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

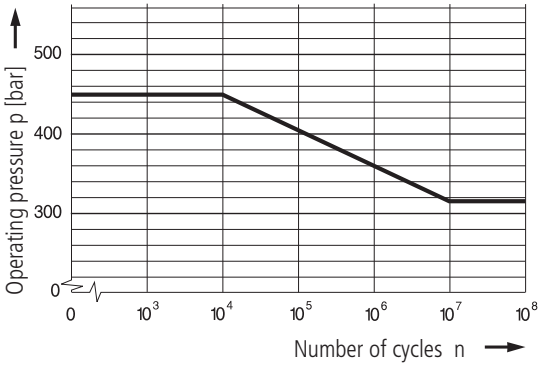
Accessories
Electrical and/or optical clogging indicators are available – optionally with one or two switching points resp. temperature suppression.
Dimensions and technical data see catalogue sheet 60.30.

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.

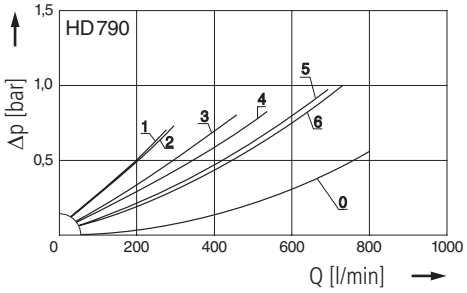
Connection
SAE-flange (6000 psi).
Sizes see Selection Chart, column 6 (other connections on request).

Diagrams

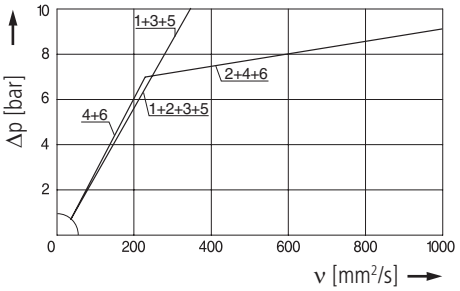
Δp-curves for complete filters in Selection Chart, column 3

D1

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

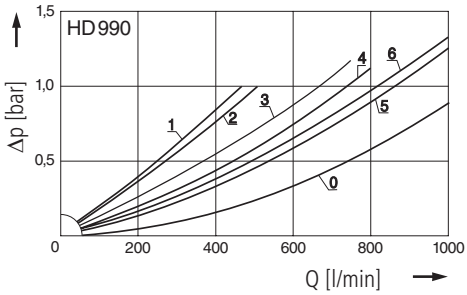


Pressure drop as a function of the **kinematic viscosity**
at nominal flow

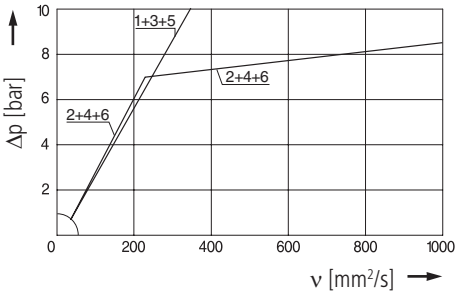


D2

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



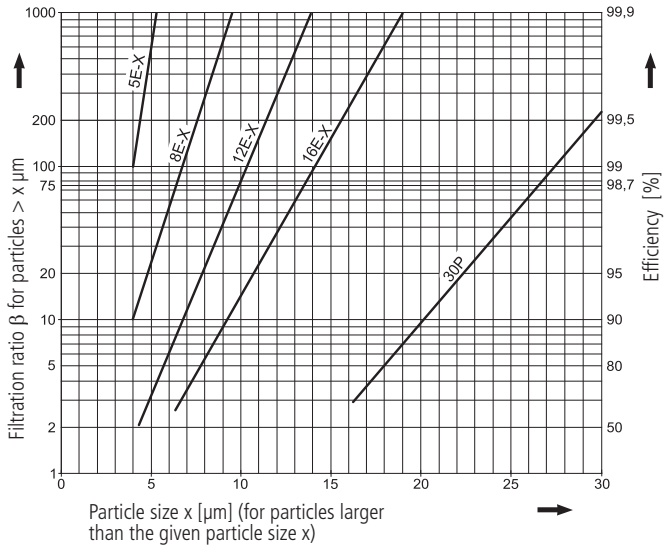
Pressure drop as a function of the **kinematic viscosity**
at nominal flow



