

Hydraulic and lubrication oil filters Technical data sheets



Powering Business Worldwide

Hydraulic and lubrication oil filter technical data sheets

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Series DWF	Welded pressure filter, change-over - 232 PSI ASME U-Stamp
	DWF 1505
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	DSF 176-331
Series DU	Pressure filter, change-over - 464 PSI
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	DU 631-1950
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	HDD 601-1351



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	EHP 60-90



Series	Suction filters
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	AS 220
	AS 632
Series TS	Suction filter for vertical tank-mounting
	TS 210-310
	TS 426
	TS 625
Series TSW	Suction filter for horizontal tank-mounting
	TSW 210-310
	TSW 426
	TSW 625

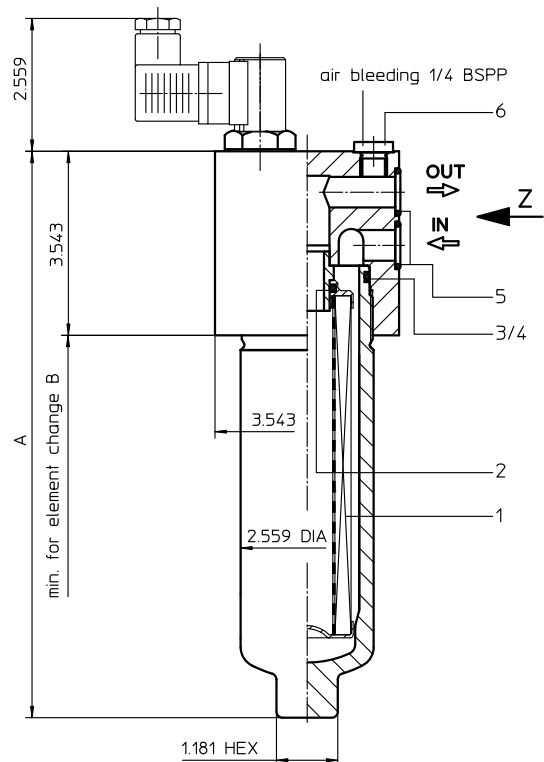
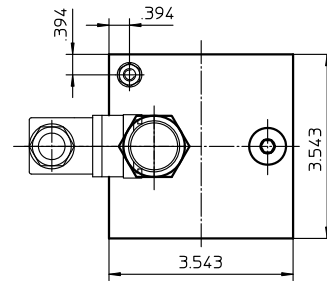
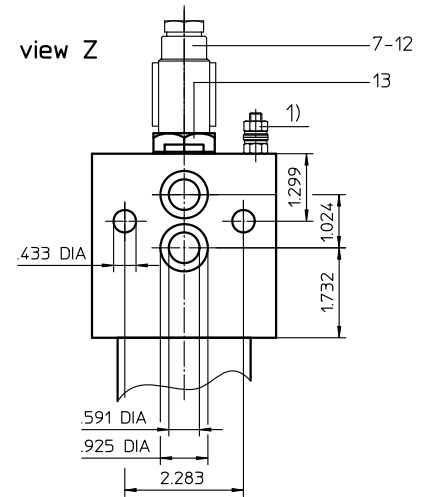


Series	Off-line filters
Series NF	Partial flow filter 232 PSI
	NF 250
	NF 631
	NF 1000



Series	Indicators
Series E/O	
Series AOR/AOC	
Series AE	
	AE Block
	AE Thread
Series OP/OE	
	OP/OE Block
	OP/OE Thread
Series VS5	
	VS5 Block
	VS5 Thread

Series FHP 60-150 3625 PSI



Dimensions:

type	FHP 60	FHP 90	FHP 150
connection	3/4"		
A	8.35	10.90	15.12
B	10.63	13.19	17.52
weight approx.	11 lbs.	12 lbs.	14 lbs.
volume tank	.08 gal.	.10 gal.	.16 gal.

1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series FHP 60-150

3625 PSI

Description:

Pressure filter series FHP 60-150 have a working pressure up to 3625 PSI. Pressure peaks can be absorbed with a sufficient safety margin. The FHP-filter are flange mounted to the hydraulic system.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head. After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

The reversing valve provides another level of protection for the filter element. The reverse flow will not be filtered.

1. Type index:

1.1. Complete filter: (ordering example)

FHP. 90. 10VG. HR. E. P. - . F. 4. - . - . AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

FHP = pressure filter, manifold mounted

2 nominal size: 60, 90, 150

3 filter-material and filter-fineness:

80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass

4 filter element collapse rating:

30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601

8 process connection:

F = manifold mounted

9 process connection size:

4 = $\frac{3}{4}$ "

10 filter housing specification: (see catalog)

- = standard
IS06 = for HFC applications, see sheet no.31605

11 internal valve:

- = without
S1 = with bypass valve Δp 51 PSI
S2 = with bypass valve Δp 102 PSI
R = reversing valve, $Q \leq 18.50$ GPM

12 clogging indicator or clogging sensor:

- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 90. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to company standard

2 nominal size: 60, 90, 150

3 - 7 see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	3625 PSI
test pressure:	5184 PSI
process connection:	manifold mounted
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4)

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

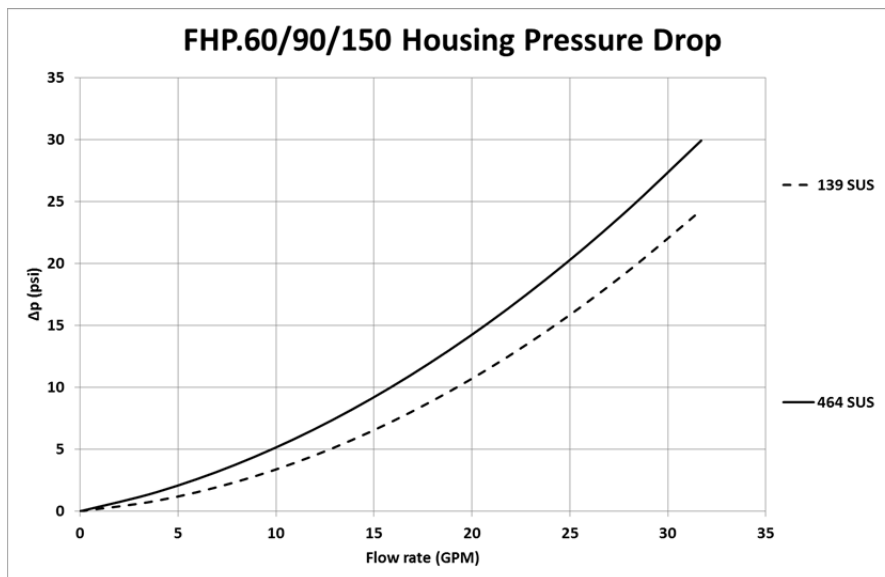
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

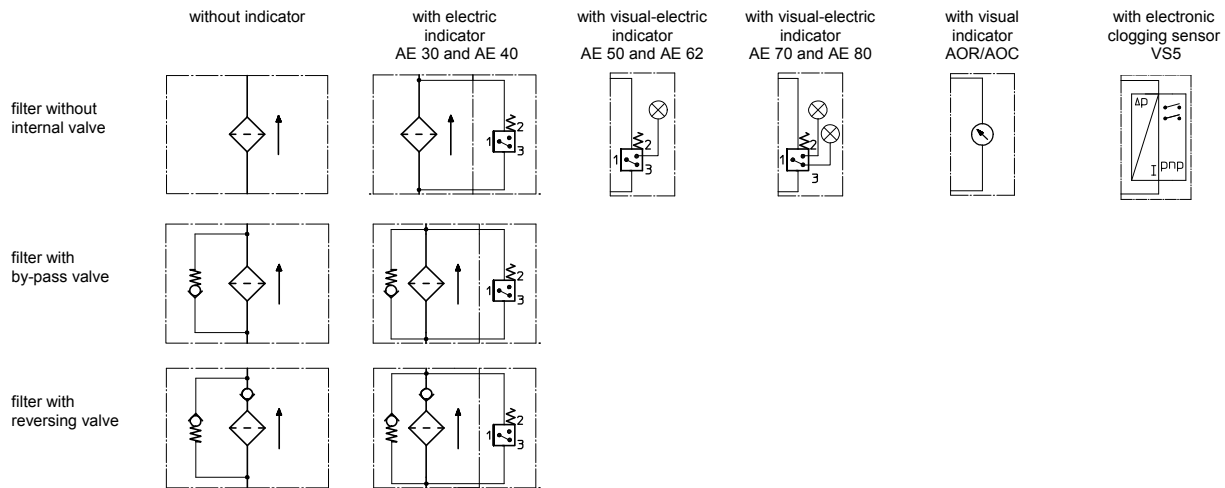
FHP	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
60	6.748	4.685	2.999	2.577	1.760	0.2002	0.1868	0.1280
90	4.059	2.818	1.804	1.550	1.059	0.1210	0.1130	0.0774
150	2.422	1.681	1.076	0.925	0.632	0.0723	0.0675	0.0462

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimensions			article-no.	
			FHP 60 01E.60...	FHP 90 01E.90...	FHP 150 01E.150...		
1	1	filter element					
2	1	O-ring		22 x 3,5		304341 (NBR)	304392 (FPM)
3	1	O-ring		54 x 3		304657 (NBR)	304720 (FPM)
4	1	support ring		61 x 2,6 x 1			304660
5	2	O-ring		18 x 2,5			304371 (NBR)
6	1	screw plug		¼ BSPP			305003
7	1	clogging indicator, visual		AOR or AOC			see sheet-no. 1606
8	1	clogging indicator, visual-electric		AE			see sheet-no. 1615
9	1	clogging sensor, electronic		VS5			see sheet-no. 1619
10	1	O-ring		15 x 1,5		315357 (NBR)	315427 (FPM)
11	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
12	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
13	1	screw plug		20913-4			309817

item 13 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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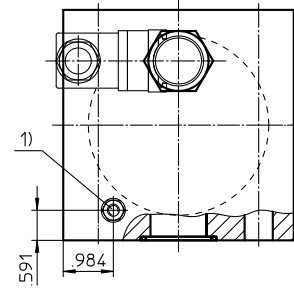
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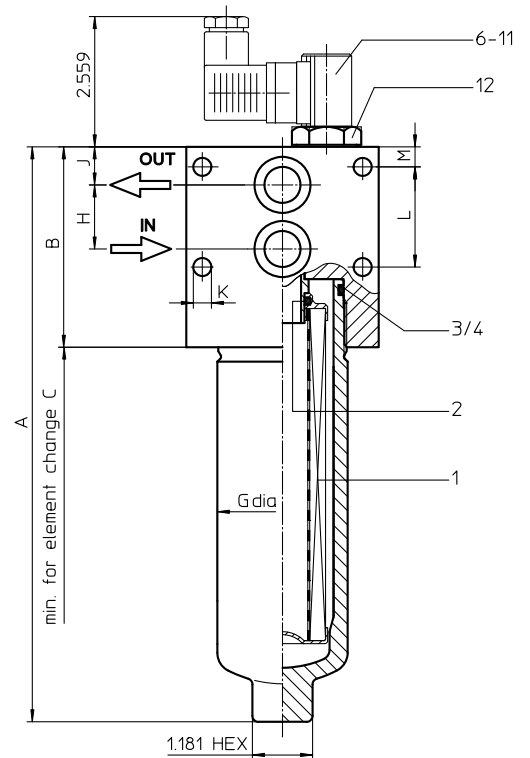
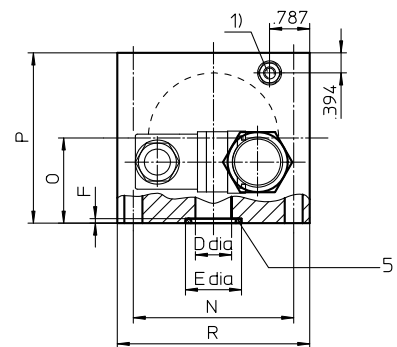
Series HPF 60-450

4568 PSI

HPF170-450



HPF60-150



Dimensions:

type	HPF 60	HPF 90	HPF 150	HPF 170	HPF 240	HPF 360	HPF 450
connection	3/4"	3/4"	3/4"	1"	1"	1"	1"
A	8.58	11.14	15.43	12.99	14.96	18.11	22.24
B	3.78	3.78	3.78	5.51	5.51	5.51	5.51
C	10.63	13.19	17.52	13.78	15.75	18.90	23.03
D	0.71	0.71	0.71	1.10	1.10	1.10	1.10
E	1.10	1.10	1.10	1.50	1.50	1.50	1.50
F	0.09	0.09	0.09	0.07	0.07	0.07	0.07
G	2.55	2.55	2.55	3.54	3.54	3.54	3.54
H	1.26	1.26	1.26	1.73	1.73	1.73	1.73
J	0.75	0.75	0.75	1.10	1.10	1.10	1.10
K	0.35	0.35	0.35	0.55	0.55	0.55	0.55
L	1.97	1.97	1.97	1.73	1.73	1.73	1.73
M	0.39	0.39	0.39	1.10	1.10	1.10	1.10
N	3.15	3.15	3.15	3.15	3.15	3.15	3.15
O	1.67	1.67	1.67	2.26	2.26	2.26	2.26
P	3.35	3.35	3.35	4.52	4.52	4.52	4.52
R	3.78	3.78	3.78	4.52	4.52	4.52	4.52
weight	12.1 lbs.	13.2 lbs.	15.4 lbs.	37.4 lbs.	39.6 lbs.	44.0 lbs.	50.6 lbs.
volume tank	.08 Gal.	.10 Gal.	.16 Gal.	.18 Gal.	.23 Gal.	.31 Gal.	.42 Gal.

1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series HPF 60-450

4568 PSI

Description:

Pressure filter series HPF 60-450 have a working pressure up to 4568 PSI. Pressure peaks can be absorbed with a sufficient safety margin. The HPF-filters are flanged to the mounting-surface.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 5 $\mu\text{m(c)}$. Finer filtration is available upon request.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head.

After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

The reversing valve provides another level of protection for the filter element. The reverse flow will not be filtered.

1. Type index:

1.1. Complete filter: (ordering example)

HPF. 90. 10VG. HR. E. P. - . F. 4. - . - . AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

HPF = pressure filter, manifold mounted

2 nominal size: 60, 90, 150, 170, 240, 360, 450

3 filter-material and filter-fineness:

80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG glass fiber

4 filter element collapse rating:

30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601

8 process connection:

F = manifold mounted

9 process connection size:

4 = $\frac{3}{4}$ " (HPF 60-150)
5 = 1" (HPF 170-450)

10 filter housing specification: (see catalog)

- = standard
IS06 = for HFC applications, see sheet no.31605

11 internal valve:

- = without
S1 = with bypass valve Δp 51 PSI
S2 = with bypass valve Δp 102 PSI
R = reversing valve, $Q \leq 18.50$ GPM (HPF 60-150)
reversing valve, $Q \leq 55.75$ GPM (HPF 170-450)

12 clogging indicator or clogging sensor:

- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 90. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to company standard

2 nominal size: 60, 90, 150, 170, 240, 360, 450

3 - 7 see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	6525 PSI
process connection:	manifold mounted
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4)

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

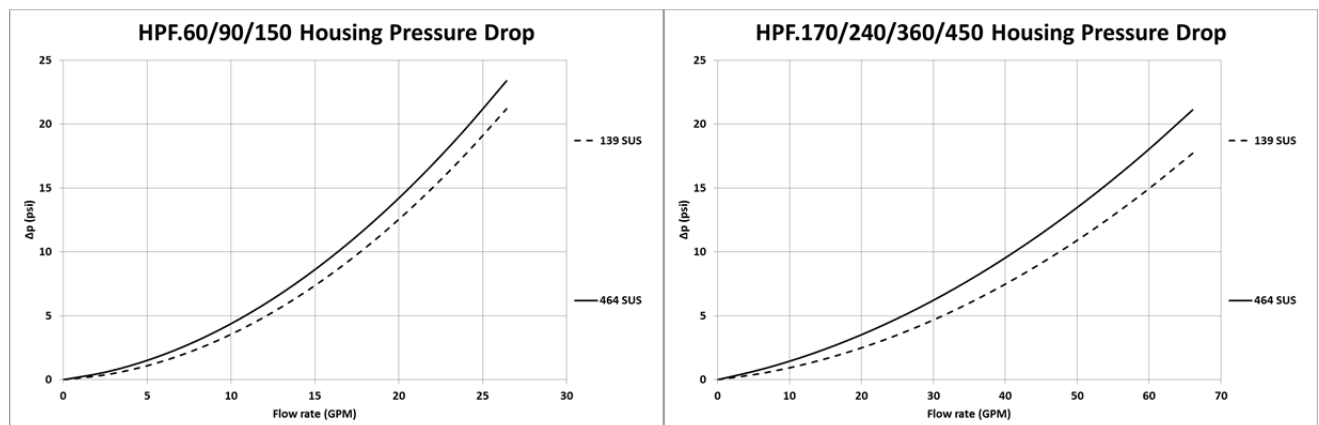
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

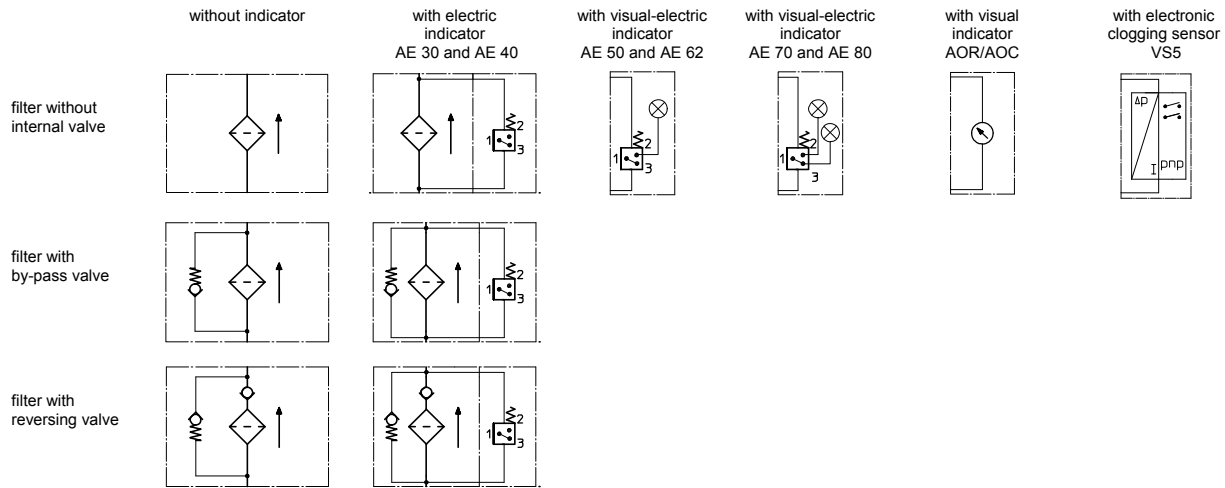
HPF	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
60	6.748	4.685	2.999	2.577	1.760	0.2002	0.1868	0.1280
90	4.059	2.818	1.804	1.550	1.059	0.1210	0.1130	0.0774
150	2.422	1.681	1.076	0.925	0.632	0.0723	0.0675	0.0462
170	2.714	1.884	1.206	1.036	0.708	0.0839	0.0783	0.0537
240	2.092	1.452	0.930	0.799	0.546	0.0651	0.0607	0.0416
360	1.530	1.062	0.680	0.584	0.399	0.0475	0.0444	0.0304
450	1.126	0.782	0.500	0.430	0.294	0.0349	0.0326	0.0223

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension and article-no.	
			HPF 60-150	HPF 170-450
1	1	filter element	01E.60... - 01E.150...	01E.170... - 01E.450...
2	1	O-Ring	22 x 3,5 304341 (NBR) 304392 (FPM)	34 x 3,5 304338 (NBR) 304730 (FPM)
3	1	O-Ring	54 x 3 304657 (NBR) 304720 (FPM)	75 x 3 302215 (NBR) 304729 (FPM)
4	1	support ring	61 x 2,6 x 1 304660	81 x 2,6 x 1 304581
5	2	O-Ring	22 x 3 304387 (NBR) 304931 (FPM)	33,3 x 2,4 304380 (NBR) 314706 (FPM)
6	1	clogging indicator, visual	AOR or AOC see sheet-no. 1606	
7	1	clogging indicator, visual-electric	AE see sheet-no. 1615	
8	1	clogging sensor, electronic	VS5 see sheet-no. 1619	
9	1	O-Ring	15 x 1,5 315357 (NBR) 315427 (FPM)	
10	1	O-Ring	22 x 2 304708 (NBR) 304721 (FPM)	
11	1	O-Ring	14 x 2 304342 (NBR) 304722 (FPM)	
12	1	srew plug	20913-4	309817

item 12 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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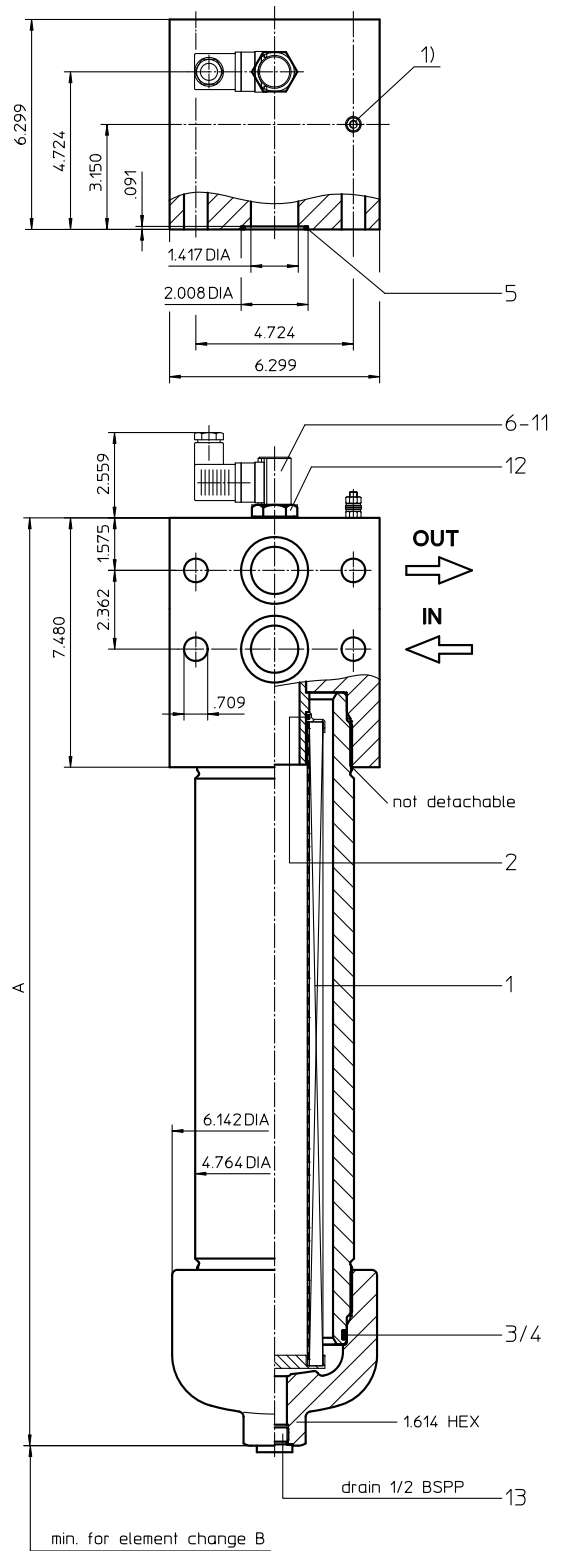
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Series HPF 601-1351 4568 PSI



Dimensions:

type	HPF 601	HPF 901	HPF 1351
connection	1 1/4"	1 1/4"	1 1/4"
A	21.93	27.83	37.60
B	12.20	18.11	27.95
weight	103 lbs.	119 lbs.	145 lbs.
volume tank	.55 Gal.	.82 Gal.	1.21 Gal.

1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series HPF 601-1351

4568 PSI

Description:

Pressure filter series HPF 601-1351 have a working pressure up to 4568 PSI. Pressure peaks can be absorbed with a sufficient safety margin. The HPF-filters are flanged to the mounting-surface.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 5 $\mu\text{m}_{(c)}$. Finer filtration is available upon request.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head.

After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

The reversing valve provides another level of protection for the filter element. The reverse flow will not be filtered.

1. Type index:

1.1. Complete filter: (ordering example)

HPF. 901. 10VG. HR. E. P. -. F. 6. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

HPF = pressure filter, manifold mounted

2 nominal size: 601, 901, 1351

3 filter-material and filter-fineness:

80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG glass fiber

4 filter element collapse rating:

30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601

8 process connection:

F = manifold mounted

9 process connection size:

6 = 1 1/4"

10 filter housing specification: (see catalog)

- = standard
IS06 = for HFC applications, see sheet no.31605

11 internal valve:

- = without
S1 = with bypass valve Δp 51 PSI
S2 = with bypass valve Δp 102 PSI
R = reversing valve, $Q \leq 122.94$ GPM

12 clogging indicator or clogging sensor:

- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 900. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to company standard

2 nominal size: 600, 900, 1350

3 - 7 see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	6525 PSI
process connection:	manifold mounted
housing material:	C-steel, EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4)

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

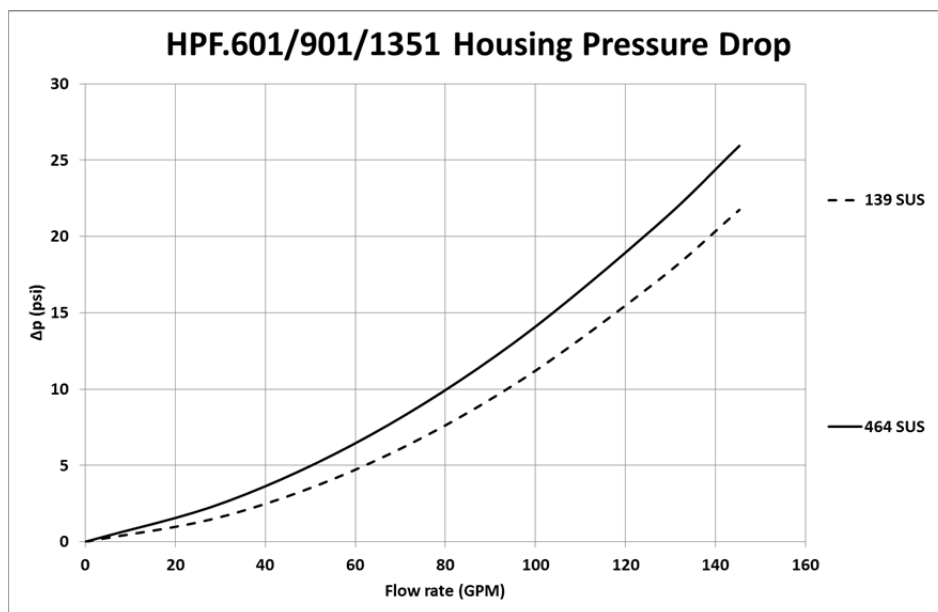
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

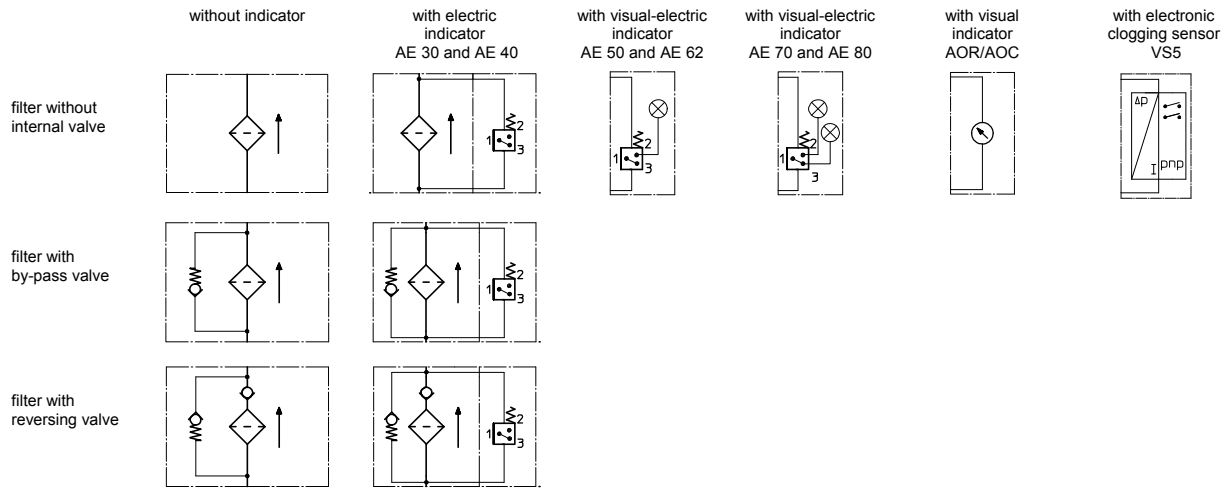
HPF	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
601	0.963	0.669	0.428	0.368	0.251	0.0303	0.0282	0.0193
901	0.668	0.464	0.297	0.225	0.174	0.0189	0.0177	0.0121
1351	0.417	0.290	0.185	0.185	0.109	0.0122	0.0114	0.0078

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension			article-no.	
			HPF 601	HPF 901	HPF 1351		
1	1	filter element	01E.600...	01E.900...	01E.1350...		
2	1	O-ring		48 x 3		304357 (NBR)	304404 (FPM)
3	1	O-ring		98 x 4		301914 (NBR)	304765 (FPM)
4	1	support ring		110 x 3,5 x 2		304802	
5	2	O-ring		45 x 3		304991 (NBR)	304997 (FPM)
6	1	clogging indicator, visual		AOR or AOC		see sheet-no. 1606	
7	1	clogging indicator, visual-electric		AE		see sheet-no. 1615	
8	1	clogging sensor, electronic		VS5		see sheet-no. 1619	
9	1	O-ring		15 x 1,5		315357 (NBR)	315427 (FPM)
10	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
11	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
12	1	screw plug		20913-4		309817	
13	1	screw plug		½ BSPP		304678	

item 12 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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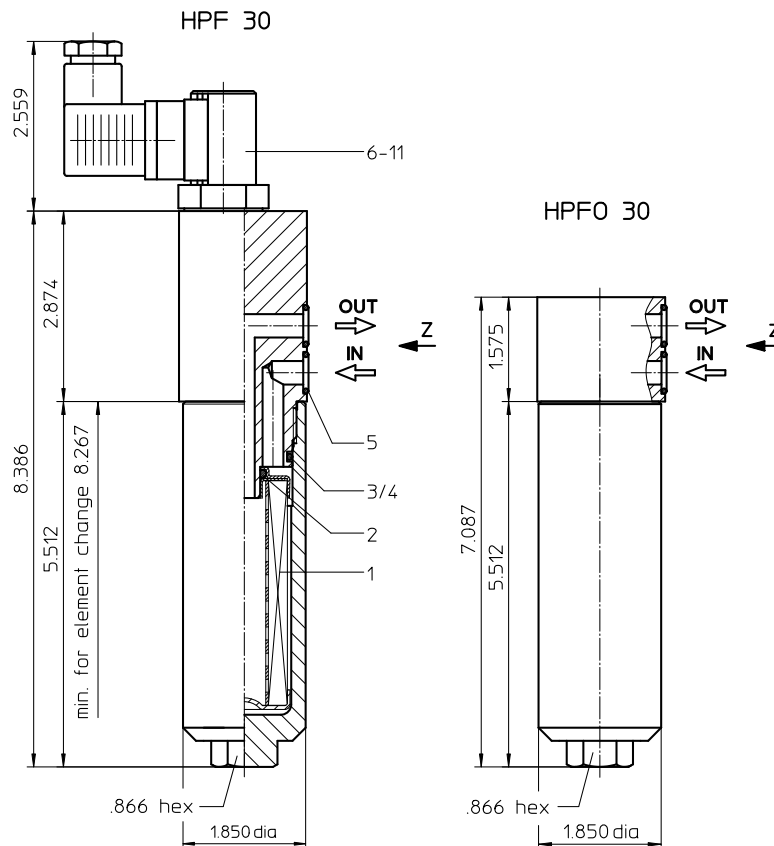
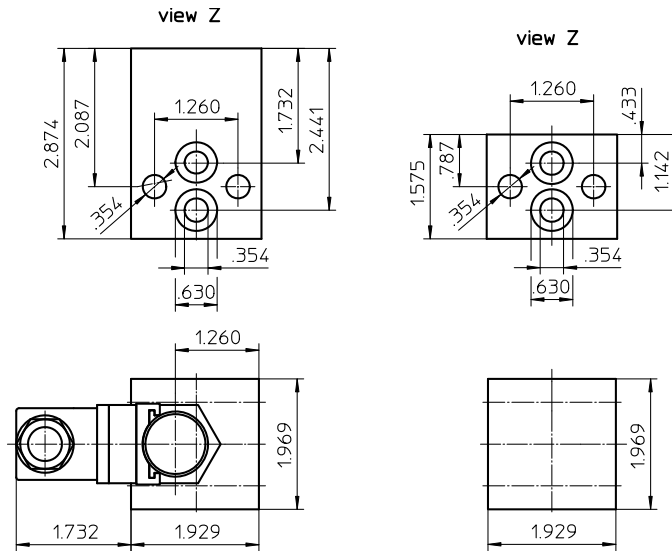
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Series HPF/HPFO 30 4568 PSI



Weight without indicator: approx. 3.96 lbs.
Weight with indicator: approx. 5.29 lbs

Dimensions: inches

Designs and performance values are subject to change.

Pressure Filter

Series HPF/HPFO 30

4568 PSI

Description:

Pressure filter series HPF 30 and HPFO 30, have a working pressure up to 4568 PSI. Pressure peaks can be absorbed with a sufficient safety margin. The filters are flange mounted to the hydraulic system.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 5 $\mu\text{m}_{(c)}$. Finer filtration is available upon request.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

1. Type index:

1.1. Complete filter: (ordering example)

HPF. 30. 10VG. HR. E. P. -. F. 2. -. AE

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

1 series:

HPF = medium pressure filter, manifold mounted with indicator
 HPFO = medium pressure filter, manifold mounted without indicator

2 nominal size: 30

3 filter-material and filter-fineness:

80G, 40G, 25G, 10G stainless steel wire mesh
 25VG, 16VG, 10VG, 6VG, 3VG microglass

4 filter element collapse rating:

30 = Δp 435 PSI
 HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)
 V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard
 VA = stainless steel
 IS06 = for HFC application, see sheet-no. 31601

8 process connection:

F = manifold mounted

9 process connection size:

2 = 3/8"

10 filter housing specification: (see catalog)

- = standard
 IS06 = for HFC applications, see sheet-no. 31605

11 clogging indicator or clogging sensor:

series HPFO:
 - = without
 series HPF:
 AOR = visual, see sheet-no. 1606
 AOC = visual, see sheet-no. 1606
 AE = visual-electric, see sheet-no. 1615
 VS5 = electronic, see sheet-no. 1619

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 30. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to company standard

2 nominal size: 30

3 - 7 see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	6532 PSI
process connection:	manifold mounted
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	.02 Gal

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

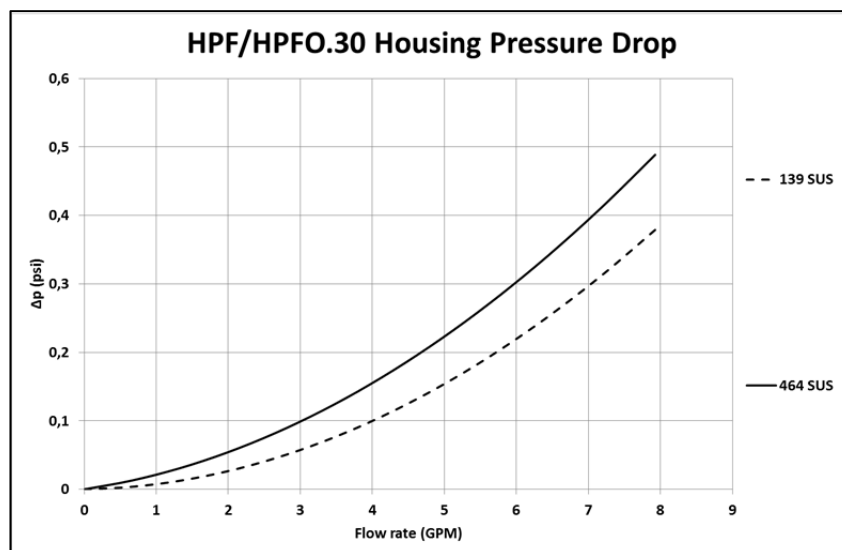
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

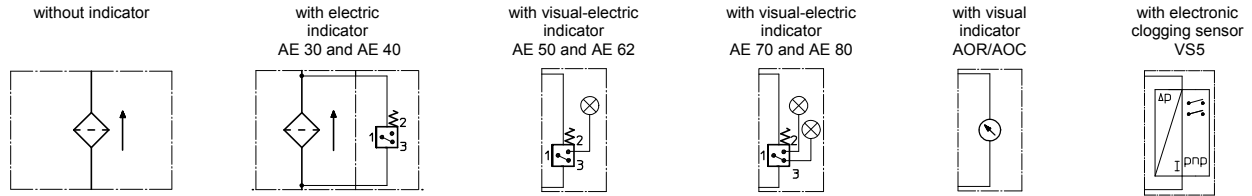
HPF/HPFO	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
30	12.554	8.716	5.580	4.794	3.275	0.2539	0.2369	0.1623

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01E.30...		
2	1	O-ring	11 x 3	312603 (NBR)	312727 (FPM)
3	1	O-ring	32 x 2,5	306843 (NBR)	308268 (FPM)
4	1	support ring	37 x 2,1 x 1	305466	
5	2	O-ring	12 x 2	311014 (NBR)	310271 (FPM)
6	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
7	1	clogging indicator, visual-electric	AE	see sheet-no. 1615	
8	1	clogging sensor, electronic	VS5	see sheet-no. 1619	
9	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
10	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
11	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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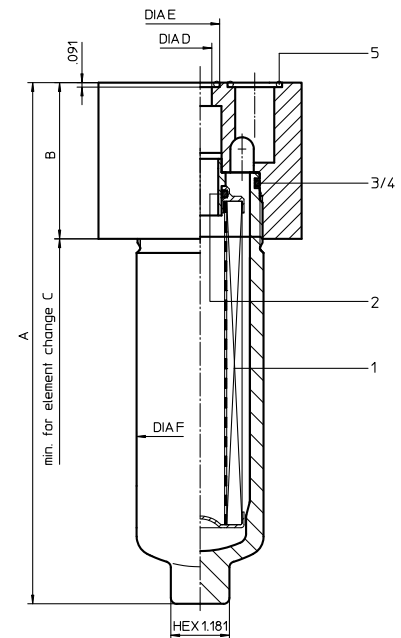
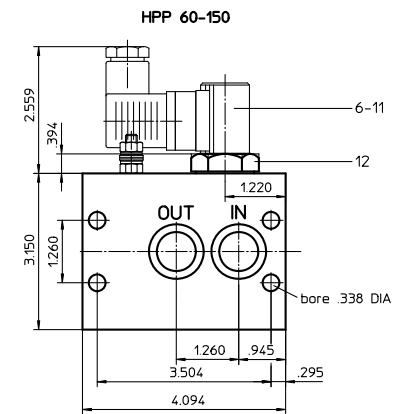
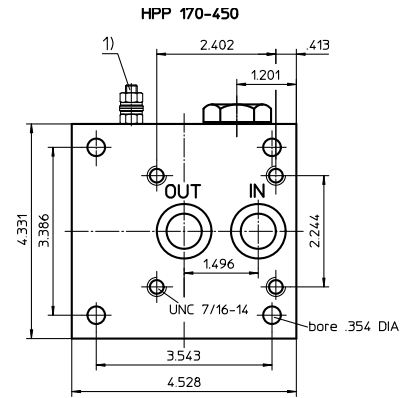
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Series HPP 60-450

4568 PSI



Dimensions:

type	HPP 60	HPP 90	HPP 150	HPP 170	HPP 240	HPP 360	HPP 450
connection	3/4"			1"			
A	7.95	10.51	14.80	11.22	13.18	16.33	20.55
B	3.15	3.15	3.15	3.74	3.74	3.74	3.74
C	10.63	13.19	17.52	13.78	15.75	18.90	23.03
D	.79	.79	.79	.87	.87	.87	.87
E	1.10	1.10	1.10	1.18	1.18	1.18	1.18
F	2.56	2.56	2.56	3.54	3.54	3.54	3.54
weight	11 lbs.	12 lbs.	14 lbs.	33 lbs.	35 lbs.	39 lbs.	44 lbs.
volume tank	.08 Gal.	.10 Gal.	.16 Gal.	.18 Gal.	.23 Gal.	.31 Gal.	.42 Gal.

1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series HPP 60-450

4568 PSI

Description:

Pressure filter series HPP 60-450 have a working pressure up to 4568 PSI. Pressure peaks can be absorbed with a sufficient safety margin. The HPF-filters are flanged to the mounting-surface.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 5 $\mu\text{m(c)}$. Finer filtration is available upon request.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head.

After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

The reversing valve provides another level of protection for the filter element. The reverse flow will not be filtered.

1. Type index:

1.1. Complete filter: (ordering example)

HPP. 90. 10VG. HR. E. P. - . P. 4. - . - . AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

HPP = pressure filter, manifold mounted

2 nominal size: 60, 90, 150, 170, 240, 360, 450

3 filter-material and filter-fineness:

80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass

4 filter element collapse rating:

30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601

8 process connection:

P = manifold mounted

9 process connection size:

4 = $\frac{3}{4}$ " (HPP 60-150)
5 = 1" (HPP 170-450)

10 filter housing specification: (see catalog)

- = standard
IS06 = for HFC applications, see sheet no.31605

11 internal valve:

- = without
S1 = with bypass valve Δp 51 PSI
S2 = with bypass valve Δp 102 PSI
R = reversing valve, $Q \leq 18.50$ GPM (HPP 60-150)
reversing valve, $Q \leq 55.75$ GPM (HPP 170-450)

12 clogging indicator or clogging sensor:

- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 90. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to company standard

2 nominal size: 60, 90, 150, 170, 240, 360, 450

3 - 7 see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	6525 PSI
process connection:	manifold mounted
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

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 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4)

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) - \text{characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

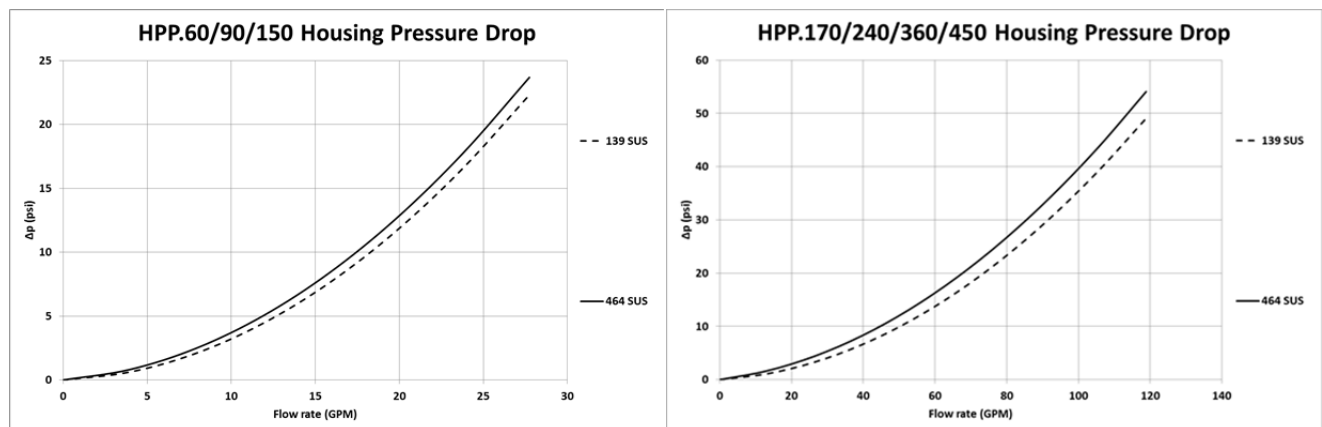
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

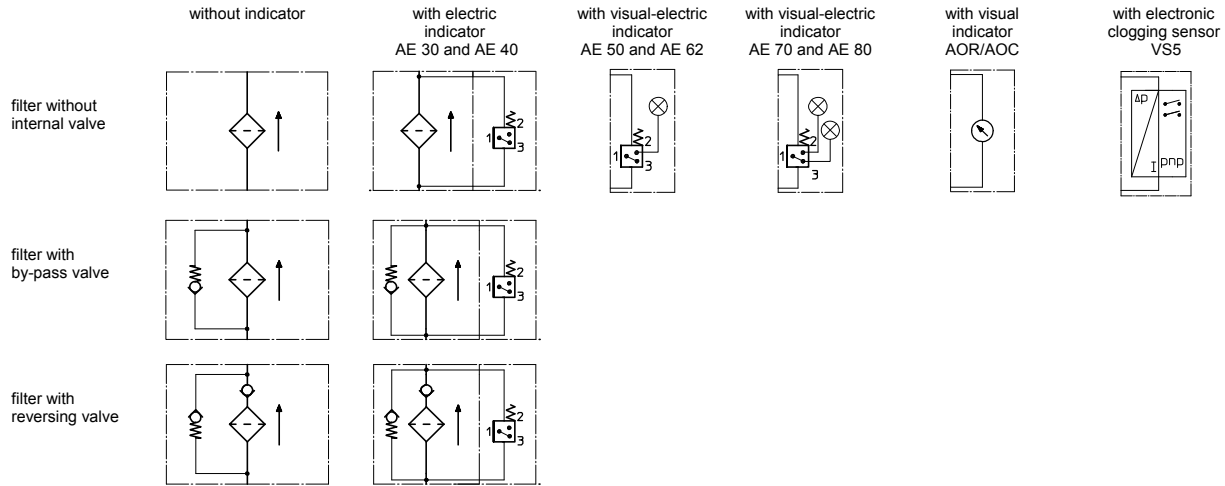
HPP	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
60	6.748	4.685	2.999	2.577	1.760	0.2002	0.1868	0.1280
90	4.059	2.818	1.804	1.550	1.059	0.1210	0.1130	0.0774
150	2.422	1.681	1.076	0.925	0.632	0.0723	0.0675	0.0462
170	2.714	1.884	1.206	1.036	0.708	0.0839	0.0783	0.0537
240	2.092	1.452	0.930	0.799	0.546	0.0651	0.0607	0.0416
360	1.530	1.062	0.680	0.584	0.399	0.0475	0.0444	0.0304
450	1.126	0.782	0.500	0.430	0.294	0.0349	0.0326	0.0223

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension and article-no.	
			HPP 60-150	HPF 170-450
1	1	filter element	01E.60... - 01E.150...	01E.170... - 01E.450...
2	1	O-Ring	22 x 3,5 304341 (NBR) 304392 (FPM)	34 x 3,5 304338 (NBR) 304730 (FPM)
3	1	O-Ring	54 x 3 304657 (NBR) 304720 (FPM)	75 x 3 302215 (NBR) 304729 (FPM)
4	1	support ring	61 x 2,6 x 1 304660	81 x 2,6 x 1 304581
5	2	O-Ring	22 x 3 304387 (NBR) 304931 (FPM)	33,3 x 2,4 304380 (NBR) 314706 (FPM)
6	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606
7	1	clogging indicator, visual-electric	AE	see sheet-no. 1615
8	1	clogging sensor, electronic	VS5	see sheet-no. 1619
9	1	O-Ring	15 x 1,5 315357 (NBR) 315427 (FPM)	
10	1	O-Ring	22 x 2 304708 (NBR) 304721 (FPM)	
11	1	O-Ring	14 x 2 304342 (NBR) 304722 (FPM)	
12	1	screw plug	20913-4	309817

item 12 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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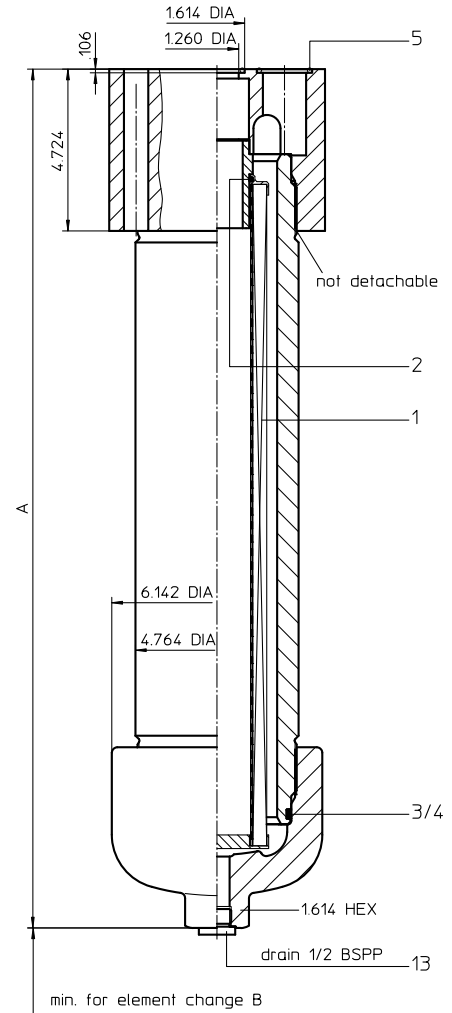
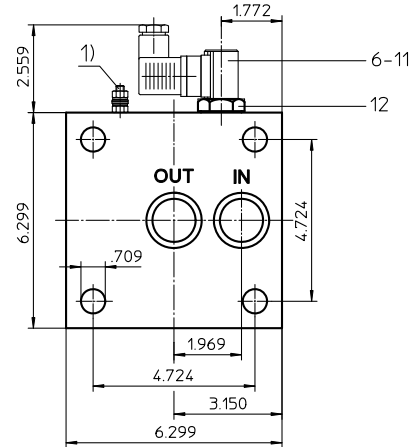
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Series HPP 601-1351

4568 PSI



Dimensions:

type	HPP 601	HPP 901	HPP 1351
connection	1 1/4"	1 1/4"	1 1/4"
A	19.17	25.07	34.84
B	12.20	18.11	27.95
weight	86 lbs.	101 lbs.	128 lbs.
volume tank	.55 Gal.	.82 Gal.	1.21 Gal.

1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series HPP 601-1351

4568 PSI

Description:

Pressure filter series HPP 601-1351 have a working pressure up to 4568 PSI. Pressure peaks can be absorbed with a sufficient safety margin. The HPP-filters are flanged to the mounting-surface.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 5 $\mu\text{m}_{(c)}$. Finer filtration is available upon request.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head.

After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

The reversing valve provides another level of protection for the filter element. The reverse flow will not be filtered.

1. Type index:

1.1. Complete filter: (ordering example)

HPP.901.10VG.HR.E.P.-P.6.-.-.AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 series:**
HPP = pressure filter, manifold mounted
- 2 nominal size:** 601, 901, 1351
- 3 filter-material and filter-fineness:**
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
- 4 filter element collapse rating:**
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)
- 5 filter element design:**
E = single-end open
- 6 sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601
- 8 process connection:**
P = manifold mounted
- 9 process connection size:**
6 = 1 1/4"
- 10 filter housing specification:** (see catalog)
- = standard
IS06 = for HFC applications, see sheet no.31605
- 11 internal valve:**
- = without
S1 = with bypass valve Δp 51 PSI
S2 = with bypass valve Δp 102 PSI
R = reversing valve, $Q \leq 122.94$ GPM
- 12 clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E.900.10VG.HR.E.P.-

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 series:**
01E. = filter element according to company standard
- 2 nominal size:** 600, 900, 1350
- 3 - 7** | see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	6525 PSI
process connection:	manifold mounted
housing material:	C-steel, EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4)

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) - \text{characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

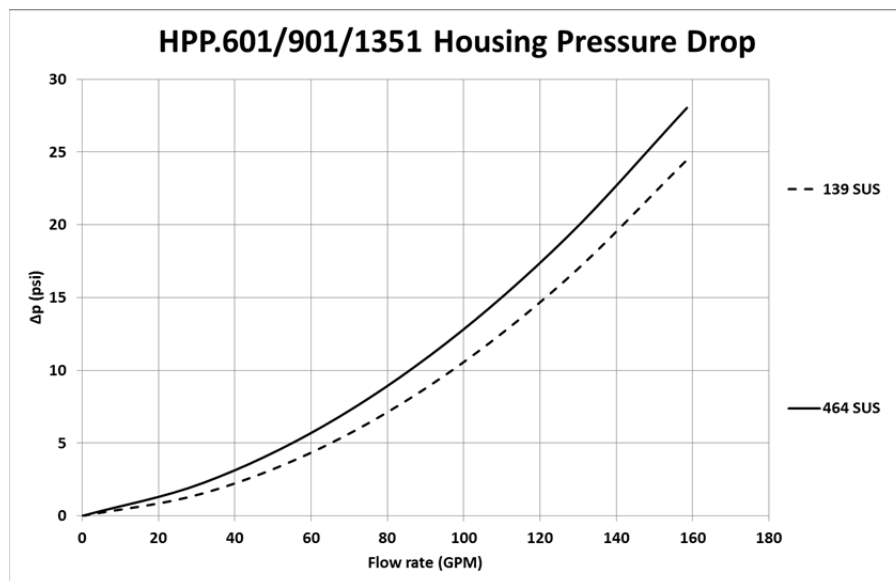
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

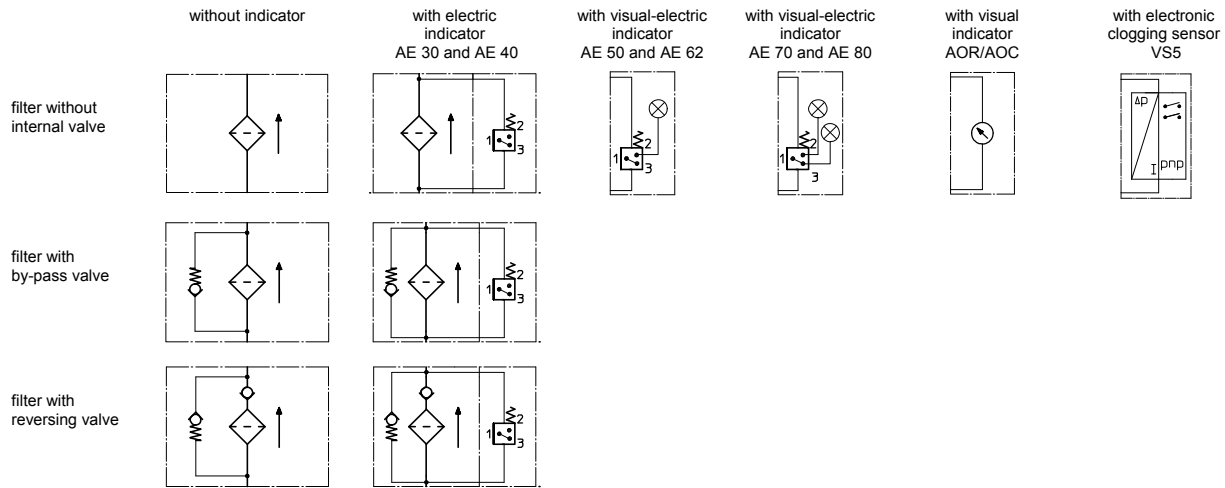
HPP	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
601	0.963	0.669	0.428	0.368	0.251	0.0303	0.0282	0.0193
901	0.668	0.464	0.297	0.225	0.174	0.0189	0.0177	0.0121
1351	0.417	0.290	0.185	0.185	0.109	0.0122	0.0114	0.0078

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension			article-no.	
			HPP 601	HPP 901	HPP 1351		
1	1	filter element	01E.600...	01E.900...	01E.1350...		
2	1	O-ring		48 x 3		304357 (NBR)	304404 (FPM)
3	1	O-ring		98 x 4		301914 (NBR)	304765 (FPM)
4	1	support ring		110 x 3,5 x 2		304802	
5	2	O-ring		34 x 3,5		304338 (NBR)	304730 (FPM)
6	1	clogging indicator, visual		AOR or AOC		see sheet-no. 1606	
7	1	clogging indicator, visual-electric		AE		see sheet-no. 1615	
8	1	clogging sensor, electronic		VS5		see sheet-no. 1619	
9	1	O-ring		15 x 1,5		315357 (NBR)	315427 (FPM)
10	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
11	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
12	1	screw plug		20913-4		309817	
13	1	screw plug		½ BSPP		304678	

item 12 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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Pressure Filter

Series HPU 601-1351

4568 PSI

Description:

Pressure filter series HPU 601-1351 have a working pressure up to 4568 PSI. Pressure peaks can be absorbed with a sufficient safety margin. The HPU-filters are flange mounted to the hydraulic system.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head. After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

The reversing valve provides another level of protection for the filter element. The reverse flow will not be filtered.

1. Type index:

1.1. Complete filter: (ordering example)

HPU. 901. 10VG. HR. E. P. - P. 6. - - AE. -

1	2	3	4	5	6	7	8	9	10	11	12	13
---	---	---	---	---	---	---	---	---	----	----	----	----

- 1 series:**
HPU = pressure filter, manifold mounted
- 2 nominal size:** 601, 901, 1351
- 3 filter-material and filter-fineness:**
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
- 4 filter element collapse rating:**
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)
- 5 filter element design:**
E = single-end open
- 6 sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601
- 8 process connection:**
P = manifold mounted
- 9 process connection size:**
6 = 1 1/4"
- 10 filter housing specification:** (see catalog)
- = standard
IS06 = for HFC applications, see sheet-no. 31605
- 11 internal valve:**
- = without
S1 = with bypass valve Δp 51 PSI
S2 = with bypass valve Δp 102 PSI
R = reversing valve, $Q \leq 122.94$ GPM
- 12 clogging indicator or clogging sensor at M1:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619
- 13 clogging indicator or clogging sensor at M1:**
possible indicators see position 12 of the type index

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 900. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 series:**
01E. = filter element according to company standard
- 2 nominal size:** 600, 900, 1350
- 3 - 7** see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	6532 PSI
process connection:	manifold mounted
housing material:	EN-GJS-400-18-LT, C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

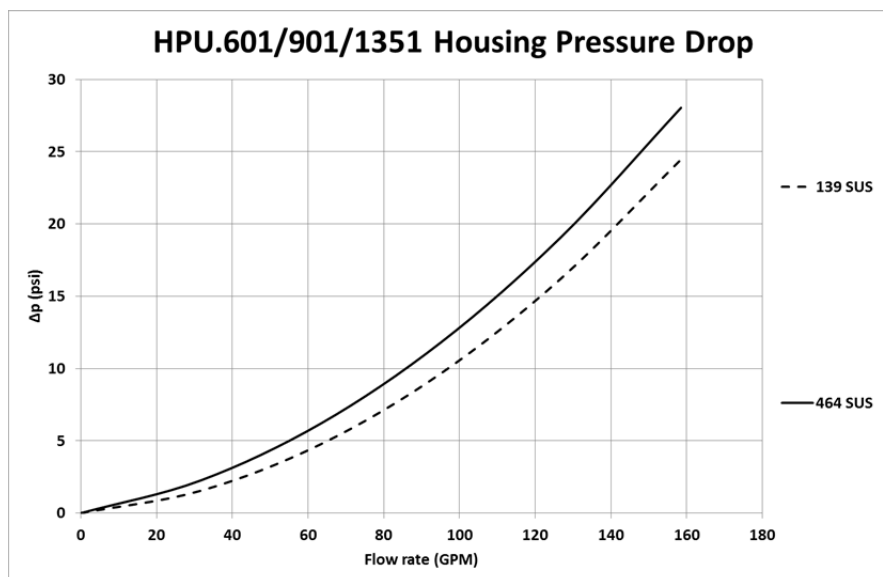
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

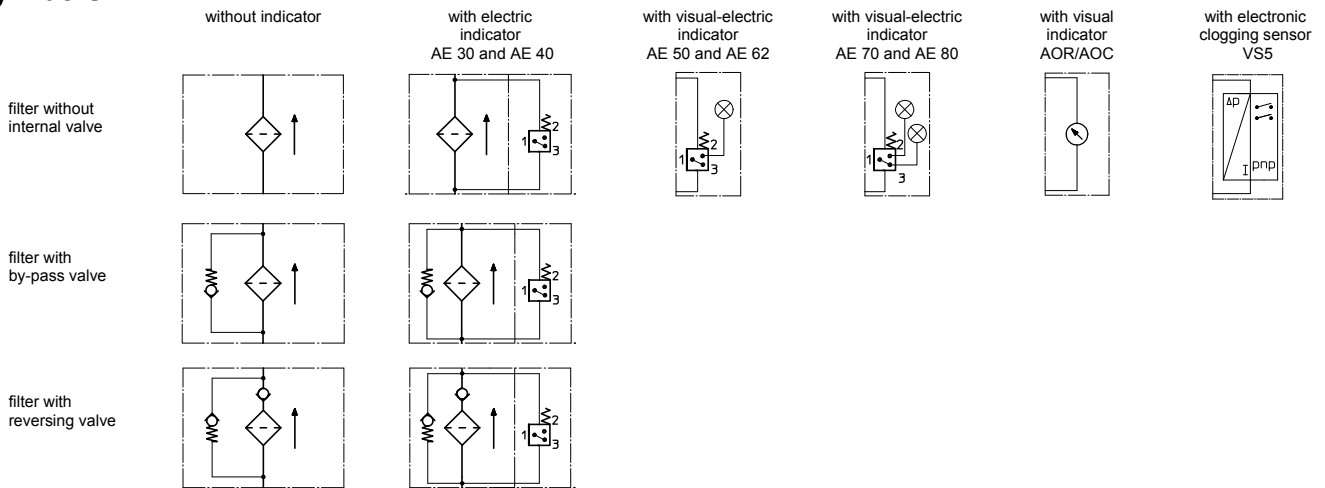
HPU	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
601	0.963	0.669	0.428	0.368	0.251	0.0303	0.0282	0.0193
901	0.668	0.464	0.297	0.225	0.174	0.0189	0.0177	0.0121
1351	0.417	0.290	0.185	0.185	0.109	0.0122	0.0114	0.0078

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension			article-no.	
			HPU 601	HPU 901	HPU 1351		
1	1	filter element	01E.600...	01E.900...	01E.1350...		
2	1	O-ring		48 x 3		304357 (NBR)	304404 (FPM)
3	1	O-ring		98 x 4		301914 (NBR)	304765 (FPM)
4	1	support ring		110 x 3,5 x 2		304802	
5	2	O-ring		34 x 3,5		304338 (NBR)	304730 (FPM)
6	1	clogging indicator, visual		AOR or AOC		see sheet no. 1606	
7	1	clogging indicator, visual-electric		AE		see sheet no. 1615	
8	1	clogging sensor, electronic		VS5		see sheet no. 1619	
9	1	O-ring		15 x 1,5		315357 (NBR)	315427 (FPM)
10	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
11	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
12	1	screw plug		20913-4		309817	
13	1	screw plug		½ BSPP		304678	

item 12 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

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ISO 2943	Verification of material compatibility with fluids
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ISO 3724	Verification of flow fatigue characteristics
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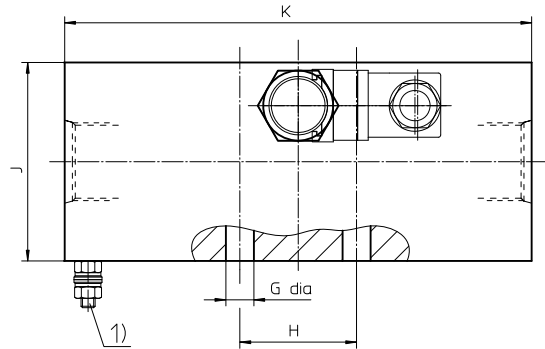
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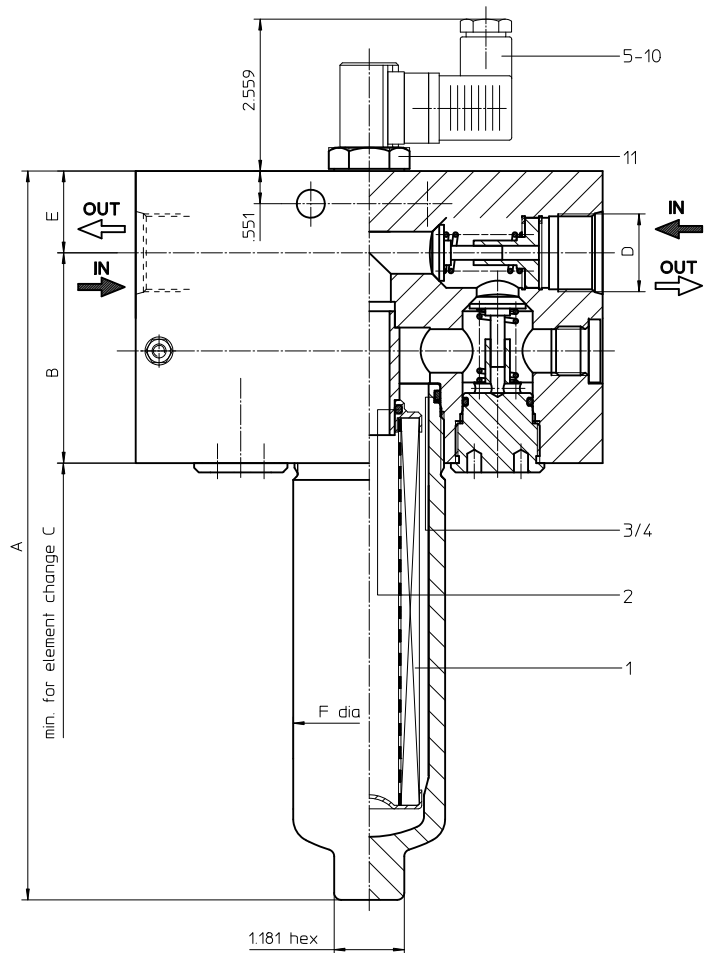
Series HPW 60-450 4568 PSI



Dimensions:

type	HPW 60	HPW 90	HPW 150
A	9.72	12.28	16.58
B	3.54	3.54	3.54
C	10.63	13.19	17.52
D	-16 SAE	-16 SAE	-16 SAE
E	1.38	1.38	1.38
F	2.56	2.56	2.56
G	.48	.48	.48
H	1.97	1.97	1.97
J	3.35	3.35	3.35
K	7.87	7.87	7.87
weight	35.2 lbs.	36.3 lbs.	37.4 lbs.
volume tank	.08 Gal.	.10 Gal.	.16 Gal.

type	HPW 170	HPW 240	HPW 360	HPW 450
A	13.78	15.75	18.90	23.03
B	4.72	4.72	4.72	4.72
C	13.80	15.75	18.90	13.03
D	-24 SAE	-24 SAE	-24 SAE	-24 SAE
E	1.58	1.58	1.58	1.58
F	3.55	3.55	3.55	3.55
G	.55	.55	.55	.55
H	2.36	2.36	2.36	2.36
J	4.53	4.53	4.53	4.53
K	10.63	10.63	10.63	10.63
weight	85.8 lbs.	88.0 lbs.	92.4 lbs.	96.8 lbs.
volume tank	.18 Gal.	.23 Gal.	.31 Gal.	.42 Gal.



1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series HPW 60-450

4568 PSI

Description:

Pressure filter series HPW 60-450 are used in systems where the fluid requires bidirectional flow through the same filter. A series of four internal check valves ensure that the system fluid is directed to the outside of the element, regardless of flow direction.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head. After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

1. Type index:

1.1. Complete filter: (ordering example)

HPW. 170. 10VG. HR. E. P. - UG. 7. - - AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

HPW = pressure filter for reversible filtration

2 nominal size: 60, 90, 150, 170, 240, 360, 450

3 filter-material and filter-fineness:

80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass

4 filter element collapse rating:

30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification:

- = standard
VA = stainless steel

8 process connection:

UG = thread connection

9 process connection size:

5 = -16 SAE HPW 60-150
7 = -24 SAE HPW 170-450

10 filter housing specification:

- = standard

11 internal valve:

- = without
S1 = with bypass valve Δp 51 PSI
S2 = with bypass valve Δp 102 PSI

12 clogging indicator or clogging sensor:

- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 170. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to company standard

2 nominal size: 60, 90, 150, 170, 240, 360, 450

3 - 7 see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	6532 PSI
process connection:	thread connection
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

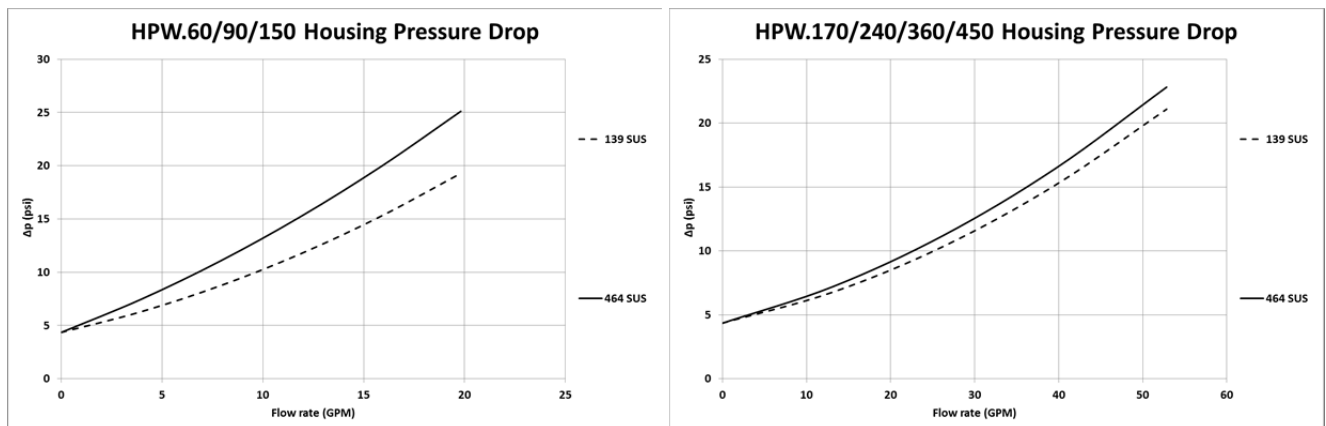
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

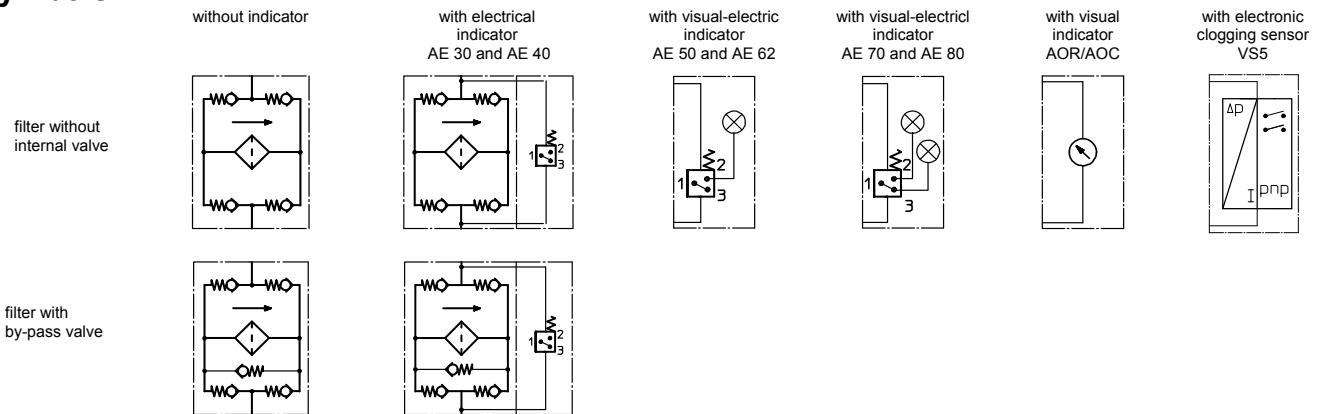
HPW	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
60	6.748	4.685	2.999	2.577	1.760	0.2002	0.1868	0.1280
90	4.059	2.818	1.804	1.550	1.059	0.1210	0.1130	0.0774
150	2.422	1.681	1.076	0.925	0.632	0.0723	0.0675	0.0462
170	2.714	1.884	1.206	1.036	0.708	0.0839	0.0783	0.0537
240	2.092	1.452	0.930	0.799	0.546	0.0651	0.0607	0.0416
360	1.530	1.062	0.680	0.584	0.399	0.0475	0.0444	0.0304
450	1.126	0.782	0.500	0.430	0.294	0.0349	0.0326	0.0223

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension and article-no.						
			HPW 60	HPW 90	HPW 150	HPW 170	HPW 240	HPW 360	HPW 450
1	1	filter element	01E.60...	01E.90...	01E.150...	01E.170...	01E.240...	01E.360...	01E.450...
2	1	O-ring	22 x 3,5		304341 (NBR) 304392 (FPM)	34 x 3,5		304338 (NBR) 304730 (FPM)	
3	1	O-ring	54 x 3		304657 (NBR) 304720 (FPM)	75 x 3		302215 (NBR) 304729 (FPM)	
4	1	support ring	61 x 2,6 x 1		304660	81 x 2,6 x 1		304581	
5	1	clogging indicator visual	AOR or AOC			see sheet-no. 1606			
6	1	clogging indicator visual-electrical	AE			see sheet-no. 1615			
7	1	clogging sensor electrical	VS5			see sheet-no. 1619			
/8	1	O-ring	15 x 1,5		315357 (NBR) 315427 (FPM)				
9	1	O-ring	22 x 2		304708 (NBR) 304721 (FPM)				
10	1	O-ring	14 x 2		304342 (NBR) 304722 (FPM)				
11	1	screw plug	20913-4		309817				

item 11 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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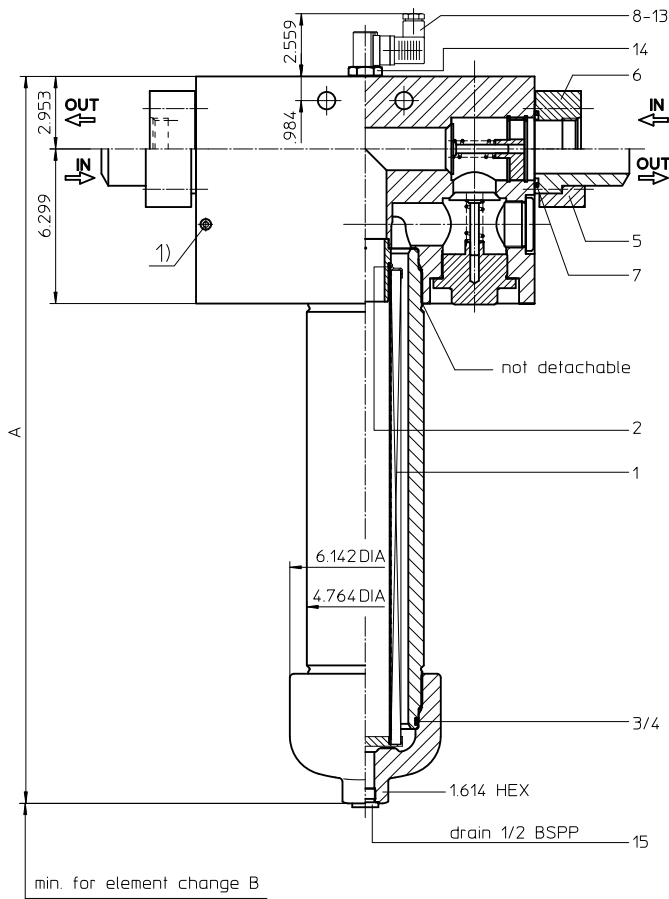
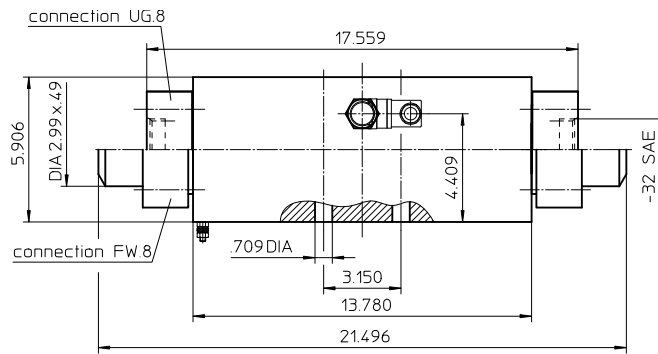
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Series HPW 601-1351

4568 PSI



Dimensions:

type	HPW 601	HPW 901	HPW 1351
connection		2"	
A	23.70	29.60	39.37
B	12.20	18.11	27.95
weight	253	268 lbs.	295 lbs.
volume tank	.55 Gal.	.82 Gal.	1.21 Gal.

1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions: inches

Designs and performance values are subject to change.

Pressure Filter

Series HPW 601-1351

4568 PSI

Description:

Pressure filter series HPW 601-1351 are used in systems where the fluid requires bidirectional flow through the same filter. A series of four internal check valves ensure that the system fluid is directed to the outside of the element, regardless of flow direction.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head. After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

1. Type index:

1.1. Complete filter: (ordering example)

HPW. 901. 10VG. HR. E. P. - FW. 8. - - AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- | | |
|----|--|
| 1 | series:
HPW = pressure filter for reversible filtration |
| 2 | nominal size: 601, 901, 1351 |
| 3 | filter-material and filter-fineness:
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass |
| 4 | filter element collapse rating:
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI) |
| 5 | filter element design:
E = single-end open |
| 6 | sealing material:
P = Nitrile (NBR)
V = Viton (FPM) |
| 7 | filter element specification:
- = standard
VA = stainless steel |
| 8 | process connection:
FW = flange connection factory specification
UG = thread connection |
| 9 | process connection size:
8 = 2" |
| 10 | filter housing specification:
- = standard |
| 11 | internal valve:
- = without
S1 = with bypass valve Δp 51 PSI
S2 = with bypass valve Δp 102 PSI |
| 12 | clogging indicator or clogging sensor:
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619 |

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 900. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- | | |
|---|---|
| 1 | series:
01E. = filter element according to company standard |
| 2 | nominal size: 600, 900, 1350 |
| 3 | - 7 \| see type index-complete filter |

Accessories:

- counter flange, see sheet-no. 1654

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	6532 PSI
process connection:	flange connection factory specification or thread connection
housing material:	C-steel , EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

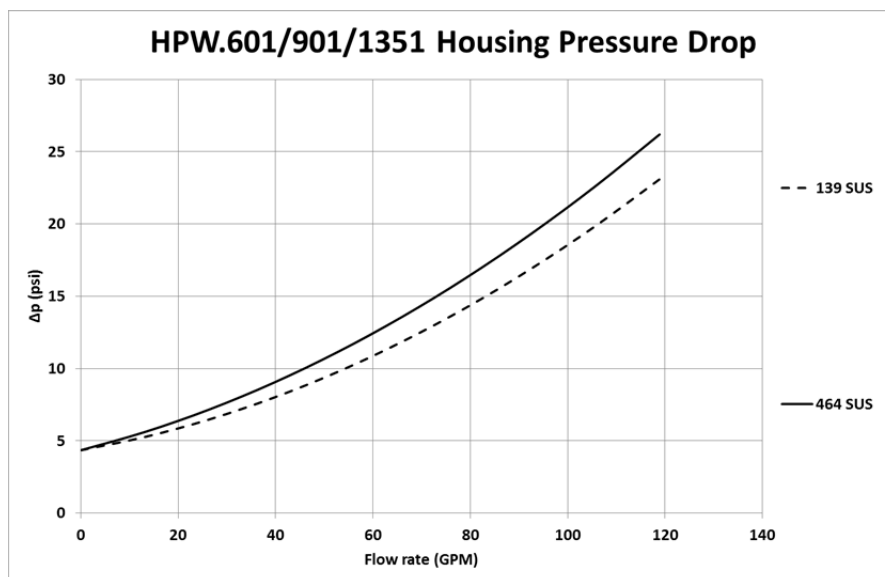
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

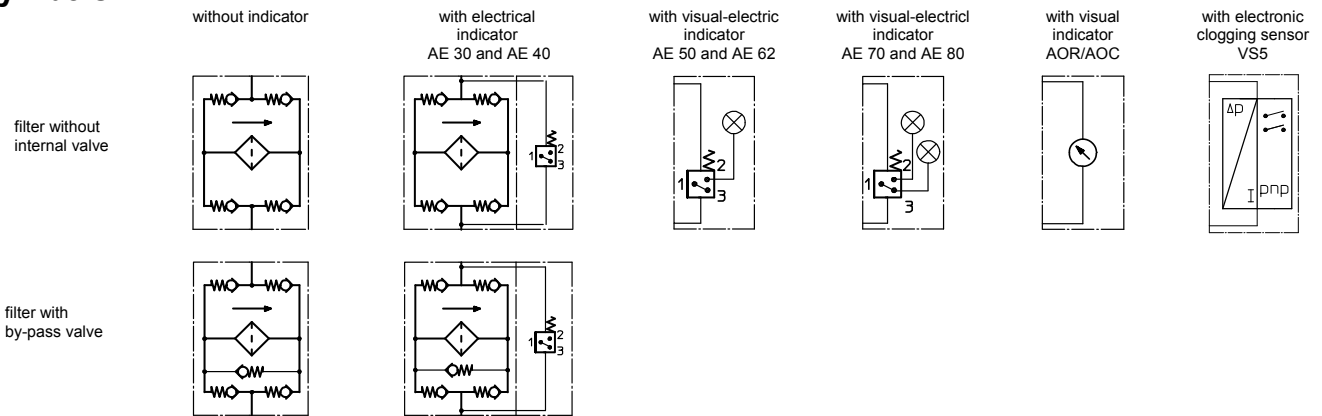
HPW	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
601	0.963	0.669	0.428	0.368	0.251	0.0303	0.0282	0.0193
901	0.668	0.464	0.297	0.225	0.174	0.0189	0.0177	0.0121
1351	0.417	0.290	0.185	0.185	0.109	0.0122	0.0114	0.0078

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension			article-no..	
			HPW 601 01E.600...	HPW 901 01E.900...	HPW 1351 01E.1350...		
1	1	filter element					
2	1	O-ring		48 x 3		304357 (NBR)	304404 (FPM)
3	1	O-ring		98 x 4		301914 (NBR)	304765 (FPM)
4	1	support ring		110 x 3,5 x 2		304802	
5	2	counter flange		FW 50-4-2.99 x .49		303717.1	
6	2	adapter		FW.8.UG.8		320556	
7	2	O-ring		68 x 5		304376 (NBR)	304394 (FPM)
8	1	clogging indicator visual		AOR or AOC		see sheet-no. 1606	
9	1	clogging indicator visual-electric		AE		see sheet-no. 1615	
10	1	clogging sensor electronic		VS5		see sheet-no. 1619	
11	1	O-ring		15 x 1,5		315357 (NBR)	315427 (FPM)
12	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
13	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
14	1	screw plug		20913-4		309817	
15	1	screw plug		½ BSPP		304678	

item 14 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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Pressure Filter

Series HPX 60-150

4568 PSI

Description:

Pressure filter series HPX 60-150 have a working pressure up to 4568 PSI. The HPX filters are manifold mounted.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head. After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

The reversing valve provides another level of protection for the filter element. The reverse flow will not be filtered.

1. Type index:

1.1. Complete filter: (ordering example)

HPX. 90. 10VG. HR. E. P. -, F. 4. -, -, AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

HPX = pressure filter

2 nominal size: 60, 90, 150

3 filter-material and filter-fineness:

80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass

4 filter element collapse rating:

30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601

8 process connection:

F = manifold mounted

9 process connection size:

4 = $\frac{3}{4}$ "

10 filter housing specification: (see catalog)

- = standard
IS06 = for HFC applications, see sheet no.31605

11 internal valve:

- = without
S1 = with bypass valve Δp 51 PSI
S2 = with bypass valve Δp 102 PSI
R = reversing valve, $Q \leq 18.50$ GPM

12 clogging indicator or clogging sensor:

- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 90. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to company standard

2 nominal size: 60, 90, 150

3 - 7 see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	6532 PSI
process connection:	manifold mounted
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4)

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

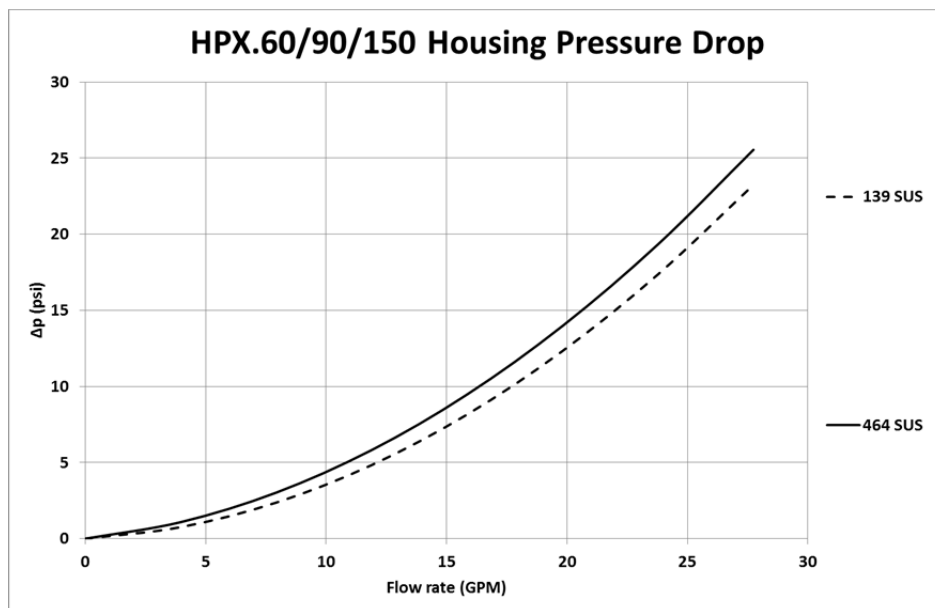
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

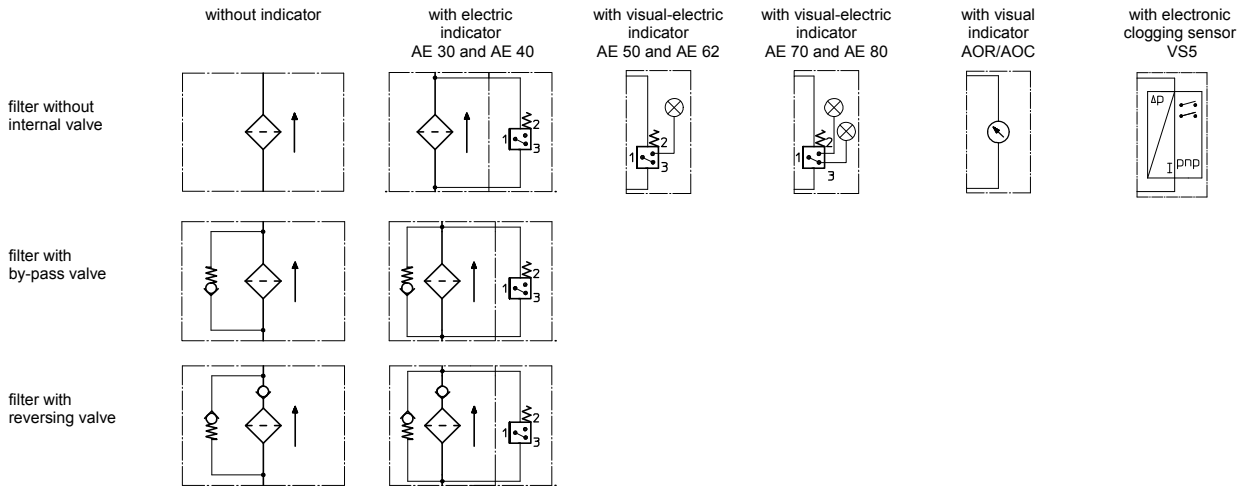
HPX	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
60	6.748	4.685	2.999	2.577	1.760	0.2002	0.1868	0.1280
90	4.059	2.818	1.804	1.550	1.059	0.1210	0.1130	0.0774
150	2.422	1.681	1.076	0.925	0.632	0.0723	0.0675	0.0462

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension			article-no.	
			HPX 60 01E.60...	HPX 90 01E.90...	HPX 150 01E.150...		
1	1	filter element					
2	1	O-ring		22 x 3,5		304341 (NBR)	304392 (FPM)
3	1	O-ring		54 x 3		304657 (NBR)	304720 (FPM)
4	1	support ring		61 x 2,6 x 1		304660	
5	2	O-ring		24 x 3		303038 (NBR)	304397 (FPM)
6	1	clogging indicator, visual		AOR or AOC		see sheet-no. 1606	
7	1	clogging indicator, visual-electric		AE		see sheet-no. 1615	
8	1	clogging sensor, electronic		VS5		see sheet-no. 1619	
9	1	O-ring		15 x 1,5		315357 (NBR)	315427 (FPM)
10	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
11	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
12	1	screw plug		20913-4		309817	

item 12 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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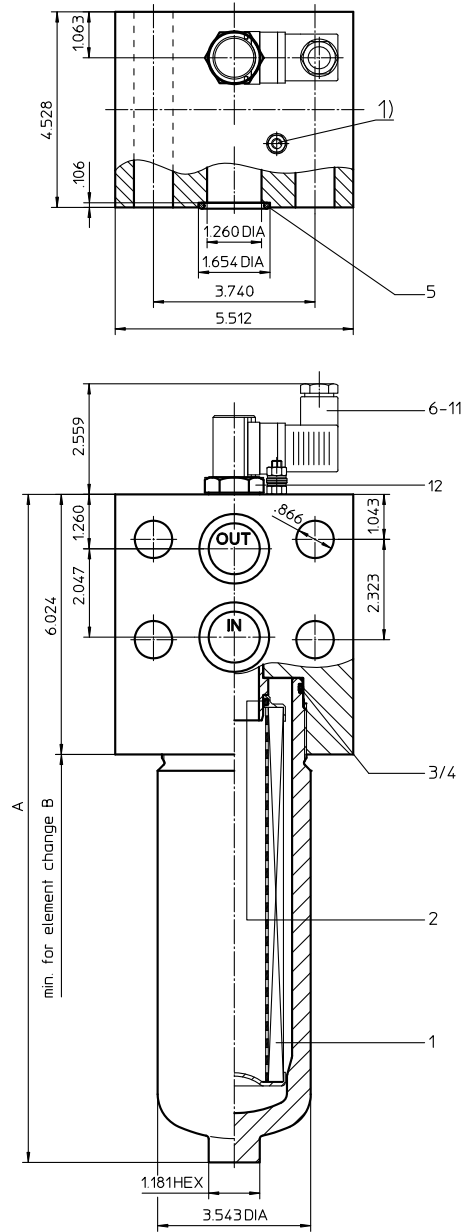
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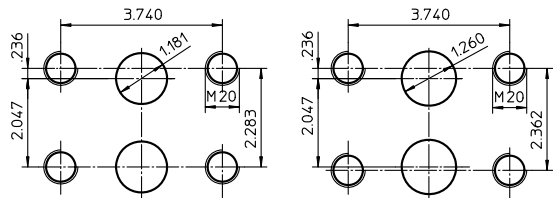
Series HPX 170-450 4568 PSI



Dimensions:

type	HPX 170	HPX 240	HPX 360	HPX 450
connection	1 1/4"			
A	13.50	15.47	18.62	22.83
B	13.78	15.75	18.89	23.03
weight approx.	46 lbs.	49 lbs.	53 lbs.	61 lbs.
volume tank	.18 Gal.	.23 Gal.	.31 Gal.	.42 Gal.

possible connection masses



- 1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series HPX 170-450

4568 PSI

Description:

Pressure filter series HPX 170-450 have a working pressure up to 4568 PSI. The HPX filters are manifold mounted.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head. After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

The reversing valve provides another level of protection for the filter element. The reverse flow will not be filtered.

1. Type index:

1.1. Complete filter: (ordering example)

HPX. 360. 10VG. HR. E. P. - . F. 6. - . - . AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 | **series:**
HPX = pressure filter
- 2 | **nominal size:** 170, 240, 360, 450
- 3 | **filter-material and filter-fineness:**
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
- 4 | **filter element collapse rating:**
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)
- 5 | **filter element design:**
E = single-end open
- 6 | **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 | **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601
- 8 | **process connection:**
F = manifold mounted
- 9 | **process connection size:**
6 = 1 1/4"
- 10 | **filter housing specification:** (see catalog)
- = standard
IS06 = for HFC applications, see sheet no.31605
- 11 | **internal valve:**
- = without
S1 = with bypass valve Δp 51 PSI
S2 = with bypass valve Δp 102 PSI
R = reversing valve, $Q \leq 55.75$ GPM
- 12 | **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 360. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 | **series:**
01E. = filter element according to company standard
- 2 | **nominal size:** 170, 240, 360, 450
- 3 | - | 7 | see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	6532 PSI
process connection:	manifold mounted
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4)

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

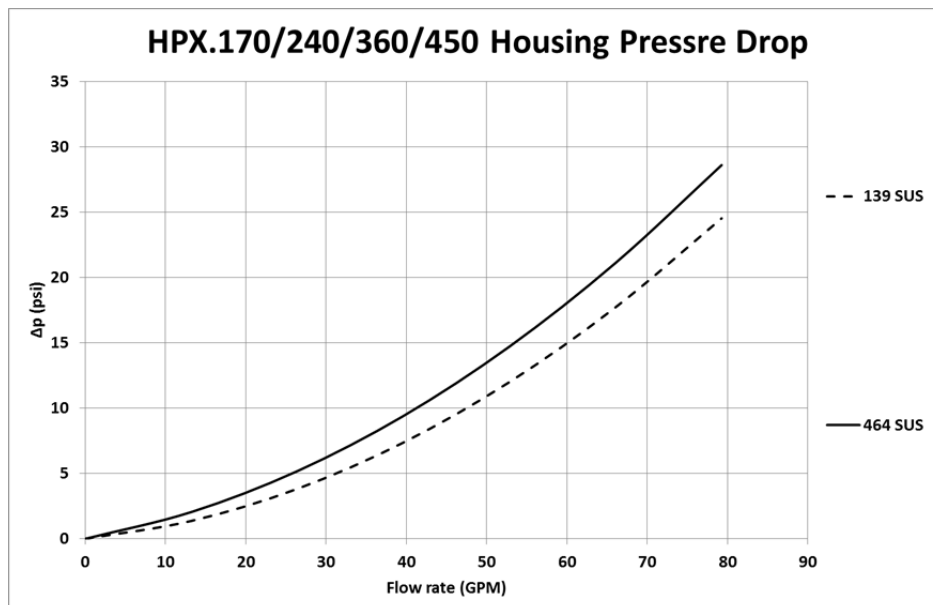
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

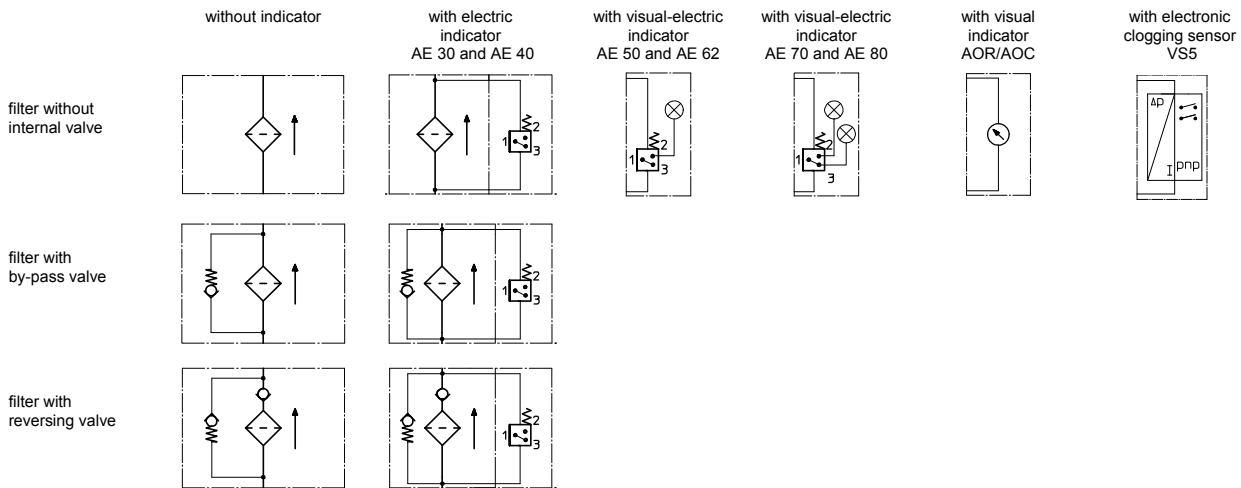
HPX	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
170	2.714	1.884	1.206	1.036	0.708	0.0839	0.0783	0.0537
240	2.092	1.452	0.930	0.799	0.546	0.0651	0.0607	0.0416
360	1.530	1.062	0.680	0.584	0.399	0.0475	0.0444	0.0304
450	1.126	0.782	0.500	0.430	0.294	0.0349	0.0326	0.0223

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension				article-no.	
			HPX 170 01E.170...	HPX 240 01E.240...	HPX 360 01E.360...	HPX 450 01E.450...		
1	1	filter element						
2	1	O-ring		34 x 3,5			304338 (NBR)	304730 (FPM)
3	1	O-ring		75 x 3			302215 (NBR)	304729 (FPM)
4	1	support ring		81 x 2,6 x 1			304581	
5	2	O-ring		36 x 3			304358 (NBR)	313900 (FPM)
6	1	clogging indicator, visual		AOR or AOC			see sheet-no. 1606	
7	1	clogging indicator, visual-electric		AE			see sheet-no. 1615	
8	1	clogging sensor, electronic		VS5			see sheet-no. 1619	
9	1	O-ring		15 x 1,5			315357 (NBR)	315427 (FPM)
10	1	O-ring		22 x 2			304708 (NBR)	304721 (FPM)
11	1	O-ring		14 x 2			304342 (NBR)	304722 (FPM)
12	1	screw plug		20913-4			309817	

item 12 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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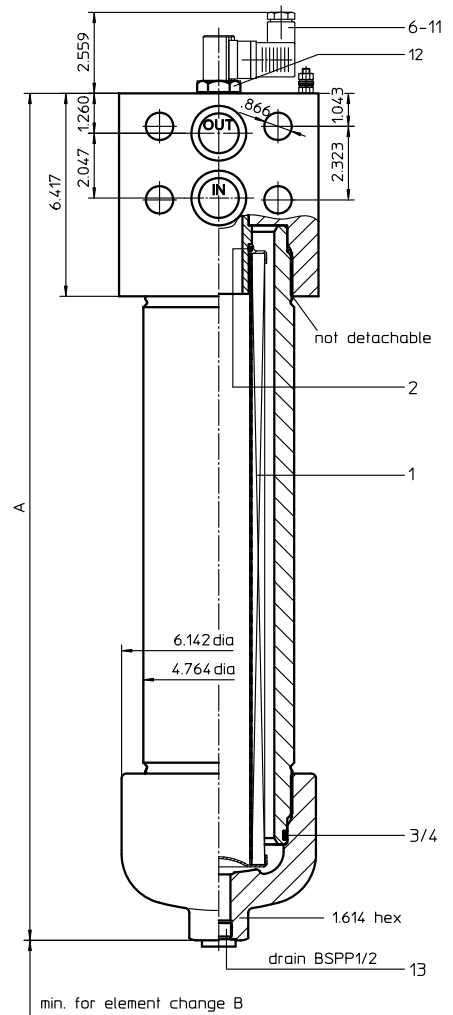
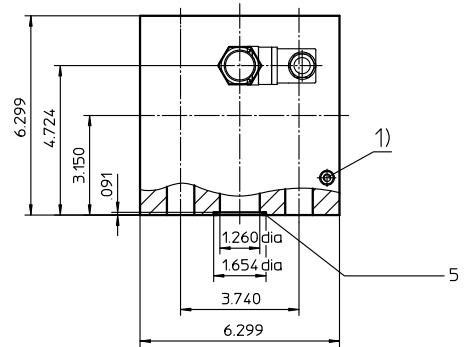
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Series HPX 601-1351 4568 PSI

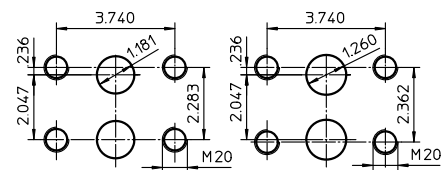


1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions:

type	HPX 601	HPX 901	HPX 1351
connection		1 1/4"	
A	20.86	26.77	36.53
B	12.20	18.11	27.95
weight lbs.	121	136	163
volume tank	.55 Gal.	.82 Gal.	1.21 Gal.

possible connection masses



Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series HPX 601-1351

4568 PSI

Description:

Pressure filter series HPX 601-1351 have a working pressure up to 4568 PSI. The HPX filters are manifold mounted.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head. After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

The reversing valve provides another level of protection for the filter element. The reverse flow will not be filtered.

1. Type index:

1.1. Complete filter: (ordering example)

HPX. 901. 10VG. HR. E. P. - . F. 6. - . - . AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

HPX = pressure filter

2 nominal size: 601, 901, 1351

3 filter-material and filter-fineness:

80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass

4 filter element collapse rating:

30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601

8 process connection:

F = manifold mounted

9 process connection size:

6 = 1 1/4"

10 filter housing specification: (see catalog)

- = standard
IS06 = for HFC applications, see sheet no.31605

11 internal valve:

- = without
S1 = with bypass valve Δp 51 PSI
S2 = with bypass valve Δp 102 PSI
R = reversing valve, $Q \leq 55.75$ GPM

12 clogging indicator or clogging sensor:

- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 900. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to company standard

2 nominal size: 600, 900, 1350

3 - 7 see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	6532 PSI
process connection:	manifold mounted
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4)

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

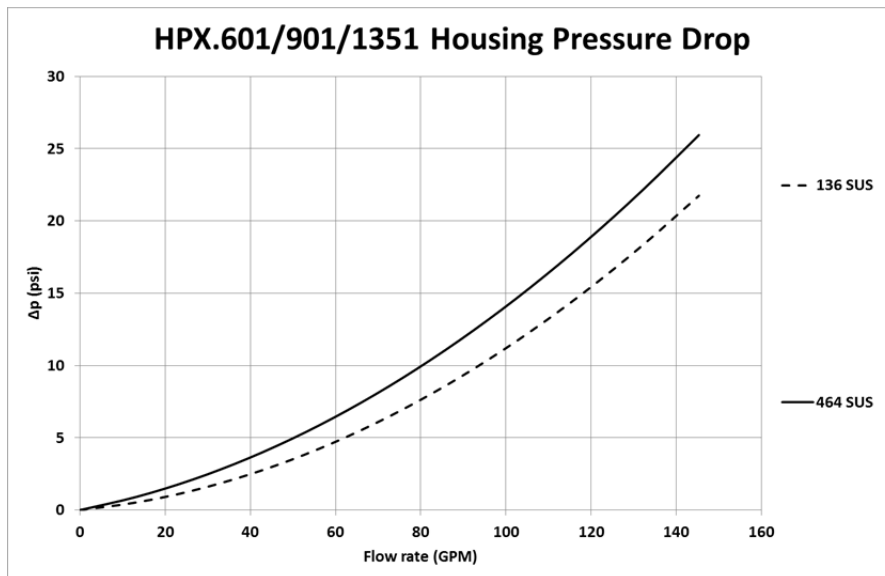
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

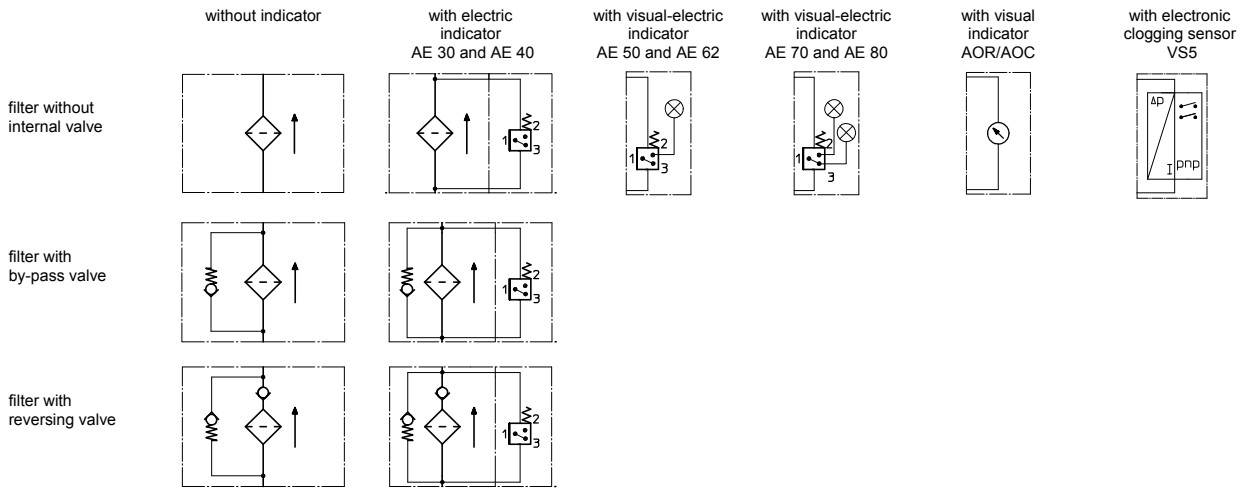
HPX	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
601	0.963	0.669	0.428	0.368	0.251	0.0303	0.0282	0.0193
901	0.668	0.464	0.297	0.225	0.174	0.0189	0.0177	0.0121
1351	0.417	0.290	0.185	0.185	0.109	0.0122	0.0114	0.0078

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension			article-no.	
			HPX 601	HPX 901	HPX 1351		
1	1	filter element	01E.600...	01E.900...	01E.1350...		
2	1	O-ring		48 x 3		304357 (NBR)	304404 (FPM)
3	1	O-ring		98 x 4		301914 (NBR)	304765 (FPM)
4	1	support ring		110 x 3,5 x 2		304802	
5	2	O-ring		36 x 3		304358 (NBR)	313900 (FPM)
6	1	clogging indicator, visual		AOR or AOC		see sheet-no. 1606	
7	1	clogging indicator, visual-electric		AE		see sheet-no. 1615	
8	1	clogging sensor, electronic		VS5		see sheet-no. 1619	
9	1	O-ring		15 x 1,5		315357 (NBR)	315427 (FPM)
10	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
11	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
12	1	screw plug		20913-4		309817	
13	1	screw plug		BSPP ½		304678	

item 12 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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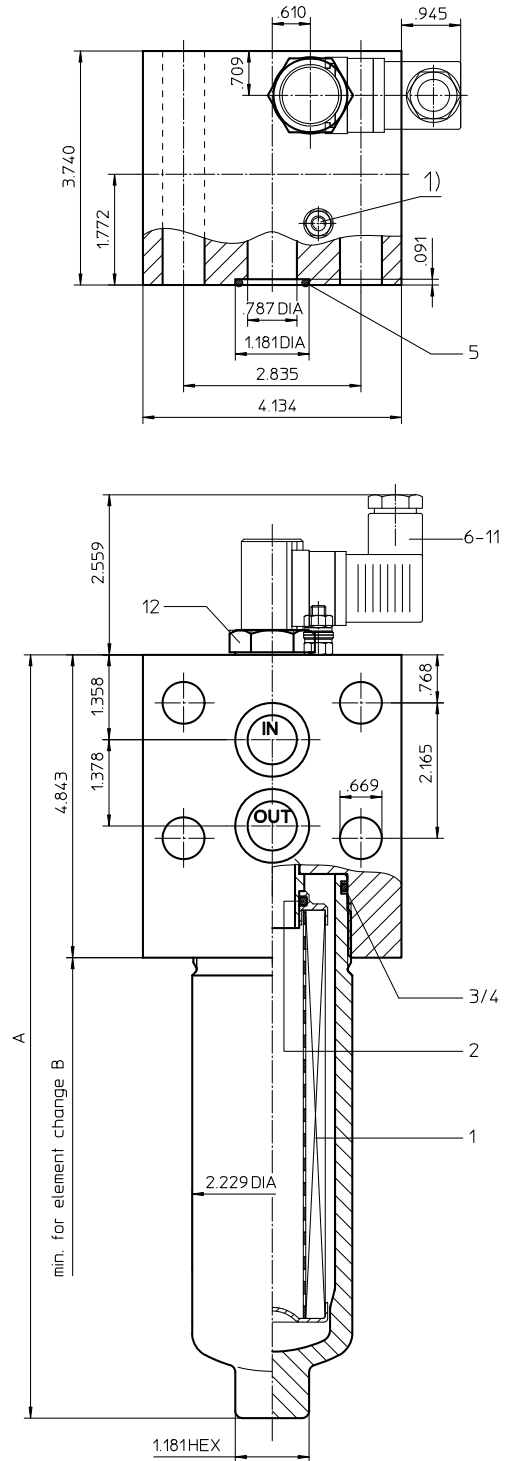
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Series HPY 60-150 4568 PSI



Dimensions:

type	HPY 60	HPY 90	HPY 150
connection		3/4"	
A	9.64	12.20	16.49
B	10.63	13.19	17.52
weight approx.	20 lbs.	21 lbs.	23 lbs.
volume tank	.08 Gal.	.10 Gal.	.16 Gal.

1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series HPY 60-150

4568 PSI

Description:

Pressure filter series HPY 60-150 have a working pressure up to 4568 PSI. The HPY filters are manifold mounted.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head. After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

The reversing valve provides another level of protection for the filter element. The reverse flow will not be filtered.

1. Type index:

1.1. Complete filter: (ordering example)

HPY. 90. 10VG. HR. E. P. -, F. 4. -, -, AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

HPY = pressure filter

2 nominal size: 60, 90, 150

3 filter-material and filter-fineness:

80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass

4 filter element collapse rating:

30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601

8 process connection:

F = manifold mounted

9 process connection size:

4 = $\frac{3}{4}$ "

10 filter housing specification: (see catalog)

- = standard
IS06 = for HFC applications, see sheet no.31605

11 internal valve:

- = without
S1 = with bypass valve Δp 51 PSI
S2 = with bypass valve Δp 102 PSI
R = reversing valve, $Q \leq 18.50$ GPM

12 clogging indicator or clogging sensor:

- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 90. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to company standard

2 nominal size: 60, 90, 150

3 - 7 see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	6532 PSI
process connection:	manifold mounted
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4)

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

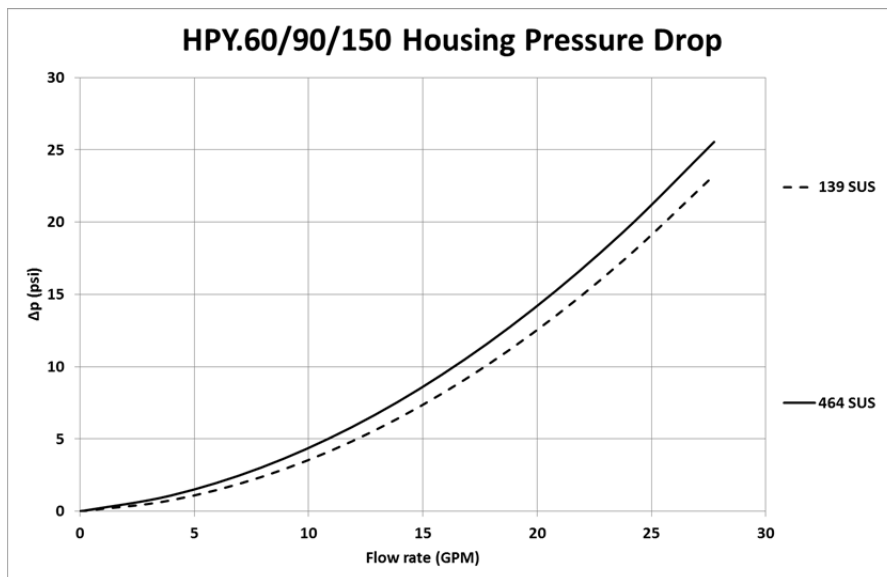
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

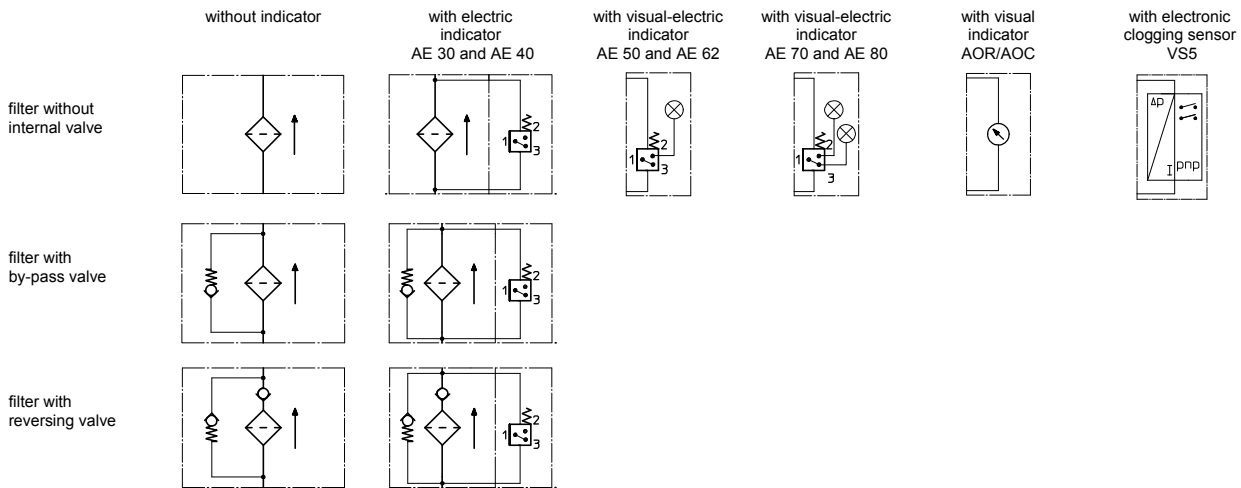
HPY	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
60	6.748	4.685	2.999	2.577	1.760	0.2002	0.1868	0.1280
90	4.059	2.818	1.804	1.550	1.059	0.1210	0.1130	0.0774
150	2.422	1.681	1.076	0.925	0.632	0.0723	0.0675	0.0462

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension			article-no.	
			HPY 60 01E.60...	HPY 90 01E.90...	HPY 150 01E.150...		
1	1	filter element		22 x 3,5		304341 (NBR)	304392 (FPM)
2	1	O-ring		54 x 3		304657 (NBR)	304720 (FPM)
3	1	O-ring		61 x 2,6 x 1		304660	
4	1	support ring		24 x 3		303038 (NBR)	304397 (FPM)
5	2	O-ring		AOR or AOC		see sheet-no. 1606	
6	1	clogging indicator, visual		AE		see sheet-no. 1615	
7	1	clogging indicator, visual-electric		VS5		see sheet-no. 1619	
8	1	clogging sensor, electronic		15 x 1,5		315357 (NBR)	315427 (FPM)
9	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
10	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
11	1	O-ring		20913-4		309817	
12	1	screw plug					

item 12 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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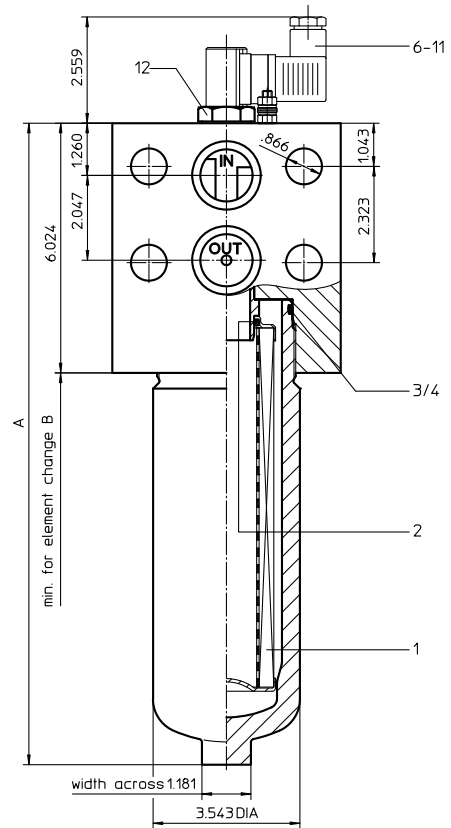
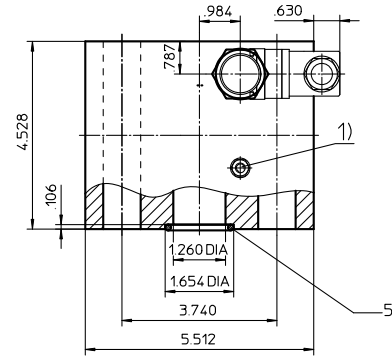
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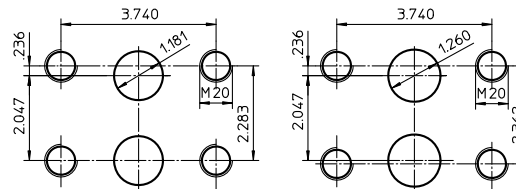
Series HPY 170-450 4568 PSI



Dimensions:

type	HPY 170	HPY 240	HPY 360	HPY 450
connection	1 1/4"			
A	13.50	15.47	18.62	22.83
B	13.78	15.75	18.89	23.03
weight approx.	46 lbs.	49 lbs.	53 lbs.	61 lbs.
volume tank	.18 Gal.	.23 Gal.	.31 Gal.	.42 Gal.

possible connection masses



- 1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series HPY 170-450

4568 PSI

Description:

Pressure filter series HPY 170-450 have a working pressure up to 4568 PSI. The HPY filters are manifold mounted.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head. After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

The reversing valve provides another level of protection for the filter element. The reverse flow will not be filtered.

