10 %

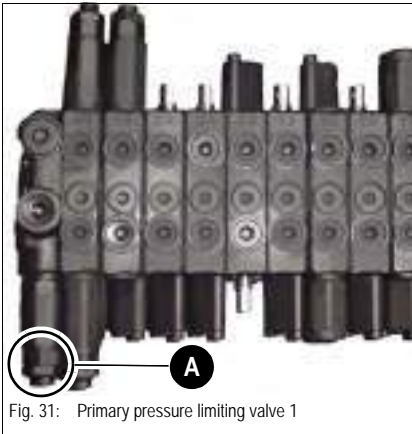


Fig. 31: Primary pressure limiting valve 1

Adjusting primary pressure limiting valve 1 (PPLV 1)

- ☞ Adjust the pressure at the primary pressure limiting valve (PPLV 1) **A** on the main valve block
- ☞ Loosen the locknut of the pressure limiting valve
- ☞ Unscrew the pressure limiting valve until you can read off a pressure drop on the pressure gage
 - ➔ The valve seat may be stuck and must be loosened first
- ☞ Adjust the pressure limiting valve and tighten the locknut
- ☞ Check the primary pressure limiting valve 1 and the pressure drop once adjustment is over

Also check by extending/retracting the stick cylinder!

Pressure check of gear pump P1

Hydraulic supply for swivel, bucket and boom functions

Checking primary pressure limiting valve 2 (PPLV 2)

- ☞ Install a pressure gage with a T-fitting (EVL 8L no.1000015515) and a measurement connection (8L no.1000015578) temporarily on the boom cylinder.



- ☞ At maximum engine speed, actuate the boom cylinder as far as it will go to either side

Checking pressure drop

- ☞ At maximum engine speed, actuate the boom cylinder as far as it will go to either side
- ☞ Swiftly reduce engine speed from maximum to minimum -> pressure drop
- ☞ Check and make a note of the pressure value.

- ➔ Pressure drop should not exceed the specified value by more than 10 %

Adjusting primary pressure limiting valve 2 (PPLV 2)

- ☞ Adjust the pressure at the primary pressure limiting valve (PPLV 2) **B** on the main valve block
- ☞ Loosen the locknut of the pressure limiting valve
- ☞ Unscrew the pressure limiting valve until you can read off a pressure drop on the pressure gage
 - ➔ The valve seat may be stuck and must be loosened first
- ☞ Adjust the pressure limiting valve and tighten the locknut
- ☞ Check the primary pressure limiting valve 2 and the pressure drop once adjustment is over

Also check by extending/retracting the boom cylinder!

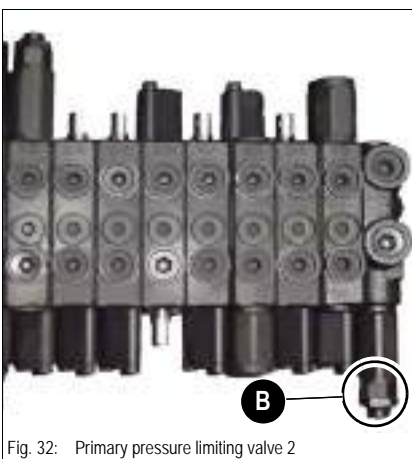



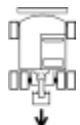
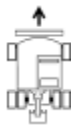


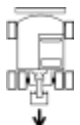
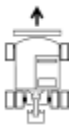
Fig. 32: Primary pressure limiting valve 2

3.14 Test report

Pump 1

Function	Movement	Symbol	Pressure limiting valve	Measurement connection	Specified values	Measured	✓
Rotate	LEFT		Secondary pressure limiting valve SPLV-A1 and B1	Micro measurement connection Control valve	Rated value	70 ^{±5} bar	
	RIGHT				Drop	7 bar	
Stick	EXTEND		Main pressure limiting valve PPLV-1	EVL in flexible line	Rated value	170 ^{±3} bar	
	RETRACT				Drop	17 bar	
Machine travel (left)	FORWARD				Rated value	170 ^{±3} bar	
	REVERSE				Drop	17 bar	

Pump 2

Function	Movement	Symbol	Pressure limiting valve	Measurement connection	Specified values	Measured	✓
Machine travel (right)	FORWARD		Main pressure limiting valve PPLV-2	EVL in flexible line	Rated value	170 ^{±3} bar	
	REVERSE				Drop	17 bar	

3.14 Test report

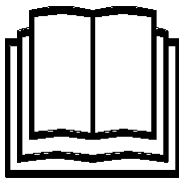
Boom swiveling	LEFT		Main pressure limiting valve PPLV-2	EVL in flexible line	Rated value	170 ^{±3} bar
	RIGHT				Drop	17 bar
Bucket cylinder	EXTEND				Rated value	170 ^{±3} bar
	RETRACT				Drop	17 bar
Boom	UP		Rated value	170 ^{±3} bar		
	DOWN		Drop	17 bar		

Pumps 1 and 2

Function	Movement	Symbol	Pressure limiting valve	Measurement connection	Specified values	Measured	✓
Stabilizer blade/telescopic undercarriage	UP/RETRACT		Main pressure limiting valves PPLV-1 and 2	EVL in flexible line	Rated value	170 ^{±3} bar	
	DOWN/EXTEND				Drop	17 bar	
Auxiliary hydraulics	A5				Rated value	170 ^{±3} bar	
					Drop	17 bar	

3.15 Hydraulic system

Specific safety instructions



- Release the pressure in all lines carrying hydraulic oil prior to any maintenance and repair work. To do this:
 - Lower the boom or the attachment to the ground
 - Move all control levers of the hydraulic control valves several times
- Raise the lock lever
- Hydraulic oil escaping under high pressure can penetrate the skin and cause serious injury. Always consult a doctor immediately even if the wound seems insignificant – otherwise serious infections could set in!
- If the hydraulic oil in the sight glass is cloudy, this indicates that water or air has penetrated the hydraulic system. This can cause damage to the hydraulic pump!
- Oil or fuel flowing out of high pressure lines can cause fire or malfunctions, and serious injury or damage to property. Interrupt work immediately if loose nuts or damaged hoses and lines are detected
 - ☞ Contact a Wacker Neuson dealer immediately. Have a line replaced if one of the following problems is detected:
 - ☞ Damaged or leaky hydraulic seals
 - ☞ Worn or torn shells or uncovered reinforcement branches
 - ☞ Expanded shells in several positions
 - ☞ Entangled or crushed movable parts
 - ☞ Foreign bodies jammed or stuck in protective layers



Caution!

Dirty hydraulic oil, lack of oil or wrong hydraulic oil –

Risk of serious damage to the hydraulic system!

- ☞ *Take care to avoid dirt when working!*
- ☞ *Always add hydraulic oil by means of a screen or the return filter!*
- ☞ *Only use authorized oils of the same type*
– see “Fluids and lubricants” on page 3-2
- ☞ *Always add hydraulic oil before the level gets too low*
– see “Adding hydraulic oil” on page 3-38
- ☞ *If the hydraulic system is filled with biodegradable oil, then only use biodegradable oil of the same type for adding oil – observe the sticker on the hydraulic oil reservoir!*
- ☞ *Contact your dealer immediately if the hydraulic system filter is contaminated with metal chippings. Otherwise, follow-on damage can result!*



Environment!

Collect drained hydraulic oil and biodegradable oil in a suitable container! Dispose of drained oil and used filters by an ecologically safe method. Always contact the relevant authorities or commercial establishments in charge of oil disposal before disposing of biodegradable oil.

Checking the hydraulic oil level



Caution!

Do not add oil if the oil level is above the **FULL** mark, otherwise the hydraulic system can be damaged and escaping oil can cause serious injury.

☞ Check the hydraulic oil level each time the machine is put into operation or once a day

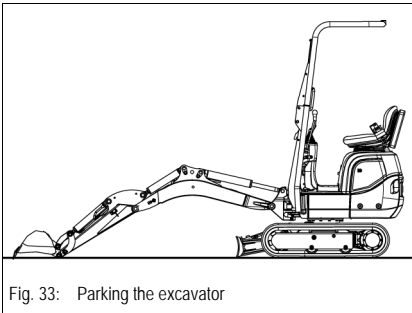


Fig. 33: Parking the excavator

- If the attachment is not positioned as shown:
 - ☞ Start the engine and let it run at idling speed
 - ☞ Retract the bucket and boom cylinders, lower the boom, the bucket teeth and the stabilizer blade to the ground.
 - ☞ Stop the engine again.

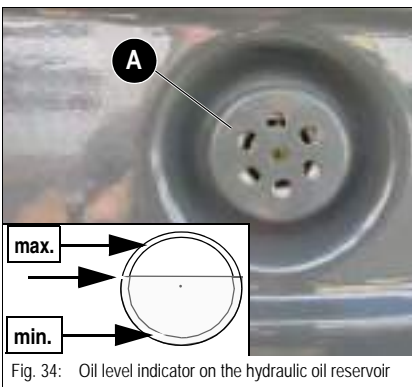


Fig. 34: Oil level indicator on the hydraulic oil reservoir

☞ Proceed as follows:

- Park the machine on level ground
- Stop the engine
- Raise the control lever base
- Open the engine cover
- Sight glass **A** is located at the rear of the excavator
- Check the oil level on sight glass **A**
- The oil level should be at the middle of the sight glass
 - A yellowish color of the entire sight glass is a sign that too much oil has been filled in

If the oil level is lower

- Adding hydraulic oil

The oil level varies according to the machine's operating temperature:

Machine condition	Temperature	Oil level
• Before putting into operation	Between 10 and 30 °C (50 – 86 °F)	In the lower part of the sight glass
• Normal operation	Between 50 and 90 °C (122 – 194 °F)	In the upper part of the sight glass



Notice!

Measure the oil level of the hydraulic system only after the machine reaches its operating temperature.

Adding hydraulic oil



Danger!

Removing the filler plug can cause oil to escape.

Accident hazard!

☞ *Carefully unscrew the plug to slowly reduce the pressure inside the oil reservoir.*

Do not add hydraulic oil unless the engine is stopped. Otherwise, hydraulic oil will overflow at the filler opening on the hydraulic oil reservoir.



Fig. 35: Hydraulic oil filler inlet with screen

- ☞ *Park the machine on level ground*
- ☞ *Lower the boom and the attachment as shown in fig. 27*
- ☞ *Lower the stabilizer blade to the ground*
- ☞ *Position the boom straight ahead*
- ☞ *Stop the engine*
- ☞ *Remove the key and carry it with you*
- ☞ *Raise the control lever base*
- ☞ *Let the engine cool down*
- ☞ *Open the engine cover*
- ☞ *Clean the area around filler opening with a cloth*
- ☞ *Open the filler opening with tool no. 12 B*
- ☞ *Add clean hydraulic oil through the screen*
- ☞ *Check the hydraulic oil level on sight glass 28/A*
- ☞ *Add if necessary and check again*
- ☞ *Close the filler opening*
- ☞ *Close and lock the engine cover*



Notice!

You can also refill through the return filter to avoid contamination of the hydraulic oil as you add oil.

Changing hydraulic oil



Notice!

Only change the hydraulic oil if it is warm (about 50 °C).
Retract all hydraulic cylinders before changing the oil.

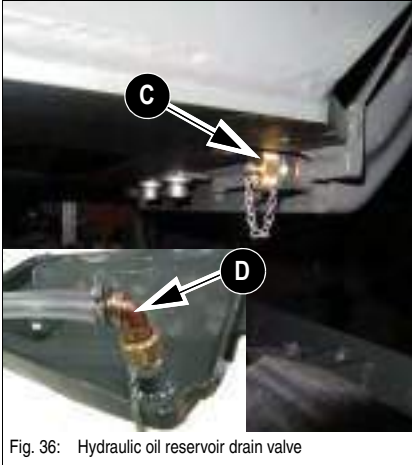
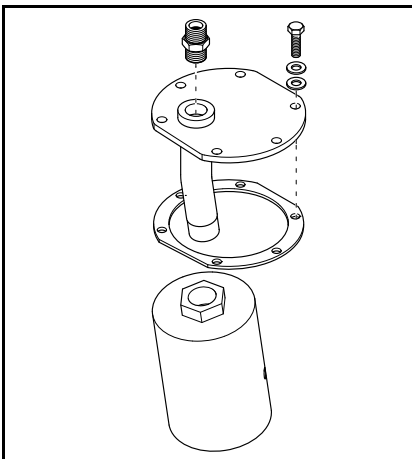


Fig. 36: Hydraulic oil reservoir drain valve

- ☞ Open the filler plug to release pressure
- ☞ Open drain valve **C** on the lower side of the reservoir and install drain hose **D** (included in the scope of delivery of the excavator) to drain the oil into a container
- ☞ Check the hydraulic oil reservoir for contamination and clean it if necessary
- ☞ Screw the drain plug back in correctly
- ☞ Add clean hydraulic oil through a screen
– see “Adding hydraulic oil” on page 3-38
- ☞ Close the hydraulic oil reservoir correctly
- ☞ Close and lock the engine cover
- ☞ Let the machine run at idling speed without load for some minutes

Replacing the filter cartridge



- ☞ Open the engine cover
- ☞ Remove the coolant reservoir
- ☞ Unscrew the return line from the filler cap
- ☞ Loosen the filler cap of the hydraulic oil reservoir
- ☞ Remove the cover with the connection piece and the filter cartridge
- ☞ Replace the filter
- ☞ Reassemble in the reverse order
- ☞ Check for tightness after a short test run
- ☞ Check the fluid levels
- ☞ Close and lock the engine cover

Checking hydraulic pressure lines

Specific safety instructions



Danger!

Caution when checking hydraulic lines, especially when searching for leaks. Hydraulic oil escaping under high pressure can penetrate the skin and cause serious injury.

Injury hazard!

☞ *Always consult a doctor immediately, even if the wound seems insignificant – otherwise serious infections could set in!*

☞ *Always observe the following instructions:*

- Retighten leaking threaded fittings and hose connections only when the system is not under pressure. In other words, release the pressure before working on pressurized lines!
- Never weld or solder damaged or leaking pressure lines and threaded fittings. Replace damaged parts with new ones!
- Never search for leaks with your bare hands, but wear protective gloves!
- Use paper or wood to check for minor leaks. Never use an unprotected light or open flame!
- Have damaged flexible lines replaced by a Wacker Neuson service center only!

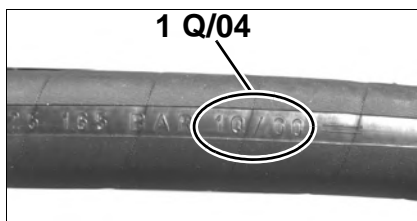
- Leaks and damaged pressure lines must be immediately repaired or replaced by a Wacker Neuson service center or after-sales personnel. This not only increases the operating safety of your machine but also helps to protect the environment
- Replace hydraulic hoses every 6 years from the date of manufacture, even if they do not seem to be damaged

In this respect, we recommend that you observe all the relevant safety regulations for hydraulic lines, as well as the safety regulations regarding accident prevention and occupational health and safety in your country. Also observe DIN 20066, part 5.

The date of manufacture (month or quarter and year) is indicated on the flexible line.

Example:

The indication “1 Q/04” means manufactured in the 1st quarter of 2004.



3.16 Tracks

- Track wear can vary according to work and ground conditions.
 - ☞ We recommend checking track wear and tension once a day.
 - ☞ Park the machine on firm and level ground to check and perform maintenance.

Checking track tension

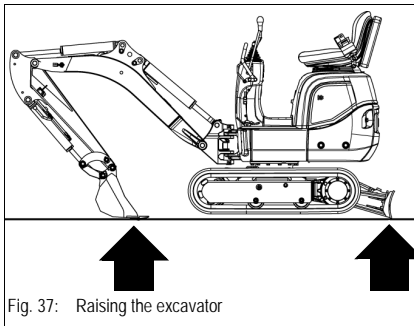


Danger!

Working under the machine with the tracks off the ground and only supported by the attachment is extremely dangerous.

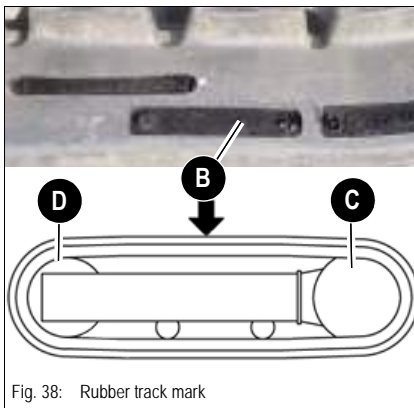
Caution, danger!

☞ *Firmly support the machine with chocks or suitable brackets*

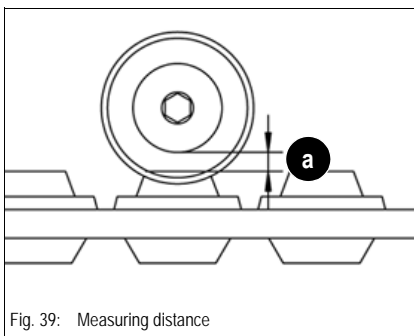


Check track tension as follows:

- ☞ Stop the machine on firm, level and horizontal ground
- ☞ Raise the machine evenly and horizontally
- ☞ Raise the machine by means of the boom and the stabilizer blade
 - ☞ Slowly and carefully actuate the control levers



- The rubber track has a mark **B** as shown in [Fig. 38](#)
 - ☞ Place the excavator so that mark **B** of the rubber track is between the drive pin **C** and the track tension roller **D**
 - ☞ Stop the engine
 - ☞ Remove the key and carry it with you
 - ☞ Lock the control levers



- Standard play **a** between the shoulder of the sliding block and the contact area of the second support roller of the drive pin is 15 – 20 mm (0.6 – 0.8").
 - ☞ Set the tension as follows if it is not in accordance with the rated value.

Setting the tracks



Danger!

The lubricating valve can be squeezed out due to the high grease pressure in the hydraulic cylinder.

Injury hazard!

- ⚠ Do not loosen and unscrew the lubricating valve by more than one turn.
- ⚠ Loosen no other component except the lubricating valve.
- ⚠ Keep your face away from the lubricating valve connection.
 - ➔ Contact your Neuson dealer if this does not reduce the tension of the rubber sliding block.



Caution!

Excessive tension of the tracks causes serious damage to the cylinder and the track.

- ⚠ Tighten the tracks only up to the prescribed measuring distance

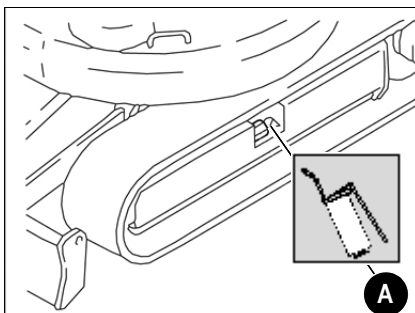


Fig. 40: Tightening the tracks

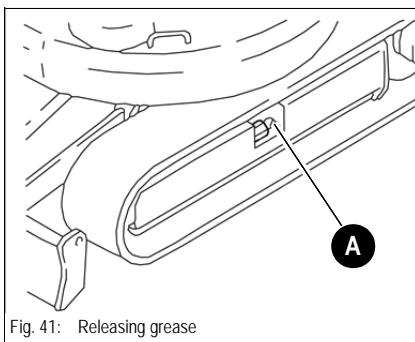


Fig. 41: Releasing grease

Tightening the tracks

- ⚠ Inject grease with the pump through lubricating valve **A**
- ⚠ Check the tension is correct by starting the engine, letting it run at idling speed and slowly moving the machine forward and reverse and switching it off again
- ⚠ Check the tension of the tracks again
 - ➔ If it is not correct:
 - ⚠ Adjust again
- ⚠ Should the track still be slack after injecting more grease, replace the track or the seal in the cylinder. Contact a Wacker Neuson dealer in this case

Reducing tension

- Draining grease in a way different from the one described below is very dangerous. Also bear in mind the safety instructions on this page
- ⚠ Slowly open the lubricating valve **A** by 1 turn to allow the grease to flow out.
 - ⚠ Place a suitable container underneath to collect the grease
 - ➔ The grease flows out of the groove of the lubricating valve
- ⚠ Retighten lubricating valve **A**
- ⚠ Check the tension is correct by starting the engine, letting it run at idling speed and slowly moving the machine forward and reverse and switching it off again
- ⚠ Check the tension of the tracks again
 - ➔ If it is not correct:
 - ⚠ Adjust again



Environment!

Use a suitable container to collect the grease as it flows out and dispose of it in an environmentally friendly manner.



3.17 Lubrication points on boom (up to serial number AI00966)



Fig. 42: Lubrication points on the boom

Lubrication strip

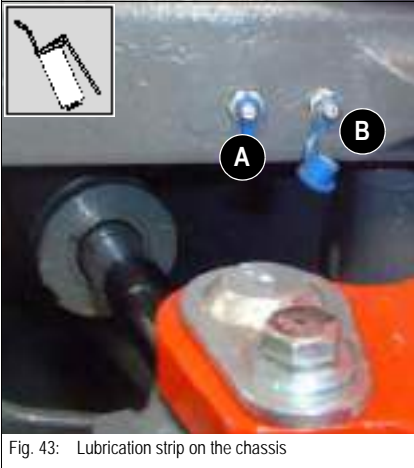


Fig. 43: Lubrication strip on the chassis

Apply grease to the lubrication strip as follows:

- ☞ Lubrication point **A** for live ring ball bearing
 - ➔ Grease: BP Energrease MP-MG2
- ☞ Lubrication point **B** for the swiveling cylinder

i **Notice!**

Apply grease to lubrication points **A** and **B** once a day.

3.18 Overview of lubrication points (from serial no. AI00967)



Pos.	Lubrication point	Quantity
1	Bucket cylinder	2
2	Stick cylinder	2
3	Boom cylinder	2
4	Boom	2
5	Stabilizer blade cylinder – see chapter “Lubrication points on the stabilizer blade and stabilizer blade cylinder” on page 3-47	2
6	Stabilizer blade – see chapter “Lubrication points on the stabilizer blade and stabilizer blade cylinder” on page 3-47	2
7	Stick	1
8	Bucket	2
9	Swiveling console – see chapter “Lubrication points on swiveling console” on page 3-47	2
10	Swiveling cylinder	2
11	Live ring (ball bearing) – see chapter “Lubrication points on live ring (ball bearing)” on page 3-48	1
12	Live ring teeth – see chapter “Lubrication points of live ring teeth” on page 3-49	1
13	Ball sockets (ISO/SAE changeover option)	2

i Notice!

Keep the lubrication points clean and remove ejected grease.

Parking the machine

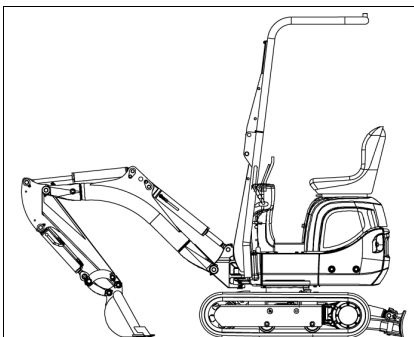


Fig. 44: Parking the excavator

- Park the machine on level and horizontal ground.
- Lower the boom and the attachment to the ground.
- Lower the stabilizer blade to the ground.
- Stop the engine.
- Remove the starting key and carry it with you.
- Move control levers **15** and **16** in all directions repeatedly.
- Raise the lock lever.
- Get off the machine, lock the engine cover.

Lubrication points on the stabilizer blade and stabilizer blade cylinder

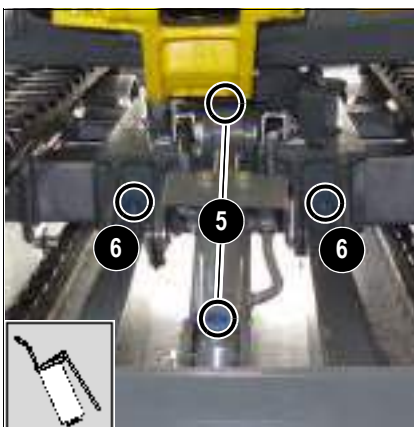


Fig. 45: Lubrication points on the stabilizer blade

- Apply grease to lubrication points **5** on the stabilizer blade cylinder
- Apply grease to lubrication points **6** on the stabilizer blade

Lubrication points on swiveling console

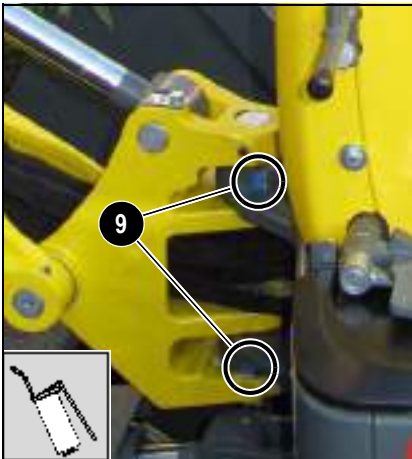


Fig. 46: Lubrication point on the swiveling console

☛ Apply grease to lubrication points **9** of the swiveling console

Swiveling cylinder lubrication points

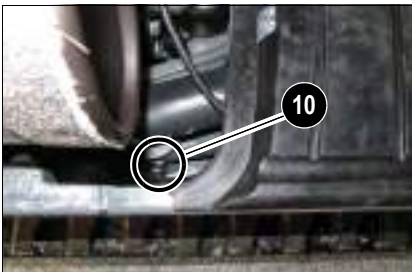


Fig. 47: Lubrication point on swiveling cylinder (engine cover)

- ☛ Stop and park the machine.
- ☛ Open the engine cover.
- ☛ The lubrication point is located on the right under the engine cover.
- ☛ Apply grease to lubrication point **10** with a grease gun.
- ☛ Remove ejected grease.

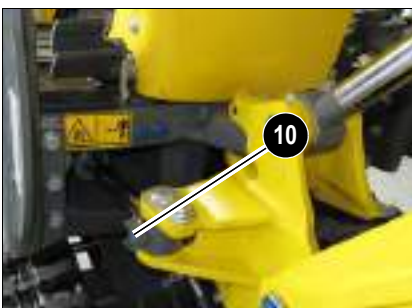


Fig. 48: Lubrication point on swiveling cylinder (swiveling console)

- ☛ A further lubrication point is located on the right on the swiveling console.
- ☛ Apply grease to lubrication point **10** with a grease gun.
- ☛ Remove ejected grease.

Lubrication points on live ring (ball bearing)



Danger!

Do not rotate the machine during lubrication!

Risk of serious crushing that can cause death or serious injury!

☞ Stop and park the machine. – see chapter “Parking the machine” on page 3-46



Fig. 49: Lubrication points of ball bearing race

- ☞ Stop and park the machine.
- ☞ The lubrication point is located at the front right on the upper carriage.
- ☞ Apply grease to lubrication point **11** with one stroke of the grease gun.
- ☞ Remove ejected grease.

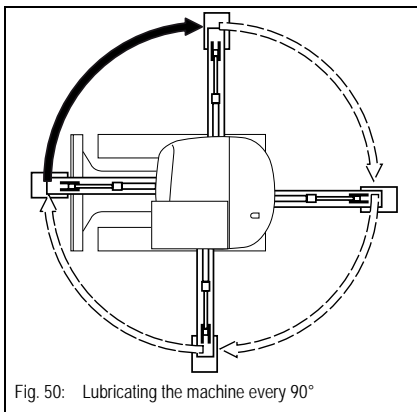


Fig. 50: Lubricating the machine every 90°

- ☞ Turn the machine 90° three more times and apply grease to lubrication point **11** with one stroke of the grease gun in the following three positions.
- ☞ Remove ejected grease.
- ☞ Turn the machine 360° a few times.

Lubrication points of live ring teeth

Danger!

Do not rotate the machine during lubrication!

Risk of serious crushing that can cause death or serious injury!

☞ *Stop and park the machine. – see chapter “Parking the machine” on page 3-46*



Fig. 51: Teeth lubrication point

- ☞ Stop and park the machine.
- ☞ The lubrication point is located at the front right on the upper carriage.
- ☞ Apply grease to lubrication point **12** with one stroke of the grease gun.
- ☞ Remove ejected grease.

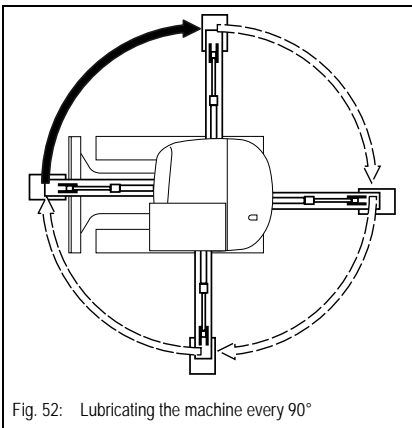


Fig. 52: Lubricating the machine every 90°

- ☞ Turn the machine 90° three more times and apply grease to lubrication point **12** with one stroke of the grease gun in the following three positions.
- ☞ Remove ejected grease.
- ☞ Turn the machine 360° twice.

Ball sockets (ISO/SAE changeover option)



Fig. 53: Control stand covers

- ☞ Stop and park the machine.
- ☞ Raise covers **1**.

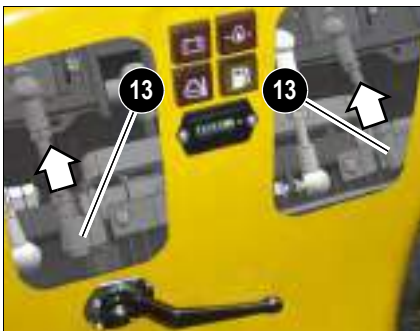


Fig. 54: Ball pins (SAE controls shown)

- ☞ Slide the knurled sleeve **13** upward, and hold, unhitch and grease it with Gleitmo 800 lubricant.
- ☞ The sleeve is safely locked if it is firmly connected with the ball pin and if it is engaged in the lower position.
- ☞ Lower covers **1**.

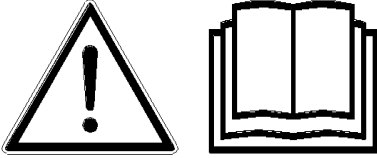
Maintenance of attachments

i **Notice!**

Correct maintenance and service is absolutely necessary for smooth and continuous operation, and for an increased service life of the attachments. Observe the lubrication and maintenance instructions in the Operator's Manuals of the attachments.

3.19 Electrical system

Specific safety instructions



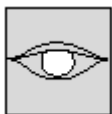
- The battery contains sulfuric acid! This acid must not be allowed to come into contact with the skin, the eyes, clothing or the machine
Therefore when recharging or working near the battery:
 - ☞ Always wear safety glasses and protective clothing with long sleeves
- If acid is spilled:
 - ☞ Thoroughly rinse all affected surfaces immediately with plenty of water
 - ☞ Thoroughly wash any part of the body touched by the acid immediately with plenty of water and seek medical attention at once!
- Especially when charging batteries, as well as during normal operation of batteries, an oxyhydrogen mixture is formed in the battery cells – explosion hazard!
- Do not attempt to jump-start the machine if the battery is frozen or if the acid level is low. The battery can burst or explode!
 - ☞ Replace the battery immediately
- Avoid open flames and sparks and do not smoke near open battery cells – otherwise the gas produced during normal battery operation can ignite!
- Use only 12 V power sources. Higher voltages will damage the electrical components
- When connecting the battery leads, ensure that the poles +/- are not inverted, otherwise sensitive electrical components will be damaged
- Do not interrupt voltage-carrying circuits at the battery terminals – sparking hazard!
- Never place tools or other conductive articles on the battery – risk of short circuit!
- Disconnect the negative (-) battery terminal from the battery before starting repair work on the electrical system
- Dispose of used batteries properly

Servicing and maintenance at regular intervals



Before performing machine travel

- ☞ Check every time before performing machine travel:
 - Is the light system OK?
 - Do the lights and the acoustic warning system work?



Every week

- ☞ Check once a week:
 - Electric fuses – see “Relays” on page 2-5
 - Cable and grounding connections
 - Battery charge condition – see “Battery” on page 3-52
 - Condition of battery terminals

Instructions concerning specific components

Cables, bulbs and fuses

Always observe the following instructions:

- Malfunctioning components of the electrical system must always be replaced by a Wacker Neuson service center. Lamps and fuses may be replaced by unqualified persons
- When performing maintenance on the electrical system, pay particular attention to ensuring good contact in leads and fuses
- Blown fuses indicate overloading or short circuits. The electrical system must therefore be checked before installing the new fuse
- Only use fuses with the specified load capacity (amperage)
– see *“Fuse box at the right under the control stand behind the side trim”* on page 2-5



Notice!

Always disconnect and remove the battery before performing welding work on the machine, and short-circuit the terminal cables of the machine to avoid damage to the electronic components.

Alternator



Fig. 55: Alternator

Observe the following instructions:

- Start the engine only if the battery is connected
- When connecting the battery, ensure that the poles (+/-) are not inverted
- Always disconnect the battery before performing welding work or connecting a quick battery charger!
- Replace malfunctioning charge indicator lights immediately
– see *“Alternator charge function indicator light (red)”* on page 1-12

Battery

Battery charge condition

☞ *Stop and park the machine. Stop the engine.*

- The battery is maintenance-free according to DIN.
- However check the battery at regular intervals to ensure that the electrolyte level is between the MIN and MAX marks.

More maintenance is required if:

- The engine does not start easily.
- The battery is used in areas with higher temperatures.
- The machine was out of operation over a longer period of time (2 – 3 months).

Notice!

The battery must be removed before it can be checked.

Charging the battery

☞ *Stop and park the machine. Stop the engine.*

☞ *Remove the battery with a suitable tool – see Replacing the battery on page 3-53.*

☞ *Charge the battery with a suitable battery charger.*

- Recommended battery charging current: 1/10 of the battery capacity.

☞ *After charging the battery, check the electrolyte level to ensure that it is between the MIN and MAX marks.*

☞ *Correct the electrolyte level if necessary.*

Replacing the battery

The battery is located under the floor panel directly in front of the control stand.

Always follow the specific battery safety instructions.

☞ *Stop and park the machine. Stop the engine.*

☞ *Open the engine cover.*

☞ *Remove floor panel **B** with a suitable tool.*

☞ *First remove the black battery lead from the negative terminal (-), then the red battery lead from the positive terminal (+).*

☞ *Replace the battery.*

☞ *First install the battery lead on the positive terminal (+), then on the negative terminal (-).*

☞ *Install floor panel **B**.*

☞ *Close the engine cover.*

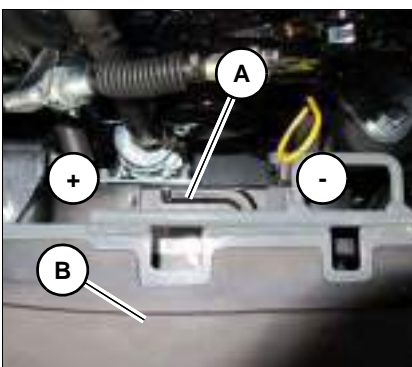


Fig. 56: Replacing the battery

Notice!

In order to avoid damage to the engine electronics, do not disconnect the battery while the engine is running.

3.20 General maintenance

Cleaning

Cleaning the machine is divided into 2 separate areas:

- Exterior of the machine
- Engine compartment

The wrong choice of cleaning equipment and agents can impair the operating safety of the machine on the one hand, and on the other undermine the health of the persons in charge of cleaning the machine. It is therefore essential to observe the following instructions.

General instructions for all areas of the machine

Cleaning with washing solvents

- Ensure appropriate room ventilation
- Wear suitable protective clothing
- Do not use flammable liquids, such as gasoline or diesel

Cleaning with compressed air

- Work carefully
- Wear safety glasses and protective clothing
- Do not aim the compressed air at the skin or at other people
- Do not use compressed air for cleaning your clothing

Cleaning with a high-pressure cleaner or steam jet

- Electrical components and damping material must be covered and not directly exposed to the jet
- Cover the hydraulic oil reservoir and the covers of the fuel tank, the hydraulic oil reservoir, etc.
- Protect the following components from moisture:
 - Engine
 - Electrical components such as the alternator, etc.
 - Control devices and seals
 - Air intake filters, etc.

Cleaning with volatile and easily flammable anticorrosion agents and sprays:

- Ensure appropriate room ventilation
- Do not use unprotected lights or open flames
- Do not smoke

Control stand



Caution!

