



Return Filters

**E 440 · E 450 · E 460
E 640 · E 700**

- Tank mounting
- Nominal flow rate up to 800 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

Installation: Installation directly into a separate tank section for the return oil. This solution allows a number of return line connections and does not show any restriction by a filter head.

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
- high dirt-holding capacities
- low pressure drop
- 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 bowl: Steel

Seals: NBR (FPM on request)

Filter media: EXAPOR®MAX 2 - inorganic multi-layer microfibre web
Paper - cellulose web, impregnated with resin

Accessories

Extension pipes and diffusers on the bowl outlet are available on request.

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

Diffusers: 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.

Electrical and optical clogging indicators are available on request.

Dimensions and technical data see catalogue sheet 60.20.

Characteristics

Nominal flow rate

Up to 800 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 > 1.000 operating hours at an average fluid contamination of 0,07 g per l/min flow volume
- flow velocity in the connection lines $\leq 4,5 \text{ m/s}$

Installation

Tank immersed installation in a separate return oil chamber of the reservoir.

Filter fineness

10 $\mu\text{m(c)}$... 30 $\mu\text{m(c)}$

β -values according to ISO 16889

(see Selection Chart, column 4 and diagram Dx)

Dirt-holding capacity

Values in g test dust 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)

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: $v_{\text{max}} = 1.200 \text{ mm}^2/\text{s}$

• 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 % 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

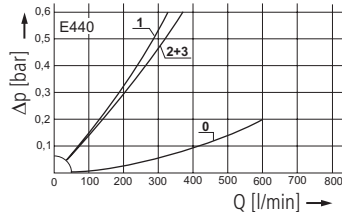
Mounting position

Preferably vertical, outlet downwards

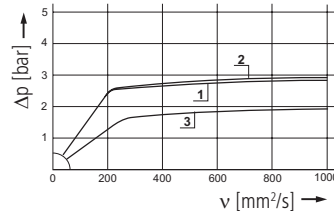
Diagrams

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

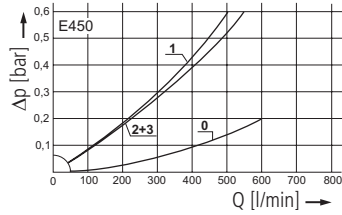
D1 Pressure drop as a function of the **flow volume** at $v = 35 \text{ mm}^2/\text{s}$ (0=casing empty)



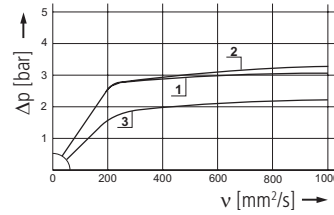
Pressure drop as a function of the **kinematic viscosity** at nominal flow



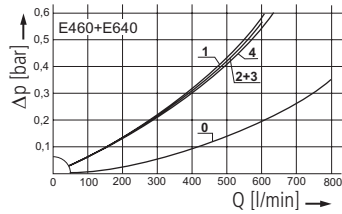
D2 Pressure drop as a function of the **flow volume** at $v = 35 \text{ mm}^2/\text{s}$ (0=casing empty)



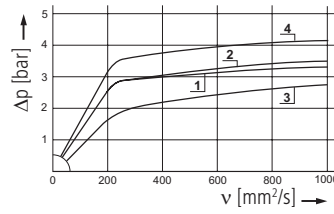
Pressure drop as a function of the **kinematic viscosity** at nominal flow



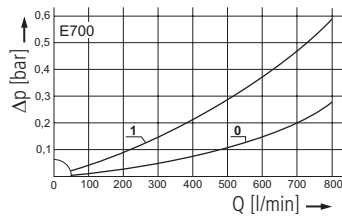
D3 Pressure drop as a function of the **flow volume** at $v = 35 \text{ mm}^2/\text{s}$ (0=casing empty)



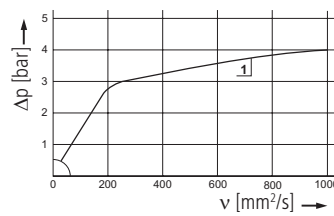
Pressure drop as a function of the **kinematic viscosity** at nominal flow



D4 Pressure drop as a function of the **flow volume** at $v = 35 \text{ mm}^2/\text{s}$ (0=casing empty)

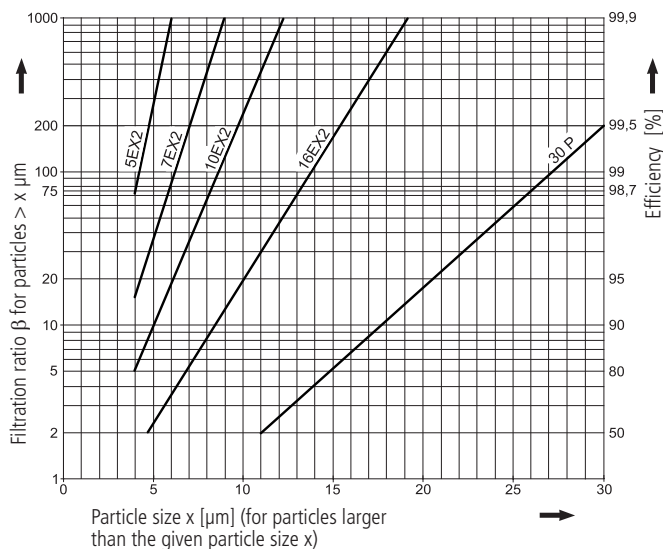


Pressure drop as a function of the **kinematic viscosity** at nominal flow



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 2- and Paper elements:

5EX2 = $\beta_{5(c)} = 200$ EXAPOR®MAX 2

7EX2 = $\beta_{7(c)} = 200$ EXAPOR®MAX 2

10EX2 = $\beta_{10(c)} = 200$ EXAPOR®MAX 2

16EX2 = $\beta_{16(c)} = 200$ EXAPOR®MAX 2

30P = $\beta_{30(c)} = 200$ 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 special applications, finenesses differing from these curves are also available by using special composed filter material.

Selection Charts

Part No.	Nominal flow rate Pressure drop see diagram D /curve no.	Filter fineness see Diagr. Dx	Dirt-holding capacity	Connection A	Cracking pressure of by-pass Symbol	Replacement filter element Part No.	Weight	Remarks		
1	2	3	4	5	6	7	8	9	10	11
	l/min			g		bar			kg	
E 440-156	200	D1/1	10EX2	61	-	2,5	1	V2.1217-36	2,4	-
E 440-168	270	D1/2	16EX2	62	-	2,5	1	V2.1217-08	2,4	-
E 440-153	175	D1/3	30P	29	-	1,5	1	P2.1217-21 ¹	2,4	-
E 450-156	375	D2/1	10EX2	122	-	2,5	1	2 x V2.1217-36	4,1	-
E 450-168	480	D2/2	16EX2	124	-	2,5	1	2 x V2.1217-08	4,1	-
E 450-153	350	D2/3	30P	58	-	1,5	1	2 x P2.1217-21 ¹	4,1	-
E 460-156	500	D3/1	10EX2	183	-	2,5	1	3 x V2.1217-36	5,8	-
E 460-168	600	D3/2	16EX2	186	-	2,5	1	3 x V2.1217-08	5,8	-
E 460-153	480	D3/3	30P	87	-	1,5	1	3 x P2.1217-21 ¹	5,8	-
E 640-76	680	D3/4	10EX2	250	-	3,0	1	V2.1260-26	7,5	-
E 700-156	800	D4/1	10EX2	300	-	2,5	1	V2.1460-26	12,4	-

As clogging indicators either manometers or electrical pressure switches can be used. 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 450-156 has to be supplied with an outlet diffuser and an extension pipe (EV) for 580 mm length.

Order description: E 450-156 / VD / EV 580

Part No. (Basic unit) _____

Options

Two various options are available
 VD: Outlet diffuser, RV: Extension pipe

Extension pipes:

7 various lengths are available
 E 440 / E 450 / E 460 / E 640
 EV = K + 81 / + 136 / + 196 / + 231 / + 356 / + 446 / + 626 mm (see section dimensions and measurements)
 E 700
 EV on request.

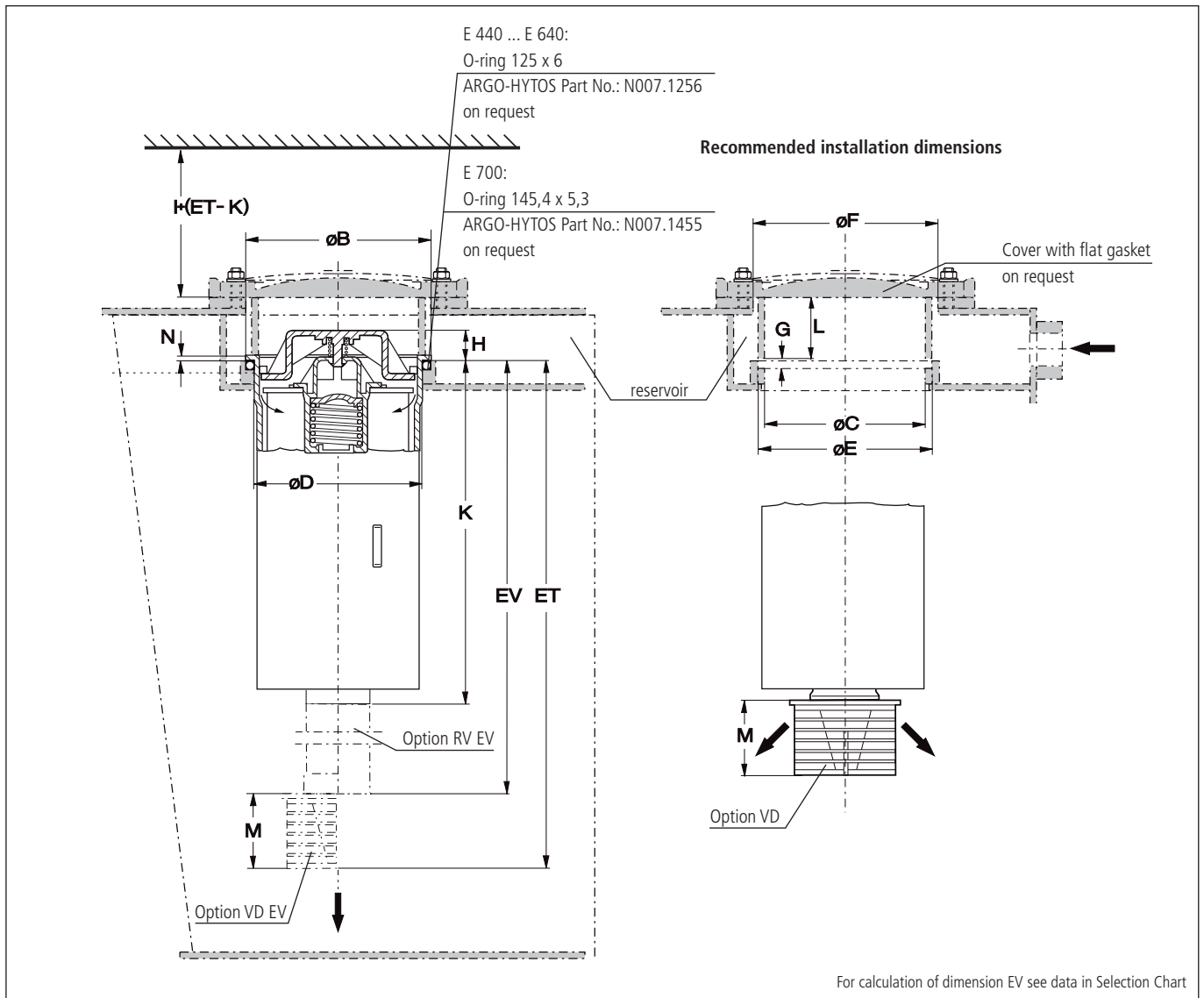
For the appropriate clogging indicators see catalogue sheet 60.20.

