

## Hydraulic and lubrication oil filters Technical data sheets



*Powering Business Worldwide*

## Hydraulic and lubrication oil filter technical data sheets

### Table of contents

Click on model numbers below to view technical data sheets



Series	High pressure filters
<b>Series FHP</b>	<b>Pressure filter, front manifold mounted 3625 PSI</b>
FHP 60-150	
<b>Series HPF</b>	<b>Pressure filter, manifold mounted 4568 PSI</b>
HPF 60-450	
HPF 601-1351	
HPF/HPFO 30	
<b>Series HPP</b>	<b>Pressure filter, top manifold mounted 4568 PSI</b>
HPP 60-450	
HPP 601-1351	
<b>Series HPU</b>	<b>Pressure filter, top manifold mounted 4568 PSI</b>
HPU 601-1351	
<b>Series HPW</b>	<b>Pressure filter for reversable filtration 4568 PSI</b>
HPW 60-450	
HPW 601-1351	
<b>Series HPX</b>	<b>Pressure filter, manifold mounted 4568 PSI</b>
HPX 60-150	
HPX 170-450	
HPX 601-1351	
<b>Series HPY</b>	<b>Pressure filter, manifold mounted 4568 PSI</b>
HPY 60-150	
HPY 170-450	
<b>Series HPZ</b>	<b>Pressure filter for sandwich stacking 5075 PSI</b>
HPZ 32	
HPZ 90	
<b>Series HP</b>	<b>Pressure filter in-line 6000 PSI</b>
HP 31	
HP 61	
HP 170-450	
HP 171-451	
HP 601-1351	
<b>Series HPV</b>	<b>Pressure filter with differential pressure valve 6000 PSI</b>
HPV 60-150	
HPV 170-450	



Series	Medium pressure filters
<b>Series MF</b>	<b>Medium pressure filter, manifold mounted 2320 PSI</b>
MF/MFO 30	
<b>Series ML</b>	<b>Standard in-line filter-medium pressure range 2320 PSI</b>
ML 170-450	
ML/MLO 30	
<b>Series MNL</b>	<b>Standard in-line filter-medium pressure range according to DIN 24550 T1, T2 2320 PSI</b>
MNL 40-100	
<b>Series MDV</b>	<b>Medium pressure filter with differential pressure valve 2900 PSI</b>
MDV 40-63	



Series	Low pressure filters
<b>Series LF</b>	<b>In-line low pressure filter 464 PSI</b>
LF 63	
LF 101	
LF 251-1100	
LF 1950-2200	
LF 2005-4005	



Series	Return line filters - descriptions
<b>Series DTEF</b>	<b>Return-line filter, change over 145 PSI</b>
DTEF 70	
DTEF 120	
DTEF 320	
DTEF 426	
DTEF 625	
DTEF 952	
<b>Series RF</b>	<b>Return-line filter 145 PSI</b>
RF 210-320	
<b>Series TEF</b>	<b>Tank mounted return-line filter 145 PSI</b>
TEF 41	
TEF 55-320	
TEF 426	
TEF 625	
TEF 952	
<b>Series TEFB</b>	<b>Tank mounted return-line filter with breather filter 145 PSI</b>
TEFB 41	
TEFB 55-120	
TEFB 210-310	
<b>Series TNRS</b>	<b>Tank mounted return-line filter according to DIN 24550 T5 with suction connection 145 PSI</b>
TNRS 101	
<b>Series TRS</b>	<b>Tank mounted return-line filter with suction connection 145 PSI</b>
TRS 226	
TRS 625	
<b>Series TRW</b>	<b>Return-line filter for horizontal tank mounted 145 PSI</b>
TRW 310	
Series	Duplex filters
<b>Series DWF</b>	<b>Welded pressure filter, change over 232 PSI</b>
DWF 1505	
DWF 3005	
DWF 4505	
DWF 6005	
<b>Series DSF</b>	<b>In-line pressure filter, change over 363 PSI</b>
DSF 176-331	
<b>Series DU</b>	<b>Pressure filter, change over 464 PSI</b>
DU 63	
DU 101-401	
DU 631-1950	
DU 635	
DU 1050-2050	
DU 2005-4005	
<b>Series DUV</b>	<b>Pressure filter, change over, top port inlet, bottom port outlet 464 PSI</b>
DUV 635	
DUV 1050-2050	
DUV 2005-4005	
<b>Series MDD</b>	<b>Medium pressure filter, change over 2900 PSI</b>
MDD 40-63	
<b>Series HDD</b>	<b>High pressure filter, change over 4568 PSI</b>
HDD 30	
HDD 61-151	
HDD 170-450	
HDD 601-1351	





Series	Stainless steel filters
<b>Series EHD</b>	<b>Stainless steel pressure filter, change over 4568 PSI</b>
EHD 61-151	
EHD 241-451	
<b>Series EHPF</b>	<b>Stainless steel pressure filter, manifold mounted 4568 PSI</b>
EHPF 60-150	
EHPF 170-450	
<b>Series EH</b>	<b>Stainless steel pressure filter 6000 PSI</b>
EH 31	
EH 60-150	
EH 240-450	
EH 601-1351	
<b>Series EHP</b>	<b>Pressure filter, front manifold mounted 11600 or 20300 PSI</b>
EHP 31	
EHP 60-90	



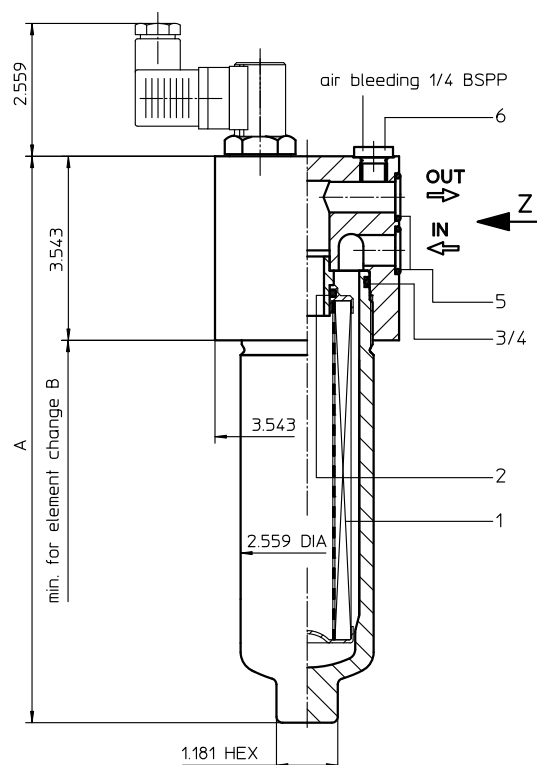
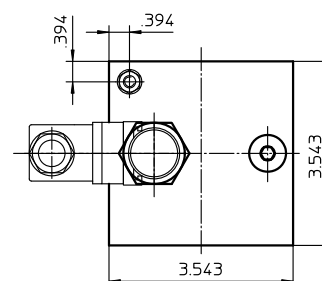
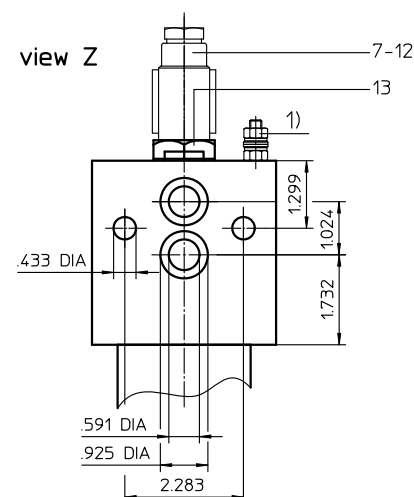
Series	Suction filters
<b>Series AS</b>	<b>Suction filter</b>
AS 220	
AS 632	
<b>Series TS</b>	<b>Suction filter for vertical tank mounting</b>
TS 210-310	
TS 426	
TS 625	
<b>Series TSW</b>	<b>Suction filter for horizontal tank mounting</b>
TSW 210-310	
TSW 426	
TSW 625	



Series	Off-line filters
<b>Series NF</b>	<b>Partial flow filter 232 PSI</b>
NF 250	
NF 631	
NF 1000	

# 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

EDV 09/15

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
S2 = with bypass valve  $\Delta p$  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/](http://www.eatonpowersource.com/calculators/filtration/)

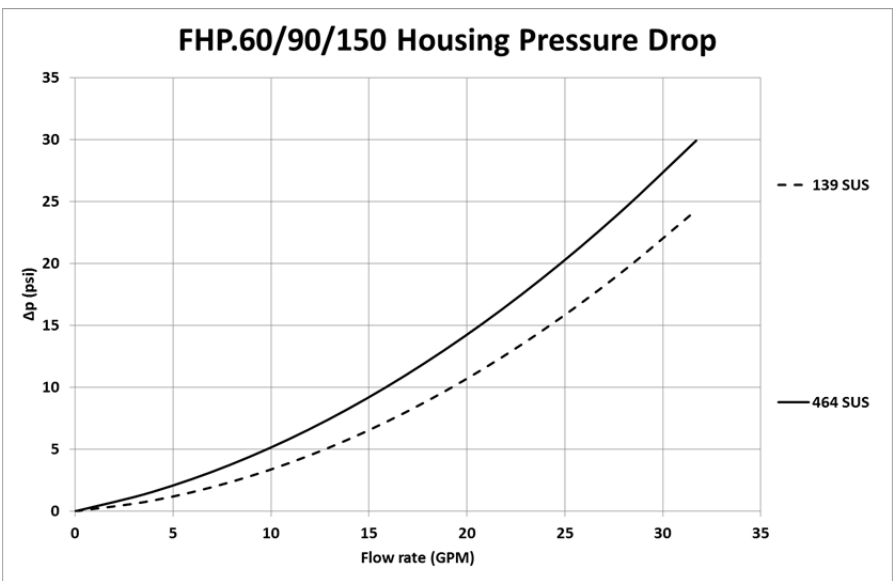
#### Material gradient coefficients (MSK) for filter elements

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.

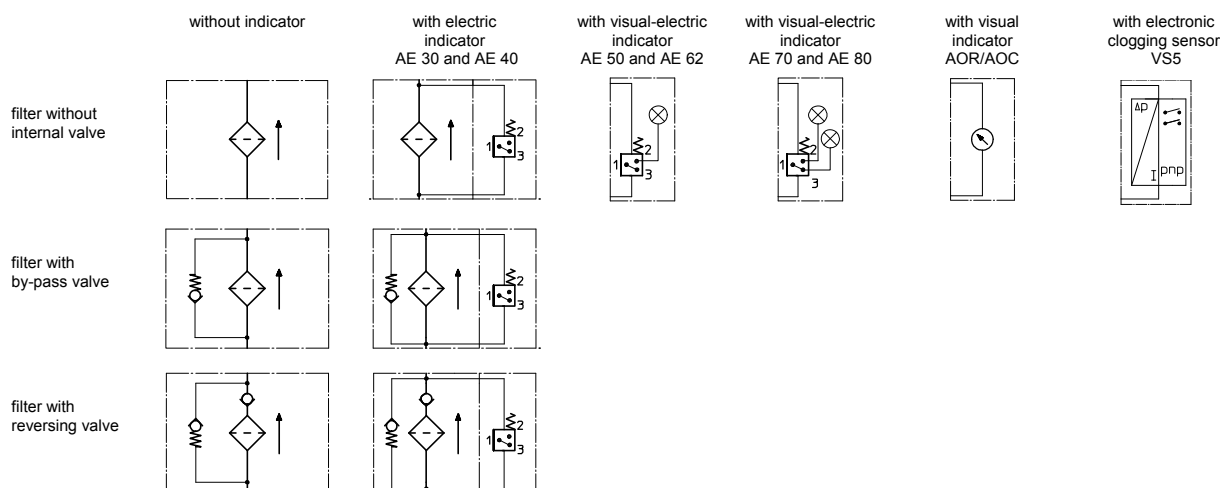
FHP	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
60	6.748	4.685	2.999	2.577	1.760	0.2002	0.1868	0.1280
90	4.059	2.818	1.804	1.550	1.059	0.1210	0.1130	0.0774
150	2.422	1.681	1.076	0.925	0.632	0.0723	0.0675	0.0462

#### Δp = 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	FHP 90	FHP 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	2	O-ring		18 x 2,5		304371 (NBR)	
6	1	screw plug		1/4 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlufheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

## For more information, please

email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

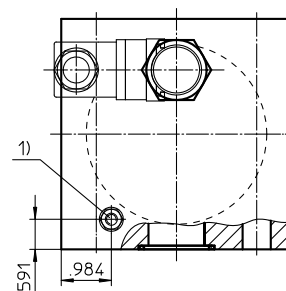




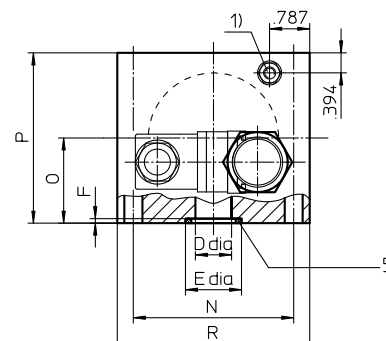
# Series HPF 60-450

## 4568 PSI

HPF170-450

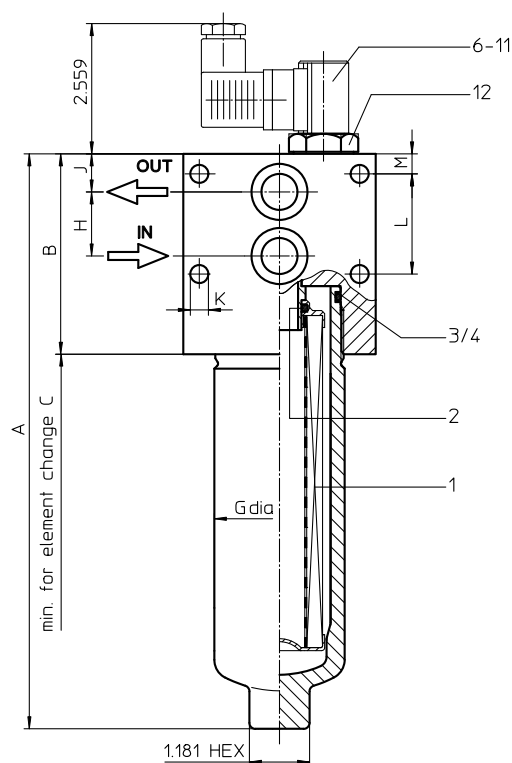


HPF60-150



### 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.

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
S2 = with bypass valve  $\Delta p$  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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

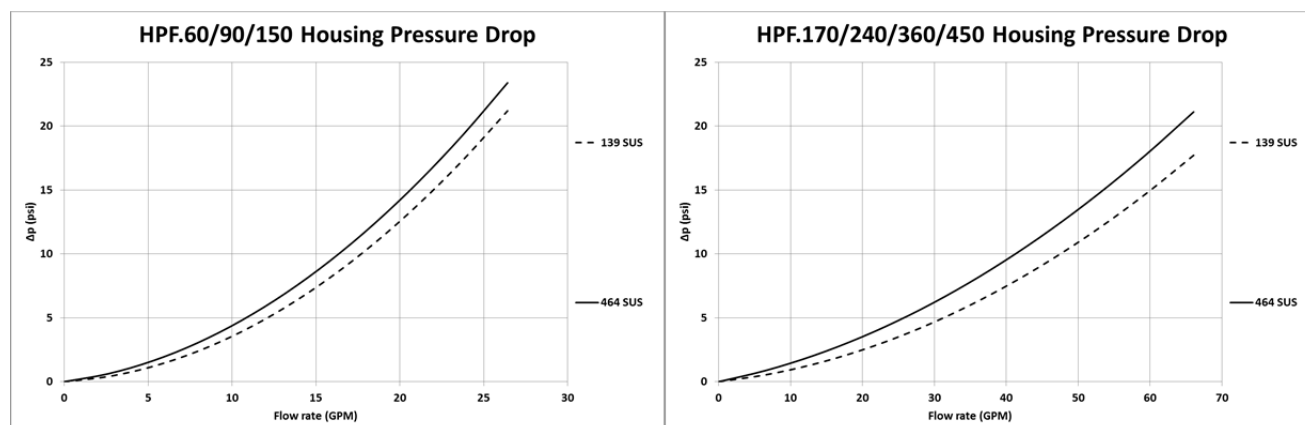
### Material gradient coefficients (MSK) for filter elements

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.

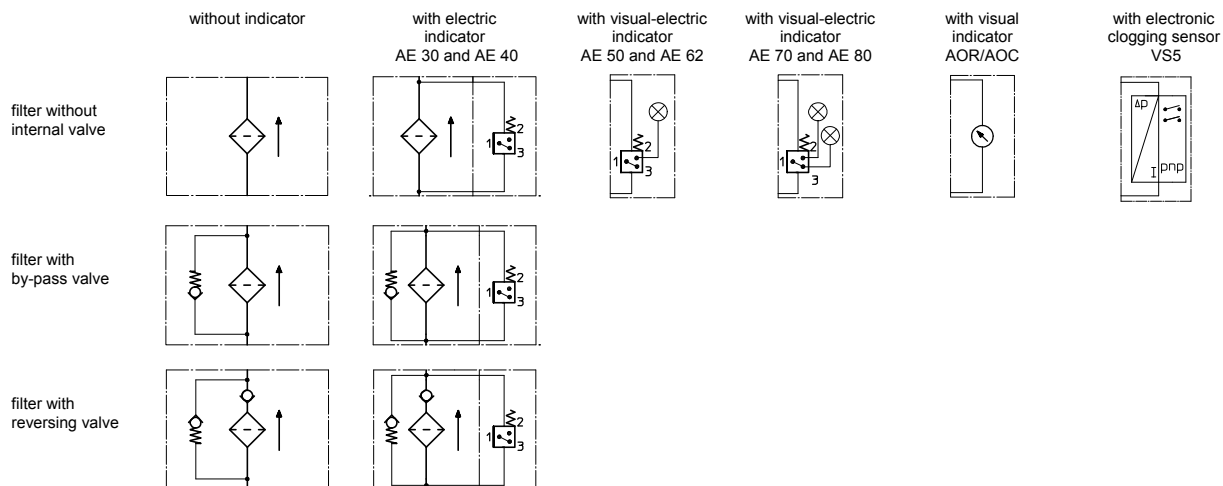
HPF	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
60	6.748	4.685	2.999	2.577	1.760	0.2002	0.1868	0.1280
90	4.059	2.818	1.804	1.550	1.059	0.1210	0.1130	0.0774
150	2.422	1.681	1.076	0.925	0.632	0.0723	0.0675	0.0462
170	2.714	1.884	1.206	1.036	0.708	0.0839	0.0783	0.0537
240	2.092	1.452	0.930	0.799	0.546	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	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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

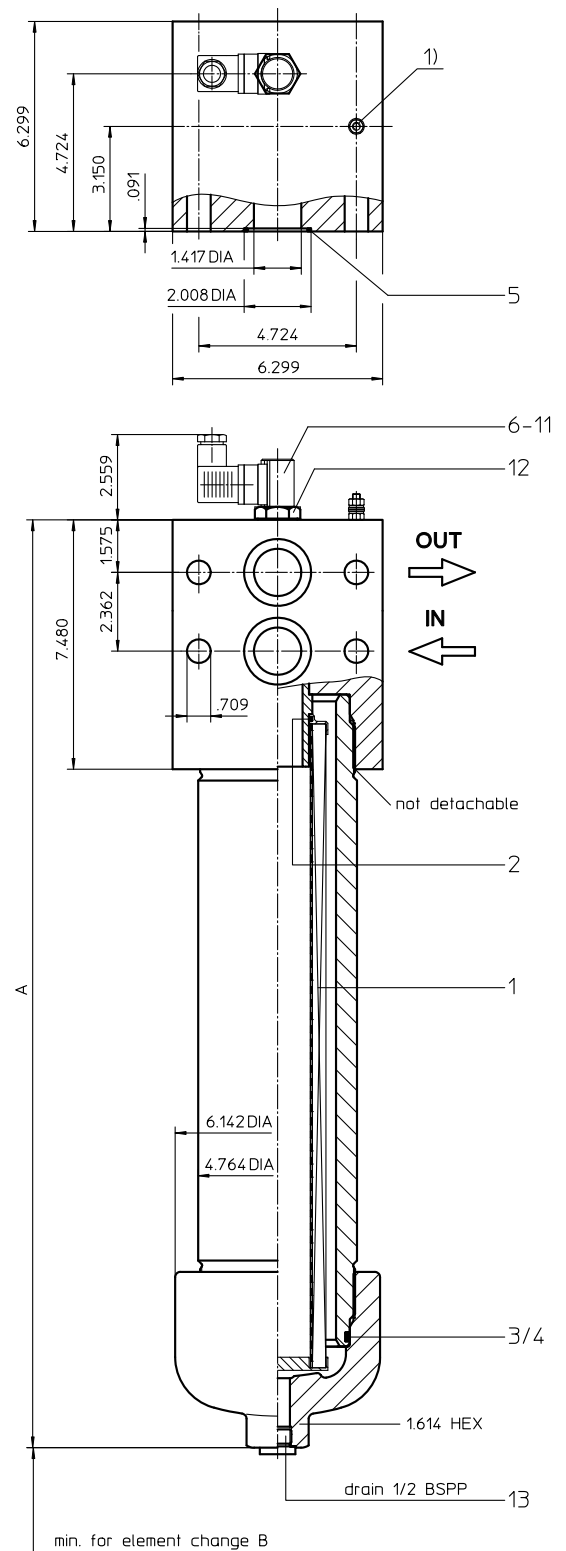
Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

Series HPF 601-1351  
4568 PSI



### Dimensions:

type	HPF 601	HPF 901	HPF 1351
connection	1 ¼"	1 ¼"	1 ¼"
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.

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
S2 = with bypass valve  $\Delta p$  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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

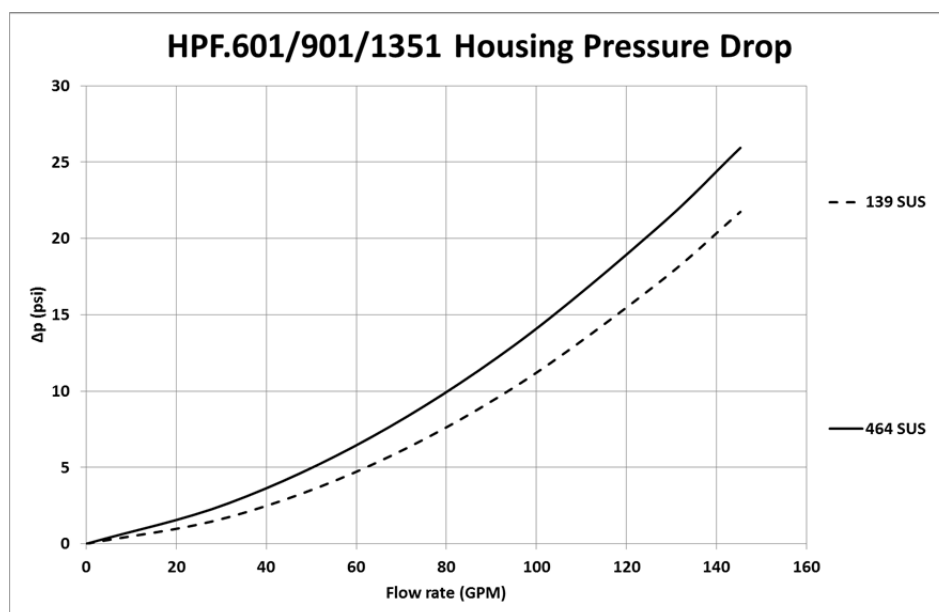
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/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

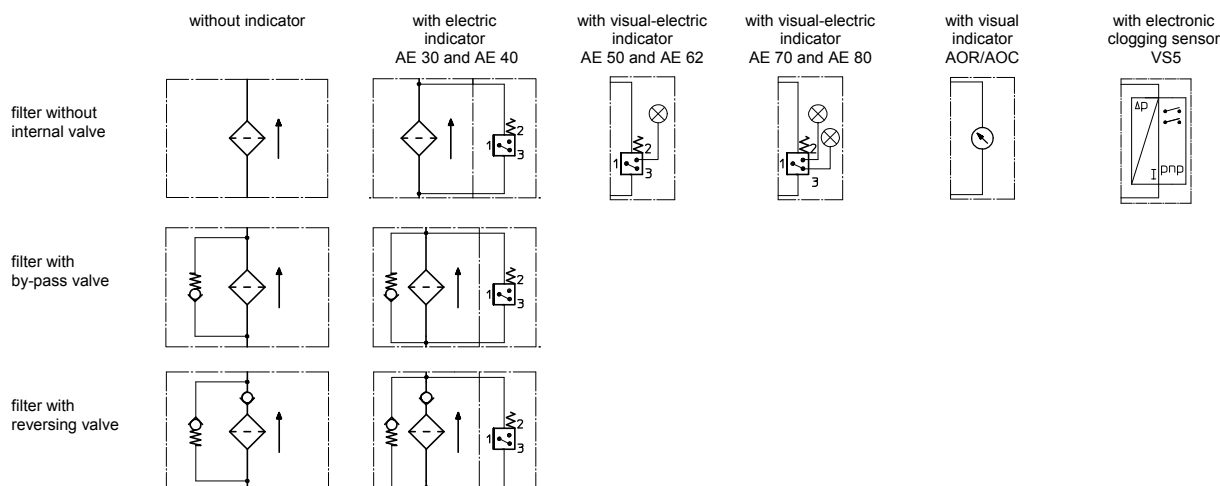
### $\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. The pressure drop changes proportionally to the density.





## Symbols:



## Spare parts:

item	qty.	designation	HPF 601	dimension HPF 901	HPF 1351	article-no.	
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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlußheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

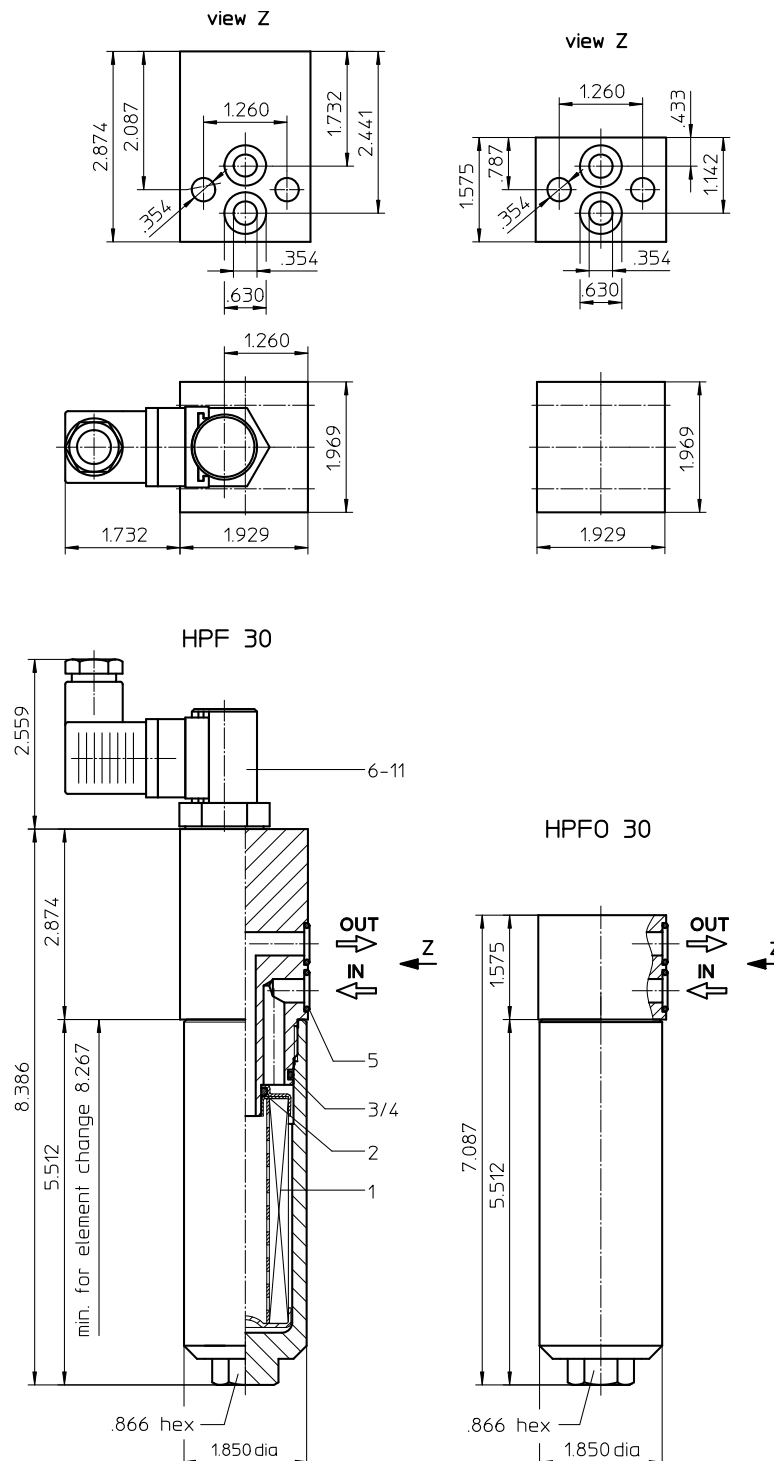
## For more information, please

email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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.



Powering Business Worldwide

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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 =  $\Delta p$  435 PSI  
 HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  and the element  $\Delta p$  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/](http://www.eatonpowersource.com/calculators/filtration/)

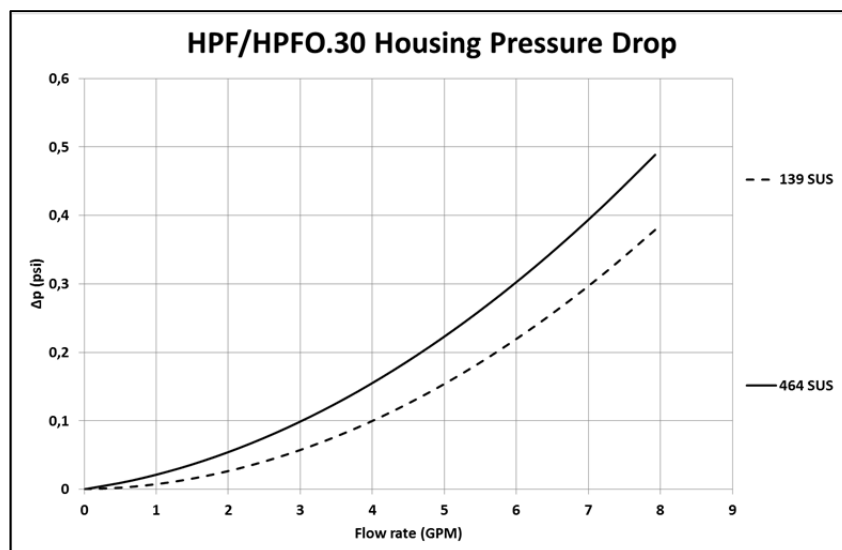
### Material gradient coefficients (MSK) for filter elements

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.

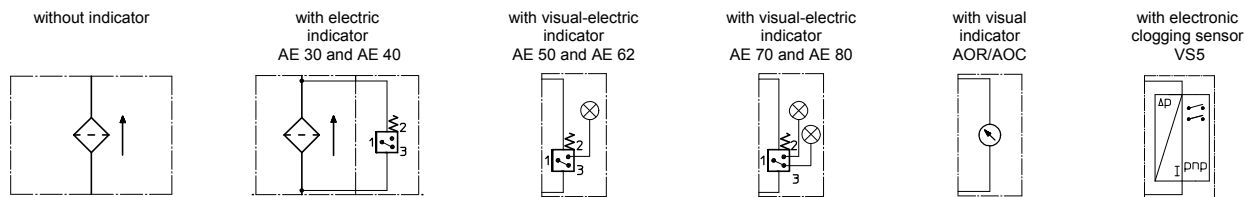
HPF/HPFO	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
30	12.554	8.716	5.580	4.794	3.275	0.2539	0.2369	0.1623

### $\Delta p = f(Q)$ – 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

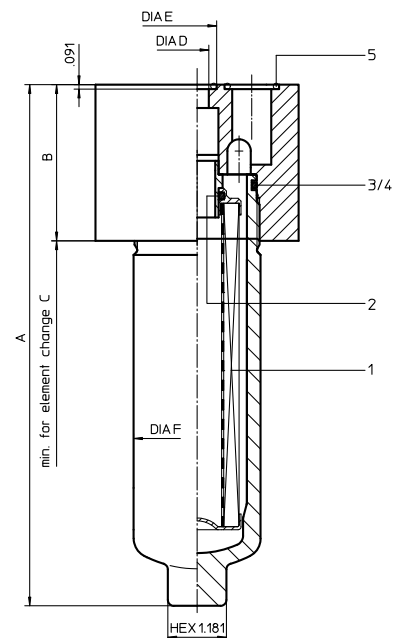
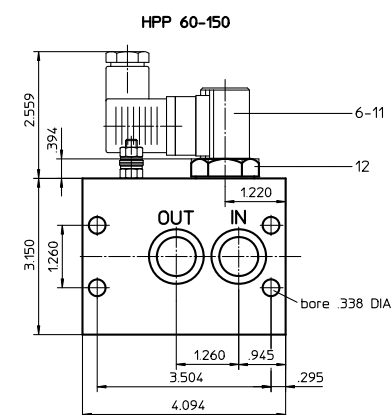
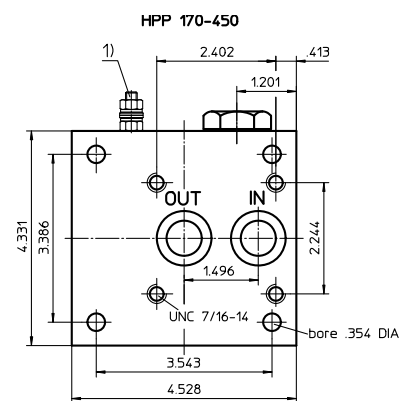
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# Series HPP 60-450

## 4568 PSI



### Dimensions:

type	HPP 60	HPP 90	HPP 150	HPP 170	HPP 240	HPP 360	HPP 450
connection	$\frac{3}{4}$ "			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.

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
S2 = with bypass valve  $\Delta p$  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

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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

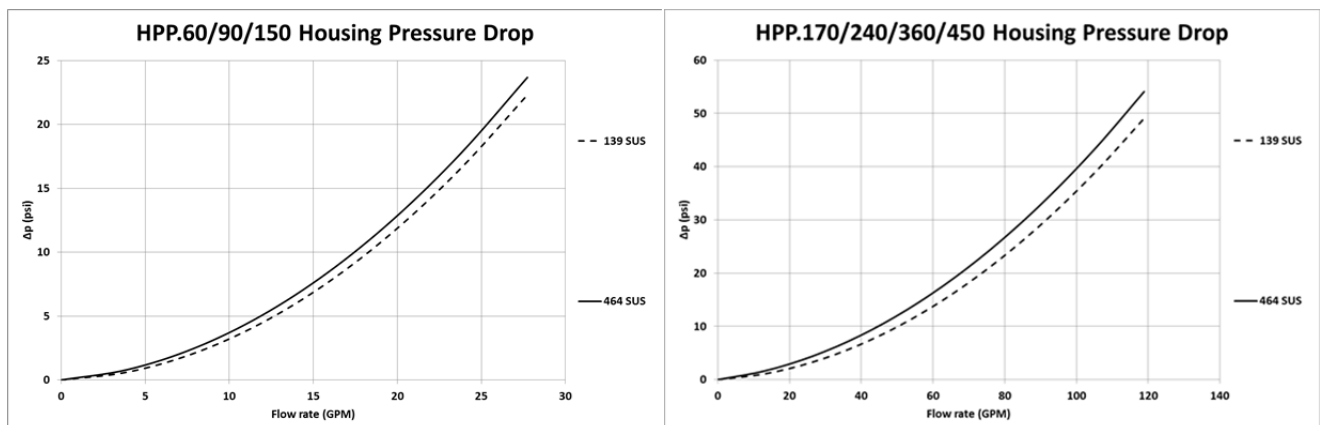
### Material gradient coefficients (MSK) for filter elements

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

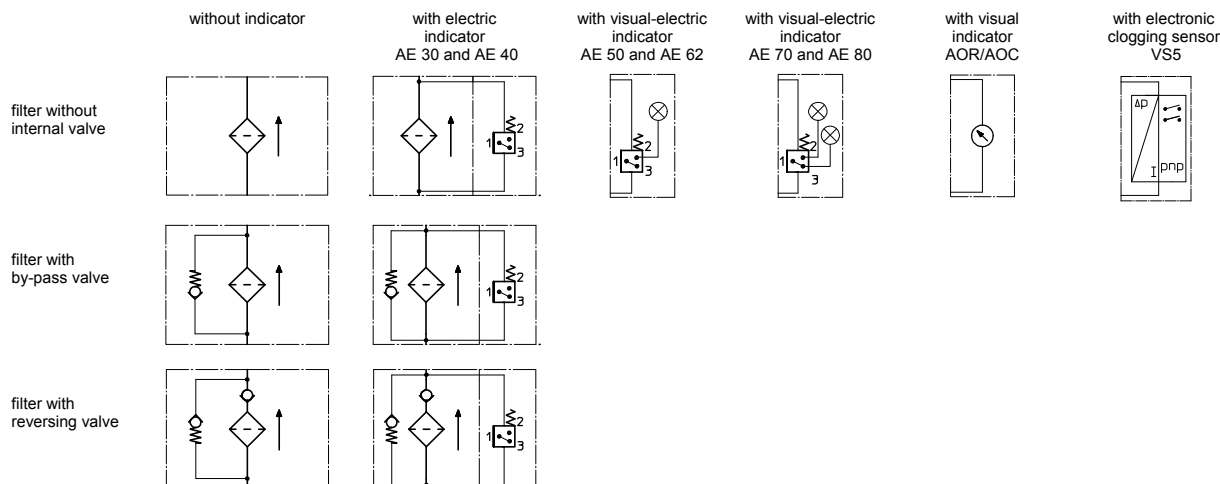
### $\Delta p = f(Q)$ – characteristics according to ISO 3968

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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

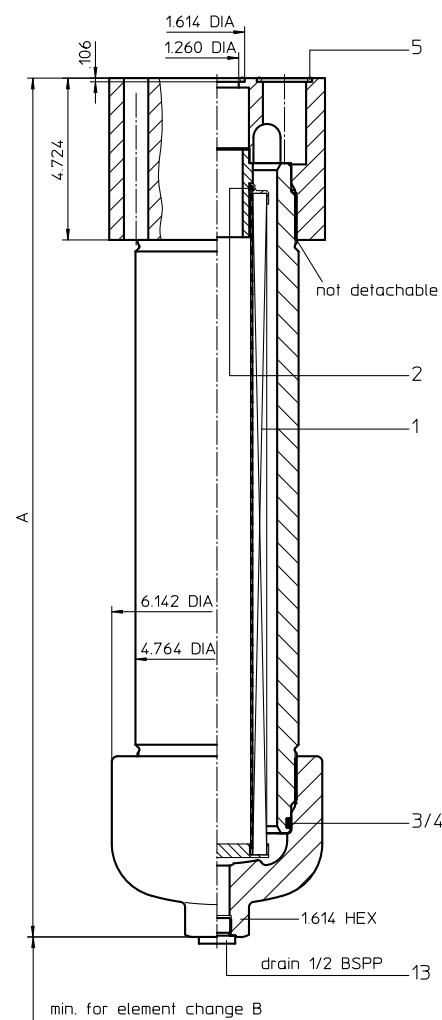
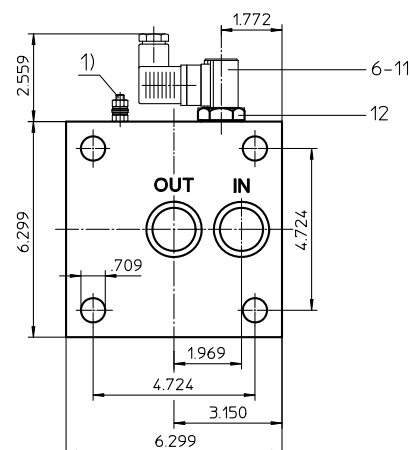
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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.

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
S2 = with bypass valve  $\Delta p$  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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

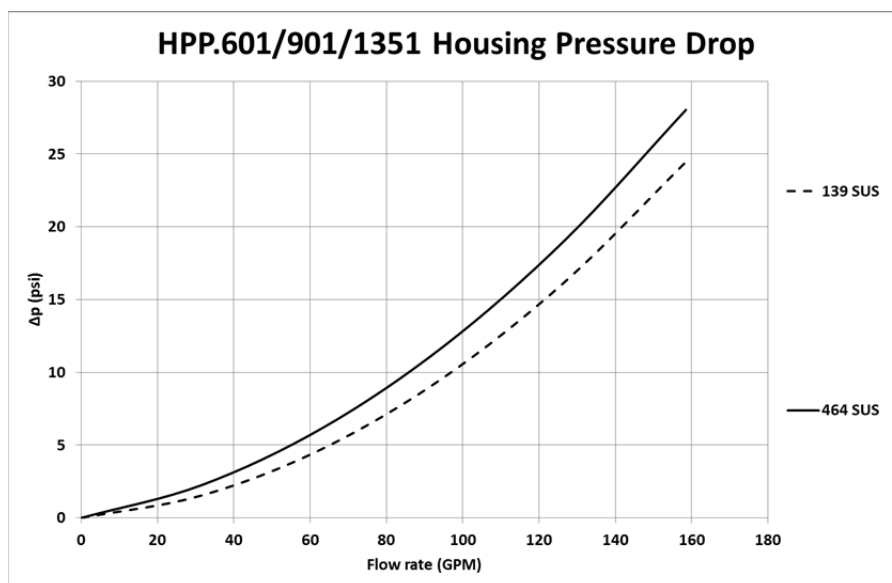
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

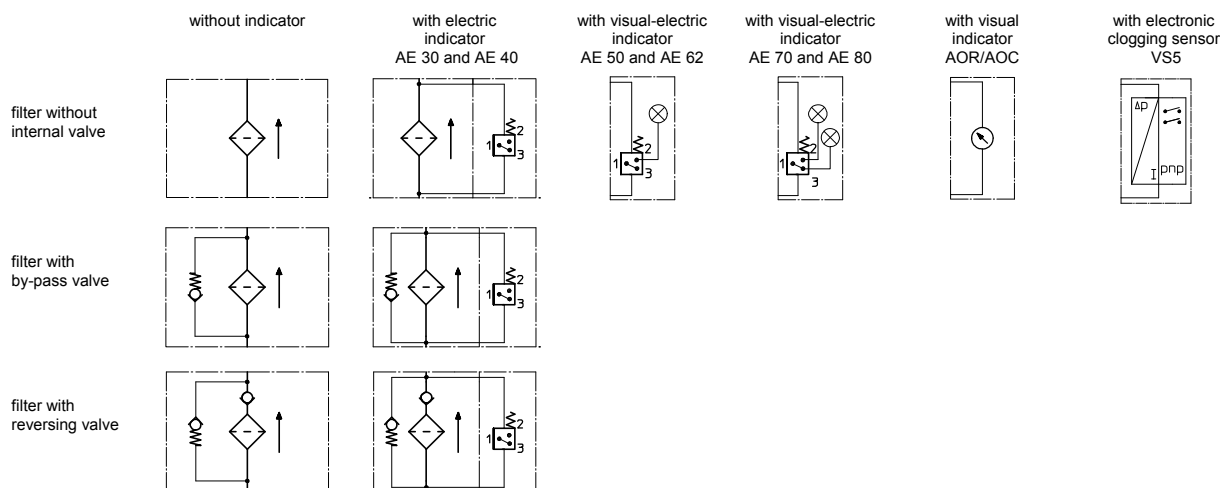
HPP	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
601	0.963	0.669	0.428	0.368	0.251	0.0303	0.0282	0.0193
901	0.668	0.464	0.297	0.225	0.174	0.0189	0.0177	0.0121
1351	0.417	0.290	0.185	0.185	0.109	0.0122	0.0114	0.0078

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

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. The pressure drop changes proportionally to the density.



## Symbols:



## Spare parts:

item	qty.	designation	HPP 601	dimension HPP 901	HPP 1351	article-no.	
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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlufheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

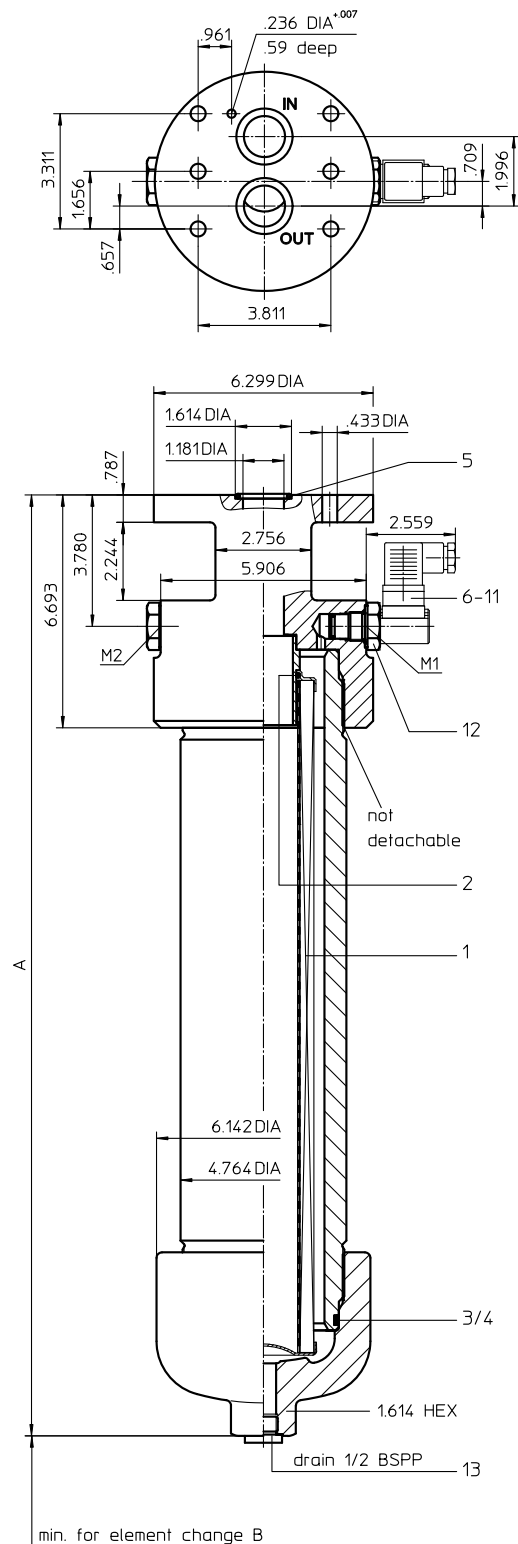
Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

## For more information, please

email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

Series HPU 601-1351  
4568 PSI



### Dimensions:

type	HPU 601	HPU 901	HPU 1351
connection	1 1/4"		
A	21.14	27.05	36.81
B	12.20	18.11	27.95
weight	83 lbs.	101 lbs.	130 lbs.
volume tank	.55 Gal.	.82 Gal.	1.21 Gal.

Dimensions: inches

Designs and performance values are subject to change.

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
S2 = with bypass valve  $\Delta p$  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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

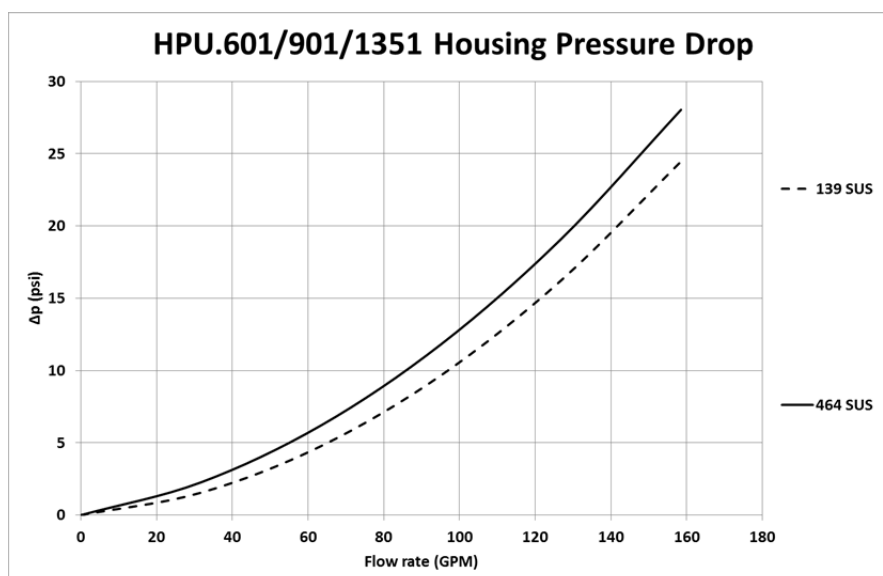
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/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

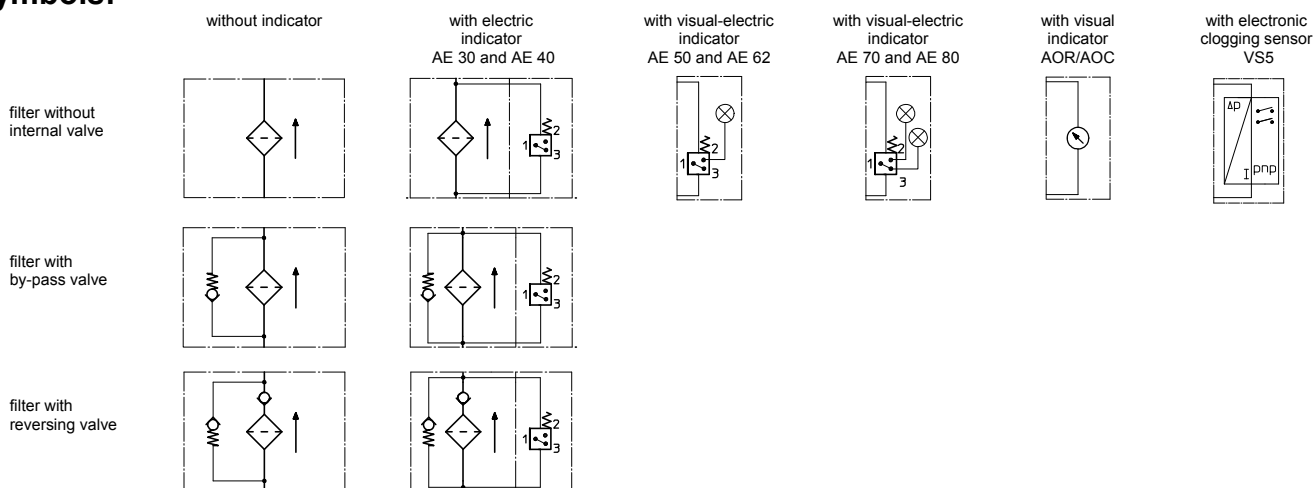
### $\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. The pressure drop changes proportionally to the density.





## Symbols:



## Spare parts:

item	qty.	designation	HPU 601	dimension HPU 901	HPU 1351	article-no.	
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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlufheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

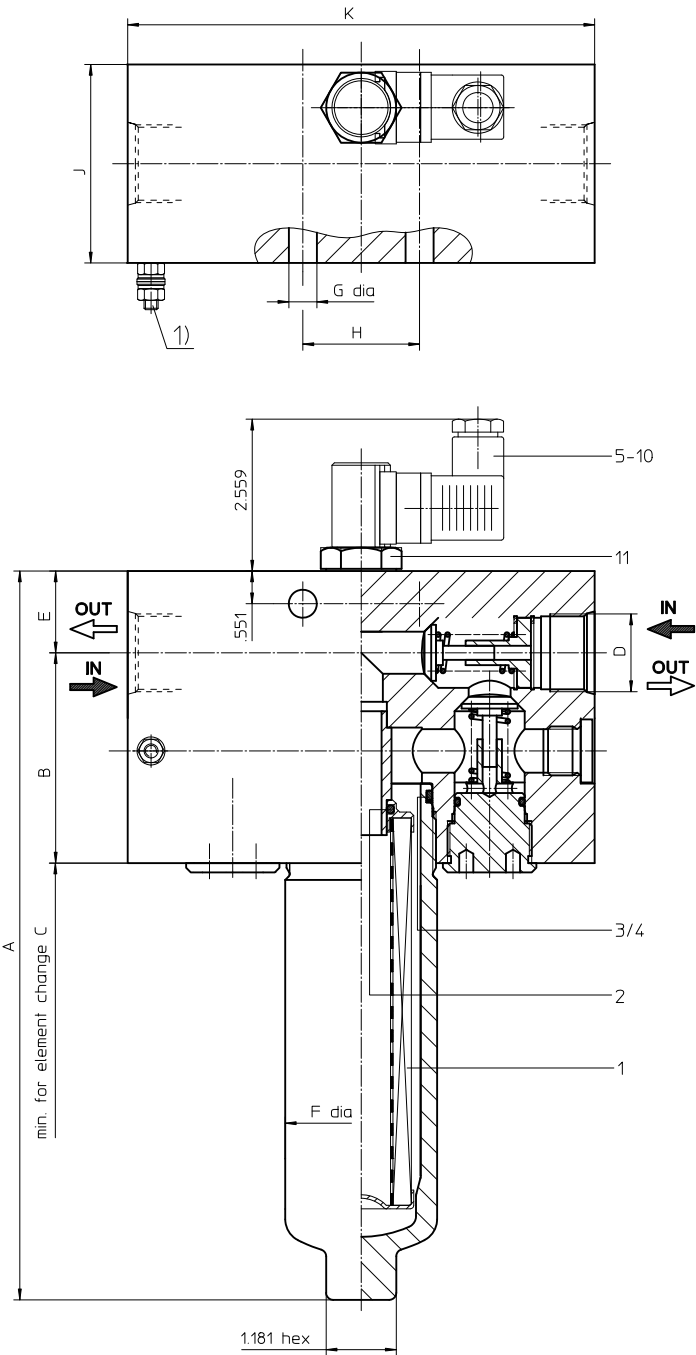
© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

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.

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
S2 = with bypass valve  $\Delta p$  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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

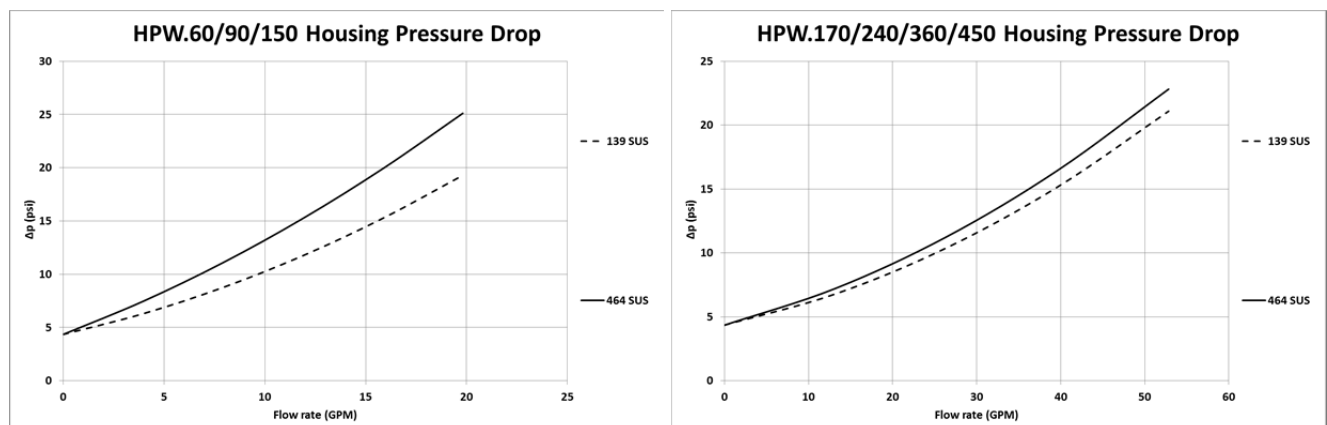
### Material gradient coefficients (MSK) for filter elements

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.

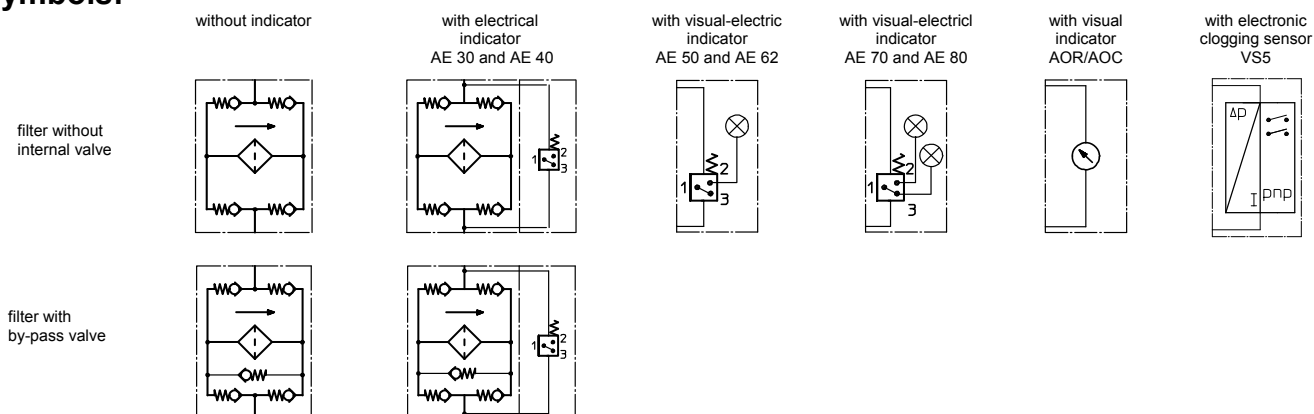
HPW	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
60	6.748	4.685	2.999	2.577	1.760	0.2002	0.1868	0.1280
90	4.059	2.818	1.804	1.550	1.059	0.1210	0.1130	0.0774
150	2.422	1.681	1.076	0.925	0.632	0.0723	0.0675	0.0462
170	2.714	1.884	1.206	1.036	0.708	0.0839	0.0783	0.0537
240	2.092	1.452	0.930	0.799	0.546	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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlufheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

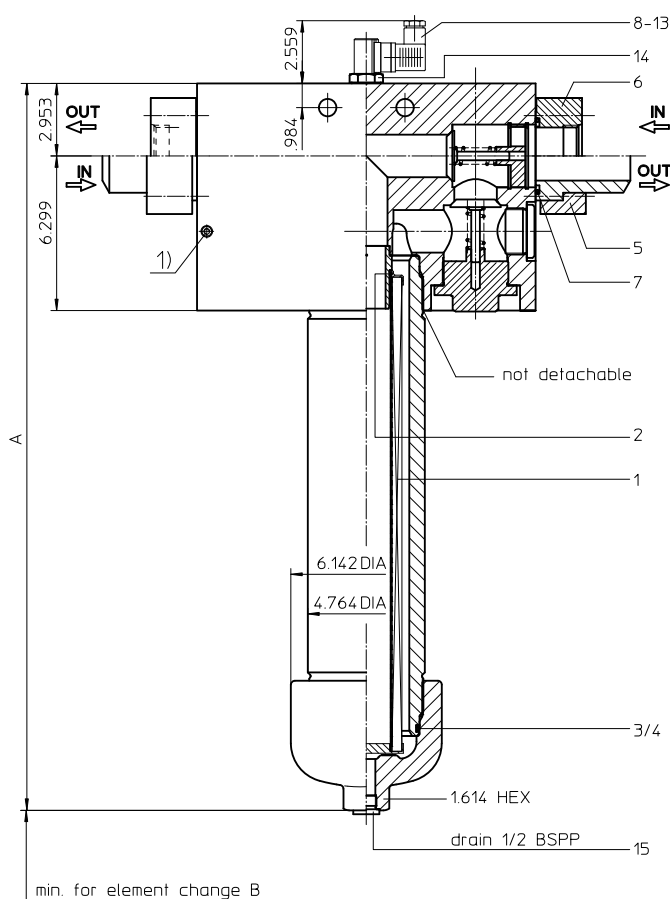
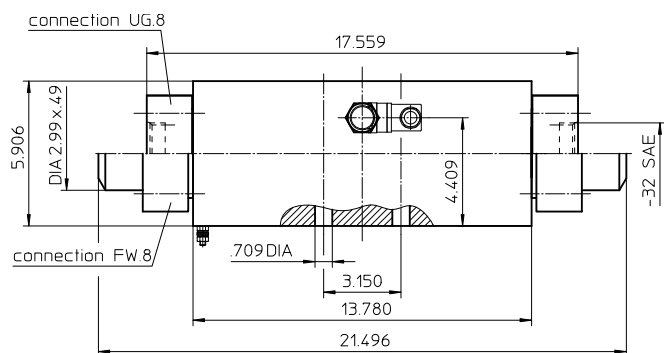
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
S2 = with bypass valve  $\Delta p$  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  $\Delta p$  and the element  $\Delta p$  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/](http://www.eatonpowersource.com/calculators/filtration/)

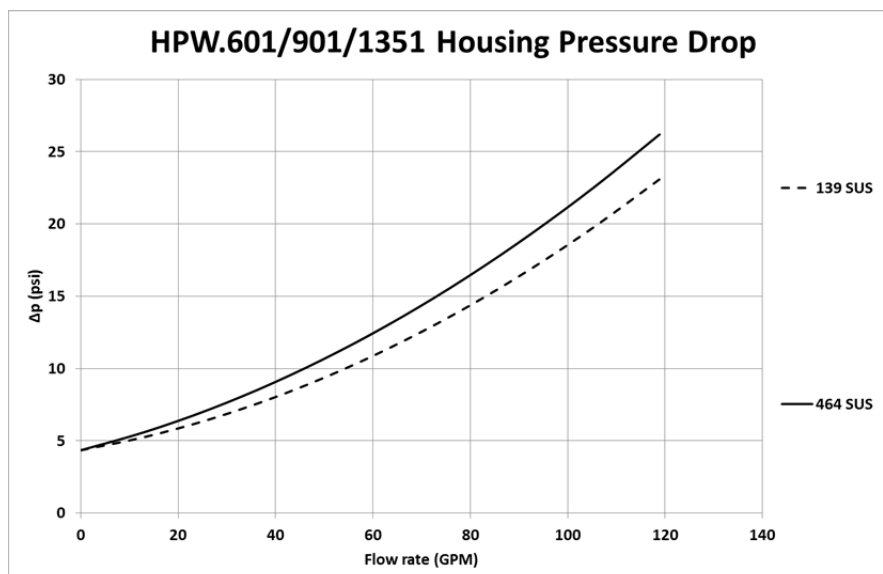
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/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

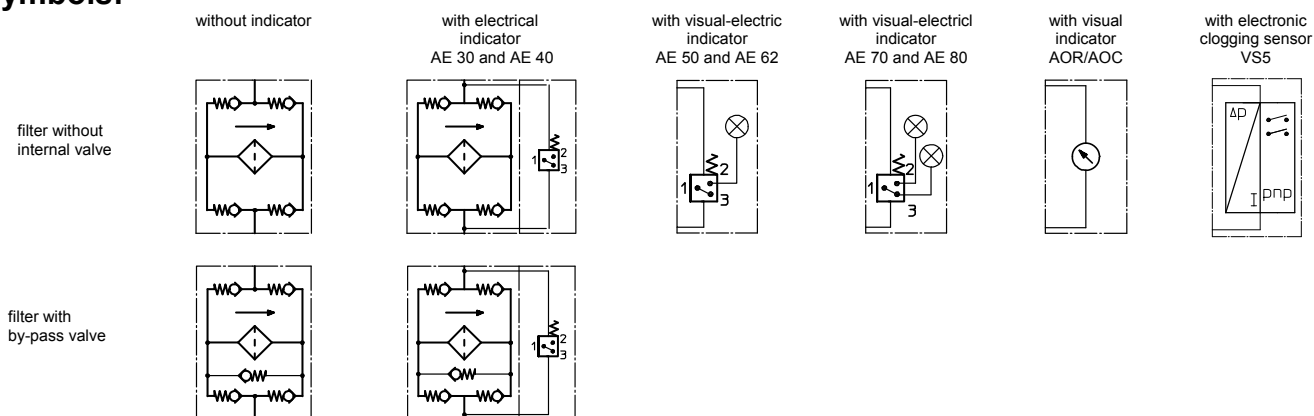
### $\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. The pressure drop changes proportionally to the density.





## Symbols:



## Spare parts:

item	qty.	designation	HPW 601	dimension HPW 901	HPW 1351	article-no..	
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	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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlufheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

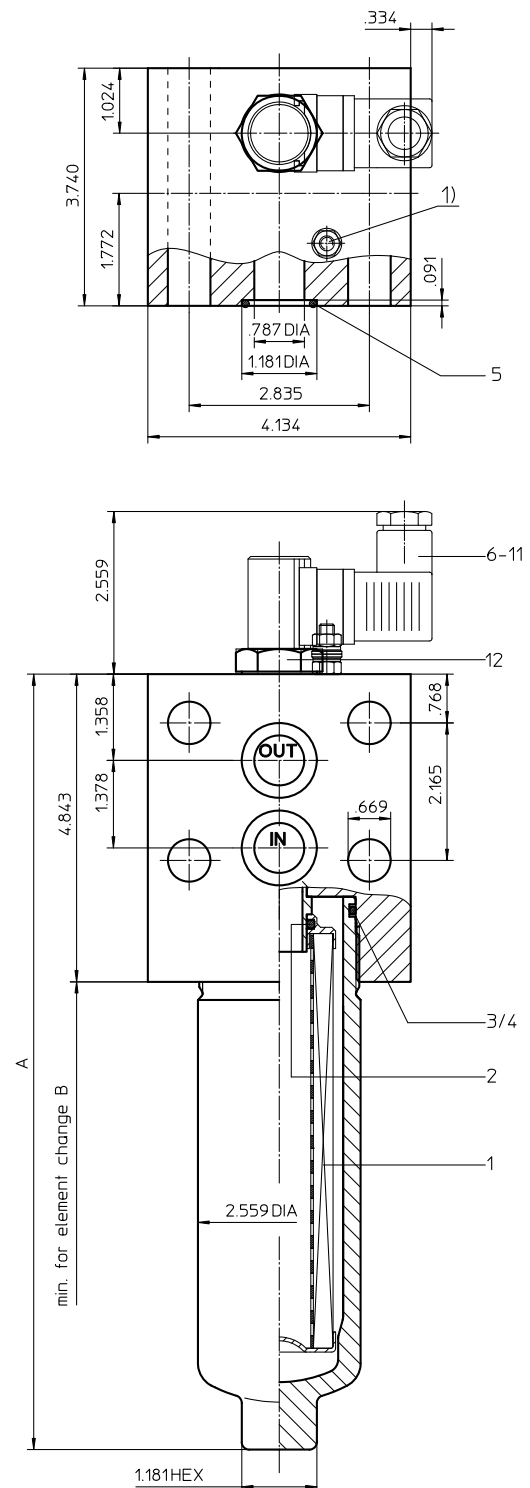
For more information, please

email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# Series HPX 60-150 4568 PSI



### Dimensions:

type	HPX 60	HPX 90	HPX 150
connection	$\frac{3}{4}$ "		
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.

