Pressure Filters

D 042 • D 062
- In-line mounting
- Operating pressure up to 100 bar
- Nominal flow rate up to 70 l/min
**Description**

**Application**
In the pressure circuits of hydraulic and lubrication systems.

**Performance features**

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

**Protection against malfunction:** Through installation near to the control valves or other expensive components. The specific determined flow rate guarantees a closed by-pass valve even at $v \leq 200 \text{ mm}^2/\text{s}$ (cold start condition).

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

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

**Materials**
- Filter head: Aluminium alloy
- Filter bowl: Aluminium alloy
- Seals: NBR (Viton on request)
- Filter media: EXAPOR®MAX - inorganic multi-layer microfibre web
  Paper - cellulose web, impregnated with resin

**Accessories**
Electrical and/or optical clogging indicators are available - optionally with one or two switching points resp. temperature suppression.

Dimensions and technical data see catalogue sheet 60.30.

**Characteristics**

**Operating pressure**
0 ... 63 bar, min. $10^7$ pressure cycles
Nominal pressure according to DIN 24550

0 ... 100 bar, min. $10^8$ pressure cycles
Quasi-static operating pressure

**Permissible pressures for other numbers of cycles**

**Nominal flow rate**
Up to 70 l/min (see Selection Chart, column 2)
The nominal flow rates indicated by ARGO-HYTOS are based on the following features:
- closed by-pass valve at $v \leq 200 \text{ mm}^2/\text{s}$
- element service life > 1000 operating hours at an average fluid contamination of 0,07 g per l/min flow volume
- flow velocity in the connection lines:
  up to 40 bar ≤ 4,5 m/s
  up to 250 bar ≤ 8 m/s

**Filter fineness**
5 µm(c) ... 30 µm(c)
β-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 or HETG, see info-sheet 00.20)

**Temperature range**
-30 °C ... +100 °C (temporary - 40 °C ... +120 °C)

**Viscosity at nominal flow rate**
- at operating temperature: $v < 60 \text{ mm}^2/\text{s}$
- as starting viscosity: $v_{\text{max}} = 1200 \text{ mm}^2/\text{s}$
- 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% ∆p of the cracking pressure of the by-pass valve on the vertical axis. Draw a horizontal line so that it intersects the ∆p curve at a point. Read this point on the horizontal axis for the viscosity.

**Mounting position**
Preferably vertical, filter head on top

**Connection**
Threaded ports according to ISO 228 or DIN 13.
Sizes see Selection Chart, column 6 (other port threads 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 \( v = 35 \text{ mm}^2/\text{s} \) (0 = casing empty)

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

**D2**
Pressure drop as a function of the flow volume at \( v = 35 \text{ mm}^2/\text{s} \) (0 = casing empty)

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- and Paper elements:**
- \( 5 \text{ E-X} = \beta_{5}[\text{c}] = 200 \) EXAPOR®MAX
- \( 8 \text{ E-X} = \beta_{8}[\text{c}] = 200 \) EXAPOR®MAX
- \( 12 \text{ E-X} = \beta_{12}[\text{c}] = 200 \) EXAPOR®MAX
- \( 16 \text{ E-X} = \beta_{16}[\text{c}] = 200 \) EXAPOR®MAX
- \( 30 \text{ P} = \beta_{30}[\text{c}] = 200 \) Paper

