ARGO HYTOS

Pressure Filters

D 042 · D 062

- In-line mounting
- Operating pressure up to 100 bar
- Nominal flow rate up to 70 l/min

30.10-2e

Description

Application
In the pressure circuits of hydraulic and lubrication 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:	Aluminium alloy
Filter bowl:	Aluminium alloy
Seals:	NBR (Viton on request)
Filter media:	EXAPOR®MAX - inorganic multi-layer microfibre web Paper - cellulose web, impregnated with resin

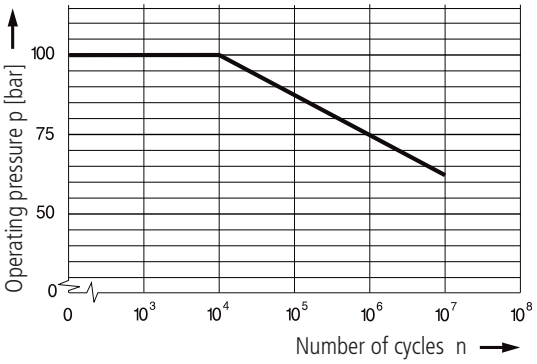
Accessories
Electrical and/or optical clogging indicators are available - optionally with one or two switching points resp. temperature suppression.
Dimensions and technical data see catalogue sheet 60.30.

Characteristics

Operating pressure
0 ... 63 bar, min. 10^7 pressure cycles
Nominal pressure according to DIN 24550

0 ... 100 bar, min. 10^4 pressure cycles
Quasi-static operating pressure

Permissible pressures for other numbers of cycles



Nominal flow rate
Up to 70 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 40 bar ≤ 4,5 m/s
  up to 250 bar ≤ 8 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 or 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

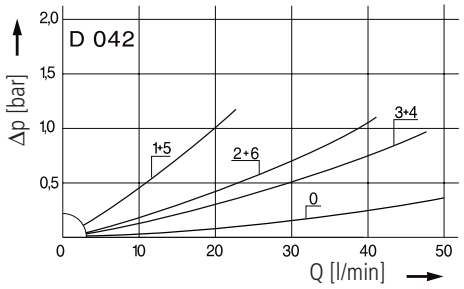
Connection
Threaded ports according to ISO 228 or DIN 13.
Sizes see Selection Chart, column 6 (other port threads on request).

Diagrams

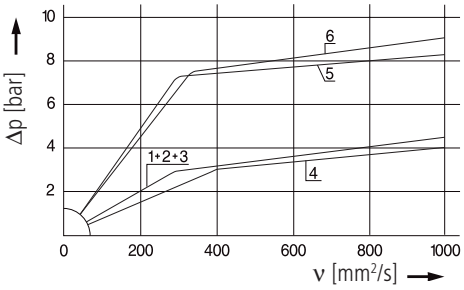
Δp-curves for complete filters in Selection Chart, column 3

D1

Pressure drop as a function of the **flow volume** at $\nu = 35\ mm^2/s$ (0 = casing empty)

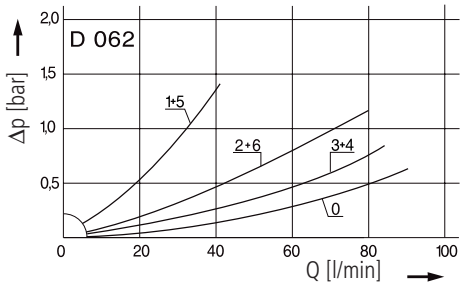


Pressure drop as a function of the **kinematic viscosity** at nominal flow

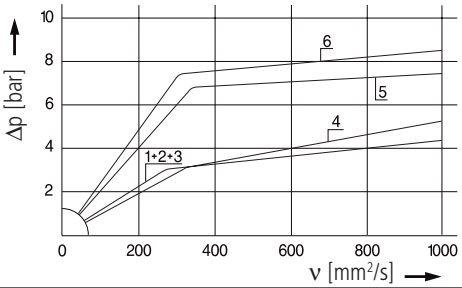


D2

Pressure drop as a function of the **flow volume** at $\nu = 35\ mm^2/s$ (0 = casing empty)



