HD 049 · HD 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 HD 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 ≤ 200 mm^2/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 - inorganic multi-layer microfiber web Paper - cellulose web, impregnated with resin

Accessories

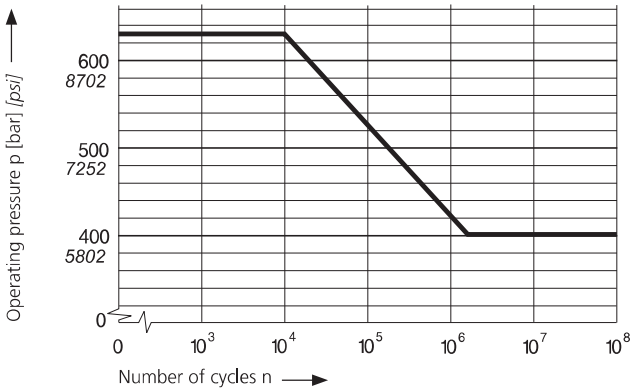
Electrical and / or optical clogging indicators are available on request. Dimensions and technical data see catalog sheet 60.40.

Operating pressure

0 ... 400 bar / 5800 psi, min. 2 x 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 $\nu \leq 200$ mm²/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 ≤ 8 m/s / up to 3626 ≤ 26.3 ft/s
  > 250 bar ≤ 12 m/s / > 3626 ≤ 39.4 ft/s

Filter fineness

5 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)
-22 °F ... +212 °F (temporary -40 °F ... +248 °F)

Viscosity at nominal flow rate

- at operating temperature: $\nu < 60$ mm²/s / 280 SUS
- as starting viscosity: $\nu_{max} = 1200$ mm²/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

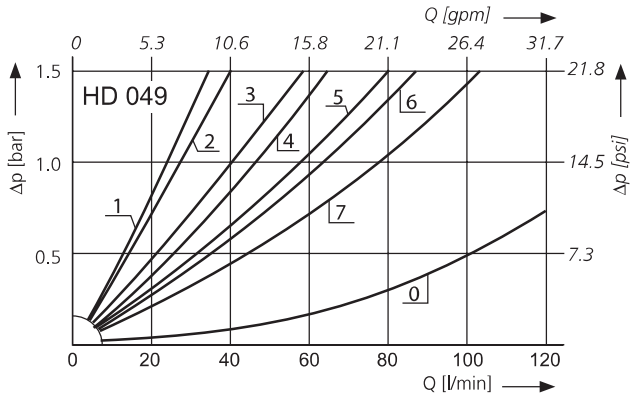
Threaded ports according to

- ISO 228 or DIN 13
- SAE standard J514

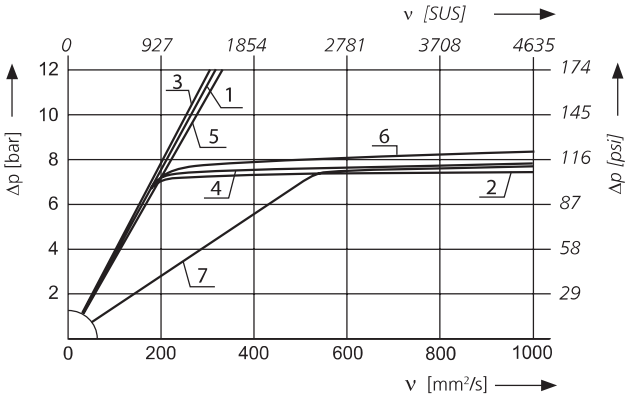
Sizes see Selection Chart, column 6
(other port threads on request).

