ARGO HYTOS

High-Pressure Safety Filters

HD 040 · HD 081
HD 150

- In-line mounting
- Operating pressure up to 315 bar
- Nominal flow rate up to 100 l/min

40.05-3e

Description

Application
In the high-pressure circuits of hydraulic systems.

Performance features
Functional protection: The high-pressure safety filter retains residues remaining in the system due to installation or after repairs, and intake chips from pumps (especially gear pumps). This prevents functional failures or faults on downstream components, particularly control/regulation or throttle valves.

Protection against wear: For wear protection, a fine filter should be installed elsewhere in the system.

Filter elements
Flow direction from outside to centre. The star-shaped pleating of the filter material provides:
- large filter surfaces
- low pressure drop
- high dirt-holding capacities
- long service life

Materials
Housing: steel, zinc plated
Seals: NBR (Viton on request)
Filter media: stainless steel wire mesh (1.4301)

Selection Chart

Part No.	Nominal flow	Pressure drop see diagram **D**/curve no.	Filter fineness	Filter surface	Cracking pressure of by-pass	Connection A/B	Dimension C	Dimension D	Dimension E	Dimension F	Dimension H	Dimension L	Width across flats $SW_{1/2}$	Symbol	Weight	Remarks
	l/min		µm	cm^2	bar		mm	mm	mm	mm	mm	mm			kg	
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**
HD 040-110	40	**D1**/1	100[1]	60	-	M22 x 1,5	12	-	7	15	63	97	36/36	1	0,45	[2]
HD 081-111	80	**D1**/2	100[1]	125	-	M26 x 1,5	12	52	7,5	18	11	130	46/46	1	1,10	[2]
HD 150-01	100	**D1**/3	100[1]	300	-	G3/4	12	65	10,5	-	-	142,5	55/36	1	2,00	-
HD 150-50	100	**D1**/4	60	320	3,5	G3/4	12	65	10,5	-	-	142,5	55/36	2	1,90	-

Remark:
The filters listed in this chart are standard filters. If modifications are required, e.g. different filter finenesses, we kindly ask for your request.

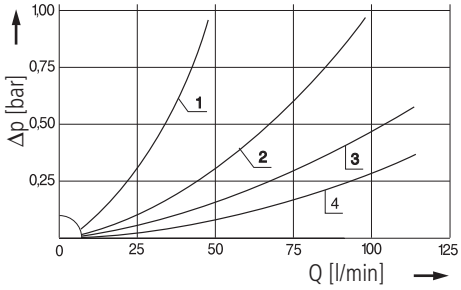
[1] Filter element differential pressure stable up to 160 bar [2] Connection according to DIN 3861

Diagrams

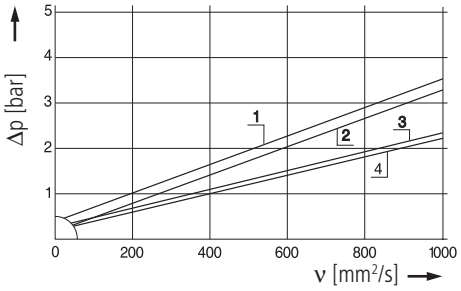
Δp-curves for the filters in Selection Chart, column 3

D1

Pressure drop as a function of the **flow volume** at ν = 35 mm²/s

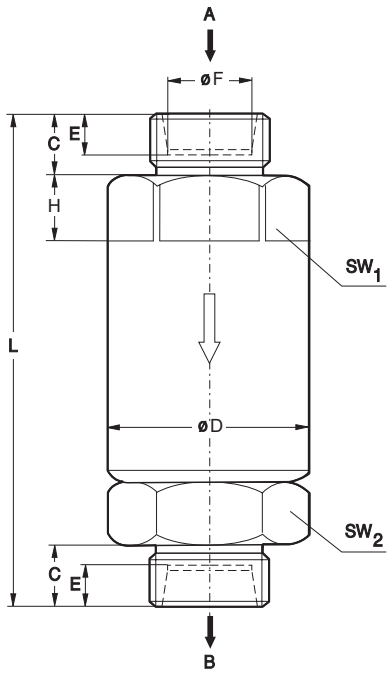


Pressure drop as a function of the **kinematic viscosity** at nominal flow

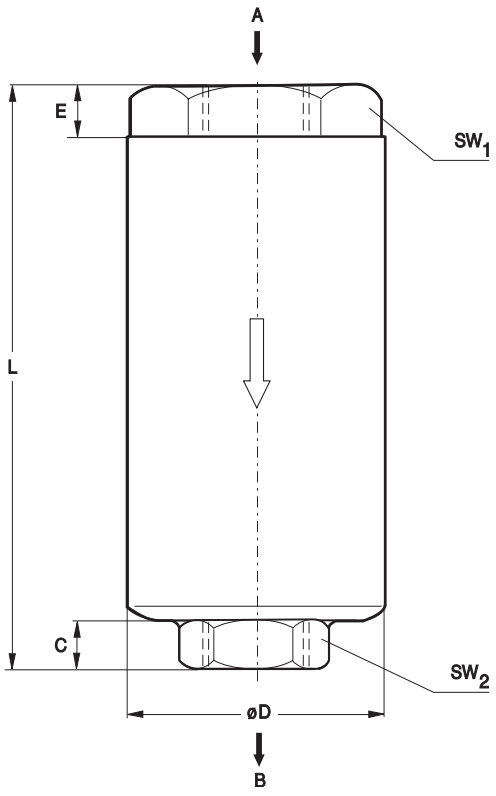


Dimensions

HD 040 / HD 081



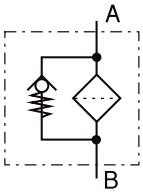
HD 150



Symbols

1

2

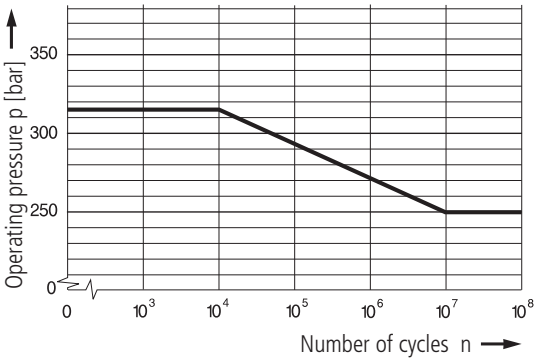


Characteristics

Operating pressure
0 ... 250 bar, min. 10^7 pressure cycles
Nominal pressure according to DIN 24550

0 ... 315 bar, min. 10^4 pressure cycles
Quasi-static operating pressure

Permissible pressure for other numbers of cycles



Nominal flow rate
Up to 100 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 $\nu \leq 200$ mm²/s
- flow velocity in the connection lines:
  up to 250 bar ≤ 8 m/s
  up to 450 bar ≤ 12 m/s

Filter fineness
60 µm, 100 µm
(see Selection Chart, column 4)

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)

Viscosity at nominal flow rate

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

Connection
Threaded ports according to ISO 228, DIN 13 and/or DIN 3861. Sizes see Selection Chart, column 7 (other port threads on request).

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	Verification of fabrication integrity (Bubble Point Test)
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-Pass-Test (evaluation of filter fineness and dirt-holding capacity)

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.

Our engineers will be glad to advice 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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Tel: +49 7250 76-0 · Fax: +49 7250 76-199 · info.de@argo-hytos.com · www.argo-hytos.com

Subject to change · 9107298-e · 0905

ARGO HYTOS

High Pressure Filters

HD 044 · HD 064

- Flange mounting
- Operating pressure up to 350 bar
- Nominal flow rate up to 80 l/min

40.30-3e

Description

Application
In the high pressure 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:	Through installation near to the control valves or other expensive components. The specific determined flow rate guarantees a closed by-pass valve even at $\nu \leq 200$ mm²/s (cold start condition).

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

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 (Viton on request)
Filter media:	EXAPOR®MAX - inorganic multi-layer microfibre web

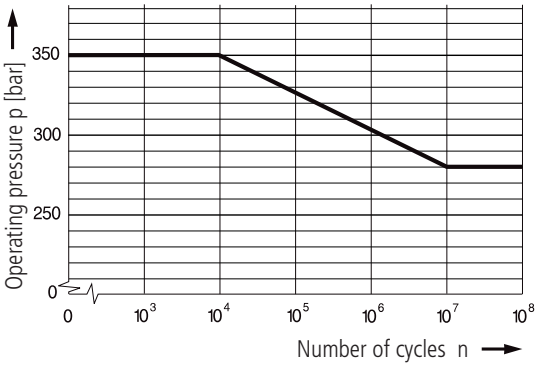
Accessories
Electrical and/or optical clogging indicators are available - optionally with one or two switching points resp. temperature suppression.
Dimensions and technical data see catalogue sheet 60.30.

Characteristics

Operating pressure
0 ... 280 bar, min. 10^7 pressure cycles
Nominal pressure according to DIN 24550

0 ... 350 bar, min. 10^4 pressure cycles
Quasi-static operating pressure

Permissible pressures for other numbers of cycles



Nominal flow rate
Up to 80 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 $\nu \leq 200$ mm²/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:
  up to 250 bar ≤ 8 m/s
  up to 450 bar ≤ 12 m/s

Filter fineness
5 µm(c) ... 16 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 ISO16889
(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)

Viscosity at nominal flow rate
- at operating temperature: < 60 mm²/s
- as starting viscosity: ν_{max} = 1200 mm²/s
- 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

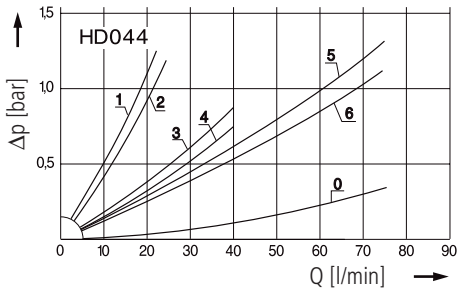
Connection
2 x Ø 15 mm on plain flange

Diagrams

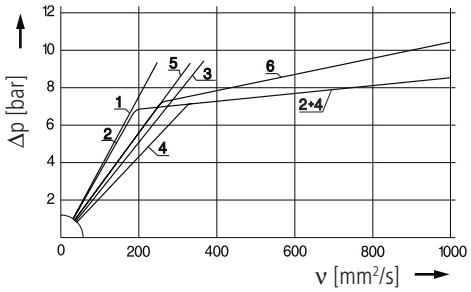
Δp-curves for complete filters in Selection Chart, column 3

D1

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

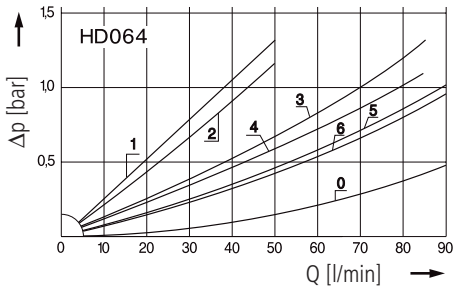


Pressure drop as a function of the **kinematic viscosity** at nominal flow

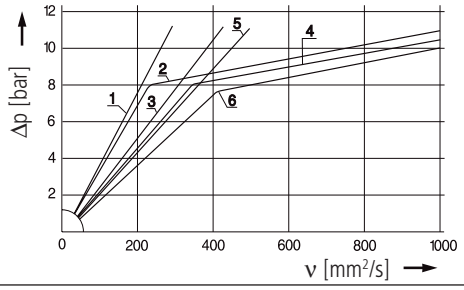


D2

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



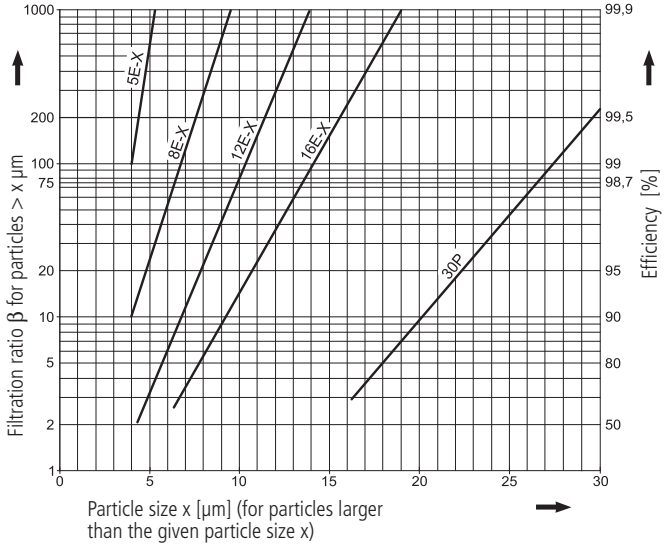
Pressure drop as a function of the **kinematic viscosity** at nominal flow



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	= $\bar{\beta}_{5\,(c)}$	= 200	EXAPOR®MAX
8 E-X	= $\bar{\beta}_{8\,(c)}$	= 200	EXAPOR®MAX
12 E-X	= $\bar{\beta}_{12\,(c)}$	= 200	EXAPOR®MAX
16 E-X	= $\bar{\beta}_{16\,(c)}$	= 200	EXAPOR®MAX
30 P	= $\bar{\beta}_{30\,(c)}$	= 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 special applications, finenesses differing from these curves are also available by using special composed filter media.

Selection Chart

Part No.	Nominal flow	Pressure drop see diagram **D**/curve no.	Filter fineness see diagr. **Dx**	Dirt-holding capacity	Connection A/B	Cracking pressure of by-pass	Symbol	Replacement filter element Part No.	Weight	Clogging indicator	Remarks
	l/min			g		bar			kg		
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
HD 044-183	20	**D1**/1	5 E-X	3,4	Ø 15	-	7	V3.0510-13[1]	3,4	optional	[2]
HD 044-153	25	**D1**/2	5 E-X	3,8	Ø 15	7	4	V3.0510-03	3,4	optional	-
HD 044-186	30	**D1**/3	12 E-X	5,0	Ø 15	-	7	V3.0510-16[1]	3,4	optional	[2]
HD 044-156	35	**D1**/4	12 E-X	6,1	Ø 15	7	4	V3.0510-06	3,4	optional	-
HD 044-178	55	**D1**/5	16 E-X	5,5	Ø 15	-	7	V3.0510-18[1]	3,4	optional	[2]
HD 044-158	63	**D1**/6	16 E-X	6,6	Ø 15	7	4	V3.0510-08	3,4	optional	-
HD 064-183	43	**D2**/1	5 E-X	6,9	Ø 15	-	7	V3.0520-13[1]	4,6	optional	[2]
HD 064-153	50	**D2**/2	5 E-X	7,6	Ø 15	7	4	V3.0520-03	4,5	optional	-
HD 064-196	63	**D2**/3	12 E-X	11	Ø 15	-	7	V3.0520-16[1]	4,6	optional	[2]
HD 064-156	70	**D2**/4	12 E-X	13	Ø 15	7	4	V3.0520-06	4,5	optional	-
HD 064-178	80	**D2**/5	16 E-X	12	Ø 15	-	7	V3.0520-18[1]	4,6	optional	[2]
HD 064-158	80	**D2**/6	16 E-X	14	Ø 15	7	4	V3.0520-08	4,5	optional	-

Optical or electrical indicators are available to monitor the clogging condition of the element. If the indicator should be already mounted onto the filter head use the abbreviation "M" behind the part number of the indicator. The printed order acknowledgements show both items separately.

Order example: The filter HD 064-156 has to be supplied with optical clogging indicator - response pressure 5,0 bar

Order description: **HD 064-156 / DG 042-02 M**

Part No. (Basic unit) — **HD 064-156**

Clogging indicator — **DG 042-02** — **M** — **mounted**

For the appropriate clogging indicators see catalogue sheet 60.30.

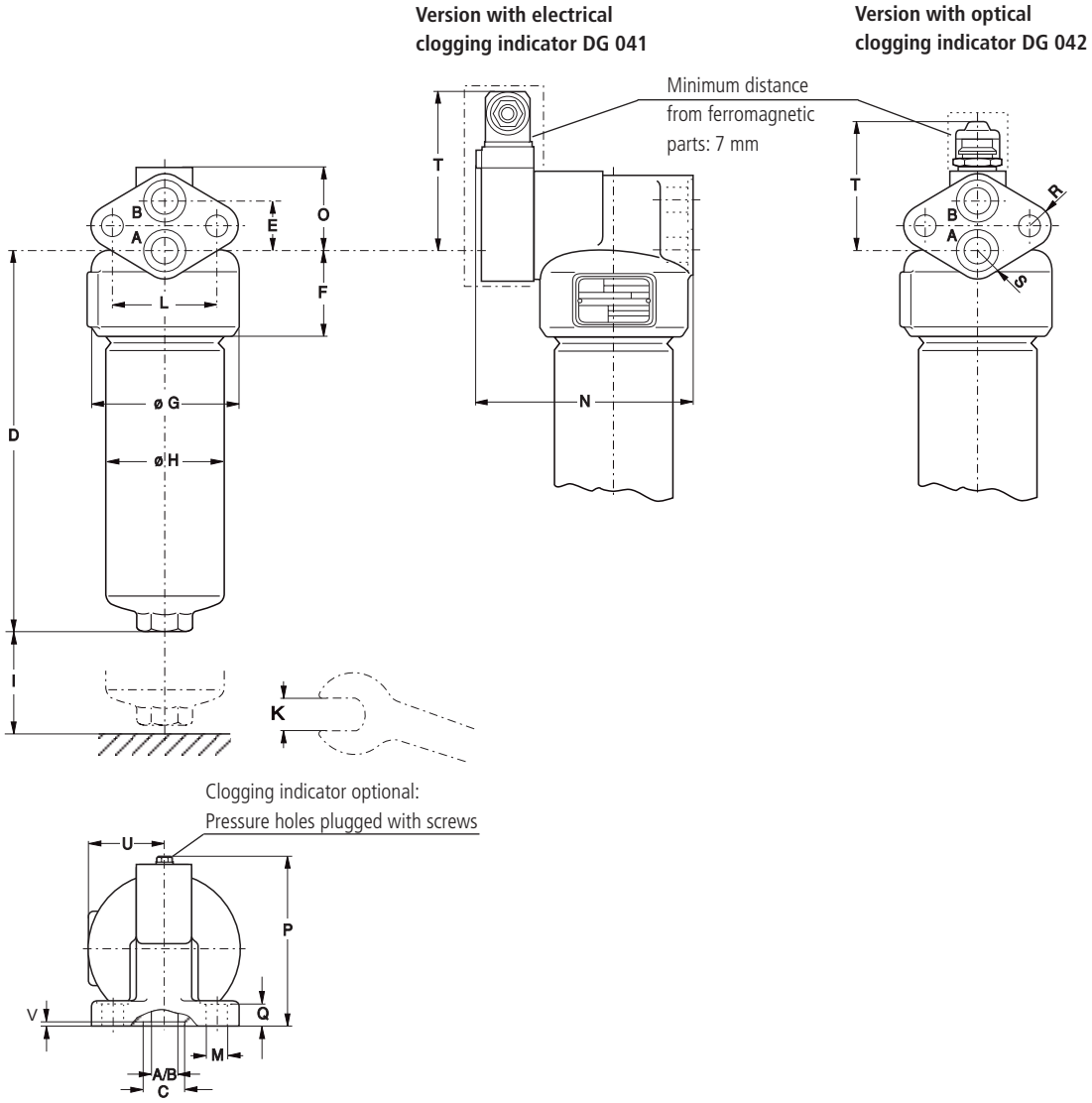
Remarks:

- Filter versions without by-pass valves must always be equipped with a clogging indicator.
- The filters listed in this chart are standard filters. If modifications are required, e.g. filter fineness 30 P, we kindly ask for your request.

