Service Manual

Compact loaders

SW 24 ST 35
SW 28 ST 45

Machine models	S04-01/S04-03
Edition	1.0
Document order no.	1000327523
Language	en

WACKER NEUSON

Documentation	Language	Order no.	Documentation	Language	Order no.
Operator's manual	en	1000309123	--	--	--
Service manual	de	1000327522	--	--	--
Spare parts list	SW24 de/en/fr	1000323666	Spare parts list	SW35 de/en/fr	1000323692
	SW24 de/it/es	1000323669		SW35 de/it/es	1000323693
	SW28 de/en/fr	1000323670		SW45 de/en/fr	1000323865
	SW28 de/it/es	1000323691		SW45 de/it/es	1000323870

Legend	
Original service manual	x
Translation of original service manual	–
Edition	1.0
Date	05/2014
Document	SHB S04 en

Wacker Neuson is keep abreast of the latest technical developments and constantly improve their products. For this reason, we may from time to time need to make changes to figures and descriptions in this documentation which do not reflect products that have already been delivered and that will not be implemented on these machines.

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.

Photographs and graphics are symbolic representations and may differ from the actual products.

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

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Maintenance

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 Operator's 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.

1.2 Identification of warnings and dangers

Important indications regarding the safety of the personnel and the machine are identified in this 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 (waste oil, for example) is not subject to proper use or disposal.

1.3 Explanation of symbols and abbreviations

- Identifies a list
  - Subdivision within lists.
    Follow the order of the activity.

☞ *Identifies an activity*

☞ Subdivision of an activity
Follow the order of the activity.

➥ Identifies a result after a list

➥ Subdivision of a result after a list.
Follow the order of the activity.

Cross reference: see page *1-1* (page)

Cross reference: 7 (pos. no. or table no.)

Cross reference: *fig. 1* (fig. no. 1)

Cross references: – *see chapter "5 Operation" on page 5-1* (see chapter)

Cross references: – *see "Operation" on page 5-1* (– see text)

Abbreviations

TOPS	=	Tip Over Protective Structure
ROPS	=	Roll Over Protective Structure (without losing contact with the ground)
FOPS	=	Falling Objects Protective Structure
FGPS	=	Front Guard Protective Structure
AUX	=	Auxiliary-hydraulics circuit
B	=	Width
NE	=	Nominal width
PS	=	Stabilizer blade
LS	=	Stick
Hydraulic quickhitch	=	Hydraulic Easy Lock quickhitch
o/h	=	Operating hours
Pos.	=	Position
Fig.	=	Figure
e.g.	=	for example
approx.	=	approximately
max.	=	maximum
min.	=	minimum

Conversion table

The rounded imperial values are indicated in brackets, for example 1060 cm³ (64.7 in³).

Volume unit	
1 cm³	(0.061 in³)
1 m³	(35.31 ft³)
1 ml	(0.034 US fl.oz.)
1 l	(0.26 gal)
1 l/min	(0.26 gal/min)
Unit of length	
1 mm	(0.039 in)
1 m	(3.28 ft)
Weight	
1 kg	(2.2 lbs)
1 g	(0.035 oz)
Pressure	
1 bar	(14.5 psi)
1 kg/cm²	(14.22 lbs/in²)
Force/output	
1 kN	(224.81 lbf)
1 kW	(1.34 hp)
1 PS	(0.986 hp)
Torque	
1 Nm	(0.74 ft.lbs.)
Speed	
1 kph	(0.62 mph)
Acceleration	
1 m/s²	(3.28 ft/s²)

1.4 Warranty and liability

Exemption from warranty and liability

Warranty

Warranty claims can be made only if the conditions of warranty have been observed. They are included in the General Conditions of Sales and Delivery for new machines and spare parts sold by the dealers of Wacker Neuson Linz GmbH. Furthermore, all instructions in this service manual must be observed.

Have the maintenance, delivery inspection and the entries in the service booklet performed by a Wacker Neuson service center, otherwise warranty claims will not be acknowledged.

Exemption from liability

- Modifying Wacker Neuson products and fitting them with additional equipment and attachments that are 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.
- 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. Warranty and product liability for possible damage caused by these modifications shall not be applicable.
- Wacker Neuson Linz GmbH shall not be liable for injury and/or damage to property caused by failure to observe the safety instructions and the service 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 as well as in the Operator's and maintenance manuals.
  - Read and understand the service manual before servicing or repairing the machine. Observe all safety instructions.

1.5 Labels

Caution!

Injury hazard due to missing or damaged labels!

Missing or incomplete warning and information labels can lead to situations with serious injury or death.

- *Do not remove warning and information labels.*
- *Immediately replace damaged warning and information labels.*

Type labels

Fig. 1: Type label (symbolic representation)

Serial number

The serial number is stamped on the machine chassis. It is also located on the type label. Refer to the Operator's Manual of the machine for more information.

Fig. 2: (symbolic representation)

Cabin number

The type label is located inside the cabin on the wall on the right.

Fig. 3: (symbolic representation)

Engine number

The type label is located behind the cover.

Fig. 4: Hydraulic pump type label

Hydraulic pump number

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

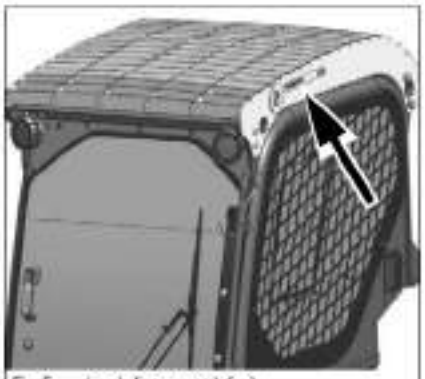


Fig. 5: (symbolic representation)

FOPS screen type label

The type label is located on the left on the screen.

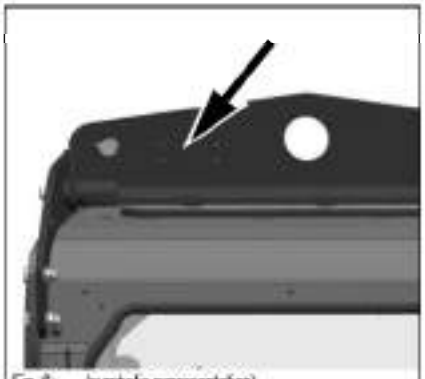


Fig. 6: (symbolic representation)

Type label of crane-handling bracket

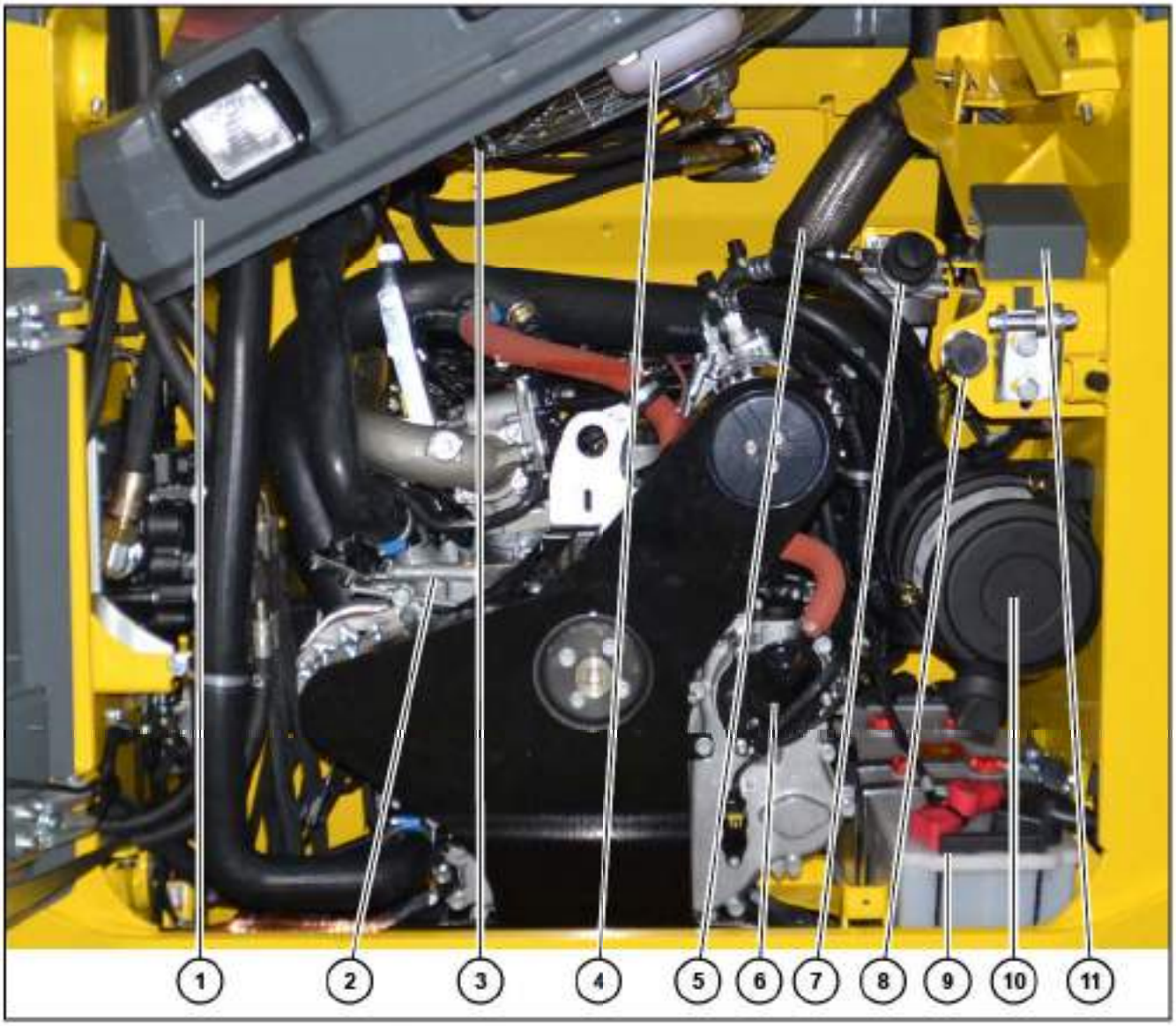
The type label is located on the cross tie.

1.6 Machine overview

Fig. 7: (symbolic representations)

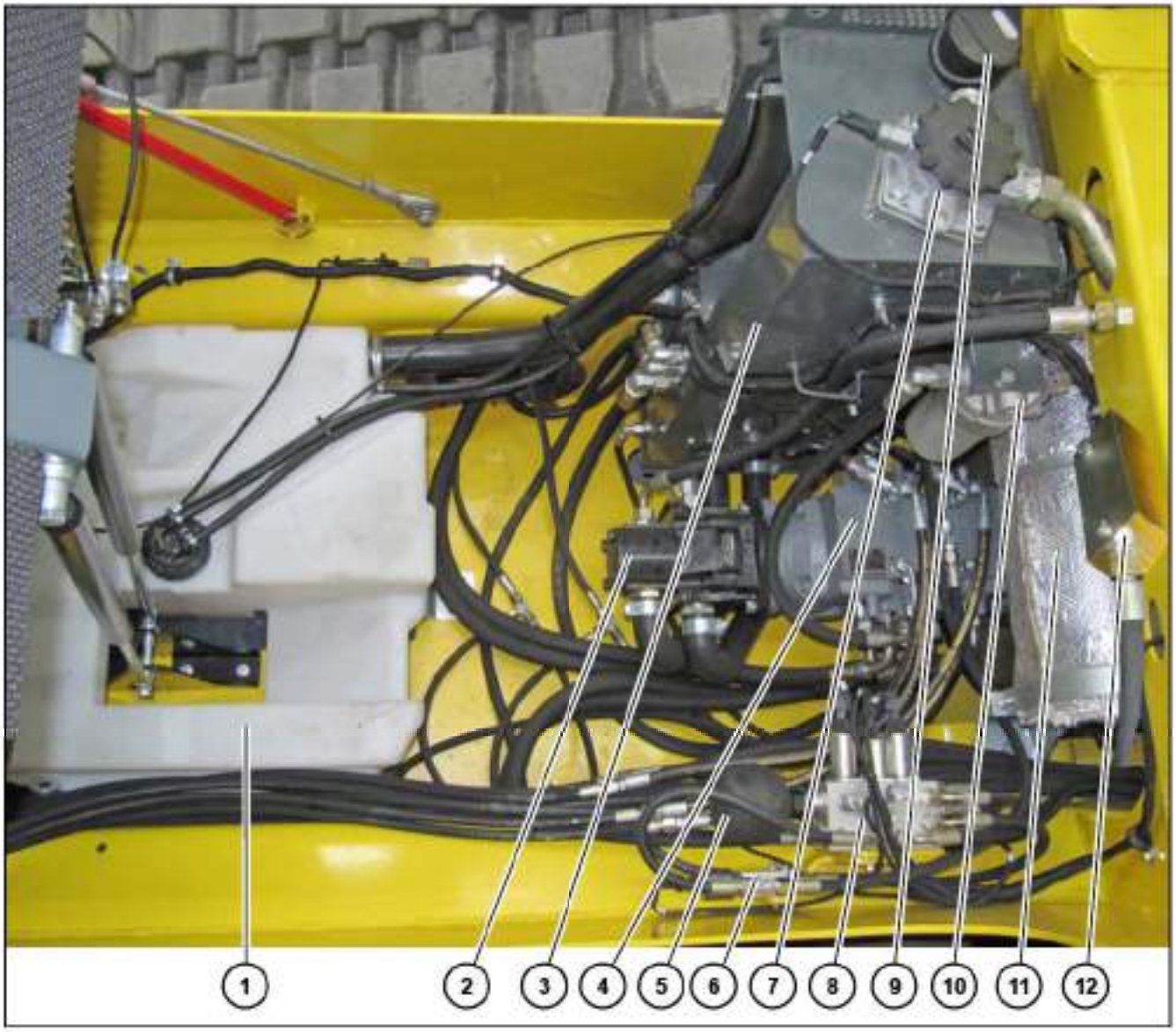
Pos.	Designation	Pos.	Designation
1	Front working light	10	Tracks (ST35/45)
2	Rear working light	11	Numberplate bracket (option)
3	Outside mirrors (option)	12	Exhaust pipe
4	Lights/turn indicators (option)	13	Counterweight (option)
5	Handholds	14	Crane-handling bracket (option)
6	Bucket (option)	15	Type label
7	Loader unit	16	Engine cover
8	Radiator cover	17	Rear lights (option)
9	Tires (SW24/28)	18	Side cover

1.7 Engine compartment (overview)



Pos.	Designation
1	Radiator cover
2	Diesel engine
3	Engine radiator/radiator fan
4	Coolant reservoir
5	Muffler
6	Crankcase breather filter
7	Fuel filter
8	Diagnosis tool connection
9	Battery
10	Air-filter housing
11	Main fuse box

1.8 Chassis overview



Pos.	Designation
1	Fuel tank
2	Gear pump
3	Hydraulic oil reservoir
4	Tandem pump
5	Bladder type accumulator
6	2nd speed valve
7	Hydraulic oil filter
8	Control valve
9	Breather filter
10	Boost-pressure filter
11	Muffler
12	High Flow valve (option)

1.9 Hydraulic connections

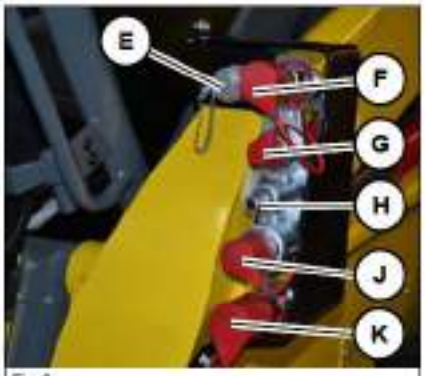


Fig. 8:

Connection	Function
E	Electrical connections for attachment controls
F	High Flow (connector)
G	Auxiliary hydraulics (connector)
H	Leak oil line
J	Auxiliary hydraulics (sleeve)
K	High Flow (sleeve)

Notice!

Follow the instructions in the Operator's Manual of the attachment manufacturer for connecting the hydraulics to the attachment.

1.10 Releasing the pressure in the hydraulic system

Caution!

Injury hazard due to fluid escaping under pressure!

Hydraulic oil escaping under pressure can penetrate the skin and cause serious injury or death.

- ☞ *Do not allow anyone to stay in the danger zone.*
- ☞ *Clean hydraulic couplings and sleeves before connecting them.*
- ☞ *Release the pressure before connecting or removing hydraulic attachments.*
- ☞ *Wear protective clothes.*

Connecting and disconnecting hydraulic couplings

Preparations for releasing the pressure (auxiliary hydraulics):

- ☞ *Stop and park the machine.*
- ☞ *Lower the loader unit completely.*
- ☞ *Stop the engine.*
- ☞ *Remove the starting key and carry it with you.*

Releasing the pressure in the auxiliary hydraulics

Release the pressure in the auxiliary hydraulics before connecting or removing attachments.

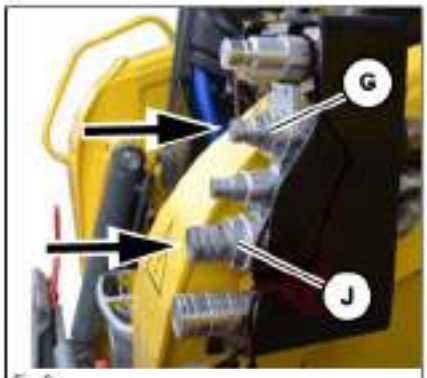


Fig. 9

Before connecting:

☞ *Press the auxiliary hydraulics connector G, and then the auxiliary hydraulics sleeve J in the direction of the arrow.*

➥ This releases the pressure in the auxiliary hydraulics circuit.

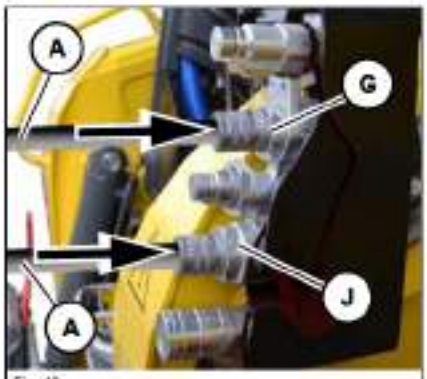


Fig. 10

Before removing:

☞ *Press the auxiliary hydraulics connector G, and then the auxiliary hydraulics sleeve J in the direction of the arrow with hoses A connected.*

➥ This releases the pressure in the auxiliary hydraulics circuit.

Preparations for releasing the pressure (loader unit/load stabilizer):

The pressure in the **loader unit** and **load stabilizer** circuits has to be released after parking the machine.

☞ *Stop and park the machine.*

☞ *Lower the loader unit completely.*

☞ *Stop the engine.*

☞ *Turn the starting key to position 1.*

☞ *Lower the safety bar and close the door (option).*

Releasing the pressure in the loader unit

☞ *Move both control levers in all directions repeatedly to release the pressure from the hydraulic system.*

Releasing the pressure in the load stabilizer (option)

☞ *Enable the load stabilizer.*

➥ The loader unit is slightly raised.

☞ *Perform emergency lowering.*

➥ The loader unit is lowered to the ground and the pressure is released from the hydraulic system.

1.11 Emergency lowering

Danger!

Danger of crushing when lowering the loader unit!

Causes serious crushing or injury resulting in death.

- Do not allow anyone to stay in the danger zone.
- Stop all work movements immediately if someone enters the danger zone.

Lower the loader unit in case of an engine or hydraulics malfunction.

☞ *Lower the safety bar and close the door (option).*

☞ *Pull and hold button **A** until the loader unit is completely lowered.*

☞ *Return the control lever to neutral.*

Fig. 11: Emergency lowering

1.12 Opening the high-pressure circuit (SW24/28 only)

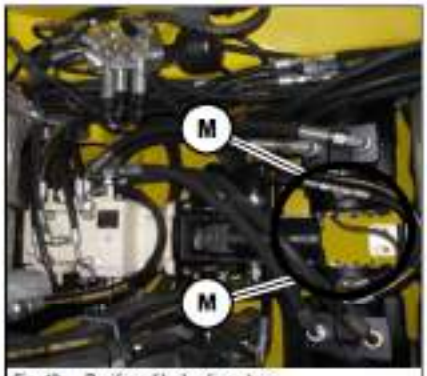


Fig. 12: Position of hydraulic motors

☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*

- Hydraulic motors **M** are located underneath the cabin.

☞ *Raise the cabin – see Raising/lowering the cabin on page 3-19.*

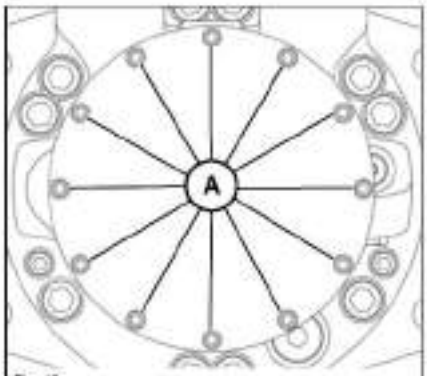


Fig. 13:

☞ *Carefully loosen 12 screws **A** (M6) clockwise on each hydraulic motor **M** with a suitable tool until no resistance can be felt.*

☞ *Perform maintenance.*

☞ *Put the machine into operation again in the reverse order.*

☞ Tighten screws **A** (M6) to 14 – 16 Nm (10.3 – 11.8 ft.lbs.) with a suitable tool.

☞ Lower the cabin.– *see Raising/lowering the cabin* on page 3-19

1.13 Transportation

Refer to the Operator's Manual of the machine for data on transportation and towing.

Technical data

2 Technical data

2.1 Engine

Engine	Tier IV
Product	Perkins
Type	854F-E34TTF
Design	Water-cooled 4-cylinder diesel engine
Number of cylinders	4
Intake system	Turbo-charging, charge air cooling
Fuel injection system	Direct fuel injection
Cooling system	Water-cooled
Lubrication system	Force-feed lubrication
Displacement	3387 cm³ (207 in³)
Nominal bore and stroke	99 x 100 mm (3.9 x 3.9 in)
Output	55 kW at 2500 rpm (73.8 hp at 2.500 rpm)
Max. torque	291 Nm (215 ft.lbs) at 1600 rpm
Max. engine speed without load	2625 +/- 50 rpm
Idling speed	1000 +/- 50 rpm
Starting aid	Glow plugs (preheating time 15 seconds)
Valve clearance (intake/outlet)	Maintenance-free hydraulic tappets
Compression	17.0 : 1
Engine oil pressure	2 bar (29 psi)
Pressure switch for engine oil pump	0.6 – 0.9 bar (8.7 – 13 psi)
Thermostat opening temperature/ fully open	79 °C (174.2 °F) 94 °C (201.2 °F)
Firing order	1 – 3 – 4 – 2
Direction of rotation	Anticlockwise (as seen from the flywheel)
Exhaust values according to	EU NRMM 97/68/EC European Tier 4 US EPA 40 CFR Part 89 American Tier IV final UN/ECE-R120

2.2 Traveling drive/axles

Traveling drive	SW24/28	ST35/45
Design	Infinitely variable axial piston pump with speed-sensitive control	
Flow rate	2 x 115 l/min (2 x 3 gal/min)	
Max. operating pressure	407 bar (5,903 psi)	365 bar (5,294 psi)
Starting speed	1000 rpm	
Boost pump	**SW24/28**	**ST35/45**
Design	Gear	
Flow rate	19 cm^3/min^{-1} (1.16 in^3/rpm)	
Charging/boost pressure	27 bar (392 psi)	
Hydraulic motor	**SW24/28**	**ST35/45**
Design	Radial piston motor with integrated parking brake	Axial piston motor with swash plate
Max. capacity in 1st speed	680 cm^3/rev (41.5 in^3/rpm)	50.9 cm^3/rev (3.1 in^3/rpm)
Max. capacity in 2nd speed	410 cm^3/rev (25 in^3/rpm)	30.3 cm^3/rev (1.8 in^3/rpm)
Flushed with flush valve	10 l/min at 27 bar (2.6 gal/min at 392 psi)	15 l/min at 27 bar (4 gal/min at 392 psi)
Transmission ratio	1.66	27

2.3 Brakes

Service brake	SW24/28/ST35/45
Design	Hydrostatic
Location	Traveling drive
Effect	Service brake via hydrostatic closed circuit by means of neutral position of pump
Parking brake	**SW24/28/ST35/45**
Design	Manual, negative-action electro-hydraulic multi-disk brake
Location	On either side of hydraulic motor
Effect	Hydraulic release; braked if no pressure

2.4 Tires/tracks

Tires

Tire type/size	Tire size	Tire pressure	Load-bearing capacity
ATG Galaxy XD2010 R-4	12-16.5	4.50 bar (65 psi)	10 PR
ATG Galaxy Beefy Baby III R-4 (option)	12-16.5	4.48 bar (65 psi)	10 PR

Tracks

Rubber track	
Track width (standard)	450 mm (17.8 in)
Track width (narrow track option)	320 mm (12.6 in)
Number of tread rollers	5

2.5 Steering system

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

2.6 Operating hydraulics

Operating hydraulics	SW24/28/ST35/45
Pump design	Gear
Flow rate at max. engine speed	85 l/min at 2625 rpm (22.5 gal/min at 2,625 rpm)
Control valve	3 sections
Max. operating pressure	230 bar (3,336 psi)
Secondary protection bucket cylinder	275 bar (3,989 psi) (base/rod)
Secondary protection for loader unit cylinder	260 bar (3,771 psi) (base)
Filter	Return and pressure filter

2.7 Speed

Maximum speed	SW24/28	ST35/45
Speed range 1/2	11/18 kph (7/11 mph)	7/12 kph (4/7 mph)

2.8 High Flow (option)

Auxiliary hydraulics	SW24/28/ST35/45
Max. operating pressure	230 bar (3,336 psi)
Operation	Electroproportionally/hydraulically controlled spool valve on control lever
High Flow version	**SW24/28/ST35/45**
Hydraulic pump flow rate	85 + 47.5 l/min at 2,625 rpm (22.5 + 12.5 gal/min at 2,625 rpm)
Max. operating pressure	230 bar (3,336 psi)

2.9 Coolant

Compound table

Outside temperature[1]	Water	Coolant[2]
Up to °C (°F)	% by volume	% by volume
−37 (−34.6)	50	50

1. Use the 1:1 concentration for warm outside temperatures, too, to ensure protection against corrosion, cavitation and deposits.
2. Do not mix the coolant with other coolants.

2.10 Noise emissions

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

2.11 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/s^2.

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

2.12 Weight

Machine weights

Weight		
Transport weight[1]	SW24	3200 kg (7,054 lbs)
	SW28	3521 kg (7,762 lbs)
	ST35	4181 kg (9,218 lbs)
	ST45	4505 kg (9932 lbs)
Operating weight	SW24[2]	3568 kg (7,867 lbs)
	SW28[2]	3890 kg (8,575 lbs)
	ST35[3]	4560 kg (10,051 lbs)
	ST45[3]	4883 kg (10,765 lbs)

1. Transport weight: machine + 10 % fuel capacity.
2. Operating weight: machine + full fuel tank + 1900 mm bucket + operator (75 kg/165 lbs).
3. Operating weight: machine + full fuel tank + 2030 mm bucket + operator (75 kg/165 lbs).

Notice!

The actual machine weight depends on the selected options and must be read off the type label.
Add the weight of all subsequently installed equipment to the weight of the machine.
Weight indications can vary by +/– 2 %.

Weight of attachments

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

Breakout forces

According to ISO 6015

	Max. breakout force at bucket tooth
SW24/SW28/ST35/ST45	31.1 kN (7000 lbf)

Ground clearance/ground pressure

Ground clearance		
Ground clearance	SW24	235 mm (9.3 in)
	SW28	230 mm (9.1 in)
	ST35	255 mm (10 in)
	ST45	250 mm (10 in)
Ground pressure	SW24	--
	SW28	--
	ST35	0.31 kg/cm^2 (4.4 lbs/in^2)
	ST 35 narrow tracks	0.44 kg/cm^2 (6.25 lbs/in^2)
	ST45	0.32 kg/cm^2 (4.4 lbs/in^2)
	ST45 narrow tracks	0.45 kg/cm^2 (6.4 lbs/in^2)

2.13 Payload/stability

Not available.

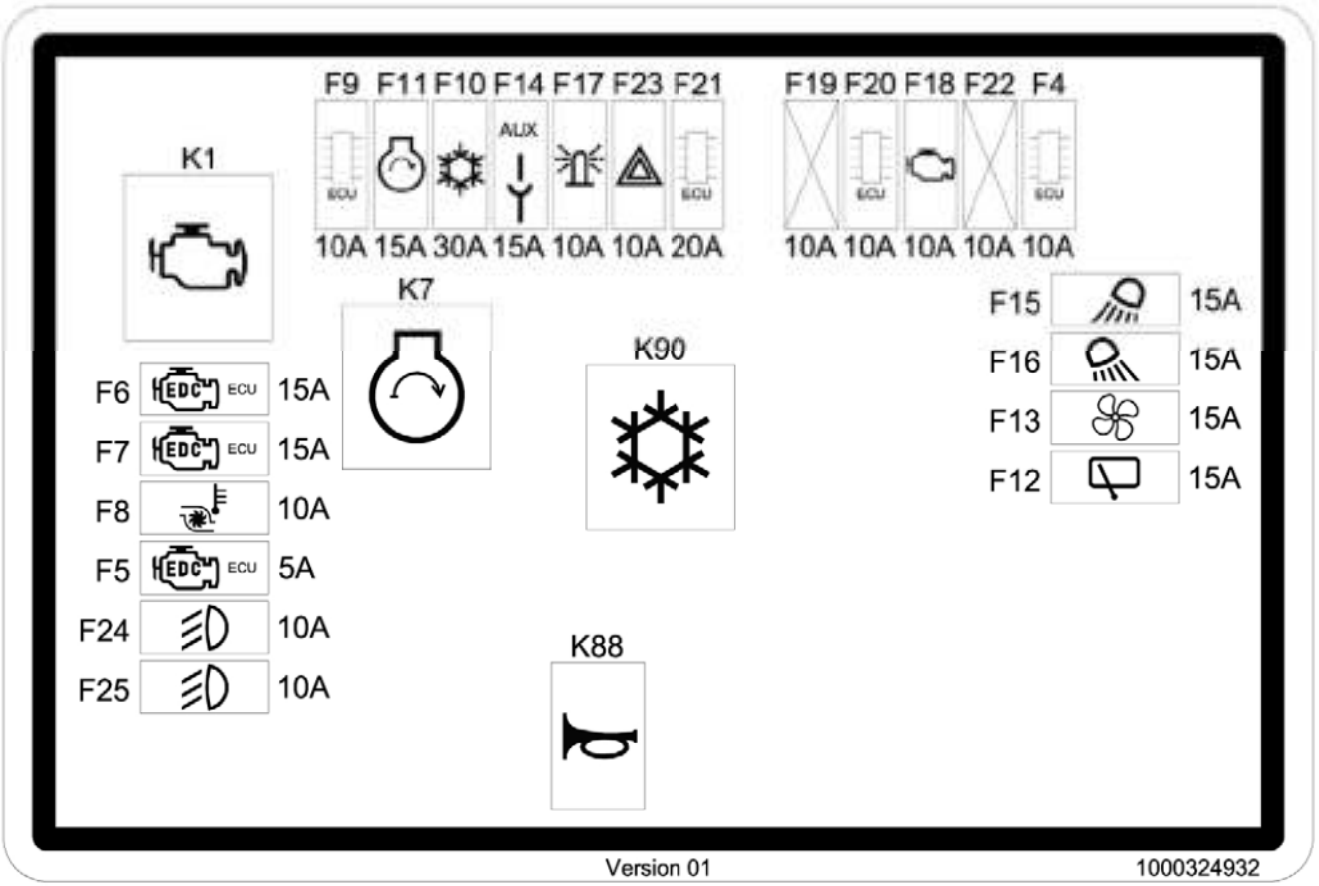
2.14 Electrical system

Electrical components	
Alternator	12 V/120 A
Starter	12 V/3.2 kW
Battery[1]	12 V/100 Ah
Battery[1] (winter package option)	12 V/120 Ah
12 V socket	15 A max.

1 According to DIN EN 50342, DIN IEC 60095-2

Fuse box

The fuse box is located behind the operator seat.



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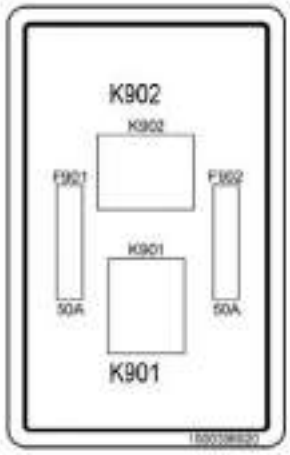
Main fuse box

The main fuse box is located at the upper right in the engine compartment.



F901

F902

Fuses/relays	Rated current	Protected circuits
F901	50A	Main engine fuse
F902	50A	Main starter fuse
F4	10A	Controller, control lever inputs, reversing signal
F5	5A	ECU supply
F6	15A	ECU supply
F7	15A	ECU supply
F8	10A	Preheater
F9	10A	Main ECU relay, internal controller, Telematic, drive interlock, alarm
F10	30A	Air conditioning
F11	15A	Starter
F12	15A	Wiper
F13	15A	Heating
F14	15A	12 V socket
F15	15A	Working light
F16	15A	Working light
F17	10A	Rotating beacon
F18	10A	ECU engine
F19	10A	Not assigned
F20	10A	Display element, controller 15, controller inputs
F21	20A	Controller
F22	10A	Not assigned

Fuses/relays	Rated current	Protected circuits
F23	10A	Hazard warning system
F24	10A	Parking light
F25	10A	Low beam
K901	Relay for ignition plus	
K902	Preheating relay (American tier III only)	
K1	Main engine relay	
K7	Start high-current relay	
K88	Horn relay	
K90	Air conditioning relay	

Bulbs

	SW24/28/ST35/45
Working lights/roof lights	H3 12 V/55 W
Interior light	Festoon lamp 12 V/5 W
Rotating beacon	H1 12 V/55 W

2.15 Tightening torques

Model-specific tightening torques

SW24/SW28		
Component	Thread	Torque Nm (ft.lbs.)
Traveling drive	M16 10.9	135 (100)
Angled engine bracket	M12 10.9	110 (81)
Engine bearing	M12 10.9	110 (81)
Pump base	M10 8.8	65 (48)
Tandem pump	M14 10.9	160 (118)
Gear pump	M12 10.9	110 (81)

*) All connections with an * must be glued with Loctite 52420 or VaryBond 12-43.

General tightening torques

UNF thread Triple-Lok with O-ring			
Thread	Wrench size	Torque Nm (ft.lbs)	
		Steel	Aluminum
7/16-20	14/17	23 (17)	15 (11)
1/2-20	16	28 (20.6)	19 (14)
9/16-18	17/19	34 (25)	22 (16.2)
3/4-16	22/24	60 (44.2)	39 (28.7)
7/8-14	25/27	115 (84.8)	75 (55.3)
1 1/16-12	32/36	140 (103.3)	91 (67.1)
1 5/16-12	41/46	210 (154.8)	137 (101)
1 5/8-12	48/50/55	290 (213.9)	190 (140)
1 7/8-12	--	325 (239.7)	212 (157.8)

UNF thread Triple-Lok		
Thread	Wrench size	Torque Nm (ft.lbs)
7/16-20	14/16	18 (13.2)
1/2-20	17	23 (17)
9/16-18	19	30 (22.1)
3/4-16	22	57 (42)
7/8-14	27	81 (59.7)
1 1/16-12	32	114 (84)
1 5/16-12	38/41	160 (118)
1 5/8-12	50	228 (168.2)
1 7/8-12	57/60	265 (195.5)
2 1/2-12	72	360 (265.5)

UNF thread O-Lok		
Thread (ORFS)	Wrench size	Torque Nm (ft.lbs)
9/16-18	17	25 (18.4)
11-16-16	21	40 (29.5)
13/16-16	24	57 (42)
1-14	29	85 (62.7)
1 3/16-12	35	123 (90.7)
1 7/16-12	41	160 (118)
1 11/16-12	48	205 (151.2)
2-12	--	278 (205)

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)

Threaded fittings with various seals for hydraulic applications (light execution)					
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)

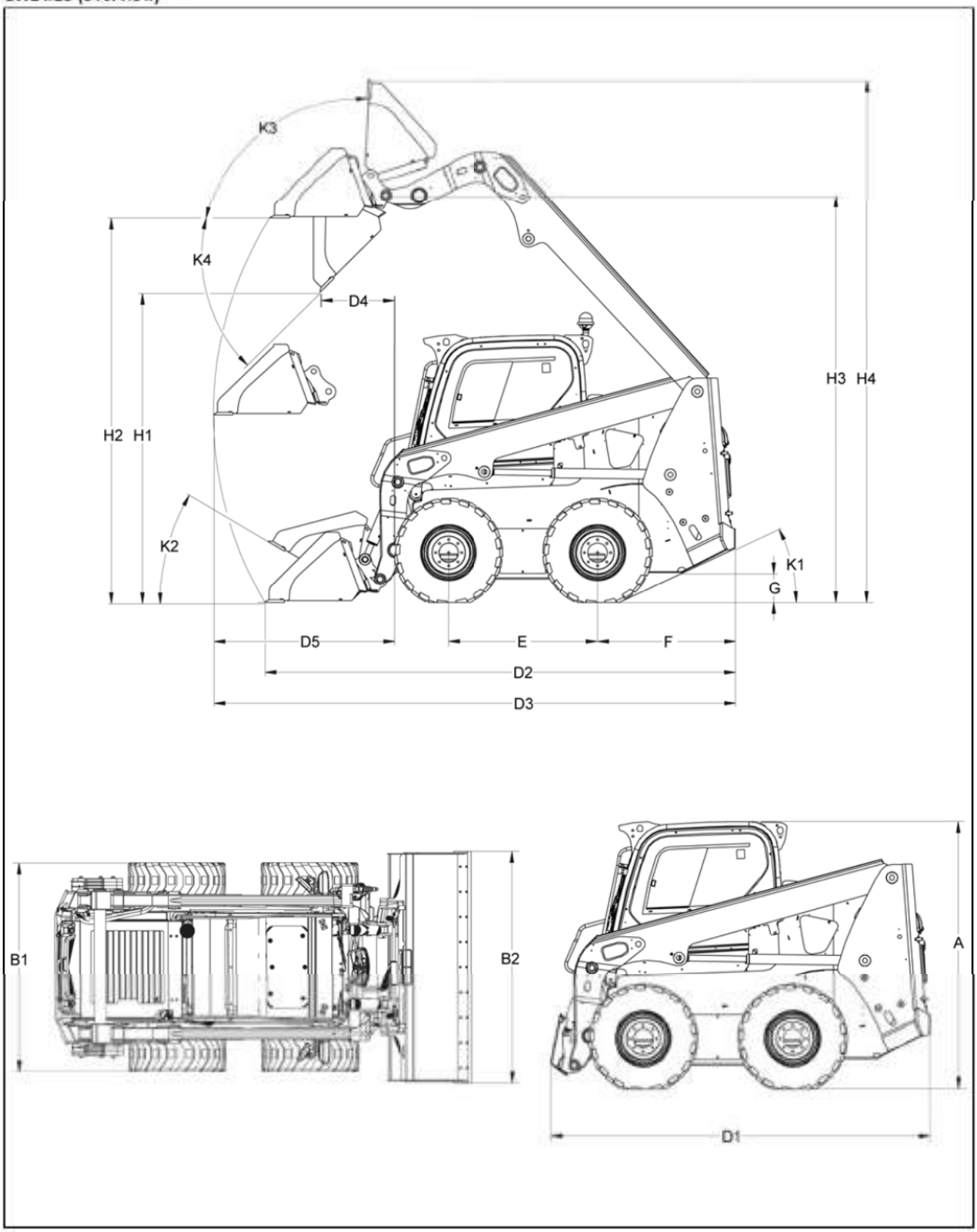
DIN 912 – hexagon socket head cap screw; DIN 931/DIN 933 – hexagon head screw with/without shaft;
DIN 7984 – hexagon socket head cap screw with short head
All values subject to a friction coefficient of μ = 0.12 and are to be used as approximate figures.

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 μ = 0.12 and are to be used as approximate figures.

2.16 Dimensions

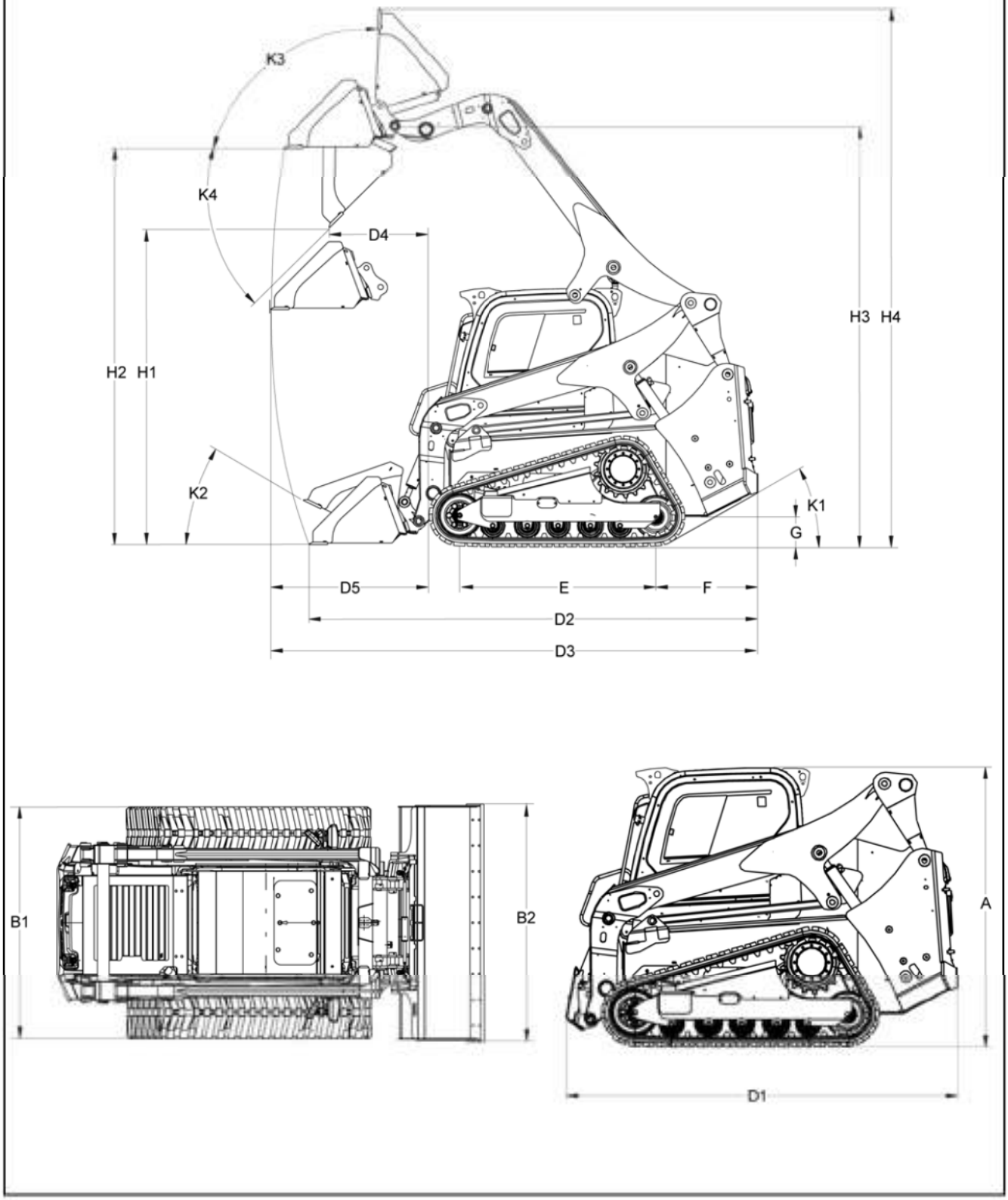
SW24/28 (overview)



	Values with bucket 1900 mm (75 in)	SW24 mm (in/ft'-in")	SW28[1] mm (in/ft'-in")
A1	Height	2088 (82)	
B1	Width incl. wheels (for tires 12x16.5)	1830 (72)	
B2	Bucket width	1900 (75)	
D1	Length without attachment	2945 (9'-8")	2945 (9'-8")
D2	Length	3660 (12')	3660 (12')
D3	Maximum length	4062 (13'-4")	3968 (13')
D4	Reach	585 (23)	900 (35)
D5	Maximum reach	1405 (55)	1311 (52)
E	Wheelbase	1164 (46)	
F	Rear overhang	1069 (42)	
G	Ground clearance	240 (9)	235 (9)
H1	Maximum tilt-out height	2420 (95)	2720 (8'-11")
H2	Topmost bucket position	3000 (9'-10")	3240 (10'-8")
H3	Maximum height up to bucket joint	3180 (10'-5")	3420 (11'-3")
H4	Maximum height	4083 (13'-5")	4331 (14'-3")
K1	Departure angle	25°	
K2	Tilt-in angle on the ground	31°	30°
K3	Tilt-in angle	93°	100°
K4	Tilt-out angle	45°	40°

1. Symbolic SW28 figure : machine is equipped with a vertical loader arm system.

ST35/ST45 (overview)



	Values with bucket 2030 mm (80 in)	ST35[1] mm (in/ft'-in")	ST45 mm (in/ft'-in")
A1	Height	2088 (82)	2108 (83)
B1	Width incl. tracks	1982 (78)	
B1	Width incl. narrow tracks	1851 (72.9)	
B2	Bucket width	2030 (80)	
D1	Length without attachment	2940 (9'-8")	2940 (9'-8")
D2	Length	3660 (12')	3660 (12')
D3	Maximum length	4062 (13'-4")	3968 (13')
D4	Reach	585 (23)	900 (35)
D5	Maximum reach	1382 (54)	1289 (51)
E	Wheelbase	1600 (63)	
F	Rear overhang	830 (33)	
G	Ground clearance	240 (9)	250 (10)
H1	Maximum tilt-out height	2420 (95)	2720 (8'-11")
H2	Topmost bucket position	3000 (9'-10")	3240 (10'-8")
H3	Maximum height up to bucket joint	3200 (10'-6")	3440 (11'-3")
H4	Maximum height	4103 (13'-6")	4351 (14'-3")
K1	Departure angle	30°	
K2	Tilt-in angle on the ground	31°	30°
K3	Tilt-in angle	93°	100°
K4	Tilt-out angle	45°	40°

1. Symbolic ST35 figure : machine is equipped with a radial loader unit system.

Maintenance

3 Maintenance

3.1 Fluids and lubricants

Application	Fluid/lubricant	Specification	Season/ temperature	Capacities [1]
Diesel engine	Engine oil[2]	API CH-4	−20 to +40 °C (−4 to 104 °F)	8 l (2.1 gal)
		ACEA E5		
		EMA-DHD-1		
		API CJ-4		
		ACEA E9		
		ECF-3		
Diesel engine[2]	Diesel fuel	ASTM D975 grade 2D S15 (USA)[3]	Summer or winter diesel depending on outside tempera-tures	92 l (24.3 gal)
		EN 590 (EU)[4]		
		BS 2869:2010 class A2 (GB)[5]		
Engine cooling system	Coolant	Soft or distilled water and anti-freeze ASTM D6210	Year-round	16 + 2 l (4.2 + 0.52 gal)
Hydraulic oil reservoir	Hydraulic oil	Eurolub HVLP 46[5]	Year-round[6]	45 + 20 l (11.9 + 5.3 gal)
	Biodegradable hydraulic oil[7]	Panolin HLP Synth 46		
Gearbox ST35/45	Gearbox oil	SAE 75W-90	Year-round	1.3 l (0.3 gal) on either side
Chain cases SW24/28	Engine oil	SAE 10W-40	Year-round	18 l (4.8 gal) on either side
Grease	Grease nipples	KPF 2 K-25[8]	Year-round	According to the maintenance plan
Battery terminals	Acid-proof grease [9]	FINA Marson L2	Year-round	As required
Washer system	Cleaning agent	Glass cleaner and antifreeze	Year-round	1.2 l (73 in^3)

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. Using biodegradable diesel fuel is prohibited.
3. Sulfur content up to 15 ppm (0.0015 %)
4. Sulfur content up to 10 ppm (0.001 %)
5. According to DIN 51524 section 3, ISO-VG 46
6. Depending on local conditions – *see Engine-oil types (temperature-dependent)* on page 3-3
7. Biodegradable hydraulic oil based on saturated synthetic esters with an iodine value of < 10, according to DIN 51524, section 3, HVLP, HEES
8. KF2K-25 according to DIN 51502 multipurpose lithium grease with MoS^2 additive
9. Standard acid-proof grease NGLI category 2

Engine-oil types (temperature-dependent)

American Tier IV engine		
Viscosity grade	Ambient temperature	
API CJ-4; ACEA E9; ECF-3	min.	max.
SAE 0W30	-30 °C (-22 °F)	30 °C (86 °F)
SAE 0W40	-30 °C (-22 °F)	40 °C (104 °F)
SAE 5W30	-25 °C (-13 °F)	30 °C (86 °F)
SAE 5W40	-25 °C (-13 °F)	50 °C (122 °F)
SAE 10W30	-18 °C (0 °F)	40 °C (104 °F)
SAE 10W40	-18 °C (0 °F)	50 °C (122 °F)
SAE 15W40	-10 °C (14 °F)	50 °C (122 °F)

Hydraulic oil types (depending on temperature)

Hydraulic oil types		
Viscosity grade	Ambient temperature	
HVLP 46[1]	min.	max.
ISO VG32	-20 °C (-4 °F)	30 °C (86 °F)
ISO VG46	-5 °C (23 °F)	40 °C (104 °F)
ISO VG68	5 °C (41 °F)	50 °C (122 °F)

1. According to DIN 51524 section 3, ISO-VG 46.

Additional hydraulic-oil and filter replacement

Notice!

An additional hydraulic-oil 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
Normal operation		Every 1000 o/h	Replace the first time after 50 o/h, then every 500 o/h
Share of hammer operation	20 %	Every 800 o/h	300 o/h
	40 %	Every 400 o/h	
	60 %	Every 300 o/h	100 o/h
	Over 80 %	Every 200 o/h	

Important information regarding operation with biodegradable hydraulic oil

- Use only the biodegradable oils that have been tested and released by Wacker Neuson. Contact a Wacker Neuson dealer for the use of other products that have not been released. In addition, ask the oil supplier for a written declaration of guarantee. This guarantee is applicable to damage occurring on the hydraulic components that can be proved to be due to the hydraulic oil.
- Use only biodegradable oil of the same type for adding oil. In order to avoid misunderstandings, a label providing clear information is located on the hydraulic oil reservoir (next to the filler inlet) regarding the type of oil currently used. Replace missing labels. The joint use of two different biodegradable oils can affect the quality of one of the oil types. Therefore, ensure that the remaining amount of initial hydraulic fluid in the hydraulic system does not exceed 8 % when changing biodegradable oil (follow the manufacturer's indications).
- Do not add mineral oil – the content of mineral oil should not exceed 2 % in order to avoid foaming problems and to ensure biological degradability.
- When running the machine with biodegradable oil, the same oil and filter replacement intervals are valid as for mineral oil.
- Always have the condensation water in the hydraulic oil reservoir drained by a Wacker Neuson service center before the cold season. The water content may not exceed 0.1 % by weight.
- The instructions in this Operator's Manual concerning environmental protection are also valid for the use of biodegradable oil.
- If additional hydraulic attachments are installed or operated, use the same type of biodegradable oil for these attachments to avoid mixtures in the hydraulic system.
- Subsequent change from mineral oil to biodegradable oil must be performed by a Wacker Neuson service center.

