Service Manual

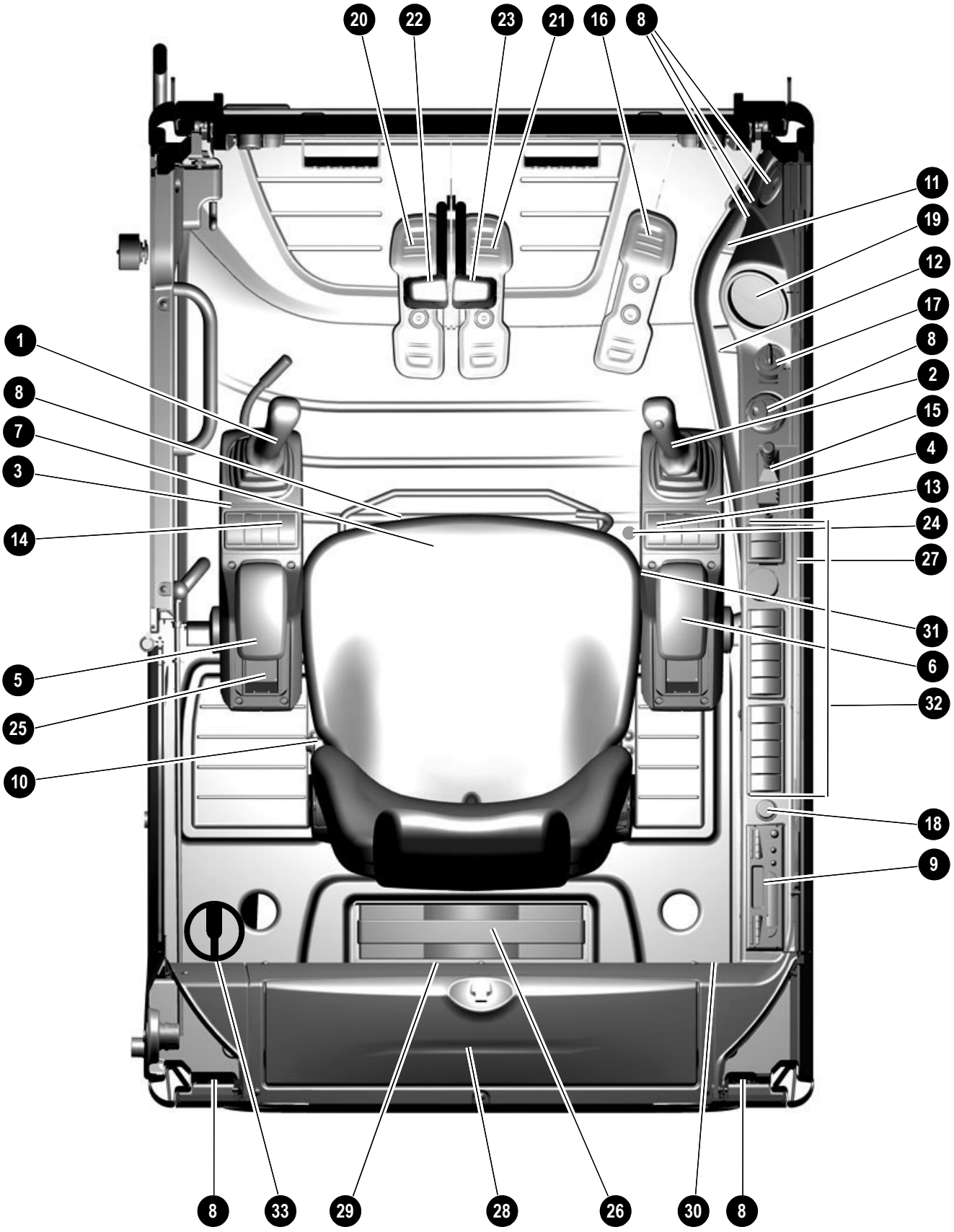
Track excavator

14504

Machine model	**14504**
Edition	**1.3**
Language	**en**
Article number	**1000263436**

WACKER NEUSON

1.6 Cabin overview

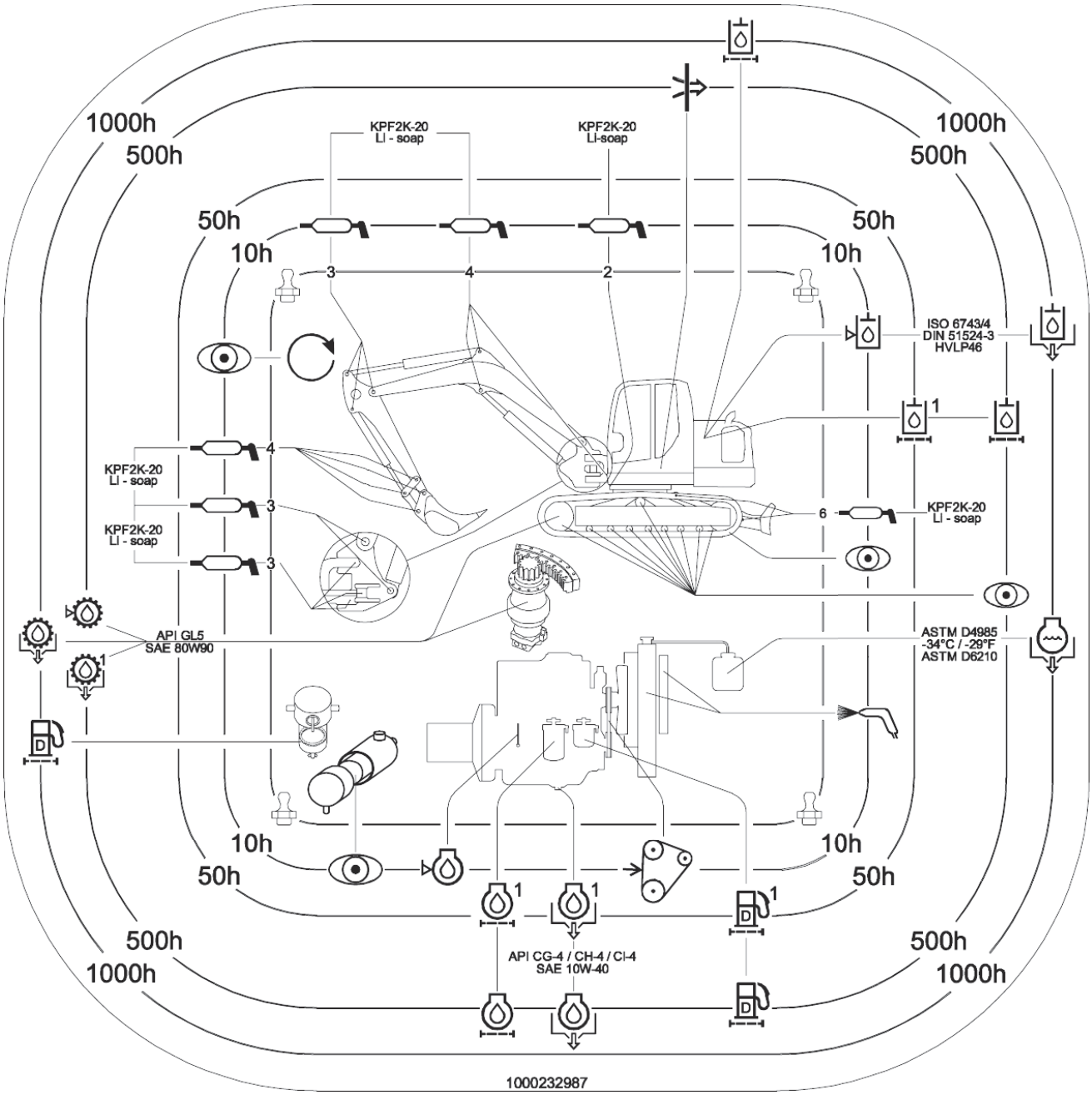


Technical data

Main data	Model 14504 (rubber tracks)
Operating weight	15300 kg/(33730 lbs)
Transport weight	14450 kg/(31856 lbs)
Extra weight with long stick	50 kg/(110 lbs)
Height	2785 mm (9'-2")
Width	2490 mm (8'-2")
Transport width	2490 mm (8'-2")
Transport length, short/long stick	7720 mm/7790 mm (25'-4"/25'-7")
Max. digging depth	5000 mm (16'-5")
Max. digging depth (long stick)	5500 mm (18'-1")
Stick length (standard)	2070 mm (6'-9")
Stick length (long version)	2570 mm (8'-5")
Max. vertical digging depth	3100 mm (10'-2")
Max. vertical digging depth (long stick)	3600 mm (11'-10")
Max. digging height	8300 mm (27'-3")
Max. digging height (long stick)	8600 mm (28'-3")
Max. tilt-out height	5700 mm (18'-8")
Max. dump height (long stick)	6000 mm (19'-8")
Max. digging radius	8300 mm (27'-3")
Max. digging radius (long stick)	8800 mm (28'-11")
Max. reach at ground level	8100 mm (26'-7")
Max. reach at ground level (long stick)	8600 mm (28'-3")
Max. breakout force at bucket tooth	91 kN (20458 ft lbs)
Max. tearout force (standard stick)	69.2 kN (15557 ft lbs)
Max. tearout force (long stick)	60.1 kN (13511 ft lbs)
Min. tail end slewing radius	2015 mm (6'-7")
Max. boom displacement to bucket center (right side)	850 mm (2'-10")
Max. boom displacement to bucket center (left side)	640 mm (2'-1")
Ground clearance	480 mm (1'-7")

* Short stick
** Long stick

3.2 Maintenance label



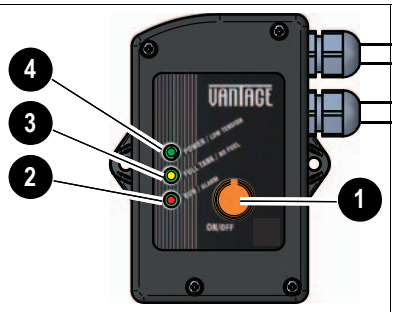


Fig. 9: Fuel-filling pump

➥ About 1 minute after the last work step, the fuel-filling pump goes into standby mode.

