

Service manual

Track excavators

2503 3503



Machine models	E03-04/E03-E07
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Technical data, dimensions and weights are only given as an indication. Responsibility for errors or omissions not accepted.

The cover features the machine with possible optional equipment.



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Chapter

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Abbreviations:

AP	...	Adjustment point
MP	...	Measuring point
PPLV	...	Primary - pressure limiting valve
SPLV	...	Sekondary - pressure limiting valve
TT	...	Tightening torque
Pb1	...	Port code at the hydraulic diagram



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CHAPTER A:

Technical data

(Neuson Service Manual 2503 - 3703)



A Technical data

A.1 Engine

Model 2503 engine

Engine	Model 2503
	Tier 3A
Product	Yanmar diesel engine
Type	3TNV88-BSNS
Design	Water-cooled 4 stroke diesel engine
Number of cylinders	3
Fuel injection system	Direct injection
Aspiration	Natural aspiration
Cooling system	Water-cooled/aspirating fan
Lubrication system	Force-feed lubrication with trochoidal pump
Displacement	1642 cm ³ (100.2 in ³)
Nominal bore and stroke	88 x 90 mm (3.46 x 3.54")
Output	19.4 kW (26 hp) at 2200 rpm
Max. torque	107.3 Nm (79.14 ft.lbs.) at 1320 rpm
Max. engine speed without load	2400 ± 50 rpm
Idling speed	1100 ± 50 rpm
Valve clearance (intake = outlet)	0.15 – 0.25 mm/(0.0059 – 0.0098) cold
Compression	33.3 – 35.3 bar at 250 rpm (483 – 512 psi at 250 rpm)
Engine oil pressure	3.5 – 5.0 bar (50.76 – 72.52 psi)
Pressure switch for engine oil pump	0.5 ± 0.1 bar (7.25 ± 1.45 psi)
Thermostat opening temperature	69.5 – 72.5 °C (157.1 – 162.5 °F)
Thermal switch	107 – 113 °C (224.6 – 235.4 °F)
Firing order	1 – 3 – 2
Direction of rotation	Anticlockwise (as seen from the flywheel)
Starting aid	Glow elements (preheating time 10 – 15 seconds)
Max. inclined position (engine no longer supplied with oil):	30° in all directions 35° no longer than 3 minutes!
Specific fuel consumption	252 g/kWh (0.414 lb/hph)
Exhaust values according to	97/68/EC Tier 3A EPA Tier 4 interim

Fuel injection pump

Type	YPD-MP2
Design	Single piston distributor injection pump
Injection pressure	196 – 206 bar (2843 – 2988 psi)
Engine speed control	Mechanical
Lubrication system	Engine oil lubrication

Engine capacities

Capacities	Model 2503
Fuel tank	44 l (11.624 gal)
Engine oil	7.1 l (1.877 gal)
Coolant (without radiator)	2 l (0.53 gal)
Radiator	5.5 l (1.453 gal)
Coolant reservoir	0.84 l (0.222 gal)

Overview of capacities – [see Fluids and lubricants](#) on page B-2

Engine tightening torques

Tightening torques	Model 2503 Nm/ft.lbs.
Cylinder-head bolt	85.3 – 91.1/62.9 – 67.2 (M10x1.25)
Connecting rod bearing screw	44.1 – 49.0/32.5 – 36.1 (M9x1)
Main bearing screw	93.2 – 98.1/68.7 – 72.4 (M12x1.5)
Flywheel screw	83.3 – 88.2/61.4 – 65.1 (M10x1.25)

Hydraulic system

Hydraulics	Model 2503
Pump	Double variable displacement pump + 1 gear pump 2 x 12 + 8 cm ³ (2 x 0.73 + 0.49 in ³) PVD-0B-24P-8G-4900Z
Flow rate	2 x 28.8 + 19.2 l/min (2 x 7.6 + 5.1 gal/min) at 2400 rpm
Control valve	11 sections/12 sections (3rd control circuit)
Main pressure limiting valve for pumps P1, P2	240 ± ³ bar (3481± ⁴⁴ psi)
Main pressure limiting valve for pump P3	210± ³ bar (3046± ⁴⁴ psi)
Secondary pressure limiting valve for main valve block	275 ^{-0/+0.5} bar at 20 l/min
Main pressure limiting valve for pilot control pressure	35 ^{-0/+4} bar (508 ^{-0/+58} psi)
Main pressure limiting valve for swivel unit engine pressure restriction	210 ± ³ bar (3046± ⁴⁴ psi)
Hydraulic oil radiator	Standard
Hydraulic reservoir capacity	45 l (11.9 gal)
2nd speed shift pressure	180 bar (2611 psi)
Gear motor braking deceleration time	3.7 ^{-1.2/+1.2} s at 50 °C (122 °F) oil temperature.
Circulation pressure P1, P2	15.5 bar (225 psi)/12.5 bar (181 psi)
Circulation pressure P3	18 bar (261 psi)

Traveling drive/axles

2503 from serial no. WNCE0304HPAL00199

Traveling drive	Model 2503
Product	Nachi
Type	PHV-290-37-5R1-8842B

Tracks

2503

Type	Width	Ground pressure	Ground clearance	Remarks
Rubber	250 mm (10 in)	0.34 kg/cm ² (4.8 lbs/in ²) ¹	270 mm (11 in)	Standard
Rubber	300 mm (12 in)	0.28 kg/cm ² (4 lbs/in ²) ¹	270 mm (11 in)	Option
Steel	250 mm (10 in)	0.36 kg/cm ² (5.1 lbs/in ²) ¹	267 mm (11 in)	Option

1. Ground pressure can be higher depending on the configuration chosen.

Model 3503 engine
Tier III

Engine	Model 3503
Product	Yanmar diesel engine
Type	4TNV88-BWNS
Design	Water-cooled 4 stroke diesel engine
Number of cylinders	4
Fuel injection system	Direct injection
Aspiration	Natural aspiration
Cooling system	Water-cooled/aspirating fan
Lubrication system	Force-feed lubrication with trochoidal pump
Displacement	2190 cm ³ (133.6 cu. in.)
Nominal bore and stroke	88 x 90 mm (3.46 x 3.54")
Output	23.7 kW (31.8 hp) at 2000 rpm
Max. torque	143 Nm (105 ft.lbs.) at 1200 rpm
Max. engine speed without load	2025 ± 25 rpm
Idling speed	1100 ± 25 rpm
Valve clearance (intake = outlet)	0.15 – 0.25 mm/(0.0059 – 0.0098") cold
Compression	33.3 – 35.3 bar (483 – 512 psi) at 250 rpm
Engine oil pressure	3.2 – 4.7 bar (46 – 68 psi)
Pressure switch for engine oil pump	0.5 ± 0.1 bar (7.3 ± 1.5 psi)
Thermostat opening temperature	69.5 – 72.5 °C (157.1 – 162.5 °F)
Thermal switch	107 – 113 °C (224.6 – 235.4 °F)
Firing order	1 – 3 – 4 – 2
Direction of rotation	Anticlockwise (as seen from the flywheel)
Starting aid	Glow plug (preheating time 10 – 15 seconds)
Max. inclined position (engine no longer supplied with oil):	30° in all directions
Fuel consumption	5.9 l/h (1.6 gal/h) (without air conditioning) ¹
	5.9 l/h (1.6 gal/h) (with air conditioning) ¹
Specific fuel consumption	249 g/kWh (0.409 lb/hph)
Exhaust values according to	97/68/EC Tier 3A EPA Tier 4 interim

1. Values based on an average 70 % load of the excavator and a diesel fuel density of 0.83 kg/dm³ and cannot be used for comparison with competitors. Specific fuel consumption should be used for this. The air conditioning system has been taken into account with 100 % operating time.

Model 3503 engine
Tier IV

Engine	Model 3503
Product	Perkins diesel engine
Type	Perkins 404F-22
Design	Water-cooled diesel engine
Number of cylinders	4 cylinders
Displacement	2216 cm ³ (135 in ³)
Nominal bore and stroke	84 x 100 mm (3.3 x 3.9 in)
Output	29.8 kW at 1975 rpm (40.0 hp at 1975 rpm)
Max. torque (intermittent)	143 Nm at 1800 rpm (105 ft.lbs at 1,800 rpm)
Max. engine speed without load	1975 rpm
Idling speed	800 rpm
Fuel injection system	Indirect injection
Lubrication system	Force-feed lubrication with trochoidal pump
Cooling system	Water-cooled/aspirating fan
Aspiration	Natural aspiration
Compression	23.3 : 1
Engine oil pressure at rated speed	2.07 – 4.13 bar (30 – 60 psi)
Engine oil pressure switch	0.689 bar kPa (10.0 psi)
Thermostat opening temperature	80 – 84 °C (176 – 183 °F)
Firing order	1 – 3 – 4 – 2
Valve clearance	Intake valve 0.2 mm (0.0078") Exhaust valve 0.2 mm (0.0078")
Direction of rotation	Anticlockwise (as seen from the flywheel)
Starting aid	Sheathed-element heater plugs
Exhaust values according to	US EPA 40 CFR Part 1039 Tier 4 final

Fuel injection pump

Type	YPD-MP2
Design	Single piston distributor injection pump
Injection pressure	196 – 206 bar (2843 – 2988 psi)
Engine speed control	Mechanical
Lubrication system	Engine oil lubrication

Engine capacities

Capacities	Model 3503
Fuel tank	83 l 22 (gal)
Engine oil (max./effect.)	7.4 l/3.4 l (2.0 gal/0.9 gal)
Coolant (without radiator)	2.7 l (0.7 gal)
Radiator	3.5 l (0.9 gal)
Coolant reservoir	0.45 l (0.1 gal)

Overview of capacities – [see Fluids and lubricants](#) on page B-2

Engine tightening torques

Tightening torques	Model 3503 Nm/ft.lbs.
Cylinder-head bolt	85.3 – 91.1/62.96 – 67.20 (M10x1.25)
Connecting rod bearing screw	44.1 – 49.0/32.5 – 36.1 (M9x1)
Main bearing screw	93.2 – 98.1/68.7 – 72.4 (M12x1.5)
Flywheel screw	83.3 – 88.2/61.4 – 65.1 (M10x1.25)

Hydraulic system model 3503

Hydraulics		Model 3503
Pump	Tier 3A	Double variable displacement pump + 1 gear pump 2 x 22.0 + 12.4 cm ³ (2 x 1.34 + 0.76 in ³) PVD-2B-44P-12G-4713G
Flow rate	Tier 3A	2 x 44.5 + 25.1 l/min (2 x 11.8 + 6.6 gal/min) at 2025 rpm
Control valve		10 sections/11 sections (3rd control circuit)
Main pressure limiting valve for pumps P1, P2		240 ^{-0/+5} bar (3481 ^{-0/+73} psi)
Main pressure limiting valve for pump P3		210 ^{±3} bar (3046 ^{±44} psi)
Secondary pressure limiting valve for main valve block		275 ^{-0/+0.5} bar (3989 ^{-0/+7.3} psi) at 20 l/min (5.3 gal/min)
Main pressure limiting valve for pilot control pressure		35 ^{-0/+4} bar (508 ^{-0/+58} psi)
Main pressure limiting valve for swivel unit engine pressure restriction		215 ^{±3} bar/3118 ^{±44} psi (at idling speed)
Hydraulic oil radiator		Standard
Hydraulic reservoir capacity		50 l (13.2 gal)
2nd speed shift pressure		180 bar (2611 psi)
Gear motor braking deceleration time		3.7 ^{-1.2/+1.2} s at 50 °C (122 °F) oil temperature.
Circulation pressure P1, P2		15.5 bar (225 psi)/12.5 bar (181 psi)
Circulation pressure P3		18 bar (261 psi)

Hydraulic system model 3503 VDS

Hydraulics	Model 3503 VDS
Pump	Double variable displacement pump + gear pump + pilot control pump
Flow rate	43.5 + 43.5 + 24.1 + 8.9 l/min (11.5 + 11.5 + 6.4 + 2.4 gal/min)
Operating pressure for operating and travel hydraulics	240 bar (3,481 psi)
Swivel unit operating pressure	210 bar (3,046 psi)
Operating pressure for auxiliary hydraulics	240 bar (3,481 psi)
Hydraulic oil radiator	Standard
Hydraulic tank capacity (system fill)	50 l (13.2 gal)
Max. operating pressure	240 bar (3,481 psi)
Main pressure restriction for boom/bucket/stick	240 bar (3,481 psi)
Main pressure restriction for stabilizer blade	210 bar (3,046 psi)
Main pressure restriction for pilot control pressure	35 bar (508 psi)
Main pressure restriction for swivel drive (hydraulic motor pressure restriction)	200 bar (2,901 psi)
Filter	Return filter

Coolant compound table

Outside temperature ¹	Distilled 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.

Stabilizer blade

Stabilizer blade	Model 3503	Model 3503 tilttable
Width	1620 mm (64 in)	
Height	370 mm (15 in)	350 mm (14 in)
Max. lift over subgrade	410 mm (16 in)	385 mm (15 in)
Scraping depth	480 mm (19 in)	529 mm (21 in)
Tilting angle	--	+/- 25°

Tracks 3503

Type	Width	Ground pressure	Ground clearance	Remarks
Rubber	300 mm (12 in)	0.34 kg/cm ² (4.8 lbs/in ²) ¹	260 mm (10 in)	Standard
Steel	300 mm (12 in)	0.34 kg/cm ² (4.8 lbs/in ²) ¹	270 mm (11 in)	Option

1. Ground pressure can be higher depending on the configuration chosen.

Tracks 3503 VDS

Type	Width	Ground pressure	Ground clearance	Remarks
Rubber	300 mm (12 in)	0.36 kg/cm ² (5.1 lbs/in ²) ¹	275 mm (11 in)	Standard
Steel	300 mm (12 in)	0.37 kg/cm ² (5.3 lbs/in ²) ¹	285 mm (11 in)	Option

1. Ground pressure can be higher depending on the configuration chosen.

Rotation speed of upper carriage (2503/3503/3503 VDS)

Rotation speed of upper carriage	
2503/3503/3503 VDS	About 9 rpm

A.2 Electrical system

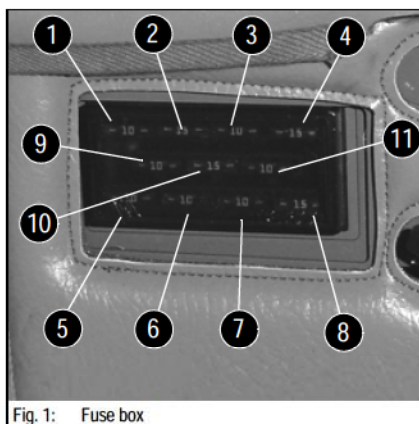
Fuse box in cabin


Fig. 1: Fuse box

Fuse no.	Rated current (A)	Protected circuit
1	10	Switch assignment, indicator lights and indicators, engine relays
2	15	Lights, boom, roof lights
3	10	12V/15 cabin
4	15	Heating, horn
5	10	Valves, travel signal
6	10	Window wiper, cabin
7	10	Alternator
8	15	Spare
9	10	Rotating beacon, radio, 12 V power outlet, antitheft protection
10	15	Socket
11	10	Spare

A.3 Noise levels

Sound power level	2503	3503
Sound power level (L_{WA}) ¹ up to AG02452	93 dB (A)	
Sound power level (L_{WA}) ¹ from AG02453	94 dB(A)	95 dB(A)
Uncertainty factor (K_{PA}) ²	0.8 dB(A)	0.8 dB(A)
Operator-perceived sound pressure level (L_{PA}) ³	≤ 75dB (A)	≤ 76dB (A)

1. ISO 6395 (EC Directives 2000/14/EC and 2005/88/EC)

2. EN ISO 4871 (EC Directives 2000/14/EC and 2005/88/EC)

3. ISO 6394 (EC Directives 84/532/EEC, 89/514/EEC, 95/27/EEC)


Notice!

Measurements performed on asphalted surface.

A.4 Vibration

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

Vibration values indicated in m/s².

A.5 Powertilt (option 3503)

Powertilt	Model 3503
Model size	6
Piston stroke	525 cm ³ (32 in ³)
Required oil flow	3 – 6 l/min (0.8 – 1.6 gal/min)
Connections	1/4 in
Swiveling range	180°
Weight	65 kg (143.3 lbs)
Drive torque – at 210 bar (3045 psi)	2990 Nm (2,205 ft.lbs)
Holding torque – at 225 bar (3263 psi)	7270 Nm (5,362 ft.lbs)
Minimum hose/pipe size	10 mm (0.4 in)
Connecting hose size	6 mm (0.25 in)

A.6 Weights

Type	Transport weight ¹ kg (lbs)	Operating weight ² kg (lbs)
2503 canopy	2483 (5,474)	2639 (5,818)
2503 cabin	2592 (5,714)	2747 (6,056)
3503 canopy	3424 (7,549)	3602 (7,941)
3503 cabin	3551 (7,829)	3728 (8,219)
3503 VDS canopy	3689 (8131)	3866 (8,523)
3503 VDS cabin	3815 (8,411)	3993 (8,803)
3503 Vario canopy	3699 (8,155)	3877 (8,547)
3503 Vario cabin	3826 (8,435)	4003 (8,825)

1. Transport weight: basic machine + 10 % fuel capacity

2. Operating weight: basic machine + full fuel tank + backhoe bucket (400 mm) + user (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 %.

A.7 Tightening torques

General tightening torques

Tightening torques for hydraulic threaded fittings (dry assembly)

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

Galvanized and dry surface (O-ring slightly oiled). Torque tolerance: -10 %

Values determined empirically and to be applied as approximate figures.

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

Galvanized and dry surface (O-ring slightly oiled). Torque tolerance: -10 %

Values determined empirically and to be applied as approximate figures.

Threaded fittings with various seals for hydraulic applications (light execution)					
Thread	Straight pipe fitting with thread and screwed plug			Non-return valve with elastic seal	Identification aid outside Ø
	Sealing washer	Elastic seal	O-ring		
	Nm (ft.lbs)	Nm (ft.lbs.)	Nm (ft.lbs.)	Nm (ft.lbs.)	mm (")
M10X1.0	9 (7)	18 (13)	15 (11)	18 (13)	10 (0.4)
M12X1.5	20 (15)	25 (18)	25 (18)	25 (18)	12 (0.5)
M14X1.5	35 (26)	45 (33)	35 (26)	35 (26)	14 (0.55)
M16X1.5	45 (33)	55 (41)	40 (30)	50 (37)	16 (0.6)
M18X1.5	55 (41)	70 (52)	45 (33)	70 (52)	18 (0.7)
M22X1.5	65 (48)	125 (92)	60 (44)	125 (92)	22 (0.9)
M27X2.0	90 (66)	180 (133)	100 (74)	145 (107)	27 (1.0)
M33X2.0	150 (111)	310 (229)	160 (118)	210 (155)	33 (1.3)
M42X2.0	240 (177)	450 (332)	210 (155)	360 (266)	42 (1.7)

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 $\mu = 0.12$ and are to be used as approximate figures.

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

DIN 912 – hexagon socket head cap screw; DIN 931/DIN 933 – hexagon head screw with/without shaft;

DIN 7984 – hexagon socket head cap screw with short head

All values subject to a friction coefficient of $\mu = 0.12$ and are to be used as approximate figures.

A.8 Dimensions model 2503

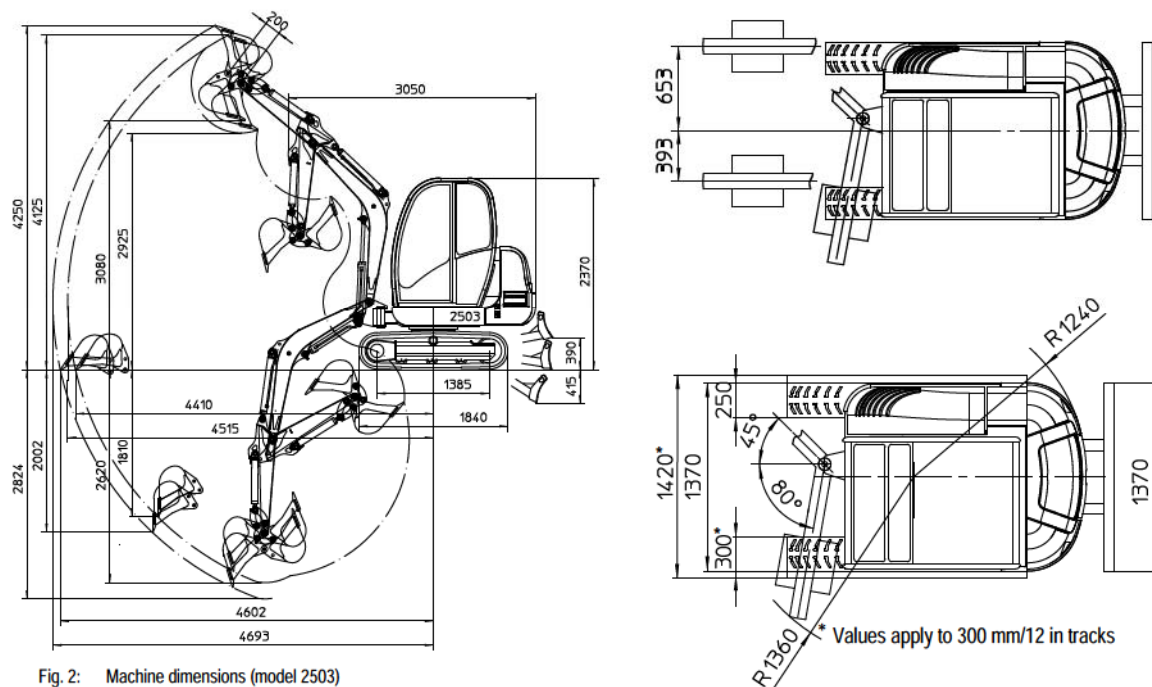


Fig. 2: Machine dimensions (model 2503)

Main data	Model 2503
Height	2370 mm (93 in)
Width 250 mm (10 in) tracks (standard)/300 mm (12 in) tracks (option)	1370 mm/1420 mm (54 in/56 in)
Transport length	4410 mm (14'-6")
Max. digging depth	2620 mm (8'-7")
Stick length (standard/long version)	1150 mm/1350 mm (45 in/53 in)
Max. digging depth for long stick (+ 300 mm)	2825 mm (9'-3")
Max. vertical digging depth	1810 mm (71 in)
Max. vertical digging depth (long stick)	2000 mm (79 in)
Max. digging height	4125 mm (13'-6")
Max. digging height (long stick)	4250 mm (13'-11")
Max. tilt-out height	2925 mm (9'-7")
Max. tilt-out height (long stick)	3080 mm (10'-1")
Max. digging radius	4515 mm (14'-10")
Max. digging radius (long stick)	4693 mm (15'-5")
Max. reach at ground level	4410 mm (14'-6")
Max. reach at ground level (long stick)	4602 mm (15'-1")
Max. breakout force at bucket tooth	20 kN (4,496 lbf)
Max. tearout force (standard stick)	13 kN (2,923 lbf)
Max. tearout force (long stick)	11 kN (2,473 lbf)
Min. tail end slewing radius	1240 mm (49 in)
Max. tail end lateral projection (90° rotation of upper carriage) (250/300 tracks)	555 mm/530 mm (22 in/21 in)
Max. boom displacement to bucket center (right side)	653 mm (26 in)
Max. boom displacement to bucket center (left side)	393 mm (15 in)

A.9 Dimensions model 3503

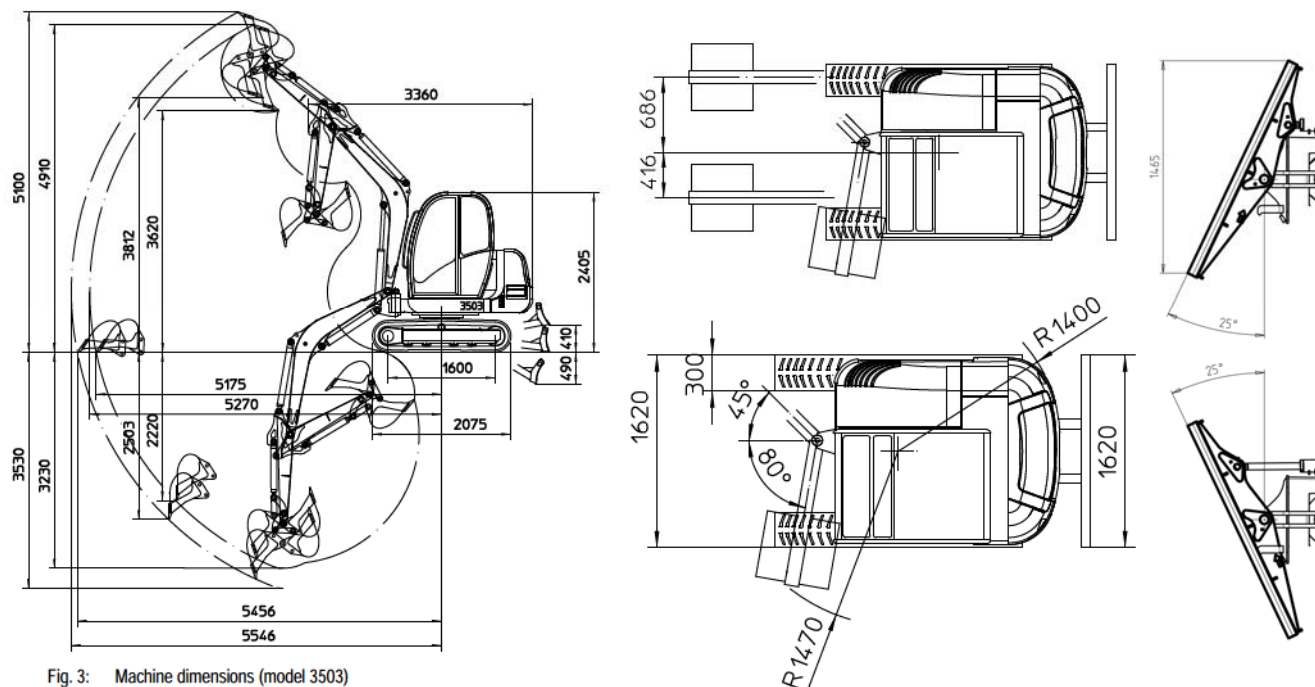


Fig. 3: Machine dimensions (model 3503)

Main data	Model 3503	Vario 3503
Height/width	2405 mm/1620 mm (95 in/64 in)	2508 mm/1620 mm (99 in/64 in)
Transport length	5170 mm (16'-12")	5170 mm (16'-12")
Max. digging depth	3230 mm (10'-7")	3127 mm (10'-3")
Stick length (standard/long version)	1335 mm/1635 mm (53 in/64 in)	1335/1635 mm (53 in/64 in)
Max. digging depth for long stick (+ 300 mm)	3530 mm (11'-7")	3427 mm (11'-3")
Max. vertical digging depth	2220 mm (87 in)	2117 mm (83 in)
Max. vertical digging depth (long stick)	2500 mm (98 in)	2396 mm (94 in)
Max. digging height	4910 mm (16'-1")	5013 mm (16'-5")
Max. digging height (long stick)	5100 mm (16'-9")	5211 mm (17'-1")
Max. tilt-out height	3620 mm (11'-11")	3723 mm (12'-3")
Max. dump height with long stick	3810 mm (12'-6")	3923 mm (12'-10")
Max. digging radius	5270 mm (17'-3")	5100 mm/5440 mm (16'-9"/17'-10")
Max. digging radius with long stick	5546 mm (18'-2")	5296 mm/5796 mm (17'-5"/19'-0")
Max. reach at ground level	5175 mm (16'-12")	5005 mm/5345 mm (16'-5"/17'-6")
Max. reach at ground level (long stick)	5456 mm (17'-11")	5206 mm/5706 mm (17'-1"/18'-9")
Max. breakout force at bucket tooth	30.3 kN (6,811 lbf)	30.3 kN (6,811 lbf)
Max. tearout force (standard stick)	20.6 kN (4,631 lbf)	20.6 kN (4,631 lbf)
Max. tearout force (long stick)	16.8 kN (3,777 lbf)	16.8 kN (3,777 lbf)
Min. tail end slewing radius	1400 mm (55 in)	1400 mm (55 in)
Max. tail end lateral projection (90° rotation of upper carriage)	590 mm (23 in)	420/760** mm (17 in/30 in)
Max. boom displacement to bucket center (right side)	685 mm (27 in)	855 mm (34 in)
Max. boom displacement to bucket center (left side)	415 mm (16 in)	585 mm (23 in)
Stabilizer blade tilting angle	+/- 25°	

A.10 Dimensions model 3503 VDS

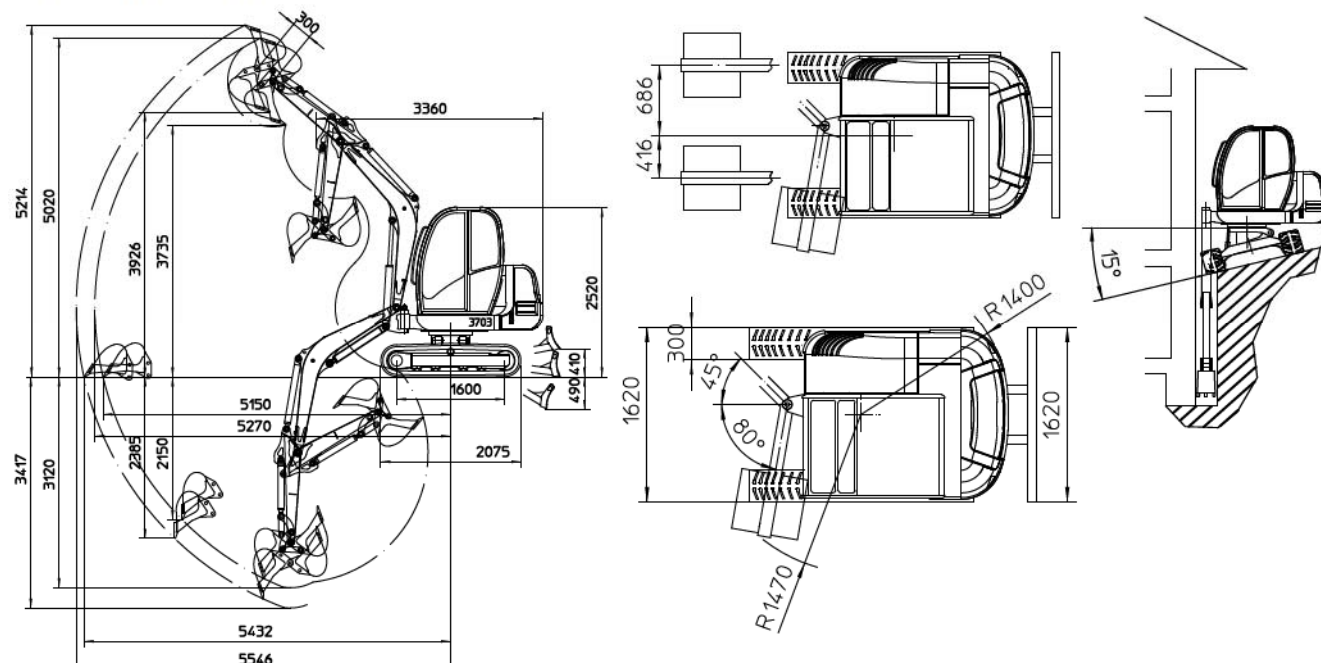
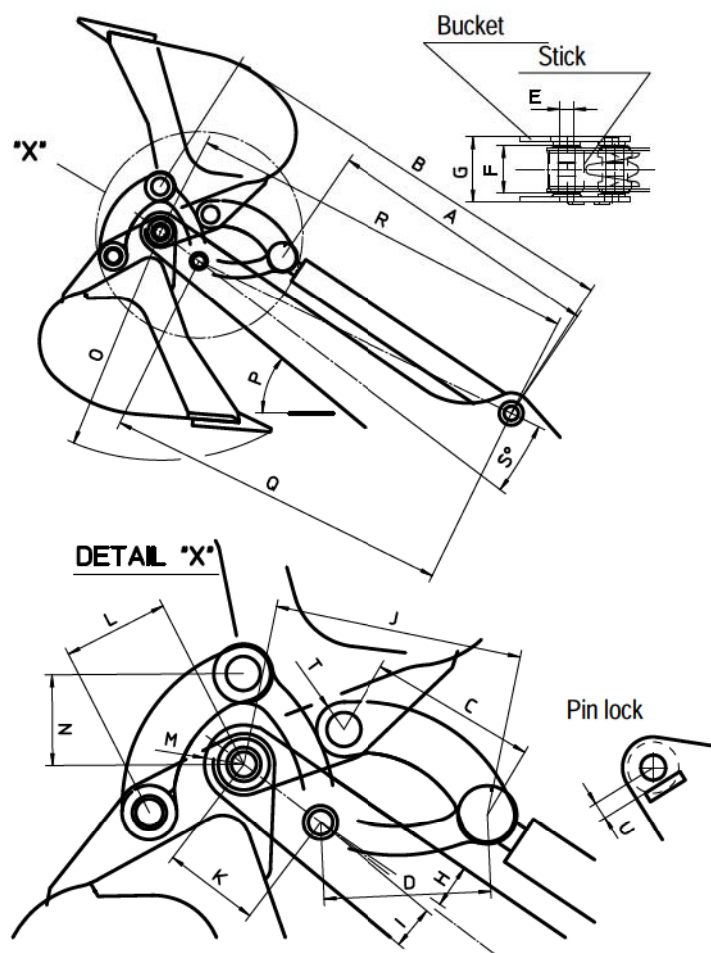


Fig. 4: Machine dimensions (model 3503 VDS)

Main data	Model 3503 VDS
Height/width	2520 mm/1620 mm (99 in/64 in)
Transport length	5170 mm (16'-12")
Max. digging depth	3120 mm (10'-3")
Stick length (standard)	1335 mm (52 in)
Stick length (long version)	1635 mm (64 in)
Max. digging depth for long stick (+ 300 mm)	3417 mm (11'-3")
Max. vertical digging depth	2105 mm (83 in)
Max. vertical digging depth (long stick)	2385 mm (94 in)
Max. digging height	5020 mm (16'-6")
Max. digging height (long stick)	5220 mm (17'-2")
Max. tilt-out height	3735 mm (12'-3")
Max. tilt-out height (long stick)	3935 mm (12'-11")
Max. digging radius	5270 mm (17'-3")
Max. digging radius (long stick)	5546 mm (18'-2")
Max. reach at ground level	5150 mm (16'-11")
Max. reach at ground level (long stick)	5432 mm (17'-10")
Max. breakout force at bucket tooth	30.4 kN (6834 lbf)
Max. tearout force (standard stick)	20.6 kN (4631 lbf)
Max. tearout force (long stick)	16.8 kN (3777 lbf)
Min. tail end slewing radius	1400 mm (55 in)
Max. tail end lateral projection (90° rotation of upper carriage)	590 mm (23 in)
Max. boom displacement to bucket center (right side)	686 mm (27 in)
Max. boom displacement to bucket center (left side)	416 mm (16 in)
Max. tilt angle for VDS	15°
Stabilizer blade tilting angle	+/- 25°

A.11 Kinematics



Pos.	Model 2503	Model 3503
A	694 mm (27.32 in)	840 mm (33.07 in)
B	1038 mm (40.86 in)	1320 mm (51.96 in)
C	197 mm (7.75 in)	270.7 mm (10.65 in)
D	205 mm (8.07 in)	280 mm (11.02 in)
E	d = 32 mm (1.25 in)	d = 40 mm (1.57 in)
F	118 - 0.5 mm (4.64 - 0.019 in)	140 - 0.2 mm (5.51 - 0.0078 in)
G	159.5 mm (6.27 in)	190.5 mm (7.49 in)
H	49.5 mm (1.94 in)	61.4 mm (2.41 in)
I	49 mm (1.92 in)	56.2 mm (2.21 in)
J	305 mm (12 in)	411.5 mm (16.2 in)
K	117.7 mm (4.63 in)	150 mm (5.9 in)
L	129.5 mm (5.09 in)	180 mm (5.08 in)
M	R40 mm (1.57 in)	R45 mm (1.77 in)
N	111.7 mm (4.39 in)	160.4 mm (6.31 in)
O	R610 mm (24.01 in)	R670 mm (26.37 in)
P	40°	41.3°
Q	865.2 mm (40.06 in)	1085.7 mm (42.74 in)
R	981.2 mm (38.62 in)	1233.4 mm (48.55 in)
S	10.2°	11.3°
T	R35 mm (1.37 in)	R40 mm (1.57 in)
U	20 mm +0.5 (0.78 +0.019 in)	25.5 mm +0.5 (1 +0.019 in)





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CHAPTER B:

Maintenance

(Neuson Service Manual 2503 - 3703)



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B Maintenance

Fluids and lubricants

Application	Fluid/lubricant	Specification	Season/temperature	Capacities ¹
Diesel engine 3TNV88 (Tier III)	Engine oil SAE 10W-40	API: CF, CF-4, CI-4 ACEA: E3, E4, E5 JASO: DH-1	-20 °C (-4 °F) +40 °C (104 °F)	max. 6.7 l (1.76 gal)
Diesel engine 4TNV88 (Tier III)				max. 7.4 l (1.95 gal)
Diesel engine Tier IV	Engine oil SAE 10W-40	API: CJ-4 ACEA: E9 ECF-3		10.6 l (2.8 gal)
Traveling drive	Gearbox oil SAE 80W-90	API: GL-4, GL-5	Year-round	About 0.6 l each (0.2 gal)
Hydraulic oil reservoir	Hydraulic oil	EUROLUB HVLP46 ²	Year-round ³	2503: 27 l (7 gal)
	Biodegradable oil ⁴	PANOLIN HLP Synth 46 BP BIOHYD SE-46		3503: 50 l (13 gal)
Roller and friction bearings	Grease	KF2K-20 ⁵	Year-round	As required
Live ring: ball bearings				
Live ring gears				
Grease zerks				
Battery terminals	Acid-proof grease ⁶	FINA Marson L2	Year-round	As required
Fuel tank	Diesel fuel ⁷	2-D ASTM D975 – 94 (USA) ^{7,8}	Depending on outside temperature Summer or winter diesel fuel	2503: 41 l (11 gal) 3503: 52 l (14 gal)
		1-D ASTM D975 – 94 (USA)		
		EN 590 : 96 (EU) ^{7,9}		
		ISO 8217 DMX (International)		
		BS 2869 – A1 (GB)		
		BS 2869 – A2 (GB) ^{7,8}		
		JIS K2204 (Japan)		
		KSM-2610 (Korea)		
		GB252 (China)		
Radiator	Coolant	Distilled water + antifreeze ASTM D4985 (reddish) ¹⁰	Year-round	About 4.5 l (1.2 gal)
		Distilled water + antifreeze ASTM D6210 (violet) ¹¹		
Air conditioning	Refrigerant	R134a ¹²	Year-round	~ 950 g (2.1 lbs)
	Compressor oil	Sanden SP20	Year-round	Tier 2: 122 cm ³ (7.45 in ³) Tier 3A: 90 cm ³ (5.5 in ³)
Washer system	Cleaning solution	Water + antifreeze	Year-round	1.2 l (0.32 gal)



1. The capacities indicated are approximate values; the oil level check alone is relevant for the correct oil level
Capacities indicated are no system fills
2. According to DIN 51524 section 3
3. Depending on local conditions – [see Hydraulics oil grade](#) on page B-4
4. Biodegradable hydraulic oil based on saturated synthetic esters with an iodine value of < 10, according to DIN 51524Teil3, section , HVLP, HEES
5. SKPF2K-20 lithium-saponified grease according to DIN 51502/ISO 6743-9
6. Standard acid-proof grease
7. In countries without regulations on exhaust gas emissions, diesel fuel with a sulfur content of up to 4000 ppm (0.4 %) can be used.
8. Sulfur content up to 15 ppm (0.0015 %)
9. Sulfur content up to 10 ppm (0.001 %)
10. 2503: up to serial no. WNCE0304PPAL00399; 3503: up to serial no. WNCE0307APAL00999
11. 2503: from serial no. WNCE0304HPAL00400; 3503: from serial no. WNCE0307PPAL01000
12. According to DIN 8960

Oil grades for the diesel engine, depending on temperature

Engine oil grade	Ambient temperature (°C)													
	°C	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40
API: CD, CF, CF-4, CI-4 ACEA: E3, E4, E5 JASO: DH-1	SAE 10W													
	SAE 20W													
	SAE 10W-30													
	SAE 10W-40													
	SAE 15W-40													
	SAE 20													
	SAE 30													
	SAE 40													
	°F	-4	5	14	23	32	41	50	59	68	77	86	95	104

Additional oil change and filter replacement (hydraulic system)

**Caution!**

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

☞ Observe the following intervals

Application		Hydraulic oil	Hydraulic oil filter insert
Normal work (excavation work)		Every 1000 o/h	Replace the first time after 50 o/h, then every 500 o/h
Percentage of hammer work	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	



**Notice!**

Please refer to the maintenance plan on page [B-5](#) for additional maintenance.

Oil grades for the hydraulic system, depending on temperature

Hydraulic oil grade	Ambient temperature														
	°C	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	50
HVLP ¹															
	°F	-4	5	14	23	32	41	50	59	68	77	86	95	104	122

1. According to DIN 51524 section 3

B.1 Maintenance plan (Tier III) Work description For servicing and maintenance on the attachment, please refer to the operation and maintenance manual of the attachment manufacturer as well. Fluid and filter changes (): Perform the following oil and filter changes (check oil levels after test run): <ul style="list-style-type: none"> • Engine oil ¹ • Engine oil filter ² • Fuel filter ³ • Air filter element (as indicated by the indicator light) • Coolant • Hydraulic oil filter insert ⁴ • Hydraulic oil ⁵ • Hydraulic oil reservoir breather • Gearbox oil ⁶ Inspection work (): Check the following material. Refill if necessary: <ul style="list-style-type: none"> • Engine oil • Engine coolant • Fuel • Hydraulic oil • Gearbox oil Clean water ducts ⁷ Check radiator for engine and hydraulic oil for dirt. Clean if necessary Check cooling systems, heating and hoses for leaks (visual check) Air filter (visual check for damage) Check the pilot control filter for dirt, clean it if necessary Prefilter with water separator: drain water	Maintenance plan/operating hours (o/h)							Authorized service center
	Maintenance (once a day)	Service 50 o/h	Every 250 o/h	Every 500 o/h	Every 1000 o/h once a year	Every 2000 o/h	Customer	
		•		•				
		•		•				
				•				
					•		•	
		•		•	•			
	•						•	
	•						•	
	•						•	
	•						•	

B.1 Maintenance plan (Tier III) Work description For servicing and maintenance on the attachment, please refer to the operation and maintenance manual of the attachment manufacturer as well.	Maintenance plan/operating hours (o/h)							
	Authorized service center	Customer	Every 2000 o/h	Every 1000 o/h once a year	Every 500 o/h	Every 250 o/h	Service 50 o/h	Maintenance (once a day)
	●	●			●			●
		●						●
		●						●
	●			●				●
	●			●				●
	●			●				●
	●				●			●
Drain condensation water from the hydraulic oil reservoir (from serial no. AH02272)								
Fuel filter: from AG00580: drain 10 ml (0.3 US fl.oz) of fuel/water mixture								
Check V-belt condition and tension								
Check the exhaust system for damage and condition								
Check valve clearance. Adjust if necessary	●			●				
Clean and adjust the fuel injection pump ⁸	●			●				
Check and adjust the injection pressure of the injection nozzles, clean the injection needles/nozzles	●			●				
Check and adjust injection time ⁹	●			●				
Empty diesel fuel tank					●			
Check battery electrolyte. Add distilled water if necessary		●			●		●	
Check alternator, starter and electric connections, bearing play and function	●				●			
Check preheating system and electric connections	●				●			
Check correct function of air filter contamination gage	●				●			
Pressure check of primary pressure limiting valves					●		●	
Check tracks for cracks and cuts	●	●						●
Check the track tension and retension the tracks if necessary	●	●						●
Check bearing play of tread rollers, track carrier rollers, front idlers					●			
Check piston rods for damage					●			
Check screws for tightness					●		●	
Check live-ring screws for tightness					●			
Check pin lock								●
Check wear on load hook and joint rod (lifting eye)		●		●				
Check line fixtures		●						
Check indicator lights for correct function					●		●	

B.1 Maintenance plan (Tier III)	Work description For servicing and maintenance on the attachment, please refer to the operation and maintenance manual of the attachment manufacturer as well.	Maintenance plan/operating hours (o/h)							
		Maintenance (once a day)	Service 50 o/h	Every 250 o/h	Every 500 o/h	Every 1000 o/h once a year	Every 2000 o/h	Customer	
		Authorized service center							

B.1 Maintenance plan (Tier III)	Work description For servicing and maintenance on the attachment, please refer to the operation and maintenance manual of the attachment manufacturer as well.	Maintenance plan/operating hours (o/h)							Authorized service center
		Maintenance (once a day)	Service 50 o/h	Every 250 o/h	Every 500 o/h	Every 1000 o/h once a year	Every 2000 o/h	Customer	
			●		●			●	
			●						
			●						
			●						
			●						
			●						
Functional check ():									
Check the function of the following assemblies/components. Rectify if necessary:									
• Lights, signaling system, acoustic warning system									
• Hydraulic quickhitch (lock)									
• Check the Powertilt									
Leakage check ():									
Check for tightness, leaks and chafing: pipes, flexible lines and threaded fittings of the following assemblies and components. Rectify if necessary:									
• Visual check									
Engine and hydraulic system									
Cooling and heating circuit									
Traveling drive									
Hydraulic quickhitch (hoses, valve)									
Visual check									
Correct function; deformations, damage, surface cracks, wear or corrosion									
• Check the exhaust system for damage									
• Check the insulating mats in the engine compartment for damage									
• Check the cabin and protective structures for damage (for example the front guard, FOPS)									
• Check the tracks for cracks and cuts									
• Check the travel gear for damage (for example the track rollers, insert rolling bearings)									
• Check the piston rods of the cylinders for damage									
• Check all threaded fittings regularly for tightness									
• Check the seat belt for damage									
• Check the lifting gear (load hook, joint rod, lifting eyes) and slings (option)									
• Check the hydraulic quickhitch and/or Powertilt for damage (option)									



1. Drain engine oil the first time after 50 o/h, then every 500 o/h
2. Replace the engine oil filter the first time after 50 o/h, then every 500 o/h
3. Replace the fuel filter the first time after 500 o/h, then every 500 o/h
4. Replace the hydraulic oil filter insert the first time after 50 o/h, then every 500 o/h
5. Replace the hydraulic oil the first time after 500 o/h, then every 1000 o/h
6. Drain the gearbox oil the first time after 50 o/h, then every 1000 o/h
7. Clean the water ducts every other 1000 o/h servicing
8. Adjust and clean the fuel injection pump every other 1000 o/h servicing
9. Check and adjust injection time every other 1000 o/h servicing
10. Rinse the system to remove dirt. Repeat the procedure in the opposite flow direction.
11. Twice daily when used in water

B.2 Maintenance plan (Tier IV)

Daily maintenance (user)	
Inspection work (Check the following fluids and lubricants, 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)	--
Check the radiator and hydraulic oil cooler for dirt, clean them if necessary	--
Lubricate the machine according to the lubrication plan	--
Check the water separator and fuel filter: drain water if necessary	--
Check the track tension and retension the tracks if necessary	--
Check the engine air intake	--
Check pin lock	--
Check line fixtures	--
Check the indicator lights and warning devices for correct function	--
Check the swivel unit brake for correct function	--
Check the hydraulic couplings for dirt	--
Check the threaded fittings of the protective structures (for example the cabin) for tightness	--
Clean the lights/light system, signaling system	--
Option	
Check the acoustic warning device of the overload valve	--
Easy Lock: check the acoustic warning system	--
Lubricate the Powertilt according to the lubrication plan	--
Adjust the mirrors correctly, clean them and check them for damage, check the fastening screws and tighten them if necessary	--
Leakage check	
Check for tightness, leaks and chafing: pipes, flexible lines and threaded fittings of the following assemblies and components. Repair if necessary	Page
Engine and hydraulic system	--
Traveling drive	--
Cooling systems, heating and hoses (visual check)	--
Option	
Hydraulic quickhitch (Easy Lock) and Powertilt (hoses, valve)	--
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 (for example the Front Guard, FOPS)	--
Check the tracks for damage	--
Check the travel gear for damage (for example the track rollers, insert rolling bearings)	--
Check the piston rods of the cylinders for damage	--



Daily maintenance (user)	
Check the seat belt for damage	--
Check the hydraulic hose for damage	--
Option	
Check the load hook, joint rod, lifting eyes	--
Check the hydraulic quickhitch (Easy Lock) for damage	--
Check the Powertilt for damage	--
Weekly maintenance (every 50 operating hours) (user)	Page
Lubricate the machine according to the lubrication plan	--
Check the air filter element (clean or replace it if necessary) ¹	--
Option	
Actuate Powertilt swivel device in final position for 1 minute ²	--
All steps for maintenance intervals once a day	--

1. When in extensive use in dusty environment. Replace the filter if it shows signs of cracks, damage or clogging.

2. Rinse the system to remove dirt. Repeat the procedure in the opposite flow direction.

**Notice!**

Check the antifreeze at temperatures below 4 °C (39 °F).

Only once after the first 50 operating hours (Wacker Neuson service center)

Replace the hydraulic oil filter insert	--
Replace the gearbox oil in the traveling drive, axles and transfer gearbox	--
Check V-belt condition and tension	--
Check the threaded fittings for tightness	--
Check labels and Operator's Manual for completeness and condition	--
Check the pressure of the primary pressure limiting valves of the operating hydraulics	--
All steps for maintenance once a day and once a week	

Every 500 operating hours (Wacker Neuson service center)

Change the engine oil	--
Replace the engine oil filter	--
Replacing the fuel filter	--
Replace the water separator (prefilter element)	--
Replace the hydraulic oil filter insert	--
Replace the V-belt	--
Drain the condensation water from the hydraulic oil reservoir	--
Check the gearbox oil in the traveling drive, axles and transfer gearbox	--
Clean the dust valve	--
Drain the condensation water (fuel tank)	--
Check bearing play of tread rollers, track carrier rollers, front idlers	--
Check the electric cables and connectors (cable and grounding connections, etc.)	--
Check the threaded fittings for tightness	--
Reset the maintenance meter	--
All steps for maintenance once a day and once a week	--
Option	
Check Powertilt for axial play (must not be over 0.38 mm/0.015 in)	--

Every 1000 operating hours or once a year (Wacker Neuson service center)

Change the hydraulic oil	--
Replace the breather filter of the hydraulic oil reservoir	--
Replace the gearbox oil in the traveling drive, axles and transfer gearbox	--
¹ Replace the air filter element	--
Replacing the crankcase breather filter	--
Check valve clearance, adjust if necessary ²	--
Check the pressure of the primary pressure limiting valves of the operating hydraulics	--
Check the antifreeze	--
Check the battery condition (charge condition, terminals, etc.)	--
All steps for maintenance once a day and once a week (and all steps for maintenance at 500 operating hours)	--
Option	
Wear of load hook and joint rod (check at least once a year)	--

1. Air filter replacement according to the dirt indicator, every 1000 o/h or once a year at the latest. (Replace after 50 o/h when in extensive use in environments with acidic air, such as acid production facilities, steel and aluminum mills, chemical plants and other nonferrous-metal plants, independently of the dirt indicator)
2. If equipped with a Perkins engine: have performed by a Perkins service center.

Every 2000 operating hours or every 2 years (Wacker Neuson service center)

Check the bladder type accumulator	--
All steps for maintenance once a day and once a week (and all steps for maintenance at 500 and 1000 operating hours)	--

Every 3000 operating hours or every 3 years (Wacker Neuson service center)

Check the injection nozzles and clean them if necessary	--
Clean the diesel particulate filter, replacement program	--
Check the exhaust gas recirculation and clean it if necessary	--
Draining coolant	
Replace the fuel-burner glow plug	
Check the water pump (visual check)	--
Replace the coolant thermostat	--
Replace the radiator cap	--
All steps for maintenance once a day and once a week (and all steps for maintenance at 500 and 1000 operating hours)	--


Notice!

Maintenance with the note **Wacker Neuson service center** must be performed only 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.

B.3 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 be performed only 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 injury caused by failure to observe the specific information and descriptions

Important safety instructions on maintenance

- Observe all safety instructions in this service manual.
- Follow the instructions given in chapter **Safety, safety instructions on maintenance and qualification of the operating and maintenance personnel** in the Operator's Manual.
- Follow the maintenance and safety instructions given in the Operator's Manuals of the attachments.
- Wear protective equipment (for example hard hat, safety glasses, protective gloves, safety boots).
- 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).

B.4 Fuel system



Danger!

Burn and poisoning hazard when handling fuel!

Can cause serious injury or death.

- Before refueling, stop the engine and remove the starting key!
- Never perform work on the fuel system near open flames or sparks
- Do not refuel in closed rooms
- No smoking, no fire!
- Do not smoke when working on the fuel system or when refueling!
- Wipe away fuel spills immediately!
- Keep the machine clean to reduce the fire hazard!

Refueling

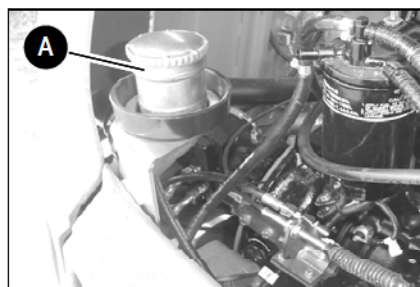


Fig. 1: Fuel filler inlet

Filler inlet **A** for the fuel tank is located behind the cabin, on the right in travel direction.



Environment!

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



Notice!

Do not run the fuel tank completely dry. Otherwise, air is drawn into the fuel system. This requires bleeding the fuel system – [see Bleeding the fuel system](#) on page B-18.



Notice!

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

Stationary fuel pumps

General

Only refuel from stationary fuel pumps. Fuel from barrels or cans is usually dirty. Even the smallest particles of dirt can cause

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

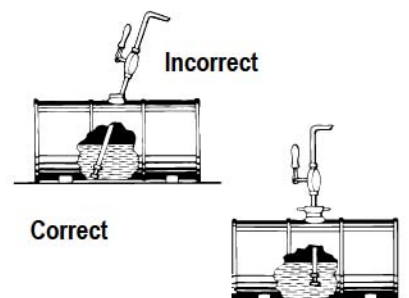


Fig. 2: Refueling from a barrel

Refueling from barrels

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

- ☞ Barrels must neither be rolled nor tilted before refueling
- ☞ Protect the suction pipe opening of the barrel pump with a fine-mesh screen
- ☞ Immerse it down to a max. 15 cm above the bottom of the barrel
- ☞ Only fill the tank using refueling aids (funnels or filler pipes) with integral microfilter
- ☞ Keep all refueling containers clean at all times

Draining fuel

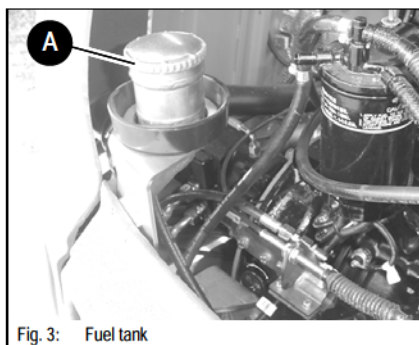


Fig. 3: Fuel tank



Environment!

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

Filler inlet **A** for the fuel tank is located in the valve compartment, on the left in travel direction.

Proceed as follows:

- ☞ Open filler inlet **A**
- ☞ Pump out the fuel with a suitable pump
- ➡ Collect the fuel in a suitable container

Diesel fuel specification

Use only high-grade fuels. In countries without regulations on exhaust gas emissions, diesel fuel with a sulfur content of up to 4000 ppm (0.4 %) can be used.

Grade	Use
• 2-D ASTM D975 – 94 ¹	USA
• 1-D ASTM D975 – 94	
• EN 590 : 96 ²	EU
• ISO 8217 DMX	International
• BS 2869 – A1	England
• BS 2869 – A2 ¹	

1. Sulfur content up to 15 ppm (0.0015 %)

2. Sulfur content up to 10 ppm (0.001 %)

- Sulfur content below 0.05 %
- Cetane number over 45



Notice!

Using biodegradable diesel fuel is prohibited.

Bleeding the fuel system

Bleed the fuel system in the following cases:

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

☞ *Bleed the fuel system as follows:*

- Fill the fuel tank
- Turn the starting key to the first position
- Wait about 5 minutes while the fuel system bleeds itself automatically
- Start the engine

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

- Stop the engine
- Bleed the fuel system again as described above
- Have this checked by authorized personnel if necessary

Water separator

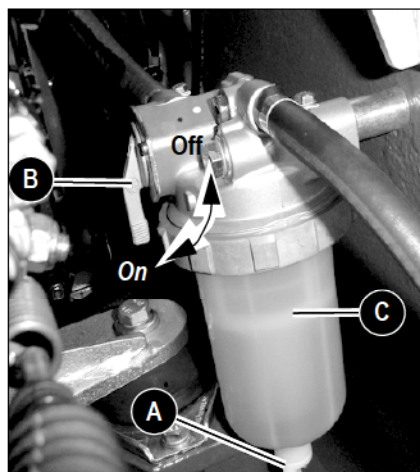


Fig. 4: Water separator

Interrupt fuel supply as follows:

- ☞ *Stop the engine.*
- ☞ *Turn ball-type cock B to the OFF mark*
 - ➔ Fuel supply is interrupted
- ☞ *Turn ball-type cock B to the ON mark*
 - ➔ Fuel supply is open again

Check the water separator as follows:

- If the red indicator ring has risen to position C:
 - ☞ *Stop the engine.*
 - ☞ *Interrupt fuel supply.*
 - ☞ *Unscrew thread A*
 - ➔ The fuel/water mixture drains
 - ➔ Wait until the indicator ring returns to the bottom of the water separator
 - ☞ *Screw thread A back on again*



Environment!

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

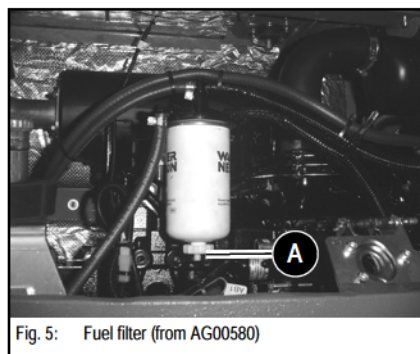


Fig. 5: Fuel filter (from AG00580)

2503 from AG00790:

3503 from AG00593:

The fuel/water mixture must be drained directly on the fuel filter in addition.

Perform this at regular intervals according to the maintenance plan.

Proceed as follows:

- ☞ *Stop the engine.*
- ☞ *Place a suitable container underneath the filter.*
- ☞ *Unscrew screw A.*
 - ➔ The fuel/water mixture drains from the filter housing.
- ☞ *Drain about 10 ml (0.3 US fl. oz.) of the fuel/water mixture.*


Environment!

Collect the fuel/water mixture as it drains with a suitable container and dispose of it in an environmentally friendly manner.

B.5 Engine lubrication system


Caution!

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

Engine damage and loss of output!

- Perform oil changes according to the maintenance plan.
 - see *Maintenance plan (Tier III)* on page B-5
 - or – see *Maintenance plan (Tier IV)* on page B-10 (Tier IV)

Checking the oil level


Notice!

Check the oil level once a day.

We recommend checking it before starting the engine. After stopping a warm engine, wait at least 5 minutes before checking.

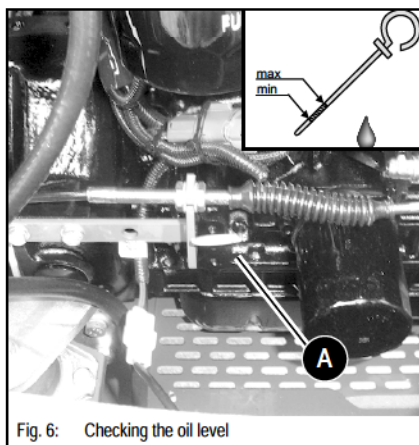


Fig. 6: Checking the oil level

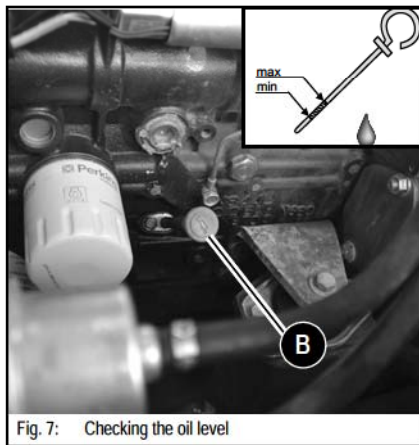


Fig. 7: Checking the oil level

➤ Proceed as follows:

➤ Park the machine on level ground

➤ Stop the engine!

