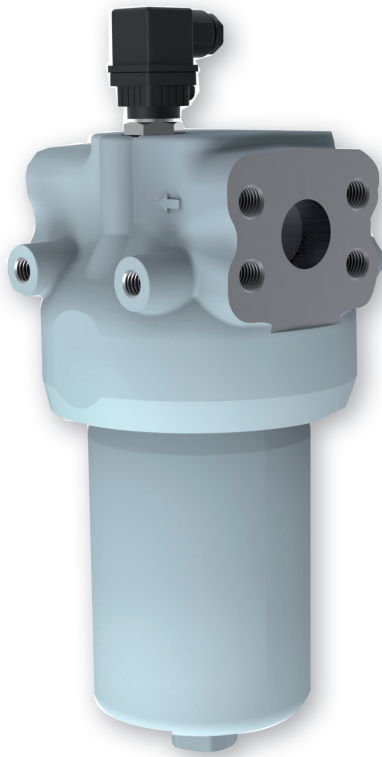


## HD 319 · HD 419 · HD 619

In-line mounting · Operating pressure up to 630 bar / 9137 psi · Nominal flow rate up to 450 l/min / 118.9 gpm



High Pressure Filter HD 319

### 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  $v \leq 200 \text{ mm}^2/\text{s}$  / 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
Seals:	NBR (FPM on request)
Filter media:	EXAPOR®MAX 2 - inorganic multi-layer microfiber web

#### Accessories

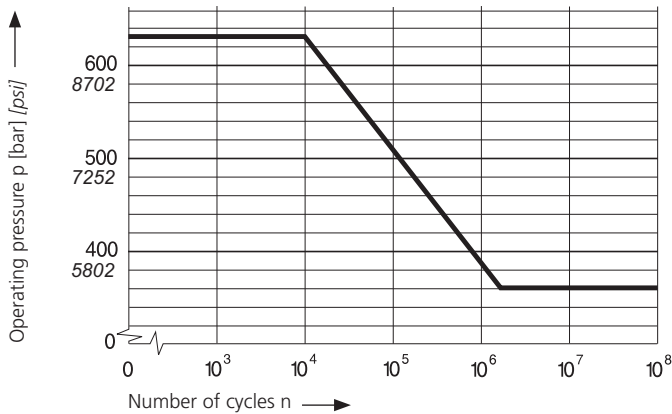
Electrical and / or optical clogging indicators are available on request. Dimensions and technical data see catalog sheet 60.40.

### Operating pressure

0 ... 360 bar / 5220 psi, min.  $2 \times 10^6$  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 450 l/min / 118.9 gpm (see Selection Charts, column 2).  
The nominal flow rates indicated by ARGO-HYTOS are based on the following features:

- › closed by-pass valve at  $v \leq 200 \text{ mm}^2/\text{s} / 927 \text{ SUS}$
- › 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  $\leq 8 \text{ m/s} / \text{ up to } 3626 \text{ psi} \leq 26.3 \text{ ft/s}$   
> 250 bar  $\leq 12 \text{ m/s} / > 3626 \text{ psi} \leq 39.4 \text{ ft/s}$

### Filter fineness

5  $\mu\text{m(c)}$  ... 16  $\mu\text{m(c)}$   
 $\beta$ -values according to ISO 16889  
(see Selection Charts, column 4 and diagram Dx).

### Dirt-holding capacity

Values in g test dust ISO MTD according to ISO 16889  
(see Selection Charts, 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:  $v < 60 \text{ mm}^2/\text{s} / 280 \text{ SUS}$
- › as starting viscosity:  $v_{\text{max}} = 1200 \text{ mm}^2/\text{s} / 5560 \text{ SUS}$
- › 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%  $\Delta p$  of the cracking pressure of the by-pass valve on the vertical axis. Draw a horizontal line so that it intersects the  $\Delta p$  curve at a point. Read this point on the horizontal axis for the viscosity.