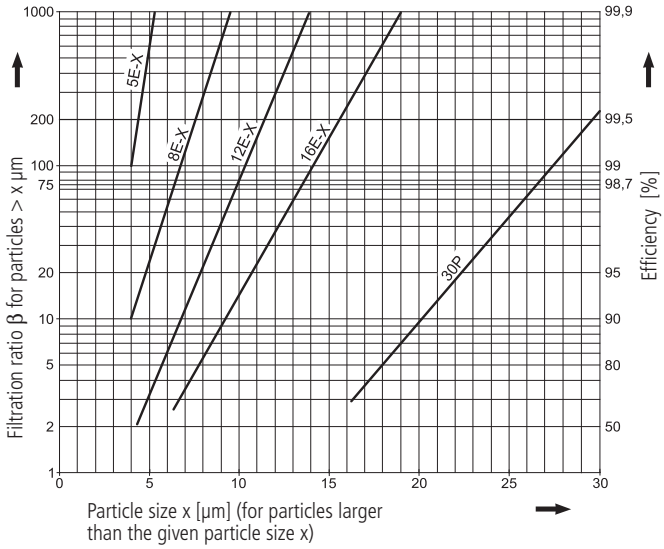
Pressure drop as a function of the **kinematic viscosity** at nominal flow



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	$= \overline{\beta}_{5\,(c)}$	$= 200$	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 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**
D 042-153	9	**D1**/1	5 E-X	3,8	G½	3,5	4	V3.0510-03	0,8	optional	-
D 042-156	15	**D1**/2	12 E-X	6,1	G½	3,5	4	V3.0510-06	0,8	optional	-
D 042-158	30	**D1**/3	16 E-X	6,6	G½	3,5	4	V3.0510-08	0,8	optional	-
D 042-151	35	**D1**/4	30 P	3,6	G½	3,5	4	P3.0510-11*	0,8	optional	-
D 042-183	20	**D1**/5	5 E-X	3,8	G½	7	4	V3.0510-03	0,8	optional	-
D 042-186	35	**D1**/6	12 E-X	6,1	G½	7	4	V3.0510-06	0,8	optional	-
D 062-153	20	**D2**/1	5 E-X	7,6	G½	3,5	4	V3.0520-03	1,1	optional	-
D 062-156	30	**D2**/2	12 E-X	13	G¾	3,5	4	V3.0520-06	1,1	optional	-
D 062-158	60	**D2**/3	16 E-X	14	G¾	3,5	4	V3.0520-08	1,1	optional	-
D 062-151	70	**D2**/4	30 P	7,1	G¾	3,5	4	P3.0520-01*	1,1	optional	-
D 062-183	40	**D2**/5	5 E-X	7,6	G½	7	4	V3.0520-03	1,1	optional	-
D 062-196	70	**D2**/6	12 E-X	13	G¾	7	4	V3.0520-06	1,1	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 D 042-156 has to be supplied with optical clogging indicator - response pressure 2,0 bar