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

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>Symbol</th>
<th>Flow Rate l/min</th>
<th>Weight kg</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>D 042-153</td>
<td>D1/1</td>
<td>9</td>
<td>3.5</td>
<td>4</td>
</tr>
<tr>
<td>D 042-156</td>
<td>D1/2</td>
<td>15</td>
<td>6.1</td>
<td>3.5</td>
</tr>
<tr>
<td>D 042-158</td>
<td>D1/3</td>
<td>30</td>
<td>6.6</td>
<td>3.5</td>
</tr>
<tr>
<td>D 042-151</td>
<td>D1/4</td>
<td>35</td>
<td>3.6</td>
<td>3.5</td>
</tr>
<tr>
<td>D 042-183</td>
<td>D1/5</td>
<td>20</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>D 042-186</td>
<td>D1/6</td>
<td>35</td>
<td>6.1</td>
<td>7</td>
</tr>
<tr>
<td>D 062-153</td>
<td>D2/1</td>
<td>20</td>
<td>7.6</td>
<td>3.5</td>
</tr>
<tr>
<td>D 062-156</td>
<td>D2/2</td>
<td>30</td>
<td>13</td>
<td>3.5</td>
</tr>
<tr>
<td>D 062-158</td>
<td>D2/3</td>
<td>60</td>
<td>14</td>
<td>3.5</td>
</tr>
<tr>
<td>D 062-151</td>
<td>D2/4</td>
<td>70</td>
<td>7.1</td>
<td>3.5</td>
</tr>
<tr>
<td>D 062-183</td>
<td>D2/5</td>
<td>40</td>
<td>7.6</td>
<td>7</td>
</tr>
<tr>
<td>D 062-196</td>
<td>D2/6</td>
<td>70</td>
<td>13</td>
<td>7</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 acknowledgements show both items separately.

**Order example:** The filter D 042-156 has to be supplied with optical clogging indicator - response pressure 2.0 bar

**Order description:** D 042-156 / DG 042-01 M

**Part No. (Basic unit) Mounte d**

**Clogging indicator**

For the appropriate clogging indicators see catalogue sheet 60.30

**Remarks:**
- The switching pressure of the clogging indicator has always to be lower than the cracking pressure of the by-pass valve (see Selection Chart, column 7).
- The filters listed in this chart are standard filters. Other designs available on request.

* Paper media supported with metal gauze
Clogging indicator optional: Pressure holes plugged with screws M4

Minimum distance from ferromagnetic parts: 7 mm

Version with electrical clogging indicator DG 041

Dimensions

Measurements

<table>
<thead>
<tr>
<th>Type</th>
<th>A/B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>O</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>D 042</td>
<td>G½</td>
<td>39</td>
<td>148</td>
<td>27</td>
<td>45,5</td>
<td>80</td>
<td>58,5</td>
<td>55</td>
<td>27</td>
<td>35</td>
<td>M6/8</td>
<td>44</td>
<td>36</td>
<td>19</td>
<td>15</td>
<td>70</td>
<td>81</td>
<td>55</td>
<td>23</td>
<td>30</td>
<td>35,5</td>
</tr>
<tr>
<td>D 062</td>
<td>G½, G¾</td>
<td>39</td>
<td>244</td>
<td>27</td>
<td>45,5</td>
<td>80</td>
<td>58,5</td>
<td>55</td>
<td>27</td>
<td>35</td>
<td>M6/8</td>
<td>44</td>
<td>36</td>
<td>19</td>
<td>15</td>
<td>70</td>
<td>81</td>
<td>55</td>
<td>23</td>
<td>30</td>
<td>35,5</td>
</tr>
</tbody>
</table>

Symbols

1
2
3
4
5
6
7
Spare Parts

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Designation</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Filter bowl D 042</td>
<td>D 044.0101</td>
</tr>
<tr>
<td>1</td>
<td>Filter bowl D 062</td>
<td>D 064.0101</td>
</tr>
<tr>
<td>2</td>
<td>O-ring 50 x 2</td>
<td>N 007.0501</td>
</tr>
<tr>
<td>3</td>
<td>Filter element (with seal)</td>
<td>see Chart / col. 9</td>
</tr>
<tr>
<td>4</td>
<td>Hexagonal head screw M4 x 8</td>
<td>3301051</td>
</tr>
<tr>
<td>5</td>
<td>Bonded seal 4,1 x 7,2 x 1</td>
<td>3404074</td>
</tr>
</tbody>
</table>

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 DIN and ISO standards:

- **DIN ISO 2941**: Verification of collapse/burst resistance
- **DIN ISO 2943**: Verification of material compatibility with fluids
- **DIN ISO 3724**: Verification of flow fatigue characteristics
- **ISO 2942**: Verification of fabrication integrity (Bubble Point Test)
- **ISO 3968**: Evaluation of pressure drop versus flow characteristics
- **ISO 16889**: Multi-Pass-Test (evaluation of filter fineness and dirt-holding capacity)

Before release into the series production the filter casing is tested for fatigue strength in our pressure pulse test rig. Various quality controls during the production process guarantee the leakfree function and solidity of our filters.