### Mounting position

Preferably vertical, filter head on top.

### Connection

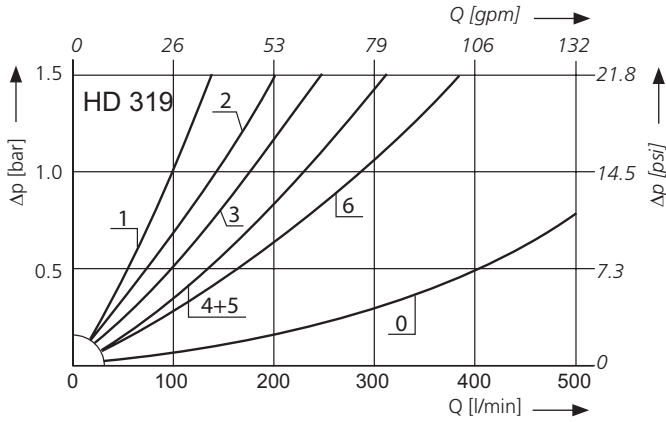
Threaded ports according to

- › ISO 228 or DIN 13
- › SAE standard J514
- › SAE-flange (6000 psi)

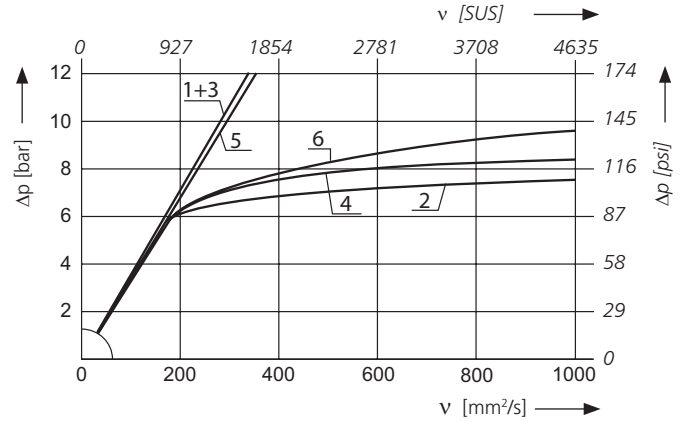
Sizes see Order Information and Selection Charts, column 6  
as well as ordering example (other connections on request).

**Δp-curves for complete filters in Selection Charts, column 3**

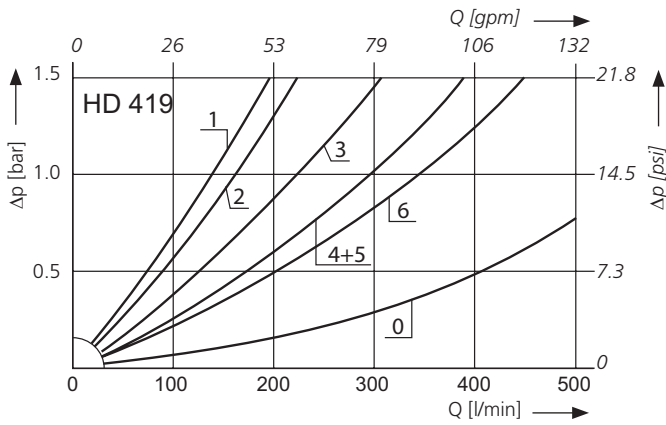
**D1** Pressure drop as a function of the **flow volume**  
at  $v = 35 \text{ mm}^2/\text{s} / 162 \text{ SUS}$  (0 = casing empty)