[1] Element differential pressure stable up to 160 bar

[2] Clogging indicator is obligatory

Dimensions

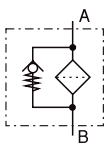


Measurements

Type	A/B	C	D	E	F	G	H	I	K	L	M	N	O	P	Q	R	S	T electr. / opt.	U	V
HD 044	Ø 15	23,5	145	26	49	83	66	70	36	58	12,5	118,5	48	90	17	13	16	106 / 79	45	2
HD 064	Ø 15	23,5	241	26	49	83	66	70	36	58	12,5	118,5	48	90	17	13	16	106 / 79	45	2

Symbols

1



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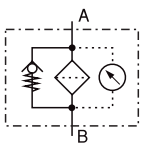

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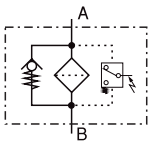

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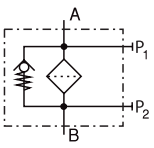

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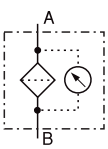

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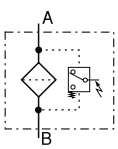

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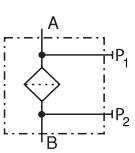
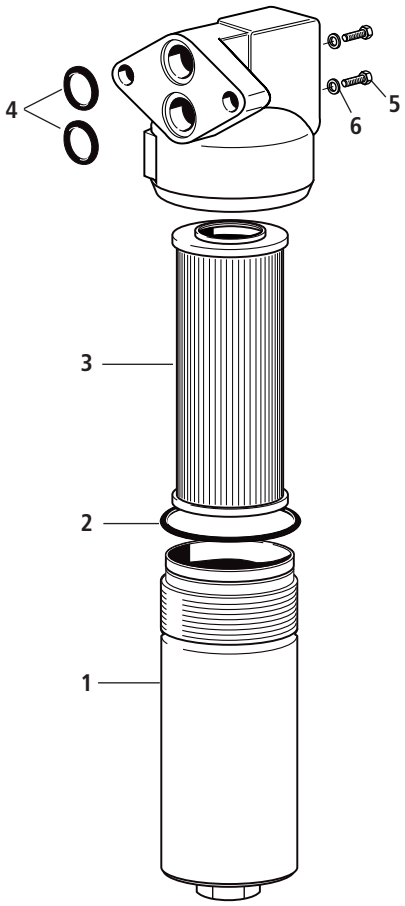


Spare Parts



Pos.	Designation	Part No.
1	Filter bowl HD 044	HD 052.0101
1	Filter bowl HD 064	HD 072.0101
2	O-ring 53,57 x 3,53	N 007.0543/1
3	Filter element (with seal)	s. Chart / col. 9
4	O-ring 18,72 x 2,62 *	N 007.0193
5	Hexagonal head screw M4x8 DIN 933-8.8	3301051
6	Bonded Seal 4,1 x 7,2 x 1	3404074

*Not supplied with filter - has to be ordered separately

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 Verification of fabrication integrity (Bubble Point Test)
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-Pass-Test (evaluation of filter fineness and dirt-holding capacity)

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.

Our engineers will be glad to advice 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 · 9107178-e · 0905

ARGO HYTOS

High Pressure Filters – Worldline 100

HD 049 · HD 069

- In-line mounting
- Operating pressure up to 450 bar
- Nominal flow rate up to 80 l/min

40.45-2e

Description

Application
In the high pressure 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: 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 mm²/s (cold start condition).

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

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
Seals:	NBR (Viton on request)
Filter media:	EXAPOR®MAX - inorganic multi-layer microfibre web Paper - cellulose web, impregnated with resin

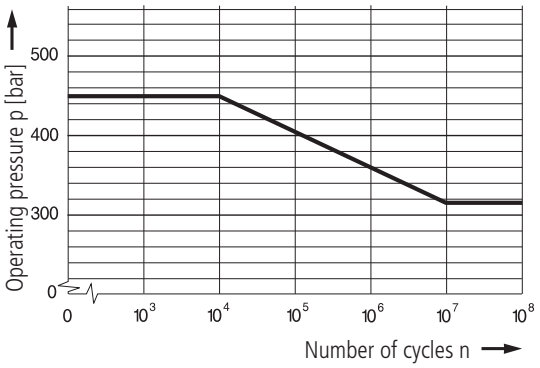
Accessories
If an electrical indicator is used a transparent socket with LED for optical indication is also available with Part No. DG 041.1200.

Characteristics

Operating pressure
0 ... 315 bar, min. 10^7 pressure cycles
Nominal pressure according to DIN 24550

0 ... 450 bar, min. 10^4 pressure cycles
Quasi-static operating pressure

Permissible pressures for other numbers of cycles



Nominal flow rate
Up to 80 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 $\nu \leq 200$ mm²/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:
  up to 250 bar ≤ 8 m/s
  up to 450 bar ≤ 12 m/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)

Viscosity at nominal flow rate
- at operating temperature: $\nu < 60$ mm²/s
- as starting viscosity: $\nu_{max} = 1200$ mm²/s
- 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. Sizes see Selection Chart, column 6 (other port threads on request)

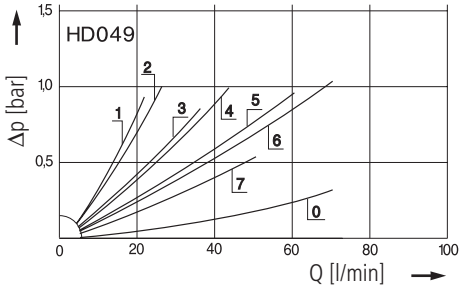
Electrical clogging indicator
- Switching voltage: max. 120 V AC / 175 V DC
- Switching current: max. 0,17 A AC / 0,25 A DC
- Switching power: max. 3,5 VA AC / 5 W DC
- Type of contact: Change-over
- Electrical protection: IP 65 (with mounted and secured socket)

Diagrams

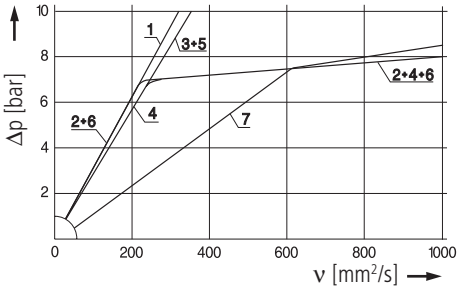
Δp-curves for complete filters in Selection Chart, column 3

D1

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

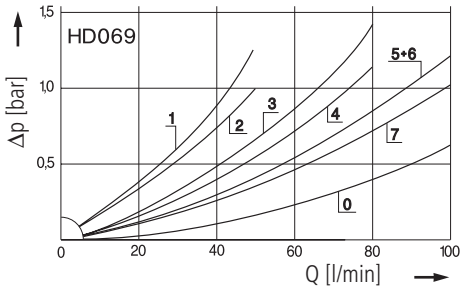


Pressure drop as a function of the **kinematic viscosity**
at nominal flow

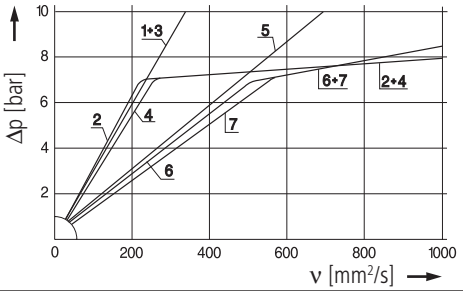


D2

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



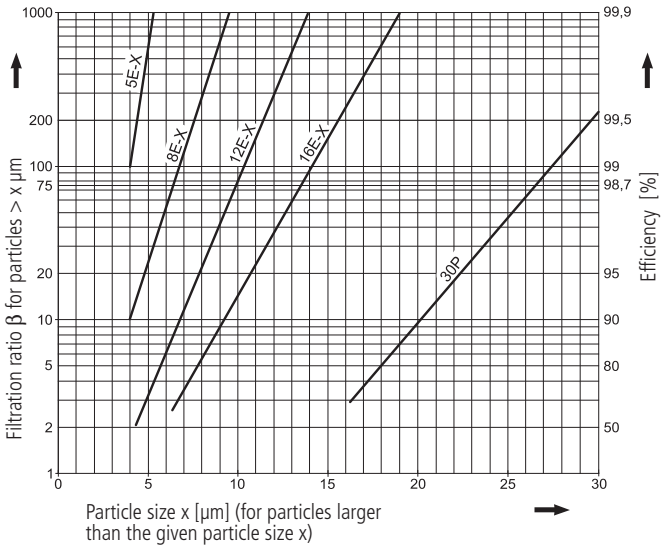
Pressure drop as a function of the **kinematic viscosity**
at nominal flow



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	= $\bar{\beta}_{5\,(c)}$	= 200	EXAPOR®MAX
8 E-X	= $\bar{\beta}_{8\,(c)}$	= 200	EXAPOR®MAX
12 E-X	= $\bar{\beta}_{12\,(c)}$	= 200	EXAPOR®MAX
16 E-X	= $\bar{\beta}_{16\,(c)}$	= 200	EXAPOR®MAX
30 P	= $\bar{\beta}_{30\,(c)}$	= 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 special applications, finenesses differing from these curves are also available by using special composed filter media.

Selection Chart

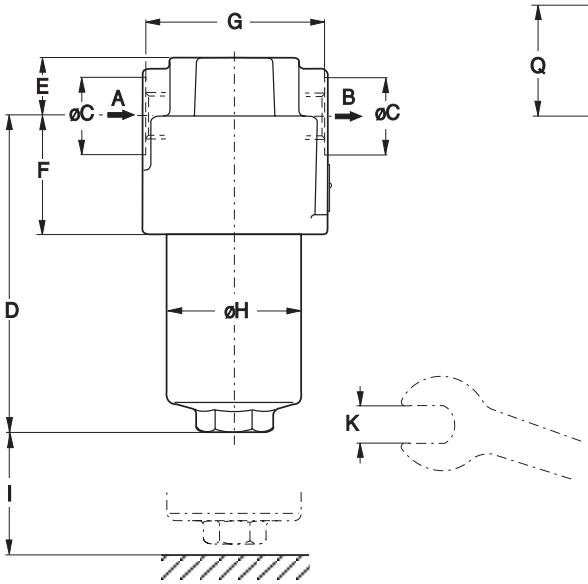
Part No.	Nominal flow	Pressure drop see diagram **D**/curve no.	Filter fineness see diagr. **Dx**	Dirt-holding capacity	Connection A/B	Cracking pressure of by-pass	Symbol	Replacement element Part No.	Weight	Clogging indicator Cracking pressure in ( )		Remarks
	l/min			g		bar			kg	bar		
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**		**12**
HD 049-189	20	**D1**/1	5 E-X	3,4	G½	-	6	V3.0510-13[1]	3,9	electrical	(5)	change-over
HD 049-169	25	**D1**/2	5 E-X	3,8	G½	7	1	V3.0510-03	3,8	-		-
HD 049-179	25	**D1**/2	5 E-X	3,8	G½	7	2	V3.0510-03	3,9	optical	(5)	-
HD 049-159	25	**D1**/2	5 E-X	3,8	G½	7	3	V3.0510-03	3,9	electrical	(5)	change-over
HD 049-186	30	**D1**/3	12 E-X	5	G½	-	6	V3.0510-16[1]	3,9	electrical	(5)	change-over
HD 049-166	35	**D1**/4	12 E-X	6,1	G½	7	1	V3.0510-06	3,8	-		-
HD 049-176	35	**D1**/4	12 E-X	6,1	G½	7	2	V3.0510-06	3,9	optical	(5)	-
HD 049-156	35	**D1**/4	12 E-X	6,1	G½	7	3	V3.0510-06	3,9	electrical	(5)	change-over
HD 049-188	55	**D1**/5	16 E-X	5,5	G½	-	6	V3.0510-18[1]	3,9	electrical	(5)	change-over
HD 049-268	63	**D1**/6	16 E-X	6,6	M18 x 1,5	7	1	V3.0510-08	3,8	-		casing phosphated
HD 049-168	63	**D1**/6	16 E-X	6,6	G½	7	1	V3.0510-08	3,8	-		-
HD 049-178	63	**D1**/6	16 E-X	6,6	G½	7	2	V3.0510-08	3,9	optical	(5)	-
HD 049-158	63	**D1**/6	16 E-X	6,6	G½	7	3	V3.0510-08	3,9	electrical	(5)	change-over
HD 049-151	55	**D1**/7	30 P	3,6	G½	7	1	P3.0510-11[2]	3,8	-		-
HD 049-161	55	**D1**/7	30 P	3,6	G½	7	2	P3.0510-11[2]	3,9	optical	(5)	-
HD 049-171	55	**D1**/7	30 P	3,6	G½	7	3	P3.0510-11[2]	3,9	electrical	(5)	change-over
HD 069-189	43	**D2**/1	5 E-X	6,9	G½	-	6	V3.0520-13[1]	5,1	electrical	(5)	change-over
HD 069-169	50	**D2**/2	5 E-X	7,6	G½	7	1	V3.0520-03	4,9	-		-
HD 069-179	50	**D2**/2	5 E-X	7,6	G½	7	2	V3.0520-03	5,0	optical	(5)	-
HD 069-159	50	**D2**/2	5 E-X	7,6	G½	7	3	V3.0520-03	5,0	electrical	(5)	change-over
HD 069-186	63	**D2**/3	12 E-X	11	G¾	-	6	V3.0520-16[1]	5,1	electrical	(5)	change-over
HD 069-166	70	**D2**/4	12 E-X	13	G¾	7	1	V3.0520-06	4,9	-		-
HD 069-176	70	**D2**/4	12 E-X	13	G¾	7	2	V3.0520-06	5,0	optical	(5)	-
HD 069-156	70	**D2**/4	12 E-X	13	G¾	7	3	V3.0520-06	5,0	electrical	(5)	change-over
HD 069-188	80	**D2**/5	16 E-X	12	G¾	-	6	V3.0520-18[1]	5,1	electrical	(5)	change-over
HD 069-268	80	**D2**/6	16 E-X	14	G¾	7	1	V3.0520-08	4,9	-		casing phosphated
HD 069-168	80	**D2**/6	16 E-X	14	G¾	7	1	V3.0520-08	4,9	-		-
HD 069-178	80	**D2**/6	16 E-X	14	G¾	7	2	V3.0520-08	5,0	optical	(5)	-
HD 069-158	80	**D2**/6	16 E-X	14	G¾	7	3	V3.0520-08	5,0	electrical	(5)	change-over
HD 069-151	80	**D2**/7	30 P	7,1	G¾	7	1	P3.0520-01[2]	4,9	-		-
HD 069-161	80	**D2**/7	30 P	7,1	G¾	7	2	P3.0520-01[2]	5,0	optical	(5)	-
HD 069-171	80	**D2**/7	30 P	7,1	G¾	7	3	P3.0520-01[2]	5,0	electrical	(5)	change-over

Remarks:

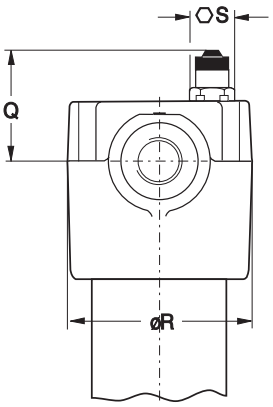
- The filters listed in this chart are standard filters. If modifications are required, e.g. bolt mounted indicators according to catalogue sheet 60.30, we kindly ask for your request.
- If an electrical indicator is used a transparent socket with LED for optical indication is also available with Part No. DG 041.1200.

[1] Element differential pressure up to 160 bar [2] Paper media supported with metal gauze

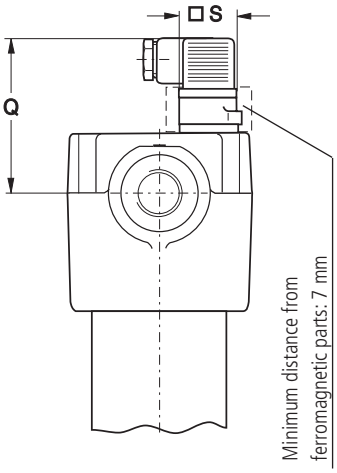
Dimensions



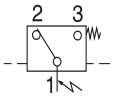
Version with integrated optical clogging indicator

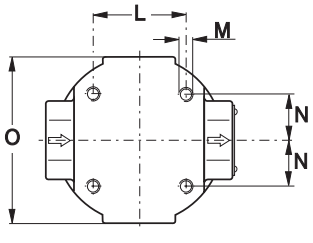


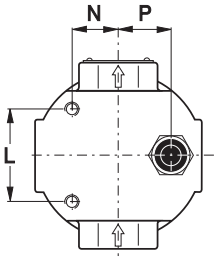
Version with integrated electrical clogging indicator



Terminal connection





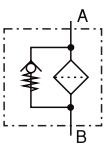


Measurements

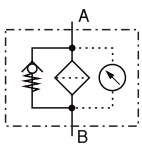
Type	A/B	C	D	E	F	G	H	I	K	L	M ø/depth	N	O	P	Q opt./electr.	R	S opt./electr.
HD 049	M18 x 1,5 , G½	24, 33	158	24,5	61	84	65	55	36	40	M8/12	25	89	27,5	55/72	85	24/30
HD 069	G½, G¾	33, 36	254	24,5	61	84	65	55	36	40	M8/12	25	89	27,5	55/72	85	24/30

Symbols

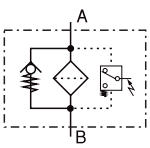
1



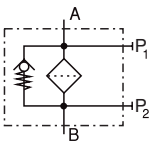
2



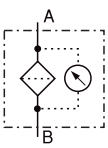
3



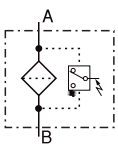
4



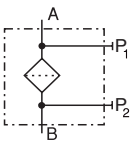
5



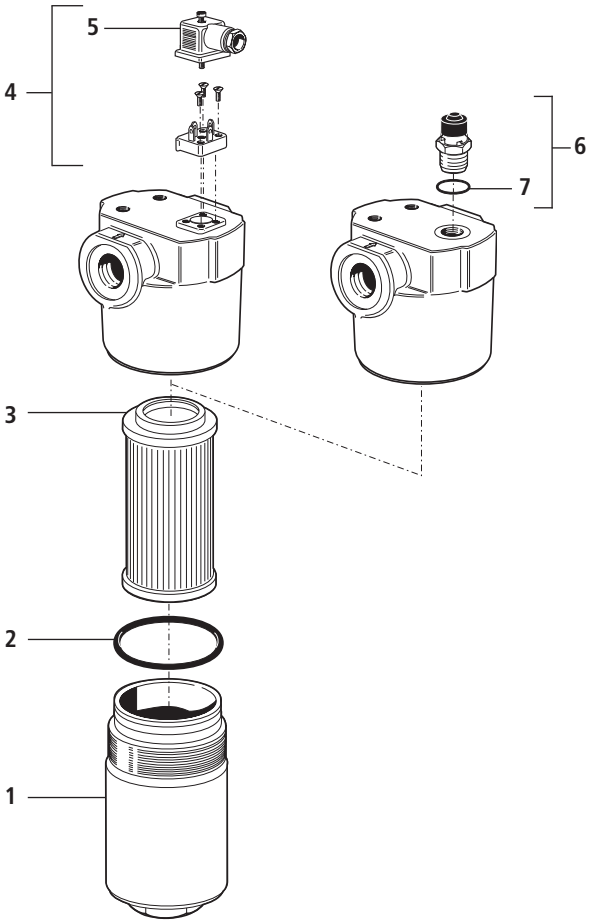
6



7



Spare Parts



Pos.	Designation	Part No.
1	Filter bowl HD 049	HD 052.0101
1	Filter bowl HD 069	HD 072.0101
2	O-ring 53,57 x 3,53	N 007.0543/1
3	Filter element (with seal)	s. Chart / col. 9
4	Reed switch with screws and socket (Pos. 5)	HD 049.1410
5	Socket DIN 43650 - AF3	DG 041.1220
6	Optical indicator (with Pos. 7)	HD 049.1400
7	O-ring 17 x 2	N 007.0172

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 Verification of fabrication integrity (Bubble Point Test)
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-Pass-Test (evaluation of filter fineness and dirt-holding capacity)

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.