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**

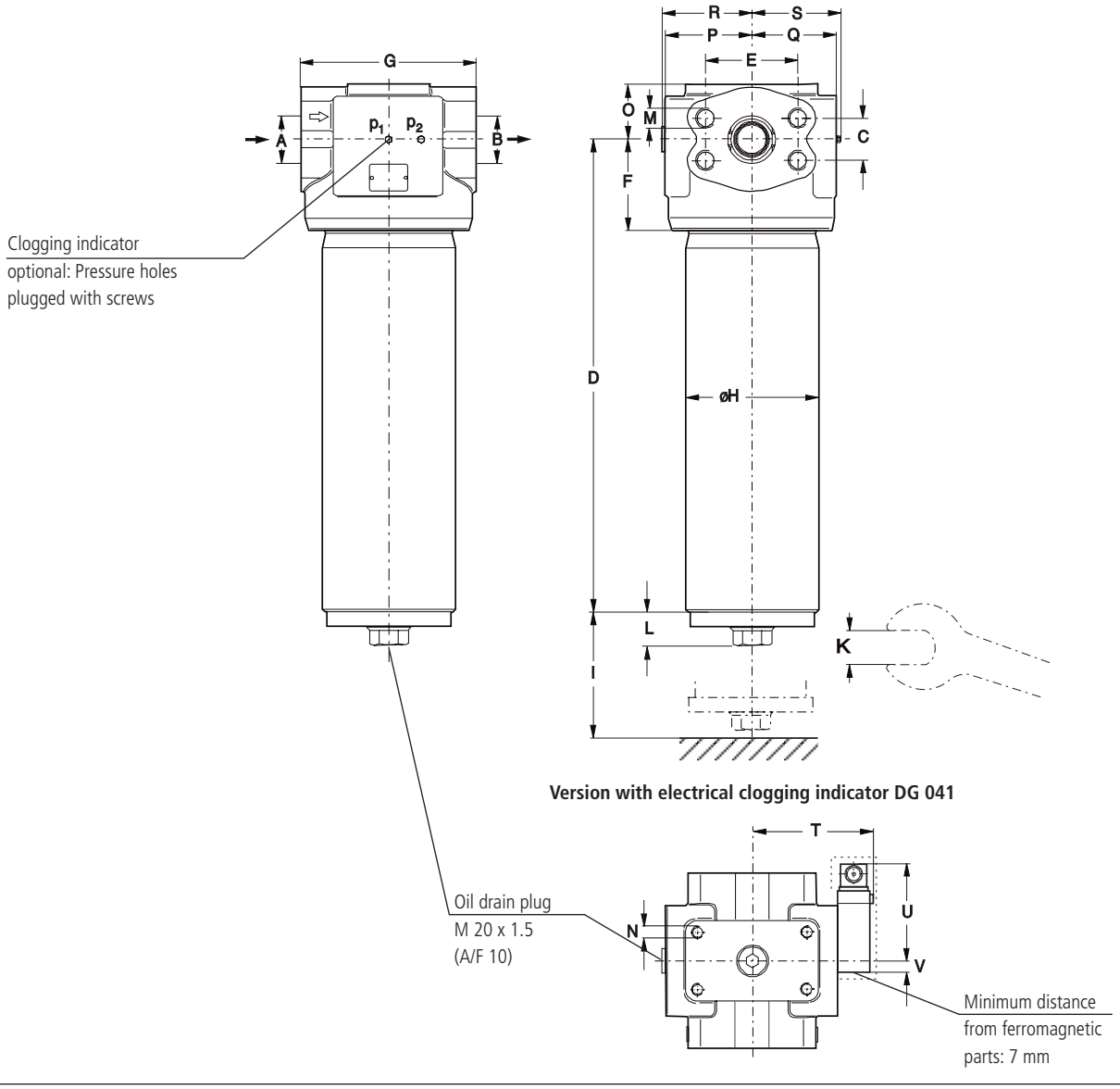
For the appropriate clogging indicators see catalogue sheet 60.30.

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

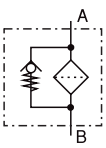


Measurements

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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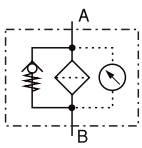

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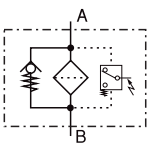

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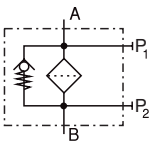

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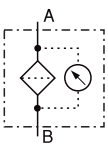

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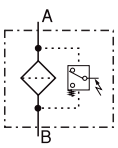

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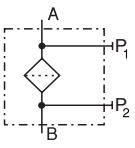
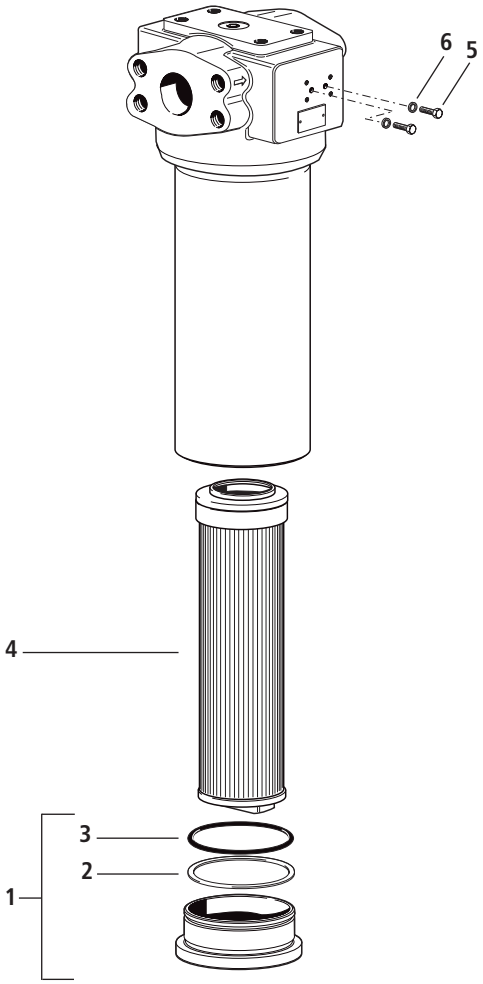


Spare Parts



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
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