

Fig. 1: Partial flow filter GENO-VARIO 3000

Partial flow filter GENO-VARIO 3000 with touch panel

Intended use

The partial flow filter GENO-VARIO 3000 is designed for the continuous improvement of the heating circulation water of closed heating or cooling networks. The water is treated in two steps:

First of all, the gravel filter unit removes all insoluble elements such as scale, rust or dirt particles. Then, the softener unit installed downstream completely softens the water, and generates a water quality complying with the applicable guidelines VDI 2035 and AGFW 510 (VdTÜV 1466) without the need for a replacement of the system content. The built-in circulation pump ensures the simple hydraulic integration. At the same time, the make-up water may also be treated immediately by means of the partial flow filter.

The fully automatic control electronics monitors all functions such as, for instance, the backwash of the gravel filter unit following the measurement of the differential pressure and the regeneration of the softener unit. Consequently, during the entire cleaning cycle, neither the filter material nor the ion exchanger resin needs to be replaced and the operating costs and the maintenance efforts are reduced.

Function

The partial flow filter GENO-VARIO 3000 features 3 different connections.

Via the connection for raw water, the gravel filter unit as well as the softener unit are supplied with raw water for the fully automatic backwash process as well as the regeneration and the make-up water is provided by means of this connection as well. Furthermore, this connection is secured with a fine filter BOXER KD and a Euro system separator, design type BA.

The switch-over between filter/softener operation and backwash/regeneration or make-up water feed is done by means of a 3-way valve, which is controlled automatically by means of the control electronics.

The connection to the heating circuit is equipped with a circulation pump and a non-return valve, which prevents backflow. Via this connection, the heating circulation water to be filtered and softened gets into the partial flow filter.

Voltage-free contacts are available for the transfer of the operating and collective fault signals, the signalling of the active make-up water feed as well as the operating signal of the optional GENODOS pump.

Filtration

The gravel filter unit is flown through from top to bottom - through the various filter layers -, and thus the heating circulation water is filtered and various solid substances such as corrosion particles and calcareous elements are removed. Afterwards, the hardness formers calcium and magnesium are removed from the cleaned heating circulation water by means of the softener unit and the treated water is then fed into the heating circuit again.

The differential pressure controlled backwash is released fully automatically by means of the control electronics. During the backwash process, the filter layers are thoroughly flushed from bottom to top and thus thoroughly loosened up in order to wash out particles retained in the depth filtration via the drain outlet at the control valve. After each backwash, the filter bed is washed out from top to bottom and the first filtrate is discharged to the drain.

Softening

The softener unit works according to the ion exchange principle. If the resin's intake capacity is exhausted and the resin is completely loaded with calcium and magnesium ions, a regeneration has to take place in order to reload the resin with sodium ions. The regeneration intervals are controlled by means of the central control electronics and activated fully automatically as soon as the set water volume has been softened in the softener unit. The various softening steps are processed automatically and afterwards, the partial flow filter returns to its initial state. The brine tank with a filling volume of 60 litres covers the salt demand for 9 regenerations.

Make-up water feed

Due to small leakages, steam diffusion at sealing points, bleeding processes or after repair and retrofitting work water losses may occur in the heating circuit. This water loss must be made up for by adding water of the proper quality to the heating circulation water again.

The partial flow filter GENO-VARIO 3000 offers the possibility for a manual make-up water feed to compensate for the water loss: The raw water make-up feed is treated directly by the partial flow filter and then added to the heating circulation water. The process is activated manually via the fully automatic control electronics. After the freely adjustable make-up water volume has been discharged, the partial flow filter switches off automatically.

A module for an automatic make-up water feed with integrated leakage monitoring is available as an option.

A pressure measurement device, which is placed in the heating circuit, scans the system pressure. The fully

automatic control electronics activates and monitors the make-up water feed until the pre-set system pressure is reached again.

By means of a 3-way valve located between the gravel filter unit and the softener unit, the softener unit can be bypassed, so that the circulation water of the heating system is only filtered by means of the gravel filter unit but no longer softened. If the system fluid contains a high load of impurities, the system fluid may be filtered first while the softener unit is bypassed.

If the max. admissible water temperature of 80 °C is exceeded, the partial flow filter automatically switches off in order to protect the components.

By means of the integrated, quick-acting bleeding device at the gravel filter and softener unit, the partial flow filter can be deaerated.

Design

The partial flow filter GENO-VARIO 3000 consists of a circulation pump, connections for the heating circuit, make-up and raw water, a gravel filter unit, a softener unit with brine tank and the control electronics with touch panel.

The control electronics is triggered by means of a contact water meter - for an exact flow measurement - as well as a differential pressure sensor to monitor the differential pressure of the gravel filter unit. Via the control unit, several automatic valves regulate the flow of the backwash and the heating circulation water; by means of the manually operated 3-way valve, the softener unit can be bypassed.

The gravel filter unit made of hot-water resistant stainless steel with built-in parts for water flow and retention of the filter material is equipped with a control valve made of red bronze. In order to achieve an optimum filtration performance, filter layers consisting of 3 quartz gravel fractions of different size (refer to "technical specifications") are used.