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

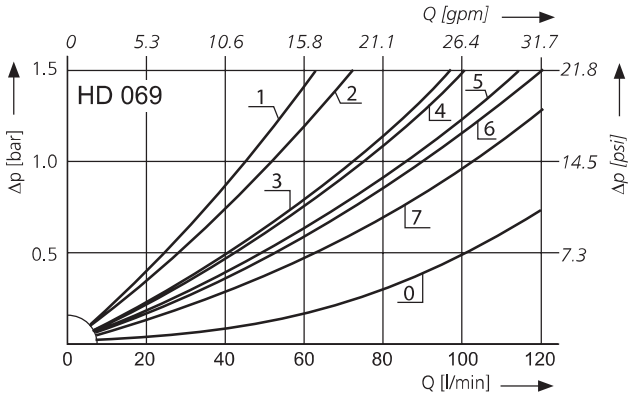
D1 Pressure drop as a function of the **flow volume** at ν = 35 mm²/s / 162 SUS (0 = casing empty)



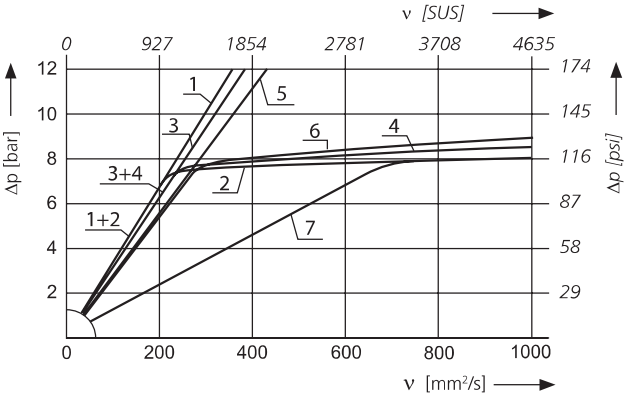
Pressure drop as a function of the **kinematic viscosity** at nominal flow



D1 Pressure drop as a function of the **flow volume** at ν = 35 mm²/s / 162 SUS (0 = casing empty)

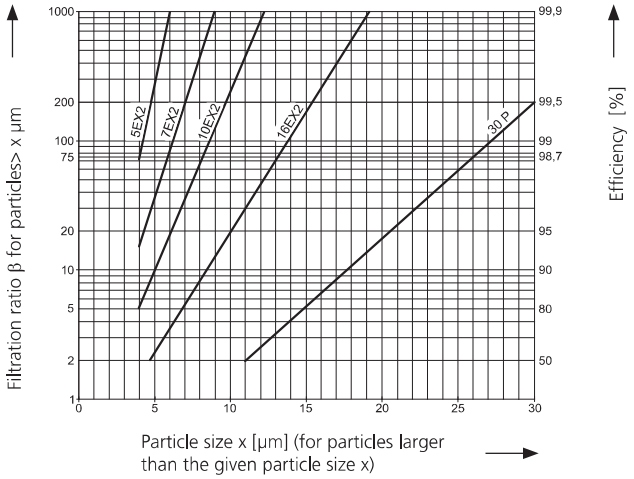


Pressure drop as a function of the **kinematic viscosity** at nominal flow



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 resp. finenesses:

For EXAPOR®MAX2 and Paper element:

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 media.

