Original instructions

BG00310569 A.001.1 2014-04-09

Dust collector DC 120 H
Maintenance

SANDVIK

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1 TECHNICAL DATA

1.1 Technical data

Dust collector

device name	DC 120
cross-sectional dimensions	550 x 765 mm
height	1324 mm
weight	90 kg
hydraulic motor	F11-5
suction hose	75 mm
capture efficiency	99.9 %

Hydraulic motor

output	4 kW
displacement	4.88 cm^3/r
speed	5,800 rpm
max. pressure	125 bar

Filter

filter area	4.8 m^2
no. of filter cartridges	6

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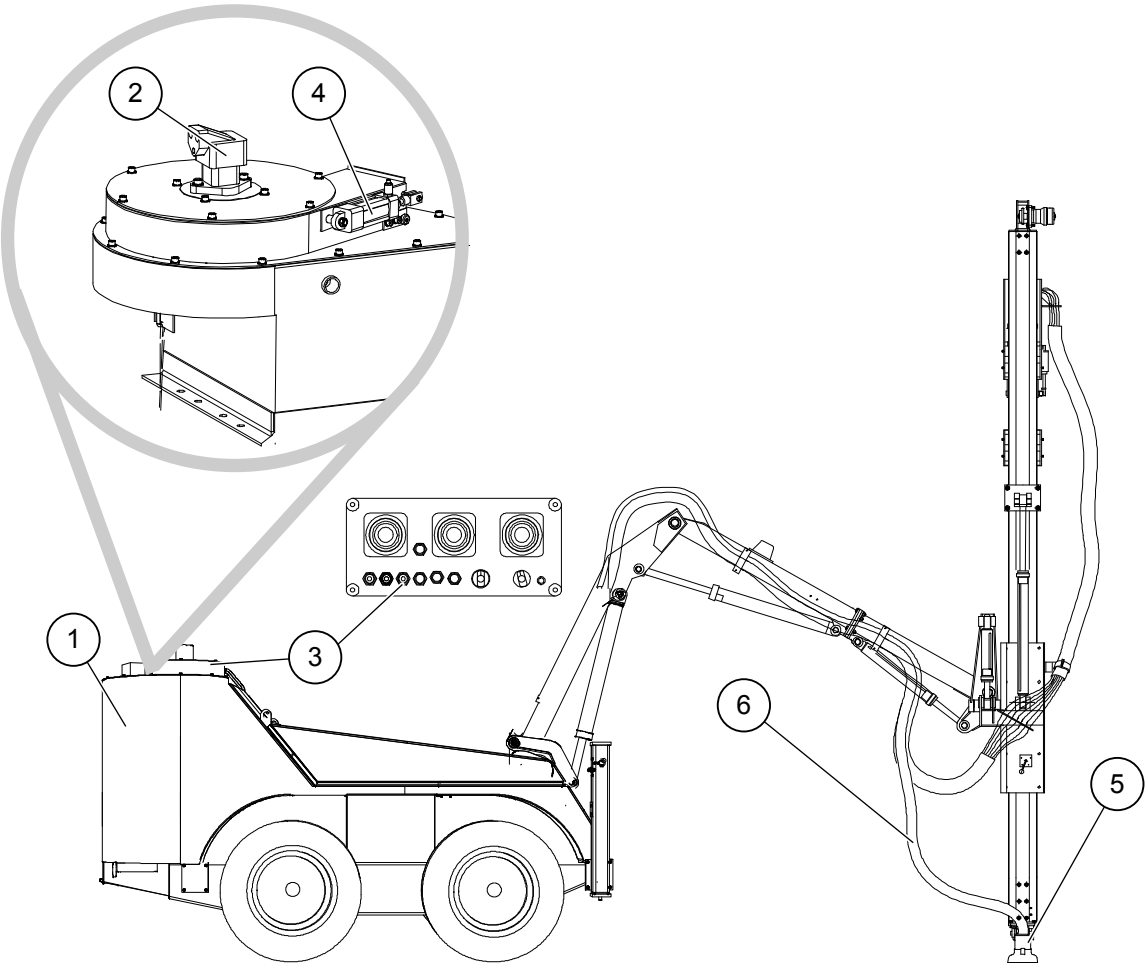
2 COMPONENTS

2.1 Components



1	*Dust collector*	*2*	*Dust collector hydraulic motor and valve block*
3	*Dust collector selector switch (DC121R, DC122R: on the remote control)*	*4*	*Cut–off cylinder and air valve*
5	*Suction head*	*6*	*Suction hose*