➤ Raise the control lever base

➤ Let the engine cool down

➤ Open the engine cover

➤ Clean the area around the oil dipstick with a lint-free cloth

➤ Oil dipstick A (Tier III) or B (Tier IV)

➤ Pull it out

➤ Wipe it with a lint-free cloth

➤ Push it back in as far as possible

➤ Withdraw it and read off the oil level

➤ However if necessary, add oil at the latest when the oil reaches the MIN mark on the oil dipstick A or B

Adding engine oil

**Notice!**

Too much or incorrect engine oil can cause engine damage! For this reason:

- Do not add engine oil above the MAX mark of oil dipstick 8/A
- Use only the specified engine oil

**Environment!**

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

**Notice!**

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

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

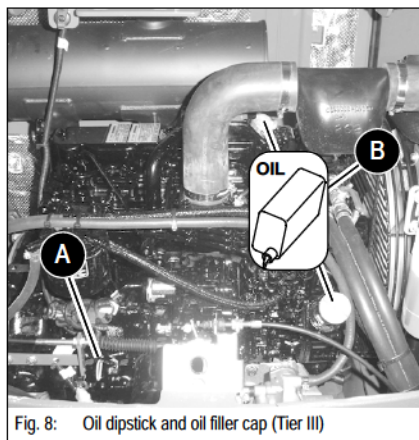


Fig. 8: Oil dipstick and oil filler cap (Tier III)

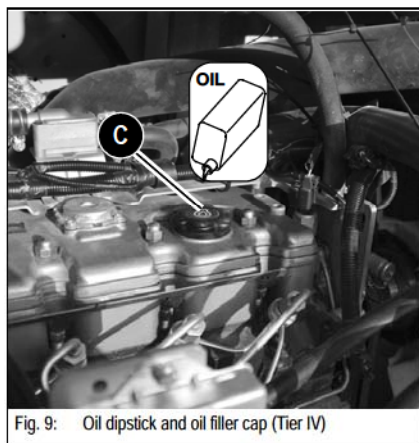


Fig. 9: Oil dipstick and oil filler cap (Tier IV)

➤ Proceed as follows:

- Clean the area around oil filler cap **B** (Tier III) or **C** (Tier IV) with a lint-free cloth
- Open filler cap **B** (Tier III) or **C** (Tier IV)
- Raise oil dipstick **A** slightly to allow any trapped air to escape
- Add engine oil
- Wait about 3 minutes until all the oil has run into the oil sump
- Check the oil level
 - see Checking the oil level on page B-19
- Add oil if necessary and check the oil level again
- Close filler cap **B** (Tier III) or **C** (Tier IV)
- Push oil dipstick **A** back in as far as possible
- Completely remove all oil spills from the engine

B.6 Engine and hydraulics cooling system

The oil/water radiator is located in the engine compartment, on the right side of the engine. It cools the diesel engine, and the hydraulic oil of the drive and operating hydraulics. The coolant reservoir is also located in the engine compartment, in front of the oil cooler.

Specific safety instructions

- Dirt on the radiator fins reduces the radiator's heat dissipation capacity! To avoid this:
 - ☞ Clean the outside of the radiator at regular intervals. Use oil-free compressed air (2 bar/29 psi max.) to clean. Maintain a certain distance from the radiator to avoid damage to the radiator fins. Refer to the maintenance plans in the appendix for the cleaning intervals
 - ☞ In dusty or dirty work conditions, clean more frequently than indicated in the maintenance plans
- An insufficient coolant level reduces the heat dissipation capacity as well and can cause engine damage! Therefore:
 - ☞ Check the coolant level at regular intervals. Refer to the maintenance plans in the appendix for the intervals
 - ☞ If coolant must be added frequently, check the cooling system for leaks and/or contact your dealer!
 - ☞ Never add cold water/coolant if the engine is warm!
 - ☞ After filling the coolant reservoir, make a test run with the engine and check the coolant level again after stopping the engine
- The use of the wrong coolant can destroy the engine and the radiator. Therefore:
 - ☞ Add enough antifreeze compound to the coolant – but never more than 50 %. If possible use brand-name antifreeze agents since they already contain anticorrosion agents
 - ☞ Observe the coolant compound table
 - *see chapter Coolant compound table* on page A-8
 - ☞ Do not use radiator cleaning compounds if an antifreeze compound has been added to the coolant – otherwise this causes sludge to form that can damage the engine
- Once you have filled the coolant reservoir:
 - ☞ Test run the engine
 - ☞ Stop the engine
 - ☞ Let the engine cool down
 - ☞ Check the coolant level again



Environment!

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

B.7 Checking the coolant level/adding coolant



Caution!

Burn hazard due to hot fluid.
Can cause serious injury or death.

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



Caution!

Injury hazard when handling flammable and toxic fluids!
Can cause serious injury or death.

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

Checking the coolant level

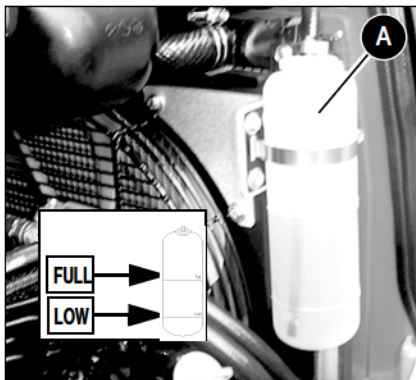


Fig. 10: Coolant reservoir

➤ Proceed as follows:

➤ Park the machine on level ground

➤ Stop the engine!

➤ Raise the control lever base

➤ Remove the key and carry it with you

➤ Let the engine and the coolant cool down

➤ Open the engine cover

➤ Tier III: Check the coolant level on the transparent coolant reservoir **A** and on the radiator

➤ If the coolant level is below the **LOW** seam or if there is no coolant at the radiator's filler inlet:

➔ Add coolant

➤ Tier IV: check the coolant level on sight glass **B**

➤ If the coolant level is below the **FULL** mark:

➔ Add coolant

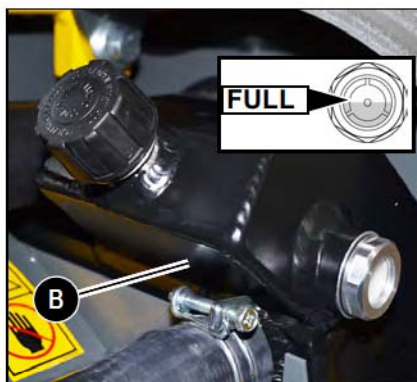


Fig. 11: Radiator


Notice!

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


Notice!

Do not mix the coolant with other coolants.

- Use only the coolant prescribed by Wacker Neuson
– see [chapter Fluids and lubricants](#) on page B-2.

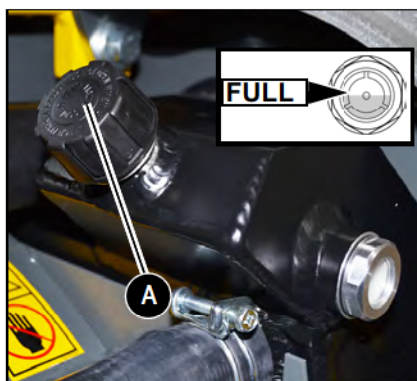
Adding coolant


Fig. 12: Radiator

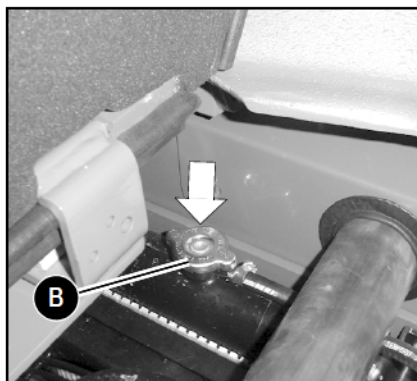


Fig. 13: Radiator

After the engine has cooled down:

- Release overpressure in the radiator
- Carefully open filler cap A (Tier IV) or B (Tier III) to the first notch and fully release the pressure
- Open filler cap A or B
- Tier IV: add coolant up to the middle of the sight glass
- Tier III: Add coolant up to the lower edge of the filler inlet (radiator)
- Close filler cap A or B
- Start the engine and let it warm up for about 5 – 10 minutes.
- Stop the engine
- Remove the key and carry it with you
- Let the engine cool down
- Check the coolant level again
 - ➡ The coolant level must be between the **Low and Full** reservoir seams
- If necessary, add coolant and repeat the procedure until the coolant level remains constant


Notice!

Check the antifreeze every year before the cold season sets in

Draining coolant



Caution!

Burn hazard due to hot fluid.
Can cause serious injury or death.

- Always use appropriate protective equipment, protective gloves, for example!
- No smoking, no fire!

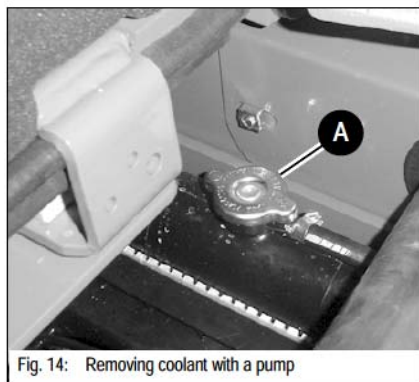


Fig. 14: Removing coolant with a pump

Proceed as follows:

- ☞ Stop the engine
- ☞ Let the coolant cool down
- ☞ Open filler inlet A
- ☞ Pump out the coolant with a suitable pump
 - ➡ Collect the coolant in a suitable container

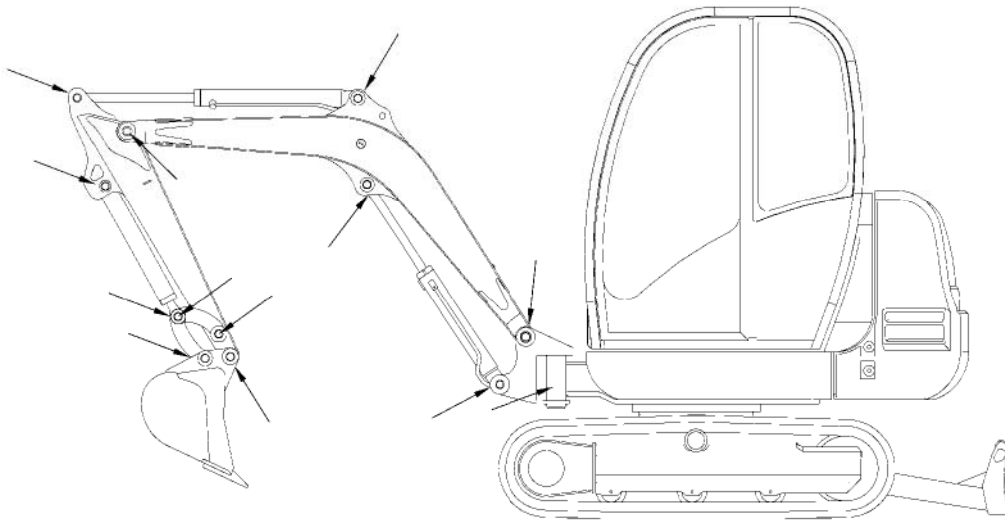


Environment!

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

B.8 Overview of lubrication points

Lubricate the lubrication points with the green caps once a week.
Lubricate the lubrication points with the blue caps daily.



Danger!

Crushing hazard! Do not tilt or rotate the upper carriage during lubrication.

Can cause serious injury or death.

- Do not rotate the upper carriage.
- Do not tilt the upper carriage if the machine is equipped with the VDS option.



Notice!

Lubricate only over a pit.

Lubrication points on slewing cylinder/ball bearing race of live ring

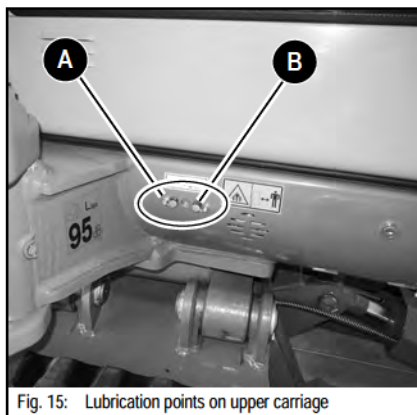


Fig. 15: Lubrication points on upper carriage

A (swiveling cylinder) lubricate once a day.

B (ball bearing race of live ring) lubricate every 50 o/h or once a week.

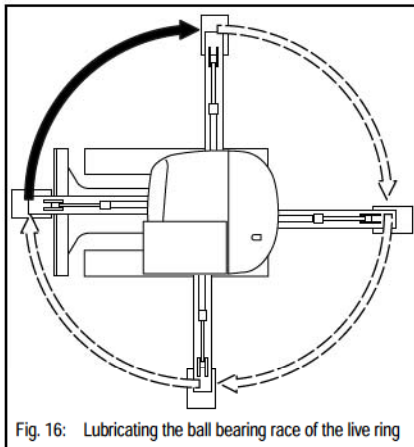


Fig. 16: Lubricating the ball bearing race of the live ring

Lubricating the ball bearing race of the live ring

- Drive the machine over a pit.
- Lower the stabilizer blade to the ground.
- Lower and support the boom to prevent it from lowering into the pit.
- Stop the engine, remove the starting key and carry it with you.
- Apply grease to lubrication point B with one stroke of the grease gun.
- Start the engine, raise the boom and the stabilizer blade.
- Rotate the upper carriage by 90°.
- Repeat steps 2 – 7 three times until the upper carriage is back in its initial position.
- Rotate the upper carriage several times by 360°.

Lubrication points on the stabilizer blade

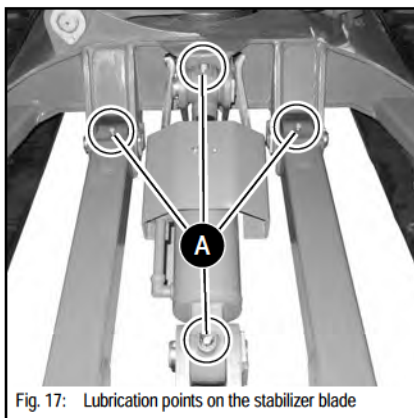


Fig. 17: Lubrication points on the stabilizer blade

- Apply grease to lubrication points A every 50 o/h or once a week.

Additional lubrication points on slewing stabilizer blade (option 3503)

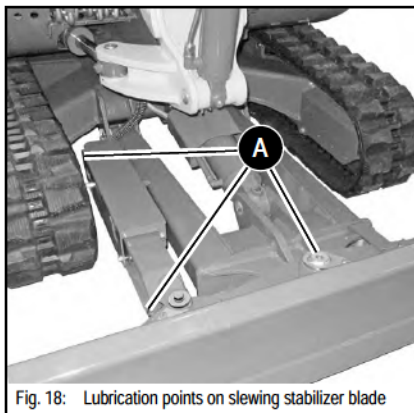


Fig. 18: Lubrication points on slewing stabilizer blade

- Apply grease to lubrication points A every 50 o/h or once a week.

Lubricating the teeth of the live ring



Danger!

Do not rotate the upper carriage during lubrication!

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



Caution!

Lubricate only over a pit.

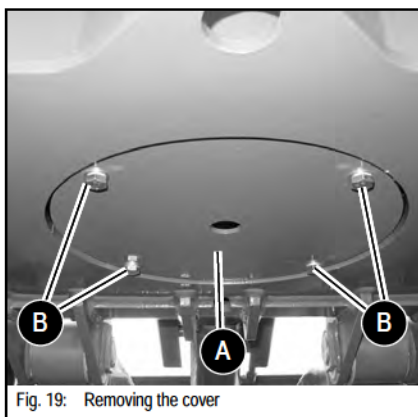


Fig. 19: Removing the cover

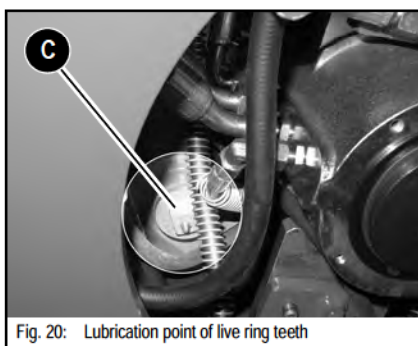


Fig. 20: Lubrication point of live ring teeth

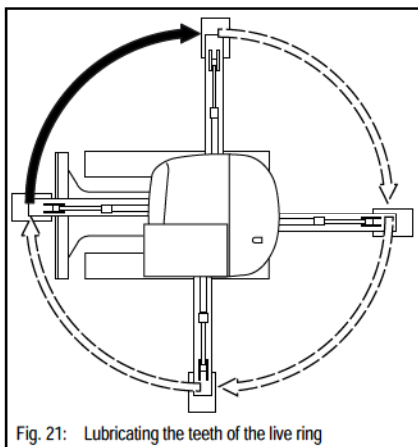
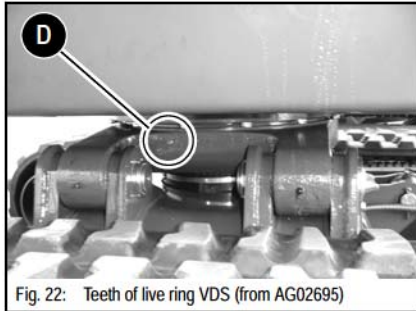


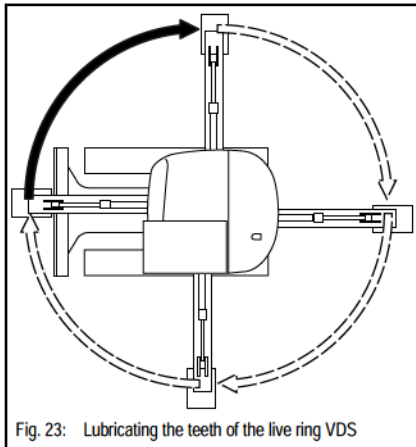
Fig. 21: Lubricating the teeth of the live ring

- Drive the machine over a pit.
- Lower the stabilizer blade to the ground.
- Lower and support the boom to prevent it from lowering into the pit.
- Stop the engine, remove the starting key and carry it with you.
- The lubrication point is located on the lower side of the travel gear.
- Remove cover A by means of screws B on the lower side.
- Apply grease to lubrication point C with five strokes of the grease gun.
- Start the engine, raise the boom and the stabilizer blade.
- Rotate the upper carriage by 90°.
- Repeat steps 2 – 7 three times until the upper carriage is back in its initial position.
- Rotate the upper carriage several times by 360°.
- Install cover A.

Lubricating the teeth of the live ring VDS

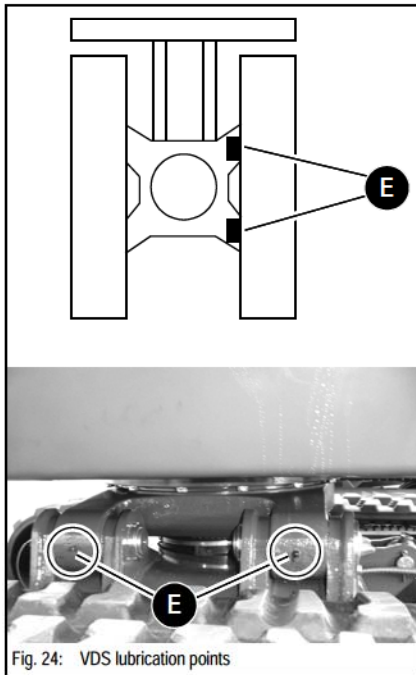


☞ The lubrication point is located at the front of the VDS console.



- ☞ Drive the machine over a pit.
- ☞ Lower the stabilizer blade to the ground.
- ☞ Lower and support the boom to prevent it from lowering into the pit.
- ☞ Stop the engine, remove the starting key and carry it with you.
- ☞ Apply grease to lubrication point D with five strokes of the grease gun.
- ☞ Start the engine, raise the boom and the stabilizer blade.
- ☞ Rotate the upper carriage by 90°.
- ☞ Repeat steps 2 – 7 three times until the upper carriage is back in its initial position.
- ☞ Rotate the upper carriage several times by 360°.

VDS lubrication points (option)



- ☞ Apply grease to lubrication points E once a week.

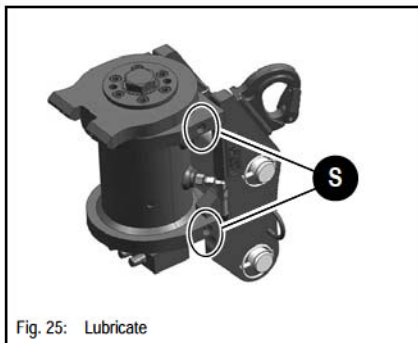
Powertilt (option 3503)


Fig. 25: Lubricate

Perform maintenance on the Powertilt unit once a day with the other maintenance for the machine.

Perform visual checks for possible malfunctions, damage or cracks.

Remove all dirt on and around moving parts.

Apply grease via grease zerks **S**.

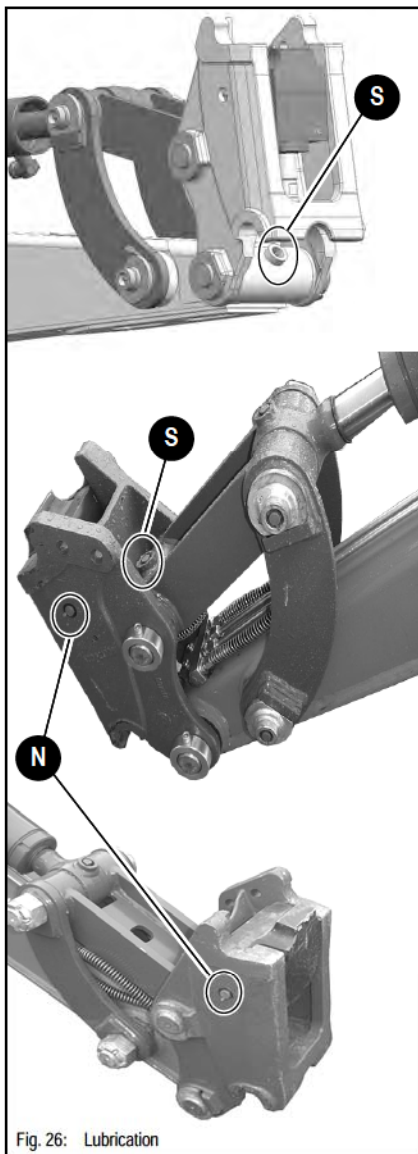
Lubrication points of hydraulic quickhitch (option)


Fig. 26: Lubrication


Notice!

Before picking up an attachment, the operator must ensure that it can be hitched correctly by removing all dirt on either claw of the quickhitch.

Perform maintenance on the quickhitch once a day with the other maintenance for the machine.

Perform visual checks for possible malfunctions, damage or cracks.

Remove all dirt on and around moving parts.

The claws must be clean and slightly greased.

Apply grease to the pins via grease zerks **S**.

Apply grease to the friction surfaces of the lock mechanism via 2 further grease zerks **N** on either side of the quickhitch (see [Fig. 26](#)).

Before starting work, check the acoustic signal. You must be able to hear the acoustic signal as you actuate the hydraulic quickhitch.

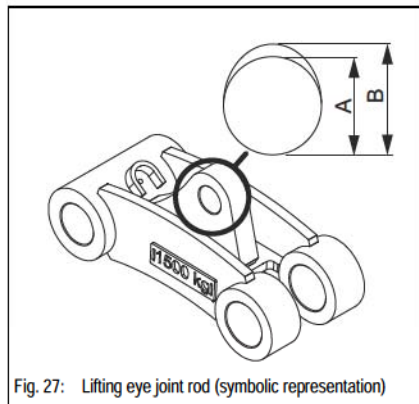
Maintenance of joint rod (lifting eye) and load hook


Fig. 27: Lifting eye joint rod (symbolic representation)

Wear of joint rod (lifting eye)

Immediately replace lifting eyes with inadmissible wear (for example if they are beyond the max. tolerance), damage, deformations, surface cracks and corrosion.

The nominal size must not be worn more than 5 % (max. tolerance). Measurement can be performed with the accuracy of a slide gage.

Welding is prohibited!

Joint rod (lifting eye)	Nominal size A	Max. tolerance B
2503	32 mm (1 1/4 in)	33.6 mm (1 3/8 in)
3503 up to WNCE0307JPAL00239	32 mm (1 1/4 in)	33.6 mm (1 3/8 in)
3503 from WNCE0307JPAL00240	30 mm (1 1/8 in)	31.5 mm (1 1/4 in)

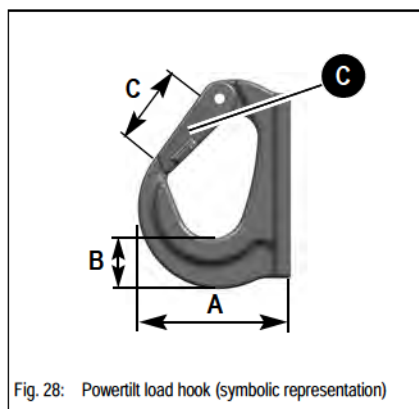


Fig. 28: Powertilt load hook (symbolic representation)

Load hook wear

Have load hooks (Powertilt, Powertilt for Easylock) with inadmissible wear (beyond max. tolerance, for example), damage, deformations, surface cracks and corrosion immediately replaced by a Wacker Neuson service center.

The nominal size must not be worn more than 10 % (max. tolerance). Measurement can be performed with the accuracy of a slide gage.

Welding is prohibited!

If the spring mechanism of snap link C does not automatically close any more, stop working with the load hook and have the error repaired by a Wacker Neuson service center.

Load hook	Nominal size A	Max. tolerance A	Nominal size B	Max. tolerance B	Nominal size C	Max. tolerance C
2503/3503	105 mm (4 1/8 in)	115.5 mm (4 1/2 in)	32 mm (1 1/4 in)	28.8 mm (1 1/8 in)	30 mm (1 1/8 in)	33 mm (1 1/4 in)

B.9 Tracks

Track wear can vary according to work and ground conditions.

☞ We recommend checking track wear and tension once a day.

Checking track tension



Caution!

Crushing hazard during work under the machine!

Can cause serious injury or death.

- Do not allow anyone to stay in the danger zone!
- Support the machine so as to allow the tracks to sag freely.

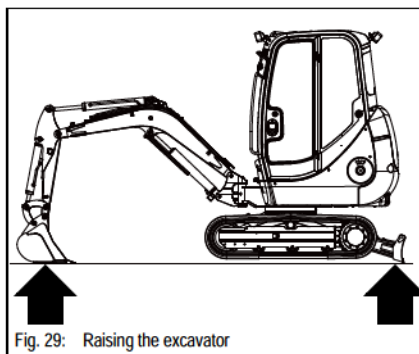


Fig. 29: Raising the excavator

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

☞ Stop and park the machine. Stop the engine.

☞ Raise the machine evenly and horizontally by means of the boom and stabilizer blade.

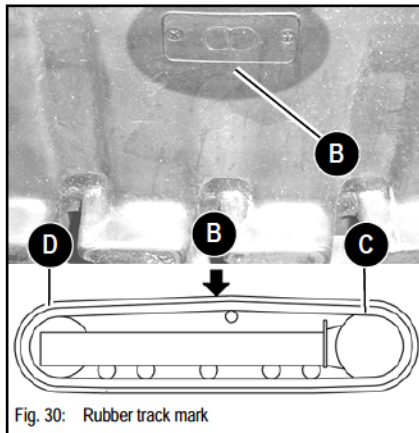


Fig. 30: Rubber track mark

Rubber track

☞ Position the machine so that mark B of the rubber track is in the middle between the drive pinion C and the track tension roller D.

☞ Stop the engine.

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

☞ Raise the control lever base.

☞ Remove the starting key and carry it with you.

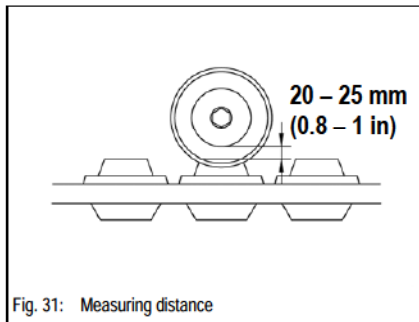


Fig. 31: Measuring distance

☞ Adjust the correct track tension if the play between the track roller and the track is not 20 – 25 mm (0.8 - 1 in).

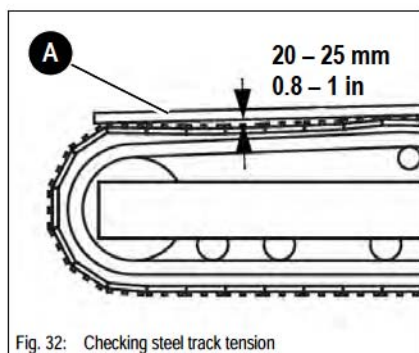


Fig. 32: Checking steel track tension

Steel track (option)

- Place a measuring rod **A** across the highest points of the track.
- Adjust the correct track tension if the play between the track roller and the track is not 20 – 25 mm (0.8 - 1 in).

Setting the tracks**Danger!****Risk of lubricant escaping under high pressure!**

Can cause serious injury or death.

- Do not loosen and unscrew the lubricating valve by more than one turn.
- Only the lubricating valve may be loosened.
- Keep your face away from the lubricating valve connection.
- ➔ Contact a Wacker Neuson service center if this does not reduce track tension.

**Notice!**

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

- Tighten the tracks only up to the prescribed measuring distance

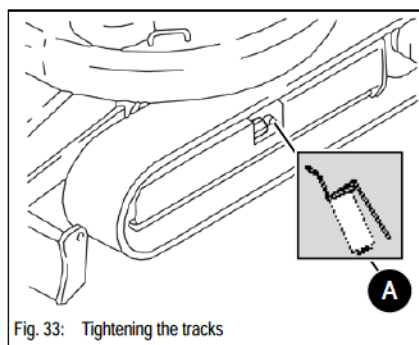
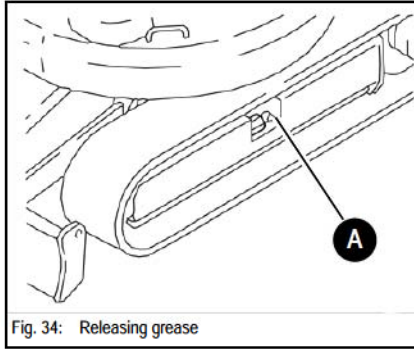


Fig. 33: Tightening the tracks

Tightening the tracks

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



Reducing tension

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



Environment!

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

B.10 Electrical system

Specific safety instructions



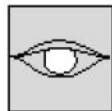
- The battery contains sulfuric acid! This acid must not be allowed to come into contact with the skin, the eyes, clothing or the machine
Therefore when recharging or working near the battery:
 - ☞ Always wear safety glasses and protective clothing with long sleeves
- If acid is spilled:
 - ☞ Thoroughly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

Servicing and maintenance at regular intervals



Before performing machine travel

- Check every time before performing machine travel:
 - ☞ *Is the light system OK?*
 - ☞ *Is the signaling and warning system OK?*



Every week

- Check once a week:
 - ☞ *Electric fuses*
– [see chapter A.2 Electrical system on page A-9](#)
 - ☞ *Cable and grounding connections*
 - ☞ *Battery charge condition – [see Battery on page B-35](#)*
 - ☞ *Condition of battery terminals*

Instructions concerning specific components

Cables, bulbs and fuses

Always observe the following instructions:

- Malfunctioning components of the electrical system must always be replaced by a Wacker Neuson service center. Bulbs and fuses may be changed by unqualified persons
- When performing maintenance on the electrical system, pay particular attention to ensuring good contact in leads and fuses
- Blown fuses indicate overloading or short circuits. The electrical system must therefore be checked before installing the new fuse
- Only use fuses with the specified load capacity (amperage)
– [see chapter A.2 Electrical system on page A-9](#)

Alternator

Always observe the following instructions:

- Only test run the engine with the battery connected
- When connecting the battery, ensure that the poles (+/-) are not inverted
- Always disconnect the battery before performing welding work or connecting a quick battery charger
- Replace malfunctioning charge indicator lights immediately

Battery**Danger!****Caustic injury hazard!**

Can cause serious injury or death.

- Always wear safety glasses and protective clothing with long sleeves

If acid is spilled:

- Thoroughly rinse all affected surfaces immediately with plenty of water
- Thoroughly wash any part of the body touched by the acid immediately with plenty of water and seek medical attention at once!

**Danger!****Explosion hazard when handling batteries!**

Can cause serious injury or death.

- Avoid open lights and sparks near the battery and do not smoke!
- Do not attempt to jump-start the machine if the battery is frozen or if the acid level is low. The battery can burst or explode!
 - Replace the battery immediately
- Disconnect the negative terminal (-) from the battery before starting repair work on the electrical system.

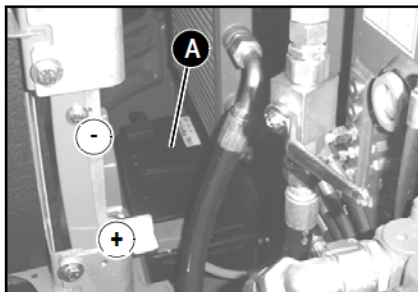


Fig. 35: Battery

Battery **A** is located under the cabin, in front of the fuel tank. The battery is "maintenance-free". However have the battery checked at regular intervals to ensure that the electrolyte level is between the MIN and MAX marks.

Checking the battery requires it to be removed and must be performed by a Wacker Neuson service center.

Always follow the specific battery safety instructions!

**Notice!**

Do not disconnect the battery while the engine is running!

3. HYDRAULIC SYSTEM

3.1 General Prerequisites:

- Before each pressure test the device must be run up! - **Hydraulic oil temperature at least 40°C.**
- For **hydraulic settings** please refer to chapter **Technical Data**.
- **Primary pressure limiting valves** must be adjusted at **max. engine speed** (see chapter Technical Data).

3.2 Pressure Test of Variable Displacement Pump P1

Functions: **bucket, boom, driving left**

- a) Apply manometer at **measuring port MP 1**.
- b) Move **bucket cylinder** to stop (bottom and rod side).
- c) Check pressure and/or adjust it at pressure reducing valve PRV 1 at the **main valve block**.
- d) Check the functions boom, driving left by following items a - c.

3.3 Pressure Test of Variable Displacement Pump 2

Functions: **dipper stick, driving right, auxiliary hydraulics**

- a) Apply manometer at **measuring port MP 2**.
- b) Move **dipper stick** to stop (bottom and rod side).
- c) Check pressure and/or adjust it at pressure reducing valve PRV 2 at the **main valve block**.
- d) Check the functions driving right and auxiliary hydraulics by following items a - c.

3.4 Pressure Test of Gear Pump P3

Functions: **swivelling, dozer blade, auxiliary hydraulics / boom offset**

- a) Apply manometer at **measuring port MP 3**.
- b) Move **dozer blade** to stop (bottom and rod side).
- c) Check pressure and/or adjust it at pressure reducing valve PRV 3 at the **main valve block**.
- d) Check the function auxiliary hydraulics by following items a - c.
- e) The swivelling function is supplied by pump 3, though the operating pressure is limited by the secondary pressure limiting valve at the swivel motor! - See secondary pressures of swivel motor.

3.5 Pilot Pressure Test:

Functions: **hydraulic pilot control**

- a) Apply manometer at **measuring port MP 4**.
- b) Actuate joystick.
- c) Check pressure and/or adjust it at the pressure reducing valve at the control oil unit.



Fig.: **Measuring ports** at the control oil unit

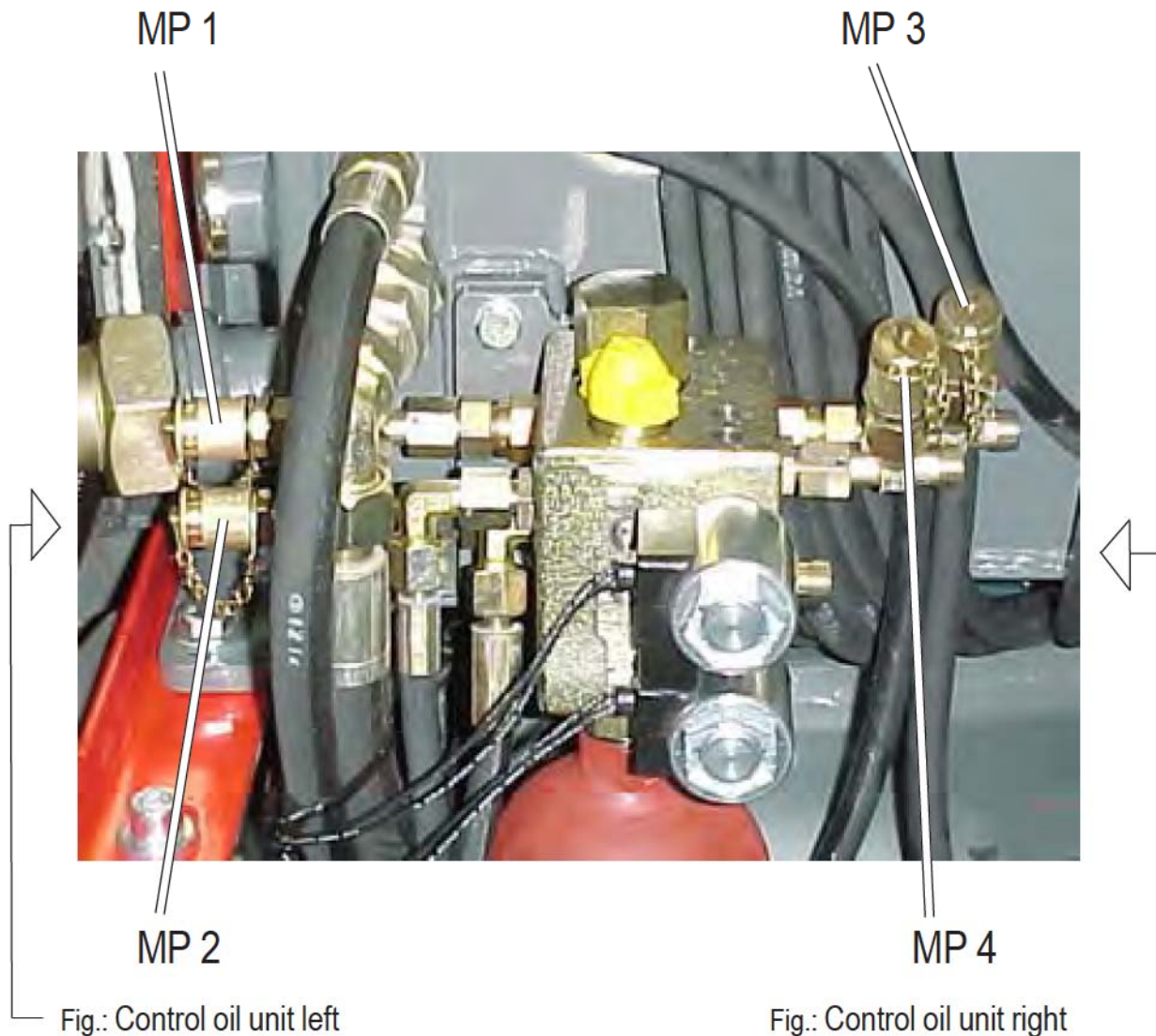


Fig.: Control oil unit left

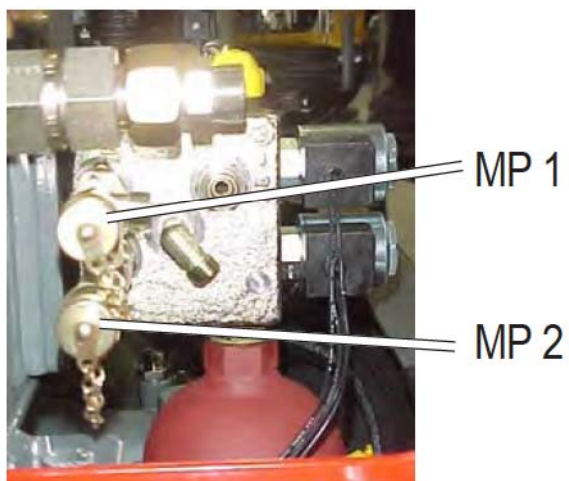
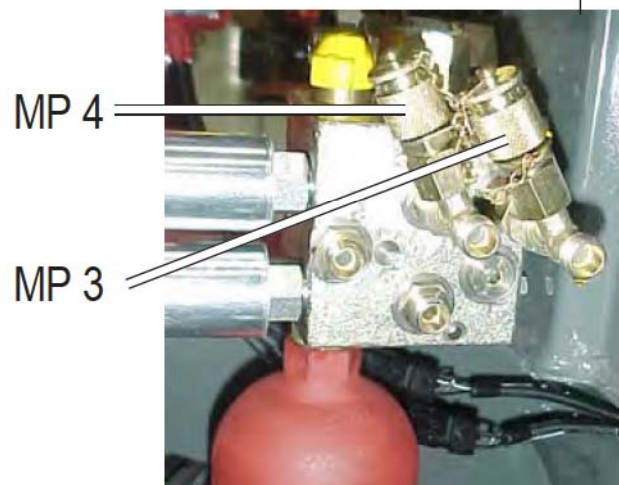
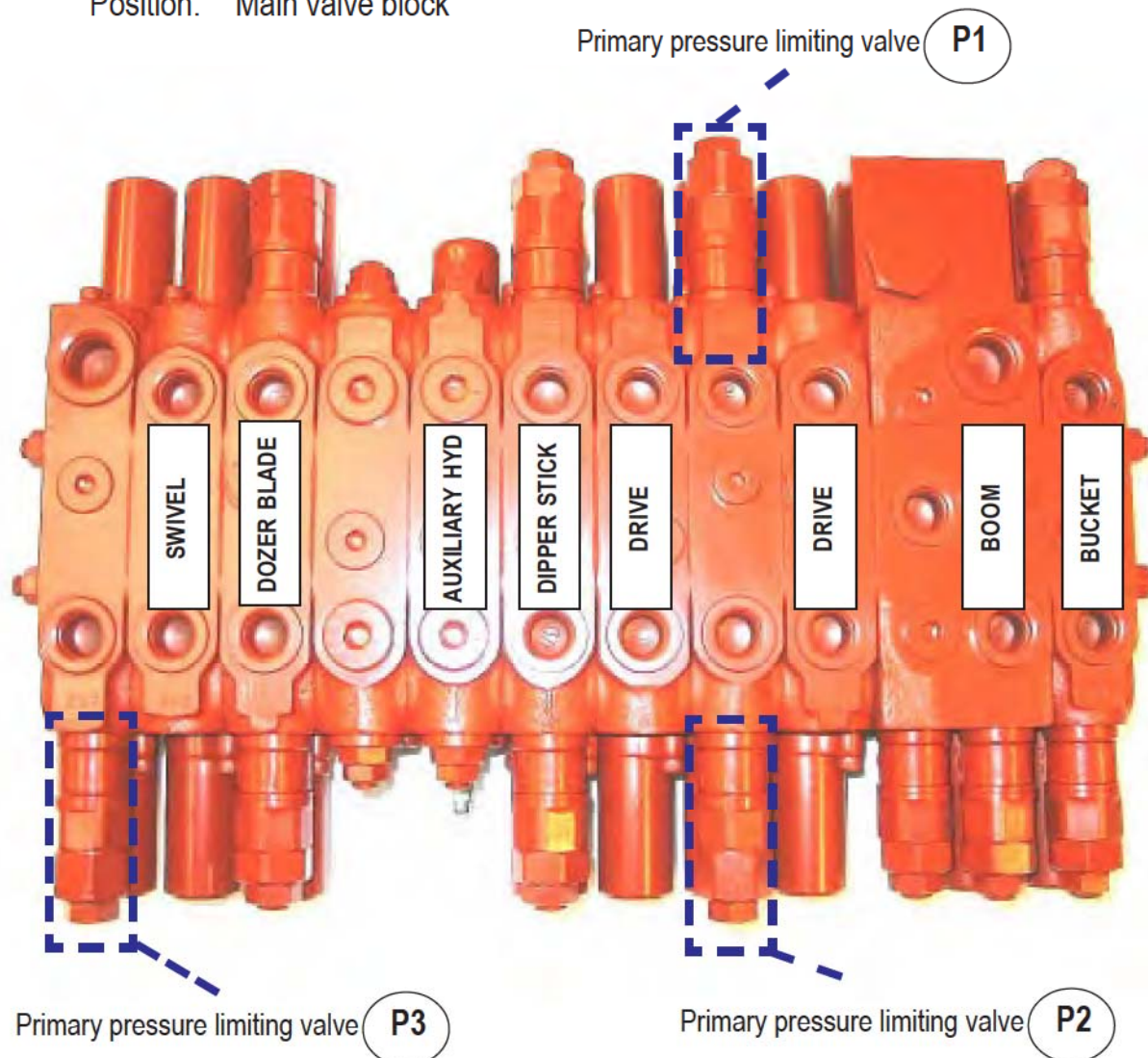


Fig.: Control oil unit right

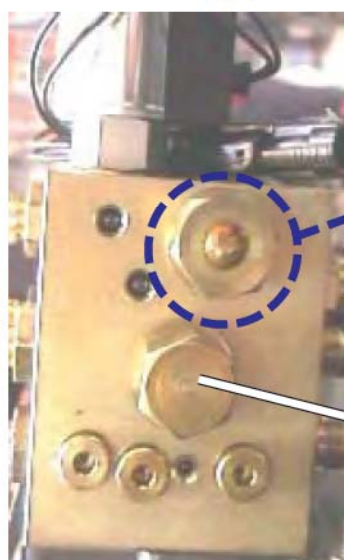


Pict.: **Primary - Pressure limiting valves (AP) -**

Position: Main valve block



Pict.: Pilot oil supply unit 1408615



Pict.: **Pressure checklist** - example 2503 Fabr.No.: AB00502 (settings not binding)

PLV... Pressure limiting valve

PRV... Pressure reducing valve

(1)... Notice: **pressure settings correspond with the Fabr.Nr. of your excavator !**

Always compare with the pressure setting in chapter „Technical data“ !

(2)... Notice: Setting only correct without secondary pressure limiting valves !

(3)... FunctionSwivel: see chapter „Technical data“ and „Maintenance“









(4)... See chapt. „Technical data“: different settings

2503 NEUSON		Fabr.No: AB 00502 Work hrs/Dat. 50		Checked by: Huemer Andreas		PRESSURE CHECKLIST Neuson Excavators		N° Site		
Function	Motion	Symbol	Press.limit. valve	Measuring point	Settings (1)	Checked	OK?			
PUMP 1										
Boom	UP		Primary pressure limiting valve PPLV 1 (Main valve block)	Measuring point MP 1 (Main valve block)	Setting	240 bar	+/- 3	>	Notice	
	DOWN				Fall:	24 bar		>		
Bucket	OUT				Setting	240 bar	+/- 3	>		
	IN				Fall	24 bar		>		
Drive left			Setting	240 bar	+/- 3	>				
			Fall	24 bar		>				
			Setting	240 bar	+/- 3	>				
			Fall	24 bar		>				
PUMP 2										
Dipper stick	OUT		Primary pressure limiting valve PPLV 2 (Main valve block)	Measuring point MP 2 (Main valve block)	Setting	240 bar	+/- 3	>		Notice
	IN				Fall	24 bar		>		
Drive right	FORWARD				Setting	240 bar	+/- 3	>		
	BACKWARD				Fall	24 bar		>		
Auxiliary hydraulics	A		Sett. (2):	240 bar	+/- 3	>				
	B		Fall (2):	24 bar		>				




Bild: **Druckprüfprotokoll** - Beispiel 2503 Fabr.Nr.: AB00502 (Einstellwerte unverbindlich)

Neuson 2503	Fabr.No.: AB 00502	Date: 02.January 2003	Checked by: Andreas Huemer	PRESSURE CHECKLIST
Work hrs.: 50				
PUMP 3				X

Dozer blade	UP		Primary pressure limiting valve PPLV 3 (Main valve block)	<div>Measuring point MP 3 (Main valve block)</div> <div>/</div> <div>(Swivel motor) (3)</div> <div></div>	Setting	210 bar	+/- 3	>		
	DOWN				Fall	20 bar		>		
Auxiliary hydraulics	A (2)		Setting		210 bar	+/- 3	>			
	B (2)		Fall (2):		20 bar		>			
	Boom offset	LEFT			Setting	210 bar	+/- 3	>		
		RIGHT			Fall	20 bar		>		
Swivel motor		LEFT			Setting	210 bar	+/- 3	>		
		RIGHT			Fall	20 bar		>		
		LEFT			Setting	200 bar	+/- 5	>		
		RIGHT			Fall	N bar		>		
		LEFT		Setting	200 bar	+/- 5	>			
		RIGHT		Fall	N bar		>			

Notice

PILOT PRESSURE SYSTEM

Joystick	All		Press.Reduc. valve PRV 5 Pilot oil supply unit	Measuring point MP 4 Pilot oil supply unit	Setting	35 bar	± 2	
					Fall	N bar		

PLV ... Pressure limiting valve **PRV ...** Pressure reducing valve
 (1) ... Notice: **pressure settings correspond with the Fabr.Nr. of your excavator !**
 Always compare with the pressure setting in chapter „Technical data“ !
 (2) ... Notice: Setting only correct without secondary pressure limiting valves !
 (3) ... Function/Swivel: see chapter „Technical data“ and „Maintenance“
 (4) ... See chapt. „Technical data“; different settings



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Id.No.: 9707748

Edition: Jan 03

- PLV...** Pressure limiting valve **PRV...** Pressure reducing valve
- (1)... Notice: **pressure settings correspond with the Fabr.Nr. of your excavator !**
Always compare with the pressure setting in chapter „Technical data“ !
- (2)... Notice: Setting only correct without secondary pressure limiting valves !
- (3)... FunctionSwivel: see chapter „Technical data“ and „Maintenance“
- (4)... See chapt. „Technical data“: different settings

No. /
Stand

NEUSON 2503-3703		Fabr.No: Work hrs/Dat. Checked by:		PRESSURE CHECKLIST Neuson Excavators		Settings (1)		Checked	OK?	
Function	Motion	Symbol	Press.limit. valve	Measuring point	Setting	bar	bar	bar	bar	
PUMP 1										
Boom	UP		Primary pressure limiting valve PPLV 1 (Main valve block)	Measuring point MP 1 (Main valve block)	Setting					
	DOWN				Fall:					
Bucket	OUT				Setting					
	IN				Fall					
Drive left	FORWARD		Setting							
	BACKWARD		Fall							
PUMP 2										
Dipper stick	OUT		Primary pressure limiting valve PPLV 2 (Main valve block)	Measuring point MP 2 (Main valve block)	Setting					
	IN				Fall					
Drive right	FORWARD				Setting					
	BACKWARD				Fall					
Auxiliary hydraulics	A		Sett(2)							
	B		Fall (2):							
			Sett(2)							
			Fall (2):							
			Sett(2)							
			Fall (2):							











neuson

Id.No.: 9707748
Edition: Jan 03

Type:	Date:	Work hrs:	Checked by:	PRESSURE CHECKLIST
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PUMP 3


X

Dozer blade	UP		Primary pressure limiting valve PPLV 3 (Main valve block)	Measuring point MP 3 (Main valve block)	Setting	bar		>	
	DOWN				Fall	bar		>	
Auxiliary hydraulics	A (2)				Setting	bar		>	
	B (2)				Fall	bar		>	
Boom offset	LEFT				Sett. (2):	bar		>	
	RIGHT				Fall (2):	bar		>	
Swivel motor	LEFT		Secondary pressure limiting valve SPLV 4 (Swivel motor I)		Setting	bar		>	
	RIGHT				Fall	bar		>	
	LEFT				Sett. (4)	bar		>	
	RIGHT				Fall	bar		>	
	LEFT				Sett. (4)	bar		>	
	RIGHT				Fall	bar		>	

Notice

PILOT PRESSURE SYSTEM

X

Joystick	All		Press.Reduc.valve PRV 5 Pilot oil supply unit	Measuring point MP 4 Pilot oil supply unit	Setting	bar			
					Fall	bar			

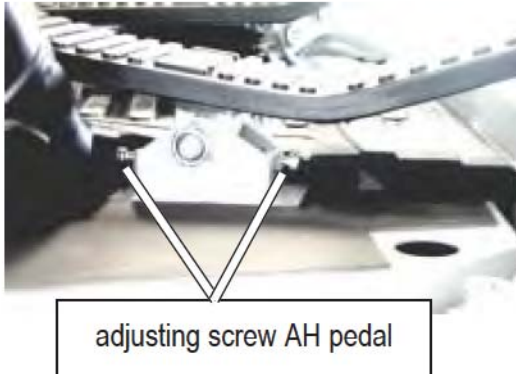
- PLV ...** Pressure limiting valve **PRV ...** Pressure reducing valve
- (1) ... Notice: **pressure settings correspond with the Fabr.Nr. of your excavator !**
- (2) ... Always compare with the pressure setting in chapter „Technical data“ !
- (3) ... Notice: Setting only correct without secondary pressure limiting valves !
- (4) ... FunctionSwivel: see chapter „Technical data“ and „Maintenance“
- See chapt. „Technical data“; different settings



4. AUXILIARY HYDRAULICS

> PILOT PEDAL

Fig.: Pedal auxiliary hydraulic system



> CHECK of activation of auxiliary hydraulic system :

It must be ensured that the piston of the auxiliary hydraulic system (operated mechanically via cable pull) can be operated fully in both directions.
Otherwise the **hydraulic system** may be **overheated!**

> ADJUST

a) Adjustment of cable pull in both operating directions:

- 1) Actuate pedal by hand and drive cylinder fully in the main valve block.
If pedal stop is limited by the adjusting screws - turn out adjusting screws.

Warning: Actuate pedal only by hand! - Maladjustment of the pedal might lead to kinking of the cable because of excessive pedal forces (thrust) !

- 2) Screw in adjusting screw to stop while the pedal is actuated.
- 3) Subsequently the adjusting screw must be turned out again half a turn (stop clearance).
- 4) Fix adjusting screw by means of lock nut.
- 5) Check activation.

This adjustment must be done for both adjusting screws.

Warning: Check of activation - subject to maintenance (see maintenance schedule).

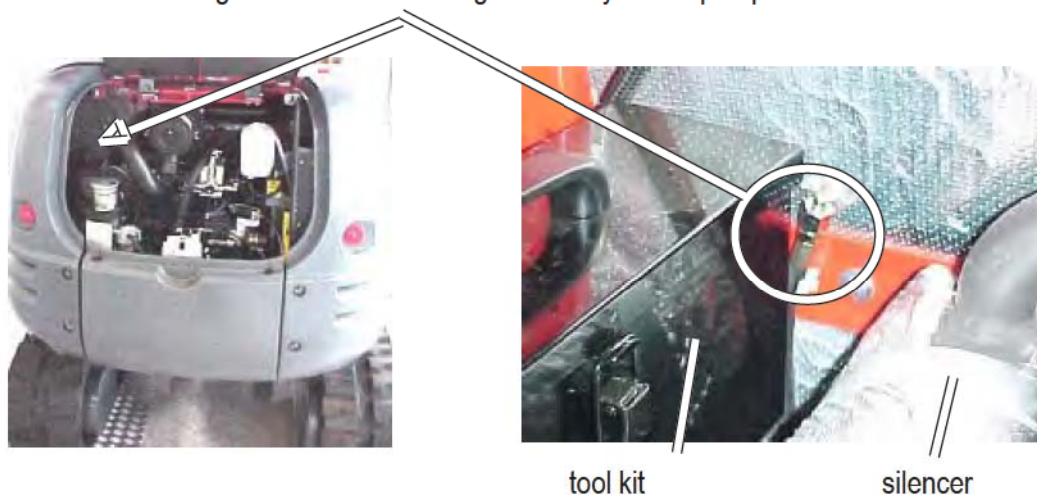
- b) The pedal must not rest on the floor carpet!

5. HYDRAULIC PUMP

> BLEED

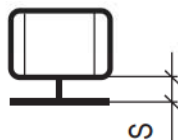
- Shut down device.
- Open breathing/bleeding filter.
- Open stopper of bleeding hose.
- Drain a small amount of hydraulic oil via the bleeding hose (hose down).
- Lift the bleeding hose a little above the level of the hydraulic pump, drain a small amount of hydraulic oil and reseal the bleeding hose.
- Fix bleeding hose again at the rear wall of the engine compartment.

Fig.: Position of bleeding hose of hydraulic pump



6. HOSE BURST PROTECTION VALVES

> GAP DIMENSION CHECK



The European Safety Regulations provide for the installation of hose burst protection facilities in dozer blade cylinders and in tilting cylinders. If such valves are missing, there will be liability problems in case of an excavator accident.

> SETTING of GAP DIMENSION „S“ :

1. Loosen the two nuts.
2. Adjust the gap S by means of a gauge for the relevant type of excavator (see Chapt. Technical Data).
3. Tighten the nuts lightly by hand and fix them cautiously against each other.

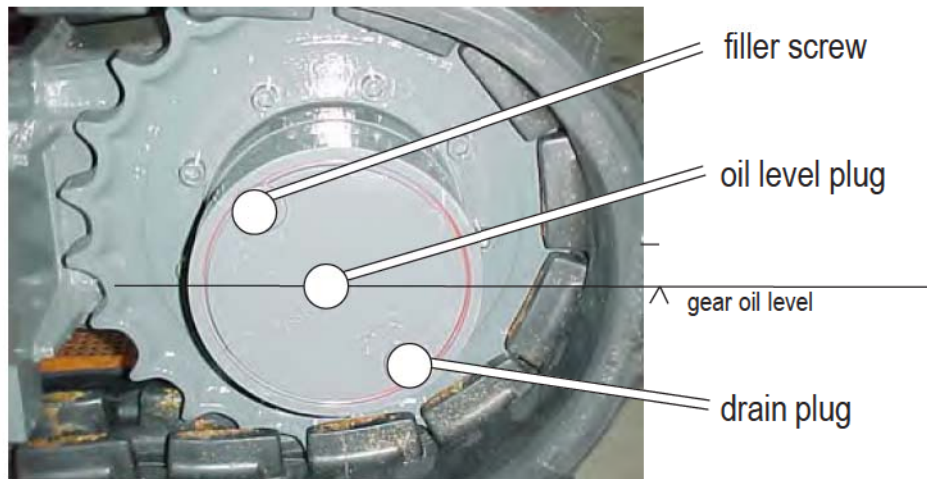
7. DRIVE UNIT

GEARBOX_____.

- > CHECK:
- Open the oil level plug.
 - The oil level must be at the oil level inspection orifice.
- > CHANGE:
- Open the oil filler and drain plug.
 - Drain oil and collect it in an appropriate vessel.
 - Close drain plug and open oil level plug.
 - Fill in fresh oil via the filler orifice until gear oil emerges from the inspection orifice.
 - Close oil level plug and filler orifice.

Warning: It is recommended, as specified in the maintenance schedule, to check leakage and thus the filling level in the drive unit continually.
Dispose of waste oil as provided by environmental laws.

For gear oil quality - see List of Lubricants (Chapt. Technical Data)



8. SWIVEL UNIT

As described in chapter Hydraulic System - Swivel Unit the **gear box is „maintenance-free“** (as lubricated with hydraulic oil).

9. HYDRAULIC OIL TANK

> HYDRAULIC OIL CHANGE

The hydraulic oil shall be changed only when warm (approx. 40°C)

Before changing the oil withdraw all hydraulic cylinders.

Turn uppercarriage by 90°.

Fig.: Oil drain hose



- 1) Open breather filter (width across 36) to unpressurize tank (tank pressurized).
- 2) Open drain hose of oil tank carefully (access from below - chassis floor).
- 3) Drain oil into collecting vessel.
- 4) Check hydraulic oil tank for contamination and clean it, if necessary.
- 5) Replace filter according to maintenance instructions.
- 6) Close screw plug of drain hose properly again.
- 7) Fill in clean hydraulic oil via filter station (filtering 10 mμ).
- 8) Vent hydraulic pump (see chapt. Hydraulic Pump).
- 9) Close hydraulic oil tank properly.
- 10) Let machine run idle for several minutes.
Dispose of old oil as provided by environmental laws.

11. CABIN

> REMOVAL.

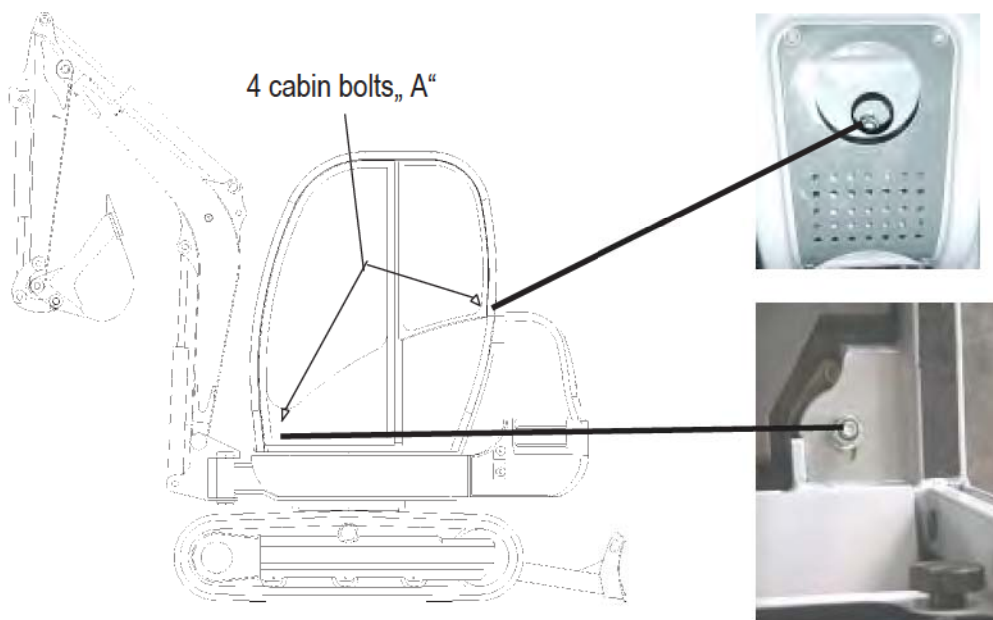
Feature: Simple removal of frame of driver's cabin by opening the 4 cabin bolts and the central connector.

The device functions remain active, the cabin cable system is disabled.

Removal:

- Open cabin bolts A.
- Loosen washing container hose at non-return valve (valve compartment).
- Loosen cabin connector (right beside the seat).
- Lift the cabin at the lugs provided for this purpose.

Tightening torque of cabin bolts A : M12 , 10.9 - **120 Nm** (glued in with Loctite S2420) !

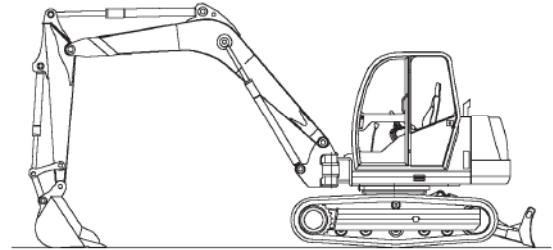


12. UNDERCARRIAGE

> CRAWLER TENSION

Lift crawler excavator by means of dozer blade and excavator boom.