1. Type index:

1.1. Complete filter: (ordering example)

HPY. 360. 10VG. HR. E. P. - . F. 6. - . - . AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

HPY = pressure filter

2 nominal size: 170, 240, 360, 450

3 filter-material and filter-fineness:

80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass

4 filter element collapse rating:

30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601

8 process connection:

F = manifold mounted

9 process connection size:

6 = 1 1/4"

10 filter housing specification: (see catalog)

- = standard
IS06 = for HFC applications, see sheet no.31605

11 internal valve:

- = without
S1 = with bypass valve Δp 51 PSI
S2 = with bypass valve Δp 102 PSI
R = reversing valve, $Q \leq 55.75$ GPM

12 clogging indicator or clogging sensor:

- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 360. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to company standard

2 nominal size: 170, 240, 360, 450

3 - 7 see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	6532 PSI
process connection:	manifold mounted
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4)

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

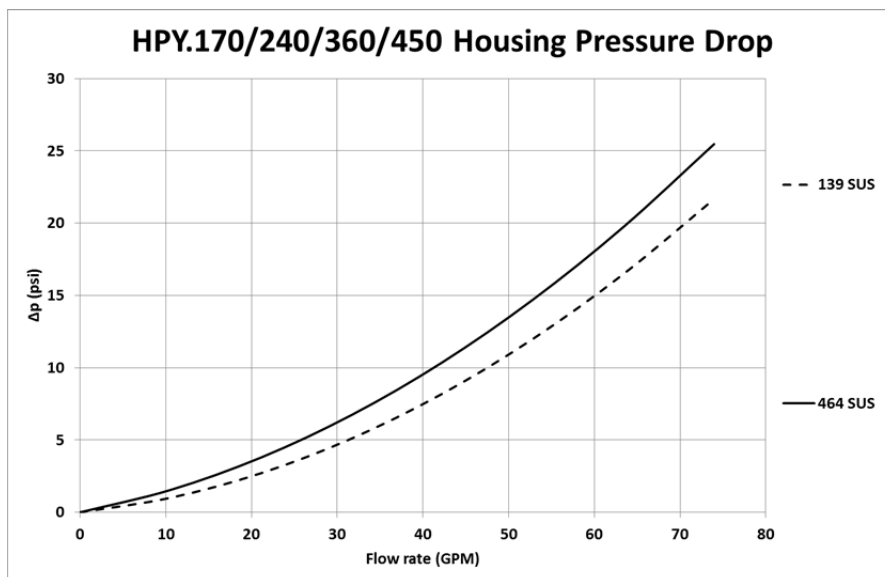
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

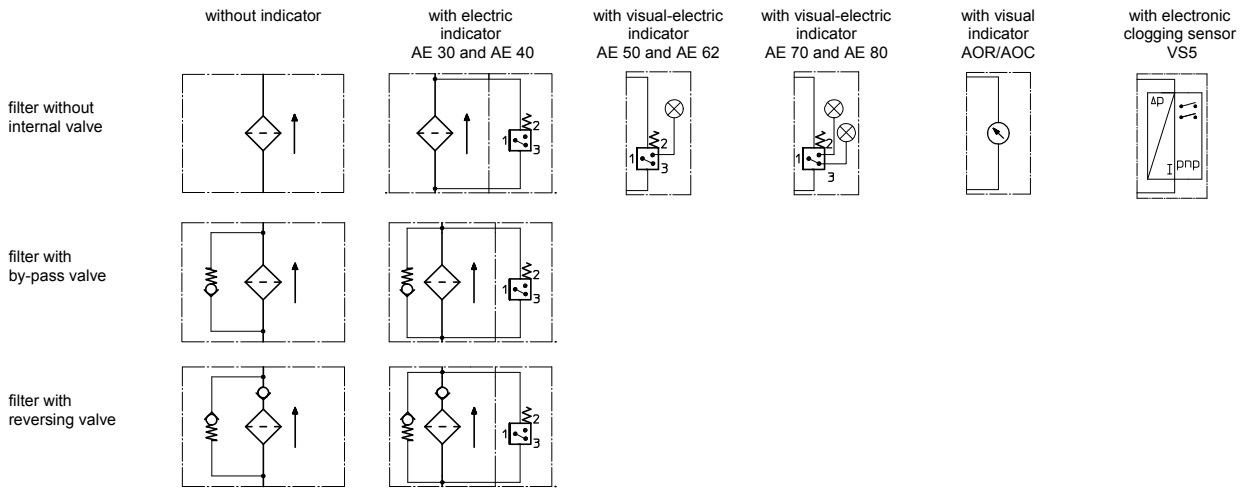
HPY	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
170	2.714	1.884	1.206	1.036	0.708	0.0839	0.0783	0.0537
240	2.092	1.452	0.930	0.799	0.546	0.0651	0.0607	0.0416
360	1.530	1.062	0.680	0.584	0.399	0.0475	0.0444	0.0304
450	1.126	0.782	0.500	0.430	0.294	0.0349	0.0326	0.0223

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension				article-no.	
			HPY 170	HPY 240	HPY 360	HPY 450		
1	1	filter element	01E.170...	01E.240...	01E.360...	01E.450...		
2	1	O-ring		34 x 3,5			304338 (NBR)	304730 (FPM)
3	1	O-ring		75 x 3			302215 (NBR)	304729 (FPM)
4	1	support ring		81 x 2,6 x 1			304581	
5	2	O-ring		36 x 3			304358 (NBR)	313900 (FPM)
6	1	clogging indicator, visual		AOR or AOC			see sheet-no. 1606	
7	1	clogging indicator, visual-electric		AE			see sheet-no. 1615	
8	1	clogging sensor, electronic		VS5			see sheet-no. 1619	
9	1	O-ring		15 x 1,5			315357 (NBR)	315427 (FPM)
10	1	O-ring		22 x 2			304708 (NBR)	304721 (FPM)
11	1	O-ring		14 x 2			304342 (NBR)	304722 (FPM)
12	1	screw plug		20913-4			309817	

item 12 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
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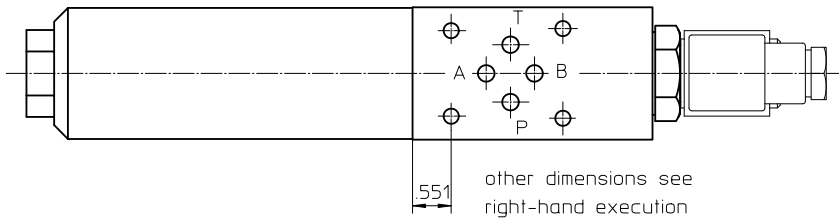
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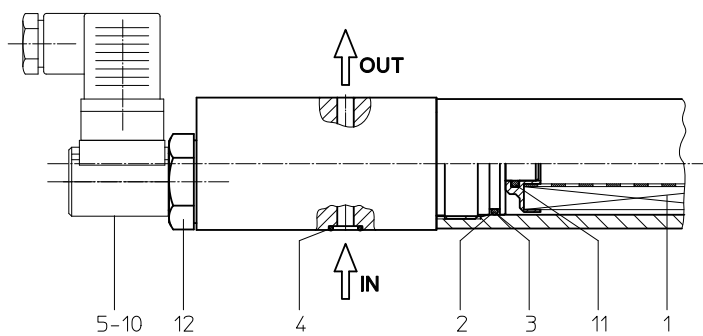
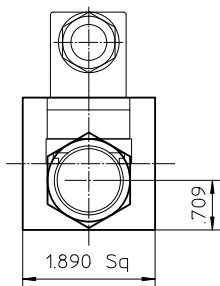
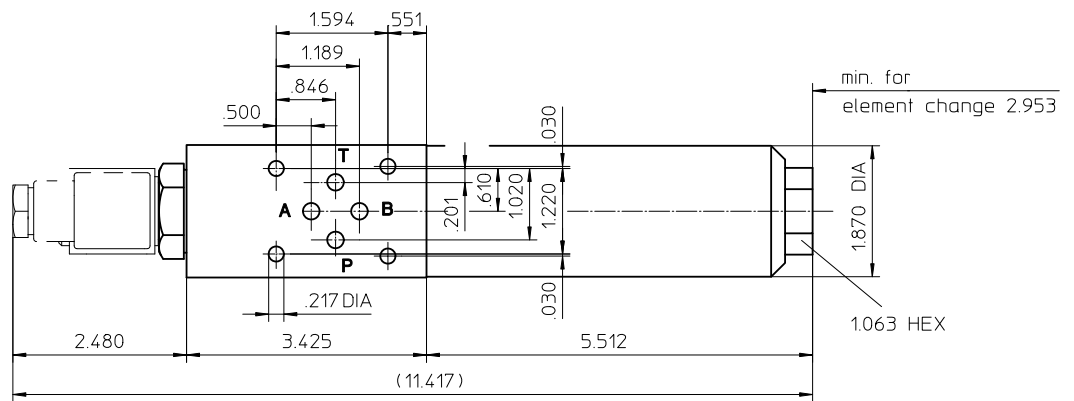
Series HPZ 32

5075 PSI

Left hand installation



Right hand installation



Weight: approx. 7.7 lbs.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series HPZ 32

5075 PSI

Description:

The HPZ series filter is a valve protection filter according to DIN 24340-A6 (D03 & D05 pattern). These pressure filters are mounted between the valve and manifold to provide extra protection for critical valves. The HPZ filter can be mounted on either side of the valve for easy filter maintenance, depending on the filter configuration.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

1. Type index:

1.1. Complete filter: (ordering example)

HPZ. 32. 10VG. HR. E. P. - . Z. 1. - . R. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- | | |
|----|--|
| 1 | series:
HPZ = pressure filter for sandwich stacking |
| 2 | nominal size: 32 |
| 3 | filter-material and filter-fineness:
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass |
| 4 | filter element collapse rating:
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI) |
| 5 | filter element design:
E = single-end open |
| 6 | sealing material:
P = Nitrile (NBR)
V = Viton (FPM) |
| 7 | filter element specification:
- = standard
VA = stainless steel |
| 8 | process connection:
Z = sandwich stacking according to DIN 24340, T2 |
| 9 | process connection size:
1 = A6 according to DIN 24340, T2 |
| 10 | filter housing specification: (see catalog)
- = standard |
| 11 | head design:
R = right-hand installation
L = left-hand installation |
| 12 | clogging indicator or clogging sensor:
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619 |

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 30. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- | | |
|---|---|
| 1 | series:
01E. = filter element according to company standard |
| 2 | nominal size: 30 |
| 3 | - 7 \| see type index-complete filter |

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium:	mineral oil, other media on request
max. operating pressure:	5075 PSI
test pressure:	7257 PSI
process connection:	(master gauge for holes) DIN 24340-A6
housing material:	EN-GJS-400-18-LT, C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	0.02 Gal

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 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

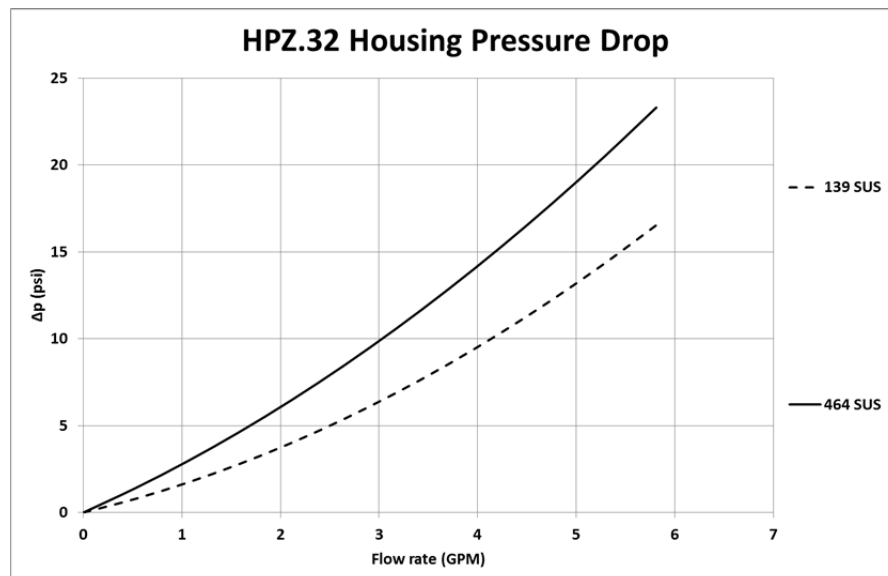
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

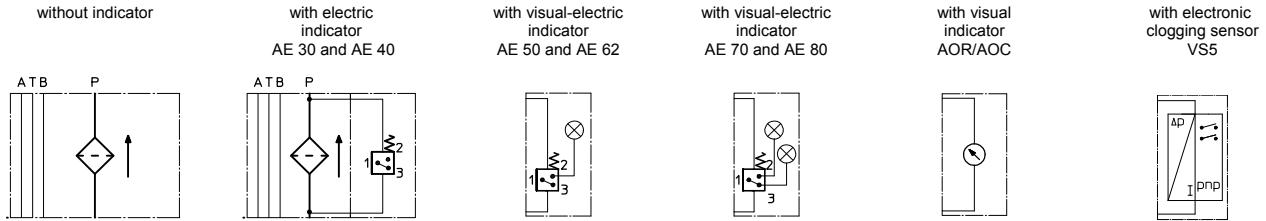
HPZ	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
32	12.554	8.716	5.580	4.794	3.275	0.2539	0.2369	0.1623

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01E.30...		
2	1	support ring	SRA 27 x 2,1 x 1	305466	
3	1	O-ring	32 x 2,5	306843 (NBR)	308268 (FPM)
4	4	O-ring	9,25 x 1,78	304354 (NBR)	310268 (FPM)
5	1	clogging indicator, visual	AOR or AOC	see sheet no. 1606	
6	1	clogging indicator, visual-electric	AE	see sheet no. 1615	
7	1	clogging sensor, electronic	VS5	see sheet no. 1619	
8	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
9	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
10	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
11	1	O-ring	11 x 3	312603 (NBR)	312727 (FPM)
12	1	screw plug	20913-4	309817	

item 12 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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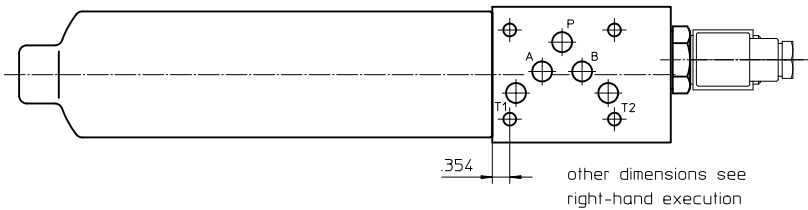
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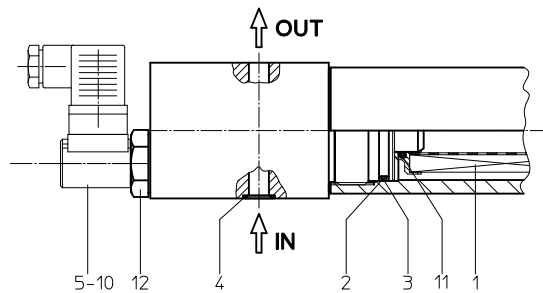
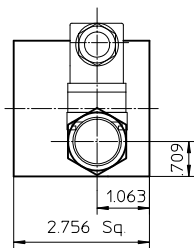
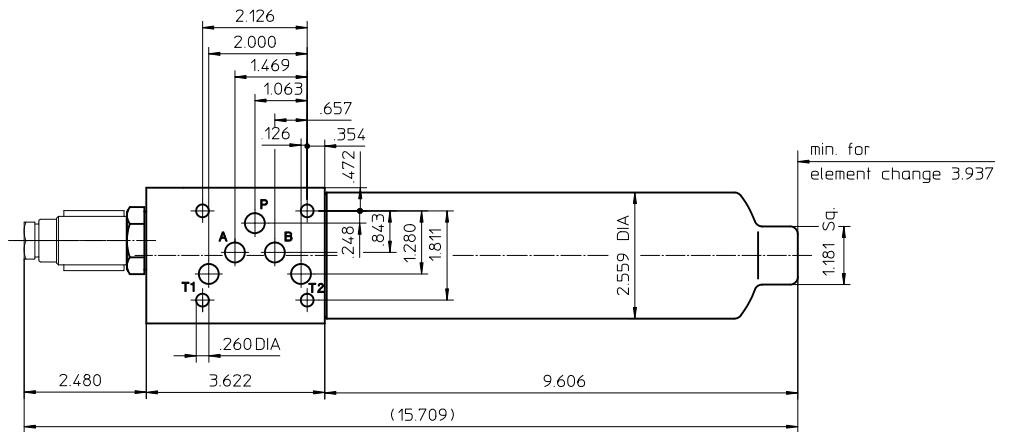
Series HPZ 90

5075 PSI

Left hand installation



Right hand installation



Weight: approx. 14.3 lbs.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series HPZ 90

5075 PSI

Description:

The HPZ series filter is a valve protection filter according to DIN 24340-A6 (D03 & D05 pattern). These pressure filters are mounted between the valve and manifold to provide extra protection for critical valves. The HPZ filter can be mounted on either side of the valve for easy filter maintenance, depending on the filter configuration.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

1. Type index:

1.1. Complete filter: (ordering example)

HPZ. 90. 10VG. HR. E. P. - . Z. 2. - . R. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- | | |
|----|--|
| 1 | series:
HPZ = pressure filter for sandwich stacking |
| 2 | nominal size: 90 |
| 3 | filter-material and filter-fineness:
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass |
| 4 | filter element collapse rating:
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI) |
| 5 | filter element design:
E = single-end open |
| 6 | sealing material:
P = Nitrile (NBR)
V = Viton (FPM) |
| 7 | filter element specification:
- = standard
VA = stainless steel |
| 8 | process connection:
Z = sandwich stacking according to DIN 24340, T2 |
| 9 | process connection size:
2 = A10 according to DIN 24340, T2 |
| 10 | filter housing specification: (see catalog)
- = standard |
| 11 | head design:
R = right-hand installation
L = left-hand installation |
| 12 | clogging indicator or clogging sensor:
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619 |

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 90. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- | | |
|---|---|
| 1 | series:
01E. = filter element according to company standard |
| 2 | nominal size: 90 |
| 3 | - 7 \| see type index-complete filter |

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	5075 PSI
test pressure:	7257 PSI
process connection:	(master gauge for holes) DIN 24340-A10
housing material:	EN-GJS-400-18-LT, C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	0.10 Gal

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v(SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

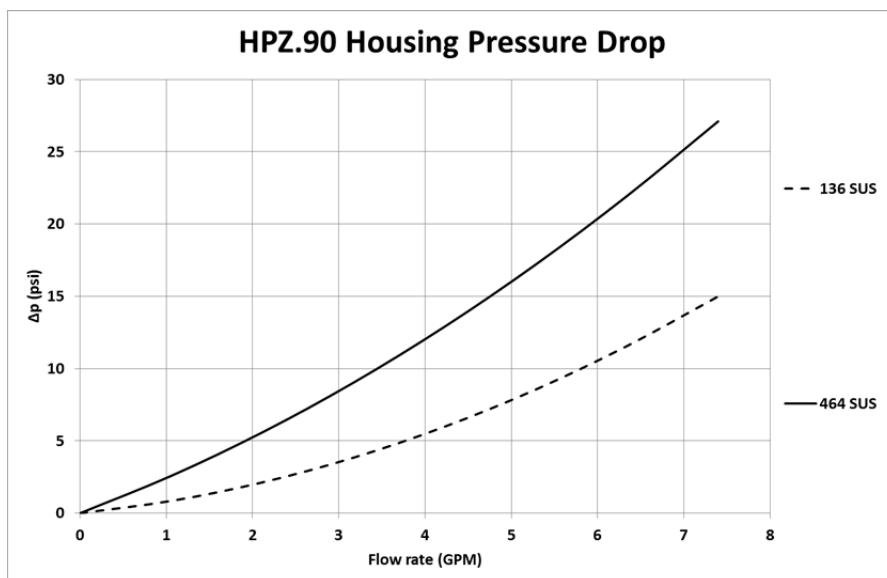
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

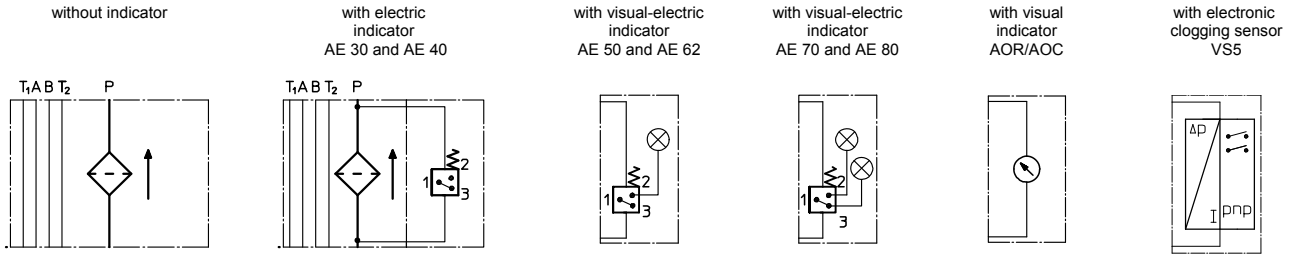
HPZ	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
90	4.059	2.818	1.804	1.550	1.059	0.1210	0.1130	0.0774

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension	article-no.
1	1	filter element	01E.90...	
2	1	support ring	SRA 52 x 2,6 x 1	311013
3	1	O-ring	45 x 3	304991 (NBR) 304997 (FPM)
4	4	O-ring	12 x 2	311014 (NBR) 310271 (FPM)
5	1	clogging indicator, visual	AOR or AOC	see sheet no. 1606
6	1	clogging indicator, visual-electric	AE	see sheet no. 1615
7	1	clogging sensor, electronic	VS5	see sheet no. 1619
8	1	O-ring	15 x 1,5	315357 (NBR) 315427 (FPM)
9	1	O-ring	22 x 2	304708 (NBR) 304721 (FPM)
10	1	O-ring	14 x 2	304342 (NBR) 304722 (FPM)
11	1	O-ring	22 x 3,5	304341 (NBR) 304392 (FPM)
12	1	screw plug	20913-4	309817

item 12 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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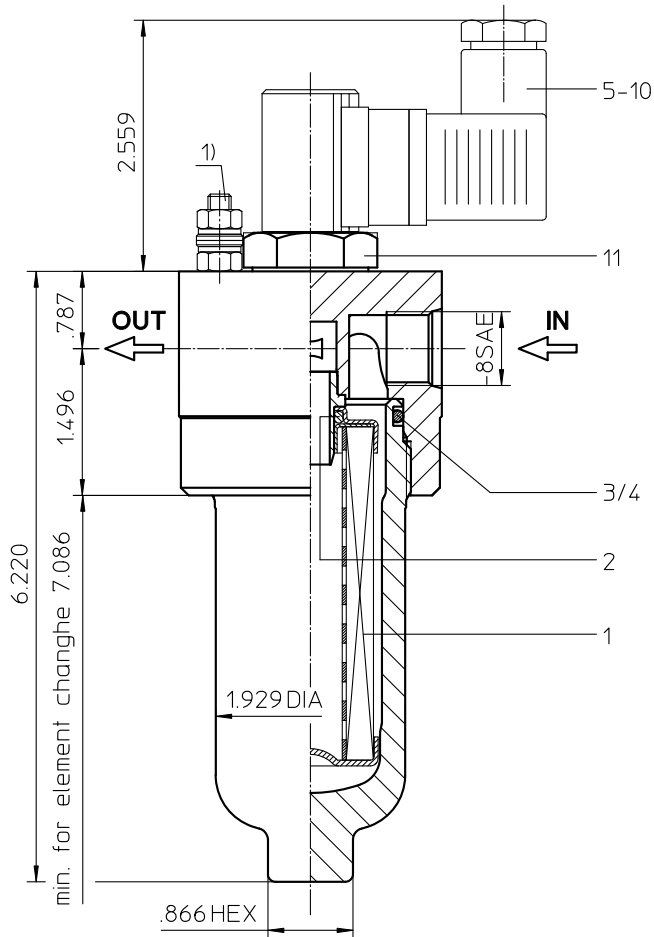
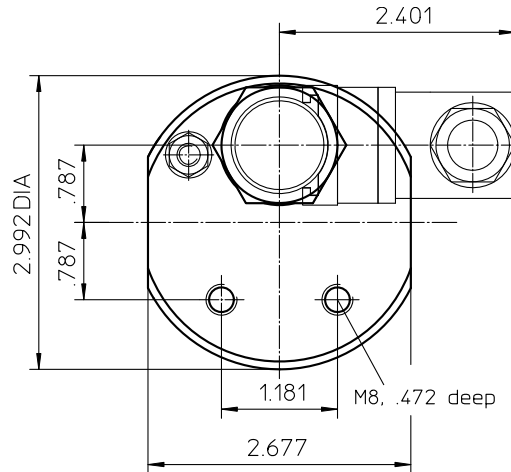
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Series HP 31 6000 PSI



1) Connect the stand grounding tab to a suitable earth ground point.

Pressure Filter

Series HP 31

6000 PSI

Description:

Pressure filter series HP 31 have a working pressure up to 6000 PSI. Pressure peaks can be absorbed with a sufficient safety margin. The HP-filter is in-line mounted.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The bypass valve is integrated into the filter head.

After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

1. Type index:

1.1. Complete filter: (ordering example)

HP. 31. 10VG. HR. E. P. - UG. 3. - - AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

HP = pressure filter

2 nominal size: 31

3 filter-material and filter-fineness:

80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass

4 filter element collapse rating:

30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601

8 process connection:

UG = thread connection

9 process connection size:

3 = -8 SAE

10 filter housing specification: (see catalog)

- = standard
IS06 = for HFC applications, see sheet-no. 31605

11 internal valve:

- = without
S1 = with by-pass valve Δp 51 PSI
S2 = with by-pass valve Δp 102 PSI

12 clogging indicator or clogging sensor:

- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 30. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to company standard

2 nominal size: 30

3 - 7 see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	6000 PSI
test pressure:	8580 PSI
process connection:	thread connection
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	0.02 Gal

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

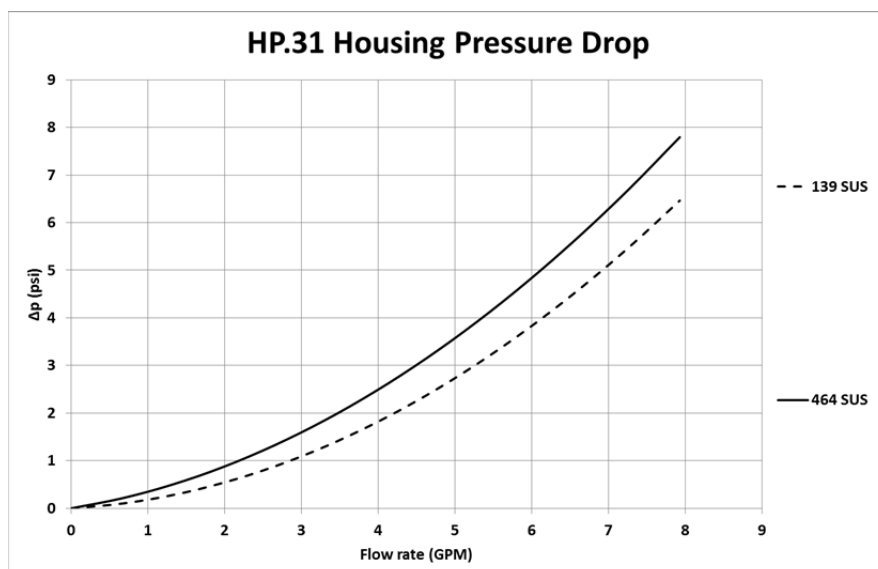
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

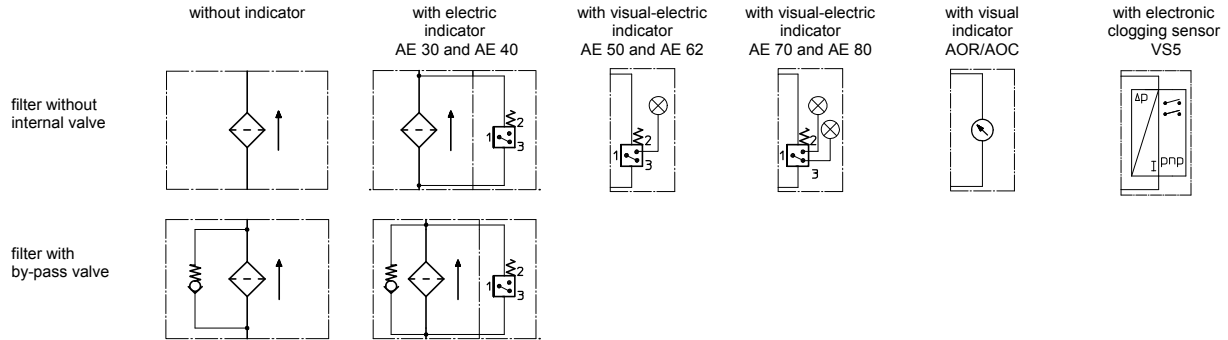
HP	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
31	12.554	8.716	5.580	4.794	3.275	0.2369	0.2369	0.1623

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01E. 30		
2	1	O-ring	11 x 3	312603 (NBR)	312727 (FPM)
3	1	O-ring	40 x 3	304389 (NBR)	304391 (FPM)
4	1	support ring	48 x 2,6 x 1	305391	
5	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
6	1	clogging indicator, visual-electric	AE	see sheet-no. 1615	
7	1	clogging sensor, electronic	VS5	see sheet-no. 1619	
8	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
9	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
10	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
11	1	screw plug	20913-4	309817	

item 11 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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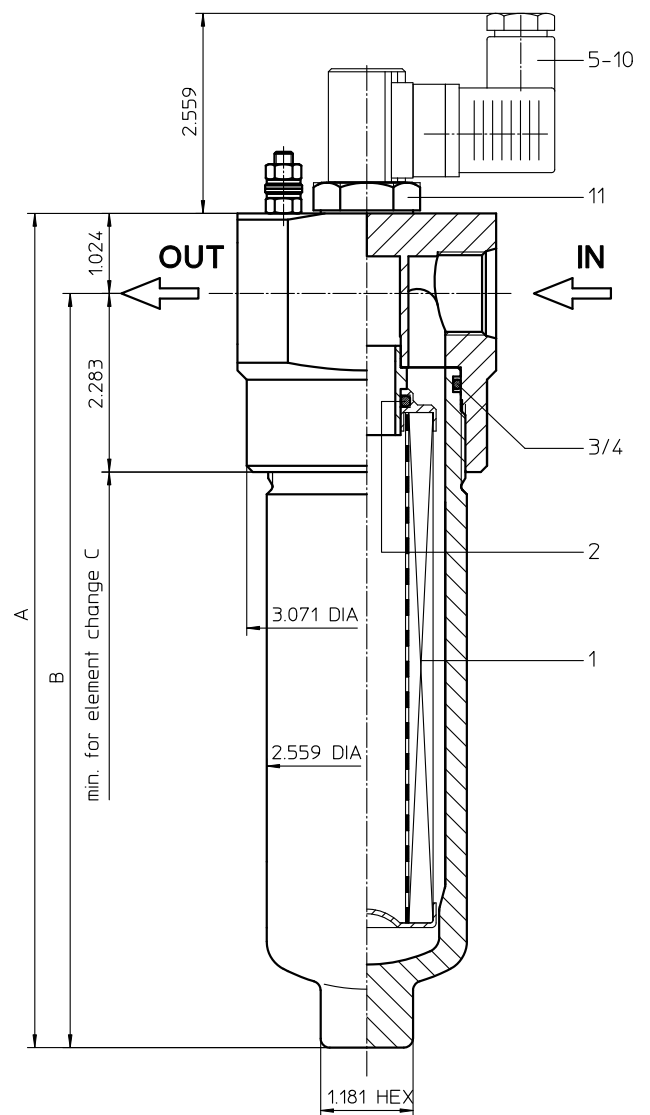
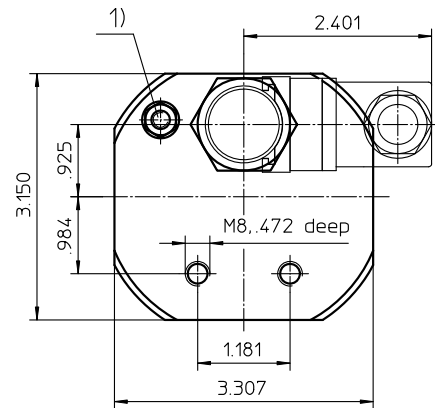
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Series HP 61-151

6000 PSI



Dimensions:

Type	HP 61	HP 91	HP 151
Connection	- 8 SAE	-12 SAE	-16 SAE
A	8.11	10.66	14.96
B	7.08	9.64	13.93
C	10.63	13.19	17.52
Weight approx.	8.80 lbs.	9.90 lbs.	12.10 lbs.
Volume tank	0.08 gal.	0.10 gal.	0.16 gal.

1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions: inches
 Designs and performance values are subject to change.

Pressure Filter

Series HP 61-151

6000 PSI

Description:

Pressure filter series HP 61-151 have a working pressure up to 6000 PSI. Pressure peaks can be absorbed with a sufficient safety margin. The HP-filter is in-line mounted.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 4 $\mu\text{m}(\text{c})$.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head.

After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

The reversing valve provides another level of protection for the filter element. The reverse flow will not be filtered.

1. Type index:

1.1. Complete filter: (ordering example)

HP. 91. 10VG. HR. E. P. - UG. 4. - - AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- | | |
|----|--|
| 1 | series:
HP = pressure filter |
| 2 | nominal size: 61, 91, 151 |
| 3 | filter-material and filter-fineness:
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass |
| 4 | filter element collapse rating:
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI) |
| 5 | filter element design:
E = single-end open |
| 6 | sealing material:
P = Nitrile (NBR)
V = Viton (FPM) |
| 7 | filter element specification: (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601 |
| 8 | process connection:
UG = thread connection |
| 9 | process connection size:
3 = -8 SAE
4 = -12 SAE
5 = -16 SAE |
| 10 | filter housing specification: (see catalog)
- = standard
IS06 = for HFC applications, see sheet no.31605 |
| 11 | internal valve:
- = without
S1 = with bypass valve Δp 51 PSI
S2 = with bypass valve Δp 102 PSI
R = reversing valve, $Q \leq 18.50$ GPM |
| 12 | clogging indicator or clogging sensor:
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619 |

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 90. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- | | |
|---|---|
| 1 | series:
01E. = filter element according to company standard |
| 2 | nominal size: 60, 90, 150 |
| 3 | - 7 \| see type index-complete filter |

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium:	mineral oil, other media on request
max. operating pressure:	6000 PSI
test pressure:	8580 PSI
process connection:	thread connection
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4)

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) - \text{characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

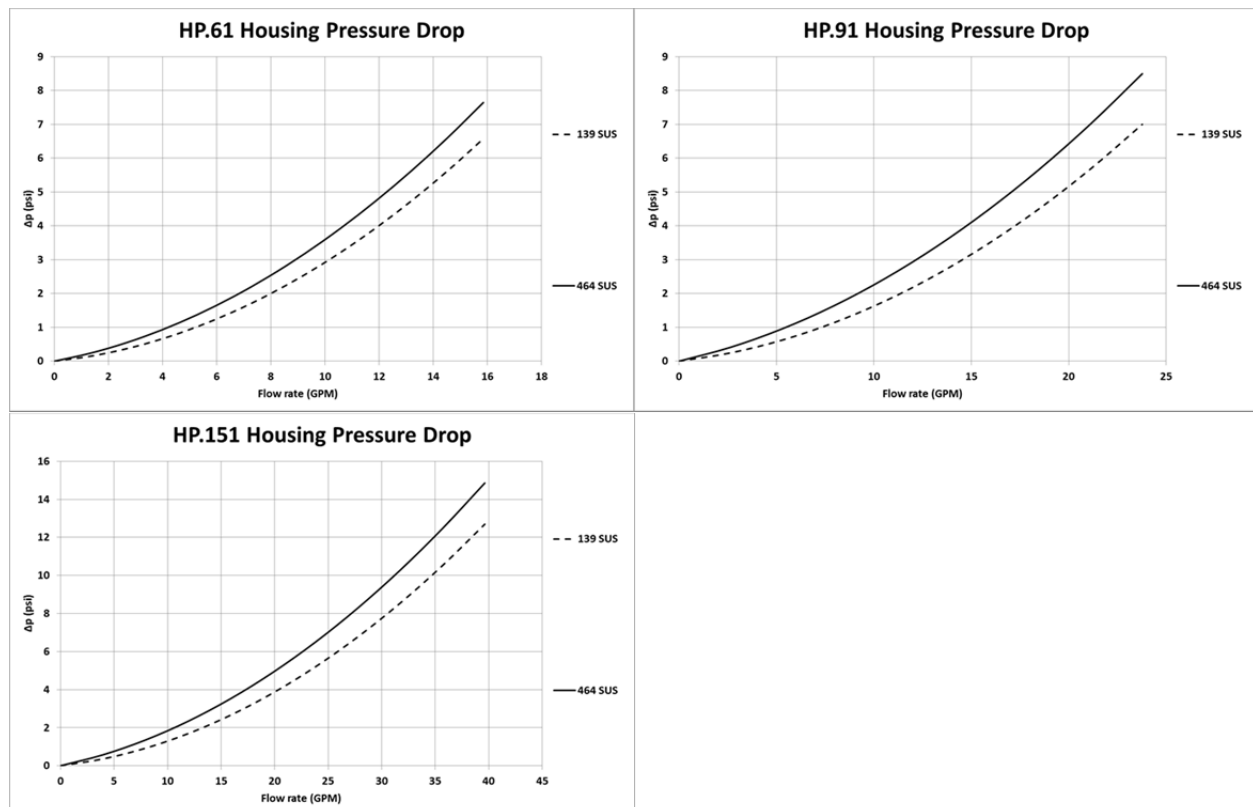
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

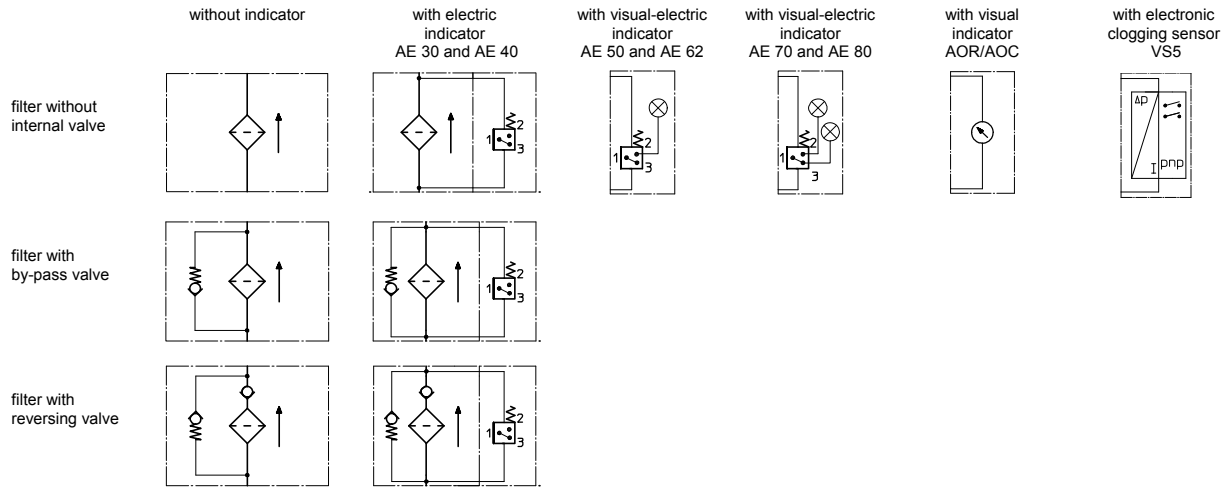
HP	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
61	6.748	4.685	2.999	2.577	1.760	0.2002	0.1868	0.1280
91	4.059	2.818	1.804	1.550	1.059	0.1210	0.1130	0.0774
151	2.422	1.681	1.076	0.925	0.632	0.0723	0.0675	0.0462

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension			article-no.	
			HP61 01E.60...	HP91 01E.90...	HP151 01E.150...		
1	1	filter element					
2	1	O-ring		11 x 3		312603 (NBR)	312727 (FPM)
3	1	O-ring		40 x 3		304389 (NBR)	304391 (FPM)
4	1	support ring		48 x 2,6 x 1			305391
5	1	clogging indicator, visual		AOR or AOC		see sheet-no. 1606	
6	1	clogging indicator, visual-electric		AE		see sheet-no. 1615	
7	1	clogging sensor, electronic		VS5		see sheet-no. 1619	
8	1	O-ring		15 x 1,5		315357 (NBR)	315427 (FPM)
9	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
10	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
11	1	screw plug		20913-4		309817	

item 11 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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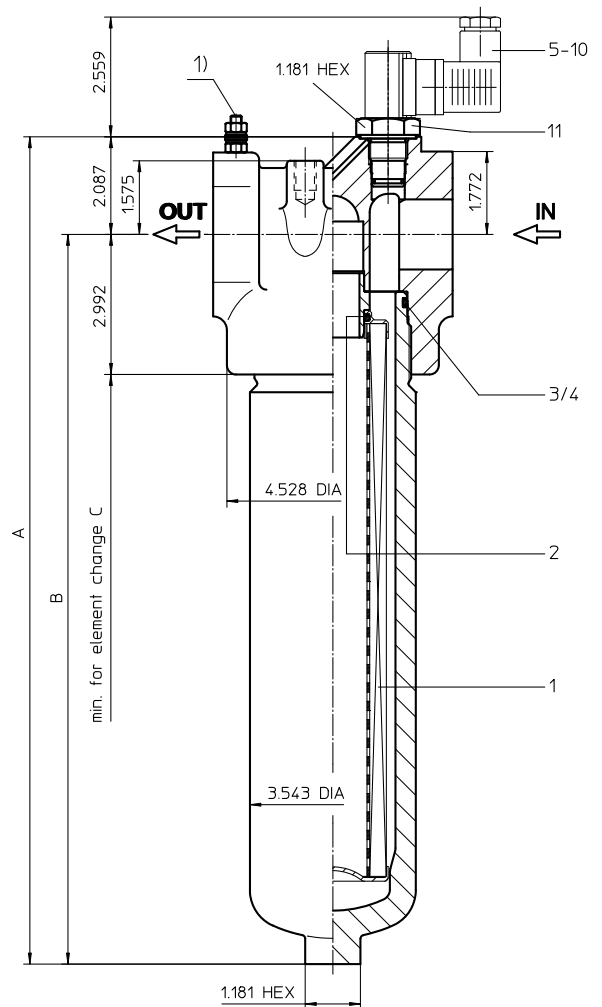
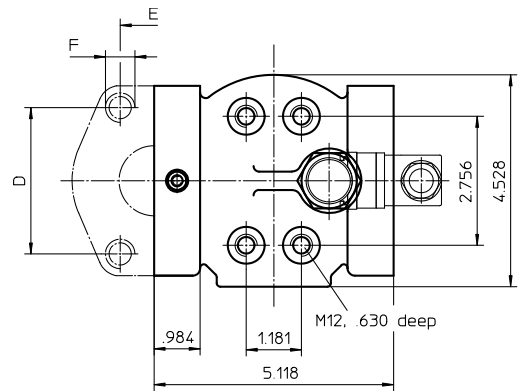
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Series HP 170-450 6000 PSI



Dimensions:

type	HP 170	HP 240	HP 360	HP 450
connection	1 1/2" SAE			
A	12.56	14.49	17.68	21.81
B	10.47	12.44	15.59	19.72
C	13.78	15.75	18.90	23.03
D	3.13			
E	1.45			
F	M16, .79 deep			
weight	28.6 lbs.	30.8 lbs.	35.2 lbs.	41.8 lbs.
volume tank	0.18 Gal.	0.23 Gal.	0.31 Gal.	0.42 Gal.

1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions: inches
Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series HP 170-450

6000 PSI

Description:

Pressure filter series HP 170-450 have a working pressure up to 6000 PSI. Pressure peaks can be absorbed with a sufficient safety margin. The HP-filter is in-line mounted.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head.

After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

The reversing valve provides another level of protection for the filter element. The reverse flow will not be filtered.

1. Type index:

1.1. Complete filter: (ordering example)

HP. 170. 10VG. HR. E. P. - . FS. 7. - . - . AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 | **series:**
HP = pressure filter
- 2 | **nominal size:** 170, 240, 360, 450
- 3 | **filter-material and filter-fineness:**
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG glass fiber
- 4 | **filter element collapse rating:**
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)
- 5 | **filter element design:**
E = single-end open
- 6 | **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 | **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601
- 8 | **process connection:**
FS = SAE-flange 6000 PSI
- 9 | **process connection size:**
7 = 1 1/2"
- 10 | **filter housing specification:** (see catalog)
- = standard
IS06 = for HFC applications, see sheet-no. 31605
- 11 | **internal valve:**
- = without
S1 = with bypass valve Δp 51 PSI
S2 = with bypass valve Δp 102 PSI
R = reversing valve, Q \leq 55.75 GPM
- 12 | **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 170. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 | **series:**
01E. = filter element according to company standard
- 2 | **nominal size:** 170, 240, 360, 450
- 3 | - 7 | see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	6000 PSI
test pressure:	8580 PSI
process connection:	SAE-flange 6000 PSI
housing material:	EN-GJS-400-18-LT; C-steel (filter bowl)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) - \text{characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

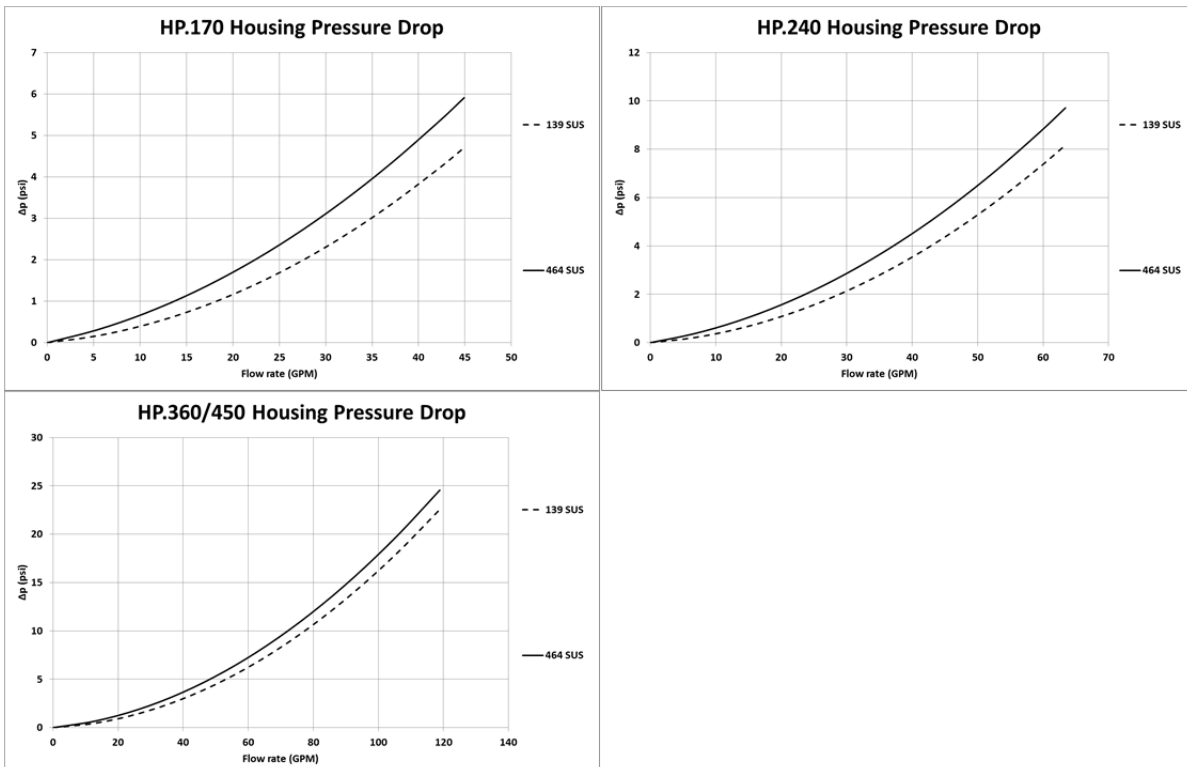
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

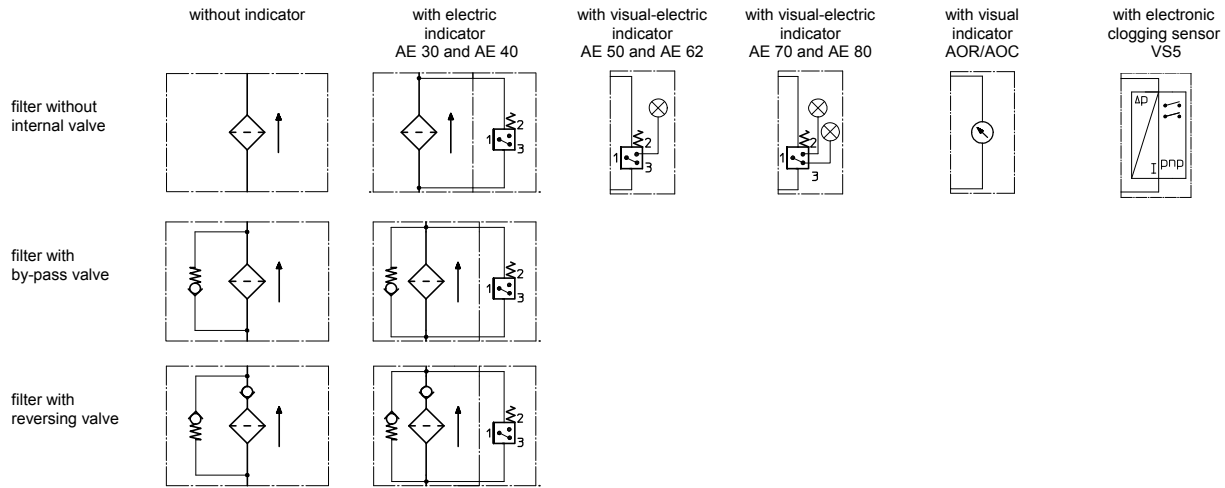
HP	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
170	2.714	1.884	1.206	1.036	0.708	0.0839	0.0783	0.0537
240	2.092	1.452	0.930	0.799	0.546	0.0651	0.0607	0.0416
360	1.530	1.062	0.680	0.584	0.399	0.0475	0.0444	0.0304
450	1.126	0.782	0.500	0.430	0.294	0.0349	0.0326	0.0223

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension				article-no.	
			HP 170	HP 240	HP 360	HP 450		
1	1	filter element	01E.170...	01E.240...	01E.360...	01E.450...		
2	1	O-ring	34 x 3,5				304338 (NBR)	304730 (FPM)
3	1	O-ring	75 x 3				302215 (NBR)	304729 (FPM)
4	1	support ring	81 x 2,6 x 1				304581	
5	1	clogging indicator visual	AOR or AOC				see sheet-no. 1606	
6	1	clogging indicator visual-electric	AE				see sheet-no. 1615	
7	1	clogging sensor electronic	VS5				see sheet-no. 1619	
8	1	O-ring	15 x 1,5				315357 (NBR)	315427 (FPM)
9	1	O-ring	22 x 2				304708 (NBR)	304721 (FPM)
10	1	O-ring	14 x 2				304342 (NBR)	304722 (FPM)
11	1	screw plug	20913-4				309817	

item 11 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
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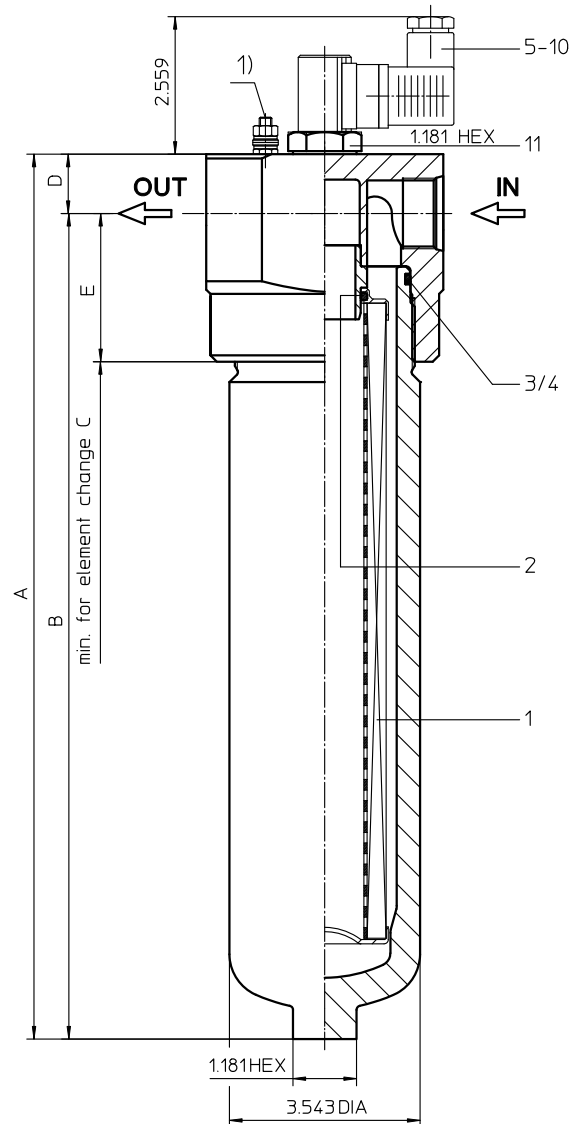
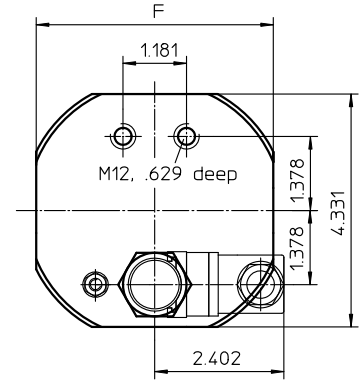
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Series HP 171-451 6000 PSI

Dimensions:

type HP 171			
connection	-16SAE	-20SAE	-24SAE
A	11.33	11.61	11.81
B	10.23	10.35	10.43
C	13.77	13.77	13.77
D	1.10	1.25	1.37
E	2.75	2.87	2.95
F	4.40	4.56	4.56
weight	24 lbs.	25 lbs.	26 lbs.
volume tank	0.18 Gal.		
type HP 241			
connection	-16SAE	-20SAE	-24SAE
A	11.33	11.61	11.81
B	10.23	10.35	10.43
C	13.77	13.77	13.77
D	1.10	1.25	1.37
E	2.75	2.87	2.95
F	4.40	4.56	4.56
weight	24 lbs.	25 lbs.	26 lbs.
volume tank	23 Gal.		
type HP 361			
connection	-16SAE	-20SAE	-24SAE
A	16.45	16.73	16.92
B	15.35	15.47	15.55
C	18.89	18.89	18.89
D	1.10	1.25	1.37
E	2.75	2.87	2.95
F	4.40	4.56	4.56
weight	31 lbs.	32 lbs.	33 lbs.
volume tank	0.31 Gal.		
type HP 451			
connection	-16SAE	-20SAE	-24SAE
A	20.59	20.86	21.06
B	19.48	19.60	19.68
C	23.03	23.03	23.03
D	1.10	1.25	1.37
E	2.75	2.87	2.95
F	4.40	4.56	4.56
weight	36 lbs.	38 lbs.	39 lbs.
volume tank	0.42 Gal.		



1) Connect the stand grounding tab to a suitable earth ground point.



Powering Business Worldwide

Dimensions: inches
Designs and performance values are subject to change.

Pressure Filter

Series HP 171-451

6000 PSI

Description:

Pressure filter series HP 171-451 have a working pressure up to 6000 PSI. Pressure peaks can be absorbed with a sufficient safety margin. The HP-filter is in-line mounted.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The bypass valve is integrated into the filter head.

After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

The reversing valve provides another level of protection for the filter element. The reverse flow will not be filtered.

1. Type index:

1.1. Complete filter: (ordering example)

HP. 171. 10VG. HR. E. P. - UG. 5. - - AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 | **series:**
HP = pressure filter
- 2 | **nominal size:** 171, 241, 361, 451
- 3 | **filter-material and filter-fineness:**
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
- 4 | **filter element collapse rating:**
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)
- 5 | **filter element design:**
E = single-end open
- 6 | **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 | **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601
- 8 | **process connection:**
UG = thread connection
- 9 | **process connection size:**
5 = -16 SAE
6 = -20 SAE
7 = -24 SAE
- 10 | **filter housing specification:** (see catalog)
- = standard
IS06 = for HFC applications, see sheet-no. 31605
- 11 | **internal valve:**
- = without
S1 = with by-pass valve Δp 51 PSI
S2 = with by-pass valve Δp 102 PSI
R = reversing valve, $Q \leq 55.75$ GPM
- 12 | **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 170. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 | **series:**
01E. = filter element according to company standard
- 2 | **nominal size:** 170, 240, 360, 450
- 3 | - 7 | see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	6000 PSI
test pressure:	8580 PSI
process connection:	thread connection
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) - \text{characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

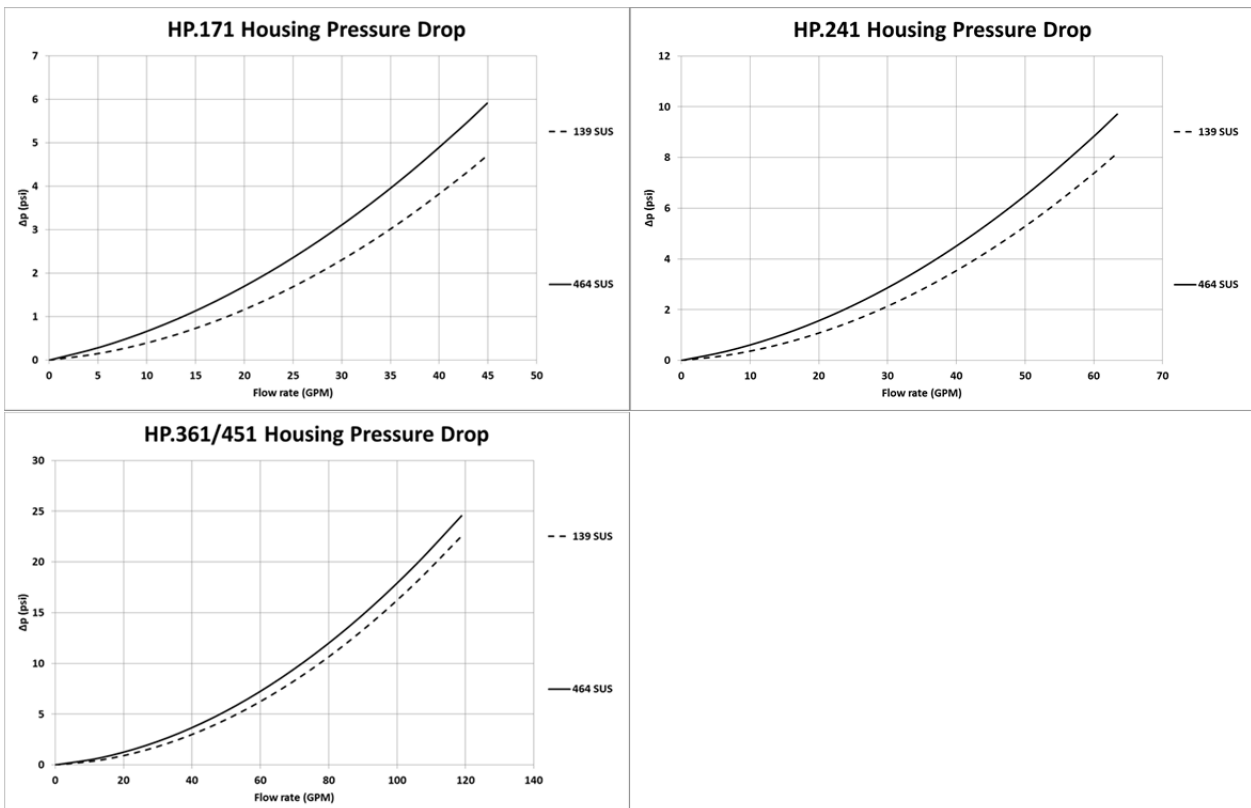
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

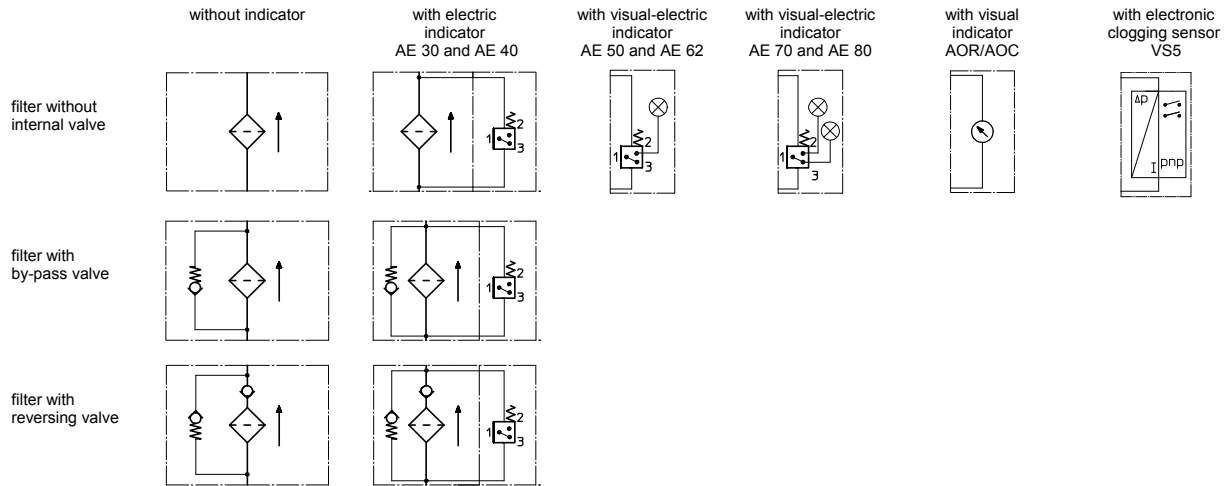
HP	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
171	2.714	1.884	1.206	1.036	0.708	0.0839	0.0783	0.0537
241	2.092	1.452	0.930	0.799	0.546	0.0651	0.0607	0.0416
361	1.530	1.062	0.680	0.584	0.399	0.0475	0.0444	0.0304
451	1.126	0.782	0.500	0.430	0.294	0.0349	0.0326	0.0223

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension				article-no.	
			HP 171	HP 241	HP 361	HP 451		
1	1	filter element	01E.170...	01E.240...	01E.360...	01E.450...		
2	1	O-ring	34 x 3,5				304338 (NBR)	304730 (FPM)
3	1	O-ring	75 x 3				302215 (NBR)	304729 (FPM)
4	1	support ring	81 x 2,6 x 1				304581	
5	1	clogging indicator visual	AOR or AOC				see sheet-no. 1606	
6	1	clogging indicator visual-electric	AE				see sheet-no. 1615	
7	1	clogging sensor electronic	VS5				see sheet-no. 1619	
8	1	O-ring	15 x 1,5				315357 (NBR)	315427 (FPM)
9	1	O-ring	22 x 2				304708 (NBR)	304721 (FPM)
10	1	O-ring	14 x 2				304342 (NBR)	304722 (FPM)
11	1	screw plug	20913-4				309817	

item 11 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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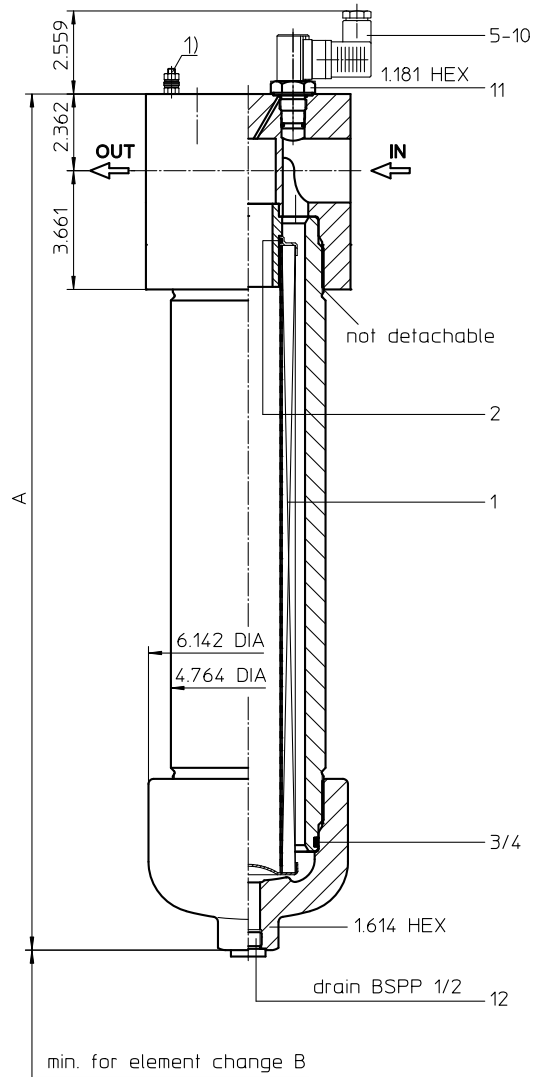
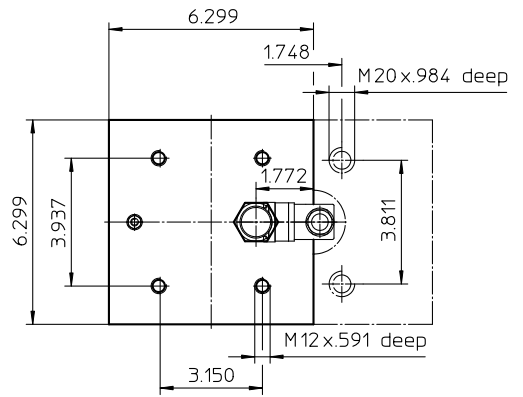
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Series HP 601-1351

6000 PSI



Dimensions:

type	HP 601	HP 901	HP 1351
connection	SAE 2"		
A	20.47	26.37	36.14
B	12.20	18.11	27.95
weight	108 lbs.	123 lbs.	150 lbs.
volume tank	0.55 Gal.	0.82 Gal.	1.21 Gal.

1) Connect the stand grounding tab to a suitable earth ground point.



Powering Business Worldwide

Dimensions: inches
 Designs and performance values are subject to change.

Pressure Filter

Series HP 601-1351

6000 PSI

Description:

Pressure filter series HP 601-1351 have a working pressure up to 6000 PSI. Pressure peaks can be absorbed with a sufficient safety margin. The HP-filter is in-line mounted.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head.

After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

The reversing valve provides another level of protection for the filter element. The reverse flow will not be filtered.

1. Type index:

1.1. Complete filter: (ordering example)

HP. 901. 10VG. HR. E. P. - FS. 8. - - AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

HP = pressure filter

2 nominal size: 601, 901, 1351

3 filter-material and filter-fineness:

80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass

4 filter element collapse rating:

30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601

8 process connection:

FS = SAE-flange 6000 PSI

9 process connection size:

8 = 2"

10 filter housing specification: (see catalog)

- = standard
IS06 = for HFC applications, see sheet-no. 31605

11 internal valve:

- = without
S1 = with bypass valve Δp 51 PSI
S2 = with bypass valve Δp 102 PSI
R = reversing valve, $Q \leq 122.94$ GPM

12 clogging indicator or clogging sensor:

- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 900. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to company standard

2 nominal size: 600, 900, 1350

3 - 7 see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium:	mineral oil, other media on request
max. operating pressure:	6000 PSI
test pressure:	8580 PSI
process connection:	SAE-flange 6000 PSI
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

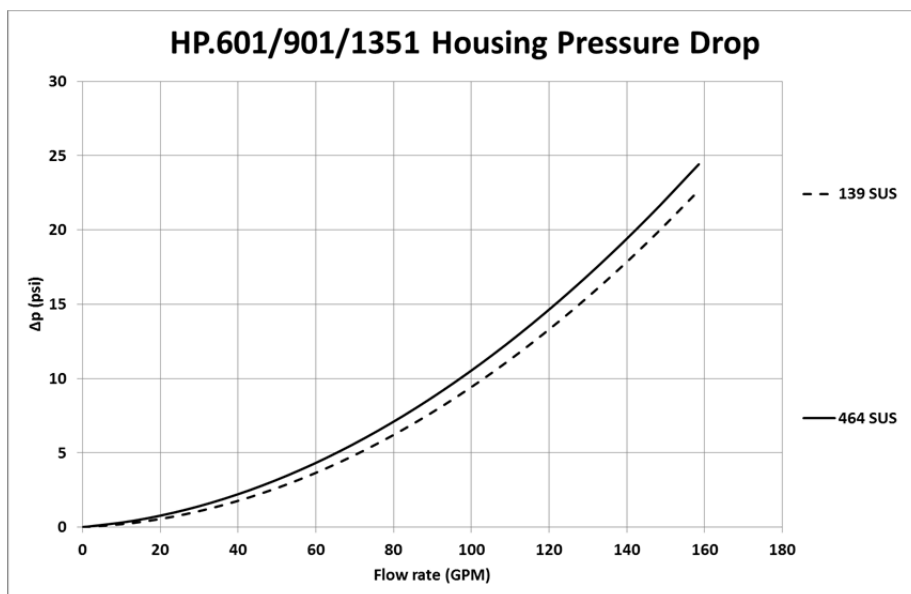
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

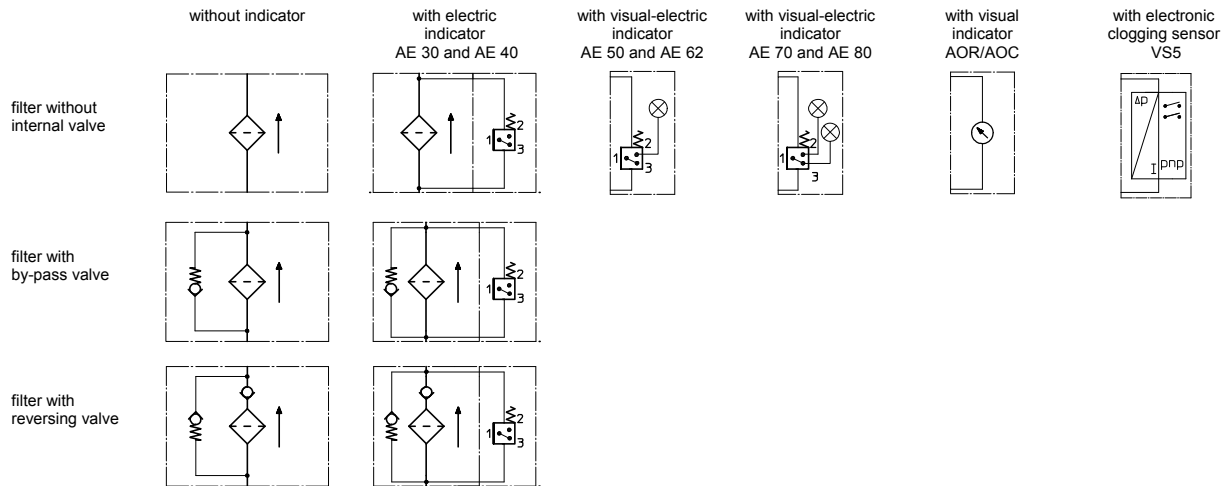
HP	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
601	2.714	1.884	1.206	1.036	0.708	0.0839	0.0783	0.0537
901	2.092	1.452	0.930	0.799	0.546	0.0651	0.0607	0.0416
1351	1.530	1.062	0.680	0.584	0.399	0.0475	0.0444	0.0304

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension			article-no.	
			HP 601	HP 901	HP 1351		
1	1	filter element	01E.600...	01E.900...	01E.1350...		
2	1	O-ring		48 x 3		304357 (NBR)	304404 (FPM)
3	1	O-ring		98 x 4		301914 (NBR)	304765 (FPM)
4	1	support ring		110 x 3,5 x 2			304802
5	1	clogging indicator, visual		AOR or AOC			see sheet no. 1606
6	1	clogging indicator, visual-electric		AE			see sheet no. 1615
7	1	clogging sensor, electronic		VS5			see sheet no. 1619
8	1	O-ring		15 x 1,5		315357 (NBR)	315427 (FPM)
9	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
10	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
11	1	screw plug		20913-4			309817
12	1	screw plug		G ½			304678

item 11 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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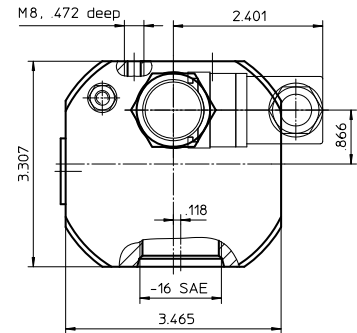
For more information, please

email us at filtration@eaton.com

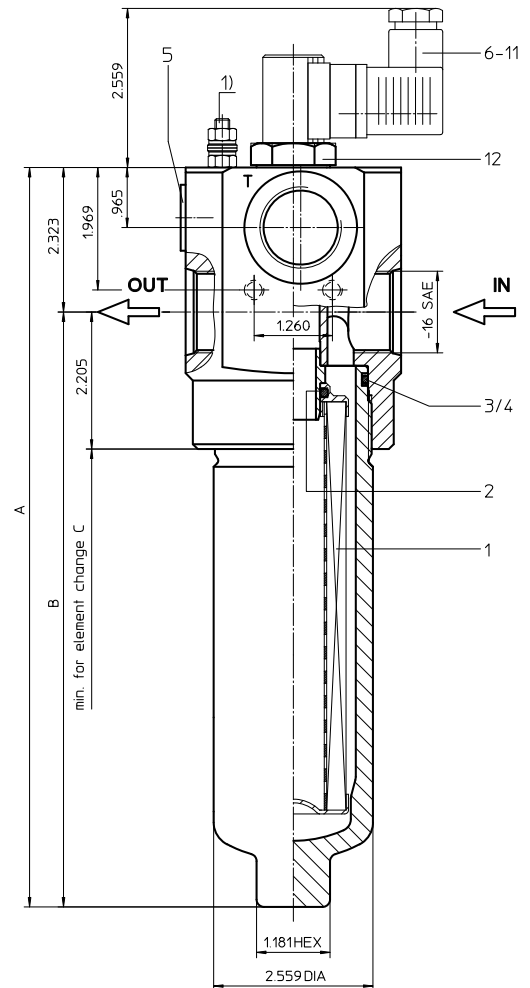
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Series HPV 60-150 6000 PSI



↓ tank



Dimensions:

type	HPV 60	HPV 90	HPV 150
connection	-16 SAE		
A	9.33	11.88	16.18
B	7.00	9.56	13.85
C	10.63	13.19	17.52
weight	14.30 lbs.	15.40 lbs.	17.60 lbs.
volume tank	.08 Gal.	.10 Gal.	.16 Gal.

1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series HPV 60-150

6000 PSI

Description:

Pressure filter series HPV 60-150 have a working pressure up to 6000 PSI. Pressure peaks can be absorbed with a sufficient safety margin. The HPV filter is in-line mounted.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 5 $\mu\text{m}_{(c)}$. Finer filtration is available upon request.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head. The differential pressure valve diverts the contaminated fluid to the tank when the element is clogged. During cold start, the differential pressure valve will divert the fluid to the tank until the system warms up.

1. Type index:

1.1. Complete filter: (ordering example)

HPV. 90. 10VG. HR. E. P. -. UG. 5. -. D2. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

HPV = pressure filter with differential pressure-valve

2 nominal size: 60, 90, 150

3 filter-material and filter-fineness:

80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass

4 filter element collapse rating:

30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification:

- = standard
VA = stainless steel

8 process connection:

UG = thread connection

9 process connection size:

5 = -16 SAE

10 filter housing specification:

- = standard

11 internal valve:

D1 = differential pressure-valve Δp 51 PSI
D2 = differential pressure-valve Δp 102 PSI

12 clogging indicator or clogging sensor:

- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 90. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to company standard

2 nominal size: 60, 90, 150

3 - 7 see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	6000 PSI
test pressure:	8580 PSI
process connection:	thread connection
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

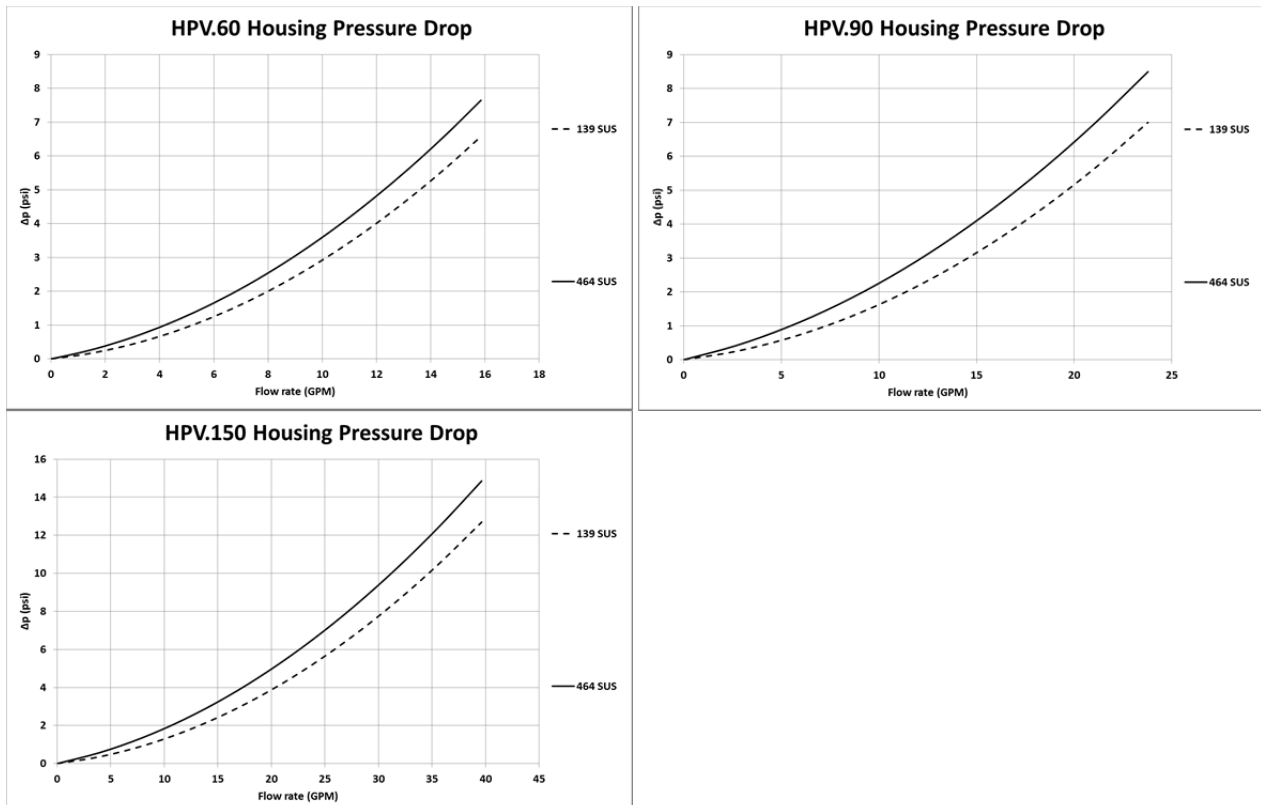
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

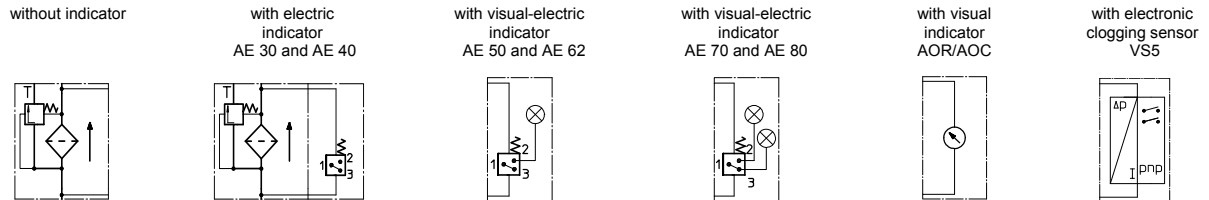
HPV	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
60	6.748	4.685	2.999	2.577	1.760	0.2002	0.1868	0.1280
90	4.059	2.818	1.804	1.550	1.059	0.1210	0.1130	0.0774
150	2.422	1.681	1.076	0.925	0.632	0.0723	0.0675	0.0462

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension			article-no.	
			HPV 60	HPV 90	HPV 150		
1	1	filter element	01E.60...	01E.90...	01E.150...		
2	1	O-ring		22 x 3,5		304341 (NBR)	304392 (FPM)
3	1	O-ring		54 x 3		304657 (NBR)	304720 (FPM)
4	1	support ring		61 x 2,6 x 1			304660
5	1	screw plug		1/2 BSPP			304678
6	1	clogging indicator visual		AOR or AOC		see sheet-no. 1606	
7	1	clogging indicator visual-electric		AE		see sheet-no. 1615	
8	1	clogging sensor electronic		VS5		see sheet-no. 1619	
9	1	O-ring		15 x 1,5		315357 (NBR)	315427 (FPM)
10	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
11	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
12	1	screw plug		20913-4		309817	

item 12 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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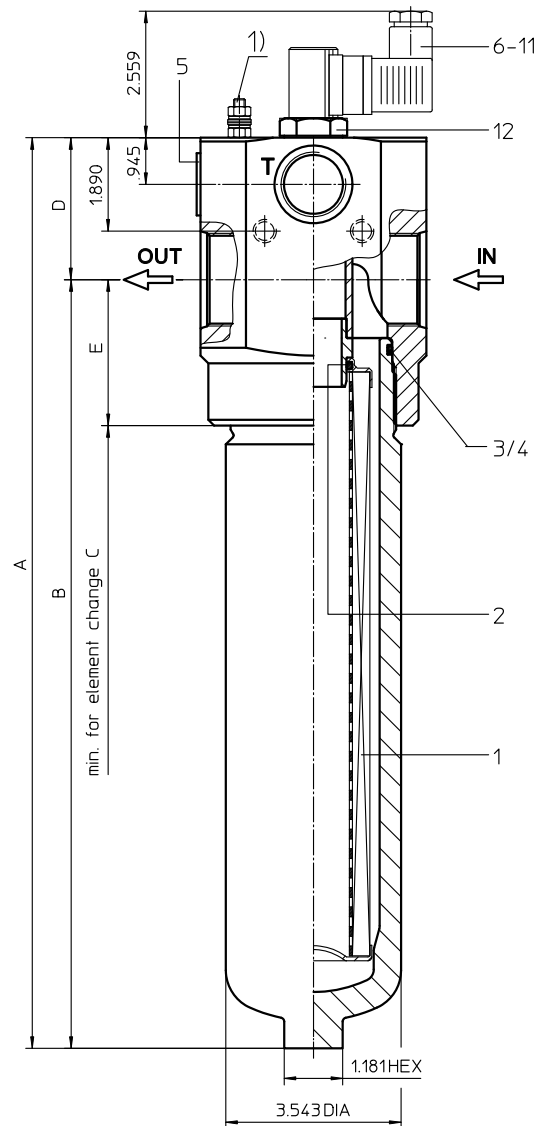
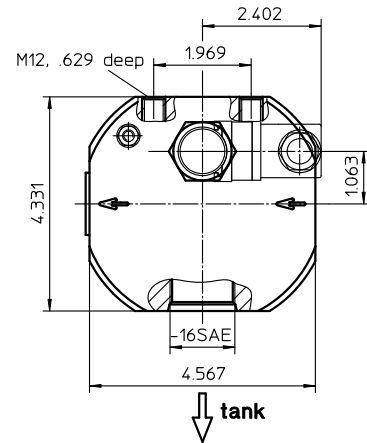
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Series HPV 170-450 6000 PSI

Dimensions:

type	HPV 170		
connection	-16SAE	-20SAE	-24SAE
A	13.26	13.26	13.46
B	10.35	10.35	10.43
C	13.77	13.77	13.77
D	2.91	2.91	3.03
E	2.87	2.87	2.95
weight	30 lbs.	32 lbs.	33 lbs.
volume tank	0.18 Gal.		
type	HPV 240		
connection	-16SAE	-20SAE	-24SAE
A	15.23	15.23	15.43
B	12.32	12.32	12.40
C	15.74	15.74	15.74
D	2.91	2.91	3.03
E	2.87	2.87	2.95
weight	33 lbs.	35 lbs.	36 lbs.
volume tank	23 Gal.		
type	HPV 3610		
connection	-16SAE	-20SAE	-24SAE
A	18.38	18.38	18.58
B	15.47	15.47	15.55
C	18.89	18.89	18.89
D	2.91	2.91	3.03
E	2.87	2.87	2.95
weight	37 lbs.	39 lbs.	40 lbs.
volume tank	0.31 Gal.		
type	HPV 450		
connection	-16SAE	-20SAE	-24SAE
A	22.51	22.51	22.71
B	19.60	19.60	19.68
C	23.03	23.03	23.03
D	2.91	2.91	3.03
E	2.87	2.87	2.95
weight	42 lbs.	44 lbs.	45 lbs.
volume tank	0.42 Gal.		



1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series HPV 170-450

6000 PSI

Description:

Pressure filter series HPV 170-450 have a working pressure up to 6000 PSI. Pressure peaks can be absorbed with a sufficient safety margin. The HPV filter is in-line mounted.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 5 $\mu\text{m}_{(c)}$. Finer filtration is available upon request.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head. The differential pressure valve diverts the contaminated fluid to the tank when the element is clogged. During cold start, the differential pressure valve will divert the fluid to the tank until the system warms up.

1. Type index:

1.1. Complete filter: (ordering example)

HPV. 360. 10VG. HR. E. P. - UG. 7. - D2. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- | | |
|----|--|
| 1 | series:
HPV = pressure filter with differential pressure-valve |
| 2 | nominal size: 170, 240, 360, 450 |
| 3 | filter-material and filter-fineness:
80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass |
| 4 | filter element collapse rating:
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI) |
| 5 | filter element design:
E = single-end open |
| 6 | sealing material:
P = Nitrile (NBR)
V = Viton (FPM) |
| 7 | filter element specification:
- = standard
VA = stainless steel |
| 8 | process connection:
UG = thread connection |
| 9 | process connection size:
5 = -16 SAE
6 = -20 SAE
7 = -24 SAE |
| 10 | filter housing specification:
- = standard |
| 11 | internal valve:
D1 = differential pressure-valve Δp 51 PSI
D2 = differential pressure-valve Δp 102 PSI |
| 12 | clogging indicator or clogging sensor:
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619 |

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 360. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- | | |
|---|---|
| 1 | series:
01E. = filter element according to company standard |
| 2 | nominal size: 170, 240, 360, 450 |
| 3 | - 7 \| see type index-complete filter |

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	6000 PSI
test pressure:	8580 PSI
process connection:	thread connection
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

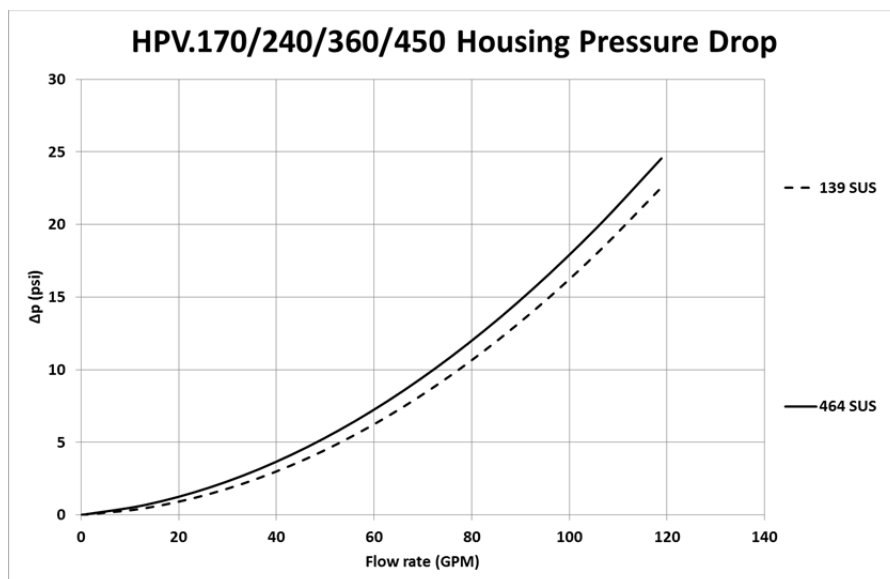
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

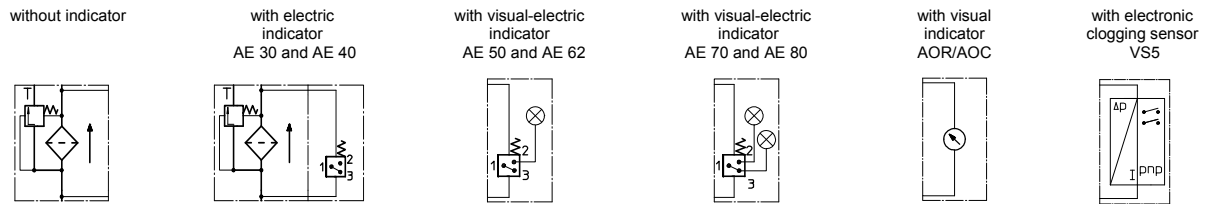
HPV	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
170	2.714	1.884	1.206	1.036	0.708	0.0839	0.0783	0.0537
240	2.092	1.452	0.930	0.799	0.546	0.0651	0.0607	0.0416
360	1.530	1.062	0.680	0.584	0.399	0.0475	0.0444	0.0304
450	1.126	0.782	0.500	0.430	0.294	0.0349	0.0326	0.0223

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension				article-no.	
			HPV 170	HPV 240	HPV 360	HPV 450		
1	1	filter element	01E.170...	01E.240...	01E.360...	01E.450...		
2	1	O-ring	34 x 3,5				304338 (NBR)	304730 (FPM)
3	1	O-ring	75 x 3				302215 (NBR)	304729 (FPM)
4	1	support ring	81 x 2,6 x 1				304581	
5	1	screw plug	3/4 BSPP				308529	
6	1	clogging indicator visual	AOR or AOC				see sheet-no. 1606	
7	1	clogging indicator visual-electric	AE				see sheet-no. 1615	
8	1	clogging sensor electronic	VS5				see sheet-no. 1619	
9	1	O-ring	15 x 1,5				315357 (NBR)	315427 (FPM)
10	1	O-ring	22 x 2				304708 (NBR)	304721 (FPM)
11	1	O-ring	14 x 2				304342 (NBR)	304722 (FPM)
12	1	screw plug	20913-4				309817	

item 12 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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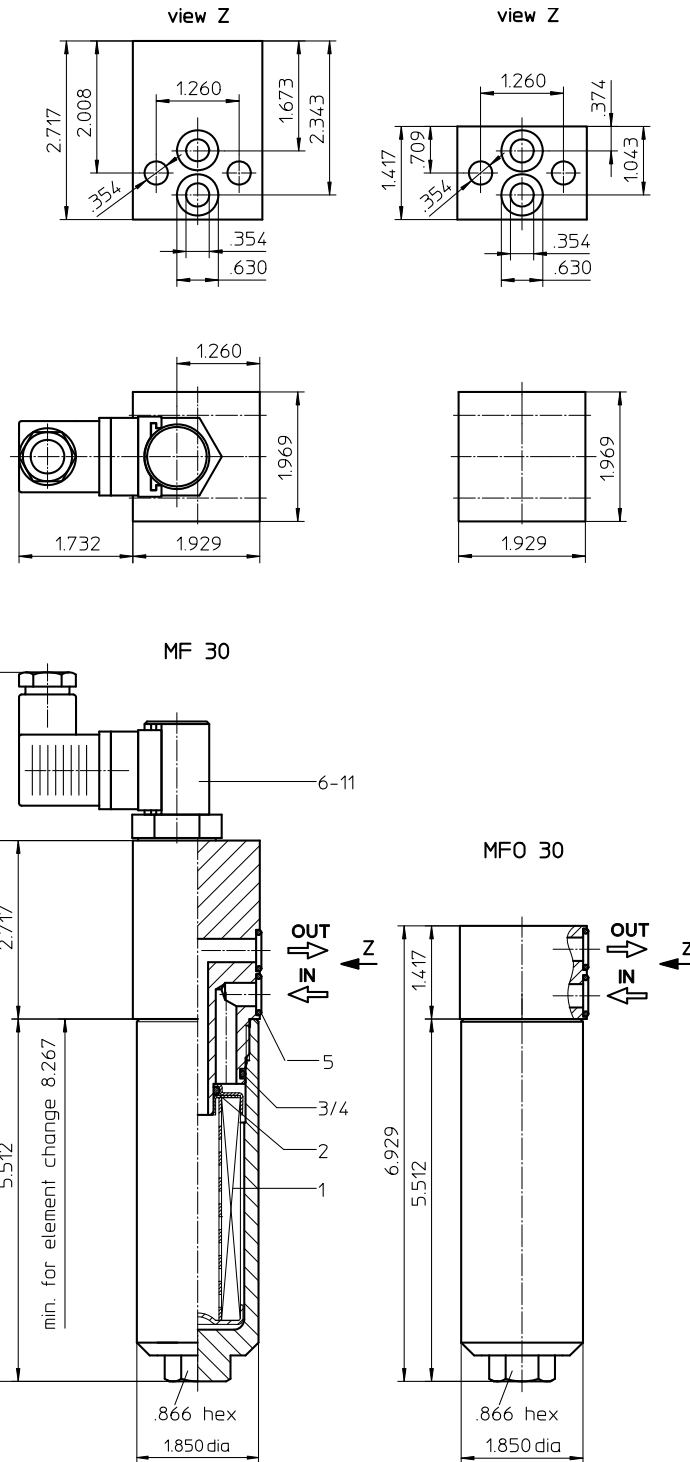
Brazil

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Series MF/MFO 30 2320 PSI



Weight without indicator: approx. 2.60 lbs.
Weight with indicator: approx. 3.10 lbs

Dimensions: inches

Designs and performance values are subject to change!

Pressure Filter

Series MF/MFO 30

2320 PSI

Description:

Pressure filter series MF30 and MFO30 have a working pressure up to 2320 PSI. Pressure peaks can be absorbed with a sufficient safety margin. The filters are flange mounted to the hydraulic system.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 5 $\mu\text{m}_{(c)}$. Finer filtration is available upon request.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

1. Type index:

1.1. Complete filter: (ordering example)

MF. 30. 10VG. HR. E. P. - . F. 2. - . AE

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

1 series:

MF = medium pressure filter, manifold mounted with indicator
MFO = medium pressure filter, manifold mounted without indicator

2 nominal size: 30

3 filter-material and filter-fineness:

80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass

4 filter element collapse rating:

30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601

8 process connection:

F = manifold mounted

9 process connection size:

2 = 3/8"

10 filter housing specification: (see catalog)

- = standard
IS06 = for HFC applications, see sheet-no. 31605

11 clogging indicator or clogging sensor:

series MFO:
- = without
series MF:
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 30. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to company standard

2 nominal size: 30

3 - 7 see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	2320 PSI
test pressure:	3318 PSI
process connection:	manifold mounted
housing material:	Al, C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	.02 Gal

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

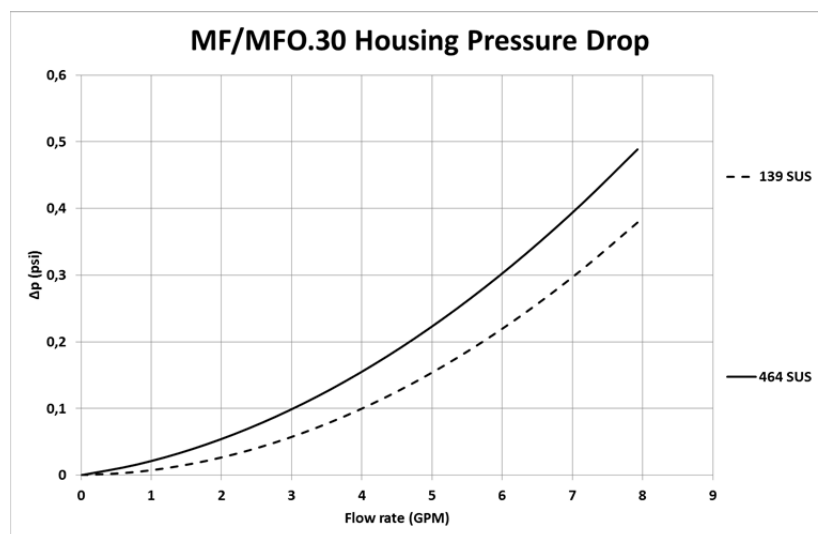
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

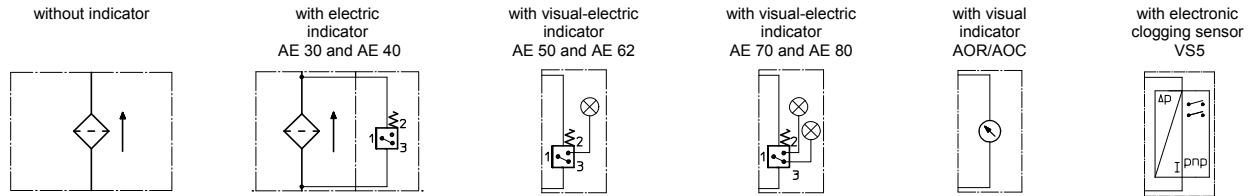
MF/MFO	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
30	12.554	8.716	5.580	4.794	3.275	0.2539	0.2369	0.1623

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01E.30...		
2	1	O-ring	11 x 3	312603 (NBR)	312727 (FPM)
3	1	O-ring	32 x 2,5	306843 (NBR)	308268 (FPM)
4	1	support ring	37 x 2,1 x 1	305466	
5	2	O-ring	12 x 2	311014 (NBR)	310271 (FPM)
6	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
7	1	clogging indicator, visual-electric	AE	see sheet-no. 1615	
8	1	clogging sensor, electronic	VS5	see sheet-no. 1619	
9	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
10	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
11	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
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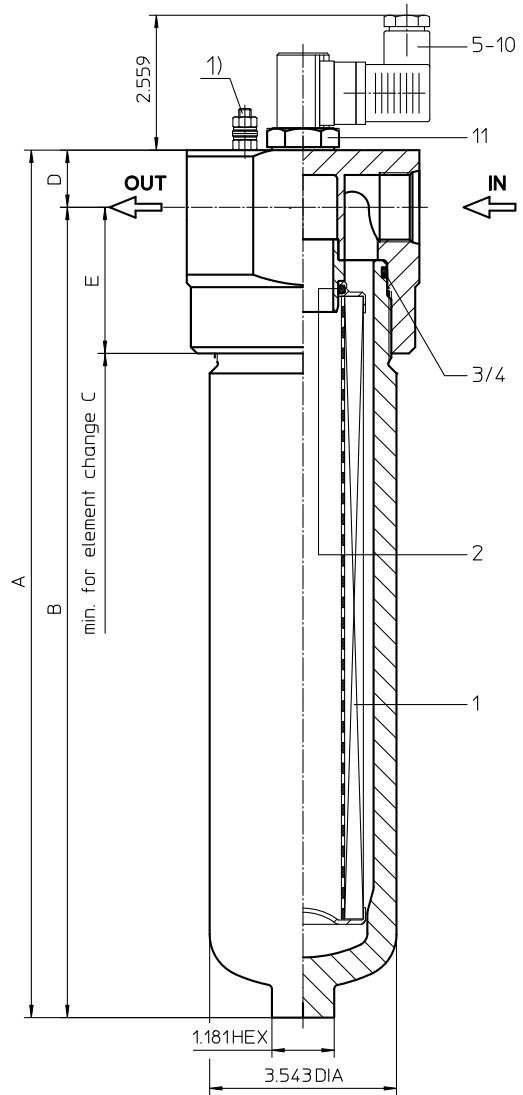
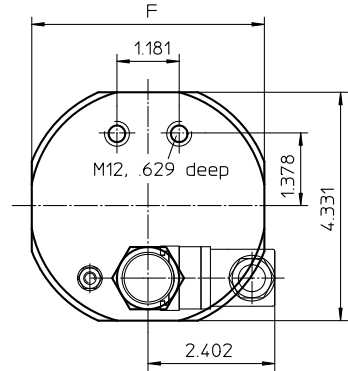
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Series ML 170-450

2320 PSI



Dimensions:

type	ML 170	ML 240	ML 360	ML 450
connection	-16 SAE			
A	11.33	13.30	16.45	20.59
B	10.23	12.20	15.35	19.48
C	13.77	15.74	18.89	23.03
D	1.10	1.10	1.10	1.10
E	2.76	2.76	2.76	2.76
F	4.40	4.40	4.40	4.40
weight	16.5 lbs.	18.7 lbs.	22.2 lbs.	28.8 lbs.
volume tank	.18 Gal.	.23 Gal.	.31 Gal.	.42 Gal.

type	ML 170	ML 240	ML 360	ML 450
connection	-24 SAE			
A	11.81	13.77	16.92	21.06
B	10.43	12.40	15.55	19.68
C	13.77	15.74	18.89	23.03
D	1.37	1.37	1.37	1.37
E	2.95	2.95	2.95	2.95
F	4.56	4.56	4.56	4.56
weight	17.3 lbs.	19.5 lbs.	23.1 lbs.	29.7 lbs.
volume tank	.18 Gal.	.23 Gal.	.31 Gal.	.42 Gal.

1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series ML 170-450

2320 PSI

Description:

Pressure filter series ML 170-450 have a working pressure up to 2320 PSI. Pressure peaks can be absorbed with a sufficient safety margin. The ML-filter is in-line mounted.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 5 $\mu\text{m}_{(c)}$. Finer filtration is available upon request.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head. After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

The reversing valve provides another level of protection for the filter element. The reverse flow will not be filtered.

1. Type index:

1.1. Complete filter: (ordering example)

ML. 360. 10VG. HR. E. P. -. UG. 5. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

ML = in-line filter-medium pressure range

2 nominal size: 170, 240, 360, 450

3 filter-material and filter-fineness:

80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass

4 filter element collapse rating:

30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601

8 process connection:

UG = thread connection

9 process connection size:

5 = -16 SAE
7 = -24 SAE

10 filter housing specification: (see catalog)

- = standard
IS06 = for HFC applications, see sheet-no. 31605

11 internal valve:

- = without
S1 = with by-pass valve Δp 51 PSI
S2 = with by-pass valve Δp 102 PSI
R = reversing valve, $Q \leq 55.75$ GPM

12 clogging indicator or clogging sensor:

- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 360. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E. = filter element according to company standard

2 nominal size: 170, 240, 360, 450

3 - 7 see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	2320 PSI
test pressure:	3320 PSI
process connection:	thread connection
housing material:	Al; C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v(SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

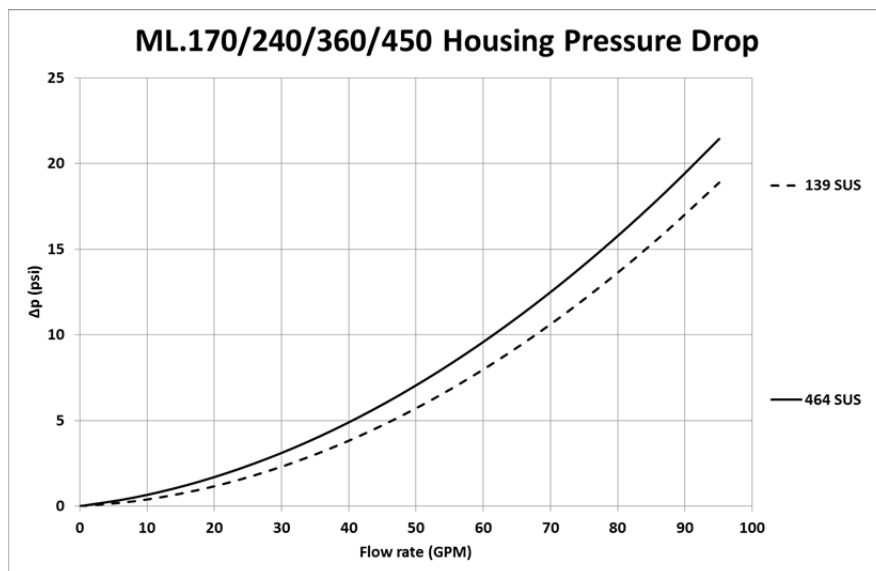
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

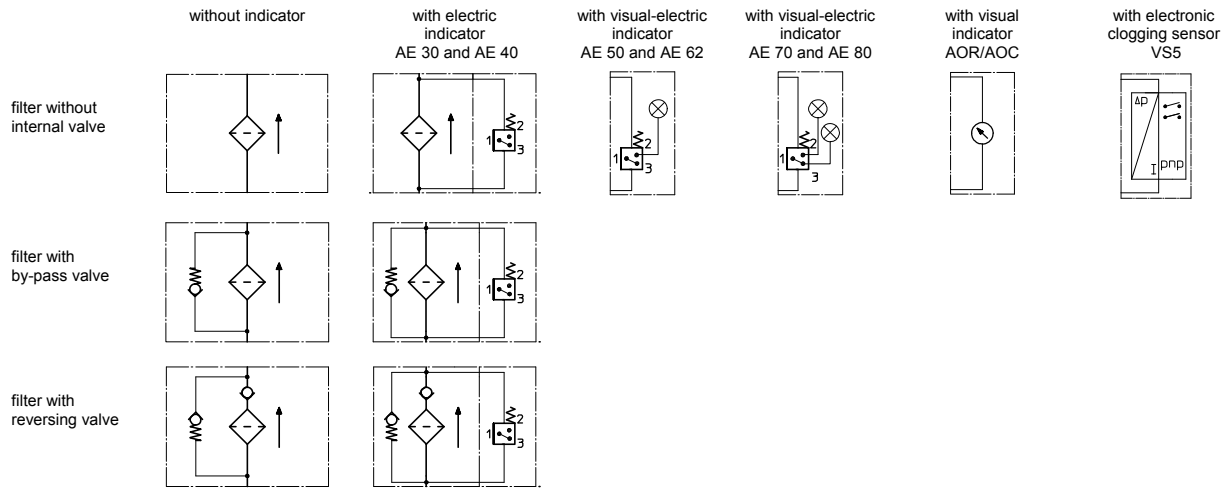
ML	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
170	2.714	1.884	1.206	1.036	0.708	0.0839	0.0783	0.0537
240	2.092	1.452	0.930	0.799	0.546	0.0651	0.0607	0.0416
360	1.530	1.062	0.680	0.584	0.399	0.0475	0.0444	0.0304
450	1.126	0.782	0.500	0.430	0.294	0.0349	0.0326	0.0223

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension				article-no.	
			ML 170	ML 240	ML 360	ML 450		
1	1	filter element	01E.170...	01E.240...	01E.360...	01E.450...		
2	1	O-ring	34 x 3,5				304338 (NBR)	304730 (FPM)
3	1	O-ring	75 x 3				302215 (NBR)	304729 (FPM)
4	1	support ring	81 x 2,6 x 1				304581	
5	1	clogging indicator visual	AOR or AOC				see sheet-no. 1606	
6	1	clogging indicator visual-electric	AE				see sheet-no. 1615	
7	1	clogging sensor electronic	VS5				see sheet-no. 1619	
8	1	O-ring	15 x 1,5				315357 (NBR)	315427 (FPM)
9	1	O-ring	22 x 2				304708 (NBR)	304721 (FPM)
10	1	O-ring	14 x 2				304342 (NBR)	304722 (FPM)
11	1	screw plug	20913-4				309817	

item 11 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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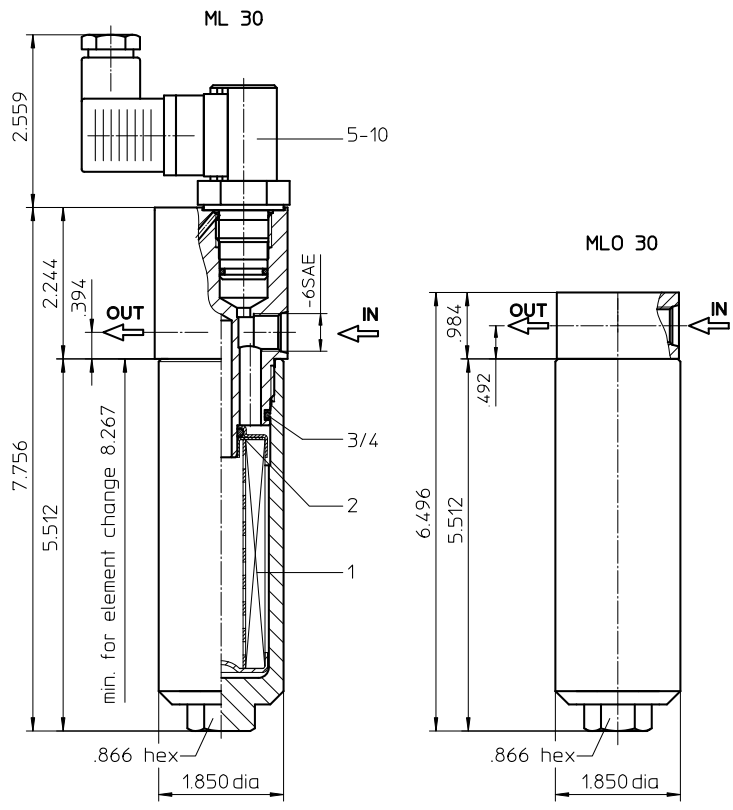
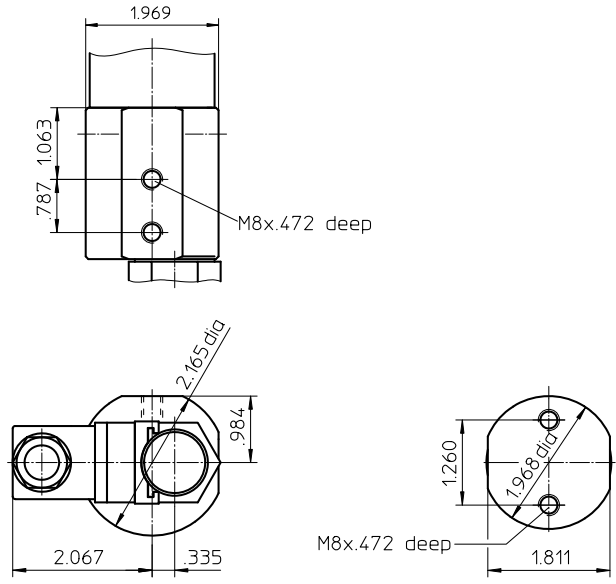
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Series ML/MLO 30

2320 PSI



Weight without indicator: approx. 2.50 lbs.
 Weight with indicator: approx. 2.90 lbs

Dimensions: inches

Designs and performance values are subject to change.

Pressure Filter

Series ML/MLO 30

2320 PSI

Description:

Pressure filter series ML30 and MLO30, have a working pressure up to 2320 PSI. Pressure peaks can be absorbed with a sufficient safety margin. The Filter is in-line mounted.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

1. Type index:

1.1. Complete filter: (ordering example)

ML.	30.	10VG.	HR.	E.	P.	-	UG.	1.	-	AE
1	2	3	4	5	6	7	8	9	10	11

1 series:

ML = in-line filter-medium pressure range with indicator
MLO = in-line filter-medium pressure range without indicator

2 nominal size: 30

3 filter-material and filter-fineness:

80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass

4 filter element collapse rating:

30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601

8 process connection:

UG = thread connection

9 process connection size:

1 = -6 SAE

10 filter housing specification: (see catalog)

- = standard
IS06 = for HFC application, see sheet-no. 31605

11 clogging indicator or clogging sensor:

series MLO:
- = without
series ML:
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E.	30.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 series:

01E. = filter element according to company standard

2 nominal size: 30

3 - 7 see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	2320 PSI
test pressure:	3318 PSI
process connection:	thread connection
housing material:	Al, C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	.02 Gal

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

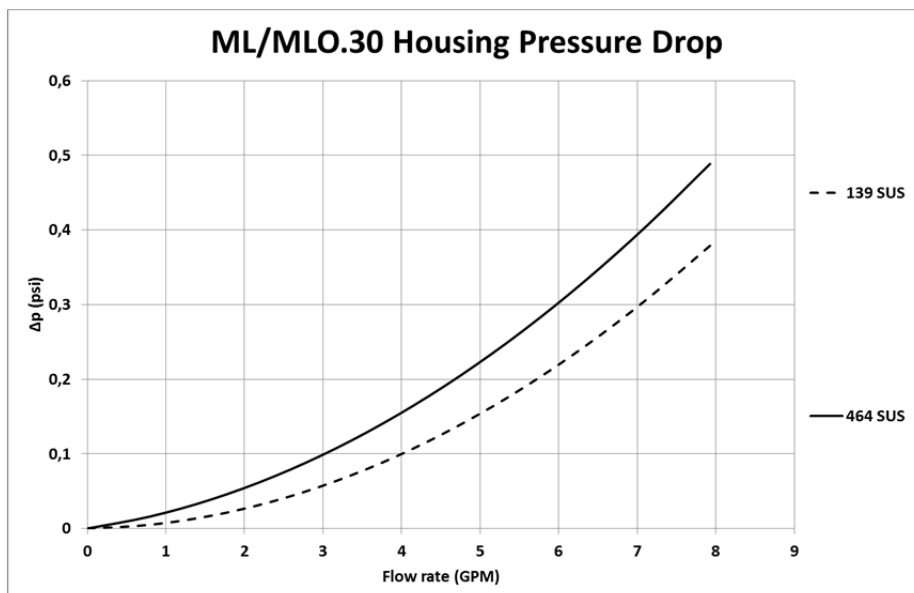
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

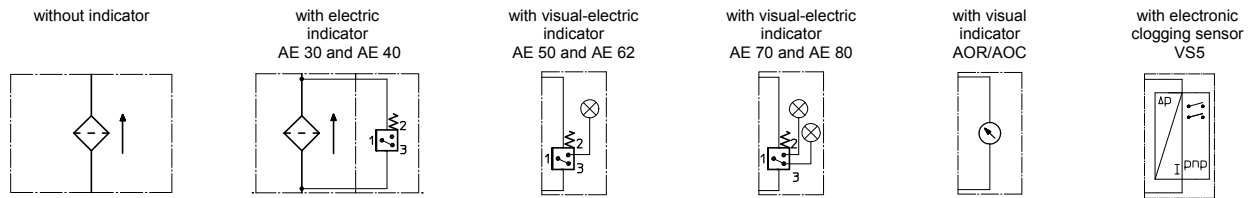
ML/MLO	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
30	12.554	8.716	5.580	4.794	3.275	0.2539	0.2369	0.1623

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01E.30...		
2	1	O-ring	11 x 3	312603 (NBR)	312727 (FPM)
3	1	O-ring	32 x 2,5	306843 (NBR)	308268 (FPM)
4	1	support ring	37 x 2,1 x 1	305466	
5	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
6	1	clogging indicator, visual-electric	AE	see sheet-no. 1615	
7	1	clogging sensor, electronic	VS5	see sheet-no. 1619	
8	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
9	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
10	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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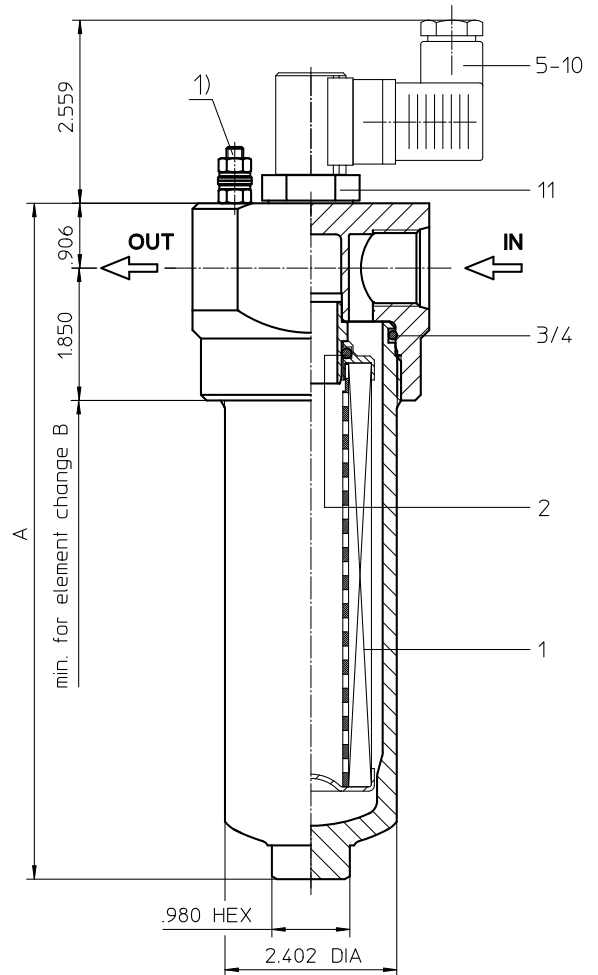
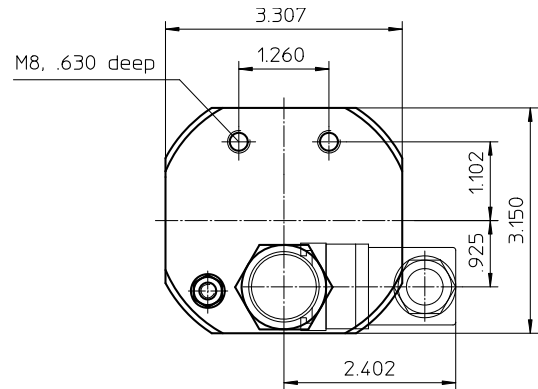
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Series MNL 40-100

2320 PSI



Dimensions:

type	MNL 40	MNL 63	MNL100
connection	-8 SAE	-12 SAE	-16 SAE
A	7.17	9.53	13.07
B	8.26	10.62	14.17
weight	4.41 lbs.	5.51 lbs.	7.28 lbs.
volume tank	.06 Gal.	.09 Gal.	.14 Gal.

1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series MNL 40-100

2320 PSI

Description:

Pressure filter series MNL 40-100 have a working pressure up to 2320 PSI. Pressure peaks can be absorbed with a sufficient safety margin. The MNL-filters is in-line mounted.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 5 $\mu\text{m}_{(c)}$. Finer filtration is available upon request.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head. After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

The reversing valve provides another level of protection for the filter element. The reverse flow will not be filtered.

