

High Pressure Filters

HFL 049 · HFL 069

In-line mounting · Operating pressure up to 630 bar / 9137 psi · Nominal flow rate up to 105 l/min / 27.7 gpm



High Pressure Filter HFL 049

Description

Application

In the high pressure circuits of hydraulic systems.

Performance features

Protection against wear:

By means of filter elements that even in full-flow filtration meet the highest demands regarding cleanliness classes.

Protection against malfunction:

Through installation near to the control valves or other expensive components. The specific determined flow rate guarantees a closed by-pass valve even at $\leq 200 \text{ mm}^2/\text{s}$ / 927 SUS (cold start condition).

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

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:	Spheroidal graphite cast iron (SGI)
Filter bowl:	Cold extruded steel
Coating:	Powder paint resp. phosphate coating / primed
Seals:	NBR (FPM on request)
Filter media:	EXAPOR® MAX 2 / MAX 3 - inorganic multi-layer microfiber web
	Paper - cellulose web, impregnated with resin

Accessories

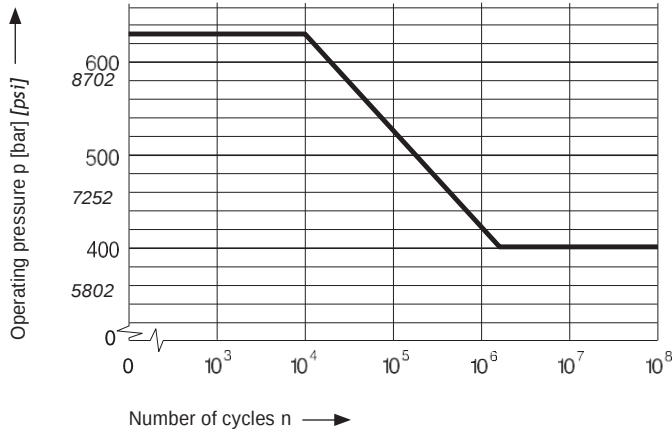
Electrical and / or optical clogging indicators are available on request. Dimensions and technical data see catalog sheet 60.40.

Operating pressure

0 ... 400 bar / 5800 psi, min. 2×10^6 pressure cycles
Nominal pressure according to DIN 24550

0 ... 630 bar / 9137 psi, min. 10^4 pressure cycles
Quasi-static operating pressure

Permissible pressures for other numbers of cycles



Nominal flow rate

Up to 105 l/min / 27.7 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 $v \leq 200 \text{ mm}^2/\text{s}$ / 927 SUS
- > element service life > 1000 operating hours at an average fluid contamination of 0.07 g per l/min / 0.27 g per gpm flow volume
- > flow velocity in the connection lines:
up to 250 bar $\leq 8 \text{ m/s}$ / up to 3626 psi $\leq 26.3 \text{ ft/s}$
> 250 bar $\leq 12 \text{ m/s}$ / > 3626 psi $\leq 39.4 \text{ ft/s}$

Filter fineness

5 $\mu\text{m(c)}$... 30 $\mu\text{m(c)}$ – For microfiber and cellulose media
 β -values according to ISO 16889
(see Selection Chart, column 4 and diagram Dx).
40 μm ... 100 μm – For Wire-mesh

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)
-22 °F ... +212 °F (temporary -40 °F ... +248 °F)

Viscosity at nominal flow rate

- > at operating temperature: $v < 60 \text{ mm}^2/\text{s}$ / 280 SUS
- > as starting viscosity: $v_{\text{max}} = 1200 \text{ mm}^2/\text{s}$ / 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.

Mounting position

Preferably vertical, filter head on top.