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
S2 = with bypass valve  $\Delta p$  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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

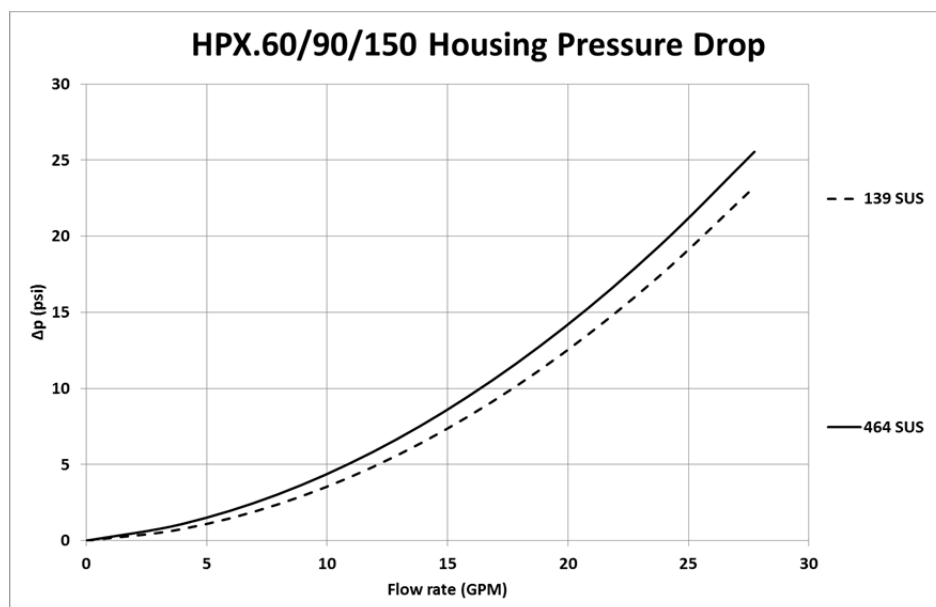
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

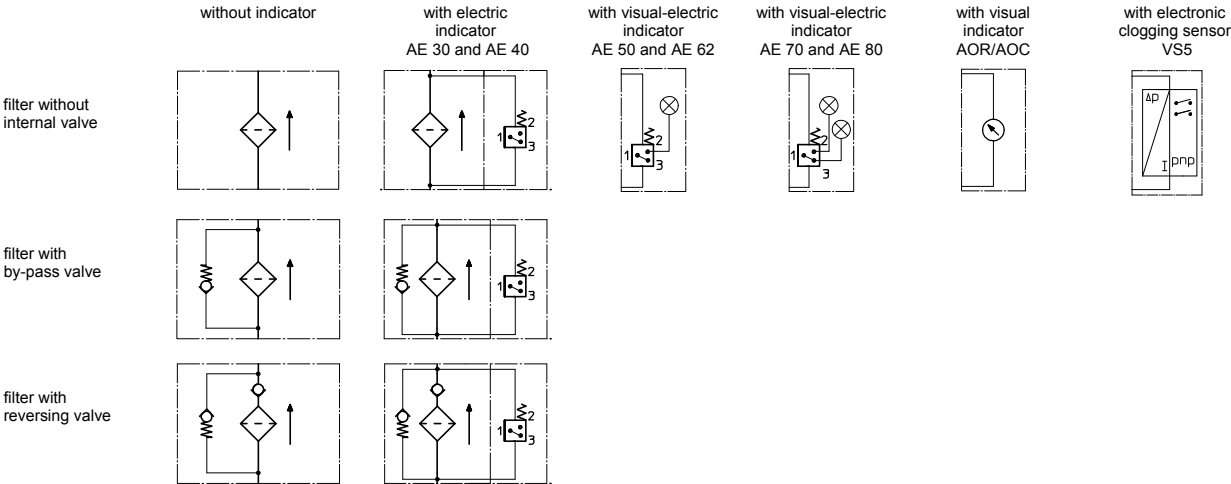
HPX	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
60	6.748	4.685	2.999	2.577	1.760	0.2002	0.1868	0.1280
90	4.059	2.818	1.804	1.550	1.059	0.1210	0.1130	0.0774
150	2.422	1.681	1.076	0.925	0.632	0.0723	0.0675	0.0462

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

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. The pressure drop changes proportionally to the density.



# Symbols:



# Spare parts:

item	qty.	designation	HPX 60	dimension HPX 90	HPX 150	article-no.	
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	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

## North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

## Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

## China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

## Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

## Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

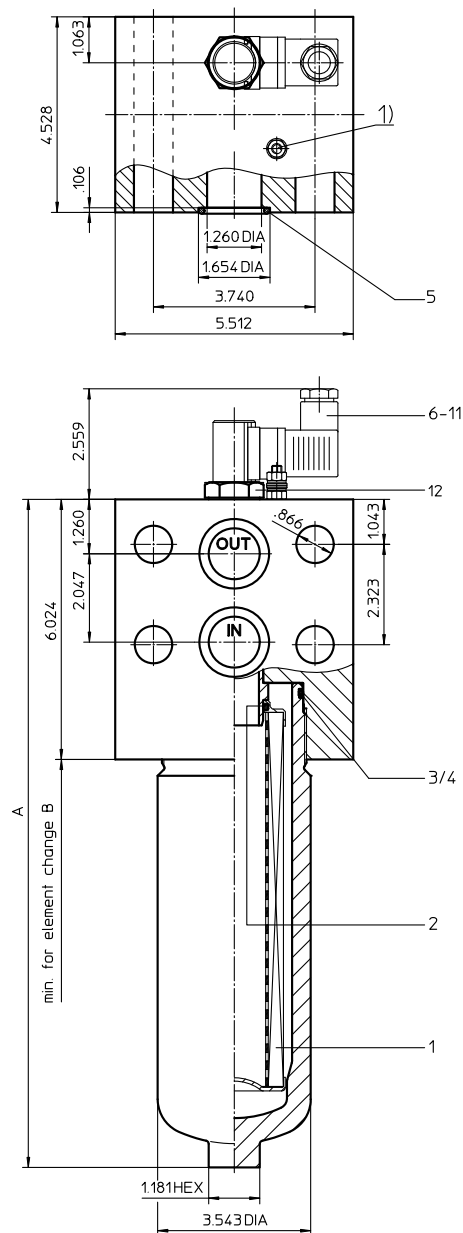
© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# Series HPX 170-450

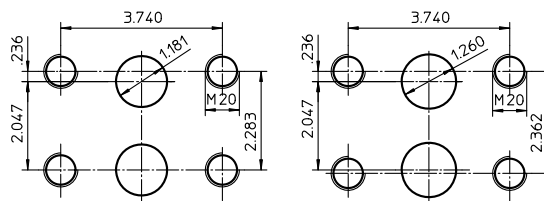
## 4568 PSI

### 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
S2 = with bypass valve  $\Delta p$  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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

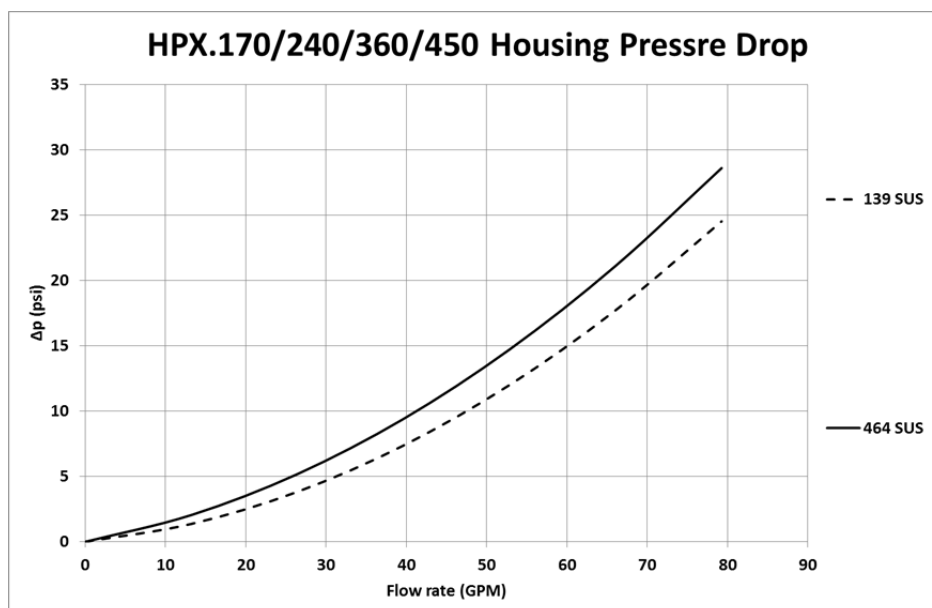
### Material gradient coefficients (MSK) for filter elements

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

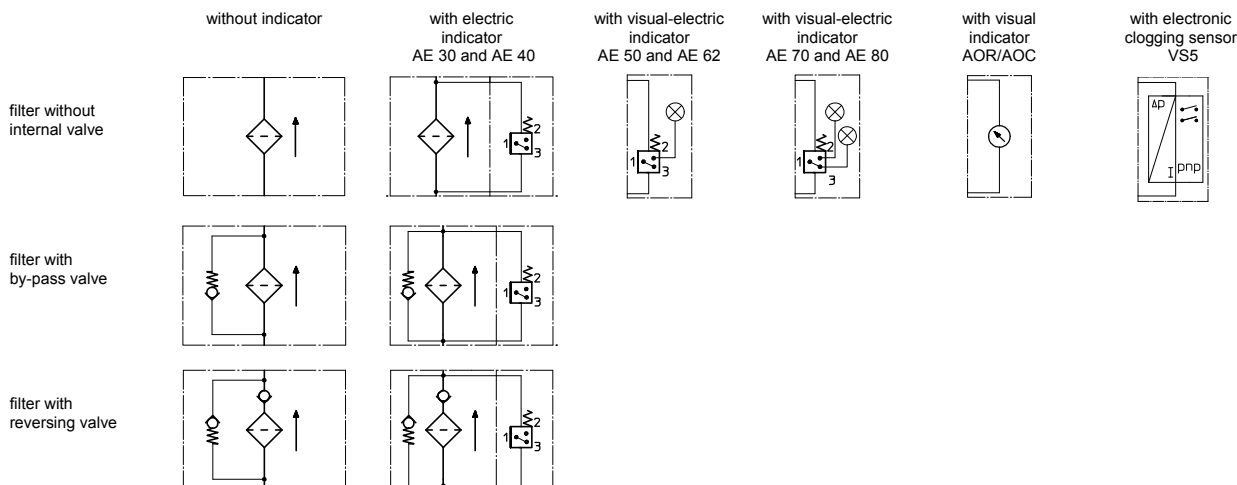
### $\Delta p = f(Q)$ – characteristics according to ISO 3968

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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlufheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

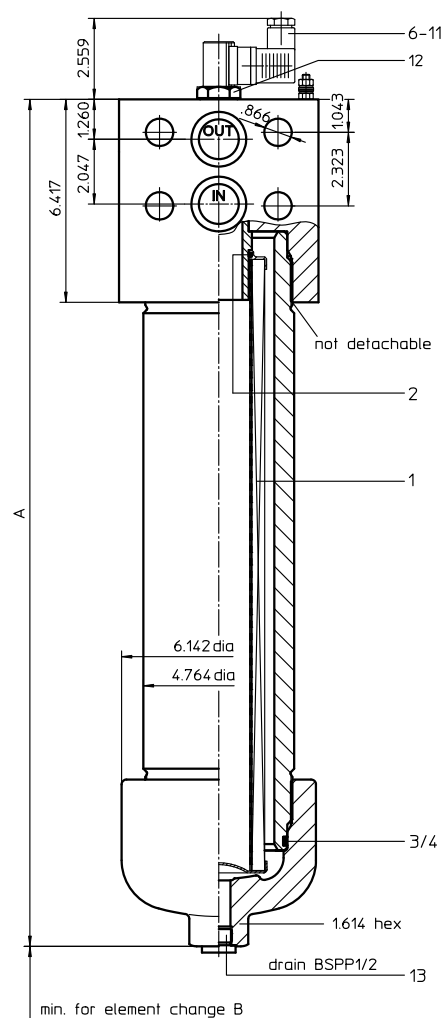
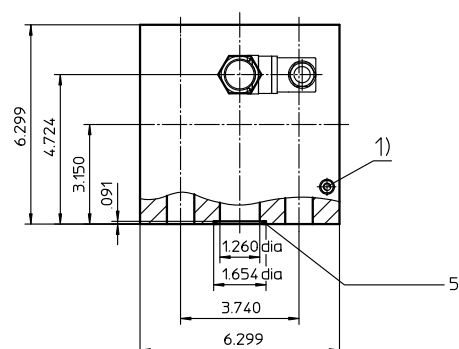
# Series HPX 601-1351

## 4568 PSI

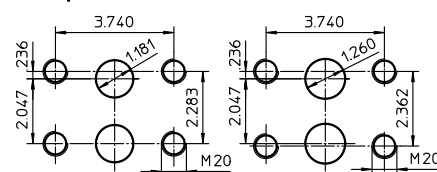
- 1) Connect the stand grounding tab to a suitable earth ground point.

### 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.

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
S2 = with bypass valve  $\Delta p$  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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

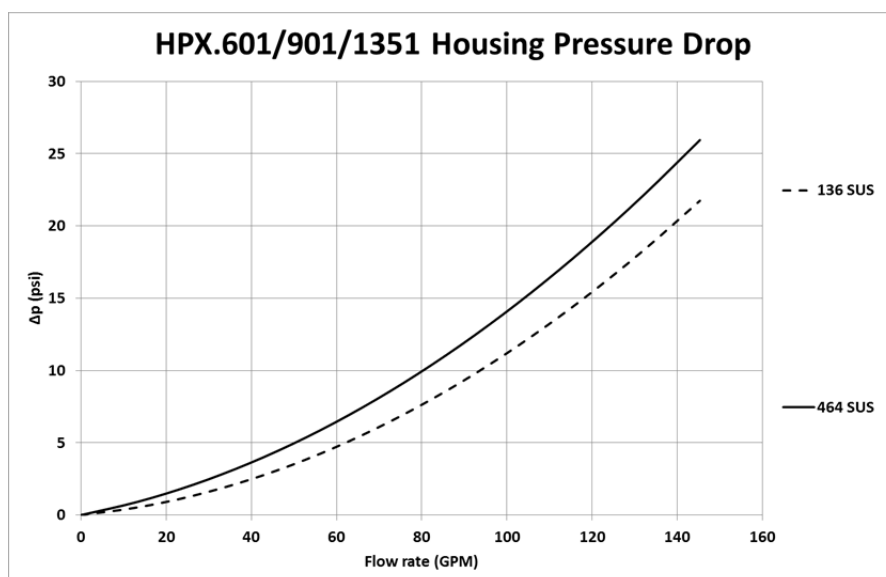
### Material gradient coefficients (MSK) for filter elements

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.

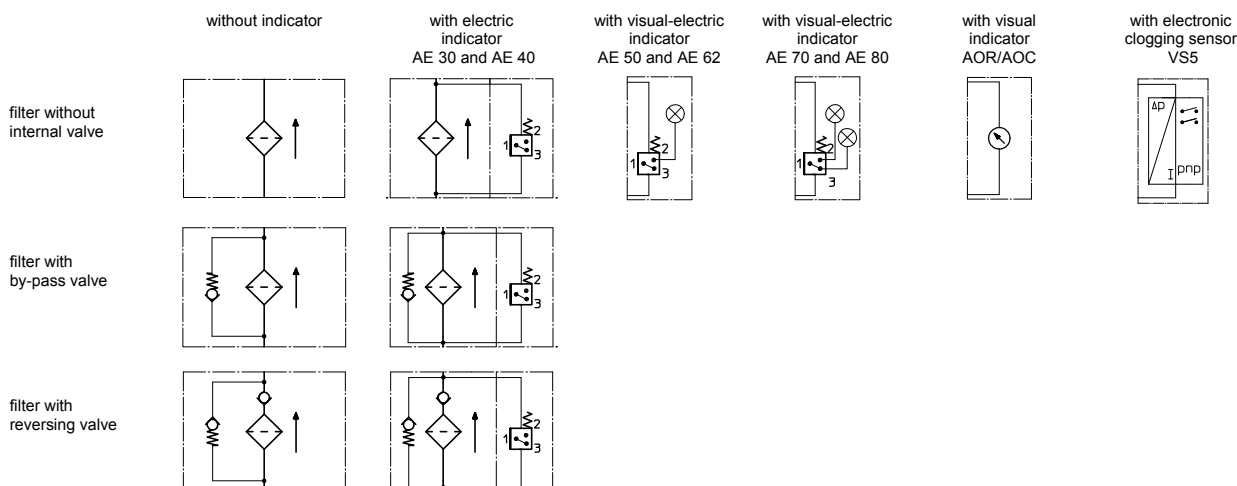
HPX	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
601	0.963	0.669	0.428	0.368	0.251	0.0303	0.0282	0.0193
901	0.668	0.464	0.297	0.225	0.174	0.0189	0.0177	0.0121
1351	0.417	0.290	0.185	0.185	0.109	0.0122	0.0114	0.0078

### $\Delta p = f(Q)$ – 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	HPX 601	dimension HPX 901	HPX 1351	article-no.	
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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

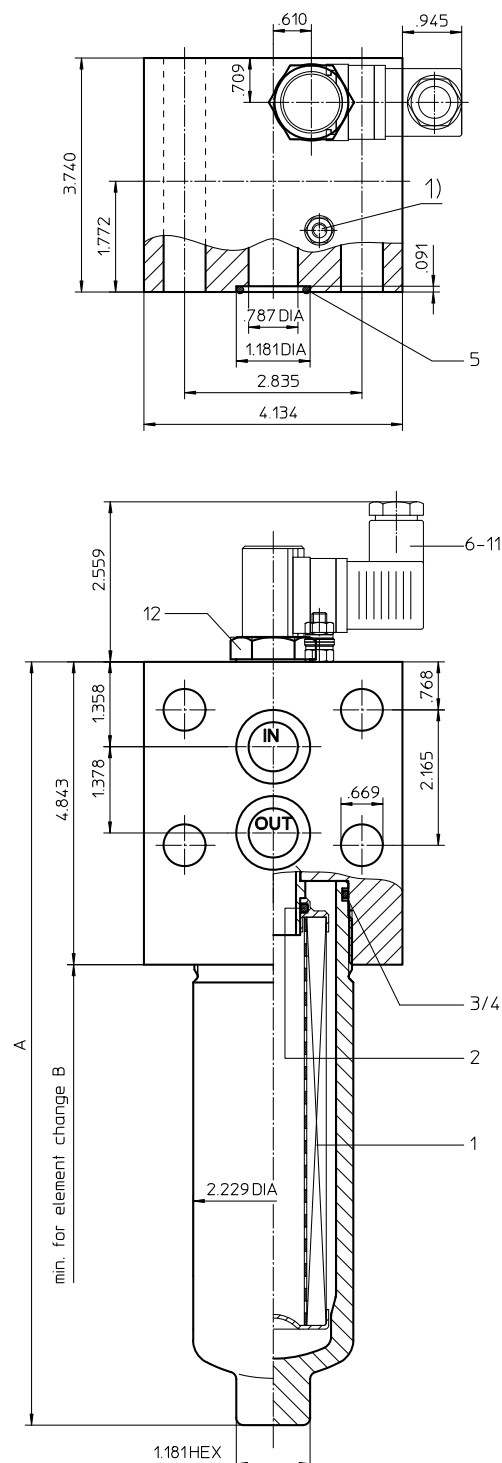
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# Series HPY 60-150

## 4568 PSI



### Dimensions:

type	HPY 60	HPY 90	HPY 150
connection		$\frac{3}{4}$ "	
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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
S2 = with bypass valve  $\Delta p$  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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

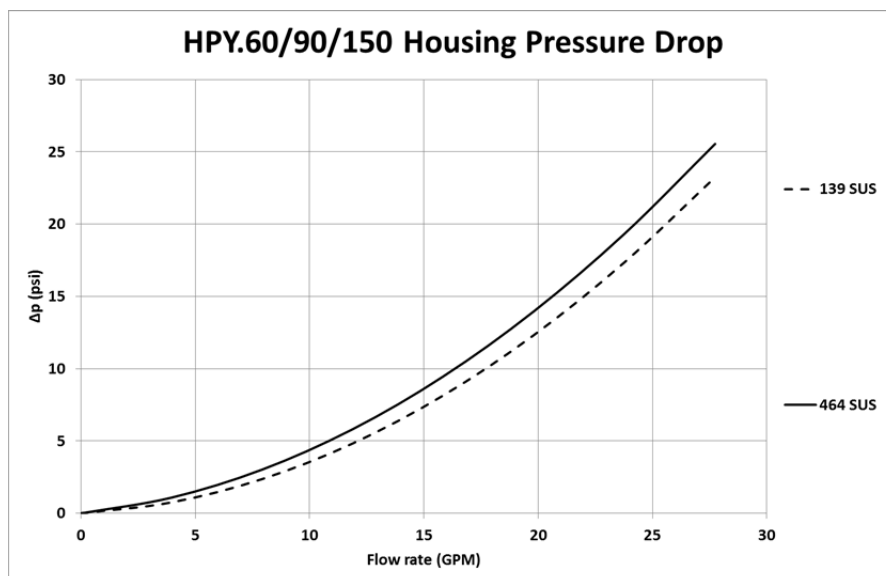
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/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

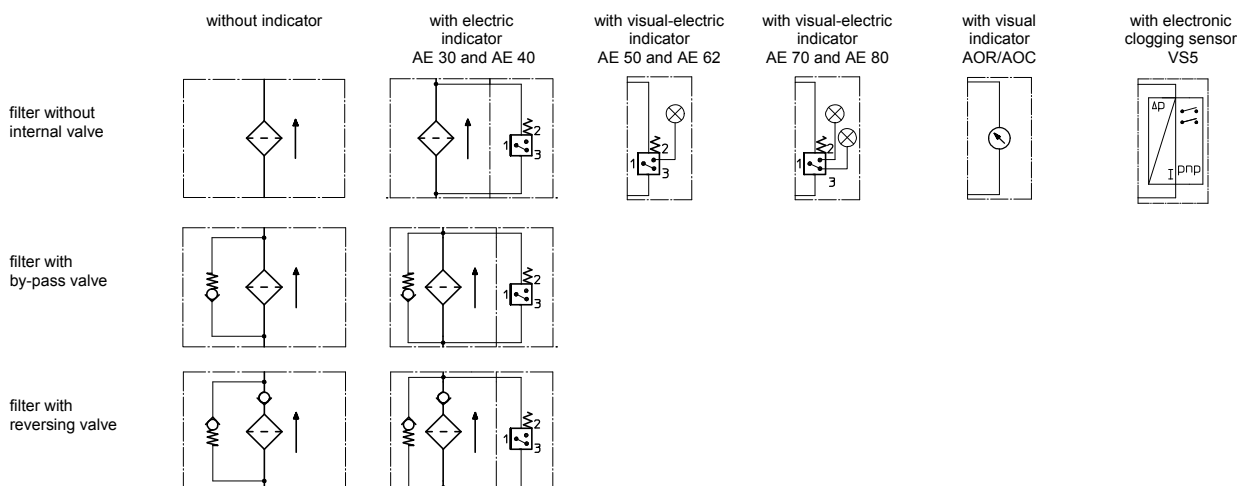
### $\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. The pressure drop changes proportionally to the density.





## Symbols:



## Spare parts:

item	qty.	designation	dimension			article-no.	
			HPY 60	HPY 90	HPY 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	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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlufheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

## For more information, please

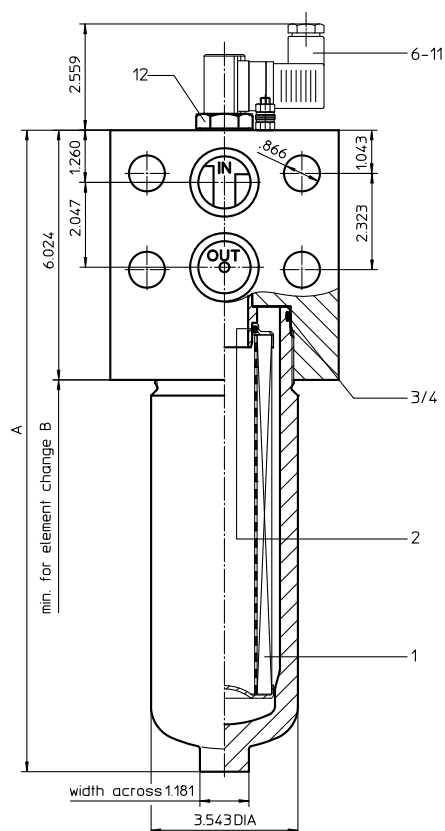
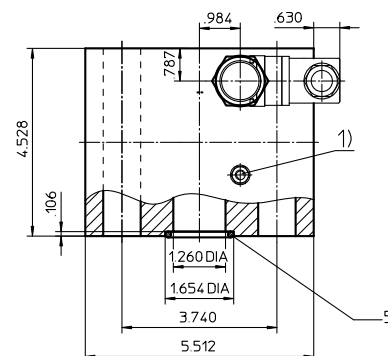
email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable



# Series HPY 170-450

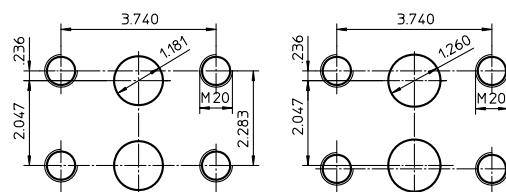
## 4568 PSI



### 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\frac{1}{4}$ "
- 10 **filter housing specification:** (see catalog)  
- = standard  
IS06 = for HFC applications, see sheet no.31605
- 11 **internal valve:**  
- = without  
S1 = with bypass valve  $\Delta p$  51 PSI  
S2 = with bypass valve  $\Delta p$  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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

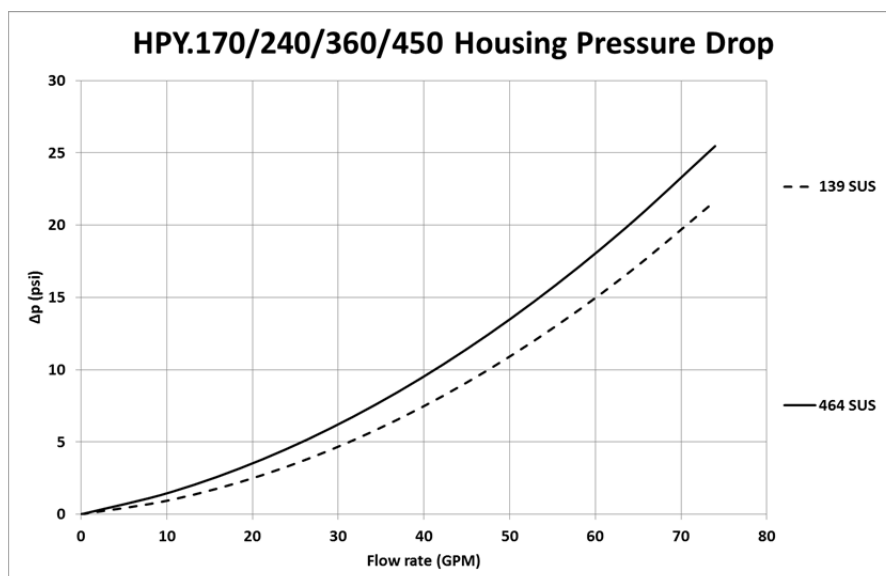
### Material gradient coefficients (MSK) for filter elements

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.

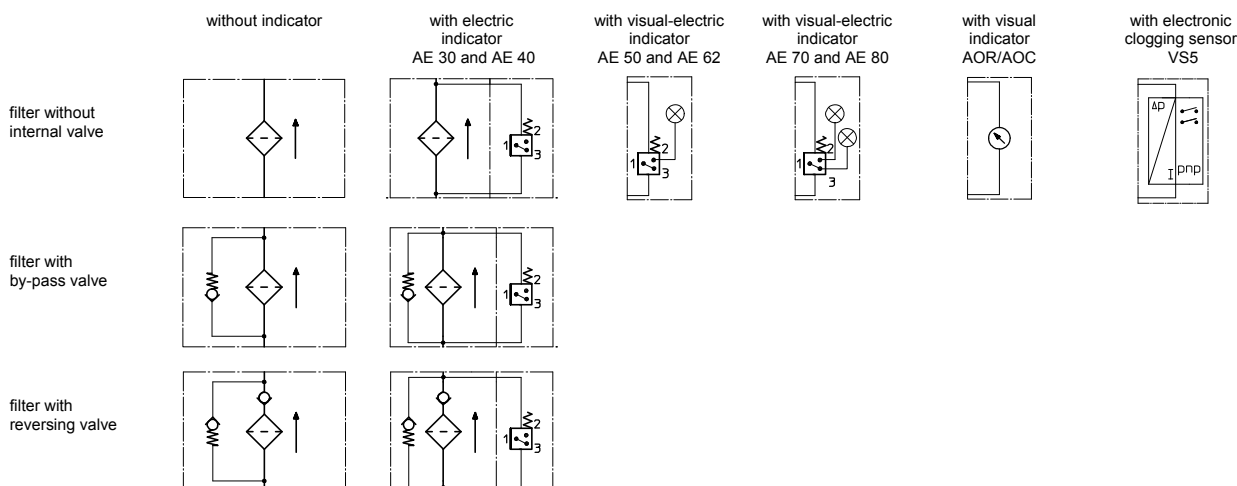
HPY	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
170	2.714	1.884	1.206	1.036	0.708	0.0839	0.0783	0.0537
240	2.092	1.452	0.930	0.799	0.546	0.0651	0.0607	0.0416
360	1.530	1.062	0.680	0.584	0.399	0.0475	0.0444	0.0304
450	1.126	0.782	0.500	0.430	0.294	0.0349	0.0326	0.0223

### $\Delta p = f(Q)$ – 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
ISO 16889	Multi-pass method for evaluating filtration performance

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altludersheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

## For more information, please

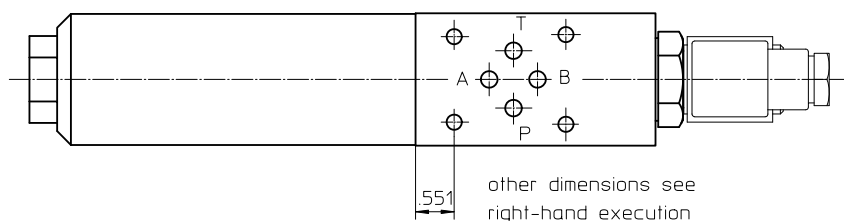
email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

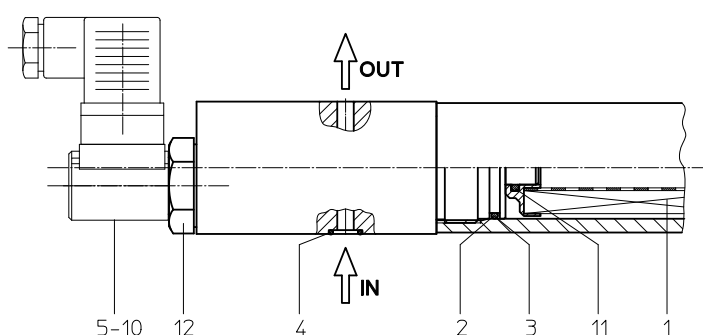
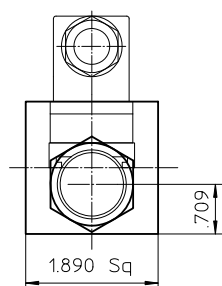
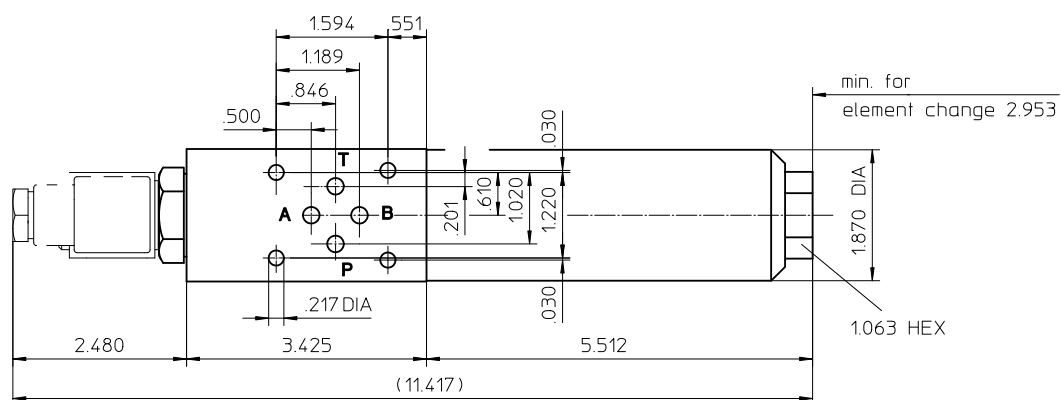
# Series HPZ 32

## 5075 PSI

### Left hand installation



### Right hand installation



Weight: approx. 7.7 lbs.

Dimensions: inches

Designs and performance values are subject to change.

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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

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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

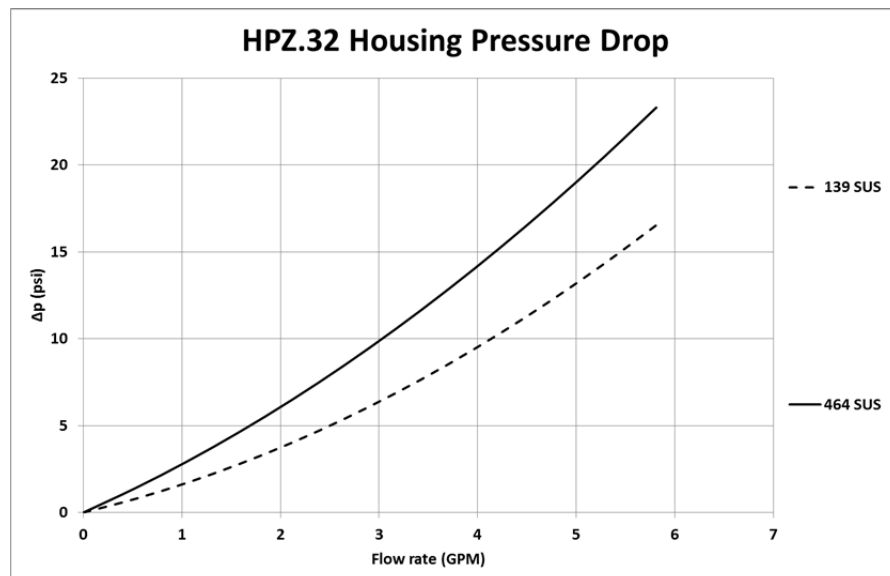
### Material gradient coefficients (MSK) for filter elements

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.

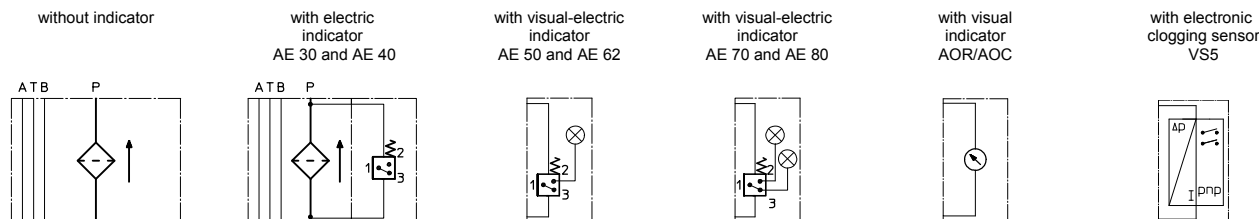
HPZ	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
32	12.554	8.716	5.580	4.794	3.275	0.2539	0.2369	0.1623

### $\Delta p = f(Q)$ – 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlufheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

## For more information, please

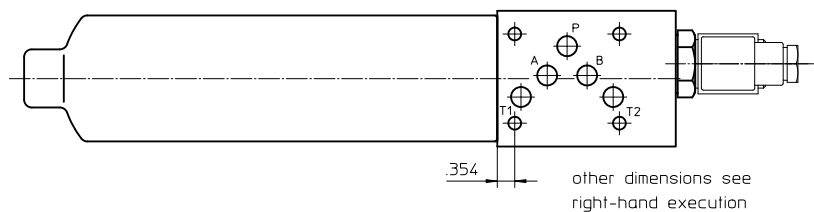
email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

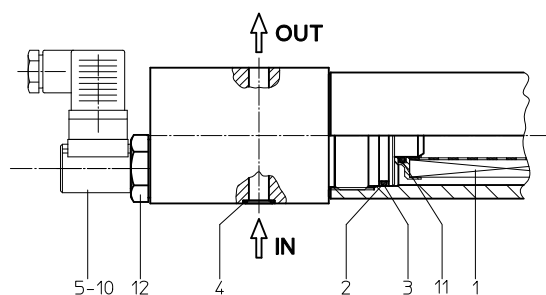
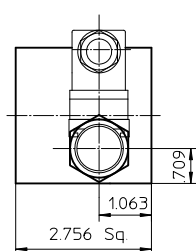
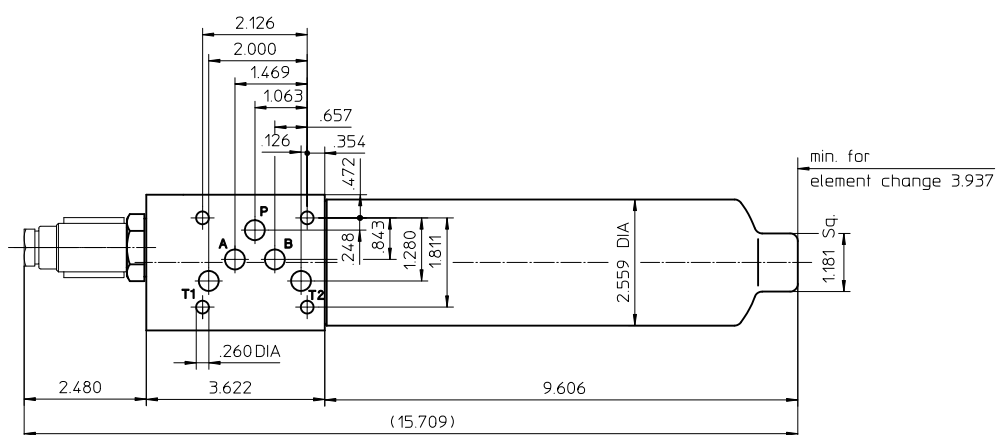
# Series HPZ 90

## 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

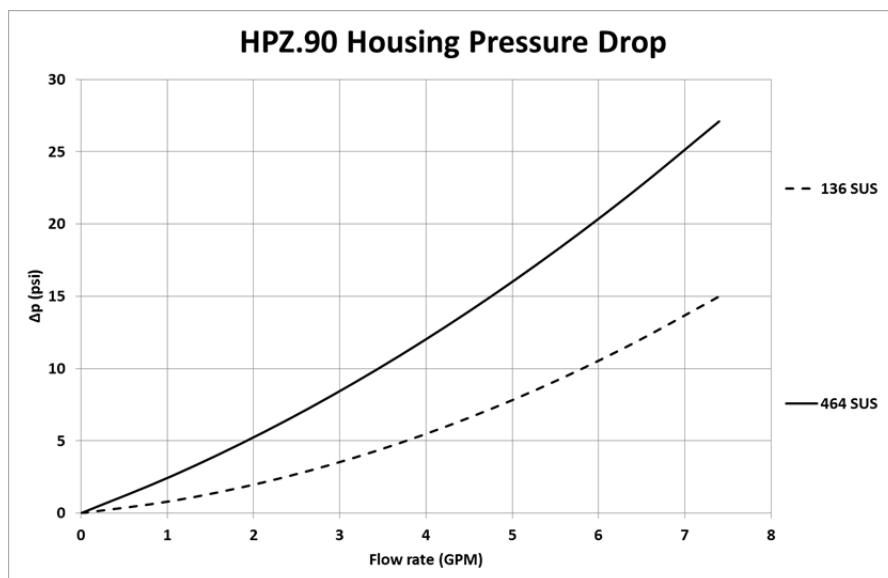
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

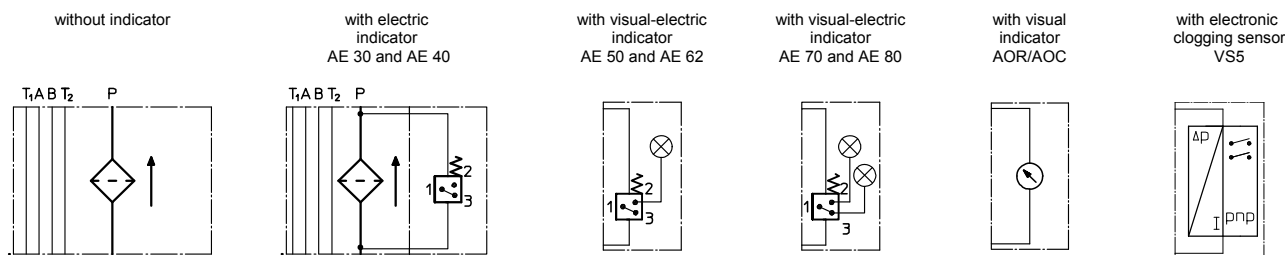
HPZ	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
90	4.059	2.818	1.804	1.550	1.059	0.1210	0.1130	0.0774

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

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

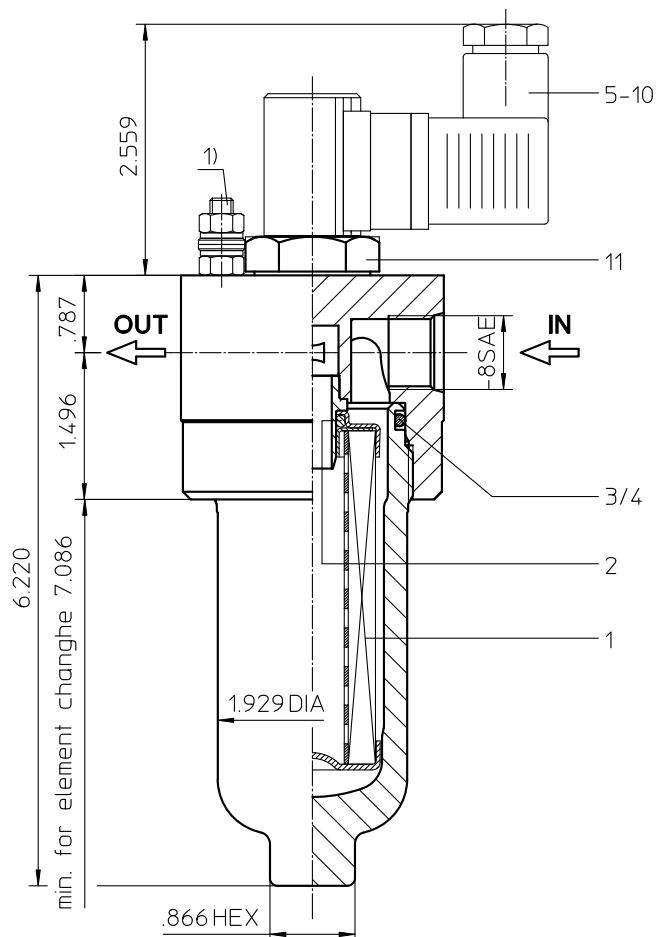
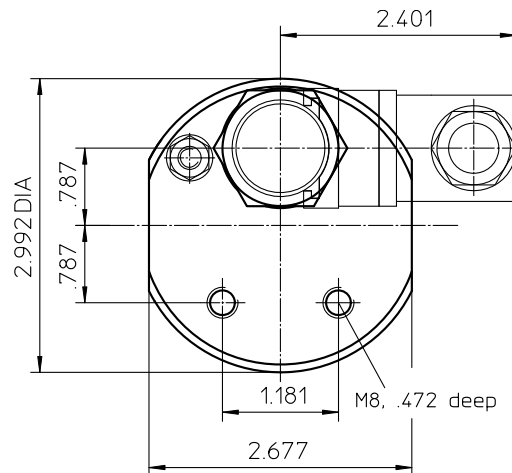
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
S2 = with by-pass valve  $\Delta p$  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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

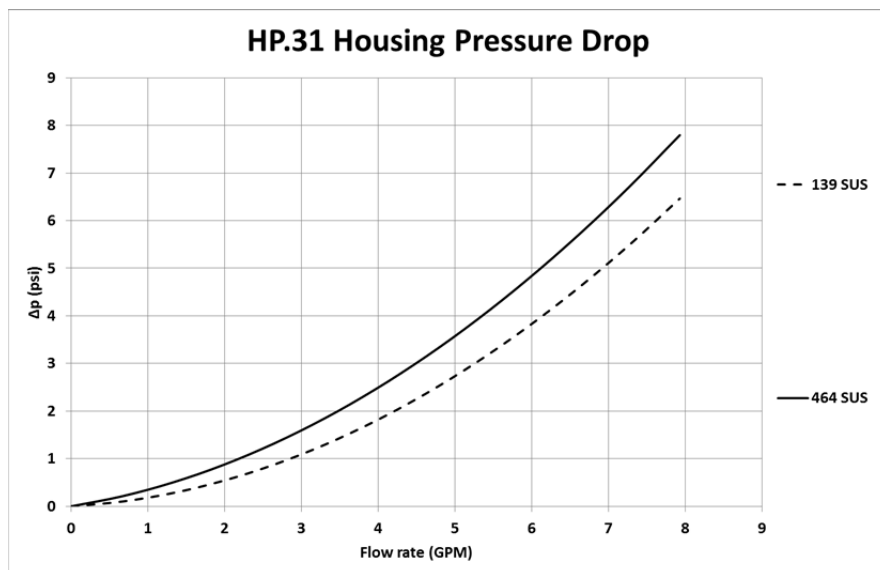
### Material gradient coefficients (MSK) for filter elements

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.

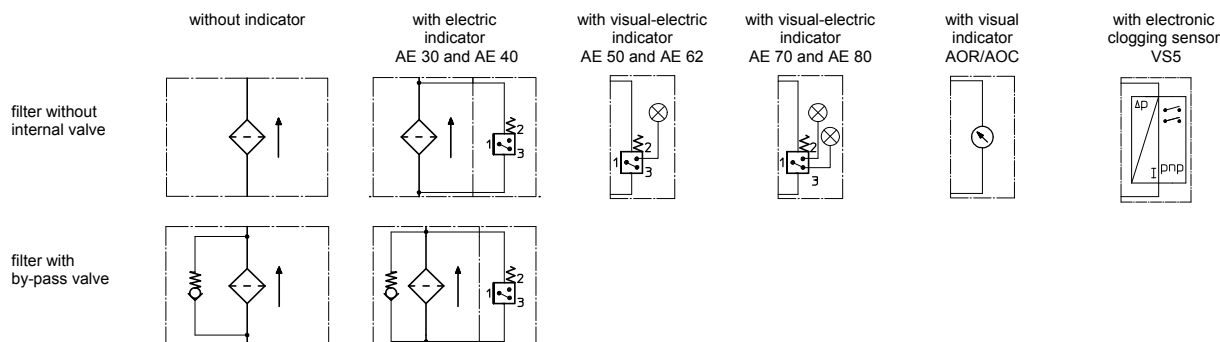
HP	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
31	12.554	8.716	5.580	4.794	3.275	0.2369	0.2369	0.1623

### $\Delta p = f(Q)$ – 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altludersheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changhong District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

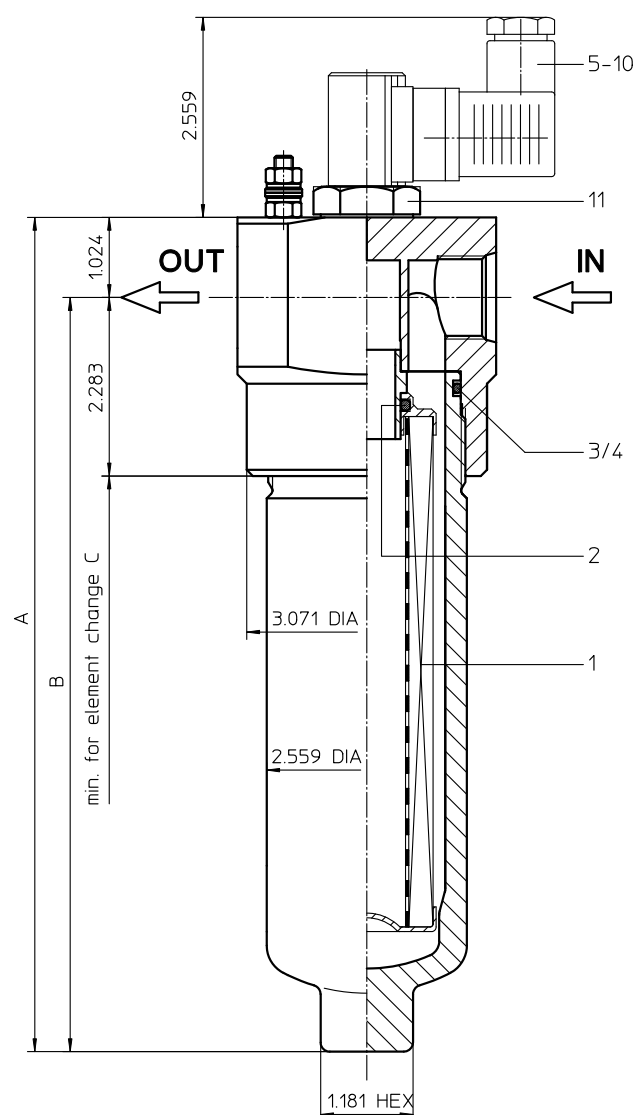
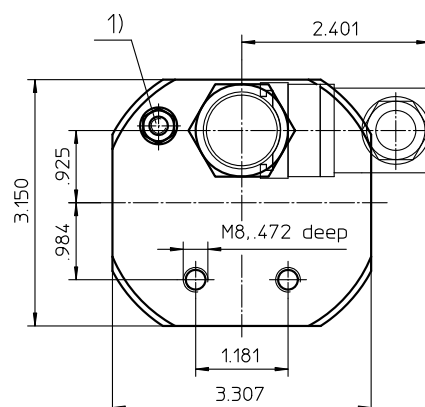
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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  $\mu\text{m}_{(c)}$ .

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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
S2 = with bypass valve  $\Delta p$  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:

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

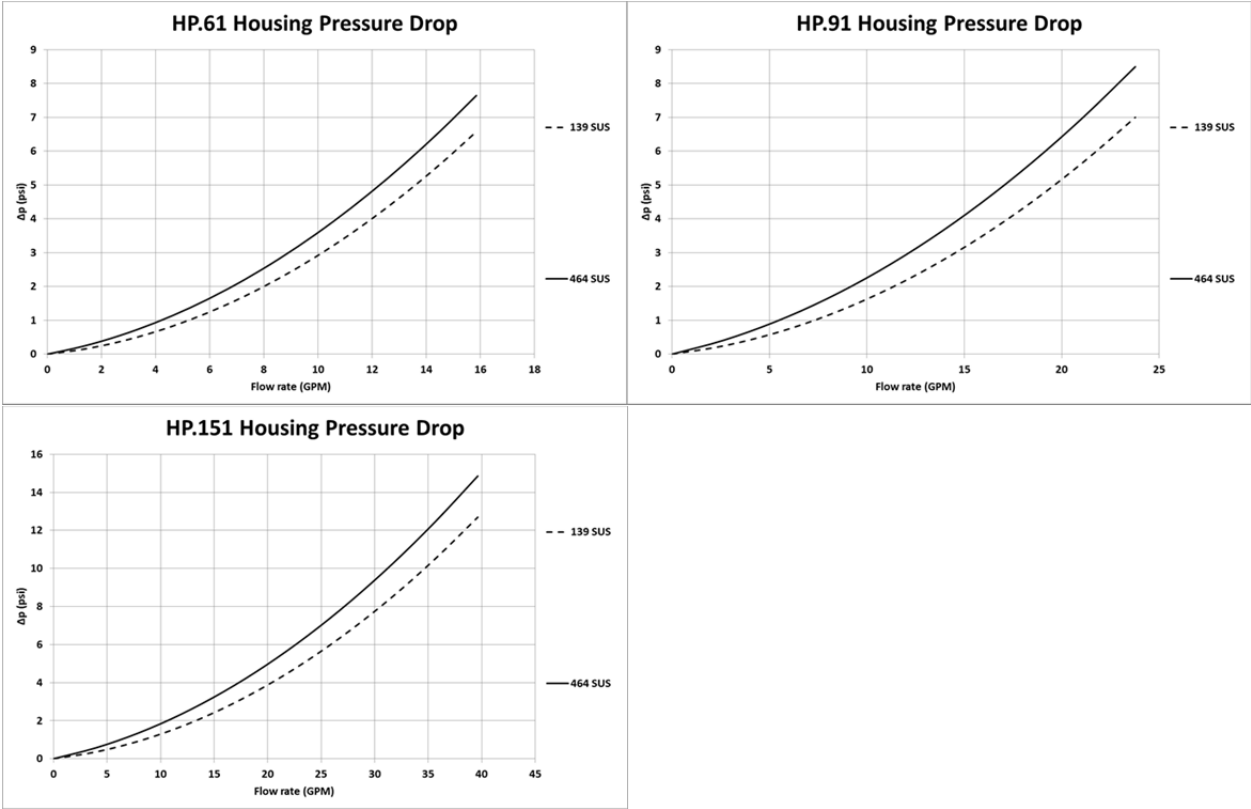
Material gradient coefficients (MSK) for filter elements

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.

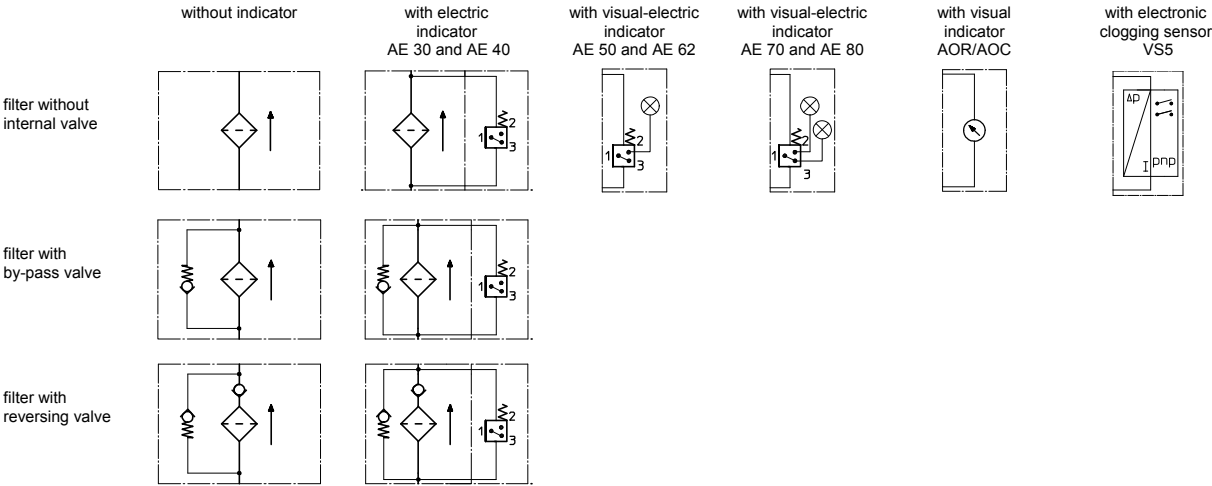
HP	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
61	6.748	4.685	2.999	2.577	1.760	0.2002	0.1868	0.1280
91	4.059	2.818	1.804	1.550	1.059	0.1210	0.1130	0.0774
151	2.422	1.681	1.076	0.925	0.632	0.0723	0.0675	0.0462

Δp = 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	HP91	HP151		
1	1	filter element	01E.60...	01E.90...	01E.150...		
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



**North America**  
44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

**Europe/Africa/Middle East**  
Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

**China**  
No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

**Singapore**  
4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

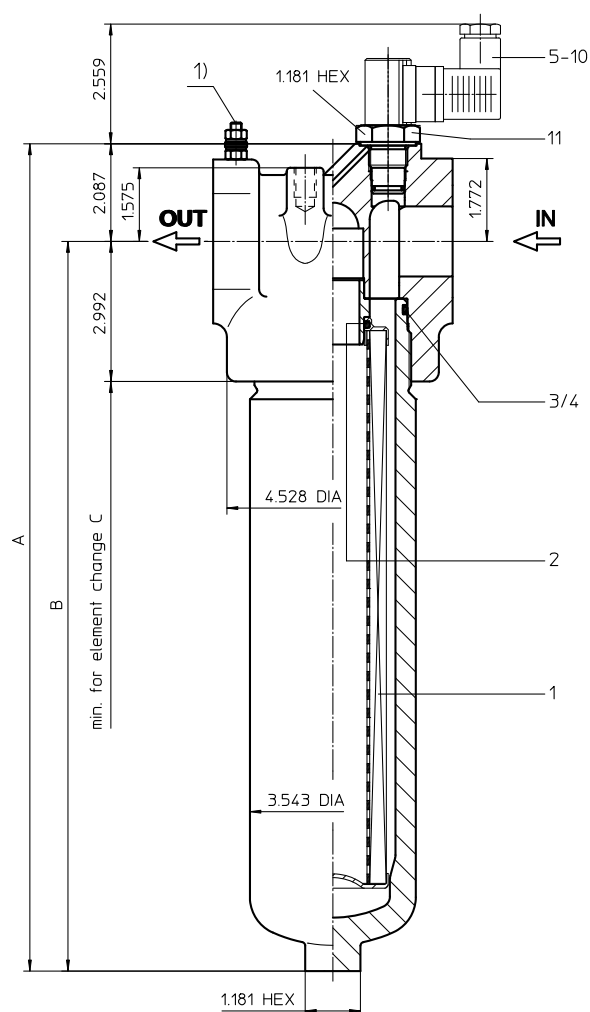
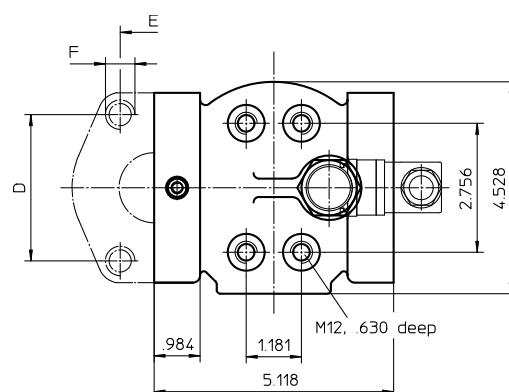
**Brazil**  
Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please  
email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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.

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
S2 = with bypass valve  $\Delta p$  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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

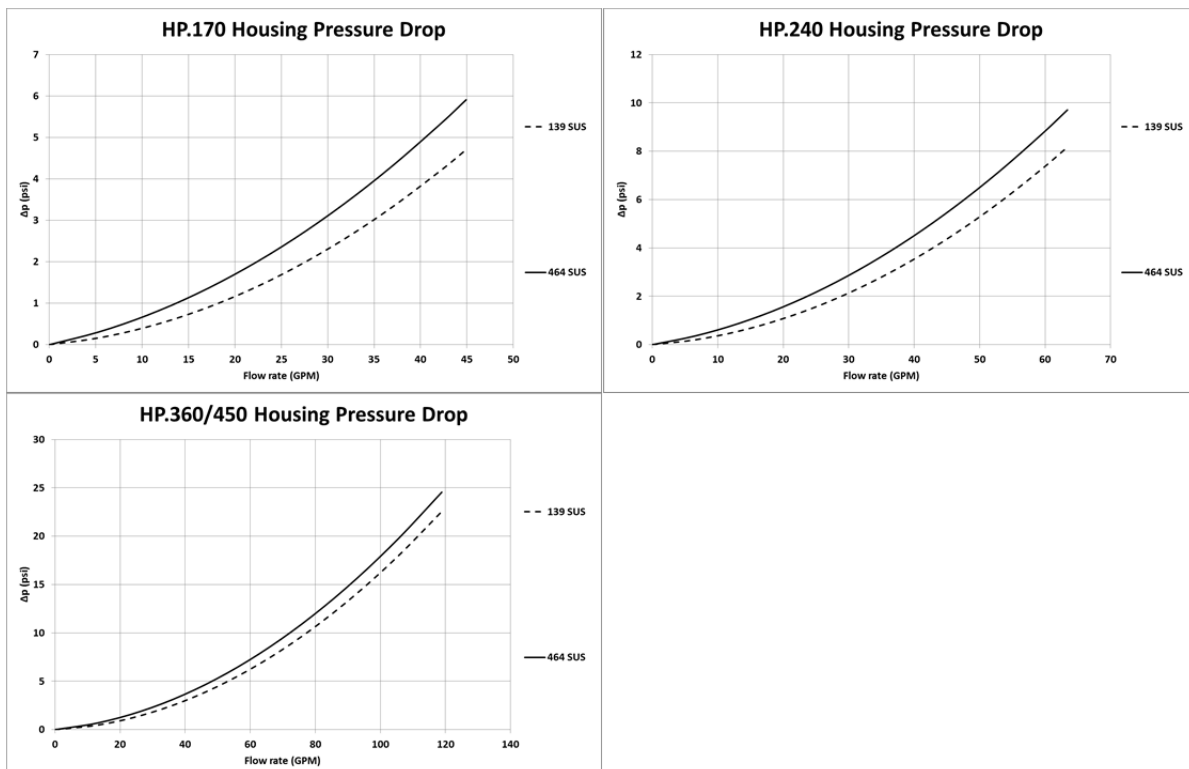
### Material gradient coefficients (MSK) for filter elements

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.

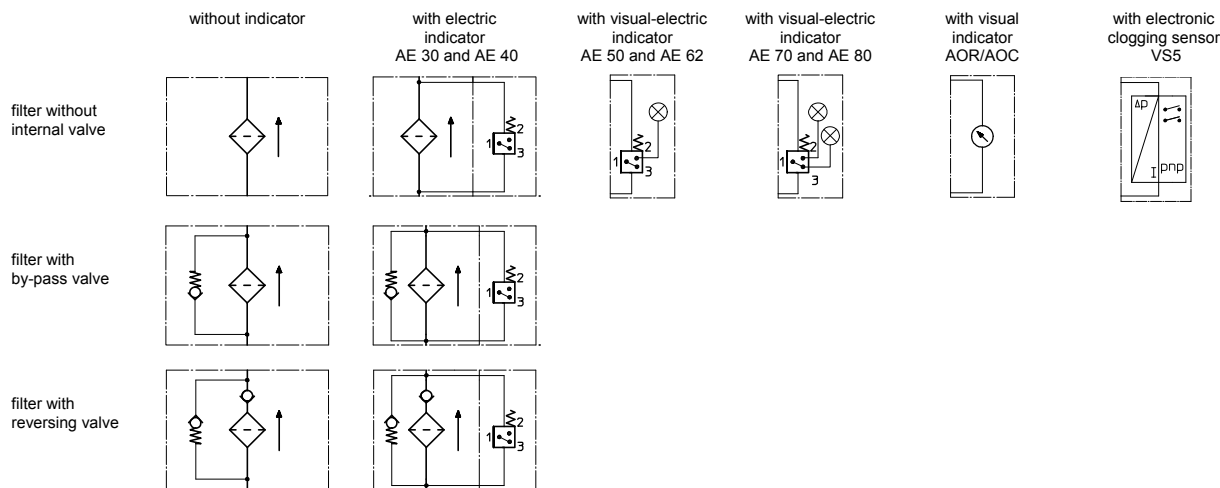
HP	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
170	2.714	1.884	1.206	1.036	0.708	0.0839	0.0783	0.0537
240	2.092	1.452	0.930	0.799	0.546	0.0651	0.0607	0.0416
360	1.530	1.062	0.680	0.584	0.399	0.0475	0.0444	0.0304
450	1.126	0.782	0.500	0.430	0.294	0.0349	0.0326	0.0223

### $\Delta p = f(Q)$ – 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:

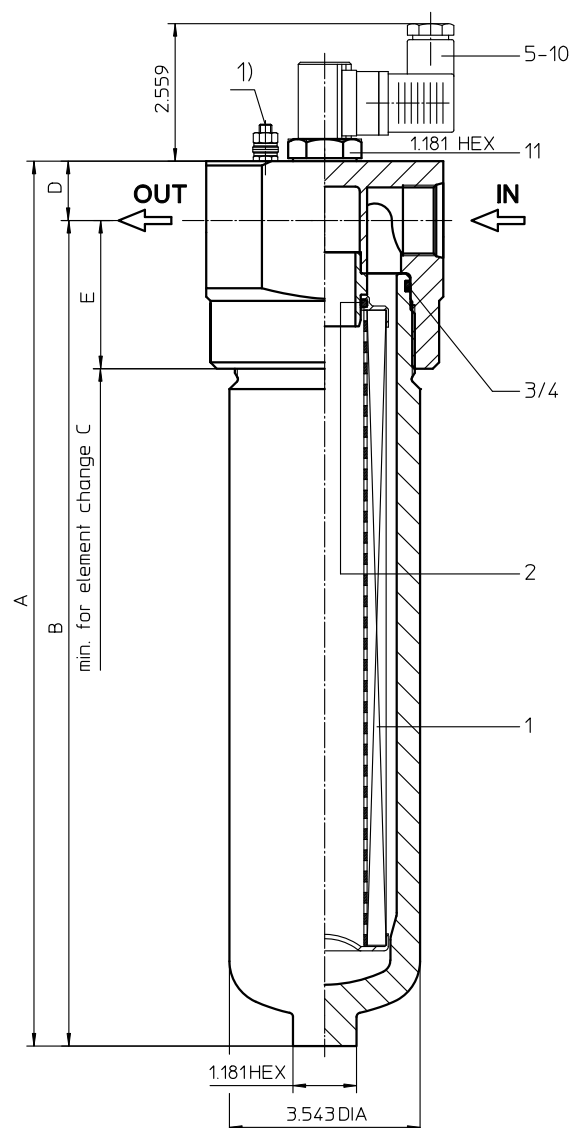
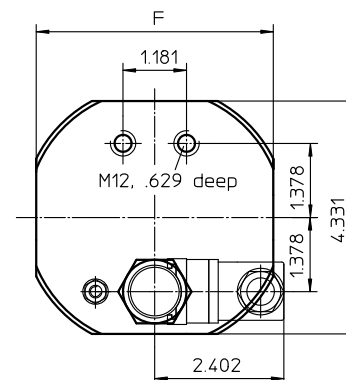
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics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

# 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.

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
S2 = with by-pass valve  $\Delta p$  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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

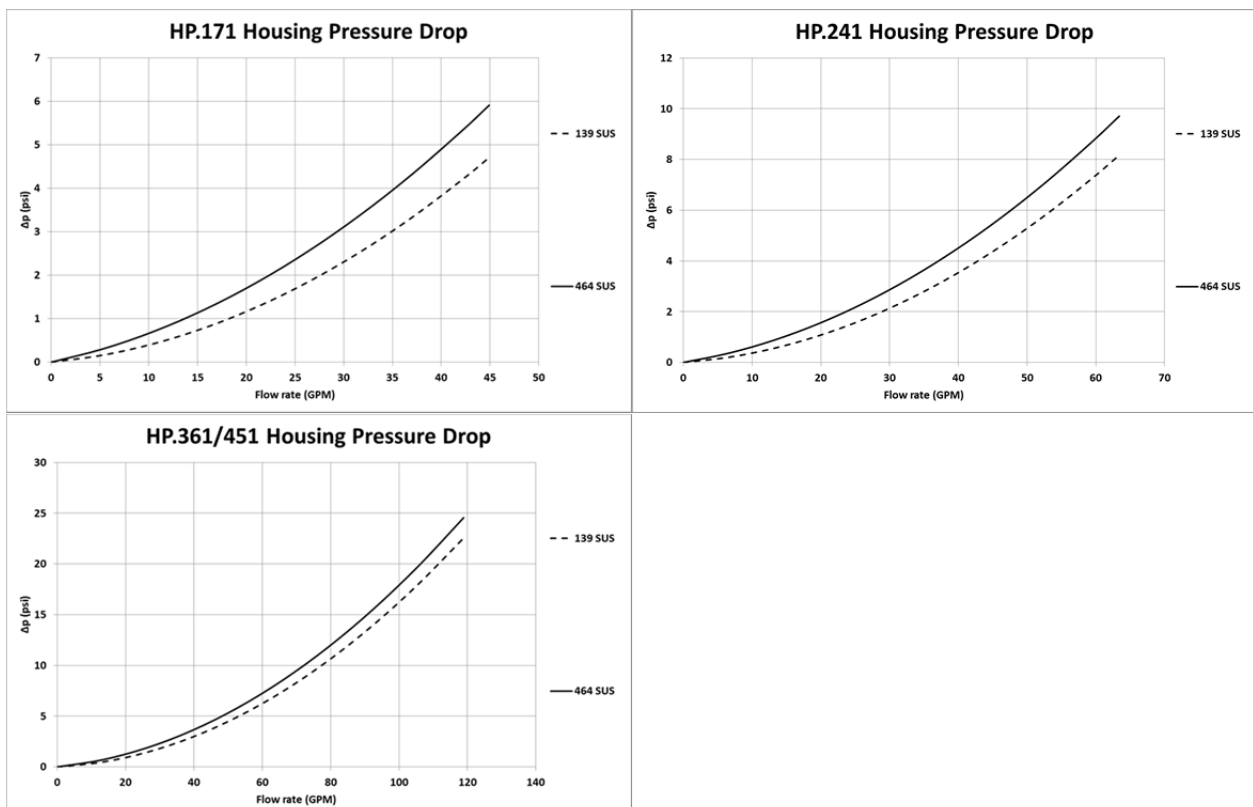
### Material gradient coefficients (MSK) for filter elements

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.

