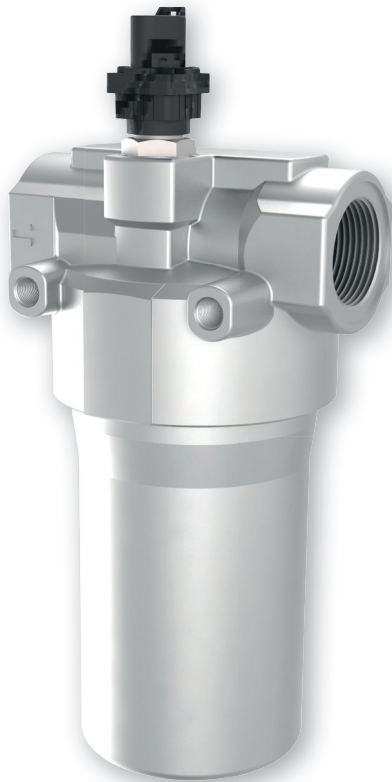


Pressure Filters
D 162 · D 232 · D 332

In-line mounting · Operating pressure up to 63 bar / 914 psi · Nominal flow rate up to 350 l/min / 92.5 gpm



Pressure Filter D 162

Description
Application

In the pressure circuits of hydraulic and lubrication systems.

Performance features
Protection against wear:

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

Protection against malfunction:

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

Filter elements

Flow direction from outside to center.

The star-shaped pleating of the filter material results in:

- › large filter surfaces
- › low pressure drop
- › high dirt-holding capacities
- › long service life

Filter maintenance

By using a clogging indicator the correct moment for maintenance is stated and guarantees the optimum utilization of the filter life.

Materials

Filter head:	Aluminum alloy
Filter bowl:	Aluminum alloy
Seals:	NBR (FPM on request)
Filter media:	EXAPOR®MAX 2 - inorganic multi-layer microfiber web
	Paper - cellulose web, impregnated with resin

Clogging indicators

Electrical and / or optical clogging indicators can be integrated in the filter head if desired. For dimensions and technical data see catalog sheet 60.40.

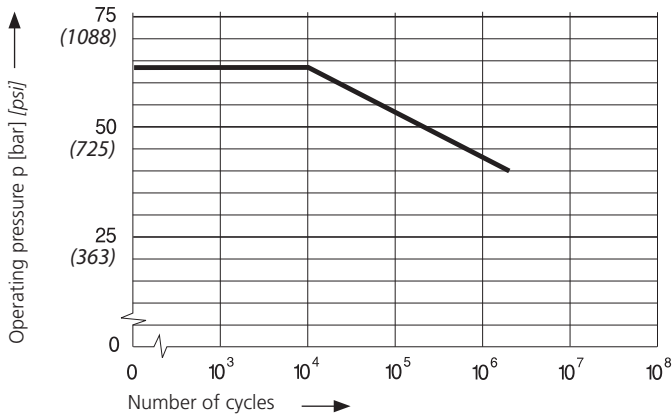
Suitable retrofittable indicators - optionally with one or two switching points or temperature compensation - can be found in catalog sheet 60.30.

Operating pressure

0 ... 40 bar / 580 psi, min. 3×10^6 pressure cycles
Nominal pressure according to DIN 24550

0 ... 63 bar / 914 psi, min. 10^4 pressure cycles
Quasi-static operating pressure

Permissible pressures for other numbers of cycles



Nominal flow rate

Up to 350 l/min / 92.5 gpm (see Selection Chart, column 2)
The nominal flow rates indicated by ARGO-HYTOS are based on the following features:

- › closed by-pass valve at $v \leq 200 \text{ mm}^2/\text{s}$ / 927 SUS
- › element service life > 1000 operating hours at an average fluid contamination of 0.07 g per l/min / 0.27 g per gpm flow volume
- › flow velocity in the connection lines:
up to 100 bar $\leq 6 \text{ m/s}$ / 1450 psi $\leq 19.7 \text{ ft/s}$

Filter fineness

$5 \mu\text{m(c)}$... $30 \mu\text{m(c)}$
 β -values according to ISO 16889
(see Selection Chart, column 4 and diagram Dx).

Dirt-holding capacity

Values in g test dust ISO MTD according to ISO 16889
(see Selection Chart, column 5).