Connection

Threaded ports according to

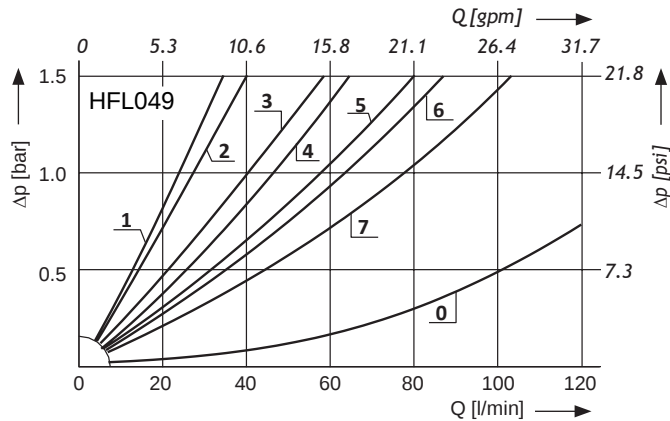
- > ISO 228 or DIN 13
- > SAE standard J514

Sizes see Selection Chart, column 6
(other port threads on request).

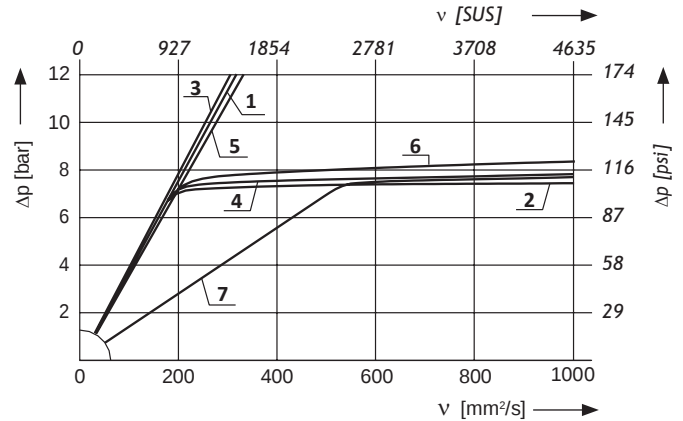
Δp -curves for complete filters in Selection Chart, column 3

For 150 mm²/s oil, consider nominal flow rate 15% higher than what is shown in the below graph.

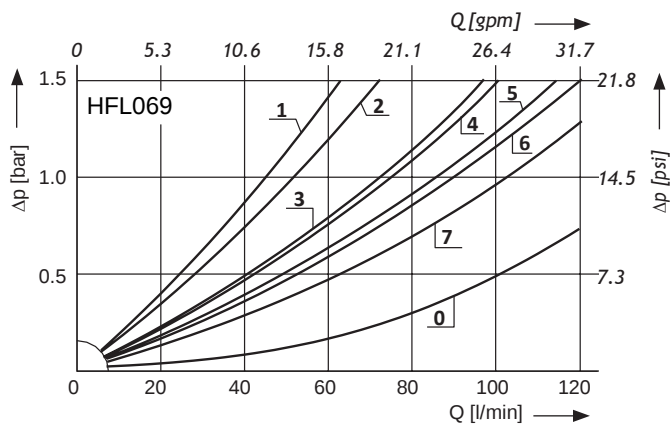
D1 Pressure drop as a function of the flow volume at $v = 35 \text{ mm}^2/\text{s}$ / 162 SUS (0 = casing empty)



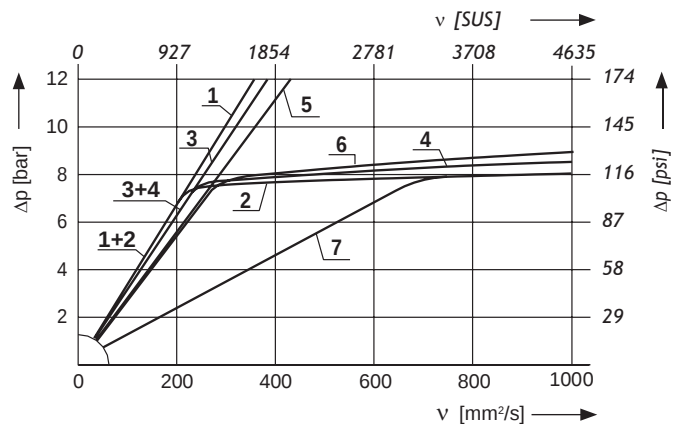
Pressure drop as a function of the kinematic viscosity at nominal flow