Our engineers will be glad to advice 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
ARGO-HYTOS GMBH · Industriestraße 9 · D-76703 Kraichtal
Tel: +49 7250 76-0 · Fax: +49 7250 76-199 · info.de@argo-hytos.com · www.argo-hytos.com

Subject to change · 9107181-e · 0905

ARGO HYTOS

High Pressure Filters – Worldline 200

HD 152 · HD 172

- In-line mounting
- Operating pressure up to 450 bar
- Nominal flow rate up to 150 l/min

40.55-4e

Description

Application
In the high pressure 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: Through installation near to the control valves or other expensive components. The specific determined flow rate guarantees a closed by-pass valve even at $\nu \leq 200$ mm²/s (cold start condition).

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

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 (Viton on request)
Filter media:	EXAPOR®MAX - inorganic multi-layer microfibre web Paper - cellulose web, impregnated with resin

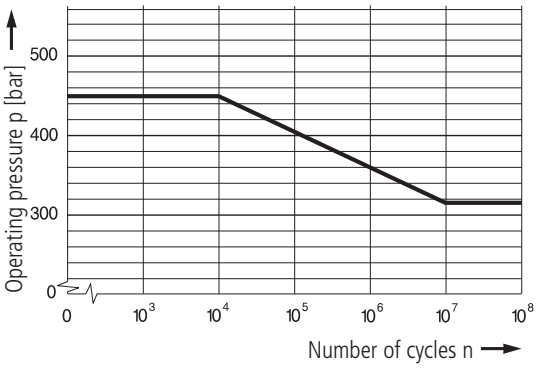
Accessories
If an electrical indicator is used a transparent socket with LED for optical indication is also available with Part No. DG 041.1200.

Characteristics

Operating pressure
0 ... 315 bar, min. 10^7 pressure cycles
Nominal pressure according to DIN 24550

0 ... 450 bar, min. 10^4 pressure cycles
Quasi-static operating pressure

Permissible pressures for other numbers of cycles



Nominal flow rate
Up to 150 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 $\nu \leq 200$ mm²/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:
  up to 250 bar ≤ 8 m/s
  up to 450 bar ≤ 12 m/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)

Viscosity at nominal flow rate
- at operating temperature: $\nu < 60$ mm²/s
- as starting viscosity: $\nu_{max} = 1200$ mm²/s
- 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. Sizes see Selection Chart, column 6 (other port threads on request)

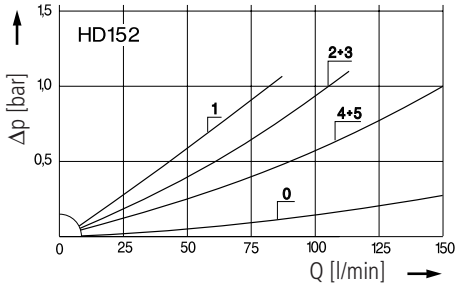
Electrical clogging indicator
- Switching voltage: max. 120 V AC / 175 V DC
- Switching current: max. 0,17 A AC / 0,25 A DC
- Switching power: max. 3,5 VA AC / 5 W DC
- Type of contact: Change-over
- Electrical protection: IP 65 (with mounted and secured socket)

Diagrams

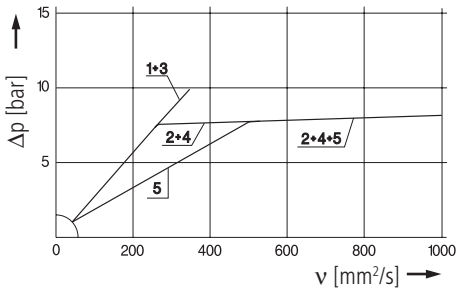
Δp-curves for complete filters in Selection Chart, column 3

D1

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

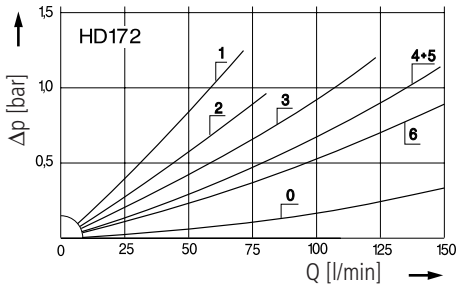


Pressure drop as a function of the **kinematic viscosity** at nominal flow

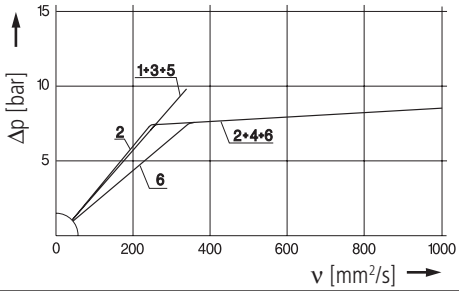


D2

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



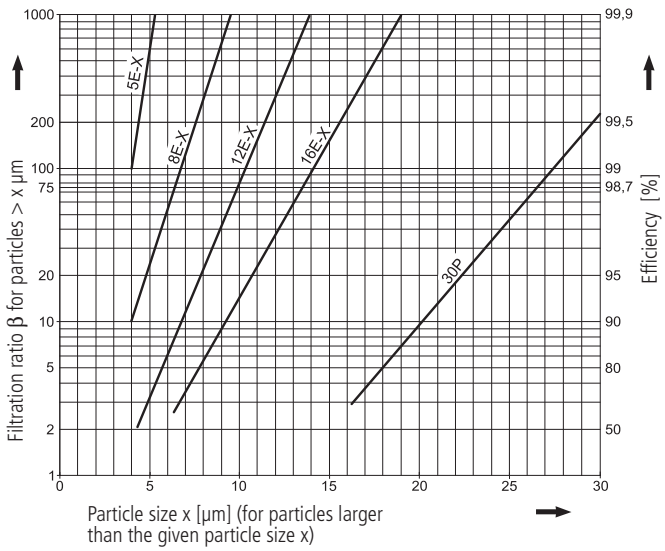
Pressure drop as a function of the **kinematic viscosity** at nominal flow



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	= $\bar{\beta}_{5\,(c)}$	= 200	EXAPOR®MAX
8 E-X	= $\bar{\beta}_{8\,(c)}$	= 200	EXAPOR®MAX
12 E-X	= $\bar{\beta}_{12\,(c)}$	= 200	EXAPOR®MAX
16 E-X	= $\bar{\beta}_{16\,(c)}$	= 200	EXAPOR®MAX
30 P	= $\bar{\beta}_{30\,(c)}$	= 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 special applications, finenesses differing from these curves are also available by using special composed filter media.

Selection Charts

Part No.	Nominal flow	Pressure drop see diagram **D**/curve no.	Filter fineness see diagr. **Dx**	Dirt-holding capacity	Connection A/B	Cracking pressure of by-pass	Symbol	Replacement filter element Part No.	Weight	Clogging indicator	Remarks
	l/min			g		bar			kg	bar	
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
HD 152-186	60	**D1**/1	12 E-X	12	G¾	-	6	V3.0617-26[1]	7,1	electrical (5)	change-over
HD 152-166	95	**D1**/2	12 E-X	14	G¾	7	1	V3.0617-06	6,9	-	-
HD 152-276	95	**D1**/2	12 E-X	14	G¾	7	2	V3.0617-06	7,0	optical (5)	-
HD 152-156	95	**D1**/2	12 E-X	14	G¾	7	3	V3.0617-06	7,0	electrical (5)	change-over
HD 152-188	90	**D1**/3	16 E-X	13	G1	-	6	V3.0617-18[1]	7,1	electrical (5)	change-over
HD 152-168	150	**D1**/4	16 E-X	15	G1	7	1	V3.0617-08	6,9	-	-
HD 152-278	150	**D1**/4	16 E-X	15	G1	7	2	V3.0617-08	7,0	optical (5)	-
HD 152-158	150	**D1**/4	16 E-X	15	G1	7	3	V3.0617-08	7,0	electrical (5)	change-over
HD 152-151	130	**D1**/5	30 P	8,7	G1	7	1	P3.0617-01[2]	6,9	-	-
HD 152-261	130	**D1**/5	30 P	8,7	G1	7	2	P3.0617-01[2]	7,0	optical (5)	-
HD 172-189	55	**D2**/1	5 E-X	11	G1	-	6	V3.0623-13[1]	8,4	electrical (5)	change-over
HD 172-163	80	**D2**/2	5 E-X	14	G1	7	1	V3.0623-03	8,0	-	-
HD 172-273	80	**D2**/2	5 E-X	14	G1	7	2	V3.0623-03	8,1	optical (5)	-
HD 172-153	80	**D2**/2	5 E-X	14	G1	7	3	V3.0623-03	8,1	electrical (5)	change-over
HD 172-186	100	**D2**/3	12 E-X	17	G1	-	6	V3.0623-26[1]	8,4	electrical (5)	change-over
HD 172-166	150	**D2**/4	12 E-X	22	G1	7	1	V3.0623-06	8,0	-	-
HD 172-276	150	**D2**/4	12 E-X	22	G1	7	2	V3.0623-06	8,1	optical (5)	-
HD 172-156	150	**D2**/4	12 E-X	22	G1	7	3	V3.0623-06	8,1	electrical (5)	change-over
HD 172-188	150	**D2**/5	16 E-X	18	G1	-	6	V3.0623-18[1]	8,4	electrical (5)	change-over
HD 172-168	150	**D2**/6	16 E-X	24	G1	7	1	V3.0623-08	8,0	-	-
HD 172-278	150	**D2**/6	16 E-X	24	G1	7	2	V3.0623-08	8,1	optical (5)	-
HD 172-158	150	**D2**/6	16 E-X	24	G1	7	3	V3.0623-08	8,1	electrical (5)	change-over
HD 172-151	150	**D2**/6	30 P	14	G1	7	1	P3.0623-11[2]	8,0	-	-
HD 172-261	150	**D2**/6	30 P	14	G1	7	2	P3.0623-11[2]	8,1	optical (5)	-

Remarks:

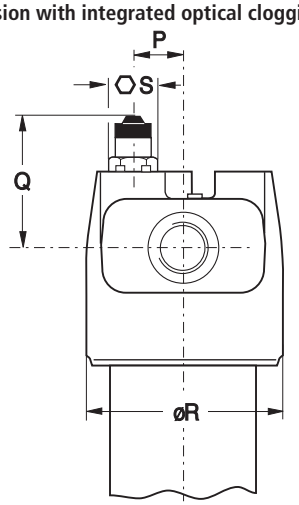
- The filters listed in this chart are standard filters. If modifications are required, e.g. connections SAE ¾ resp. SAE 1 (6000 psi), we kindly ask for your request.
- If an electrical indicator is used a transparent socket with LED for optical indication is also available with Part No. DG 041.1200.

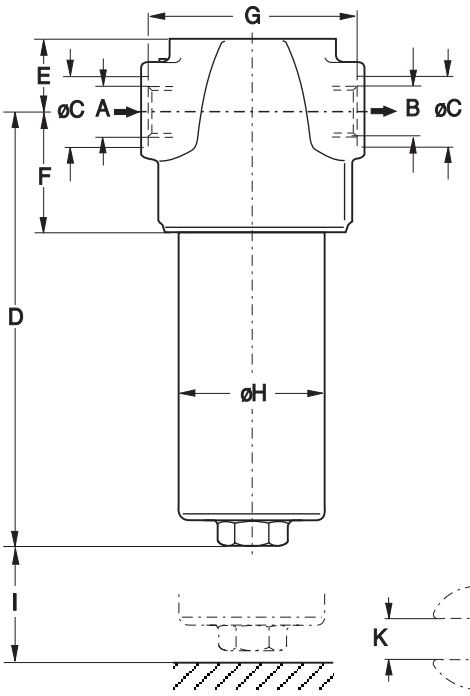
[1] Filter element differential pressure stable up to 160 bar

[2] Paper media supported with metal gauze

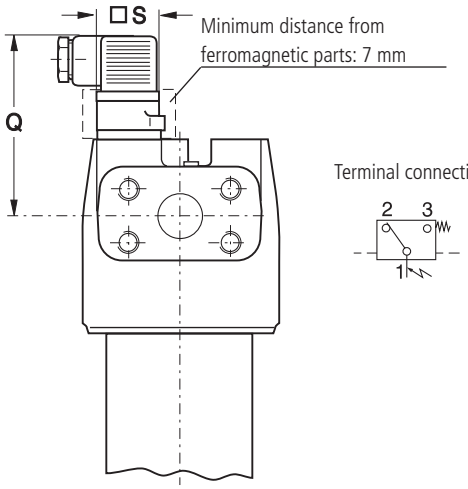
Dimensions

Version with integrated optical clogging indicator

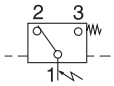


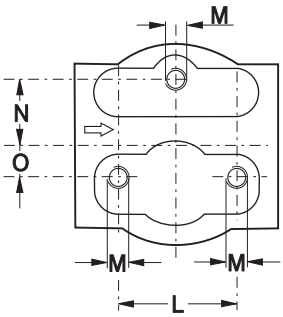


Version with integrated electrical clogging indicator and SAE-flange (6000 psi)



Terminal connection



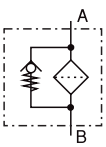


Measurements

Type	A/B	C	D	E	F	G	H	I	K	L	M ø/depth	N	O	P	Q opt./electr.	R	S opt./electr.
HD 152	G¾, G1	36, 45	224	39	66	104	75	70	27	60	M10/12	35	17,5	30	69/86	102	24/30
HD 172	G1	45	285	39	66	104	75	70	27	60	M10/12	35	17,5	30	69/86	102	24/30

Symbols

1



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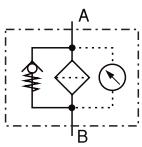

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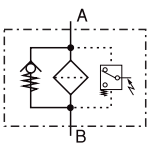

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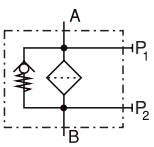

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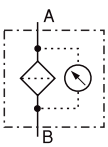

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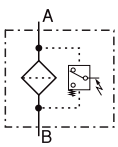
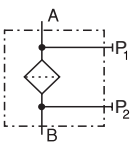
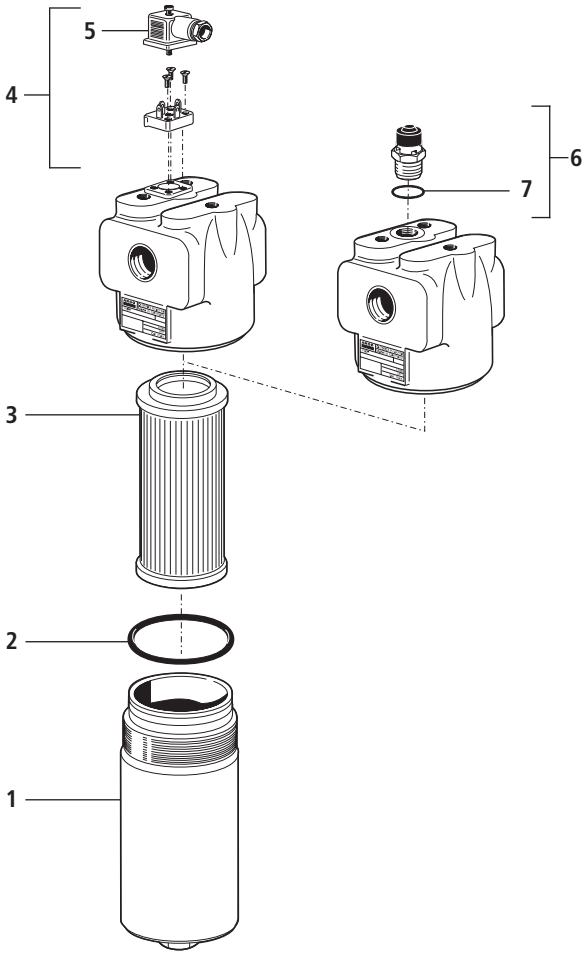


7



Spare Parts



Pos.	Designation	Part No.
1	Filter bowl HD 152	HD 152.0102
1	Filter bowl HD 172	HD 171.0101
2	O-ring 63 x 3,5	N 007.0634
3	Filter element (with seal)	see Chart/col. 9
4	Reed switch with screws and socket (Pos. 5)	HD 049.1410
5	Socket DIN 43650 - AF3	DG 041.1220
6	Optical indicator (with Pos. 7)	HD 049.1400
7	O-ring 17 x 2	N 007.0172

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 Verification of fabrication integrity (Bubble Point Test)
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-Pass-Test (evaluation of filter fineness and dirt-holding capacity)

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.

Our engineers will be glad to advice 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
ARGO-HYTOS GMBH · Industriestraße 9 · D-76703 Kraichtal
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Subject to change · 9107183-e · 0905

ARGO HYTOS

High Pressure Filters

HD 417 · HD 617

- Bi-directional flow
- In-line mounting
- Operating pressure up to 450 bar
- Nominal flow rate up to 300 l/min

40.80-3e

Description

Application
In the high pressure circuits of hydraulic systems with changing flow direction.

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:	Through installation near to the control valves or other expensive components. The specific determined flow rate guarantees a closed by-pass valve even at $\nu \leq 200$ mm²/s (cold start condition).

Special features

Reverse flow valves:	The "Graetz" system (see Symbols) integrated into the head piece ensures the filtration of the hydraulic fluid in both flow directions.

