ARGO HYTOS

Return Filters

FR 043 · FR 072

- Tank top mounting / In-line mounting
- Hose connection up to ID ¾ inch
- Nominal flow rate up to 18.5 gpm

20.15-5us

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
Connection: Hose nipple
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.
Oil separator: Prevents oil splashing through the breather on mobile application.
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
Housing: Polyamide, CF reinforced, electrically conducting
Seals: NBR (FKM on request)
Filter media: EXAPOR®MAX 2 - inorganic multi-layer microfibre web
Paper - cellulose web, impregnated with resin

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

Recommended hose clamps according to DIN 3017 Part 2 or equivalent for hose OD 0.91 inch or 1.02 inch. For orders use ARGO-HYTOS Part No. 332 70 03 or 332 70 04.

Extension pipes on the bowl outlet are available in several lengths on request. A self-assembly system for installation of extension pipes can be ordered. For detailled information please see catalog sheet 20.390.

Characteristics

Nominal flow rate
Up to 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 $\nu \leq 930$ SUS
- element service life > 1,000 operating hours at an average fluid contamination of 0.27 g per gpm flow volume
- flow velocity in the connection lines ≤ 14.8 ft/s

Connection
Hose nipple for hose up to ID ¾ inch.
Sizes see Selection Chart, column 6 (other connections on request).

Filter fineness
10 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).
With high filling conditions we recommend
an electrical conductivity ≥ 500 pS/m at 68 °F.

Temperature range
- 22 °F ... + 176 °F (short intervals to + 212 °F)

Viscosity at nominal flow rate
- at operating temperature: $\nu < 280$ SUS
- as starting viscosity: $\nu_{max} = 5560$ 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 % 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. 87 psi

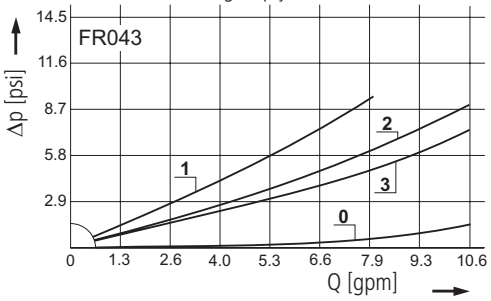
Mounting position
Preferably vertical, outlet downwards

Diagrams

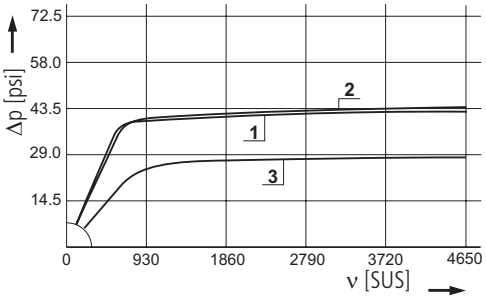
Δp-curves for complete filters in Selection Chart, column 3

D1

Pressure drop as a function of the **flow volume**
at ν = 162 SUS (0 = casing empty)

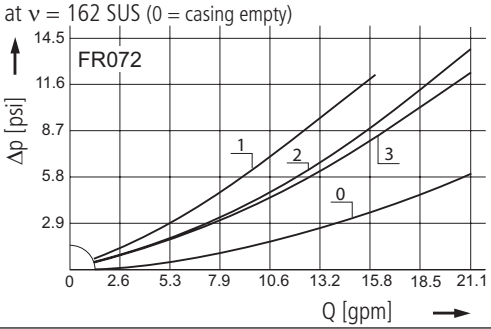


Pressure drop as a function of the **kinematic viscosity**
at nominal flow

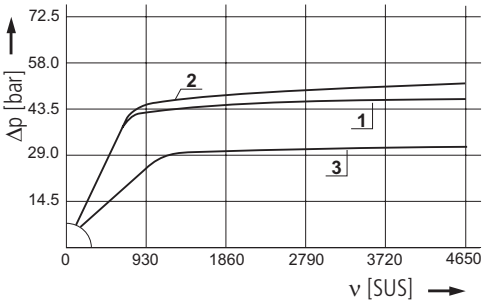


D2

Pressure drop as a function of the **flow volume**
at ν = 162 SUS (0 = casing empty)