D2 Pressure drop as a function of the flow volume at $v = 35 \text{ mm}^2/\text{s}$ / 162 SUS (0 = casing empty)

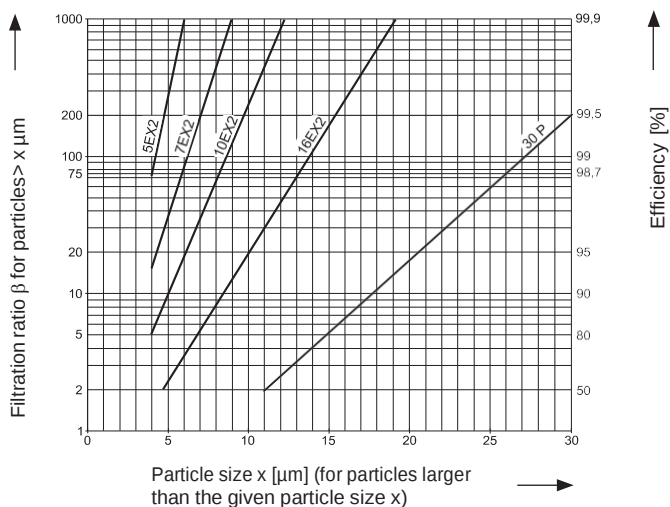


Pressure drop as a function of the kinematic viscosity at nominal flow



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 respective fineness:

For EXAPOR[®]MAX2 and Paper element:

5EX2 = $\bar{\beta}_{5(c)}$ = 200	EXAPOR [®] MAX 2 / MAX 3
7EX2 = $\bar{\beta}_{7(c)}$ = 200	EXAPOR [®] MAX 2 / MAX 3
10EX2 = $\bar{\beta}_{10(c)}$ = 200	EXAPOR [®] MAX 2 / MAX 3
16EX2 = $\bar{\beta}_{16(c)}$ = 200	EXAPOR [®] MAX 2 / MAX 3
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 special applications, fineness differing from these curves are also available by using special composed filter media.

Selection Chart

Part No.	Nominal flow rate	Pressure drop see diagram D/curve no.	Filter fineness see diag. Dx	Dirt-holding capacity	Connection A/B	Cracking pressure of by-pass	Replacement filter element	Weight	Clogging indicator	Cracking pressure ()	Remarks
	l/min			g	bar			kg			
1	2	3	4	5	6 ■■	7	8	9	10	11 ●●	12
HFL-049-■■-D6-A●●-100	27	D1/1	5EX2	5.2	GB - G½ UA-SAE-8 ¹	-	Refer Page 7	V3.0510-713 ⁴	3.9	AA ⁵ (-), EF (5), KL (5), KW (5)	-
HFL-049-■■-D1-X●●-100	30	D1/2	5EX2	4.9	GB - G½ UA-SAE-8 ¹	7		V3.0510-703	3.8		-
HFL-049-■■-G6-A●●-100	47	D1/3	10EX2	5.1	GB - G½ UA-SAE-8 ¹	-		V3.0510-716 ⁴	3.9		-
HFL-049-■■-G1-X●●-100	50	D1/4	10EX2	6.8	GB - G½ UA-SAE-8 ¹	7		V3.0510-706	3.8		-
HFL-049-■■-I6-A●●-100	65	D1/5	16EX2	5.6	GB - G½ UA-SAE-8 ¹	-		V3.0510-718 ⁴	3.9		-
HFL-049-■■-I1-X●●-100	75	D1/6	16EX2	6.9	GB - G½ UA-SAE-8 ¹	7		V3.0510-708	3.8		-
HFL-049-■■-N3-X●●-100	55	D1/7	30P	3.6	GB - G½ UA-SAE-8 ¹	7		P3.0510-11 ³	3.8		-
HFL-069-■■-D6-A●●-100	50	D2/1	5EX2	8.7	GB - G½ UA - SAE-8	-		V3.0520-713 ⁴	5.1		-
HFL-069-■■-D1-X●●-100	60	D2/2	5EX2	10	GB - G½ UA-SAE-8 ¹	7		V3.0520-703	4.9		-
HFL-069-■■-G6-A●●-100	80	D2/3	10EX2	11	GC - G¾ UC-SAE-12 ²	-		V3.0520-716 ⁴	5.1		-
HFL-069-■■-G1-X●●-100	85	D2/4	10EX2	14	GC - G¾ UC-SAE-12 ²	7		V3.0520-706	4.9		-
HFL-069-■■-I6-A●●-100	100	D2/5	16EX2	12	GC - G¾ UC-SAE-12 ²	-		V3.0520-718 ⁴	5.1		-
HFL-069-■■-I1-X●●-100	105	D2/6	16EX2	15	GC - G¾ UC-SAE-12 ²	7		V3.0520-708	4.9		-
HFL-069-■■-N3-X●●-100	80	D2/7	30P	7.1	GC - G¾ UC-SAE-12 ²	7		P3.0520-01 ³	4.9		-

