Return Filters

E 043 · E 072
Tank top mounting · Connection up to G¾ / -12 SAE · Nominal flow rate up to 70 l/min / 18.5 gpm

Description

Application
In the return line circuits of hydraulic systems.

Performance features
Protection against wear:
By means of filter elements that even in full-flow filtration meet the highest demands regarding cleanliness classes.

Protection against malfunction:
By means of full-flow filtration in the system return, the pumps above all are protected from dirt particles remaining in the system after assembly, repairs, or which are generated by wear or enter the system from outside.

Special features
› By-pass valve:
The location close to the inlet port prevents dirt particles retained by the filter element from entering into the clean oil side.
› Removable bowl:
In case of maintenance the filter bowl is removed together with the filter element – therefore dirt particles are not flushed back into the tank.
› Extension pipe:
A correct extension pipe length ensures oil outlet below minimum oil level and prevents foaming.

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

Ventilating filter
Ventilation of the reservoir by an integral star-shape pleated filter element:
› removable (replace annually!)
› splash-proof
› fineness 2 µm

Filter maintenance
By using a clogging indicator the correct moment for maintenance is stated and guarantees the optimum utilization of the filter life.
Materials
Screw-on cap: Polyester, GF-reinforced
Filter head: Aluminum alloy
Filter bowl: Polyamide, CF-reinforced, electrically conducting
Seals: NBR (FPM on request)
Filter media: EXAPOR®MAX2- organic multi-layer microfiber web
Paper - cellulose web, impregnated with resin

Characteristics
Nominal flow rate
Up to 70 l/min / 18.5 gpm (see Selection Chart, column 2). The nominal flow rates indicated by ARGO-HYTOS are based on the following features:
› closed by-pass valve at \( \nu \leq 200 \text{ mm}^2/\text{s} / 927 \text{ SUS} 
› element service life > 1000 operating hours at an average fluid contamination of 0.07 g per l/min / 0.27 g per gpm flow volume
› flow velocity in the connection lines \( \leq 4.5 \text{ m/s} / 14.8 \text{ ft/s} 

Connection
Threaded ports according to
› ISO 228 or DIN 13
› SAE standard J514
Sizes see Selection Chart, column 6, (other port threads on request).

Filter fineness
5 \( \mu \text{m}(c) \ldots 30 \mu \text{m}(c) \)
\( \beta \)-values according to ISO 16889
(see Selection Chart, column 4 and diagram Dx).

Dirt-holding capacity
Values in g test dust ISO MTD according to ISO 16889
(see Selection Chart, column 5).

Hydraulic fluids
Mineral oil and biodegradable fluids
(HEES and HETG, see info-sheet 00.20).
With high filling conditions we recommend an electrical conductivity \( \geq 500 \text{ pS/m} \) at 20 °C / 68 °F.

Temperature range
-30 °C ... +100 °C (temporary -40 °C ... +120 °C)
-22 °F ... +212 °F (temporary -40 °C ... +248 °F)

Viscosity at nominal flow rate
› at operating temperature: \( \nu < 60 \text{ mm}^2/\text{s} / 280 \text{ SUS} 
› as starting viscosity: \( \nu_{\text{max}} = 1200 \text{ mm}^2/\text{s} / 5560 \text{ SUS} 
› at initial operation: The recommended starting viscosity can be read from the diagram D (pressure drop as a function of the kinematic viscosity) as follows: Find the 70% \( \Delta p \) of the cracking pressure of the by-pass valve on the vertical axis. Draw a horizontal line so that it inter-sects the \( \Delta p \) curve at a point. Read this point on the horizontal axis for the viscosity.

Operating pressure
Max. 10 bar / 145 psi

Mounting position
Preferably vertical, outlet downwards.

Accessories
Electrical and optical clogging indicators are available on request.
Dimensions and technical data see catalogue sheet 60.20.

An optional oil separator (Part No. E 043.1701) prevents oil splashing through the ventilating filter at mobile applications and is available on request.