Order description: **D 042-156 / DG 042-01 M**

Part No. (Basic unit) — **D 042-156**

Clogging indicator — **DG 042-01**

M — **Mounted**

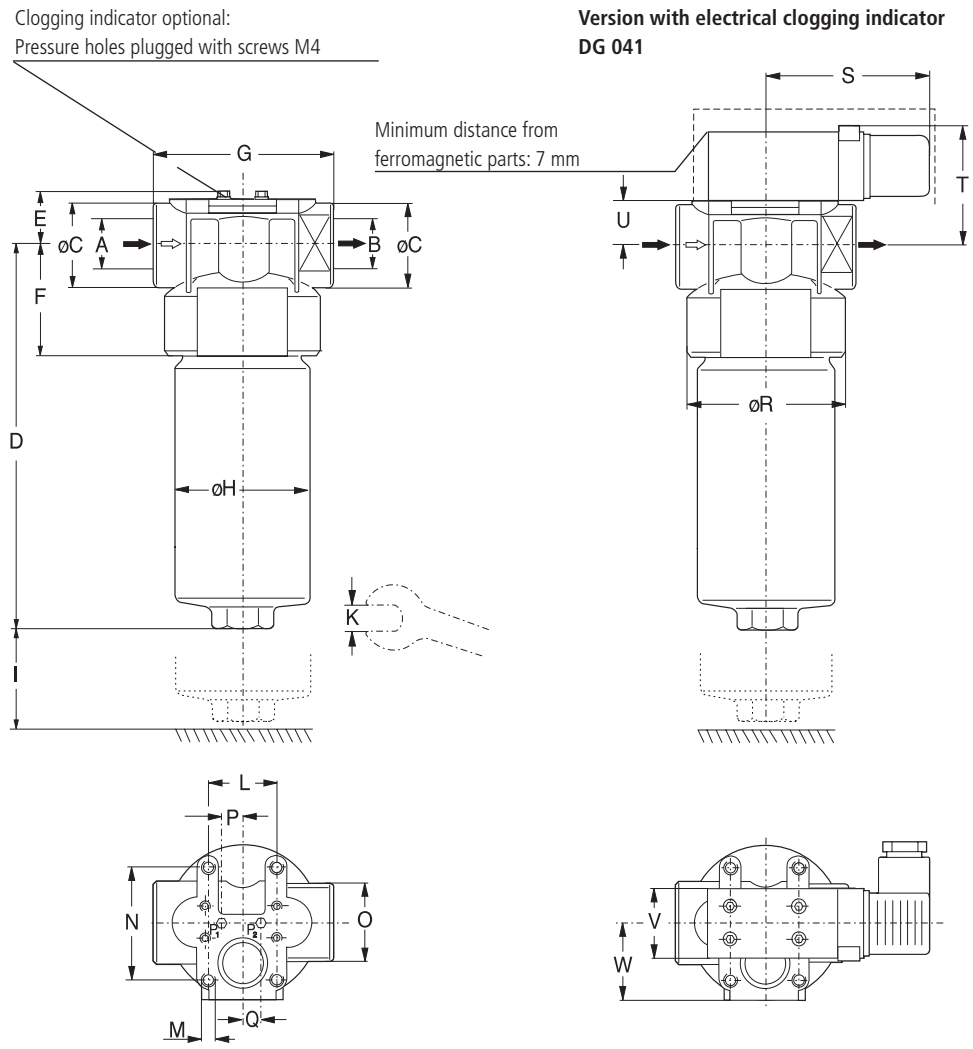
For the appropriate clogging indicators see catalogue sheet 60.30

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.

* Paper media supported with metal gauze

Dimensions

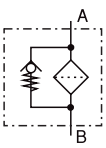


Measurements

Type	A/B	C	D	E	F	G	H	I	K	L	M ø/depth	N	O	P	Q	R	S	T	U	V	W
D 042	G½	39	148	27	45,5	80	58,5	55	27	35	M6/8	44	36	19	15	70	81	55	23	30	35,5
D 062	G½, G¾	39	244	27	45,5	80	58,5	55	27	35	M6/8	44	36	19	15	70	81	55	23	30	35,5

Symbols

1



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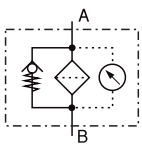
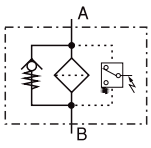


3



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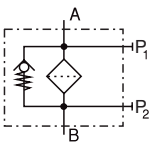

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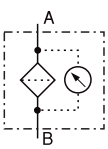

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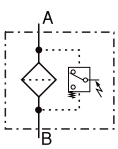
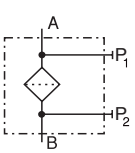
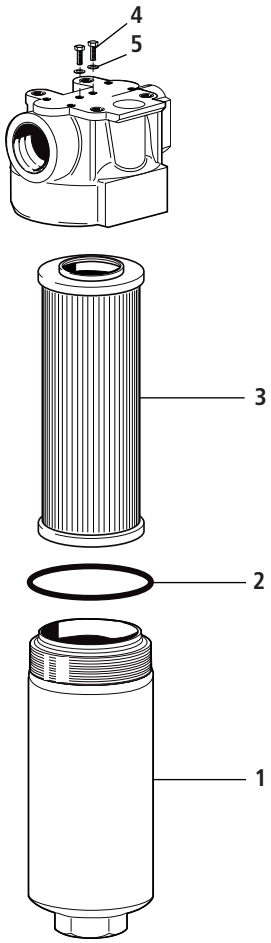


7



Spare Parts



Pos.	Designation	Part No.
1	Filter bowl D 042	D 044.0101
1	Filter bowl D 062	D 064.0101
2	O-ring 50 x 2	N 007.0501
3	Filter element (with seal)	see Chart / col. 9
4	Hexagonal head screw M4 x 8 DIN 933-8.8	3301051
5	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.

