Off-line Filter Unit

FNA 045
Operating pressure up to 7 bar / 101 psi · Nominal flow rate up to 45 l/min / 12 gpm

Description

Application
In the by-pass flow of hydraulic and lubrication systems.

Performance features

Protection against wear:
The EXAPOR®MAX 2 ultra-fine element meets the highest cleanliness standards, even at full flow.

Protection against failure:
The off-line filter includes a feature that guarantees a closed by-pass valve even at v ≤ 200 mm²/s / 930 SUS (cold start condition) within specified operating parameters.

Special design features

Housing cover:
Fold-out handle parts at the cover facilitate the opening.

Compact:
The filter housing, the internal gear pump and the electric motor are screwed together to form a unit. No pipes are needed except for the connection lines. The filter units feature low power consumption and minimal operational noise.

Pressure relief valve:
An integrated PRV (pressure relief valve) protects against overload.

Dirt retention valve:
At the bottom of the filter element, flown through from the inside to the outside, there is a dirt retention valve. This closes while pulling the filter element, which is hung up at the cover, out of the housing. Sedimented dirt is removed together with the filter element. Because of the cover design, the filter element change can be carried out almost without losing any oil.

Filter elements
Flow direction from the inside to the outside. The star-shaped pleating of the filter material results in:
› large filter surfaces
› low pressure drop
› high dirt-holding capacities
› particularly long maintenance intervals

Filter maintenance
By using a clogging indicator, the correct moment for maintenance is stated, what guarantees optimum utilization of the filter life.
**Materials**

- **Pump and filter housing:** Aluminum alloy
- **Cover:** Aluminum alloy
- **Seals:** NBR (FPM on request)
- **Filter media:** EXAPOR®MAX 2 - inorganic, multi-layer microfiber web

**Accessories**

- Water-absorbing filter elements EXAPOR®AQUA are available on request.
- Electrical and/or optical clogging indicators are available on request – with either one or two switching points resp. temperature suppression.
- For dimensions and technical data of the clogging indicators, please refer to catalog sheet 60.30.

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**Characteristics**

**Nominal flow rate**

Up to 45 l/min at ν = 35 mm²/s / up to 12 gpm at ν = 162 SUS (see Selection Chart, column 2)

**Connection**

Threaded port according to ISO 228 or DIN 13. Sizes see Selection Chart, column 9 and 10

**Filter fineness**

3 µm(c) ... 10 µm(c)

β-values according to ISO 16889 (see Selection Chart, column 4 and Diagram Dx)

**Dirt-holding capacity**

The dirt-holding capacity values in grams from the ISO MTD test dust are in accordance with the ISO 16889 requirements (see Selection Chart, column 4).

**Hydraulic fluids**

Mineral oil and biodegradable fluids (HEES and HETG, see info-sheet 00.20)

**Temperature range of fluids**

0 °C ... +65 °C / +32 °F ... +149 °F (also see viscosity range)

**Ambient temperature range**

0 °C ... +50 °C / +32 °F ... +122 °F

**Viscosity range**

<table>
<thead>
<tr>
<th>Electro motor type of protection:</th>
<th>Continuous operation min.</th>
<th>Continuous operation max.</th>
<th>Short-term max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP 55</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 ~ 400 V / 460 V</td>
<td>15 mm²/s / 70 SUS</td>
<td>600 mm²/s / 2790 SUS</td>
<td>800 mm²/s / 3720 SUS</td>
</tr>
<tr>
<td>1 ~ 230 V</td>
<td>15 mm²/s / 70 SUS</td>
<td>600 mm²/s / 2790 SUS</td>
<td>800 mm²/s / 3720 SUS</td>
</tr>
</tbody>
</table>

**Maximum suction height**

- max. 2 m / 6.56 ft (unfilled)
- max. 6 m / 19.69 ft (in operating condition)

**Operating pressure**

Max. 7 bar / 101 psi, pressure protection with pressure relief valve

**Operating position**

Vertical, pump block at the bottom

**Recommended tank capacities**

- From 500 l up
- For off-line filter units for smaller tank capacities see catalog sheet 80.40.
$\Delta p$-curves for complete filters in Selection Chart, column 3

Filtration ratio $\beta$ as a function of particle size $x$ obtained by the Multi-Pass Test according to ISO 16889

The abbreviations represent the following $\beta$-values resp. finenesses:

With EXAPOR® MAX 2 elements:

- $3\text{EN2} = \beta_{3\mu\text{m}} = 200$ EXAPOR® MAX 2
- $5\text{EN2} = \beta_{5\mu\text{m}} = 200$ EXAPOR® MAX 2
- $10\text{EX2} = \beta_{10\mu\text{m}} = 200$ EXAPOR® MAX 2

For special applications, finenesses differing from these curves are also available by using special composed filter media.
## Selection Chart

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Nominal flow rate</th>
<th>Filter fineness s. diagram</th>
<th>Dirt-holding capacity</th>
<th>E-motor operating voltage (max.)</th>
<th>E-motor operating frequency (max.)</th>
<th>E-motor power (max.)</th>
<th>Engine speed at 50 Hz (max.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>l/min</td>
<td>gpm</td>
<td></td>
<td></td>
<td></td>
<td>kW</td>
<td>min¹</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>FNA 045-1553</td>
<td>45*</td>
<td>12*</td>
<td>3EN2</td>
<td>1,950</td>
<td>1 ~ 230 V</td>
<td>50(60)*</td>
<td>1.1*</td>
</tr>
<tr>
<td>FNA 045-1153</td>
<td>45*</td>
<td>12*</td>
<td>5EN2</td>
<td>1,980</td>
<td>1 ~ 230 V</td>
<td>50(60)*</td>
<td>1.1*</td>
</tr>
<tr>
<td>FNA 045-4553</td>
<td>45*</td>
<td>12*</td>
<td>3EN2</td>
<td>1,950</td>
<td>3 ~ 400/460 V</td>
<td>50(60)*</td>
<td>1.1*</td>
</tr>
<tr>
<td>FNA 045-4153</td>
<td>45*</td>
<td>12*</td>
<td>5EN2</td>
<td>1,980</td>
<td>3 ~ 400/460 V</td>
<td>50(60)*</td>
<td>1.1*</td>
</tr>
</tbody>
</table>

* Indications at 50 Hz. At 60 Hz, the value increases by approx. 20%.