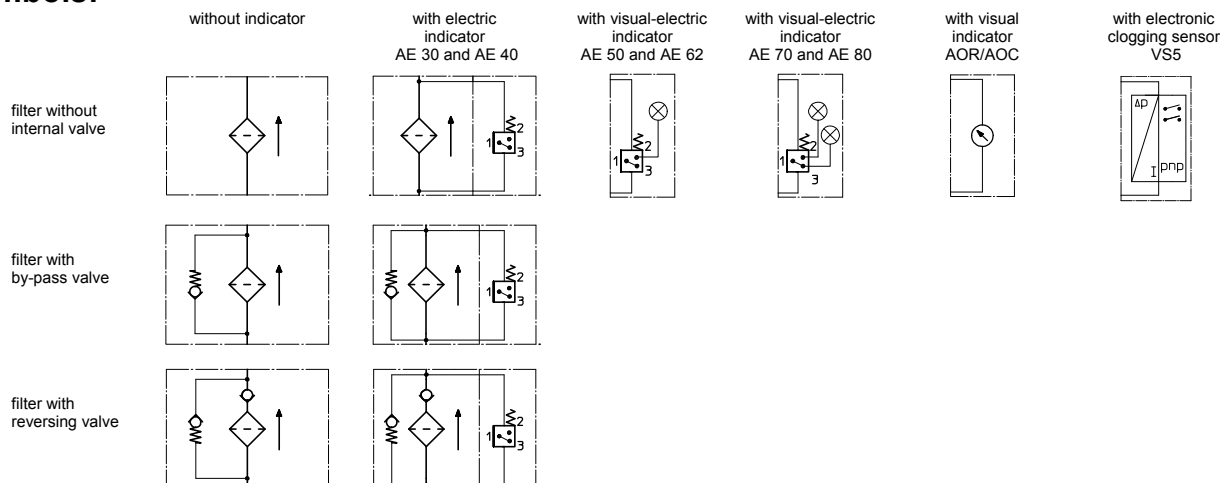
HP	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
171	2.714	1.884	1.206	1.036	0.708	0.0839	0.0783	0.0537
241	2.092	1.452	0.930	0.799	0.546	0.0651	0.0607	0.0416
361	1.530	1.062	0.680	0.584	0.399	0.0475	0.0444	0.0304
451	1.126	0.782	0.500	0.430	0.294	0.0349	0.0326	0.0223

### $\Delta p = f(Q)$ – 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlußheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

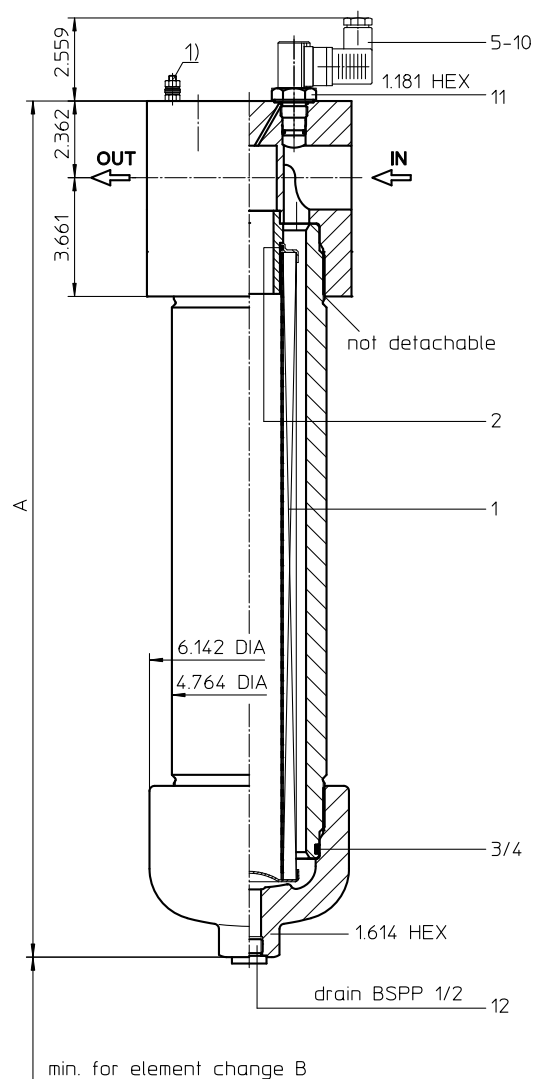
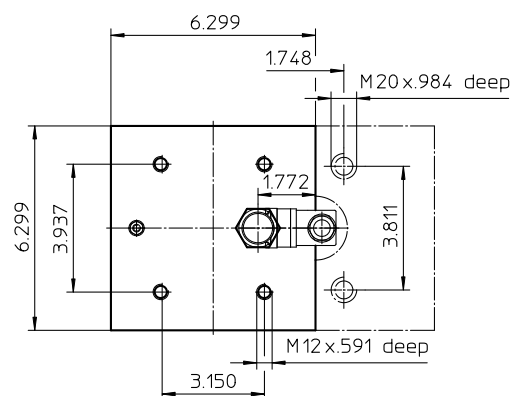
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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.

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
S2 = with bypass valve  $\Delta p$  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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

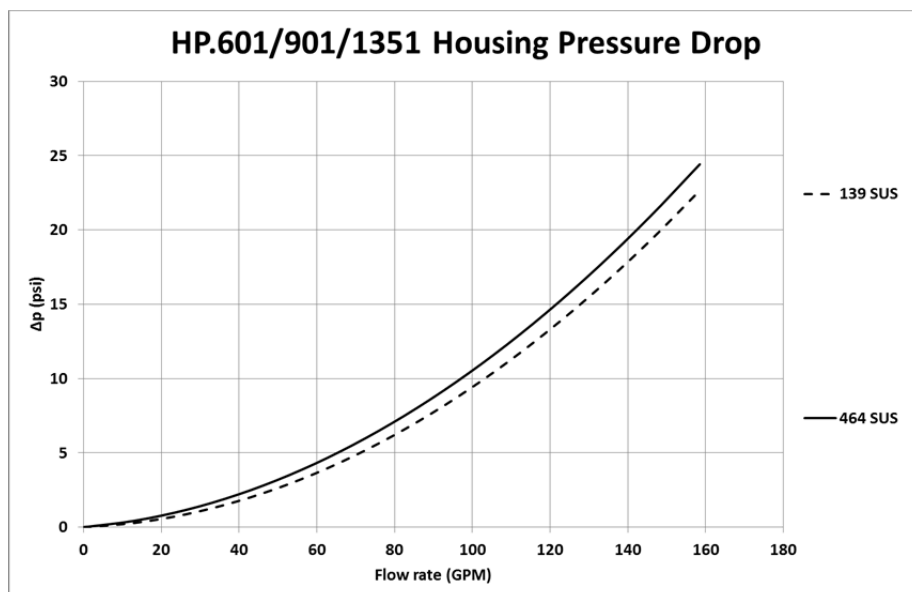
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

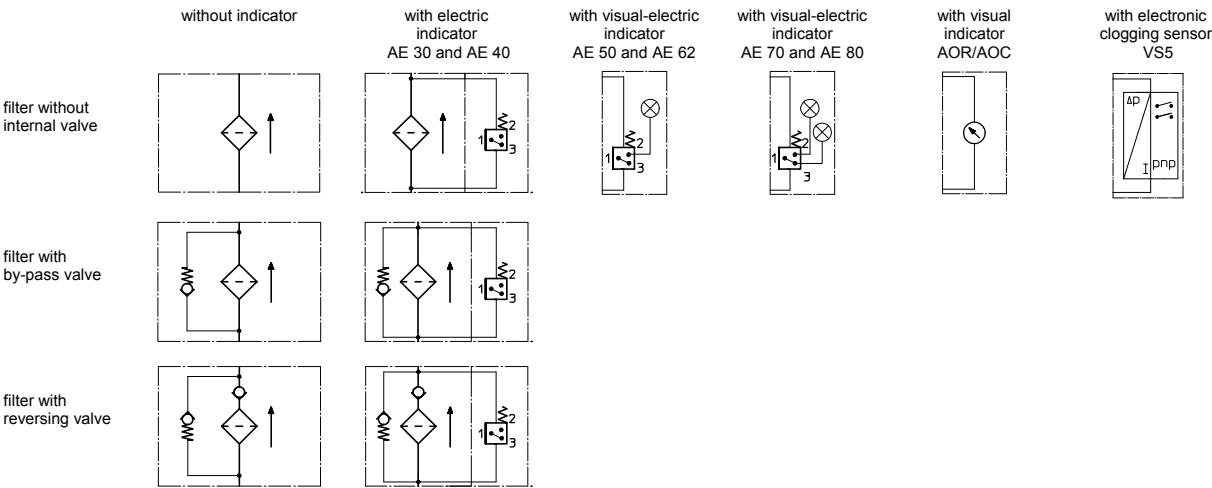
HP	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
601	2.714	1.884	1.206	1.036	0.708	0.0839	0.0783	0.0537
901	2.092	1.452	0.930	0.799	0.546	0.0651	0.0607	0.0416
1351	1.530	1.062	0.680	0.584	0.399	0.0475	0.0444	0.0304

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

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. The pressure drop changes proportionally to the density.



# Symbols:



# Spare parts:

item	qty.	designation	HP 601	dimension HP 901	HP 1351	article-no.	
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

## North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

## Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

## China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

## Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

## Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

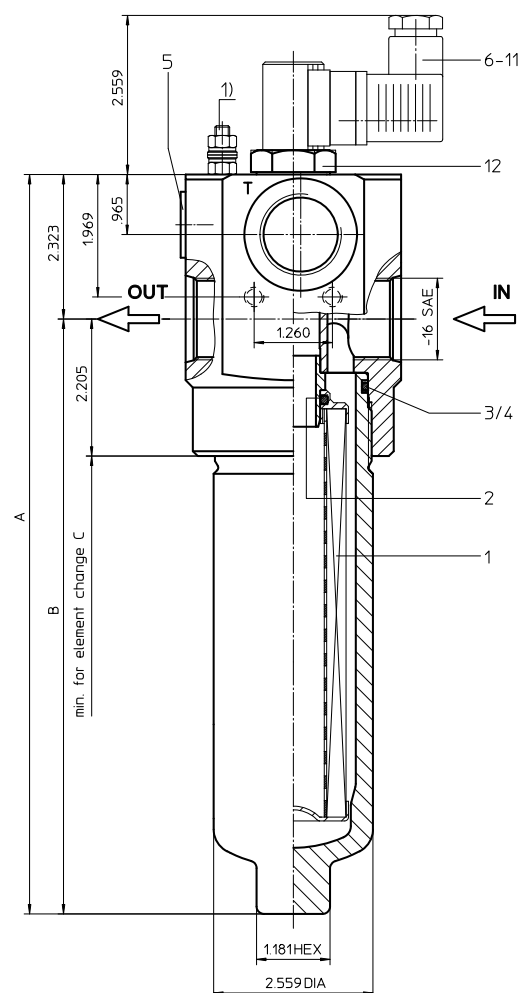
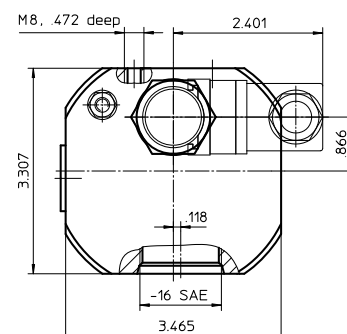
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# Series HPV 60-150

## 6000 PSI



### 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
D2 = differential pressure-valve  $\Delta p$  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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

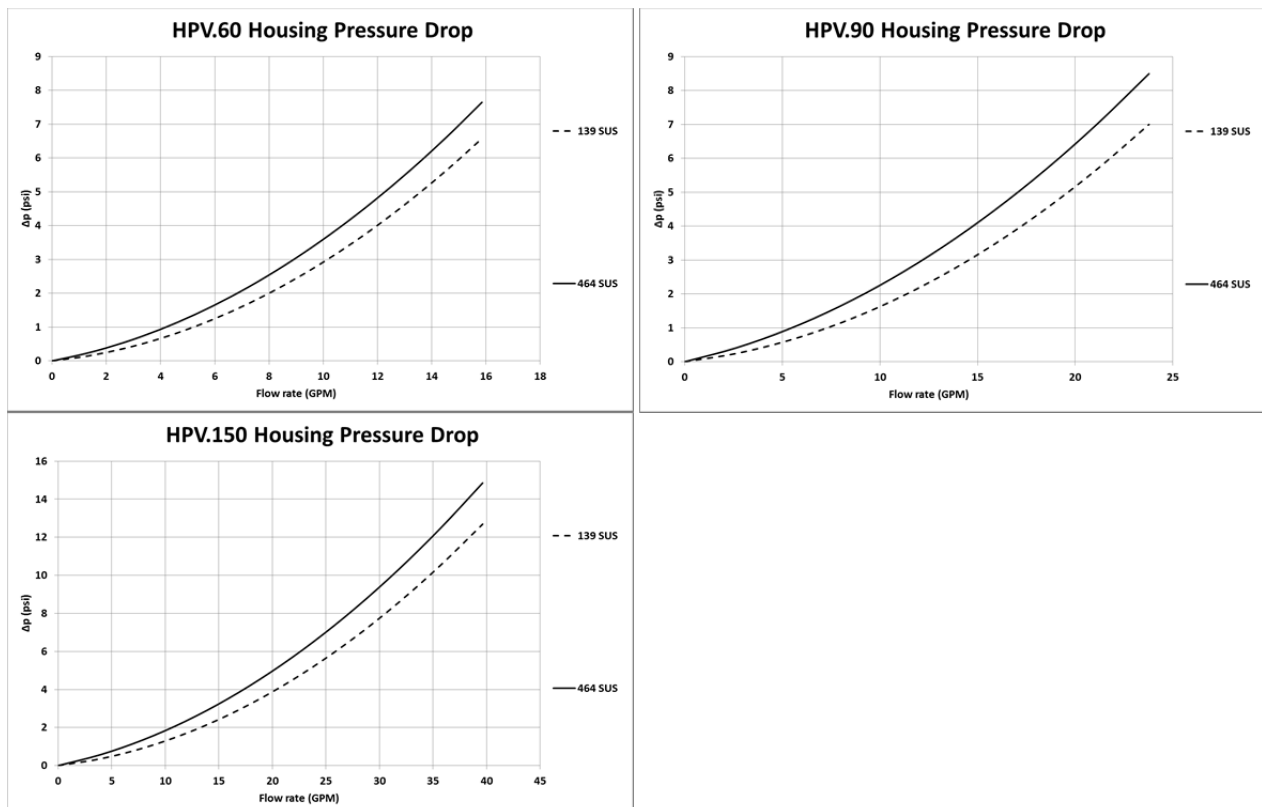
### Material gradient coefficients (MSK) for filter elements

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.

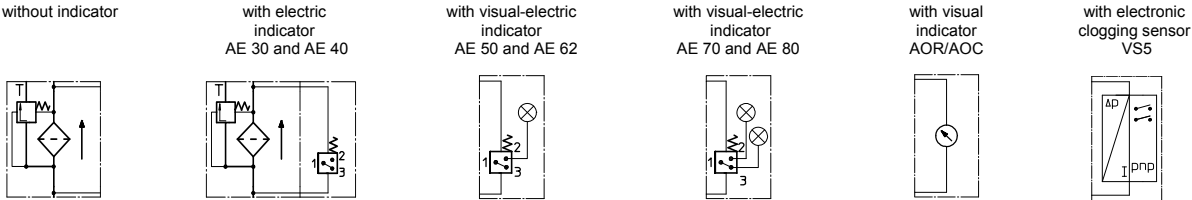
HPV	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
60	6.748	4.685	2.999	2.577	1.760	0.2002	0.1868	0.1280
90	4.059	2.818	1.804	1.550	1.059	0.1210	0.1130	0.0774
150	2.422	1.681	1.076	0.925	0.632	0.0723	0.0675	0.0462

### $\Delta p = f(Q)$ – 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

**North America**  
44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

**Europe/Africa/Middle East**  
Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0



Powering Business Worldwide

**China**  
No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

**Singapore**  
4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

**Brazil**  
Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

**For more information, please**  
**email us at [filtration@eaton.com](mailto:filtration@eaton.com)**  
**or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)**

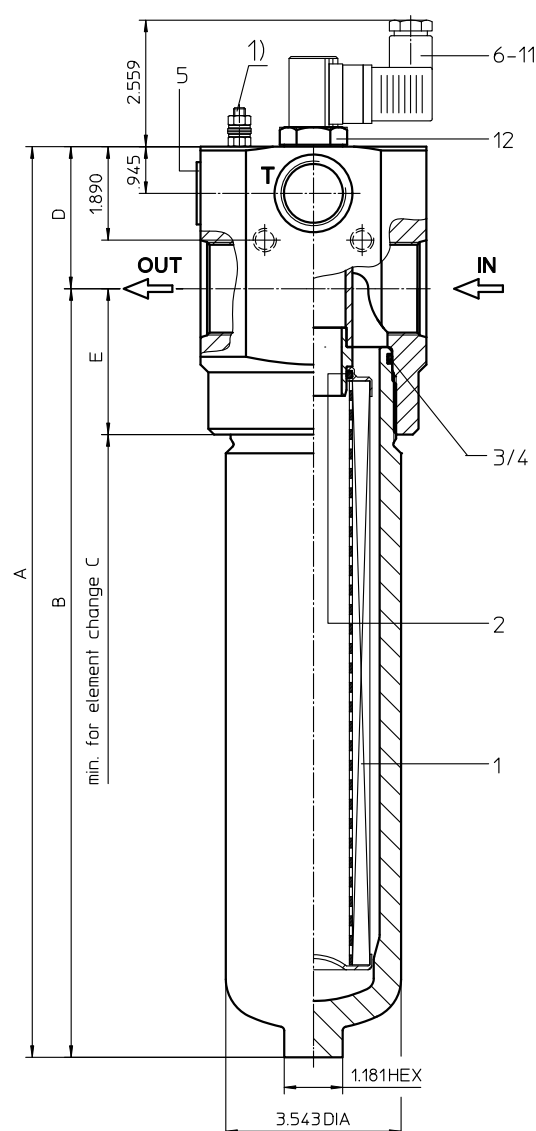
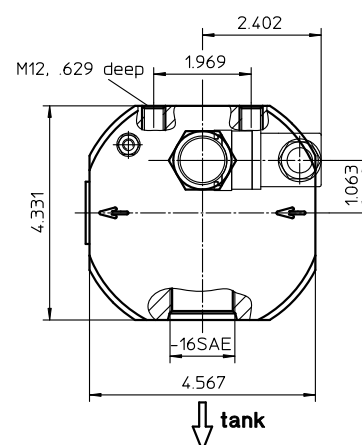
© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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.

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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)

<b>HPV.</b>	<b>360.</b>	<b>10VG.</b>	<b>HR.</b>	<b>E.</b>	<b>P.</b>	<b>-</b>	<b>UG.</b>	<b>7.</b>	<b>-</b>	<b>D2.</b>	<b>AE</b>
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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
D2 = differential pressure-valve  $\Delta p$  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)

<b>01E.</b>	<b>360.</b>	<b>10VG.</b>	<b>HR.</b>	<b>E.</b>	<b>P.</b>	<b>-</b>
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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

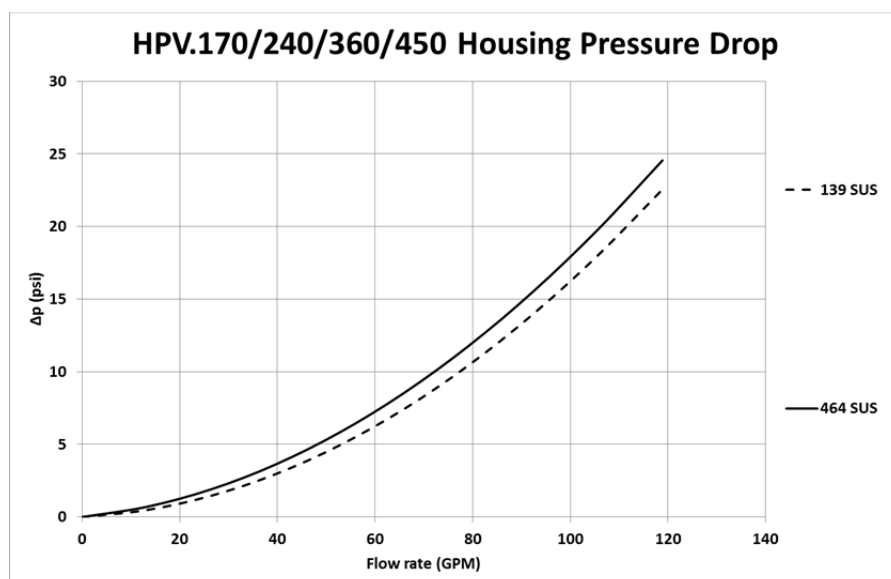
### Material gradient coefficients (MSK) for filter elements

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.

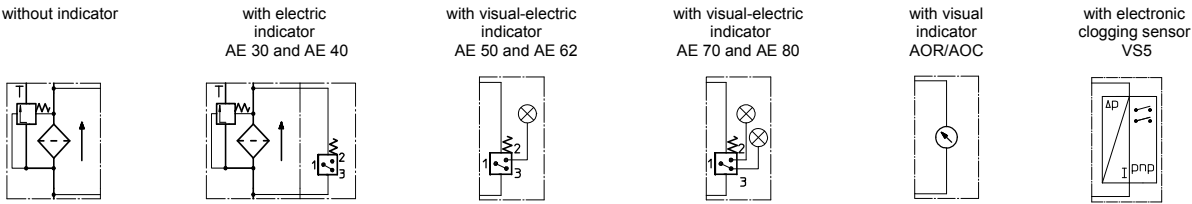
HPV	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
170	2.714	1.884	1.206	1.036	0.708	0.0839	0.0783	0.0537
240	2.092	1.452	0.930	0.799	0.546	0.0651	0.0607	0.0416
360	1.530	1.062	0.680	0.584	0.399	0.0475	0.0444	0.0304
450	1.126	0.782	0.500	0.430	0.294	0.0349	0.0326	0.0223

### $\Delta p = f(Q)$ – 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		¾ 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

## North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

## Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altludersheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

## China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

## Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

## Brazil

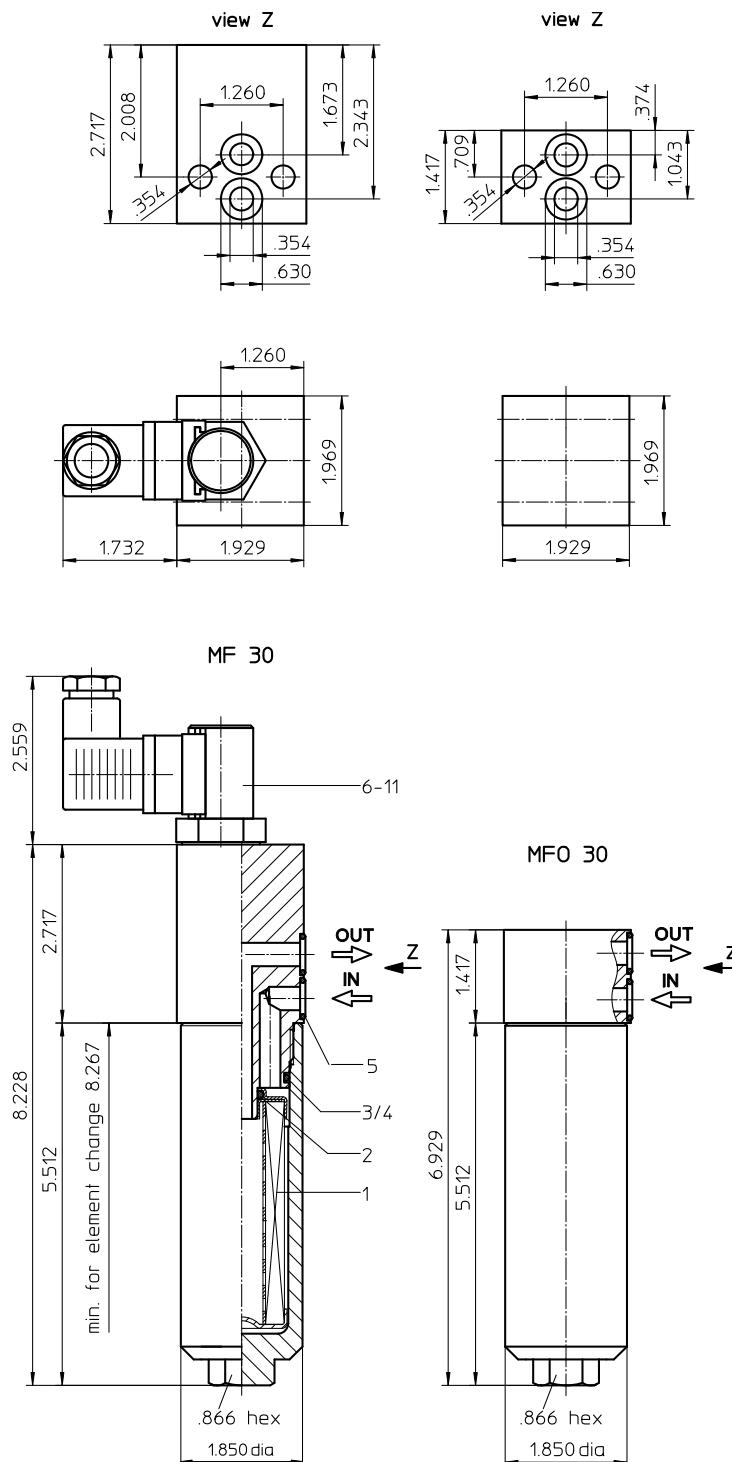
Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please  
email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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!



Powering Business Worldwide

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  3625 PSI.

#### 1. Type index:

##### 1.1. Complete filter: (ordering example)

<b>MF.</b>	<b>30.</b>	<b>10VG.</b>	<b>HR.</b>	<b>E.</b>	<b>P.</b>	<b>-</b>	<b>F.</b>	<b>2.</b>	<b>-</b>	<b>AE</b>
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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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)

<b>01E.</b>	<b>30.</b>	<b>10VG.</b>	<b>HR.</b>	<b>E.</b>	<b>P.</b>	<b>-</b>
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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

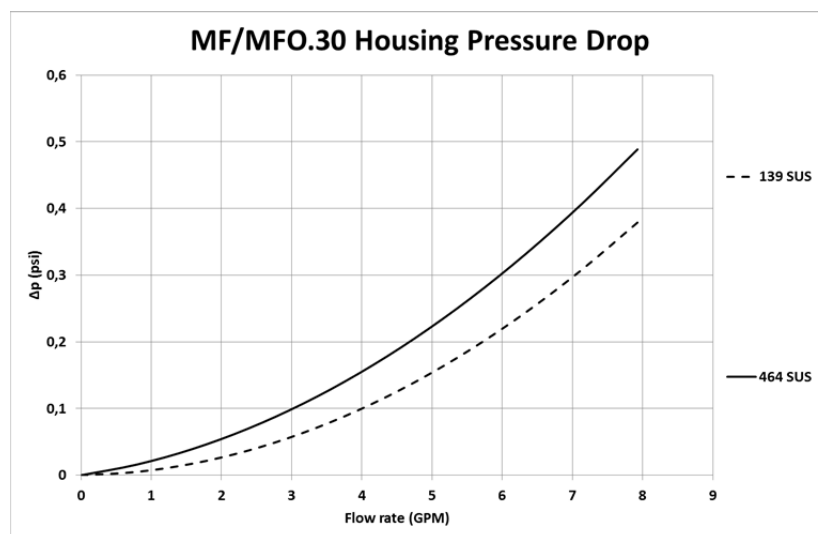
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

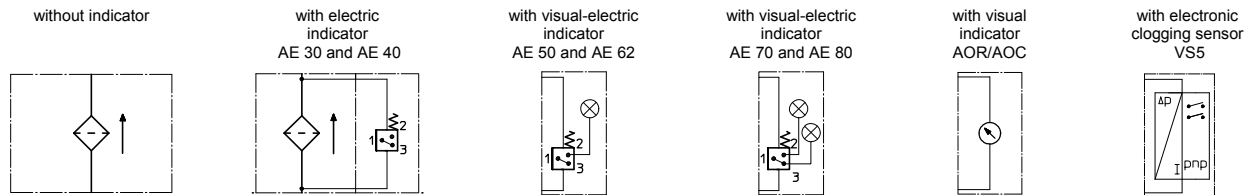
MF/MFO	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
30	12.554	8.716	5.580	4.794	3.275	0.2539	0.2369	0.1623

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

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altludersheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please  
email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

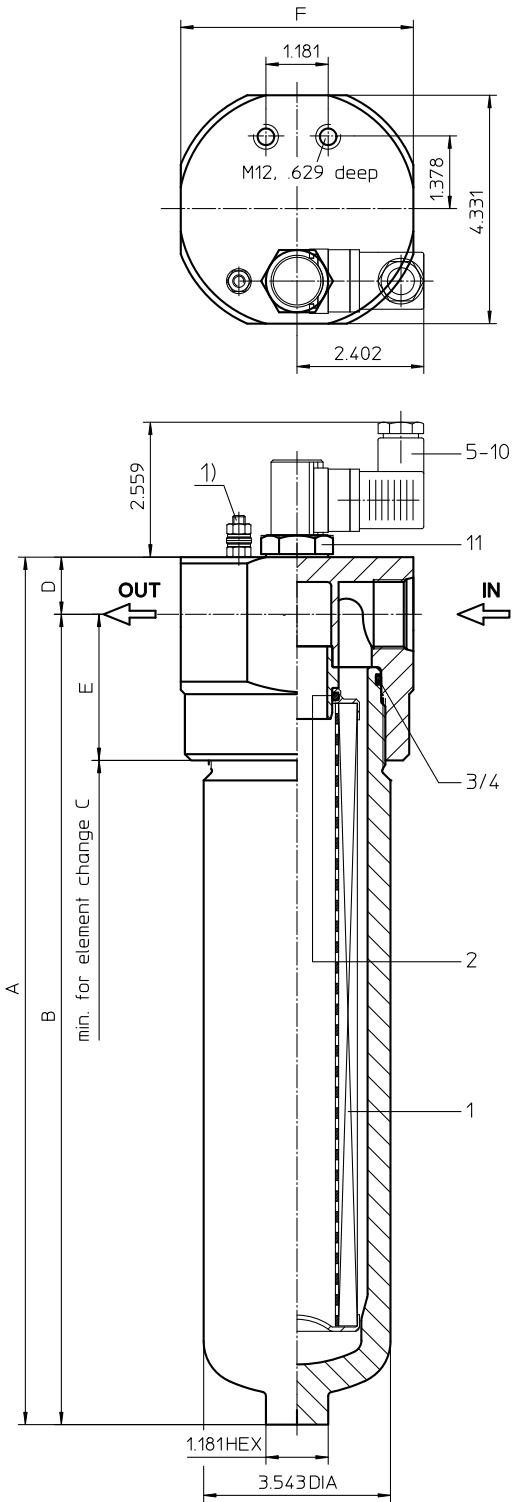
© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

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.

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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)

<b>ML.</b>	<b>360.</b>	<b>10VG.</b>	<b>HR.</b>	<b>E.</b>	<b>P.</b>	<b>-.</b>	<b>UG.</b>	<b>5.</b>	<b>-.</b>	<b>-.</b>	<b>AE</b>
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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
S2 = with by-pass valve  $\Delta p$  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)

<b>01E.</b>	<b>360.</b>	<b>10VG.</b>	<b>HR.</b>	<b>E.</b>	<b>P.</b>	<b>-</b>
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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

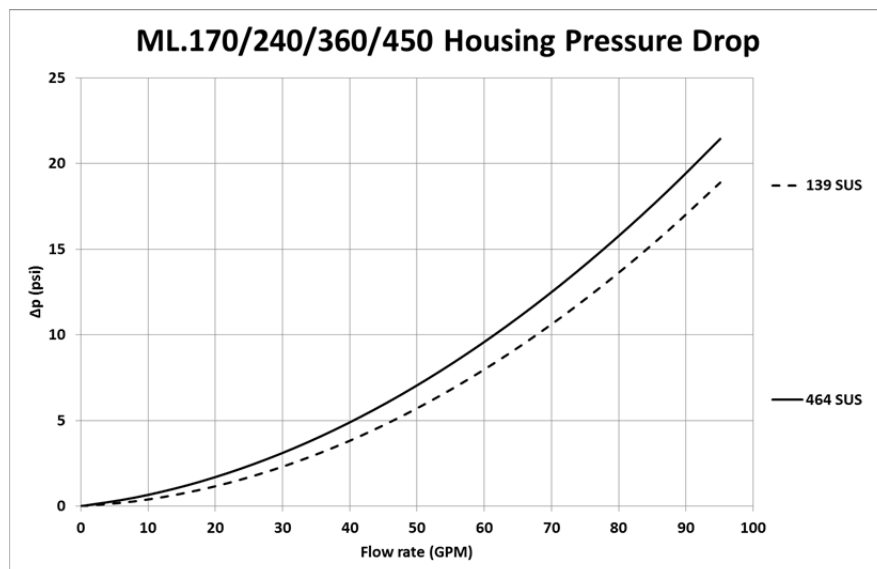
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

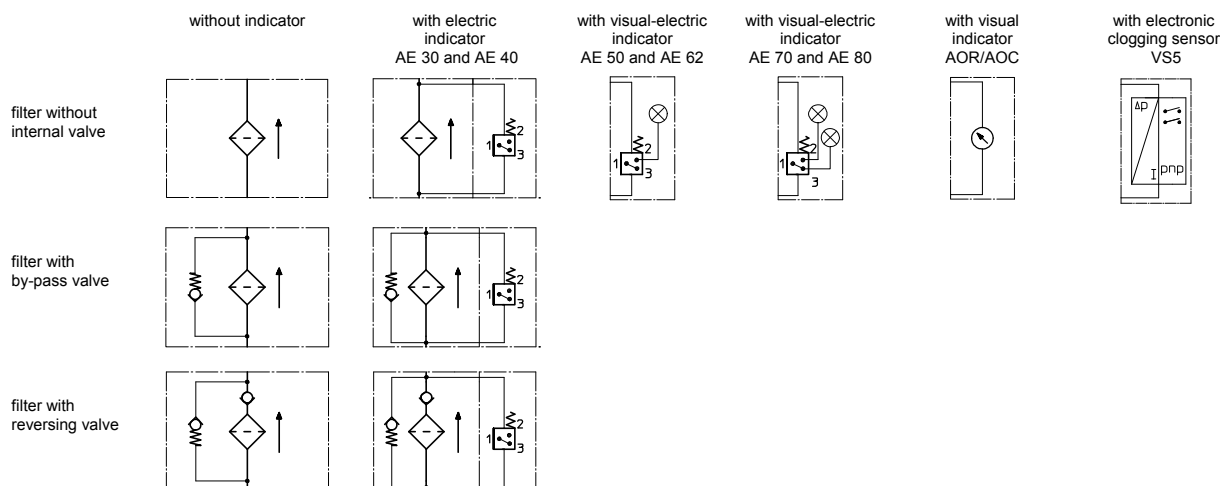
ML	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
170	2.714	1.884	1.206	1.036	0.708	0.0839	0.0783	0.0537
240	2.092	1.452	0.930	0.799	0.546	0.0651	0.0607	0.0416
360	1.530	1.062	0.680	0.584	0.399	0.0475	0.0444	0.0304
450	1.126	0.782	0.500	0.430	0.294	0.0349	0.0326	0.0223

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

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlußheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langerlohn, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

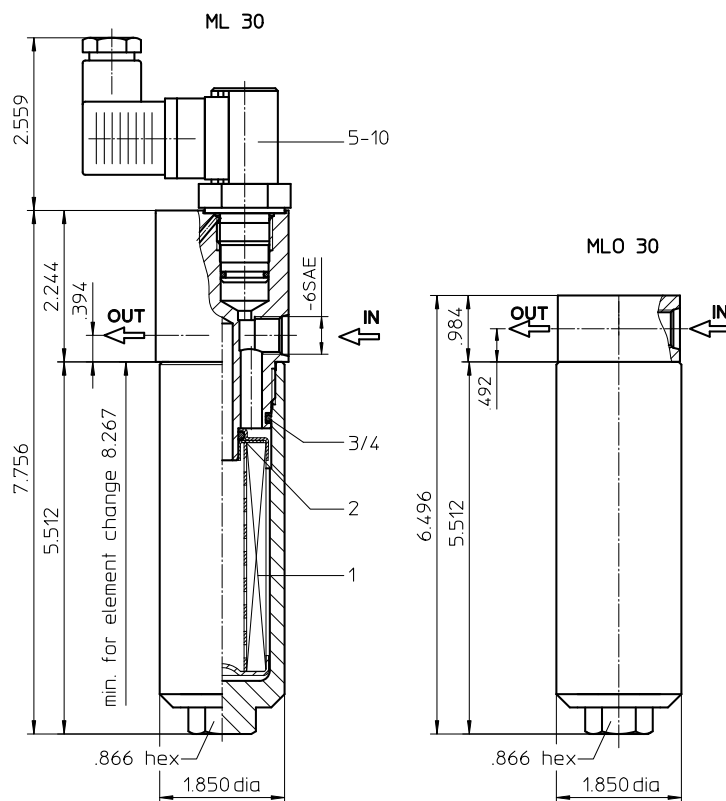
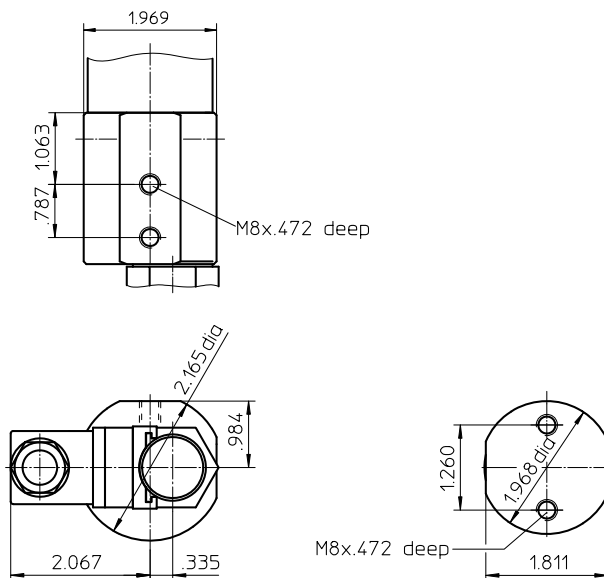
For more information, please

email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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.

EDV 09/15



Powering Business Worldwide

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

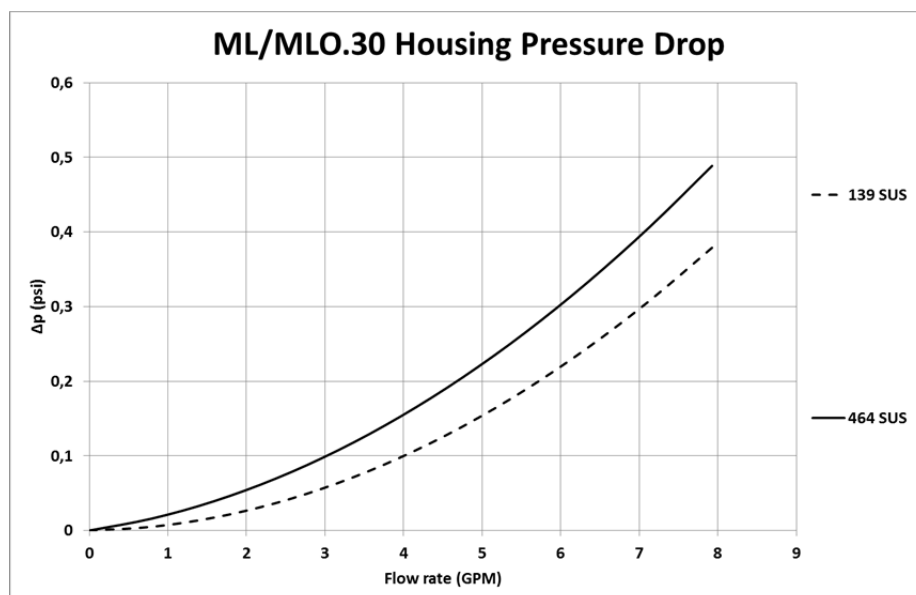
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

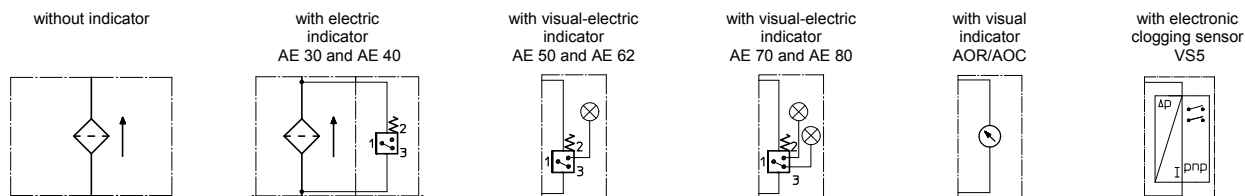
ML/MLO	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
30	12.554	8.716	5.580	4.794	3.275	0.2539	0.2369	0.1623

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

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altludersheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

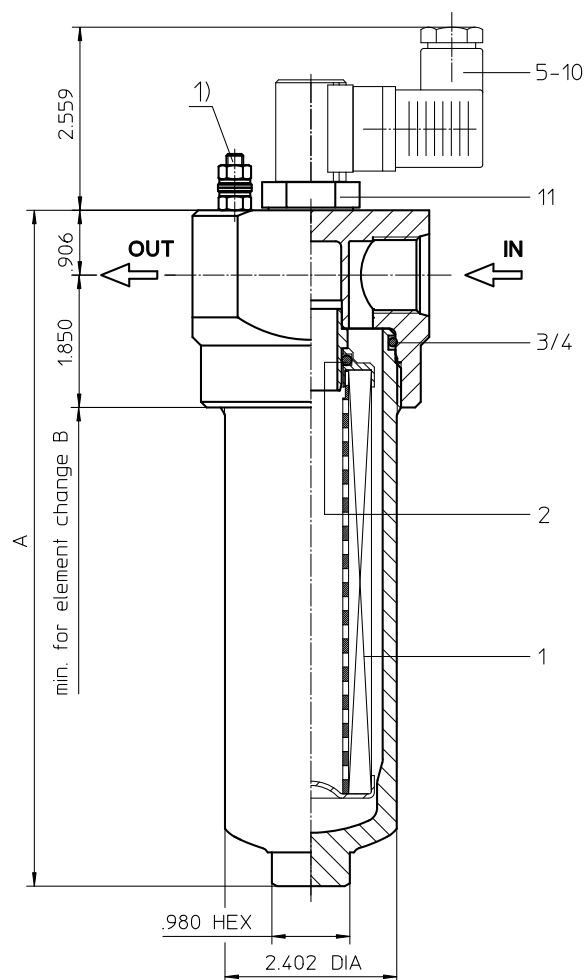
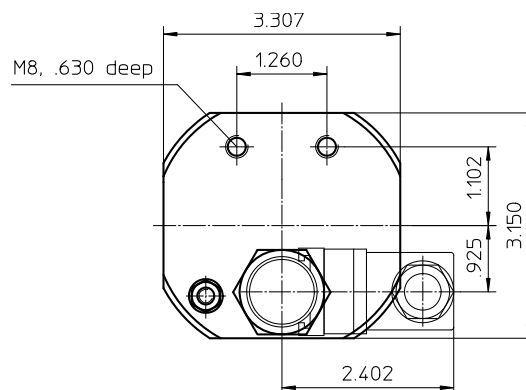
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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.

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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)

<b>MNL.</b>	<b>63.</b>	<b>10VG.</b>	<b>HR.</b>	<b>E.</b>	<b>P.</b>	<b>-.</b>	<b>UG.</b>	<b>4.</b>	<b>-.</b>	<b>-.</b>	<b>AE</b>
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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
S2 = with by-pass valve  $\Delta p$  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)

<b>01NL.</b>	<b>63.</b>	<b>10VG.</b>	<b>HR.</b>	<b>E.</b>	<b>P.</b>	<b>-</b>
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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

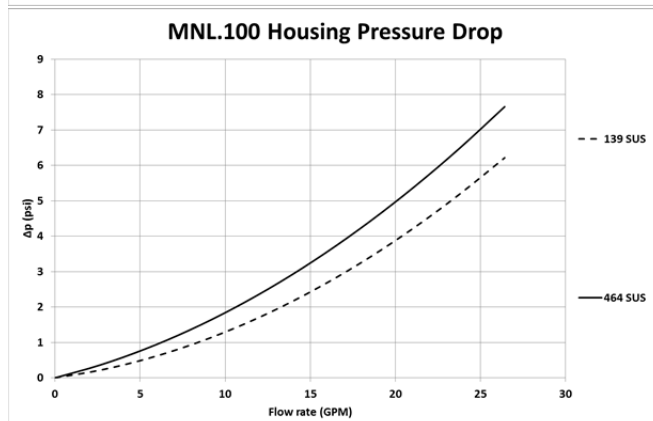
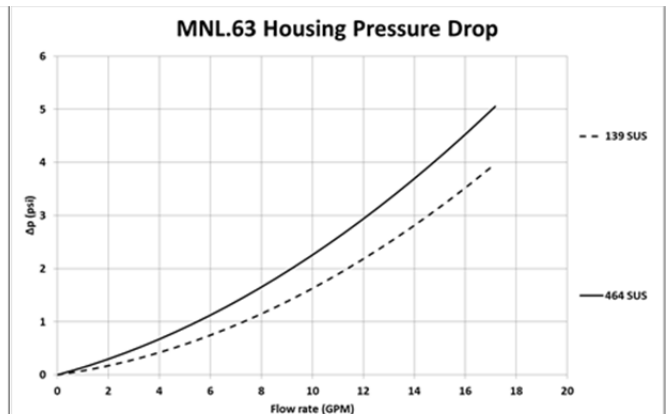
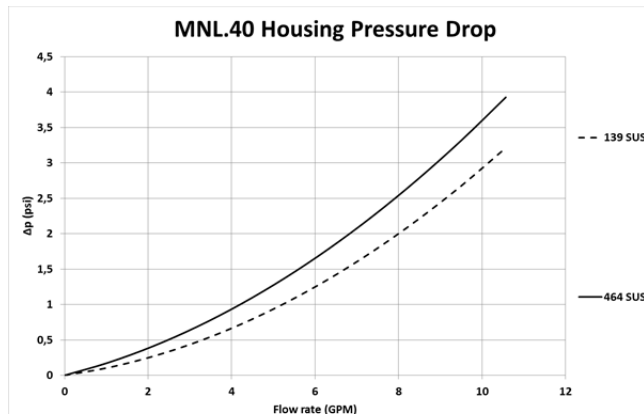
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

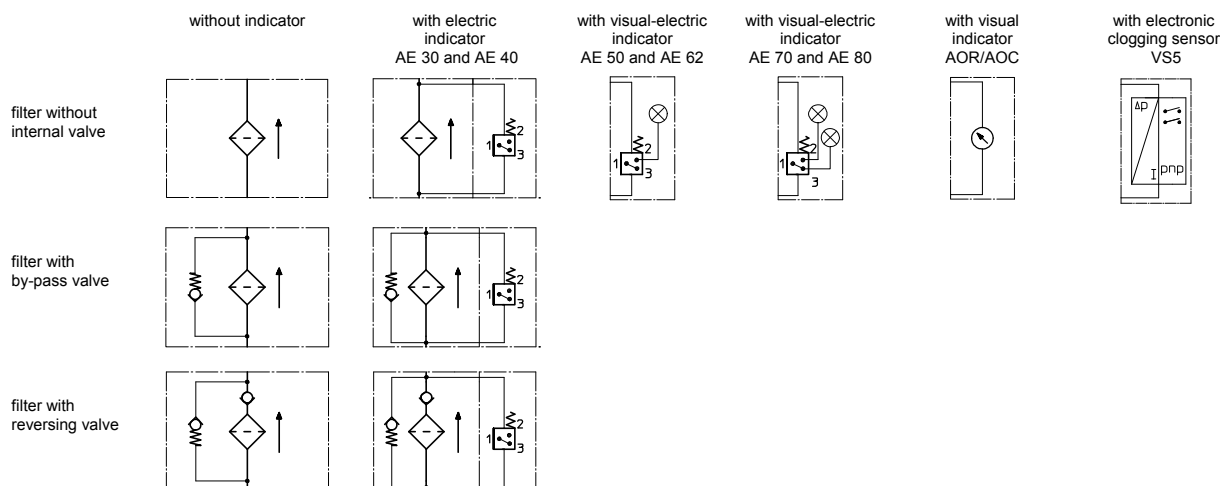
MNL	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
40	6.991	4.853	3.107	2.705	1.848	0.1893	0.1766	0.1210
63	4.241	2.926	1.873	1.631	1.114	0.1131	0.1056	0.0723
100	2.640	1.833	1.173	1.021	0.698	0.0699	0.0652	0.0447

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

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. 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
ISO 16889	Multi-pass method for evaluating filtration performance

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

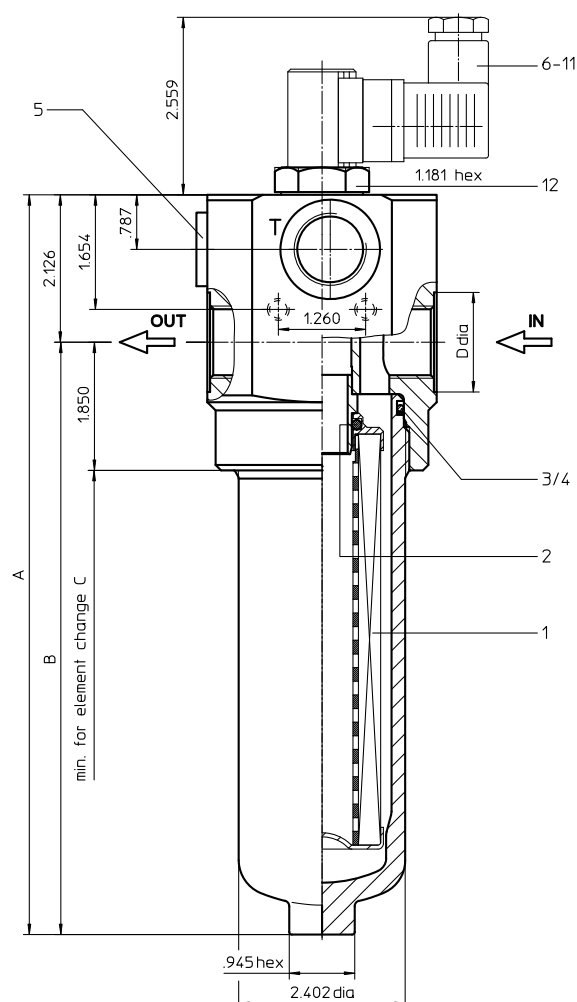
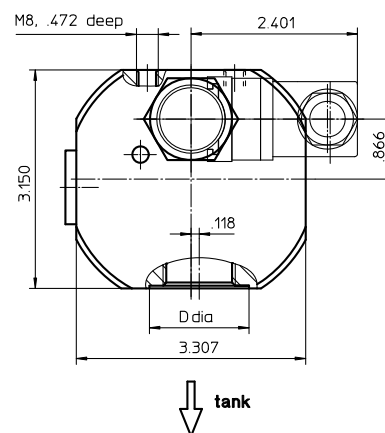
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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)

<b>MDV.</b>	<b>40.</b>	<b>10VG.</b>	<b>HR.</b>	<b>E.</b>	<b>P.</b>	<b>-</b>	<b>UG.</b>	<b>3.</b>	<b>-</b>	<b>D2.</b>	<b>AE</b>
1	2	3	4	5	6	7	8	9	10	11	12

1	<b>series:</b>	MDV = medium pressure filter with differential pressure-valve
2	<b>nominal size:</b>	40, 63
3	<b>filter-material and filter-fineness:</b>	80G, 40G, 25G stainless steel wire mesh 25VG, 16VG, 10VG, 6VG, 3VG microglass
4	<b>filter element collapse rating:</b>	30 = $\Delta p$ 435 PSI HR = $\Delta p$ 2320 PSI (rupture strength $\Delta p$ 3625 PSI)
5	<b>filter element design:</b>	E = single-end open
6	<b>sealing material:</b>	P = Nitrile (NBR) V = Viton (FPM)
7	<b>filter element specification:</b>	- = standard VA = stainless steel
8	<b>process connection:</b>	UG = thread connection
9	<b>process connection size:</b>	3 = -8 SAE 4 = -12 SAE
10	<b>filter housing specification:</b>	- = standard
11	<b>internal valve:</b>	D1 = differential pressure-valve $\Delta p$ 51 PSI D2 = differential pressure-valve $\Delta p$ 102 PSI
12	<b>clogging indicator or clogging sensor:</b>	- = 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)

<b>01NL.</b>	<b>40.</b>	<b>10VG.</b>	<b>HR.</b>	<b>E.</b>	<b>P.</b>	<b>-</b>
1	2	3	4	5	6	7

1	<b>series:</b>	01NL. = standard filter element according to DIN 24550, T3
2	<b>nominal size:</b>	40, 63
3	<b>-</b>	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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

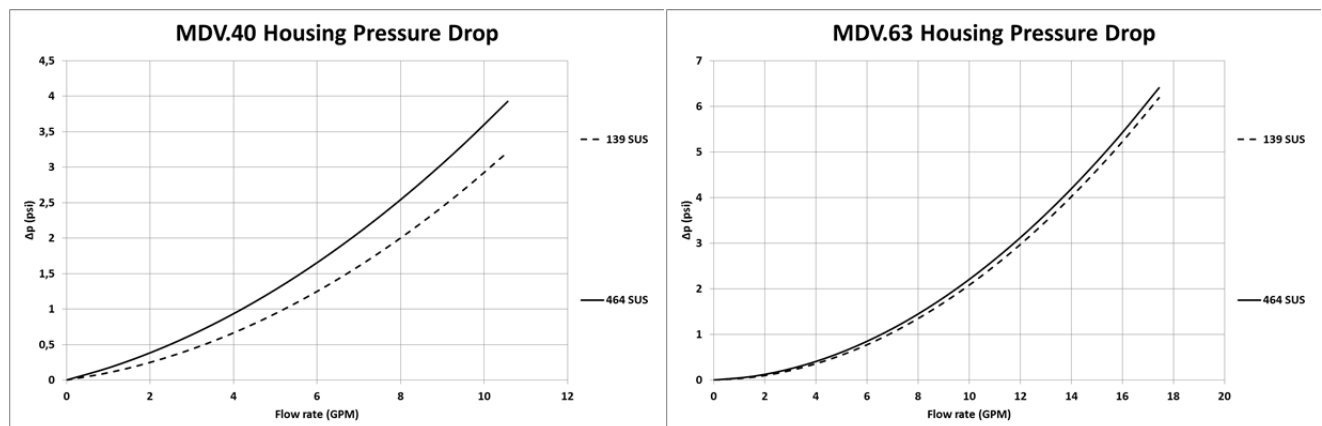
### Material gradient coefficients (MSK) for filter elements

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

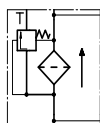
### $\Delta p = f(Q)$ – characteristics according to ISO 3968

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.

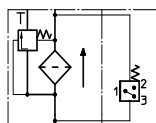


## Symbols:

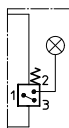
without indicator



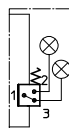
with electric indicator  
AE 30 and AE 40



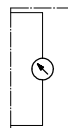
with visual-electric indicator  
AE 50 and AE 62



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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlufheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

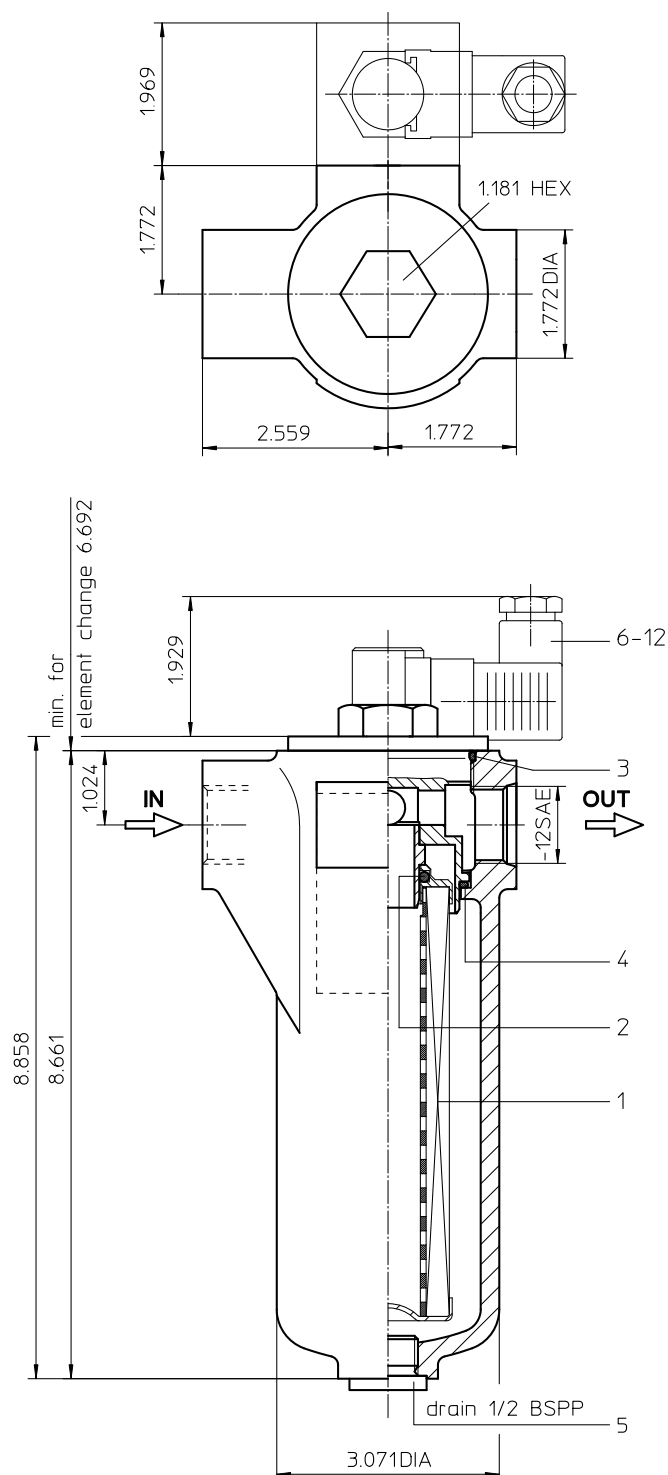
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

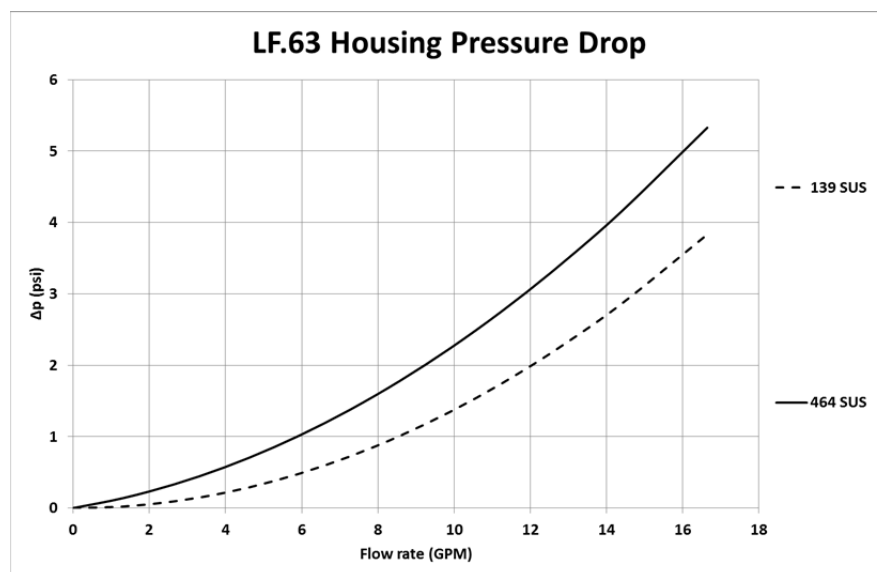
### Material gradient coefficients (MSK) for filter elements

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.

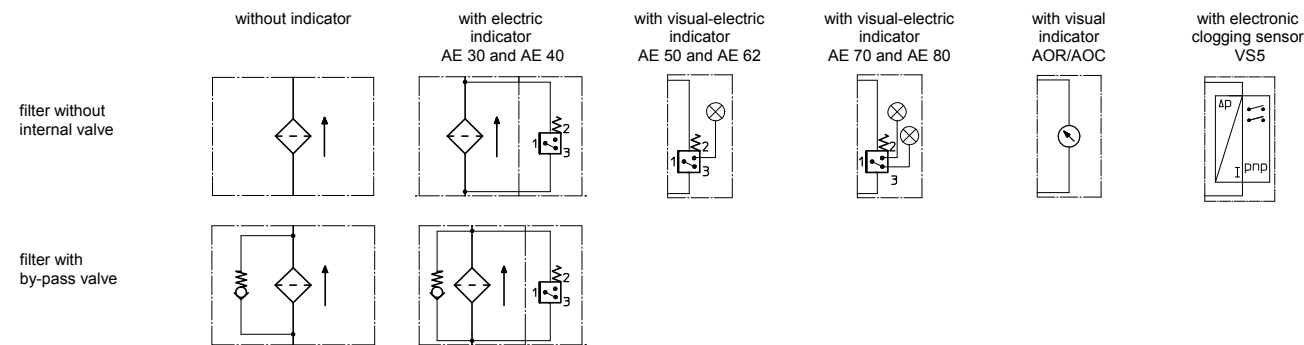
LF	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
63	4.214	2.926	1.873	1.631	11.4	0.1131	0.1056	0.0723

### $\Delta p = f(Q)$ – 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

## North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

## Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlußheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

## China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

## Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

## Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

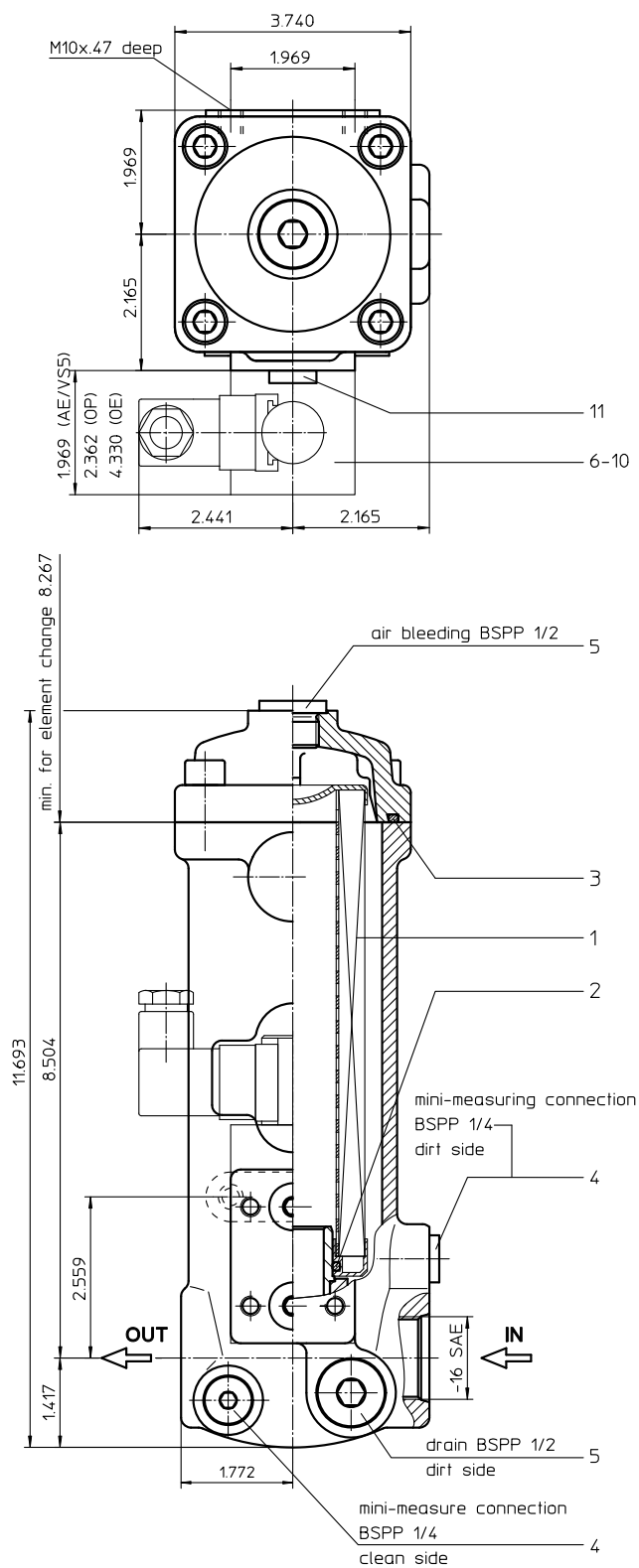
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

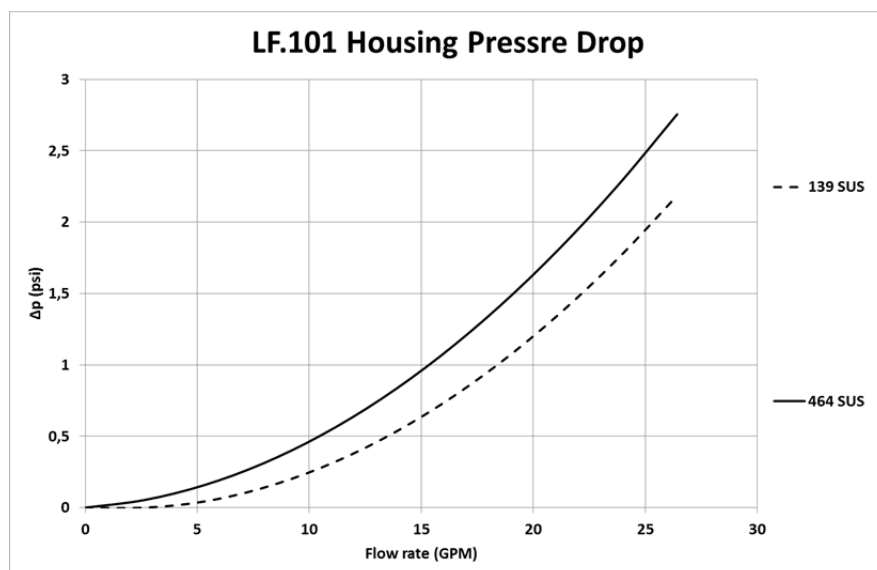
### Material gradient coefficients (MSK) for filter elements

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.

