Original instructions

BG00307952 A.001.1 2014-04-22

Carrier DC120/DC121R/DC122R

SANDVIK

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1 SAFETY INSTRUCTIONS

1.1 Safety instructions

⚠ DANGER	
	**CRUSHING HAZARD!** **Unexpected boom movement will cause death or severe injury.** **Before removing the cylinders or their overcenter or non-return valves, support the boom, feed, and rock drill carefully so that they do not move during maintenance. Do not work under components that are supported only by hydraulics.**

⚠ DANGER	
 	**HYDRAULIC FLUID INJECTION HAZARD!** **High-pressure hydraulic fluid sprays can penetrate the skin and will cause death or severe injury.** **Search for leaks with a piece of cardboard or wood. Never try to locate a leak by feeling with your hand. Seek immediate medical attention if you are hit by a hydraulic fluid spray.**

⚠ WARNING	
 	**IGNORING INSTRUCTIONS HAZARD!** **False service and repair methods could cause death or severe injury.** **Always follow the safety instructions and be careful with your work.** **Only people who have been given specific service training are allowed to undertake service, adjustment and repair procedures. Read the instructions before undertaking any servicing, adjusting or repairing.**

⚠ WARNING	
	**ENTANGLEMENT HAZARD!** **Getting entangled with the moving or rotating parts of the machine could cause death or severe injury.** **Carry out service and repair work only when the rig is not running. Make sure that the rig cannot be accidentally started or moved when you are carrying out the service.**

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NOTICE

RISK OF DAMAGING THE HYDRAULIC SYSTEM!
Observe absolute cleanness when dismantling and reassembling hydraulic equipment. Whenever a cylinder has been removed, the hydraulic circuit must be vented and flushed. This is to prevent dirt and air in the cylinder from causing functional disturbances.

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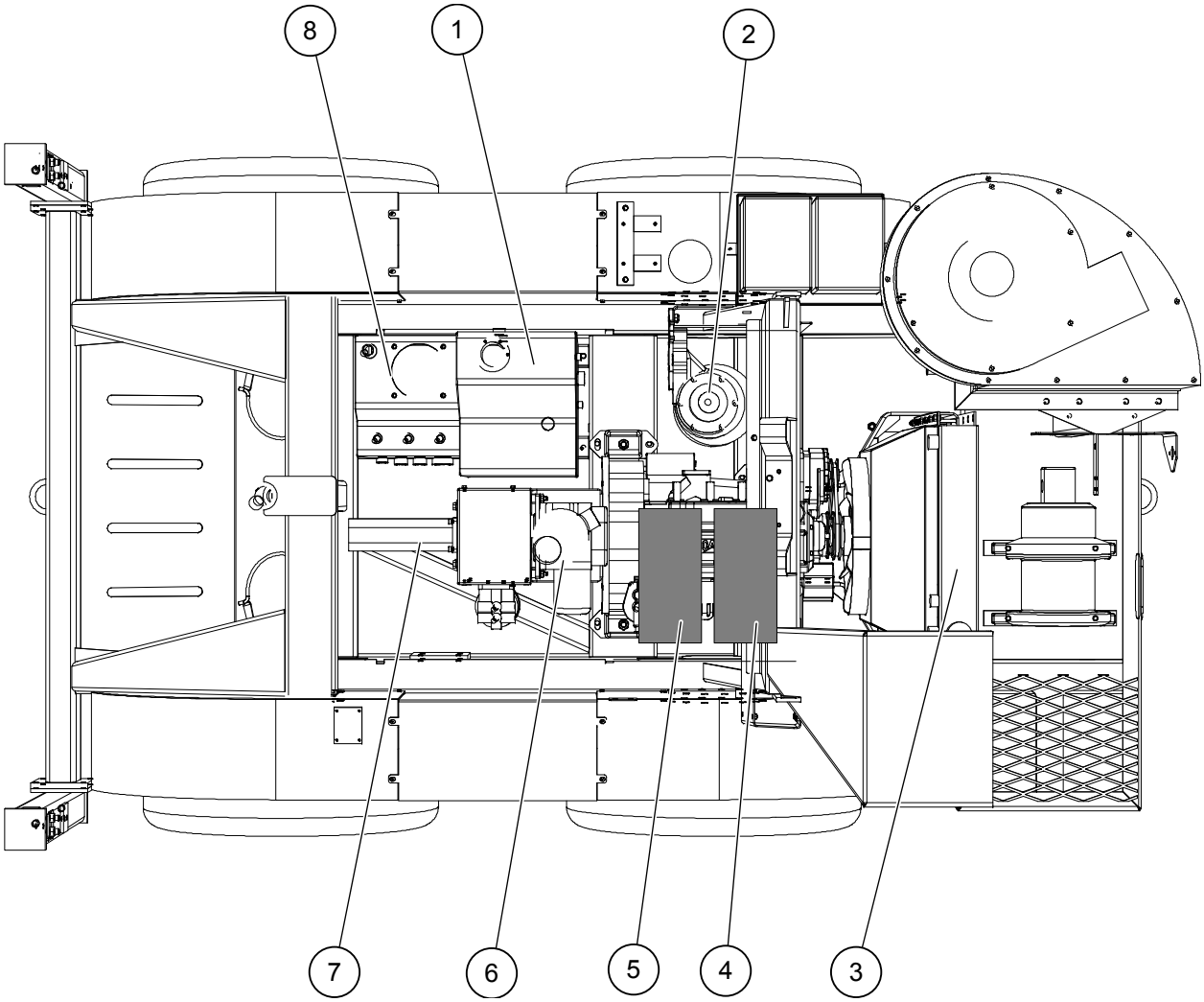
2 LOCATION OF COMPONENTS

2.1 Location of components



1	*Fuel tank*	*2*	*Compressor oil/air receiver*
3	*Engine oil, hydraulic oil, and compressor oil cooler*	*4*	*Engine air filter*
5	*Compressor air filter*	*6*	*Compressor*
7	*Hydraulic pumps*	*8*	*Hydraulic receiver*