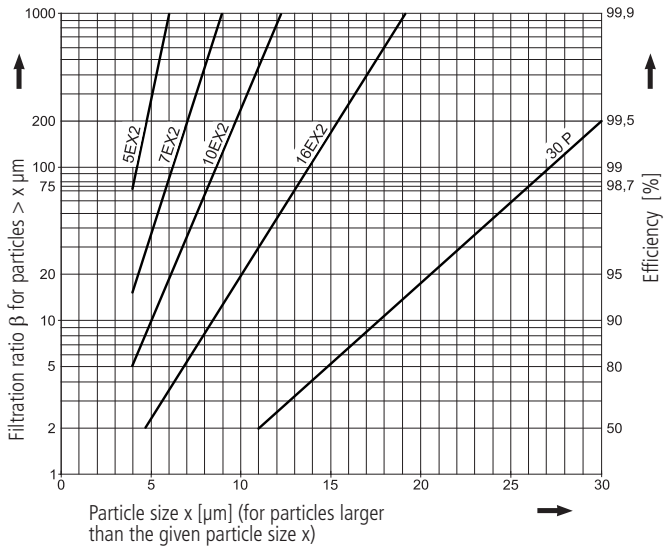
Pressure drop as a function of the **kinematic viscosity**
at nominal flow



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 = $\bar{\beta}_{5\,(c)}$ = 200 EXAPOR®MAX 2
7EX2 = $\bar{\beta}_{7\,(c)}$ = 200 EXAPOR®MAX 2
10EX2 = $\bar{\beta}_{10\,(c)}$ = 200 EXAPOR®MAX 2
16EX2 = $\bar{\beta}_{16\,(c)}$ = 200 EXAPOR®MAX 2
30P = $\bar{\beta}_{30\,(c)}$ = 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 ventilating filter elements:

2CL = 99.5 % filter 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

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	Replacement ventilating filter Part No. (Filter fineness, see diagrams)	Remarks
	gpm			g	inch	psi			lbs		
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
FR 043-256	6.6	**D1**/1	10EX2	6.1	ID 5/8	36	1	V3.0510-56	0.93	-	-
FR 043-266	6.6	**D1**/1	10EX2	6.1	ID 5/8	36	2	V3.0510-56	0.93	L1.0403-51 (2CL)	with oil separator
FR 043-168	9.2	**D1**/2	16EX2	6.1	ID 5/8	36	1	V3.0510-58	0.93	-	-
FR 043-198	9.2	**D1**/2	16EX2	6.1	ID 5/8	36	2	V3.0510-58	0.93	L1.0403-51 (2CL)	with oil separator
FR 043-281	7.9	**D1**/3	30P	4.0	ID 5/8	22	1	P3.0510-51	0.93	-	-
FR 043-291	7.9	**D1**/3	30P	4.0	ID 5/8	22	2	P3.0510-51	0.93	L1.0403-51 (2CL)	with oil separator
FR 072-266	13.2	**D2**/1	10EX2	13	ID ¾	36	1	V3.0520-56	1.28	-	-
FR 072-276	13.2	**D2**/1	10EX2	13	ID ¾	36	2	V3.0520-56	1.28	L1.0403-51 (2CL)	with oil separator
FR 072-188	18.5	**D2**/2	16EX2	13	ID ¾	36	1	V3.0520-58	1.28	-	-
FR 072-258	18.5	**D2**/2	16EX2	13	ID ¾	36	2	V3.0520-58	1.28	L1.0403-51 (2CL)	with oil separator
FR 072-281	13.2	**D2**/3	30P	6.6	ID ¾	22	1	P3.0520-51*	1.28	-	-
FR 072-291	13.2	**D2**/3	30P	6.6	ID ¾	22	2	P3.0520-51*	1.28	L1.0403-51 (2CL)	with oil separator

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 FR 072-276 has to be supplied with an extension pipefor a mounting depth of 500 mm (resp. 19.69 inch).