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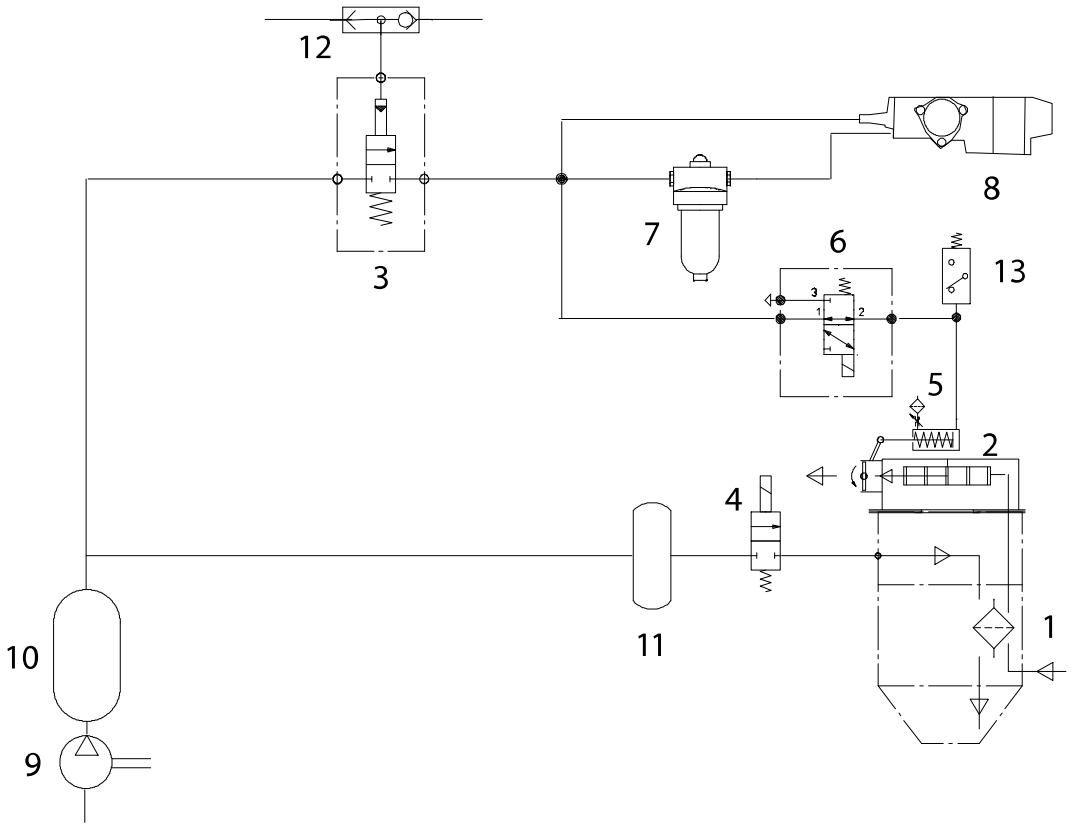
3 PNEUMATIC CIRCUIT DIAGRAMS

3.1 Pneumatic circuit diagrams



Diagram, DC120

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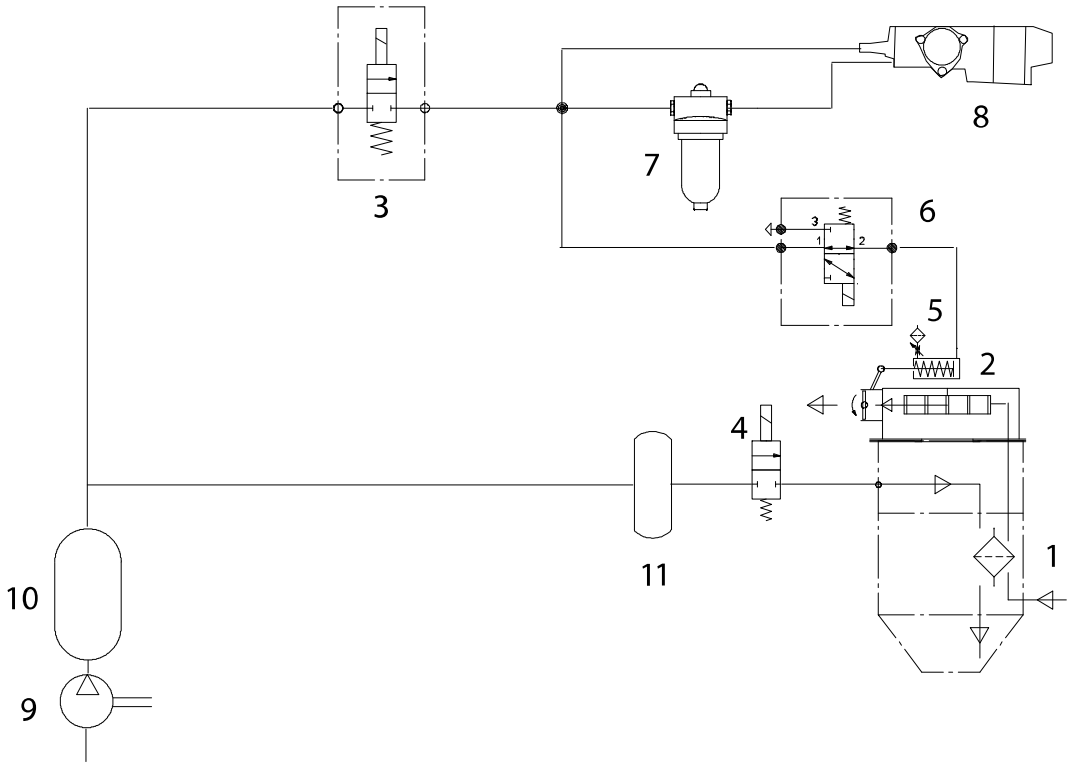