Extension pipes on the bowl outlet are available in several lengths on request.
Diagrams

$\Delta p$-curves for complete filters in Selection Chart, column 3

**D1** Pressure drop as a function of the **flow volume** at $v = 35 \text{ mm}^2/\text{s} / 162 \text{ SUS}$ (0 = casing empty)

**D2** Pressure drop as a function of the **kinematic viscosity** at nominal flow

Filter fineness curves in Selection Chart, column 4

**Dx** 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:

**For EXAPOR®MAX 2 and Paper elements:**

- $5EX2 = \beta_{5,(x)} = 200$ EXAPOR®MAX 2
- $7EX2 = \beta_{7,(x)} = 200$ EXAPOR®MAX 2
- $10EX2 = \beta_{10,(x)} = 200$ EXAPOR®MAX 2
- $16EX2 = \beta_{16,(x)} = 200$ EXAPOR®MAX 2
- $30P = \beta_{30,(x)} = 200$ Paper

Based on the structure of the filter media of the 30P paper elements, deviations from the printed curves are quite probable.

**For screen elements:**

- $40S$ = screen material with mesh size 40 µm
- $60S$ = screen material with mesh size 60 µm
- $100S$ = screen material with mesh size 100 µm

Tolerances for mesh size according to DIN 4189

**For ventilating filter elements:**

- $2CL$ = 99.5% efficiency for particles of size 2 µm

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

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Nominal flow rate</th>
<th>Pressure drop</th>
<th>Filter media</th>
<th>Dirt-holding capacity</th>
<th>Cracking pressure of bypass</th>
<th>Replacement element</th>
<th>Weight</th>
<th>Replacement ventilating filter</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>E 043-156¹</td>
<td>25</td>
<td>D1/1</td>
<td>10EX2</td>
<td>6.1 G½</td>
<td>2.5</td>
<td>V3.0510-56</td>
<td>0.6</td>
<td>L1.0403-01 (2CL)</td>
<td>-</td>
</tr>
<tr>
<td>E 043-166¹</td>
<td>25</td>
<td>D1/1</td>
<td>10EX2</td>
<td>6.1 G½</td>
<td>2.5</td>
<td>V3.0510-56</td>
<td>0.6</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>E 043-158¹</td>
<td>35</td>
<td>D1/2</td>
<td>16EX2</td>
<td>6.1 G½</td>
<td>2.5</td>
<td>V3.0510-58</td>
<td>0.6</td>
<td>L1.0403-01 (2CL)</td>
<td>-</td>
</tr>
<tr>
<td>E 043-168¹</td>
<td>35</td>
<td>D1/2</td>
<td>16EX2</td>
<td>6.1 G½</td>
<td>2.5</td>
<td>V3.0510-58</td>
<td>0.6</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>E 043-151</td>
<td>30</td>
<td>D1/3</td>
<td>30P</td>
<td>4.0 G½</td>
<td>1.5</td>
<td>P3.0510-51</td>
<td>0.6</td>
<td>L1.0403-01 (2CL)</td>
<td>-</td>
</tr>
<tr>
<td>E 043-161</td>
<td>30</td>
<td>D1/3</td>
<td>30P</td>
<td>4.0 G½</td>
<td>1.5</td>
<td>P3.0510-51</td>
<td>0.6</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>E 072-153</td>
<td>25</td>
<td>D2/1</td>
<td>5EX2</td>
<td>7.7 G¾</td>
<td>2.5</td>
<td>V3.0520-53</td>
<td>0.8</td>
<td>L1.0403-01 (2CL)</td>
<td>-</td>
</tr>
<tr>
<td>E 072-163</td>
<td>25</td>
<td>D2/1</td>
<td>5EX2</td>
<td>7.7 G¾</td>
<td>2.5</td>
<td>V3.0520-53</td>
<td>0.8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>E 072-156¹</td>
<td>50</td>
<td>D2/2</td>
<td>10EX2</td>
<td>13 G¾</td>
<td>2.5</td>
<td>V3.0520-56</td>
<td>0.8</td>
<td>L1.0403-01 (2CL)</td>
<td>-</td>
</tr>
<tr>
<td>E 072-166¹</td>
<td>50</td>
<td>D2/2</td>
<td>10EX2</td>
<td>13 G¾</td>
<td>2.5</td>
<td>V3.0520-56</td>
<td>0.8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>E 072-158¹</td>
<td>70</td>
<td>D2/3</td>
<td>16EX2</td>
<td>13 G¾</td>
<td>2.5</td>
<td>V3.0520-58</td>
<td>0.8</td>
<td>L1.0403-01 (2CL)</td>
<td>-</td>
</tr>
<tr>
<td>E 072-168¹</td>
<td>70</td>
<td>D2/3</td>
<td>16EX2</td>
<td>13 G¾</td>
<td>2.5</td>
<td>V3.0520-58</td>
<td>0.8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>E 072-151</td>
<td>50</td>
<td>D2/4</td>
<td>30P</td>
<td>6.6 G¾</td>
<td>1.5</td>
<td>P3.0520-51²</td>
<td>0.8</td>
<td>L1.0403-01 (2CL)</td>
<td>-</td>
</tr>
<tr>
<td>E 072-161</td>
<td>50</td>
<td>D2/4</td>
<td>30P</td>
<td>6.6 G¾</td>
<td>1.5</td>
<td>P3.0520-51²</td>
<td>0.8</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

