

Return Filters

E 303 · E 503 · E 703

- Tank top mounting
- Connection up to SAE 2½
- Nominal flow rate up to 780 l/min

Description

Application

In the return line circuits of hydraulic 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: 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 clear 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.

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 cover: Steel
Filter head: Aluminium alloy
Filter bowl: Steel
Seals: NBR (Viton on request)
Filter media: EXAPOR®MAX - inorganic multi-layer microfibre web

Accessories

Extension pipes or diffusers are available on the bowl outlet.

Extension pipe: A correct extension pipe length ensures oil outlet below minimum oil level and prevents foaming.

Diffuser: Diffusers reduce oil velocity and direct the oil to 90° outlet flow. This function prevents also oil foaming and whirling up of solid particles settled at the tank bottom. The mesh screen element filters the oil in case of an open by-pass valve.

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

Characteristics

Nominal flow

Up to 780 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 $\leq 4,5 \text{ m/s}$

Connection

SAE-flange (3000 psi). Sizes see Selection Chart, column 6 (other port threads on request)

Filter fineness

5 $\mu\text{m(c)}$... 16 $\mu\text{m(c)}$

β -values according to ISO 16889

(see Selection Chart, column 4 and Diagram Dx)

Dirt-holding capacity

Values in g test dust ACFTD according to ISO 16889

(see Selection Chart, column 5)

Hydraulic fluids

Mineral oil and biodegradable fluids
(HEES and 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 first 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% Δp of the cracking pressure of the by-pass valve on the vertical axis. Draw a horizontal line so that it intersects the Δp curve at a point. Read this point on the horizontal axis for the viscosity.

Operating pressure

Max. 10 bar

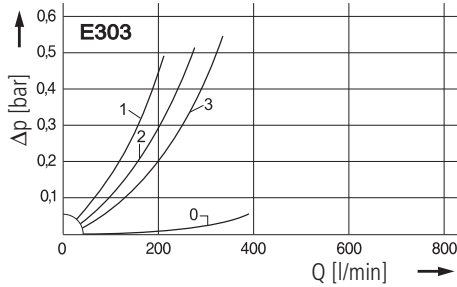
Mounting position

Preferably vertical, outlet downwards

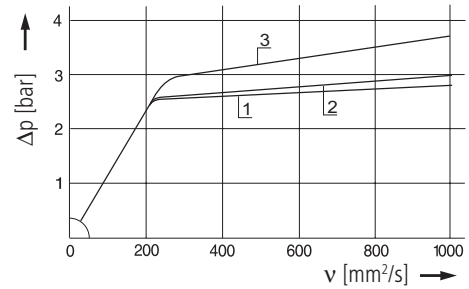
Diagrams

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

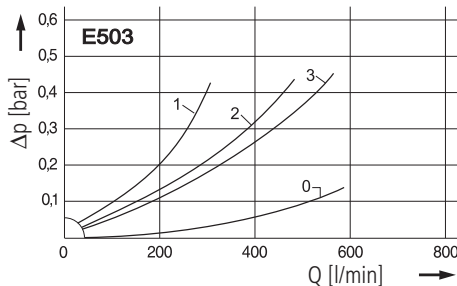
D1 Pressure drop as a function of the **flow volume** at $v = 35 \text{ mm}^2/\text{s}$ (0=casing empty)



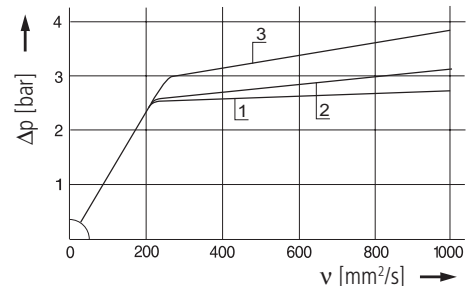
Pressure drop as a function of the **kinematic viscosity** at nominal flow



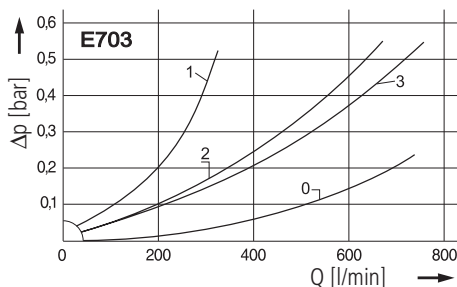
D2 Pressure drop as a function of the **flow volume** at $v = 35 \text{ mm}^2/\text{s}$ (0=casing empty)



