

Automatic filter AF 113 G

Cast design with internal pressure cleaning and integrated cyclone effect
Connection sizes: G2, screw in flange DN 50 and DN 65

1. Short description

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 cartridge and back-flushing with internal pressure media.

Advantages:

- Low lifecycle costs because no filter material is consumed
- Cleaning is possible without interrupting filtration
- Precise separation quality in accordance with the surface filter principle
- Top-quality, asymmetric filter medium made of multiple-sintered stainless steel fleece on a rugged core element
- Efficient filter cleaning assures maximum process stability
- Solid construction and high-quality materials for a long service life
- Minimal liquid loss during cleaning
- Filter cleaned one segment at a time with a high backflush pulse
- Actual filter rating and nominal separation are indicated
- Integrated preseparator thanks to tangential inflow and preseparator tube
- Material variants open up a wide range of applications
- MAHLE modular Vario system for optimum filter selection
- Easy maintenance
- Worldwide distribution



2. Operating principle

The MAHLE AF 113 G backflush filter belongs to the Vario series. The compact MAHLE automatic filter system is used for fine and micro-filtration of a variety of low-viscosity liquids.

This inline pressure filter consumes no filter material, which means there is also no need for subsequent disposal. The filter is cleaned without interrupting operation. The concentrated solids are drained off simply by opening the system for a short time.

The medium to be cleaned is guided into the filter housing under pressure and flows inward through the MAHLE segmented element. Particles settle on the surface of the filter medium. The filtered fluid exits the filter housing at the top opposite the inlet connection.

The integrated preseparator relieves the load on the segmented element, particularly from coarse and heavy particles. This is achieved by a tangential flow around the preseparator tube and the deflection edges.

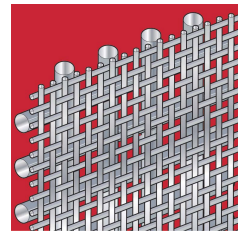
The filter is cleaned when a preset differential pressure limit, a set interval or a defined filtered fluid quantity is reached. The segmented element is turned as the cleaning and external pressure valves are opened. The segments are then guided one at a time past the flushing channel on the outer circumference, causing them to open and close alternately. The internal pressure is built up at a throttling point downstream of the filter, so that when one segment opens, an outward surge cleans the separated particles from the filter material. As a result of this pulse cleaning principle, the particles are catapulted out, collected in the flushing channel and discharged with a small amount of internal medium. One turn suffices to clean all segments. The residue that has settled in the collection cone can be emptied via the drain valve either when the machine is at a standstill or during filtration.

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

The AF 113 G backflush filter can be used with either topmesh or notched wire cartridges:

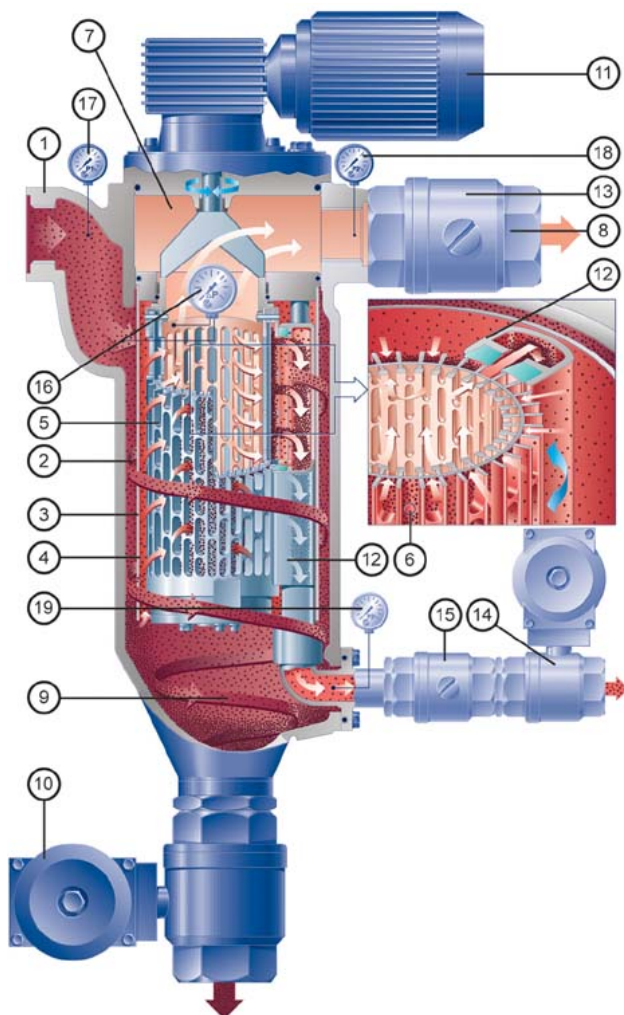
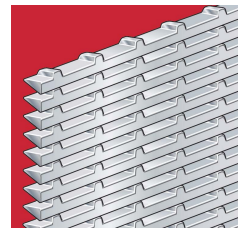
MAHLE topmesh cartridges (standard):

