ILMEG

ECON 600 H

Dust Collector System

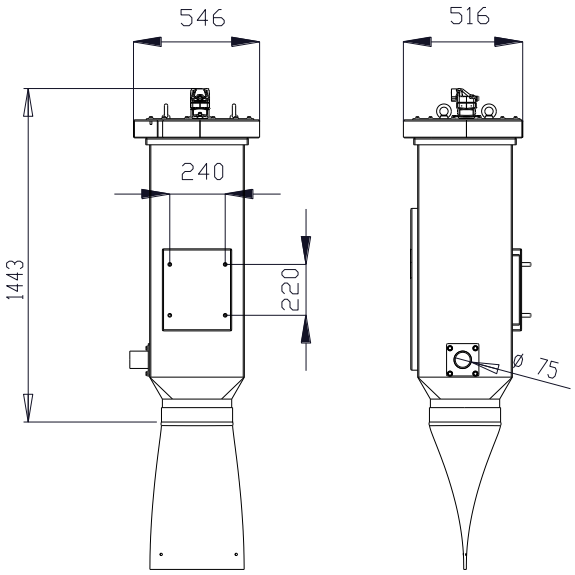
Heavy duty hydraulically powered dust collector systems, designed for improved productivity and improved working conditions in the construction and mining industry.

ECON 600 H
Dust Collector System

The ILMEG ECON 600 H hydraulically driven dust collectors are used in rock drilling applications for improved productivity and improved working conditions with regards to dust. A typical application is blast hole drilling with top hammer rock drills.
The filter cleansing function is carried out with reversed air.
ILMEG dust collectors are continuously improved and built of high quality components to ensure long, safe and economical operation.

Specification:

Max hole size:	51 mm (2")
Filter area:	4,3 m^2
Oil flow requirement:	25 l/min
Oil pressure requirement:	100 BAR
Approx weight:	140 Kg
Filter cleansing system:	Reversed air
Electric system:	24 V



Optional Equipment:
Pre-skimmer
Pick-up hood

The heavy duty cuttings collector is specially designed to reduce the dust to the minimum.

The fan is purpose built with regards to the specific requirements in mobile drilling applications to ensure a high vacuum capacity in combination with a high suction flow capacity

The filter capacity is 4,3 m^2 with water resistant filter material in combination with the reversed air cleansing system safeguards a long and trouble free operation

1. The Dust collector

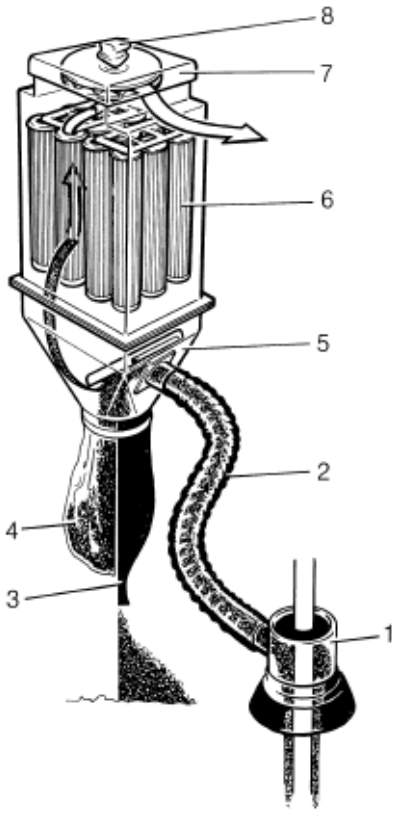
Looking at a drill rig with a dust collector mounted, all you see is: the pick up hood (1), the suction hose (2), and a big box mounted somewhere on the rig, and hopefully no dust. Everytime a new drill rod is added, the big box will drop its contents of drill chips and dust in a plastic sack (4), or just on the ground in a neat pile via the rubber dump valve (3).

What is happening inside the dust collector?

Flushing air and drill chips enter the filter housing through the rubber hose. Inside air and chips hit a heavy steel wear plate, and the heavier chips ricochet downwards into the conical part (5). Air and fine dust moves upwards towards the cylindrical filter elements (6). The fine dust settles on the filter surface, the clean air passes through, and is picked up by the fan (7) (or the venturi on the pneumatic models) and expelled out of the top of the dust collector.