1. Type index:

1.1. Complete filter: (ordering example)

MNL.	63.	10VG.	HR.	E.	P.	-	UG.	4.	-	-	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 series:

MNL = standard in-line filter-medium pressure range according to DIN 24550 T1, T2

2 nominal size: 40, 63, 100

3 filter-material and filter-fineness:

80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass

4 filter element collapse rating:

30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601

8 process connection:

UG = thread connection

9 process connection size:

3 = -8 SAE
4 = -12 SAE
5 = -16 SAE

10 filter housing specification: (see catalog)

- = standard
IS06 = for HFC applications, see sheet-no. 31605

11 internal valve:

- = without
S1 = with by-pass valve Δp 51 PSI
S2 = with by-pass valve Δp 102 PSI
R = reversing valve, $Q \leq 18.50$ GPM

12 clogging indicator or clogging sensor:

- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01NL.	63.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 series:

01NL. = filter element according to DIN 24550, T3

2 nominal size: 40, 63, 100

3 - 7 see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	2320 PSI
test pressure:	3320 PSI
process connection:	thread connection
housing material:	aluminum forging alloy; C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

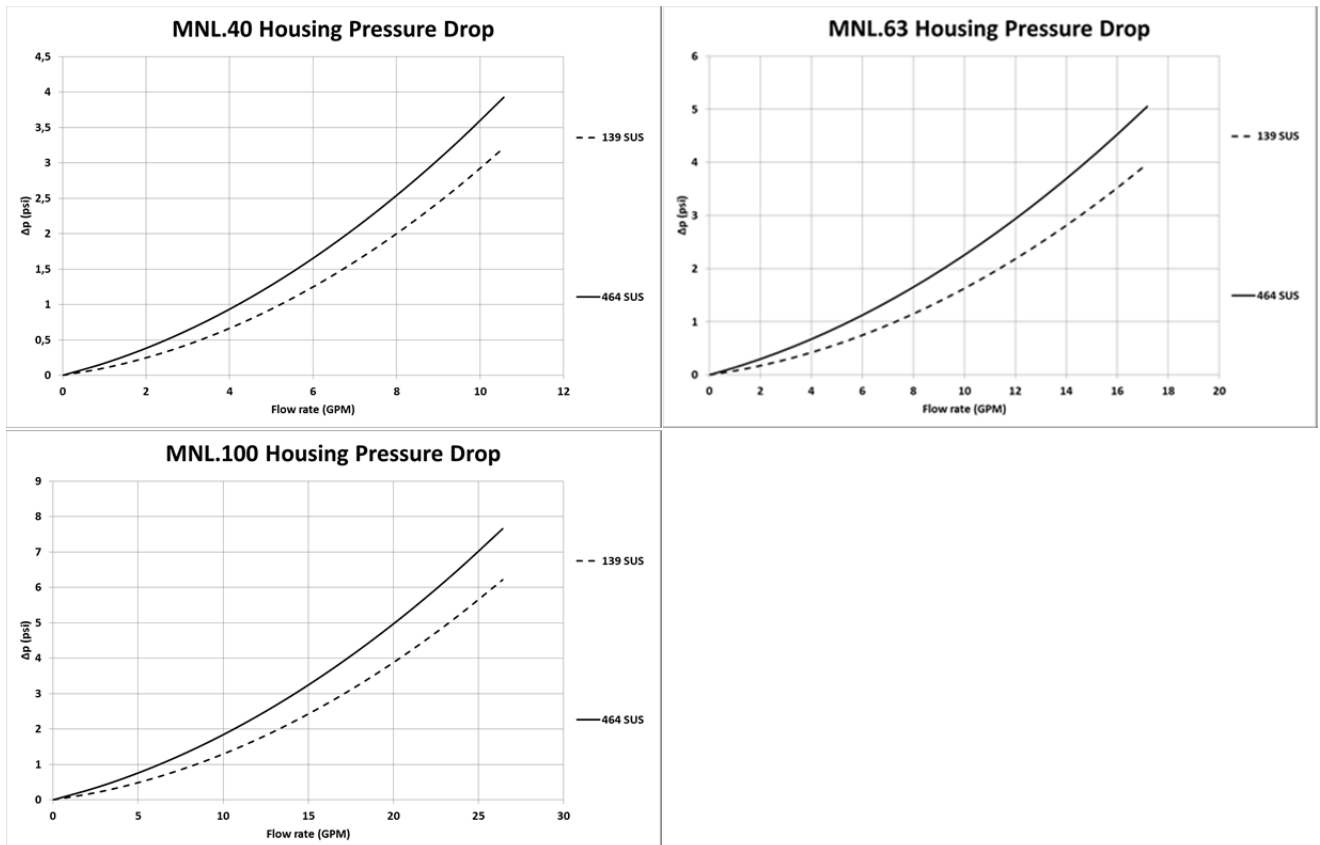
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

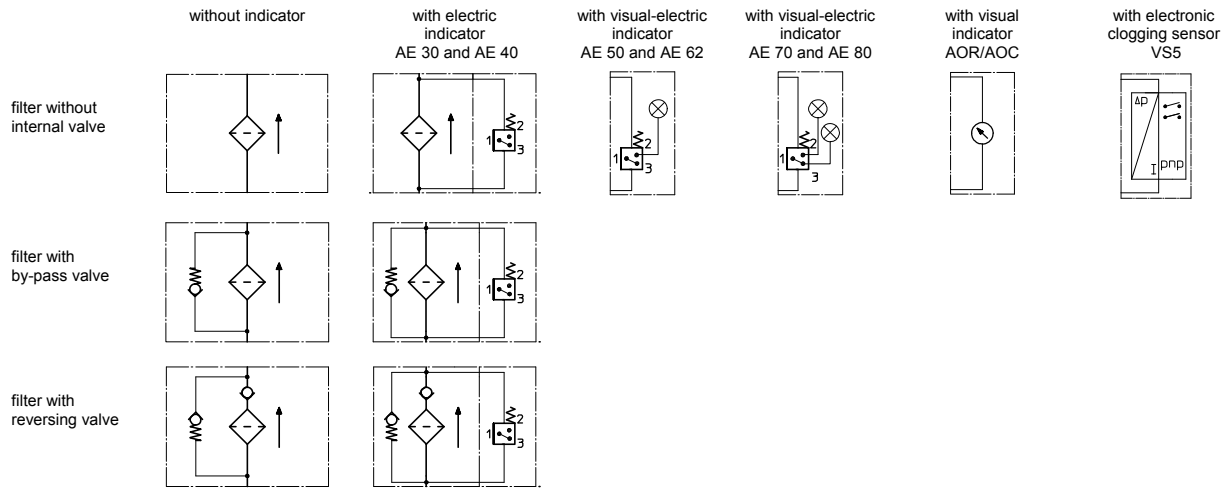
MNL	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
40	6.991	4.853	3.107	2.705	1.848	0.1893	0.1766	0.1210
63	4.241	2.926	1.873	1.631	1.114	0.1131	0.1056	0.0723
100	2.640	1.833	1.173	1.021	0.698	0.0699	0.0652	0.0447

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension			article-no.	
			MNL 40	MNL 63	MNL 100		
1	1	filter element	01NL.40...	01NL.63...	01NL.100...		
2	1	O-ring		22 x 3,5		304341 (NBR)	304392 (FPM)
3	1	O-ring		54 x 3		304657 (NBR)	304720 (FPM)
4	1	support ring		60 x 2,6 x 1			311779
5	1	clogging indicator visual		AOR or AOC			see sheet-no. 1606
6	1	clogging indicator visual-electric		AE			see sheet-no. 1615
7	1	clogging sensor electronic		VS5			see sheet-no. 1619
8	1	O-ring		15 x 1,5		315357 (NBR)	315427 (FPM)
9	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
10	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
11	1	screw plug		20913-4			309817

item 11 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
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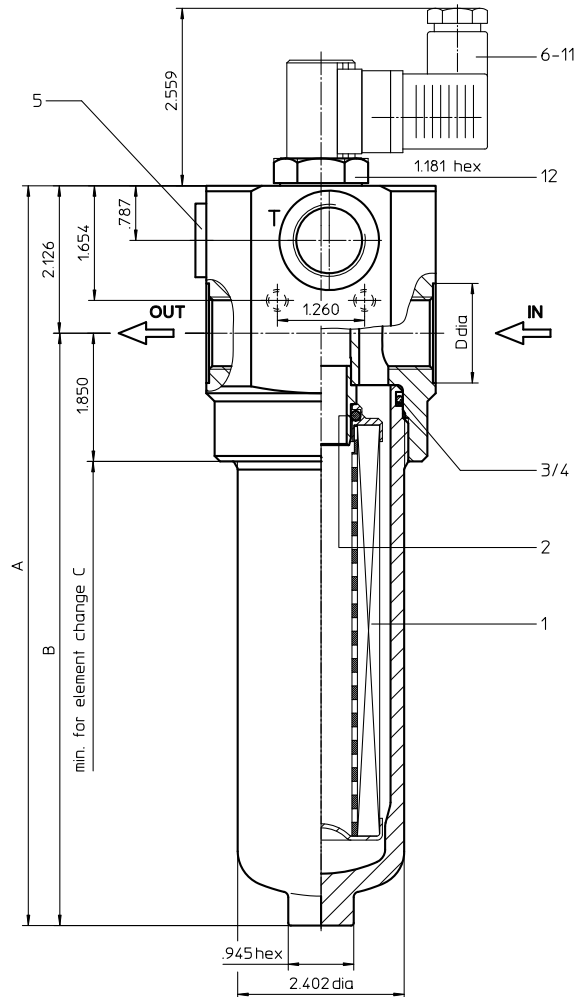
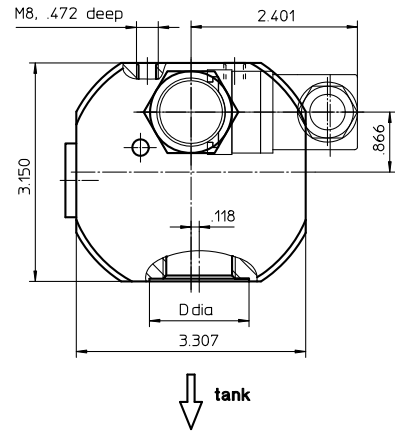
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Series MDV 40-63

2900 PSI



Dimensions:

type	MDV 40	MDV 63
connection	- 8 SAE	-12 SAE
A	8.30	10.67
B	6.18	8.54
C	10.43	12.80
weight approx.	5.94 lbs.	7.04 lbs.
volume tank	0.06 Gal.	0.09 Gal.

Dimensions: inches

Designs and performance values are subject to change.

Pressure Filter

Series MDV 40-63

2900 PSI

Description:

Pressure filter series MDV have a working pressure up to 2900 PSI. The pressure peaks are absorbed by a sufficient margin of safety. The MDV-filter is in-line mounted.

The filter element meets DIN 24550T3 and consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 5 $\mu\text{m}_{(c)}$. Finer filtration is available upon request.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head. The differential pressure valve diverts the contaminated fluid to the tank when the element is clogged. During cold start, the differential pressure valve will divert the fluid to the tank until the system warms up.

1. Type index:

1.1. Complete filter: (ordering example)

MDV. 40. 10VG. HR. E. P. - UG. 3. - D2.AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- | | |
|----|--|
| 1 | series:
MDV = medium pressure filter with differential pressure-valve |
| 2 | nominal size: 40, 63 |
| 3 | filter-material and filter-fineness:
80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass |
| 4 | filter element collapse rating:
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI) |
| 5 | filter element design:
E = single-end open |
| 6 | sealing material:
P = Nitrile (NBR)
V = Viton (FPM) |
| 7 | filter element specification:
- = standard
VA = stainless steel |
| 8 | process connection:
UG = thread connection |
| 9 | process connection size:
3 = -8 SAE
4 = -12 SAE |
| 10 | filter housing specification:
- = standard |
| 11 | internal valve:
D1 = differential pressure-valve Δp 51 PSI
D2 = differential pressure-valve Δp 102 PSI |
| 12 | clogging indicator or clogging sensor:
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619 |

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01NL. 40. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- | | |
|---|--|
| 1 | series:
01NL. = standard filter element according to DIN 24550, T3 |
| 2 | nominal size: 40, 63 |
| 3 | - 7 \| see type index-complete filter |

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	2900 PSI
test pressure:	4147 PSI
process connection:	thread connection
housing material:	aluminum forging alloy, C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
air bleeding and mini-measuring connections dirt side:	BSPP ¼
measuring connections clean side:	BSPP ½

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

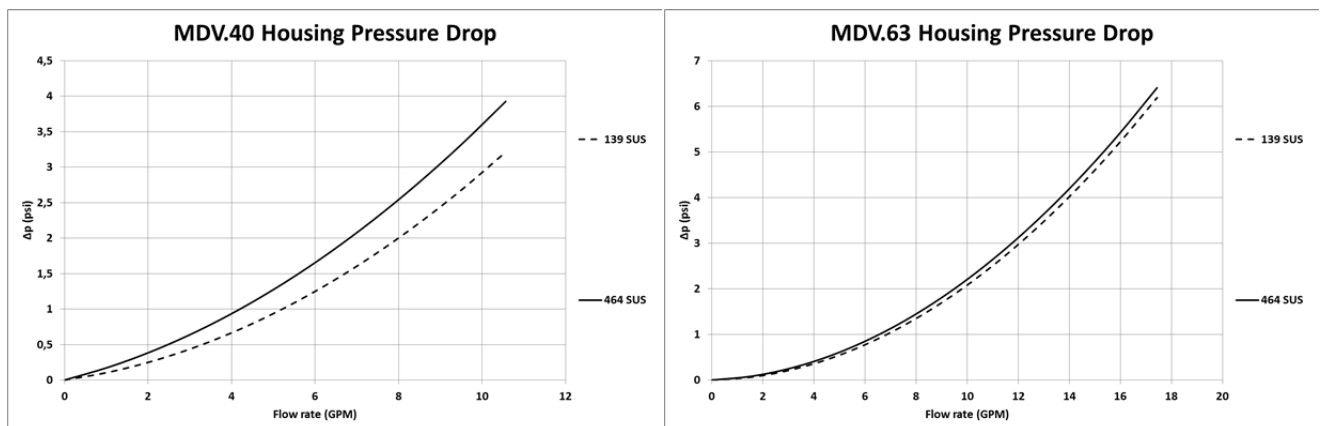
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

MDV	VG				
	3VG	6VG	10VG	16VG	25VG
40	6.991	4.853	3.107	2.705	1.848
63	4.214	2.926	1.873	1.631	1.114

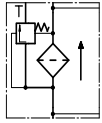
$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.

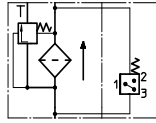


Symbols:

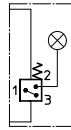
without indicator



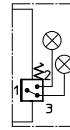
with electric indicator
AE 30 and AE 40



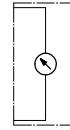
with visual-electric indicator
AE 50 and AE 62



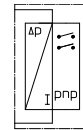
with visual-electric indicator
AE 70 and AE 80



with visual indicator
AOR/AOC



with electronic clogging sensor
VS5



Spare parts:

item	qty.	designation	dimension		article-no.	
			MDV 40	MDV 63		
1	1	filter element	01NL.40...	01NL.63...		
2	1	O-ring		22 x 3,5	304341 (NBR)	304392 (FPM)
3	1	O-ring		54 x 3	304657 (NBR)	304720 (FPM)
4	1	support ring		60 x 2,6 x 1		311779
5	1	screw plug		1/2 BSPP		304678
6	1	clogging indicator visual		AOR or AOC		see sheet-no. 1606
7	1	clogging indicator visual-electric		AE		see sheet-no. 1615
8	1	clogging sensor electronic		VS5		see sheet-no. 1619
9	1	O-ring		15 x 1,5	315357 (NBR)	315427 (FPM)
10	1	O-ring		22 x 2	304708 (NBR)	304721 (FPM)
11	1	O-ring		14 x 2	304342 (NBR)	304722 (FPM)
12	1	screw plug		20913-4		309817

item 12 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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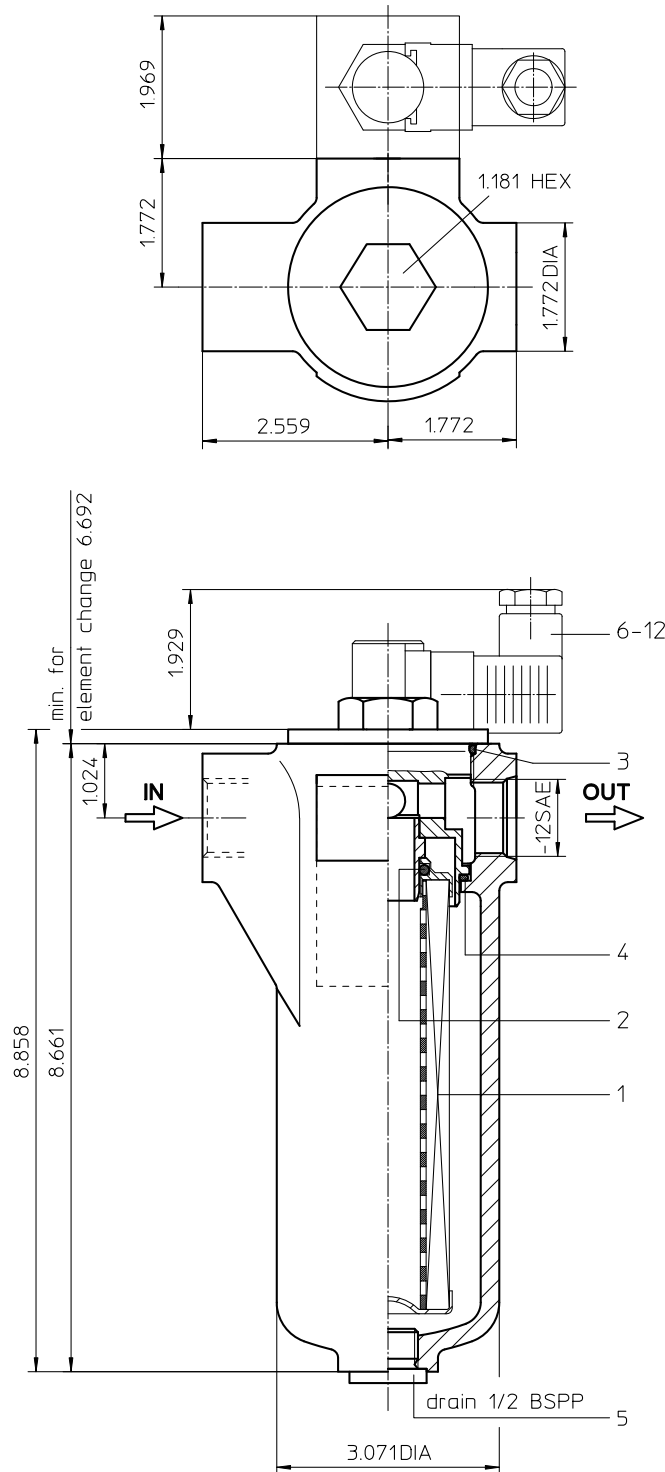
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Series LF 63 363 PSI



Weight: approx. 4.40 lbs.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series LF 63

363 PSI

Description:

In-line filter series LF 63 have a working pressure up to 363 PSI. Pressure peaks can be absorbed with a sufficient safety margin. The LF filter is mounted in-line. It can be used as suction filter, pressure filter and return-line filter.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

For cleaning the mesh element or changing the glass fiber element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

For filtration finer than 40 µm, use the disposable elements made of microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements upon request.

Eaton-filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The by-pass valve is integrated into the filter head. After reaching the by-pass pressure setting, the by-pass valve will send unfiltered partial flow around the filter.

Ship classifications available upon request.

1. Type index:

1.1. Complete filter: (ordering example)

LF. 63. 10VG. 30. E. P. - . UG. 4. - . - . AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

LF = In-line filter

2 nominal size: 63

3 filter-material and filter-fineness:

80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass

4 filter element collapse rating:

30 = Δp 435 PSI

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601
IS07 = for oil/amonia mixtures (NH3), see sheet-no. 31602

8 process connection:

UG = thread connection

9 process connection size:

4 = -12 SAE

10 filter housing specification: (see catalog)

- = standard
IS06 = for HFC applications, see sheet-no. 31605

11 internal valve:

- = without
S1 = with by-pass valve Δp 51 PSI

12 clogging indicator or clogging sensor:

- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01NL. 63. 10VG. 30. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01NL. = standard filter element according to DIN 24550, T3

2 nominal size: 63

3 - 7 see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	363 PSI
test pressure:	522 PSI
process connection:	thread connection
housing material:	aluminium-cast
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
measure connections:	BSPP ¼
drain- and bleeder connections:	BSPP ½
volume tank:	.18 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

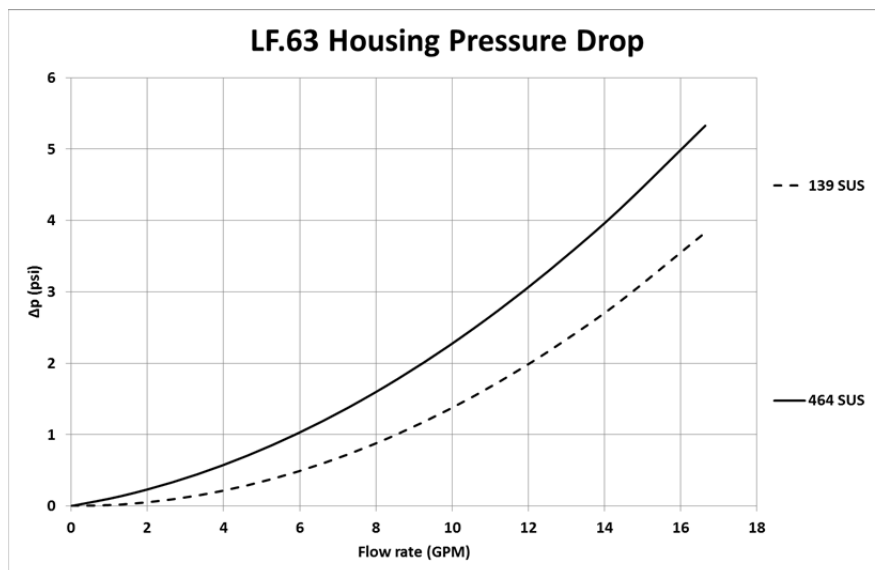
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

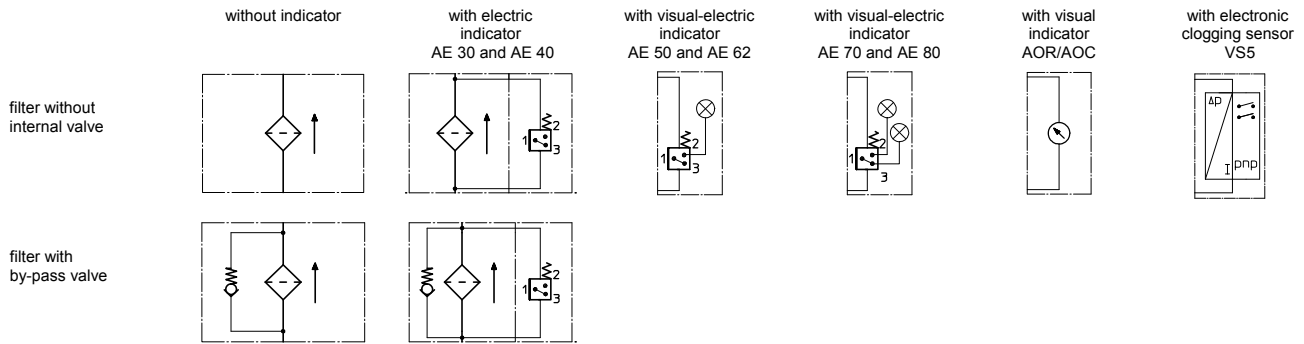
LF	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
63	4.214	2.926	1.873	1.631	11.4	0.1131	0.1056	0.0723

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01NL.63...		
2	1	O-ring	22 x 3,5	304341 (NBR)	304392 (FPM)
3	1	O-ring	56 x 3	305072 (NBR)	305322 (FPM)
4	1	O-ring	48 x 3	304357 (NBR)	304404 (FPM)
5	1	screw plug	1/2 BSPP	304678	
6	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
7	1	clogging indicator, visual-electrical	AE	see sheet-no. 1615	
8	1	clogging sensor, electrical	VS5	see sheet-no. 1619	
9	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
10	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
11	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
12	2	screw plug	1/8 BSPP	305496	

item 12 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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Brazil

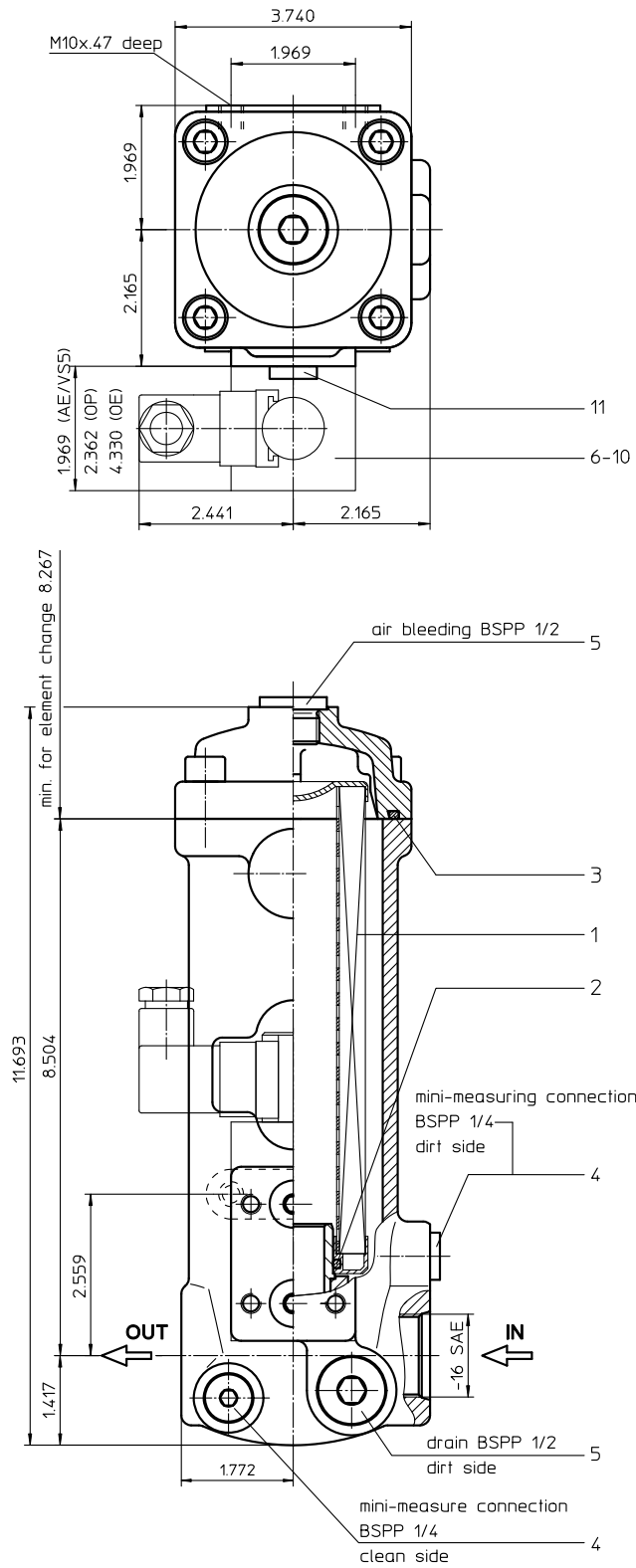
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Series LF 101

464 PSI



Weight: approx. 8.0 lbs.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series LF 101

464 PSI

Description:

In-line filters series LF 101 have a working pressure up to 464 PSI. Pressure peaks can be absorbed with a sufficient safety margin. The LF filter is mounted in-line. It can be used as suction filter, pressure filter and return-line filter.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

For cleaning the mesh element or changing the glass fiber element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

For filtration finer than 40 µm, use the disposable elements made of microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements upon request.

Eaton filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Ship classifications available upon request.

1. Type index:

1.1. Complete filter: (ordering example)

LF. 101. 10VG. 16. E. P. - UG. 5. - AE

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

1 series:

LF = In-line filter

2 nominal size: 101

3 filter-material and filter-fineness:

80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
25API, 10API microglass according to API

4 filter element collapse rating:

16 = Δp 232 PSI

5 filter element design:

E = single-end open
S = with by-pass valve Δp 29 PSI
S1 = with by-pass valve Δp 51 PSI

6 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601
IS07 = for oil/amonia mixtures (NH3), see sheet-no. 31602

8 process connection:

UG = thread connection

9 process connection size:

5 = -16 SAE

10 filter housing specification: (see catalog)

- = standard
IS06 = for HFC applications, see sheet-no. 31605

11 clogging indicator or clogging sensor:

- = without
AE = visual-electric, see sheet-no. 1609
OP = visual, see sheet-no. 1628
OE = visual-electric, see sheet-no. 1628
VS5 = electronic, see sheet-no. 1641

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01N. 100. 10VG. 16. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01N. = filter element according to company standard

2 nominal size: 100

3 - 7 see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	464 PSI
test pressure:	900 PSI
process connection:	thread connection
housing material:	aluminium-cast
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
measure connections:	BSPP ¼
drain- and bleeder connections:	BSPP ½
volume tank:	.26 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

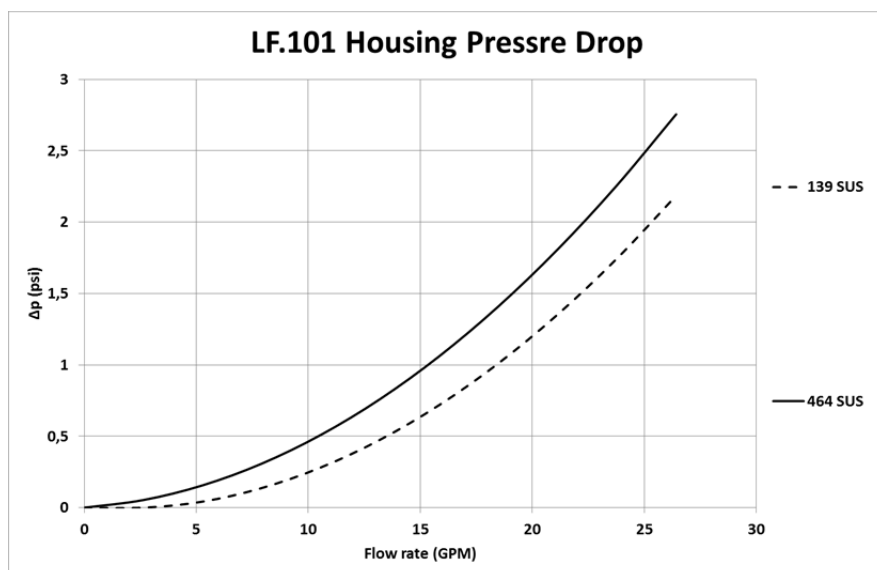
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

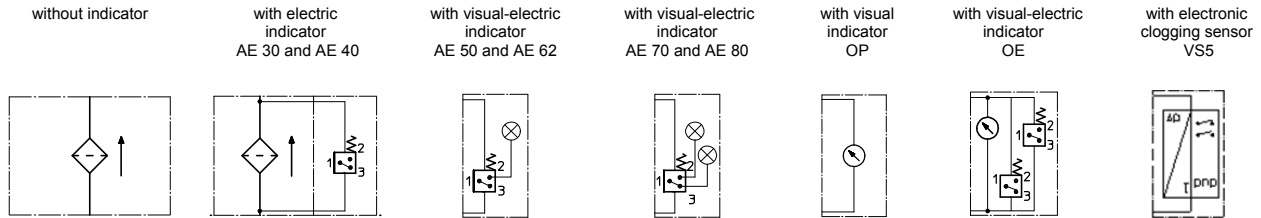
LF	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
101	2.473	1.717	1.099	0.957	0.654	0.0651	0.0607	0.0416

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension	article-no.
1	1	filter element	01N.100...	
2	1	O-ring	32 x 3,5	304378 (NBR) | 304401 (FPM)
3	1	O-ring	76 x 4	305599 (NBR) | 310291 (FPM)
4	2	screw plug	BSPP ¼	305003
5	2	screw plug	BSPP ½	304678
6	1	clogging indicator, visual	OP	see sheet-no. 1628
7	1	clogging indicator, visual-electric	OE	see sheet-no. 1628
8	1	clogging indicator, visual-electric	AE	see sheet-no. 1609
9	1	clogging sensor, electronic	VS5	see sheet-no. 1641
10	2	O-ring	14 x 2	304342 (NBR) | 304722 (FPM)
11	2	screw plug	BSPP ¼	305003

item 11 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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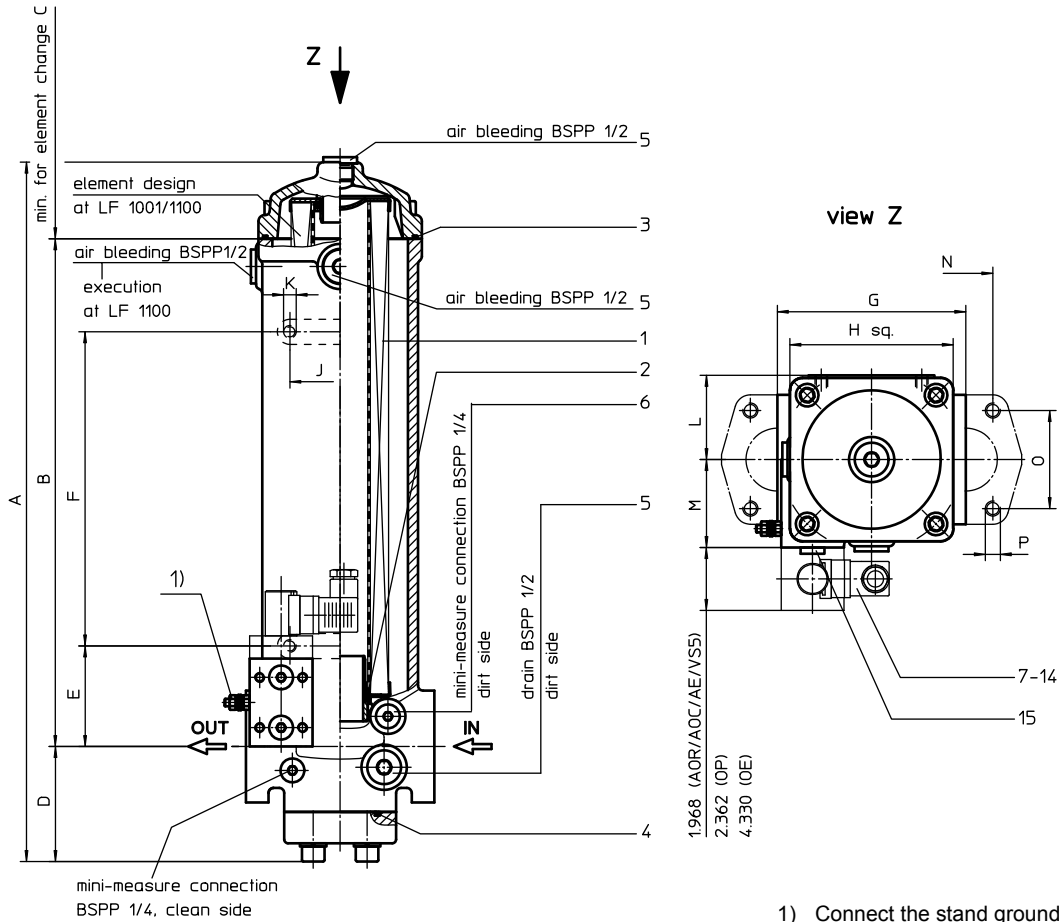
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Series LF 251-1100

464 PSI



1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions:

type	LF 251	LF 401	LF 631	LF 1001	LF 1100
connection	SAE 1 1/2"	SAE 2"	SAE 2 1/2"	SAE 3"	SAE 5"
A	13.94	21.65	22.09	23.03	25.24
B	10.00	15.91	15.98	15.91	16.93
C	10.24	16.14	16.14	16.14	16.14
D	1.54	3.35	3.39	3.94	5.19
E	3.15	3.15	3.15	3.54	4.57
F	-	9.84	9.84	9.84	9.84
G	5.51	5.91	6.69	8.66	8.66
H	5.12	5.12	6.30	8.07	8.07
J	3.15	3.15	3.15	4.57	4.57
K	M10x.47 deep	M10x.47 deep	M12x.71 deep	M12x.71 deep	M12x.71 deep
L	2.64	2.64	3.23	4.17	4.17
M	2.83	2.76	3.39	4.17	4.17
N	1.40	1.68	2.00	2.44	3.62
O	2.75	3.06	3.50	4.19	6.00
P	M12x.74deep	M10x.74 deep	M12x.74 deep	M16x.94 deep	M16x.94 deep
weight	35 lbs.	55 lbs.	77 lbs.	99 lbs.	112 lbs.
volume tank	.63 Gal.	1.0 Gal.	1.4 Gal.	3.0 Gal.	3.0 Gal.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series LF 251-1100

464 PSI

Description:

In-line filter series LF 251-1100 have a working pressure up to 464 PSI. Pressure peaks can be absorbed with a sufficient safety margin. The LF filter is mounted in-line. It can be used as suction filter, pressure filter and return-line filter.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

For cleaning the mesh element or changing the glass fiber element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

For filtration finer than 40 µm, use the disposable elements made of microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements upon request.

Eaton-filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The by-pass valve is integrated into the filter head. After reaching the by-pass pressure setting, the by-pass valve will send unfiltered partial flow around the filter.

Ship classifications available upon request.

1. Type index:

1.1. Complete filter: (ordering example)

LF.	401.	10VG.	30.	E.	P.	-.	FS.	8.	-.	-.	AE
1	2	3	4	5	6	7	8	9	10	11	12

- 1 series:**
LF = In-line filter
- 2 nominal size:** 251, 401, 631, 1001, 1100
- 3 filter-material and filter-fineness:**
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
25API, 10API microglass according to API
- 4 filter element collapse rating:**
10 = Δp 145 PSI (01NR.1000)
30 = Δp 435 PSI (01NL.250-630)
- 5 filter element design:**
E = single-end open
B = both sides open (01NR.1000)
S = with by-pass valve Δp 29 PSI
S1 = with by-pass valve Δp 51 PSI
- 6 sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 filter element specification: (see catalog)**
- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601
IS07 = for oil/ammonia mixtures (NH3), see sheet-no. 31602
- 8 process connection:**
FS = SAE-flange 3000 PSI
- 9 process connection size:**
7 = 1 ½" (LF251)
8 = 2" (LF401)
9 = 2 ½" (LF631)
A = 3" (LF1001)
C = 5" (LF1100)
- 10 filter housing specification: (see catalog)**
- = standard
IS06 = for HFC applications, see sheet-no. 31605
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217 (operating pressure max. 232 PSI)
- 11 internal valve:**
- = without
S = with by-pass valve Δp 29 PSI (LF1001/1100)
S1 = with by-pass valve Δp 51 PSI (LF1001/1100)
- 12 clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1609
OP = visual, see sheet-no. 1628
OE = visual-electric, see sheet-no. 1628
VS5 = electronic, see sheet-no. 1641

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01NL.	401.	10VG.	30.	E.	P.	-
1	2	3	4	5	6	7

- 1 series:**
01NL. = standard filter element according to DIN 24550, T3
01NR. = standard return line filter element according to DIN 24550, T4
- 2 nominal size:** 250, 400, 630 (01NL.), 1000 (01NR.)
- 3 - 7** see type index-complete filter

Accessories:

- gauge port - and bleeder connection, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1651
- SAE-counter flange, see sheet-no. 1652

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	464 PSI
max. operating pressure at IS20:	232 PSI
test pressure:	900 PSI
test pressure at IS20:	464 PSI
process connection:	SAE-flange 3000 PSI
housing material:	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
measure connections:	BSPP ¼
drain- and bleeder connections:	BSPP ½

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

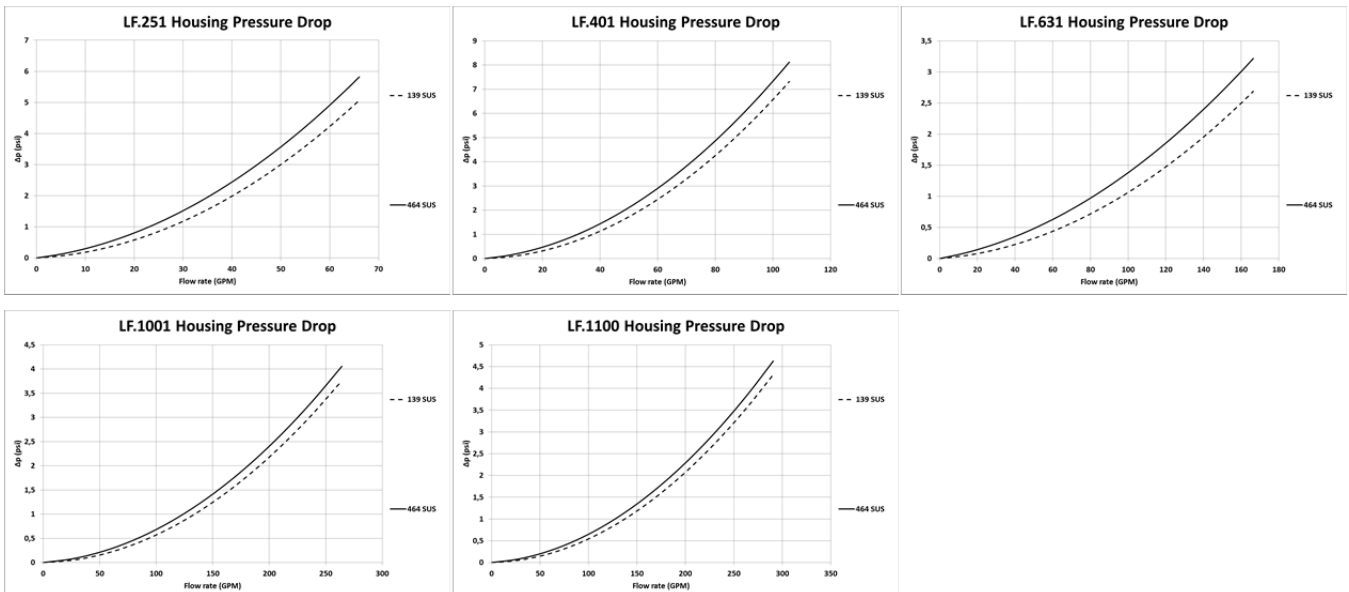
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

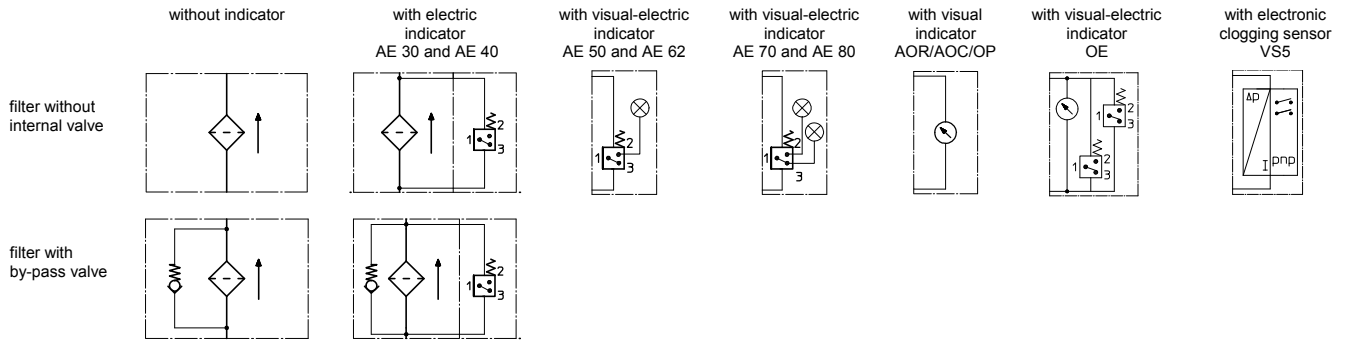
LF	VG					G			API	
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10API	25API
251	1.14	0.646	0.414	0.360	0.246	0.0277	0.0258	0.0177	0.212	0.097
401	0.700	0.397	0.254	0.221	0.151	0.0169	0.0158	0.0108	0.130	0.059
631	0.534	0.303	0.194	0.169	0.115	0.1417	0.1322	0.0906	0.099	0.045
1001	0.237	0.165	0.105	0.092	0.063	0.0061	0.0057	0.0039	0.053	0.024
1100	0.237	0.165	0.105	0.092	0.063	0.0061	0.0057	0.0039	0.053	0.024

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0,876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	designation	qty.	dimension and article-no. LF 251	qty.	dimension and article-no. LF 401	qty.	dimension and article-no. LF 631	qty.	dimension and article-no. LF 1001/1100
1	filter element	1	01NL 250...	1	01NL 400...	1	01NL 630...	1	01NR.1000...
2	O-ring	1	40 x 3	1	40 x 3	1	60 x 3,5	1	90 x 4
			304389 (NBR) 304391 (FPM)		304389 (NBR) 304391 (FPM)		304377 (NBR) 304398 (FPM)		306941 (NBR) 307031 (FPM)
3	O-ring	1	115 x 3	1	115 x 3	1	125 x 3	1	185 x 4
			303963 (NBR) 307762 (FPM)		303963 (NBR) 307762 (FPM)		306025 (NBR) 307358 (FPM)		305593 (NBR) 306309 (FPM)
4	O-ring (LF 401-1001)	-	-	1	56,75 x 3,53 306035 (NBR) 310264 (FPM)	1	69,45 x 3,53 305868 (NBR) 307357 (FPM)	1	85,32 x 3,53 305590 (NBR) 306308 (FPM)
	O-ring (LF 1100)	-	-		-		-		1	136,12 x 3,53 320162 (NBR) 320163 (FPM)
5	screw plug	3	BSPP ½ 304678	3	BSPP ½ 304678	3	BSPP ½ 304678	3	BSPP ½ 304678
6	screw plug	2				BSPP ¼ 305003			
7	clogging indicator, visual	1				AOR or AOC		see sheet-no. 1606	
8	clogging indicator, visual	1				OP		see sheet-no. 1628	
9	clogging indicator, visual-electric	1				OE		see sheet-no. 1628	
10	clogging indicator, visual-electric	1				AE		see sheet-no. 1609	
11	clogging sensor, electronic	1				VS5		see sheet-no. 1641	
12	O-ring	1				15 x 1,5 315357 (NBR) 315427 (FPM)			
13	O-ring	1				22 x 2 304708 (NBR) 304721 (FPM)			
14	O-ring	2				14 x 2 304342 (NBR) 304722 (FPM)			
15	screw plug	2				BSPP ¼ 305003			

item 15 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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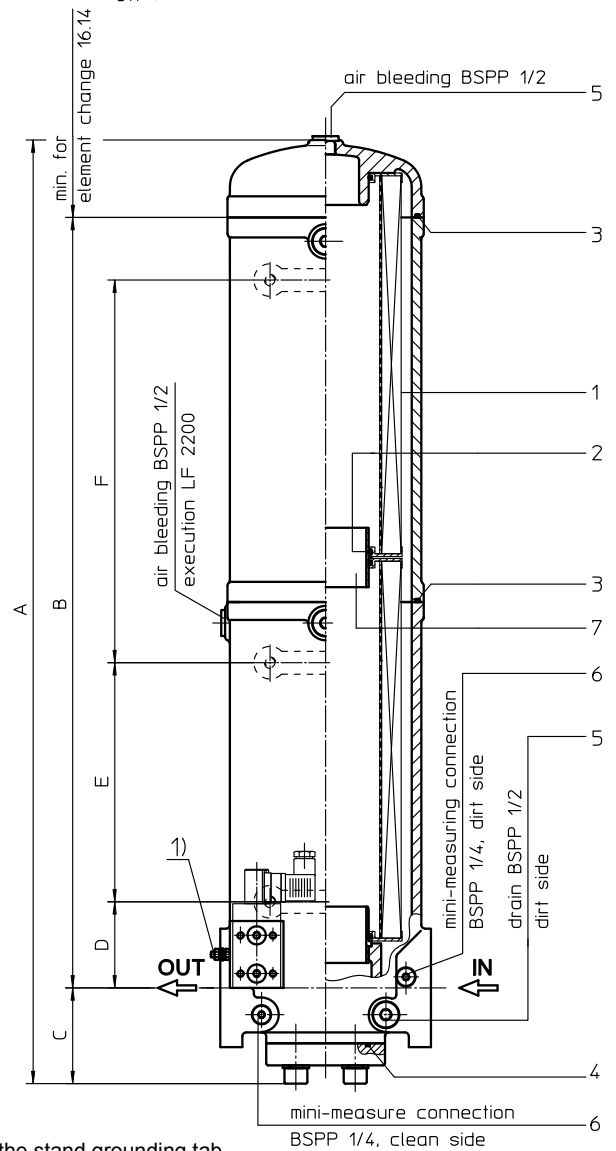
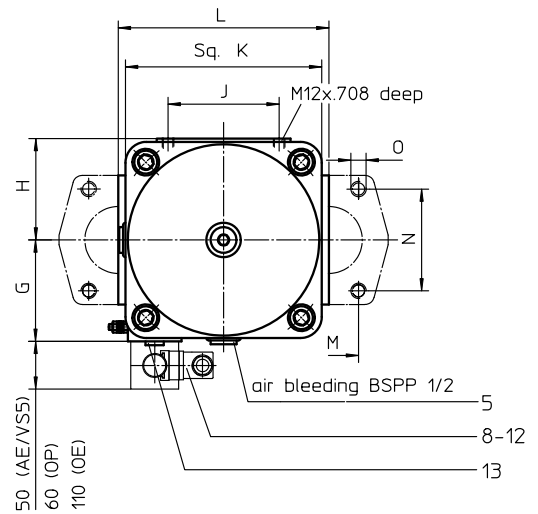
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Series LF 1950-2200 464 PSI



Dimensions:

type	LF1950	LF2200
connection	SAE 3"	SAE 5"
A	38.86	41.10
B	31.73	32.75
C	3.94	5.12
D	3.54	4.57
E	9.84	9.84
F	15.75	15.75
G	4.17	4.17
H	4.17	4.17
J	4.57	4.57
K	8.07 sq.	8.07 sq.
L	8.66	8.66
M	2.44	3.62
N	4.19	6.00
O	M16x .94 deep	M16x .94 deep
weight	150 lbs.	163 lbs.
volume tank	5.7 Gal.	5.8 Gal.

- 1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series LF 1950-2200

464 PSI

Description:

In-line filter series LF 1950-2200 have a working pressure up to 464 PSI. Pressure peaks can be absorbed with a sufficient safety margin. The LF filter is mounted in-line. It can be used as suction filter, pressure filter and return-line filter.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

For cleaning the mesh element or changing the glass fiber element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

For filtration finer than 40 µm, use the disposable elements made of microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements upon request.

Eaton-filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The by-pass valve is integrated into the filter head. After reaching the by-pass pressure setting, the by-pass valve will send unfiltered partial flow around the filter.

Ship classifications available upon request.

1. Type index:

1.1. Complete filter: (ordering example)

LF. 1950. 10VG. 10. B. P. -. FS. A. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- | | |
|----|---|
| 1 | series:
LF = In-line filter |
| 2 | nominal size: 1950, 2200 |
| 3 | filter-material and filter-fineness:
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
25API, 10API microglass according to API |
| 4 | filter element collapse rating:
10 = Δp 145 PSI |
| 5 | filter element design:
B = both sides open |
| 6 | sealing material:
P = Nitrile (NBR)
V = Viton (FPM) |
| 7 | filter element specification: (see catalog)
- = standard
VA = stainless steel
IS06 = for HPC applications, see sheet-no. 31601
IS07 = for oil/ammonia mixtures (NH ₃), see sheet-no. 31602 |
| 8 | process connection:
FS = SAE-flange 3000 PSI |
| 9 | process connection size:
A = 3" (LF1950)
C = 5" (LF2200) |
| 10 | filter housing specification: (see catalog)
- = standard
IS06 = for HFC application, see sheet-no. 31605
IS20 = ASME VIII Div.1 with ASME equivalent material,
see sheet-no. 55217 (operating pressure max. 232 PSI) |
| 11 | internal valve:
- = without
S = with by-pass valve Δp 29 PSI
S1 = with by-pass valve Δp 51 PSI |
| 12 | clogging indicator or clogging sensor:
- = without
AE = visual-electric, see sheet-no. 1609
OP = visual, see sheet-no. 1628
OE = visual-electric, see sheet-no. 1628
VS5 = electronic, see sheet-no. 1641 |

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01NR. 1000. 10VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- | | |
|---|--|
| 1 | series:
01NR. = standard return line filter element according to DIN 24550, T4 |
| 2 | nominal size: 1000 |
| 3 | - 7 \| see type index-complete filter |

Accessories:

- gauge port- and bleeder connection, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1651
- SAE-counter flange, see sheet-no. 1652

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	464 PSI
max. operating pressure at IS20:	232 PSI
test pressure:	900 PSI
test pressure at IS20:	464 PSI
process connection:	SAE-flange 3000 PSI
housing material:	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
measure connections:	BSPP ¼
drain- and bleeder connections:	BSPP ½

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) - \text{characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

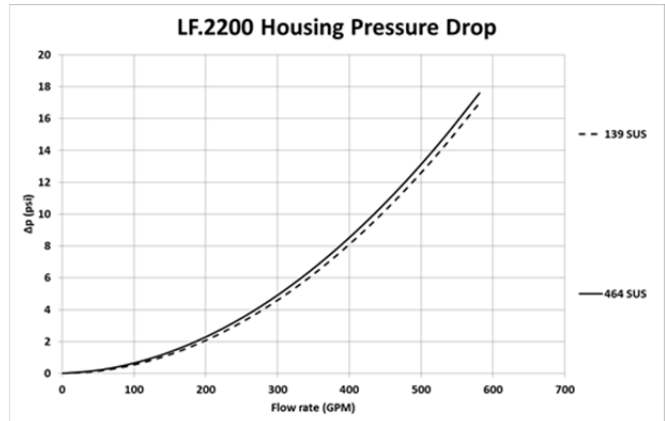
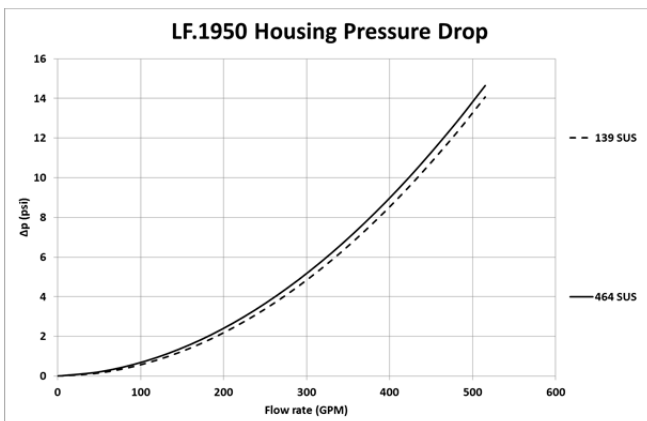
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

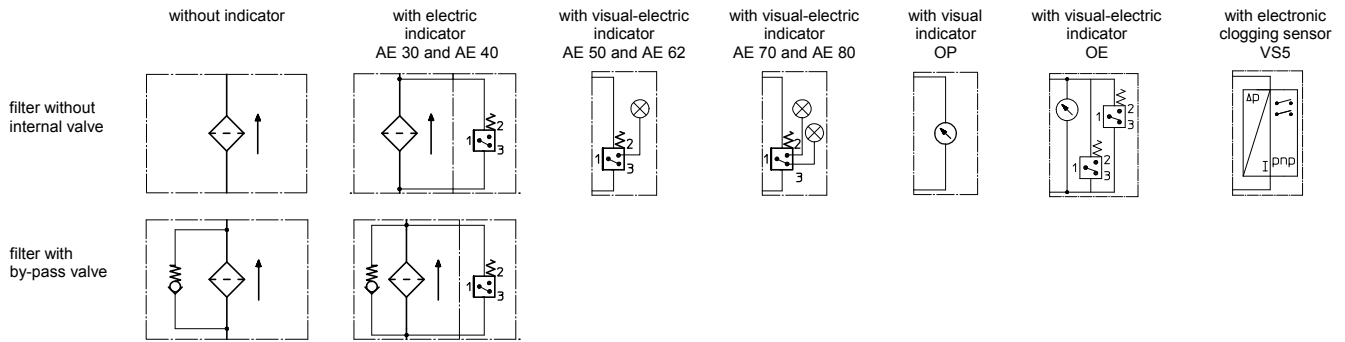
LF	VG					G			API	
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10API	25API
1950	0.118	0.082	0.053	0.046	0.031	0.0030	0.0028	0.0019	0.027	0.012
2200	0.118	0.082	0.053	0.046	0.031	0.0030	0.0028	0.0019	0.027	0.012

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NR.1000...		
2	4	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
3	2	O-ring	185 x 4	305593 (NBR)	306309 (FPM)
4	1	O-ring LF 1950	85,32 x 3,53	305590 (NBR)	306308 (FPM)
	1	O-ring LF 2200	136,12 x 3,53	320162 (NBR)	320163 (FPM)
5	4	screw plug	1/2 BSPP	304678	
6	2	screw plug	1/4 BSPP	305003	
7	1	connecting pipe	21689-4	313233	
8	1	clogging indicator, visual	OP	see sheet-no. 1628	
9	1	clogging indicator, visual-electric	OE	see sheet-no. 1628	
10	1	clogging indicator, visual-electric	AE	see sheet-no. 1609	
11	1	clogging sensor, electronic	VSS	see sheet-no. 1641	
12	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
13	2	screw plug	1/4 BSPP	305003	

item 13 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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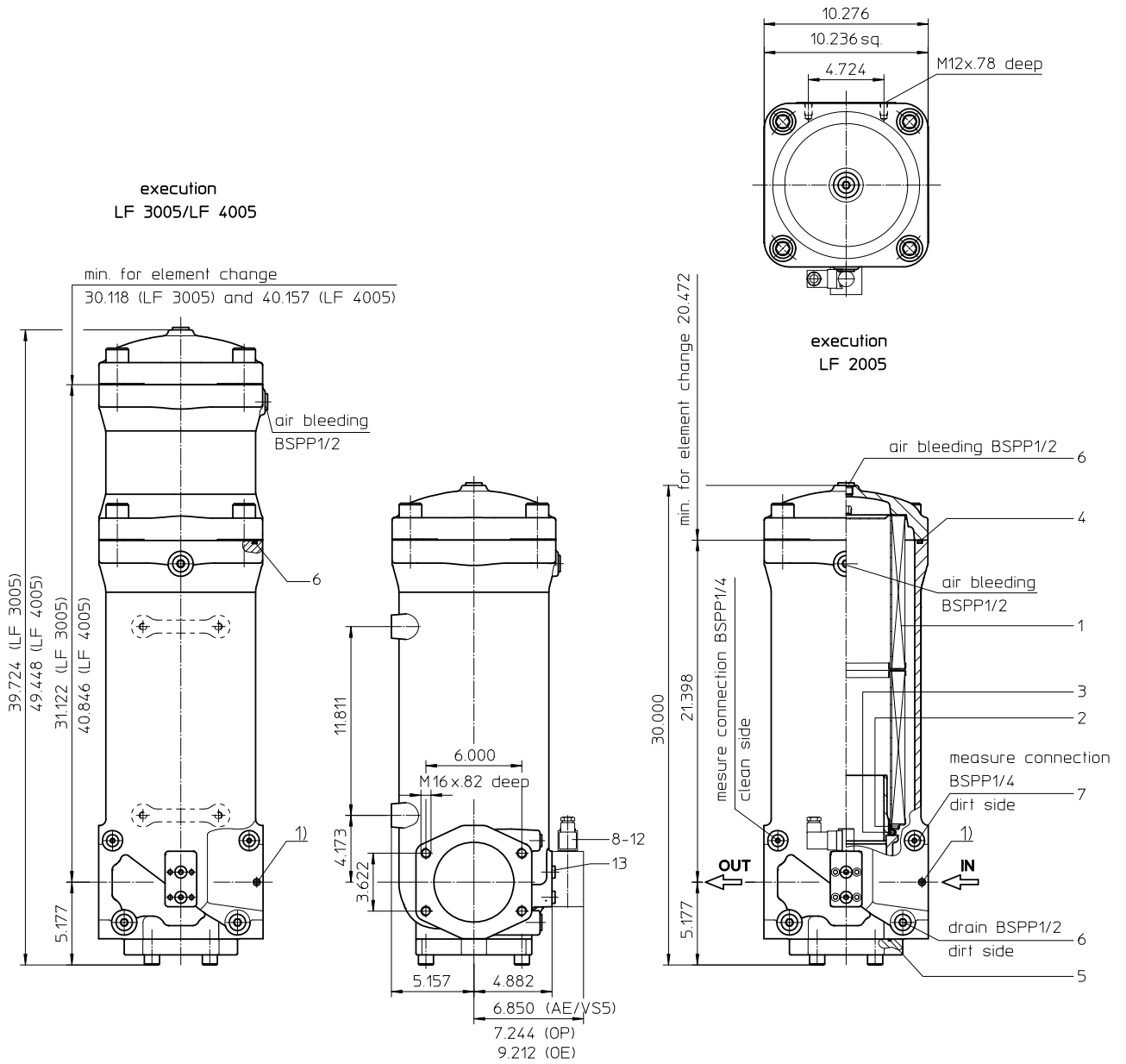
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Series LF 2005-4005

464 PSI



- 1) Connect the stand grounding tab to a suitable earth ground point.

Weight LF 2005: approx. 392 lbs.
Weight LF 3005: approx. 545 lbs.
Weight LF 4005: approx. 626 lbs.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series LF 2005-4005

464 PSI

Description:

In-line filter series LF 2005-4005 have a working pressure up to 464 PSI. Pressure peaks can be absorbed with a sufficient safety margin. The LF filter is mounted in-line. It can be used as suction filter, pressure filter and return-line filter.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

For cleaning the mesh element or changing the glass fiber element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

For filtration finer than 40 µm, use the disposable elements made of microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements upon request.

Eaton-filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The by-pass valve is integrated into the filter head. After reaching the by-pass pressure setting, the by-pass valve will send unfiltered partial flow around the filter.

Ship classifications available upon request.

1. Type index:

1.1. Complete filter: (ordering example)

LF. 2005. 10VG. 10. E. P. -. FS. C. -. AE

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

- | | |
|----|--|
| 1 | series:
LF = In-line filter |
| 2 | nominal size: 2005, 3005, 4005 |
| 3 | filter-material and filter-fineness:
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
25API, 10API microglass according to API |
| 4 | filter element collapse rating:
10 = Δp 145 PSI |
| 5 | filter element design:
E = without by-pass valve
S = with by-pass valve Δp 29 PSI |
| 6 | sealing material:
P = Nitrile (NBR)
V = Viton (FPM) |
| 7 | filter element specification: (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601 |
| 8 | process connection:
FS = SAE-flange 3000 PSI |
| 9 | process connection size:
C = 5" |
| 10 | filter housing specification: (see catalog)
- = standard
IS06 = for HFC applications, see sheet-no. 31605
IS20 = ASME VIII Div.1 with ASME equivalent material,
see sheet-no. 55217 (operating pressure max. 232 PSI) |
| 11 | internal valve:
- = without
S = with by-pass valve Δp 29 PSI
S1 = with by-pass valve Δp 51 PSI |
| 12 | clogging indicator or clogging sensor:
- = without
AE = visual-electric, see sheet-no. 1609
OP = visual, see sheet-no. 1628
OE = visual-electric, see sheet-no. 1628
VS5 = electronic, see sheet-no. 1641 |

1.2. Filter element: (ordering example)

01E. 2001. 10VG. 10. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- | | |
|---|---|
| 1 | series:
01E. = filter element according to company standard |
| 2 | nominal size: 2001 |
| 3 | - 7 \| see type index-complete filter |

Accessories:

- gauge port- and bleeder connection, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1651
- SAE-counter flange, see sheet-no. 1652

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	464 PSI
max. operating pressure at IS20:	232 PSI
test pressure:	900 PSI
test pressure at IS20:	464 PSI
process connection:	SAE-flange 3000 PSI
housing material:	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
measure connections:	BSPP ¼
drain- and bleeder connections:	BSPP ½
volume tank LF 2005:	6 Gal.
LF 3005:	8 Gal.
LF 4005:	10 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) - \text{characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

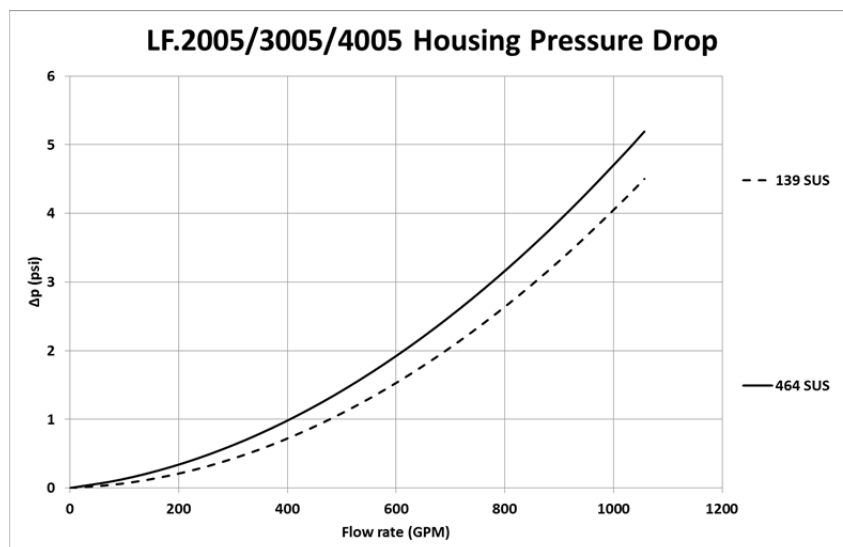
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

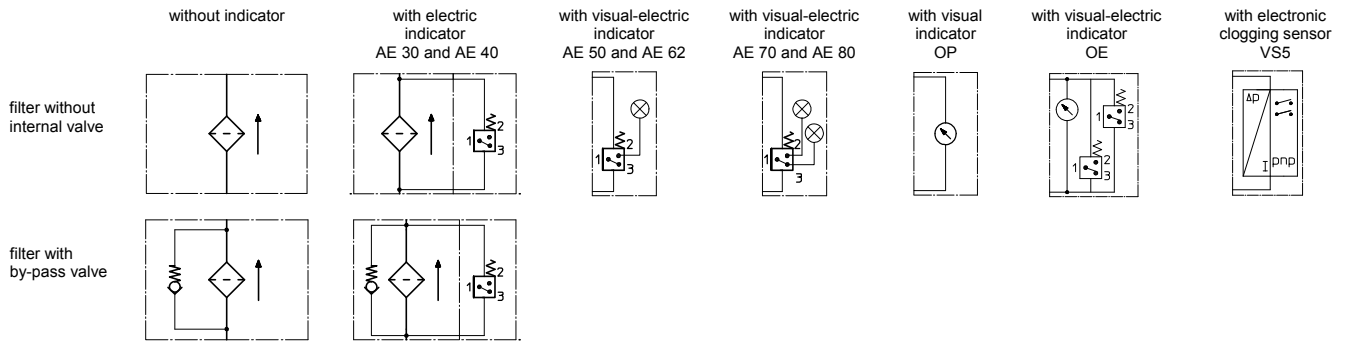
LF	VG					G			API	
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10API	25API
2005	0.177	0.123	0.079	0.068	0.047	0.0059	0.0055	0.0038	0.040	0.018
3005	0.118	0.082	0.052	0.046	0.031	0.0040	0.0037	0.0025	0.027	0.012
4005	0.088	0.061	0.039	0.034	0.023	0.0030	0.0028	0.0019	0.020	0.009

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension and article-no. LF 2005	dimension and article-no. LF 3005	dimension and article-no. LF 4005
1	1	filter element	01E.2001...	01E.3001...	01E.4001...
2	1	O-ring		135 x 10 306016 (NBR) 307045 (FPM)	
3	1	O-ring		125 x 10 304388 (NBR) 306006 (FPM)	
4	1	O-ring (LF 2005)		240 x 5 307592 (NBR) 328793 (FPM)	
	2	O-ring (LF 3005/4005)			
5	1	O-ring		136,12 x 3,53 320162 (NBR) 320163 (FPM)	
6	4	screw plug (LF 2005)		BSPP 1/2 304678	
	5	screw plug (LF 3005/4005)			
7	2	screw plug		BSPP 1/4 305003	
8	1	clogging indicator visual-electric		OE see seat-no. 1628	
9	1	clogging indicator visual		OP see seat-no. 1628	
10	1	clogging indicator visual-electric		AE see seat-no. 1609	
11	1	clogging sensor electronic		VS5 see seat-no. 1641	
12	2	O-ring		14 x 2 304342 (NBR) 304722 (FPM)	
13	2	screw plug		BSPP 1/4 305003	

item 13 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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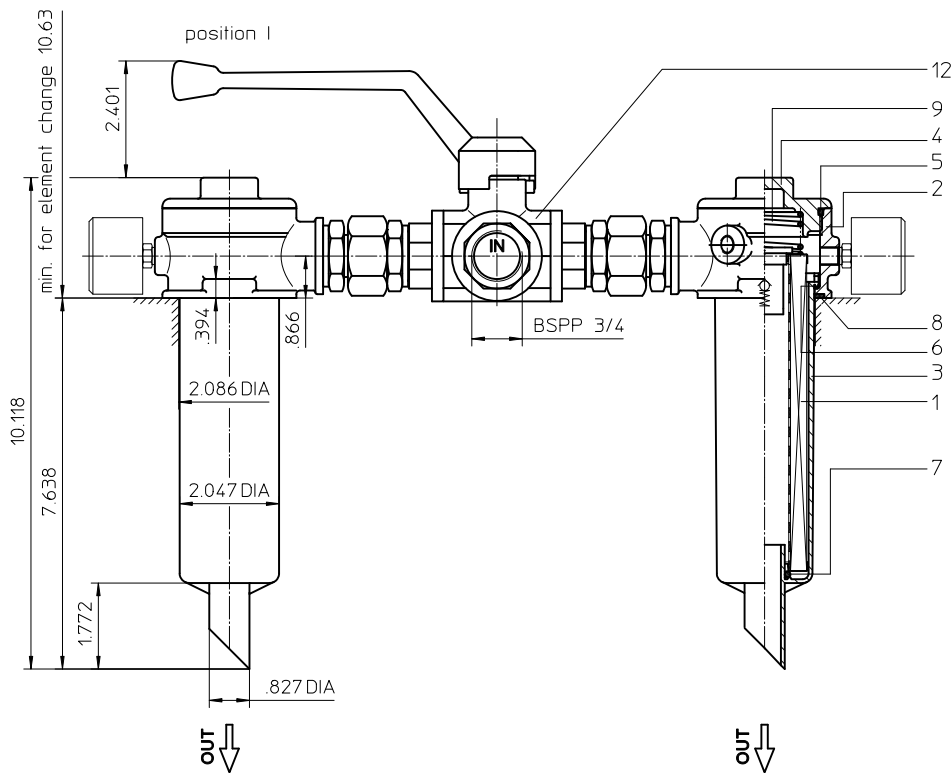
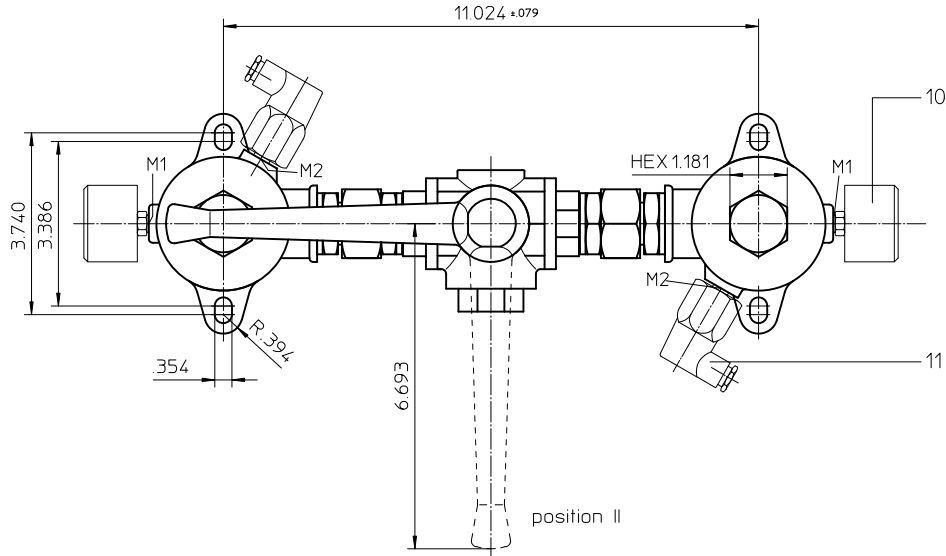
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Series DTEF 70

145 PSI



Position I: left filter-side in operation
 Position II: right filter-side in operation

Weight: approx. 8.0 lbs.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Return Line Filter

Series DTEF 70

145 PSI

Description:

Return-line filter series DTEF 70 have a working pressure up to 145 PSI.

The DTEF-filters are directly mounted to the reservoir and connected to the return-line.

A three way changeover valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation. These filters can be installed as suction filters.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

Eaton filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

For filtration finer than 40 µm use the disposable elements made of microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements on request.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

When changing the filter element, a detachable connection between the filter head and the filter bowl prevents dirty oil from flowing into the tank.

1. Type index:

1.1. Complete filter: (ordering example)

DTEF. 70. 10VG. 16. S. P. -. G. 4. -. O. E1

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 | **series:**
DTEF = tank-mounted return-line-filter, change over
- 2 | **nominal size:** 70
- 3 | **filter-material and filter-fineness:**
80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
10P paper
- 4 | **filter element collapse rating:**
16 = Δp 232 PSI
- 5 | **filter element design:**
E = without by-pass valve
S = with by-pass valve Δp 29 PSI
- 6 | **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 | **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC application, see sheet-no. 31601
- 8 | **process connection:**
G = thread connection
- 9 | **process connection size:**
4 = BSPP ¾
- 10 | **filter housing specification:** (see catalog)
- = standard
IS06 = for HFC application, see sheet-no. 31605
- 11 | **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
- 12 | **clogging indicator at M2:**
possible indicators see position 11 of the type index

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 70. 10VG. 16. S. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 | **series:**
01E. = filter element according to company standard
- 2 | **nominal size:** 70
- 3 | - 7 | see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	29 PSI
process connection:	thread connection
housing material standard:	Al-casting, glass fibre reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	2x .08 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

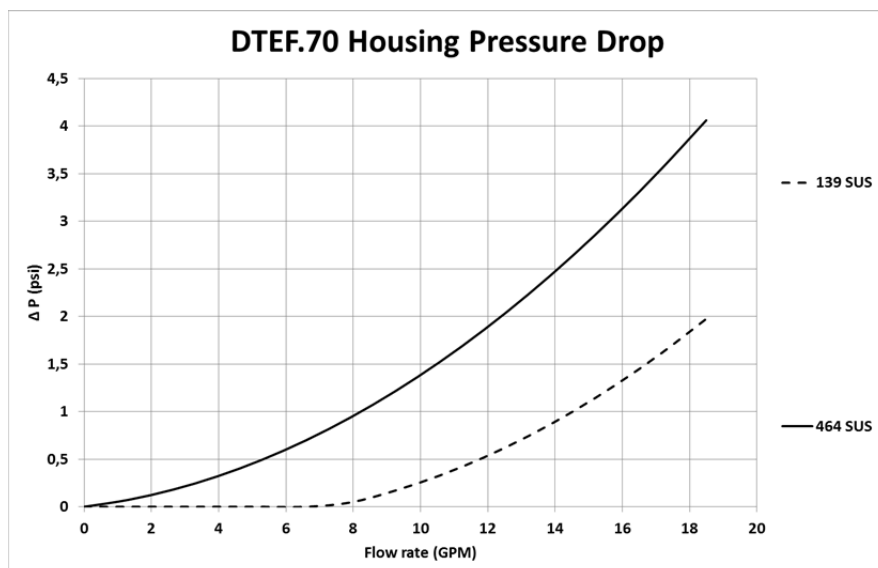
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

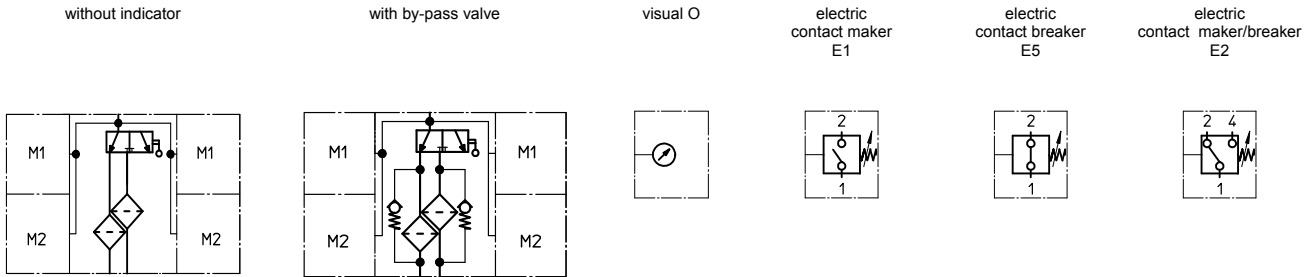
DTEF	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
70	3.535	2.454	1.571	1.368	0.935	0.1196	0.1117	0.0765	0.797

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01.E70...	-	
2	2	filter head		305459	
3	2	filter bowl		304595	
4	2	screw plug	M 60 x 2	303621	
5	2	O-ring	56 x 3	305072 (NBR)	305322 (FPM)
6	2	O-ring	50 x 2,5	305239 (NBR)	305321 (FPM)
7	2	O-ring	22 x 3	304387 (NBR)	304931 (FPM)
8	4	O-ring	56 x 3	305072 (NBR)	305322 (FPM)
9	2	spring	DA = 40	304982	
10	2	clogging indicator, visual	O	see sheet-no. 1616	
11	2	pressure switch, electric	alternatively E1, E2 or E5	see sheet-no. 1616	
12	1	three-way-change-over valve		308115	

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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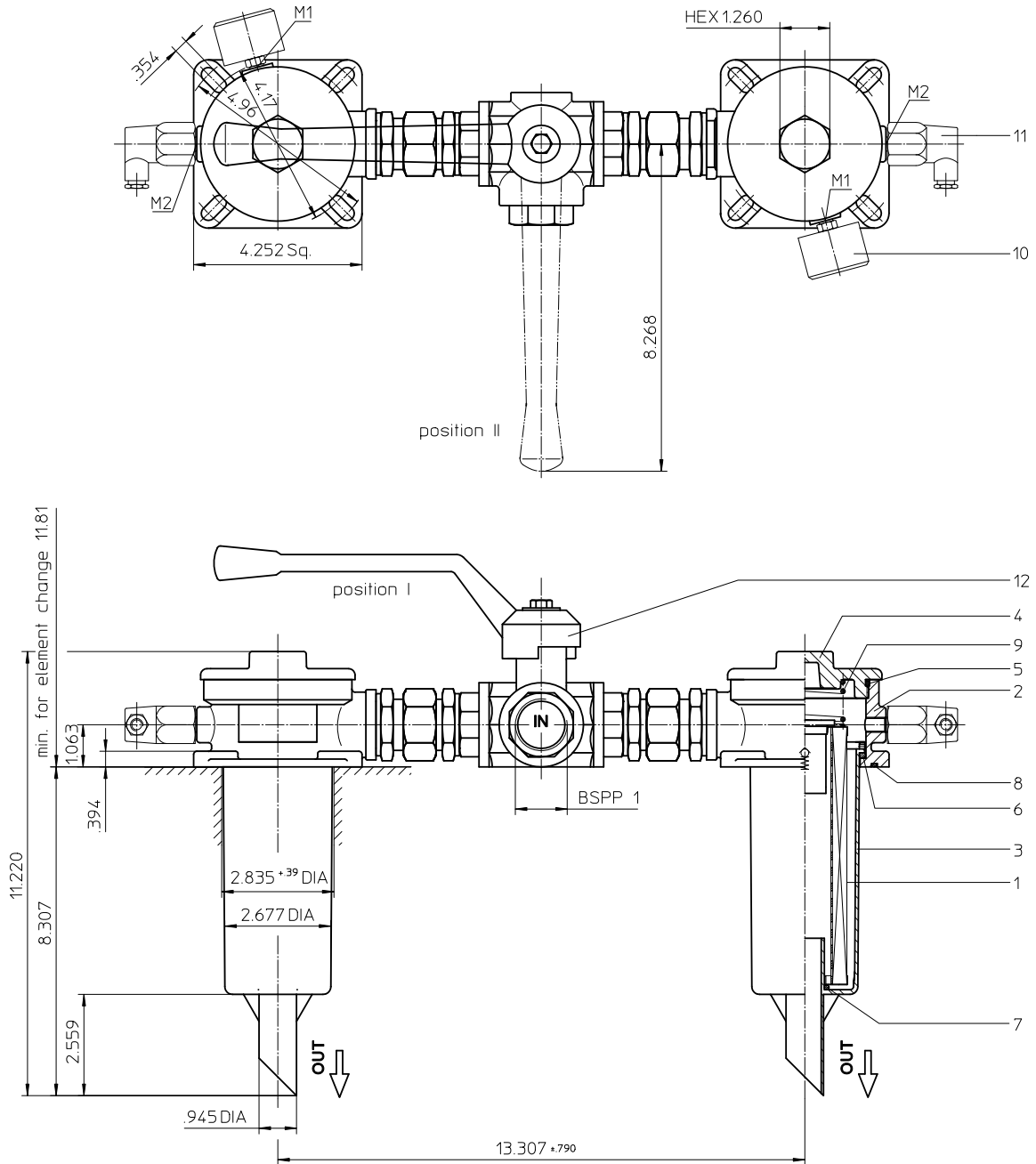
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Series DTEF 120 145 PSI



Position I: left filter-side in operation
 Position II: right filter-side in operation

Weight: approx. 13 lbs.

Dimensions: inches

Designs and performance values are subject to change.

Return Line Filter

Series DTEF 120

145 PSI

Description:

Return-line filter series DTEF 120 have a working pressure up to 145 PSI.

The DTEF-filters are directly mounted to the reservoir and connected to the return-line.

A three way changeover valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation. These filters can be installed as suction filters.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

Eaton filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

For filtration finer than 40 µm use the disposable elements made of microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements on request.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

When changing the filter element, a detachable connection between the filter head and the filter bowl prevents dirty oil from flowing into the tank.

1. Type index:

1.1. Complete filter: (ordering example)

DTEF. 120. 10VG. 16. S. P. -. G. 5. -. O. E1

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 | **series:**
DTEF = tank-mounted return-line-filter, change over
- 2 | **nominal size:** 120
- 3 | **filter-material and filter-fineness:**
80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
10P paper
- 4 | **filter element collapse rating:**
16 = Δp 232 PSI
- 5 | **filter element design:**
E = without by-pass valve
S = with by-pass valve Δp 29 PSI
- 6 | **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 | **filter element specification: (see catalog)**
- = standard
VA = stainless steel
IS06 = for HFC application, see sheet-no. 31601
- 8 | **process connection:**
G = thread connection
- 9 | **process connection size:**
5 = BSPP 1
- 10 | **filter housing specification: (see catalog)**
- = standard
IS06 = for HFC application, see sheet-no. 31605
- 11 | **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
- 12 | **clogging indicator at M2:**
possible indicators see position 11 of the type index

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 120. 10VG. 16. S. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 | **series:**
01E. = filter element according to company standard
- 2 | **nominal size:** 120
- 3 | - 7 | see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	29 PSI
process connection:	thread connection
housing material standard:	Al-casting, glass fiber reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	2x .16 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

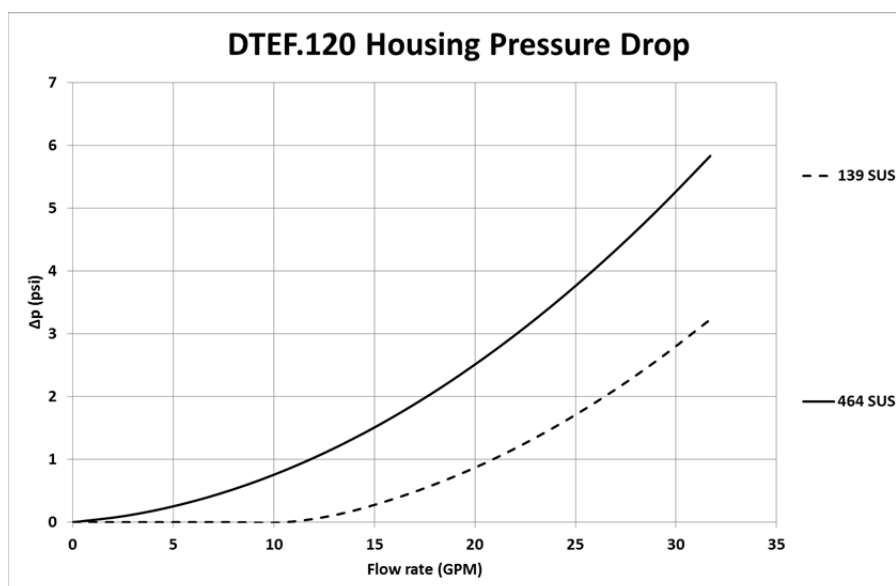
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

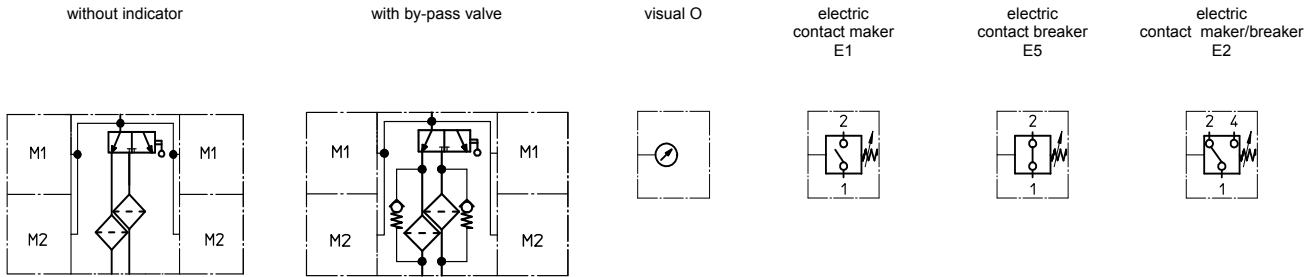
DTEF	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
120	3.162	2.195	1.405	1.224	0.836	0.1144	0.1068	0.0731	0.690

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01.E120...		
2	2	filter head		305467	
3	2	filter bowl		303041	
4	2	screw plug	M 60 x 2	302069	
5	2	O-ring	75 x 3	302215 (NBR)	304729 (FPM)
6	2	O-ring	68 x 4	303037 (NBR)	313046 (FPM)
7	2	O-ring	24 x 3	303038 (NBR)	304397 (FPM)
8	4	O-ring	86 x 3	305470 (NBR)	313047 (FPM)
9	2	spring	DA = 52	302144	
10	2	clogging indicator, visual	O	see sheet-no. 1616	
11	2	pressure switch, electric	alternatively E1, E2 or E5	see sheet-no. 1616	
12	1	three-way-change-over valve		308123	

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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Return Line Filter

Series DTEF 320

145 PSI

Description:

Return-line filter series DTEF 320 have a working pressure up to 145 PSI.

The DTEF-filters are directly mounted to the reservoir and connected to the return-line.

A three way changeover valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation. These filters can be installed as suction filters.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

Eaton filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

For filtration finer than 40 µm use the disposable elements made of microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements on request.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

When changing the filter element, a detachable connection between the filter head and the filter bowl prevents dirty oil from flowing into the tank.

1. Type index:

1.1. Complete filter: (ordering example)

DTEF. 320. 10VG. 16. S. P. -. G. 7. -. O. E1

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- | | |
|----|---|
| 1 | series:
DTEF = tank-mounted return-line-filter, change over |
| 2 | nominal size: 320 |
| 3 | filter-material and filter-fineness:
80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
10P paper |
| 4 | filter element collapse rating:
16 = Δp 232 PSI |
| 5 | filter element design:
E = without by-pass valve
S = with by-pass valve Δp 29 PSI |
| 6 | sealing material:
P = Nitrile (NBR)
V = Viton (FPM) |
| 7 | filter element specification: (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC application, see sheet-no. 31601 |
| 8 | process connection:
G = thread connection |
| 9 | process connection size:
7 = BSPP 1 ½ |
| 10 | filter housing specification: (see catalog)
- = standard
IS06 = for HFC application, see sheet-no. 31605 |
| 11 | clogging indicator at M1:
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616 |
| 12 | clogging indicator at M2:
possible indicators see position 11 of the type index |

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 320. 10VG. 16. S. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- | | |
|---|---|
| 1 | series:
01E. = filter element according to company standard |
| 2 | nominal size: 320 |
| 3 | - 7 \| see type index-complete filter |

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	29 PSI
process connection:	thread connection
housing material standard:	Al-casting, glass fibre reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	2x .48 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

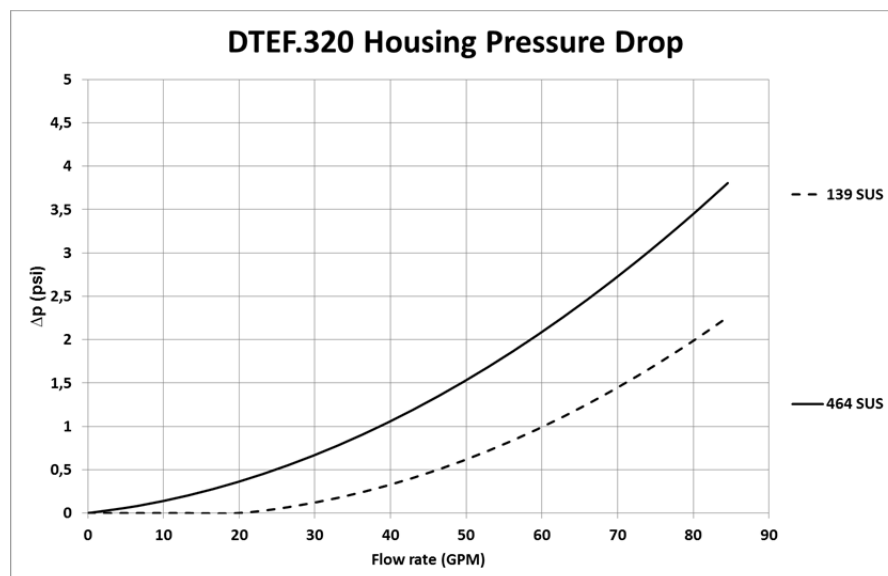
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

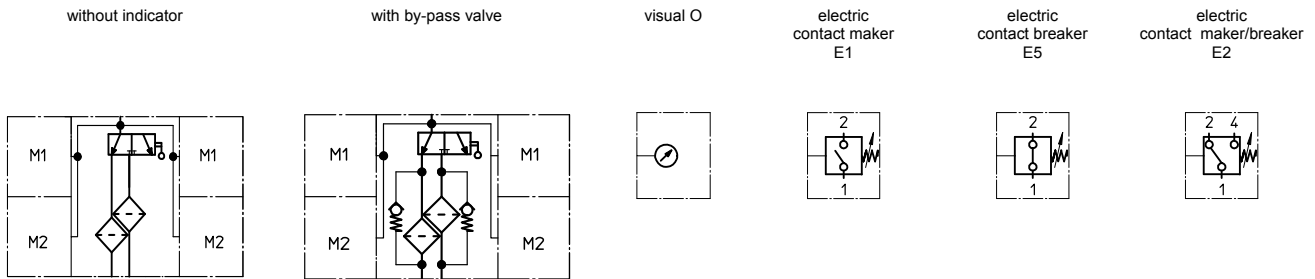
DTEF	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
320	1.148	0.797	0.510	0.444	0.304	0.0337	0.0314	0.0215	0.253

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01.E320...		
2	2	filter head		305475	
3	2	filter bowl		302145	
4	2	screw plug	M 100 x 2	302338	
5	2	O-ring	96 x 3	305292 (NBR)	305297 (FPM)
6	2	O-ring	82 x 3	305191 (NBR)	305298 (FPM)
7	2	O-ring	40 x 3	304389 (NBR)	304391 (FPM)
8	4	gasket	110 x 110 x 3	304456 (NBR)	314138 (FPM)
9	2	spring	DA = 52	305053	
10	2	clogging indicator, visual	O	see sheet-no. 1616	
11	2	pressure switch, electric	alternatively E1, E2 or E5	see sheet-no. 1616	
12	1	three-way-change-over valve		308128	

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
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Return Line Filter

Series DTEF 426

145 PSI

Description:

Return-line filter series DTEF 426 have a working pressure up to 145 PSI.

The DTEF-filters are directly mounted to the reservoir and connected to the return-line.

A three way changeover valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation. These filters can be installed as suction filters.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

Eaton filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

For filtration finer than 40 µm use the disposable elements made of microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements on request.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

When changing the filter element, a detachable connection between the filter head and the filter bowl prevents dirty oil from flowing into the tank.

1. Type index:

1.1. Complete filter: (ordering example)

DTEF. 426. 10VG. 16. S. P. - G. 7. - O. E1. -

1	2	3	4	5	6	7	8	9	10	11	12	13
---	---	---	---	---	---	---	---	---	----	----	----	----

- 1 | **series:**
DTEF = tank-mounted return-line-filter, change over
- 2 | **nominal size:** 426
- 3 | **filter-material and filter-fineness:**
80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
10P paper
- 4 | **filter element collapse rating:**
16 = Δp 232 PSI
- 5 | **filter element design:**
E = without by-pass valve
S = with by-pass valve Δp 29 PSI
- 6 | **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 | **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC application, see sheet-no. 31601
- 8 | **process connection:**
G = thread connection
- 9 | **process connection size:**
7 = BSPP 1 ½
- 10 | **filter housing specification:** (see catalog)
- = standard
IS06 = for HFC application, see sheet-no. 31601
- 11 | **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
- 12 | **clogging indicator at M2:**
possible indicators see position 11 of the type index
- 13 | **clogging indicator at M3:**
possible indicators see position 11 of the type index

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 425. 10VG. 16. S. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 | **series:**
01E. = filter element according to company standard
- 2 | **nominal size:** 425
- 3 | - 7 | see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	29 PSI
process connection:	thread connection
housing material standard:	Al-casting, glass fibre reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	2x .70 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

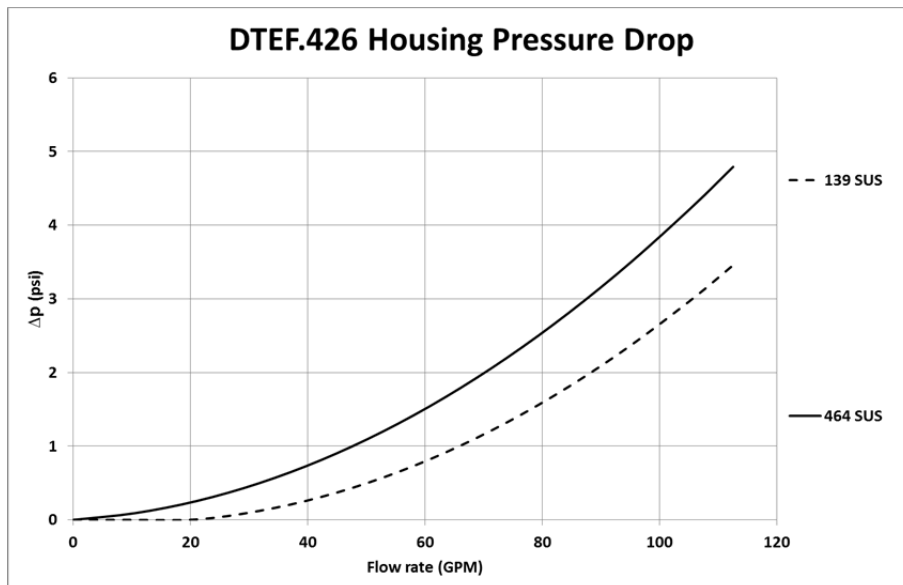
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

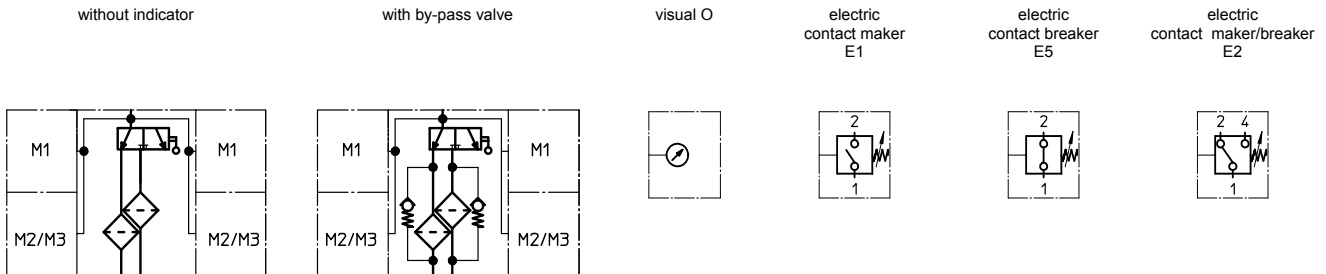
DTEF	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
426	0.849	0.589	0.377	0.328	0.224	0.0270	0.0252	0.0172	0.182

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01.E425...		
2	2	filter head		313434	
3	2	filter bowl		303732	
4	2	screw plug	M 120 x 3	313649	
5	2	O-ring	128 x 3	304602 (NBR)	308140 (FPM)
6	2	O-ring	98 x 4	301914 (NBR)	304765 (FPM)
7	2	O-ring	44 x 6	302222 (NBR)	304384 (FPM)
8	4	O-ring	115 x 3	303963 (NBR)	307762 (FPM)
9	2	spring	DA = 63,5	304983	
10	2	clogging indicator. visual	O	see sheet-no. 1616	
11	2	pressure switch, electric	alternatively E1, E2 or E5	see sheet-no. 1616	
12	1	three-way-change-over valve		308128	

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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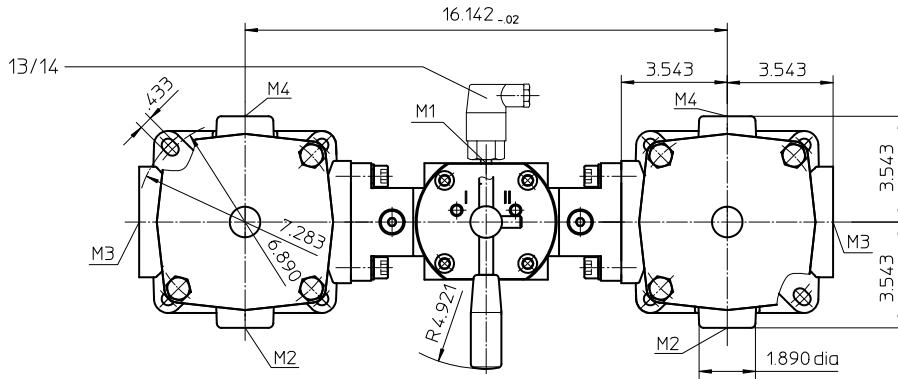
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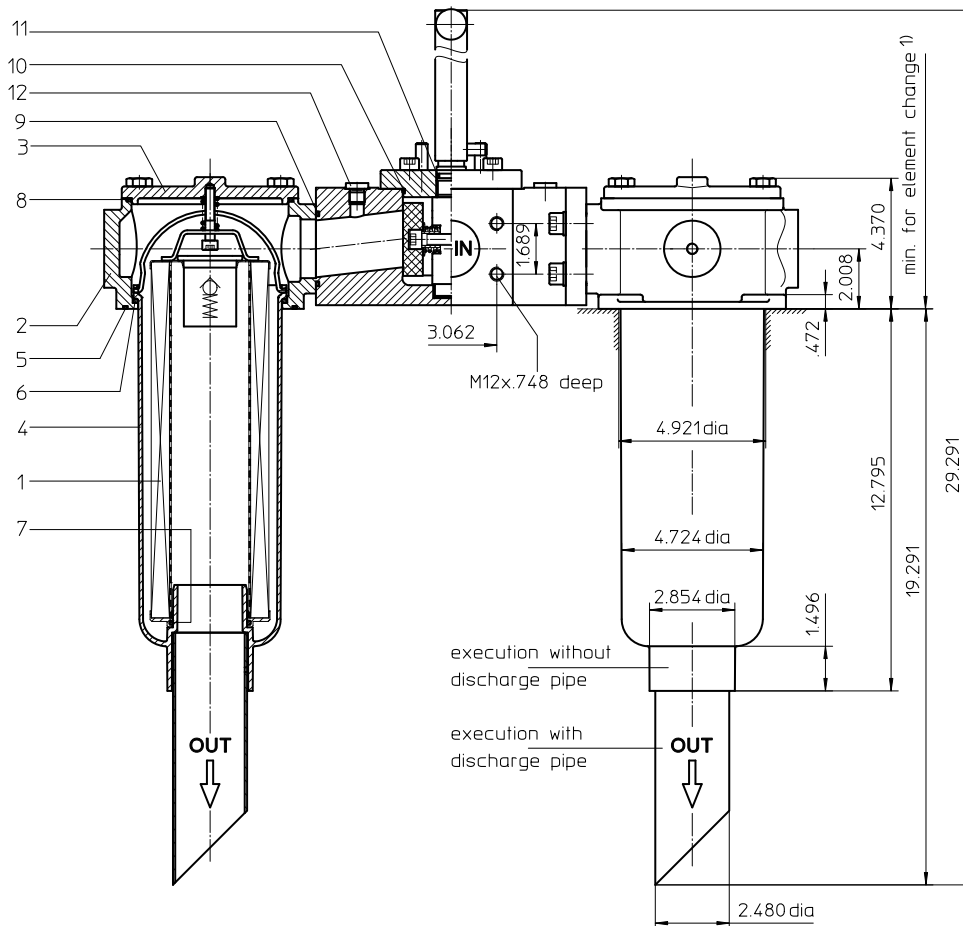
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Series DTEF 625

145 PSI



1) min. for element change without discharge pipe 20.47
 min. for element change with discharge pipe 26.97



Position I: left filter-side in operation
 Position II: right filter-side in operation

Weight: approx. 33 lbs.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Return Line Filter Series DTEF 625 145 PSI

Description:

Return-line filter series DTEF 625 have a working pressure up to 145 PSI.

The DTEF-filters are directly mounted to the reservoir and connected to the return-line.

A rotary slide valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation. These filters can be installed as suction filters.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

Eaton filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

For filtration finer than 40 µm use the disposable elements made of microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements on request.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

When changing the filter element, a detachable connection between the filter head and the filter bowl prevents dirty oil from flowing into the tank.

1. Type index:

1.1. Complete filter: (ordering example)

DTEF. 625. 10VG. 16. S. P. - FS. 8. - E1. - - - -

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----

- 1 series:**
DTEF = tank-mounted return-line-filter, change over
- 2 nominal size:** 625
- 3 filter-material and filter-fineness:**
80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
10P paper
- 4 filter element collapse rating:**
16 = Δp 232 PSI
- 5 filter element design:**
E = without by-pass valve
S = with by-pass valve Δp 29 PSI
- 6 sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC application, see sheet-no. 31601
- 8 process connection:**
FS = SAE-flange 3000 PSI
- 9 process connection size:**
8 = 2"
- 10 filter housing specification:** (see catalog)
- = standard
IS06 = for HFC application, see sheet-no. 31605
- 11 clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
- 12 clogging indicator at M2:**
possible indicators see position 11 of the type index
- 13 clogging indicator at M3:**
possible indicators see position 11 of the type index
- 14 clogging indicator at M4:**
possible indicators see position 11 of the type index
- 15 discharge pipe:**
- = without
1 = with discharge pipe

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 631. 10VG. 16. S. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 series:**
01E. = filter element according to company standard
- 2 nominal size:** 631
- 3 - 7** see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	29 PSI
process connection:	SAE-flange 3000 PSI
housing material standard:	Al-casting, C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	2x 1.0 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

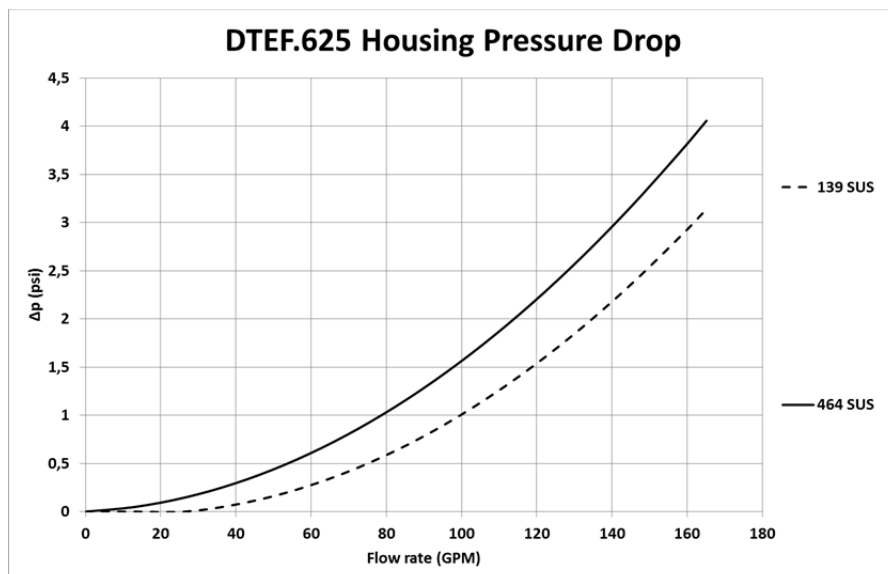
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

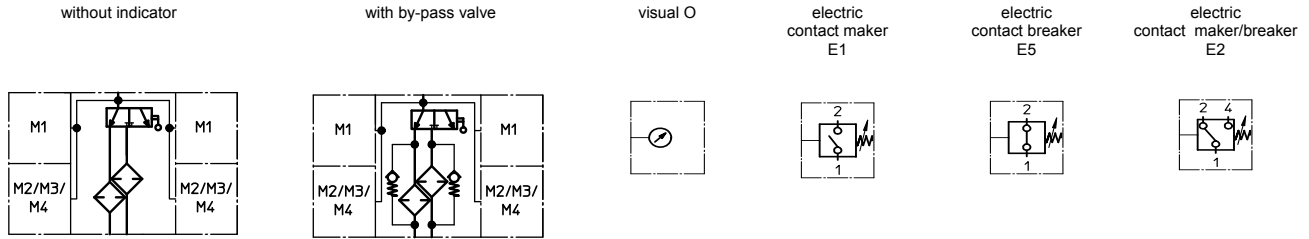
DTEF	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
625	0.643	0.446	0.286	0.249	0.170	0.0236	0.0220	0.0151	0.142

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01.E631...		
2	2	filter head		316414	
3	2	filter cover	32571-4		
4	2	filter bowl without discharge pipe		316416	
	2	filter bowl with discharge pipe			
5	2	O-ring	140 x 3	304604 (NBR)	307514 (FPM)
6	2	O-ring	120 x 4	305300 (NBR)	307991 (FPM)
7	2	O-ring	63 x 3,5	311189 (NBR)	311592 (FPM)
8	2	O-ring	135 x 3,5	318386 (NBR)	318387 (FPM)
9	1	O-ring	56,75 x 3,53	306035 (NBR)	310264 (FPM)
10	1	O-ring	75 x 3	302215 (NBR)	304729 (FPM)
11	2	O-ring	18 x 3	304359 (NBR)	304399 (FPM)
12	2	screw plug	¼ BSPP	305003	
13	1	pressure switch, electric	alternatively E1, E2 or E5	see sheet-no. 1616	
14	1	clogging indicator, visual	O	see sheet-no. 1616	

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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Return Line Filter Series DTEF 952 145 PSI

Description:

Return-line filter series DTEF 952 have a working pressure up to 145 PSI.

The DTEF-filters are directly mounted to the reservoir and connected to the return-line.

A rotary slide valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation. These filters can be installed as suction filters.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

Eaton filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

For filtration finer than 40 µm use the disposable elements made of microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements on request.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

When changing the filter element, a detachable connection between the filter head and the filter bowl prevents dirty oil from flowing into the tank.

1. Type index:

1.1. Complete filter: (ordering example)

DTEF. 952. 10VG. 10. S. P. - FS. A. - E2. - - - -

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----

- 1 series:**
DTEF = tank-mounted return-line-filter, change over
- 2 nominal size:** 952
- 3 filter-material and filter-fineness:**
80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
10P paper
- 4 filter element collapse rating:**
10 = Δp 145 PSI
- 5 filter element design:**
E = without by-pass valve
S = with by-pass valve Δp 29 PSI
- 6 sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC application, see sheet-no. 31601
- 8 process connection:**
FS = SAE-flange 3000 PSI
- 9 process connection size:**
A = 3"
- 10 filter housing specification:** (see catalog)
- = standard
IS06 = for HFC application, see sheet-no. 31605
- 11 clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
- 12 clogging indicator at M2:**
possible indicators see position 11 of the type index
- 13 clogging indicator at M3:**
possible indicators see position 11 of the type index
- 14 clogging indicator at M4:**
possible indicators see position 11 of the type index
- 15 discharge pipe:**
- = without
1 = with discharge pipe

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 950. 10VG. 10. S. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 series:**
01E. = filter element according to company standard
- 2 nominal size:** 950
- 3 - 7** see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	29 PSI
process connection:	SAE-flange 3000 PSI
housing material standard:	Al, glass fiber reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	2x 2.6 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

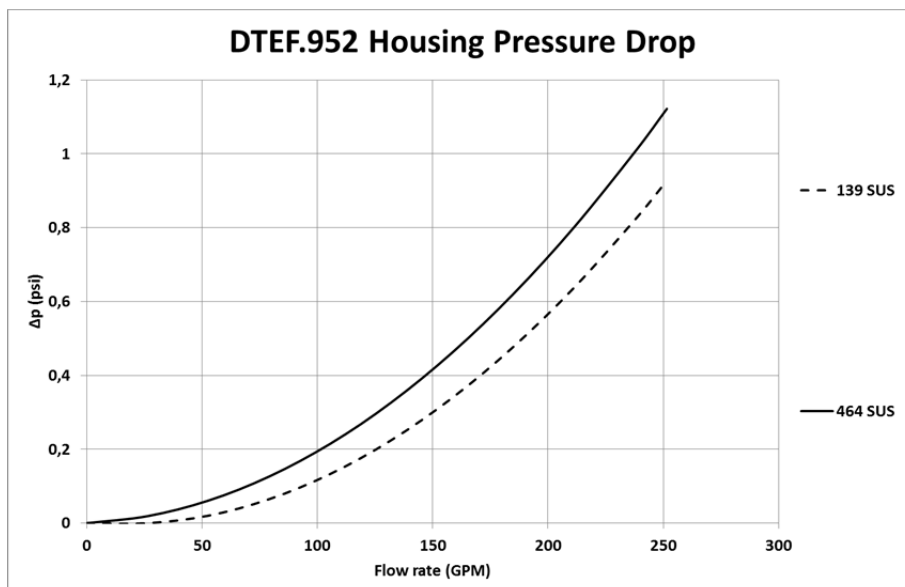
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

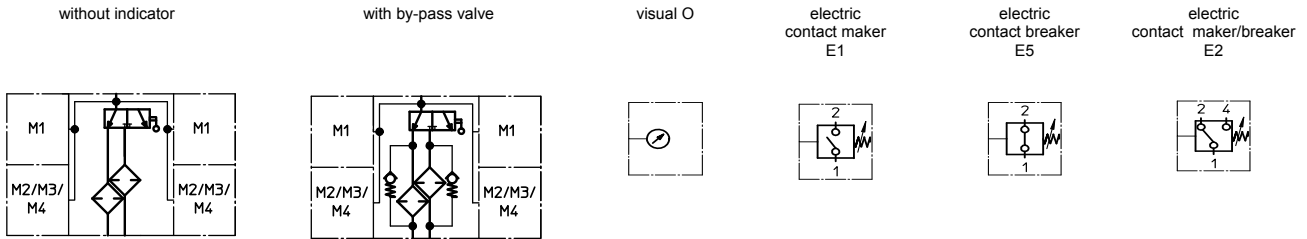
DTEF	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
952	0.364	0.253	0.162	0.141	0.096	0.0179	0.0167	0.0115	0.076

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01.E950...		
2	2	filter bowl without discharge pipe		327460	
	2	filter bowl with discharge pipe		327461	
3	2	O-ring	195 x 3,5	301831 (NBR)	306528 (FPM)
4	2	O-ring	170 x 6	304799 (NBR)	306529 (FPM)
5	2	O-ring	190 x 5	305432 (NBR)	310283 (FPM)
6	2	O-ring	78 x 10	305017 (NBR)	305552 (FPM)
7	2	O-ring	85,32 x 3,53	305590 (NBR)	306308 (FPM)
8	2	screw plug	¼ BSPP	305003	
90	1	O-ring	18 x 3	304359 (NBR)	304399 (FPM)
10	1	O-ring	105 x 5	310003 (NBR)	323080 (FPM)
11	1	pressure switch, electric	alternatively E1, E2 or E5	see sheet-no. 1616	
12	1	clogging indicator, visual	O	see sheet-no. 1616	

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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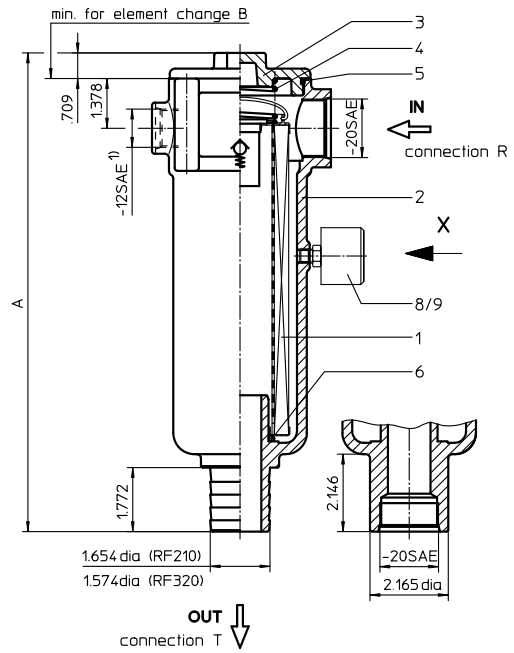
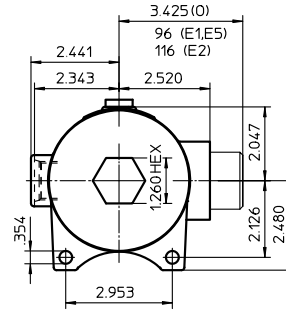
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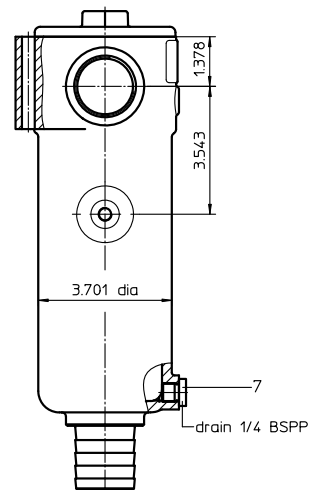
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Series RF 210-320 145 PSI



view X



Dimensions:

Type	A	B	weight	volume tank
RF 210	13.26	8.07	6.0 lbs.	.30 Gal.
RF 320	16.61	11.41	7.7 lbs.	.45 Gal.

1) additional connection „IN“ max. -12 SAE, by agreement

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Return Line Filter

Series RF 210-320

145 PSI

Description:

Return-line filter series RF 210-320 have a working pressure up to 145 PSI. The RF filter is mounted in the return line.

The return pipes at the outlet connection must be less than 39 inches long. The pressure measured at the clogging indicator is the back pressure of the element and the return line hose.

For cleaning the mesh element or changing the glass fiber element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

For filtration finer than 40 µm, use the disposable elements made of microglass or paper. Filter elements as fine as 5 µm(c) are available; finer filter elements upon request.