Never use high-pressure cleaners, steam jets or high-pressure water to clean the control stand. Water under high pressure can

- penetrate into the electrical system and cause short circuits and
- damage seals and disable the controls!

We recommend using the following aids to clean the control stand:

- Damp cloth
- Brush
- Water with mild soap solution

Cleaning the seat belt:

- Clean the seat belt (which remains fitted in the machine) with a mild soap solution only. Do not use chemical agents as they can destroy the fabric!

Exterior of the machine

The following articles are generally suitable:

- High-pressure cleaner
- Steam jet

Engine compartment**Danger!**

Clean the engine only when it is at a standstill –

Injury hazard!

☞ *Stop the engine before cleaning*

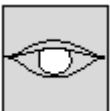
**Caution!**

When cleaning the engine with a water or steam jet

☞ *The engine must be cold*

☞ *and do not point the jet directly at electric sensors such as the oil pressure switch.*

The humidity penetrating any such sensors causes them to fail and leads to engine damage!

Threaded fittings and attachments

All threaded fittings must be checked regularly for tightness, even if they are not listed in the maintenance schedules. This applies in particular to:

- ☞ *Engine fastening screws*
- ☞ *Fastening screws on the hydraulic system*
- ☞ *Bucket teeth and pin fastenings on the attachment*
- ☞ *Rollbar fastening screws*

Retighten loose connections immediately. Contact a Wacker Neuson service center if necessary.

Pivots and hinges

All mechanical pivot points on the machine (door hinges, joints, for example) and fittings (door arresters, for example) must be lubricated regularly, even if they are not listed in the lubrication plan.

3.21 Preparatory work before taking out of service

The measures indicated below refer to putting the machine out of operation for 30 days or longer.

- See chapter 2 "Safety instructions for maintenance" in the Operator's Manual
- If the machine is stored outdoors, place it on a wooden base and cover it with a water-tight tarp to protect it against humidity
- Check whether oil or other fluids leak from the machine
- Lower the boom and the stabilizer blade to the ground
- Clean the engine with a high-pressure cleaner in a suitable place.
Observe the following chapter – [see *Cleaning with a high-pressure cleaner or steam jet*](#) on page 3-54
- Carefully clean and dry the entire machine
- Spray an anticorrosion agent onto bare metal parts of the machine (piston rods of hydraulic cylinders, for example)
- Apply grease to all lubrication points
- Change the engine oil
- Check all oil levels in the units and add oil if necessary
- Check the hydraulic oil level and if necessary, add oil
- Fill up the fuel tank to the maximum level
- Check the coolant, change as required
- Remove the grounding strap from the battery, or remove the battery and store it in a safe place. Charge the battery and perform battery maintenance at regular intervals
- Close the exhaust pipe and the air intake opening of the air filter system

3.22 Maintenance if the machine is out of service for a longer period of time

The following measures must be taken if the machine is out of service for more than 30 days.

Putting into operation again

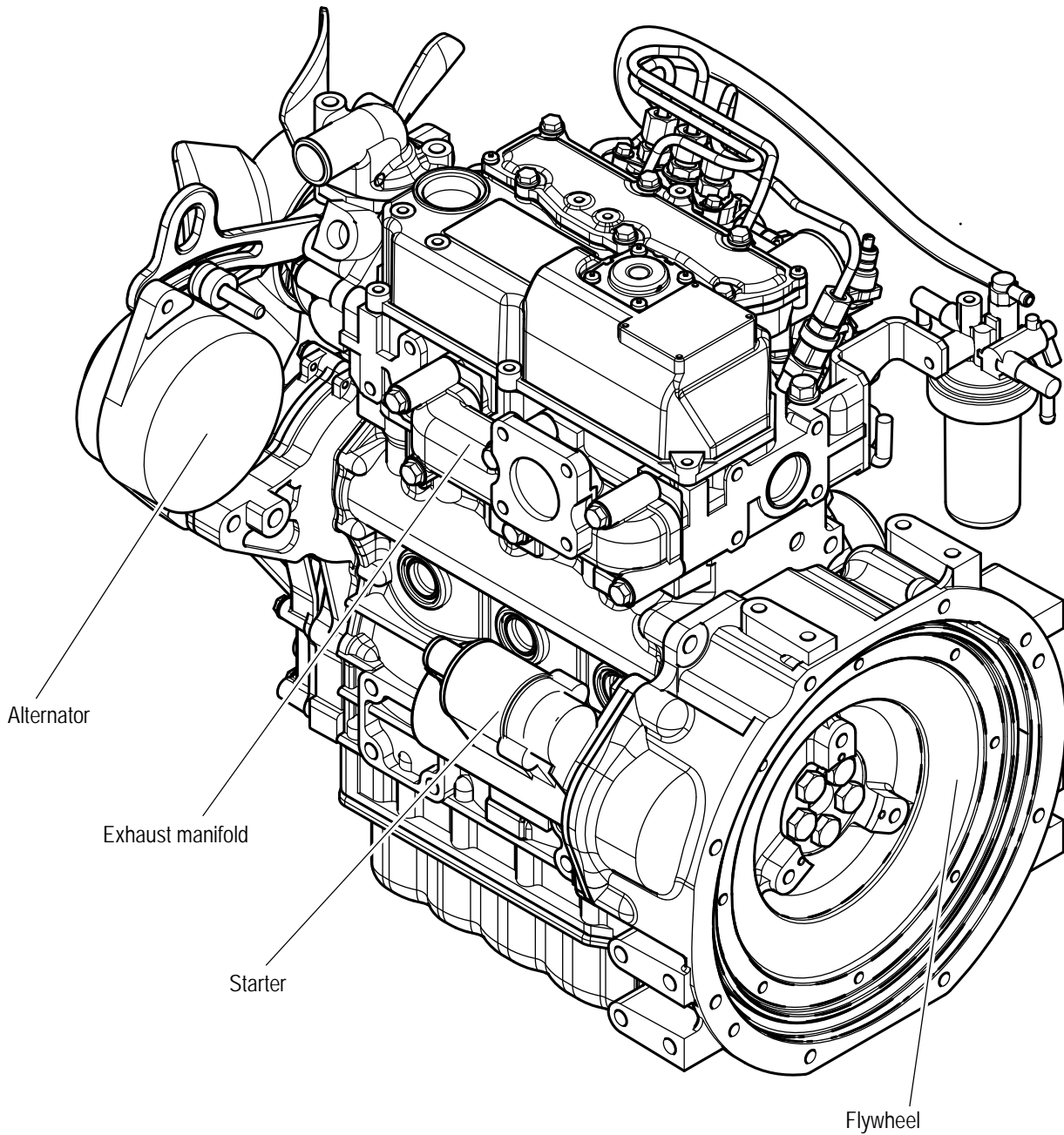
- Remove anticorrosion agent from the piston rods
- Charge, install and connect the battery
- Remove the seals from the exhaust pipe and the air filter intake
- Check the condition of the air filter element and replace the element if necessary
- Check the dust valve
- Refuel
- Switch on the fuel prefilter on the upper carriage and the fuel filter on the engine (turn to ON).
- Turn the starter to position 1 for 2 minutes (to supply the engine with fuel)
- If the machine was out of service for over 6 months, change the oil in the gearbox, engine, etc. and the hydraulic oil reservoir
- Check the engine oil
- Also replace hydraulic oil filters (return and breather filters) if the machine has been out of service for over 6 months
- Lubricate the machine according to the lubrication plan
- Check the levels
- Check the coolant, change as required
- Remove the starting key, remove fuse F2 on the right-hand cover
- Let the engine run 15 seconds
- Wait 15 seconds
- Let the engine run 1 minute again

- Remove the starting key, put fuse F2 back in
- Start the diesel engine
- Let the engine run at idling speed at least 15 minutes without load.
- Check all oil levels in the units and add oil if necessary

Engine

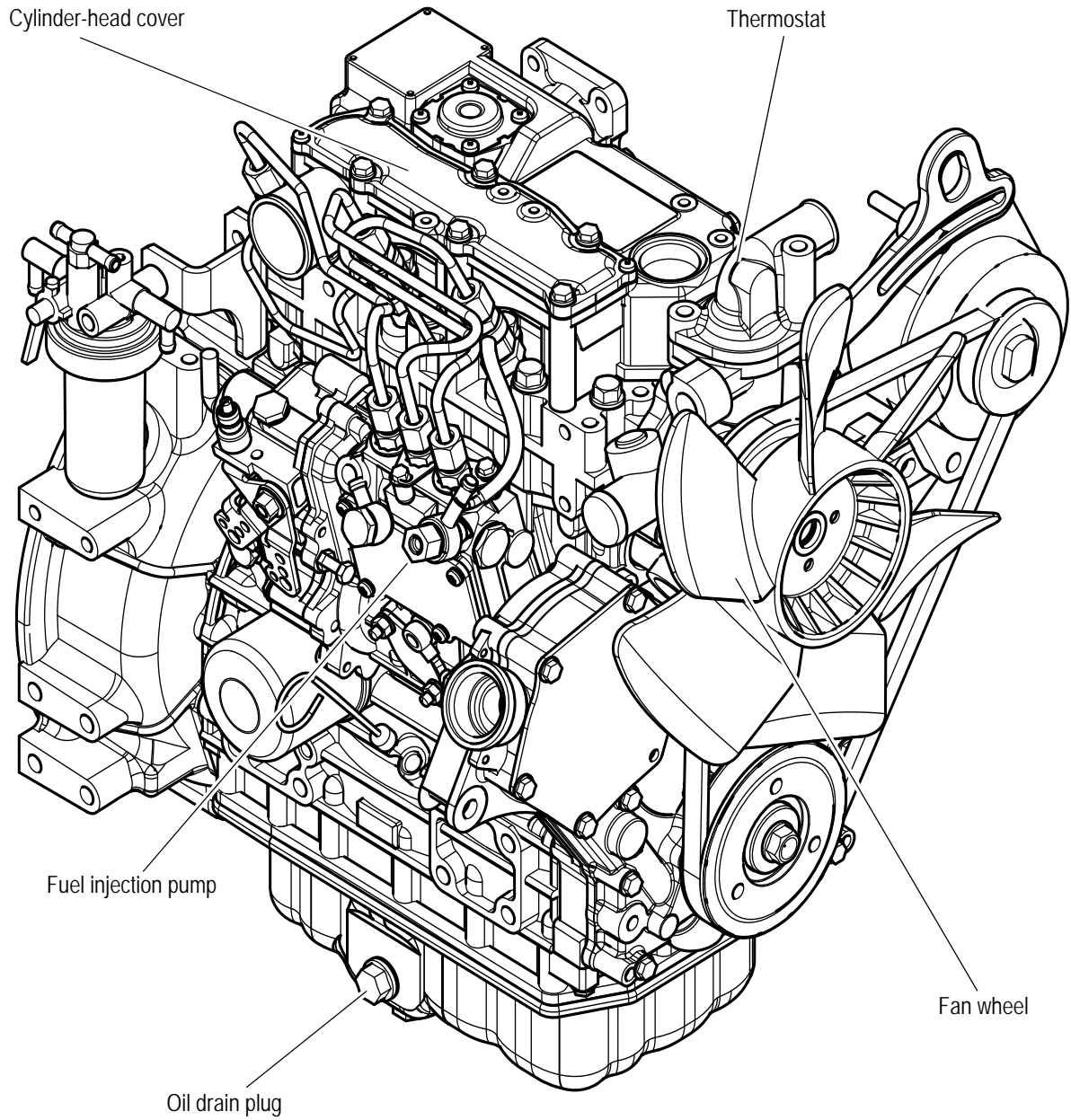
4 Engine

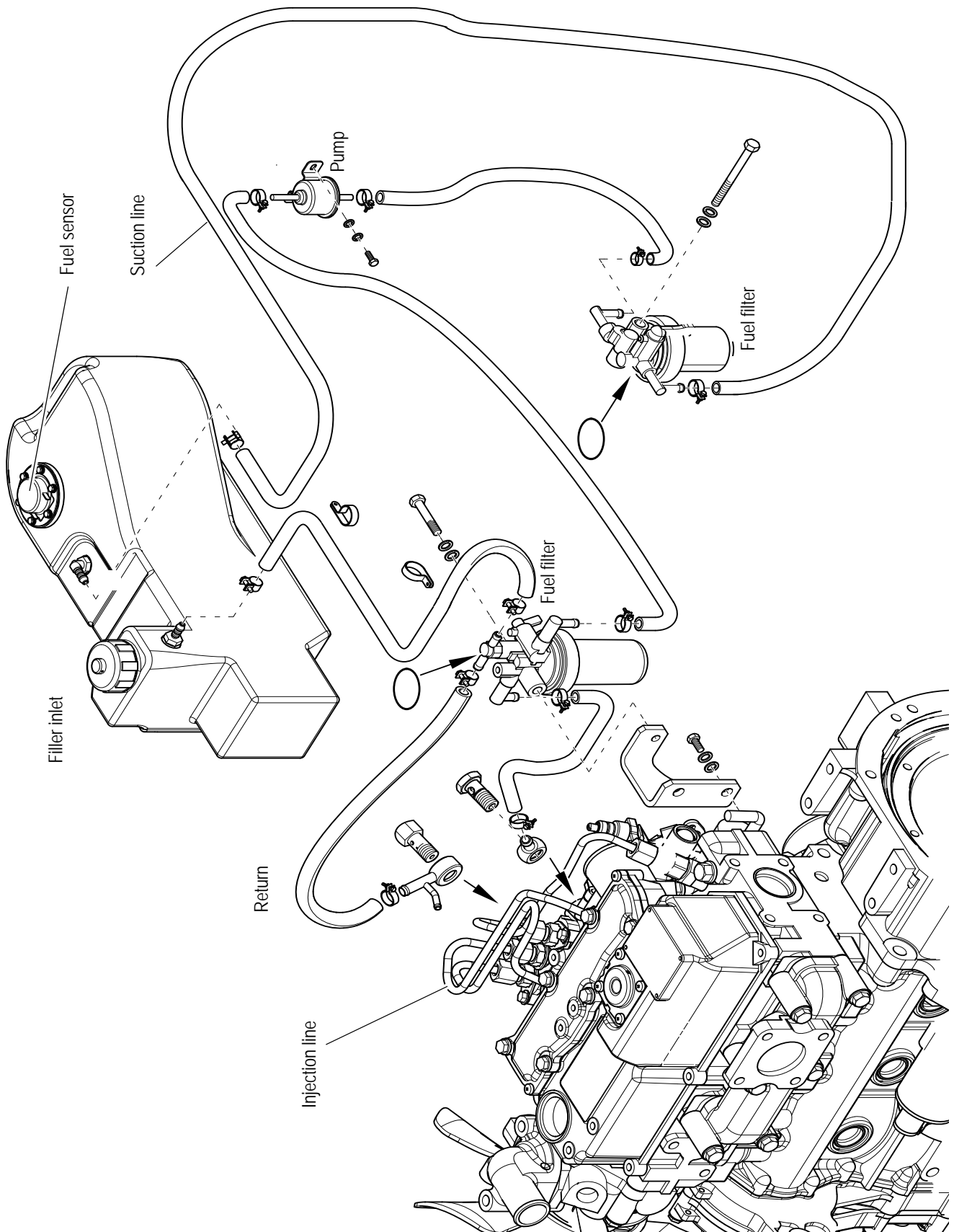
4.1 Overview of engine 3TNV70-VNS (Tier IV final up to 2012)





4.2 Fuel system





4.3 Checking and adjusting valve clearance

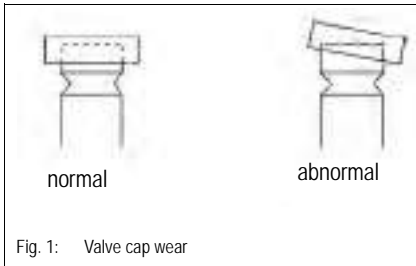


Fig. 1: Valve cap wear

☞ Standard setting of valve clearance is possible:

➔ On a cold engine

☞ Remove the cylinder-head cover

☞ Turn the engine with a screwdriver (as in 4.7) until the cylinder reaches the top dead center of the compression cycle.

➔ Valve overlapping

☞ Check the valve cap for abnormal wear

☞ Check valve clearance with feeler gage **2/A**

➔ Valve clearance: 0.15 – 0.25 mm (0.0059" – 0.0098")

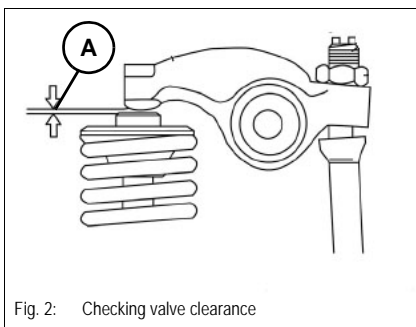


Fig. 2: Checking valve clearance

☞ Repeat the procedure for each cylinder

☞ Reset valve clearance if necessary (valve clearance not within the tolerance range).

☞ Loosen the locknut on the rocker arm and reset valve clearance with a screwdriver.

☞ Hold the screw with the screwdriver and counter again.

☞ Position the cylinder-head cover gasket.

☞ Install the cylinder-head cover.

4.4 Tightening order for cylinder head bolts

☞ Install the cylinder-head bolts

➔ Tightening torque:

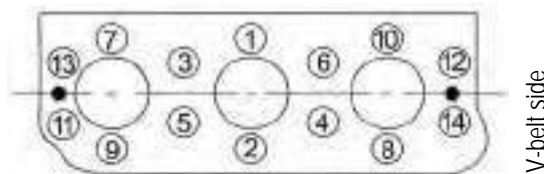
1st position	26 – 30 Nm	19.1 – 22.1 ft lbs
2nd position	53.9 – 57.9 Nm	39.75 – 42.7 ft lbs



Caution!

Bear in the mind the order for tightening the cylinder-head bolts!

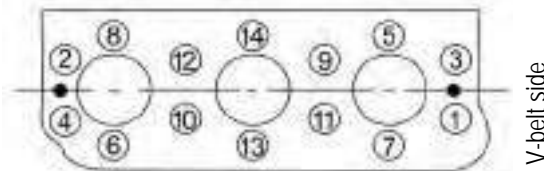
☞ See figure



Notice!

Apply oil to the threads and contact surfaces before installing.

☞ Order for removing the cylinder-head bolts



Notice!

Always perform work on the cylinder head on a cold engine!

4.5 Checking the injection nozzles

Pressure check

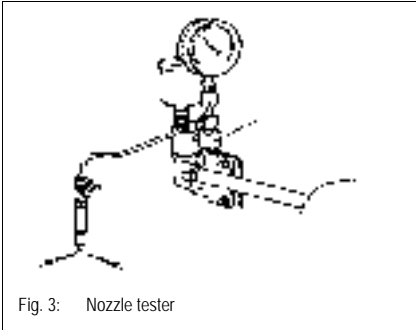
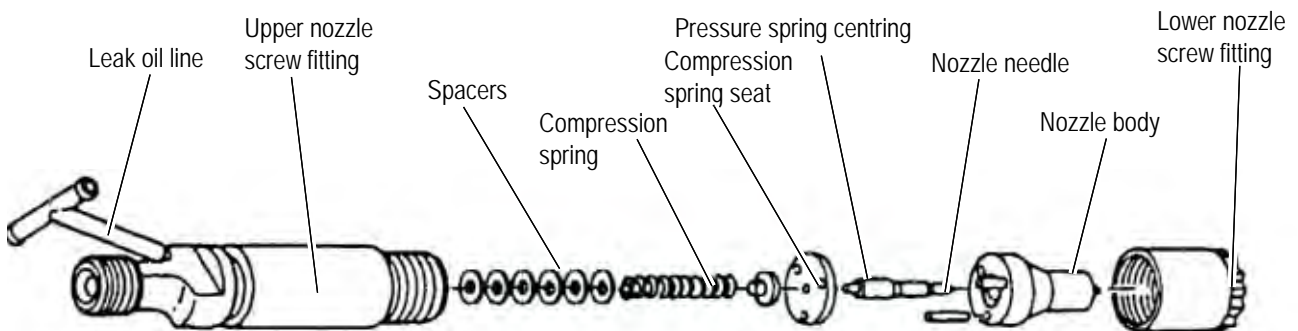


Fig. 3: Nozzle tester

- ☞ Remove the injection line and the injection nozzle
- ☞ Connect the injection nozzle with the high pressure line of the nozzle tester
- ☞ Slowly increase pressure until the nozzle ejects fuel and read the pressure off the pressure gage
- ☞ If the injection pressure is too low, replace the spacer in the nozzle by a thicker one. If the pressure is too high, replace the spacer by a thinner one.
 - ➔ Injection pressure: **120 – 130 bar (1740 – 1885 psi)**
- Spacer thickness of 0.1 mm (0.0039") corresponds to modification by 7 – 10 bar (101 – 145 psi).
- Check the injection nozzle for drips after it has ejected fuel.
- ☞ Create a pressure of about 20 bar (290 psi) below injection pressure and check whether fuel drips from the nozzle.



4.6 Checking the nozzle jet

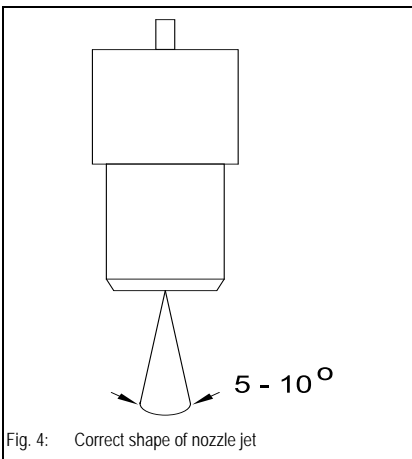


Fig. 4: Correct shape of nozzle jet

- ☞ Remove the injection lines and the injection nozzles
- ☞ Connect the injection nozzle with the high pressure line of the nozzle tester
- ☞ Quickly create pressure until the nozzle ejects fuel (ejection 3 – 4 times)
- ☞ Hold a white sheet of paper about 30 cm (11.8") away from the nozzle and let the nozzle eject fuel

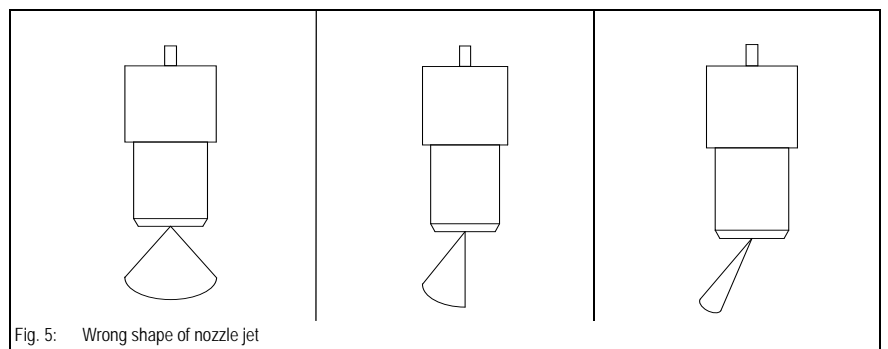


Fig. 5: Wrong shape of nozzle jet

4.7 Injection time

Checking and adjusting injection time



Fig. 6: Measuring equipment

- Preparatory work:
 - ☞ Mark the actual position of the fuel injection pump on the engine block.
 - ☞ Trace the mark with a touch-up applicator.
 - ☞ Set the throttle to work position.
 - ☞ Unscrew only the injection line on the pump side and bend it a little to the side so that you can see the opening to the fuel injection pump.
 - ☞ In order to be able to see better, you can use a section of an injection line or a transparent tube instead of the injection line (**as required**)
- Measurement:
 - ☞ Slowly turn the engine clockwise, as seen from the radiator side.
 - ☞ As you do so, carefully watch the opening where the injection line was.
 - ☞ Stop turning as soon as fuel starts coming out.
 - ☞ Wipe away the fuel and turn back to about 20° before top dead center.
 - ☞ Repeat the measurement.
 - ☞ Read the mark on the crankshaft (15°).
Injection time is set correctly if it corresponds to this value.
 - ☞ If it does not correspond to this value, loosen the fuel injection pump (do not unscrew it completely) and rotate it a little.
 - ➔ Rotated toward the engine: earlier injection time
 - ➔ Rotated away from the engine: later injection time
 - ☞ Screw the fuel injection pump firmly and check.
 - ☞ Repeat the procedure as required.



Fig. 7: Mark on housing

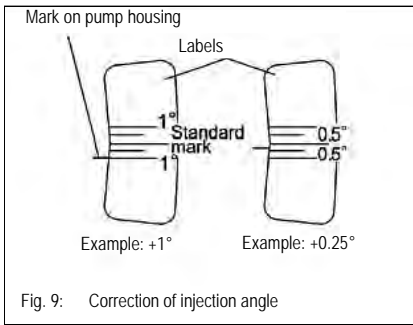
i Notice!

Bend the injection lines as you install them so they are not subject to tension once they are installed. Bleed the injection lines once they are installed.



Fig. 8: Opening on fuel pump

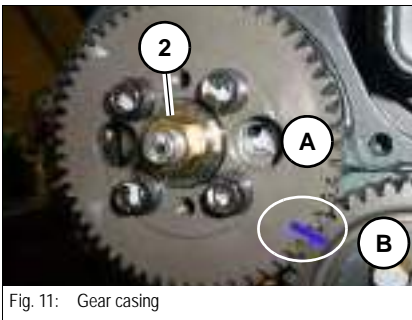
Replacement of fuel injection pump



- ☞ Mark the initial position on the pump and wheel case housing before removing the fuel injection pump – see [Fig. 9](#)
- ☞ Remove gear casing cover **10/1** of the fuel injection pump
 - ☞ Mark the position of the gear of the fuel injection pump **11/A** in relation to gear **11/B**
 - ☞ Completely loosen lock nut **11/2** of the drive pinion

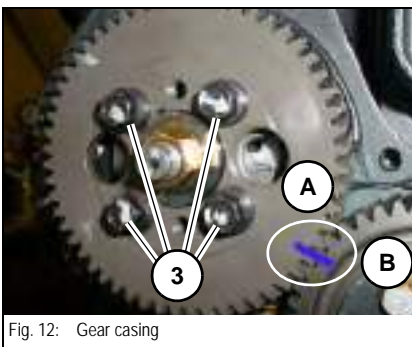


- ☞ Remove the fuel injection pump
 - ☞ Read off the injection angle on the pump
 - ☞ Read off the injection angle on the new pump
 - ➔ Read off the imprint on the engine side of the fuel injection pump



- ☞ Difference of "Angle of new pump" – "Angle of old pump" gives you the mounting angle of the new fuel injection pump
 - ➔ Positive value: later injection time (toward the engine)
 - ➔ Negative value: earlier injection time (away from the engine)

- ☞ Install the new fuel injection pump
 - ☞ Check the marked position of the drive pinion of the fuel injection pump (fig. [Fig. 11](#))
 - ☞ Screw on and tighten nut **11/2**
 - ☞ Check injection time
 - ☞ Install gear casing cover **10/1** of the fuel injection pump



i Notice!

Do not loosen screws **11/3** of the drive pinion of the fuel injection pump. These screws specify the precision setting of the fuel injection pump set by the manufacturer!

4.8 Adjusting engine speed



Notice!

The maximum engine speed is set and sealed by the manufacturer without the pump and may not be increased!

Adjust engine speed without load!

- ☞ Run the diesel engine until it reaches operating temperature
- ☞ Check idling speed and maximum engine speed with all attachment functions in neutral
 - ➔ Idling speed: 1100 +/- 50 rpm
 - ➔ Max. engine speed: 2270 +/- 10 rpm

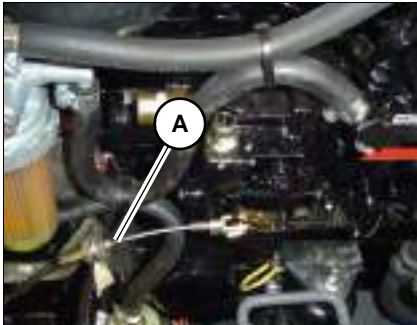


Fig. 13: Adjusting engine speed

4.9 Compression

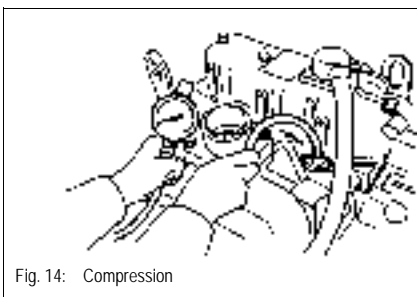


Fig. 14: Compression

- ☞ Remove the injection lines and the injection nozzles
- ☞ Set the fuel injection pump to zero delivery (remove the plug for the cutoff solenoid)
- ☞ Turn the engine
- ☞ Install the compression gage on the cylinder you want to measure
- ☞ Turn the engine with the starter and read the pressure off the pressure gage
 - ➔ Specified value: **33 +/- 1 bar (478.6 psi +/- 14.5) at 250 rpm**
 - ➔ Threshold value: **26 +/- 1 bar (377 psi +/- 14.5) at 250 rpm**

4.10 Checking the coolant thermostat

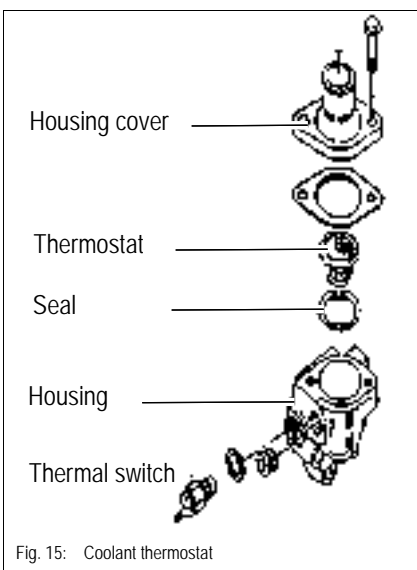
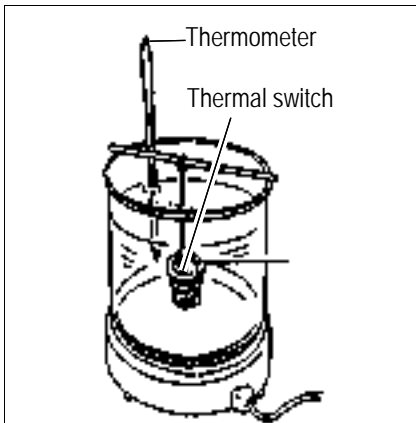


Fig. 15: Coolant thermostat

- ☞ Remove the thermostat
 - ➔ The thermostat is located on the water pump
 - see [Overview of engine 3TNV70-VNS \(Tier IV final up to 2012\)](#) on page 4-2



- ☞ Warm up the thermostat in a container with water
- ☞ Check whether the thermostat opens at the specified temperature (check with a temperature gage)
- ➔ Thermostat opening temperature: **69.5 – 72.5 °C (157.1 – 162.5 °F)**

4.11 Checking the thermal switch

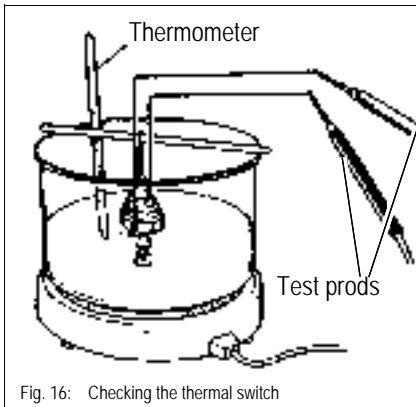


Fig. 16: Checking the thermal switch

- ☞ Remove the thermal switch
- ☞ Warm up the thermal switch in a container with coolant or oil
- ☞ Measure the resistance of the thermal switch as shown by means of an ohmmeter.
- ➔ The switch must allow the coolant to pass at a temperature of **107 – 113 °C (224.6 – 235.4 °F)**

4.12 Oil pressure switch

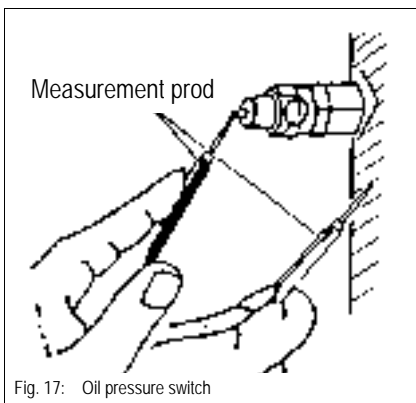


Fig. 17: Oil pressure switch

- ☞ Remove the cable connection from the oil pressure switch (in the area of the cutoff solenoid)
- ☞ Start the engine, check for correct idling speed
- ☞ Measure the resistance of the oil pressure switch as shown by means of an ohmmeter.
- ➔ Oil pressure switch OK: infinite resistance
- ➔ The oil pressure switch is malfunctioning if the oil can pass

4.13 Checking the coolant circuit

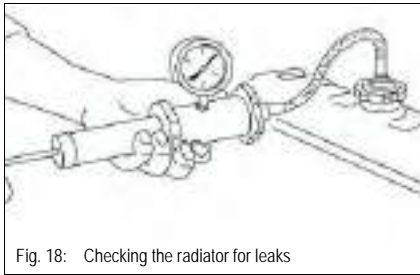


Fig. 18: Checking the radiator for leaks

Leakage check

- ☞ Fill up the radiator completely
- ☞ Install an adapter on the radiator as shown
- ☞ Increase the pressure in the cooling system by means of a hand pump to about **1 bar**
 - ➔ Check the lines and the connections for leaks if the pressure drops at the pressure gage

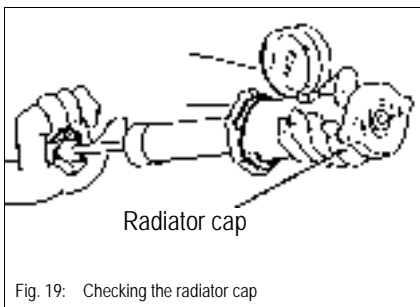


Fig. 19: Checking the radiator cap

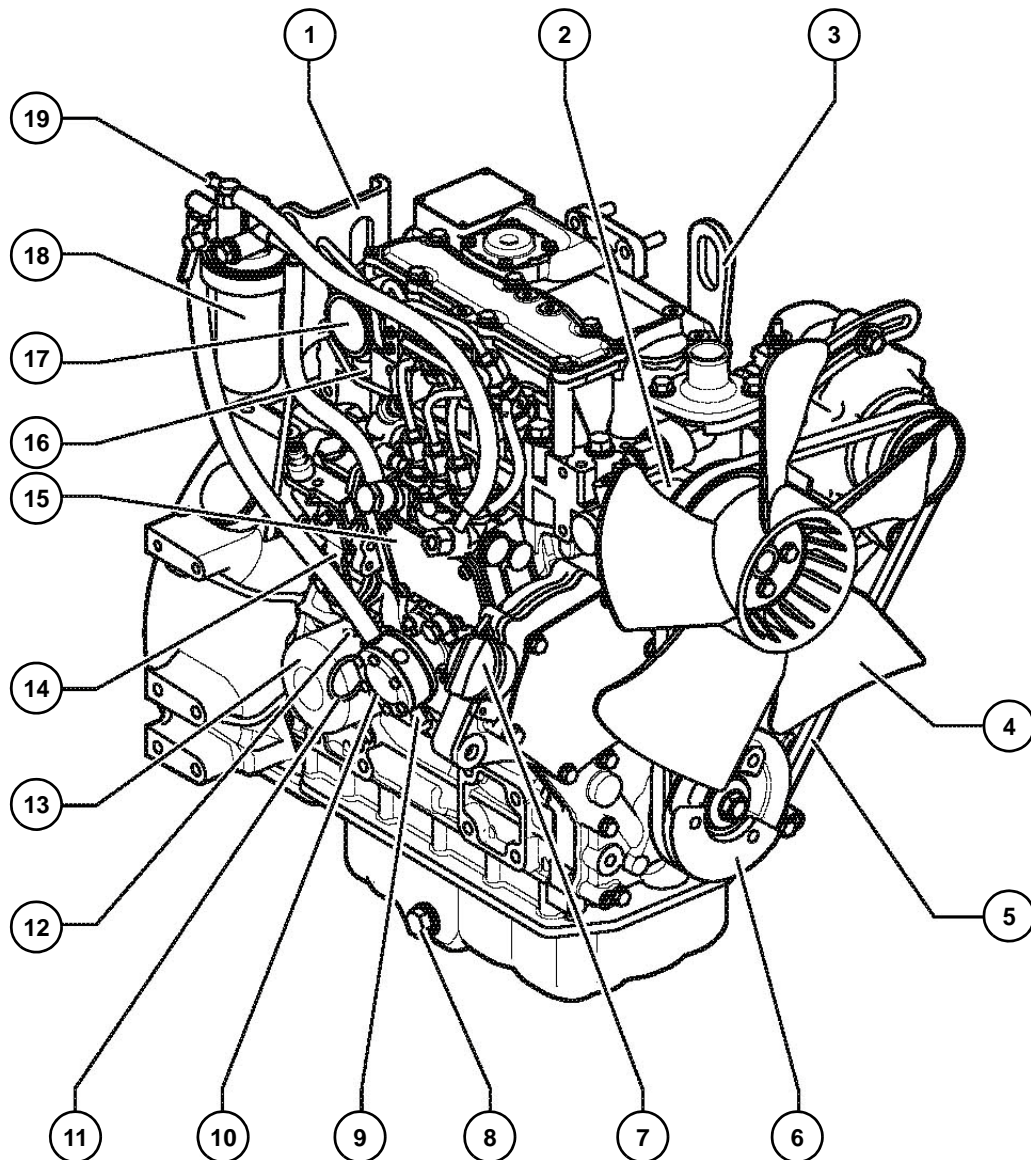
Checking the radiator cap

- ☞ Remove the radiator cap and install it on the adapter as shown
- ☞ Increase the pressure to about 1 bar (stamped onto the radiator cap) with the hand pump
 - ➔ The radiator cap must open