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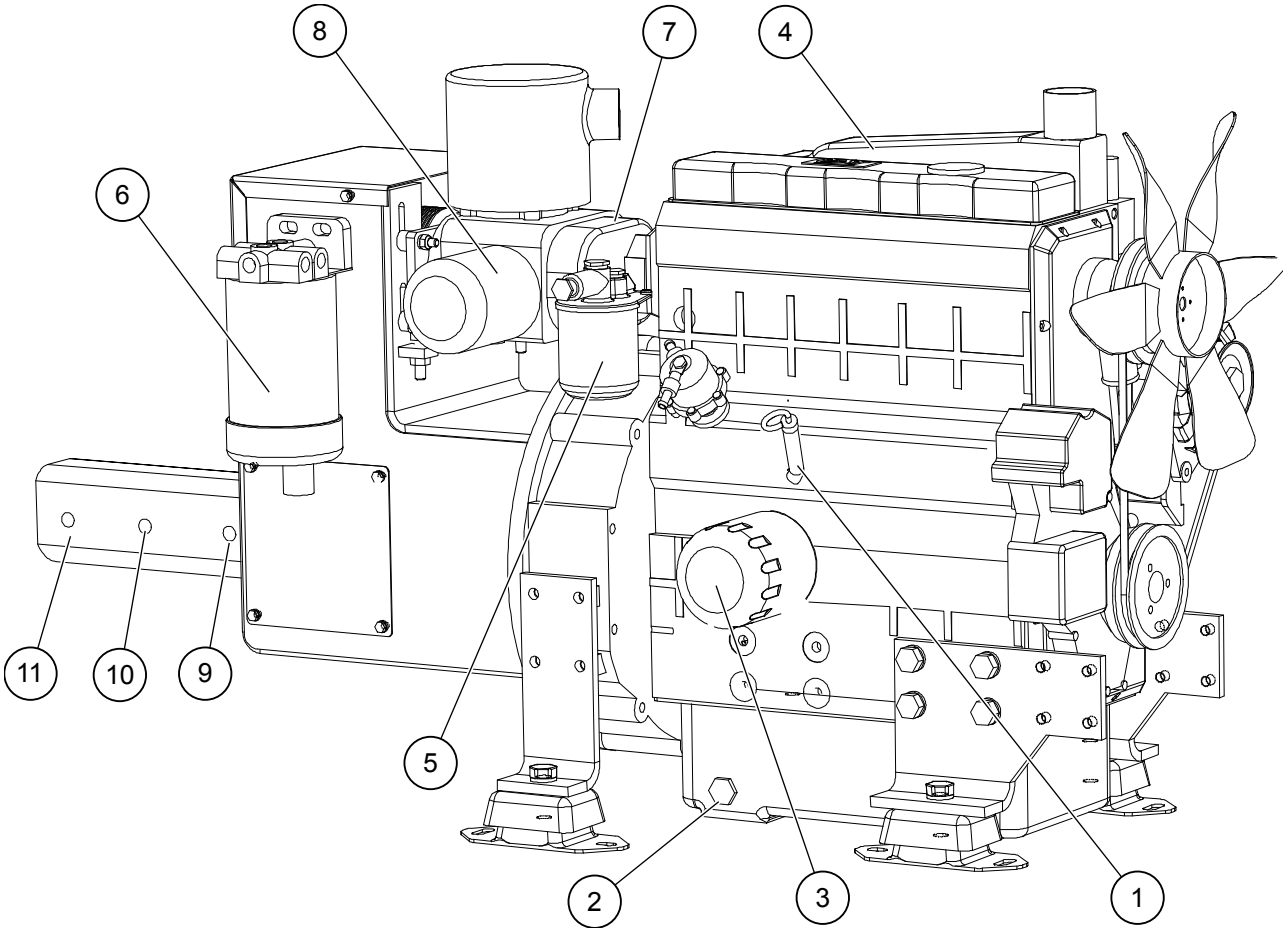
3 POWERPACK

3.1 Powerpack



1	*Oil dipstick*	*2*	*Oil drain plug*
3	*Engine oil filter*	*4*	*Crankcase breather*
5	*Fuel filter*	*6*	*Water separator*
7	*Compressor*	*8*	*Compressor oil filter*
9	*Gear pump (tramming, percussion, feed)*	*10*	*Gear pump (dust collector, tramming auxiliary, grinding unit, boom)*
11	*Gear pump (rotation)*		

3.2 Engine

For detailed operation and maintenance instructions, refer to the instruction manual for the engine.

3.2.1 Engine oil and oil filter

1. Check the engine oil level daily using the dipstick. The oil level must be between the upper and lower markings on the dipstick.
2. Change the engine oil and replace the filter according to hours mentioned in maintenance schedule.

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3.2.2 Water separator/filter

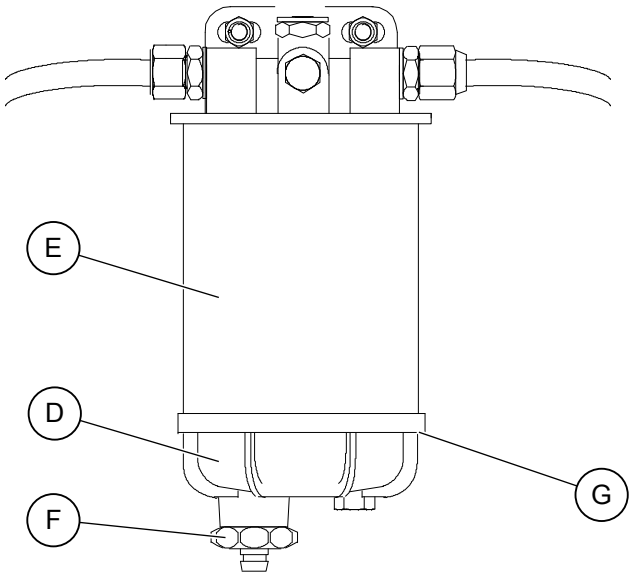
The water separator drain interval is determined by the level of impurities in the fuel. Because water is heavier than fuel, it settles to the bottom of the bowl **(D)** . The bowl must be drained before the water level reaches the bottom of the filter cartridge (E). Check the water level in the bowl daily and drain the water by opening the drain valve **(F)**located at the bottom of the bowl.

As impurities gradually clog the filter cartridge, the fuel flow to the engine is restricted, causing power loss and/or problems with starting.

Replace the filter according to maintenance schedule, or if power loss is observed:

1. Drain some fuel from the bowl by opening the drain valve **(F)** .
2. Unscrew the filter cartridge **(E)**with the bowl **(D)** from the filter base.
3. Unscrew the bowl from the cartridge and replace the O–ring **(G)**.
4. Apply clean fuel or engine oil to the cartridge seal and O–ring.
5. Reattach the bowl to the cartridge and then screw the cartridge and bowl back onto the filter base by hand. **Do not use tools for the tightening!**

