



Return Filters - lightline

FR 043 • FR 072

- Tank top mounting / In-line mounting
- Hose connection up to ID 19 mm
- Nominal flow rate up to 70 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

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: Easy and fast adaption to various lengths.

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

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, GF reinforced*

Seals: NBR (Viton on request)

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

* due to the conductable plastic material no static charge can occur

Accessories

Electrical and optical clogging indicators are available.

Dimensions and technical data see catalogue sheet 60.20.

Recommended hose clamps according to DIN 3017 Part 2 or equivalent for hose OD 23 mm or 26 mm. For orders use ARGO-HYTOS Part No. 332 70 03 or 332 70 04.

For mounting of extension pipes following parts are needed:

Aluminium pipe (Length xxx in mm)	Part No. FR 043.Lxxx
O-ring	Part No. N 007.0203
Crimping tool	Part No. FR 043.1770

Characteristics

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

Connection

Hose nipple for hose up to ID 19 mm. Sizes see Selection Chart, column 6 (other connections on request)

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 or HETG, see info-sheet 00.20)

With high filling conditions we recommend an electrical conductivity $\geq 500 \text{ pS/m}$ at 20 °C.

Temperature range

- 30 °C ... + 80 °C (short intervals to + 100 °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. 6 bar

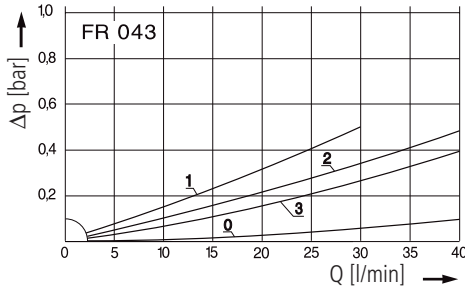
Mounting position

Preferably vertical, outlet downwards

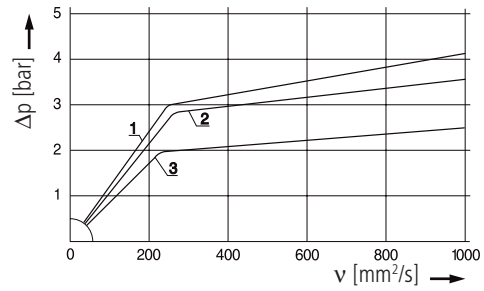
Diagrams

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

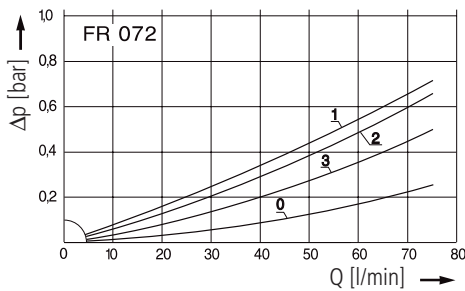
D1 Pressure drop as a function of the **flow volume**
at $v = 35 \text{ mm}^2/\text{s}$ (0 = casing empty)



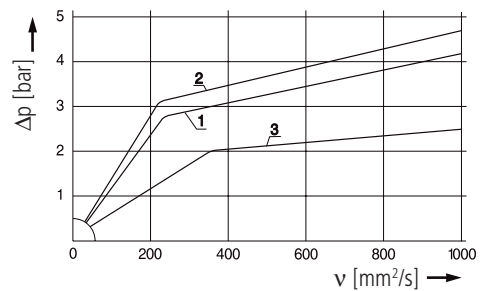
Pressure drop as a function of the **kinematic viscosity**
at nominal flow



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

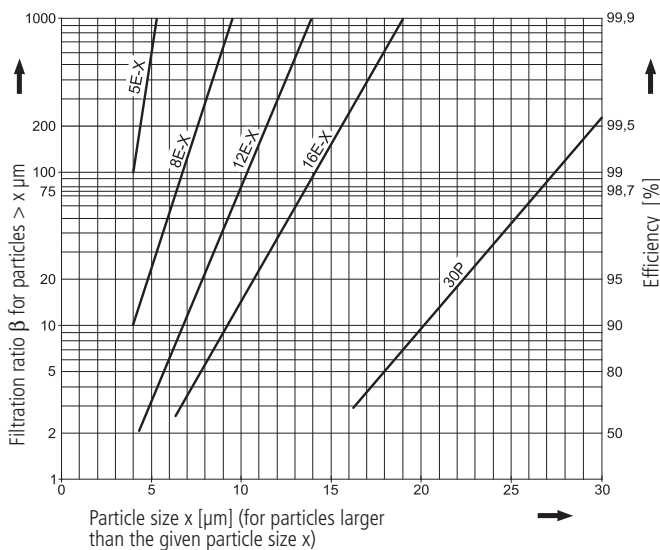


Pressure drop as a function of the **kinematic viscosity**
at nominal flow



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 ventilating filter elements:

- 2 CL** = 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.	N nominal flow Pressure drop see Diagram D/curve no.	Filter fineness see Diagram D/curve no.	Dirt-holding capacity see Diag. Dx	Connection A	Cracking pressure of by-pass Symbol	Replacement filter element Part No.	Weight	Replacement ventilating filter Part No.	Filter fineness see Diagrams	Remarks	
1	l/min	3	g	bar	8	kg	10	11	12		
FR 043-156	25	D1/1	12 E-X	5,3	17,5	2,5	1	V3.0510-56	0,42	L1.0403-51 (2 CL)	-
FR 043-166	25	D1/1	12 E-X	5,3	17,5	2,5	2	V3.0510-56	0,42	L1.0403-51 (2 CL)	M12 x 1,5 for indicator
FR 043-158	35	D1/2	16 E-X	5,7	17,5	2,5	1	V3.0510-58	0,42	L1.0403-51 (2 CL)	-
FR 043-178	35	D1/2	16 E-X	5,7	17,5	2,5	2	V3.0510-58	0,42	L1.0403-51 (2 CL)	M12 x 1,5 for indicator
FR 043-151	30	D1/3	30 P	4,0	17,5	1,5	1	P3.0510-51	0,42	L1.0403-51 (2 CL)	-
FR 043-161	30	D1/3	30 P	4,0	17,5	1,5	2	P3.0510-51	0,42	L1.0403-51 (2 CL)	M12 x 1,5 for indicator
FR 072-156	50	D2/1	12 E-X	11	20,5	2,5	1	V3.0520-56	0,58	L1.0403-51 (2 CL)	-
FR 072-166	50	D2/1	12 E-X	11	20,5	2,5	2	V3.0520-56	0,58	L1.0403-51 (2 CL)	M12 x 1,5 for indicator
FR 072-158	70	D2/2	16 E-X	12	20,5	2,5	1	V3.0520-58	0,58	L1.0403-51 (2 CL)	-
FR 072-168	70	D2/2	16 E-X	12	20,5	2,5	2	V3.0520-58	0,58	L1.0403-51 (2 CL)	M12 x 1,5 for indicator
FR 072-151	50	D2/3	30 P	6,6	20,5	1,5	1	P3.0520-51*	0,58	L1.0403-51 (2 CL)	-
FR 072-171	50	D2/3	30 P	6,6	20,5	1,5	2	P3.0520-51*	0,58	L1.0403-51 (2 CL)	M12 x 1,5 for indicator

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 043-166 has to be supplied with an extension pipe (EV) for a mounting depth of 300 mm.

Order description:

FR 043-166 / EV 300

Part No. (Basic unit) _____

Extension pipe (5 various lengths are available) _____

EV = K + 65 / + 115 / + 215 / + 315 / + 415 (see dimensions and measurements)

For the appropriate clogging indicator see data sheet 60.20.

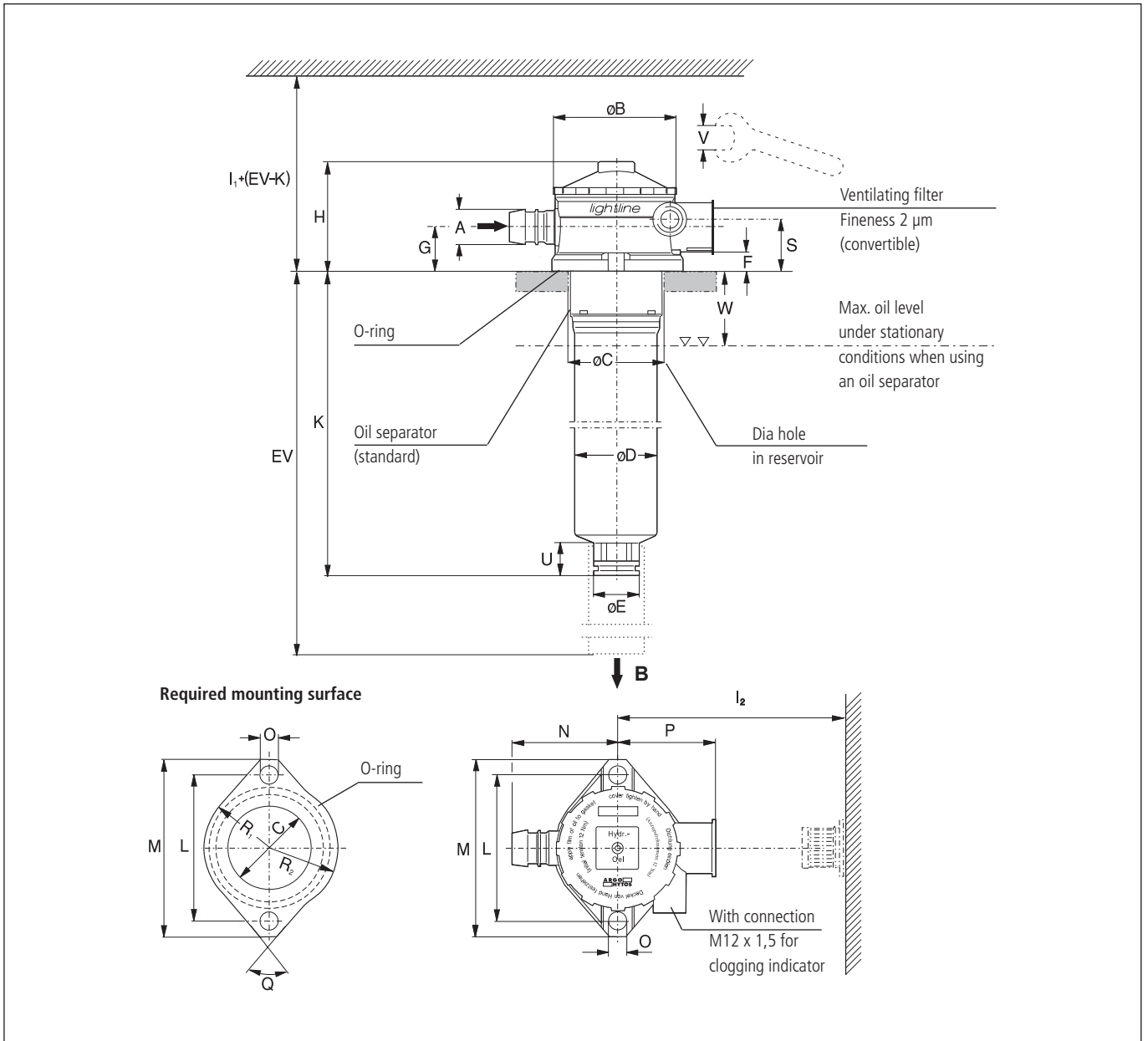
When using pressure switches of series DG 813 sealing by means of an O-ring (order no. N 007.0103, to be ordered separately) has to be guaranteed (torque 4 Nm). When using manometers of series DG 200 variants with preformed sealing ring are to be used.