Selection Chart

Part No.	Nominal flow rate	Pressure drop see diagram **D**/curve no.	Filter fineness diagr. **Dx**	Dirt-holding capacity	Connection A/B	Cracking pressure of by-pass	Symbol	Replacement element Part No.	Weight	Clogging indicator Cracking pressure ( )	Remarks
	l/min			g		bar			kg	bar	
1	2	3	4	5	6	7	8	9	10	11	12
HD 049-189 ED8	27	**D1**/1	5EX2	5.2	G½	-	4	V3.0510-13[2]	3.9	electrical (5)	change-over
HD 049-169	30	**D1**/2	5EX2	4.9	G½	7	1	V3.0510-03	3.8	-	-
HD 049-186 ED8	47	**D1**/3	10EX2	5.1	G½	-	4	V3.0510-16[2]	3.9	electrical (5)	change-over
HD 049-166[1]	50	**D1**/4	10EX2	6.8	G½	7	1	V3.0510-06	3.8	-	-
HD 049-188 ED8	65	**D1**/5	16EX2	5.6	G½	-	4	V3.0510-18[2]	3.9	electrical (5)	change-over
HD 049-268[1]	75	**D1**/6	16EX2	6.9	M18 x 1.5	7	1	V3.0510-08	3.8	-	[4]
HD 049-168[1]	75	**D1**/6	16EX2	6.9	G½	7	1	V3.0510-08	3.8	-	-
HD 049-151	55	**D1**/7	30P	3.6	G½	7	1	P3.0510-11[3]	3.8	-	-
HD 069-189 ED8	50	**D2**/1	5EX2	8.7	G½	-	4	V3.0520-13[2]	5.1	electrical (5)	change-over
HD 069-169	60	**D2**/2	5EX2	10	G½	7	1	V3.0520-03	4.9	-	-
HD 069-186 ED8	80	**D2**/3	10EX2	11	G¾	-	4	V3.0520-16[2]	5.1	electrical (5)	change-over
HD 069-166[1]	85	**D2**/4	10EX2	14	G¾	7	1	V3.0520-06	4.9	-	-
HD 069-188 ED8	100	**D2**/5	16EX2	12	G¾	-	4	V3.0520-18[2]	5.1	electrical (5)	change-over
HD 069-268[1]	105	**D2**/6	16EX2	15	G¾	7	1	V3.0520-08	4.9	-	[4]
HD 069-168[1]	105	**D2**/6	16EX2	15	G¾	7	1	V3.0520-08	4.9	-	-
HD 069-151	80	**D2**/7	30P	7.1	G¾	7	1	P3.0520-01[3]	4.9	-	-

[1] Preferred type, no minimum order quantity required
[2] Element differential pressure up to 160 bar, clogging indicator required
[3] Paper media supported with metal gauze
[4] Housing primed/phosphated

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 added to the order code of the desired filter variant.

For the appropriate clogging indicator see catalog sheet 60.40.

Oder example: The filter HD 049-169 is to be supplied with an optical indicator with automatic reset.

Order code: **HD 049-169 OD1**
Part No. (basic unit)
Clogging indicator

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).
- For versions with electrical clogging indicator, the device socket is not included in the scope of delivery.
- For the electrical clogging indicator of type DIN EN 175301-803 (ED8 and ED9), a device socket with two LEDs is available, which additionally enables visual indication of the filter contamination (order no. DG 041.1200).
- The filters listed in this chart are standard filters. Other designs available on request.

Selection Chart

Part No.	Nominal flow rate	Pressure drop see diagram **D**/curve no.	Filter fineness diag. **Dx**	Dirt-holding capacity	Connection A/B	Cracking pressure of by-pass	Symbol	Replacement element Part No.	Weight	Clogging indicator Cracking pressure ( )	Remarks
	gpm			g	SAE	psi			lbs	psi	
1	2	3	4	5	6	7	8	9	10	11	12
HD 049-789 ED8	7.1	**D1**/1	5EX2	5.2	-8[4]	-	4	V3.0510-13[2]	8.6	electrical (73)	change-over
HD 049-769	7.9	**D1**/2	5EX2	4.9	-8[4]	102	1	V3.0510-03	8.4	-	-
HD 049-786 ED8	12.4	**D1**/3	10EX2	5.1	-8[4]	-	4	V3.0510-16[2]	8.6	electrical (73)	change-over
HD 049-766[1]	13.2	**D1**/4	10EX2	6.8	-8[4]	102	1	V3.0510-06	8.4	-	-
HD 049-788 ED8	17.2	**D1**/5	16EX2	5.6	-8[4]	-	4	V3.0510-18[2]	8.6	electrical (73)	change-over
HD 049-798[1]	19.8	**D1**/6	16EX2	6.9	-8[4]	102	1	V3.0510-08	8.4	-	-
HD 049-751	14.5	**D1**/7	30P	3.6	-8[4]	102	1	P3.0510-11[3]	8.4	-	-
HD 069-789 ED8	13.2	**D2**/1	5EX2	8.7	-8[4]	-	4	V3.0520-13[2]	11.2	electrical (73)	change-over
HD 069-769	15.9	**D2**/2	5EX2	10	-8[4]	102	1	V3.0520-03	10.8	-	-
HD 069-786 ED8	21.1	**D2**/3	10EX2	11	-12[5]	-	4	V3.0520-16[2]	11.2	electrical (73)	change-over
HD 069-766[1]	22.5	**D2**/4	10EX2	14	-12[5]	102	1	V3.0520-06	10.8	-	-
HD 069-788 ED8	26.4	**D2**/5	16EX2	12	-12[5]	-	4	V3.0520-18[2]	11.2	electrical (73)	change-over
HD 069-768[1]	27.7	**D2**/6	16EX2	15	-12[5]	102	1	V3.0520-08	10.8	-	-
HD 069-751	21.1	**D2**/7	30P	7.1	-12[5]	102	1	P3.0520-01[3]	10.8	-	-