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

We produce fluid power solutions
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Subject to change · 9107173-e · 0905

ARGO HYTOS

Pressure Filters

D 162 · D 232 · D 332

- In-line mounting
- Operating pressure up to 63 bar
- Nominal flow rat up to 300 l/min

30.30-2e

Description

Application
In the pressure circuits of hydraulic and lubrication 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:	Aluminium alloy
Filter bowl:	Aluminium alloy
Seals:	NBR (Viton on request)
Filter media:	EXAPOR®MAX - inorganic multi-layer microfibre web Paper - cellulose web, impregnated with resin

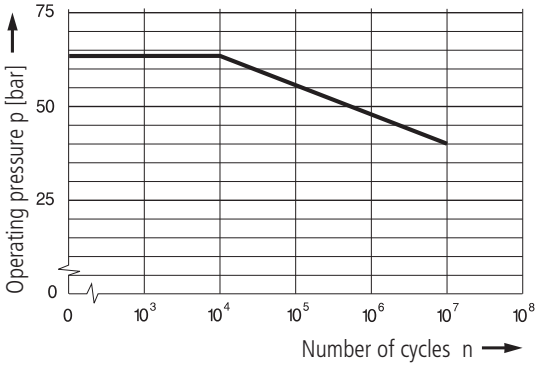
Accessories
Electrical and/or optical clogging indicators are available - optionally with one or two switching points resp. temperature suppression.
Dimensions and technical data see catalogue sheet 60.30.

Characteristics

Operating pressure
0 ... 40 bar, min. 10^7 pressure cycles
Nominal pressure according to DIN 24550

0 ... 63 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 40 bar ≤ 4,5 m/s
  up to 250 bar ≤ 8 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 or 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: 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).

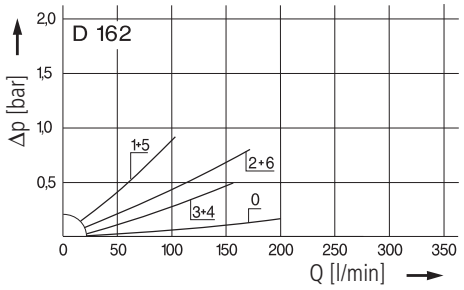
Electrical clogging indicator
- Switching voltage: max. 120 V AC / 175 V DC
- Switching current: max. 0,17 A AC / 0,25 A DC
- Switching power: max. 3,5 VA AC / 5 W DC
- Type of contact: change-over
- Electrical protection: IP 65 (with mounted and secured socket)

Diagrams

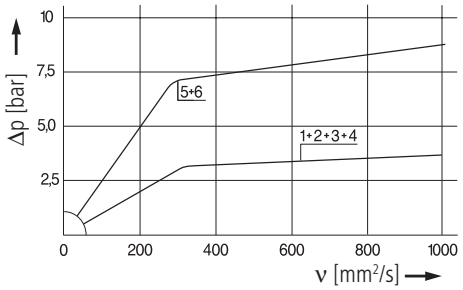
Δp-curves for complete filters in Selection Chart, column 3

D1

Pressure drop as a function of the **flow volume** at $\nu = 35\ mm^2/s$ (0 = casing empty)

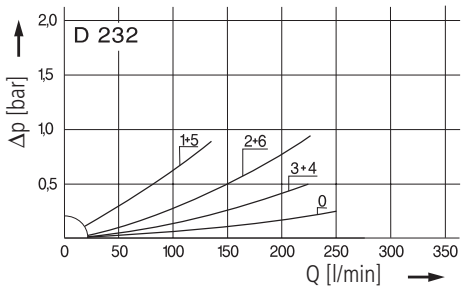


Pressure drop as a function of the **kinematic viscosity** at nominal flow

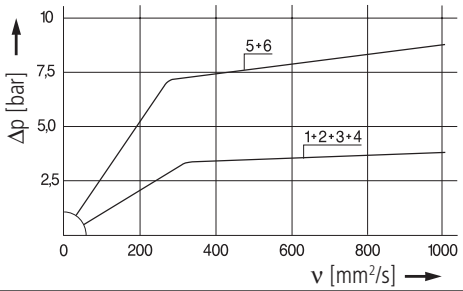


D2

Pressure drop as a function of the **flow volume** at $\nu = 35\ mm^2/s$ (0 = casing empty)