The crawlers should no longer rest on the ground
If necessary, support the excavator additionally (secure it against tilting).

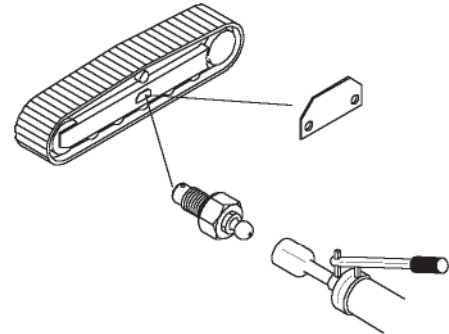


When tightened, the crawler must not lift from the track rollers by more than 15 - 20 mm .

NOTE: As far as possible the adjusted dimension should be equal for both crawlers.

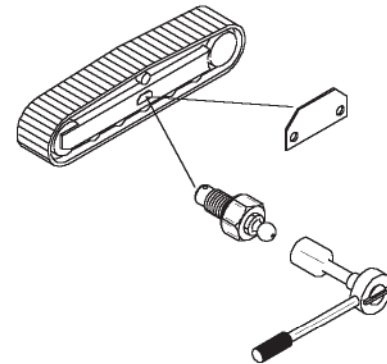
> Tightening of crawler

- 1) Take off protective cover (1).
- 2) Tighten crawler by means of grease gun (2).



> Release of crawler tension

- 1) Take off protective cover (1).
- 2) Screw out non-return valve (3) (width across 22).
- 3) Drain grease slowly until the unit is fully depressurized.





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CHAPTER C:

Hydraulic

(Neuson Service Manual 2503 - 3703)



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2. POSITION OF HYDRAULIC COMPONENTS

Fig.: Valve bonnet right

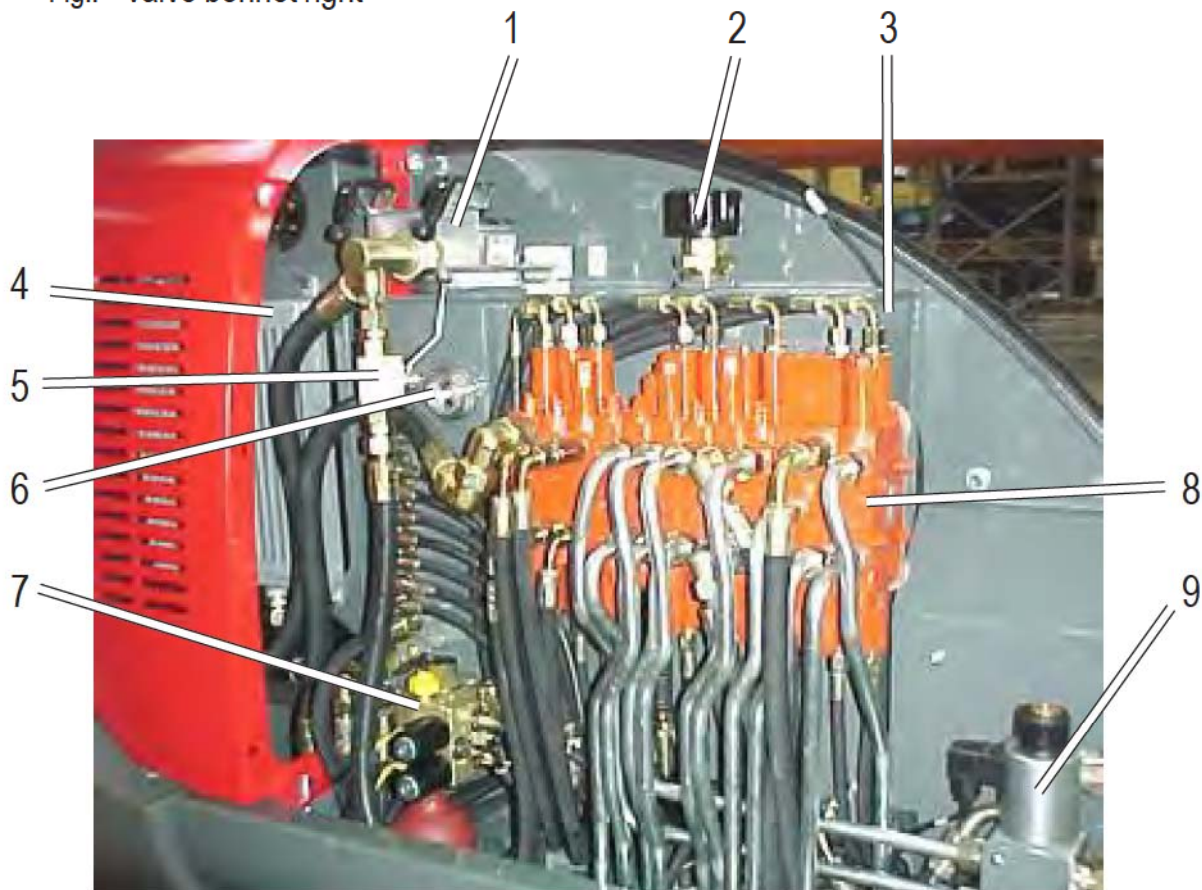
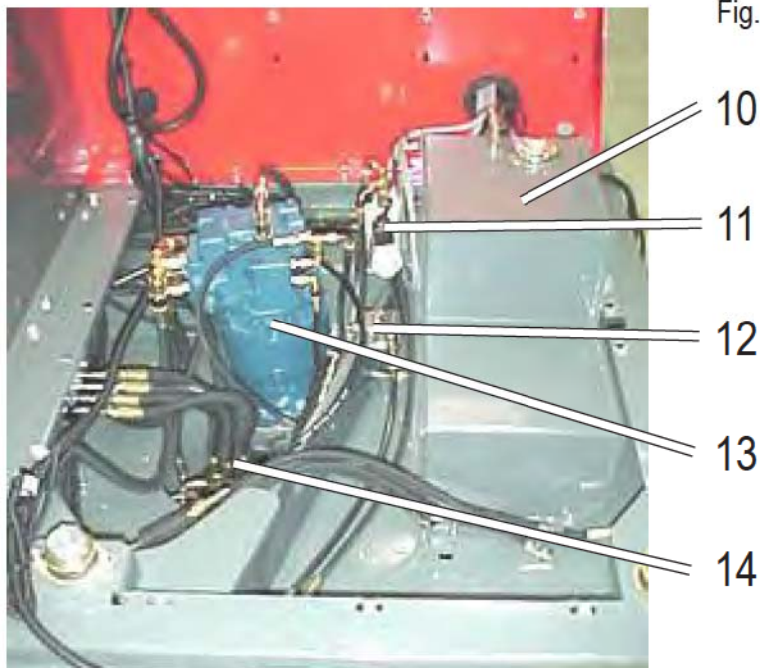


Fig. C003: Area below the cabin



Legend - position of hydraulic components

- 1 return filter
- 2 breathing/bleeding filter (0.2 bar)
- 3 hydraulic oil tank
- 4 hydraulic oil cooler
- 5 reversing valve auxiliary hydraulics (unpressurized return)
- 6 inspection glass hydraulic oil tank
- 7 control oil unit
- 8 main valve block
- 9 switch valve (boom offset / auxiliary hydraulics)
- 10 fuel tank
- 11 switch valve (boom / dozer blade cylinder)
3703 > additional switch valve (bucket / tilting cylinder)
- 12 manifold block pilot control oil
- 13 swivel unit
- 14 swivel joint

3. HYDRAULIC PUMP

Neuson 2503 / 3003 / 3503 / 3703 :

Pump:	Neuson 2503	> 2528402	(PVD-0B-24P)
	Neuson 3003	> 3028402	(PVD-1B-29P)
	Neuson 3503 / 3703	> 3528402	(PVD-1B-32P) - Fabr.No.: AB00001 - AC09999
		> 4408302	(PVD-2B-44P) - Fabr.No.: AD00001 and higher



Theme:	Service News 73/02 : New hydraulic pump type starting with diesel engine Yanmar type (setting !)
Fabr.Nr.:	AD00001 and higher

Fig.: Double axial and gear pump (pressure side view)

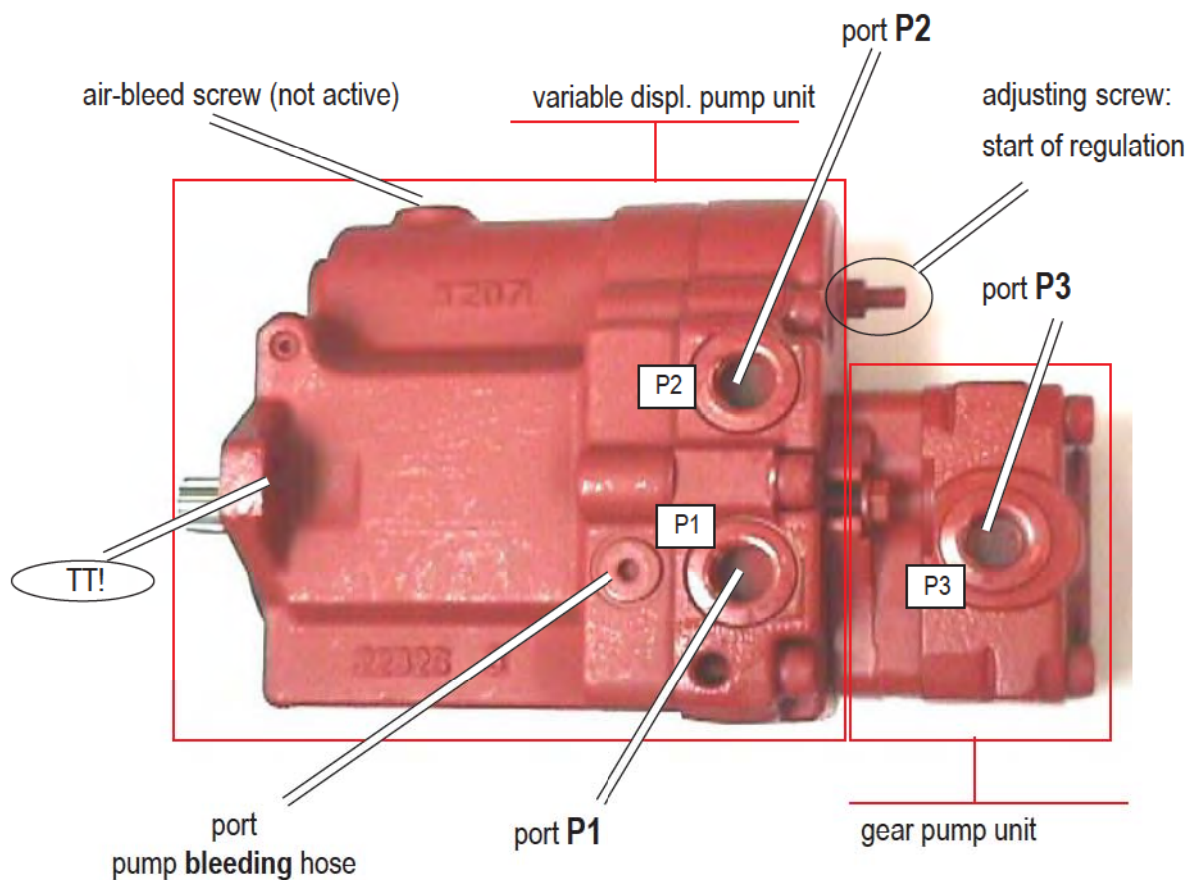
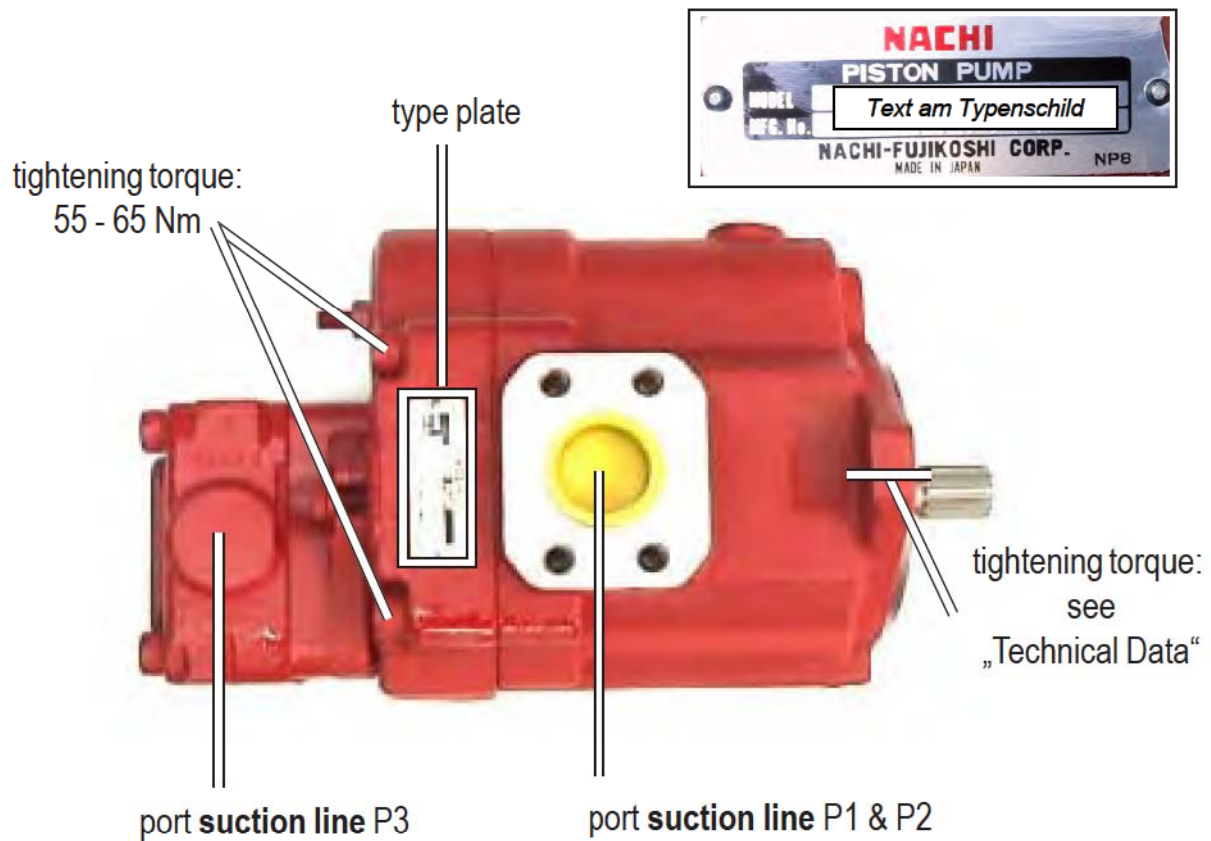
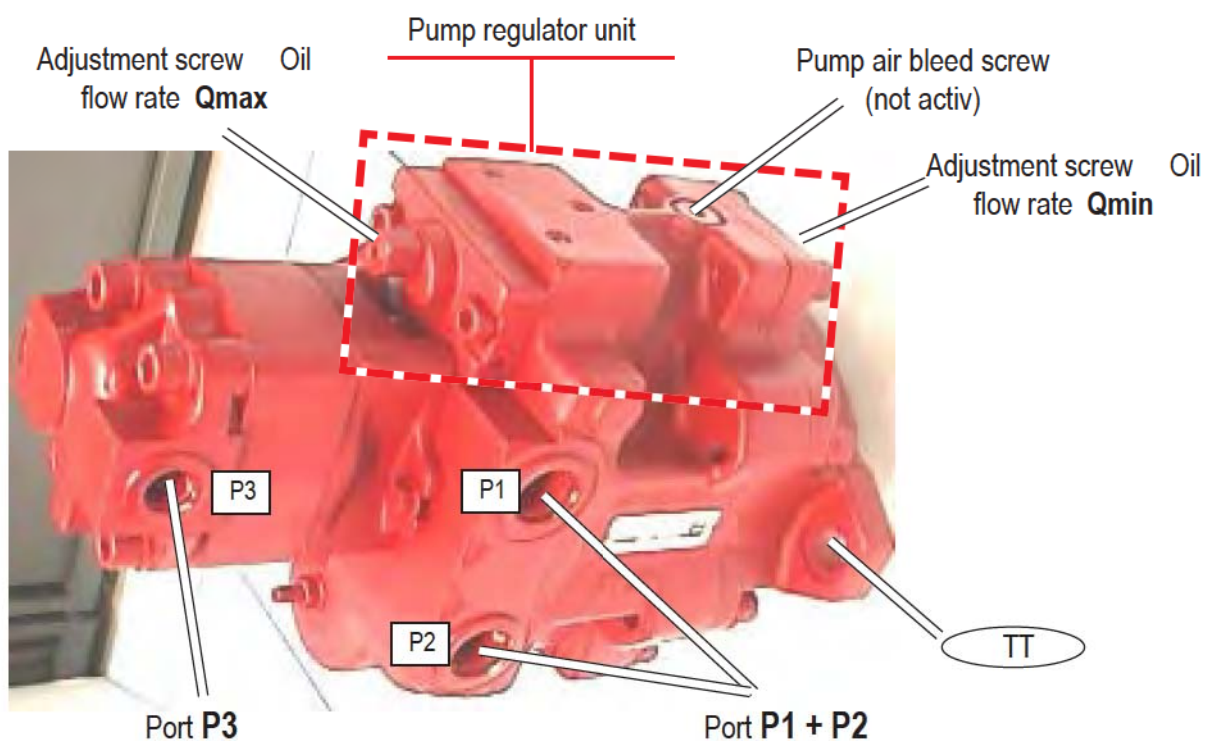


Fig.: **Double axial and gear pump** (suction side view)Pict.: **Hydraulic pump 4408302**

Legend: Double variable displacement and gear pump 2503 (PVD - OB)

1	case	42	stopper
2	case cover	44	screw
3	primary shaft	49	stopper
4	cylinder drum	56	dowel pin
5	distribution plate	60	screw
6	piston	61	hexagon nut
7	sliding blocks	65	gear pump
8	sliding block bracket	66	coupling
9	centering ring	67	ring
11	spacer pins	68	screw
14	spring	70	washer
24	spacer ring	73	pilot control case
35	Seeger circlip ring	76	solenoid valve
10	swash plate	77	solenoid valve
12	ball	74	screw
13	sealing	75	washer
32	shaft sealing ring		
39	O-ring		
40	O-ring		
62	packing ring		
69	O-ring		
71	O-ring		
72	O-ring		
15	spring		
18	spring receptacle		
19	spring guide		
20	centering pin		
21	pin		
25	piston		
26	piston		
27	centering pin		
30	ball bearing		
31	needle bearing		
33	spacer ring		
34	Seeger circlip ring		
36	Seeger circlip ring		



Fig.: **Exploded view** - double axial and gear pump **2503**

Feature : 1 governing spring - linear pump regulation

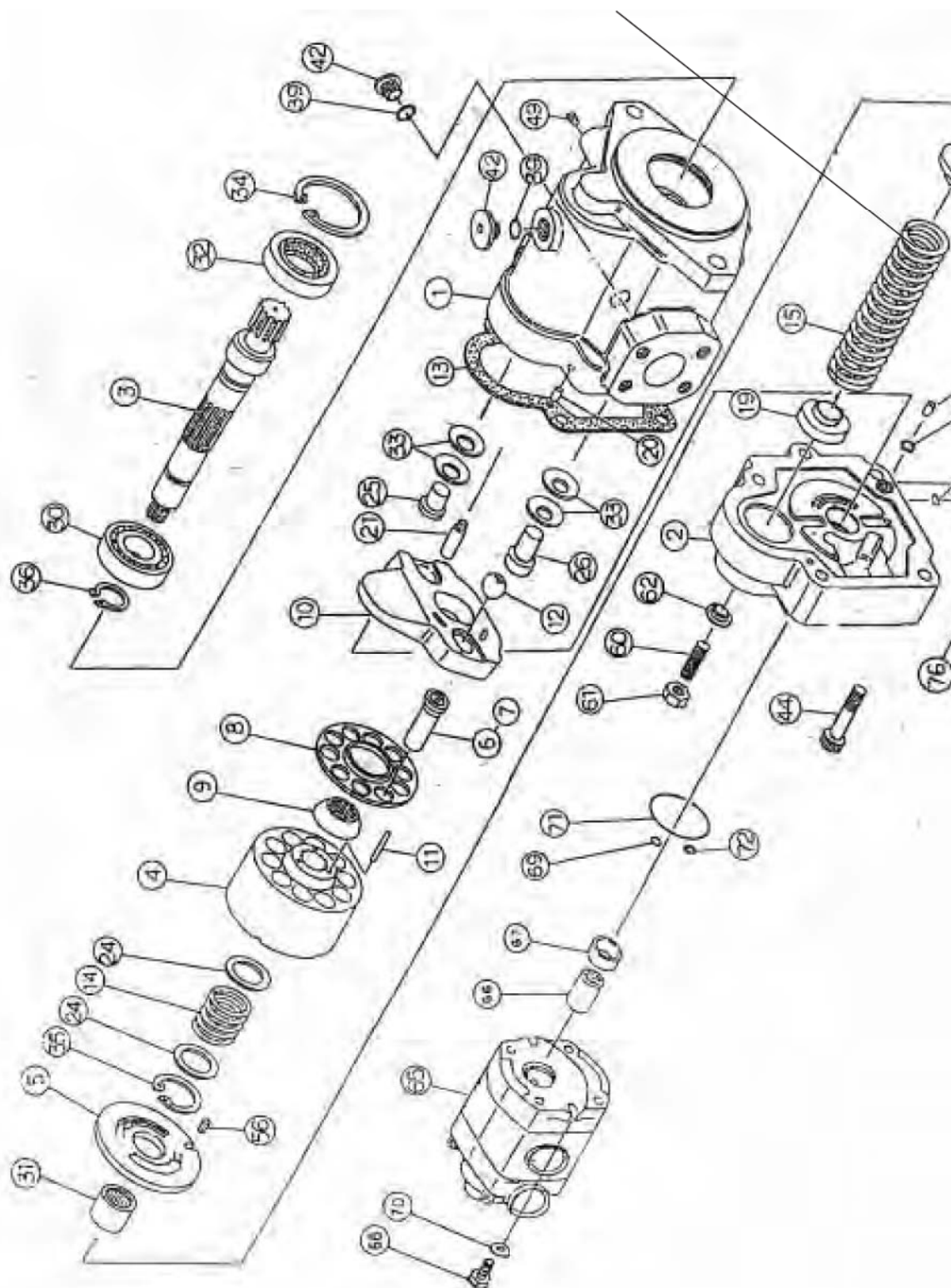
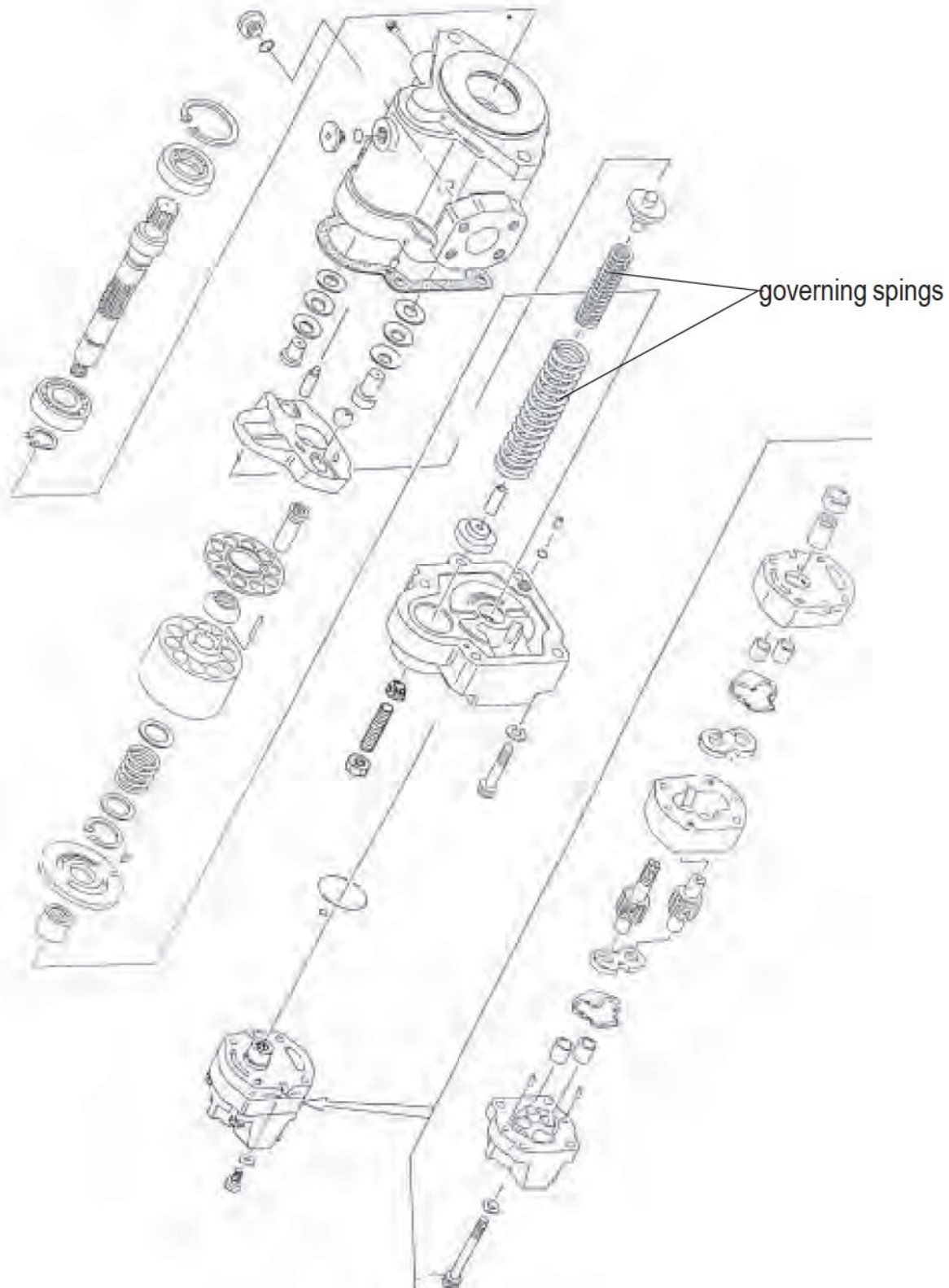


Fig.: **Exploded view - double axial and gear pump 3003 - 3703**

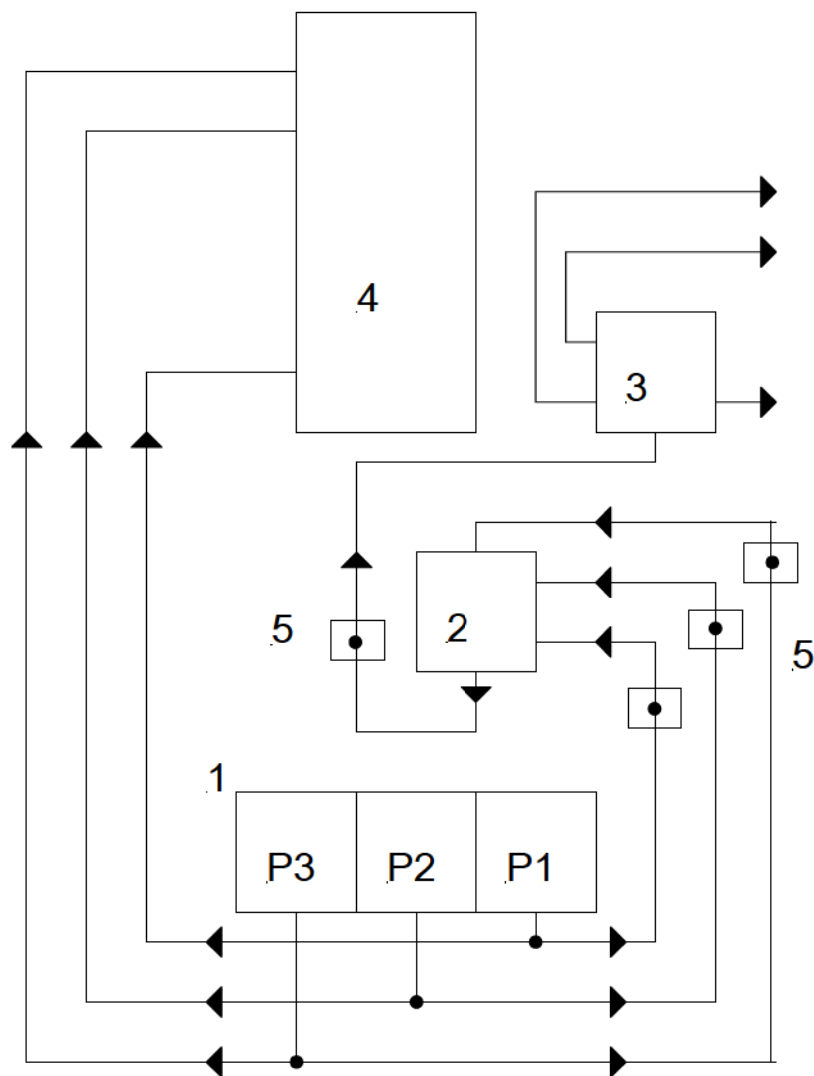
Feature: 2 governing springs - non-linear pump regulation



4. PILOT OIL SUPPLY UNIT

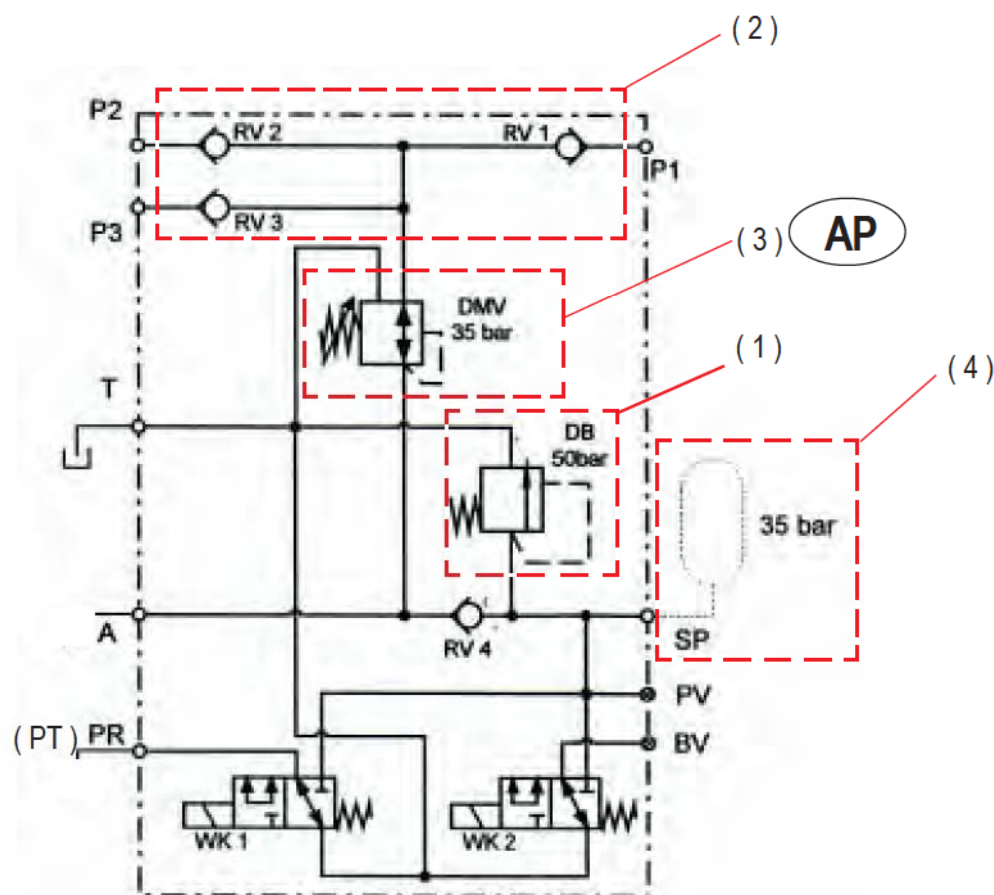
Neuson 2503 / 3003 / 3503 / 3703 :

Fig.: Schematic of pilot control circuit:



- 1 pump unit
- 2 control oil unit
- 3 manifold block
- 4 main valve block
- 5 measuring ports

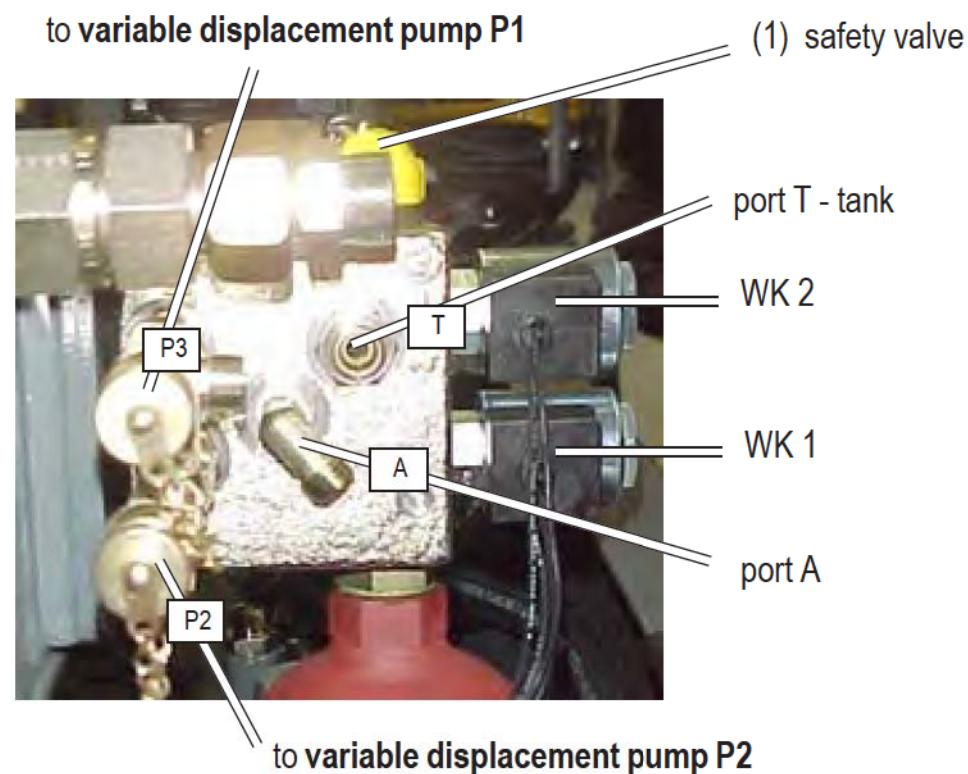
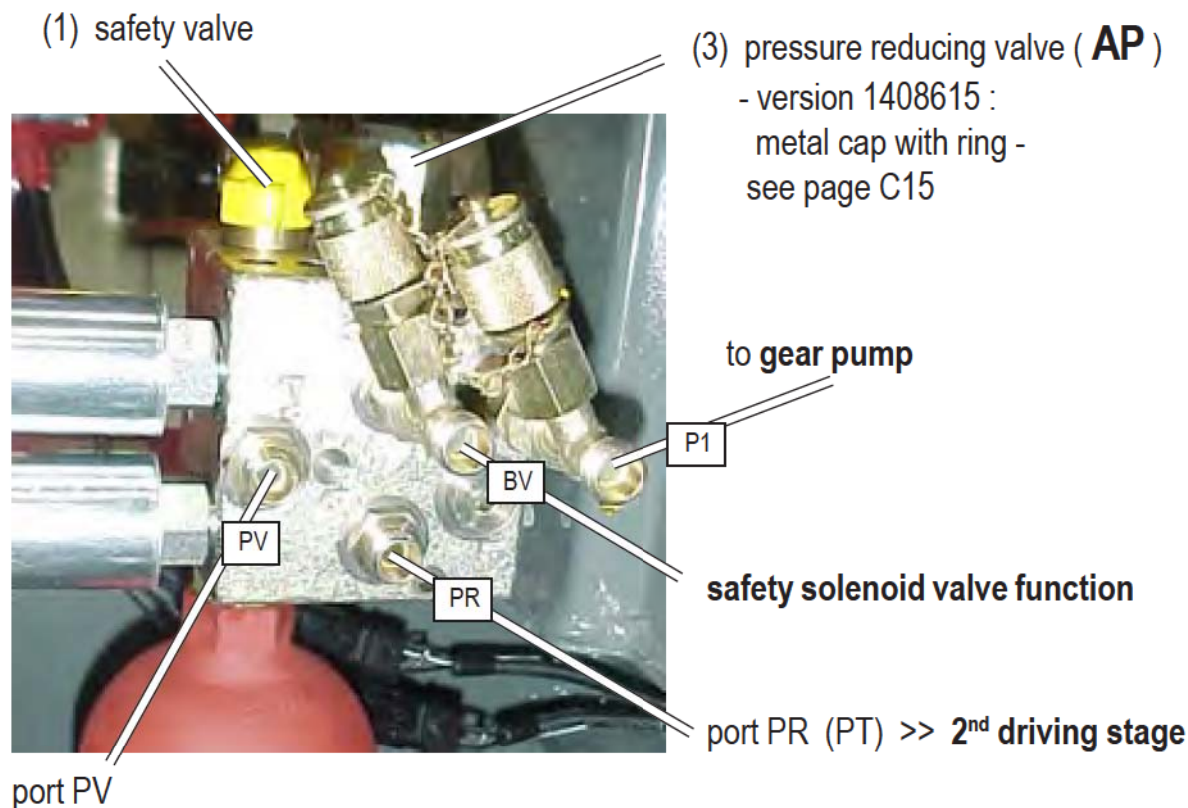
Fig.: Control oil unit 2503 - 3703



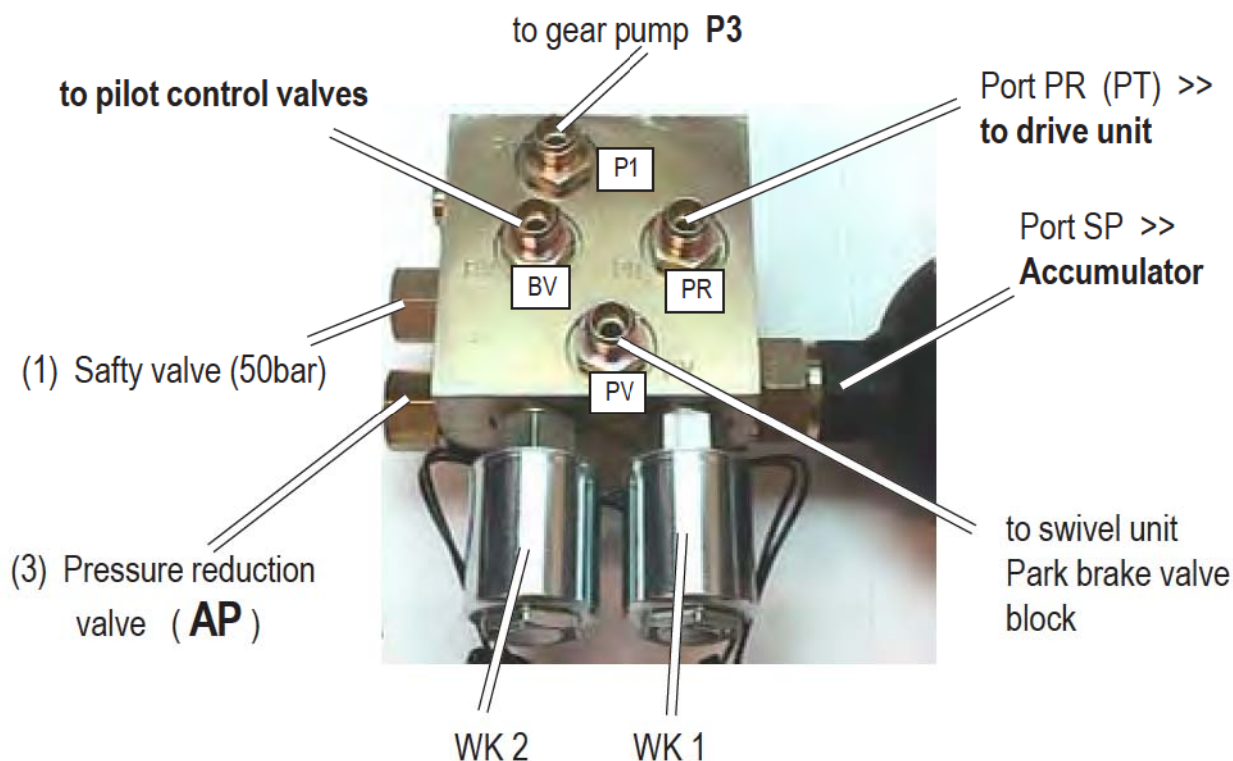
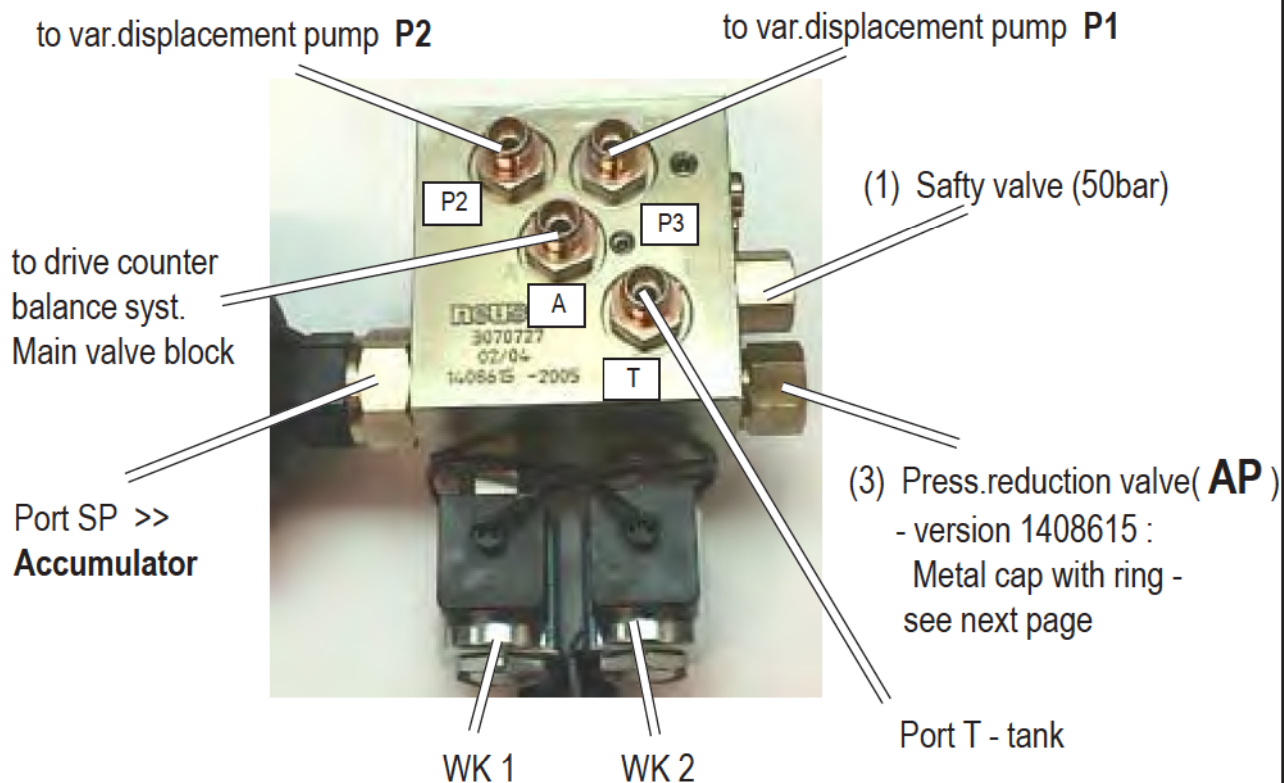
- port P1: >> gear pump P3
 port P2: >> variable displacement pump P2
 port P3: >> variable displacement pump P1
 port T : >> tank
 port A : >> driving counterbalancing system (main valve block)
 port PR: >> **2nd driving stage** (drive units)
 valve WK1 - in combination with pushbutton at driving lever
 (formerly port PT - control oil unit 1408610)
 port BV: >> pilot control valves (joystick,..) via the **safety solenoid valve**
 in combination with the sensitive micro-switches in the arm rests (WK2).
 port PV: >> supply of setting chamber to swivel motor - **brake release**.

- (1) ... safety valve 50 bar - protects the control oil unit in case of defective pressure reducing valve
 (2) ... shuttle valves - always accept the highest pump pressure for control oil pressure
 (3) ... pressure reducing valve pilot control pressure (PRV) - **ADJUSTMENT POINT (AP)**
 (4) ... accumulator

Fig.: **Port assignment** of control oil unit 2503 - 3703
(version 1408610 / 1408615)

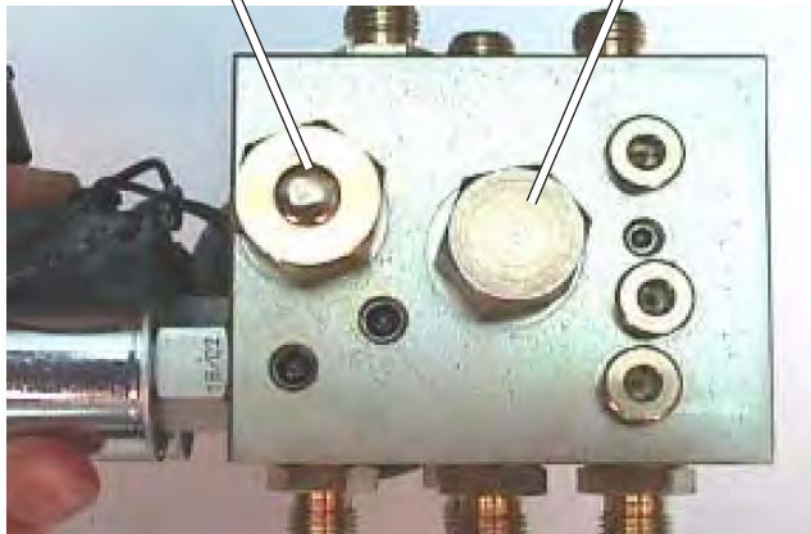


Pict.: **Port position** pilot oil supply unit 2503 - 3703
(version 1408615)



Pict.: **Port position** pilot oil supply unit 1408615 (5002 - 6002)

- (3) Pressure reduction valve
(**AP**)
- (1) Safty valve

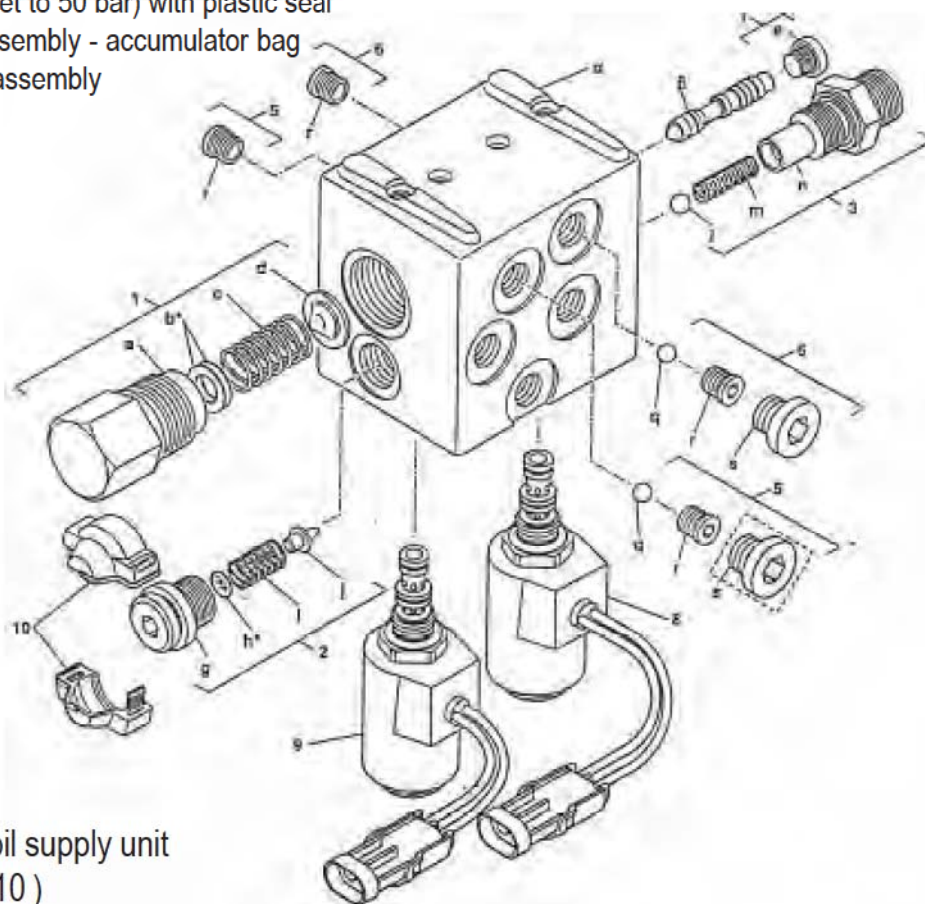


- 1... pressure reducing valve unit (**AP**) * adjusting washers
2... safety valve (preset to 50 bar) with plastic seal
3... connecting subassembly - accumulator bag
5 - 6 shuttle valve subassembly
8 - 9 solenoid valves

Fig.: Version 1408610

Tightening torques:

- 1a... 150 Nm
1e... 10 Nm
2g... 100 Nm
3n... 100 Nm
5r... 10 Nm
5s, 6s 30 Nm
8, 9 15 - 20 Nm



Pict.: Structure pilot oil supply unit
(version 1408610)

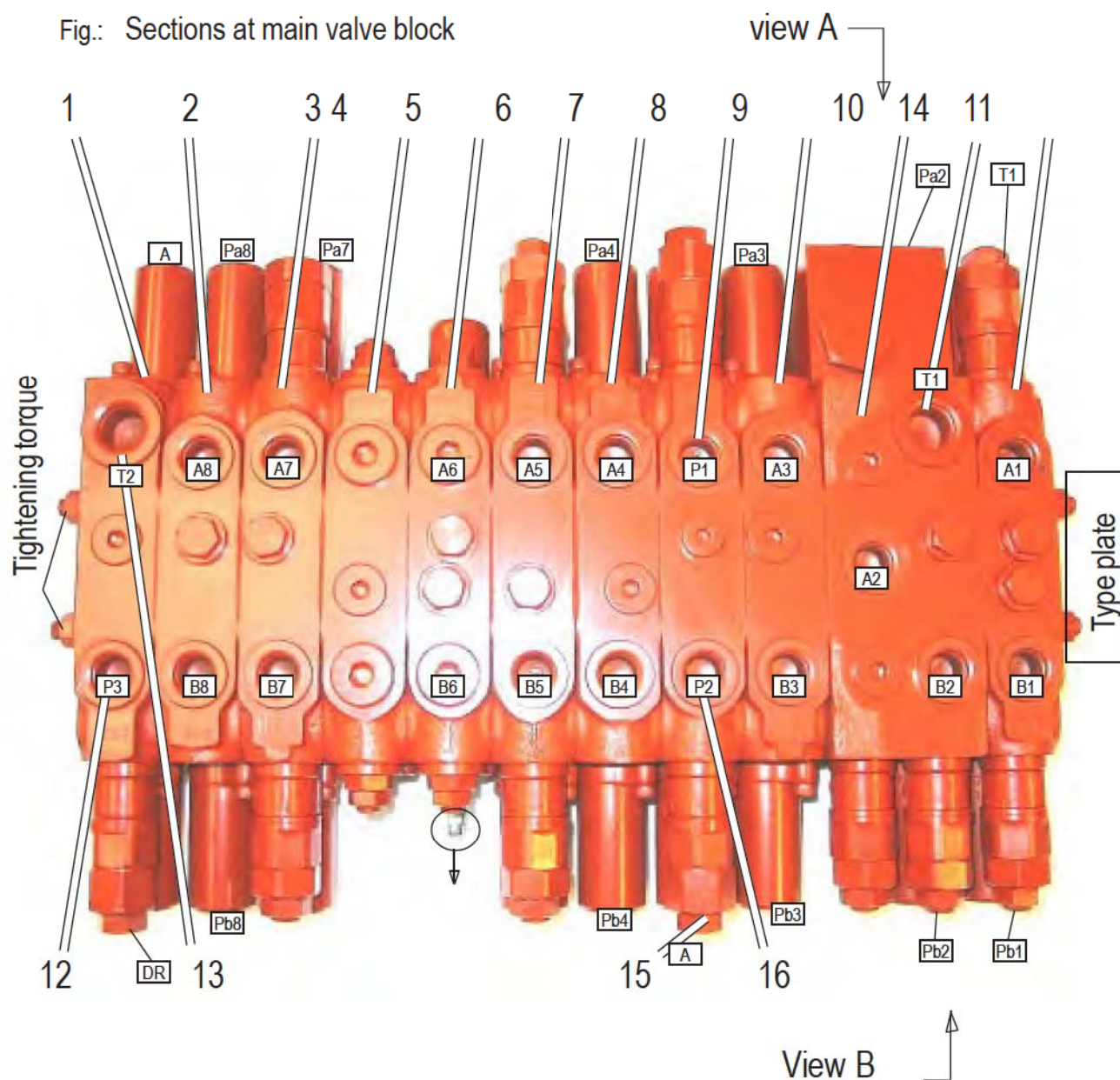
5. MAIN VALVE BLOCK

Neuson **2503 / 3003 / 3503 / 3703** :

Type: Neuson KVSE-36-9 identical design for 2503 -3703 - different piston valve!
(see different item.No.)

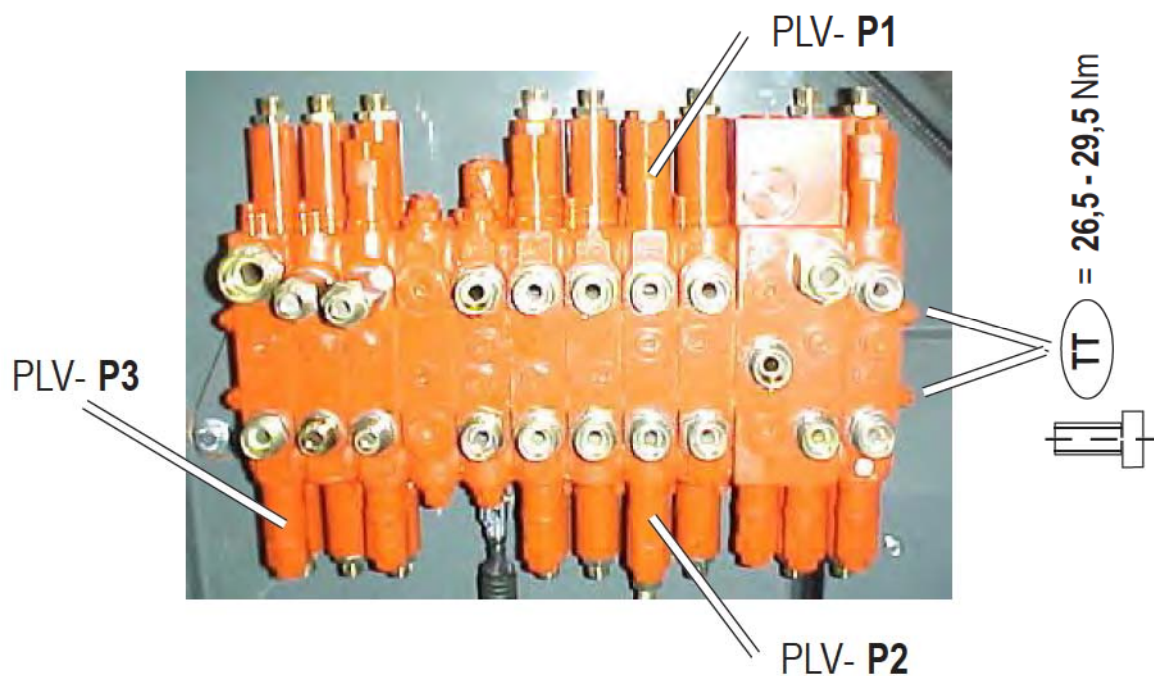
Features: regenerating function of dipper stick, drive counterbalancing system, standard functions

Fig.: Sections at main valve block



- | | | | |
|----|---|----|------------------------------------|
| 1 | counterbalancing system (port A control oil unit) | 11 | bucket |
| 2 | swivel unit | 12 | port gear pump P3 |
| 3 | dozer blade | 13 | hydraulic oil cooler (tank-T2) |
| 4 | flow rate adjustment of auxiliary hydraulics | 14 | suction hose T1 swivel motor |
| 5 | auxiliary hydraulics, mechanically driven | 15 | port A (counter balancing) |
| 6 | dipper stick | 16 | port variable displacement pump P2 |
| 7 | driving right | | |
| 8 | variable displacement pump P1 | | |
| 9 | driving left | | |
| 10 | boom | | |

Fig.: **Primary** pressure limiting valves (PLV) - (**AP**)



- | | | |
|----|-------------------------------------|-------------------------|
| 11 | section bucket | — supplied by P1 |
| 10 | section boom | |
| 9 | section driving right | |
| 7 | section driving left | — supplied by P2 |
| 6 | section dipper stick | |
| 5 | section auxiliary hydraulics | |
| 4 | section flow rate AH | — supplied by P3 |
| 3 | section dozer blade | |
| 2 | section swivelling drive | |
| 1 | section counterbalancing | |

Fig.: Valves - view A

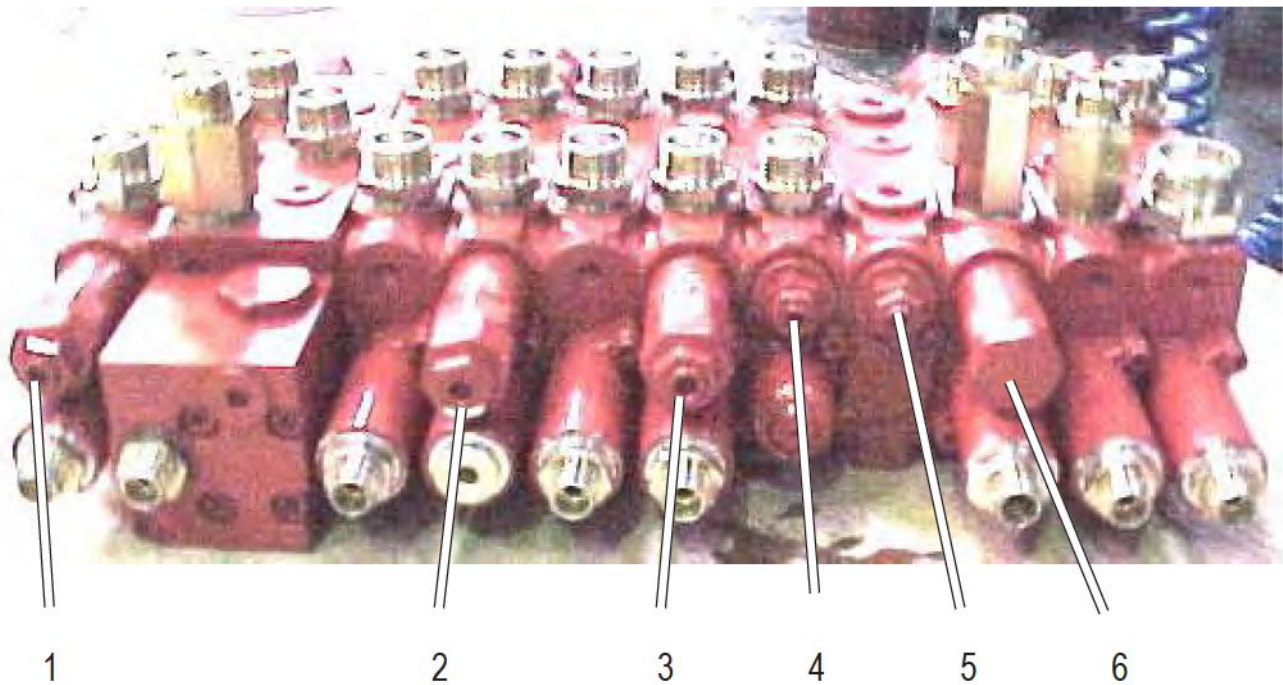
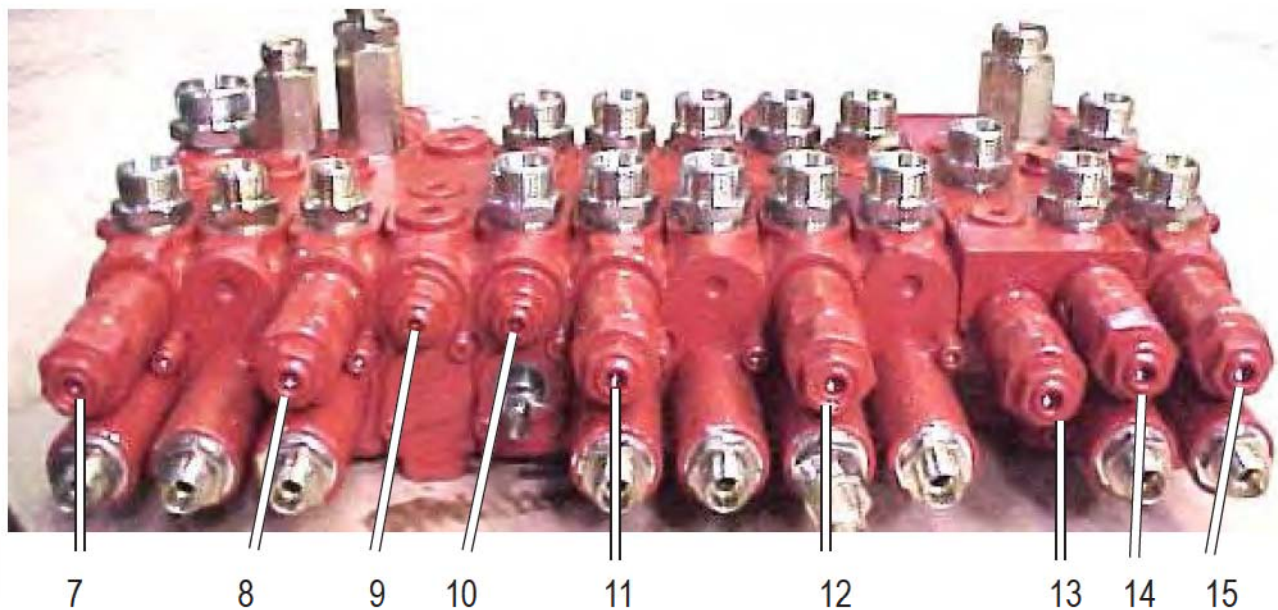


Fig.: Valves - view B



- | | | | |
|---|--|----|--|
| 1 | sec. pressure limiting valve bucket bottom side | 9 | flow rate adjusting screw AH |
| 2 | primary pressure limiting valve P1 | 10 | stopper (option sec. press. lim. val. AH) |
| 3 | sec. pressure limiting valve dipper stick rod side | 11 | sec. press. lim. val. dipper stick bottom side |
| 4 | stopper auxiliary hydraulics (option PLV) | 12 | primary pressure limiting valve P2 |
| 5 | flow rate adjusting screw auxiliary hydraulics | 13 | sec. press. lim. val. boom bot. side |
| 6 | stopper | 14 | sec. press. lim. val. boom rod side |
| 7 | primary pressure limiting valve P3 | 15 | sec. press. lim. val. bucket rod side |
| 8 | sec. press. limiting valve dozer blade bottom side | | |

Fig.: Hydraulic circuit diagram - main valve block

section bucket

section boom

section driving right

section driving left

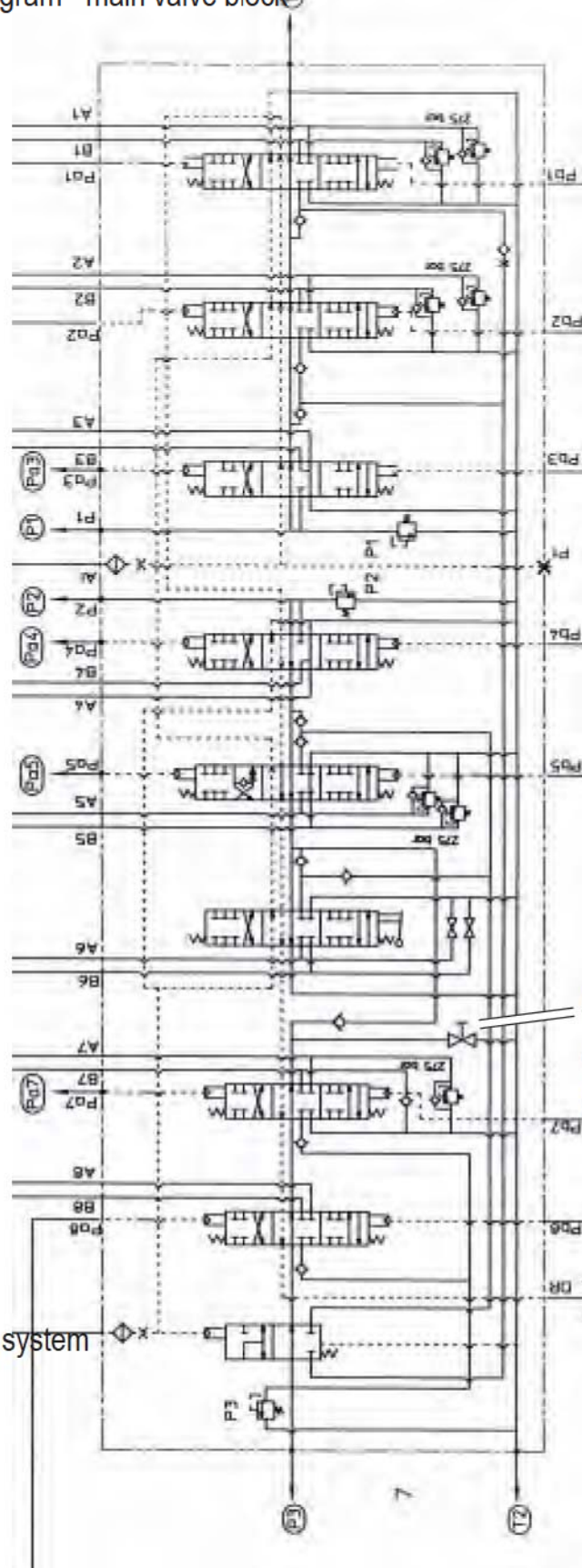
section dipper stick

section aux. hydraulics
and boom offset

section dozer blade

section swivelling

section counterbalancing system



Function **Drive Counterbalancing System**

General:

Without counterbalancing: If an arm function is activated during driving, the device leaves its track! (P1, P2 supply one drive unit, each).