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

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 (Viton on request)
Filter media:	EXAPOR®MAX - inorganic multi-layer microfibre web Paper - cellulose web, impregnated with resin

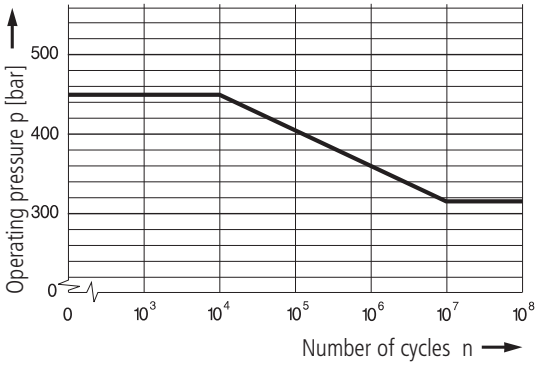
Accessories
Electrical and/or optical clogging indicators are available - optionally with one or two switching points resp. temperature suppression.
Dimensions and technical data see catalogue sheet 60.30.

Characteristics

Operating pressure
0 ... 315 bar, min. 10^7 pressure cycles
Nominal pressure according to DIN 24550

0 ... 450 bar, min. 10^4 pressure cycles
Quasi-static operating pressure

Permissible pressures for other numbers of cycles



Nominal flow rate
Up to 300 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 $\nu \leq 200$ mm²/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:
  up to 250 bar ≤ 8 m/s
  up to 450 bar ≤ 12 m/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)

Viscosity at nominal flow rate
- at operating temperature: $\nu < 60$ mm²/s
- as starting viscosity: $\nu_{max} = 1200$ mm²/s
- 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.

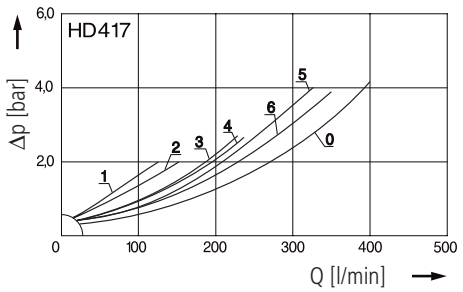
Mounting position
Preferably vertical, filter head on top

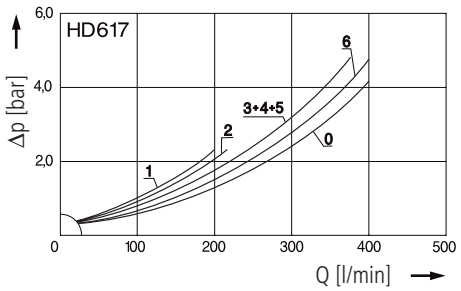
Connection
SAE-flange (6000 psi). Sizes see Selection Chart, column 6

Diagrams

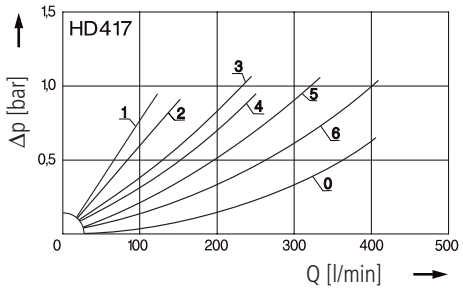
Δp-curves for complete filters in Selection Chart, column 3

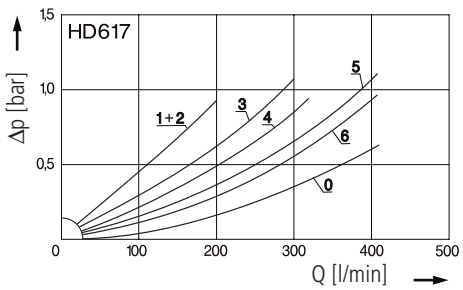
D1 Pressure drop as a function of the **flow volume** at ν = 35 mm²/s, measurement **with** reverse flow valves, (0 = casing empty)



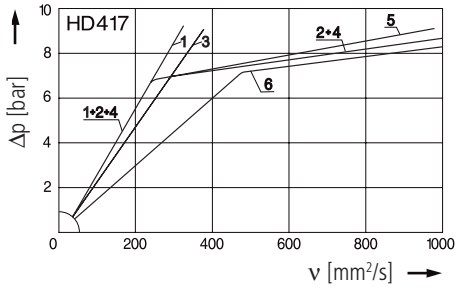


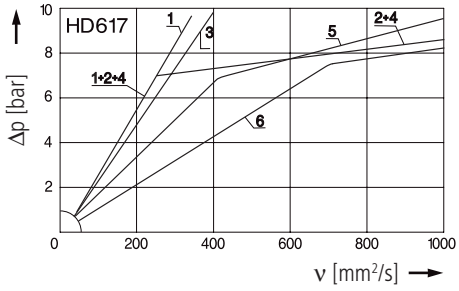
D2 Pressure drop as a function of the **flow volume** at ν = 35 mm²/s, measurement **without** reverse flow valves, (0 = casing empty)





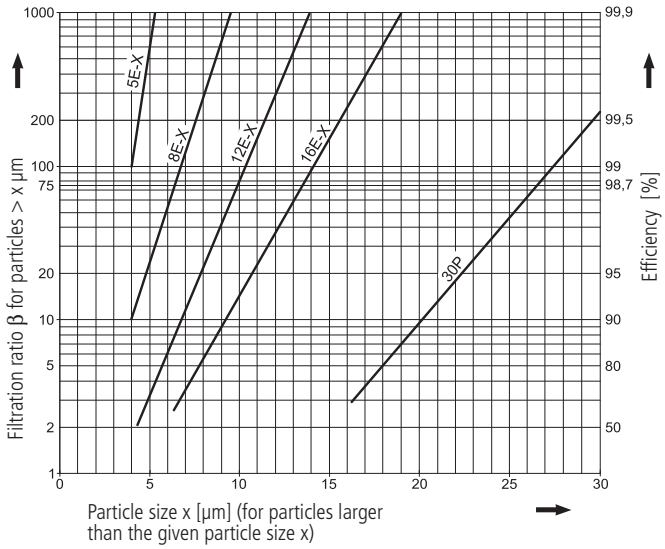
D3 Pressure drop as a function of the **kinematic viskosity** at nominal flow, measurement **without** reverse flow valves





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	= $\bar{\beta}_{5\,(c)}$	= 200	EXAPOR®MAX
8 E-X	= $\bar{\beta}_{8\,(c)}$	= 200	EXAPOR®MAX
12 E-X	= $\bar{\beta}_{12\,(c)}$	= 200	EXAPOR®MAX
16 E-X	= $\bar{\beta}_{16\,(c)}$	= 200	EXAPOR®MAX
30 P	= $\bar{\beta}_{30\,(c)}$	= 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 special applications, finenesses differing from these curves are also available by using special composed filter media.

Selection Chart

Part No.	Nominal flow	Pressure drop see diagram **D**/curve no.	Filter fineness see diagr. **Dx**	Dirt-holding capacity	Connection A/B	Cracking pressure of by-pass Symbol		Replacement filter element Part No.	Weight	Clogging indicator	Remarks
	l/min			g		bar			kg		
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
HD 417-149	115	**D1,2,3**/1	5 E-X	20	SAE 1¼	-	3	V3.0823-13[1]	20,3	optional	[2]
HD 417-179	130	**D1,2,3**/2	5 E-X	26	SAE 1¼	7	1	V3.0823-03	19,7	optional	-
HD 417-146	180	**D1,2,3**/3	12 E-X	32	SAE 1¼	-	3	V3.0823-16[1]	20,3	optional	[2]
HD 417-176	210	**D1,2,3**/4	12 E-X	41	SAE 1¼	7	1	V3.0823-06	19,7	optional	-
HD 417-168	300	**D1,2,3**/5	16 E-X	46	SAE 1¼	7	1	V3.0823-08	19,7	optional	-
HD 417-161	300	**D1,2,3**/6	30 P	26	SAE 1¼	7	1	P3.0823-01[3]	19,7	optional	-
HD 617-149	170	**D1,2,3**/1	5 E-X	29	SAE 1½	-	3	V3.0833-13[1]	23,1	optional	[2]
HD 617-179	190	**D1,2,3**/2	5 E-X	36	SAE 1½	7	1	V3.0833-03	22,4	optional	-
HD 617-146	270	**D1,2,3**/3	12 E-X	46	SAE 1½	-	3	V3.0833-16[1]	23,1	optional	[2]
HD 617-176	300	**D1,2,3**/4	12 E-X	58	SAE 1½	7	1	V3.0833-06	22,4	optional	-
HD 617-178	300	**D1,2,3**/5	16 E-X	67	SAE 1½	7	1	V3.0833-08	22,4	optional	-
HD 617-161	300	**D1,2,3**/6	30 P	34	SAE 1½	7	1	P3.0833-01[3]	22,4	optional	-

Optical or electrical indicators are available to monitor the clogging condition of the element. If the indicator should be already mounted onto the filter head use the abbreviation "M" behind the part number of the indicator. The printed order acknowledgements show both items separately.

Order example: The filter HD 417-149 has to be supplied with electrical clogging indicator - cracking pressure 5,0 bar

Order description: **HD 417-149 / DG 041-33 M**

Part No. (Basic unit) — **HD 417-149**

Clogging indicator — **DG 041-33**

M — **mounted**

For the appropriate clogging indicators see catalogue sheet 60.30.

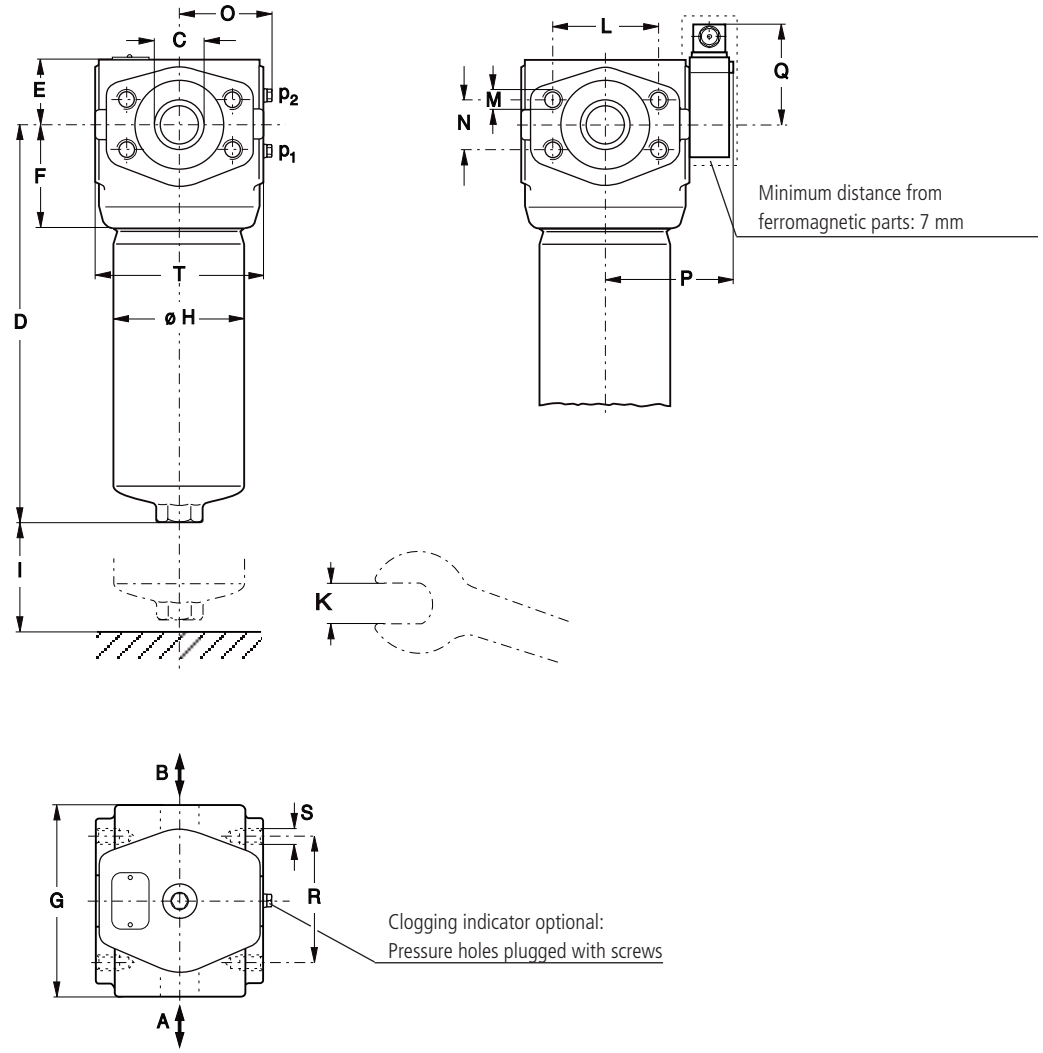
Remarks:

- Filter versions without by-pass valves must always be equipped with a clogging indicator.
- The filters listed in this chart are standard filters. Other designs available on request.

[1] Element differential pressure up to 160 bar
[2] Clogging indicator is obligatory
[3] Paper media supported with metal gauze

Dimensions

Version with electrical clogging indicator DG 041

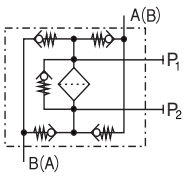


Measurements

Type	A/B	C	D	E	F	G	H	I	K	L	M ø/depth	N	O	P	Q	R	S ø/depth	T
HD 417	SAE 1¼	31,5	328	58	87,5	156	108	80	32	66,7	M14/22	31,8	73	102	87	100	M12/18	138
HD 617	SAE 1½	31,5	428	58	87,5	156	108	80	32	79,4	M16/24	36,5	73	102	87	100	M12/18	138

Symbols

1



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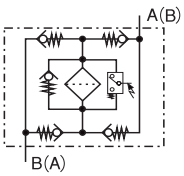

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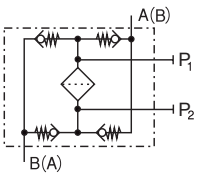

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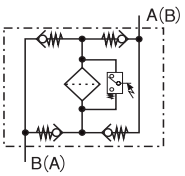
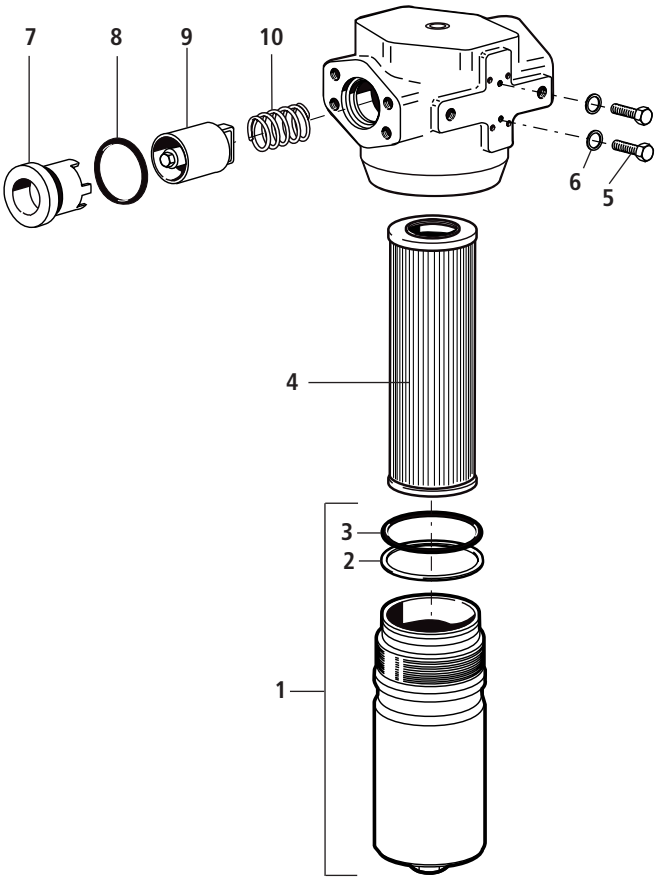


Spare Parts



Pos.	Designation	Part No.
1	Filter bowl HD 417 (with Pos. 2 and 3)	HD 451.0702
1	Filter bowl HD 617 (with Pos. 2 and 3)	HD 619.0701
2	Back-ring	HD 255.0102
3	O-ring 94,84 x 3,53	N 007.0953
4	Filter element (with seal)	see Chart / col. 9
5	Hexagonal head screw M4 x 8 DIN 933-8.8	3301051
6	Bonded seal 4,1 x 7,2 x 1	3404074
7	Sleeve	HD 417.0505
8	O-ring 42,52 x 2,62	N 007.0433
9	Reverse flow valve	HD 417.1520
10	Spring DM 38	N 015.3801

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 Verification of fabrication integrity (Bubble Point Test)
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-Pass-Test (evaluation of filter fineness and dirt-holding capacity)

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.

Our engineers will be glad to advice 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 · 9107186-e · 0905

ARGO HYTOS

High Pressure Filters

HD 314 · HD 414
HD 614

- Flange mounting
- Operating pressure up to 350 bar
- Nominal flow rate up to 400 l/min

40.35-3e

Description

Application
In the high pressure 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: 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 mm²/s (cold start condition).

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

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 (Viton on request)
Filter media:	EXAPOR®MAX - inorganic multi-layer microfibre web Paper - cellulose web, impregnated with resin

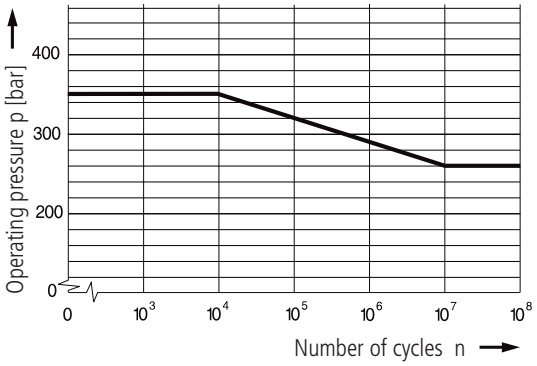
Accessories
Electrical and/or optical clogging indicators are available - optionally with one or two switching points resp. temperature suppression.
Dimensions and technical data see catalogue sheet 60.30.