Our engineers will be glad to advice you in questions concerning filter application, selection as well as the cleanliness class of the filtered medium attainable under practical operating conditions.

Illustrations may sometimes differ from the original. ARGO-HYTOS is not responsible for any unintentional mistake in this specification sheet.
Pressure Filters

D 162 • D 232 • D 332

- In-line mounting
- Operating pressure up to 63 bar
- Nominal flow rate up to 300 l/min
**Description**

**Application**
In the pressure circuits of hydraulic and lubrication systems.

**Performance features**

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

**Protection against malfunction:** Through installation near to the control valves or other expensive components. The specific determined flow rate guarantees a closed by-pass valve even at $v \leq 200 \text{ mm/s}$ (cold start condition).

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

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

**Materials**

- **Filter head:** Aluminium alloy
- **Filter bowl:** Aluminium alloy
- **Seals:** NBR (Viton on request)
- **Filter media:** EXAPOR®MAX - inorganic multi-layer microfibre web
  Paper - cellulose web, impregnated with resin

**Accessories**
Electrical and/or optical clogging indicators are available - optionally with one or two switching points resp. temperature suppression.
Dimensions and technical data see catalogue sheet 60.30.

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**Characteristics**

**Operating pressure**
0 ... 40 bar, min. $10^7$ pressure cycles
Nominal pressure according to DIN 24550

0 ... 63 bar, min. $10^4$ pressure cycles
Quasi-static operating pressure

**Permissible pressures for other numbers of cycles**

<table>
<thead>
<tr>
<th>Operating pressure $p$ [bar]</th>
<th>Number of cycles $n$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>75</td>
</tr>
<tr>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>50</td>
<td>25</td>
</tr>
<tr>
<td>75</td>
<td>0</td>
</tr>
</tbody>
</table>

**Nominal flow rate**
Up to 300 l/min (see Selection Chart, column 2)
The nominal flow rates indicated by ARGO-HYTOS are based on the following features:
- closed by-pass valve at $v \leq 200 \text{ mm/s}$
- element service life $> 1000$ operating hours at an average fluid contamination of 0,07 g per l/min flow volume
- flow velocity in the connection lines:
  - up to 40 bar $\leq 4,5 \text{ m/s}$
  - up to 250 bar $\leq 8 \text{ m/s}$

**Filter fineness**
5 µm (c) ... 30 µm (c)
$\beta$-values according to ISO 16889
(see Selection Chart, column 4 and diagram D)

**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 or HETG, see info-sheet 00.20)

**Temperature range**
-30 °C ... + 100 °C (temporary -40 °C ... + 120 °C)

**Viscosity at nominal flow rate**
- at operating temperature: $v < 60 \text{ mm²/s}$
- as starting viscosity: $v_{\text{max}} = 1200 \text{ mm²/s}$
- at initial operation: 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 intersects the $\Delta p$ curve at a point. Read this point on the horizontal axis for the viscosity.

**Mounting position**
Preferably vertical, filter head on top

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

**Electrical clogging indicator**
- **Switching voltage:** max. 120 V AC / 175 V DC
- **Switching current:** max. 0,17 A AC / 0,25 A DC
- **Switching power:** max. 3,5 VA AC / 5 W DC
- **Type of contact:** change-over
- **Electrical protection:** IP 65 (with mounted and secured socket)
Diagrams

Δp-curves for complete filters in Selection Chart, column 3

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

**D2**
Pressure drop as a function of the flow volume
at \( \nu = 35 \text{ mm}^2/\text{s} \) (\( 0 = \) casing empty)

**D3**
Pressure drop as a function of the flow volume
at \( \nu = 35 \text{ mm}^2/\text{s} \) (\( 0 = \) casing empty)

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- and Paper elements:

- **5 E-X** = \( \beta_{(5 \text{E-X})} \) = 200 EXAPOR®MAX
- **8 E-X** = \( \beta_{(8 \text{E-X})} \) = 200 EXAPOR®MAX
- **12 E-X** = \( \beta_{(12 \text{E-X})} \) = 200 EXAPOR®MAX
- **16 E-X** = \( \beta_{(16 \text{E-X})} \) = 200 EXAPOR®MAX
- **30 P** = \( \beta_{(30 \text{P})} \) = 200 Paper

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

For special applications, finenesses differing from these curves are also available by using special composed filter material.
**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 acknowledgements show both items separately.**

**Order example:** The Filter D 232-256 has to be supplied with optical clogging indicator - response pressure 2,0 bar.

**Order description:**

<table>
<thead>
<tr>
<th>Part No. (basic unit)</th>
<th>D 232-256</th>
<th>DG 042-01</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clogging indicator</td>
<td>D 232-256 ED</td>
<td>(electrical differential pressure indicator)</td>
<td></td>
</tr>
</tbody>
</table>

For the appropriate clogging indicator see catalogue sheet 60.30.

Besides these mounted clogging indicators we also offer - with a certain order quantity - clogging indicators integrated in the filter head (as listed under "dimensions").

**Order examples:**

D 232-256 OD (optical differential pressure indicator)

\{ the switching pressure matches the cracking pressure of the by-pass valve \}

**Remarks:**

- The switching pressure of the clogging indicator has always to be lower than the cracking pressure of the by-pass valve (see Selection Chart, column 7).
- The filters listed in this chart are standard filters. Other designs available on request.

* Paper media supported with metal gauze
Dimensions

Clogging indicator optional:
Pressure holes plugged with screws M4

Version with electrical clogging indicator
DG 041

Minimum distance from ferromagnetic parts: 7 mm

Version ED with integrated electrical clogging indicator

Minimum distance from ferromagnetic parts: 7 mm

Version OD with integrated optical clogging indicator

Terminal connection

Measurements

| Type | A/B   | C   | D   | E   | F   | G   | H   | I   | K   | L   | M   | N   | O   | P   | Q   | R   | S   | T   | U   | V   | W   | X   |
|------|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| D 162| G1¼   | 61  | 232 | 38  | 62  | 140 | 95  | 80  | 32  | 80  | M12/18 | 116 | SW60 | 34  | 17  | 115 | 34  | 66  | 66  | 44  | 30  | 49  | 30  |
| D 232| G1¼, G1½ | 61 | 296 | 38  | 62  | 140 | 95  | 80  | 32  | 80  | M12/18 | 116 | SW60 | 34  | 17  | 115 | 34  | 66  | 66  | 44  | 30  | 49  | 30  |
| D 332| G1¼, G1½ | 61 | 396 | 38  | 62  | 140 | 95  | 80  | 32  | 80  | M12/18 | 116 | SW60 | 34  | 17  | 115 | 34  | 66  | 66  | 44  | 30  | 49  | 30  |

Symbols

1  2  3  4  5  6  7
Spare Parts

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 DIN and ISO standards:

DIN ISO 2941  Verification of collapse/burst resistance
DIN ISO 2943  Verification of material compatibility with fluids
DIN ISO 3724  Verification of flow fatigue characteristics

ISO 2942  Verification of fabrication integrity (Bubble Point Test)
ISO 3968  Evaluation of pressure drop versus flow characteristics
ISO 16889  Multi-Pass-Test (evaluation of filter fineness and dirt-holding capacity)

Before release into the series production the filter casing is tested for fatigue strength in our pressure pulse test rig. Various quality controls during the production process guarantee the leakfree function and solidity of our filters.

Our engineers will be glad to advice you in questions concerning filter application, selection as well as the cleanliness class of the filtered medium attainable under practical operating conditions.

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Subject to change · 9107174-e · 09.05