Hydraulic fluids

Mineral oil and biodegradable fluids
(HEEs and HETG, see info-sheet 00.20).

Temperature range

-30 °C ... +100 °C (temporary -40 °C ... +120 °C)
-22 °F ... +212 °F (temporary -40 °F ... +248 °F)

Viscosity at nominal flow rate

- › at operating temperature: $v < 60 \text{ mm}^2/\text{s}$ / 280 SUS
- › as starting viscosity: $v_{\text{max}} = 1200 \text{ mm}^2/\text{s}$ / 5560 SUS
- › at initial operation:
The recommended starting viscosity can be read from the diagram D (pressure drop as a function of the kinematic viscosity) as follows: Find the 70% Δp of the cracking pressure of the by-pass valve on the vertical axis. Draw a horizontal line so that it intersects the Δp curve at a point. Read this point on the horizontal axis for the viscosity.

Mounting position

Preferably vertical, filter head on top.

Connection

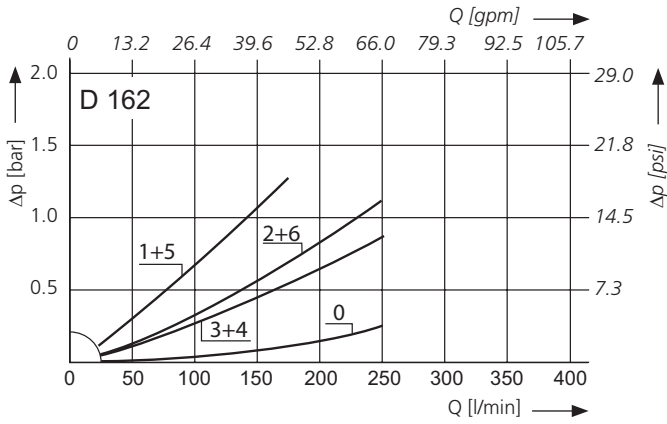
Threaded ports according to

- › ISO 228 or DIN 13
- › SAE standard J514.

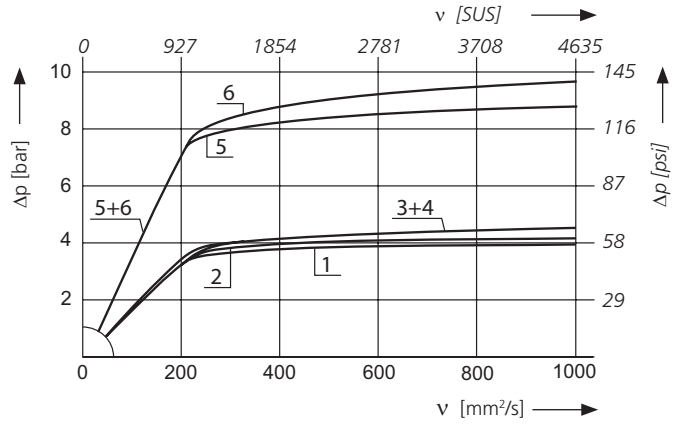
Sizes see Selection Chart, column 6
(other port threads on request).

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

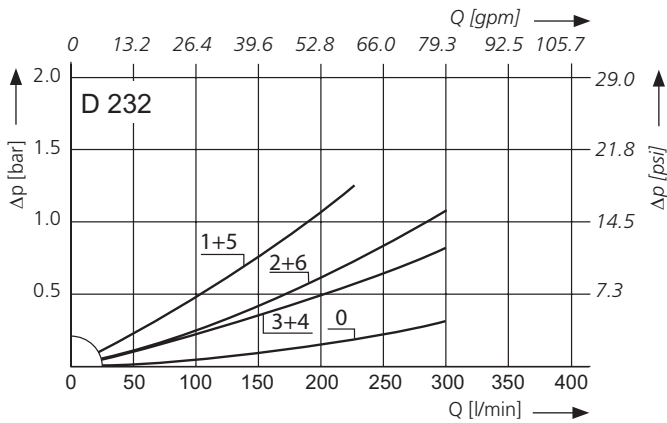
D1 Pressure drop as a function of the **flow volume** at $v = 35 \text{ mm}^2/\text{s} / 162 \text{ SUS}$ (0 = casing empty)



