

Automatic metal-edge filter AF 73 G / AF 93 G

with radial scraper cleaning
Connection size G2, flange DN 50, cast stainless steel

1. Features

MAHLE automatic metal-edge filters are suitable for all applications where low or high-viscosity liquids or pastes have to be filtered and homogenised.

These compact, inline filter systems are designed for automatic cleaning. The system is cleaned by rotating the filter cartridge against a spring actuated scraper. The AF 93 G version also has integrated preseparation.

Advantages:

- Low lifecycle costs because no filter material is consumed
- Cleaning is possible without interrupting filtration
- Precise separation quality in accordance with the metal-edge principle
- Sturdy filter cartridge made of triangular stainless steel wire on a rugged core element
- Efficient filter cleaning assures maximum process stability
- Solid construction and high-quality materials for a long service life
- Modular system for optimum filter selection (small Vario series)
- Modular MAHLE Vario system for optimum filter selection
- Material variants open up a wide range of applications
- Easy maintenance
- Worldwide distribution



2. Operating principle

The MAHLE AF 73 G and AF 93 G metal-edge filters belong to the small Vario series. The MAHLE metal-edge filter system is used to filter and homogenise a wide range of liquids and pastes.

This compact, inline filter system consumes no filter material, which means there is also no need for subsequent disposal. The filter is cleaned either automatically or semi-automatically 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 or in suction mode. It flows inward through the MAHLE filter cartridge. The solids are separated on the surface of the triangular filter cartridge wires. The filtered fluid exits the filter housing at the top opposite the inlet connection.

In the AF 93 G version, the tangential flow around the tube of the integrated preseparator relieves the load on the filter cartridge from coarse and heavy particles.

The filter is cleaned either when a preset differential pressure limit is reached or after a specified cycle time elapses. The MAHLE filter cartridge is rotated against a spring actuated scraper for this purpose. The special gap geometry of the filter cartridge guarantees efficient cleaning.

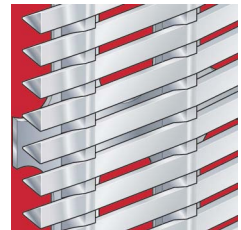
The particles or agglomerates are skimmed from the surface and settle in the collection cone. The patented filter cartridge bearing (AKF system) prevents high axial forces and facilitates the cleaning process.

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.

The AF 73 G and AF 93 G metal-edge filters can be used with either coiled or welded cartridges:

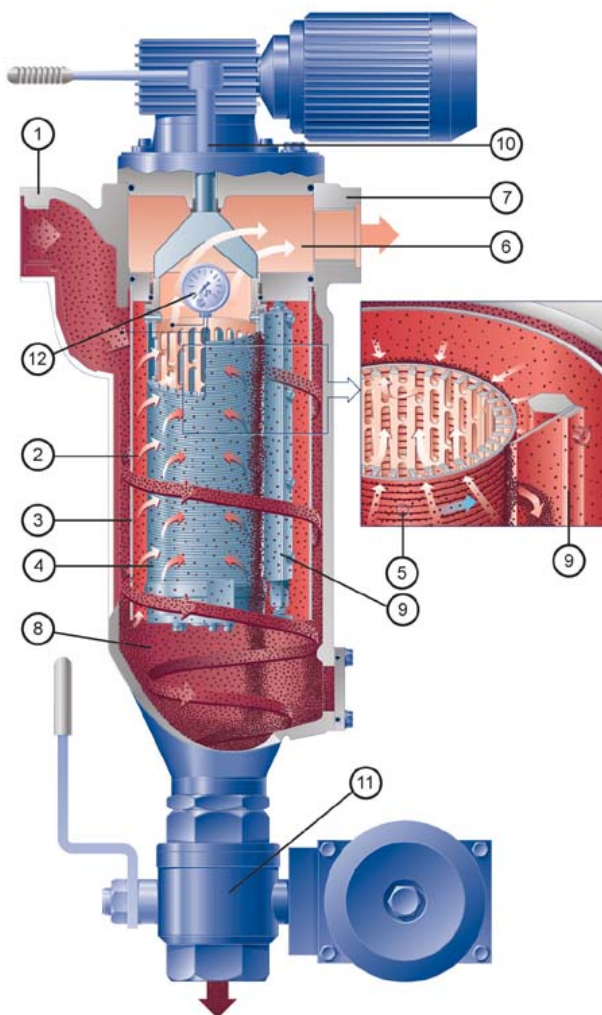
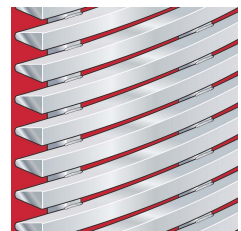
MAHLE coiled cartridge (standard):