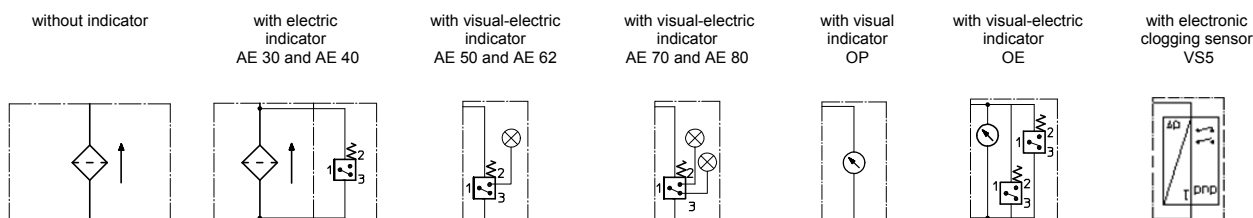
LF	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
101	2.473	1.717	1.099	0.957	0.654	0.0651	0.0607	0.0416

### $\Delta p = f(Q)$ – 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 1/4	305003	
5	2	screw plug	BSPP 1/2	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 1/4	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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlufheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

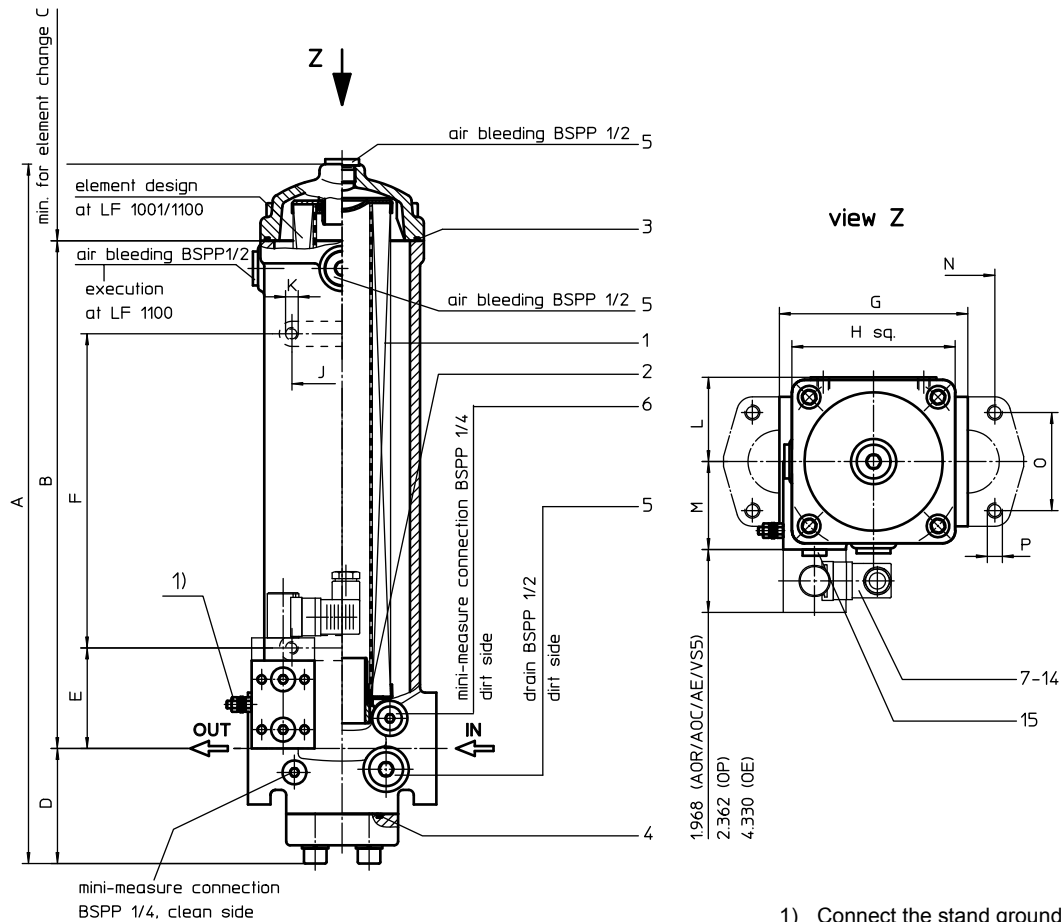
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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

EDV 09/15

# 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 1/2" (LF251)  
8 = 2" (LF401)  
9 = 2 1/2" (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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

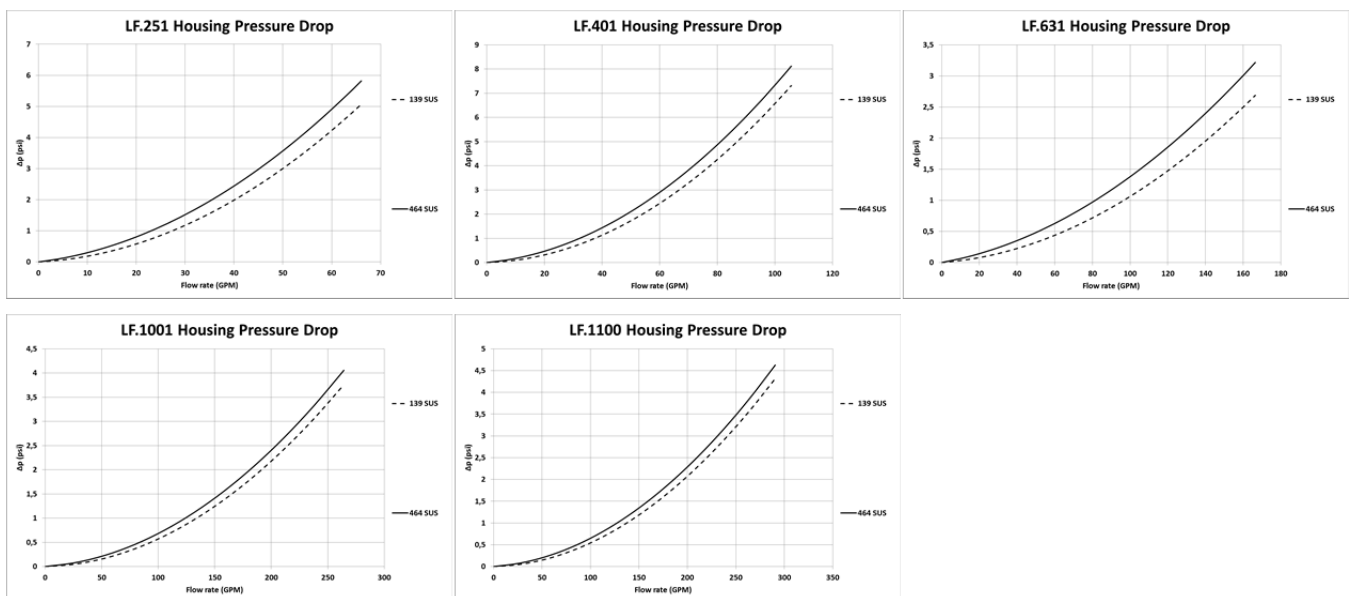
### Material gradient coefficients (MSK) for filter elements

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.

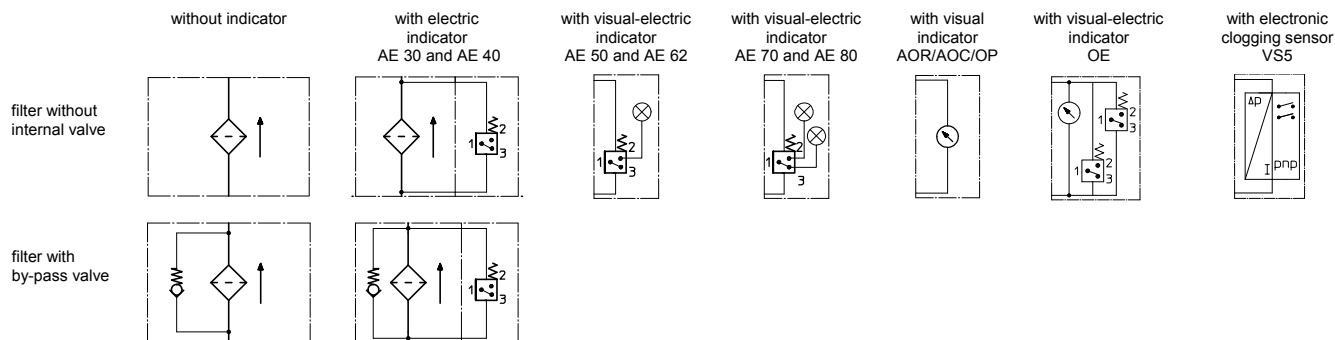
LF	VG					G			API	
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10API	25API
251	1.14	0.646	0.414	0.360	0.246	0.0277	0.0258	0.0177	0.212	0.097
401	0.700	0.397	0.254	0.221	0.151	0.0169	0.0158	0.0108	0.130	0.059
631	0.534	0.303	0.194	0.169	0.115	0.1322	0.0906	0.0906	0.099	0.045
1001	0.237	0.165	0.105	0.092	0.063	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 304389 (NBR) 304391 (FPM)	1	40 x 3 304389 (NBR) 304391 (FPM)	1	60 x 3,5 304377 (NBR) 304398 (FPM)	1	90 x 4 306941 (NBR) 307031 (FPM)
3	O-ring	1	115 x 3 303963 (NBR) 307762 (FPM)	1	115 x 3 303963 (NBR) 307762 (FPM)	1	125 x 3 306025 (NBR) 307358 (FPM)	1	185 x 4 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

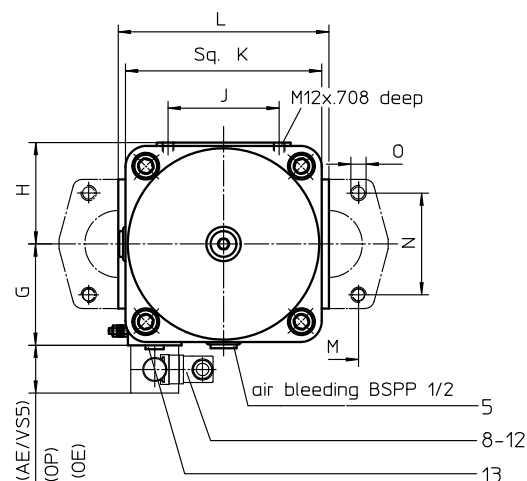
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

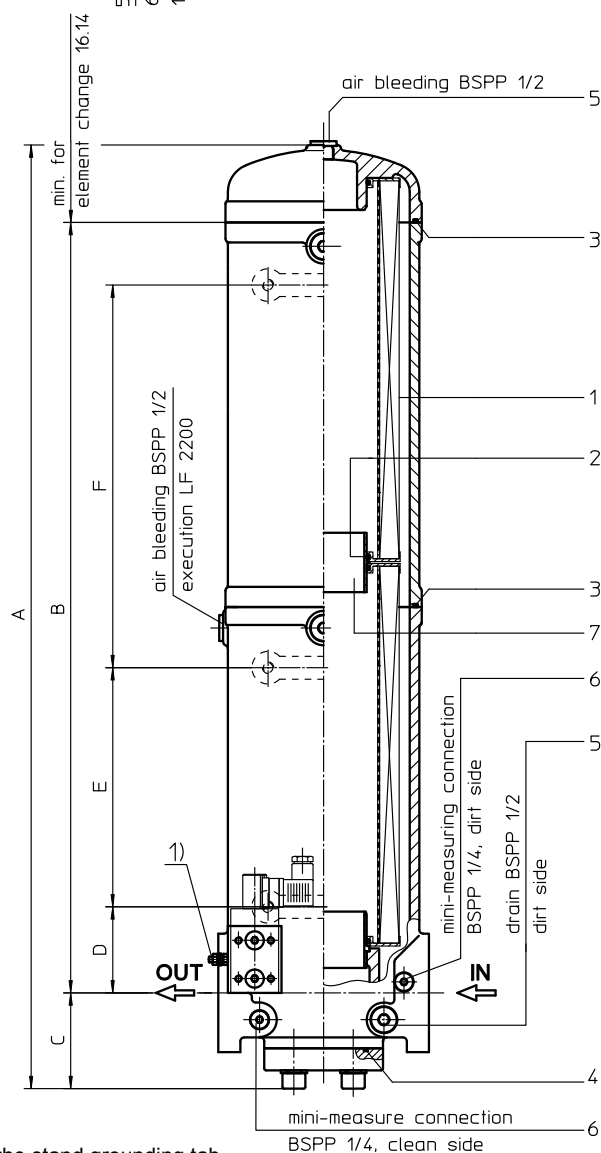
# Series LF 1950-2200

## 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.

# 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)

<b>LF.</b>	<b>1950.</b>	<b>10VG.</b>	<b>10.</b>	<b>B.</b>	<b>P.</b>	<b>-.</b>	<b>FS.</b>	<b>A.</b>	<b>-.</b>	<b>-.</b>	<b>AE</b>
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 =  $\Delta p$  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<sub>3</sub>), 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  $\Delta p$  29 PSI  
S1 = with by-pass valve  $\Delta p$  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)

<b>01NR.</b>	<b>1000.</b>	<b>10VG.</b>	<b>10.</b>	<b>B.</b>	<b>P.</b>	<b>-</b>
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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

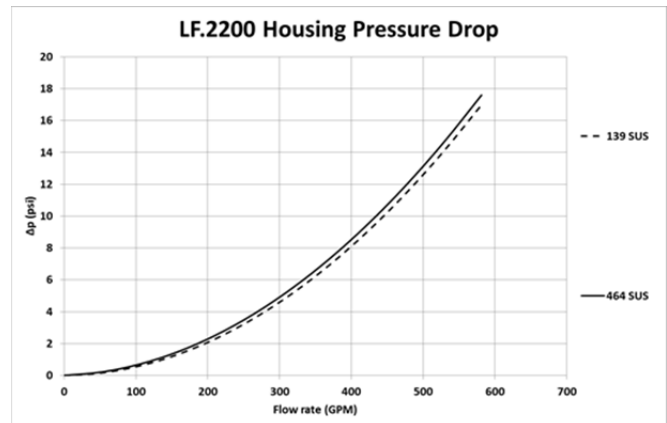
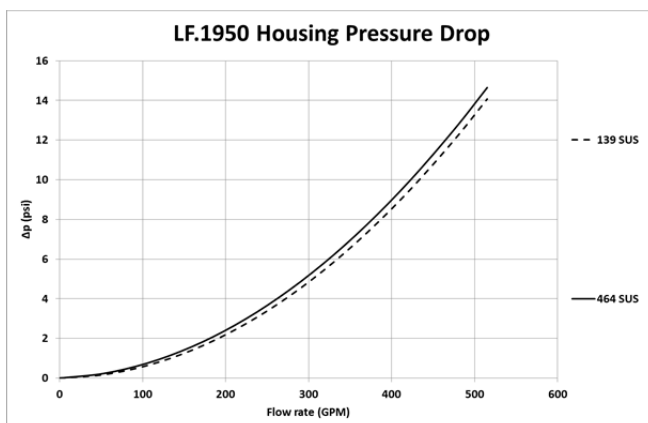
### Material gradient coefficients (MSK) for filter elements

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.

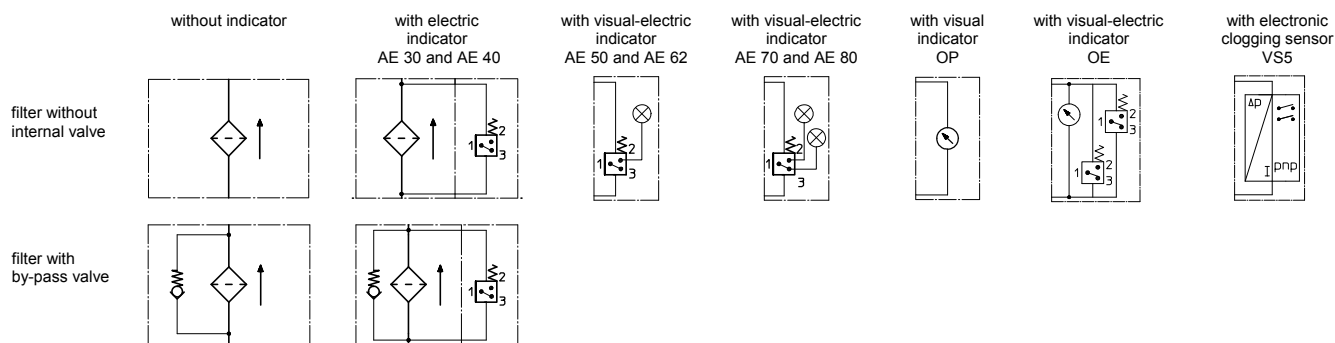
LF	VG					G			API	
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10API	25API
1950	0.118	0.082	0.053	0.046	0.031	0.0030	0.0028	0.0019	0.027	0.012
2200	0.118	0.082	0.053	0.046	0.031	0.0030	0.0028	0.0019	0.027	0.012

### $\Delta p = f(Q)$ – 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	VS5	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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

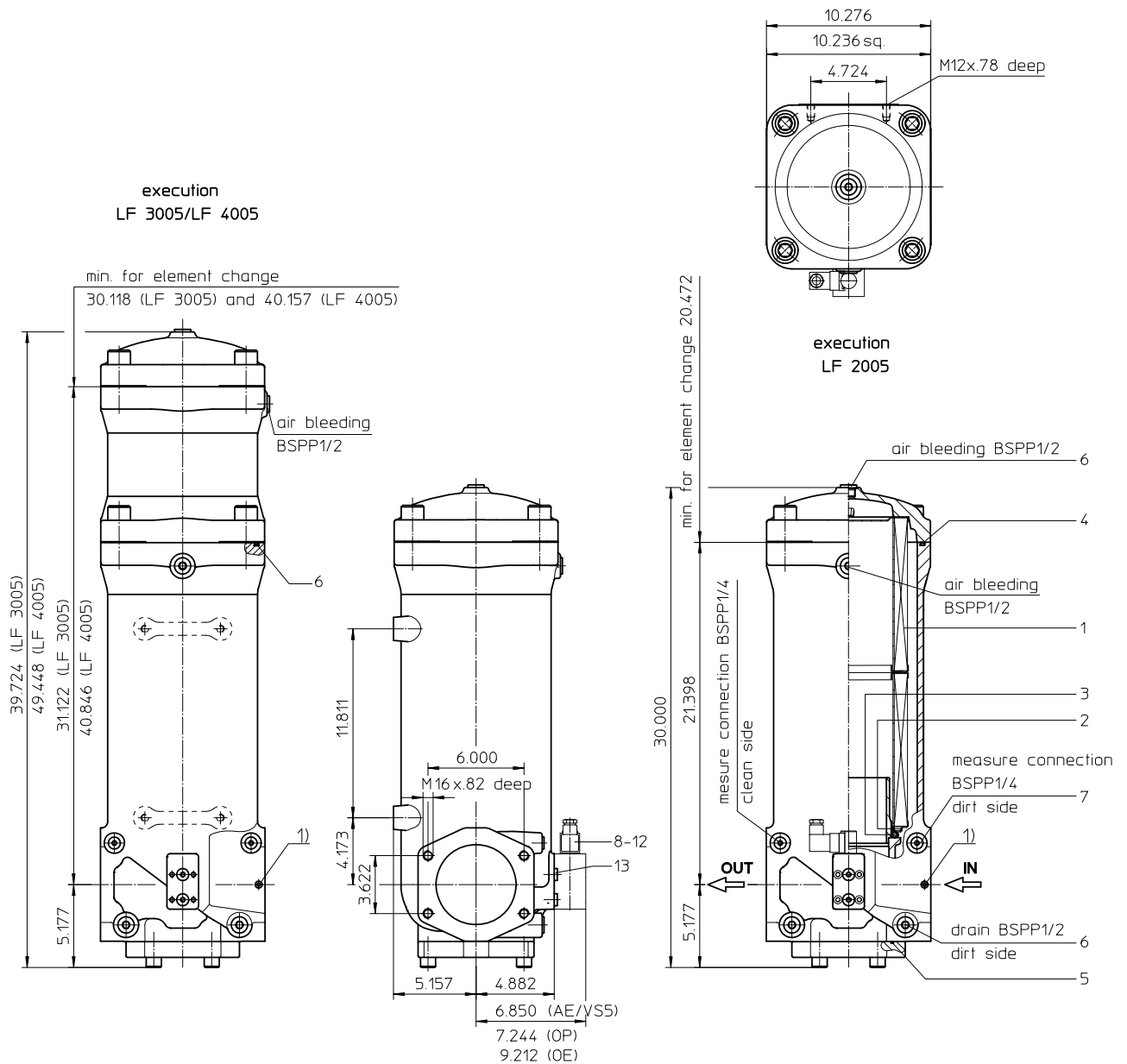
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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.

# 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)

<b>LF.</b>	<b>2005.</b>	<b>10VG.</b>	<b>10.</b>	<b>E.</b>	<b>P.</b>	<b>-.</b>	<b>FS.</b>	<b>C.</b>	<b>-.</b>	<b>AE</b>
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 =  $\Delta p$  145 PSI
- 5 **filter element design:**  
E = without by-pass valve  
S = with by-pass valve  $\Delta p$  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  $\Delta p$  29 PSI  
S1 = with by-pass valve  $\Delta p$  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)

<b>01E.</b>	<b>2001.</b>	<b>10VG.</b>	<b>10.</b>	<b>E.</b>	<b>P.</b>	<b>-</b>
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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

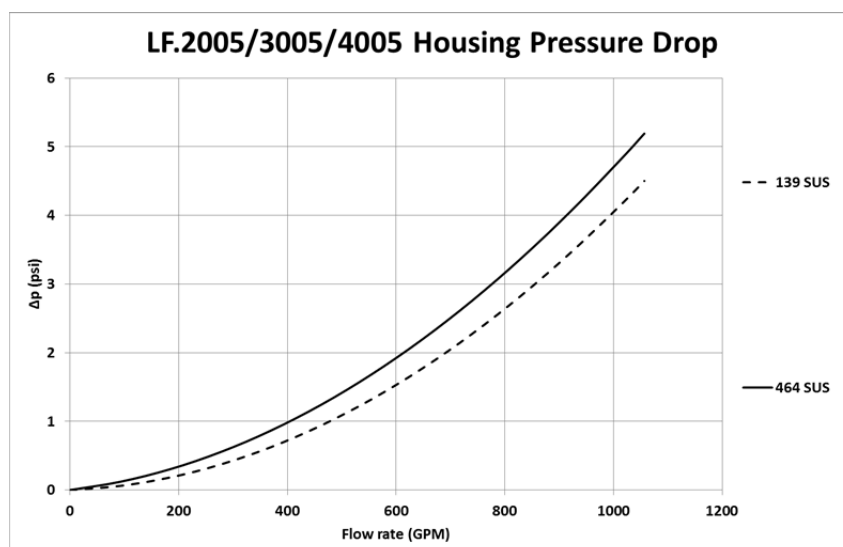
### Material gradient coefficients (MSK) for filter elements

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.

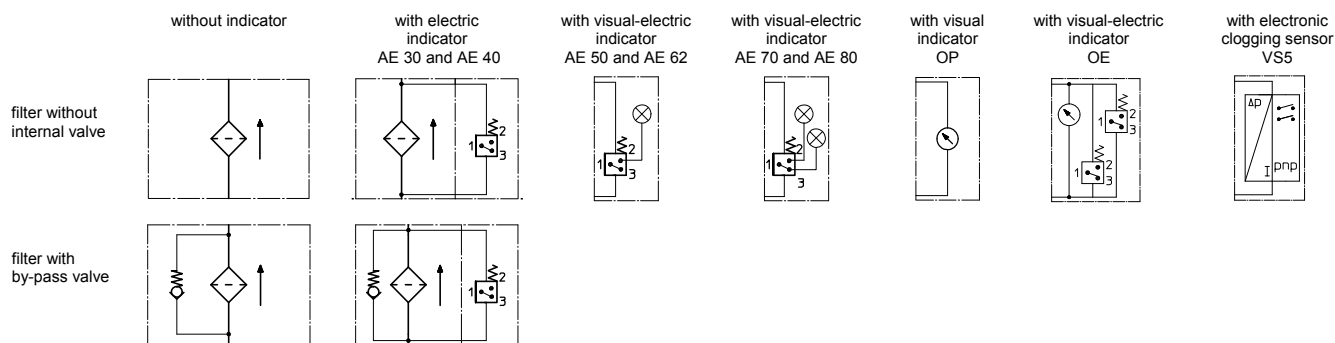
LF	VG					G			API	
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10API	25API
2005	0.177	0.123	0.079	0.068	0.047	0.0059	0.0055	0.0038	0.040	0.018
3005	0.118	0.082	0.052	0.046	0.031	0.0040	0.0037	0.0025	0.027	0.012
4005	0.088	0.061	0.039	0.034	0.023	0.0030	0.0028	0.0019	0.020	0.009

### $\Delta p = f(Q)$ – 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)		
5	1	O-ring (LF 3005/4005)	136,12 x 3,53 320162 (NBR) 320163 (FPM)		
6	4	screw plug (LF 2005)	BSPP 1/2 304678		
7	2	screw plug (LF 3005/4005)	BSPP 1/4 305003		
8	1	clogging indicator visual-electric	OE see seet-no. 1628		
9	1	clogging indicator visual	OP see seet-no. 1628		
10	1	clogging indicator visual-electric	AE see seet-no. 1609		
11	1	clogging sensor electronic	VS5 see seet-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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altludersheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

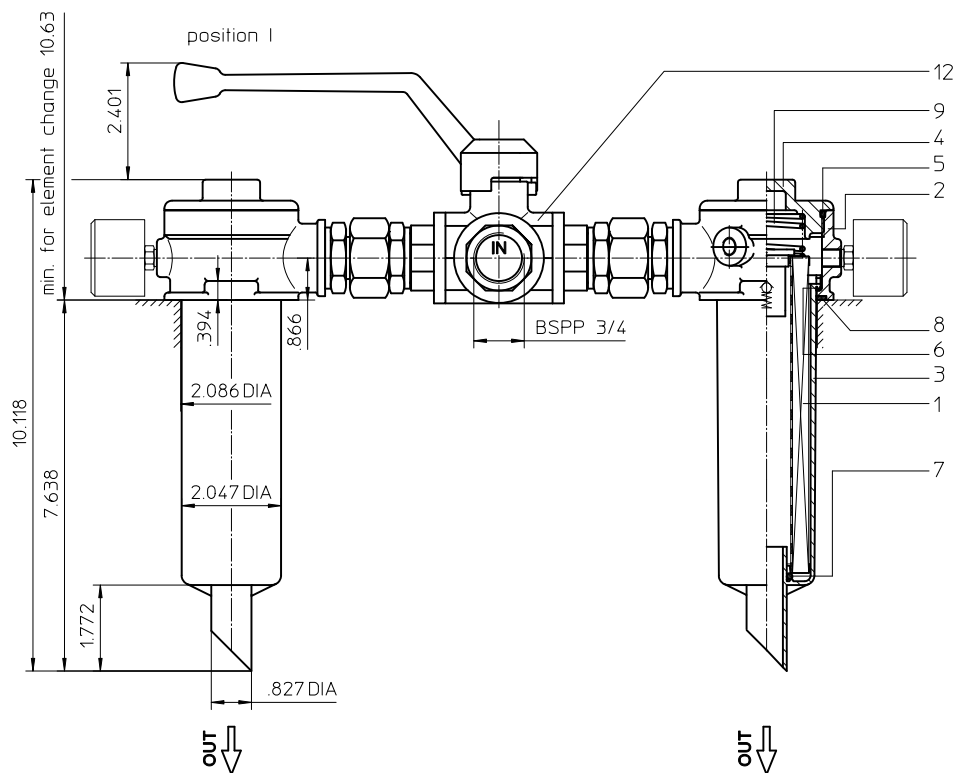
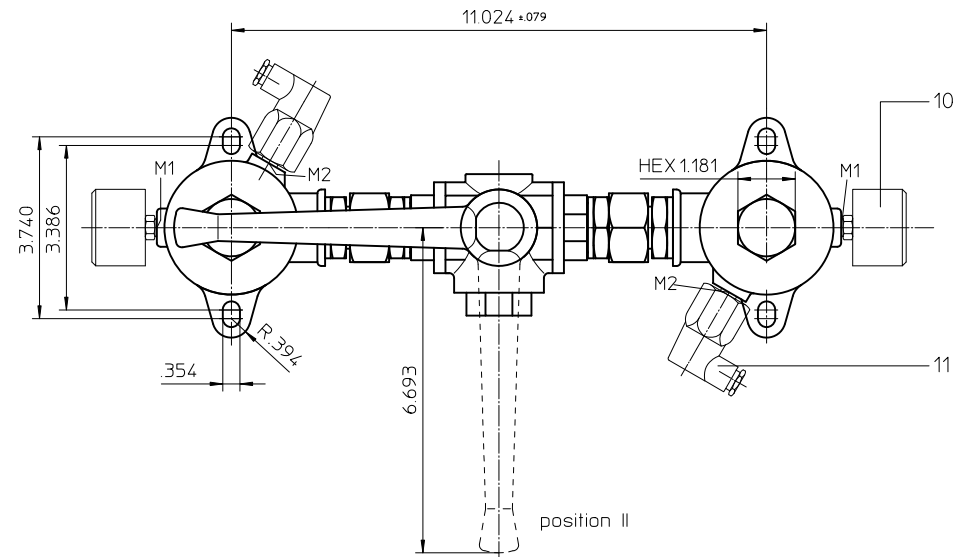
For more information, please

email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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.

# 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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

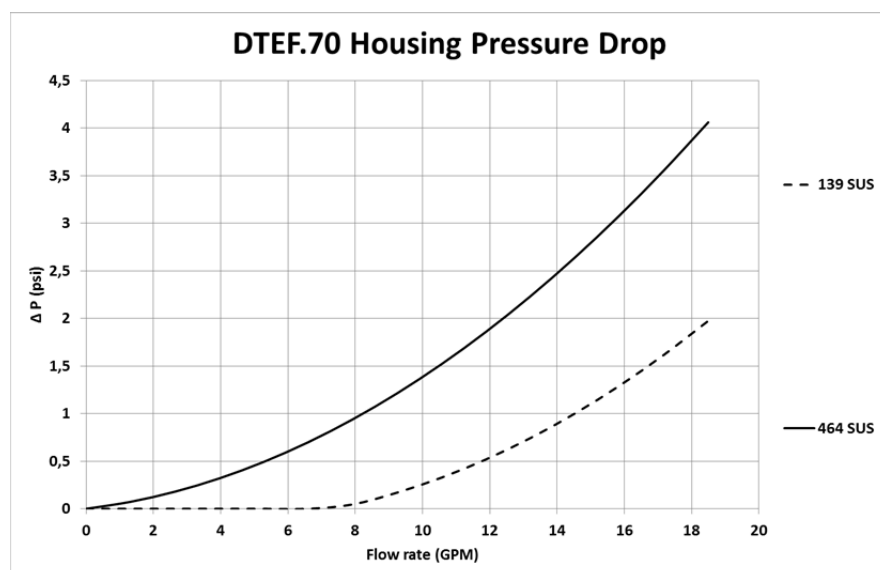
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

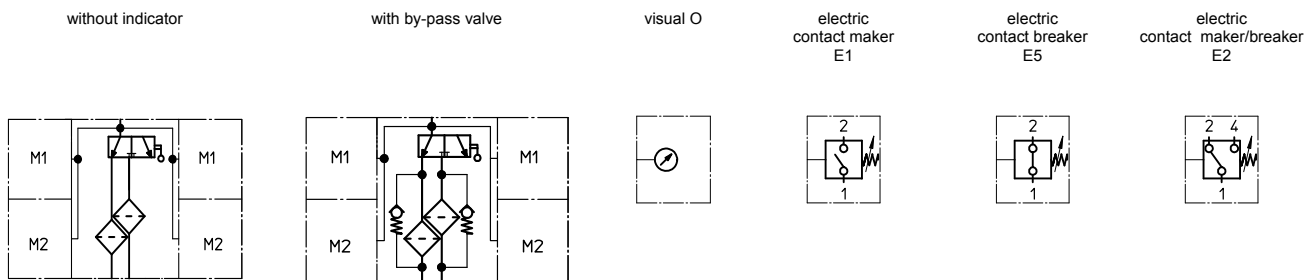
DTEF	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
70	3.535	2.454	1.571	1.368	0.935	0.1196	0.1117	0.0765	0.797

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

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altludersheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

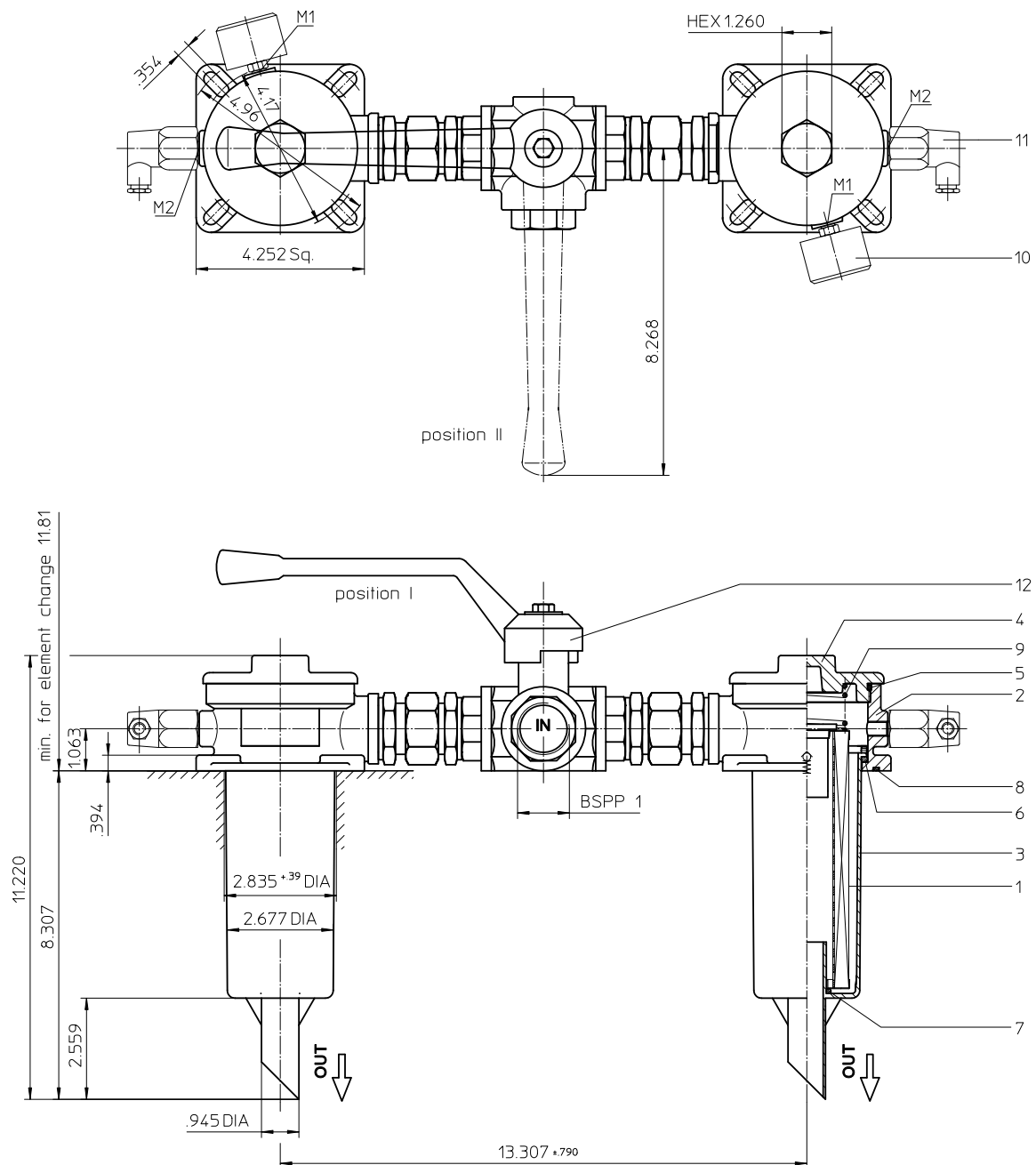
Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

**For more information, please  
email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)**

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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.



Powering Business Worldwide

# 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)

<b>DTEF.</b>	<b>120.</b>	<b>10VG.</b>	<b>16.</b>	<b>S.</b>	<b>P.</b>	<b>-.</b>	<b>G.</b>	<b>5.</b>	<b>-.</b>	<b>O.</b>	<b>E1</b>
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)

<b>01E.</b>	<b>120.</b>	<b>10VG.</b>	<b>16.</b>	<b>S.</b>	<b>P.</b>	<b>-</b>
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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

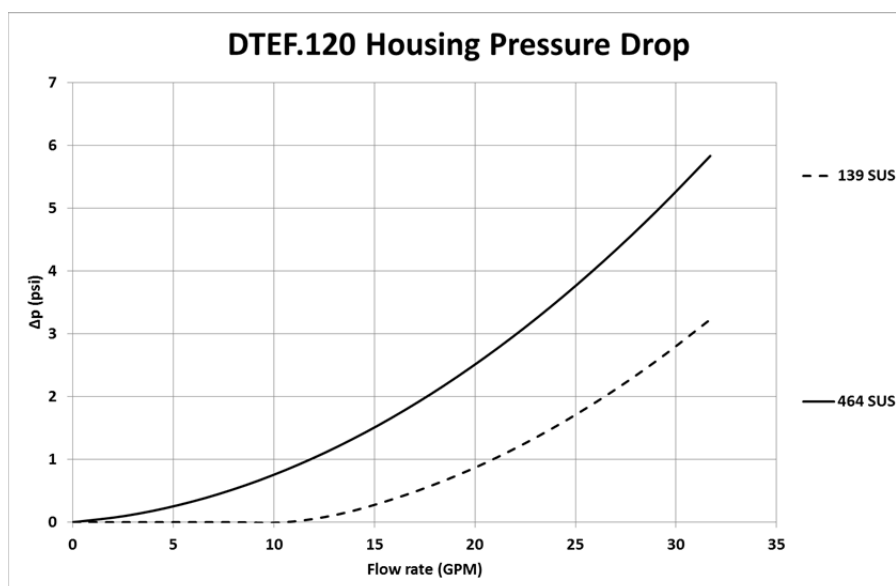
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

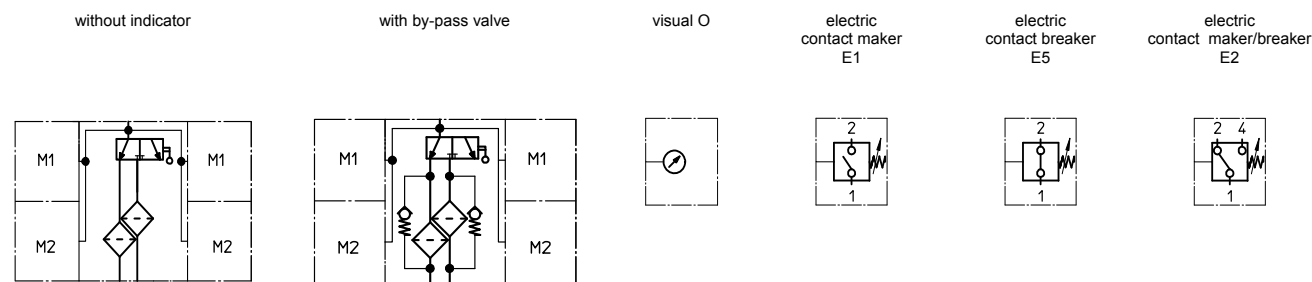
DTEF	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
120	3.162	2.195	1.405	1.224	0.836	0.1144	0.1068	0.0731	0.690

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

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. 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

North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlußheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

Brazil

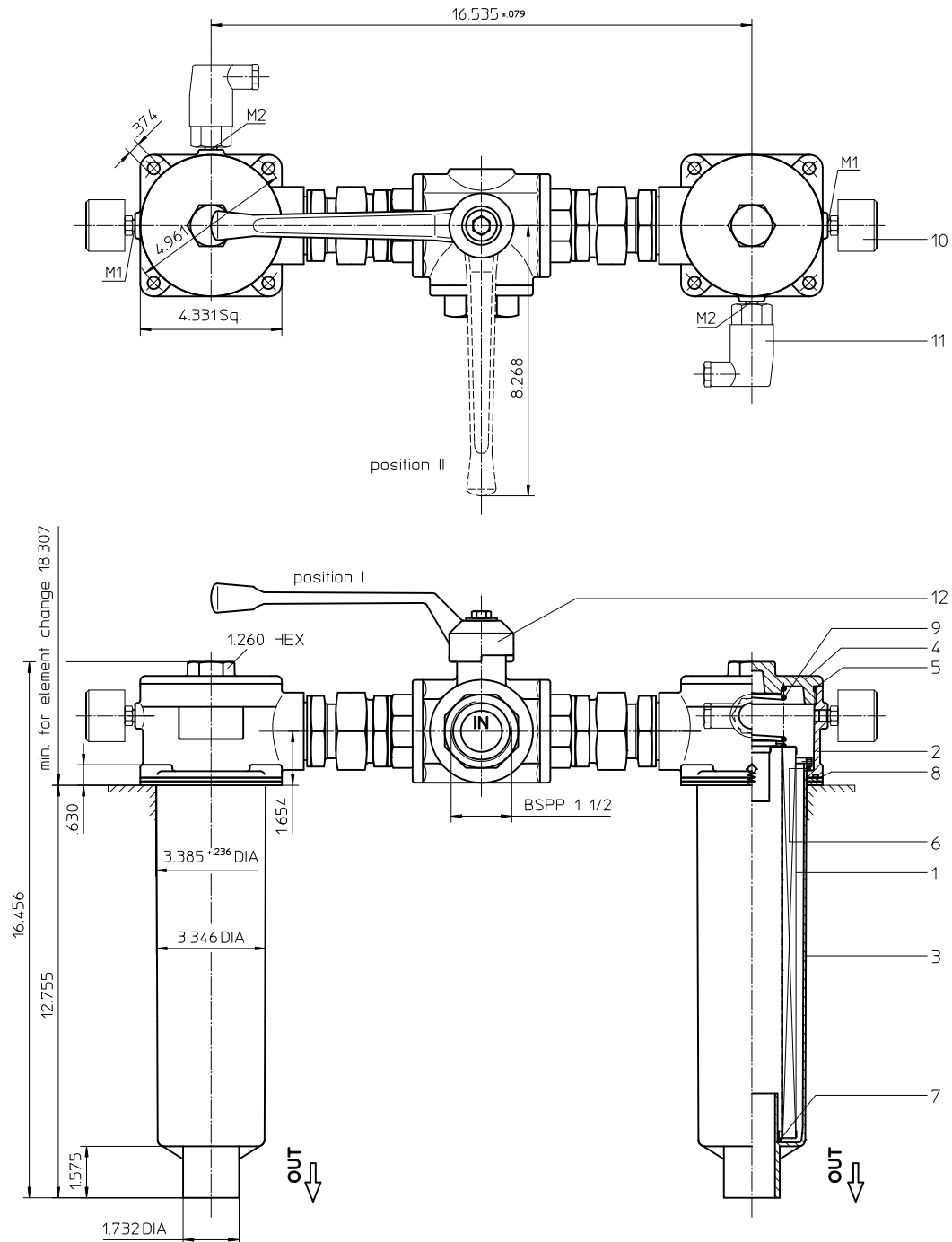
Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please  
email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# Series DTEF 320

## 145 PSI



Position I: left filter-side in operation  
Position II: right filter-side in operation

Weight: approx. 22 lbs.

Dimensions: inches

Designs and performance values are subject to change.

# 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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

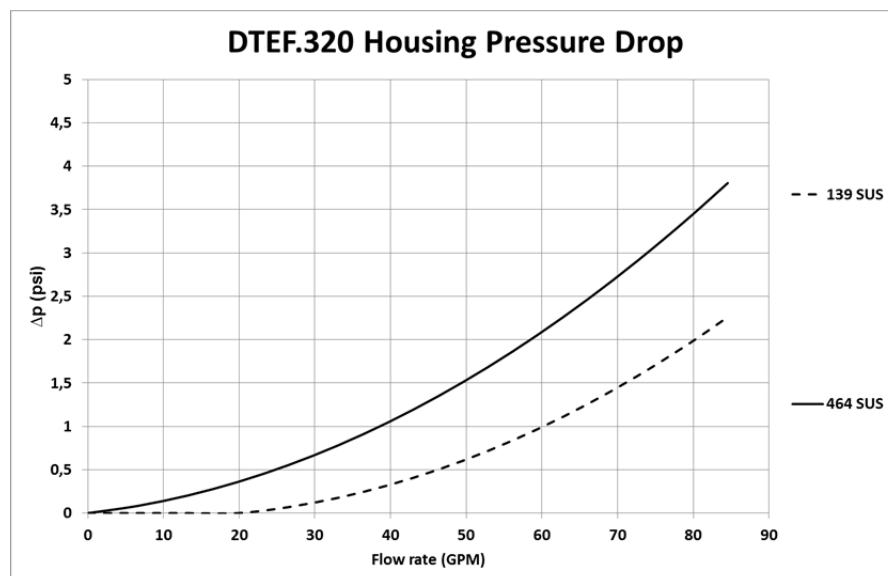
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

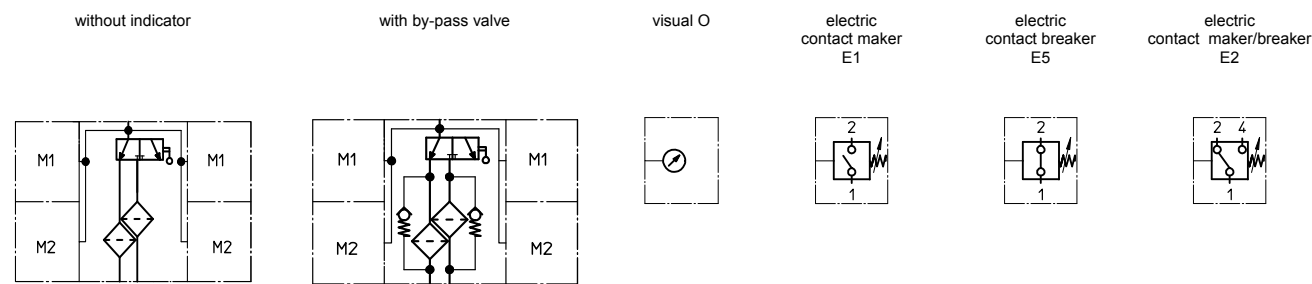
DTEF	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
320	1.148	0.797	0.510	0.444	0.304	0.0337	0.0314	0.0215	0.253

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

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. 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
ISO 16889	Multi-pass method for evaluating filtration performance

North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlußheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

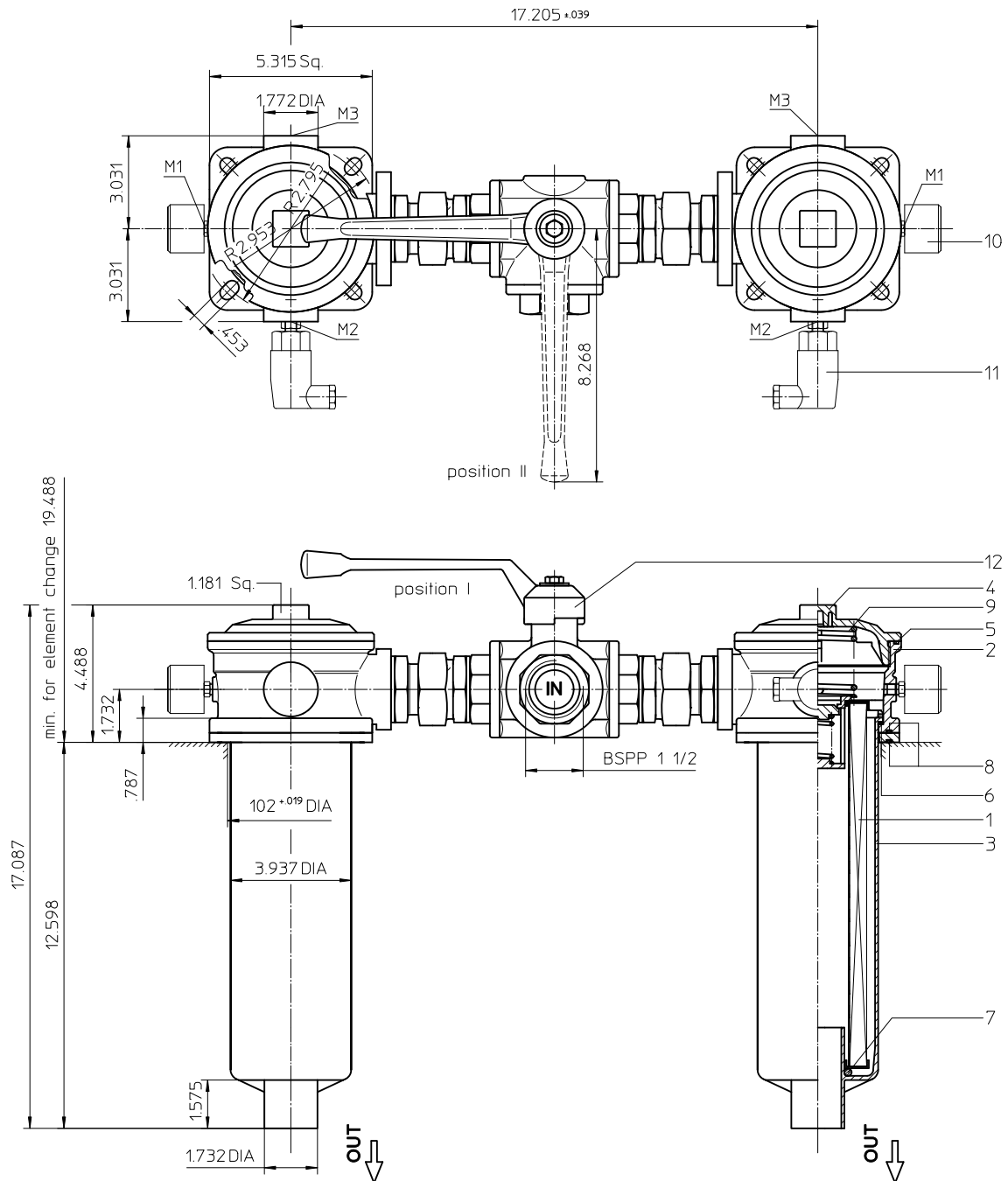
Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please  
email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

Series DTEF 426  
145 PSI



Position I: left filter-side in operation  
Position II: right filter-side in operation

Weight: approx. 27.5 lbs.

Dimensions: inches

Designs and performance values are subject to change.

# 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)

<b>DTEF.</b>	<b>426.</b>	<b>10VG.</b>	<b>16.</b>	<b>S.</b>	<b>P.</b>	<b>-.</b>	<b>G.</b>	<b>7.</b>	<b>-.</b>	<b>O.</b>	<b>E1.</b>	<b>-</b>
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. 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

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)

<b>01E.</b>	<b>425.</b>	<b>10VG.</b>	<b>16.</b>	<b>S.</b>	<b>P.</b>	<b>-</b>
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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

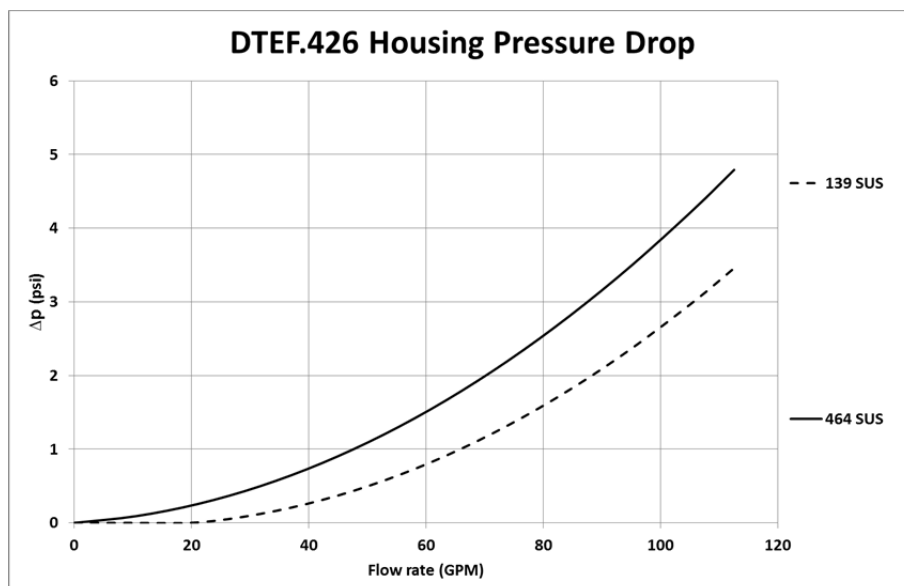
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

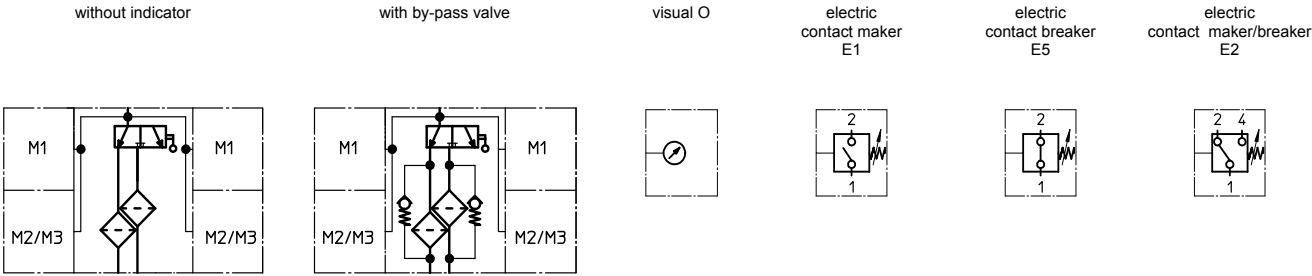
DTEF	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
426	0.849	0.589	0.377	0.328	0.224	0.0270	0.0252	0.0172	0.182

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

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. 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



**North America**  
44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

**Europe/Africa/Middle East**  
Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

**China**  
No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

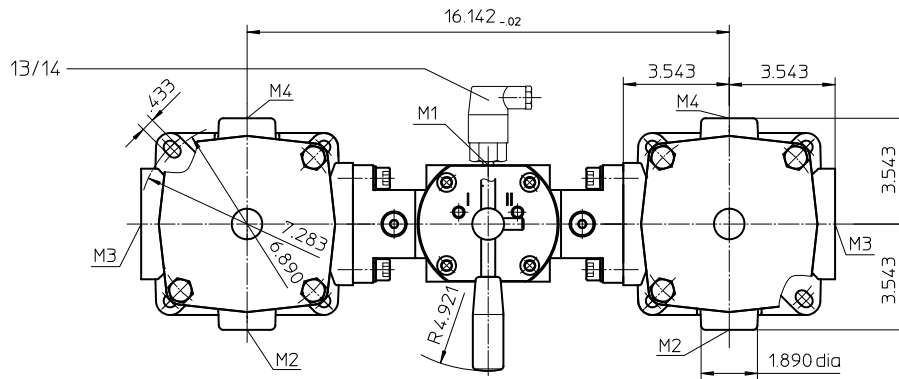
**Singapore**  
4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

**Brazil**  
Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

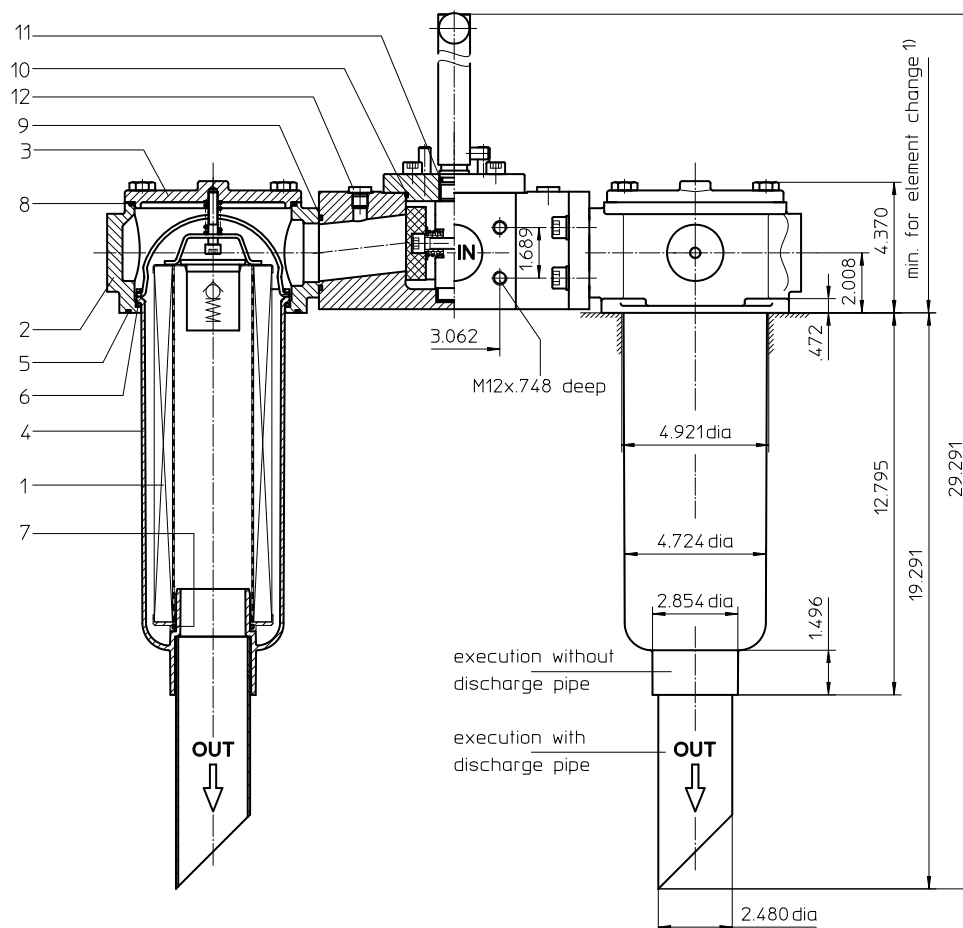
For more information, please  
email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

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.

# 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)

<b>DTEF.</b>	<b>625.</b>	<b>10VG.</b>	<b>16.</b>	<b>S.</b>	<b>P.</b>	<b>-</b>	<b>FS.</b>	<b>8.</b>	<b>-</b>	<b>E1.</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
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)

<b>01E.</b>	<b>631.</b>	<b>10VG.</b>	<b>16.</b>	<b>S.</b>	<b>P.</b>	<b>-</b>
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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

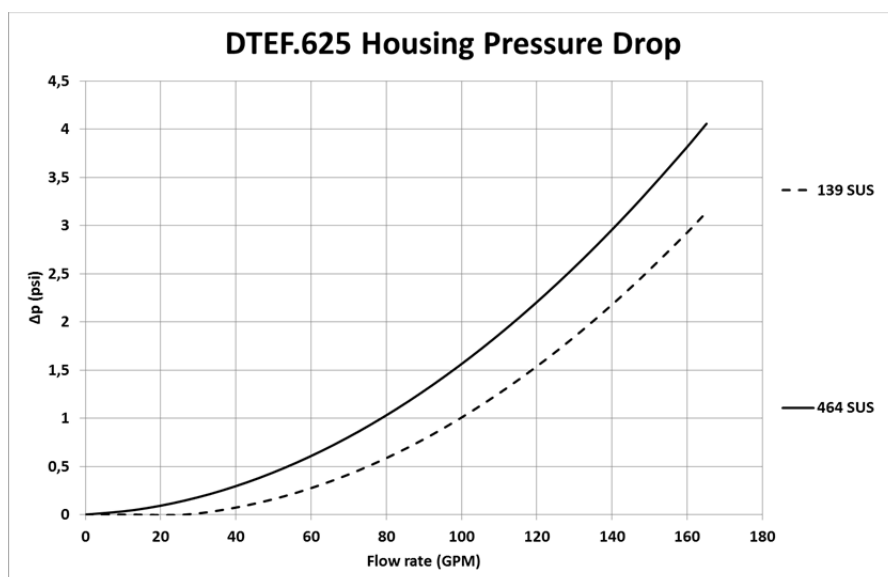
### Material gradient coefficients (MSK) for filter elements

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.

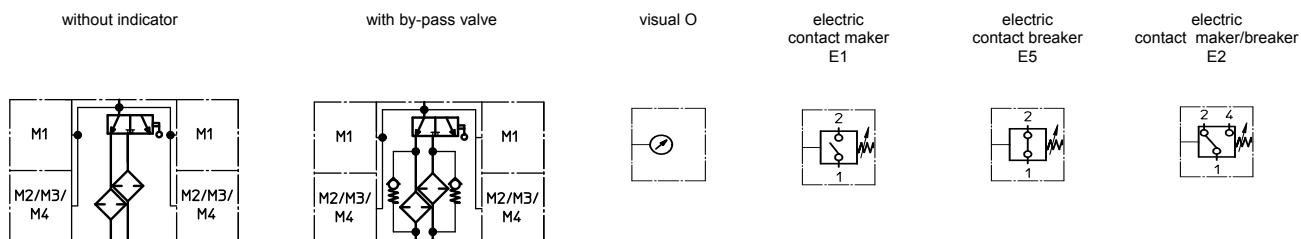
DTEF	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
625	0.643	0.446	0.286	0.249	0.170	0.0236	0.0220	0.0151	0.142

### $\Delta p = f(Q)$ – 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:

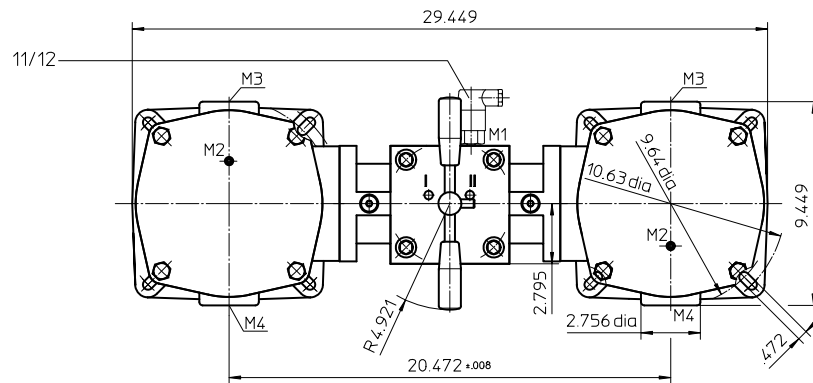
item	qty.	designation	dimension	article-no.	
1	2	filter element	01.E631...		
2	2	filter head		316414	
3	2	filter cover	32571-4		
4	2	filter bowl without discharge pipe		316416	
	2	filter bowl with discharge pipe			
5	2	O-ring	140 x 3	304604 (NBR)	307514 (FPM)
6	2	O-ring	120 x 4	305300 (NBR)	307991 (FPM)
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:

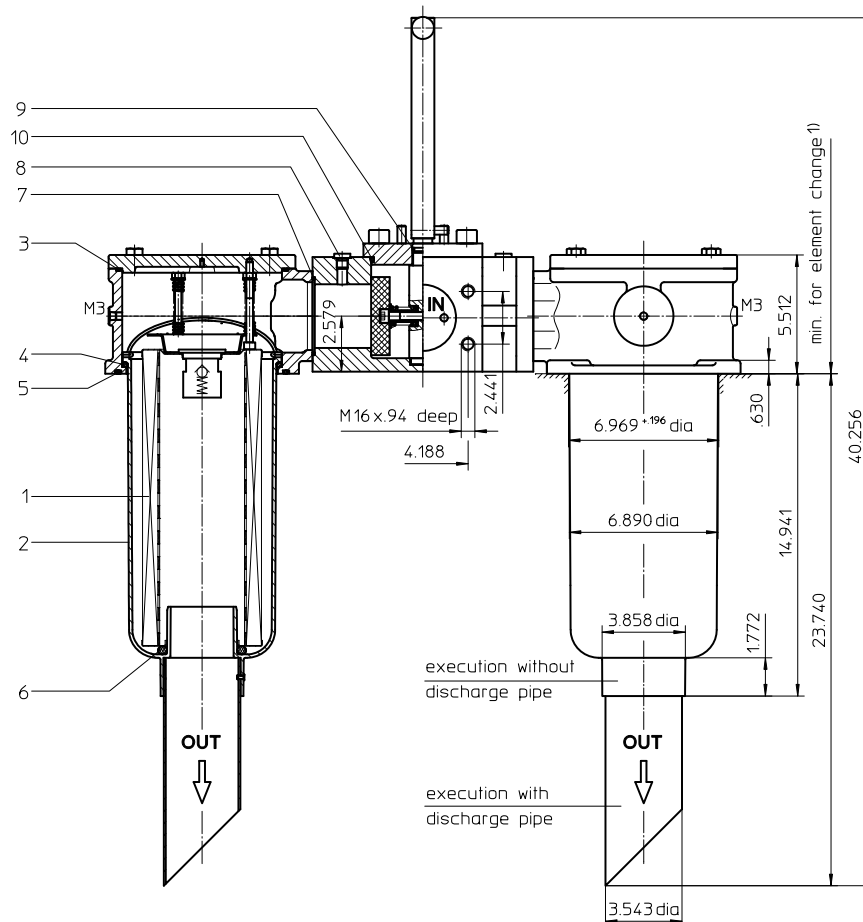
Filter elements are tested according to the following ISO standards:

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

Series DTEF 952  
145 PSI



1) min. for element change without discharge pipe 21.88  
min. for element change with discharge pipe 30.70



Position I: left filter-side in operation  
Position II: right filter-side in operation

Weight: approx. 119 lbs.

Dimensions: inches

Designs and performance values are subject to change.

