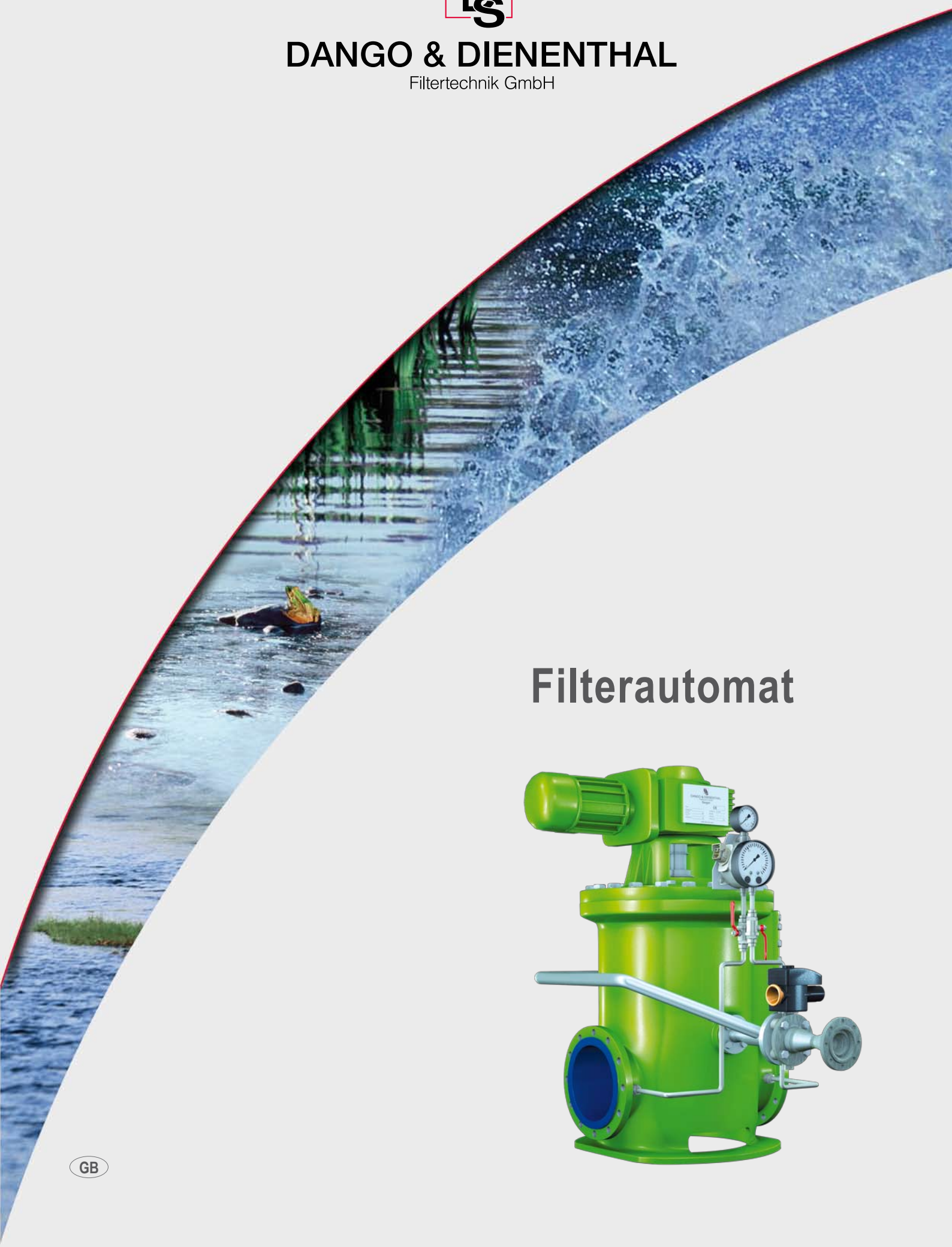
DANGO & DIENENTHAL
Filtertechnik GmbH



Filterautomat

GB

The Filterautomat

The New Definition of Purity for Your Medium

- Cooling Water
- River Water
- Sea Water
- Sinter and Scale Separation
- Emulsions
- Process Water
- Mussel / Mussel Larvae Separation