Diagram, DC121R/DC122R

1	*Filter cartridges*	*2*	*Dust collector motor*
3	*Flushing valve*	*4*	*Blow–out valves*
5	*Cut–off cylinder*	*6*	*Suction cut–off valve (optional)*
7	*Shank lubrication unit*	*8*	*Rock drill*
9	*Compressor*	*10*	*Oil/air receiver*
11	*Pressure tank*	*12*	*Flushing control (DC120)*
13	*Blow–out and hour meter pressure switch (DC120)*		

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4 OPERATION AND OPERATING PRINCIPLE

4.1 Operation and operating principle

Before starting drilling, start the dust collector motor from the operating panel switch or remote control (DC121R, DC122R).

During drilling and when flushing is on, the dust conveyed by the flushing air is directed through the suction head to the dust collector. There the dust particles travel onto the filter cartridges and adhere to the filtering surface as the air travels through the cartridges. Cleaned air comes out of the open outlet.

The filter cartridges are cleaned by inducing pulse jets toward the filters. The cleaning of cartridges is electrically controlled so that a 0.1-second pulse of compressed air is directed to the filter every five seconds after the drilling is finished. Time settings depend on the drilling conditions.

When percussion is turned off, the flushing valve closes and the dust collector’s suction stops. Since the cut-off cylinder is no longer pressurised, the outlet air valve is closed by a spring and the pulse jet cleaning of the filter cartridges commences.

Unnecessary cleaning of the filter cartridges can be prevented via the dust collector pulse jet cleaning switch on the operating panel.

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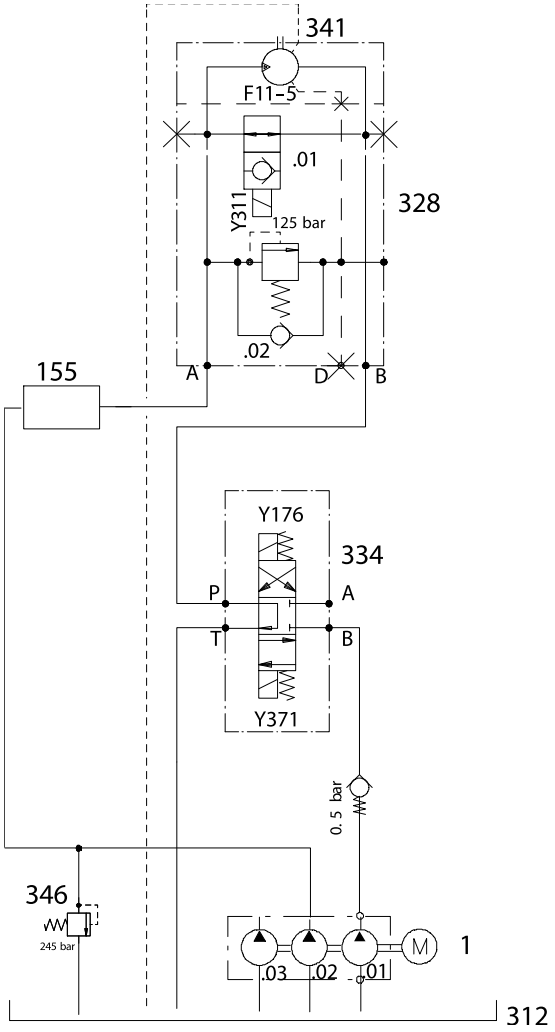
5 DUST COLLECTOR SYSTEM HYDRAULIC COMPONENTS

