Automatic back-flushing filter
AutoFilt® RF4W
for water applications

1. GENERAL

Product description
- Self-cleaning automatic filter
- Separation of solid particles from low viscosity fluids

Conical filter element technology
- Wedge wire (50 µm – 1000 µm)
- SuperMesh wire mesh, 3-layer, sintered (25 µm, 40 µm, 60 µm)
- Optional SuperFlush non-stick coating

Product advantages
- Ready-to-operate unit
- Compact design with innovative sealing concept and quick-opening
- Fully automatic operation
- No interruption of filtration during back-flushing
- Full filtration performance following back-flushing
- Maximum utilisation of the filter area
- Low operating costs
- Low maintenance costs

Specifications

<table>
<thead>
<tr>
<th>Nominal size:</th>
<th>G 2&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q_{max}:</td>
<td>450 l/min</td>
</tr>
<tr>
<td>P_{max}:</td>
<td>16 bar</td>
</tr>
<tr>
<td>Filtration ratings:</td>
<td>25 – 1000 µm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>10 / 16</td>
<td>G 2&quot;</td>
<td>G ¾&quot;</td>
<td>45</td>
<td>9</td>
<td>4</td>
<td>1430</td>
<td>13</td>
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<tr>
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<td></td>
<td>6</td>
<td>2140</td>
<td>20</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>7</td>
<td>2500</td>
<td>23</td>
</tr>
</tbody>
</table>

Legend
[^1] T_{max} for all AutoFilt® RF4W: 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

Technical specifications of standard models

<table>
<thead>
<tr>
<th>Size</th>
<th>Pressure range</th>
<th>Connection Inlet</th>
<th>Connection, back-flush line</th>
<th>Weight</th>
<th>Volume</th>
<th>No. of filter elements</th>
<th>Filter area</th>
<th>Back-flush volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>10 / 16</td>
<td>G 2&quot;</td>
<td>G ¾&quot;</td>
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<td></td>
<td></td>
<td></td>
<td>7</td>
<td>2500</td>
<td>23</td>
</tr>
</tbody>
</table>
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 contaminated and clean side of the filter increases.
- When the differential pressure reaches the pre-set trigger point, back-flushing starts automatically.

**TRIGGERING BACK-FLUSHING**
- **Automatic**: Back-flushing is triggered automatically when the triggering differential pressure is exceeded.
- **Timer function**: Makes it possible to set a maximum filtration time, independent of differential pressure, between two back-flushing cycles.
- By pressing the **“TEST”** button.

**BACK-FLUSHING OF THE FILTER ELEMENTS – EPT ELECTRO-PNEUMATIC CYCLIC CONTROL**
- The rotary drive rotates the filter element mounting plate, along with the filter elements, into position so that a contaminated filter element is located above a flushing 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 contaminated filter element.
- The contamination particles deposited on the inside of the filter elements are loosened and flushed into the back-flush line via the flush opening.
- After 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.
- The flow of filtrate is not interrupted during back-flushing.

**BACK-FLUSHING OF THE FILTER ELEMENTS – EU ELECTRICAL CIRCULATION CONTROL**
- The electrically operated back-flushing valve opens.
- The gear motor rotates the filter element mounting plate continuously as it passes underneath the filter elements to be cleaned.
- The pressure drop between the filtrate side and back-flush line flushes a small amount of the filtrate back through the contaminated filter elements.
- The contamination particles deposited on the inside of the filter elements are loosened and flushed into the back-flush line via the filter element mounting plate.
- Once a pre-set time has elapsed, the gear motor stops and the electric back-flushing valve closes automatically.
- A back-flushing cycle is complete once all the filter elements have been cleaned.
- The number of cycles can be preset via the control.
- 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® RF4W 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 type, 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 type, 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® RF4W 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 all AutoFilt® RF4Ws is 80 °C
- The flow must not drop below the minimum flow rate of 40 l/min

Step 2: Filter sizing
- 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 50 µm to 1000 µm wedge wire and to 25 µm / 40 µm and 60 µm SuperMesh filter elements
- The flow must not drop below the minimum flow rate 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 the selection of the AutoFilt® RF4W.

- In particular, the higher contamination load in cooling lubricant emulsion applications requires that the filter be calculated more generously

CALCULATION TABLES
WATER APPLICATIONS

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Filter size / max. flow rate [l/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>450</td>
</tr>
</tbody>
</table>

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

* Please contact our Head Office if you have any queries regarding the filter calculation
PRESSURE DROP CURVES
The pressure drop curves apply to water and fluids with a similar viscosity

![Pressure Drop Curves](image)

Flow rate [l/min]

0 60 120 180 240 300 360 420

Pressure difference [bar]

0 0,1 0,2 0,3 0,4 0,5 0,6 0,7

RF4W size 3

4 elements

6 elements

7 elements

CIRCUIT DIAGRAM

Inlet

Pre-filter

Shut-off valve

Bypass line (optional)