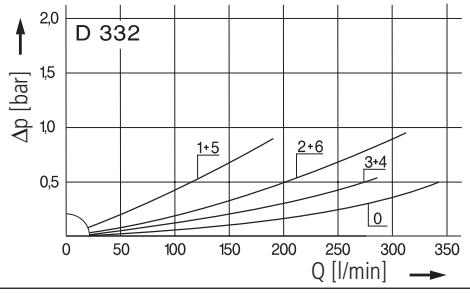


Pressure drop as a function of the **kinematic viscosity** at nominal flow

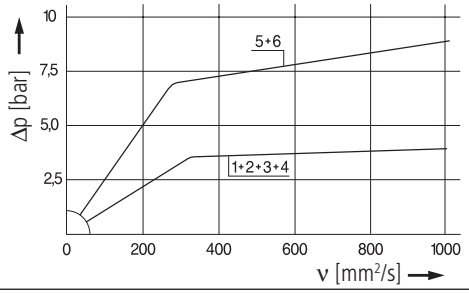


D3

Pressure drop as a function of the **flow volume** at $\nu = 35\ mm^2/s$ (0 = casing empty)



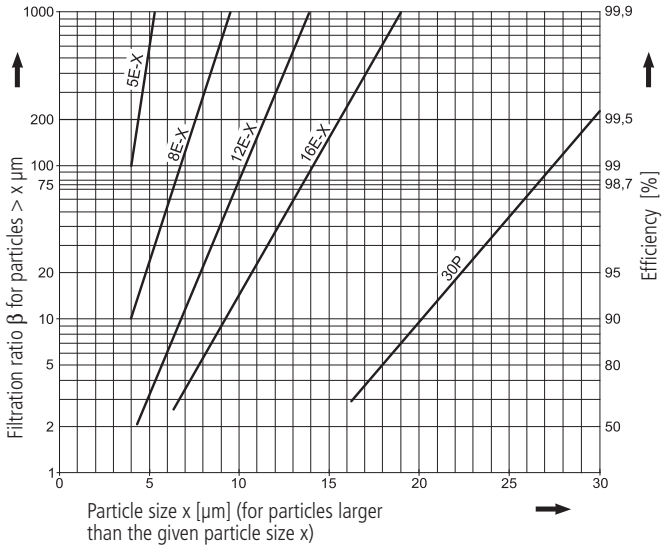
Pressure drop as a function of the **kinematic viscosity** at nominal flow



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	$= \overline{\beta}_{5\,(c)}$	$= 200$	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 special applications, finenesses differing from these curves are also available by using special composed filter material.

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**
D 162-253	40	**D1**/1	5 E-X	18	G1¼	3,5	4	V3.0817-03	3,2	optional	-
D 162-256	65	**D1**/2	12 E-X	28	G1¼	3,5	4	V3.0817-06	3,2	optional	-
D 162-258	105	**D1**/3	16 E-X	30	G1¼	3,5	4	V3.0817-08	3,2	optional	-
D 162-251	130	**D1**/4	30 P	18	G1¼	3,5	4	P3.0817-01*	3,2	optional	-
D 162-283	95	**D1**/5	5 E-X	18	G1¼	7	4	V3.0817-03	3,2	optional	-
D 162-286	150	**D1**/6	12 E-X	28	G1¼	7	4	V3.0817-06	3,2	optional	-
D 232-253	55	**D2**/1	5 E-X	26	G1¼	3,5	4	V3.0823-03	3,4	optional	-
D 232-256	90	**D2**/2	12 E-X	41	G1¼	3,5	4	V3.0823-06	3,4	optional	-
D 232-258	150	**D2**/3	16 E-X	46	G1¼	3,5	4	V3.0823-08	3,4	optional	-
D 232-251	180	**D2**/4	30 P	26	G1¼	3,5	4	P3.0823-01*	3,4	optional	-
D 232-283	130	**D2**/5	5 E-X	26	G1¼	7	4	V3.0823-03	3,4	optional	-
D 232-286	210	**D2**/6	12 E-X	41	G1½	7	4	V3.0823-06	3,4	optional	-
D 332-253	80	**D3**/1	5 E-X	36	G1¼	3,5	4	V3.0833-03	4,0	optional	-
D 332-256	130	**D3**/2	12 E-X	58	G1¼	3,5	4	V3.0833-06	4,0	optional	-
D 332-258	210	**D3**/3	16 E-X	67	G1¼	3,5	4	V3.0833-08	4,0	optional	-
D 332-251	260	**D3**/4	30 P	34	G1½	3,5	4	P3.0833-01*****	4,0	optional	-
D 332-283	190	**D3**/5	5 E-X	36	G1¼	7	4	V3.0833-03	4,0	optional	-
D 332-286	300	**D3**/6	12 E-X	58	G1½	7	4	V3.0833-06	4,0	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 D 232-256 has to be supplied with optical clogging indicator - response pressure 2,0 bar.