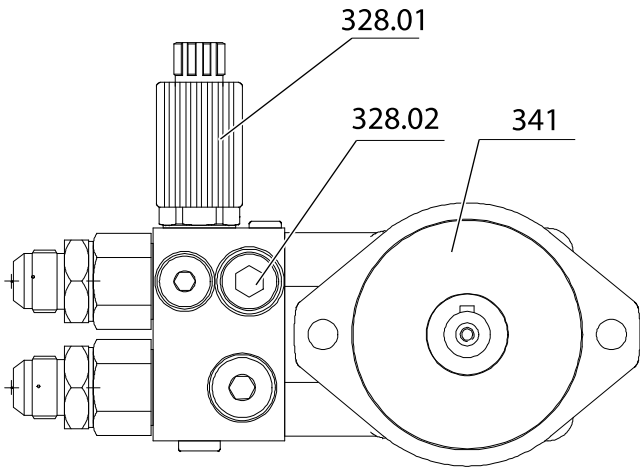
5.1 Dust collector system hydraulic components

1. Gear pump; output used for the dust collector (1.02)
2. Dust collector selector valve; turns the dust collector on and off (328.01) (in the image1)
3. Dust collector motor; drives the blower (341) (in the image3)
4. Dust collector pressure--relief valve (328.02) (in the image2)
5. Intake valve for the dust collector motor; supplies oil to the motor (328.02) intake side
6. Receiver (312)
7. Control valve (334)
8. Boom valve (155)
9. Pressure--relief valve (346)

The dust collector motor (341) is driven by oil from the gear pump (1.02). The maximum circuit pressure is determined by the pressure–relief valve (328.02) and is 125 bar.

The dust collector is turned on and off via an electrical switch operating the directional control valve (328.01). The valve directs the oil to either the dust collector or the receiver.





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6 MAINTENANCE

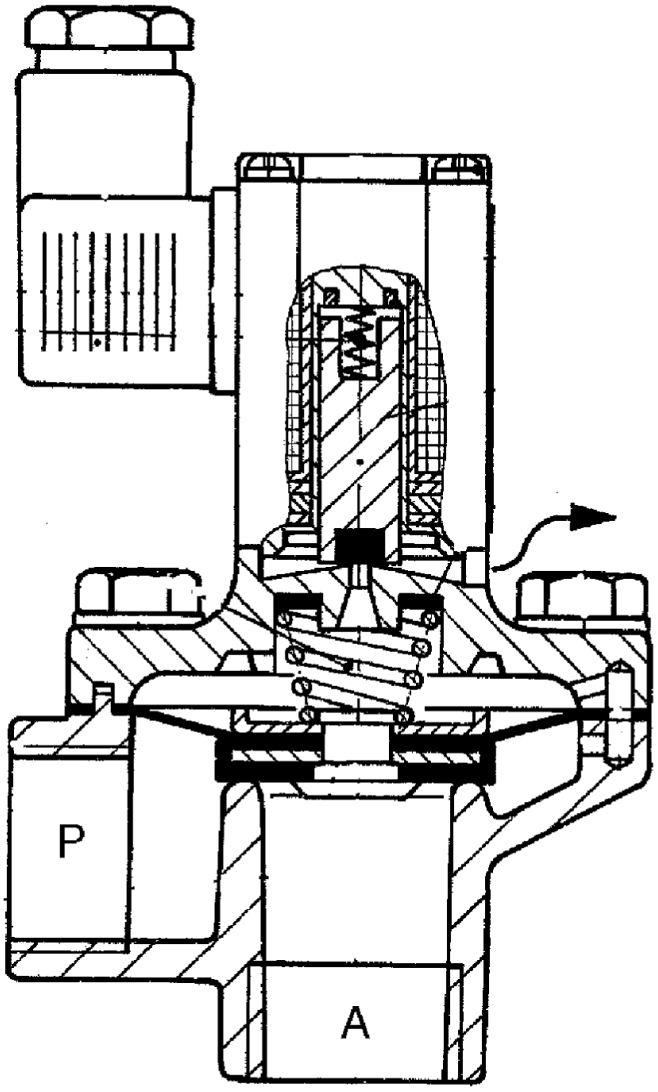
6.1 Filter elements

Dust coming out of the exhaust port of the dust collector indicates a damaged filter element. **Replace the element immediately since dust passing through the damaged element quickly wears down the blower fan.** The elements have threaded fittings at the upper end.

The elements can be checked and if necessary, blown clean with compressed air from the hatch provided on the side of the dust collector. The compressed air nozzle must be kept at a safe distance from the elements to prevent them from becoming damaged.

6.2 Blow-out valve

A blow--out valve is fitted to the dust collector pulse jet cleaning line.