Eaton-filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

1. Type index:

1.1. Complete filter: (ordering example)

RF. 210. 10VG. 16. S. P. -. UG. 4. -. O

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

- 1 | **series:**
RF = return-line filter
- 2 | **nominal size:** 210, 320
- 3 | **filter-material and filter-fineness:**
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
- 4 | **filter element collapse rating:**
16 = Δp 232 PSI
- 5 | **filter element design:**
E = without by-pass valve
S = with by-pass valve, Δp 29 PSI
- 6 | **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 | **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601
IS07 = for oil/ammonia mixtures (NH₃), see sheet-no. 31602
- 8 | **connection:**
UG = thread connection
- 9 | **no. of version:**

version	3	4
connection R type	UG	UG
size	6	6
connection T type	UG	SA
size	6	42 or 40

type: UG = thread
SA = hose nozzle

size: 6 = -20 SAE
42 = 1.65 dia (RF 210)
40 = 1.57 dia (RF 320)
- 10 | **filter housing specification:** (see catalog)
- = standard
IS06 = for HFC applications, see sheet-no. 31605
- 11 | **clogging indicator:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 210. 10VG. 16. S. P. -. D

1	2	3	4	5	6	7	8
---	---	---	---	---	---	---	---

- 1 | **series:**
01E. = filter element according to company standard
- 2 | **nominal size:** 210, 320
- 3 | - 7 | see type index-complete filter
- 8 | **accessories:**
D = with wire strap

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	29 PSI
process connection:	thread connection
output:	hose nozzle or thread connection
housing material:	Al-cast, glass fiber reinforced polyamide (filter cover)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) - \text{characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

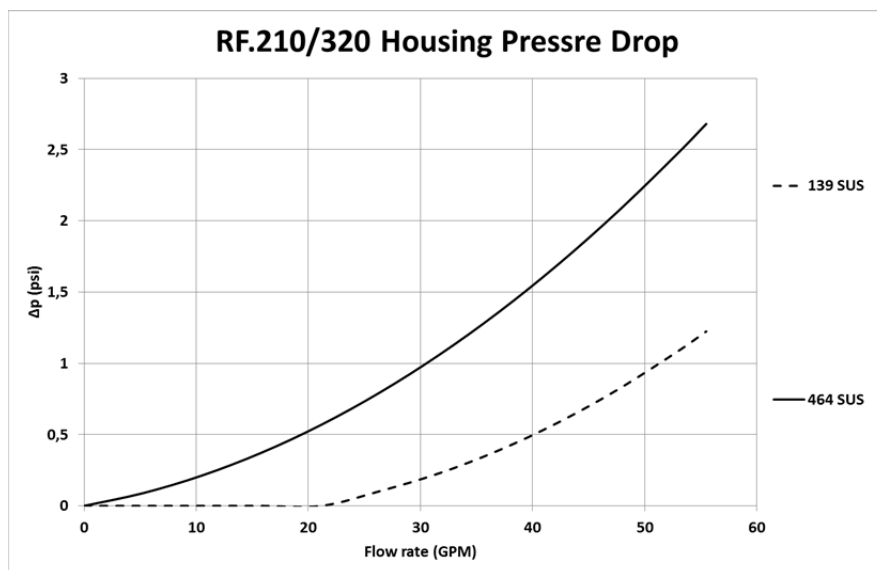
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

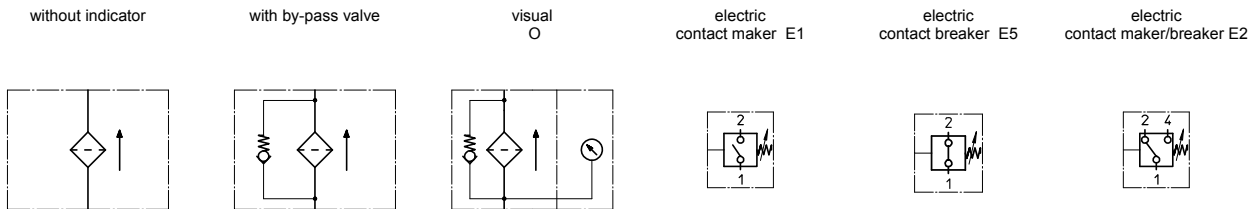
RF	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
210	1.600	1.111	0.711	0.619	0.423	0.0588	0.0549	0.0376	0.353
320	1.148	0.797	0.510	0.444	0.304	0.0337	0.0314	0.0215	0.253

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension		article-no.
			RF 210	RF 320	
1	1	filter element	01E.210...	01E.320...	
2	1	filter housing	NG 210	NG 320	
3	1	screw plug	M90 x 2		301910
4	1	spring			302144
5	1	O-ring	82 x 3		305191 (NBR) | 305298 (FPM)
6	1	O-ring	40 x 3		304389 (NBR) | 304391 (FPM)
7	1	screw plug	¼ BSPP		305003
8	1	clogging indicator, visual	O		301721
9	1	pressure switch, electric	E1, E2 or E5		see sheet-no. 1616

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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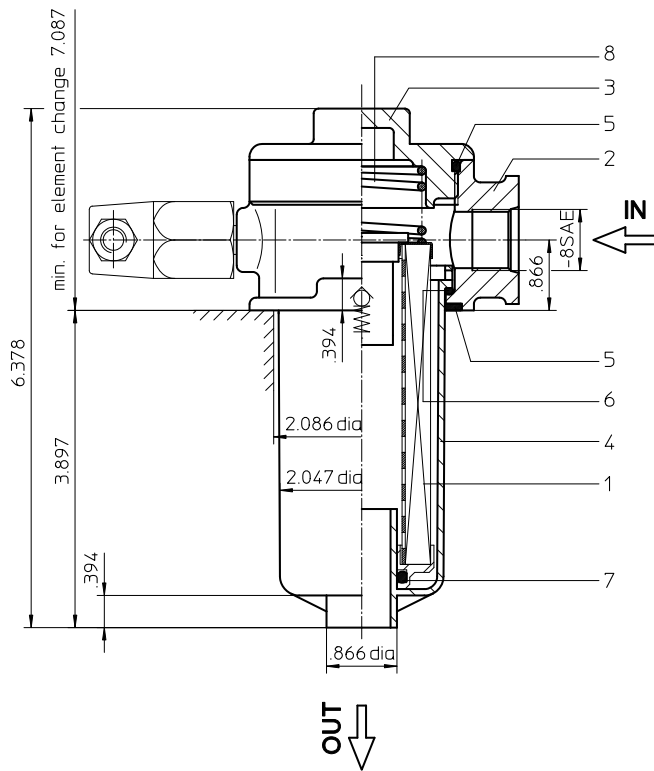
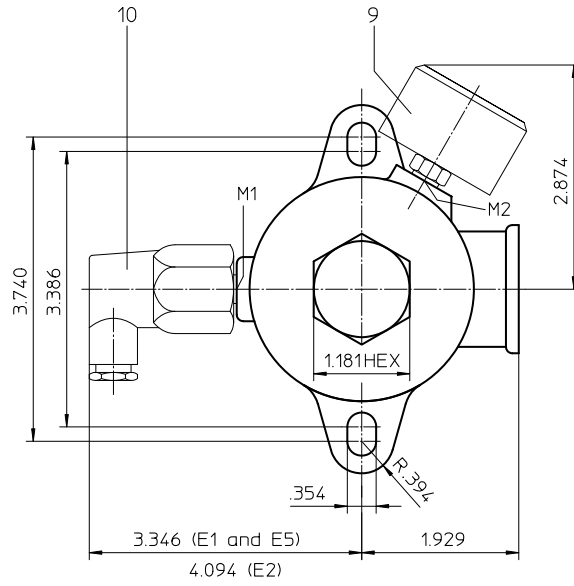
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Series TEF 41 145 PSI



Use connection M1 if only one indicator is required.

Weight: approx. 1.76 lbs.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Return Line Filter

Series TEF 41

145 PSI

Description:

Return-line TEF series filters have a working pressure up to 145 PSI. Pressure peaks can be absorbed with a sufficient safety margin.

The TEF-filters are directly mounted to the reservoir and connected to the return-line.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life. Due to its practical design, the return-line filter is easy to service.

When changing the filter element, a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

1. Type index:

1.1. Complete filter: (ordering example)

TEF. 41. 10VG. 16. S. P. -. UG. 3. -. E1. O

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- | | |
|----|---|
| 1 | series:
TEF = tank-mounted return-line-filter |
| 2 | nominal size: 41 |
| 3 | filter-material and filter-fineness:
80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
10P paper (only with 01E.41) |
| 4 | filter element collapse rating:
16 = 01E.41 for Δp 232 PSI (standard with by-pass valve)
30 = 01E.60 for Δp 435 PSI (standard without by-pass valve) |
| 5 | filter element design:
S = with by-pass valve (01E.41) Δp 29 PSI
E = without by-pass valve (01E.60) |
| 6 | sealing material:
P = Nitrile (NBR)
V = Viton (FPM) |
| 7 | filter element specification: (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601 |
| 8 | process connection:
UG = thread connection |
| 9 | process connection size:
3 = - 8 SAE |
| 10 | filter housing specification: (see catalog)
- = standard
IS06 = for HFC applications, see sheet-no. 31605 |
| 11 | clogging indicator at M1:
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616 |
| 12 | clogging indicator at M2:
see position 11 of the type index for indicator options |

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 41. 10VG. 16. S. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- | | |
|---|---|
| 1 | series:
01E. = filter element according to company standard |
| 2 | nominal size: 41, 60 |
| 3 | - 7 \| see type index-complete filter |

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	29 PSI
process connection:	thread connection
housing material:	Al-cast, glass fiber reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	.05 Gal

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

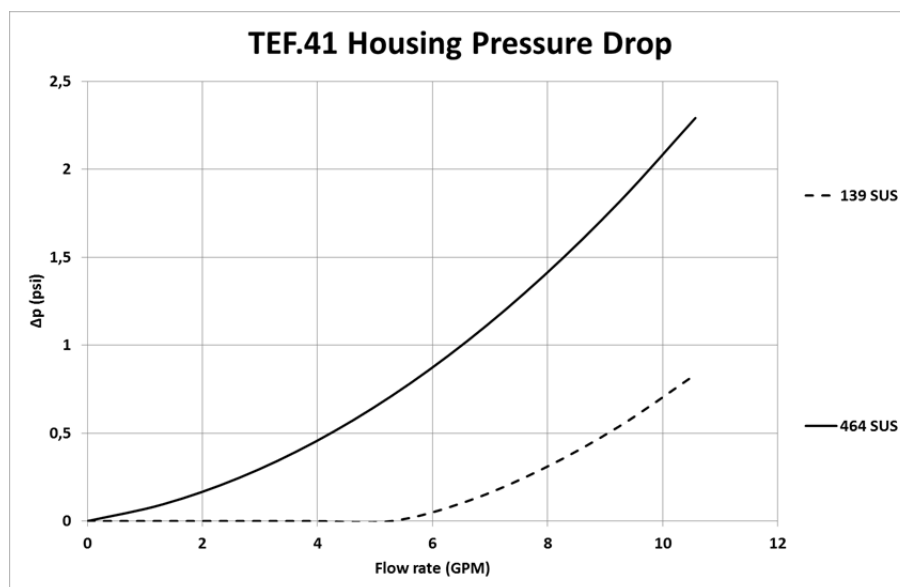
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

TEF	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
41 (without bypass)	6.748	4.685	2.999	2.577	1.760	0.2002	0.1868	0.1280	1.469
41 (with bypass)	6.748	4.685	2.999	2.577	1.760	0.2002	0.1868	0.1280	-

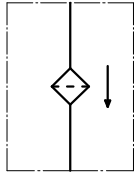
$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.

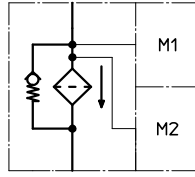


Symbols:

without indicator



with by-pass valve



visual O



electric contact maker
E1



electric contact breaker
E5



electric contact maker/breaker
E2



Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element with by-pass	01.E41...		
	1	filter element without by-pass	01.E60...		
2	1	filter head	TEF 41 - 55	308646	
3	1	filter cover	M 60 x 2	303621	
4	1	filter bowl	TEF 41	306673	
5	2	O-ring	56 x 3	305072 (NBR)	305322 (FPM)
6	1	O-ring	50 x 2,5	305239 (NBR)	305321 (FPM)
7	1	O-ring	22 x 3,5	304341 (NBR)	304392 (FPM)
8	1	spring	DA = 40	304982	
9	1	clogging indicator visual	O	301721	
10	1	clogging indicator electrical	E1, E2 or E5	see sheet-no. 1616	

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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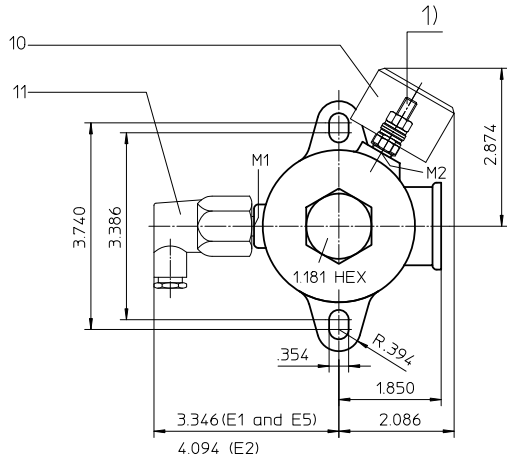
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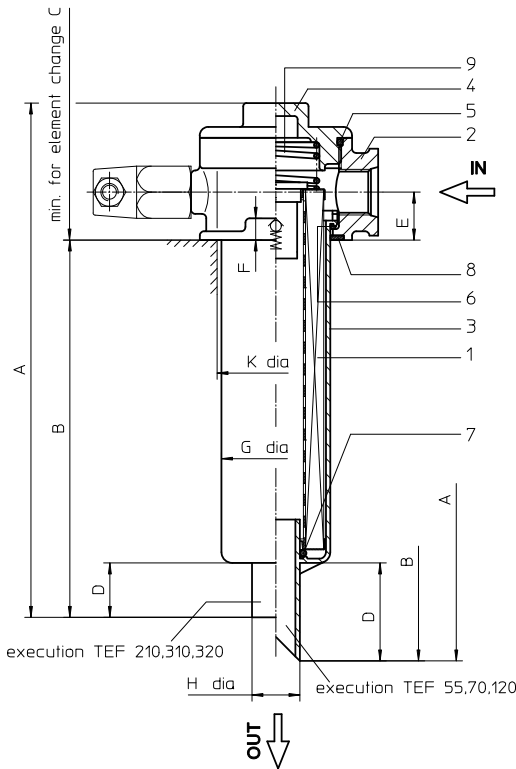
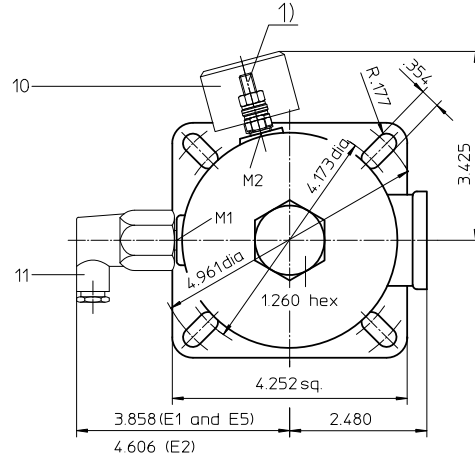
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Series TEF 55-320 145 PSI

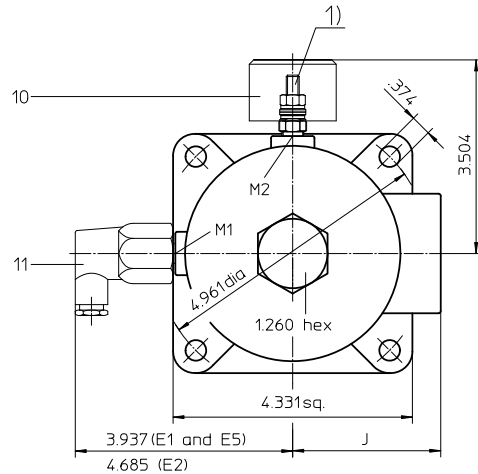
view TEF 55,70



view TEF 120



view TEF 210,310,320



Use connection M1 if only one indicator is required.

- 1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions:

type	connection	A	B	C	D	E	F	G	H	J	K	weight	volume tank
TEF 55	-8 SAE	10.11	7.64	10.63	1.77	.87	.39	2.05	.87	-	2.08	1.98 lbs.	.08 Gal.
TEF 70	-12 SAE	10.11	7.64	10.63	1.77	.87	.39	2.05	.87	-	2.08	1.98 lbs.	.08 Gal.
TEF 120	-16 SAE	11.30	8.39	11.80	2.56	1.06	.39	2.76	.97	-	2.83 ⁺³⁹	3.30 lbs.	.15 Gal.
TEF 210	-20 SAE	12.00	9.06	13.78	.98	1.18	.39	3.15	1.50	2.86	3.22 ⁺¹¹	4.60 lbs.	.29 Gal.
TEF 310	-20 SAE	15.25	12.26	15.94	.98	1.18	.39	3.15	1.50	2.86	3.22 ⁺¹¹	5.50 lbs.	.36 Gal.
TEF 320	-24 SAE	16.54	13.00	18.31	1.57	1.42	.39	3.35	1.73	2.79	3.38 ⁺²³	6.20 lbs.	.45 Gal.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Return Line Filter

Series TEF 55-320

145 PSI

Description:

Return-line TEF series filters have a working pressure up to 145 PSI. Pressure peaks can be absorbed with a sufficient safety margin.

The TEF-filters are directly mounted to the reservoir and connected to the return-line.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life. Due to its practical design, the return-line filter is easy to service.

When changing the filter element, a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

1. Type index:

1.1. Complete filter: (ordering example)

TEF. 70. 10VG. 16. S. P. -. UG. 4. -. E1. O. -

1	2	3	4	5	6	7	8	9	10	11	12	13
---	---	---	---	---	---	---	---	---	----	----	----	----

- | | |
|----|---|
| 1 | series:
TEF = tank-mounted return-line-filter |
| 2 | nominal size: 55, 70, 120, 210, 310, 320 |
| 3 | filter-material and filter-fineness:
80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
10P paper |
| 4 | filter element collapse rating:
16 = Δp 232 PSI |
| 5 | filter element design:
E = without by-pass valve
S = with by-pass valve Δp 29 PSI
S1 = with by-pass valve Δp 51 PSI |
| 6 | sealing material:
P = Nitrile (NBR)
V = Viton (FPM) |
| 7 | filter element specification: (see catalog)
- = standard
VA = stainless steel
IS06 = For HFC applications, see sheet-no. 31601 |
| 8 | process connection:
UG = thread connection |
| 9 | process connection size:
3 = - 8 SAE TEF 55
4 = - 12 SAE TEF 70
5 = - 16 SAE TEF 120
6 = - 20 SAE TEF 210/310
7 = - 24 SAE TEF 320 |
| 10 | filter housing specification: (see catalog)
- = standard
IS06 = for HFC applications, see sheet-no. 31605
IS11 = for mining applications, see sheet-no. 40530 |
| 11 | clogging indicator at M1:
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
PA = electrical grounding connection |
| 12 | clogging indicator at M2:
possible indicators see position 11 of the type index |
| 13 | permanent magnet:
- = without
M = with permanent magnet |

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 70. 10VG. 16. S. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- | | |
|---|---|
| 1 | series:
01E. = filter element according to company standard |
| 2 | nominal size: 70 (TEF55/70), 120 (TEF120),
210 (TEF210), 320 (TEF310/320) |
| 3 | - 7 see type index-complete filter |

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium:	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	29 PSI, 51 PSI
process connection:	thread connection
housing material standard:	filter head AL , filter cover / filter bowl microglass reinforced polyamide
housing material IS11, category M2:	filter head GG, filter cover steel, filter bowl carbon fibre reinforced polyamide
housing material IS11, category 2:	filter head AL, filter cover / filter bowl carbon fibre reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) - \text{characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

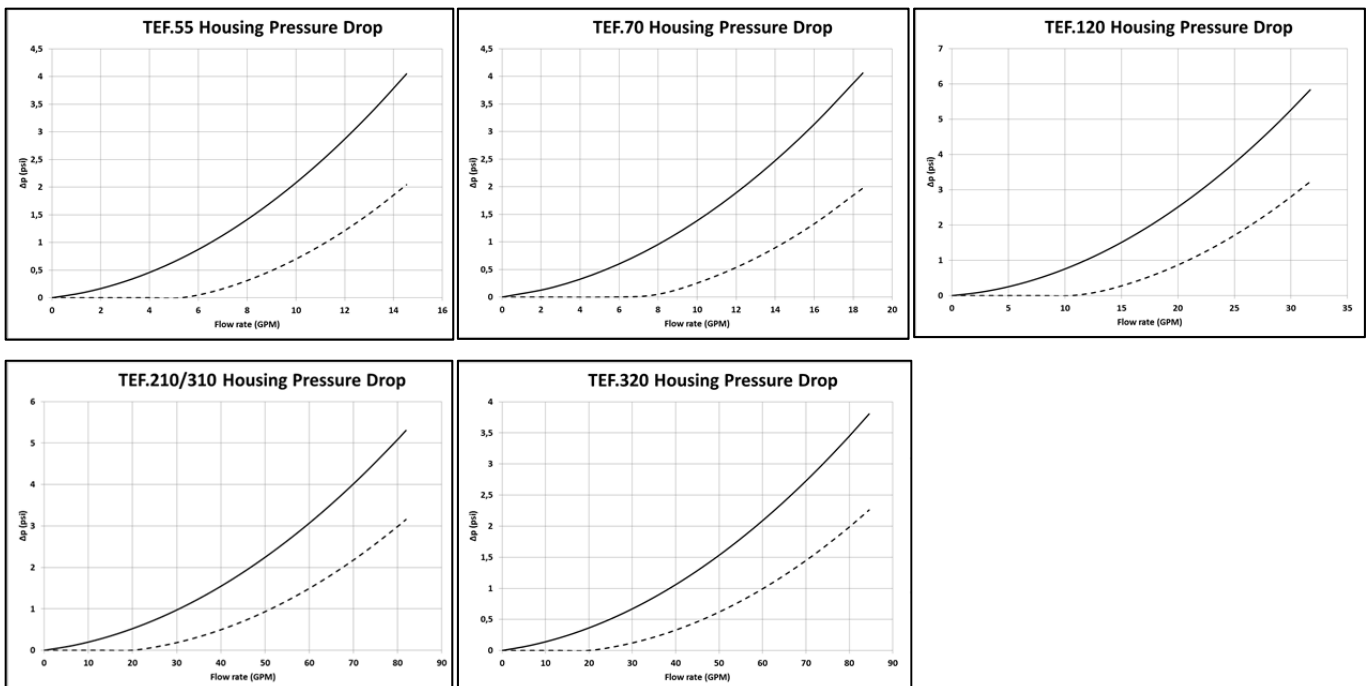
TEF	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
55	3.535	2.454	1.571	1.368	0.935	0.1196	0.1117	0.0765	0.797
70	3.535	2.454	1.571	1.368	0.935	0.1196	0.1117	0.0765	0.797
120	3.162	2.195	1.405	1.224	0.836	0.1144	0.1068	0.0731	0.690
210	1.600	1.111	0.711	0.619	0.423	0.0588	0.0549	0.0376	0.353
310	1.148	0.797	0.510	0.444	0.304	0.0337	0.0314	0.0215	0.253
320	1.148	0.797	0.510	0.444	0.304	0.0337	0.0314	0.0215	0.253

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.

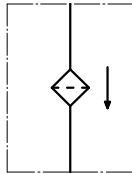
Viscosity key:

--- 139 SUS ——— 464 SUS

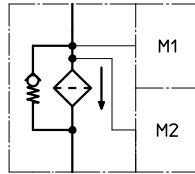


Symbols:

without indicator



with by-pass valve



visual O



electric contact maker
E1



electric contact breaker
E5



electric contact maker/breaker
E2



Spare parts:

item	qty.	designation	dimension and article-no.					
			TEF 55	TEF 70	TEF 120	TEF 210	TEF 310	TEF 320
1	1	filter element	01E.70...		01E.120...	01E.210...	01E.320...	01E.320...
2	1	filter head						
3	1	filter bowl						
4	1	filter cover	M 60 x 2		M 82 x 2	M 90 x 2		M100 x 2
5	1	O-ring	56 x 3 305072 (NBR) 305322 (FPM)		75 x 3 302215 (NBR) 304729 (FPM)	82 x 3 305191 (NBR) 305298 (FPM)		96 x 3 305292 (NBR) 305297 (FPM)
6	1	O-ring	50 x 2,5 305239 (NBR) 305321 (FPM)		68 x 4 303037 (NBR) 313046 (FPM)	75 x 3 302215 (NBR) 304729 (FPM)		82 x 3 305191 (NBR) 305298 (FPM)
7	1	O-ring	22 x 3 304387 (NBR) 304931 (FPM)		24 x 3 303038 (NBR) 304397 (FPM)	40 x 3 304389 (NBR) 304391 (FPM)		40 x 3 304389 (NBR) 304391 (FPM)
8	1	O-ring	56 x 3 305072 (NBR) 305322 (FPM)		86 x 3 305470 (NBR) 313047 (FPM)	88 x 3 304417 (NBR) 310266 (FPM)		96 x 3 305292 (NBR) 305297 (FPM)
9	1	spring	DA = 40 304982		DA = 52 302144	DA = 52 302144		DA = 52 305053
10	1	clogging indicator	O 301721					
11	1	clogging indicator electric	alternatively E1, E2 or E5 see sheet-no. 1616					

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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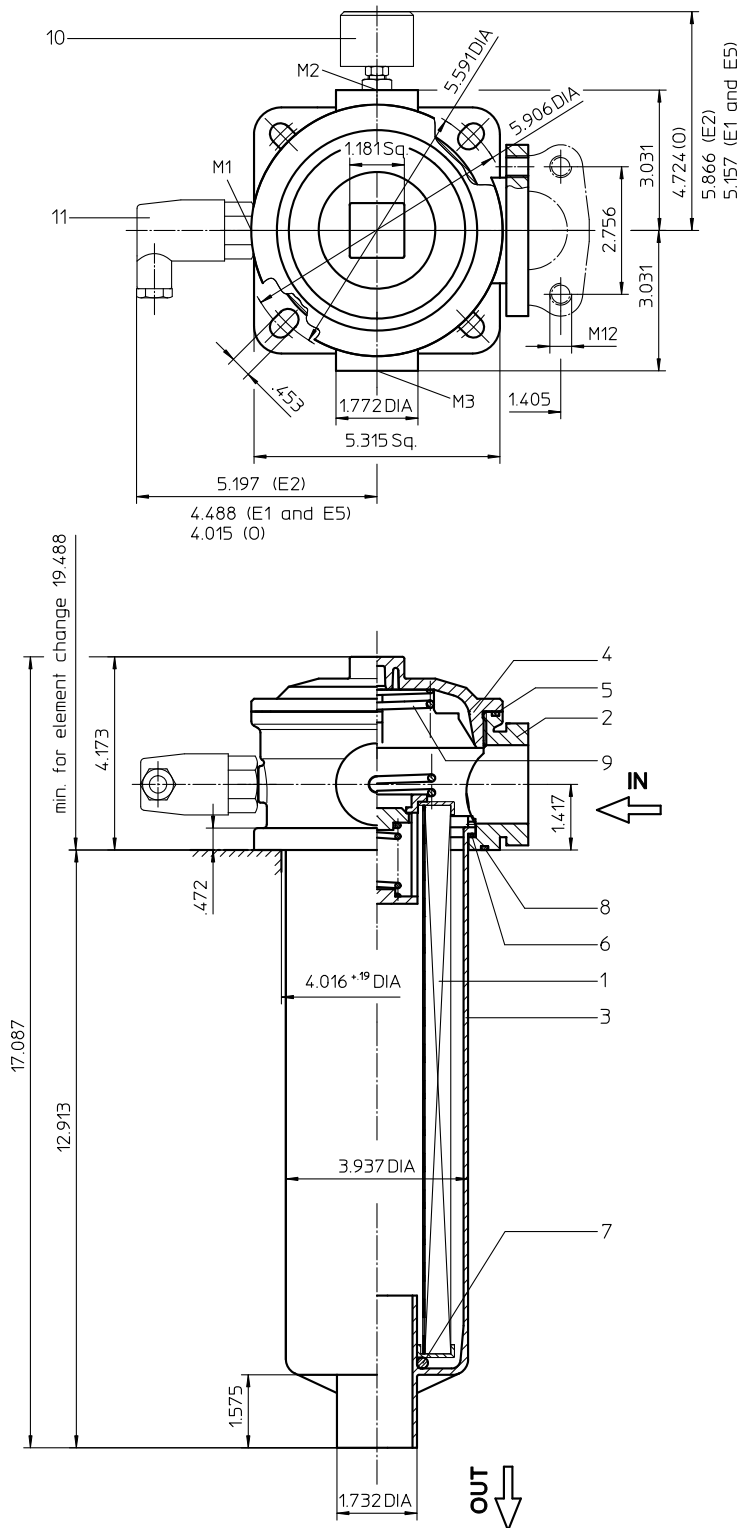
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Series TEF 426 145 PSI



Use connection M1 if only one indicator is required.

Weight: approx. 5.7 lbs.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Return Line Filter

Series TEF 426

145 PSI

Description:

Return-line TEF series filters have a working pressure up to 145 PSI. Pressure peaks can be absorbed with a sufficient safety margin.

The TEF-filters are directly mounted to the reservoir and connected to the return-line.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 4 $\mu\text{m(c)}$.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life. Due to its practical design, the return-line filter is easy to service.

When changing the filter element, a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

Type index:

Complete filter: (ordering example)

TEF. 426. 10VG. 16. S. P. -. FS. 7. -. E1. O. -

1	2	3	4	5	6	7	8	9	10	11	12	13
---	---	---	---	---	---	---	---	---	----	----	----	----

- 1 series:**
TEF = tank-mounted return-line-filter
- 2 nominal size:** 426
- 3 filter-material and filter-fineness:**
80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
10P paper
- 4 filter element collapse rating:**
16 = Δp 232 PSI
- 5 filter element design:**
E = without by-pass valve
S = with by-pass valve Δp 29 PSI
- 6 sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601
- 8 process connection:**
FS = SAE-flange 3000 PSI
- 9 process connection size:**
7 = 1 1/2"
- 10 filter housing specification:** (see catalog)
- = standard
IS06 = for HFC applications, see sheet-no. 31605
- 11 clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
- 12 clogging indicator at M2:**
see position 11 of the type index for indicator options
- 13 clogging indicator at M3:**
see position 11 of the type index for indicator options

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 425. 10VG. 16. S. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 series:**
01E. = filter element according to company standard
- 2 nominal size:** 425
- 3 - 7** | see type index-complete filter

Accessories:

- SAE-counter flange, see sheet-no. 1652

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	29 PSI
process connection:	SAE-flange 3000 PSI
housing material:	AL-casting; glass fiber reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	.65 Gal

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

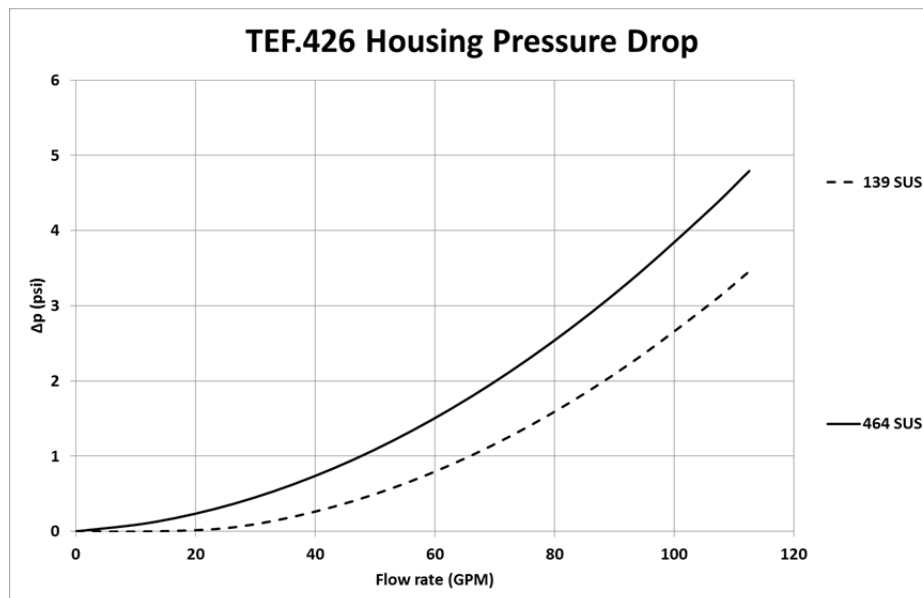
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

TEF	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
426	0.849	0.589	0.377	0.328	0.224	0.0270	0.0252	0.0172	0.182

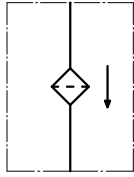
$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.

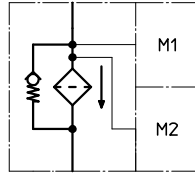


Symbols:

without indicator



with by-pass valve



visual O



electric contact maker
E1



electric contact breaker
E5



electric contact maker/breaker
E2



Spare parts:

item	qty.	designation	dimension	article-no.
1	1	filter element	01.E425...	-
2	1	filter head	nominal size 426	313571
3	1	filter bowl	nominal size 425	303732
4	1	screw plug	M 120 x 3	313649
5	1	O-ring	128 x 3	304602 (NBR) | 308140 (FPM)
6	1	O-ring	98 x 4	301914 (NBR) | 304765 (FPM)
7	1	O-ring	44 x 6	302222 (NBR) | 304384 (FPM)
8	1	O-ring	115 x 3	303963 (NBR) | 307762 (FPM)
9	1	spring	DA = 63,5	304983
10	1	clogging indicator visual	O	see sheet-no. 1616
11	1	clogging indicator electrical	alternatively E1, E2 or E5	see sheet-no. 1616

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
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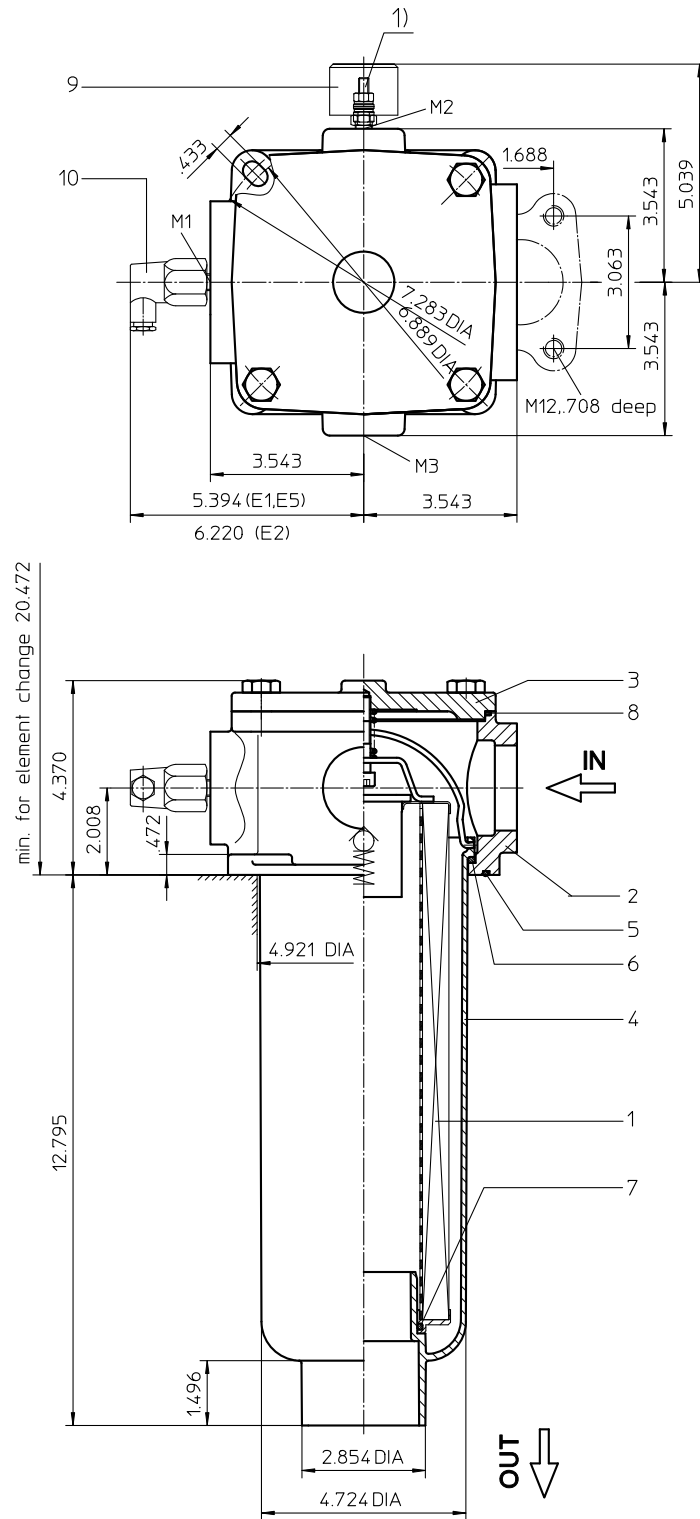
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Series TEF 625 145 PSI



Use connection M1 if only one indicator is required.

1) Connect the stand grounding tab to a suitable earth ground point.

Weight: approx. 10 lbs.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Return Line Filter

Series TEF 625

145 PSI

Description:

Return-line TEF series filters have a working pressure up to 145 PSI. Pressure peaks can be absorbed with a sufficient safety margin.

The TEF-filters are directly mounted to the reservoir and connected to the return-line.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life. Due to its practical design, the return-line filter is easy to service.

When changing the filter element, a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

Type index:

Complete filter: (ordering example)

TEF. 625. 10VG. 16. S. P. -. FS. 8. -. E1. O. -

1	2	3	4	5	6	7	8	9	10	11	12	13
---	---	---	---	---	---	---	---	---	----	----	----	----

- 1 series:**
TEF = tank-mounted return-line-filter
- 2 nominal size:** 625
- 3 filter-material and filter-fineness:**
80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
10P paper
- 4 filter element collapse rating:**
16 = Δp 232 PSI
- 5 filter element design:**
E = without by-pass valve
S = with by-pass valve Δp 29 PSI
- 6 sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601
- 8 process connection:**
FS = SAE-flange 3000 PSI
- 9 process connection size:**
8 = 2"
- 10 filter housing specification:** (see catalog)
- = standard
IS06 = for HFC applications, see sheet-no. 31605
IS11 = for mining applications, see sheet-no. 40530
- 11 clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
PA = electrical grounding connection
- 12 clogging indicator at M2:**
possible indicators see position 11 of the type index
- 13 clogging indicator at M3:**
possible indicators see position 11 of the type index

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element:

(ordering example)

01E. 631. 10VG. 16. S. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 series:**
01E. = filter element according to company standard
- 2 nominal size:** 631
- 3 - 7** | see type index-complete filter

Accessories:

- SAE-counter flange see sheet-no. 1652

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	29 PSI
process connection:	SAE-flange 3000 PSI
housing material:	filter head / filter cover AL; filter bowl glass fiber reinforced polyamide (standard) filter head / filter cover GG; filter bowl carbon fiber reinforced polyamide (according to IS11)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	.95 Gal

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) - \text{characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

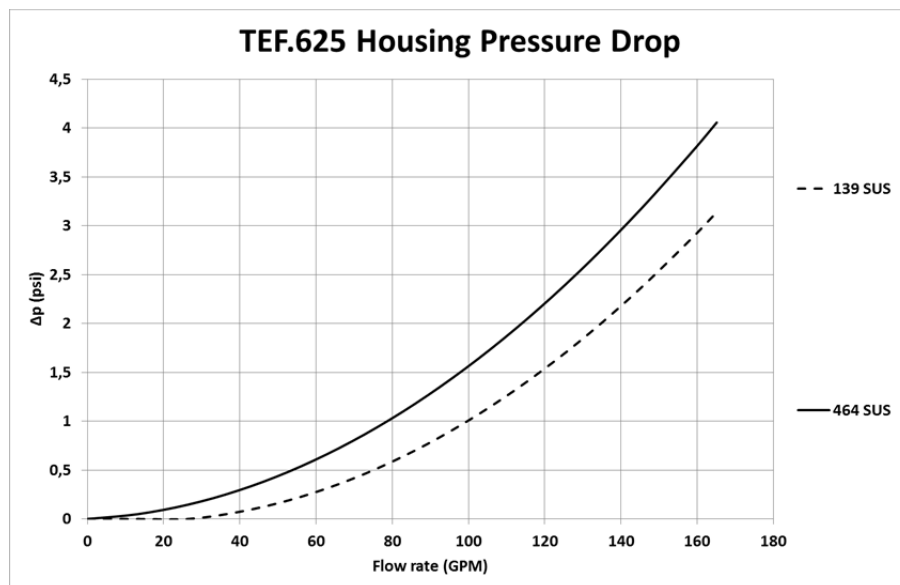
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

TEF	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
625	0.643	0.446	0.286	0.249	0.170	0.0236	0.0220	0.0151	0.142

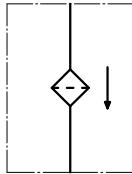
$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.

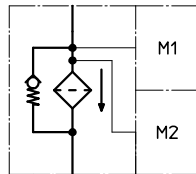


Symbols:

without indicator



with by-pass valve



visual O



electric contact maker
E1



electric contact breaker
E5



electric contact maker/breaker
E2



Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01E.631...		
2	1	filter head	NG 625		
3	1	filter cover			
4	1	filter bowl	NG 625		
5	1	O-ring	140 x 3	304604 (NBR)	307514 (FPM)
6	1	O-ring	120 x 4	305300 (NBR)	307991 (FPM)
7	1	O-ring	63 x 3,5	311189 (NBR)	311592 (FPM)
8	1	O-ring	135 x 3,5	318386 (NBR)	318387 (FPM)
9	1	clogging indicator, visual	O	301721	
10	1	clogging indicator, electric	alternatively E1, E2 or E5	see sheet-no. 1616	

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
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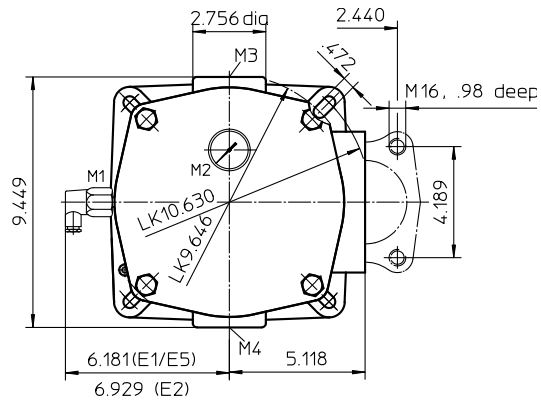
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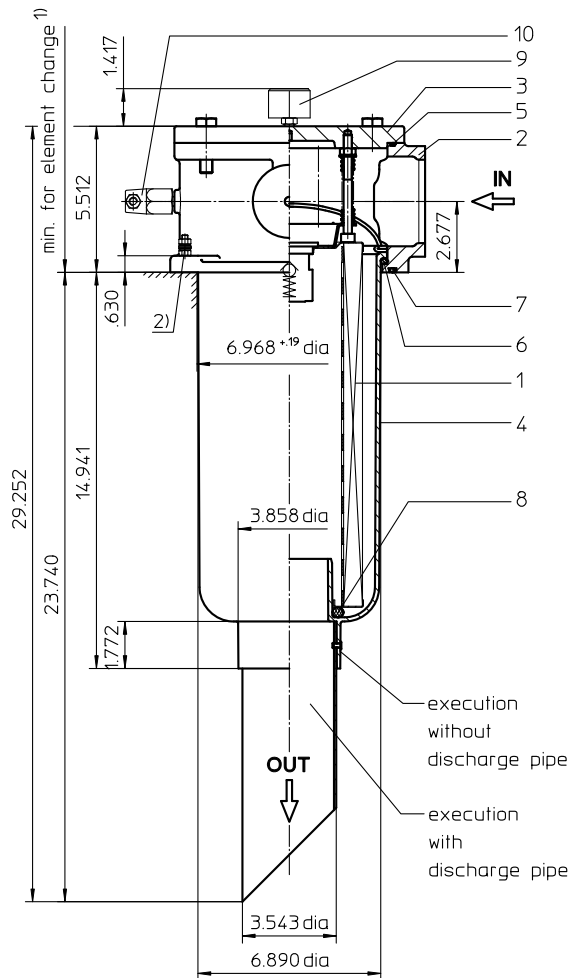
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Series TEF 952 145 PSI



- 1) min. for element change without discharge pipe 21.88
- min. for element change with discharge pipe 30.70



Use connection M1 if only one indicator is required.

- 1) Connect the stand grounding ab to a suitable earth ground point.

Weight: approx. 24 lbs.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Return Line Filter

Series TEF 952

145 PSI

Description:

Return-line TEF series filters have a working pressure up to 145 PSI. Pressure peaks can be absorbed with a sufficient safety margin.

The TEF-filters are directly mounted to the reservoir and connected to the return-line.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use disposable elements made of paper or microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements on request.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life. Due to its practical design, the return-line filter is easy to service.

When changing the filter element, a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

Type index:

Complete filter: (ordering example)

TEF. 952. 10VG. 10. S. P. -. FS. A. -.

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

E1. O. -. -. -

11	12	13	14	15
----	----	----	----	----

- 1 series:**
TEF = tank-mounted return-line-filter
- 2 nominal size:** 952
- 3 filter-material and filter-fineness:**
80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
10P paper
- 4 resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 filter element design:**
E = without by-pass valve
S = with by-pass valve Δp 29 PSI
S1 = with by-pass valve Δp 51 PSI
- 6 sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 filter element specification: (see catalog)**
- = standard
VA = stainless steel
IS06 = For HFC applications, see sheet-no. 31601
- 8 process connection:**
FS = SAE-flange 3000 PSI
- 9 process connection size:**
A = 3"
- 10 filter housing specification: (see catalog)**
- = standard
IS06 = for HFC applications, see sheet-no. 31605
IS11 = for mining applications, see sheet-no. 40530
- 11 clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
- 12 clogging indicator at M2:**
possible indicators see position 11 of the type index
- 13 clogging indicator at M3:**
possible indicators see position 11 of the type index
- 14 clogging indicator at M4:**
possible indicators see position 11 of the type index
- 15 discharge pipe:**
- = without
1 = with discharge pipe

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 950. 10VG. 10. S. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 series:**
01E. = filter element according to company standard
- 2 nominal size:** 950
- 3 - 7** see type index-complete filter

Accessories:

- SAE-counter flange, see sheet-no. 1652

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	29 PSI, 51 PSI
process connection:	SAE-flange 3000 PSI
housing material:	filter head / filter cover AL; filter bowl glass fiber reinforced polyamide (standard) filter head / filter cover GG; filter bowl carbon fiber reinforced polyamide (according to IS11)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	2.60 Gal

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

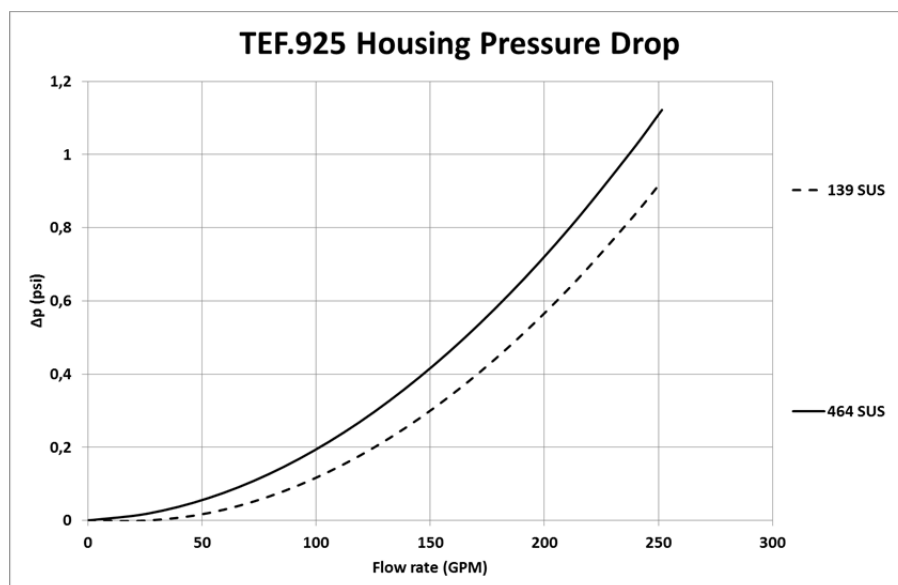
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

TEF	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
952	0.364	0.253	0.162	0.141	0.096	0.0179	0.0167	0.0115	0.076

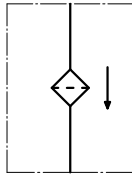
$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.

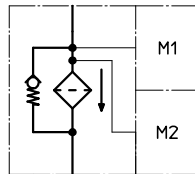


Symbols:

without indicator



with by-pass valve



visual O



electric contact maker
E1



electric contact breaker
E5



electric contact maker/breaker
E2



Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01.E 950...		
2	1	filter head			
3	1	filter cover			
4	1	filter bowl without discharge pipe			
	1	filter bowl with discharge pipe			
5	1	O-ring	195 x 3,5	301831 (NBR)	306528 (FPM)
6	1	O-ring	170 x 6	304799 (NBR)	306529 (FPM)
7	1	O-ring	190 x 5	305432 (NBR)	310283 (FPM)
8	1	O-ring	78 x 10	305017 (NBR)	305552 (FPM)
9	1	clogging indicator visual	O	301721	
10	1	clogging indicator electric	alternatively E1, E2 or E5	see sheet-no. 1616	

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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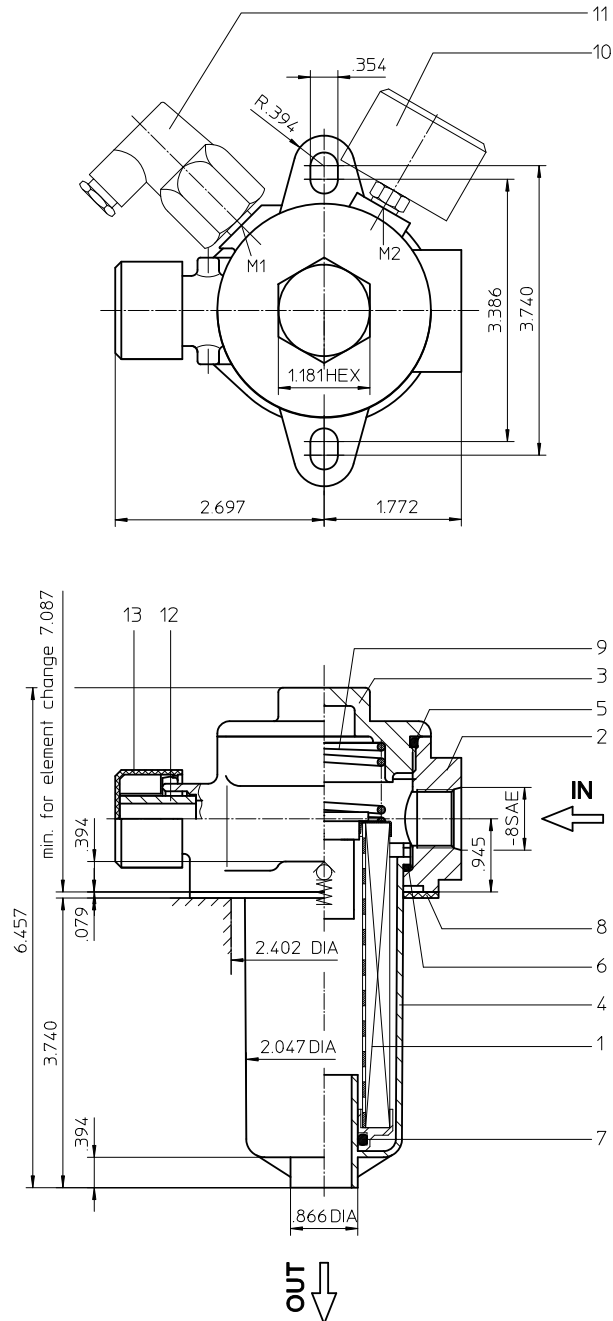
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Series TEFB 41

145 PSI



When selecting only one indicator, use connection M2.

Weight: approx. 2.0 lbs.

Dimensions: inches

Designs and performance values are subject to change.

Return Line Filter

Series TEFB 41

145 PSI

Description:

Return-line filter series TEFB 41 have a working pressure up to 145 PSI.

The TEFB filters are directly mounted to the reservoir and connected to the return-line. No connection is needed for the built-in air filter. The air filter has a 10µm disposable element.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

Eaton filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

For filtration finer than 40 µm use the disposable elements made of microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements on request.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

When changing the filter element, a detachable connection between the filter head and the filter bowl prevents dirty oil from flowing into the tank.

1. Type index:

1.1. Complete filter: (ordering example)

TEFB.41.10VG.16.S.P.-.UG.3.-.E1.O

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

TEFB.41.10VG.30.E.P.-.UG.3.-.E1.O

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 | **series:**
TEFB = tank-mounted return-line-filter with breather filter
- 2 | **nominal size:** 41
- 3 | **filter-material and filter-fineness:**
80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
10P paper (only with 01E.41)
- 4 | **filter element collapse rating:**
16 = 01E.41 for Δp 232 PSI (standard with by-pass valve)
30 = 01E.60 for Δp 435 PSI (standard without by-pass valve)
- 5 | **filter element design:**
S = with by-pass valve (01E.41) Δp 29 PSI
E = without by-pass valve (01E.60)
- 6 | **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 | **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC application, see sheet-no. 31601
- 8 | **process connection:**
UG = thread connection
- 9 | **process connection size:**
3 = - 8 SAE
- 10 | **filter housing specification:** (see catalog)
- = standard
IS06 = for HFC application, see sheet-no. 31605
- 11 | **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
- 12 | **clogging indicator at M2:**
possible indicators see position 11 of the type index

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 41. 10VG. 16. S. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

01E. 60. 10VG. 30. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 | **series:**
01E. = filter element according to company standard
- 2 | **nominal size:** 41, 60
- 3 | - 7 | see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	29 PSI
process connection:	thread connection
housing material standard:	Al-cast, glass fiber reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	.05 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

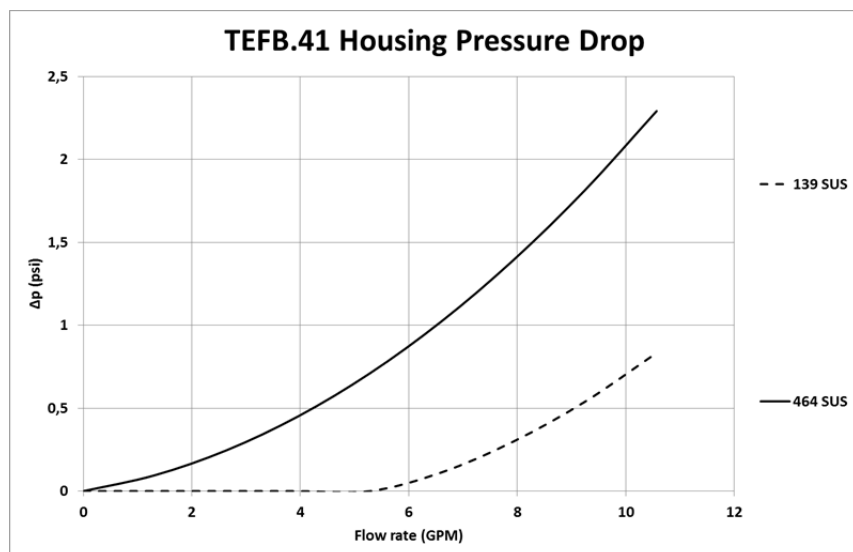
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

TEFB	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
41 (without bypass)	6.748	4.685	2.999	2.577	1.760	0.2002	0.1868	0.1280	1.469
41 (with bypass)	6.748	4.685	2.999	2.577	1.760	0.2002	0.1868	0.1280	-

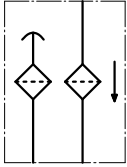
$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.

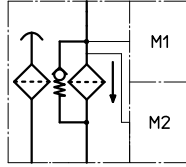


Symbols:

without indicator



with by-pass valve



visual O



electrical contact maker
E1



electrical contact breaker
E5



electrical contact maker/breaker
E2



Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element with by-pass	01E.41...		
		filter element without by-pass	01E.60...		
2	1	filter head	TEFB 41 - 55	308751	
3	1	filter cover	M 60 x 2	303621	
4	1	filter bowl	TEF 41	306673	
5	1	O-ring	56 x 3	305072 (NBR)	305322 (FPM)
6	1	O-ring	50 x 2,5	305239 (NBR)	305321 (FPM)
7	1	O-ring	22 x 3,5	304341 (NBR)	304392 (FPM)
8	1	gasket	.08 thick	303039	
9	1	spring	DA = 40	304982	
10	1	clogging indicator visual	O	301721	
11	1	clogging indicator electrical	alternatively E1, E2 or E5	see sheet-no. 1616	
12	1	filter element breather	01BFE.70	301865	
13	1	protection cap		305312	

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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Return Line Filter

Series TEFB 55-120

145 PSI

Description:

Return-line filter series TEFB 55-120 have a working pressure up to 145 PSI.

The TEFB filters are directly mounted to the reservoir and connected to the return-line. No connection is needed for the built-in air filter. The air filter has a 10µm disposable element.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

Eaton filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

For filtration finer than 40 µm use the disposable elements made of microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements on request.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

When changing the filter element, a detachable connection between the filter head and the filter bowl prevents dirty oil from flowing into the tank.

1. Type index:

1.1. Complete filter: (ordering example)

TEFB. 120. 10VG. 16. S. P. -. UG. 5. -. E1. O. 1

1	2	3	4	5	6	7	8	9	10	11	12	13
---	---	---	---	---	---	---	---	---	----	----	----	----

- | | |
|----|---|
| 1 | series:
TEFB = tank-mounted return-line-filter with breather filter |
| 2 | nominal size: 55, 70, 120 |
| 3 | filter-material and filter-fineness:
80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
10P paper |
| 4 | filter element collapse rating:
16 = Δp 232 PSI |
| 5 | filter element design:
E = without by-pass valve
S = with by-pass valve Δp 29 PSI |
| 6 | sealing material:
P = Nitrile (NBR)
V = Viton (FPM) |
| 7 | filter element specification: (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC application, see sheet-no. 31601 |
| 8 | process connection:
UG = thread connection |
| 9 | process connection size:
3 = - 8 SAE (TEFB 55)
4 = -12 SAE (TEFB 70)
5 = -16 SAE (TEFB 120) |
| 10 | filter housing specification: (see catalog)
- = standard
IS06 = for HFC application, see sheet-no. 31605
IS11 = for filter head and filter cover, see sheet-no. 40530 |
| 11 | clogging indicator at M1:
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
PA = ground connection |
| 12 | clogging indicator at M2:
possible indicators see position 11 of the type index |
| 13 | oil separator:
- = without
1 = with oil separator |

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 120. 10VG. 16. S. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- | | |
|---|---|
| 1 | series:
01E. = filter element according to company standard |
| 2 | nominal size: 70, 120 |
| 3 | - 7 see type index-complete filter |

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	29 PSI
process connection:	thread connection
housing material standard:	filter head AL, filter cover / filter bowl glass fibre reinforced polyamide
housing material IS11, category M2:	filter head GG, filter cover steel / filter bowl carbon fibre reinforced polyamide
housing material IS11, category 2:	filter head AL, filter cover / filter bowl carbon fibre reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) - \text{characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

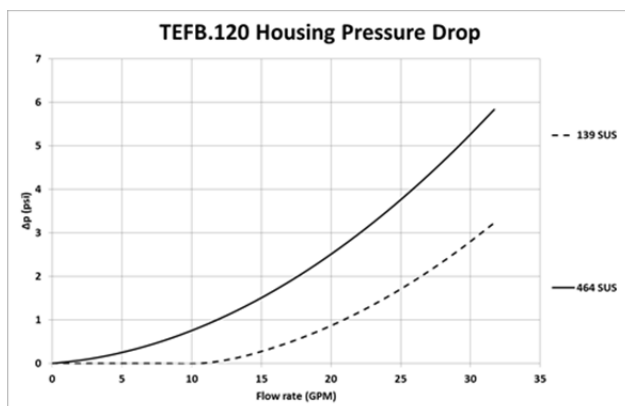
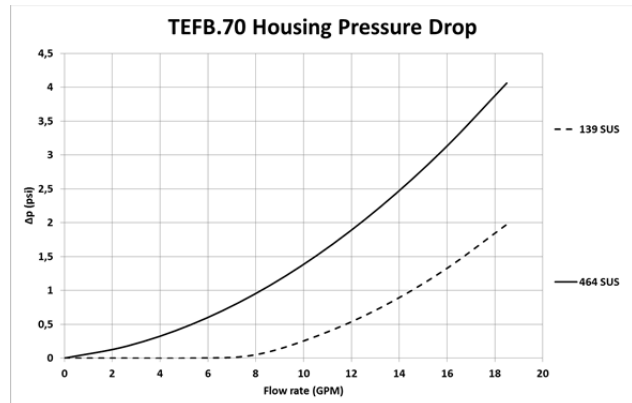
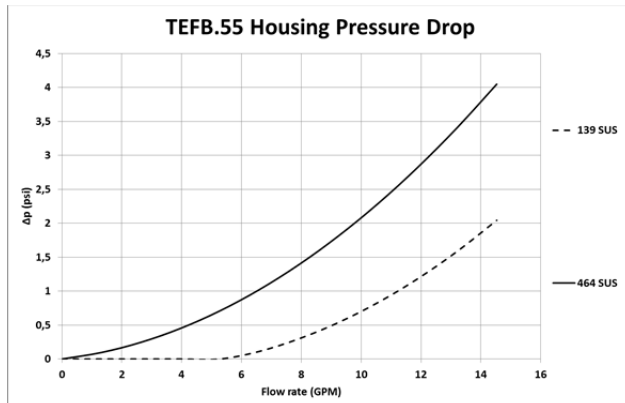
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

TEFB	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
55	3.535	2.454	1.571	1.368	0.935	0.1196	0.1117	0.0765	0.797
70	3.535	2.454	1.571	1.368	0.935	0.1196	0.1117	0.0765	0.797
120	3.162	2.195	1.405	1.224	0.836	0.1144	0.1068	0.0731	0.690

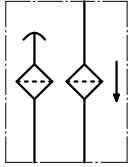
$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.

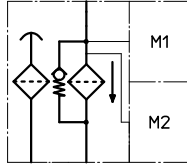


Symbols:

without indicator



with by-pass valve



visual O



electrical
contact maker
E1



electrical
contact breaker
E5



electrical
contact maker/breaker
E2



Spare parts:

item	qty.	designation	dimension and article-no.		
			TEFB 55	TEFB 70	TEFB 120
1	1	filter element	01E.70...		01E.120...
2	1	filter head	308751	308752	308648
3	1	filter bowl	304595		303041
4	1	screw plug	M 60 x 2		M 82 x 2
5	1	O-ring	56 x 3 305072 (NBR) 305322 (FPM)		75 x 3 302215 (NBR) 304729 (FPM)
6	1	O-ring	50 x 2,5 305239 (NBR) 305321 (FPM)		68 x 4 303037 (NBR) 313046 (FPM)
7	1	O-ring	22 x 3 304387 (NBR) 314733 (FPM)		24 x 3 303038 (NBR) 304397 (FPM)
8	1	gasket (filter without oil separator)	.08 thick 307706		.12 thick 303039
	1	gasket (filter with oil separator)	.08 thick 306786		.12 thick 303039
9	1	spring	DA = 40 304982		DA = 52 302144
10	1	oil separator	304544		310261
11	1	clogging indicator visual	O 301721		
12	1	clogging indicator electric	alternatively E1, E2 or E5 see sheet-no. 1616		
13	1	filter element breather	01BFE.70		01BFE.120
			301865		301866
14	1	protection cap	305312		303048

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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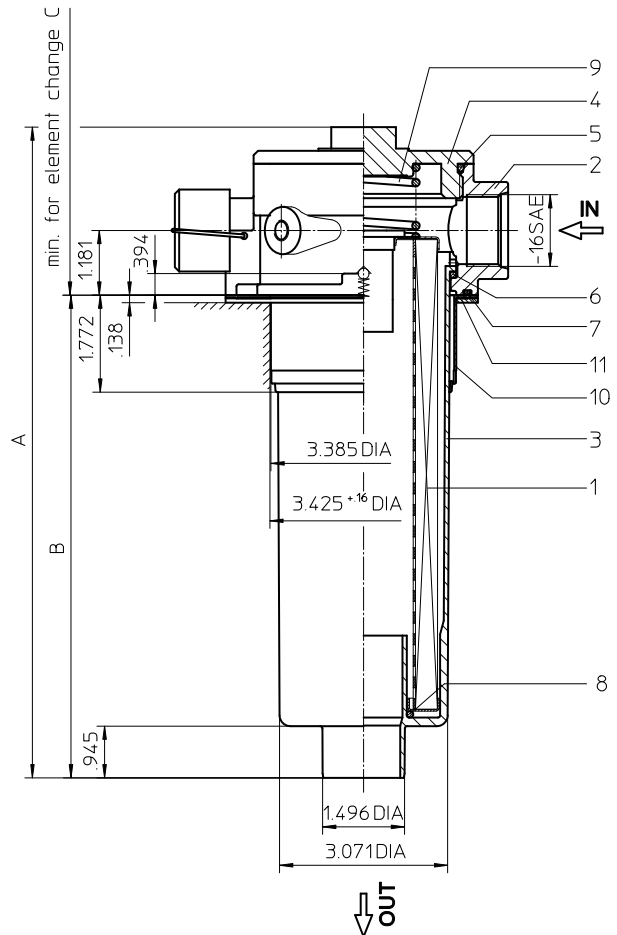
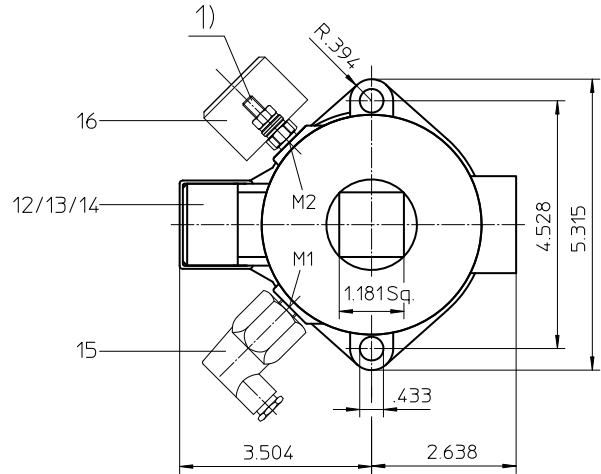
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Series TEFB 210-310

145 PSI



Dimensions:

type	TEFB 210	TEFB 310
A	11.89	15.24
B	8.82	12.13
C	13.78	17.13
weight	5.0 lbs.	5.1 lbs.
volume tank	.26 Gal.	.36 Gal.

When selecting only one indicator, use connection M2.

- 1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Return Line Filter

Series TEFB 210-310

145 PSI

Description:

Return-line filter series TEFB 210-310 have a working pressure up to 145 PSI.

The TEFB filters are directly mounted to the reservoir and connected to the return-line. No connection is needed for the built-in air filter. The air filter has a 10µm disposable element.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

Eaton filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

For filtration finer than 40 µm use the disposable elements made of microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements on request.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

When changing the filter element, a detachable connection between the filter head and the filter bowl prevents dirty oil from flowing into the tank.

1. Type index:

1.1. Complete filter: (ordering example)

TEFB. 210. 10VG. 16. S. P. -. UG. 5. -. E1. O. 1

1	2	3	4	5	6	7	8	9	10	11	12	13
---	---	---	---	---	---	---	---	---	----	----	----	----

- | | |
|----|---|
| 1 | series:
TEFB = tank-mounted return-line-filter with breather filter |
| 2 | nominal size: 310, 310 |
| 3 | filter-material and filter-fineness:
80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
10P paper |
| 4 | filter element collapse rating:
16 = Δp 232 PSI |
| 5 | filter element design:
E = without by-pass valve
S = with by-pass valve Δp 29 PSI |
| 6 | sealing material:
P = Nitrile (NBR)
V = Viton (FPM) |
| 7 | filter element specification: (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC application, see sheet-no. 31601 |
| 8 | process connection:
UG = thread connection |
| 9 | process connection size:
5 = -16 SAE |
| 10 | filter housing specification: (see catalog)
- = standard
IS06 = for HFC application, see sheet-no. 31605
IS11 = for filter head and filter cover, see sheet-no. 40530 |
| 11 | clogging indicator at M1:
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
PA = ground connection |
| 12 | clogging indicator at M2:
possible indicators see position 11 of the type index |
| 13 | oil separator:
- = without
1 = with oil separator |

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 210. 10VG. 16. S. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- | | |
|---|---|
| 1 | series:
01E. = filter element according to company standard |
| 2 | nominal size: 210, 320 |
| 3 | - 7 \| see type index-complete filter |

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	29 PSI
process connection:	thread connection
housing material standard:	filter head AL, filter cover / filter bowl glass fibre reinforced polyamide
housing material IS11, category M2:	filter head GG, filter cover steel / filter bowl carbon fibre reinforced polyamide
housing material IS11, category 2:	filter head AL, filter cover / filter bowl carbon fibre reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

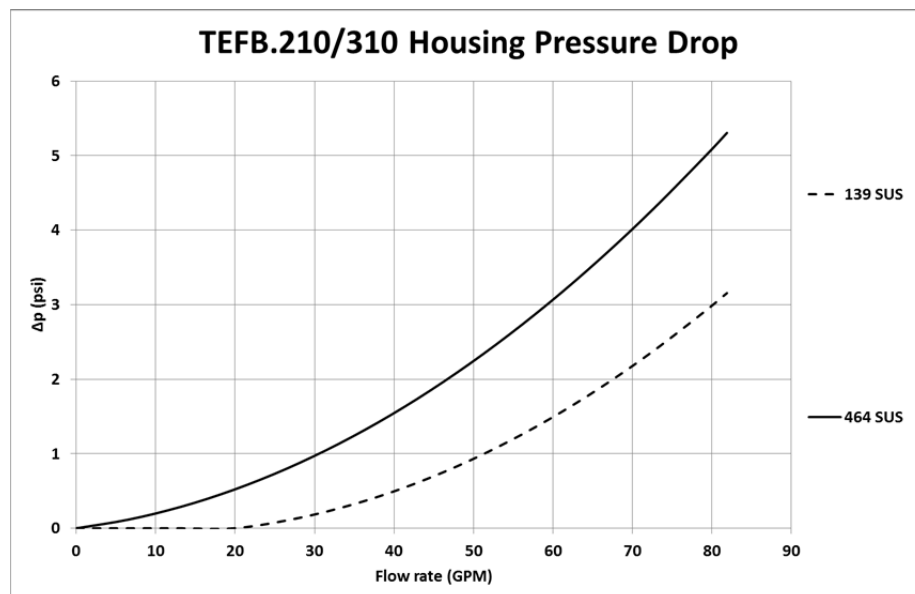
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

TEFB	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
210	1.600	1.111	0.711	0.619	0.423	0.0588	0.0549	0.0376	0.353
310	1.148	0.797	0.510	0.444	0.304	0.0337	0.0314	0.0215	0.253

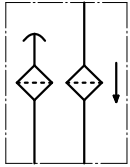
$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.

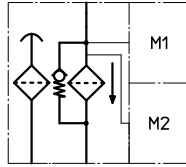


Symbols:

without indicator



with by-pass valve



visual O



electric contact maker
E1



electric contact breaker
E5



electric contact maker/breaker
E2



Spare parts:

item	qty.	designation	dimension	
			TEFB 210	TEFB 310
1	1	filter element	01.E 210...	01E.320...
2	1	filter head	TNR 100 313952	
3	1	filter bowl	NG 210 304518	NG 310 305471
4	1	filter cover	M 92 x 3 317014	
5	1	O-ring	82 x 3,5 304403 (NBR) 308745 (FPM)	
6	1	O-ring	75 x 3 302215 (NBR) 304729 (FPM)	
7	1	O-ring	95 x 3 305808 (NBR) 304828 (FPM)	
8	1	O-ring	40 x 3 304991 (NBR) 304997 (FPM)	
9	1	spring	DA = 52 305053	
10	1	oil separator		
11	1	gasket (with execution oil separator)	.078 thick 325389	
12	1	filter element breather	01BFE. 120 301866	
13	1	protection cap	303048	
14	1	clip	303046	
15	1	clogging indicator electric	alternatively E1, E2 or E5 see sheet-no. 1616	
16	1	clogging indicator visual	O 301721	

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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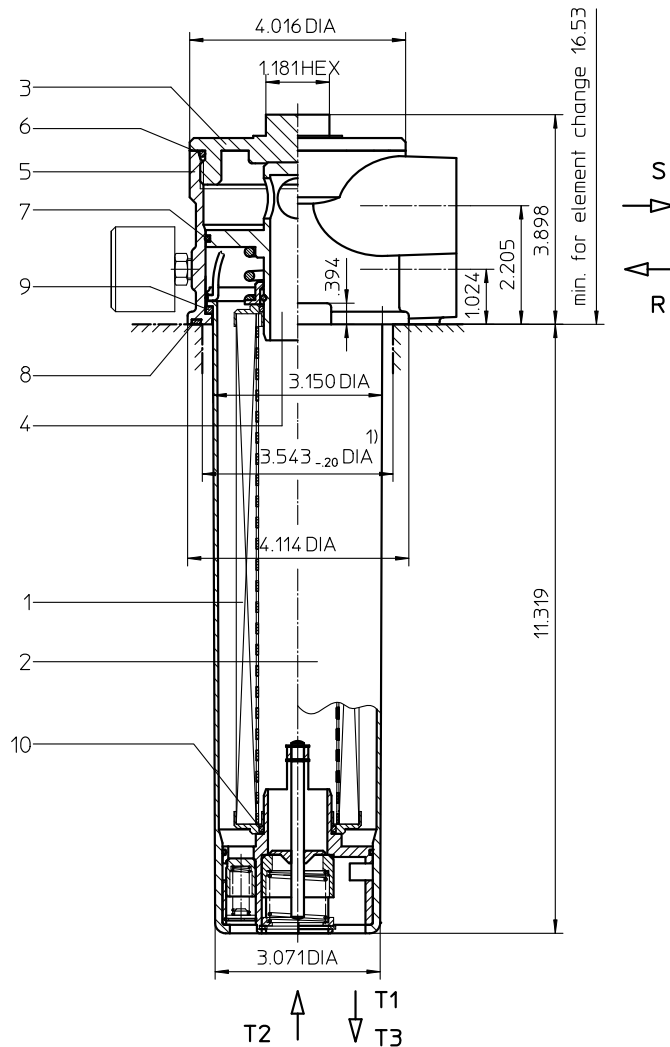
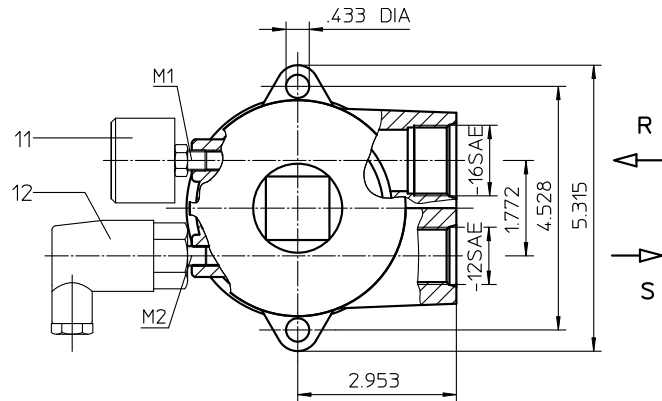
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Series TNRS 101

145 PSI



¹⁾ tank cutout according to DIN 24550, T5

Weight: approx. 4.62 lbs.

Dimensions: inches

Designs and performance values are subject to change.

Return Line Filter Series TNRS 101 145 PSI

Description:

Return-line filter series TNRS 101 have a working pressure up to 145 PSI.

TNRS series are tank-top mounted in-line filters. In addition to the return-line connection, they have a suction connection on the clean-side. This suction connection has a preload pressure (fitting pressure) of ≥ 7.25 PSI.

This combination, return-line and suction filter, is for hydraulic circuits which are equipped with a minimum 2 feed pumps (2 hydraulic circuits). The preload suction connection is for the full volume flow filtration of the pump with the smaller volume flow.

The filter element according to DIN 24550, T4 consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

When changing the filter element, a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

1. Type index:

1.1. Complete filter: (ordering example)

TNRS. 101. 10VG. 10.B. P. -. UG. 5. -. S2,5. Z. O. E2

1	2	3	4	5	6	7	8	9	10	11	12	13	14
---	---	---	---	---	---	---	---	---	----	----	----	----	----

- | | |
|----|---|
| 1 | series:
TNRS = tank-mounted return-line filter with suction connection |
| 2 | nominal size: 101 |
| 3 | filter-material and filter-fineness:
80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
10P paper |
| 4 | filter element collapse rating:
10 = Δp 145 PSI |
| 5 | filter element design:
B = both sides open |
| 6 | sealing material:
P = Nitrile (NBR)
V = Viton (FPM) |
| 7 | filter element specification:
- = standard
VA = stainless steel |
| 8 | process connection:
UG = thread connection |
| 9 | process connection size:
5 = -16 SAE |
| 10 | filter housing specification:
- = standard |
| 11 | internal valve:
S2,5 = with by-pass valve Δp 36 PSI |
| 12 | suction valve:
Z = with suction valve |
| 13 | clogging indicator at M1:
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616 |
| 14 | preload pressure indicator at M2:
- = without
E2 = pressure switch, see sheet-no. 1616 |

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01NR. 100. 10VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- | | |
|---|---|
| 1 | series:
01NR. = standard-return-line filter element according to
DIN 24550, T4 |
| 2 | nominal size: 100 |
| 3 | - 7 \| see type index-complete filter |

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	36 PSI
opening pressure preload valve:	7.25 PSI
opening pressure suction valve:	.72 PSI
line adapter:	thread connection -16 SAE and -12 SAE
housing material:	Al-casting, polyamide 6
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	.35 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

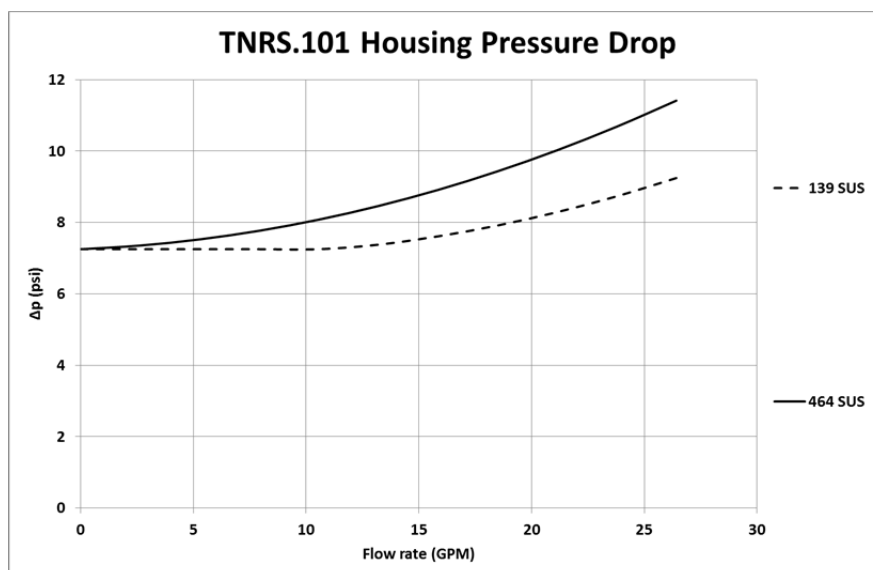
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

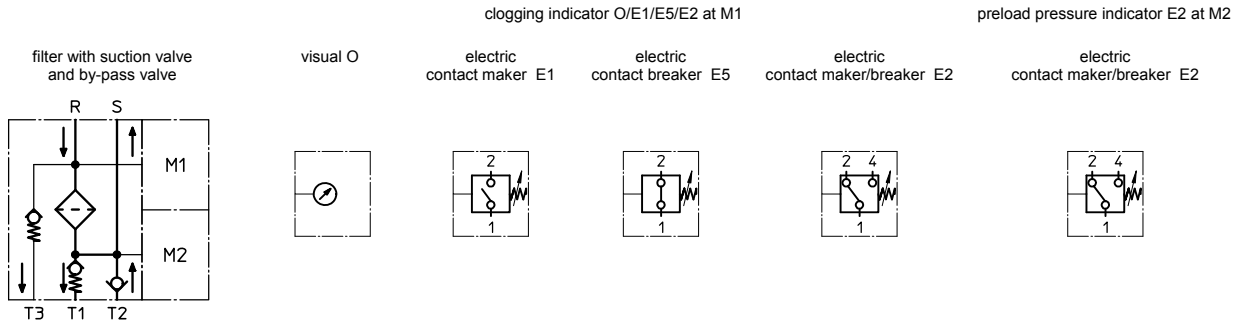
TNRS	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
101	2.021	1.403	0.898	0.782	0.534	0.0609	0.0568	0.0389	0.477

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01NR.100...		
2	1	filter bowl with valve combination	TNRS 101		
3	1	screw plug	M 92 x 3	317014	
4	1	centering pivot	TNRS 63-100		
5	1	filter head	TNRS 101		
6	1	O-ring	82 x 4	331337 (NBR)	337365 (FPM)
7	1	O-ring	80 x 2,5	313179 (NBR)	314148 (FPM)
8	1	O-ring	92 x 3	325584 (NBR)	325585 (FPM)
9	1	O-ring	75 x 3	302215 (NBR)	304729 (FPM)
10	2	O-ring	32 x 3,5	304378 (NBR)	304401 (FPM)
11	1	clogging indicator at M1	alternatively O, E1, E5 or E2	see sheet-no. 1616	
12	1	preload pressure indicator at M2	E2	see sheet-no. 1616	

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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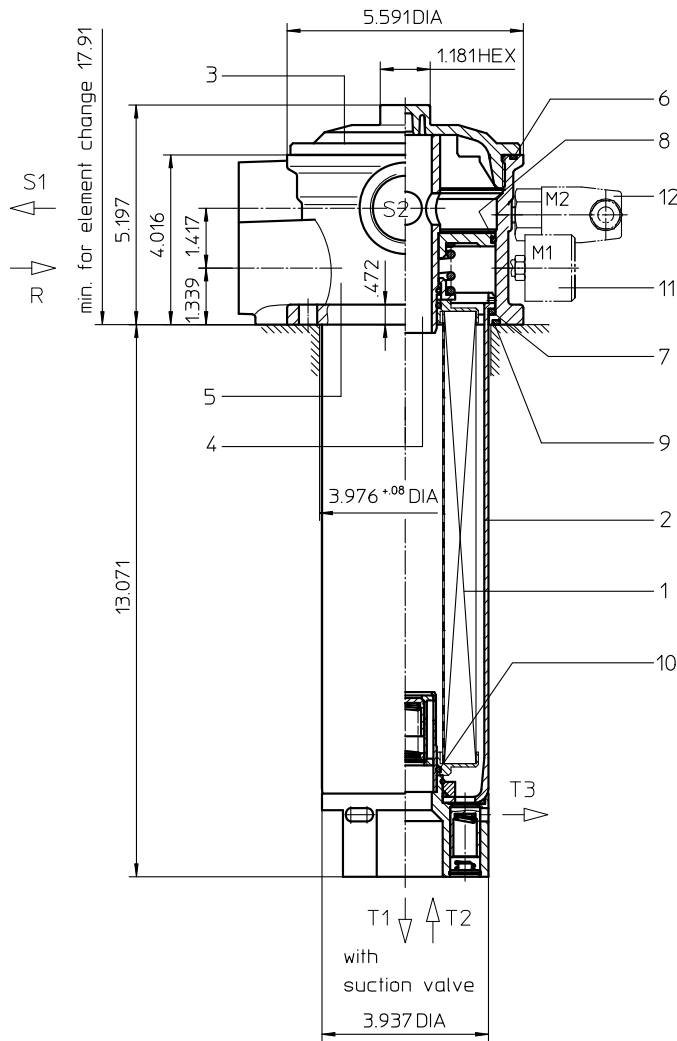
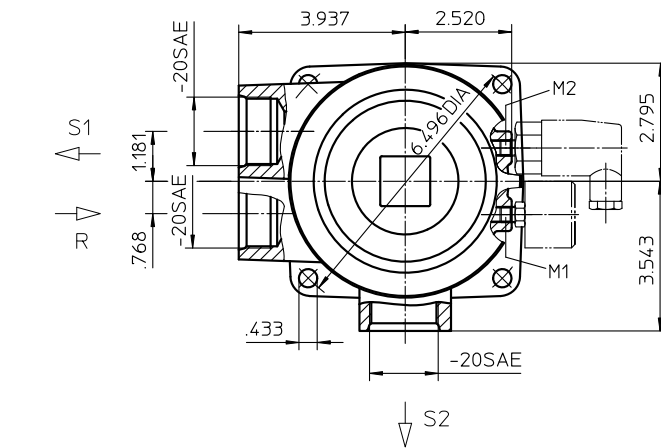
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Series TRS 226

145 PSI



Weight: approx. 7.0 lbs.

Dimensions: inches

Designs and performance values are subject to change.

Return Line Filter

Series TRS 226

145 PSI

Description:

TRS series return line filters are suitable for a working pressure up to 145 PSI.

TRS series are tank-top mounted in-line filters. In addition to the return-line connection, they have a suction connection on the clean-side. This suction connection has a preload pressure (fitting pressure) of ≥ 7.25 PSI.

This combination, return-line and suction filter, is for hydraulic circuits which are equipped with a minimum 2 feed pumps (2 hydraulic circuits). The preload suction connection is for the full volume flow filtration of the pump with the smaller volume flow.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to $4 \mu\text{m(c)}$.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

When changing the filter element, a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

1. Type index:

1.1. Complete filter: (ordering example)

TRS. 226. 10VG. 10.B. P. -. UG. 6. -. S2,5. Z. O. E2

1	2	3	4	5	6	7	8	9	10	11	12	13	14
---	---	---	---	---	---	---	---	---	----	----	----	----	----

- | | | |
|----|---|---|
| 1 | series: | TRS = tank-mounted return-line filter with suction connection |
| 2 | nominal size: | 101 |
| 3 | filter-material and filter-fineness: | 80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
10P paper |
| 4 | filter element collapse rating: | 10 = Δp 145 PSI |
| 5 | filter element design: | B = both sides open |
| 6 | sealing material: | P = Nitrile (NBR)
V = Viton (FPM) |
| 7 | filter element specification: | - = standard
VA = stainless steel |
| 8 | process connection: | UG = thread connection |
| 9 | process connection size: | 6 = -20 SAE |
| 10 | filter housing specification: | - = standard |
| 11 | internal valve: | S2,5 = with by-pass valve Δp 36 PSI |
| 12 | suction valve: | Z = with suction valve |
| 13 | clogging indicator at M1: | - = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616 |
| 14 | preload pressure indicator at M2: | - = without
O1 = visual, see sheet-no. 1606
E2 = pressure switch, see sheet-no. 1616 |

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01RS. 225. 10VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- | | | |
|---|----------------------|--|
| 1 | series: | 01RS. = return-line suction filter element |
| 2 | nominal size: | 225 |
| 3 | - | 7 \| see type index-complete filter |

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	36 PSI
opening pressure preload valve:	7.25 PSI
opening pressure suction valve:	.72 PSI
line adapter:	thread connection -20 SAE
housing material:	Al-casting, polyamide 6
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	.45 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

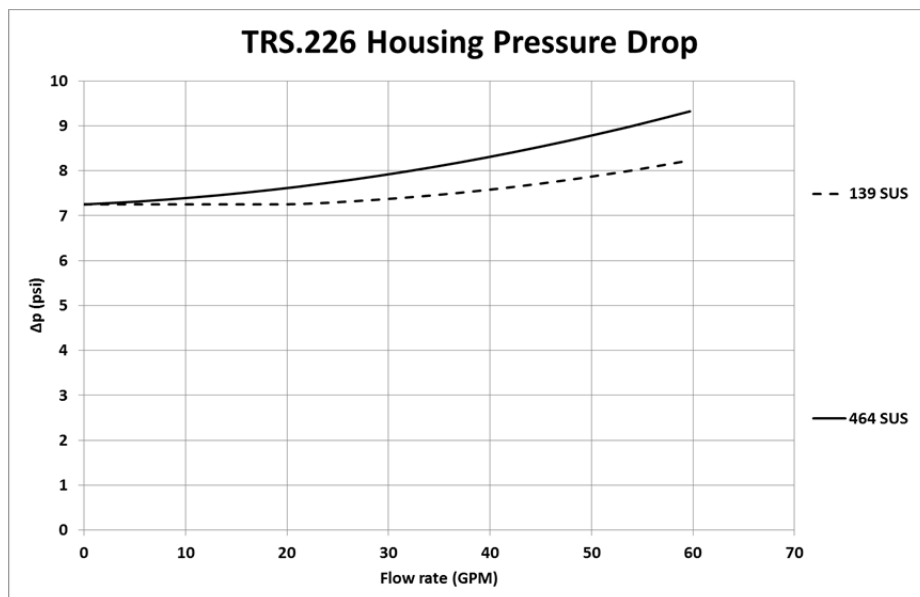
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

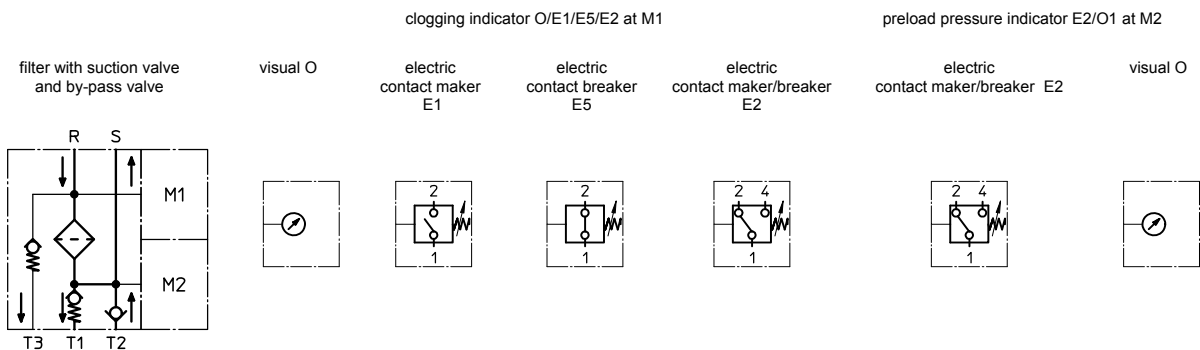
TRS	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
226	0.917	0.636	0.407	0.355	0.242	0.0209	0.0195	0.0134	0.182

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01RS.225.....		
2	1	filter bowl with valve combination	TRS 226		
3	1	screw plug	M 120 x 3	313649	
4	1	centering pivot	TRS 175-225		
5	1	filter head	TRS 175-225		
6	1	O-ring	128 x 3	304602 (NBR)	308140 (FPM)
7	1	O-ring	98 x 4	301914 (NBR)	304765 (FPM)
8	1	O-ring	96 x 3	305292 (NBR)	305297 (FPM)
9	1	O-ring	104,37 x 3,53	304339 (NBR)	304390 (FPM)
10	2	O-ring	38 x 3	304340 (NBR)	317013 (FPM)
11	1	clogging indicator at M1	alternatively O, E1, E5 or E2	see sheet-no. 1616	
12	1	preload pressure indicator at M2	E2 or O1	see sheet-no. 1616	

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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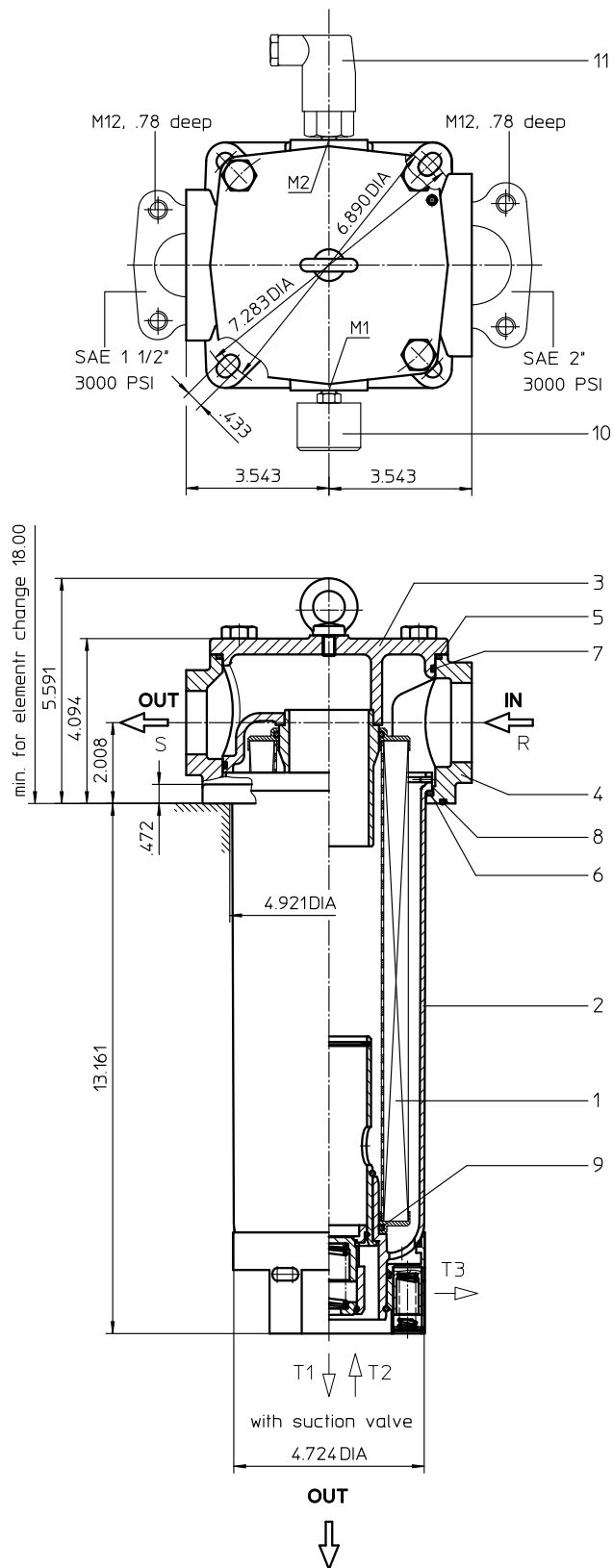
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Series TRS 625 145 PSI



Weight: approx. 13.2 lbs.

Dimensions: inches

Designs and performance values are subject to change.

Return Line Filter

Series TRS 625

145 PSI

Description:

TRS series return line filters are suitable for a working pressure up to 145 PSI.

TRS series are tank-top mounted in-line filters. In addition to the return-line connection, they have a suction connection on the clean-side. This suction connection has a preload pressure (fitting pressure) of ≥ 7.25 PSI.

This combination, return-line and suction filter, is for hydraulic circuits which are equipped with a minimum 2 feed pumps (2 hydraulic circuits). The preload suction connection is for the full volume flow filtration of the pump with the smaller volume flow.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to $4 \mu\text{m(c)}$.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

When changing the filter element, a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

1. Type index:

1.1. Complete filter: (ordering example)

TRS. 625. 10VG. 10.B. P. -. FS. 8. -. S2,5. Z. O. E2

1	2	3	4	5	6	7	8	9	10	11	12	13	14
---	---	---	---	---	---	---	---	---	----	----	----	----	----

- | | |
|----|---|
| 1 | series:
TRS = tank-mounted return-line filter with suction connection |
| 2 | nominal size: 625 |
| 3 | filter-material and filter-fineness:
80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
10P paper |
| 4 | filter element collapse rating:
10 = Δp 145 PSI |
| 5 | filter element design:
B = both sides open |
| 6 | sealing material:
P = Nitrile (NBR)
V = Viton (FPM) |
| 7 | filter element specification:
- = standard
VA = stainless steel |
| 8 | process connection:
FS = SAE-flange 3000 PSI |
| 9 | process connection size:
8 = 2" |
| 10 | filter housing specification:
- = standard |
| 11 | internal valve:
S2,5 = with by-pass valve Δp 36 PSI |
| 12 | suction valve:
Z = with suction valve |
| 13 | clogging indicator at M1:
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616 |
| 14 | preload pressure indicator at M2:
- = without
E2 = pressure switch, see sheet-no. 1616 |

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 625. 10VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- | | |
|---|---|
| 1 | series:
01E. = filter element according to company standard |
| 2 | nominal size: 625 |
| 3 | - 7 \| see type index-complete filter |

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	36 PSI
opening pressure preload valve:	7.25 PSI
opening pressure suction valve:	.72 PSI
line adapter:	SAE 2" and 1 ½"
housing material:	Al-casting, polyamide 6
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	1.0 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

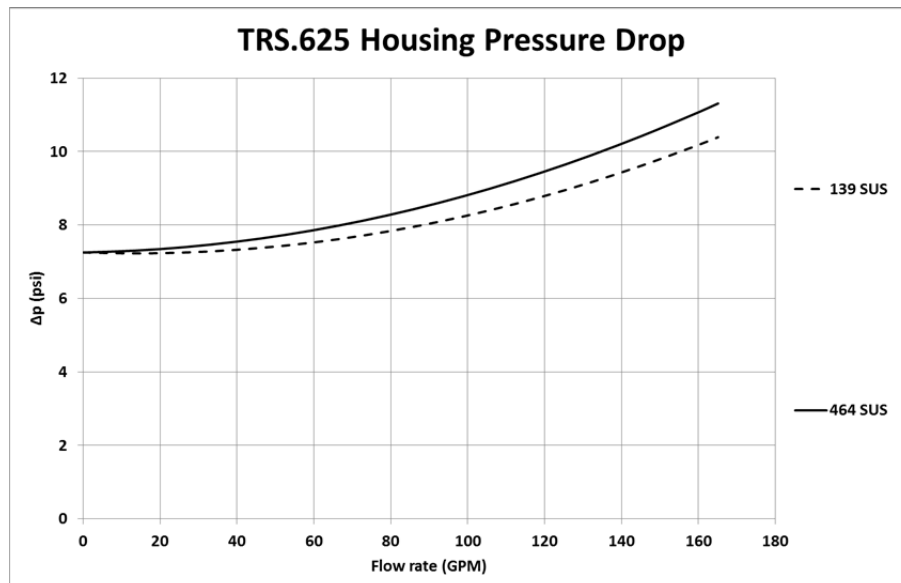
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

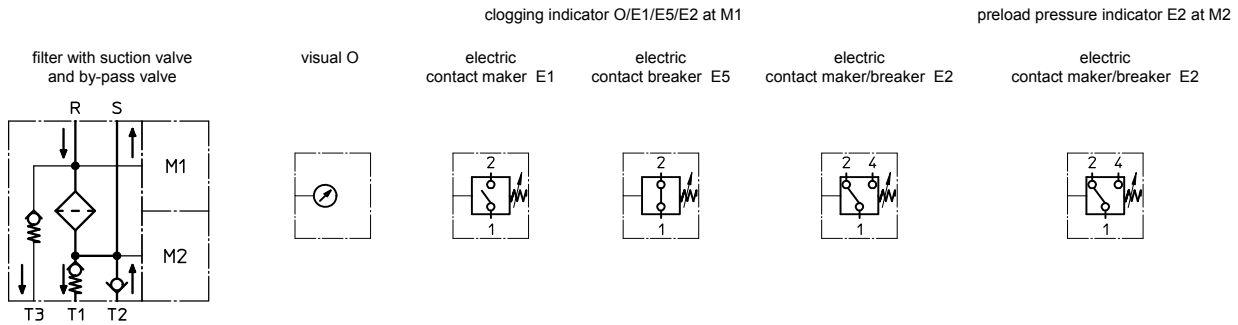
TRS	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
625	0.696	0.483	0.309	0.269	0.184	0.0236	0.0220	0.0151	0.142

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	Abmessung	article-no.	
1	1	filter element	01E.625...		
2	1	filter bowl with suction valve and by-pass valve	TRS 625		
3	1	filter cover	TRS 625		
4	1	filter head	TRS 625		
5	1	O-ring	135 x 3,5	318386 (NBR)	318387 (FPM)
6	1	O-ring	120 x 4	305300 (NBR)	307991 (FPM)
7	1	O-ring	125 x 3	306025 (NBR)	307358 (FPM)
8	1	O-ring	140 x 3	304604 (NBR)	307514 (FPM)
8	2	O-ring	63 x 3,5	311189 (NBR)	311592 (FPM)
10	1	clogging indicator at M1	alternatively O, E1, E5 or E2	see sheet-no. 1616	
11	1	preload pressure indicator at M2	E2	see sheet-no. 1616	

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
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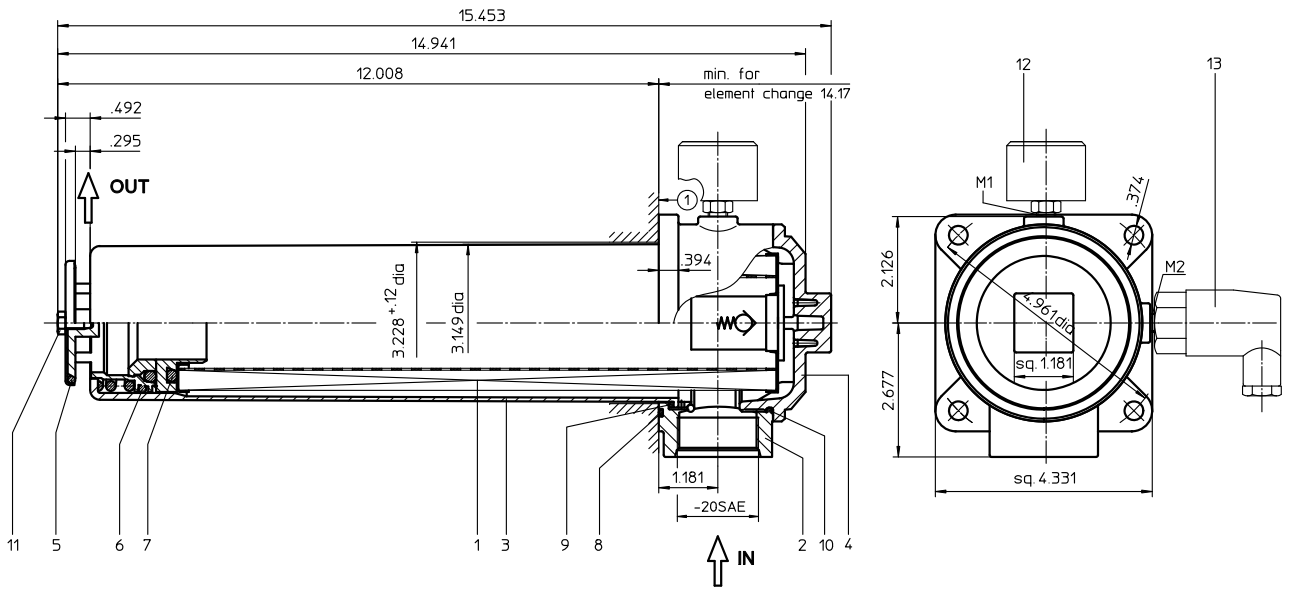
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Series TRW 310

145 PSI



- mounting surface 1
- surface quality 3.2
▽
- flatness tolerance 0.2

Weight: approx. 6.20 lbs.

Dimensions: inches

Designs and performance values are subject to change.

Return Line Filter Series TRW 310 145 PSI

Description:

Return-line filter series TRW 310 have a working pressure up to 145 PSI.

The TRW filters are directly mounted to the reservoir and connected to the return-line. The inlet connection must be below the oil level.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

Eaton filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

For filtration finer than 40 µm use the disposable elements made of microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements on request.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

When changing the filter element, a detachable connection between the filter head and the filter bowl prevents dirty oil from flowing into the tank.

1. Type index:

1.1. Complete filter: (ordering example)

TRW. 310. 10VG. 16. S. P. -. UG. 6. -. O. E2

1	2	3	4	5	6	7	8	9	10	13	14
---	---	---	---	---	---	---	---	---	----	----	----

- 1 | **series:**
TRW = tank-mounted return-line filter for horizontal tank-mounting
- 2 | **nominal size:** 310
- 3 | **filter-material and filter-fineness:**
80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
10P paper
- 4 | **filter element collapse rating:**
16 = Δp 232 PSI
- 5 | **filter element design:**
E = without by-pass valve
S = with by-pass valve Δp 29 PSI
- 6 | **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 | **filter element specification:**
- = standard
VA = stainless steel
- 8 | **process connection:**
UG = thread connection
- 9 | **process connection size:**
6 = -20 SAE
- 10 | **filter housing specification:**
- = standard
- 11 | **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
- 12 | **clogging indicator at M2:**
possible indicators see position 11 of the type index

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 320. 10VG. 16. S. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 | **series:**
01E. = filter element according to company standard
- 2 | **nominal size:** 320
- 3 | - 7 | see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	145 PSI
opening pressure by-pass valve:	29 PSI
process connection:	thread connection
housing material:	Al-cast, glass fiber reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	horizontal
volume tank:	.40 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

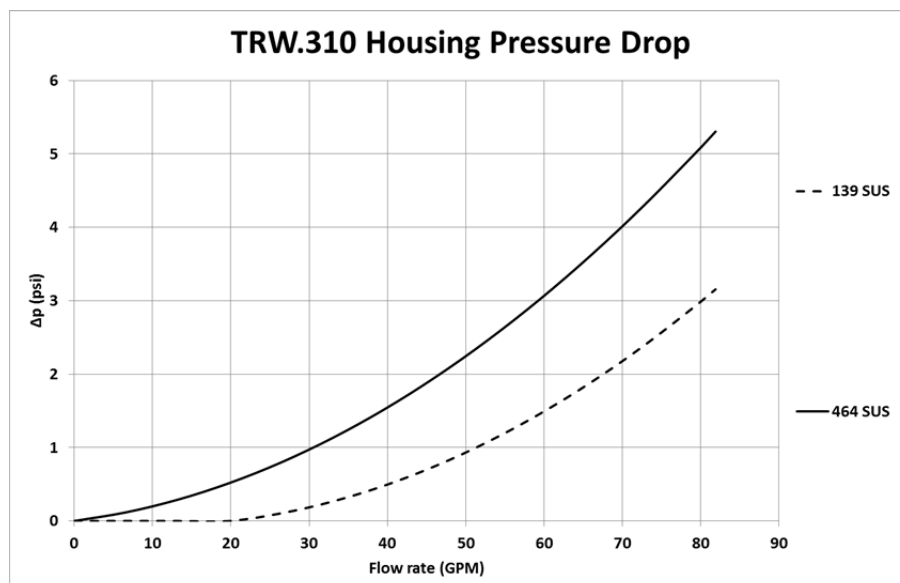
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

TRW	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
310	1.148	0.797	0.510	0.444	0.304	0.0337	0.0314	0.0215	0.253

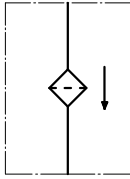
$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.

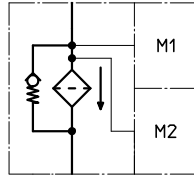


Symbols:

without indicator



with by-pass valve



visual O



electric contact maker
E1



electric contact breaker
E5



electric contact maker/breaker
E2



Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01E.320...		
2	1	filter head	NG 210-310	304423	
3	1	filter bowl	NG 310		
4	1	screw plug	M 90 x 2	316637	
5	1	O-ring	53 x 4	309143 (NBR)	332434 (FPM)
6	1	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
7	2	O-ring	44 x 6	302222 (NBR)	304384 (FPM)
8	1	O-ring	88 x 3	304417 (NBR)	310266 (FPM)
9	1	O-ring	75 x 3	302215 (NBR)	304729 (FPM)
10	1	O-ring	82 x 3	305191 (NBR)	305298 (FPM)
11	1	sheet metal screw	DIN 7976-F 6,3x13	316641	
12	1	clogging indicator, visual	O	301721	
13	1	clogging indicator, electric	alternatively E1, E2 or E5	see sheet-no. 1616	

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
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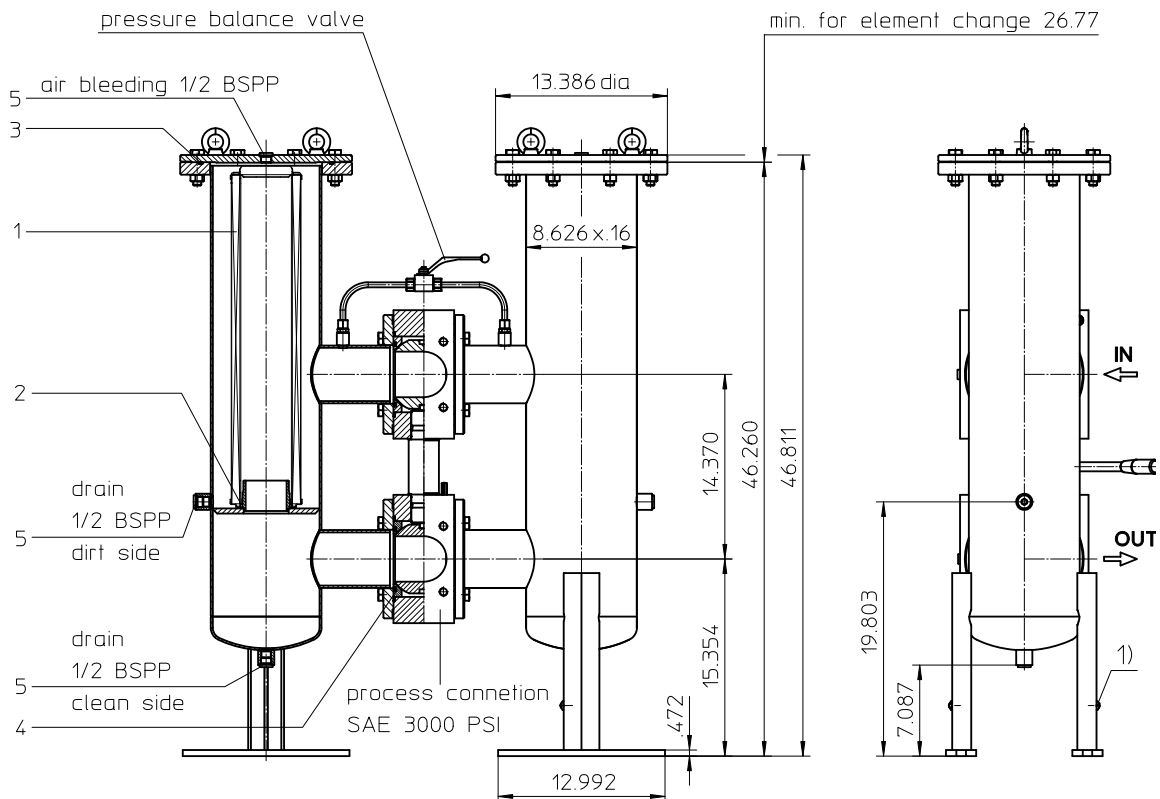
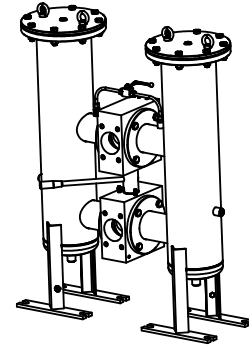
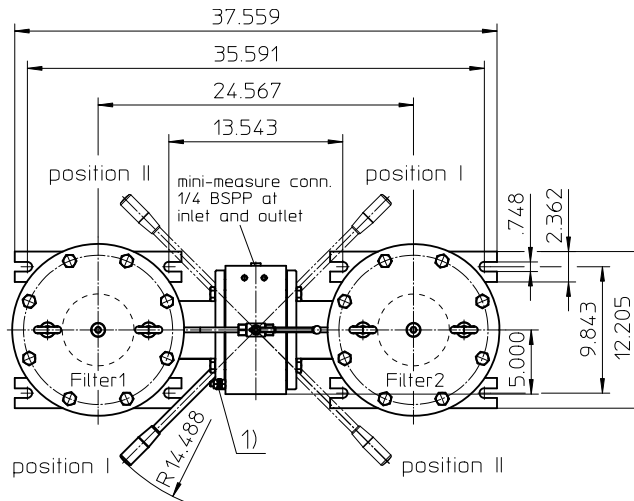
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Series DWF 1505

232 PSI



Position I: Filter 1 in operation
 Position II: Filter 2 in operation

1) Connect the stand grounding tab to a suitable earth ground point.

Weight: approx. 551 lbs
 Dimensions: inches

Duplex Pressure Filter

Series DWF 1505

232 PSI

Description:

Duplex filter series DWF 1505 have a working pressure up to 232 PSI. Pressure peaks can be absorbed with a sufficient safety margin.

A changeover ball valve between the two filter housings makes it possible to switch from the dirty filter side to the clean filter side without interrupting operation. The filters can be installed as a suction filter, pressure filter or return line filter.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. Additionally, the depth filter has a metal outer core to protect the filter media. The flow direction is from outside to inside.

For cleaning the mesh element or changing the glass fiber element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

For filtration finer than 40 µm, use the disposable elements made of glass fiber. Filter elements as fine as 5 µm(c) are available; finer filter elements are available upon request.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Ship classifications available upon request.

Type index:

Complete filter: (ordering example)

DWF.	1505.	10VG.	10.	E.	P.	-.	FS.	B.	-.	OP
1	2	3	4	5	6	7	8	9	10	11

- 1 series:**
DWF = double welded filter
- 2 nominal size:** 1505
- 3 filter-material and filter-fineness:**
stainless steel wire mesh: 80G, 40G, 25G, 10G
glass fiber: 25VG, 16VG, 10VG, 6VG, 3VG
glass fiber according to API: 25API, 10API
- 4 filter element collapse rating:**
10 = Δp 145 PSI
- 5 filter element design:**
E = without by-pass
S = with by-pass valve Δp 29 PSI
- 6 sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- 8 process connection:**
FS = flange SAE 3000 PSI
- 9 process connection size:**
B = 4"
- 10 filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
- 11 clogging indicator or clogging sensor:**
- = without
AE = visual-electric, see sheet-no.1615
OP = visual, see sheet-no.1614
OE = visual-electric, see sheet-no.1614
VS5 = electronic, see sheet-no.1619

Filter element: (ordering example)

01E.	1501.	10VG.	10.	E.	P.	-
1	2	3	4	5	6	7

- 1 series:**
01E. = filter element according to company standard
- 2 nominal size :** 1501
- 3 - 7** see type index complete filter

Accessories:

- measure- and bleeder connection, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1651
- shut-off valve, see sheet-no. 1655
- lifting mechanism, see sheet-no. 1661

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	232 PSI
test pressure:	334 PSI
process connection:	flange SAE 3000 PSI
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
drain- and bleeder connections:	½ BSPP
measure connections:	¼ BSPP
volume tank:	2x 8,6 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Performance characteristics of DWF 1505 (Data sheet 2227)

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{Element} (PSI) = Q (GPM) \times \frac{MSK (PSI)}{1000 \left(\frac{PSI}{GPM}\right)} \times v (SUS) \times \frac{\rho}{0,876} \left(\frac{kg}{dm^3}\right)$$

For ease of calculation our Filter Selection tool is available online at
www.eatonpowersource.com/calculators/filtration/

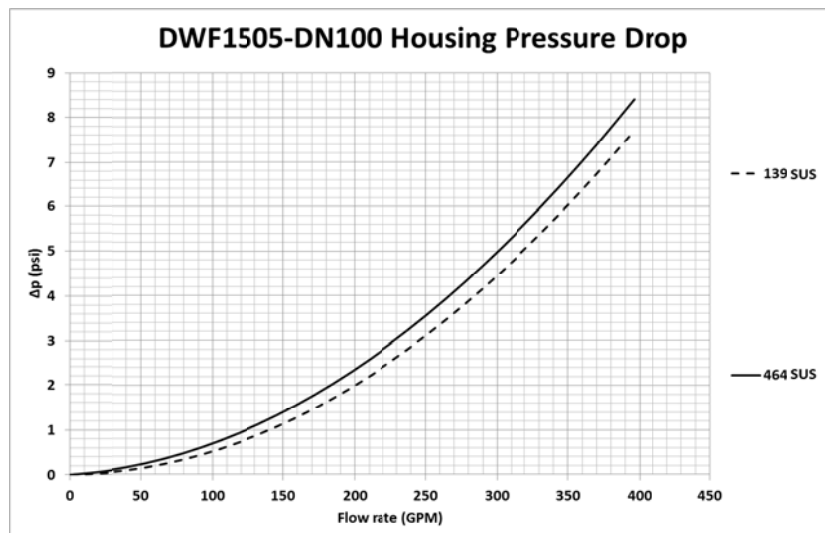
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0,876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

DWF	VG					G				API	
	3VG	6VG	10VG	16VG	25VG	10G	25G	40G	80G	10API	25API
DWF 1505	0,193	0,134	0,086	0,075	0,051	0,0071	0,0053	0,0049	0,0034	0,048	0,022

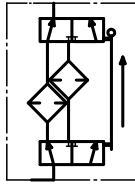
$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0,876 kg/dm³. The pressure drop changes proportionally to the density.

