

Installation and Operating Instructions

**Rotating Vacuum Filter
Type VRF 450 & 900**



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1 Description of product and functions

Scope

Cleaning of cooling lubricants

Field of application

- Primarily used in conjunction with machine tools for both single machines and machine groups.

Function

- Liquid flows through the inflow chamber into the rotating vacuum filter from a lifting pump. A sieve drum is arranged such that it is completely immersed in the liquid and forms a vacuum chamber.
- A vacuum pump sucks the liquid from the inside of the drum and conveys it to the clean water tank. The resulting vacuum causes liquid to flow into the drum; dirt particles are retained by the sieve drum mesh.
- Vacuum pressure increases due to dirt particles (filter cake) deposited on the fine filter mesh.
- The preset subpressure value sets the drum rotating via the drive motor and the chain.
- The sludge cake is scraped off and the filter is rinsed by reversed flow.
- Simultaneously the sludge is discharged into a sludge container by means of a scraper chain.

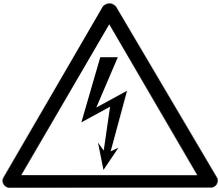
Noise level: < 70 dB(A)

2 Danger and safety instructions

2.1 General instructions



- Always observe all statements and instructions in the operating instructions delivered with the plant.
- It is forbidden for unqualified persons to work at the plant.
- Observe correct fastening if components were installed by customer.
- Never bypass safety contrivances (e.g. safety clutch).
- The operation of safety contrivances must always be guaranteed

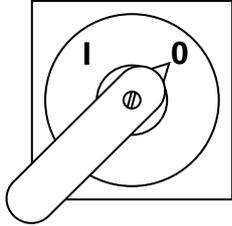


- Work on the electrical plant may only be carried out by qualified personnel.
- Observe the relevant VDE requirements and connection requirements of the responsible Electricity Board.

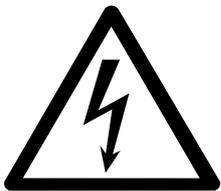


- Do not remove covers while plant is in operation.

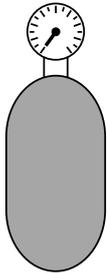
2.2 Instructions for repair and maintenance work and for malfunctions



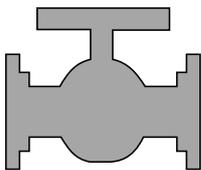
- Switch off the main switch.
- Secure the plant against being started accidentally.



- Ensure that the plant is dead.



- Depressurize the plant.



- Close pipe valves.
- Remove all noxious materials.
- Coolants must not enter the environment.



- When handling chips, wear protective clothing, safety boots and protective gloves.

3 Installation and location



- **Ensure secure positioning and installation**
- **Secure equipment against accidental start-up!**

- Install equipment on a level surface.
- Connect supply/return lines and reverse flow rinsing pump, if applicable.



Check retrofitted piping for leaks.

- Install sludge container etc.
- Connect power supply for motor(s) and pump(s)

4 Start-up and operation

4.1 Prior to initial operation

- Connect electrical equipment (ensure proper voltage, frequency, strength of current and sense of rotation).
- The rotating vacuum filter must always be connected through a lifting system (dirty water tank) because there should be a steady overflow of liquid during operation.
- The rotating vacuum filter can be filled directly from above or by means of a lifting pump. In both cases the equipment is filled up until liquid flows back to the dirty water tank through the lateral flow-off channel.



The dirty water tank should be dimensioned big enough to hold the liquid coming from the rotating vacuum filter without flooding!

- The vacuum pump must be deaerated before initial operation; this applies also when the pump has aspirated air. For this purpose, open the air bleed screw at the pump (below the delivery-side flange) until water is forced through the hole. For this the equipment must be filled sufficiently.
- The entire equipment must be free of loose hardware (such as tools, accessories etc.)