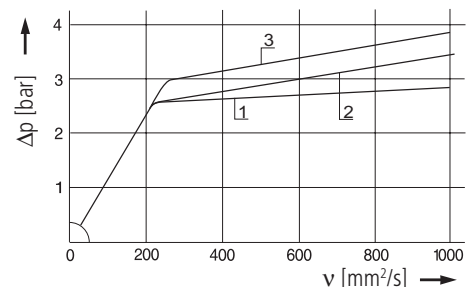
Pressure drop as a function of the **kinematic viscosity** at nominal flow



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

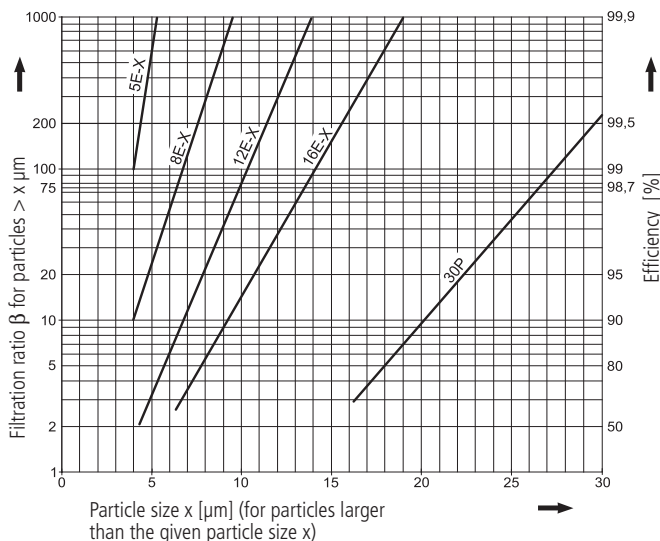


Pressure drop as a function of the **kinematic viscosity** at nominal flow



Filter fineness curves in Selection Chart, column 4

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



The abbreviations represent the following β -values resp. finenesses:

For EXAPOR®MAX- and Paper elements:

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

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

For screen elements:

- 40 S** = screen material with mesh size 40 μm
 - 60 S** = screen material with mesh size 60 μm
 - 100 S** = screen material with mesh size 100 μm
- Tolerances for mesh size according to DIN 4189.

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

Selection Chart

| Part No. | Nominal flow rate Pressure drop Diagram D /curve no. | Filter fineness no. Dirt-holding capacity Connection A SAE (3000 psi) | Cracking pressure of by-pass Symbol | Replacement filter element Part no. | Weight | Remarks | |
|-----------|---|--|--|--|------------|---------|----|
| 1 | l/min | g | bar | 8 | 9 | 10 | 11 |
| E 303-253 | 160 D1/1 | 5 E-X 68 | SAE2½ + G1 2,5 | 1 | V2.1425-23 | 8,9 | - |
| E 303-256 | 280 D1/2 | 12 E-X 110 | SAE2½ + G1 2,5 | 1 | V2.1425-26 | 8,9 | - |
| E 303-258 | 340 D1/3 | 16 E-X 115 | SAE2½ + G1 2,5 | 1 | V2.1425-28 | 8,9 | - |
| E 503-253 | 260 D2/1 | 5 E-X 110 | SAE2½ + G1 2,5 | 1 | V2.1440-23 | 11,7 | - |
| E 503-256 | 450 D2/2 | 12 E-X 180 | SAE2½ + G1 2,5 | 1 | V2.1440-26 | 11,7 | - |
| E 503-258 | 550 D2/3 | 16 E-X 190 | SAE2½ + G1 2,5 | 1 | V2.1440-28 | 11,7 | - |
| E 703-253 | 390 D3/1 | 5 E-X 170 | SAE2½ + G1 2,5 | 1 | V2.1460-23 | 15,4 | - |
| E 703-256 | 680 D3/2 | 12 E-X 270 | SAE2½ + G1 2,5 | 1 | V2.1460-26 | 15,4 | - |
| E 703-258 | 780 D3/3 | 16 E-X 290 | SAE2½ + G1 2,5 | 1 | V2.1460-28 | 15,4 | - |

All filters are delivered with a plugged clogging indicator connection M 12x1,5. (Mounting holes for differential pressure switches on request). As clogging indicators either manometers or electrical pressure switches can be used. Two different head pieces with three various connecting options are available. All filters can also be supplied with an outlet diffuser. 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 703-256 has to be supplied with 4 connections (A1, A2, A3 and A4) and an extension pipe for 800 mm length.