☞ *Close and lock the filler cap.*

1 ON/OFF
– Starts or stops refueling

2 RUN/ALARM (red LED)
– Red LED indicates start of delivery.
– Displays several alarm conditions
– *see chapter 11.6 Error codes of fuel-filling pump* on page 11-9.

3 FULL TANK/NO FUEL (yellow LED)
– Full tank, yellow LED illuminates permanently.

4 POWER/LOW TENSION (green LED)
– Fuel-filling pump is operational.
– Flashing green LED indicates insufficient power supply.
– *see chapter 11.7 Troubleshooting the fuel-filling pump* on page 11-10

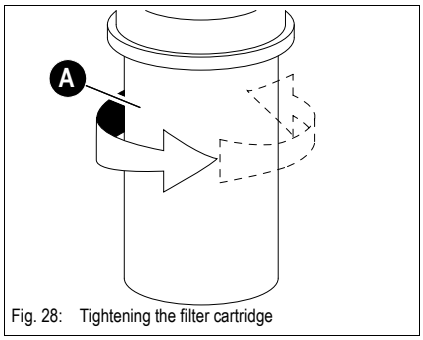


Fig. 28: Tightening the filter cartridge

- Tighten oil filter cartridge **A** by hand or with an oil filter wrench

➥ Tighten to 25 Nm (18 ft lbs) or hand-tight

- Ensure that the oil level is correct!
- Completely remove all oil spills from the engine
- Allow the engine to warm up for about 5 minutes
- Stop the engine
- Check the seal of oil filter cartridge **A** and retighten by hand
- Check the oil level and add engine oil if necessary
- Completely remove all oil spills from the engine
- Dispose of the used oil filter in an environmentally friendly manner

3.13 V-belt

Danger!

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

danger of serious injury!

☞ *Stop the engine before performing inspection work in the engine compartment!*

☞ *Disconnect the battery.*

☞ *Let the engine cool down.*

Caution!

Cracked and stretched V-belts cause engine damage.

☞ *Replace the V-belt.*

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

Checking V-belt tension

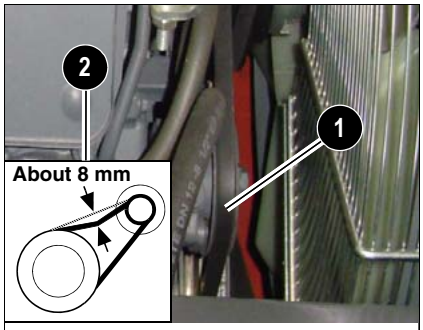


Fig. 44: Checking V-belt tension

Checking the V-belt tension of the coolant and fuel pump

☞ Stop the engine.

☞ Raise the control lever base.

☞ Remove the key and carry it with you.

☞ Let the engine cool down.

☞ Open the engine cover.

☞ Disconnect the battery.

☞ Carefully check V-belt **1** for damage, cracks or cuts.

☞ Replace the V-belt if it touches the base of the V-belt groove or if the pulleys are damaged.

- If the V-belt is damaged:

☞ Replace the V-belt.

☞ Press with your thumb about 100 N (22.5 lbs) to check the deflection of the V-belt between both pulleys.
A new V-belt should have a deflection of 6 to 8 mm (0.24 to 0.31") (see figure **2**).
Otherwise, the deflection should be 7 to 9 mm (0.27 to 0.35") after about 5 minutes running time (see figure **2**).

☞ Retighten the V-belt if necessary.

3.16 Pressure check

General

☞ *Run the machine warm before checking the pressure! Hydraulic oil temperature: 50 °C/ 122 °F min. (operating temperature)*

➥ An infrared thermometer can be used for simple temperature checks on the machine.

☞ *Pressure drop is checked by reducing engine speed from maximum to idling speed at constant load*

☞ *Set the primary pressure limiting valves (PPLV) at maximum engine speed.*

➥ Refer to chapter “Technical data” for the pressure settings – *see Hydraulic system pressures* on page 2-3.

Caution!

Ensure utmost cleanliness of all measuring points, measurement connections, micro measuring lines and pressure gages that are connected!

☞ *Even the slightest traces of dirt can cause leaks.*

☞ *We recommend using the Wacker Neuson measuring kit:*

- 6 pressure gages (2 x 60 bar/870 psi, 2 x 400 bar/5802 psi, 2 x 600 bar/8702 psi)
- Color-coded measuring lines
- Magnetic mounting plate for simple attachment to the machine
- Sturdy plastic case with additional storage space

☞ *The Wacker Neuson threaded fitting set for measurement contains all standard measurement connections and the necessary threaded fittings to make hydraulic system checks easier.*

☞ *The Wacker Neuson vacuum pump is ideal for performing repair work on the hydraulics to reduce hydraulic oil losses to a minimum.*

3.22 Air conditioning

Danger!

Switch on the air conditioning once a month to lubricate the compressor components regularly.

Escaping refrigerant!

☞ The shaft seal in the compressor must become neither dry nor brittle.

Danger!

Proceed with extreme care when performing maintenance and repair work. Work may be performed only if the fan is stopped. Disconnect the fan from the electrical circuit!

Injury hazard!

☞ *Wear protective equipment (leather gloves, safety glasses).*

- The condensor and the heat exchanger have sharp-edged fins.
- Liquid refrigerant is harmful to the skin.
- Do not breathe in the vapors.

Danger!

Proceed with extreme care when performing maintenance and repair work.

Explosion hazard!

☞ *No direct soldering or welding work on parts of the closed cooling circuit or next to it.*

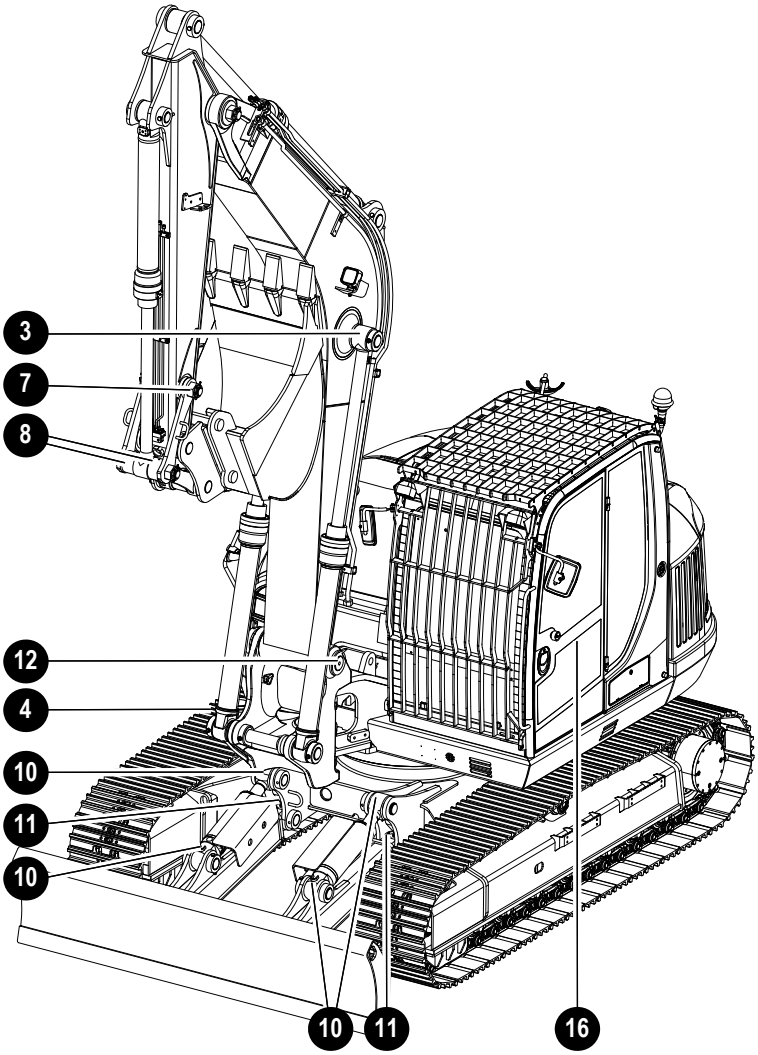
☞ *Do not throw refrigerant cylinders and/or do not expose them to direct sunlight or other heat sources over a longer period of time when they are full. Temperature of full refrigerant cylinder < 45 °C.*

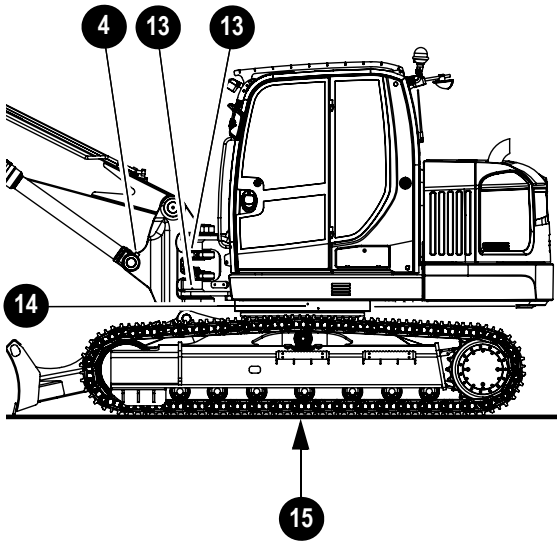
Notice!