Our Filter Systems Protect


Plate Heat Exchangers


Spray Nozzles


Piping Systems


Mechanical Seals


Pumps


Micro Filtration

flow rate	5 m³/h to 4,000 m³/h
filter fineness	≥ 5 µm
operating pressure	0.8 to 63 bar
pressure loss with clean filter	0.1 to 0.3 bar
flange	DN 50 to DN 1,000
temperature	– 10 to + 110 °C
automatic backwash	✓

Scope of Delivery

Fig. 1

voltage 230 V or 400 V	•	
voltage 110 V to 690 V		Δ
Pressure Equipment Directive (PED)	•	
ASME		Δ
explosion protection		Δ
differential pressure gauging	•	
differential pressure as 4 - 20 mA-signal		Δ
automatic filter control	•	
self-medium backwash	•	
backwash with suction pump		Δ
electric or pneumatic backwash valve	•	
signal exchange with PLC	•	
electrical cabling incl. connectors	•	
documentation	•	
certificates	•	Δ
functional test at manufacturer's works	•	

included in the scope of delivery	•
available at extra charge	Δ

	standard design	sea water resistant design	special design
filter housing	grey-cast iron	nickel resist	steel, stainless steel
filter element	stainless steel	stainless steel	stainless steel

Fig. 2 filter system on skid incl. backwash pump

Fig. 3 river water filtration for cooling plant

Fig. 4 sealing water filtration in power plant

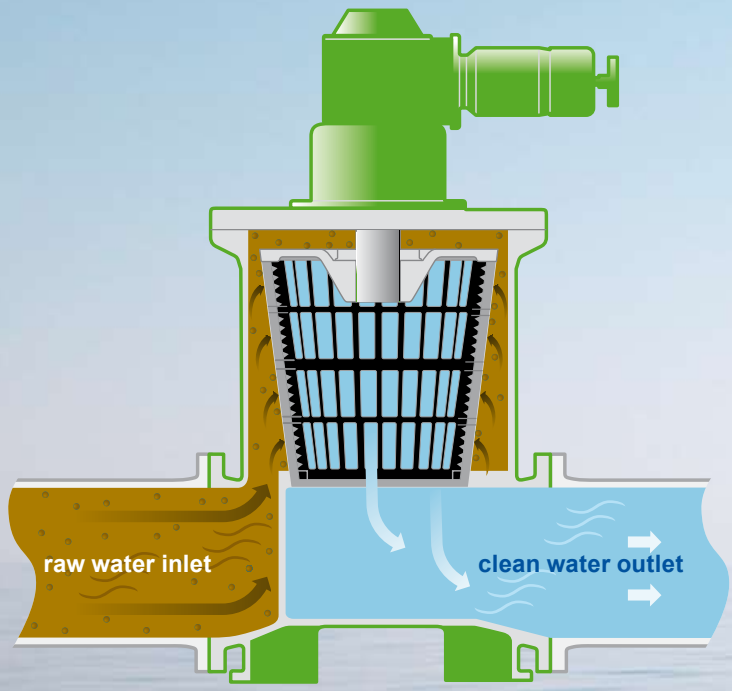


Fig. 5

Filtration Process

The raw water enters the filter through the raw water inlet and disperses in the outer ring of the housing. Then it flows upwards in the housing and penetrates the three-part filter drum from outside to inside.

The filter drum rotates with approx. 5 - 7 rpm for ensuring an even loading on the filter element. The impurities contained in the raw water are thus retained on the outside of the segment-like openings of the filter drum's outer part. The cleaned water leaves the filter through the clean water outlet.