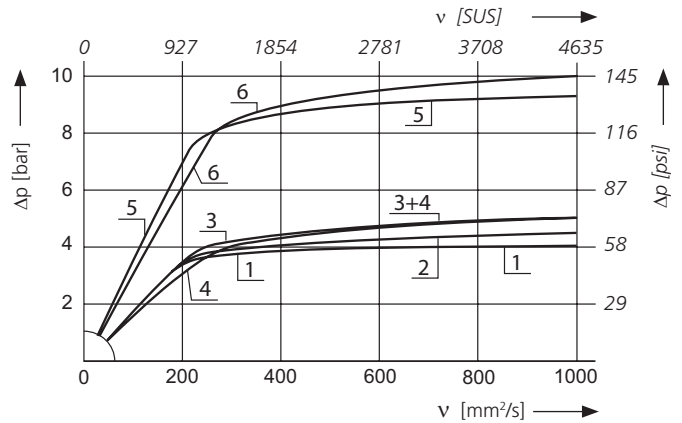
Pressure drop as a function of the **kinematic viscosity** at nominal flow



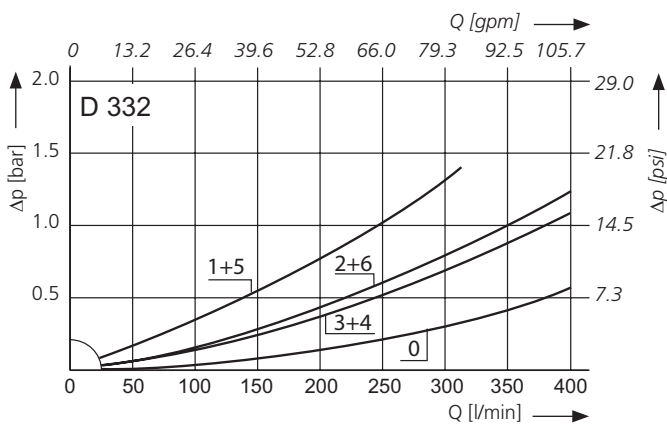
D2 Pressure drop as a function of the **flow volume** at $v = 35 \text{ mm}^2/\text{s} / 162 \text{ SUS}$ (0 = casing empty)



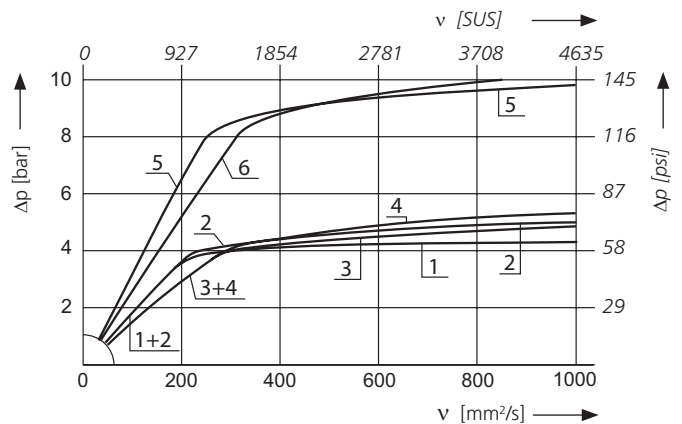
Pressure drop as a function of the **kinematic viscosity** at nominal flow



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

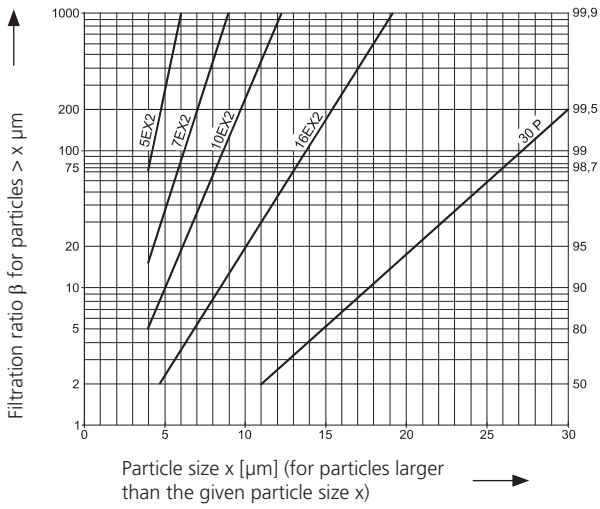


Pressure drop as a function of the **kinematic viscosity** at nominal flow



Filter fineness curves in Selection Chart, column 4

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



The abbreviations represent the following β -values resp. finenesses:

For EXAPOR®MAX2 and Paper elements:

- 5EX2 = $\bar{\beta}_{5(c)} = 200$ EXAPOR®MAX 2
- 7EX2 = $\bar{\beta}_{7(c)} = 200$ EXAPOR®MAX 2
- 10EX2 = $\bar{\beta}_{10(c)} = 200$ EXAPOR®MAX 2
- 16EX2 = $\bar{\beta}_{16(c)} = 200$ EXAPOR®MAX 2
- 30P = $\bar{\beta}_{30(c)} = 200$ Paper

Based on the structure of the filter media of the 30P paper elements, deviations from the printed curves are quite probable.

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

Selection Chart

Part No.	Nominal flow rate	Pressure drop see diagram D/curve no.	Filter fineness see diagram D/curve no.	Dirt-holding capacity	Connection	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
D 162-253	85	D1/1	5EX2	24	G1¼	3.5	1	V3.0817-03	2.4	retrofitable	-
D 162-256¹	140	D1/2	10EX2	33	G1¼	3.5	1	V3.0817-06	2.4	retrofitable	-
D 162-258¹	200	D1/3	16EX2	33	G1¼	3.5	1	V3.0817-08	2.4	retrofitable	-
D 162-251	220	D1/4	30P	18	G1¼	3.5	1	P3.0817-01 ²	2.4	retrofitable	-
D 162-283	160	D1/5	5EX2	24	G1¼	7	1	V3.0817-03	2.4	retrofitable	-
D 162-286	250	D1/6	10EX2	33	G1¼	7	1	V3.0817-06	2.4	retrofitable	-
D 232-253	120	D2/1	5EX2	33	G1¼	3.5	1	V3.0823-03	3.4	retrofitable	-
D 232-256¹	195	D2/2	10EX2	47	G1¼	3.5	1	V3.0823-06	3.4	retrofitable	-
D 232-258¹	275	D2/3	16EX2	48	G1¼	3.5	1	V3.0823-08	3.4	retrofitable	-
D 232-251	280	D2/4	30P	26	G1¼	3.5	1	P3.0823-01 ²	3.4	retrofitable	-
D 232-283	220	D2/5	5EX2	33	G1¼	7	1	V3.0823-03	3.4	retrofitable	-
D 232-286	300	D2/6	10EX2	47	G1½	7	1	V3.0823-06	3.4	retrofitable	-
D 332-253	170	D3/1	5EX2	49	G1¼	3.5	1	V3.0833-03	4.0	retrofitable	-
D 332-256¹	275	D3/2	10EX2	67	G1¼	3.5	1	V3.0833-06	4.0	retrofitable	-
D 332-258¹	280	D3/3	16EX2	68	G1¼	3.5	1	V3.0833-08	4.0	retrofitable	-
D 332-251	350	D3/4	30P	34	G1½	3.5	1	P3.0833-01 ²	4.0	retrofitable	-
D 332-283	280	D3/5	5EX2	49	G1¼	7	1	V3.0833-03	4.0	retrofitable	-
D 332-286	350	D3/6	10EX2	67	G1½	7	1	V3.0833-06	4.0	retrofitable	-

¹ Preferred type, no minimum order quantity required

² Paper media supported with metal gauze

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

For the appropriate clogging indicator see catalog sheet 60.40.

Order example: The filter D 162-253 is to be supplied with an optical indicator with automatic reset.

Order code: **D 162-253 OD1**

Part No. (basic unit) _____

Clogging indicator _____

From catalog sheet 60.30, you can see clogging indicators that can be retrofitted.

Remarks:

- › The switching pressure of the clogging indicator has always to be lower than the cracking pressure of the by-pass valve (see Selection Chart, column 7).
- › The filters listed in this chart are standard filters. Other designs available on request.
- › For versions with electrical clogging indicator, the device socket is not included in the scope of delivery.
- › For the electrical clogging indicator of type DIN EN 175301-803 (ED8 and ED9) a device socket with two LEDs is available, which additionally enables visual indication of the filter contamination (order no. DG 041.1200).

