ARGO HYTOS

Return Filters

E 440 · E 450 · E 460
E 640 · E 700

- Tank mounting
- Nominal flow rate up to 680 l/min

20.60-3e

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 (Viton on request)
Filter media: EXAPOR®MAX - inorganic multi-layer microfibre web
Paper - cellulose web, impregnated with resin

Accessories
Extension pipes and diffusers are available on the bowl outlet.
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. 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 rate
Up to 680 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 $\nu \leq 200$ mm²/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 ≤ 4,5 m/s

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

Filter fineness
12 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 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: $\nu < 60$ mm²/s
- as starting viscosity: $\nu_{max} = 1200$ mm²/s
- at first operation: The recommanded 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

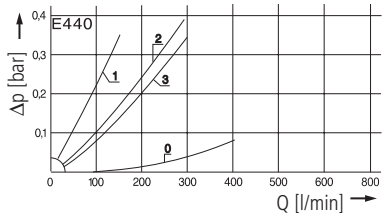
Mounting position
Preferably vertical, outlet downwards

Diagrams

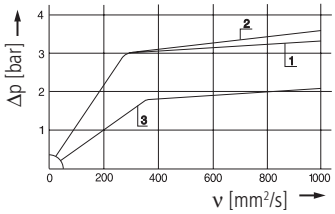
Δp-curves for complete filters in Selection Chart, column 3

D1

Pressure drop as a function of the **flow volume** at ν = 35 mm²/s (0=casing empty)

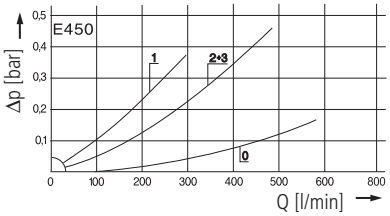


Pressure drop as a function of the **kinematic viscosity** at nominal flow

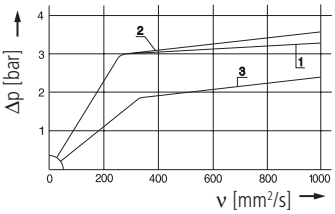


D2

Pressure drop as a function of the **flow volume** at ν = 35 mm²/s (0=casing empty)

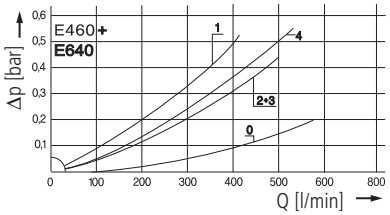


Pressure drop as a function of the **kinematic viscosity** at nominal flow

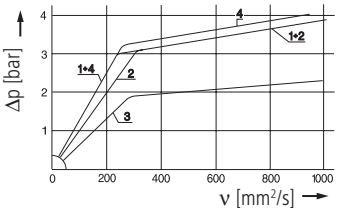


D3

Pressure drop as a function of the **flow volume** at ν = 35 mm²/s (0=casing empty)

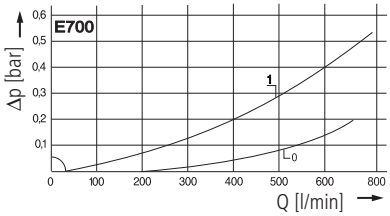


Pressure drop as a function of the **kinematic viscosity** at nominal flow

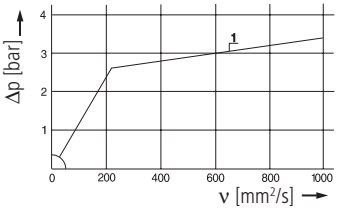


D4

Pressure drop as a function of the **flow volume** at ν = 35 mm²/s (0=casing empty)



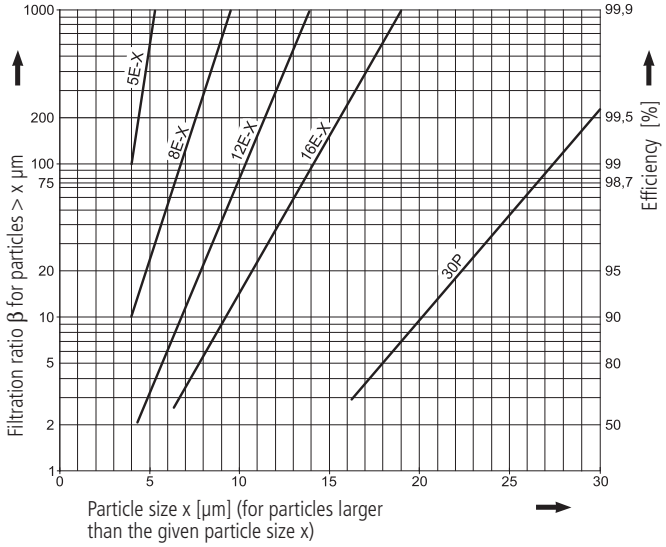
Pressure drop as a function of the **kinematic viscosity** at nominal flow