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).
- The clogging indicators are optionally available and will then be loosely provided.
- For fastening the filter the enclosed spring washers have to be used. Mounting force 15⁺⁵ Nm.
- The filters listed in this chart are standard filters. Other designs available on request.

* Paper media supported with metal gauze

Dimensions

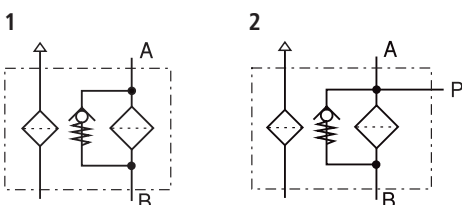


Measurements

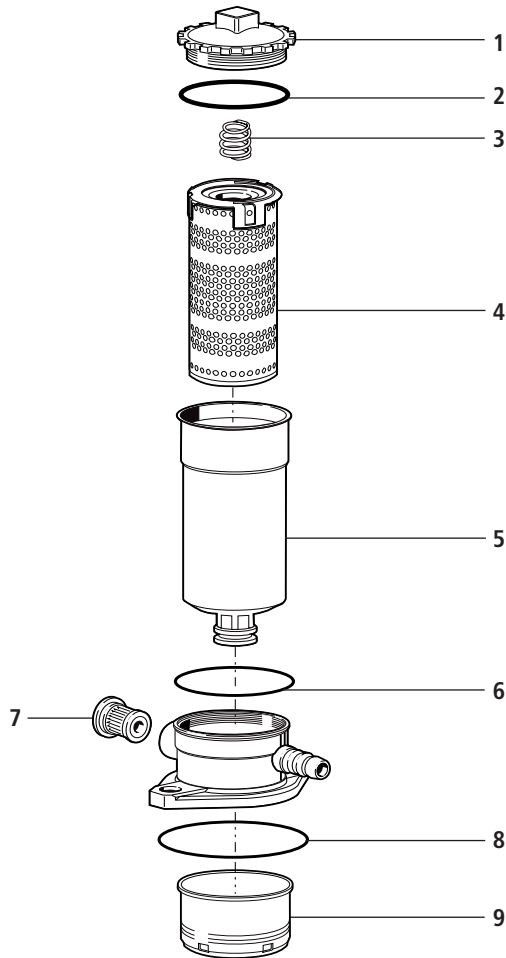
Type	A	B	C min./max.	D	E	F*	G	H	I ₁	I ₂	K	L	M	N	O	P	Q	R ₁	R ₂	S
FR 043	17,5	75	60/61	51	27,8	11	22	65	175	30	85	88	108	65	11	59	80°	39	42	27
FR 072	20,5	75	60/61	51	27,8	11	22	65	270	30	182	88	108	65	11	59	80°	39	42	27
Type	U	V	W																	
FR 043	20	27	40																	
FR 072	20	27	40																	

* including the enclosed spring washers Ø10, DIN 137 shape B, corrugated

Symbols



Spare Parts



Pos.	Designation	Part No.
1	Screw-on cap	FR 043.0201
2	O-ring 57 x 3	N 007.0573
3	Compression spring	N 015.1606
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 50 x 2	N 007.0501
7	Ventilating filter	L1.0403-51
8	O-ring 69 x 4	N 007.0704
9	Oil separator	FR 043.0701

* Specify mounting depth 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 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 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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