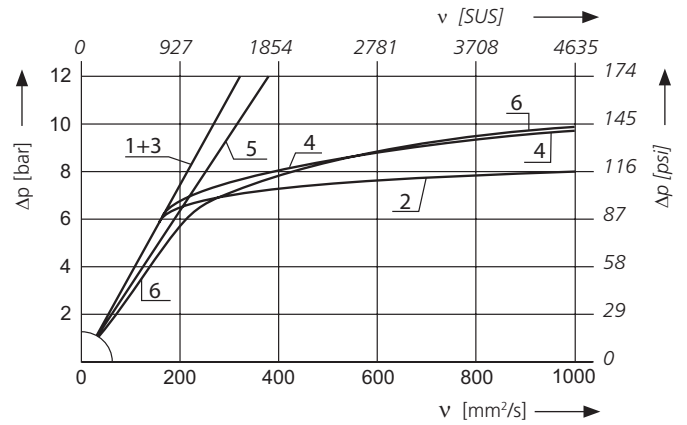
Pressure drop as a function of the **kinematic viscosity** at nominal flow



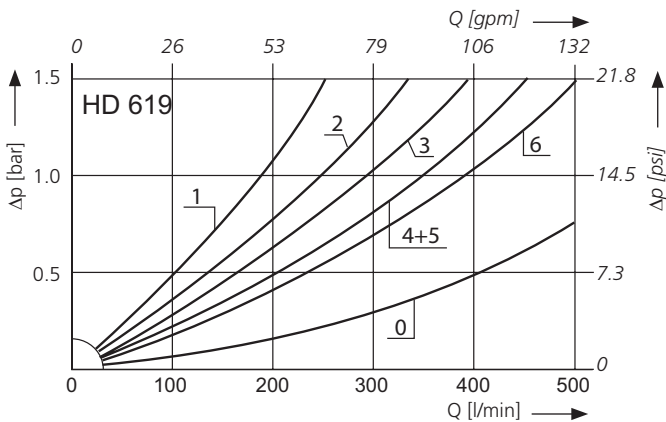
**D2** Pressure drop as a function of the **flow volume**  
at  $v = 35 \text{ mm}^2/\text{s} / 162 \text{ SUS}$  (0 = casing empty)



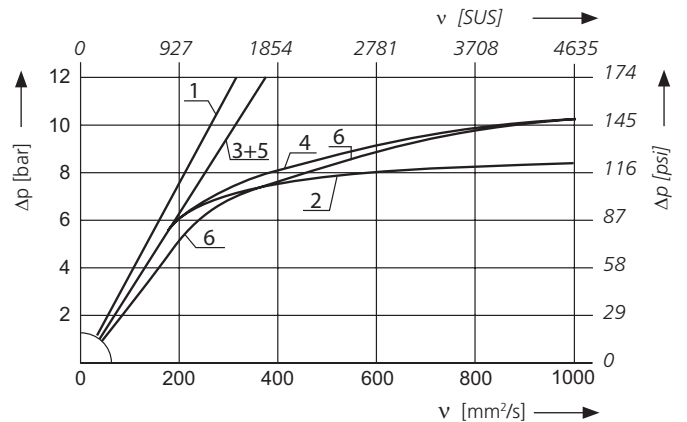
Pressure drop as a function of the **kinematic viscosity** at nominal flow



**D3** Pressure drop as a function of the **flow volume**  
at  $v = 35 \text{ mm}^2/\text{s} / 162 \text{ SUS}$  (0 = casing empty)

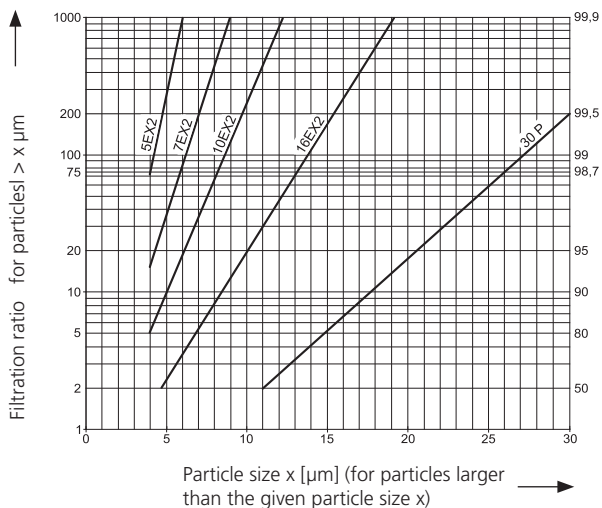


Pressure drop as a function of the **kinematic viscosity** at nominal flow



**Filter fineness curves in Selection Charts, column 4**

**Dx** Filtration ratio  $\beta$  as a function of particle size  $x$  obtained by the Multi-Pass Test according to ISO 16889