NOTICE **Do not fill the filter with fuel prior to installation!**



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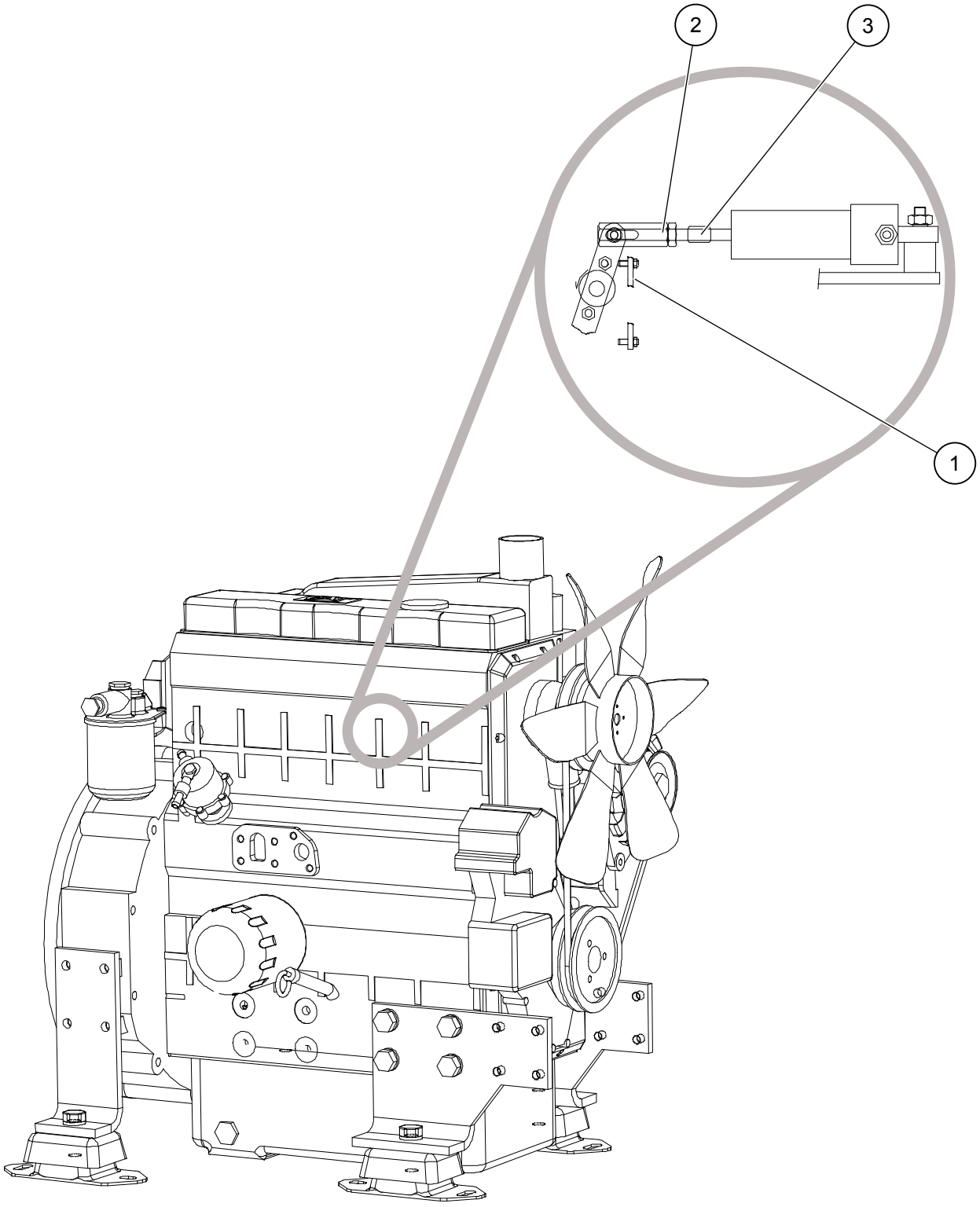
3.2.3 Engine speed adjustments

Perform the adjustments while the engine is warm.

Adjust the engine's idle speed to 1500 rpm with the adjusting screw (1). Adjust the engine's maximum speed to 2700 rpm by opening the lock nut (2) and turning the piston rod (3) until the correct speed is reached. Lock the nut (2).



3.2.4 Engine cooling system

Always use antifreeze or an anti-corrosive additive in the cooling system. Verify the correct concentration by consulting the engine's instruction manual.

Check the coolant level daily. The coolant level should be between the marks in the expansion tank.

Hot fluid and steam can cause serious injury. Never open the expansion tank cap while the engine is hot or running.

NOTICE

Never add cold coolant to a hot engine. Doing so could damage the cylinder head.

Replace coolant according to maintenance schedule. Drain both the engine and radiator. Mix the antifreeze with water and fill the cooling system slowly to prevent the formation of air pockets. Start the engine and leave the expansion tank cap open. Allow the coolant level to settle. Add coolant, if necessary. Check the cooling system for leaks.

3.2.5 Radiator core

- Clean the radiator core every 50 hours for impurities. Always inspect/ clean the radiator core with the engine stopped.
- If you use a high pressure washer for the cleaning, be careful not to damage the radiator core.
- Normal impurities, such as dust, can also be removed with pressurized air. Do not use a higher air pressure than 4 bar.

Note! ***The engine is equipped with a suction fan. Clean the radiator by blowing air from the fan side.***

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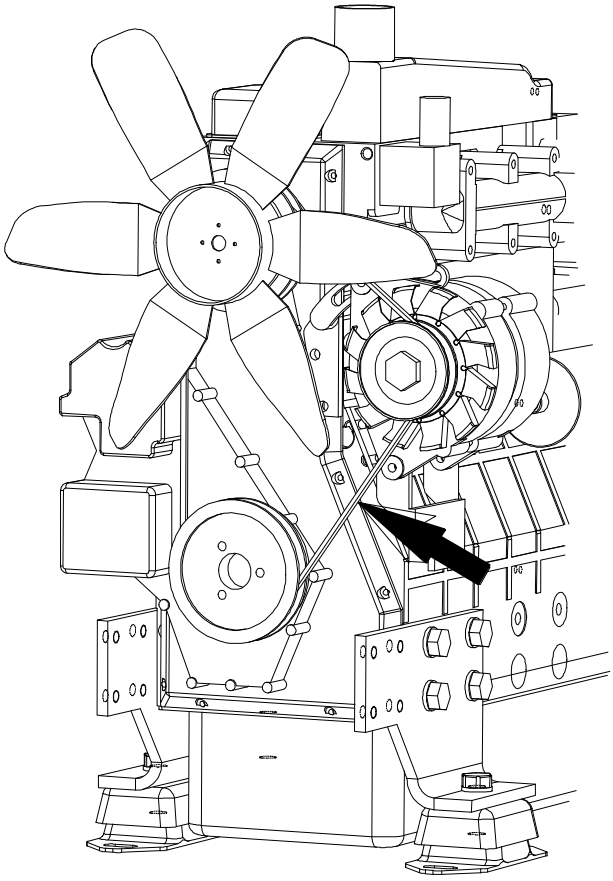
3.2.6 Fan and alternator V-belt

The V-belt driving the engine cooling fan and alternator should be in good condition and sufficiently tight.



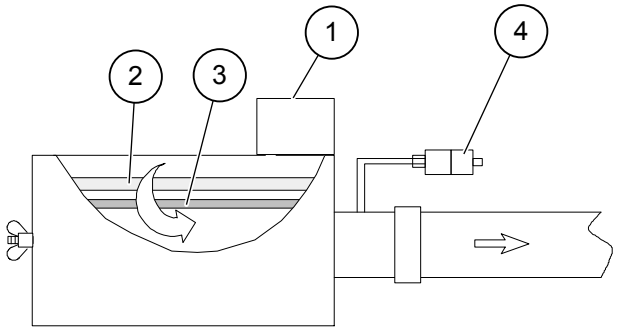
Check the tightness of the V-belt by pressing it at the middle of the span between the alternator and crankshaft pulleys. At a normal thumb pressure (about 100 N), the deflection of the belt should be 10–15 mm.

If necessary, tighten the belt by loosening the alternator's mounting screws and turning the alternator outwards. However, do not tighten excessively since this will result in rapid wear of the belt and unnecessary strain to the alternator bearings.

3.3 Engine and compressor air filters

Both the engine and compressor have separate air filters located at the left side of the drilling rig. The air filter has a pre--cleaner integrated with the actual filter cartridge.

When the air is sucked inside the filter through the opening (1) in the housing, it is forced into a whirling motion inside the housing and the coarsest impurities are separated from the intake air. Then the pre--cleaned air flows through the actual filter (2) and the safety filter (3) to the engine or compressor.