4.14 Engine trouble

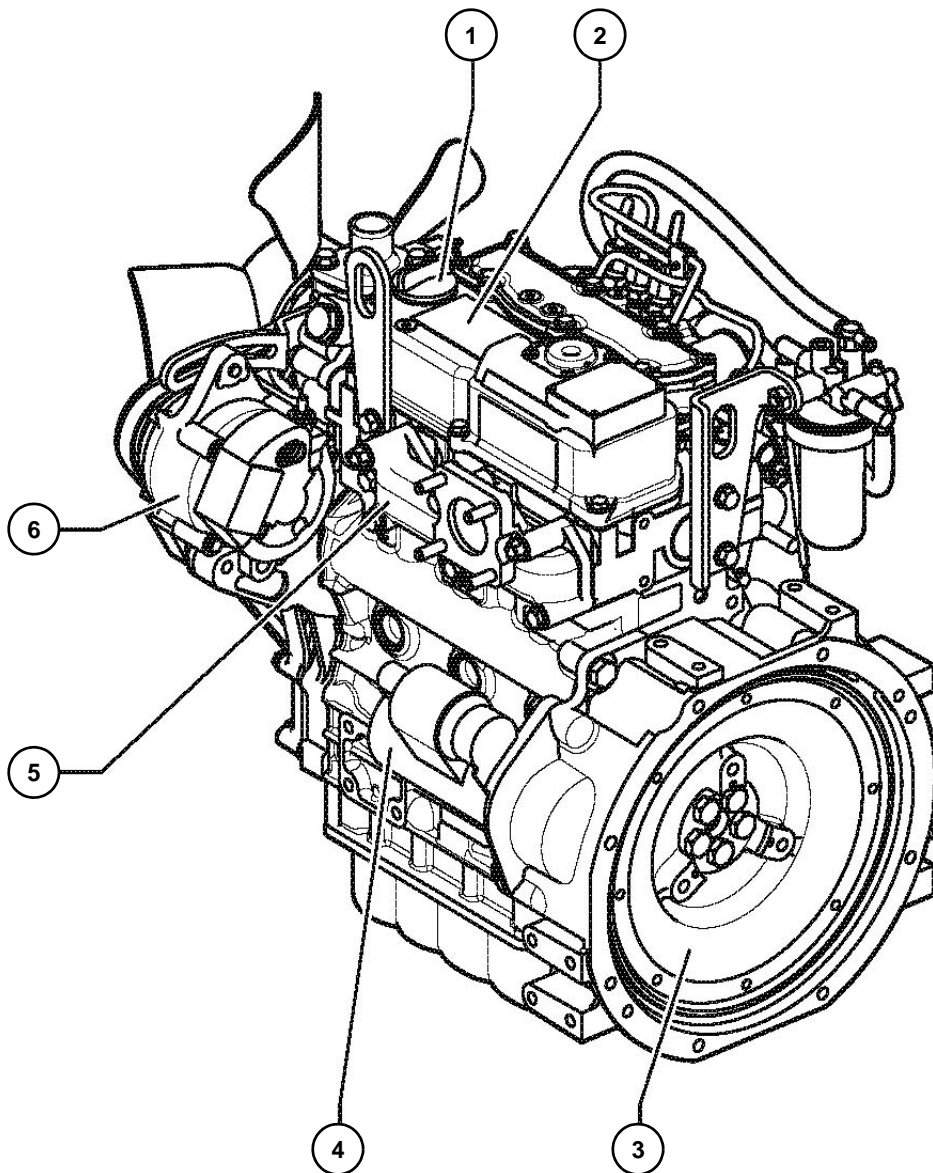
Problem	Possible cause
Engine does not start or is not easy to start	Wrong SAE grade of engine lubrication oil
	Fuel grade does not comply with specifications
	Malfunctioning or empty battery
	Loose or oxidized cable connections in starter circuit
	Malfunctioning starter, or pinion does not engage
	Wrong valve clearance
	Malfunctioning fuel injector
	Malfunctioning starting relay
	Malfunctioning glow plug
	Malfunctioning solenoid switch
	Cutoff solenoid does not attract
	Cutoff solenoid without current
	High pressure created immediately in the hydraulic system
	Malfunctioning fuses
Engine starts, but does not run smoothly or faultless	Fuel grade does not comply with specifications
	Wrong valve clearance
	Injection line leaks
	Malfunctioning fuel injector
	Air in fuel system
	Dirty fuel filter
Engine overheats. Temperature warning system responds	Oil level too low
	Oil level too high
	Dirty air filter
	Dirty radiator fins
	Malfunctioning fan, torn or loose V-belt
	Resistance in cooling system too high, flow capacity too low
	Malfunctioning fuel injector
	Not enough coolant
	Cooling system leaks

Problem		Possible cause
Insufficient engine output		Oil level too high
		Fuel grade does not comply with specifications
		Dirty air filter
		Malfunctioning air filter maintenance switch or gage
		Wrong valve clearance
		Injection line leaks
		Malfunctioning fuel injector
		Air in fuel system
Engine does not run on all cylinders		Injection line leaks
		Malfunctioning fuel injector
		Malfunctioning fuel injection pump
Insufficient or no engine oil pressure		Oil level too low
		Machine inclination too high (max. 25°)
		Wrong SAE grade of engine lubrication oil
		Malfunctioning oil pump
Engine oil consumption too high		Oil level too high
		Machine inclination too high (max. 25°)
Engine smoke	Blue	Oil level too high
		Machine inclination too high (max. 25°)
		Engine oil combustion (malfunctioning cylinder-head gasket)
	White	Engine starting temperature too low
		Fuel grade does not comply with specifications
		Malfunctioning fuel injector
		Coolant combustion (malfunctioning cylinder-head gasket)
		Extreme misalignment of injection time
	Black	Dirty air filter
		Malfunctioning air filter maintenance switch or gage
		Wrong valve clearance
		Malfunctioning fuel injector (drips)
		Wrong fuel injection pump setting

4.15 Overview of engine 3TNV74F-SNNS (Tier IV final from 2012)


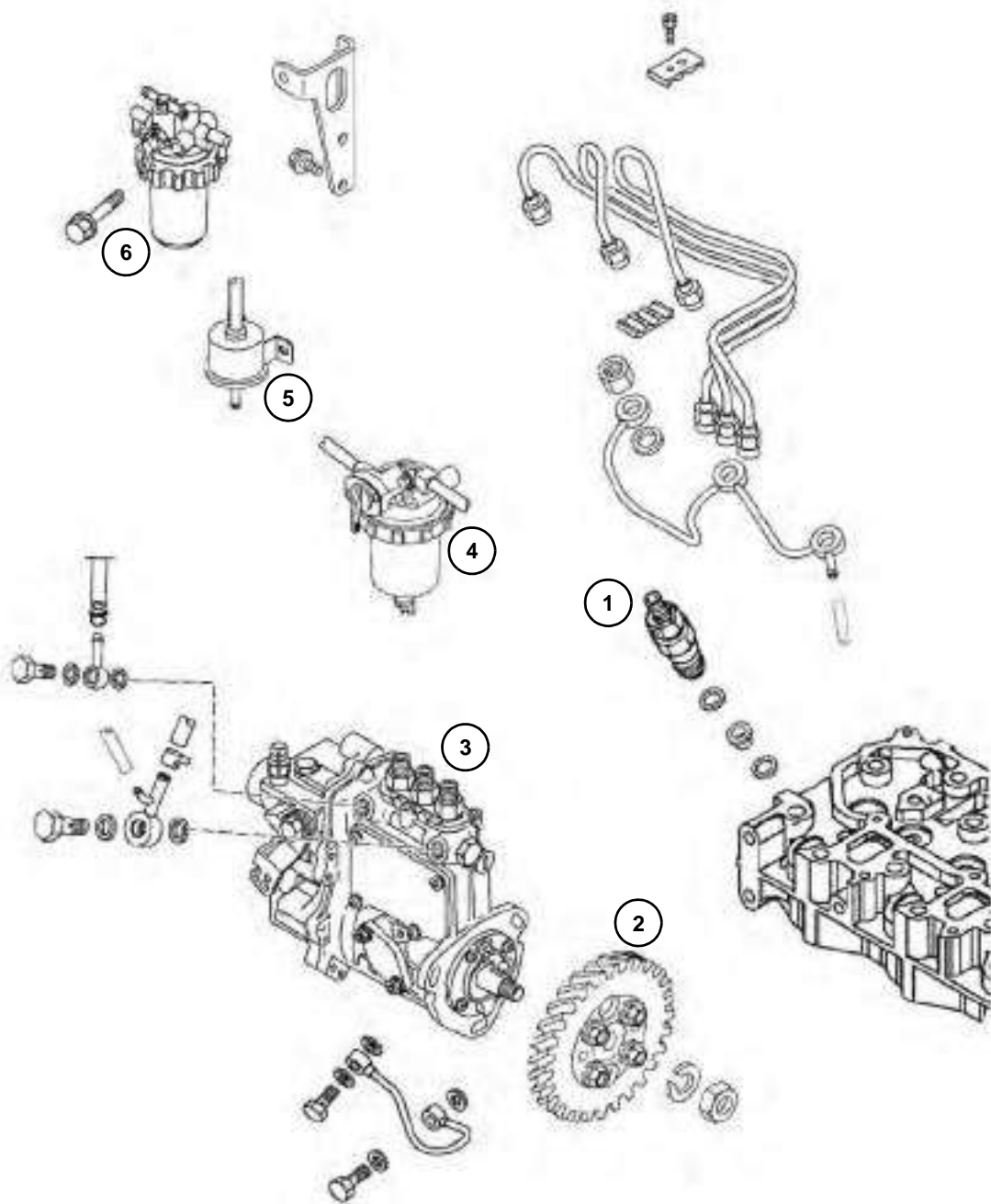
Symbolic representation

Pos.	Designation	Pos.	Designation
1	Lifting eye	2	Water pump
3	Lifting eye	4	Injection pump fan wheel
5	V-belt	6	Crankshaft disk
7	Oil filler neck	8	Oil drain plug
9	Fuel intake	10	Void
11	Oil dipstick	12	Fuel supply connection
13	Engine oil filter	14	Speed control
15	Fuel injection pump	16	Intake manifold (manifold)
17	Air-intake opening (via air filter)	18	Fuel filter
19	Fuel return line		



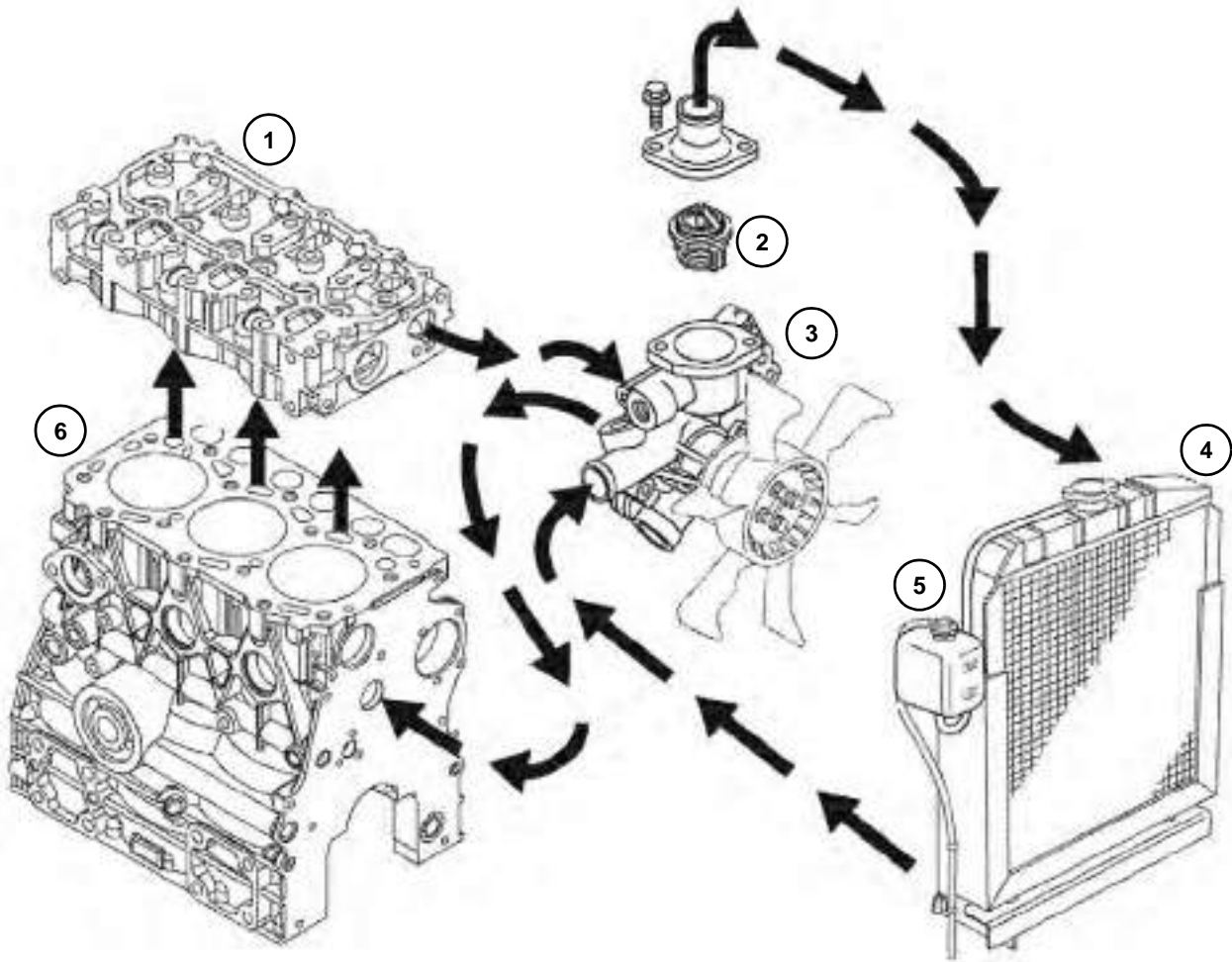
Symbolic representation

Pos.	Designation	Pos.	Designation
1	Oil filler neck	2	Cylinder-head cover
3	Flywheel	4	Starter
5	Exhaust manifold	6	Alternator

4.16 Fuel system


Pos.	Designation	Pos.	Designation
1	Injection nozzle	2	Injection pump drive pinion
3	Fuel injection pump	4	Fuel filter with water separator
5	Fuel pump	6	Water separator

4.17 Cooling system



Pos.	Designation	Pos.	Designation
1	Cylinder head	2	Thermostat
3	Water pump	4	Radiator
5	Coolant reservoir	6	Cylinder block

4.18 Altitude-dependent output reduction

This engine is equipped with an altitude-dependent output reduction to prevent the formation of black smoke at higher altitudes (fine particulate pollution).

Engine output is reduced when the engine is started at altitudes over 800 m (2624'-8") above sea level.

Control unit **20/A** of the altitude sensor controls the output-reduction magnet of the engine. Controlling in intermediate steps is not possible!

The control unit measures the altitude about 4 seconds after the engine is started.

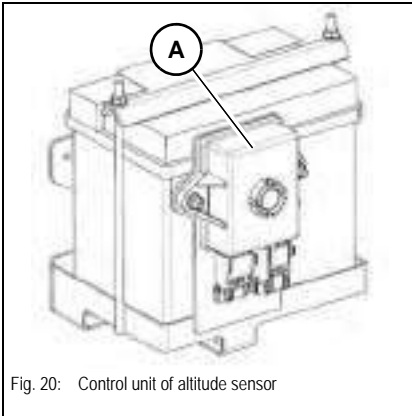


Fig. 20: Control unit of altitude sensor

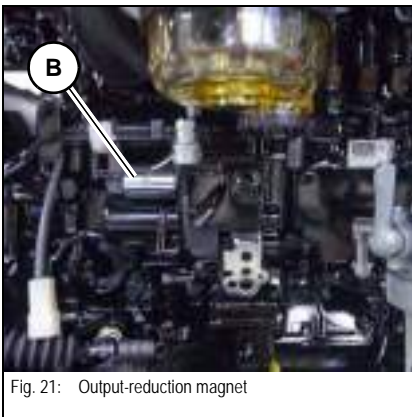


Fig. 21: Output-reduction magnet

The output-reduction magnet (normal operation) **21/B** is de-energized at an altitude of over 800 m (2624'-8") = output reduction.

No further modifications are performed as long as the engine runs. A new measurement is only performed if the engine is restarted.

4.19 Checking and adjusting valve clearance

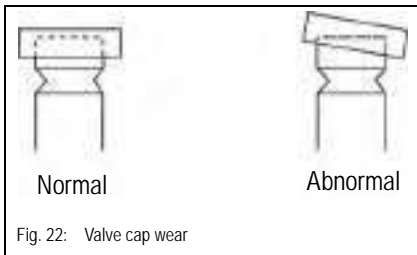


Fig. 22: Valve cap wear

- ☞ The standard valve clearance setting is performed on a cold engine:
 - ➔ The firing order is 1 – 3 – 2, starter at the 240° position of the crankshaft rotation.

i Notice!

The first cylinder is located on the pump side at the flywheel end opposite the radiator.

Checking valve clearance

- ☞ Remove the cylinder-head cover.
- ☞ Turn the ring gear on the flywheel clockwise until the cylinder reaches top dead center of the compression cycle.
 - ➔ Both rocker arms are accessible.
 - ➔ The intake and exhaust valves can be set in this position.
 - ➔ The top dead center mark (indentation) can be seen on the flywheel.
- ☞ Check the valve cap for abnormal wear – see Fig. 22.
- ☞ Check valve clearance with feeler gage **A**.
 - ➔ Valve clearance: 0.15 – 0.25 mm (0.006 – 0.01 in).
- ☞ Adjust the valve clearance if it varies.

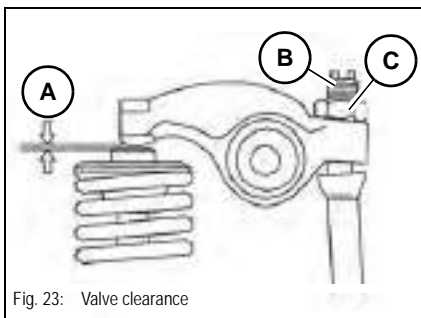


Fig. 23: Valve clearance

To reduce the number of necessary rotations of the crankshaft for checking the valve clearance, the setting of various valves can be adjusted in parallel in accordance with the following table:

Cylinder number	1		2		3	
	Inlet	Exhaust	Inlet	Exhaust	Inlet	Exhaust
Cylinder 1 at top dead center (compression)	●	●	●			●
Cylinder 1 at top dead center (exhaust open)				●	●	

Example:

- Turn cylinder 1 to top dead center (both valves closed – compression).
 - ➔ The valves in the upper row of the table can be set in this manner.
- Then turn the crankshaft to top dead center of the exhaust valve (only the exhaust valve is open).
 - ➔ Both other valves in the lower row of the table can be adjusted.

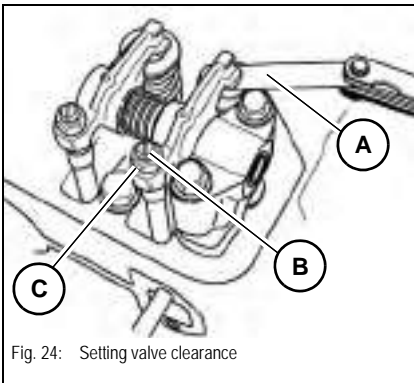


Fig. 24: Setting valve clearance

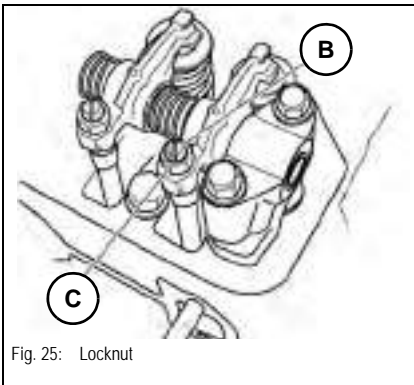


Fig. 25: Locknut

Setting valve clearance

- ☞ Check the valve setting as described in the "Valve clearance" section.
- ☞ Loosen locknut **C** and adjusting screw **B** on the rocker arm.
- ☞ Check the valve cap for abnormal wear – see Fig. 22
- ☞ For the correct valve clearance insert feeler gage **A**.
- ☞ Adjust the valve clearance by turning adjusting screw **B**.
 - The feeler gage must slip between the valve cap and rocker arm with slight resistance.
 - Valve clearance: 0.15 – 0.25 mm (0.006 – 0.01 in)

- ☞ Tighten locknut **C** while holding adjusting screw **B**.
 - Lightly oil the surface between the valve tappet and the adjusting screw.



Notice!

The valve clearance tends to decrease slightly when the locknut **C** is tightened – pay attention to this during adjustment.

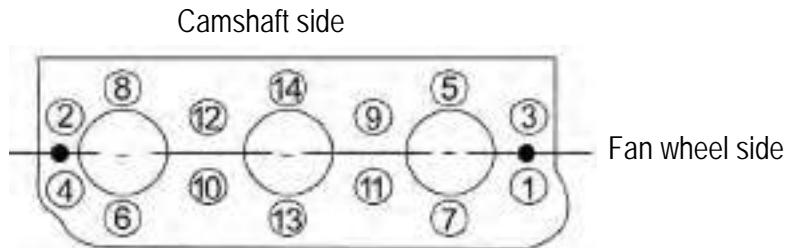
- ☞ Check the valve clearance again.
- ☞ Repeat the procedure for each valve.
- ☞ Position the cylinder-head cover gasket.
- ☞ Install the valve cover again.

4.20 Tightening order for cylinder head bolts

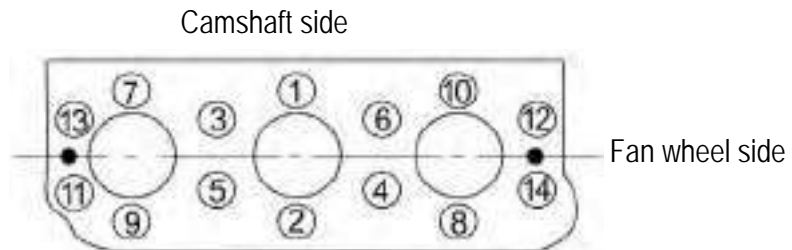
i Notice!

Always perform work on the cylinder head on a cold engine!

Order for removing the cylinder-head bolts:



Order for installing the cylinder-head bolts:



Tightening torques for cylinder-head bolts (M9x1.25)

1st position	29.5 – 31.5 Nm	21.5 – 23 ft.lbs.
2nd position	59 – 63 Nm	43.5 – 46.5 ft.lbs.

i Notice!

Apply a thin coat of oil to the threads and contact surfaces before installing.

⚠ Caution!

Bear in the mind the order for tightening the cylinder-head bolts!

4.21 Checking the injection nozzles

Pressure check

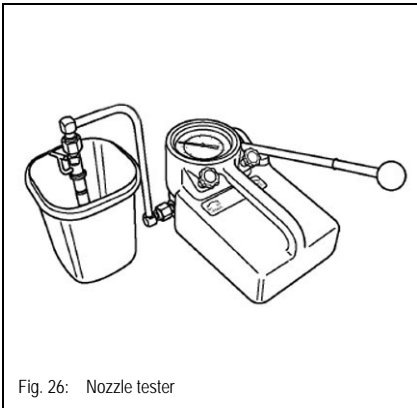


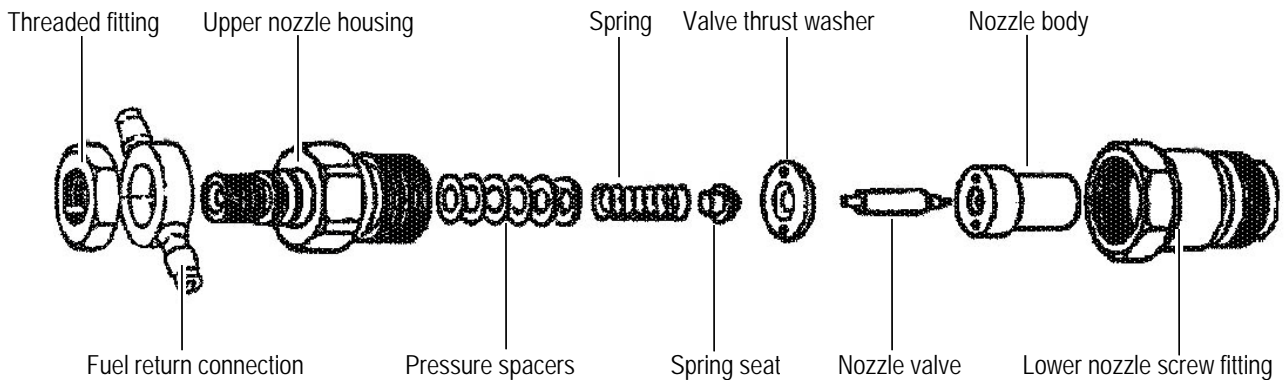
Fig. 26: Nozzle tester

- ☞ Ball-type cock on fuel filter in the "OFF" position.
- ☞ Clean the area around the nozzles and the injection pump.
- ☞ Remove the injection line and the injection nozzle.
- ☞ Connect the injection nozzle to the nozzle tester by means of a suitable adapter.
- ☞ Slowly increase pressure until the nozzle ejects fuel and read the pressure off the pressure gage.
- ☞ If the injection pressure is too low, replace the spacer in the nozzle by a thicker one. If the pressure is too high, replace the spacer by a thinner one.
 - Injection pressure: 118 – 128 bar (1711 – 1856 psi).
- Spacer thickness of 0.1 mm (0.004") corresponds to modification by 6.9 – 9.8 bar (100 – 142 psi).
- ☞ Perform another check.
- ☞ Check the injection nozzle for drips after it has ejected fuel.
 - ☞ Increase pressure up to shortly below the injection pressure during 5 seconds, and check whether fuel drips from the nozzle.
- ☞ Install the nozzle.
- ☞ Open the ball-type cock on the fuel filter again.
- ☞ Start the engine and check the system for leaks.



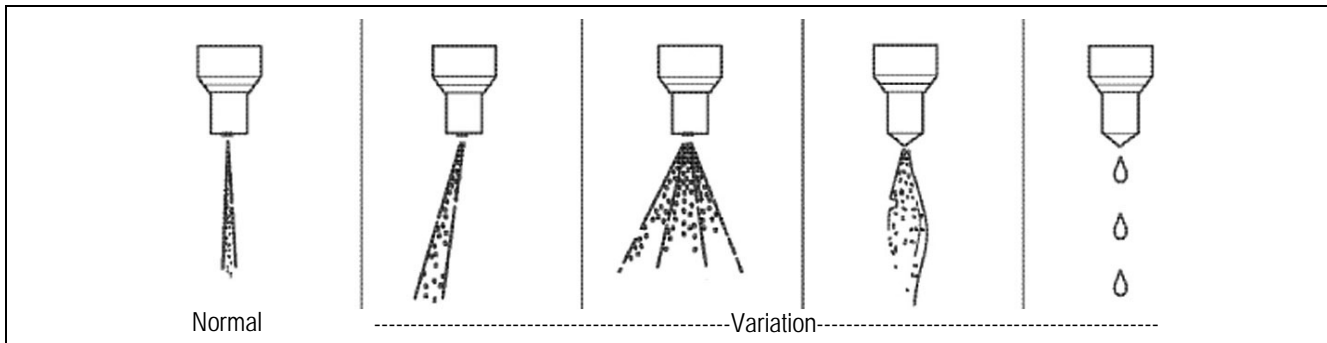
Environment!

Use a suitable container to collect fluids and lubricants as they flow out and dispose of them in an environmentally friendly manner.



4.22 Checking the nozzle jet

- ☞ Remove the injection lines and the injection nozzles.
- ☞ Connect the injection nozzle with the high pressure line of the nozzle tester.
- ☞ Quickly create pressure until the nozzle ejects fuel (ejection 3 – 4 times).
- ☞ Hold a white sheet of paper about 30 cm (12") away from the nozzle and let the nozzle eject fuel.
- ☞ The nozzle jet must create a shape on the paper as shown below.



4.23 Injection time

Checking injection time

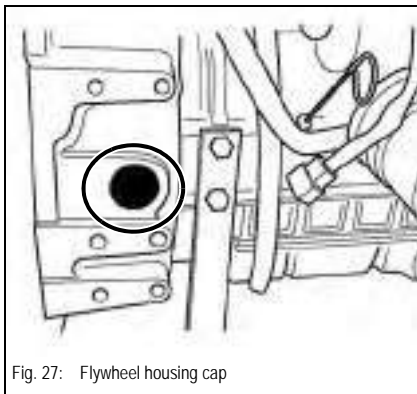


Fig. 27: Flywheel housing cap

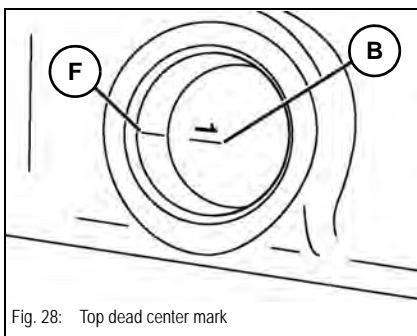


Fig. 28: Top dead center mark

Preparatory work:

- The fuel system must be filled and bled.
- Clean the injection pump and keep it clean.
- ☞ Checking cylinder 1 is basically sufficient and serves the purpose, but all other cylinders can also be checked.
- ☞ Apply current to the cutoff solenoid, or remove the cutoff solenoid and the O-ring from the injection pump.
 - ➔ Fuel supply is enabled.
- ☞ Set the throttle to the maximum speed.
- ☞ Remove the cap on the flywheel housing, see Fig. 27
 - ➔ The view to the ring gear is opened.
- ☞ Position a spanner on the screw of the pulley (on the crankshaft) and turn clockwise.
- ☞ Turn until top dead center marks **B** on the ring gear for cylinder 1 are visible and at the same level as mark **F** on the flywheel housing.
 - ➔ There are several marks on the ring gear depending on the number of cylinders of the diesel engine; each individual mark can be used with the corresponding cylinder for testing purposes.
 - ➔ Top dead center can be assigned to the correct cylinder with the number **B** stamped next to it.

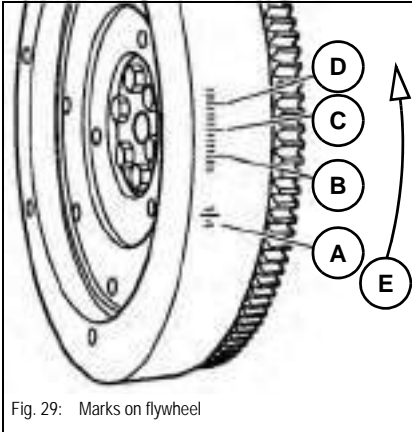


Fig. 29: Marks on flywheel

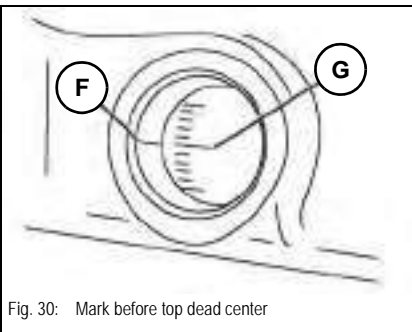


Fig. 30: Mark before top dead center

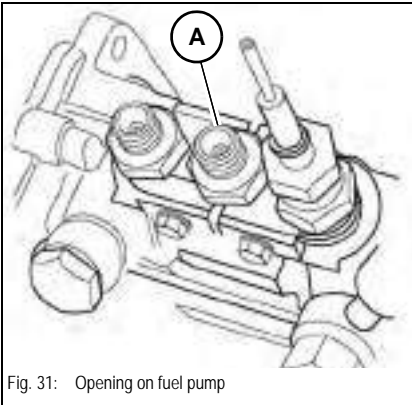


Fig. 31: Opening on fuel pump

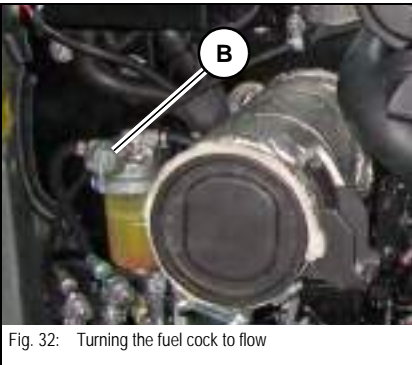


Fig. 32: Turning the fuel cock to flow

Marks (standard specification) on the flywheel:

Pos.	Designation
A	Top dead center with corresponding cylinder number
B	15° before top dead center
C	20° before top dead center
D	25° before top dead center
E	Direction of rotation

☞ Turn until mark **G** on the ring gear for cylinder 1 are visible and at the same level as mark **F** on the flywheel housing.

➔ Rated injection point 16° before top dead center (+/- 1°).

☞ Mark the (rated) injection point on the flywheel housing and ring gear.

Measurement:

☞ Loosen and push all high-pressure fuel injection lines to one side.

➔ Opening **A** of injection pump must be visible.

☞ Turn fuel cock **B** to flow, see Fig. 32

i Notice!

Fuel is pumped to the cylinder only every second turn of the crankshaft; for this reason it may be necessary to turn the crankshaft twice.

☞ An auxiliary means (fuel injection line with a transparent pipe) can be installed on the fuel injection line for precise observation. – see Fig. 33

➔ This auxiliary means is not essential.

☞ Position a spanner on the screw of the pulley (on the crankshaft).

☞ Slowly turn clockwise until fuel is discharged from the opening of injection pump **A**.



Fig. 33: Measuring equipment

- ☞ Then slowly turn back approximately two more rotations until about 30° before top dead center.
- ☞ Remove any bubbles at the opening of the injection pump with your finger so that the opening of the injection pump is about half full with fuel.
- ☞ Slowly keep turning the crankshaft clockwise until the fuel level rises to the opening of injection pump A.
- ☞ Stop the rotary motion immediately.
- ☞ Read the degrees before top dead center by means of the indentation on the flywheel.
 - ➔ Rated value: 16° +/- 1° before top dead center – see [Marks on flywheel](#) on page 4-25.
- ☞ Measure the injection time two to three times.
 - ➔ If the specified value is reached, the injection time is correct.
- ☞ Install the fuel injection lines, cutoff solenoid and cap back on again.
- ☞ Check the fuel system for leaks.
- ➔ If the value varies from the specified value, the injection time must be adjusted.

i Notice!

Bend the injection lines as you install them so they are not subject to tension once they are installed. Bleed the injection lines once they are installed.