### Connection A inlet, Connection B outlet

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Connection A inlet</th>
<th>Connection B outlet</th>
<th>Max. operating pressure (PRV)</th>
<th>Symbols hydraulic</th>
<th>Symbols electric</th>
<th>Replacement filter element</th>
<th>Part No.</th>
<th>Clogging indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>bar</td>
<td>psi</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>14</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FNA 045-1553</td>
<td>G1¼</td>
<td>G1</td>
<td>7</td>
<td>101</td>
<td>1</td>
<td>3</td>
<td>V7.1560-103</td>
<td>optional</td>
</tr>
<tr>
<td>FNA 045-1153</td>
<td>G1¼</td>
<td>G1</td>
<td>7</td>
<td>101</td>
<td>1</td>
<td>3</td>
<td>V7.1560-03</td>
<td>optional</td>
</tr>
<tr>
<td>FNA 045-4553</td>
<td>G1¼</td>
<td>G1</td>
<td>7</td>
<td>101</td>
<td>1, 2</td>
<td>V7.1560-103</td>
<td>optional</td>
<td></td>
</tr>
<tr>
<td>FNA 045-4153</td>
<td>G1¼</td>
<td>G1</td>
<td>7</td>
<td>101</td>
<td>1, 2</td>
<td>V7.1560-03</td>
<td>optional</td>
<td></td>
</tr>
</tbody>
</table>

Optical or electrical indicators are available to monitor the clogging condition of the element. If the indicator should be already mounted onto the filter head, use the abbreviation “M” behind the part number of the indicator. The printed order acknowledgments show both items separately.

**Order example:** The filter FNA 045-1553 has to be supplied with optical clogging indicator - response pressure 2.0 bar / 29 psi.

**Order example:** FNA 045-1553 / DG 042-01 M

Clogging indicator

**For appropriate clogging indicators see catalog sheet 60.30.**

**Remarks:**

› In case of an increasing operating frequency, the pump delivery volume will increase as well.

› The filter units listed in this chart are standard units. If modifications are required, e.g. with water-absorbing filter elements, we kindly ask for your request.
Minimum distance for filter maintenance

Differential pressure indicator

Minimum distance from ferromagnetic parts:
7 mm / 0.3 inch

Switch positions:
I = Pumping over
II = Filtering

Weight approx. 37 kg / 81.6 lbs

Dimensions

Measurements in mm

<p>| Type | A  | B  | C  | D  | E  | F  | G  | H  | I  | J  | K  | L  | M  | N  | O  |
|------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| FNA 045 | G1¼ | G1 | 735 | 312 | 176 | 63 | 10 | 30 | 87 | 395 | 175 | 130 | 79 | 186 | 154 |</p>
<table>
<thead>
<tr>
<th>Type</th>
<th>P</th>
<th>Q</th>
<th>R</th>
<th>S</th>
<th>T</th>
<th>U</th>
<th>V</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>FNA 045</td>
<td>150</td>
<td>11</td>
<td>367</td>
<td>164</td>
<td>215</td>
<td>241</td>
<td>700</td>
<td>160</td>
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</tbody>
</table>

Measurements in inch

<table>
<thead>
<tr>
<th>Type</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>O</th>
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</thead>
<tbody>
<tr>
<td>FNA 045</td>
<td>G1¼</td>
<td>G1</td>
<td>28.94</td>
<td>12.28</td>
<td>6.93</td>
<td>2.48</td>
<td>0.39</td>
<td>1.18</td>
<td>3.43</td>
<td>15.55</td>
<td>6.89</td>
<td>5.12</td>
<td>3.11</td>
<td>7.32</td>
<td>6.06</td>
</tr>
<tr>
<td>Type</td>
<td>P</td>
<td>Q</td>
<td>R</td>
<td>S</td>
<td>T</td>
<td>U</td>
<td>V</td>
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<td></td>
</tr>
<tr>
<td>FNA 045</td>
<td>5.91</td>
<td>0.43</td>
<td>14.45</td>
<td>6.46</td>
<td>8.46</td>
<td>9.49</td>
<td>27.56</td>
<td>6.30</td>
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</tbody>
</table>
Quality Assurance

Quality management according to DIN EN ISO 9001
To ensure constant quality in production and operation, ARGO-HYTOS filter elements undergo strict controls and tests according to the following ISO standards:

ISO 2941 Verification of collapse / burst pressure rating
ISO 2942 Verification of fabrication integrity (Bubble Point Test)
ISO 2943 Verification of material compatibility with fluids
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-Pass-Test (evaluation of filter fineness and dirt-holding capacity)
ISO 23181 Determination of resistance to flow fatigue using high viscosity fluid

Various quality controls during the production process guarantee the leak-free function and solidity of our filters.