Order description: **FR 072-276 / EV 500**

Part No. (Basic unit)

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

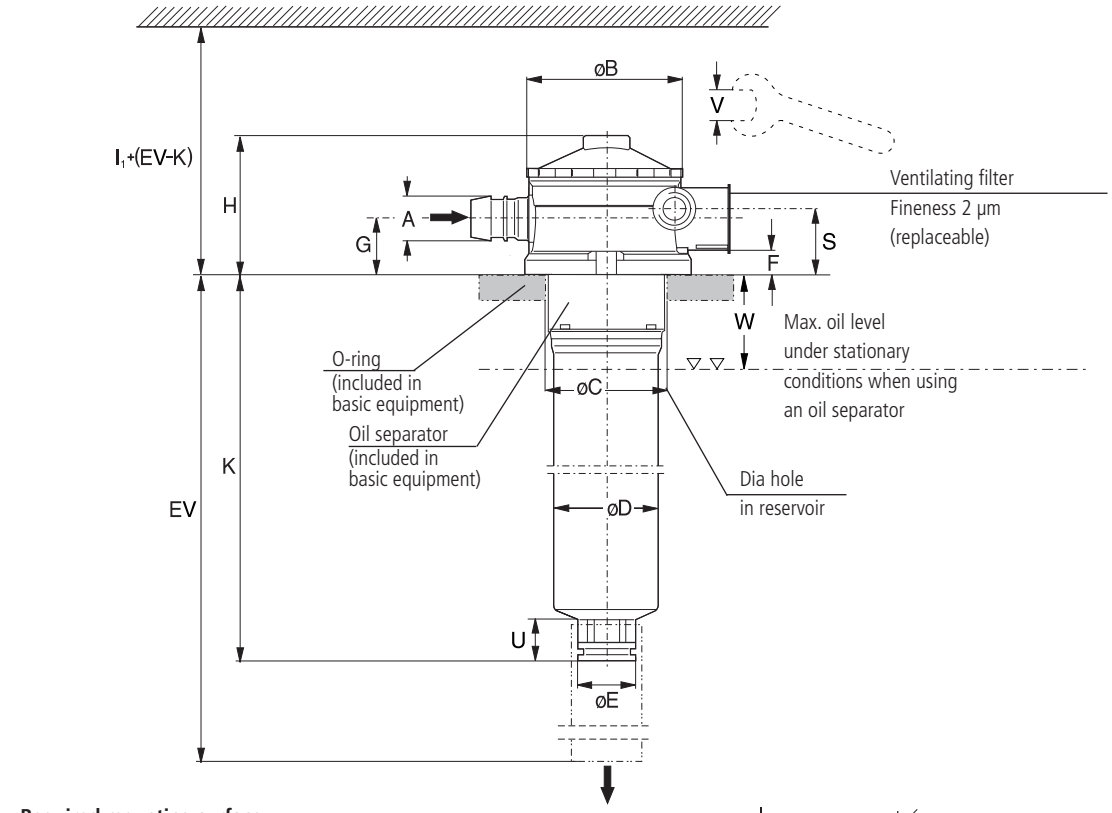
For the appropriate clogging indicator see catalog sheet 60.20.

When using pressure switches of series DG 813 sealing by means of an O-ring (order no. N007.0103, to be ordered separately) has to be guaranteed (torque 4 Nm). When using manometers of series DG 200 variants with preformed sealing ring are to be used.

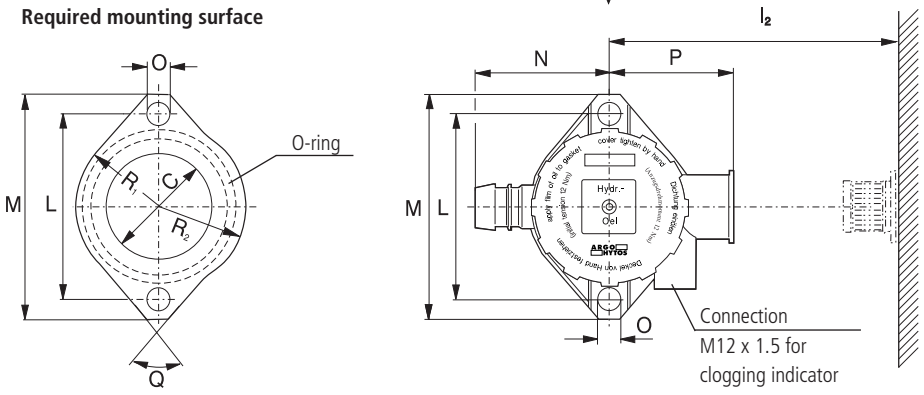
Remarks:
- The switching pressure of the electrical pressure switch has always to be lower than the cracking pressure of the by-pass valve (see Selection Chart, column 7).
- Clogging indicators are optional and always delivered detached from the filter.
- For fastening the filter the enclosed spring washers have to be used. Assembly torque 15^{+5} Nm.
- The filters listed in this chart are standard filters. Other designs available on request.