The abbreviations represent the following  $\beta$ -values resp. finenesses:

**For EXAPOR®MAX2 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  $\mu\text{m}$
  - 60S = screen material with mesh size 60  $\mu\text{m}$
  - 100S = screen material with mesh size 100  $\mu\text{m}$
- 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.

**Order Information**

Two different head pieces with four various connecting options are available.

**Order example: The filter HD 319-265 has to be supplied with SAE 1¼ flanged connection (with metric fastening threads) and with an optical clogging indicator with automatic reset.**

**Order description:**

**HD 319-165 OD1**

**Connections:**

4 options are available

- Flanged connection (A/B) SAE 1¼ (6000 psi) <sup>1</sup> \_\_\_\_\_ 1 \_\_\_\_\_
- Threaded port (A/B) G1¼ resp. G1½ <sup>2</sup> \_\_\_\_\_ 2 \_\_\_\_\_
- Flanged connection (A/B) SAE 1¼ (6000 psi) <sup>3</sup> \_\_\_\_\_ 3 \_\_\_\_\_
- Threaded port (A/B) -20 SAE resp. -24 SAE <sup>4</sup> \_\_\_\_\_ 4 \_\_\_\_\_

**Clogging indicator (code)** \_\_\_\_\_

For the appropriate clogging indicator see catalog sheet 60.40. The desired clogging indicator model is indicated by the code (Selection Charts, column 2).

<sup>1</sup> With metric fastening threads  
<sup>2</sup> G1½ from size HD 619 upwards  
<sup>3</sup> With UNC fastening threads  
<sup>4</sup> -24 SAE (17/8-12 UN-2B) from size HD 619 upwards

**Selection Chart 1 of 2**

Part No. 1	Nominal flow rate	Pressure drop see diagram <b>D1</b> /curve no.	Filter fineness see diagram <b>Dx</b>	Dirt-holding capacity	Connection A/B	Cracking pressure of by-pass	Symbol	Replacement filter element Part No.	Weight	Clogging indicator	Cracking pressure in ( )	Remarks / contact type of clogging indicator
1	l/min			g	bar				kg	bar		
2	3	4	5	6	7	8	9	10	11	12		
HD 319-289 ED8	110	<b>D1/1</b>	5EX2	20	G1¼	-	4	V3.0817-13 <sup>3</sup>	16.3	electrical (5)		change-over
HD 319-269	155	<b>D1/2</b>	5EX2	24	G1¼	7	1	V3.0817-03	15.9	-		-
HD 319-286 ED8	195	<b>D1/3</b>	10EX2	24	G1¼	-	4	V3.0817-16 <sup>3</sup>	16.3	electrical (5)		change-over
<b>HD 319-265<sup>2</sup></b>	250	<b>D1/4</b>	10EX2	33	G1¼	7	1	V3.0817-06	15.9	-		-
HD 319-288 ED8	270	<b>D1/5</b>	16EX2	25	G1¼	-	4	V3.0817-18 <sup>3</sup>	16.3	electrical (5)		change-over
<b>HD 319-267<sup>2</sup></b>	330	<b>D1/6</b>	16EX2	33	G1¼	7	1	V3.0817-08	15.9	-		-
HD 419-289 ED8	155	<b>D2/1</b>	5EX2	29	G1¼	-	4	V3.0823-13 <sup>3</sup>	17.8	electrical (5)		change-over
HD 419-269	190	<b>D2/2</b>	5EX2	33	G1¼	7	1	V3.0823-03	17.2	-		-
HD 419-286 ED8	265	<b>D2/3</b>	10EX2	33	G1¼	-	4	V3.0823-16 <sup>3</sup>	17.8	electrical (5)		change-over
<b>HD 419-266<sup>2</sup></b>	330	<b>D2/4</b>	10EX2	47	G1¼	7	1	V3.0823-06	17.2	-		-
HD 419-288 ED8	330	<b>D2/5</b>	16EX2	35	G1¼	-	4	V3.0823-18 <sup>3</sup>	17.8	electrical (5)		change-over
<b>HD 419-268<sup>2</sup></b>	380	<b>D2/6</b>	16EX2	48	G1¼	7	1	V3.0823-08	17.2	-		-
HD 619-289 ED8	220	<b>D3/1</b>	5EX2	41	G1½	-	4	V3.0833-13 <sup>3</sup>	20.6	electrical (5)		change-over
HD 619-269	280	<b>D3/2</b>	5EX2	49	G1½	7	1	V3.0833-03	19.9	-		-
HD 619-286 ED8	330	<b>D3/3</b>	10EX2	49	G1½	-	4	V3.0833-16 <sup>3</sup>	20.6	electrical (5)		change-over
<b>HD 619-266<sup>2</sup></b>	400	<b>D3/4</b>	10EX2	67	G1½	7	1	V3.0833-06	19.9	-		-
HD 619-288 ED8	450	<b>D3/5</b>	16EX2	51	G1½	-	4	V3.0833-18 <sup>3</sup>	20.6	electrical (5)		change-over
<b>HD 619-268<sup>2</sup></b>	450	<b>D3/6</b>	16EX2	68	G1½	7	1	V3.0833-08	19.9	-		-