- Optimum cleaning by means of sharp-edged triangular wire
- Large effective filter surface
- Small, precise gap widths
- High differential pressure stability and torsional strength
- Several material combinations possible



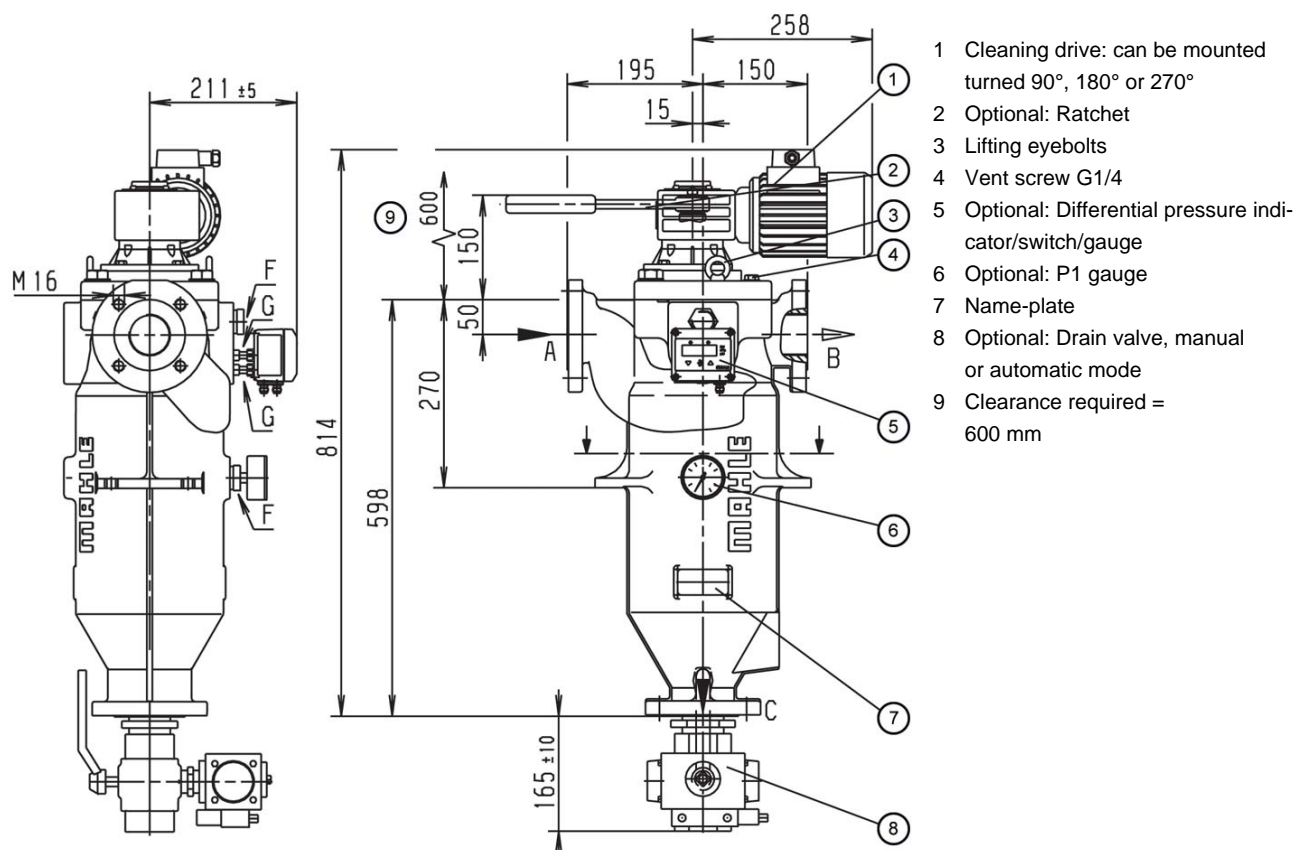
MAHLE welded cartridge

- High wear resistance to abrasive media
- Sturdy trapezoidal wire for high-viscosity media
- Welded design
- Manufactured in stainless steel