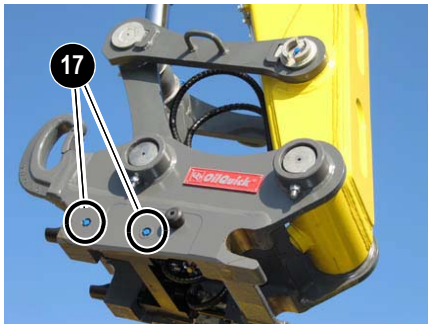
Important information for maintenance and repair work:

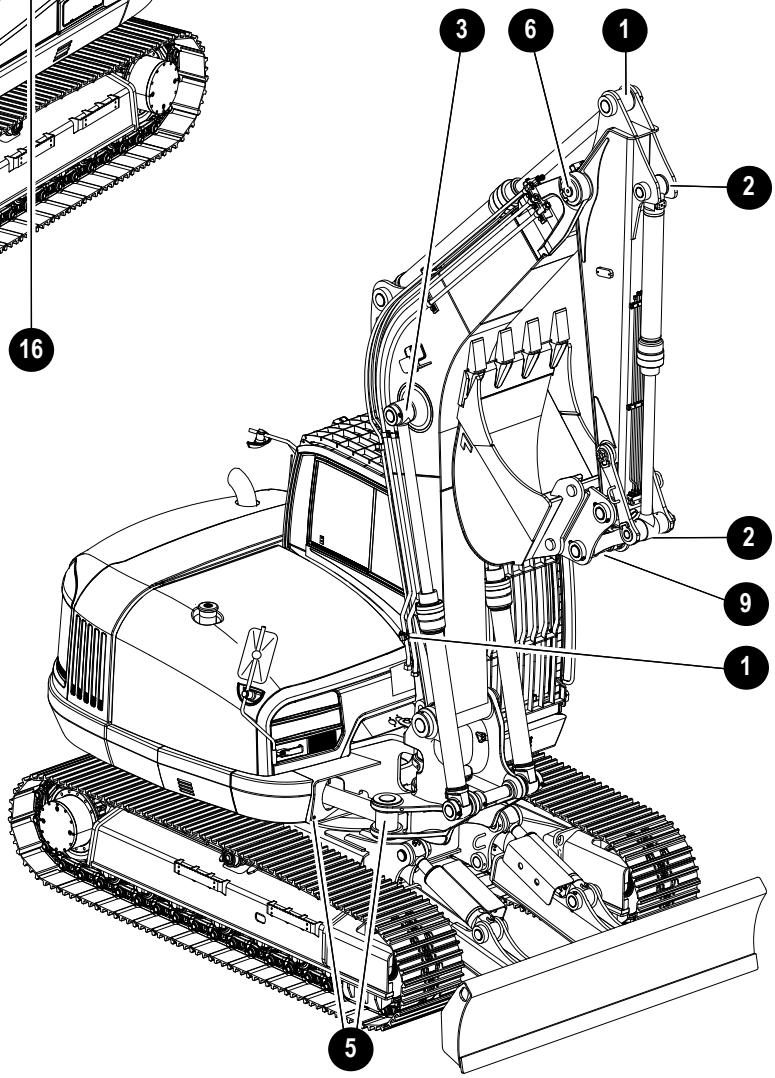
- Use only R134a refrigerant for the compressor.
- Do not use refrigerant again that has been removed with a pump.
- Do not store any components of the refrigerant circuit without any appropriate protection, lids, etc.
- There may be residual pressure in the system even if it is empty. Release this pressure with extreme care as you remove the connections.
- When working on the cooling circuit, close all openings tightly to prevent humidity from penetrating into the system.
- Do not open the cooling circuit outdoors in humid weather or rain.
- Always empty the system before performing maintenance on the cooling circuit.
- Have maintenance and repair work performed by specialized personnel only.

Lubrication points

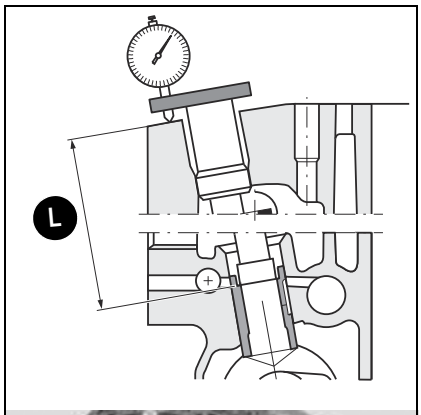








Engine



☞ *Take the measure "L" and enter it in the table*
– *see Automatic engine speed setting on page 4-14*
➥ Example: 125.28 mm

☞ *Turn the dial gage to the zero position of the pointer by means of the outer ring*

Important: Do not modify the direction of rotation when adjusting prestroke travel!

☞ *Turn the crankshaft in the direction of rotation of the engine until the dial gage shows the prestroke travel measure, see table 1*
➥ Example: start of delivery 9°
Camshaft type L
Prestroke travel 3.95 mm

☞ *Read off the* actual start *of delivery and enter it in the table*
– *see Automatic engine speed setting on page 4-14*
➥ Example: 8°

☞ *Measure "A" = read off the code for the injection pump length and enter it in the table*
– *see Automatic engine speed setting on page 4-14*
➥ Example: 42

☞ *Remove the measuring instrument*

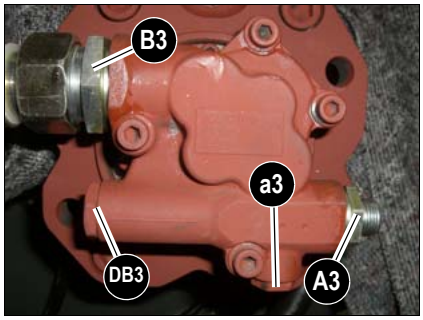
☞ *Determine the correct shim thickness*
– *see Determining the shim thickness for start of delivery on page 4-13*

☞ *Place the correct shim on the roller tappet*

Important: The measurement procedure described above must be performed for each injection pump!

Problem		Possible causes
Insufficient engine output		Lube oil level too high
		Fuel grade does not comply with specifications
		Dirty fuel filter
		Dirty air filter
		Wrong valve clearance
		Injection line leaks
		Malfunctioning fuel injector
		Air in fuel system
Engine does not run on all cylinders		Injection line leaks
		Malfunctioning fuel injector/injection pump
Insufficient or no engine oil pressure		Lube oil level too low
		Engine inclination too high
		Wrong SAE viscosity/oil grade of engine lubrication oil
Engine oil consumption too high		Lube oil level too high
		Engine inclination too high
		Wrong SAE viscosity/oil grade of engine lubrication oil
		Worn oil scraper rings
Engine smoke	Blue	Lube oil level too high
		Engine inclination too high
		Engine oil combustion (malfunctioning cylinder-head gasket)
		Worn oil scraper rings
	White	Engine starting temperature too low
		Fuel grade does not comply with specifications
		Malfunctioning fuel injector
		Exteme misalignment of injection time
		Coolant combustion (malfunctioning cylinder-head gasket)
	Black	Dirty air filter
		Malfunctioning fuel injector (drips)
		Wrong fuel injection pump setting
		Wrong valve clearance
		Dirty injection nozzle

5.2 Gear pump



Pos.	Designation
B3	Positions of upper table page 5-4
A3	Gear pump output 3
a3	Measurement connection MC3
DB3	Pressure limiting valve P3

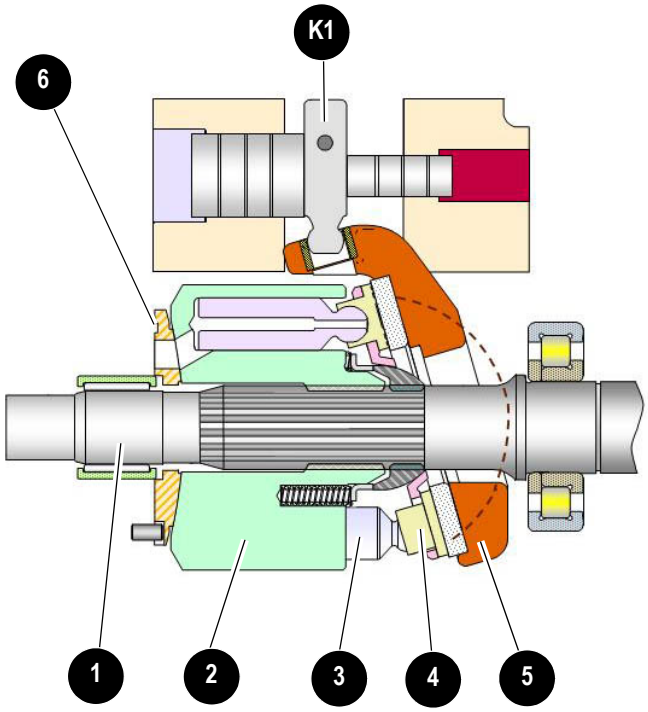
Design

- Axial piston pump
- Swash-plate design
- Add-on regulator
- 2 separate pumps (P1, P2) on one shaft
- 2 separate regulators (1 x per pump)