# 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	<b>series:</b> DTEF = tank-mounted return-line-filter, change over													
2	<b>nominal size:</b> 952													
3	<b>filter-material and filter-fineness:</b> 80G, 40G, 25G stainless steel wire mesh 25VG, 16VG, 10VG, 6VG, 3VG microglass 10P paper													
4	<b>filter element collapse rating:</b> 10 = Δp 145 PSI													
5	<b>filter element design:</b> E = without by-pass valve S = with by-pass valve Δp 29 PSI													
6	<b>sealing material:</b> P = Nitrile (NBR) V = Viton (FPM)													
7	<b>filter element specification:</b> (see catalog) - = standard VA = stainless steel IS06 = for HFC application, see sheet-no. 31601													
8	<b>process connection:</b> FS = SAE-flange 3000 PSI													
9	<b>process connection size:</b> A = 3"													
10	<b>filter housing specification:</b> (see catalog) - = standard IS06 = for HFC application, see sheet-no. 31605													
11	<b>clogging indicator at M1:</b> - = 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	<b>clogging indicator at M2:</b> possible indicators see position 11 of the type index													
13	<b>clogging indicator at M3:</b> possible indicators see position 11 of the type index													
14	<b>clogging indicator at M4:</b> possible indicators see position 11 of the type index													
15	<b>discharge pipe:</b> - = 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	<b>series:</b> 01E. = filter element according to company standard					
2	<b>nominal size:</b> 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  $\Delta p$  and the element  $\Delta p$  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/](http://www.eatonpowersource.com/calculators/filtration/)

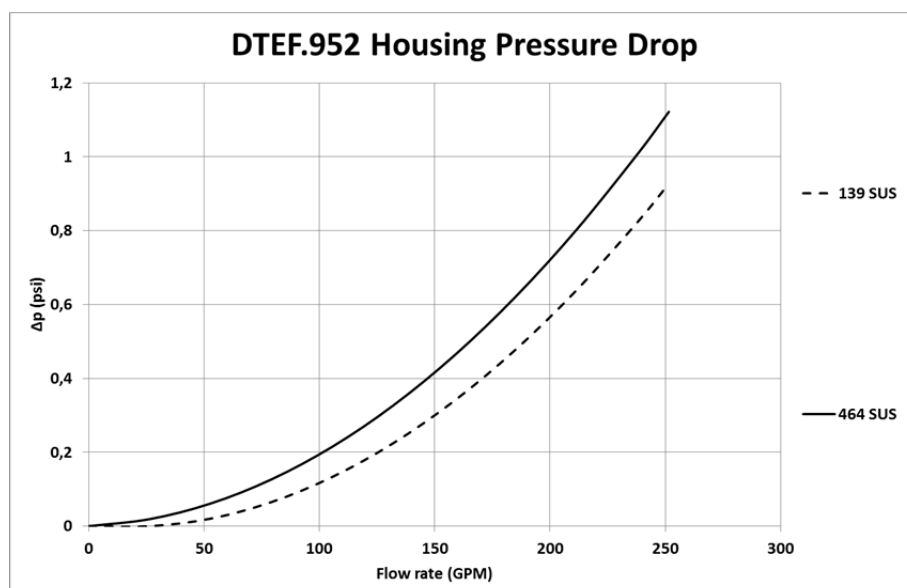
### Material gradient coefficients (MSK) for filter elements

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.

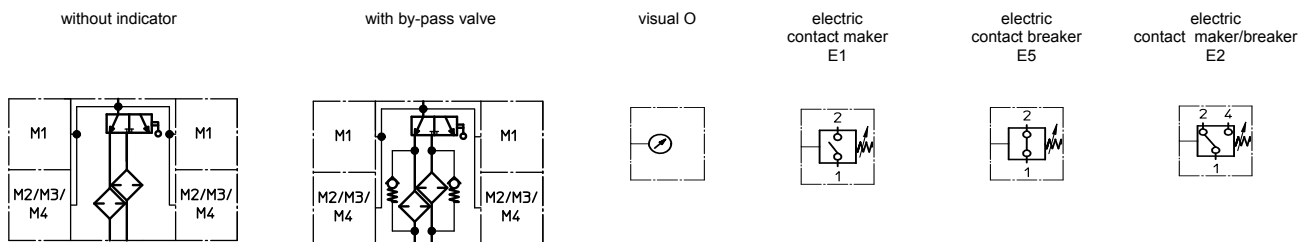
DTEF	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
952	0.364	0.253	0.162	0.141	0.096	0.0179	0.0167	0.0115	0.076

### $\Delta p = f(Q)$ – 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	1/4 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlufheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

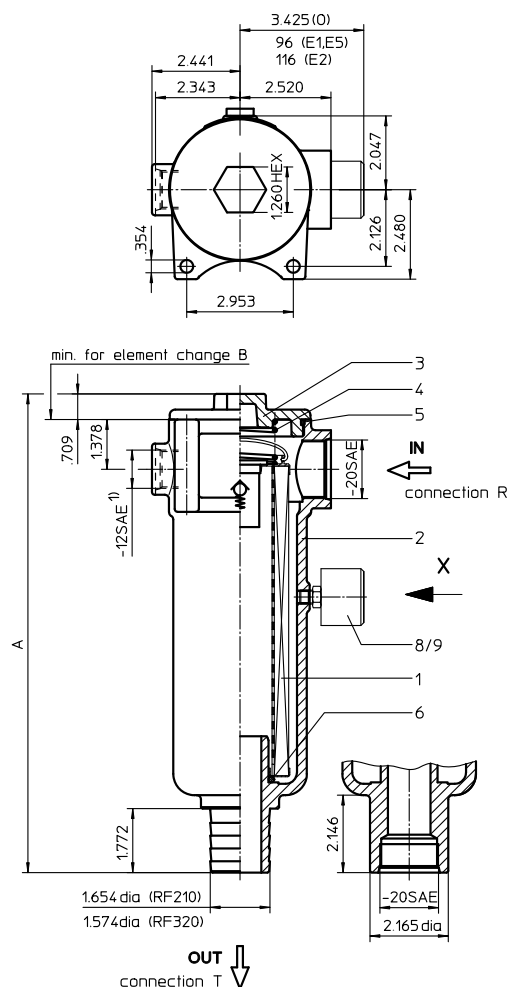
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

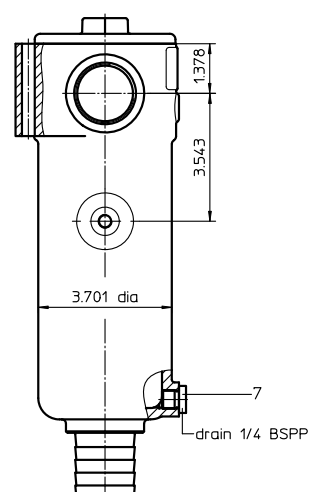
© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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.

# 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 (NH<sub>3</sub>), see sheet-no. 31602
- 8 **connection:**  
UG = thread connection
- 9 **no. of version:**

<b>version</b>	3	4
<b>connection R type</b>	UG	UG
<b>size</b>	6	6
<b>connection T type</b>	UG	SA
<b>size</b>	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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

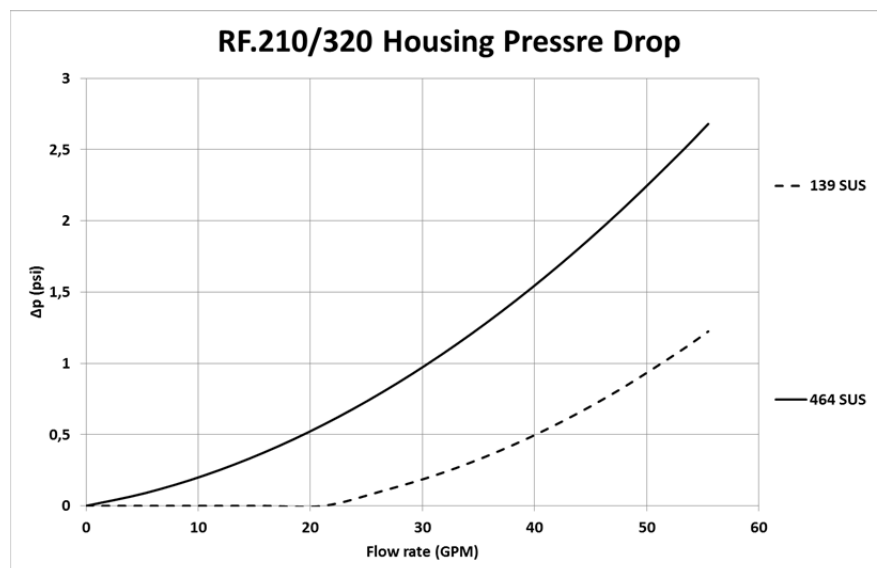
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/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

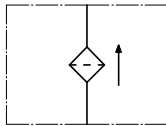
### $\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. The pressure drop changes proportionally to the density.

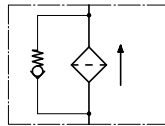


## Symbols:

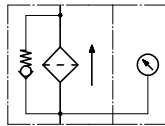
without indicator



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.
			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)
6	1	O-ring	40 x 3		304389 (NBR)
7	1	screw plug	1/4 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

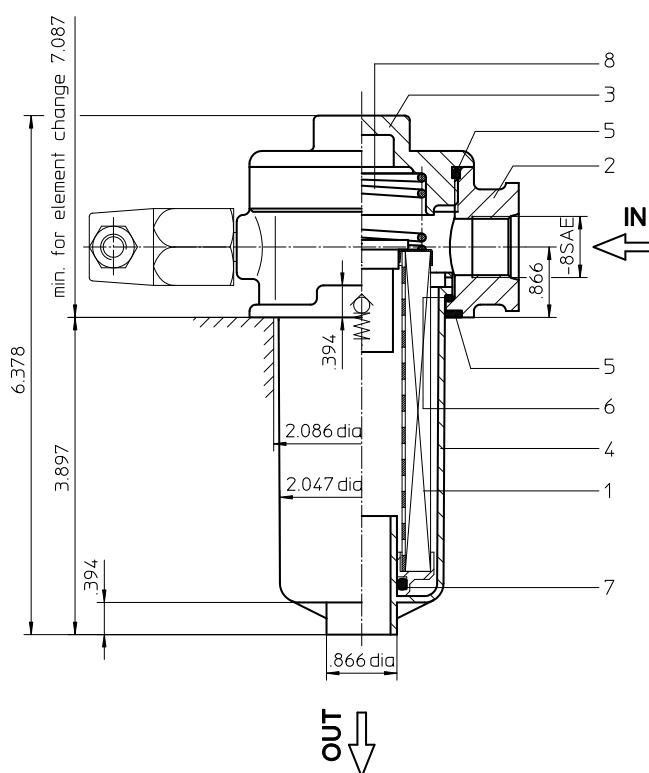
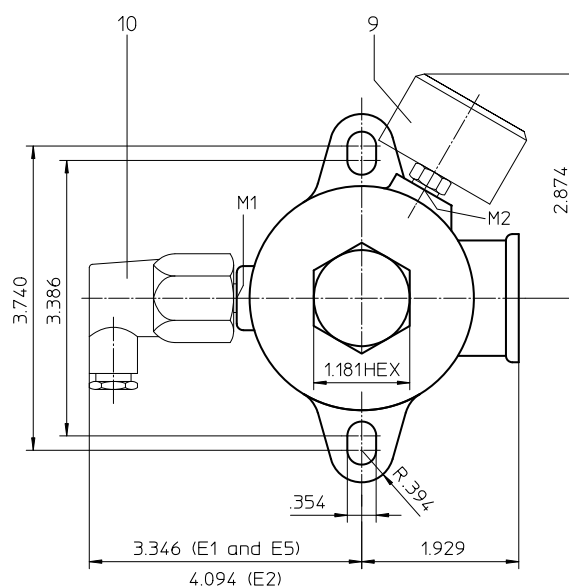
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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  $\Delta p$  232 PSI (standard with by-pass valve)  
30 = 01E.60 for  $\Delta p$  435 PSI (standard without by-pass valve)
- 5 filter element design:**  
S = with by-pass valve (01E.41)  $\Delta p$  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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

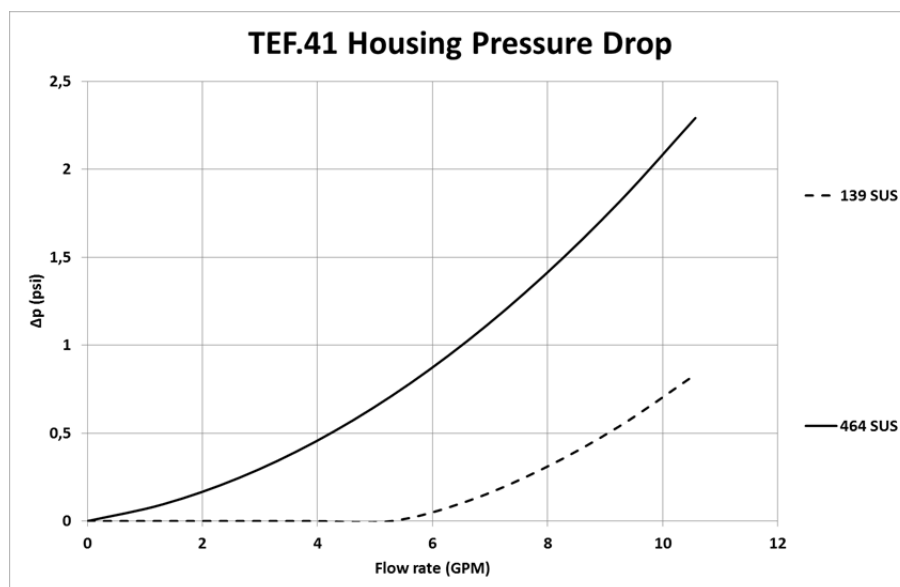
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/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	-

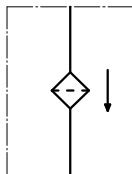
### $\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. The pressure drop changes proportionally to the density.

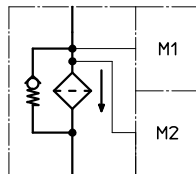


## Symbols:

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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

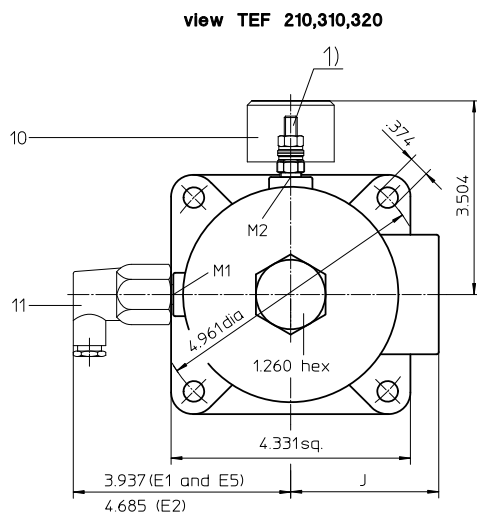
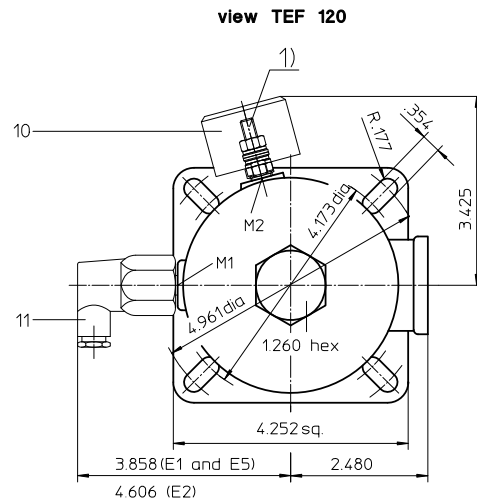
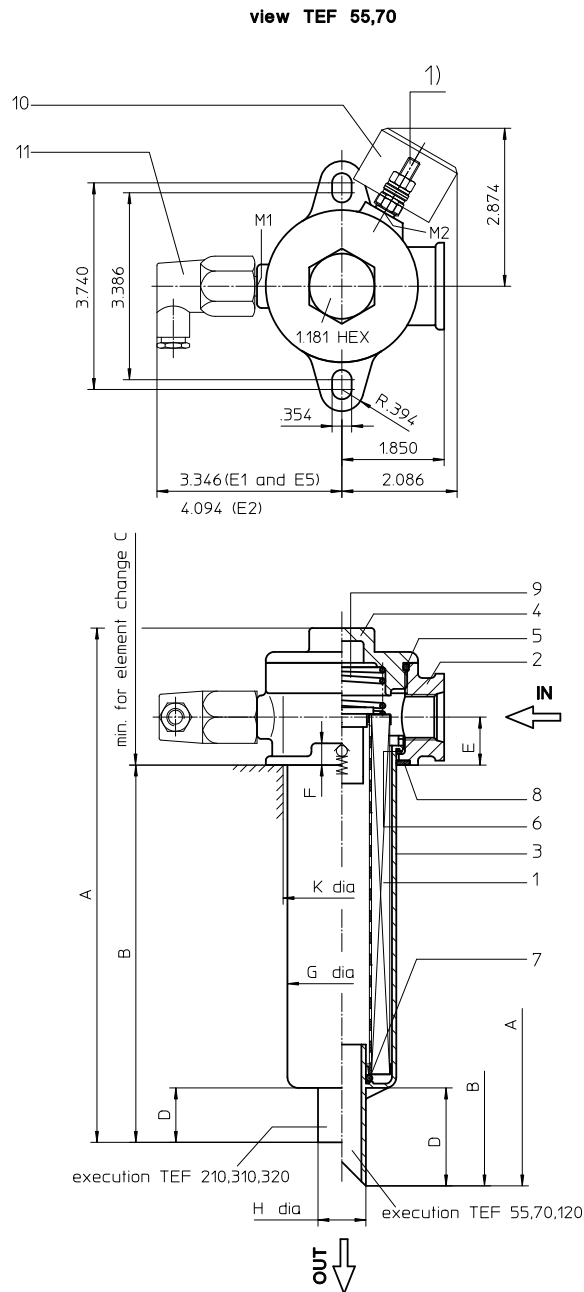
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# Series TEF 55-320

## 145 PSI



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 <sup>+39</sup>	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 <sup>+11</sup>	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 <sup>+11</sup>	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 <sup>+23</sup>	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 =  $\Delta p$  232 PSI
- 5 **filter element design:**  
E = without by-pass valve  
S = with by-pass valve  $\Delta p$  29 PSI  
S1 = with by-pass valve  $\Delta p$  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  $\Delta p$  and the element  $\Delta p$  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/](http://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.

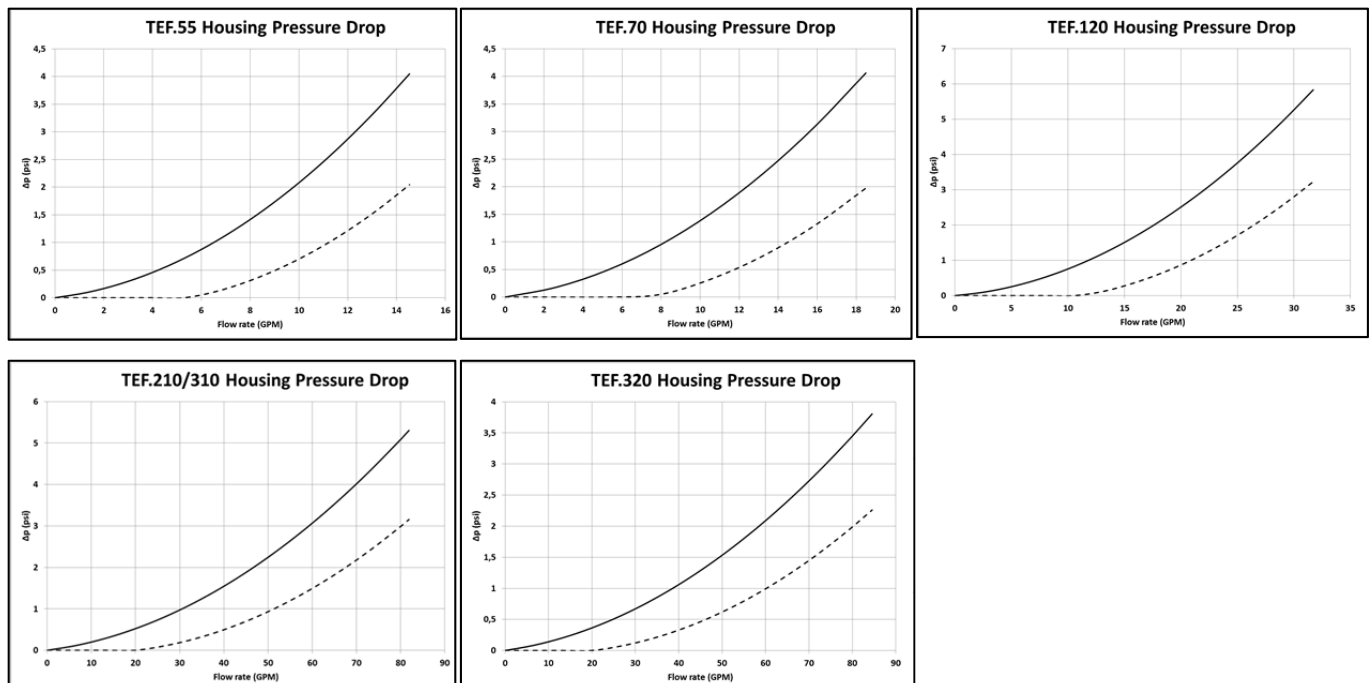
TEF	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
55	3.535	2.454	1.571	1.368	0.935	0.1196	0.1117	0.0765	0.797
70	3.535	2.454	1.571	1.368	0.935	0.1196	0.1117	0.0765	0.797
120	3.162	2.195	1.405	1.224	0.836	0.1144	0.1068	0.0731	0.690
210	1.600	1.111	0.711	0.619	0.423	0.0588	0.0549	0.0376	0.353
310	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.

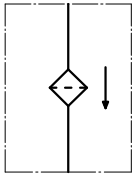
Viscosity key:

--- 139 SUS      ——— 464 SUS

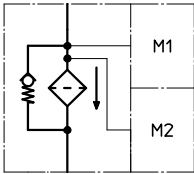


**Symbols:**

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 E5see 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

**North America**

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

**Europe/Africa/Middle East**

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlusheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

**China**

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

**Singapore**

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

**Brazil**

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

**For more information, please**

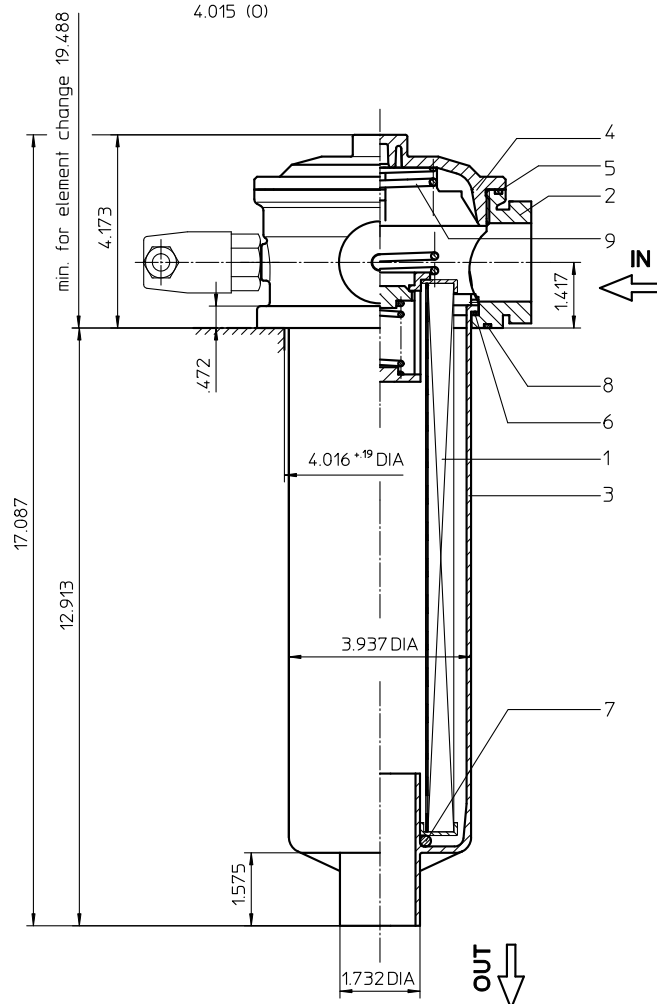
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

Figure 1 is a technical drawing of a pump assembly, showing a front view and a side view. The drawing includes the following dimensions and labels:

- Front View Dimensions:**
  - Overall width: 5.197 (E2)
  - Overall height: 5.866 (E2)
  - Top flange diameter: 5.591 DIA
  - Bottom flange diameter: 5.906 DIA
  - Central square feature side: 1.181 Sq
  - Bottom square feature side: 1.772 DIA
  - Overall bottom width: 5.315 Sq
  - Port M1 diameter: .531
  - Port M2 diameter: .531
  - Port M3 diameter: 1.405
  - Port M12 diameter: .531
- Side View Dimensions:**
  - Overall height: 4.724 (0)
  - Port M12 diameter: .531
  - Port M12 offset: 2.756
  - Port M12 offset: 3.031
  - Port M12 offset: 3.031
- Labels:**
  - M1, M2, M3, M12 (ports)
  - 10, 11 (dimension lines)



Weight: approx. 5.7 lbs.  
Dimensions: inches



**EATON**  
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)

<b>TEF.</b>	<b>426.</b>	<b>10VG.</b>	<b>16.</b>	<b>S.</b>	<b>P.</b>	<b>-.</b>	<b>FS.</b>	<b>7.</b>	<b>-.</b>	<b>E1.</b>	<b>O.</b>	<b>-</b>
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 =  $\Delta p$  232 PSI
- 5 filter element design:**  
E = without by-pass valve  
S = with by-pass valve  $\Delta p$  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)

<b>01E.</b>	<b>425.</b>	<b>10VG.</b>	<b>16.</b>	<b>S.</b>	<b>P.</b>	<b>-</b>
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  $\Delta p$  and the element  $\Delta p$  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/](http://www.eatonpowersource.com/calculators/filtration/)

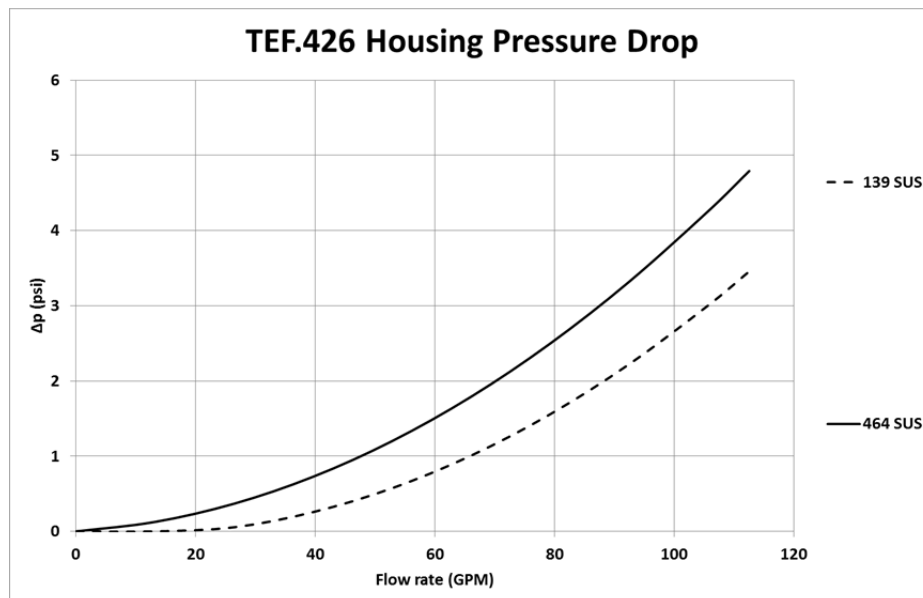
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/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

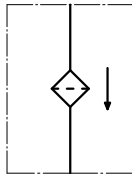
### $\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. The pressure drop changes proportionally to the density.

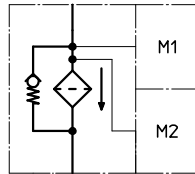


## Symbols:

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
ISO 16889	Multi-pass method for evaluating filtration performance

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

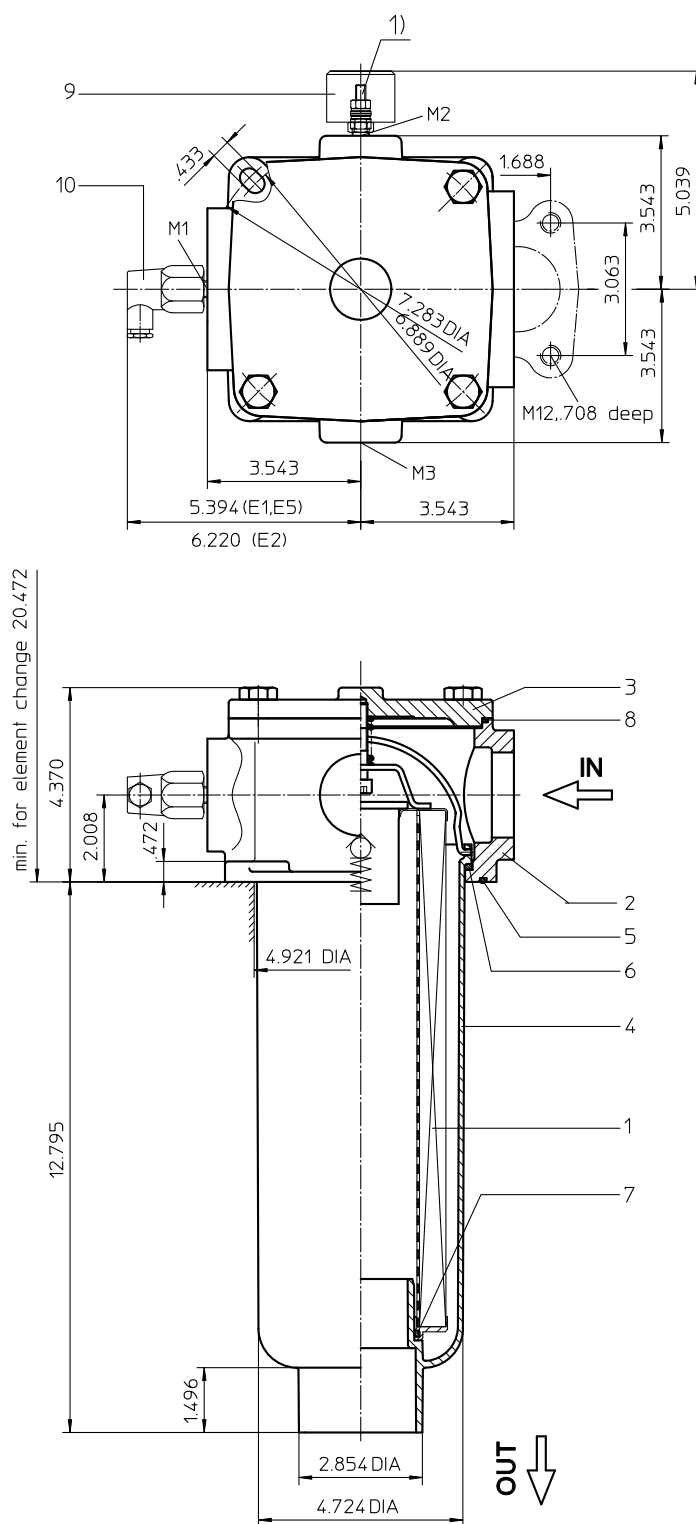
Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

**For more information, please  
email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)**

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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)

<b>TEF.</b>	<b>625.</b>	<b>10VG.</b>	<b>16.</b>	<b>S.</b>	<b>P.</b>	<b>-.</b>	<b>FS.</b>	<b>8.</b>	<b>-.</b>	<b>E1.</b>	<b>O.</b>	<b>-</b>
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 =  $\Delta p$  232 PSI
- 5 filter element design:**  
E = without by-pass valve  
S = with by-pass valve  $\Delta p$  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)

<b>01E.</b>	<b>631.</b>	<b>10VG.</b>	<b>16.</b>	<b>S.</b>	<b>P.</b>	<b>-</b>
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  $\Delta p$  and the element  $\Delta p$  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/](http://www.eatonpowersource.com/calculators/filtration/)

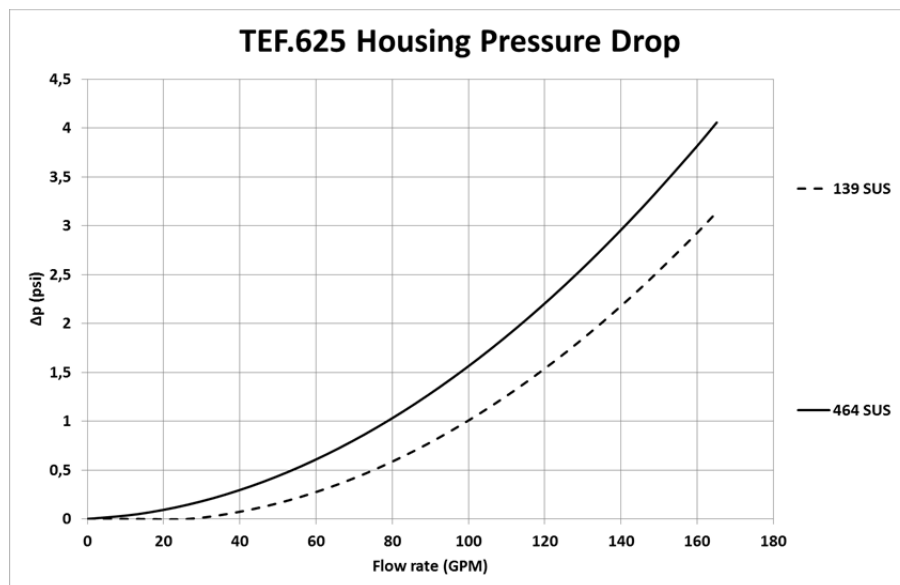
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/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

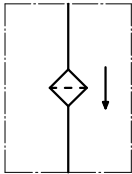
### $\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. The pressure drop changes proportionally to the density.

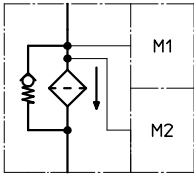


Symbols:

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
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

Brazil

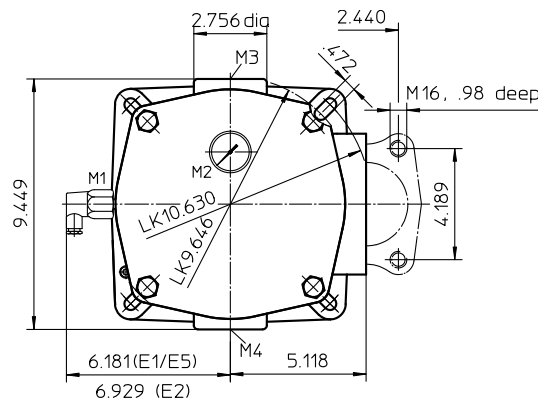
Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please  
email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

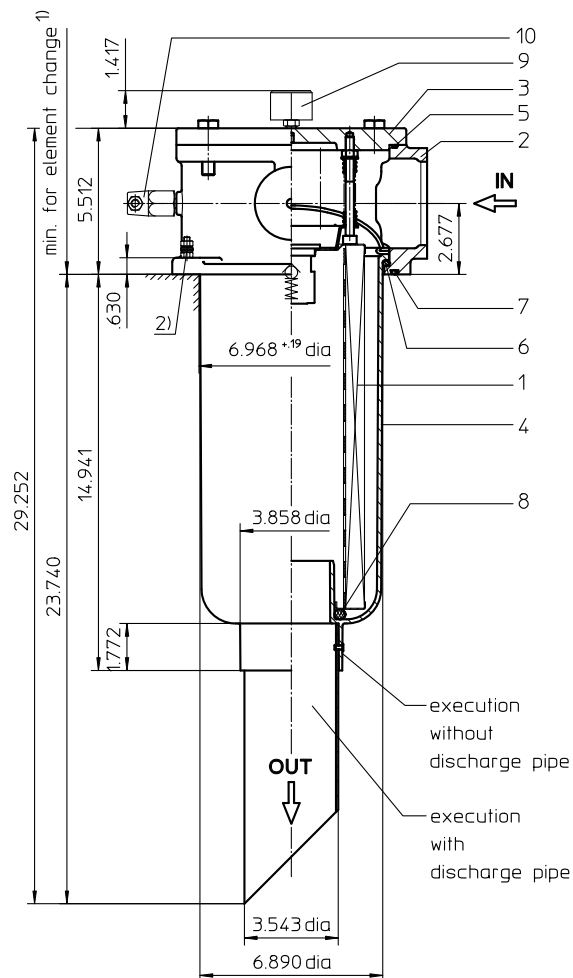
© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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)

<b>TEF.</b>	<b>952.</b>	<b>10VG.</b>	<b>10.</b>	<b>S.</b>	<b>P.</b>	<b>-.</b>	<b>FS.</b>	<b>A.</b>	<b>-.</b>
1	2	3	4	5	6	7	8	9	10

<b>E1.</b>	<b>O.</b>	<b>-.</b>	<b>-.</b>	<b>-</b>
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)

<b>01E.</b>	<b>950.</b>	<b>10VG.</b>	<b>10.</b>	<b>S.</b>	<b>P.</b>	<b>-</b>
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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

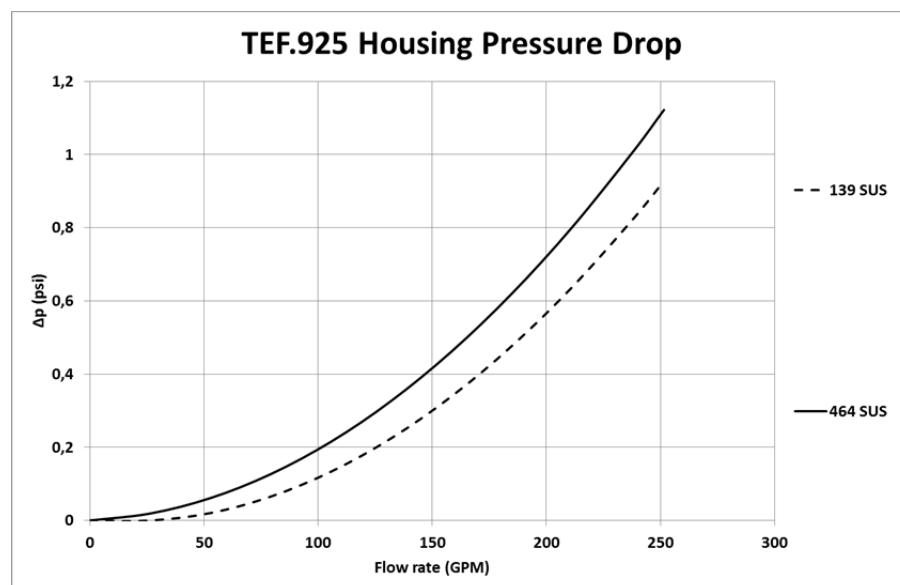
### Material gradient coefficients (MSK) for filter elements

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

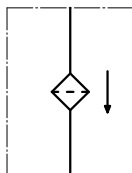
### $\Delta p = f(Q)$ – characteristics according to ISO 3968

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.

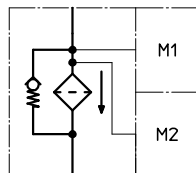


## Symbols:

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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

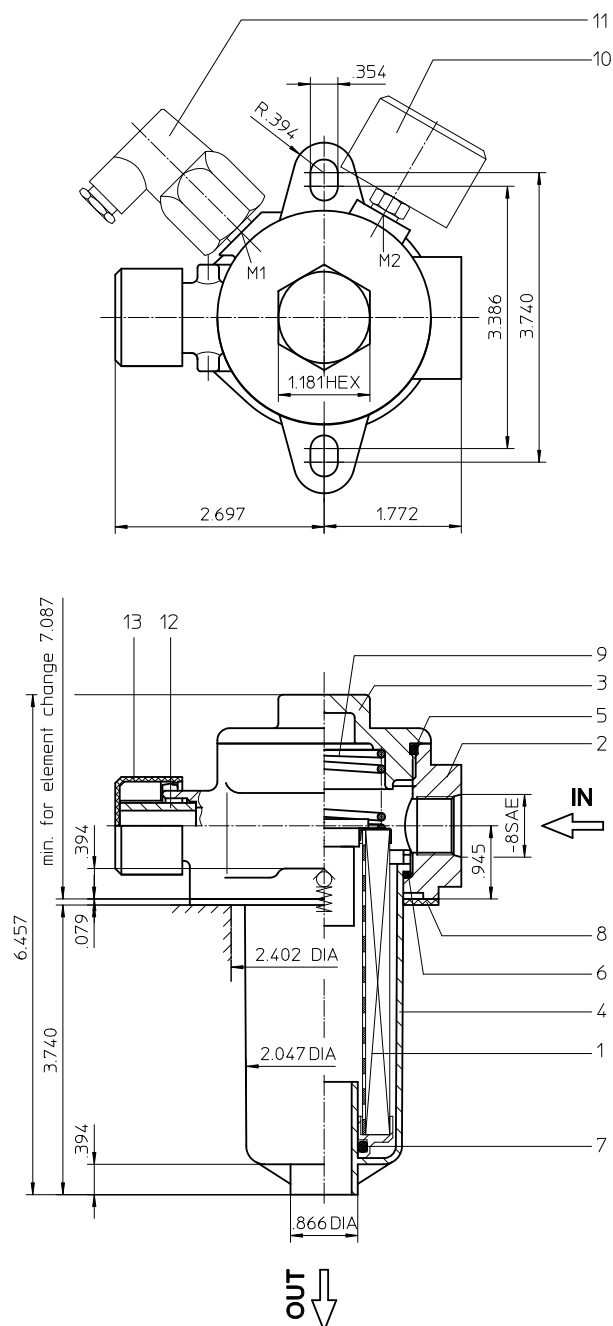
Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

**For more information, please  
email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)**

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

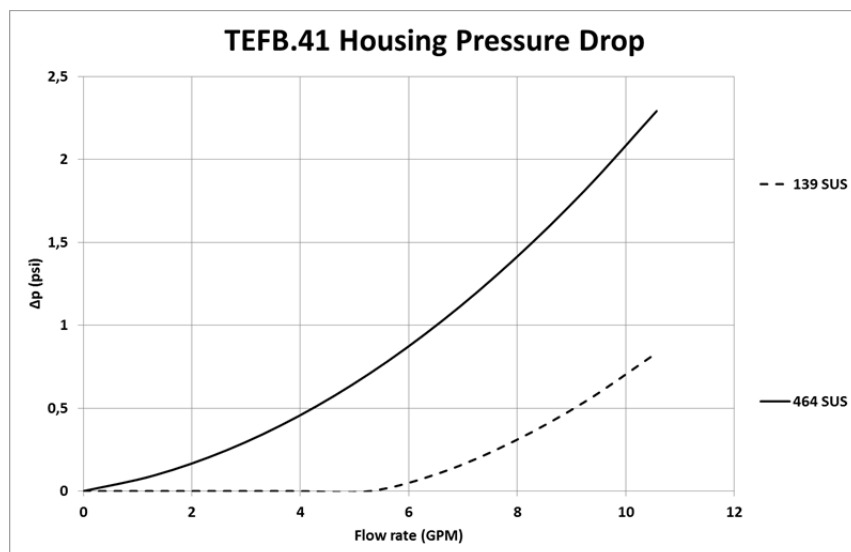
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/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	-

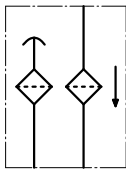
### $\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. The pressure drop changes proportionally to the density.

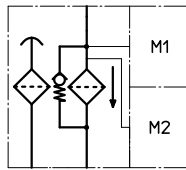


## Symbols:

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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

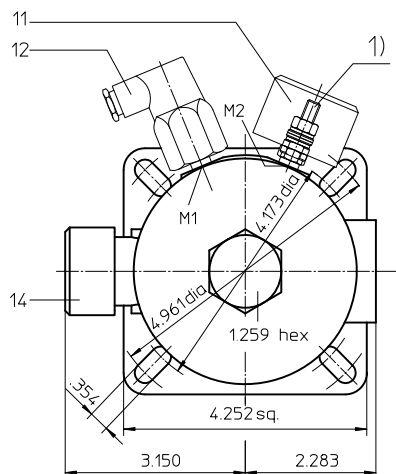
For more information, please  
email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

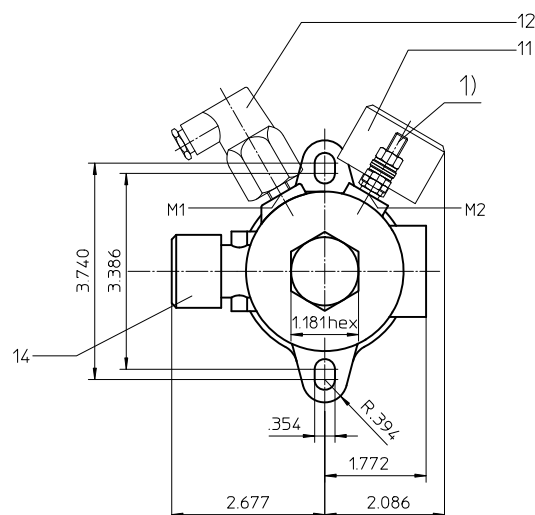
# Series TEFB 55-120

## 145 PSI

view TEFB 120



views TEFB 55/70

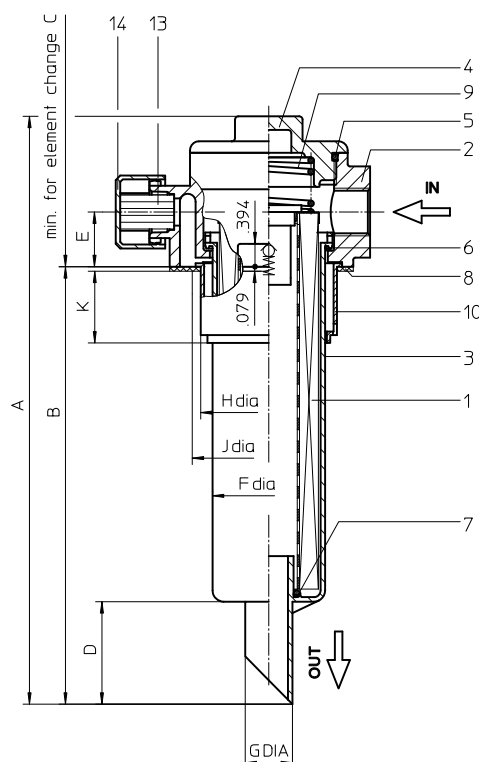


### Dimensions:

type	TEFB 55	TEFB 70	TEFB 120
connection	- 8 SAE	-12 SAE	-16 SAE
A	10.24	10.24	11.42
B	7.56	7.56	8.27
C	10.63	10.63	11.81
D	1.77	1.77	2.56
E	.94	.94	1.18
F	2.05	2.05	2.76
G	.87	.87	.94
H	2.38	2.38	3.09
J	2.40	2.40	3.11
K	1.25	1.25	1.65
weight	2.20 lbs.	2.20 lbs.	3.30 lbs.
volume tank	.08 Gal.	.08 Gal.	.15 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.

# 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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

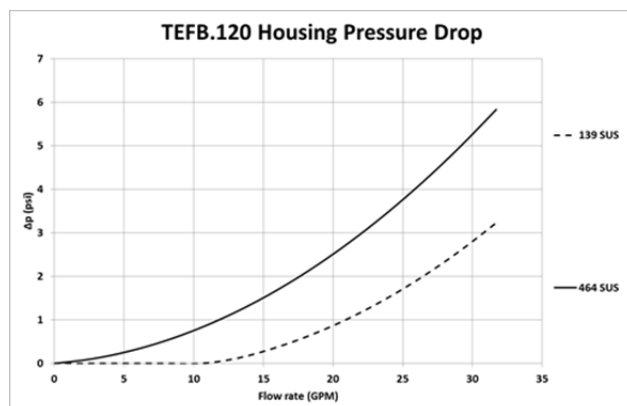
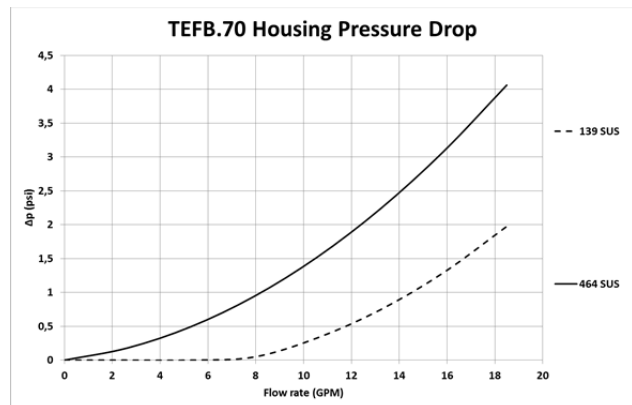
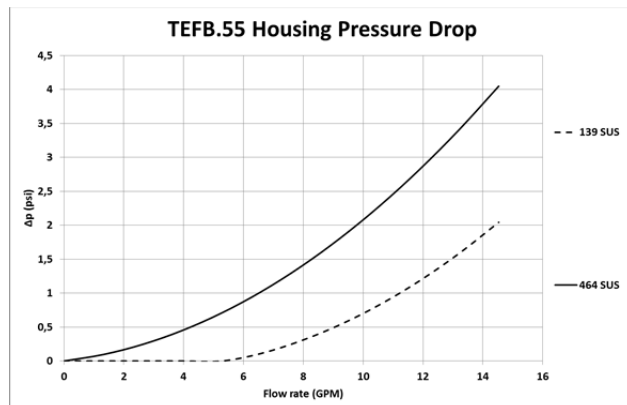
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/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

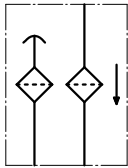
### $\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. The pressure drop changes proportionally to the density.

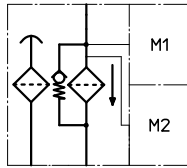


## Symbols:

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 301865		01BFE.120 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altludersheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langerlorenshausen, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

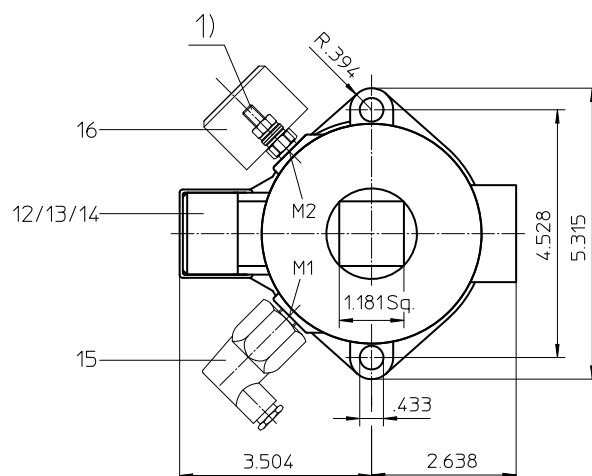
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# Series TEFB 210-310

## 145 PSI

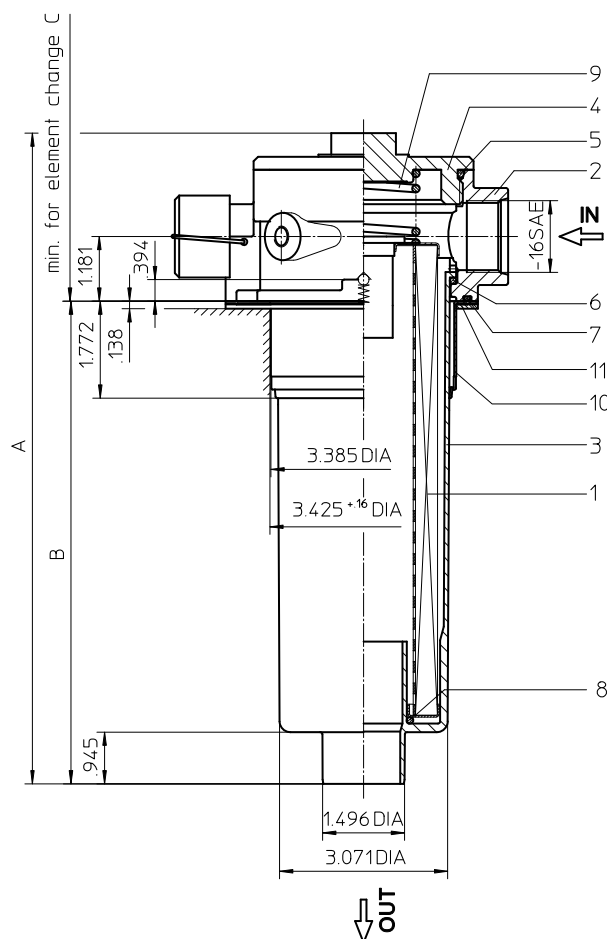


### Dimensions:

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.

# 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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

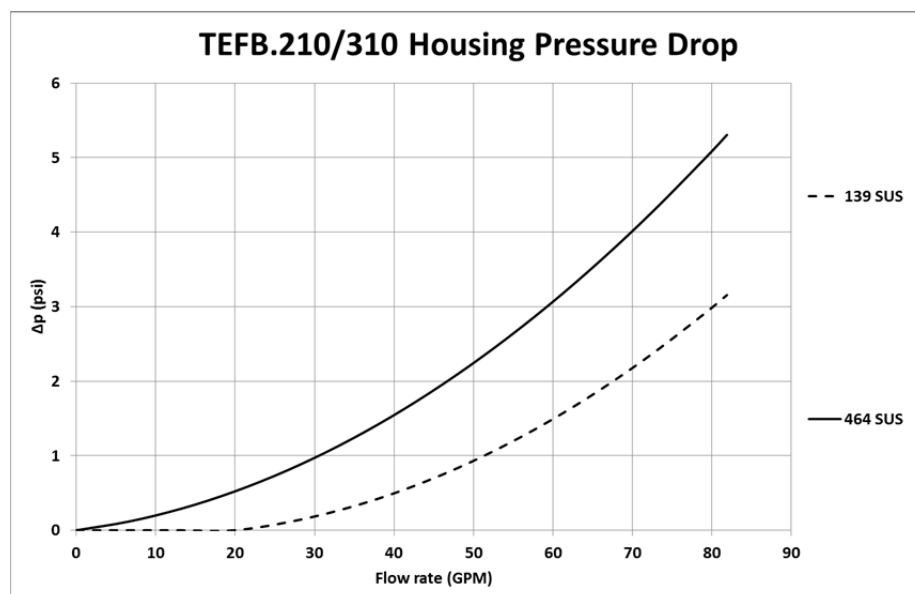
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/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

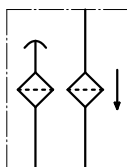
### $\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. The pressure drop changes proportionally to the density.

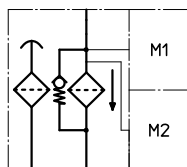


## Symbols:

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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

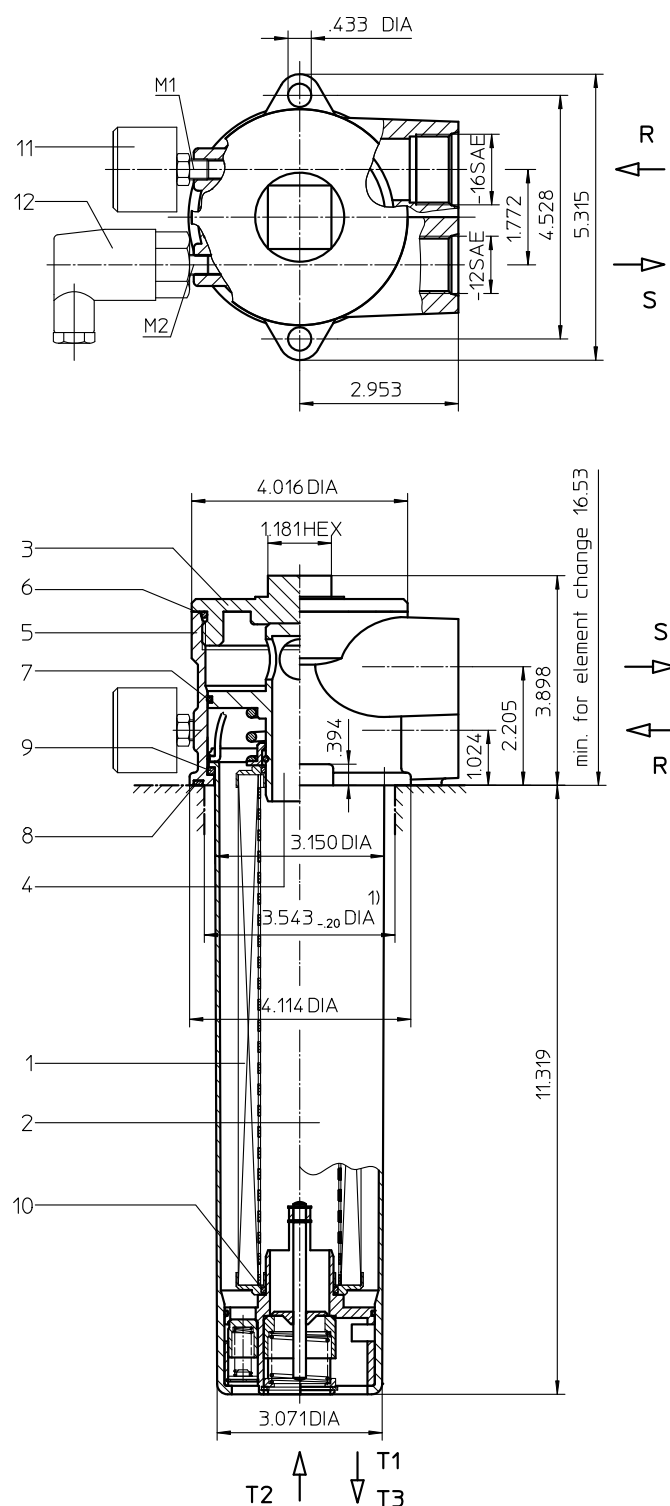
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# Series TNRS 101

## 145 PSI



<sup>1)</sup> 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  $\geq 7.25$  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	<b>series:</b> TNRS = tank-mounted return-line filter with suction connection
2	<b>nominal size:</b> 101
3	<b>filter-material and filter-fineness:</b> 80G, 40G, 25G stainless steel wire mesh 25VG, 16VG, 10VG, 6VG, 3VG microglass 10P paper
4	<b>filter element collapse rating:</b> 10 = $\Delta p$ 145 PSI
5	<b>filter element design:</b> B = both sides open
6	<b>sealing material:</b> P = Nitrile (NBR) V = Viton (FPM)
7	<b>filter element specification:</b> - = standard VA = stainless steel
8	<b>process connection:</b> UG = thread connection
9	<b>process connection size:</b> 5 = -16 SAE
10	<b>filter housing specification:</b> - = standard
11	<b>internal valve:</b> S2,5 = with by-pass valve $\Delta p$ 36 PSI
12	<b>suction valve:</b> Z = with suction valve
13	<b>clogging indicator at M1:</b> - = 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	<b>preload pressure indicator at M2:</b> - = 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	<b>series:</b> 01NR. = standard-return-line filter element according to DIN 24550, T4
2	<b>nominal size:</b> 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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

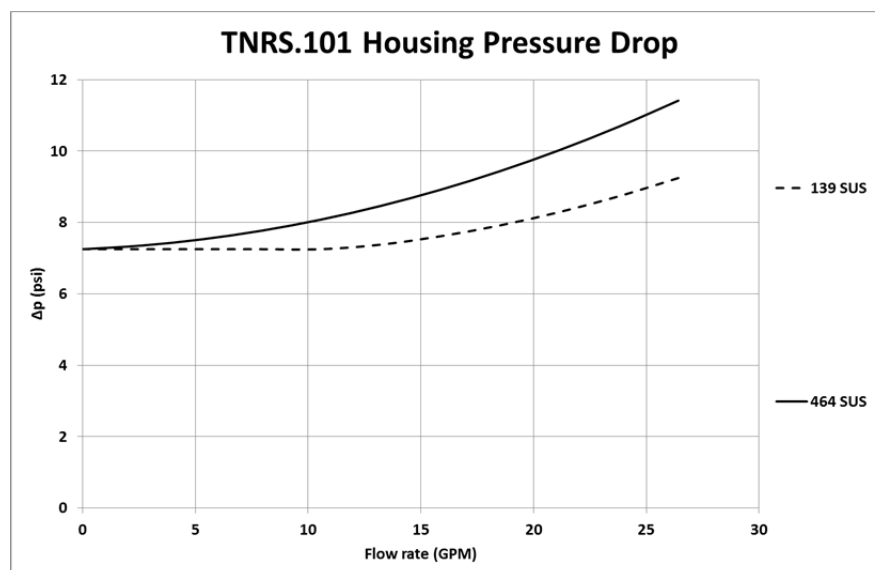
### Material gradient coefficients (MSK) for filter elements

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.

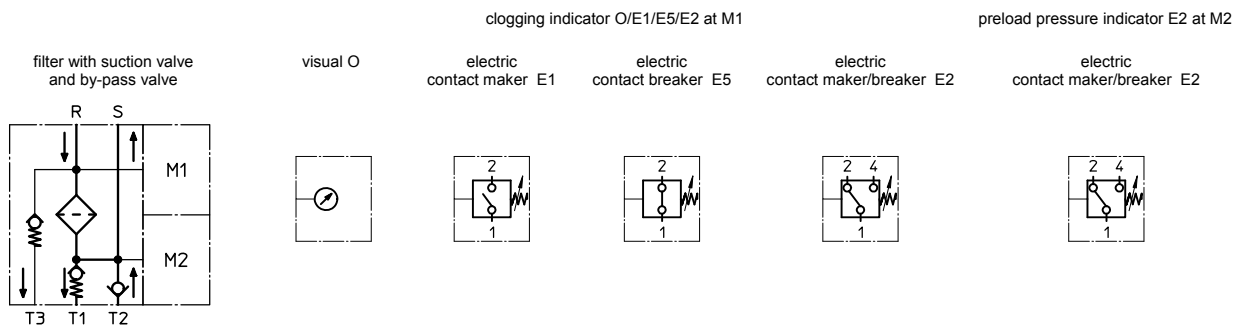
TNRS	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
101	2.021	1.403	0.898	0.782	0.534	0.0609	0.0568	0.0389	0.477

### $\Delta p = f(Q)$ – 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

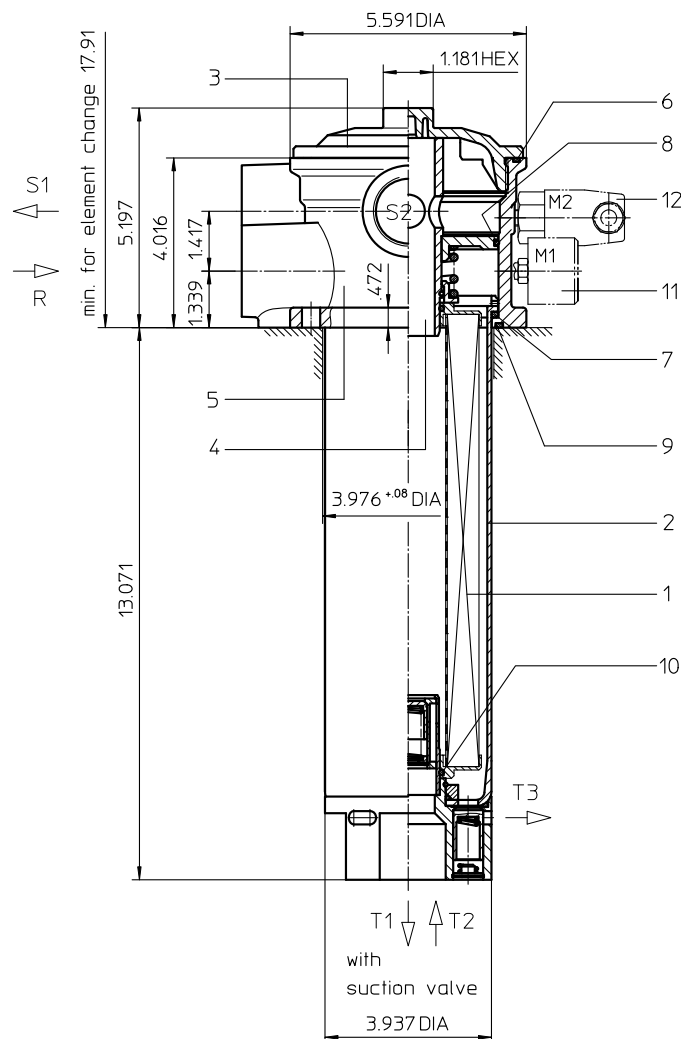
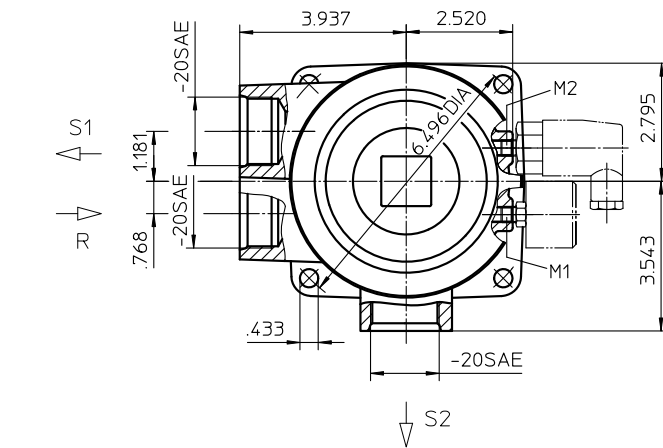
For more information, please

email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

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  $\geq 7.25$  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)

<b>TRS. 226. 10VG. 10.B. P. -. UG. 6. -. S2,5. Z. O. E2</b>													
1	2	3	4	5	6	7	8	9	10	11	12	13	14

1	<b>series:</b>	TRS = tank-mounted return-line filter with suction connection
2	<b>nominal size:</b>	101
3	<b>filter-material and filter-fineness:</b>	80G, 40G, 25G stainless steel wire mesh 25VG, 16VG, 10VG, 6VG, 3VG microglass 10P paper
4	<b>filter element collapse rating:</b>	10 = $\Delta p$ 145 PSI
5	<b>filter element design:</b>	B = both sides open
6	<b>sealing material:</b>	P = Nitrile (NBR) V = Viton (FPM)
7	<b>filter element specification:</b>	- = standard VA = stainless steel
8	<b>process connection:</b>	UG = thread connection
9	<b>process connection size:</b>	6 = -20 SAE
10	<b>filter housing specification:</b>	- = standard
11	<b>internal valve:</b>	S2,5 = with by-pass valve $\Delta p$ 36 PSI
12	<b>suction valve:</b>	Z = with suction valve
13	<b>clogging indicator at M1:</b>	- = 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	<b>preload pressure indicator at M2:</b>	- = 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)

<b>01RS. 225. 10VG. 10. B. P. -</b>						
1	2	3	4	5	6	7

1	<b>series:</b>	01RS. = return-line suction filter element
2	<b>nominal size:</b>	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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

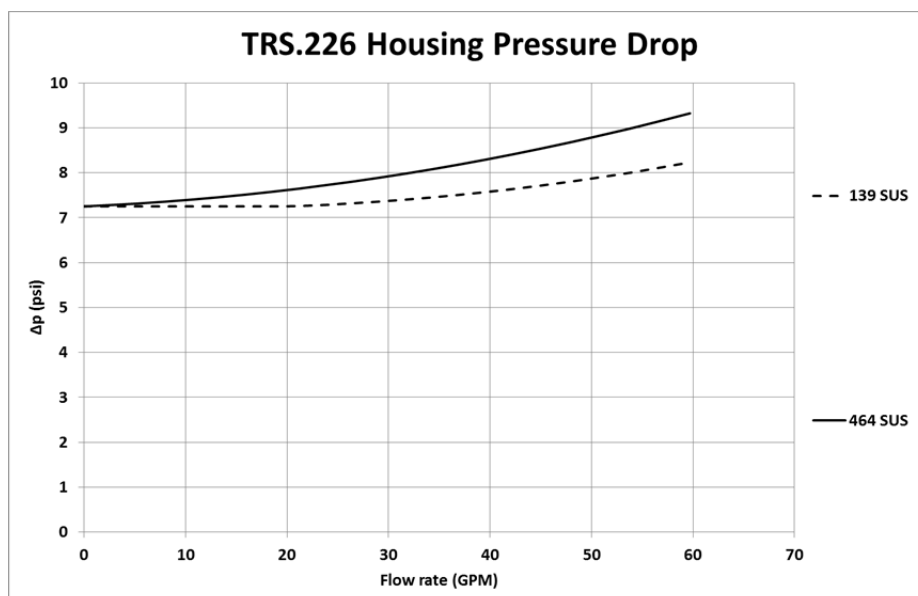
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

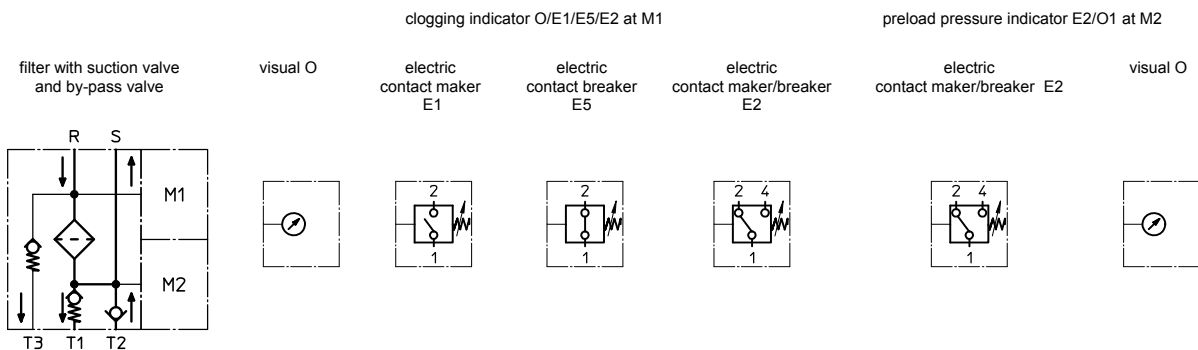
TRS	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
226	0.917	0.636	0.407	0.355	0.242	0.0209	0.0195	0.0134	0.182

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

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altludersheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

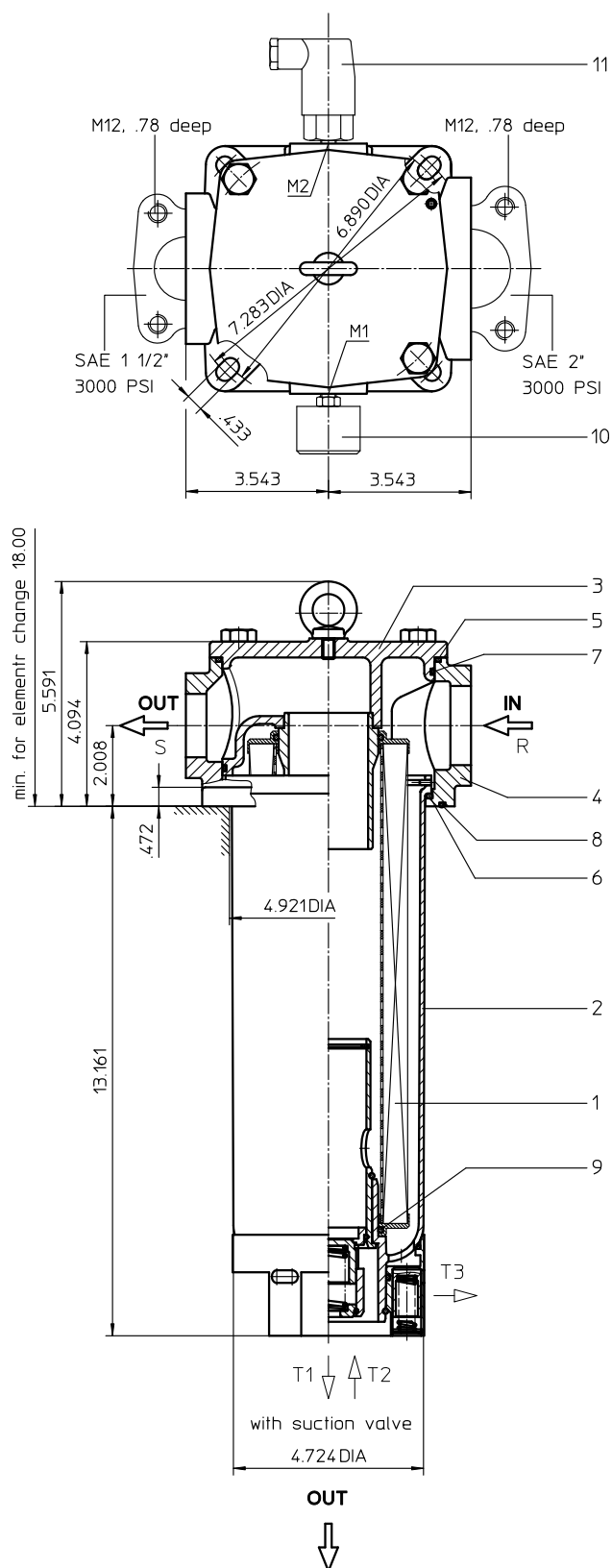
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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  $\geq 7.25$  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	<b>series:</b> TRS = tank-mounted return-line filter with suction connection												
2	<b>nominal size:</b> 625												
3	<b>filter-material and filter-fineness:</b> 80G, 40G, 25G stainless steel wire mesh 25VG, 16VG, 10VG, 6VG, 3VG microglass 10P paper												
4	<b>filter element collapse rating:</b> 10 = $\Delta p$ 145 PSI												
5	<b>filter element design:</b> B = both sides open												
6	<b>sealing material:</b> P = Nitrile (NBR) V = Viton (FPM)												
7	<b>filter element specification:</b> - = standard VA = stainless steel												
8	<b>process connection:</b> FS = SAE-flange 3000 PSI												
9	<b>process connection size:</b> 8 = 2"												
10	<b>filter housing specification:</b> - = standard												
11	<b>internal valve:</b> S2,5 = with by-pass valve $\Delta p$ 36 PSI												
12	<b>suction valve:</b> Z = with suction valve												
13	<b>clogging indicator at M1:</b> - = 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	<b>preload pressure indicator at M2:</b> - = 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	<b>series:</b> 01E. = filter element according to company standard					
2	<b>nominal size:</b> 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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

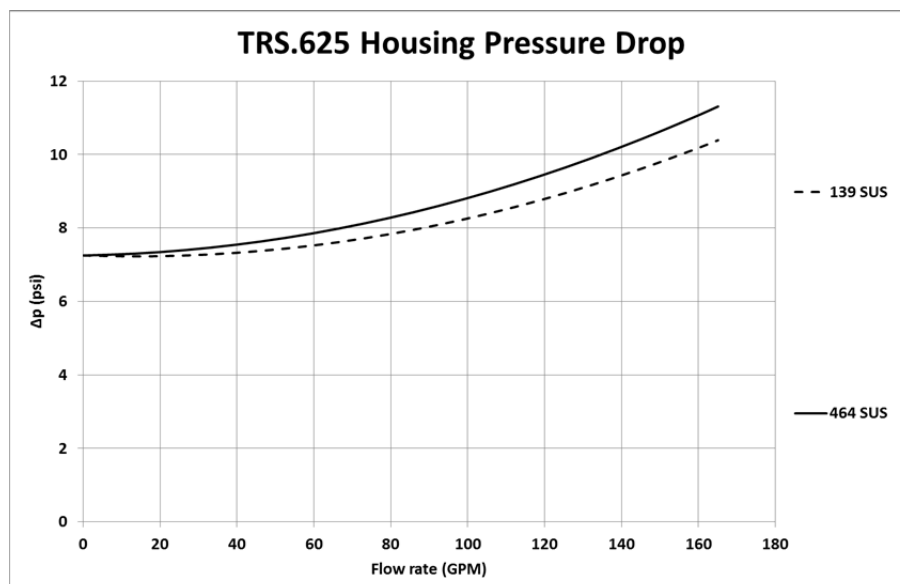
### Material gradient coefficients (MSK) for filter elements

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.