¹ Corresponds to ¾-16 UNF-2B

² Corresponds to 1½-12 UN-2B

³ Paper media supported with metal gauze

⁴ Filter element differential pressure stable up to 160 bar / 2320.6 psi, clogging indicator required

⁵ Not applicable for non-bypass filters with 160bar collapse rated element

●● AA – No indicator, EF – Optical Indicator (5bar), KL – Electrical Indicator with DIN EN 175301-803 socket (5bar), KW - Electrical Indicator with visual indication DG 041.1200 with 2 LEDs (5bar)

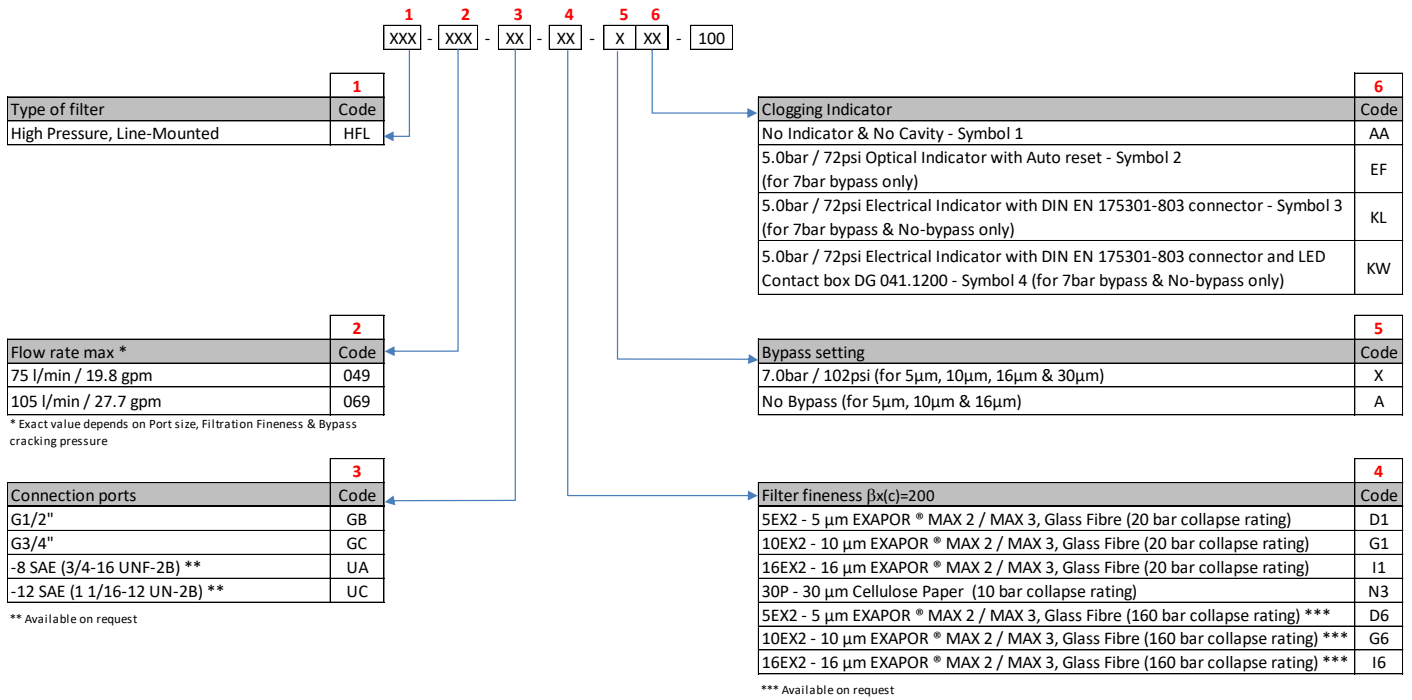
Optical or electrical clogging indicators are available to monitor the clogging condition of the element. When ordering filters with integrated monitoring, the abbreviation of the clogging indicator has to be changed according to the code of the below desired filter variant:

For the appropriate clogging indicator see catalog sheet 60.40.

Remarks:

- › The switching pressure of the clogging indicator has always to be lower than the cracking pressure of the by-pass valve (see Selection Chart, column 7).
- › The filters listed in this chart are standard filters. Other designs available on request as per Order Code definitions given in page 5.
- › Other indicators available on request as per catalog sheet 60.40.

Order Code Definition - Filter Assembly

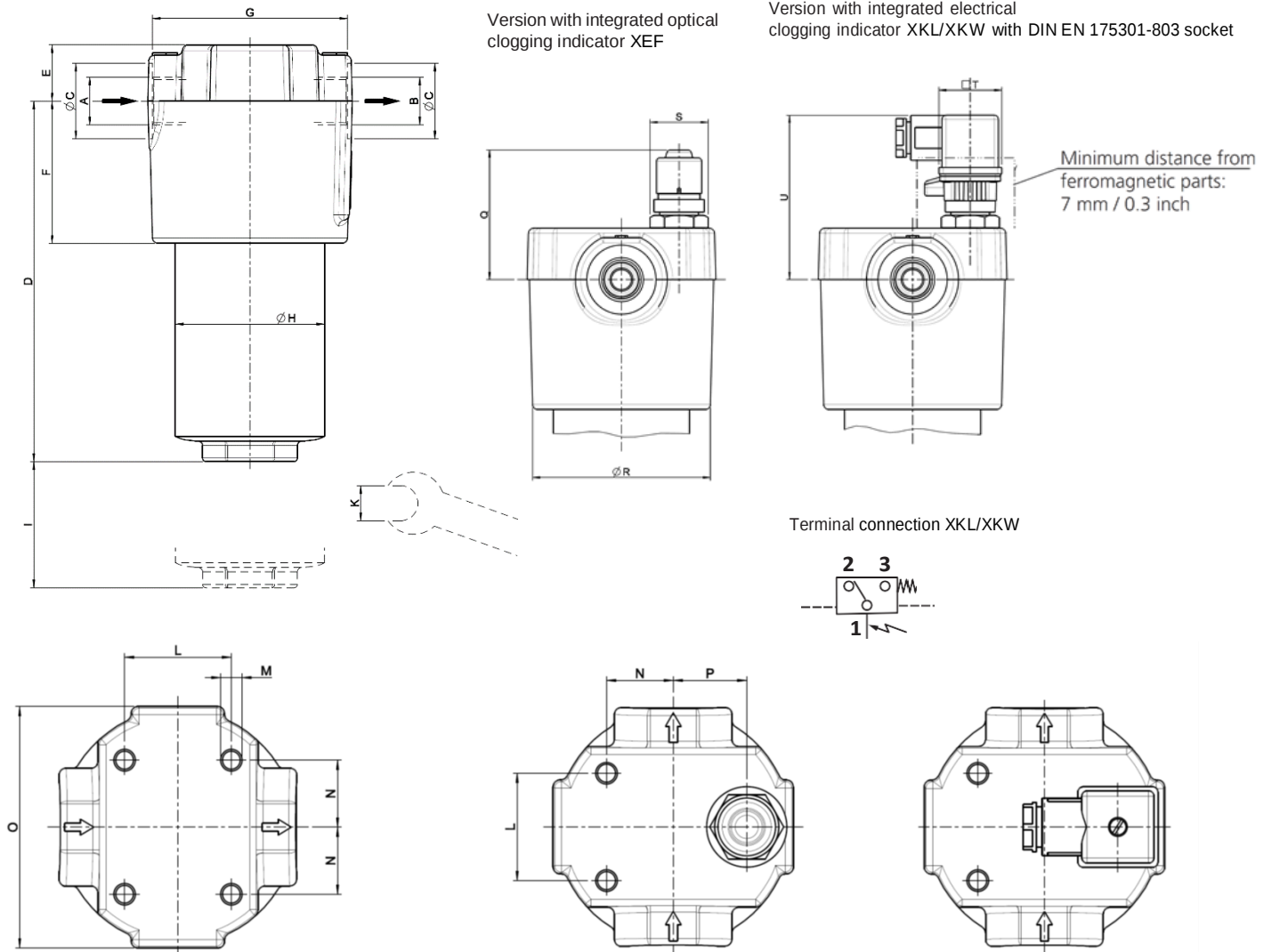


Order Code Definition - Filter Element

Filter fineness $\beta_{x(c)=200}$	Code	HFL-049	HFL-069
5EX2 - 5 μ m EXAPOR ® MAX 2 / MAX 3, Glass Fibre (20 bar collapse rating)	D1	V3.0510-703K1	V3.0520-703K1
10EX2 - 10 μ m EXAPOR ® MAX 2 / MAX 3, Glass Fibre (20 bar collapse rating)	G1	V3.0510-706K1	V3.0520-706K1