Order description: E 703- 456 / RV / EV 800

Connections:

four various options are available

two connections (A und A4)¹ - SAE2½ and G1 ————— 2

four connections (A1, A2, A3 and A4) - 2 x G1¼ / SAE1½, G¾ and G1 ————— 4

Bowl outlet:

two various options are available

VD - Outlet diffuser, RV - Only extension pipe

Extension pipe²:

four various lengths are available

EV = K (Bowl length) + 64 / + 164 / + 264 / + 454 mm (see section dimensions and measurements)

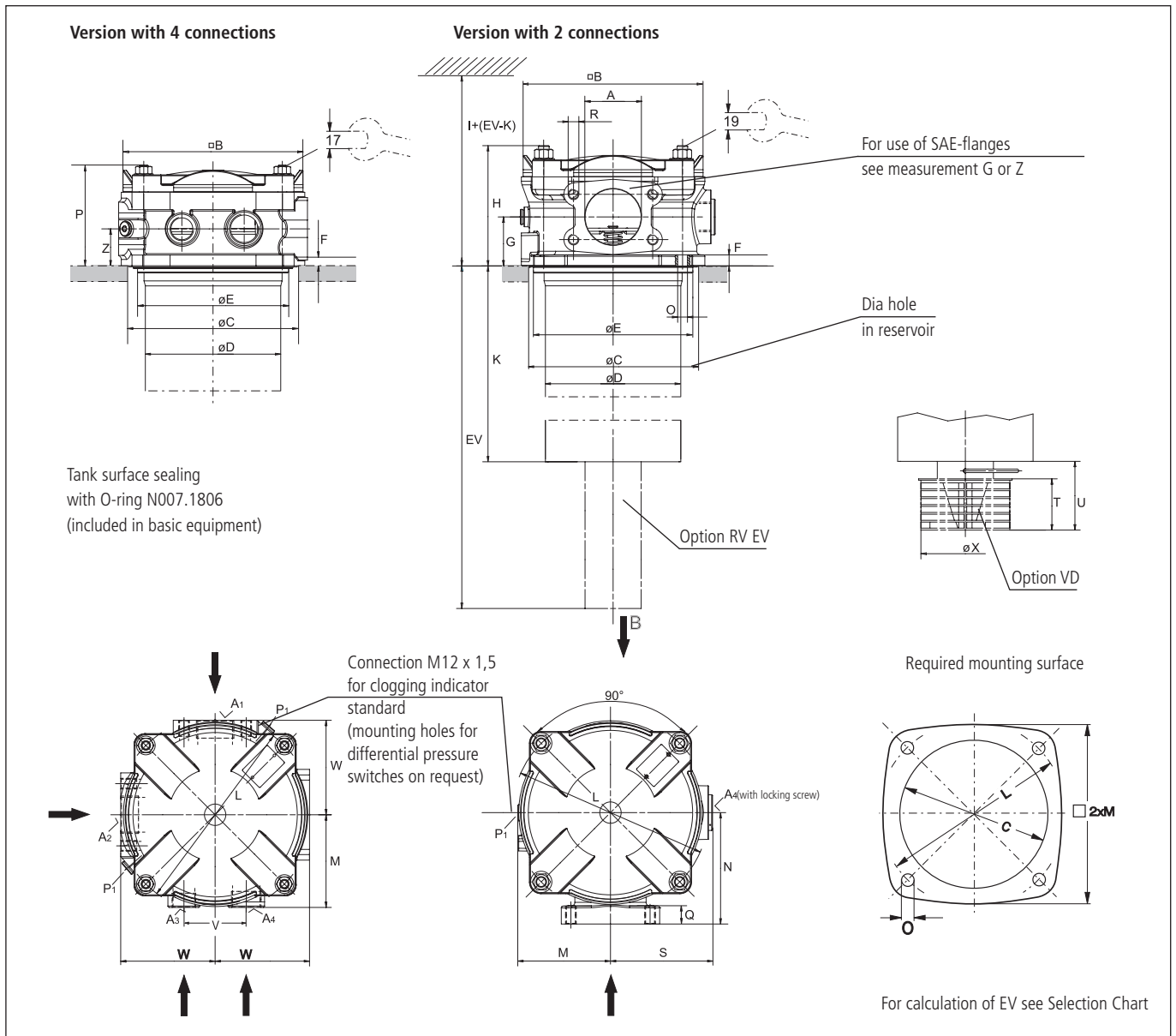
For the appropriate clogging indicators see catalogue sheet 60.20.

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).
- The 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.