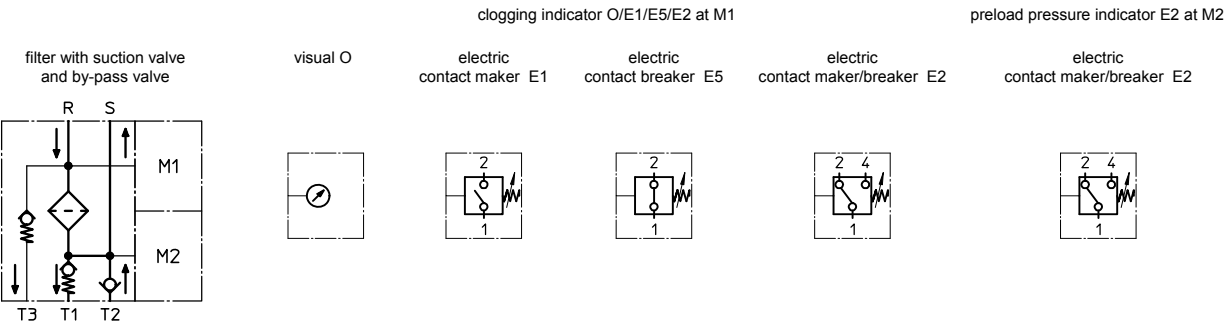
TRS	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
625	0.696	0.483	0.309	0.269	0.184	0.0236	0.0220	0.0151	0.142

### $\Delta p = f(Q)$ – 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
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



North America  
44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

Europe/Africa/Middle East  
Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

China  
No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

Singapore  
4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

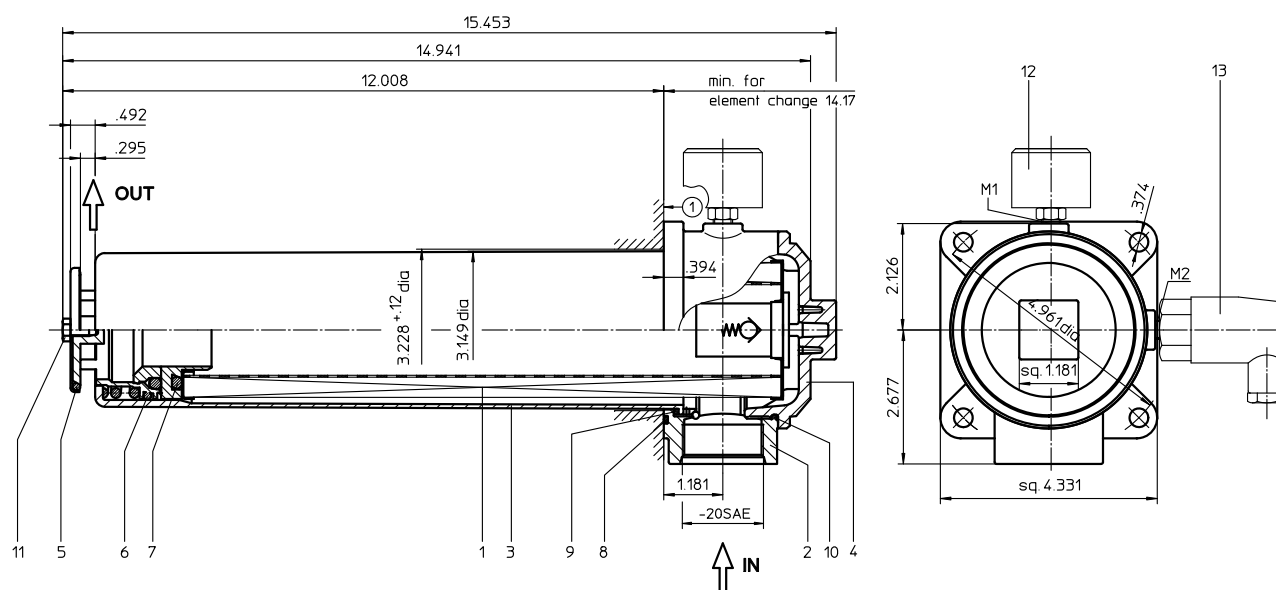
Brazil  
Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please  
email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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  $\Delta p$  and the element  $\Delta p$  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/](http://www.eatonpowersource.com/calculators/filtration/)

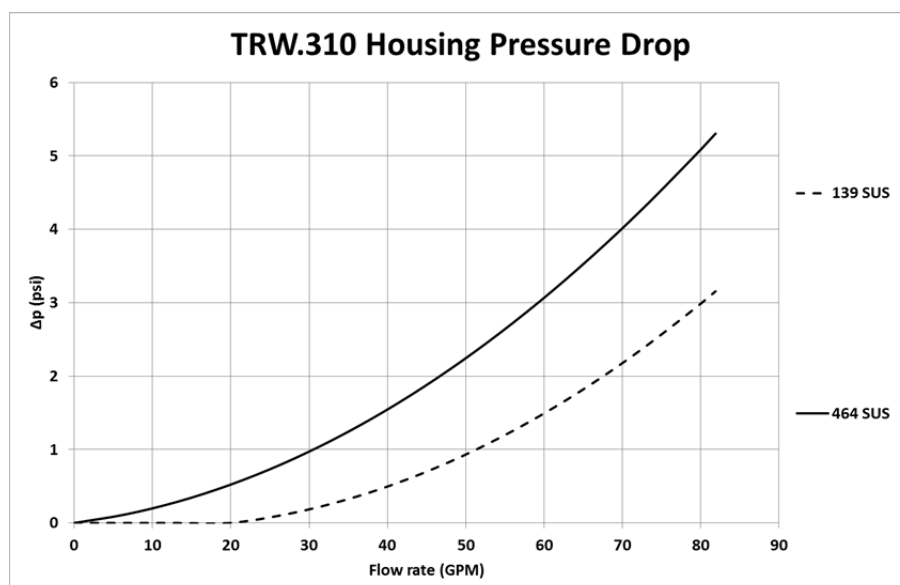
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/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

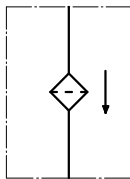
### $\Delta p = f(Q)$ – characteristics according to ISO 3968

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. The pressure drop changes proportionally to the density.

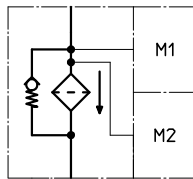


## Symbols:

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
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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

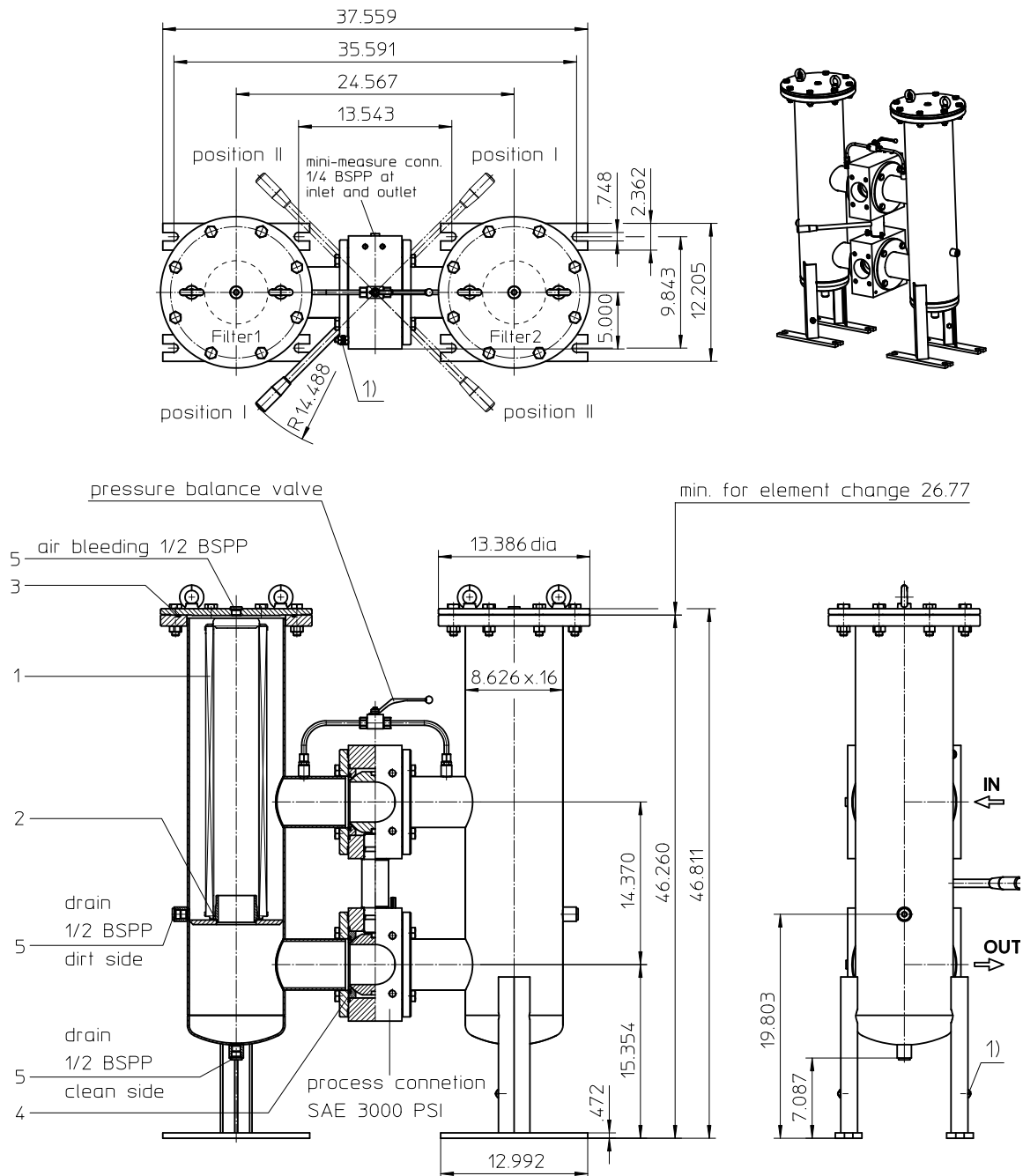
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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



Powering Business Worldwide

Designs and performance values are subject to change.

EDV 09/15

# 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  $\Delta p$  and the element  $\Delta p$  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/](http://www.eatonpowersource.com/calculators/filtration/)

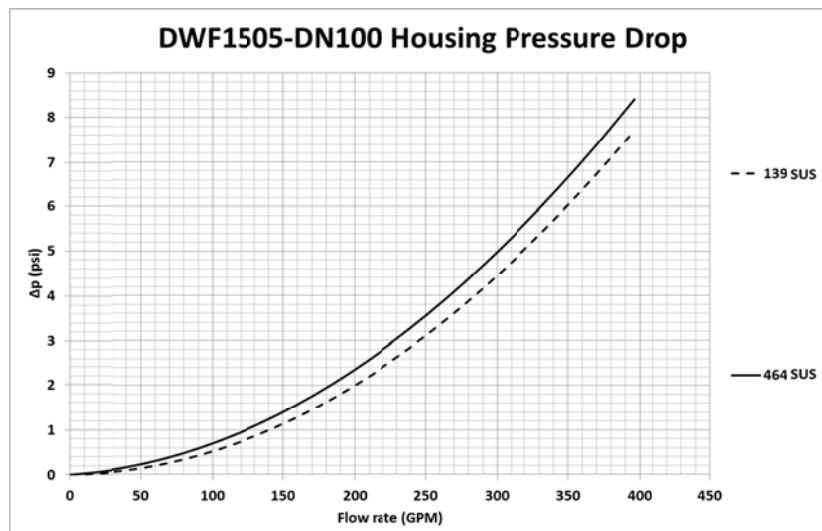
#### Material gradient coefficients (MSK) for filter elements

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

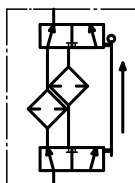
#### $\Delta p = f(Q)$ – characteristics according to ISO 3968

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.

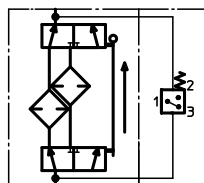


## Symbols:

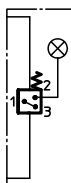
without indicator



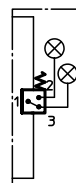
with electric indicator  
AE 30 and AE 40



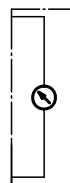
with visual-electric indicator  
AE 50 and AE 62



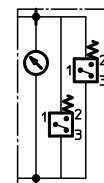
with visual-electric indicator  
AE 70 and AE 80



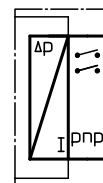
with visual indicator  
OP



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	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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

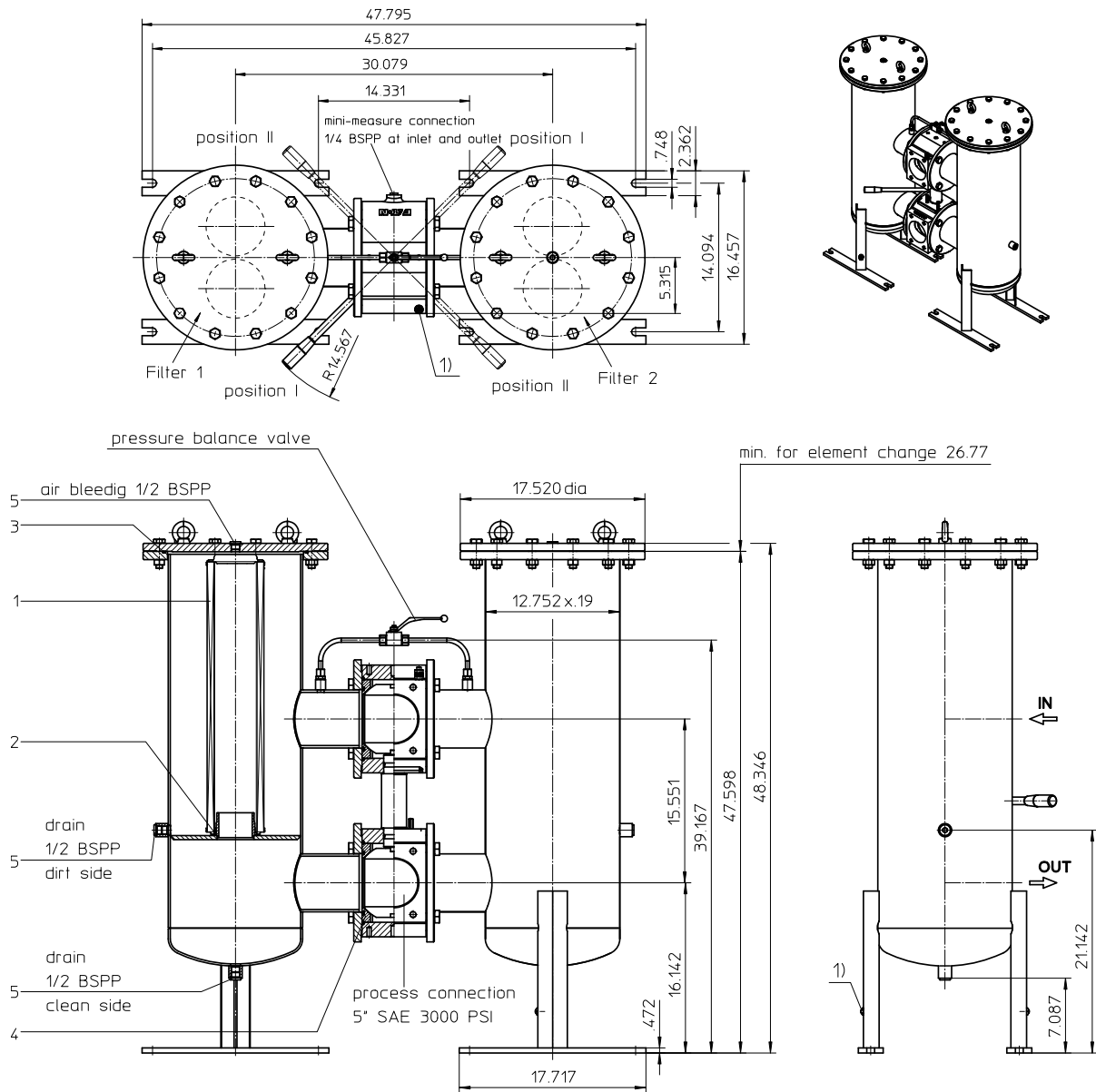
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

$$\Delta p_{\text{Element}} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left( \frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0,876} \left( \frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at  
[www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

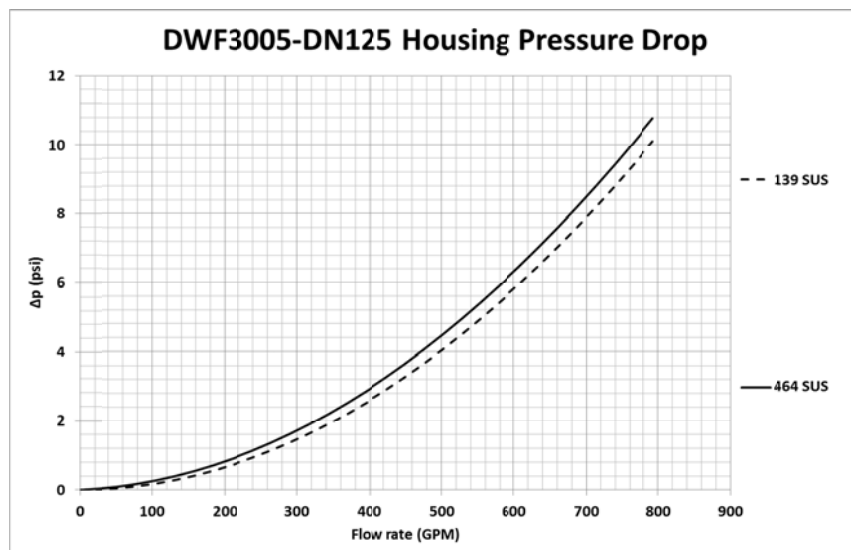
#### Material gradient coefficients (MSK) for filter elements

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

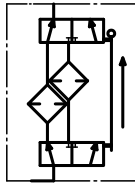
#### $\Delta p = f(Q)$ – characteristics according to ISO 3968

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.

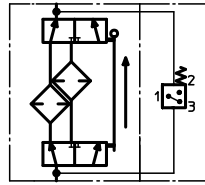


## Symbols:

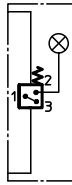
without indicator



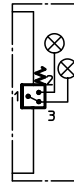
with electric indicator  
AE 30 and AE 40



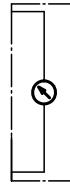
with visual-electric indicator  
AE 50 and AE 62



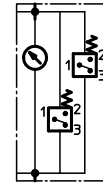
with visual-electric indicator  
AE 70 and AE 80



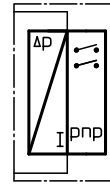
with visual indicator  
OP



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	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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlufheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

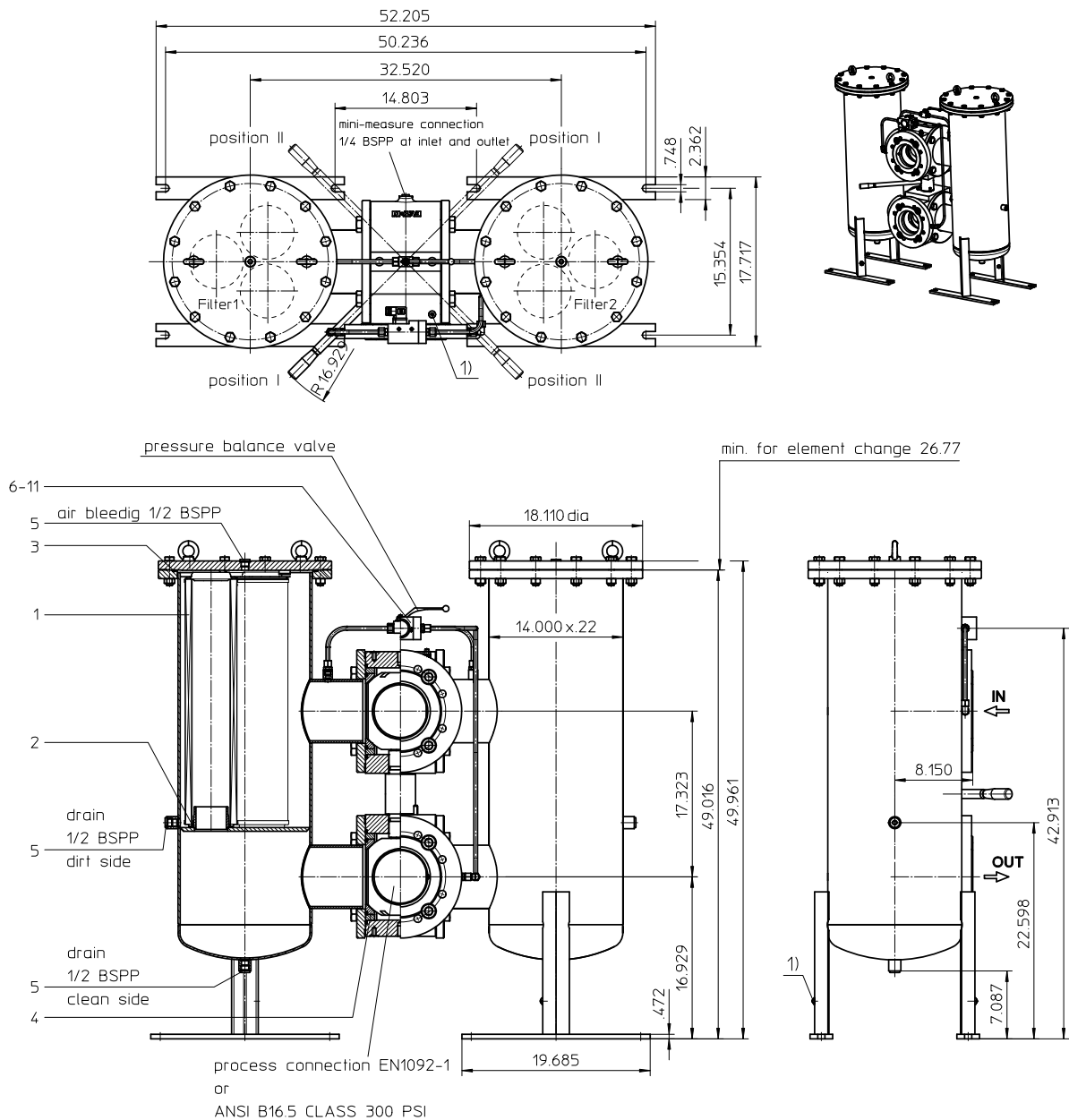
## For more information, please

email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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  $\Delta p$  and the element  $\Delta p$  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/](http://www.eatonpowersource.com/calculators/filtration/)

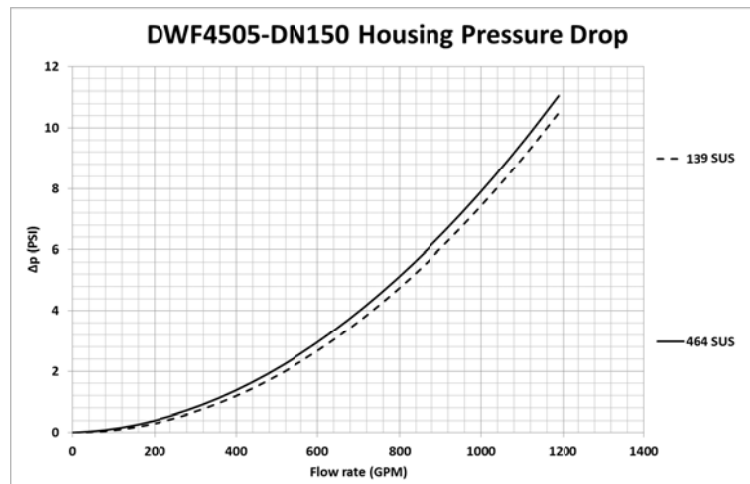
#### Material gradient coefficients (MSK) for filter elements

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
<b>DWF 4505</b>	0.064	0.045	0.029	0.025	0.017	0.0024	0.0018	0.0016	0.0011	0.016	0.007

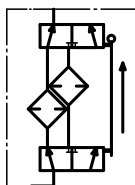
#### $\Delta p = f(Q)$ – characteristics according to ISO 3968

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.

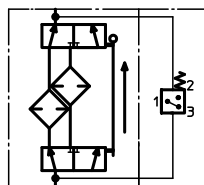


## Symbols:

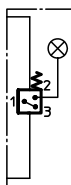
without indicator



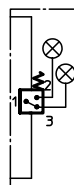
with electric indicator  
AE 30 and AE 40



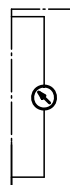
with visual-electric indicator  
AE 50 and AE 62



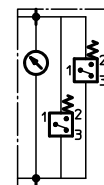
with visual-electric indicator  
AE 70 and AE 80



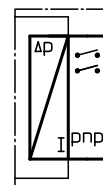
with visual indicator  
OP



with visual-electric indicator  
OE



with electronic sensor  
VS5



## Spare parts:

item	qty.	designation	dimension	Article-no.	
1	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	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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlufheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

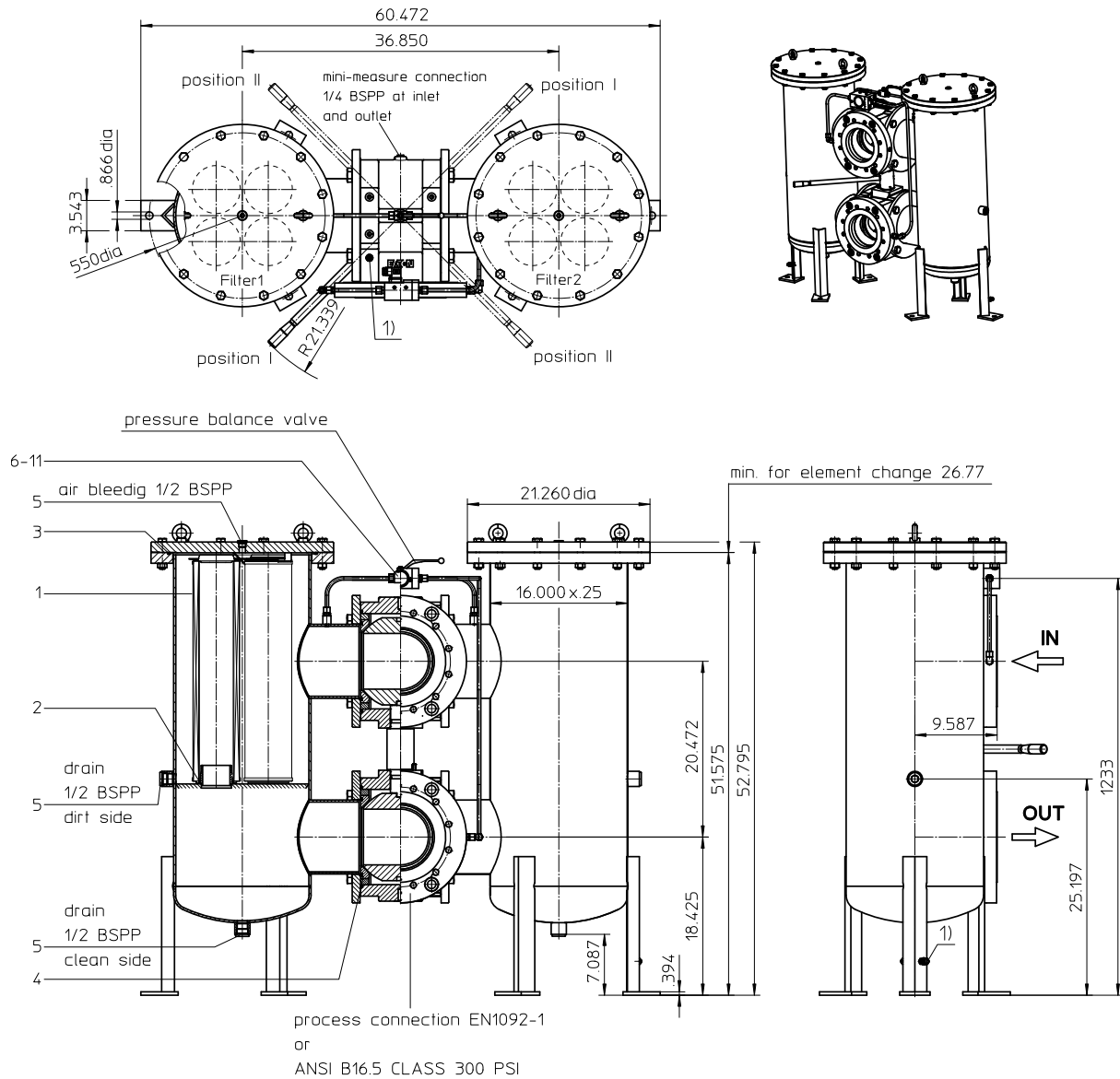
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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 =  $\Delta p$  145 PSI
- 5 **filter element design:**  
E = without by-pass  
S = with by-pass valve  $\Delta p$  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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

$$\Delta p_{\text{Element}} (PSI) = Q (GPM) \times \frac{MSK}{1000} \left( \frac{PSI}{GPM} \right) \times v (SUS) \times \frac{\rho}{0,876} \left( \frac{kg}{dm^3} \right)$$

For ease of calculation our Filter Selection tool is available online at  
[www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

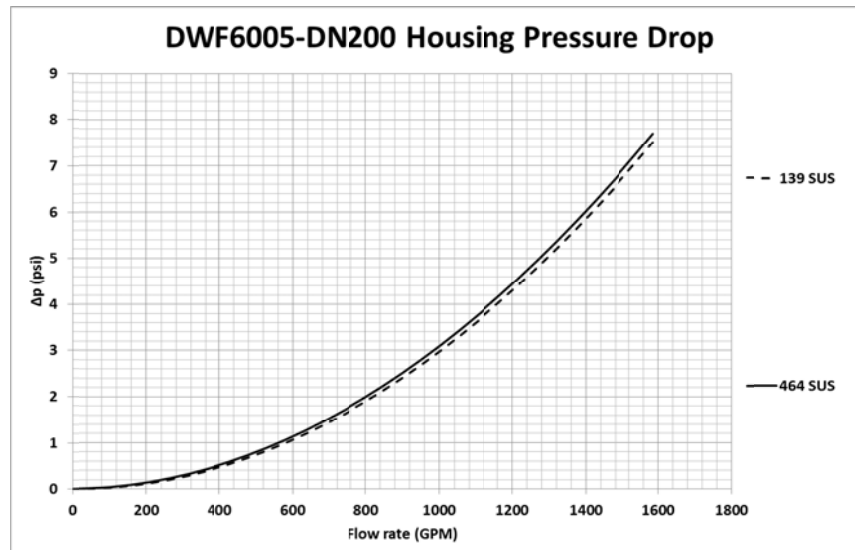
#### Material gradient coefficients (MSK) for filter elements

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

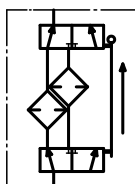
#### $\Delta p = f(Q)$ – characteristics according to ISO 3968

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.

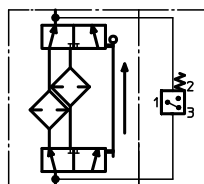


## Symbols:

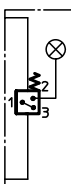
without indicator



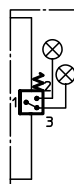
with electric indicator  
AE 30 and AE 40



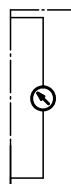
with visual-electric indicator  
AE 50 and AE 62



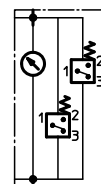
with visual-electric indicator  
AE 70 and AE 80



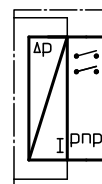
with visu indicator  
OP



with visual-electric indicator  
OE



with electronical 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linzhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

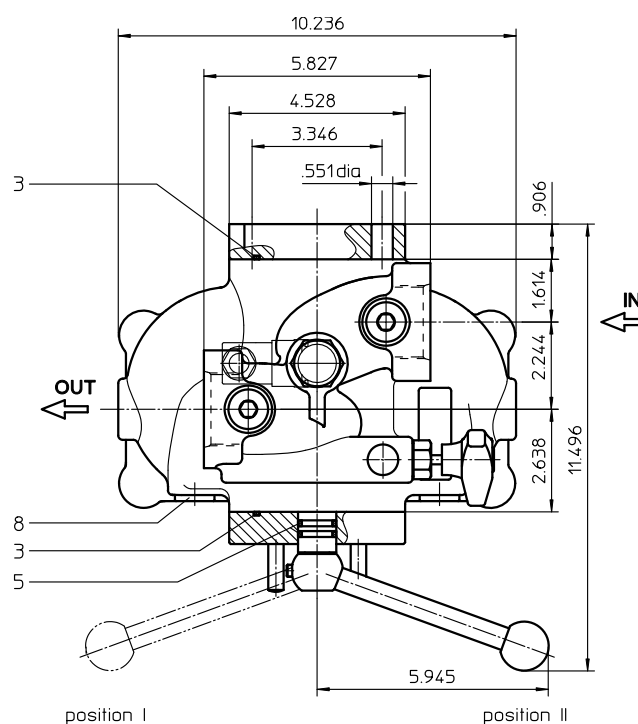
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# Series DSF 176-331

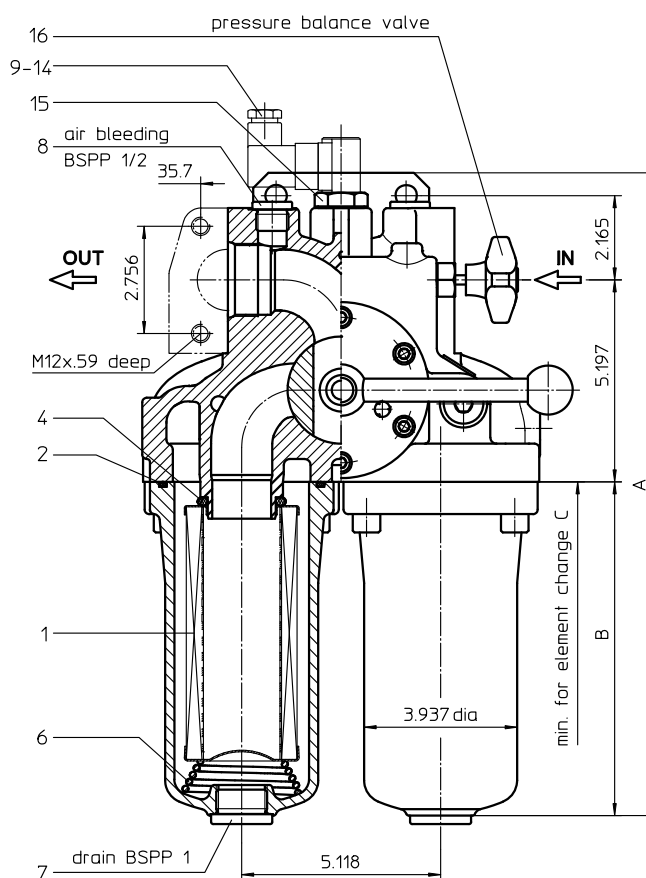
## 363 PSI



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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

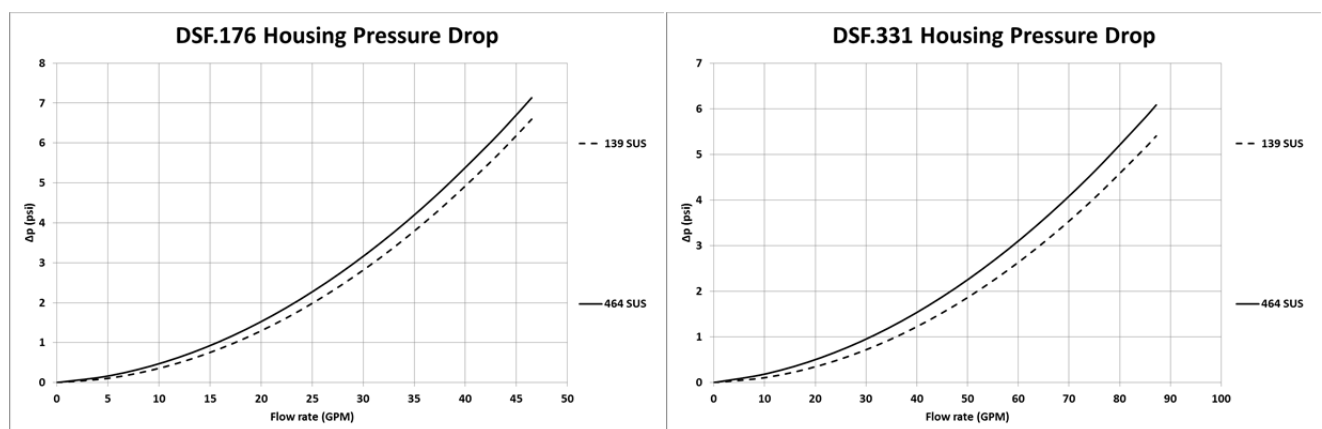
### Material gradient coefficients (MSK) for filter elements

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.

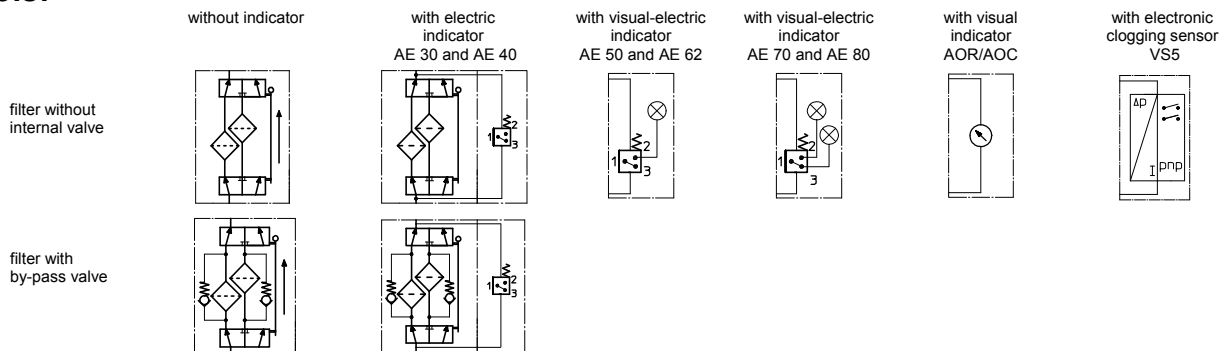
DSF	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
176	2.078	1.443	0.923	0.804	0.549	0.0743	0.0694	0.0475	0.446
331	1.152	0.800	0.512	0.446	0.305	0.0421	0.0393	0.0269	0.247

### $\Delta p = f(Q)$ – 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	DSF 331		
1	2	filter element	01E.175...	01E.330...		
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	1/2 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlufheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

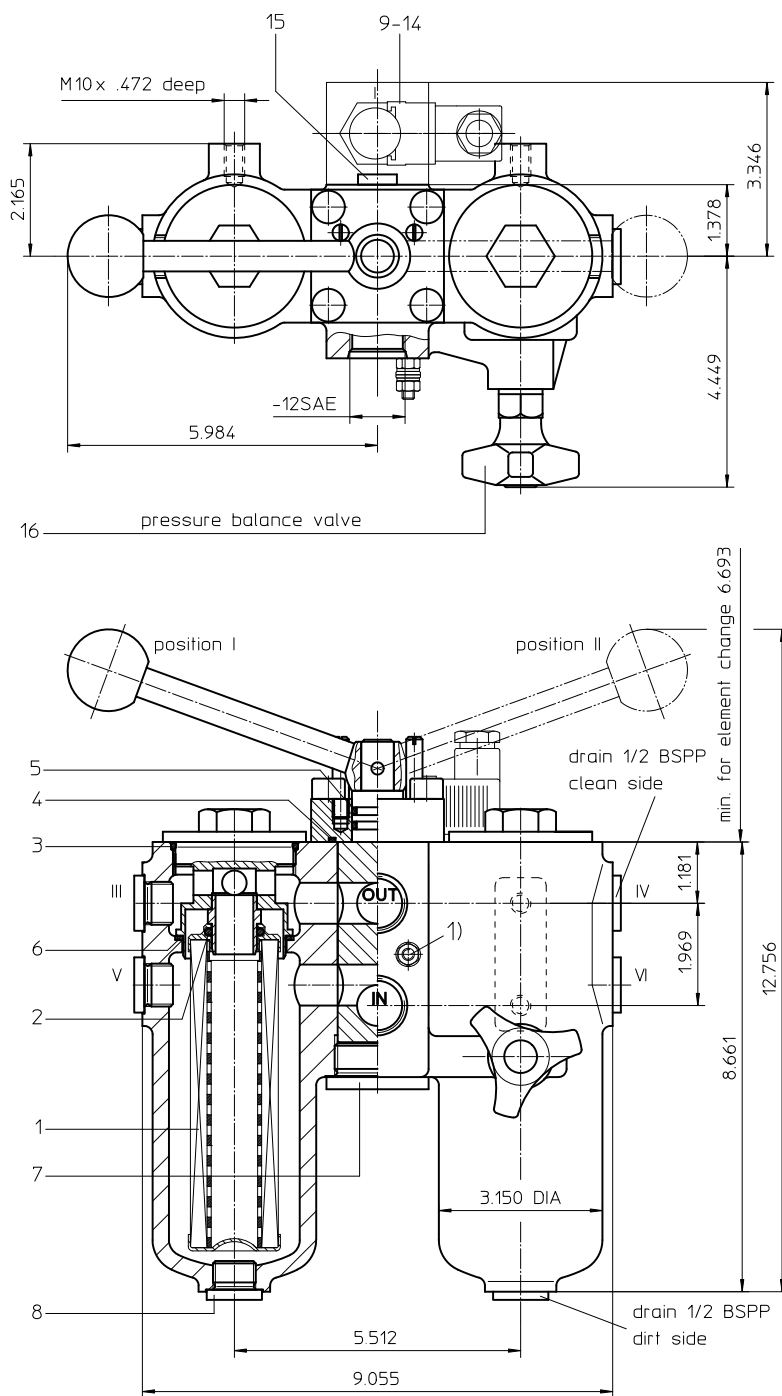
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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)

<b>DU.</b>	<b>63.</b>	<b>10VG.</b>	<b>30.</b>	<b>E.</b>	<b>P.</b>	<b>-.</b>	<b>UG.</b>	<b>4.</b>	<b>-.</b>	<b>-.</b>	<b>AE</b>
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)

<b>01NL.</b>	<b>63.</b>	<b>10VG.</b>	<b>30.</b>	<b>E.</b>	<b>P.</b>	<b>-</b>
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  $\Delta p$  and the element  $\Delta p$  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/](http://www.eatonpowersource.com/calculators/filtration/)

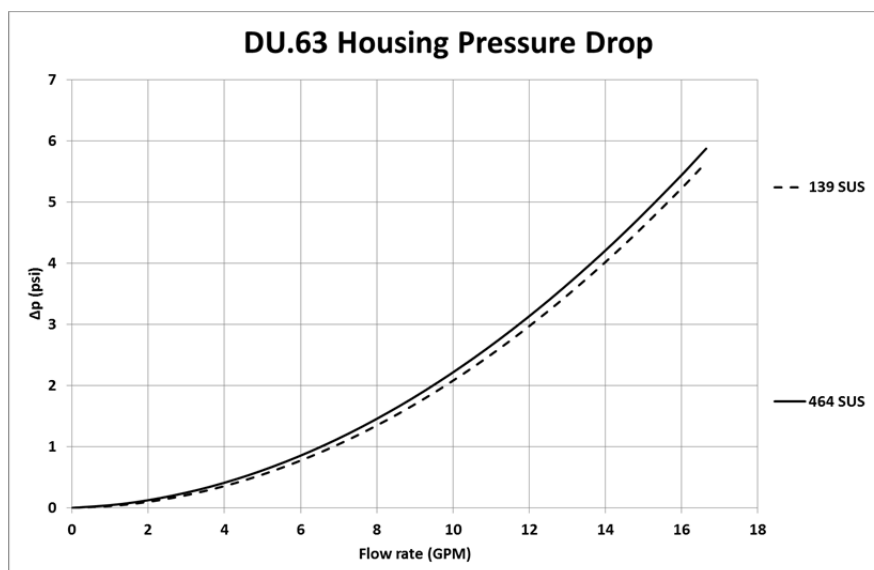
### Material gradient coefficients (MSK) for filter elements

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

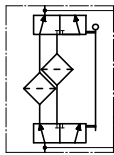
### $\Delta p = f(Q)$ – characteristics according to ISO 3968

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.

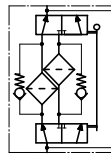


## Symbols:

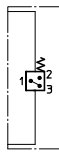
without indicator



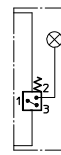
with by-pass valve



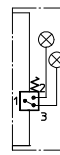
with electric indicator  
AE 30 and AE 40



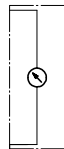
with visual-electric indicator  
AE 50 and AE 62



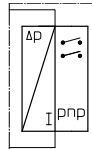
with visual-electric indicator  
AE 70 and AE 80



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 1/4 BSPP	308530	
8	6	screw plug	1/2 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	1/4 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altludersheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

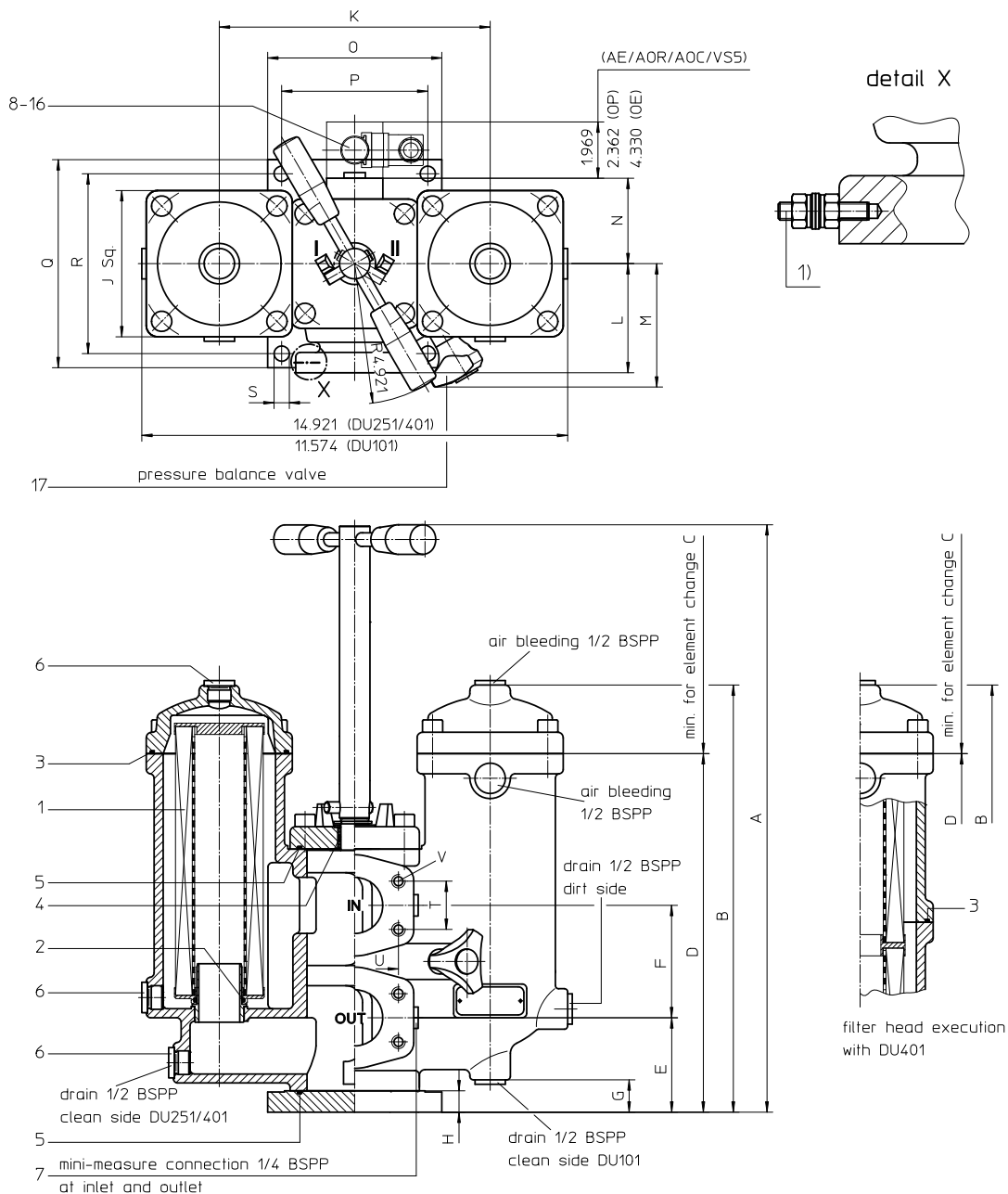
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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 <sup>1)</sup>	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 1/4 <sup>2)</sup>	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 <sup>2)</sup>	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.

<sup>1)</sup> by counter flange BFS.6.A.33,7x2,6.St.P.3000

<sup>2)</sup> 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.

EDV 10/15

# 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 1/4" (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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

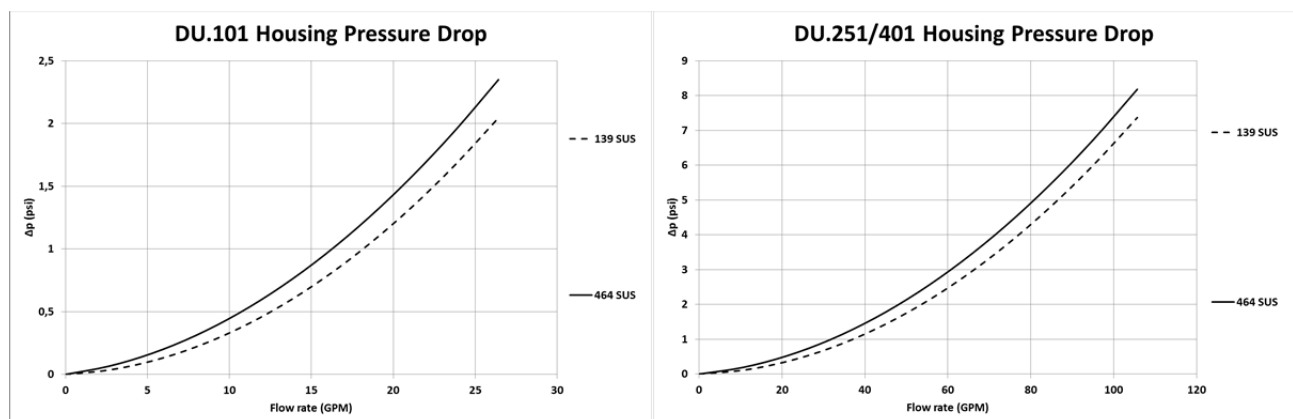
### Material gradient coefficients (MSK) for filter elements

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

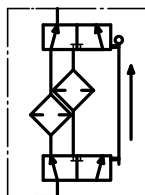
### $\Delta p = f(Q)$ – characteristics according to ISO 3968

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.

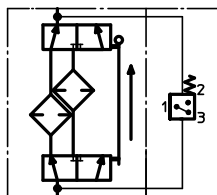


## Symbols:

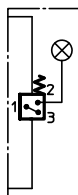
without indicator



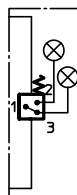
with electric indicator  
AE 30 and AE 40



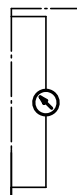
with visual-electric indicator  
AE 50 and AE 62



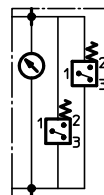
with visual-electric indicator  
AE 70 and AE 80



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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altludersheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langerlohn, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

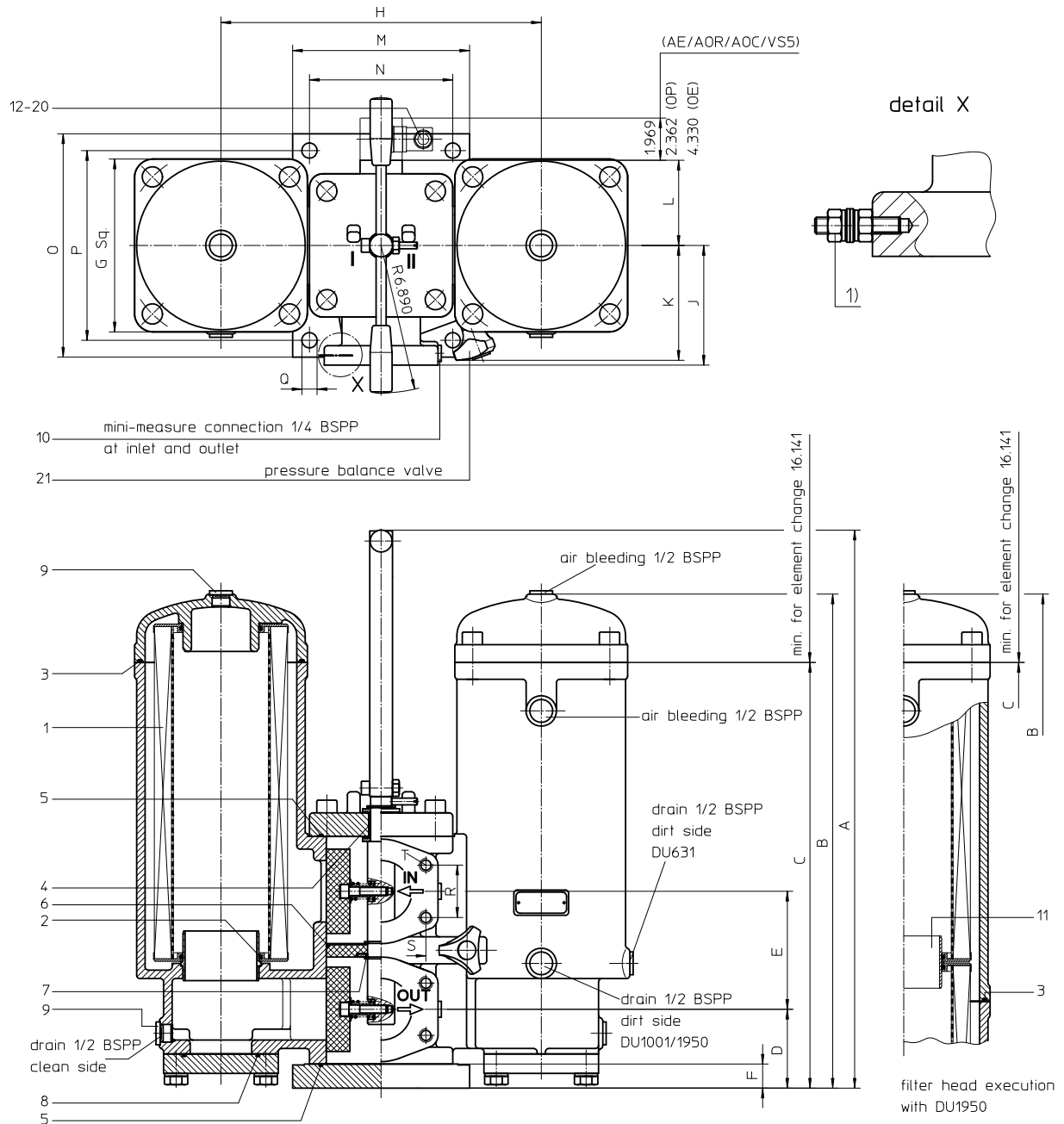
Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

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 (NH<sub>3</sub>), 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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

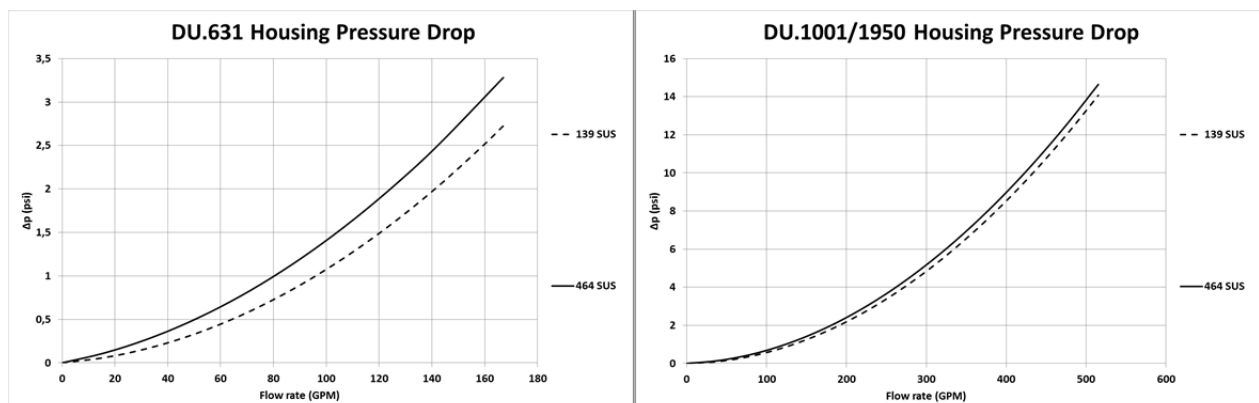
### Material gradient coefficients (MSK) for filter elements

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
<b>631</b>	0.534	0.371	0.237	0.207	0.141	0.1735	0.1619	0.1109	0.112	0.121	0.056
<b>1001</b>	0.237	0.165	0.105	0.092	0.063	0.0061	0.0057	0.0039	0.051	0.053	0.024
<b>1950</b>	0.118	0.082	0.053	0.046	0.031	0.0030	0.0028	0.0019	0.026	0.027	0.012

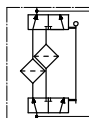
### $\Delta p = f(Q)$ – characteristics according to ISO 3968

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.

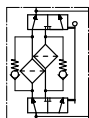


## Symbols:

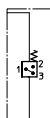
without indicator



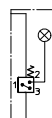
with by-pass valve



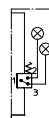
with electric indicator  
AE 30 and AE 40



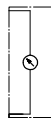
with visual-electric indicator  
AE 50 and AE 62



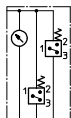
with visual-electric indicator  
AE 70 and AE 80



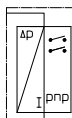
with visual indicator  
OP/AOR/AOC



with visual-electric 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	½ BSPP 304678
10	screw plug	2	¾ BSPP 305003				
11	connecting pipe	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	¾ 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altludersheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

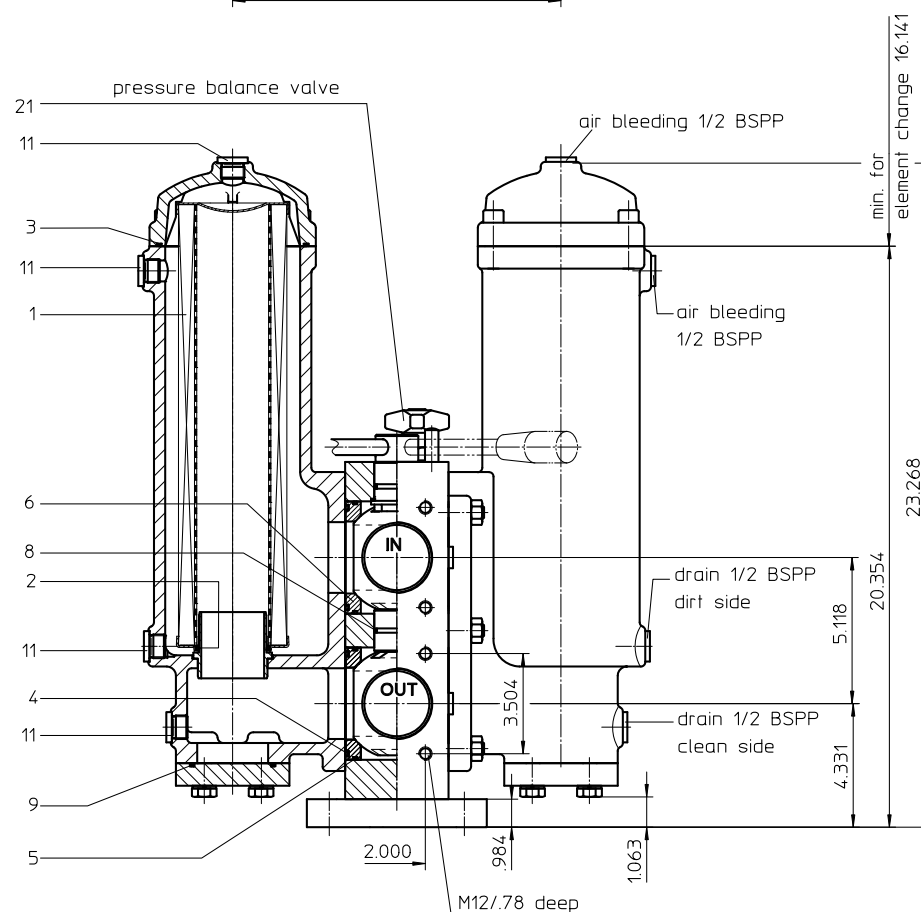
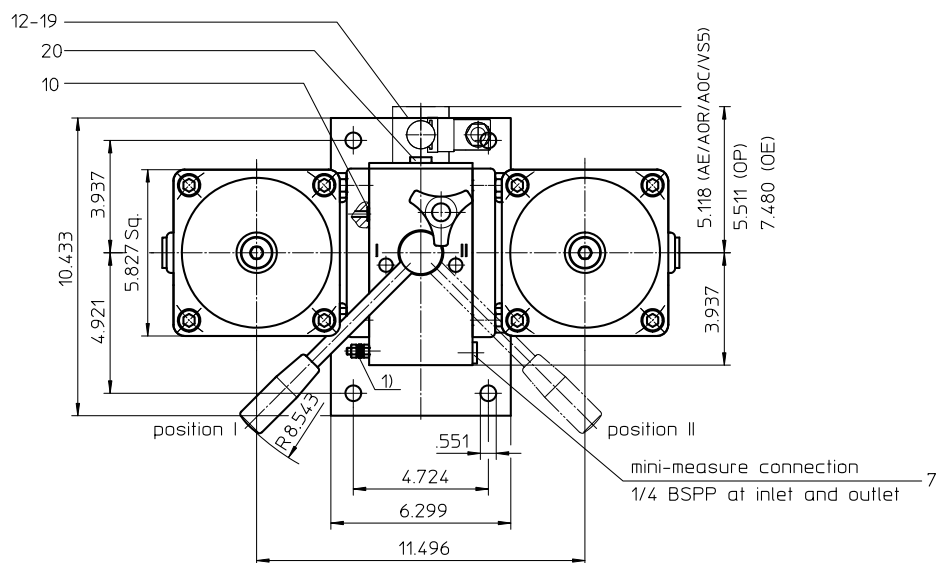
### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

Series DU 635  
464 PSI 12-19 ———

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.