1 Intake opening
2 Filter cartridge
3 Safety filter cartridge
4 Service indicator

The purpose of the safety filter cartridge is to prevent the impurities from entering the intake lines during replacement of the filter cartridge or in the event that the filter cartridge fails.

3.3.1 Maintenance and replacement of filters

A service indicator (4) is part of the air filter system. The indicator shows red if the engine or compressor intake is restricted due to a clogged air filter.

The indicator must be checked daily by pressing the button on the top. The red indicator must move.

The filter cartridge must be replaced whenever the service indicator shows red, or according to maintenance schedule, whichever comes first.

The safety filter cartridge must be replaced according to maintenance schedule.

NOTICE

RISK OF DAMAGING THE ENGINE AND THE COMPRESSOR!
Always check the seals and the sealing surfaces when replacing the filters. The seals must be installed carefully in their proper positions. When replacing the filter, check the engine and compressor intake lines for proper condition and tightness of the connections.

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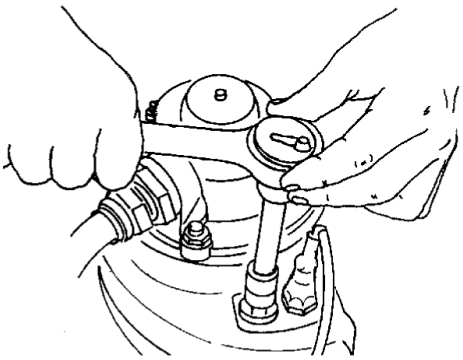
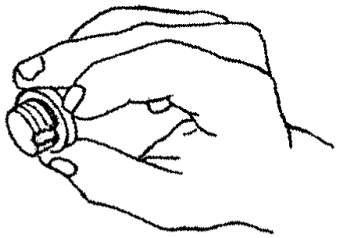
3.4 Compressor

3.4.1 Changing and adding oil

1. Use the compressor until the oil is warm (40–50°C).
2. Stop the compressor and wait until the pressure from the receiver is released by the blow--down valve.
3. Open the oil filler plug on top of the oil/air receiver next to the output valve (see figure).
4. Open the oil drain plug under the oil/air receiver and drain the oil into a suitable container.
5. Close the oil drain plug.

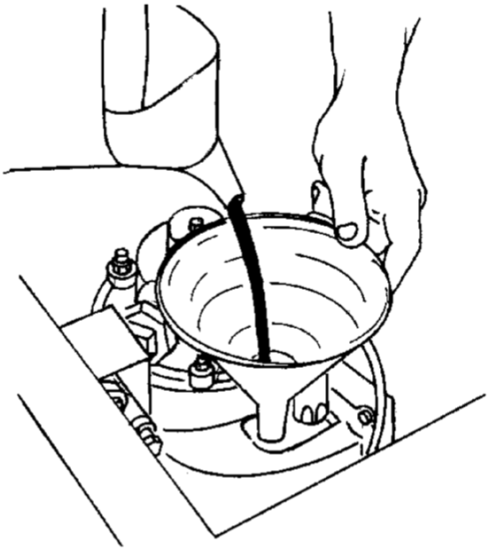


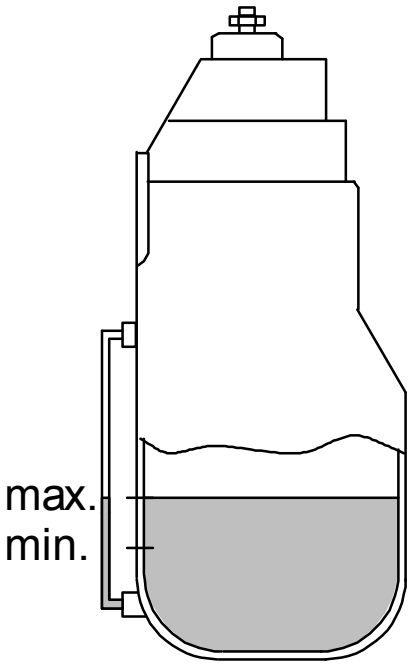


A safety groove ismachined in the filler plug, allowing any excess pressure in the receiver to be released when the plug is opened even slightly.

Filling

1. Fill with the recommended oil to the 'max' mark on the side of the oil/air receiver. The oil volume is 6 L.
2. Close the oil filler plug.





3.4.2 Adding oil

1. Stop the compressor and wait until the pressure from the receiver is released by the blow--down valve.
2. Open the oil filler plug on top of the oil/air receiver next to the output valve.
3. Using the same oil already in the compressor, add oil up to the ‘max’ mark on the side of the oil/air receiver.
4. Close the oil filler plug.

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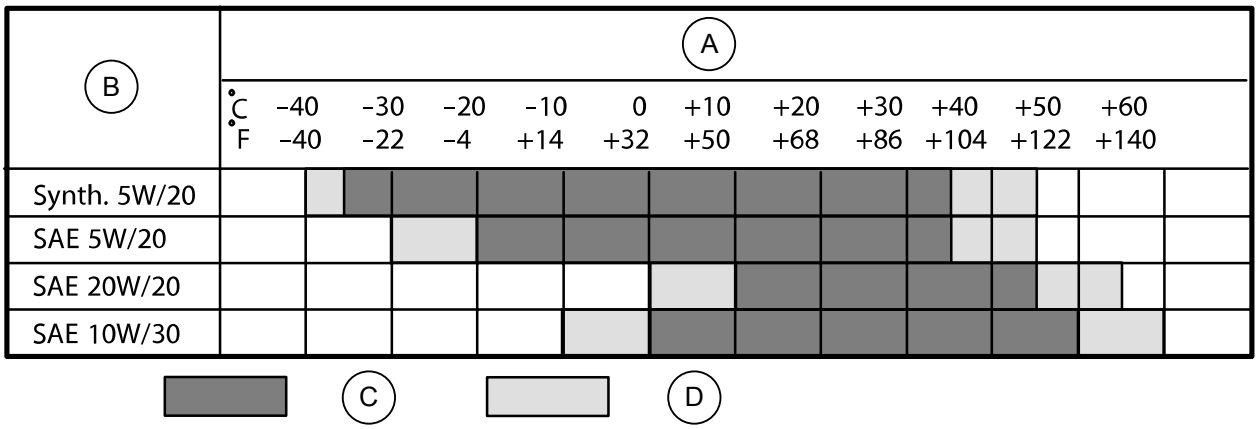
3.4.3 Oil recommendations for the Enduro 3 compressor

The oil recommendations are based on the ambient temperature. The flash point must be over 180ºC. For arctic conditions (under –30ºC), synthetic oils are recommended. Automatic transmission fluid can also be used in the compressor if the viscosity is correct.



A: Ambient temperature

B: SAE grade

C: Recommended temperature range

D: Transient temperature range

NOTICE

RISK OF DAMAGING THE COMPRESSOR!
Do not mix different type of oils.

