Product description
- Self-cleaning automatic filter
- Separation of solid particles from low viscosity fluids
- Available as a fully automatic or manual filter variant

Filter element technology
- Conical filter elements
- Wedge wire: 30 to 1000 µm
- SuperMesh wire mesh, sintered: 25 to 60 µm

Product advantages
- Fully automatic function
- Compact design
- Continuous flow of filtrate even during back-flushing
- Maximum utilisation of the filter area
- Full filtration performance after back-flushing
- Ready-to-operate unit
- Low maintenance costs
- Low operating costs

1. GENERAL

Technical data – standard models

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
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<tbody>
<tr>
<td>RF4-1</td>
<td>6</td>
<td>G1”</td>
<td>G ½”</td>
<td>13</td>
<td>2.5</td>
<td>4 x KM</td>
<td>548</td>
<td>4</td>
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<td>G1”</td>
<td>G ½”</td>
<td>15</td>
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<td>4 x KM</td>
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<td>4</td>
</tr>
<tr>
<td>RF4-2</td>
<td>6</td>
<td>G1 ½”</td>
<td>G ¾”</td>
<td>32</td>
<td>3.7</td>
<td>4 x KN</td>
<td>1420</td>
<td>13</td>
</tr>
<tr>
<td>RF4-2</td>
<td>16</td>
<td>G1 ½”</td>
<td>G ¾”</td>
<td>63</td>
<td>3.7</td>
<td>4 x KN</td>
<td>1420</td>
<td>13</td>
</tr>
</tbody>
</table>

Legend
1) $T_{\text{max}}$ for all AutoFilt® RF4: 80°C
2) Refers to EPT version
3) Back-flush volume with a valve opening time of 1.5 seconds with a pressure difference of 1.5 bar between the filtrate line and the back-flush line
2. FUNCTION

FILTRATION
- The fluid to be filtered flows through the filter elements of the back-flushing filter, passing from the inside to the outside
- During this process, the particles deposit on the smooth inside of the filter element surface
- As the level of contamination increases, the differential pressure between the dirty and the clean side of the filter increases
- When the pressure drop reaches the pre-set differential pressure trigger point, back-flushing starts automatically

TRIGGERING BACK-FLUSHING
- Automatic: automatic back-flushing is triggered when the pre-set differential pressure trigger point is exceeded
- Manual: when the visual clogging indicator is triggered

BACK-FLUSHING OF THE FILTER ELEMENTS – BACK-FLUSHING CYCLE
- The rotary drive rotates the filter element mounting plate, along with the filter elements, into position so that a clogged filter element is located above a flush opening
- The back-flushing valve is opened
- The pressure drop between the filtrate side and the back-flush line flushes a small amount of the filtrate back through the filter element to be cleaned
- The contaminant particles deposited on the inside of the filter elements are loosened and flushed into the back-flush line via the flushing arm
- Once the “back-flush time per filter element” has elapsed, the back-flushing valve is closed
- In this way, all the filter elements are back-flushed, one after the other
- A back-flushing cycle is complete once all the filter elements have been cleaned
- In the AutoFilt® RF4 with manual back-flushing, the filter element mounting plate is turned along with the filter elements, and the back-flushing valve is opened manually
- The flow of filtrate is not interrupted during back-flushing
3. SPECIAL FEATURES

FILTER ELEMENT TECHNOLOGY

Conical filter elements
Robust wedge wire or SuperMesh filter elements made from stainless steel are used in the HYDAC AutoFilt® RF4 automatic back-flushing filter. The conical shape of the filter elements provides maximum efficiency during filtration and optimum effectiveness during back-flushing.

SuperFlush non-stick coating
For waste-water treatment applications, the filter elements can also be given a special non-stick coating (SuperFlush).

Advantages of the SuperFlush coating:
- Unique coating technology
- Available for conical filter elements
- Prevents particle build-up on the filter element surface
- Gel-like particles do not adhere to the filter element surface
- Reduces biofouling
- Increases the service life
- Increases effectiveness

ISOKINETIC FILTRATION AND BACK-FLUSHING

The conical shape and alignment of the filter elements allow uniform flow, resulting in a low pressure drop and effective cleaning of the filter elements.