Control system

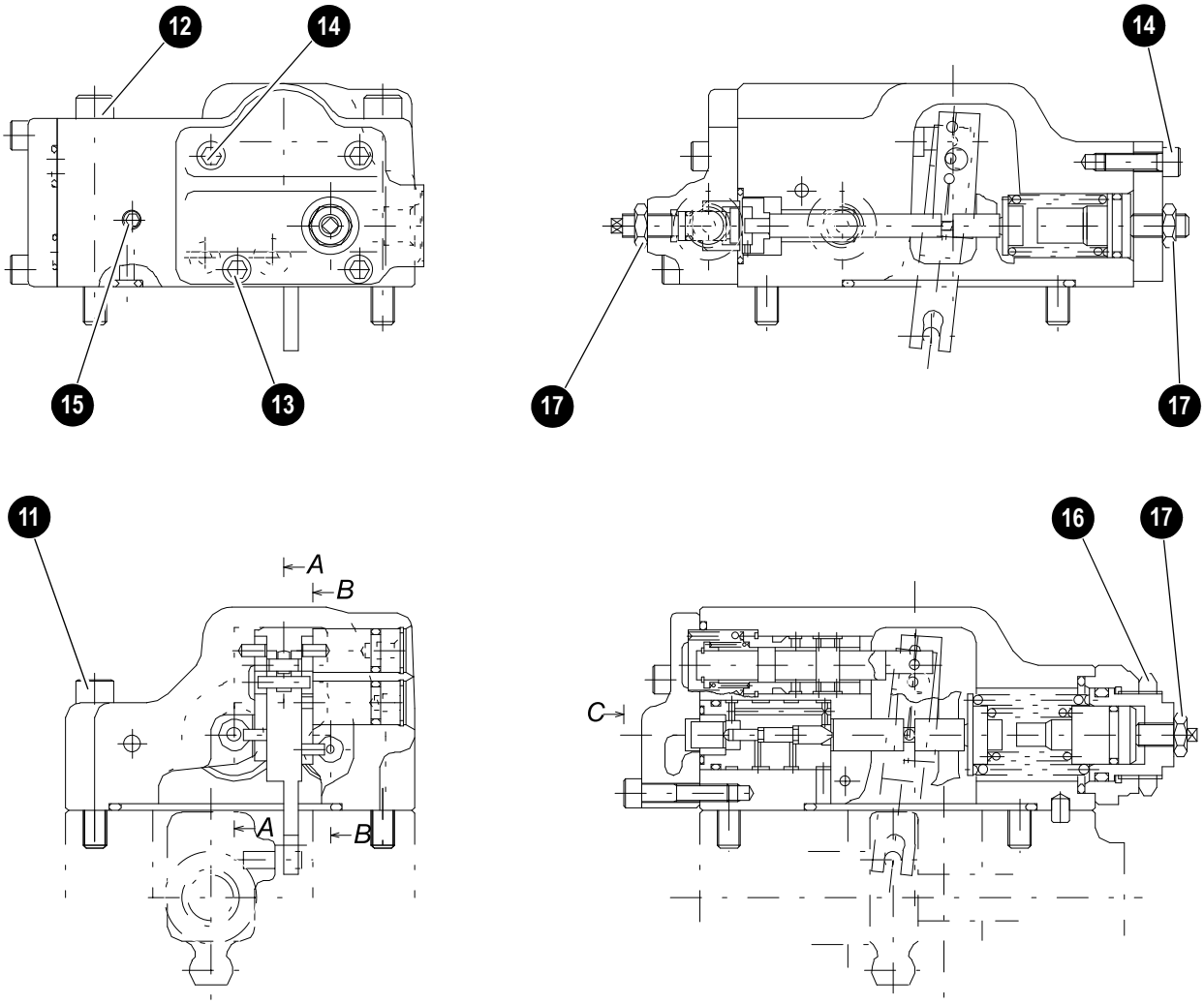
- Summation regulation
- Negative Control regulation
- Output regulation
- Oil flow regulation

Design

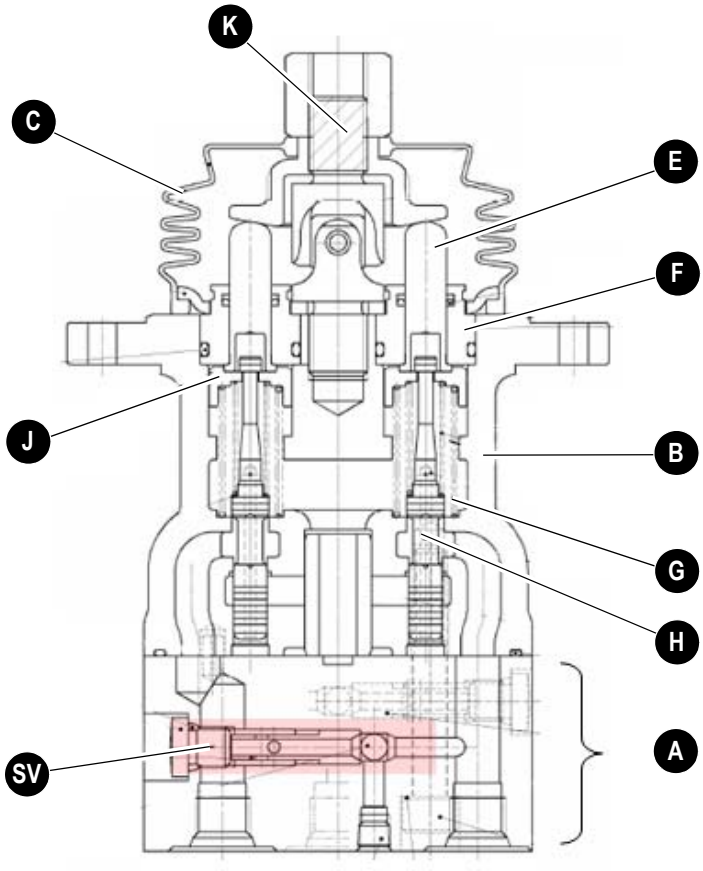


Pos.	Designation
K1	Pump control piston
1	Shaft
2	Cylinder
3	Piston
4	Slide
5	Swash plate
6	Control disc

Tightening torques for front pump regulator



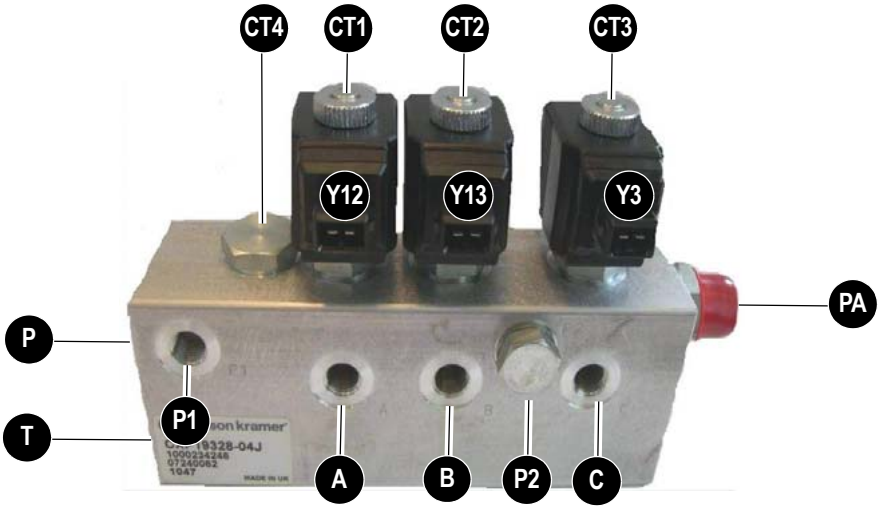
Pos.	Thread size	Tightening torque (Nm / ft lbs)
11	M8	15.7/11.6
12	M8	15.7/11.6
13	M6	11.8/8.7
14	M6	11.8/8.7
15	NPTF 1/16	8.8/6.5
16	M30x1.5	156.9/115.7
17	M8	15.7/11.6

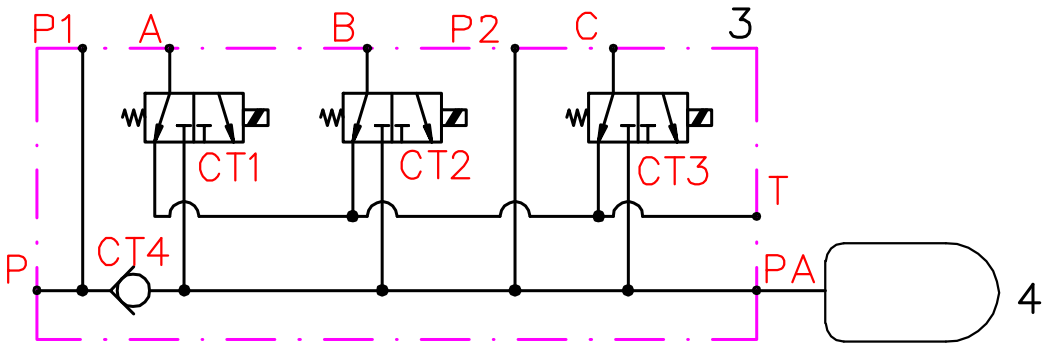


Pos.	Designation	Remarks
1	Connection	
2	Connection	
3	Connection	
4	Connection	
5	Connection	
A	Shuttle valve block	
B	Housing of pilot control unit	
C	Bellows	
D	Handle	See electrical components
E	Tappet	
F	lift	
G	Spring pile	
H	Control spool	
J	Spring guide	
K	Universal joint	
P	Connection P	Wire filter in threaded connection
SV	Shuttle valve	in shuttle valve block A
SVE	External shuttle valve	accessed via floor panel in cabin
T	Connection T	

5.12 Pilot oil supply unit

The pilot oil supply unit is located under the base cover in the cabin (D2).
The pilot control filter is integrated in the threaded connection in connection P1.