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 are available on request.

¹ Paper media supported with metal gauze

Dimensions

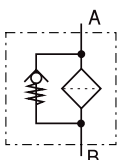


Measurements

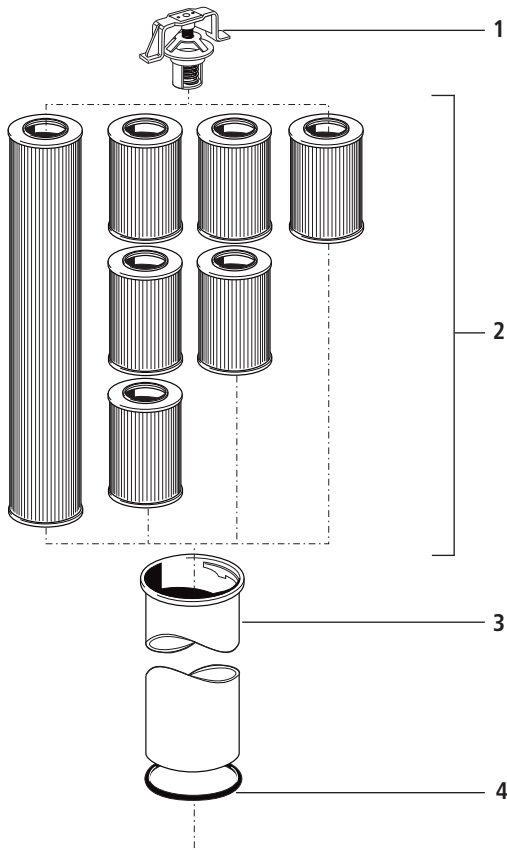
Type	A	B	C	D	E	F	G	H	I	K	L	M	N
E 440	-	142 ⁺²	132	130,5	145	>145	6,5	26	250	217	48	58	1,5
E 450	-	142 ⁺²	132	130,5	145	>145	6,5	26	410	384	48	58	1,5
E 460	-	142 ⁺²	132	130,5	145	>145	6,5	26	580	552	48	58	1,5
E 640	-	142 ⁺²	132	130,5	145	>145	6,5	26	680	650	48	58	1,5
E 700	-	167 ⁺²	155	155	170	>170	6,5	27	700	651	82	58	1,5

Symbols

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Spare Parts



Pos.	Designation	Part No.
1	By-pass (1,5 bar)	E 440.1500
1	By-pass (2,5 bar)	E 460.1520
1	By-pass (3,0 bar)	E 640.1510
1	By-pass (2,5 bar) for E 700	E 703.1510
2	Filter elements	see Chart. / col. 9
3	Filter bowl E 440 ¹	E 440.1960
3	Filter bowl E 450 ¹	E 450.1906
3	Filter bowl E 460 ¹	E 460.1915
3	Filter bowl E 640 ¹	E 640.1910
3	Filter bowl E 700	E 700.1900
4.1	O-ring 125 x 6 ²	N007.1256
4.2	O-ring 145,4 x 5,3 (for E 700) ²	N007.1455

¹ Please indicate options (VD, VDEV and RVEV respectively)

² Not included in basic equipment

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.

Our engineers will be glad to advise 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

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