¹ Preferred type, no minimum order quantity required
² Paper media supported with metal gauze

All filters are delivered with a plugged clogging indicator connection M12 x 1.5. As clogging indicators either manometers or electrical pressure switches can be used. Optional extension pipes adapt the filter length to various tank depths. For ordering of accessories please use the below mentioned codes.

Order example: The filter E 072-156 has to be supplied with an extension pipe for a mounting depth of 500 mm.

**Order description:**

E 072-156 / EV 500

**Part No. (Basic unit)**

Mounted extension pipe (5 various lengths are available on request)

E 043: EV 150, EV 200, EV 300, EV 400, EV 500
E 072: EV 250, EV 300, EV 400, EV 500, EV 600

For the appropriate clogging indicators see catalogue sheet 60.20.

**Remarks:**

- The switching pressure of the electrical pressure switch has always to be lower than the cracking pressure of the by-pass valve (see Selection Chart, column 7).
- Clogging indicators are optional and always delivered detached from the filter.
- The filters listed in this chart are standard filters. Other designs available on request.
<table>
<thead>
<tr>
<th>Part No.</th>
<th>Nominal flow rate</th>
<th>Pressure drop</th>
<th>Correlation</th>
<th>Dirt-holding capacity</th>
<th>Connection A</th>
<th>Cracking pressure of bypass</th>
<th>Replacement element</th>
<th>Weight</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>E 043-776</td>
<td>6.6</td>
<td>D1/1</td>
<td>10EX2</td>
<td>6.1</td>
<td>-12</td>
<td>36</td>
<td>2</td>
<td>V3.0510-56</td>
<td>1.32</td>
</tr>
<tr>
<td>E 043-786</td>
<td>6.6</td>
<td>D1/1</td>
<td>10EX2</td>
<td>6.1</td>
<td>-12</td>
<td>36</td>
<td>1</td>
<td>V3.0510-56</td>
<td>1.32</td>
</tr>
<tr>
<td>E 043-778</td>
<td>9.2</td>
<td>D1/2</td>
<td>16EX2</td>
<td>6.1</td>
<td>-12</td>
<td>36</td>
<td>2</td>
<td>V3.0510-58</td>
<td>1.32</td>
</tr>
<tr>
<td>E 043-788</td>
<td>9.2</td>
<td>D1/2</td>
<td>16EX2</td>
<td>6.1</td>
<td>-12</td>
<td>36</td>
<td>1</td>
<td>V3.0510-58</td>
<td>1.32</td>
</tr>
<tr>
<td>E 043-771</td>
<td>7.9</td>
<td>D1/3</td>
<td>30P</td>
<td>4.0</td>
<td>-12</td>
<td>21</td>
<td>2</td>
<td>P3.0510-51</td>
<td>1.32</td>
</tr>
<tr>
<td>E 043-781</td>
<td>7.9</td>
<td>D1/3</td>
<td>30P</td>
<td>4.0</td>