Everytime the driller stops to add on another drill rod suction stops so that the accumulated chips can fall out. At the same time the filter elements are cleaned by repeated air blasts from the inside. This happens automatically everytime drilling is interrupted on the hydraulic units. The pneumatically driven dust collectors are all equipped with a manual filter cleaning system.

THE ILMEG DUST COLLECTOR



1. **Pick up hood**
2. **Suction hose**
3. **Rubber dump valve**
4. **Plastic sack**
5. **Bottom housing section**
6. **Filter elements**
7. **Fan**
8. **Hydraulic Motor**

We find several components inside the dust collector whose function is vital to the dust collecting system.

A: Filter elements

The exchangeable filter elements are basically cylindrical, with a diameter of 5" and in two different lengths: 600 mm and 900 mm. The filter material is specially treated to be water resistant.

Surface area:

1: 900 mm filter : 1.2 m^2 (12.9 sq.ft)

2: 600 mm filter : 0.8 m^2 (8.6 sq.ft)

If you are drilling in a type of rock that gives a lot of dust instead of larger chips, the filters need to be cleaned at shorter intervals. If there is water in the drillhole, the dust will turn into mud that sticks to the filter surface, and the automatic cleaning cycle is not sufficient.

The solution is to dry out the filters by disconnecting the suction hose from the pick up hood and let the fan work for some time (5-10 min). After drying, the filter can be cleaned by the automatic cleaning cycle.

As the case is with any type of filter, these have a limited life. Even though they are cleaned after every drill rod, some dirt will stick in the microscopic pores, reducing the capacity and increasing the pressure drop. The filter material will also finally be worn out by the constant bombarding with drill chips. WHEN DUST STARTS COMING OUT OF THE FAN, IT MEANS THERE IS A HOLE IN ONE OF THE FILTER ELEMENTS. CHANGE THE DAMAGED FILTER ELEMENT IMMEDIATELY! PASSING DRILL CHIPS THROUGH THE FAN WILL ALSO WEAR OUT THE FAN IN A VERY SHORT TIME.

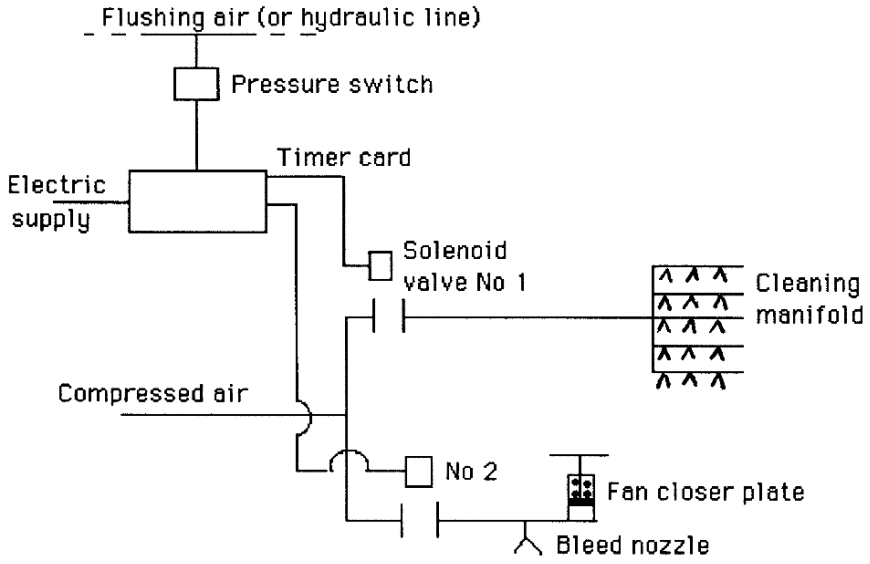
B: The automatic cleaning cycle

In the dust collector the heavy chips fall to the bottom, but the fine dust collects on the filter surface. When adding on a new drill rod there is time to clean the filter elements.

In the Ilmeg dust collectors, compressed air is used for cleaning the filters. This method gives the best cleaning results and does not destroy the filter elements with hard mechanical vibration.

The system works as follows:

As the driller stops the rock drill, the flushing air (or the hydraulic pressure) is also shut off. In the air line or the hydraulic line there is an electric pressure switch. As the pressure drops, the switch is closed and an electric signal goes to a small control unit mounted inside the dust collector. This signal starts the cleaning cycle.