Selection Chart

Part No.	Nominal flow rate	Pressure drop see diagram D/curve no.	Filter fineness see diagram D/curve no.	Dirt-holding capacity	Connection	Cracking pressure of by-pass	Symbol	Replacement filter element Part No.	Weight	Clogging indicator	Remarks
	gpm		g	SAE	psi				lbs		
1	2	3	4	5	6	7	8	9	10	11	12
D 162-753	22.5	D1/1	5EX2	24	-20 ²	51	1	V3.0817-03	5.3	retrofitable	-
D 162-756¹	37.0	D1/2	10EX2	33	-20 ²	51	1	V3.0817-06	5.3	retrofitable	-
D 162-758¹	52.8	D1/3	16EX2	33	-20 ²	51	1	V3.0817-08	5.3	retrofitable	-
D 162-751	58.1	D1/4	30P	18	-20 ²	51	1	P3.0817-01 ⁴	5.3	retrofitable	-
D 162-783	42.3	D1/5	5EX2	24	-20 ²	101	1	V3.0817-03	5.3	retrofitable	-
D 162-786	66.0	D1/6	10EX2	33	-20 ²	101	1	V3.0817-06	5.3	retrofitable	-
D 232-753	31.7	D2/1	5EX2	33	-20 ²	51	1	V3.0823-03	7.5	retrofitable	-
D 232-756¹	51.5	D2/2	10EX2	47	-20 ²	51	1	V3.0823-06	7.5	retrofitable	-
D 232-758¹	72.6	D2/3	16EX2	48	-20 ²	51	1	V3.0823-08	7.5	retrofitable	-
D 232-751	74.0	D2/4	30P	26	-20 ²	51	1	P3.0823-01 ⁴	7.5	retrofitable	-
D 232-783	58.1	D2/5	5EX2	33	-20 ²	101	1	V3.0823-03	7.5	retrofitable	-
D 232-786	79.3	D2/6	10EX2	47	-24 ³	101	1	V3.0823-06	7.5	retrofitable	-
D 332-753	44.9	D3/1	5EX2	49	-20 ²	51	1	V3.0833-03	8.8	retrofitable	-
D 332-756¹	72.6	D3/2	10EX2	67	-20 ²	51	1	V3.0833-06	8.8	retrofitable	-
D 332-758¹	74.0	D3/3	16EX2	68	-20 ²	51	1	V3.0833-08	8.8	retrofitable	-
D 332-751	92.5	D3/4	30P	34	-24 ³	51	1	P3.0833-01 ⁴	8.8	retrofitable	-
D 332-783	74.0	D3/5	5EX2	49	-20 ²	101	1	V3.0833-03	8.8	retrofitable	-
D 332-786	92.5	D3/6	10EX2	67	-24 ³	101	1	V3.0833-06	8.8	retrofitable	-

¹ Preferred type, no minimum order quantity required

² Corresponds to 1⁵/₈-12 UN-2B

³ Corresponds to 1⁷/₈-12 UN-2B

⁴ Paper media supported with metal gauze

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

For the appropriate clogging indicator see catalog sheet 60.40.

Order example: The filter D 162-753 is to be supplied with an optical indicator with automatic reset.

Order code: **D 162-753 OD1**

Part No. (basic unit) _____

Clogging indicator _____

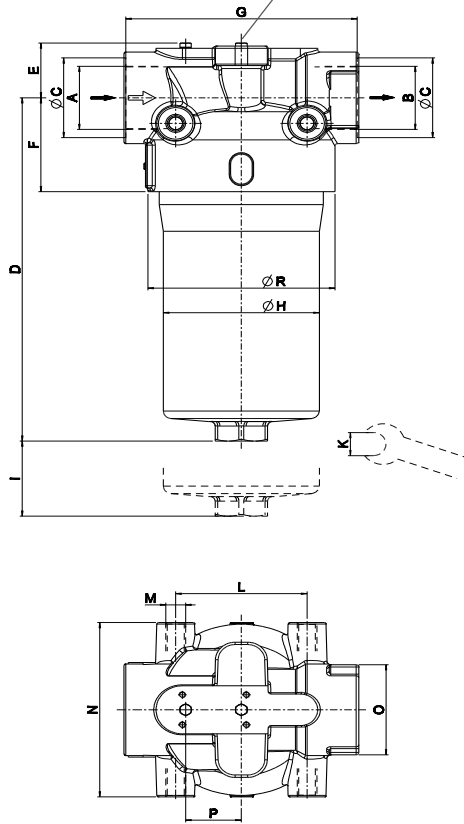
From catalog sheet 60.30, you can see clogging indicators that can be retrofitted.