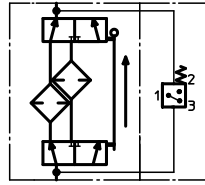


Symbols:

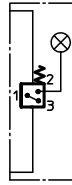
without indicator



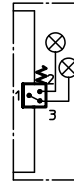
with electric indicator
AE 30 and AE 40



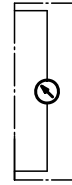
with visual-electric indicator
AE 50 and AE 62



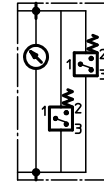
with visual-electric indicator
AE 70 and AE 80



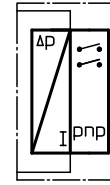
with visual indicator
OP



with visual-electric indicator
OE



with electronic sensor
VS5



Spare parts:

item	qty.	designation	dimension	Article-no.	
1	2	filter element	01E.1501...		
2	2	O-ring	93 x 5	307588 (NBR)	307589 (FPM)
3	2	O-ring	250 x 5	xxxxxx (NBR)	xxxxxx (FPM)
4	4	gasket kit of change over UKK	DN100 (4")	322721 (NBR)	322722 (FPM)
5	6	screw plug	1/2 BSPP	304678	
6	1	clogging indicator, visual-electric	AE	see sheet-no.1615	
7	1	clogging indicator, visual	OP	see sheet-no 1614	
8	1	clogging indicator, visual-electric	OE	see sheet-no 1614	
9	1	clogging sensor, electronic	VS5	see sheet-no 1619	
10	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
11	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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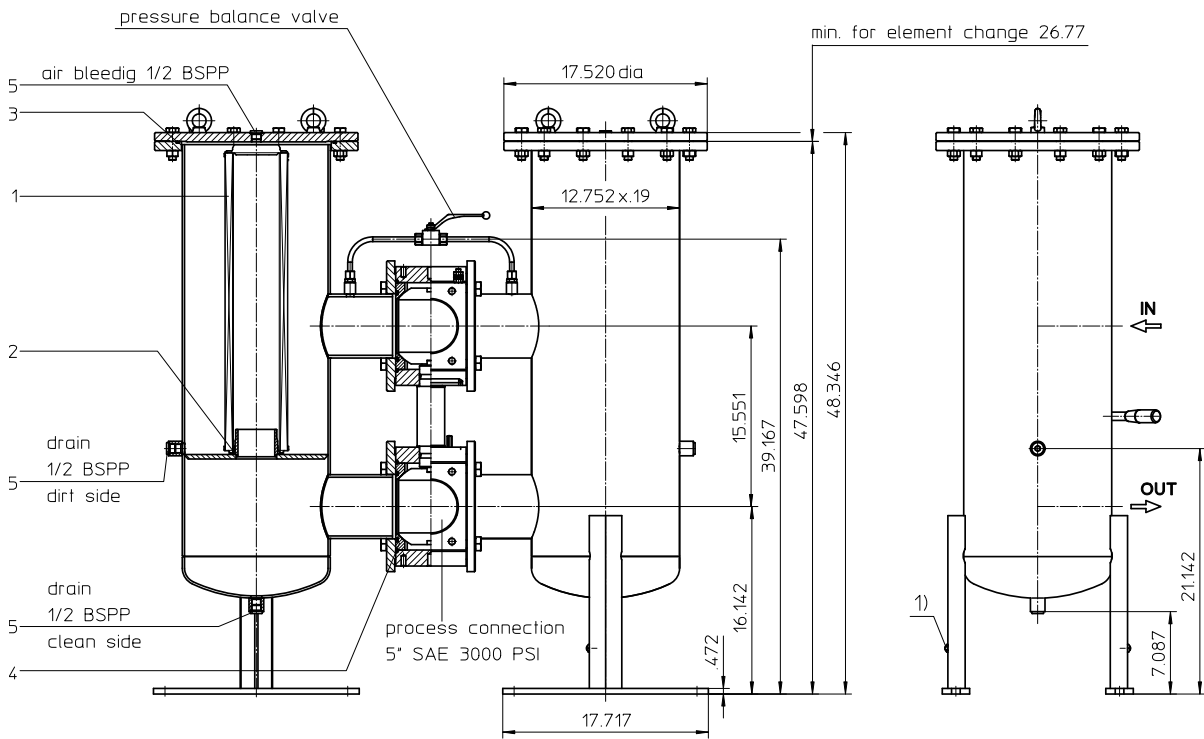
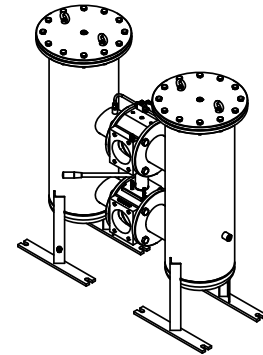
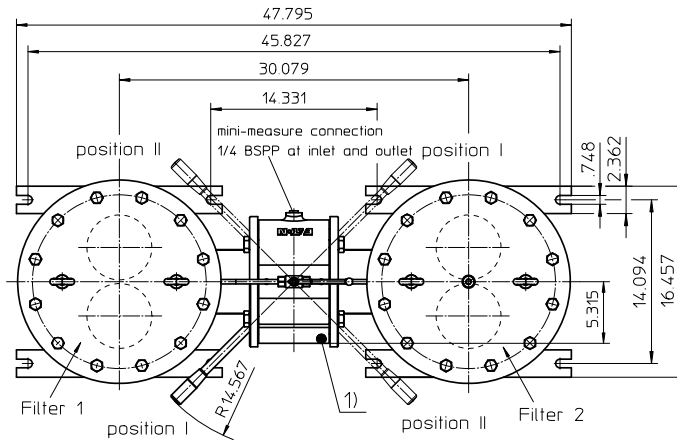
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Series DWF 3005

232 PSI



Position I: Filter 1 in operation
Position II: Filter 2 in operation

1) Connect the stand grounding tab to a suitable earth ground point.

Weight: approx. 683 lbs
Dimensions: inches

Designs and performance values are subject to change.

Duplex Pressure Filter

Series DWF 3005

232 PSI

Description:

Duplex filter series DWF 3005 have a working pressure up to 232 PSI. Pressure peaks can be absorbed with a sufficient safety margin.

A changeover ball valve between the two filter housings makes it possible to switch from the dirty filter side to the clean filter side without interrupting operation. The filters can be installed as a suction filter, pressure filter or return line filter.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. Additionally, the depth filter has a metal outer core to protect the filter media. The flow direction is from outside to inside.

For cleaning the mesh element or changing the glass fiber element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

For filtration finer than 40 µm, use the disposable elements made of glass fiber. Filter elements as fine as 5 µm(c) are available; finer filter elements are available upon request.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Ship classifications available upon request.

Type index:

Complete filter: (ordering example)

DWF. 3005. 10VG. 10. E. P. -. FS. C. -. OP

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

- 1 series:**
DWF = double welded filter
- 2 nominal size:** 3005
- 3 filter-material and filter-fineness:**
stainless steel wire mesh: 80G, 40G, 25G, 10G
glass fiber: 25VG, 16VG, 10VG, 6VG, 3VG
glass fiber according to API: 25API, 10API
- 4 filter element collapse rating:**
10 = Δp 145 PSI
- 5 filter element design:**
E = without by-pass
S = with by-pass valve Δp 29 PSI
- 6 sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- 8 process connection:**
FS = flange SAE 3000 PSI
- 9 process connection size:**
C = 5"
- 10 filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
- 11 clogging indicator or clogging sensor:**
- = without
AE = visual-electric, see sheet-no.1615
OP = visual, see sheet-no.1614
OE = visual-electric, see sheet-no.1614
VS5 = electronic, see sheet-no.1619

Filter element: (ordering example)

01E. 1501. 10VG. 10. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 series:**
01E. = filter element according to company standard
- 2 Nominal size:** 1501
- 3 - 7** see type index complete filter

Accessories:

- measure- and bleeder connection, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1651
- shut-off valve, see sheet-no. 1655
- lifting mechanism, see sheet-no. 1661

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium:	mineral oil, other media on request
max. operating pressure:	232 PSI
test pressure:	334 PSI
process connection:	flange SAE 3000 PSI
housing material:	C-steel
housing material change over:	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
drain- and bleeder connections:	½ BSPP
measure connections:	¼ BSPP
volume tank:	2x 18,2 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Performance characteristics of DWF 3005 (Data sheet 2228)

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{Element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0,876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at
www.eatonpowersource.com/calculators/filtration/

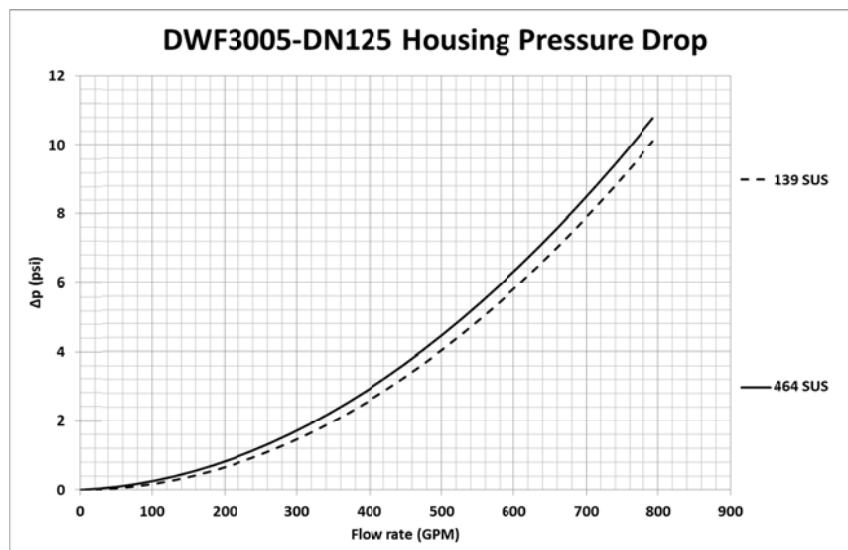
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0,876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

DWF	VG					G				API	
	3VG	6VG	10VG	16VG	25VG	10G	25G	40G	80G	10API	25API
DWF 3005	0,096	0,067	0,043	0,037	0,025	0,0035	0,0026	0,0025	0,0017	0,024	0,011

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0,876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:

without indicator

with electric indicator
AE 30 and AE 40

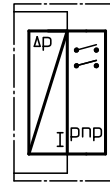
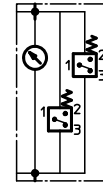
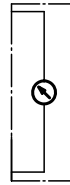
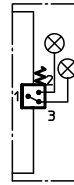
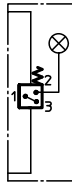
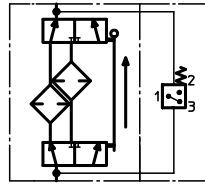
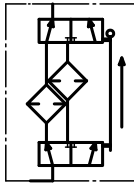
with visual-electric indicator
AE 50 and AE 62

with visual-electric indicator
AE 70 and AE 80

with visual indicator
OP

with visual-electric indicator
OE

with electronic sensor
VS5



Spare parts:

item	qty.	designation	dimension	Article-no.	
1	4	filter element	01E.1501...		
2	4	O-ring	93 x 5	307588 (NBR)	307589 (FPM)
3	2	O-ring	330 x 5	xxxxxx (NBR)	310275 (FPM)
4	4	gasket kit of change over UKK	DN125 (5")	322726 (NBR)	322727 (FPM)
5	6	screw plug	½ BSPB	304678	
6	1	clogging indicator, visual-electric	AE	see sheet-no.1615	
7	1	clogging indicator, visual	OP	see sheet-no 1614	
8	1	clogging indicator, visual-electric	OE	see sheet-no 1614	
9	1	clogging sensor, electronic	VS5	see sheet-no 1619	
10	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
11	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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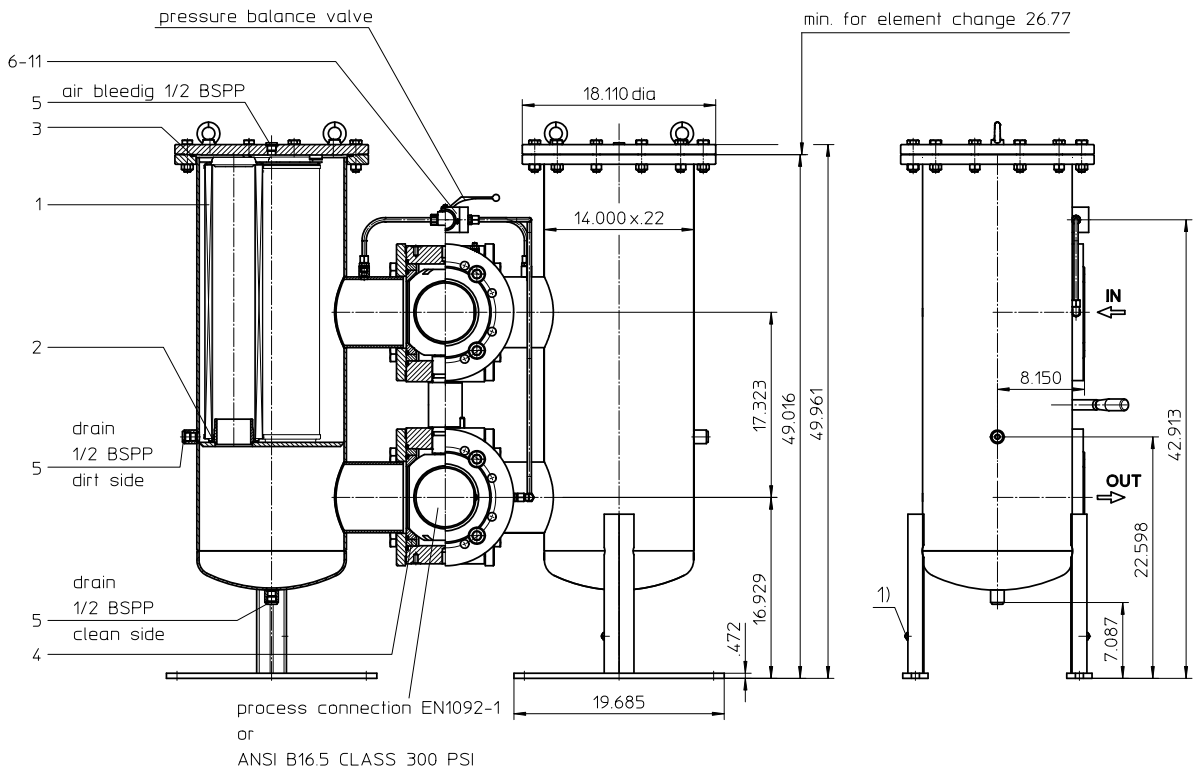
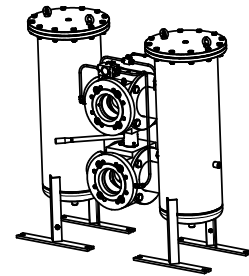
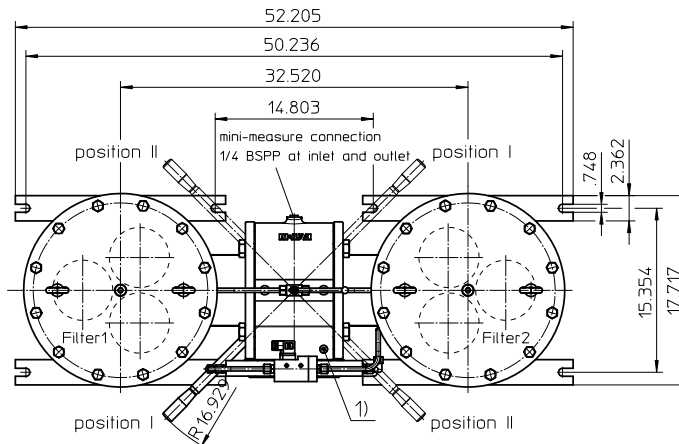
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Series DWF 4505

232 PSI



Position I: Filter 1 in operation
Position II: Filter 2 in operation

1) Connect the stand grounding tab to a suitable earth ground point.

Weight: approx. 1323 lbs.

Dimensions: inches

Designs and performance values are subject to change.

Duplex Pressure Filter

Series DWF 4505

232 PSI

Description:

Duplex filter series DWF 4505 have a working pressure up to 232 PSI. Pressure peaks can be absorbed with a sufficient safety margin.

A changeover ball valve between the two filter housings makes it possible to switch from the dirty filter side to the clean filter side without interrupting operation. The filters can be installed as a suction filter, pressure filter or return line filter.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. Additionally, the depth filter has a metal outer core to protect the filter media. The flow direction is from outside to inside.

For cleaning the mesh element or changing the glass fiber element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

For filtration finer than 40 µm, use the disposable elements made of glass fiber. Filter elements as fine as 5 µm(c) are available; finer filter elements are available upon request.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Ship classifications available upon request.

Type index:

Complete filter: (ordering example)

DWF. 4505. 10VG. 10. E. P. -. FA1. D. -. OP

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

- 1 series:**
DWF = double welded filter
- 2 nominal size:** 4505
- 3 Filter material and grades of filter fineness (µm):**
stainless steel wire mesh: 80G, 40G, 25G, 10G
glass fiber: 25VG, 16VG, 10VG, 6VG, 3VG
glass fiber according to API: 25API, 10API
- 4 filter element collapse rating:**
10 = Δp 145 PSI
- 5 filter element design:**
E = without by-pass
S = with by-pass valve Δp 29 PSI
- 6 sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- 8 process connection**
FD1 = flange EN1092-1, design B1
FD2 = flange EN1092-1, design B2
FA1 = flange ANSI CLASS 300 PSI,
sealing surface Rz = 160 µm (not finer than 40 µm)
FA2 = flange ANSI CLASS 300 PSI, sealing surface Rz = 16 µm
- 9 process connection size:**
D = DN150 (6")
- 10 filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
- 11 clogging indicator or clogging sensor:**
- = without
AE = visual-electric, see sheet-no.1615
OP = visual, see sheet-no.1614
OE = visual-electric, see sheet-no.1614
VS5 = electronic, see sheet-no.1619

Filter element: (ordering example)

01E. 1501. 10VG. 10. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 series:**
01E. = filter element according to company standard
- 2 nominal size:** 1501
- 3 - 7** see type index complete filter

Accessories:

- measure- and bleeder connection, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1651
- shut-off valve, see sheet-no. 1655
- lifting mechanism, see sheet-no. 1661

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium:	mineral oil, other media on request
max. operating pressure:	232 PSI
test pressure:	334 PSI
process connection:	flange EN1092-1, 232 PSI or flange ANSI B16.5 CLASS 300 PSI
housing material:	C-steel
housing material change over:	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
drain- and bleeder connections:	½ BSPP
measure connections:	¼ BSPP
volume tank:	2x 23,8 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Performance characteristics of DWF 4505 (Data sheet 2229)

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{Element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0,876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation, our Filter Selection tool is available online at:

www.eatonpowersource.com/calculators/filtration/

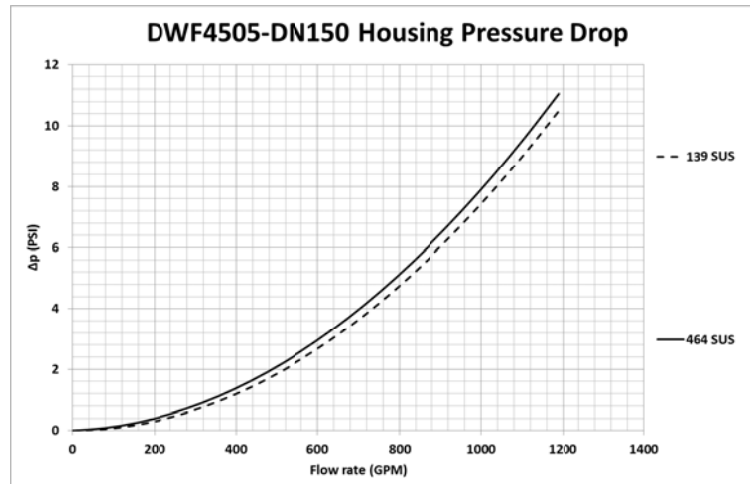
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0,876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

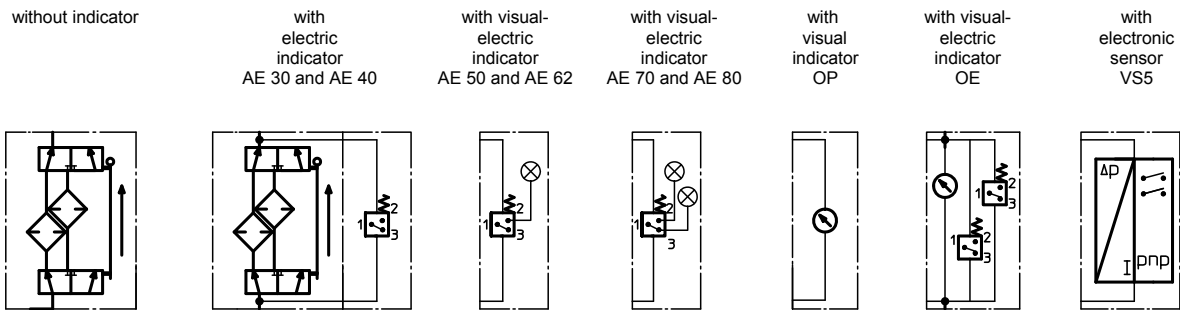
DWF	VG					G				API	
	3VG	6VG	10VG	16VG	25VG	10G	25G	40G	80G	10API	25API
DWF 4505	0.064	0.045	0.029	0.025	0.017	0.0024	0.0018	0.0016	0.0011	0.016	0.007

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0,876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension	Article-no.	
1	6	filter element	01E.1501...		
2	6	O-ring	93 x 5	307588 (NBR)	307589 (FPM)
3	2	O-ring	372 x 5	347195 (NBR)	xxxxxx (FPM)
4	4	gasket kit of change over UKK	DN150 (6")	319929 (NBR)	322725 (FPM)
5	6	screw plug	½ BSPP	304678	
6	1	clogging indicator, visual-electric	AE	see sheet-no.1615	
7	1	clogging indicator, visual	OP	see sheet-no 1614	
8	1	clogging indicator, visual-electric	OE	see sheet-no 1614	
9	1	clogging sensor, electronic	VS5	see sheet-no 1619	
10	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
11	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
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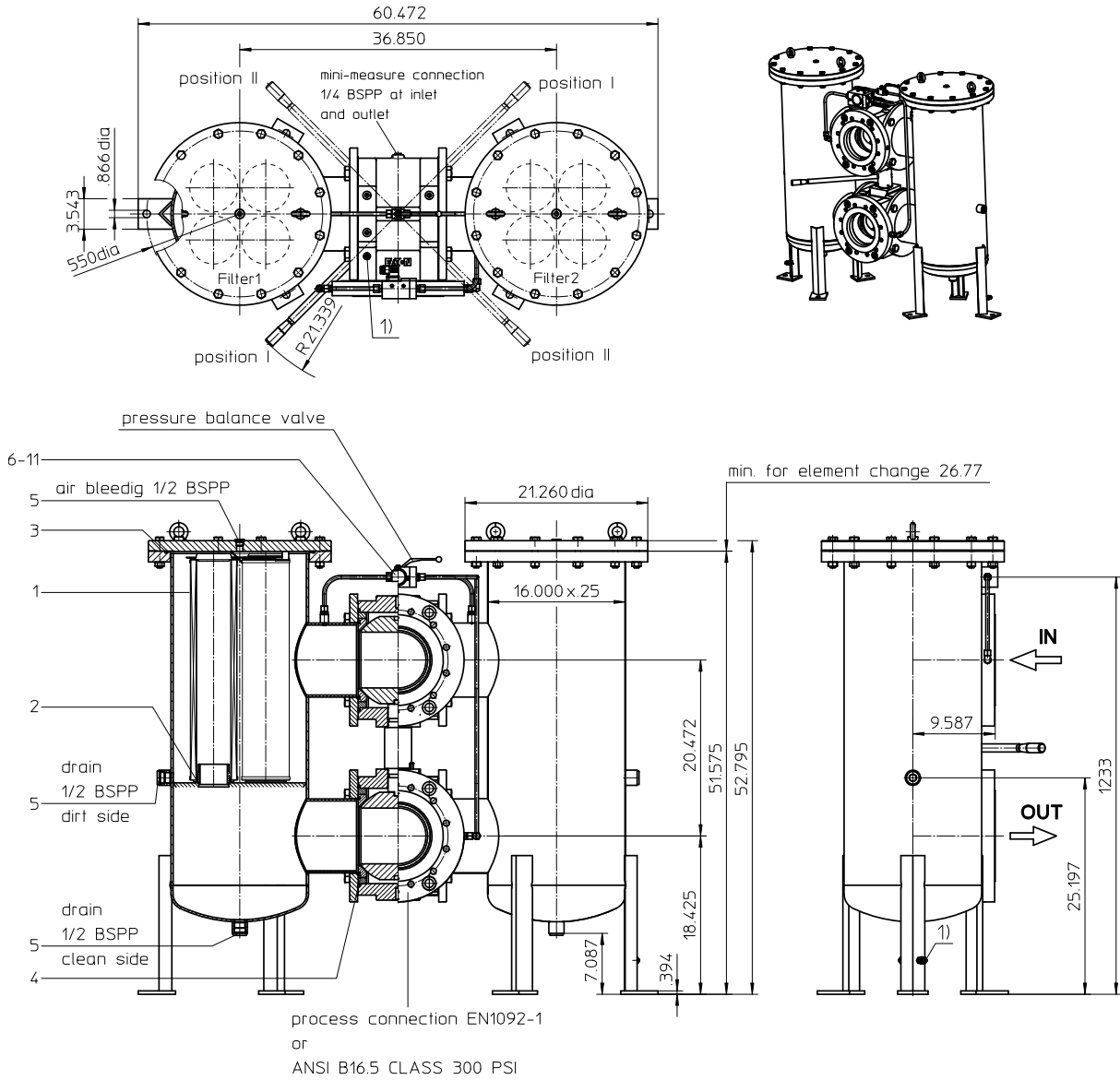
For more information, please

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Series DWF 6005

232 PSI



Position I: Filter 1 in operation
Position II: Filter 2 in operation

1) Connect the stand grounding tab to a suitable earth ground point.

Weight: approx. 1504 lbs.

Dimensions: inches

Designs and performance values are subject to change.

Duplex Pressure Filter

Series DWF 6005

232 PSI

Description:

Duplex filter series DWF 6005 have a working pressure up to 232 PSI. Pressure peaks can be absorbed with a sufficient safety margin.

A change over ball valve between the two filter housings makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation. The filters can be installed as a suction filter, pressure filter or return-line filter.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. Additionally, the depth filter has a metal outer core to protect the filter media. The flow direction is from outside to inside.

For cleaning the mesh element or changing the glass fiber element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

For filtration finer than 40 µm, use the disposable elements made of glass fiber. Filter elements as fine as 5 µm(c) are available; finer filter elements are available upon request.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Ship classifications available upon request.

Type index:

Complete filter: (ordering example)

DWF. 6005. 10VG. 10. E. P. -. FA1. E. -. OP

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

- 1 series:**
DWF = double welded filter
- 2 nominal size:** 6005
- 3 filter-material and filter-fineness:**
stainless steel: 80G, 40G, 25G, 10G
glass fiber: 25VG, 16VG, 10VG, 6VG, 3VG
glass fiber according to API: 25API, 10API
- 4 filter element collapse rating:**
10 = Δp 145 PSI
- 5 filter element design:**
E = without by-pass
S = with by-pass valve Δp 29 PSI
- 6 sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
- 8 process connection:**
FD1 = flange EN1092-1, design B1
FD2 = flange EN1092-1, design B2
FA1 = flange ANSI CLASS 300 PSI,
sealing surface Rz = 160 µm (not finer than 40 µm)
FA2 = flange ANSI CLASS 300 PSI, sealing surface Rz = 16 µm
- 9 process connection size:**
E = DN200 (8")
- 10 filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
- 11 clogging indicator or clogging sensor:**
- = without
AE = visual-electric, see sheet-no.1615
OP = visual, see sheet-no.1614
OE = visual-electric, see sheet-no.1614
VS5 = electronic, see sheet-no.1619

Filter element: (ordering example)

01E. 1501. 10VG. 10. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 series:**
01E. = filter element according to company standard
- 2 nominal size:** 1501
- 3 - 7** see type index complete filter

Accessories:

- measure- and bleeder connection, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1651
- shut-off valve, see sheet-no. 1655
- lifting mechanism, see sheet-no. 1661

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium:	mineral oil, other media on request
max. operating pressure:	232 PSI
test pressure:	334 PSI
process connection:	flange EN1092-1, 232 psi or flange ANSI B16.5 CLASS 300 PSI
housing material:	C-steel
housing material change over:	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
drain- and bleeder connections:	½ BSPP
measure connections:	¼ BSPP
volume tank:	2x 31,2 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Performance characteristics of DWF 6005 (Data sheet 2230)

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{Element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0,876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at
www.eatonpowersource.com/calculators/filtration/

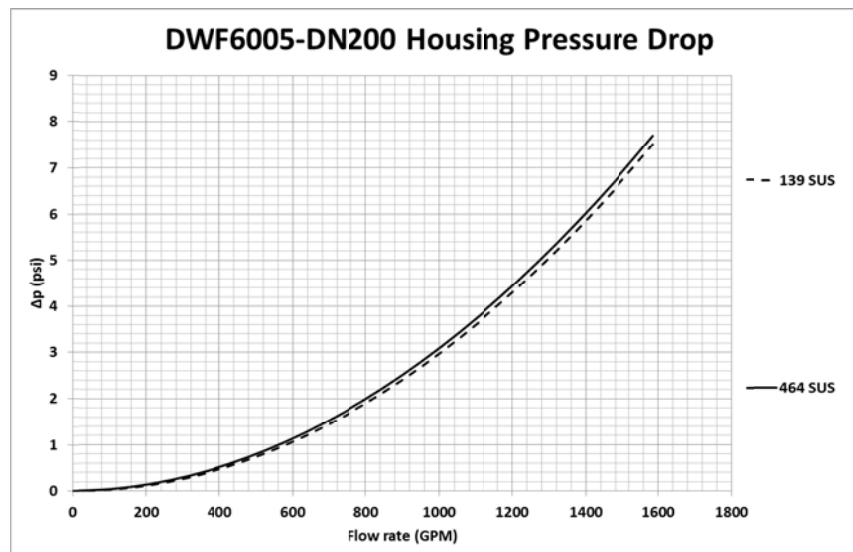
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0,876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

DWF	VG					G				API	
	3VG	6VG	10VG	16VG	25VG	10G	25G	40G	80G	10API	25API
DWF 6005	0,048	0,033	0,021	0,019	0,013	0,0018	0,0013	0,0012	0,0008	0,012	0,005

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0,876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:

without indicator

with electric indicator
AE 30 and AE 40

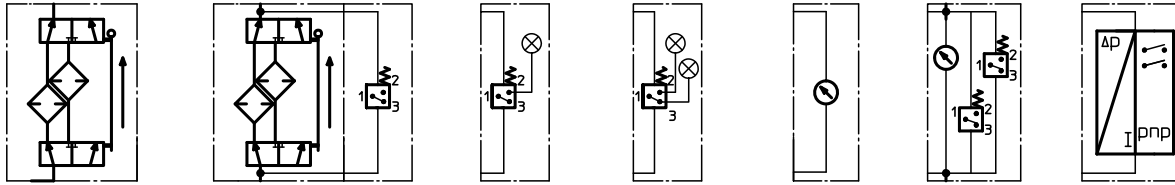
with visual-electric indicator
AE 50 and AE 62

with visual-electric indicator
AE 70 and AE 80

with visu indicator
OP

with visual-electric indicator
OE

with electronic sensor
VS5



Spare parts:

item	qty.	designation	dimension	Article-no.	
1	8	filter element	01E.1501...		
2	8	O-ring	93 x 5	307588 (NBR)	307589 (FPM)
3	2	O-ring	429 x 6	308659 (NBR)	310273 (FPM)
4	4	gasket kit of change over UKK	DN200 (8")	322723 (NBR)	322724 (FPM)
5	6	screw plug	½ BSPP	304678	
6	1	clogging indicator, visual-electric	AE	see sheet-no.1615	
7	1	clogging indicator, visual	OP	see sheet-no 1614	
8	1	clogging indicator, visual-electric	OE	see sheet-no 1614	
9	1	clogging sensor, electronic	VS5	see sheet-no 1619	
10	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
11	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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Series DWF 1505

232 PSI

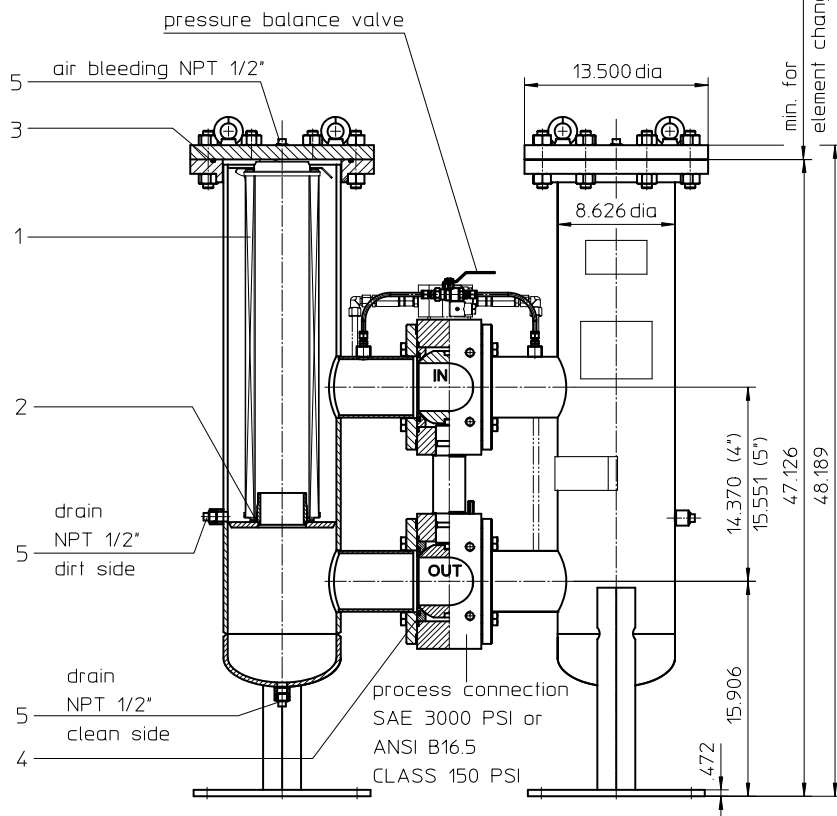
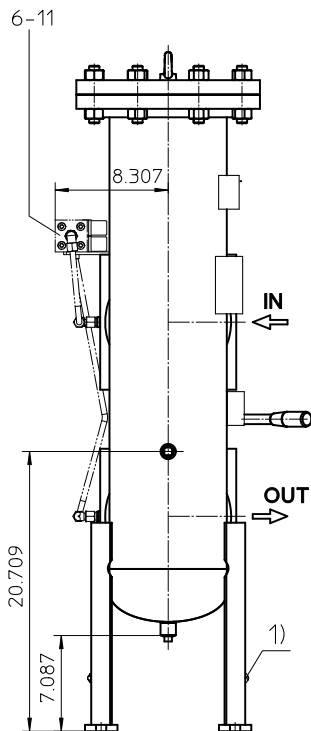
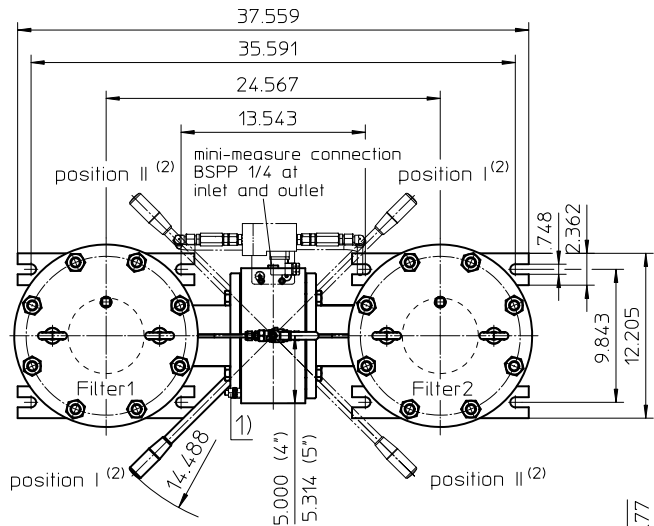
- 1) Connect the stand grounding tab to a suitable earth ground point.

Switch lever standard in the front.

- 2) On request: The switch lever can be moved to backside of the changeover valve, opposite to the inlet and outlet.

Please specify this configuration on the order.

Position I: Filter 1 in operation
Position II: Filter 2 in operation



Weight: approx.: 714 lbs.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Duplex Pressure Filter

Series DWF 1505

232 PSI

Description:

Duplex filter series DWF 1505 have a working pressure up to 232 PSI. Pressure peaks can be absorbed with a sufficient safety margin.

A changeover ball valve between the two filter housings makes it possible to switch from the dirty filter side to the clean filter side without interrupting operation. The filters can be installed as a suction filter, pressure filter or return line filter.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. Additionally, the depth filter has a metal outer core to protect the filter media. The flow direction is from outside to inside.

For cleaning the stainless steel mesh element or changing the glass fiber element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

For filtration finer than 25 µm, use the disposable elements made of microglass. Filter elements as fine as 3 µm are available; finer filter elements are available upon request.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Ship classifications available upon request.

Type index:

Complete filter: (ordering example)

DWF. 1505. 10VG. 10. E. P. -. FS. B. -. IS21.

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

KH. OE

12	13
----	----

1 series:

DWF = double welded filter, according to ASME-code

2 nominal size: 1505

3 filter material:

80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
25API, 10API microglass according to API

4 filter element collapse rating:

10 = Δp 145 PSI

5 filter element design:

E = without by-pass
S = with by-pass valve Δp 29 PSI

6 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification:

- = standard
VA = stainless steel
IS06 = for HFC application, see sheet-no. 31601

8 process connection:

FS = SAE-flange 3000 PSI
FA11 = flange ANSI CLASS 150 PSI,
sealing surface Rz = 160 µm (not finer than 40 µm)
(only with connection 5")
FA12 = flange ANSI CLASS 150 PSI,
sealing surface Rz = 16 µm
(only with connection 5")

9 process connection size:

B = 4" (standard)
C = 5"

10 filter housing specification:

- = standard
IS12 = internal parts of change over armature stainless steel,
see sheet-no. 41028

11 specification pressure vessel:

IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415

12 shut-off :

- = without
KH = with shut-off ball valve

13 clogging indicator or clogging sensor:

- = without
AE = visual-electrical, see sheet-no. 1609
OP = visual, see sheet-no. 1614
OE = visual-electrical, see sheet-no. 1614
VS5 = sensor, see sheet-no. 1641

To add an indicator/sensor to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

Filter element: (ordering example)

01E. 1501. 10VG. 10. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E = filter element according to company standard

2 nominal size: 1501

3 - **7** see type index-complete filter

Accessories:

- drain- and bleeder connection, see sheet-no. 1651
- lifting mechanism, see sheet-no. 1662

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	232 PSI
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 302 PSI
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 348 PSI
standard process connection:	SAE-flange 3000 PSI
housing material:	carbon steel (ASTM)
housing material change over 4":	carbon steel
housing material change over 5":	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
drain- and bleeder connections:	NPT 1/2"
measure connections:	BSPP 1/4"
operating pressure adapter flanges:	according to B16.5 CLASS 150 PSI

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation, our Filter Selection tool is available online at: www.eatonpowersource.com/calculators/filtration/

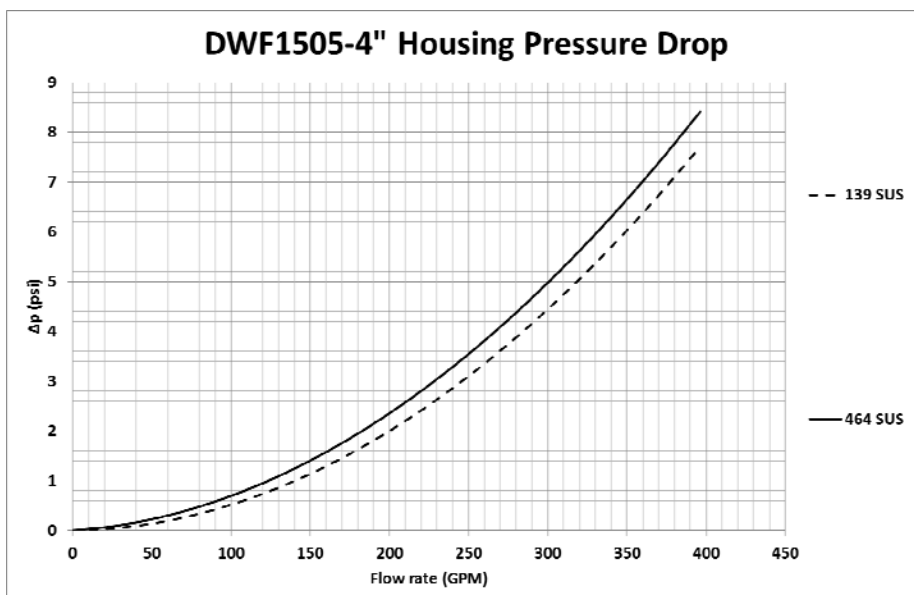
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

DWF	VG					G				API	
	3VG	6VG	10VG	16VG	25VG	10G	25G	40G	80G	10 API	25 API
1505	0.160	0.111	0.071	0.062	0.042	0.0058	0.0043	0.0040	0.0027	0.039	0.018

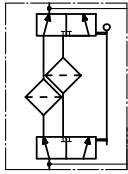
$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0,876 kg/dm³. The pressure drop changes proportionally to the density. The flow curve for 5" available on request.

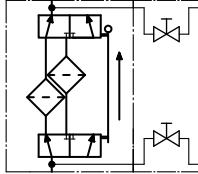


Symbol

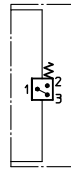
without indicator



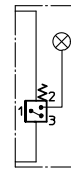
with shut-off ball valve



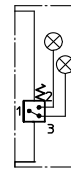
with electric indicator
AE 30 and AE 40



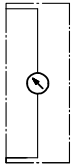
with visual-electric indicator
AE 50 and AE 62



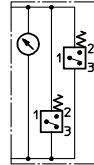
with visual-electric indicator
AE 70 and AE 80



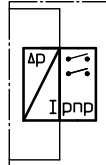
with visual indicator
OP



with visual-electric indicator
OE



with electronic sensor
VS5



Spare parts:

item	qty.	designation	dimension	Article-no.
1	2	filter element	01E.1501...	
2	2	O-ring	93 x 5	307588 (NBR) | 307589 (FPM)
3	2	O-ring	9.975" ID x 0.210 CS	ST521Z6B (BUNA-N)
4	4	gasket kit of change over UKK 4"	4" (DN100)	347922 (FPM)
	4	gasket kit of change over UKK 5"	5" (DN125)	347921 (FPM)
5	6	screw plug	NPT 1/2"	ST260Z35
6	1	clogging indicator, visual-electric	AE	see sheet-no.1609
7	1	clogging indicator, visual	OP	see sheet-no 1614
8	1	clogging indicator, visual-electric	OE	see sheet-no 1614
9	1	clogging sensor, electronic	VS5	see sheet-no 1641
10	3	O-ring	14 x 2	304342 (NBR)
				304722 (FPM)
11	1	O-ring	22 x 2	304708 (NBR)
				304721 (FPM)

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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Series DWF 3005

232 PSI

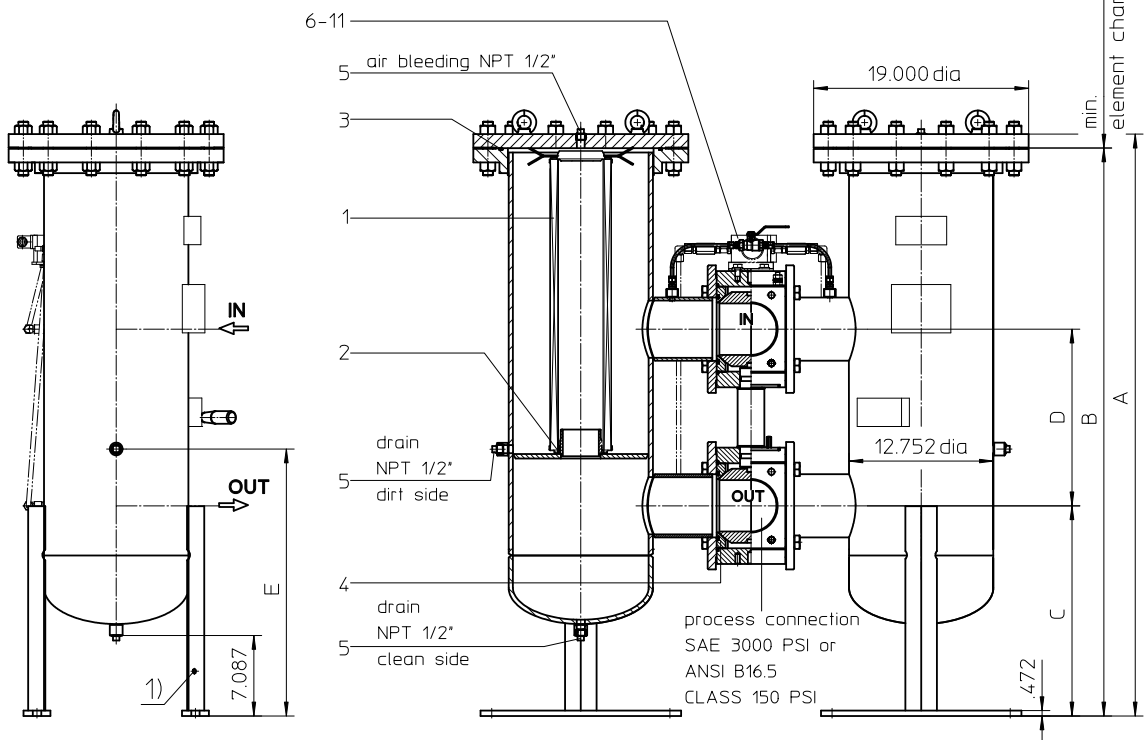
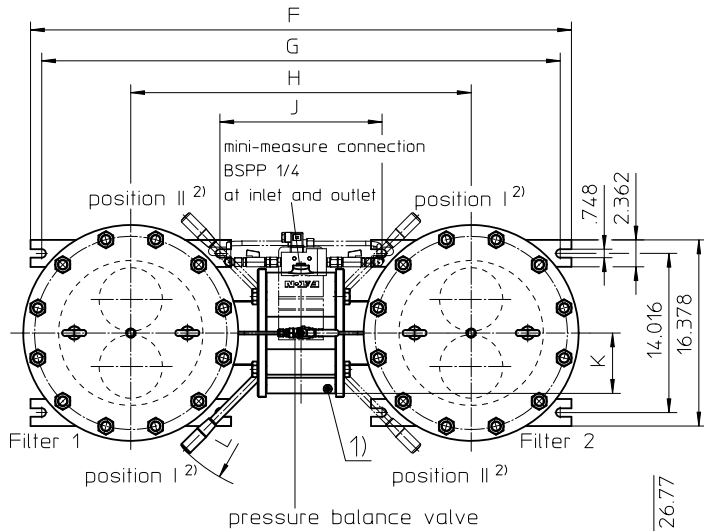
1) Connect the stand grounding tab to a suitable earth ground point.

Switch lever standard in the front.

2) On request: The switch lever can be moved to backside of the changeover valve, opposite to the inlet and outlet.

Please specify this configuration on the order.

Position I: Filter 1 in operation
Position II: Filter 2 in operation



Dimensions:

DWF 3005	A	B	C	D	E	F	G	H	J	K	L	weight lbs.	volume tank
connection 4"	51.22	50.00	18.50	14.37	23.50	46.37	40.41	28.66	12.91	5.00	14.56		2x 20 Gal.
connection 5"	51.22	50.00	18.50	15.55	23.50	47.79	45.82	30.07	14.33	5.31	14.56	1093	2x 20 Gal.
connection 6"	52.12	50.90	19.40	17.32	24.40	48.97	47.00	31.25	15.51	8.15	16.92		2x 21 Gal.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Duplex Pressure Filter

Series DWF 3005

232 PSI

Description:

Duplex filter series DWF 3005 have a working pressure up to 232 PSI. Pressure peaks can be absorbed with a sufficient safety margin.

A changeover ball valve between the two filter housings makes it possible to switch from the dirty filter side to the clean filter side without interrupting operation. The filters can be installed as a suction filter, pressure filter or return line filter.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. Additionally, the depth filter has a metal outer core to protect the filter media. The flow direction is from outside to inside.

For cleaning the stainless steel mesh element or changing the glass fiber element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

For filtration finer than 25 µm, use the disposable elements made of microglass. Filter elements as fine as 3 µm are available; finer filter elements are available upon request.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Ship classifications available upon request.

Type index:

Complete filter: (ordering example)

DWF. 3005. 10VG. 10. E. P. - . FS. C. - . IS21.

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

KH. OE

12	13
----	----

1 series:

DWF = double welded filter, according to ASME-code

2 nominal size: 3005

3 filter material:

80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
25API, 10API microglass according to API

4 filter element collapse rating:

10 = Δp 145 PSI

5 filter element design:

E = without by-pass
S = with by-pass valve Δp 29 PSI

6 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification:

- = standard
VA = stainless steel
IS06 = for HFC application, see sheet-no. 31601

8 process connection:

FS = SAE-flange 3000 PSI (only with connection 4" and 5")
FA11 = flange ANSI CLASS 150 PSI,
sealing surface Rz = 160 µm (not finer than 40 µm)
(only with connection 5" and 6")
FA12 = flange ANSI CLASS 150 PSI,
sealing surface Rz = 16 µm
(only with connection 5" and 6")

9 process connection size:

B = 4"
C = 5" (standard)
D = 6"

10 filter housing specification:

- = standard
IS12 = internal parts of change over armature stainless steel,
see sheet-no. 41028

11 specification pressure vessel:

IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415

12 shut-off :

- = without
KH = with shut-off ball valve

13 clogging indicator or clogging sensor:

- = without
AE = visual-electrical, see sheet-no. 1609
OP = visual, see sheet-no. 1614
OE = visual-electrical, see sheet-no. 1614
VS5 = sensor, see sheet-no. 1641

To add an indicator/sensor to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

Filter element: (ordering example)

01E. 1501. 10VG. 10. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E = filter element according to company standard

2 nominal size: 1501

3 - 7 see type index-complete filter

Accessories:

- drain- and bleeder connection, see sheet-no. 1651
- lifting mechanism, see sheet-no. 1662

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	232 PSI
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 302 PSI
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 348 PSI
standard process connection:	SAE-flange 3000 PSI
housing material:	carbon steel (ASTM)
housing material change over 4":	carbon steel
housing material change over 5" and 6":	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
drain- and bleeder connections:	NPT ½"
measure connections:	BSPP ¼"
operating pressure adapter flanges:	according to B16.5 CLASS 150 PSI

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation, our Filter Selection tool is available online at: www.eatonpowersource.com/calculators/filtration/

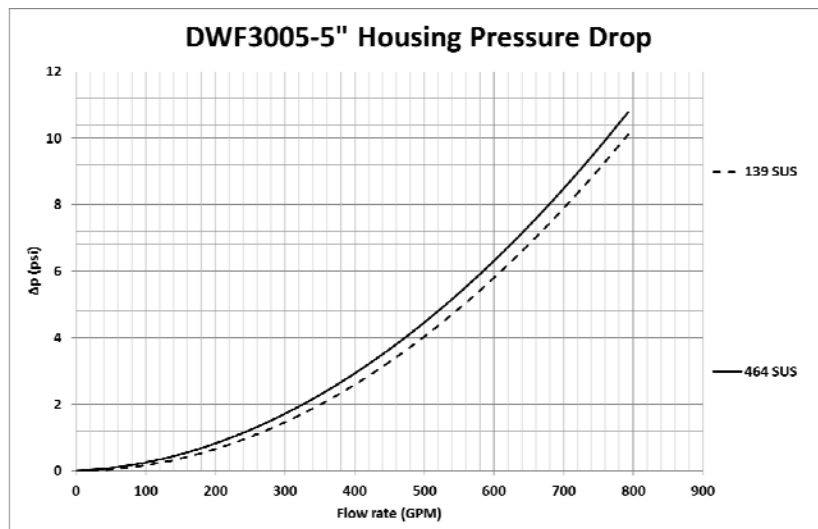
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

DWF	VG					G				API	
	3VG	6VG	10VG	16VG	25VG	10G	25G	40G	80G	10 API	25 API
3005	0.080	0.056	0.036	0.031	0.021	0.0029	0.0021	0.0020	0.0014	0.019	0.009

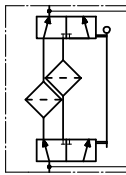
$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0,876 kg/dm³. The pressure drop changes proportionally to the density. The flow curves for 4" and 6" available on request.

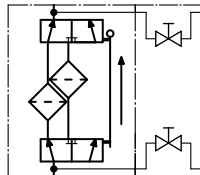


Symbol

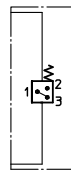
without indicator



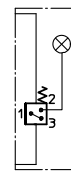
with shut-off ball valve



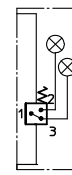
with electric indicator
AE 30 and AE 40



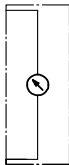
with visual-electric indicator
AE 50 and AE 62



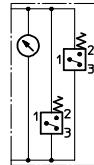
with visual-electric indicator
AE 70 and AE 80



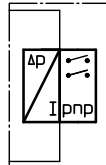
with visual indicator
OP



with visual-electric indicator
OE



with electronic sensor
VS5



Spare parts:

item	qty.	designation	dimension	Article-no.	
1	4	filter element	01E.1501...		
2	4	O-ring	93 x 5	307588 (NBR)	307589 (FPM)
3	2	O-ring	13.975" ID x 0.210 CS	2375017893 (BUNA-N)	
4	4	gasket kit of change over UKK 4"	4" (DN100)		347922 (FPM)
	4	gasket kit of change over UKK 5"	5" (DN125)		347921 (FPM)
	4	gasket kit of change over UKK 6"	6" (DN150)		347916 (FPM)
5	6	screw plug	NPT 1/2"	ST260Z35	
6	1	clogging indicator, visual-electric	AE	see sheet-no.1609	
7	1	clogging indicator, visual	OP	see sheet-no 1614	
8	1	clogging indicator, visual-electric	OE	see sheet-no 1614	
9	1	clogging sensor, electronic	VS5	see sheet-no 1641	
10	3	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
11	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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Series DWF 4505

232 PSI

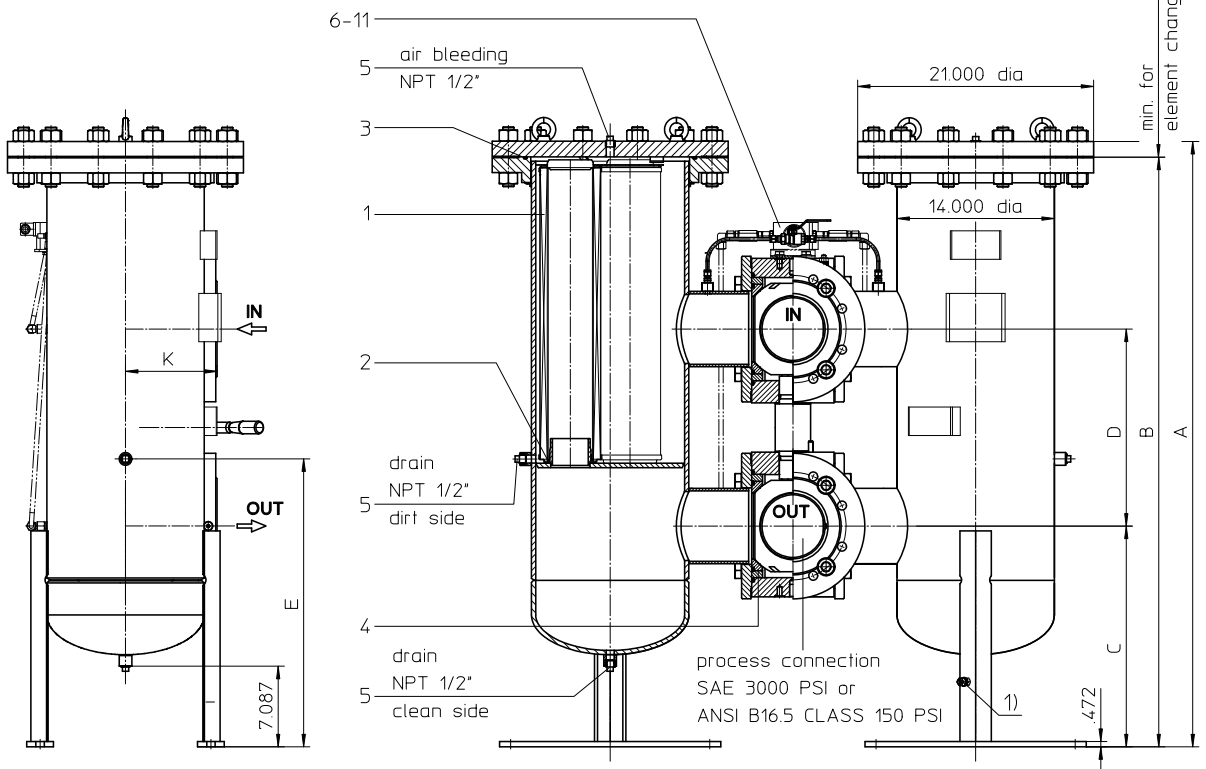
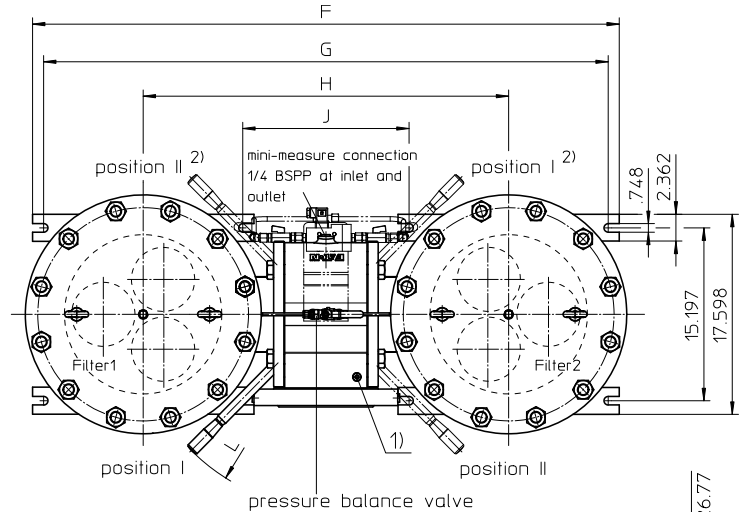
- 1) Connect the stand grounding tab to a suitable earth ground point.

Switch lever standard in the front.

- 2) On request: The switch lever can be moved to backside of the changeover valve, opposite to the inlet and outlet.

Please specify this configuration on the order.

Position I: Filter 1 in operation
Position II: Filter 2 in operation



Dimensions:

DWF 4505	A	B	C	D	E	F	G	H	J	K	L	weight lbs.	volume tank
connection 5"	53.22	51.85	19.40	15.55	25.31	51.02	49.05	31.33	13.62	5.31	14.56		2x 26 Gal.
connection 6"	53.22	51.85	19.40	17.32	25.31	52.20	50.23	32.52	14.80	8.15	16.92	1521	2x 26 Gal.
connection 8"	55.31	53.93	20.47	20.47	27.36	54.37	52.40	34.68	16.97	9.61	21.33		2x 28 Gal.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Duplex Pressure Filter

Series DWF 4505

232 PSI

Description:

Duplex filter series DWF 4505 have a working pressure up to 232 PSI. Pressure peaks can be absorbed with a sufficient safety margin.

A changeover ball valve between the two filter housings makes it possible to switch from the dirty filter side to the clean filter side without interrupting operation. The filters can be installed as a suction filter, pressure filter or return line filter.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. Additionally, the depth filter has a metal outer core to protect the filter media. The flow direction is from outside to inside.

For cleaning the stainless steel mesh element or changing the glass fiber element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

For filtration finer than 25 µm, use the disposable elements made of microglass. Filter elements as fine as 3 µm are available; finer filter elements are available upon request.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Ship classifications available upon request.

Type index:

Complete filter: (ordering example)

DWF. 4505. 10VG. 10. E. P. - FA11. D. - IS21.

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

KH. OE

12	13
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1 series:

DWF = double welded filter, according to ASME-code

2 nominal size: 4505

3 filter material:

80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
25API, 10API microglass according to API

4 filter element collapse rating:

10 = Δp 145 PSI

5 filter element design:

E = without by-pass
S = with by-pass valve Δp 29 PSI

6 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification:

- = standard
VA = stainless steel
IS06 = for HFC application, see sheet-no. 31601

8 process connection:

FS = SAE-flange 3000 PSI (only with connection 5")
FA11 = flange ANSI CLASS 150 PSI,
sealing surface Rz = 160 µm (not finer than 40 µm)
FA12 = flange ANSI CLASS 150 PSI,
sealing surface Rz = 16 µm

9 process connection size:

C = 5"
D = 6" (standard)
E = 8"

10 filter housing specification:

- = standard
IS12 = internal parts of change over armature stainless steel,
see sheet-no. 41028

11 specification pressure vessel:

IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415

12 shut-off :

- = without
KH = with shut-off ball valve

13 clogging indicator or clogging sensor:

- = without
AE = visual-electrical, see sheet-no. 1609
OP = visual, see sheet-no. 1614
OE = visual-electrical, see sheet-no. 1614
VS5 = sensor, see sheet-no. 1641

To add an indicator/sensor to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

Filter element: (ordering example)

01E. 1501. 10VG. 10. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E = filter element according to company standard

2 nominal size: 1501

3 - 7 see type index-complete filter

Accessories:

- drain- and bleeder connection, see sheet-no. 1651
- lifting mechanism, see sheet-no. 1662

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	232 PSI
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 302 PSI
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 348 PSI
standard process connection:	flange ANSI B16.5 CLASS 150 PSI
housing material:	carbon steel (ASTM)
housing material change over:	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
drain- and bleeder connections:	NPT ½"
measure connections:	BSPP ¼"
operating pressure adapter flanges:	according to B16.5 CLASS 150 PSI

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation, our Filter Selection tool is available online at: www.eatonpowersource.com/calculators/filtration/

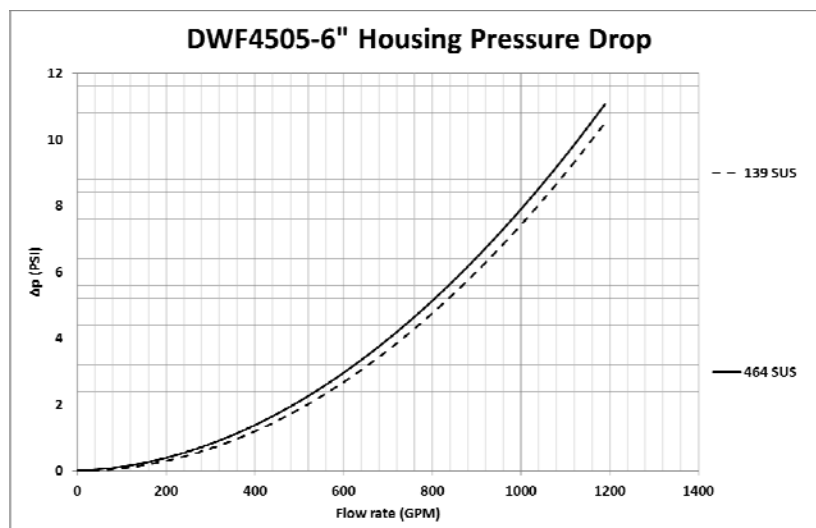
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

DWF	VG					G				API	
	3VG	6VG	10VG	16VG	25VG	10G	25G	40G	80G	10 API	25 API
4505	0.064	0.045	0.029	0.025	0.017	0.0024	0.0018	0.0016	0.0011	0.016	0.007

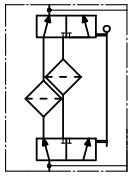
$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0,876 kg/dm³. The pressure drop changes proportionally to the density. The flow curves for 5" and 8" available on request.

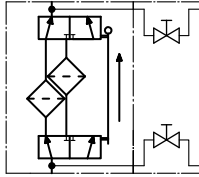


Symbols:

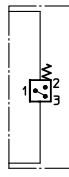
without indicator



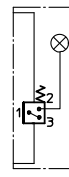
with shut-off ball valve



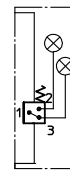
with electric indicator
AE 30 and AE 40



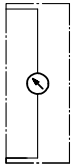
with visual-electric indicator
AE 50 and AE 62



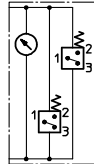
with visual-electric indicator
AE 70 and AE 80



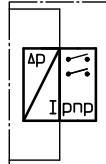
with visual indicator
OP



with visual-electric indicator
OE



with electronic sensor
VS5



Spare parts:

item	qty.	designation	dimension	Article-no.	
1	6	filter element	01E.1501...		
2	6	O-ring	93 x 5	307588 (NBR)	307589 (FPM)
3	2	O-ring	14.975" ID x 0.210 CS	2375017993 (BUNA-N)	
4	4	gasket kit of change over UKK 5"	5" (DN125)		347921 (FPM)
	4	gasket kit of change over UKK 6"	6" (DN150)		347916 (FPM)
	4	gasket kit of change over UKK 8"	8" (DN200)		347931 (FPM)
5	6	screw plug	NPT 1/2"	ST260Z35	
6	1	clogging indicator, visual-electric	AE	see sheet-no.1609	
7	1	clogging indicator, visual	OP	see sheet-no 1614	
8	1	clogging indicator, visual-electric	OE	see sheet-no 1614	
9	1	clogging sensor, electronic	VS5	see sheet-no 1641	
10	3	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
11	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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Series DWF 6005

232 PSI

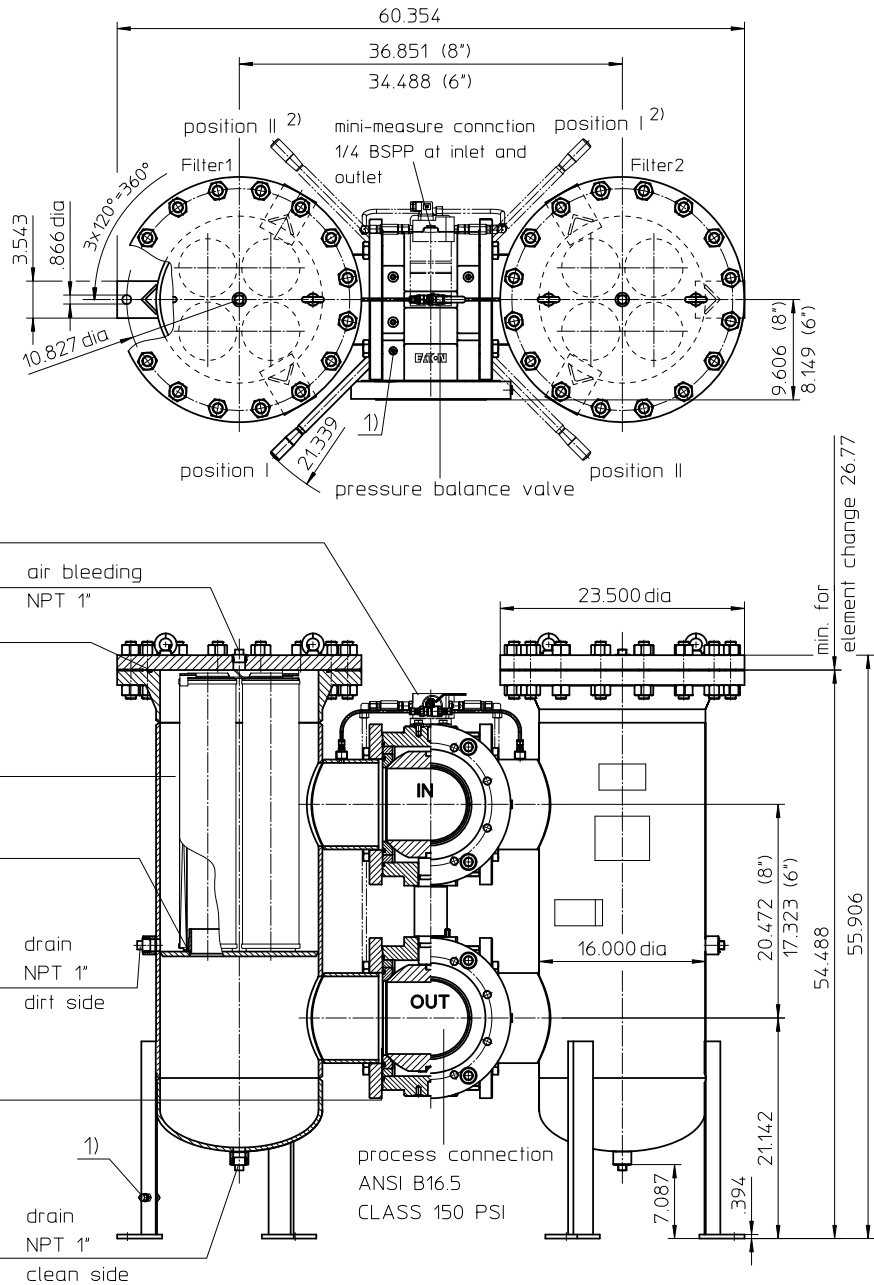
1) Connect the stand grounding tab to a suitable earth ground point.

Switch lever standard in the front.

2) On request: The switch lever can be moved to backside of the changeover valve, opposite to the inlet and outlet.

Please specify this configuration on the order.

Position I: Filter 1 in operation
Position II: Filter 2 in operation



Weight: approx. 1990 lbs.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Duplex Pressure Filter

Series DWF 6005

232 PSI

Description:

Duplex filter series DWF 6005 have a working pressure up to 232 PSI. Pressure peaks can be absorbed with a sufficient safety margin.

A changeover ball valve between the two filter housings makes it possible to switch from the dirty filter side to the clean filter side without interrupting operation. The filters can be installed as a suction filter, pressure filter or return line filter.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. Additionally, the depth filter has a metal outer core to protect the filter media. The flow direction is from outside to inside.

For cleaning the stainless steel mesh element or changing the glass fiber element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

For filtration finer than 25 µm, use the disposable elements made of microglass. Filter elements as fine as 3 µm are available; finer filter elements are available upon request.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Ship classifications available upon request.

Type index:

Complete filter: (ordering example)

DWF. 6005. 10VG. 10. E. P. - FA11. E. - IS21.

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

KH. OE

12	13
----	----

1 series:

DWF = double welded filter, according to ASME-code

2 nominal size: 6005

3 filter material:

80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
25API, 10API microglass according to API

4 filter element collapse rating:

10 = Δp 145 PSI

5 filter element design:

E = without by-pass
S = with by-pass valve Δp 29 PSI

6 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification:

- = standard
VA = stainless steel
IS06 = for HFC application, see sheet-no. 31601

8 process connection:

FA11 = flange ANSI CLASS 150 PSI,
sealing surface Rz = 160 µm (not finer than 40 µm)
FA12 = flange ANSI CLASS 150 PSI,
sealing surface Rz = 16 µm

9 process connection size:

D = 6"
E = 8" (standard)

10 filter housing specification:

- = standard
IS12 = internal parts of change over armature stainless steel,
see sheet-no. 41028

11 specification pressure vessel:

IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415

12 shut-off :

- = without
KH = with shut-off ball valve

13 clogging indicator or clogging sensor:

- = without
AE = visual-electrical, see sheet-no. 1609
OP = visual, see sheet-no. 1614
OE = visual-electrical, see sheet-no. 1614
VS5 = sensor, see sheet-no. 1641

To add an indicator/sensor to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

Filter element: (ordering example)

01E. 1501. 10VG. 10. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01E = filter element according to company standard

2 nominal size: 1501

3 - 7 see type index-complete filter

Accessories:

- drain- and bleeder connection, see sheet-no. 1651
- lifting mechanism, see sheet-no. 1662

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	232 PSI
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 302 PSI
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 348 PSI
standard process connection:	flange ANSI B16.5 CLASS 150 PSI
housing material:	carbon steel (ASTM)
housing material change over:	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
drain- and bleeder connections:	NPT 1"
measure connections:	BSPP 1/4"
volume tank:	2x 36 Gal.
operating pressure adapter flanges:	according to B16.5 CLASS 150 PSI

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation, our Filter Selection tool is available online at: www.eatonpowersource.com/calculators/filtration/

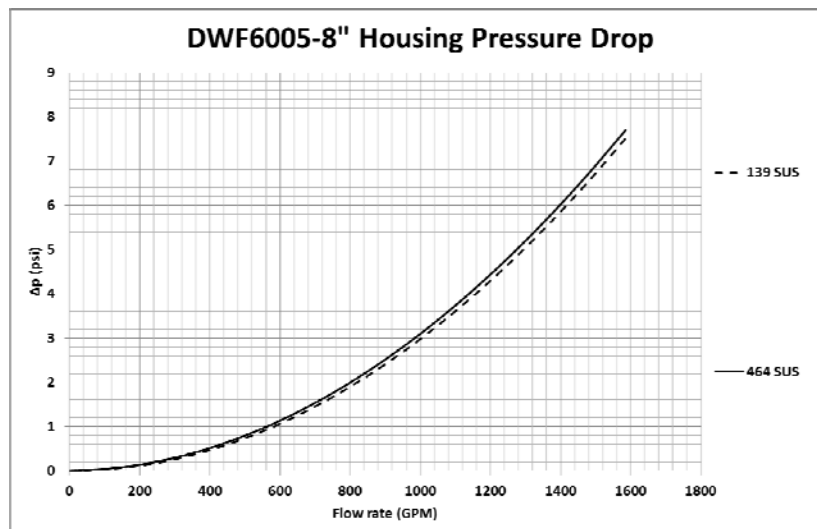
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

DWF	VG					G				API	
	3VG	6VG	10VG	16VG	25VG	10G	25G	40G	80G	10 API	25 API
6005	0.048	0.033	0.021	0.019	0.013	0.0018	0.0013	0.0012	0.0008	0.012	0.005

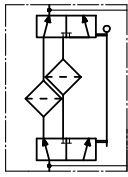
$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0,876 kg/dm³. The pressure drop changes proportionally to the density. The flow curve for 6" available on request.

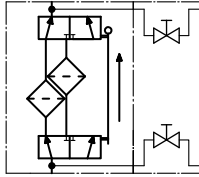


Symbols:

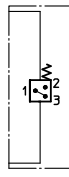
without indicator



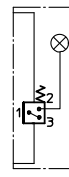
with shut-off ball valve



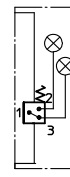
with electric indicator
AE 30 and AE 40



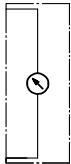
with visual-electric indicator
AE 50 and AE 62



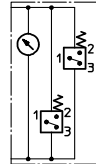
with visual-electric indicator
AE 70 and AE 80



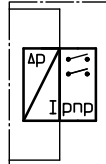
with visual indicator
OP



with visual-electric indicator
OE



with electronic sensor
VS5



Spare parts:

item	qty.	designation	dimension	Article-no.	
1	8	filter element	01E.1501...		
2	8	O-ring	93 x 5	307588 (NBR)	307589 (FPM)
3	2	O-ring	17" ID x 0.210 CS	2375017093 (BUNA-N)	
4	4	gasket kit of change over UKK 6"	6" (DN150)		347916 (FPM)
	4	gasket kit of change over UKK 8"	8" (DN200)		347931 (FPM)
5	6	screw plug	NPT 1"	ST501Z35	
6	1	clogging indicator, visual-electric	AE	see sheet-no.1609	
7	1	clogging indicator, visual	OP	see sheet-no 1614	
8	1	clogging indicator, visual-electric	OE	see sheet-no 1614	
9	1	clogging sensor, electronic	VS5	see sheet-no 1641	
10	3	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
11	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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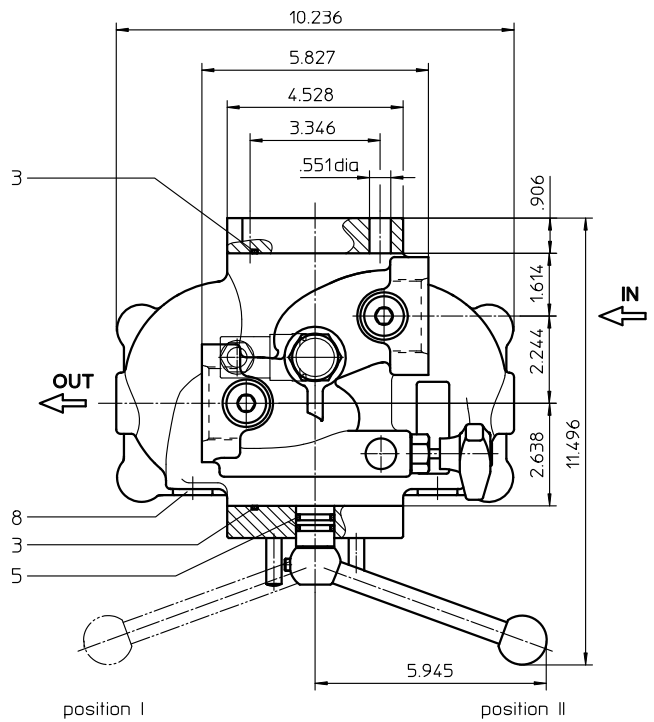
Brazil

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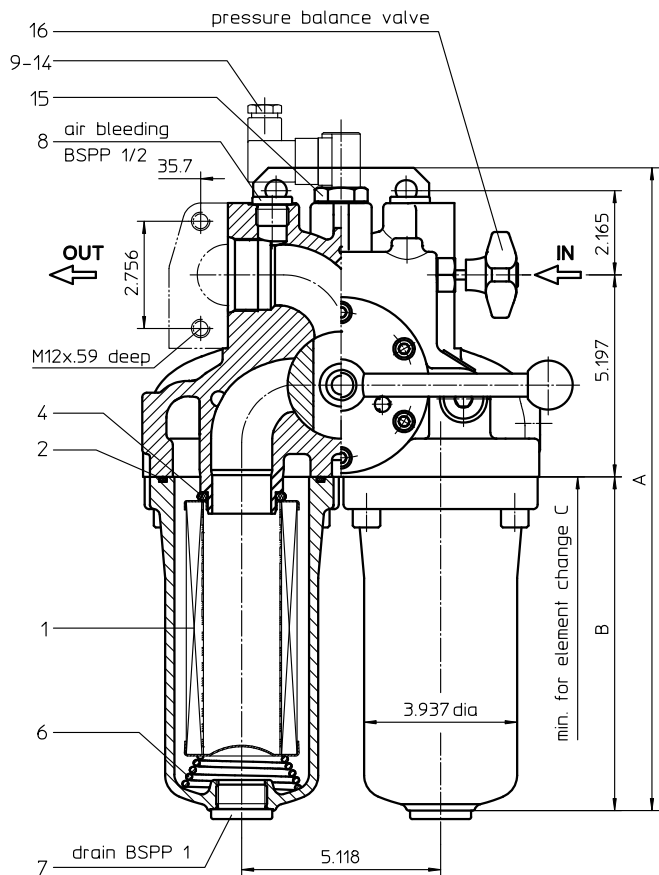
Series DSF 176-331 363 PSI



Position. I: left filter-side in operation
Position. II: right filter-side in operation

Dimensions:

type	DSF 176	DSF 331
A	16.35	21.85
B	8.58	13.89
C	9.84	15.35
weight approx.	79 lbs.	84 lbs.
volume tank	2x .31 Gal.	2x .52 Gal.



Dimensions: inches

Designs and performance values are subject to change.

Pressure Filter

Series DSF 176-331

363 PSI

Description:

Duplex pressure filter series DSF 176-331 are suitable for a working pressure up to 363 PSI. Pressure peaks can be absorbed with a sufficient safety margin.

A three-way-change-over valve integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation. The filters can be installed as a suction filter, pressure filter or return-line filter. Filter elements are available down to a filter fineness of 4 µm(c).

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head. After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

1. Type index:

1.1. Complete filter: (ordering example)

DSF. 176. 10VG. 16. E. P. -. FS. 7. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 series:**
DSF = duplex filter, change-over
- 2 nominal size:** 176, 331
- 3 filter-material and filter-fineness:**
80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
25API, 10API microglass according to API
10P paper
- 4 filter element collapse rating:**
16 = Δp 232 PSI
- 5 filter element design:**
E = single-end open
- 6 sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 filter element specification:**
- = standard
VA = stainless steel
- 8 process connection:**
FS = SAE-flange 3000 PSI
UG = thread connection
- 9 process connection size:**
7 = 1 ½"
- 10 filter housing specification:**
- = standard
- 11 internal valve:**
- = without
S1 = with by-pass valve Δp 51 PSI
S2 = with by-pass valve Δp 102 PSI
- 12 clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 175. 10VG. 16. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 series:**
01E. = filter element according to company standard
- 2 nominal size:** 175, 330
- 3 - 7** see type index-complete filter

Accessories:

- SAE-counter flange, see sheet-no. 1652

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	363PSI
test pressure:	725 PSI
process connection:	SAE-flange 3000 PSI or thread
housing material:	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

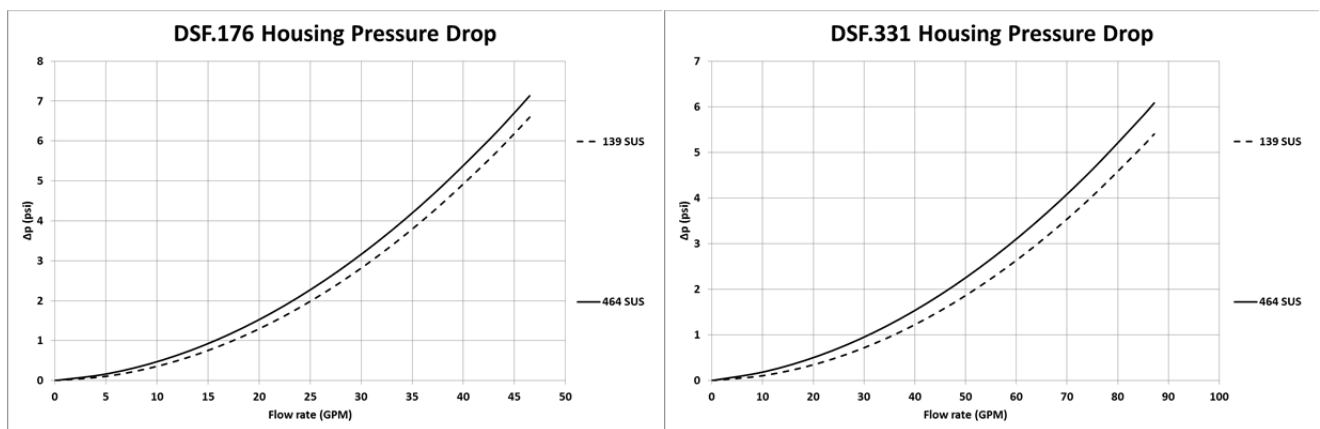
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

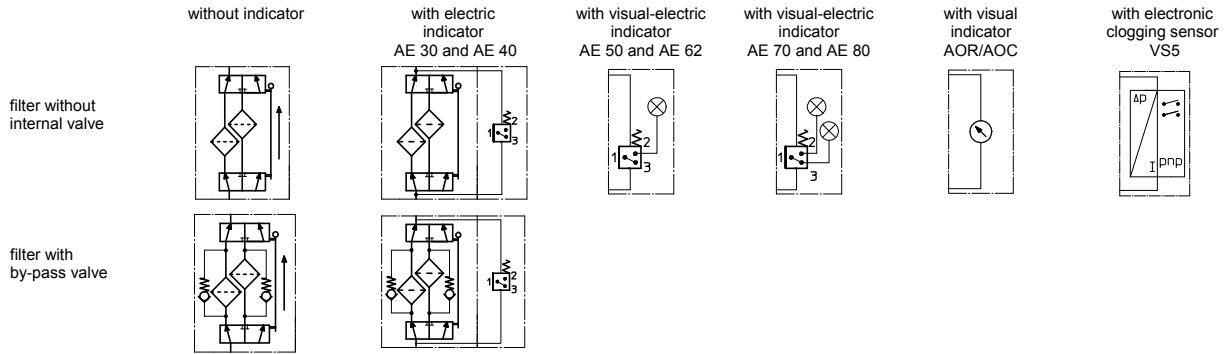
DSF	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
176	2.078	1.443	0.923	0.804	0.549	0.0743	0.0694	0.0475	0.446
331	1.152	0.800	0.512	0.446	0.305	0.0421	0.0393	0.0269	0.247

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension		article-no.	
			DSF 176 01E.175...	DSF 331 01E.330...		
1	2	filter element				
2	2	O-ring	100 x 4		320540 (NBR)	332740 (FPM)
3	2	O-ring	75 x 3		302215 (NBR)	304729 (FPM)
4	2	O-ring	44 x 6		302222 (NBR)	304384 (FPM)
5	2	O-ring	18 x 3		304359 (NBR)	304399 (FPM)
6	2	spring	Da = 52			304989
7	2	screw plug	1 BSPP			305303
8	4	screw plug	½ BSPP			304678
9	1	clogging indicator, visual	AOR or AOC		see sheet-no.1606	
10	1	clogging indicator, visual-electric	AE		see sheet-no.1615	
11	1	clogging sensor, electronic	VS5		see sheet-no.1619	
12	1	O-ring	15 x 1,5		315357 (NBR)	315427 (FPM)
13	1	O-ring	22 x 2		304708 (NBR)	304721 (FPM)
14	1	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
15	1	screw plug	20913-4			309817
16	1	pressure balance valve	3/8"			305000

item 15 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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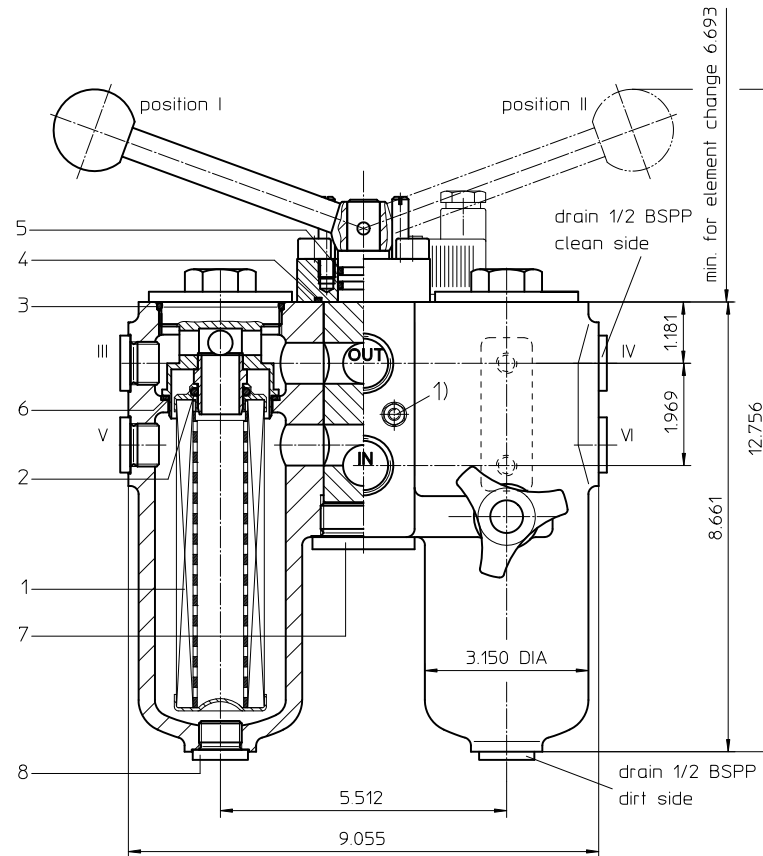
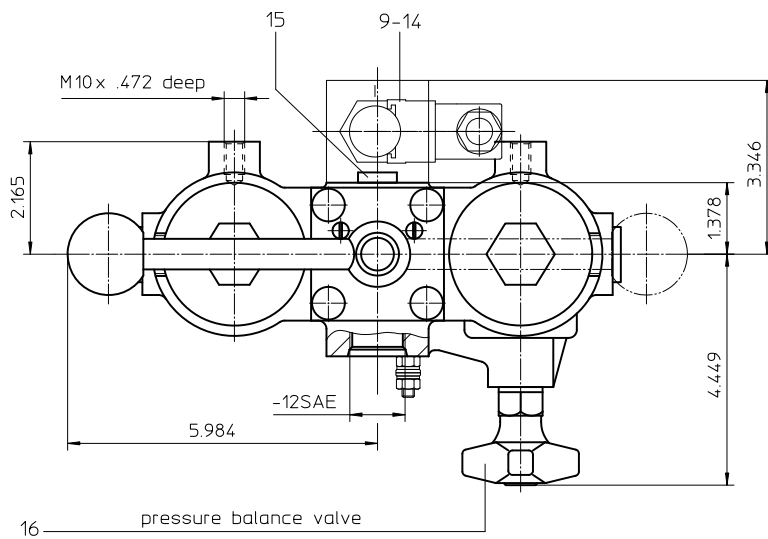
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Series DU 63

464 PSI



Position I: Left filter-side in operation
 Position II: Right filter-side in operation

1) Connect the stand grounding tab to a suitable earth ground point.

Measure connection III, IV: Air bleeding, pressure relief 1/2 BSPP - clean side
 Measure connection V, VI: Air bleeding, pressure relief 1/2 BSPP - dirt side

Weight: approx. 33 lbs.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series DU 63

464 PSI

Description:

Duplex filter series DU63 have a working pressure up to 464 PSI. Pressure peaks can be absorbed with a sufficient safety margin.

A rotary slide valve integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation. These filters can be installed as suction filters.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

For cleaning the mesh element or changing the microglass element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

For filtration finer than 40 µm, use the disposable elements made of microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements are available upon request.

Eaton-filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The bypass valve is integrated in the filter cover. After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

Ship classifications available upon request.

Type index:

Complete filter: (ordering example)

DU. 63. 10VG. 30. E. P. -. UG. 4. -. -. AE
1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12

- 1 **series:**
DU = pressure filter, change over
- 2 **nominal size:** 63
- 3 **filter-material and filter-fineness:**
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
25API, 10API microglass according to API
10P paper
- 4 **filter element collapse rating:**
30 = Δp 435 PSI
- 5 **filter element design:**
E = single end open
- 6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 **filter element specification:**
- = standard
VA = stainless steel
- 8 **process connection:**
UG = thread connection
- 9 **process connection size:**
4 = -12 SAE
- 10 **filter housing specification:**
- = standard
- 11 **internal valve:**
- = without
S1 = with bypass valve Δp 51 PSI
- 12 **clogging indicator or clogging sensor:**
- = without
AOR = visual-electric, see sheet-no.1606
AOC = visual-electric, see sheet-no.1606
AE = visual-electric, see sheet-no.1615
VS5 = electronic, see sheet-no.1619

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

Filter element: (ordering example)

01NL. 63. 10VG. 30. E. P. -
1 | 2 | 3 | 4 | 5 | 6 | 7

- 1 **series:**
01NL. = standard filter element according to DIN 24550, T3
- 2 **nominal size:** 63
- 3 - 7 see type index complete filter

Accessories:

- gauge port and bleeder connection, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1651

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	464 PSI
test pressure:	900 PSI
process connection:	thread connection
housing material:	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
measure connections:	BSPP ¼
drain- and bleeder connections:	BSPP ½
volume tank:	2x 0.17 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) - \text{characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v(SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at
www.eatonpowersource.com/calculators/filtration/

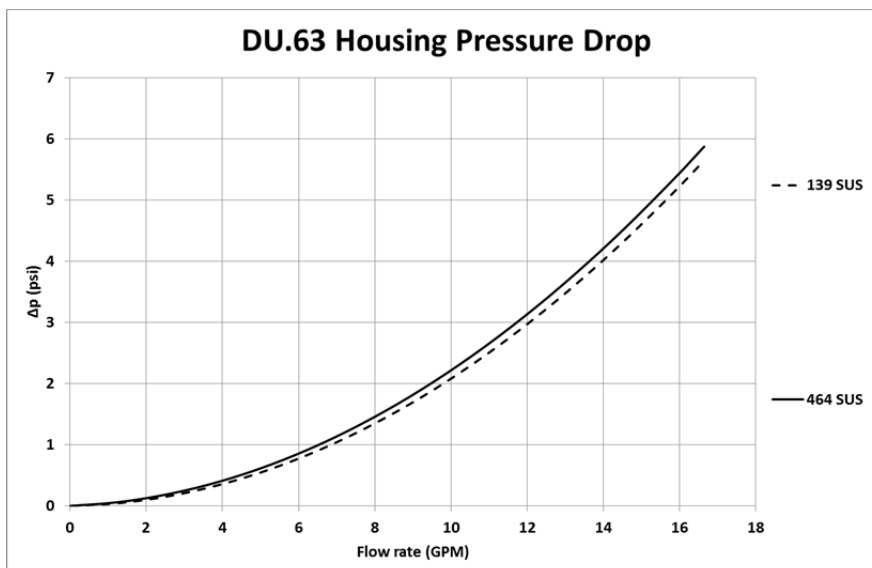
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

DU	VG					G			P	API	
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P	10API	25API
63	4.214	2.926	1.873	1.631	1.114	0.1131	0.1056	0.0723	0.946	0.993	0.455

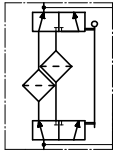
$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.

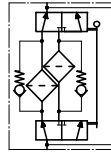


Symbols:

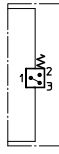
without indicator



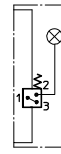
with by-pass valve



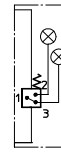
with electric indicator
AE 30 and AE 40



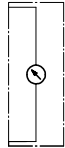
with visual-electric indicator
AE 50 and AE 62



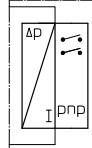
with visual-electric indicator
AE 70 and AE 80



with visual indicator
AOR/AOC



with electronic clogging sensor
VS5



Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NL.63...		
2	2	O-ring	22 x 3,5	304341 (NBR)	304392 (FPM)
3	2	O-ring	56 x 3	305072 (NBR)	305322 (FPM)
4	1	O-ring	42,52 x 2,62	304352 (NBR)	304393 (FPM)
5	2	O-ring	18 x 3	304359 (NBR)	304399 (FPM)
6	2	O-ring	48 x 3	304357 (NBR)	304404 (FPM)
7	1	screw plug	1 ¼ BSPP	308530	
8	6	screw plug	½ BSPP	304678	
9	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
10	1	clogging indicator, visual-electric	AE	see sheet-no. 1615	
11	1	clogging sensor, electronic	VS5	see sheet-no. 1619	
12	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
13	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
14	3	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
15	2	screw plug	¼ BSPP	305003	
16	1	pressure balance valve	3/8"	305000	

item 15 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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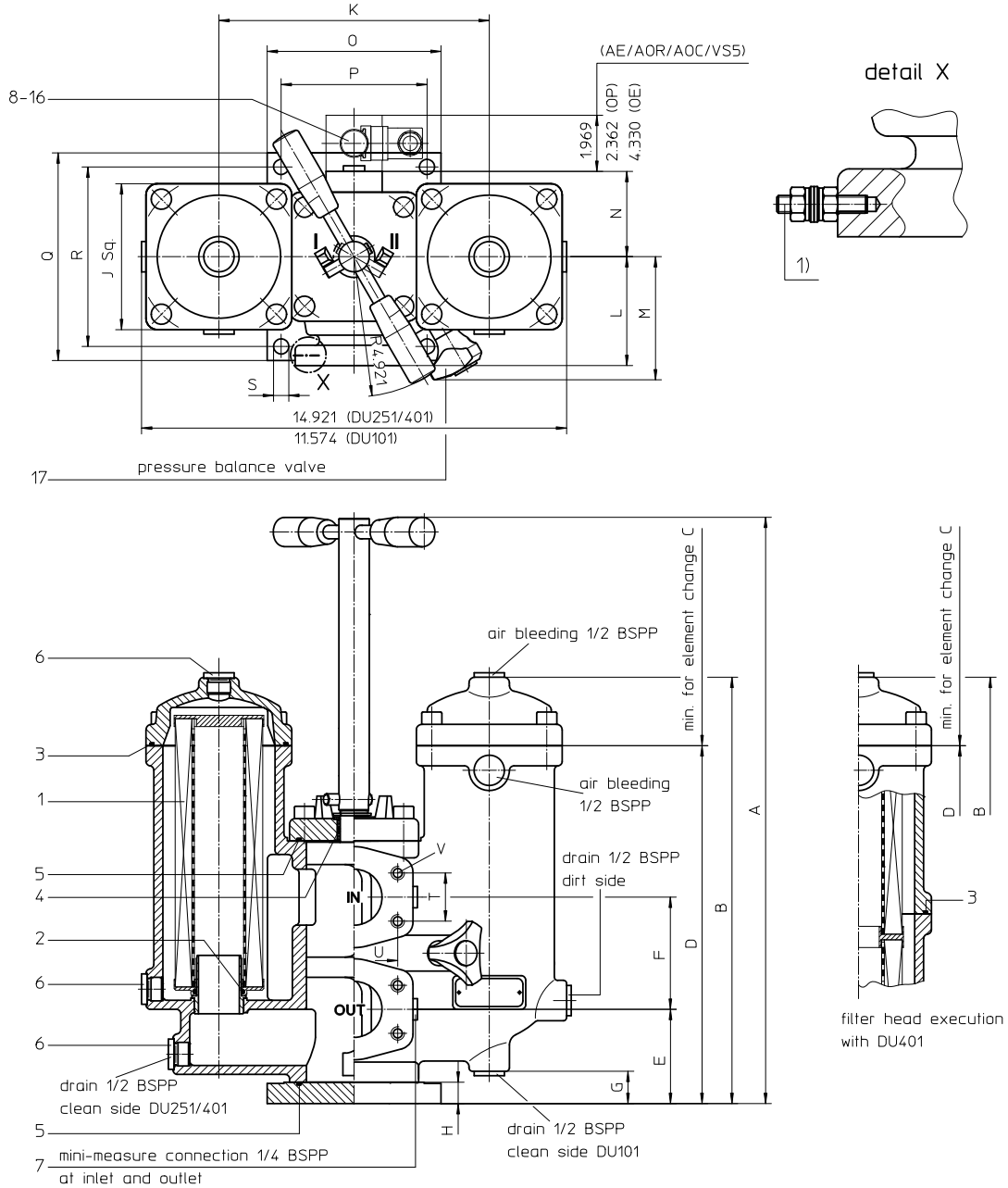
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Series DU 101-401

464 PSI



Position I: Left filter-side in operation
 Position II: Right filter-side in operation

1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions:

type	SAE-connection	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	weight
DU 101	SAE 1 1/4 ¹⁾	18.23	12.20	8.27	10.43	2.17	3.15	.87	.63	3.74	7.09	2.36	3.94	1.96	5.51	4.53	5.51	4.53	.47	1.19	2.31	M10/.75 dp.	51 lbs.
DU 101	SAE 1 1/2 ²⁾	20.55	14.97	10.23	12.56	3.31	3.94	-	.75	5.12	9.45	3.82	4.33	2.99	6.10	5.12	7.28	6.30	.53	1.69	3.10	M12/.71 dp.	88 lbs.
DU 251	SAE 2 ²⁾	24.88	20.87	16.14	18.46	3.31	3.94	-	.75	5.12	9.45	3.82	4.33	2.99	6.10	5.12	7.28	6.30	.53	1.69	3.10	M12/.71 dp.	110 lbs.

¹⁾ by counter flange BFS.6.A.33,7x2,6.St.P.3000

²⁾ by counter flange BFS.8.A.48,3x3,7.St.P.3000

Dimensions: inches



Powering Business Worldwide

Designs and performance values are subject to change.

Pressure Filter

Series DU 101-401

464 PSI

Description:

Duplex filter series DU 101-401 have a working pressure up to 464 PSI. Pressure peaks can be absorbed with a sufficient safety margin.

A three way changeover valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation. These filters can be installed as suction filters.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

For cleaning the mesh element or changing the microglass element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

For filtration finer than 40 µm use the disposable elements made of microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements on request.

Eaton filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Ship classifications available upon request.

Type index:

Complete filter: (ordering example)

DU. 251. 10VG. 30. E. P. - . FS. 8. - . - . AE
1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12

- 1 | **series:**
DU = pressure filter, change over
- 2 | **nominal size:** 101, 251, 401
- 3 | **filter-material and filter-fineness:**
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
25API, 10API microglass according to API
10P paper
- 4 | **filter element collapse rating:**
16 = Δp 232 PSI (01N.100)
30 = Δp 435 PSI (01NL.250/400)
- 5 | **filter element design:**
E = single end open
S = with by-pass valve Δp 29 PSI
S1 = with by-pass valve Δp 51 PSI
- 6 | **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 | **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC application, see sheet-no. 31601
- 8 | **process connection:**
FS = SAE-flange 3000 PSI
- 9 | **process connection size:**
6 = 1 ¼" (DU 101)
8 = 2" (DU 251/401)
- 10 | **filter housing specification:** (see catalog)
- = standard
IS12 = for stainless steel ball valve, see sheet-no. 41028
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217 (operating pressure max. 232 PSI)
- 11 | **internal valve:**
- = without
- 12 | **clogging indicator or clogging sensor:**
- = without
AOR = visual-electric, see sheet-no.1606
AOC = visual-electric, see sheet-no.1606
AE = visual-electric, see sheet-no.1609
OP = visual, see sheet-no.1628
OE = visual-electric, see sheet-no.1628
VS5 = electronic, see sheet-no.1641

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

Filter element: (ordering example)

01NL. 250. 10VG. 30. E. P. -
1 | 2 | 3 | 4 | 5 | 6 | 7

- 1 | **series:**
01N. = standard filter element according to EATON specification
01NL. = standard filter element according to DIN 24550, T3
- 2 | **Nominal size:** 100 (01N.), 250,400 (01NL.)
- 3 | - 7 | see type index for complete filter

Accessories:

- gauge port and bleeder connection, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1651
- SAE-counter flange, see sheet-no. 1652
- shut-off valve, see sheet-no. 1655

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	464 PSI
max. operating pressure at IS20:	232 PSI
test pressure:	900 PSI
test pressure at IS20:	464 PSI
process connection:	SAE-flange 3000 PSI
housing material:	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
measure connections:	BSPP ¼
drain- and bleeder connections:	BSPP ½
volume tank DU 101:	2x .23 Gal.
DU 251:	2x .66 Gal.
DU 401:	2x .97 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

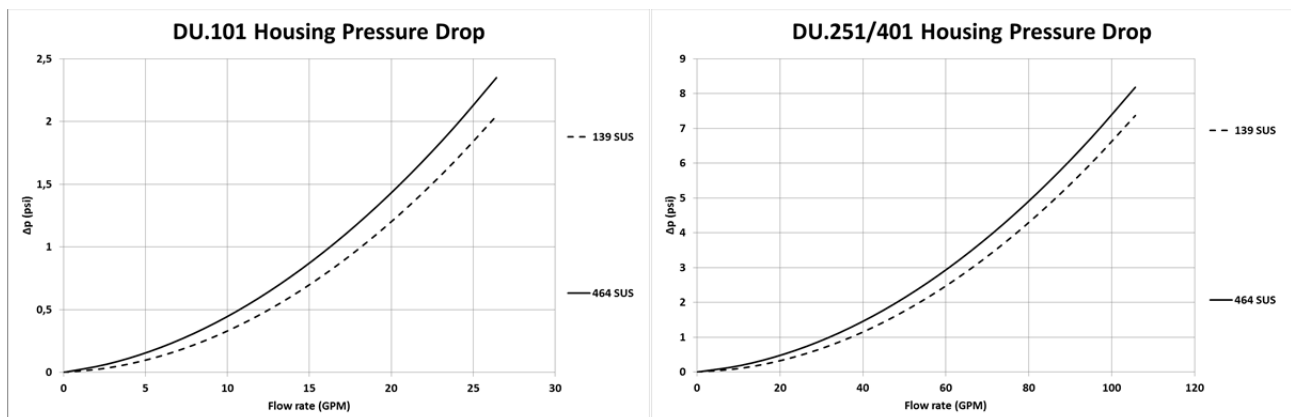
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

DU	VG					G			P	API	
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P	10API	25API
101	2.473	1.717	1.099	0.957	0.654	0.0651	0.0607	0.0416	0.504	0.582	0.266
251	1.140	0.792	0.507	0.441	0.301	0.0339	0.0316	0.0217	0.231	0.260	0.119
401	0.700	0.486	0.311	0.271	0.185	0.0207	0.0194	0.0133	0.121	0.159	0.073

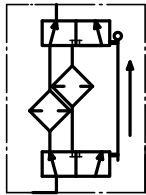
$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.

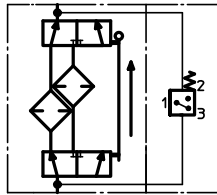


Symbols:

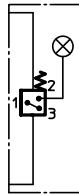
without indicator



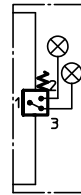
with electric indicator
AE 30 and AE 40



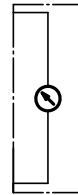
with visual-electric indicator
AE 50 and AE 62



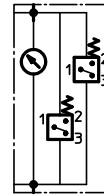
with visual-electric indicator
AE 70 and AE 80



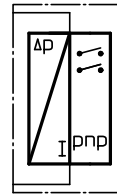
with visual indicator
AOR/AOC/OP



with visual-electric indicator
OE



with electronic sensor
VS5



Spare parts:

item	designation	qty.	dimension/article no. DU 101	qty.	dimension/article no. DU 251	qty.	dimension/article no. DU 401
1	filter element	2	01N.100...	2	01NL.250...	2	01NL.400...
2	O-ring	2	32 x 3,5 304378 (NBR) 304401 (FPM)	2	40 x 3 304389 (NBR) 304391 (FPM)	2	40 x 3 304389 (NBR) 304391 (FPM)
3	O-ring	2	76 x 4 305599 (NBR) 310291 (FPM)	2	115 x 3 303963 (NBR) 307762 (FPM)	4	115 x 3 303963 (NBR) 307762 (FPM)
4	O-ring	1	24 x 3 303038 (NBR) 304397 (FPM)	1	24 x 3 303038 (NBR) 304397 (FPM)	1	24 x 3 303038 (NBR) 304397 (FPM)
5	O-ring	2	60 x 2,5 305601 (NBR) 310267 (FPM)	2	95 x 3 305808 (NBR) 304828 (FPM)	2	95 x 3 305808 (NBR) 304828 (FPM)
6	screw plug	8			1/2 BSPP 304678		
7	screw plug	2			1/4 BSPP 305003		
8	clogging indicator, visual				AOR or AOC see sheet-no. 1606		
9	clogging indicator, visual	1			OP see sheet-no. 1628		
10	clogging indicator, visual-electric	1			OE see sheet-no. 1628		
11	clogging indicator, visual-electric	1			AE see sheet-no. 1609		
12	clogging sensor, electronic	1			VS5 see sheet-no. 1641		
13	O-ring	1			15 x 1,5 315537 (NBR) 315427 (FPM)		
14	O-ring	1			22 x 2 304708 (NBR) 304721 (FPM)		
15	O-ring	2			14 x 2 304342 (NBR) 304722 (FPM)		
16	screw plug	2			1/4 BSPP 305003		
17	pressure balance valve	1			3/8" 305000		

item 16 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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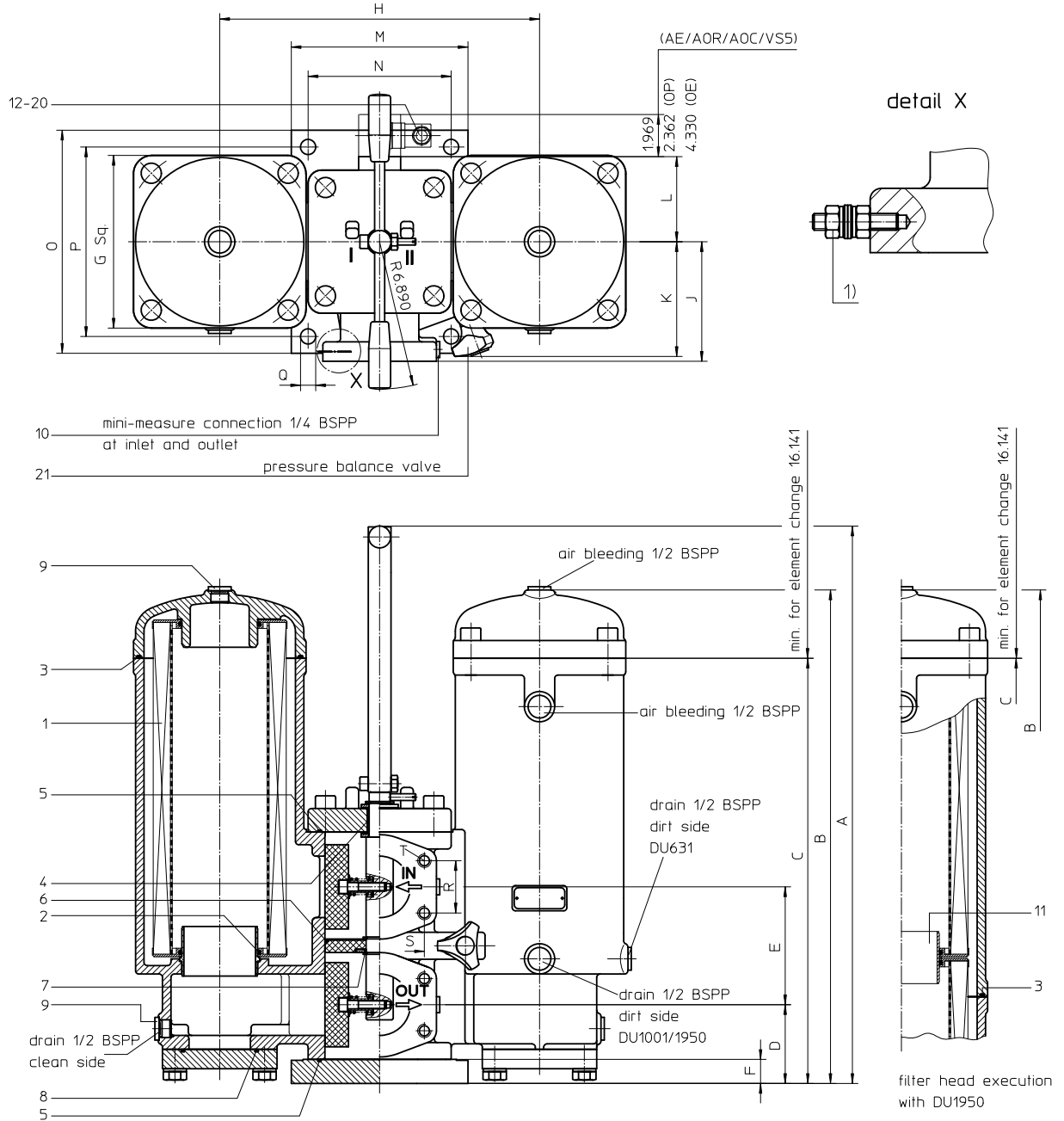
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Series DU 631-1950

464 PSI



Position I: Left filter-side in operation
 Position II: Right filter-side in operation

1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions:

type	SAE-connection	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	weight
DU 631	SAE 2 1/2"	27.28	22.36	19.56	4.33	4.52	.94	6.29	11.29	3.26	4.76	5.23	5.51	4.52	8.26	7.28	.53	2.00	3.50	M12, .71 dp.	198 lbs.
DU 1001	SAE 3"	28.22	23.07	19.88	3.68	5.51	1.12	8.07	14.96	3.97	5.39	5.94	8.26	6.69	10.43	8.85	.70	2.44	4.18	M16, .91 dp.	255 lbs.
DU 1950	SAE 3"	44.05	38.89	35.70	3.68	5.51	1.12	8.07	14.96	3.97	5.39	5.94	8.26	6.69	10.43	8.85	.70	2.44	4.18	M16, .91 dp.	374 lbs.

Dimensions: inches

Designs and performance values are subject to change.

Pressure Filter

Series DU 631-1950

464 PSI

Description:

Duplex filter series DU 631-1950 have a working pressure up to 464 PSI. Pressure peaks can be absorbed with a sufficient safety margin.

A three way changeover valve integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation. These filters can be installed as suction filters.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

For cleaning the mesh element or changing the microglass element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

For filtration finer than 40 µm use the disposable elements made of microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements on request.

Eaton filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The internal valve is integrated in the filter cover. After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

Ship classifications available upon request.

Type index:

Complete filter: (ordering example)

DU. 631. 10VG. 30. E. P. -. FS. 9. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 series:**
DU = pressure filter, change over
- 2 nominal size:** 631, 1001, 1950
- 3 filter-material and filter-fineness:**
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
25API, 10API microglass according to API
10P paper
- 4 filter element collapse rating:**
30 = Δp 435 PSI (01NL.630)
10 = Δp 146 PSI (01NR.1000/1001)
- 5 filter element design:**
E = single end open (01NL.630)
S = with bypass valve Δp 29 PSI (01NL.630)
S1 = with bypass valve Δp 51 PSI (01NL.630)
B = both sides open (01NR.1001)
- 6 sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601
IS07 = for oil/amonia mixtures (NH₃), see sheet-no. 31602
- 8 process connection:**
FS = SAE-flange 3000 PSI
- 9 process connection size:**
9 = 2 1/2" (DU 631)
A = 3" (DU 1001/1950)
- 10 filter housing specification:** (see catalog)
- = standard
IS06 = for HFC applications, see sheet-no. 31605
IS12 = for stainless steel ball valve, see sheet-no. 41028
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217 (operating pressure max. 232 PSI)
- 11 internal valve:**
- = without
S = with bypass valve Δp 29 PSI (DU 1001/1950)
S1 = with bypass valve Δp 51 PSI (DU 1001/1950)
- 12 clogging indicator or clogging sensor:**
- = without
AOR = visual-electric, see sheet-no.1606
AOC = visual-electric, see sheet-no.1606
AE = visual-electric, see sheet-no.1609
OP = visual, see sheet-no.1628
OE = visual-electric, see sheet-no.1628
VS5 = electronic, see sheet-no.1641

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

Filter element: (ordering example)

01NL. 630. 10VG. 30. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 series:**
01NL. = standard filter element according to DIN 24550, T3
01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 nominal size:** 630 (01NL.), 1000 (01NR.)
- 3 - 7** see type index for complete filter

Accessories:

- gauge port and bleeder connection, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1651
- SAE-counter flange, see sheet-no. 1652
- shut-off valve, see sheet-no. 1655

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	464 PSI
max. operating pressure at IS20:	232 PSI
test pressure:	900 PSI
test pressure at IS20:	464 PSI
process connection:	SAE-flange 3000 PSI
housing material:	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
measure connections:	BSPP ¼
drain- and bleeder connections:	BSPP ½
volume tank DU 631:	2x 1.5 Gal.
DU 1001:	2x 3.4 Gal.
DU 1950:	2x 6.1 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v(SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

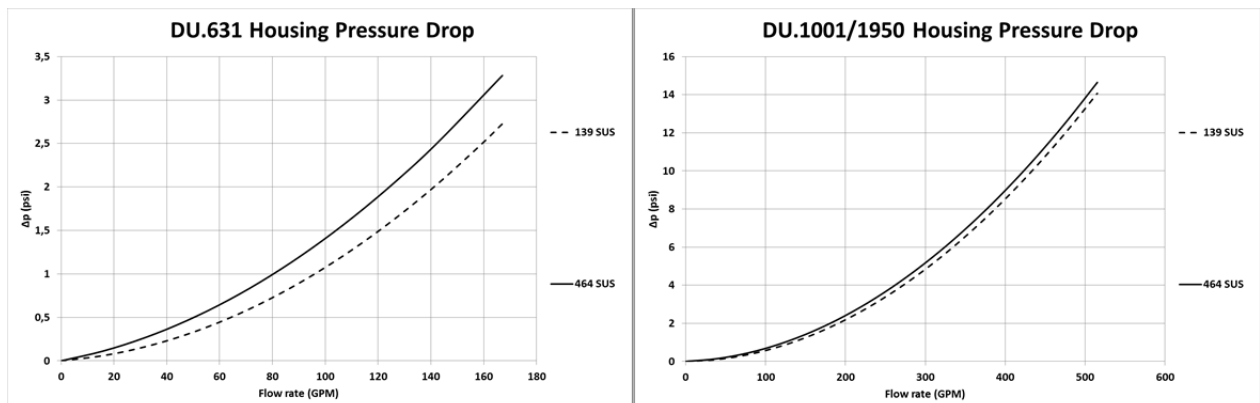
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

DU	VG					G			P	API	
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P	10API	25API
631	0.534	0.371	0.237	0.207	0.141	0.1735	0.1619	0.1109	0.112	0.121	0.056
1001	0.237	0.165	0.105	0.092	0.063	0.0061	0.0057	0.0039	0.051	0.053	0.024
1950	0.118	0.082	0.053	0.046	0.031	0.0030	0.0028	0.0019	0.026	0.027	0.012

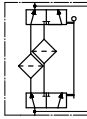
$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.