Setting injection time

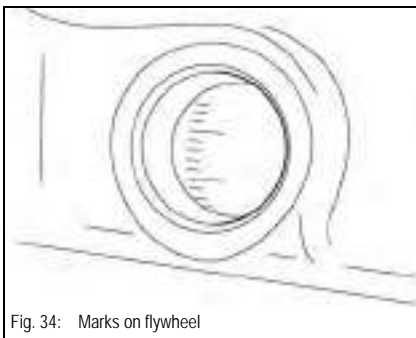


Fig. 34: Marks on flywheel

- Variations of the injection time outside the tolerance range can be corrected by turning the fuel injection pump.
- ➔ The injection time must be measured to determine whether it is premature or too late, see [Fig. 34](#)



Fig. 35: Mark on pump housing

- ☞ Mark the original position of the injection pump on the pump and gear casing. – see [Fig. 35](#)
- ☞ Remove all injection lines on the fuel injection pump and loosen the 4 flange screws by about ½ a revolution (do not unscrew completely).
- ☞ Swivel the pump in the required direction and retighten the screws.
 - ➔ Rotated away from the engine: earlier injection time.
 - ➔ Rotated toward the engine: later injection time.
- ☞ Bend each of the injection lines before you install them so they are not subject to tension once they are installed.
- ☞ Check the injection time again – see [Checking injection time](#) on page 4-24.

i Notice!

Bend the injection lines as you install them so they are not subject to tension once they are installed. Bleed the injection lines once they are installed.

4.24 Removing and installing the injection pump

Removing the injection pump

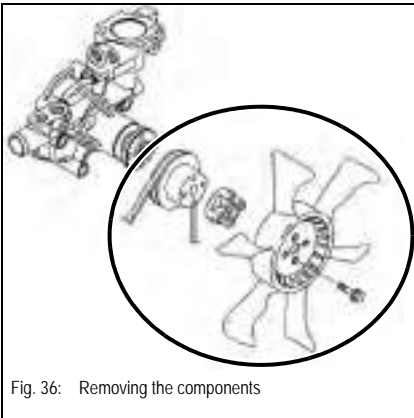


Fig. 36: Removing the components

- Remove the V-belt, pulley and fan wheel with a suitable tool.
- Mark the original position of the injection pump on the pump and gear casing – see Mark on pump housing on page 4-26.
- Shut off the fuel supply (fuel cock), clean the area of the injection pump and have a container ready to collect any leaked fuel.

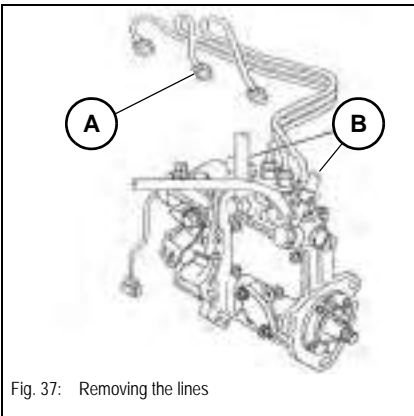


Fig. 37: Removing the lines

- Remove fuel injection lines **A** and fuel and leak oil lines **B**.
 - ➡ Close any open connections to prevent dirt and to minimize leakage.
- Unhook the Bowden cable on the injection pump and remove the cutoff solenoid.

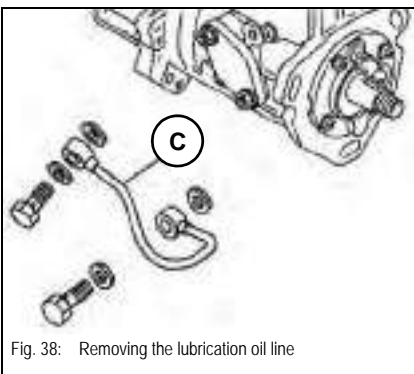



Fig. 38: Removing the lubrication oil line

- Remove lubrication oil line **C** from the injection pump and cylinder block.


Notice!

Do not bend the lubrication oil line and protect it against damage.

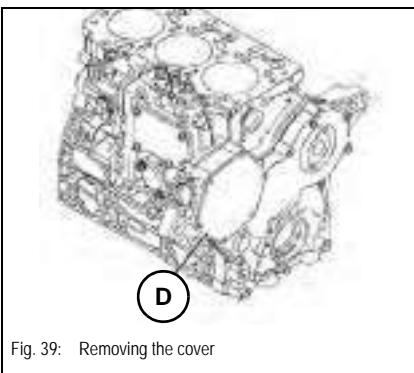


Fig. 39: Removing the cover

- Remove cover **D** of the injection pump on the gear casing.
 - Cover **D** is installed with sealant, therefore separate the cover from the gear casing with a scraper.

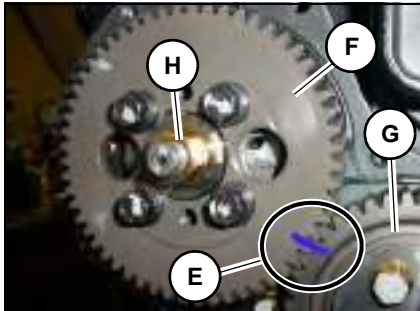


Fig. 40: Mark on gear

- ☞ Mark position **E** of injection pump gear **F** in relation to gear position **G**.
- ☞ After marking, do not turn the crankshaft.
 - ➔ Tighten the screw of the pulley with a long spanner to fix the crankshaft in place.
- ☞ Loosen lock nut **H** of gear **F** and unscrew until the shaft end of the injection pump.

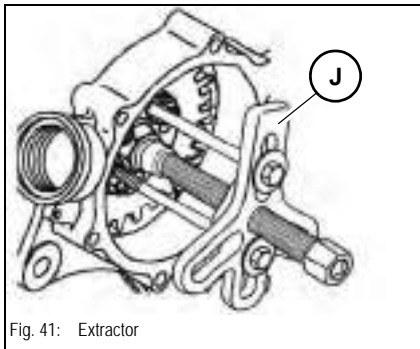


Fig. 41: Extractor

- ☞ Use an extractor **J** to pull off/loosen gear **F** on the conical shaft.
- ☞ Loosen lock nut **H** completely and remove it from the gear casing with the spring washer and gear **F**.

i Notice!

Gear **F** of the injection pump can be removed from the gear casing. We recommend, however, leaving gear **F** meshed with the gear **G** in the gear casing.

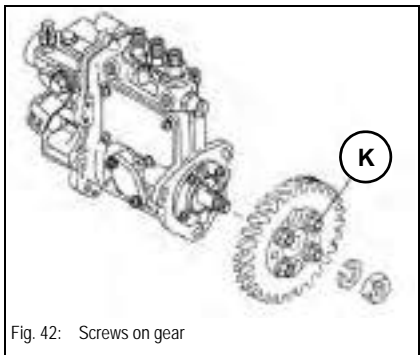


Fig. 42: Screws on gear

- Do not loosen screws **K** of the gear of the injection pump, as these specify the precision setting of the fuel injection pump set by the manufacturer!
 - ➔ It is very difficult or even impossible to subsequently set the correct injection time.
- ☞ Remove the fuel injection pump.
 - ➔ To this purpose unscrew the three fastening screws of the injection pump.

i Notice!

After removing the injection pump, do not turn the crankshaft anymore. Tampering with the sealed screws is prohibited.

Fitting the fuel injection pump

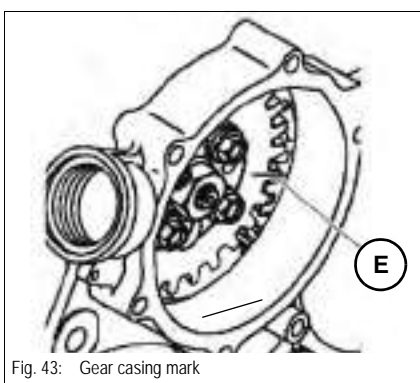


Fig. 43: Gear casing mark

- ☞ Check the position of the gears by means of mark **E** made during removal.
- ☞ Fit a new O-ring on the flange of the injection pump with grease.
- ☞ Ensure that the shaft of the injection pump is clean and dry.
- ☞ The feather key on the shaft of the injection pump must be aligned with the groove in the hub and gear.
- ☞ Fit the injection pump and tighten the securing screws hand tight.

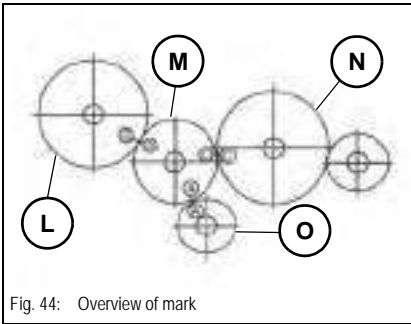


Fig. 44: Overview of mark

- If the injection pump is installed in a diesel engine in which the gear casing was also removed, alignment is possible by means of the marks on the gears of the injection pump, camshaft, crankshaft and idler gear.

➔ Ensure that all three marks (A, B, C) coincide.

Pos.	Designation
L	Injection pump gear
M	Idler gear
N	Camshaft gear
O	Crankshaft gear

⚙️ *Install the lock nut with spring washer and tighten to the correct torque.*

➔ Tightening torque: 59 – 69 Nm (44 – 51 ft.lbs.)

➔ Never use oil or grease for assembly.

➔ Tighten the screw of the pulley with a long spanner to fix the crankshaft in place.

⚙️ *Set the injection pump to the original position by means of the marks on the gear casing and injection pump housing made during removal. – see Fig. 35*

i Notice!

If a new injection pump is fitted, the mark on the injection pump housing made at the factory is used and must align with the mark on the gear casing.

⚙️ *Tighten the fastening screws of the injection pump to the correct torque.*

⚙️ *Fit the fuel lines back on again.*

⚙️ *Hook up the Bowden cable again and fit the cutoff solenoid.*

⚙️ *If a new or newly calibrated injection pump is fitted, the injection time must be checked before all components have been fitted.*

➔ It is not absolutely necessary to check the original injection pump, but this is recommended – see *Checking injection time* on page 4-24.

⚙️ *Install the lubrication oil line back on again, see Fig. 38*

⚙️ *Fit the cover of the injection pump on the gear casing and tighten the screws.*

➔ Apply a sealant to the sealing surface.

⚙️ *Install the fuel injection line back on again, see Fig. 37*

i Notice!

If a new or newly calibrated injection pump is fitted, at least 0.15 – 0.20 l (0.04 – 0.05 gal) of new, clean engine oil must be filled through the top rear plug of the governor

⚙️ *Bleed the fuel system.*

⚙️ *Start the engine and check for any fuel or engine oil leaks.*

⚙️ *Install the V-belt, pulley and fan wheel back on again, see Fig. 36*

4.25 Measuring and adjusting the engine speed



Fig. 45: Manual tachometer

Measuring the engine speed

The engine speed can be quickly and simply determined with a tachometer.

- ☞ *Measurement on the crankshaft disk or on the ring gear.*



Notice!

The maximum engine speed is set and sealed by the manufacturer without the pump and may not be modified.

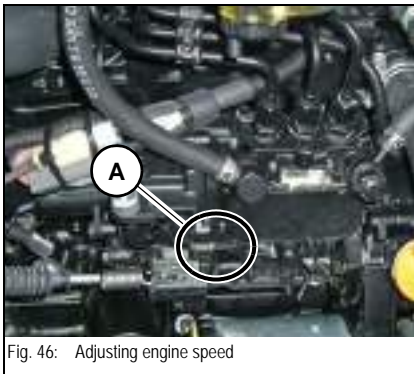


Fig. 46: Adjusting engine speed

Adjusting engine speed

Only the idling speed can be adjusted

- ☞ *Adjust engine speed without load.*
- ☞ *Run the diesel engine until it reaches operating temperature.*
- ☞ *Check idling speed and maximum engine speed with all attachment functions in neutral.*
 - ➔ *Idling speed: 1300 +/- 25 rpm*
 - ➔ *Max. engine speed: 2675 +/- 25 rpm*
- ☞ *In the event of deviation, correct the idling speed by means of the idling speed adjusting screw A.*

4.26 Compression

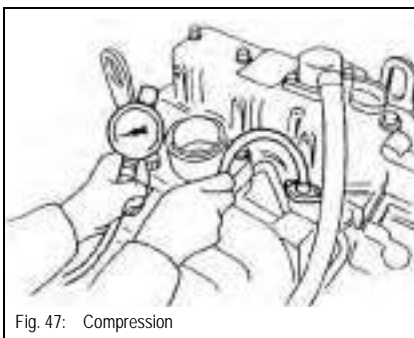
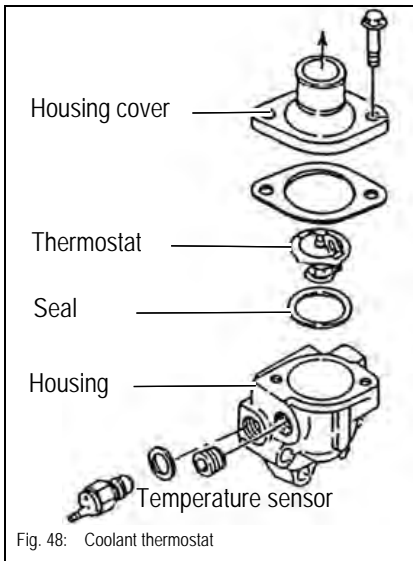


Fig. 47: Compression

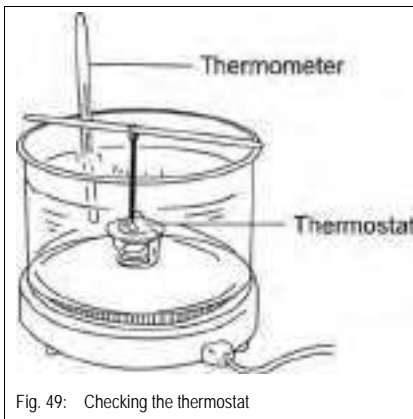
- ☞ *Clean the engine.*
- ☞ *Run the diesel engine until it reaches operating temperature.*
- ☞ *Stop the engine.*
- ☞ *Remove the injection lines and the injection nozzles.*
- ☞ *Set the fuel supply to zero delivery.*
 - ➔ *Remove the connector for the cutoff solenoid.*
- ☞ *Turn the engine before attaching the compression gage.*
 - ➔ *The remaining fuel is ejected.*
- ☞ *Attach the compression gage to the respective cylinder with a sealing ring.*
- ☞ *Turn the diesel engine with the starter and read off the pressure on the pressure gage, repeat until the reading is stable.*
 - ➔ *Specified value: 34.3 +/- 1 bar (498 psi +/- 15) at 250 rpm*
 - ➔ *Threshold value: 27.5 +/- 1 bar (399 psi +/- 15) at 250 rpm*
- ☞ *Install and connect the components again in the reverse order.*
- ☞ *Check the system for leaks.*

4.27 Checking the coolant thermostat



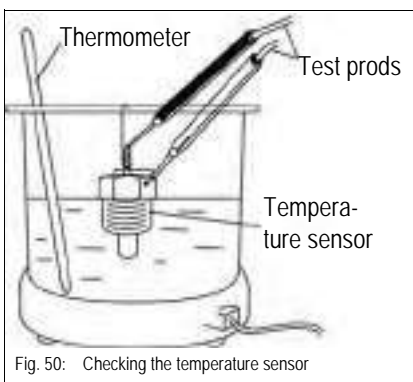
- The thermostat is located on the water pump – see [Cooling system](#) on page 4-18

- ☞ Remove the thermostat.
- ☞ Drain the coolant.
- ☞ Remove the coolant hose.
- ☞ Remove the connecting line of the temperature sensor.
- ☞ Unscrew the housing cover from the thermostat.
 - ➔ Remove the thermostat.



- ☞ Warm up the thermostat in a container with water.
- ☞ Check whether the thermostat opens at the specified temperature (check with a temperature gage).
 - ➔ Thermostat opening temperature: see value stamped on thermostat flange.
- Install in the reverse order.

4.28 Checking the temperature sensor



- ☞ Remove the temperature sensor.
- ☞ Warm up the temperature sensor in a container with coolant.
- ☞ Measure the resistance of the temperature sensor as shown by means of an ohmmeter.
 - ➔ The switch must allow the coolant to pass at a temperature of 107 – 113 °C (225 – 235 °F).
- ☞ Install the temperature sensor.
- ☞ Pay attention to the temperature gage in the display element during machine operation.

4.29 Oil pressure switch

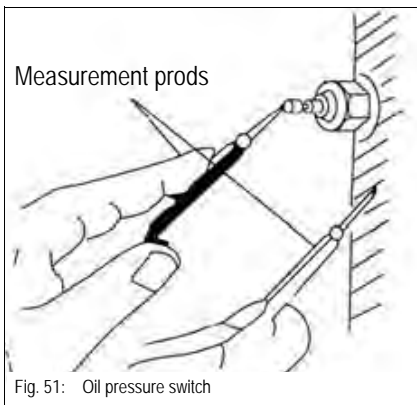


Fig. 51: Oil pressure switch

- ☞ Remove the cable connection from the oil pressure switch (in the area of the cutoff solenoid).
- ☞ Start the engine, check for correct idling speed.
- ☞ Measure the resistance of the oil pressure switch as shown by means of an ohmmeter.
 - ➔ Oil pressure switch is OK: infinite resistance.
 - ➔ The oil pressure switch is malfunctioning if the oil can pass.

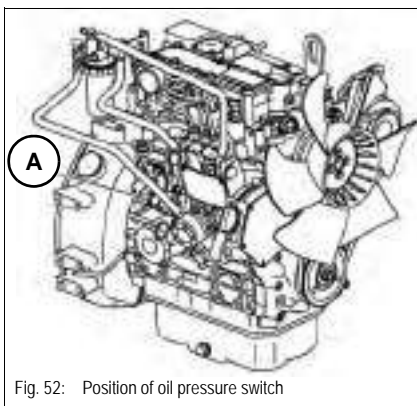


Fig. 52: Position of oil pressure switch

- The oil pressure can also be measured with a mechanical dial gage.
- ☞ Remove oil pressure switch **A** and replace it with the dial gage.
- ☞ Start the diesel engine and measure the oil pressure.
 - ➔ Replace the oil pressure switch if malfunctioning or determine the cause for insufficient oil pressure.

4.30 Checking the coolant circuit

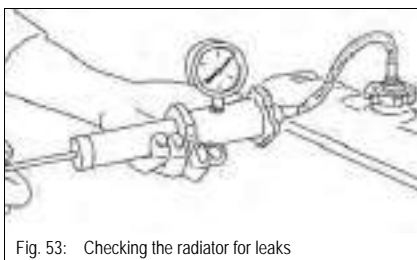


Fig. 53: Checking the radiator for leaks

Leakage check

- ☞ Fill up the radiator correctly.
- ☞ Install test appliance on the radiator as shown.
- ☞ Increase the pressure in the cooling system by means of a hand pump to about 0.75 – 1.05 bar (10.8 – 14.8 psi).
 - ➔ If the pressure drops at the pressure gage, check the lines and the connections for leaks and repair them.

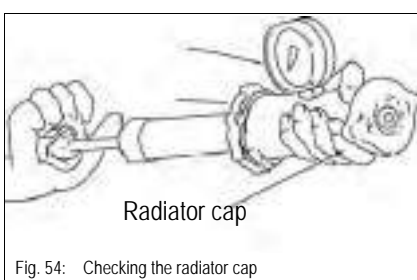


Fig. 54: Checking the radiator cap

Checking the radiator cap

- ☞ Remove the radiator cap and install it on the test appliance as shown.
- ☞ Increase the pressure by means of a hand pump to about 0.75 – 1.05 bar (10.8 – 14.8 psi).
 - ➔ The radiator cap must open within this pressure range.

4.31 Cleaning the cooling water channels

- ☞ Let the engine and the cooling system cool down.
- ☞ Remove the radiator screw plug.
- ☞ Drain the coolant – see chapter Draining coolant on page 3-25
- ☞ Rinse the cooling circuit.
- ☞ Add coolant – see chapter Checking the coolant level/adding coolant on page 3-23.

4.32 Coolant and fuel hoses

☞ Check the coolant and fuel hoses regularly to ensure that they are not kinked, cracked or damaged.

➔ Renew coolant and fuel hoses every 2000 o/h.

4.33 Crankcase vent

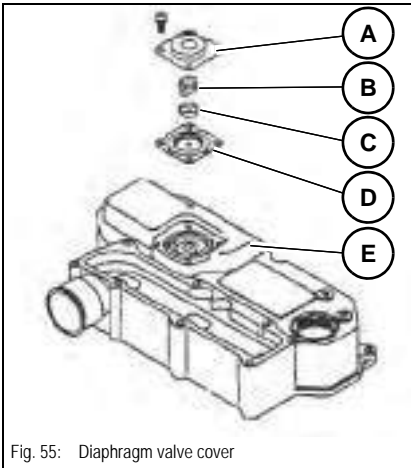


Fig. 55: Diaphragm valve cover

- Venting system by means of a spring-loaded diaphragm **C** on the valve cover **D**.
- If the specified value is exceeded, a connection is opened between the crankcase and the intake manifold.

☞ Unscrew the fastening screws of the cover.

☞ Remove cover **A**, spring **B**, diaphragm washer **C** and diaphragm **D**.

☞ Check diaphragm **D** for cracks and spring **B** for deformation.

➔ If necessary, replace the parts.

➔ Malfunctioning parts result in inappropriate monitoring of the crankcase pressure and possible damage.

☞ Install the parts in reverse order (pay attention to the torque).

4.34 Replacing the glow plugs

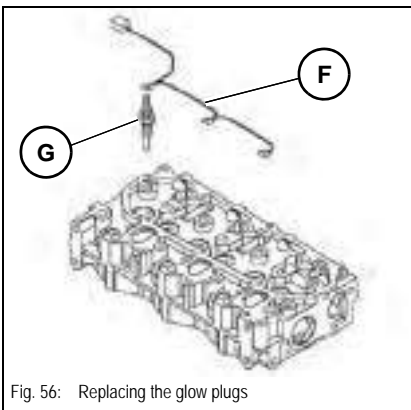


Fig. 56: Replacing the glow plugs

Removing the glow plugs

☞ Unscrew the fastening screws of valve cover **E**.

☞ Remove the valve cover and gasket.

☞ Remove wiring harness **F** from the glow plugs.

➔ To this purpose remove the nuts on glow plugs **G**.

☞ Unscrew glow plugs **G** from the cylinder head.

Installing the glow plugs

☞ Screw the glow plugs into the cylinder head.

➔ Tightening torque: 14.7 – 19.6 Nm (11 – 15 ft.lbs.).

☞ Refit the wiring harness and tighten the nuts.

☞ Lightly grease and fit the new valve cover gasket.

☞ Fit the valve cover and tighten the fastening screws.

4.35 Engine trouble

Problem	Possible causes
Engine does not start or is not easy to start	Incorrect engine oil
	Fuel grade does not comply with specifications
	Malfunctioning or empty battery
	Loose or oxidized cable connections in starter circuit
	Malfunctioning starter, or pinion does not engage
	Wrong valve clearance
	Malfunctioning intake or exhaust valve
	Malfunctioning starting relay
	Malfunctioning glow plug
	Malfunctioning solenoid switch
	Malfunctioning fuse
	Dirty fuel filter
	Very dirty air filter
	Cutoff solenoid does not attract
	Air in fuel system
	Stuck or broken piston ring
	No fuel
	Poor injection
Stuck or malfunctioning system components	
Water or air in fuel system	
Foreign bodies in combustion chamber	
Engine starts, but does not run smoothly or faultless	Fuel grade does not comply with specifications
	Wrong valve clearance
	Injection line leaks
	Malfunctioning fuel injector
	Dirty fuel filter
	Air or water in fuel system
	Incorrect setting of speed control
	Poor fuel supply to injection pump

Problem	Possible causes
Engine overheats, temperature warning system responds	Malfunctioning thermostat
	Malfunctioning cylinder-head gasket
	Malfunctioning piston ring
	Malfunctioning radiator
	Malfunctioning fan, torn or loose V-belt
	Malfunctioning fuel injector
	Not enough coolant
	Malfunctioning coolant pump
	Cooling system leaks
Insufficient engine output	Incorrect engine oil
	Fuel grade does not comply with specifications
	Dirty fuel filter
	Dirty air filter
	Malfunctioning air filter maintenance switch or gage
	Wrong valve clearance
	Injection line leaks
	Malfunctioning fuel injector
	Air in fuel system
Engine does not run on all cylinders	Injection line leaks
	Malfunctioning fuel injector/injection pump
Insufficient or no engine oil pressure	Lube oil level too low
	Overfilled crankshaft housing
	Wrong SAE grade of engine lubrication oil
	Malfunctioning pressure regulating valve
	Leaks in engine lubrication system
	Clogged engine oil filter
Engine oil consumption too high	Leaks in engine lubrication system
	Excessive fuel injection
	Wrong SAE grade of engine lubrication oil
	Worn oil scraper rings
	Worn valve guide

Problem		Possible causes
Engine smoke	White	Malfunctioning piston ring
		Malfunctioning piston/cylinder
		Fuel grade does not comply with specifications
		Malfunctioning fuel injector
		Wrong injection time (too late!)
		Malfunctioning thermostat
		Too much cooling
		Water in fuel system
		Engine burns oil
		Incorrect setting of injection pump (injection too early)
		Dirty injection nozzle
	Black	Dirty air filter
		Clogged exhaust pipe
		Malfunctioning fuel injector (drips)
		Incorrect setting of injection pump (injection too early)
		Wrong valve clearance
		Dirty injection nozzle
		Wrong fuel
		Injection quantity too high
Overloaded engine		

Hydraulic system

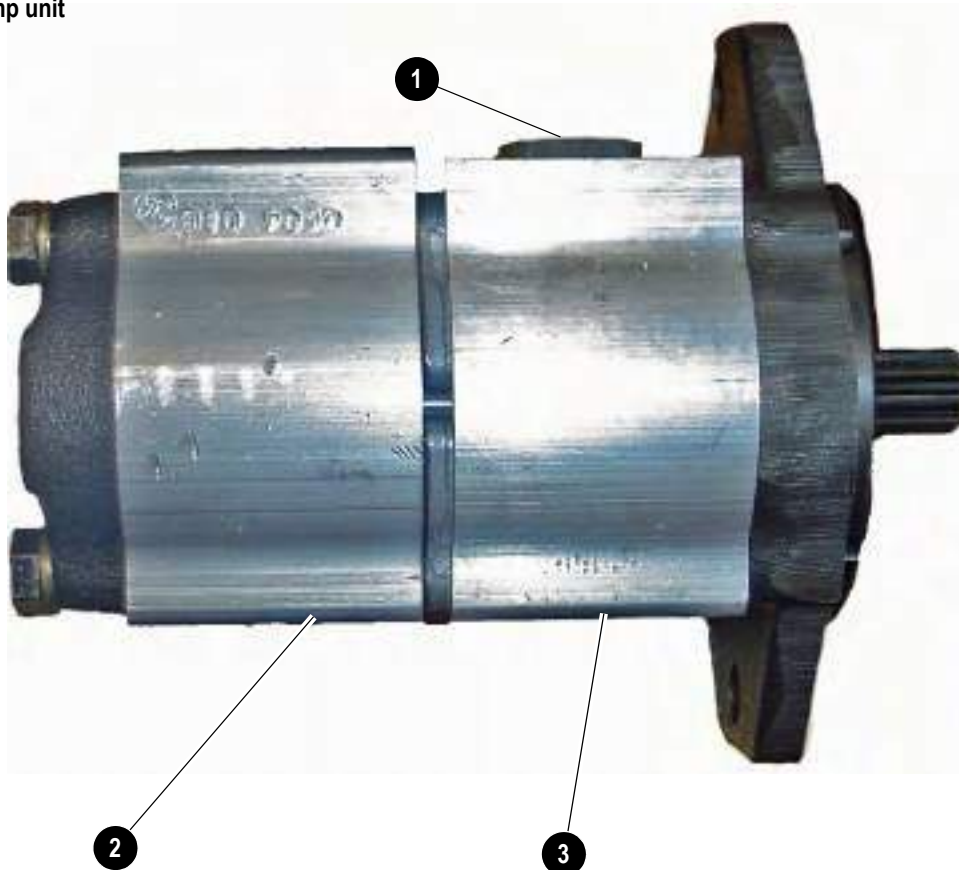
5 Hydraulic system

The hydraulic system is governed by a throttle

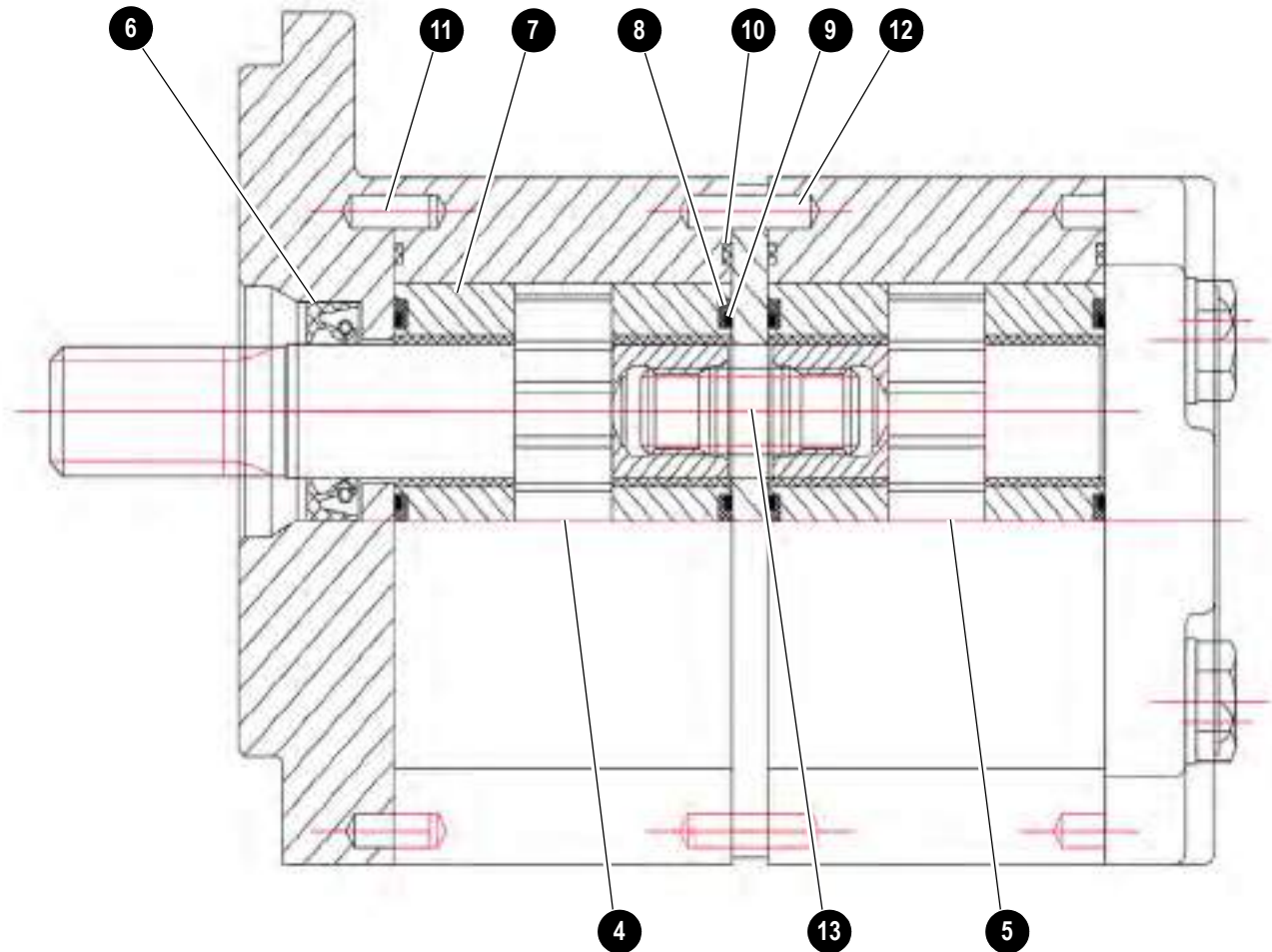
5.1 Hydraulic pump PGP505B0050CA1H2NJ7J5C-505A00 (Tier IV final up to 2012)

2 coupled gear pumps

Gear pump unit



Pos.	Designation
1	Suction line Connection
2	Pressure line P1 connection
3	Pressure line P2 connection

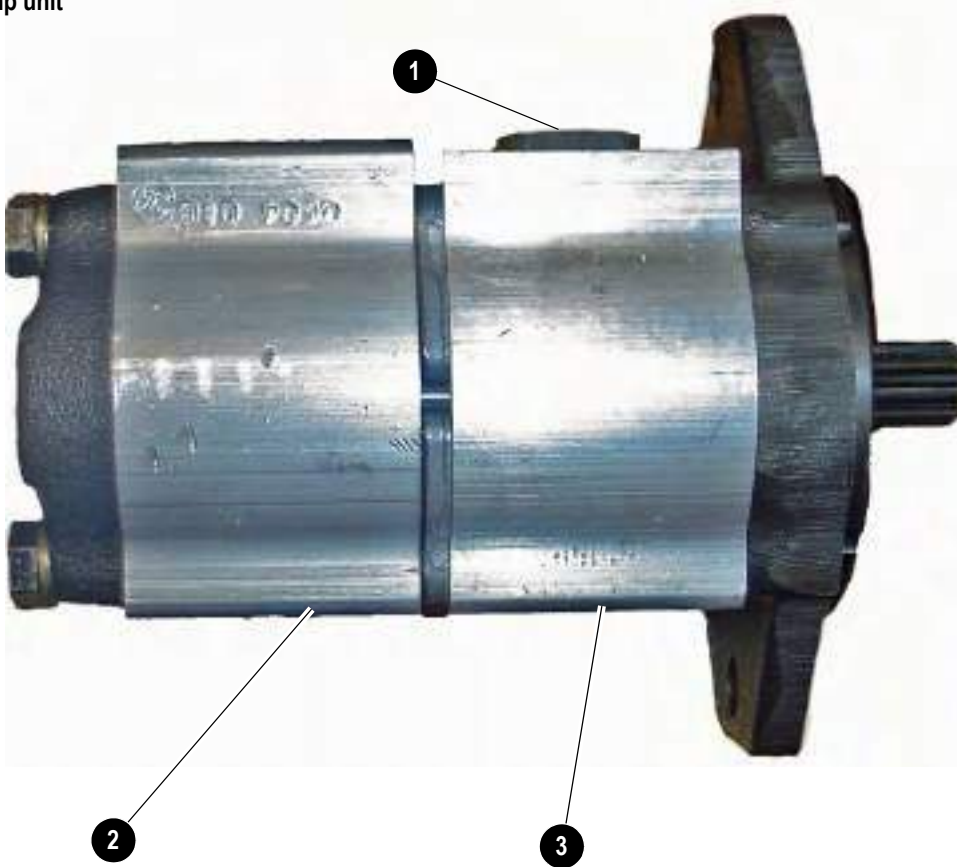
Pump unit: exploded view


Pos.	Designation
4	Gear shaft set
5	Gear set
6	Lip seal
7	Sleeve
8	Sealing ring
9	Prop ring
10	Seal
11	Parallel pin
12	Parallel pin
13	Connecting shaft