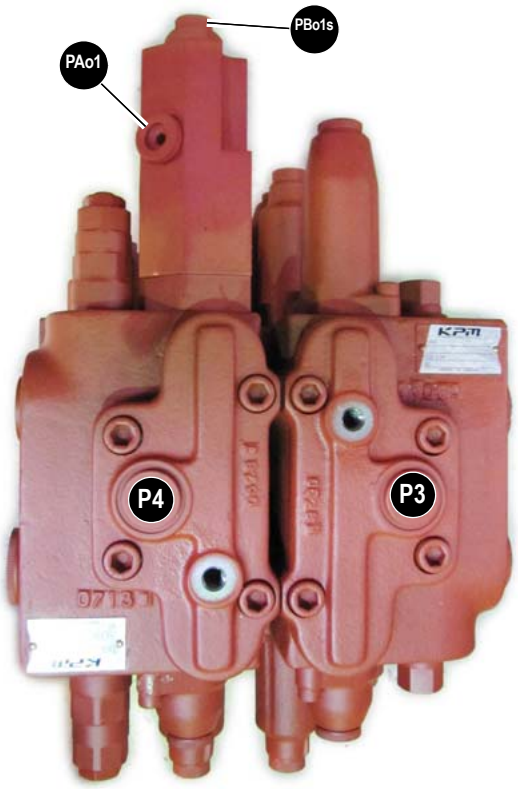


Legend

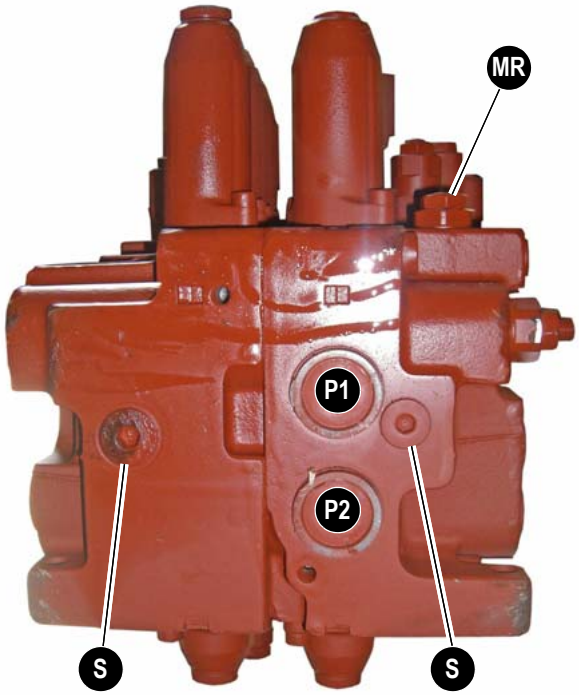
Pos.	Designation	E connector	Remarks
CT1	Solenoid directional valve (oil flow limit)	Y12	Hydraulic pump
CT2	Solenoid directional valve (safety valve)	Y13	Pilot control
CT3	Solenoid directional valve (high speed)	Y3	
CT4	Non-return valve		

Connections view E/view F

View E



View F



Connections view E (legend)

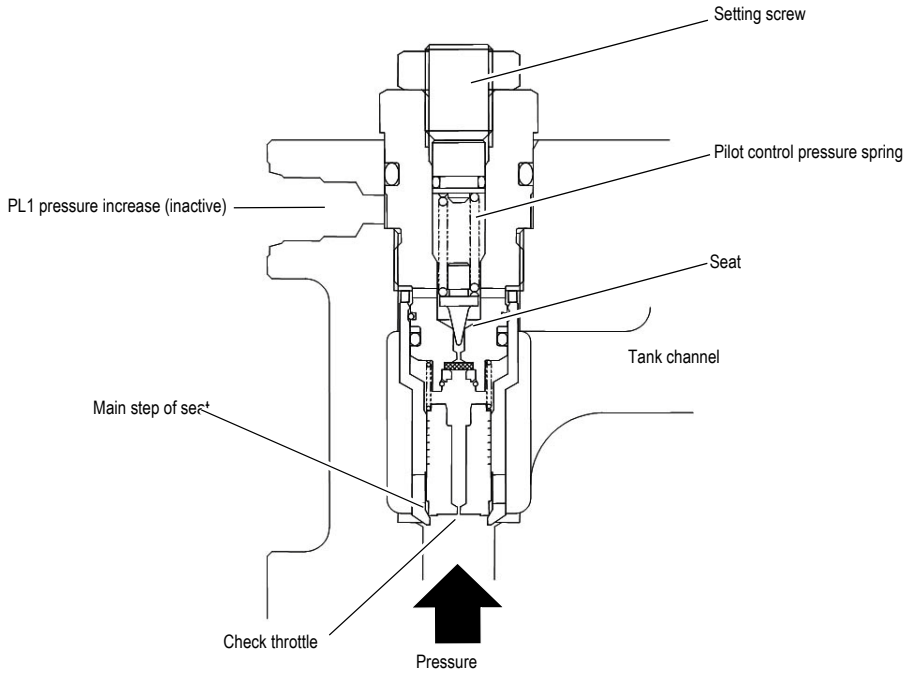
Pos.	Designation
PAo1	Stick RETRACTION summation
PBo1s	Stick RETRACTION summation
P3	Closed/inactive
P4	To secondary control block

Connections view F (legend)

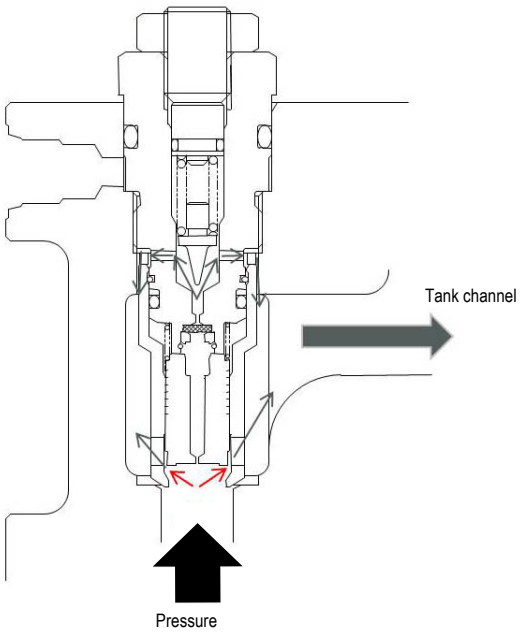
Pos.	Designation
P1	Pump 1 connection
P2	Pump 2 connection
MR	Main pressure limiting valve
S	Plug

5.17 Main pressure limiting valve MR

Main pressure limiting valve closed



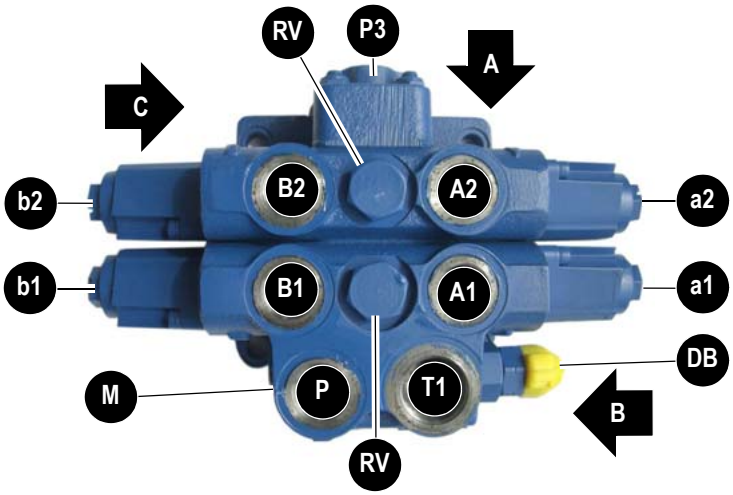
Main pressure limiting valve open

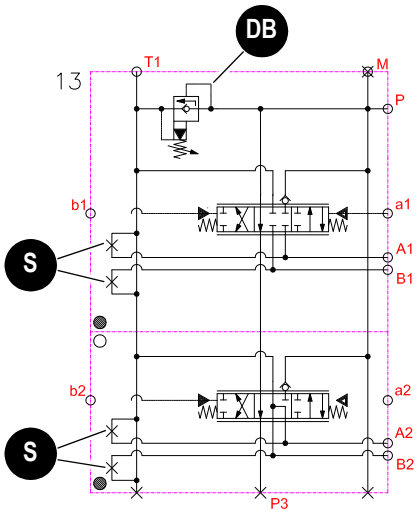


5.23 Stabilizer blade control block

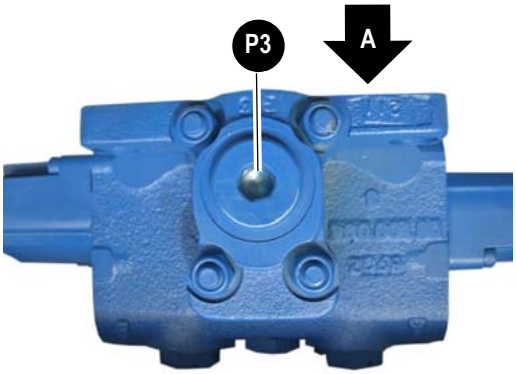
The stabilizer blade control block is located in the valve compartment (H2).

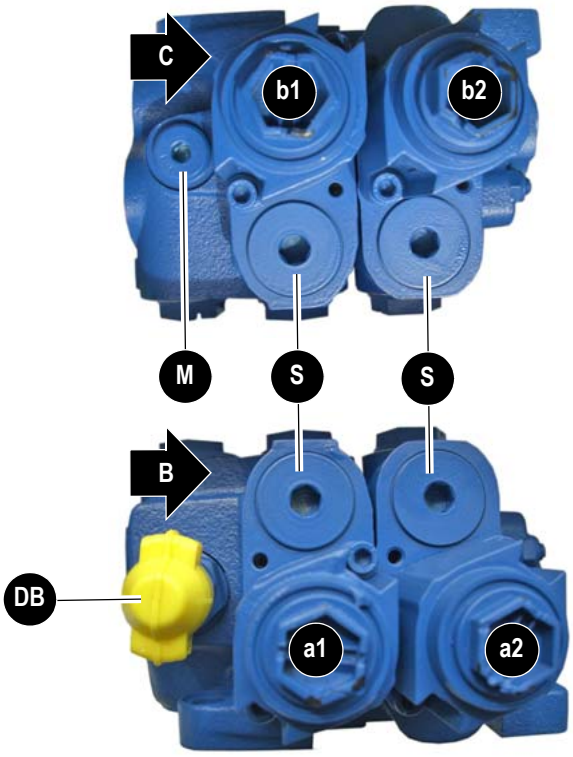
Design

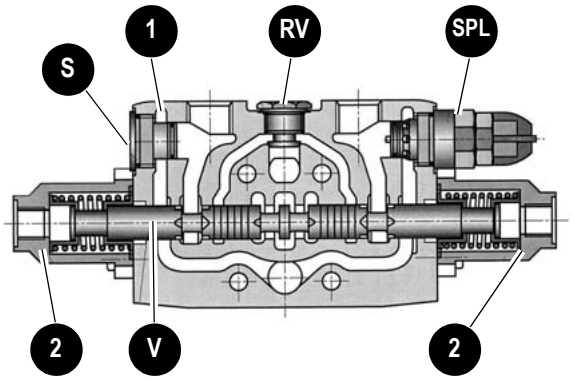




TD	Specified value
DB	350 bar (5076 psi)







Pos.	Designation	Pos.	Designation
1	Housing	RV	Non-return valve
2	Pilot-control cap	S	Plug
DB	Pressure limiting valve	SPLV	Secondary pressure limiting valve
M	Plug	V	Valve piston

Oscillation suppression PU

After the rotation comes to a stop (neutral position of main spool), the gear motor can make an oscillating movement (inertia of masses in movement). This causes an alternating pressure increase at **A** and **B**.
The oscillation suppression valve dampens this oscillating movement.