Characteristics

Operating pressure
0 ... 260 bar, min. 10^7 pressure cycles
Nominal pressure according to DIN 24550

0 ... 350 bar, min. 10^4 pressure cycles
Quasi-static operating pressure

Permissible pressures for other numbers of cycles



Nominal flow rate
Up to 400 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 $\nu \leq 200$ mm²/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:
  up to 250 bar ≤ 8 m/s
  up to 450 bar ≤ 12 m/s

Filter fineness
5 µm(c) ... 16 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)

Viscosity at nominal flow rate
- at operating temperature: $\nu < 60$ mm²/s
- as starting viscosity: $\nu_{max} = 1200$ mm²/s
- 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

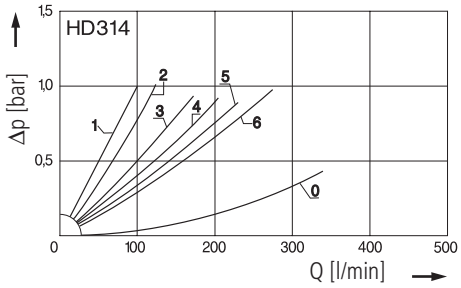
Connection
2 x Ø 31 mm on plain flange

Diagrams

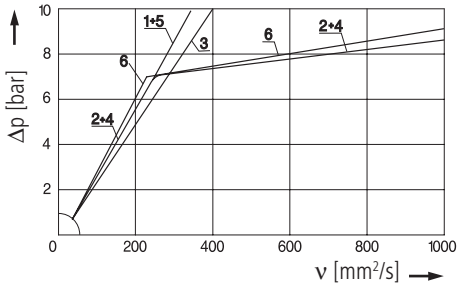
Δp-curves for complete filters in Selection Chart, column 3

D1

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

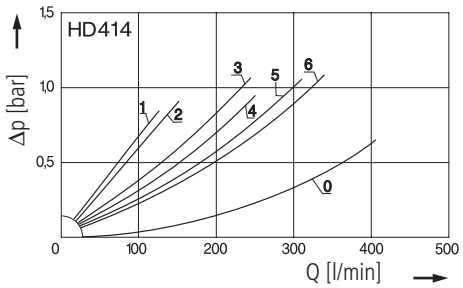


Pressure drop as a function of the **kinematic viscosity** at nominal flow

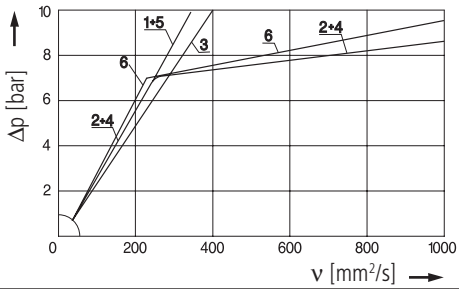


D2

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

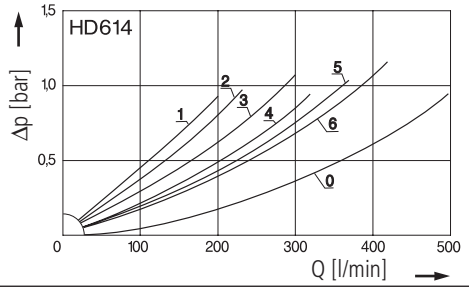


Pressure drop as a function of the **kinematic viscosity** at nominal flow

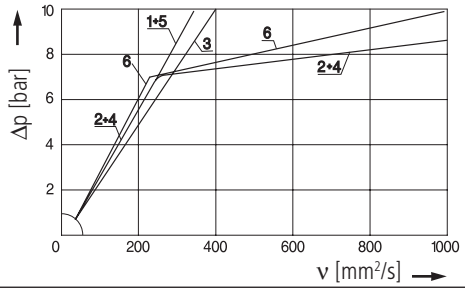


D3

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



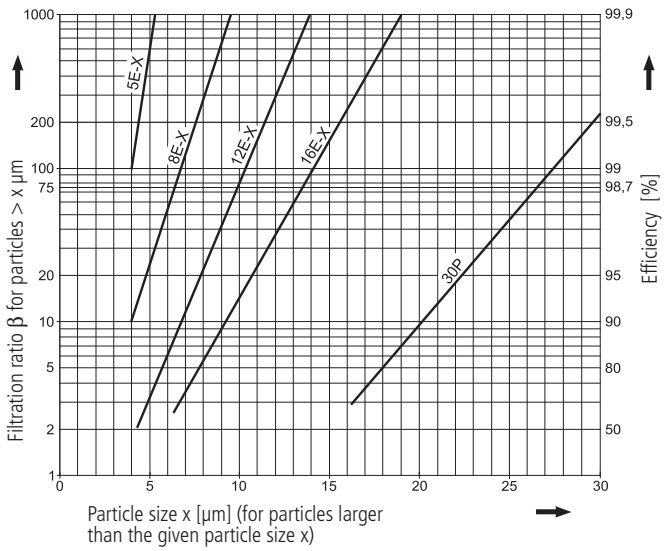
Pressure drop as a function of the **kinematic viscosity** at nominal flow



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	= $\bar{\beta}_{5\,(c)}$	= 200	EXAPOR®MAX
8 E-X	= $\bar{\beta}_{8\,(c)}$	= 200	EXAPOR®MAX
12 E-X	= $\bar{\beta}_{12\,(c)}$	= 200	EXAPOR®MAX
16 E-X	= $\bar{\beta}_{16\,(c)}$	= 200	EXAPOR®MAX
30 P	= $\bar{\beta}_{30\,(c)}$	= 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 special applications, finenesses differing from these curves are also available by using special composed filter media.

Selection Chart

Part No.	Nominal flow	Pressure drop see diagram **D**/curve no.	Filter fineness see diagr. **Dx**	Dirt-holding capacity	Connection A/B	Cracking pressure of by-pass Symbol		Replacement filter element Part No.	Weight	Clogging indicator	Remarks
	l/min			g		bar			kg		
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
HD 314-279	85	**D1**/1	5 E-X	14	Ø 31	-	7	V3.0817-13*	14,2	optional	-
HD 314-259	95	**D1**/2	5 E-X	18	Ø 31	7	4	V3.0817-03	13,8	optional	-
HD 314-246	135	**D1**/3	12 E-X	22	Ø 31	-	7	V3.0817-16*	14,2	optional	-
HD 314-256	160	**D1**/4	12 E-X	28	Ø 31	7	4	V3.0817-06	13,8	optional	-
HD 314-248	240	**D1**/5	16 E-X	24	Ø 31	-	7	V3.0817-18*	14,2	optional	-
HD 314-258	270	**D1**/6	16 E-X	30	Ø 31	7	4	V3.0817-08	13,8	optional	-
HD 414-279	115	**D2**/1	5 E-X	20	Ø 31	-	7	V3.0823-13*	15,7	optional	-
HD 414-259	130	**D2**/2	5 E-X	26	Ø 31	7	4	V3.0823-03	15,1	optional	-
HD 414-296	180	**D2**/3	12 E-X	32	Ø 31	-	7	V3.0823-16*	15,7	optional	-
HD 414-256	210	**D2**/4	12 E-X	41	Ø 31	7	4	V3.0823-06	15,1	optional	-
HD 414-298	300	**D2**/5	16 E-X	34	Ø 31	-	7	V3.0823-18*	15,7	optional	-
HD 414-258	340	**D2**/6	16 E-X	46	Ø 31	7	4	V3.0823-08	15,1	optional	-
HD 614-279	170	**D3**/1	5 E-X	29	Ø 31	-	7	V3.0833-13*	18,5	optional	-
HD 614-259	190	**D3**/2	5 E-X	36	Ø 31	7	4	V3.0833-03	17,8	optional	-
HD 614-246	270	**D3**/3	12 E-X	46	Ø 31	-	7	V3.0833-16*	18,5	optional	-
HD 614-256	300	**D3**/4	12 E-X	58	Ø 31	7	4	V3.0833-06	17,8	optional	-
HD 614-288	400	**D3**/5	16 E-X	50	Ø 31	-	7	V3.0833-18*	18,5	optional	-
HD 614-258	400	**D3**/6	16 E-X	67	Ø 31	7	4	V3.0833-08	17,8	optional	-

Optical or electrical indicators are available to monitor the clogging condition of the element. If the indicator should be already mounted onto the filter head use the abbreviation "M" behind the part number of the indicator. The printed order acknowledgements show both items separately.

Order example: The filter HD HD 314-279 has to be supplied with optical clogging indicator - response pressure 5,0 bar

Order description: **HD 314-279 / DG 042-02 M**

Part No. (Basic unit) — **HD 314-279**

Clogging indicator — **DG 042-02**

M — **mounted**

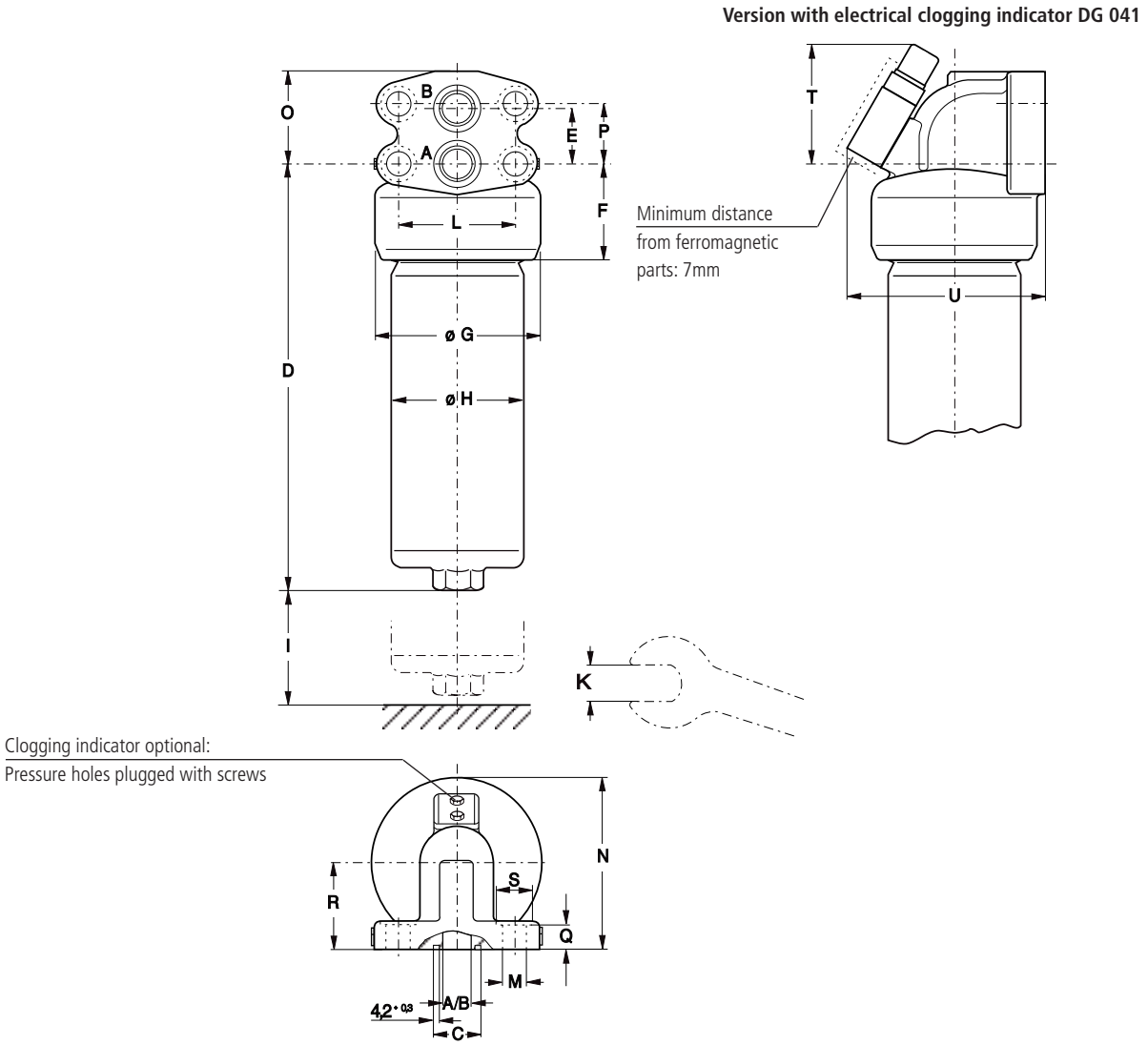
For the appropriate clogging indicators see catalogue sheet 60.30.

Remarks:

- Filter versions without by-pass valves must always be equipped with a clogging indicator.
- The filters listed in this chart are standard filters. If modifications are required, e.g. filter fineness 30 P, we kindly ask for your request.

* Element differential pressure stable up to 160 bar, clogging indicator is obligatory

Dimensions

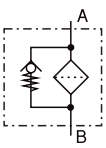


Measurements

Type	A/B	C	D	E	F	G	H	I	K	L	M	N	O	P	Q	R	S	T	U
HD 314	Ø 31	44,4	263	52	82	138	109	80	32	95	21,5	150	83	58	25	80	34	93	165
HD 414	Ø 31	44,4	325	52	82	138	109	80	32	95	21,5	150	83	58	25	80	34	93	165
HD 614	Ø 31	44,4	426	52	82	138	109	80	32	95	21,5	150	83	58	25	80	34	93	165

Symbols

1



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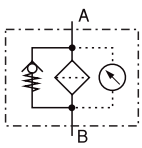

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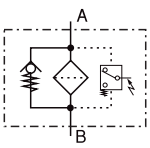

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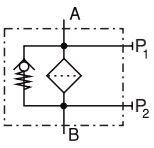

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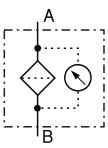

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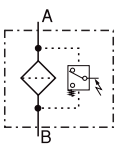

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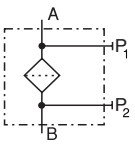
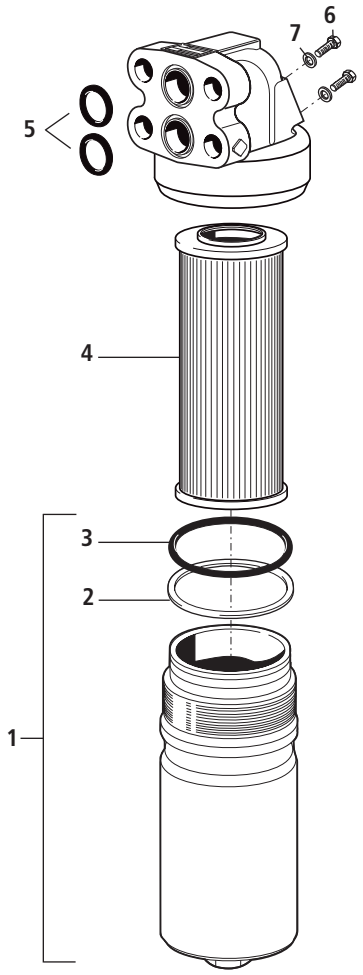


Spare Parts



Pos.	Designation	Part No.
1	Filter bowl HD 314 (with Pos. 2 and 3)	HD 250.0701
1	Filter bowl HD 414 (with Pos. 2 and 3)	HD 451.0702
1	Filter bowl HD 614 (with Pos. 2 and 3)	HD 619.0701
2	Back-ring	HD 255.0102
3	O-ring 94,84 x 3,53	N 007.0953
4	Filter element (with seal)	s. Chart / col. 9
5	O-ring 37,69 x 3,53 *	N 007.0384
6	Hexagonal head screw M4 x 8 DIN 933-8.8	3301051
7	Bonded Seal 4,1 x 7,2 x 1	3404074

* Not supplied with filter - has to be ordered separately

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

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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 Verification of fabrication integrity (Bubble Point Test)
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-Pass-Test (evaluation of filter fineness and dirt-holding capacity)

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Our engineers will be glad to advice you in questions concerning filter application, selection as well as the cleanliness class of the filtered medium attainable under practical operating conditions.

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Tel: +49 7250 76-0 · Fax: +49 7250 76-199 · info.de@argo-hytos.com · www.argo-hytos.com

Subject to change · 9107179-e · 0905

ARGO HYTOS

High Pressure Filters - Worldline 300

HD 319 · HD 419
HD 619

- In-line mounting
- Operating pressure up to 600 bar
- Nominal flow rate up to 450 l/min

40.70-3e

Description

Application
In the high pressure 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: Through installation near to the control valves or other expensive components. The specific determined flow rate guarantees a closed by-pass valve even at $\nu \leq 200$ mm²/s (cold start condition).

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

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 (Viton on request)
Filter media:	EXAPOR®MAX - inorganic multi-layer microfibre web

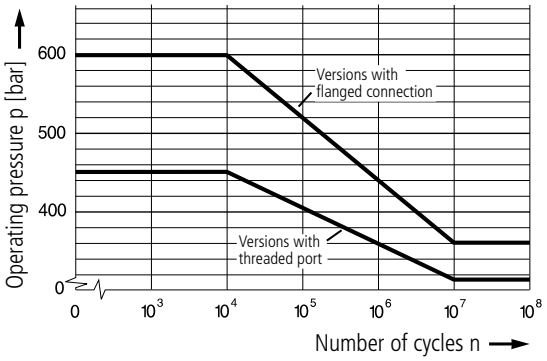
Accessories
If an electrical indicator is used, a transparent socket with LED for optical indication is also available with Part No. DG 041.1200.

Characteristics

Operating pressure
0 ... 315 bar, min. 10^7 pressure cycles (threaded port)
0 ... 360 bar, min. 10^7 pressure cycles (flanged connection)
Nominal pressure according to DIN 24550

0 ... 450 bar, min. 10^4 pressure cycles (threaded port)
0 ... 600 bar, min. 10^4 pressure cycles (flanged connection)
Quasi-static operating pressure

Permissible pressures for other numbers of cycles



Nominal flow rate
Up to 450 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 $\nu \leq 200$ mm²/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:
  up to 250 bar ≤ 8 m/s
  up to 450 bar ≤ 12 m/s

Filter fineness
5 µm(c) ... 16 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)

Viscosity at nominal flow rate
- at operating temperature: $\nu < 60$ mm²/s
- as starting viscosity: $\nu_{max} = 1200$ mm²/s
- 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-flange (6000 psi)

Sizes see Selection Chart, column 6 and ordering example
(other connections on request).