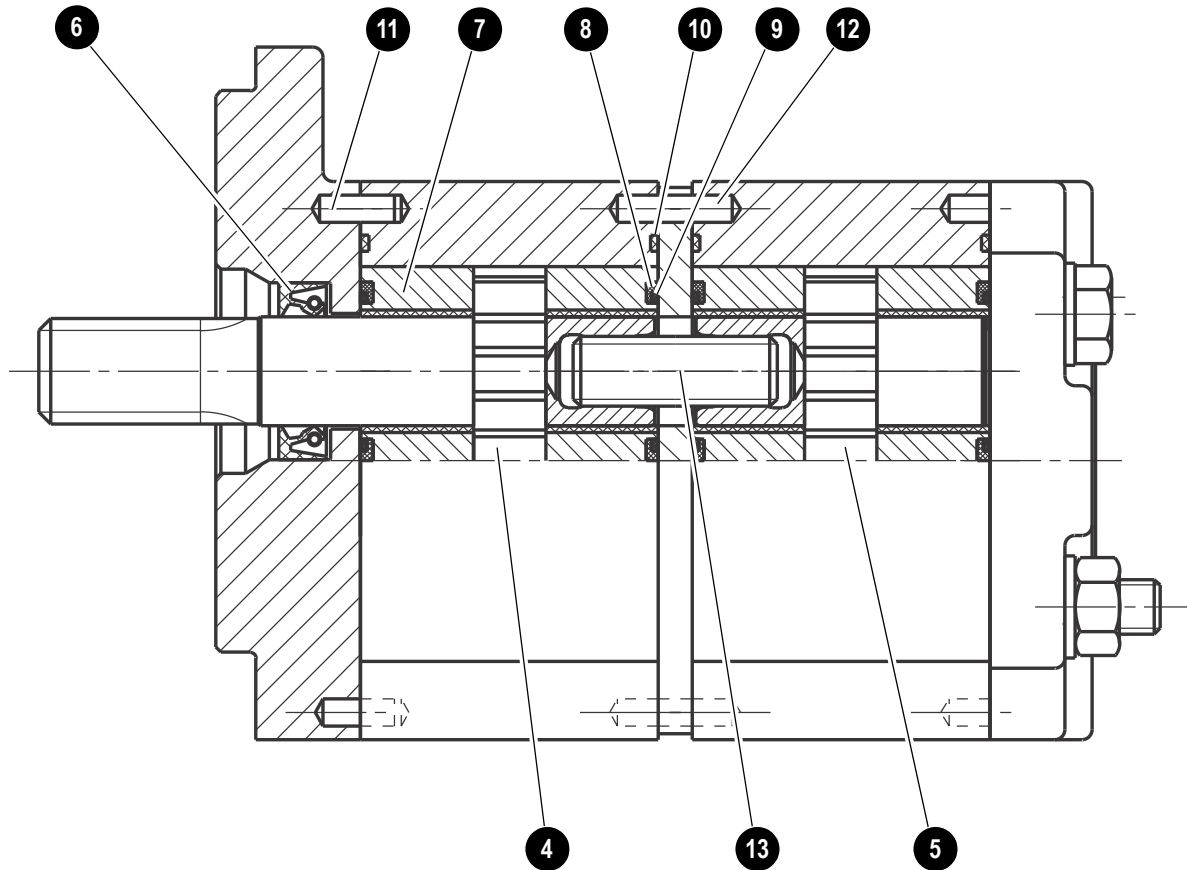
5.2 Hydraulic pump PGP505B0040CA1H2NJ7J5C-505A0040XB1J5B1B1 (Tier IV final from 2012)

2 coupled gear pumps

Gear pump unit



Pos.	Designation
1	Suction line Connection
2	Pressure line P1 connection
3	Pressure line P2 connection

Pump unit: exploded view


Pos.	Designation
4	Gear shaft set
5	Gear set
6	Lip seal
7	Sleeve
8	Sealing ring
9	Prop ring
10	Seal
11	Parallel pin
12	Parallel pin
13	Connecting shaft

5.3 Main valve block

Connections



Legend

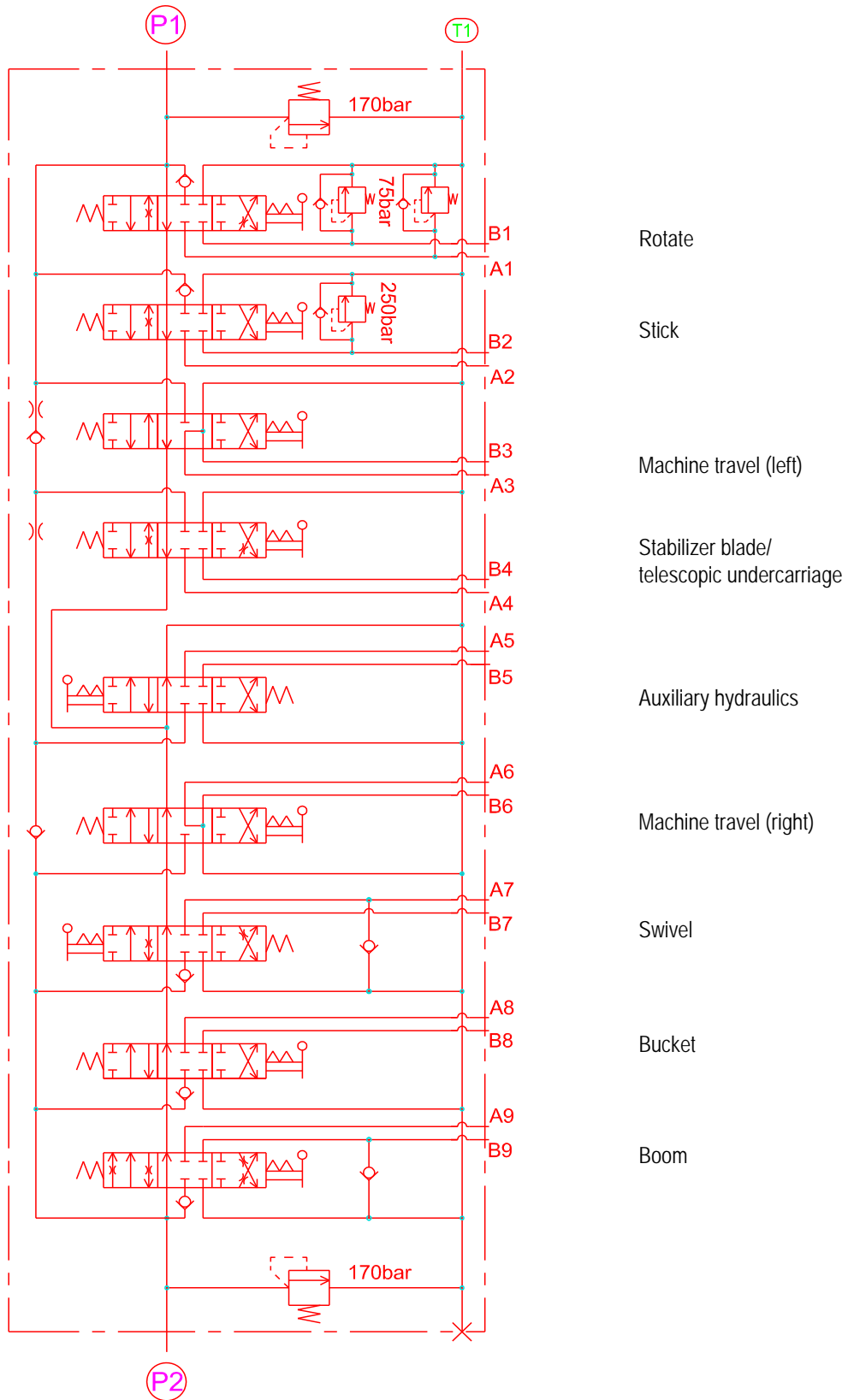
Main control lines

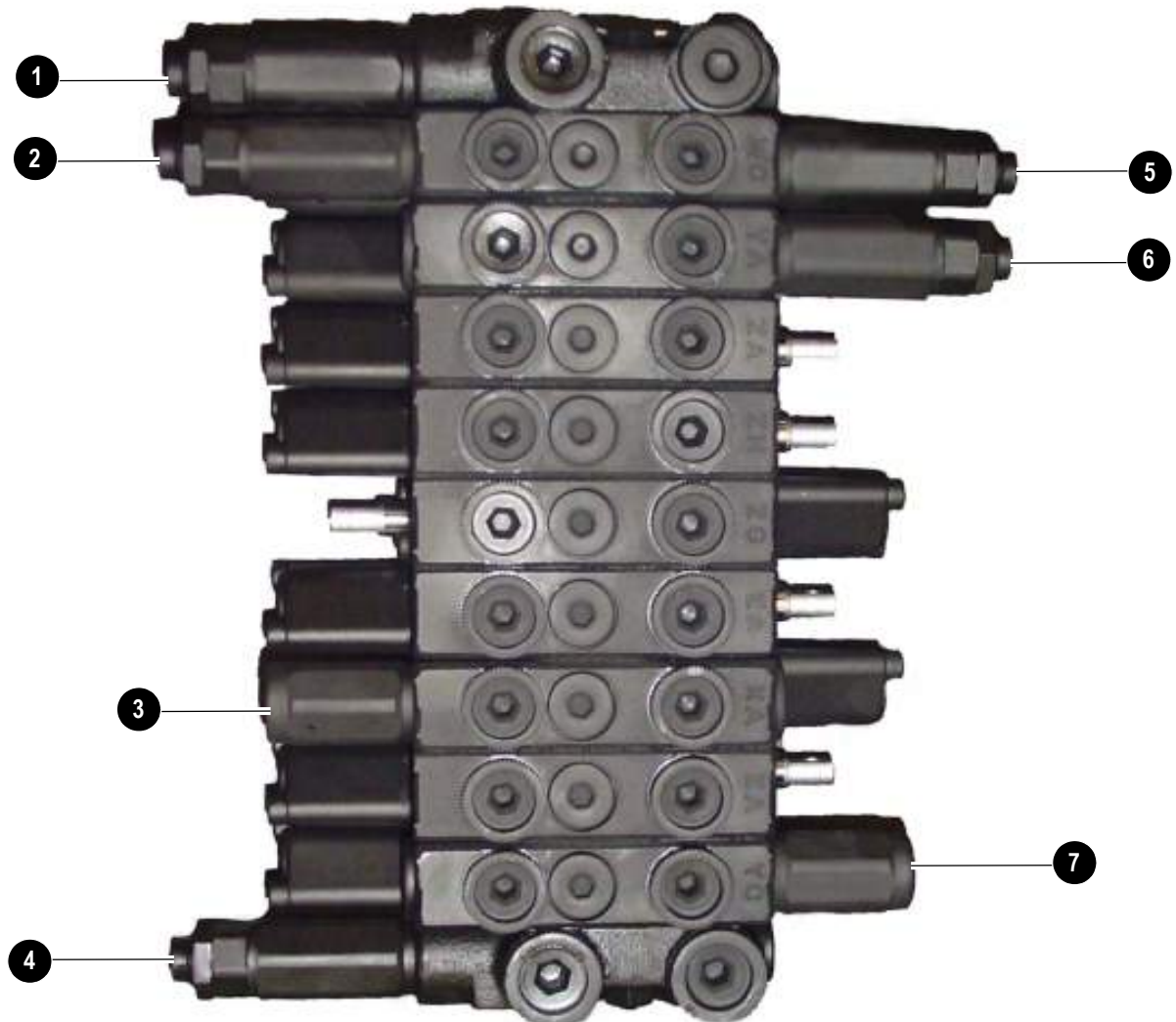
Connection	Legend
B1	Rotation to the left
A1	Rotation to the right
B2	Stick cylinder rod side
B1	Stick cylinder base side
B3	Left-hand traveling drive reverse
A3	Left-hand traveling drive forward
B4	Stabilizer blade/telescopic undercarriage rod side
A4	Stabilizer blade/telescopic undercarriage base side
A5	Auxiliary hydraulics
B5	Closed
A6	Right-hand traveling drive forward
B6	Right-hand traveling drive reverse
A7	Swiveling cylinder rod side
B7	Swiveling cylinder base side
A8	Bucket cylinder base side
B8	Bucket cylinder rod side
A9	Boom cylinder rod side
B9	Boom cylinder base side

Pump/reservoir lines

Connection	Legend
P1	Pump 1 connection
P2	Pump 2 connection
T1	Reservoir line via non-return valve and filter in reservoir

Main valve block diagram



Pressure limiting valves


Pos.	Designation
1	Primary pressure limiting valve P1
2	Secondary pressure limiting valve, swivel, right
3	Anticavitation valve
4	Primary pressure limiting valve P2
5	Secondary pressure limiting valve, swivel, left
6	Secondary pressure limiting valve, stick
7	Anticavitation valve

Pump assignment

Hydraulic supply by pump 1

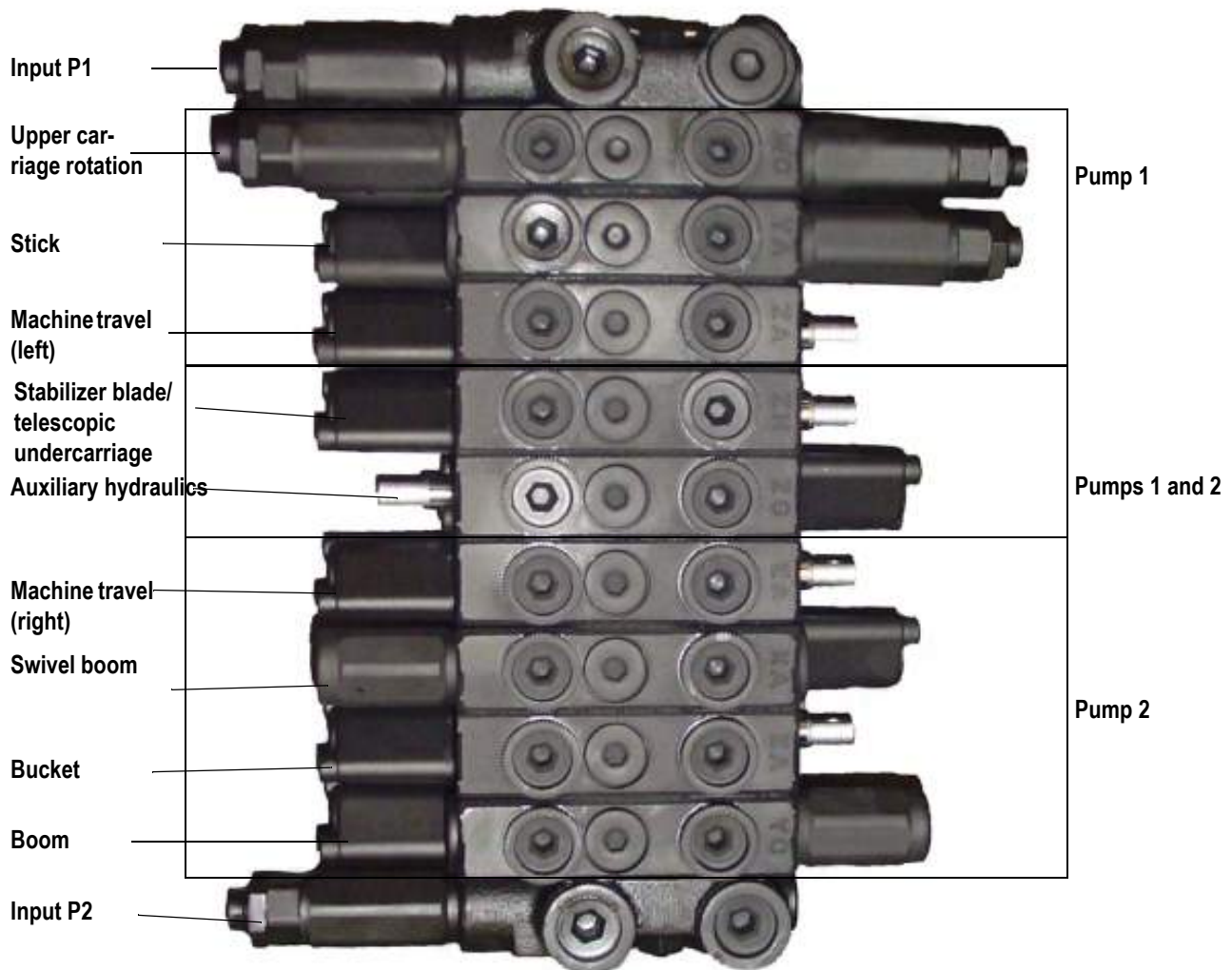
- Upper carriage rotation section
- Stick section
- Left-hand drive section

Supplied by pumps 1 and 2

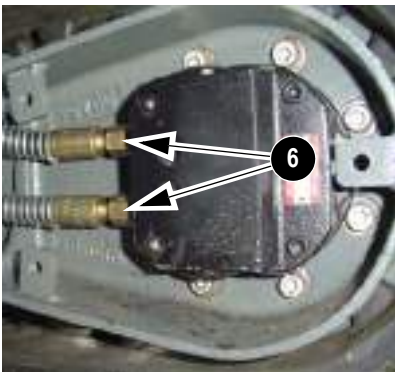
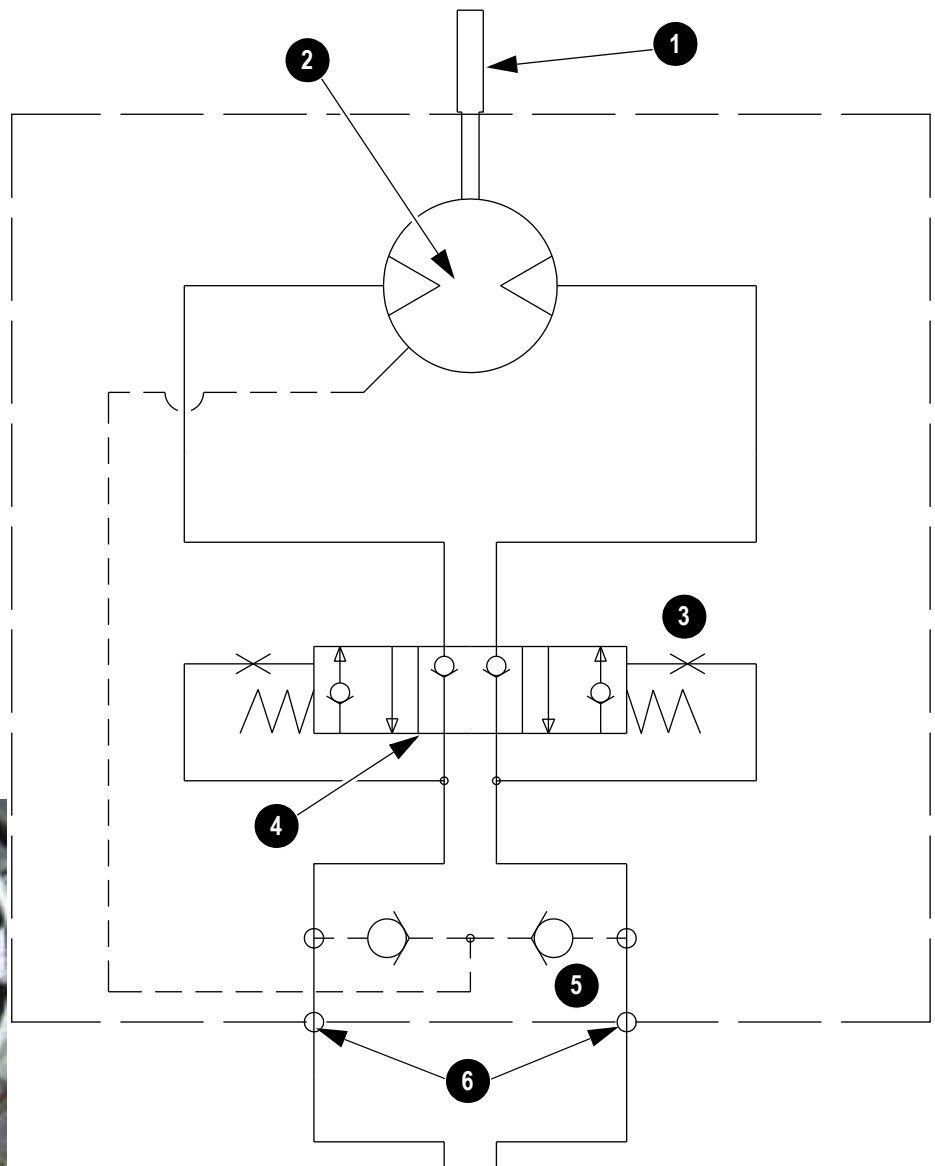
- Stabilizer blade/telescopic undercarriage section
- Auxiliary hydraulics section

Hydraulic supply by pump 2

- Right-hand drive section
- Swivel boom section
- Bucket section
- Boom section



5.4 Traveling drive



Pos.	Designation
1	Input shaft
2	Engine
3	Damping
4	Brake valve
5	Non-return valve
6	Connections

The hydraulic motor is slow-running Geroller motor without gears and with internal leak oil drain.

Function

Starting machine travel:

If high pressure is applied to a traveling drive, the brake valve is first moved in the corresponding direction and the oil moves the eccentric gear of the Gerotor in the respective direction of rotation.

Stopping:

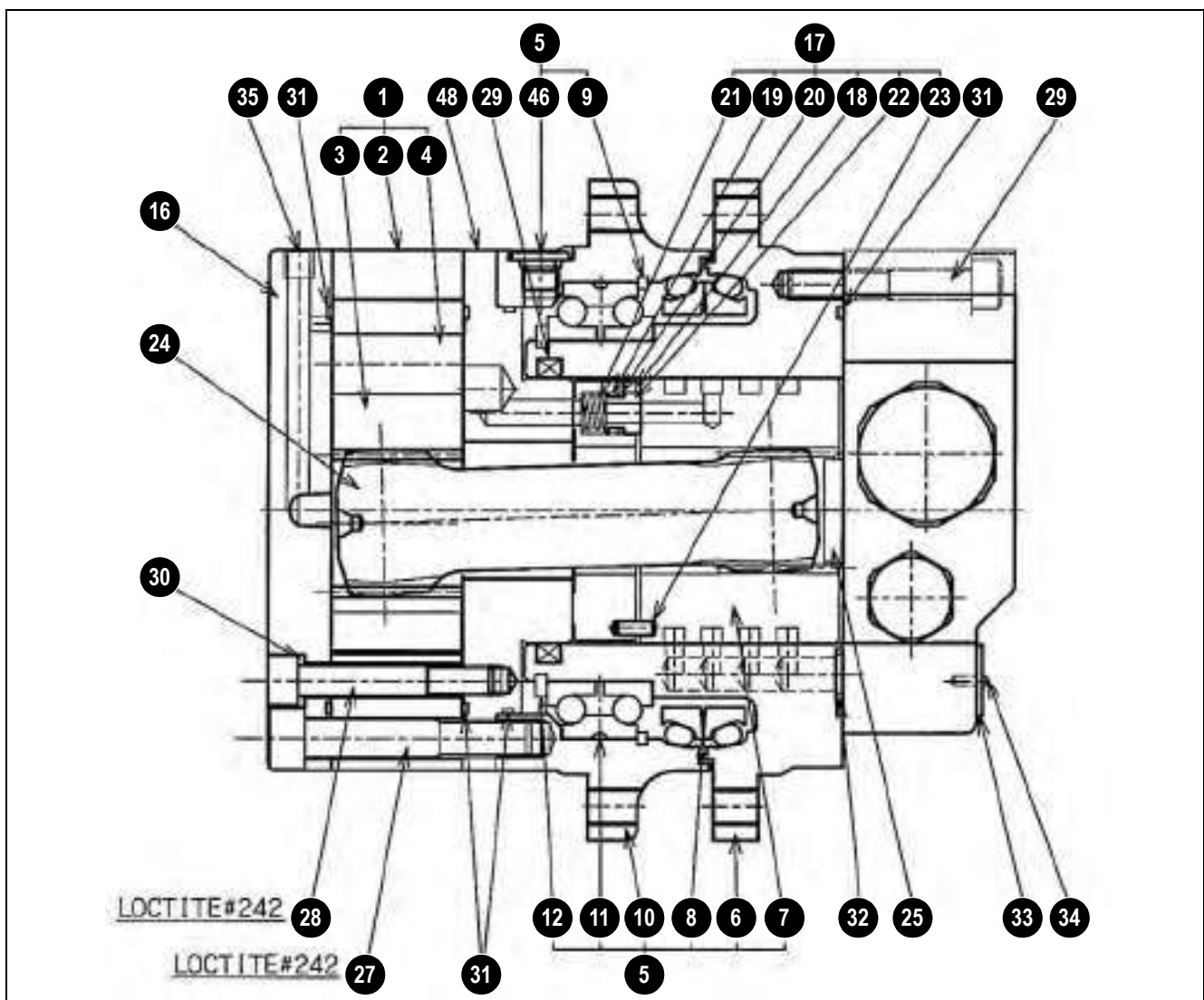
As soon as no more pressure is applied to the traveling drive, the integrated brake valve returns to its initial position by spring action.

This interrupts the oil flow from the motor.

A braking effect sets in and the excavator stops.

The brake valve is dampened for smooth braking.

This also works on slopes and keeps the excavator in its position.

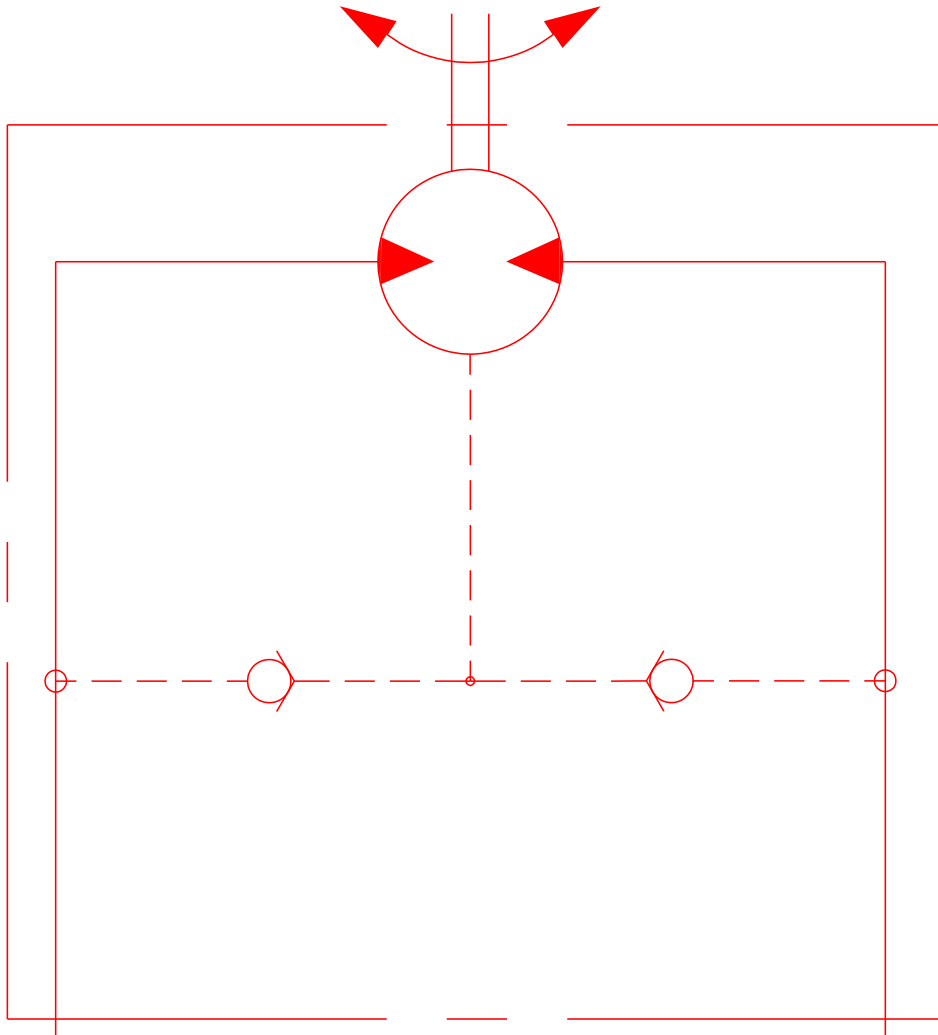




Pos.	Designation	Pos.	Designation
1	Geroller unit	19	O-ring
2	Geroller ring	20	Prop ring
3	Geroller star wheel	21	Spring
4	Geroller roller	22	Control sleeve
5	Housing assembly	23	Pin
6	Housing element (undercarriage side)	24	Shaft
7	Valve bushing	25	Spacer washer
8	Seal	26	X ring
9	Snap ring	27	Screw
10	Housing element (torus wheel side)	28	Screw
11	Ball bearing	29	Screw
12	Snap ring	30	Sealing washer
13	Plug	31	O-ring
15	Control plate	32	O-ring
16	Geroller cover	33	Type label
17	Valve	34	Rivet
18	Valve	35	Plug

5.5 Swivel unit

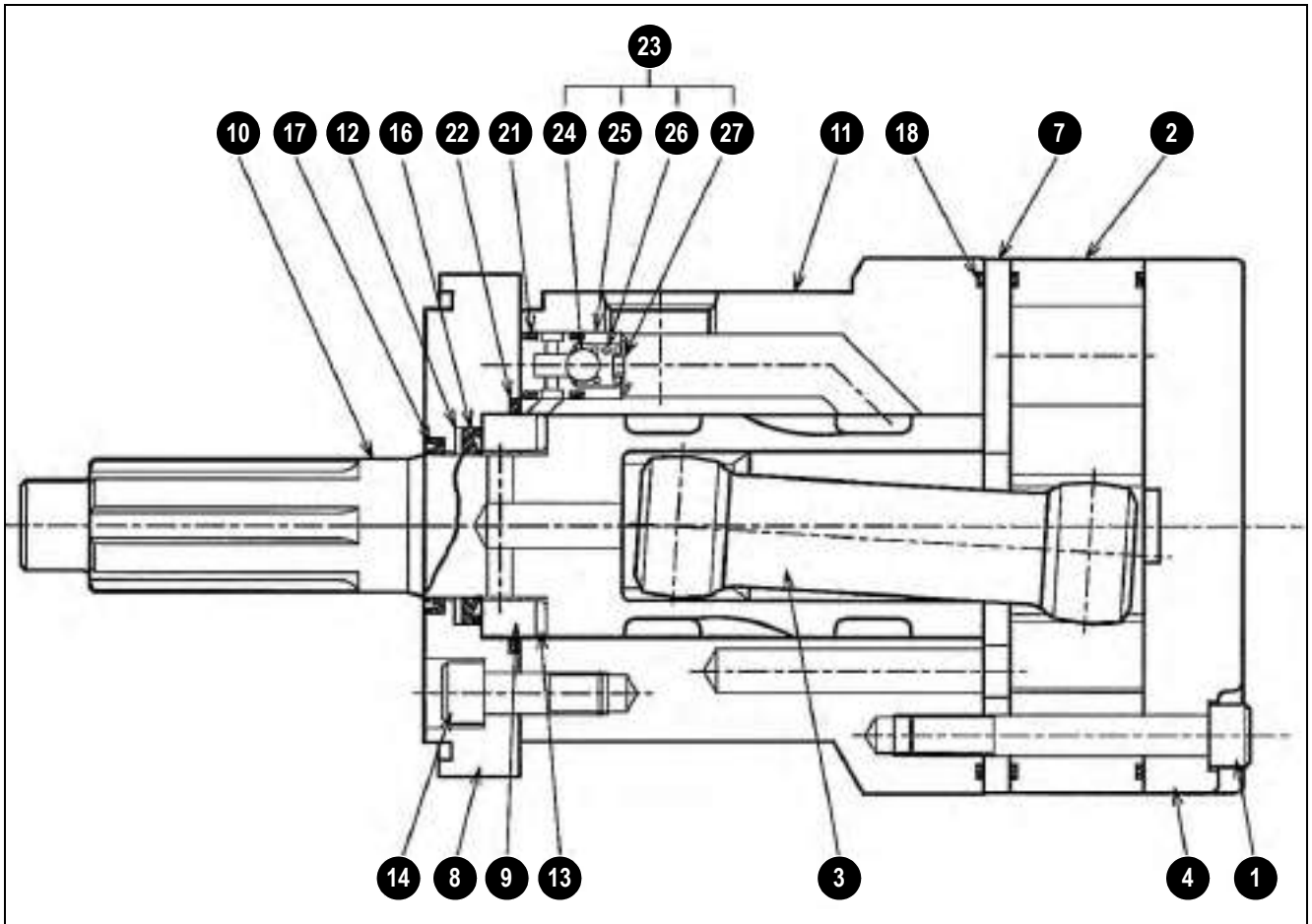
The swivel unit is a slow-running Gerotor motor without gears.



If the gear motor is not actuated, the feed lines are closed by the spool, i.e. the upper carriage stops and does not continue turning by itself.

i **Notice!**

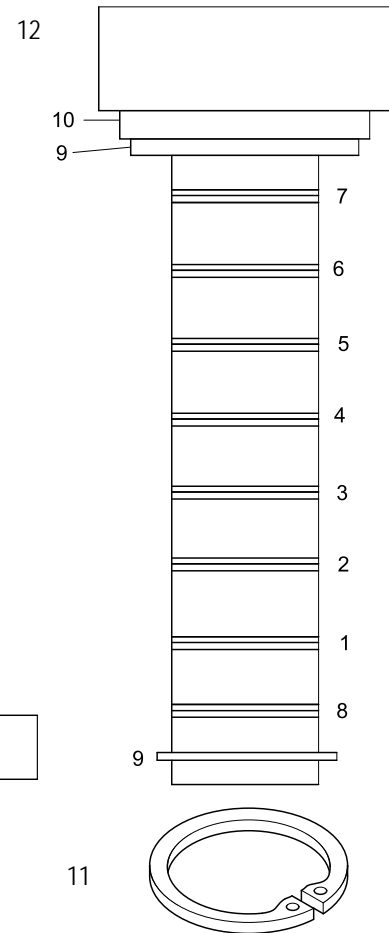
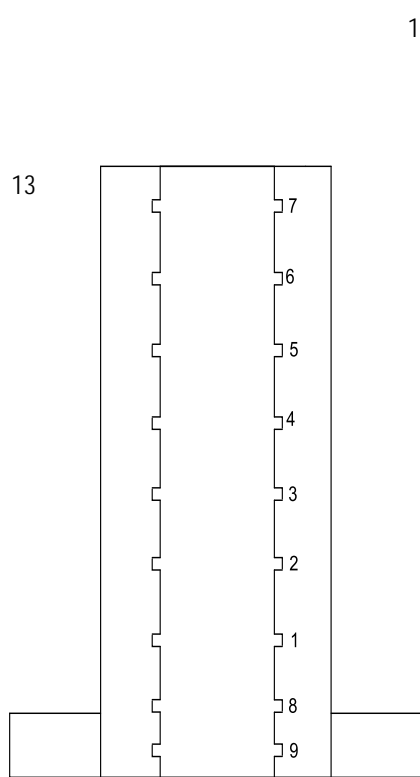
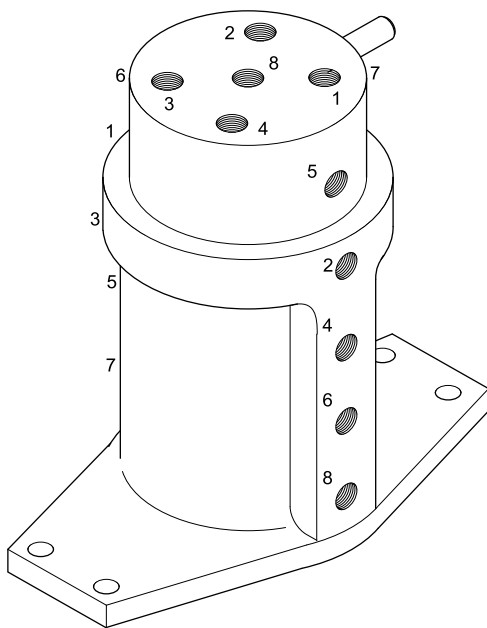
Ensure that the parts are in their exact positions when assembling the Gerotor.