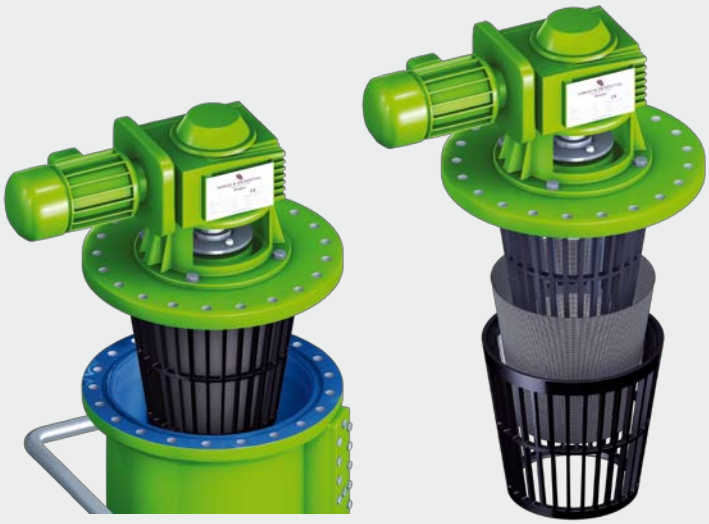


Fig.6

Filter Drum

The filter drum consists of two rigid supporting cages, one in another. The filter element is placed between these cages. Because of their conical construction all three parts can be precisely fixed and screwed together. For protection against corrosion the supporting cages are layered with a premium powder coating.

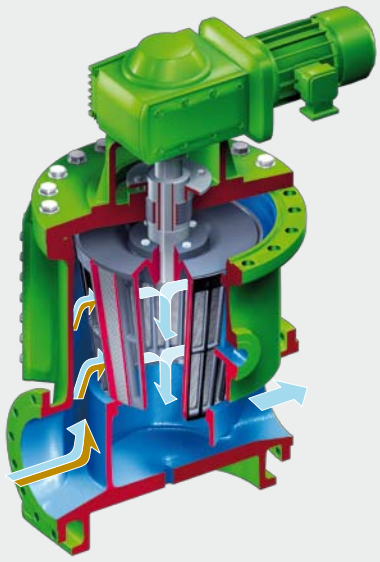


Fig. 7

Sectional View

During assembly the upper part of the filter is inserted in the housing. The lower part of the filter drum is centered by a ring surface in the filter housing.

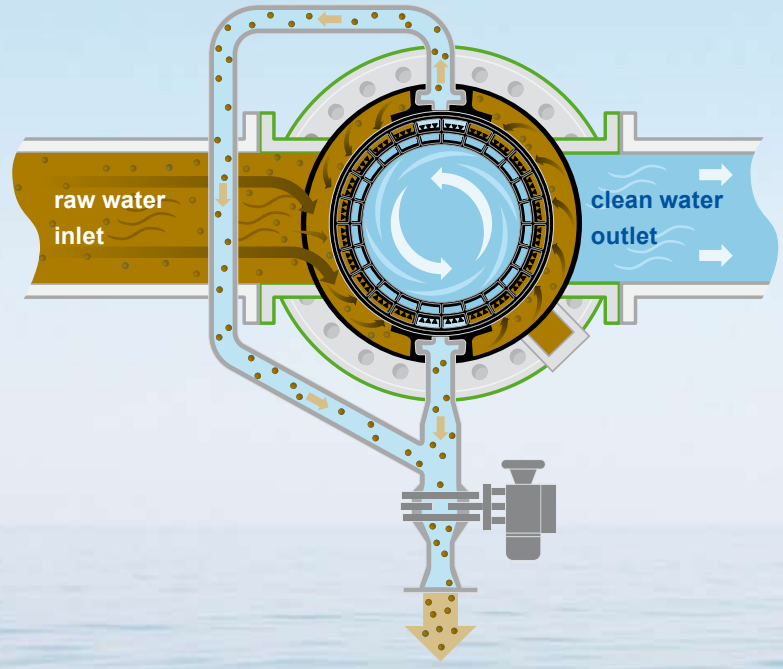


Fig.8

Backwash Process

The backwash process is triggered off by a defined differential pressure (pressure difference between raw and clean water side). Additionally an adjustable time lag relay in the electric control permits the start of the backwash process.

The filter cleaning starts off with the opening of the motor driven backwash valve. This leads to atmospheric pressure in the backwash pipe and the backwash canals in the filter housing. Due to the overpressure on the clean water side in the filter drum the solids retained on the filter element's outside are now compulsorily backwashed to atmosphere contrary to the filtration direction.