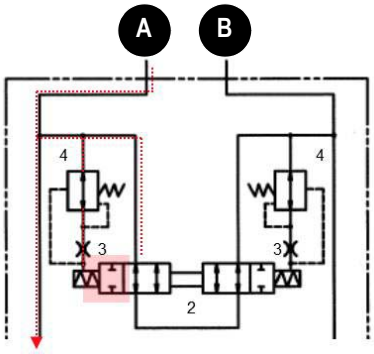


Figure 1 – rotation to the right

The directional valve in the main control block directs the oil to connection **A** of the hydraulic motor. At the same time, seat valve **2** is shifted to the right and blocks the bypass in connection **A**. The required control pressure leaves **A** and passes valve **4** and throttle orifice **3** before it reaches spring chamber **5** and shifts seat valve **2**.

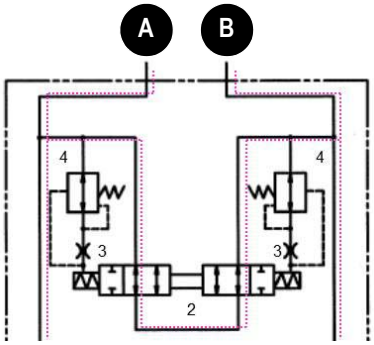


Figure 2 – rotation stopped

The pressure increase in outflow side **B** pushes seat valve **2** to the left, throttle orifice **3** brakes this movement. In doing so, the seat valve moves through the center position. Connections **A** and **B** are connected together via the bypass. The impact pressure is reduced.

➥ Damping

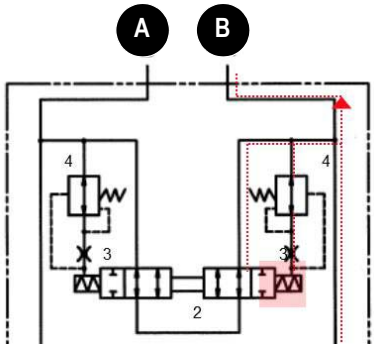
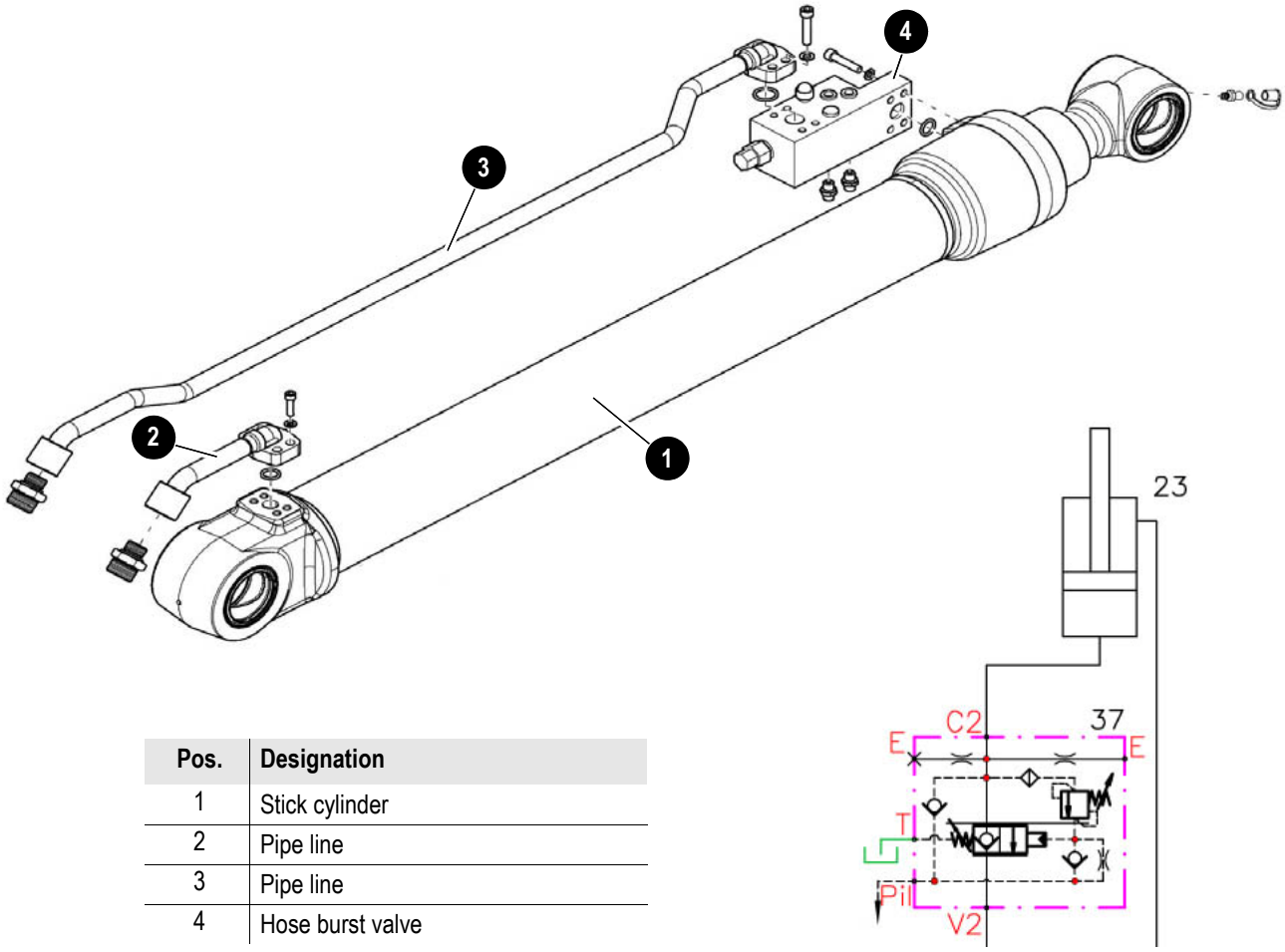


Figure 3 – end of damping

Seat valve **2** on the B side blocks the flow from **B** to **A**.

The process is resumed if an oscillating movement on the opposite side causes the pressure to increase again.

Stick cylinder position



Pos.	Designation
1	Stick cylinder
2	Pipe line
3	Pipe line
4	Hose burst valve

Stick cylinder function

The valve is installed on the rod-side connection of the stick cylinder.

“Retract stick cylinder” function:

- Cylinder can be retracted as usual (always “free flow” from the cylinder).

The built-in non-return valve safely holds the load in rest position.

“Extend stick cylinder” function:

- Pilot control pressure moves valve (CT2) to work position (free oil flow to the base side).
- The valve moves back to home position if the pilot control pressure drops.

In addition, a safety valve (CT1) protects the hydraulic cylinder from overload.

Notice!

The valve settings are sealed.

Electrical system

6.14 Alternator

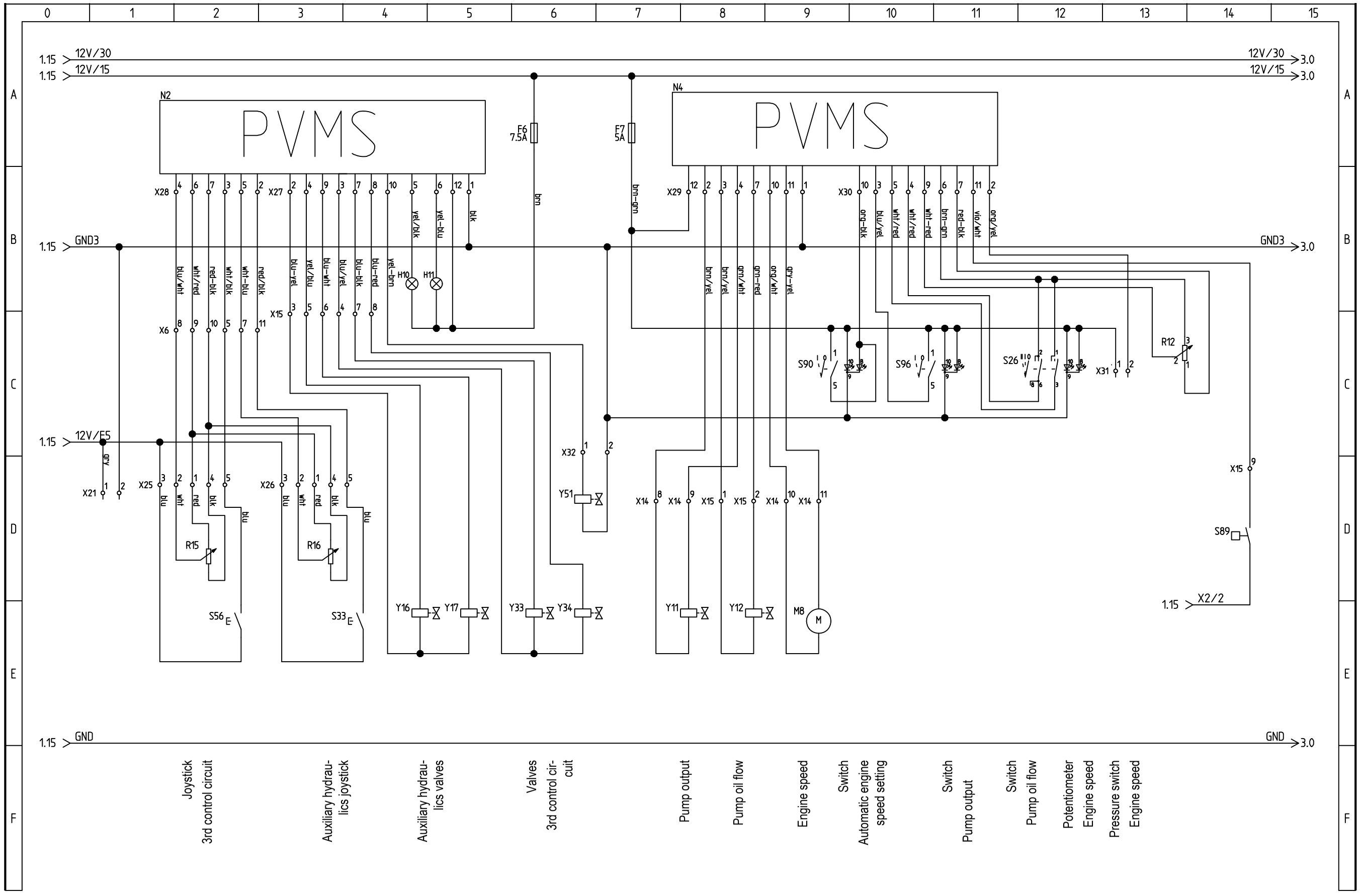
The alternator charges the battery and supplies direct current to electric consumers.