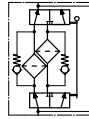


Symbols:

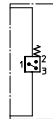
without indicator



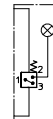
with by-pass valve



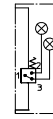
with electric indicator
AE 30 and AE 40



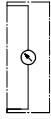
with visual-electric indicator
AE 50 and AE 62



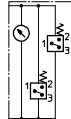
with visual-electric indicator
AE 70 and AE 80



with visual indicator
OP/AOR/AOC



with visual-electrical indicator
OE



with electronic clogging sensor
VS5



Spare parts:

item	designation	qty.	dimension and article-no. DU 631	qty.	dimension and article-no. DU 1001	qty.	dimension and article-no. DU 1950	
1	filter element	2	01NL.630...	2	01NR.1000...	4	01NR.1000...	
2	O-ring	2	60 x 3,5 304377 (NBR) 304398 (FPM)	4	90 x 4 306941 (NBR) 307031 (FPM)	8	90 x 4 306941 (NBR) 307031 (FPM)	
3	O-ring	2	125 x 3 306025 (NBR) 307358 (FPM)	2	185 x 4 305593 (NBR) 306309 (FPM)	4	185 x 4 305593 (NBR) 306309 (FPM)	
4	O-ring	1	24 x 3		304038 (NBR)	304397 (FPM)		
5	O-ring	2	115 x 3	303963 (NBR)	307762 (FPM)	140 x 3	304604 (NBR) 307541 (FPM)	
6	O-ring	1	96 x 4	305190 (NBR)	308148 (FPM)	120 x 4	305300 (NBR) 307991 (FPM)	
7	O-ring	1	32 x 2,5	306843 (NBR)	308268 (FPM)	32 x 2,5	306843 (NBR) 308268 (FPM)	
8	O-ring	2	69,45 x 3,53 305868 (NBR) 307357 (FPM)			85,32 x 3,53 305590 (NBR) 306308 (FPM)		
9	screw plug	8	½ BSPP	304678	8	½ BSPP	304678	
10	screw plug	2			½ BSPP	305003	10	½ BSPP
11	connecting pipe	2			-			
12	clogging indicator, visual	1			AOR or AOC	see sheet-no. 1606		
13	clogging indicator, visual	1			OP	see sheet-no. 1628		
14	clogging indicator, visual-electric	1			OE	see sheet-no. 1628		
15	clogging indicator, visual-electric	1			AE	see sheet-no. 1609		
16	clogging sensor, electronic	1			VS5	see sheet-no. 1641		
17	O-ring	1	15 x 1,5	315357 (NBR)	315427 (FPM)			
18	O-ring	1	22 x 2	304708 (NBR)	304721 (FPM)			
19	O-ring	2	14 x 2	304342 (NBR)	304722 (FPM)			
20	screw plug	2			½ BSPP	305003		
21	pressure balance valve	1			3/8"	305000		

item 20 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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For more information, please

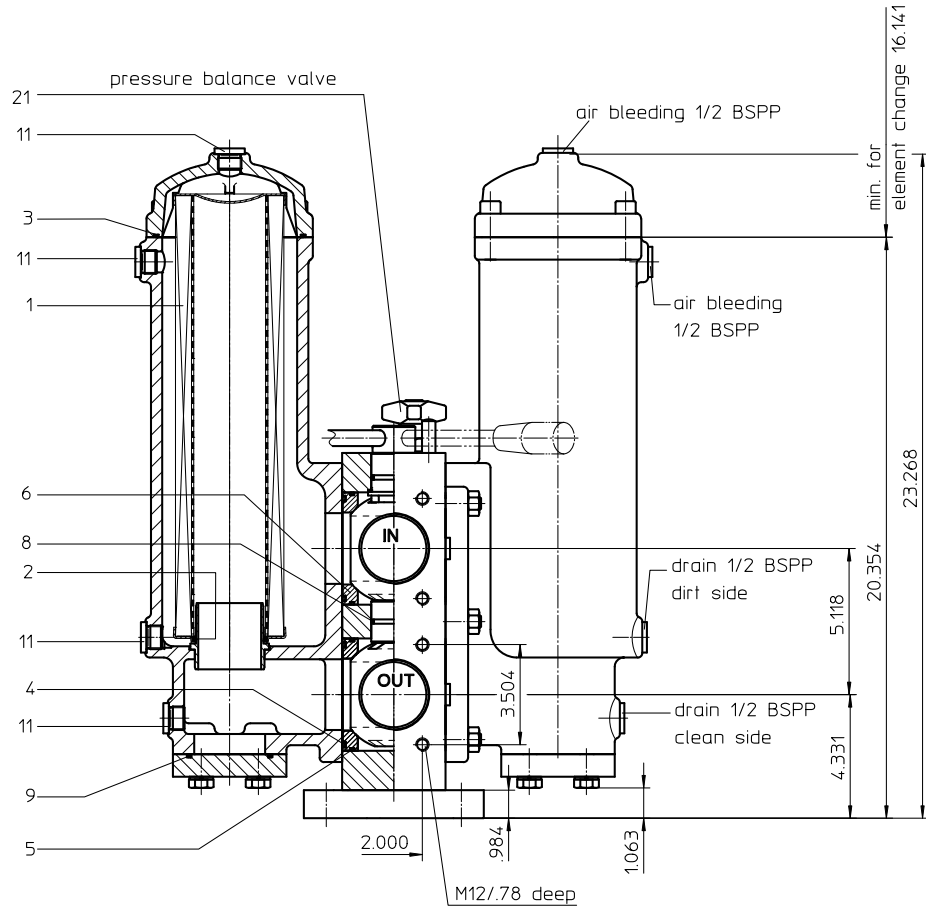
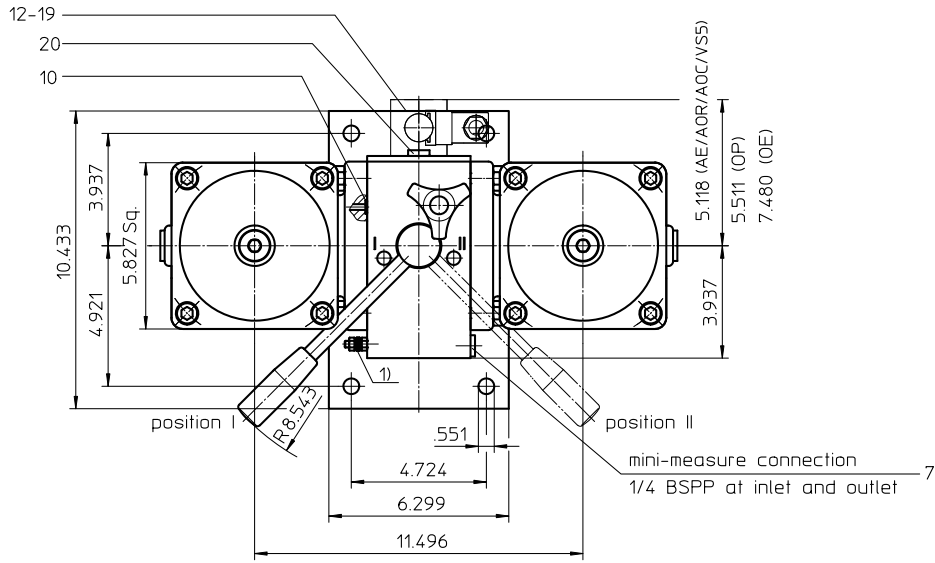
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Series DU 635

464 PSI



Position I: Left filter-side in operation
 Position II: Right filter-side in operation

1) Connect the stand grounding tab to a suitable earth ground point.

Weight: approx. 200 lbs.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series DU 635

464 PSI

Description:

Duplex filter series DU635 have a working pressure up to 464 PSI. Pressure peaks can be absorbed with a sufficient safety margin.

Change-over ball valve between the two filter housings makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation. These filters can be installed as suction filters.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

For cleaning the mesh element or changing the microglass element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

For filtration finer than 40 µm, use the disposable elements made of microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements are available upon request.

Eaton-filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Ship classifications available upon request.

Type index:

Complete filter: (ordering example)

DU. 635. 10VG. 30. E. P. -. FS. 9. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 | **series:**
DU = pressure filter, change over
- 2 | **nominal size:** 635
- 3 | **filter-material and filter-fineness:**
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
25API, 10API microglass according to API
10P paper
- 4 | **filter element collapse rating:**
30 = Δp 435 PSI
- 5 | **filter element design:**
E = single end open
S = with by-pass valve Δp 29 PSI
S1 = with by-pass valve Δp 51 PSI
- 6 | **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 | **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601
IS07 = for oil/amonia mixtures (NH3), see sheet-no. 31602
- 8 | **process connection:**
FS = SAE-flange 3000 PSI
- 9 | **process connection size:**
9 = 2 1/2"
- 10 | **filter housing specification:** (see catalog)
- = standard
IS06 = for HFC applications, see sheet-no. 31605
IS12 = for stainless steel ball valve, see sheet-no. 41028
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217 (operating pressure max. 232 PSI)
- 11 | **internal valve:**
- = without
- 12 | **clogging indicator or clogging sensor:**
- = without
AOR = visual-electric, see sheet-no.1606
AOC = visual-electric, see sheet-no.1606
AE = visual-electric, see sheet-no.1609
OP = visual, see sheet-no.1628
OE = visual-electric, see sheet-no.1628
VS5 = electronic, see sheet-no.1641

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

Filter element: (ordering example)

01NL. 630. 10VG. 30. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 | **series:**
01NL. = standard filter element according to DIN 24550, T3
- 2 | **nominal size:** 630
- 3 | - 7 | see type index complete filter

Accessories:

- gauge port and bleeder connection, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1651
- SAE-counter flange, see sheet-no. 1652
- shut-off valve, see sheet-no. 1655

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	464 PSI
max. operating pressure at IS20:	232 PSI
test pressure:	900 PSI
test pressure at IS20:	464 PSI
process connection:	SAE-flange 3000 PSI
housing material:	EN-GJS-400-18-LT
switching housing material:	S355J2 + N
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
measure connections:	BSPP ¼
drain- and bleeder connections:	BSPP ½
volume tank:	2x 1.5 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

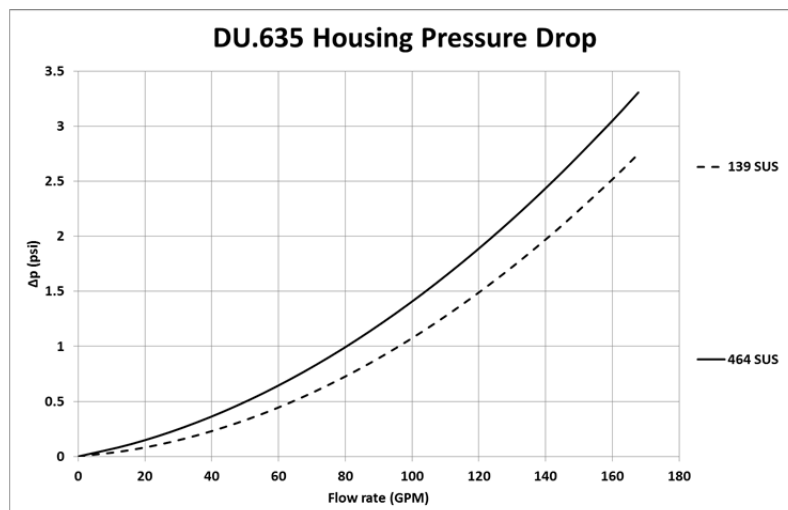
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0,876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

DU	VG					G			P	API	
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P	10API	25API
635	0.534	0.371	0.237	0.207	0.141	0.1735	0.1619	0.1109	0.112	0.121	0.056

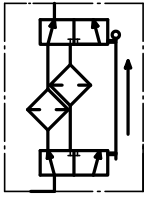
$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.

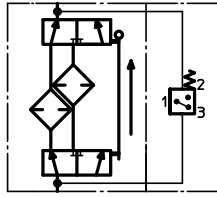


Symbols:

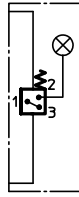
without indicator



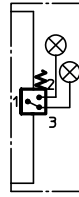
with electric indicator
AE 30 and AE 40



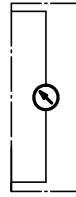
with visual-electric indicator
AE 50 and AE 62



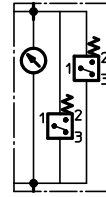
with visual-electric indicator
AE 70 and AE 80



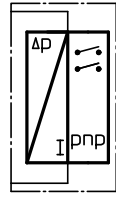
with visual indicator
AOR/AOC/OP



with visual-electric indicator
OE



with electronic sensor
VS5



Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NL.630...		
2	2	O-ring	60 x 3,5	304377 (NBR)	304398 (FPM)
3	2	O-ring	125 x 3	306025 (NBR)	307358 (FPM)
4	4	O-ring	85 x 4	305685 (NBR)	310285 (FPM)
5	4	O-ring	95 x 3	305808 (NBR)	304828 (FPM)
6	4	gasket		317651	
7	2	screw plug	1/4 BSPP	305003	
8	2	O-ring	32 x 3	304368 (NBR)	311020 (FPM)
9	2	O-ring	69,45 x 3,53	305868 (NBR)	307357 (FPM)
10	4	O-ring	8 x 2	310004 (NBR)	316530 (FPM)
11	8	screw plug	1/2 BSPP	304678	
12	1	clogging indicator, visual	AOR or AOC	see sheet no. 1606	
13	1	clogging indicator, visual	OP	see sheet no. 1628	
14	1	clogging indicator, visual-electric	OE	see sheet no. 1628	
15	1	clogging indicator, visual-electric	AE	see sheet no. 1609	
16	1	clogging sensor, electronic	VS5	see sheet no. 1641	
17	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
18	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
19	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
20	2	screw plug	1/4 BSPP	305003	
21	1	pressure balance valve	3/8"	305000	

item 20 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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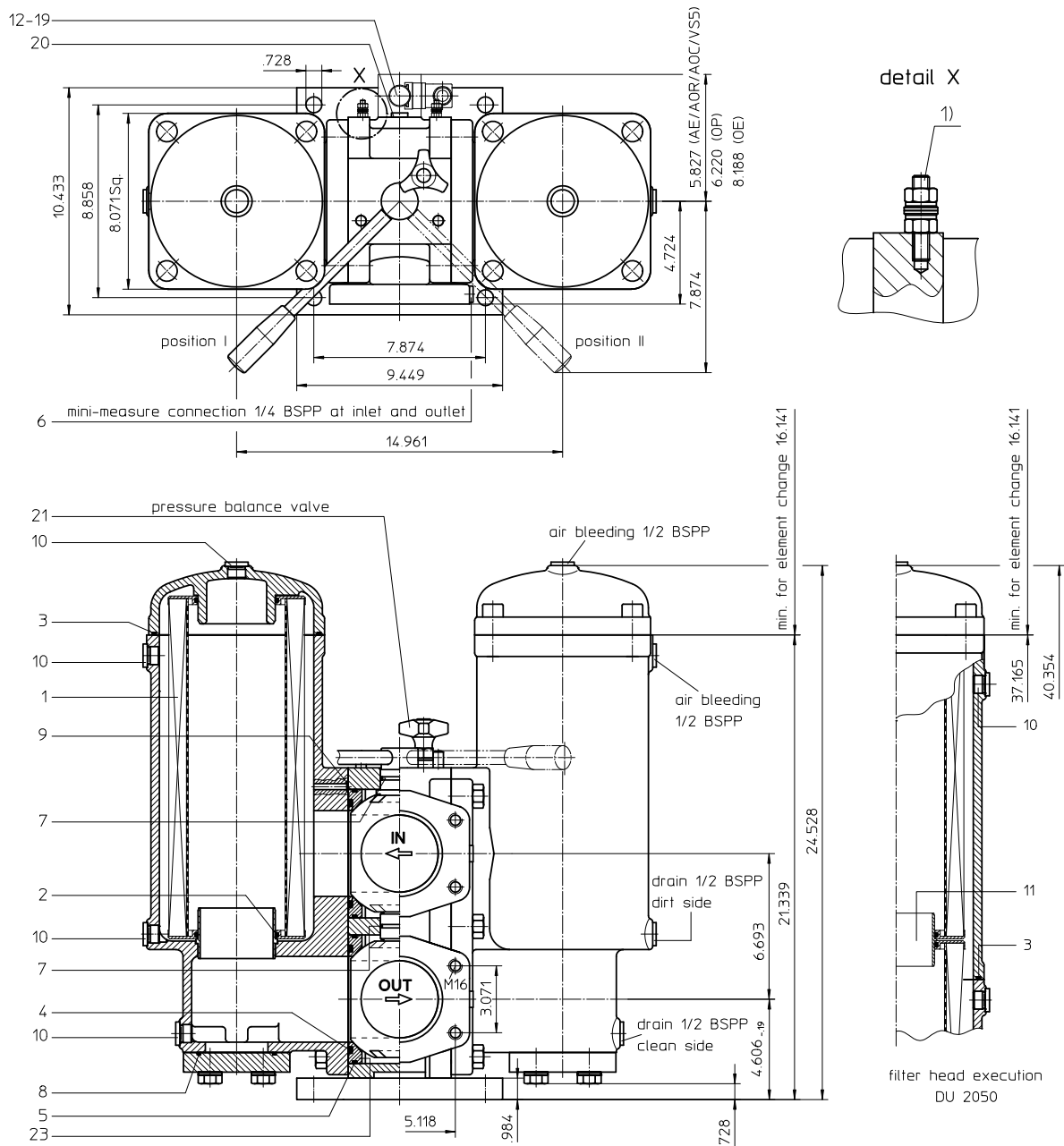
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Series DU 1050-2050

464 PSI



Position I: Left filter-side in operation
 Position II: Right filter-side in operation

1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions:

type	connection	SAE-connection size	weight
DU 1050	SAE 3" ¹⁾	SAE 4" 3000 PSI	330 lbs.
DU 1050	SAE 4"	SAE 4" 3000 PSI	330 lbs.
DU 2050	SAE 3" ¹⁾	SAE 4" 3000 PSI	440 lbs.
DU 2050	SAE 4"	SAE 4" 3000 PSI	440 lbs.

¹⁾ with reducing flange BFS.B.E.88,9x3,2.St.P.3000 / V (Viton) can be used instead P (Nitrile)

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series DU1050-2050

464 PSI

Description:

Duplex filter series DU1050-2050 have a working pressure up to 464 PSI. Pressure peaks can be absorbed with a sufficient safety margin.

A changeover ball valve between the housings makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation. These filters can be installed as suction filters..

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

For cleaning the mesh element or changing the microglass element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

For filtration finer than 40 µm, use the disposable elements made of microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements are available upon request.

Eaton-filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The internal valve is integrated in the filter cover. After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

Ship classifications available upon request..

Type index:

Complete filter: (ordering example)

DU.	1005.	10VG.	10.	B.	P.	-.	FS.	B.	-.	-.	AE
1	2	3	4	5	6	7	8	9	10	11	12

- 1 | **series:**
DU = pressure filter, change over
- 2 | **nominal size:** 1050, 2050
- 3 | **filter-material and filter-fineness:**
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
25API, 10API microglass according to API
10P paper
- 4 | **filter element collapse rating:**
10 = Δp 145 PSI
- 5 | **filter element design:**
B = both sides open
- 6 | **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 | **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601
IS07 = for oil/amonia mixtures (NH₃), see sheet-no. 31602
- 8 | **process connection:**
FS = SAE-flange 3000 PSI
- 9 | **process connection size:**
B = 4"
- 10 | **filter housing specification:** (see catalog)
- = standard
IS06 = for HFC applications, see sheet-no. 31605
IS12 = for stainless steel ball valve, see sheet-no. 41028
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217 (operating pressure max. 232 PSI)
- 11 | **internal valve:**
- = without
S = with bypass valve Δp 29 PSI
S1 = with bypass valve Δp 51 PSI
- 12 | **clogging indicator or clogging sensor:**
- = without
AOR = visual-electric, see sheet-no.1606
AOC = visual-electric, see sheet-no.1606
AE = visual-electric, see sheet-no.1609
OP = visual, see sheet-no.1628
OE = visual-electric, see sheet-no.1628
VS5 = electronic, see sheet-no.1641

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

Filter element: (ordering example)

01NR.	1000.	10VG.	10.	B.	P.	-
1	2	3	4	5	6	7

- 1 | **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 | **nominal size:** 1000
- 3 | - 7 | see type index complete filter

Accessories:

- gauge port- and bleeder connection, see sheet-no. 1650
- evacuation- and bleeder connection, see sheet-no. 1651
- SAE-counter flange, see sheet-no. 1652
- shut-off valve, see sheet-no. 1655

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	464 PSI
max. operating pressure at IS20:	232 PSI
test pressure:	900 PSI
test pressure at IS20:	464 PSI
process connection:	SAE-flange 3000 PSI
housing material:	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
measure connections:	BSPP ¼
drain- and bleeder connections:	BSPP ½
volume tank DU 1050:	2x 3.6 Gal.
DU 2050:	2x 6.3 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v(SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

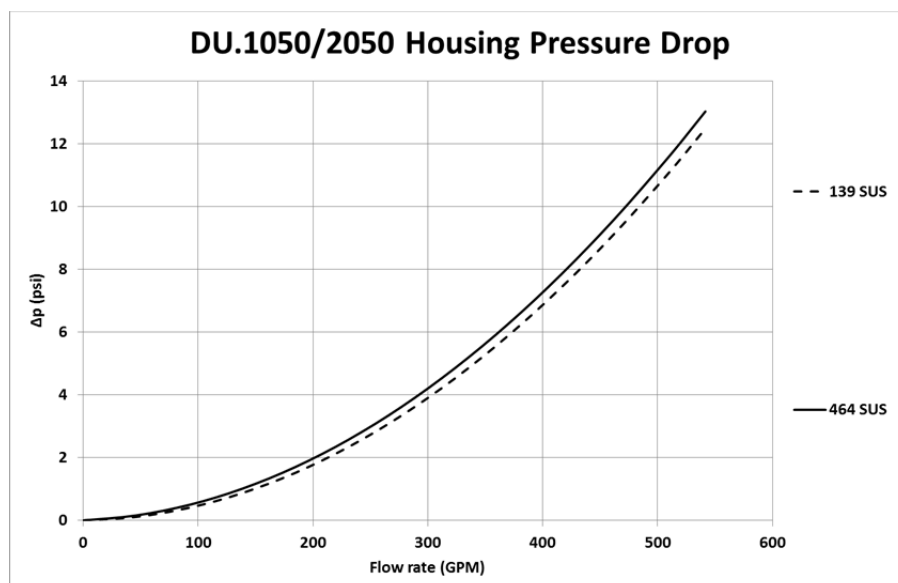
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

DU	VG					G			P	API	
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P	10API	25API
1050	0.237	0.165	0.105	0.092	0.063	0.0061	0.0057	0.0039	0.051	0.053	0.024
2050	0.118	0.082	0.053	0.046	0.031	0.0030	0.0028	0.0019	0.026	0.027	0.012

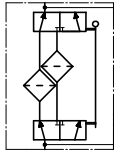
$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.

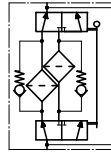


Symbols:

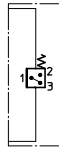
without indicator



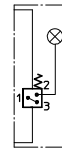
with by-pass valve



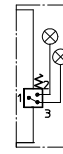
with electric indicator
AE 30 and AE 40



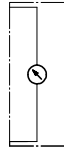
with visual-electric indicator
AE 50 and AE 62



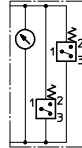
with visual-electric indicator
AE 70 and AE 80



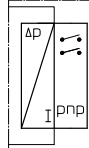
with visual indicator
OP/AOR/AOC



with visual-electrical indicator
OE



with electronic clogging sensor
VS5



Spare parts:

item	designation	qty.	dimension and article-no.				qty.	dimension and article-no.					
			DU 1050							DU 2050			
1	filter element	2	01NR.1000...				4	01NR.1000...					
2	O-ring	4	90 x 4	306941 (NBR)	307031 (FPM)	8	90 x 4	306941 (NBR)	307031 (FPM)				
3	O-ring	2	185 x 4	305593 (NBR)	306309 (FPM)	4	185 x 4	305593 (NBR)	306309 (FPM)				
4	O-ring	4	114 x 6	314419 (NBR)	316531 (FPM)	4	114 x 6	314419 (NBR)	316531 (FPM)				
5	O-ring	4	140 x 4	305145 (NBR)	305201 (FPM)	4	140 x 4	305145 (NBR)	305201 (FPM)				
6	screw plug	2	1/4 BSPP	305003		2	1/4 BSPP	305003					
7	O-ring	2	38 x 3	304340 (NBR)	317013 (FPM)	2	38 x 3	304340 (NBR)	317013 (FPM)				
8	O-ring	2	85,32 x 3,53	305590 (NBR)	306308 (FPM)	2	85,32 x 3,53	305590 (NBR)	306308 (FPM)				
9	O-ring	4	8 x 2	310004 (NBR)	316530 (FPM)	4	8 x 2	310004 (NBR)	316530 (FPM)				
10	screw plug	8	1/2 BSPP	304678		10	1/2 BSPP	304678					
11	slip coupling	-				2	3,543 dia	313233					
12	clogging indicator visual	1	AOR or AOC				see sheet-no. 1606						
13	clogging indicator visual	1	OP				see sheet-no. 1628						
14	clogging indicator visual-electric	1	OE				see sheet-no. 1628						
15	clogging indicator visual-electric	1	AE				see sheet-no. 1609						
16	clogging sensor electronic	1	VS5				see sheet-no. 1641						
17	O-ring	1	15 x 1,5	315357 (NBR)			315427 (FPM)						
18	O-ring	1	22 x 2	304708 (NBR)			304721 (FPM)						
19	O-ring	2	14 x 2	304342 (NBR)			304722 (FPM)						
20	screw plug	2	1/4 BSPP				305003						
21	pressure balance valve	1	3/8"				305000						
22	gasket	4	DN 90				312275						

item 20 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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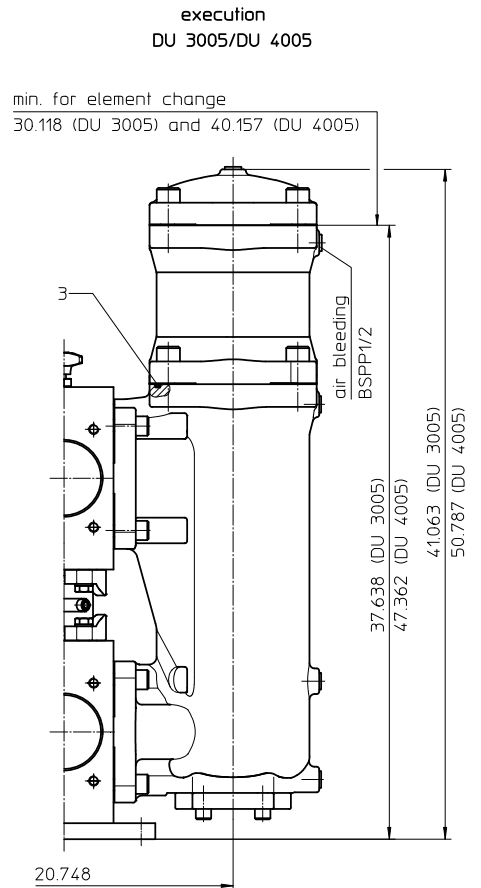
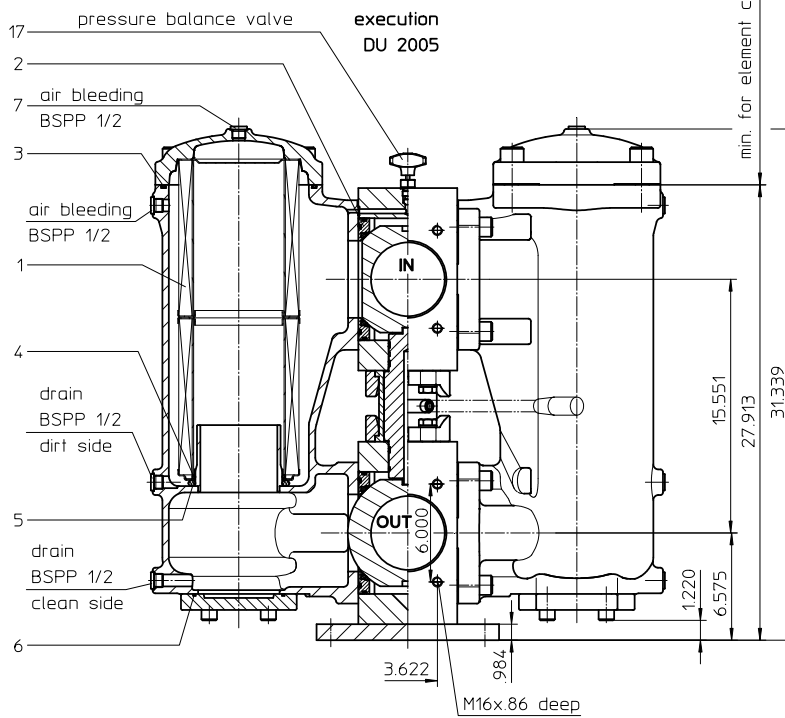
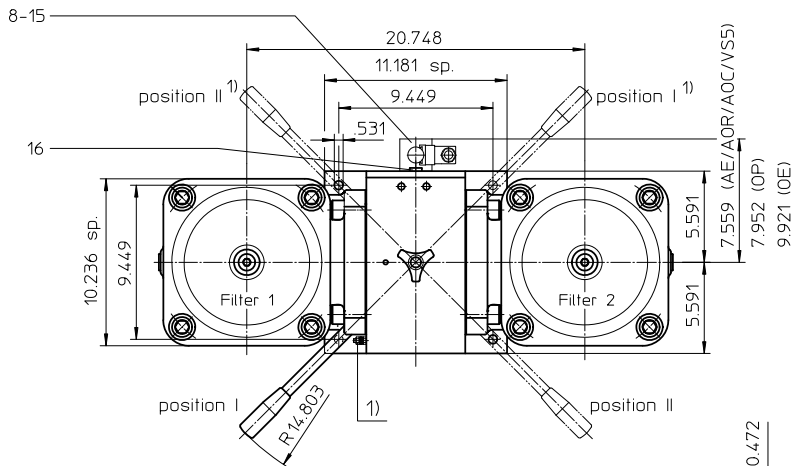
For more information, please

email us at filtration@eaton.com
or visit www.eaton.com/filtration

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Series DU 2005-4005

464 PSI



Position I: Left filter-side in operation
 Position II: Right filter-side in operation

1) Connect the stand grounding tab to a suitable earth ground point.

Weight DU 2005: approx. 750 lbs.
 Weight DU 3005: approx. 886 lbs.
 Weight DU 4005: approx. 961 lbs.

Dimensions: inches



Powering Business Worldwide

Designs and performance values are subject to change.

Pressure Filter

Series DU2005-4005

464 PSI

Description:

Duplex filter series DU 2005-4005 have a working pressure up to 464 PSI. Pressure peaks can be absorbed with a sufficient safety margin.

A changeover ball valve between the housings makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation. These filters can be installed as suction filters.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

For cleaning the mesh element or changing the microglass element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

For filtration finer than 40 µm, use the disposable elements made of microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements are available upon request.

Eaton-filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Ship classifications available upon request.

Type index:

Complete filter: (ordering example)

DU.	2005.	10VG.	10.	E.	P.	-.	FS.	C.	-.	AE
1	2	3	4	5	6	7	8	9	10	11

- 1 series:**
DU = pressure filter, change over
- 2 nominal size:** 2005, 3005, 4005
- 3 filter-material and filter-fineness:**
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
25API, 10API microglass according to API
10P paper
- 4 filter element collapse rating:**
10 = Δp 145 PSI
- 5 filter element design:**
E = without by-pass
S = with by-pass valve Δp 29 PSI
S1 = with by-pass valve Δp 51 PSI
- 6 sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601
- 8 process connection:**
FS = SAE-flange 3000 PSI
- 9 process connection size:**
C = 5"
- 10 filter housing specification:** (see catalog)
- = standard
IS06 = for HFC applications, see sheet-no. 31605
IS12 = for stainless ball valve, see sheet-no. 41028
IS20 = ASME VIII Div.1 with ASME equivalent material,
see sheet-no. 55217 (operating pressure max. 232 PSI)
- 11 clogging indicator or clogging sensor:**
- = without
AOR = visual-electric, see sheet-no.1606
AOC = visual-electric, see sheet-no.1606
AE = visual-electric, see sheet-no.1609
OP = visual, see sheet-no.1628
OE = visual-electric, see sheet-no.1628
VS5 = electronic, see sheet-no.1641

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

Filter element: (ordering example)

01E.	2001.	10VG.	10.	E.	P.	-
1	2	3	4	5	6	7

- 1 series:**
01E. = filter element according to company standard
- 2 nominal size:** 2001, 3001, 4001
- 3 - 7** see type index complete filter

Accessories:

- gauge port- and bleeder connection, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1651
- SAE-counter flange, see sheet-no. 1652
- shut-off valve, see sheet-no. 1655

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	464 PSI
max. operating pressure at IS20:	232 PSI
test pressure:	900 PSI
test pressure at IS20:	464 PSI
process connection:	SAE-flange 3000 PSI
housing material:	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
measure connections:	BSPP ¼
drain- and bleeder connections:	BSPP ½
volume tank DU 2005:	2x 8 Gal.
DU 3005:	2x 10 Gal.
DU 4005:	2x 12 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0,876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

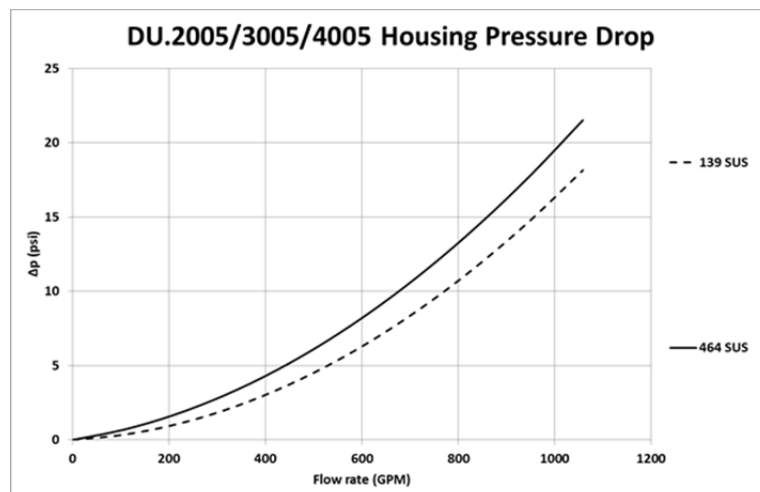
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

DU	VG					G			P	API	
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P	10API	25API
2005	0.177	0.123	0.079	0.068	0.047	0.0059	0.0055	0.0038	0.041	0.040	0.018
3005	0.118	0.082	0.052	0.046	0.031	0.0040	0.0037	0.0025	0.027	0.027	0.012
4005	0.088	0.061	0.039	0.034	0.023	0.0030	0.0028	0.0019	0.020	0.020	0.009

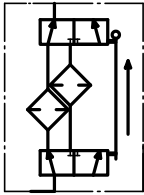
$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.

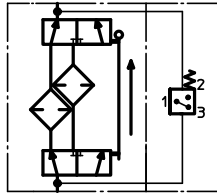


Symbols:

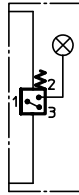
without indicator



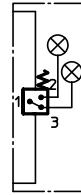
with electric indicator
AE 30 and AE 40



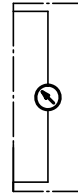
with visual-electric indicator
AE 50 and AE 62



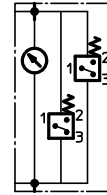
with visual-electric indicator
AE 70 and AE 80



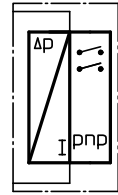
with visual indicator
AOR/AOC/OP



with visual-electric indicator
OE



with electronic sensor
VS5



Spare parts:

item	qty.	designation	dimension and article-no. DU 2005	dimension and article-no. DU 3005	dimension and article-no. DU 4005
1	2	filter element	01E.2001...	01E.3001...	01E.4001...
2	1	gasket kit of change over	5"		
3	2	O-ring (DU 2005)	240 x 5	307592 (NBR)	328793 (FPM)
	4	O-ring (DU 3005/4005)			
4	2	O-ring	135 x 10	306016 (NBR)	307045 (FPM)
5	2	O-ring	125 x 10	304388 (NBR)	306006 (FPM)
6	2	O-ring	136,12 x 3,53	320162 (NBR)	320163 (FPM)
7	8	screw plug (DU 2005)	BSPP 1/4		
	10	screw plug (DU 3005/4005)	304678		
8	1	clogging indicator visual	AOR or AOC	see seet-no. 1606	
9	1	clogging indicator visual-electric		OE	see seet-no. 1628
10	1	clogging indicator visual		OP	see seet-no. 1628
11	1	clogging indicator visual-electric		AE	see seet-no. 1609
12	1	clogging sensor electronic		VS5	see seet-no. 1641
13	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
14	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
15	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
16	2	screw plug	BSPP 1/4		
17	1	pressure balance valve	3/8"		305000

item 16 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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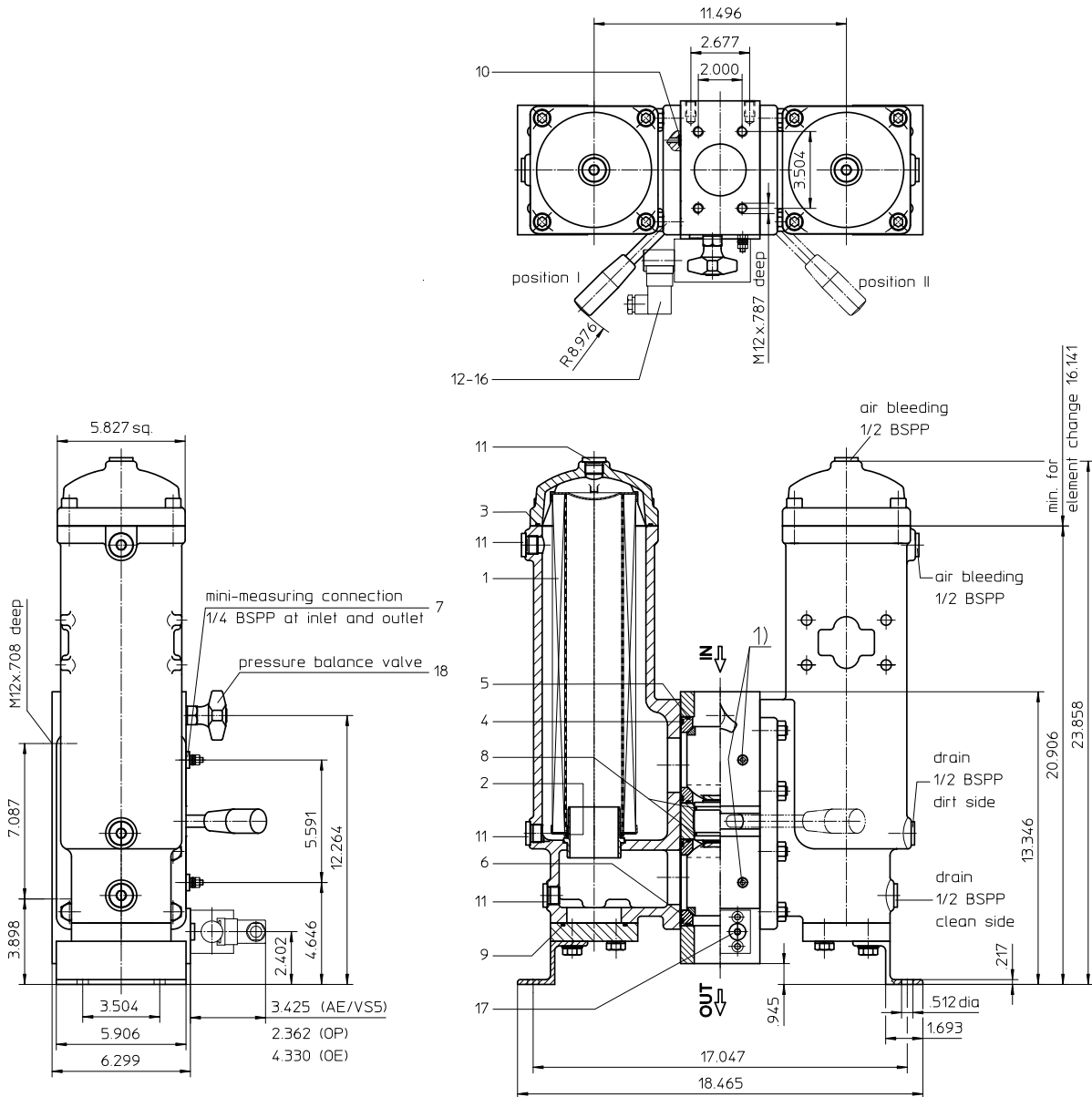
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Series DUV 635

464 PSI



Position I: Left filter-side in operation
 Position II: Right filter-side in operation

1) Connect the stand grounding tab to a suitable earth ground point.

Weight: approx. 200 lbs.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series DUV 635

464 PSI

Description:

Duplex filter series DUV 635 have a working pressure up to 464 PSI. Pressure peaks can be absorbed with a sufficient safety margin.

A change over ball valve between the two filter housings makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

For cleaning the mesh element or changing the microglass element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

For filtration finer than 40 µm, use the disposable elements made of microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements are available upon request.

Eaton-filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Ship classifications available upon request.

Type index:

Complete filter: (ordering example)

DUV. 635. 10VG. 30. E. P. -. FS. 9. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 series:**
DUV = pressure filter, change over with vertical connecting pipe
- 2 nominal size:** 635
- 3 filter-material and filter-fineness:**
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
25API, 10API microglass according to API
10P paper
- 4 filter element collapse rating:**
30 = Δp 435 PSI
- 5 filter element design:**
E = single end open
- 6 sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC application, see sheet-no. 31601
IS07 = for oil/amonia mixtures (NH₃), see sheet-no. 31602
- 8 process connection:**
FS = SAE-flange 3000 PSI
- 9 process connection size:**
9 = 2 1/2"
- 10 filter housing specification:** (see catalog)
- = standard
IS06 = for HFC application, see sheet-no. 31605
IS12 = for stainless steel ball valve, see sheet-no. 41028
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217 (operating pressure max. 232 PSI)
- 11 internal valve:**
- = without
S = with by-pass valve Δp 29 PSI
S1 = with by-pass valve Δp 51 PSI
- 12 clogging indicator or clogging sensor:**
- = without
AE = visual-electric, see sheet-no.1609
OP = visual, see sheet-no.1628
OE = visual-electric, see sheet-no.1628
VS5 = electronic, see sheet-no.1641

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

Filter element: (ordering example)

01NL. 630. 10VG. 30. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 series:**
01NL. = standard filter element according to DIN 24550, T3
- 2 nominal size:** 630
- 3 - 7** see type index complete filter

Accessories:

- gauge port and bleeder connection, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1651
- SAE-counter flange, see sheet-no. 1652
- shut-off valve, see sheet-no. 1655

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	464 PSI
max. operating pressure at IS20:	232 PSI
test pressure:	900 PSI
test pressure at IS20:	464 PSI
process connection:	SAE-flange 3000 PSI
housing material:	EN-GJS-400-18-LT
switching housing material:	S355J2+N
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
measure connections:	BSPP ¼
drain- and bleeder connections:	BSPP ½
volume tank:	2x 1.5 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v(SUS) \times \frac{\rho}{0,876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

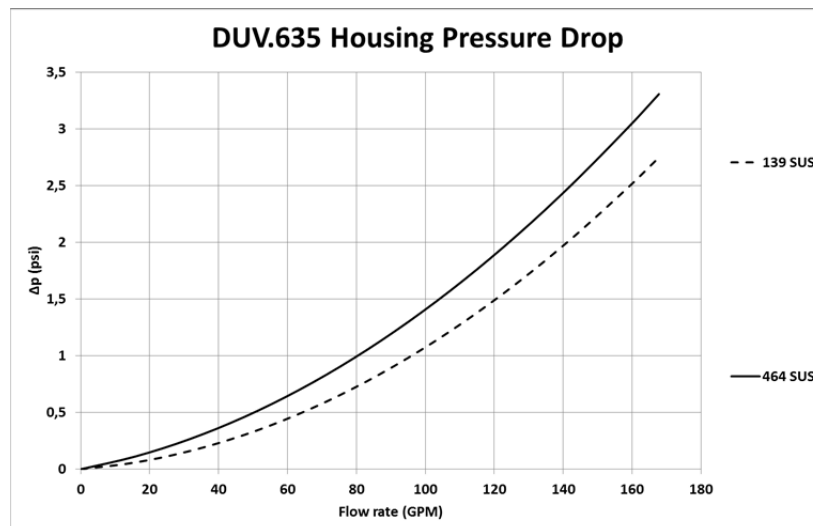
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0,876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

DUV	VG					G			P	API	
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P	10API	25API
635	0.534	0.371	0.237	0.207	0.141	0.1735	0.1619	0.1109	0.112	0.121	0.056

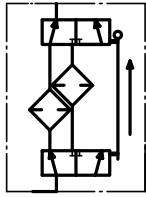
$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0,876 kg/dm³. The pressure drop changes proportionally to the density.

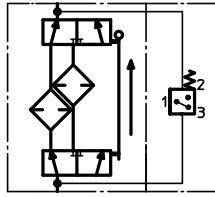


Symbols:

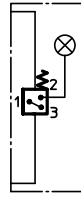
without indicator



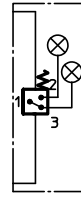
with electric indicator
AE 30 and AE 40



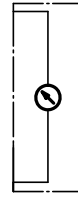
with visual-electric indicator
AE 50 and AE 62



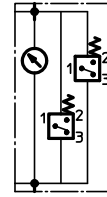
with visual-electric indicator
AE 70 and AE 80



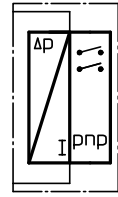
with visual indicator
AOR/AOC/OP



with visual-electric indicator
OE



with electronic sensor
VS5



Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NL.630...		
2	2	O-ring	60 x 3,5	304377 (NBR)	304398 (FPM)
3	2	O-ring	125 x 3	306025 (NBR)	307358 (FPM)
4	4	O-ring	85 x 4	305685 (NBR)	310285 (FPM)
5	4	O-ring	95 x 3	305808 (NBR)	304828 (FPM)
6	4	gasket			317651
7	2	screw plug	¼ BSPP		305003
8	2	O-ring	54 x 3	304657 (NBR)	304720 (FPM)
9	2	O-ring	69,45 x 3,53	305868 (NBR)	307357 (FPM)
10	4	O-ring	8 x 2	310004 (NBR)	316530 (FPM)
11	8	screw plug	½ BSPP		304678
12	1	clogging indicator, visual	OP		see sheet no. 1628
13	1	clogging indicator, visual-electric	OE		see sheet no. 1628
14	1	clogging indicator, visual-electric	AE		see sheet no. 1609
15	1	clogging sensor, electronic	VS5		see sheet no. 1641
16	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
17	2	screw plug	¼ BSPP		305003
18	1	pressure balance valve	3/8"		305000

item 17 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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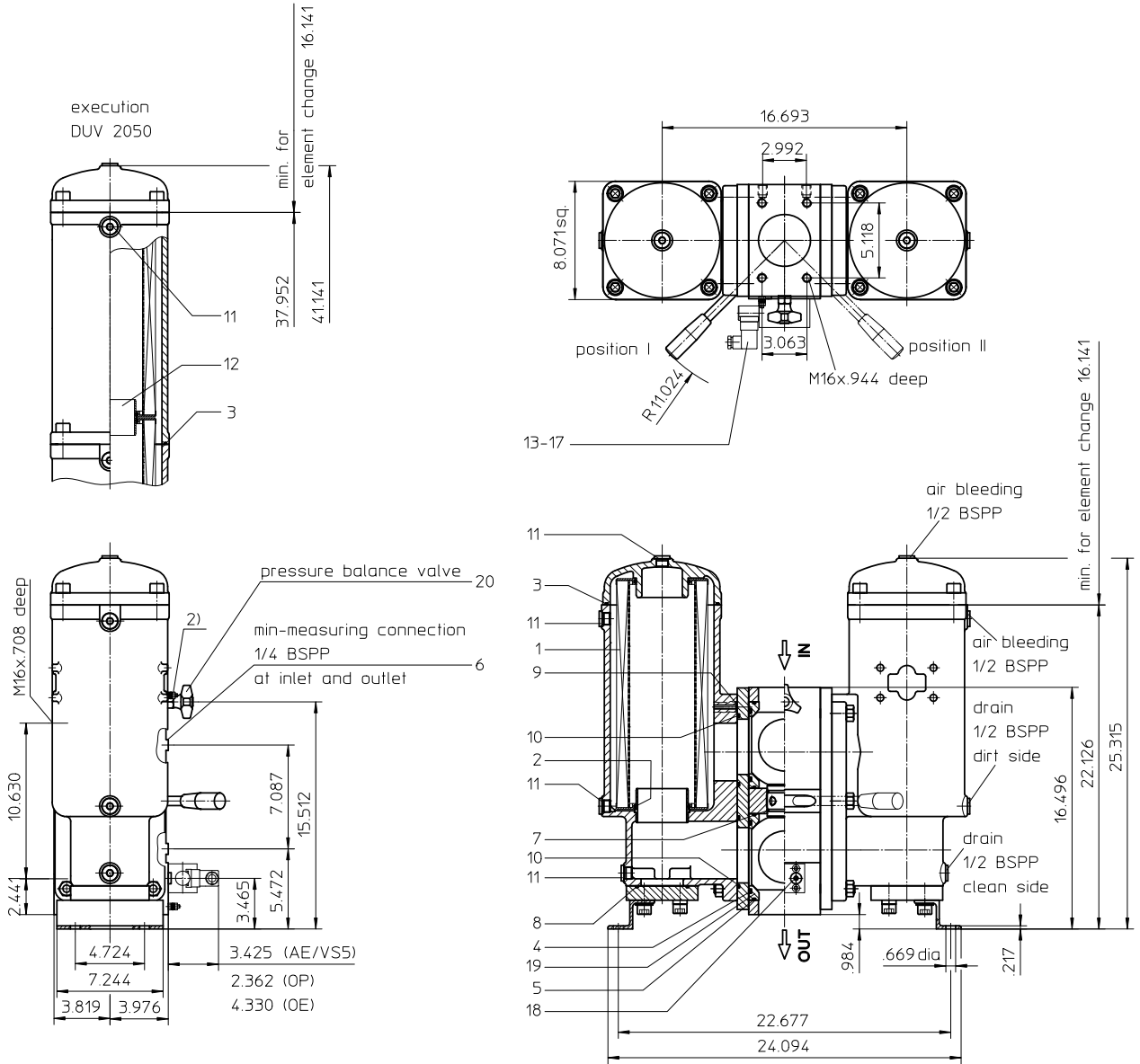
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Series DUV 1050-2050 464 PSI



2) Connect the stand grounding tab to a suitable earth ground point.

Position I: Left filter-side in operation
Position II: Right filter-side in operation

Dimensions:

type	connection	SAE-connection size	weight
DUV 1050	SAE 3" ¹⁾	SAE 4" 3000 PSI	330 lbs.
DUV 1050	SAE 4"	SAE 4" 3000 PSI	330 lbs.
DUV 2050	SAE 3" ¹⁾	SAE 4" 3000 PSI	440 lbs.
DUV 2050	SAE 4"	SAE 4" 3000 PSI	440 lbs.

¹⁾ with reducing flange BFS.B.E.88,9x3,2.St.P.3000 / Instead of P (Nitrile) also V (Viton) can be chosen.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series DUV 1050-2050

464 PSI

Description:

Duplex filter series DUV 1050-2050 have a working pressure up to 464 PSI. Pressure peaks can be absorbed with a sufficient safety margin.

A change over ball valve between the two filter housings makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

For cleaning the mesh element or changing the microglass element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

For filtration finer than 40 µm, use the disposable elements made of microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements are available upon request.

Eaton-filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

The internal valve is integrated in the filter cover. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

Ship classifications available upon request.

Type index:

Complete filter: (ordering example)

DUV. 1050. 10VG. 10. B. P. -. FS. B. -. -. AE											
1	2	3	4	5	6	7	8	9	10	11	12

- 1 series:**
DUV = pressure filter, change over with vertical connecting pipe
- 2 nominal size:** 1050, 2050
- 3 filter-material and filter-fineness:**
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
25API, 10API microglass according to API
10P paper
- 4 filter element collapse rating:**
10 = Δp 145 PSI
- 5 filter element design:**
B = both sides open
- 6 sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC application, see sheet-no. 31601
IS07 = for oil/amonia mixtures (NH₃), see sheet-no. 31602
- 8 process connection:**
FS = SAE-flange 3000 PSI
- 9 process connection size:**
B = 4"
- 10 filter housing specification:** (see catalog)
- = standard
IS06 = for HFC application, see sheet-no. 31605
IS12 = for stainless steel ball valve, see sheet-no. 41028
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217 (operating pressure max. 232 PSI)
- 11 internal valve:**
- = without
S = with by-pass valve Δp 29 PSI
S1 = with by-pass valve Δp 51 PSI
- 12 clogging indicator or clogging sensor:**
- = without
AE = visual-electric, see sheet-no.1609
OP = visual, see sheet-no.1628
OE = visual-electric, see sheet-no.1628
VS5 = electronic, see sheet-no.1641

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

Filter element: (ordering example)

01NR. 1000. 10VG. 10. B. P. -						
1	2	3	4	5	6	7

- 1 series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
- 2 nominal size:** 1000
- 3 - 7** see type index complete filter

Accessories:

- gauge port and bleeder connection, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1651
- SAE-counter flange, see sheet-no. 1652
- shut-off valve, see sheet-no. 1655

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	464 PSI
max. operating pressure at IS20:	232 PSI
test pressure:	900 PSI
test pressure at IS20:	464 PSI
process connection:	SAE-flange 3000 PSI
housing material:	EN-GJS-400-18-LT
switching housing material:	S355J2 + N
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
measure connections:	BSPP ¼
drain- and bleeder connections:	BSPP ½
volume tank DUV 1050:	2x 3.6 Gal.
DUV 2050:	2x 6.3 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0,876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

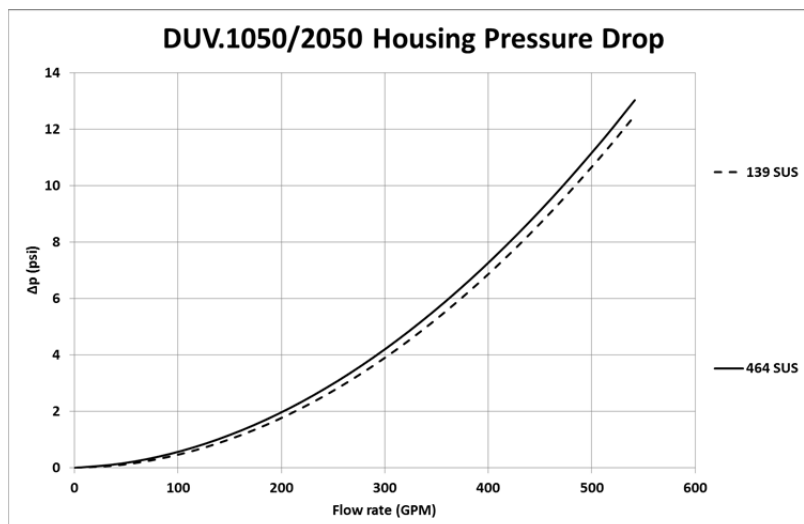
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0,876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

DUV	VG					G			P	API	
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P	10API	25API
1050	0.237	0.165	0.105	0.092	0.063	0.0061	0.0057	0.0039	0.051	0.053	0.024
2050	0.118	0.082	0.053	0.046	0.031	0.0030	0.0028	0.0019	0.026	0.027	0.012

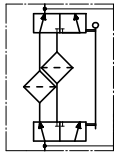
$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0,876 kg/dm³. The pressure drop changes proportionally to the density.

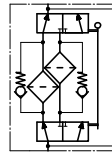


Symbols:

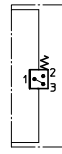
without indicator



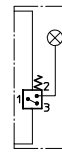
with by-pass valve



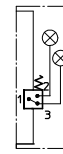
with electric indicator
AE 30 and AE 50



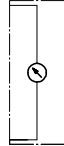
with visual-electric indicator
AE 50 and AE 62



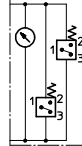
with visual-electric indicator
AE 70 and AE 80



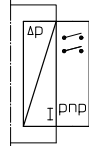
with visual indicator
OP/AOR/AOC



with visual-electrical indicator
OE



with electronic clogging sensor
VS5



Spare parts:

item	designation	qty.	dimension and article-no.				qty.	dimension and article-no.			
			DUV 1050					DUV 2050			
1	filter element	2	01NR.1000...				4	01NR.1000...			
2	O-ring	4	90 x 4	306941 (NBR)	307031 (FPM)	8	90 x 4	306941 (NBR)	307031 (FPM)		
3	O-ring	2	185 x 4	305593 (NBR)	306309 (FPM)	4	185 x 4	305593 (NBR)	306309 (FPM)		
4	O-ring	4	114 x 6	314419 (NBR)	316531 (FPM)	4	114 x 6	314419 (NBR)	316531 (FPM)		
5	O-ring	4	140 x 4	305145 (NBR)	305201 (FPM)	4	140 x 4	305145 (NBR)	305201 (FPM)		
6	screw plug	2	1/4 BSPP	305003		2	1/4 BSPP	305003			
7	O-ring	2	54 x 3	304657 (NBR)	304720 (FPM)	2	54 x 3	304657 (NBR)	304720 (FPM)		
8	O-ring	2	85,32 x 3,53	305590 (NBR)	306308 (FPM)	2	85,32 x 3,53	305590 (NBR)	306308 (FPM)		
9	O-ring	8	8 x 2	310004 (NBR)	316530 (FPM)	8	8 x 2	310004 (NBR)	316530 (FPM)		
10	O-ring	4	115 x 5	306640 (NBR)	310287 (FPM)	4	115 x 5	306640 (NBR)	310287 (FPM)		
11	screw plug	8	1/2 BSPP	304678		10	1/2 BSPP	304678			
12	slip coupling	-	-	-		2	3,543 dia	313233			
13	clogging indicator visual	1	OP			see sheet-no. 1628					
14	clogging indicator visual-electric	1	OE			see sheet-no. 1628					
15	clogging indicator visual-electric	1	AE			see sheet-no. 1609					
16	clogging sensor electronic	1	VS5			see sheet-no. 1641					
17	O-ring	2	14 x 2	304342 (NBR)		304722 (FPM)					
18	screw plug	2	1/4 BSPP			305003					
19	gasket	4	DN 90			312275					
20	pressure balance valve	1	3/8"			305000					

item 18 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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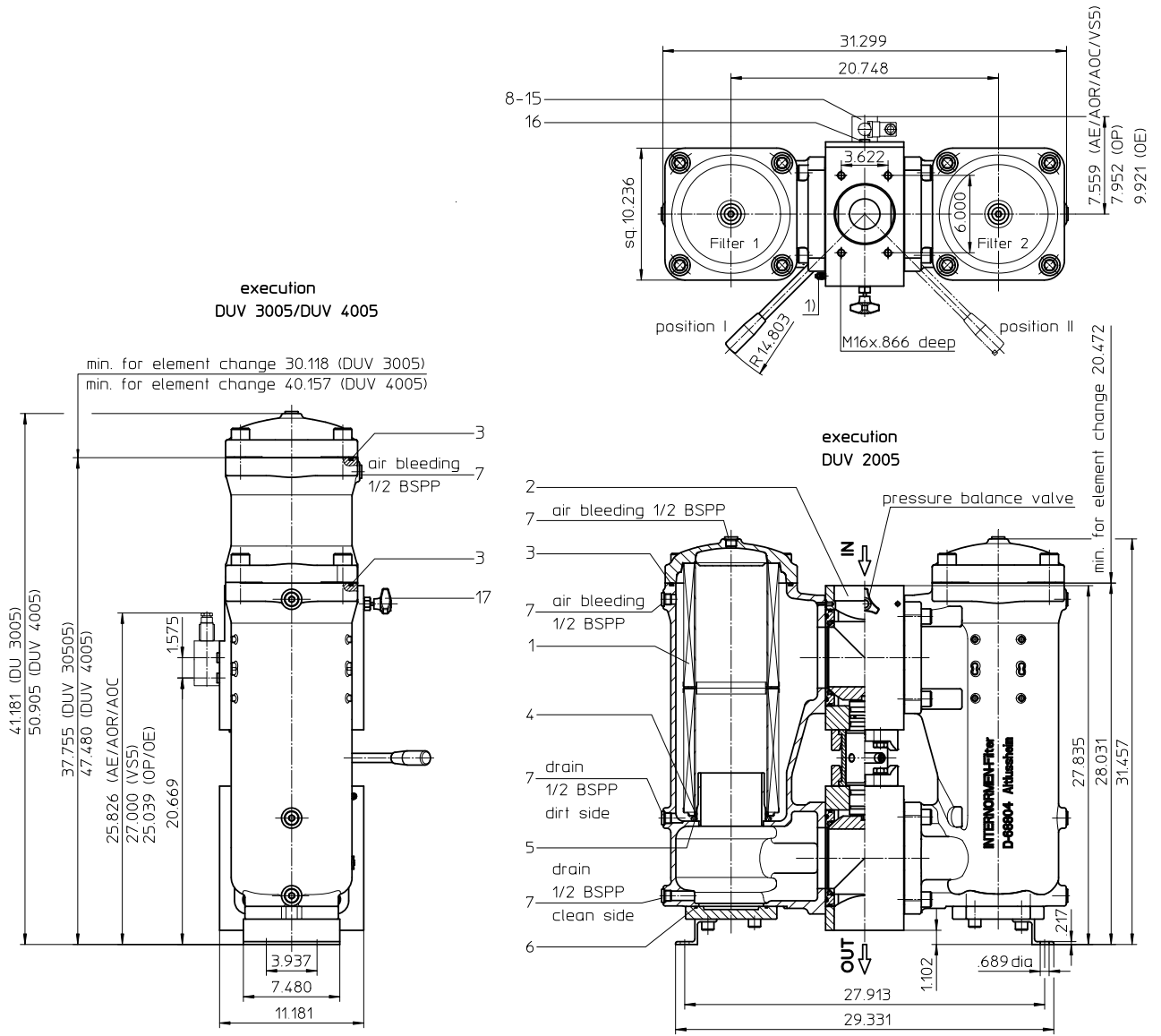
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Series DUV 2005-4005

493 PSI



1) Connect the stand grounding tab to a suitable earth ground point.

Position I: Filter 1 in operation
Position II: Filter 2 filter-side in operation

Weight DUV 2005: approx. 750 lbs.
Weight DUV 3005: approx. 886 lbs.
Weight DUV 4005: approx. 961 lbs.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series DUV 2005-4005

493 PSI

Description:

Duplex filter series DUV 1050-2050 have a working pressure up to 493 PSI. Pressure peaks can be absorbed with a sufficient safety margin.

A change over ball valve between the two filter housings makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

For cleaning the mesh element or changing the microglass element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

For filtration finer than 40 µm, use the disposable elements made of microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements are available upon request.

Eaton-filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Ship classifications available upon request.

Type index:

Complete filter: (ordering example)

DUV. 2005. 10VG. 10. E. P. -. FS. C. -. AE

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

1 | series:

DUV = pressure filter, change over with vertical connecting pipe

2 | nominal size: 2005, 3005, 4005

3 | filter-material and filter-fineness:

80G, 40G, 25G, 10G stainless steel wire mesh
 25VG, 16VG, 10VG, 6VG, 3VG microglass
 25API, 10API microglass according to API
 10P paper

4 | filter element collapse rating:

10 = Δp 145 PSI

5 | filter element design:

E = single end open
 S = with by-pass valve Δp 29 PSI

6 | sealing material:

P = Nitrile (NBR)
 V = Viton (FPM)

7 | filter element specification: (see catalog)

- = standard
 VA = stainless steel
 IS06 = for HFC application, see sheet-no. 31601

8 | process connection:

FS = SAE-flange 3000 PSI

9 | process connection size:

C = 5"

10 | filter housing specification: (see catalog)

- = standard
 IS06 = for HFC application, see sheet-no. 31605
 IS12 = for stainless steel ball valve, see sheet-no. 41028
 IS20 = ASME VIII Div.1 with ASME equivalent material,
 see sheet-no. 55217 (operating pressure max. 232 PSI)

11 | clogging indicator or clogging sensor:

- = without
 AOR = visual, see sheet-no.1606
 AOC = visual, see sheet-no.1606
 AE = visual-electric, see sheet-no.1609
 OP = visual, see sheet-no.1628
 OE = visual-electric, see sheet-no.1628
 VS5 = electronic, see sheet-no.1641

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

Filter element: (ordering example)

01E. 2001. 10VG. 10. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 | series:

01E. = filter element according to company standard

2 | nominal size: 2001, 3001, 4001

3 | - 7 | see type index complete filter

Accessories:

- gauge port and bleeder connection, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1651
- SAE-counter flange, see sheet-no. 1652
- shut-off valve, see sheet-no. 1655

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	493 PSI
max. operating pressure at IS20:	232 PSI
test pressure:	986 PSI
test pressure at IS20:	464 PSI
process connection:	SAE-flange 3000 PSI
housing material:	EN-GJS-400-18-LT
switching housing material:	S355J2+N
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
measure connections:	BSPP ¼
drain- and bleeder connections:	BSPP ½
volume tank DUV 2005:	2x 8 Gal.
DUV 3005:	2x 10 Gal.
DUV 4005	2x 12 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) - \text{characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0,876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

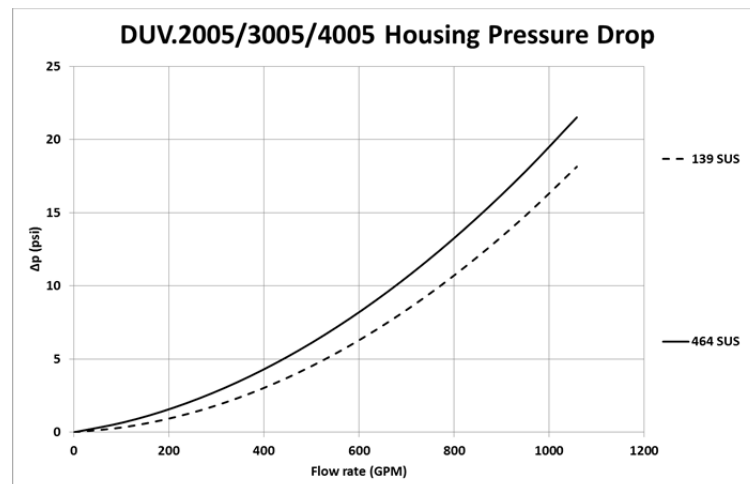
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0,876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

DUV	VG					G			P	API	
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P	10API	25API
2005	0.177	0.123	0.079	0.068	0.047	0.0059	0.0055	0.0038	0.041	0.040	0.018
3005	0.118	0.082	0.052	0.046	0.031	0.0040	0.0037	0.0025	0.027	0.027	0.012
4005	0.088	0.061	0.039	0.034	0.023	0.0030	0.0028	0.0019	0.020	0.020	0.009

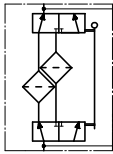
$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0,876 kg/dm³. The pressure drop changes proportionally to the density.

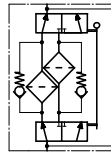


Symbols:

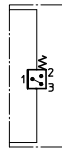
without indicator



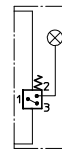
with by-pass valve



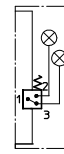
with electric indicator
AE 30 and AE 40



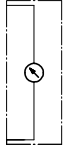
with visual-electric indicator
AE 50 and AE 62



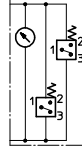
with visual-electric indicator
AE 70 and AE 80



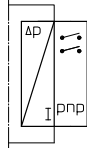
with visual indicator
OP/AOR/AOC



with visual-electrical indicator
OE



with electronic clogging sensor
VS5



Spare parts:

item	qty.	designation	dimension and article-no. DUV 2005	dimension and article-no. DUV 3005	dimension and article-no. DUV 4005
1	2	filter element	01E.2001...	01E.3001...	01E.4001...
2	1	gasket kit of change over		5" 322726 (NBR)	322727 (FPM)
3	2	O-ring (DU 2005)	240 x 5	307592 (NBR)	328793 (FPM)
4	2	O-ring (DU 3005/4005)			
4	2	O-ring	135 x 10	306016 (NBR)	307045 (FPM)
5	2	O-ring	125 x 10	304388 (NBR)	306006 (FPM)
6	2	O-ring	136,12 x 3,53	320162 (NBR)	320163 (FPM)
7	8	screw plug (DU 2005)	BSPP 1/4	304678	
	10	screw plug (DU 3005/4005)			
8	1	clogging indicator visual	AOR or AOC	see seet-no. 1606	
9	1	clogging indicator visual-electric	OE	see seet-no. 1628	
10	1	clogging indicator visual	OP	see seet-no. 1628	
11	1	clogging indicator visual-electric	AE	see seet-no. 1609	
12	1	clogging sensor electronic	VS5	see seet-no. 1641	
13	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
14	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
15	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
16	2	screw plug	BSPP 1/4	305003	
17	1	pressure balance valve	3/8"	305000	

item 16 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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For more information, please

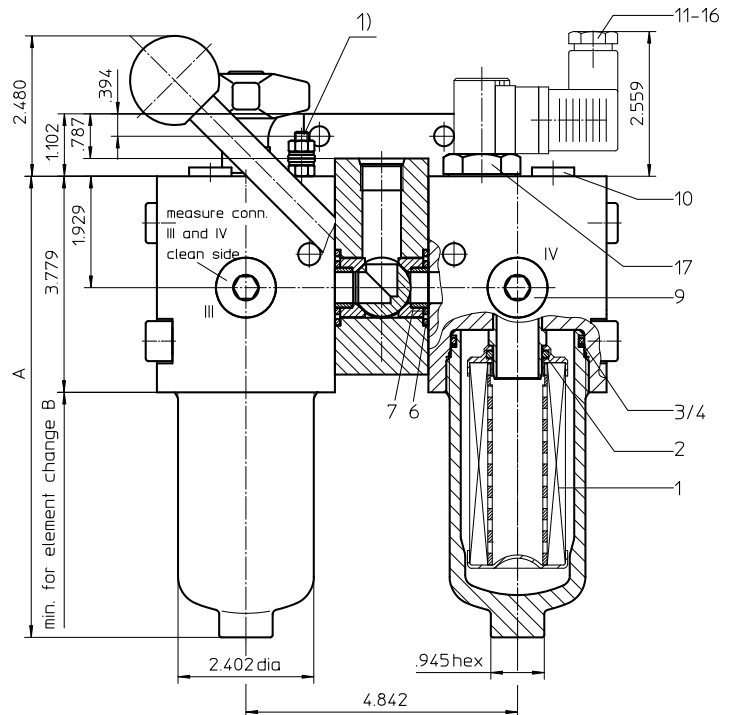
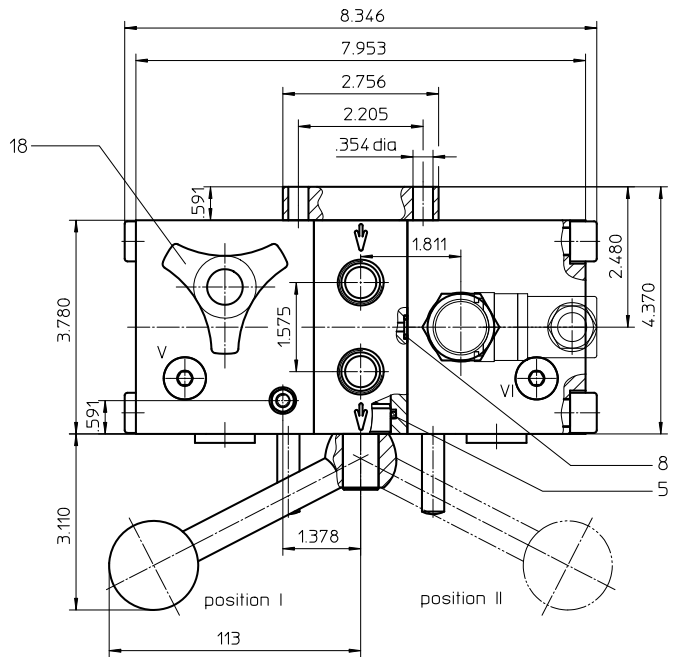
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Series MDD 40-63

2900 PSI



Position. I: left filter-side in operation
 Position. II: right filter-side in operation
 Connection V and VI should be used to bleed filter or to relieve pressure.

Dimensions:

type	MDD 40	MDD 63
connection	- 8 SAE	-12 SAE
A	8.11	10.47
B	11.22	13.58
weight approx.	34 lbs.	36 lbs.
volume tank	2x .06 Gal.	2x .09 Gal.

1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series MDD 40-63

2900 PSI

Description:

Duplex pressure filter series MDD 40-63 with change-over valve have a working pressure up to 2900 PSI. Pressure peaks can be absorbed with a sufficient safety margin. Duplex filters can be serviced without interruption of operation.

The filter head has a three-way-change-over valve which diverts the flow from the dirty filter-side to the clean filter-side without interrupting operation of the filter. All filter housings have an integrated pressure balance valve to make main valve operation from one filter side to the other easier. Filter elements are available down to 5 $\mu\text{m}_{(0)}$. Finer filtration is available upon request.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head. After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

The reversing valve provides another level of protection for the filter element. The reverse flow will not be filtered.

1. Type index:

1.1. Complete filter: (ordering example)

MDD. 40. 10VG. HR. E. P. - . UG. 3. - . - . AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1 series:

MDD = medium pressure filter, change over

2 nominal size: 40, 63

3 filter-material and filter-fineness:

25VG, 16VG, 10VG, 6VG, 3VG microglass

4 filter element collapse rating:

30 = Δp 435 PSI

HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)

V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard

VA = stainless steel

IS06 = for HFC applications, see sheet-no. 31601

8 process connection:

UG = thread connection

9 process connection size:

3 = -8 SAE (MDD 40)

4 = -12 SAE (MDD 63)

10 filter housing specification: (see catalog)

- = standard

IS06 = for HFC applications, see sheet-no. 31605

IS12 = for stainless steel ball valve, see sheet-no. 41028

11 internal valve:

- = without

S1 = with by-pass valve Δp 51 PSI

S2 = with by-pass valve Δp 102 PSI

R = reversing valve, $Q \leq 18.50$ GPM

12 clogging indicator or clogging sensor:

- = without

AOR = visual, see sheet-no. 1606

AOC = visual, see sheet-no. 1606

AE = visual-electric, see sheet-no. 1615

VS5 = electronic, see sheet-no. 1619

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01NL. 40. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

01NL. = standard filter element according to DIN 24550, T3

2 nominal size: 40, 63

3 - 7 see type index-complete filter

Accessories:

- gauge port- and bleeder connection, see sheet-no. 1650

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	2900 PSI
test pressure:	4147 PSI
process connection:	thread connection
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
air bleeding and measure connections dirt side:	BSPP ¼
measure connections clean side:	BSPP ½

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

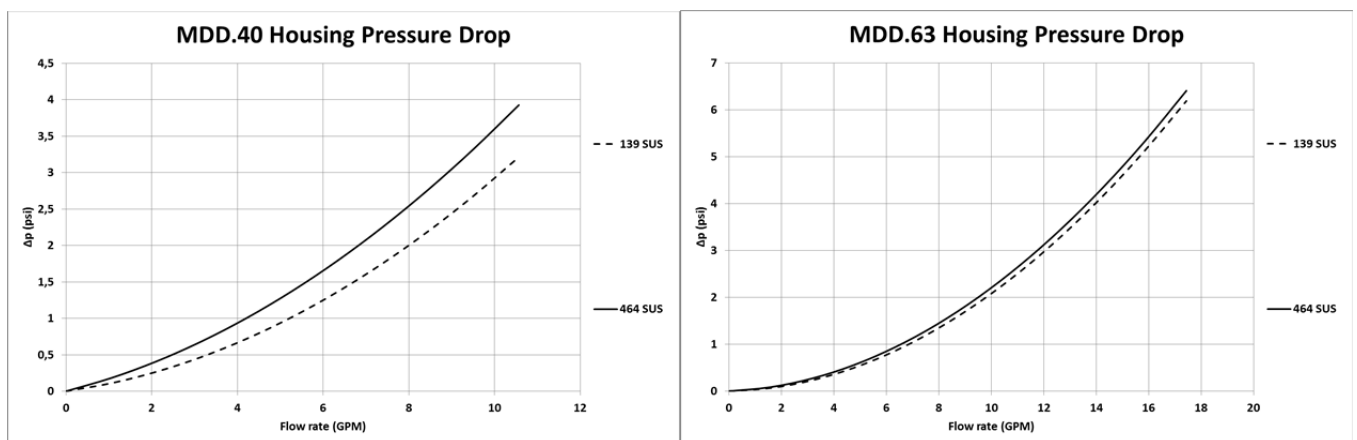
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

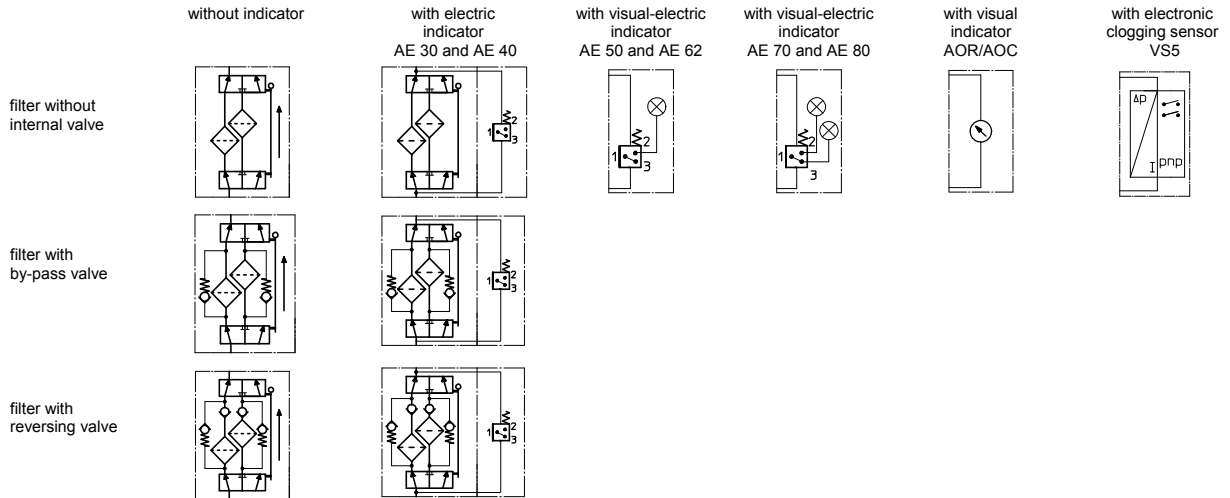
MDD	VG				
	3VG	6VG	10VG	16VG	25VG
40	6.991	4.853	3.107	2.705	1.848
63	4.214	2.926	1.873	1.631	1.114

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension		article-no.	
			MDD 40 01NL.40...	MDD 63 01NL.63...		
1	2	filter element				
2	2	O-ring		22 x 3,5	304341 (NBR)	304392 (FPM)
3	2	O-ring		54 x 3	304657 (NBR)	304720 (FPM)
4	2	support ring		60 x 2,6 x 1	311779	
5	3	O-ring		26 x 3	304379 (NBR)	318576 (FPM)
6	4	O-ring		28 x 3	316778 (NBR)	318366 (FPM)
7	4	O-ring		18 x 3	304359 (NBR)	304399 (FPM)
8	4	O-ring		6,5 x 2	313553 (NBR)	318577 (FPM)
9	2	screw plug		1/2 BSPP	304678	
10	2	screw plug		1/4 BSPP	305003	
11	1	clogging indicator, visual		AOR or AOC	see sheet-no. 1606	
12	1	clogging indicator, visual-electric		AE	see sheet-no. 1615	
13	1	clogging sensor, electronic		VS5	see sheet-no. 1619	
14	1	O-ring		15 x 1,5	315357 (NBR)	315427 (FPM)
15	1	O-ring		22 x 2	304708 (NBR)	304721 (FPM)
16	1	O-ring		14 x 2	304342 (NBR)	304722 (FPM)
17	1	screw plug		20913-4	309817	
18	1	pressure balance valve		3/8"	305000	

item 17 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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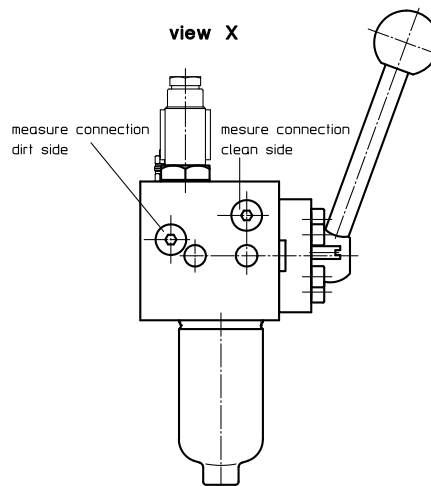
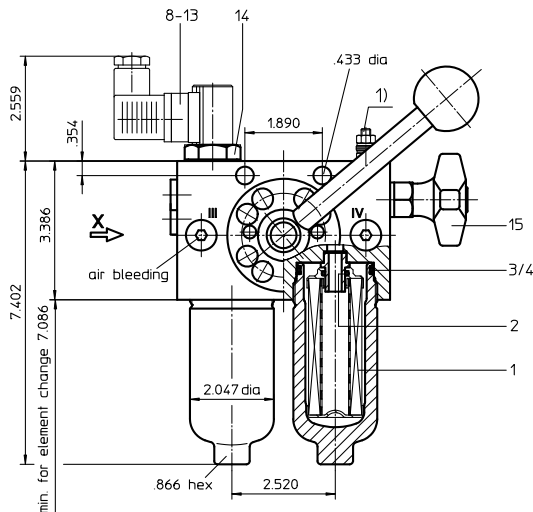
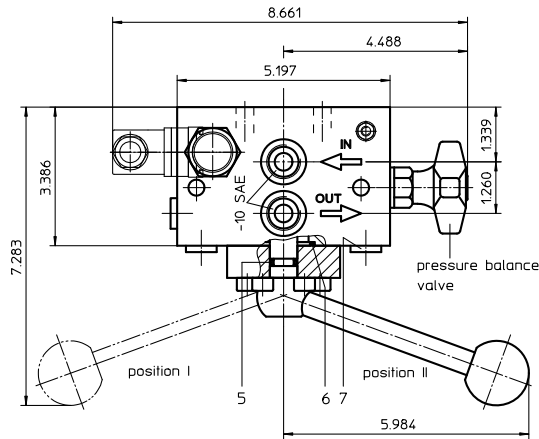
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Series HDD 30 4568 PSI



Position. I: left filter-side in operation
 Position. II: right filter-side in operation
 Connection III and IV should be used to bleed filter or to relieve pressure.

1) Connect the stand grounding tab to a suitable earth ground point.

Weight: approx. 17.6 lbs.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series HDD 30

4568 PSI

Description:

Duplex pressure filter series HDD 30 with change-over valve have a working pressure up to 4568 PSI. Pressure peaks can be absorbed with a sufficient safety margin. Duplex filters can be serviced without interruption of operation.

The filter head has a three-way-change-over valve which diverts the flow from the dirty filter-side to the clean filter-side without interrupting operation of the filter. All filter housings have an integrated pressure balance valve to make main valve operation from one filter side to the other easier. Filter elements are available down to 5 $\mu\text{m}_{(c)}$. Finer filtration is available upon request.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

1. Type index:

1.1. Complete filter: (ordering example)

HDD. 30. 10VG. HR. E. P. -. UG. 3A. -. AE

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

- | | |
|----|--|
| 1 | series:
HDD = pressure filter, change over |
| 2 | nominal size: 30 |
| 3 | filter-material and filter-fineness:
25VG, 16VG, 10VG, 6VG, 3VG microglass |
| 4 | filter element collapse rating:
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI) |
| 5 | filter element design:
E = single-end open |
| 6 | sealing material:
P = Nitrile (NBR)
V = Viton (FPM) |
| 7 | filter element specification:
- = standard
VA = stainless steel |
| 8 | process connection:
UG = thread connection |
| 9 | process connection size:
3A = -10 SAE |
| 10 | filter housing specification:
- = standard |
| 11 | clogging indicator or clogging sensor:
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619 |

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 30. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- | | |
|---|---|
| 1 | series:
01E. = filter element according to company standard |
| 2 | nominal size: 30 |
| 3 | - 7 \| see type index-complete filter |

Accessories:

- gauge port- and bleeder connection, see sheet-no. 1650

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	6525 PSI
process connection:	thread connection
housing material:	EN-GJS-400-18-LT, C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
air bleeding and measure connections dirt side:	BSPP ¼
measure connections clean side:	BSPP ½

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

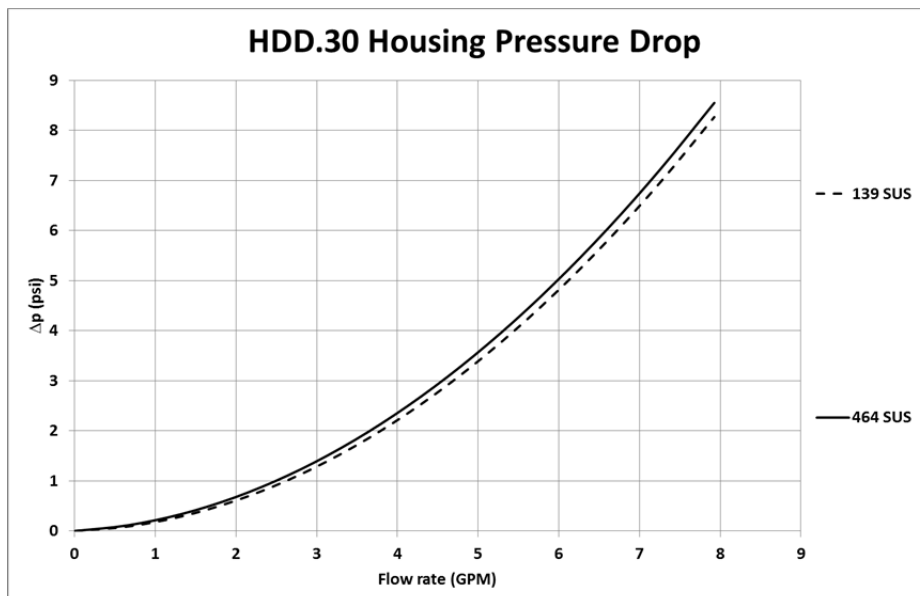
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

HDD	VG				
	3VG	6VG	10VG	16VG	25VG
30	12.554	8.716	5.580	4.794	3.275

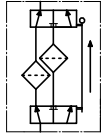
$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.

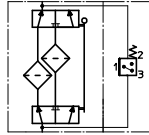


Symbols:

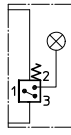
without indicator



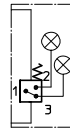
with electric indicator
AE 30 and AE 40



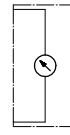
with visual-electric indicator
AE 50 and AE 62



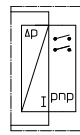
with visual-electric indicator
AE 70 and AE 80



with visual indicator
AOR/AOC



with electronic clogging sensor
VS5



Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01E.30...		
2	2	O-ring	12,37 x 2,62	304356 (NBR)	304396 (FPM)
3	2	O-ring	40 x 3	304389 (NBR)	304391 (FPM)
4	2	support ring	48 x 2,6 x 1	305391	
5	2	O-ring	10 x 3	307285 (NBR)	311019 (FPM)
6	2	O-ring	32 x 3	304368 (NBR)	311020 (FPM)
7	4	screw plug	1/4 BSPP	305003	
8	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
9	1	clogging indicator, visual-electric	AE	see sheet-no. 1615	
10	1	clogging sensor, electronic	VS5	see sheet-no. 1619	
11	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
12	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
13	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
14	1	screw plug	20913-4	309817	
15	1	pressure balance valve	3/8"	305000	

item 14 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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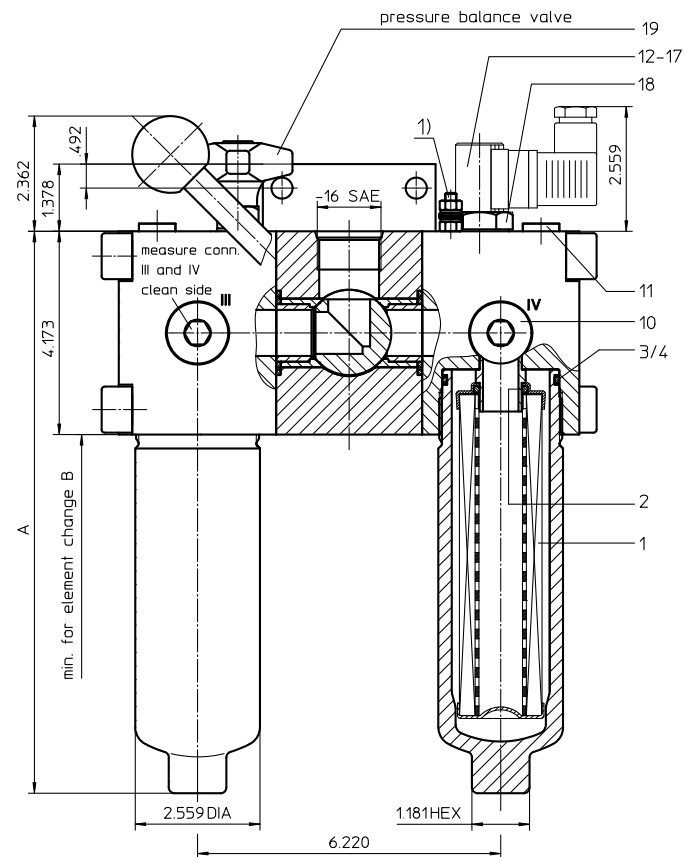
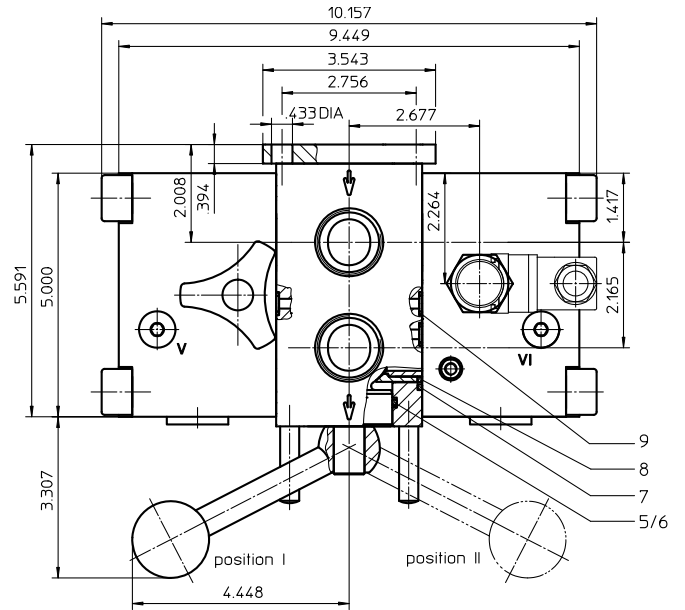
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Series HDD 61-151

4568 PSI



Position. I: left filter-side in operation
 Position. II: right filter-side in operation
 Connection V and VI should be used to bleed filter or to relieve pressure.

Dimensions:

type	HDD 61	HDD 91	HDD 151
connection	-16 SAE		
A	8.97	11.53	15.82
B	10.82	13.38	17.71
weight approx.	53 lbs.	55 lbs.	59 lbs.
volume tank	2x .08 Gal.	2x .10 Gal.	2x .16 Gal.

1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series HDD 61-151

4568 PSI

Description:

Duplex pressure filter series HDD 61-151 with change-over valve have a working pressure up to 4568 PSI. Pressure peaks can be absorbed with a sufficient safety margin. Duplex filters can be serviced without interruption of operation.

The filter head has a three-way-change-over valve which diverts the flow from the dirty filter-side to the clean filter-side without interrupting operation of the filter. All filter housings have an integrated pressure balance valve to make main valve operation from one filter side to the other easier. Filter elements are available down to 5 $\mu\text{m}_{(0)}$. Finer filtration is available upon request.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head. After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

The reversing valve provides another level of protection for the filter element. The reverse flow will not be filtered.

1. Type index:

1.1. Complete filter: (ordering example)

HDD. 91. 10VG. HR. E. P. - . UG. 5. - . - . AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- | | |
|----|--|
| 1 | series:
HDD = pressure filter, change over |
| 2 | nominal size: 61, 91, 151 |
| 3 | filter-material and filter-fineness:
25VG, 16VG, 10VG, 6VG, 3VG microglass |
| 4 | filter element collapse rating:
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI) |
| 5 | filter element design:
E = single-end open |
| 6 | sealing material:
P = Nitrile (NBR)
V = Viton (FPM) |
| 7 | filter element specification: (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC application, see sheet-no. 31601 |
| 8 | process connection:
UG = thread connection |
| 9 | process connection size:
5 = -16 SAE |
| 10 | filter housing specification: (see catalog)
- = standard
IS06 = for HFC applications, see sheet-no. 31605 |
| 11 | internal valve:
- = without
S1 = with by-pass valve Δp 51 PSI
S2 = with by-pass valve Δp 102 PSI
R = reversing valve, Q \leq 18.50 GPM |
| 12 | clogging indicator or clogging sensor:
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619 |

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 90. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- | | |
|---|---|
| 1 | series:
01E. = filter element according to company standard |
| 2 | nominal size: 60, 90, 150 |
| 3 | - 7 \| see type index-complete filter |

Accessories:

- gauge port- and bleeder connection, see sheet-no. 1650

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium:	mineral oil, other media on request
max. operating pressure:	4538 PSI
test pressure:	6525 PSI
process connection:	thread connection
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
air bleeding and measure connections dirt side:	BSPP ¼
measure connections clean side:	BSPP ¼

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

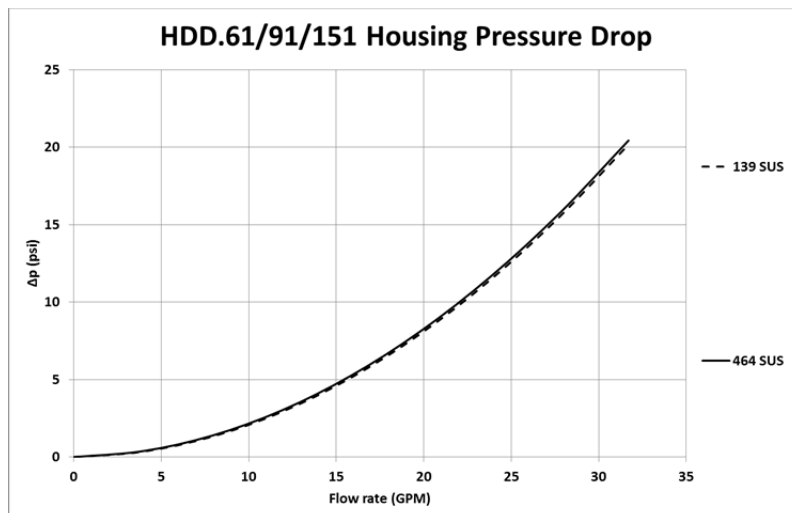
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

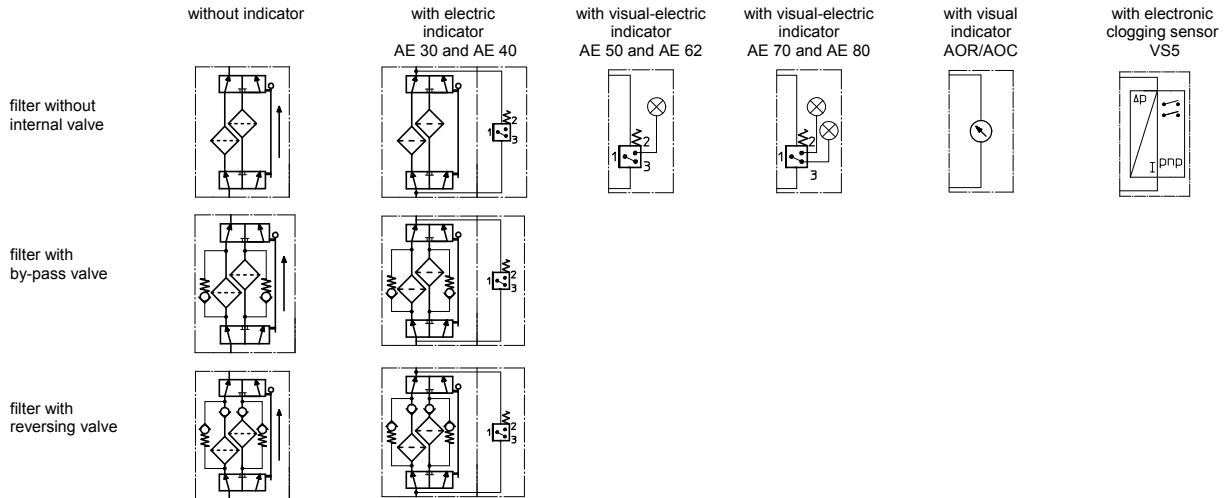
HDD	VG				
	3VG	6VG	10VG	16VG	25VG
61	6.748	4.685	2.999	2.577	1.760
91	4.059	2.818	1.804	1.550	1.059
151	2.422	1.681	1.076	0.925	0.632

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension			article-no.	
			HDD 61	HDD 91	HDD 151		
1	2	filter element	01E.60...	01E.90...	01E.150...		
2	2	O-ring		22 x 3,5		304341 (NBR)	304392 (FPM)
3	2	O-ring		54 x 3		304657 (NBR)	304720 (FPM)
4	2	support ring		61 x 2,6 x 1		304660	
5	3	O-ring		45 x 3		304991 (NBR)	304997 (FPM)
6	2	support ring		49,7 x 2,4 x 1		317709	
7	4	O-ring		38 x 3		304340 (NBR)	317013 (FPM)
8	4	O-ring		28 x 3		316778 (NBR)	318366 (FPM)
9	4	O-ring		8 x 2		310004 (NBR)	316530 (FPM)
10	2	screw plug		3/4 BSPP		308529	
11	2	screw plug		1/4 BSPP		305003	
12	1	clogging indicator, visual		AOR or AOC		see sheet-no. 1606	
13	1	clogging indicator, visual-electric		AE		see sheet-no. 1615	
14	1	clogging sensor, electronic		VS5		see sheet-no. 1619	
15	1	O-ring		15 x 1,5		315357 (NBR)	315427 (FPM)
16	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
17	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
18	1	screw plug		20913-4		309817	
19	1	pressure balance valve		3/8"		305000	

item 18 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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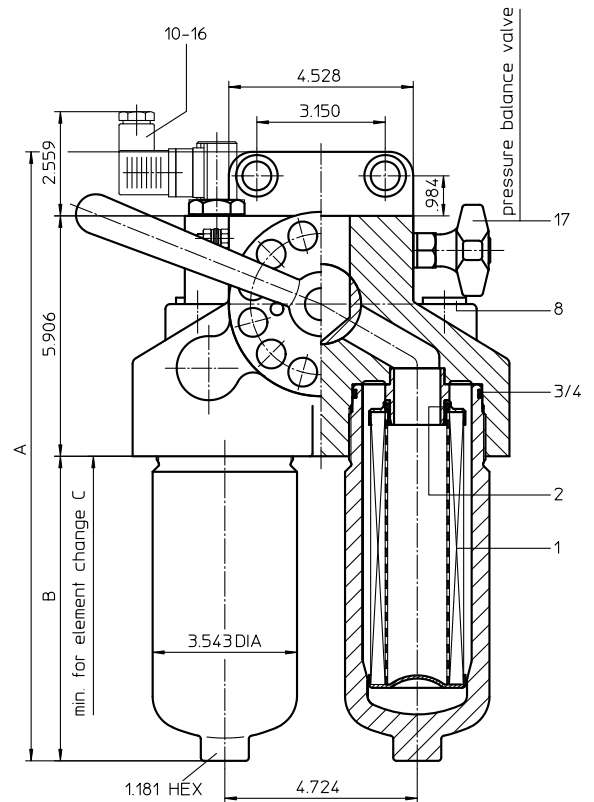
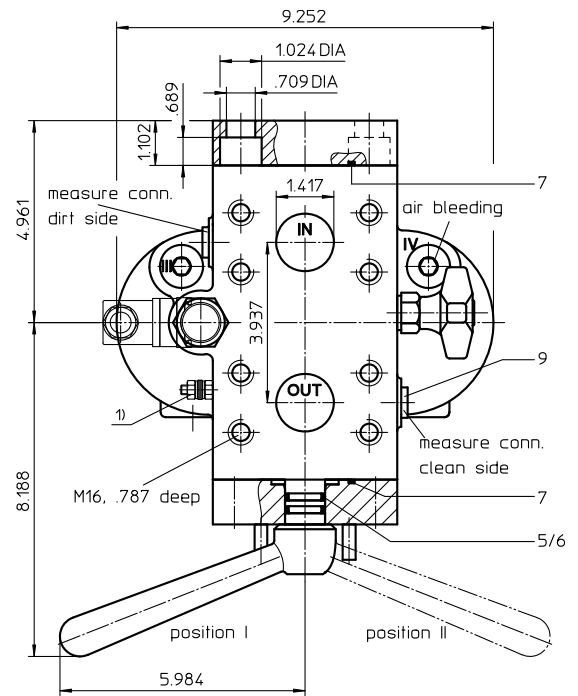
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Series HDD 170-450 4568 PSI



Position. I: left filter-side in operation
 Position. II: right filter-side in operation
 Connection III and IV should be used to bleed filter or to relieve pressure.

Dimensions:

type	HDD 170	HDD 240	HDD 360	HDD 450
connection	SAE 1 1/2"			
A	14.96	16.93	20.08	24.21
B	7.48	9.45	12.60	16.73
C	13.78	15.75	18.90	23.03
weight approx.	86 lbs.	90 lbs.	99 lbs.	110 lbs.
volume tank	2x .18 Gal.	2x .23 Gal.	2x .31 Gal.	2x .42 Gal.

1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series HDD 170-450

4568 PSI

Description:

Duplex pressure filter series HDD 170-450 with change-over valve have a working pressure up to 4568 PSI. Pressure peaks can be absorbed with a sufficient safety margin. Duplex filters can be serviced without interruption of operation.

The filter head has a three-way-change-over valve which diverts the flow from the dirty filter-side to the clean filter-side without interrupting operation of the filter. All filter housings have an integrated pressure balance valve to make main valve operation from one filter side to the other easier. Filter elements are available down to 5 $\mu\text{m}_{(c)}$. Finer filtration is available upon request.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head. After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

The reversing valve provides another level of protection for the filter element. The reverse flow will not be filtered.

1. Type index:

1.1. Complete filter: (ordering example)

HDD. 170. 10VG. HR. E. P. - . FS. 7. - . - . AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- | | |
|----|--|
| 1 | series:
HDD = pressure filter, change over |
| 2 | nominal size: 170, 240, 360, 450 |
| 3 | filter-material and filter-fineness:
25VG, 16VG, 10VG, 6VG, 3VG microglass |
| 4 | filter element collapse rating:
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI) |
| 5 | filter element design:
E = single-end open |
| 6 | sealing material:
P = Nitrile (NBR)
V = Viton (FPM) |
| 7 | filter element specification:
- = standard
VA = stainless steel |
| 8 | process connection:
FS = SAE-flange 6000 PSI |
| 9 | process connection size:
7 = 1 1/2" |
| 10 | filter housing specification:
- = standard |
| 11 | internal valve:
- = without
S1 = with by-pass valve Δp 51 PSI
S2 = with by-pass valve Δp 102 PSI
R = reversing valve, $Q \leq 55.75$ GPM |
| 12 | clogging indicator or clogging sensor:
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619 |

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 170. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- | | |
|---|---|
| 1 | series:
01E. = filter element according to company standard |
| 2 | nominal size: 170, 240, 360, 450 |
| 3 | - 7 \| see type index-complete filter |

Accessories:

- gauge port- and bleeder connection, see sheet-no. 1650

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	4538 PSI
test pressure:	6525 PSI
process connection:	SAE-flange 6000 PSI
housing material:	EN-GJS-400-18-LT, C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
air bleeding connections:	BSPP ½
measure connections:	BSPP ¼

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) - \text{characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

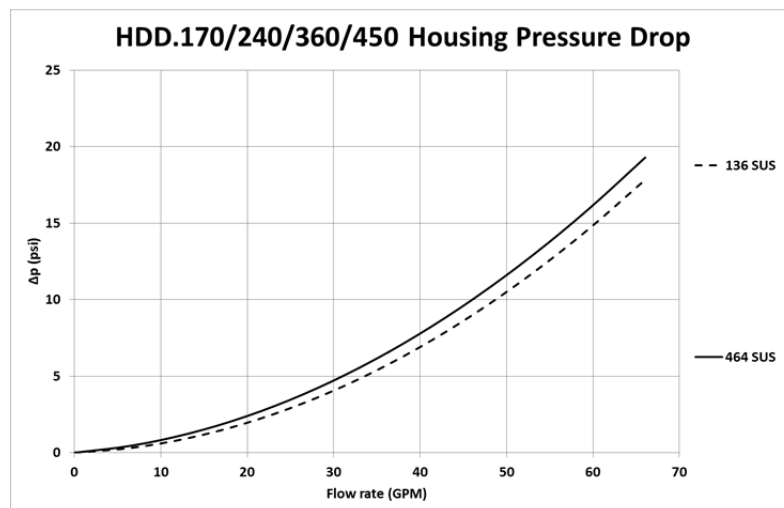
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

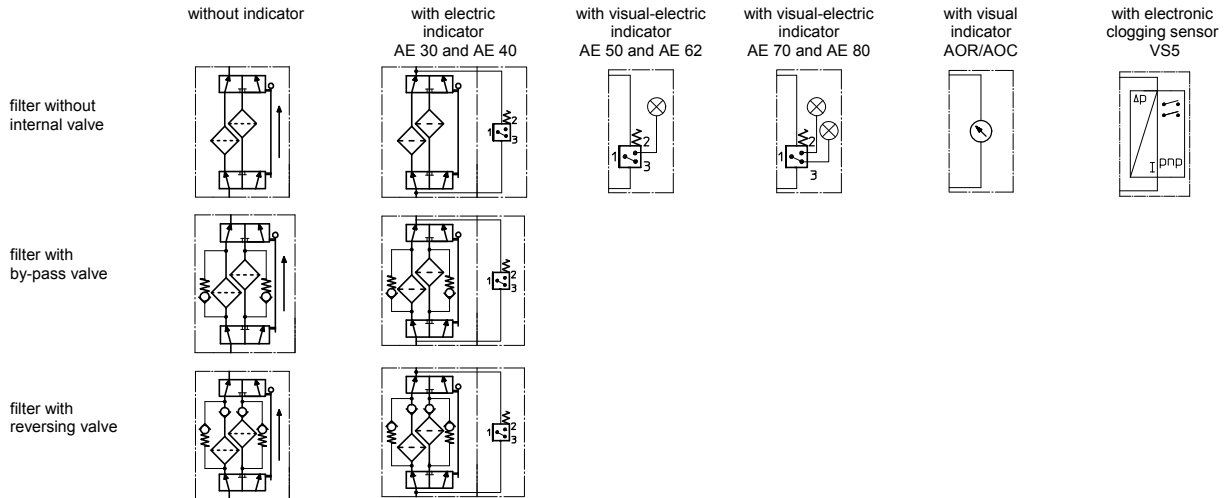
HDD	VG				
	3VG	6VG	10VG	16VG	25VG
170	2.714	1.884	1.206	1.036	0.708
240	2.092	1.452	0.930	0.799	0.546
360	1.530	1.062	0.680	0.584	0.399
450	1.126	0.782	0.500	0.430	0.294

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension				article-no.	
			HDD 170 01E.170...	HDD 240 01E.240...	HDD 360 01E.360...	HDD 450 01E.450...		
1	2	filter element						
2	2	O-ring		34 x 3,5			304338 (NBR)	304730 (FPM)
3	2	O-ring		75 x 3			302215 (NBR)	304729 (FPM)
4	2	support ring		81 x 2,6 x 1			304581	
5	2	O-ring		18 x 3			304359 (NBR)	304399 (FPM)
6	2	support ring		25 x 2,5 x 0,5			311311	
7	2	O-ring		56 x 3			305072 (NBR)	305322 (FPM)
8	2	screw plug		½ BSPP			304678	
9	2	screw plug		¼ BSPP			305003	
10	1	clogging indicator visual		AOR or AOC			see sheet-no. 1606	
11	1	clogging indicator visual-electric		AE			see sheet-no. 1615	
12	1	clogging sensor electronic		VS 5			see sheet-no. 1619	
13	1	O-ring		15 x 1,5			315357 (NBR)	315427 (FPM)
14	1	O-ring		22 x 2			304708 (NBR)	304721 (FPM)
15	1	O-ring		14 x 2			304342 (NBR)	304722 (FPM)
16	1	screw plug		20913-4			309817	
17	1	pressure balance valve		3/8"			305000	

item 16 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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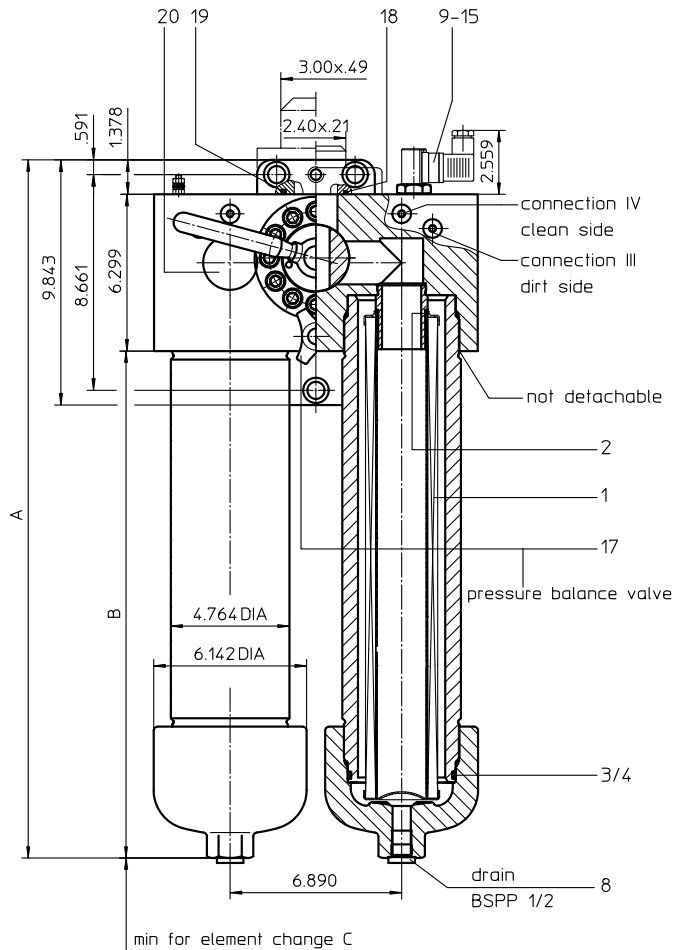
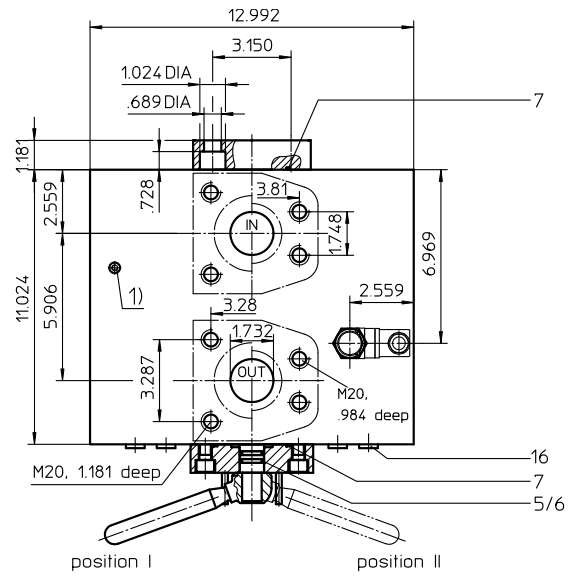
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Series HDD 601-1351

4568 PSI



Position. I: left filter-side in operation
 Position. II: right filter-side in operation
 Connection III and IV should be used to bleed filter or to relieve pressure.

Dimensions:

type	HDD 601	HDD 901	HDD 1351
connection	SAE 2"		
A	22.32	28.22	37.99
B	14.65	20.55	30.30
C	12.20	18.11	27.95
weight approx.	315 lbs.	330 lbs.	356 lbs.
volume tank	2x .55 Gal.	2x .82 Gal.	2x 1.21 Gal.

1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series HDD 601-1351

4568 PSI

Description:

Duplex pressure filter series HDD 601-1351 with change-over valve have a working pressure up to 4568 PSI. Pressure peaks can be absorbed with a sufficient safety margin. Duplex filters can be serviced without interruption of operation.

The filter head has a three-way-change-over valve which diverts the flow from the dirty filter-side to the clean filter-side without interrupting operation of the filter. All filter housings have an integrated pressure balance valve to make main valve operation from one filter side to the other easier. Filter elements are available down to 5 $\mu\text{m}_{(c)}$. Finer filtration is available upon request.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head. After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

The reversing valve provides another level of protection for the filter element. The reverse flow will not be filtered.

1. Type index:

1.1. Complete filter: (ordering example)

HDD. 901. 10VG. HR. E. P. -. FS. 8. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- | | |
|----|--|
| 1 | series:
HDD = pressure filter, change over |
| 2 | nominal size: 601, 901, 1351 |
| 3 | filter-material and filter-fineness:
80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass |
| 4 | filter element collapse rating:
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI) |
| 5 | filter element design:
E = single-end open |
| 6 | sealing material:
P = Nitrile (NBR)
V = Viton (FPM) |
| 7 | filter element specification:
- = standard
VA = stainless steel |
| 8 | process connection:
FS = SAE-flange 6000 PSI (standard)
FV = AVIT-flange 4640 PSI (special design) |
| 9 | process connection size:
8 = 2" |
| 10 | filter housing specification:
- = standard |
| 11 | internal valve:
- = without
S1 = with by-pass valve Δp 51 PSI
S2 = with by-pass valve Δp 102 PSI
R = reversing valve, $Q \leq 122.94$ GPM |
| 12 | clogging indicator or clogging sensor:
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619 |

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 900. 10VG. HR. E. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- | | |
|---|---|
| 1 | series:
01E. = filter element according to company standard |
| 2 | nominal size: 600, 900, 1350 |
| 3 | - 7 \| see type index-complete filter |

Accessories:

- gauge port- and bleeder connection, see sheet-no. 1650
- SAE-counter flange, see sheet-no. 1652
- AVIT-counter flange, see sheet-no. 1654

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	4538 PSI
test pressure:	6525 PSI
process connection:	SAE-flange 6000 PSI (standard) or AVIT-flange 4640 PSI (special design)
housing material:	EN-GJS-400-18-LT, C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
air bleeding connections:	BSPP ¼
measure connections:	BSPP ¼

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

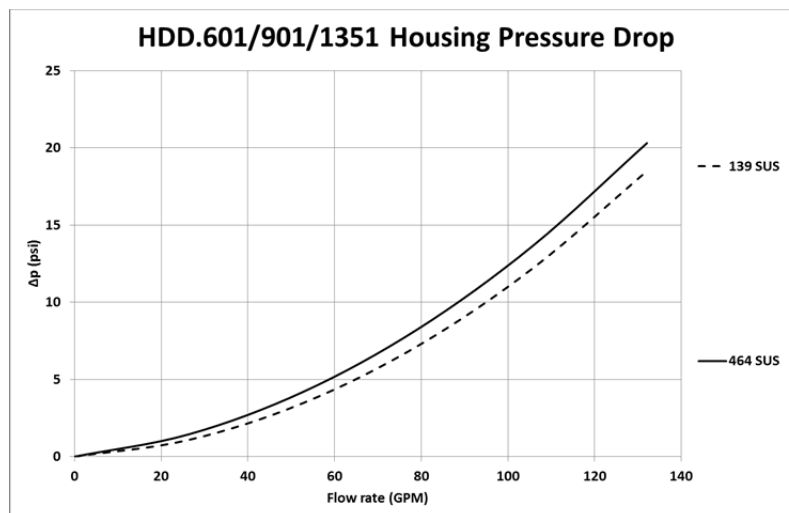
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

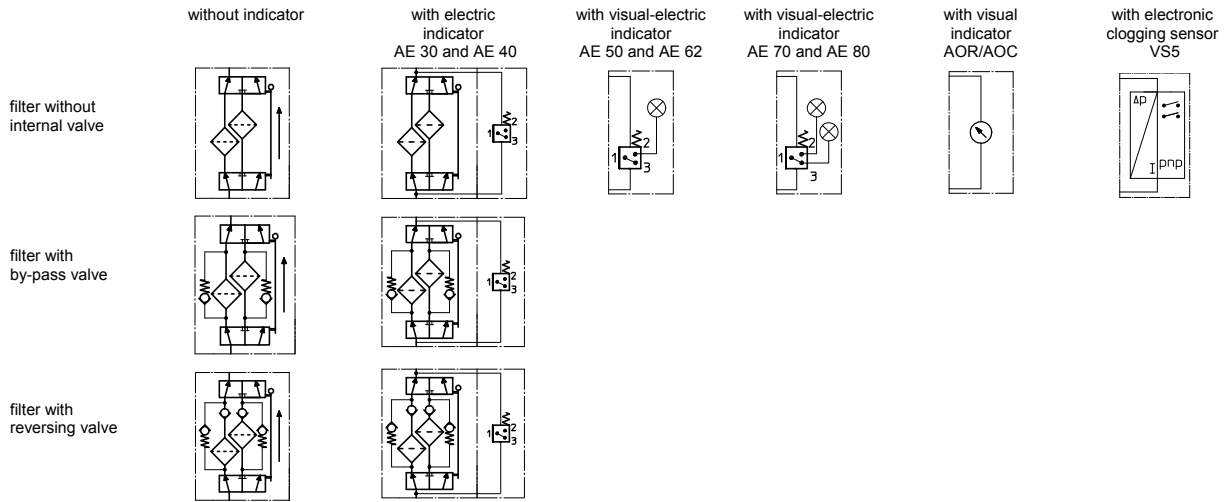
HDD	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
601	0.963	0.669	0.428	0.368	0.251	0.0303	0.0282	0.0193
901	0.668	0.464	0.297	0.225	0.174	0.0189	0.0177	0.0121
1351	0.417	0.290	0.185	0.185	0.109	0.0122	0.0114	0.0078

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension			article-no.	
			HDD 601 01E.600...	HDD 901 01E.900...	HDD 1351 01E.1350...		
1	2	filter element		48 x 3			
2	2	O-ring		98 x 4		304357 (NBR)	304404 (FPM)
3	2	O-ring		110 x 3,5 x 2		301914 (NBR)	304765 (FPM)
4	2	support ring		18 x 3			304802
5	2	O-ring		25 x 2,5 x 0,5		304359 (NBR)	304399 (FPM)
6	2	support ring		71 x 3			311311
7	2	O-ring		1/2 BSPP		306451 (NBR)	306897 (FPM)
8	2	screw plug					304678
9	1	clogging indicator, visual		AOR or AOC			see sheet no. 1606
10	1	clogging indicator, visual-electric		AE			see sheet no. 1615
11	1	clogging sensor, electronic		VS5			see sheet no. 1619
12	1	O-ring		15 x 1,5		315457 (NBR)	315427 (FPM)
13	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
14	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
15	1	screw plug		20913-4			309817
16	4	screw plug		1/4 BSPP			305003
17	1	pressure balance valve		3/8"			305000
18	1	O-ring (only with counter flange SAE)		56,75 x 3,53		306035 (NBR)	310264 (FPM)
19	1	O-ring (only with counter flange AVIT)		61 x 5			
20	8	screw plug		1 1/2 BSPP			311475

item 15 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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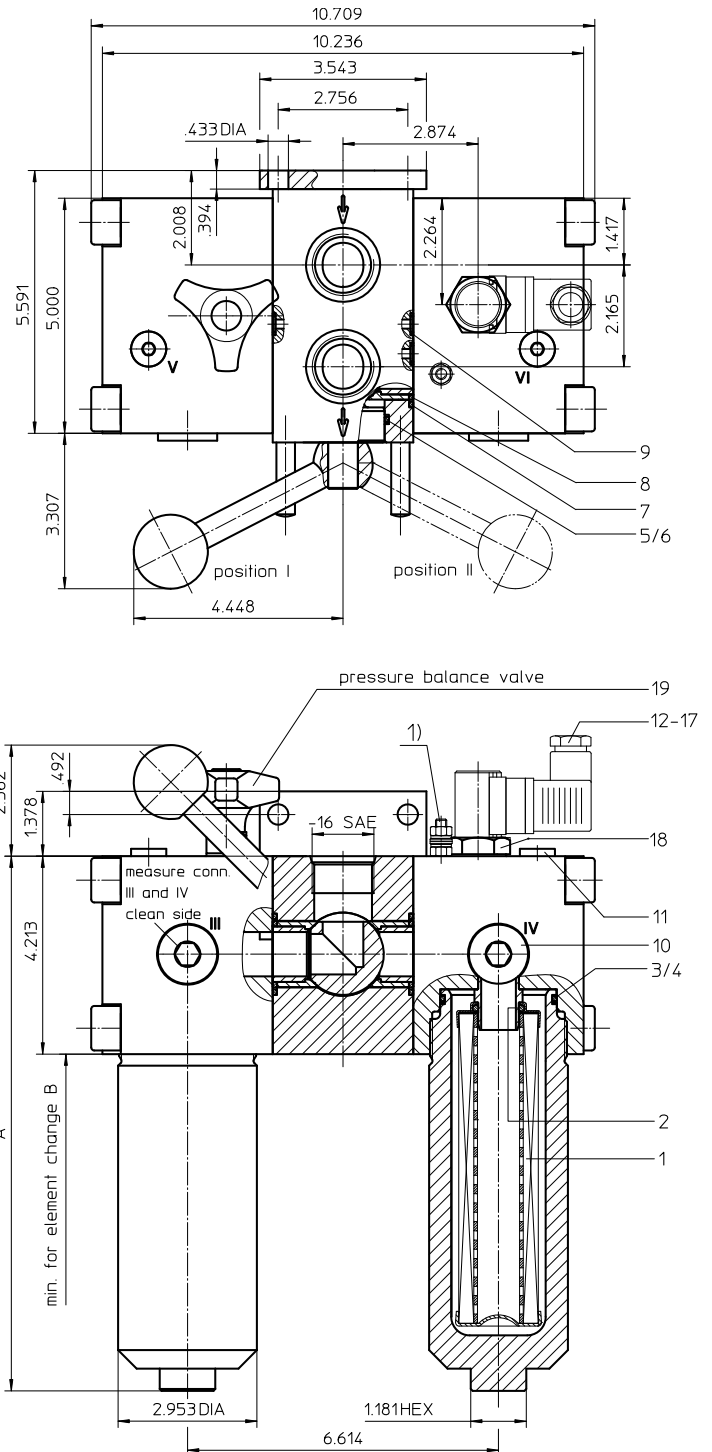
For more information, please

email us at filtration@eaton.com
or visit www.eaton.com/filtration

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Series EHD 61-151

4568 PSI



Position. I: left filter-side in operation
 Position. II: right filter-side in operation
 Connection V and VI used to bleed filter or to relieve pressure

Dimensions:

type	EHD 61	EHD 91	EHD 151
connection	- 16 SAE		
A	8.81	11.37	15.70
B	8.26	13.38	17.71
weight approx.	66 lbs.	70 lbs.	77 lbs.
volume tank	2x .06 Gal.	2x .10 Gal.	2x .16 Gal.