Swivel unit


Pos.	Designation	Pos.	Designation
1	Screw	16	Oil sealing ring
2	Geroller	17	Dust seal
3	Shaft	18	O-ring
4	Geroller cover	19	Type label
7	Spacer washer	20	Rivet
8	Screwed flange	21	O-ring
9	Axial bearing ball race	22	O-ring
10	Output shaft	23	Ball check
11	Housing	24	Ball
12	Prop ring	25	Housing
13	Axial needle bearing	26	Spring
14	Bolt 5/16 – 2 UNF	27	Washer

5.6 Swivel joint

8-channel swivel joint



Pos.	Connection
1a and 6a	Stabilizer blade cylinder
2a and 4a	Traveling drive (right)
3a and 5a	Traveling drive (left)
7a and 8a	Telescopic undercarriage cylinder

Pos.	Designation
1-8	Sealing rings
9	PU prop ring
10	V sealing ring
11	Circlip
12	Inside part
13	Outside part

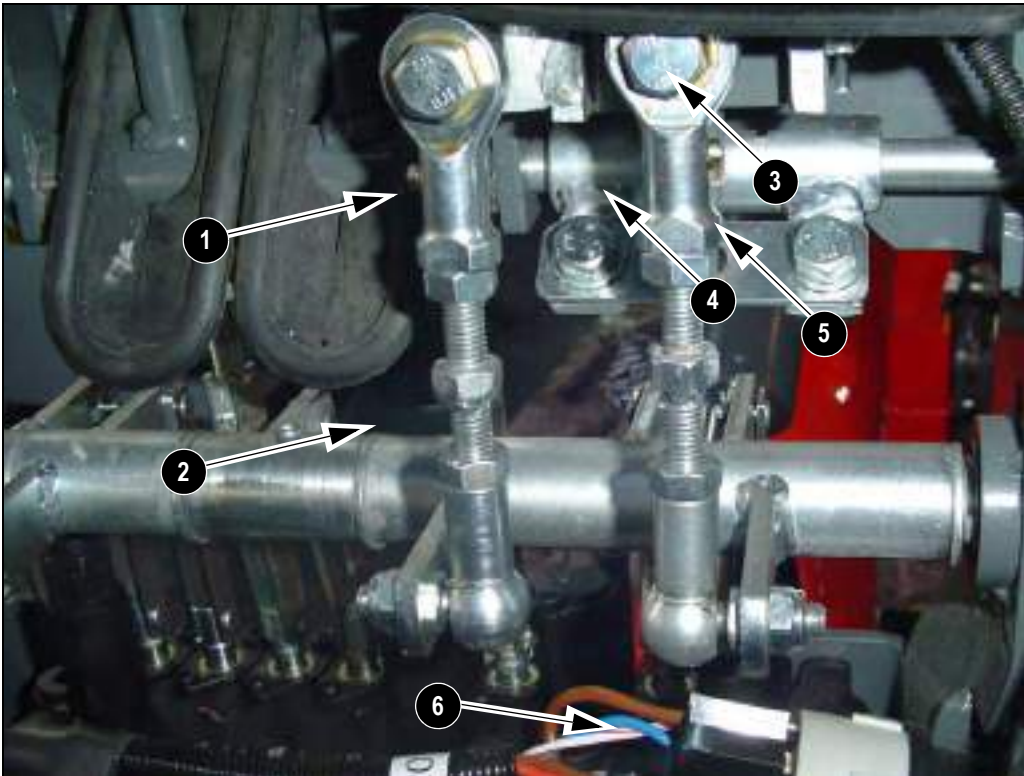
Sealing

- ☞ Loosen the circlip on the lower side.
- ☞ Pull the swivel joint apart.
- ☞ Replace the sealing rings.
- ☞ Push the inside and outside parts together again.
- ☞ Insert the circlip again

5.7 Mechanical control

All hydraulic functions of the 803 are controlled mechanically. Accessing the elements of the mechanical pilot control requires removing the plastic trims – see [chapter 5.9 Plastic trims](#) on page 5-22.

Control levers (up to serial no. AI00814)

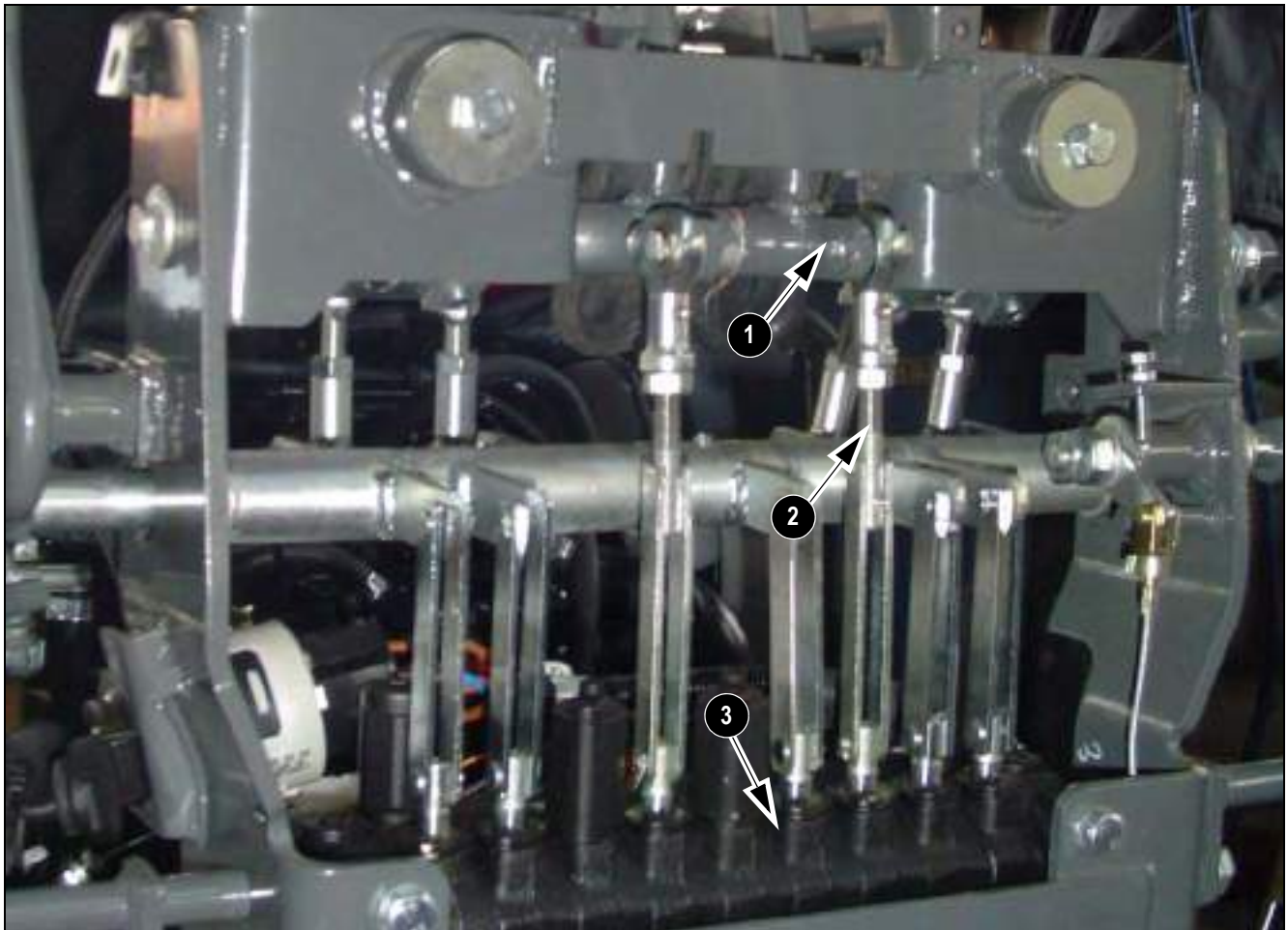


Pos.	Connection	Pos.	Connection
1	Adjustment linkage	4	Boom rocker
2	Bucket segment rocker	5	Lock
3	Control lever	6	Preheating start switch

Setting the control levers

- ☞ Replacing damaged elements requires setting the control levers again.
- ☞ Enable and disable the lock and watch the control levers as you do so.
- ☞ Once the lock is disabled, the control levers automatically return to their neutral positions if they are not set correctly.
- ☞ The position of the control levers can be modified by means of the adjustment linkage, so that the control levers remain in their positions when disabling the lock.
- ☞ Check for correct setting.

Drive levers (up to serial no. AI00814)



Pos.	Connection
1	Shackle on drive lever
2	Adjustment linkage
3	Main valve block

Setting the drive levers

☞ Place the machine horizontally

☞ Adjust the length of the adjustment linkage so that the shackle on the drive lever remains horizontal in neutral position.

➔ A correct setting ensures maximum operating comfort and best possible straight-ahead driving features.

i Notice!

The pedals for the auxiliary hydraulics and for swiveling cannot be adjusted.

Control levers (from serial number AI00815)

All hydraulic functions of the 803 are controlled mechanically.
 Accessing the elements of the mechanical pilot control requires removing the plastic trims – see [chapter 5.9 Plastic trims](#) on page 5-22.

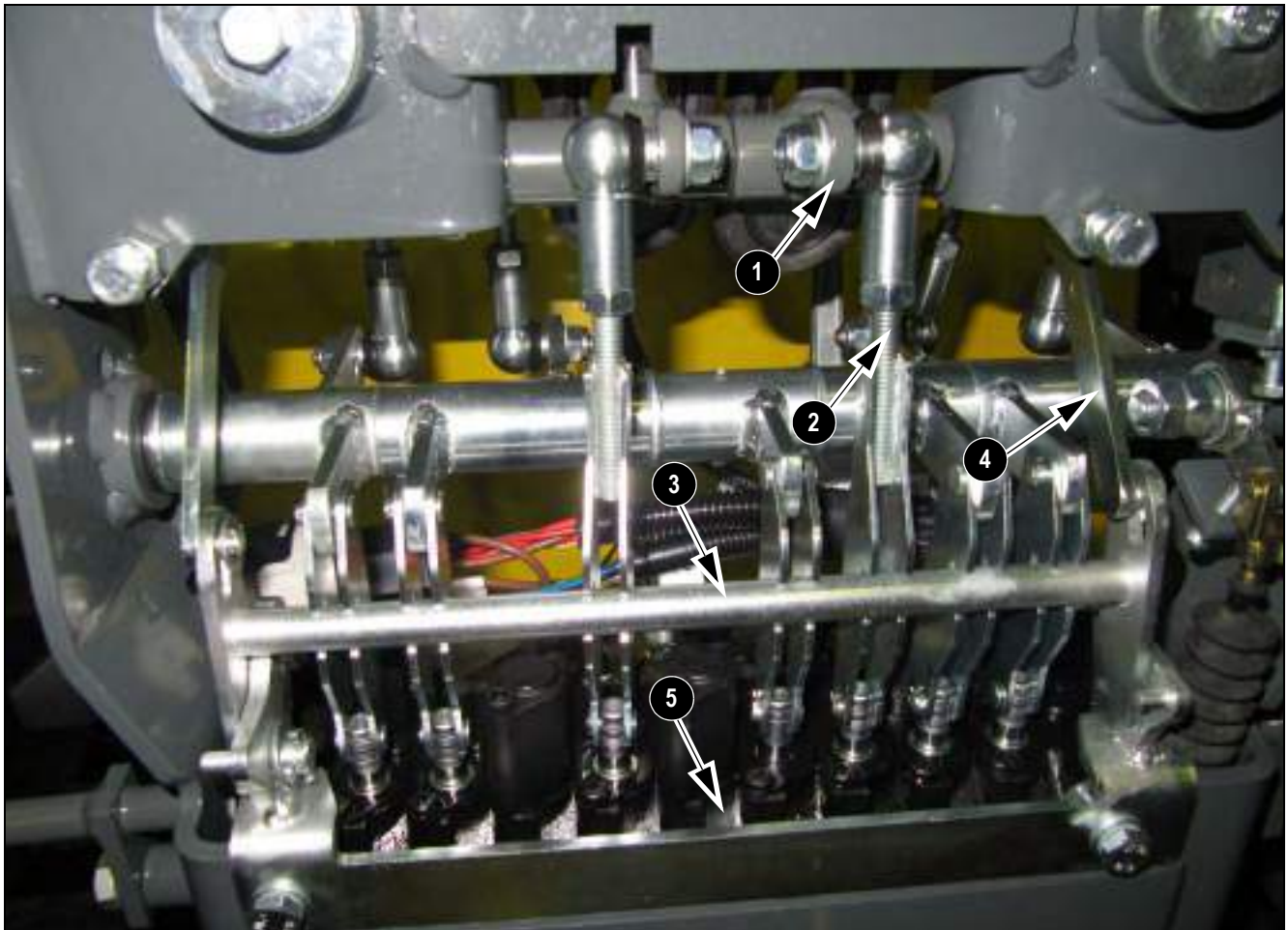


Pos.	Connection	Pos.	Connection
1	Control lever	5	Lock lever rocker
2	Bucket segment adjustment linkage	6	Boom segment adjustment linkage
3	Bucket segment rocker	7	Lock lever gas strut
4	Preheating start switch	8	Boom segment rocker

Setting the control levers

- ☞ Replacing damaged elements requires setting the control levers again.
- ☞ Modify the position of the adjustment linkage so that the lock lever can be locked and unlocked easily without applying any force.
- ☞ Adjust the control levers so that they remain in their positions when the lock is released.
- ☞ The lock cannot be applied if the adjustment is not correct.
- ☞ Check for correct setting.

Drive levers (from serial number AI00815)



Pos.	Connection
1	Shackle on drive lever
2	Adjustment linkage
3	Lock
4	Lock linkage
5	Main valve block

Setting the drive levers

☞ Place the machine horizontally

☞ Adjust the length of the adjustment linkage so that the shackle on the drive lever remains horizontal without any appreciable resistance in neutral position when the lock is actuated.

➔ A correct setting ensures maximum operating comfort and best possible straight-ahead driving features.

i Notice!

The pedals for the auxiliary hydraulics and for swiveling cannot be adjusted.

Lock lever (from serial number AI00815)



Notice!

When the lock lever is locked, all control stand functions are locked and the excavator is protected against unintentional operation of the levers.

5.8 Troubleshooting in the hydraulic system

Problem	Possible causes
Hydraulic system without function	Hydraulic oil level too low
	Malfunctioning control lever lock
Hydraulic hammer does not work correctly	Quick couplers not connected correctly
	Hydraulic oil quantity too high/too low
	Hydraulic oil pressure too high/too low

5.9 Plastic trims

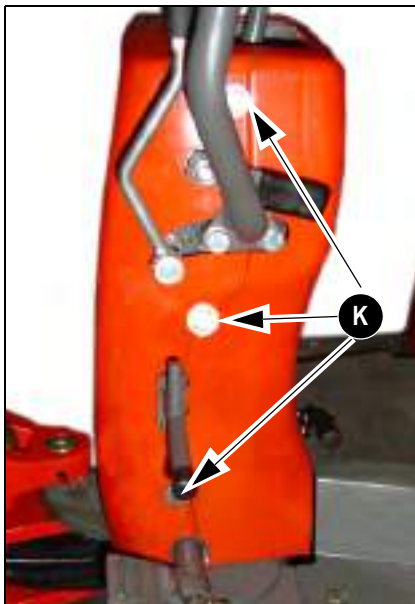


Fig. 1: Plastic trim up to serial no. AI00966

Removing the plastic trim on machines without ROPS bar (up to serial number AI00966)

Figure 1

- ☞ Stop and secure the excavator
- ☞ Loosen clamp screws **K** on either side of the excavator.
- ☞ Fold away the plastic trim to the front and rear.

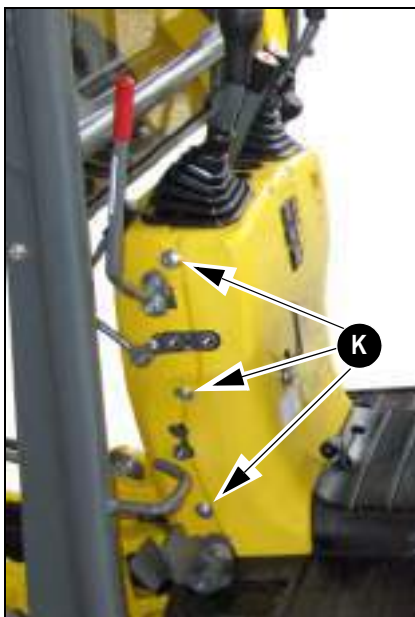


Fig. 2: Plastic trim from serial no. AI00967

Removing the plastic trim on machines with ROPS bar (from serial number AI00967)

Figure 2

- ☞ Stop and secure the excavator
- ☞ Loosen clamp screws **K** on either side of the excavator.
- ☞ Fold away the plastic trim to the front and rear.

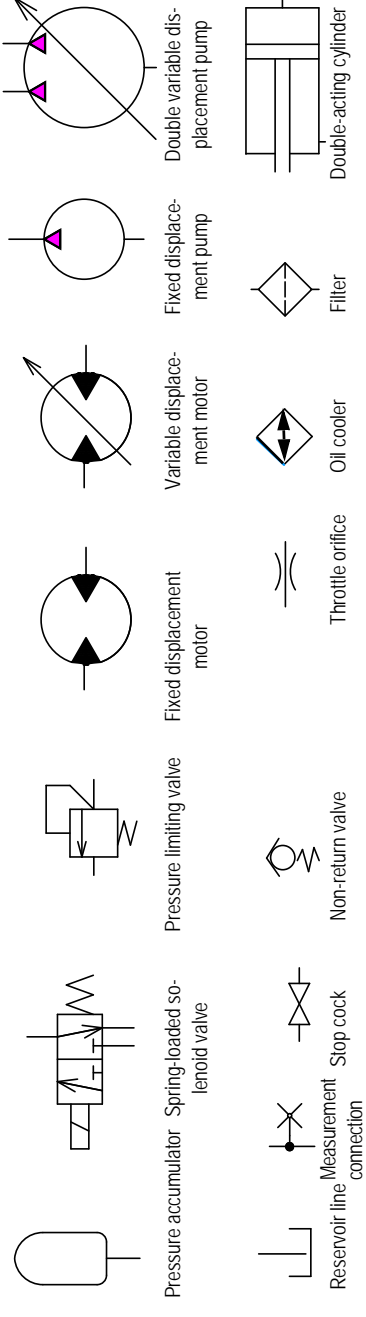


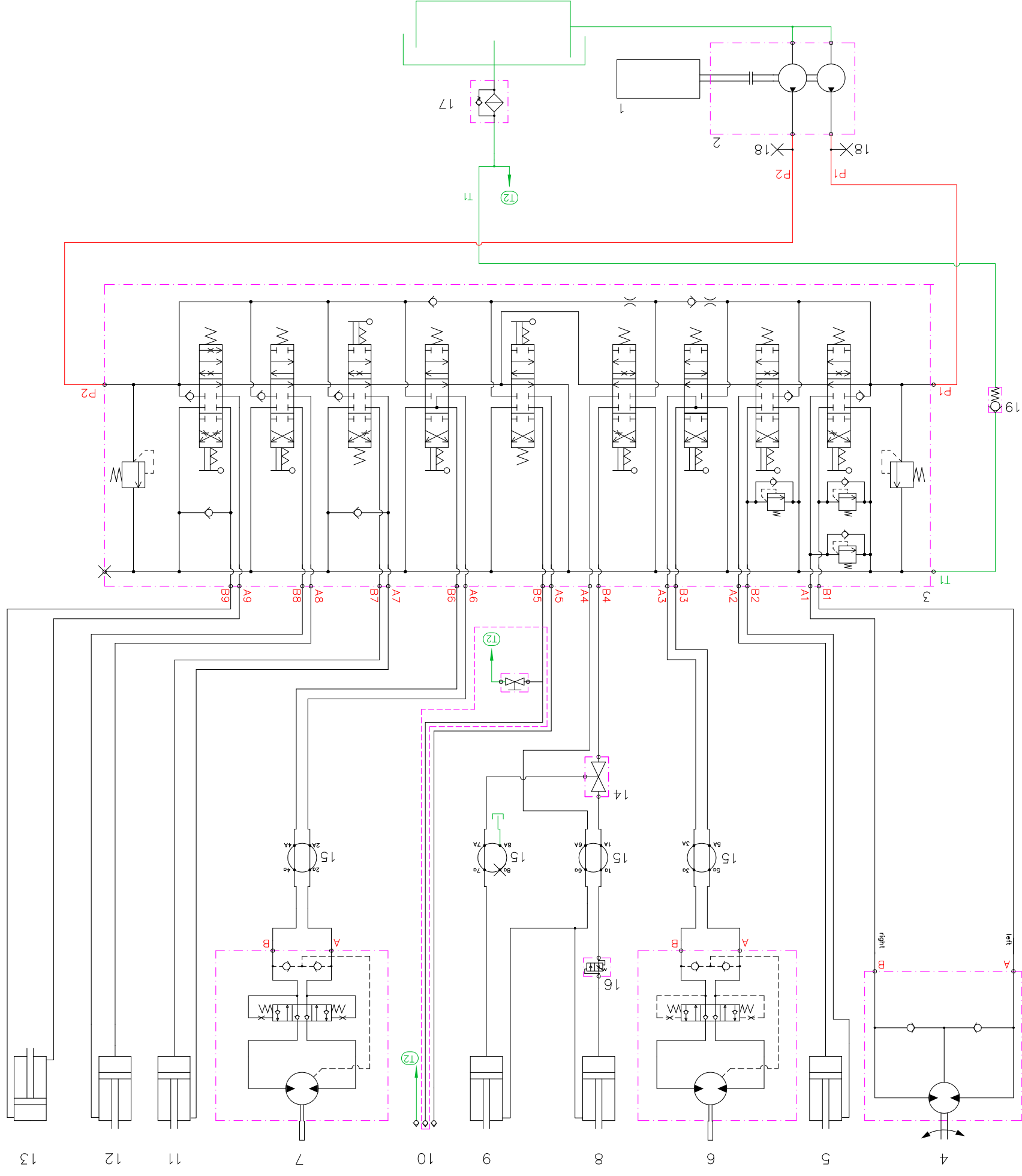
Hydraulics diagram

Hydraulic system

5.10 Hydraulics diagram (legend)

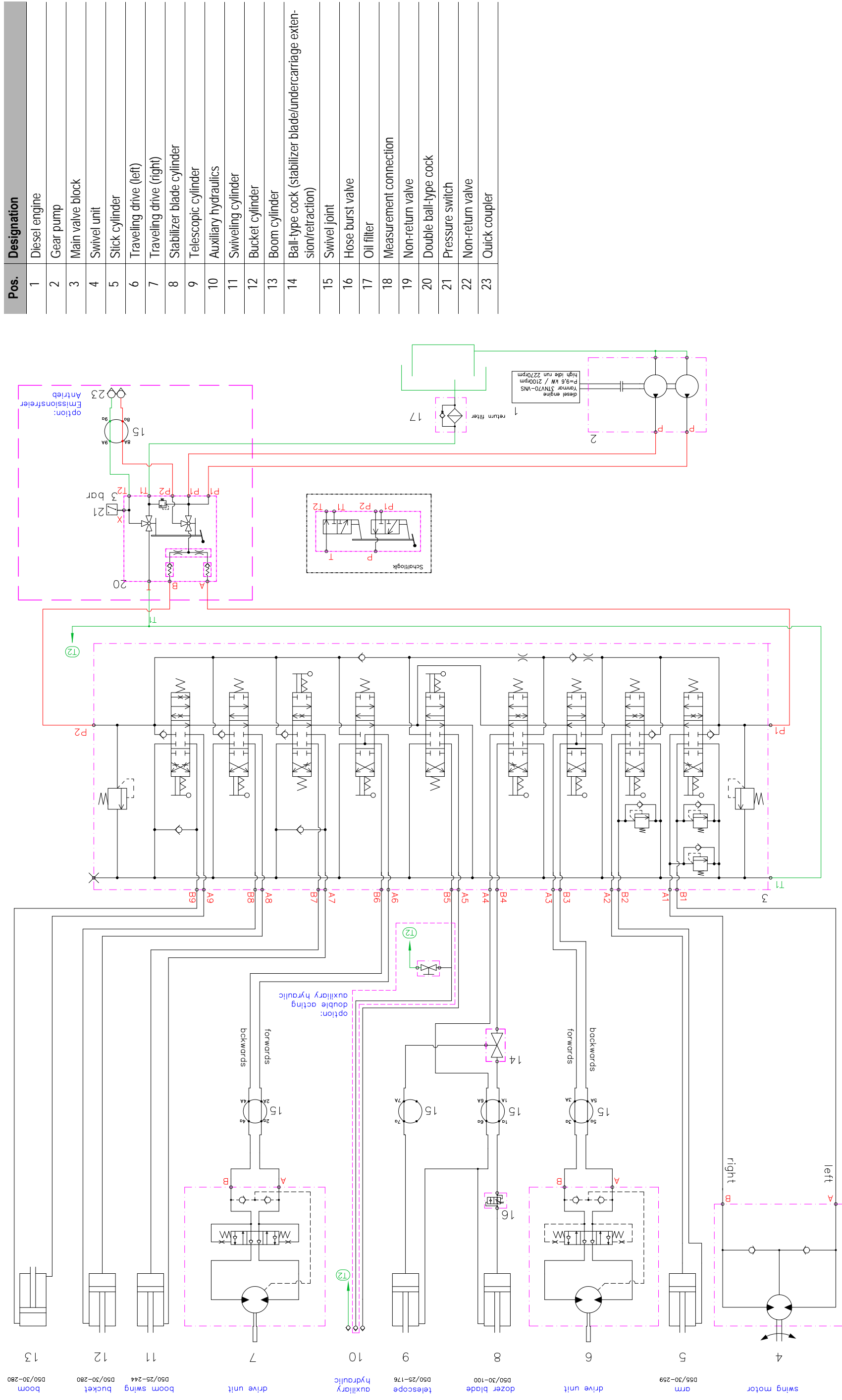
Pos.	Designation
1	Diesel engine
2	Gear pump
3	Main valve block
4	Swivel unit
5	Stick cylinder
6	Traveling drive (left)
7	Traveling drive (right)
8	Stabilizer blade cylinder
9	Telescopic cylinder
10	Auxiliary hydraulics
11	Swiveling cylinder
12	Bucket cylinder
13	Boom cylinder
14	Boom swivel/auxiliary hydraulics ball-type cock
15	Swivel joint
16	Hose burst valve
17	Oil filter
18	Measurement connection
19	Non-return valve



5.11 Hydraulics diagram

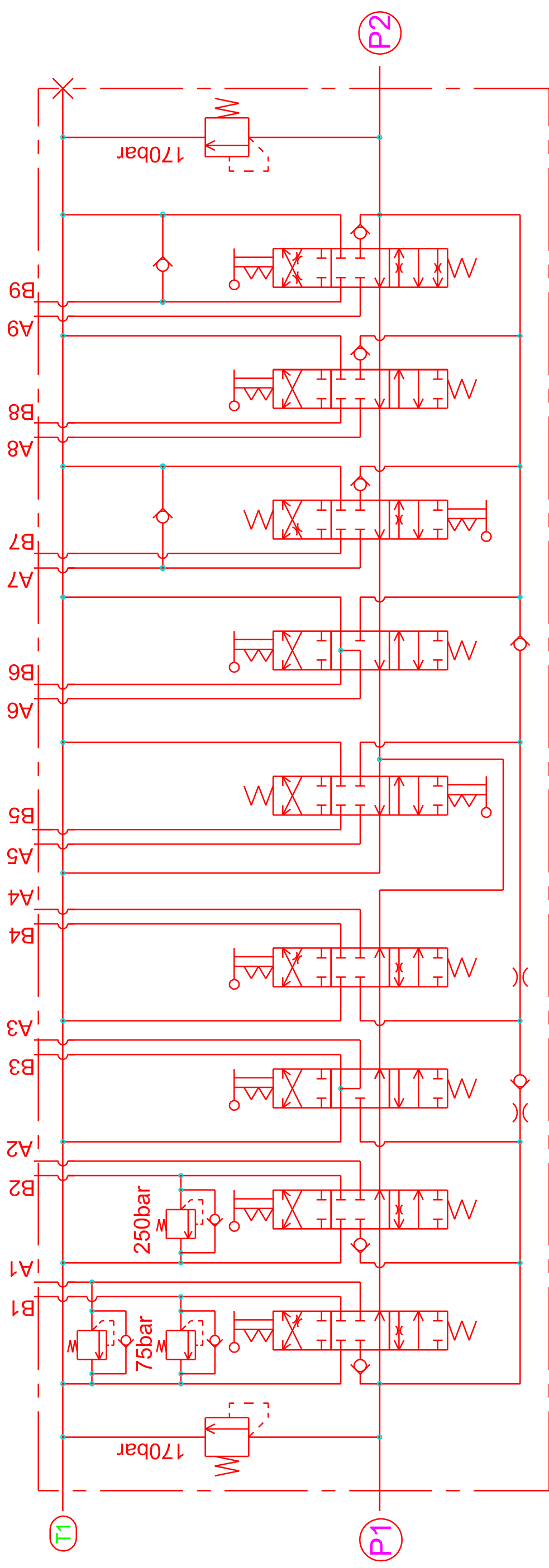


5.12 Hydraulics diagram (Dual Power option)



boom D50/30-280
boom swing D50/25-244
bucket D50/30-280
drive unit
auxiliary hydraulic
telescope D50/30-100
dozer blade D50/25-176
drive unit
arm D55/30-259
swing motor
left
right

5.13 Main valve block diagram



Main control lines

Connection	Legend
A1, B1	Swivel unit
A2, B2	Stick
A3, B3	Traveling drive (left)
A4, B4	Stabilizer blade/telescopic undercarriage
A5	Auxiliary hydraulics
A6, B6	Traveling drive (right)
A7, B7	Swiveling cylinder
A8, B8	Bucket cylinder
A9, B9	Boom cylinder

Pump/reservoir lines

Connection	Legend
P1	Pump 1 connection
P2	Pump 2 connection
T1 and T2	Reservoir line via non-return valve and filter in reservoir



Electrical system

6 Electrical system

6.1 Ohm's Law (current, voltage, resistance); power

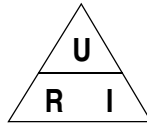
It describes the interrelation between current, voltage and resistance.

Current "I" – Ampere (A)

Voltage "U" – Volt (V)

Resistance "R" – Ohm (Ω)

Mnemonic:



Output

Power "P" – Watt (W)

$$P = U \times I = R \times I^2 = U^2/R$$

6.2 Measuring equipment, measuring methods

Multifunction measuring device

- Measurements of values (U, R, I, f)
- Continuity test
- Diode test

Calculate the measuring range using known data (P, U, R, I) and set before measuring!

Observe AC/DC basic setting.

➔ AC = alternating current/voltage;

➔ DC = direct current/voltage

Test device with acoustic and optical signal output

- Continuity test in de-energized machine electrical system and of wiring harnesses.

Measuring methods – multifunction measuring device

- Measuring current (starter switched on):
 - Black cable in COM socket (ground),
 - red cable in A socket or mA socket; connect in series to consumer.
- Measuring voltage (starter switched on):
 - Black cable in COM socket (ground),
 - red cable in V socket;
 - connect in parallel to consumer.
- Measuring resistance (starter switched off):
 - Black cable in COM socket (ground),
 - red cable in Ω socket;
 - connect in parallel to consumer (see measuring voltage).

Test lamp

The test lamp is used for testing lines and functions with the starter switched on.

- Line test (testing voltage):

Connect test lamp between test point (live cable) and machine ground or between test point (grounding line) and a live cable.

- Functional check (testing current):

Connect test lamp between a connection on the consumer to be tested and the connection line.

6.3 Cable color coding

Color	Code
Black	blk
Brown	brn
Red	red
Orange	org
Yellow	yel
Green	grn
Blue	blu
Violet	vio
Gray	gry
White	wht
Pink	pnk

6.4 Relays

Use, mode of function

Relays are used for switching electric loads (high currents) whereby the control power of the relay coil is relatively low. Relays can therefore be controlled by microelectronics or microswitches (touchpad keyboards, sensors, for example). The switch contacts can be make-contact, break-contact or changeover switches. These undertake the actual switching function.

Zero-center relay

- 86 = Start of coil (control line)
- 85 = End of coil (ground)
- 30 = Input (load line)
- 87 = Make-contact switch output (load line)
- 87 a= Break-contact switch output (load line)

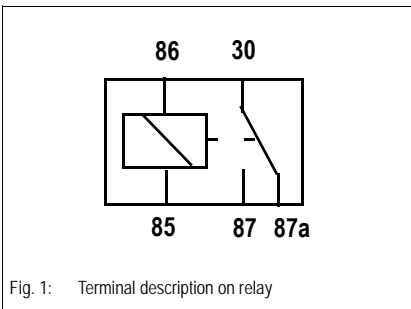


Fig. 1: Terminal description on relay

6.5 Electrical system

Electrical system	
Dynamo	12 V 20 A
Starter	12 V 1.1 kW (1.5 hp)
Battery	12 V 30 Ah
Socket	For 12 V power outlet, for example; 15 A max.

Fuses behind the right-hand trim

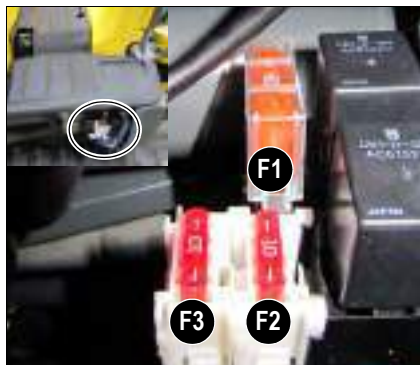


Fig. 2: Fuses (up to serial number WNCE0801CPAL0050)

Fuse no.	Rated current (A)	Protected circuit
F1	40 A	Main fuse: air-pressure sensor/output adaptation (Yanmar 3TNV74F-SNNS)
F2	10 A	Fuse: relay, indicator, cutoff solenoid
F3	10 A	Fuse: horn, working light 12 V power outlet (up to serial number WNCE0801CPAL0050, travel signal (option))
F4	10 A	12 V power outlet (from serial number WNCE0801TPAL0051)

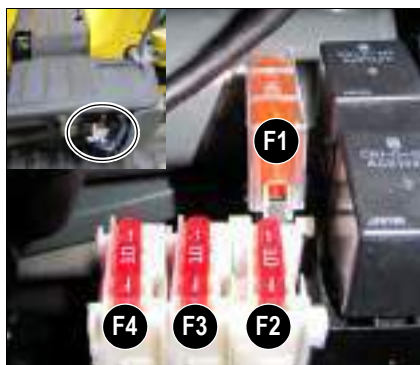


Fig. 3: Fuses (from serial number WNCE0801TPAL0051)

Relays behind the right-hand trim

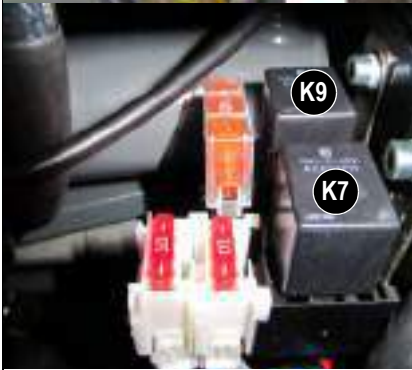


Fig. 4: Relays

Relay no.	Protected circuit
K 7	Starting relay
K 8	Cutoff solenoid time lag relay 1s
K 9	Cutoff solenoid switching relay

Fuses and relays with Dual Power option

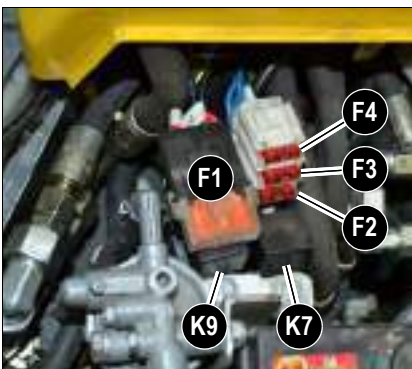


Fig. 5: Fuses and relays with Dual Power option

If the machine is equipped with the Dual Power option, the fuses and relays are located under the base plate.

Fuse no.	Rated current (A)	Protected circuit
F1	40 A	Main fuse: air-pressure sensor/output adaptation (Yanmar 3TNV74F-SNNS)
F2	10 A	Fuse: relay, indicator, cutoff solenoid
F3	10 A	Fuse: horn, working light 12 V power outlet (up to serial number WNCE0801CPAL0050, travel signal (option), battery control (Dual Power option))
F4	10 A	12 V power outlet (from serial number WNCE0801TPAL0051)



Fig. 6: Relay K8

Relay no.	Protected circuit
K 7	Starting relay
K 8	Cutoff solenoid time lag relay 1s
K 9	Cutoff solenoid switching relay
K 116	Battery control

6.6 Control lever push button

Right handle

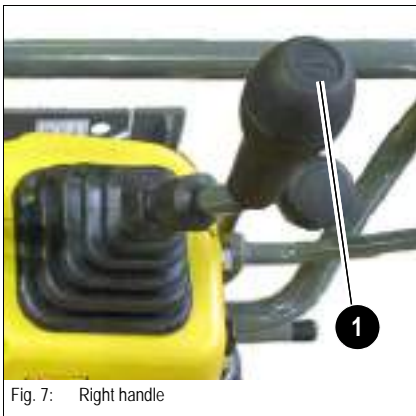


Fig. 7: Right handle

Pos.	Designation
1	Horn

6.7 Working light



Pos.	Designation
2	Working light rotary switch

6.8 Dynamo



Fig. 8: Dynamo

The dynamo supplies the alternating current (rectified by the rectifier) to the electric consumers and for charging the battery.