4.2 Setting various modes of operation

„Manual“ mode

- Switch main switch to „ON“.
- Set selector switch to „Manual“.

Now each consumer can be switched on individually.

- „Automatic“ mode
- Switch main switch to „ON“.
- Set all consumer switches to „Automatic“.
- Set selector switch to „Automatic mode on“.

Now the equipment is set for automatic operation.



VRF, controlled by the processing machine:

see operating instructions of the processing machine

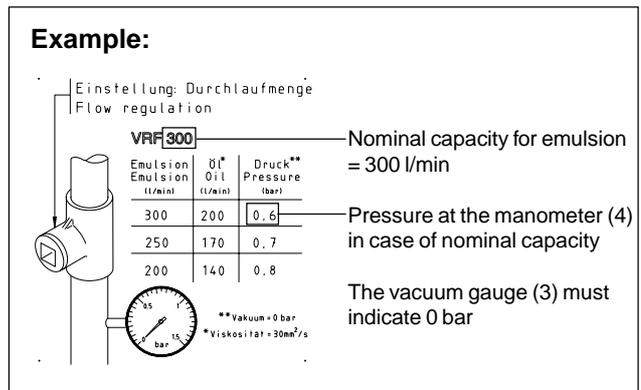
VRF with MT control:

see operating instructions VRF-MT

5 Maintenance

5.1 VRF Basic Settings

- Put the VRF and the processing machine into operation
- Set the liquid consumption of the processing machine at the processing maximum, but do not exceed the nominal capacity of the VRF under any circumstances
- For the VRF nominal capacity for emulsion or oil, see signboard (7)

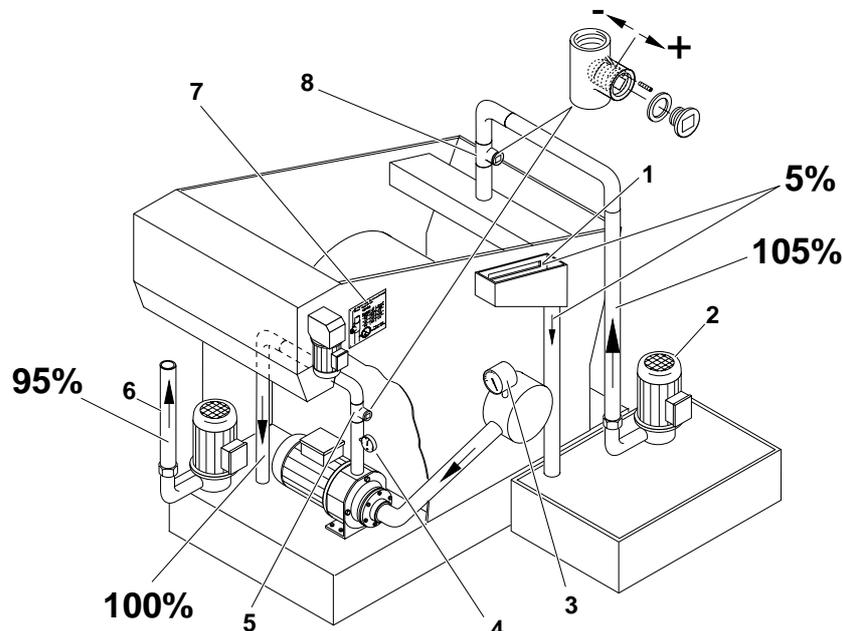


VRF Settings



In the VRF with MT control, a pressure sensor is installed instead of the vacuum gauge (3); the subpressure value is selected at the control unit. From size VRF 700 upwards, a gate valve is installed instead of the adjusting sleeve (5).