16EX2 - 16 μ m EXAPOR ® MAX 2 / MAX 3, Glass Fibre (20 bar collapse rating)	I1	V3.0510-708K1	V3.0520-708K1
30P - 30 μ m Cellulose Paper (10 bar collapse rating)	N3	P3.0510-11K	P3.0520-01K
5EX2 - 5 μ m EXAPOR ® MAX 2 / MAX 3, Glass Fibre (160 bar collapse rating) ***	D6	V3.0510-713K1	V3.0520-713K1
10EX2 - 10 μ m EXAPOR ® MAX 2 / MAX 3, Glass Fibre (160 bar collapse rating) ***	G6	V3.0510-716K1	V3.0520-716K1
16EX2 - 16 μ m EXAPOR ® MAX 2 / MAX 3, Glass Fibre (160 bar collapse rating) ***	I6	V3.0510-718K1	V3.0520-718K1

*** Available on request

Dimensions



Measurements in mm

Type	A/B	C	D	E	F	G	H	I	K	L	M Ø/depth	N	O	P	Q	R	S	T	U
HFL 049	G $\frac{1}{2}$, G $\frac{3}{4}$	33 / 36	158	24.5	61	84	65	55	AF 36	40	M8 / 12	25	89	27.5	62	85	AF 24	□ 30	79
HFL 069	G $\frac{1}{2}$, G $\frac{3}{4}$	33 / 36	254	24.5	61	84	65	55	AF 36	40	M8 / 12	25	89	27.5	62	85	AF 24	□ 30	79