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



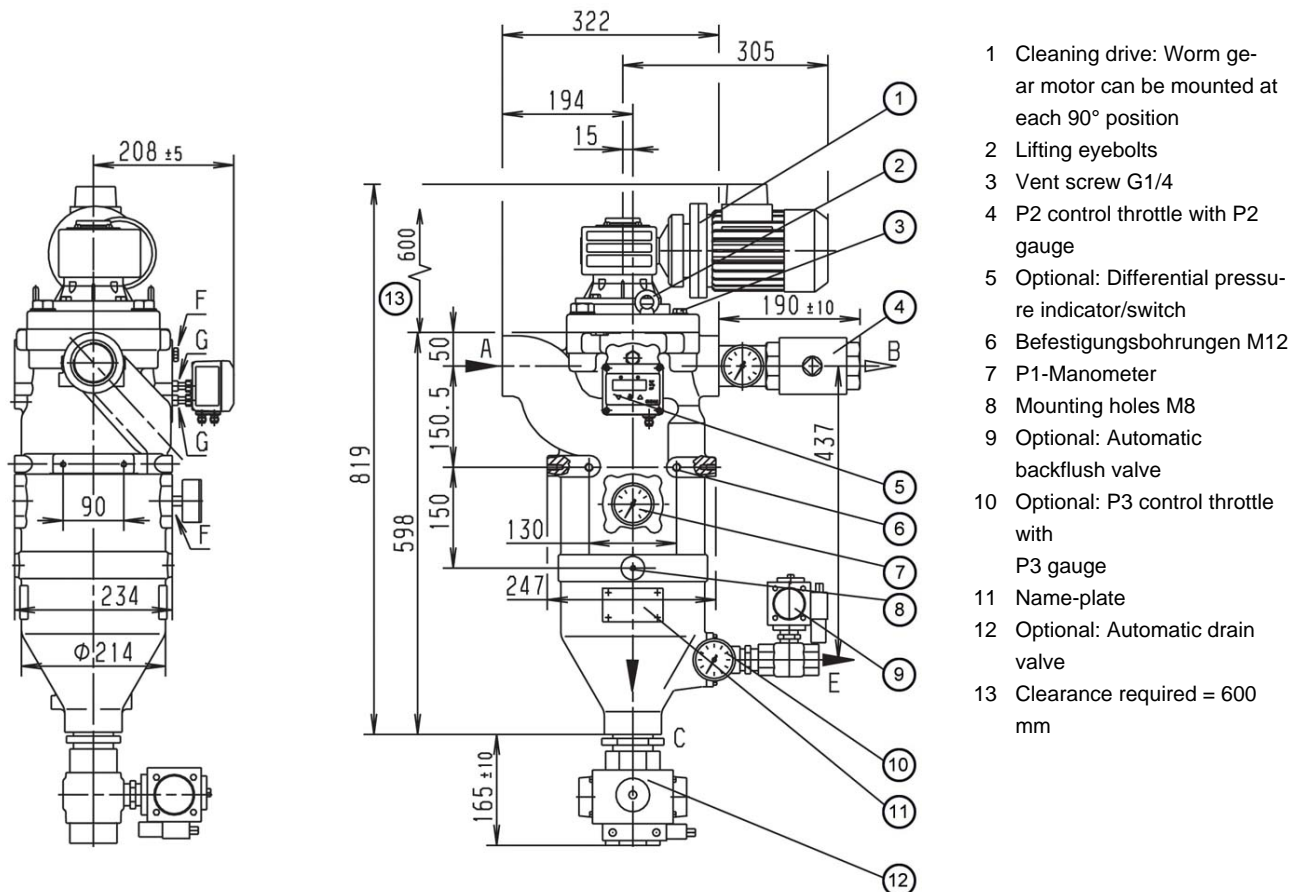
MAHLE notched wire cartridges:

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



- 1 Inlet connection
- 2 Outer inlet plenum
- 3 Preseparator tube
- 4 Inner inlet plenum
- 5 MAHLE segment cartridge
- 6 MAHLE filter materials
- 7 Plenum for filtered fluid
- 8 Drain connection for filtered fluid
- 9 Residue collection cone
- 10 Drain valve
- 11 Drive motor
- 12 Flushing channel
- 13 P2-control throttle
- 14 Cleaning valve
- 15 P3-control throttle (not always required)
- 16 Differential pressure contact gauge
- 17 P1-gauge
- 18 P2-gauge
- 19 P3-gauge (not always required)

3. Technical data



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 (Δp max. 10 bar)
- 4 x M20 hexagon screws

Cover lock:

Optional: Ex protection acc. to ATEX 94/9/EG:

Connections and nominal diameters:

- Electr. components in Ex II 2G T3
- Mech. components in Ex II 2G c T3
- A-inlet, B-outlet, C-drain: G2
- E-backflush: G1
- F-gauge: G1/4
- G-indicator: G1/8
- All threaded holes acc. to DIN 3852 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

External finish: Synthetic resin primer, blue acc. to RAL 5007

Motor data

Worm gear motor
Multi-range winding

V	Hz	kW	U/min	A
Δ 230 ± 10%	50	0.18	9.3	1.2
λ 400 ± 10%	50	0.18	9.3	0.7
Δ 266 ± 10%	60	0.22	11.2	1.1
λ 460 ± 10%	60	0.22	11.2	0.7

Protection class: IP55; insulation class F; output torque: 52 Nm

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

Weigh: 85 kg

Volume: 12 l

Differential pressure resistance

Segmented cartridge with topmesh or stainless steel fleece: 10 bar
Segmented cartridge with triangular notched wire winding: 25 bar

Other versions available on request!

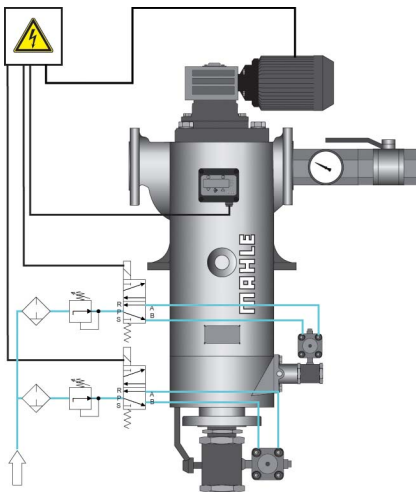
Technical data is subject to change without notice.

4. Design and application

Cartridge type (see section 6)	Total surface in cm ²	Filter rating in µm/ effective filter surface in cm ²								
		5	10	20	30	40	60	80	100	200
AF 100XX6	763		637	637	637	637	637	637	637	637
AF 120XX6	Effect. filter surface %		6	32	39	40	40	43	45	48
	Effect. filter surface cm ²		38	204	248	255	255	274	286	306

Recommended design

Cleaning and discharge modes



Fully automatic operation:

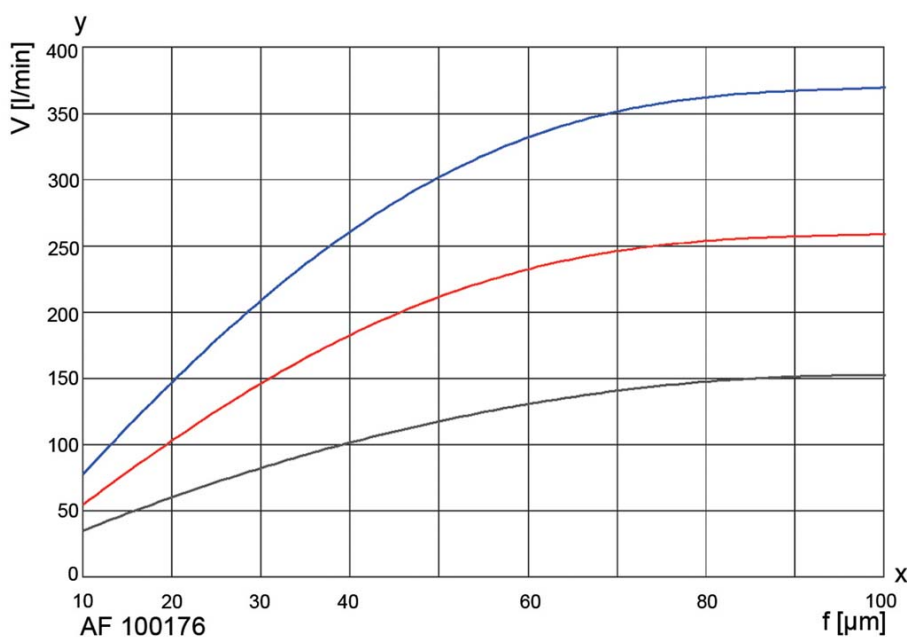
Filtration usually takes place under pressure. The filter is cleaned after a programmed time or a preset number of cycles or according to the differential pressure. We recommend cleaning the system at a differential pressure of approximately 0.5 - 0.7 bar. The cleaning motor is operated for around 7 s (about one turn of the cartridge). The cleaning valve remains open for this period. An internal pressure of 2 - 3 bar is adequate to clean the filter efficiently.

The drain valve is opened in order to discharge the filter. Depending on the residue concentration, this can either take place directly after cleaning or be time or cycle controlled. The opening time of the drain valve is 2 - 3 s.

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. Performance 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

- 1 mm²/s
- 33 mm²/s
- 100 mm²/s

y = Volume flow V [l/min]

x = Filter rating f [µm]

6. Type number key

Type number key with selection example for AF 11363-1321-41220 /G3

Size

AF 1136 1 x 110x265 No. of steps x diameter x length [mm]

Cleaning drive

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

Inlet and outlet connections

- 3 DN 50
- 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, PU, bearing PTFE

- 1 Cover and housing nodular cast iron, internals steel, aluminium
- 3 Cover and housing 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
- 3 PIS 3160, digital Δp gauge, 2 switching levels settable from 0 to 6 bar
- 4 PIS 3160, digital Δp gauge, 2 switching levels settable from 0 to 1.6 bar
- 5 PIS 3165, digital Δp gauge, 2 pressure transmitters settable from 0 to 6 bar

Valves and control throttles

- 1 P2 control throttle with P2 gauge
- 6 Like 1 but with P3 control throttle and P3 gauge

Drain valve

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

Cleaning valve

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

Optional features

- 0 Without / special version

AF 1136 3 - 13 2 1 -4 1 2 2 0 -XXXX (end number for special version) /G3

End number	Special version
3001	Standard filter insert (complete), without housing or drive
3002	Standard filter insert (complete), without housing, with drive
3700	PTFE seals
Other numbers	On request

Type number key with selection example for cartridges for AF 100, 120

Series

AF 100 Segmented cartridge with topmesh (5 µm to 100 µm)

AF 120 Segmented cartridge with triangular notched wire winding (60 µm to 250 µm)

Material	Core element	Filter medium	Clamp rings	Wire width in mm
Segmented cartridge				
17	Al	1.4571	St	-
20	Hardcoted Al	1.4571	1.4571	-
21	1.4571	1.4571	1.4571	-

Overall length Diameter x length in mm

6 110 x 265

Gap width / rating in µm

		003	30 µm	010	100 µm
0005	5 µm	004	40 µm	013	130 µm
001	10 µm	006	60 µm	016	160 µm
002	20 µm	008	80 µm	025	250 µm

Other filter ratings on request

AF 100 **17** **6** **- 006**

For the correct choice of the filter fineness please consult the table on page 4.

7. Spare parts

No.	Designation	Material no.	
		FPM/C steel	PTFE/VA
1	Bush kit		70308169
2	Set of seals (complete)	70316068	70316071
3	Backflush channel moulding	79744004	70312375
4	Cartridge	see name-plate	

MAHLE Filtersysteme GmbH
 Industriefiltration
 Schleifbachweg 45
 D-74613 Öhringen
 Phone +49 (0) 7941/67-0
 Fax +49 (0) 7941/67-23429
 industriefiltration@mahle.com
 www.mahle-industriefiltration.com
 79799073.03/2008