[1] Preferred type, no minimum order quantity required
[2] Element differential pressure up to 2320 psi, clogging indicator required
[3] Paper media supported with metal gauze
[4] Corresponds to ¾-16 UNF-2B
[5] Corresponds to 1 1/16-12 UN-2B

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 added to the order code of the desired filter variant.

For the appropriate clogging indicator see catalog sheet 60.40.

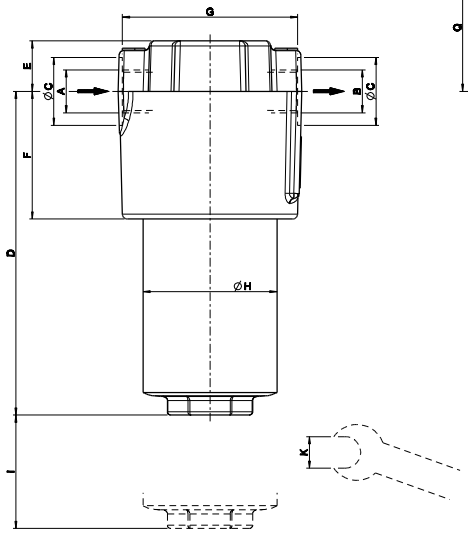
Oder example: The filter HD 049-769 is to be supplied with an optical indicator with automatic reset.

Order code: **HD 049-769 OD1**
Part No. (basic unit)
Clogging indicator

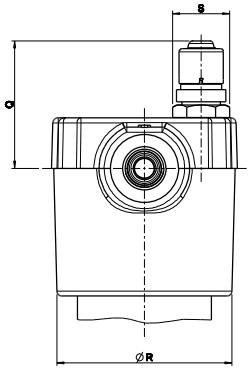
Remarks:

- 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).
- For versions with electrical clogging indicator, the device socket is not included in the scope of delivery.
- For the electrical clogging indicator of type DIN EN 175301-803 (ED8 and ED9), a device socket with two LEDs is available, which additionally enables visual indication of the filter contamination (order no. DG 041.1200).
- The filters listed in this chart are standard filters. Other designs available on request.

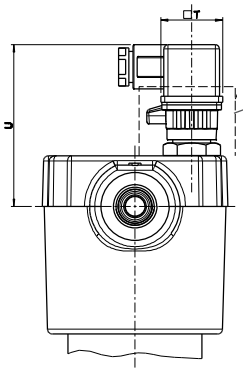
Dimensions



Version with integrated optical clogging indicator OD1



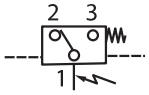
Version with integrated electrical clogging indicator ED8 with device socket [1]

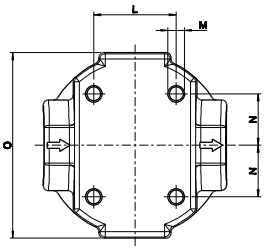


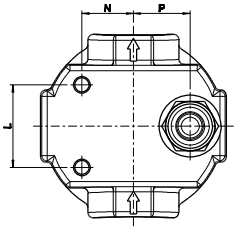
Minimum distance from ferromagnetic parts: 7 mm / 0.3 inch