Advantages:
- Fewer back-flushing cycles
- Lower back-flushing losses

PULSE-AIDED BACK-FLUSHING

In the EPT control types, the filter element to be back-flushed remains in the flushing position for only a few seconds. Rapid opening of the back-flushing valve generates a pressure surge in the filter element openings, providing an additional cleaning effect to the back-flushing process.

SMALL BACK-FLUSH VOLUMES DUE TO CYCLIC CONTROL

In the EPT control types, the back-flushing valve opens and closes during back-flushing of each filter element.
4. FILTER CALCULATION*

CHECKLIST, FILTER CALCULATION

Step 1: Checking the prerequisites
- The determining factor for operating the AutoFilt® RF4 is the presence of a pressure difference of at least 1.5 bar** between the filter outlet and the back-flush line
- This minimum pressure difference is vital for the filter operation
- Application data is determined using filter questionnaires
- The flow velocity of 4 m/s at the filter inlet should not be exceeded
- The maximum permitted operating temperature for every AutoFilt® RF4 is 80°C
- The flow must not drop below the minimum flow rate of 40 l/min

Step 2: Filter sizing
- Determined on the basis of the pressure drop curves and, specially for cooling lubricant emulsion applications, on the basis of the calculation table
- The initial pressure difference (Δp) when the filter is in a clean condition must not exceed 0.2 bar
- The pressure drop curve applies to filtration ratings of 100 to 1000 µm wedge wire and to 25 µm / 40 µm and 60 µm SuperMesh filter elements
- The flow velocity of 4 m/s at the filter inlet should not be exceeded

Step 3: Calculation tables
The calculation tables form an important decision-making basis for selection of the AutoFilt® RF4.

- In particular, the higher contamination load in the cooling lubricant emulsion applications requires that the filter be calculated more generously
- Validity of the tables for emulsions and oils up to a viscosity of 15 mm²/s

** For diverse cooling lubricant applications, the filtrate pressure must be adjusted to suit the particular application.

* Please contact our Head Office if you have any queries regarding the filter calculation

CALCULATION TABLES

WATER APPLICATIONS

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Filter size / max. flow rate [l/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RF4-1</td>
</tr>
<tr>
<td>Water</td>
<td>120</td>
</tr>
</tbody>
</table>

The flow rate ranges indicated apply to filtration ratings ≥ 100 µm

COoling LUBricant EMULSIONS
Applications only following consultation with our Head Office

<table>
<thead>
<tr>
<th>Conditions for correct performance in standard areas of application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filtration rating</td>
</tr>
<tr>
<td>Pre-filtration</td>
</tr>
<tr>
<td>Contamination content</td>
</tr>
<tr>
<td>Viscosity</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Type of contamination</th>
<th>Machining</th>
<th>Max. flow rate [l/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>RF4-1</td>
</tr>
<tr>
<td>Emulsion</td>
<td>Aluminium</td>
<td>Milling</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Cast iron</td>
<td>Boring</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>Carbon steel</td>
<td>Turning</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>Stainless steel</td>
<td></td>
<td>80</td>
</tr>
</tbody>
</table>

- The flow rate ranges indicated apply to filtration ratings ≥ 100 µm and a maximum contamination content of 120 mg/l
- Validity of the tables for emulsions and oils up to a viscosity of 15 mm²/s
- Our Head Office must be consulted for applications involving compacted graphite iron, grinding, honing and fluids with a viscosity greater than 15 mm²/s
PRESSURE DROP CURVES
The pressure drop curves apply to water and fluids with a similar viscosity

![Pressure Drop Curve Graph]

CIRCUIT DIAGRAM

![Circuit Diagram]

** For diverse cooling lubricant applications, the filtrate pressure must be adjusted to suit the particular application.
## 5. FILTER CONFIGURATION*