<sup>1</sup> For additional options please see section "Order Information"

<sup>2</sup> Preferred type, no minimum order quantity required

<sup>3</sup> Element differential pressure stable up to 160 bar, clogging indicator required

Optical or electrical clogging indicators are available to monitor the clogging condition of the element. When ordering filters with integrated monitoring, the code of the clogging indicator (to be found in catalog sheet 60.40) has to be added to the part no. of the desired filter (basic unit).

The mounting hole for clogging indicators is available at all filters, i.e. all clogging indicators from catalog sheet 60.40 can also be retrofitted.

**For the appropriate clogging indicator see catalog sheet 60.40.**

**Oder example: see "Order Information".**

**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 ED8, a transparent 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 2 of 2**

Part No. 1	Nominal flow rate	Pressure drop see diagram <b>D1</b> /curve no.	Filter fineness see diagram <b>Dx</b>	Dirt-holding capacity	Connection A/B	Cracking pressure of by-pass	Symbol	Replacement filter element Part No.	Weight	Clogging indicator Cracking pressure in ( )	Remarks / contact type of clogging indicator
	gpm		g		psi				lbs	psi	
1	2	3	4	5	6	7	8	9	10	11	12
HD 319-789 ED8	29.1	<b>D1/1</b>	5EX2	20	-20 <sup>4</sup>	-	4	V3.0817-13 <sup>3</sup>	35.9	electrical (73)	change-over
HD 319-769	40.9	<b>D1/2</b>	5EX2	24	-20 <sup>4</sup>	102	1	V3.0817-03	35.1	-	-
HD 319-786 ED8	51.5	<b>D1/3</b>	10EX2	24	-20 <sup>4</sup>	-	4	V3.0817-16 <sup>3</sup>	35.9	electrical (73)	change-over
<b>HD 319-766<sup>2</sup></b>	66.0	<b>D1/4</b>	10EX2	33	-20 <sup>4</sup>	102	1	V3.0817-06	35.1	-	-
HD 319-788 ED8	71.3	<b>D1/5</b>	16EX2	25	-20 <sup>4</sup>	-	4	V3.0817-18 <sup>3</sup>	35.9	electrical (73)	change-over
<b>HD 319-768<sup>2</sup></b>	87.2	<b>D1/6</b>	16EX2	33	-20 <sup>4</sup>	102	1	V3.0817-08	35.1	-	-
HD 419-789 ED8	40.9	<b>D2/1</b>	5EX2	29	-20 <sup>4</sup>	-	4	V3.0823-13 <sup>3</sup>	39.2	electrical (73)	change-over