- 1 Tangential inlet connection
- 2 Inlet plenum
- 3 Preseparator tube for AF 93
- 4 MAHLE filter cartridge
- 5 Triangular wire winding
- 6 Plenum for filtered fluid
- 7 Outlet connection
- 8 Particle collection cone
- 9 Scraper
- 10 Cleaning drive with gear motor or hand ratchet
- 11 Drain valve (automatic or manual)
- 12 Differential pressure indicator/switch

3. Technical data



Filter data

Max. operating pressure: 16 bar

Max. operating temperature: 100 °C

Materials:

- Housing and cover: Nodular cast iron 1.4581
- Option: certificate acc. to EN 10204-3.1
- Internals: Nodular cast iron 1.4581, stainless steel 1.4571
- Bearing bushes: PTFE based
- Seals: FPM (Viton)
- Coiled cartridge: 1.4571 or 1.4571/Al (Δp max. 30 bar)
- Welded cartridge: 1.4571 (Δp 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 - DN 50
- F-gauge: G1
- G-indicator: G1/8
- All threaded holes acc. to DIN 3852 X
- Flanges DIN 2635

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 |
|-------------|----|------|-----|-----|
| Δ 230 ± 10% | 50 | 0.18 | 17 | 1.2 |
| λ 400 ± 10% | 50 | 0.18 | 17 | 0.7 |
| Δ 266 ± 10% | 60 | 0.22 | 21 | 1.1 |
| λ 460 ± 10% | 60 | 0.22 | 21 | 0.7 |

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

Worm gear motor Ex
Ex II 2G T3; output torque: 52 Nm

Weight: 73 kg (with ratchet) or 82 kg (with motor)
Volume: 12 l

Differential pressure stability:

Coiled cartridge: 30 bar (AF 73 G) or 40 bar (AF 93 G)
Welded cartridge: 10 bar

Other types available on request!

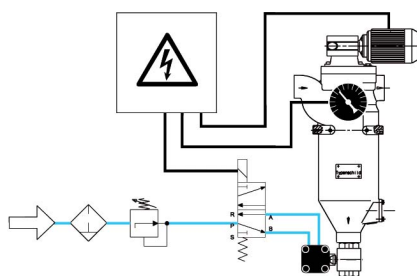
Technical data is subject to change without notice

4. Design and application

| Cartridge type (see section 6) | Total sur- face in cm ² | Gap width in μm / effective filter surface in cm ² | | | | | | | | | | | | | | |
|-----------------------------------|---------------------------------------|---|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| | | 30 | 40 | 50 | 60 | 80 | 100 | 130 | 160 | 200 | 250 | 360 | 500 | 1000 | 1500 | 2000 |
| AF 6016 | 818 | 48 | 63 | 77 | 91 | 117 | 142 | 176 | 206 | | | | | | | |
| AF 6026 | 818 | | | 50 | 59 | 77 | 95 | 119 | 142 | 170 | 203 | 264 | 328 | 473 | 555 | 608 |
| AF 6036 | 814 | 48 | 63 | 77 | 91 | 117 | 141 | 175 | 206 | | | | | | | |
| AF 6046 | 814 | | | 50 | 59 | 77 | 94 | 119 | 141 | 170 | 202 | 263 | 326 | 471 | 553 | 606 |
| AF 6066 | 812 | | | | | | | | | 85 | 103 | 141 | 184 | 302 | 385 | 446 |
| AF 6076 | 812 | | | 40 | 48 | 63 | 77 | 97 | 117 | 141 | 169 | 224 | 282 | | | |

Recommended design

Cleaning and emptying



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 approximately 4 times the initial differential pressure. The cleaning motor is operated for around 10 s (about three turns of the filter cartridge). This suffices to clean the filter thoroughly. The motor may need to run continuously in exceptional cases. The drive shaft is always turned clockwise.