Pos.	Designation
1	Alternating voltage to rectifier

6.9 Rectifier



Fig. 9: Rectifier

Rectifier **R** rectifies the dynamo voltage.

Wiring:

Color	Assignment
Blue	Alternating voltage (dynamo)
Black	Ground
Red	Battery +
Orange	12V starter
Brown	Start interlock
Yellow	Charge indicator light

6.10 Starter

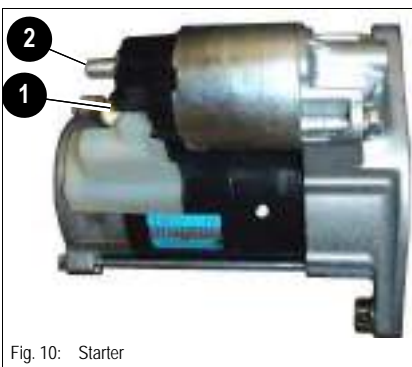


Fig. 10: Starter

Pos.	Designation
1	Connection S starting relay
2	Connection B battery

Wiring harnesses

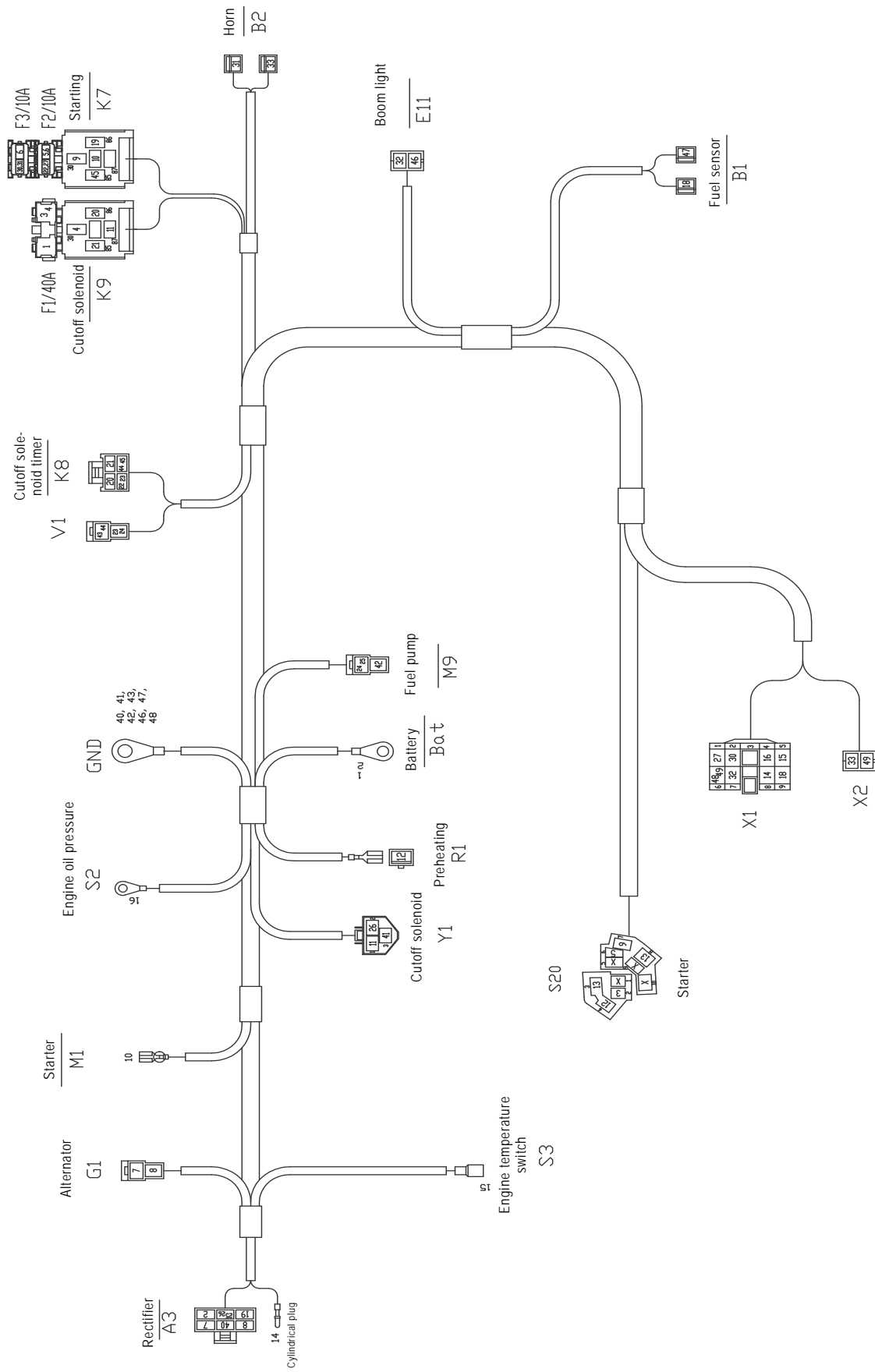


6.11 Engine wiring harness legend (Tier IV final up to 2012)

No	To	To	Color	mm ²
1	Battery	F1/1 main fuse	red	6
2	Battery	A3 regulator	red	2.5
3	F1/2 main fuse	S1/2 preheating start switch	red	4
4	F1/2	K9/30	red	2.5
5	S1/6 preheating start switch	F2/1 relay fuse	blu	2.5
6	F3/1 horn fuse	F2/1 relay fuse	blu	2.5
7	G1 alternator	A3 regulator	blu/red	2.5
8	G1 alternator	A3 regulator	blu/red	2.5
9	S1/7 preheating start switch	K7/10 start high-current relay	wht/red	2.5
10	M1 starter	K7/87a start high-current relay	wht/red	2.5
11	Y1/1 cutoff solenoid	K9/87 cutoff solenoid switching relay	wht	2.5
12	R1 glow plug	S1/4 preheating start switch	brn	4
13	S1/8 preheating start switch	S1/3 preheating start switch	brn	4
14	A3 regulator	X1/8 display connector	pnk	1
15	S3 engine temperature switch	X1/5 indicator connector	blk/grn	1
16	S2 engine oil pressure switch	X1/4 indicator connector	wht/grm	1
18	B1 fuel level indicator	X1/9 indicator connector	vio/blk	1
19	A3 regulator	K7/86 start high-current relay	brn/blk	1
20	K8 time lag relay	K9/86 cutoff solenoid switching relay	blu/blk	1
21	K8 time lag relay	K9/85 cutoff solenoid switching relay	pnk/blk	1
22	F2/2 relay fuse	K8 time lag relay	blu	1
23	V1 recovery diode	K8 time lag relay	blu	1
24	V1 recovery diode	M9 fuel feed pump	blu	1
25	A3 regulator	M9 fuel pump	blu	1
26	A3 regulator	Y1/2 cutoff solenoid	blu	1
27	F2/2 relay fuse	X1/1 indicator connector	blu	1
30	F3/2 horn fuse	X1/2 indicator connector	grn	1
31	F3/2 horn fuse	B2 horn	grn	1
32	E11/1 working light	X1/7 display connector	grn/yel	1
33	B2 horn	X2/1 control lever connector	org/blk	1

No	To	To	Color	mm ²
40	GND	A3 regulator	blk	1
41	GND	Y1/3 cutoff solenoid	blk	1
42	GND	M9 fuel feed pump	blk	1
43	GND	V1 recovery diode	blk	1
44	K8 time lag relay	V1 recovery diode	blk	1
45	K8 time lag relay	K7/85 start high-current relay	blk	1
46	GND	E11/2 working light	blk	1
47	GND	B1 fuel level indicator	blk	1
48	GND	X1/6 indicator connector	blk	1
49	X2/2 control lever connector	X1/6 indicator connector	blk	1

6.12 Engine wiring harness (Tier IV final up to 2012)



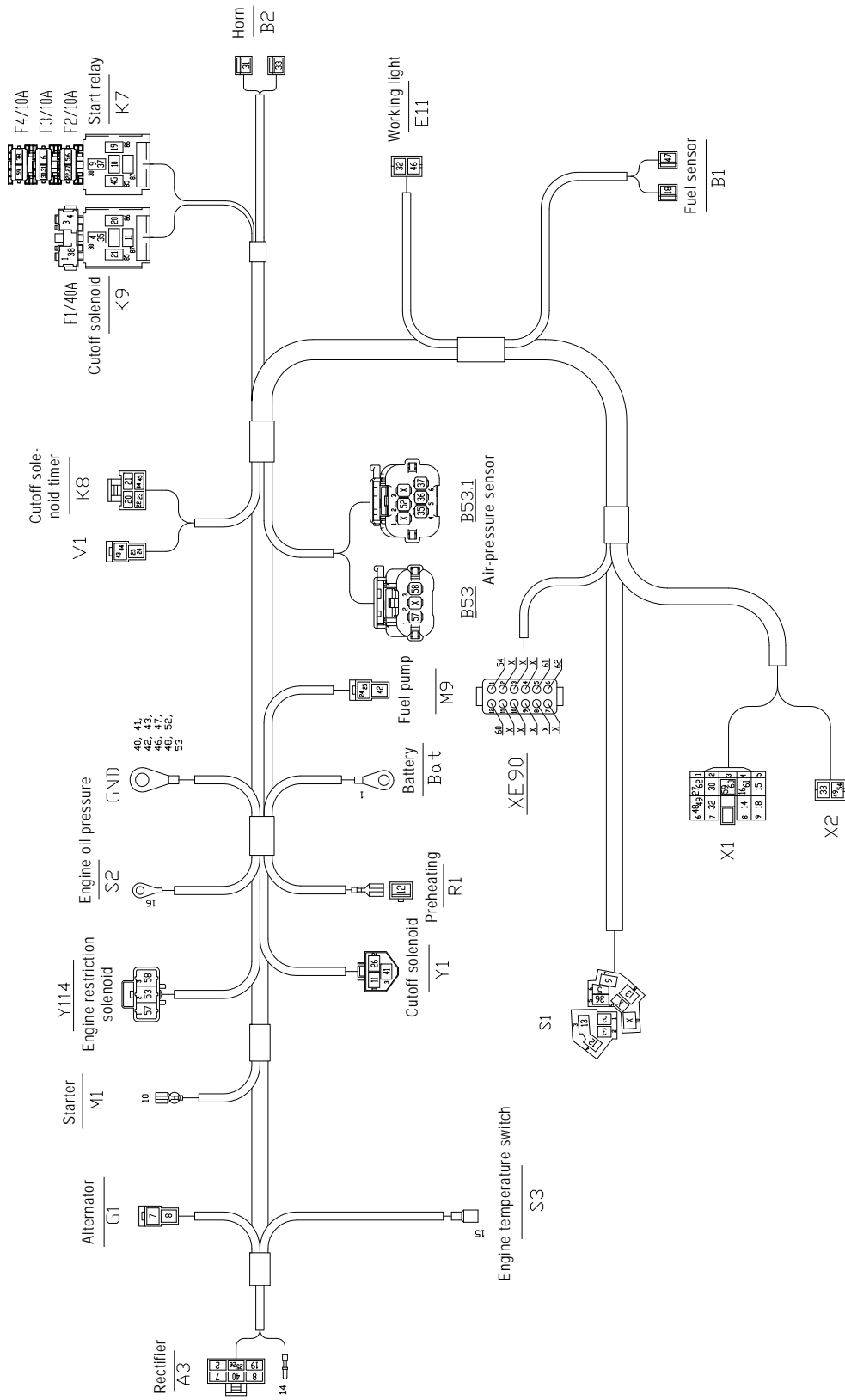


6.13 Engine wiring harness legend (Tier IV final from 2012)

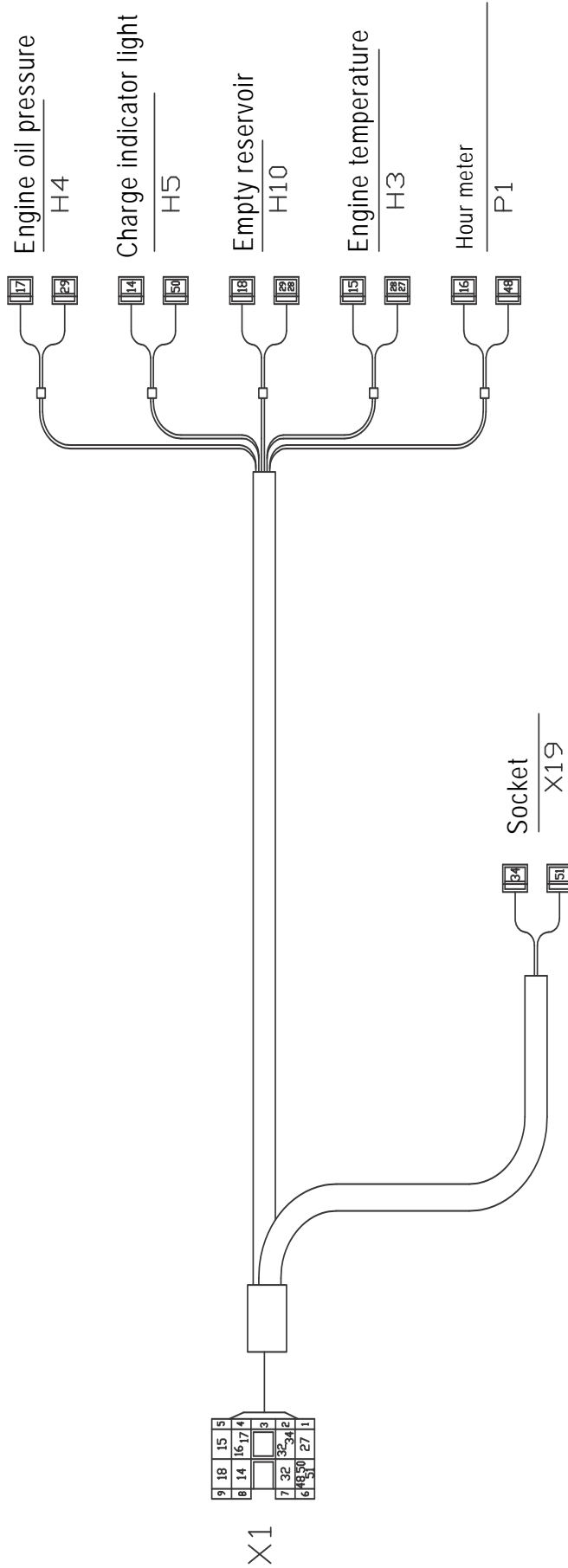
No.	To	To	Color	mm ²	Function
1	Battery	F1/1	red	6	12 V 30
2	S1/1	A3	red	2.5	12 V 30
3	F1/2	S1/2	red	4	12 V 30 starter
4	F1/2	K9/30	red	2.5	12 V 30 relay
5	S1/6	F2/1	blu	2.5	12 V/15 fuses
6	F3/1	F2/1	blu	2.5	12 V/15 fuses
7	G1	A3	blu/red	2.5	Alternator
8	G1	A3	blu/red	2.5	Alternator
9	S1/7	K1/30	wht/red	2.5	Starter
10	M1	K7/87a	wht/red	2.5	Starter
11	Y1/1	K9/87	wht	2.5	Pull contact cutoff solenoid
12	R1	S1/4	brn	4	Preheating
13	S1/8	S1/3	brn	4	Preheating
14	A3	X1/8	prnk	1	Charge indicator light
15	S3	X1/5	blk/grn	1	Engine temperature switch
16	S2	X1/4	wht/grn	1	Engine oil pressure
18	B1	X1/9	vio/blk	1	Fuel level indicator
19	A3	K7/86	brn/blk	1	Start interlock
20	K8	K9/86	blu/blk	1	Cutoff solenoid relay
21	K8	K9/85	prnk/blk	1	Cutoff solenoid relay
22	F2/2	K8	blu	1	12 V/15 relay
23	V1	K8	blu	1	12 V/15 relay
24	V1	M9	blu	1	Fuel pump
25	A3	M9	blu	1	12 V/15 regulator
26	A3	Y1/2	blu	1	Holding contact cutoff solenoid
27	F2/2	X1/1	blu	1	12 V/15 indicators
30	F3/2	X1/2	grn	1	12 V lights, horn
31	F3/2	B2	grn	1	12 V lights, horn
32	E11/1	X1/7	grn/yel	1	Working lights
33	B2	X2/1	org/blk	1	Horn
35	B53.1/4	K9/30	red	1.5	12 V/30 relay
36	B53.1/5	S1/5	blu	1.5	12 V/15
37	B53.1/6	K7/30	wht/red	1.5	Starter
38	F1/1	F4/1	red	1.5	12 V/30
40	GND	A3	blk	1	Ground
41	GND	Y1/3	blk	1	Ground

No.	To	To	Color	mm ²	Function
42	GND	M9	blk	1	Ground
43	GND	V1	blk	1	Ground
44	K8	V1	blk	1	Ground
45	K8	K7/85	blk	1	Ground
46	GND	E11/2	blk	1	Ground
47	GND	B1	blk	1	Ground
48	GND	X1/6	blk	1	Ground
49	X2/2	X1/6	blk	1	Ground
52	GND	B53.1/2	blk	1	Ground
53	GND	Y114/2	blk	1.5	Ground
54	XE90/1	X2/2	blk	1	Ground
57	B53/1	Y114/1	blu	1	Holding contact
58	B53/3	Y114/3	wht	1.5	Pull contact
59	F4/2	X1/3	red	1	12 V 30
60	XE90/12	X1/3	red	1	12 V 30
61	XE90/5	X1/4	wht/grn	1	Engine oil pressure
62	XE90/6	X1/1	blu	1	12 V/15 indicating instrument

6.14 Engine wiring harness (Tier IV final from 2012)

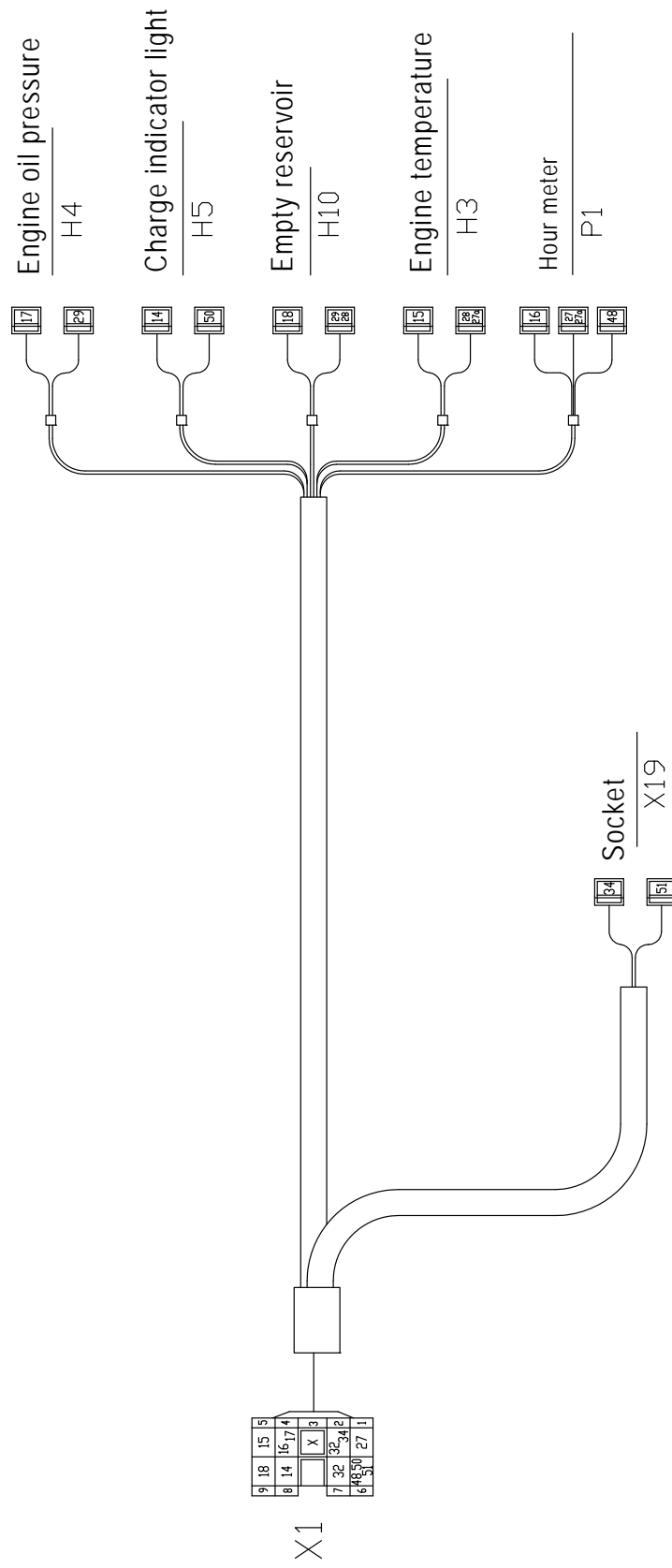


6.15 Wiring harness for indicators (up to serial number WNCE0801TPAL00923)

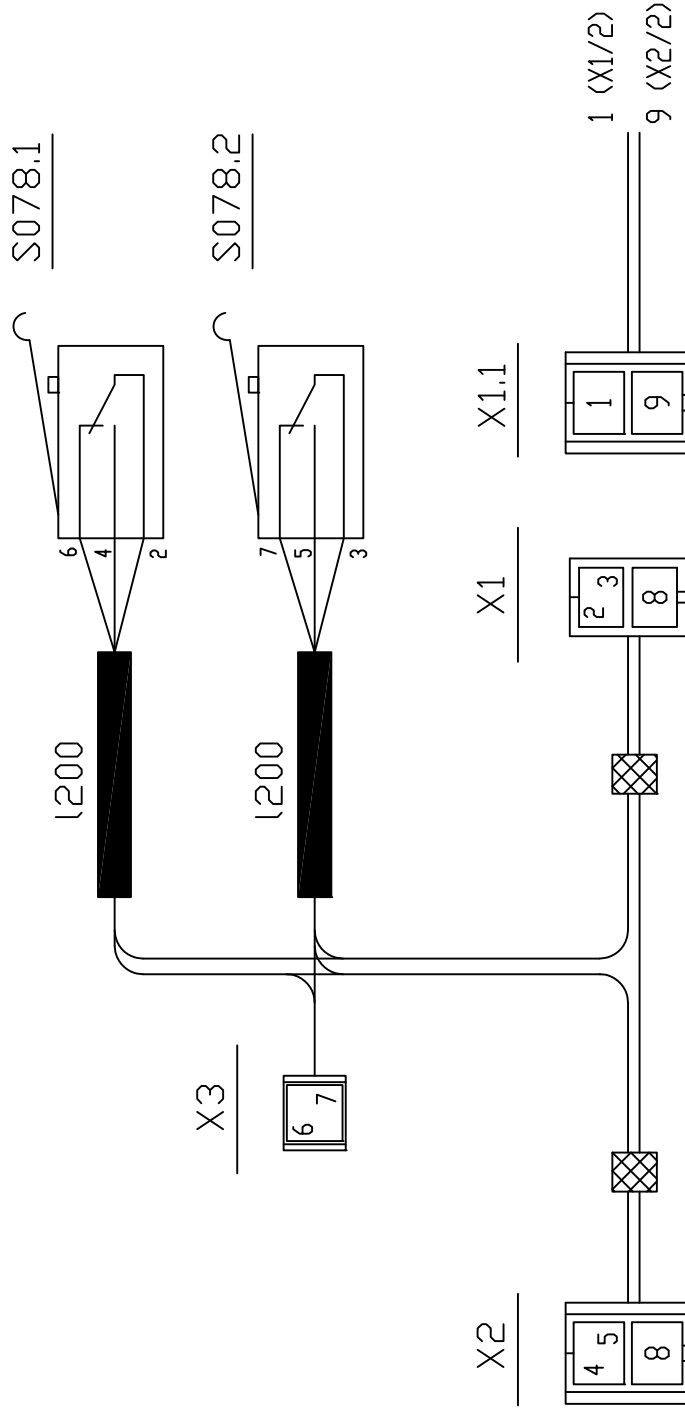


No.	To	To	Color	mm ²	Function
14	X1/8	H5	pnk	1	Charge indicator light
15	X1/5	H3	blk/grn	1	Engine temperature switch
16	X1/4	P1	whl/grn	1	Engine oil pressure
17	X1/4	H4	whl/grn	1	Engine oil pressure
18	X1/9	H10	viol/blk	1	Fuel level indicator
27	X1/1	H3	blu	1	12 V/15 indicators
28	H10	H3	blu	1	12 V/15 indicators
29	H10	H4	blu	1	12 V/15 indicators
32	X1/7	X1/2	grn/yel	1	Working light
34	X1/2	X1/9	grn/yel	1	Socket
48	X1/6	P1	blk	1	Ground
50	X1/6	H5	blk	1	Ground
51	X1/6	X1/9	blk	1	Ground

6.16 Wiring harness for indicators (from serial number WNCE0801PPAL00924)

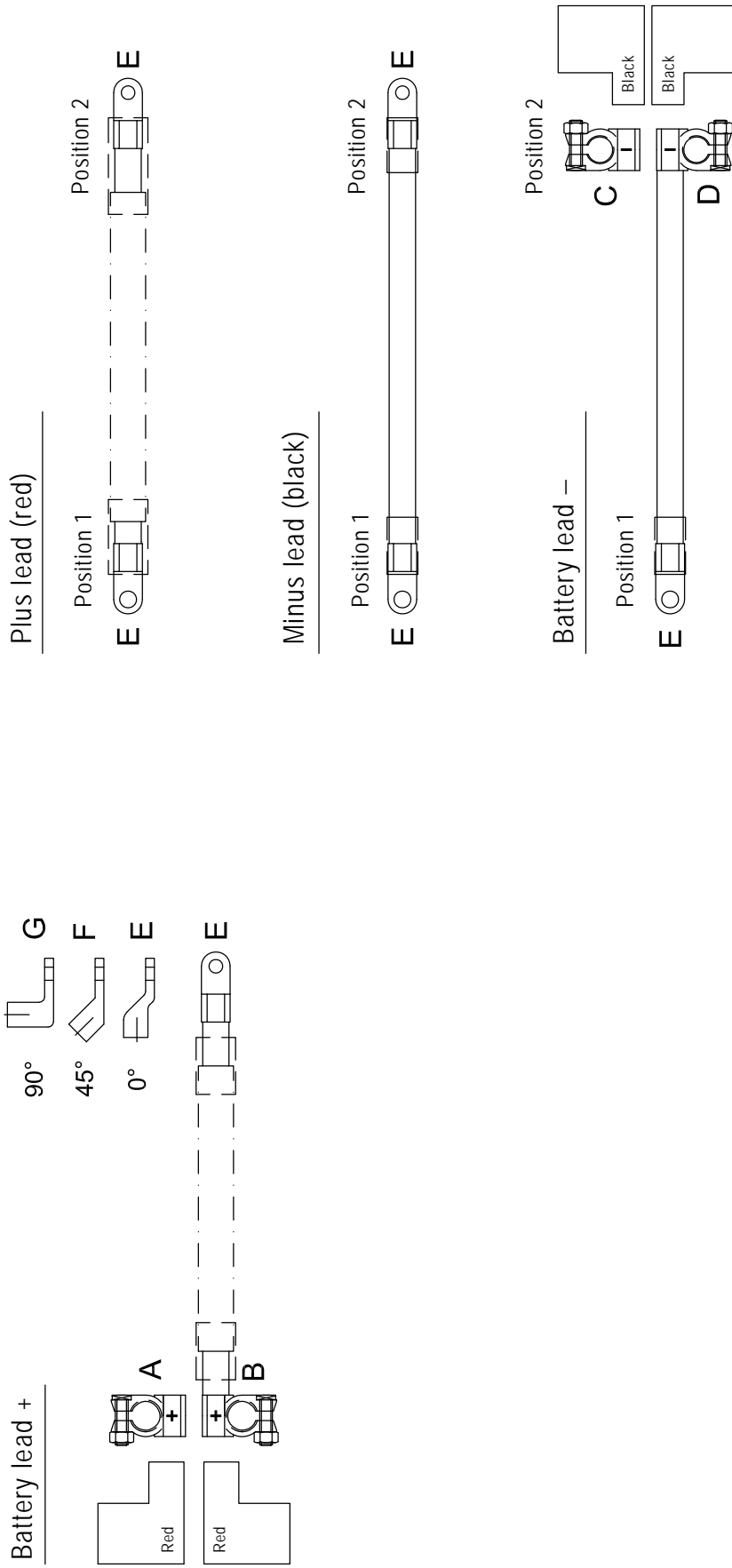


6.17 Traveling signal wiring harness (option)

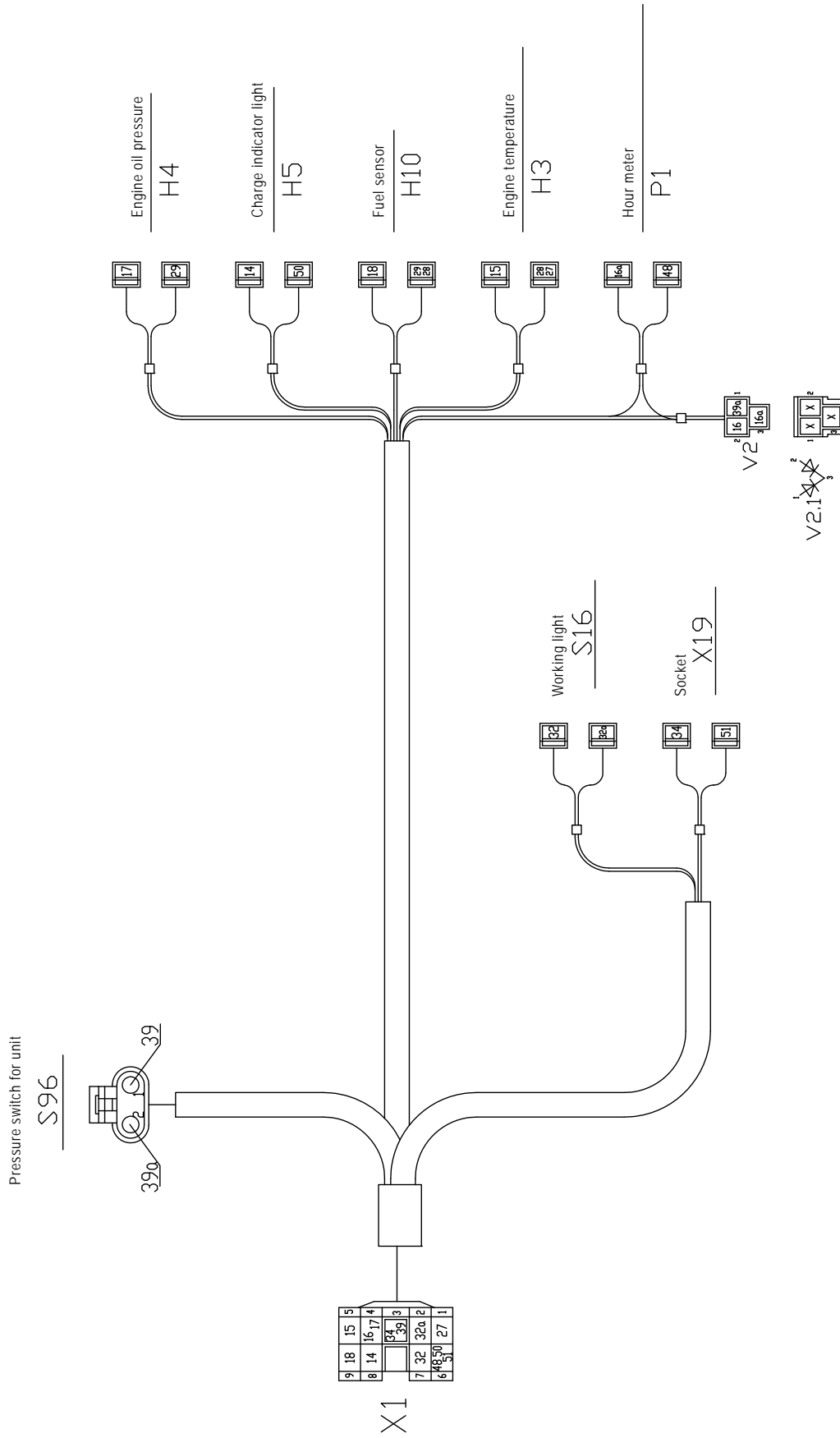


Strand	From	To	mm ²	Color
1	X1.1/1	1	1	blu
2	X1/1	S78.1	1	blk
3	X1/1	S78.2	1	blk
4	S78.1	X2/1	1	blu
5	S78.2	X2/1	1	blu
6	S78.1	X3	1	red
7	S78.2	X3	1	red
8	X2/2	X1/2	1	blk
9	X1.1/2		1	blk