AutoFilt® RF4W

M

Scope of delivery HYDAC

Outlet

Shut-off valve

Shut-off valve

\( \Delta p_{\text{min}} = 1.5 \text{ bar} \)
### 5. FILTER CONFIGURATION*

<table>
<thead>
<tr>
<th></th>
<th>Standard</th>
<th>Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Housing manufacture</strong></td>
<td>HYDAC standard</td>
<td></td>
</tr>
<tr>
<td><strong>Connection size</strong></td>
<td>• Inlet/outlet: G 2”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Back-flush line: G ¾”</td>
<td></td>
</tr>
<tr>
<td><strong>Housing materials</strong></td>
<td>Stainless steel casting: 1.4571 or similar (group 316)</td>
<td></td>
</tr>
<tr>
<td><strong>Material of filter elements</strong></td>
<td>• Wedge wire</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Wire mesh – SuperMesh</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Stainless steel group 316</td>
<td></td>
</tr>
<tr>
<td><strong>Materials of internal parts</strong></td>
<td>Stainless steel group 304</td>
<td>Stainless steel group 316</td>
</tr>
<tr>
<td><strong>Sealing materials</strong></td>
<td>FPM / FKM</td>
<td>Various sealing materials on request, depending on the particular fluid</td>
</tr>
<tr>
<td><strong>Differential pressure monitoring</strong></td>
<td>HDA pressure transmitter, stainless steel</td>
<td>HDA pressure transmitter, duplex</td>
</tr>
<tr>
<td><strong>Documentation</strong></td>
<td>• Assembly and operating instructions</td>
<td>• Certificate of Conformance CoC</td>
</tr>
<tr>
<td></td>
<td>• Electric plan</td>
<td>• Acceptance test certificate 3.1 according to DIN EN 10204 for design, pressure and functional test</td>
</tr>
<tr>
<td></td>
<td>• Declaration of Incorporation</td>
<td>• Acceptance test certificate 3.1 according to DIN EN 10204 for design, pressure and functional test including material certificates according to EN 10204, 3.1 for the pressure-bearing media-contacting housing part</td>
</tr>
<tr>
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<td>• Material certificates according to EN 10204, 3.1 for the pressure-bearing media-contacting housing parts</td>
</tr>
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<td></td>
<td></td>
<td>• Russian device pass card incl. explanation letter for TRCU 032/2013; in addition to Declaration of Conformity for TRCU 010/2011</td>
</tr>
</tbody>
</table>

* Other versions and customer-specific special solutions after consultation with our Head Office.
### 6. MODEL CODE

**MODEL CODE AutoFilt® RF4**

| Filter type | RF4WL – left filter inlet – standard  
| RF4WR – right filter inlet |
| **Filter size** | 3 = G2” |
| **Pressure ranges** | 2 = 10 bar (only for EU)  
| 3 = 16 bar (EPT & EU) |
| **No. of filter elements** | 4 = 4 pcs.  
| 6 = 6 pcs. – standard  
| 7 = 7 pcs. – only in cases of high contamination loads |
| **Mounting/venting (more than one option can be chosen)** | 0 = without – standard  
| 1 = for wall mounting  
| 2 = base frame  
| 3 = air-bleed ball valve and piping  
| 4 = automatic aeration/deaeration (plastic) and piping |

**Control type / supply voltage**

| Control type | A _ _ = EPT: electro-pneumatic cyclic control  
| B _ _ = EU: electrical circulation control – standard |
| **Supply voltage** |  D _ _ = supply voltage 230VAC 50Hz/60Hz – standard  
| (*= gear motor, pilot valves / RSVE 24VDC)  
| _ F _ = supply voltage 115VAC 60Hz  
| (*= gear motor, pilot valves / RSVE 24VDC)  
| _ L _ = supply voltage 24VDC (only for EPT) |

**Design**

| 0 = without control, loose cable, cable length 5 metres  
| 1 = basic terminal box on filter, actuators & sensors on the terminal strip  
| 2 = ACU Basic on filter – standard  
| 3 = ACU Basic with 5 metre cable for wall mounting  
| 4 = ACU (metal switch box, with 5 metre cable for wall mounting) |

**Differential pressure monitoring**

| S = HDA 4700 stainless steel V2A group (4-20 mA), 2 pcs. |

**Housing material / coating**

| E2 = stainless steel casting 1.4581 (group 316) – standard |

**Inner parts**

| E1 = stainless steel 1.4301, 1.4541 or similar (group 304/321) – standard  
| E2 = stainless steel 1.4401, 1.4404, 1.4571 or similar (group 316) |

**Back-flush valve**

| E1 = stainless steel 1.4301 or similar (group 304) – standard in case of EU filter  
| E2 = stainless steel 1.4408 / 1.4401 (group 316) – standard in case of EPT filter |

**End documentation (multiple naming possible)**

| 0 = standard (assembly & operating instructions, electric plan, Declaration of Incorporation)  
| A = Certificate of Conformance CoC + standard  
| B = acceptance test certificate 3.1 according to DIN EN 10204 for design, pressure and functional test + standard  
| C = acceptance test certificate 3.1 according to DIN EN 10204 for design, pressure and functional test + standard  
| D = material certificates according to EN 10204, 3.1 for the pressure-bearing media-contacting housing parts + standard  
| E = Russian device pass card incl. explanation letter for TRCU 032/2013; in addition to Declaration of Conformity for TRCU 010/2011 + standard |

**Modification number**

The latest version is always supplied (currently 2)

**Filter elements/filtration rating**

| S = preceded with an additional “S” for SuperFlush  
| KNS = wedge wire 50 µm to 1000 µm  
| KND = SuperMesh 25 µm, 40 µm, 60 µm (3-layer) |

Filtration ratings: KNS 50 µm, 100 µm, 150 µm, 200 µm, 250 µm, 300 µm, 500 µm, 1000 µm  
Filtration ratings: KND 25 µm, 40 µm, 60 µm  
Other filtration ratings available on request

**Special number**

For special designs (number will be issued after technical clarification at Head Office)
7. DIMENSIONS

RF4WL3-EU

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

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.