All Neuson 2503-3703 are equipped with drive counterbalancing function!

If an arm function is activated when driving straight, **the device keeps track** - the driving speed remains constant. The drive counterbalancing system is activated only, if both driving valves are active.

Function:

- Both piston valves for driving and one arm function must be actuated.
- The valve (V1) of the drive counterbalancing system is activated because of an increased banking-up pressure.
- P3 - assumes the supply of arm functions.
- Section auxiliary hydraulics

Switching pressure of valve V1:

Fig.: Hose piping of drive counterbalancing system

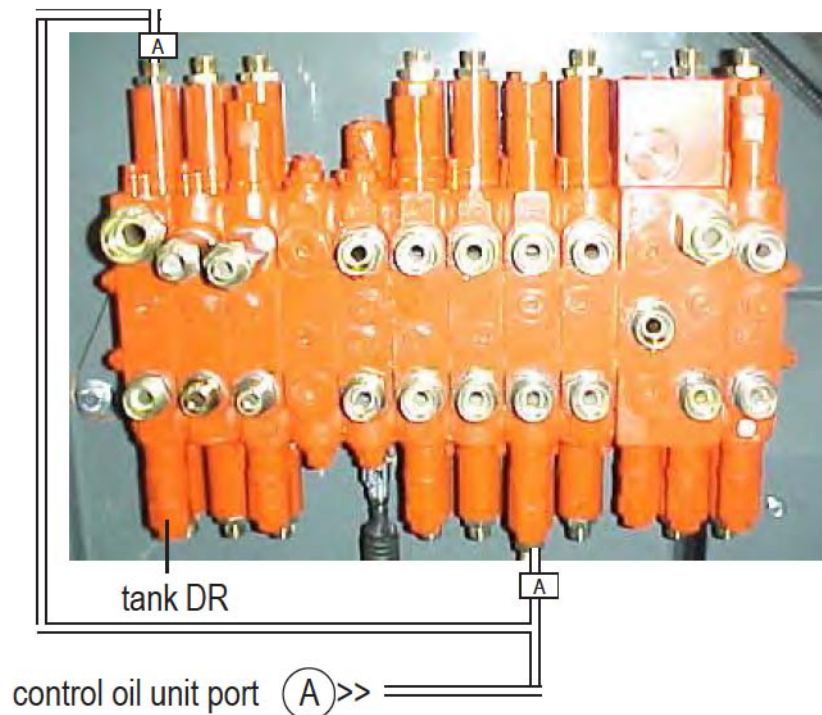


Fig.: Circuit diagram of drive counterbalancing system

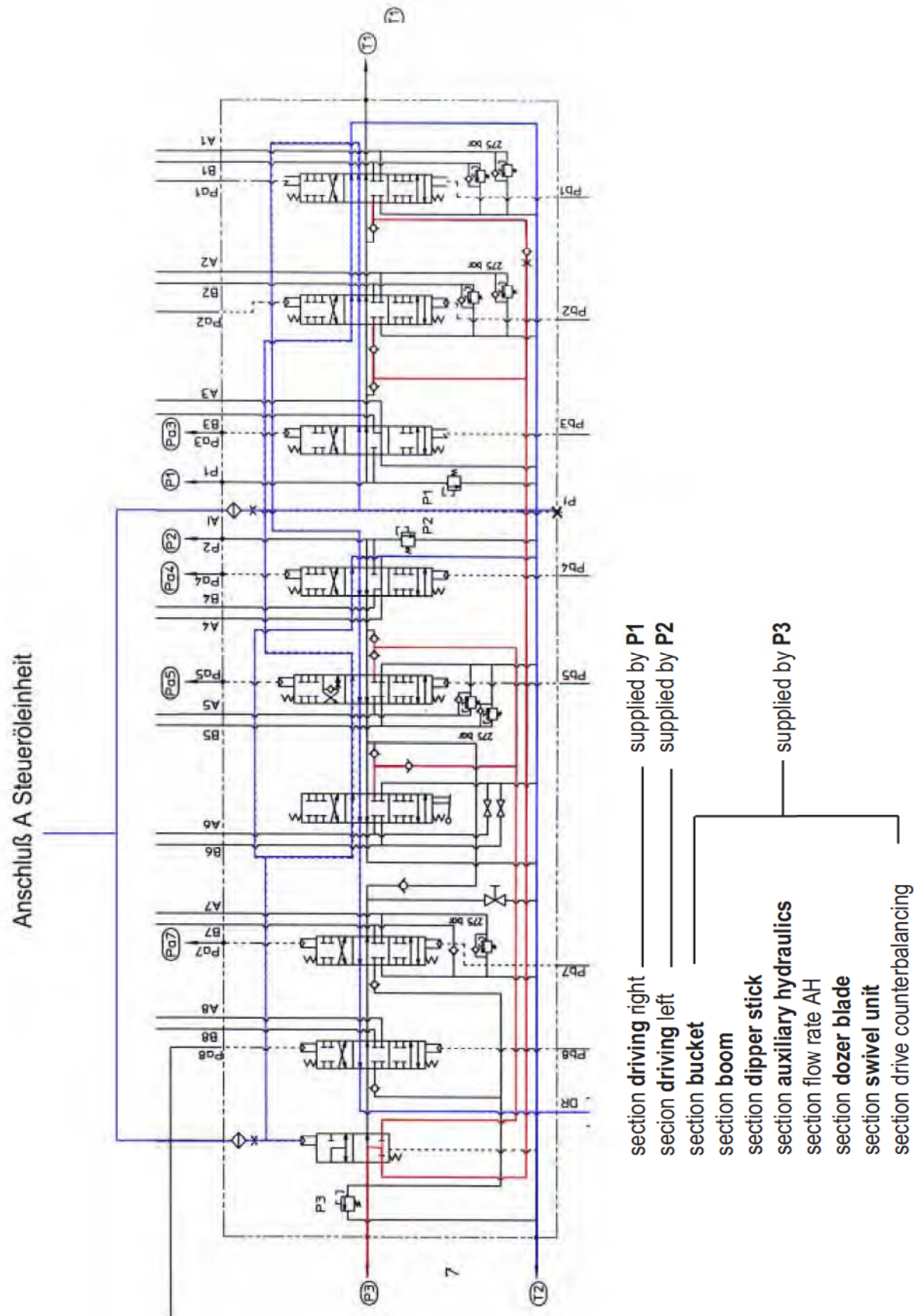
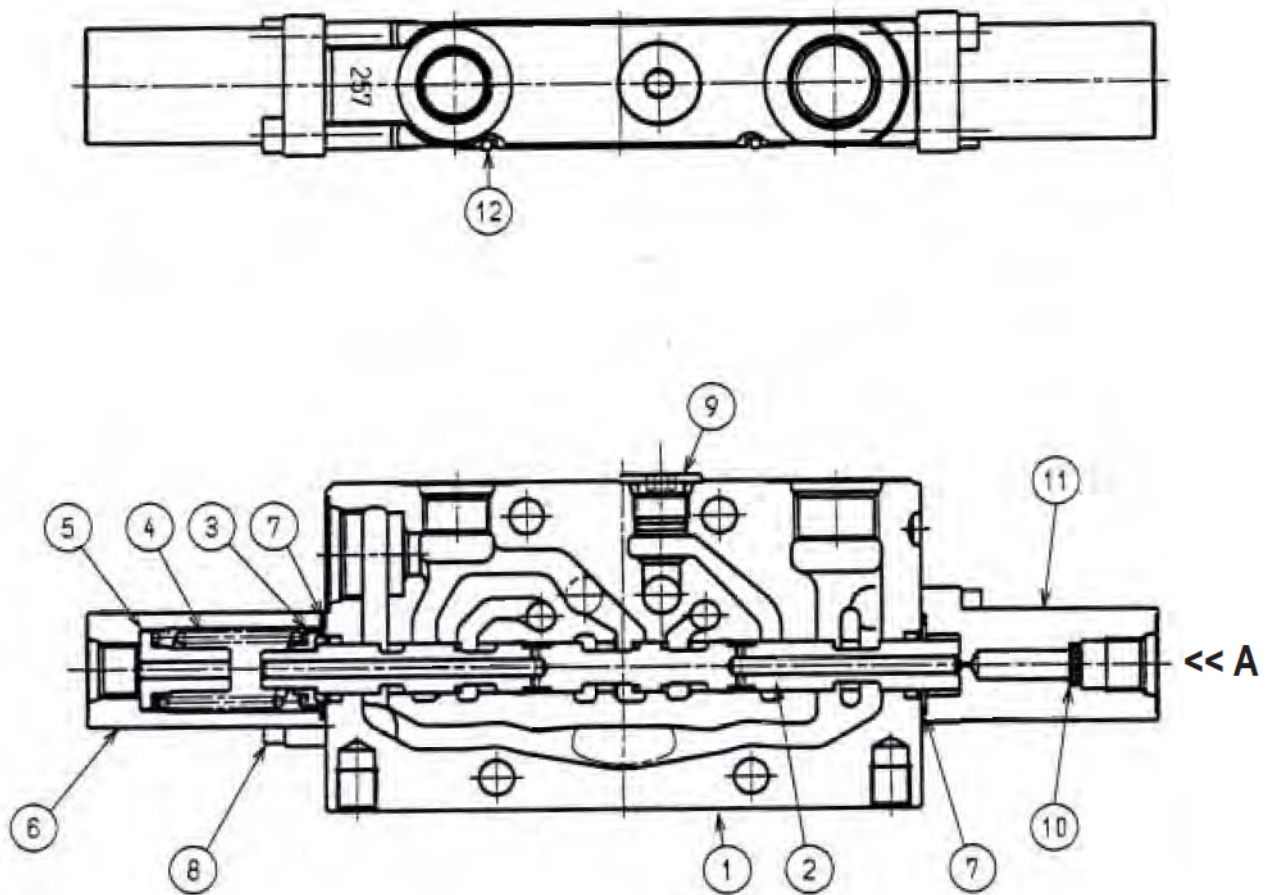


Fig. : Section drive counterbalancing system



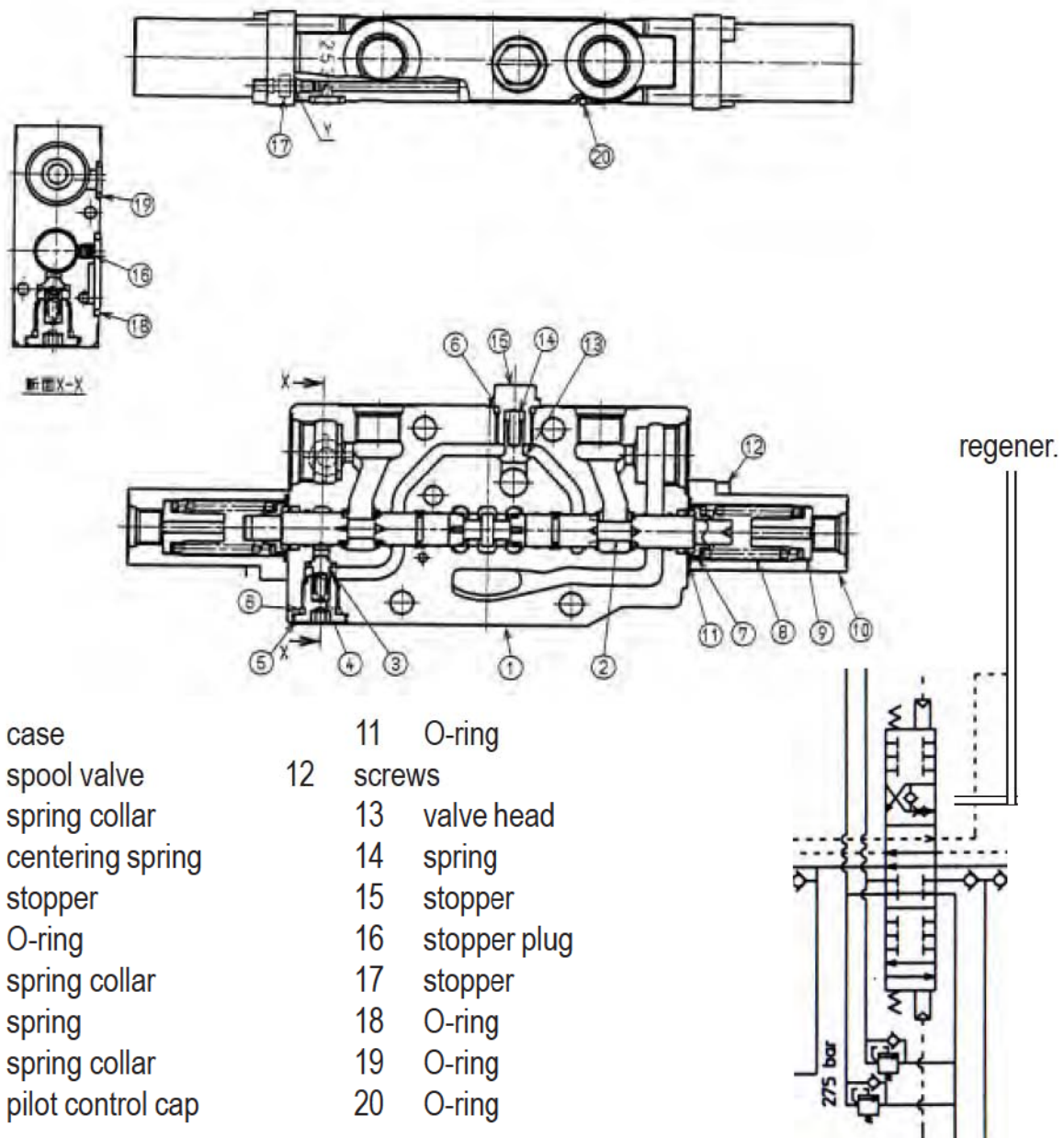
- 1 case
- 2 spool valve
- 3 spring collar
- 4 centering spring
- 5 spring collar
- 6 pilot control cap
- 7 O-ring
- 8 screw
- 9 stopper
- 10 metal
- 11 pilot control cap
- 12 O-ring

Function **Regeneration - Section Dipper Stick**

Situation: Because of heavy loads at the dipper stick the dipper stick cylinder may become „evacuated“ on the bottom side, which might lead to a dipper stick standstill in vertical position.

Solution: Regeneration of the rod-side dipper stick cylinder oil to the cylinder bottom side. To this end the spool valve is provided with a non-return valve.

Fig.: Section dipper stick



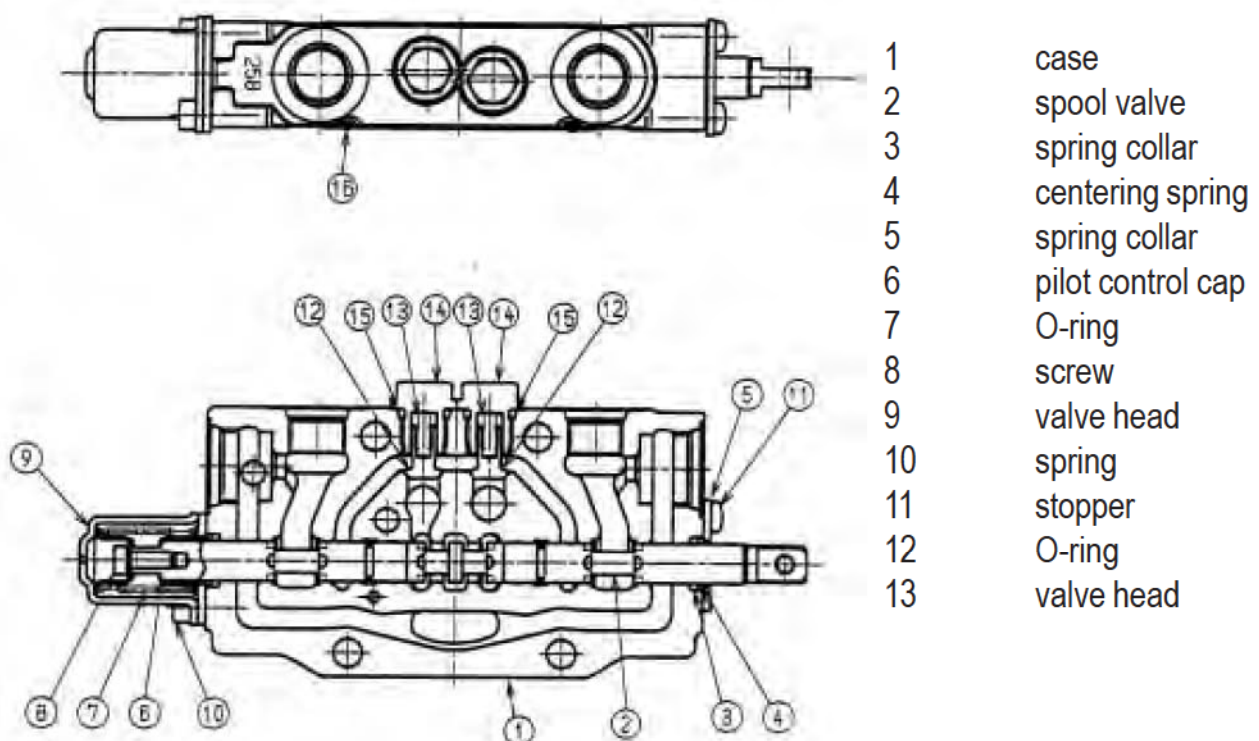
Function **Auxiliary Hydraulics (AH)**

- Mechanically actuated via cable pull (**maintenance**) !
- 2 flow rates adjustable : standard -> P2 + P3
 regulating screw -> P2
- Options: **secondary pressure limiting valves** (in case of stoppers)
 electrically driven auxiliary hydraulic system
- For pressure-related flow rates of aux. hydraulics - see chapt. Technical Data

Warning: In case of **thermal problems**, please make sure that:

- the shut-off valve for unpressurized return flow AH is always open when in hammering mode!
- the flow rate adjusting screw is not in an intermediate position !
- the spool valve AH is switching correctly - see maintenance - adjustment of cable pull for spool valve of auxiliary hydraulics.

Fig.: Section auxiliary hydraulics



Function **Oil Flow Adjusting Screws - Auxiliary Hydraulics (AH)**

- 1 case
- 2 spool valve
- 3 O-ring
- 4 supporting ring
- 5 cover of case
- 6 screw
- 7 stopper
- 8 stopper

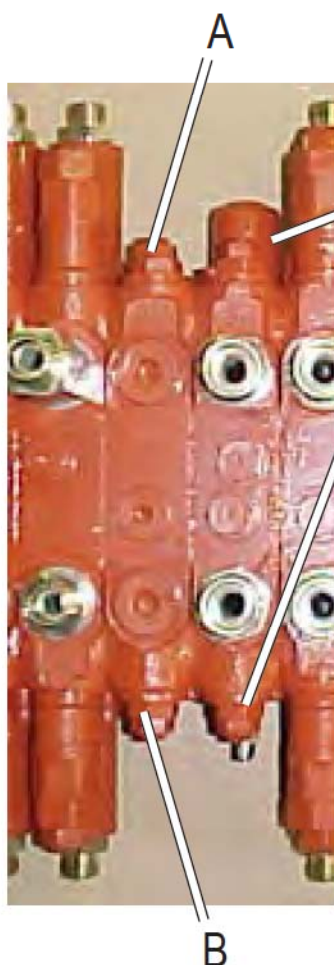
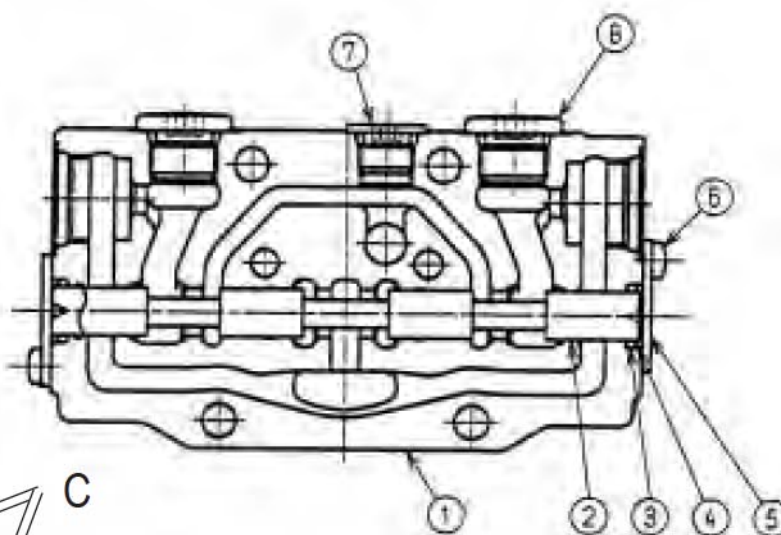
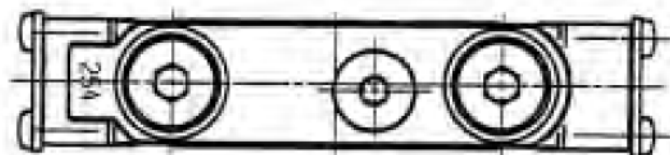


Fig.: Adjustment of flow rate AH

To reduce the flow rate of the auxiliary hydraulic system the stoppers A and/or B must be turned out, each, by 2 turns.

Warning: No intermediate position - overheating !

Stoppers A and B - **closed** (factory setting)

>> supply AH: P2 + P3

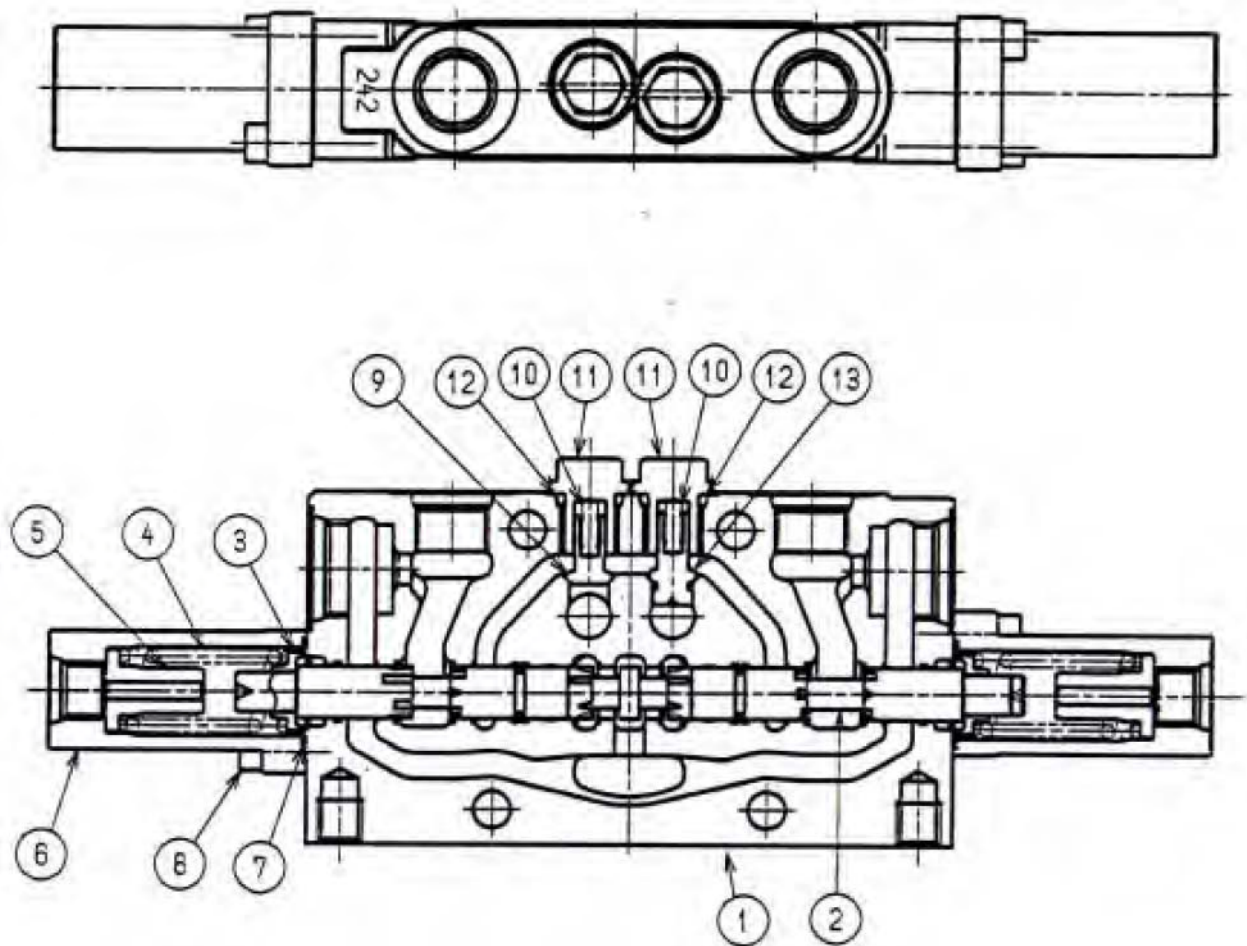
Stoppers A and B - **turned out 2 turns**

>> supply AH : P2

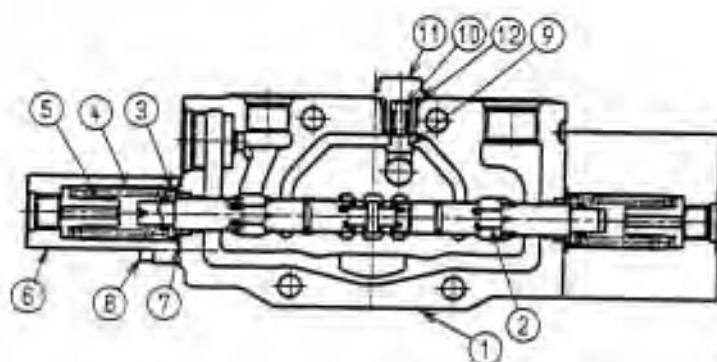
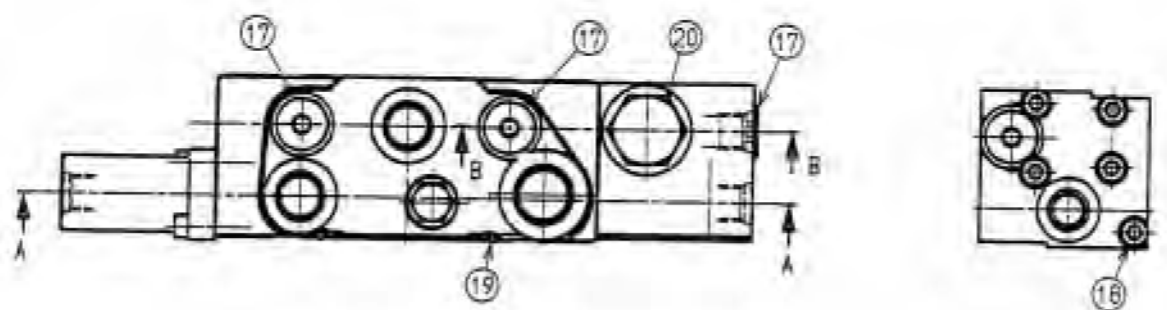
For pressure-related flow rates of AH - see chapt. Technical Data.

Stopper C - receptacle option sec. press. limit. valve - AH

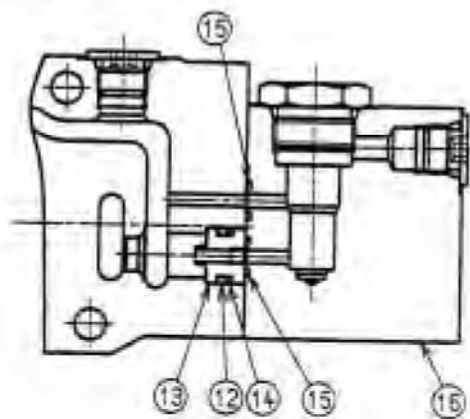
Function **Bucket**



- 1 case
- 2 spool valve
- 3 spring collar
- 4 centering spring
- 5 spring collar
- 6 pilot control cap
- 7 O-ring
- 8 screw
- 9 valve head
- 10 spring
- 11 stopper
- 12 O-ring
- 13 valve head

Function **Boom**

断面A-A



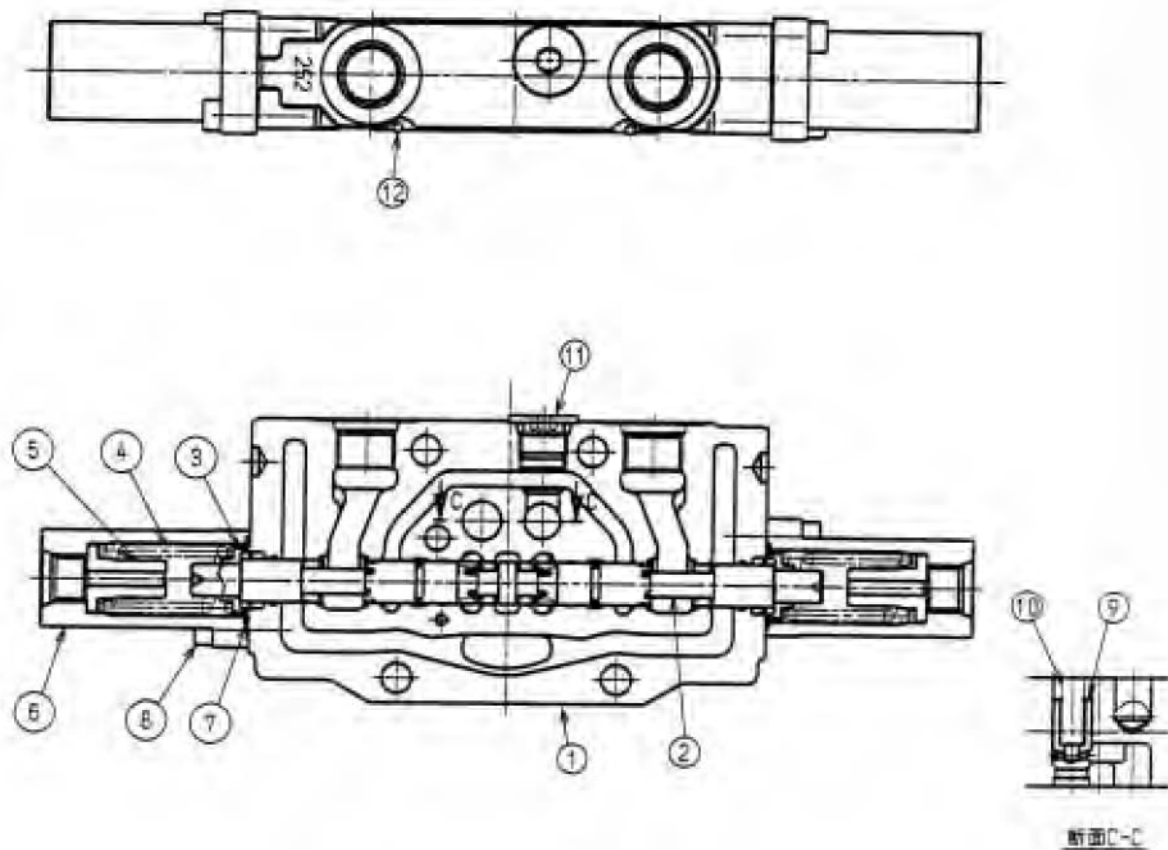
断面B-B

Bleeding facility:
case without valve
section boom



- | | | | |
|----|-------------------|----|-----------------|
| 1 | case | 14 | supporting ring |
| 2 | spool valve | 15 | O-ring |
| 3 | spring collar | 16 | case |
| 4 | centering spring | 17 | stopper |
| 5 | spring collar | 18 | screw |
| 6 | pilot control cap | 19 | O-ring |
| 7 | O-ring | 20 | stopper |
| 8 | screw | | |
| 9 | valve head | | |
| 10 | spring | | |
| 11 | stopper | | |
| 12 | O-ring | | |
| 13 | bush | | |

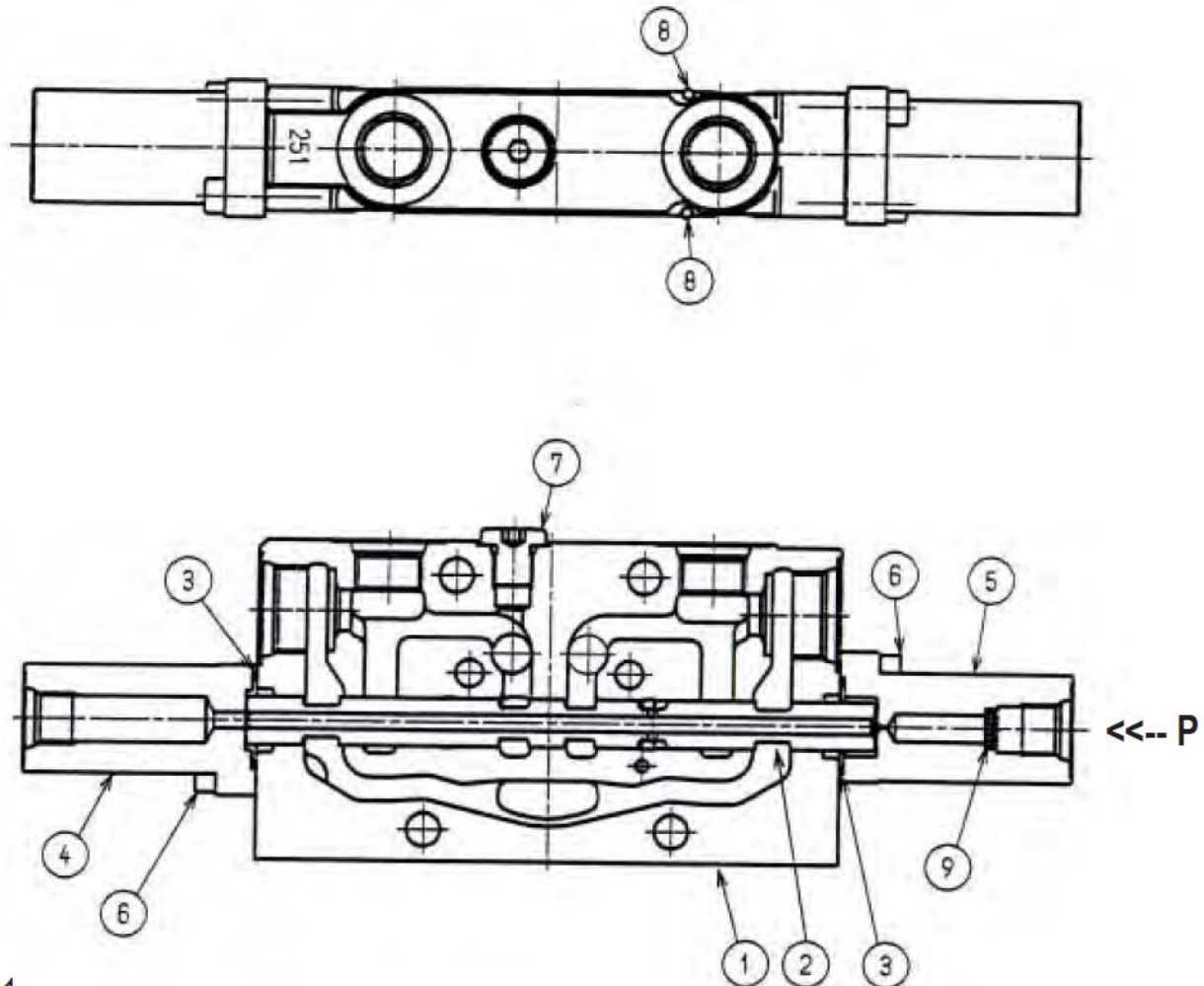
Section **Drive** (Left / Right)



- 1 case
- 2 spool valve
- 3 spring collar
- 4 centering spring
- 5 spring collar
- 6 pilot control cap
- 7 O-ring
- 8 screw
- 9 valve head
- 10 spring
- 11 stopper
- 12 O-ring

Section **Input** (P1 / P2)

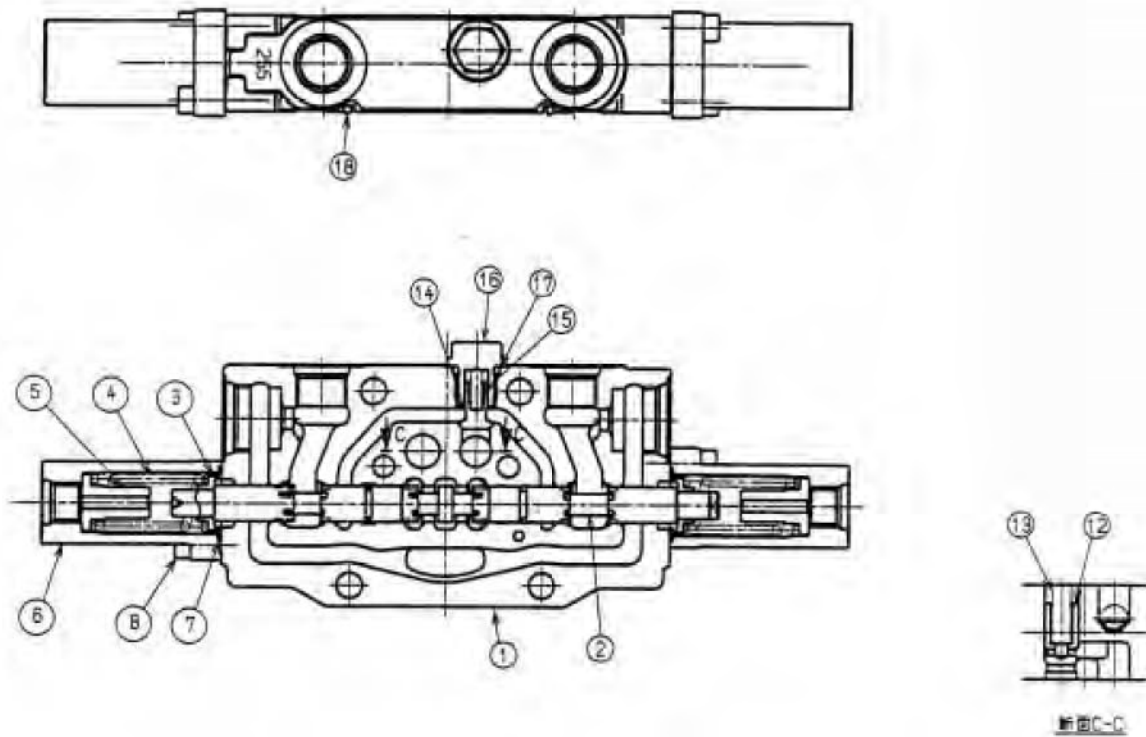
- with primary pressure limiting valves P1 and P2 (**AP**)



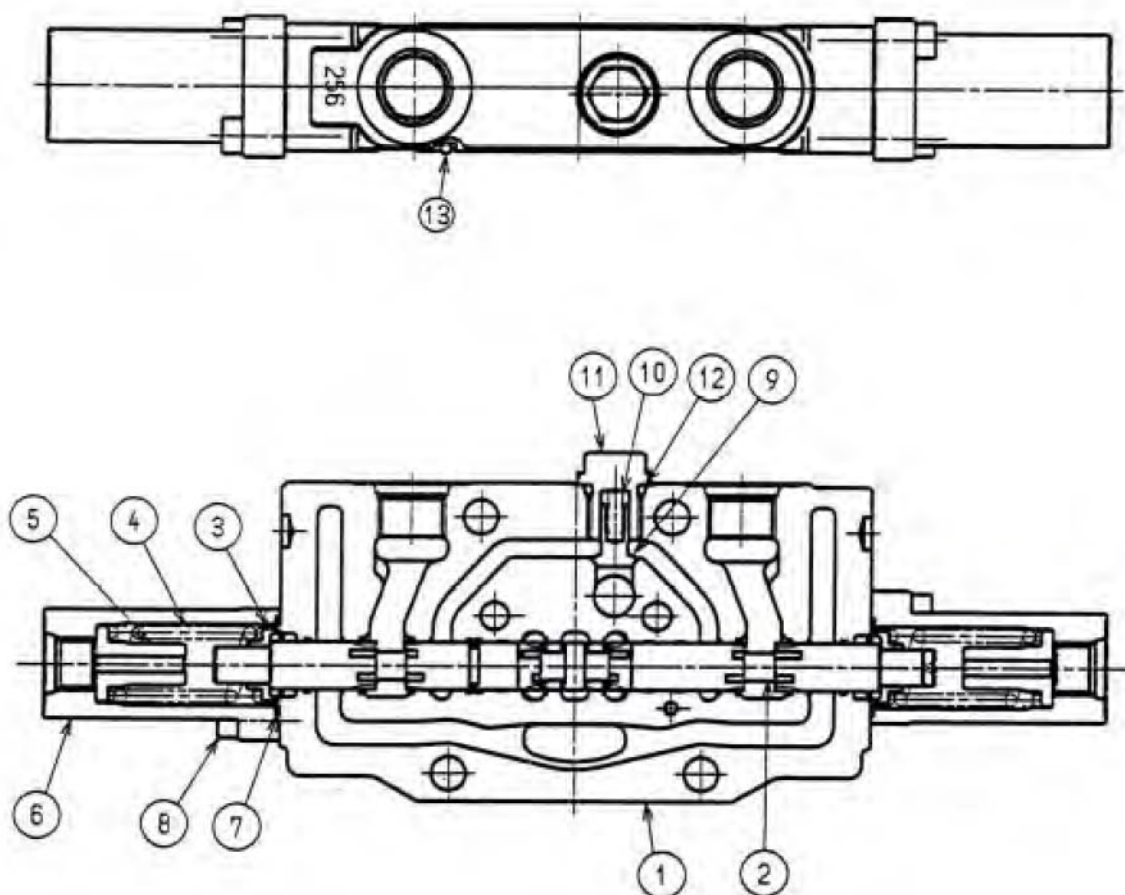
- 1 case
- 2 spool valve
- 3 O-ring
- 4 pilot control cap
- 5 pilot control cap
- 6 screws
- 7 stopper
- 8 O-ring
- 9 metal filter

<< P... port counterbalancing system coming from the control oil unit

Section **Dozer Blade**



- 1 case
- 2 spool valve
- 3 spring collar
- 4 centering spring
- 5 spring collar
- 6 pilot control cap
- 7 O-ring
- 8 screw
- 9 valve head
- 10 spring
- 11 stopper
- 12 O-ring
- 13 O-ring

Section **Swivel Unit**

- 1 case
- 2 spool valve
- 3 spring collar
- 4 centering spring
- 5 spring collar
- 6 pilot control cap
- 7 O-ring
- 8 screw
- 9 valve head
- 10 spring
- 11 stopper
- 12 O-ring
- 13 O-ring

6. PILOT CONTROL VALVES

Type: Neuson 2528415, 2708313 (4TH5)

Features: - progressive hydraulic pilot control device
- operation: directly controlled pressure reducing valve

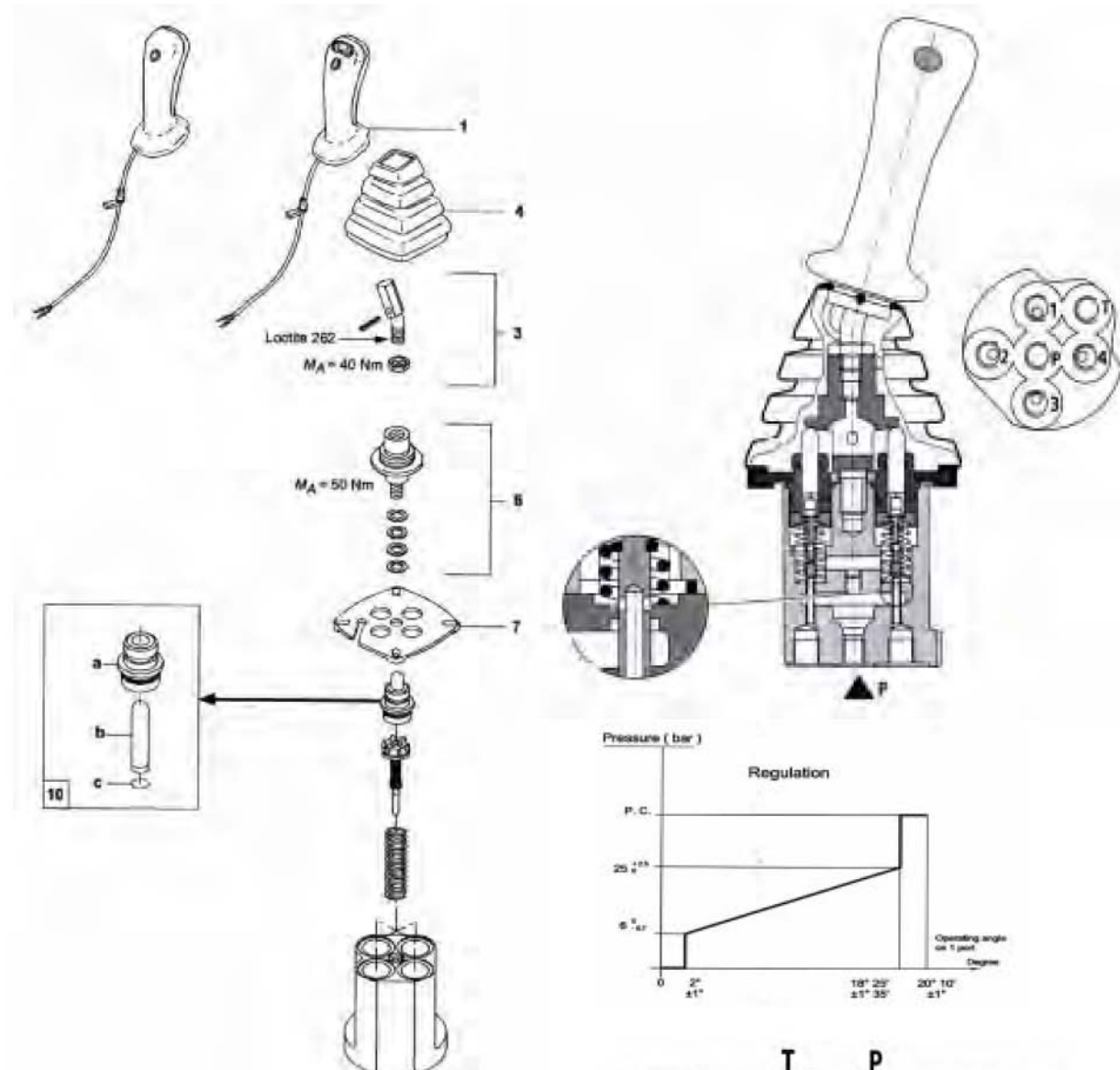


Fig.: **Manual control valve (joystick)**

- 1 control lever
- 3 rod assembly
- 4 rubber collar
- 6 joint
- 7 guide plate
- 10 tappet

Fig: **Driving pedal with hydraulic damper**
Type: Neuson 2528409 (4TH6NR)

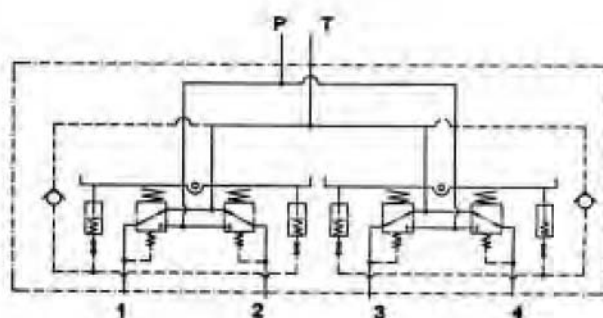
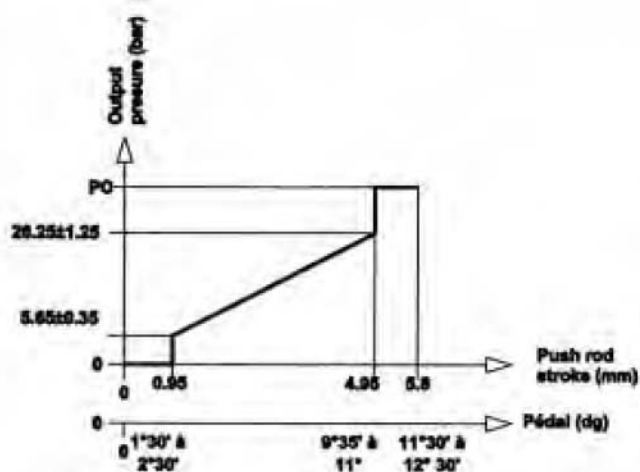
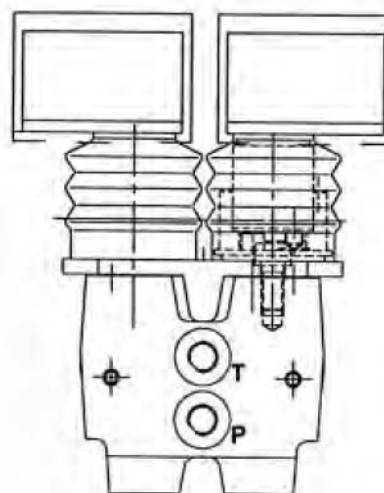
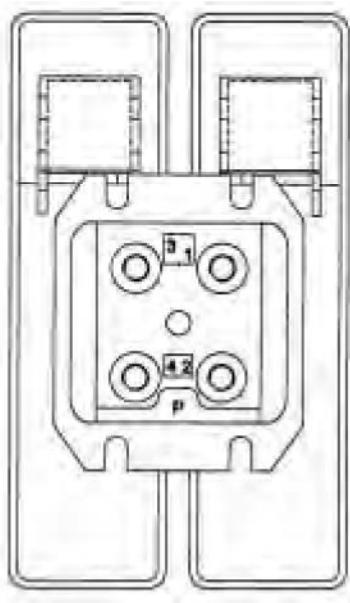
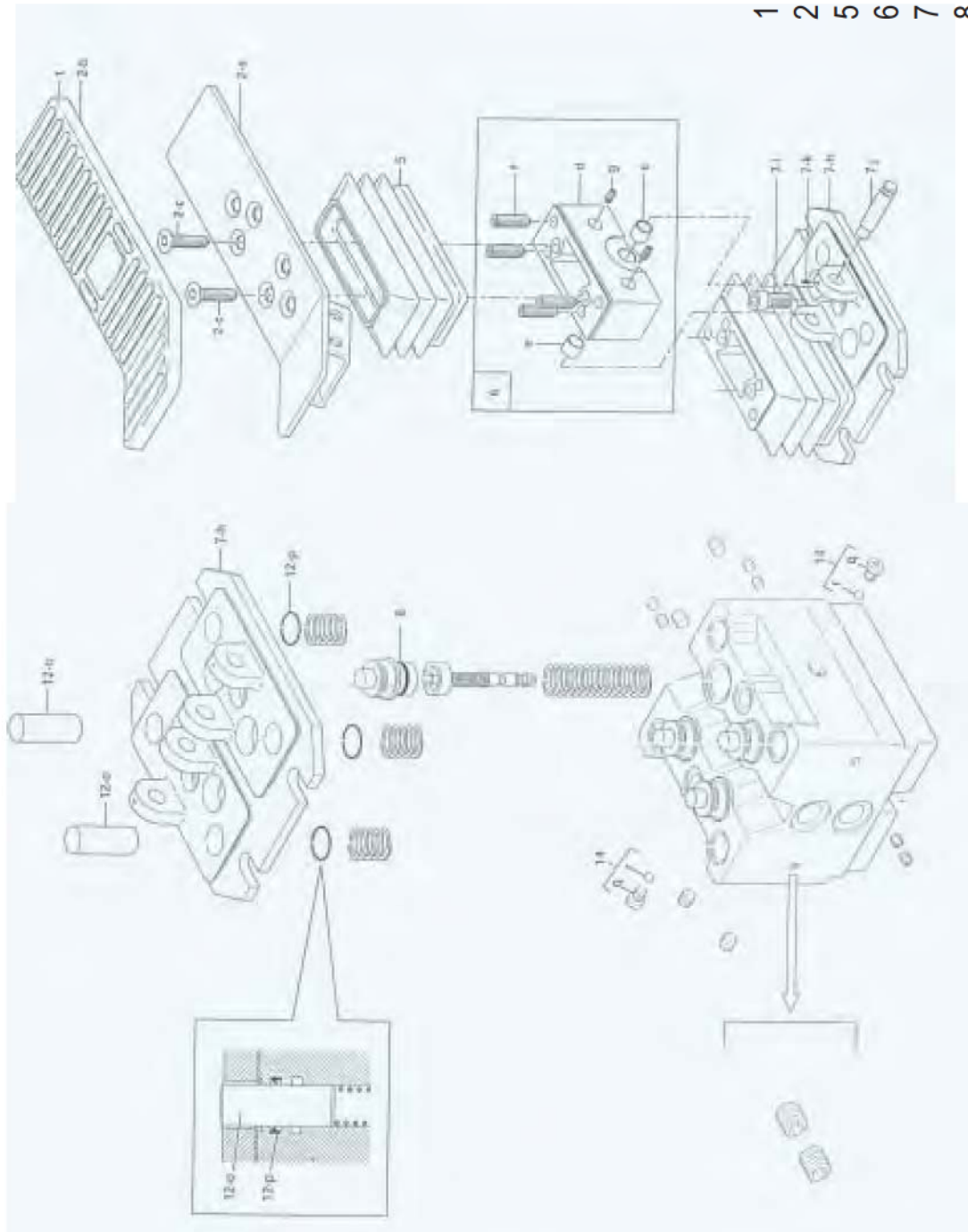


Fig.: **Driving pedal with hydraulic damper**
Type: Neuson 2528409 (4TH6NR)

foot rest
pedal assembly
expansion bellows
indexing table
plate assembly
tappet assembly
damping assembly
non-return valve assembly

1 2 5 6 7 8 12 14



7. SWIVEL UNIT

Neuson **2503 / 3003 / 3503 / 3703 :**

Type: Neuson 2503 > 2528401, 2528490 (Fabr.Nr.: AC00901 and higher)
 Neuson 30 - 3703 > 3028401, 3028490 (Fabr.Nr.: AC00904 and higher)



Service News **72/02:**
 Theme: New swivel unit 2503-3703 (Type 490°)
 Fabr.No.: See list
 Swivel gear box still free of maintenance !