1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Stainless Steel-Pressure Filter

Series EHD 61-151

4568 PSI

Description:

Stainless steel duplex filters series EHD have a working pressure up to 4568 PSI. Duplex filters can be serviced without interruption of operation.

The filter head has a three-way-change-over valve which diverts the flow from the dirty filter-side to the clean filter-side without interrupting operation of the filter. All filter housings have an integrated pressure balance valve to make main valve operation from one filter side to the other easier. Filter elements are available down to 5 $\mu\text{m}_{(c)}$. Finer filtration is available upon request.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head. After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

The reversing valve provides another level of protection for the filter element. The reverse flow will not be filtered.

1. Type index:

1.1. Complete filter: (ordering example)

EHD. 91. 10VG. HR. E. P. VA. UG. 5. VA. -. AE											
1	2	3	4	5	6	7	8	9	10	11	12

- 1 | **series:**
EHD = stainless steel-pressure filter, change over
- 2 | **nominal size:** 61, 91, 151
- 3 | **filter-material and filter-fineness:**
80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
- 4 | **filter element collapse rating:**
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)
- 5 | **filter element design:**
E = single-end open
- 6 | **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 | **filter element specification:** (see catalog)
- = standard
VA = stainless steel
- 8 | **process connection:**
UG = thread connection
- 9 | **process connection size:**
5 = -16 SAE
- 10 | **filter housing specification:**
VA = stainless steel
- 11 | **internal valve:**
- = without
S1 = with by-pass valve Δp 51 PSI
S2 = with by-pass valve Δp 102 PSI
R = reversing valve, $Q \leq 18.50$ GPM
- 12 | **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 90. 10VG. HR. E. P. VA						
1	2	3	4	5	6	7

- 1 | **series:**
01E. = filter element according to company standard
- 2 | **nominal size:** 60, 90, 150
- 3 | - 7 | see type index-complete filter

Accessories:

- gauge port- and bleeder connection, see sheet-no. 1650

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	6532 PSI
process connection:	thread connection
housing material:	EN 10088-3-1.4571 (316 Ti according to AISI)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
air bleeding and measure connections dirt side:	BSPP ¼
measure connections clean side:	BSPP ¼

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) - \text{characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

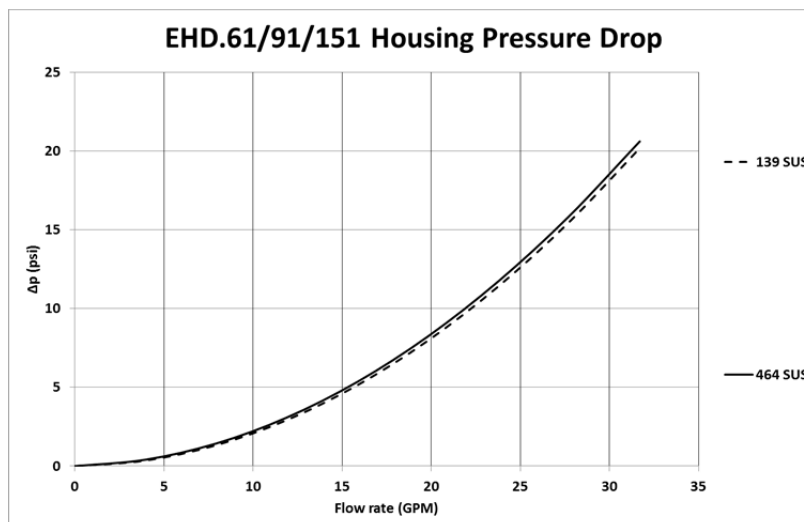
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

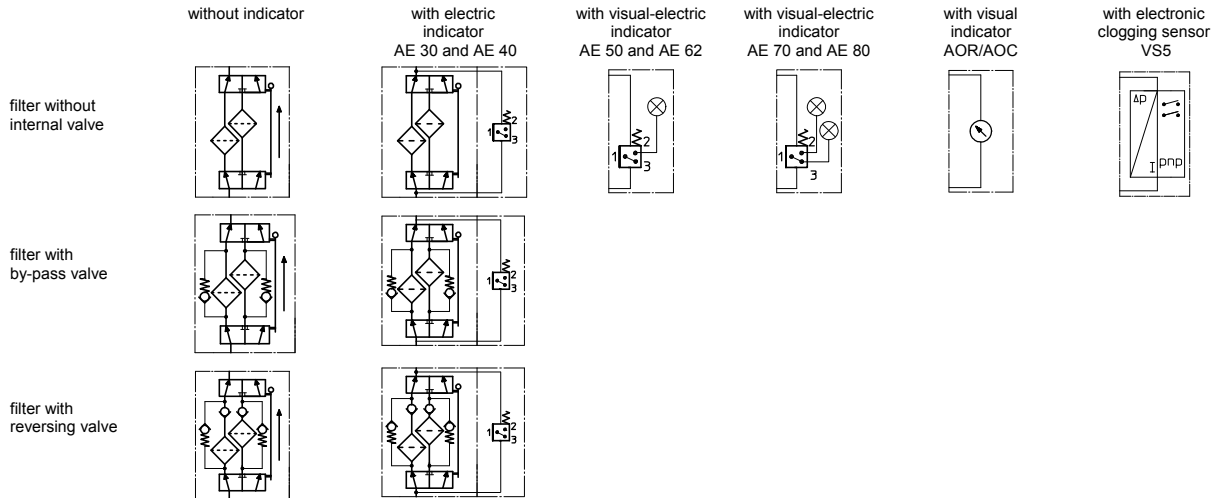
EHD	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
61	6.748	4.685	2.999	2.577	1.760	0.2002	0.1868	0.1280
91	4.059	2.818	1.804	1.550	1.059	0.1210	0.1130	0.0774
151	2.422	1.681	1.076	0.925	0.632	0.0723	0.0675	0.0462

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension			article-no.	
			EHD 61	EHD 91	EHD 151		
1	2	filter element	01E.60...	01E.90...	01E.150...		
2	2	O-ring		22 x 3,5		304341 (NBR)	304392 (FPM)
3	2	O-ring		56 x 3		305072 (NBR)	305322 (FPM)
4	2	support ring		63 x 2,6 x 1			312309
5	3	O-ring		45 x 3		304991 (NBR)	304997 (FPM)
6	2	support ring		49,7 x 2,4 x 1			317709
7	4	O-ring		38 x 3		304340 (NBR)	317013 (FPM)
8	4	O-ring		28 x 3		316778 (NBR)	318366 (FPM)
9	4	O-ring		8 x 2		310004 (NBR)	316530 (FPM)
10	2	screw plug		¼ BSPP			313815
11	2	screw plug		¼ BSPP			306968
12	1	clogging indicator, visual		AOR or AOC			see sheet-no. 1606
13	1	clogging indicator, visual-electric		AE			see sheet-no. 1615
14	1	clogging sensor, electronic		VS5			see sheet-no. 1619
15	1	O-ring		15 x 1,5		315357 (NBR)	315427 (FPM)
16	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
17	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
18	1	screw plug		20913-4			314442
19	1	pressure balance valve		3/8"			310316

item 18 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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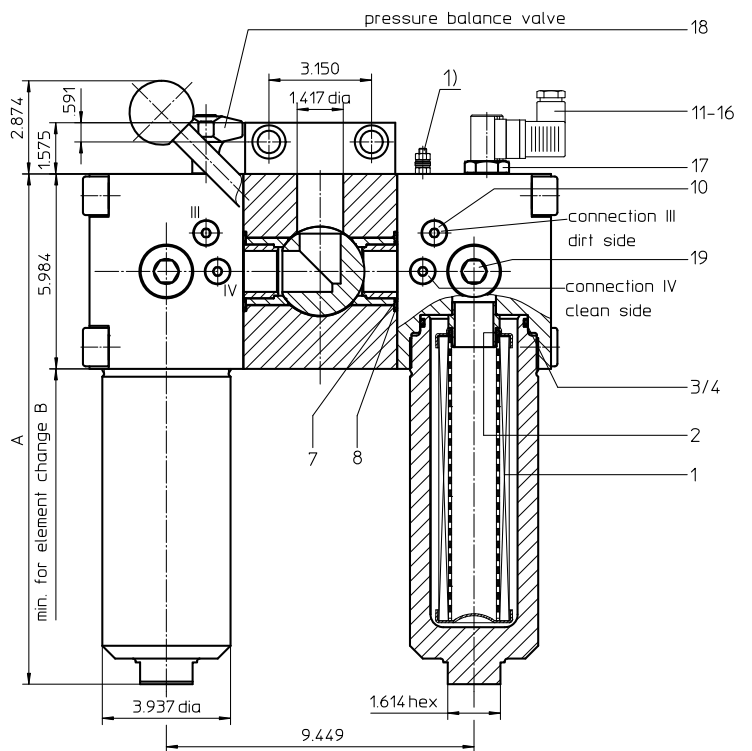
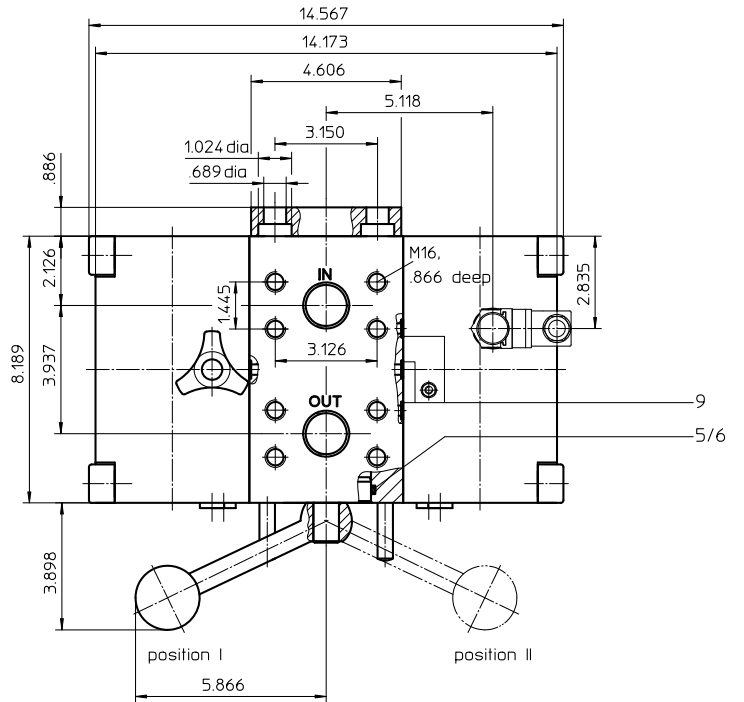
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Series EHD 241-451 4568 PSI



Position. I: left filter-side in operation
 Position. II: right filter-side in operation
 Connection III and IV used to
 bleed filter or to relieve pressure

Dimensions:

type	EHD 241	EHD 451
connection	SAE 1 1/2"	
A	15.67	22.95
B	13.88	30.67
weight approx.	224 lbs.	255 lbs.
volume tank	2x .22 Gal.	2x .40 Gal.

1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Stainless Steel-Pressure Filter

Series EHD 241-451

4568 PSI

Description:

Stainless steel duplex filters series EHD have a working pressure up to 4568 PSI. Duplex filters can be serviced without interruption of operation.

The filter head has a three-way-change-over valve which diverts the flow from the dirty filter-side to the clean filter-side without interrupting operation of the filter. All filter housings have an integrated pressure balance valve to make main valve operation from one filter side to the other easier. Filter elements are available down to 5 $\mu\text{m}_{(c)}$. Finer filtration is available upon request.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head. After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

The reversing valve provides another level of protection for the filter element. The reverse flow will not be filtered.

1. Type index:

1.1. Complete filter: (ordering example)

EHD.	241.	10VG.	HR.	E.	P.	VA.	FS.	7.	VA.	-.	AE
1	2	3	4	5	6	7	8	9	10	11	12

- 1 | **series:**
EHD = stainless steel-pressure filter, change over
- 2 | **nominal size:** 241, 451
- 3 | **filter-material and filter-fineness:**
80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
- 4 | **filter element collapse rating:**
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)
- 5 | **filter element design:**
E = single-end open
- 6 | **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 | **filter element specification:** (see catalog)
- = standard
VA = stainless steel
- 8 | **process connection:**
FS = SAE-flange 3000 PSI
- 9 | **process connection size:**
7 = 1 1/2"
- 10 | **filter housing specification:**
VA = stainless steel
- 11 | **internal valve:**
- = without
S1 = with by-pass valve Δp 51 PSI
S2 = with by-pass valve Δp 102 PSI
R = reversing valve, $Q \leq 55.75$ GPM
- 12 | **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E.	240.	10VG.	HR.	E.	P.	VA
1	2	3	4	5	6	7

- 1 | **series:**
01E. = filter element according to company standard
- 2 | **nominal size:** 240, 450
- 3 | - 7 | see type index-complete filter

Accessories:

- gauge port- and bleeder connection, see sheet-no. 1650

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	6532 PSI
process connection:	SAE-flange 3000 PSI
housing material:	EN 10088-3-1.4571 (316 Ti according to AISI)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
air bleeding and measure connections:	BSPP ¼

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

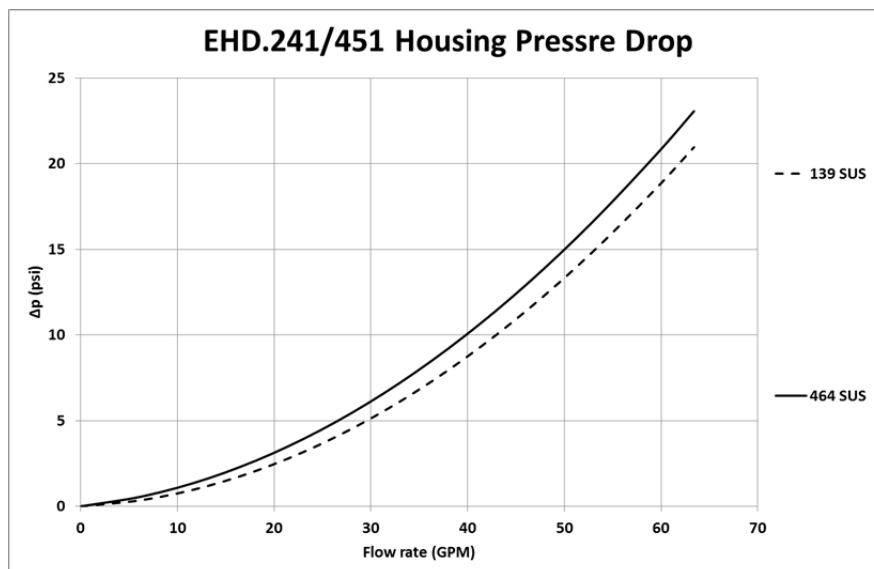
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

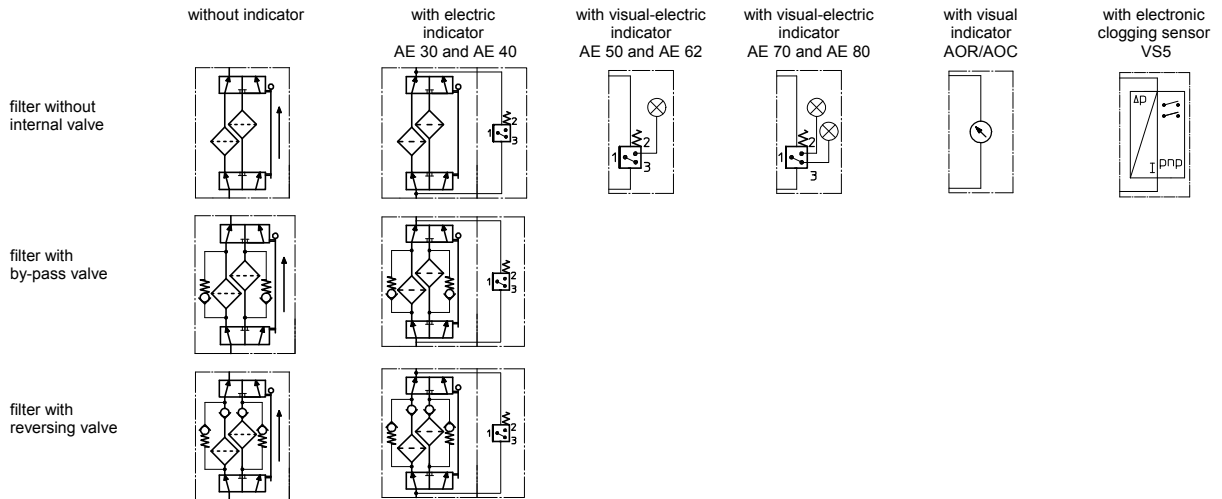
EHD	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
241	2.092	1.452	0.930	0.799	0.546	0.0651	0.0607	0.0416
451	1.126	0.782	0.500	0.430	0.294	0.0349	0.0326	0.0223

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension		article-no.	
			EHD 241 01E.240...	EHD 451 01E.450...		
1	2	filter element				
2	2	O-ring		34 x 3,5	304338 (NBR)	304730 (FPM)
3	2	O-ring		76 x 4	305599 (NBR)	310291 (FPM)
4	2	support ring		84 x 3,2 x 1,5		312307
5	3	O-ring		70 x 4	306253 (NBR)	310280 (FPM)
6	2	sliding ring		076 x70 x 45°		318070
7	4	O-ring		56 x 3	305072 (NBR)	305322 (FPM)
8	4	O-ring		42,52 x 2,62	304352 (NBR)	304393 (FPM)
9	4	O-ring		10 x 2	309998 (NBR)	310272 (FPM)
10	4	screw plug		¼ BSPP		306968
11	1	clogging indicator visual		AOR or AOC		see sheet-no. 1606
12	1	clogging indicator visual-electric		AE		see sheet-no. 1615
13	1	clogging sensor electronic		VS5		see sheet-no. 1619
14	1	O-ring		15 x 1,5	315357 (NBR)	315427 (FPM)
15	1	O-ring		22 x 2	304708 (NBR)	304721 (FPM)
16	1	O-ring		14 x 2	304342 (NBR)	304722 (FPM)
17	1	screw plug		20913-4		314442
18	1	pressure balance valve		3/8"		310316
19	4	screw plug		1 BSPP		308498

item 17 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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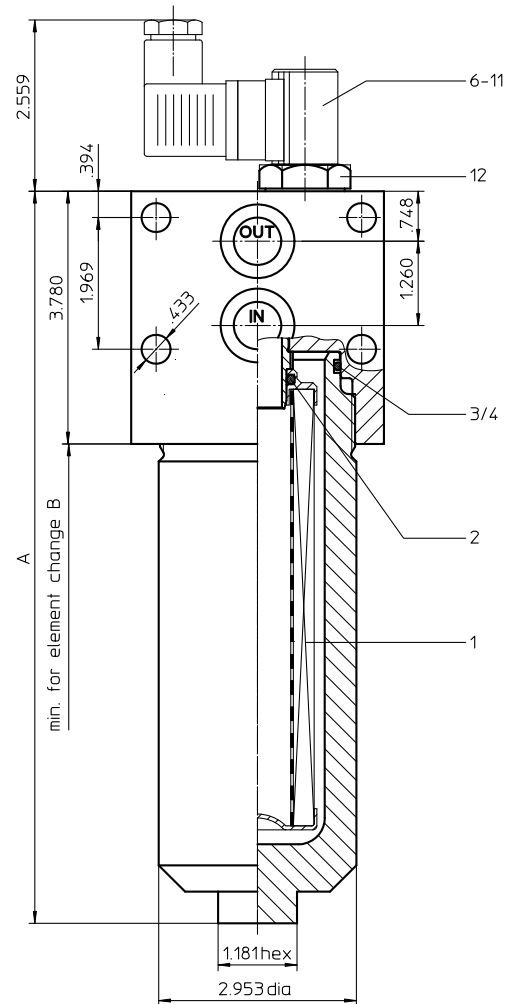
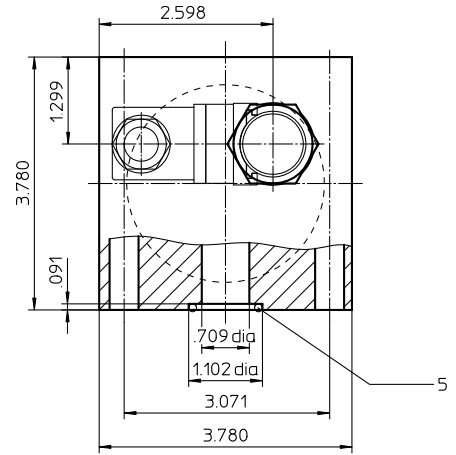
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Series EHPF 60-150 4568 PSI



Dimensions:

type	EHPF 60	EHPF 90	EHPF 150
connection		3/4"	
A	8.38	10.95	12.27
B	8.50	11.00	15.35
weight approx.	22 lbs.	24 lbs.	27 lbs.
volume tank	.08 Gal.	.10 Gal.	.16 Gal.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Stainless Steel-Pressure Filter Series EHPF 60-150 4568 PSI

Description:

Stainless steel pressure filter series EHPF 60-150 have a working pressure up to 4568 PSI. Pressure peaks can be absorbed with a sufficient safety margin. The EHPF-filters are flanged to the mounting-surface.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 5 $\mu\text{m(c)}$. Finer filtration is available upon request.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head.

After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

The reversing valve provides another level of protection for the filter element. The reverse flow will not be filtered.

1. Type index:

1.1. Complete filter: (ordering example)

EHPF.	90.	10VG.	HR.	E.	P.	VA.	F.	4.	VA.	-.	AE
1	2	3	4	5	6	7	8	9	10	11	12

- | | |
|----|--|
| 1 | series:
EHPF = stainless steel-pressure filter, manifold mounted |
| 2 | nominal size: 60, 90, 150 |
| 3 | filter-material and filter-fineness:
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass |
| 4 | filter element collapse rating:
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI) |
| 5 | filter element design:
E = single-end open |
| 6 | sealing material:
P = Nitrile (NBR)
V = Viton (FPM) |
| 7 | filter element specification: (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601 |
| 8 | process connection:
F = manifold mounted |
| 9 | process connection size:
4 = $\frac{3}{4}$ " |
| 10 | filter housing specification:
VA = standard |
| 11 | internal valve:
- = without
S1 = with bypass valve Δp 51 PSI
S2 = with bypass valve Δp 102 PSI
R = reversing valve, $Q \leq 18.50$ GPM |
| 12 | clogging indicator or clogging sensor:
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619 |

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E.	90.	10VG.	HR.	E.	P.	VA
1	2	3	4	5	6	7

- | | |
|---|---|
| 1 | series:
01E. = filter element according to company standard |
| 2 | nominal size: 60, 90, 150 |
| 3 | - 7 \| see type index-complete filter |

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	6525 PSI
process connection:	manifold mounted
housing material:	EN10088-3 1.4571 (316 Ti according to AISI)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4)

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

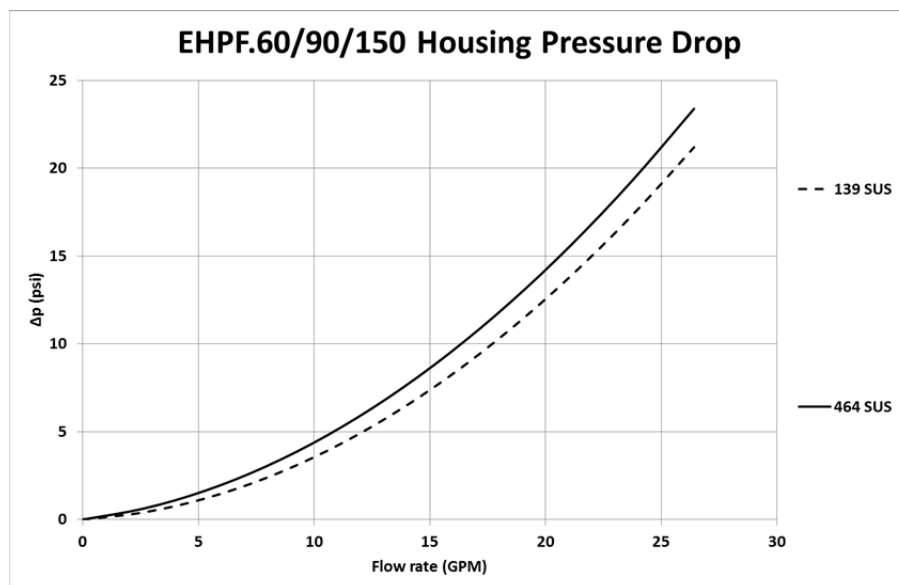
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

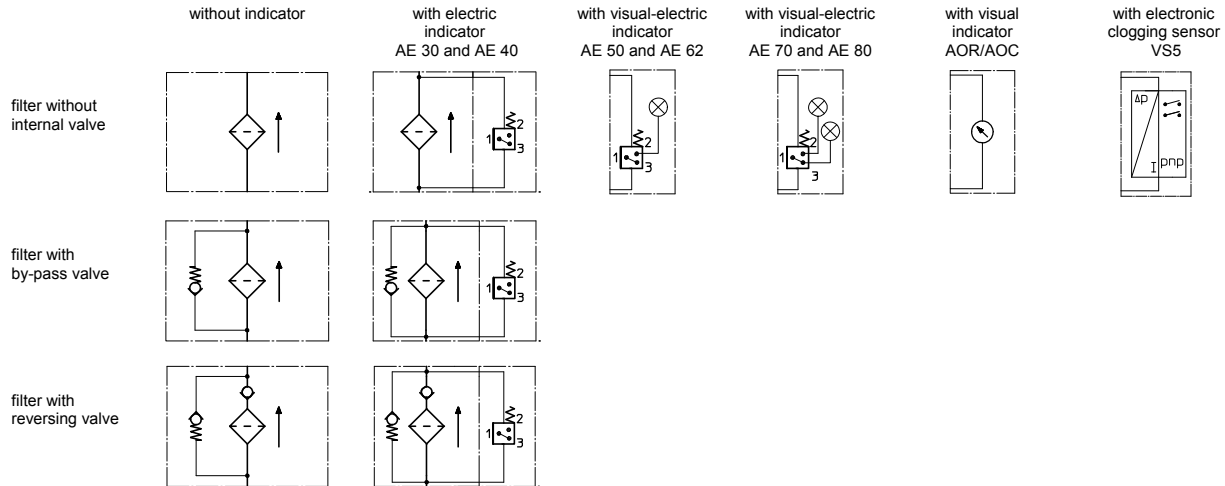
EHPF	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
60	6.748	4.685	2.999	2.577	1.760	0.2002	0.1868	0.1280
90	4.059	2.818	1.804	1.550	1.059	0.1210	0.1130	0.0774
150	2.422	1.681	1.076	0.925	0.632	0.0723	0.0675	0.0462

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension			article-no.	
			EHPF 60 01E.60...	EHPF 90 01E.90...	EHPF 150 01E.150...		
1	1	filter element					
2	1	O-ring		22 x 3,5		304341 (NBR)	304392 (FPM)
3	1	O-ring		56 x 3		305072 (NBR)	305322 (FPM)
4	1	support ring		63 x 2,6 x 1		312309	
5	2	O-ring		22 x 3		304387 (NBR)	304931 (FPM)
6	1	clogging indicator, visual		AOR or AOC		see sheet no. 1606	
7	1	clogging indicator, visual-electric		AE		see sheet no. 1615	
8	1	clogging sensor, electronic		VS5		see sheet no. 1619	
9	1	O-ring		15 x 1,5		315357 (NBR)	315427 (FPM)
10	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
11	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
12	1	screw plug		40171-4		314442	

item 12 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
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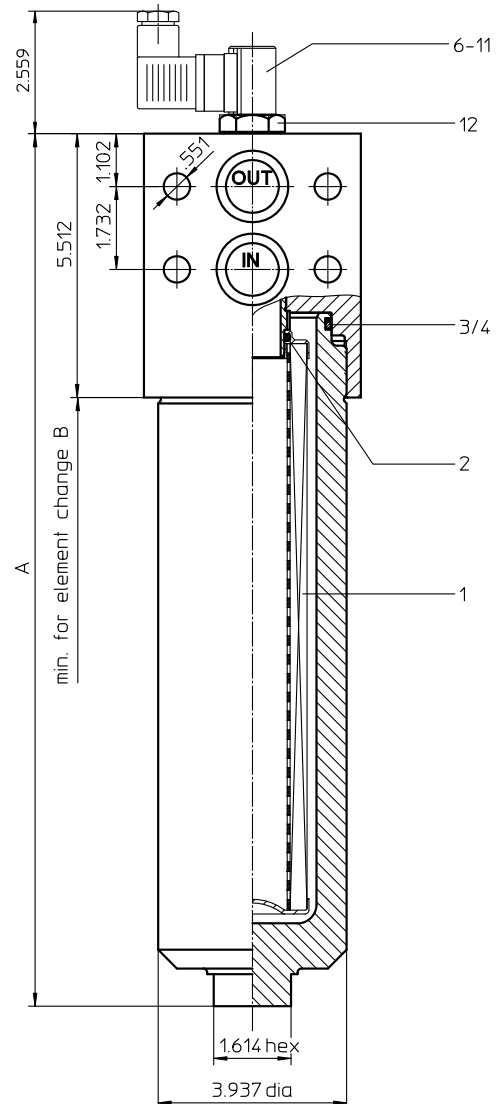
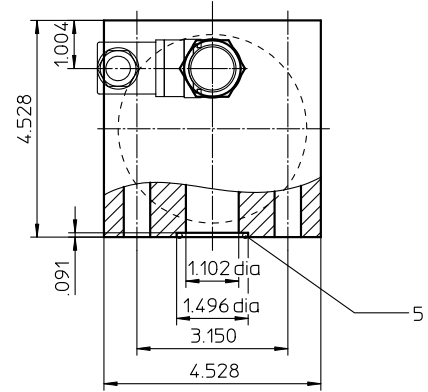
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Series EHPF 170-450

4568 PSI



Dimensions:

type	EHPF 170	EHPF 240	EHPF 360	EHPF 450
connection	1"			
A	13.11	15.07	18.22	22.36
B	13.00	14.00	18.00	22.00
weight approx.	48 lbs.	53 lbs.	57 lbs.	66 lbs.
volume tank	.18 Gal.	.23 Gal.	.31 Gal.	.42 Gal.

Dimensions: inches

Designs and performance values are subject to change.

Stainless Steel-Pressure Filter Series EHPF 170-450 4568 PSI

Description:

Stainless steel pressure filter series EHPF 170-450 have a working pressure up to 4568 PSI. Pressure peaks can be absorbed with a sufficient safety margin. The EHPF-filters are flanged to the mounting-surface.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 5 $\mu\text{m}_{(c)}$. Finer filtration is available upon request.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head.

After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

The reversing valve provides another level of protection for the filter element. The reverse flow will not be filtered.

1. Type index:

1.1. Complete filter: (ordering example)

EHPF. 360. 10VG. HR. E. P. VA. F. 5. VA. -. AE											
1	2	3	4	5	6	7	8	9	10	11	12

- | | |
|----|--|
| 1 | series:
EHPF = stainless steel-pressure filter, manifold mounted |
| 2 | nominal size: 170, 240, 360, 450 |
| 3 | filter-material and filter-fineness:
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass |
| 4 | filter element collapse rating:
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI) |
| 5 | filter element design:
E = single-end open |
| 6 | sealing material:
P = Nitrile (NBR)
V = Viton (FPM) |
| 7 | filter element specification: (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601 |
| 8 | process connection:
F = manifold mounted |
| 9 | process connection size:
5 = 1" |
| 10 | filter housing specification:
VA = standard |
| 11 | internal valve:
- = without
S1 = with bypass valve Δp 51 PSI
S2 = with bypass valve Δp 102 PSI
R = reversing valve, $Q \leq 55.75$ GPM |
| 12 | clogging indicator or clogging sensor:
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619 |

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 360. 10VG. HR. E. P. VA						
1	2	3	4	5	6	7

- | | |
|---|---|
| 1 | series:
01E. = filter element according to company standard |
| 2 | nominal size: 170, 240, 360, 450 |
| 3 | - 7 \| see type index-complete filter |

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	6525 PSI
process connection:	manifold mounted
housing material:	EN10088-3 1.4571 (316 Ti according to AISI)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4)

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

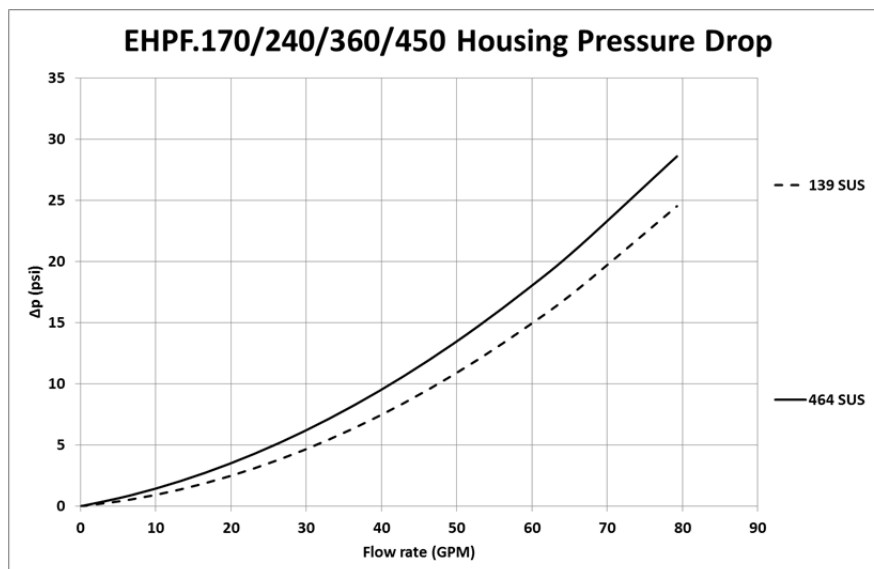
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

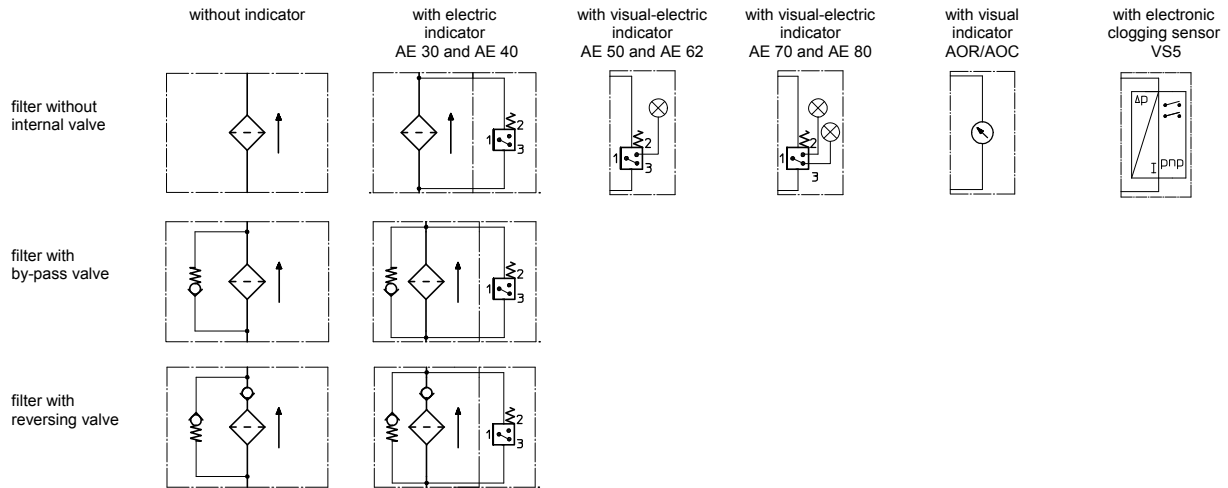
EHPF	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
170	2.714	1.884	1.206	1.036	0.708	0.0839	0.0783	0.0537
240	2.092	1.452	0.930	0.799	0.546	0.0651	0.0607	0.0416
360	1.530	1.062	0.680	0.584	0.399	0.0475	0.0444	0.0304
450	1.126	0.782	0.500	0.430	0.294	0.0349	0.0326	0.0223

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimensions				article-no.	
			EHPF 170	EHPF 240	EHPF 360	EHPF 450		
1	1	filter element	01E.170...	01E.240...	01E.360...	01E.450...		
2	1	O-ring	34 x 3,5				304338 (NBR)	304730 (FPM)
3	1	O-ring	76 x 4				305599 (NBR)	310291 (FPM)
4	1	support ring	84 x 3,2 x 1,5				312307	
5	2	O-ring	32 x 3				304368 (NBR)	311020 (FPM)
6	1	clogging indicator, visual	AOR or AOC				see sheet-no. 1606	
7	1	clogging indicator, visual-electric	AE				see sheet-no. 1615	
8	1	clogging sensor, electronic	VS5				see sheet-no. 1619	
9	1	O-ring	15 x 1,5				315357 (NBR)	315427 (FPM)
10	1	O-ring	22 x 2				304708 (NBR)	304721 (FPM)
11	1	O-ring	14 x 2				304342 (NBR)	304722 (FPM)
12	1	screw plug	40171-4				314442	

item 12 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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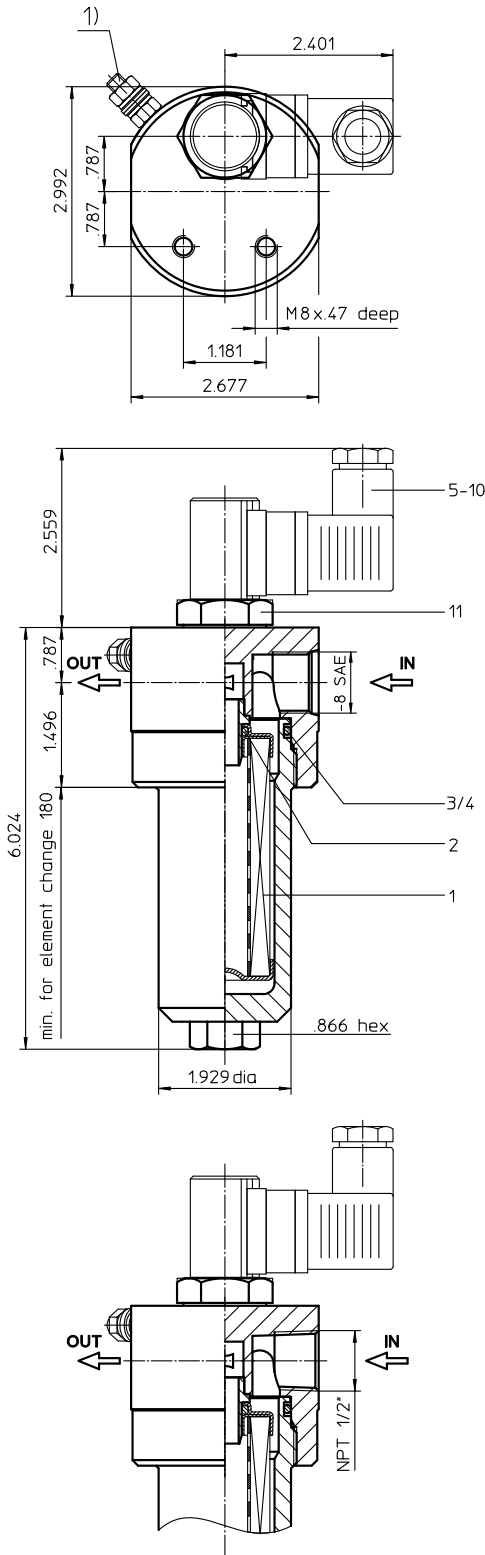
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Series EH 31 6000 PSI



1) Connect the stand grounding tab to a suitable earth ground point.

Weight: approx. 7 lbs.

Dimensions: inches

Designs and performance values are subject to change.

Pressure Filter

Series EH 31

6000 PSI

Description:

The stainless steel pressure filters series EH 31 have a working pressure up to 6000 PSI. The EH-filter is in-line mounted.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head. After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

1. Type index:

1.1. Complete filter: (ordering example)

EH. 31. 10VG. HR. E. P. VA. UG. 3. VA. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- | | |
|----|--|
| 1 | series:
EH = stainless steel-pressure filter |
| 2 | nominal size: 31 |
| 3 | filter-material and filter-fineness:
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass |
| 4 | filter element collapse rating:
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI) |
| 5 | filter element design:
E = single-end open |
| 6 | sealing material:
P = Nitrile (NBR)
V = Viton (FPM) |
| 7 | filter element specification: (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601 |
| 8 | process connection:
UG = thread connection
NPT = thread connection according to ANSI B1.20.1 |
| 9 | process connection size:
3 = -8 SAE or 1/2" NPT |
| 10 | filter housing specification:
VA = stainless steel |
| 11 | internal valve:
- = without
S1 = with by-pass valve Δp 51 PSI
S2 = with by-pass valve Δp 102 PSI |
| 12 | clogging indicator or clogging sensor:
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619 |

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 30. 10VG. HR. E. P. VA

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- | | |
|---|---|
| 1 | series:
01E. = filter element according to company standard |
| 2 | nominal size: 30 |
| 3 | - 7 \| see type index-complete filter |

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	6000 PSI
test pressure:	8700 PSI
process connection:	thread connection or ANSI B1.20.1
housing material:	EN10088 - 1.4571 (316 Ti according to AISI)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	0.03 Gal

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

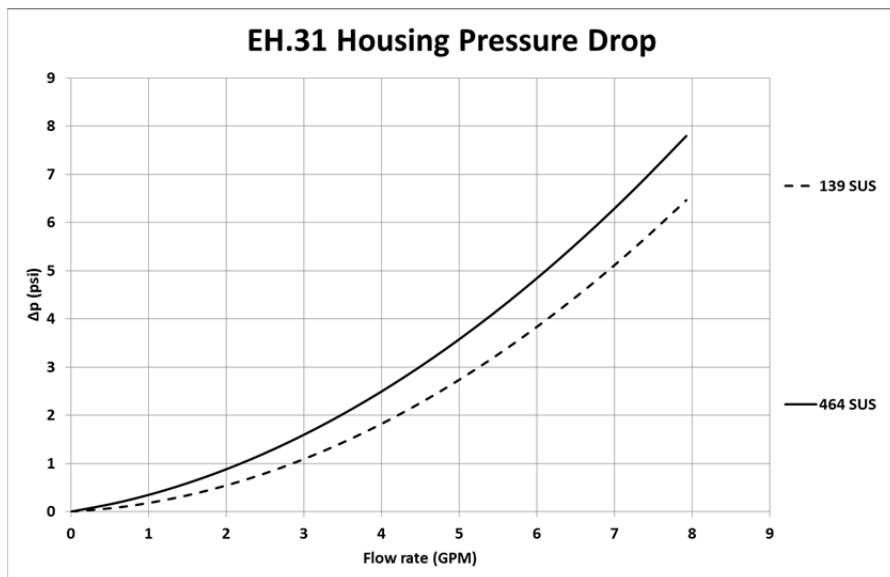
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

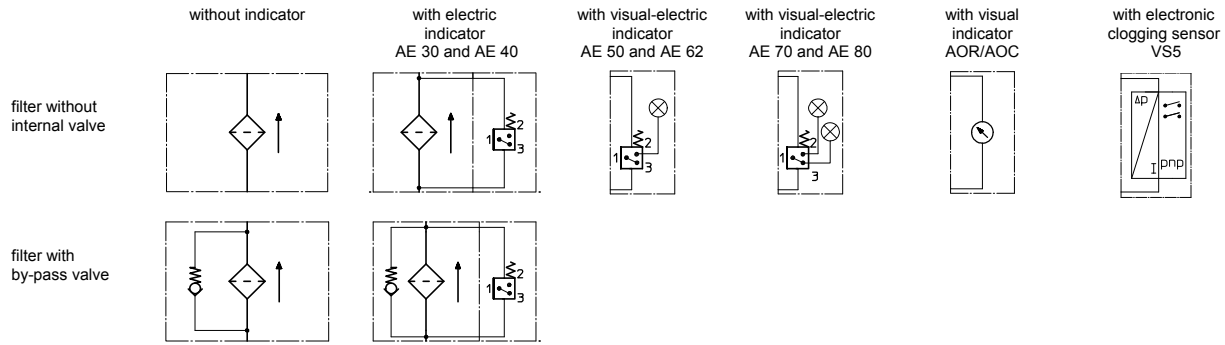
EH	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
31	12.554	8.716	5.580	4.794	3.275	0.2539	0.2369	0.1623

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01E.90...		
2	1	O-ring	11 x 3	312603 (NBR)	312727 (FPM)
3	1	O-ring	42 x 3,5	329381 (NBR)	338204 (FPM)
4	1	support ring	48 x 2,6 x 1	305391	
5	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
6	1	clogging indicator, visual-electric	AE	see sheet-no. 1615	
7	1	clogging sensor, electronic	VS5	see sheet-no. 1619	
8	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
9	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
10	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
11	1	screw plug	20913-4	314442	

item 11 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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Pressure Filter

Series EH 60-150

6000 PSI

Description:

The stainless steel pressure filters series EH 60-150 have a working pressure up to 6000 PSI. The EH-filter is in-line mounted.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head. After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

The reversing valve provides another level of protection for the filter element. The reverse flow will not be filtered.

1. Type index:

1.1. Complete filter: (ordering example)

EH.	90.	10VG.	HR.	E.	P.	VA.	UG.	4.	VA.	-.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 series:

EH = stainless steel-pressure filter

2 nominal size: 60, 90, 150

3 filter-material and filter-fineness:

80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass

4 filter element collapse rating:

30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)

5 filter element design:

E = single-end open

6 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification: (see catalog)

- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601

8 process connection:

UG = thread connection
NPT = thread connection according to ANSI B1.20.1

9 process connection size:

3 = -8 SAE or 1/2" NPT
4 = -12 SAE or 3/4" NPT
5 = -16 SAE or 1 NPT

10 filter housing specification: (see catalog)

VA = stainless steel

11 internal valve:

- = without
S1 = with by-pass valve Δp 51 PSI
S2 = with by-pass valve Δp 102 PSI
R = with reversing valve, $Q \leq 55.75$ GPM

12 clogging indicator or clogging sensor:

- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E.	90.	10VG.	HR.	E.	P.	VA
1	2	3	4	5	6	7

1 series:

01E. = filter element according to company standard

2 nominal size: 60, 90, 150

3 - 7 see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	6000 PSI
test pressure:	8700 PSI
process connection:	thread connection or ANSI B1.20.1
housing material:	EN10088 - 1.4571 (316 Ti according to AISI)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

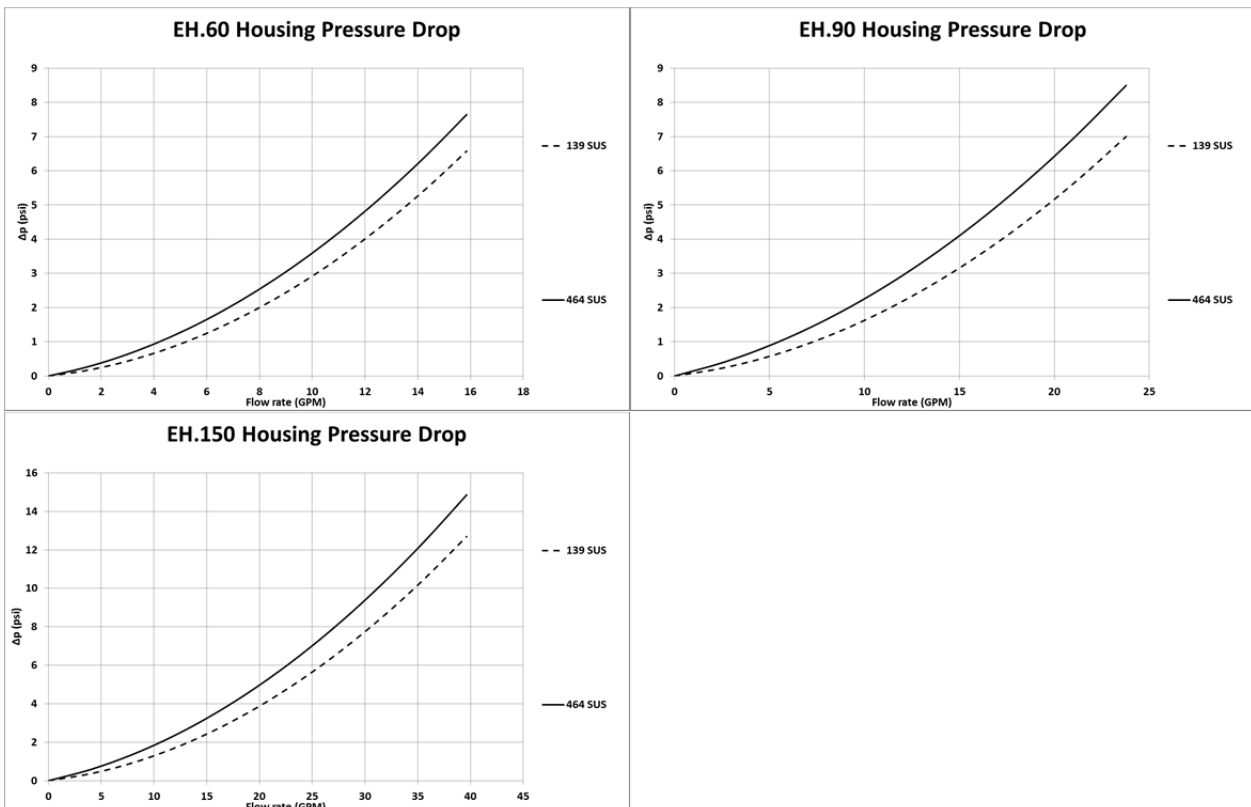
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

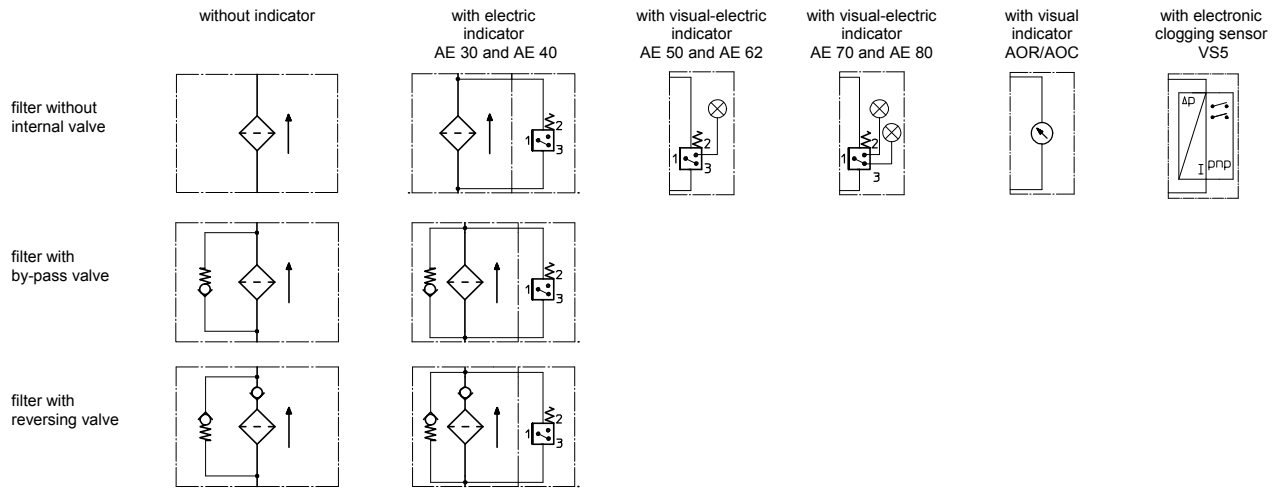
EH	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
60	6.748	4.685	2.999	2.577	1.760	0.2002	0.1868	0.1280
90	4.059	2.818	1.804	1.550	1.059	0.1210	0.1130	0.0774
150	2.422	1.681	1.076	0.925	0.632	0.0723	0.0675	0.0462

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension			article-no.	
			EH 60 01E.60...	EH 90 01E.90...	EH 150 01E.150...		
1	1	filter element					
2	1	O-ring	22 x 3,5			304341 (NBR)	304392 (FPM)
3	1	O-ring	56 x 3			305072 (NBR)	305322 (FPM)
4	1	support ring	63 x 2,6 x 1			312309	
5	1	clogging indicator, visual	AOR or AOC			see sheet no. 1606	
6	1	clogging indicator, visual-electric	AE			see sheet no. 1615	
7	1	clogging sensor, electronic	VS5			see sheet no. 1619	
8	1	O-ring	15 x 1,5			315357 (NBR)	315427 (FPM)
9	1	O-ring	22 x 2			304708 (NBR)	304721 (FPM)
10	1	O-ring	14 x 2			304342 (NBR)	304722 (FPM)
11	1	screw plug	20913-4			314442	

item 11 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
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ISO 16889	Multi-pass method for evaluating filtration performance

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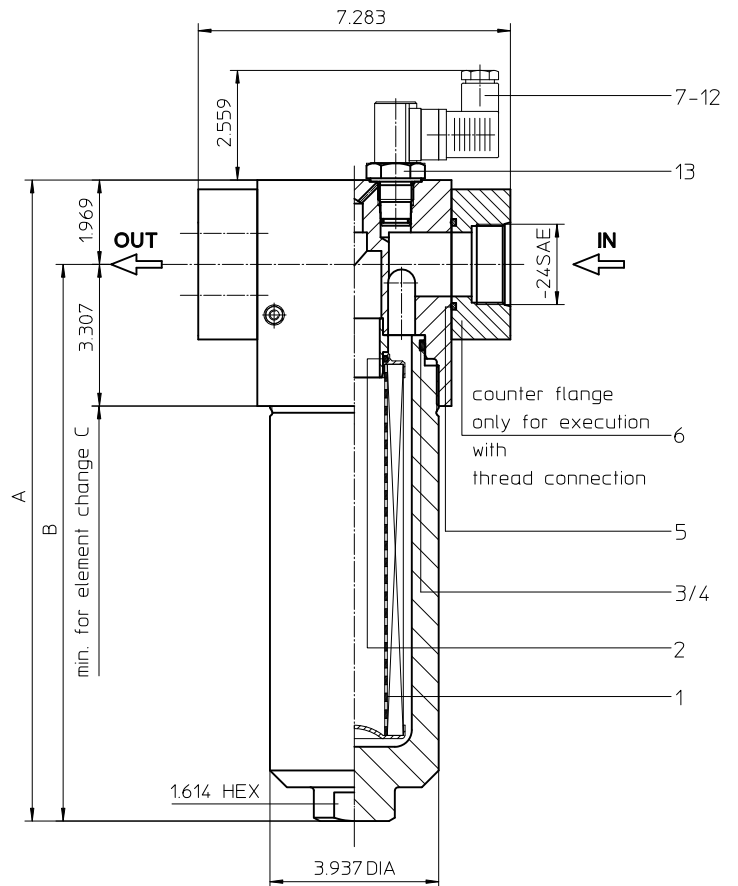
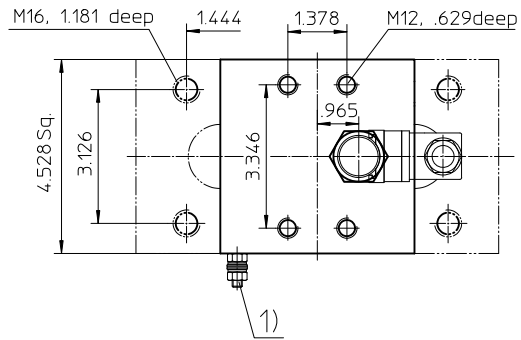
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Series EH 240-450 6000 PSI

delineation without counter flange



Dimensions:

type	EH 240	EH 450
connection	-24 SAE or SAE 1 1/2"	
A	14.96	22.24
B	12.90	20.27
C	12.59	19.68
weight approx.	48 lbs.	66 lbs.
volume tank	.22 Gal.	.40 Gal.

1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series EH 240-450

6000 PSI

Description:

The stainless steel pressure filters series EH 240-450 have a working pressure up to 6000 PSI. The EH-filter is in-line mounted.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head. After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

The reversing valve provides another level of protection for the filter element. The reverse flow will not be filtered.

1. Type index:

1.1. Complete filter: (ordering example)

EH.240.10VG.HR. E. P. VA. FS. 7. VA. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- | | |
|----|--|
| 1 | series:
EH = stainless steel-pressure filter |
| 2 | nominal size: 240, 450 |
| 3 | filter-material and filter-fineness:
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass |
| 4 | filter element collapse rating:
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI) |
| 5 | filter element design:
E = single-end open |
| 6 | sealing material:
P = Nitrile (NBR)
V = Viton (FPM) |
| 7 | filter element specification: (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601 |
| 8 | process connection:
UG = thread connection
FS = SAE-flange 6000 PSI |
| 9 | process connection size:
7 = 1 1/2" |
| 10 | filter housing specification:
VA = stainless steel |
| 11 | internal valve:
- = without
S1 = with by-pass valve Δp 51 PSI
S2 = with by-pass valve Δp 102 PSI
R = with reversing valve, $Q \leq 55.75$ GPM |
| 12 | clogging indicator or clogging sensor:
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619 |

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E.240.10VG.HR. E. P. VA

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- | | |
|---|---|
| 1 | series:
01E. = filter element according to company standard |
| 2 | nominal size: 240, 450 |
| 3 | - 7 \| see type index-complete filter |

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	6000 PSI
test pressure:	8700 PSI
process connection:	thread connection or SAE-flange 6000 PSI
housing material:	EN10088 - 1.4571 (316 Ti according to AISI)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

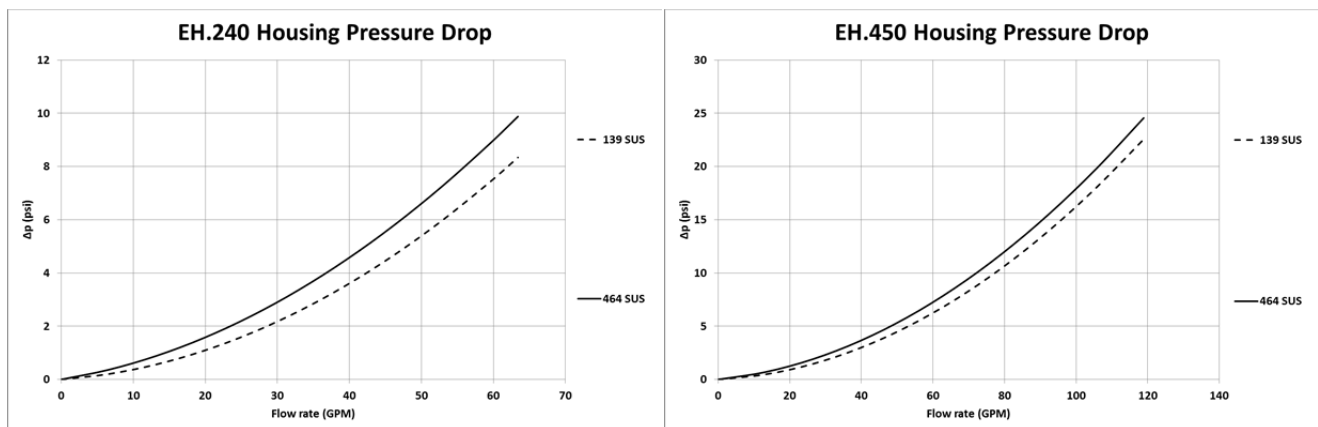
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

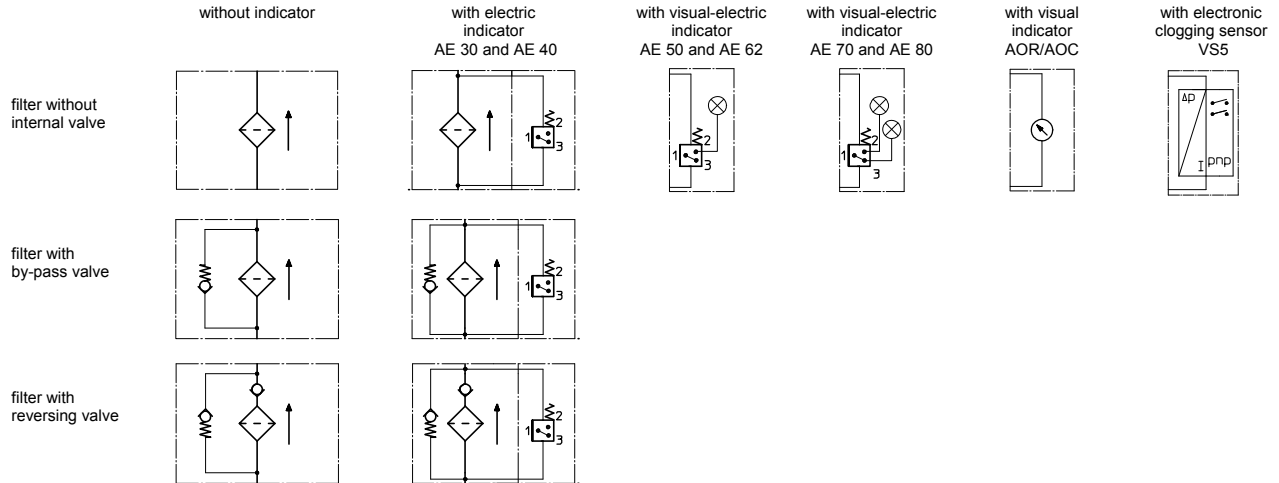
EH	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
240	2.092	1.452	0.930	0.799	0.546	0.0651	0.0607	0.0416
450	1.126	0.782	0.500	0.430	0.294	0.0349	0.0326	0.0223

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension		article-no.	
			EH 240	EH 450		
1	1	filter element	01E.240...	01E.450...		
2	1	O-ring	34 x 3,5		304338 (NBR)	304730 (FPM)
3	1	O-ring	76 x 4		305599 (NBR)	310291 (FPM)
4	1	support ring	84 x 3,2 x 1,5		312307	
5	2	O-ring (only with counter flange)	47,22 x 3,53		305078 (NBR)	310269 (FPM)
6	2	counter flange 6000 PSI	SAE 1 1/2"		322274	
7	1	clogging indicator, visual	AOR or AOC		see sheet no. 1606	
8	1	clogging indicator, visual-electric	AE		see sheet no. 1615	
9	1	clogging sensor, electronic	VS5		see sheet no. 1619	
10	1	O-ring	15 x 1,5		315357 (NBR)	315427 (FPM)
11	1	O-ring	22 x 2		304708 (NBR)	304721 (FPM)
12	1	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
13	1	screw plug	20913-4		314442	

item 13 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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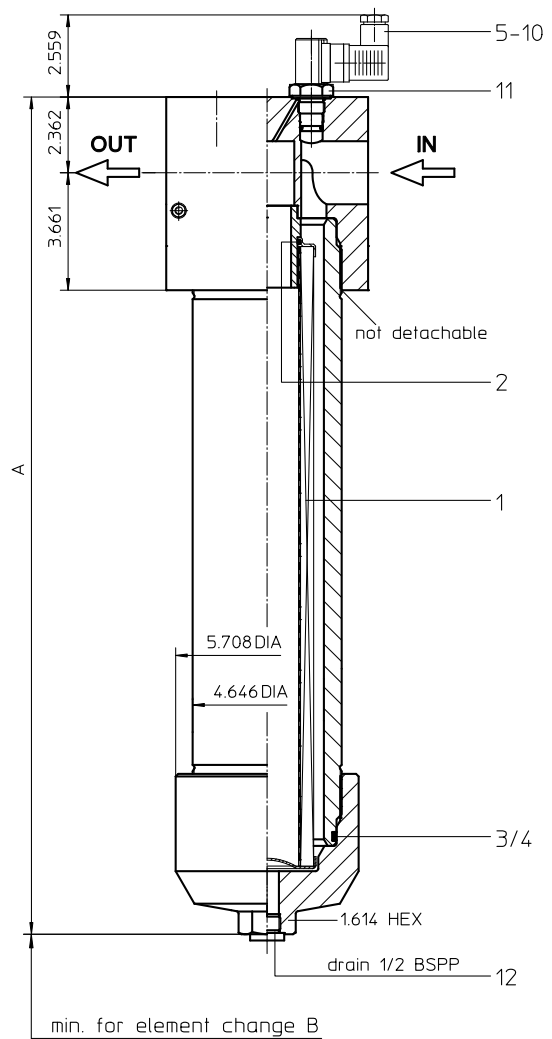
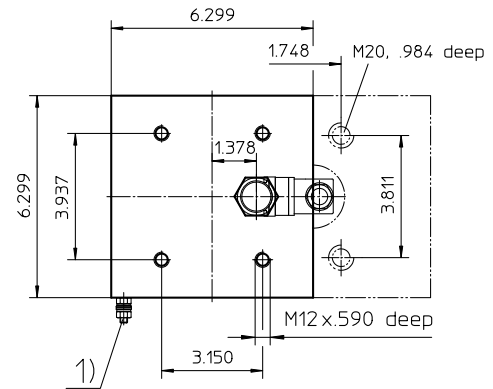
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Series EH 601-1351

4568 PSI



Dimensions:

type	EH 601	EH 901	EH 1351
connection	SAE 2"		
A	20.47	23.37	36.14
B	12.20	18.11	27.95
weight approx.	108 lbs.	123 lbs.	150 lbs.
volume tank	.55 Gal.	.82 Gal.	1.21 Gal.

1) Connect the stand grounding tab to a suitable earth ground point.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Pressure Filter

Series EH 601-1351

4568 PSI

Description:

The stainless steel pressure filters series EH 601-1351 have a working pressure up to 4568 PSI. The EH-filter is in-line mounted.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The internal valve is integrated into the filter head. After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

The reversing valve provides another level of protection for the filter element. The reverse flow will not be filtered.

1. Type index:

1.1. Complete filter: (ordering example)

EH.901.10VG.HR. E. P. VA. FS. 8. VA. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- | | |
|----|--|
| 1 | series:
EH = stainless steel-pressure filter |
| 2 | nominal size: 601, 901, 1351 |
| 3 | filter-material and filter-fineness:
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass |
| 4 | filter element collapse rating:
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI) |
| 5 | filter element design:
E = single-end open |
| 6 | sealing material:
P = Nitrile (NBR)
V = Viton (FPM) |
| 7 | filter element specification: (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601 |
| 8 | process connection:
FS = SAE-flange 6000 PSI |
| 9 | process connection size:
8 = 2" |
| 10 | filter housing specification:
VA = stainless steel |
| 11 | internal valve:
- = without
S1 = with by-pass valve Δp 51 PSI
S2 = with by-pass valve Δp 102 PSI
R = with reversing valve, $Q \leq 122.94$ GPM |
| 12 | clogging indicator or clogging sensor:
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electric, see sheet-no. 1615
VS5 = electronic, see sheet-no. 1619 |

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E.900.10VG.HR. E. P. VA

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- | | |
|---|---|
| 1 | series:
01E. = filter element according to company standard |
| 2 | nominal size: 600, 900, 1350 |
| 3 | - 7 \| see type index-complete filter |

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	4568 PSI
test pressure:	6525 PSI
process connection:	SAE-flange 6000 PSI
housing material:	EN10088 - 1.4571 (316 Ti according to AISI)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

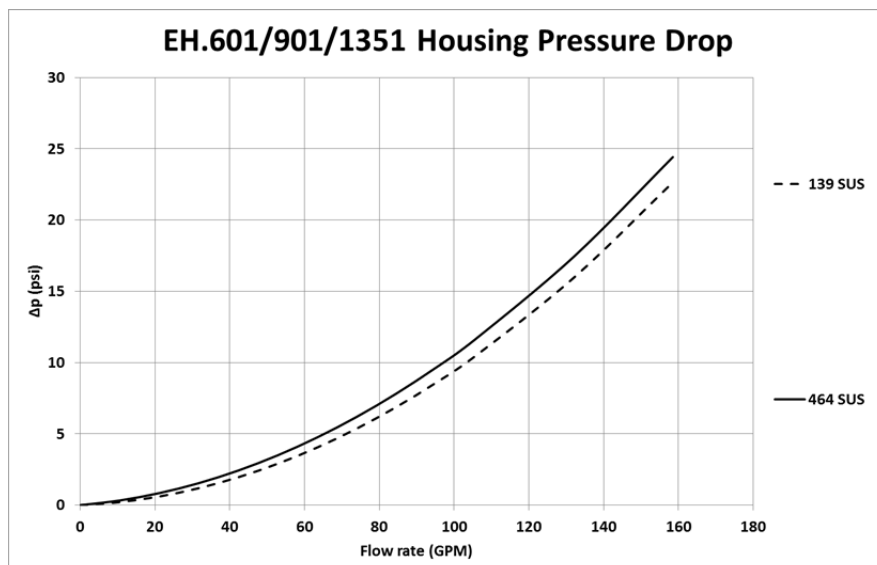
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

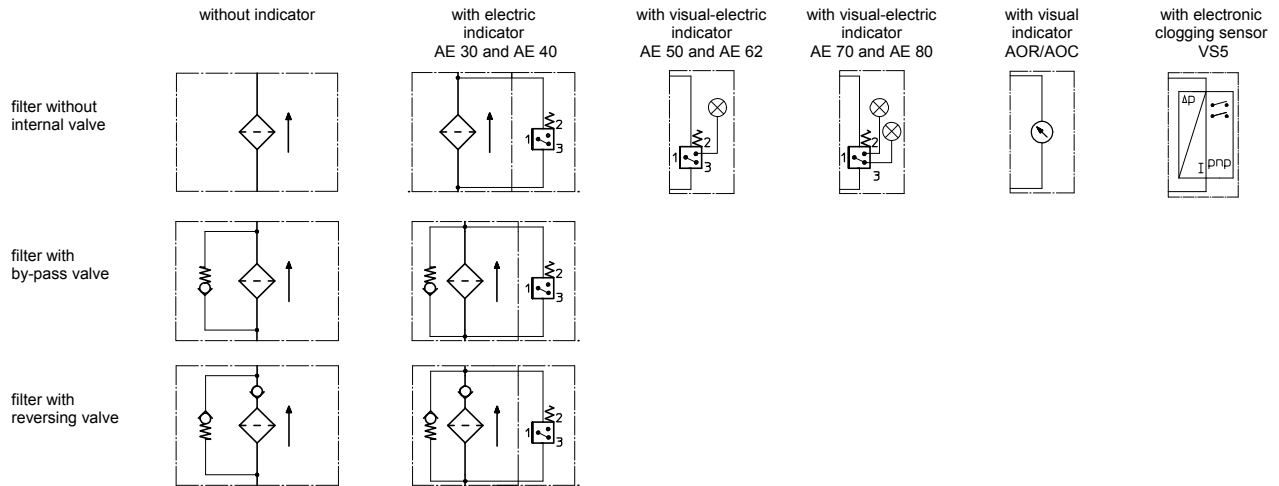
EH	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
601	0.963	0.669	0.428	0.368	0.251	0.0303	0.0282	0.0193
901	0.668	0.464	0.297	0.225	0.174	0.0189	0.0177	0.0121
1351	0.417	0.290	0.185	0.185	0.109	0.0122	0.0114	0.0078

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension			article-no.	
			EH 601	EH 901	EH 1351		
1	1	filter element	01E.600...	01E.900...	01E.1350...		
2	1	O-ring		48 x 3		304357 (NBR)	304404 (FPM)
3	1	O-ring		98 x 4		301914 (NBR)	304765 (FPM)
4	1	support ring		110 x 3,5 x 2		304802	
5	1	clogging indicator, visual		AOR or AOC		see sheet no. 1606	
6	1	clogging indicator, visual-electrical		AE		see sheet no. 1615	
7	1	clogging sensor, electronic		VS1		see sheet no. 1617	
8	1	O-ring		15 x 1,5		315357 (NBR)	315427 (FPM)
9	1	O-ring		22 x 2		304708 (NBR)	304721 (FPM)
10	1	O-ring		14 x 2		304342 (NBR)	304722 (FPM)
11	1	screw plug		20913-4		314442	
12	1	screw plug		½ BSPP		306966	

item 11 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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07251-500 – Guarulhos, Brazil
Tel: +55 11 2465-8822

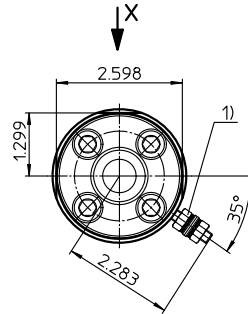
For more information, please

email us at filtration@eaton.com
or visit www.eaton.com/filtration

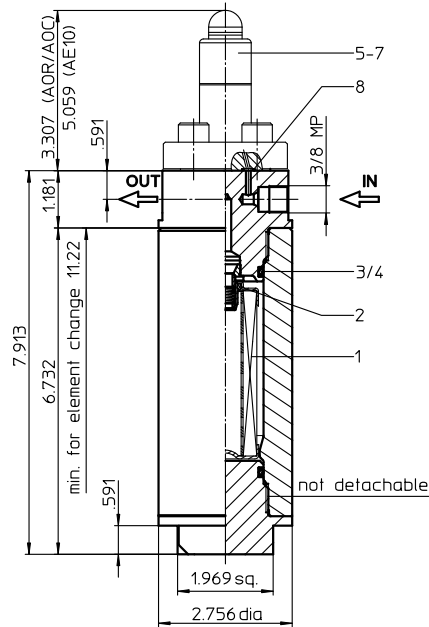
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Series EHP 31

11600/20300 PSI

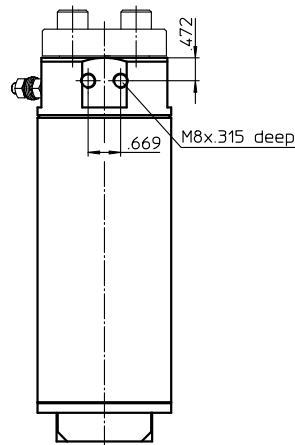


filter with clogging indicator



view X

filter with blind flange
(execution without clogging indicator)



1) Connect the stand grounding tab to a suitable earth ground point.

Weight: approx. 6.5 lbs
Dimensions: inches

Designs and performance values are subject to change.

EDV 09/15



Powering Business Worldwide

Stainless Steel-Pressure Filter Series EHP 31 11600/20300 PSI

Description:

Stainless steel pressure filter series EHP 31 have a working pressure up to 11600 or 20300 PSI. Pressure peaks can be absorbed with a sufficient safety margin. The HP-filter is in-line mounted.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

The bypass valve is integrated into the filter head.

After reaching the bypass pressure setting, the bypass valve will send unfiltered partial flow around the filter.

1. Type index:

1.1. Complete filter: (ordering example)

EHP. 31. 10VG. HR. E. P. VA. NPT. 3. -. VA. -. 800

1	2	3	4	5	6	7	8	9	10	11	12	13
1	series: EHP = stainless steel-pressure filter											
2	nominal size: 31											
3	filter-material and filter-fineness: 80G, 40G, 25G, 10G stainless steel wire mesh 25VG, 16VG, 10VG, 6VG, 3VG microglass											
4	filter element collapse rating: 30 = Δp 435 PSI HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)											
5	filter element design: E = single-end open											
6	sealing material: P = Nitrile (NBR) V = Viton (FPM)											
7	filter element specification: (see catalog) - = standard VA = stainless steel ISO6 = for HFC application, see sheet-no. 31601											
8	process connection: UG2 = autoclave medium pressure NPT = thread connection											
9	process connection size: 2 = MP 3/8" (9/16"-18UNF) 3 = NPT 1/2											
10	internal valve: - = without S1 = with by-pass valve Δp 51 PSI S2 = with by-pass valve Δp 102 PSI											
11	filter housing specification: VA = stainless steel											
12	clogging indicator or clogging sensor: - = without AOR = visual, see sheet-no. 46041 AOC = visual, see sheet-no. 61565 AE10 = visual-electric, see sheet-no. 46042											
13	pressure level: 800 = max. operating pressure 11600 PSI 1400 = max. operating pressure 20300 PSI											

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 30. 10VG. HR. E. P. VA

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1	series: 01E. = filter element according to company standard					
2	nominal size: 30					
3	-	7	see type index-complete filter			

Technical data:

design temperature:	14 °F to +212 °F				
operating temperature:	14 °F to +176 °F				
operating medium:	mineral oil, other media on request				
max. operating pressure:	<table border="1"> <tr> <td>11600 PSI</td> <td>20300 PSI</td> </tr> </table>	11600 PSI	20300 PSI		
11600 PSI	20300 PSI				
test pressure:	<table border="1"> <tr> <td>16600 PSI</td> <td>29000 PSI</td> </tr> </table>	16600 PSI	29000 PSI		
16600 PSI	29000 PSI				
process connection:	thread connection				
housing material:	<table border="1"> <tr> <td>EN10088-3 - 1.4462</td> <td>11600 PSI</td> </tr> <tr> <td>EN10088-3 - 1.4418 + QT900</td> <td>20300 PSI</td> </tr> </table>	EN10088-3 - 1.4462	11600 PSI	EN10088-3 - 1.4418 + QT900	20300 PSI
EN10088-3 - 1.4462	11600 PSI				
EN10088-3 - 1.4418 + QT900	20300 PSI				
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request				
installation position:	vertical				

Pressure stage 11600: Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Pressure stage 20300: Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 1.1.b)
 Category I (Modul A)
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) - \text{characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

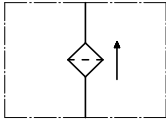
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

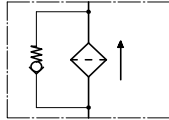
EHP	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
31	12.554	8.716	5.580	4.794	3.275	0.2539	0.2369	0.1623

Symbols:

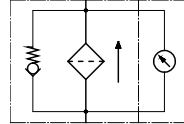
filter without internal valve



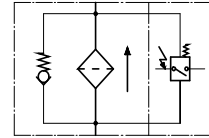
filter with by-pass valve



filter with visual clogging indicator



filter with electrical clogging indicator



Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01E.30....	328344	
2	1	O-ring	11 x 3	312603 (NBR)	312727 (FPM)
3	1	O-ring	34 x 3	330601 (NBR)	340165 (FPM)
4	2	support ring	40 x 2,6 x 1	330602	
5	1	clogging indicator, visual	AOR.46041	see sheet-no. 46041	
6	1	clogging indicator, visual	AOC.61565	see sheet-no. 61565	
7	1	clogging indicator, electric	AE.10.46042	see sheet-no. 46042	
8	2	O-ring (only with execution clogging indicator)	4 x 1,5	326913 (NBR)	329675 (FPM)

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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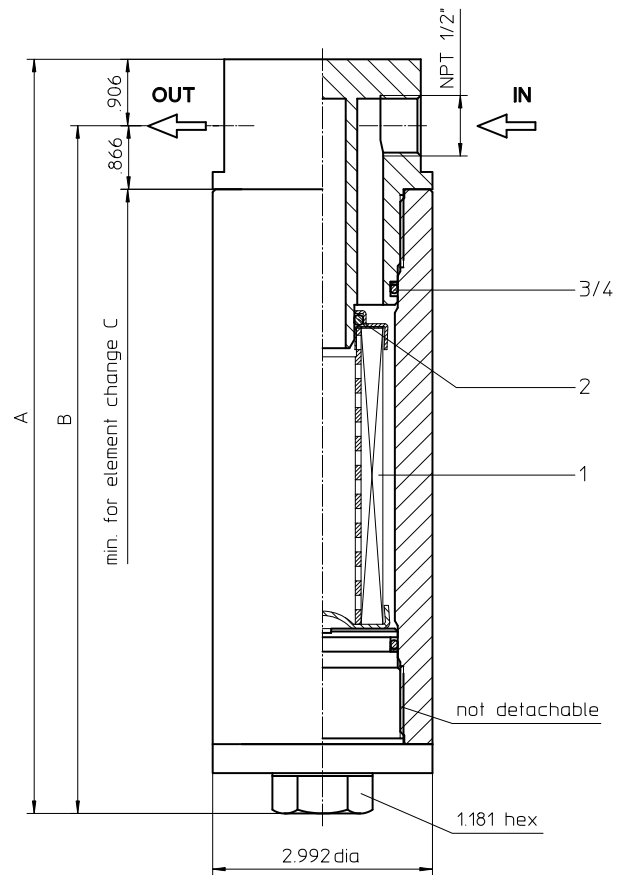
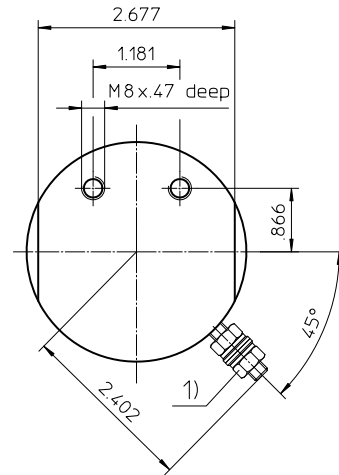
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Series EHP 60-90 10150/20300 PSI



Dimensions:

type	EHP 60	EHP 90
A	10.27	12.83
B	9.37	11.93
C	14.17	16.73
weight	18 lbs.	22 lbs.
volume tank	.08 Gal.	.10 Gal.

1) Connect the stand grounding tab to a suitable earth ground point.

Weight: approx. 6.5 lbs
Dimensions: inches

Designs and performance values are subject to change.

Stainless Steel-Pressure Filter

Series EHP 60-90

10150/20300 PSI

Description:

Stainless steel pressure filter series EHP 60-90 have a working pressure up to 11600 or 20300 PSI. Pressure peaks can be absorbed with a sufficient safety margin. The EHP-filter is in-line mounted.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 4 $\mu\text{m}_{(c)}$.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

Eaton filter elements are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.

Eaton filter elements are available up to a pressure resistance of Δp 2320 PSI and a rupture strength of Δp 3625 PSI.

1. Type index:

1.1. Complete filter: (ordering example)

EHP. 90. 10VG. HR. E. P. VA. NPT. 3. VA. 700

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

- 1 | **series:**
EHP = stainless steel-pressure filter
- 2 | **nominal size:** 60, 90
- 3 | **filter-material and filter-fineness:**
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
- 4 | **filter element collapse rating:**
30 = Δp 435 PSI
HR = Δp 2320 PSI (rupture strength Δp 3625 PSI)
- 5 | **filter element design:**
E = single-end open
- 6 | **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 | **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC application, see sheet-no. 31601
- 8 | **process connection:**
NPT = thread connection
- 9 | **process connection size:**
3 = NPT $\frac{1}{2}$
- 10 | **filter housing specification:**
VA = stainless steel
- 11 | **pressure level:**
700 = max. operating pressure 10150 PSI
1400 = max. operating pressure 20300 PSI

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01E. 90. 10VG. HR. E. P. VA

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 | **series:**
01E. = filter element according to company standard
- 2 | **nominal size:** 60, 90
- 3 | - 7 | see type index-complete filter

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium:	mineral oil, other media on request
max. operating pressure:	10150 PSI | 20300 PSI
test pressure:	14500 PSI | 29000 PSI
process connection:	thread connection
housing material:	EN10088-3 - 1.4418 + QT900
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Pressure stage 11600: Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Pressure stage 20300: Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 1.1.b)
 Category I (Modul A)
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) - \text{characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

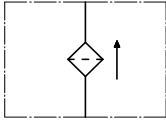
For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

EHP	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
60	6.748	4.685	2.999	2.577	1.760	0.2002	0.1868	0.1280
90	4.059	2.818	1.804	1.550	1.059	0.1210	0.1130	0.0774

Symbol:



Spare parts:

item	qty.	designation	dimension		article-no.	
			EHP 60 01E.60...	EHP 90 01E.90...		
1	1	filter element				
2	1	O-ring	22 x 3,5		304341 (NBR)	304392 (FPM)
3	1	O-ring	45 x 3		304991 (NBR)	304997 (FPM)
4	1	support ring	52 x 2,6 x 1		311013	

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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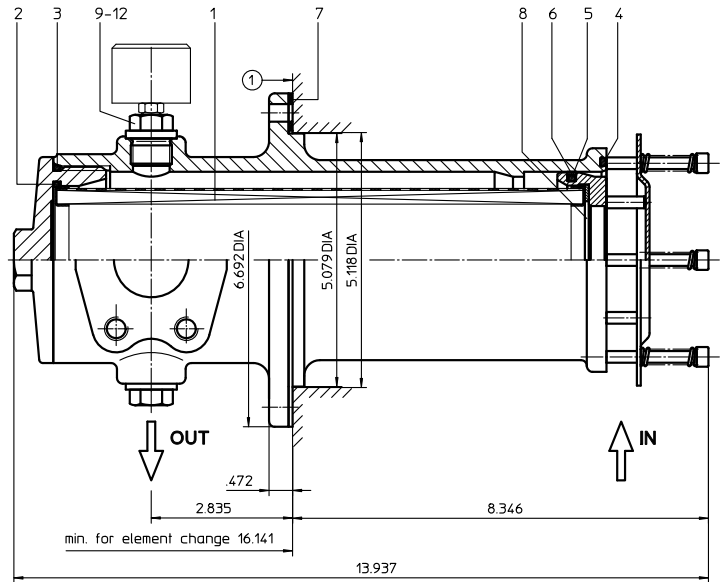
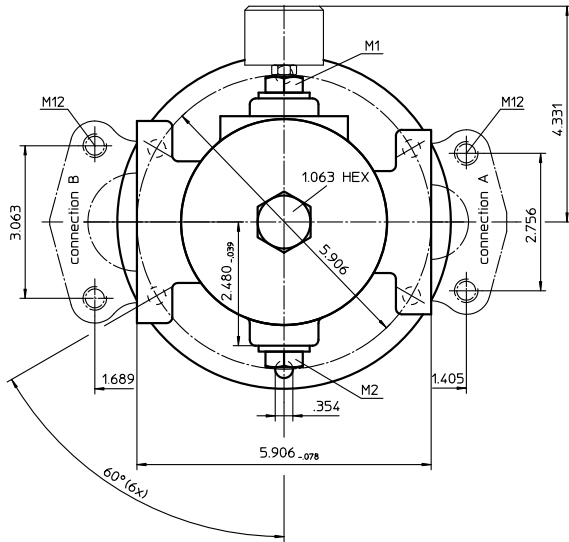
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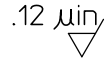
Series AS 220



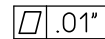
mounting surface



surface quality



flatness tolerance



Weight: approx. 10 lbs.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Suction Filter Series AS 220

Description:

The AS suction filters are horizontally or vertically mounted to the reservoir and connected directly to the suction-line. The filter housing consists of high quality aluminum material.

The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive.

Eaton filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

The suction filter is easy to service. When releasing the filter lid, a plate valve closes the suction-inlet of the filter and prevents the return flow of dirty oil to the reservoir. When mounted horizontally, it is not possible to drain the reservoir. After cleaning the element, the filter is ready for operation.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

1. Type index:

1.1. Complete filter: (ordering example)

AS. 220. 40G. - . B. P. - . FS. 8. - . O1. -											
1	2	3	4	5	6	7	8	9	10	11	12

- 1 | **series:**
AS = suction filter
- 2 | **nominal size:** 220
- 3 | **filter-material and filter-fineness:**
40G stainless steel wire mesh
- 4 | **filter element collapse rating:**
- = not specified
- 5 | **filter element design:**
B = both sides open
- 6 | **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 | **filter element specification:**
- = standard
VA = stainless steel
- 8 | **process connection:**
FS = SAE-flange 3000 PSI
- 9 | **no. of version:**

version	7	4	8
connection A type size	-	FS	FS
	-	7	7
connection B type size	FS	-	FS
	8	-	8

type: FS = SAE-flange 3000 PSI
size: - = no connection
7 = 1 1/2"
8 = 2"
- 10 | **filter housing specification:**
- = standard
- 11 | **clogging indicator at M1:**
- = without
O1 = visual, see sheet-no. 1616
E4.-0,25 = pressure switch, see sheet-no. 1616
- 12 | **clogging indicator at M2:**
possible indicators see position 11 of the type index

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01AS. 220. 40G. - . B. - . -						
1	2	3	4	5	6	7

- 1 | **series:**
01AS. = suction filter element according to company standard
- 2 | **nominal size:** 220
- 3 | - 5 | / 7 | see type index-complete filter
- 6 | **seling material:**
- = without

Accessories:

- SAE-counter flanges, see sheet-no. 1652

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
process connection:	SAE-flange 3000 PSI
housing material:	G-AlSi10Mgwa DIN 1725 (3.2381.61)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	optional
volume tank:	.42 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

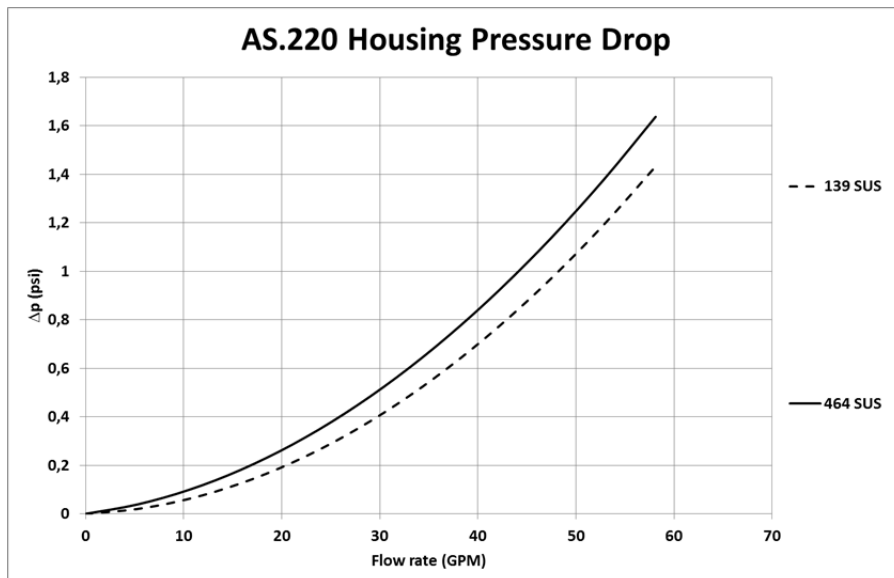
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

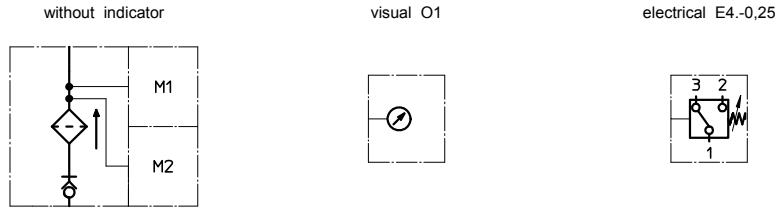
AS	G
	40G
220	0.0491

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension	article-no.
1	1	filter element	01AS.220...	
2	1	O-ring	75 x 3	302215 (NBR) | 304729 (FPM)
3	1	O-ring	88 x 3	304417 (NBR) | 310266 (FPM)
4	1	O-ring	96 x 4	305190 (NBR) | 308148 (FPM)
5	1	O-ring	78 x 3,5	311610 (NBR) | 314696 (FPM)
6	1	sliding ring	20165-4	305194
7	1	gasket	.079 thick	305135
8	1	sliding ring	20164-4	305199
9	2	screw plug	½ BSPP	309730
10	2	gasket	A 21 x 26	309815
11	1	clogging indicator, visual	O1	301722
12	1	clogging indicator, electric	E4.-0,25	301725

Test methods:

Filter elements are tested according to the following ISO standards:

- ISO 2941 Verification of collapse/burst resistance
- ISO 2942 Verification of fabrication integrity
- ISO 2943 Verification of material compatibility with fluids
- ISO 3723 Method for end load test
- ISO 3724 Verification of flow fatigue characteristics
- ISO 3968 Evaluation of pressure drop versus flow characteristics
- ISO 16889 Multi-pass method for evaluating filtration performance

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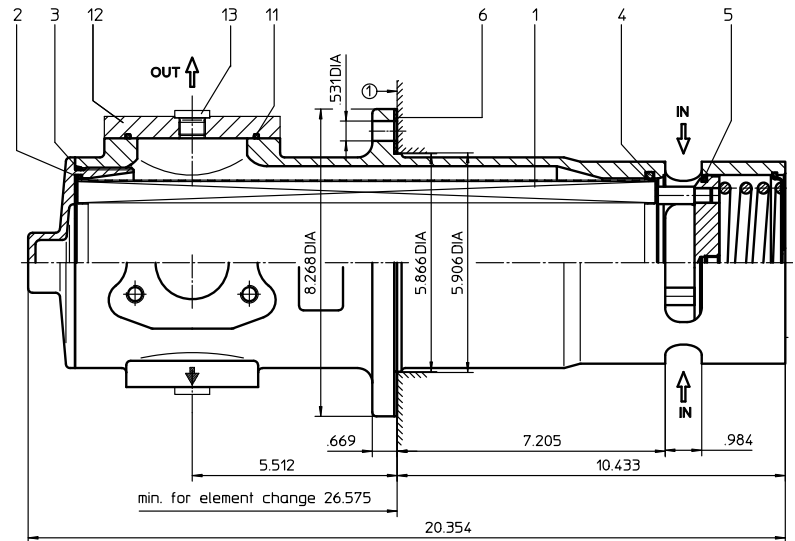
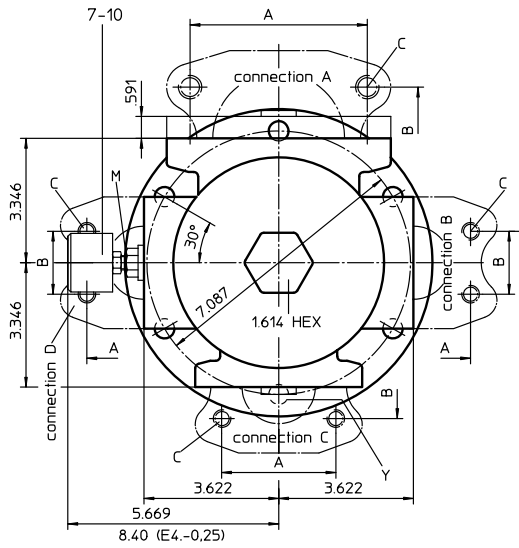
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Series AS 632



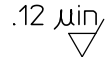
Dimensions:

connection size	2"	2 1/2"	3"	3 1/2"
dimension A	3.07	3.50	4.18	4.76
dimension B	1.69	2.01	2.44	2.76
thread C	M12, .71 deep	M12, .71 deep	M16, .87 deep	M16 .87 deep

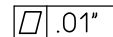
mounting surface



surface quality



flatness tolerance



Weight: approx. 26 lbs.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Suction Filter Series AS 632

Description:

The AS suction filters are horizontally or vertically mounted to the reservoir and connected directly to the suction-line. The filter housing consists of high quality aluminum material.

The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive.

Eaton filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

The suction filter is easy to service. When releasing the filter lid, a plate valve closes the suction-inlet of the filter and prevents the return flow of dirty oil to the reservoir. When mounted horizontally, it is not possible to drain the reservoir. After cleaning the element, the filter is ready for operation.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

1. Type index:

1.1. Complete filter: (ordering example)

AS. 632. 40G. -. B. P. -. FS. 11. -. O1

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

- 1 | **series:**
AS = suction filter
- 2 | **nominal size:** 632
- 3 | **filter-material and filter-fineness:**
40G stainless steel wire mesh
- 4 | **filter element collapse rating:**
- = not specified
- 5 | **filter element design:**
B = both sides open
- 6 | **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 | **filter element specification:**
- = standard
VA = stainless steel
- 8 | **process connection:**
FS = SAE-flange 3000 PSI
- 9 | **no. of version:**

version	1	5	6	10	11	12	14	21
connection A type size	XY	XY	XY	FS A1	FS A1	FS A1	-	FS A
connection B type size	Y	M	M	FS 8	FS 9	-	FS 8	Y
connection C type size	FS 8	FS 9	FS 9	Y	Y	Y	FS 8	Y
connection D type size	FS 8	FS 9	-	Y	M	M	FS 8	FS 8

type: FS = SAE-flange 3000 PSI **size:** 8 = 2"
M = adapter M18x1,5 – R1/8 9 = 2 1/2"
Y = drain M18x1,5 A = 3"
X = adapter SAE 3" – M18x1,5 A1 = 3 1/2"
- = no connection

- 10 | **filter housing specification:**
- = standard
- 11 | **clogging indicator at M1:**
- = without
O1 = visual, see sheet-no. 1616
E4.-0,25 = pressure switch, see sheet-no. 1616

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01AS. 631. 40G. -. B. -. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 | **series:**
01AS. = suction filter element according to company standard
- 2 | **nominal size:** 631
- 3 | - 5 | / 7 | see type index-complete filter
- 6 | **seling material:**
- = without

Accessories:

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
process connection:	SAE-flange 3000 PSI
housing material:	G-AlSi10Mgwa DIN 1725 (3.2381.61)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	optional
volume tank:	1.6 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) - \text{characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

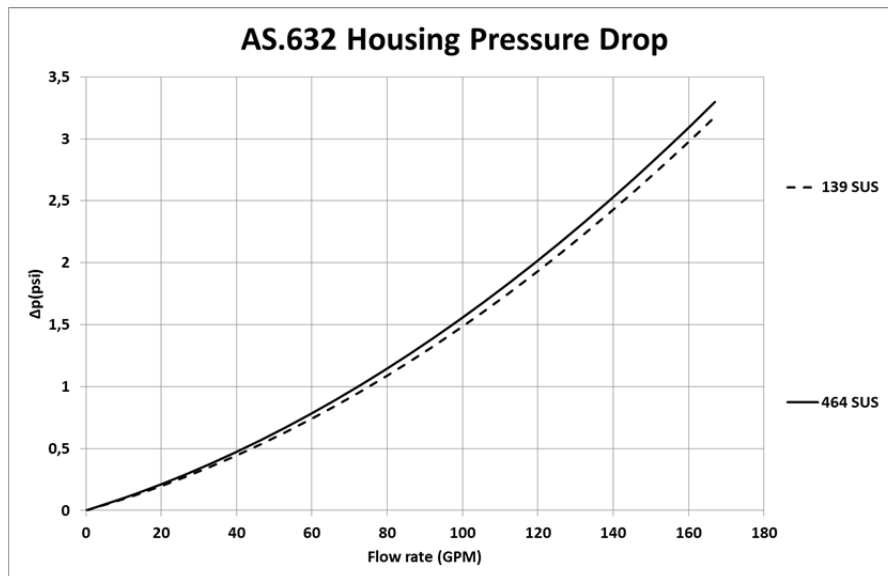
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

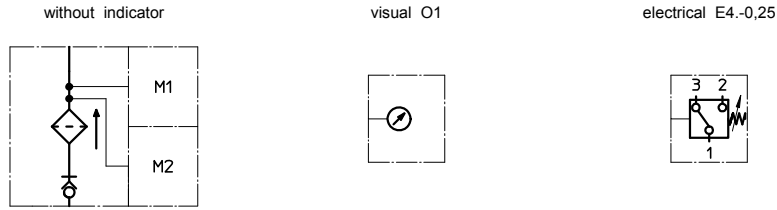
AS	G
	40G
632	0.0193

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01AS.631...		
2	1	O-ring	115 x 3	303963 (NBR)	307762 (FPM)
3	1	O-ring	125 x 3	306025 (NBR)	307358 (FPM)
4	1	O-ring	115 x 5	306640 (NBR)	310287 (FPM)
5	1	O-ring	104,37 x 3,53	304339 (NBR)	304390 (FPM)
6	1	gasket	.078 thick		305160
7	1	adapter M18 x 1,5 - 1/8 BSPP	30505-4		317114
8	2	gasket	A18 x 24x1,5		305136
9	1	clogging indicator, visual	O1		301722
10	1	clogging indicator, electrical	E4.-0,25		301725
11	1	O-ring	85,32 x 3,53	305590 (NBR)	306308 (FPM)
12	1	adapter SAE 3" - M18 x 1,5	30294-3		317048
13	1	screw plug	M18 x 1,5		305193

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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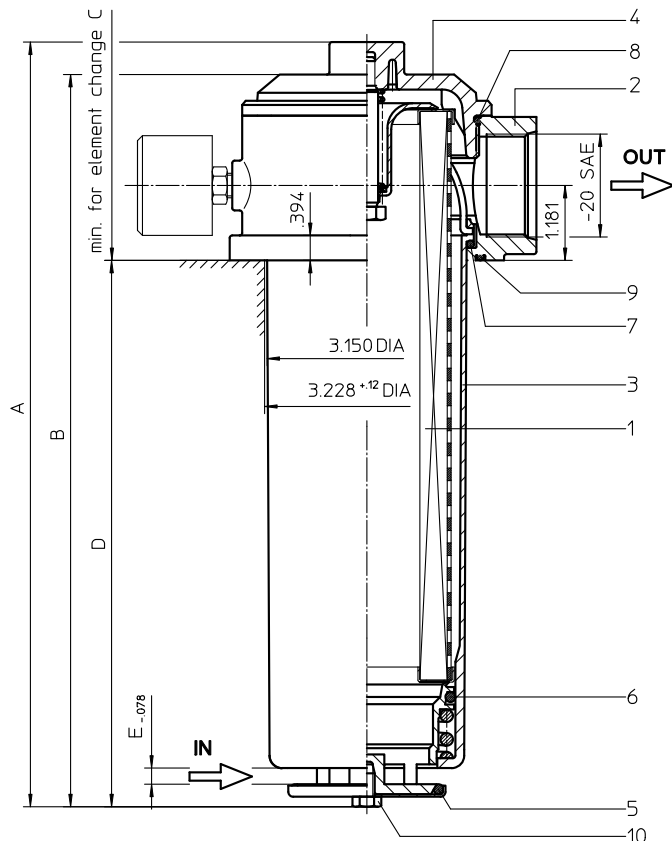
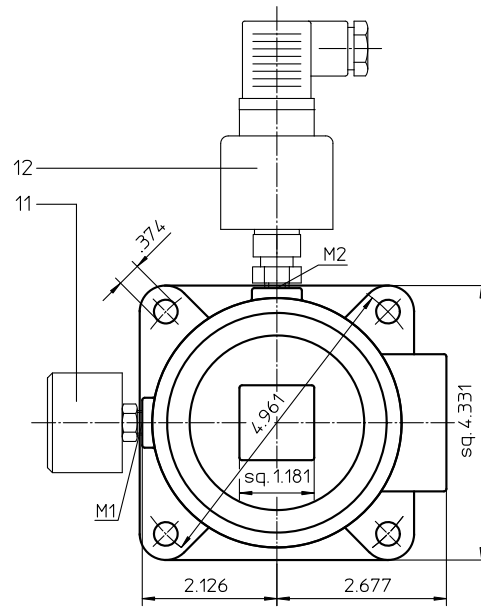
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Series TS 210-310



Dimensions:

type	TS 210	TS 310
connection	-20 SAE	-20 SAE
A	12.09	15.47
B	11.57	14.96
C	11.42	14.76
D	8.62	12.00
E	.26	.30
weight	5.10 lbs.	6.60 lbs.
volume tank	.30 Gal.	.40 Gal.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Suction Filter

Series TS 210-310

Description:

The TS-filters are directly mounted to the reservoir and connected to the suction-line. The suction inlet connection must be below the oil level.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

Eaton filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

For filtration finer than 40 µm use the disposable elements made of microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements on request.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

When removing the filter cover, a plate-shaped valve closes the suction-inlet of the filter bowl and prevents dirty oil from flowing into the tank. For cleaning, the filter bowl and the filter element can be taken out of the filter head.

1. Type index:

1.1. Complete filter: (ordering example)

TS. 210. 10VG. - . B. P. - . UG. 6. - . - . O1. E4												
1	2	3	4	5	6	7	8	9	10	11	12	13

- 1 | **series:**
TS = suction filter for vertical tank-mounting
- 2 | **nominal size:** 210, 310
- 3 | **filter-material and filter-fineness:**
80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
10P paper
- 4 | **resistance of pressure difference for filter element:**
- = not specified
- 5 | **filter element design:**
B = both sides open
- 6 | **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 | **filter element specification:**
- = standard
VA = stainless steel
- 8 | **process connection:**
UG = thread connection
- 9 | **process connection size:**
6 = -20 SAE
- 10 | **filter housing specification:**
- = standard
- 11 | **internal valve:**
- = without
S = with by-pass valve Δp 4.1 PSI
- 12 | **clogging indicator at M1:**
- = without
O1 = visual, see sheet-no. 1616
E4 = pressure switch, see sheet-no. 1616
- 13 | **clogging indicator at M2:**
possible indicators see position 12 of the type index

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01TS. 210. 10VG. - . B. - . -						
1	2	3	4	5	6	7

- 1 | **series:**
01TS. = suction filter element according to company standard
- 2 | **nominal size:** 210, 310
- 3 | - 5 | / 7 | see type index-complete filter
- 6 | **seling material:**
- = without

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
process connection:	thread connection
housing material:	Al-casting, glass fiber reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

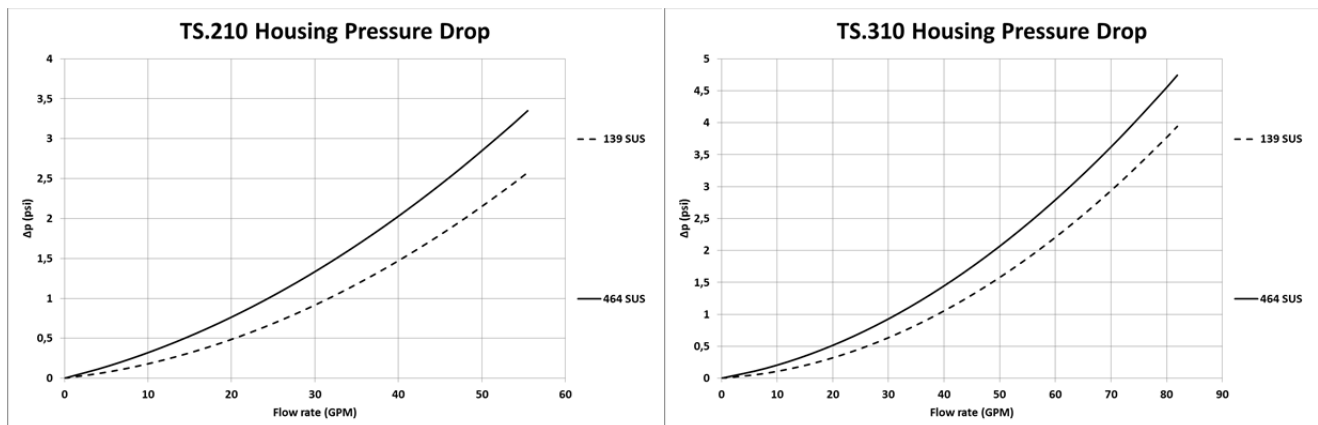
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

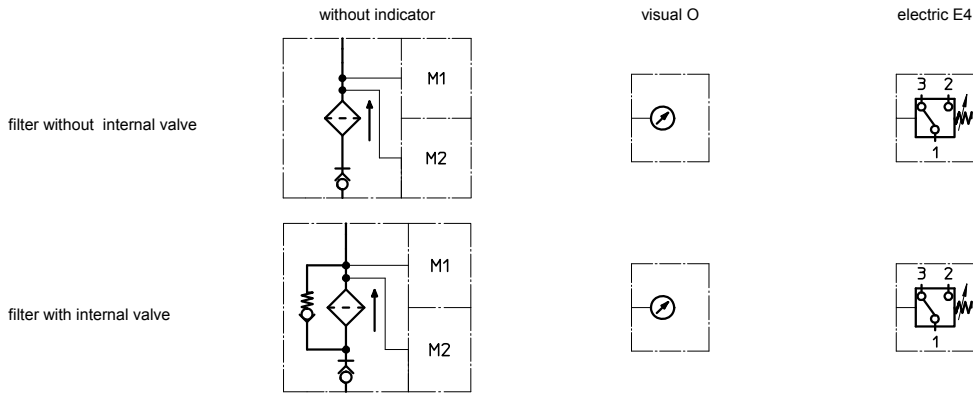
TS	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
210	2.250	1.562	1.000	0.871	0.595	0.0826	0.0612	0.0571	0.443
310	1.628	1.130	0.724	0.630	0.430	0.0598	0.0443	0.0413	0.321

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension		article-no.	
			TS 210	TS 310		
1	1	filter element	01TS.210...	01TS.310...		
2	1	filter head			304423	
3	1	filter bowl			304518.1	
4	1	filter cover	M 90 x 2			
5	1	O-ring	53 x 4		309143 (NBR)	332434 (FPM)
6	1	O-ring	62 x 4		308045 (NBR)	311472 (FPM)
7	1	O-ring	75 x 3		302215 (NBR)	304729 (FPM)
8	1	O-ring	82 x 3		305191 (NBR)	305298 (FPM)
9	1	O-ring	88 x 3		304417 (NBR)	310266 (FPM)
10	1	sheet metal screw	B 6,3 x 13		316641	
11	1	clogging indicator, visual	O1		301722	
12	1	pressure switch, electric	E4		311016	

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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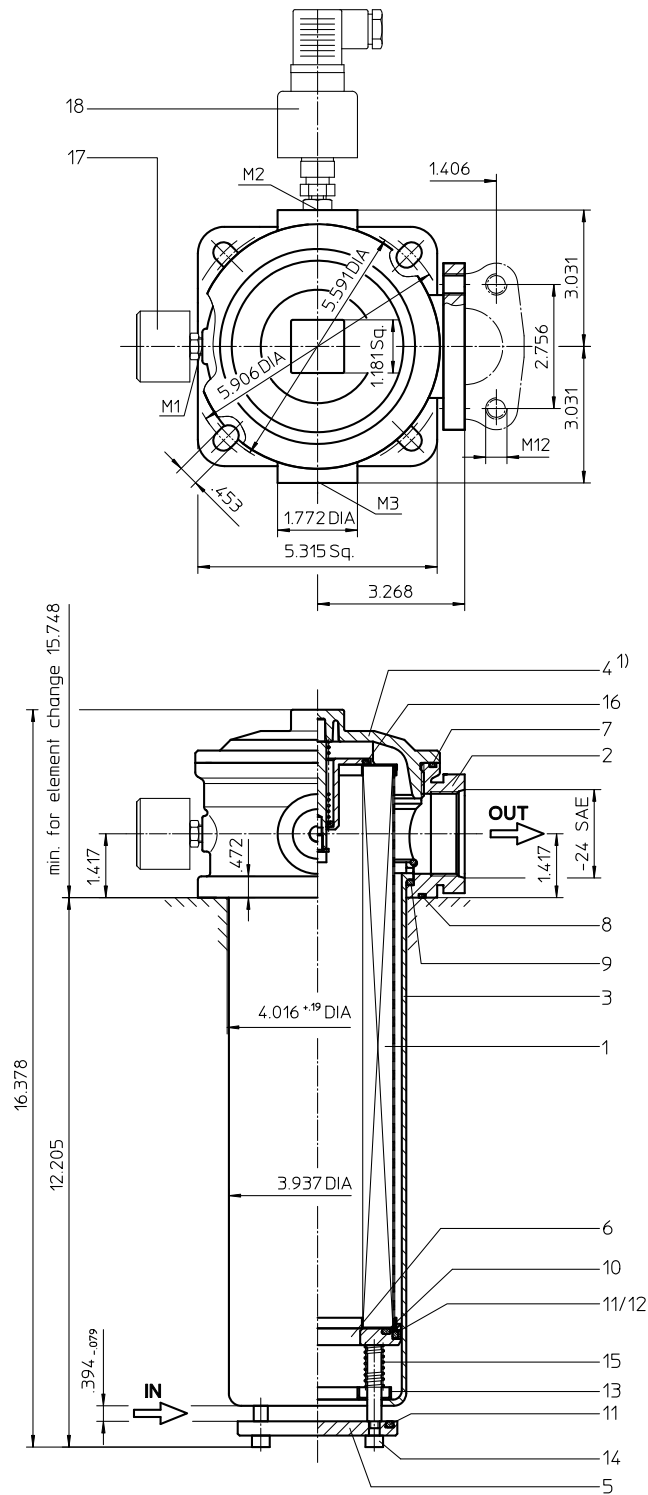
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Series TS 426



¹⁾ The bypass valve is contained in the screw plug. For filters without a by-pass valve, the opening pressure is Δp 14.5 PSI.

Weight: approx. 12.5 lbs.

Dimensions: inches

Designs and performance values are subject to change.

Suction Filter Series TS 426

Description:

The TS-filters are directly mounted to the reservoir and connected to the suction-line. The suction inlet connection must be below the oil level.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

Eaton filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

For filtration finer than 40 µm use the disposable elements made of microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements on request.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

When removing the filter cover, a plate-shaped valve closes the suction-inlet of the filter bowl and prevents dirty oil from flowing into the tank. For cleaning, the filter bowl and the filter element can be taken out of the filter head.