1. vacuum gauge (3): switch point at - 0.15 bar
 2. adjusting sleeve (5): opening or closing, respectively, until the gauge (4) indicates the pressure under nominal capacity, see signboard (7)
 3. adjusting sleeve (8): open until the filling level in the lifting tank drops slowly if the lifting pump (2) is operating
 4. adjusting sleeve (5): close until the liquid (approx. 10 l/min.) overflows (1) into the lifting tank
- When the contact gauge (3) responds, a reverse flow cycle must be initiated
 - The interval for the scraper belt drive should be activated as little as possible; however, the vacuum drum may not be blocked by accumulating chips



Cycle Times and Settings

- The cycle times are preset ex works and can (or must) be modified individually
 - de-sludger: dead time 30 sec., pulse time 5 sec.
 - subpressure: - 0.15 bar
 - when the contact gauge responds: vacuum pump OFF, de-sludger ON, slush pump ON

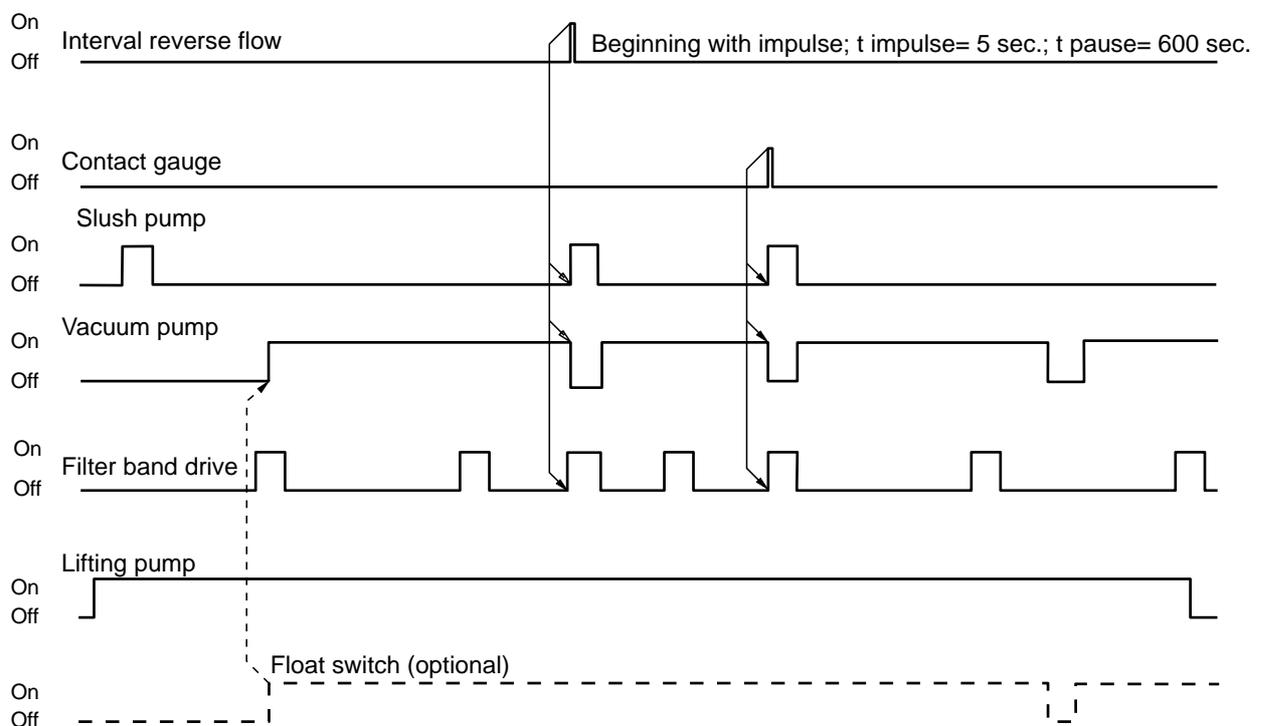
- For some types of processing or chips (e.g. aluminium), it may be necessary to employ an interval reverse flow



Interval Reverse Flow (Induced Reverse Flow)

