

## Automatic filter AF 133 G

with external pressure cleaning  
Connection sizes: G2, screw-in flange DN 50 and DN 65, cast design

### 1. Features

MAHLE automatic backflush filters are suitable for all applications where low-viscosity liquids have to be filtered.

These compact, inline filter systems are designed for automatic cleaning. The system is cleaned by rotating the filter cartridge and backflushing with external or internal pressure media.

#### Advantages:

- Low lifecycle costs because no filter material is consumed
- Precise separation quality in accordance with the surface filter principle
- Top-quality, asymmetric filter medium made of multiple-sintered stainless steel fleece on a robust inner core
- Efficient filter cleaning assures maximum process stability
- Solid construction and high-quality materials for a long service life
- Filter cleaned one segment at a time with a high backflush pulse
- Actual filter rating and nominal separation are indicated
- Integrated preseparation thanks to tangential inflow
- Material options open up a wide range of applications
- Modular MAHLE Vario system for optimum filter selection
- Optional: Gas-tight shaft seals available
- Optional: Application in Ex zone 1 and 2
- Easy maintenance
- Worldwide distribution



## 2. Operating principle

The MAHLE AF 133 G backflush filter belongs to the Vario series. The compact MAHLE automatic filter system is used for fine filtration of a variety of lowviscosity liquids.

This inline pressure filter consumes no filter material, which means there is also no need for subsequent disposal. The filter can only be cleaned after switching off the system.

The medium to be cleaned is guided into the filter housing under pressure. It flows inward through the MAHLE segmented element. Particles settle on the surface of the filter medium. Due to the unique design also coarse particles can be backflushed. The filtered fluid exits the filter housing at the top opposite the inlet connection.

The filter is cleaned when a preset differential pressure limit, a set interval or a defined filtered fluid quantity is reached.

The segmented element is turned as the drain and external pressure valves are opened. The segments are then guided one at a time past the pressure channel housing on the inside. This causes them to open and close alternately. The integrated external pressure accumulator is pretensioned during closing, so that when one segment opens, an outward surge cleans the separated particles from the filter material. The particles are catapulted out as a result of this pulse cleaning principle and discharged via the drain valve. One turn suffices to clean all segments.

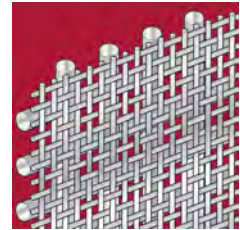
All filters in the MAHLE Vario series are protected by various patents.

### Used MAHLE filter cartridges in the AF 133 G backflush filter:

#### MAHLE Topmesh

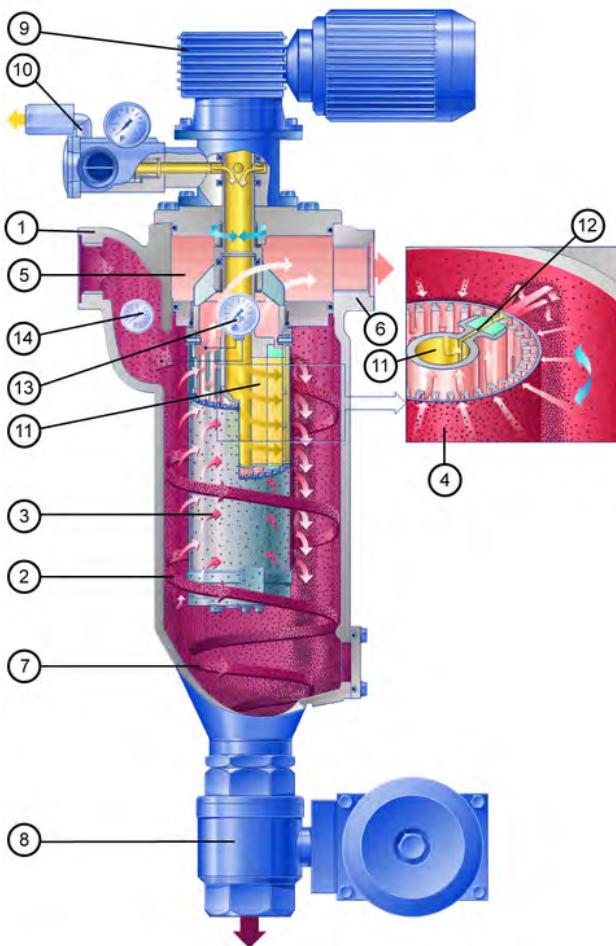
##### (Standard):