Order description: **D 232-256** **/** **DG 042-01** **M**

Part No. (basic unit) — **D 232-256**

Clogging indicator — **DG 042-01**

M — **Mounted**

For the appropriate clogging indicator see catalogue sheet 60.30.

Besides these mounted clogging indicators we also offer - with a certain order quantity - clogging indicators integrated in the filter head (as listed under "dimensions").

Order examples:

D 232-256 ED (electrical differential pressure indicator)
D 232-256 OD (optical differential pressure indicator)

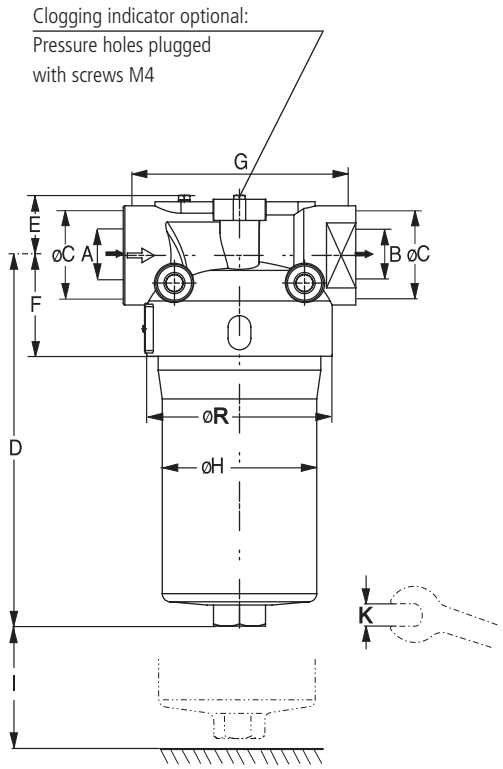
} the switching pressure matches the cracking pressure of the by-pass valve

Remarks:

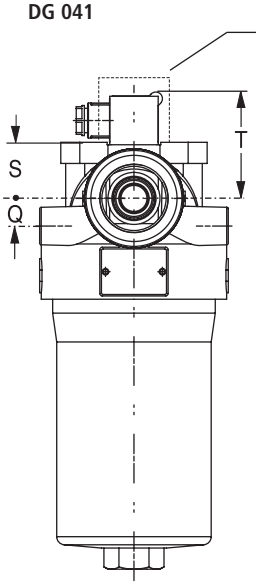
- The switching pressure of the clogging indicator has always to be lower than the cracking pressure of the by-pass valve (see Selection Chart, column 7).
- The filters listed in this chart are standard filters. Other designs available on request.

***** Paper media supported with metal gauze

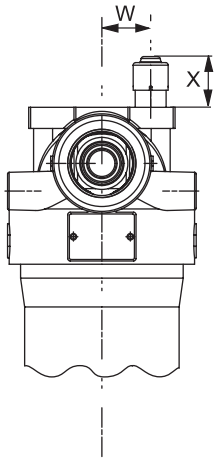
Dimensions



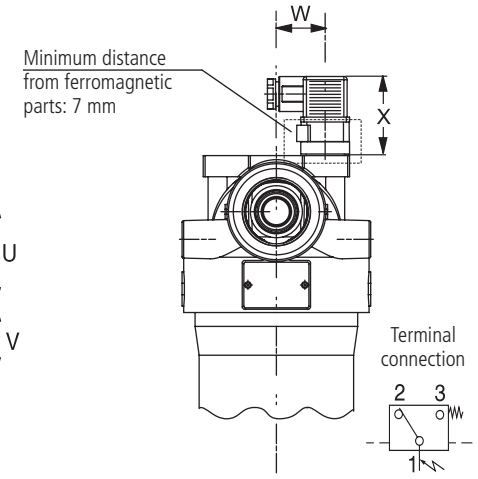
Version with electrical clogging indicator DG 041