The rotating filter drum passing the backwash canals ensures a 100 % cleaning of the filter element. After 15 - 20 seconds the backwash process is finished and the backwash valve closes automatically.

During backwashing the filtration process is not interrupted.

Fig. 9

Filter Drum Segments

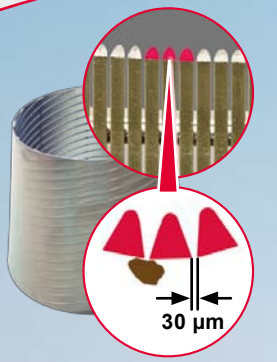
Even rougher parts can be retained in the segment-like openings of the filter drum's outer part. During backwashing these are then flushed out of the system.

Fig. 10

Filter Housing

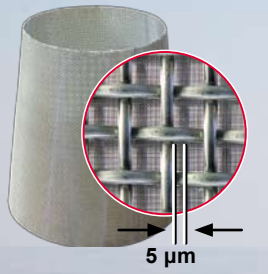
The filter housing is coated with a two-component epoxy resin as standard. Two backwash canals are situated on opposite sides of the filter housing. Their backwash ports are entirely closed off by seal surfaces, which prevent the raw water from entering the backwash canals during backwashing.

Filter Element



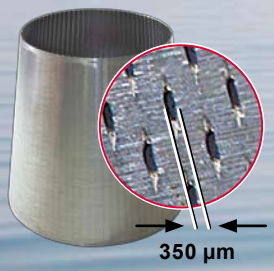
The Slotted Sieve

- on the basis of welded stainless steel triangular support rods
- very sturdy design
- manufacturable in different stainless steel qualities
- filter fineness ≥ 30 µm



The Wire-Cloth Screen

- the cloth is clamped in sandwich structure by two supports
- better utilization of the net filter area
- manufacturable in different stainless steel qualities
- filter fineness ≥ 5 µm



The Perforated Plate

- rolled perforated plate with staggered perforations
- manufacturable in different stainless steel qualities
- filter fineness ≥ 350 µm

Fig. 11

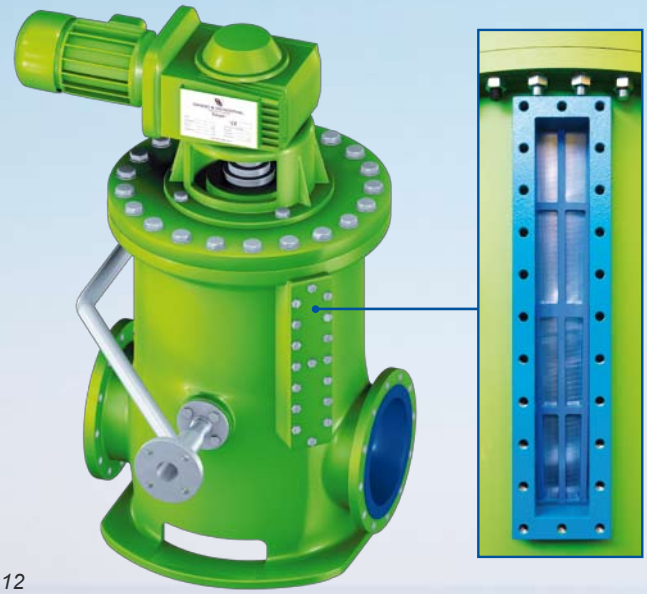


Fig. 12

Inspection Port

The filter housing's construction with an inspection port along the length of the whole filter element provides insight into the interior. Due to the slow rotation of the filter drum the complete filter element can be inspected.