Features: - **Maintenance-free** gear box (swivel motor lubricated by hydraulic oil)
 Warning: Use only the specified hydraulic oil !
 - Mech. motor brake (multiple-disk brake), hydr. driven
 - Swash-plate piston motor

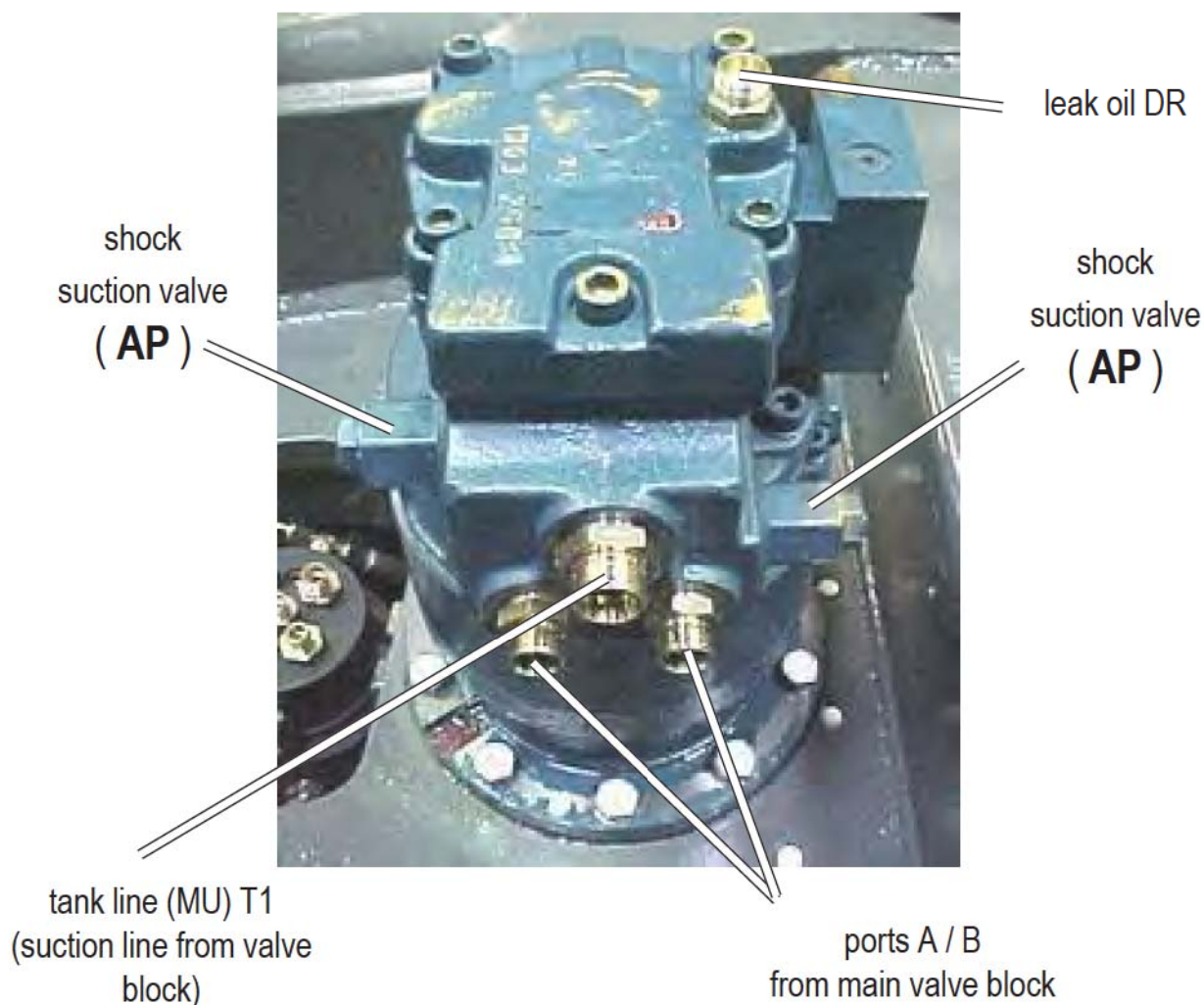
Fig.: **Port assignment - swivel unit** 2528401, 3028401

Fig.: Port assignment - swivel unit 2528401, 3028401

Brake block:

port **S**:
control line

port **P**:
supply control oil unit



Fig.: Hydraulic diagram - swivel unit 2528401, 3028401

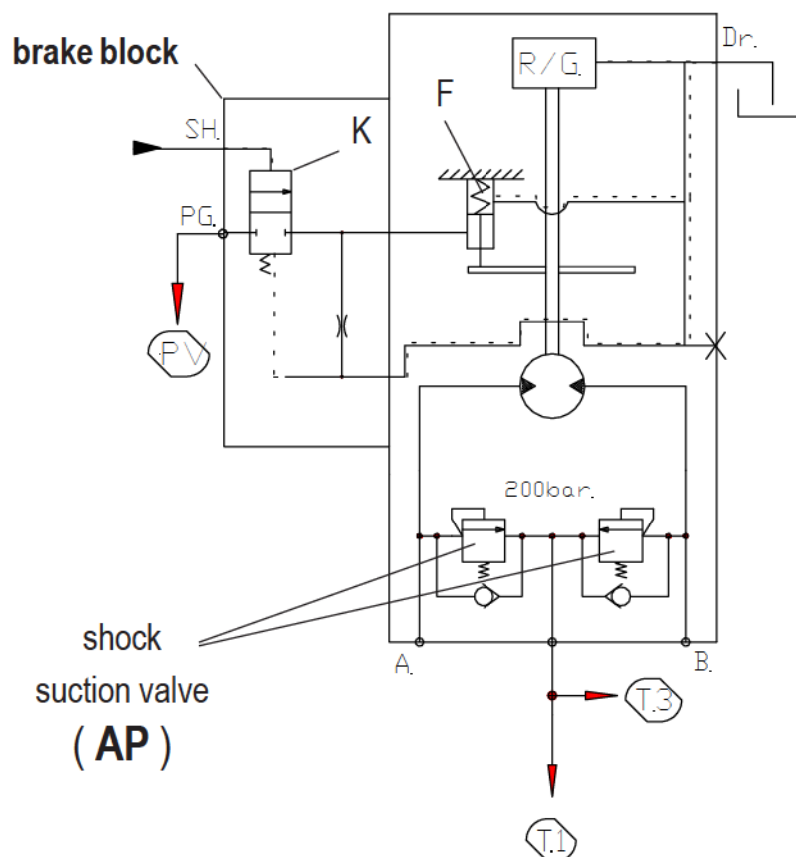
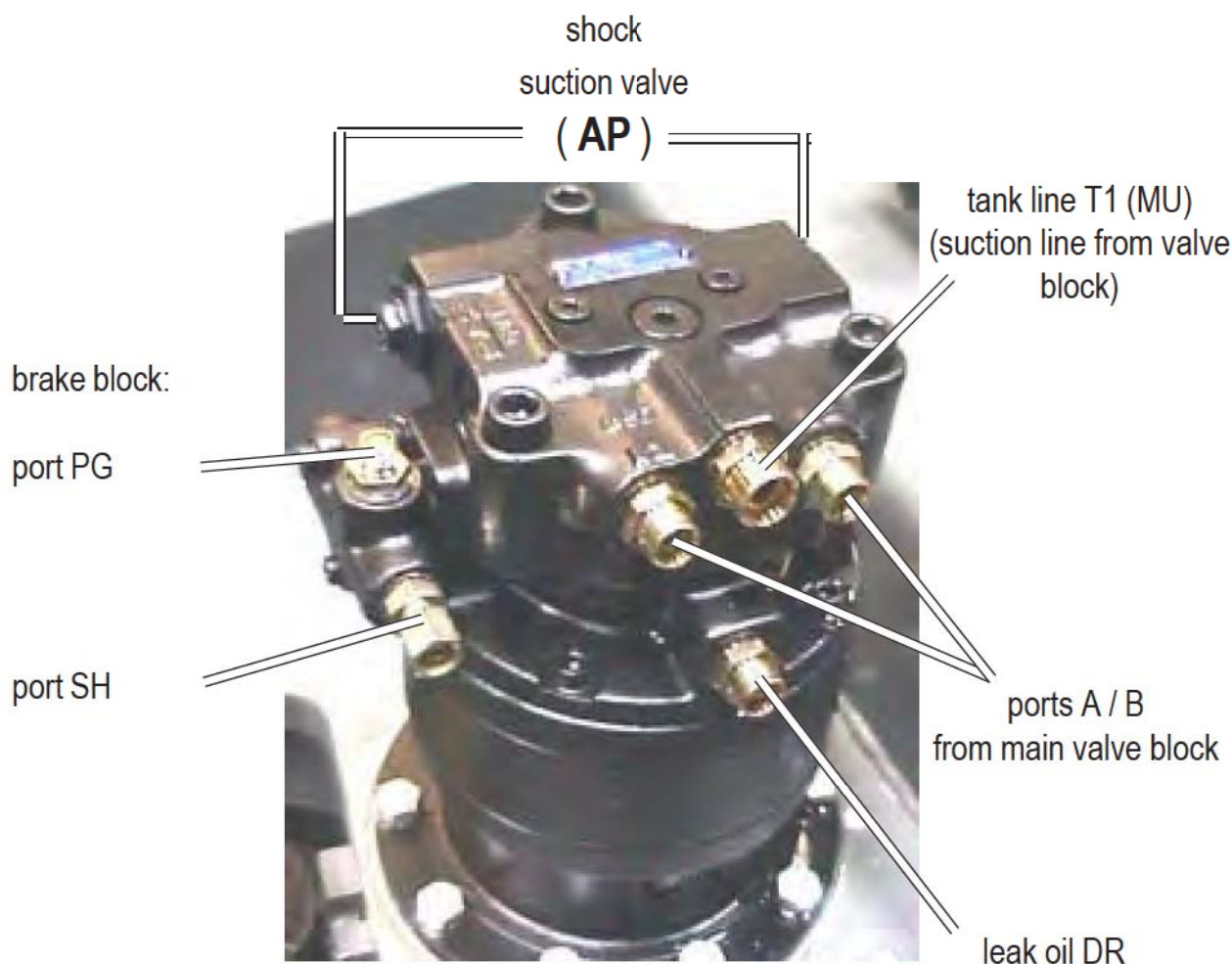


Fig.: **Port assignment - swivel unit** 2528490, 3028490

Function: **Mechanical parking brake**

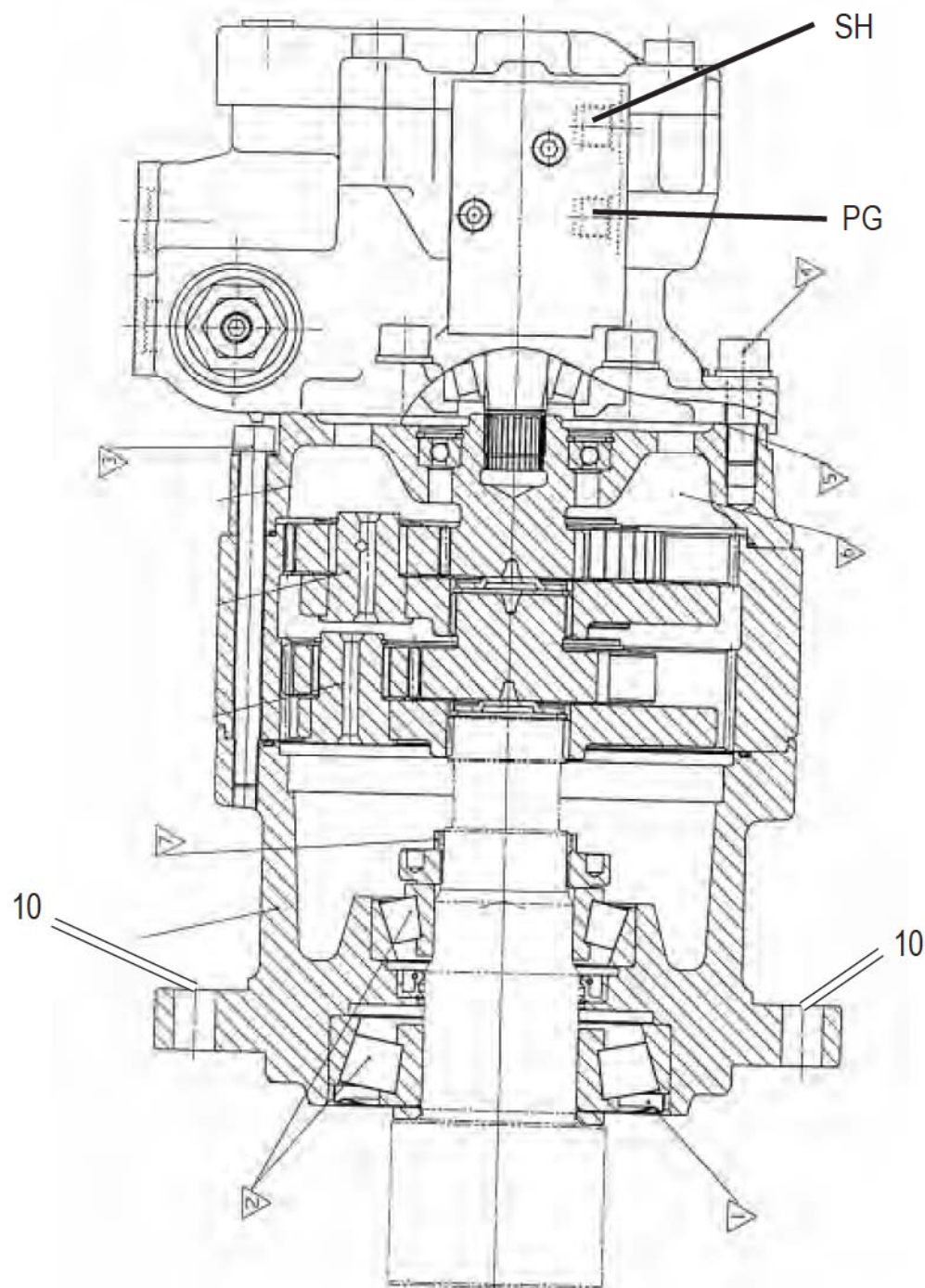
Opening the brake (release) :

This is effected via the pilot control pressure of the function swivelling left and/or right via port S (SH). As soon as pressure is applied to this port, the piston (K) is displaced, and via port P (PG) the pilot control pressure gets to the brake cylinder and opens it against spring force (F).

Closing the brake:

As soon as the pressure of port S drops, the piston (K) is moved to its original position by spring force and the brake cylinder chamber is no longer supplied; application of the brake is effected via restrictor (B) at a certain delay of approx. 8 sec when at operating temperature.

Fig.: **Swivel unit** 2528401, 3028401



Tightening torques:

No. 3	25 Nm
No. 4	50 Nm
No. 10	120 Nm

Fig.: Swivel unit 2528490 - gear box

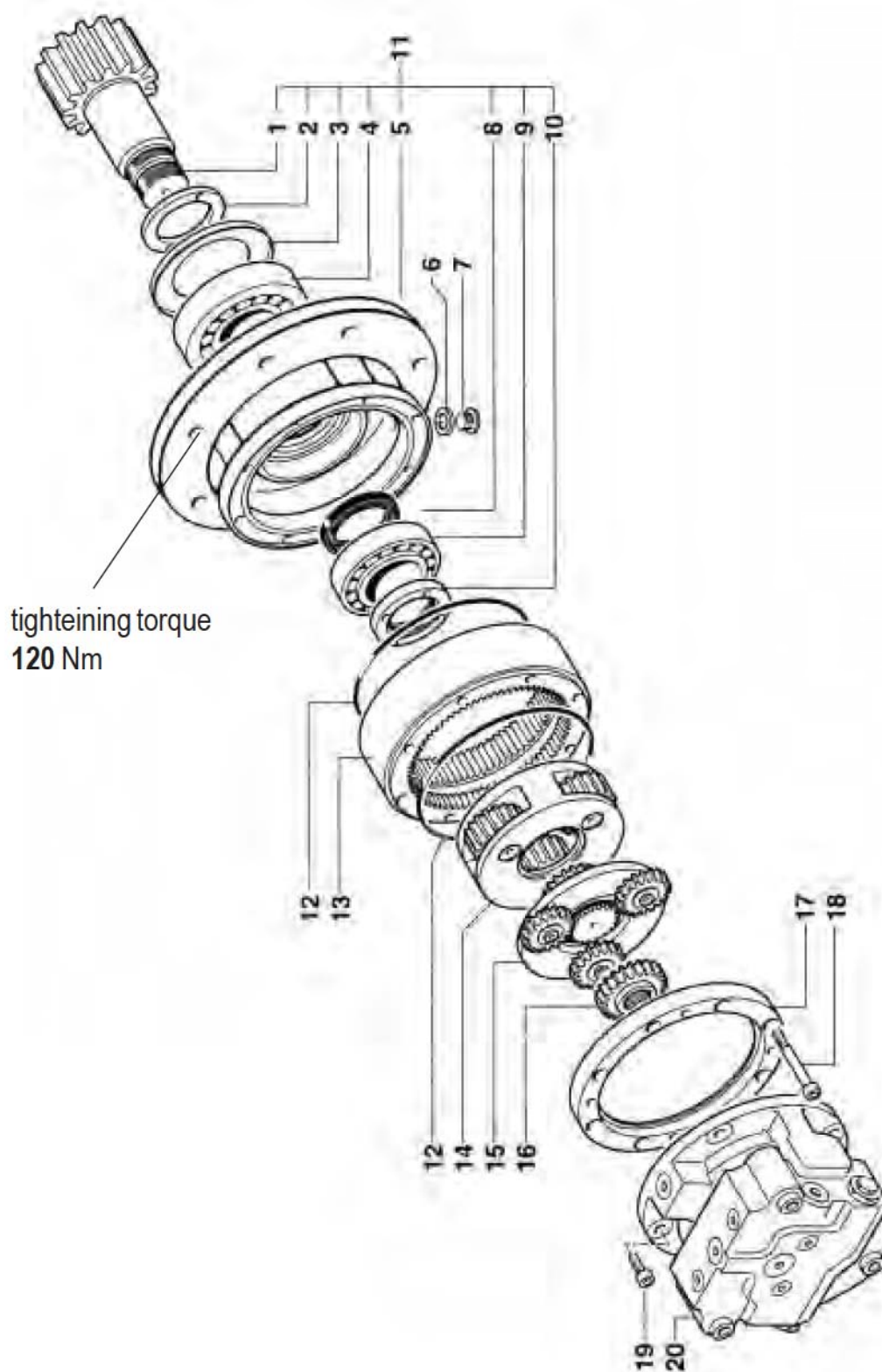
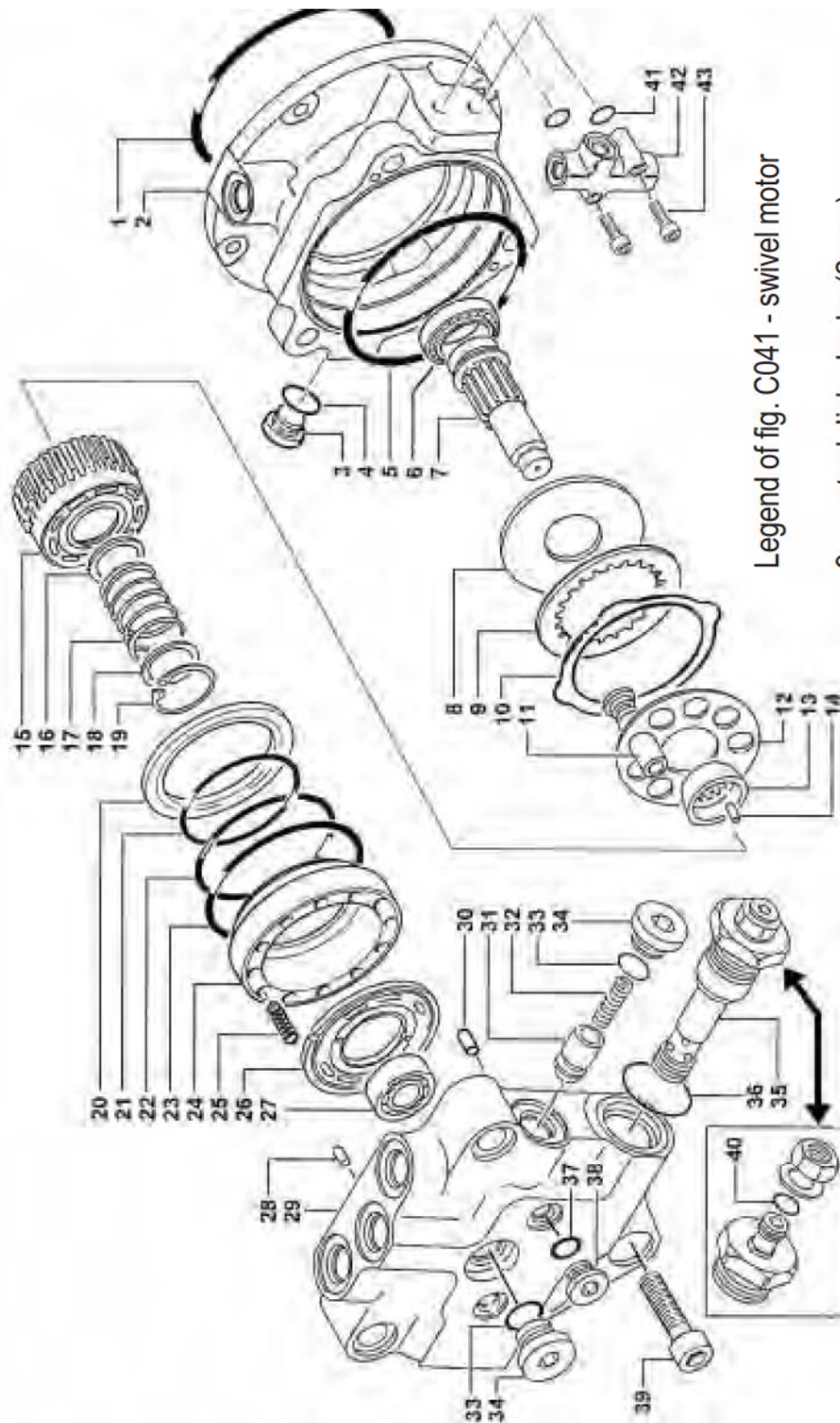


Fig.: Swivel Unit 2528490 - **swivel motor**



Legend of fig. C041 - swivel motor

- 9 steel disk - brake (2 pcs.)
- 10 brake disk (2 pcs.)
- 24 brake piston
- 31 suction valve
- 35 pressure reducing valve (secondary)
- 42 brake block (valve)



8. DRIVE UNIT

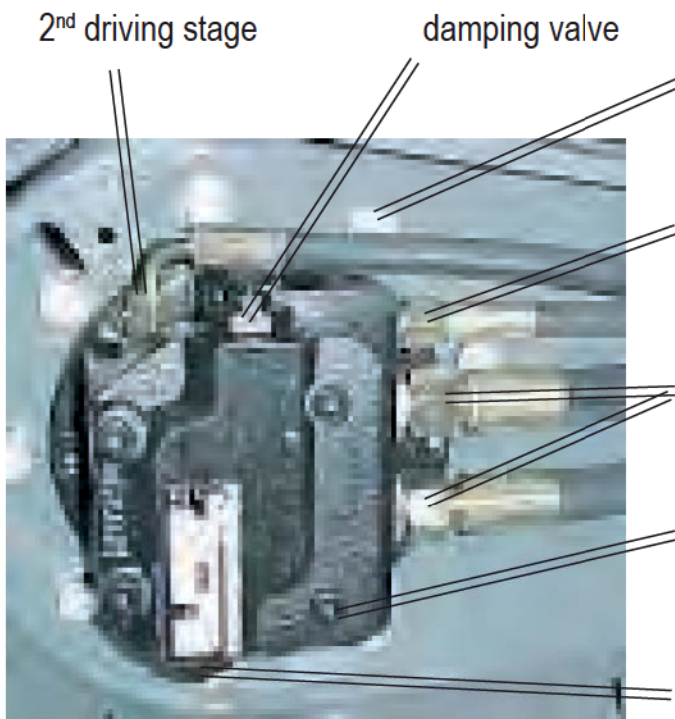
Neuson **2503 / 3003 :**

- Features:
- swash-plate piston motor, 2 positions for absorption capacity
 - maintenance intervals - see chapter Maintenance
 - no mechanical motor brake

Neuson **3503 / 3703 :**

- Features:
- like 2503 - 3003, with mech. motor brake (multiple-disk brake), hydr.

Attention: Traction drive down only up to serial number AE01100, starting from AE01101 traction drive 1000125872 inserted which is described afterwards.³⁹



tightening torque
(TT) : **123 Nm**, glued in

leak oil
(always connect on top for
better venting of motor)

A and B - driving motor ports

hydraulic brake piston

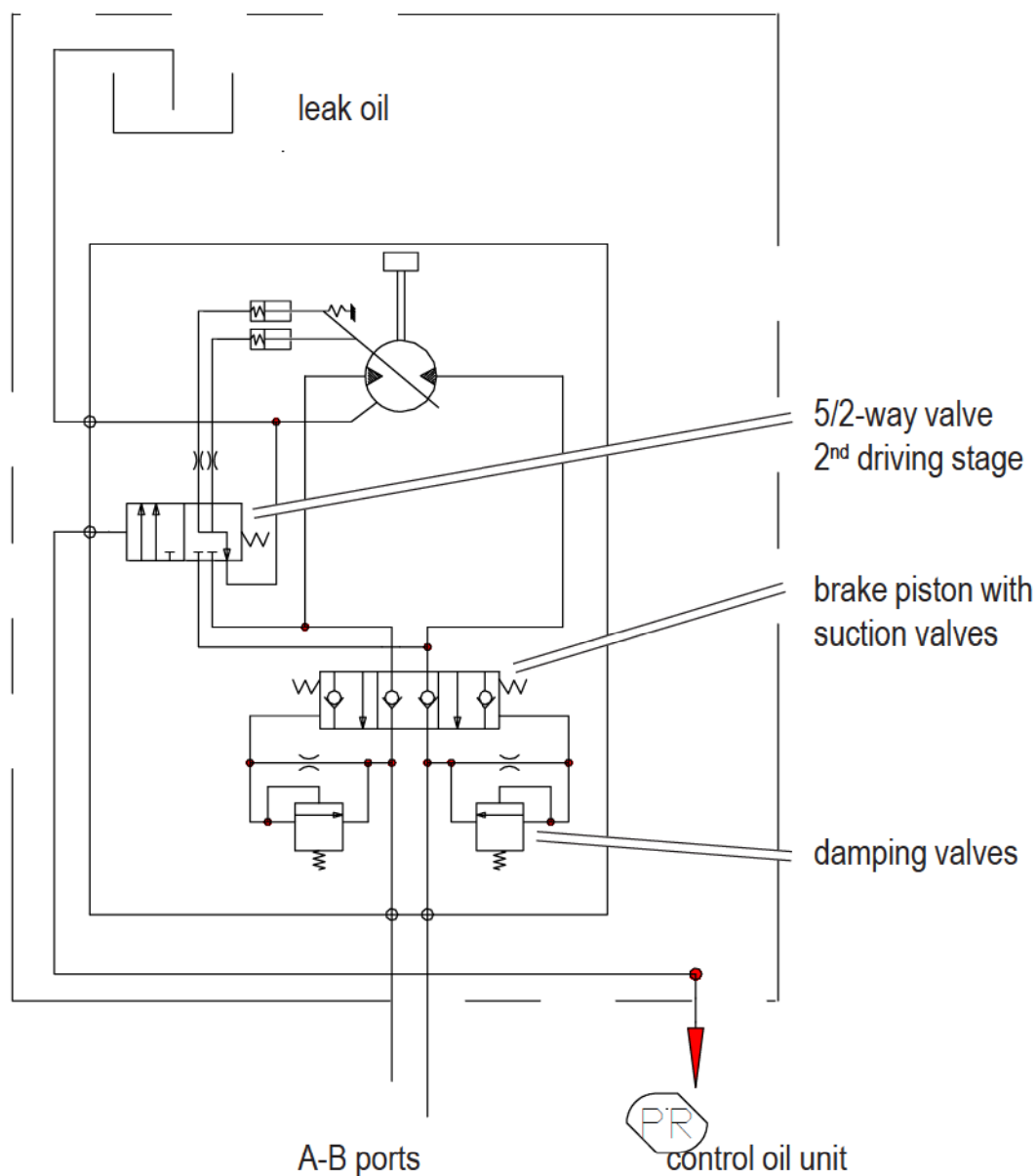
damping valve

Fig.: Port assignment of driving motor

Fig.: Schematic diagram of **driving motor without mechanical parking brake**

Neuson 2503 - version 2528403

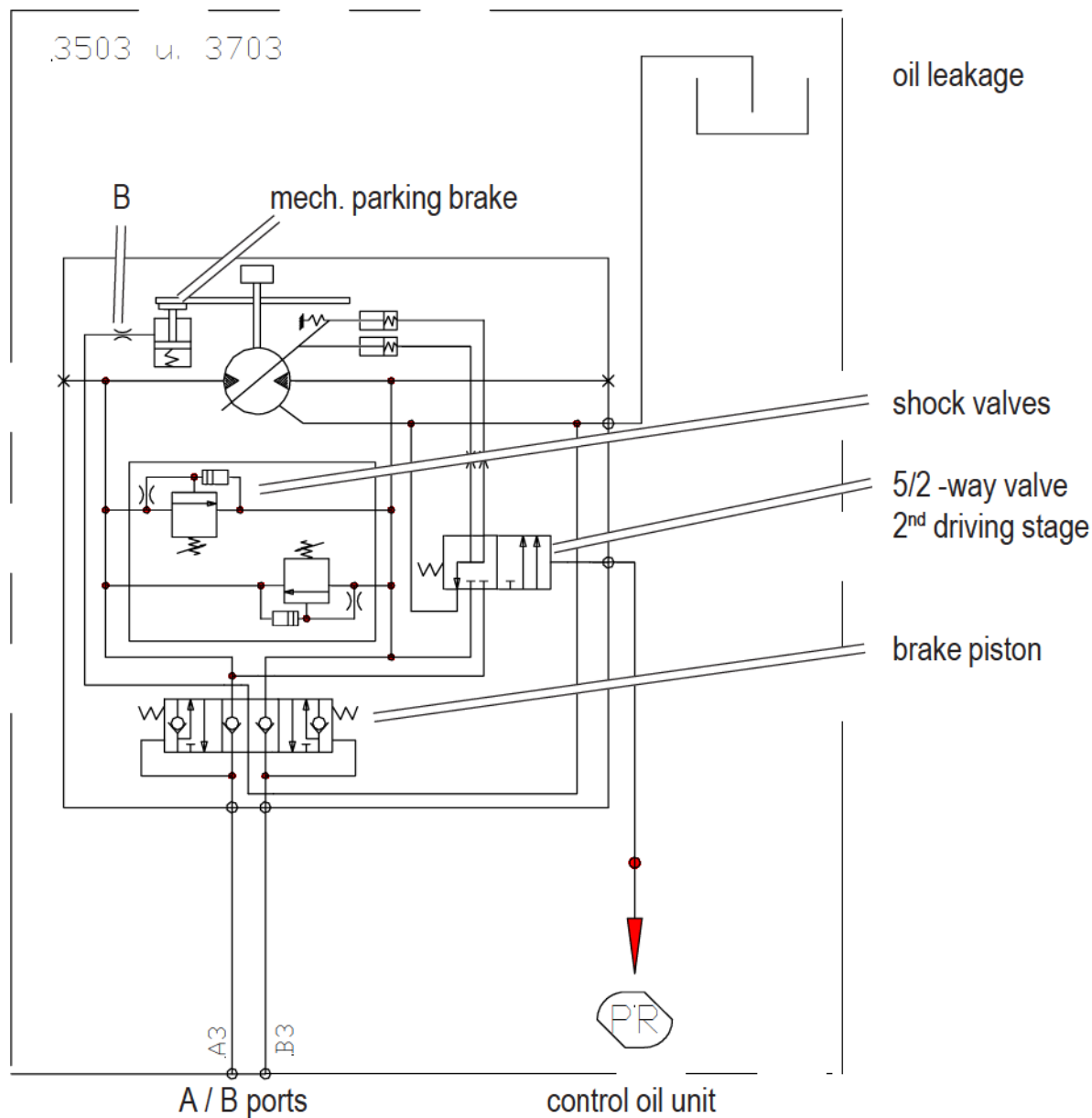
Neuson 3003 - version 3028403



Function - Hydraulic **Brake Piston**:

The hydraulic brake piston prevents overspeeding of the motor and keeps speed constant when driving downhill by blocking the relevant return flow. The damping valves prevent jerking motions to avoid any building up of vibrations.

Fig.: Circuit diagram of **driving motor with mechanical parking brake**
Neuson 3503, 3703 - design 2608505



Function - Mechanical Parking Brake:

The brake is released automatically via high-pressure from the brake piston; as soon as the brake piston goes back to neutral position, the brake is applied via a restrictor (B) at a certain time delay to avoid damage to the brake linings.

Fig.: **Gear box** - drive unit 2503 - 3003
Subassembly 2528403, 3028403

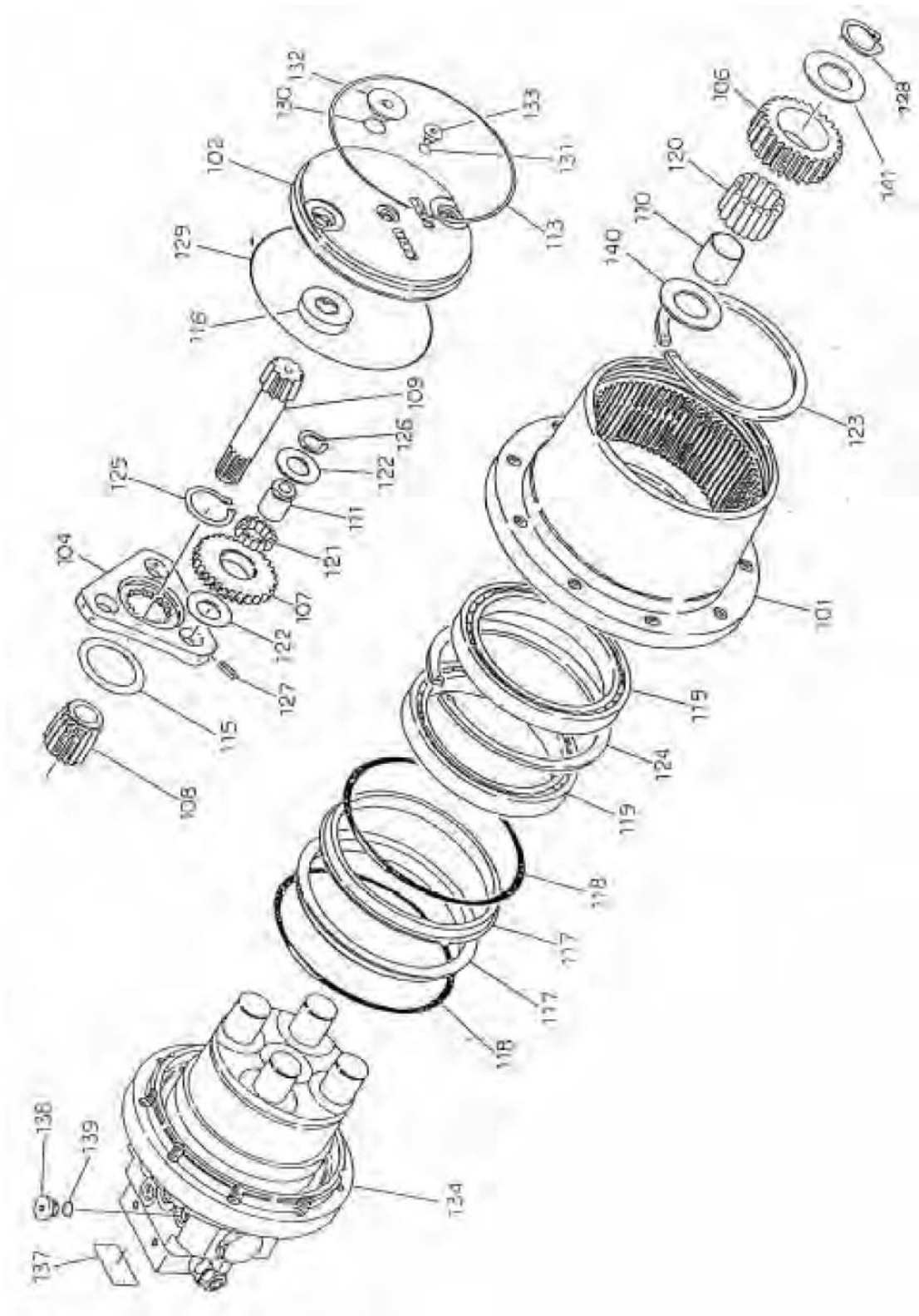


Fig.: **Driving motor** - drive unit 2503 - 3003
Subassembly 2528403, 3028403

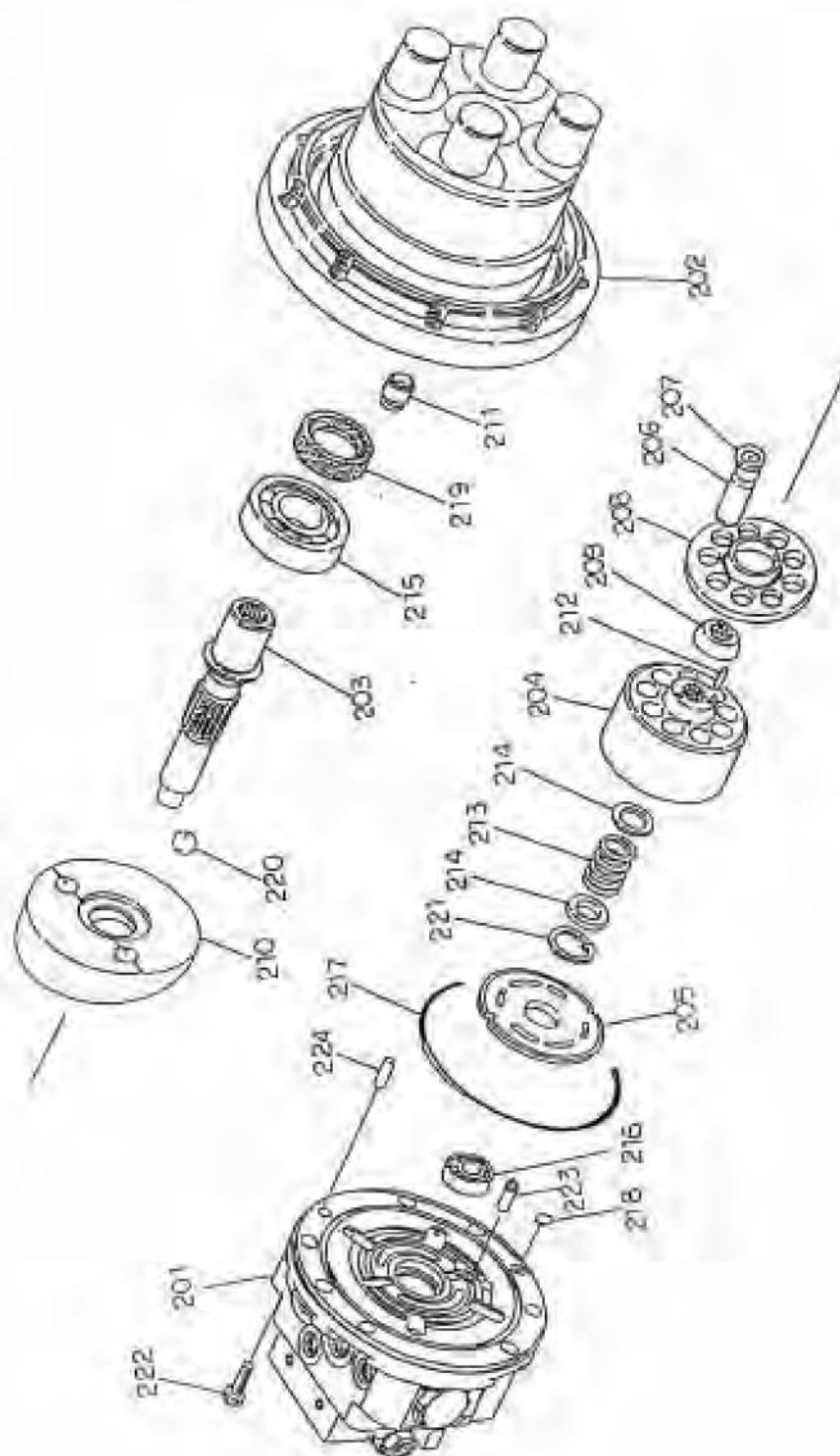


Fig.: **Brake valve block - drive unit 2503 / 3003**
Subassembly 2528403, 3028403

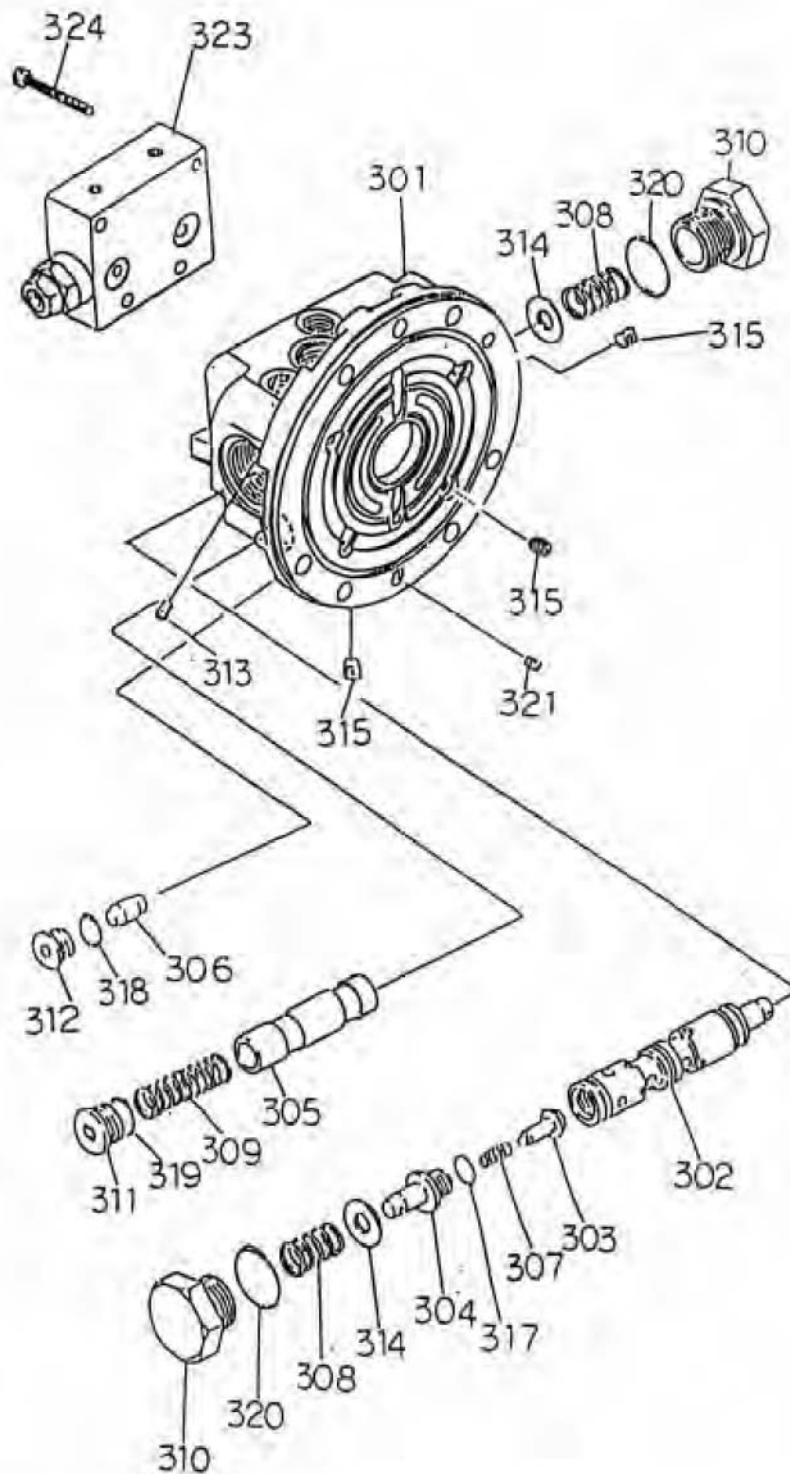
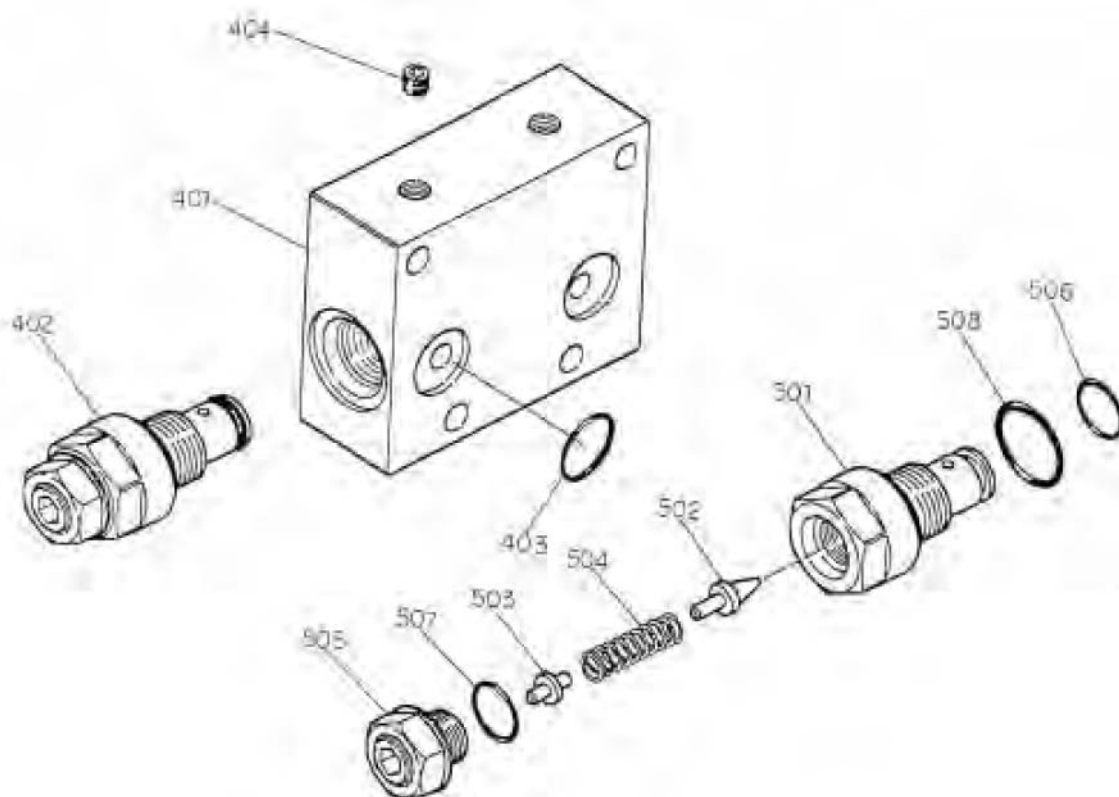


Fig.: **Shock valve block** - drive unit 2503 / 3003
Subassembly 2528403, 3028403



Legend: drive unit complete 2503 - 3003

117, 118	lifetime sealing
134	hydraulic motor
204	cylinder drum
205	distribution plate
206, 207	motor piston, sliding block
210	swash plate
211	setting piston of swash plate
219	oil sealing
220	swash plate bearing
302	brake piston
303	non-return valve / check valve
305	piston - 2 nd driving speed
306	shuttle spool valve
402	damping valves (shock valve cartridge)

Fig.: **Brake valve block - drive unit 3503 / 3703**
Subassembly 2608505

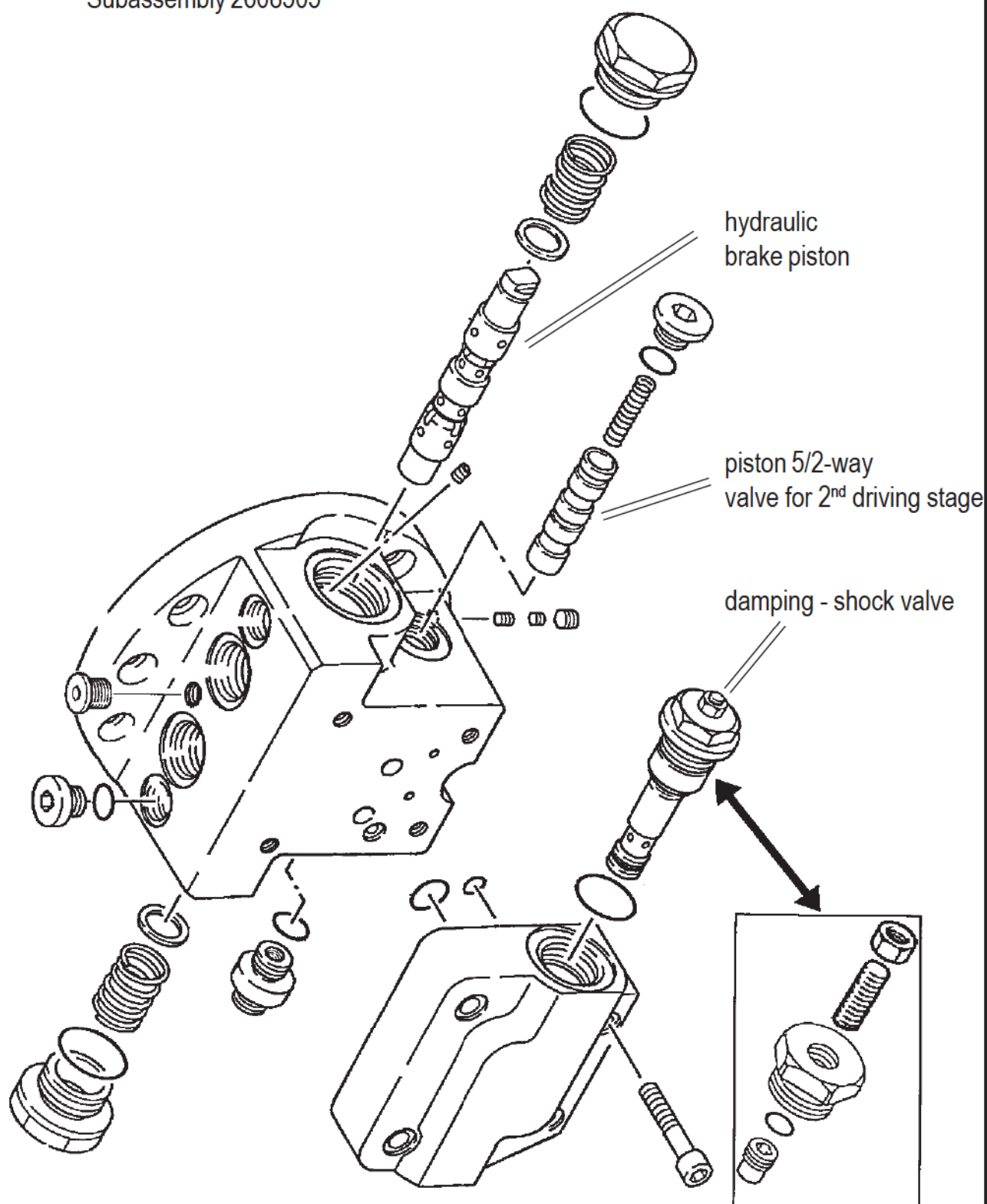


Fig. : **Driving motor - drive unit 3503 / 3703**
Subassembly 2608505

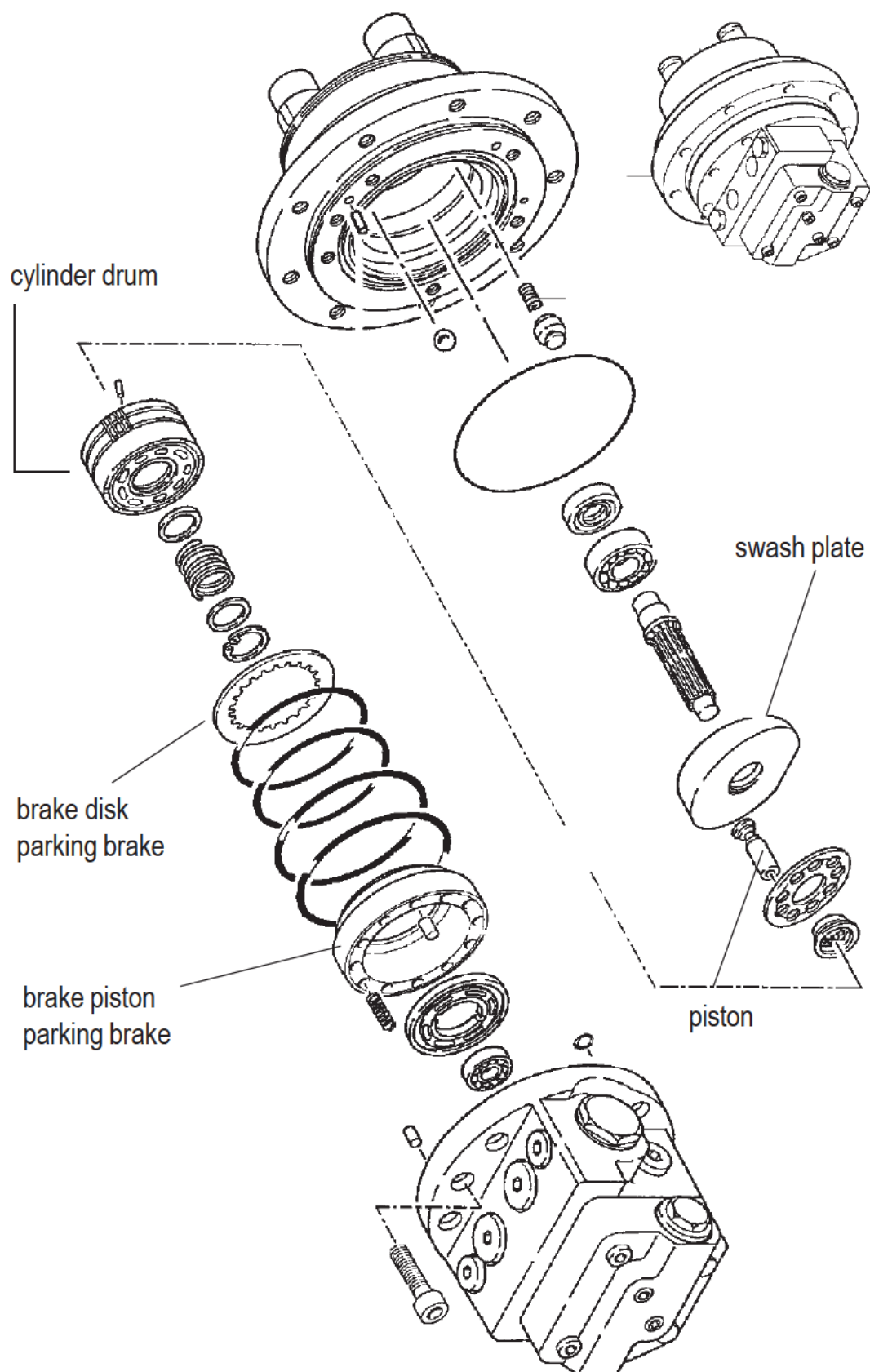
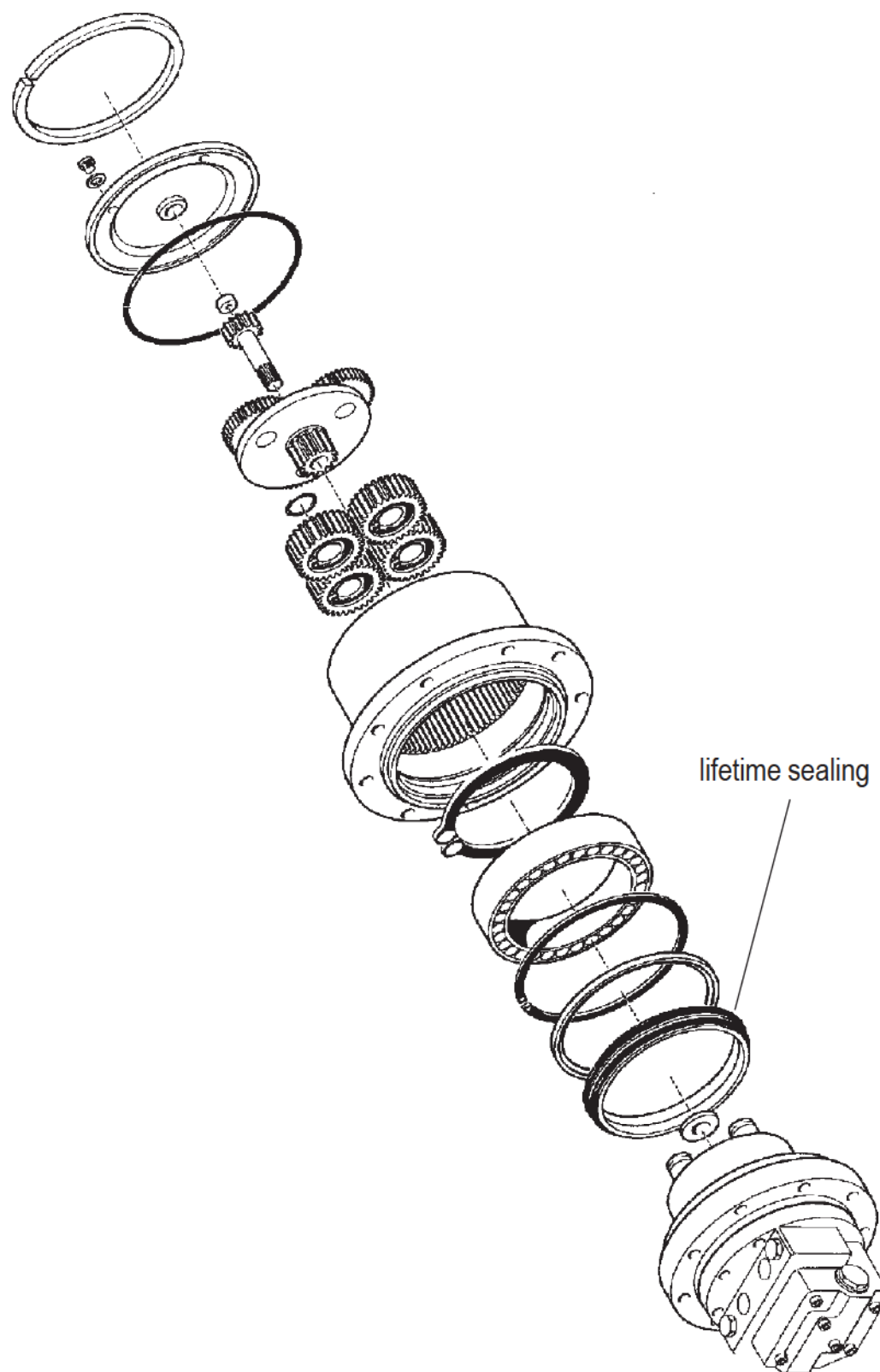


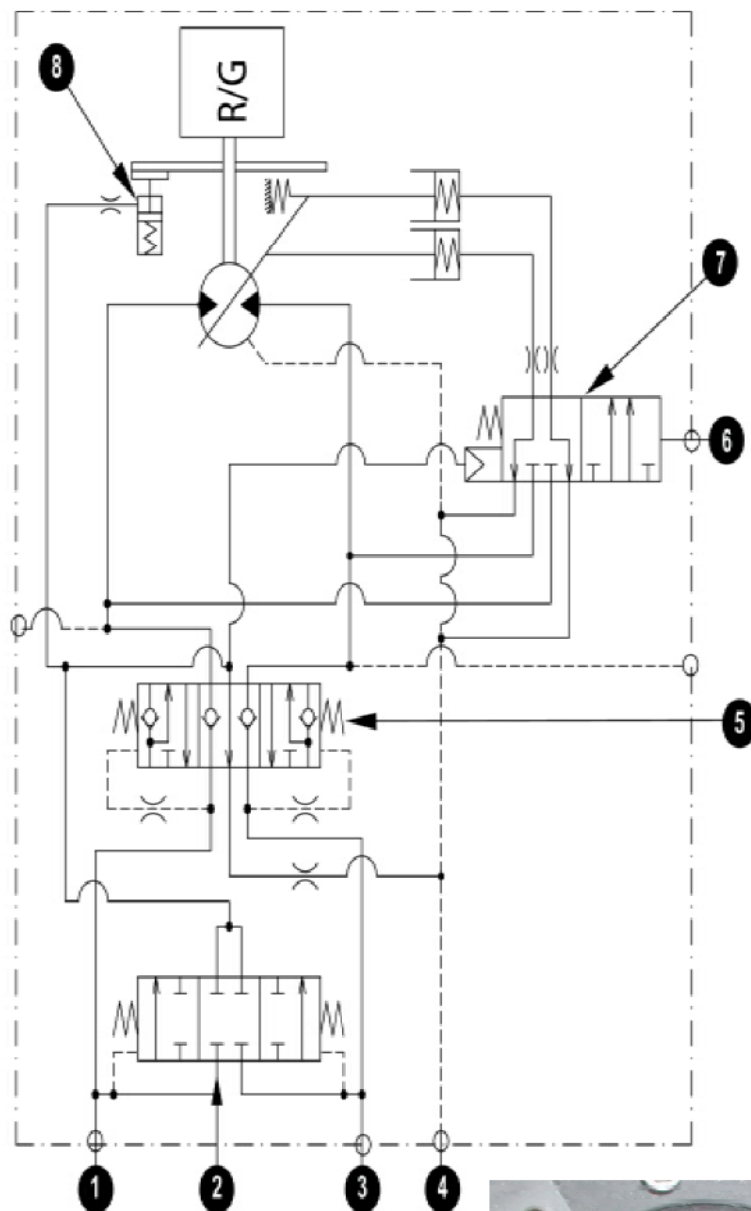
Fig. : **Gear box** - drive unit 2608505





The travelling drive now has an „automatic powershift“ gearbox. The travelling drive is basically in 2nd speed if the switch for 2nd speed range is switched on (high speed).

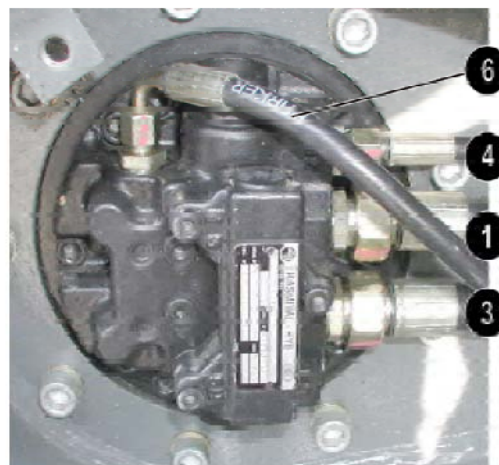
1st speed is automatically engaged if more power is required.



Pos.

Description

- | | |
|---|--|
| 1 | Drive port (-> swivel joint 2/7) |
| 2 | Brake release piston |
| 3 | Drive port (-> swivel joint 6/5) |
| 4 | Leak oil port (-> swivel joint 1) |
| 5 | Brake piston |
| 6 | 2nd speed range port (-> swivel joint 8) |
| 7 | 2nd speed range directional valve |
| 8 | Brake piston |



**Function****Driving:**

If high pressure is applied to one of the drives, the brake release piston is actuated first and passes high pressure on to the brake cylinder, which releases the brake. The throttle slowly actuates the brake piston at the same time. Brake piston control causes high pressure to be applied to the motor, which starts turning.

Stopping:

The oil flows from both ports to the tank upon releasing the joystick. The brake release piston and the brake piston (slowly actuated by the throttle) return to their base positions. The slow drop of the brake piston prevents the hydraulic motor from coming to an abrupt standstill. With the brake piston in neutral position, the ports are no longer connected to the motor, which can no longer turn. The brake release pressure is reduced via both throttles shortly afterwards.