3.2 Maintenance overview

Maintenance label

Maintenance that has to be performed by the operator is indicated on the maintenance label.

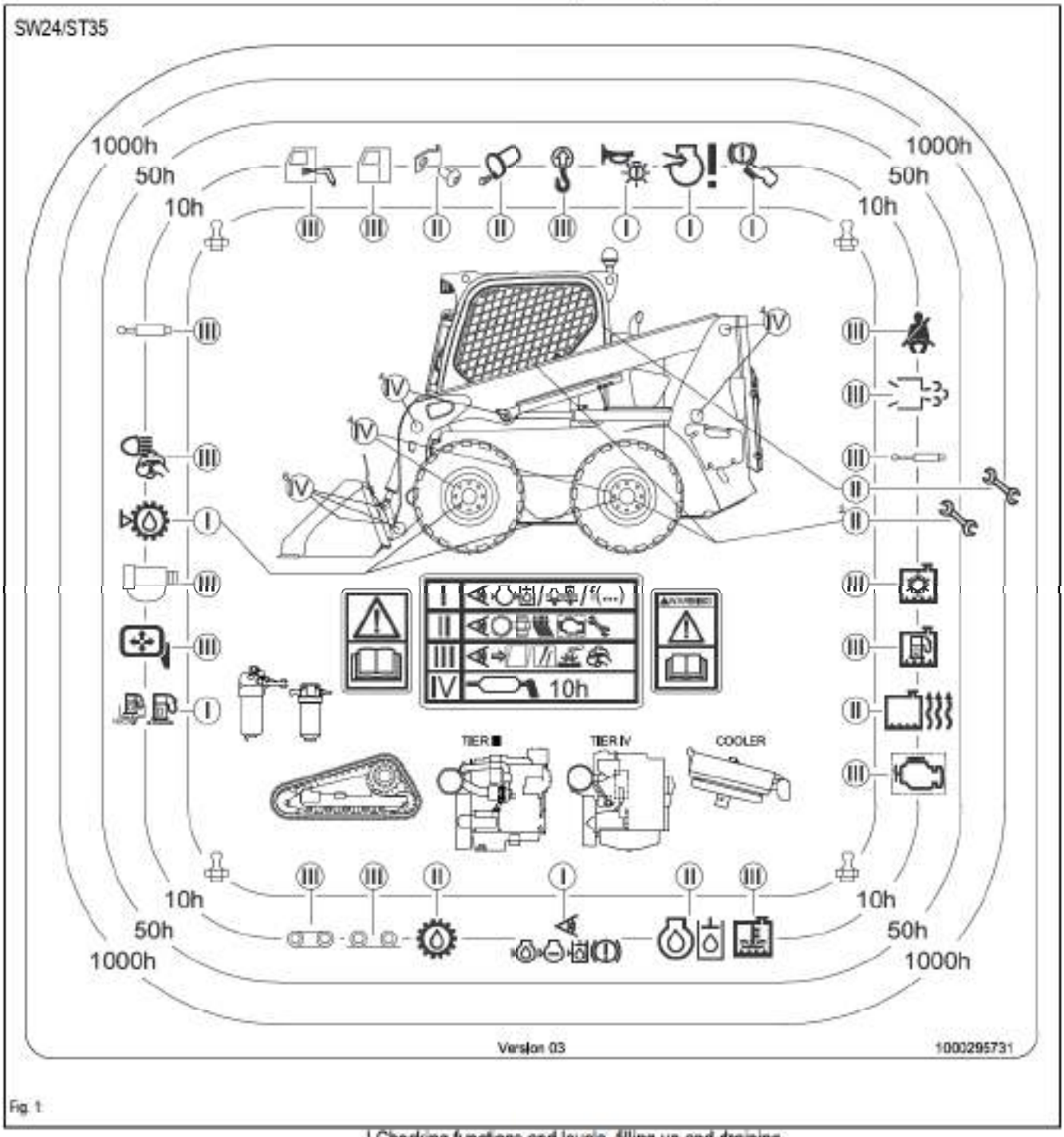


Fig. 1

I Checking functions and levels, filling up and draining.

II Checking wear parts, seals, hoses and threaded fittings.

III Checking for damage, corrosion, dirt.

IV Lubricate daily after the work shift.

Maintenance that has to be performed by the operator is indicated on the maintenance label.

SW28/ST45

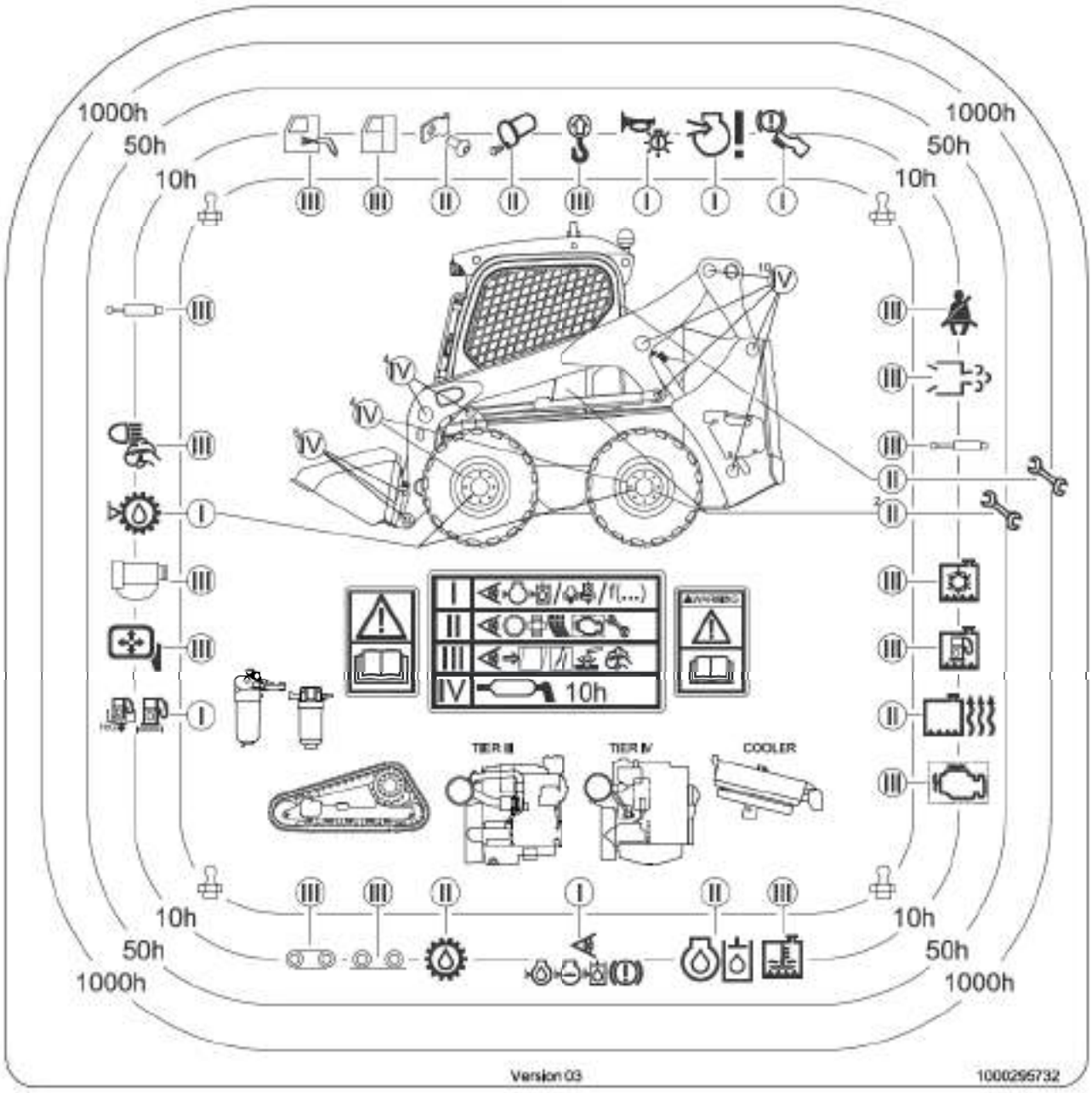


Fig. 2

I Checking functions and levels, filling up and draining.

II Checking wear parts, seals, hoses and threaded fittings.

III Checking for damage, corrosion, dirt.

IV Lubricate daily after the work shift.

3.3 Lubrication work

Preparing lubrication

Fig. 3: Preparing lubrication

- ☞ *Park the machine on firm, level and horizontal ground.*
- ☞ *Lower the loader unit to the ground.*
- ☞ *Stop the engine.*
- ☞ *Release the pressure in the hydraulic system. – see chapter 1.10 Releasing the pressure in the hydraulic system on page 1-12.*
- ☞ *Raise the safety bars.*
- ☞ *Remove the starting key and carry it with you.*
- ☞ *Remove all loose objects inside the machine, or store them safely.*
- ☞ *Close the windows and the door.*
- ☞ *Close and lock all covers.*
- ☞ *Attach a warning label to the control elements (for example "Machine being serviced, do not start").*
- ☞ *Wait at least 10 minutes after stopping the engine!*

3.4 Lubrication plan

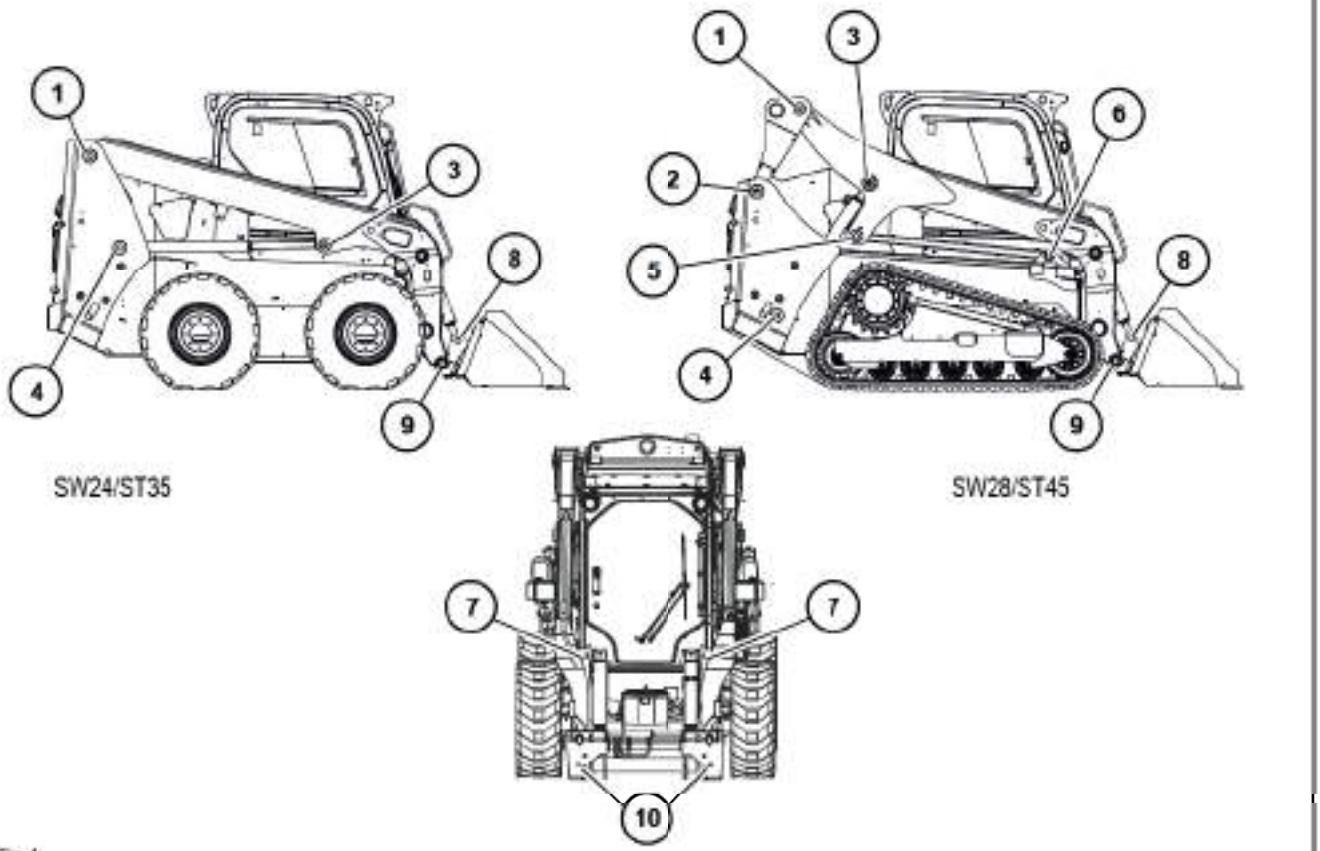
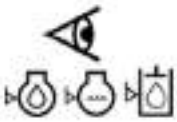


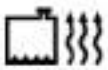
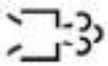
Fig. 4:

Lubricate the specified lubrication points once a day.

Position	Lubrication point	SW24	SW28	ST35	ST45	Quantity
1	Loader unit	●	●	●	●	2
2	Loader unit swingarm	--	●	--	●	2
3	Loader-unit cylinder (front)	●	●	●	●	2
4	Loader-unit cylinder (rear)	●	●	●	●	2
5	Rear joint rod	--	●	--	●	2
6	Front joint rod	--	●	--	●	2
7	Upper bucket cylinder	●	●	●	●	2
8	Lower bucket cylinder	●	●	●	●	2
9	Quickhitch pin	●	●	●	●	2
10	Quickhitch cylinder pin	●	●	●	●	2

3.5 Maintenance plan

Daily maintenance (operator)		
Symbol	Inspection work (Check the following engine/machine fluids. Check the oil levels after a test run and add oil if necessary)	Page
	Check the fluids and lubricants (engine oil, engine coolant, hydraulic oil)	3-31, 3-36, 3-54
	Check the radiators (for example water, hydraulic oil) for dirt, clean them if necessary	3-36
	Check the fuel radiator for dirt, clean it if necessary	3-36
	Lubricate the machine according to the lubrication plan	3-8
	Check the water separator (prefilter) and fuel filter: drain water if necessary	3-25
	Check the tires and rims (damage, inflation pressure, tread depth)	3-61
	Check the tracks (damage, tension, profile)	3-61
	Check the engine air intake	3-40
	Check pin lock	--
	Check line fixtures	--
	Check the indicator lights and acoustic warning devices	--
	Check the service and parking brake function	--
	Check the hydraulic couplings for dirt	--
	Check the threaded fittings of the protective structures (rollbar, cabin, for example) for tightness	--
	Clean the lights/light system, signaling systems	--

Daily maintenance (operator)		
Option		Page
	Check labels and Operator's Manual for completeness and condition	--
	Adjust the mirrors correctly, clean them and check them for damage, check the fastening screws and tighten them if necessary	--
	Check the condenser for dirt, clean it if necessary	--
Leakage check		
Check for tightness, leaks and chafing: pipes, flexible lines and threaded fittings of the following assemblies and components. Have them repaired if necessary		Page
	Engine and hydraulic system	--
	Traveling drive, axles and transfer gearbox	--
	Cooling systems, heating and hoses (visual check)	--
Visual check		
Correct function; deformations, damage, surface cracks, wear and corrosion		Page
	Check the exhaust system for damage	--
	Check the insulating mats in the engine compartment for damage	--
	Check the cabin and protective structures for damage (FOPS, for example)	--
	Check the piston rods of the cylinders for damage	--
	Check the seat belt for damage	--
	Check function of radiator cover gas strut	--
	Check the lifting eyes	--
	Check accesses and exits for dirt	--

Weekly maintenance (every 50 operating hours) (operator)		Page
All steps for previous maintenance intervals		–
	Lubricate the machine according to the lubrication plan	3-8
	Retighten the axle mountings	–
	Check the wheel nuts for tightness (SW24/28 only)	3-62

Only once after the first 50 operating hours (Wacker Neuson service center)	
Replace the hydraulic oil filter (boost-pressure filter + return filter)	--
Check the threaded fittings for tightness	--
Pressure check of primary pressure limiting valves	--
Check the gearbox oil level of the drive (SW24/28)	--
Check track tension (SW24/28)	--
Reset the maintenance meter	--

Every 250 operating hours or once a year (Wacker Neuson service center)	
Replace the gearbox oil of the drive (ST35/45 only)	--
All steps for maintenance once a day and once a week	--

Every 500 operating hours or once a year (Wacker Neuson service center)	
Engine oil replacement	--
Engine oil filter replacement	--
Fuel filter replacement	--
Replace the water-separator prefilter element	--
Replace the hydraulic oil filter (boost-pressure filter + return filter)	--
Replace the gearbox oil of the drive (ST35/45)	--
Clean the dust valve	--
Check the electric cables and connectors (cable and grounding connections, etc.)	--
Check the threaded fittings for tightness	--
Clean the cabin air filter (replace it if necessary)	--
Replace the gearbox oil of the drive (SW24/28)	--
Check track tension (SW24/28)	--
Reset the maintenance meter	--
Option	
Check the oil level in the air conditioning compressor and the threaded fittings for tightness	--
Check the dehumidifier of the air conditioning system (visual check)	--
All steps for maintenance once a day and once a week (and all steps for maintenance at 250 operating hours)	--

Every 1000 operating hours (Wacker Neuson service center)	
Hydraulic oil replacement	--
Replace the breather filter of the hydraulic oil reservoir	--
Air filter replacement[1]	--
Check the water pump (visual check)	--
Replace the cabin air filter	--
Pressure check of primary pressure limiting valves	--
Check the battery condition (charge condition, terminals, etc.)	--
Lifting eye wear (check at least once a year)	--
All steps for maintenance once a day and once a week (and all steps for maintenance at 250 and 500 operating hours)	--

1. Air filter replacement according to the indicator light, every 1000 oh or once a year at the latest. (Replace after 50 oh 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, independently of the indicator light)

Every 1500 operating hours (Wacker Neuson service center)	
Replace the crankshaft housing filter	–
All steps for maintenance once a day and once a week (and all steps for maintenance at 250 and 500 operating hours)	–

Every 2000 operating hours or every 2 years (Wacker Neuson service center)	
Coolant replacement	–
Check the exhaust-gas turbocharger	–
Check the bladder type accumulator	–
Option	
Replace the dehumidifier of the air conditioning system	–
Replace the air conditioning refrigerant	–
Replace the air-conditioning compressor oil	–
All steps for maintenance once a day and once a week (and all steps for maintenance at 250, 500 and 1000 operating hours)	–

Every 3000 operating hours or every 3 years (Wacker Neuson service center)	
Check the radiator cap	–
Replace the Lambda probe	–
Replace the V-belt of the water pump/alternator/fan	–
Option	
Replace the air-conditioning V-belt	–
All steps for maintenance once a day and once a week (and all steps for maintenance at 250, 500, 1000 and 1500 operating hours)	–

Notice!

Maintenance with the note **Wacker Neuson service center** must only be performed by the trained and qualified personnel of a Wacker Neuson service center.

Notice!

The maintenance meter starts at 500.0 hours. It counts down to 0.0 hours. A wrench symbol flashes as soon as the maintenance meter reaches this value.

3.6 Information on maintenance

Responsibilities and prerequisites

The working order and the service life of machines are heavily dependent on maintenance.

Daily and weekly servicing and maintenance must be performed by specifically trained personnel.

Have the maintenance, delivery inspection and the entries in the service booklet performed by a Wacker Neuson service center, otherwise warranty claims will not be acknowledged.

It is therefore in the interest of the machine owner to perform the mandatory maintenance.

This ensures optimal machine operation. Immediately repair or replace parts that are already damaged or not working properly before they are due for replacement.

Repair or replacement of safety-relevant parts may only be performed by a Wacker Neuson service center.

Use only original spare parts for repairs.

The manufacturer shall not be liable for damage to the machine or personal injury caused by failure to observe the specific information and descriptions.

Important safety instructions on maintenance

- Follow all safety instructions given in this Operator's Manual.
- Follow the instructions given in chapter **Safety, safety instructions on maintenance** and **qualification of the operating and maintenance personnel** in this Operator's Manual.
- Follow the maintenance and safety instructions given in the Operator's Manuals of the attachments.
- Wear protective gloves and clothing.
- Observe the danger indications and safety instructions during maintenance.
- In order to avoid injury hazard, do not perform work on a hot and running engine.
- Use a suitable container to collect fluids and lubricants as they flow out and dispose of them in an environmentally friendly manner.
- Attach a warning label to the control elements (for example **Machine being serviced, do not start**).
- Stop the machine (see Preparing lubrication).
- In order to avoid damage to electronic components, do not perform welding work on the machine, add-on parts or tools. Contact a Wacker Neuson service center.

3.7 Maintenance accesses

Radiator cover

Danger!

Burn hazard due to hot engine parts!

Can cause serious burns.

☞ *Stop the engine and let it cool down.*

☞ *Wear protective equipment.*

Danger!

Injury hazard due to rotating parts!

Rotating parts can cause serious injury or death.

☞ *Open the engine cover only at engine standstill.*

Caution!

Injury hazard due to open radiator cover and/or tilted radiator!

Can cause injury.

☞ *Make sure not to hit your head on the open radiator cover or tilted radiator.*

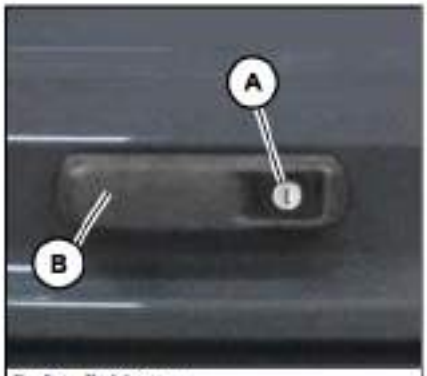


Fig. 5: Radiator cover

Unlocking and locking:

Unlock and lock the radiator cover with the starting key.

☞ *Turn the starting key in lock A anticlockwise.*

➥ The radiator cover is locked.

☞ *Turn the starting key in lock A clockwise.*

➥ The radiator cover is unlocked.

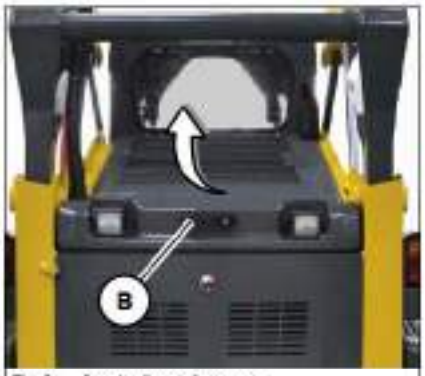


Fig. 6: Opening the engine cover

Opening:

☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*

☞ *Press button **A** and pull handle **B** upward.*

➥ The radiator cover is held open with a gas strut.

Fig. 7: Closing radiator cover

Closing:

☞ *Press the radiator cover down until it locks into place.*

Engine cover

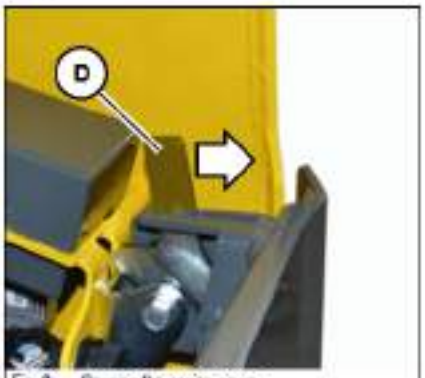


Fig. 8: Opening the engine cover

Opening:

☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*

☞ *Open the engine cover.*

☞ *Unlock lever **D** near the main fuse box and fully open the engine cover toward the left. This locks it in its final position.*

Fig. 9: Opening the engine cover

Notice!

The engine cover can only be opened if the radiator cover is open.

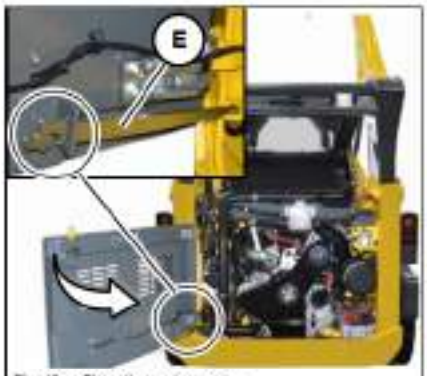


Fig. 10: Close the engine cover

Closing:

☞ *Move the engine cover slightly to the right and raise lock E at the same time.*

☞ *Completely close the engine cover and let it lock into place.*

Notice!

Close the engine cover only if the radiator cover is open.

Tilting the radiator

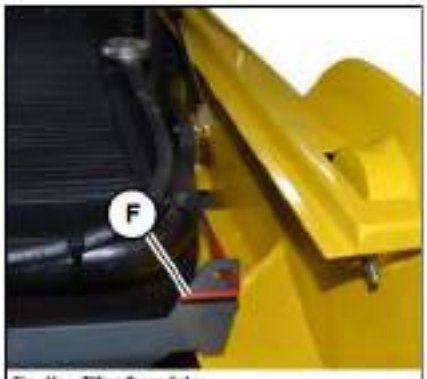


Fig. 11: Tilting the radiator

Unlocking the radiator

☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*

☞ *Open the radiator and engine cover.*

☞ *Pull lock F. This unlocks the radiator.*


Fig. 12: Raising the radiator

Raising the radiator (SW24/ST35)

☞ *Raise the radiator on the right side.*

➥ A gas strut holds the radiator in its final position.


Fig. 13: Raising the radiator

Raising the radiator (SW28/ST45)

☞ *Lower the radiator cover onto the radiator.*

☞ *Raise the radiator cover and radiator together on the right side.*

➥ A gas strut holds the radiator in its final position.

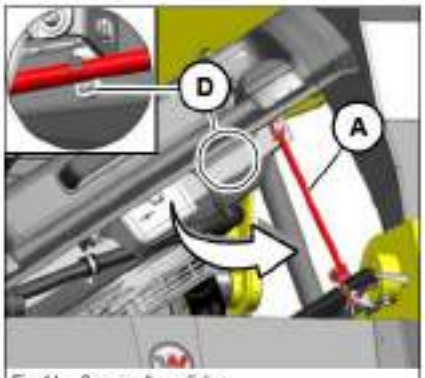


Fig. 14: Securing the radiator

Securing the radiator (SW24/SW28/ST35/ST45)

☞ *Release and lower radiator prop **A** from clip **D**.*

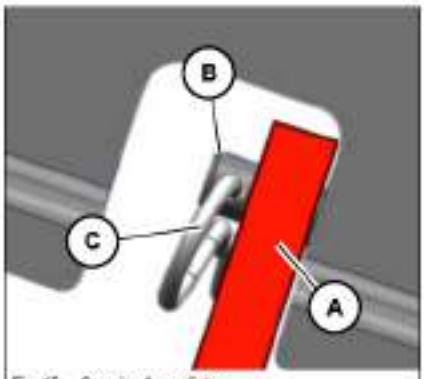


Fig. 15: Securing the radiator

☞ *Slide radiator prop **A** over pin **B** and secure it with split pin **C**.*


Fig. 16: Lowering the radiator

Lowering the radiator (SW24/ST35)

☞ *Release radiator prop **A** from pin **B** and split pin **C**, raise it and fasten it with clip **D**.*

☞ *Lower the radiator and lock it into place.*

Fig. 17: Lowering the radiator

Lowering the radiator (SW28/ST45)

☞ *Release radiator prop **A** from pin **B** and split pin **C**, raise it and fasten it with clip **D**.*

☞ *Lower the radiator cover and the radiator, and lock them into place.*

Raising/lowering the cabin

Caution!

Crushing hazard by raising or lowering the cabin!

Raising or lowering the cabin can cause serious injury or death.

- *All persons must stay clear of the cabin as you lower it.*
- *Remove all loose objects inside the machine, or store them safely.*
- *Always close and lock the door before raising the cabin.*

The cabin can be raised in two different ways.

- Position 1: half raised, loader unit lowered.

Fig. 18: Half raised

- Position 2: completely raised, loader raised.

Fig. 19: Completely raised

Raising/lowering the cabin (position 1)

☞ *Remove cabin fastening nuts G on the left and right and store them safely.*

☞ *Raise the cabin to position 1 (half raised).*

Fig. 20: Cabin fastening nuts

☞ *Remove split pin L on the right side of the cabin.*

Fig. 21: Removing the split pin

☞ *Put cabin prop M in guide N and secure it with split pin L.*

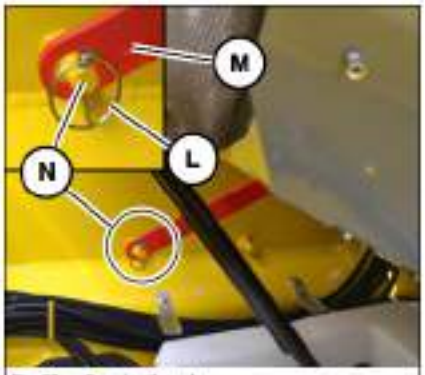


Fig. 22: Securing the cab

Notice!

Put the cabin into operation again in the reverse order.

☞ *Tighten the cab fastening nuts G to 39 Nm (29 ft.lbs) with a suitable tool.*

Fig. 23: Cabin fastening nuts

Raising/lowering the cabin (position 2)

Removing the loader unit prop (vertical loader unit system)

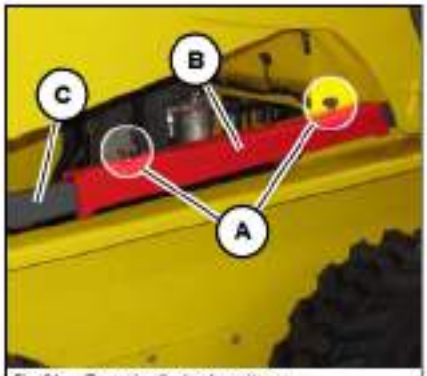


Fig. 24: Removing the loader unit prop

☞ *Remove screws **A** from joint rod **C** on the left and remove loader unit prop **B**.*

☞ *Fasten screws **A** back onto joint rod **C**.*

Raising the loader unit completely (ISO controls)

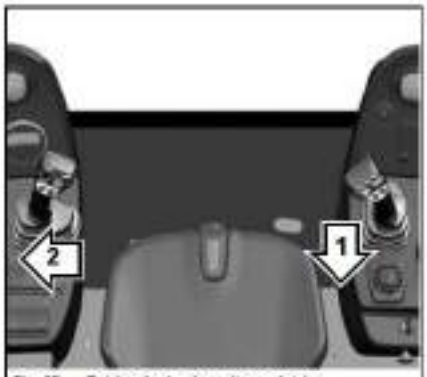


Fig. 25: Raising the loader unit completely

☞ *Pull the control lever on the right backward **(1)**.*

Raising the loader unit completely (H controls)

☞ *Push the control lever on the left **(2)** to the left.*

Securing the loader unit (vertical loader unit system)

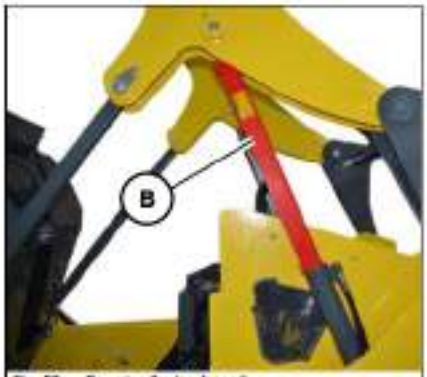


Fig. 26: Securing the loader unit

☞ *Secure the loader unit with loader unit prop **B**.*

Notice!

Lower the loader completely so that the entire weight rests on the loader unit prop. Use the emergency lowering feature – *see Emergency lowering on page 1-14.*

Securing the loader unit (radial loader unit system)

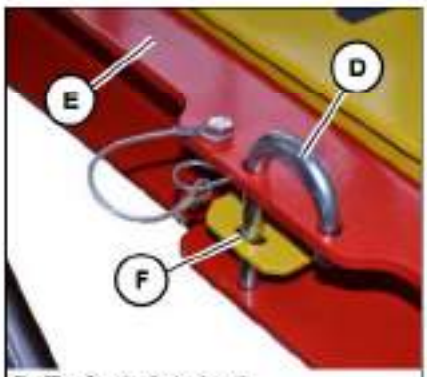


Fig. 27: Securing the loader unit

☞ *Remove split pin **D** on the left side of the loader unit and fold down loader unit prop **E**.*

Fig. 28: Lowering the loader unit prop

☞ *Fold down loader unit prop* **E**.

☞ *Insert split pin* **D** *back into guide* **F**.

Fig. 29: Securing the loader unit prop

☞ *Secure the loader unit as shown with loader unit prop* **E**.

Notice!

Lower the loader completely so that the entire weight rests on the loader unit prop. Use the emergency lowering feature – see *Emergency lowering* on page 1-14

Fig. 30: Cabin fastening nuts

☞ *Remove cabin fastening nuts* **G** *on the left and right and store them safely.*

Fig. 31: (symbolic representation)

☞ *Tilt the cabin fully forward*

➥ Safety cable **H** must be tight.

Fig. 32: Removing the split pin

☞ *Remove split pin **L** on the right side of the cabin.*

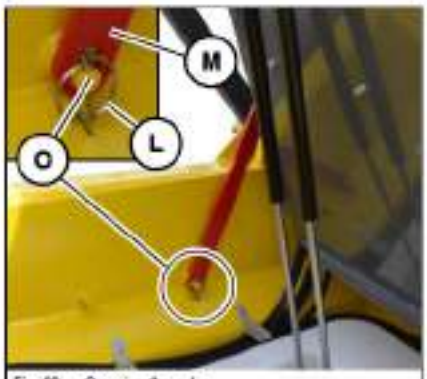


Fig. 33: Securing the cab

☞ *Put cabin prop **M** in guide **O** and secure it with split pin **L**.*

Notice!

Put the cabin into operation again in the reverse order.

Fig. 34: Cabin fastening nuts

☞ *Tighten the cab fastening nuts **G** to 39 Nm (29 ft.lbs) with a suitable tool.*

Side cover


Fig. 35: Side cover

- The side cover is located on the left side of the machine. The condenser is located behind it.

Underbody maintenance access

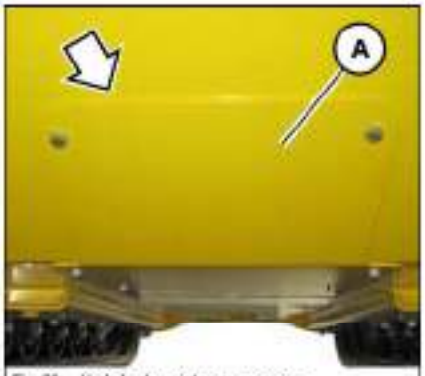


Fig. 36: Underbody maintenance access

- The underbody maintenance access is located at the rear under the machine.

☞ *Remove the fastening screws with a suitable tool.*

☞ *Remove cover A.*

☞ *Perform maintenance.*

☞ *Install cover A.*

☞ *Install and tighten the fastening screws with a suitable tool.*

Cabin fuse box

Fig. 37: Cabin fuse box

- The fuse box is located behind the backrest.

Opening:

☞ *Remove screws A and the cover.*

Closing:

☞ *Fit the cover and tighten screws A.*

Main fuse box in engine compartment

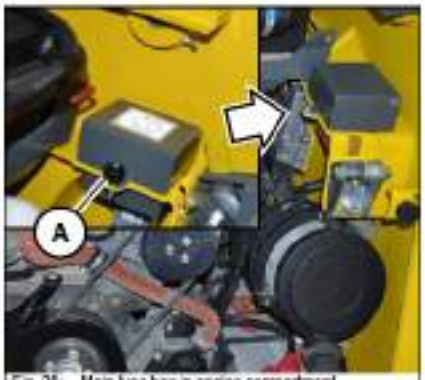


Fig. 38: Main fuse box in engine compartment

- The main fuse box is located on the right in the engine compartment.

Opening:

☞ *Remove screw A and the cover.*

Closing:

☞ *Fit the cover and tighten screw A.*

3.8 Fuel system

Important information regarding the fuel system

Notice!

In order to prevent the formation of condensation water, fill up the fuel tank nearly completely at the end of each working day.

Notice!

Do not run the fuel tank completely dry. Otherwise, air is drawn into the fuel system. This requires bleeding the fuel system.

Diesel fuel specification

Notice!

Engine damage due to incorrect or dirty diesel fuel.

- Only use clean diesel fuel according to the engine/machine **fluids and lubricants**.
- Do not use any diesel fuel with additives.

– *see chapter 3.1 Fluids and lubricants on page 3-2*

Refueling

Danger!

Burn hazard when refueling!

Fuels develop explosive and flammable mixtures with air that can cause serious burns or death.

- *Fire, open flames and smoking is prohibited.*
- *Keep the maintenance area clean.*
- *Do not refuel in closed rooms.*
- *Do not add gasoline to the diesel fuel.*
- *Let the engine cool down.*

Caution!

Health hazard due to diesel fuel!

Diesel fuel and fuel vapors are harmful to health!

☞ *Avoid contact with the skin, eyes and mouth.*

☞ *Seek medical attention immediately in case of accidents with diesel fuel.*

☞ *Wear protective equipment.*

Caution!

Fire hazard due to diesel fuel!

Diesel fuel gives off flammable vapors.

☞ *Fire, open flames and smoking is prohibited.*

☞ *Adding gasoline is prohibited.*

Notice!

Do not refuel with cans in order to avoid dirt in the fuel.

Fig. 38: Fuel tank filler inlet

- Filler inlet **A** of the fuel tank is located on the right of the machine.

☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*

☞ *Unlock and remove filler cap A.*

☞ *Refuel.*

☞ *Close and lock filler cap A.*

Stationary fuel pumps

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:

- Barrels must neither be rolled nor tilted before refueling
- Protect the suction pipe opening of the barrel pump with a fine-mesh screen.
- Immerse the suction pipe opening down to a max. 15 cm (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.

Water separator

A water/fuel mixture is collected in the water separator during operation.

Position

Fig. 40: (symbolic representation)

The water separator is located on the right in the engine compartment.

Notice!

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

Emptying the water separator

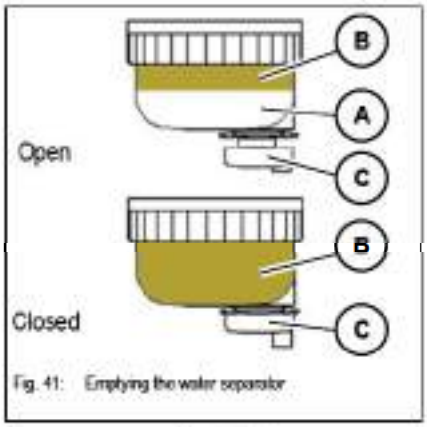


Fig. 41: Emptying the water separator

If the error message **SPN 97** appears in the multifunctional display, drain the water/fuel mixture **(A)**. Close drain valve **C** if there is only fuel **(B)** in the sight glass.

Perform the following points before emptying the water separator:

- ☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*
- ☞ *Open the radiator and engine cover.– see chapter 3.7 Maintenance accesses on page 3-15*
- ☞ *Place a suitable container under the water separator.*

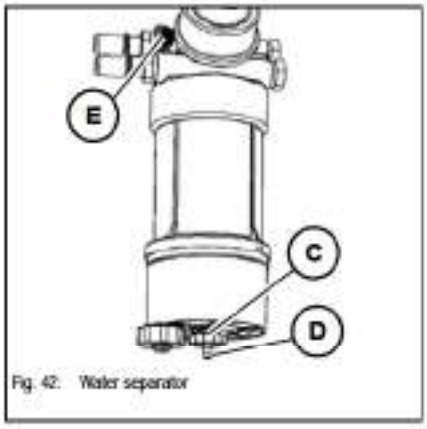


Fig. 42: Water separator

- ☞ *Connect a suitable hose to the drain device **D**.*
- ☞ *Open drain valve **C**.*
- ☞ *Loosen bleed screw **E** with a suitable tool.*
- ☞ *Drain the fuel/water mixture into the receptacle.*
- ☞ *Tighten bleed screw **E** with a suitable tool.*
- ☞ *Close drain valve **C**.*
- ☞ *Remove the hose.*
- ☞ *Close the engine and radiator cover.*
- ☞ *Lock the radiator cover.*

Replacing the prefilter element of the water separator

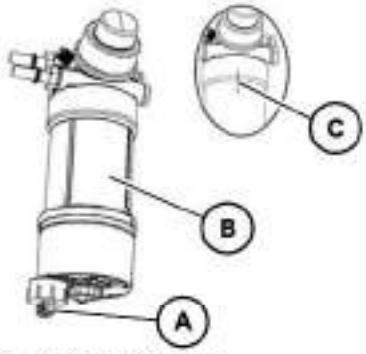


Fig. 43: Removing the filter housing

- Stop and park the machine. Stop the engine. See "Preparing lubrication".
- Prepare a suitable container for collecting the fuel/water mixture.
- Open the radiator and engine cover.– see chapter 3.7 Maintenance accesses on page 3-15
- Empty the water separator – see Emptying the water separator on page 3-27.
- Remove the cable from connection **A**.
- Make a mark **C** on the filter housing.
- Remove filter housing **B** with a suitable tool.

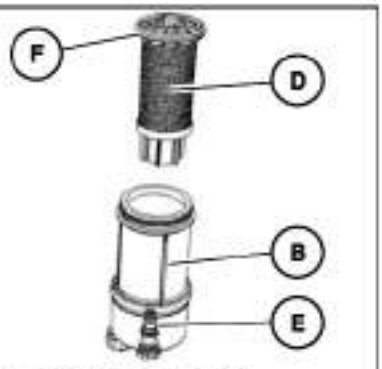


Fig. 44: Replacing the prefilter element

- Turn prefilter element **D** anticlockwise and remove it from filter housing **B**.
- Insert and screw a new prefilter element **D** onto threads **E** in filter housing **B**.
- Apply clean engine oil to O-ring seal **F**.
- Install filter housing **B** and align it with mark **C**.
- Connect the cable to connection **A**.
- Bleed the fuel system – see Bleeding the fuel system on page 3-29.
- Check the filter housing for tightness after a short test run.
- Close the engine and radiator cover.
- Lock the radiator cover.
- Dispose of the old prefilter element in an environmentally friendly manner

Environment!

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

Replacing the fuel filter

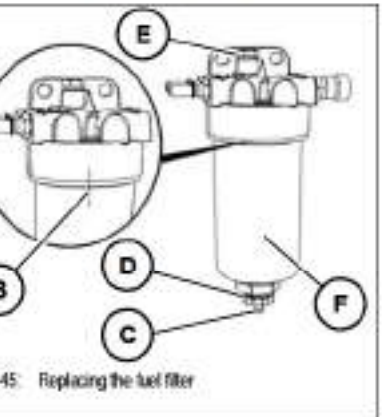


Fig. 45: Replacing the fuel filter

- Stop and park the machine. Stop the engine. See "Preparing lubrication".
- Prepare a suitable container for collecting the fuel/water mixture.
- Open the radiator and engine cover.– see chapter 3.7 Maintenance accesses on page 3-15
- Empty the water separator – see Emptying the water separator on page 3-27.
- Connect a suitable hose to the drain device **C**.
- Open drain valve **D**.
- Loosen bleed screw **E**.
  - Drain the fuel/water mixture into a receptacle.
- Tighten bleed screw **E**.
- Close drain valve **D**.
- Remove the hose.
- Make a mark **B** on the filter housing.
- Remove filter housing **F** with a suitable tool.

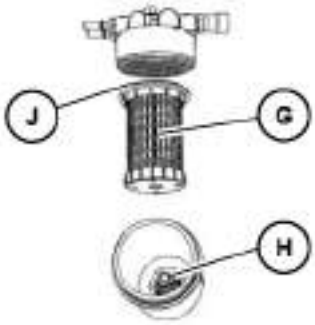


Fig. 48: Replacing the fuel filter

☞ *Turn fuel filter **G** anticlockwise and remove it from the filter housing.*
☞ *Insert and screw a new fuel filter **G** onto threads **H** in filter housing **F**.*
☞ *Apply clean engine oil to O-ring seal **J**.*
☞ *Install filter housing **F** and align it with mark **B**.*
☞ *Bleed the fuel system – see Bleeding the fuel system on page 3-29.*
☞ *Check the fuel filter for tightness after a short test run.*
☞ *Close the engine and radiator cover.*
☞ *Lock the radiator cover.*
☞ *Dispose of the old fuel filter in an environmentally friendly manner.*

Environment!

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

Bleeding the fuel system

Caution!

Burn hazard due to hot engine components!

Can cause serious burns.

☞ *Stop the engine and let it cool down.*
☞ *Wear protective equipment.*

Bleed the fuel system in the following cases:

- After removing and fitting the fuel filter, prefilter or the fuel lines back on again.
- If the fuel tank is run empty.
- If the machine is put into operation after having been out of operation for more than 30 days.

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

☞ *Stop the engine.*
☞ *Raise the safety bars.*
☞ *Remove the starting key and carry it with you.*
☞ *Bleed the fuel system again as described above.*
☞ *Check for leaks after starting the engine.*
☞ *Have a Wacker Neuson service center perform a check if necessary.*

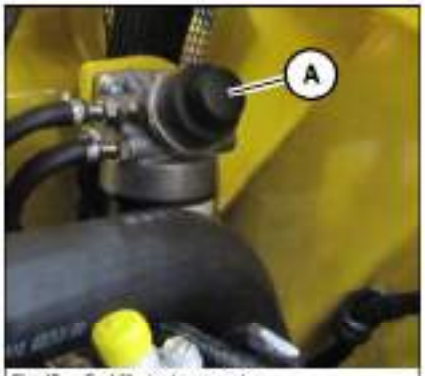


Fig. 47: Fuel filter/water separator

Bleeding the fuel system

- *Stop and park the machine. Stop the engine. See "Preparing lubrication".*
- *Fill up and close the fuel tank.*
- *Open the radiator and engine cover.*
- *– see chapter Radiator cover on page 3-15*
- *Raise the radiator cover and radiator together.*
- *– see chapter Tilting the radiator on page 3-17*
- *Press pump A several times until a firmer resistance can be felt.*
- *Press pump A 5 x.*
- *Start the engine.*

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

- *Stop the engine.*
- *Stop and park the machine. Stop the engine. See "Preparing lubrication".*
- *Bleed the fuel system again as described above.*
- *Check for leaks after starting the engine.*
- *Close the engine and radiator cover.*
- *Lock the radiator cover.*

Notice!

The fuel system can also be bled if the engine is at operating temperature.

3.9 Engine lubrication system

Important information regarding the engine lubrication system

Notice!

Engine damage due to incorrect engine oil level.

- The oil level must be between the MIN and MAX marks.

Notice!

Damage due to wrong engine oil.

- Use engine oil according to the Fluids and lubricants list.
- Have the oil changed only by a Wacker Neuson service center.

Notice!

Damage due to adding engine oil too quickly.

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

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.

Checking the engine oil level

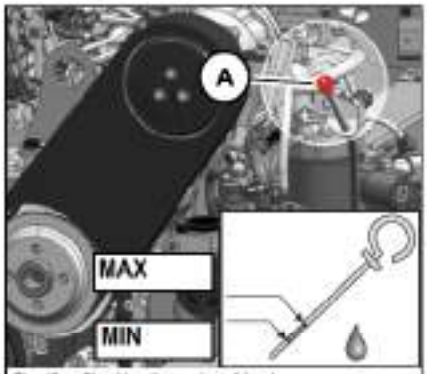


Fig. 48: Checking the engine oil level

☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*
☞ *Open the radiator and 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 oil dipstick* **A** *back in as far as possible.*
☞ *Withdraw it and read off the oil level.*
➥ The oil level must be between the MIN and MAX marks.
➥ Add engine oil if necessary.
☞ *Push oil dipstick* **A** *back in as far as possible.*
☞ *Close the engine and radiator cover.*
☞ *Lock the radiator cover.*

Adding engine oil

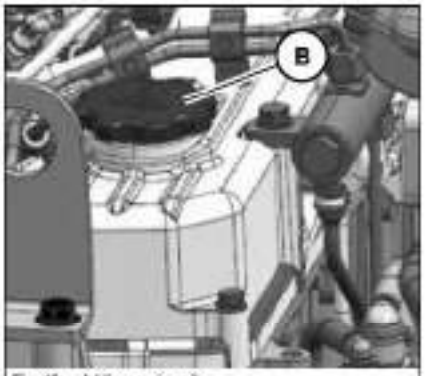


Fig. 49 Adding engine oil

- *Stop and park the machine. Stop the engine. See "Preparing lubrication".*
- *Open the radiator and engine cover.*
- *Clean the area around the oil filler cap with a lint-free cloth.*
- *Open filler cap **B**.*
- *Raise oil dipstick **A** slightly to allow any trapped air to escape.*
- *Add engine oil.*
- *Wait 5 minutes until all the oil has run into the oil sump.*
- *Check the oil level.*
- *Add oil if necessary and check the oil level again.*
- *Close filler cap **B**.*
- *Push oil dipstick **A** back in as far as possible.*
- *Close the engine and radiator cover.*
- *Lock the radiator cover.*

Notice!

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

Changing engine oil

Caution!

Caution when draining hot engine oil –

Burn hazard!

- ☞ *Wear protective gloves*
- ☞ *Use suitable tools*

Fig. 50: Draining engine oil

- ☞ *Let the engine run until it reaches its operating temperature (oil temperature about 60 °C/176 °F).*
- ☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*
- ☞ *Open the radiator and engine cover.*
- ☞ *Remove the underbody maintenance access with a suitable tool*
  – see Underbody maintenance access on page 3-24.
- ☞ *Place a suitable container under oil drain plug C.*
- ☞ *Carefully unscrew oil drain plug C with a suitable tool.*
  - ☞ If the machine is equipped withe service valve option, install the drain hose (supplied with the machine).
- ☞ *Completely drain the oil.*
  - ☞ Replace the sealing ring of oil drain plug C.
- ☞ *Screw in oil drain plug C and tighten it to 34 Nm (25 ft.lbs) with a suitable tool.*
- ☞ *Clean the area around the oil filler cap with a lint-free cloth.*
- ☞ *Add new engine oil at filler cap B.*
- ☞ *Start the engine and let it run briefly at low speed.*
- ☞ *Stop the engine.*
- ☞ *Wait about 5 minutes until all the oil has run into the oil sump.*
- ☞ *Check the oil level and add engine oil if necessary.*
- ☞ *Completely remove all oil spills from the engine.*
- ☞ *Install the underbody maintenance access with a suitable tool*
  – see Underbody maintenance access on page 3-24.
- ☞ *Close the radiator and engine cover.*
- ☞ *Lock the radiator cover.*

Environment!

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

Replacing the engine-oil filter cartridge

Caution!

Hot engine oil –

Burn hazard!