- Good cleanability due to asymmetric design
- Large effective filter surface
- Defined particle retention
- Several material combinations possible



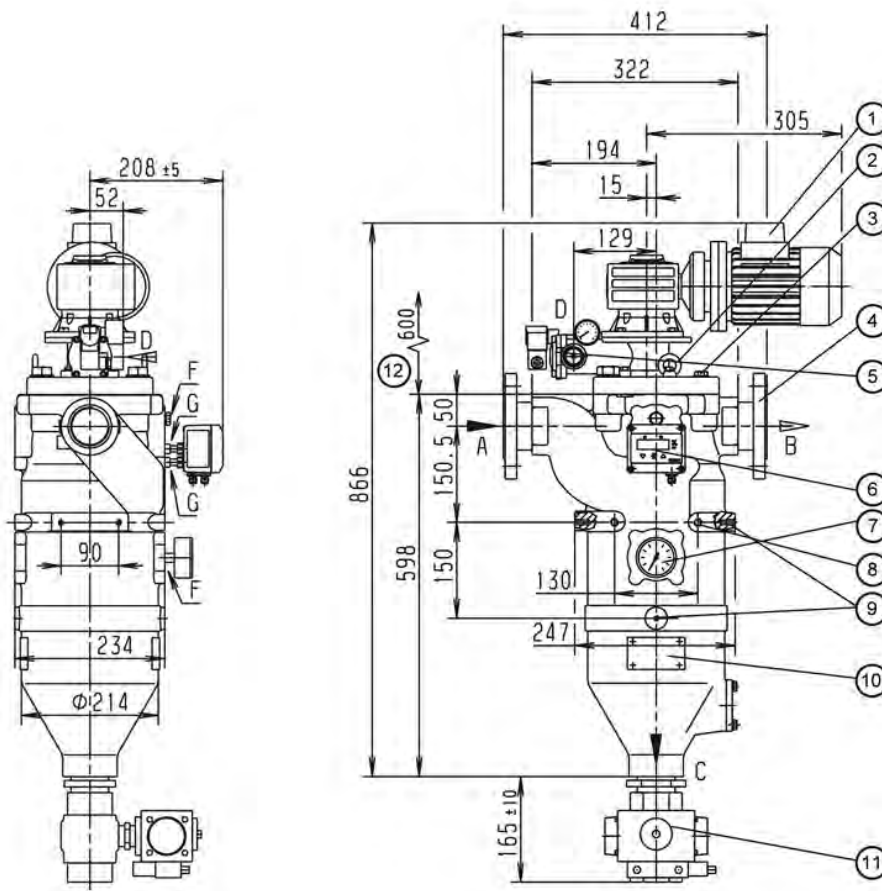
#### MAHLE notched wire cartridges:

- High differential pressure stability
- High wear resistance in extreme applications
- Good backflush properties
- Several material combinations possible



- 1 Tangential inlet connection
- 2 Inlet plenum
- 3 MAHLE segmented element
- 4 MAHLE filter material
- 5 Plenum for filtered fluid
- 6 Outlet connection for filtered fluid
- 7 Residue collection cone
- 8 Drain valve
- 9 Drive motor
- 10 External pressure connection, external pressure and check valves and gauge  $P_1$
- 11 External pressure accumulator
- 12 External pressure nozzle
- 13 Differential pressure contact gauge
- 14  $P_1$  gauge

### 3. Technische Daten



- 1 Cleaning drive: can be mounted turned 90°, 180° or 270°
- 2 Lifting eyebolts
- 3 Vent screw G1/4
- 4 If DN 65 screw-in flanges are used, the motor is mounted turned 90°
- 5 External pressure valve
- 6 Optional: Differential pressure indicator/switch
- 7 Optional: P1 gauge
- 8 Mounting holes M12
- 9 Mounting holes M8
- 10 Name-plate
- 11 Optional: Automatic drain valve
- 12 Clearance required = 600 mm

#### Filter data

Max. operating pressure: 16 bar  
 Max. operating temperature: 100 °C

- Materials:
- Housing and cover: Nodular cast iron
  - Internals: Nodular cast iron, steel
  - Bearing bushes: PTFE based
  - Seals: FPM (Viton)
  - Segmented element: 1.4571 or 1.4571/Al ( $\Delta p$  max. 10 bar)
- Cover fastening: 4 x M20 hexagon screws
- Optional: Ex protection acc. to ATEX 94/9/EC:
- Electrical components in Ex II 2G T3
  - Mechanical design in Ex II 2G c T3
- Connections and nominal diameters:
- A-inlet, B-outlet, C-drain: G2
  - D-external pressure: G1 (air: must be reduced to G1/2 by the customer)
  - F-gauge: G1/4
  - G-indicator: G1/8
  - All threaded holes acc. to DIN 3852 form X
  - Optional: A/B/C screw-in flanges DN 50 or DN 65 acc. to EN 1092-1/05A
- Drive shaft seal: Lip seal with O-ring
- Outside coating: Synthetic resin primer, blue acc. to RAL 5007