Cleaning cycle:

1. Pressure switch sends signal to the timer card when the rock drill is stopped.

2. Timer card activates solenoid valve Nº 2 and the fan inlet is closed, which means no air passes through the filters.

3. Timer card activates solenoid valve Nº 1 with a series of pulses. Altogether 10 pulses, 1 sec between them. As an option there is available Timer card with 3 sec. interval between pulses. The air blasts from the inside of the filters clean the filter surface.

4. After the ten pulses, solenoid valve Nº 2 closes, the spring loaded air cylinder returns.

5. If drilling is started before the cleaning cycle is finished the built in pressure switch terminates the cleaning cycle.

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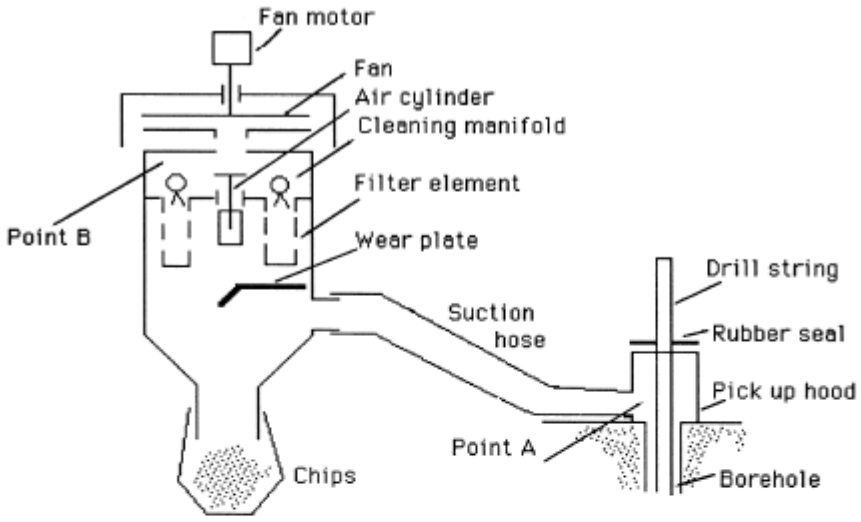
FILTER CLEANING SYSTEM
DIMENSION OF AIR HOSES AND AIR CONSUMPTION

Dust collector	Number of hoses	Hose diameter	Numer of filters	Air consumption per 1 sec. pulse	
				m3/sec	CF/sec
ECON 900 Hydr.	1	3/4"	6	0.06	2.1
HS 600/900	1	3/4"	8	0.08	2.8
HSL 900	1	3/4"	12	0.13	4.5
HML 900	2	1"	24	0.25	8.8
HXL 900	2	1"	32	0.34	11.9
HEXL 900-50	4	1"	64	0.67	23.7

C: The fan

The fan creates the suction that makes the dust collector work.

The dust collecting system:



The fan pumps out the air from the clean side of the filters thus creating a vacuum at Point B.
During drilling air speed is higher at Point A than at Point B.
The difference in speed forces the air (in this case the flushing air) to move from Point A to Point B.
The air volume moved depends on the pressure difference and the flow resistance between A and B.

As explained above it is necessary that the capacity of the dust collector is somewhat higher than the volume of the flushing air coming out of the borehole.

Summing up:

1. The fan capacity and the flow resistance through the dust collector give the volume of air that will pass through the dust collector.

2. This volume must be higher than the volume of the flushing air.

3. The air speed through the suction hose must be high enough (25 m/sec +) to prevent fall-out.

4. The rig hydraulic system must be able to deliver sufficient oil volume (measured in litres/minute) and oil pressure (in Bars) to run the fan motor at the required RPM's.

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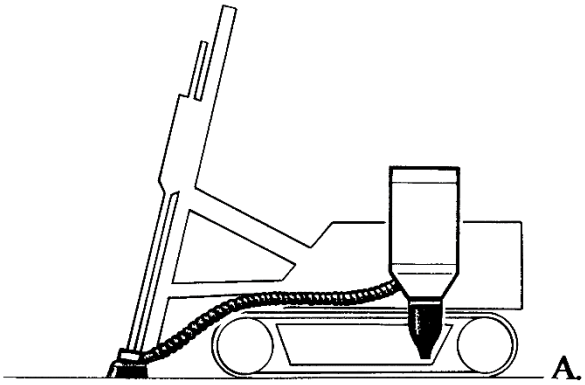
3. How to mount the dust collector on the drill rig