☞ *Wear protective equipment.*

☞ *No smoking, no fire!*

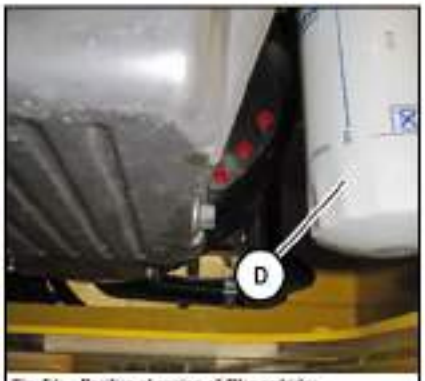


Fig. 51: Position of engine-oil filter cartridge

- The engine-oil filter cartridge **D** is located on the lower side of the machine, behind the underbody maintenance access.

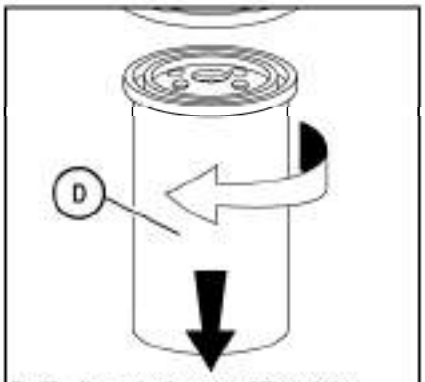


Fig. 52: Unscrewing the engine-oil filter cartridge

☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*

☞ *Open the radiator and engine cover.*

☞ *Remove the underbody maintenance access with a suitable tool – see Underbody maintenance access on page 3-24.*

☞ *Place a suitable container under the engine-oil filter cartridge.*

☞ *Slowly loosen engine-oil filter cartridge **D** using a commercially available oil filter wrench.*

☞ *Let the oil drain into the container.*

☞ *Remove engine-oil filter cartridge **D** once the oil is completely drained.*

☞ *Ensure that the thread adapter is correctly placed in the filter head.*

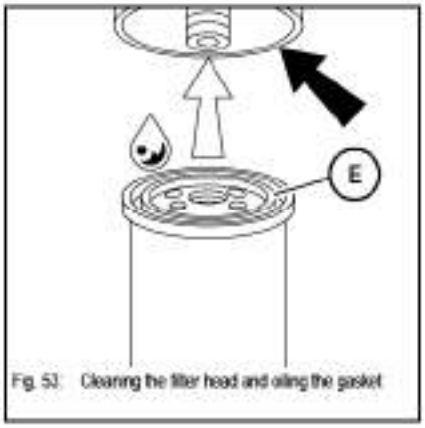


Fig. 53: Cleaning the filter head and oiling the gasket

☞ *Clean the inside of the filter head.*

☞ *Apply a thin coat of fresh engine oil to rubber seal **E** of the new engine-oil filter cartridge.*

☞ *Tighten the new engine-oil filter cartridge by hand until the gasket makes contact.*

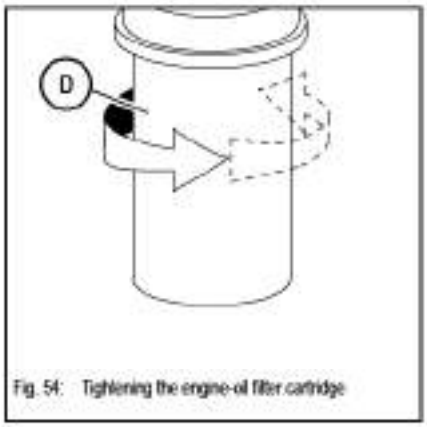


Fig. 54: Tightening the engine-oil filter cartridge

- ☞ *Tighten engine-oil filter cartridge D by hand by about half a revolution.*
- ☞ *Ensure that the oil level is correct.*
- ☞ *Let the engine run briefly.*
- ☞ *Stop the engine.*
- ☞ *Check the seal of engine-oil filter cartridge D and retighten by hand.*
- ☞ *Check the oil level and add engine oil if necessary.*
- ☞ *Completely remove all oil spills from the engine.*
- ☞ *Install the underbody maintenance access with a suitable tool*
  – see *Underbody maintenance access on page 3-24.*
- ☞ *Close the radiator and engine cover.*
- ☞ *Lock the radiator cover.*
- ☞ *Dispose of used engine-oil filter cartridges through approved methods for recycling.*

Environment!

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

3.10 Cooling system

Important information regarding the cooling system

Danger!

Poisoning hazard due to hazardous substances!

Contact with hazardous substances can cause serious injury or death.

- *Wear protective equipment.*
- *Do not inhale or swallow coolant.*
- *Avoid contact of the coolant or antifreeze with the skin and eyes.*

Danger!

Burn hazard due to coolant or antifreeze!

The coolant and antifreeze are easily flammable fluids that can cause serious burns or death if they are brought into contact with fire or open flames.

- *Only perform maintenance on an engine that has cooled down.*
- *Do not smoke, avoid fire and open flames.*

Caution!

Burn hazard due to hot coolant!

At high temperatures, the cooling system is under pressure and can cause burning of the skin.

- *Wear protective equipment.*
- *Let the engine cool down.*
- *Carefully open the radiator cap.*

Notice!

Possible engine damage due to wrong coolant.

- Observe the fluids and lubricants table, and the coolant compound table.

Notice!

Possible engine damage due to low coolant level.

- Check the coolant level once a day.

Checking the coolant level

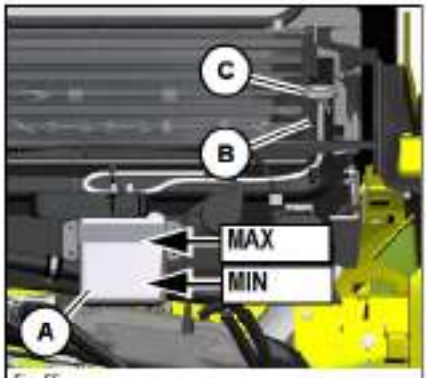


Fig. 55

- ☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*
- ☞ *Let the engine and the coolant cool down.*
- ☞ *Open the radiator and engine cover.*
- ☞ *Check the coolant level on coolant reservoir **A** and filler inlet **B**.*
- ☞ *Add coolant if the coolant level is below the MIN mark or if there is no coolant at the radiator's filler inlet.*
- ☞ *Close the engine and radiator cover.*
- ☞ *Lock the radiator cover.*

Notice!

Check the coolant level once a day before starting the engine.

Adding coolant

- ☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*
- ☞ *Let the engine and the coolant cool down.*
- ☞ *Open the engine and radiator cover.*
- ☞ *Carefully unscrew filler cap **C** and release the pressure.*
- ☞ *Open filler cap **C**.*
- ☞ *Add coolant up to the MAX mark.*
- ☞ *Close filler cap **C**.*
- ☞ *Start the engine and let it warm up for about 5 – 10 minutes.*
- ☞ *Stop the engine.*
- ☞ *Remove the starting key and carry it with you.*
- ☞ *Let the engine cool down.*
- ☞ *Check the coolant level again.*
- ☞ *If necessary, add coolant and repeat the procedure until the coolant level remains constant.*
- ☞ *Close the engine and radiator cover.*
- ☞ *Lock the radiator cover.*

Draining coolant

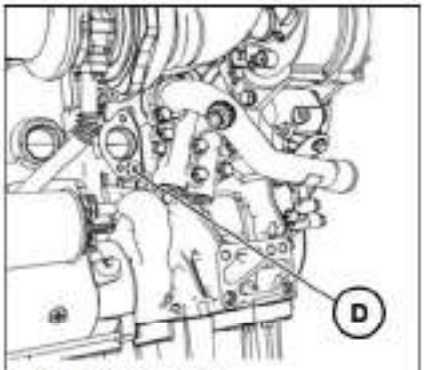


Fig. 56: Engine oil drain plug

- *Stop and park the machine. Stop the engine. See "Preparing lubrication".*
- *Let the engine and the coolant cool down.*
- *Open the engine and radiator cover.*
- *Remove the underbody maintenance access with a suitable tool – see Underbody maintenance access on page 3-24.*
- *Place a suitable container under the machine.*
- *Remove drain plug D from the engine with a suitable tool.*
- *Slowly open filler inlet B and filler cap C and release the pressure.*
  - Remove filler inlet B and filler cap C.

Fig. 57: Coolant drain plug

- *Remove coolant drain plug E with a suitable tool.*
  - Drain the coolant into a receptacle.
- *Flush the cooling system with clear water to remove foreign bodies.*
- *Install drain plug D and coolant drain plug C with a suitable tool.*
- *Add clean water to the cooling system.*
- *Install filler inlet B and filler cap C.*
- *Start the engine and let it run at idling speed until the coolant temperature reaches 49 to 66 °C (120 to 150 °F).*
- *Stop the engine and let it cool down.*
- *Slowly open filler inlet B and filler cap C and release the pressure.*
  - Remove filler inlet B and filler cap C.
- *Remove drain plug D and coolant drain plug E from the engine with a suitable tool.*
  - Drain the water into a receptacle.
- *Flush the cooling system with clear water to remove foreign bodies.*
- *Install drain plug D and coolant drain plug C with a suitable tool.*
- *Add new coolant via filler cap C.*
  - ➥ Mixing ratio – see Coolant on page 2-5.
- *Close the engine and radiator cover.*
- *Lock the radiator cover.*

Environment!

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

3.11 Air filter

Important information regarding the air filter

☞ *Store filters in their original packaging and in a dry place.*

☞ *Check air filter attachments, air intake hoses and the air filter element for damage, and immediately repair or replace them if necessary.*

☞ *Check the screws at the induction manifold and the clamps for tightness.*

Air filter monitoring

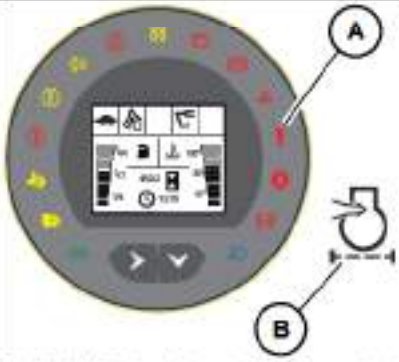


Fig. 58: Multifunctional display (symbolic representation)

Damage to diesel engine due to dirty air filter.

- Replace the air filter elements if the indicator light "General malfunction" **A** illuminates red, the buzzer sounds and symbol **B** appears in the multifunctional display.
- Do not clean air filter elements, replace them.
- Do not use any damaged air filter elements.

Replacing the air filter

Notice!

Damage to air-filter elements when in use in acidic air for longer periods of time.

- Replace the air filter elements according to the multifunctional display, 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, independently of the multifunctional display.

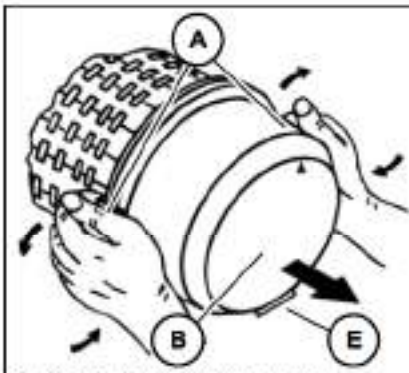


Fig. 59: Removing the lower housing section

☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*

☞ *Open the radiator and engine cover.*

☞ *Remove dirt and dust from the air filter housing and the area around it.*

☞ *Fold bow clips A on lower housing section B to the outside.*

☞ *Remove the lower housing section B.*

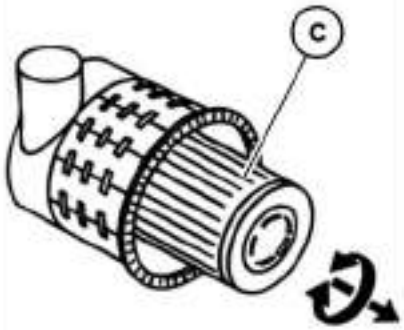


Fig. 60: Removing the outside filter

- *Carefully remove the outside filter **C** with slightly turning movements.*
- *Remove all dirt (dust) inside the upper and lower housing sections, including the dust valve.*
- *Clean the parts with a clean lint-free cloth, do not use compressed air.*

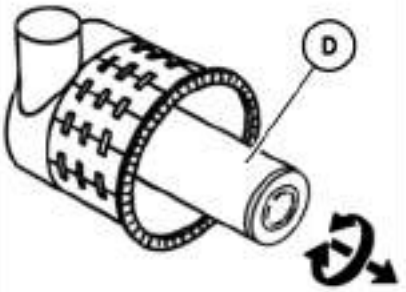


Fig. 61: Removing the inside filter

- *Carefully remove the inside filter **D** with slightly turning movements.*
- *Check the new inside filter **D** and outside filter **C** for damage and carefully insert them in the housing section.*
- *Position the lower housing section **B**.*
- *Close bow clips **A**.*
- *Close the engine and radiator cover.*
- *Lock the radiator cover.*

Notice!

Ensure that dust valve **E** shows downward once it is installed.

Checking the air intake

Notice!

In order to avoid engine damage:

- Check once a day for cleanliness before putting the machine into operation.

Fig. 62: Air intake

- *Stop and park the machine. Stop the engine. See "Preparing lubrication".*
- *Open the radiator and engine cover.*
- *Check and, if necessary, clean the air intake.*
- *Close the engine and radiator cover.*
- *Lock the radiator cover.*

Replacing the cabin air filter

Fig. 63: Cabin air filter

☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*
☞ *Open the radiator and engine cover.*
☞ *Remove cover A.*
☞ *Remove the cabin air filter.*
☞ *Insert the new cabin air filter.*
☞ *Install cover A.*
☞ *Close the engine and radiator cover.*
☞ *Lock the radiator cover.*

3.12 Washer system

Important information regarding the washer system

Only use glass cleaner (with antifreeze if necessary) for refilling.

Checking the fluid level and adding fluid

Fig. 64: Reservoir

The tank filler inlet is located on the left in the cabin.
☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*
☞ *Check the fluid level in tank A and add fluid if necessary.*

3.13 V-belts

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

Check the V-belt once a day, and retighten it if necessary.

Retighten new V-belts after about 15 minutes of running time.

Checking V-belt tension

Fig. 65: Remove the protective cover

☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*

☞ *Remove the starting key and carry it with you.*

☞ *Disconnect the battery or the battery master switch.*

☞ *Let the engine cool down.*

☞ *Open the radiator and engine cover.*

☞ *Remove protective cover A with a suitable tool.*

☞ *Carefully the check V-belt for damage, cracks or cuts.*

☞ *Replace the V-belt if it touches the base of the V-belt groove or the discs of the pulley.*

- If the V-belt is damaged:

☞ *Replace the V-belt.*

Fig. 66: Checking V-belt tension

☞ *Press with your thumb to check the deflection of the V-belt between the crankshaft disk and the camshaft disk position B. A new V-belt should have a deflection of 6 to 8 mm (0.2" – 0.3"), a used V-belt (after about 5 minutes running time) should have a deflection of 7 to 9 mm (0.3" – 0.35").*

☞ *Retighten the V-belt if necessary.*

☞ *Install protective cover A with a suitable tool.*

☞ *Close the engine and radiator cover.*

☞ *Lock the radiator cover.*

Replacing the V-belt

Caution!

Overtightening the V-belt can damage the V-belt, V-belt guide, alternator and water pump bearing.
Avoid contact of oil, grease or similar substances with the V-belt.

- Check the V-belt tension

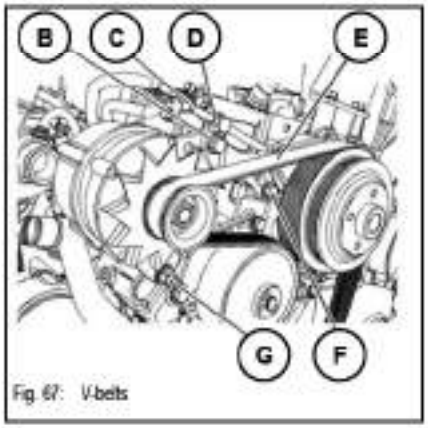


Fig. 67: V-belts

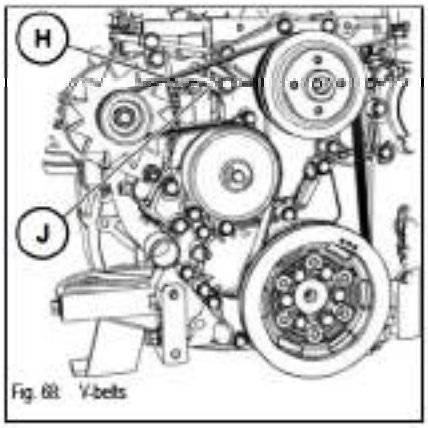


Fig. 68: V-belts

☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*
☞ *Remove the starting key and carry it with you.*
☞ *Disconnect the battery or the battery master switch.*
☞ *Let the engine cool down.*
☞ *Open the radiator and engine cover.*
☞ *Remove protective cover **A** with a suitable tool.*
☞ *Loosen screws B, F and G with a suitable tool.*
☞ *Loosen nut **D** with a suitable tool and turn screw **C** anticlockwise until the V-belt can be removed from the pulley.*
  ☞ Remove the V-belt.
☞ *Check all pulleys visually that are driven by the V-belt.*
  ☞ Ensure that all pulleys are clean and not damaged.
  ☞ Ensure that the pulleys can turn freely.
☞ *Install a new V-belt as shown **H**.*
  ☞ Check visually whether the V-belt is aligned correctly.
☞ *Turn screw **C** clockwise to increase V-belt tension.*
  ☞ Ensure that connector adjustment J has maximum tension.
☞ *Tighten screw **F** first, then screw **B** to 50 Nm (37 ft.lbs.) with a suitable tool.*
☞ *Turn screw **C** anticlockwise two full revolutions and tighten nut **D** to 30 Nm (22 ft.lbs.) with a suitable tool.*
☞ *Retighten the V-belt if necessary.*
☞ *Connect the battery or the battery master switch.*
☞ *Install protective cover **A** with a suitable tool.*
☞ *Close the engine and radiator cover.*
☞ *Lock the radiator cover.*

Checking the V-belt tension of the air conditioning system (option)

Caution!

Excessive or insufficient tension of the V-belt can cause damage to the V-belt or to the compressor of the air conditioning system.

☞ *Always ensure that the V-belt has the correct tension*

☞ *Replace V-belts with damage, cracks, cuts, etc.*

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

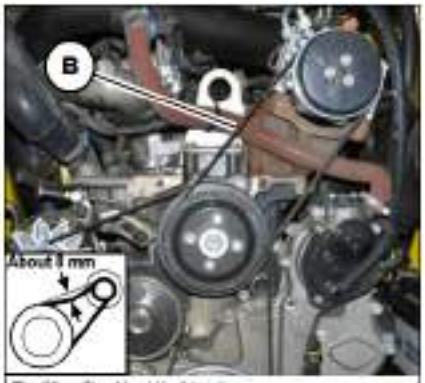


Fig. 68: Checking V-belt tension

☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*

☞ *Remove the starting key and carry it with you.*

☞ *Disconnect the battery or the battery master switch.*

☞ *Let the engine cool down.*

☞ *Open the radiator and engine cover.*

☞ *Remove protective cover A with a suitable tool.*

☞ *Carefully check V-belt B for damage, cracks or cuts.*

☞ *Replace the V-belt if it touches the base of the V-belt groove or the discs of the pulley.*

- If the V-belt is damaged:

☞ *Replace the V-belt.*

☞ *Press with your thumb to check the deflection of the V-belt. A new V-belt should have a deflection of 7 to 9 mm (0.27 to 0.35 in), a used V-belt (after about 5 minutes running time) should have a deflection of 9 to 11 mm (0.35 to 0.43 in).*

☞ *Retighten the V-belt if necessary.*

☞ *Connect the battery or the battery master switch.*

☞ *Install protective cover A with a suitable tool.*

☞ *Close the engine and radiator cover.*

☞ *Lock the radiator cover.*

Tightening the V-belt of the air conditioning system (option)

Notice!

This machine is equipped with a self-tensioning V-belt that has to replaced under all circumstances in case of insufficient tension.

Replacing the V-belt of the air conditioning system (option)

Fig. 70: Replacing the V-belt

- Stop and park the machine. Stop the engine. See "Preparing lubrication".
- Remove the starting key and carry it with you.
- Disconnect the battery or the battery master switch.
- Let the engine cool down.
- Open the radiator and engine cover.
- Remove protective cover **A** with a suitable tool.
- Remove fastening screws **B** with a suitable tool.
- Remove the V-belt.
- Insert the new V-belt.

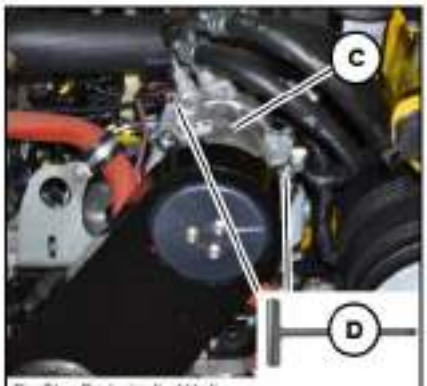


Fig. 71: Replacing the V-belt

- Fix the air-conditioning compressor **C** in the correct position with two adjusting screws **D** (see special tools).
- Install two opposite fastening screws **B** with a suitable tool.
- Remove adjusting screws **D**.
- Install the remaining fastening screws **B** with a suitable tool.
- A new V-belt should have a deflection of 7 to 9 mm (0.27 to 0.35 in), a used V-belt (after about 5 minutes running time) should have a deflection of 9 to 11 mm (0.35 to 0.43 in).
- Install protective cover **A** with a suitable tool.
- Close the engine and radiator cover.
- Lock the radiator cover.

3.14 Replacing the crankcase breather filter (Tier IV)

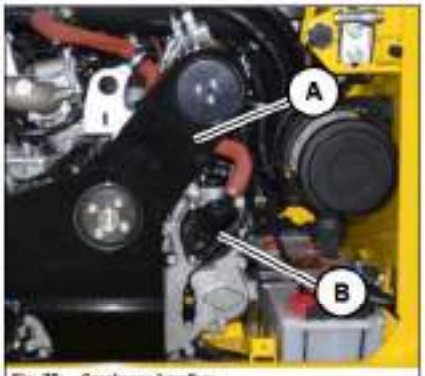


Fig. 72: Crankcase breather

- ☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*
- ☞ *Remove the starting key and carry it with you.*
- ☞ *Disconnect the battery or the battery master switch.*
- ☞ *Let the engine cool down.*
- ☞ *Open the radiator and engine cover.*
- ☞ *Remove protective cover **A** with a suitable tool.*
- ☞ *Remove cover **B** of the crankcase breather with a suitable tool.*

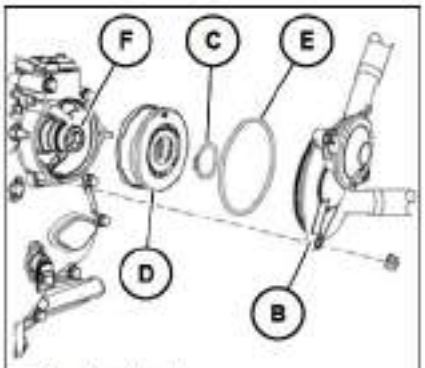


Fig. 73: Filter element

- ☞ *Remove circlip **C** with a suitable tool.*
- ☞ *Remove filter element **D**.*
- ☞ *Remove seal **E** from cover **B** of the crankcase breather.*
- ☞ *Fit a new seal **E** on cover **B**.*
- ☞ *Position a new filter element on shaft **F** so that the inscription is visible.*
- ☞ *Install circlip **C** and cover **B** with a suitable tool.*
- ☞ *Tighten the fastening screws of cover **B** to 25 Nm (18 ft.lbs).*
- ☞ *Install protective cover **A** with a suitable tool.*
- ☞ *Close and lock the engine cover.*
- ☞ *Close the engine and radiator cover.*
- ☞ *Lock the radiator cover.*

Environment!

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

3.15 Pressure check

General

- Set the primary pressure limiting valves (PPLV) at maximum engine speed.
- Refer to chapter "Technical data" – *see chapter 2.6 Operating hydraulics* on page 2-4 for the pressure settings.
- *Perform the checks and settings according to the test report*
  – *see Test report* on page 3-52.

Prerequisites for pressure check

- Run the machine warm before checking the pressure!
  Hydraulic oil temperature: 50 °C (122 °F) min. (indication of operating temperature in display).
- Remove all objects around the machine.

Caution!

A lack of cleanliness and incorrect handling can cause damage and leaks on components!

Fig. 74: Wacker Neuson measuring kit

- We recommend using the Wacker Neuson measuring kit:
  - 6 pressure gages (2 x 60 bar/870 psi, 2 x 400 bar/5802 psi, 2 x 600 bar/8702 psi).
  - Color-coded measuring lines.
  - Magnetic mounting plate for simple attachment to the machine.
  - Sturdy plastic case with additional storage space.
- The Wacker Neuson threaded fitting set for measurement contains all standard measurement connections and the necessary threaded fittings to make hydraulic system checks easier.
- The Wacker Neuson vacuum pump is ideal for performing repair work on the hydraulics to reduce hydraulic oil losses to a minimum.

Preparations

☞ *Carefully open the cap of the hydraulic reservoir to the first notch and fully release the pressure.*

☞ *Open the cap of the hydraulic reservoir.*

☞ *Install the measurement connections at the specific test points.*

☞ *Connect the measuring instrument.*

☞ *Bleed the hydraulic pump.*

☞ *Close the cap of the hydraulic reservoir.*

- Run the machine warm before checking the pressure!
  Hydraulic oil temperature: 50 °C (122 °F) min. (indication of operating temperature in display).
- *You can then perform the measurements.*

Measurement connections

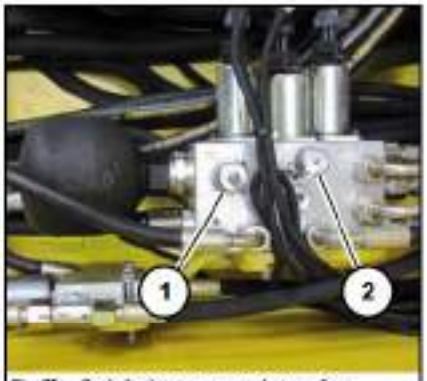


Fig. 75: Control valve measurement connections

Pos.	Designation	
1	Control valve measurement connection	MG
2	Control valve measurement connection	MY
3	High Flow valve measurement connection (option)	MP

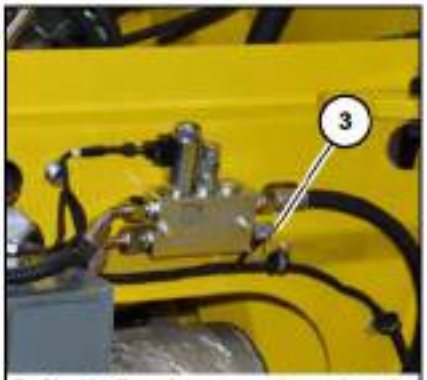


Fig. 76: High Flow valve measurement connection (option)

Fig. 77: Variable displacement pump measurement connection

Pos.	Designation	
4	Variable displacement pump measurement connection (closed)	Y
5	Variable displacement pump measurement connection (constant pilot control pressure for travel and operating hydraulics)	G1
6	Variable displacement pump measurement connection	Mb1
7	Variable displacement pump measurement connection	Mb2

Fig. 78: Variable displacement pump measurement connection

Fig. 79: Variable displacement pump measurement connection

Pos.	Designation	
8	Variable displacement pump measurement connection	Ma1
9	Variable displacement pump measurement connection	Ma2
10	Control valve measurement connection	Ma3

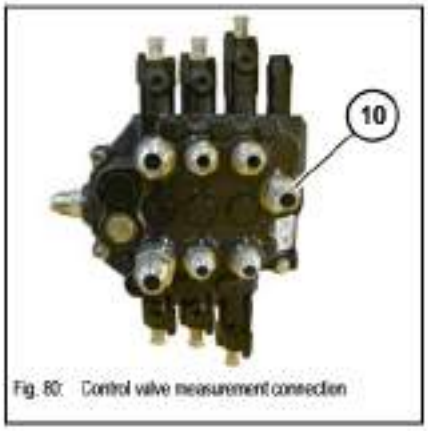


Fig. 80: Control valve measurement connection

Checking the main pressure (P1 & P2)

Fig. 81: Checking main pressure

Fig. 82: Checking main pressure

- *Stop and park the machine. Stop the engine.*
- *Raise the cabin – see Raising/lowering the cabin on page 3-19.*
- *Remove plugs **6**, **7**, **8** and **9** from the variable displacement pump with a suitable tool.*
- *Install the measurement connections with a suitable tool and connect them with the measuring instrument.*
- *Route the wiring so as to avoid damage.*
- *Lower the cabin – see Raising/lowering the cabin on page 3-19.*
- *Start the engine.*
  - Check the pressure at maximum engine speed.
- *Keep the machine in a firm position so that the wheels cannot turn with the control lever in final position (for example drive against a mound).*
  - Travel forward.
- *Keep the machine in a firm position so that the wheels cannot turn with the control lever in final position (for example drive against a mound).*
  - Travel in reverse.
- *Check and make a note of the pressure values – see Test report on page 3-52.*
- *Stop the engine.*
- *Raise the cabin.*
- *Remove the measurement connections.*
- *Install plugs **6**, **7**, **8** and **9** with a suitable tool.*
- *Lower the cabin.*

Checking the pilot control pressure of the operating and travel hydraulics (constant pressure)

Fig. 83: Checking pilot control pressure

- Stop and park the machine. Stop the engine.
- Raise the cabin – see Raising/lowering the cabin on page 3-19.
- Remove the hose on connection **5** of the variable displacement pump with a suitable tool.
- Install the measurement connection and the T-fitting with a suitable tool and connect them with the measuring instrument.
- Ensure that no wires or cables can be damaged.
- Install the hose with a suitable tool.
- Start the engine.
  - Leave the cabin in the raised position.
- Check and make a note of the pressure at idling speed.
- Check and make a note of the pressure at maximum speed.
- Stop the engine.
- Remove the hose with a suitable tool.
- Remove the measurement connection and the T-fitting with a suitable tool.
- Install the hose on connection **5** with a suitable tool.
- Lower the cabin.– see Raising/lowering the cabin on page 3-19

Checking the operating hydraulics pressure

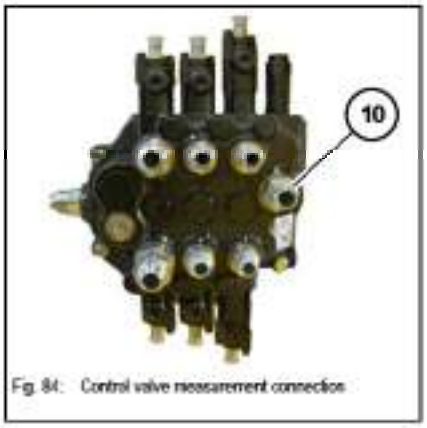


Fig. 84: Control valve measurement connection

- Stop and park the machine. Stop the engine.
- Raise the cabin – see Raising/lowering the cabin on page 3-19.
- Install the measurement connection and the T-fitting on connection **10** with a suitable tool and connect them with the measuring instrument.
- Ensure that no wires or cables can be damaged.
- Lower the cabin.– see Raising/lowering the cabin on page 3-19
- Start the engine.
- Extend/retract (base/rode side) the bucket cylinder as far as it will go.
  - Check and make a note of the pressure at idling speed.
  - Check and make a note of the pressure at maximum speed.
- Extend/retract (base/rode side) the loader unit cylinder as far as it will go.
  - Check and make a note of the pressure at idling speed.
  - Check and make a note of the pressure at maximum speed.
- Actuate the auxiliary hydraulics fully in both directions.
  - Check and make a note of the pressure at idling speed.
  - Check and make a note of the pressure at maximum speed.
- Stop the engine.
- Raise the cabin.
- Remove the measurement connection and the T-fitting from connection **10** with a suitable tool.
- Lower the cabin.

Adjusting the operating hydraulics pressure

Danger!

Adjusting the operating hydraulics pressure with the loader unit function –

Injury hazard!

Fig. 85: Pressure limiting valve on control valve

- ☞ *Stop and park the machine. Stop the engine.*
- ☞ *Raise the cabin – see Raising/lowering the cabin on page 3-19.*
- ☞ *Loosen the locknut of the pressure limiting valve **DB1** with a suitable tool.*
- ☞ *Unscrew the pressure limiting valve until you can read off a pressure drop on the measuring instrument.*
  - ➥ The valve seat may be stuck and must be loosened first.
- ☞ *Adjust the pressure at the pressure limiting valve and tighten the locknut with a suitable tool.*
  - ➥ Adjustment values – *see Operating hydraulics* on page 2-4, – *see Test report* on page 3-52
- ☞ *After adjusting the pressure, check the pressure limiting valve and the pressure drop again.*
- ☞ *Lower the cabin – see Raising/lowering the cabin on page 3-19*

Checking the 3rd control circuit pressure (High Flow option)

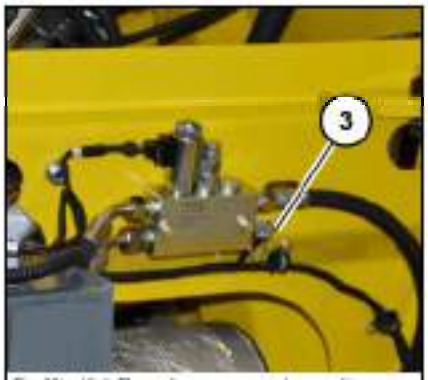


Fig. 86: High-Flow valve measurement connection

- ☞ *Stop and park the machine. Stop the engine.*
- ☞ *Raise the cabin – see Raising/lowering the cabin on page 3-19.*
- ☞ *Connect the measuring instrument with measurement connection **3**.*
- ☞ *Ensure that no wires or cables can be damaged.*
- ☞ *Lower the cabin – see Raising/lowering the cabin on page 3-19*
- ☞ *Start the engine.*

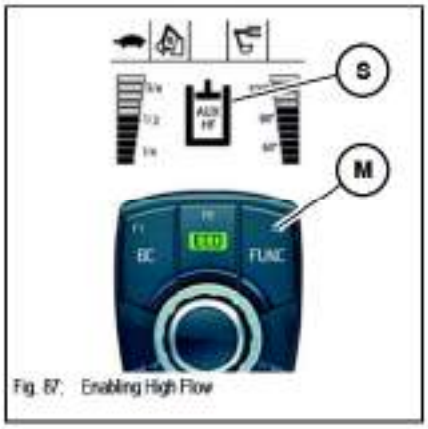


Fig. 87: Enabling High Flow

- ☞ *Enable the High Flow function with push button **M** on the jog dial control unit.*
  - ➥ Symbol **S** appears for a few seconds in the multifunctional display.
- ☞ *Check and make a note of the pressure at maximum speed – see Test report on page 3-52.*
- ☞ *Stop the engine.*
- ☞ *Raise the cabin.*
- ☞ *Remove the measuring instrument.*
- ☞ *Lower the cabin.*

3.16 Test report

Boost pressure

Oil supply by P4 (19 cm³/rev / 1.16 in³/rev)		Specified values		1st measurement	2nd measurement
		Engine speed	Pressure in bar (psi)		
G1 measurement connection	Min. engine speed	Rated value	27 (392)		
	Max. engine speed	Rated value	27 (392)		

Operating hydraulics

Oil supply by P3 (34 cm³/rev/2.1 in³/rev)

Function	Movement	Pressure limiting valve	Measurement connection	Specified values	1st measurement	2nd measurement
Bucket	DUMP OUT	Pressure limiting valve (control valve)	Measurement connection 10 control valve input	$230^{\pm 3.5}$ ($3336^{\pm 50.8}$)		
	DUMP IN			$230^{\pm 3.5}$ ($3336^{\pm 50.8}$)		
Loader unit	UP			$230^{\pm 3.5}$ ($3336^{\pm 50.8}$)		
	DOWN			$230^{\pm 3.5}$ ($3336^{\pm 50.8}$)		
Auxiliary hydraulics	A			$230^{\pm 3.5}$ ($3336^{\pm 50.8}$)		
	B			$230^{\pm 3.5}$ ($3336^{\pm 50.8}$)		

Brake release pressure = boost pressure

Oil supply by P4 (19 cm³/rev / 1.16 in³/rev)		Specified values		1st measurement	2nd measurement
Measurement connection 9	Min. engine speed	Rated value	27 (392)		
	Max. engine speed	Rated value	27 (392)		

3.16 Test report

Main pressure (P1 and P2) (SW24/28)

Oil supply by variable displacement pump P1 and P2 (45 cm³/rev / 2.75 in³/rev)

Function	Engine speed	Measurement connection	Specified values		1st measurement	2nd measurement
Forward	Max. engine speed	Ma1	Rated value	27 (392)		
		Ma2	Rated value	27 (392)		
		Mb1	Rated value	407 (5903)		
		Mb2	Rated value	407 (5903)		
Reverse	Max. engine speed	Ma1	Rated value	407 (5903)		
		Ma2	Rated value	407 (5903)		
		Mb1	Rated value	27 (392)		
		Mb2	Rated value	27 (392)		

Main pressure (P1 and P2) (ST35/45)

Oil supply by variable displacement pump P1 and P2 (45 cm³/rev / 2.75 in³/rev)

Function	Engine speed	Measurement connection	Specified values		1st measurement	2nd measurement
Forward	Max. engine speed	Ma1	Rated value	27 (392)		
		Ma2	Rated value	27 (392)		
		Mb1	Rated value	365 (5294)		
		Mb2	Rated value	365 (5294)		
Reverse	Max. engine speed	Ma1	Rated value	365 (5294)		
		Ma2	Rated value	365 (5294)		
		Mb1	Rated value	27 (392)		
		Mb2	Rated value	27 (392)		

3.17 Hydraulic system

Important information on the hydraulic system

Caution!

Burn hazard due to hot hydraulic oil!

Hot hydraulic oil can cause burning to the skin, serious injury or death.

- ☞ *Release the pressure in the hydraulic system.*
- ☞ *Let the engine cool down.*
- ☞ *Wear protective equipment.*

Caution!

Injury hazard due to fluid escaping under pressure!

Hydraulic oil escaping under pressure can penetrate the skin and cause serious injury or death.

- ☞ *Do not operate the machine with leaking or damaged hydraulic system components.*
- ☞ *Open the breather filter carefully to slowly release the pressure inside the reservoir.*
- ☞ *Wear protective equipment. If oil contacts the eye flush immediately with clean water and seek medical treatment.*
- ☞ *Malfunctioning or leaking threaded fittings, hose connections and pressure lines must be immediately repaired by a Wacker Neuson service center (search for hydraulic leaks with a piece of cardboard).*

Notice!

Damage due to wrong hydraulic oil.

- Use hydraulic oil according to **Fluids and lubricants**.
- Have the hydraulic oil only changed by a Wacker Neuson service center.

Notice!

Damage to hydraulic system due to incorrect hydraulic oil level.

- With a warm engine, the hydraulic oil must be about at the middle of the sight glass.
- Check the hydraulic oil level once a day.

Notice!

Damage to hydraulic system due to dirty hydraulic oil.

- Always add hydraulic oil using the filling screen.
- If the hydraulic oil in the sight glass is cloudy, this indicates that water or air has penetrated the hydraulic system. Contact a Wacker Neuson service center.
- Contact a Wacker Neuson service center if the filter of the hydraulic system is dirty.

Checking the hydraulic oil level

Fig. 88: (symbolic representation)

☞ *Park the machine on firm, level and horizontal ground.*
☞ *Position the loader unit and the bucket as shown.*
☞ *Stop the engine.*
☞ *Operate the control lever repeatedly to release the pressure in the hydraulic system.*
☞ *Remove the starting key and carry it with you.*

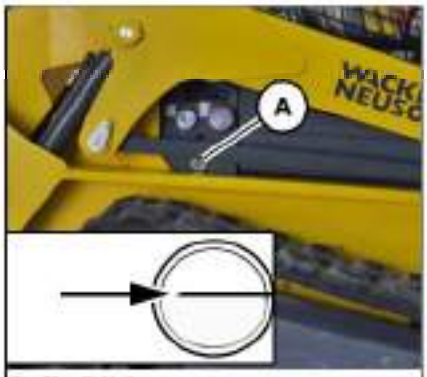


Fig. 89: Sight glass

☞ *Sight glass **A** is located on the right side of the machine.*
☞ *Check the oil level on sight glass **A**.*
➥ With a warm engine, the oil level must be about at the middle of the sight glass.

- If the oil level is below this mark:
  ☞ Add hydraulic oil.

Adding hydraulic oil

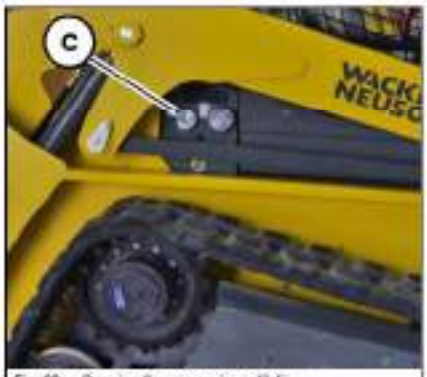


Fig. 90: Opening the reservoir ventilation

☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*
☞ *Slowly unscrew filler plug **C** with a suitable tool.*
☞ *Add hydraulic oil up to the corresponding mark.*
☞ *Check the hydraulic oil level on sight glass **A**.*
☞ *Add if necessary and check again.*
☞ *Screw in filler plug **C** tightly with a suitable tool.*

Environment!

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

Replacing hydraulic oil

Notice!

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

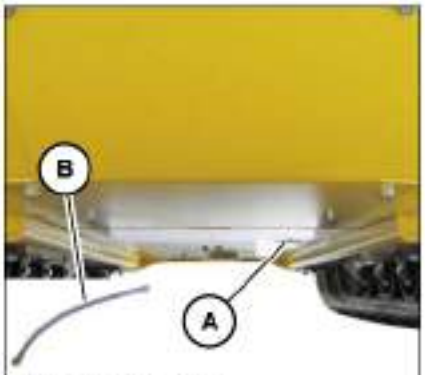


Fig. 91: Changing hydraulic oil

- *Stop and park the machine. Stop the engine. See "Preparing lubrication".*
- *Remove the starting key and carry it with you.*
- *Let the engine cool down.*
- *Actuate the reservoir ventilation to release pressure.*
- *Remove the underbody maintenance access with a suitable tool*
  – see Underbody maintenance access on page 3-24.
- *Place a suitable container under the service valve.*
- *Remove protective cap **A** from the service valve.*
- *Connect drain hose **B** (supplied with the machine) onto service valve **A**.*
- *Completely drain the oil.*
  - Check the hydraulic oil reservoir for dirt and clean it if necessary.
- *Remove drain hose **B**.*
- *Install the protective cap on service valve **A**.*
- *Remove filler plug **C** with a suitable tool.*
- *Add clean hydraulic oil up to the corresponding mark.*
- *Install filler plug **C** with a suitable tool.*
- *Start the engine and perform all hydraulic functions.*
- *Stop the engine.*
- *Check the hydraulic oil level and add oil if necessary.*
- *Install the underbody maintenance access with a suitable tool*
  – see Underbody maintenance access on page 3-24.
- *Completely remove all hydraulic oil spills.*

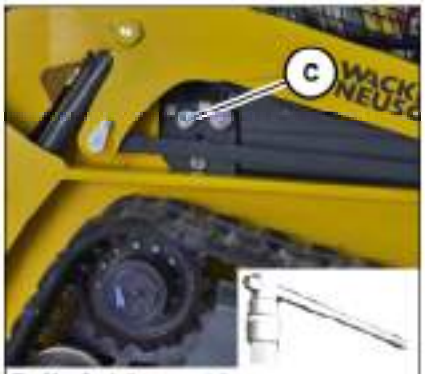


Fig. 92: Symbolic representation

Environment!

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

Changing the hydraulic oil filter element

Fig. 93: Hydraulic oil filter element

☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*

☞ *Remove the starting key and carry it with you.*

☞ *Let the engine cool down.*

☞ *Actuate the reservoir ventilation to release pressure.*

☞ *Raise the cabin – see Raising/lowering the cabin on page 3-19.*

☞ *Thoroughly clean the outside of hydraulic oil filter element **A**.*

☞ *Place a suitable container under the machine to collect the hydraulic oil as it flows out.*

Fig. 94: Hydraulic oil filter element

☞ *Unscrew cover **B**.*

☞ Collect the hydraulic oil as it drains.

☞ *Remove spring **C** if it is not seated on cover **B**.*

☞ *Remove the old hydraulic oil filter element **D** by means of the bracket and replace with a new element.*

☞ Check the surface of the element for dirt residues and coarse particles.

➥ These can be a sign of damage to the components.

➥ Clean the drip and dirt collector **E**.

☞ *Carefully place a new hydraulic oil filter element **D** onto the mount in the filter housing.*

☞ *Remove dirt from the housing and the sealing surface of cover **B** if necessary.*

☞ *Screw on cover **B** with spring **C** and tighten by hand.*

☞ *Make a test run – and check for tightness.*

☞ *Check the hydraulic oil level and add oil if necessary.*

☞ *Lower the cabin.– see Raising/lowering the cabin on page 3-19*

☞ *Dispose of the replaced hydraulic oil filter element in an environmentally friendly manner.*

Environment!

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

Draining condensation water from the hydraulic oil reservoir

Check the hydraulic oil reservoir after a longer standstill or every 500 o/h. Drain the condensation water if there is any.

The hydraulic oil replacement interval must be shortened if the condensation water is not drained regularly.

Draining condensation water from the hydraulic oil reservoir

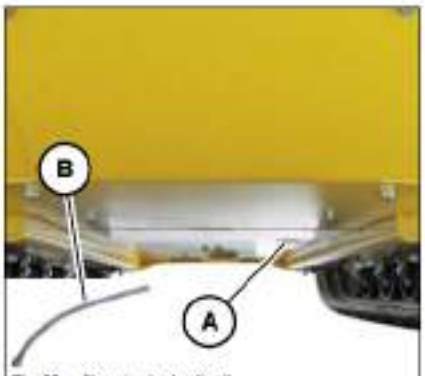


Fig. 95: Changing hydraulic oil

- ☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*
- ☞ *Remove the starting key and carry it with you.*
- ☞ *Let the engine cool down.*
- ☞ *Actuate the reservoir ventilation to release pressure.*
- ☞ *Remove the underbody maintenance access with a suitable tool*
  – see Underbody maintenance access on page 3-24.
- ☞ *Place a suitable container under the service valve.*
- ☞ *Remove protective cap **A** from the service valve.*
- ☞ *Install drain hose **B** (supplied with the machine) onto service valve **A**.*
- ☞ *Drain the condensation water (mixed with hydraulic oil) until only pure hydraulic oil flows out.*
- ☞ *Remove drain hose **B**.*
- ☞ *Install the protective cap on service valve **A**.*
- ☞ *Check the hydraulic oil level and add oil if necessary.*
- ☞ *Install the underbody maintenance access with a suitable tool*
  – see Underbody maintenance access on page 3-24.
- ☞ *Completely remove all hydraulic oil spills.*
- ☞ *Close the hydraulic oil reservoir.*

Environment!

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

Replacing the boost-pressure filter

Fig. 96: Boost-pressure filter

- Boost-pressure filter **A** is located under the cabin, on the hydraulic oil reservoir

☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*

☞ *Remove the starting key and carry it with you.*

☞ *Let the engine cool down.*

☞ *Actuate the reservoir ventilation to release pressure.*

☞ *Raise the cabin – see Raising/lowering the cabin on page 3-19.*

☞ *Place a suitable container under the filter housing to collect the hydraulic oil as it flows out.*

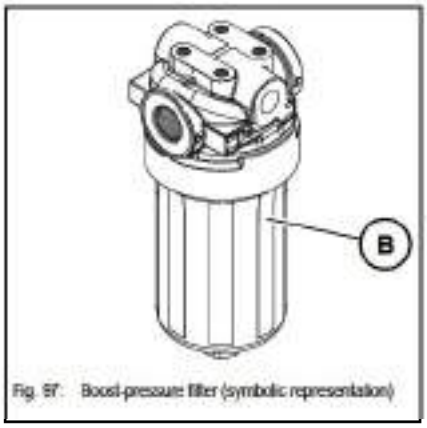


Fig. 97: Boost-pressure filter (symbolic representation)

☞ *Remove filter housing **B** with a suitable tool.*

☞ *Remove the old filter element.*

☞ *Insert the new filter element.*

☞ *Install filter housing **B**.*

☞ *Check the hydraulic oil level and add oil if necessary.*

☞ *Lower the cabin – see Raising/lowering the cabin on page 3-19*

☞ *Completely remove all hydraulic oil spills.*

☞ *Dispose of the replaced filter element in an environmentally friendly manner.*

Environment!

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

Checking the hydraulic system for leaks

Notice!

Leaks and damaged pressure lines must be immediately repaired or replaced by a Wacker Neuson service center. This not only increases the operating safety of the machine but also helps to protect the environment.

- Leaks and damaged pressure lines must be immediately repaired or replaced.
- Have hydraulic hoses replaced every 6 years from the date of manufacture, even if they do not seem to be damaged.

- Do not operate the machine with leaking or damaged hydraulic system components.
- Retighten leaking threaded fittings and hose connections only when the system is not under pressure. Release the pressure before working on pressurized lines.
- Do not weld or solder damaged or leaking pressure lines and threaded fittings, but have them replaced.
- Wear protective equipment.

Checking the condition and age of hydraulic hoses

Notice!

Leaks and damaged pressure lines must be immediately repaired or replaced by a Wacker Neuson service center. This not only increases the operating safety of the machine but also helps to protect the environment.

- Damaged or leaky pressure lines must be immediately repaired or replaced by a Wacker Neuson service center.
- Have hydraulic hoses replaced 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 20 066, part 5.

The article number is marked on the clamping section, and the date of manufacture is indicated on the hose of each hose connection.

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.

3.18 Tires/tracks

Caution!

Tire or track wear can vary according to work and ground conditions.

Accident hazard due to incorrect repair of the travel gear! Can cause serious injury or death.

- *All repair work on the wheels, tires and tracks may only be performed by a Wacker Neuson service center.*

Inspection work

Perform the following maintenance once a day:

- ☞ *Visual check of the tire condition,.*
- ☞ *Check the tire pressure.*
- ☞ *Check the tires, rims or tracks (outside and inside) for damage and wear.*
- ☞ *Remove foreign bodies from the tire tread.*
- ☞ *Remove dirt, debris, dust, etc. from the tires.*

Tires

Fig. 98: (symbolic representation)

Checking the tires at regular intervals increases operational safety and the service life of the tires, and reduces machine downtimes.

For the permissible tire types and pressures – *see chapter 2.4 Tires/tracks* on page 2-4

Notice!

Replace the tires after 6 years and dispose of them correctly since the properties of the rubber mixture degrade with increasing age.

Check tire wear and the tightness of the wheel nuts daily. The machine must be parked on horizontal, firm and level ground.

Notice!

The wheels can damage the threads on the wheel studs if they are handled incorrectly.

- Use suitable assembly tools, such as covering sleeves for the studs, a jack, etc.

Notice!

Use only tires and rims that are authorized for the machine.