Position	Designation
1	Connection B (battery)
2	Connection D+ indicator light

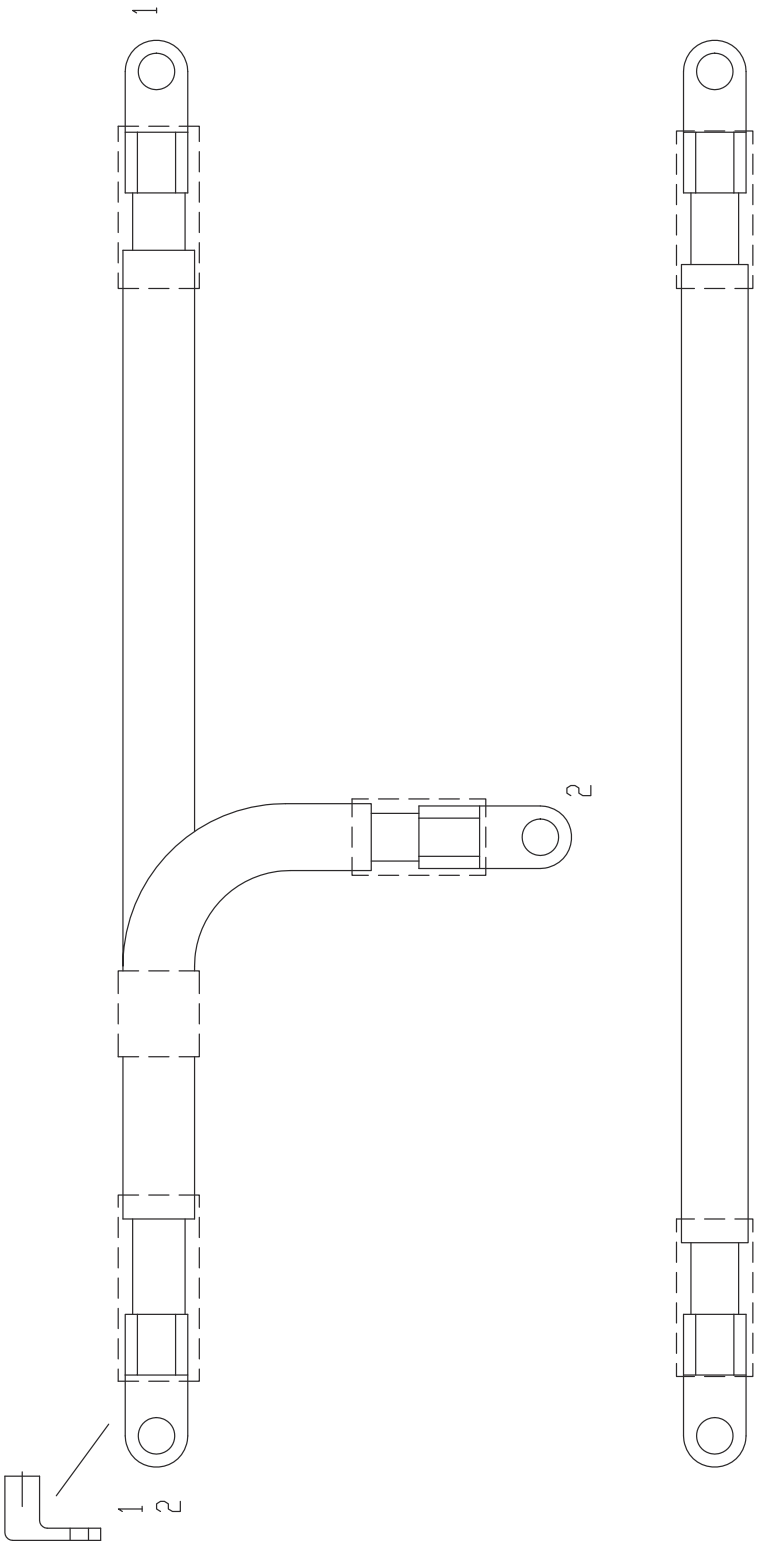
6.15 Starter

Position	Designation
1	Connection S starting relay 50
2	Connection B battery

6.23 Wiring diagram (2) version 2



6.32 Preheating cable



Air conditioning

8.5 KAT drive interlock (antitheft protection)

Fig. 2: Drive interlock key

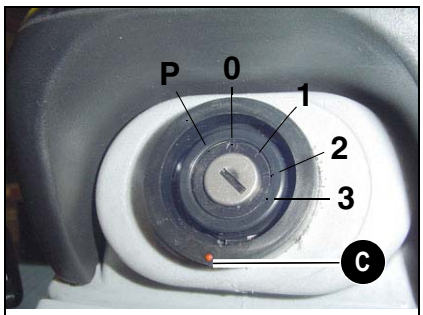


Fig. 3: Starting with the drive interlock

A = operator's key (blue key)

For starting the machine. Scope of delivery includes 2 keys.

B = master key (red key)

Notice!

Store the master key in a safe place. It is only used for coding new keys.
All keys are deleted if the key remains in position **1** for more than 20 seconds.

The flashing LED **C** indicates the active status of the antitheft protection.

The machine can be started without performing any further settings.

Coding a new key

☞ *Insert master key* **B** *in the starter*

☞ *Turn the starting key to position* ***1*** *for a maximum 5 seconds*

☞ *Turn the starting key to position* ***0*** *and remove master key* **B**

☞ *Now insert the new key or the key requiring coding in the starter and turn it to position* ***1*** *within 15 seconds*

☞ *This action registers the key*

The procedure is automatically cancelled if no key requiring coding is detected within 15 seconds. Several keys requiring coding can be inserted one after another in the starter. Each key must then remain at least 1 second in position **1**. Coding can be performed for a maximum 10 keys.

Deleting coded keys

Deleting coded keys is necessary whenever a coded key is lost.

☞ *Insert master key* **B** *in the starter*

☞ *Turn the starting key to position* ***1*** *for a minimum 20 seconds*

☞ *All coded keys are deleted after 20 seconds, and all existing keys can be re-coded.*

The master key code is not deleted during deletion

Checking the antenna

☞ *Inspect the antenna cable for breakage or kinks*

☞ *Check the antenna connector for faulty contacts*

Measuring the antenna parameters

☞ *Remove the antenna connector from the control unit*

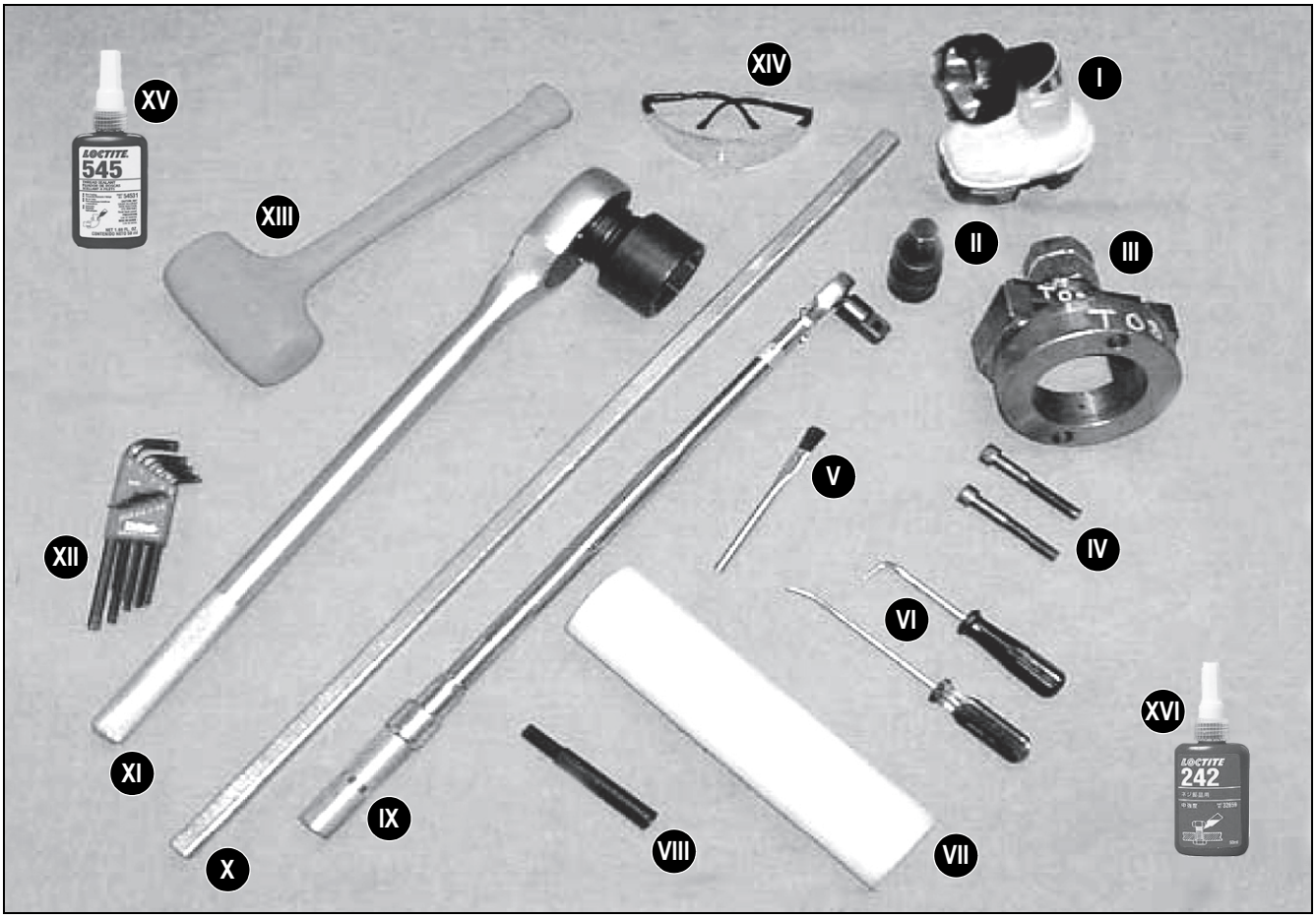
☞ *Measure the resistance on antenna connectors Pin1 and Pin2*