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	= $\bar{\beta}_{5\,(c)}$	= 200	EXAPOR®MAX
8 E-X	= $\bar{\beta}_{8\,(c)}$	= 200	EXAPOR®MAX
12 E-X	= $\bar{\beta}_{12\,(c)}$	= 200	EXAPOR®MAX
16 E-X	= $\bar{\beta}_{16\,(c)}$	= 200	EXAPOR®MAX
30 P	= $\bar{\beta}_{30\,(c)}$	= 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 material.

Selection Charts

Part No.	Nominal flow	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
	l/min			g		bar			kg	
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
E 440-156	130	**D1**/1	12 E-X	53	-	2,5	1	V2.1217-36	2,4	-
E 440-168	210	**D1**/2	16 E-X	57	-	2,5	1	V2.1217-08	2,4	-
E 440-153	175	**D1**/3	30 P	29	-	1,5	1	P2.1217-21*	2,4	-
E 450-156	260	**D2**/1	12 E-X	106	-	2,5	1	2 x V2.1217-36	4,1	-
E 450-168	410	**D2**/2	16 E-X	114	-	2,5	1	2 x V2.1217-08	4,1	-
E 450-153	350	**D2**/3	30 P	58	-	1,5	1	2 x P2.1217-21*	4,1	-
E 460-156	390	**D3**/1	12 E-X	159	-	2,5	1	3 x V2.1217-36	5,8	-
E 460-168	500	**D3**/2	16 E-X	171	-	2,5	1	3 x V2.1217-08	5,8	-
E 460-153	480	**D3**/3	30 P	87	-	1,5	1	3 x P2.1217-21*	5,8	-
E 640-76	550	**D3**/4	12 E-X	210	-	3,0	1	V2.1260-26	7,5	-
E 700-156	680	**D4**/1	12 E-X	270	-	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 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

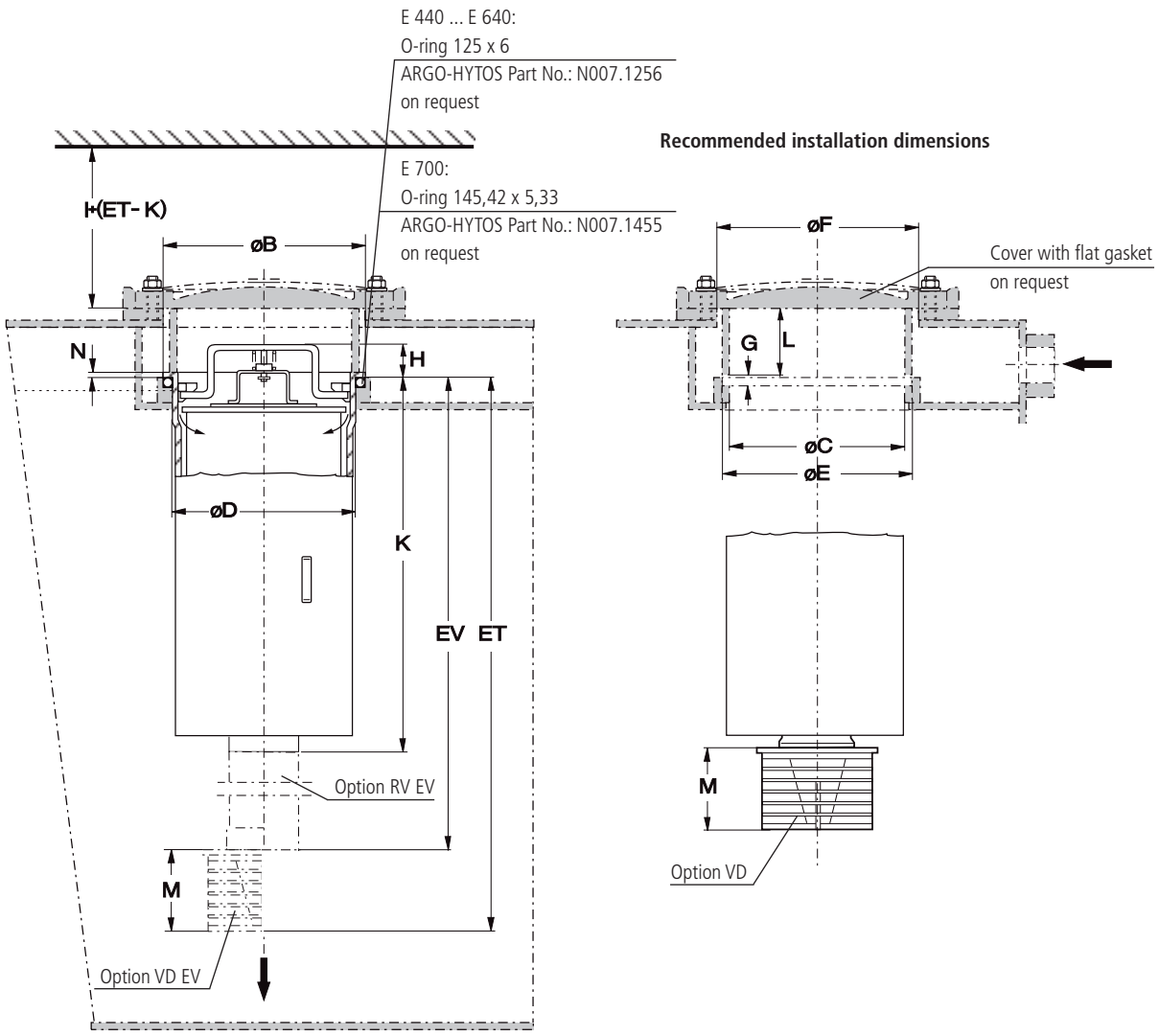
Extension pipes:
7 various lengths are available
E 440 / E 450 / E 460 / E 640
EV = K + 81 / + 136 / + 196 / + 231 / + 356 / + 446 / + 626 mm (see section dimensions and measurements)
E 700
EV on request.