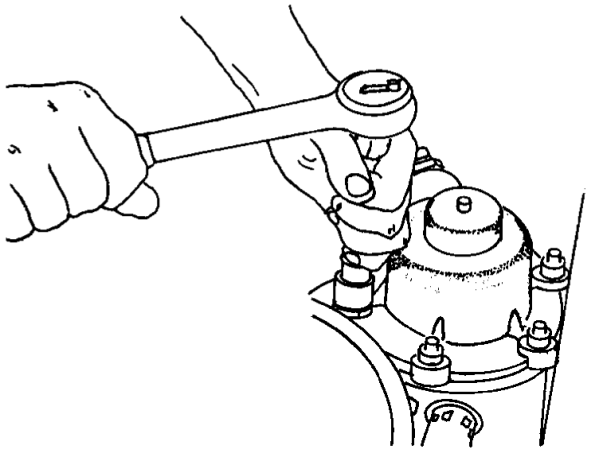
3.4.4 Replacing the oil filter

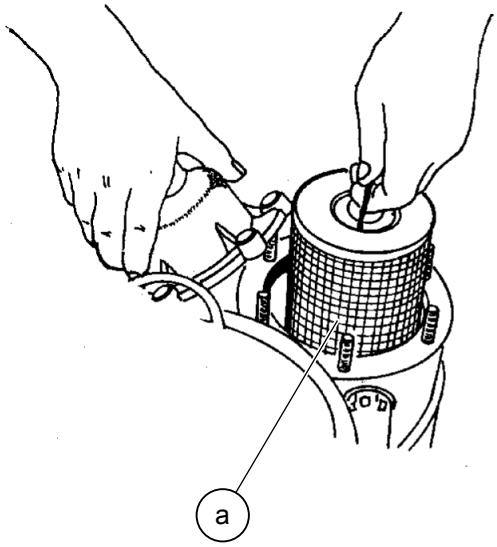
The oil filter is located at the side of the air end.

1. Stop the compressor and wait until the pressure from the receiver is released by the blow--down valve.
2. Place a container or protective cloth under the filter since some oil will run out from the filter housing when removing the filter.
3. Remove the filter by turning it anti--clockwise using a filter wrench or screwdriver (a groove is provided for the screwdriver at the end of the filter).
4. Apply oil to the seal of the new filter.
5. Install the filter and tighten it by hand.

3.4.5 Replacing the oil separator element

1. Stop the compressor and wait until the pressure from the receiver is released by the blow--down valve.





2. Open the output valve mounting nuts and turn the valve to the side.
3. Remove the separator element (**a**).
4. Ensure that the separator O--ring (1) is removed from the receiver.

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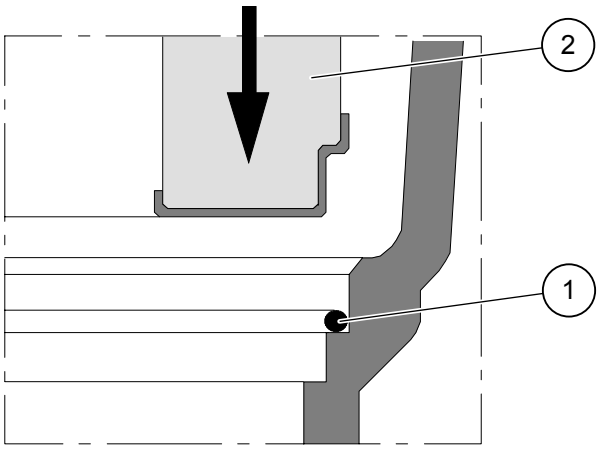
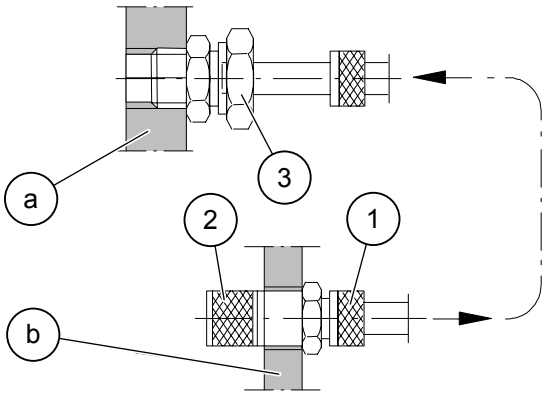


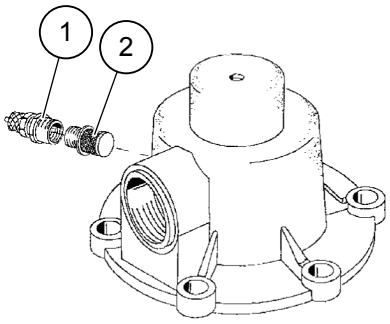
5. Clean the receiver and output valve flanges.
6. Apply oil to the O--ring (1) supplied with the new separator element and install it in the receiver as shown in the figure.
7. Insert the new element (2) into its position.
8. Ensure that the O--ring on the receiver cover is in place and intact.
9. Reinstall the output valve.

3.4.6 Cleaning the filters and orifice

The oil separated from the output air by the oil separator element in the air/oil receiver is led from the receiver to the air end pressure side bearing housing through a small--diameter pipe. This pipe has a restrictor with a 1.0--mm orifice to prevent unnecessary air recirculation. A filter is fitted at the end of the pipe, inside the air/oil receiver, to prevent the orifice from becoming blocked. The pressure control line has a similar filter located at the side of the minimum pressure valve.

1. Stop the compressor and wait until the pressure from the receiver is released by the blow--down valve.
2. Open the connectors (1), then remove and clean the filters (2).
3. Disconnect the connector (3) and clean the orifice at the end of the pipe.
4. Reconnect the connectors.