HD 419-769	50.2	<b>D2/2</b>	5EX2	33	-20 <sup>4</sup>	102	1	V3.0823-03	37.9	-	-
HD 419-786 ED8	70.0	<b>D2/3</b>	10EX2	33	-20 <sup>4</sup>	-	4	V3.0823-16 <sup>3</sup>	39.2	electrical (73)	change-over
<b>HD 419-766<sup>2</sup></b>	87.2	<b>D2/4</b>	10EX2	47	-20 <sup>4</sup>	102	1	V3.0823-06	37.9	-	-
HD 419-788 ED8	87.2	<b>D2/5</b>	16EX2	35	-20 <sup>4</sup>	-	4	V3.0823-18 <sup>3</sup>	39.2	electrical (73)	change-over
<b>HD 419-768<sup>2</sup></b>	100.4	<b>D2/6</b>	16EX2	48	-20 <sup>4</sup>	102	1	V3.0823-08	37.9	-	-
HD 619-789 ED8	58.1	<b>D3/1</b>	5EX2	41	-24 <sup>5</sup>	-	4	V3.0833-13 <sup>3</sup>	45.4	electrical (73)	change-over
HD 619-769	73.9	<b>D3/2</b>	5EX2	49	-24 <sup>5</sup>	102	1	V3.0833-03	43.9	-	-
HD 619-786 ED8	87.2	<b>D3/3</b>	10EX2	49	-24 <sup>5</sup>	-	4	V3.0833-16 <sup>3</sup>	45.4	electrical (73)	change-over
<b>HD 619-766<sup>2</sup></b>	105.6	<b>D3/4</b>	10EX2	67	-24 <sup>5</sup>	102	1	V3.0833-06	43.9	-	-
HD 619-788 ED8	118.9	<b>D3/5</b>	16EX2	51	-24 <sup>5</sup>	-	4	V3.0833-18 <sup>3</sup>	45.4	electrical (73)	change-over
<b>HD 619-768<sup>2</sup></b>	118.9	<b>D3/6</b>	16EX2	68	-24 <sup>5</sup>	102	1	V3.0833-08	43.9	-	-

<sup>1</sup> For additional options please see section "Order Information"  
<sup>2</sup> Preferred type, no minimum order quantity required  
<sup>3</sup> Element differential pressure stable up to 2320 psi, clogging indicator required  
<sup>4</sup> Corresponds to 1<sup>5</sup>/<sub>8</sub>-12 UN-2B  
<sup>5</sup> Corresponds to 1<sup>7</sup>/<sub>8</sub>-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 code of the clogging indicator (to be found in catalog sheet 60.40) has to be added to the part no. of the desired filter (basic unit).  
 The mounting hole for clogging indicators is available at all filters, i.e. all clogging indicators from catalog sheet 60.40 can also be retrofitted.

**For the appropriate clogging indicator see catalog sheet 60.40.**

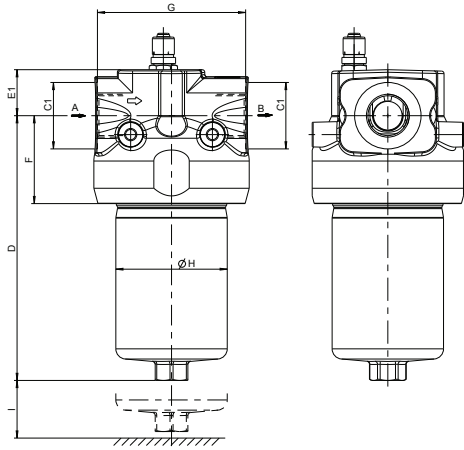
**Oder example: see "Order Information".**