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 e.g. with screen elements (mesh size 450 µm) at the bowl outlet, are available on request.

* Paper media supported with metal gauze

Dimensions



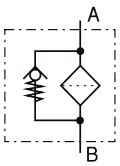
Measurements

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}	156,5	155	170	>170	6,5	27	700	651	82	58	1,5

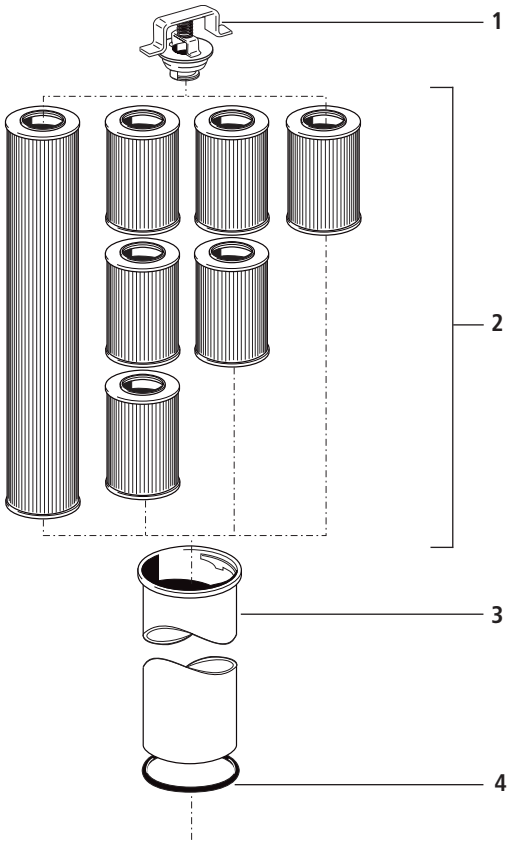
For calculation of EV use data in Selection Chart

Symbols

1



Spare Parts



Pos.	Designation	Part No.
1	By-pass assy (1,5 bar)	E 440.1500
1	By-pass assy (2,5 bar)	E 460.1520
1	By-pass assy (3,0 bar)	E 640.1510
1	By-pass assy (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]	N 007.1256
4.2	O-ring 145,42 x 5,33 [2] for E 700	N 007.1455

[1] Please indicate options (VD, VDEV resp. RVEV)
[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 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)

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.

We produce fluid power solutions
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