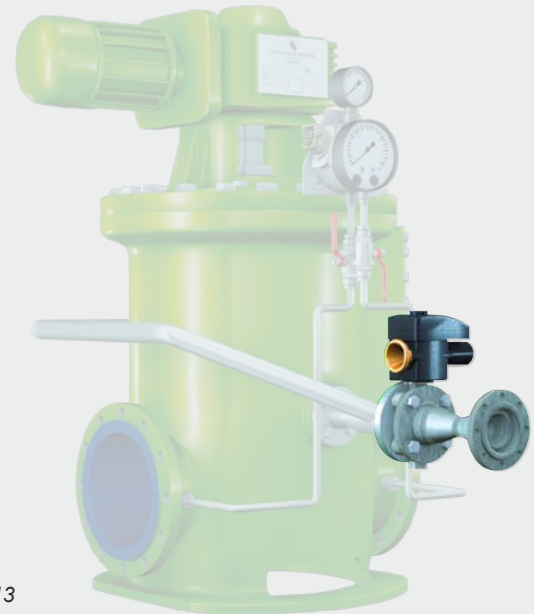


Fig. 13

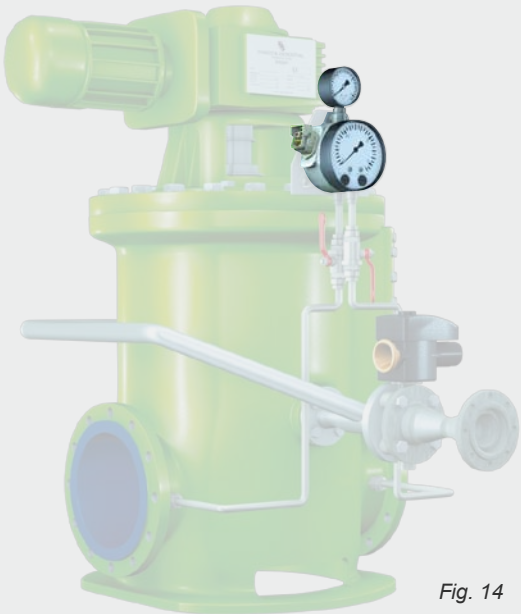


Fig. 14

Venturi Nozzle and Backwash Valve

The venturi nozzle is dimensioned according to the conditions at site for regulating the necessary backwash water amount and for avoiding pressure fluctuations in the piping system. As standard the backwash valve is equipped with an electric or a pneumatic drive.

Differential Pressure Gauging

Consisting of:

- optical inlet-pressure indicator
- optical indicator of the differential pressure
- 2 adjustable micro-switches
- start filter backwash
- alarm signal

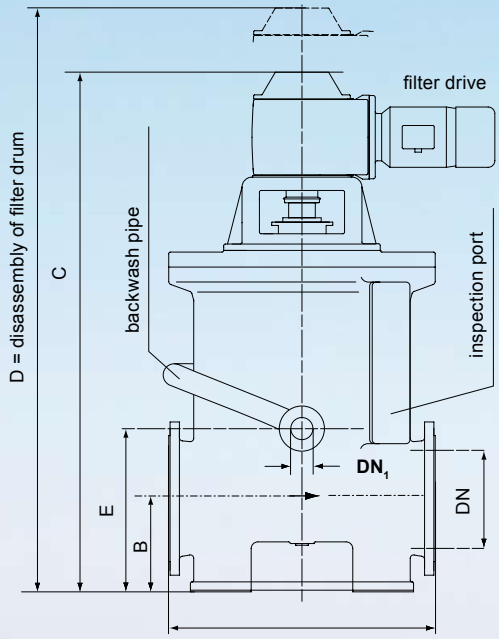


Fig. 15

Type	DN	dimensions						weight in kg	motor output in kW
		A	B	C	D	E	DN_1		
50-1	50	320	125	791	1020	192	32	160	0.37
80-1	80	400	150	879	1150	241	50	250	0.55
100-1	100	470	180	978	1300	275	50	320	0.55
150-1	150	530	225	1121	1470	362	50	450	0.75
200-1	200	600	225	1221	1670	381	50	500	0.75
250-1	250	660	240	1306	1800	416	80	660	0.75
300-1	300	800	280	1560	2320	475	80	1250	1.50
400-1	400	915	318	1805	2750	600	100	1800	1.50
500-1	500	1145	490	2040	3000	775	100	2770	1.50
600-1	600	1320	425	2610	4160	939	100	3600	1.50

Fig. 16

Filter Size Determination

The filter size depends on the flow rate, the choice of filter element, its fineness, the maximal admissible pressure loss, and the raw water's degree of contamination. The performance chart (fig. 18) shows the filter sizes as a function of the flow rate per hour and the related pressure loss.