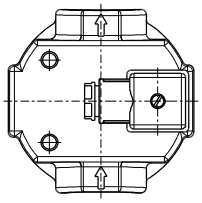
[1] not included in scope of delivery

Terminal connection ED8









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
HD 049	M18 x 1.5 resp. G½	28 / 33	158	24.5	61	84	65	55	AF 36	40	M8 / 12	25	89	27.5	62	85	AF 24	□ 30	79
HD 069	G½, G¾	33 / 36	254	24.5	61	84	65	55	AF 36	40	M8 / 12	25	89	27.5	62	85	AF 24	□ 30	79

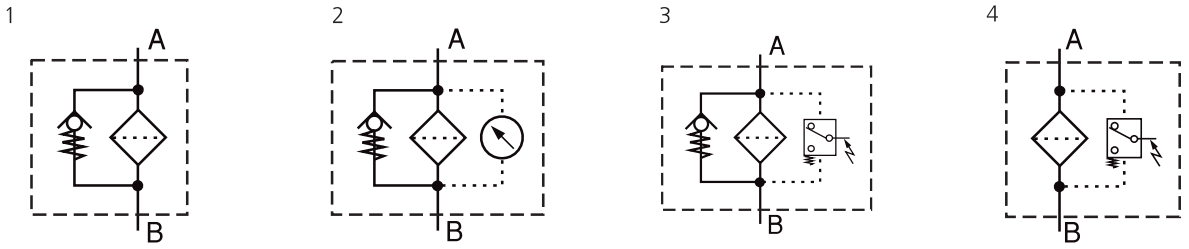
Measurements in inch

Type	A/B	C	D	E	F	G	H	I	K mm	L	M Ø/depth	N	O	P
HD 049	-8 SAE	1.10/1.30	6.22	0.96	2.40	3.31	2.56	2.17	AF 36	1.57	[2]	0.98	3.50	1.08
HD 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	[2]	0.98	3.50	1.08

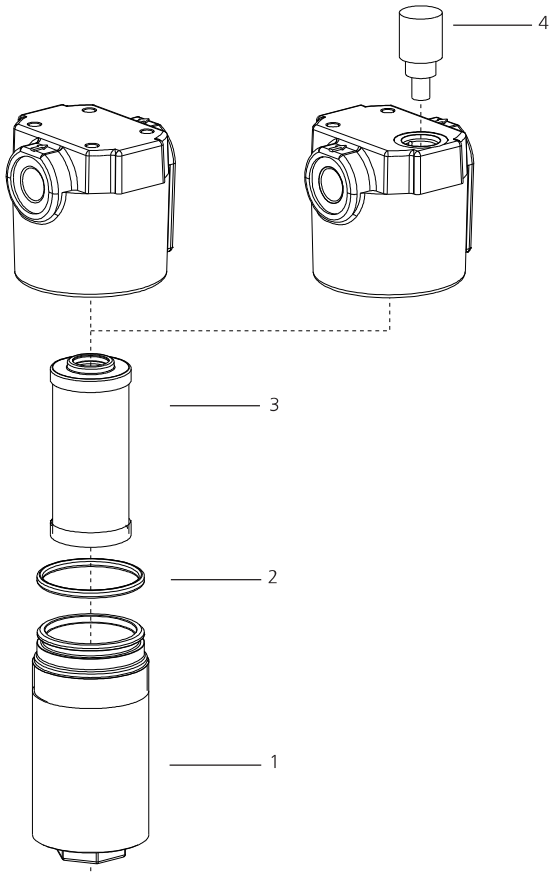
Type	Q	R	S mm	T	U
HD 049	2.44	3.35	AF 24	□ 1.18	3.11
HD 069	2.44	3.35	AF 24	□ 1.18	3.11

[2] $^{5}/_{16}$-18 UNC-2B / 0.47

Symbols



Spare Parts



Pos.	Designation	Part No.
1	Filter bowl HD 049	HD 052.0102
1	Filter bowl HD 069	HD 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 leakfree 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.