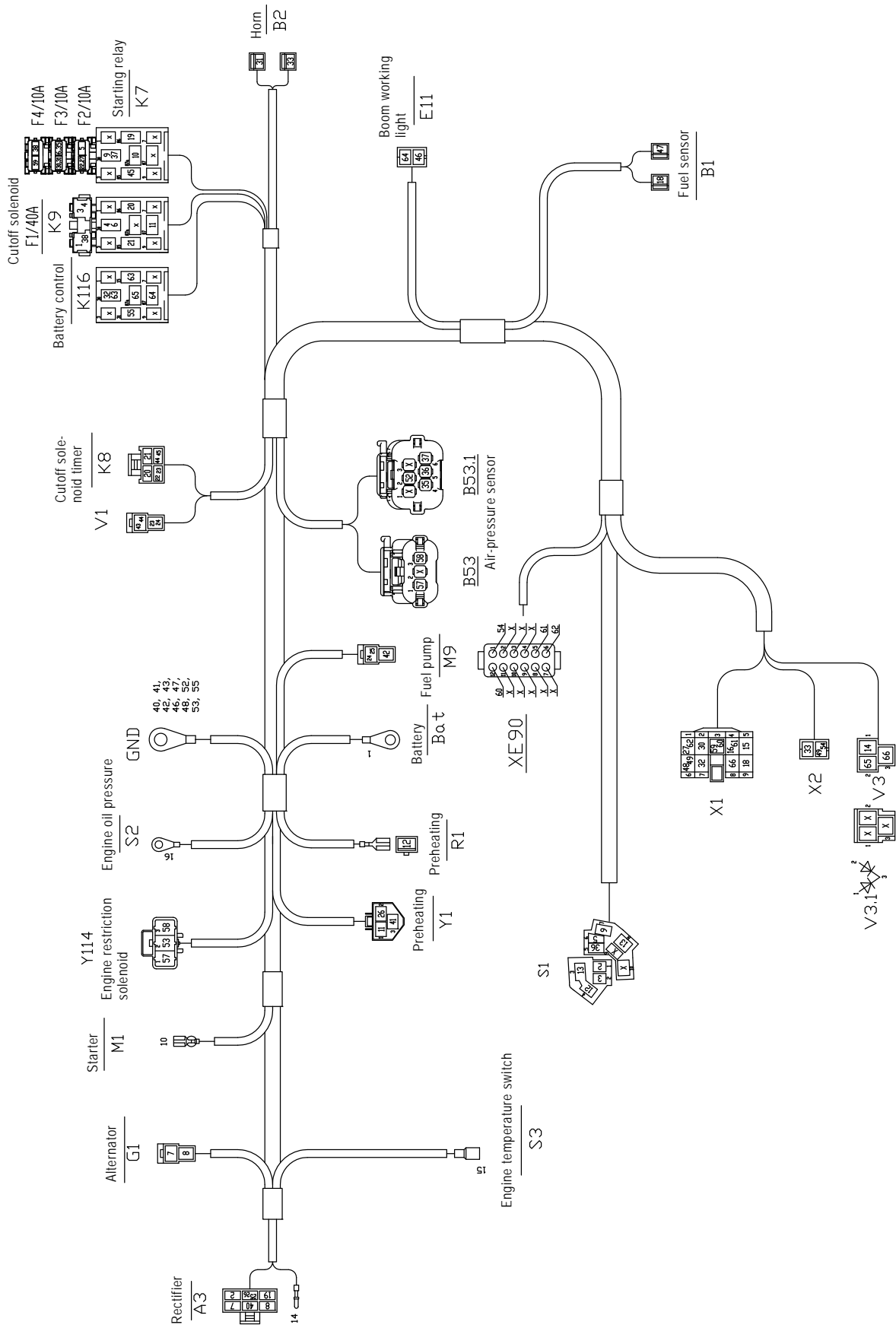
6.19 Battery lead



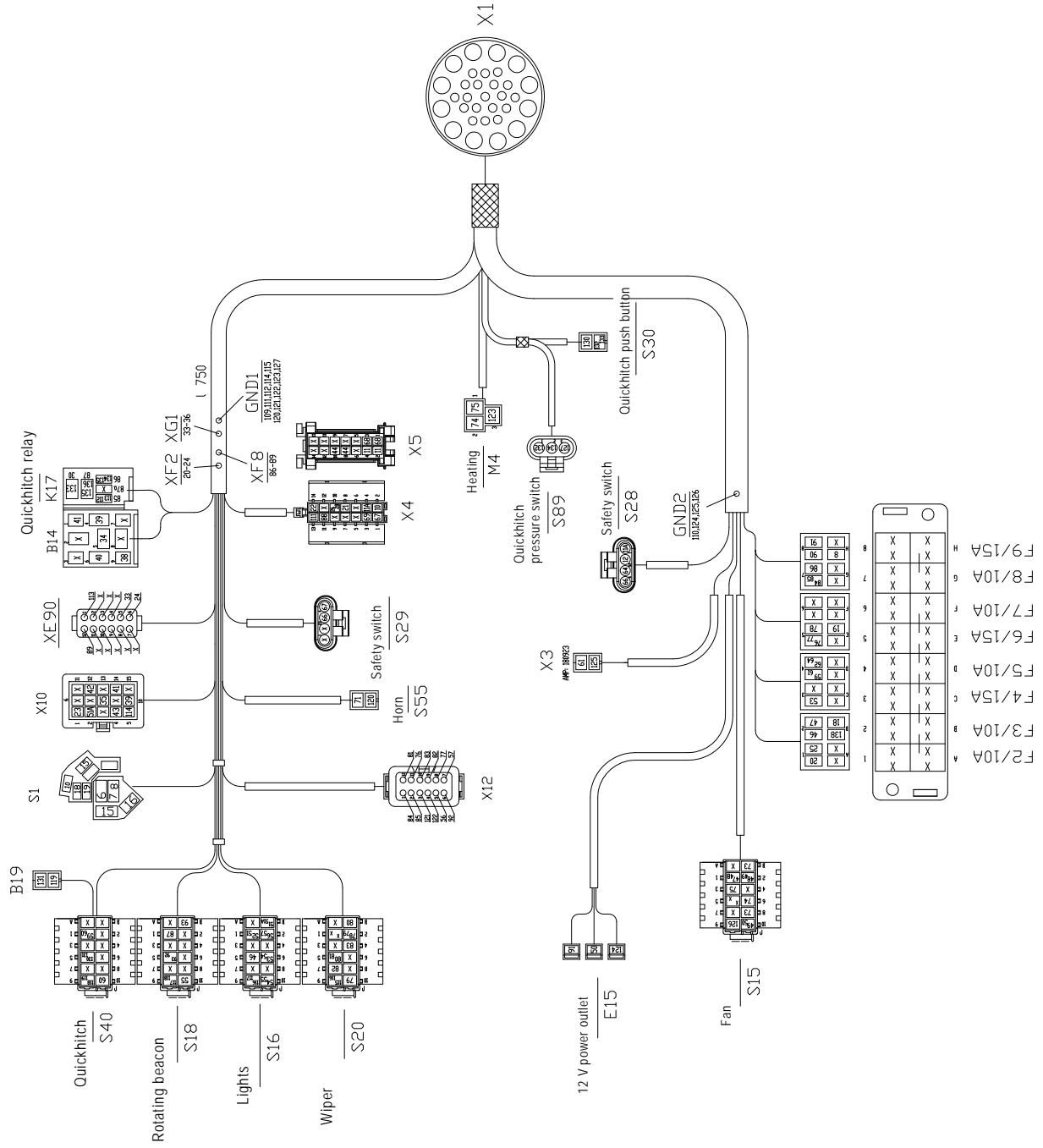
6.20 Indicating instrument wiring harness (Dual Power option)



6.21 Engine/chassis wiring harness (Dual Power option)



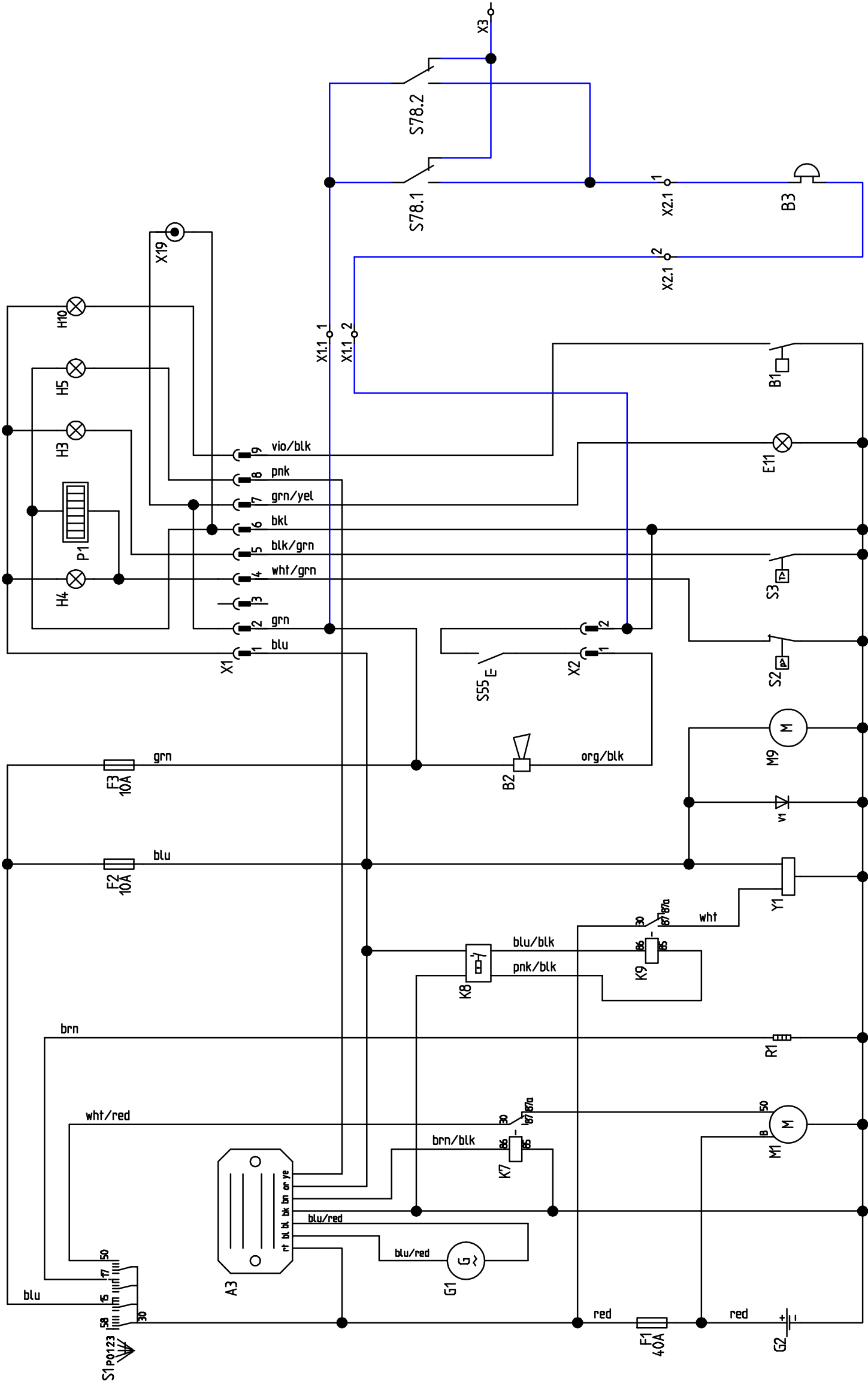
6.22 Seat console wiring harness



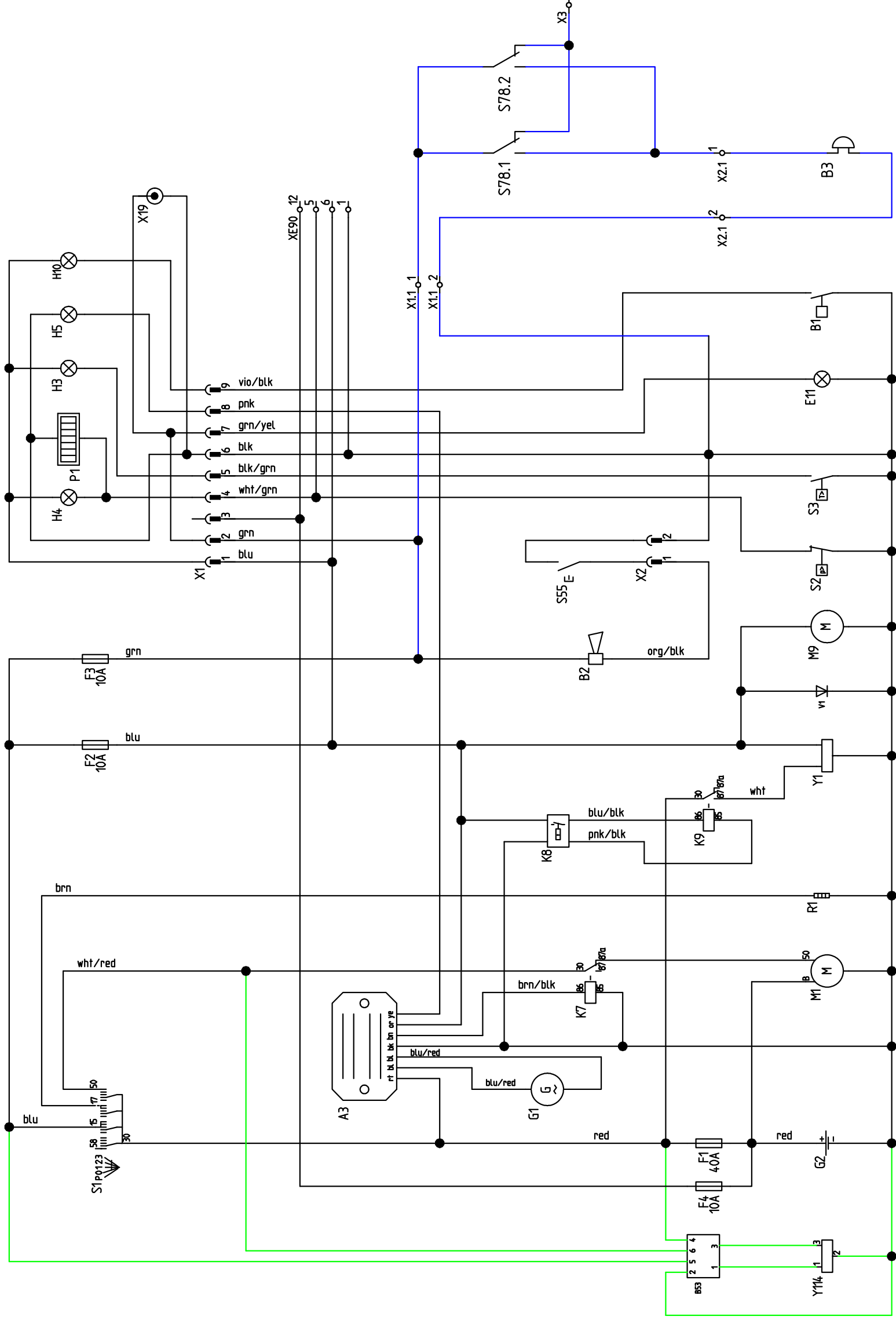


Wiring diagrams

6.2.3 Wiring diagram

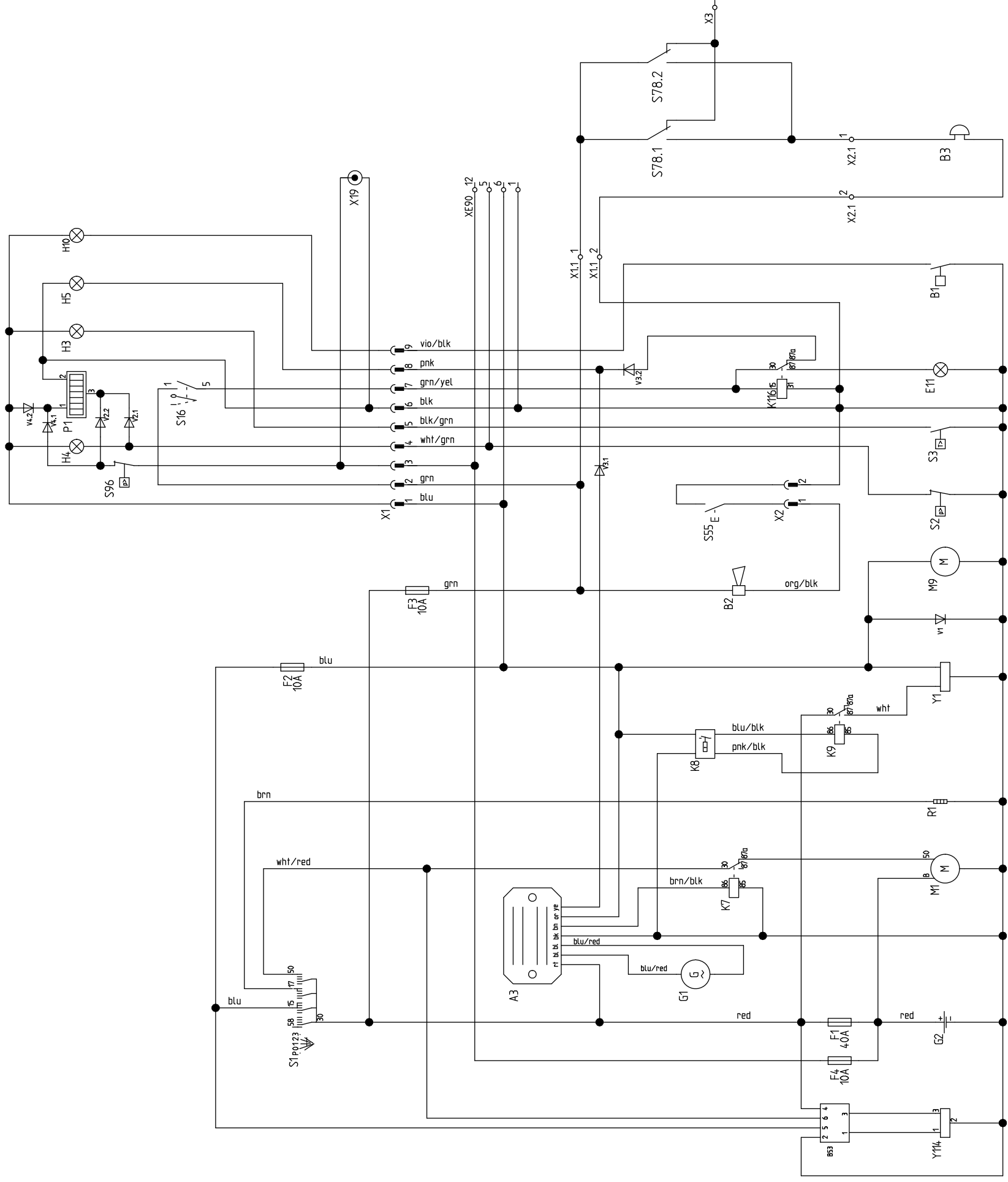


No.	Designation
A3	Regulator
B1	Fuel indicator
B2	Horn
E11	Working light
F1	Main fuse
F2	Fuse: relay, indicator, cutoff solenoid
F3	Fuse: horn, working light
G1	Dynamo
G2	Battery
H3	Engine temperature indicator light
H4	Engine oil pressure indicator light
H5	Dynamo charge function indicator light
H10	Fuel level indicator light
K7	Start high-current relay
K8	Time lag relay 1s cutoff solenoid
K9	Cutoff solenoid switching relay
M1	Starter
M9	Fuel pump
P1	Hour meter
R1	Glow plug
S1	Preheating start switch
S2	Engine oil pressure switch
S3	Engine temperature switch
S55	Horn push button
Y1	Cutoff solenoid

6.24 Wiring diagram Tier IV (Yanmar)


No.	Designation
A3	Regulator
B1	Fuel indicator
B2	Horn
B53	Atmospheric pressure sensor
E11	Working light
F1	Main fuse
F2	Fuse: relay, indicator, cutoff solenoid
F3	Fuse: horn, working light
G1	Dynamo
G2	Battery
H3	Engine temperature indicator light
H4	Engine oil pressure indicator light
H5	Dynamo charge function indicator light
H10	Fuel level indicator light
K7	Start high-current relay
K8	Time lag relay 1s cutoff solenoid
K9	Cutoff solenoid switching relay
M1	Starter
M9	Fuel pump
P1	Hour meter
R1	Glow plug
S1	Preheating start switch
S2	Engine oil pressure switch
S3	Engine temperature switch
S55	Horn push button
Y1	Cutoff solenoid
Y114	Diesel engine limitation solenoid

6.25 Wiring diagram (Dual Power option)



No.	Designation
A3	Regulator
B1	Fuel indicator
B2	Horn
B3	Atmospheric pressure sensor
E11	Working light
F1	Main fuse
F2	Fuse: relay, indicator, cutoff solenoid
F3	Fuse: horn, working light
G1	Dynamo
G2	Battery
H3	Engine temperature indicator light
H4	Engine oil pressure indicator light
H5	Dynamo charge function indicator light
H10	Fuel level indicator light
K7	Start high-current relay
K8	Time lag relay 1s cutoff solenoid
K9	Cutoff solenoid switching relay
M1	Starter
M9	Fuel pump
P1	Hour meter
R1	Glow plug
S1	Preheating start switch
S2	Engine oil pressure switch
S3	Engine temperature switch
S55	Horn push button
Y1	Cutoff solenoid
Y114	Diesel engine limitation solenoid

Options

7 Options

7.1 Rollbar

- Article numbers for options and retrofit kits: please refer to the 803 spare parts list.

- TOPS – **T**ip **O**ver **P**rotection **S**tructure for compact machines.
- ROPS – **R**oll **O**ver **P**rotection **S**tructure

TOPS rollbar up to serial number AF01416

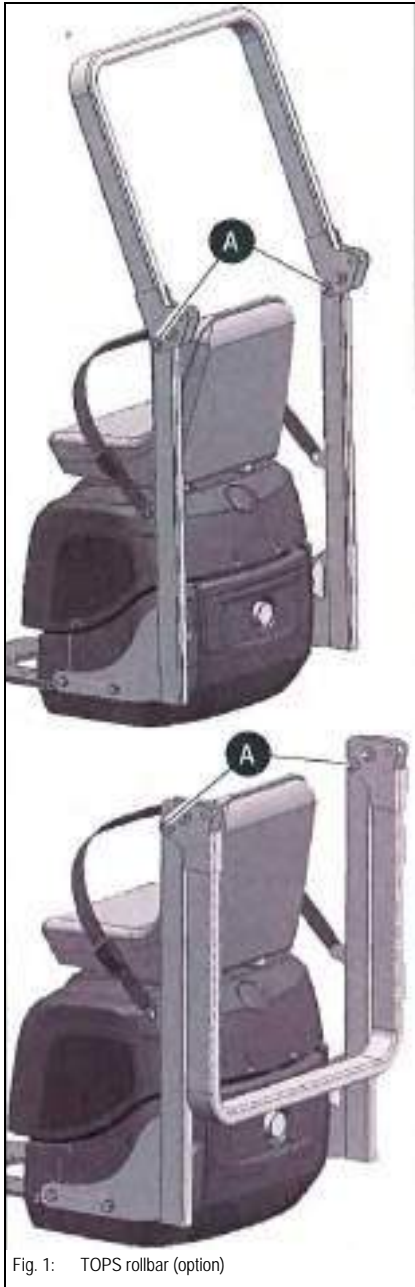


Fig. 1: TOPS rollbar (option)



Danger!

The rollbar is very heavy, folding it up or down is very

Dangerous!

☞ Use suitable lifting gear and auxiliary means to fold the rollbar up and down.

Always fasten the lap belt if the rollbar is folded up.

Do not use the lap belt without the rollbar!

Accident hazard!

In case of structural damage on the rollbar, replace it immediately otherwise safety is no longer ensured!

Raising the rollbar:

- ☞ Park the machine on level ground
- ☞ Stop the engine
- ☞ Lock the control levers
- ☞ Install suitable lifting gear on the rollbar
- ☞ Remove the lock nuts and screws **A** on either side
- ☞ Slowly and carefully raise the rollbar with suitable lifting gear and auxiliary means
- ☞ Insert the screws again on either side and secure them with the lock nuts

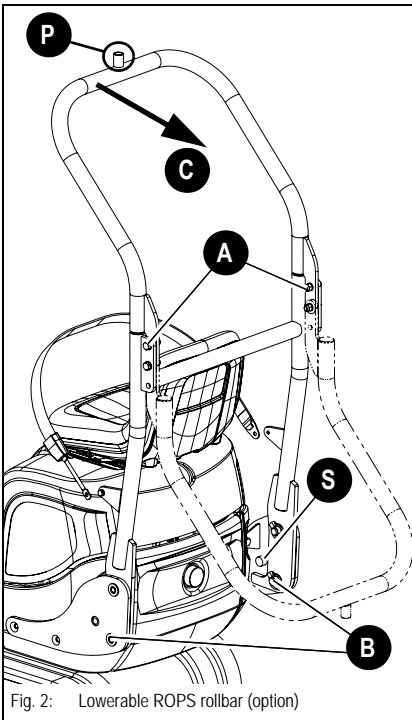
Lowering the rollbar:

- ☞ Park the machine on level ground
- ☞ Stop the engine
- ☞ Lock the control levers
- ☞ Install suitable lifting gear on the rollbar
- ☞ Remove the lock nuts and screws **A** on either side
- ☞ Slowly and carefully lower the rollbar with suitable lifting gear and auxiliary means
- ☞ Insert the screws again on either side and secure them with the lock nuts



Notice!

If the machine is equipped with a TOPS bar, always use it for safety reasons.

Lowerable ROPS rollbar (from serial no. AF01417 to serial no. AI00966)

Raising/lowering the rollbar:

Danger!

The ROPS rollbar is very heavy, folding it up and down, or lowering and raising it, is very

Dangerous!

☞ Use suitable lifting gear and auxiliary means to lower, raise and fold the rollbar up and down.

Always fasten the lap belt if the rollbar is folded up.

Do not use the lap belt without the rollbar!

Accident hazard!

In case of structural damage on the rollbar, replace it immediately otherwise safety is no longer ensured!


Notice!

For safety reasons, always use the ROPS bar if it is fitted on your machine.

Bracket **P** for installing a rotating beacon is located on top of the rollbar.

Raising the rollbar:

- ☞ Park the machine on level ground
- ☞ Stop the engine
- ☞ Lock the control levers
- ☞ Install suitable lifting gear on the rollbar
- ☞ Remove the lock nuts and screws **A** on either side
- ☞ Slowly and carefully raise the rollbar with suitable lifting gear and auxiliary means
- ☞ Insert the screws again on either side and secure them with the lock nuts

Lowering the rollbar:

- ☞ Park the machine on level ground
- ☞ Stop the engine
- ☞ Lock the control levers
- ☞ Install suitable lifting gear on the rollbar
- ☞ Remove the lock nuts and screws **A** on either side
- ☞ Slowly and carefully lower the rollbar with suitable lifting gear and auxiliary means
- ☞ Insert the screws again on either side and secure them with the lock nuts

Lowering and raising the rollbar

Lowering the rollbar:

- ☞ Park the machine on level ground
- ☞ Stop the engine
- ☞ Lock the control levers
- ☞ Install suitable lifting gear on the rollbar
- ☞ Remove the split pins and pins **B** on either side
- ☞ Slowly and carefully lower the rollbar with suitable lifting gear and auxiliary means toward **C**, as far as it will go **S**.

Raising the rollbar:

- ☞ Park the machine on level ground
- ☞ Stop the engine
- ☞ Lock the control levers
- ☞ Install suitable lifting gear on the rollbar
- ☞ Slowly and carefully raise the rollbar with suitable lifting gear and auxiliary means
- ☞ Fit pins **B** again on either side and secure them with the split pins

Lowerable ROPS rollbar from serial no. AI00967

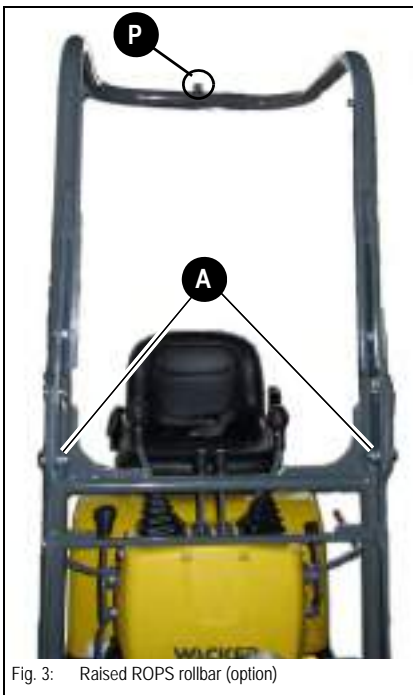


Fig. 3: Raised ROPS rollbar (option)



Danger!

The ROPS rollbar is very heavy, folding it up and down, or lowering and raising it, is very

Dangerous!

- ☞ Use suitable lifting gear and auxiliary means to lower, raise and fold the rollbar up and down.

Always fasten the lap belt if the rollbar is folded up.
Do not use the lap belt without the rollbar!

Accident hazard!

In case of structural damage on the rollbar, replace it immediately otherwise safety is no longer ensured!



Notice!

For safety reasons, always use the ROPS bar if it is fitted on your machine.

Bracket **P** for installing a rotating beacon is located on top of the rollbar.

Raising/lowering the rollbar:

Fig. 4: Lowered ROPS rollbar (option)

Raising the rollbar:

- ☞ Park the machine on level ground
- ☞ Stop the engine
- ☞ Lock the control levers
- ☞ Install suitable lifting gear on the rollbar
- ☞ Remove the lynch pins and pins **A** on either side
- ☞ Slowly and carefully raise the rollbar with suitable lifting gear and auxiliary means
- ☞ Fit pins **A** again on either side and secure them with the lynch pins

Lowering the rollbar:

- ☞ Park the machine on level ground
- ☞ Stop the engine
- ☞ Lock the control levers
- ☞ Install suitable lifting gear on the rollbar
- ☞ Remove the lynch pins and pins **A** on either side
- ☞ Slowly and carefully lower the rollbar with suitable lifting gear and auxiliary means
- ☞ Fit pins **A** again on either side and secure them with the lynch pins

7.2 ISO/SAE changeover (option)



Danger!

Accident hazard due to modified control lever operation! Can cause serious injury or death.

Accident hazard!

- ☞ Change over the controls only on level and firm ground, and only if the starting key is removed.
- ☞ Ensure that you know which control mode has been selected before starting work.



Caution!

The spool segment function remains the same when changing over (ISO/SAE), only the control lever functions are changed.

The changeover is located under both covers **1** on the control stand.

Changeover is possible between ISO controls A (Europe) and SAE controls B (USA).

- ☞ Park the machine on firm, level and horizontal ground, lower the boom to the ground, stop the engine and remove the starting key.
- ☞ Raise covers **1**.
- ☞ Slide the knurled sleeve **2** upward, and hold, unhitch and grease it.
- ☞ Slide the knurled sleeve **2** upward and hitch it into ball pin **A** or **B** as required. The sleeve is safely locked if it is firmly connected with the ball pin and if it is engaged in the lower position.
- ☞ Lower covers **1**.



Fig. 5: Control stand covers

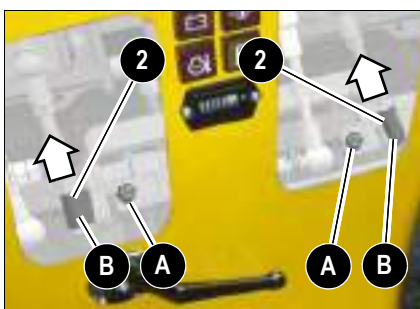


Fig. 6: Ball pin position

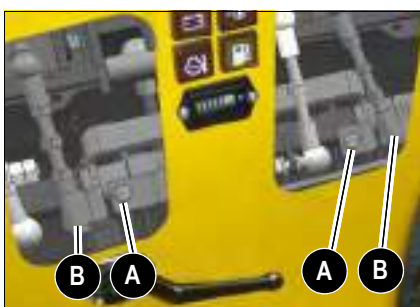


Fig. 7: ISO/SAE changeover

Wiring diagram	Controls	
A	ISO controls (Europe)	Ball pin position A (inside)
B	SAE controls (US)	Ball pin position B (outside)

7.3 Traveling signal (option)

A signal sounds if a drive lever is actuated.



Danger!

Accident hazard during forward/backward machine travel. Danger of severe crushing causing death or serious injury.

- ☞ *Do not allow anyone to stay in the danger zone.*
- ☞ *Do not rely on the traveling signal under any circumstances.*
- ☞ *Have a malfunctioning signal transmitter repaired by a Wacker Neuson service center.*

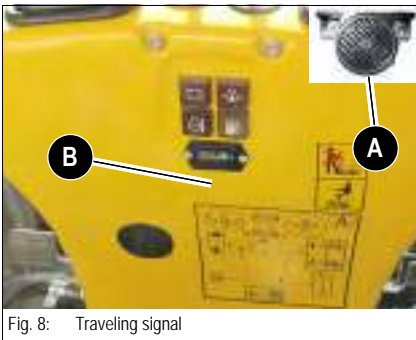


Fig. 8: Traveling signal

Signal transmitter **A** is located behind trim **B** on the control stand.

Cable assignment – see [chapter 6.17 Traveling signal wiring harness \(option\)](#) on page 6-15.

7.4 Telematic



Fig. 9: Telematic

After installing the Telematic system, module **A** is enabled and sends data to the Telematic web portal.

Technical data

- This works in 90 countries with currently 160 roaming partners with a GPRS data network.
- The GPS receiver registers the movements and has a low power consumption.
- Backup battery for additional safety with an autonomy time of 48 – 96 hours.
- Supplies additional information via the web-based Wacker Neuson Telematic software.
- Module has 3 digital inputs and one digital output of which 2 digital inputs (engine and starter) are assigned at the factory. One input and output is freely assignable with other functions, such as for monitoring an additional heating system or particulate-soot filter or controlling these functions via SMS.
- Certified according to IP67.

Connections

Pos.	Connection	Color	Designation
1	Power supply	rd	12 V permanent plus via a series-connected 1 ampere high-speed fuse
2	Ground	bl	-
3	Digital input 1	wh	Engine START/STOP signal
4	Digital input 2	bn	Starter ON/OFF signal
5	Digital input 4	pk	Not assigned at the factory. Can be used for determining an operating state.
6	Digital output 1	ye	The digital output of the module can be used for enabling/disabling additional functions via SMS, such as an auxiliary heater. Important: Selection is only possible for comfort functions. Remote-control of safety-relevant functions or functions affecting handling is prohibited under all circumstances.

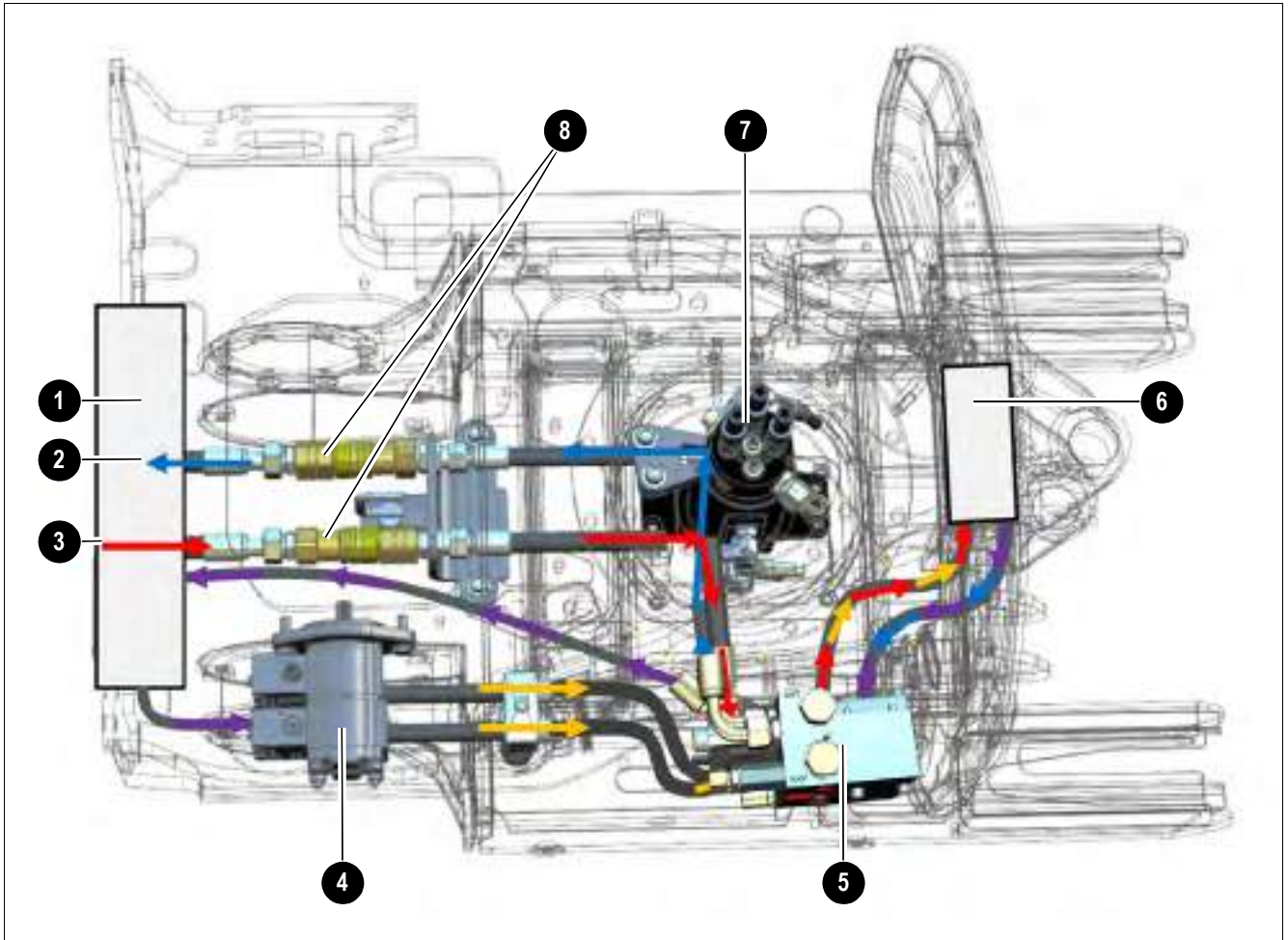
Functional check/diode

LED mode	Operating state
Steady green light with short, red flashing interruptions	The unit is connected with the GSM network and the GPS module is navigating > all is OK
No light	The unit is not connected with a power source
Steady red light	The unit is supplied with power, but is not connected with a GSM network
Short red flashing	The unit is supplied with power and is connected with a GSM network
Steady green light	The unit is navigating (fixed GPS satellite position)

7.5 Zero-emission Dual Power drive

- Diesel operation is identical to standard version.
- During HPU operation, this unit ensures the oil supply by means of a connection on the travel gear (via the swivel joint to the double ball-type cock).
- Diesel engine OFF: oil flows from HPU to main control block.
 - ➔ Return via double ball-type cock and swivel joint to HPU.
- Diesel engine ON: oil from hydraulic pump to main control block.
 - ➔ Return via double ball-type cock and return filter to hydraulic oil reservoir.

Overview



Pos.	Designation
1	Hydraulic oil reservoir
2	Return
3	Feed
4	Hydraulic pump
5	Double ball-type cock
6	Main control block
7	Swivel joint
8	Couplings

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