Remarks:

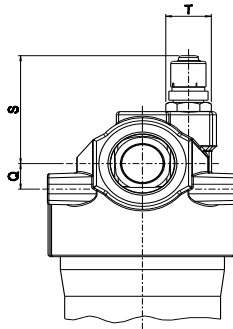
- › The switching pressure of the clogging indicator has always to be lower than the cracking pressure of the by-pass valve (see Selection Chart, column 7).
- › The filters listed in this chart are standard filters. Other designs available on request.
- › For versions with electrical clogging indicator, the device socket is not included in the scope of delivery.
- › For the electrical clogging indicator of type DIN EN 175301-803 (ED8 and ED9), a device socket with two LEDs is available, which additionally enables visual indication of the filter contamination (order no. DG 041.1200).

Dimensions

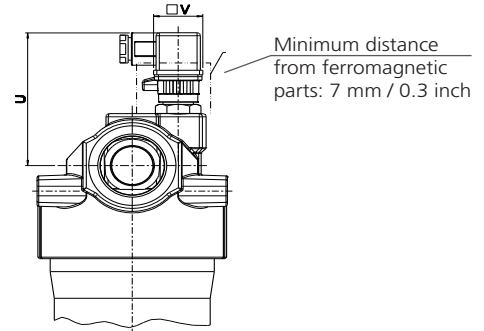
Clogging indicator optional:
Pressure holes plugged with screws M4



Version with integrated
optical clogging indicator (OD2)

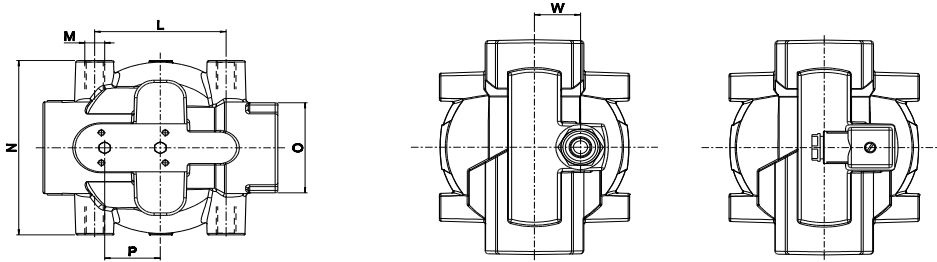
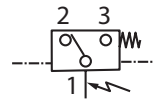


Version with integrated
electrical clogging indicator (ED8) and device socket*



* not included in scope of delivery

Terminal connection ED8



Measurements in mm

Type	A/B	C	D	E	F	G	H	I	K	L	M Ø/depth	N	O	P	Q
D 162	G1¼	53	228	38	62	140	95	80	AF 32	80	M12 / 18	116	AF 60	34	17
D 232	G1¼, G1½	53	291	38	62	140	95	80	AF 32	80	M12 / 18	116	AF 60	34	17
D 332	G1¼, G1½	53	398	38	62	140	95	80	AF 32	80	M12 / 18	116	AF 60	34	17

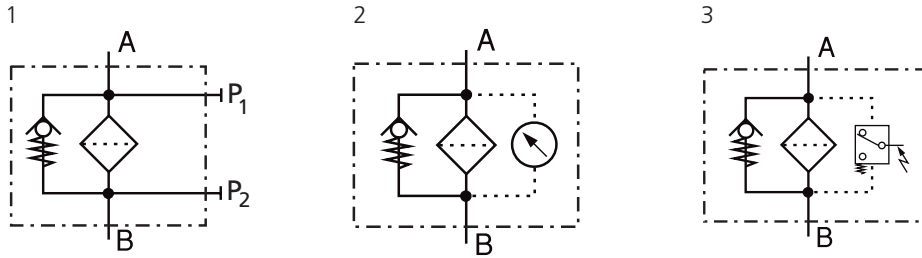
Type	R	S	T	U	V	W									
D 162	115	72	AF 24	89	□ 30	28									
D 232	115	72	AF 24	89	□ 30	28									
D 332	115	72	AF 24	89	□ 30	28									