<table>
<thead>
<tr>
<th>Types of control</th>
<th>Standard</th>
<th>Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• EPT: electro-pneumatic cyclic control</td>
<td>Customised special solutions</td>
</tr>
<tr>
<td></td>
<td>• ET: electrical cyclic control (electrical only)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• M: manual</td>
<td></td>
</tr>
<tr>
<td>Connection voltages</td>
<td>• 230 V AC main voltage</td>
<td>Special voltages</td>
</tr>
<tr>
<td></td>
<td>• 230 V AC or 24 V DC control voltage</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• For ET control variants only: control voltage 24 V DC, drive 3 x 400 V / N / PE, 50 Hz</td>
<td></td>
</tr>
<tr>
<td>Electrical protection classes</td>
<td>IP65</td>
<td></td>
</tr>
<tr>
<td>Housing materials (combinations)</td>
<td>Aluminium, anodised</td>
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</tr>
<tr>
<td></td>
<td>• Stainless steel: 1.4571 or similar (Group 316)</td>
<td></td>
</tr>
<tr>
<td>Material of internal parts</td>
<td>• Carbon steel, nickel-plated</td>
<td></td>
</tr>
<tr>
<td>Back-flushing valve</td>
<td>• Coaxial valve</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Stainless steel ball valve</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Ball valve, brass, nickel-plated</td>
<td></td>
</tr>
<tr>
<td>Filter elements</td>
<td>SuperMesh filter elements:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• SuperMesh wire mesh, sintered, with or without support structure: 1.4401 or similar (Group 316)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Nominal filtration rating: 30 – 60 µm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wedge wire:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Robust wedge wire</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Stainless steel: 1.4435 or similar (Group 316)</td>
<td></td>
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<tr>
<td></td>
<td>• Nominal filtration rating: 30 – 1000 µm</td>
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</tr>
<tr>
<td>Differential pressure monitoring</td>
<td>• Differential pressure switch with or without setting options</td>
<td></td>
</tr>
<tr>
<td>Pressure ranges</td>
<td>• 6 bar (stainless steel version only)</td>
<td>25 bar</td>
</tr>
<tr>
<td></td>
<td>• 16 bar</td>
<td></td>
</tr>
<tr>
<td>Documentation</td>
<td>• Operating and maintenance instructions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Material certificates according to EN 10204, 3.1 for the pressurised components in contact with media (stainless steel version only)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Manufacturer inspection certificate according to DIN 55350, Part 18 “M” for final inspection and pressure testing</td>
<td></td>
</tr>
</tbody>
</table>

* Other versions and customised special solutions following consultation with our Head Office.
MODEL CODE AutoFilt® RF4

Filter type
RF4-1 = AutoFilt® RF4, size 1
RF4-2 = AutoFilt® RF4, size 2

Control
M = manual
EPT = electro-pneumatic control (incl. pneumatic drive)
ET = electrical control

Control type / connection voltage
For EPT control only:
0 = without control, without solenoid valve
1 = with S7 control, 1 x 230 V / N / PE 50 Hz, solenoid valve 230 V AC
2 = with S7 control, 1 x 230 V / N / PE 50 Hz, solenoid valve 24 V DC
2M = with S7 control, 1 x 230 V / N / PE 50 Hz, solenoid valve 24 V DC / M12x1 male connector
3 = without control, with solenoid valve 230 V AC
4 = without control, with solenoid valve 24 V DC
4M = without control, with solenoid valve 24 V DC / M12x1 male connector
5A = with AutoFilt® Control Unit ACU control, 1 x 230 V/N/PE 50 Hz
5C = with AutoFilt® Control Unit ACU control, 3 x 380–420 V / N / PE 50/60 Hz
5D = with AutoFilt® Control Unit ACU control, 3 x 380–420 V / x / PE 50/60 Hz

For ET control only:
0A = without control, drive 1 x 230 V / N / PE, 50 Hz
DC = without control, drive 3 x 380–420 V / x / PE, 50/60 Hz
Back-flushing valve 1 x 230 V / N / PE, 40–60 Hz
Sensor system 24 V DC
1A = with S7 control, 1 x 230 V / N / PE, 50 Hz
1C = with S7 control, 3 x 380–420 V / N / PE, 50/60 Hz
2A = with AutoFilt® Control Unit ACU control, 1 x 230 V / N / PE, 50 Hz
2C = with AutoFilt® Control Unit ACU control, 3 x 380–420 V / N / PE, 50/60 Hz
2D = with AutoFilt® Control Unit ACU control, 3 x 380–420 V / x / PE, 50/60 Hz

Other voltages on request!