¹ Connection G1 (A4) with locking screw ² On request an outlet diffuser can be combined with an extension pipe

Dimensions

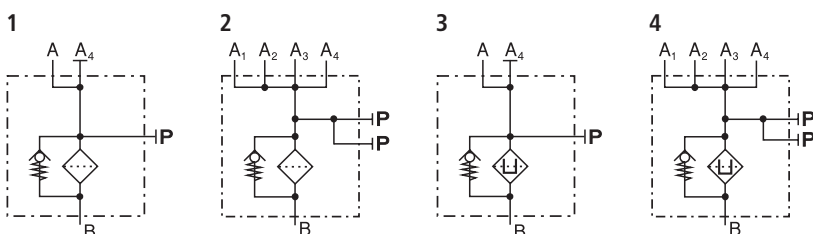


Measurements

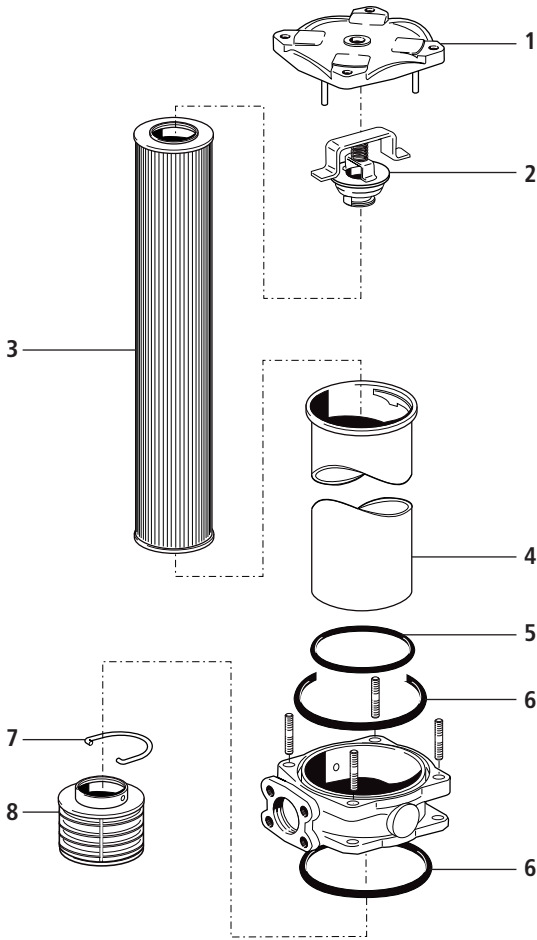
| Type | A | B | C | D | E | F | G | H | I | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Z |
|-------|-----------|-----|-----|-----|-----|----|----|-----|-----|-----|-----|-----|-----|-------|-----|----|-----|-----|----|----|----|-----|-----|------|
| E 303 | see | 182 | 180 | 152 | 179 | 12 | 55 | 133 | 400 | 276 | 220 | 104 | 125 | 11,5* | 113 | 20 | M12 | 115 | 58 | 79 | 70 | 106 | 100 | 41,5 |
| E 503 | Selection | 182 | 180 | 152 | 179 | 12 | 55 | 133 | 550 | 430 | 220 | 104 | 125 | 11,5* | 113 | 20 | M12 | 115 | 58 | 79 | 70 | 106 | 100 | 41,5 |
| E 703 | Chart | 182 | 180 | 152 | 179 | 12 | 55 | 133 | 810 | 636 | 220 | 104 | 125 | 11,5* | 113 | 20 | M12 | 115 | 58 | 79 | 70 | 106 | 100 | 41,5 |

* for M10

Symbols



Spare Parts



| Pos. | Designation | Part No. |
|------|----------------------------|--------------------|
| 1 | Cover assy (2 connections) | E 303.1200 |
| 1 | Cover (4 connections) | E 703.2202 |
| 2 | By-pass assy (2,5 bar) | E 703.1510 |
| 3 | Filter elements | see Chart / col. 9 |
| 4 | Filter bowl E 303* | E 303.1900 |
| 4 | Filter bowl E 503* | E 503.1910 |
| 4 | Filter bowl E 703* | E 703.1900 |
| 5 | O-ring 145,42 x 5,33 | N007.1455 |
| 6 | O-ring 180 x 6 | N007.1806 |
| 7 | Clip (only option VD) | N026.0311 |
| 8 | Diffuser (only option VD) | E 703.0701 |

* Please indicate options (VD, VDEV resp. RVEV)

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 ISO 3968 ISO 16889

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

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.



We produce fluid power solutions

ARGO-HYTOS GMBH · Industriestraße 9 · D-76703 Kraichtal

Tel: +49 7250 76-0 · Fax: +49 7250 76-199 · info.de@argo-hytos.com · www.argo-hytos.com