➥ The resistance of the antenna cable must be about 8Ω

☞ *Or inductive measurement on antenna connectors Pin1 and Pin2*

➥ The inductivity of the antenna cable and antenna must be about 440µH

9.2 Tools



List of required tools		
No.	**Designation**	**Qty**
I	Torch (may be required)	1
II	Spanner	1
III	Special PTS10 tool for end cap (article number 1000256985)	1
IV	Threaded bolts PTS10 (M16 x 100)	2
V	Brush	1
VI	Tools for removing seals – *see chapter Making a tool VI for removing the seals* on page 9-6	1-2
VII	Plastic pusher	1
VIII	Permanent marker pen	1
IX	Torque wrench	1
X	Mounting lever or similar	1
XI	Large socket spanner	1
XII	Allen keys	1 set
XIII	Rubber or plastic hammer	1
XIV	Safety glasses	1
XV	Loctite 242	
XVI	Loctite 545	

9.11 Removing the seals (kit A), shaft bearings and pressure discs (kit B)

Fig. 23: Removing the seals and bearings

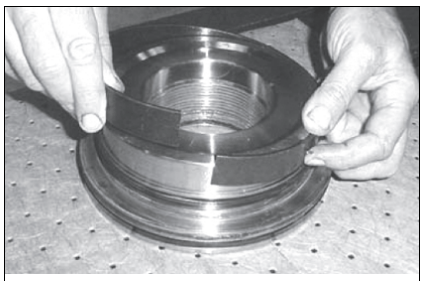


Fig. 24: Removing the seals and bearings

Fig. 25: Removing the seals and bearings

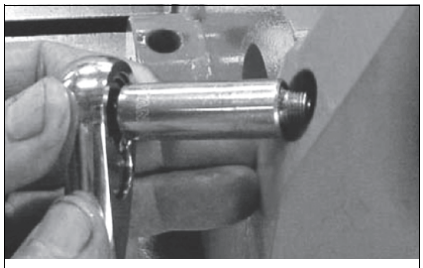


Fig. 26: Removing the grease nipple, etc.

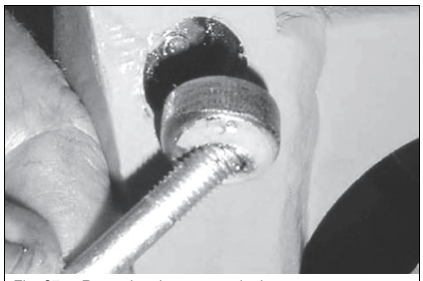


Fig. 27: Removing the grease nipple, etc.

☞ *Use appropriate tools to remove all seals, wear indicators and pressure discs **B5** from piston tube body **3** and end cap **4**.*

Caution!

In order to avoid damage to parts:

☞ *Use only tools with rounded edges to remove seals.*

Notice!

Some models may possibly not have wear indicators on the inside and outside diameters of the piston tube body.

☞ Remove grease nipple **h**, grease decompression valve covers **i** and grease decompression valves **j**.

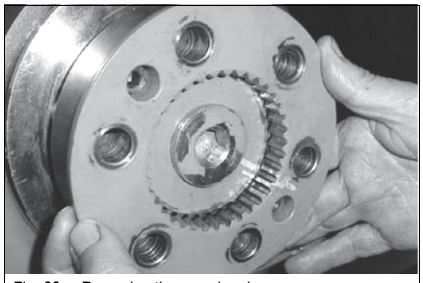


Fig. 66: Removing the securing ring

☞ *Remove the securing ring*

Fig. 67: Installing the parallel pin in the base block

☞ *If not already fitted, fit parallel pin **f** for the alignment in base block **6.1** on the drive-shaft side.*

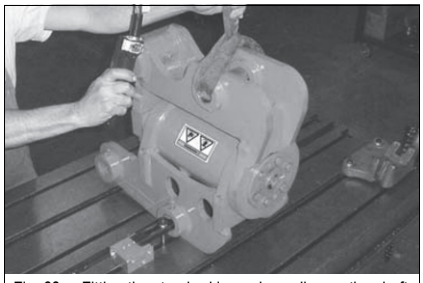


Fig. 68: Fitting the standard journal coupling on the shaft

☞ *Fit the standard journal coupling **6** on shaft **2** with suitable lifting gear. Align the parallel pin of the shaft with the base block **6.1** on the drive-shaft side.*

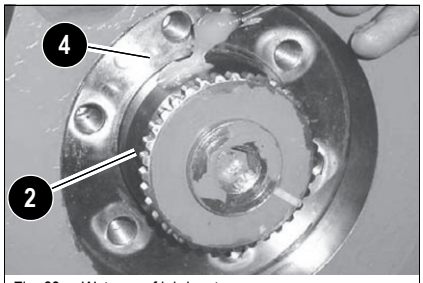


Fig. 69: Waterproof lubricant

☞ *Apply a waterproof lubricant to the end of shaft **2**, securing ring **5** and the outside surfaces of end cap **4**.*

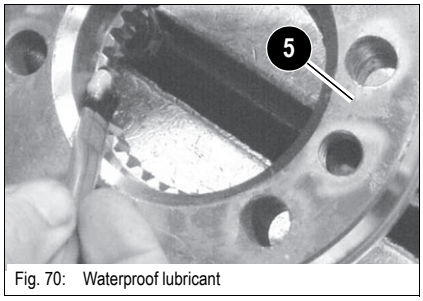


Fig. 70: Waterproof lubricant

10.2 Technical data

General data

Model	OQ 65-5
Hydraulic oil	Category HM, HV according to CETOP RP 91H in viscosity classes: ISO VG 32, 46 and 68
Oil temperature	−30 °C to +80 °C
Ambient temperature	−25 °C to +55 °C

Quickhitch

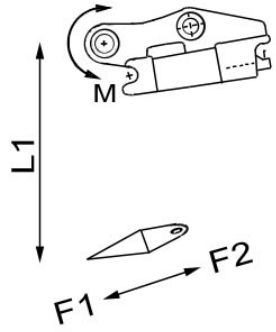


Fig. 1: Dimensions

Model	OQ 65-5
Max. breakout torque (M)	150 kNm
Bucket radius (L1)	700 mm
Force at bucket blade (F)	190 kN
Width	340 mm
Weight	130 kg

M (kNm) = F (kN) x L1 (m)

Quickhitch with 2 parallel hydraulic cylinders

Model	OQ 65-5		
Max. operating pressure	35 MPa		
Load-securing hose burst valves	Yes		
Pressure regulating valves	Yes		
Piston rod diameter	35/16 mm		
Stroke	60 mm		
Overall closing force at 100 bar	19.2 kN		
Leakage-free quick couplers	Steel, OilQuick type		
Coupling sizes (quantity)	1/4"	1/2"	3/4"
Number of couplings	2	1	2
Oil flow at 0.3 MPa pressure drop	12 l/min	70 l/min	140 l/min
Max. permanent work pressure	35 MPa	35 MPa	35 MPa

Quick coupler layout

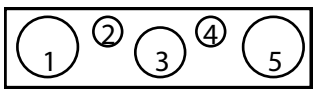


Fig. 1: Quick coupler layout

Model	Function	OQ 65-5
Coupling 1	Return line for auxiliary hydraulics	3/4"
Coupling 2	Feed line for auxiliary hydraulics	1/4"
Coupling 3	Leak oil	1/2"
Coupling 4	3rd control circuit – rotate	1/4"
Coupling 5	3rd control circuit – rotate	3/4"

10.9 Starting and stopping the excavator during maintenance

The pressure in the hydraulic system is released and the power supply is interrupted when stopping the excavator. When starting the excavator, the hydraulic pressure and the power supply are re-established. Switching the power supply on and off can have the effect of the hydraulic valves changing their positions. When starting and stopping the excavator, this can trigger an uncontrolled movement of the H cylinder due to residual pressure in the hydraulic system. Therefore, when starting and stopping the excavator, ensure that no one is close to the quickhitch.

Danger!

Persons must neither be near the quickhitch nor touch it when starting or stopping the excavator.

Danger of uncontrolled movements of the H cylinder

☞Residual pressure in the hydraulic system and modified valve positions