**Remarks:**

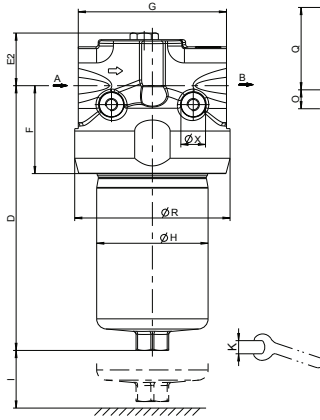
- › The switching pressure of the clogging indicator has always to be lower than the cracking pressure of the by-pass valve (see Selection Chart, column 7).
- › For versions with electrical clogging indicator, the device socket is not included in the scope of delivery.
- › For the electrical clogging indicator of type ED8, a transparent 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

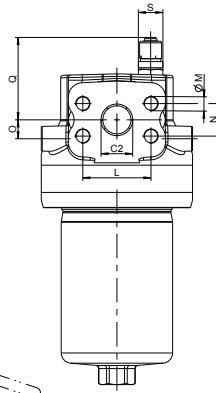
Threaded connection



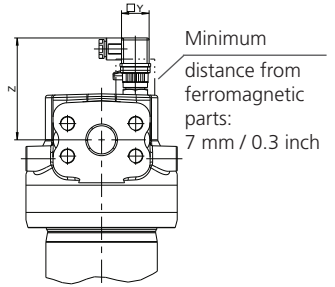
Flanged connection



Version with integrated optical clogging indicator OD1



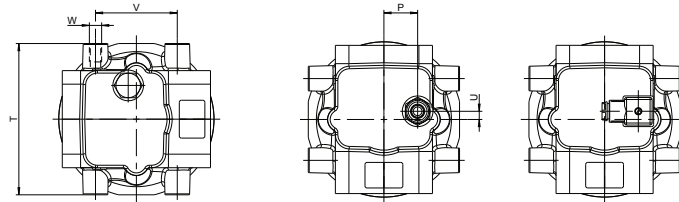
Version with integrated electrical clogging indicator ED8 and connector socket<sup>1</sup>



<sup>1</sup> not included in scope of delivery



Terminal connection ED8



## Measurements in mm

Type	A/B	C <sub>1</sub>	C <sub>2</sub>	D	E <sub>1</sub>	E <sub>2</sub>	F	G	H	I	K	L	M Ø / depth	N
HD 319	see	65	31	259	45	52	86	145	109	55	AF 32	66,7	M14 / 22	31.8
HD 419	Selection	65	31	323	45	52	86	145	109	55	AF 32	66,7	M14 / 22	31.8
HD 619	Chart	65	31	424	45	52	86	145	109	55	AF 32	66,7	M14 / 22	31.8

Type	O	P	Q	R	S	T	U	V	W Ø / depth	X	Y	Z		
HD 319	18.5	33	81	152	AF 24	148	8	80	M12 / 18	24	□ 30	100		
HD 419	18.5	33	81	152	AF 24	148	8	80	M12 / 18	24	□ 30	100		
HD 619	18.5	33	81	152	AF 24	148	8	80	M12 / 18	24	□ 30	100		