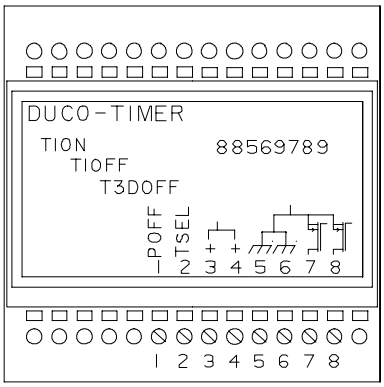


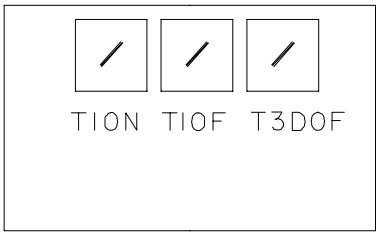
6.3 Timing the filter cleaning with DC120 duco timer

The timer unit is a separate module located in the terminal block box in the rear part of the rig. Timer settings are to be changed only when the ignition key is in the ‘STOP’ position.

Adjusting screw T1ON is used to set the pulse jet time for the dust collector blow--out valve (e.g., 0.5 s). Adjusting screw T1OF is used to set the pause time for the dust collector blow--out valve (e.g., 5 s).

Adjusting screw T3DOF is not used in the DC120.





6.4 Timing the filter cleaning with DC121R/DC122R programming tool

In the DC121R/DC122R, the cleaning settings for the filters are made with the programming tool; refer to the instructions for the programming tool.

6.5 Dust collector flap closing valve (suction cut-off, optional)

The valve is installed in the power pack. When the valve is closed the pressure ceases to affect the cut-off cylinder, and the dust collector valve closes. The system prevents dust collector operation when drilling a water hole, for instance.

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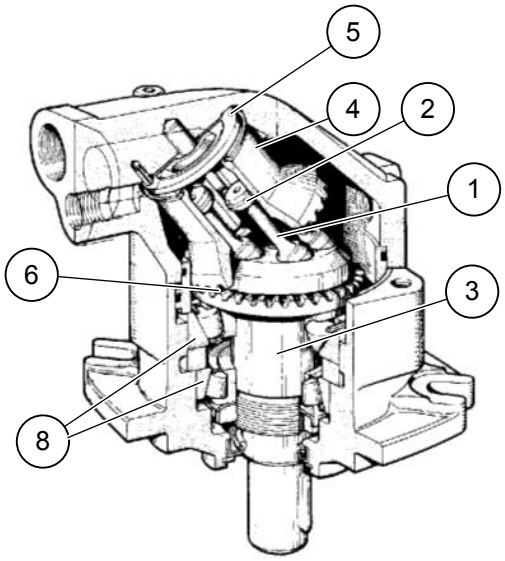
6.6 Repair and maintenance of the dust collector hydraulic motor

6.6.1 Construction and operation



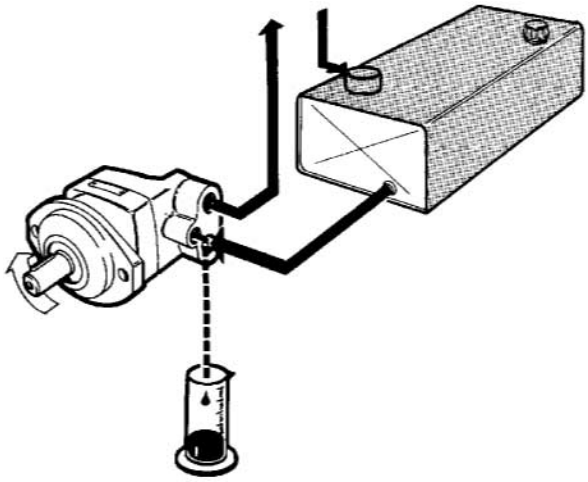
The F11 is a piston-type motor consisting of an upper and a lower chamber. The spherical pistons (1) and piston rings (2) act at a 40° angle to the drive shaft (3).

When oil is introduced to the pressure coupling, the pistons are pushed down in the cylinder barrel (4) and rotate the shaft. A spring element pushes the cylinder barrel (4) against the valve plate (5) and the connecting end. Since the gear ring (6) connects the cylinder barrel to the drive shaft, they rotate at the same speed. The drive shaft is supported with two taper roller bearings (8).

6.6.2 Checking the operation

The condition of the motor can be checked by measuring the drain oil flow.

1. Detach one of the drain oil hoses and place its end in a measuring can. Plug the open connection.
2. Detach the other drain oil hose, and plug the connection as well as the hose end.
3. Run the unit at normal speed and pressurize the system with about 150–200 bar.
4. Check that there is no leakage at the shaft seal and the housing halves.
5. Measure the drain oil running out during one minute. If the drain flow exceeds the values indicated when the unit is pressurized, the unit is worn and must be replaced.