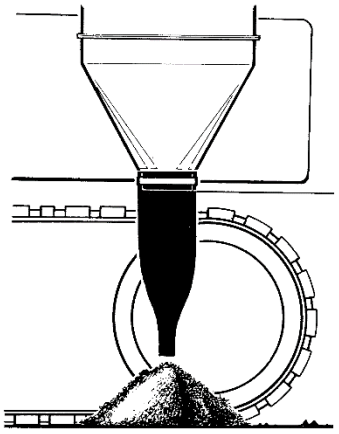
A. The dust collector should be put in a place where it does not hinder boom and feed movements. It should not make tramming or transport of the drill rig difficult, and it should not hinder the access to other components on the rig that need regular service and maintenance.

B. The dust collector must be placed high enough above ground, approx 3', so that emptying it, or putting on bags is convenient. The cuttings should not fall on the tracks or other components of the rig.

C. The suction hose should run as straight as possible between pick up hood and dust collector.

D. Of course, the bracket holding the dust collector must be able to take the strain of tramming the rig over rough terrain.


A.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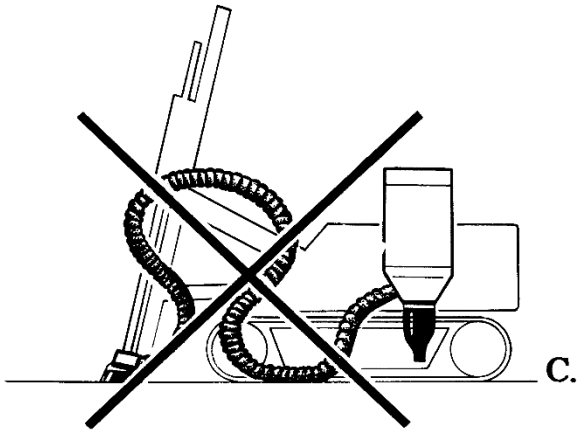
C.

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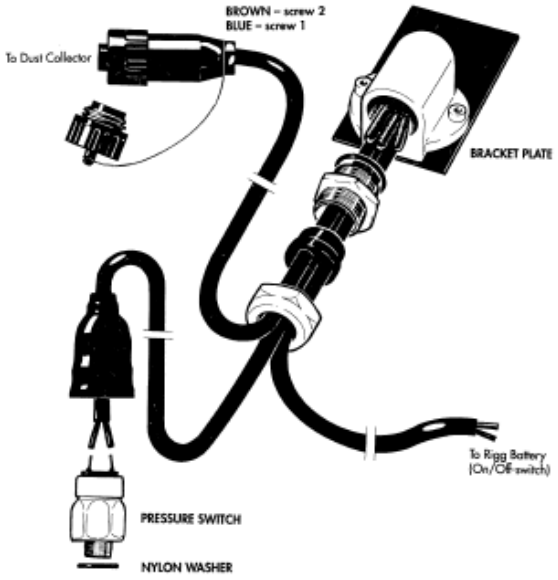
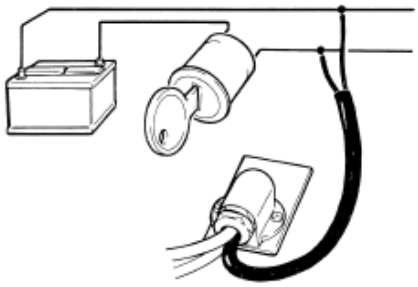
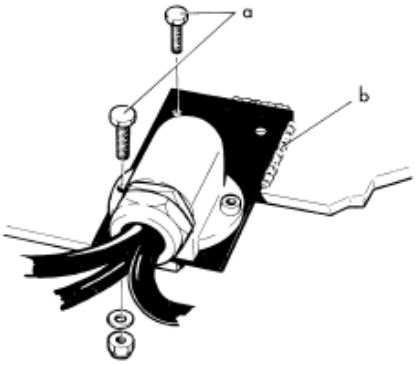
MOUNTING AND CONNECTION OF PRESSURE SWITCH