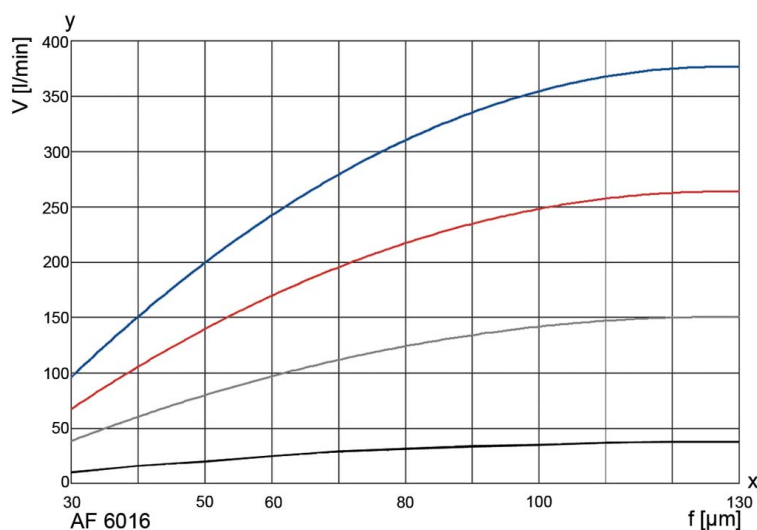
The drain valve is opened in order to empty the filter. Depending on the residue concentration, this can either take place synchronously with cleaning or be time or cycle controlled.

The opening time of the drain valve can be set between 2 and 6 s. The filter can be emptied in suction mode using a buffer or by interrupting the filtration process.

Semi-automatic and manual operation are also possible.

Refer to the Instruction Manual for further information

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 mm²/s

- 1 mm²/s
- 33 mm²/s
- 100 mm²/s
- 500 mm²/s

y = Volume flow V [l/min]

x = Gap width f [μm]

6. Type number key

Type number key with selection example for AF 73/9363-1322-40200 /G3

Size

| | | |
|---------------|-------------|---------------------------------------|
| AF 736 | 1 x 110x200 | No. of steps x diameter x length [mm] |
| AF 936 | 1 x 110x265 | No. of steps x diameter x length [mm] |

Cleaning drive

- 2** Ratchet
- 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 design
- 13** G2

Permissible operating pressure in bar (housing/cover)

- 1** PN 10
- 2** PN 16
- 3** PN 25
- 4** PN 40
- 5** PN 63

Material Seal FPM, bearing PTFE

- 2** Housing and cover 1.4581, internals 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
- 8** PIS 3076, switching level at 2.2 bar, static 63 bar, aluminium / FPM
- 9** PIS 3076, switching level at 5 bar, static 63 bar, aluminium / FPM

Valves and control throttles

- 0** Without / special version

Drain valve

- 1** Ball valve, manual
- 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 736 3 - 13 2 2 -4 0 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 AF 60

| Series | | | | | | /E1 | |
|---|--------------|---|---------------|-------------|------------------|-------------|------|
| AF 60 Coiled or welded cartridge with triangular wire winding | | | | | | | |
| Material | Core element | | Filter medium | Clamp rings | Wire width in mm | | |
| Coiled cartridge | | | | | | | |
| 1 | Al | | 1.4571 | 1.4571 | 0.5 | | |
| 2 | Al | | 1.4571 | 1.4571 | 0.8 | | |
| 3 | 1.4581 | | 1.4571 | - | 0.5 | | |
| 4 | 1.4581 | | 1.4571 | - | 0.8 | | |
| Welded cartridge | | | | | | | |
| 6 | - | | 1.4571 | 1.4571 | 1.8 | | |
| 7 | - | | 1.4571 | 1.4571 | 1 | | |
| Overall length Diameter x length in mm | | | | | | | |
| 6 | 110 x 265 | | | | | | |
| Gap width / rating in µm | | | | | | | |
| 003 | 30 µm | | 010 | 100 µm | | 036 360 µm | |
| 004 | 40 µm | | 013 | 130 µm | | 050 500 µm | |
| 005 | 50 µm | | 016 | 160 µm | | 100 1000 µm | |
| 006 | 60 µm | | 020 | 200 µm | | 150 1500 µm | |
| 008 | 80 µm | | 025 | 250 µm | | 200 2000 µm | |
| Other filter ratings on request | | | | | | | |
| AF 60 | 1 | 6 | - 010 | | | | / E1 |

7. Spare parts

| No. | Designation | Material No. | |
|-----|---------------------|----------------|----------|
| | | FPM/C-Steel | PTFE/VA |
| 1 | Bush kit | | 70308169 |
| 2 | Seal kit (complete) | | 70315880 |
| 3 | Scraper | | 71116805 |
| 4 | Spring kit | | 79753492 |
| 5 | Filter 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
 70360061.02/2008