#### Motor data

Worm gear motor  
 Multi-range winding

V	Hz	kW	rpm	A
$\Delta$ 230 $\pm$ 10%	50	0.18	9.3	1.2
$\lambda$ 400 $\pm$ 10%	50	0.18	9.3	0.7
$\Delta$ 266 $\pm$ 10%	60	0.22	11.2	1.1
$\lambda$ 460 $\pm$ 10%	60	0.22	11.2	0.7

Protection class: IP55; insulation class F; output torque: 97Nm

Optional:  
 Worm gear motor Ex  
 Ex II 2G T3, output torque: 97 Nm

Weight: 92 kg  
 Volume: 12 l

#### Differential pressure stability

Segmented elements with topmesh or stainless steel media: 10 bar  
 Segmented elements with V-profiled, notched wire winding: 25 bar

**Other types available on request!**

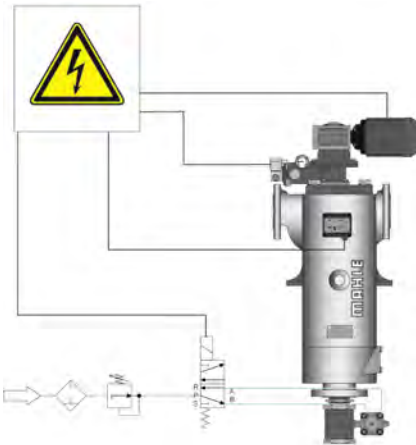
**Technical data is subject to change without notice**

## 4. Design and application

Cartridge type (see section 6)	Total surface in in cm <sup>2</sup>	Filter rating in $\mu\text{m}$ / effective filter surface in cm <sup>2</sup>								
		5	10	20	30	40	60	80	100	200
AF 170XX6	763		637	637	637	637	637	637	637	637
	Effective filter surface in %		6	32	39	40	40	43	45	48
	Effective filter surface in cm <sup>2</sup>		38	204	248	255	255	274	286	306

Recommended design

### Possible cleaning and emptying modes



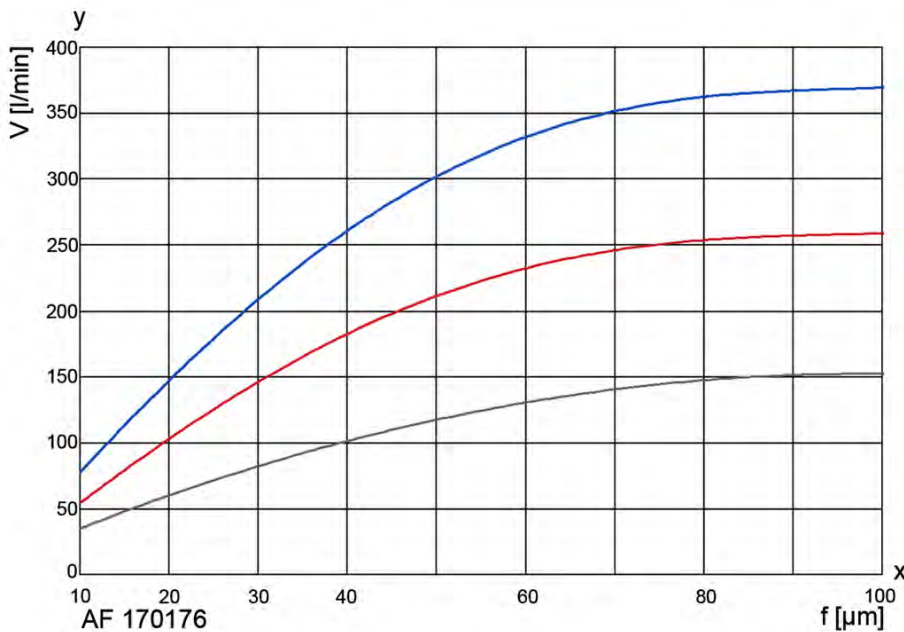
#### Fully automatic operation:

Filtration usually takes place under pressure. The filter is cleaned after a programmed time or a preset number of cycles or according to the differential pressure. We recommend cleaning the system at a differential pressure of approximately 0.5 to 0.7 bar. The cleaning motor is operated for around 7 s (about one turn of the filter cartridge). The external pressure and cleaning valves remain open for this period. This suffices to clean the filter thoroughly.