- – *see chapter 2.4 Tires/tracks* on page 2-4

Wheel change

Fig. 98 (symbolic representation)

☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*

☞ *Remove the starting key and carry it with you.*

☞ *Use wheel chocks to prevent the machine from rolling away.*

☞ *Loosen the wheel nuts of the wheel you want to remove.*

☞ *Safely place a jack with a lift capacity of 5,000 kg (11,023 lbs) under the chassis near the chain case.*

☞ *Apply the parking brake.*

☞ *Raise the machine on the side where you want to change a wheel.*

☞ *Check the machine is standing firmly.*

☞ *Secure the machine with trestles in appropriate places.*

Notice!

Trestles must be positioned so as to avoid machine damage.

☞ *Loosen and remove the wheel nuts.*

☞ *Remove the wheel.*

☞ *Place the new wheel onto the wheel bolts.*

➥ Bear in mind the correct direction of rotation of the tires.

☞ *Tighten the wheel nuts.*

☞ Tighten opposite wheel nuts alternately.

☞ *Remove the trestles.*

☞ *Lower the raised side of the machine.*

☞ *Tighten the wheel nuts to 175 Nm (129 ft.lbs).*

☞ Tighten opposite wheel nuts alternately.

Notice!

After changing a wheel, check the wheel nuts for tightness after 10 operating hours. Retighten the wheel nuts if necessary.

Notice!

There is more wear on the rear tires than on the front tires. Therefore exchange the front and rear wheels regularly to ensure even wear on all tires.

Checking track tension (ST35/ST45)

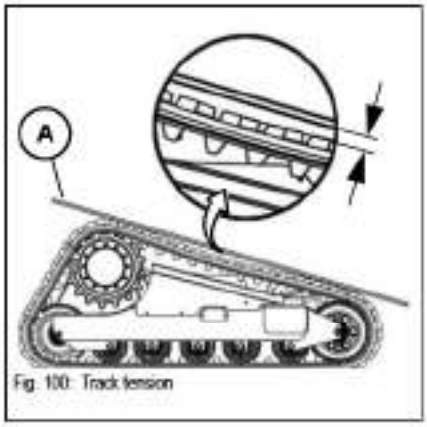


Fig. 100: Track tension

☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*

☞ *Remove the starting key and carry it with you.*

☞ *Place a straight measuring rod (A) on the tracks.*

☞ *Adjust the correct track tension if the distance between the upper side of the tracks and the measuring rod is not 20 – 25 mm (0.8 – 1 in).*

Correcting track tension (ST35/ST45)

Caution!

Injury hazard due to grease escaping under pressure!

Grease escaping under pressure can penetrate the skin and cause serious injury or death.

- *Open the lubricating valve only very carefully and do not unscrew it more than a revolution.*
- *Wear protective gloves and safety glasses.*
- *Release grease only as described below.*
- *Contact a Wacker Neuson service center if this does not reduce track tension.*

Notice!

Possible damage to tracks due to overtightening. This causes serious damage to the cylinder and the track.

- Tighten the tracks only up to the mandatory measuring distance.

Increasing tension

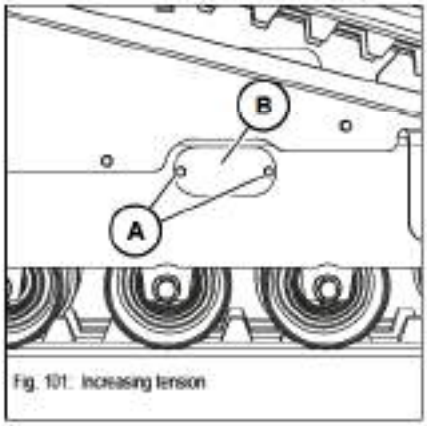


Fig. 101: Increasing tension

☞ *Raise the machine at the front with the bucket so that only the rear ends of the tracks touch the ground.*

☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*

☞ *Remove the starting key and carry it with you.*

☞ *Remove screws A and cover B.*

☞ *Pump the grease into lubricating valve C with a grease gun.*

☞ *Lower the machine to the ground.*

☞ *Check the tension is correct by:*

☞ starting the engine,

☞ letting it run at idling speed without any load

☞ slowly moving the machine forward and reverse and switching it off again.

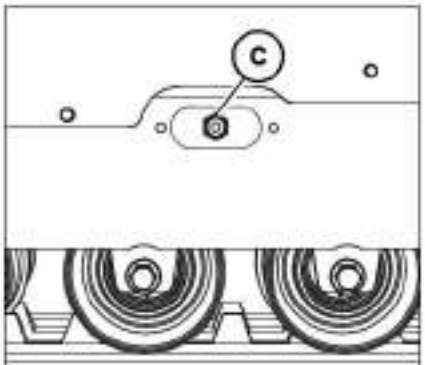


Fig. 162:

☞ *Check the track tension again.*

➥ If the tension is not correct:

☞ Repeat the procedure.

- If a track still does not have enough tension after pumping grease again,

☞ Do not put the machine into operation and replace the malfunctioning component.

☞ *Install cover B.*

Reducing tension

☞ *Raise the machine at the front with the bucket so that only the rear ends of the tracks touch the ground.*

☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*

☞ *Remove the starting key and carry it with you.*

☞ *Slowly turn lubricating valve C a maximum one revolution anticlockwise to release the grease into a suitable container.*

➥ The grease flows out of the groove of the lubricating valve.

☞ *Retighten lubricating valve C.*

☞ *Check the tension is correct by:*

☞ starting the engine,

☞ letting it run at idling speed without any load

☞ slowly moving the machine forward and reverse and switching it off again.

☞ *Check the track tension again.*

➥ If the tension is not correct:

☞ Repeat the procedure.

- If a track still does not have enough tension after pumping grease again,

☞ Do not put the machine into operation and replace the malfunctioning component.

☞ *Install cover B.*

Notice!

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

Checking drive-chain tension (SW24/SW28)

Caution!

Injury hazard when checking drive chain tension!

Can cause serious injury or death.

☞ *Support the machine with suitable means (wheel chocks, for example).*

Notice!

Possible damage to the drive chain due to wrong chain tension.

- Check drive chain tension every 500 o/h.

☞ *Park the machine on firm, level and horizontal ground.*

☞ *Lower the loader unit to the ground.*

☞ *Stop the engine.*

☞ *Operate the control lever repeatedly to release the pressure in the hydraulic system.*

☞ *Remove the starting key and carry it with you.*

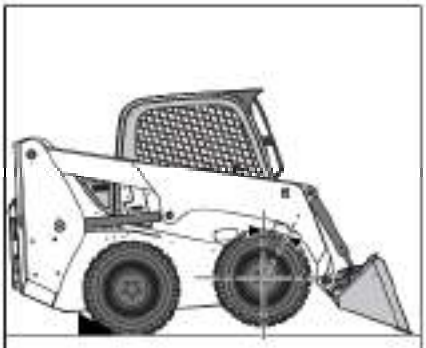


Fig. 103: (symbolic representation)

Front drive chains

☞ *Raise the front wheels with the bucket.*

☞ *Make a mark on the rim.*

☞ *Turn the wheels on the left and right.*

☞ Measure the chain tension at the tire tread.

➥ The wheels may move a maximum 3 – 6 mm (0.12 in – 0.24 in) to the left and right.

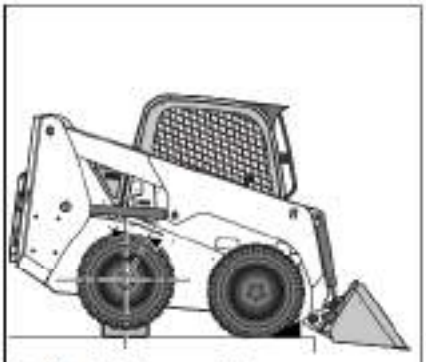


Fig. 104: (symbolic representation)

Rear drive chains

☞ *Raise the rear wheels with a crane or jack.*

☞ *Make a mark on the rim.*

☞ *Turn the wheels on the left and right.*

☞ Measure the chain tension at the tire tread.

➥ The wheels may move a maximum 3 – 6 mm (0.12 in – 0.24 in) to the left and right.

Notice!

Correct the chain tension if it is not correct.

Correcting drive-chain tension (SW24/SW28)

Fig. 185: Correcting drive-chain tension

☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*

☞ *Remove the starting key and carry it with you.*

☞ *Raise the front and rear wheels.*

☞ *Support the machine on firm ground and with means of sufficient load-bearing capacity.*

☞ *Remove cover **A** with a suitable tool.*

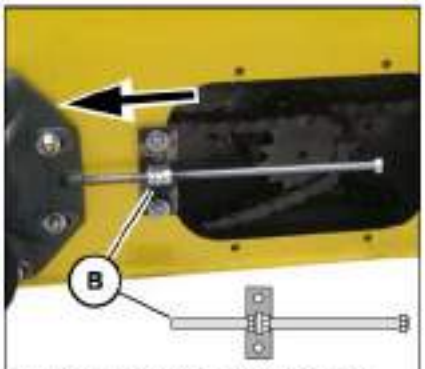


Fig. 186: Chain tensioner (symbolic representation)

☞ *Remove the fastening screws on the drive with a suitable tool.*

☞ *Install chain tensioner **B** (special tool) with a suitable tool.*

☞ *Put a suitable tool on chain tensioner **B** and adjust the drive in the direction of the arrow to correct the chain tension.*

☞ *Tighten the fastening screws on the drive with a suitable tool.*

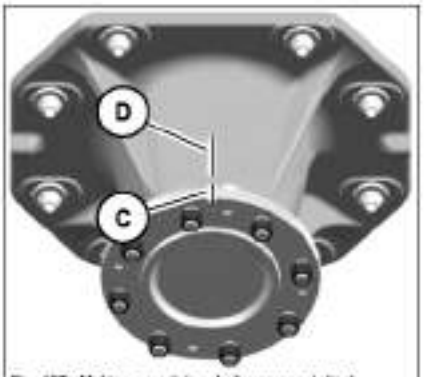


Fig. 187: Making a mark (symbolic representation)

☞ *Turn the input shaft in any direction to tighten the drive chain.*

☞ *Make a mark **C** and **D** on the drive shaft and cast-iron flange of the drive.*

☞ *Then turn the drive shaft in the opposite direction.*

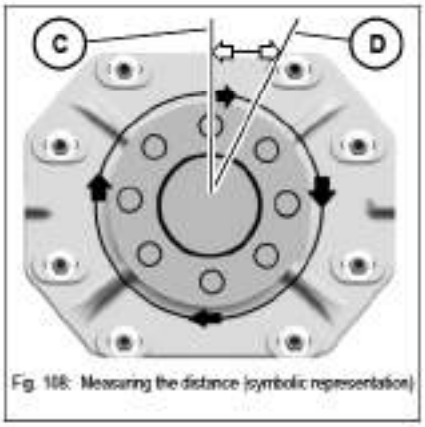


Fig. 188: Measuring the distance (symbolic representation)

☞ *Measure the distance between the marks **C** and **D**.*

➥ The maximum distance must be 1 mm (0.04 in) or less.

- If the tension is not correct.

☞ Repeat the procedure.

☞ *Remove chain tensioner **B**.*

☞ *Tighten the fastening screws on the drive to 135 Nm (100 ft.lbs.) with a suitable tool.*

☞ *Install cover **A** with a suitable tool.*

Replacing the drive-chain oil (SW24/SW28)

Fig. 109: Drive chain oil drain plugs

- ☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*
- ☞ *Remove the starting key and carry it with you.*
- ☞ *Operate the control lever repeatedly to release the pressure in the hydraulic system.*
- ☞ *Remove the starting key and carry it with you.*
- ☞ *Put a suitable container under oil drain plugs **A** at the front of the machine.*
- ☞ *Remove oil drain plugs **A** with a suitable tool.*
  - ☞ Completely drain the oil.
- ☞ *Install oil drain plugs **A** with a suitable tool.*

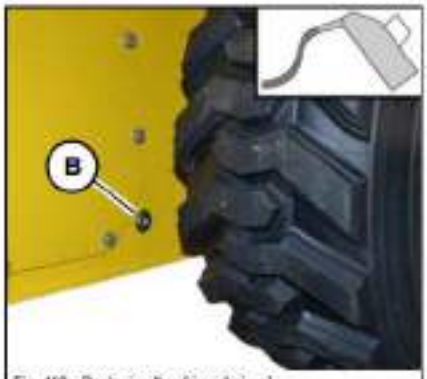


Fig. 110: Replacing the drive chain oil

- ☞ *Clean the area around locks **B** on either side of the machine.*
- ☞ *Remove locks **B** with a suitable tool.*
- ☞ *Add oil until it reaches below the edge of the opening.*
- ☞ *Use an oil can with a hose for adding oil.*
- ☞ *Install locks **A** with a suitable tool.*

Notice!

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

3.19 Axles/traveling drive

Caution!

Some components of the machine and the oil are still very hot after switching off the machine –

Burn and injury hazard!

☞ *Wait until the engine has cooled down before taking up work.*

☞ *Slowly open the plug to release the pressure inside.*

Checking the oil level and adding oil

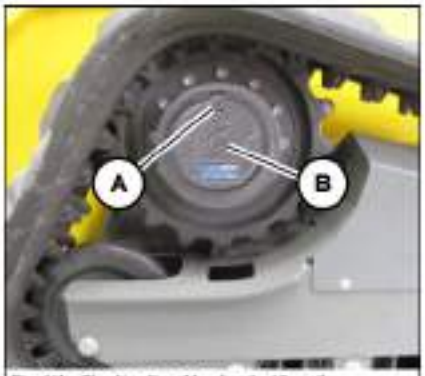


Fig. 111: Checking the oil level and adding oil

☞ *Position the machine so that filler plug **A** is at the top.*

☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*

☞ *Remove the starting key and carry it with you.*

☞ *Let the engine cool down.*

☞ *Place a suitable container under the filler plug.*

☞ *Remove filler plugs **A** and **B** with a suitable tool.*

☞ *A small quantity of oil must flow out of opening **B**.*

➥ If the oil does not flow out of opening B,

☞ add oil through opening A until it flows out slightly through opening B.

☞ *Install filler plugs **A** and **B** with a suitable tool.*

☞ *Move the machine a few metres.*

☞ *Check the oil level.*

➥ If the oil level is not correct:

☞ Repeat the procedure.

Environment!

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

Changing the oil

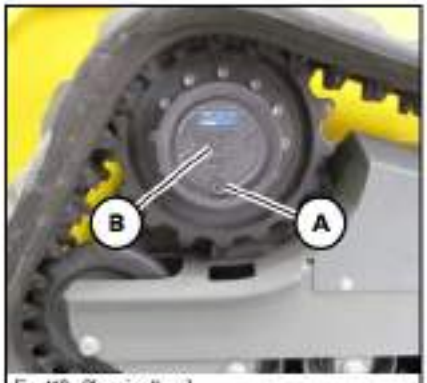


Fig. 112: Changing the oil

☞ *Position the machine so that filler plug A is at the bottom.*

☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*

☞ *Remove the starting key and carry it with you.*

☞ *Let the engine cool down.*

☞ *Place a suitable container under the filler plug.*

☞ *Remove filler plugs A and B with a suitable tool.*

➥ The oil flows out of the opening.

☞ *Position the machine so that filler plug A is at the top.*

☞ add oil through opening A until it flows out slightly through opening B.

☞ *Install filler plugs A and B with a suitable tool.*

☞ *Move the machine a few metres.*

☞ *Check the oil level.*

➥ If the oil level is not correct:

☞ Repeat the procedure.

Environment!

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

3.20 Electrical system

Important information regarding the electrical system

Maintenance and repair work on the electrical system may be performed only by trained technical personnel or a Wacker Neuson service center!

- Malfunctioning components of the electrical system must be replaced by a Wacker Neuson service center.
- Light bulbs and fuses may be replaced by the operator.

Alternator

- Start the engine only if the battery is connected.
- When connecting the battery, ensure that the poles are not inverted.
- Have malfunctioning charge indicator lights immediately replaced.

Caution!

Injury hazard due to malfunctioning batteries!

Batteries give off explosive gases that can cause deflagrations if ignited.

- *Fire, open flames and smoking is prohibited.*
- *Do not place any tools on the battery.*
- *Wear protective gloves and safety glasses.*
- *Do not attempt to jump-start the machine if the battery is frozen or if the acid level is low.*
- *Disconnect the grounding strap of the battery before starting repair work on the electrical system.*

Notice!

Damage to electrical components or the engine electronics.

- When connecting the battery leads, ensure that the poles are not inverted.
- Do not place tools or other conductive articles on the battery – risk of short circuit.
- Do not interrupt voltage-carrying circuits at the battery terminals because of the sparking hazard.
- Do not disconnect the battery while the engine is running.

Environment!

Dispose of old batteries in an environmentally friendly manner.

Fuses and relays

- Blown fuses indicate overloading or short circuits. Check the electrical system.
- Only use fuses with the specified amperage.

– *see chapter 2.14 Electrical system* on page 2-8

Battery charge condition

☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*

- The battery is "maintenance-free".
- 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. See "Preparing lubrication".*

☞ *Remove the battery.*

☞ *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

Fig. 113: Replacing the battery

Open the engine cover to replace the battery.

Always follow the specific battery safety instructions.

☞ *Stop and park the machine. Stop the engine. See "Preparing lubrication".*

☞ *Remove bracket A 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 bracket A with a suitable tool.*

☞ *Close the engine cover.*

Notice!

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

Notice!

In order to avoid damage to the engine electronics, wait two minutes after stopping the engine before disconnecting the battery.

3.21 Cleaning and maintenance

Information on cleaning and maintenance

Cleaning the machine is divided into three separate areas:

- Inside the cabin.
- 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. Follow the information below.

Cleaning with washing solvents

- Ensure adequate 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

- Cover electric parts.
- Do not directly expose electrical components and damping material to the jet.
- Cover the vent filter on the hydraulic oil reservoir and the filler caps for fuel, hydraulic oil, etc.
- Protect the following components from moisture:
  - Electrical components such as the alternator.
  - Control devices and seals.
  - Air intake filters, etc.
- Wear eye protection.

Cleaning with volatile and easily flammable anticorrosion agents and sprays:

- Ensure adequate room ventilation.
- Fire, open flames and smoking is prohibited.

Environment!

In order to avoid damage to the environment, clean the machine only in wash bays and places provided to this effect.

Use of solvents

Notice!

Damage to rubber and electrical parts when cleaning with solvents.

- Do not use solvents, benzine or other aggressive chemicals.

Cleaning inside the cabin

Notice!

Machine damage due to cleaning.

- Do not clean the inside with high-pressure cleaners, steam jets or high-pressure water. Water 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 cabin:

- Broom
- Vacuum cleaner
- Damp cloth
- Brush
- Water with mild soap solution

Cleaning the outside of the machine

We recommend using the following aids to clean the machine:

- High-pressure cleaner
- Steam jet

Cleaning the engine compartment

Caution!

Burn hazard due to hot engine parts!

Can cause serious burns.

- *Stop the engine and let it cool down.*
- *Wear protective equipment.*

Caution!

Injury hazard due to rotating parts!

Rotating parts can cause serious injury or death.

- *Open the engine cover only at engine standstill.*

Notice!

Damage due to water or steam jet.

- Do not point the water jet directly at any of the electric sensors such as temperature and oil pressure switches or control valves, etc.
- Protect all electric parts, such as the alternator, connectors, relays, etc. from humidity.
- If water contacts electrical components, dry them with compressed air and apply contact spray to them.
- Lubricate the lubrication points after washing the machine.

Clean the engine compartment as follows:

☞ *Park the machine in a wash bay or place.*

☞ *Stop the engine. See "Preparing lubrication".*

☞ *Clean the machine.*

Cleaning the seat belt

Always keep the seat belt clean, as coarse dirt can impair the proper functioning of the seat belt buckle.

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!

Threaded fittings and attachments

All threaded fittings must be checked regularly for tightness.

- Engine fastening screws
- Fastening screws on the hydraulic system
- Bucket teeth, line and pin fastenings on the attachment

Retighten loose connections immediately, and have them immediately replaced by a Wacker Neuson service center if necessary.

3.22 Maintenance of attachments

Important information regarding maintenance of attachments

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

3.23 Exhaust gas treatment

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

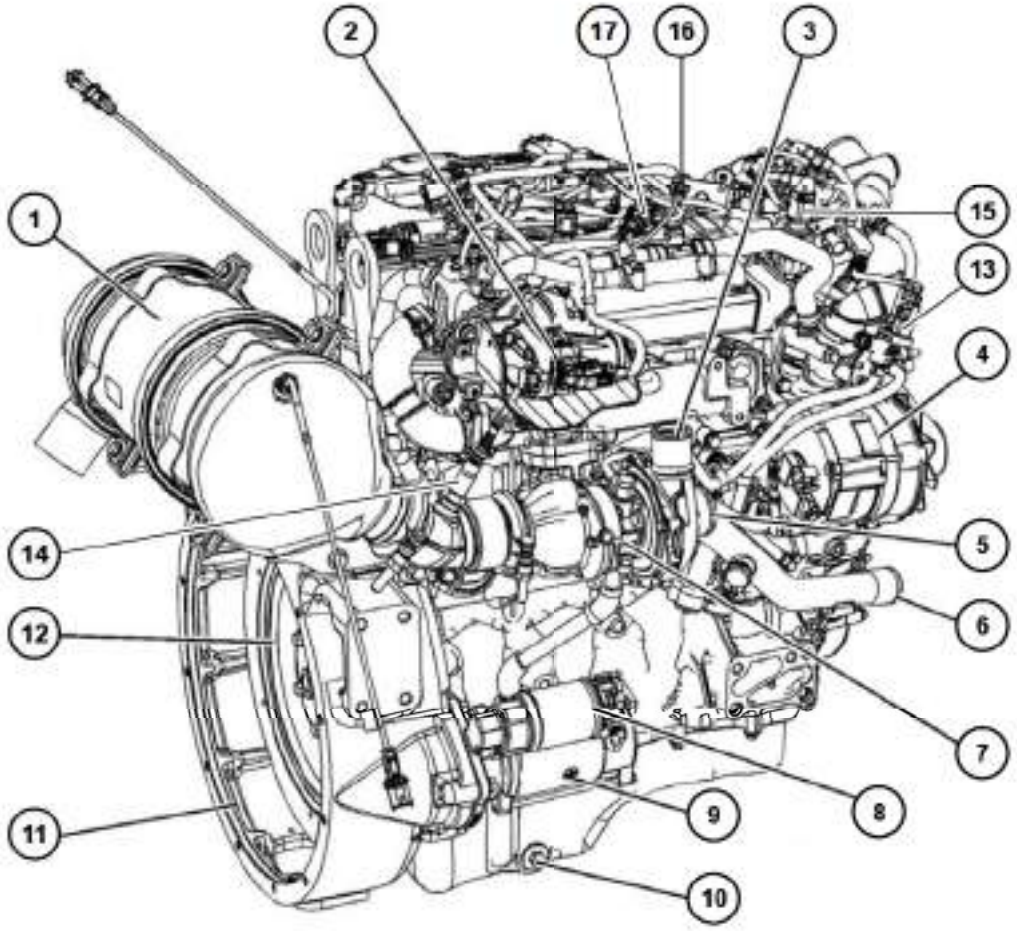
3.24 Maintenance of options

– *see chapter 3.2 Maintenance overview* on page 3-5

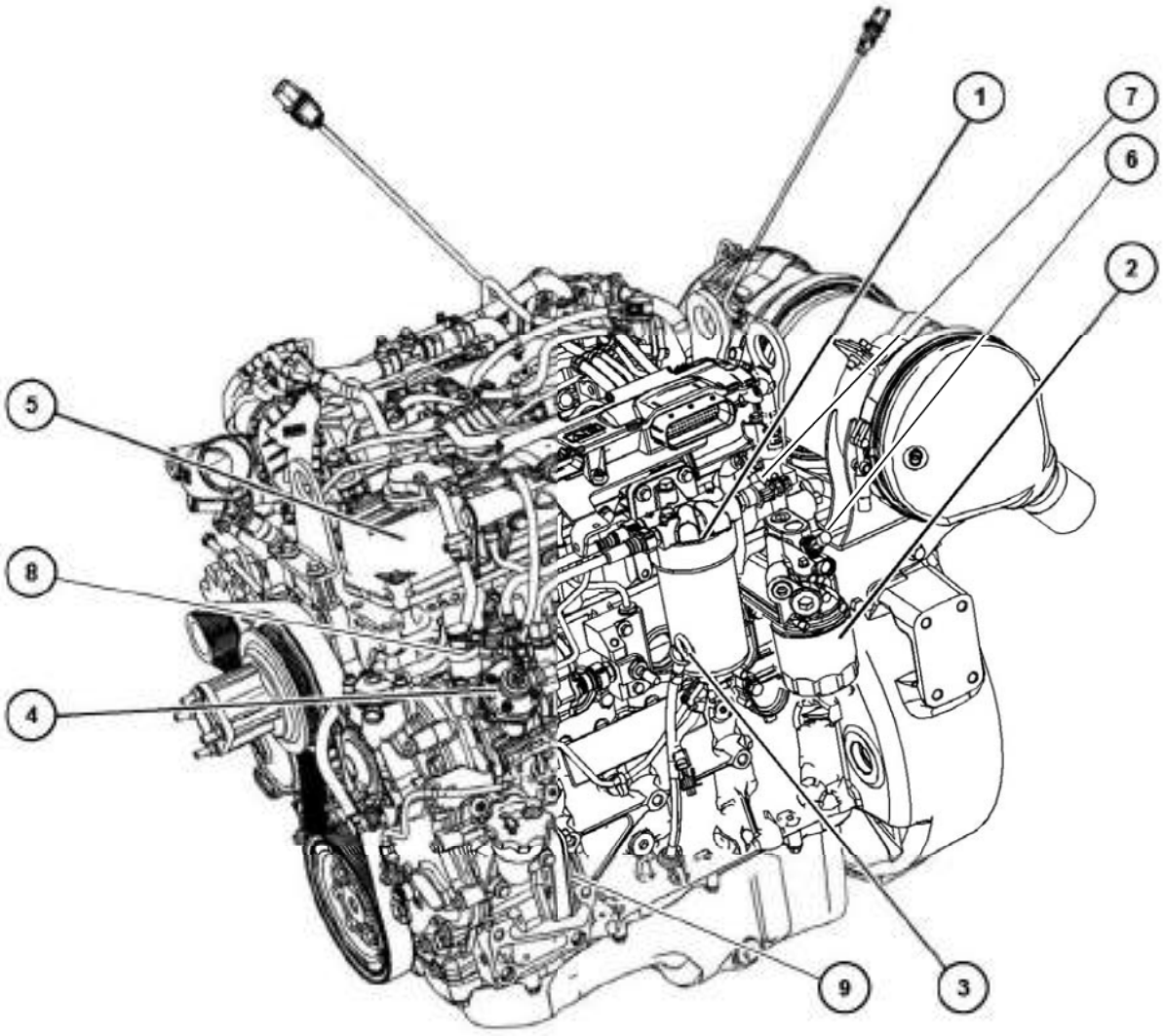
Engine

4 Engine

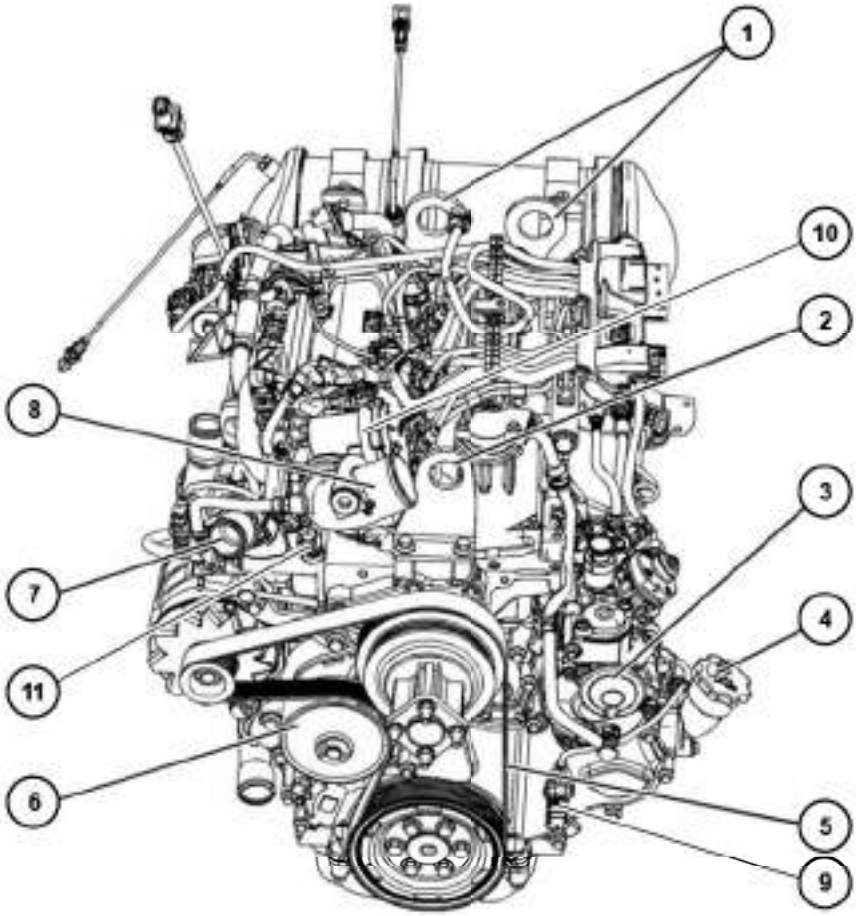
4.1 Perkins 854F-E34TTF engine (overview)



Pos.	Designation	Pos.	Designation
1	Engine aftertreatment system	10	Oil-drain plug
2	Control valve of nitrogen oxide reduction system	11	Flywheel housing
3	Air outlet connection of exhaust-gas turbocharger	12	Flywheel
4	Alternator	13	Waste gate
5	Air intake of air filter	14	Oxygen sensor
6	Coolant intake connection	15	Exhaust gas pressure sensor
7	Turbocharger	16	Connection of exhaust gas temperature sensor
8	Solenoid valve of starter	17	Intake manifold pressure sensor and temperature sensor
9	Starter		



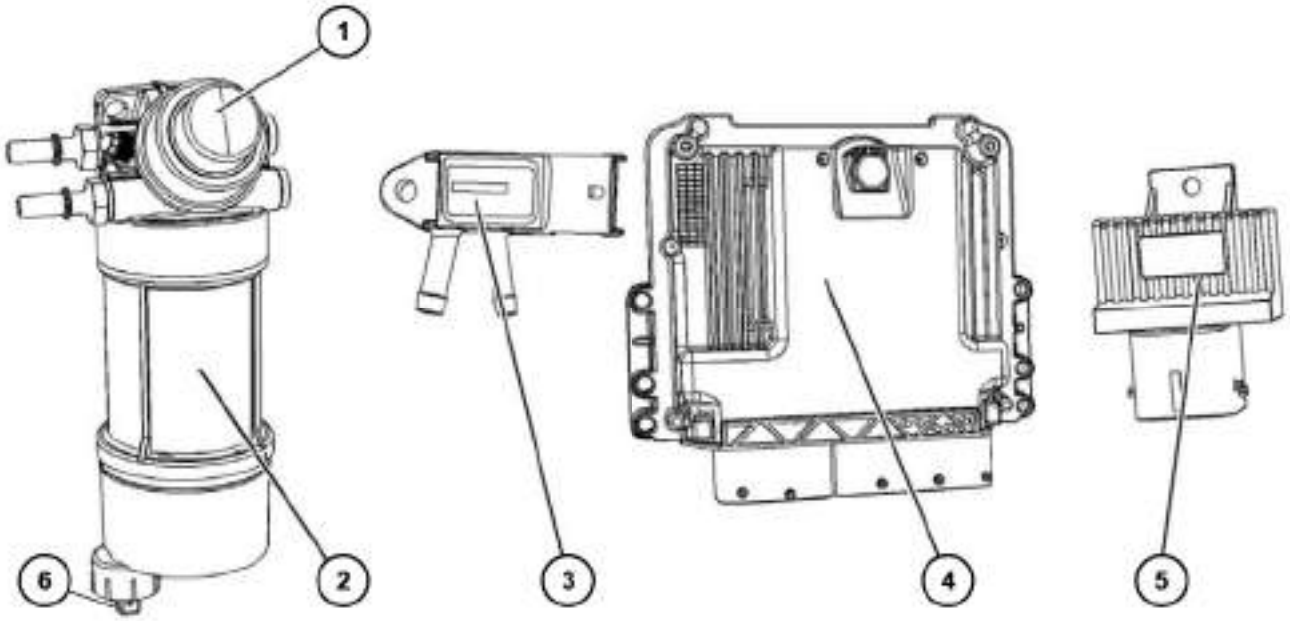
Pos.	Designation
1	Fuel safety filter
2	Oil filter
3	Oil dipstick
4	High-pressure fuel pump
5	Cylinder-head cover
6	Oil pressure switch
7	Fuel temperature sensor
8	Fuel metering valve
9	Primary engine speed/ignition time sensor (crankshaft angle sensor)



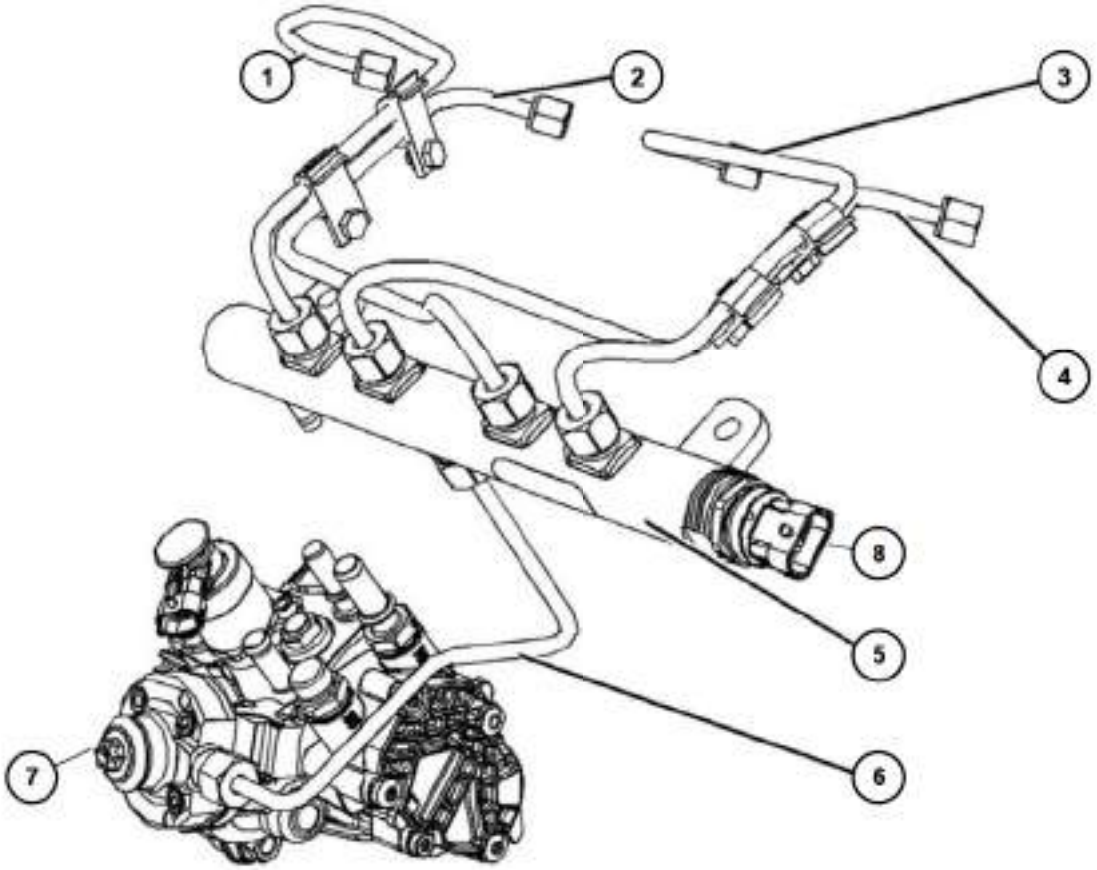
Pos.	Designation
1	Rear lifting eyes
2	Front lifting eye
3	Crankcase breather
4	Oil filler neck cover
5	V-belt
6	Coolant pump
7	Coolant outlet connection
8	Air intake connection
9	Secondary engine speed/ignition time sensor (camshaft position sensor)
10	Throttle valve intake valve
11	Coolant temperature sensor

Notice!

The cover of oil filler neck **4** can be located on the cylinder-head cover

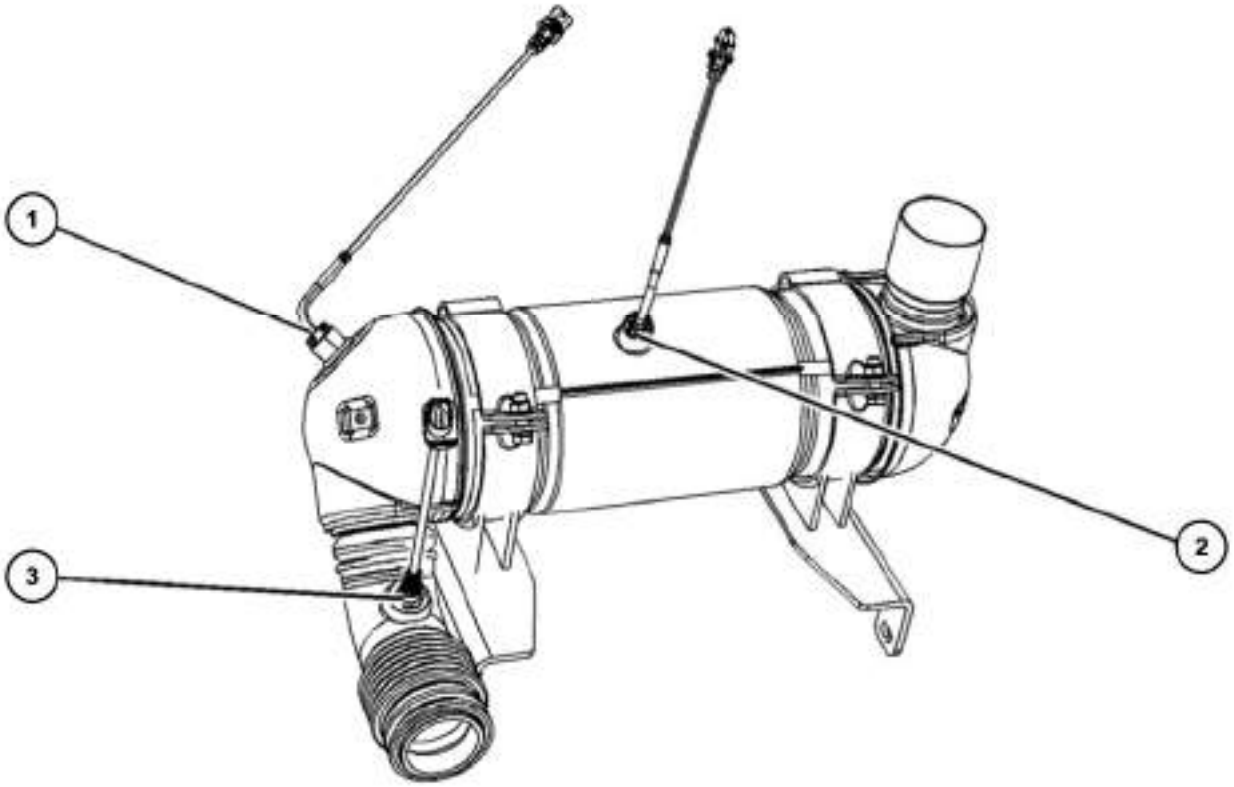


Pos.	Designation
1	Manual fuel pump
2	Fuel prefilter
3	Differential pressure sensor
4	Electronic engine control unit
5	Glow plug relay
6	Water-in-fuel sensor



Pos.	Designation
1 – 4	High-pressure line
5	High-pressure fuel rail
6	High-pressure fuel transmission line
7	High-pressure fuel pump
8	Fuel rail pressure sensor

Auxiliary flow aftertreatment system

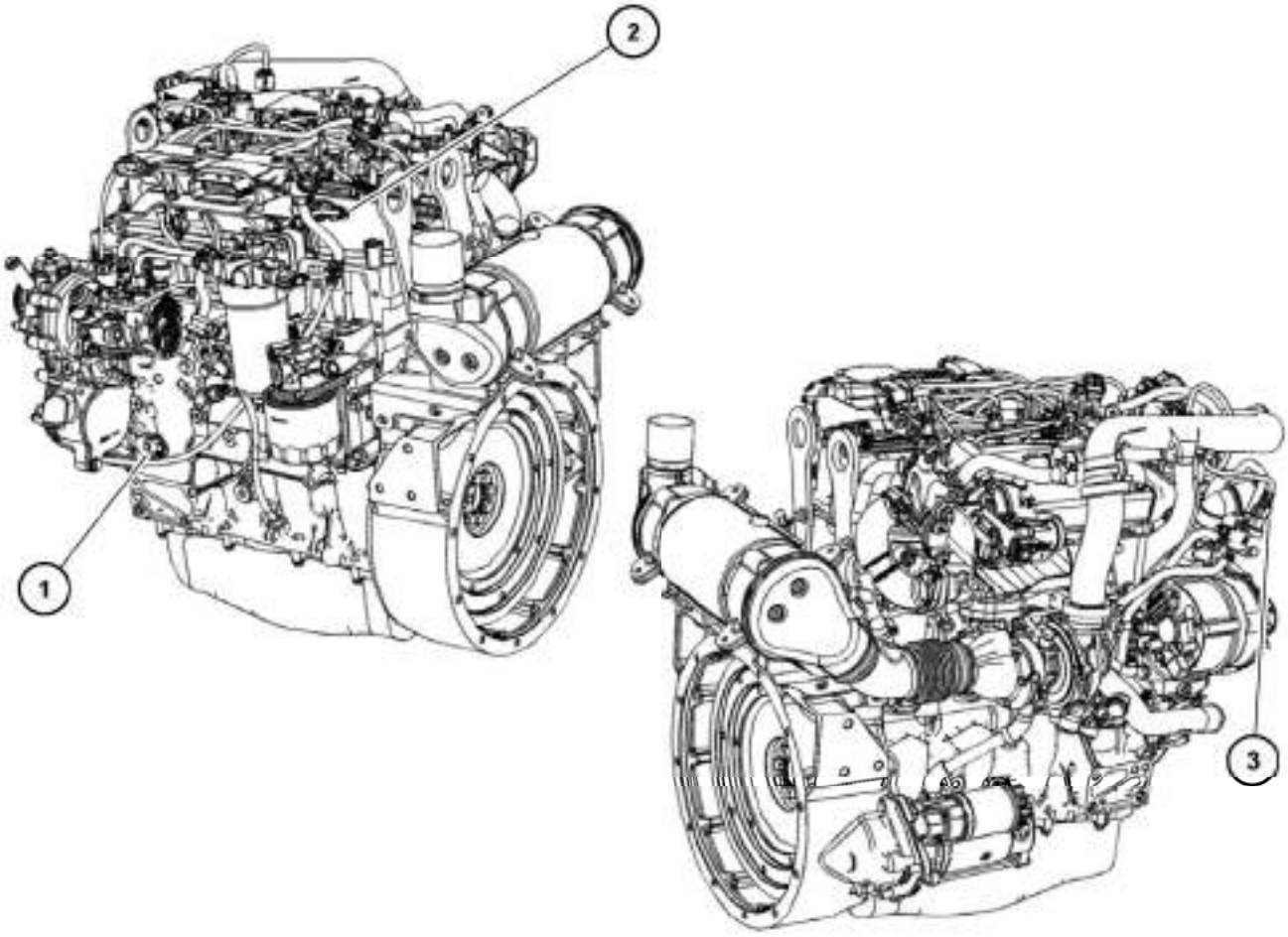


Pos.	Designation
1	Temperature sensor of diesel oxidation catalyst (DOC)
2	Temperature sensor after the DOC
3	Oxygen sensor

Notice!

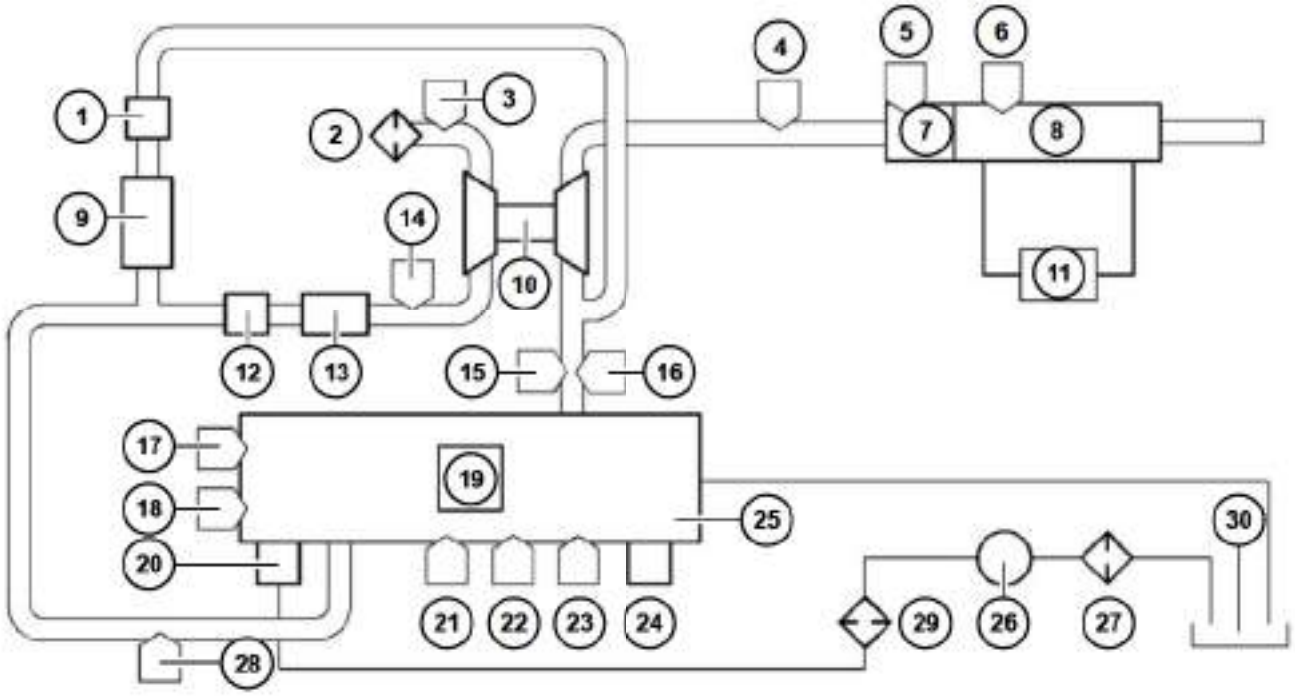
The auxiliary-flow diesel particulate filter (DPF) does not require any maintenance.

Representation with auxiliary-flow diesel particulate filter



Pos.	Designation
1	Primary engine speed/ignition time sensor (crankshaft angle sensor)
2	Fuel rail pressure sensor (fuel rail)
3	Waste gate

Engine block overview

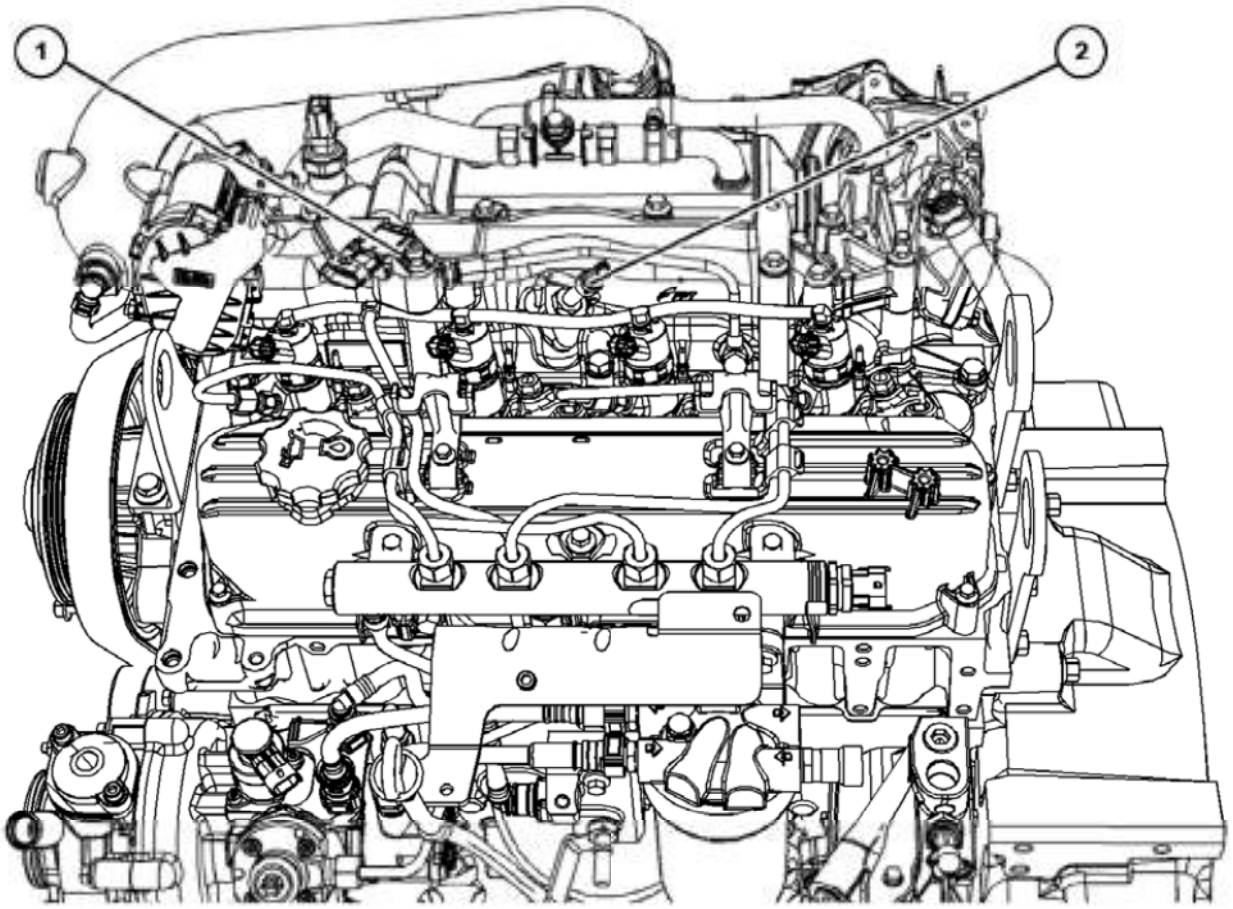


Pos.	Designation	Pos.	Designation
1	NRS valve	16	Engine exhaust temperature sensor
2	Air filter	17	Primary engine-speed sensor/reference mark transmitter
3	Air intake temperature sensor	18	Secondary speed sensor/reference mark transmitter
4	Oxygen sensor	19	Fuel injection nozzle
5	DOC intake temperature sensor	20	High-pressure fuel pump
6	DPF intake temperature sensor	21	Fuel rail pressure sensor
7	DOC	22	Oil pressure switch
8	DPF	23	Coolant temperature sensor
9	NRS cooler	24	ECM
10	Turbocharger	25	Engine
11	DPF differential pressure sensor	26	Fuel pump
12	Intake valve of engine throttle valve	27	Fuel prefilter with WIF sensor (water in fuel)
13	Air-cooled charge-air cooler	28	Air pressure and temperature sensor of intake manifold
14	Wastegate	29	Fuel safety filter with fuel temperature sensor
15	Engine exhaust pressure sensor	30	Fuel tank

Notice!