<td>-12</td>
<td>21</td>
<td>1</td>
<td>P3.0510-51</td>
<td>1.32</td>
</tr>
<tr>
<td>E 072-773</td>
<td>6.6</td>
<td>D2/1</td>
<td>5EX2</td>
<td>7.7</td>
<td>-12</td>
<td>36</td>
<td>2</td>
<td>V3.0520-53</td>
<td>1.76</td>
</tr>
<tr>
<td>E 072-783</td>
<td>6.6</td>
<td>D2/1</td>
<td>5EX2</td>
<td>7.7</td>
<td>-12</td>
<td>36</td>
<td>1</td>
<td>V3.0520-53</td>
<td>1.76</td>
</tr>
<tr>
<td>E 072-776</td>
<td>13.2</td>
<td>D2/2</td>
<td>10EX2</td>
<td>13</td>
<td>-12</td>
<td>36</td>
<td>2</td>
<td>V3.0520-56</td>
<td>1.76</td>
</tr>
<tr>
<td>E 072-786</td>
<td>13.2</td>
<td>D2/2</td>
<td>10EX2</td>
<td>13</td>
<td>-12</td>
<td>36</td>
<td>1</td>
<td>V3.0520-56</td>
<td>1.76</td>
</tr>
<tr>
<td>E 072-778</td>
<td>18.5</td>
<td>D2/3</td>
<td>16EX2</td>
<td>13</td>
<td>-12</td>
<td>36</td>
<td>2</td>
<td>V3.0520-58</td>
<td>1.76</td>
</tr>
<tr>
<td>E 072-788</td>
<td>18.5</td>
<td>D2/3</td>
<td>16EX2</td>
<td>13</td>
<td>-12</td>
<td>36</td>
<td>1</td>
<td>V3.0520-58</td>
<td>1.76</td>
</tr>
<tr>
<td>E 072-771</td>
<td>13.2</td>
<td>D2/4</td>
<td>30P</td>
<td>6.6</td>
<td>-12</td>
<td>21</td>
<td>2</td>
<td>P3.0520-51</td>
<td>1.76</td>
</tr>
<tr>
<td>E 072-781</td>
<td>13.2</td>
<td>D2/4</td>
<td>30P</td>
<td>6.6</td>
<td>-12</td>
<td>21</td>
<td>1</td>
<td>P3.0520-51</td>
<td>1.76</td>
</tr>
</tbody>
</table>

1 Preferred type, no minimum order quantity required
2 Corresponds to 15/16 -12 UN-2B
3 Paper media supported with metal gauze

All filters are delivered with a plugged clogging indicator connection M12 x 1.5 mm. As clogging indicators either manometers or electrical pressure switches can be used. Optional extension pipes adapt the filter length to various tank depths. For ordering of accessories please use the below mentioned codes.

Order example: The filter E 072-776 has to be supplied with an extension pipe for a mounting depth of 500 mm (resp. 19.69 inch).

Order description: E 072-776 / EV 500

Part No. (Basic unit)

Mounted extension pipe (5 various lengths are available on request)
E 043: EV 150 (5.90 inch), EV 200 (7.87 inch), EV 300 (11.81 inch), EV 400 (15.74 inch), EV 500 (19.69 inch)
E 072: EV 250 (9.84 inch), EV 300 (11.81 inch), EV 400 (15.74 inch), EV 500 (19.69 inch), EV 600 (23.62 inch)

For the appropriate clogging indicators see catalog sheet 60.20.