Measurements in inch

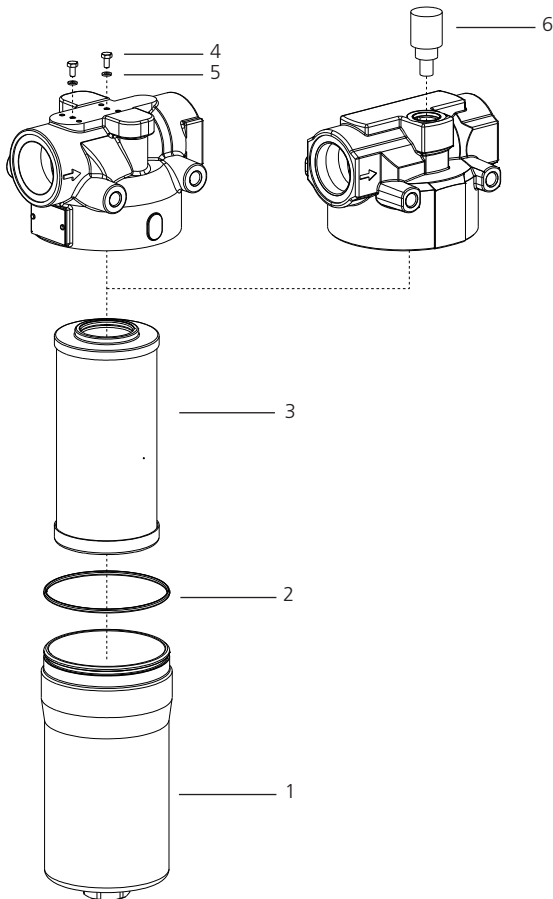
Type	A/B SAE	C	D	E	F	G	H	I	K mm	L	M Ø / depth	N	O mm	P
D 162	-20	2.09	8.98	1.50	2.44	5.51	3.74	3.15	AF 32	3.15	M12 / 0.71	4.57	AF 60	1.34
D 232	-20, -24	2.09	11.46	1.50	2.44	5.51	3.74	3.15	AF 32	3.15	M12 / 0.71	4.57	AF 60	1.34
D 332	-20, -24	2.09	15.67	1.50	2.44	5.51	3.74	3.15	AF 32	3.15	M12 / 0.71	4.57	AF 60	1.34

Type	Q	R	S	T	U	V	W							
D 162	0.67	4.53	2.83	AF 24	3.50	□ 1.18	1.10							
D 232	0.67	4.53	2.83	AF 24	3.50	□ 1.18	1.10							
D 332	0.67	4.53	2.83	AF 24	3.50	□ 1.18	1.10							

Symbols



Spare Parts



Pos.	Designation	Part No.
1	Filter bowl D 162	D 162.0102
1	Filter bowl D 232	D 232.0102
1	Filter bowl D 332	D 332.0102
2	O-ring 88.57 x 2.62 mm 3.49 x 0.10 inch	N007.0886
3	Replacement filter element (with seal)	see Chart / col. 9
4	Hexagonal head screw M4 x 8 DIN 933-8.8	11385800
5	Bonded seal 4.1 x 7.2 x 1 mm 0.16 x 0.28 x 0.04 inch	12504600
6	Clogging indicator (with seal)	s. catalog sheet 60.40

The functions of the complete filters as well as the outstanding features of the filter elements assured by ARGO-HYTOS can only be guaranteed if original ARGO-HYTOS spare parts are used.

Quality Assurance

Quality management according to DIN EN ISO 9001

To ensure constant quality in production and operation, ARGO-HYTOS filter elements undergo strict controls and tests according to the following ISO standards:

ISO 2941	Verification of collapse / burst pressure rating
ISO 2942	Verification of fabrication integrity (Bubble Point Test)
ISO 2943	Verification of material compatibility with fluids
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-Pass-Test (evaluation of filter fineness and dirt-holding capacity)
ISO 23181	Determination of resistance to flow fatigue using high viscosity fluid

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

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