The 854F-E34T engine is fitted with separate sensors for intake-manifold air-pressure and temperature

Representation with separate intake-manifold pressure sensor and temperature sensor



Pos.	Designation
1	Intake-manifold pressure sensor
2	Intake-manifold temperature sensor

4.2 Turbocharger

Check

Performing visual checks of the exhaust-gas turbocharger can minimize unscheduled downtimes. A visual check of the exhaust-gas turbocharger can also reduce the risk of damage to other engine components.

Do not perform checks on a running engine!

Notice!

In case of a malfunction of the turbocharger bearings, large quantities of oil can get into the air-intake and exhaust system. This can result in insufficient engine lubrication, and serious damage to the engine. If a turbocharger bearing malfunction results in a major loss of engine output (smoke in exhaust gas or increased engine speed during operation without load), do not operate the engine before the exhaust-gas turbocharger is replaced.

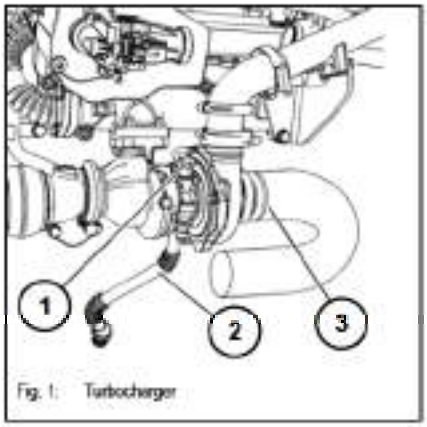


Fig. 1: Turbocharger

☞ *Before removing components, check the exhaust-gas turbocharger to ensure that it is clean.*

☞ *Remove the air intake pipe **3**. Check whether there is any oil on the pipes. There should be a small amount of oil due to the design of the breather system. Clean inside the pipe to prevent dirt from entering when installing the unit again.*

☞ *Check the exhaust-gas turbocharger for visible discoloration due to heat. Check for loose and missing screws. Check oil feed line **1** and oil drain line **2** for damage. Check the housing of the exhaust-gas turbocharger for cracks. Ensure that the compressor wheel can turn freely. Ensure that there are no visible signs of damage on the compressor wheel.*

☞ *Check whether there are any traces of oil. If oil comes out at the rear of the compressor wheel, this is a sign of possible damage of a rotary shaft lip seal of the exhaust-gas turbocharger.*

Escaping oil can be due to extensive engine operation at idling speed. The presence of oil can also be a sign of a narrow section in the air intake line (clogged air filter). A narrow section can cause oil and fuel to be transmitted by the exhaust-gas turbocharger.

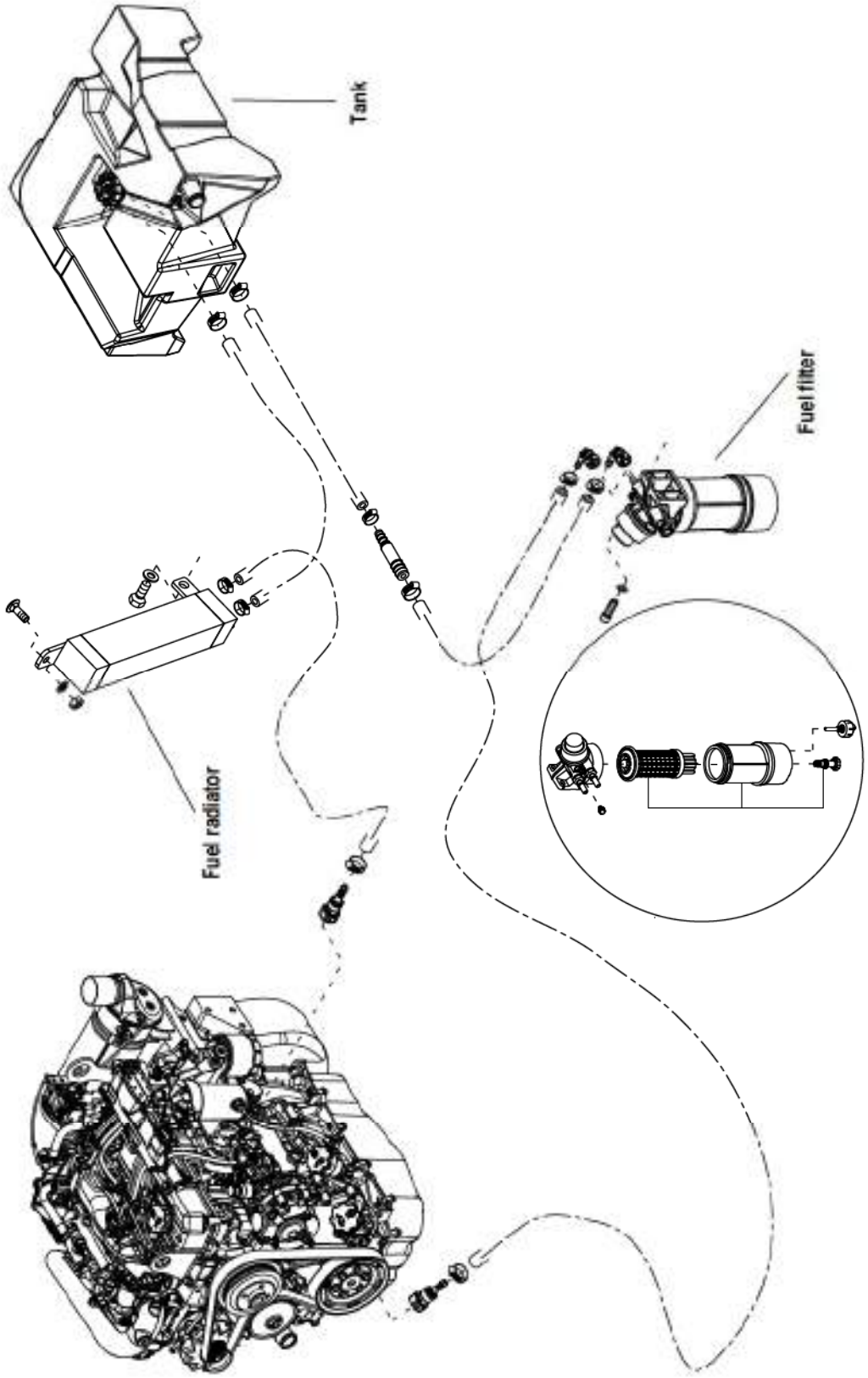
☞ *Install the air intake pipe on the exhaust-gas turbocharger housing. Ensure that all clamps are correctly installed and safely tightened.*

4.3 Replacing the oxygen sensor

Notice!

These activities may only be performed by authorized Perkins service centers during the warranty period.

4.4 Fuel system



4.5 Engine malfunctions

Problem	Possible causes
Engine turns, but does not start	Malfunctioning glow plugs
	Error in the fuel system
	Malfunctioning compression
	Malfunctioning speed sensor and reference mark transmitter
	Malfunctioning air-intake and exhaust system
	Malfunctioning components (visual damage)
	Glow plug metering unit
	Leaks in oil or fuel system
	Clogged air filter
	Damage of lines and hoses
	Malfunctioning cylinder-head gasket
Engine does not turn	Malfunctioning starter/starter solenoid coil, or error in starter circuit
	Power supply error
	Internal engine error
	Battery lead and/or battery
Fuel consumption too high	Wrong indication of fuel level
	Fuel leak
	Fuel grade
	Oil grade
	Fan
	Low engine temperature
	Reduced intake air pressure
	Air-intake and exhaust system
	Excessive valve clearance
	Operating engine speed
	Failure of primary engine speed sensor and reference mark transmitter
	Extensive operation at idling speed
	Sudden engine load

Problem	Possible causes
Low oil pressure	Engine oil level
	Oil specification
	Engine oil filter
	Engine oil cooler
	Fuel in engine oil
	Engine oil pump
	Piston cooling jets
	Engine oil pressure switch
	Engine-oil overflow valve
	Bearing play
	Engine-oil suction line
	Visible leaks
Oil contains coolant	Cylinder-head gasket
	Cylinder head
	Cylinder block
	Engine oil cooler
Oil contains fuel	Maintenance intervals
	Extensive use of active regeneration
	Seal of fuel injection nozzles
	Fuel injection nozzle tip
Excessive oil consumption	Wrong indication of oil level
	Crankcase breather
	Air-intake and exhaust system
	Turbocharger
	Low compression (cylinder pressure)
	Oil leaks
	Oil level

Problem		Possible causes
Excessive development of	white smoke	Low coolant temperature
		Separate cylinder not working correctly
		Valve clearance
		Fuel grade
		Low compression (cylinder pressure)
	Black smoke	Electronically regulated pump/nozzle units
		Air-intake and exhaust system
		Turbocharger
		Separate cylinder not working correctly
		Low compression (cylinder pressure)
		Valve clearance
Excessive valve clearance		Lubrication
		Rocker arm
		Valve linkage
		Hydraulic tappet
		Camshaft
		Valve stems
		Rocker-arm shaft
Mechanical knocking of engine		Additional equipment
		Valve train components
		Piston
		Connecting rod and main bearing
Engine backfires, does not run smoothly or is unstable		Air-intake and exhaust system
		Fuel supply
		Throttle lever sensor
		Fuel injection pump
		Low compression (cylinder pressure)
		Electronically regulated pump/nozzle units
		Separate cylinder not working correctly

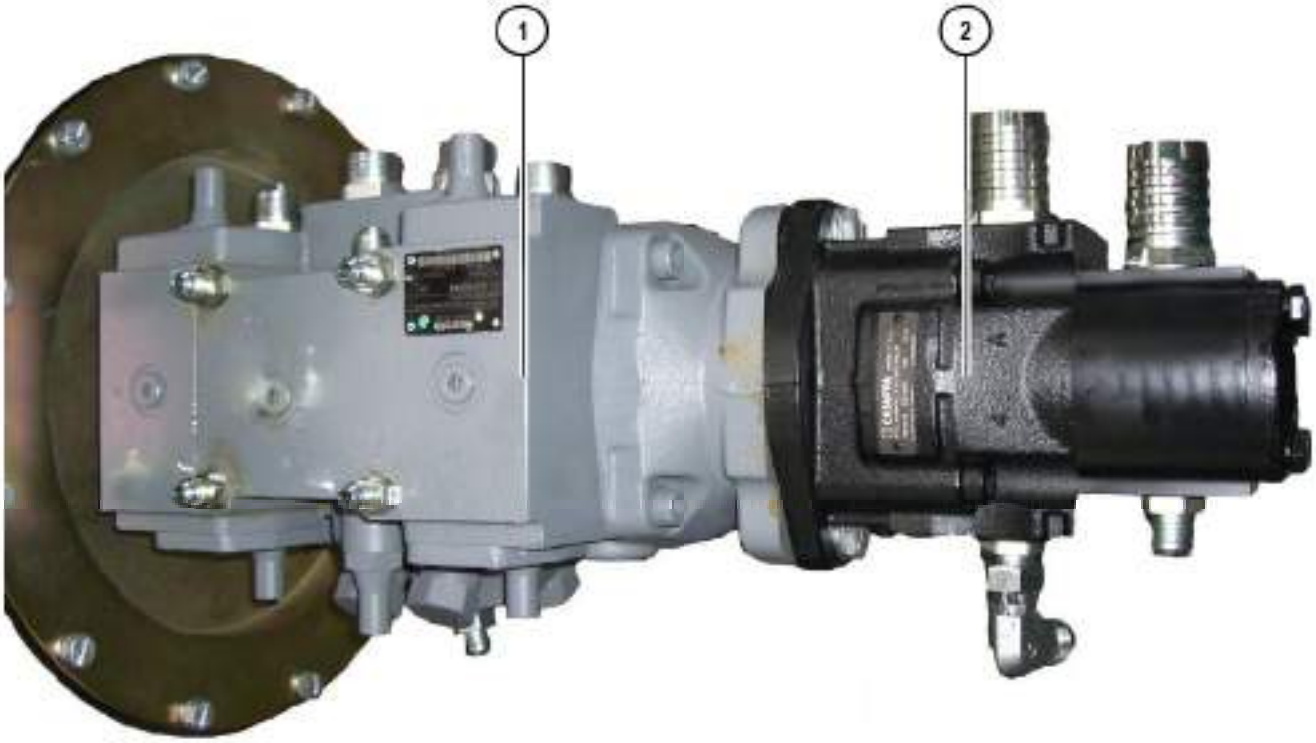
Hydraulic system

5 Hydraulic system

The drive hydraulics system is a closed system. The operating hydraulics systeme is an open circuit.

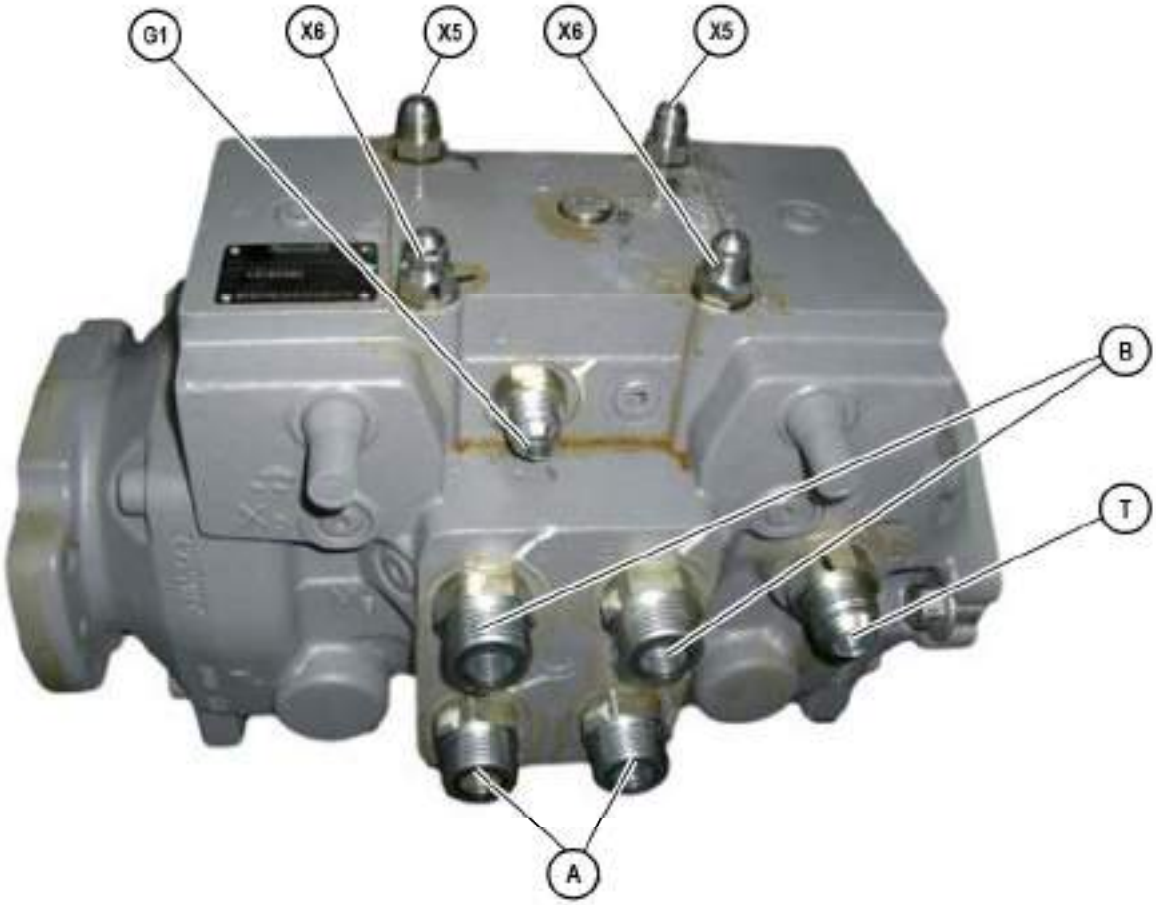
5.1 Hydraulic pump

Double variable displacement pump + twin gear pump



Pos.	Designation
1	Hydraulic pump
2	Work pump

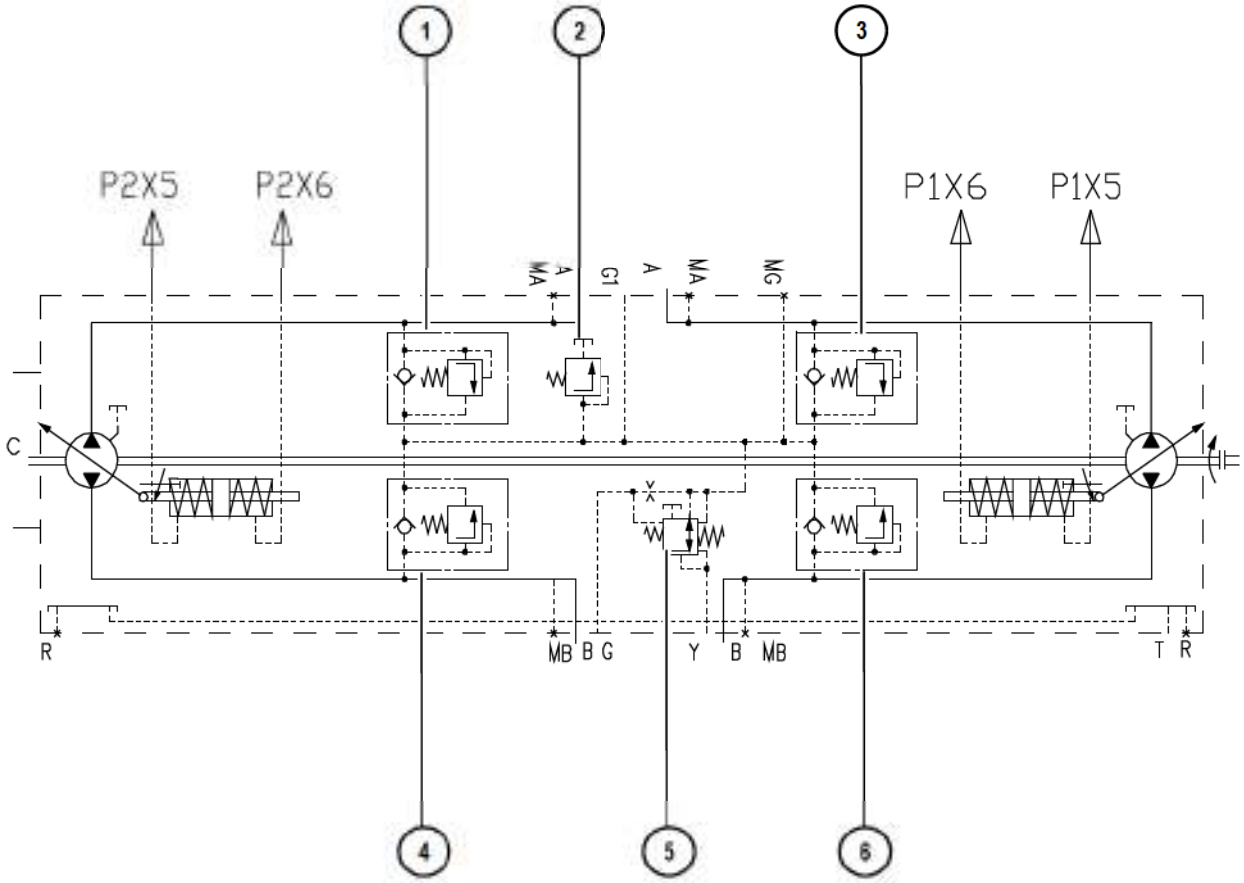
Hydraulic pump



Pos.	Designation
A	Work line to hydraulic motor on the right "P2" and hydraulic motor on the left "P1"
B	Work line to hydraulic motor on the right "P1" and hydraulic motor on the left "P2"
G1	Boost pressure filter
T	Reservoir connection
X5	Setting pressure
X6	Setting pressure

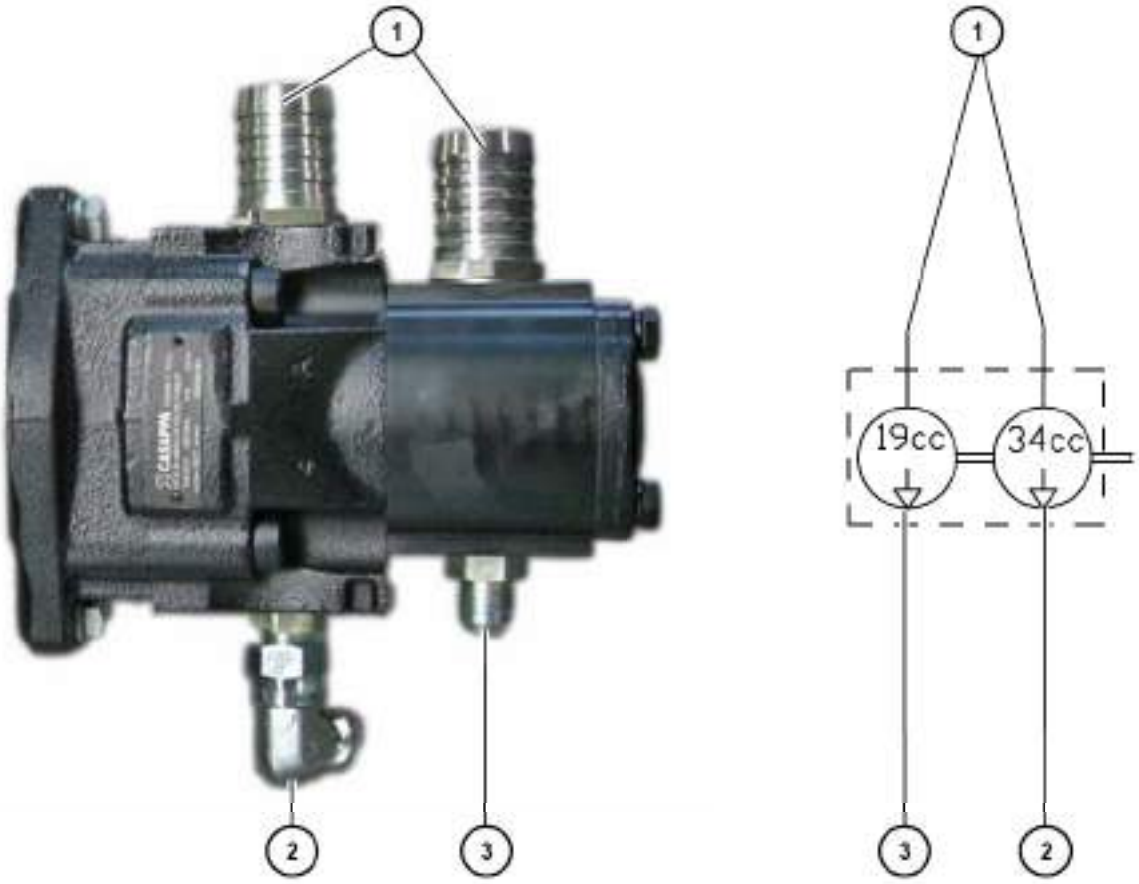
Pos.	Designation
G	Pilot control line toward "2nd speed valve" and pilot-control oil unit "G and Y1"

Diagram



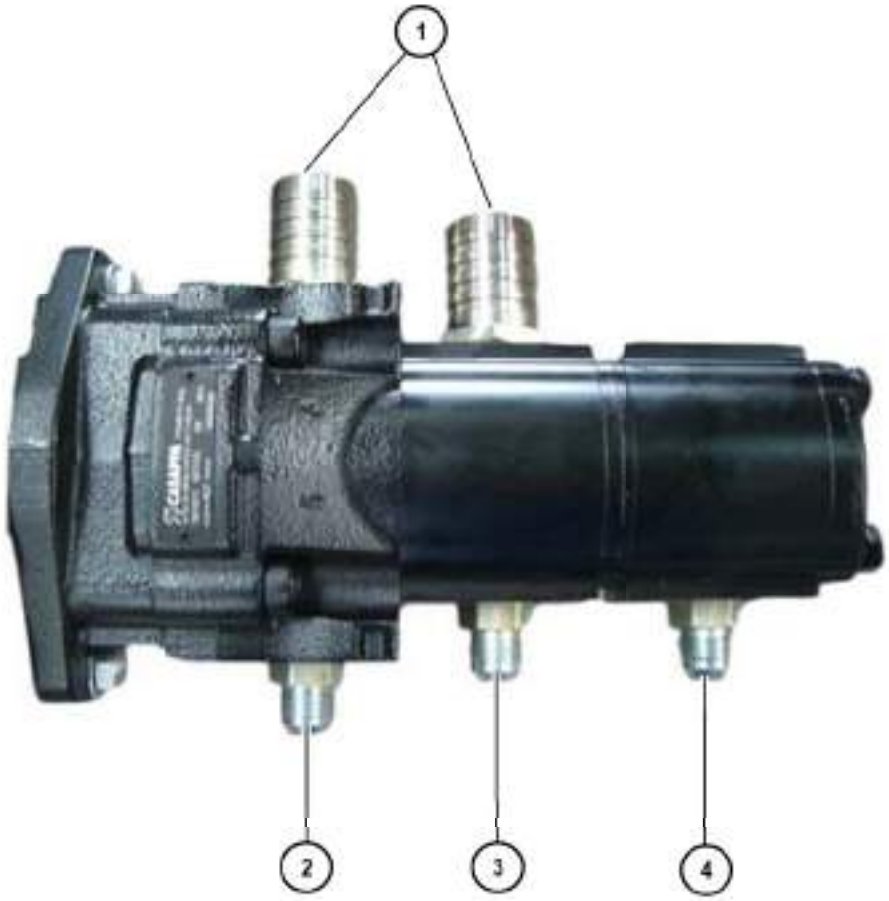
Pos.	Designation
1.4	High-pressure valves P2
2	Boost-pressure valve
3.6	High-pressure valves P1
5	Control valve
A	Work line to hydraulic motor on the right "P2" and hydraulic motor on the left "P1"
B	Work line to hydraulic motor on the right "P1" and hydraulic motor on the left "P2"
G1	Pilot control line toward "2nd speed valve" and pilot-control oil unit "G and Y1"
G	Boost pressure of pressure filter
T	Reservoir connection
X5	Setting pressure
X6	Setting pressure

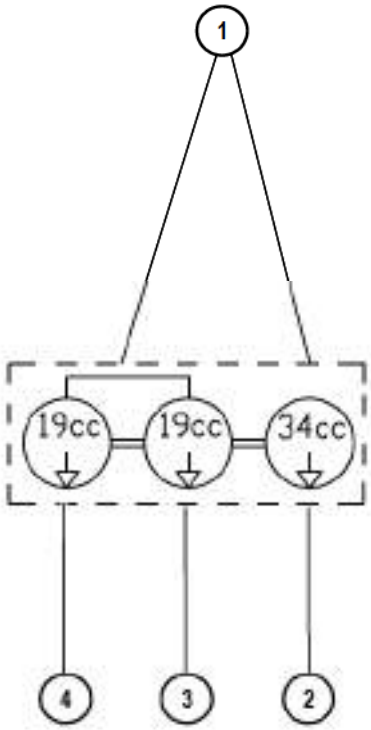
Standard operating pump



Pos.	Designation
1	Reservoir line
2	To connection "P" of main valve block
3	To connection "A" of fan motor

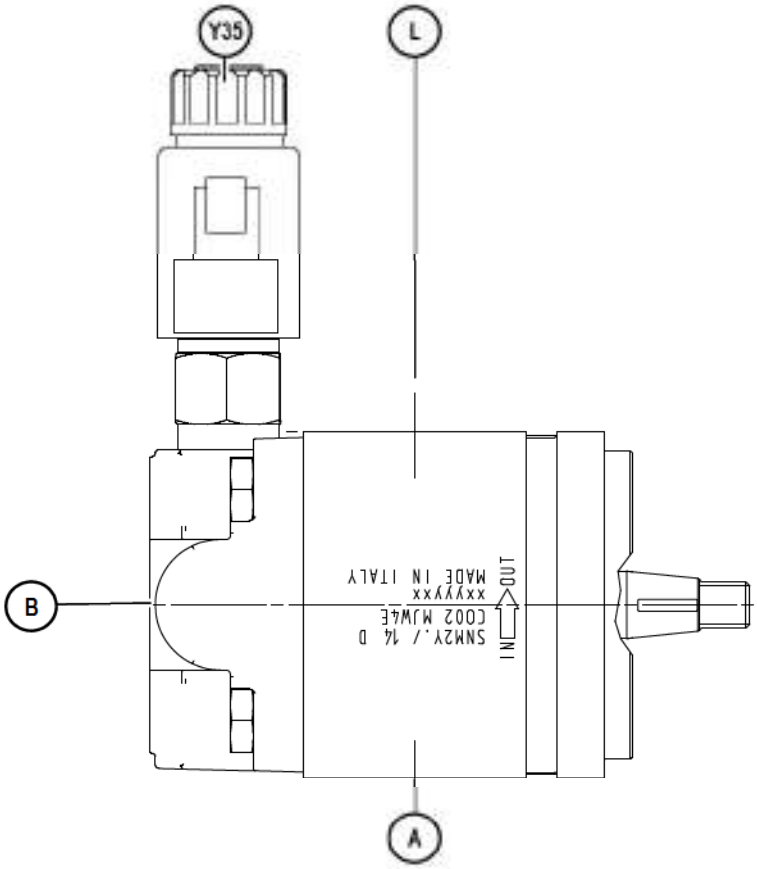
High Flow operating pump (option)

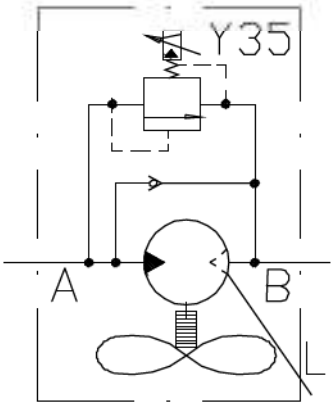




Pos.	Designation
1	Reservoir line
2	To connection "P" of main valve block
3	To connection "A" of fan motor
4	To connection "P in" of High Flow valve

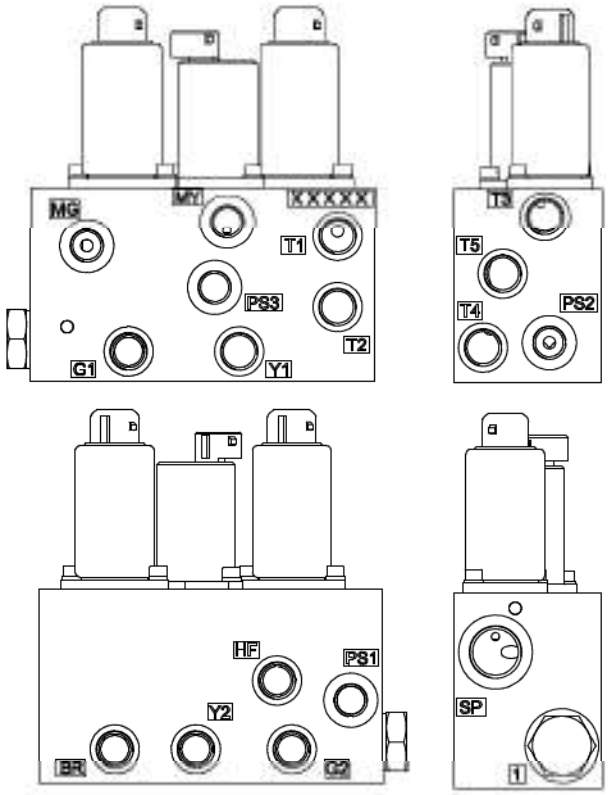
5.2 Fan motor

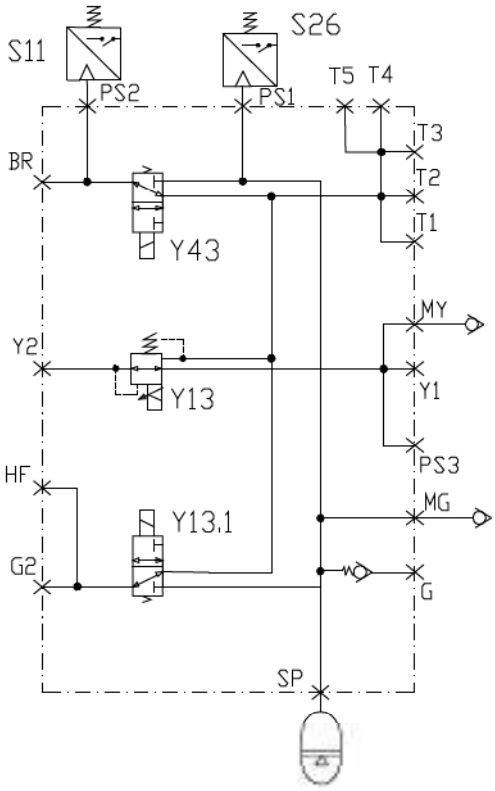




Pos.	Designation
A	From the work pump
B	Through pressure filter toward connection "G" of hydraulic pump
L	Reservoir connection
Y35	Proportional valve

5.3 Pilot oil supply unit

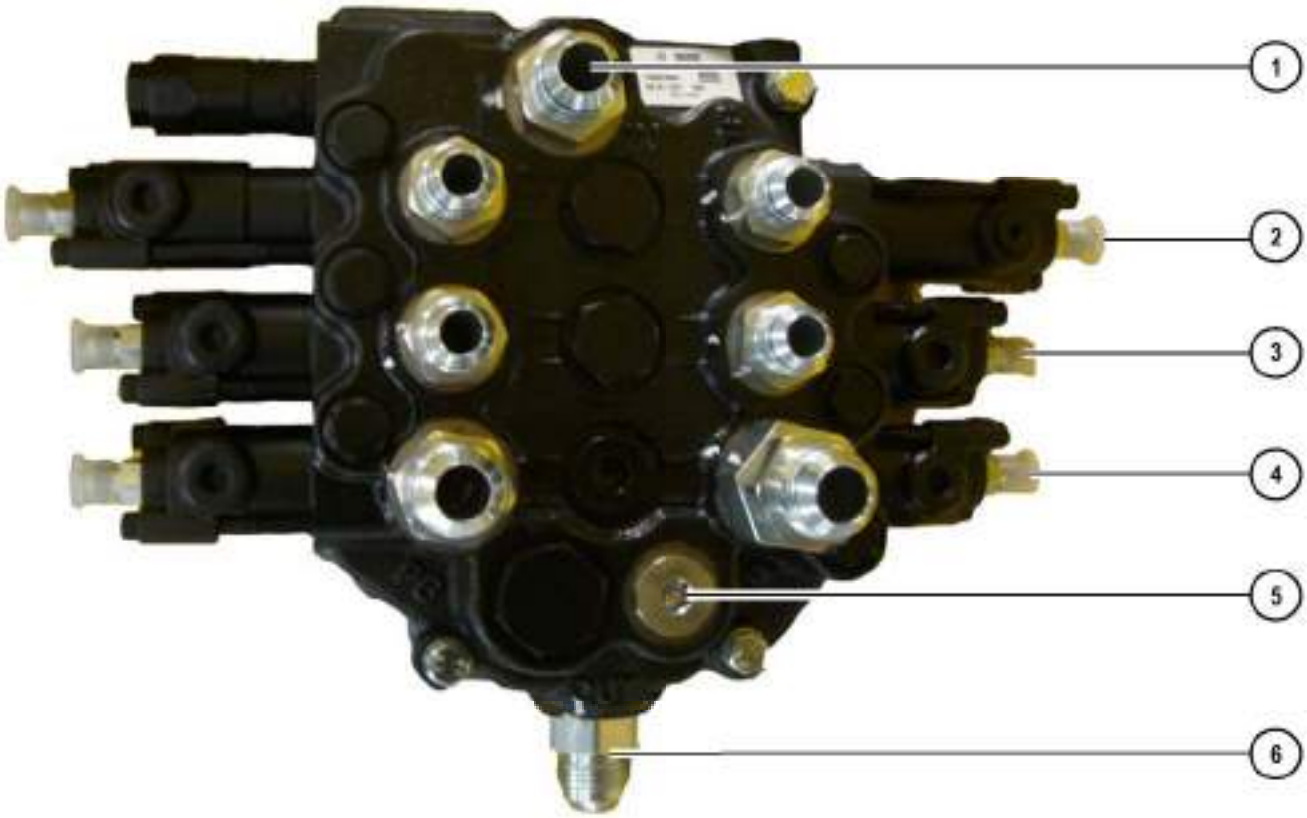




Pos.	Designation
PS1	Connection of S26 pump pressure switch
PS2	Connection of S11 parking brake pressure switch
BR	To connection "Z" of hydraulic motor on the left and right
Y2	ISO controls: connection "P" of joystick (left) H controls: connection "P" of joystick (left and right)
HF	To connection "P" of proportional valve
G2	ISO controls: connection "P" of joystick (right)
SP	Accumulator connection
G	From connection "G" of hydraulic pump
MG	Measurement connection
Y1	From connection "G" of hydraulic pump
MY	Measurement connection
T1	Reservoir connection
Y43	Parking brake solenoid valve
Y13	Drive safety valve
Y13.1	Operating hydraulics safety valve

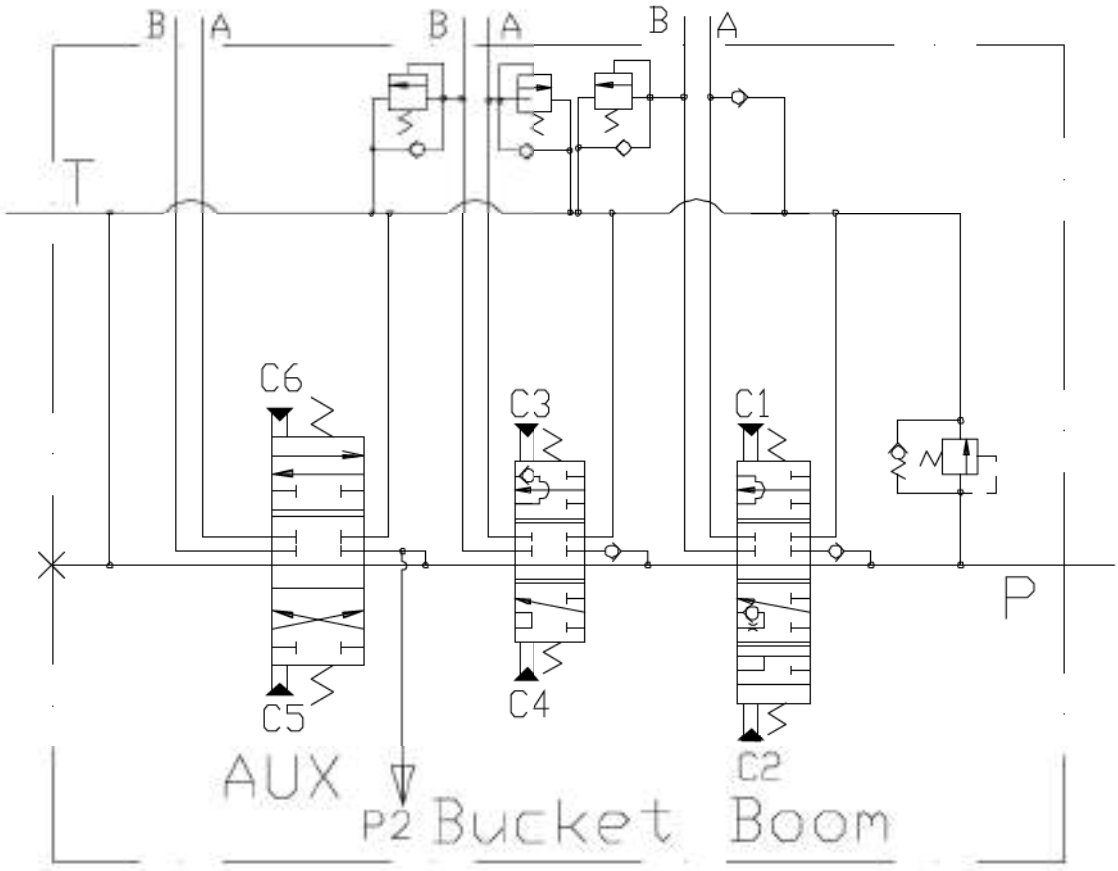
5.4 Main valve block

Connections



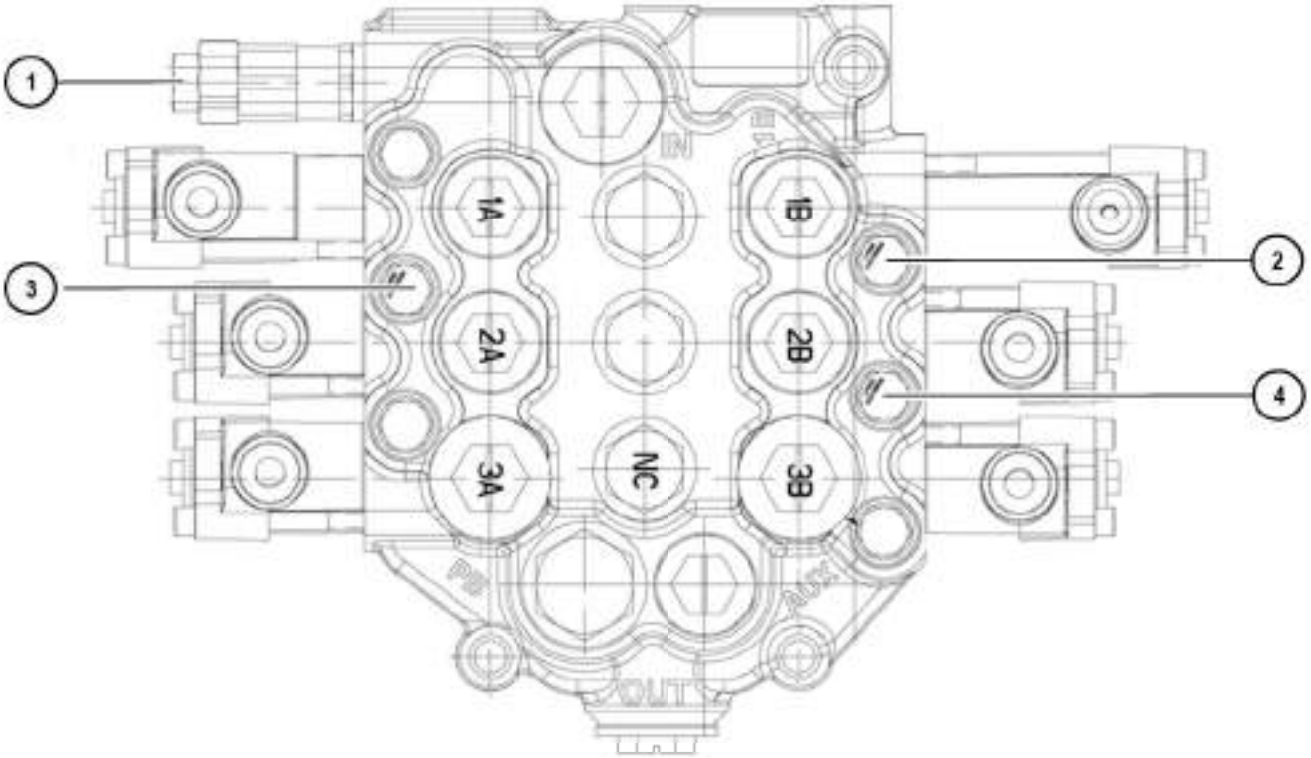
Pos.	Designation
1	Pump connection
2	Loader unit
3	Bucket
4	Auxiliary hydraulics
5	High Flow (option)
6	Reservoir connection

Main valve block diagram



Pos.	Designation
P2	Oil supply for connection "P out" of High Flow valve

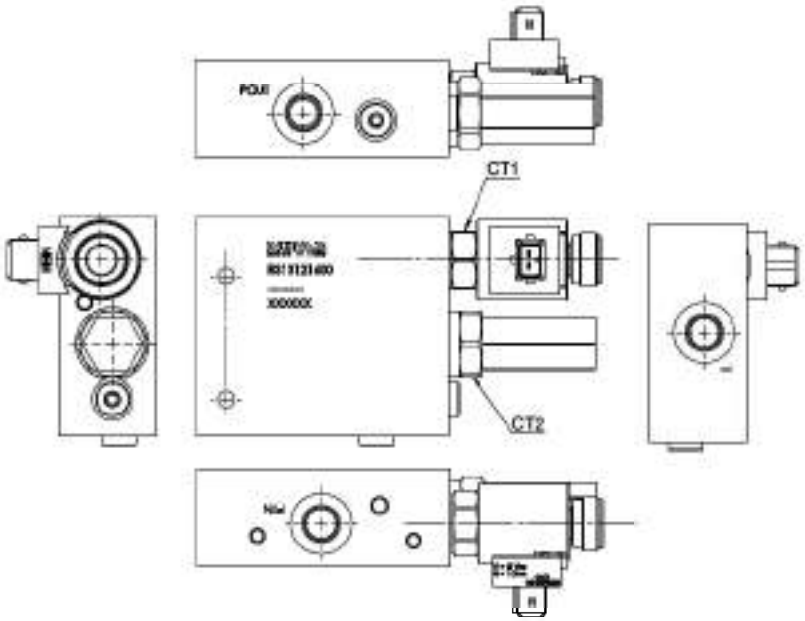
Pressure limiting valve

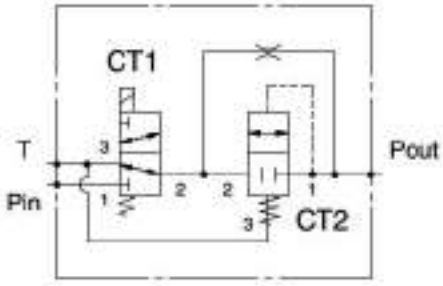


Pos.	Designation
1	Primary pressure limiting valve
2	Loader unit base side
3	Bucket base side
4	Bucket rod side

5.5 Pilot valves

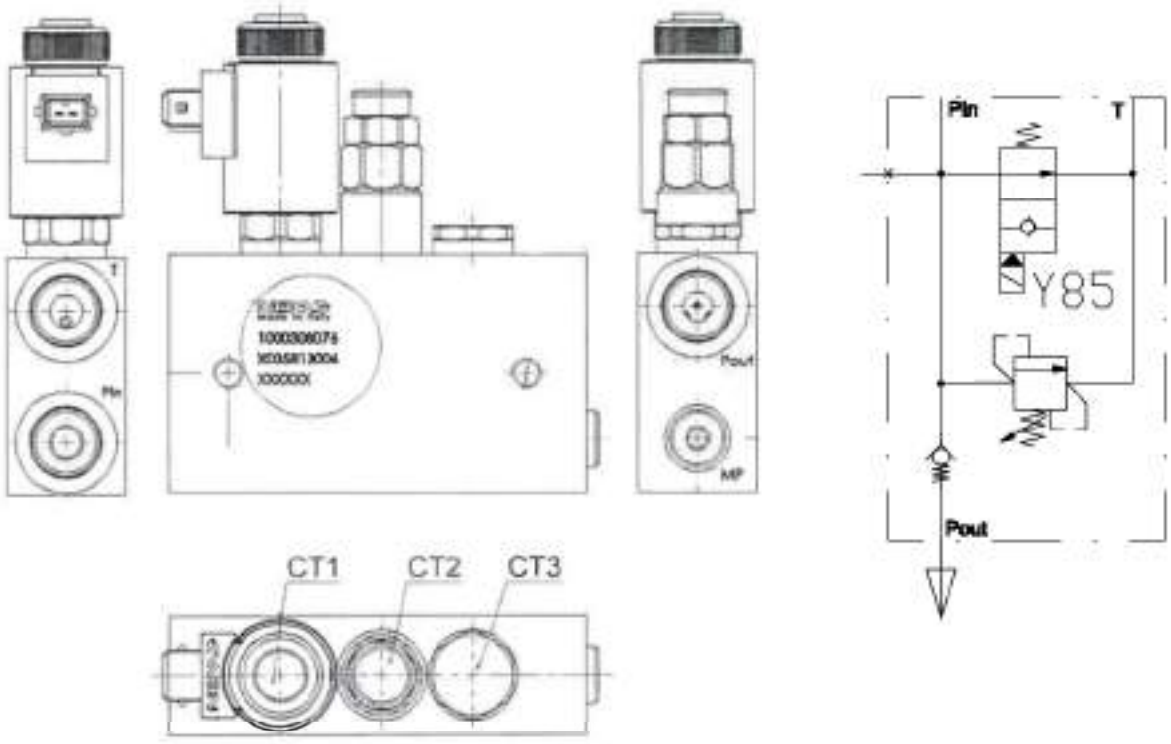
2nd speed valve





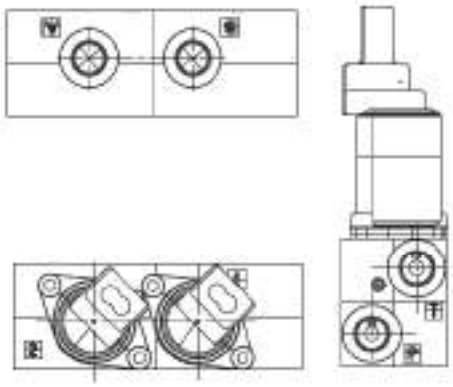
Pos.	Designation
P in	From connection "G1" of hydraulic pump
P out	To connection "X" of hydraulic motor on the right and left
T	Reservoir connection
CT1	Solenoid valve
CT2	Control spool

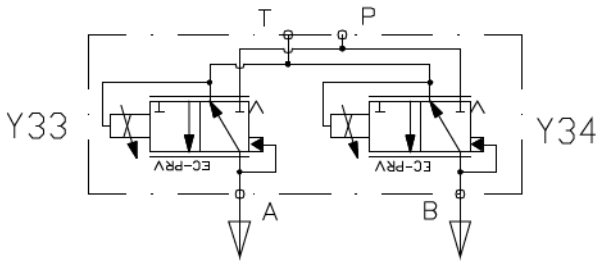
High Flow valve (option)

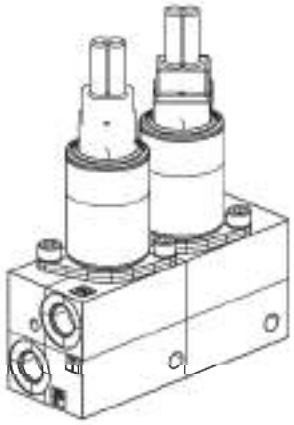


Pos.	Designation
P in	From connection "G1" of hydraulic pump
P out	To connection "X" of hydraulic motor on the right and left
T	Reservoir connection
MP	Measurement connection
CT1/Y85	Solenoid valve
CT2	Pressure limiting valve
CT3	Non-return valve