2 speed range functions

Speed range 1

2nd speed range switch: switched off

The directional valve for the 2nd speed range remains in home position (position as shown in diagram), and the hydraulic motor's swash plate is in maximum capacity position.

The motor runs at low speed.

Speed range 2

2nd speed range switch: switched on

The directional valve for the 2nd speed range is enabled, and the hydraulic motor's swash plate is in minimum capacity position.

The motor runs at high speed.

If the pressure rises in the travelling drive, the directional valve for the 2nd speed range is forced back to home position and hydraulic motor's swash plate returns to maximum capacity.

The motor now runs at low speed.

The directional valve returns to 2nd speed range as soon as the pressure in the travelling drive drops again.

The motor runs at high speed again.

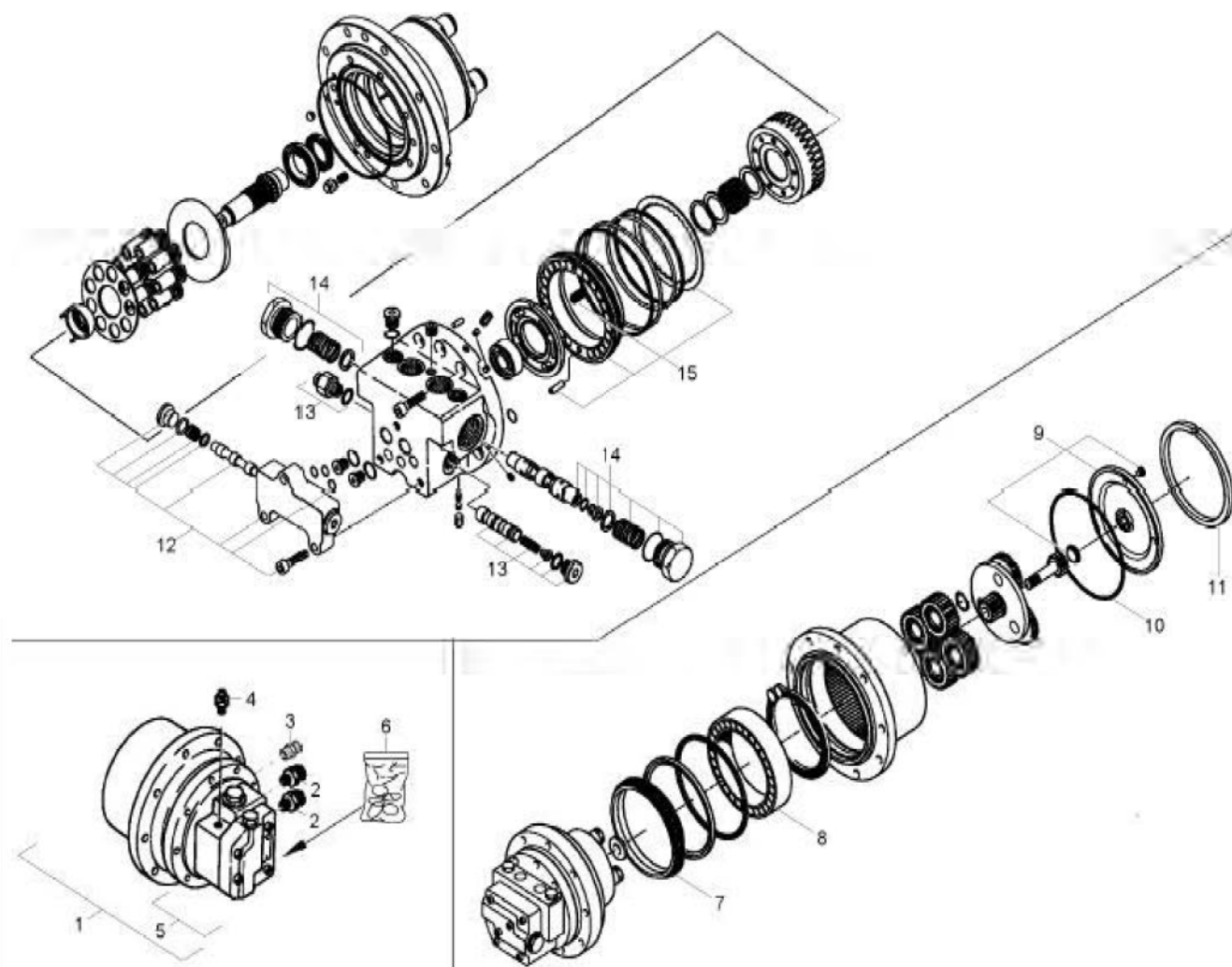
Switch operating point of valve pos. 6: 180 bar



Pos

Description

- | | |
|----|------------------------------|
| 1 | Travelling drive |
| 2 | Screw connection |
| 3 | Screw connection |
| 4 | Screw connection |
| 5 | Hydraulic motor |
| 6 | Hydraulic motor sealing kit |
| 7 | Hydraulic motor |
| 8 | Bearing |
| 9 | Cover |
| 10 | O-ring |
| 11 | Snap ring |
| 12 | Valve set |
| 13 | Piston valve for speed range |
| 14 | Brake valve |
| 15 | Travelling drive brake |

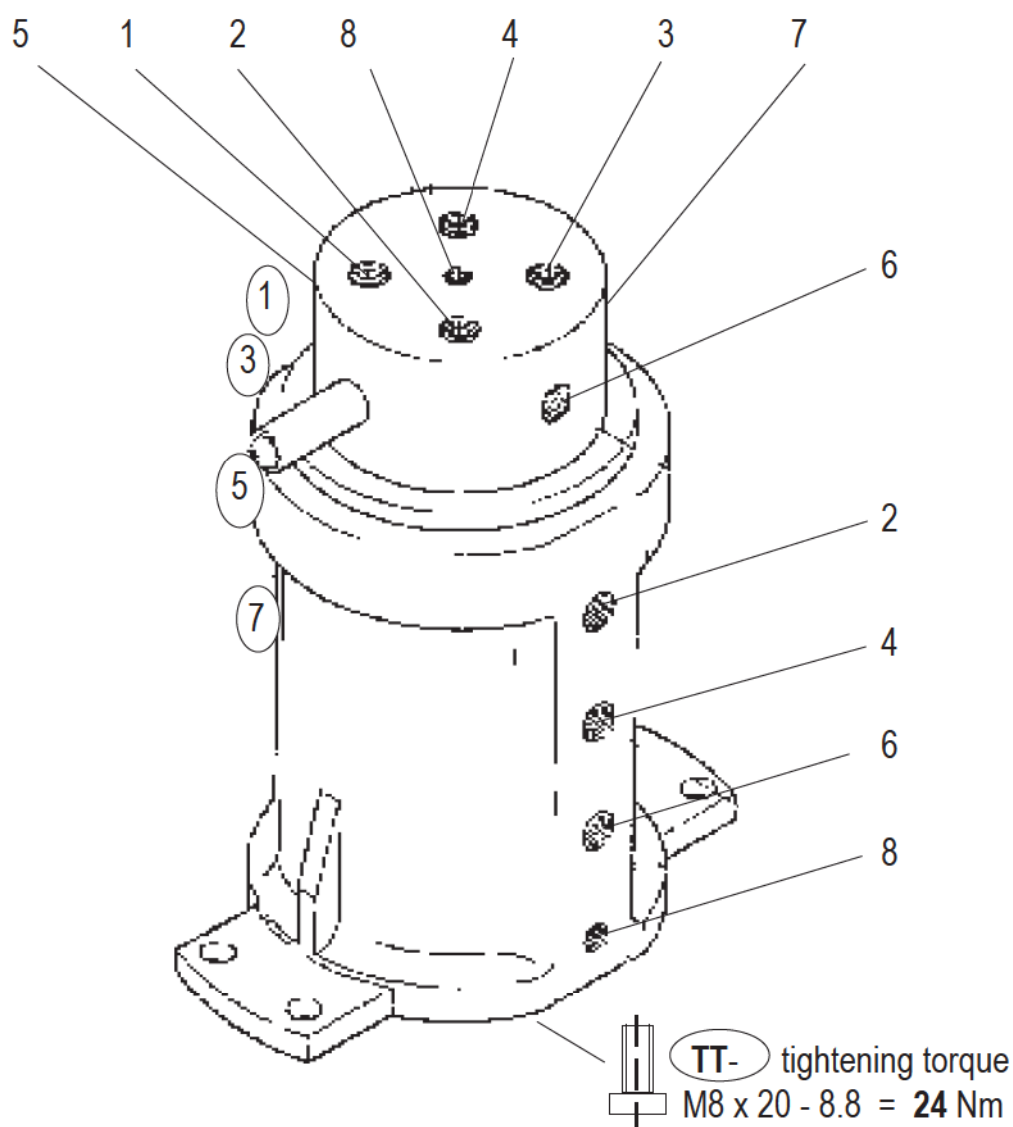




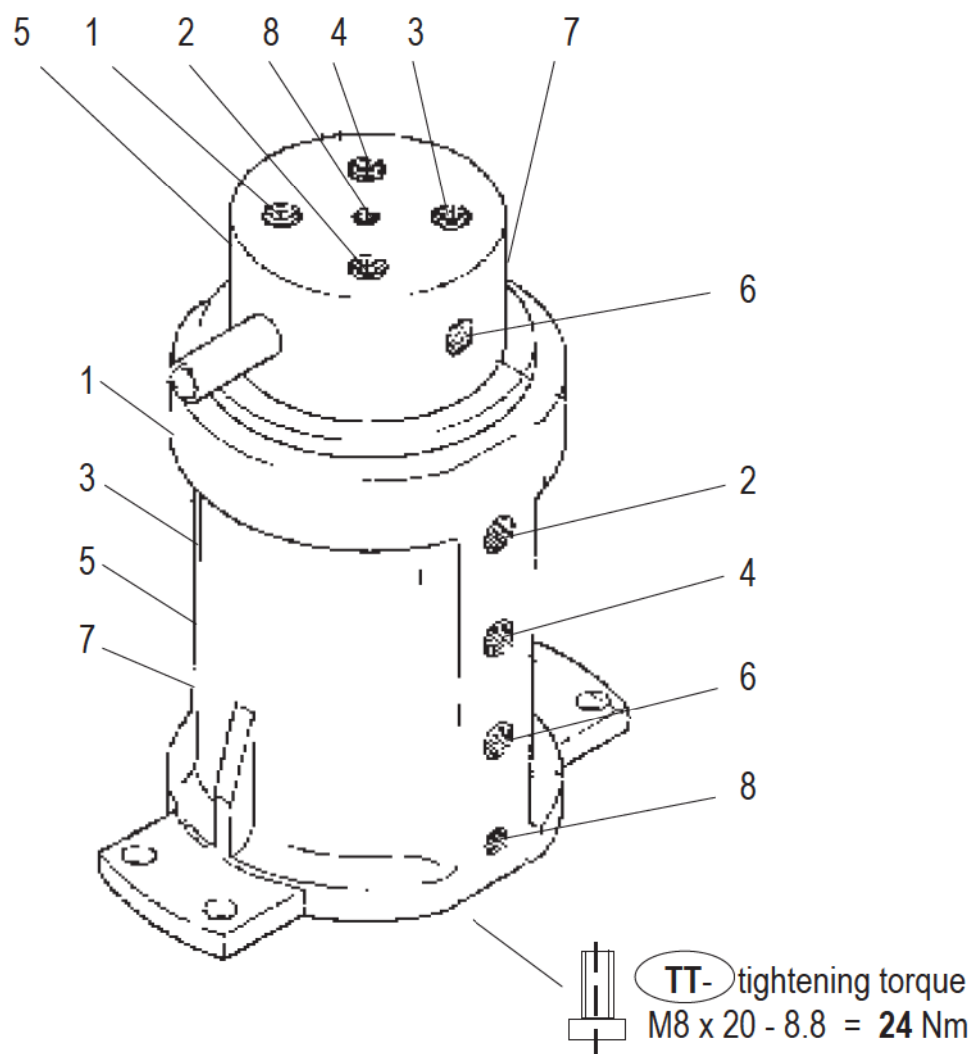
9. SWIVEL JOINT

Types:	Neuson 2503	- 8-port swivel joint
	Neuson 3003, 3503	- 8-port swivel joint
	Neuson 3703	- 10-port swivel joint

Fig.: **Swivel joint 1408050 - port assignment 2503**



Port		Port	
1	driving motor left top	2	driving motor right top
3	driving motor left bottom	4	driving motor right bottom
5	dozer blade cyl. rod side	6	dozer blade cylinder bottom side
7	2 nd driving stage	8	leak oil duct

Fig.: **Swivel joint** 2608500 - port assignment 3003 - 3503

Port

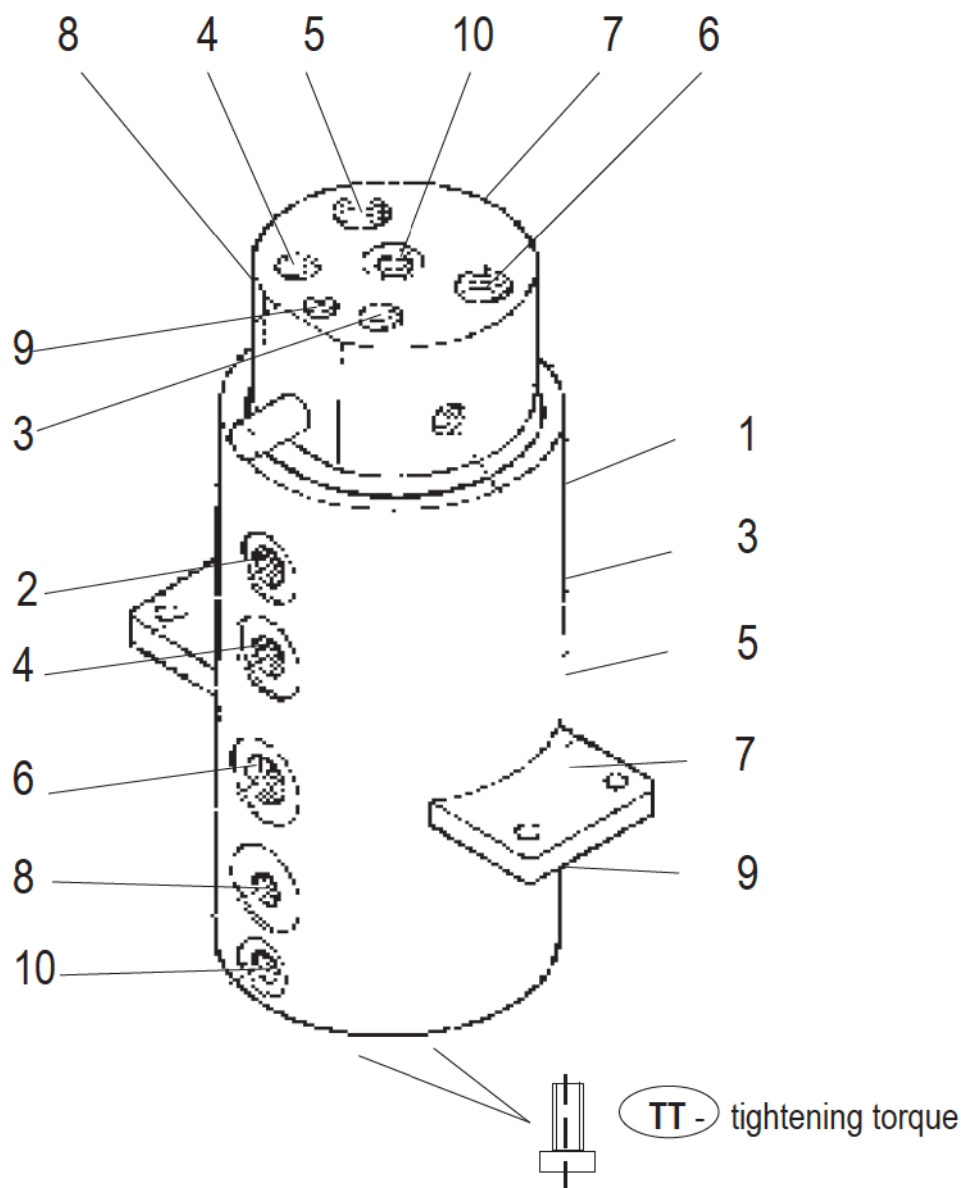
- 1 leak oil
3 dozer blade cyl. bottom side
5 driving motor left top
7 driving motor left bottom

Port

- 2 dozer blade cyl. rod side
4 driving motor right top
6 driving motor right bottom
8 2nd driving stage



Fig.: **Swivel joint 2808510 - port assignment 3703**



Port		Port	
1	2 nd driving stage	2	dozer blade cyl. bottom side
3	dozer blade cyl. rod side	4	driving motor right top
5	driving motor left top	6	driving motor right bottom
7	driving motor left bottom	8	tilting cylinder rod side
9	tilting cylinder bottom side	10	leak oil



10. SWITCH VALVE

Neuson **2503 / 3003 / 3503 :**

Features: - switch valve controlled electrically via pushbutton at the joystick,
neutral - de-energized

Function: - switch valve **A**: auxiliary hydraulics <<>> boom offset
- switch valve **B**: boom <<>> dozer blade

(SNews 50/01!)

Neuson **3703 :**

Additional - switch valve **C**: bucket <<>> tilting of uppercarriage

> Fig. C055,C056: **SWITCH VALVE A** : (additional hydraulics <<>> boom offset)

offset cylinder



secondary
pressure limiting
valves

auxiliary
hydraulics



main valve block section
auxiliary hydraulics



position of switch valve A





> Fig. : **SWITCH VALVE B** : (boom cylinder<>> boom offset)

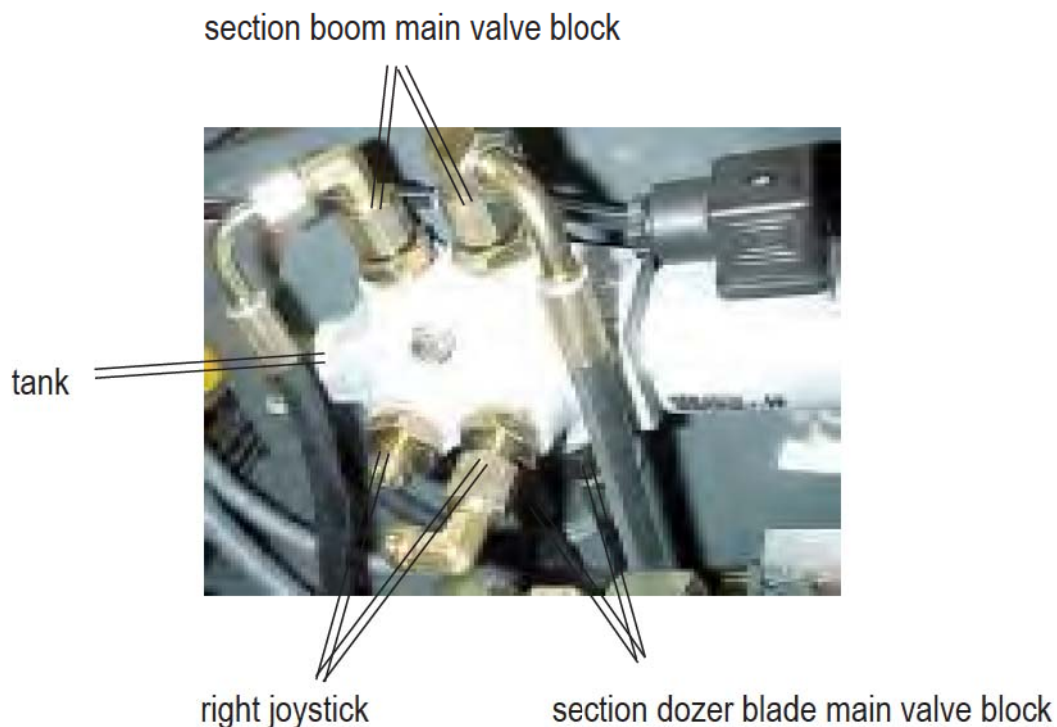
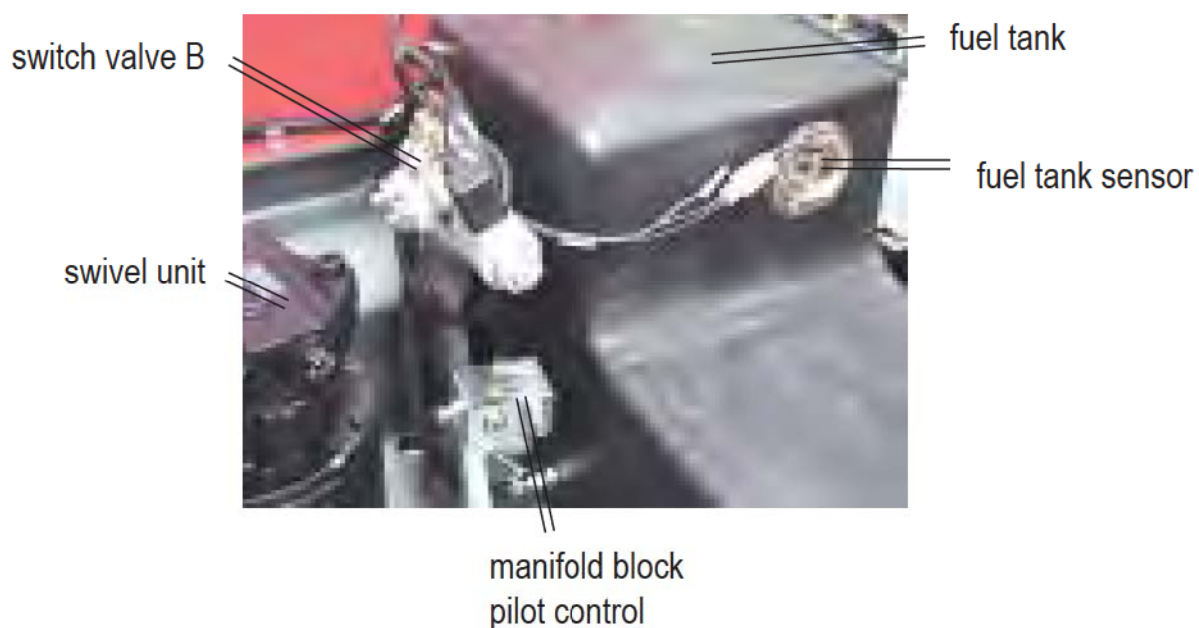


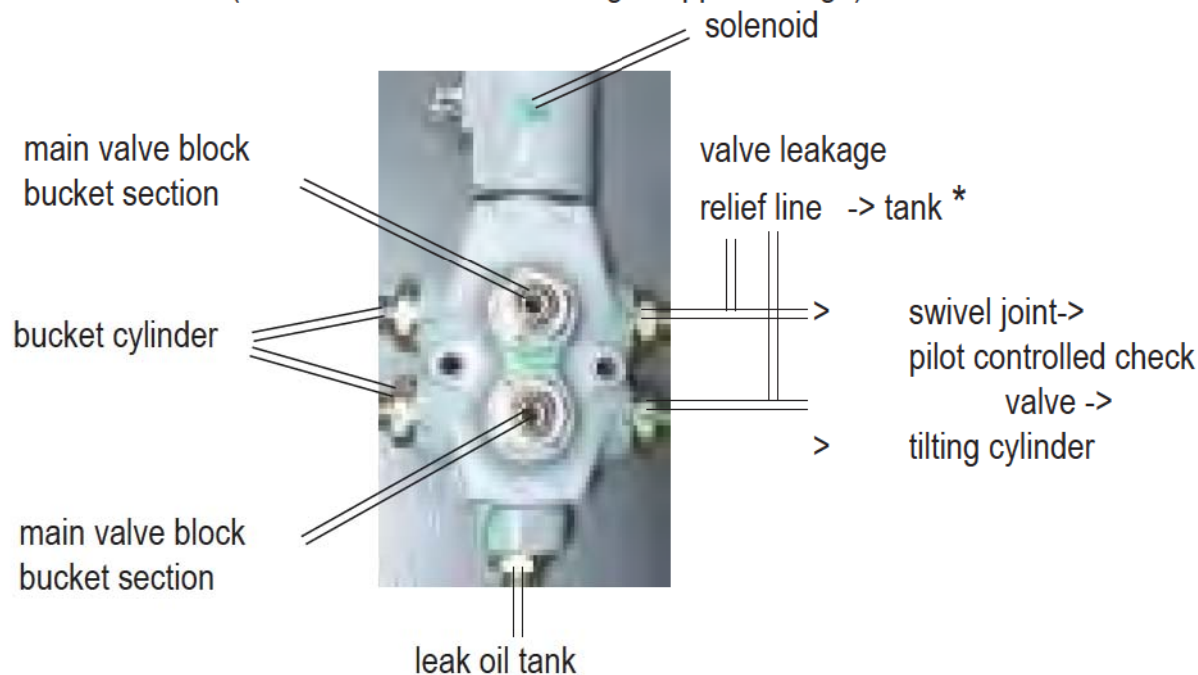
Fig. : Position of switch valve B

Access: > via covering of seat bracket

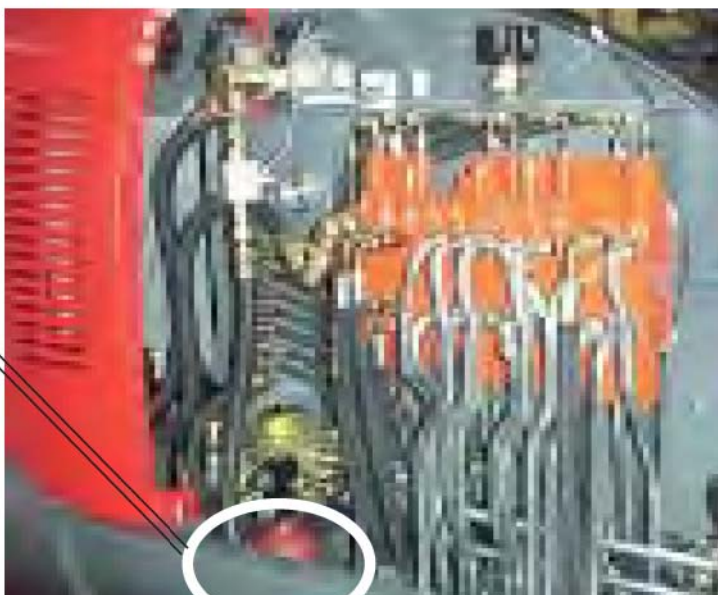




> Fig.: **SWITCH VALVE C** - Neuson 3703 :
(function bucket <<>> tilting of uppercarriage)



position of switch valve C



Service News

Service News **59/01**:
Theme: Switch valve leakage-tiltcylinder pos.
Solution: Release hose - tilt cylinder (valve C)

Possible problem:

Due to the leakage of the switch valve (C), the tilt cylinder can't hold its position

Solution: (starting with Fabr.No.: AB01031 modified by Neuson!)

Neuson uses a release hose and a check valve to connect the pressure line (switch valve-check valve block) to tank.





11. WAY VALVE

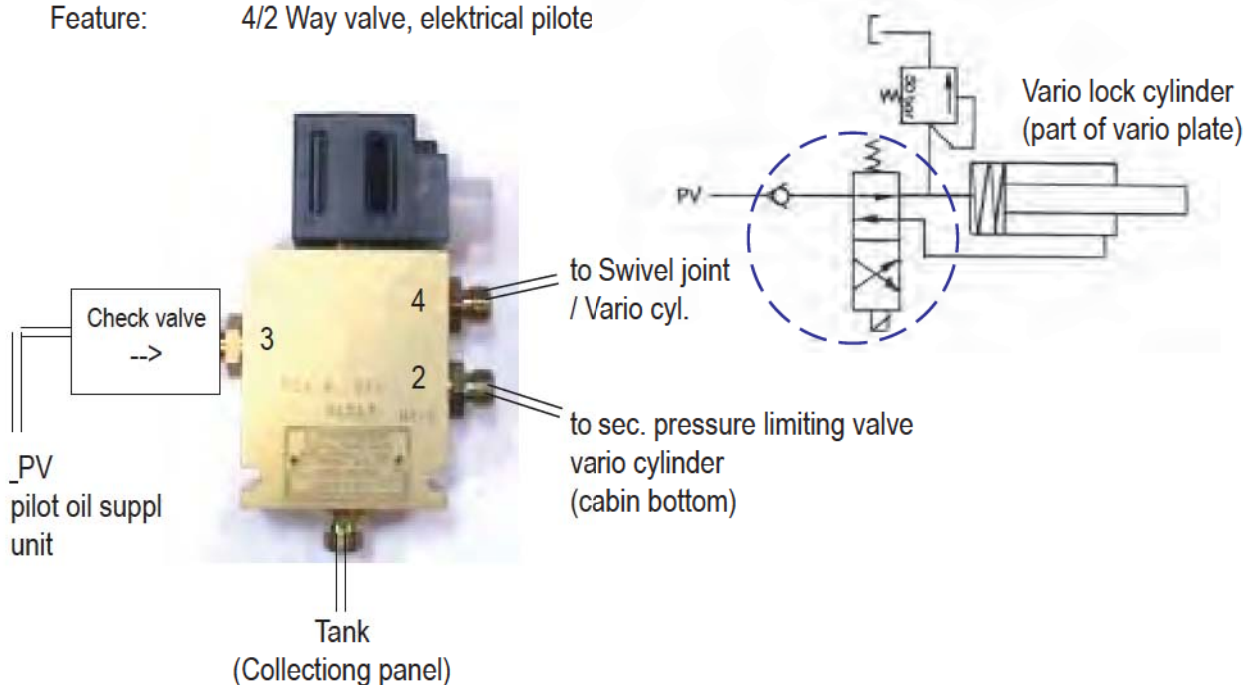
Option: **Vario**

Type: Neuson 3808610

Function: The 4/2 wayvalve is piloted by the two front bottoms at the joysticks

The wayvalve operates the vario cylinder in the vario plate

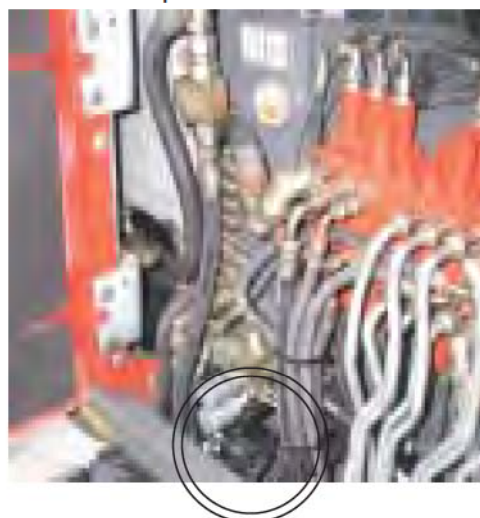
Feature: 4/2 Way valve, electrical pilote



Valve position Neuson 3003

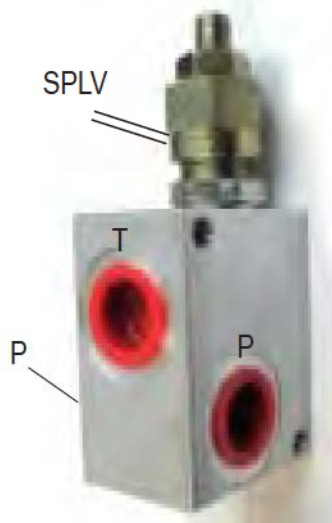


Valve position Neuson 3503

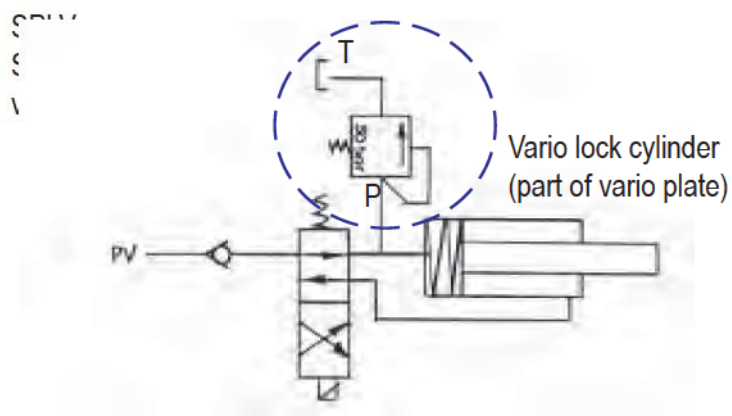


12. **PRESSURE LIMITING VALVE**Option: **Vario**

Type: Neuson 7008713
 Function: 50 bar Secondary pressure limiting valve for vario cylinder



P... Pressure line to the Vario lock cylinder
 T... Tank



SPLV alve position





13. OIL TANK - hydraulic

A) Breather filter

>>see also chapt. Maintenance

The breather provides the following **functions**:

- **Pressure compensation** in the hydraulic tank (varying oil level) by sucking and pressing air in and out of the tank - protection of oil tank against swelling
- **Pressurizing** the oil tank to the defined overpressure -> to support intake of the variable displacement pump
- **Filtering** of intake air

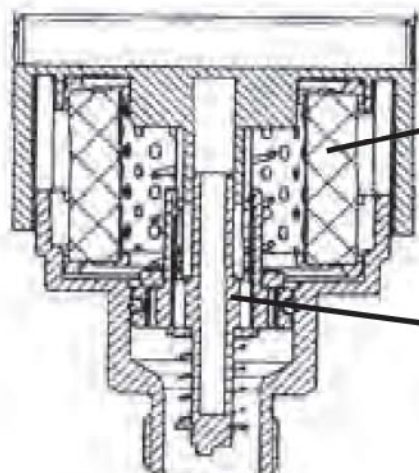
initial pressure: 0.4 bar



return filter hydraulic tank

breather 5001161
(hydraulic tank)

Fig. C063: Hydraulic oil tank



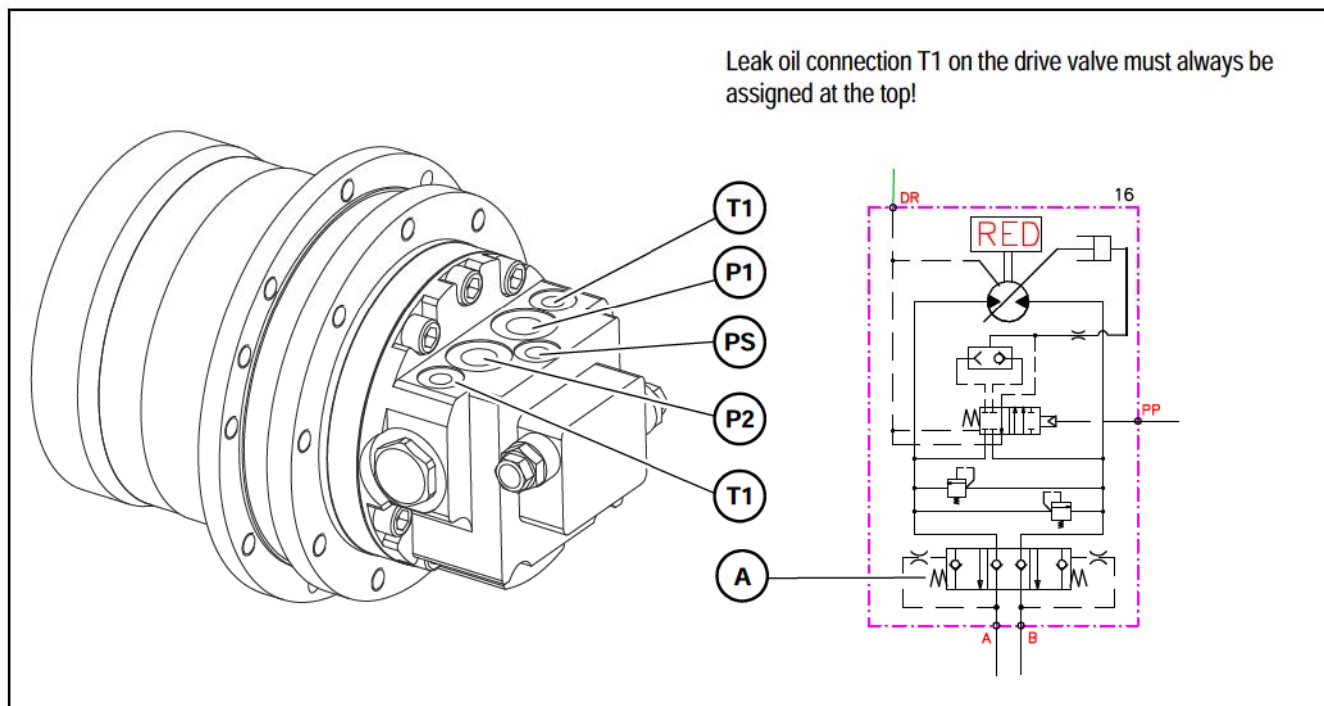
filter cloth

breather valve

Fig. : Breather

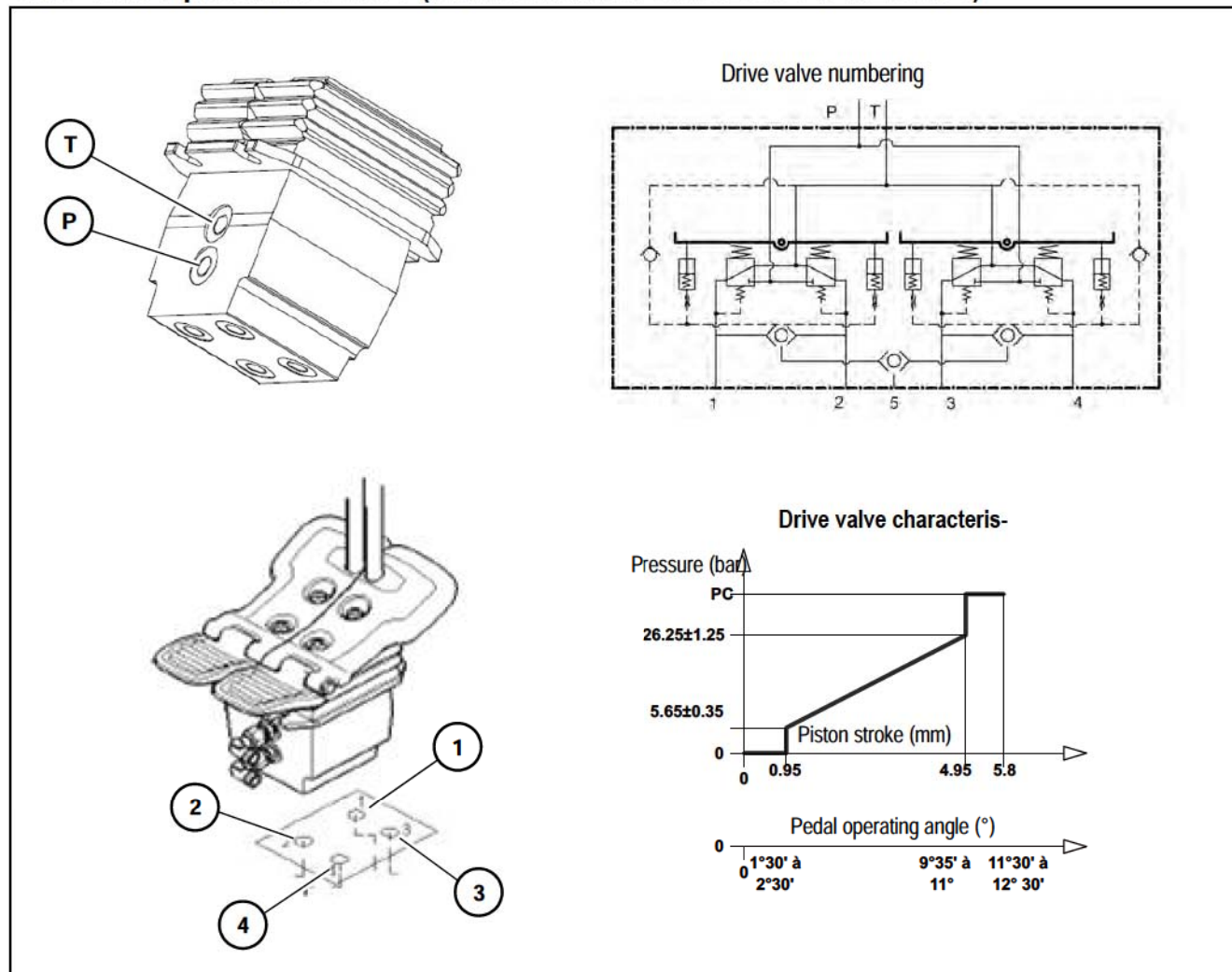


C.14 Traveling drive 2503 (from serial no. WNCE0304HPAL00199)



Pos.	Designation
PS	2nd speed range connection
T1	Reservoir line (leak oil)
P1	Drive connection (swivel joint)
P2	Drive connection (swivel joint)
A	Brake piston

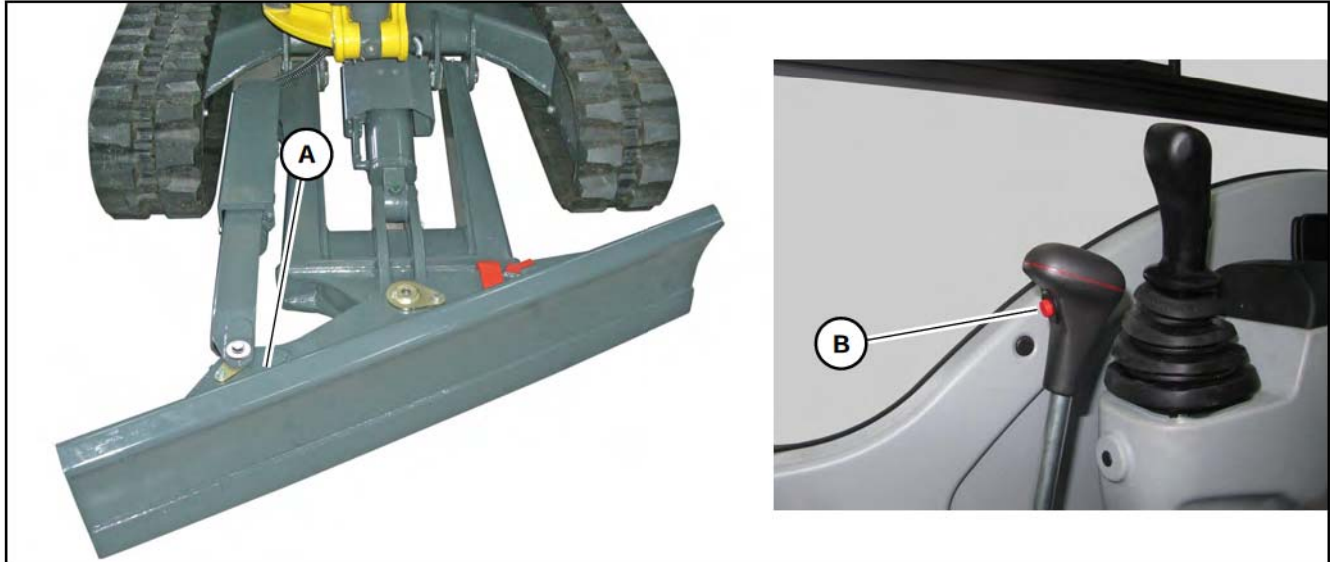
C.15 Drive pilot valve 2503 (from serial no. WNCE0304TPAL00160)



Pos.	Designation
1	Machine travel, left forward
2	Machine travel, left reverse
3	Machine travel, right forward
4	Machine travel, right reverse
P	Supply from pilot oil supply unit
T	Reservoir line

C.16 Slewable stabilizer blade 3503 (option)

- The slewable stabilizer blade is operated with push button **B** on the stabilizer-blade lever.
- ☞ If push button **B** is pressed and held, the stabilizer blade slews when the stabilizer-blade lever is actuated.
- ☞ If push button **B** is released, the standard stabilizer blade functions (UP/DOWN) are available again.

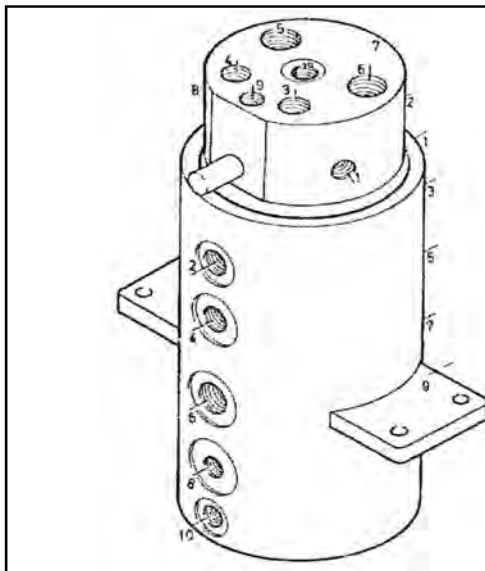


Swivel joint

- The swivel joint is used in the same way as for the VDS option.
- Channels 8 and 9 are used either for the VDS option or for the slewable stabilizer blade (option).

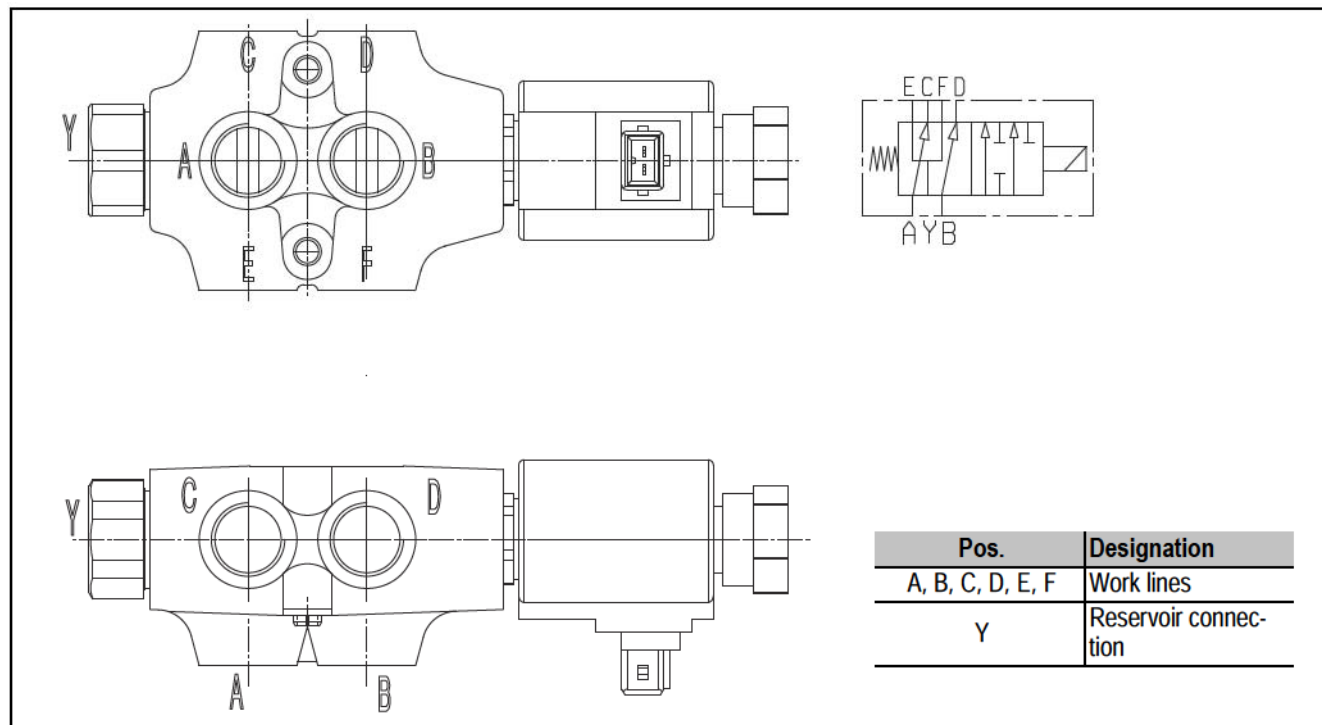
i Notice!

The VDS option is not possible if the machine is equipped with the "Slewable stabilizer blade" option.



Pos.	Designation
1	2nd speed range pilot control line
2	Stabilizer blade cylinders (base side)
3	Stabilizer blade cylinders (rod side)
4	Traveling drive (right)
5	Traveling drive (left)
6	Traveling drive (right)
7	Traveling drive (left)
8	Stabilizer blade slewing cylinder (rod side)
9	Stabilizer blade slewing cylinder (base side)
10	Traveling drive reservoir line (leak oil)

Changeover valve



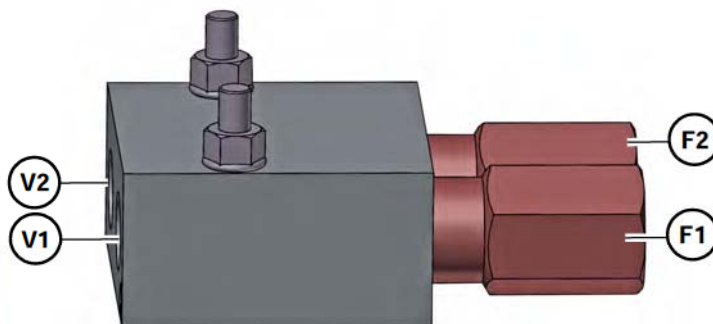
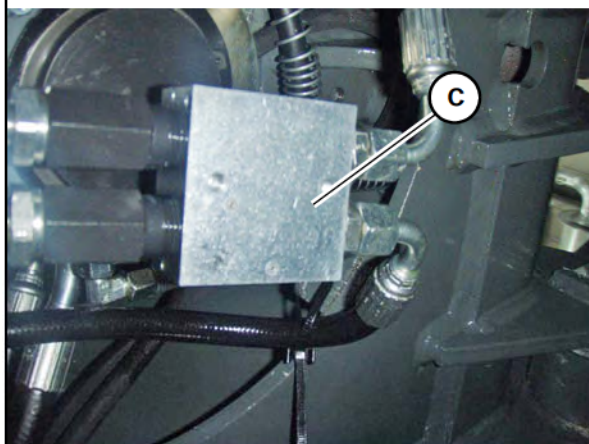
Counterbalance valve



Notice!

The unlockable non-return valve of the "UP/DOWN" stabilizer blade function has been replaced by this counterbalance valve to improve the function in the precision-control range.

Counterbalance valve C is located under the machine near the swivel joint.



Pos.	Designation
V1	Stabilizer blade cylinder connection (rod side)
V2	Stabilizer blade cylinder connection (base side) via hose burst valve
F1, F2	Changeover valve connections via swivel joint

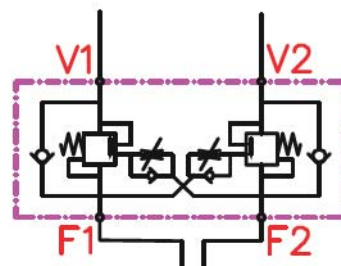
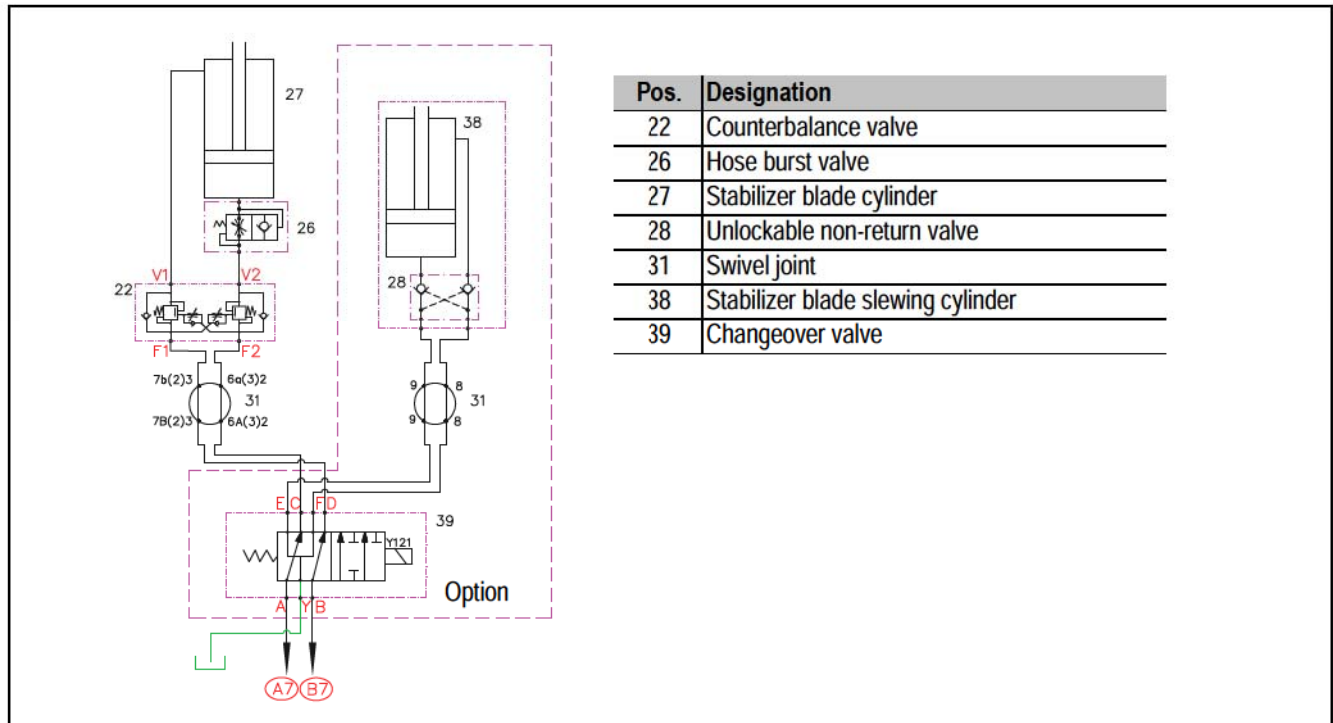
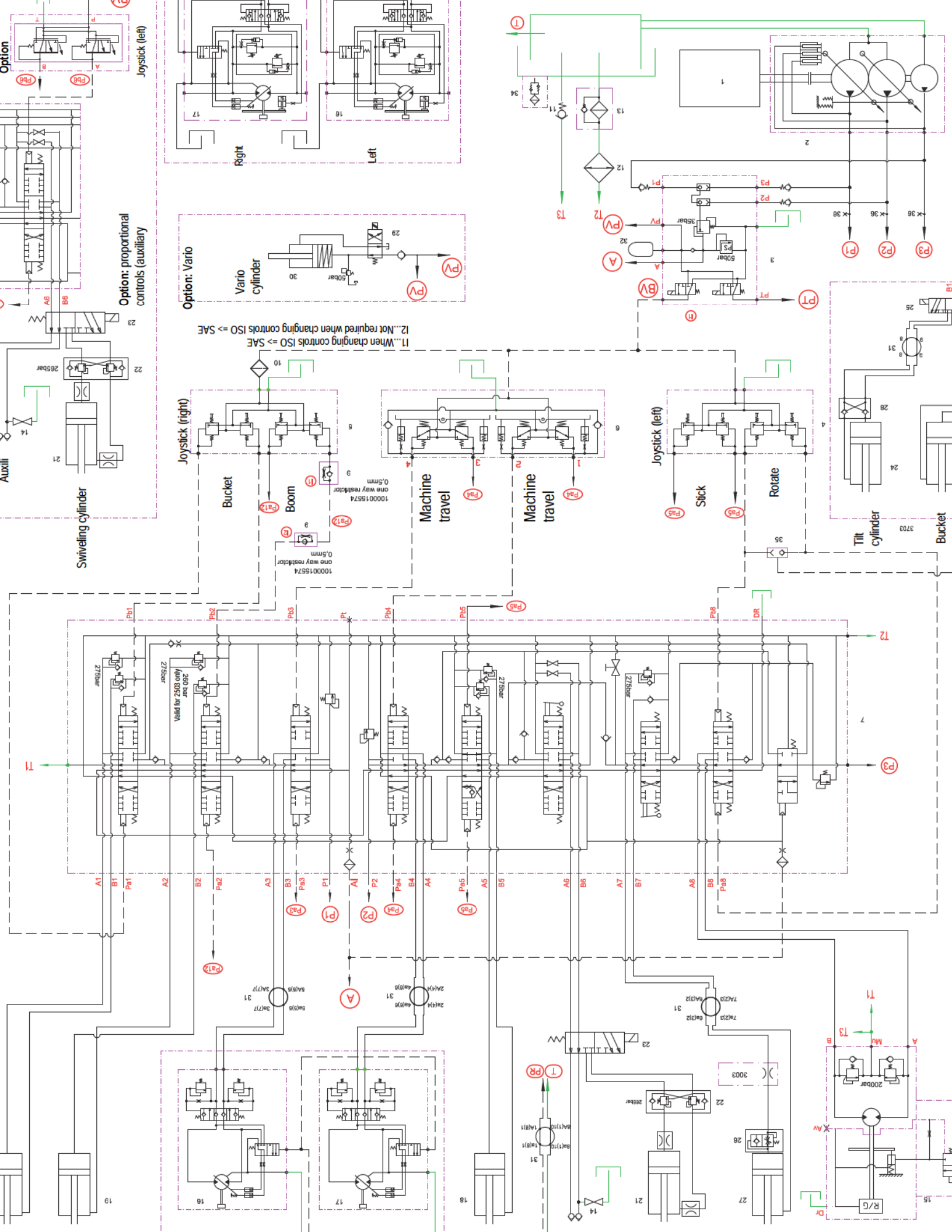
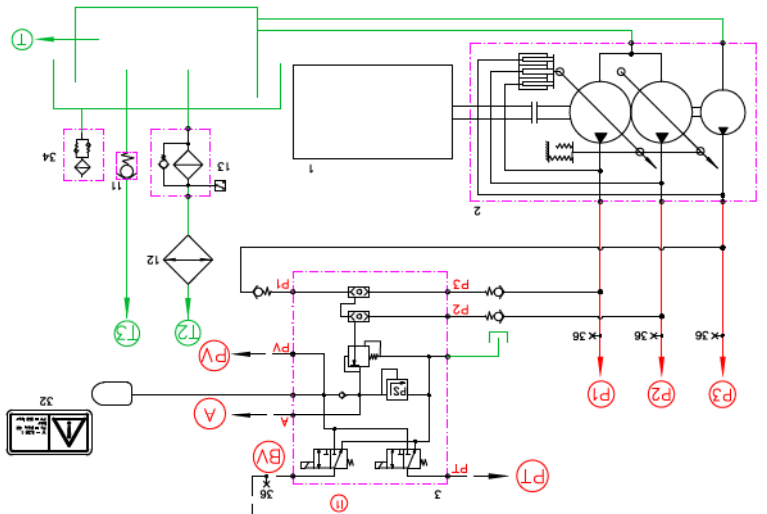


Diagram

Maintenance

– see [chapter B.1 Maintenance plan \(Tier III\)](#) on page B-5

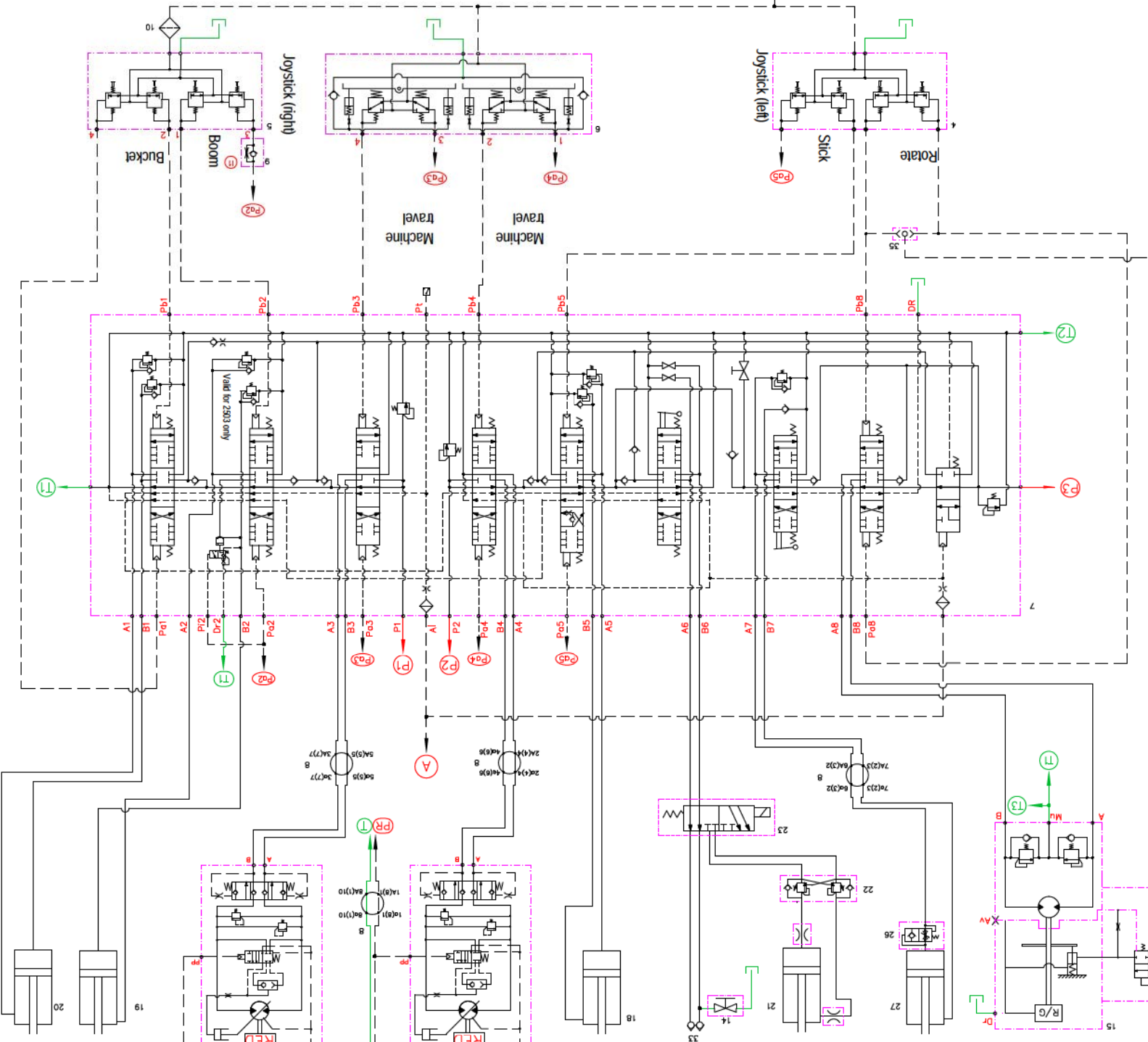


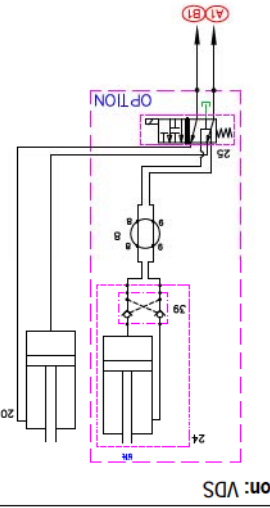




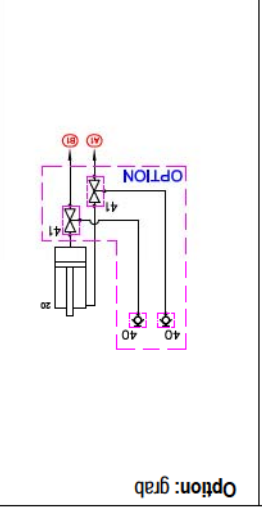
P1	P2	P3	n
bar/psi	bar/psi	bar/psi	rpm
min / gal	min / gal	min / gal	
240/3481	240/3481	210/3046	2200
35.8/9.5	35.8/9.5	25.1/6.8	2450
225/3263	225/3263	25.1/6.8	2450
44.5/11.8	44.5/11.8	25.1/6.8	2450
240/3481	240/3481	25.1/6.8	2450
3703	3503	3503	

bar	psi	bar	psi	bar	psi
245	3553	210	3046	35	508
255	3698	225	3263	50	725
265	3844	235	3408	75	1080
275	3989	240	3481	200	2901
2901	4215	2901	4215	2901	4215