The shown lines are valid for a filter fineness of 400 µm. For other finenesses please contact us. We will then quote an economical filter.

Fig. 17

Electric Control

The backwash process is started off depending on time and / or differential pressure thus ensuring a fully automatic filter operation.

The standard control includes the following signal exchanges with the customer's control system (PLC):

- collective fault indication
- ready for operation
- filter is backwashing
- external starting of the backwash process
- external release of the backwash process

Performance Chart

for 400 µm filter fineness

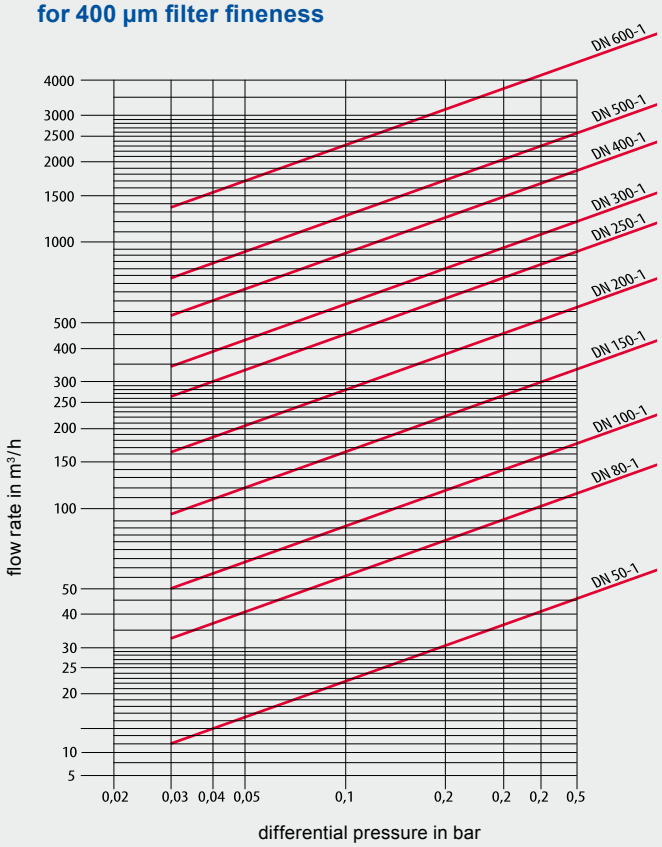


Fig. 18

Process Diagram

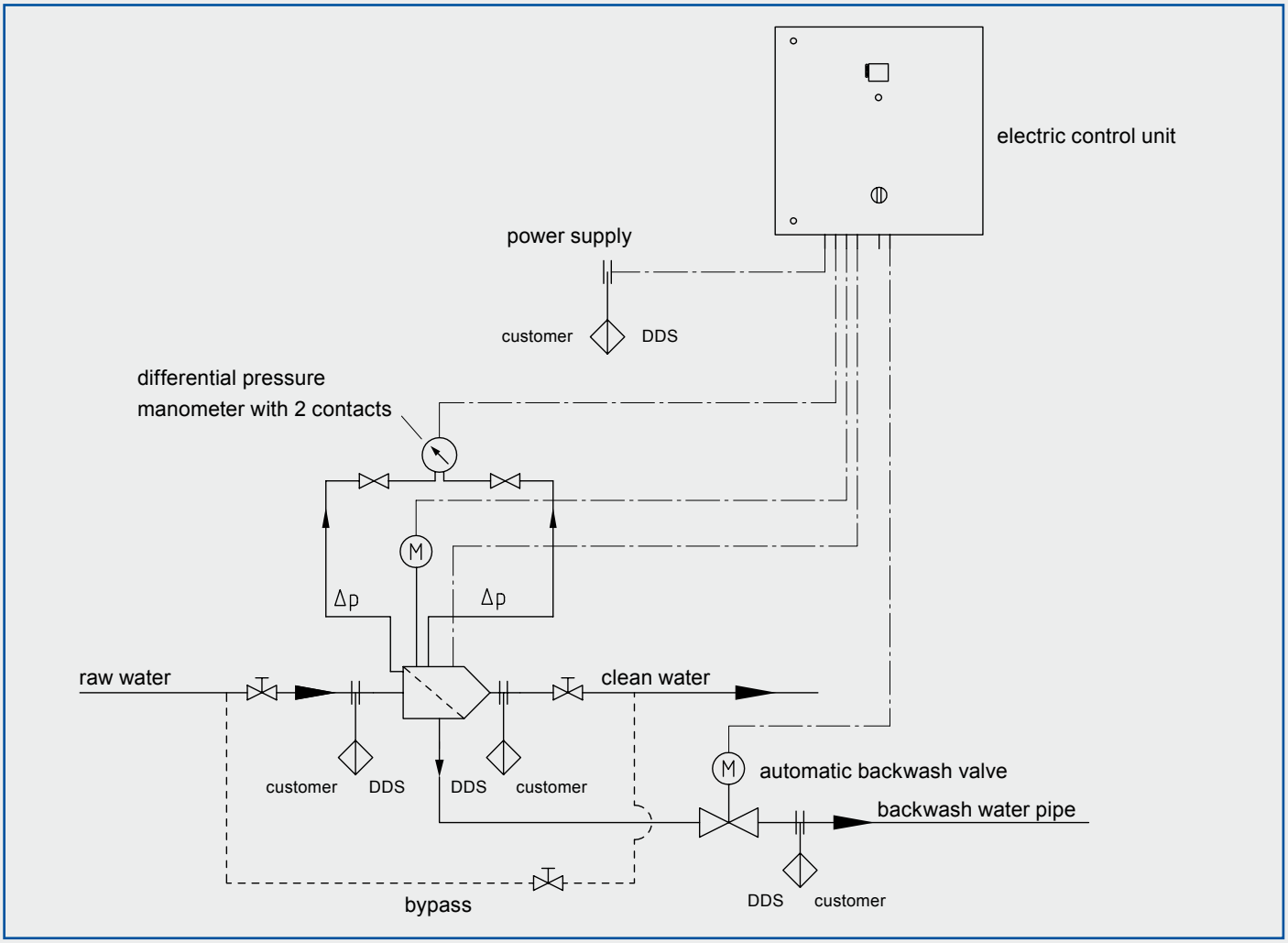
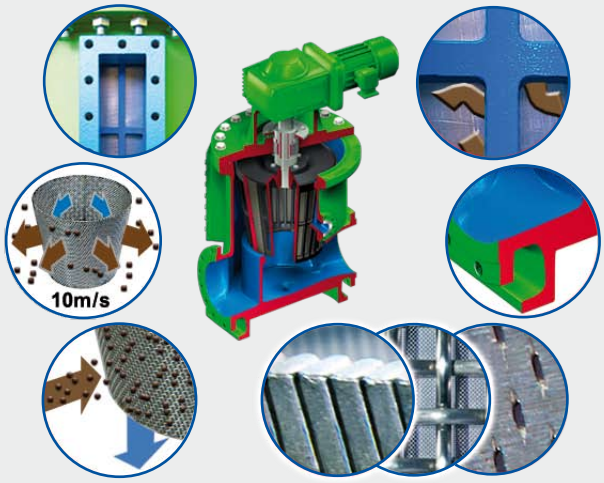


Fig. 19



Advantages

- high backwash speed (up to 4 - 10m/s)
- 100 % cleaning of the whole filter surface
- small water loss for backwashing
- robust construction
- crushing of coarse particles
- fine filtration ≥ 5 µm possible
- constant charging of the whole filter surface
- insert of slotted sieve, wire-cloth screen or perforated plate
- easy to maintain because of the inspection port
- inline construction
- tested unit with ready-made cabling

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