Proportional valve

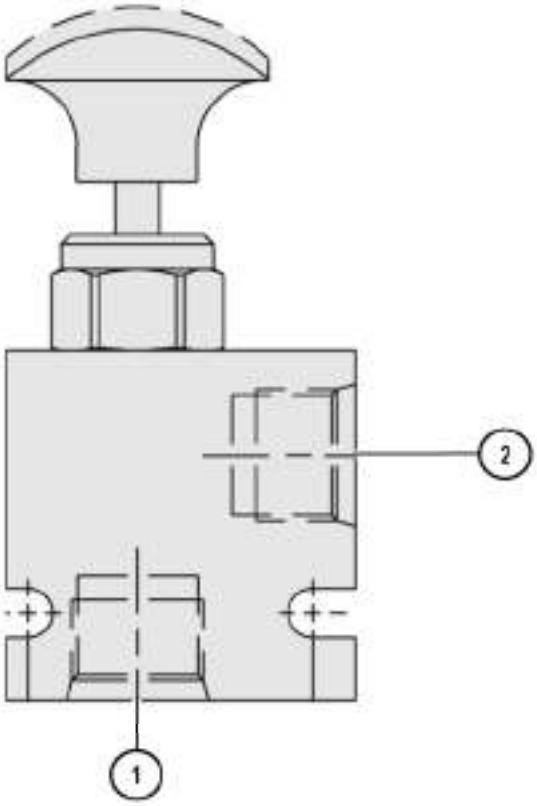


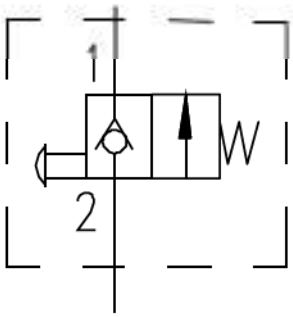




Pos.	Designation
A	To connection "C5" of auxiliary hydraulics control valve
B	To connection "C6" of auxiliary hydraulics control valve
T	Reservoir connection
P	From connection "HF" of control valve
Y33	Additional control circuit solenoid valve
Y34	Additional control circuit solenoid valve

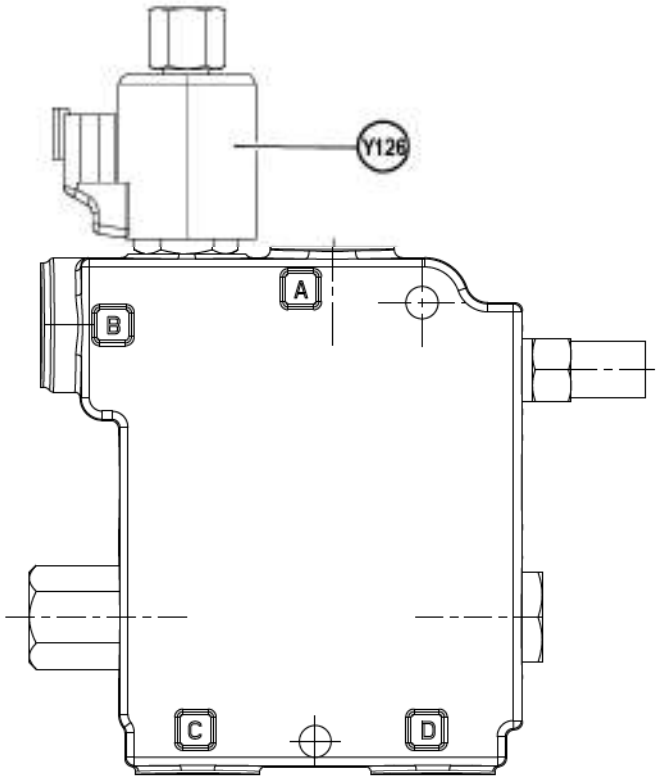
Emergency lowering valve

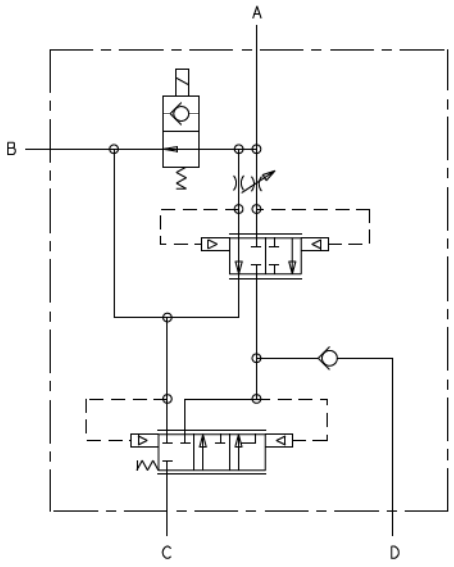




Pos.	Designation
1	From connection "B" of control valve loader unit
2	To reservoir

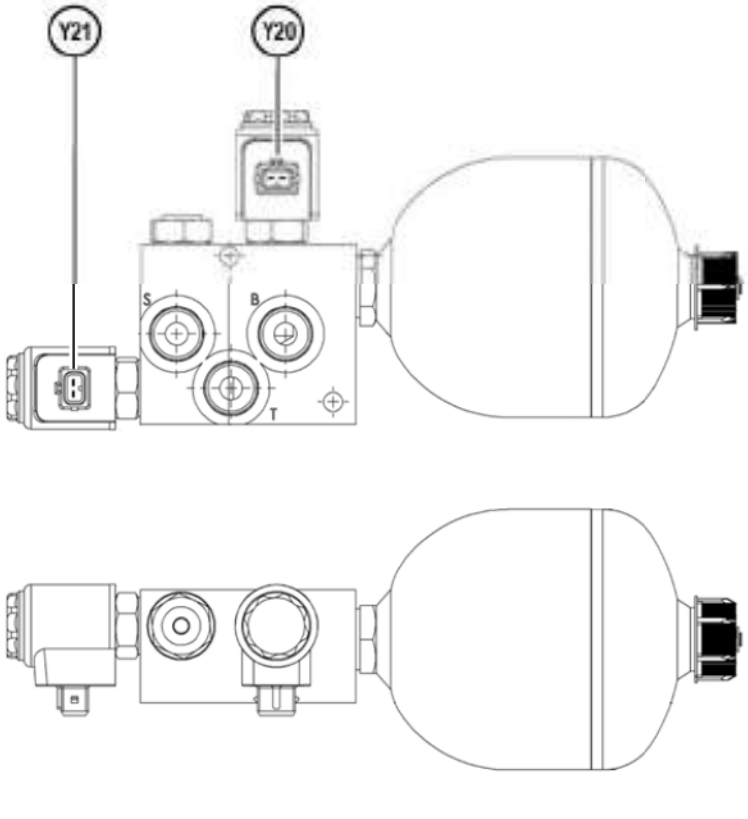
Single parallel lift valve (option)

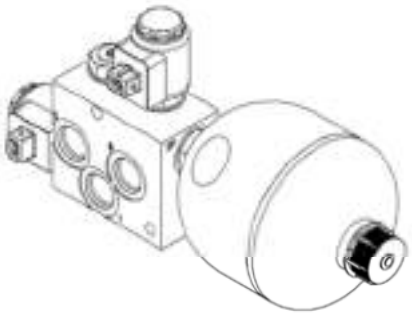


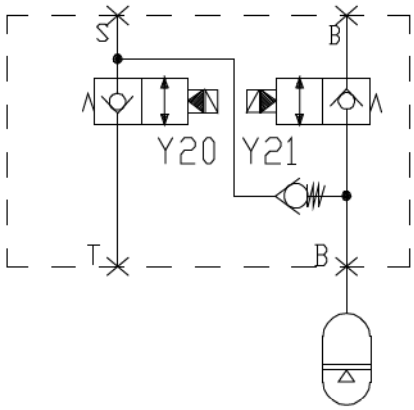


Pos.	Designation
A	To loader unit cylinder (rod side)
B	From connection "A" of control valve loader unit
C	From connection "B" of control valve bucket
D	From connection "A" of control valve bucket
Y126	Solenoid valve

Load stabilizer (option)

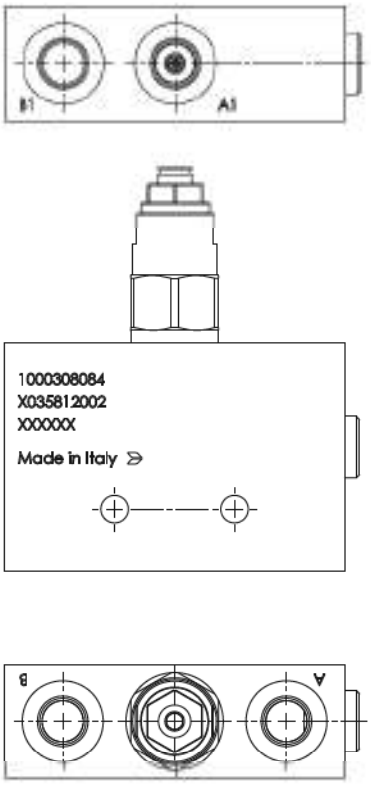


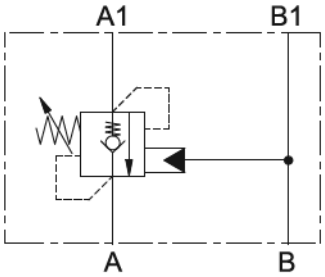




Pos.	Designation
B	Loader unit (base side)
S	Loader unit (rod side)
T	Reservoir connection
Y20	Rear axle solenoid valve (rod side)
Y21	Rear axle solenoid valve (base side)

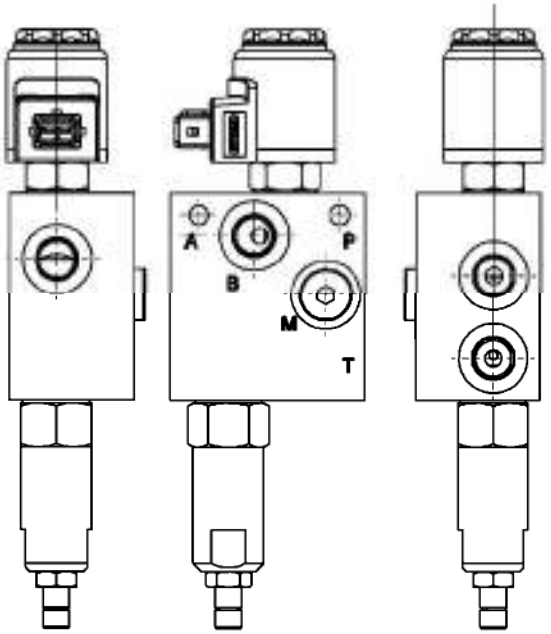
Hose burst valve (option)

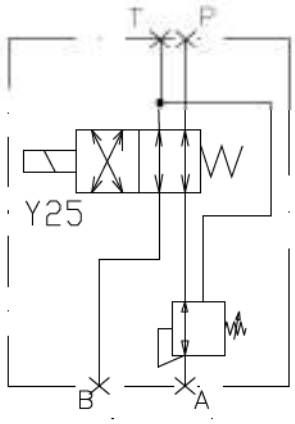


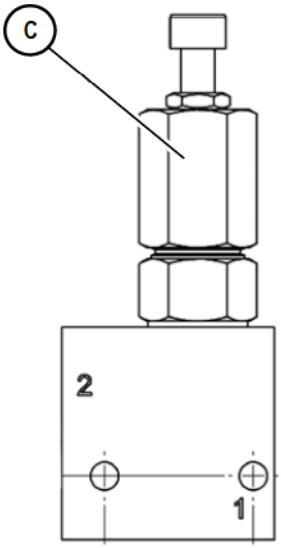


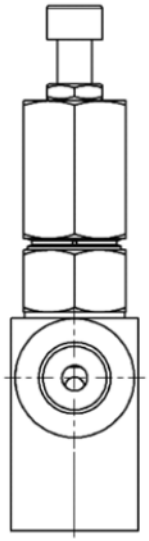
Pos.	Designation
A	From connection "B" of control valve bucket
B	From connection "A" of control valve bucket
A1	Bucket rod side
B1	Bucket base side

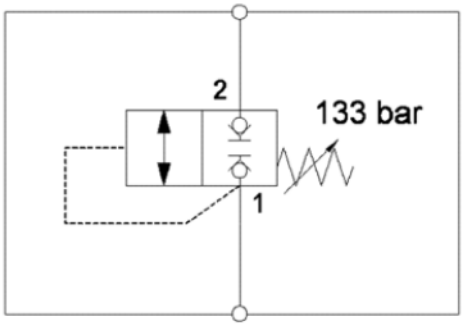
Easy Lock valve (option)











Pos.	Designation
A	Quickhitch (base side)
B	Quickhitch (rod side)
C	Pressure sequence valve
P	From connection "B" of control valve auxiliary hydraulics
T	Reservoir line
Y25	Quickhitch lock solenoid valve

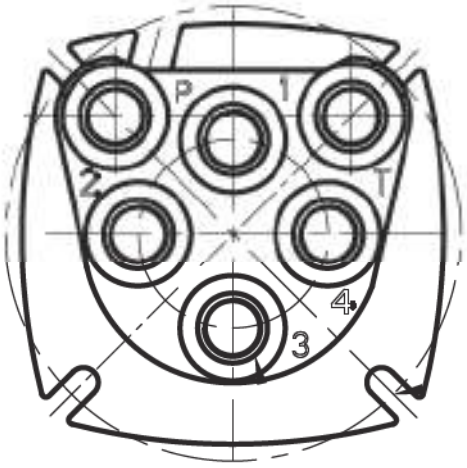
5.6 Hydraulic control

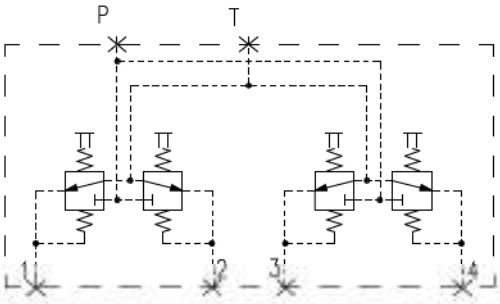
	ISO controls	H controls option
Actuation of left-hand lever (F1)	**Reaction**	**Reaction**
Control lever (left)	Machine turns to the left	Lowers the loader unit
Control lever (right)	Machine turns to the right	Raises the loader unit
Control lever forward	Machine moves forward	Traveling drive to the front left
Control lever backward	Machine reverses	Traveling drive to the rear left
Control lever fully to the front left into the engaged position	-	Lowers the loader unit to float position
Actuation of right-hand lever (F2)	**Reaction**	**Reaction**
Control lever (left)	Tilts out the attachment	Tilts in the attachment
Control lever (right)	Tilts in the attachment	Tilts out the attachment
Control lever forward	Lowers the loader unit	Traveling drive to the front right
Control lever backward	Raises the loader unit	Traveling drive to the rear right
Control lever fully to the front right into the engaged position	Lowers the loader unit to float position	-

Float position

In float position, the loader unit cylinders are short-circuited on the rod and base sides. This allows attachments to follow the profile of the ground and to remain flat on the ground at all times.

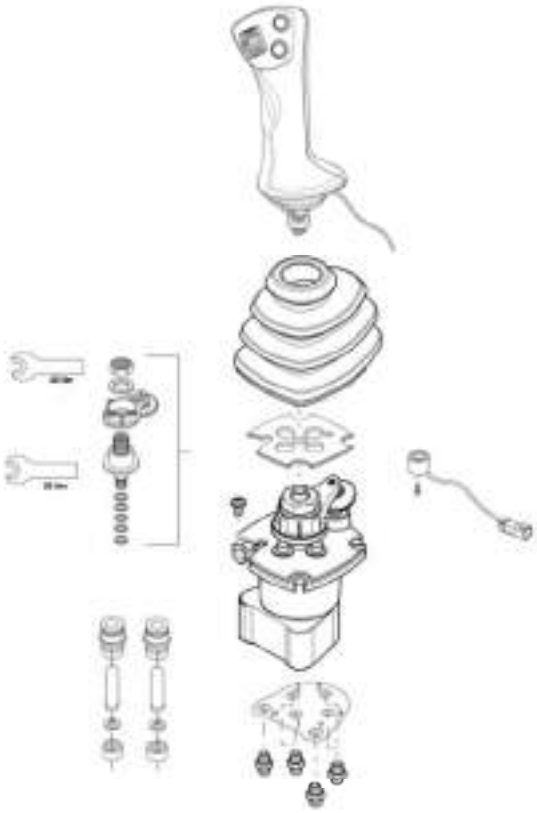
Joystick on left (ISO controls)

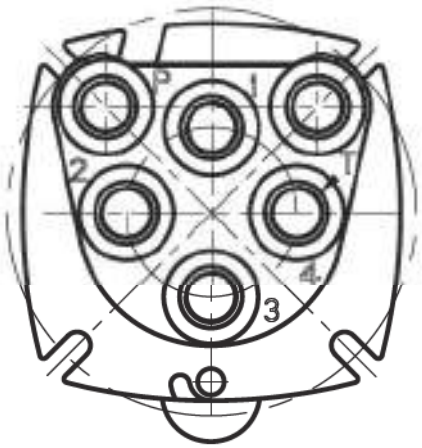


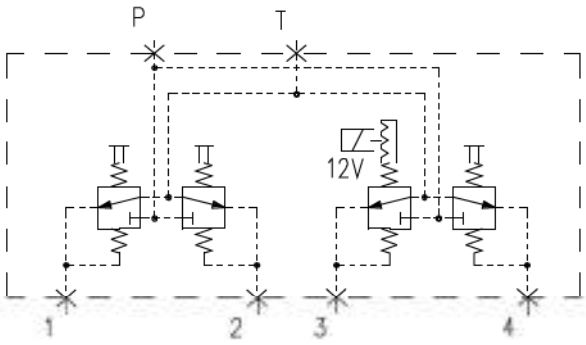


Pos.	Designation
1	To connection "P1X5" of hydraulic pump
2	To connection "P2X6" of hydraulic pump
3	To connection "P1X6" of hydraulic pump
4	To connection "P2X5" of hydraulic pump
P	From connection "Y3" of pilot oil supply unit
T	Reservoir connection

Joystick on right (ISO controls)

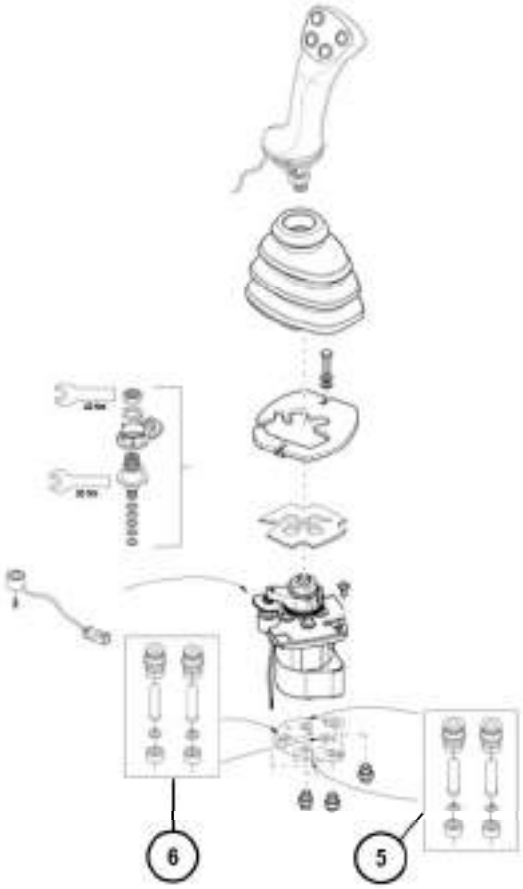


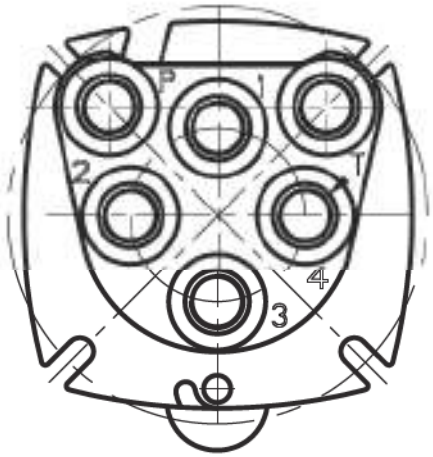


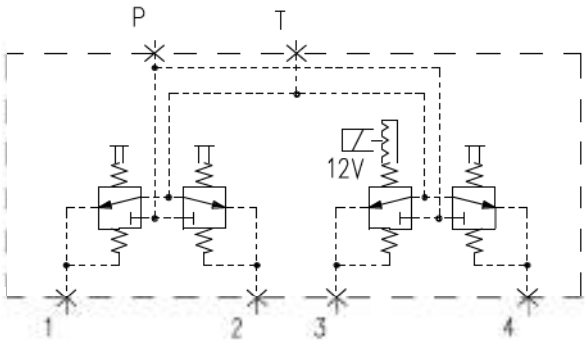


Pos.	Designation
1	To connection "C1 loader unit base side" of control valve
2	To connection "C3 bucket rod side" of control valve
3	To connection "C2 loader unit rod side" of control valve
4	To connection "C4 bucket base side" of control valve
P	From the work pump
T	Reservoir connection

Joystick on left (H controls)

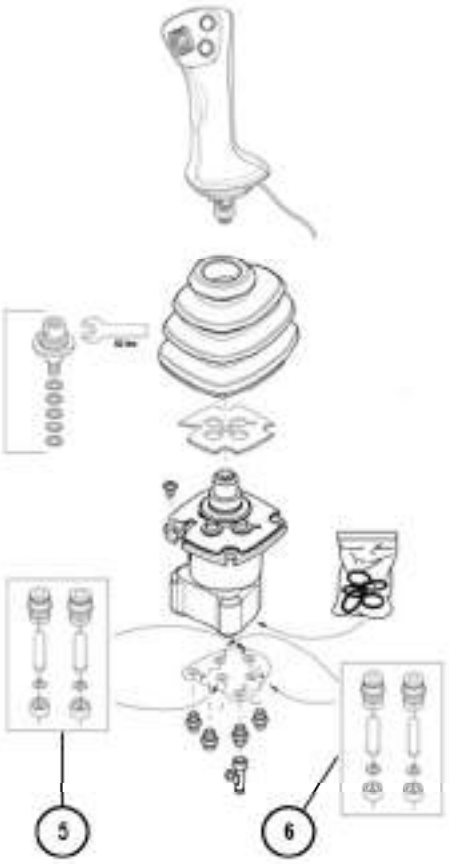


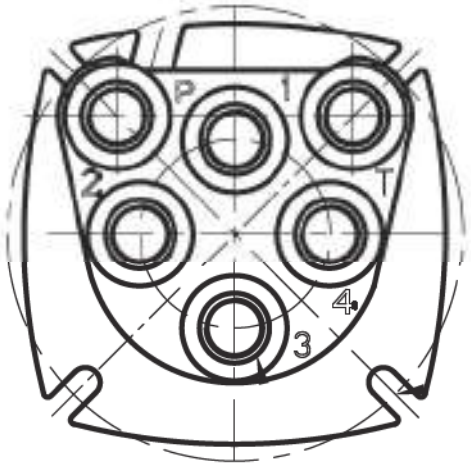


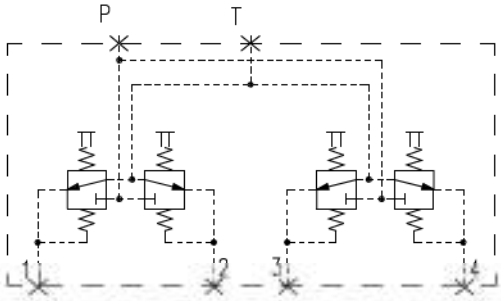


Pos.	Designation
1	To connection "C1 loader unit base side" of control valve
2	To connection "P1X5" of hydraulic pump
3	To connection "C2 loader unit rod side" of control valve
4	To connection "P1X6" of hydraulic pump
P	From the work pump
T	Reservoir connection
5	Set of tappets (machine travel)
6	Set of tappets (operating hydraulics)

Joystick on right (H controls)







Pos.	Designation
1	To connection "P2X6" of hydraulic pump
2	To connection "C3 bucket rod side" of control valve
3	To connection "P2X5" of hydraulic pump
4	To connection "C4 bucket base side" of control valve
P	From the work pump
T	Reservoir connection
5	Set of tappets (machine travel)
6	Set of tappets (operating hydraulics)

5.7 Traveling drive

The hydraulically pilot-controlled traveling drive features the well-known standard load limit sensing control (integrated in the tandem pump) that creates an ideal balance between the required hydraulic output and the available maximum engine output at any give time. Engine output is therefore always in the optimal speed range, the engine cannot be stalled and therefore runs without any unnecessary strain or loads.

Function

General

The diesel engine permanently drives two axial-piston variable displacement pumps whose oil flow is sent to the right and left-hand hydraulic motors.

Starting machine travel:

Actuating the control lever causes the swash plate of the pump to swivel.

Swash plate swivel creates high pressure at outputs A or B (depends on the direction in which the control lever is actuated).

This pressure drop has its effect on the motor, and drives the motor via the oil flow (forward or reverse, depending on the direction in which the control lever is actuated).

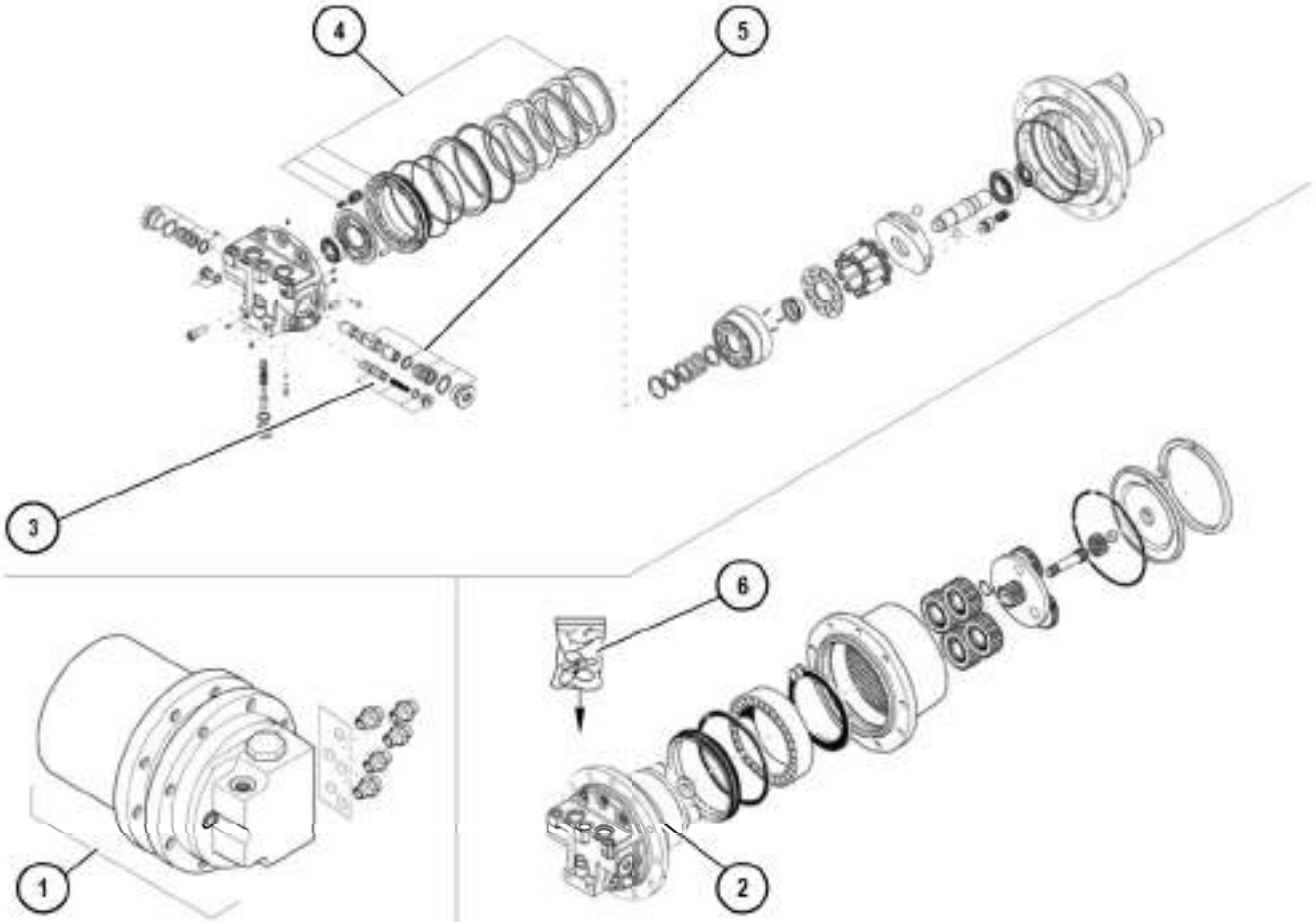
Brakes:

Moving the control levers to neutral interrupts the oil flow. There is no pressure drop at the motors. This creates a generator effect, i.e. the motor tries to keep on turning and brakes itself in doing so (hydrostatic brake).

Parking brake:

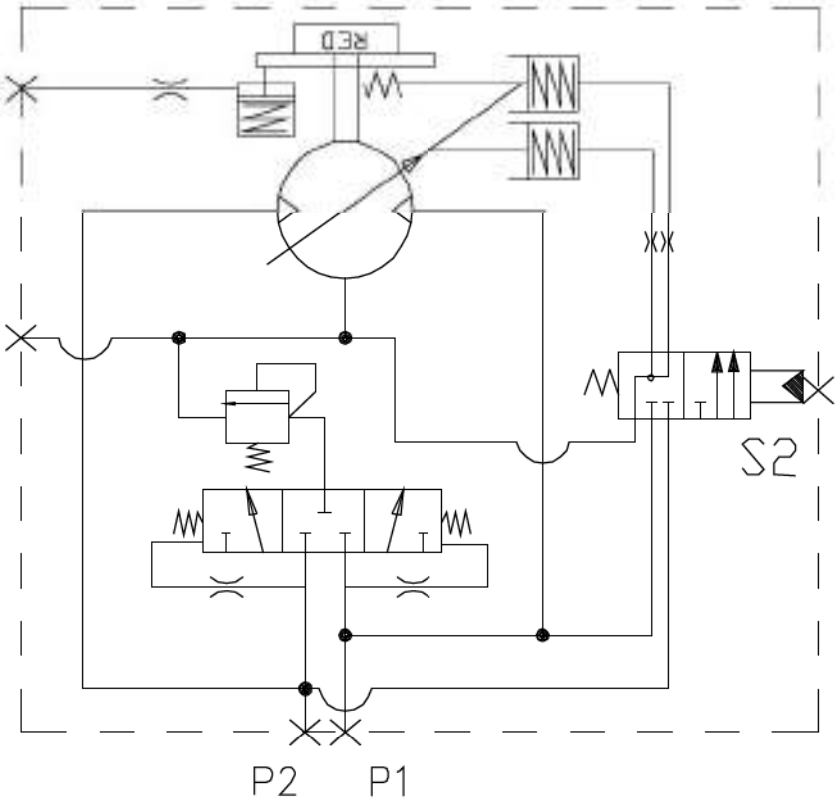
The gear pump 19 cm^3 (1.16 in^3) doubles up as the boost pump for the double variable displacement pump (tandem pump). Boost pressure is 27 bar (392 psi). This pressure also opens the brake discs in the gearbox. Switching off the diesel engine causes this pressure to drop and to enable the brake. If the engine is running, the brake lever must be actuated for fully intentional braking as usual.

Traveling drive ST35-45



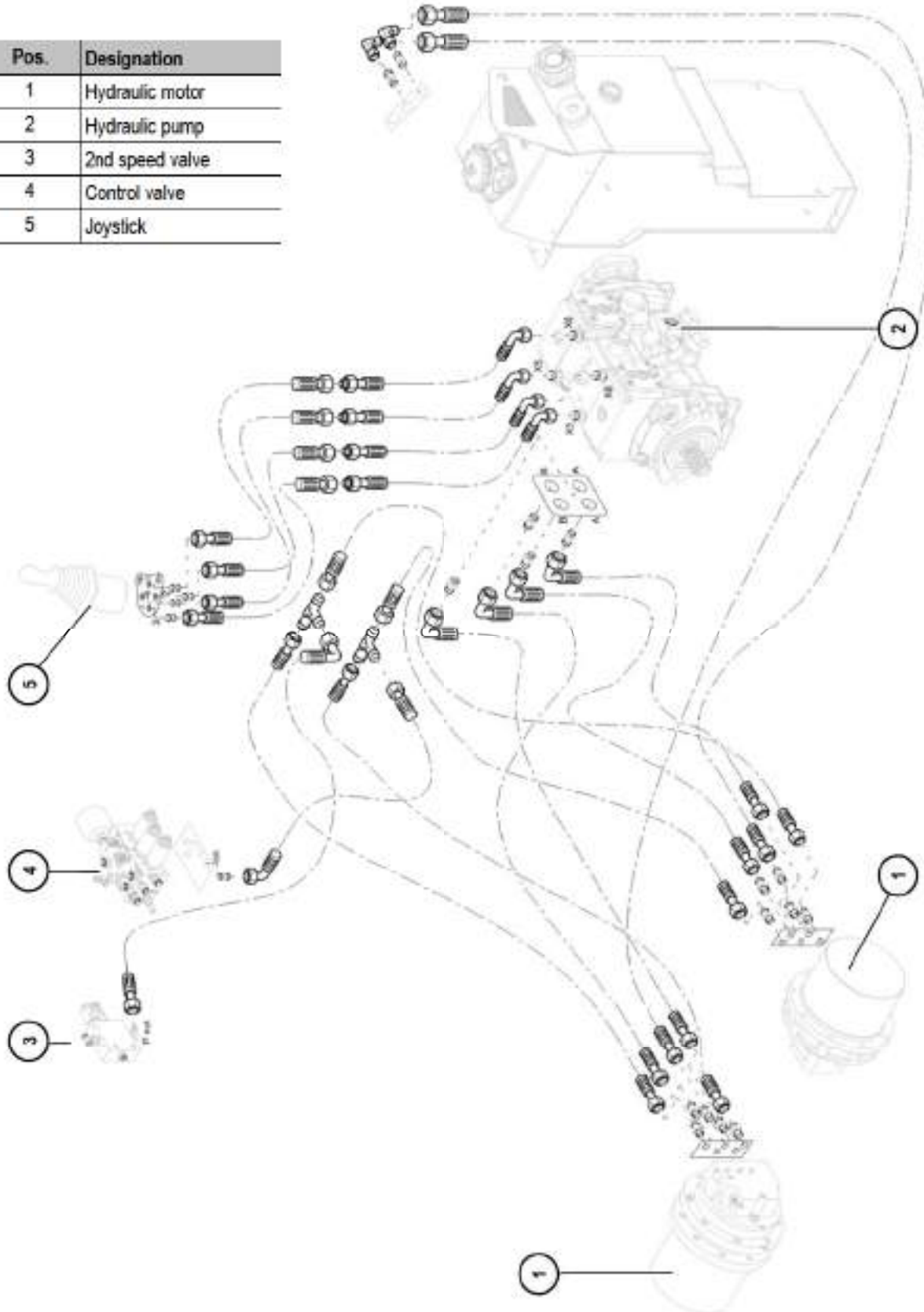
Pos.	Designation
1	Traveling drive
2	Hydraulic motor
3	Control spool
4	Engine brake set
5	Valve set
6	Hydraulic motor sealing kit

Diagram

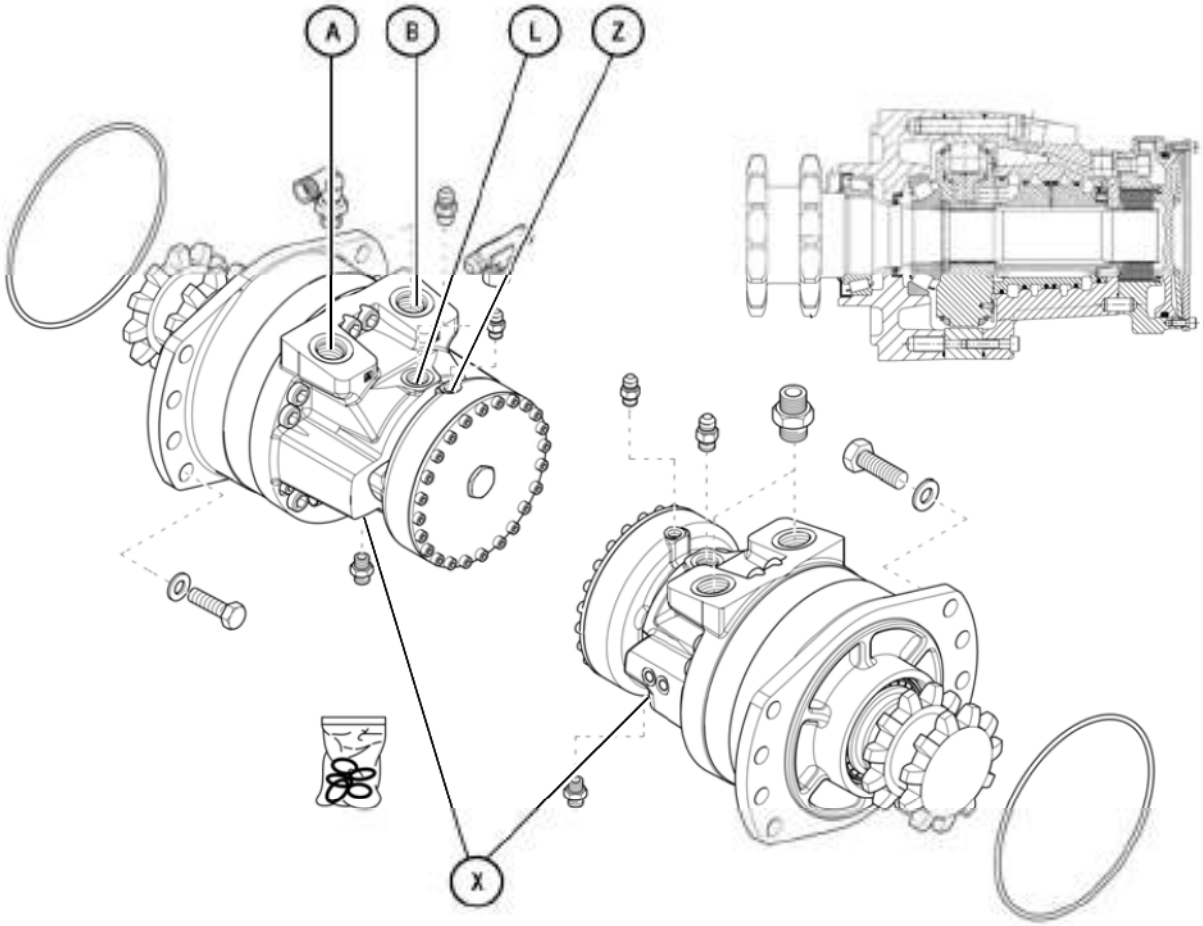


Drive diagram ST35-45

Pos.	Designation
1	Hydraulic motor
2	Hydraulic pump
3	2nd speed valve
4	Control valve
5	Joystick

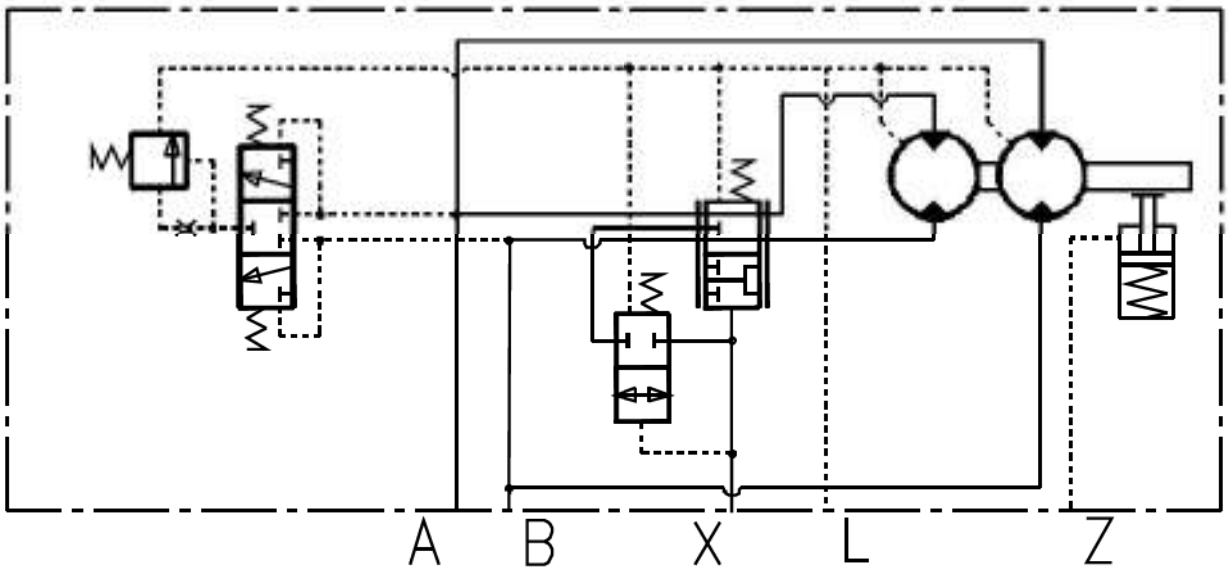


Traveling drive SW24-28

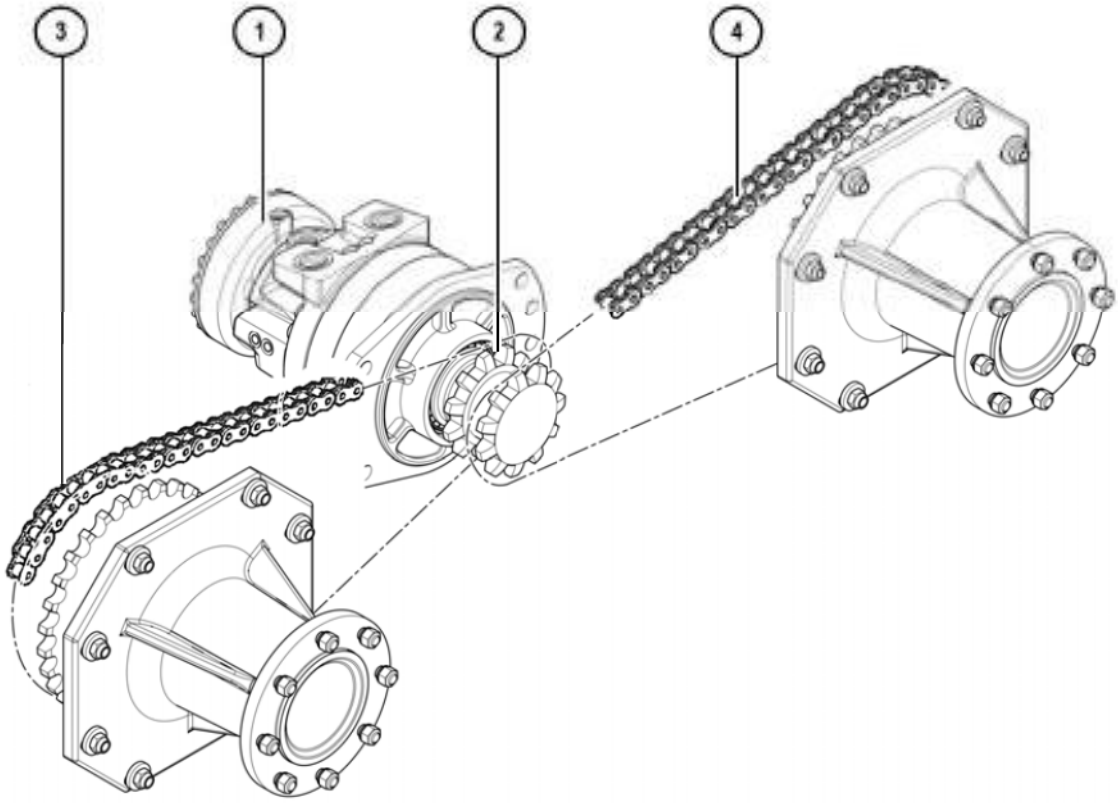


Pos.	Designation
A	From connection "A" of hydraulic pump
B	From connection "B" of hydraulic pump
L	Leak oil
X	2nd speed
E	Gearbox
Z	Brakes

Diagram



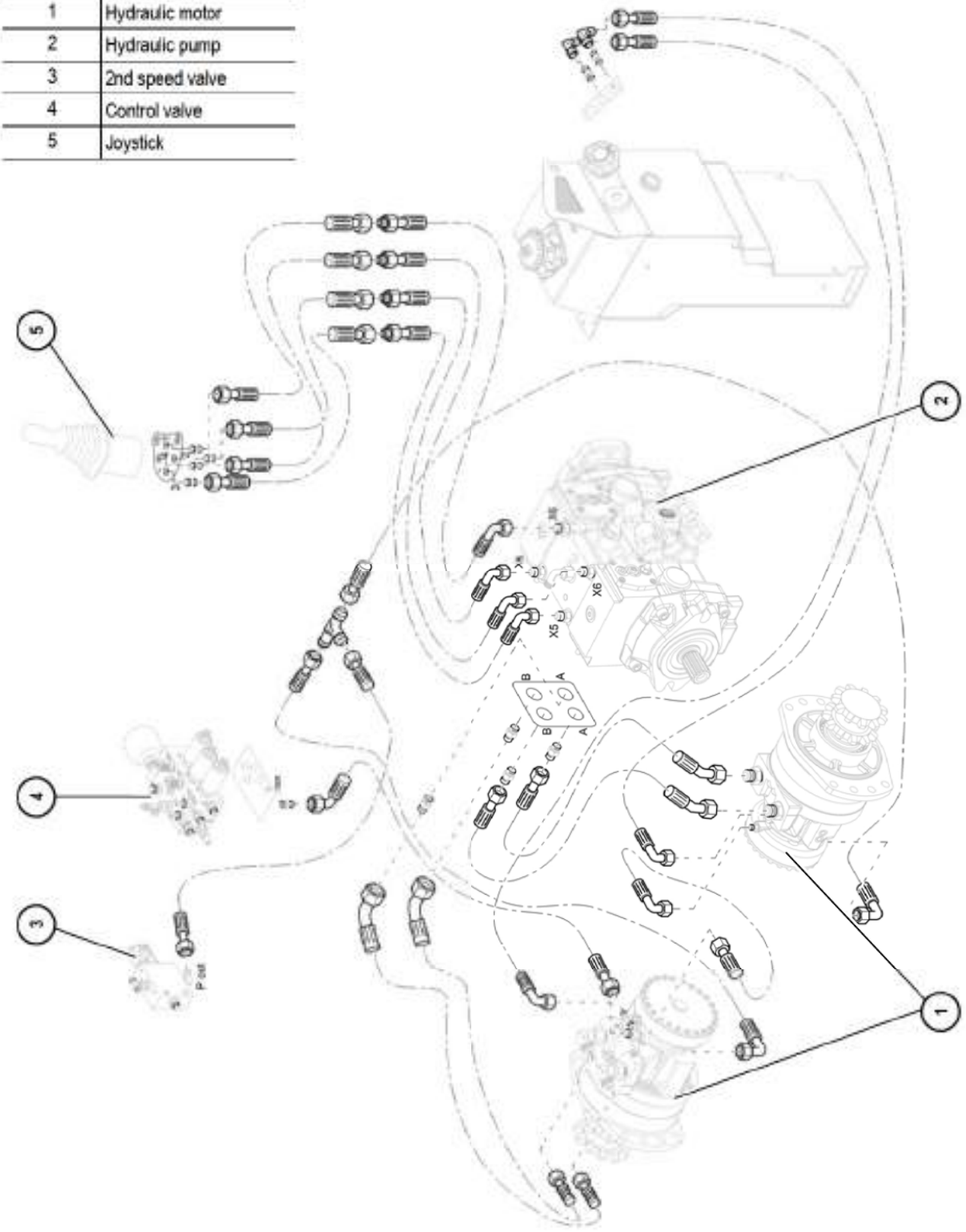
Chain drive SW24-28



Pos.	Designation
1	Hydraulic motor (braked)
2	Front, rear chain drives
3	Roller track (2 x)
4	Roller track (2 x)

Drive diagram SW28-38

Pos.	Designation
1	Hydraulic motor
2	Hydraulic pump
3	2nd speed valve
4	Control valve
5	Joystick



5.8 Malfunctions in the hydraulic system

Problem	Possible causes
Hydraulic system without function	Hydraulic oil level too low
	Malfunctioning pressure limiting valve on main valve block
	Spool is stuck.
	Hose rupture (work hoses)
	Malfunctioning connection on solenoid valve
Machine travel without actuating the control levers, more propulsion on one side	Misalignment of neutral position – loosened fastening nut
Brake is released.	Malfunctioning brake valve
Hydraulic hammer does not work correctly.	Quickhitch couplings not connected correctly
	Hydraulic oil quantity too high/too low
	Hydraulic oil pressure too high/too low

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 method – 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.

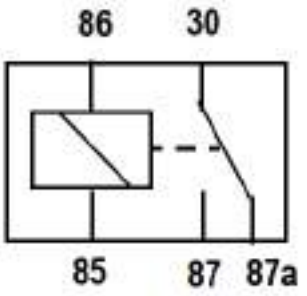


Fig. 1: Terminal description on relay

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)

6.5 Electrical system

Alternator

Fig. 2: Alternator

The alternator charges the battery and supplies direct current to electric consumers.