a *Air end outlet cover*
b *Oil separator receiver*

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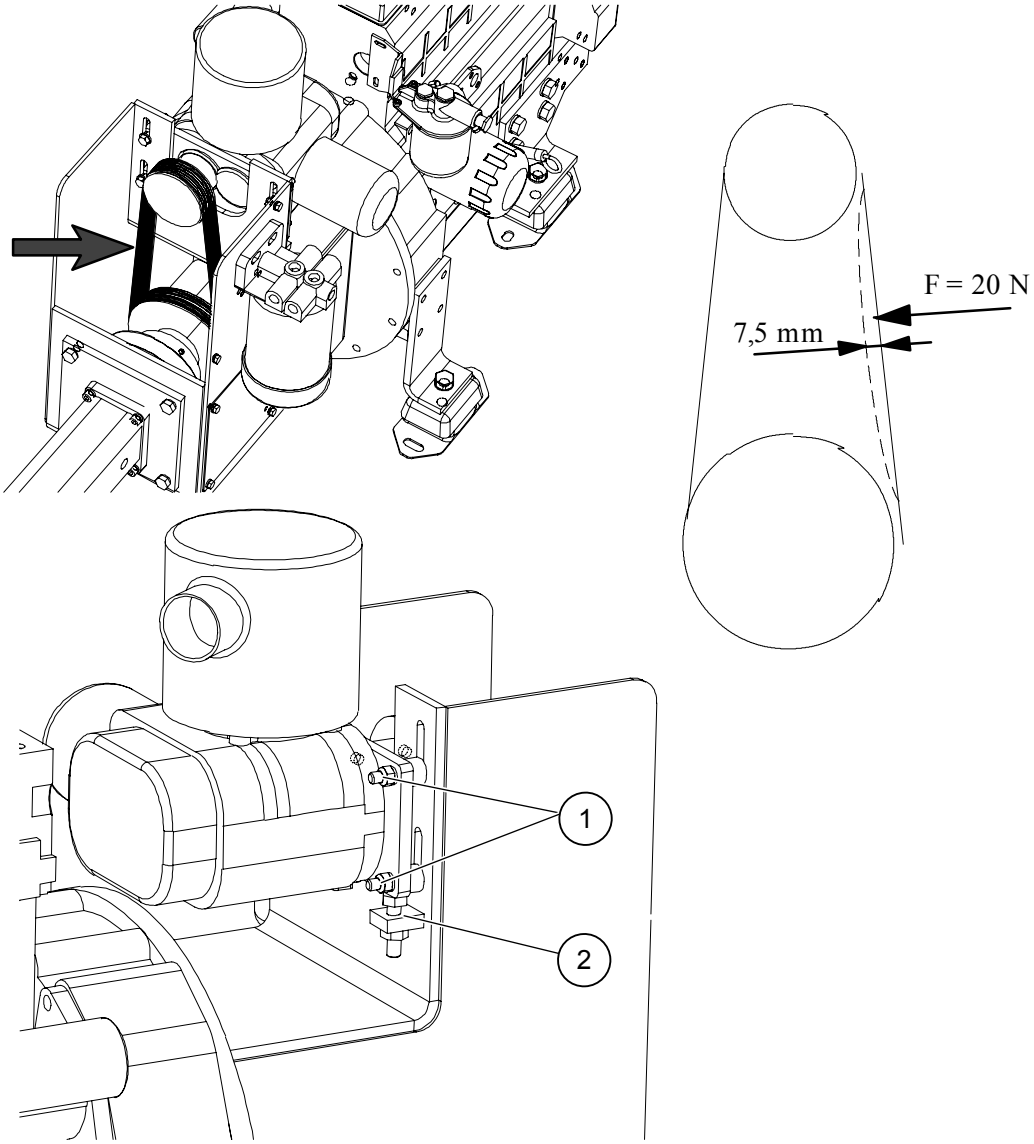
3.4.7 Adjusting the tension of the compressor poly-V-belt

The poly-V-belt driving the compressor should be in good condition and sufficiently tight.

1. Remove the protective cover.
2. Loosen the air end mounting screws (1) (4 pcs).
3. Open the lock nuts of the adjusting screws (2) (2 pcs) located behind the mounting beam.
4. Adjust the belt tension with the screws. When the belt is pressed at the middle of the span with a force of about 20 N, the deflection should be 7–8 mm.
5. Tighten the lock nuts of the adjusting screws and the air end mounting screws and reinstall the protective cover.



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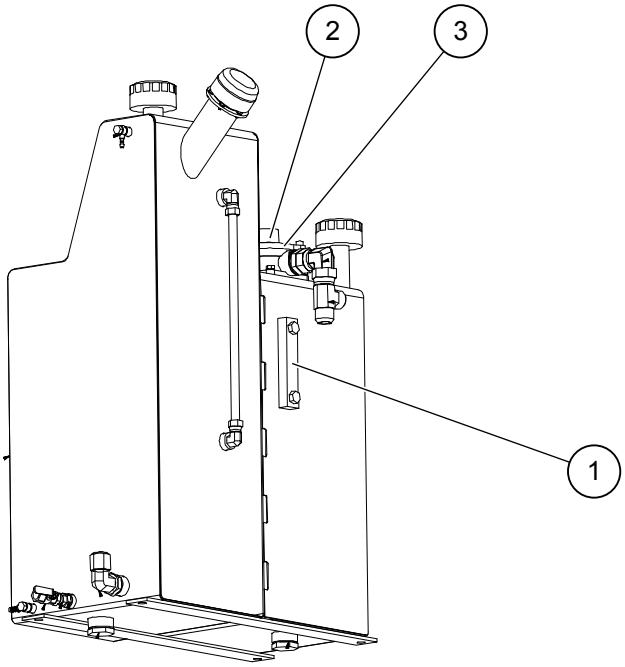
4 RECEIVERS

4.1 Hydraulic receiver

The hydraulic receiver is located on the right--hand side of the rig.



The oil level in the hydraulic receiver is checked with the sight glass (1) on the side of the receiver. The oil level should be in the middle of the sight glass.

4.1.1 Replacing the return filter

The hydraulic circuit return filter (2) is inside the hydraulic receiver. A mechanical clogging indicator (3) is located on top of the receiver on the filter housing. The return filter must be replaced before the indicator enters the red zone. Check the indicator when the oil is warm.When the engine has been started and the oil is still cold, the indicator is in the red zone even if the filter is in perfect condition. Replace the return filter according to maintenance schedule or once a year, whichever comes first.

4.1.2 Replacing the hydraulic receiver breather

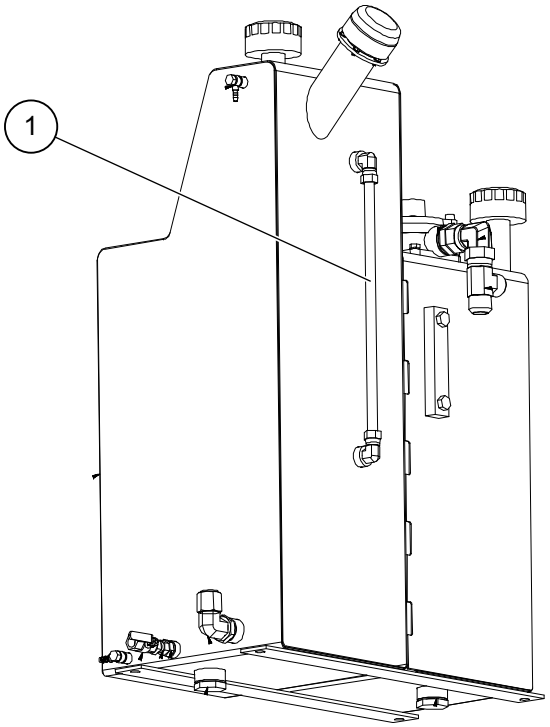
The hydraulic receiver breather should be replaced according to maintenance schedule or once a year, whichever comes first. The breather cannot be washed.

4.1.3 Changing hydraulic oil

Change the hydraulic receiver oil according to maintenance schedule or once a year, whichever comes first. If the variation in ambient temperature over the course of the year is high, use of a lower-viscosity oil in winter than in summer is recommended (see ‘Recommended lubricants’). In addition, the hydraulic receiver should be washed when the oil is changed.

4.2 Fuel tank

The fuel tank is located on the right-hand side of the rig.



1. The amount of fuel can be checked from the fuel sight glass (1) on the front side of the tank.
2. Fill the tank with clean fuel only; it is extremely important to keep the fuel storage tank clean and also to drain the water and clean it regularly.
3. Clean the area surrounding the filling tube carefully before opening the fuel tank cap. This is to prevent dust and other impurities from entering the tank.
4. Keep the filling pump valve clean. When using the hand pump, ensure cleanliness of the pump suction hose and filling tank intake port.
5. Drain water from the fuel tank regularly (according to maintenance schedule or once a week) and clean the tank according to maintenance schedule.
6. Fill the fuel tank at the end of the day, to remove moist air from the tank. This will also prevent condensation. Do not fill the tank to the brim since the fuel expands as it warms and could cause the tank to overflow.