Refer to the Instruction Manual for further information.

MAHLE's team of specialists will be pleased to assist in any way. Tests can be carried out in the absence of reliable evaluation criteria.

## 5. Efficiency curves



The curves indicate the volume flow through the complete filter system (filter housing including cartridge) and are referred to a differential pressure of 0.3 bar. Specific process information is essential to guarantee reliable operation of an automatic filter.

Viscosity in mm<sup>2</sup>/s

- 1 mm<sup>2</sup>/s
- 33 mm<sup>2</sup>/s
- 100 mm<sup>2</sup>/s

y = Volume flow V [l/min]  
x = Gap width f [μm]

## 6. Type number key

### Type number key with selection example for AF 13363-1321-43200/G3

#### Size

AF 1336 1 x 110x265 No. of steps x diameter x length [mm]

#### Cleaning drive

- 3 Gear motor 230/400 V, 50 Hz or 266/460 V, 60 Hz
- 4 Gear motor 230/400 V, 50 Hz Ex II 2G T3

#### Inlet and outlet connections

- 3 DN 50 for cast stainless steel
- 13 G2
- 14 Screw-in flange DN 50 for cast design
- 15 Screw-in flange DN 65 for cast design
- 18 G2 1/2

#### Permissible operating pressure in bar (housing/cover)

- 1 PN 10
- 2 PN 16

#### Material Seal FPM, bearing PTFE

- 1 Housing and cover nodular cast iron, internals steel, aluminium
- 3 Housing and cover nodular cast iron, internals stainless steel 1.4301/1.4571

#### Differential pressure indicator and gauge

- 1 PiS 3076, switching level at 1.2 bar, static 63 bar, aluminium/FPM
- 2 PiS 3076, switching level at 0.7 bar, static 63 bar, aluminium/FPM
- 4 PiS 3170, digital  $\Delta p$  gauge, 2 switching levels settable from 0 to 16 bar
- 5 PiS 3175, digital  $\Delta p$  gauge, 2 pressure transmitters settable from 0 to 16 bar

#### Valves and control throttles

- 3 External pressure valve G1 for liquid, 24 V
- 4 External pressure valve G1 for liquid, 230 V

#### Drain valve

- 2 Ball valve, electropneumatic 24 V
- 3 Ball valve, electropneumatic 230 V
- 4 Ball valve, electric 24 V
- 5 Ball valve, electric 230 V

#### Cleaning valve

- 0 Without/special version

#### Optional features

- 0 Without/special version

AF 1336 3 - 13 2 1 -4 3 2 0 0 -XXXX (end number for special version)/G3

End number	Special version
3001	Standard complete inner assembly, without housing or drive
3002	Standard complete inner assembly, without housing, with drive
3700	PTFE seals
Other numbers	On request

Type number key with selection example for coiled or welded cartridges for AF 170, 140

Series						/E1
AF 170	Segmented element with topmesh					
AF 140	Segmented element with V-profiled, notched wire winding					
Material	Inner core	Filter medium	Clamp rings	Wire width in mm		
<b>Segmented element</b>						
17	Al	1.4571	St	-		
20	Hard coated Al	1.4571	1.4571	-		
21	1.4571	1.4571	1.4571	-		
<b>Overall length</b> Diameter x length in mm						
6	110 x 265					
<b>Gap width/rating in µm (see 4. Design and application)</b>						
001	10 µm	004	40 µm	010	100 µm	
002	20 µm	006	60 µm	016	160 µm	
003	30 µm	008	80 µm	025	250 µm	
Other filter ratings on request						
AF 170	17	6	-006			/E1

### 7. Spare parts

No.	Designation	Material no.	
		FPM/C steel	PTFE/VA
1	Bush kit		70311579
2	Seal kit (complete)	70316111	70316118
3	Pressure channel moulding		76120810
4	Filter cartridge	See name-plate	

Please contact us for detailed technical information, any open questions about options, accessories and for general expert advice. Completion of the relevant questionnaire would facilitate in the coordination of all important parameters.

Comprehensive documentation on our filter range, filter elements and accessories can be provided. About installation and operation, please refer to the Instruction Manual.