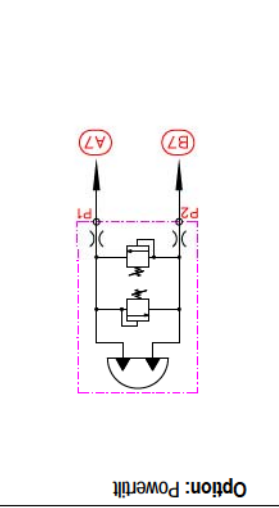




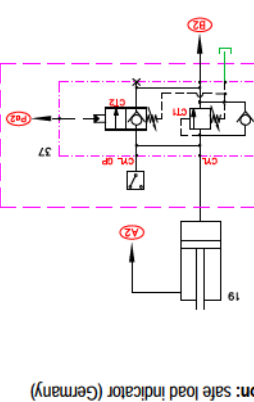
on: VDS



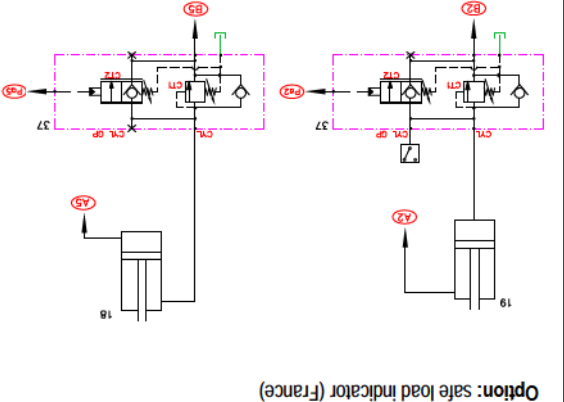
Option: grab



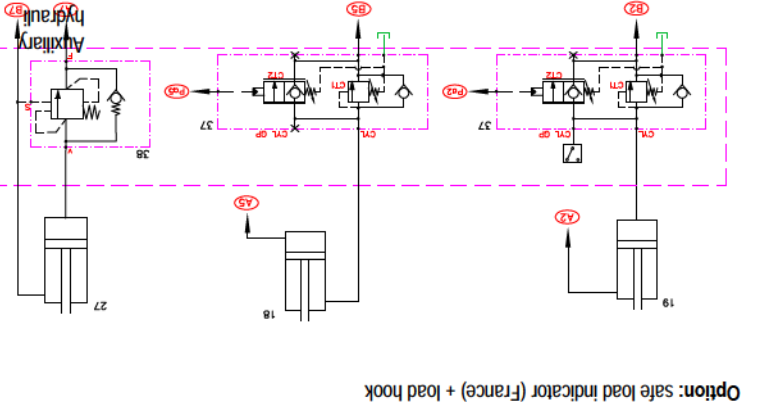
Option: Powerlift



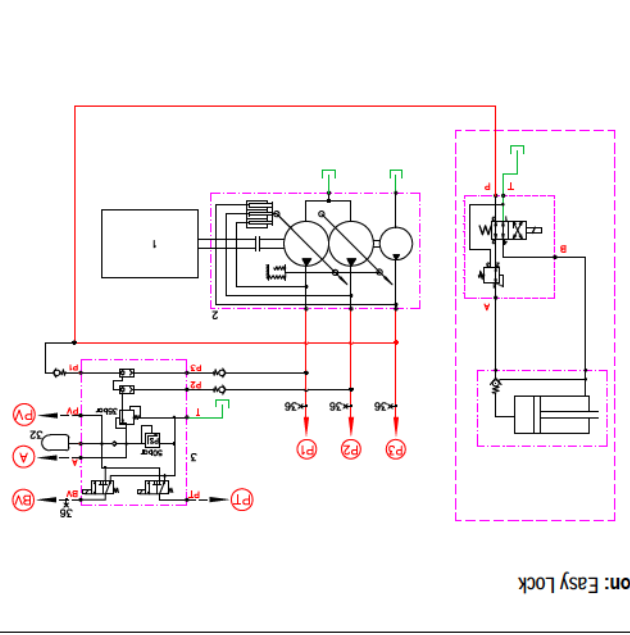
on: safe load indicator (Germany)



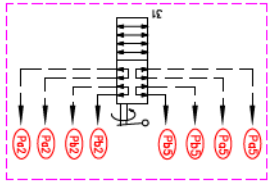
Option: safe load indicator (France)



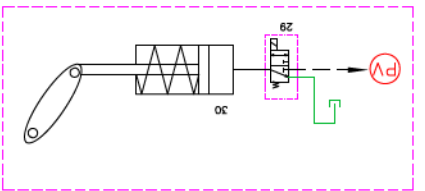
Option: safe load indicator (France) + load hook



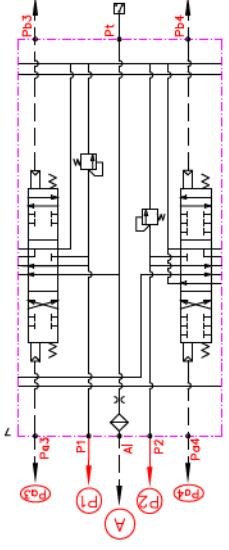
on: Easy Lock



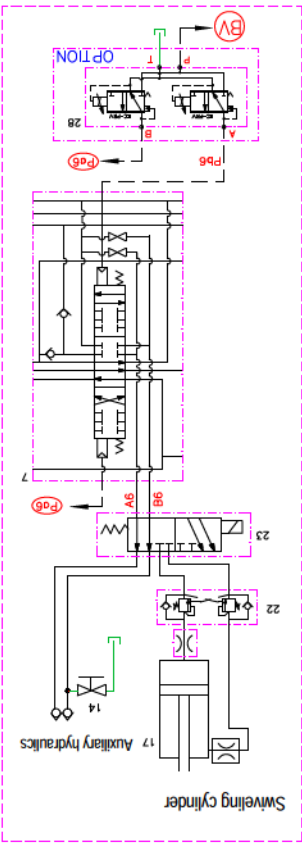
OPTION: SAE switch



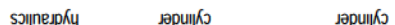
OPTION: automatic engine speed setting



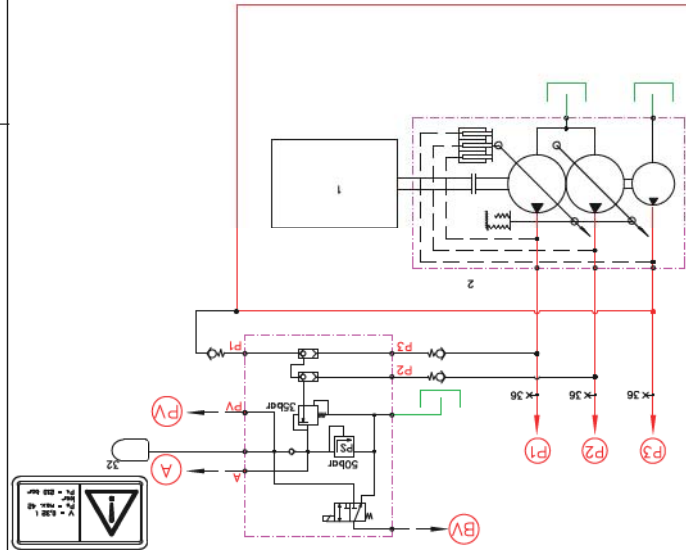
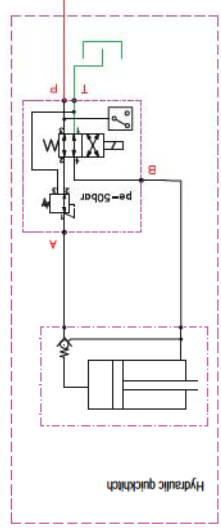
OPTION: auxiliary hydraulics proportional controls



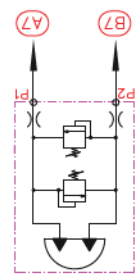
Swiveling cylinder



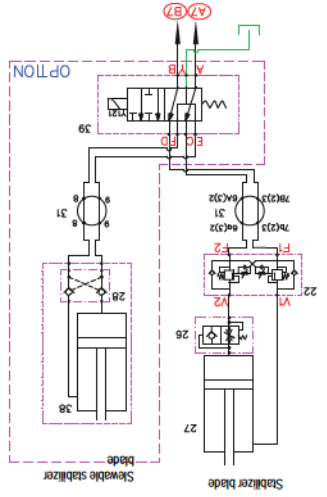
...When changing controls ISO => SAE
 ...Not required when changing controls ISO => SAE



Option: hydraulic quickhitch

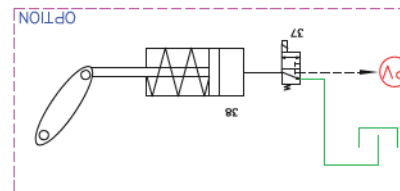


Option: Powerlilt

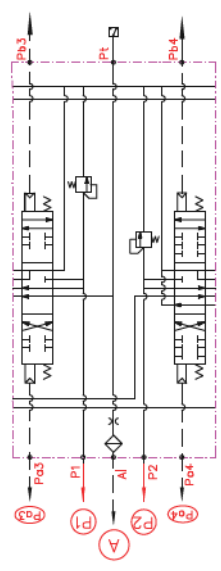


Option: slewable stabilizer blade

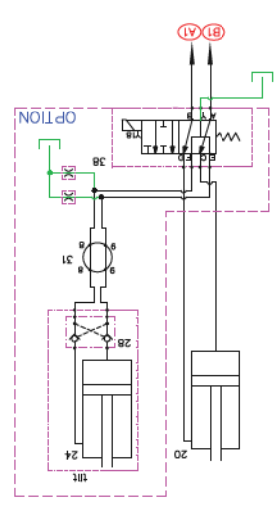
Option: safe load indicator (France)



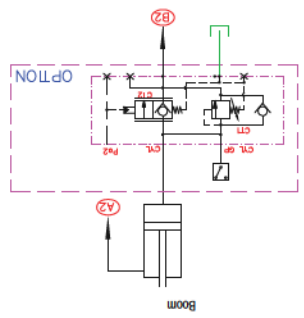
Option: automatic engine speed setting



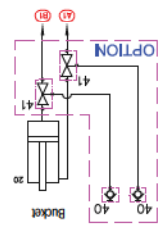
Option: VDS

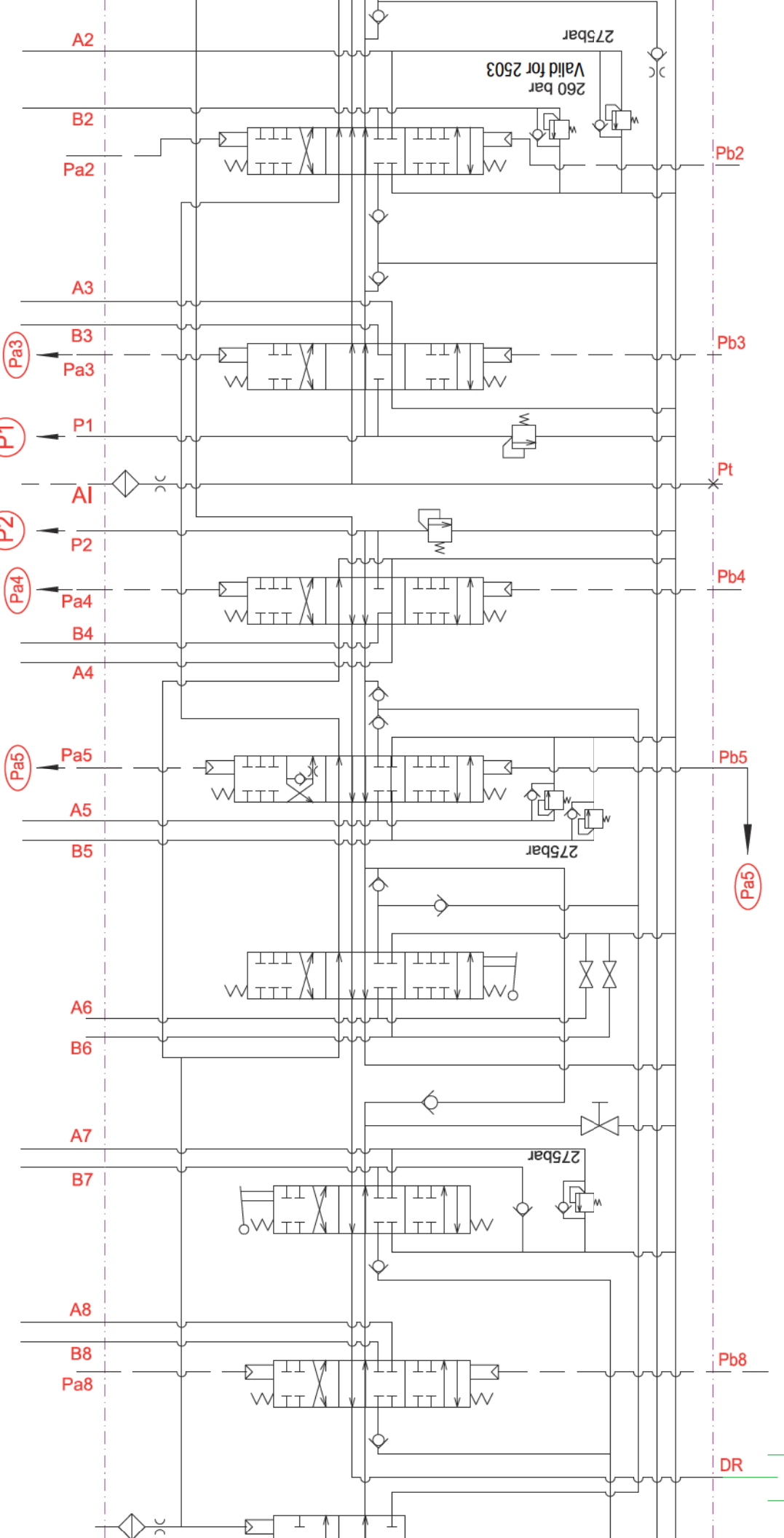


Option: safe load indicator (Germany)



Option: load hook





Pump/reservoir lines

Connection	Legend
P1	Pump 1 connection
P2	Pump 2 connection
P3	Pump 3 connection
T1	Reservoir line via non-return valve
T2	Reservoir line via oil cooler and filter

Main control lines

Connection	Legend
A1, B1	Bucket cylinder
A2, B2	Boom cylinder
A3, B3	Drive unit (left) via swivel joint
A4, B4	Drive unit (right) via swivel joint
A5, B5	Stick cylinder
A6, B6	Auxiliary hydraulics/slewing cylinder
A7, B7	Stabilizer blade cylinder
A8, B8	Stabilizer blade cylinder



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CHAPTER D:

Diesel engine

(Neuson Service Manual 2503 - 3703)



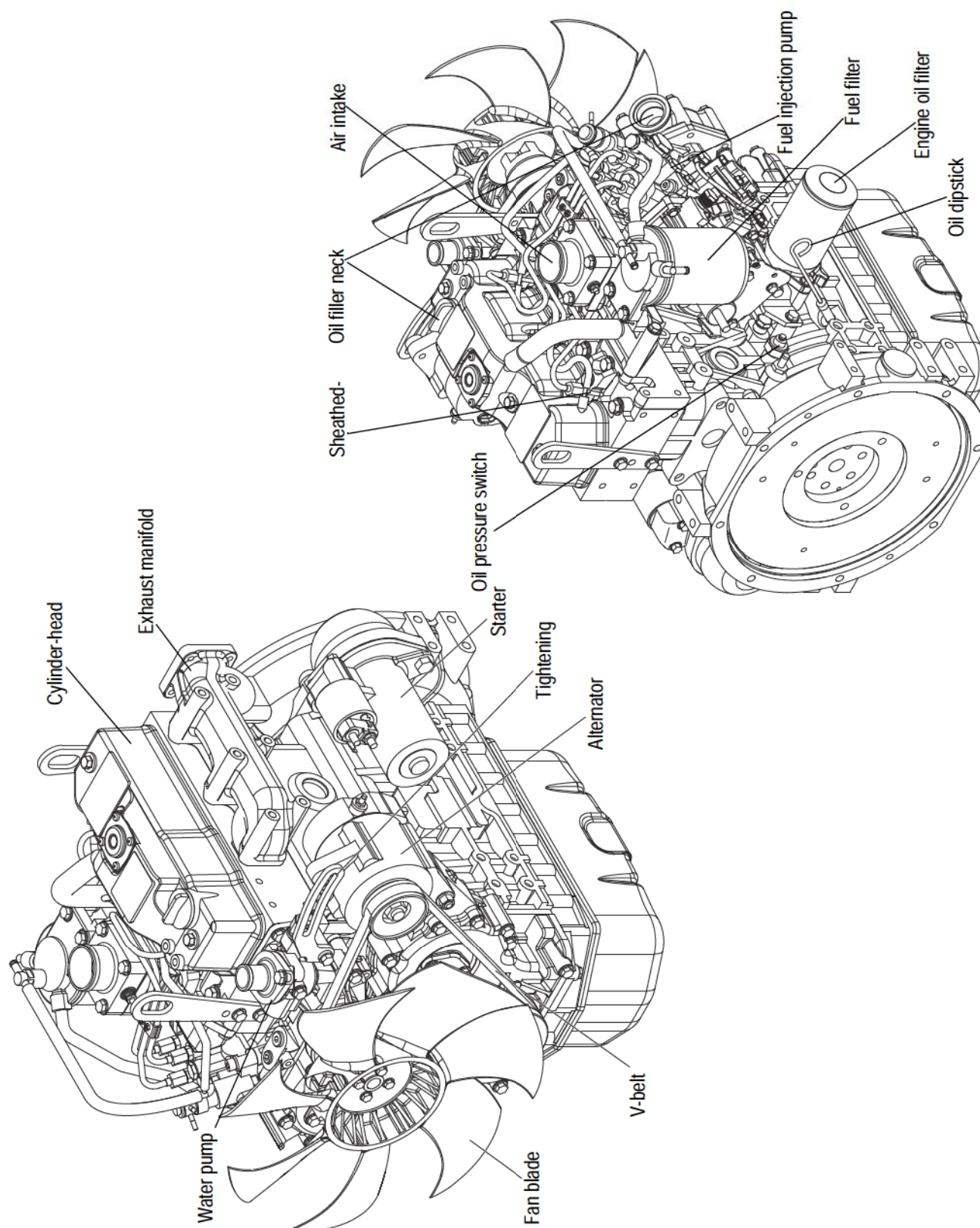
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DEngine

D.1 Engine overview

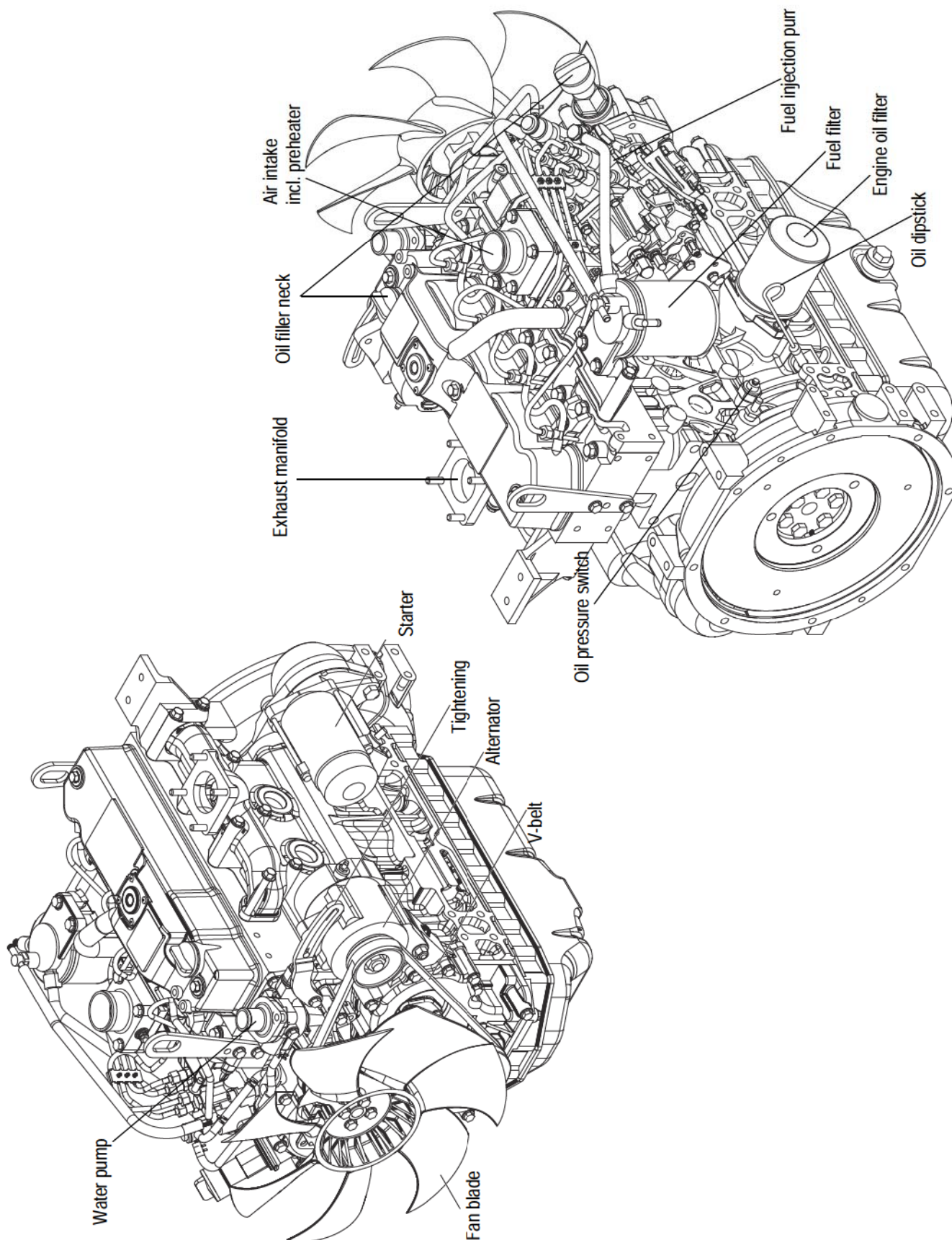
3TNV 88 (Tier 3)

2503: from serial no. AG 00597



4TNV 88 (Tier 3)

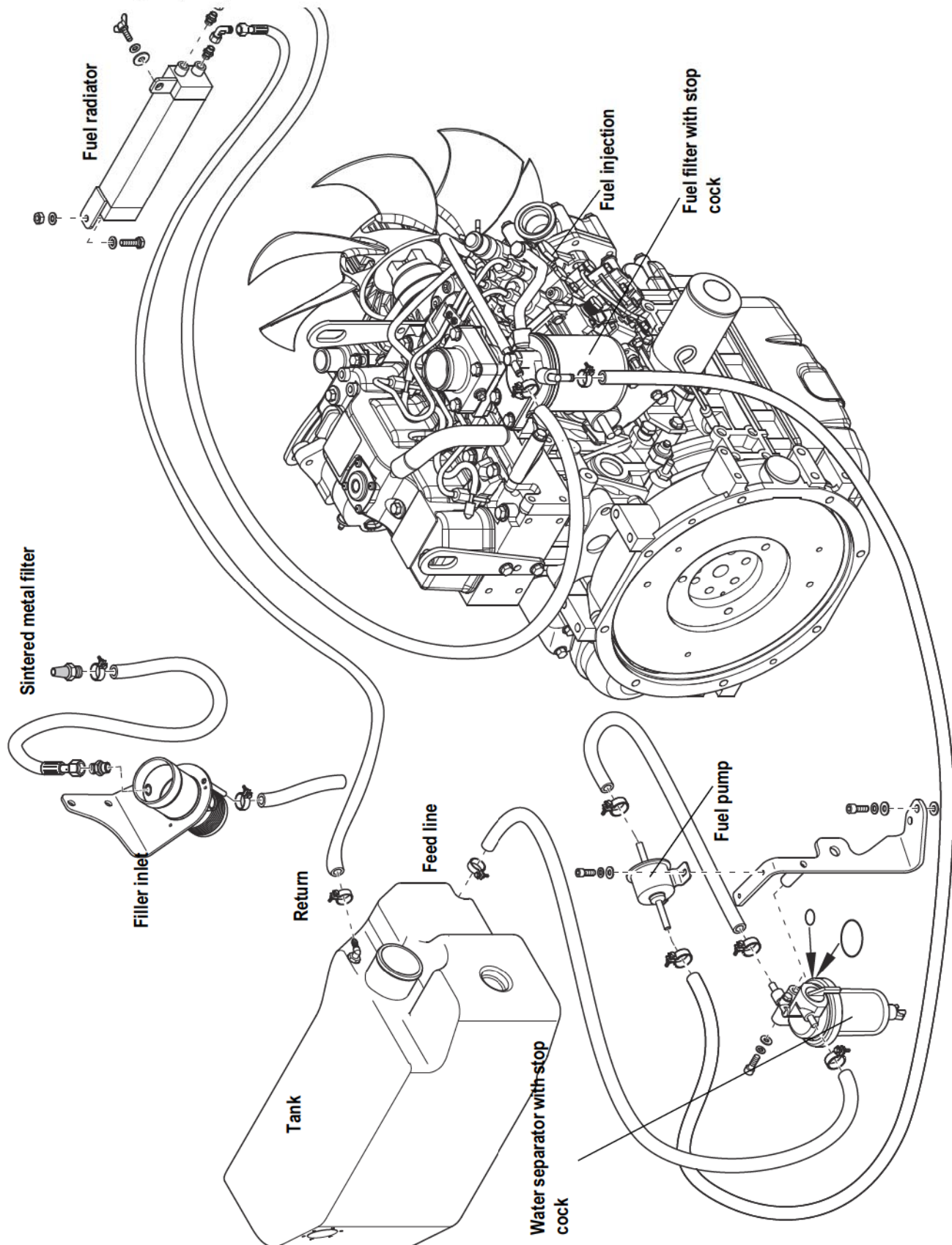
3503: from serial no. AG 00593



D.2 Fuel supply systems

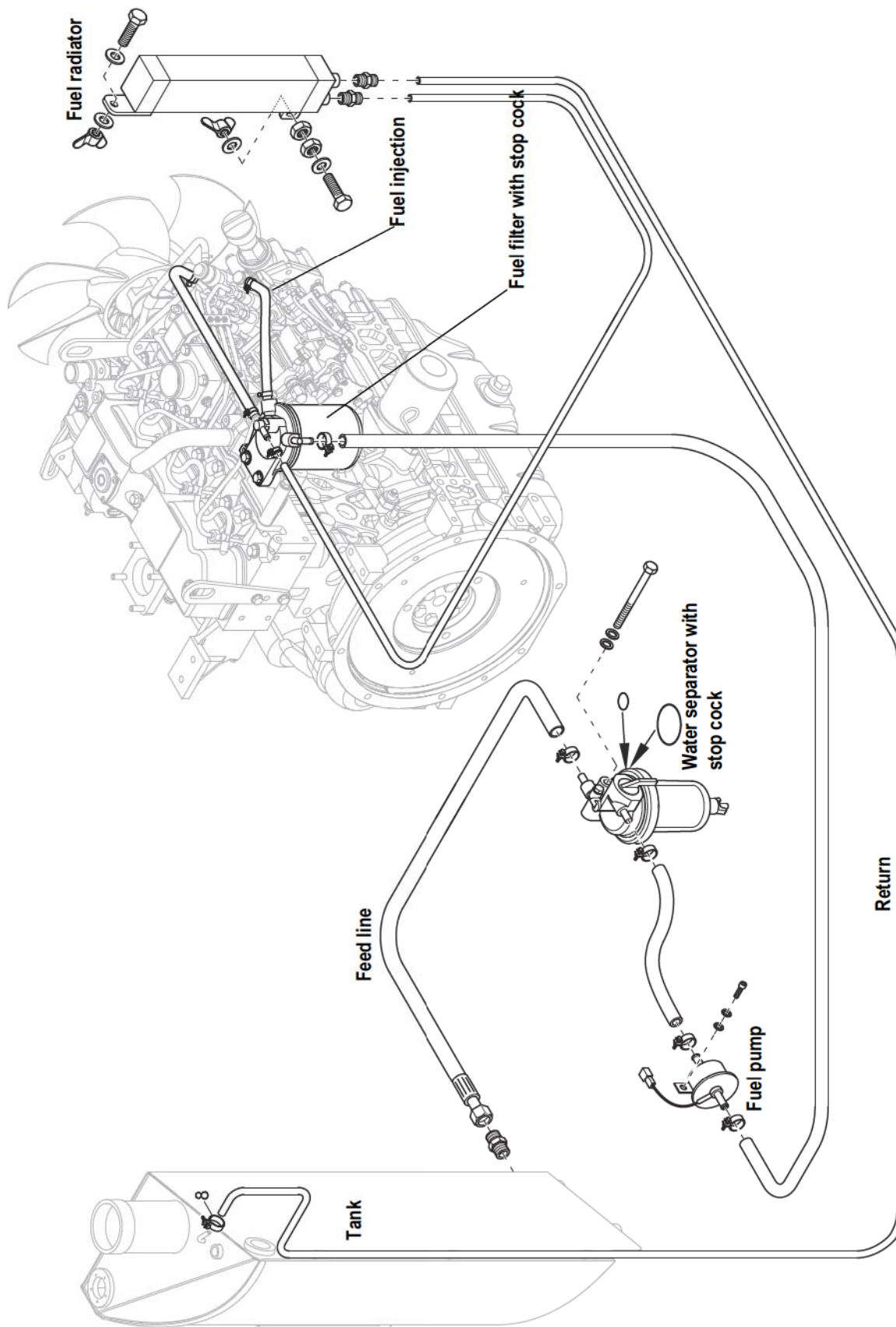
Yanmar 3 TNV engine (Tier 3)

2503: from serial no. AG 00597



Yanmar 4 TNV engine (Tier 3)

3503: from serial no. AG 00593



D.3 Adjustments: Yanmar 3TNV 88, 4TNV 88

Valve clearance (Tier 3)

2503: from serial no. AG 00597

3503: from serial no. AG 00593

Removing the cylinder-head cover



Notice!

In order to avoid damage to the glow elements, remove them before removing the cylinder head.

Remove as follows:

- Remove all dirt on the engine with a lint-free cloth
- Unscrew all hoses and fuel injection lines from the valve cover
- Remove the air intake and the exhaust manifold
- Unscrew and remove the valve cover

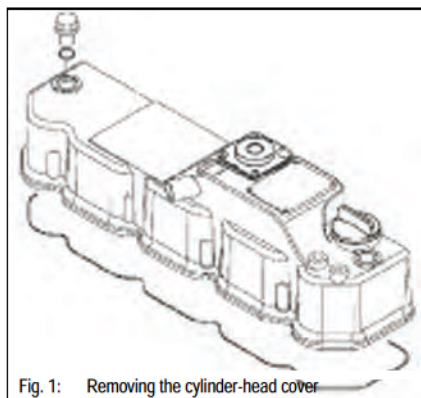


Fig. 1: Removing the cylinder-head cover

Checking and adjusting valve clearance

- Standard setting of valve clearance is possible:
 - ➔ On a cold engine
- Turn the engine with a screwdriver (as described in "Injection time" from page D-24) until the cylinder reaches the top dead center of the compression cycle.
 - ➔ Valve overlapping
- Check the valve cap for abnormal wear
- Check valve clearance 2/A with a feeler gage
 - ➔ Valve clearance: 0.15 – 0.25 mm (0.0059 – 0.0098")
- Repeat the procedure for each cylinder
- Position the cylinder-head cover gasket
- Install the cylinder-head cover

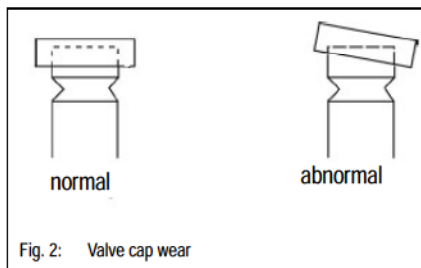


Fig. 2: Valve cap wear

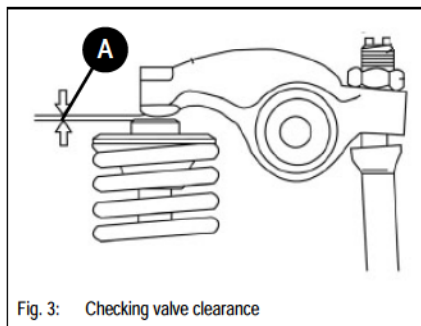


Fig. 3: Checking valve clearance

Tightening order for cylinder head bolts

3 cylinders

Order for removing the cylinder-head bolts



Oil the threads and the contact surfaces of the cylinder-head bolts before installing them!

Install the cylinder-head bolts

➔ Tightening torques:

		Tier 3
• 1st pass	41.1 – 46.9 Nm (30.3 – 34.6 ft.lbs.)	42.6 – 45.5 Nm (31.4 – 33.6 ft.lbs.)
• 2nd pass	85.3 – 91.1 Nm (62.9 – 67.2 ft.lbs.)	85.3 – 91.1 Nm (62.9 – 67.2 ft.lbs.)



Caution!

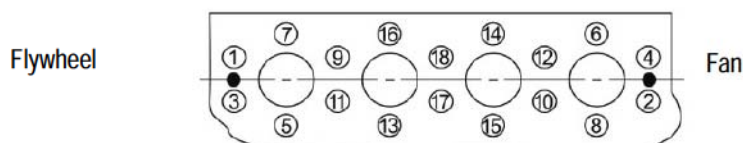
Bear in the mind the order for tightening the cylinder-head bolts!

See figure

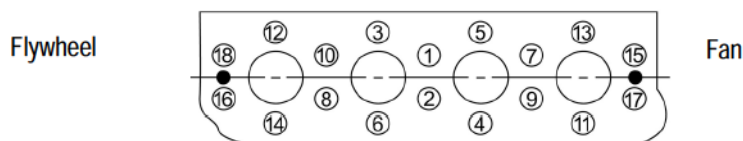


4 cylinders

Order for removing the cylinder-head bolts



Order for installing the cylinder-head bolts



Notice!

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

Checking the injection nozzles

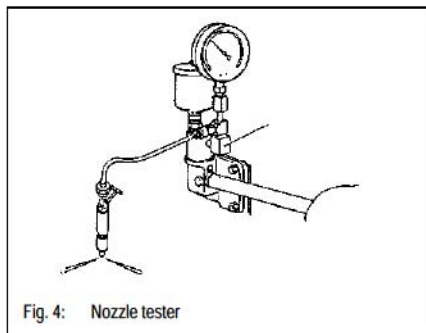


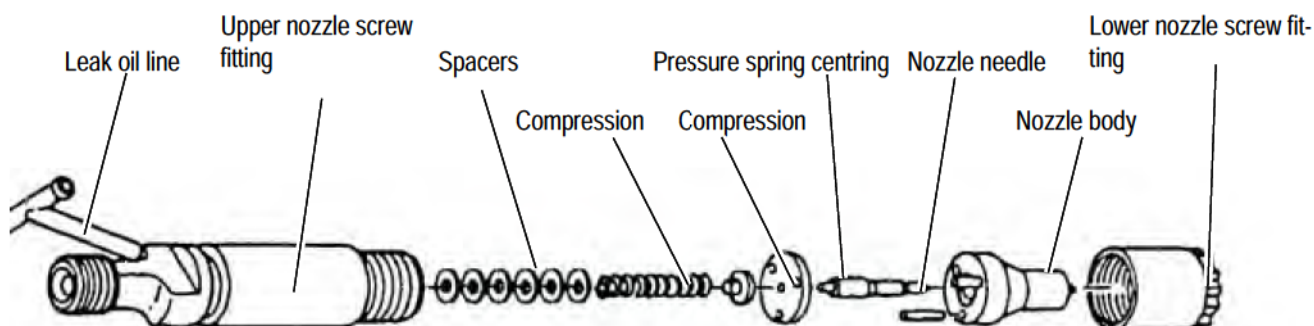
Fig. 4: Nozzle tester

Pressure check

- ☞ Remove the injection line and the injection nozzle
- ☞ Connect the injection nozzle with the high pressure line of the nozzle tester
- ☞ Slowly increase pressure until the nozzle ejects fuel and read the pressure off the pressure gage
- ☞ If the injection pressure is too low, replace the spacer in the nozzle by a thicker one. If the pressure is too high, replace the spacer by a thinner one.

➡ Injection pressure: 196 – 206 bar/2843 – 2988 psi (Tier 3)

- Spacer thickness of 0.1 mm (0.004") corresponds to modification by 19 bar (276 psi)
- Check the injection nozzle for drips after it has ejected fuel
- ☞ Create a pressure of about 20 bar (290 psi) below injection pressure and check whether fuel escapes from the nozzle



Checking the nozzle jet

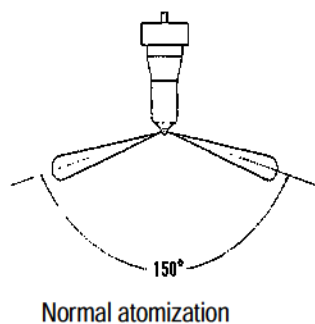
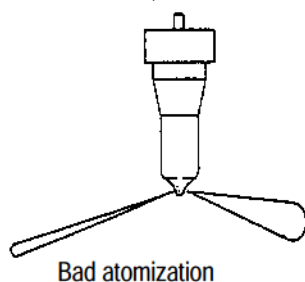
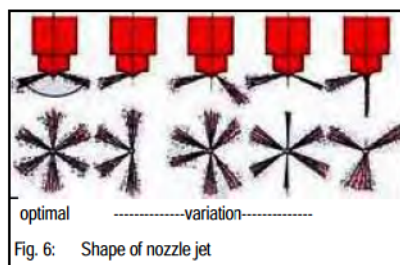


Fig. 5: Nozzle jet



- ☞ Remove the injection lines and the injection nozzles
- ☞ Connect the injection nozzle with the high pressure line of the nozzle tester
- ☞ Quickly create pressure until the nozzle ejects fuel (ejection 3 – 4 times)
- ☞ Hold a white sheet of paper about 30 cm (12") away from the nozzle and let the nozzle eject fuel
- ☞ The nozzle jet must create a shape on the paper as shown in fig. 6/left



3TNV88, 4TNV88 injection time (Tier 3)

2503: from serial no. AG 00597

3503: from serial no. AG 00593

Checking injection time



Fig. 7: Measuring equipment

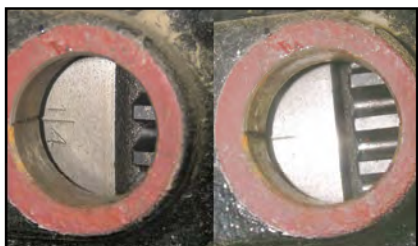
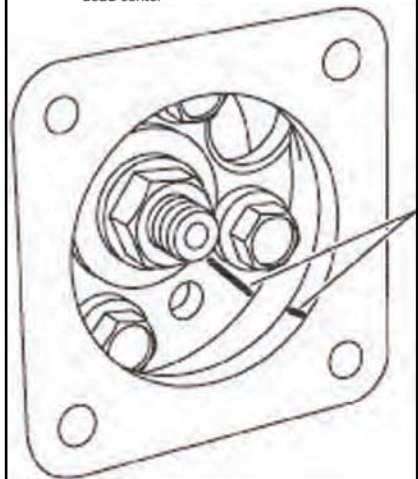


Fig. 8: Top dead center indentation and 10° before top dead center



• Preparatory work:

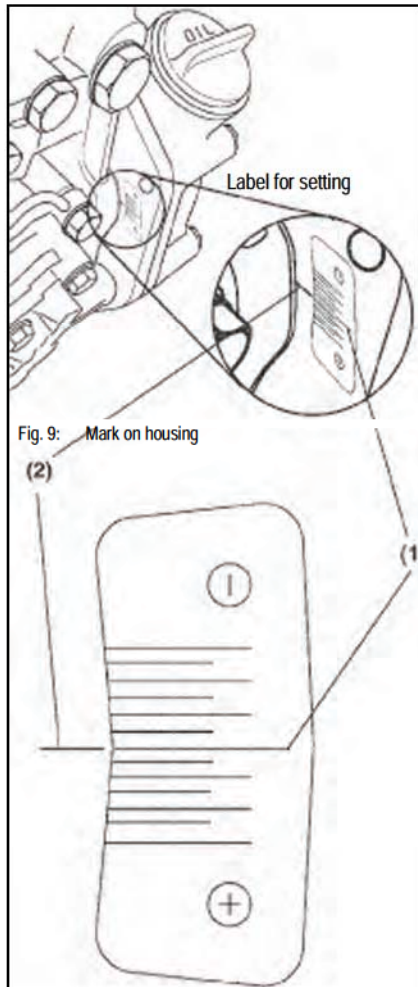
- Remove all dirt on the engine with a lint-free cloth
- Remove the high-pressure fuel injection lines
- Remove plug T11 from the piston
- Install the sleeve (no. 1000158805) and the extension (no. 1000158806) onto the dial gage (no. 1000158807) and fasten them with a clamp (no. 1000083308).
- Screw the dial gage into the bore of the piston as shown in [Fig. 7](#)

• Measurement:

- Remove the rubber cover from the flywheel housing
- Turn the crankshaft (ring gear on flywheel) until the piston in the fuel injection pump reaches the lowest point (pay no attention to the position of the cylinders)
- Set the measuring equipment to "0"
- Use suitable equipment (at the ring gear) to turn the flywheel to the top until the piston of the fuel injection pump reaches a stroke of 2.5 mm (0.1").
- Read the degrees before top dead center by means of the indentations on the flywheel
 - Indentations "1/4" and "3/2" stand for the top dead center of the respective cylinders
 - Scaling: 12°/15°/20°/25° before top dead center

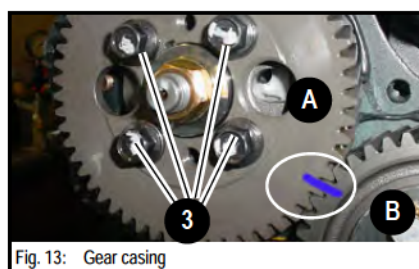
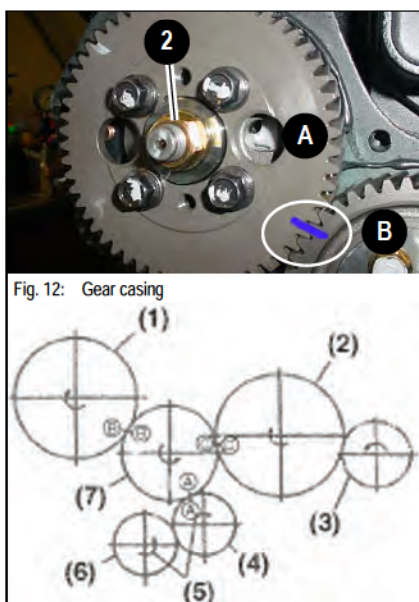
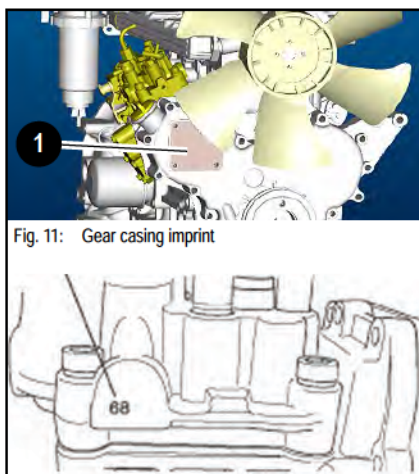
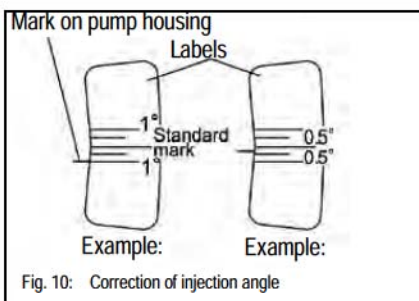
➔ Rated value: calculation according to Yanmar manual:
value on injection pump (here: 6.8 see [Fig. 11](#)) x 2 + FIR

Setting injection time



- Variations outside the tolerance range can be corrected by turning the fuel injection pump.
- ☞ Mark the initial position on the pump and wheel case housing before setting the fuel injection pump – see Fig. 9
- ☞ Remove all injection lines on the fuel injection pump and loosen the 4 flange screws by about ½ a revolution (do not unscrew completely)
- ☞ Rotate the pump in the required direction, and tighten one of the screws before you check the setting
 - ➡ Rotated toward the engine: later injection time
 - ➡ Rotated away from the engine: earlier injection time
- ☞ Bend each of the injection lines before you install them so they are not subject to tension once they are installed
- ☞ Check injection time again
- ☞ Adhesive label number 1000158808

Replacement of fuel injection pump (Tier 3)



2503: from serial no. AG 00597

3503: from serial no. AG 00593

☞ Mark the initial position on the pump and wheel case housing before removing the fuel injection pump – see [Fig. 10](#)

☞ Remove gear casing cover 11/1 of the fuel injection pump

☞ Turn the engine until the indents on the gears coincide

☞ Completely loosen lock nut 12/2 of the drive pinion

☞ Adhesive label number 1000158808

☞ Remove the fuel injection pump

☞ Read off the injection angle on the pump

☞ Read off the injection angle on the new pump

☞ Read off the imprint on the engine side of the fuel injection pump

• Tightening torque: 23 – 28 Nm (17 – 21 ft.lbs.)

☞ Difference of “Angle of new pump” – “Angle of old pump” gives you the mounting angle of the new fuel injection pump

☞ Positive value: earlier injection time (toward the engine)

☞ Negative value: later injection time (away from the engine)

☞ Install the new fuel injection pump

☞ Check the marked position of the drive pinion of the fuel injection pump (fig. 12)

☞ Screw on and tighten nut 12/2 (tightening torque: 23 – 28 Nm/17 – 21 ft.lbs.)

☞ Check injection time

☞ Install gear casing cover 11/1 of the fuel injection pump

• Tightening torque: 78 – 88 Nm (57.5 – 65 ft.lbs.)

• If a front housing cover is installed, the drive wheel of the injection pump is adapted to the running wheel by means of marks A, B, C (see [Fig. 12](#)):

- 1...Injection pump drive wheel 2...Camshaft drive wheel
- 3...Auxiliary drive wheel (option) 4...Crankshaft drive wheel
- 5...Direction of rotation 6...Fuel pump drive wheel (4TNV)
- 7...Running wheel

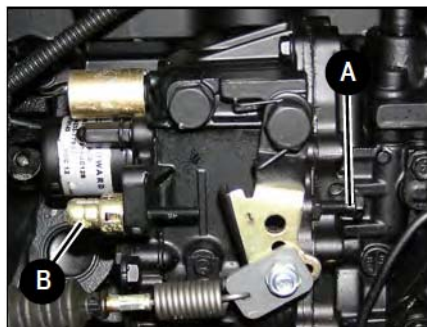
i Notice!

Do not loosen screws 13/3 of the drive pinion of the fuel injection pump. These screws specify the precision setting of the fuel injection pump set by the manufacturer!

Adjusting engine speed (all engines)

**Notice!**

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



Adjusting engine speed

Adjust engine speed without load!

- Run the diesel engine until it reaches operating temperature
- Check idling speed A, all machine functions in neutral position
 - ➔ Idling speed is indicated in the technical data for each engine type.
- Adjust as shown if values differ.

Caution: Only idling speed is allowed to be set!

Compression (all engines)

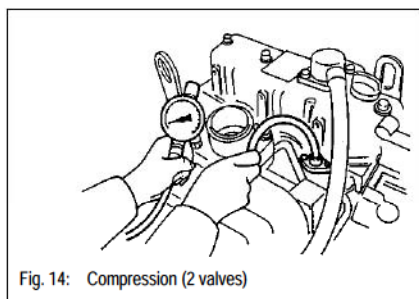


Fig. 14: Compression (2 valves)

- Remove the injection lines and the injection nozzles
- Set the fuel injection pump to zero delivery (remove the plug for the cutoff solenoid)
- Turn the engine
- Install the compression gage on the cylinder you want to measure
- Turn the engine with the starter and read the pressure off the pressure gage

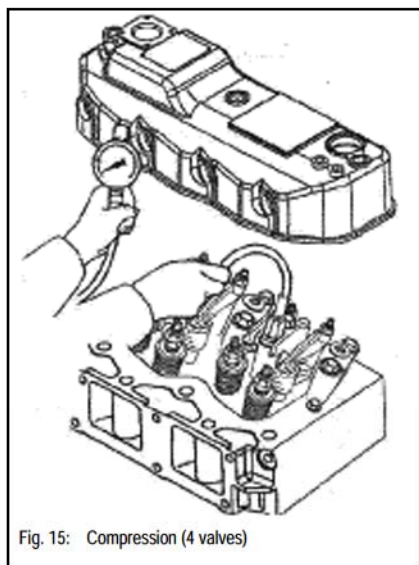
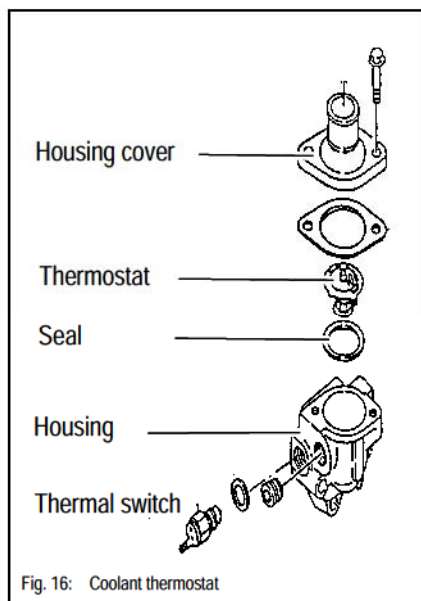


Fig. 15: Compression (4 valves)

Tier 3

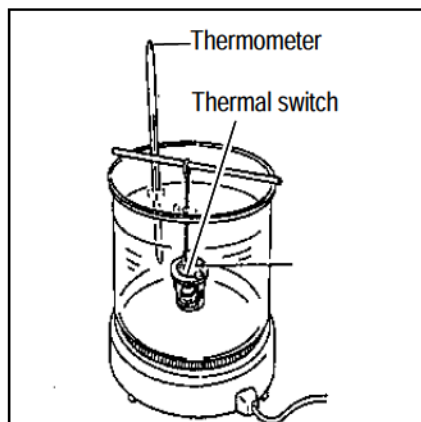
- ➔ Specified value: 33.3 – 35.3 bar (483 – 512 psi) at 250 rpm
- ➔ Threshold value: 26.5 – 28.5 bar (384 – 413 psi) at 250 rpm

Checking the coolant thermostat (all engines)



☞ *Remove the thermostat*

➡ The thermostat is located on the water pump

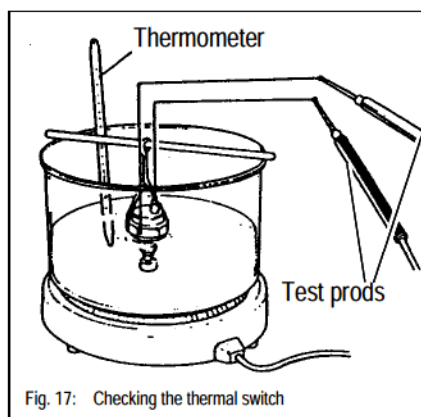


☞ *Warm up the thermostat in a container with water*

☞ *Check whether the thermostat opens at the specified temperature (check with a temperature gage)*

➡ Thermostat opening temperature: 69.5 – 72.5 °C (157.1 – 162.5 °F)
(the thermostat opens fully from 85 °C/185 °F onward only)

Checking the thermal switch (all engines)



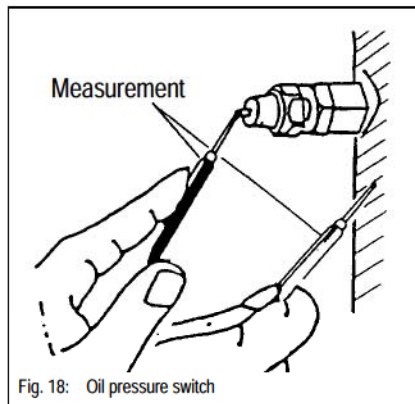
☞ *Remove the thermal switch*

☞ *Warm up the thermal switch in a container with coolant*

☞ *Measure the resistance of the thermal switch as shown by means of an ohmmeter.*

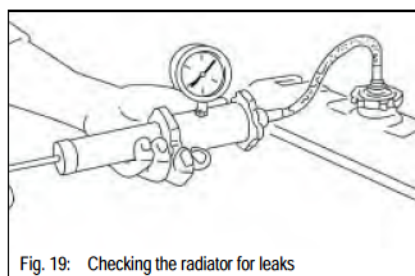
➡ The switch must allow the coolant to pass at a temperature of 107 – 113 °C (224.6 – 235.4 °F)

Oil pressure switch (all engines)



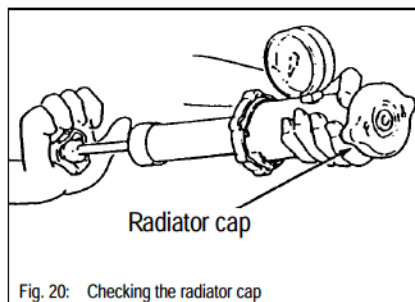
- Remove the cable connection from the oil pressure switch (in the area of the cutoff solenoid)
- Start the diesel engine
- Measure the resistance of the oil pressure switch as shown by means of an ohmmeter.
 - ➔ Oil pressure switch OK: infinite resistance
 - ➔ The oil pressure switch is malfunctioning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

Checking the coolant circuit (all engines)



Leakage check

- Fill up the radiator completely
- Install an adapter on the radiator as shown
- Increase the pressure in the cooling system by means of a hand pump to about **1 bar (15 psi)**
 - ➔ Check the lines and the connections for leaks if the pressure drops at the pressure gage



Checking the radiator cap

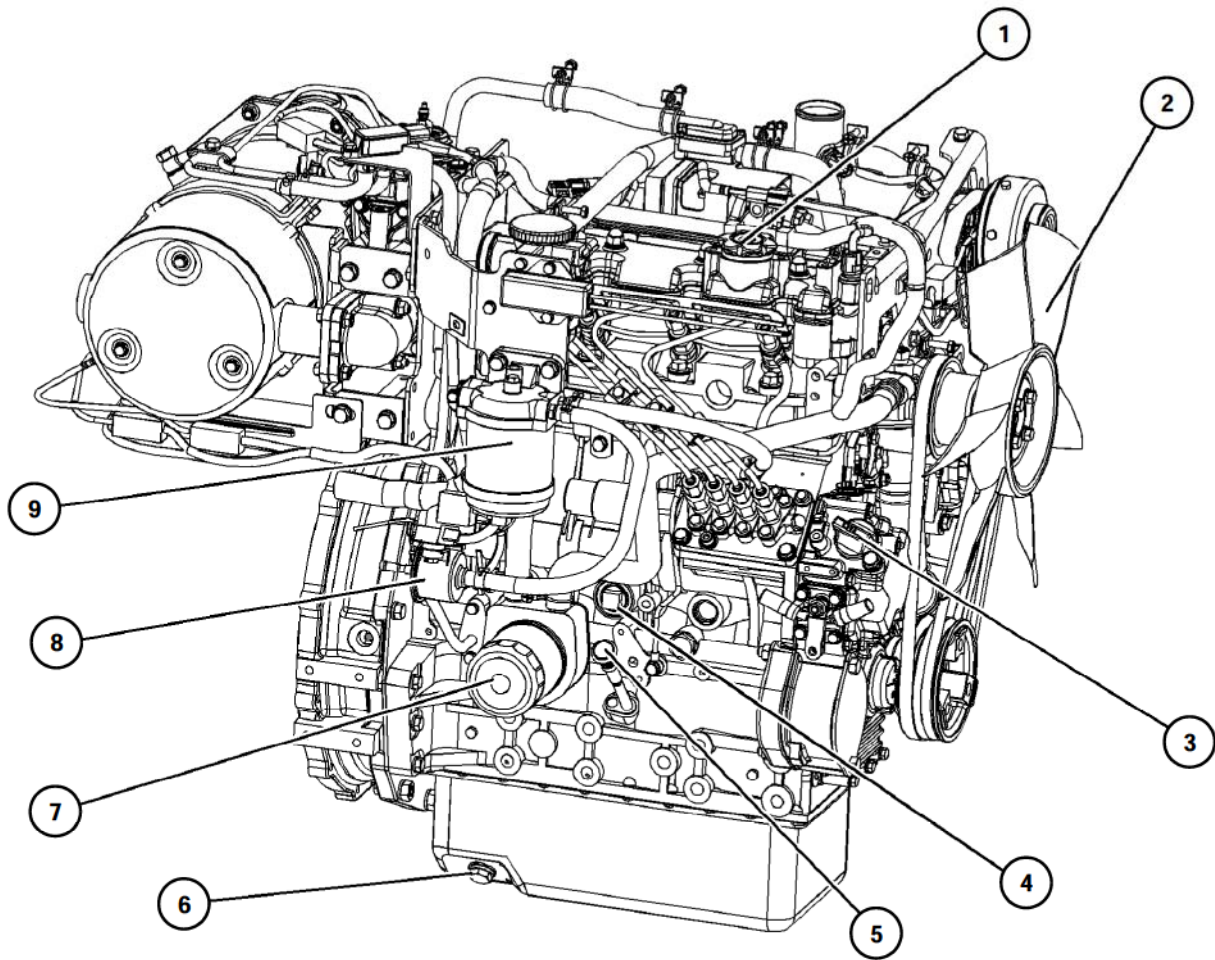
- Remove the radiator cap and install it on the adapter as shown
- Increase the pressure to about **1 bar/15 psi** (stamped onto the radiator cap) with the hand pump
 - ➔ The radiator cap must open