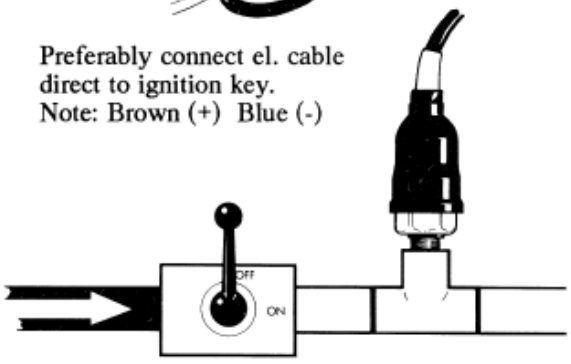




Preferably connect el. cable direct to ignition key.
Note: Brown (+) Blue (-)



Bracket to be fitted on suitable place on rig. Either use supplied screws (A) or weld (B).



Pressure switch to be connected to air line AFTER on/off switch. Either to hammer air or flushing air.

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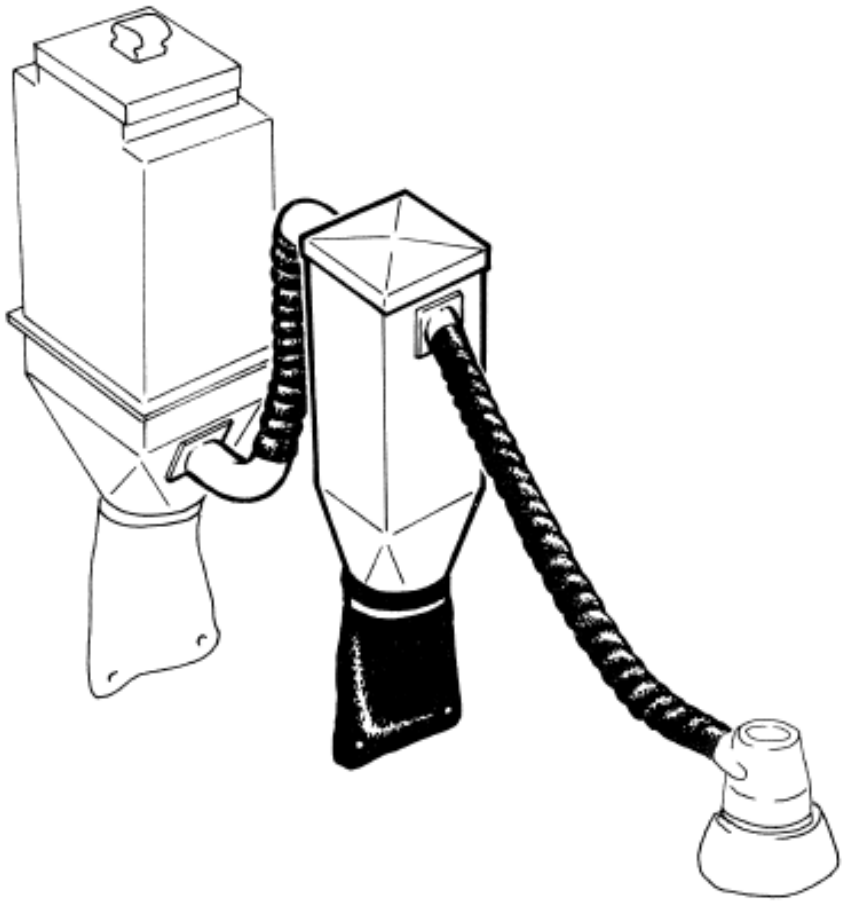
4. PRE-SEPARATOR

If drilling mainly coarse dust or regular risk for water in the hole a pre-separator is recommended. Can be mounted either close to pick-up-hood (on boom) or as shown on sketch below.



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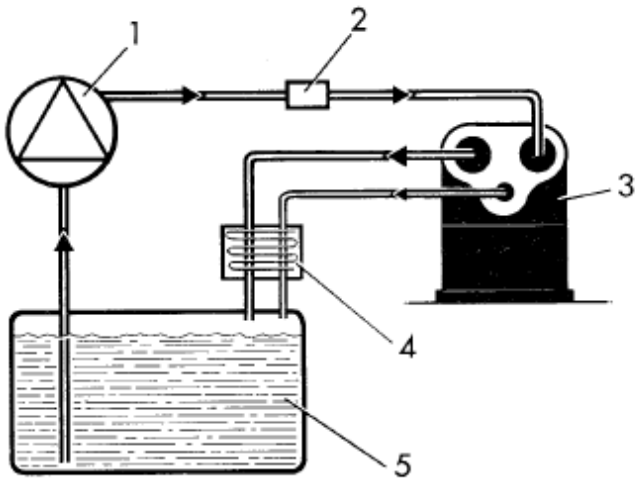
5. The hydraulic connections

As has been pointed out before, the dust collector will not work properly unless the fan works at the proper RPM's. This means the hydraulic system of the rig must be able to deliver the needed oil flow and oil pressure during drilling.