Pos.	Designation
1	Connection B (battery)
2	Connection P
3	Connection L indicator light (during service 12 V, otherwise 0 V)

Starter

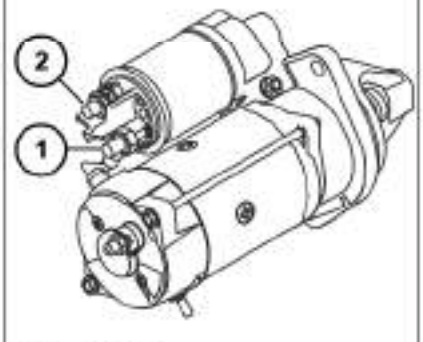
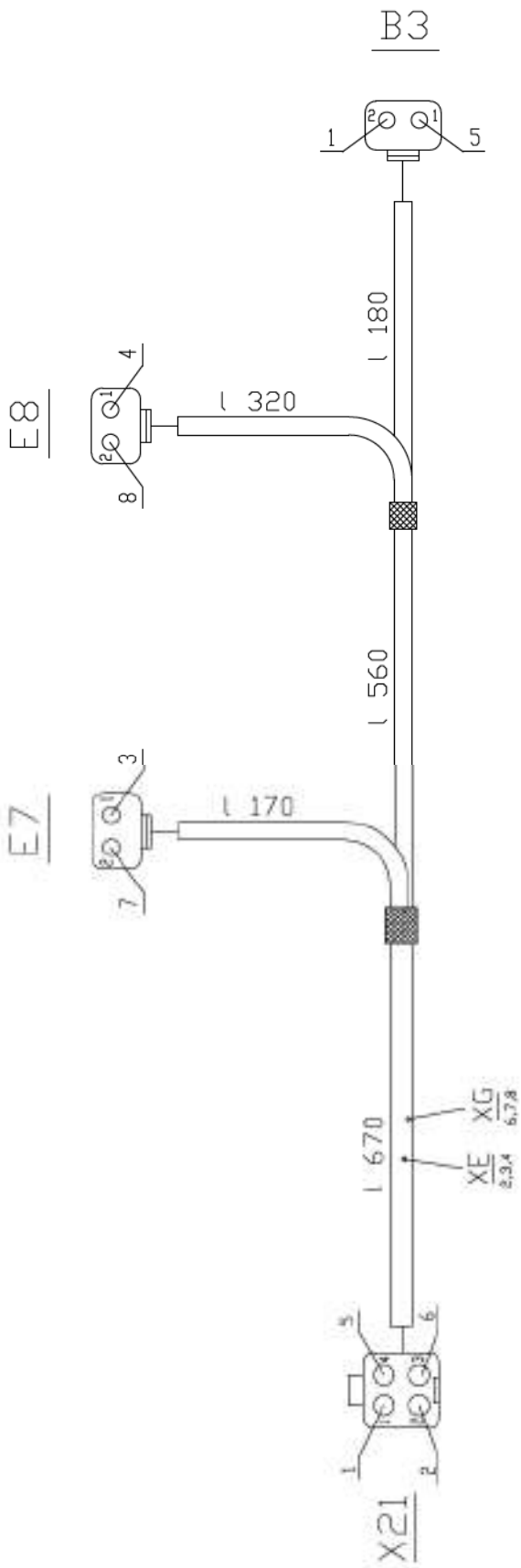


Fig. 3: Alternator

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

Wiring harnesses (overview)

6.1 Engine cover wiring harness



Strand	From	To	mm²	Color	Function
1	X21/1	B3/2	1	gy/gn	Backup warning system
2	X21/2	XE	1	ye	Rear working light
3	E7/1	XE	1	ye	Rear working light
4	E8/1	XE	1	ye	Rear working light
5	X21/3	B3/1	1	bk	Ground
6	X21/4	XG	1	bk	Ground
7	E7/2	XG	1	bk	Ground
8	E8/2	XG	1	bk	Ground

6.2 Wiring harness legend: chassis/engine Tier IV V1

No.	From	To	mm²	Color	Function
1	G2	X901_1	6	rd	12 V 30
2	G2	X902_1	6	rd	12 V 30
3	X901_2	X6/1	6	rd	12 V 30
4	X901_3	X6/2	6	bu	12 V 15
5	X902_2	X6/3	6	rd	12 V 30
6	X902_2	N3/4	6	rd	12 V 30
12	ECM K/8	XM1/1	0.75	wh	Start
13	ECM K/27	XM1/2	0.75	bk/rd	Starting relay 85
14	ECM K/53	XM1/3	0.75	gn/rd	Starting relay 86
15	M1	X7/1	2.5	wh	Starting relay 87
16	ECM K/52	N3/8	0.75	bn/wh	Preheating controller
17	ECM K/22	N3/3	0.75	bn/wh	Preheating controller
18	ECM K/41	XK41	0.75	bn/wh	Preheating controller
19	XK41	N3/5	4	bn	Preheating controller
20	EIC2/61	N3/2	2.5	bn	Glow plug 1
21	EIC2/60	N3/7	2.5	bn	Glow plug 2
22	EIC2/58	N3/1	2.5	bn	Glow plug 3
23	EIC2/57	N3/6	2.5	bn	Glow plug 4
24	ECM K/19	B57/1	0.75	gy/rd	Intake air temperature sensor
25	ECM K/20	B57/2	0.75	bk/wh	Intake air temperature sensor
26	ECM K/64	B64/1	0.75	gy/bk	Lambda sensor electrical pump (twist 26,27)
27	ECM K/86	B64/5	0.75	bl/gy	Lambda sensor adjust (twist 26,27)
28	ECM K/7	B64/3	0.75	rd/bl	Lambda sensor heating
29	ECM K/85	B64/2	0.75	bk/wh	Lambda sensor ground (twist 29,30)
30	ECM K/63	B64/6	0.75	bu/wh	Lambda sensor voltage (twist 29,30)
31	ECM K/79	B56/1	0.75	gy/rd	DOC intake temperature
32	ECM K/80	B56/2	0.75	bk/wh	DOC intake temperature
33	ECM K/84	B38/1	0.75	gy/rd	DOC intake temperature
34	ECM K/83	B38/2	0.75	bk/wh	DOC intake temperature
38	ECM K/30	S58/1	0.75	gy/bk	Water separator
39	ECM K/87	S4/1	0.75	gy/bu	Air filter
40	ECM K/43	XM1/4	0.75	gn/rd	Regeneration switch
41	ECM K/66	XM1/5	0.75	gn/bu	Regeneration switch disabled
50	ECM A/15	EIC 2/1	1.5	bu/wh	Fuel supply unit (twist 50,51)
83	ECM A/53	EIC 2/42	0.75	gy/rd	TVA position sensor signal

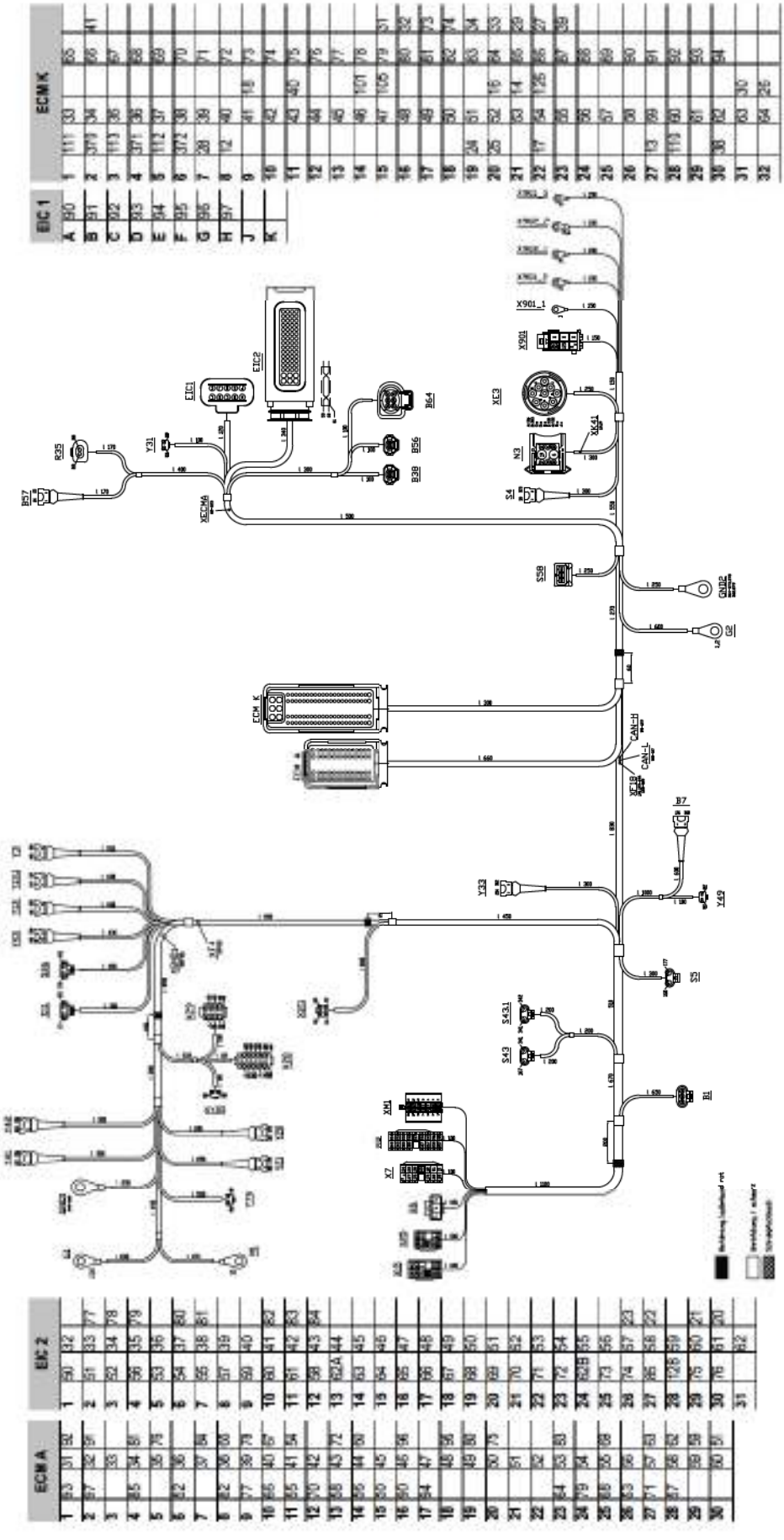
No.	From	To	mm²	Color	Function
51	ECM A/60	EIC 2/2	1.5	gy/rd	Fuel supply unit (twist 50,51)
52	ECM A/6	EIC 2/3	0.75	wh/gn	Oil pressure switch
53	ECM A/26	EIC 2/5	0.75	bk/wh	Rail pressure sensor ground (twist 53,54)
54	ECM A/41	EIC 2/6	0.75	gy/rd	Rail pressure sensor signal (twist 53,54)
55	ECM A/11	EIC 2/7	0.75	bu/wh	Rail pressure sensor supply
56	ECM A/14	EIC 2/4	0.75	gy/rd	Speed sensor signal
57	ECM A/28	EIC 2/8	0.75	bk/wh	Speed sensor ground
58	ECM A/13	EIC 2/12	0.75	bu/wh	Speed sensor supply
59	ECM A/59	EIC 2/9	0.75	bu/wh	Crankshaft speed sensor signal plus
60	ECM A/44	EIC 2/10	0.75	gy/rd	Crankshaft speed sensor signal minus
61	Shield 59,60	EIC 2/11	0.75	bk/wh	Crankshaft speed sensor shield
62	ECM A/58	XECMA	0.75	bk/wh	Coolant sensor ground
62A	EIC 2/13	XECMA	0.75	bk/wh	Coolant sensor ground
62B	EIC 2/24	XECMA	0.75	bk/wh	Coolant sensor ground
63	ECM A/57	EIC 2/14	0.75	gy/rd	Coolant sensor signal
64	ECM A/23	EIC 2/15	0.75	bk/wh	Fuel temperature sensor ground
65	ECM A/38	EIC 2/16	0.75	gy/rd	Fuel temperature sensor signal
66	ECM A/10	EIC 2/17	0.75	bu/wh	Boost pressure sensor supply
67	ECM A/40	EIC 2/18	0.75	gy/rd	Boost pressure sensor signal
68	ECM A/25	EIC 2/19	0.75	bk/wh	Boost pressure sensor ground
69	ECM A/55	EIC 2/20	0.75	gy/rd	Boost pressure temperatur sensor signal
70	ECM A/12	EIC 2/21	0.75	bu/wh	P3 exhaust pressure sensor supply
71	ECM A/27	EIC 2/22	0.75	bk/wh	P3 exhaust pressure sensor ground
72	ECM A/43	EIC 2/23	0.75	gy/rd	P3 exhaust pressure sensor signal
73	ECM K/81	EIC 2/25	0.75	bk/wh	T3 temperature sensor ground
74	ECM K/82	EIC 2/26	0.75	gy/rd	T3 temperature sensor signal
75	ECM A/50	EIC 2/29	0.75	wh/rd	EGR engine positive
76	ECM A/35	EIC 2/30	0.75	wh/bk	EGR engine negative
77	ECM A/9	EIC 2/33	0.75	bu/wh	EGR position sensor supply
78	ECM A/39	EIC 2/34	0.75	gy/rd	EGR position sensor signal
79	ECM A/24	EIC 2/35	0.75	bk/wh	EGR position sensor ground
80	ECM A/49	EIC 2/37	0.75	wh/rd	TVA engine positive
81	ECM A/34	EIC 2/38	0.75	wh/bk	TVA engine negative
82	ECM A/8	EIC 2/41	0.75	bu/wh	TVA position sensor supply
176	B7/1	X7/11	0.75	og/bk	Hydraulic oil temperature

84	ECM A/37	EIC 2/43	0.75	bk/wh	TVA position sensor ground
85	ECM A/4	EIC 2/27	0.75	rd/bk	Pressure relief valve trigger
90	ECM A/16	EIC 1/A	1.5	gn	Injector 1 (twist 90,91)
91	ECM A/32	EIC 1/B	1.5	gn/rd	Injector 1 (twist 90,91)
92	ECM A/31	EIC 1/C	1.5	gn	Injector 2 (twist 92,93)
93	ECM A/1	EIC 1/D	1.5	gn/rd	Injector 2 (twist 92,93)
94	ECM A/17	EIC 1/E	1.5	gn	Injector 3 (twist 94,95)
95	ECM A/48	EIC 1/F	1.5	gn/rd	Injector 3 (twist 94,95)
96	ECM A/46	EIC 1/G	1.5	gn	Injector 4 (twist 96,97)
97	ECM A/2	EIC 1/H	1.5	gn/rd	Injector 4 (twist 96,97)
101	ECM K/46	CAN-H	0.75	wh	CAN High (twist 101,105)
102	XE3/G	CAN-H	0.75	wh	CAN High (twist 102,106)
103	XM1/12	CAN-H	0.75	wh	CAN High (twist 103,107)
105	ECM K/47	CAN-L	0.75	wh	CAN Low (twist 101,105)
106	XE3/F	CAN-L	0.75	wh	CAN Low (twist 102,106)
107	XM1/14	CAN-L	0.75	wh	CAN Low (twist 103,107)
109	XM1/13	X7/8	0.75	rd/wh	Main relay
110	ECM K/28	XM1/10	0.75	rd/bk	Main relay
111	ECM K/1	X7/2	1.5	rd	Battery A
112	ECM K/5	X7/3	2.5	rd	Battery C
113	ECM K/3	X7/4	2.5	rd	Battery B
121	XF18	S58/2	0.75	bu	12 V 15 indicating instrument, ECM
123	XF18	XM1/11	0.75	bu	12 V 15 indicating instrument, ECM
124	XF18	XE3/A	0.75	bu	12 V 15 indicating instrument, ECM
125	XF18	X901/2	0.75	bu	12 V 15 indicating instrument, ECM
126	XF18	ECM K/54	0.75	bu	12 V 15 indicating instrument, ECM
128	XF18	EIC 2/28	0.75	bu	12 V 15 indicating instrument, ECM
129	XF18	B64/4	0.75	bu	12 V 15 indicating instrument, ECM
130	G1	X7/5	0.75	pk	Charge indicator light
133	B1/3	X7/6	0.75	gn/rd	Empty reservoir
134	B1/1	X7/7	0.75	gy/rd	Fuel sensor
160	S5/1	X7/9	1	bu	12 V 15 F20
161	X28/8	X15/8	1	bu	12 V 15 F20
167	S43/1	X8/13	1	bu	12 V 15 F4
170	XF4	X7/10	1	bu	12 V 15 F4
171	XF4	S11/1	1	bu	12 V 15 F4
172	XF4	S26/1	1	bu	12 V 15 F4
350	Y42/2	GND1	1	bk	Ground

177	S5/2	X7/12	0.75	og/wh	Hydraulic oil contamination
195	S11/2	X8/1	0.75	bk/rd	Parking brake indicator light
196	S26/2	X8/2	0.75	bk/bu	Pump pressure check
245	Y3/1	X8/3	0.75	bn/bk	2nd speed range
246	Y13/1	X8/4	0.75	bn/wh	Drive safety valve
247	Y13.1/1	X8/5	0.75	bn/wh	Work safety valve
248	Y20/1	X8/6	0.75	bn/ye	Load stabilizer
249	Y21/1	X8/17	0.75	bn/ye	Load stabilizer
251	XY25/1	X25/9	0.75	gy/ye	Quickhitch
252	Y43/1	X8/7	0.75	rd/bk	Parking brake
253	Y76/1	X8/8	0.75	og/bk	Parallel lift
254	Y33/1	X8/9	0.75	og/bu	High Flow
257	Y41/1	X8/10	0.75	gy/bk	Proportional valve 1
258	Y42/1	X8/11	0.75	gy/rd	Proportional valve 2
259	X28/1	X15/1	0.75	og	Attachment function 1 OPEN
260	X28/2	X15/2	0.75	og	Attachment function 1 CLOSED
261	X28/3	X15/3	0.75	og	Attachment function 2 OPEN
262	X28/4	X15/4	0.75	og	Attachment function 2 CLOSED
263	X28/5	X15/5	0.75	og	Attachment function 3 OPEN
264	X28/6	X15/6	0.75	og	Attachment function 3 CLOSED
265	X28/7	X15/7	0.75	og	Attachment function 4
267	Y49/1	X8/12	0.75	gy	PWM fan
270	X29/4	X25/4	0.75	ye/bu	Front left turn indicator
271	X29/6	X25/6	0.75	ye/bu	Rear left turn indicator
275	X29/5	X25/5	0.75	ye/gn	Front right turn indicator
276	X29/7	X25/7	0.75	ye/gn	Rear right turn indicator
284	X29/3	X25/3	1	ye/rd	Low beam
289	X29/1	X25/1	1	ye/rd	Clearance light (left)
293	X29/2	X25/2	1	ye/rd	Clearance light (right)
309	X21/2	X8/14	1	ye	Rear working light
328	Y31/1	X8/15	1	gn/rd	Air conditioning compressor
341	S43/2	S43.1/1	1	gy-gn	Backup warning system
342	X21/1	S43.1/2	1	gy-gn	Backup warning system
343	R35/1	X8/16	1	bu	Preheating
345	X28/10	X15/10	1	wh	Spare
346	X28/11	X15/11	1	wh	Spare
349	XY25/2	GND1	1	bk	Ground

351	Y41/2	GND1	1	bk	Ground
352	Y20/2	GND1	1	bk	Ground
353	Y21/2	GND1	1	bk	Ground
354	Y76/2	GND1	1	bk	Ground
355	XGND1	GND1	1.5	bk	Ground
356	XGND1	Y3/2	1	bk	Ground
357	XGND1	Y13.1/2	1	bk	Ground
358	XGND1	Y13/2	1	bk	Ground
359	XGND1	Y43/2	1	bk	Ground
360	XGND1	X21/3	1	bk	Ground
361	XGND1	X21/4	1	bk	Ground
362	GND2	Y33/2	1	bk	Ground
363	X901/1	XE3/B	1	bk	Ground
364	X901/1	GND2	1	bk	Ground
365	R35/2	GND2	1	bk	Ground
366	S58/3	GND2	1	bk	Ground
367	Y49/2	GND2	1	bk	Ground
368	B7/2	GND2	1	bk	Ground
369	B1/2	GND2	1	bk	Ground
370	ECM K/2	GND2	2.5	bk	Ground
371	ECM K/4	GND2	2.5	bk	Ground
372	ECM K/6	GND2	2.5	bk	Ground
373	S4/2	GND2	1	bk	Ground
378	Y31/2	GND2	1	bk	Ground

6.3 Wiring harness for chassis/engine Tier IV V1



6.4 Wiring harness legend: chassis/engine Tier IV V2

No.	From	To	mm²	Color	Function
1	G2	X901_1	6	rd	12 V 30
2	G2	X902_1	6	rd	12 V 30
3	X901_2	X6/1	4	rd	12 V 30
3A	X901_2	X6/1	4	rd	12 V 30
4	X902_3	X6/2	6	bu	12 V 15
5	X902_2	X6/3	6	rd	12 V 30
5A	X902_2	X6/3	4	rd	12 V 30
6	X902_2	N3/4	6	rd	12 V 30
12	ECM K/8	XM1/1	0.75	wh	Start
13	ECM K/27	XM1/2	0.75	bk/rd	Starting relay 85
14	ECM K/53	XM1/3	0.75	gn/rd	Starting relay 86
15	M1	X7/1	2.5	wh	Starting relay 87
16	ECM K/52	N3/8	0.75	bn/wh	Preheating controller
17	ECM K/22	N3/3	0.75	bn/wh	Preheating controller
18	ECM K/41	XK41	0.75	bn/wh	Preheating controller
19	XK41	N3/5	4	bn	Preheating controller
20	EIC2/61	N3/2	2.5	bn	Glow plug 1
21	EIC2/60	N3/7	2.5	bn	Glow plug 2
22	EIC2/58	N3/1	2.5	bn	Glow plug 3
23	EIC2/57	N3/6	2.5	bn	Glow plug 4
24	ECM K/19	B57/1	0.75	gy/rd	Intake air temperature sensor
25	ECM K/20	B57/2	0.75	bk/wh	Intake air temperature sensor
26	ECM K/64	B64/1	0.75	gy/bk	Lambda sensor electrical pump (twist 26,27)
27	ECM K/86	B64/5	0.75	bl/gy	Lambda sensor adjust (twist 26,27)
28	ECM K/7	B64/3	0.75	rd/bl	Lambda sensor heating
29	ECM K/85	B64/2	0.75	bk/wh	Lambda sensor ground (twist 29,30)
30	ECM K/63	B64/6	0.75	bu/wh	Lambda sensor voltage (twist 29,30)
31	ECM K/79	B56/1	0.75	gy/rd	DOC intake temperature
32	ECM K/80	B56/2	0.75	bk/wh	DOC intake temperature
33	ECM K/84	B38/1	0.75	gy/rd	DOC intake temperature
34	ECM K/83	B38/2	0.75	bk/wh	DOC intake temperature
36	ECM K/30	S58/1	0.75	gy/bk	Water separator

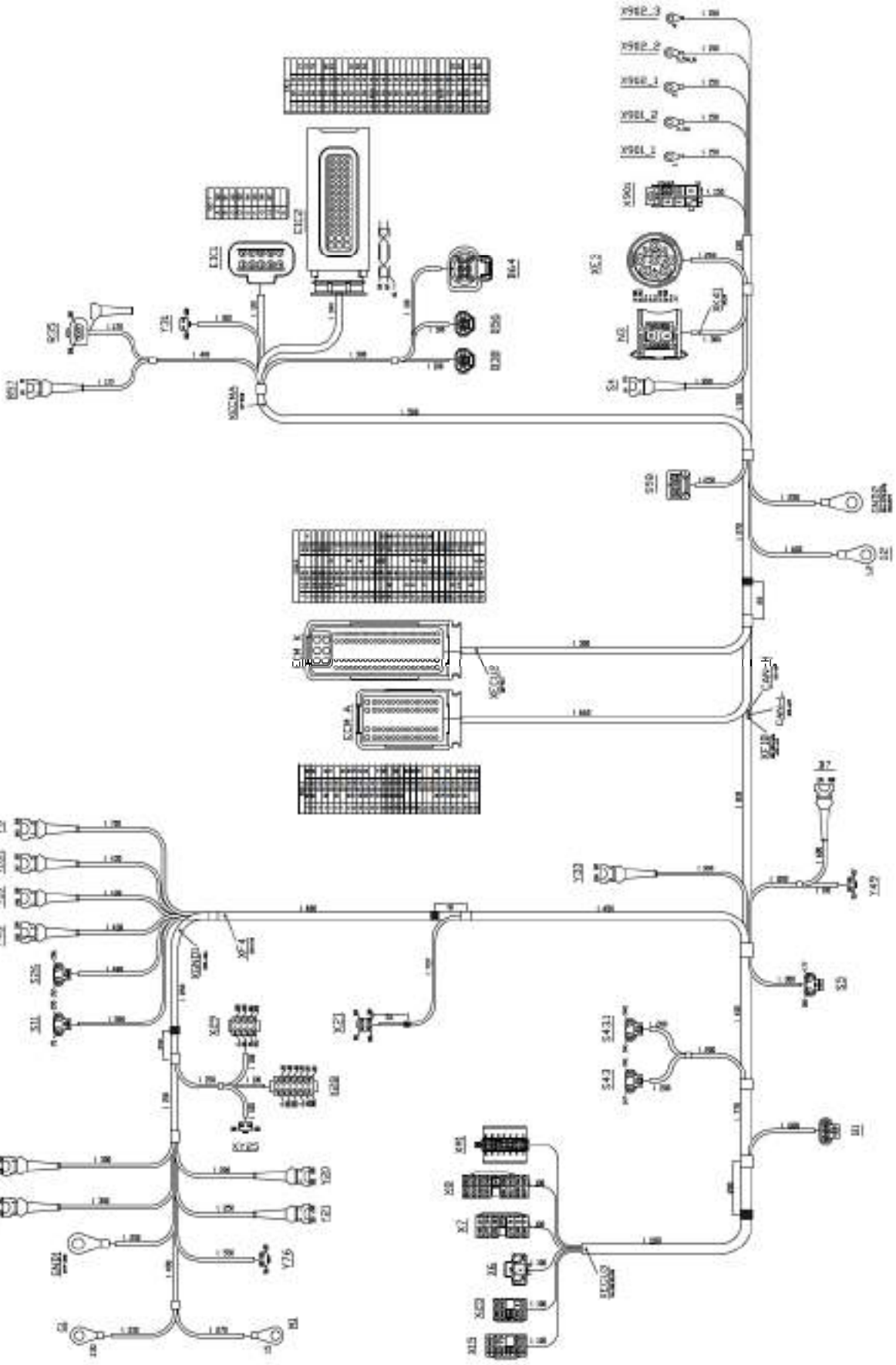
No.	From	To	mm²	Color	Function
39	ECM K/87	S4/1	0.75	gy/bu	Air filter
40	ECM K/43	XM1/4	0.75	gn/rd	Regeneration switch
41	ECM K/66	XM1/5	0.75	gn/bu	Regeneration switch disabled
50	ECM A/15	EIC 2/1	1.5	bu/wh	Fuel supply unit (twist 50,51)
51	ECM A/60	EIC 2/2	1.5	gy/rd	Fuel supply unit (twist 50,51)
52	ECM A/6	EIC 2/3	0.75	wh/gn	Oil pressure switch
53	ECM A/26	EIC 2/5	0.75	bk/wh	Rail pressure sensor ground (twist 53,54)
54	ECM A/41	EIC 2/6	0.75	gy/rd	Rail pressure sensor signal (twist 53,54)
55	ECM A/11	EIC 2/7	0.75	bu/wh	Rail pressure sensor supply
56	ECM A/14	EIC 2/4	0.75	gy/rd	Speed sensor signal
57	ECM A/28	EIC 2/8	0.75	bk/wh	Speed sensor ground
58	ECM A/13	EIC 2/12	0.75	bu/wh	Speed sensor supply
59	ECM A/59	EIC 2/9	0.75	bu/wh	Crankshaft speed sensor signal plus
60	ECM A/44	EIC 2/10	0.75	gy/rd	Crankshaft speed sensor signal minus
61	Shield 59,60	EIC 2/11	0.75	bk/wh	Crankshaft speed sensor shield
62	ECM A/58	XECMA	0.75	bk/wh	Coolant sensor ground
62A	EIC 2/13	XECMA	0.75	bk/wh	Coolant sensor ground
62B	EIC 2/24	XECMA	0.75	bk/wh	Coolant sensor ground
63	ECM A/57	EIC 2/14	0.75	gy/rd	Coolant sensor signal
64	ECM A/23	EIC 2/15	0.75	bk/wh	Fuel temperature sensor ground
65	ECM A/38	EIC 2/16	0.75	gy/rd	Fuel temperature sensor signal
66	ECM A/10	EIC 2/17	0.75	bu/wh	Boost pressure sensor supply
67	ECM A/40	EIC 2/18	0.75	gy/rd	Boost pressure sensor signal
68	ECM A/25	EIC 2/19	0.75	bk/wh	Boost pressure sensor ground
69	ECM A/55	EIC 2/20	0.75	gy/rd	Boost pressure temperatur sensor signal
70	ECM A/12	EIC 2/21	0.75	bu/wh	P3 exhaust pressure sensor supply
71	ECM A/27	EIC 2/22	0.75	bk/wh	P3 exhaust pressure sensor ground
72	ECM A/43	EIC 2/23	0.75	gy/rd	P3 exhaust pressure sensor signal
73	ECM K/81	EIC 2/25	0.75	bk/wh	T3 temperature sensor ground
74	ECM K/82	EIC 2/26	0.75	gy/rd	T3 temperature sensor signal
75	ECM A/50	EIC 2/29	0.75	wh/rd	EGR engine positive
76	ECM A/35	EIC 2/30	0.75	wh/bk	EGR engine negative

77	ECM A/9	EIC 2/33	0.75	bu/wh	EGR position sensor supply
78	ECM A/39	EIC 2/34	0.75	gy/rd	EGR position sensor signal
79	ECM A/24	EIC 2/35	0.75	bk/wh	EGR position sensor ground
80	ECM A/49	EIC 2/37	0.75	wh/rd	TVA engine positive
81	ECM A/34	EIC 2/38	0.75	wh/bk	TVA engine negative
82	ECM A/8	EIC 2/41	0.75	bu/wh	TVA position sensor supply
83	ECM A/53	EIC 2/42	0.75	gy/rd	TVA position sensor signal
84	ECM A/37	EIC 2/43	0.75	bk/wh	TVA position sensor ground
85	ECM A/4	EIC 2/27	0.75	rd/bk	Pressure relief valve trigger
90	ECM A/16	EIC 1/A	1.5	gn	Injector 1 (twist 90,91)
91	ECM A/32	EIC 1/B	1.5	gn/rd	Injector 1 (twist 90,91)
92	ECM A/31	EIC 1/C	1.5	gn	Injector 2 (twist 92,93)
93	ECM A/1	EIC 1/D	1.5	gn/rd	Injector 2 (twist 92,93)
94	ECM A/17	EIC 1/E	1.5	gn	Injector 3 (twist 94,95)
95	ECM A/48	EIC 1/F	1.5	gn/rd	Injector 3 (twist 94,95)
96	ECM A/46	EIC 1/G	1.5	gn	Injector 4 (twist 96,97)
97	ECM A/2	EIC 1/H	1.5	gn/rd	Injector 4 (twist 96,97)
98	XECU3	X7/3	2.5	rd	Battery ECU
99	XECU3	X7/4	2.5	rd	Battery ECU
100	XECU3	X7/13	2.5	rd	Battery ECU
101	ECM K/46	CAN-H	0.75	wh	CAN High (twist 101,105)
102	XE3/G	CAN-H	0.75	wh	CAN High (twist 102,106)
103	XM1/12	CAN-H	0.75	wh	CAN High (twist 103,107)
105	ECM K/47	CAN-L	0.75	wh	CAN Low (twist 101,105)
106	XE3/F	CAN-L	0.75	wh	CAN Low (twist 102,106)
107	XM1/14	CAN-L	0.75	wh	CAN Low (twist 103,107)
109	XM1/13	X7/8	0.75	rd/wh	Main relay
110	ECM K/28	XM1/10	0.75	rd/bk	Main relay
111	ECM K/1	X7/2	1.5	rd	Battery A
112	ECM K/5	XECU2	2.5	rd	Battery C
113	ECM K/3	XECU2	2.5	rd	Battery B
114	XECU3	XECU2	6	rd	Battery
121	XF18	S58/2	0.75	bu	12 V 15 indicating instrument, ECM
123	XF18	XM1/11	0.75	bu	12 V 15 indicating instrument, ECM
124	XF18	XE3/A	0.75	bu	12 V 15 indicating instrument, ECM
125	XF18	X901/5	0.75	bu	12 V 15 indicating instrument, ECM

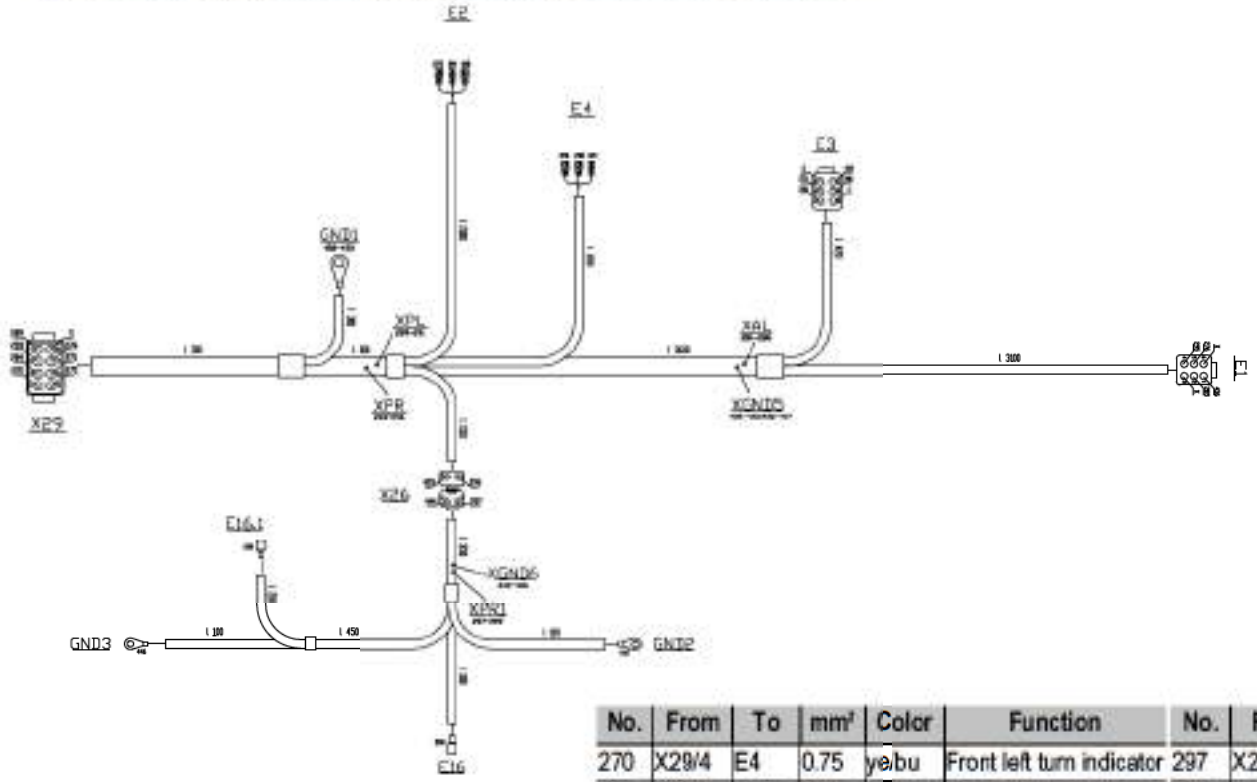
126	XF18	ECM K/54	0.75	bu	12 V 15 indicating instrument, ECM
128	XF18	EIC 2/28	0.75	bu	12 V 15 indicating instrument, ECM
129	XF18	B64/4	0.75	bu	12 V 15 indicating instrument, ECM
130	G1	X7/5	0.75	pk	Charge indicator light
133	B1/3	X7/6	0.75	gn/rd	Empty reservoir
134	B1/1	X7/7	0.75	gy/rd	Fuel sensor
160	S5/1	X7/9	1	bu	12 V 15 F20
161	X28/8	X15/8	1	bu	12 V 15 F20
167	S43/1	X8/13	1	bu	12 V 15 F4
170	XF4	X7/10	1	bu	12 V 15 F4
176	B7/1	X7/11	0.75	og/bk	Hydraulic oil temperature
177	S5/2	X7/12	0.75	og/wh	Hydraulic oil contamination
195	S11/2	X8/1	0.75	bk/rd	Parking brake indicator light
196	S26/2	X8/2	0.75	bk/bu	Pump pressure check
245	Y3/1	X8/3	0.75	bn/bk	2nd speed range
246	Y13/1	X8/4	0.75	bn/wh	Drive safety valve
247	Y13.1/1	X8/5	0.75	bn/wh	Work safety valve
248	Y20/1	X8/6	0.75	bn/ye	Load stabilizer
249	Y21/1	X8/17	0.75	bn/ye	Load stabilizer
251	XY25/1	X25/9	0.75	gy/ye	Quickhitch
252	Y43/1	X8/7	0.75	rd/bk	Parking brake
253	Y76/1	X8/8	0.75	og/bk	Parallel lift
254	Y33/1	X8/9	0.75	og/bu	High Flow
257	Y41/1	X8/10	0.75	gy/bk	Proportional valve 1
258	Y42/1	X8/11	0.75	gy/rd	Proportional valve 2
259	X28/1	X15/1	0.75	og	Attachment function 1 OPEN
260	X28/2	X15/2	0.75	og	Attachment function 1 CLOSED
261	X28/3	X15/3	0.75	og	Attachment function 2 OPEN
262	X28/4	X15/4	0.75	og	Attachment function 2 CLOSED
263	X28/5	X15/5	0.75	og	Attachment function 3 OPEN
264	X28/6	X15/6	0.75	og	Attachment function 3 CLOSED
265	X28/7	X15/7	0.75	og	Attachment function 4
267	Y49/1	X8/12	0.75	gy	PWM fan
171	XF4	S11/1	1	bu	12 V 15 F4
172	XF4	S26/1	1	bu	12 V 15 F4
270	X29/4	X25/4	0.75	ye/bu	Front left turn indicator

271	X29/6	X25/6	0.75	ye/bu	Rear left turn indicator
275	X29/5	X25/5	0.75	ye/gn	Front right turn indicator
276	X29/7	X25/7	0.75	ye/gn	Rear right turn indicator
284	X29/3	X25/3	1	ye/rd	Low beam
289	X29/1	X25/1	1	ye/rd	Clearance light (left)
293	X29/2	X25/2	1	ye/rd	Clearance light (right)
309	X21/2	X8/14	1	ye	Rear working light
328	Y31/1	X8/15	1	gn/rd	Air conditioning compressor
341	S43/2	S43.1/1	1	gy-gn	Backup warning system
342	X21/1	S43.1/2	1	gy-gn	Backup warning system
343	R35/1	X8/16	1	bu	Preheating
345	X28/10	X15/10	1	wh	Spare
346	X28/11	X15/11	1	wh	Spare
349	XY25/2	GND1	1	bk	Ground
350	Y42/2	GND1	1	bk	Ground
351	Y41/2	GND1	1	bk	Ground
352	Y20/2	GND1	1	bk	Ground
353	Y21/2	GND1	1	bk	Ground
354	Y76/2	GND1	1	bk	Ground
355	XGND1	GND1	1.5	bk	Ground
356	XGND1	Y3/2	1	bk	Ground
357	XGND1	Y13.1/2	1	bk	Ground
358	XGND1	Y13/2	1	bk	Ground
359	XGND1	Y43/2	1	bk	Ground
360	XGND1	X21/3	1	bk	Ground
361	XGND1	X21/4	1	bk	Ground
362	GND2	Y33/2	1	bk	Ground
363	X901/4	XE3/B	1	bk	Ground
364	X901/4	GND2	1	bk	Ground
365	R35/2	GND2	1	bk	Ground
366	S58/3	GND2	1	bk	Ground
367	Y49/2	GND2	1	bk	Ground
368	B7/2	GND2	1	bk	Ground
369	B1/2	GND2	1	bk	Ground
370	ECM K/2	GND2	2.5	bk	Ground
371	ECM K/4	GND2	2.5	bk	Ground
372	ECM K/6	GND2	2.5	bk	Ground
373	S4/2	GND2	1	bk	Ground
378	Y31/2	GND2	1	bk	Ground

6.5 Wiring harness for chassis/engine Tier IV V2



6.6 STVO (Austrian road traffic regulations) wiring harness



No.	From	To	mm²	Color	Function	No.	From	To	mm²	Color	Function
270	X29/4	E4	0.75	ye/bu	Front left turn indicator	297	X26.1/1	XPR1	1	ye/rd	Clearance light (right)
271	X29/6	E3/5	0.75	ye/bu	Rear left turn indicator	298	E16	XPR1	1	ye/rd	Clearance light (right)
275	X29/5	E2	0.75	ye/gn	Front right turn indicator	299	E16.1	XPR1	1	ye/rd	Clearance light (right)
276	X29/7	E1/5	0.75	ye/gn	Rear right turn indicator	428	GND1	E2	1	bk	Ground
284	X29/3	XAL	1	ye/rd	Low beam	429	GND1	E4	1	bk	Ground
285	E1/2	XAL	1	ye/rd	Low beam	430	GND1	X26/2	1	bk	Ground
286	E3/2	XAL	1	ye/rd	Low beam	432	GND1	XGND5	1.5	bk	Ground
289	X29/1	XPL	1	ye/rd	Clearance light (left)	433	E3/1	XGND5	1	bk	Ground
290	E4	XPL	1	ye/rd	Clearance light (left)	436	E1/1	XGND5	1	bk	Ground
291	E3/4	XPL	1	ye/rd	Clearance light (left)	437	Y25/2	XGND5	1	bk	Ground
293	X29/2	XPR	1	ye/rd	Clearance light (right)	444	XGND6	X26.1/2	1	bk	Ground
294	E2	XPR	1	ye/rd	Clearance light (right)	445	XGND6	GND2	1	bk	Ground
295	E1/4	XPR	1	ye/rd	Clearance light (right)	446	XGND6	GND3	1	bk	Ground
296	X26/1	XPR	1	ye/rd	Clearance light (right)						

6.7 Legend for cabin wiring harness V1

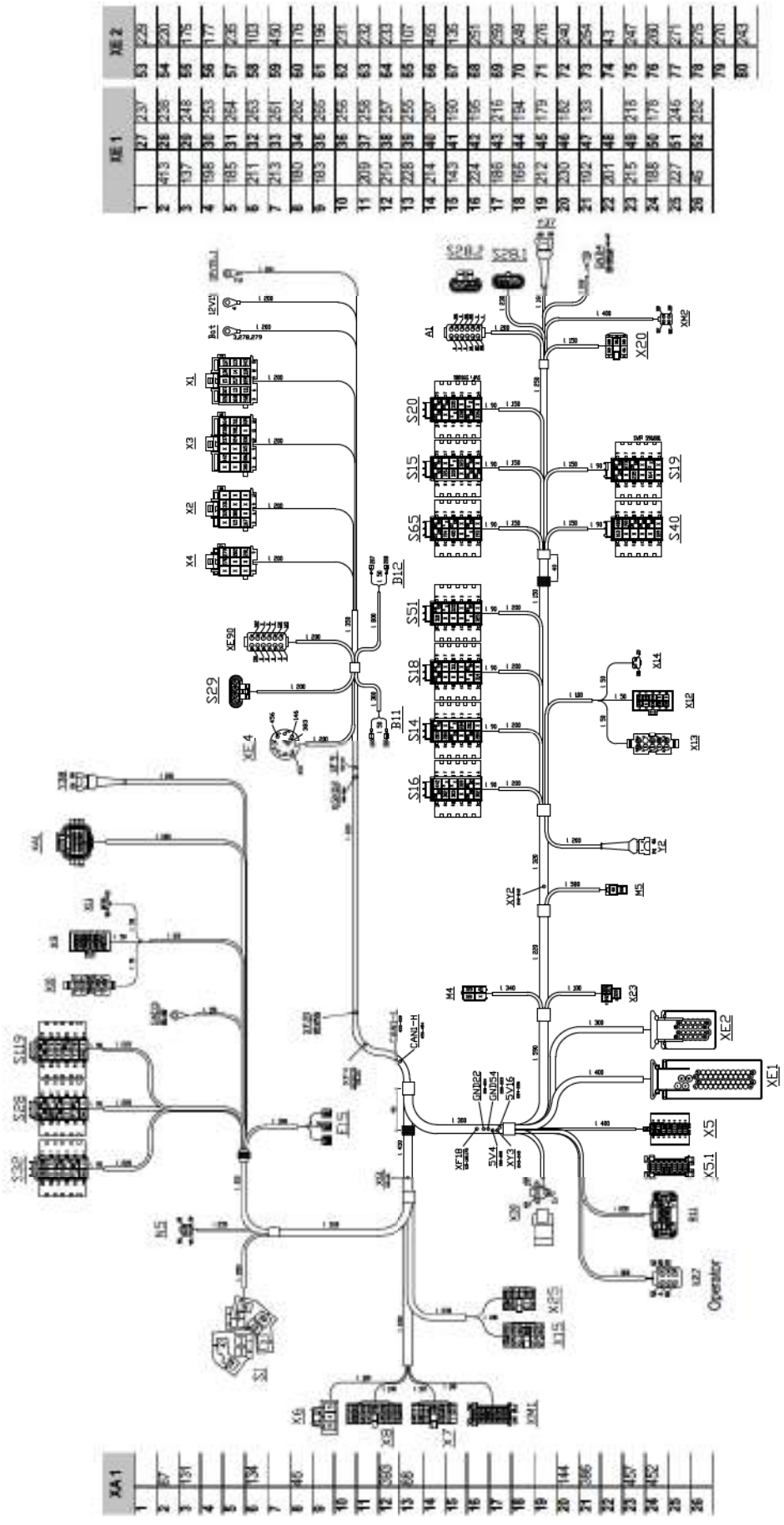
No.	From	To	mm²	Color	Function	No.	From	To	mm²	Color	Function
3	X6/1	Bat	6	rd	12 V 30	122	X5.1/8	X5.1/10	0.75	bu	12 V 15 indicating instrument, ECM
4	X6/2	12 V 15	6	bu	12 V 15	123	XM1/11	X5/10	0.75	bu	12 V 15 indicating instrument, ECM
5	X6/3	S1/1	6	rd	12 V 30	130	X7/5	XG1	0.75	pk	Charge indicator light
7	S1/5	12 V 15_1	2.5	bu	12 V 15 preheating start switch	131	XA1/3	XG1	0.75	pk	Charge indicator light
8	S1/6	12 V 15_1	2.5	bu	12 V 15 preheating start switch	132	XE90/5	XG1	0.75	pk	Charge indicator light
10	X5/2	S1/7	0.75	wh	Start	133	X7/6	XE1/47	0.75	gn/rd	Empty reservoir
11	X5.1/2	X5.1/4	0.75	wh	Start	134	X7/7	XA1/6	0.75	gy/rd	Fuel sensor
12	XM1/1	X5/4	0.75	wh	Start	135	XM1/9	XE2/67	0.75	gn/bl	Engine temperature sensor
13	XM1/2	X1/5	0.75	bk/rd	Starting relay 85	136	XF9	X1/10	0.75	rd	12 V 30 F9
14	XM1/3	X1/11	0.75	gn/rd	Starting relay 86	137	XF9	XE1/3	0.75	rd	12 V 30 F9
15	X7/1	X1/7	2.5	wh	Starting relay 87	138	XF9	XE90/12	0.75	rd	12 V 30 F9
40	XM1/4	S119/1	0.75	gn/rd	Regeneration switch	139	XF9	XM1/13	0.75	rd	12 V 30 F9
41	XM1/5	S119/7	0.75	gn/bu	Regeneration switch (disable)	140	XF9	X5/11	0.75	rd	12 V 30 F9
43	XE2/74	R11/4	0.75	gy/bk	Accelerator pedal signal	141	XF9	A1/9	0.75	rd	12 V 30 F9
45	XE1/26	R11/3	0.75	gy/rd	Accelerator pedal signal	142	X3/4	XF20	1	bu	12 V 15 F20
46	S1/4	XA1/8	1	bn	Preheating	143	XE1/15	XF20	1	bu	12 V 15 F20
47	S1/3	S1/9	1	bn	Preheating	144	XA1/20	XF20	1	bu	12 V 15 F20
48	XM1/8	S1/8	1	bn	Preheating	145	XE90/6	XF20	1	bu	12 V 15 F20
87	XM1/6	XA1/2	0.75	wh/gn	Engine oil pressure	146	XE4/7	XF20	1	bu	12 V 15 F20
88	XM1/7	XA1/13	0.75	gy/bu	Air filter	147	S29/1	XF20	1	bu	12 V 15 F20
103	XM1/12	XE2/58	0.75	wh	CAN High (twist 103,107)	148	S29/3	XF20	1	bu	12 V 15 F20
107	XM1/14	XE2/65	0.75	wh	CAN Low (twist 103,107)	149	S40/5	S19/10	1	bu	12 V 15 F20
109	X7/8	X1/9	0.75	rd/wh	Main relay	150	S40/5	S40/1	1	bu	12 V 15 F20
110	XM1/10	X1/12	0.75	rd/bk	Main relay	151	S28/5	XF20	1	bu	12 V 15 F20
111	X7/2	X1/6	1.5	rd	Battery A	152	S28/5	S28/6	1	bu	12 V 15 F20
112	X7/3	X1/13	2.5	rd	Battery C	153	S28/10	S28/6	1	bu	12 V 15 F20
113	X7/4	X1/14	2.5	rd	Battery B	154	S28/10	S32/5	1	bu	12 V 15 F20
115	XF18	X2/2	0.75	bu	12 V 15 indicating instrument, ECM	155	S32/10	S32/5	1	bu	12 V 15 F20
116	XF18	X5/8	0.75	bu	12 V 15 indicating instrument, ECM	156	XF20	S65/5	1	bu	12 V 15 F20
117	XF18	X5/14	0.75	bu	12 V 15 indicating instrument, ECM	157	S65/10	S65/5	1	bu	12 V 15 F20
118	XF18	S119/3	0.75	bu	12 V 15 indicating instrument, ECM	158	S65/10	S19/5	1	bu	12 V 15 F20
119	S119/10	S119/3	0.75	bu	12 V 15 indicating instrument, ECM	159	S19/10	S19/5	1	bu	12 V 15 F20
120	S119/10	S119/B	0.75	bu	12 V 15 indicating instrument, ECM	160	X7/9	XF20	1	bu	12 V 15 F20