D.4 Engine malfunctions

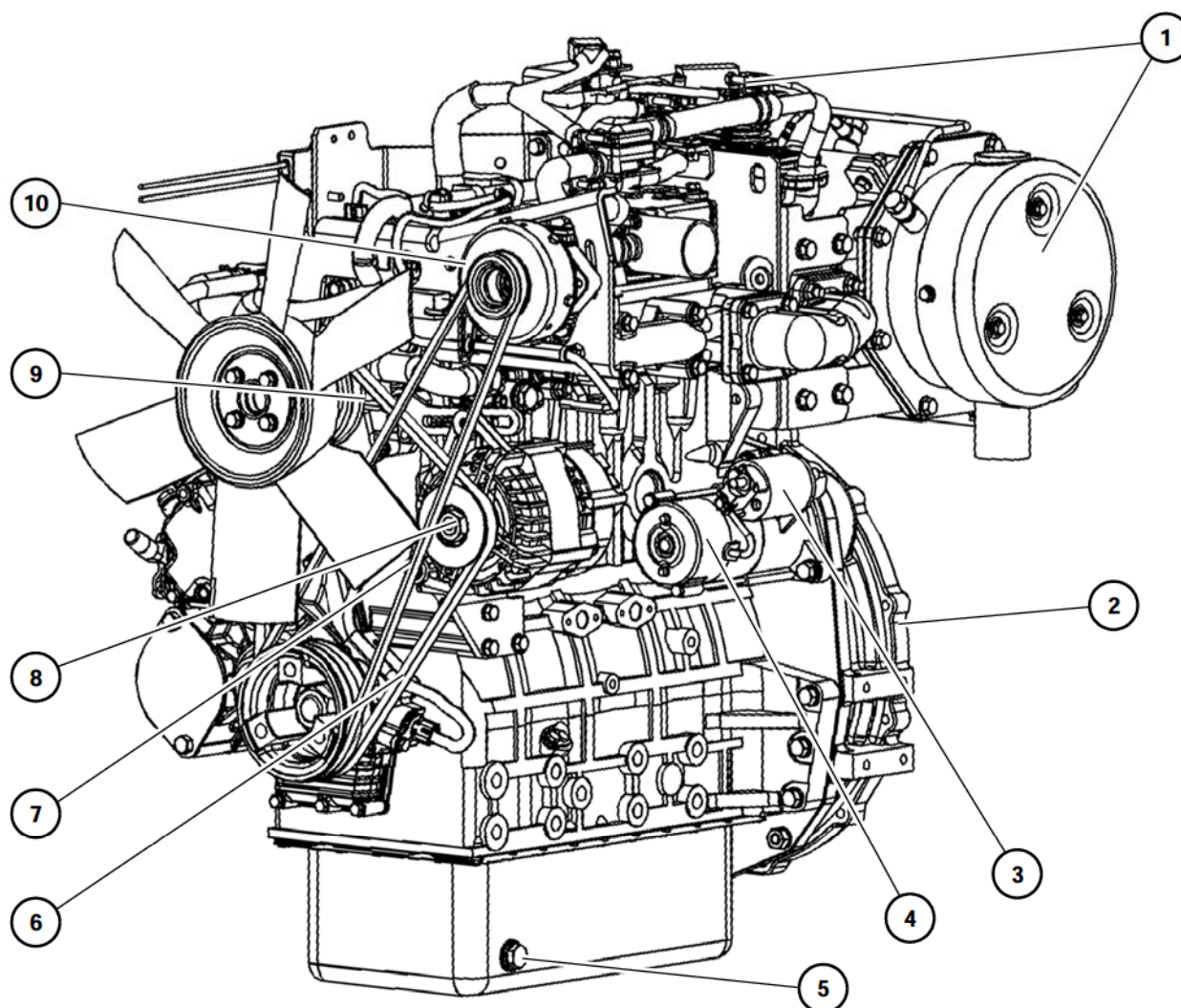
Problem	Possible causes
Engine does not start or is not easy to start	No fuel
	Air in fuel system
	Wrong SAE grade of engine lubrication oil
	Fuel grade does not comply with specifications
	Malfunctioning or empty battery
	Loose or oxidized cable connections in starter circuit
	Malfunctioning starter, or pinion does not engage
	Wrong valve clearance
	Malfunctioning fuel injector
	Malfunctioning starting relay
	Malfunctioning glow plug
	Malfunctioning solenoid switch
	Cutoff solenoid does not attract
	Cutoff solenoid without current
	High pressure created immediately in the hydraulic system
Engine starts, but does not run smoothly or faultless	Fuel grade does not comply with specifications
	Wrong valve clearance
	Injection line leaks
	Malfunctioning fuel injector
	Air in fuel system
Engine overheats. Temperature warning system responds	Oil level too low
	Damaged water pump
	Oil level too high
	Dirty air filter
	Dirty radiator fins
	Malfunctioning fan, torn or loose V-belt
	Malfunctioning thermostat
	Resistance in cooling system too high, flow capacity too low
	Malfunctioning fuel injector
Insufficient engine output	Oil level too high
	Fuel grade does not comply with specifications
	Dirty air filter
	Wrong valve clearance
	Air in fuel system
	Injection line leaks
	Malfunctioning fuel injector

Problem		Possible causes
Engine does not run on all cylinders		Injection line leaks
		Malfunctioning fuel injector
Insufficient or no engine oil pressure		Oil level too low
		Malfunctioning engine oil pump
		Machine inclination too high
		Clogged engine oil intake filter
		Wrong SAE grade of engine lubrication oil
Engine oil consumption too high		Oil level too high
		Machine inclination too high
Engine smoke	Blue	Oil level too high
		Machine inclination too high
		Engine oil combustion (malfunctioning cylinder-head gasket)
	White	Engine starting temperature too low
		Fuel grade does not comply with specifications
		Malfunctioning fuel injector
		Wrong valve clearance
		Coolant combustion (malfunctioning cylinder-head gasket)
		Externe misalignment of injection time
	Black	Dirty air filter
		Wrong valve clearance
		Malfunctioning fuel injector (drips)
		Wrong fuel injection pump setting

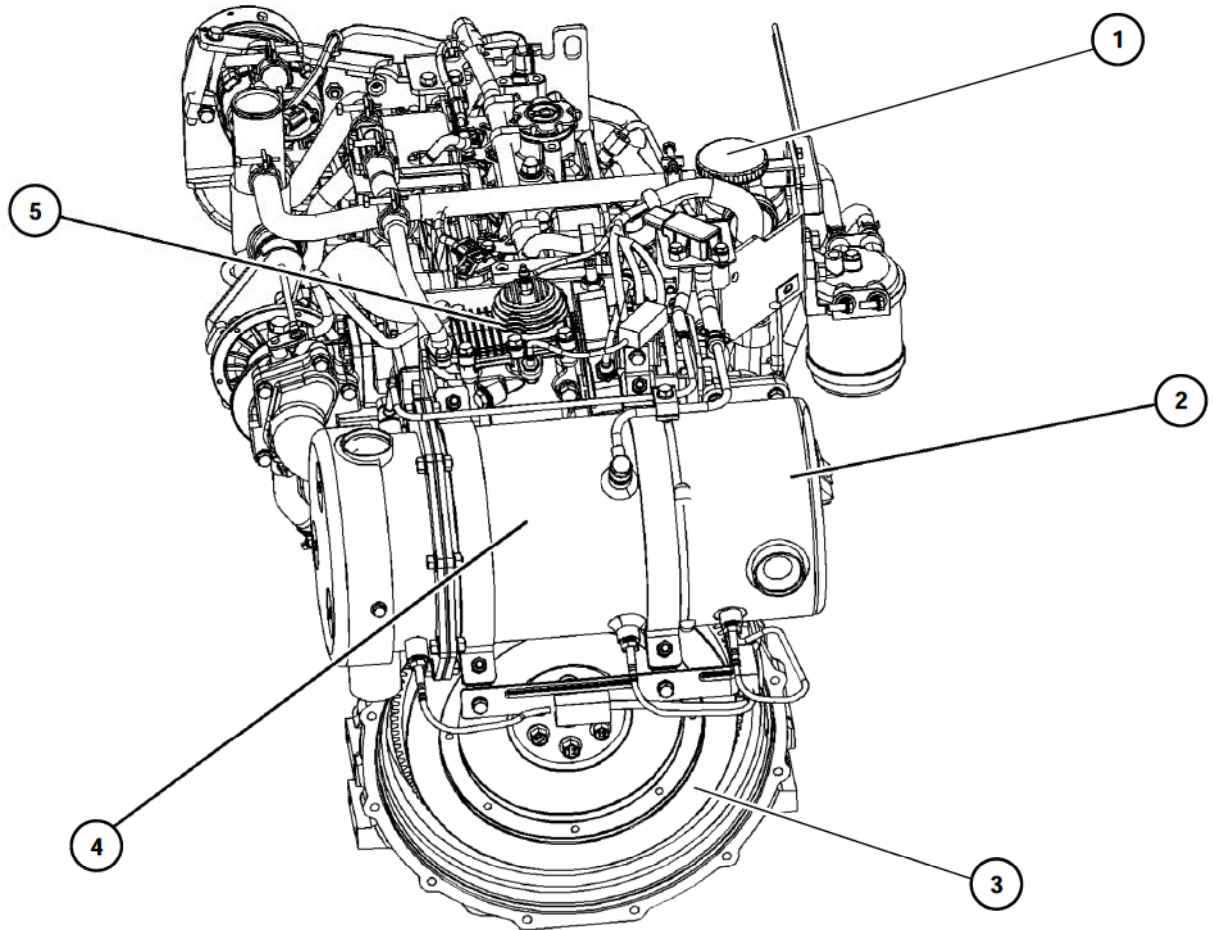
D.5 Perkins engine 404F-22T Tier IV



Pos.	Designation	Pos.	Designation
1	Upper oil filler neck	6	Oil-drain plug
2	Radiator fan	7	Engine oil filter
3	Lateral oil filler neck	8	Electric fuel pump
4	Cylinder-block drain plug	9	Fuel safety filter
5	Oil dipstick		



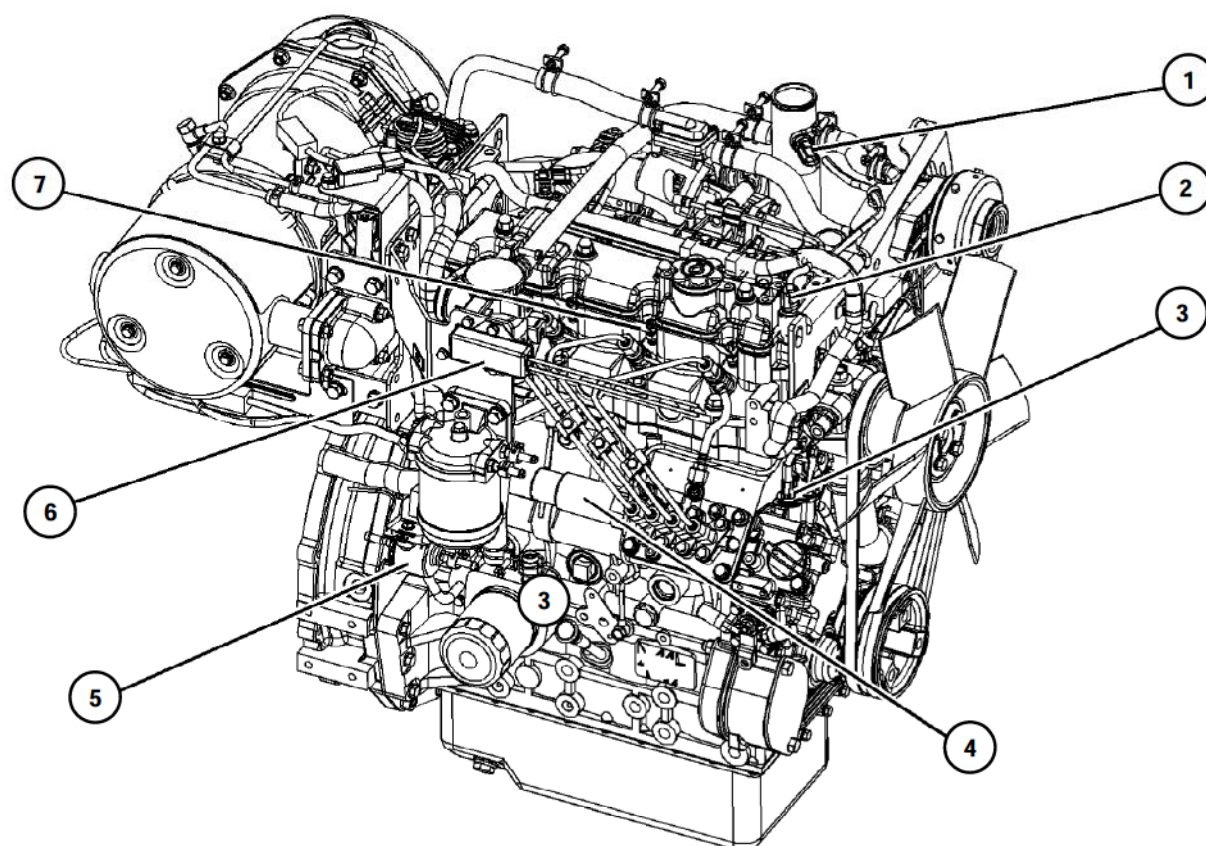
Pos.	Designation
1	Aftertreatment system
2	Flywheel housing
3	Starter solenoid valve
4	Starter
5	Oil-drain plug
6	Alternator V-belt
7	Air pump V-belt
8	Alternator
9	Water pump
10	Air pump



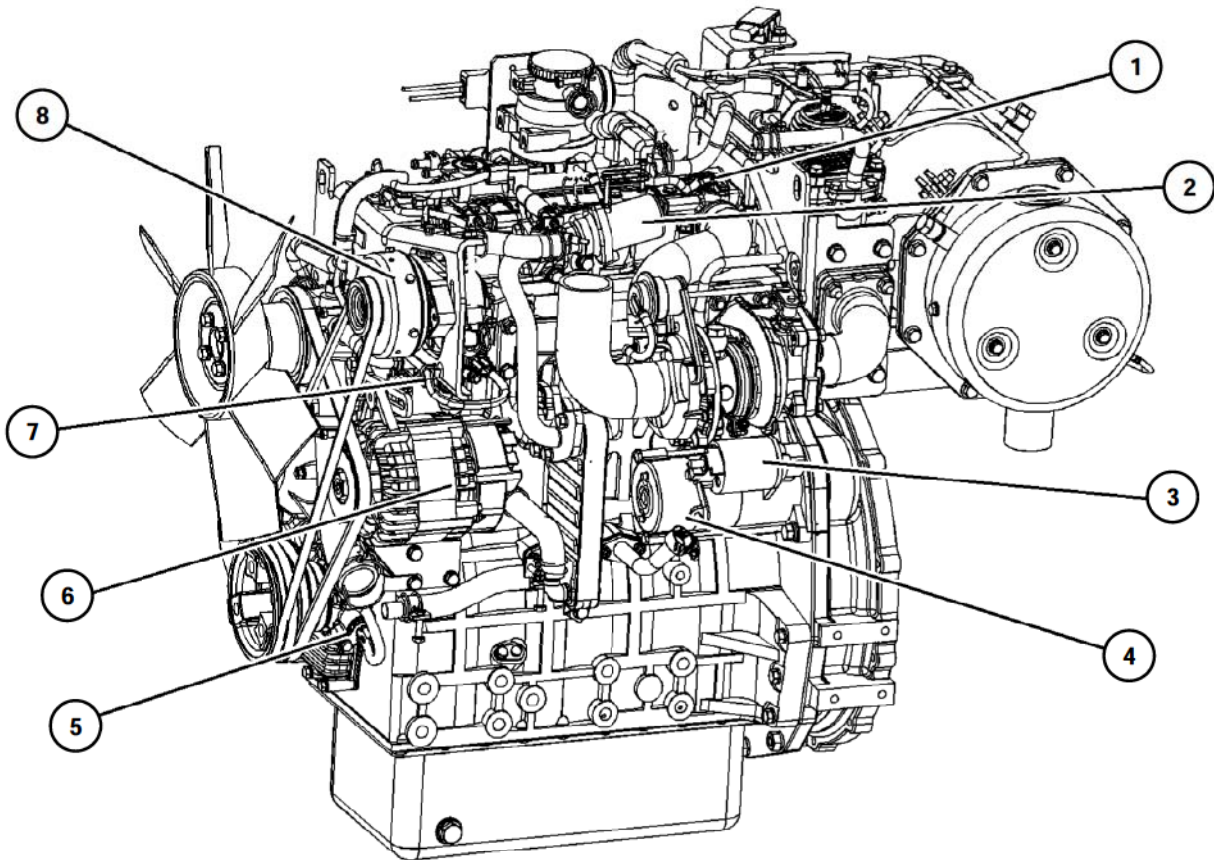
Symbolic representation

Pos.	Designation
1	Crankcase breather
2	Diesel oxidation catalyst (DOC)
3	Flywheel
4	Diesel particulate filter (DPF)
5	Aftertreatment system

Sensors and electric components

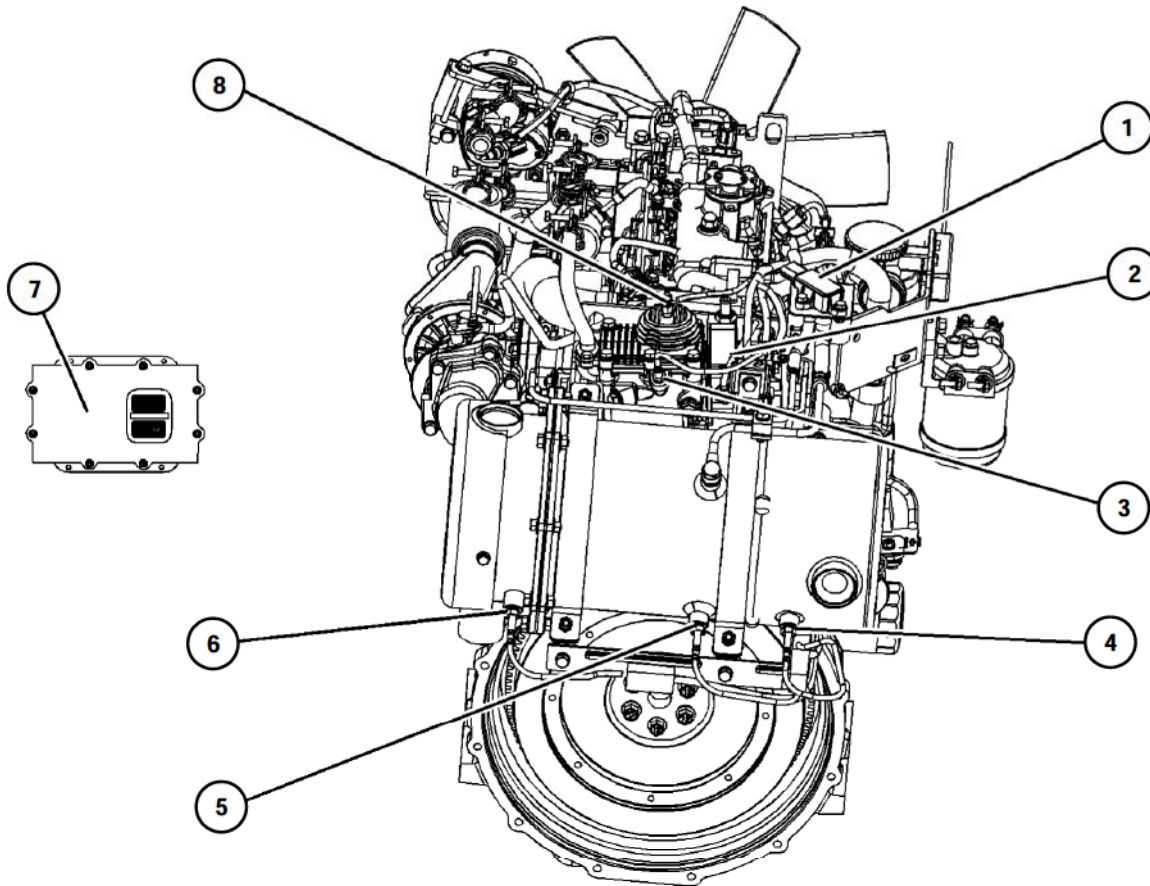


Pos.	Designation
1	Intake-air temperature sensor
2	Oil pressure switch
3	Secondary engine-speed sensor
4	Control-rack solenoid valve and position sensor
5	Fuel pump/breather pump
6	Resistor of ARD glow plug
7	Glow plugs



Symbolic representation

Pos.	Designation
1	Intake manifold air-pressure sensor
2	NRS control valve
3	Starter solenoid valve
4	Starter
5	Primary engine-speed sensor
6	Alternator
7	Coolant temperature sensor
8	Air pump



Pos.	Designation
1	DPF pressure-difference sensor
2	ARD injection nozzles
3	ARD temperature sensor
4	DOC intake temperature sensor
5	DPF intake temperature sensor
6	DPF outlet temperature sensor
7	Engine control unit (ECM)
8	ARD glow plugs

Adjusting the valve clearance



Notice!

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

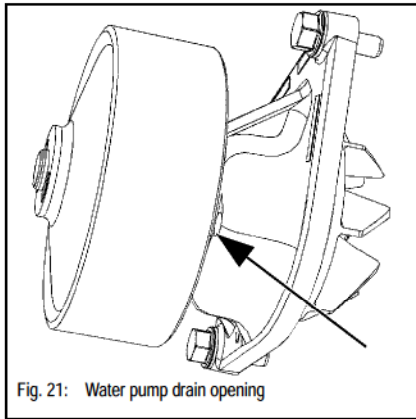
Clean the diesel particulate filter



Notice!

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

Check the water pump (visual check)



☞ Check the water pump visually for leaks.

➡ No excessive coolant leakage.

☞ Replace the water pump seal or the water pump in case of excessive coolant leakage.



Notice!

The water pump seal is lubricated by the coolant in the cooling system. A small amount of leakage when the engine cools down is normal because the warm engine components contract as they cool down.



Notice!

If engine coolant penetrates into the engine-lubrication system, replace the lube oil and the engine oil filter. Draining the oil removes all dirt particles and ensures correct sampling

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
	Fuel level too low
	Air in fuel system
	Antitheft protection
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 and/or battery master switch
Fuel consumption too high	Wrong indication of fuel level
	Fuel leak
	Fuel grade
	Oil grade
	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
	Brakes produce friction

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
	Injection pump seal
Excessive oil consumption	Wrong indication of oil level
	Crankcase breather
	Air-intake and exhaust system
	Low compression (cylinder pressure)
	Oil leaks
	Oil level

Problem		Possible causes
Excessive development of	white smoke ¹	Low coolant temperature
		Separate cylinder not working correctly
		Valve clearance
		Fuel grade
		Low compression (cylinder pressure)
	Black smoke ²	Electronically regulated pump/nozzle units
		Air-intake and exhaust system
		Separate cylinder not working correctly
		Low compression (cylinder pressure)
		Valve clearance
		Malfunctioning particulate filter
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

1. After a longer standstill (for example over night), white smoke is normal when starting the engine and shortly afterward. Only condensation water evaporates.

2. Black smoke is visible only if the particulate filter is damaged.



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CHAPTER E:

Electric

(Neuson Service Manual 2503 - 3703)

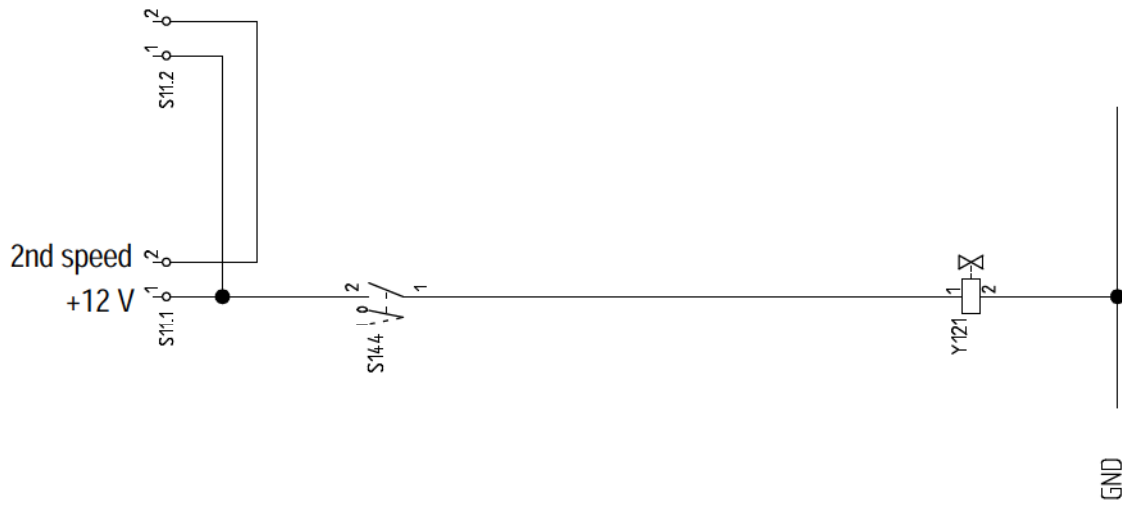


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Wiring harnesses (overview)

E.24 Slewable stabilizer blade cable 3503 (option)



Pos.	Designation
S11.1	Connector
S11.2	Connector
S144	Stabilizer-blade lever push button
Y121	Valve

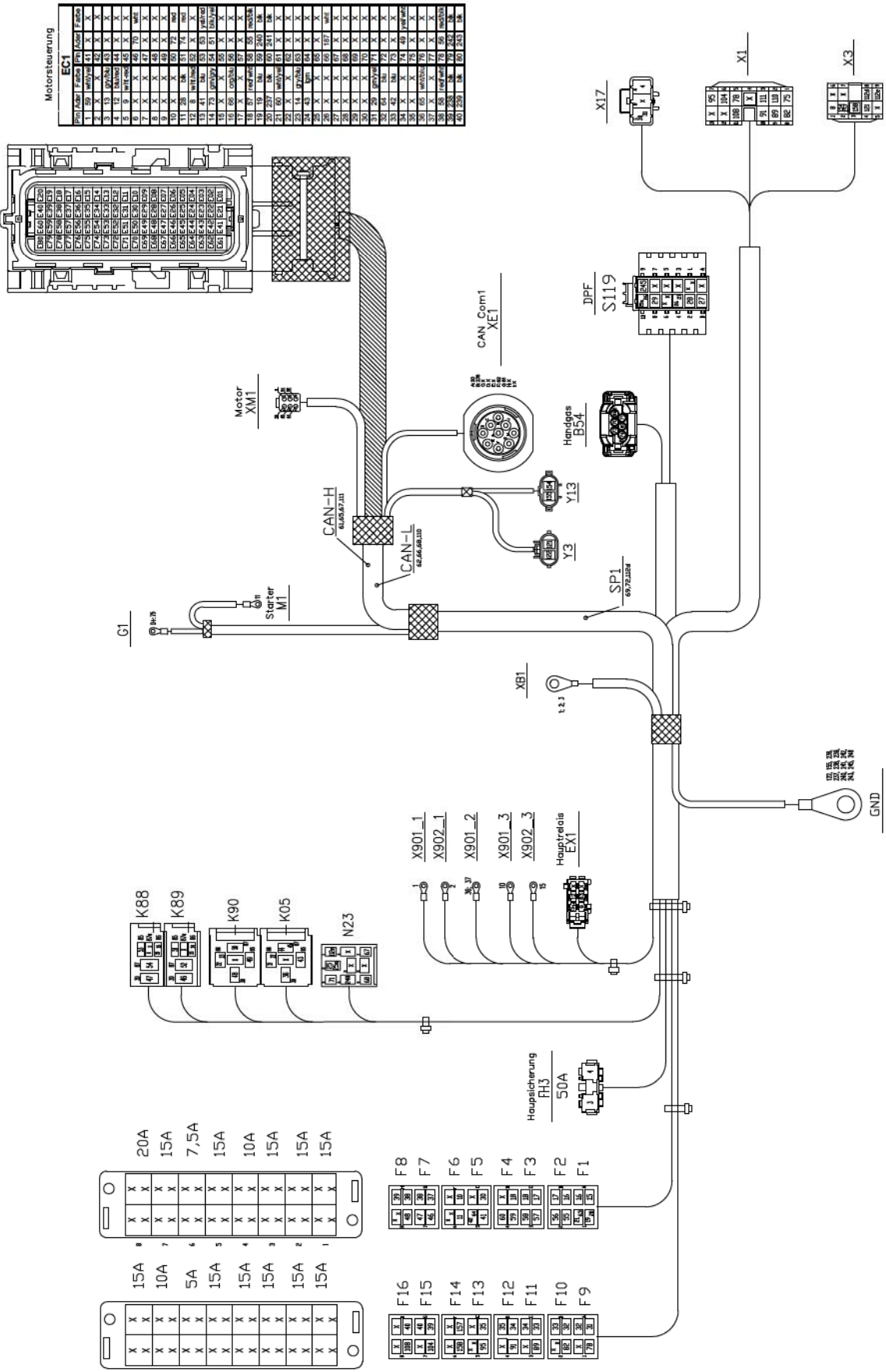
E.25 Engine wiring harness legend Tier IV

Strand	From	P in	To	P in	mm ²	Color	Function
1	XB1		X901_1		6	red	12 V/30
2	XB1		X902_1		6	red	12 V/30
3	XB1		FH3	1	6	red	12 V/30
4	FH3	2	X17	A	6	red	12 V/30
8	EC1	12	X3	1	0.5	wht/red	Start 50
9	EC1	5	EX1	1	0.75	wht/red	ECU start release
10	X901_3		F6	F	2	wht/red	ECU start release
11	F6	6	M1	S	2	wht/red	ECU start release
12	EC1	4	EX1	5	0.5	blu/red	ECU main relay
13	EX1	4	EC1	3	0.5	gry/blu	ECU main relay
14	EX1	4	EC1	23	0.5	gry/blu	ECU main relay
15	X902_3		F1	A	2	blu	12 V/15
16	F1	A	F2	B	2	blu	12 V/15
17	F2	B	F3	C	2	blu	12 V/15
18	F3	C	F4	D	2	blu	12 V/15
19	F1	1	EC1	19	0.75	blu	12 V/15
20	F1	1	XE1	A	1.25	blu	12 V/15
21	F1	1	K5	86	1.25	blu	12 V/15 preheating
22	K5	86	K90	86	1.25	blu	12 V/15 DPF heating relay
23	K90	86	K89	86	1.25	blu	12 V/15 DPF pump
24	K89	86	K88	86	1.25	blu	12 V/15 fuel pump
25	K88	86	N23	2	1	blu	12 V/15 micro SPC
25a	N23	2	S119	10	0.5	blu	12 V/15 DPF switch light
26	S119	10	S119	4	0.5	blu	12 V/15 DPF switch
27	S119	4	S119	B	0.5	blu	12 V/15 DPF switch light
28	S119	2	EC1	11	0.5	blu	DPF switch GND
29	S119	8	EC1	31	0.5	gry/yel	DPF reject regeneration
30	F5	E	X17	C	4	blu	12 V/15
31	F9	A	X17	C	4	blu	12 V/15
32	F9	A	F10	B	2.5	blu	12 V/15
33	F10	B	F11	C	2.5	blu	12 V/15
34	F11	C	F12	D	2.5	blu	12 V/15
35	F12	D	F13	E	2.5	blu	12 V/15
36	X901_2		K5	30	4	red	12 V/30
37	X901_2		F7	G	2.5	red	12 V/30
38	F7	G	F8	H	1.5	red	12 V/30

Strand	From	P in	To	P in	mm ²	Color	Function
39	F8	H	F15	G	1.5	red	12 V/30
40	F15	G	F16	H	1.5	red	12 V/30
41	F5	5	EC1	13	0.5	blu	12 V/15 ECU
42	F5	5	EC1	33	0.5	blu	12 V/15 ECU
43	K5	85	EC1	24	0.5	grn	Preheating
44	K5	87	XM1	4	2	brn	Preheating
45	K5	87	XM1	5	2	brn	Preheating
46	F7	7	K89	30	2	red	12 V/30
47	F7	7	K88	30	2	red	12 V/30
48	F8	8	K90	30	2	red	12 V/30
49	K90	85	EC1	74	0.5	yel/wht	DPF glow plugs
50	K90	87	XM1	6	2	brn	DPF glow plugs
51	K89	85	EC1	54	0.5	blk/yel	DPF pump
52	K89	87	XM1	3	0.75	wht	DPF pump
53	K88	85	EC1	53	0.5	yel/red	Fuel pump
54	K88	87	XM1	2	0.75	red	Fuel pump
55	F2	2	EC1	58	0.75	red/blk	12 V/15
56	F2	2	EC1	78	0.75	red/blk	12 V/15
57	F3	3	EC1	18	0.75	red/wht	12 V/15
58	F3	3	EC1	38	0.75	red/wht	12 V/15
59	F4	4	EC1	1	0.75	wht/yel	12 V/15
60	F4	4	EC1	21	0.75	wht/yel	12 V/15
61	CAN-H		XE1	G	0.5	wht/blu	CAN0 - H (twisted wire 61/62)
62	CAN-L		XE1	F	0.5	org/blu	CAN0 - L (twisted wire 61/62)
63	F1	1	EX1	2	0.75	wht-red	ECU start release
64	F5	5	EC1	32	0.75	blu	12 V/15
65	EC1	36	CAN-H		0.5	wht/blu	CAN0 - H (twisted wire 61/62)
66	EC1	16	CAN-L		0.5	org/blu	CAN0 - L (twisted wire 61/62)
67	N23	7	CAN-H		0.5	wht/blu	CAN0 - H (twisted wire 67/68)
68	N23	9	CAN-L		0.5	org/blu	CAN0 - L (twisted wire 67/68)
69	SP1		B54	1	0.5	red	+5 V throttle
70	EC1	46	B54	2	0.5	wht	GND throttle
71	N23	3	B54	4	0.5	blu	Throttle signal
72	EC1	50	SP1		0.5	red	+5 V sensors
73	EC1	14	B54	3	0.5	grn/gry	IVS switch
74	EC1	51	B54	6	0.5	red	+5 V IVS switch

75	G1	D+	X1	1	0.5	prk/blu	Diode for alternator charge indicator light
78	F9	1	X1	5	1.5	blu	12 V/15 display
82	F10	2	X1	8	1.5	blu	12 V/15 boom light
89	F11	3	X1	9	1.5	blu	12 V/15 cabin lights
91	F12	4	X1	10	1	gry	12 V/15 valves
95	F13	5	X1	7	1.5	blu	12 V/15 wiper
104	F15	7	X1	6	1	red	12 V/30 rotating beacon
108	F16	8	X1	11	1.5	red	12 V/30 socket
110	CAN-L		X1	2	0.5	lgrn	CAN0 – L (twisted wire 110/111)
111	CAN-H		X1	3	0.5	blu/yel	CAN0 – H (twisted wire 110/111)
112d	SP1		X3	8	1	grn/blk	Pressure switch for automatic engine speed setting
112e	N23	1	X3	9	1	grn/blk	Pressure switch signal
121	X3	4	Y3	B	1	brn/blk	2nd speed range
122	Y3	A	GND		1	blk	Ground
154	X3	2	Y13	B	1	brn/wht	Safety valve
155	Y13	A	GND		1	blk	Ground
157	X3	2	F14	F	1	brn/wht	12 V/15 proportional controls
158	F14	6	X3	3	1	gry/grn	12 V/15 proportional controls
187	EC1	66	B54	5	0.5	wht	IVS GND
236	XE1	B	GND		1	blk	Ground
237	EC1	20	GND		0.75	blk	Ground
238	EC1	39	GND		0.75	blk	Ground
239	EC1	40	GND		0.75	blk	Ground
240	EC1	59	GND		0.75	blk	Ground
241	EC1	60	GND		0.75	blk	Ground
242	EC1	79	GND		0.75	blk	Ground
243	EC1	80	GND		0.75	blk	Ground
245	ST19	9	GND		1	blk	Ground
248	N23	6	GND		1	blk	Ground

E.26 Engine wiring harness Tier IV



E.27 Chassis wiring harness legend Tier IV

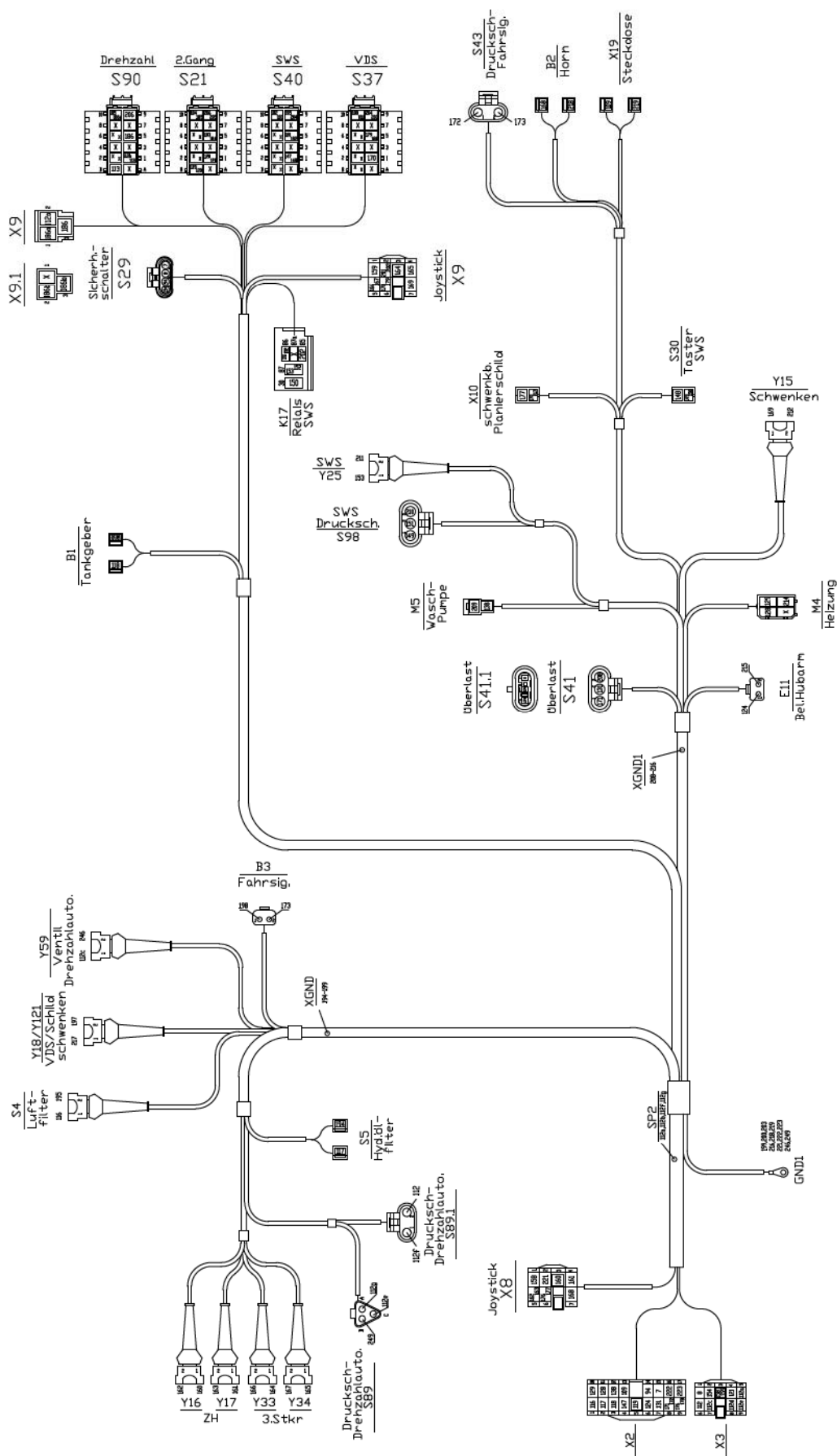
Strand	From	P in	To	P in	mm²	Color	Function
7	X2	15	S29	1	0.5	wht/red	Start 50
8	X3	1	S29	2	0.5	wht/red	Start 50
94	X2	14	S29	3	1	gry/blk	12 V/15 safety valves
109	X2	13	X19	1.5	red	red	12 V/30 socket
112	X3	6	S89.1	2	1	grn/blk	Signal pressure switch
112a	X3	5	SP2		1	blu/red	Pressure switch for automatic engine speed setting
112b	SP2		S90	1	1	blu/red	Pressure switch for automatic engine speed setting
112c	X3	7	Y59	1	1	grn/blk	Valve (automatic engine speed setting)
112d	X3	8	X9	2	1	grn/blk	Pressure switch for automatic engine speed setting
112e	X3	9	S89	C	1	grn/blk	Signal pressure switch
112f	SP2		S89.1	1	1	blu/red	Pressure switch for automatic engine speed setting
112g	SP2		S89	A	1	blu	5 V pressure switch
113	S90	1	S90	B	0.5	grn/blk	Automatic engine speed setting
116	X2	1	S4	1	0.75	gry/blk	Air filter clogging
117	X2	2	S5		0.75	org/wht	Hydraulic oil filter
118	X2	3	B1		1	vio-blk	Fuel level indicator
119	X2	5	S21	B	1	brn/blk	2nd speed range
120	S21	1	S21	B	1	brn/blk	2nd speed range
121	S21	1	X3	4	1	brn/blk	2nd speed range
124	X2	6	E11	1	1	grn/yel	Boom light
128	X2	11	M4	3	1	yel/blk	Heating 2
129	X2	10	M4	1	1	yel/blk	Heating 1
131	X2	7	S41	2	1	vio/blk	Overload indicator light
138	X2	12	M5		1	wht/blk	Washer pump
147	X2	4	S40	1	0.75	gry/yel	Quickhitch buzzer
148	S30	1	S40	1	1	gry/yel	Quickhitch switch
149	S30	2	S98	1	1	org/blk	Quickhitch pedal
150	S30	2	K17	30	1	org/blk	Quickhitch pedal
151	S98	2	K17	86	1	gry/brn	Quickhitch pressure switch
152	K17	87	K17	86	1	gry/brn	Quickhitch valve
162	Y16	2	X8	5	1	blk/blk	COM additional hydraulics
163	Y17	2	X8	5	1	blk/blk	COM additional hydraulics
164	Y33	1	X9	3	1	yel/blk	3rd control circuit valve 1
165	Y34	1	X9	4	1	yel/red	3rd control circuit valve 2
166	Y33	2	X9	5	1	blk/red	COM 3rd control circuit
167	Y34	2	X9	5	1	blk/red	COM 3rd control circuit
168	B2		X8	7	1	org/blk	Horn
169	Y15	1	X9	7	1	blu/yel	Changeover valve
170	X10	2	S37	1	1	brn/grn	VDS/blade swivel
171	X2	8	S41	1	1	blu	12 V/15 pressure switch, travel signal
172	X2	8	S43	1	1	blu	12 V/15 pressure switch, travel signal
173	B3	2	S43	2	1	gry/grn	Traveling signal
174	S41.1	2	S41.1	3	1	vio/blk	Overload jumpering
176	X2	9	X8	6	1	gry	12 V/15 valves
177	X10	1	X8	6	1	gry	12 V/15 valves
178	X2	9	X9	6	1	gry	12 V/15 valves
179	S37	5	X9	6	1	gry	12 V/15 valves
180	S37	5	S37	10	1	gry	12 V/15 valves
181	S40	5	S37	10	1	gry	12 V/15 valves
182	S40	5	S40	10	1	gry	12 V/15 valves
183	S21	5	S40	10	1	gry	12 V/15 valves
184	S21	5	S21	10	1	gry	12 V/15 valves
185	S90	10	S21	10	1	gry	12 V/15 valves
186	S90	5	X9	3	1	gry	5 V automatic engine speed setting
186a	S90	10	X9	1	1	gry	12 V automatic engine speed setting
186b	X9.1	2	X9.1	3	1	gry	Supply of automatic engine speed setting
194	XGND		S5		1	blk	Ground
195	XGND		S4	2	1	blk	Ground
197	XGND		Y18	2	1	blk	Ground
198	XGND		B3	1	1	blk	Ground

199	XGND		GND1		1	blk	Ground
200	GND1		B1		1	blk	Ground
201	X9	2	B1		1	blk	Ground
202	X9	2	K17	85	1	blk	Ground
203	GND1		S37	9	1	blk	Ground
204	S40	9	S37	9	1	blk	Ground

153	K17	87	Y25	1	1	gry/brn	Quickhitch valve
154	S29	4	X3	2	1	brn/wht	Safety valve
158	X3	3	X8	1	1	gry/grn	12 V/15 proportional controls
159	X3	3	X9	1	1	gry/grn	12 V/15 proportional controls
160	Y16	1	X8	3	1	wht/blu	Auxiliary hydraulics valve 1
161	Y17	1	X8	4	1	wht/red	Auxiliary hydraulics valve 2

205	S40	9	S21	9	1	blk	Ground
206	S90	9	S21	9	1	blk	Ground
208	XGND1		S41	3	1	blk	Ground
209	XGND1		M5		1	blk	Ground
210	XGND1		S98	3	1	blk	Ground
211	XGND1		Y25	2	1	blk	Ground
212	XGND1		Y15	2	1	blk	Ground
214	XGND1		M4	2	1	blk	Ground
215	XGND1		E11	2	1	blk	Ground
216	XGND1		GND1		1.5	blk	Ground
217	Y18/Y121	1	X10	2	1	brn/grn	VDS/blade swivel
218	B2		GND1		1	blk	Ground
219	X19		GND1		1.5	blk	Ground
221	GND1		X8	2	1	blk	Ground
222	GND1		X2	16	1.5	blk	Ground
223	GND1		X2	17	1.5	blk	Ground
246	GND1		Y59	2	1	blk	Ground
249	S89	B	GND		1	blk	Ground

E.28 Chassis wiring harness TIER IV



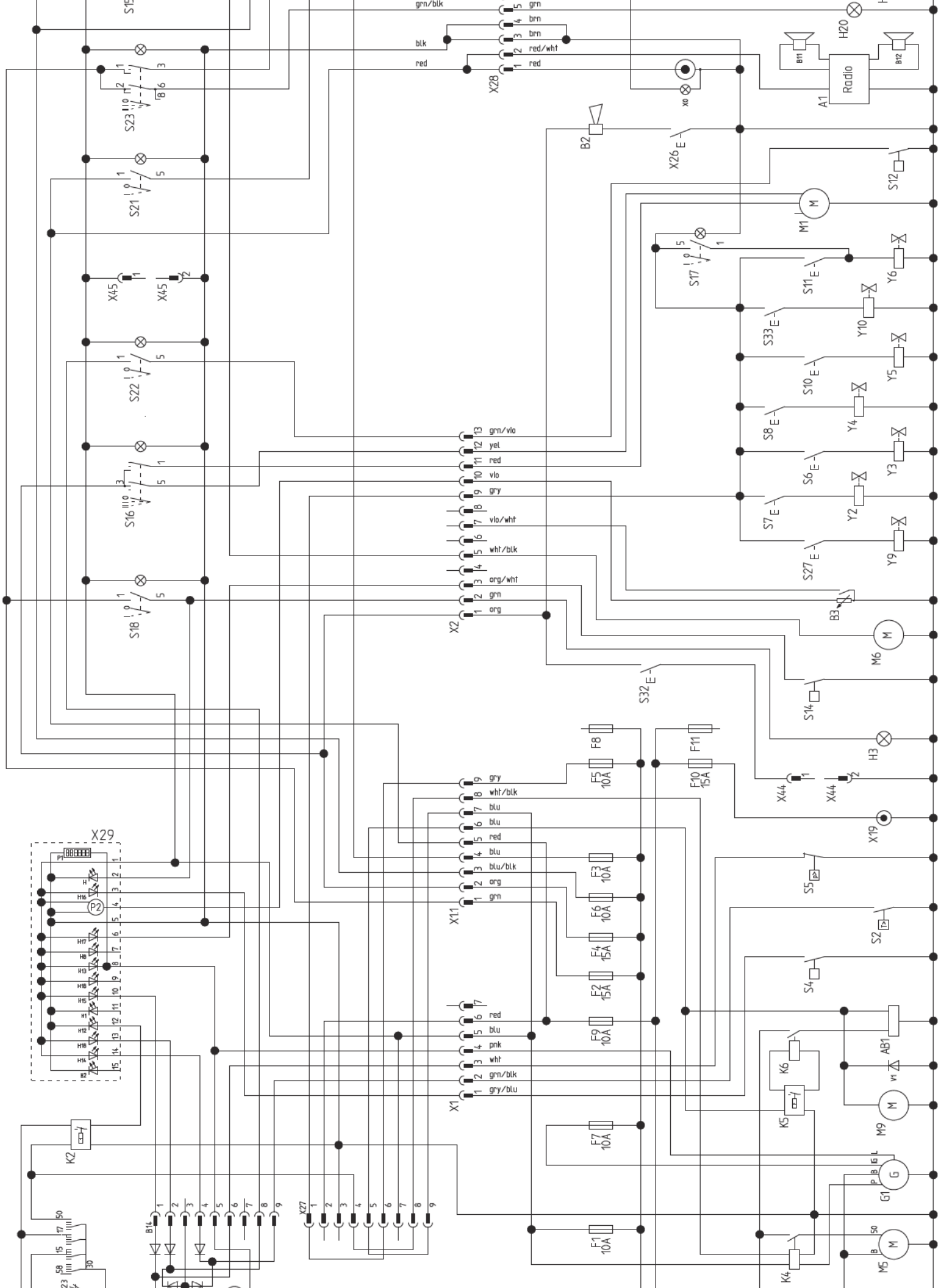


	D12	S23	Roof lights switch	B13
	F8	S27	Boom/stabilizer blade push button	E8
	F2	S32	Backup warning system pressure switch	D/E7
	F6/7	S33	Tilt valve push button	E11
Light	A4	R1	Preheating system	F1
action indicator light	A4	X0	12 V power outlet	E13
indicator light	A4	X1	Engine wiring harness main connector	C3
indicator light	A4	X2	Engine wiring harness main connector	C8
ator light	A4	X4	Several engine relays	
aging indicator light	A5	X5	Alternator charge function/excitation	
ht	A5	X6	Alternator main plus	
	F15	X9	Starter main plus	
	F14	X10	Starter pinion coil	
	F14	X17	Armrest wiring harness main connector	D0
	F14	X18	Ground	
	A3	X19	Socket	F6
	E1	X26	Horn push button connector	E12
ag relay	E3	X27	Antitheft protection connector	
solenoid relay	E3	X28	Cabin connector	D13
	E12	X29	Indicating instrument connector	A3-5
	F1/2	Y2	Boom swivel/auxiliary hydraulics valve	F9
	F7	Y3	3rd control circuit	F9
	E14	Y4	3rd control circuit	F10
	F3	Y5	Safety valve	F10
ator		Y6	High-speed valve	F11
witch	F5	Y9	Stabilizer blade UP/DOWN	F8
n switch	E4	Y10	Tilt valve	F11
h button	E5	F1	Switch lights, indicator lights and indicators, engine relays	D2
oom swivel push button	E9	F2	Boom lights, roof lights	D4
h button	E10	F3	12V/15 cabin	D5
		F4	Heating, horn	D4/5
	E11	F5	Valves	D6
ressure switch	F12	F6	Window wiper, cabin	D5
c oil)	E7	F7	Alternator excitation	D3
	B14	F8	Spare	D6/7
	B9	F9	Rotating beacon, radio, 12 V power outlet, antitheft protection	D4
	E11	F10	Socket	E6
	B8	F11	Spare	E6/7
	A1	Q1	Main fuse	E0
ch	B12			

Wiring diagram (legend)

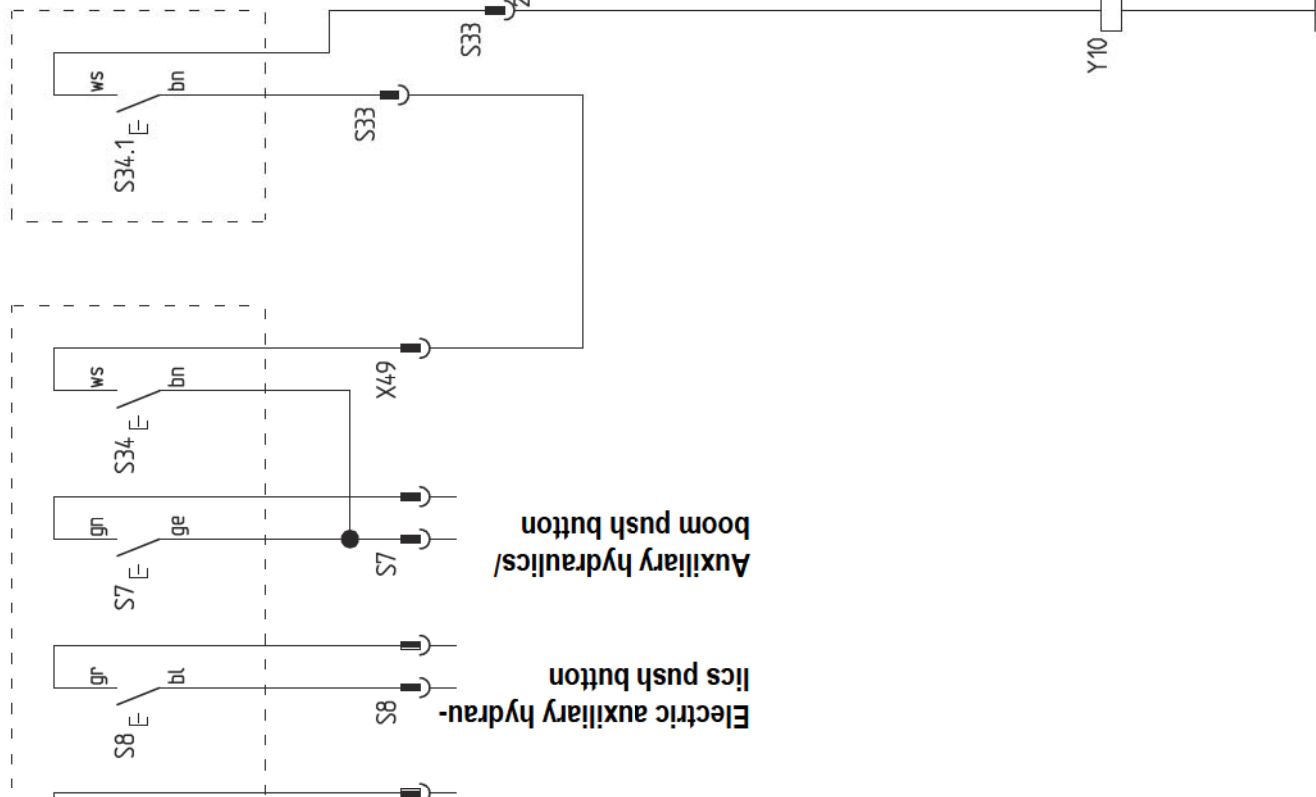
2503: from serial no. AD035

3503: from serial no. AD035



Joystick (right)

left)



Operation

F Operation

F.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.


F.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 (for example waste oil) is not subject to proper use or disposal.


F.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 cm ³	(0.061 in ³)
1 m ³	(35.31 ft ³)
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/cm ²	(14.22 lbs/in ²)
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/s ²	(3.28 ft/s ²)

F.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.

F.5 Labels



Danger!

Accident hazard! Remove missing or damaged labels immediately.

Can cause serious injury or death.

Check warning and information labels regularly whether they are missing or damaged.

Never remove warning and information labels.

Type labels



Fig. 1: Type label (symbolic representation)

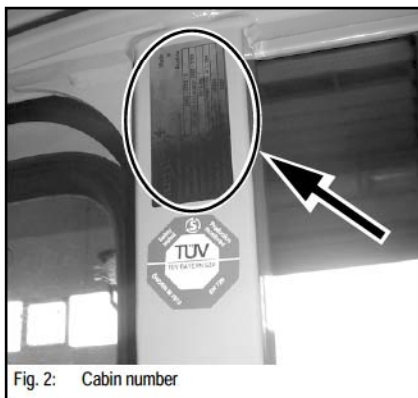


Fig. 2: Cabin number

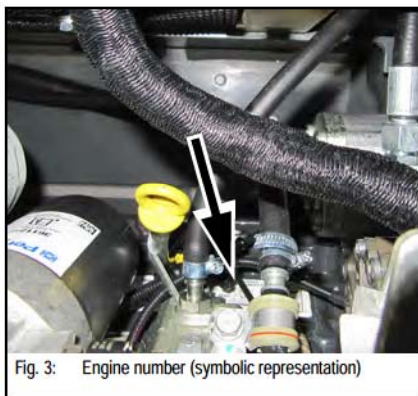


Fig. 3: Engine number (symbolic representation)

Serial number

The serial number is located on the type label.

The serial number is also stamped on the machine chassis.

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

Cabin number

The type label is located on the B pillar on the left.

Engine number

The type label is located at the lower left of the engine block.

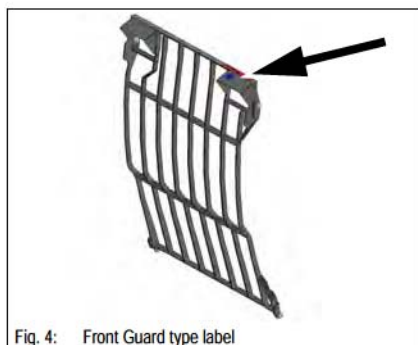


Fig. 4: Front Guard type label

Front Guard type label

The type label is located at the upper left of the chassis.

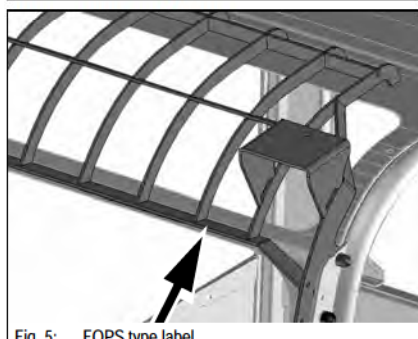


Fig. 5: FOPS type label

FOPS type label (small screen)

The type label is located at the front left of the chassis.

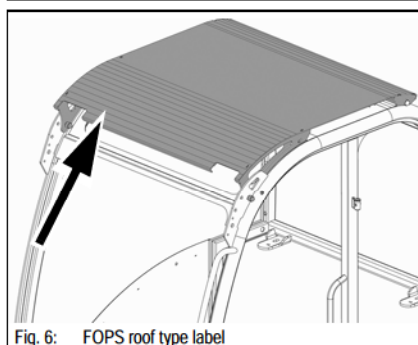


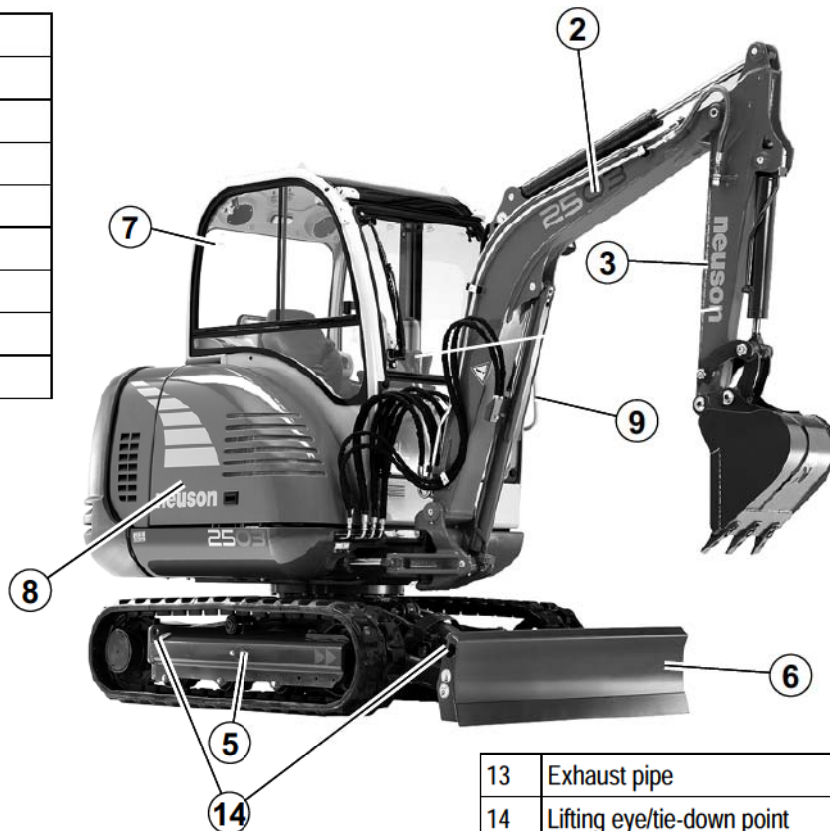
Fig. 6: FOPS roof type label

FOPS roof type label

The type label is located at the upper right on the roof.

F.6 Machine overview

1	Boom light
2	Boom
3	Stick
4	Rubber tracks
5	Travel gear
6	Stabilizer blade
7	Cabin
8	Valve cover
9	Handhold



13	Exhaust pipe
14	Lifting eye/tie-down point
15	Lubrication point for track tension
16	Engine cover

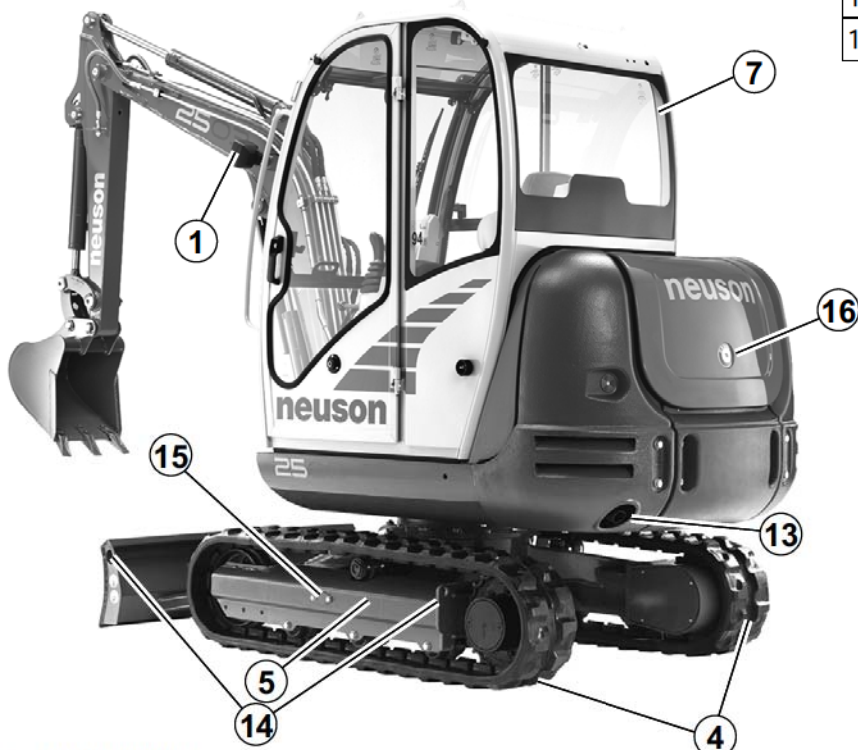


Fig. 1: Machine outside views



Wacker Neuson Linz GmbH 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 that 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.

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