Different drill rigs have different hydraulic systems, and it is necessary to analyze each rig's system to decide where to take the hydraulic power for the fan motor.

For example, if the rig has a separate pump used only for tramming, this pump may also be used to run the fan motor, as the fan does not run while tramming and vise versa. Finally the engine must have the extra horsepower needed to run the fan in addition to other functions like feed and rotation.

Further, it is very important that hoses and valves in the fan motor system are large enough in order to prevent back pressure and overheating of the hydraulic oil.



1. **Pump**
2. **Safety valve/On-off valve dust collector**
3. **Fan motor**
4. **Cleaning filter**
5. **Tank**

DIMENSION OF HYDRAULIC HOSES FOR CONNECTION OF FAN MOTOR

Motor	Necessary oil volume for fan RPM 5000	Hose in and out	Leak-oil hose
F11-5	25 l/min (6.6 US GPM)	1/2"	1/4"

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Service and Maintenance

DAILY MAINTENANCE
HYDRAULIC DUST COLLECTOR

1. Start up the dust collector.
   At low temperatures affecting hydraulic oil viscosity, let diesel motor warm up before starting the dust collector.

2. After start-up of the dust collector, first thing that happens is that a free cleaning cycle automatically runs. When compressor produces correct working pressure - allow further one cleaning cycle without drilling.

3. Check that your dust collector sucks properly by looking at the rubber dump valve (or plastic bag) which shall QUICKLY AND STRONGLY be sucked up against dust collector bottom.

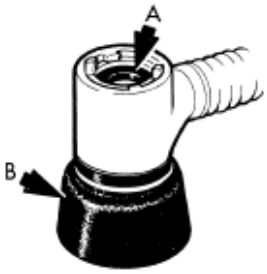
4. Check that GASKET in pick up hood A) and SKIRT B) are not worn out.

5. Check that suction hose is not damaged or bent.

6. Every day before stopping machine:
   Clean filters as described under point 2 above.

3

4



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TROUBLE SHOOTING
HYDRAULIC DUST COLLECTOR

If your dust collector performance is ineffecient though maintained daily, check the following:

1. Check suction hose for blockages. Clean any water or dirt from hose.

2. Check rubber dump valve (or plastic sack). If worn or otherwise damaged, change to a new one.

3. Check that compressor gives OIL FREE AIR at recommended pressure 7-12 bar (100-172 PSi) for the filter cleaning.

4. <u>Pressure indicating switch</u>

   Pressure switch is set on 3,5 bar from factory. Can be adjusted by turning screw (left = lower pressure, right = higher). Se sketch...

   4.1 Check function of switch by <u>short circuiting</u> the cables in switch. If cleaning cycle is then started, switch is faulty. Change to a new one.

   4.2 If cleaning does not start when short circuiting cables, check power supply all the way up to timer card in dust collector.

   4.3 Check that all cables are unbroken.

5. <u>TIMER CARD</u>

   5.1 Lift off hydraulic fan top A) to get into the clean air chamber B).

   5.2 Simulate a cleaning cycle by short circuiting pressure indicating switch as in 4. above.

   5.3 Listen if solenoid valve indicates 10 cleaning pulses with 1 sec interval. If not, change solenoid A).

   5.4 Check that cables between timer card and solenoid valves are not damaged.

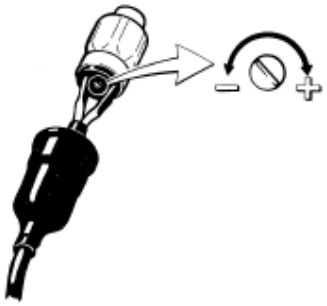
   5.5 If no faults in 5.2-5.4 are found, timer card is faulty and has to be replaced!