Remarks:
- The switching pressure of the electrical pressure switch has always to be lower than the cracking pressure of the by-pass valve (see Selection Chart, column 7).
- Clogging indicators are optional and always delivered detached from the filter.
- The filters listed in this chart are standard filters. Other designs available on request.
Dimensions

Measurements in mm

<table>
<thead>
<tr>
<th>Type</th>
<th>A</th>
<th>B</th>
<th>C min/max</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I₁</th>
<th>I₂</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>O</th>
<th>P₁</th>
</tr>
</thead>
<tbody>
<tr>
<td>E 043</td>
<td>G½</td>
<td>75</td>
<td>60/63</td>
<td>51</td>
<td>27.8</td>
<td>24</td>
<td>26</td>
<td>67</td>
<td>175</td>
<td>110</td>
<td>83</td>
<td>88</td>
<td>9</td>
<td>51</td>
<td>11</td>
<td>59.5</td>
</tr>
<tr>
<td>E 072</td>
<td>G¾</td>
<td>75</td>
<td>60/63</td>
<td>51</td>
<td>27.8</td>
<td>24</td>
<td>26</td>
<td>67</td>
<td>270</td>
<td>110</td>
<td>88</td>
<td>9</td>
<td>51</td>
<td>11</td>
<td>59.5</td>
<td></td>
</tr>
</tbody>
</table>

Measurements in inch

| Type | A SAE | B | C min/max | D | E | F | G | H | I₁ | I₂ | K | L | M | N | O | P₁ |
|------|-------|---|-----------|---|---|---|---|---|----|----|---|---|---|---|---|---|----|
| E 043 | -12* | 2.95 | 2.36/2.48 | 2.01 | 1.09 | 0.94 | 1.02 | 2.64 | 6.89 | 4.33 | 3.27 | 3.46 | 0.35 | 2.01 | 0.43 | 2.34 |
| E 072 | -12* | 2.95 | 2.36/2.48 | 2.01 | 1.09 | 0.94 | 1.02 | 2.64 | 10.63 | 4.33 | 7.09 | 3.46 | 0.35 | 2.01 | 0.43 | 2.34 |

<table>
<thead>
<tr>
<th>Type</th>
<th>P₂</th>
<th>Q</th>
<th>R</th>
<th>S</th>
<th>T</th>
<th>U</th>
<th>V mm</th>
<th>W</th>
<th>X mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>E 043</td>
<td>2.26</td>
<td>1.81</td>
<td>3.11</td>
<td>1.65</td>
<td>0.08</td>
<td>0.83</td>
<td>AF 27</td>
<td>1.38</td>
<td>AF 36</td>
</tr>
<tr>
<td>E 072</td>
<td>2.26</td>
<td>1.81</td>
<td>3.11</td>
<td>1.65</td>
<td>0.08</td>
<td>0.83</td>
<td>AF 27</td>
<td>1.38</td>
<td>AF 36</td>
</tr>
</tbody>
</table>

* Corresponds to 1 ⅜ - 12 UN-2B
Spare Parts

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Designation</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Screw-on cap FR 043.0201</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Compression spring N015.1606</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>O-ring 57 x 3 mm 2.24 x 0.12 inch</td>
<td>N007.0573</td>
</tr>
<tr>
<td>4</td>
<td>Replacement filter element</td>
<td>see Chart / col. 9</td>
</tr>
<tr>
<td>5</td>
<td>Filter bowl E 043* FR 043.0107</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>O-ring 50 x 2 mm 1.97 x 0.08 inch</td>
<td>N007.0501</td>
</tr>
<tr>
<td>7</td>
<td>Replacement ventilating filter L1.0403-01K</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Flat gasket (for versions without oil separator) D 043.0113</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Oil separator (incl. pos. 10) E 043.1701</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Flat gasket (for versions with oil separator) D 043.0118</td>
<td></td>
</tr>
</tbody>
</table>

*Specify mounting depth (EV) in mm

The functions of the complete filters as well as the outstanding features of the filter elements assured by ARGO-HYTOS can only be guaranteed if original ARGO-HYTOS spare parts are used.

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 leakfree function and solidity of our filters.