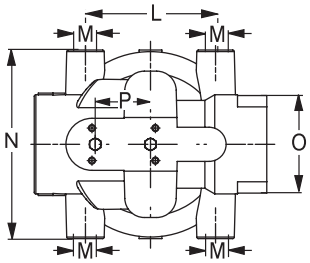


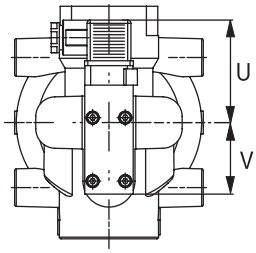
Version OD with integrated optical clogging indicator



Version ED with integrated electrical clogging indicator





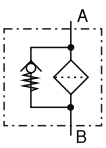


Measurements

Type	A/B	C	D	E	F	G	H	I	K	L	M ø/depth	N	O	P	Q	R	S	T	U	V	W	X ED	X OD
D 162	G1¼	61	232	38	62	140	95	80	32	80	M12/18	116	SW60	34	17	115	34	66	66	44	30	49	30
D 232	G1¼, G1½	61	296	38	62	140	95	80	32	80	M12/18	116	SW60	34	17	115	34	66	66	44	30	49	30
D 332	G1¼, G1½	61	396	38	62	140	95	80	32	80	M12/18	116	SW60	34	17	115	34	66	66	44	30	49	30

Symbols

1



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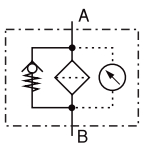

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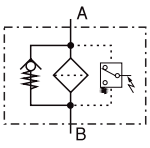

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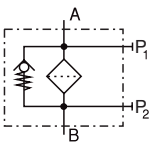

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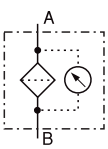

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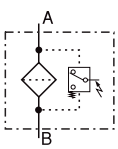
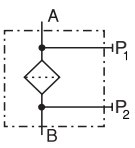
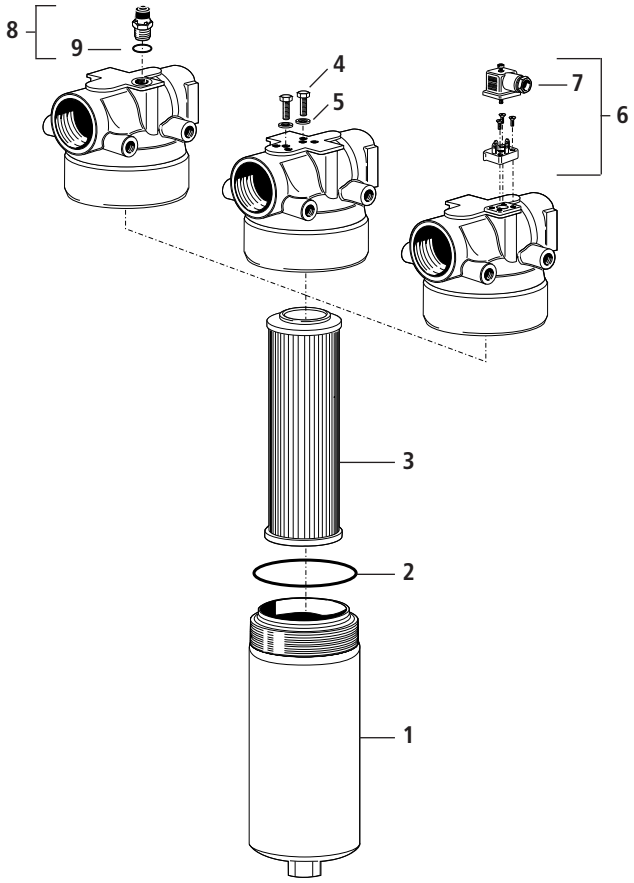


7



Spare Parts



Pos.	Designation	Part No.
1	Filter bowl 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	N 007.0886
3	Filter element (with seal)	see Chart / col. 9
4	Hexagonal head screw M4 x 8 DIN 933-8.8	3301051
5	Bonded seal 4,1 x 7,2 x 1	3404074
6	Reed switch with screws and socket (Pos. 7)	HD 049.1410
7	Socket DIN 43650 - AF3	DG 041.1220
8	Optical clogging indicator (with Pos. 9)	D 232.1400
9	O-ring 12,3 x 2,4	N 007.0124

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.

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

We produce fluid power solutions
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