# 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/amonía 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  $\Delta p$  and the element  $\Delta p$  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/](http://www.eatonpowersource.com/calculators/filtration/)

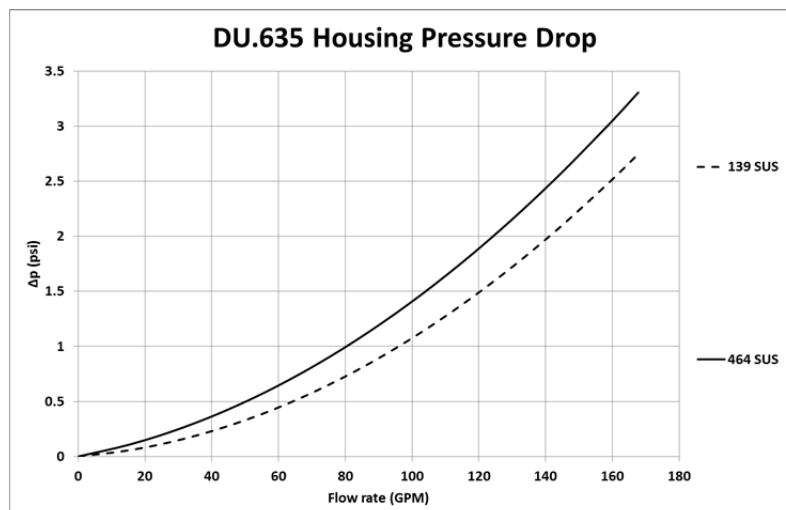
### Material gradient coefficients (MSK) for filter elements

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

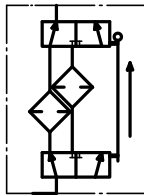
### $\Delta p = f(Q)$ – characteristics according to ISO 3968

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.

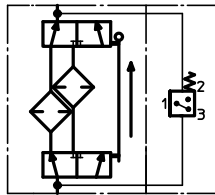


## Symbols:

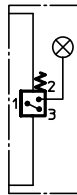
without indicator



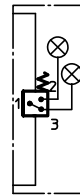
with electric indicator  
AE 30 and AE 40



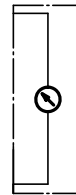
with visual-electric indicator  
AE 50 and AE 62



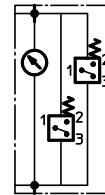
with visual-electric indicator  
AE 70 and AE 80



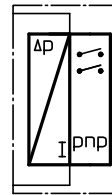
with visual indicator  
AOR/AOC/OP



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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlufheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

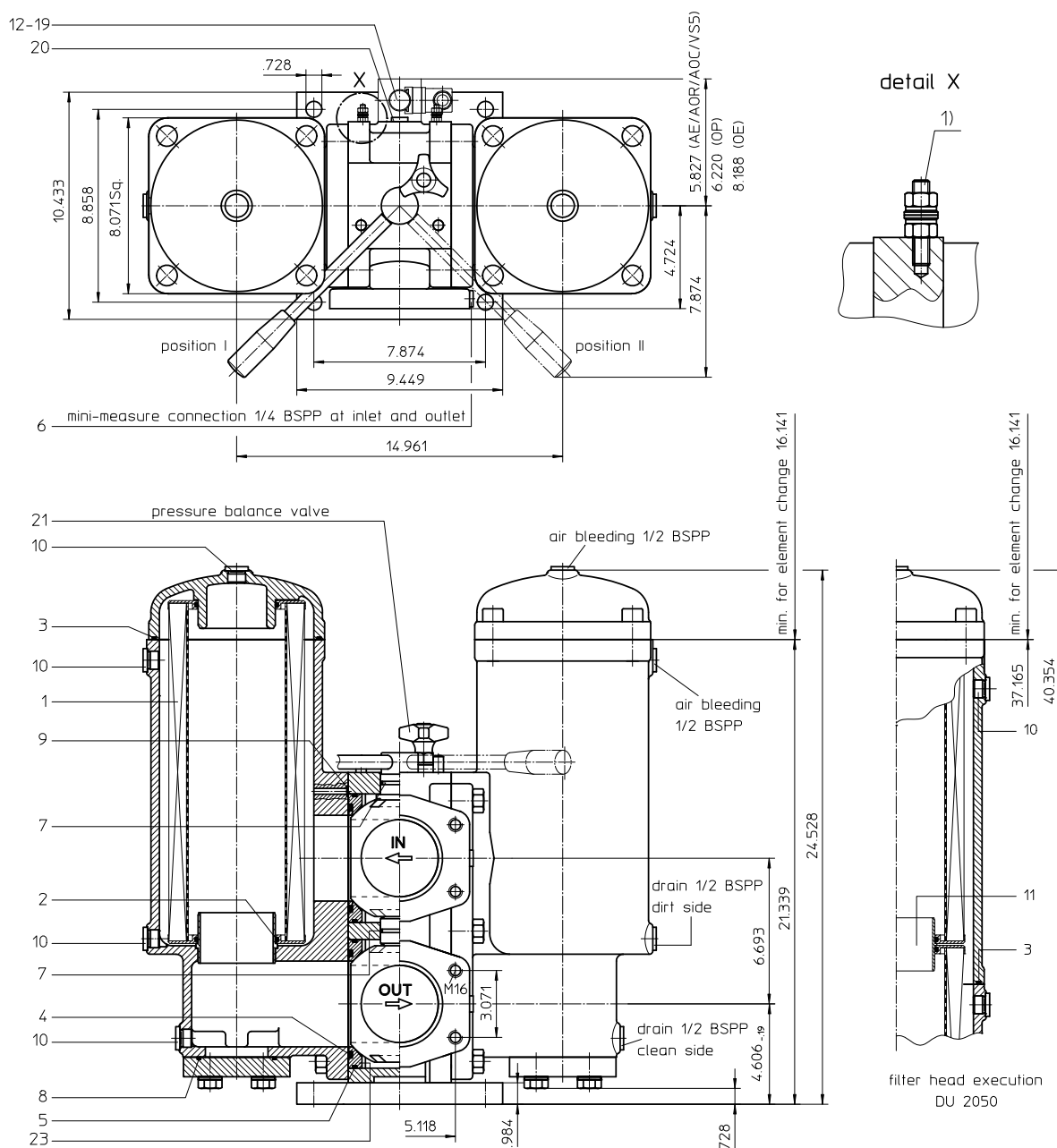
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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" <sup>1)</sup>	SAE 4" 3000 PSI	330 lbs.
DU 1050	SAE 4"	SAE 4" 3000 PSI	330 lbs.
DU 2050	SAE 3" <sup>1)</sup>	SAE 4" 3000 PSI	440 lbs.
DU 2050	SAE 4"	SAE 4" 3000 PSI	440 lbs.

<sup>1)</sup> with reducing flange BFS.B.E.88,9x3,2.St.P.3000 / V (Viton) can be used instead P (Nitrile)

Dimensions: inches



Powering Business Worldwide

Designs and performance values are subject to change.

EDV 10/15

# 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 (NH<sub>3</sub>), 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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

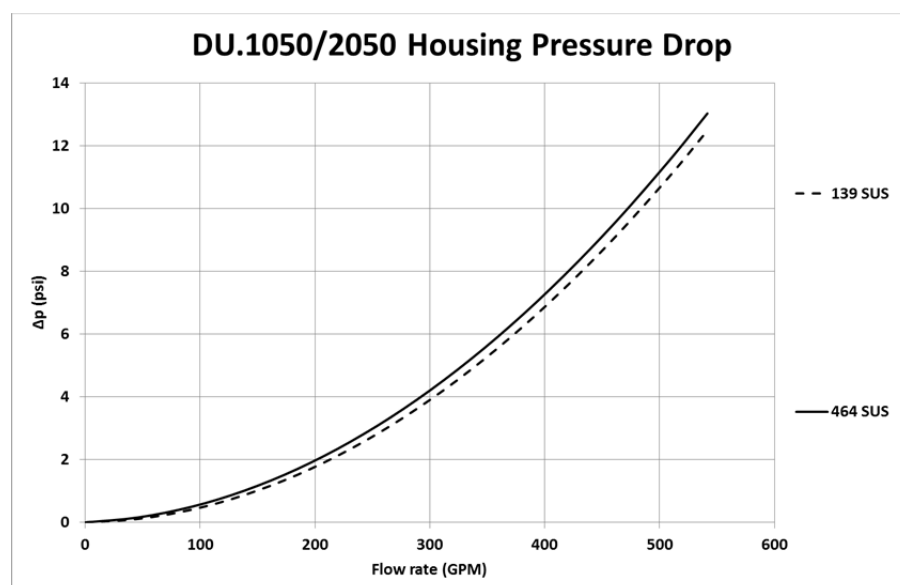
### Material gradient coefficients (MSK) for filter elements

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

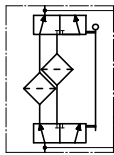
### $\Delta p = f(Q)$ – characteristics according to ISO 3968

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.

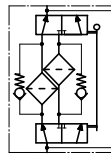


## Symbols:

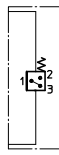
without indicator



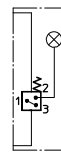
with by-pass valve



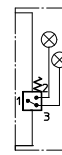
with electric indicator  
AE 30 and AE 40



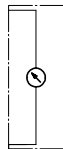
with visual-electric indicator  
AE 50 and AE 62



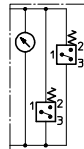
with visual-electric indicator  
AE 70 and AE 80



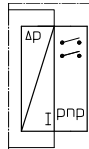
with visual indicator  
OP/AOR/AOC



with visual-electric indicator  
OE



with electronic clogging sensor  
VS5



## Spare parts:

item	designation	qty.	dimension and article-no. DU 1050			qty.	dimension and article-no. 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	¼ BSPP	305003		2	¼ 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	½ BSPP	304678		10	½ 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	¼ 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altludersheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

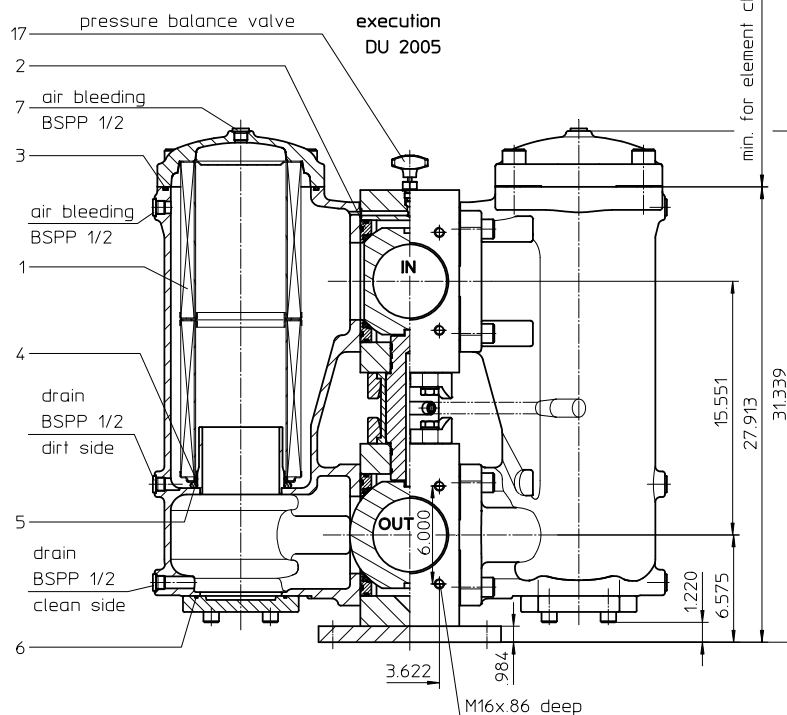
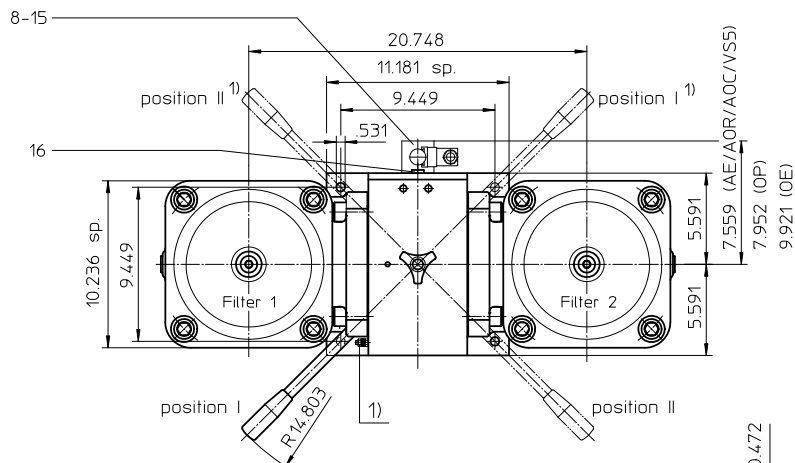
For more information, please

email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

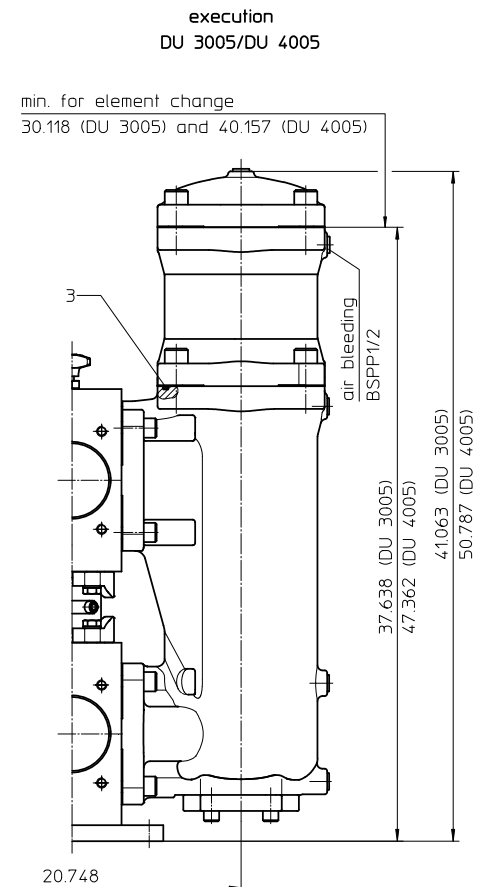
© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

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

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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

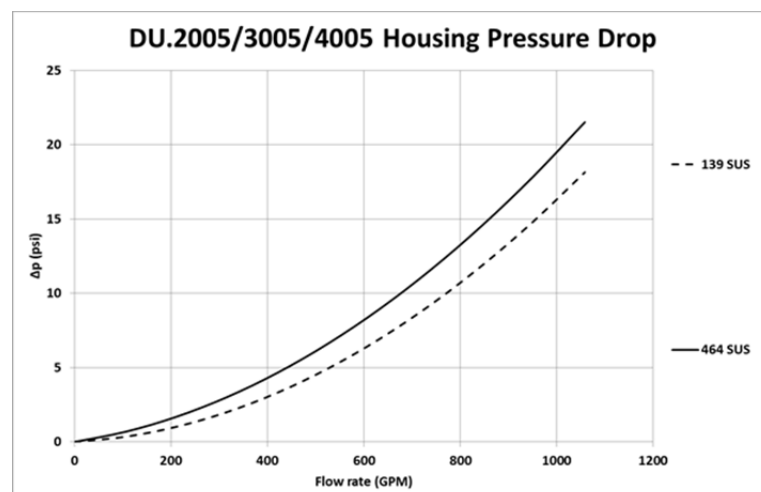
### Material gradient coefficients (MSK) for filter elements

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

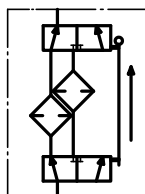
### $\Delta p = f(Q)$ – characteristics according to ISO 3968

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.

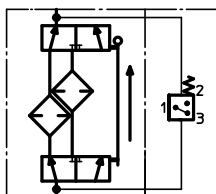


## Symbols:

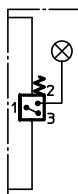
without indicator



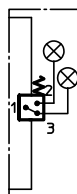
with electric indicator  
AE 30 and AE 40



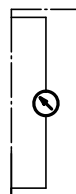
with visual-electric indicator  
AE 50 and AE 62



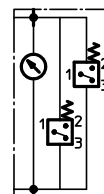
with visual-electric indicator  
AE 70 and AE 80



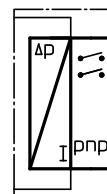
with visual indicator  
AOR/AOC/OP



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		
	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 1/2		
	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	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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlusheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

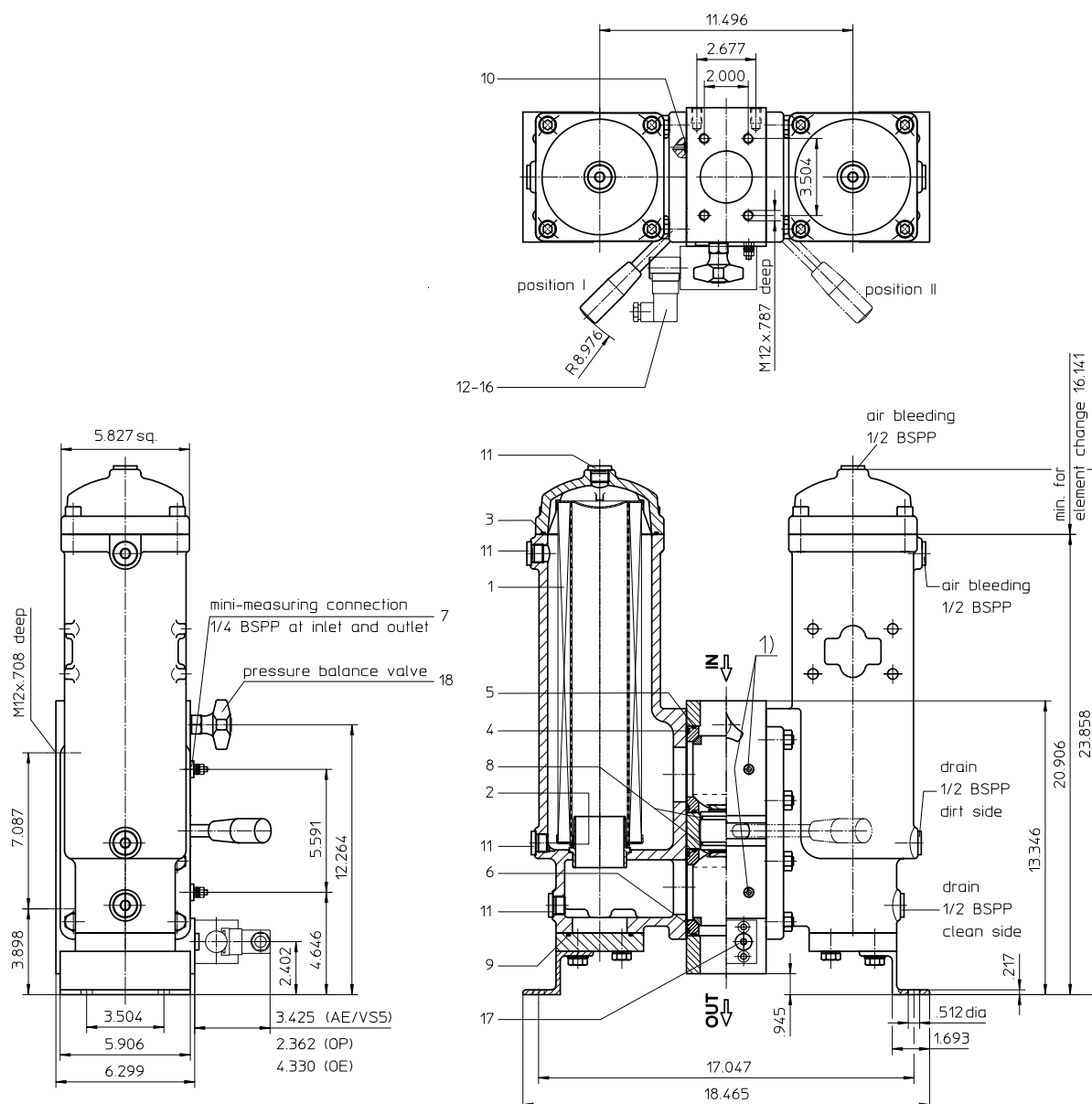
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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 (NH<sub>3</sub>), 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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

$$\Delta p_{\text{element}} (\text{PSI}) = Q (\text{GPM}) \times \frac{\text{MSK}}{1000} \left( \frac{\text{PSI}}{\text{GPM}} \right) \times \nu (\text{SUS}) \times \frac{\rho}{0,876} \left( \frac{\text{kg}}{\text{dm}^3} \right)$$

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

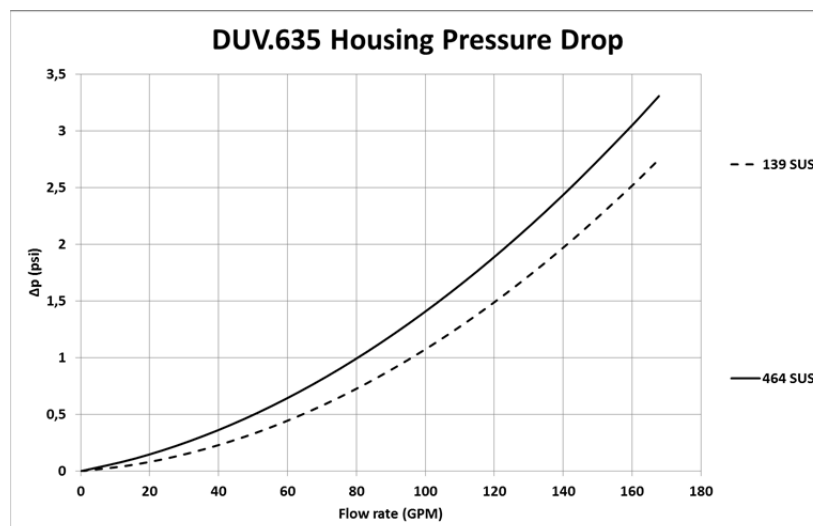
### Material gradient coefficients (MSK) for filter elements

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

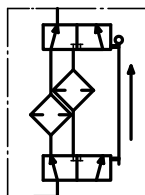
### $\Delta p = f(Q)$ – characteristics according to ISO 3968

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.

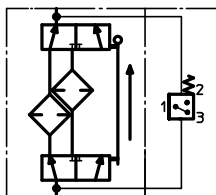


## Symbols:

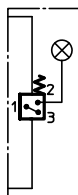
without indicator



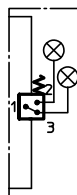
with electric indicator  
AE 30 and AE 40



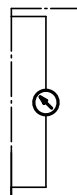
with visual-electric indicator  
AE 50 and AE 62



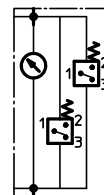
with visual-electric indicator  
AE 70 and AE 80



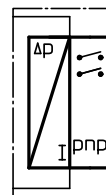
with visual indicator  
AOR/AOC/OP



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	1/4 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	1/2 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	1/4 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlufheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

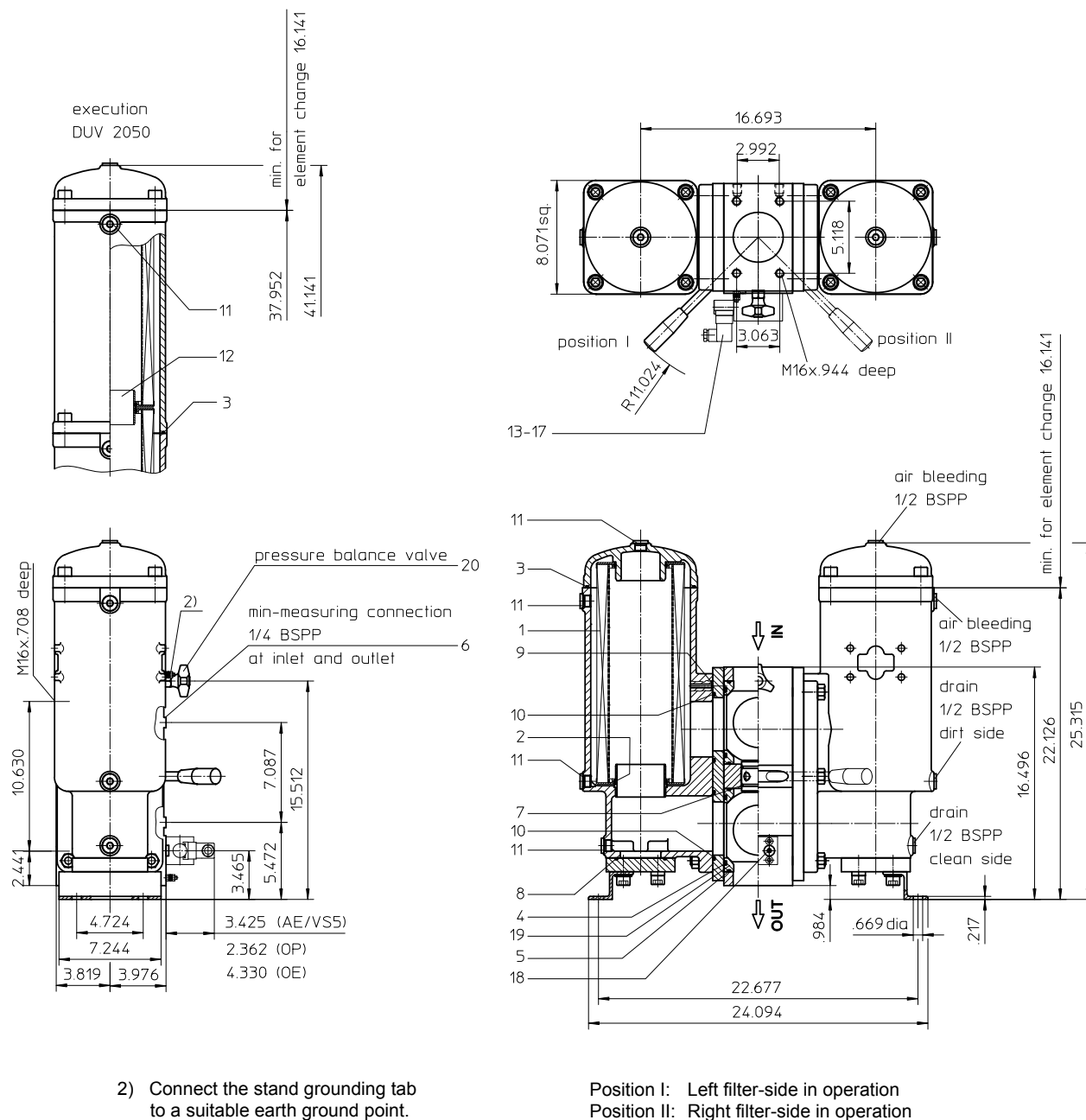
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# Series DUV 1050-2050

## 464 PSI



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

### Dimensions:

type	connection	SAE-connection size	weight
DUV 1050	SAE 3" <sup>1)</sup>	SAE 4" 3000 PSI	330 lbs.
DUV 1050	SAE 4"	SAE 4" 3000 PSI	330 lbs.
DUV 2050	SAE 3" <sup>1)</sup>	SAE 4" 3000 PSI	440 lbs.
DUV 2050	SAE 4"	SAE 4" 3000 PSI	440 lbs.

<sup>1)</sup> 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 (NH<sub>3</sub>), 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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

$$\Delta p_{\text{element}} (\text{PSI}) = Q (\text{GPM}) \times \frac{\text{MSK}}{1000} \left( \frac{\text{PSI}}{\text{GPM}} \right) \times \nu (\text{SUS}) \times \frac{\rho}{0,876} \left( \frac{\text{kg}}{\text{dm}^3} \right)$$

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

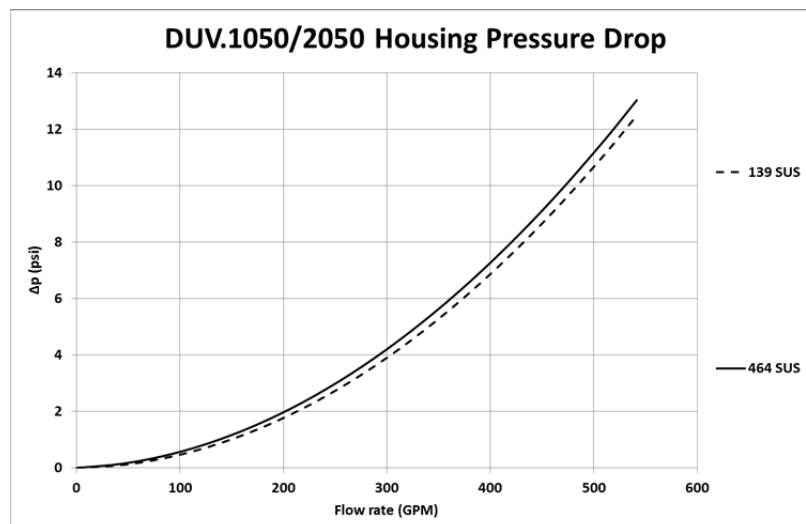
### Material gradient coefficients (MSK) for filter elements

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

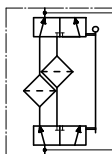
### $\Delta p = f(Q)$ – characteristics according to ISO 3968

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.

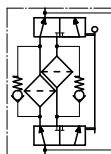


## Symbols:

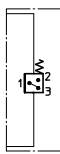
without indicator



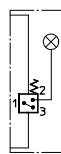
with by-pass valve



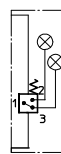
with electric indicator  
AE 30 and AE 40



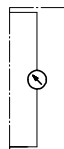
with visual-electric indicator  
AE 50 and AE 62



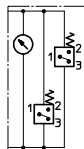
with visual-electric indicator  
AE 70 and AE 80



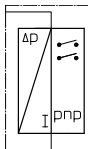
with visual indicator  
OP/AOR/AOC



with visual-electrical indicator  
OE



with electronic clogging sensor  
VS5



## Spare parts:

item	designation	qty.	dimension and article-no. DUV 1050		qty.	dimension and article-no. 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altludersheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

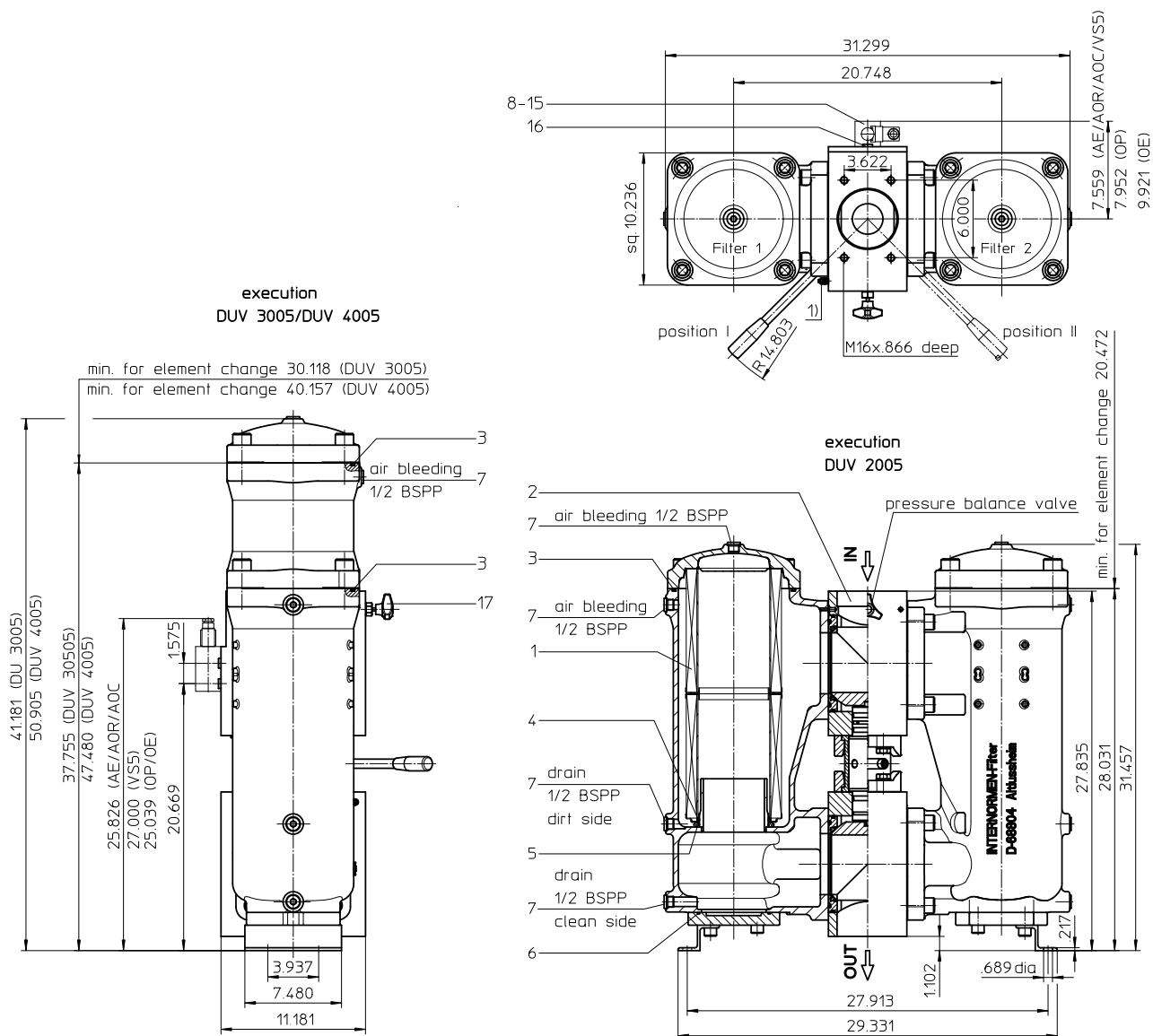
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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.

# 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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

$$\Delta p_{\text{element}} (\text{PSI}) = Q (\text{GPM}) \times \frac{\text{MSK}}{1000} \left( \frac{\text{PSI}}{\text{GPM}} \right) \times \nu (\text{SUS}) \times \frac{\rho}{0,876} \left( \frac{\text{kg}}{\text{dm}^3} \right)$$

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

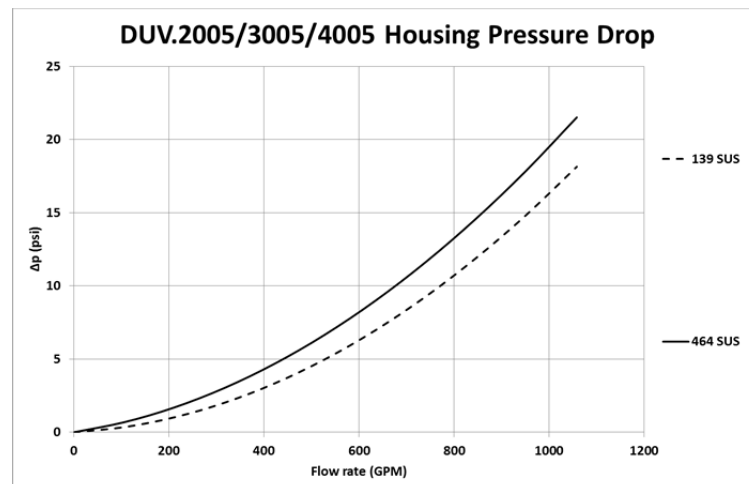
### Material gradient coefficients (MSK) for filter elements

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

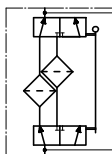
### $\Delta p = f(Q)$ – characteristics according to ISO 3968

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.

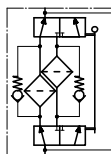


## Symbols:

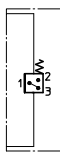
without indicator



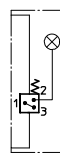
with by-pass valve



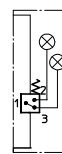
with electric indicator  
AE 30 and AE 40



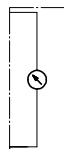
with visual-electric indicator  
AE 50 and AE 62



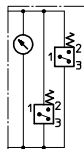
with visual-electric indicator  
AE 70 and AE 80



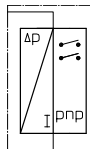
with visual indicator  
OP/AOR/AOC



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)			
5	2	O-ring	135 x 10	306016 (NBR)	307045 (FPM)
6	2	O-ring	125 x 10	304388 (NBR)	306006 (FPM)
7	2	O-ring	136,12 x 3,53	320162 (NBR)	320163 (FPM)
8	8	screw plug (DU 2005)	BSPP 1/4	304678	
9	10	screw plug (DU 3005/4005)			
10	1	clogging indicator visual	AOR or AOC	see seat-no. 1606	
11	1	clogging indicator visual-electric	OE	see seat-no. 1628	
12	1	clogging indicator visual	OP	see seat-no. 1628	
13	1	clogging indicator visual-electric	AE	see seat-no. 1609	
14	1	clogging sensor electronic	VS5	see seat-no. 1641	
15	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
16	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
17	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
18	2	screw plug	BSPP 1/4	305003	
19	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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlufheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

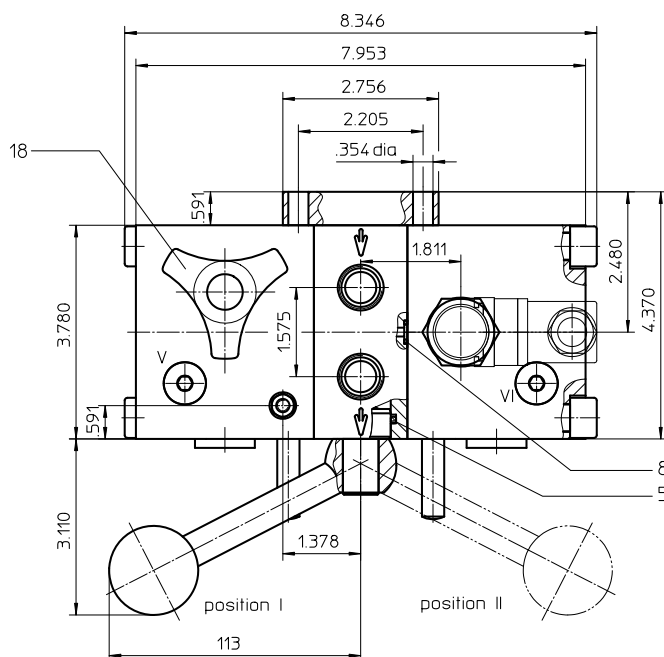
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# Series MDD 40-63

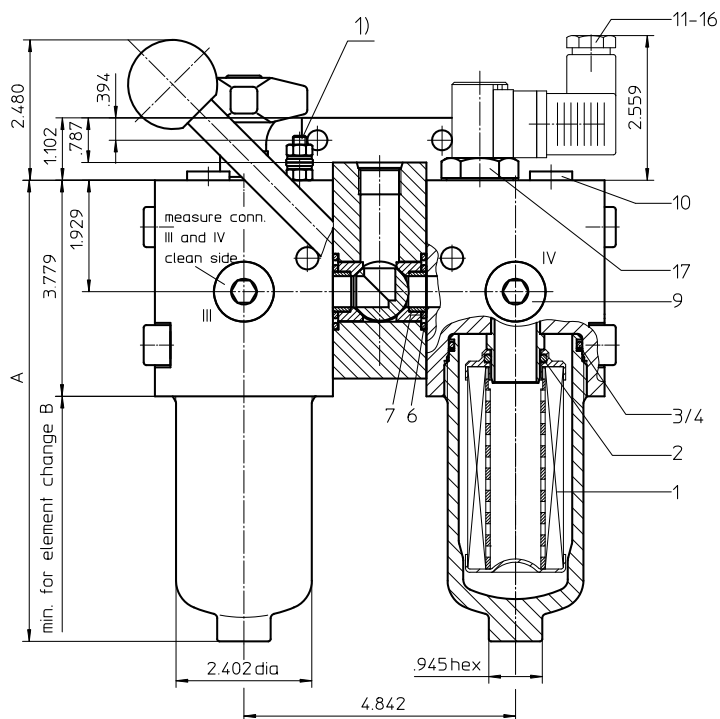
## 2900 PSI



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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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)

<b>MDD.</b>	<b>40.</b>	<b>10VG.</b>	<b>HR.</b>	<b>E.</b>	<b>P.</b>	<b>-.</b>	<b>UG.</b>	<b>3.</b>	<b>-.</b>	<b>-.</b>	<b>AE</b>
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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
S2 = with by-pass valve  $\Delta p$  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)

<b>01NL.</b>	<b>40.</b>	<b>10VG.</b>	<b>HR.</b>	<b>E.</b>	<b>P.</b>	<b>-</b>
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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

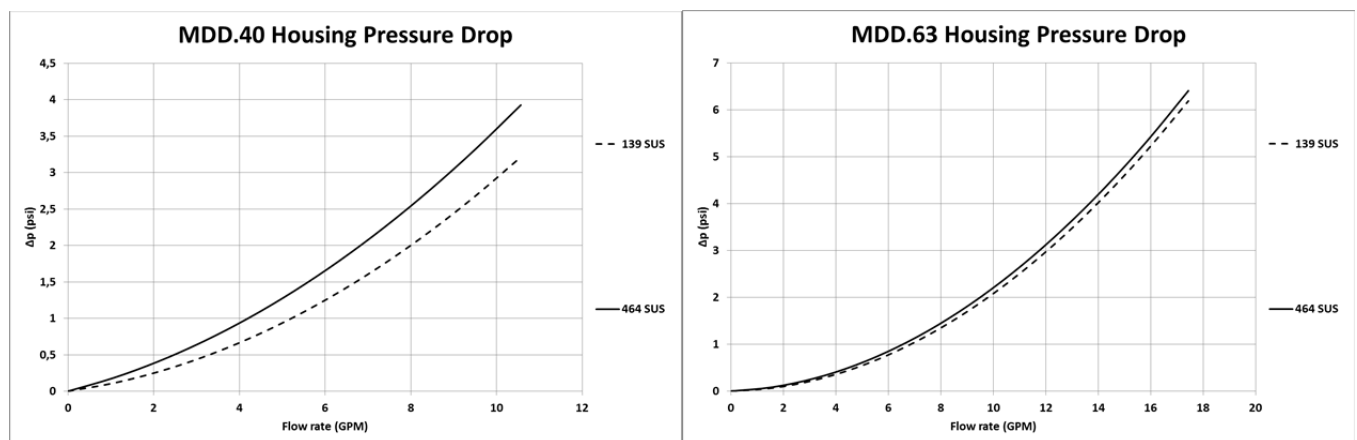
### Material gradient coefficients (MSK) for filter elements

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.

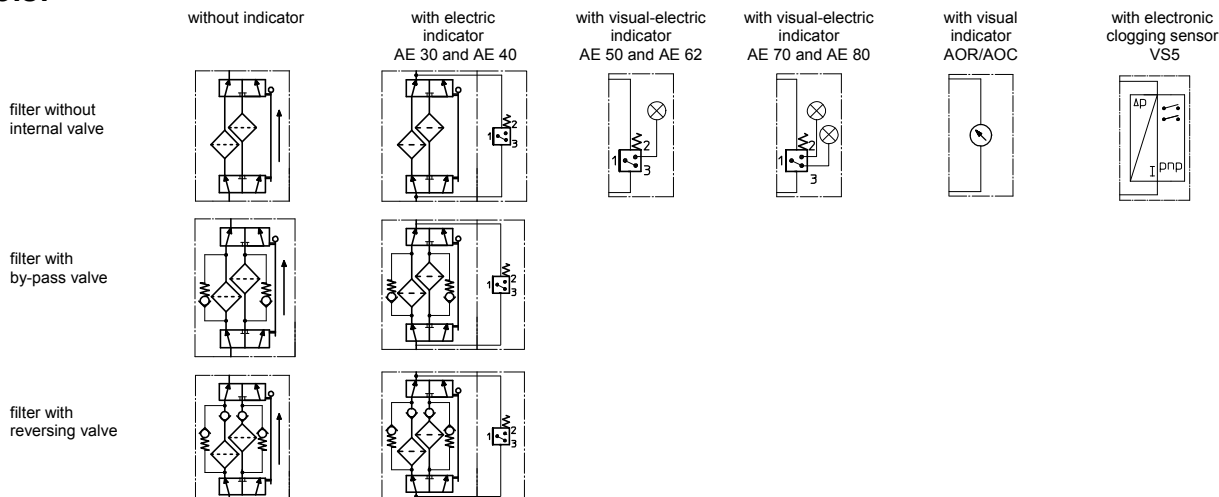
MDD	VG				
	3VG	6VG	10VG	16VG	25VG
40	6.991	4.853	3.107	2.705	1.848
63	4.214	2.926	1.873	1.631	1.114

### $\Delta p = f(Q)$ – 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	MDD 63		
1	2	filter element	01NL.40...	01NL.63...		
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	1/4 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

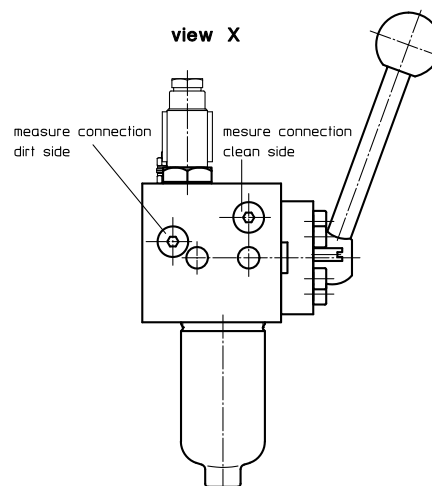
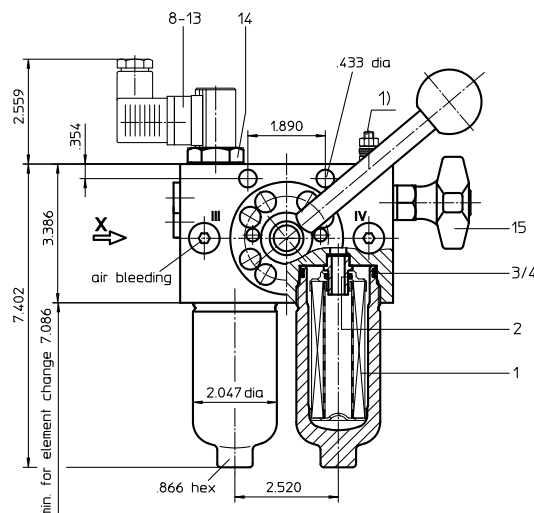
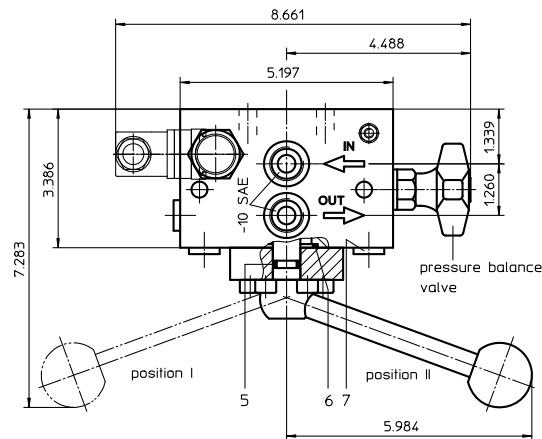
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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  $\mu\text{m}_{(0)}$ . 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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	<b>series:</b> HDD = pressure filter, change over									
2	<b>nominal size:</b> 30									
3	<b>filter-material and filter-fineness:</b> 25VG, 16VG, 10VG, 6VG, 3VG microglass									
4	<b>filter element collapse rating:</b> 30 = $\Delta p$ 435 PSI HR = $\Delta p$ 2320 PSI (rupture strength $\Delta p$ 3625 PSI)									
5	<b>filter element design:</b> E = single-end open									
6	<b>sealing material:</b> P = Nitrile (NBR) V = Viton (FPM)									
7	<b>filter element specification:</b> - = standard VA = stainless steel									
8	<b>process connection:</b> UG = thread connection									
9	<b>process connection size:</b> 3A = -10 SAE									
10	<b>filter housing specification:</b> - = standard									
11	<b>clogging indicator or clogging sensor:</b> - = 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	<b>series:</b> 01E. = filter element according to company standard					
2	<b>nominal size:</b> 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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

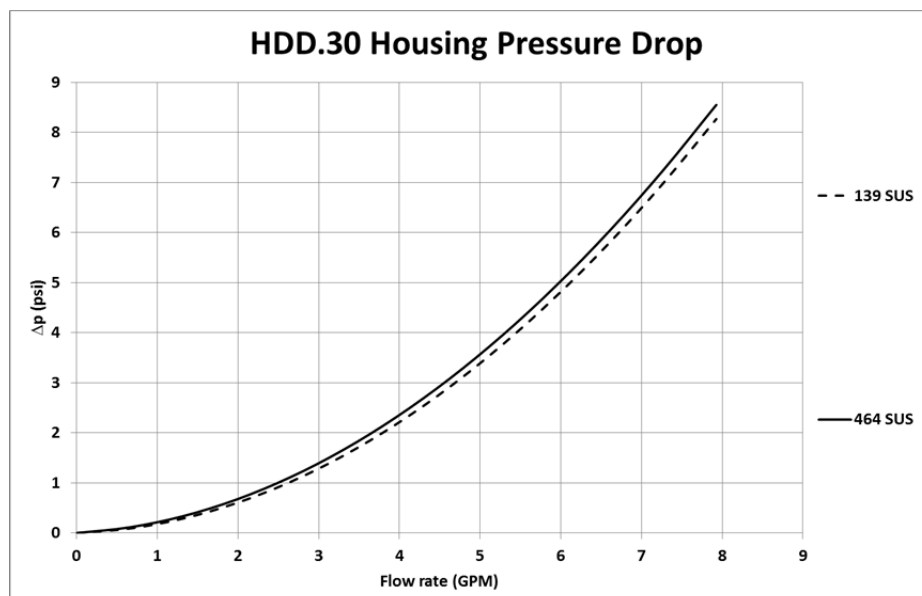
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

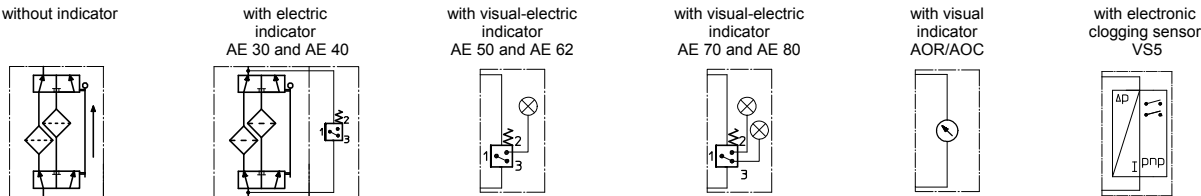
HDD	VG				
	3VG	6VG	10VG	16VG	25VG
30	12.554	8.716	5.580	4.794	3.275

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

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. The pressure drop changes proportionally to the density.



**Symbols:**



**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	¼ 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
- ISO 2942
- ISO 2943
- ISO 3723
- ISO 3724
- ISO 3968
- ISO 16889
- Verification of collapse/burst resistance
- Verification of fabrication integrity
- Verification of material compatibility with fluids
- Method for end load test
- Verification of flow fatigue characteristics
- Evaluation of pressure drop versus flow characteristics
- Multi-pass method for evaluating filtration performance



**North America**

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

**Europe/Africa/Middle East**

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlußheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

**China**

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

**Singapore**

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

**Brazil**

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

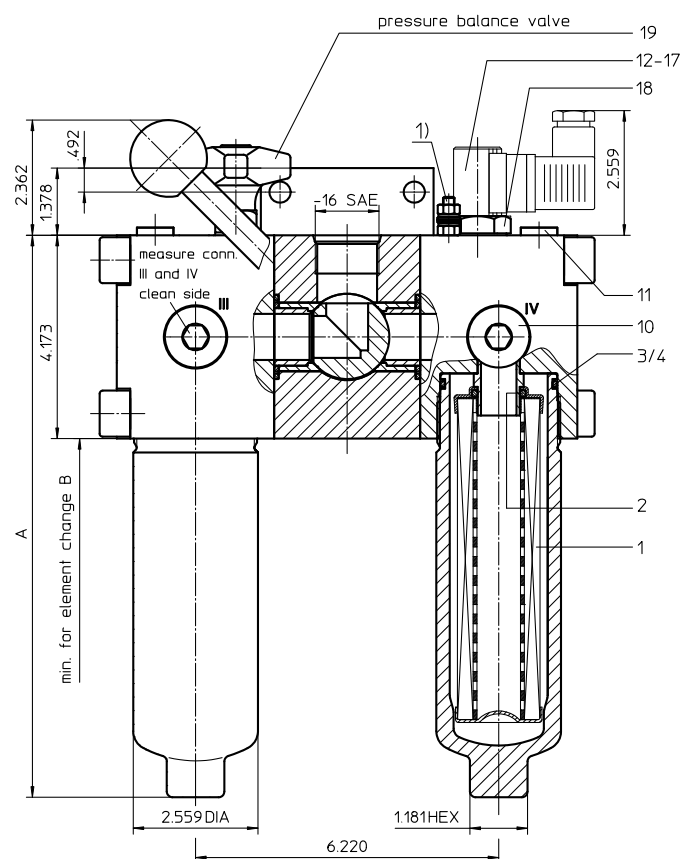
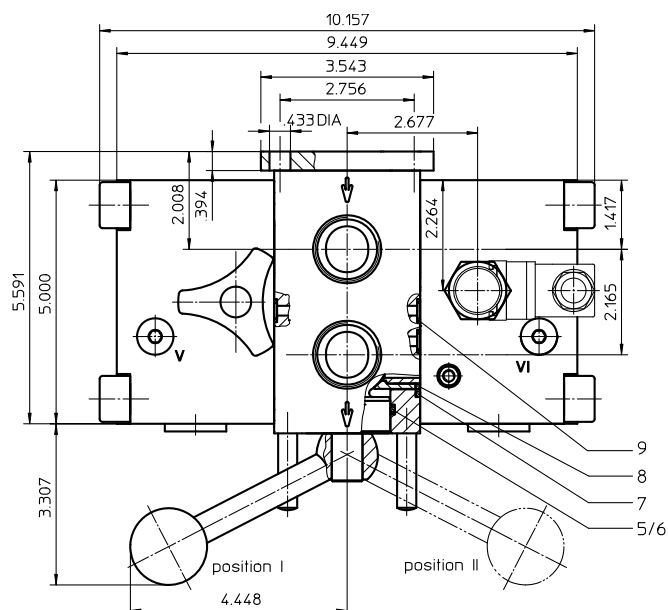
**For more information, please**

**email us at [filtration@eaton.com](mailto:filtration@eaton.com)**  
**or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)**

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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)

<b>HDD.</b>	<b>91.</b>	<b>10VG.</b>	<b>HR.</b>	<b>E.</b>	<b>P.</b>	<b>-</b>	<b>UG.</b>	<b>5.</b>	<b>-</b>	<b>-</b>	<b>AE</b>
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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
S2 = with by-pass valve  $\Delta p$  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)

<b>01E.</b>	<b>90.</b>	<b>10VG.</b>	<b>HR.</b>	<b>E.</b>	<b>P.</b>	<b>-</b>
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 ¾

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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

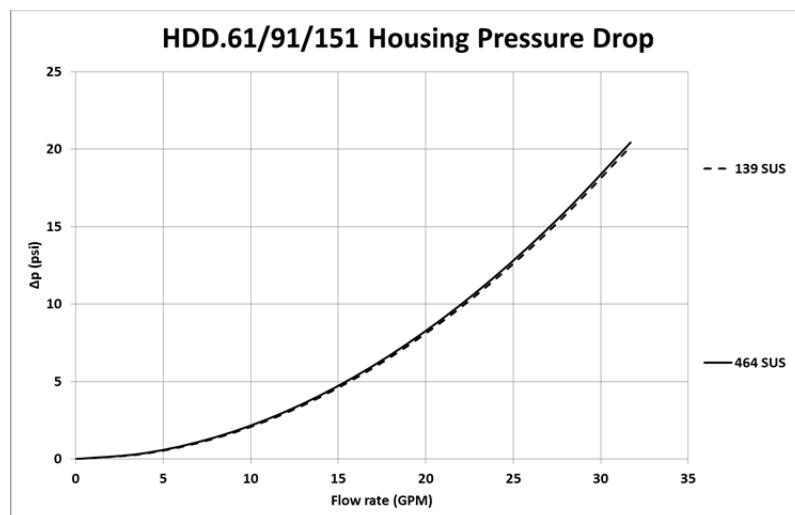
### Material gradient coefficients (MSK) for filter elements

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.

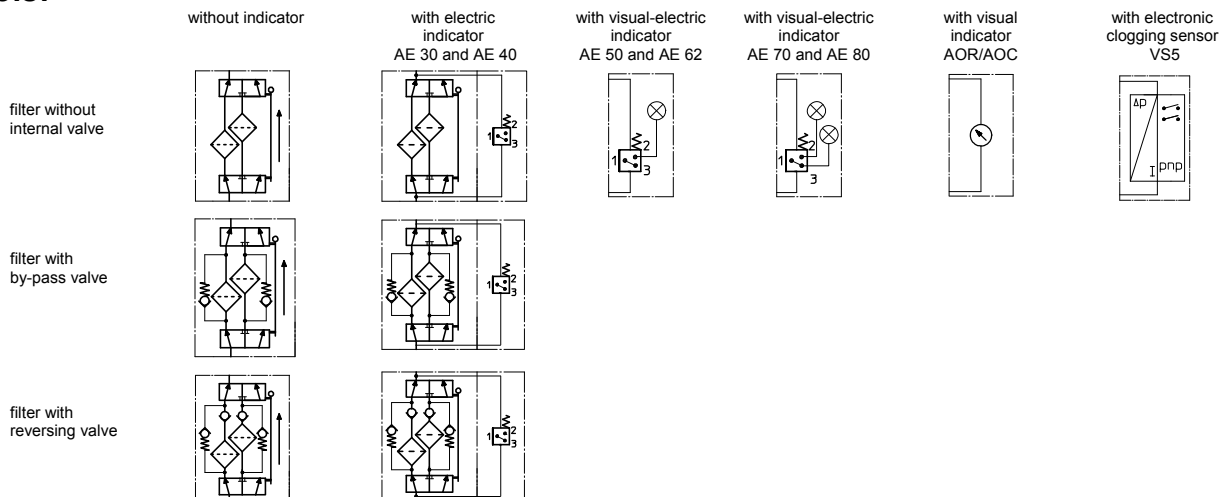
HDD	VG				
	3VG	6VG	10VG	16VG	25VG
61	6.748	4.685	2.999	2.577	1.760
91	4.059	2.818	1.804	1.550	1.059
151	2.422	1.681	1.076	0.925	0.632

### $\Delta p = f(Q)$ – 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		3/8 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

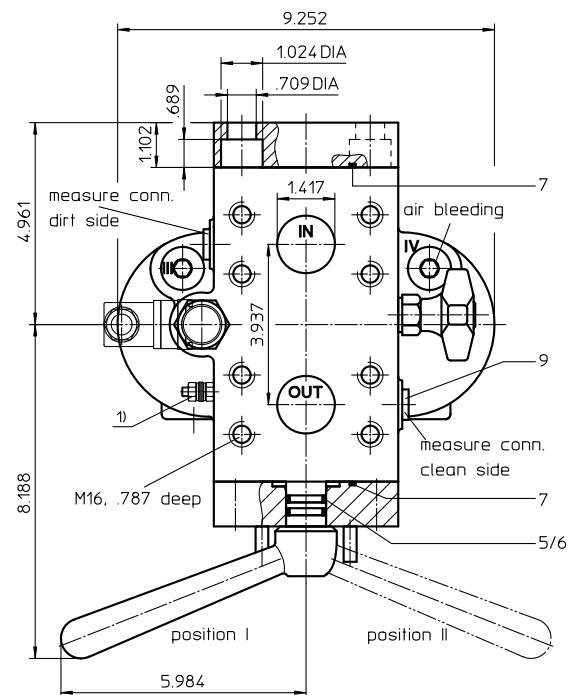
For more information, please

email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# Series HDD 170-450

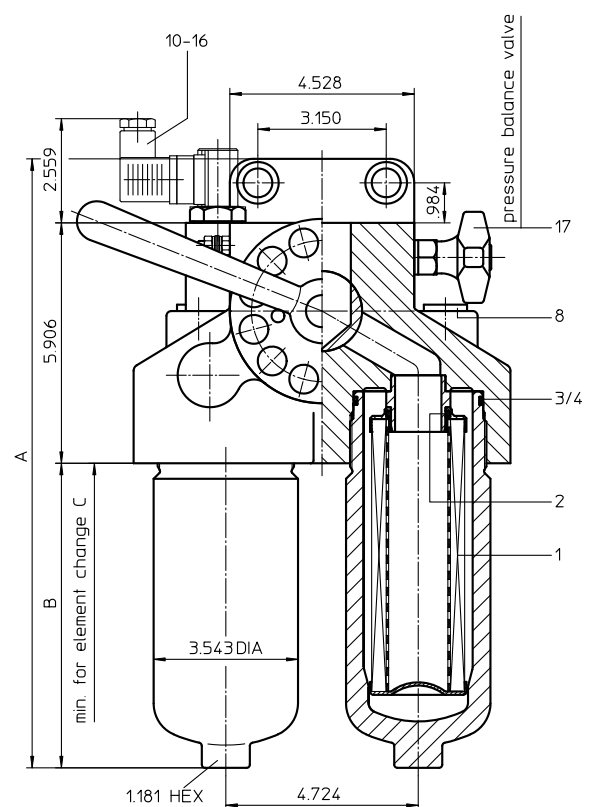


Position. I: left filter-side in operation  
Position. II: right filter-side in operation

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.

# 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  $\mu\text{m}_{(0)}$ . 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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	<b>series:</b> HDD = pressure filter, change over
2	<b>nominal size:</b> 170, 240, 360, 450
3	<b>filter-material and filter-fineness:</b> 25VG, 16VG, 10VG, 6VG, 3VG microglass
4	<b>filter element collapse rating:</b> 30 = $\Delta p$ 435 PSI HR = $\Delta p$ 2320 PSI (rupture strength $\Delta p$ 3625 PSI)
5	<b>filter element design:</b> E = single-end open
6	<b>sealing material:</b> P = Nitrile (NBR) V = Viton (FPM)
7	<b>filter element specification:</b> - = standard VA = stainless steel
8	<b>process connection:</b> FS = SAE-flange 6000 PSI
9	<b>process connection size:</b> 7 = 1 1/2"
10	<b>filter housing specification:</b> - = standard
11	<b>internal valve:</b> - = without S1 = with by-pass valve $\Delta p$ 51 PSI S2 = with by-pass valve $\Delta p$ 102 PSI R = reversing valve, Q $\leq$ 55.75 GPM
12	<b>clogging indicator or clogging sensor:</b> - = 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	<b>series:</b> 01E. = filter element according to company standard
2	<b>nominal size:</b> 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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

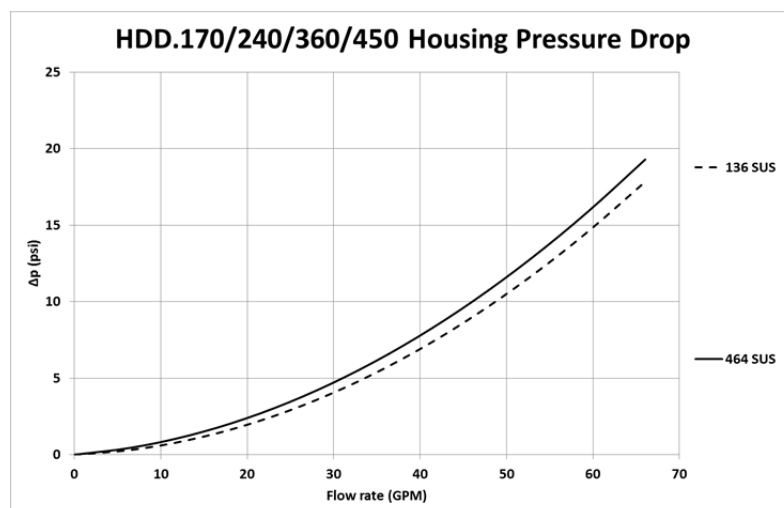
### Material gradient coefficients (MSK) for filter elements

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.