4.2.1 Replacing the fuel tank breather

The fuel tank breather should be replaced every 1500 operating hours or once a year, whichever comes first. The breather cannot be washed.

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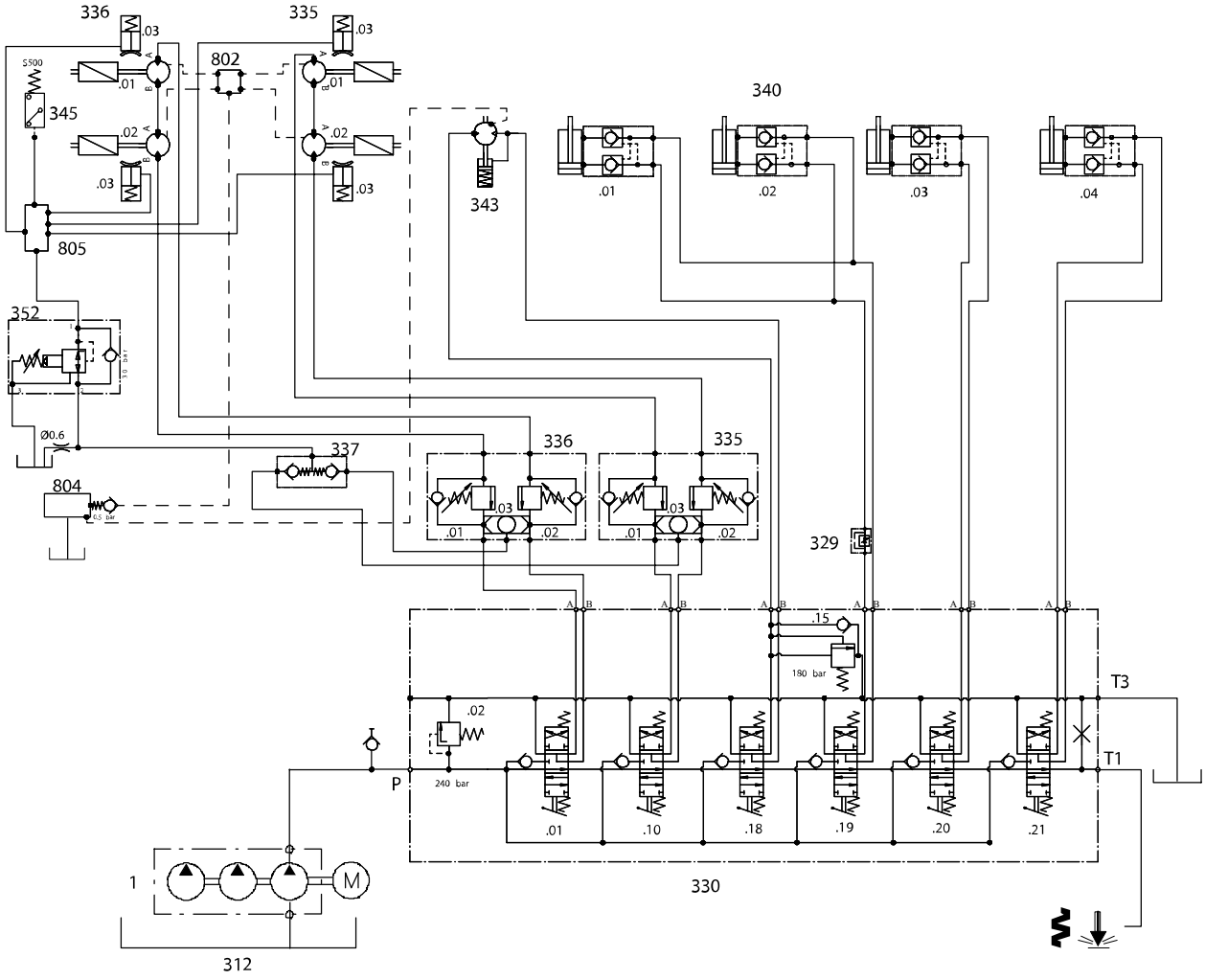
5 TRAMMING HYDRAULICS

5.1 Tramming hydraulics components, DC120/DC121R



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1	Gear pump (1)	2	Tramming overcentre valve, right (336)
3	Tramming overcentre valve, left (335)	4	Tramming motor, right rear (336.02)
5	Tramming motor, right front (336.01)	6	Tramming motor, left front (335.01)
7	Tramming motor, left rear (335.02)	8	Left rear jack and lock valve (340.01)
9	Right rear jack and lock valve (340.02)	10	Right front jack and lock valve (340.03)
11	Left front jack and lock valve (340.04)	12	Pressure--relief valve (330.02)
13	Control valve, tramming, right (330.01)	14	Control valve, tramming, left (330.10)
15	Control valve, winch (330.18)	16	Control valve, rear jacks (330.19)
17	Control valve, right front jack (330.20)	18	Control valve, left front jack (330.21)
19	Winch (343)	20	Pressure--relief valve, winch (330.15)
21	Collecting piece (802, 804, 805)	22	Pressure--reducing valve, brake circuit (352)
23	Pressure switch (345)	24	One--way restrictor (329)
25	Receiver (312)	26	Double non--return valve (337)