* Paper media supported with metal gauze

Dimensions



Required mounting surface



For dimension EV see selection chart

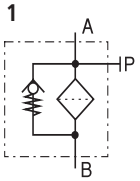
Measurements

Type	A	B	C min./max.	D	E	F*	G	H	I_1	I_2	K	L	M	N	O	P	Q
FR 043	0.69	2.95	2.36/2.40	2.01	1.09	0.43	0.87	2.56	6.89	4.33	3.35	3.46	4.25	2.56	0.43	2.32	80°
FR 072	0.81	2.95	2.36/2.40	2.01	1.09	0.43	0.87	2.56	10.63	4.33	7.17	3.46	4.25	2.56	0.43	2.32	80°
Type	**R_1**	**R_2**	**S**	**U**	**V** mm	**W**											
FR 043	1.54	1.65	1.06	0.79	AF 27	1.57											
FR 072	1.54	1.65	1.06	0.79	AF 27	1.57											

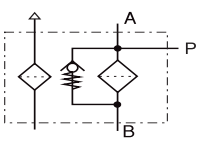
* including the enclosed spring washers Ø10 mm (0.39 inch), DIN 137 shape B, corrugated

Symbols

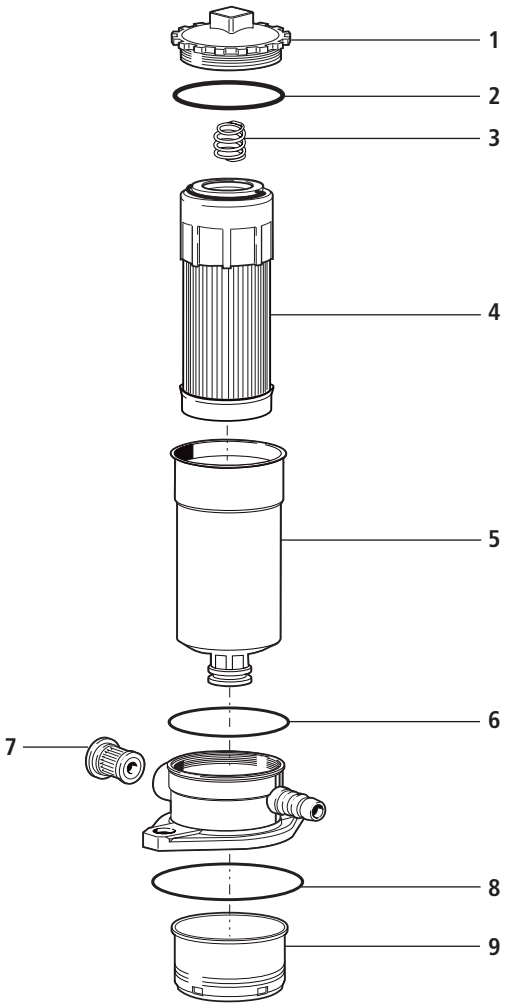
1



2



Spare Parts



Pos.	Designation	Part No.
1	Screw-on cap	FR 043.0201
2	O-ring 2.24 x 0.12	N007.0573
3	Compression spring	N015.1606
4	Filter element	s. Chart / col. 9
5	Filter bowl FR 043 *	FR 043.0107
5	Filter bowl FR 072 *	FR 072.0104
6	O-ring 1.97 x 0.08	N007.0501
7	Ventilating filter	L1.0403-51
8	O-ring 2.72 x 0.16	N007.0704
9	Oil separator	FR 043.0701

* 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.

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.

We produce fluid power solutions
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Subject to change
20.15-5us · 0714