## Measurements in inch

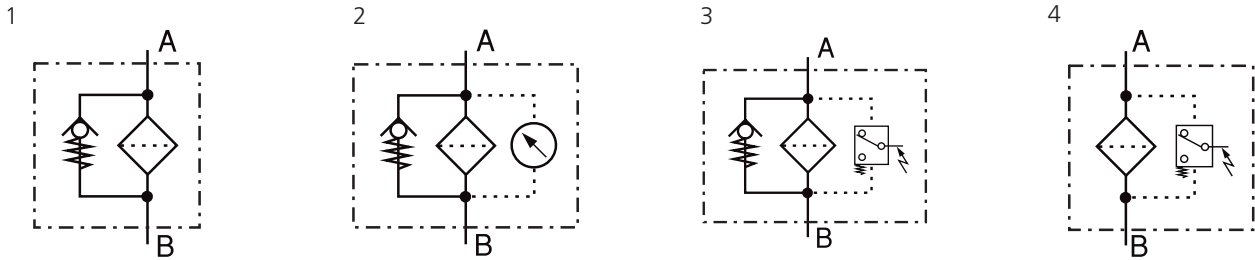
Type	A/B	C <sub>1</sub>	C <sub>2</sub>	D	E <sub>1</sub>	E <sub>2</sub>	F	G	H	I	K mm	L	M Ø / depth	N
HD 319	see	2.56	1.22	10.20	1.77	2.05	3.39	5.71	4.29	2.17	AF 32	2.63	<sup>2</sup>	1.25
HD 419	Selection	2.56	1.22	12.72	1.77	2.05	3.39	5.71	4.29	2.17	AF 32	2.63	<sup>2</sup>	1.25
HD 619	Chart	2.56	1.22	16.69	1.77	2.05	3.39	5.71	4.19	2.17	AF 32	2.63	<sup>2</sup>	1.25

Type	O	P	Q	R	S mm	T	U	V	W Ø / depth	X	Y mm	Z		
HD 319	0.73	1.30	3.19	5.98	AF 24	5.83	0.31	3.15	<sup>3</sup>	0.94	□ 1.18	3.86		
HD 419	0.73	1.30	3.19	5.98	AF 24	5.83	0.31	3.15	<sup>3</sup>	0.94	□ 1.18	3.86		
HD 619	0.73	1.30	3.19	5.98	AF 24	5.83	0.31	3.15	<sup>3</sup>	0.94	□ 1.18	3.86		

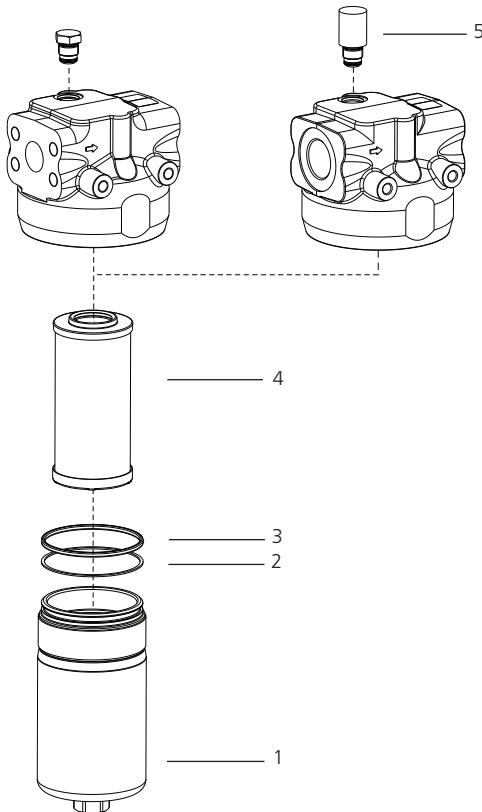
<sup>2</sup> ½-13 UNG-2B / 0.78

<sup>3</sup> W<sub>flange</sub> = ½-13 UNC-2B, W<sub>thread</sub> = 7/16-14 UNC-2B, depth = 0.71

## Symbols



## Spare Parts



Pos.	Designation	Part No.
1	Filter bowl HD 319 (with Pos. 2 und 3)	HD 250.0701
1	Filter bowl HD 419 (with Pos. 2 und 3)	HD 451.0702
1	Filter bowl HD 619 (with Pos. 2 und 3)	HD 619.0701
2	Back-ring	HD 255.0102
3	O-ring 94.84 x 3.53 mm 3.73 x 0.14 inch	N007.0953
4	Replacement filter element	see Chart / col. 9
5	Clogging indicator	see 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.**

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