Drain flow limits (Liters/minute):

Normal: 0.2 l/m

Maximum: 1.0 l/m

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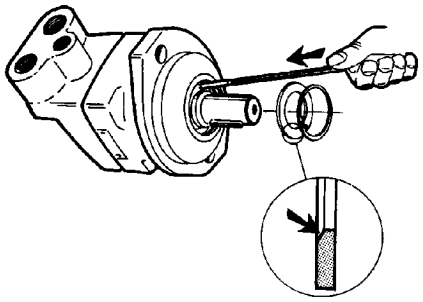
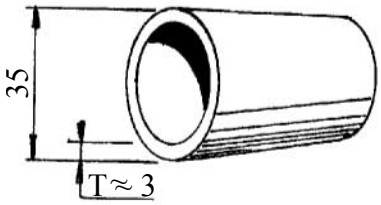
6.6.3 Replacing the seal ring

1. Remove the lock ring securing the seal ring and the support ring.



2. Drive a screwdriver inside the seal's sheet metal cover and pull the seal ring out. Be careful not to damage the shaft sealing surface!
3. An installation tool made from a pipe can be used for the installation of the seal ring.



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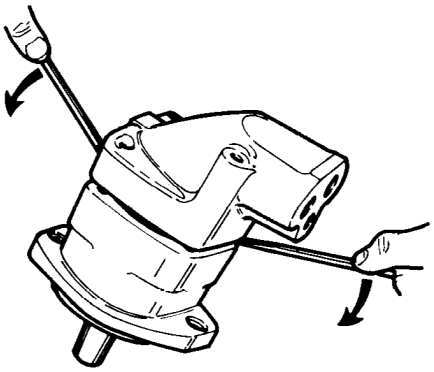
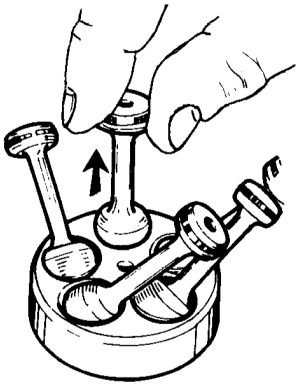
6.6.4 Disassembly

Before disassembly, clean the outside of the motor carefully. Remove any coupling components from the shaft journal.

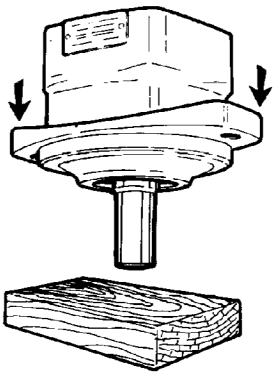
1. Remove the Allen screws (4 pcs) attaching the chamber halves together. Separate the halves by prising with two screwdrivers. Be careful not to loose the shim between the chamber and the guide bushing.



2. Mark the pistons and the corresponding ball seats so that you can place each piston back into its own ball seat during re-assembly.
3. Pull the pistons out in the drive shaft direction.



4. Push the bearing assembly out from the lower chamber by placing the chamber on, for example, a pipe and pushing the shaft journal. An alternative method for removing the bearing assembly: Hold the lower chamber with both hands and hit the shaft end against a wooden block. Do not damage the shaft journal!



5. Remove the seal ring by removing the lock ring and the support ring.

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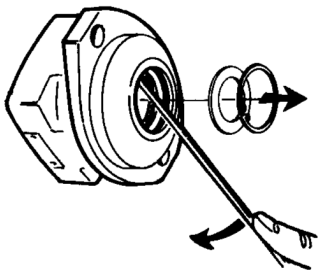
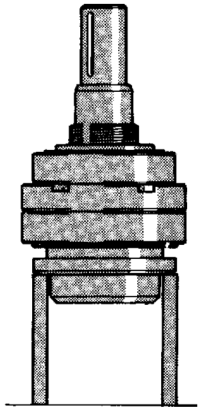
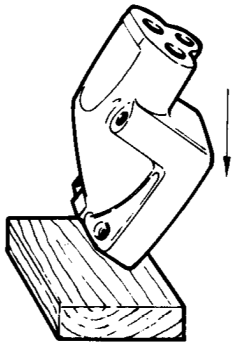


6. The bearing assembly should be disassembled only if the bearings are damaged, as the re-assembly of the bearings will require careful adjustment of bearing and gear clearances.
7. Bearing disassembly: Place the bearing assembly on a pipe so that it rests on its gear ring. Open the shaft nut and push from the end of the shaft.