The softener unit which is also made of high-quality stainless steel and filled with ion exchanger resin in the factory also has an individual control valve made of red bronze. A brine tank is available for the regeneration of the ion exchanger resin.

The partial flow filter is installed on an aluminium rack with sufficient ground clearance for transportation of the partial flow filter by means of a forklift.

Scope of supply

Partial flow filter ready for connection, with filter material and ion exchanger resin, operation manual.

Accessories

Optional unit for automatic make-up water feed for the partial flow filter GENO-VARIO 3000

Order no. 707 572

Dosing system for selective increase of the pH value to the optimum value of 9.3 - please inquire.

Regeneration salt according to EN 973 type A, 25-kg bag.

Order no. 127 001

Installation requirements

Observe local installation directives, general guidelines and technical specifications. The installation site must be frost-proof and ensure the partial flow filter's protection from chemicals, dyes, solvents and vapours.

In case of high amounts of coarse impurities, a coarse filter must be installed upstream of the system in order to protect the pump.

The ambient temperature as well as the radiation temperature next to the system must not exceed 40 °C.

A separate socket (230 V/50 Hz) is required within a range of approx. 3 m from the system. A drain connection for the discharge of the residual water must be available. In case the residual water is directed to a lifting system, make sure that said device is salt water proof.

The installation room must have a floor drain. If no floor drain is available, an appropriate water stop device has to be installed. Floor drains that discharge to a lifting system do not work in case of a power failure.

Requirements for proper function and warranty: Inspections and maintenance have to be carried out.

According to DIN EN 806-5, filter and ion exchanger systems routinely require a functional check to be performed by the operator and maintenance to be performed by an authorised technical service company.

Technical specifications		Partial flow filter GENO-VARIO 3000
Connection data		
Inlet connection from heating circuit		DN 25 (1" male thread)
Filtrate connection to heating circuit		DN 25 (1" male thread)
Connection raw water inlet		DN 25 (1" male thread)
Power supply	[V/Hz]	230/50
General performance data		
Nominal pressure		PN 10
Nominal flow	[m ³ /h]	2.5
Min./max. operating pressure of heating circuit	[bar]	2.0/6.0
Min./max. operating pressure of raw water	[bar]	3.0/8.0
Pump capacity	[kW]	0.5
Performance data of softener unit		
Nominal capacity	[mol] [°dH x m ³]	26.8 [150]
Duration of regeneration	[min.]	94
Resin volume	[l]	44
Salt consumption per regeneration, approx.	[kg]	6.2
Max. capacity of brine tank	[kg]	50
Total waste water volume per regeneration, approx.	[l]	150
Max. backwash capacity	[m ³ /h]	0.55
Performance data of gravel filter module		
Quartz gravel 3.0 – 5.6 I	[kg]	6
Quartz gravel 1.0 – 2.2 II	[kg]	22
Quartz gravel 0.4 – 0.8 III	[kg]	22
Backwash capacity	[m ³ /h]	2.0
Total waste water volume per backwash	[m ³]	0.61
Dimensions and weights		
A Total width	[mm]	990
B Total height	[mm]	1714
C Total depth	[mm]	765
D Height of foundation	[mm]	106
E Inlet connection from heating system	[mm]	263
F Waste water connection	[mm]	560
G Raw water connection	[mm]	1012
H Filtrate connection to heating system	[mm]	1237
I Distance waste water connection, raw water connection, filtrate connection to heating system	[mm]	113
J Distance inlet connection from heating system	[mm]	145
Weight on delivery	[kg]	266
Ambient data		
Max. water temperature	[°C]	80
Max. ambient temperature	[°C]	40
Order no.		707 500

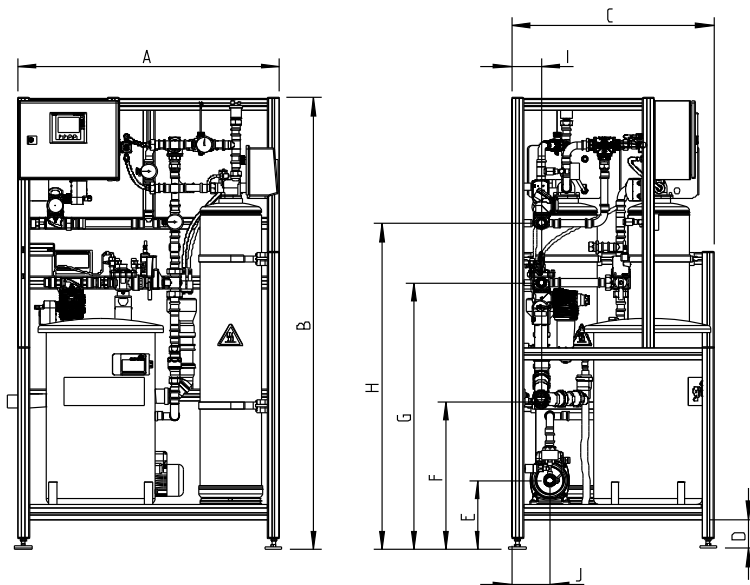


Fig. 2: Dimensional drawing of GENO-VARIO 3000