6. <u>SOLENOID VALVES FOR FILTER CLEANING</u>

   6.1 If solenoid valves allow air to blow continuously, the diaphragm in valve is broken. Change!

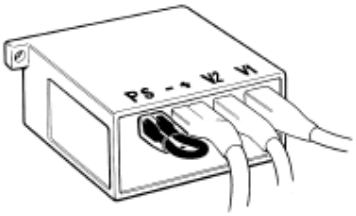
   6.2 If solenoid valves do not open, i e no air is allowed into the cleaning system, check hole B) in diaphragm C). If clogged, blow clean and refit diaphragm into solenoid valve.
   If valves still not open, change the solenoid A).

4



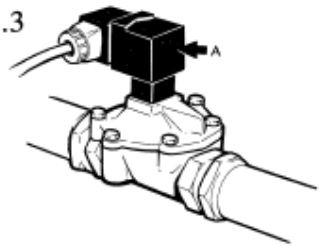
4.1

5

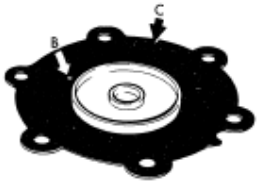


5.1

5.3



6.2



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7. AIR CYLINDER

7.1 If air cylinder puts the fan closer plate in closed position during drilling, the dust collector does not work.

Check diaphragm C) in the 1/2" solenoid valve that controls air cyliner movements. If diaphragm is broken, change to a new one. If hole is clogged, blow clean.

7.2 Check solenoid by simulating a cleaning cycle as described in 5.2 above.

7.3 Check and clean the adjustable relief valves.

NOTE! After refitting adjustable relief valves you must adjust them to achieve correct movements of air cylinder.

How to adjust

Open relief valve by turning 2.5 turns from closed.

7.4 Check and clean the bleed filter.

7.5 If air cylinder still is not working, change to a new one.

7.6 Check fan closer plate. Ensure that assy is secure and seals against bottom plate. This is very important for perfect filter cleaning and full suction capacity.

8. If dust escapes through fan top, one or more filters are broken. STOP DRILLING IMMEDIATELY and check which filters are broken. Exchange broken filters for new ones.

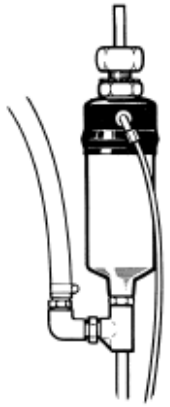
IMPORTANT! When opening filter housing from bottom section, follow instructions given in page 19!

Also check the clean air chamber and clean away any dust which otherwise can fall down inside the clean filters. If necessary, clean filter housing and bottom section.

8.1 Check if filters are clogged. If impossible to clean, change to new filters.

8.2 Check wear plate inside dust collector inlet. If plate is worn out, high-speed dust will blow directly into the filters and destroy them in a very short time.

7



7.3

7.6

8.2

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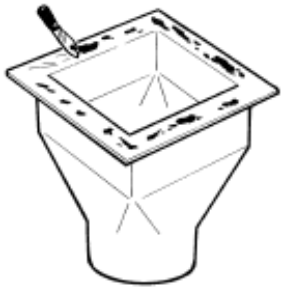
WHEN OPENING FILTER HOUSING FROM BOTTOM, ALWAYS:

Remove damaged foam rubber seal

1

Clean carefully

2



Fit new seal

3

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9. FAN

If broken filters have caused dust to blow up through the fan, this will very quickly cause unbalance.

Fan has to be dismounted immediately, cleaned and checked. If still not in balance, fan has to be replaced by a new one.

If the fan is driven while unbalanced, the hydraulic motor bearing will be affected and can lead to replacement of the complete motor unit.

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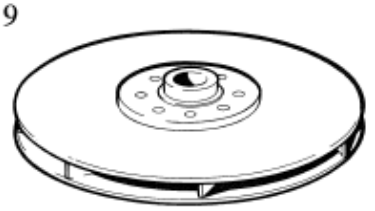

10. HYDRAULIC MOTOR

10.1 Check that the motor gets necessary oil volume at correct working pressure (see diagram page 12 in instruction book).

10.2 Also check that the motor is correctly connected with hydraulic hoses of recommended diameter (see sketch on page 12 instruction book).

If points 10.1 and 10.2 are fulfilled and the fan still is not running at 5000 rpm, there is probably an internal leakage in the motor. The motor should then be returned to your nearest Ilmeg distributor or Volvo representative for repair or replacement.