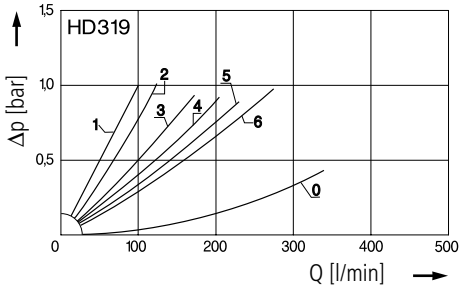
Electrical clogging indicator
- Switching voltage: max. 120 V AC / 175 V DC
- Switching current: max. 0,17 A AC / 0,25 A DC
- Switching power: max. 3,5 VA AC / 5 W DC
- Type of contact: Change-over
- Electrical protection: IP 65 (with mounted and secured socket)

Diagrams

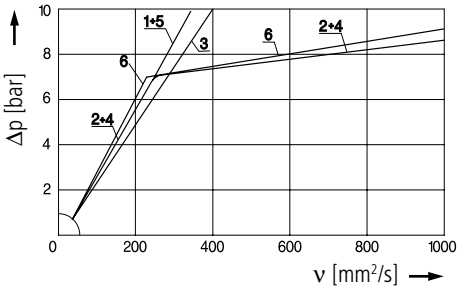
Δp-curves for complete filters in Selection Chart, column 3

D1

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

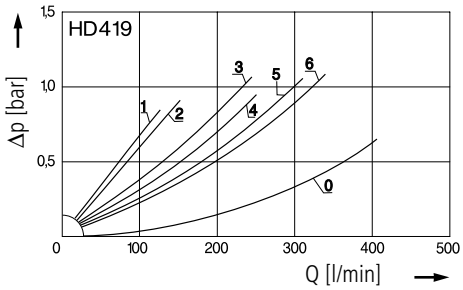


Pressure drop as a function of the **kinematic viscosity**
at nominal flow

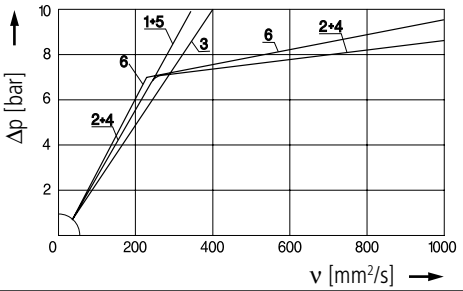


D2

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

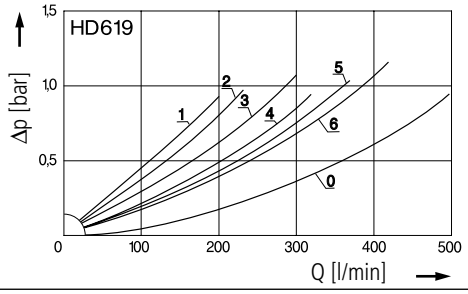


Pressure drop as a function of the **kinematic viscosity**
at nominal flow

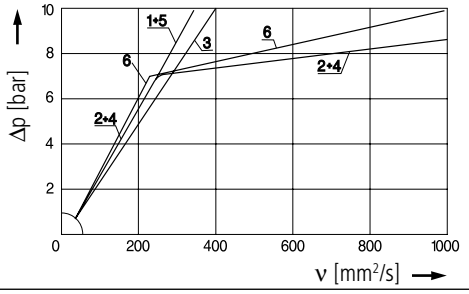


D3

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



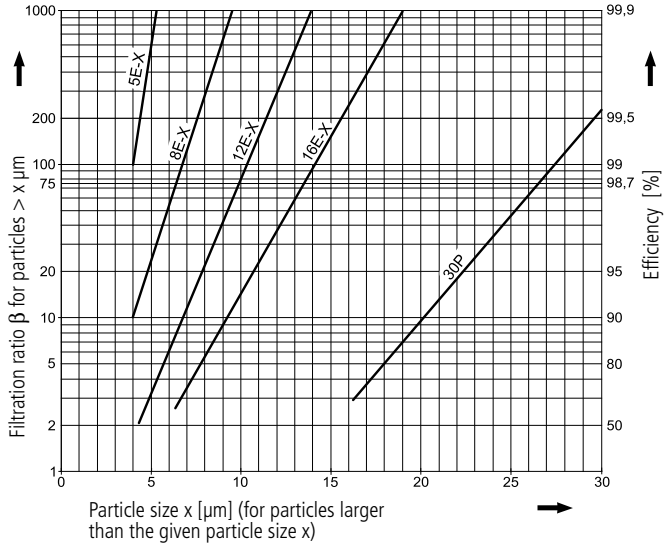
Pressure drop as a function of the **kinematic viscosity**
at nominal flow



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 special applications, finenesses differing from these curves are also available by using special composed filter media.

Selection Chart

Part No.	Nominal flow	Pressure drop see diagram **D**/curve no.	Filter fineness see diagr. **Dx**	Dirt-holding capacity	Connection A/B	Cracking pressure of by-pass Symbol	Replacement filter element Part No.	Weight	Clogging indicator Cracking pressure in ( )	Remarks
	l/min			g		bar			kg	bar	
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
HD 319-289	85	**D1**/1	5 E-X	14	G1¼	-	6	V3.0817-13[1]	16,3	electrical (5)	change-over
HD 319-279	95	**D1**/2	5 E-X	18	G1¼	7	2	V3.0817-03	15,9	optical (5)	-
HD 319-259	95	**D1**/2	5 E-X	18	G1¼	7	3	V3.0817-03	15,9	electrical (5)	change-over
HD 319-286	135	**D1**/3	12 E-X	22	G1¼	-	6	V3.0817-16[1]	16,3	electrical (5)	change-over
HD 319-276	160	**D1**/4	12 E-X	28	G1¼	7	2	V3.0817-06	15,9	optical (5)	-
HD 319-256	160	**D1**/4	12 E-X	28	G1¼	7	3	V3.0817-06	15,9	electrical (5)	change-over
HD 319-288	240	**D1**/5	16 E-X	24	G1¼	-	6	V3.0817-18[1]	16,3	electrical (5)	change-over
HD 319-278	270	**D1**/6	16 E-X	30	G1¼	7	2	V3.0817-08	15,9	optical (5)	-
HD 319-258	270	**D1**/6	16 E-X	30	G1¼	7	3	V3.0817-08	15,9	electrical (5)	change-over
HD 419-289	115	**D2**/1	5 E-X	20	G1¼	-	6	V3.0823-13[1]	17,8	electrical (5)	change-over
HD 419-279	130	**D2**/2	5 E-X	26	G1¼	7	2	V3.0823-03	17,2	optical (5)	-
HD 419-259	130	**D2**/2	5 E-X	26	G1¼	7	3	V3.0823-03	17,2	electrical (5)	change-over
HD 419-286	180	**D2**/3	12 E-X	32	G1¼	-	6	V3.0823-16[1]	17,8	electrical (5)	change-over
HD 419-276	210	**D2**/4	12 E-X	41	G1¼	7	2	V3.0823-06	17,2	optical (5)	-
HD 419-256	210	**D2**/4	12 E-X	41	G1¼	7	3	V3.0823-06	17,2	electrical (5)	change-over
HD 419-288	300	**D2**/5	16 E-X	34	G1¼	-	6	V3.0823-18[1]	17,8	electrical (5)	change-over
HD 419-278	340	**D2**/6	16 E-X	46	G1¼	7	2	V3.0823-08	17,2	optical (5)	-
HD 419-258	340	**D2**/6	16 E-X	46	G1¼	7	3	V3.0823-08	17,2	electrical (5)	change-over
HD 619-289	170	**D3**/1	5 E-X	29	G1½	-	6	V3.0833-13[1]	20,6	electrical (5)	change-over
HD 619-279	190	**D3**/2	5 E-X	36	G1½	7	2	V3.0833-03	19,9	optical (5)	-
HD 619-259	190	**D3**/2	5 E-X	36	G1½	7	3	V3.0833-03	19,9	electrical (5)	change-over
HD 619-286	270	**D3**/3	12 E-X	46	G1½	-	6	V3.0833-16[1]	20,6	electrical (5)	change-over
HD 619-276	300	**D3**/4	12 E-X	58	G1½	7	2	V3.0833-06	19,9	optical (5)	-
HD 619-256	300	**D3**/4	12 E-X	58	G1½	7	3	V3.0833-06	19,9	electrical (5)	change-over
HD 619-288	450	**D3**/5	16 E-X	50	G1½	-	6	V3.0833-18[1]	20,6	electrical (5)	change-over
HD 619-278	450	**D3**/6	16 E-X	67	G1½	7	2	V3.0833-08	19,9	optical (5)	-
HD 619-258	450	**D3**/6	16 E-X	67	G1½	7	3	V3.0833-08	19,9	electrical (5)	change-over

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

Order example: The Filter HD 319-289 has to be supplied with SAE1¼ flanged connection.

Order description: **HD 319-189**

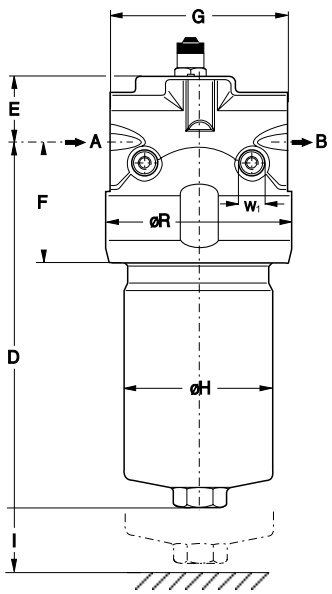
Connections:
2 various options are available
Flanged connection (A/B) SAE1¼ (6000 psi) ——— 1
Threaded port (A/B) G1¼ or G1½[2] ——— 2

Remarks:
- The filters listed in this chart are standard filters. If modifications are required, e.g. bolt mounted indicators according to catalogue sheet 60.30, we kindly ask for your request.
- If an electrical indicator is used, a transparent socket with LED for optical indication is also available with Part No. DG 041.1200.

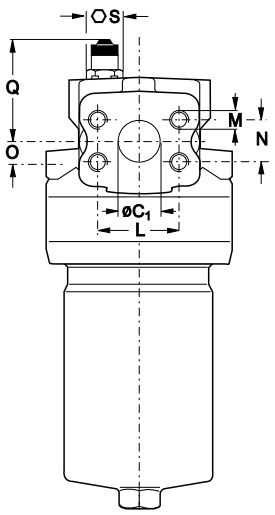
[1] Filter element differential pressure stable up to 160 bar [2] G1½ from series HD 619

Dimensions

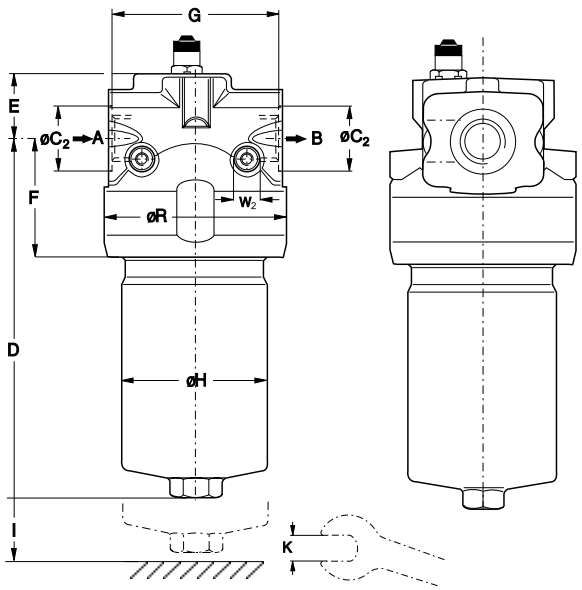
Flanged connection



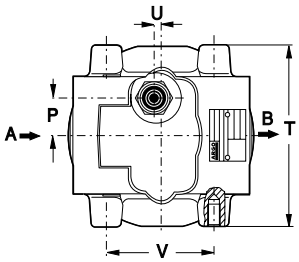
Version with integrated optical clogging indicator

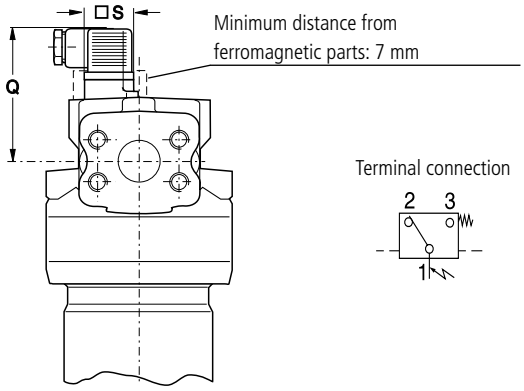


Threaded port



Version with integrated electrical clogging indicator





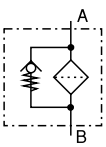
Terminal connection

Measurements

Type	A/B	C_1	C_2	D	E	F	G	H	I	K	L	M Ø/depth	N	O	P	Q opt./electr.	R	S opt./electr.	T	U	V	W Ø/depth
HD 319	see	32	65	255	45	86	145	109	80	32	66,7	M14/22	31,8	18,5	33	75/92	152	24/30	148	8	80	M12/18
HD 419	Selection	32	65	319	45	86	145	109	80	32	66,7	M14/22	31,8	18,5	33	75/92	152	24/30	148	8	80	M12/18
HD 619	Chart	32	65	420	45	86	145	109	80	32	66,7	M14/22	31,8	18,5	33	75/92	152	24/30	148	8	80	M12/18

Symbols

1



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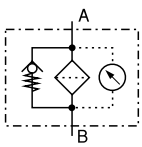

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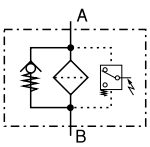

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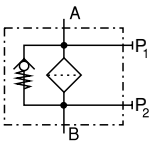
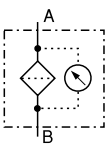
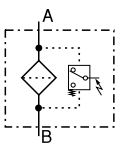


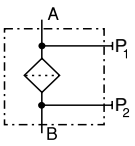
5



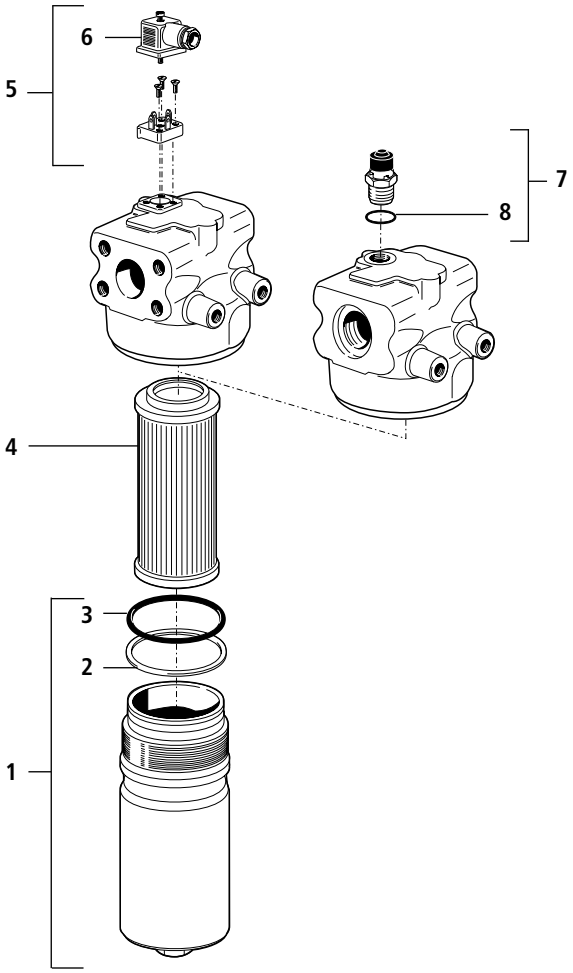
6



7



Spare Parts



Pos.	Designation	Part No.
1	Filter bowl HD 319 (with Pos. 2 and 3)	HD 250.0701
1	Filter bowl HD 419 (with Pos. 2 and 3)	HD 451.0702
1	Filter bowl HD 619 (with Pos. 2 and 3)	HD 619.0701
2	Back-ring	HD 255.0102
3	O-ring 94,84 x 3,53	N 007.0953
4	Filter element (with seal)	see Chart / col. 9
5	Reed switch with screws and socket (Pos. 6)	HD 049.1410
6	Socket DIN 43650 - AF3	DG 041.1220
7	Optical indicator (with Pos. 8)	HD 049.1400
8	O-ring 17 x 2	N 007.0172

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 Verification of fabrication integrity (Bubble Point Test)
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-Pass-Test (evaluation of filter fineness and dirt-holding capacity)

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.

Our engineers will be glad to advice 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
ARGO-HYTOS GMBH · Industriestraße 9 · D-76703 Kraichtal
Tel: +49 7250 76-0 · Fax: +49 7250 76-199 · info.de@argo-hytos.com · www.argo-hytos.com

Subject to change · 9107297-e · 0310

ARGO HYTOS

High Pressure Filters – Worldline 400

HD 790 · HD 990

- In-line mounting
- Operating pressure up to 450 bar
- Nominal flow rate up to 1000 l/min

40.90-1e

Description

Application
In the high pressure 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: Through installation near to the control valves or other expensive components. The specific determined flow rate guarantees a closed by-pass valve even at $\nu \leq 200$ mm²/s (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:	Steel
Housing cover:	Spheroidal graphite cast iron (SGI)
Coating:	Powder paint
Seals:	NBR (Viton on request)
Filter media:	EXAPOR®MAX – inorganic multi-layer microfibre web

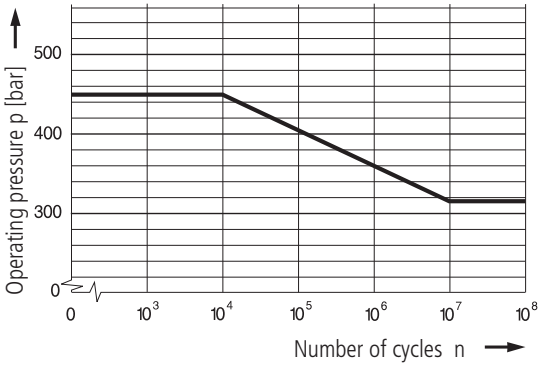
Accessories
Electrical and/or optical clogging indicators are available – optionally with one or two switching points resp. temperature suppression.
Dimensions and technical data see catalogue sheet 60.30.

Characteristics

Operating pressure
0 ... 315 bar, min. 10^7 pressure cycles
Nominal pressure according to DIN 24550

0 ... 450 bar, min. 10^4 pressure cycles
Quasi-static operating pressure

Permissible pressures for other numbers of cycles



Nominal flow rate
Up to 1000 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 $\nu \leq 200$ mm²/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:
  up to 250 bar ≤ 8 m/s
  up to 450 bar ≤ 12 m/s

Filter fineness
5 µm(c) ... 16 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)

Viscosity at nominal flow rate
- at operating temperature: $\nu < 60$ mm²/s
- as starting viscosity: $\nu_{max} = 1200$ mm²/s
- 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. The filter head can be mounted in either the uppermost position or the inverse as required.

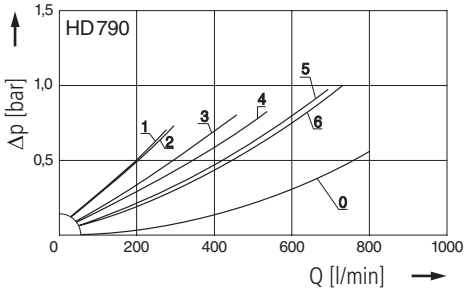
Connection
SAE-flange (6000 psi).
Sizes see Selection Chart, column 6 (other connections on request).