8. The cylinder barrel is removed by hitting the chamber against a wooden block.



6.6.5 Checking and replacing components

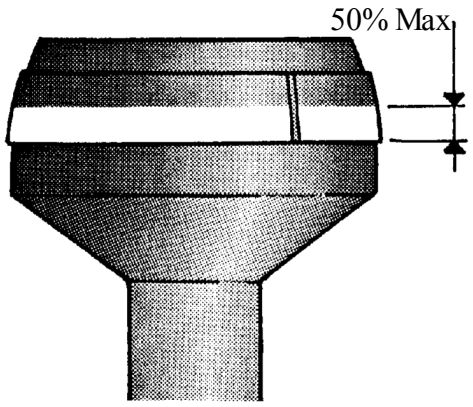
After disassembling the F11 motor, clean all parts carefully with naphtha.

If the leakage rate was too high, the following parts are probably damaged or worn:

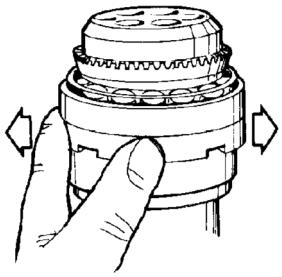
- piston rings
- the end of the cylinder barrel and the slide plate
- the upper chamber valve plate and the connecting end surface that connects to the cylinder barrel

Any scratches or marks on these parts impair the operation of the motor. Replace the parts, if necessary.

1. Replace all seals, seal rings, and O-rings.
2. Replace the piston rings that have signs of wear on over 50% of their surface. The piston rings can be removed with circlip pliers. The piston rings are fitted so that they form a continuous spherical surface with the piston head.



3. If necessary, the valve plate and the end of the cylinder barrel may be sanded carefully. Clean the parts carefully after sanding.
4. The motor's drive shaft bearing clearance is adjusted with the shaft nut, if necessary. The spacer separating the bearings may not be loose but it must move sideways by hand.



5. Check the sealing surface between the drive shaft and seal ring for damage. Replace the drive shaft, if necessary.

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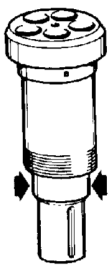

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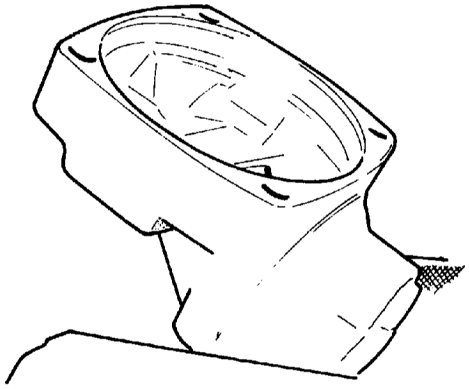
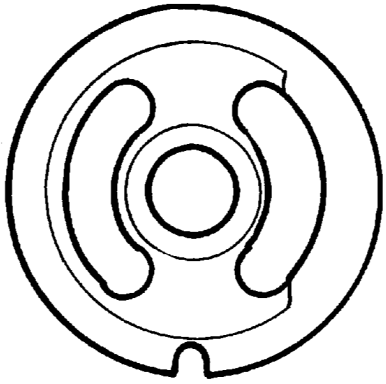
6.6.6 Assembly

Before assembly, wash the parts carefully and lubricate them with hydraulic or motor oil. The motor is assembled in reverse order to disassembly.

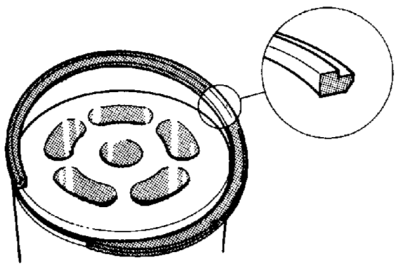
1. Attach the upper chamber to a vice so that the valve plate surface is horizontal.

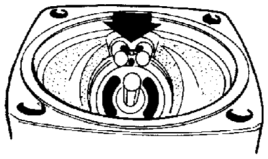


2. Install the valve plate in the upper chamber in the position shown in the figure.



3. If the motor is equipped with a mounting ring, it is installed as shown in the figure. The cylinder barrel is pressed into place so that the cut in the mounting ring is aligned with the lug on the upper chamber.