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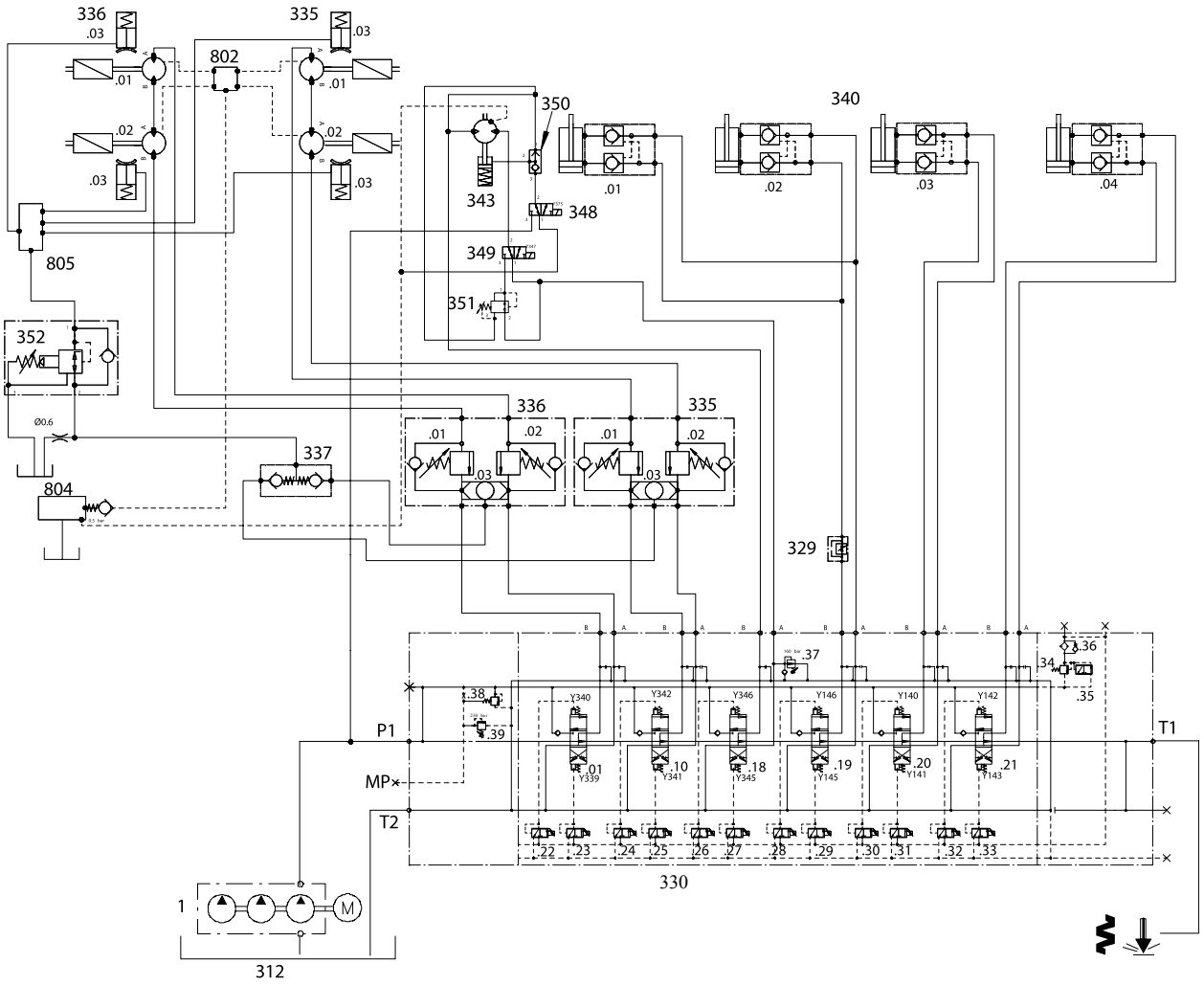
5.2 Tramming hydraulics components, DC122R



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1	*Gear pump (1)*	2	*Tramming overcentre valve, right (336)*
3	*Tramming overcentre valve, left (335)*	4	*Tramming motor, right rear (336.02)*
5	*Tramming motor, right front (336.01)*	6	*Tramming motor, left front (335.01)*
7	*Tramming motor, left rear (335.02)*	8	*Left rear jack and lock valve (340.01)*
9	*Right rear jack and lock valve (340.02)*	10	*Right front jack and lock valve (340.03)*
11	*Left front jack and lock valve (340.04)*	12	*Control valve, tramming, right (330.01)*
13	*Control valve, tramming, left (330.10)*	14	*Control valve, winch (330.18)*
15	*Control valve, rear jacks (330.19)*	16	*Control valve, right front jack (330.20)*
17	*Control valve, left front jack (330.21)*	18	*Pilot control valve for the pressure--relief valve (20), max. 240 bar (adjustable) (330.39)*
19	*Pressure--relief valve (non--adjustable) (330.38)*	20	*Pilot control circuit pressure--reducing valve (non--adjustable) (330.36)*
21	*Pilot control circuit pressure--relief valve (non--adjustable) (330.35)*	22	*Pilot control valve (12 pcs) (330.22–330.33)*
23	*Pressure--relief valve, winch (330.37)*	24	*Traction--regulating valve (351)*
25	*Tensioning automatics selector valve (349)*	26	*Brake release valve (348)*
27	*Shuttle valve (350)*	28	*Winch (343)*
29	*Collecting piece (802, 804, 805)*	30	*Pressure--reducing valve, brake circuit (352)*
31	*One--way restrictor (329)*	32	*Receiver (312)*
33	*Double non--return valve (337)*		

5.3 Changing, checking, and adding tramming gear oil

Tramming gear oil should be changed according to maintenance schedule.

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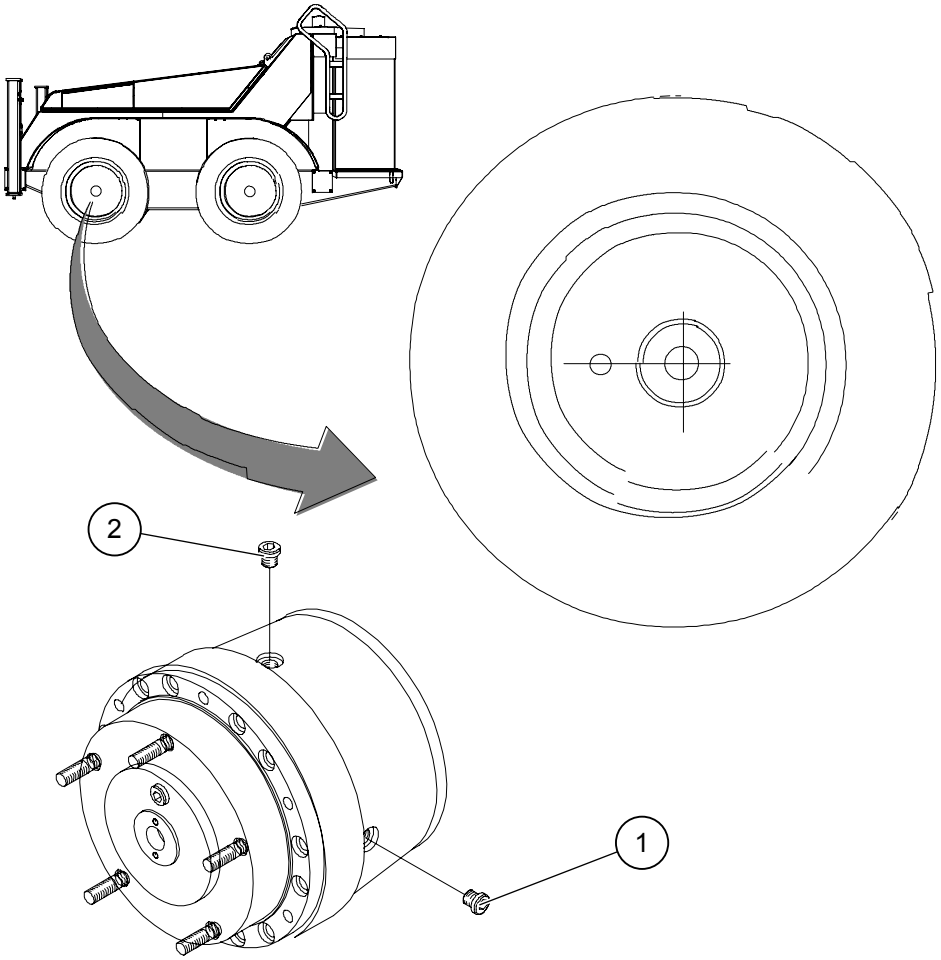

1. Turn the drain plug (1) downwards and drain the oil.
2. The tramming gear oil volume is 0.7 L. For information about the oil grade, refer to the oil recommendations.
3. Turn the drain plug (1) upwards and add oil until it flows from the plug (2). The minimum oil level is in the middle of the oil level indicator when the level indicator is oriented horizontally.

NOTICE

If the oil level in the tramming gear rises, the shaft seal of the hydraulic motor is probably damaged.

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