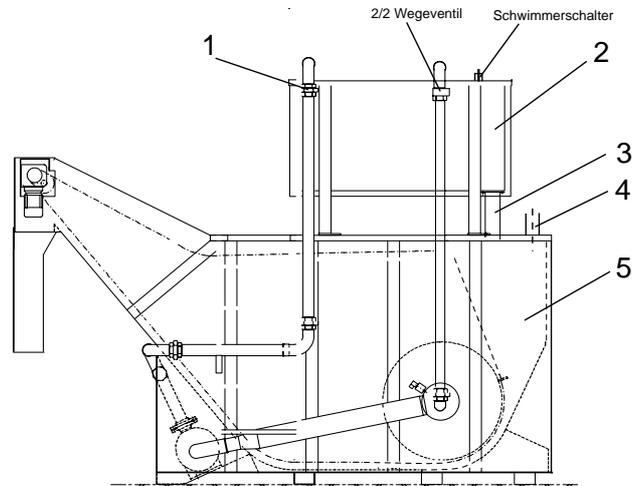
In order to guarantee an effective reverse flow and a constant cleaning performance, the reverse flow process should be activated every ten minutes for approx. five seconds.

If the contact gauge responds less often, the interval reverse flow is necessary. (See functional diagram below).



5.2 Setting the Rate of Flow

- Carry through the settings only in case of maximum liquid consumption of the processing machine(s)
- The dirty water flow must always be greater than the clean water flow (there must be a constant overflow from the clean water tank (2) into the dirty water tank (5))
- If necessary, reduce the clean water flow by means of the adjusting sleeve/gate valve (1) or increase the dirty water flow (4)



Flow Rate (Clean Water Flow)

- The adjusting sleeve / the gate valve for adjusting the flow rate is located in the pipe of the vacuum pump at which the pressure is applied (1)
- The flow rate is adjusted properly if there is a constant slight overflow (3) into the dirty water tank (5)

Adjusting Sleeve (Installed Only for Size VRF 450)

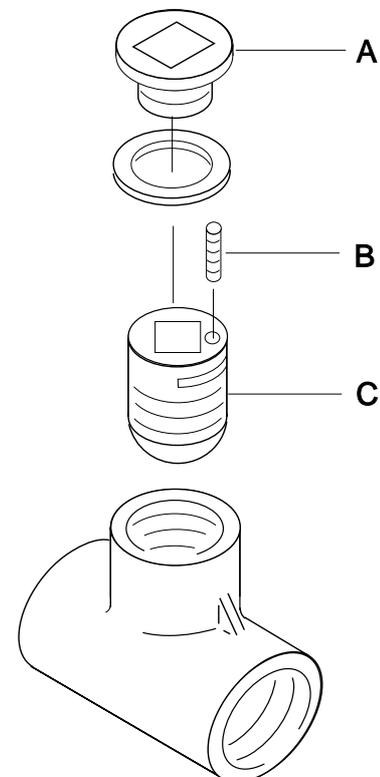
- Unscrew the screw plug (A) with the seal.
- Release the safety screw (B).



Screwing in the adjusting nipple (C) clockwise reduces the rate of flow.

Do not completely unscrew the adjusting nipple - liquid penetrates under pressure.

- Tighten the safety screw and screw in the screw plug; if necessary, with a new seal.