Materials
Bottom filter section Top filter section Note
AA = aluminium ALMG3 aluminium ALMG3 Only RF4-1, 16 bar
NN = carbon steel, nickel-plated carbon steel, nickel-plated Only RF4-2, 16 bar
EE = stainless steel stainless steel: 1.4571 or similar (Group 316) RF4-1/2, 16 bar

Internal parts
E = stainless steel: 1.4301 or similar (Group 304)

Back-flushing valve
0 = without back-flushing valve
CO = coaxial valve, brass
CON = coaxial valve, zinc-plated steel (only on request!)
COE = coaxial valve, stainless steel (only on request!)
KN = ball valve, nickel-plated brass (only on M or EPT control variants)
KE = ball valve, stainless steel (only on M or EPT control variants) (only on request!)

Differential pressure monitoring
0 = without differential pressure monitoring
1 = fixed value: 0.5 bar, type DS 32, normally open contact (n. o.)
2 = adjustable: 0.1–1 bar, type DS 31, normally open contact (n. o.)
3 = fixed value: 0.5 bar, type DS 32, normally closed contact (n. c.)
4 = adjustable: 0.1–1 bar, type DS 31, normally closed contact (n. c.)
5 = Visual clogging indicator (for manual version only)
7 = fixed value 0.5 bar, type VL 1 GW (aluminium), normally closed contact (n. c.)
8 = fixed value 0.5 bar, type PV1 1 GW (1.4301), normally closed contact (n. c.)
9 = 2 x HDA 4700 stainless steel (4–20 mA), standard in combination with AutoFilt® Control Unit ACU control

Pressure range
06 = 6 bar (housing fastened with clamp), only for housings in stainless steel design
16 = 16 bar (top filter section threaded)
25 = 25 bar, only for RF4-1 (only on request!)

Modification number
1 = the latest version is always supplied

Filter elements / filtration rating
M = “M” added in front for solenoid technology
S = “S” added in front for SuperFlush

For RF4-1:
KMS = wedge wire 30 µm to 1000 µm
KMD = SuperMesh 25 µm / 40 µm / 60 µm; other filtration ratings on request

For RF4-2:
KNS = wedge wire 30 µm to 1000 µm
KND = SuperMesh 25 µm / 40 µm / 60 µm; other filtration ratings on request

Drawing number
For special designs
7. DIMENSIONS

RF4-1/2 Coax

<table>
<thead>
<tr>
<th>Size</th>
<th>DN1</th>
<th>DN2</th>
<th>DN3</th>
<th>h1</th>
<th>h2</th>
<th>h3</th>
<th>H1</th>
<th>H2</th>
<th>L1</th>
<th>L2</th>
<th>E1</th>
<th>E2</th>
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<tr>
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<td>G1</td>
<td>G1</td>
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<td>199</td>
<td>256</td>
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<td>501</td>
<td>110</td>
<td>255</td>
<td>399</td>
<td>G1/2</td>
<td>G1/4</td>
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<tr>
<td>RF4-2</td>
<td>G1 1/2</td>
<td>G1 1/2</td>
<td>G3/4</td>
<td>206</td>
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<td>106</td>
<td>342</td>
<td>452</td>
<td>G1/2</td>
<td>G1/4</td>
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</table>

RF4-1/2 electrical

<table>
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<tr>
<th>Size</th>
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<th>DN2</th>
<th>DN3</th>
<th>h1</th>
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<th>H1</th>
<th>H2</th>
<th>L1</th>
<th>L2</th>
<th>E1</th>
<th>E2</th>
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<tbody>
<tr>
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<td>RF4-2</td>
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<td>G1 1/2</td>
<td>G3/4</td>
<td>304</td>
<td>379</td>
<td>307</td>
<td>672</td>
<td>206</td>
<td>342</td>
<td>458</td>
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<td>G1/4</td>
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</table>
### RF4-1/2 manual

The dimensions indicated have ± 10 mm tolerances. Subject to technical modifications.

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<th>DN3</th>
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<th>H2</th>
<th>L1</th>
<th>L2</th>
<th>E1</th>
<th>E2</th>
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</thead>
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<td>294</td>
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<td>G1/4</td>
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<td>RF4-2</td>
<td>G1 1/2</td>
<td>G1 1/2</td>
<td>G3/4</td>
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<td>190</td>
<td>178</td>
<td>480</td>
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<td>336</td>
<td>337</td>
<td>G1/2</td>
<td>G1/4</td>
</tr>
</tbody>
</table>
NOTE

The information in this brochure relates to the operating conditions and applications described. For applications and/or operating conditions not described, please contact the relevant technical department. Subject to technical modifications.