Diagrams

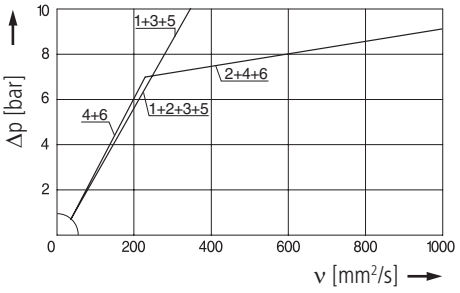
Δp-curves for complete filters in Selection Chart, column 3

D1

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

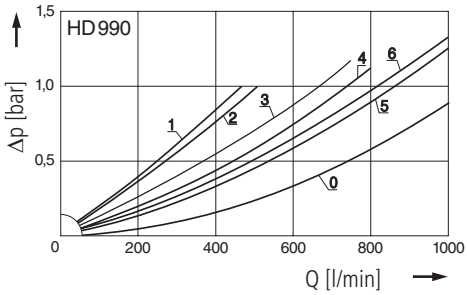


Pressure drop as a function of the **kinematic viscosity**
at nominal flow

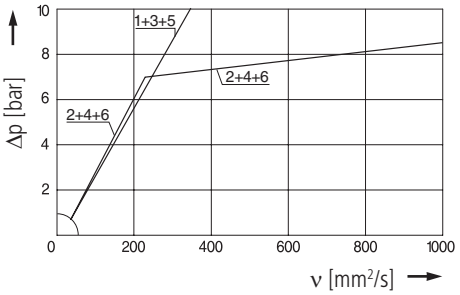


D2

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



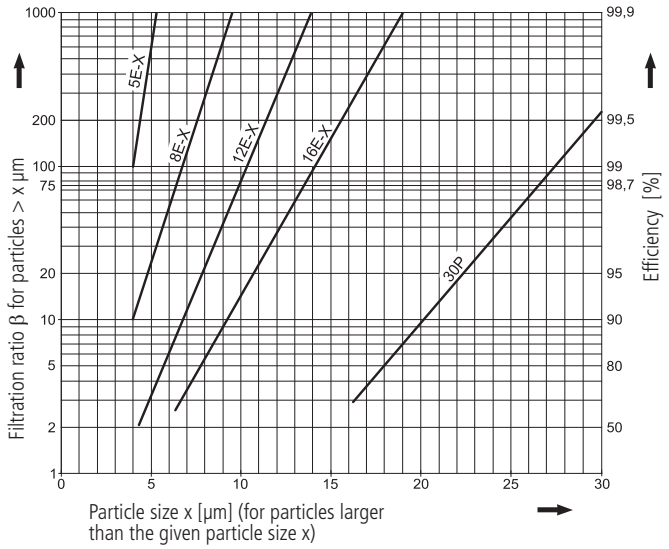
Pressure drop as a function of the **kinematic viscosity**
at nominal flow



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	= $\bar{\beta}_{5\,(c)}$	= 200	EXAPOR®MAX
8 E-X	= $\bar{\beta}_{8\,(c)}$	= 200	EXAPOR®MAX
12 E-X	= $\bar{\beta}_{12\,(c)}$	= 200	EXAPOR®MAX
16 E-X	= $\bar{\beta}_{16\,(c)}$	= 200	EXAPOR®MAX
30 P	= $\bar{\beta}_{30\,(c)}$	= 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 special applications, finenesses differing from these curves are also available by using special composed filter media.

Selection Charts

Part No.	Nominal flow	Pressure drop see diagram **D**/curve no.	Filter fineness see diagr. **Dx**	Dirt-holding capacity	Connection A/B	Cracking pressure of by-pass	Symbol	Replacement filter element Part No.	Weight	Clogging indicator	Remarks
	l/min			g		bar			kg		
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
HD 790-189	230	**D1**/1	5 E-X	45	SAE 2	-	7	V3.1040-13*	47	optional	-
HD 790-159	280	**D1**/2	5 E-X	51	SAE 2	7	4	V3.1040-03	46	optional	-
HD 790-186	400	**D1**/3	12 E-X	66	SAE 2	-	7	V3.1040-16*	47	optional	-
HD 790-156	500	**D1**/4	12 E-X	80	SAE 2	7	4	V3.1040-06	46	optional	-
HD 790-188	570	**D1**/5	16 E-X	71	SAE 2	-	7	V3.1040-18*	47	optional	-
HD 790-158	690	**D1**/6	16 E-X	87	SAE 2	7	4	V3.1040-08	46	optional	-
HD 990-189	350	**D2**/1	5 E-X	69	SAE 2	-	7	V3.1060-13*	56	optional	-
HD 990-159	430	**D2**/2	5 E-X	79	SAE 2	7	4	V3.1060-03	55	optional	-
HD 990-186	600	**D2**/3	12 E-X	97	SAE 2	-	7	V3.1060-16*	56	optional	-
HD 990-156	750	**D2**/4	12 E-X	120	SAE 2	7	4	V3.1060-06	55	optional	-
HD 990-188	870	**D2**/5	16 E-X	100	SAE 2	-	7	V3.1060-18*	56	optional	-
HD 990-158	1000	**D2**/6	16 E-X	130	SAE 2	7	4	V3.1060-08	55	optional	-

Optical or electrical indicators are available to monitor the clogging condition of the element. If the indicator should be already mounted onto the filter head use the abbreviation "M" behind the part number of the indicator. The printed order acknowledgements show both items separately.

Order example: The filter HD 790-156 has to be supplied with optical clogging indicator – response pressure 5.0 bar

Order description: **HD 790-156 / DG 042-02 M**

Part No. (Basic unit) — **HD 790-156**

Clogging indicator — **DG 042-02**

M — **mounted**

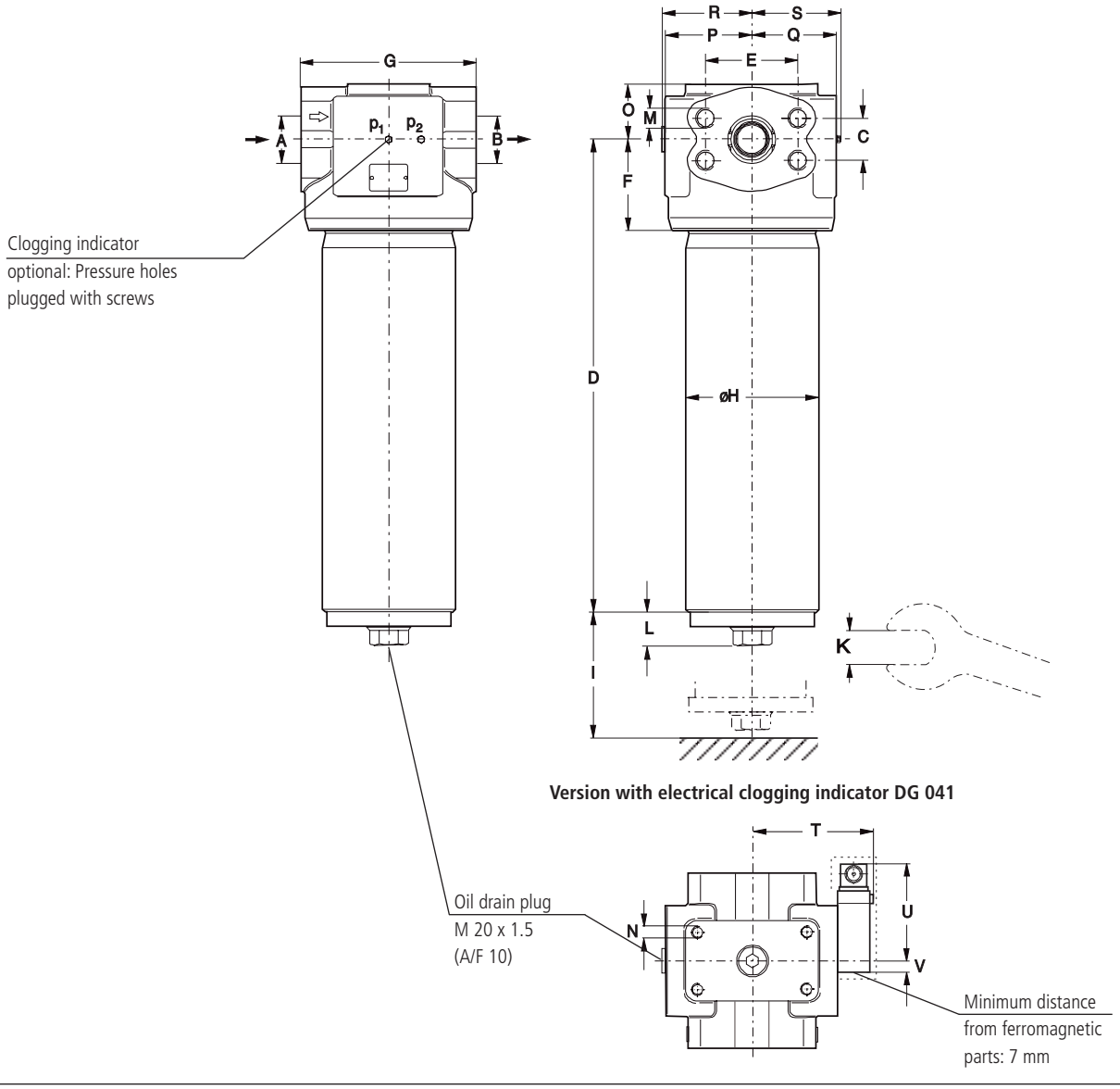
For the appropriate clogging indicators see catalogue sheet 60.30.

Remarks:

- Filter versions without by-pass valves must always be equipped with a clogging indicator.
- The filters listed in this chart are standard filters. Other designs available on request.

* Element differential pressure stable up to 160 bar, clogging indicator is obligatory

Dimensions



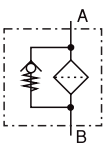
Version with electrical clogging indicator DG 041

Measurements

Type	A/B	C	D	E	F	G	H	I	K A/F	L	M ø/depth	N ø/depth	O	P	Q	R	S	T	U	V
HD 790	SAE 2	44,4	495	96,6	96	184	140	430	36	36	M20/32	M12/20	58	91	89	95	93	122	110	13
HD 990	SAE 2	44,4	700	96,6	96	184	140	640	36	36	M20/32	M12/20	58	91	89	95	93	122	110	13

Symbols

1



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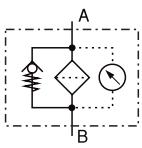

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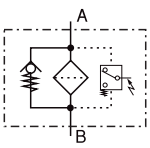

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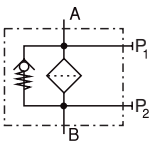

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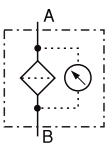
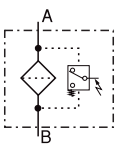


6



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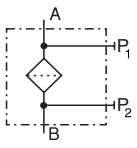
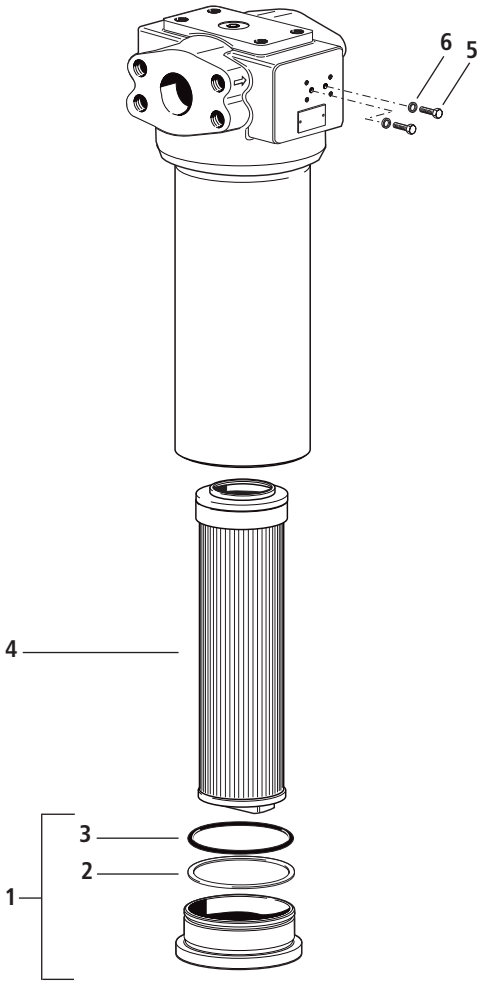


Spare Parts



Pos.	Designation	Part No.
1	Housing cover (with Pos. 2 and 3)	HD 990.1900
2	Back-ring	HD 256.0104
3	O-ring 104.37 x 3.53	N007.1044S
4	Filter element (with seal)	see Chart / col. 9
5	Hexagonal head screw M4 x 8 ISO 4017-8.8	3301051
6	Bonded seal 4.1 x 7.2 x 1	3404074

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 Verification of fabrication integrity (Bubble Point Test)
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-Pass-Test (evaluation of filter fineness and dirt-holding capacity)

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.

Our engineers will be glad to advice 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
ARGO-HYTOS GMBH · Industriestraße 9 · D-76703 Kraichtal
Tel: +49 7250 76-0 · Fax: +49 7250 76-199 · info.de@argo-hytos.com · www.argo-hytos.com

Subject to change · 12603 · 0307

ARGO HYTOS

High Pressure Filter Kits

HD 049 · HD 069
HD 172 · HD 319
HD 419 · HD 619

- Operating pressure up to 600 bar
- Nominal flow rate up to 450 l/min

40.95-3e

Description

Application
In the high pressure 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: Through installation near to the control valves or other expensive components. The specific determined flow rate guarantees a closed by-pass valve even at $\nu \leq 200$ mm²/s (cold start condition).

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

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 bowl:	Cold extruded steel
Coating:	Powder paint
Seals:	NBR (Viton on request)
Filter media:	EXAPOR®MAX - inorganic multi-layer microfibre web

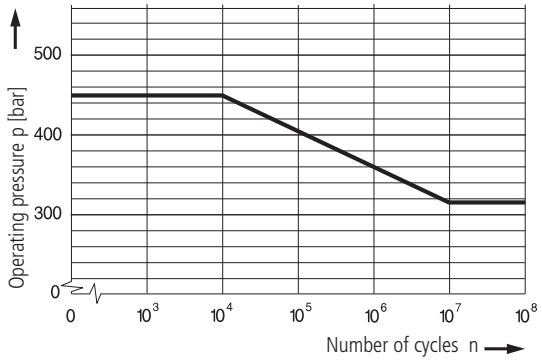
Accessories
To monitor the clogging, screw-in (see section Dimensions) or flange-mounted differential pressure switches are available.
Flange-mounted clogging indicators optionally with one or two switching points resp. temperature suppression – Dimensions and technical data see catalogue sheet 60.30.

Characteristics

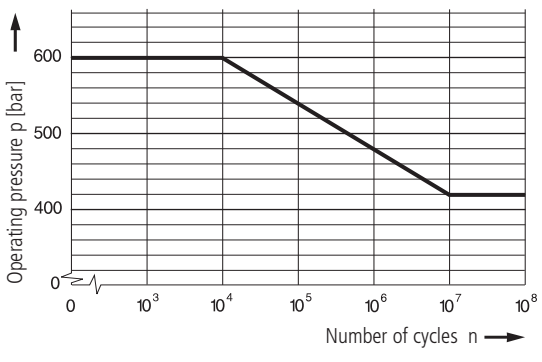
Operating pressure
HD 049 / 069 / 172: 0 ... 315 bar, min. 10^7 pressure cycles
Nominal pressure according to DIN 24550
0 ... 450 bar, min. 10^4 pressure cycles
Quasi-static operating pressure

HD 319 / 419 / 619: 0 ... 420 bar, min. 10^7 pressure cycles
Nominal pressure according to DIN 24550
0 ... 600 bar, min. 10^4 pressure cycles
Quasi-static operating pressure

Permissible pressures for other numbers of cycles
HD 049 / 069 / 172



HD 319 / 419 / 619



Nominal flow rate
Up to 450 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 $\nu \leq 200$ mm²/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:
  up to 250 bar ≤ 8 m/s
  up to 450 bar ≤ 12 m/s

Filter fineness
5 µm(c) ... 16 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)

Viscosity at nominal flow rate
- at operating temperature: $\nu < 60$ mm²/s
- as starting viscosity $\nu_{max} = 1200$ mm²/s
- 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.

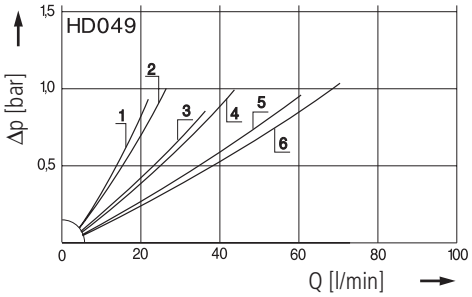
Mounting position
Preferably vertical

Diagrams

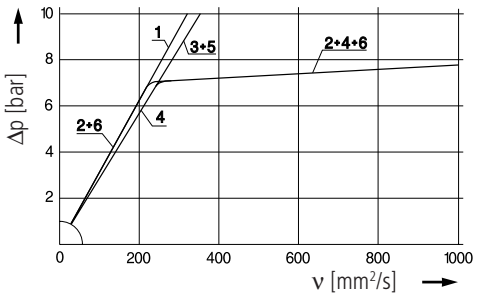
Δp-curves for complete filters in Selection Chart, column 3

D1

Pressure drop as a function of the **flow volume** at ν = 35 mm²/s

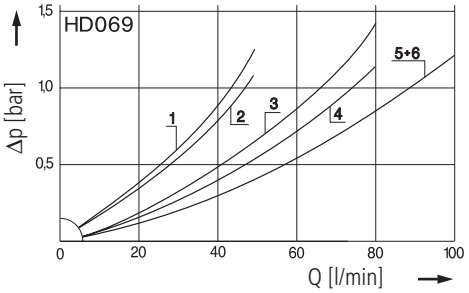


Pressure drop as a function of the **kinematic viscosity** at nominal flow

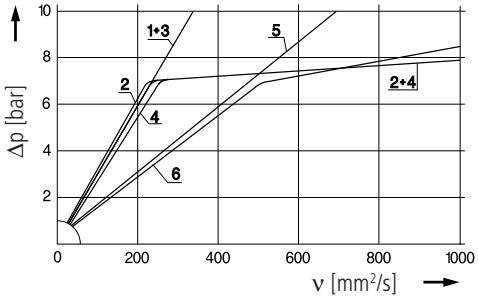


D2

Pressure drop as a function of the **flow volume** at ν = 35 mm²/s

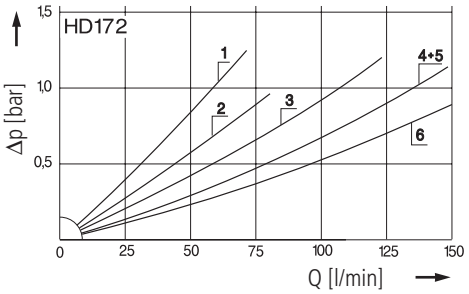


Pressure drop as a function of the **kinematic viscosity** at nominal flow

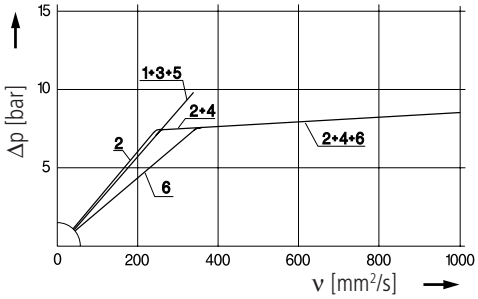


D3

Pressure drop as a function of the **flow volume** at ν = 35 mm²/s

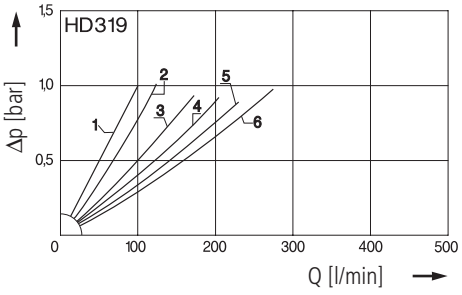


Pressure drop as a function of the **kinematic viscosity** at nominal flow

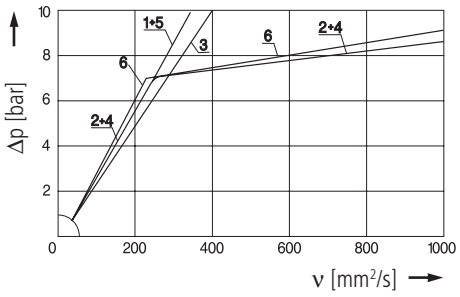


D4

Pressure drop as a function of the **flow volume** at ν = 35 mm²/s



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

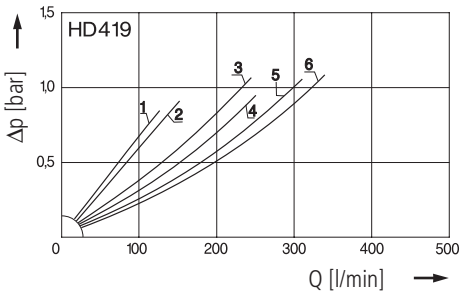


Diagrams

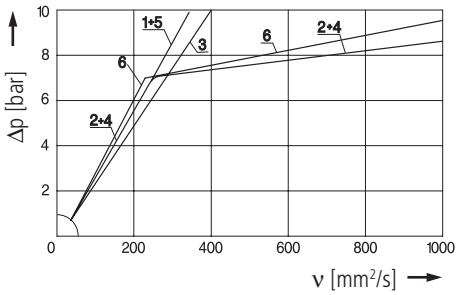
Δp-curves for complete filters in Selection Chart, column 3