161	X15/8	XF20	1	bu	12 V 15 F20	202	GND22	X9/2	0.75	bk/wh	Earth 22
162	N5/1	XF20	1	bu	12 V 15 F20	203	GND22	R11/2	0.75	bk/wh	Ground 22
163	S40/10	S40/1	1	bu	12 V 15 F20	204	GND22	X13/2	0.75	bk/wh	Ground 22
164	S19/2	X3/16	1	rd	12 V 30 F23 hazard warning system	205	A1/4	B11.1	0.75	wh	Loudspeaker (right)
166	XE1/18	XF4	1	bu	12 V 15 F4	206	A1/3	B11.2	0.75	wh/bk	Loudspeaker (right)
167	X8/13	X2/3	1	bu	12 V 15 F4	207	A1/8	B12.1	0.75	wh	Loudspeaker (left)
168	X1/2	XF4	1	bu	12 V 15 F4	208	A1/7	B12.2	0.75	wh/bk	Loudspeaker (left)
169	X12/1	XF4	1	bu	12 V 15 F4	209	X13/5	XE1/11	0.75	wh/bu	Speed control 1
170	X7/10	XF4	1	bu	12 V 15 F4	210	X13/6	XE1/12	0.75	wh/gn	Speed control 2
173	X11/1	XF4	1	bu	12 V 15 F4	211	X10/3	XE1/6	0.75	og	Attachment 2
174	X14/1	XF4	1	bu	12 V 15 F4	212	X10/4	XE1/19	0.75	og	Attachment 3
175	XE2/55	XF18	0.75	bu	12 V 15 indicating instrument, ECM	213	X10/5	XE1/7	0.75	og	Attachment 4
176	X7/11	XE2/60	0.75	og/bk	Hydraulic oil temperature	214	X9/3	XE1/14	0.75	wh/bu	Joystick (right) signal 1
177	X7/12	XE2/56	0.75	og/wh	Hydraulic oil contamination	215	X9/4	XE1/23	0.75	wh/gn	Joystick (right) signal 2
178	S29/2	XE1/50	0.75	bn/wh	Safety switch NO	216	X9/5	XE1/43	0.75	gn/rd	Load stabilizer
179	S29/4	XE1/45	0.75	bn/bu	Safety switch NC	217	X9/6	X1/8	0.75	org/wh	Horn
180	S28/1	XE1/8	0.75	bn/wh	Operating hydraulics lock NO	218	S28.1/1	XE1/49	0.75	bn/rd	Cabin door
181	S28/1	S28/B	0.75	bn/wh	Operating hydraulics lock NO	219	S28.2/1	S28.2/2	0.75	bn/rd	Cabin door
182	S28/8	XE1/46	0.75	bn/bu	Operating hydraulics lock NC	220	GND54	XE1/54	0.75	bk/wh	Ground 54
183	S32/1	XE1/9	0.75	og/bk	Parallel bucket lift	221	GND54	X9/7	0.75	bk/wh	Ground 54
184	S32/1	S32/B	0.75	og/bk	Parallel bucket lift	222	GND54	S28.1/2	0.75	bk/wh	Ground 54
185	X27/2	XE1/5	0.75	og/wh	Operator presence switch	223	GND54	R11/5	0.75	bk/wh	Ground 54
186	X27/4	XE1/17	0.75	og/wh	Operator presence switch	224	5 V 16	XE1/16	0.75	bu/wh	5 V sensors 16
188	S40/3	XE1/24	0.75	og/wh	Hydraulic quickhitch NO	225	5 V 16	X13/1	0.75	bu/wh	5 V sensors 16
189	S40/3	S40/B	0.75	og/wh	Hydraulic quickhitch NO	226	5 V 16	R11/6	0.75	bu/wh	5 V sensors 16
190	S40/7	XE1/41	0.75	og/wh	Hydraulic quickhitch NC	227	X13/3	XE1/25	0.75	wh/bu	Joystick (left) signal 1
192	S65/1	XE1/21	0.75	bn/bk	Parking brake NO	228	X13/4	XE1/13	0.75	wh/gn	Joystick (left) signal 2
193	S65/1	S65/B	0.75	bn/bk	Parking brake NO	229	X9/9	XE2/53	0.75	og	Hammer switch
194	S65/8	XE1/44	0.75	bn/rd	Parking brake NC	230	X12/3	XE1/20	0.75	gy/wh	Travel speed control
195	X8/1	XE1/42	0.75	bk/rd	Parking brake indicator light	231	X12/4	XE2/62	0.75	bn/bk	2nd speed
196	X8/2	XE2/61	0.75	bk/bu	Pump pressure check	232	X12/5	XE2/63	0.75	ye/bu	Turn indicator push button (left)
198	5 V 4	XE1/4	0.75	bu/wh	5 V sensors 4	233	X12/6	XE2/64	0.75	ye/gn	Turn indicator push button (right)
199	5 V 4	R11/1	0.75	bu/wh	5 V sensors 4	235	S19/6	XE2/57	0.75	ye/rd	Hazard warning lights
200	5 V 4	X9/1	0.75	bu/wh	5 V sensors 4	237	XE1/27	X3/10	1	rd	12 V 30 F21
201	GND22	XE1/22	0.75	bk/wh	Ground 22	238	XE1/28	X3/13	1	rd	12 V 30 F21

240	XY2	XE2/72	0.75	bn/gn	Speed control	279	X4/7	Bat	1	rd	12 V 30 StVO
241	XY2	Y2/1	0.75	bn/gn	Speed control	281	X4/9	S14/1	1	bu	12 V low beam
242	XY2	X12/7	0.75	bn/gn	Speed control	282	X4/8	S14/2	1	bu	12 V clearance light
243	XY3	XE2/80	0.75	bn/bk	2nd speed range	283	S14/10	S18/10	1	bu	12 V 15 F16
244	XY3	X12/8	0.75	bn/bk	2nd speed range	284	X25/3	S14/3	1	ye/rd	Low beam
245	XY3	X8/3	0.75	bn/bk	2nd speed range	288	S14/B	S14/8	1	ye/rd	Clearance light
246	X8/4	XE1/51	0.75	bn/wh	Drive safety valve	289	X25/1	S14/6	1	ye/rd	Clearance light (left)
247	X8/5	XE2/75	0.75	bn/wh	Work safety valve	293	X25/2	S14/6	1	ye/rd	Clearance light (right)
248	X8/6	XE1/29	0.75	bn/ye	Load stabilizer	300	S16/2	X3/3	1	bu	12 V 15 F15
249	X8/17	XE2/70	0.75	bn/ye	Load stabilizer	301	S16/2	X20/2	1	bu	12 V 15 F15
250	X8/17	X9/8	0.75	bn/ye	Load stabilizer	302	S16/B	S16/8	1	ye	Front working light
251	X25/9	XE2/68	0.75	gy/ye	Quickhitch	303	S16/6	X20/3	1	ye	Front working light
252	X8/7	XE1/52	0.75	rd/bk	Parking brake	306	S16/1	X3/6	1	bu	12 V 15 F16
253	X8/8	XE1/30	0.75	og/bk	Parallel lift	307	S16/1	S16/10	1	bu	12 V 15 F16
254	X8/9	XE2/73	0.75	og/bu	High Flow	308	S18/10	S16/10	1	bu	12 V 15 F16
255	Y37/1	XE1/39	0.75	bn/wh	Lock for operating functions (left)	309	X8/14	S16/3	1	ye	Rear working light
256	Y38/1	XE1/36	0.75	bn/wh	Lock for operating functions (right)	311	S18/5	X3/17	1	rd	12 V 30 F17
257	X8/10	XE1/38	0.75	gy/bk	Proportional valve 1	313	S18/1	X20/4	1	vt	Rotating beacon
258	X8/11	XE1/37	0.75	gy/rd	Proportional valve 2	314	S18/1	S18/B	1	vt	Rotating beacon
259	X15/1	XE2/69	0.75	og	Attachment function 1 OPEN	315	S15/1	X3/9	1	bu	12 V 15 F13
260	X15/2	XE2/76	0.75	og	Attachment function 1 CLOSED	316	S15/1	S15/2	1	bu	12 V 15 F13
261	X15/3	XE1/33	0.75	og	Attachment function 2 OPEN	317	S15/10	S15/2	1	bu	12 V 15 F13
262	X15/4	XE1/34	0.75	og	Attachment function 2 CLOSED	318	S15/10	S51/10	1	bu	12 V 15 F13
263	X15/5	XE1/32	0.75	og	Attachment function 3 OPEN	319	X27/3	X2/4	1	bu	12 V 15 F13
264	X15/6	XE1/31	0.75	og	Attachment function 3 CLOSED	320	S15/6	M4/3	1	gn	Fan 1
265	X15/7	XE1/35	0.75	og	Attachment function 4	321	S15/8	S15/B	1	gn	Fan 1
266	X15/7	X10/8	0.75	og	Attachment function 4	322	S51/5	S15/B	1	gn	Fan 1
267	X8/12	XE1/40	0.75	gy	PWM fan	323	S15/3	M4/1	1	gn/bu	Fan 2
268	X20/1	X1/3	0.75	org/wh	Horn	324	X3/11	S51/1	1	gn/rd	Air conditioning relay
270	X25/4	XE2/79	0.75	ye/bu	Front left turn indicator	325	S51/B	S51/1	1	gn/rd	Air conditioning relay
271	X25/6	XE2/77	0.75	ye/bu	Rear left turn indicator	326	X23/1	X1/1	1	gn	Air conditioning
272	X25/6	S19/7	0.75	ye/bu	Rear left turn indicator	327	X23/1	X1/4	1	gn	Air conditioning
275	X25/5	XE2/78	0.75	ye/gn	Front right turn indicator	328	X8/15	X23/3	1	gn/rd	Air conditioning compressor
276	X25/7	XE2/71	0.75	ye/gn	Rear right turn indicator	330	E15	X3/12	1	bu	12 V 15 F12
278	X4/4	Bat	1	rd	12 V 30 StVO	331	S20/2	X2/7	1	bu	12 V 15 F12

332	S20/2	S20/10	1	bu	12 V 15 F12
333	XM2/1	S20/10	1	bu	12 V 15 F12
335	XM2/2	S20/5	1	wh	Wiper
336	S20/8	S20/7	1	bu/rd	Reset
337	XM2/3	S20/7	1	bu/rd	Reset
338	M5	S20/4	1	wh/bk	Washer pump
339	X3/18	E15	1	rd	Socket
343	X8/16	X1/15	1	bu	Preheating
380	X2/5	XGND2	1	bk	Ground
381	X3/14	XGND2	1	bk	Ground
382	XE90/1	XGND2	1	bk	Ground
383	XE4/8	XGND2	1	bk	Ground
384	GND3	XGND2	1	bk	Ground
385	GND3	Y38/2	1	bk	Ground
386	GND3	XA1/21	1	bk	Ground
387	GND3	X11/2	1	bk	Ground
388	GND3	S119/9	1	bk	Ground
389	S28/9	S119/9	1	bk	Ground
390	S28/9	S32/9	1	bk	Ground
391	GND3	N5/2	1	bk	Ground
392	GND3	E15	1	bk	Ground
393	GND3	XA1/12	1	bk	Ground
395	GND4	Y37/2	1	bk	Ground
396	GND4	A1/1	1	bk	Ground
397	GND4	XM2/4	1	bk	Ground
398	GND4	X14/2	1	bk	Ground
401	GND4	X20/5	1	bk	Ground
402	GND4	S20/9	1	bk	Ground
403	S15/9	S20/9	1	bk	Ground
404	S15/9	S65/9	1	bk	Ground
405	S65/6	S65/9	1	bk	Ground
407	GND4	S19/9	1	bk	Ground
408	S40/9	S19/9	1	bk	Ground
410	GND4	M5/1	1	bk	Ground
411	GND4	M4/2	1	bk	Ground
412	GND4	X23/2	1.5	bk	Ground
413	GND4	XE1/2	1.5	bk	Ground
414	GND4	X5/13	1	bk	Ground
415	GND4	X27/6	1	bk	Ground
416	GND4	Y2/2	1	bk	Ground
417	GND4	X27/1	1	bk	Ground
439	GND4	S51/9	1	bk	Ground
440	S18/9	S51/9	1	bk	Ground
441	S18/9	S14/9	1	bk	Ground
442	S16/9	S14/9	1	bk	Ground
450	XE2/59	CAN1-H	0.75	wh	CAN1 High (twist 450,455)
451	XE4/6	CAN1-H	0.75	wh	CAN1 High (twist 451,456)
452	XA1/24	CAN1-H	0.75	wh	CAN1 High (twist 452,457)
453	N5/3	CAN1-H	0.75	wh	CAN1 High (twist 453,458)
454	X30/A	CAN1-H	0.75	wh	CAN1 High
455	XE2/66	CAN1-L	0.75	wh	CAN1 Low (twist 450,455)
456	XE4/5	CAN1-L	0.75	wh	CAN1 Low (twist 451,456)
457	XA1/23	CAN1-L	0.75	wh	CAN1 Low (twist 452,457)
458	N5/4	CAN1-L	0.75	wh	CAN1 Low (twist 453,458)
459	X30/B	CAN1-L	0.75	wh	CAN1 Low

6.8 Cabin wiring harness V1



6.9 Legend for cabin wiring harness V2

No.	From	To	mm²	Color	Function	No.	From	To	mm²	Color	Function
3	X6/1	Bat	4	rd	12 V 30	116	XF18	X5/8	0.75	bu	12 V 15 indicating instrument, ECM
3A	X6/1	Bat	4	rd	12 V 30	117	XF18	X5/14	0.75	bu	12 V 15 indicating instrument, ECM
4	X6/2	12 V 15	4	bu	12 V 15	118	XF18	S119/3	0.75	bu	12 V 15 indicating instrument, ECM
5	X6/3	S1/1	4	rd	12 V 30	119	S119/10	S119/3	0.75	bu	12 V 15 indicating instrument, ECM
5A	X6/3	S1/2	4	rd	12 V 30	120	S119/10	S119/8	0.75	bu	12 V 15 indicating instrument, ECM
7	S1/5	12 V 15	4	bu	12 V 15 preheating start switch	122	X5.1/8	X5.1/10	0.75	bu	12 V 15 indicating instrument, ECM
8	S1/6	12 V 15	4	bu	12 V 15 preheating start switch	123	XM1/11	X5/10	0.75	bu	12 V 15 indicating instrument, ECM
10	X5/2	S1/7	0.75	wh	Start	130	X7/5	XG1	0.75	pk	Charge indicator light
11	X5.1/2	X5.1/4	0.75	wh	Start	131	XA1/3	XG1	0.75	pk	Charge indicator light
12	XM1/1	X5/4	0.75	wh	Start	132	XE90/5	XG1	0.75	pk	Charge indicator light
13	XM1/2	X1/5	0.75	bk/rd	Starting relay 85	133	X7/6	XE1/47	0.75	gn/rd	Empty reservoir
14	XM1/3	X1/11	0.75	gn/rd	Starting relay 86	134	X7/7	XA1/6	0.75	gy/rd	Fuel sensor
15	X7/1	X1/7	2.5	wh	Starting relay 87	135	XM1/9	XE2/67	0.75	gn/bl	Engine temperature sensor
40	XM1/4	S119/1	0.75	gn/rd	Regeneration switch	136	XF9	X1/10	0.75	rd	12 V 30 F9
41	XM1/5	S119/7	0.75	gn/bu	Regeneration switch (disable)	137	XF9	XE1/3	0.75	rd	12 V 30 F9
43	XE2/74	R11/4	0.75	gy/bk	Accelerator pedal signal	138	XF9	XE90/12	0.75	rd	12 V 30 F9
45	XE1/25	R11/3	0.75	gy/rd	Accelerator pedal signal	139	XF9	XM1/13	0.75	rd	12 V 30 F9
46	S1/4	XA1/8	1	bn	Preheating	140	XF9	X5/11	0.75	rd	12 V 30 F9
47	S1/3	S1/9	1	bn	Preheating	142	X3/4	XF20	1	bu	12 V 15 F20
48	XM1/8	S1/8	1	bn	Preheating	143	V1/1	XF20	1	bu	12 V 15 F20
87	XM1/6	XA1/2	0.75	wh/gn	Engine oil pressure	144	XA1/20	XF20	1	bu	12 V 15 F20
88	XM1/7	XA1/13	0.75	gy/bu	Air filter	145	XE90/6	XF20	1	bu	12 V 15 F20
98	X7/3	XECU1	2.5	rd	Battery ECU	146	XE4/7	XF20	1	bu	12 V 15 F20
99	X7/4	XECU1	2.5	rd	Battery ECU	147	S29/1	XF20	1	bu	12 V 15 F20
100	X7/13	XECU1	2.5	rd	Battery ECU	148	S29/3	XF20	1	bu	12 V 15 F20
103	XM1/12	XE2/58	0.75	wh	CAN High (twist 103,107)	149	S40/5	S19/10	1	bu	12 V 15 F20
107	XM1/14	XE2/65	0.75	wh	CAN Low (twist 103,107)	150	S40/5	S40/1	1	bu	12 V 15 F20
109	X7/8	X1/9	0.75	rd/wh	Main relay	151	S28/5	XF20	1	bu	12 V 15 F20
110	XM1/10	X1/12	0.75	rd/bk	Main relay	152	S28/5	S28/6	1	bu	12 V 15 F20
111	X7/2	X1/6	1.5	rd	Battery A	153	S28/10	S28/6	1	bu	12 V 15 F20
112	XECU	X1/13	2.5	rd	Battery C	154	S28/10	S32/5	1	bu	12 V 15 F20
113	XECU	X1/14	2.5	rd	Battery B	155	S32/10	S32/5	1	bu	12 V 15 F20
114	XECU	XECU1	6	rd	Battery	156	XF20	S65/5	1	bu	12 V 15 F20
115	XF18	X2/2	0.75	bu	12 V 15 indicating instrument, ECM	157	S65/10	S65/5	1	bu	12 V 15 F20

158	S65/10	S19/10	1	bu	12 V 15 F20
159	S19/10	S19/5	1	bu	12 V 15 F20
160	X7/9	XF20	1	bu	12 V 15 F20
161	X15/8	XF20	1	bu	12 V 15 F20
162	N5/1	XF20	1	bu	12 V 15 F20
163	S40/10	S40/1	1	bu	12 V 15 F20
164	S19/2	X3/16	1	rd	12 V 30 F23 hazard warning system
165	S19/2	S19/1	1	rd	12 V 30 F23 hazard warning system
166	XE1/18	XF4	1	bu	12 V 15 F4
167	X8/13	X2/3	1	bu	12 V 15 F4
168	X1/2	XF4	1	bu	12 V 15 F4
169	X12/1	XF4	1	bu	12 V 15 F4
170	X7/10	XF4	1	bu	12 V 15 F4
173	X11/1	XF4	1	bu	12 V 15 F4
174	X14/1	XF4	1	bu	12 V 15 F4
175	XE2/55	XF18	0.75	bu	12 V 15 indicating instrument, ECM
176	X7/11	XE2/60	0.75	og/bk	Hydraulic oil temperature
177	X7/12	XE2/56	0.75	og/wh	Hydraulic oil contamination
178	S29/2	XE1/50	0.75	bn/wh	Safety switch NO
179	S29/4	XE1/45	0.75	bn/bu	Safety switch NC
180	S28/1	XE1/8	0.75	bn/wh	Operating hydraulics lock NO
181	S28/1	S28/B	0.75	bn/wh	Operating hydraulics lock NO
182	S28/8	XE1/46	0.75	bn/bu	Operating hydraulics lock NC
183	S32/1	XE1/9	0.75	og/bk	Parallel bucket lift
184	S32/1	S32/B	0.75	og/bk	Parallel bucket lift
185	X27/2	XE1/5	0.75	og/wh	Operator presence switch
186	X27/4	XE1/17	0.75	og/wh	Operator presence switch
188	S40/3	XE1/24	0.75	og/wh	Hydraulic quickhitch NO
189	S40/3	S40/B	0.75	og/wh	Hydraulic quickhitch NO
190	S40/7	XE1/41	0.75	og/wh	Hydraulic quickhitch NC
192	S65/1	XE1/21	0.75	bn/bk	Parking brake NO
193	S65/1	S65/B	0.75	bn/bk	Parking brake NO

194	S65/8	XE1/44	0.75	bn/rd	Parking brake NC
195	X8/1	XE1/42	0.75	bk/rd	Parking brake indicator light
198	5 V 4	XE1/4	0.75	bu/wh	5 V sensors 4
199	5 V 4	R11/1	0.75	bu/wh	5 V sensors 4
200	5 V 4	X9/1	0.75	bu/wh	5 V sensors 4
201	GND22	XE1/22	0.75	bk/wh	Ground 22
202	GND22	X9/2	0.75	bk/wh	Ground 22
203	GND22	R11/2	0.75	bk/wh	Ground 22
204	GND22	X13/2	0.75	bk/wh	Ground 22
205	A1/4	B11.1	0.75	wh	Loudspeaker (right)
206	A1/3	B11.2	0.75	wh/bk	Loudspeaker (right)
207	A1/8	B12.1	0.75	wh	Loudspeaker (left)
208	A1/7	B12.2	0.75	wh/bk	Loudspeaker (left)
209	X13/5	XE1/11	0.75	wh/bu	Speed control 1
210	X13/6	XE1/12	0.75	wh/gn	Speed control 2
211	X10/3	XE1/6	0.75	og	Attachment 2
212	X10/4	XE1/19	0.75	og	Attachment 3
213	X10/5	XE1/7	0.75	og	Attachment 4
214	X9/3	XE1/14	0.75	wh/bu	Joystick (right) signal 1
215	X9/4	XE1/23	0.75	wh/gn	Joystick (right) signal 2
216	X9/5	XE1/43	0.75	gn/rd	Load stabilizer
217	X9/6	X1/8	0.75	org/wh	Horn
218	S28.1/3	XE1/49	0.75	bn/rd	Cabin door
219	S28.2/3	S28.2/4	0.75	bn/rd	Cabin door
220	GND54	XE1/54	0.75	bk/wh	Ground 54
221	GND54	X9/7	0.75	bk/wh	Ground 54
222	GND54	S28.1/4	0.75	bk/wh	Ground 54
223	GND54	R11/5	0.75	bk/wh	Ground 54
224	5 V 16	XE1/16	0.75	bu/wh	5 V sensors 16
225	5 V 16	X13/1	0.75	bu/wh	5 V sensors 16
226	5 V 16	R11/6	0.75	bu/wh	5 V sensors 16
227	X13/3	XE1/25	0.75	wh/bu	Joystick (left) signal 1

228	X13/4	XE1/13	0.75	wh/gn	Joystick (left) signal 2	265	X15/7	XE1/35	0.75	og	Attachment function 4
229	X9/9	XE2/53	0.75	og	Hammer switch	266	X15/7	X10/8	0.75	og	Attachment function 4
230	X12/3	XE1/20	0.75	gy/wh	Travel speed control	268	X20/1	X1/3	0.75	org/wh	Horn
231	X12/4	XE2/62	0.75	bn/bk	2nd speed	270	X25/4	XE2/79	0.75	ye/bu	Front left turn indicator
232	X12/5	XE2/63	0.75	ye/bu	Turn indicator push button (left)	271	X25/6	XE2/77	0.75	ye/bu	Rear left turn indicator
233	X12/6	XE2/64	0.75	ye/gn	Turn indicator push button (right)	272	X25/6	S19/7	0.75	ye/bu	Rear left turn indicator
235	S19/6	XE2/57	0.75	ye/rd	Hazard warning lights	275	X25/5	XE2/78	0.75	ye/gn	Front right turn indicator
237	XE1/27	X3/10	1	rd	12 V 30 F21	276	X25/7	XE2/71	0.75	ye/gn	Rear right turn indicator
238	XE1/28	X3/13	1	rd	12 V 30 F21	278	X4/4	Bat	1	rd	12 V 30 StVO
240	XY2	XE2/72	0.75	bn/gn	Speed control	279	X4/7	Bat	1	rd	12 V 30 StVO
241	XY2	Y2/1	0.75	bn/gn	Speed control	281	X4/9	S14/1	1	bu	12 V low beam
242	XY2	X12/7	0.75	bn/gn	Speed control	282	X4/8	S14/2	1	bu	12 V clearance light
243	XY3	XE2/80	0.75	bn/bk	2nd speed range	283	S14/10	S18/10	1	bu	12 V 15 F16
244	XY3	X12/8	0.75	bn/bk	2nd speed range	284	X25/3	S14/3	1	ye/rd	Low beam
245	XY3	X8/3	0.75	bn/bk	2nd speed range	288	S14/B	S14/8	1	ye/rd	Clearance light
246	X8/4	XE1/51	0.75	bn/wh	Drive safety valve	289	X25/1	S14/6	1	ye/rd	Clearance light (left)
247	X8/5	XE2/75	0.75	bn/wh	Work safety valve	293	X25/2	S14/6	1	ye/rd	Clearance light (right)
248	X8/6	XE1/29	0.75	bn/ye	Load stabilizer	300	S16/2	X3/3	1	bu	12 V 15 F15
249	X8/17	XE2/70	0.75	bn/ye	Load stabilizer	301	S16/2	X20/2	1	bu	12 V 15 F15
250	X8/17	X9/8	0.75	bn/ye	Load stabilizer	302	S16/B	S16/8	1	ye	Front working light
251	X25/9	XE2/68	0.75	gy/ye	Quickhitch	303	S16/6	X20/3	1	ye	Front working light
252	X8/7	XE1/52	0.75	rd/bk	Parking brake	306	S16/1	X3/6	1	bu	12 V 15 F16
253	X8/8	XE1/30	0.75	og/bk	Parallel lift	307	S16/1	S16/10	1	bu	12 V 15 F16
254	X8/9	XE2/73	0.75	og/bu	High Flow	308	S18/10	S16/10	1	bu	12 V 15 F16
255	Y37/1	XE1/39	0.75	bn/wh	Lock for operating functions (left)	309	X8/14	S16/3	1	ye	Rear working light
256	Y38/1	XE1/36	0.75	bn/wh	Lock for operating functions (right)	310	A1/9	X20/2	1	bu	12 V 15 F15
257	X8/10	XE1/38	0.75	gy/bk	Proportional valve 1	311	S18/5	X3/17	1	rd	12 V 30 F17
258	X8/11	XE1/37	0.75	gy/rd	Proportional valve 2	313	S18/1	X20/4	1	vt	Rotating beacon
259	X15/1	XE2/69	0.75	og	Attachment function 1 OPEN	314	S18/1	S18/B	1	vt	Rotating beacon
262	X15/4	XE1/34	0.75	og	Attachment function 2 CLOSED	315	S15/1	X3/9	1	bu	12 V 15 F13
263	X15/5	XE1/32	0.75	og	Attachment function 3 OPEN	267	X8/12	XE1/40	0.75	gy	PWM fan
264	X15/6	XE1/31	0.75	og	Attachment function 3 CLOSED	260	X15/2	XE2/76	0.75	og	Attachment function 1 CLOSED

261	X15/3	XE1/33	0.75	og	Attachment function 2 OPEN	401	GND4	X20/5	1	bk	Ground
319	X27/3	X2/4	1	bu	12 V 15 F13	402	GND4	S20/9	1	bk	Ground
320	S15/6	M4/3	1	gn	Fan 1	403	S15/9	S20/9	1	bk	Ground
321	S15/8	S15/B	1	gn	Fan 1	404	S15/9	S65/9	1	bk	Ground
322	S51/5	S15/B	1	gn	Fan 1	405	S65/6	S65/9	1	bk	Ground
323	S15/3	M4/1	1	gn/bu	Fan 2	407	GND4	S19/9	1	bk	Ground
324	X3/11	S51/1	1	gn/rd	Air conditioning relay	408	S40/9	S19/9	1	bk	Ground
325	S51/B	S51/1	1	gn/rd	Air conditioning relay	410	GND4	M5/1	1	bk	Ground
326	X23/1	X1/1	1	gn	Air conditioning	411	GND4	M4/2	1	bk	Ground
327	X23/1	X1/4	1	gn	Air conditioning	412	GND4	X23/2	1.5	bk	Ground
328	X8/15	X23/3	1	gn/rd	Air conditioning compressor	413	GND4	XE1/2	1.5	bk	Ground
330	E15	X3/12	1	bu	12 V 15 F12	414	GND4	X5/13	1	bk	Ground
331	S20/2	X2/7	1	bu	12 V 15 F12	415	GND4	X27/6	1	bk	Ground
332	S20/2	S20/10	1	bu	12 V 15 F12	416	GND4	Y2/2	1	bk	Ground
333	XM2/1	S20/10	1	bu	12 V 15 F12	417	GND4	X27/1	1	bk	Ground
335	XM2/2	S20/5	1	wh	Wiper	439	GND4	S51/9	1	bk	Ground
336	S20/B	S20/7	1	bu/rd	Reset	440	S18/9	S51/9	1	bk	Ground
337	XM2/3	S20/7	1	bu/rd	Reset	441	S18/9	S14/9	1	bk	Ground
338	M5	S20/4	1	wh/bk	Washer pump	442	S16/9	S14/9	1	bk	Ground
339	X3/18	E15	1	rd	Socket	450	XE2/59	CAN1-H	0.75	wh	CAN1 High (twist 450,455)
343	X8/16	X1/15	1	bu	Preheating	451	XE4/6	CAN1-H	0.75	wh	CAN1 High (twist 451,456)
360	X2/5	XGND2	1	bk	Ground	452	XA1/24	CAN1-H	0.75	wh	CAN1 High (twist 452,457)
361	X3/14	XGND2	1	bk	Ground	453	N5/3	CAN1-H	0.75	wh	CAN1 High (twist 453,458)
362	XE90/1	XGND2	1	bk	Ground	454	X30/A	CAN1-H	0.75	wh	CAN1 High
363	XE4/8	XGND2	1	bk	Ground	455	XE2/66	CAN1-L	0.75	wh	CAN1 Low (twist 450,455)
364	GND3	XGND2	1	bk	Ground	456	XE4/5	CAN1-L	0.75	wh	CAN1 Low (twist 451,456)
365	GND3	Y38/2	1	bk	Ground	457	XA1/23	CAN1-L	0.75	wh	CAN1 Low (twist 452,457)
366	GND3	XA1/21	1	bk	Ground	458	N5/4	CAN1-L	0.75	wh	CAN1 Low (twist 453,458)
367	GND3	X11/2	1	bk	Ground	459	X30/B	CAN1-L	0.75	wh	CAN1 Low
368	GND3	S119/9	1	bk	Ground	390	S28/9	S32/9	1	bk	Ground
369	S28/9	S119/9	1	bk	Ground	391	GND3	N5/2	1	bk	Ground
316	S15/1	S15/2	1	bu	12 V 15 F13	392	GND3	E15	1	bk	Ground
317	S15/10	S15/2	1	bu	12 V 15 F13	393	GND3	XA1/12	1	bk	Ground
318	S15/10	S51/10	1	bu	12 V 15 F13	395	GND4	Y37/2	1	bk	Ground
398	GND4	X14/2	1	bk	Ground	396	GND4	A1/1	1	bk	Ground

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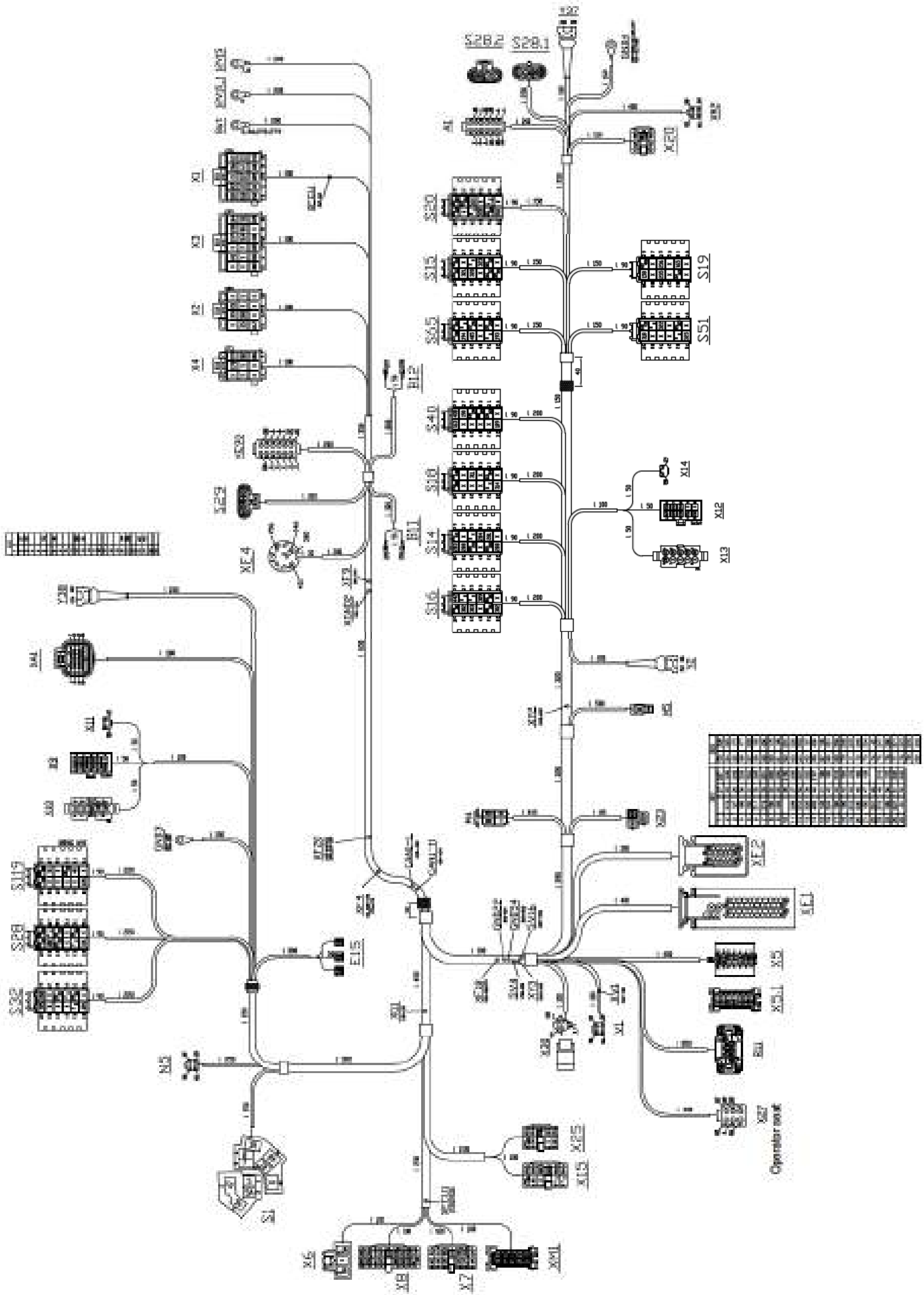
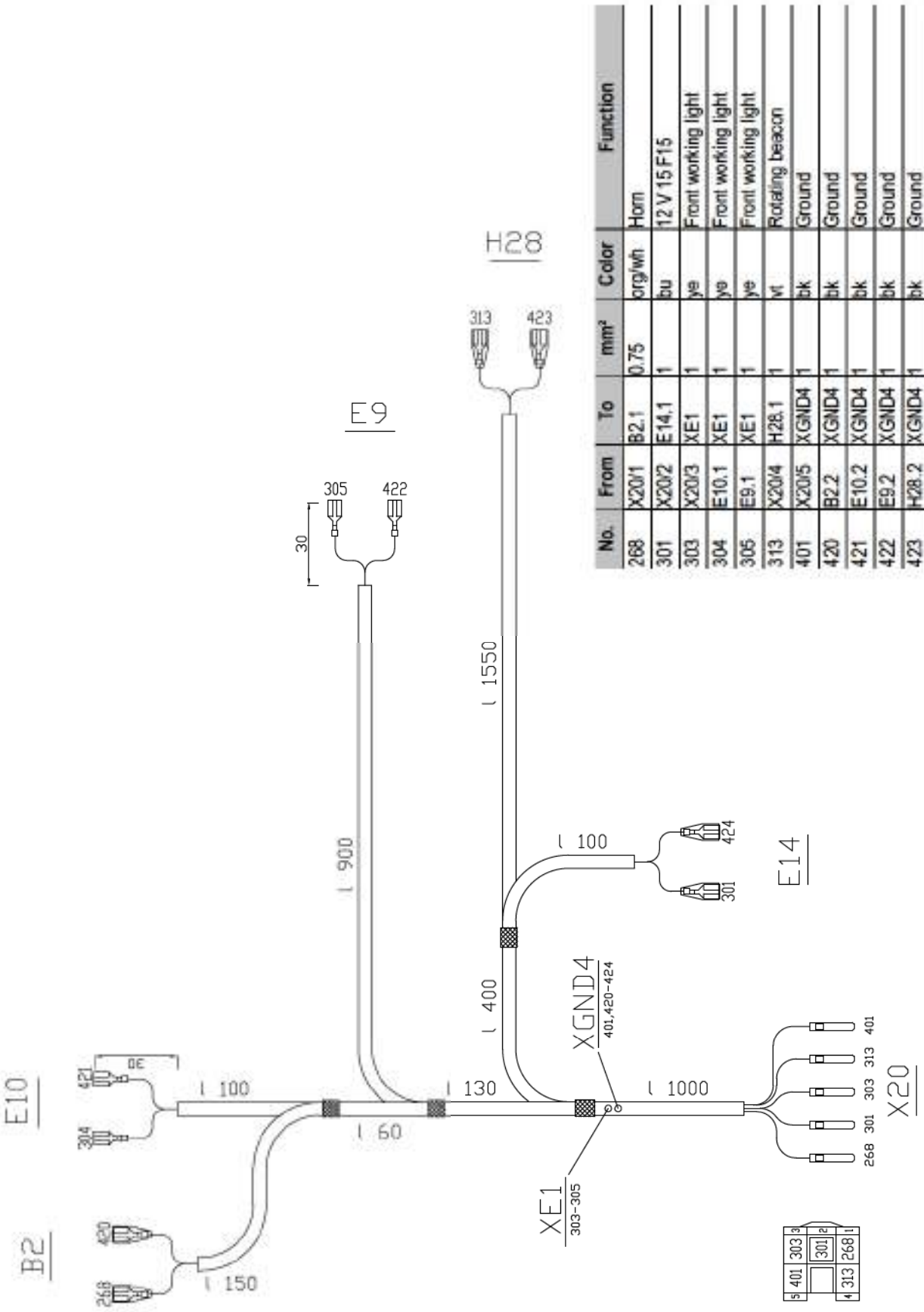
397	GND4	XM2/4	1	bk	Ground
461	V1/4	XV1	1	bu	Terminal 15 controller
462	V1/3	XV1	1	bu	Terminal 15 controller
463	XE1/15	XV1	1	bu	Terminal 15 controller

6.10 Cabin wiring harness V2

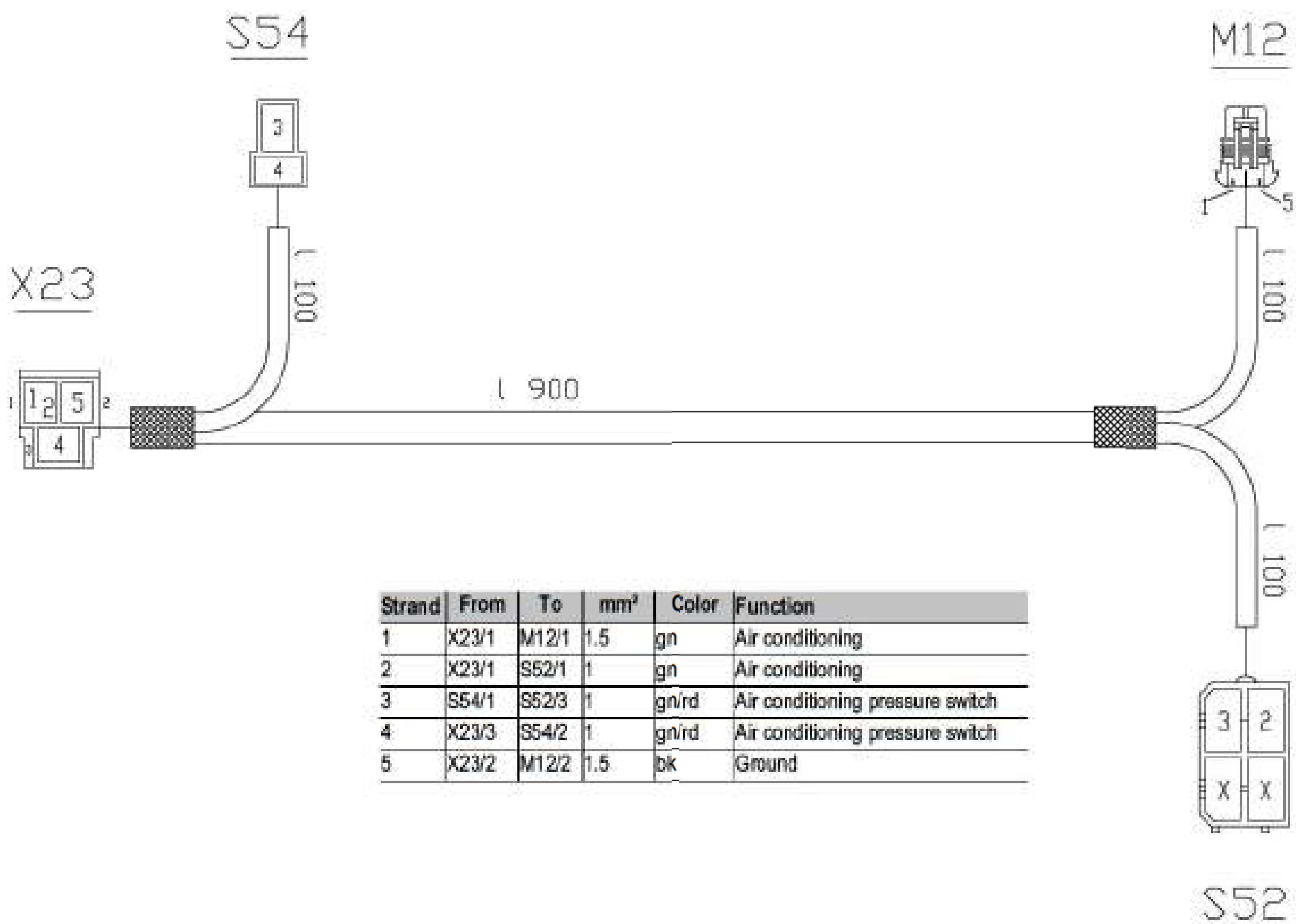


6.11 Cabin roof wiring harness



No.	From	To	mm²	Color	Function
268	X20/1	B2.1	0.75	org/wh	Horn
301	X20/2	E14.1	1	bu	12 V 15 F15
303	X20/3	XE1	1	ye	Front working light
304	E10.1	XE1	1	ye	Front working light
305	E9.1	XE1	1	ye	Front working light
313	X20/4	H28.1	1	vt	Rotating beacon
401	X20/5	XGND4	1	bk	Ground
420	B2.2	XGND4	1	bk	Ground
421	E10.2	XGND4	1	bk	Ground
422	E9.2	XGND4	1	bk	Ground
423	H28.2	XGND4	1	bk	Ground
424	E14.2	XGND4	1	bk	Ground

6.12 Air-conditioning wiring harness



Strand	From	To	mm²	Color	Function
1	X23/1	M12/1	1.5	gn	Air conditioning
2	X23/1	S52/1	1	gn	Air conditioning
3	S54/1	S52/3	1	gn/rd	Air conditioning pressure switch
4	X23/3	S54/2	1	gn/rd	Air conditioning pressure switch
5	X23/2	M12/2	1.5	bk	Ground

6.13 Wiring harness for attachments

X16	
A	434
B	435
C	259
D	260
E	261
F	262
G	263
H	264
J	265
K	161
L	345
M	346
N	
P	

No.	From	To	mm²	Color	Function
161	X28/8	X16/K	1	bu	12 V 15 F20
259	X28/1	X16/C	0.75	og	Attachment function 1 OPEN
260	X28/2	X16/D	0.75	og	Attachment function 1 CLOSED
261	X28/3	X16/E	0.75	og	Attachment function 2 OPEN
262	X28/4	X16/F	0.75	og	Attachment function 2 CLOSED
263	X28/5	X16/G	0.75	og	Attachment function 3 OPEN
264	X28/6	X16/H	0.75	og	Attachment function 3 CLOSED
265	X28/7	X16/J	0.75	og	Attachment function 4
345	X28/10	X16/L	1	wh	Spare
346	X28/11	X16/M	1	wh	Spare
434	X16/A	XGND5	1	bk	Ground
435	X16/B	XGND5	1	bk	Ground

agram for SW24/SW28/ST35/ST45

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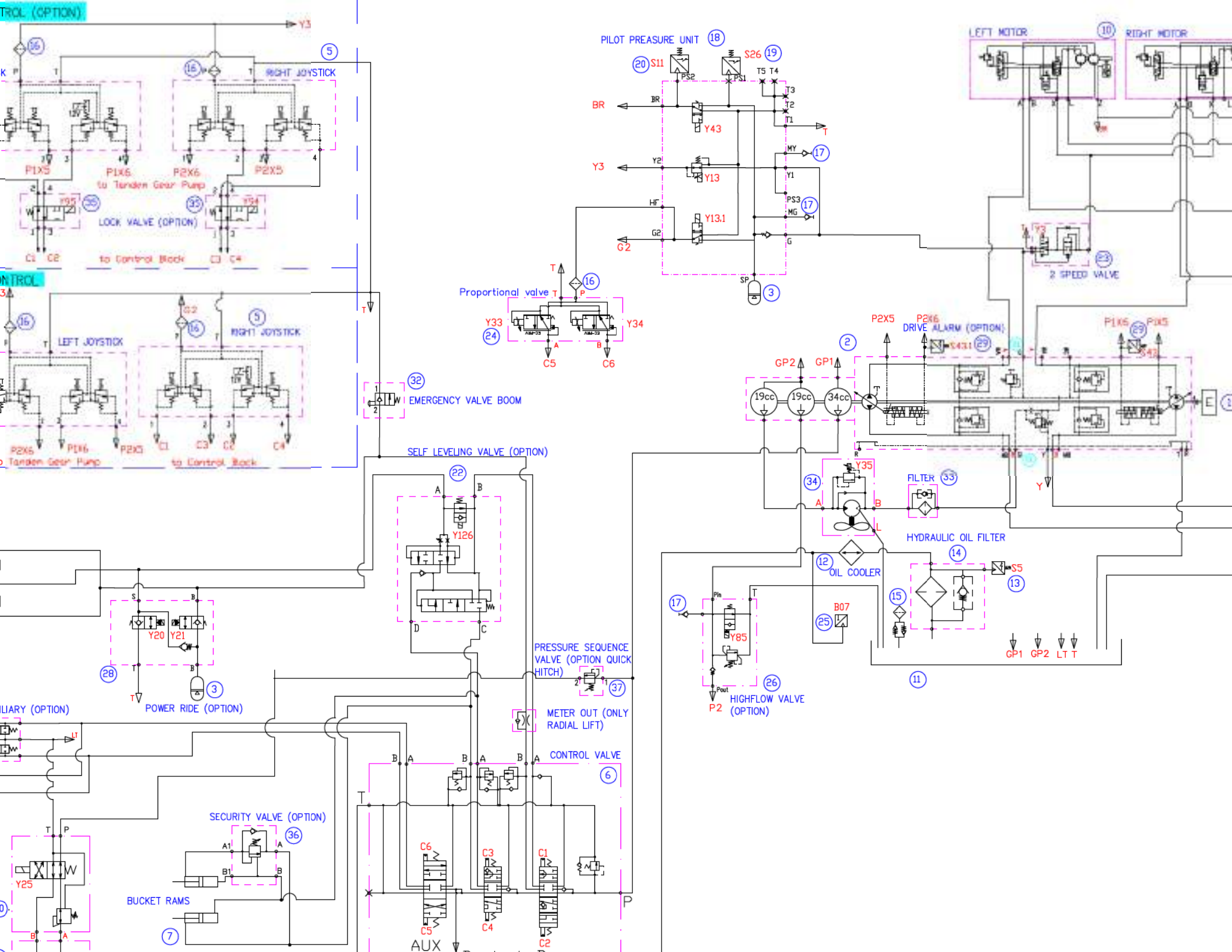
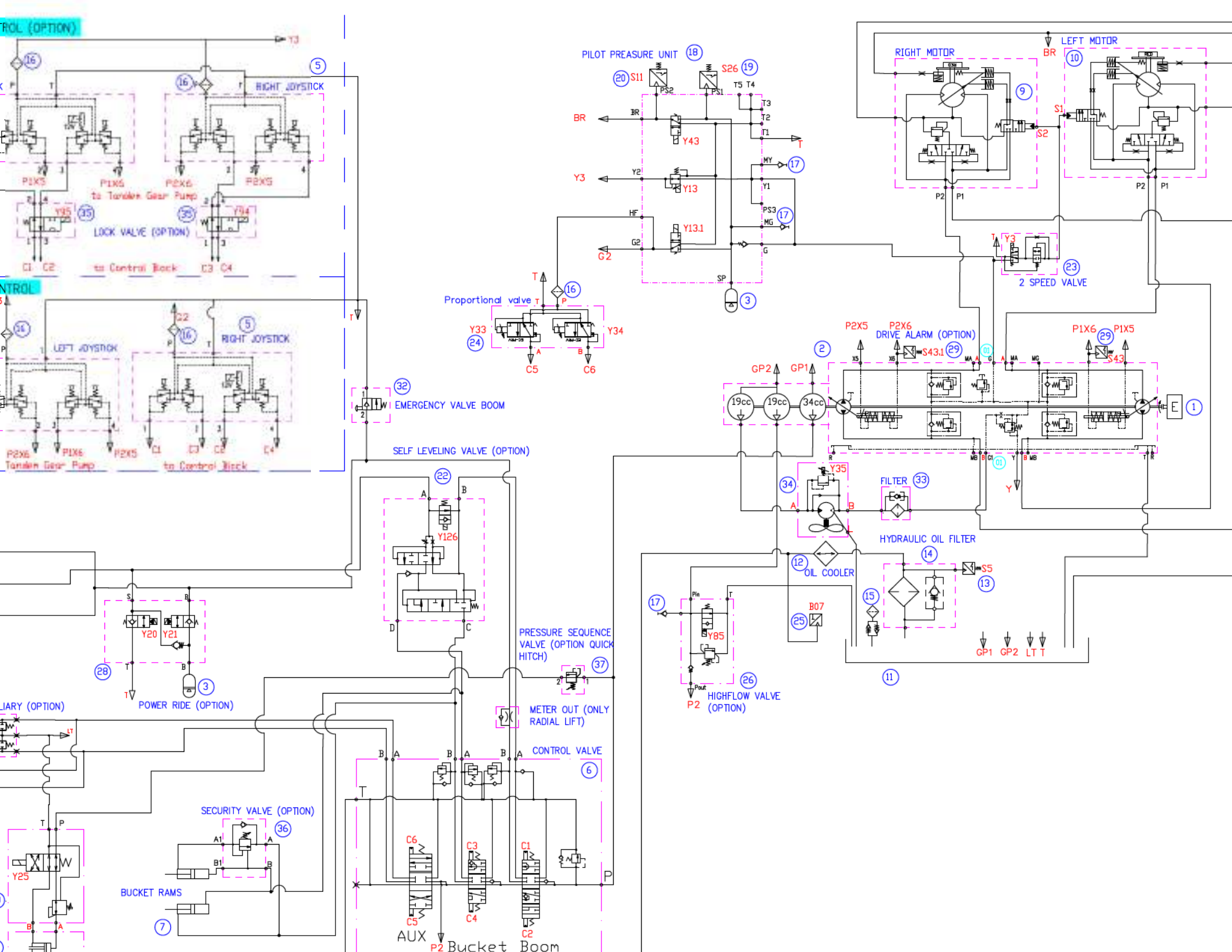

PILOT PREASURE UNIT
LEFT MOTOR
RIGHT MOTOR
RIGHT JOYSTICK
LEFT JOYSTICK
LOCK VALVE (OPTION)
to Control Block
to Tandem Gear Pump
Proportional valve
2 SPEED VALVE
DRIVE ALARM (OPTION)
EMERGENCY VALVE BOOM
SELF LEVELING VALVE (OPTION)
FILTER
HYDRAULIC OIL FILTER
OIL COOLER
HIGHFLOW VALVE (OPTION)
POWER RIDE (OPTION)
PRESSURE SEQUENCE VALVE (OPTION QUICK HITCH)
METER OUT (ONLY RADIAL LIFT)
CONTROL VALVE
SECURITY VALVE (OPTION)
BUCKET RAMS
AUX
GP1 GP2 LT T
P2 (OPTION)


RIGHT JOYSTICK
LOCK VALVE (OPTION)
to Control Block
LEFT JOYSTICK
RIGHT JOYSTICK
to Control Block
PILOT PREASURE UNIT
Proportional valve
EMERGENCY VALVE BOOM
SELF LEVELING VALVE (OPTION)
POWER RIDE (OPTION)
PRESSURE SEQUENCE VALVE (OPTION QUICK HITCH)
METER OUT (ONLY RADIAL LIFT)
CONTROL VALVE
SECURITY VALVE (OPTION)
BUCKET RAMS
AUX
Bucket
Boom
RIGHT MOTOR
LEFT MOTOR
2 SPEED VALVE
DRIVE ALARM (OPTION)
FILTER
OIL COOLER
HYDRAULIC OIL FILTER
HIGHFLOW VALVE (OPTION)