4. Fit the guide ring slot so that the tooth contact can be checked.

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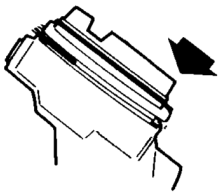
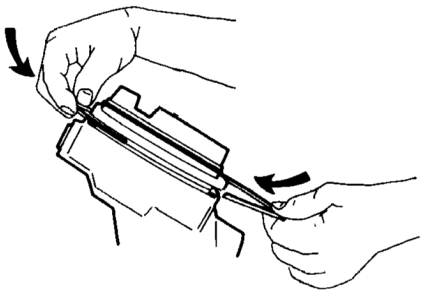
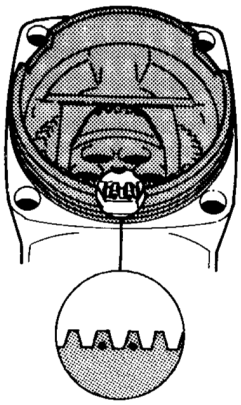


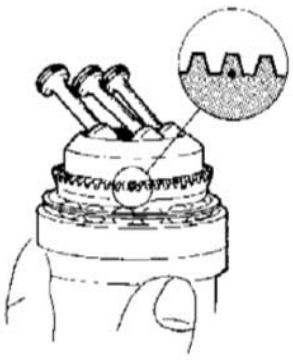
5. Install the shims as shown in the figure. The thickness of the shims is adjusted so that the tooth clearance is 0.05–0.15 mm. The shims might need to be replaced if the shaft bearings are replaced.



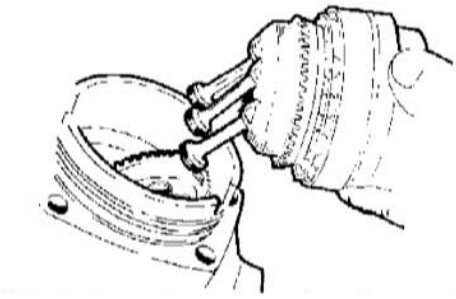
6. The teeth of the cylinder barrel and gear ring have marks to ensure that tooth contact is correct and that the pistons are placed to the cylinders in the correct position. Align the marked tooth gap in the cylinder barrel with the guide ring slot. Emphasise the marking with a small dot of paint to make the installation easier.



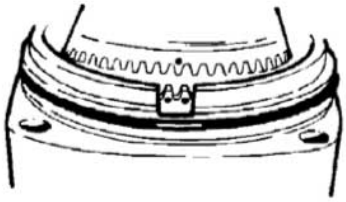
7. One tooth of the drive shaft gear ring has a mark.



8. Install the drive shaft with pistons in the cylinder barrel so that the marks on the gear rings are aligned and the pistons are placed into the correct cylinders.



9. If the timing marks do not align, pull the drive shaft with pistons out and align again.



10. Install a new shaft seal in the bearing housing. Be careful not to damage the seal when installing the bearing housing. Tighten the screws in a crosswise pattern. Tighten first to an initial tightening torque of 20 Nm and then to the final tightening torque of 25 Nm.

11. To check for proper assembly, rotate the shaft quickly back and forth; a clinking sound indicates that the clearance between the gear ring and cylinder barrel is correct. If there is no sound, the clearance is too small and a thicker shim should be installed. The correct clearance is 0.05–0.15 mm.

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7 TROUBLESHOOTING

7.1 Troubleshooting the DC 120 dust collector

Air is flowing constantly to the filter cartridges through the pulse jet cleaning line.

Cause	Remedy
The pulse jet cleaning blow-out valve is not working.	If the spool of the solenoid valve is stuck in the open position, clean the valve or, if necessary, replace it.

Pulse jet cleaning of the dust collector filters is not working.

Cause	Remedy
The pulse jet cleaning switch is in the wrong position.	Turn the switch to the correct position.
The timer unit (duco timer) is not working (DC120)	First check whether the timer unit is set correctly. If the setting is correct and pulse jet cleaning is not working, replace the timer unit.
The program module is not working (DC121R, DC122R)	Check the program with the programming tool.
The spool of the pulse jet cleaning blow-out valve is stuck in the closed position.	Clean the valve or, if necessary, replace it.

The suction capacity of the dust collector is too low.

Cause	Remedy
The interval between the filter pulse jet cleaning cycles is too long or the cycling isn't working.	Set the timer unit.
The dust collector cut-off air valve is stuck in the fully open position, causing the air to escape and thus making the pulse jet insufficient for cleaning the filters. The cut--off air valve is stuck in the closed position and insufficient suction is generated.	Check the air valve and the operation of the cut--off cylinder. Also check the tightness of the cylinder and the condition of the spring.
Moist dust has blocked the suction hose or the dust collector filters.	Clean the hose and filters.
The suction hose or suction head rubbers are damaged.	Replace the suction hose or suction head rubbers.
The hydraulic system is not working normally.	Check the circuit pressure, the pump output, and the leakage rate of the motor.

Dust comes out of the dust collector outlet.

Cause	Remedy
Some of the filter cartridges are damaged.	Replace the damaged cartridges immediately.

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