1. Type index:

1.1. Complete filter: (ordering example)

TS. 426. 10VG. - . B. P. - . UG. 7. - . - . O1. E4. -

1	2	3	4	5	6	7	8	9	10	11	12	13	14
---	---	---	---	---	---	---	---	---	----	----	----	----	----

- 1 | **series:**
TS = suction filter for vertical tank-mounting
- 2 | **nominal size:** 426
- 3 | **filter-material and filter-fineness:**
80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
10P paper
- 4 | **filter element collapse rating:**
- = not specified
- 5 | **filter element design:**
B = both sides open
- 6 | **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 | **filter element specification:**
- = standard
VA = stainless steel
- 8 | **process connection:**
UG = thread connection
FS = SAE-flange 3000 PSI
- 9 | **process connection size:**
7 = -24 SAE or 1 1/2" SAE
- 10 | **filter housing specification:**
- = standard
- 11 | **internal valve:**
- = without
S = with by-pass valve Δp 4.1 PSI
- 12 | **clogging indicator at M1:**
- = without
O1 = visual, see sheet-no. 1616
E4 = pressure switch, see sheet-no. 1616
- 13 | **clogging indicator at M2:**
possible indicators see position 12 of the type index
- 14 | **clogging indicator at M3:**
possible indicators see position 12 of the type index

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01TS. 425. 10VG. - . B. - . -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 | **series:**
01TS. = suction filter element according to company standard
- 2 | **nominal size:** 425
- 3 | - 5 | / 7 | see type index-complete filter
- 6 | **seling material:**
- = without

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
process connection:	thread connection or SAE-flange 3000 PSI
housing material:	Al-casting, glass fiber reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	.70 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

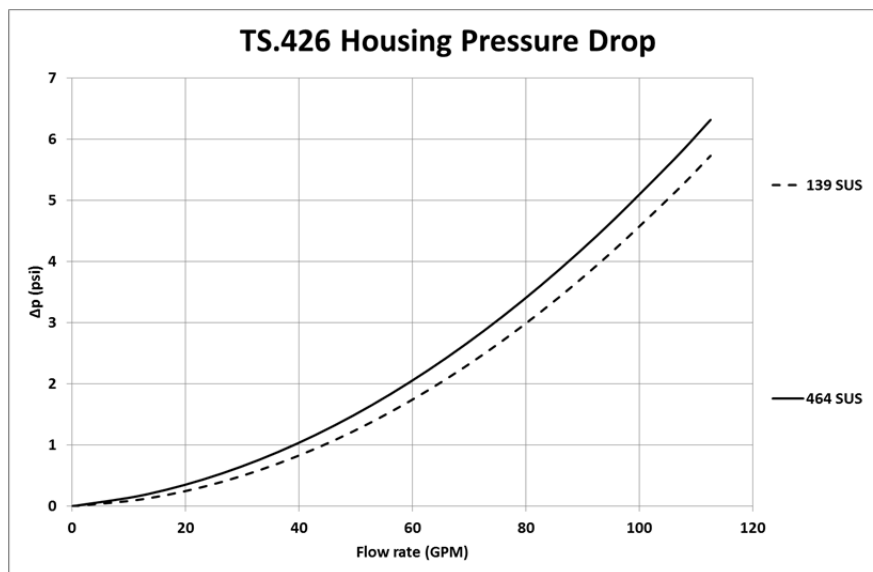
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

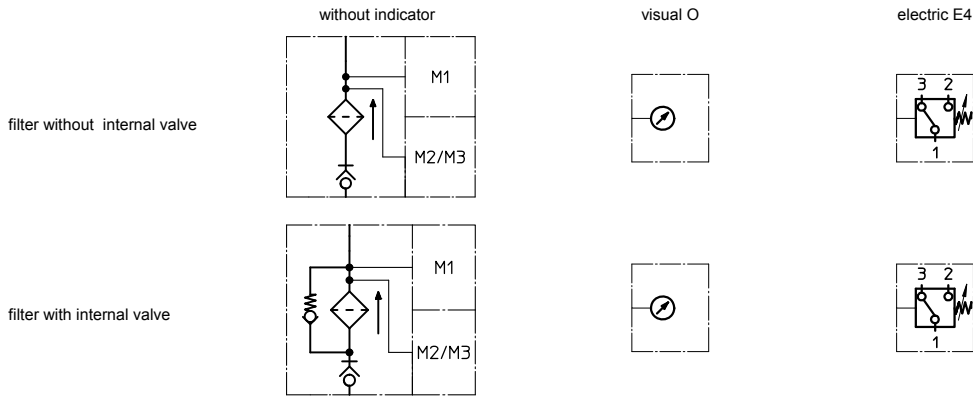
TS	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
426	0.887	0.616	0.394	0.343	0.235	0.0226	0.0211	0.0144	0.188

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01TS.425...		
2	1	filter head	NG 426		
3	1	filter bowl	NG 426		
4	1	screw plug with by-pass	M 120 x 3		
	1	screw plug without by-pass	M 120 x 3		
5	1	valve disc		311892	
6	1	valve bushing		307548	
7	1	O-ring	128 x 3	304602 (NBR)	308140 (FPM)
8	1	O-ring	115 x 3	303963 (NBR)	307762 (FPM)
9	1	O-ring	98 x 4	301914 (NBR)	304765 (FPM)
10	1	O-ring	70 x 4	306253 (NBR)	310280 (FPM)
11	2	O-ring	76 x 4	305599 (NBR)	310291 (FPM)
12	1	sliding ring		307547	
13	1	pressure ring		307549	
14	1	fillister head cap screw	M 6 x 60	307534	
15	1	spring	1,6 x 10 x 53 x 12.5	311847	
16	1	O-ring	50 x 3	307398 (NBR)	314682 (FPM)
17	1	clogging indicator, visual	O1	301722	
18	1	clogging indicator, electric	E4	311016	

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
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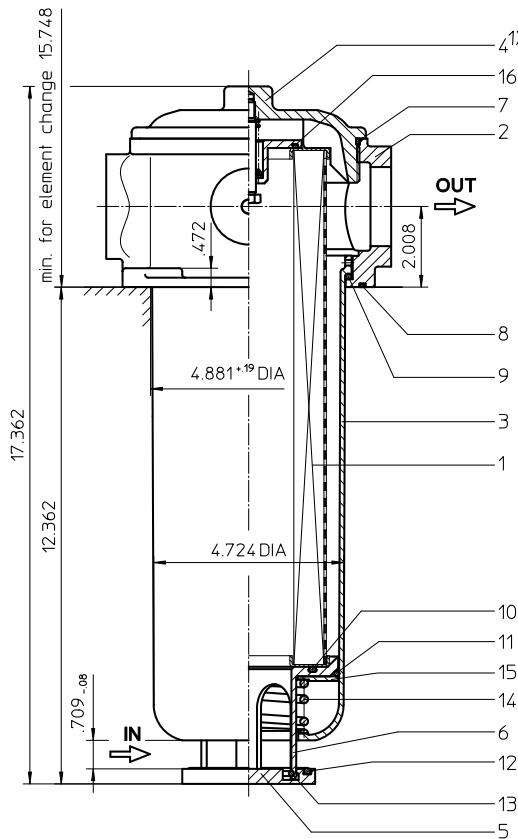
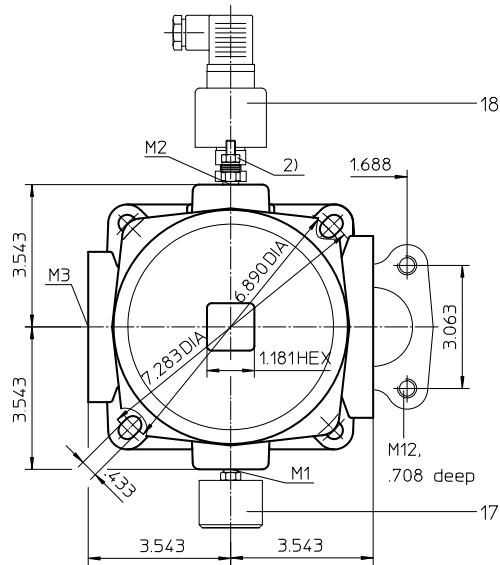
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Series TS 625



¹⁾The bypass valve is contained in the screw plug. For filters without a by-pass valve, the opening pressure is Δp 14.5 PSI.

²⁾ Connect the stand grounding tab to a suitable earth ground point.

Weight: approx. 12.0 lbs.

Dimensions: inches

Designs and performance values are subject to change.

Suction Filter

Series TS 625

Description:

The TS-filters are directly mounted to the reservoir and connected to the suction-line. The suction inlet connection must be below the oil level.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

Eaton filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

For filtration finer than 40 µm use the disposable elements made of microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements on request.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

When removing the filter cover, a plate-shaped valve closes the suction-inlet of the filter bowl and prevents dirty oil from flowing into the tank. For cleaning, the filter bowl and the filter element can be taken out of the filter head.

1. Type index:

1.1. Complete filter: (ordering example)

TS. 625. 10VG. -. B. P. -. FS. 8. -. -. O1. E4. -

1	2	3	4	5	6	7	8	9	10	11	12	13	14
---	---	---	---	---	---	---	---	---	----	----	----	----	----

- 1 | **series:**
TS = suction filter for vertical tank-mounting
- 2 | **nominal size:** 625
- 3 | **filter-material and filter-fineness:**
80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
10P paper
- 4 | **filter element collapse rating:**
- = not specified
- 5 | **filter element design:**
B = both sides open
- 6 | **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 | **filter element specification:**
- = standard
VA = stainless steel
- 8 | **process connection:**
FS = SAE-flange 3000 PSI
- 9 | **process connection size:**
8 = 2"
- 10 | **filter housing specification:**
- = standard
IS11 = for filter head and filter cover, see sheet-no. 40530
- 11 | **internal valve:**
- = without
S = with by-pass valve Δp 4.1 PSI
- 12 | **clogging indicator at M1:**
- = without
O1 = visual, see sheet-no. 1616
E4 = pressure switch, see sheet-no. 1616
PA = ground connection
- 13 | **clogging indicator at M2:**
possible indicators see position 12 of the type index
- 14 | **clogging indicator at M3:**
possible indicators see position 12 of the type index

1.2. Filter element: (ordering example)

01TS. 625. 10VG. -. B. -. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 | **series:**
01TS. = suction filter element according to company standard
- 2 | **nominal size:** 625
- 3 | - 5 | / 7 | see type index-complete filter
- 6 | **seling material:**
- = without

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
process connection:	SAE-flange 3000 PSI
housing material standard:	filter head, filter cover AL / filter bowl glass fibre reinforced polyamide
housing material IS11:	filter head, filter cover GG / filter bowl carbon fibre reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	1.0 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

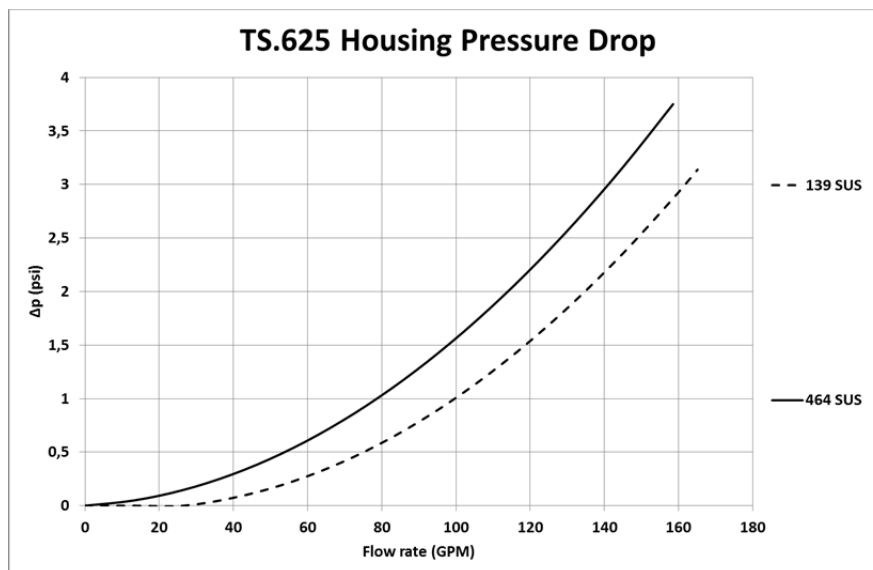
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

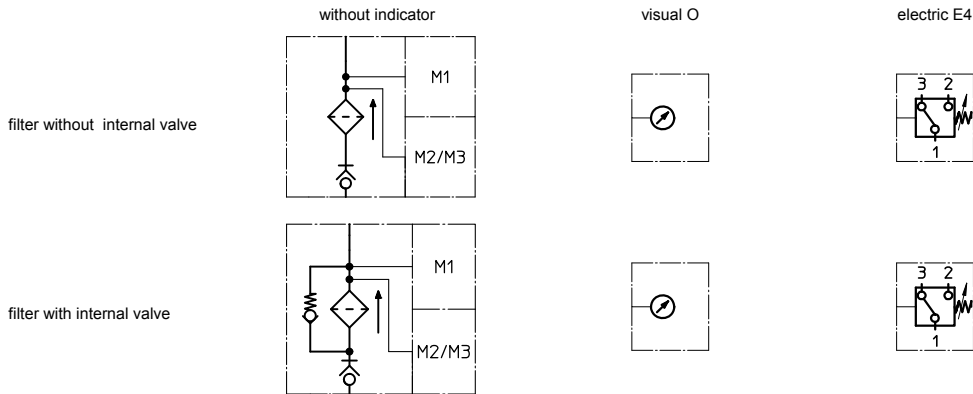
TS	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
625	0.733	0.509	0.326	0.284	0.194	0.0170	0.0159	0.0109	0.160

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01TS 625...		
2	1	filter head	NG 625		
3	1	filter bowl	NG 625		
4	1	screw plug with by-pass valve	M 140 x 3		
	1	screw plug without by-pass valve	M 140 x 3		
5	1	valve disc		318740	
6	1	valve bushing		318739	
7	1	O-ring	135 x 3,5	318386 (NBR)	318387 (FPM)
8	1	O-ring	140 x 3	304604 (NBR)	307514 (FPM)
9	1	O-ring	120 x 4	305300 (NBR)	307991 (FPM)
10	1	O-ring	76 x 4	305599 (NBR)	310291 (FPM)
11	1	O-ring	104,37 x 3,53	304339 (NBR)	304390 (FPM)
12	1	O-ring	70 x 4	306253 (NBR)	310280 (FPM)
13	1	snap ring	B 55	311976	
14	1	spring	5,0 x 70 x 117 x 3,5	318742	
15	1	disc		318741	
16	1	O-ring	56 x 3	307398 (NBR)	314682 (FPM)
17	1	clogging indicator, visual	E4	311016	
18	1	clogging indicator, electrical	O1	301722	

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
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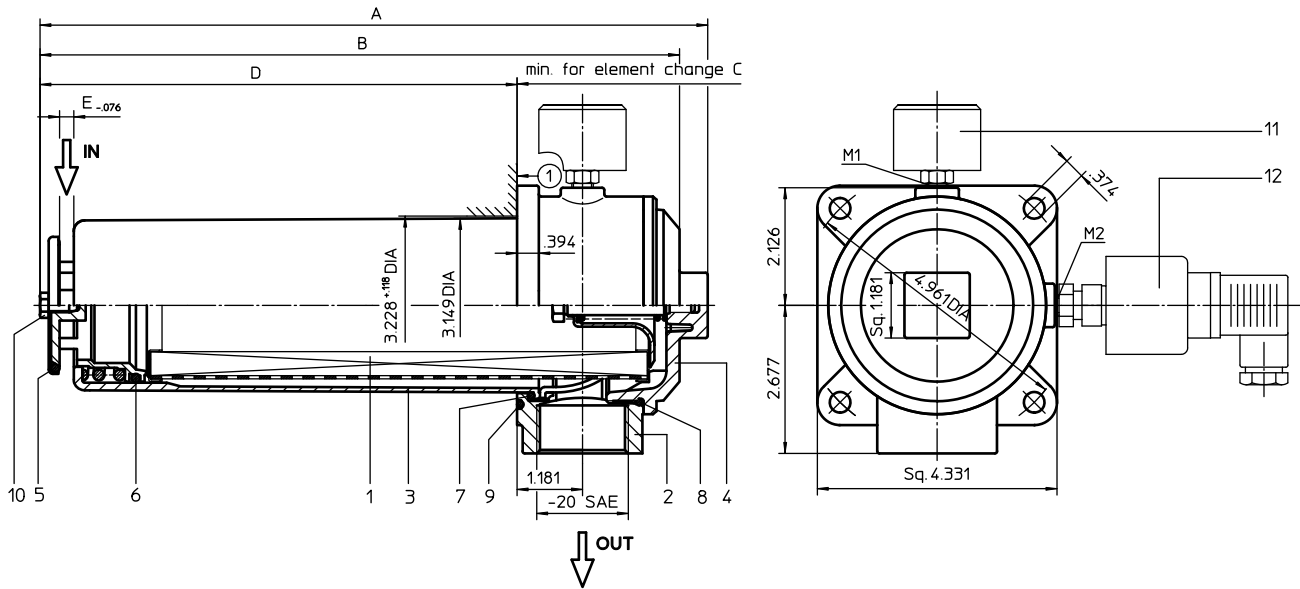
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Series TSW 210-310



Dimensions:

type	TSW 210	TSW 310
connection	- 20 SAE	-20 SAE
A	12.09	15.47
B	11.57	14.96
C	11.42	14.76
D	8.62	12.00
E	.26	.30
weight	5.10 lbs.	6.60 lbs.
volume tank	.30 Gal.	.40 Gal.

- mounting surface 1
- surface quality .12 μ in ▽
- flatness tolerance .01"

Dimensions: inches

Designs and performance values are subject to change.

Suction Filter

Series TSW 210-310

Description:

The TSW filters are directly mounted to the reservoir and connected to the suction-line.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

Eaton filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

For filtration finer than 40 µm use the disposable elements made of microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements on request.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

When removing the filter cover, a plate-shaped valve closes the suction-inlet of the filter bowl and prevents dirty oil from flowing into the tank. For cleaning, the filter bowl and the filter element can be taken out of the filter head.

1. Type index:

1.1. Complete filter: (ordering example)

TSW. 210. 10VG. - . B. P. - . UG. 6. - . - . O1. E4												
1	2	3	4	5	6	7	8	9	10	11	12	13

- 1 | **series:**
TSW = suction filter for horizontal tank-mounting
- 2 | **nominal size:** 210, 310
- 3 | **filter-material and filter-fineness:**
80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
10P paper
- 4 | **filter element collapse rating:**
- = not specified
- 5 | **filter element design:**
B = both sides open
- 6 | **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 | **filter element specification:**
- = standard
VA = stainless steel
- 8 | **process connection:**
UG = thread connection
- 9 | **process connection size:**
6 = -20 SAE
- 10 | **filter housing specification:**
- = standard
- 11 | **internal valve:**
- = without
S = with by-pass valve Δp 4.1 PSI
- 12 | **clogging indicator at M1:**
- = without
O1 = visual, see sheet-no. 1616
E4 = pressure switch, see sheet-no. 1616
- 13 | **clogging indicator at M2:**
possible indicators see position 12 of the type index

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01TS. 210. 10VG. - . B. - . -						
1	2	3	4	5	6	7

- 1 | **series:**
01TS. = suction filter element according to company standard
- 2 | **nominal size:** 210, 310
- 3 | - 5 | / 7 | see type index-complete filter
- 6 | **seling material:**
- = without

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
process connection:	thread connection
housing material:	Al-casting, glass fiber reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

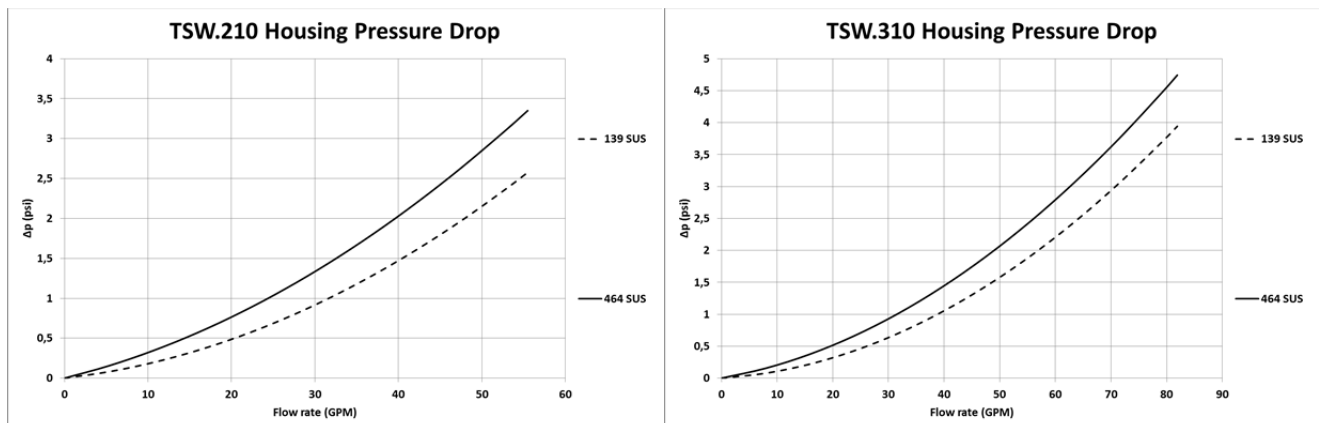
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

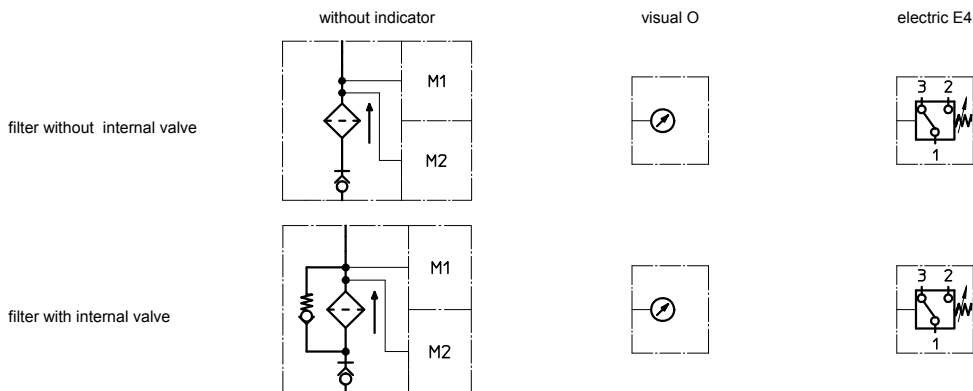
TSW	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
210	2.250	1.562	1.000	0.871	0.595	0.0826	0.0612	0.0571	0.443
310	1.628	1.130	0.724	0.630	0.430	0.0598	0.0443	0.0413	0.321

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension		article-no.	
			TSW 210	TSW 310		
1	1	filter element	01TS.210...	01TS.310...		
2	1	filter head			304423	
3	1	filter bowl			304518.1	
4	1	filter cover	M 90 x 2			
5	1	O-ring	53 x 4		309143 (NBR)	332434 (FPM)
6	1	O-ring	62 x 4		308045 (NBR)	311472 (FPM)
7	1	O-ring	75 x 3		302215 (NBR)	304729 (FPM)
8	1	O-ring	82 x 3		305191 (NBR)	305298 (FPM)
9	1	O-ring	88 x 3		304417 (NBR)	310266 (FPM)
10	1	sheet metal screw	B 6,3 x 13		316641	
11	1	clogging indicator, visual	O1		301722	
12	1	pressure switch, electric	E4		311016	

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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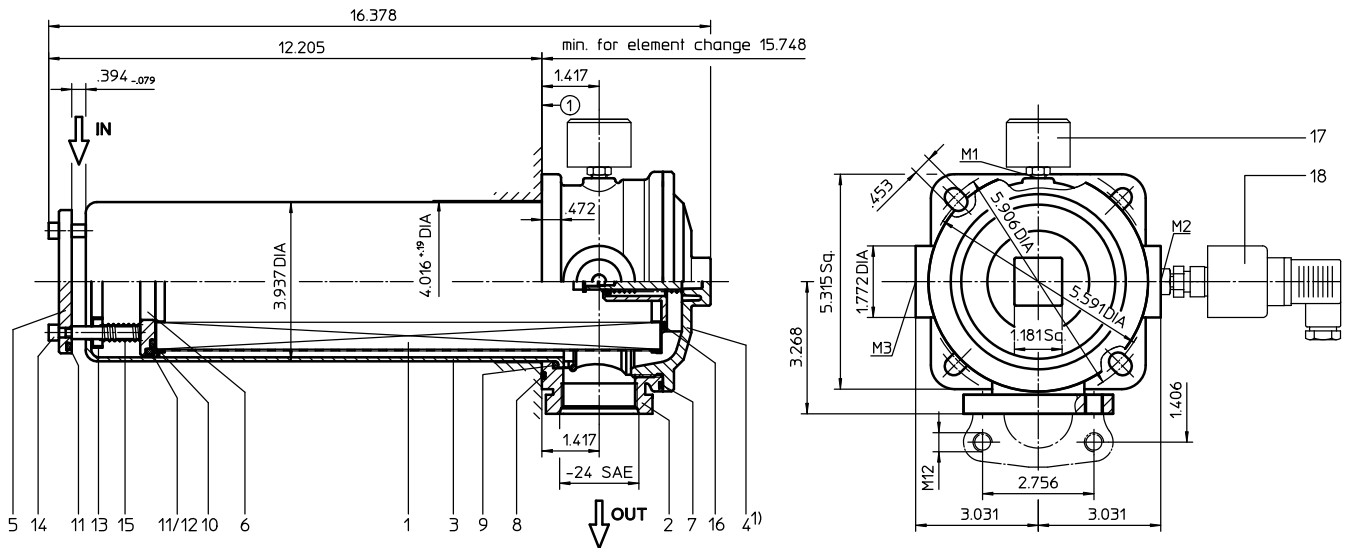
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Series TSW 426



¹⁾ The bypass valve is contained in the screw plug. For filters without a by-pass valve, the opening pressure is Δp 14.5 PSI.

- mounting surface 1
- surface quality .12 μ in
▽
- flatness tolerance \square .01"

Weight: approx. 12.5 lbs.

Dimensions: inches

Designs and performance values are subject to change.

Suction Filter

Series TSW 426

Description:

The TSW-filters are directly mounted to the reservoir and connected to the suction-line.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

Eaton filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

For filtration finer than 40 µm use the disposable elements made of microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements on request.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

When removing the filter cover, a plate-shaped valve closes the suction-inlet of the filter bowl and prevents dirty oil from flowing into the tank. For cleaning, the filter bowl and the filter element can be taken out of the filter head.

1. Type index:

1.1. Complete filter: (ordering example)

TSW. 426. 10VG. -. B. P. -. UG. 7. -. -. O1. E4. -													
1	2	3	4	5	6	7	8	9	10	11	12	13	14

- 1 | **series:**
TSW = suction filter for horizontal tank-mounting
- 2 | **nominal size:** 426
- 3 | **filter-material and filter-fineness:**
80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
10P paper
- 4 | **filter element collapse rating:**
- = not specified
- 5 | **filter element design:**
B = both sides open
- 6 | **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 | **filter element specification:**
- = standard
VA = stainless steel
- 8 | **process connection:**
UG = thread connection
FS = SAE-flange 3000 PSI
- 9 | **process connection size:**
7 = -24 SAE or 1 ½" SAE
- 10 | **filter housing specification:**
- = standard
- 11 | **internal valve:**
- = without
S = with by-pass valve Δp 4.1 PSI
- 12 | **clogging indicator at M1:**
- = without
O1 = visual, see sheet-no. 1616
E4 = pressure switch, see sheet-no. 1616
- 13 | **clogging indicator at M2:**
possible indicators see position 12 of the type index
- 14 | **clogging indicator at M3:**
possible indicators see position 12 of the type index

1.2. Filter element: (ordering example)

01TS. 425. 10VG. -. B. -. -						
1	2	3	4	5	6	7

- 1 | **series:**
01TS. = suction filter element according to company standard
- 2 | **nominal size:** 425
- 3 | - 5 | / 7 | see type index-complete filter
- 6 | **seling material:**
- = without

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
process connection:	thread connection or SAE-flange 3000 PSI
housing material:	Al-casting, glass fiber reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	.70 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

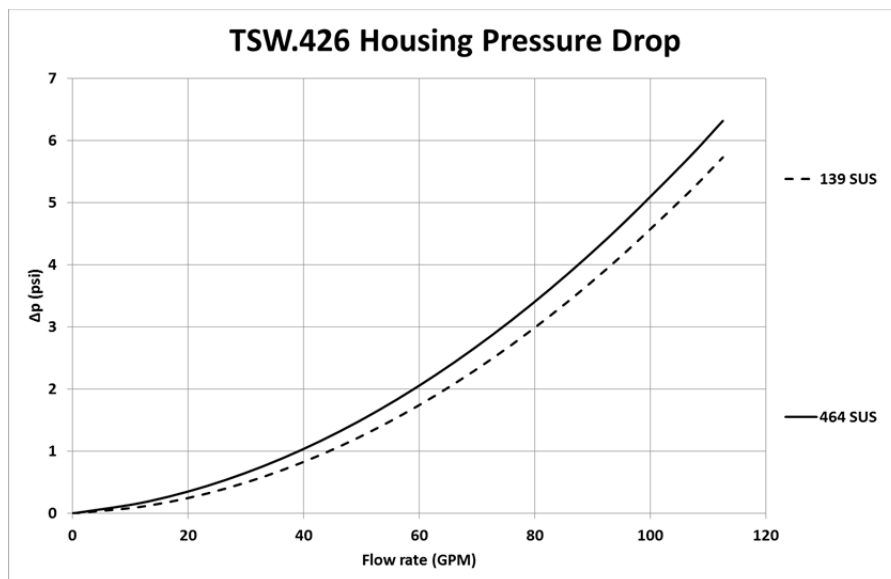
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

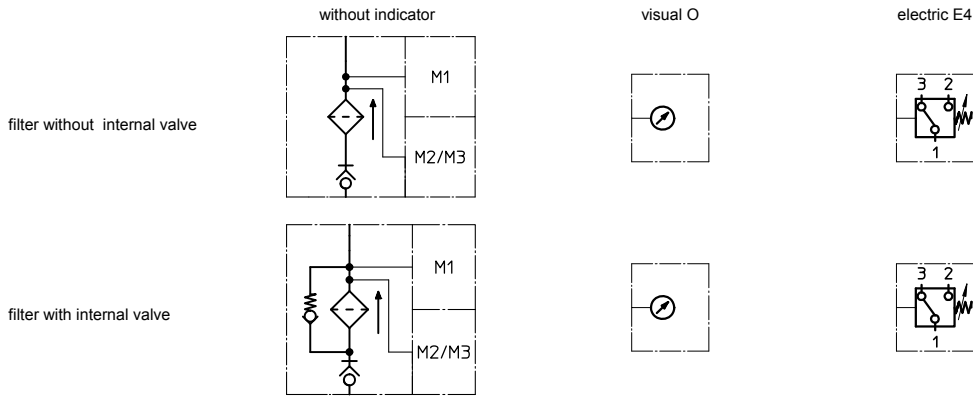
TSW	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
426	0.887	0.616	0.394	0.343	0.235	0.0226	0.0211	0.0144	0.188

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension	article-no.
1	1	filter element	01TS.425...	
2	1	filter head	NG 426	
3	1	filter bowl	NG 426	
4	1	screw plug with by-pass	M 120 x 3	
	1	screw plug without by-pass	M 120 x 3	
5	1	valve disc		311892
6	1	valve bushing		307548
7	1	O-ring	128 x 3	304602 (NBR) 308140 (FPM)
8	1	O-ring	115 x 3	303963 (NBR) 307762 (FPM)
9	1	O-ring	98 x 4	301914 (NBR) 304765 (FPM)
10	1	O-ring	70 x 4	306253 (NBR) 310280 (FPM)
11	2	O-ring	76 x 4	305599 (NBR) 310291 (FPM)
12	1	sliding ring		307547
13	1	pressure ring		307549
14	1	fillister head cap screw	M 6 x 60	307534
15	1	spring	1,6 x 10 x 53 x 12.5	311847
16	1	O-ring	50 x 3	307398 (NBR) 314682 (FPM)
17	1	clogging indicator, visual	O1	301722
18	1	clogging indicator, electric	E4	311016

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
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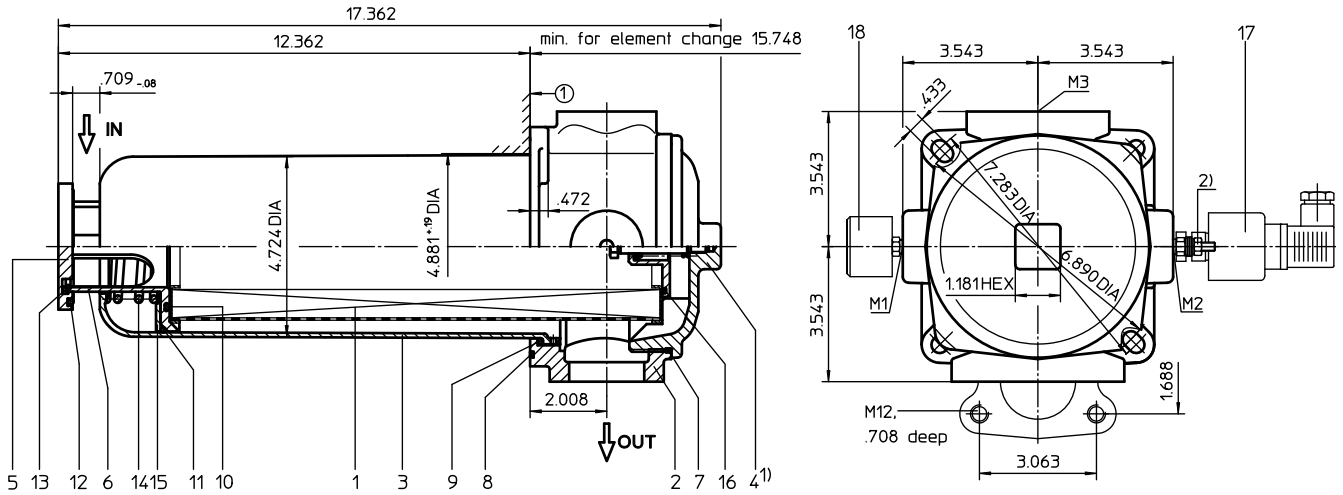
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Series TSW 625



- 1) The bypass valve is contained in the screw plug. For filters without a by-pass valve, the opening pressure is Δp 14.5 PSI.
- 2) Connect the stand grounding tab to a suitable earth ground point.

mounting surface	①
surface quality	.12 μ in
flatness tolerance	▭ .01"

Weight: approx. 12.0 lbs.

Dimensions: inches

Designs and performance values are subject to change.

Suction Filter

Series TSW 625

Description:

The TSW-filters are directly mounted to the reservoir and connected to the suction-line.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.

Eaton filter elements are known for a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

For filtration finer than 40 µm use the disposable elements made of microglass. Filter elements as fine as 5 µm(c) are available; finer filter elements on request.

Eaton filter elements can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.

When removing the filter cover, a plate-shaped valve closes the suction-inlet of the filter bowl and prevents dirty oil from flowing into the tank. For cleaning, the filter bowl and the filter element can be taken out of the filter head.

1. Type index:

1.1. Complete filter: (ordering example)

TSW. 625. 10VG. -. B. P. -. FS. 8. -. -. O1. E4. -

1	2	3	4	5	6	7	8	9	10	11	12	13	14
---	---	---	---	---	---	---	---	---	----	----	----	----	----

- 1 | **series:**
TSW = suction filter for horizontal tank-mounting
- 2 | **nominal size:** 625
- 3 | **filter-material and filter-fineness:**
80G, 40G, 25G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
10P paper
- 4 | **filter element collapse rating:**
- = not specified
- 5 | **filter element design:**
B = both sides open
- 6 | **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 | **filter element specification:**
- = standard
VA = stainless steel
- 8 | **process connection:**
FS = SAE-flange 3000 PSI
- 9 | **process connection size:**
8 = 2"
- 10 | **filter housing specification:**
- = standard
IS11 = for filter head and filter cover, see sheet-no. 40530
- 11 | **internal valve:**
- = without
S = with by-pass valve Δp 4.1 PSI
- 12 | **clogging indicator at M1:**
- = without
O1 = visual, see sheet-no. 1616
E4 = pressure switch, see sheet-no. 1616
PA = potential equalisation
- 13 | **clogging indicator at M2:**
possible indicators see position 12 of the type index
- 14 | **clogging indicator at M3:**
possible indicators see position 12 of the type index

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01TS. 625. 10VG. -. B. -. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 | **series:**
01TS. = suction filter element according to company standard
- 2 | **nominal size:** 625
- 3 | - 5 | / 7 | see type index-complete filter
- 6 | **seling material:**
- = without

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
process connection:	SAE-flange 3000 PSI
housing material standard:	filter head, filter cover AL / filter bowl glass fibre reinforced polyamide
housing material IS11:	filter head, filter cover GG / filter bowl carbon fibre reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	horizontal
volume tank:	1.0 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

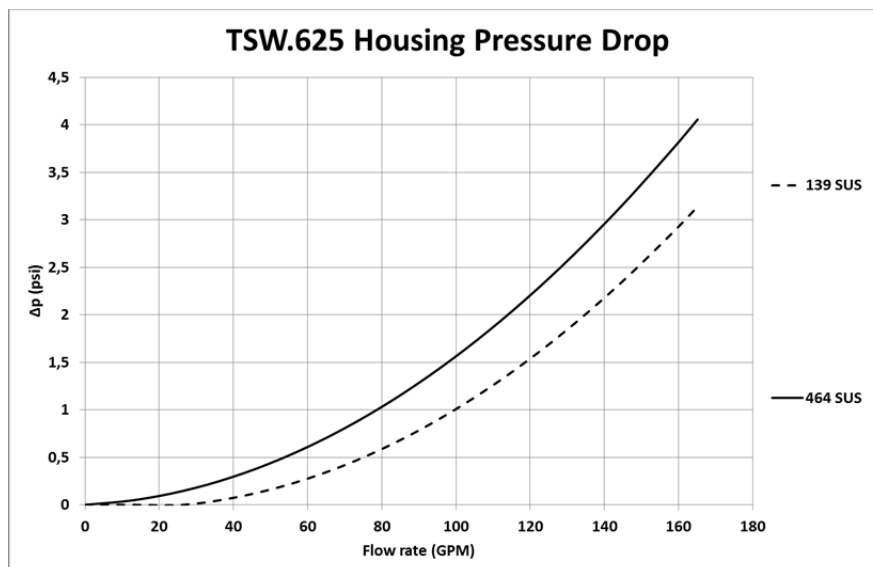
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

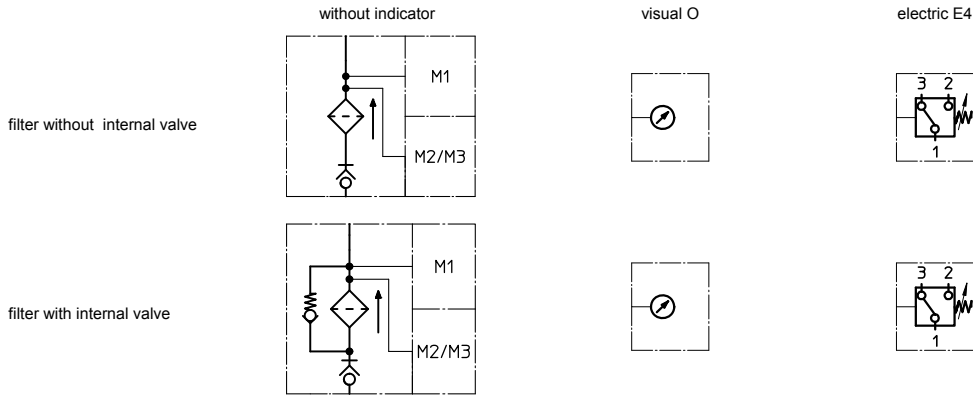
TSW	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
625	0.733	0.509	0.326	0.284	0.194	0.0170	0.0159	0.0109	0.160

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01TS.625...		
2	1	filter head	NG 625		
3	1	filter bowl	NG 625		
4	1	screw plug with by-pass valve	M 140 x 3		
	1	screw plug without by-pass valve	M 140 x 3		
5	1	valve disc		318740	
6	1	valve bushing		318739	
7	1	O-ring	135 x 3,5	318386 (NBR)	318387 (FPM)
8	1	O-ring	140 x 3	304604 (NBR)	307514 (FPM)
9	1	O-ring	120 x 4	305300 (NBR)	307991 (FPM)
10	1	O-ring	76 x 4	305599 (NBR)	310291 (FPM)
11	1	O-ring	104,37 x 3,53	304339 (NBR)	304390 (FPM)
12	1	O-ring	70 x 4	306253 (NBR)	310280 (FPM)
13	1	snap ring	B 55	311976	
14	1	spring	5,0 x 70 x 117 x 3,5	318742	
15	1	disc		318741	
16	1	O-ring	56 x 3	307398 (NBR)	314682 (FPM)
17	1	clogging indicator, visual	E4	311016	
18	1	clogging indicator, electric	O1	301722	

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
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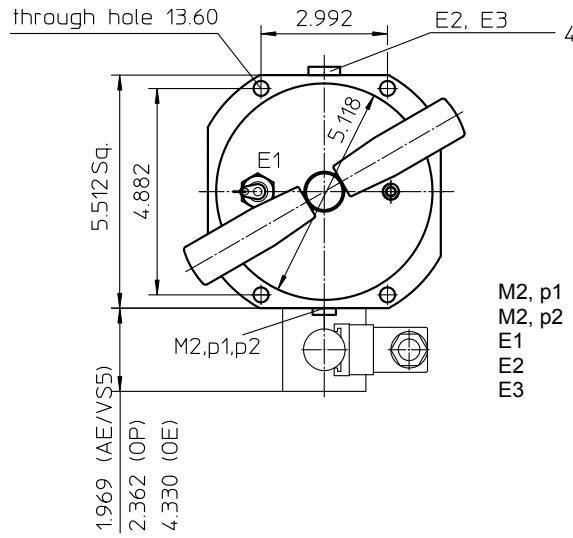
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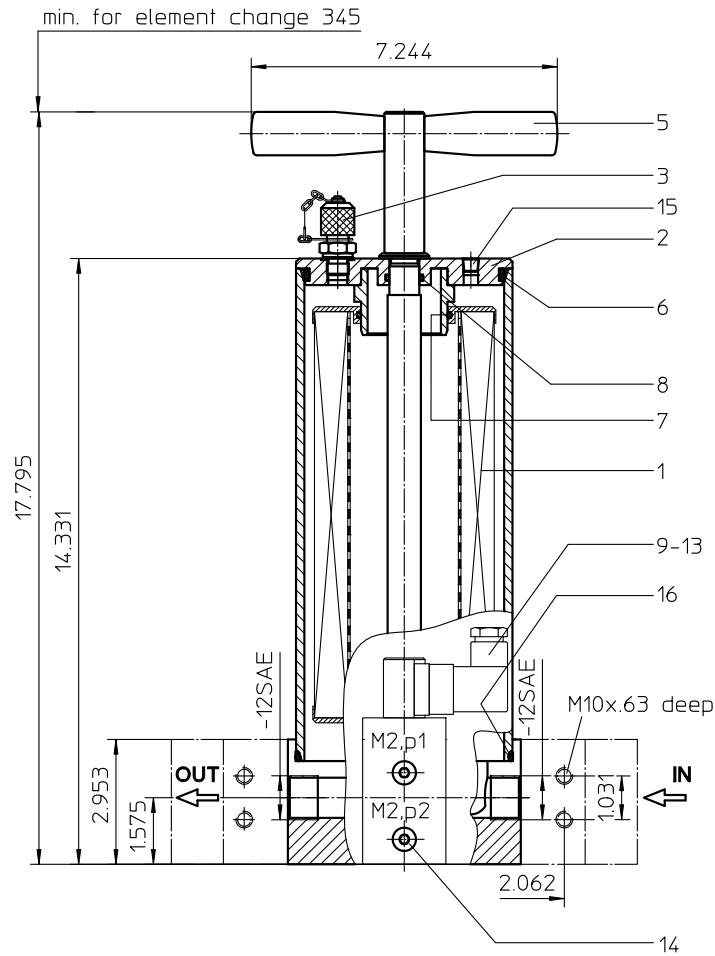
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Series NF 250

232 PSI



- M2, p1 = measure connection dirt side
- M2, p2 = measure connection clean side
- E1 = air bleeding dirt side
- E2 = drain dirt side
- E3 = drain clean side



Weight: approx. 16 lbs.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Offline Filter

Series NF 250

232 PSI

Description:

The offline filter series NF is used for fine filtration of hydraulic or lubrication circuits. This filter is designed to be installed in an offline filtration circuit, independent of the main circuit. This filter is designed to have a high dirt holding capacity which will provide a long service life.

The filter is flanged mounted to the line.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 5 $\mu\text{m}_{(c)}$. Finer filtration is available upon request.

Changing the elements is possible without tools. Release the key handle and remove the cover to access the elements.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

1. Type index:

1.1. Complete filter: (ordering example)

NF.	250.	10VG.	10.	B.	P.	-.	FS.	5.	-.	AE
1	2	3	4	5	6	7	8	9	10	11

- 1 | **series:**
NF = offline filter
- 2 | **nominal size:** 250
- 3 | **filter-material and filter-fineness:**
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
10WVG, 3WVG watersorp-filter element
- 4 | **resistance of pressure difference for filter element:**
10 = Δp 145 PSI
- 5 | **filter element design:**
B = both sides open
- 6 | **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 | **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601
- 8 | **process connection:**
FS = SAE-flange 3000 PSI ¹⁾
- 9 | **process connection size:**
5 = 1" ¹⁾
- 10 | **filter housing specification:** (see catalog)
- = standard
IS06 = for HFC applications, see sheet-no. 31605
- 11 | **clogging indicator or clogging sensor:**
- = without
AE = visual-electric, see sheet-no. 1609
OP = visual, see sheet-no. 1628
OE = visual-electric, see sheet-no. 1628
VS5 = electronic, see sheet-no. 1641

¹⁾ in addition available
thread -12 SAE according to DIN 3852 T2, design Z

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01NR.	250.	10VG.	10.	B.	P.	-
1	2	3	4	5	6	7

- 1 | **series:**
01NR. = standard return line filter element according to DIN 24550, part 4
- 2 | **nominal size:** 250
- 3 | - 7 | see type index-complete filter

Accessories:

- gauge port- and bleeder connection, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1651

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	232 PSI
test pressure:	333 PSI
process connection:	SAE-flange 3000 PSI
housing material:	aluminium forging alloy
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
measure connections:	BSPP 1/8
drain- and bleeder connections:	BSPP 1/4
volume tank:	.87 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

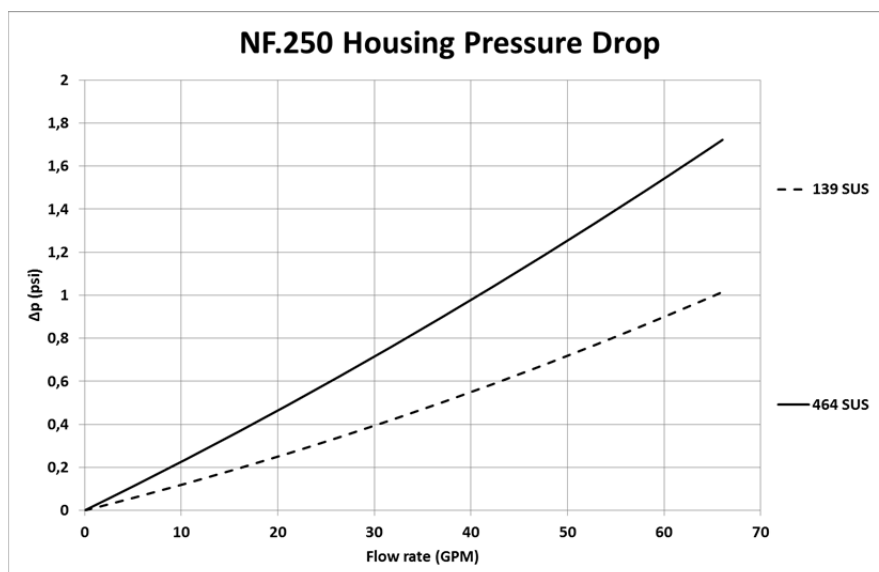
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

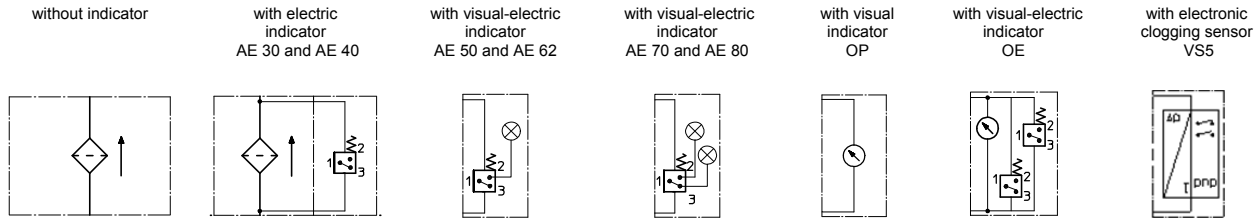
NF	VG				
	3VG	6VG	10VG	16VG	25VG
250	0.669	0.464	0.297	0.259	0.177

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01NR.250...		
2	1	filter cover	30615-3	315437	
3	1	mini-measuring connection	MA.1.ST	305453	
4	2	screw plug	1/4 BSPP	305003	
5	1	straining screw	30631-3	316404	
6	1	O-ring	110 x 6	337001 (NBR)	337002 (FPM)
7	2	O-ring	52 x 3	314206 (NBR)	316698 (FPM)
8	1	O-ring	18 x 3	304359 (NBR)	304399 (FPM)
9	1	clogging indicator, visual	OP	see sheet-no. 1628	
10	1	clogging indicator, visual-electric	OE	see sheet-no. 1628	
11	1	clogging indicator, visual-electric	AE	see sheet-no. 1609	
12	1	clogging sensor, electronic	VS5	see sheet-no. 1641	
13	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
14	2	screw plug	1/8 BSPP	304791	
15	1	screw plug	1/8 BSPP	305496	
16	1	O-ring	123 x 4	337003 (NBR)	337004 (FPM)

item 14 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

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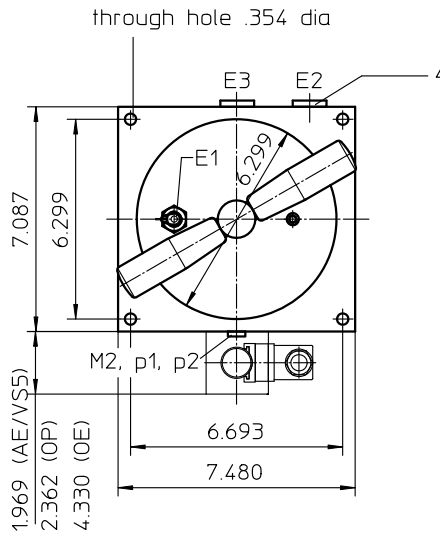
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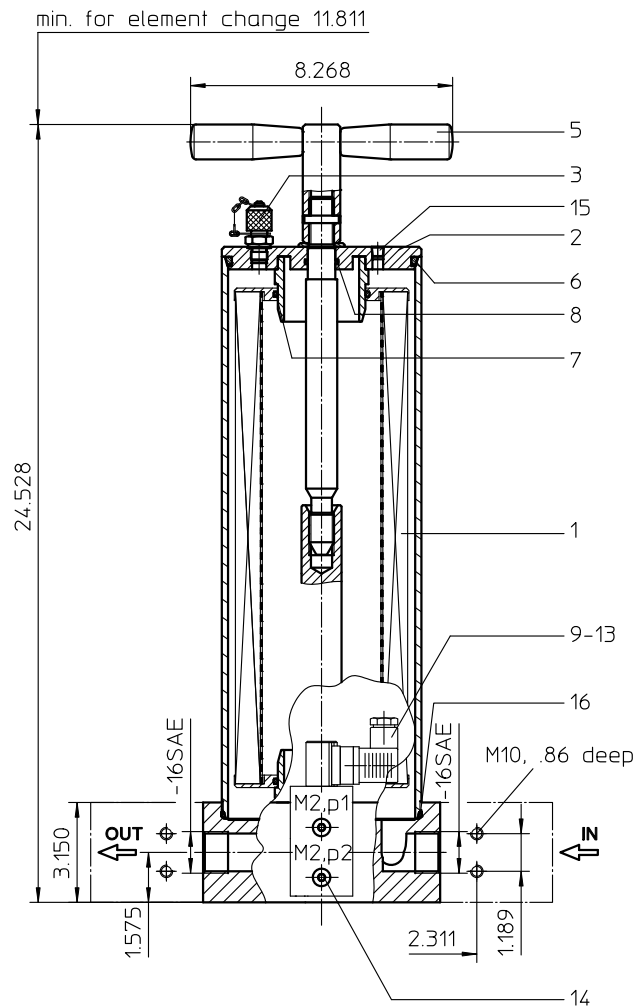
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Series NF 631

232 PSI



- M2, p1 = measure connection dirt side
- M2, p2 = measure connection clean side
- E1 = air bleeding dirt side
- E2 = drain dirt side
- E3 = drain clean side



Weight: approx. 37 lbs.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Offline Filter

Series NF 631

232 PSI

Description:

The offline filter series NF is used for fine filtration of hydraulic or lubrication circuits. This filter is designed to be installed in an offline filtration circuit, independent of the main circuit. This filter is designed to have a high dirt holding capacity which will provide a long service life.

The filter is flanged mounted to the line.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 5 $\mu\text{m(c)}$. Finer filtration is available upon request.

Changing the elements is possible without tools. Release the key handle and remove the cover to access the elements.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

1. Type index:

1.1. Complete filter: (ordering example)

NF. 631. 10VG. 10. B. P. -. FS. 6. -. AE

1	2	3	4	5	6	7	8	9	10	11
---	---	---	---	---	---	---	---	---	----	----

- | | |
|----|---|
| 1 | series:
NF = offline filter |
| 2 | nominal size: 631 |
| 3 | filter-material and filter-fineness:
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
10WVG, 3WVG watersorp-filter element |
| 4 | filter element collapse rating:
10 = Δp 145 PSI |
| 5 | filter element design:
B = both sides open |
| 6 | sealing material:
P = Nitrile (NBR)
V = Viton (FPM) |
| 7 | filter element specification: (see catalog)
- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601 |
| 8 | process connection:
FS = SAE-flange 3000 PSI ¹⁾ |
| 9 | process connection size:
6 = 1 1/4" ¹⁾ |
| 10 | filter housing specification: (see catalog)
- = standard
IS06 = for HFC applications, see sheet-no. 31605 |
| 11 | clogging indicator or clogging sensor:
- = without
AE = visual-electric, see sheet-no. 1609
OP = visual, see sheet-no. 1628
OE = visual-electric, see sheet-no. 1628
VS5 = electronic, see sheet-no. 1641 |

¹⁾ in addition available
thread -16 SAE according to DIN 3852 T2, design Z

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01NR. 630. 10VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- | | |
|---|--|
| 1 | series:
01NR. = standard return line filter element according to DIN 24550, part 4 |
| 2 | nominal size: 630 |
| 3 | - 7 \| see type index-complete filter |

Accessories:

- gauge port- and bleeder connection, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1651
- SAE-counter flange, see sheet no. 1652

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium:	mineral oil, other media on request
max. operating pressure:	232 PSI
test pressure:	333 PSI
process connection:	SAE-flange 3000 PSI
housing material:	aluminum forging alloy
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
measure connections:	BSPP ¼
drain- and bleeder connections:	BSPP ½
volume tank:	1.90 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

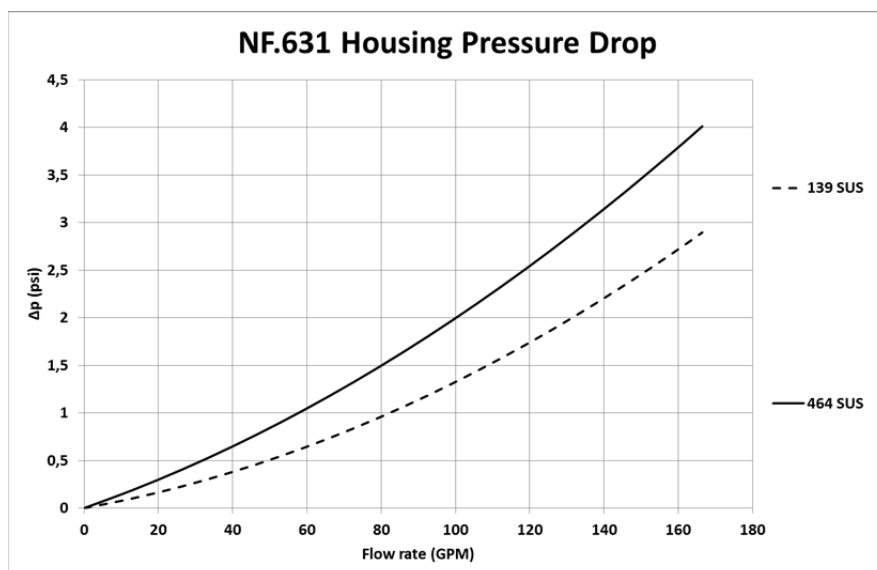
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

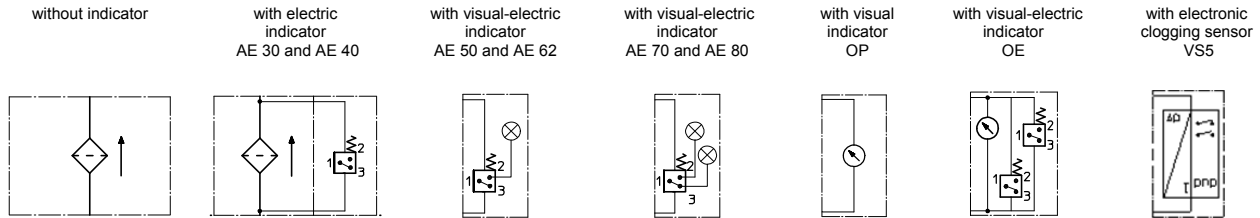
NF	VG				
	3VG	6VG	10VG	16VG	25VG
631	0.356	0.247	0.158	0.138	0.094

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension	article-no.
1	1	filter element	01NR.630...	
2	1	filter cover	30600-3	315492
3	1	mini-measuring connection	MA.1.St	305453
4	2	screw plug	1/2 BSPP	304678
5	1	straining screw	30595-3	316312
6	1	O-ring	140 x 6	315392 (NBR) | 316322 (FPM)
7	2	O-ring	70 x 4	306253 (NBR) | 310280 (FPM)
8	1	O-ring	22 x 3	304387 (NBR) | 304931 (FPM)
9	1	clogging indicator, visual	OP	see sheet-no. 1628
10	1	clogging indicator, visual-electric	OE	see sheet-no. 1628
11	1	clogging indicator, visual-electric	AE	see sheet-no. 1609
12	1	clogging sensor, electronic	VS5	see sheet-no. 1641
13	2	O-ring	14 x 2	304342 (NBR) | 304722 (FPM)
14	2	screw plug	1/8 BSPP	304791
15	1	screw plug	1/8 BSPP	305496
16	1	O-ring	153 x 4	320763 (NBR) | 322368 (FPM)

item 14 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
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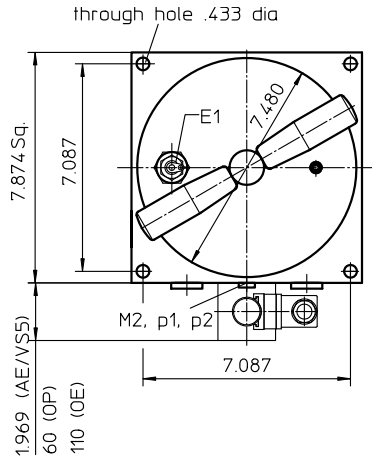
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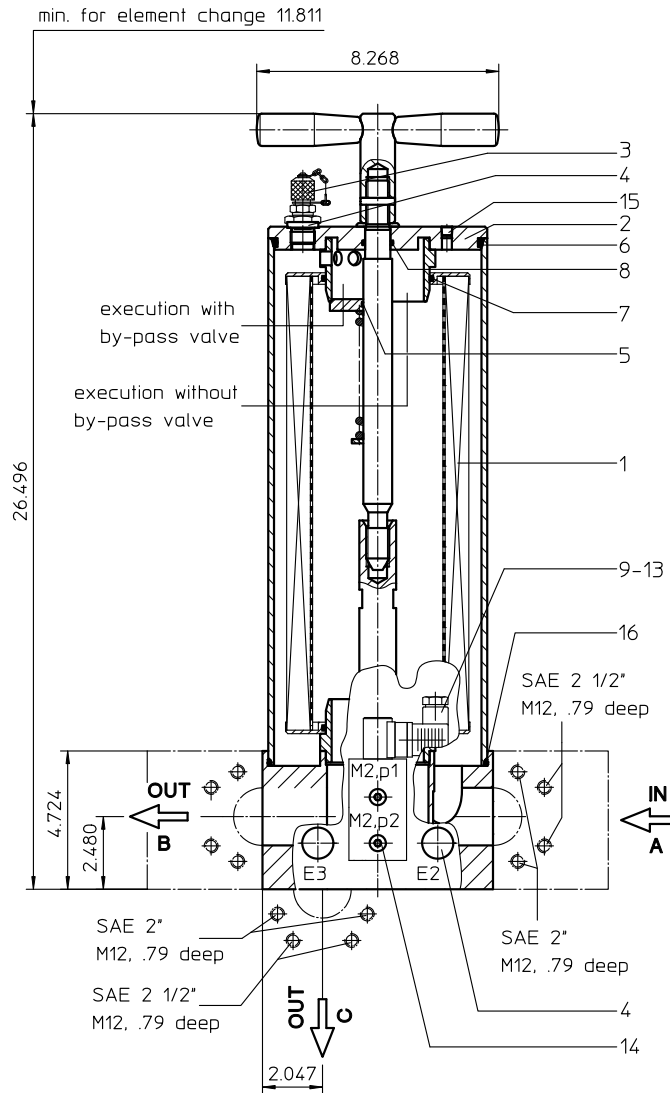
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Series NF 1000

232 PSI



- M2, p1 = measure connection dirt side
- M2, p2 = measure connection clean side
- E1 = air bleeding dirt side
- E2 = drain dirt side
- E3 = drain clean side



Weight: approx. 51 lbs.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

Offline Filter

Series NF 1000

232 PSI

Description:

The offline filter series NF is used for fine filtration of hydraulic or lubrication circuits. This filter is designed to be installed in an offline filtration circuit, independent of the main circuit. This filter is designed to have a high dirt holding capacity which will provide a long service life.

The filter is flanged mounted to the line.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to 5 $\mu\text{m}_{(c)}$. Finer filtration is available upon request.

Changing the elements is possible without tools. Release the key handle and remove the cover to access the elements.

Eaton filter elements are known for high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.

1. Type index:

1.1. Complete filter: (ordering example)

NF. 1000. 10VG. 10. B. P. -. FS. 3. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

- 1 | **series:**
NF = offline filter
- 2 | **nominal size:** 1000
- 3 | **filter-material and filter-fineness:**
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
10WVG, 3WVG watersorp-filter element
- 4 | **filter element collapse rating:**
10 = Δp 145 PSI
- 5 | **filter element design:**
B = both sides open
- 6 | **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 7 | **filter element specification: (see catalog)**
- = standard
VA = stainless steel
IS06 = for HFC applications, see sheet-no. 31601
- 8 | **connection:**
FS = SAE-flange 3000 PSI
- 9 | **no. of version:**

version	connection		
	A connection size	B connection size	C connection size
1	8	8	-
2	8	8	8
3	9	9	-
4	9	9	9

connection size: 8 = 2"
9 = 2 1/2"
- = without connection

- 10 | **filter housing specification: (see catalog)**
- = standard
IS06 = for HFC applications, see sheet-no. 31605
- 11 | **internal valve:**
- = without
S1 = with by-pass valve Δp 51 PSI
- 12 | **clogging indicator or clogging sensor :**
- = without
AE = visual-electrical, see sheet-no. 1609
OP = visual, see sheet-no. 1628
OE = visual-electrical, see sheet-no. 1628
VS5 = electrical, see sheet-no. 1641

To add an indicator to your filter, use the corresponding indicator data sheet to find the indicator details and add them to the filter assembly model code.

1.2. Filter element: (ordering example)

01NR. 1000. 10VG. 10. B. P. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 | **series:**
01NR. = standard return line filter element according to DIN 24550, T4
- 2 | **nominal size:** 1000
- 3 | - 7 | see type index-complete filter

Accessories:

- gauge port- and bleeder connection, see sheet-no. 1650
- drain- and bleeder-connections, see sheet-no. 1651
- counter flange, see sheet-no. 1652

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	232 PSI
test pressure:	333 PSI
process connection:	SAE-flange 3000 PSI
housing material:	aluminium forging alloy
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
measure connections:	BSPP ¼
drain- and bleeder connections:	BSPP ½
volume tank:	3.0 Gal.

Classified under the Pressure Equipment Directive 2014/68/EC for mineral oil (fluid group 2), Article 4, Para. 3.
 Classified under ATEX Directive 2014/34/EC according to specific application (see questionnaire sheet-no. 34279-4).

Pressure drop flow curves:

Filter calculation/sizing

The pressure drop of the assembly at a given flow rate Q is the sum of the housing Δp and the element Δp and is calculated as follows:

$$\Delta p_{assembly} = \Delta p_{housing} + \Delta p_{element}$$

$$\Delta p_{housing} = (\text{see } \Delta p = f(Q) \text{ - characteristics})$$

$$\Delta p_{element} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left(\frac{PSI}{GPM} \right) \times \nu (SUS) \times \frac{\rho}{0.876} \left(\frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at www.eatonpowersource.com/calculators/filtration/

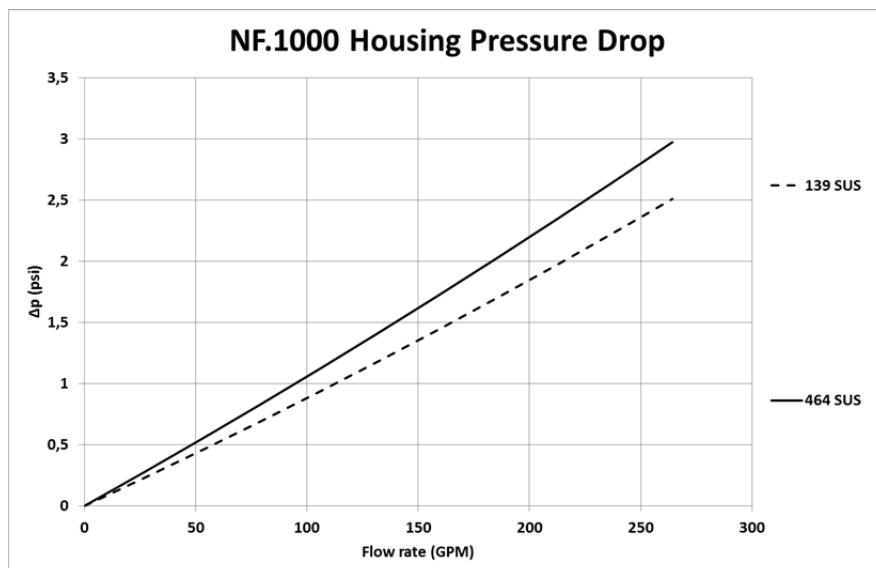
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

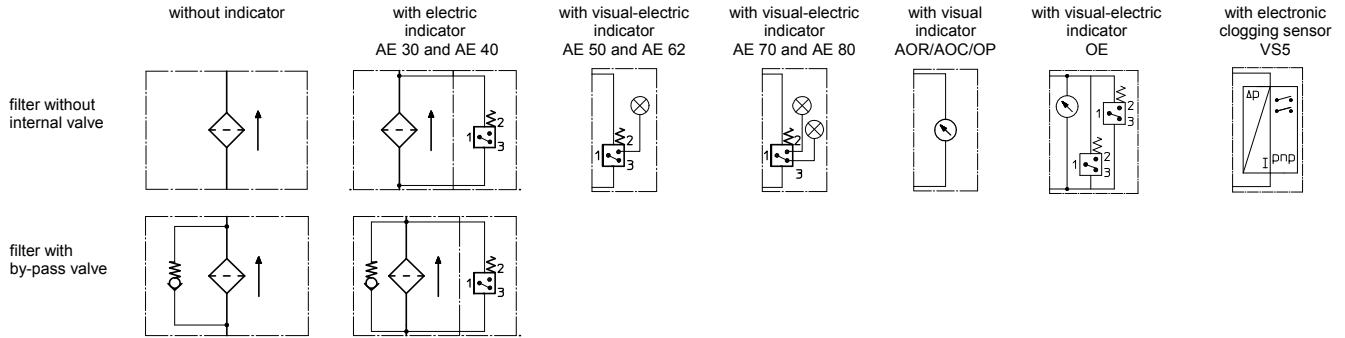
NF	VG				
	3VG	6VG	10VG	16VG	25VG
1000	0.237	0.165	0.105	0.092	0.063

$\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm³. The pressure drop changes proportionally to the density.



Symbols:



Spare parts:

item	qty.	designation	dimension	article-no.
1	1	filter element	01NR.1000...	
2	1	filter cover without by-pass valve	31065-3	
	1	filter cover with by-pass valve S1	31461-3	
3	1	mini-measuring connection	MA.3.ST	308630
4	3	screw plug	1/2 BSPP	304678
5	1	O-ring (only with by-pass valve)	22 x 3	304387 (NBR) | 304931 (FPM)
6	1	O-ring	170 x 6	304799 (NBR) | 306529 (FPM)
7	2	O-ring	90 x 4	306941(NBR) | 307031(FPM)
8	1	O-ring	22 x 3	304387(NBR) | 304931(FPM)
9	1	clogging indicator, visual	OP	see sheet-no. 1628
10	1	clogging indicator, visual-electric	OE	see sheet-no. 1628
11	1	clogging indicator, visual-electric	AE	see sheet-no. 1609
12	1	clogging sensor, electronic	VS5	see sheet-no. 1641
13	2	O-ring	14 x 2	304342 (NBR) | 304722 (FPM)
14	2	screw plug	1/8 BSPP	304791
15	1	screw plug	1/8 BSPP	305496
16	1	O-ring	183 x 4	3337005(NBR) | 337006(FPM)

item 14 execution only without clogging indicator or clogging sensor

Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
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For more information, please

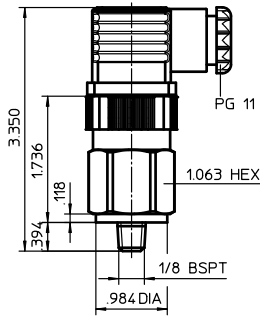
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CLOGGING INDICATOR

Series E (electrical), O (visual)

Sheet No.
1616 M



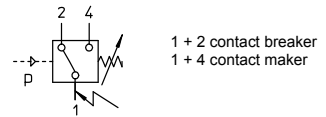
1. Type index: (ordering example)

E2.0.3.P = pressure switch, change over contacts, switching pressure 4.35 PSI
 E2.1.5.P = pressure switch, change over contacts, switching pressure 22 PSI
 E2.2.5.P = pressure switch, change over contacts, switching pressure 36 PSI

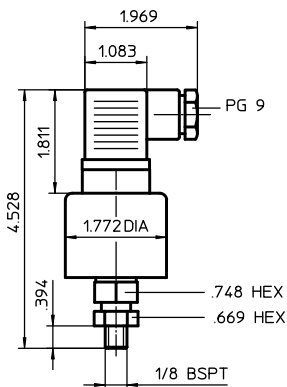
2. Technical data:

max. pressure to 1450 PSI
 temperature range: -4°F to +176°F
 max. contact load: max. 250 V ≅ /5A
 sealing material: nitrile (NBR)
 protection: IP 65
 plug-in connector: DIN 43650A

3. Symbol:



The functions contact making, contact breaking or contact making and breaking refer to the increasing pressure.



1. Type index: (ordering example)

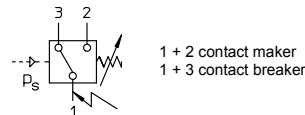
E4.-0.25.P = pressure switch, change over contacts, switching pressure -3.62 PSI

2. Technical data:

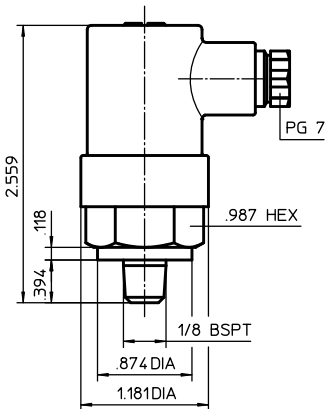
max. pressure to 1160 PSI
 temperature range: -4°F to +176°F
 max. contact load: max. 250 V ≅ /5A
 sealing material: nitrile (NBR)
 protection: IP 65

For the electrical connection please use only enclosed utensil socket. Other utensil sockets have a longer fixing screw which can destroy the inside micro switch. The screw of an available utensil socket should have a max. thread reach of 1.10 inch. Do not forget the shaped packing by sticking up the utensil and tighten the fixing screw moderately.

3. Symbol:



The functions contact making, contact breaking or contact making and breaking refer to the increasing pressure (0 PSI → -0.1 PSI).



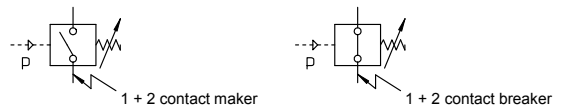
1. Type index: (ordering example)

E1.1.5.P = pressure switch, normally open contacts, switching pressure 22 PSI
 E1.2.5.P = pressure switch, normally open contacts, switching pressure 36 PSI
 E5.1.5.P = pressure switch, normally closed contacts, switching pressure 22 PSI
 E5.2.5.P = pressure switch, normally closed contacts, switching pressure 36 PSI
 E5.5.0.P = pressure switch, normally closed contacts, switching pressure 72 PSI

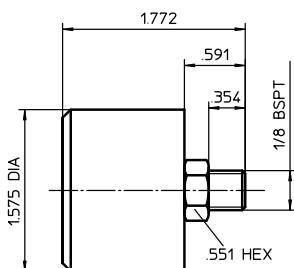
2. Technical data:

max. pressure to 4350 PSI
 temperature range: -4°F to +212°F
 max. contact load: max. 250 V ≅ /0,5A
 sealing material: nitrile (NBR)
 protection: IP 65

3. Symbol:



The function contact making or contact breaking refer to the increasing pressure.



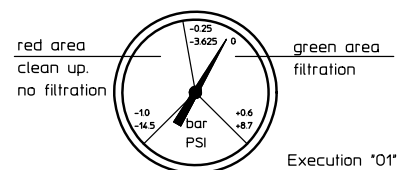
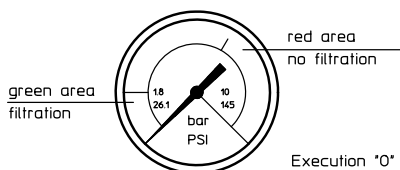
1. Type index: (ordering example)

O = clogging indicator visual, 0 to 145 PSI
 O1 = clogging indicator visual, +8.7 PSI to -14.5 PSI

2. Technical data:

temperature range: -4°F to +212°F

3. Symbol:



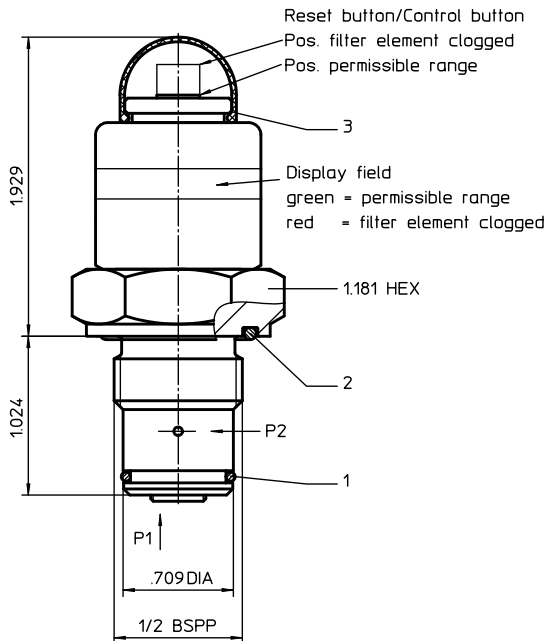
EDV 03/15

Changes of measures and design are subject to alteration!

CLOGGING INDICATOR

Series AOR, AOC (thread execution)

Sheet No.
1606 D



1. Clogging indicator AOR, AOC

1.1. Type index: (ordering example)

AOR. 1,5. P. -

1	2	3	4
---	---	---	---

1 series:

AOR = clogging indicator, visual with reset function
AOC = clogging indicator, visual with control function

2 indicator-pressure difference: Δp -nominal

1,5 = 22 PSI
2,5 = 36 PSI
5,0 = 73 PSI

3 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

4 material:

- = Standard (aluminium)
VA = stainless steel

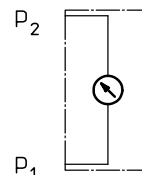
2. Technical data:

temperature ranges
- operating temperature: + 14°F to +176° F
(for a short time +212°F)
-22°F to +212°F
- resistant to compression: -22°F to +212°F
- survival temperature: -40°F to +212°F
max. operating pressure: 6000 PSI (stainless steel)
3200 PSI (aluminium)
2320 PSI
max. pressure difference: 2320 PSI
reset condition: < 60% Δp -nominal
control condition: < 80% Δp -nominal
max. display error: \pm 10%
fatigue strength: max. 1 Mio load cycles
for aluminium

3. Spare parts:

item	qty.	designation	dimension	article-no.
1	1	O-ring	15 x 1,5	315357 (NBR) 315427 (FPM)
2	1	O-ring	22 x 2	304708 (NBR) 304721 (FPM)
3	1	cap		315325 (PUR)

4. Symbol:



p₁ = measure connection supply
p₂ = measure connection output

EDV 02/15

Changes of measures and design are subject to alteration!

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Powering Business Worldwide

5. Description:

The clogging indicators with designation AOR and AOC are visual pressure difference indicators with a reset function or control function.

These pressure difference indicators can be built on to all pressure filters where ($p \leq 6000$ PSI stainless steel, $p \leq 3200$ PSI aluminium), and for which a corresponding allocation is provided on the respective dimension sheet. As the filter element becomes increasingly clogged, the difference between the inflow pressure p_1 and the outflow pressure p_2 of the filter will become larger. The display function is triggered at the switching pressure difference: this depends on the pressure difference just mentioned, and is independent of the operating pressure.

A measuring piston which is subject to the inflow and outflow pressure moves against a measuring spring in a manner which depends on the pressure difference. The tractive force between two magnets in the measuring piston and in the display cylinder changes according to the distance moved. At the switching point, the tractive force between the magnets and the force of the spring on the display cylinder are equally large, and are opposed.

In the range $\pm 10\%$ of the set switching pressure, the spring on the display cylinder causes the display cylinder to move suddenly into the „filter element clogged“ display position. This means that the colour in the display field changes from green to red.

In the case of the clogging indicator AOR the display position „filter element clogged“ is fixed, and continues to be maintained even if the pressure difference returns to permissible values, dependent on the viscosity or the rate of flow. The fixed „element clogged“ display position can be canceled by operating the reset button, provided that the reset condition is satisfied.

In the case of the clogging indicator AOC the display position „filter element clogged“ is only fixed in the pressure difference range $\geq 30 \pm 10\%$ of the switching pressure difference. In the range $< 30 \pm 10\%$ of the switching pressure difference occurs a self-instructed shift down to the display position „permissible range“. In the range $> 30\%, < 80\%$ of the switching pressure difference, the display position „filter element clogged“ can be restored for control functions with the control button.

The reset- or control button is located in a position where it is protected from dirt, underneath the elastic cap, item 3, and should be operated with slight manual pressure $< 10\text{N}$.

Note on functional behaviour:

The „filter element clogged“ display will also be triggered if the pressure difference exceeds the switching pressure difference for only a brief period ($> 100\text{ms}$).

The „filter element clogged“ display is triggered in the event of oscillatory or impulse excitations $> 1\text{g}$ at values $< 90\%$ of the switching pressure difference.

6. Operating instructions:

Normally filters are supplied with mounted clogging indicator. When retrofitting - the filter is to be discharged of the operating pressure.

- dismantling the screw plug out of the bare hole which is foreseen for the clogging indicator
- screw in the clogging indicator into the bare hole (starting torque 74 lb.-ft. stainless steel, starting torque 59 lb.-ft. aluminium)

It is necessary to make sure the availability and the right positioning of sealing parts

- O-ring 22 x 2 and

- O-ring 15 x 1,5

as well as a dirt-free mounting.

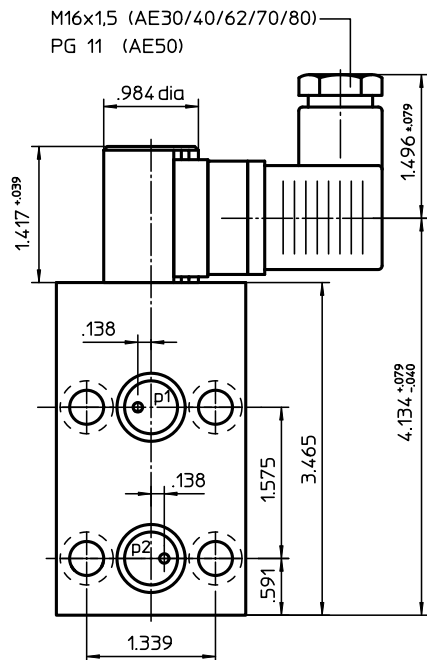
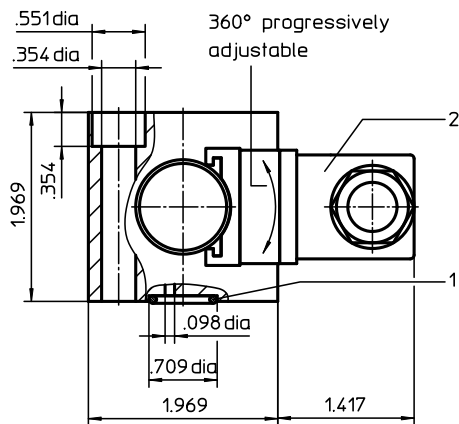
7. Maintenance:

This device is maintenance-free; however, care should be taken to ensure that no cleaning agent or solvents reach the transparent hood and the elastic cap over the reset button or control button.

CLOGGING INDICATOR

Series AE (electrical / visual-electrical, block execution)

Sheet No.
1609 I



1. Clogging indicator AE

1.1. Type index: (ordering example)

AE. 30. 1,5. P. -. B. -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 | **series:**
AE = clogging indicator, electrical / visual-electrical
- 2 | **version:**
30-80 = see table below
- 3 | **indicator-pressure difference:** Δp-nominal
1,5 = 22 PSI
2,5 = 36 PSI
5,0 = 73 PSI
- 4 | **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 5 | **material:** (block)
- = standard
VA = stainless steel
- 6 | **execution:**
B = block execution
- 7 | **damper:**
- = standard with hydraulic damper
1 = without hydraulic damper

2. Technical data:

- temperature ranges
- operating temperature: + 14°F to +176°F (for a short time +212°F)
- resistant to compression: -22°F to +212°F
- survival temperature: -40°F to +212°F
- max. operating pressure: 6000 PSI
- max. pressure difference: 2320 PSI

version	luminous indication	contact	voltage	max. rupturing capacity (resistive load)	max. switching current (resistive load)	connection protection
30	-	contact maker and contact breaker 175V DC	3 VA	0,25 A	line adapter according to DIN 43650-designA/ISO4400
40	-		..... 125V AC	3 Watt	0,25 A
50	1x LED ¹⁾	 175V DC	20 VA	1,0 A	
62	1x LED		..... 230V AC	10 Watt	0,5 A
70	2x LED		120V AC/DC	3 Watt/VA	0,025 A with 120V AC/DC	
80	2x LED		110...230V AC/DC	20 Watt/VA	0,180 A with 110V AC/DC 0,090 A with 230V AC/DC	
			24V DC	3 VA	0,080 A with 24V DC	IP 65 according to DIN EN 60529
			24V DC	20 VA	0,750 A with 24V DC	

¹⁾ LED = light emitting diode

3. Spare parts:

item	qty.	designation	dimension	article-no.	type
1	2	O-ring	14 x 2	304342 (NBR)	versions 30 - 80
				304722 (FPM)	
2	1	line adapter	DIN 43650-designA/ISO4400	312492	versions 30 and 40
	1	line adapter with LED 24V		315012	versions 70 and 80
	1	line adapter with LED 120V		315010	version 50
	1	line adapter with LED 110...230V		332235	version 62

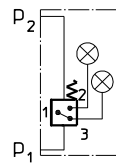
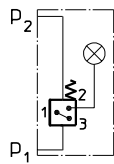
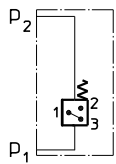
4. Symbols:

hydraulic-electrical symbol

versions 30 and 40

versions 50 and 62

versions 70 and 80



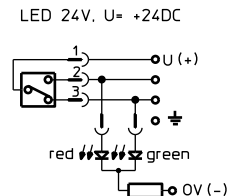
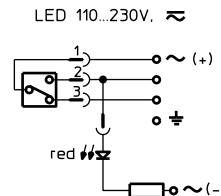
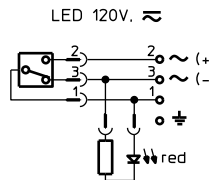
p₁ = measure connection supply
p₂ = measure connection output

connection configuration for LED

version 50

version 62

versions 70 and 80



5. Description:

The AE 30 and AE 40 pollution indicators are electrical differential pressure indicators.

The AE 50 to AE 80 pollution indicators are combined optical and electrical pressure indicators. These differential pressure indicators can be fitted to all pressure filters $p \leq 6000$ PSI for which there is a corresponding assignment on the relevant dimension drawing. As the degree of pollution of the filter element rises, so the difference between the entry pressure p_1 and the exit pressure p_2 of the filter increases. Depending on this pressure difference and irrespective of the operating pressure, in the pollution indicators

- AE 30 and AE 40, two electrical signals (contact maker/contact breaker) are triggered
- AE 50 and AE 62, two electrical signals (contact maker/contact breaker) are triggered and one optical signal is formed
- AE 70 and AE 80, two electrical signals (contact maker/contact breaker) are triggered and two optical signals are formed.

A metering piston subjected to the entry and exit pressure moves against a metering spring according to the pressure differential. Depending on the path, a permanent magnet integrated in the metering piston activates a reed contact (electromagnetic switch) and triggers the electrical signal. The electrical and optical indication is effected as a digital signal at the given switching pressure. Versions 50 to 80 of the pollution indicator are fitted with additional LED displays. The optical LED signal becomes visible according to the selected version in the translucent cover plate of the line box on the pollution indicator.

In the pollution indicators

- AE 50 and AE 62, the red LED signals that the filter element needs to be changed
- AE 70 and AE 80, the green LED signals the normal operating state (filter element not yet polluted to an unacceptable level), while the red LED signals that the filter element needs to be changed.

6. Operating instructions:

Normally filters are supplied with mounted clogging indicators.

It is necessary to make sure the availability and the right positioning of sealing parts O-ring 14 x 2 as well as a dirt-free mounting. The electrical contacts are to be connected according to the graphical symbol shown on the type plate of the clogging indicator.

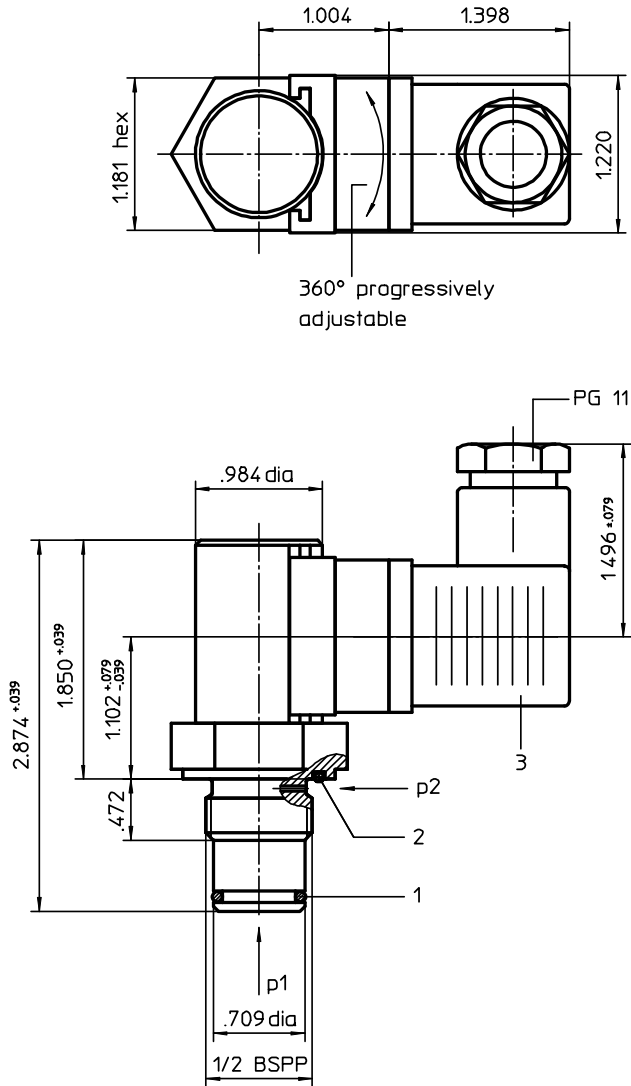
7. Maintenance:

The device is maintenance-free, however, note that no cleaning fluids and solvents get on the transparent cap of the optical indicator.

CLOGGING INDICATOR

Series AE (electrical / visual-electrical, thread execution)

Sheet No.
1615 L



1. Clogging indicator AE

1.1. Type index: (ordering example)

AE. 30. 1,5. P. - . - . -

1	2	3	4	5	6	7
---	---	---	---	---	---	---

- 1 | **series:**
AE = clogging indicator, electrical / visual-electrical
- 2 | **version:**
30-80 = see table below
- 3 | **indicator-pressure difference:** Δp -nominal
1,5 = 22 PSI
2,5 = 36 PSI
5,0 = 73 PSI
- 4 | **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)
- 5 | **material:**
- = standard (aluminium)
VA = stainless steel
- 6 | **execution:**
- = standard
- 7 | **damper:**
- = standard with hydraulic damper
1 = without hydraulic damper

2. Technical data:

- temperature ranges
- operating temperature: + 14 °F to +176 °F (for a short time +212 °F)
- resistant to compression: -22 °F to +212 °F
- survival temperature: -40 °F to +212 °F
- max. operating pressure: 6000 PSI (stainless steel)
3200 PSI (aluminium)
- max. pressure difference: 2320 PSI
- fatigue strength: max. 1 Mio load cycles

Clogging indicator AE with redundant switches, see data sheet-no. 40968-4

version	luminous indication	contact	voltage	max. rupturing capacity (resistive load)	max. switching current (resistive load)	connection protection
30	-	contact maker and contact breaker 175V DC	3 VA	0,25 A	line adapter according to DIN 43650-designA/ISO4400
40	-		..... 125V AC	3 Watt	0,25 A
50	1x LED ¹⁾	 175V DC	20 VA	1,0 A	
			..... 230V AC	10 Watt	0,5 A
62	1x LED		110...230V AC/DC	3 Watt/VA	0,025 A with 120V AC/DC	IP 65 according to DIN EN 60529
70	2x LED		24V DC	3 VA	0,080 A with 24V DC	
80	2x LED		24V DC	20 VA	0,750 A with 24V DC	

¹⁾ LED = light emitting diode

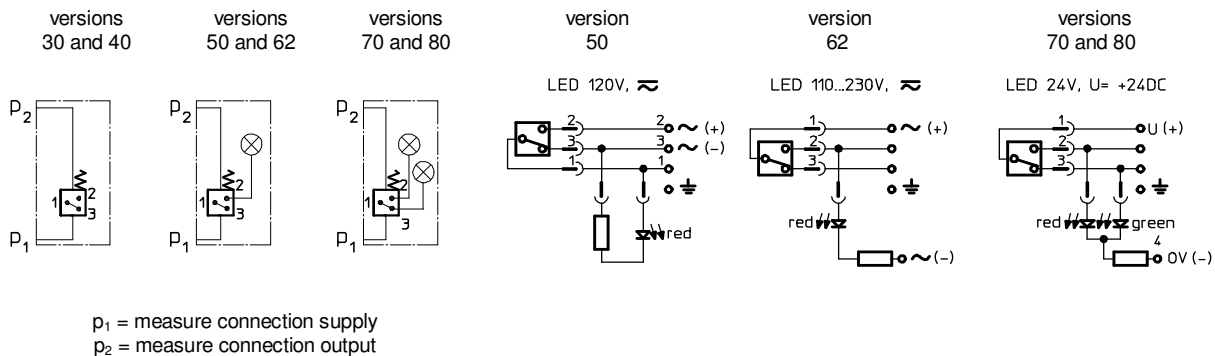
3. Spare parts:

item	qty.	designation	dimension	article-no.	type
1	1	O-ring	14 x 2	304342 (NBR)	versions 30 - 80
				304722 (FPM)	
2	1	O-ring	22 x 2	304708 (NBR)	
				304721 (FPM)	
3	1	line adapter	DIN 43650-designA/ISO4400	312492	versions 30 and 40
	1	line adapter with LED 24V		315012	versions 70 and 80
	1	line adapter with LED 120V		315010	version 50
	1	line adapter with LED 110...230V		332235	version 62

4. Symbols:

hydraulic-electrical symbol

connection configuration for LED



5. Description:

The AE 30 and AE 40 pollution indicators are electrical differential pressure indicators.

The AE 50 to AE 80 pollution indicators are combined optical and electrical differential pressure indicators. These differential pressure indicators can be fitted to all pressure filters ($p \leq 6000$ PSI stainless steel, $p \leq 3200$ PSI aluminium) for which there is a corresponding assignment on the relevant dimension drawing. As the degree of pollution of the filter element rises, so the difference between the entry pressure p_1 and the exit pressure p_2 of the filter increases. Depending on this pressure difference and irrespective of the operating pressure, in the pollution indicators

- AE 30 and AE 40, two electrical signals (contact maker/contact breaker) are triggered
- AE 50 and AE 62, two electrical signals (contact maker/contact breaker) are triggered and one optical signal is formed
- AE 70 and AE 80, two electrical signals (contact maker/contact breaker) are triggered and two optical signals are formed.

A metering piston subjected to the entry and exit pressure moves against a metering spring according to the pressure differential. Depending on the path a permanent magnet integrated in the metering piston activates a reed contact (electromagnetic switch) and triggers the electrical signal. The electrical and optical indication is effected as a digital signal at the given switching pressure. Versions 50 to 80 of the pollution indicator are fitted with additional LED displays. The optical LED signal becomes visible according to the selected version in the translucent cover plate of the line box on the pollution indicator.

In the pollution indicators

- AE 50 and AE 62, the red LED signal that the filter element needs to be changed
- AE 70 and AE 80, the green LED signal the normal operating state (filter element not yet polluted to an unacceptable level), while the red LED signal that the filter element needs to be changed.

6. Operating instructions:

Normally filters are supplied with mounted clogging indicator. When retrofitting - the filter is to be discharged of the operating pressure.

- dismantling the screw plug out of the bare hole which is foreseen for the clogging indicator
- screw in the clogging indicator into the bare hole (starting torque 59 lb.-ft. stainless steel, starting torque 37 lb.-ft. aluminium)

It is necessary to make sure the availability and the right positioning of sealing parts

- O-ring 22 x 2 and
- O-ring 14 x 2

as well as a dirt-free mounting. The electrical contacts are to be connected according to the graphical symbol shown on the type plate of the clogging indicator.

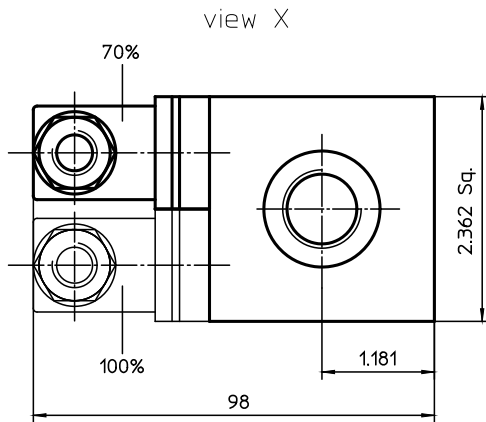
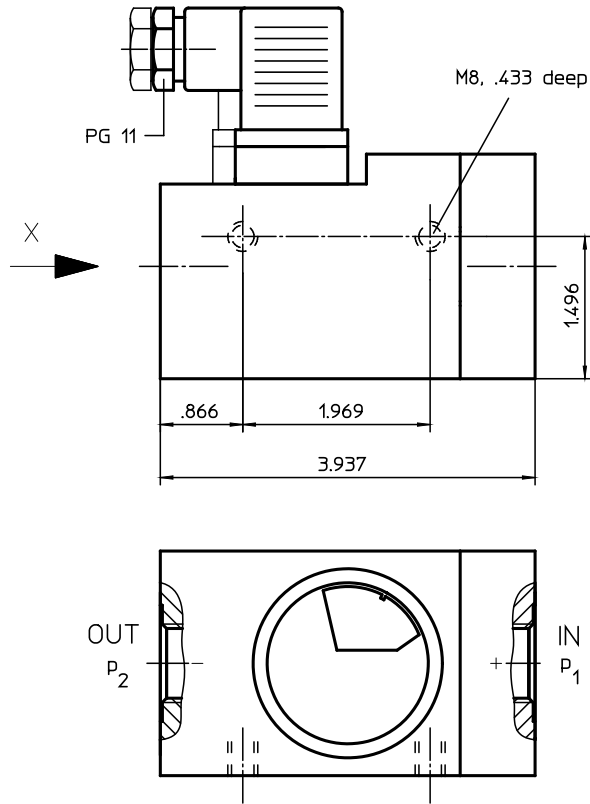
7. Maintenance:

The device is maintenance-free, however, note that no cleaning fluids and solvents get on the transparent cap of the optical indicator.

CLOGGING INDICATOR

Series OP (visual), OE (visual-electrical)

Sheet No.
1614 F



1. Clogging indicator OP-OE

1.1. Type index: (ordering example)

OE1. 1,2. G. 1. P. -. 1

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

- OE1 = clogging indicator, visual-electrical with 1 contact maker and contact breaker with 70% switching pressure difference
- OE2 = clogging indicator, visual-electrical with 1 contact maker and contact breaker with 70% and 100% switching pressure difference
- OP = clogging indicator, visual (according to series OE without switching contacts)

2 inductor-pressure difference: Δp -nominal

0,8 = 12 PSI; 1,2 = 17 PSI; 2,5 = 36 PSI; 4,5 = 65 PSI

3 connection:

G = thread connection

4 connection size:

1 = 1/4 BSPP
3 = 1/2 BSPP

5 sealing material:

P = Nitrile (NBR) V = Viton (FPM)

6 material:

- = standard
VA = stainless steel

7 execution:

- = without switching contacts (OP)
1 = execution 1 (electrical limit facts see item 3)
2 = execution 2 (electrical limit facts see item 3)

2. Technical data:

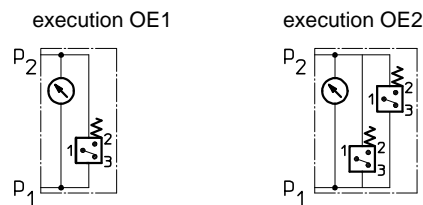
permissible operating pressure: 914 PSI
permissible operating temperature: +176°F
permissible pressure difference: $p_1 - p_2 \leq 232$ PSI
inductor-pressure difference: 12; 17; 36; 65 PSI

The electrical signal takes place at 70% of the switching pressure difference using the design with two contacts the second signal takes place at 100% of the switching pressure difference.

3. Electrical limit facts:

execution 1: 175V DC, 0,25A, 3 VA
125V AC, 0,25A, 3 Watt
execution 2: 1...150V, 1A, 20 Watt
switch-over contact: contact maker and contact breaker
protection: IP 65

4. Symbols:



1+2 contact maker
1+3 contact breaker

5. Functioning:

The clogging indicator OE is a combined visual and electrical pressure difference indicator.

This type of pressure difference indicator can be mounted on all pressure filters with operating pressure ≤ 914 PSI, if the corresponding measuring ports on the filter housing are available.

With contamination of the filter element the difference between the supply pressure and the output pressure of the filter is increasing. Depending on this pressure difference but independent of the operating pressure, visual and electrical signals are released.

A pressure difference dependent measuring piston, charged with supply pressure and output pressure, moves towards a measuring spring.

Concerning the OE1 a permanent magnet which is integrated in the measuring piston switches - depending on the gauge length - a Reed-contact (magnetic-switch) and releases electrical control signals upon reaching a pressure difference of 70%.

The OE2 is equipped with two magnetic switches which release electrical control signals in a sequence of 70% and 100% of the switching pressure.

The visual control signal is indicated by a blue-red scale which is connected to the magnetic measuring piston.

In the range of low pressure differences - depending on the gauge length of the measuring piston - the blue range of the scale appears first.

The indicated switching pressure difference is reached when the dividing line between the red and the blue range of the scale points to the marking on the display window.

6. Operating instruction:

- Connection

Upon connecting the indicator to the filter make sure that the connection marked „+“ is connected to the dirt oil side (IN) and the connection marked „-“ is connected to the clean oil side (OUT).

Note: Consider data and connecting conditions mentioned in items 2 to 4.

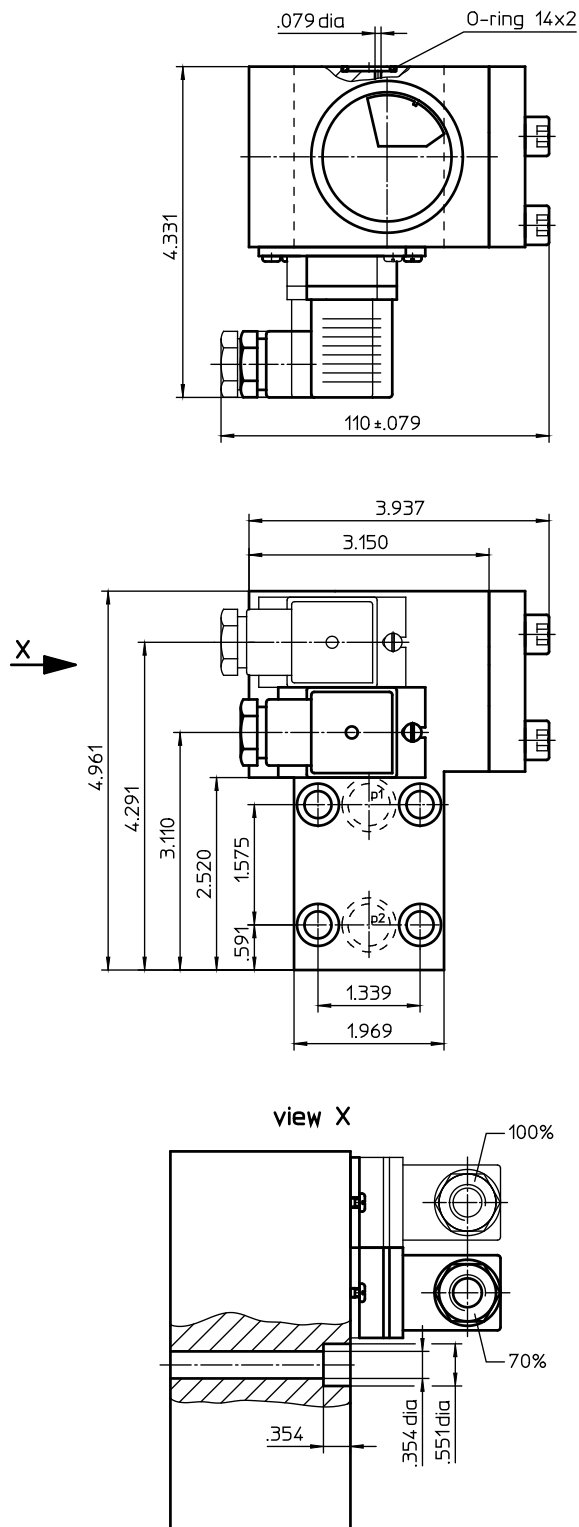
7. Maintenance:

The device is maintenance-free. However, make sure that no solvents get in touch with the display window visual indicator nor with the piston-spring-system of the clogging indicator.

CLOGGING INDICATOR

Series OP (visual), OE (visual-electrical) block execution

Sheet No.
1628 G



1. Clogging indicator OP-OE

1.1. Type index: (ordering example)

OE1.1,2. B. -. P. -. 1

1	2	3	4	5	6	7
---	---	---	---	---	---	---

1 series:

- OE1 = clogging indicator, visual-electrical with 1 contact maker and contact breaker with 70% switching pressure difference
- OE2 = clogging indicator, visual-electrical with 1 contact maker and contact breaker with 70% and 100% switching pressure difference
- OE3 = clogging indicator, visual-electrical with 2 contacts maker and contacts breaker with 70% switching pressure difference
- OP = clogging indicator, visual
(according to series OE without switching contacts)

2 indicator-pressure difference: Δp -nominal

0,3 = 4 PSI; 0,8 = 12 PSI; 1,2 = 17 PSI; 2,5 = 36 PSI; 4,5 = 65 PSI

3 connection:

B = block execution with flange connection

4 connection size:

- = standard

5 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

6 material:

- = standard
VA = stainless steel

7 execution:

- = without switching contacts (OP)
- 1 = execution 1 (electrical limit facts see item 3)
- 2 = execution 2 (electrical limit facts see item 3)

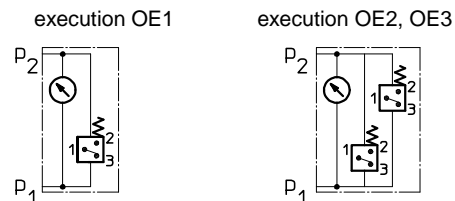
2. Technical data:

permissible operating pressure: 914 PSI
permissible operating temperature: +176°F
permissible pressure difference: $p_1 - p_2 \leq 232$ PSI
indicator-pressure difference: 4; 12; 17; 36; 65 PSI

3. Electrical limit facts:

execution 1: 175V DC, 0,25A, 3 VA
125V AC, 0,25A, 3 Watt
execution 2: 1...150V, 1A, 20 Watt
switch-over contact: contact maker and contact breaker
protection: IP 65

4. Symbols:



1+2 contact maker
1+3 contact breaker

Changes of measures and design are subject to alteration!

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5. Functioning:

The clogging indicator OE is a combined visual and electrical pressure difference indicator.

This type of pressure difference indicator can be mounted on all pressure filters with operating pressure ≤ 914 PSI, if the corresponding measuring ports on the filter housing are available.

With contamination of the filter element the difference between the supply pressure and the output pressure of the filter is increasing. Depending on this pressure difference but independent of the operating pressure, visual and electrical signals are released.

A pressure difference dependent measuring piston, charged with supply pressure and output pressure, moves towards a measuring spring.

Concerning the OE1 a permanent magnet which is integrated in the measuring piston switches - depending on the gauge length - a Reed-contact (magnetic-switch) and releases electrical control signals upon reaching a pressure difference of 70%.

The OE2 is equipped with two magnetic switches which release electrical control signals in a sequence of 70% and 100% of the switching pressure.

The OE3 is equipped with two magnetic switches triggering electrical control signals at 70% of the switching pressure (redundance of the switches).

The visual control signal is indicated by a blue-red scale which is connected to the magnetic measuring piston.

In the range of low pressure differences - depending on the gauge length of the measuring piston - the blue range of the scale appears first.

The indicated switching pressure difference is reached when the dividing line between the red and the blue range of the scale points to the marking on the display window.

6. Operating instruction:

Note: Consider data and connecting conditions mentioned in items 2 to 4.

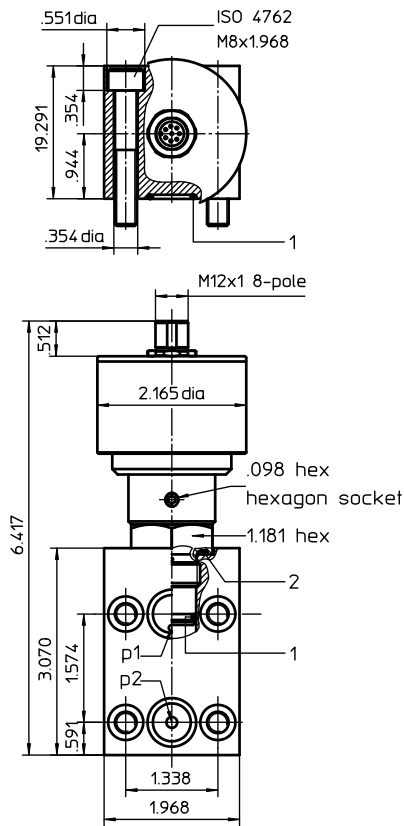
7. Maintenance:

The device is maintenance-free. However, make sure that no solvents get in touch with the display window visual indicator nor with the piston-spring-system of the clogging indicator.

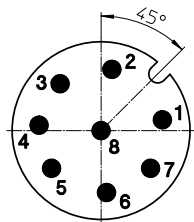
ELECTRONICAL CLOGGING INDICATOR

Series VS5 (block execution)

Sheet No.
1641 A



Configuration of M12 connector at VS5



Connection configuration

- 1 GND/OV
- 2 24VDC current supply
- 3 24V PNP at Δp 75%
- 4 24V PNP at Δp 100%
- 5 6...20 mA
- 6 \oplus PE
- 7 reserve not connected
- 8 reserve not connected

3. Spare parts:

item	qty.	designation	dimension	article-no.
1	3	O-ring	14 x 2	304342 (NBR) 304722 (FPM)
2	1	O-ring	22 x 2	304708 (NBR) 304721 (FPM)

1. Type index: (ordering example)

VS5. 1,5. V. -. NO. CS. B. -

1	2	3	4	5	6	7	8
---	---	---	---	---	---	---	---

1 series:

VS5 = electronic clogging indicator with analog output 6...20mA and 2x PNP-switching contacts (75% and 100%)

2 indicator-pressure difference: Δp -nominal

1,5 = 22 PSI 5,0 = 73 PSI
2,5 = 36 PSI 6,0 = 87 PSI

3 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

4 material:(block)

- = standard (aluminium)
VA = stainless steel

5 contact:

NO = normally opened,
NC = normally closed

6 cold start:

CS = with cold start suppression up to 77°F
- = without cold start suppression

7 execution:

B = block execution

8 connection:

- = without
GS5 = M12, 8-pole female connector
SS5 = M12, 8-pol. female connector with 197 inch cable and 3 installed LED's red/yellow/green (only in combination with contact "NO = normally opened")

2. Technical data:

max. operating pressure: 6000 PSI (stainless steel)
3200 PSI (aluminium)

max. pressure difference: 2320 PSI

operating temperature: -40°F...176°F

temperature range of fluid: -13°F...212°F (NBR)
14°F...212°F (FPM)

other temperature ranges on request

sealing material: NBR / FPM, further seals on request

power voltage: +24VDC \pm 20%

current consumption: approx.. 25mA + current signal output (measured with 24VDC)

output signal: Δp : 6...20mA, max load: 400 Ω
5mA by cold start suppression

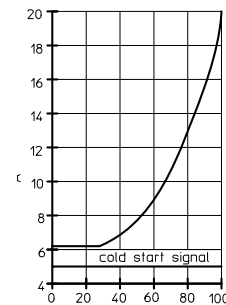
75% and 100% from $\Delta p_{nominal}$ as 24VDC

error of measurement: \pm 5% v. $\Delta p_{nominal}$

operating ability: < 400mA at closed state

< 1mA at opened state

protection: IP65 (IP67 on request)



Δp -nominal in %

Changes of measures and design are subject to alteration!

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Friedensstrasse 41, 68804 Altlussheim, Germany

phone +49 (0)6205 2094-0

fax +49 (0)6205 2094-40

url

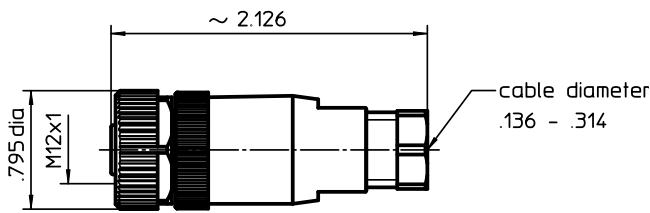
www.eaton.com/filtration

4. Functions:

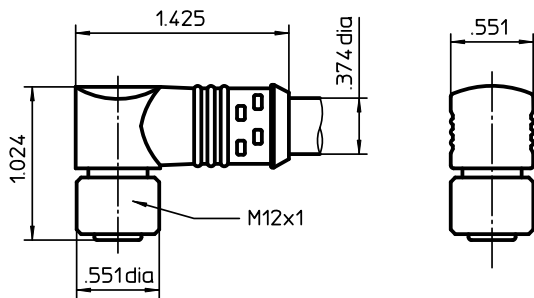
- continuous pressure difference measuring
- cold start indication up to approx. + 77°F
- suppression of pressure peaks
- dust-proof and splash-proof aluminium or stainless steel housing
- interference-free signal transmission over longer distances
- optimal utilization of the filter elements based on a high definition of the measure value within the final measure range
- interchangeable with clogging indicator type AE

5. Connection:

GS5 = M12, 8-pole female connector (article-no. 345742)
 temperature range: -40°F ... +176°F



SS5 = M12, 8-pole female connector with 197 inch cable and 3 installed LED's red/yellow/green (article-no. 347370)
 temperature range: -13°F ... +176°C

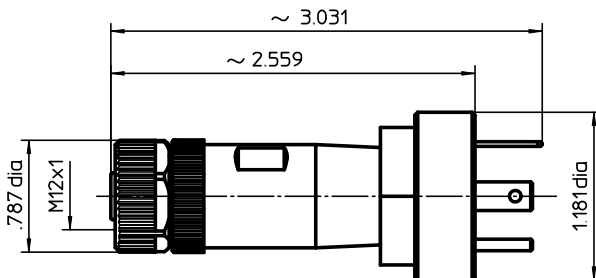


Connection configuration

WH	1	GND/0V
BN	2	24VDC current supply
GN	3	24V PNP at Δp 75%
YE	4	24V PNP at Δp 100%
GY	5	6...20 mA
PK	6	⊕PE
BU	7	reserve not connected
RD	8	reserve not connected

6. Accessories: (spare part for VS1 / VS2)

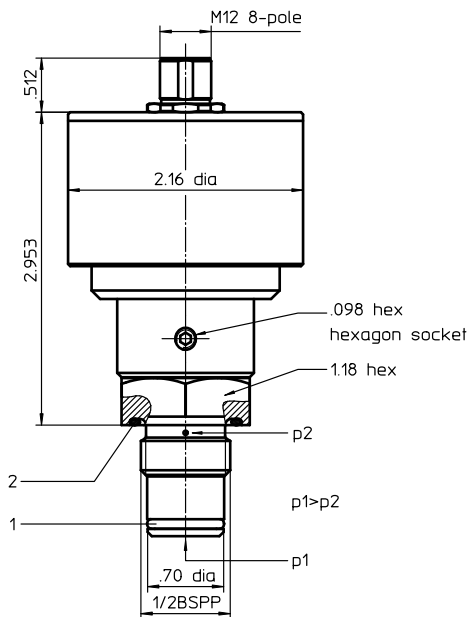
- an adapter plug GSA1 (article-no. 347425) is required when replacing a VS1 through the VS5
- an adapter plug GSA2 (article-no. 347428) is required when replacing a VS2 through the VS5



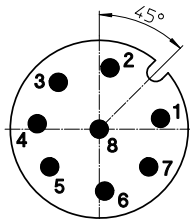
ELECTRONICAL CLOGGING INDICATOR

Series VS5 (thread execution)

Sheet No.
1619 C



Configuration of M12 connector at VS5



Connection configuration

- 1 GND/0V
- 2 24VDC current supply
- 3 24V PNP at Δp 75%
- 4 24V PNP at Δp 100%
- 5 6...20 mA
- 6 \oplus PE
- 7 reserve not connected
- 8 reserve not connected

3. Spare parts:

item	qty.	designation	dimension	article-no
1	1	O-ring	14 x 2	304342 (NBR) | 304722 (FPM)
2	1	O-ring	22 x 2	304708 (NBR) | 304721 (FPM)

1. Type index: (ordering example)

VS5. 1,5. V. -. NO. CS. -. -

1	2	3	4	5	6	7	8
---	---	---	---	---	---	---	---

1 series:

VS5 = electronic clogging indicator with analog output 6...20mA and 2x PNP-switching contacts (75% and 100%)

2 indicator-pressure difference: Δp -nominal

1,5 = 22 PSI 5,0 = 73 PSI
2,5 = 36 PSI 6,0 = 87 PSI

3 sealing material:

P = Nitrile (NBR)
V = Viton (FPM)

4 material:(screw-in-housing)

- = standard (aluminium)
VA = stainless steel

5 contact:

NO = normally opened,
NC = normally closed

6 cold start:

CS = with cold start suppression up to 77°F
- = without cold start suppression

7 execution:

- = standard

8 connection:

- = without
GS5 = M12, 8-pole female connector
SS5 = M12, 8-pol. female connector with 197 inch cable and 3 installed LED's red/yellow/green (only in combination with contact "NO = normally opened")

2. Technical data:

max. operating pressure: 6000 PSI (stainless steel)
3200 PSI (aluminium)

max. pressure difference: 2320 PSI

operating temperature: -40°F...176°F

temperature range of fluid: -13°F...212°F (NBR)
14°F...212°F (FPM)

other temperature ranges on request
NBR / FPM, further seals on request

sealing material: NBR / FPM, further seals on request

power voltage: +24VDC \pm 20%

current consumption: approx. 25mA + current signal output (measured with 24VDC)

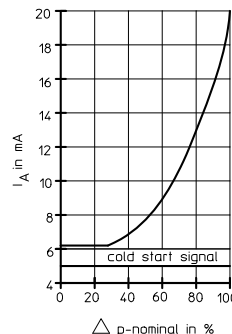
output signal: Δp : 6...20mA, max load: 400 Ω
5mA by cold start suppression
75% and 100% from $\Delta p_{nominal}$ as 24VDC

error of measurement: \pm 5% v. $\Delta p_{nominal}$

operating ability: < 400mA at closed state
< 1mA at opened state

protection: IP65 (IP67 on request)

fatigue strength: max. 1 Mio load cycles for aluminium



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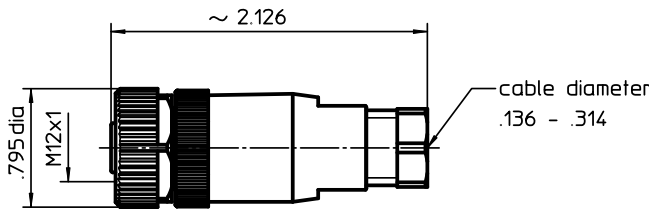
Changes of measures and design are subject to alteration!

4. Functions:

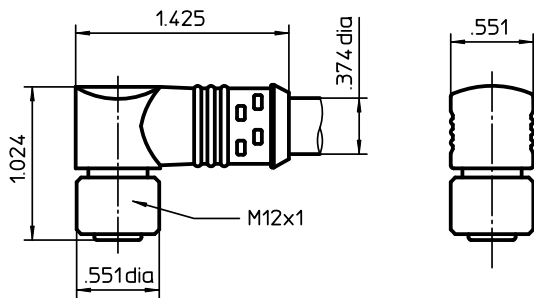
- continuous pressure difference measuring
- cold start indication up to approx. + 77°F
- suppression of pressure peaks
- dust-proof and splash-proof aluminium or stainless steel housing
- interference-free signal transmission over longer distances
- optimal utilization of the filter elements based on a high definition of the measure value within the final measure range
- interchangeable with clogging indicator type AE

5. Connection:

GS5 = M12, 8-pole female connector (article-no. 345742)
 temperature range: -40°F ... +176°F



SS5 = M12, 8-pole female connector with 197 inch cable and 3 installed LED's red/yellow/green (article-no. 347370)
 temperature range: -13°F ... +176°C



Connection configuration

WH	1	GND/0V
BN	2	24VDC current supply
GN	3	24V PNP at Δp 75%
YE	4	24V PNP at Δp 100%
GY	5	6...20 mA
PK	6	⊕PE
BU	7	reserve not connected
RD	8	reserve not connected

6. Accessories: (spare part for VS1 / VS2)

- an adapter plug GSA1 (article-no. 347425) is required when replacing a VS1 through the VS5
- an adapter plug GSA2 (article-no. 347428) is required when replacing a VS2 through the VS5