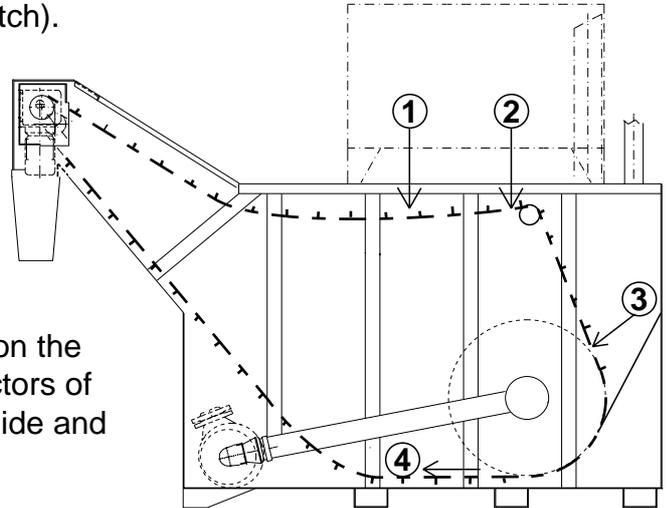


5.3 Removing and Installing the Sieve Drum

- Switch off the device and secure it against unintentional initiation (deactivate the main switch).
- Take off the upper container covers.
- Drain the liquid from the device.



- **Danger! Risk of injury!**
- **Do not put your hand in the device while the main switch is activated**



- Switch the device in the manual mode; switch on the scraper belt drive until the shackle type connectors of the hollow pin chains are visible on the upper side and at the point designated in the picture (1)
- Switch off the device and secure it against unintentional initiation (deactivate the main switch)
- Remove all driver rails from the shackle type connector (1) and the guide roller (2) to the sieve drum (3)
- Open the shackle type connectors and take the scraper belt chain off the sieve drum (4); it does, however, not have to be removed from the container
- Loosen (8) the locking screw on the bearing
- Release the hexagon nuts (5) and evenly draw the bearing lid (6) off the sieve drum

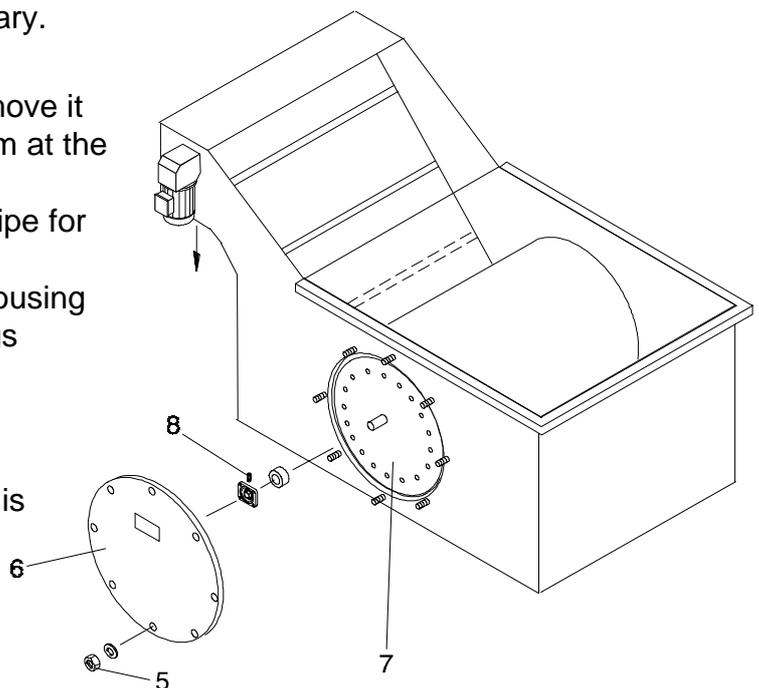


Check the conical nipple of the bearing lid for damage; replace, if necessary.

- Unscrew the sieve drum lid (7) and remove it
- Divide the scouring pipe inside the drum at the union piece and take it out.
- Check the bore holes of the scouring pipe for dirt; clean, if necessary
- Completely draw the drum out of the housing
- Clean and check the seals and bearings in the sieve drum; replace in case of damage



The installation of the sieve drum is carried out in reverse order.



5.4 Cleaning the sieve drum



The level of liquid in the rotating vacuum filter must be lowered until the surface of the sieve drum can be cleaned with a suitable vacuum cleaning device.