Measurements in inch

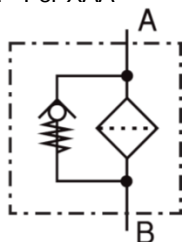
Type	A/B	C	D	E	F	G	H	I	K mm	L	M Ø/depth	N	O	P
HFL 049	-8 SAE / -12 SAE	1.30/1.42	6.22	0.96	2.40	3.31	2.56	2.17	AF 36	1.57	¹	0.98	3.50	1.08
HFL 069	-8 SAE / -12 SAE	1.30/1.42	10.00	0.96	2.40	3.31	2.56	2.17	AF 36	1.57	¹	0.98	3.50	1.08

Type	Q	R	S mm	T	U
HFL 049	2.44	3.35	AF 24	□ 1.18	3.11
HFL 069	2.44	3.35	AF 24	□ 1.18	3.11

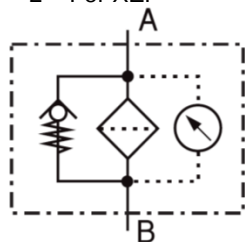
¹ $\frac{5}{16}$ -18 UNC-2B / 0.47

Symbols

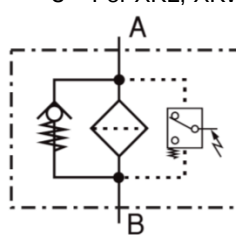
1 - For XAA



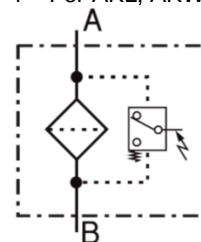
2 - For XEF



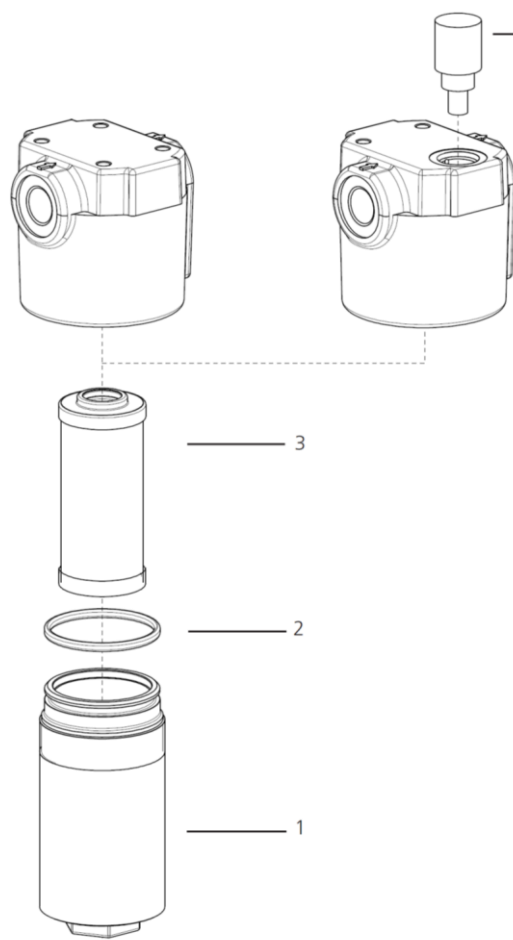
3 - For XKL, XKW



4 - For AKL, AKW



Spare Parts



Pos.	Designation	Part No.
1	Filter bowl HFL 049	HFL 052.0102
1	Filter bowl HFL 069	HFL 072.0102
2	O-ring 53.57 x 3.53 mm 2.11 x 0.14 inch	N007.0543/1
3	Replacement filter element	s. Chart / col. 9
4	Clogging indicator	s. catalog sheet 60.40

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

Before release into the series production the filter casing is tested for fatigue strength in our pressure pulse test rig. Various quality controls during the production process guarantee the leak-free function and solidity of our filters.

Illustrations may sometimes differ from the original. ARGO-HYTOS is not responsible for any unintentional mistake in this specification sheet.