D5

Pressure drop as a function of the **flow volume** at $\nu = 35\ mm^2/s$

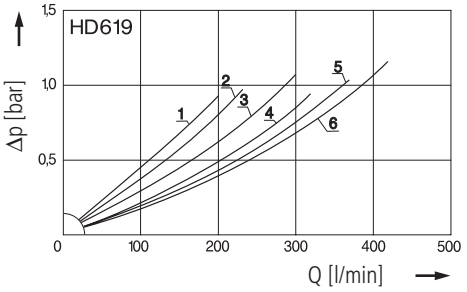


Pressure drop as a function of the **kinematic viscosity** at nominal flow

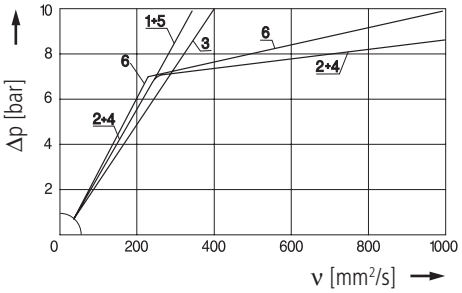


D6

Pressure drop as a function of the **flow volume** at $\nu = 35\ mm^2/s$



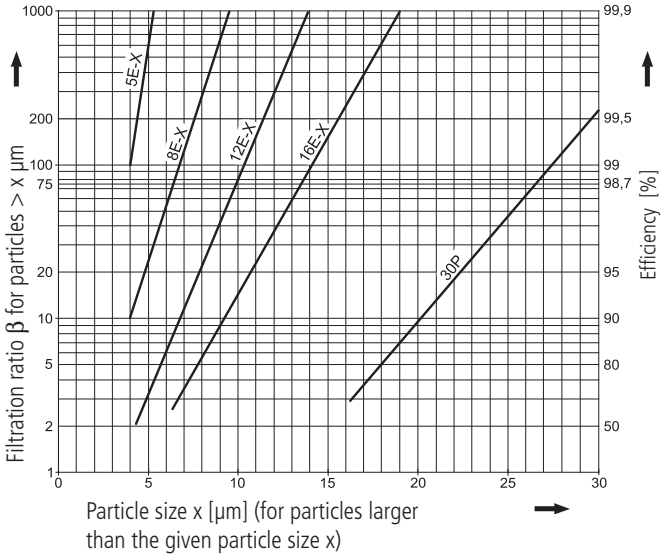
Pressure drop as a function of the **kinematic viscosity** at nominal flow



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	$= \overline{\beta}_{5\,(c)}$	= 200	EXAPOR®MAX
8 E-X	$= \overline{\beta}_{8\,(c)}$	= 200	EXAPOR®MAX
12 E-X	$= \overline{\beta}_{12\,(c)}$	= 200	EXAPOR®MAX
16 E-X	$= \overline{\beta}_{16\,(c)}$	= 200	EXAPOR®MAX
30 P	$= \overline{\beta}_{30\,(c)}$	= 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 special applications, finenesses differing from these curves are also available by using special composed filter media.

Selection Chart

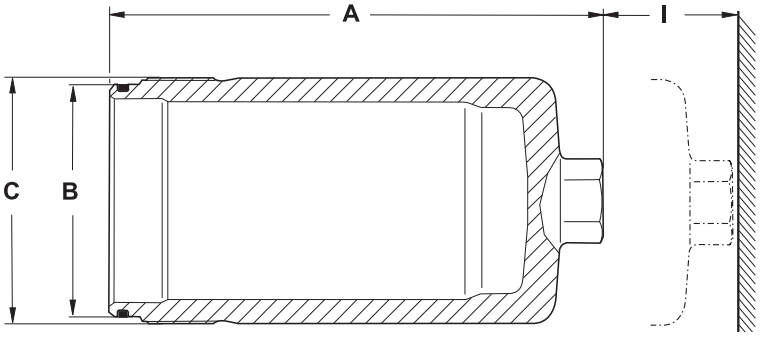
Part No.	Nominal flow	Pressure drop see diagram **D**/curve no.	Filter fineness see diagr. **Dx**	Dirt-holding capacity	Cracking pressure of by-pass	Symbol	Replacement filter element Part No.	Weight	Remarks
	l/min			g	bar			kg	
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
HD 049-0213	20	**D1**/1	5 E-X	3,4	-	5	V3.0510-13*	1,6	with screw-in bushing
HD 049-1503	25	**D1**/2	5 E-X	3,8	7	1	V3.0510-03	1,5	-
HD 049-0216	30	**D1**/3	12 E-X	5	-	5	V3.0510-16*	1,6	with screw-in bushing
HD 049-1506	35	**D1**/4	12 E-X	6,1	7	1	V3.0510-06	1,5	-
HD 049-0218	55	**D1**/5	16 E-X	5,5	-	5	V3.0510-18*	1,6	with screw-in bushing
HD 049-1508	63	**D1**/6	16 E-X	6,6	7	1	V3.0510-08	1,5	-
HD 069-0213	43	**D2**/1	5 E-X	6,9	-	5	V3.0520-13*	2,7	with screw-in bushing
HD 069-1503	50	**D2**/2	5 E-X	7,6	7	1	V3.0520-03	2,6	-
HD 069-0216	63	**D2**/3	12 E-X	11	-	5	V3.0520-16*	2,7	with screw-in bushing
HD 069-1506	70	**D2**/4	12 E-X	13	7	1	V3.0520-06	2,6	-
HD 069-0218	80	**D2**/5	16 E-X	12	-	5	V3.0520-18*	2,7	with screw-in bushing
HD 069-1508	80	**D2**/6	16 E-X	14	7	1	V3.0520-08	2,6	-
HD 172-0213	55	**D3**/1	5 E-X	11	-	5	V3.0623-13*	4,2	with screw-in bushing
HD 172-1503	80	**D3**/2	5 E-X	14	7	1	V3.0623-03	3,9	-
HD 172-0226	100	**D3**/3	12 E-X	17	-	5	V3.0623-26*	4,2	with screw-in bushing
HD 172-1506	150	**D3**/4	12 E-X	22	7	1	V3.0623-06	3,9	-
HD 172-0218	150	**D3**/5	16 E-X	18	-	5	V3.0623-18*	4,2	with screw-in bushing
HD 172-1508	150	**D3**/6	16 E-X	24	7	1	V3.0623-08	3,9	-
HD 319-0213	85	**D4**/1	5 E-X	14	-	5	V3.0817-13*	6,5	with screw-in bushing
HD 319-1503	95	**D4**/2	5 E-X	18	7	1	V3.0817-03	6	-
HD 319-0216	135	**D4**/3	12 E-X	22	-	5	V3.0817-16*	6,5	with screw-in bushing
HD 319-1506	160	**D4**/4	12 E-X	28	7	1	V3.0817-06	6	-
HD 319-0218	240	**D4**/5	16 E-X	24	-	5	V3.0817-18*	6,5	with screw-in bushing
HD 319-1508	270	**D4**/6	16 E-X	30	7	1	V3.0817-08	6	-
HD 419-0213	115	**D5**/1	5 E-X	20	-	5	V3.0823-13*	8,8	with screw-in bushing
HD 419-1503	130	**D5**/2	5 E-X	26	7	1	V3.0823-03	8,2	-
HD 419-0216	180	**D5**/3	12 E-X	32	-	5	V3.0823-16*	8,8	with screw-in bushing
HD 419-1506	210	**D5**/4	12 E-X	41	7	1	V3.0823-06	8,2	-
HD 419-0218	300	**D5**/5	16 E-X	34	-	5	V3.0823-18*	8,8	with screw-in bushing
HD 419-1508	340	**D5**/6	16 E-X	46	7	1	V3.0823-08	8,2	-
HD 619-0213	170	**D6**/1	5 E-X	29	-	5	V3.0833-13*	11,9	with screw-in bushing
HD 619-1503	190	**D6**/2	5 E-X	36	7	1	V3.0833-03	11,1	-
HD 619-0216	270	**D6**/3	12 E-X	46	-	5	V3.0833-16*	11,9	with screw-in bushing
HD 619-1506	300	**D6**/4	12 E-X	58	7	1	V3.0833-06	11,1	-
HD 619-0218	450	**D6**/5	16 E-X	50	-	5	V3.0833-18*	11,9	with screw-in bushing
HD 619-1508	450	**D6**/6	16 E-X	67	7	1	V3.0833-08	11,1	-

Remarks:

- Filter versions without by-pass valves must be equipped with a clogging indicator.
- The filter sets listed in this chart are standard filters. If modifications are required, we kindly ask for your request.
- Clogging indicators to screw into the hydraulic block see section Dimensions.
- For the appropriate, flange-mounted clogging indicators see catalogue sheet 60.30.

* Element differential pressure stable up to 160 bar, clogging indicator obligatory

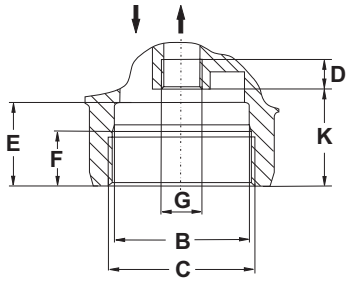
Dimensions

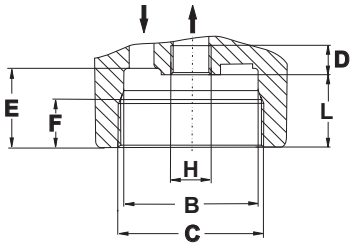


Version with by-pass valve

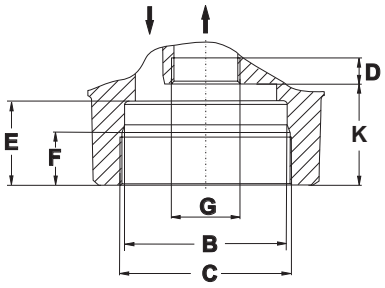
Version with screw-in bushing

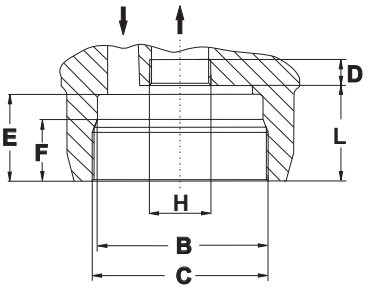
HD 049 / 069



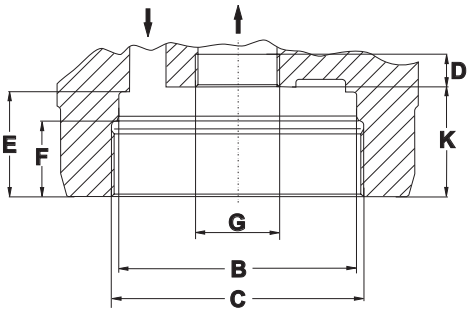


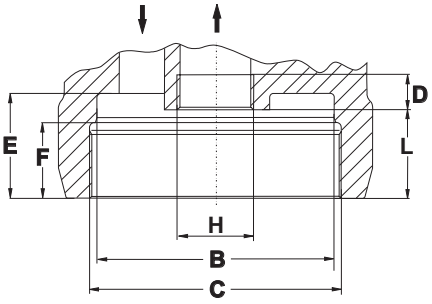
HD 172





HD 319 / 419 / 619

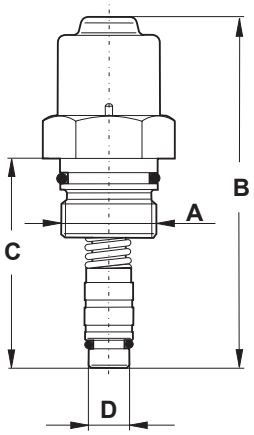




Dimensions

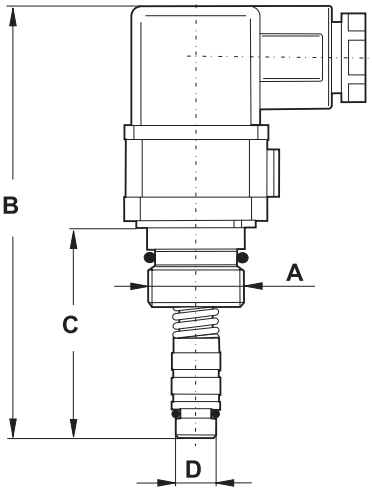
Optical differential pressure indicator

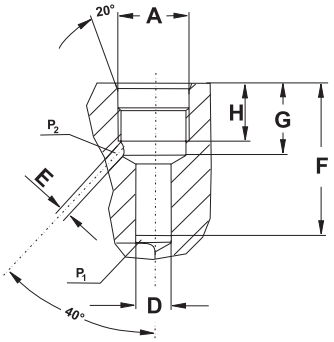
DG 032.1700



Electrical differential pressure switch (change over)

DG 031.1700



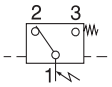


Response/Switching pressure of the clogging indicators
5 bar

Electrical clogging indicator

- Switching voltage: max. 120 V AC / 175 V DC
- Switching current: max. 0,17 A AC / 0,25 A DC
- Switching power: max. 3,5 VA AC / 5 W DC
- Type of contact: change over
- Electrical protection: IP 65 (with mounted and secured socket)

Terminal connection



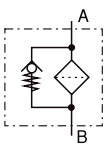
Measurements

Type	A	B	C	D	E	F	G	H	I	K	L	SW
HD 049/069	133/227,5	60	M65 x 1,5	min. 13	35,5	22,5	M18 x 1,5	M18 x 1,5	55	42	32,5	36
HD 172	256,5	71	M75 x 1,5	min. 13	37	22,5	M30 x 1	M26 x 1,5	70	44,5	41	27
HD 319/419/619	218/282/383	102	M108 x 1,5	min. 14	45	32,5	M36 x 1	M36 x 1,5	80	47	38	32
DG 031.1700	M20 x 1,5	93	44	Ø10	Ø2,5	43,8	20,5	16,5	-	-	-	-
DG 032.1700	M20 x 1,5	74	44	Ø10	Ø2,5	43,8	20,5	16,5	-	-	-	-

All measurements and tolerances required for machining are available on request.

Symbols

1



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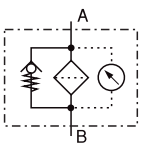

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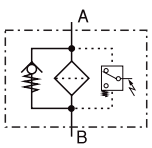

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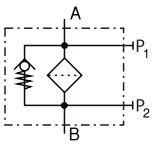

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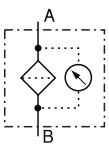

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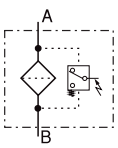

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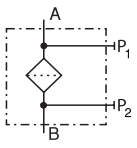
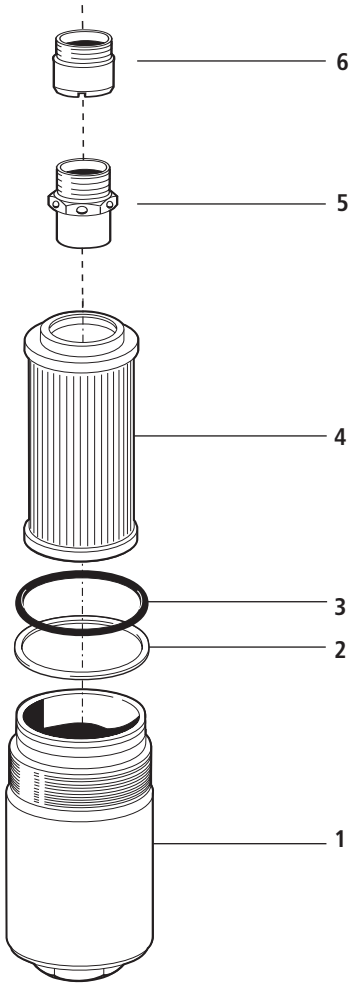


Spare Parts



HD 049 / HD 069

Pos.	Designation	Part No.
1	Filter bowl HD 049	HD 052.0102
1	Filter bowl HD 069	HD 072.0102
3	O-ring 53,57 x 3,53	N 007.0543/1
4	Filter element (with seal)	see Chart / col. 7
5	By-pass valve	HD 045.1510
6	Screw-in bushing	HD 049.0503

HD 172

Pos.	Designation	Part No.
1	Filter bowl HD 172	HD 171.0102
3	O-ring 63 x 3,5	N 007.0634
4	Filter element (with seal)	see Chart / col. 7
5	By-pass valve	HD 172.1500
6	Screw-in bushing	HD 171.0205

HD 319 / HD 419 / HD 619

Pos.	Designation	Part No.
1	Filter bowl HD 319	HD 250.0105
1	Filter bowl HD 419	HD 411.0102
1	Filter bowl HD 619	HD 611.0102
2	Back-ring	HD 255.0102
3	O-ring 94,84 x 3,53	N 007.0953
4	Filter element (with seal)	see Chart / col. 7
5	By-pass valve	HD 319.1510
6	Screw-in bushing	HD 411.0209

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 Verification of fabrication integrity (Bubble Point Test)
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-Pass-Test (evaluation of filter fineness and dirt-holding capacity)

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.

Our engineers will be glad to advice 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
ARGO-HYTOS GMBH · Industriestraße 9 · D-76703 Kraichtal
Tel: +49 7250 76-0 · Fax: +49 7250 76-199 · info.de@argo-hytos.com · www.argo-hytos.com

Subject to change · 9107300-e · 0306