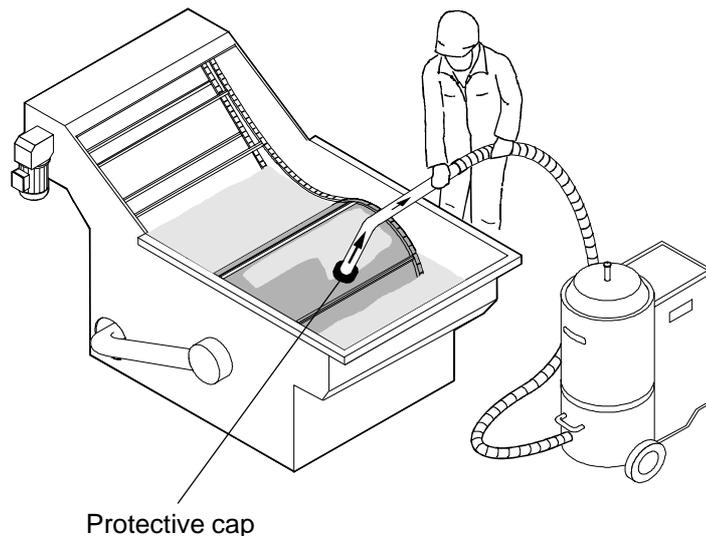
- Switch equipment off completely
- Remove covers
- Drain the rotating vacuum filter by switching the vacuum pump on until the sieve drum rises above the liquid level and can be cleaned.



Use an extractor with a protective cap for not damaging the filter material
Under no circumstances may a wire brush or sharp and pointed objects be used



- **During the cleaning process the equipment must remain switched off and secured against accidental start-up!**



5.5 Important directions for the vacuum drum



After the initial operation the vacuum drum must be continuously immersed in fluid - if this cannot be guaranteed, clean the filter material (e.g. by means of sucking off) and preserve with anticorrosive agent
Do not let the vacuum drum dry if contaminated!
Dried dirt might "conglutinate" the sieve meshes or cause corrosion. The vacuum drum becomes impermeable and thus useless. In such cases, later attempts at cleaning tend to be futile.

6 Maintenance table

Assembly/ component	Interval	Maintenance work	Safety instructions/ note
Sludge container	1 day	Drain accumulated liquid	
Pumps	---	See manufacturers operating instructions	
Electrical equipment - Motor(s)	---	See manufacturers operating instructions	
- Wiring	3 months	Check for breakage and damage	Replace defective wiring
- Filling level switch	3 months	Check function	Cross both switching positions in manual operation
- Safety equipment	3 months	Check function	
Tanks and piping	6 months	Check for leakage, corrosion and damage	Hazardous materials must not escape under any circumstances
Scraper strips	6 months	Check for wear	Replace worn inserts
Sieve drum	---	Clean tissue (clean tissue surface with vacuum cleaner or from the inside using a high pressure cleaner)	Cleaning interval depends on type of swarf/chips and coolant (see chapter 5.3)
Coolant tanks	500 working hours	Check for contamination (sludge deposits) and clean, if need be.	Depending on the tooling method, the interval may be greatly shortened. Coolant tanks are special accessories and are therefore not installed in every plant.

7 Eliminating malfunctions

Disturbance	Possible causes	Remedy
No or insufficient reverse flow rinsing	Vacuum contact-making pressure gauge / pressure sensor defective	Replace gauge
	Filling level in clean water tank too low	Refill liquid
	Holes in the rinsing nozzle of the sieve drum obstructed	Open and clean sieve drum (refer also to Chapt. 5.1) Manual reverse flow rinsing max. 20 sec.
	Filling level in the rinsing pump tank too low	Refill liquid
Safety clutch slips (loud rattling noise)	Coarse parts block the equipment	Remove parts
	Safety clutch defective	Replace clutch
No chip/swarf discharge	Amount of chips/swarf too high	Reduce discharge cycle time
Insufficient cleaning performance	Filter tissue clogged or clotted	Clean tissue surface with vacuum cleaner or from the inside using a high pressure cleaner

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Späneförderanlagen
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