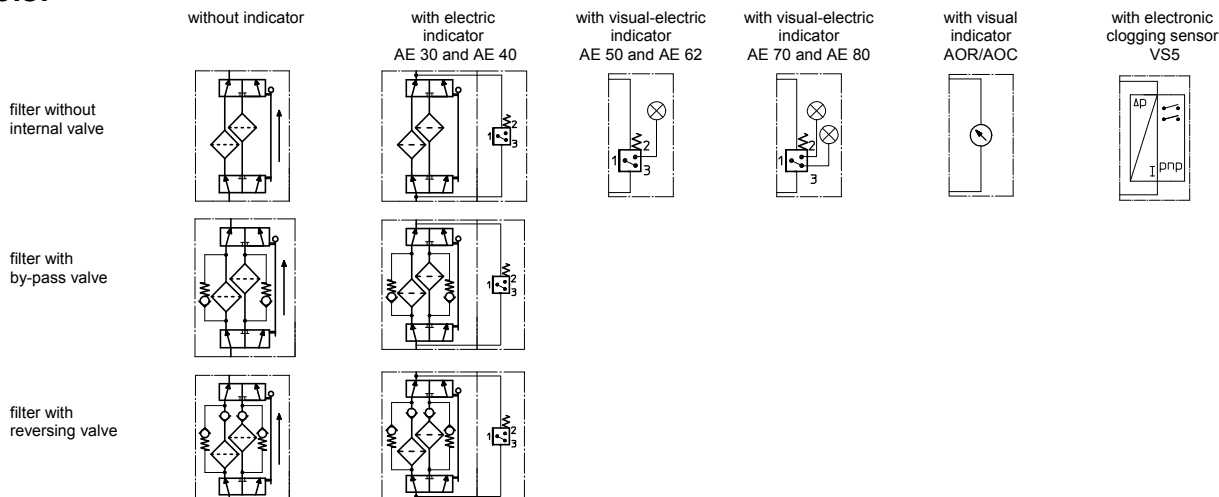
HDD	VG				
	3VG	6VG	10VG	16VG	25VG
170	2.714	1.884	1.206	1.036	0.708
240	2.092	1.452	0.930	0.799	0.546
360	1.530	1.062	0.680	0.584	0.399
450	1.126	0.782	0.500	0.430	0.294

### $\Delta p = f(Q)$ – 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	HDD 240	HDD 360	HDD 450		
1	2	filter element	01E.170...	01E.240...	01E.360...	01E.450...		
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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

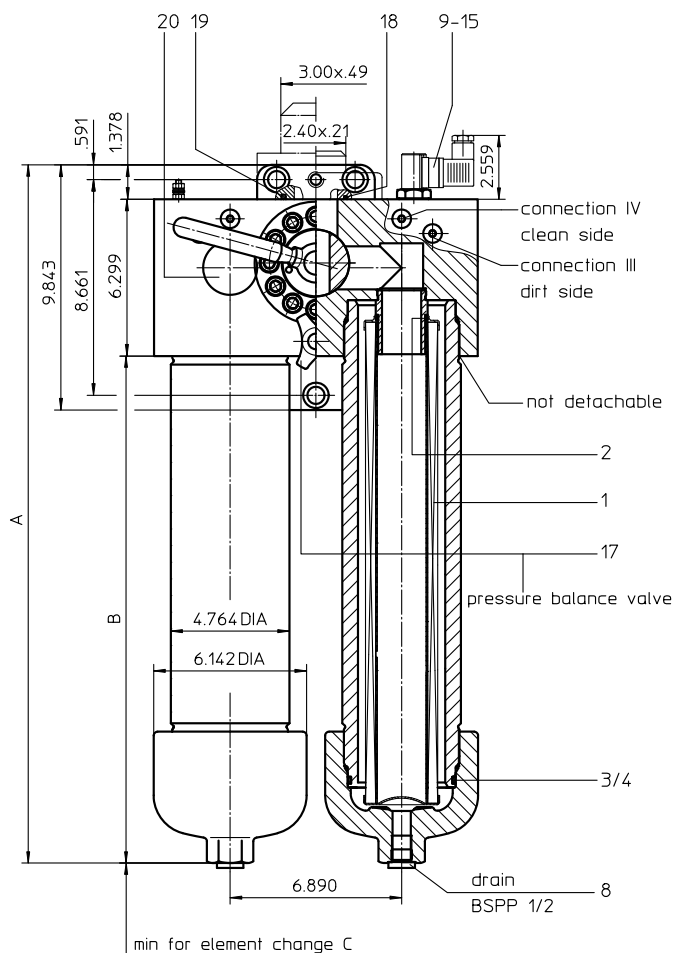
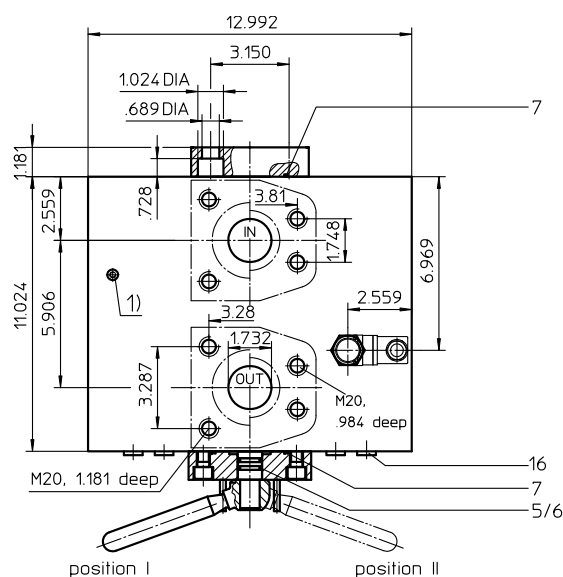
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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

EDV 09/15

# 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  $\mu\text{m}_{(0)}$ . 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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)

<b>HDD.</b>	<b>901.</b>	<b>10VG.</b>	<b>HR.</b>	<b>E.</b>	<b>P.</b>	<b>-.</b>	<b>FS.</b>	<b>8.</b>	<b>-.</b>	<b>-.</b>	<b>AE</b>
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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
S2 = with by-pass valve  $\Delta p$  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)

<b>01E.</b>	<b>900.</b>	<b>10VG.</b>	<b>HR.</b>	<b>E.</b>	<b>P.</b>	<b>-</b>
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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

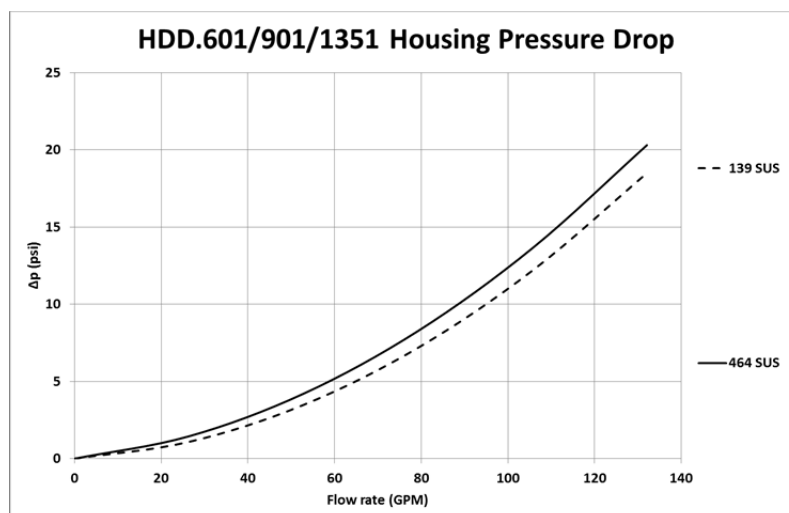
### Material gradient coefficients (MSK) for filter elements

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.

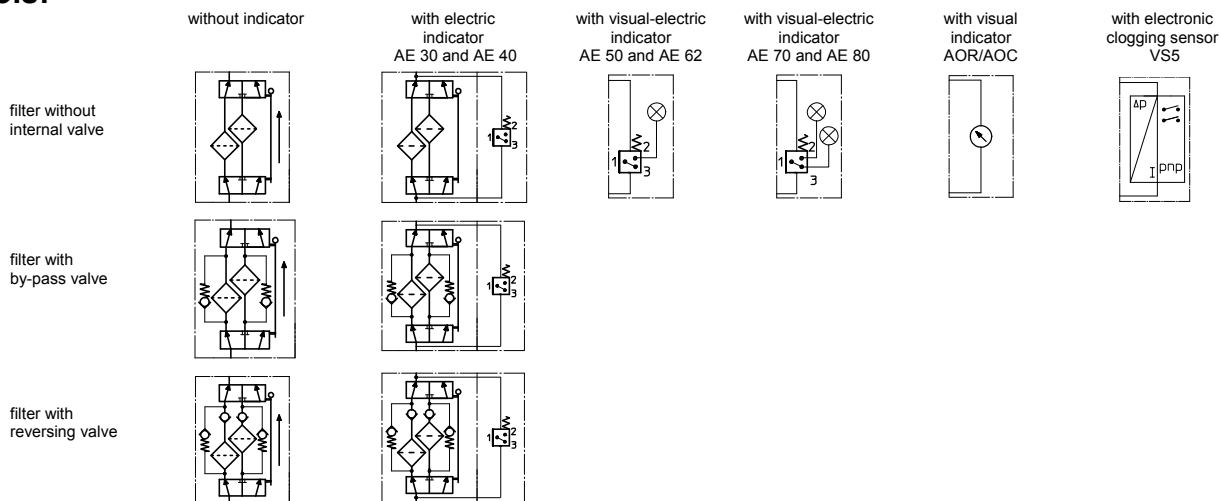
HDD	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
601	0.963	0.669	0.428	0.368	0.251	0.0303	0.0282	0.0193
901	0.668	0.464	0.297	0.225	0.174	0.0189	0.0177	0.0121
1351	0.417	0.290	0.185	0.185	0.109	0.0122	0.0114	0.0078

### $\Delta p = f(Q)$ – 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	HDD 901	HDD 1351		
1	2	filter element	01E.600...	01E.900...	01E.1350...		
2	2	O-ring		48 x 3		304357 (NBR)	304404 (FPM)
3	2	O-ring		98 x 4		301914 (NBR)	304765 (FPM)
4	2	support ring		110 x 3,5 x 2		304802	
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		71 x 3		306451 (NBR)	306897 (FPM)
8	2	screw plug		1/2 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		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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altludersheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

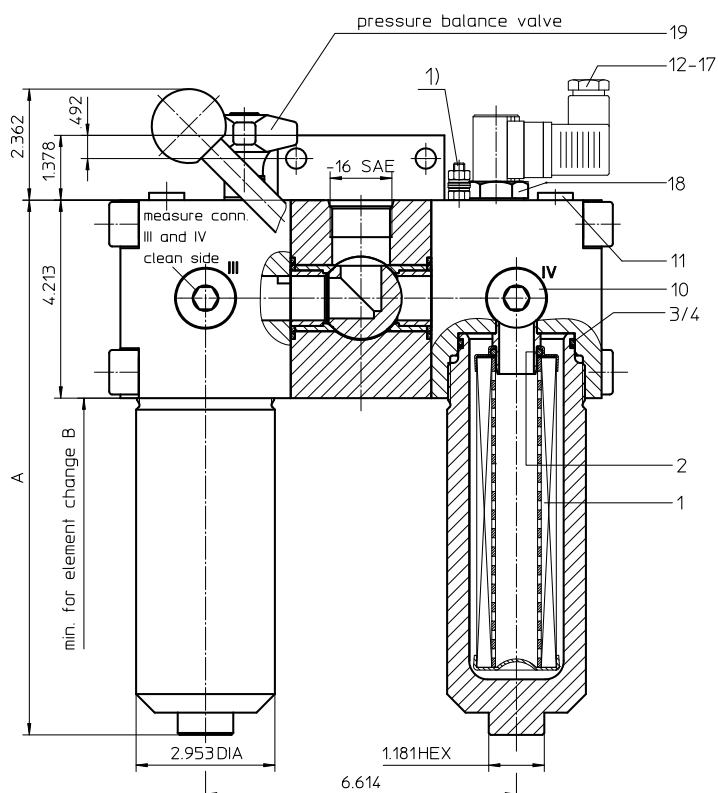
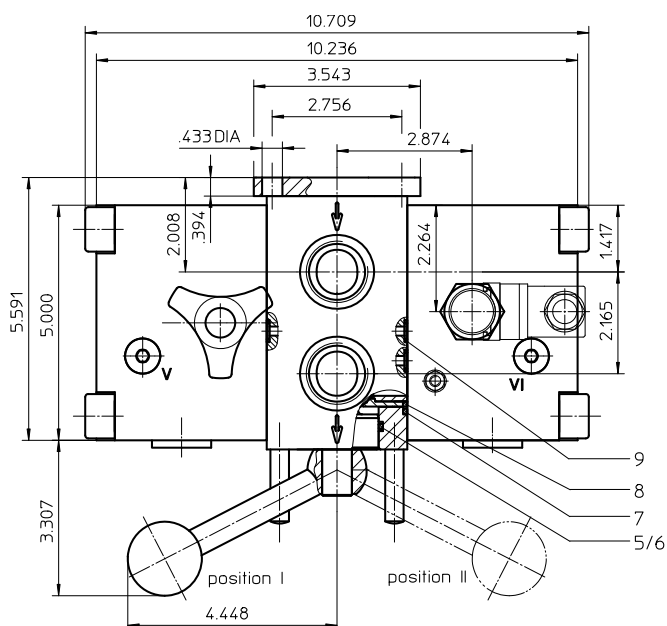
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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

EDV 09/15

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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)

<b>EHD.</b>	<b>91.</b>	<b>10VG.</b>	<b>HR.</b>	<b>E.</b>	<b>P.</b>	<b>VA.</b>	<b>UG.</b>	<b>5.</b>	<b>VA.</b>	<b>-</b>	<b>AE</b>
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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
S2 = with by-pass valve  $\Delta p$  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)

<b>01E.</b>	<b>90.</b>	<b>10VG.</b>	<b>HR.</b>	<b>E.</b>	<b>P.</b>	<b>VA</b>
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 ¾

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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

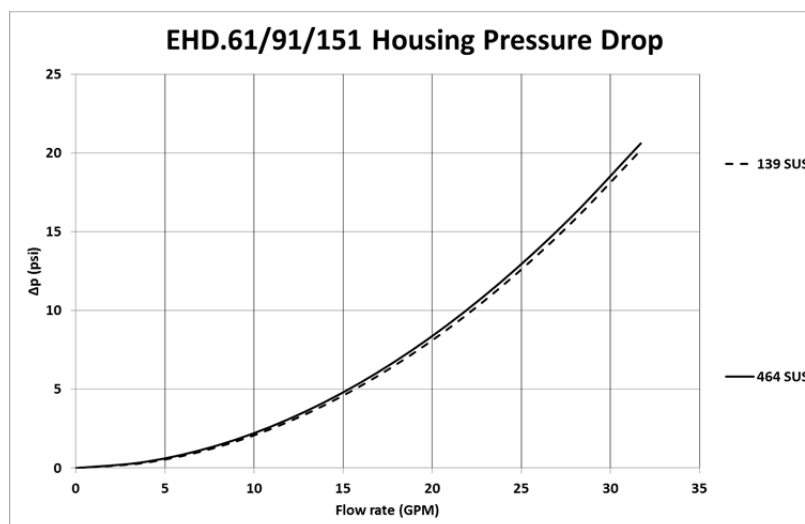
### Material gradient coefficients (MSK) for filter elements

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.

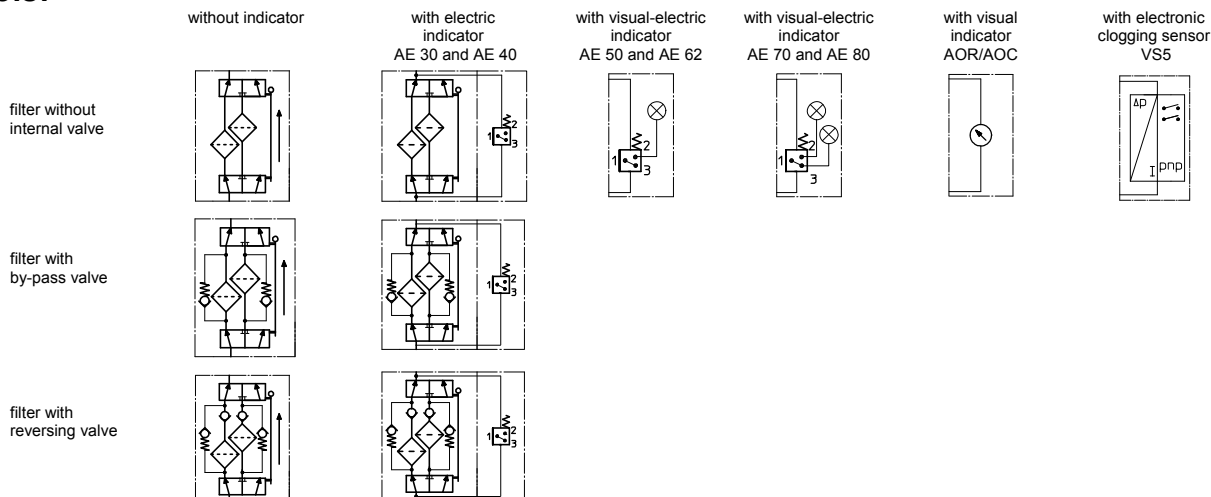
EHD	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
61	6.748	4.685	2.999	2.577	1.760	0.2002	0.1868	0.1280
91	4.059	2.818	1.804	1.550	1.059	0.1210	0.1130	0.0774
151	2.422	1.681	1.076	0.925	0.632	0.0723	0.0675	0.0462

### $\Delta p = f(Q)$ – 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		1/4 BSPP			313815
11	2	screw plug		1/4 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altludersheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

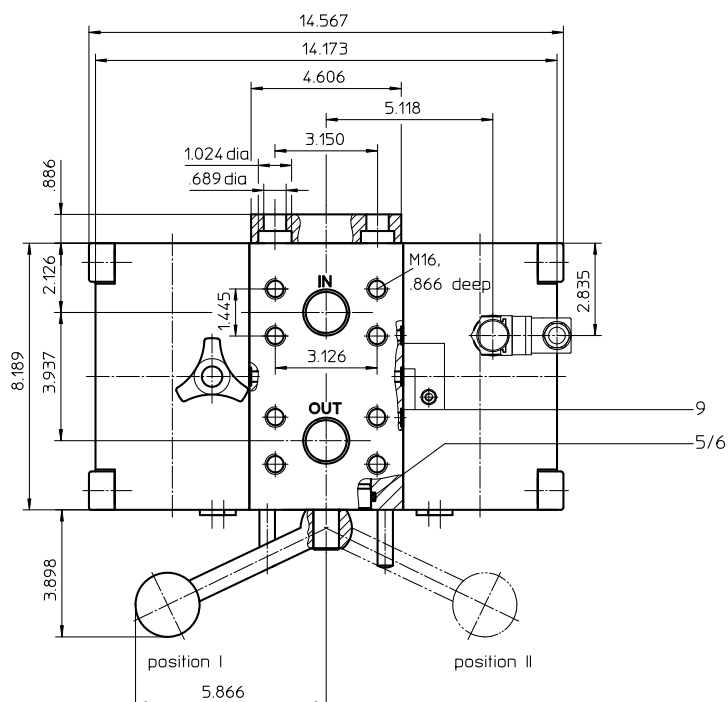
## For more information, please

email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# Series EHD 241-451

## 4568 PSI

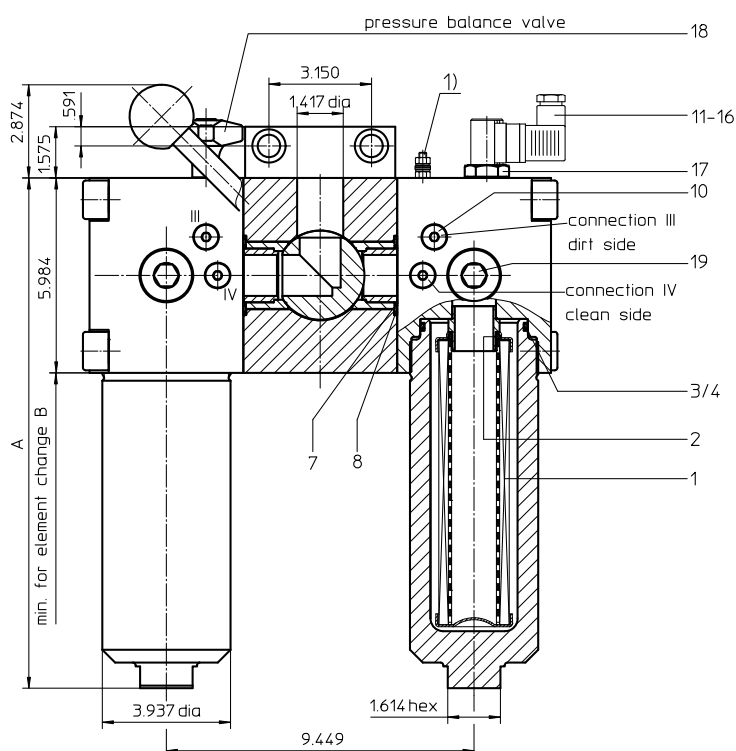


Position. I: left filter-side in operation  
Position. II: right filter-side in operation

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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
S2 = with by-pass valve  $\Delta p$  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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

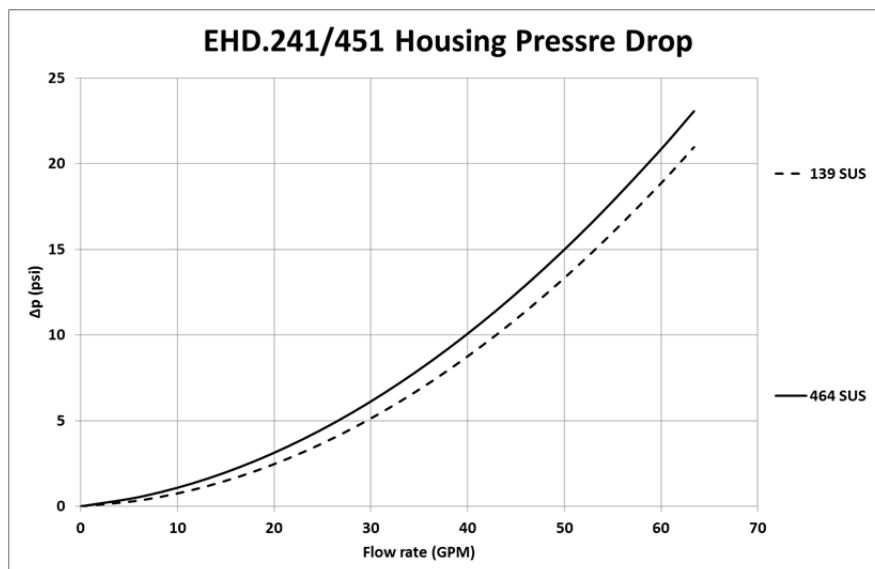
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

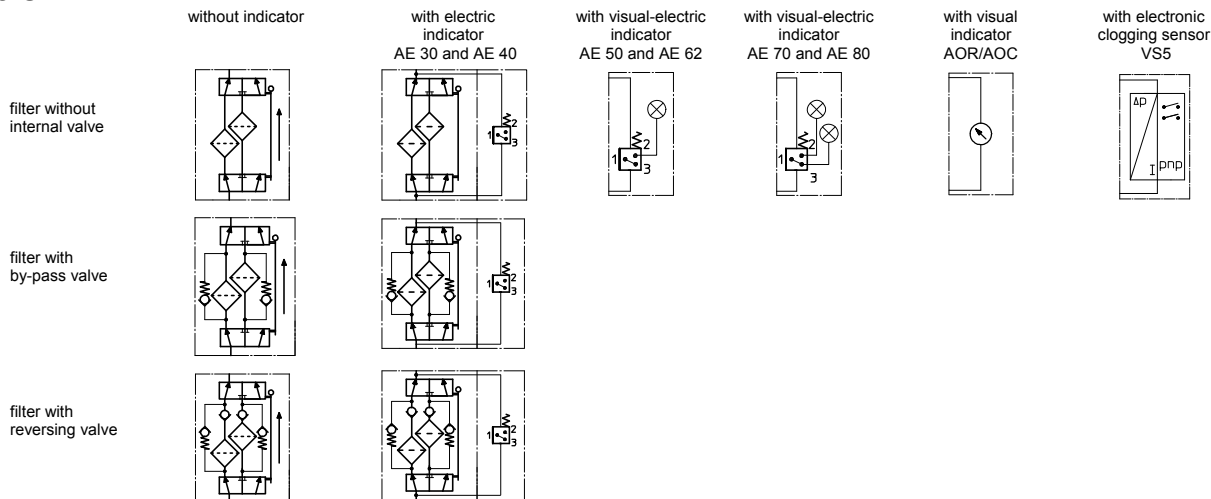
EHD	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
241	2.092	1.452	0.930	0.799	0.546	0.0651	0.0607	0.0416
451	1.126	0.782	0.500	0.430	0.294	0.0349	0.0326	0.0223

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

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. 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		1/4 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langerlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

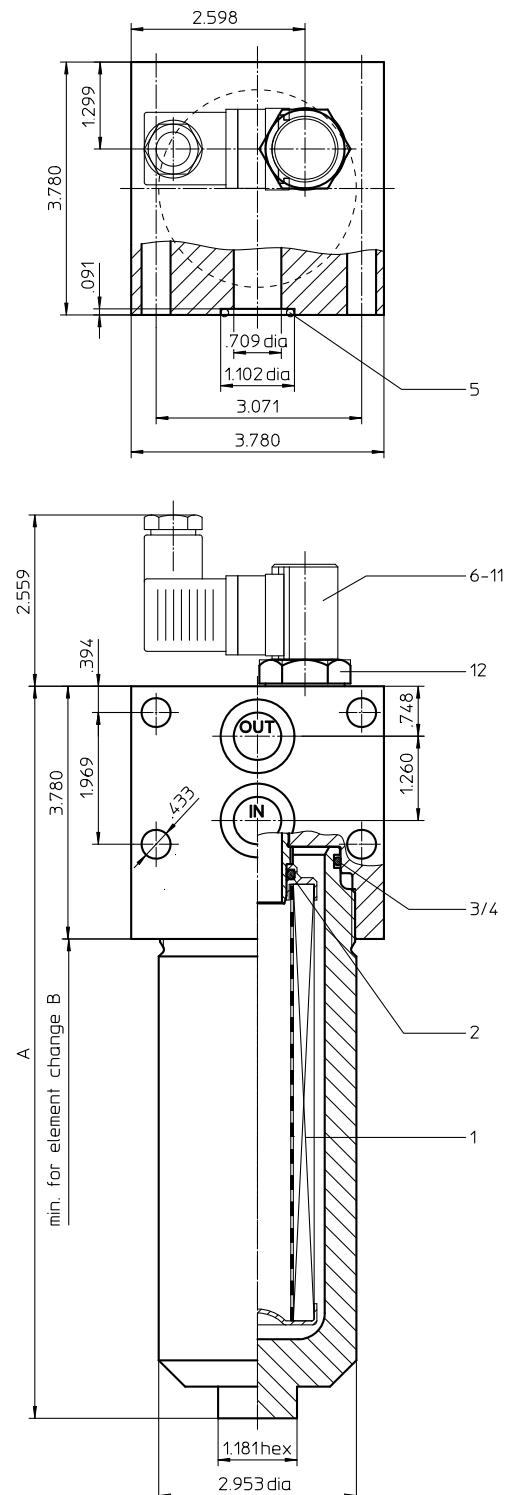
For more information, please

email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# Series EHPF 60-150 4568 PSI



### Dimensions:

type	EHPF 60	EHPF 90	EHPF 150
connection	$\frac{3}{4}$ "		
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.

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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)

<b>EHPF.</b>	<b>90.</b>	<b>10VG.</b>	<b>HR.</b>	<b>E.</b>	<b>P.</b>	<b>VA.</b>	<b>F.</b>	<b>4.</b>	<b>VA.</b>	<b>-.</b>	<b>AE</b>
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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
S2 = with bypass valve  $\Delta p$  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)

<b>01E.</b>	<b>90.</b>	<b>10VG.</b>	<b>HR.</b>	<b>E.</b>	<b>P.</b>	<b>VA</b>
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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

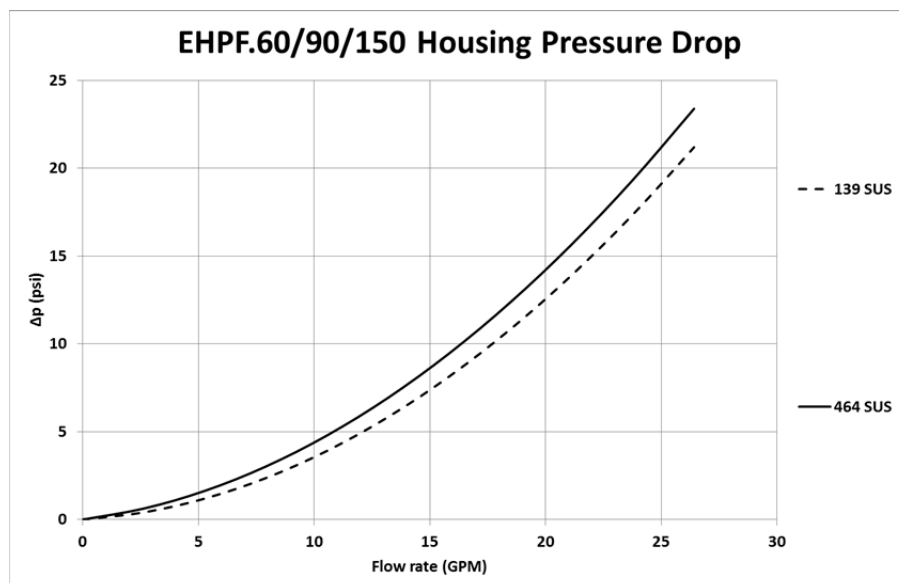
### Material gradient coefficients (MSK) for filter elements

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.

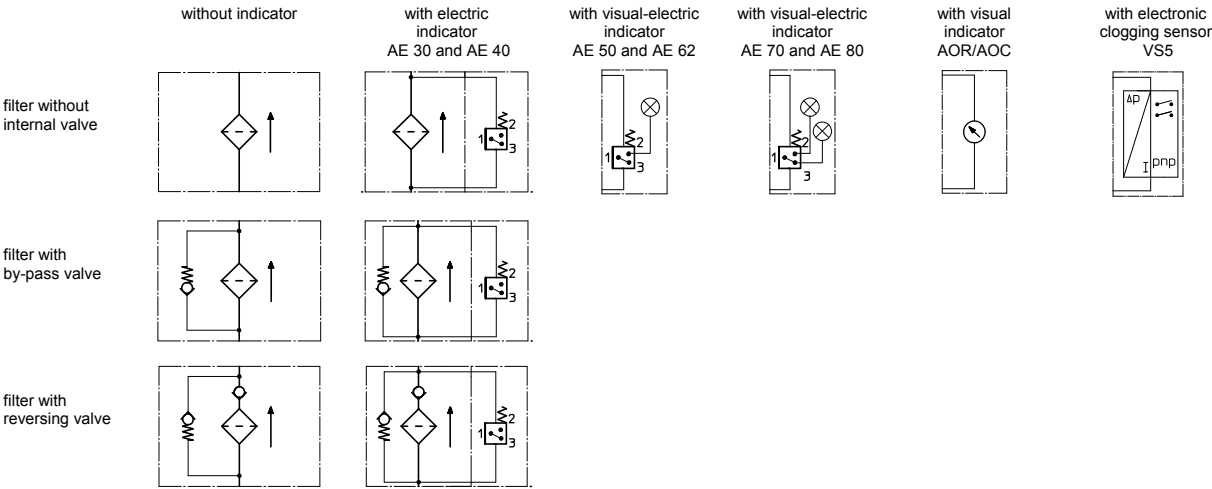
EHPF	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
60	6.748	4.685	2.999	2.577	1.760	0.2002	0.1868	0.1280
90	4.059	2.818	1.804	1.550	1.059	0.1210	0.1130	0.0774
150	2.422	1.681	1.076	0.925	0.632	0.0723	0.0675	0.0462

### $\Delta p = f(Q)$ – 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	EHPF 60	dimension	EHPF 150	article-no.	
1	1	filer element	01E.60...	EHPF 90	01E.150...		
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
- 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

**North America**

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

**Europe/Africa/Middle East**

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlufheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

**China**

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

**Singapore**

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

**Brazil**

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

**For more information, please**

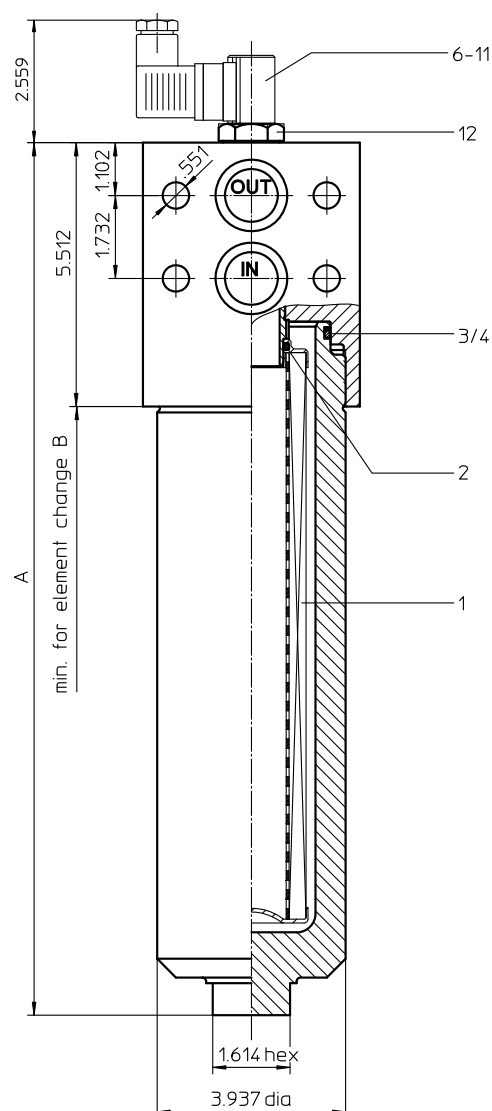
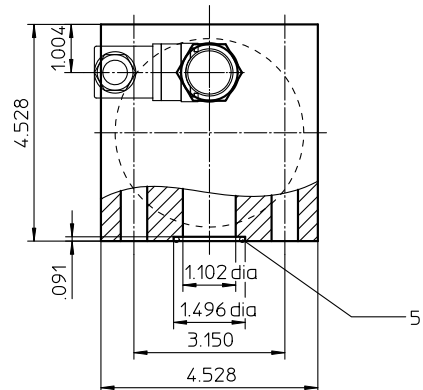
email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.



# 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.



Powering Business Worldwide

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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)

<b>EHPF.</b>	<b>360.</b>	<b>10VG.</b>	<b>HR.</b>	<b>E.</b>	<b>P.</b>	<b>VA.</b>	<b>F.</b>	<b>5.</b>	<b>VA.</b>	<b>-.</b>	<b>AE</b>
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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
S2 = with bypass valve  $\Delta p$  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)

<b>01E.</b>	<b>360.</b>	<b>10VG.</b>	<b>HR.</b>	<b>E.</b>	<b>P.</b>	<b>VA</b>
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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

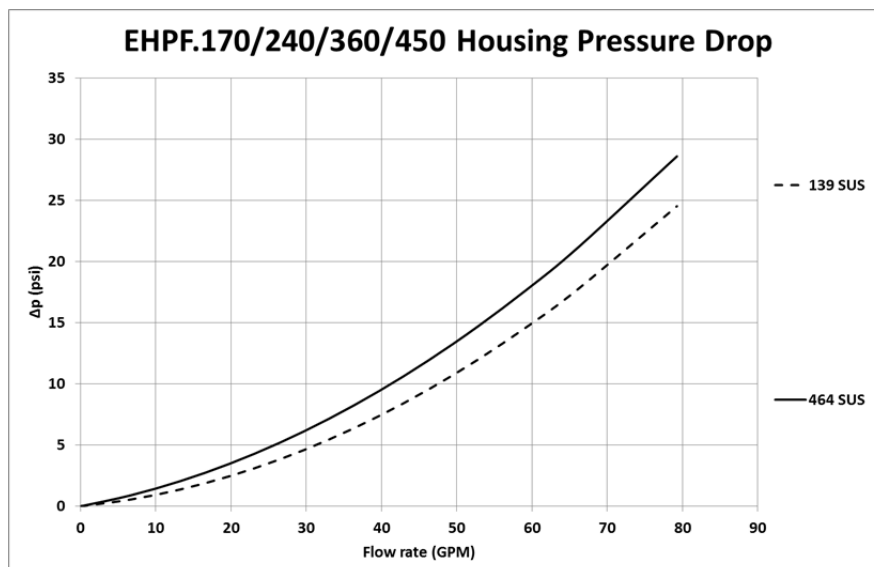
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

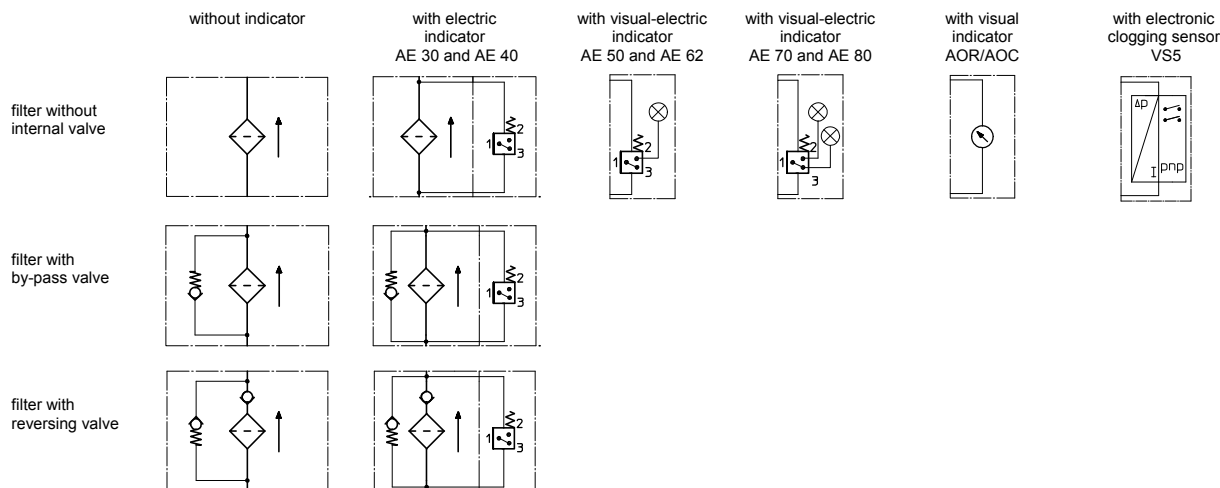
EHPF	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
170	2.714	1.884	1.206	1.036	0.708	0.0839	0.0783	0.0537
240	2.092	1.452	0.930	0.799	0.546	0.0651	0.0607	0.0416
360	1.530	1.062	0.680	0.584	0.399	0.0475	0.0444	0.0304
450	1.126	0.782	0.500	0.430	0.294	0.0349	0.0326	0.0223

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

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

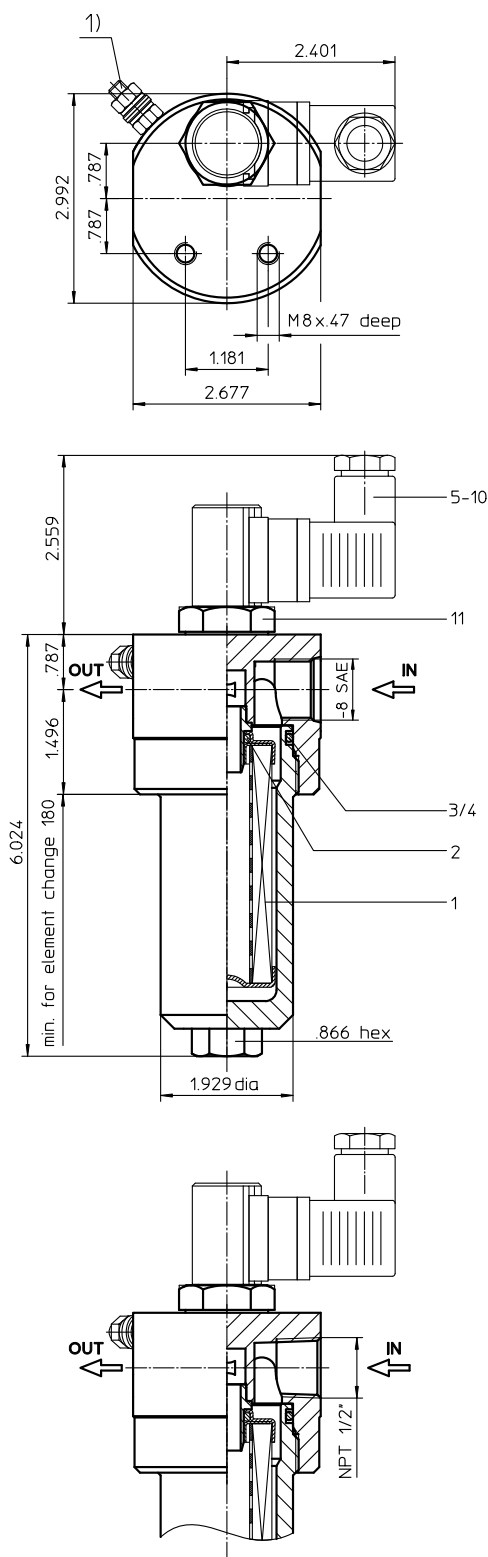
For more information, please

email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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.



Powering Business Worldwide

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
S2 = with by-pass valve  $\Delta p$  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  $\Delta p$  and the element  $\Delta p$  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/](http://www.eatonpowersource.com/calculators/filtration/)

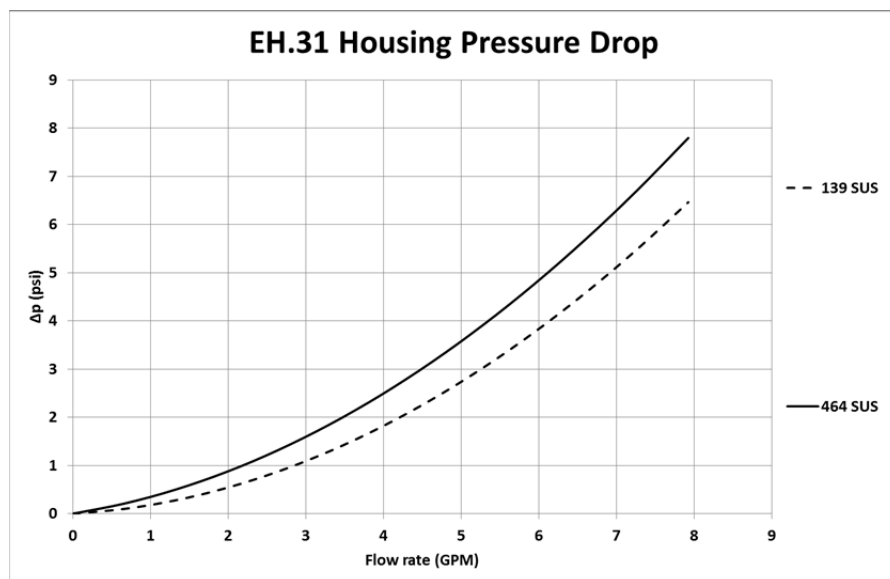
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

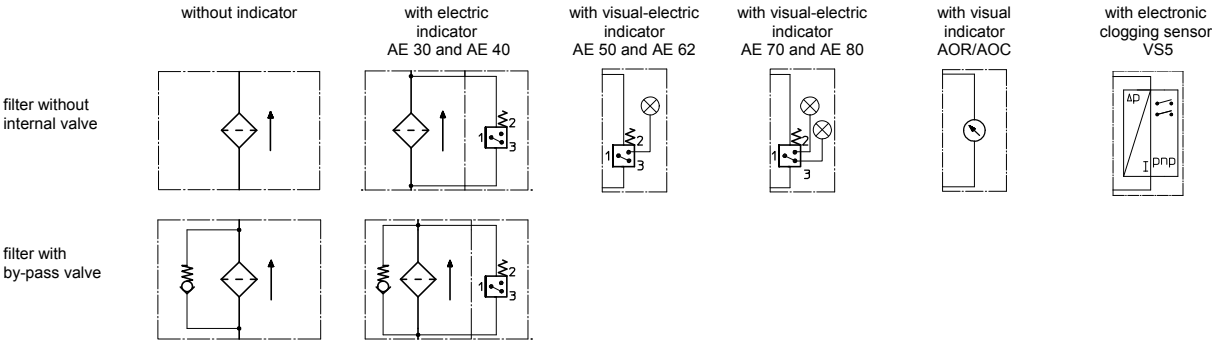
EH	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
31	12.554	8.716	5.580	4.794	3.275	0.2539	0.2369	0.1623

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

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. 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

**North America**

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

**Europe/Africa/Middle East**

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altludersheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

**China**

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

**Singapore**

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

**Brazil**

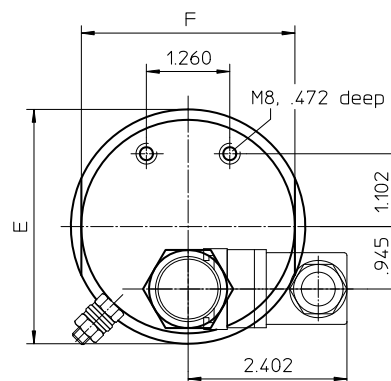
Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

**For more information, please  
email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)**

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# Series EH 60-150

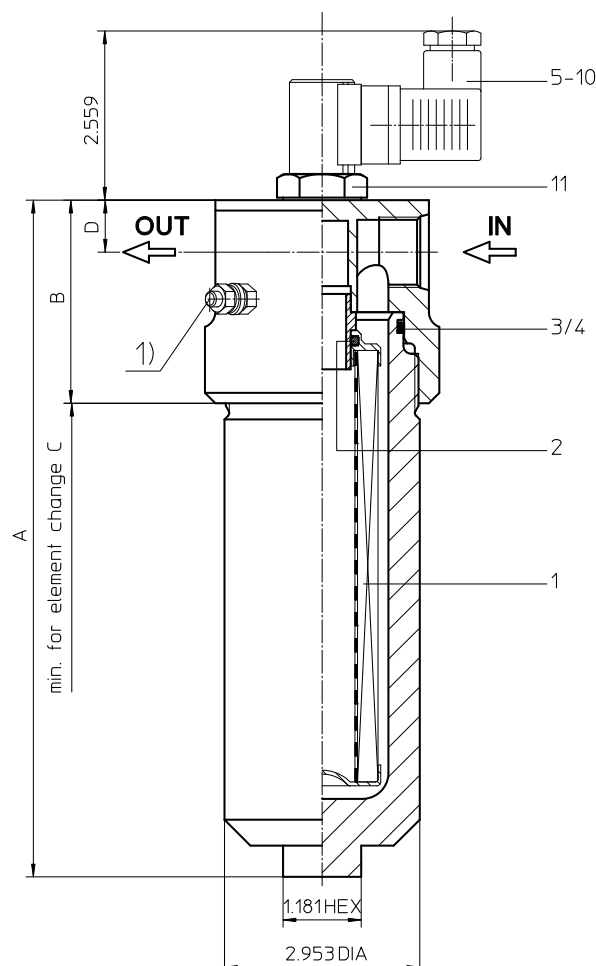
## 6000 PSI



### Dimensions:

type	EH 60	EH 90	EH 150
connection	- 8 SAE or NPT 1/2"	-12 SAE or NPT 3/4"	-16 SAE or NPT 1"
A	7.67	10.23	14.56
B	3.07	3.07	3.30
C	8.46	11.02	15.35
D	.78	.78	.90
E	3.54	3.54	3.74
F	3.22	3.22	3.30
weight approx.	18.70 lbs.	20.95 lbs.	27.55 lbs.
volume tank	.08 Gal.	.10 Gal.	.16 Gal.

Connection assignments as shown in the table are standard.  
To exchange connections see item 9 in type index.



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 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
S2 = with by-pass valve  $\Delta p$  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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

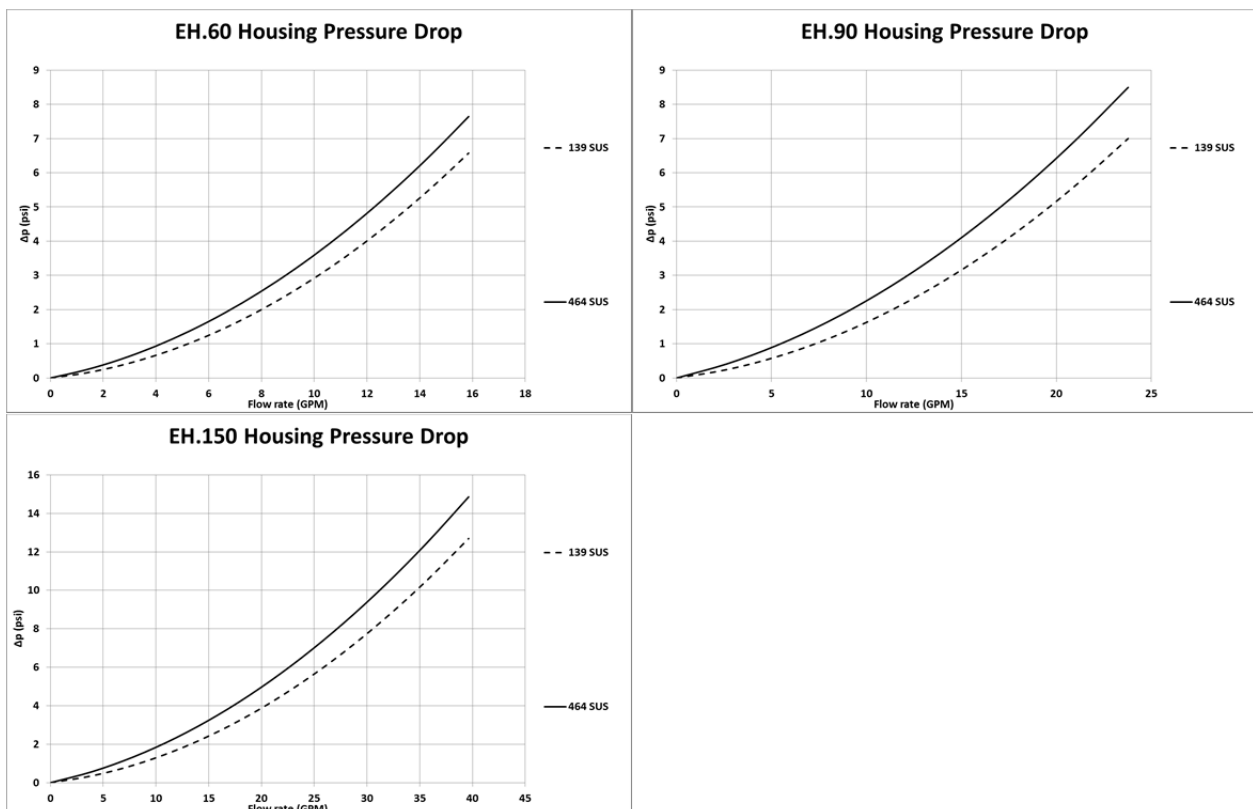
### Material gradient coefficients (MSK) for filter elements

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.

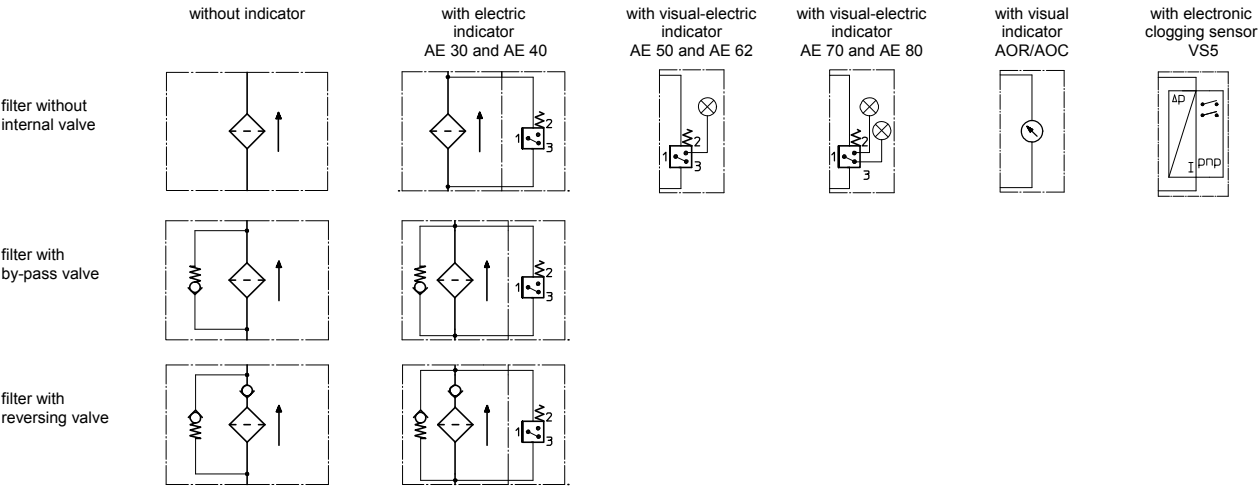
EH	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
60	6.748	4.685	2.999	2.577	1.760	0.2002	0.1868	0.1280
90	4.059	2.818	1.804	1.550	1.059	0.1210	0.1130	0.0774
150	2.422	1.681	1.076	0.925	0.632	0.0723	0.0675	0.0462

### $\Delta p = f(Q)$ – 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	EH 60	dimension EH 90	EH 150	article-no.	
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		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
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

## North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

## Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlufheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

## China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

## Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

## Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

email us at [filtration@eaton.com](mailto:filtration@eaton.com)

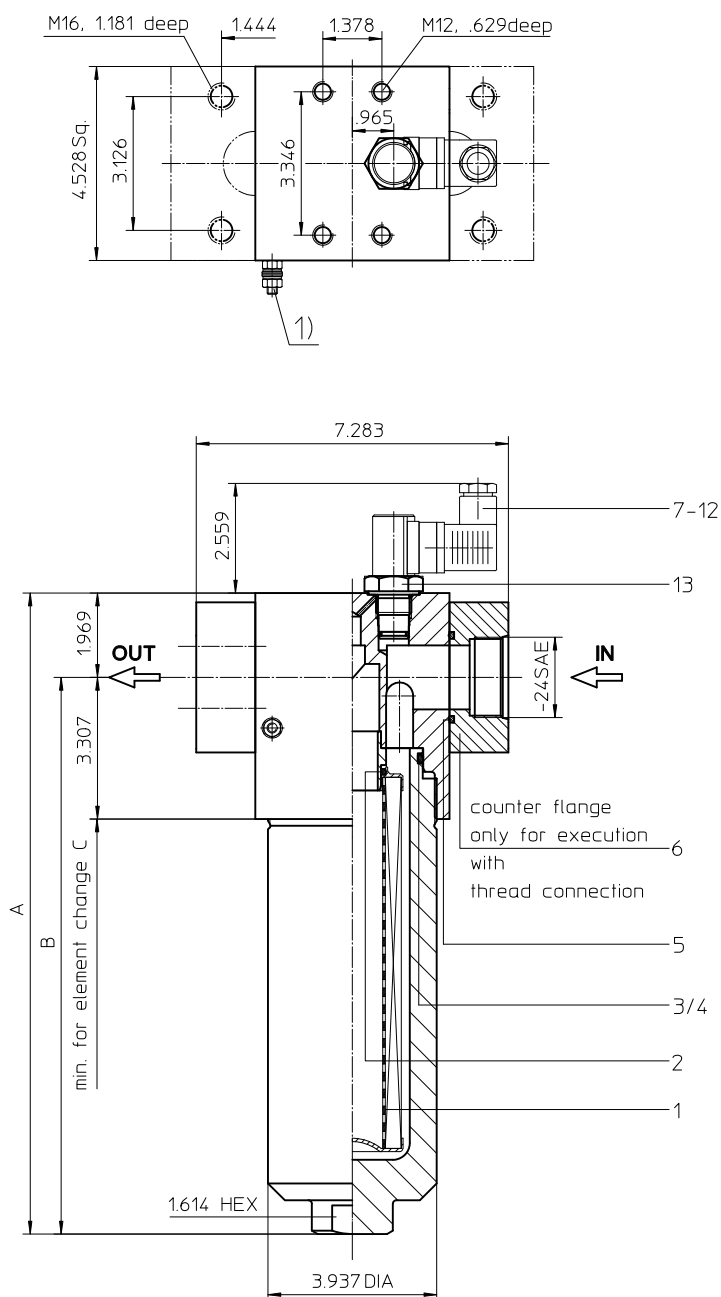
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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.

Dimensions: inches

Designs and performance values are subject to change.

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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	<b>series:</b> EH = stainless steel-pressure filter
2	<b>nominal size:</b> 240, 450
3	<b>filter-material and filter-fineness:</b> 80G, 40G, 25G, 10G stainless steel wire mesh 25VG, 16VG, 10VG, 6VG, 3VG microglass
4	<b>filter element collapse rating:</b> 30 = $\Delta p$ 435 PSI HR = $\Delta p$ 2320 PSI (rupture strength $\Delta p$ 3625 PSI)
5	<b>filter element design:</b> E = single-end open
6	<b>sealing material:</b> P = Nitrile (NBR) V = Viton (FPM)
7	<b>filter element specification:</b> (see catalog) - = standard VA = stainless steel IS06 = for HFC applications, see sheet-no. 31601
8	<b>process connection:</b> UG = thread connection FS = SAE-flange 6000 PSI
9	<b>process connection size:</b> 7 = 1 1/2"
10	<b>filter housing specification:</b> VA = stainless steel
11	<b>internal valve:</b> - = without S1 = with by-pass valve $\Delta p$ 51 PSI S2 = with by-pass valve $\Delta p$ 102 PSI R = with reversing valve, $Q \leq 55.75$ GPM
12	<b>clogging indicator or clogging sensor:</b> - = 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	<b>series:</b> 01E. = filter element according to company standard
2	<b>nominal size:</b> 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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

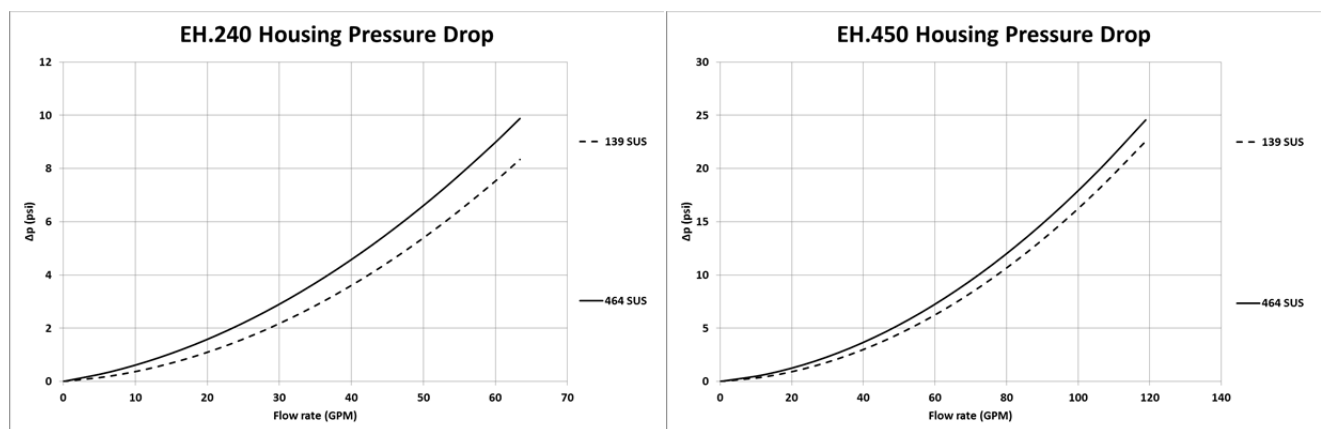
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

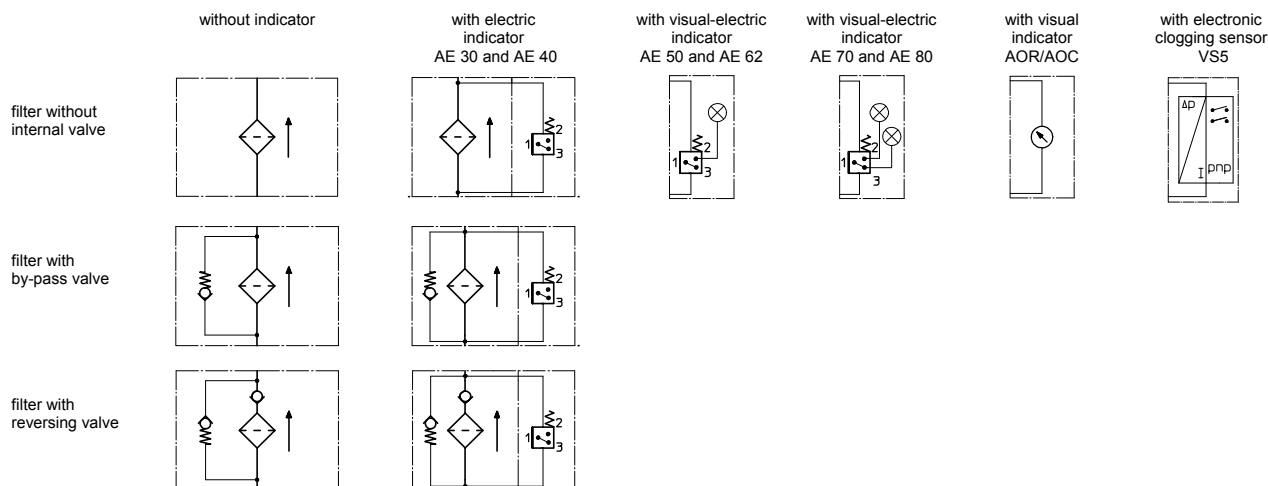
EH	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
240	2.092	1.452	0.930	0.799	0.546	0.0651	0.0607	0.0416
450	1.126	0.782	0.500	0.430	0.294	0.0349	0.0326	0.0223

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

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

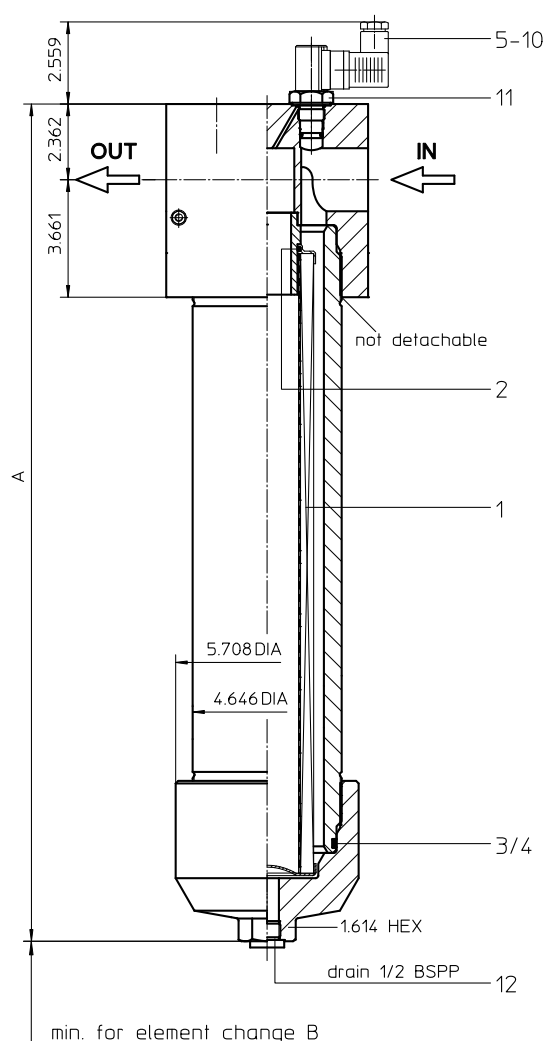
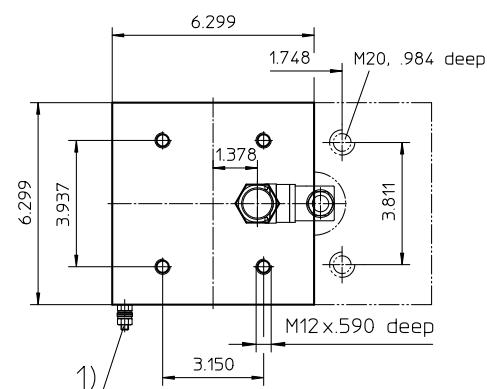
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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  $\Delta p$  51 PSI  
S2 = with by-pass valve  $\Delta p$  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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

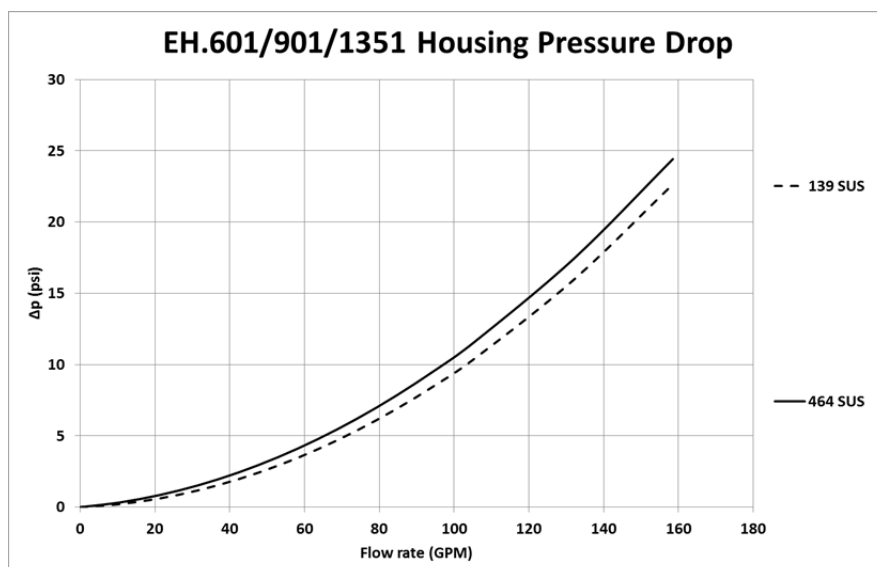
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

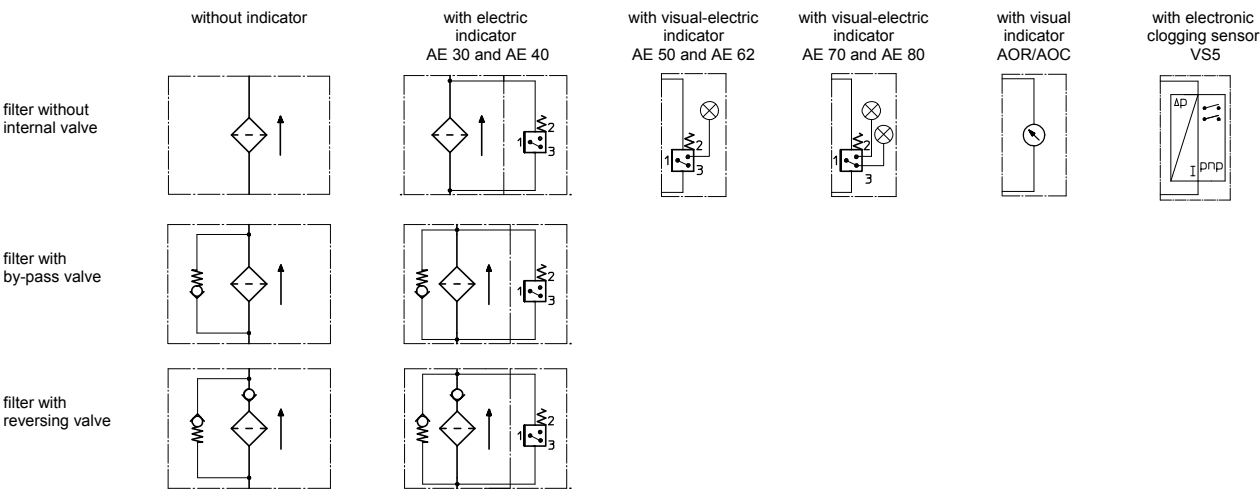
EH	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
601	0.963	0.669	0.428	0.368	0.251	0.0303	0.0282	0.0193
901	0.668	0.464	0.297	0.225	0.174	0.0189	0.0177	0.0121
1351	0.417	0.290	0.185	0.185	0.109	0.0122	0.0114	0.0078

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

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. The pressure drop changes proportionally to the density.



# Symbols:



# Spare parts:

item	qty.	designation	EH 601	dimension EH 901	EH 1351	article-no.	
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

## North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

## Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

## China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

## Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

## Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

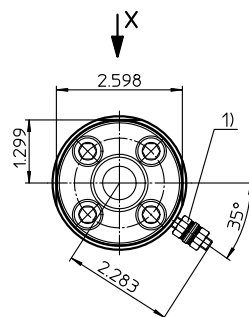
For more information, please

email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

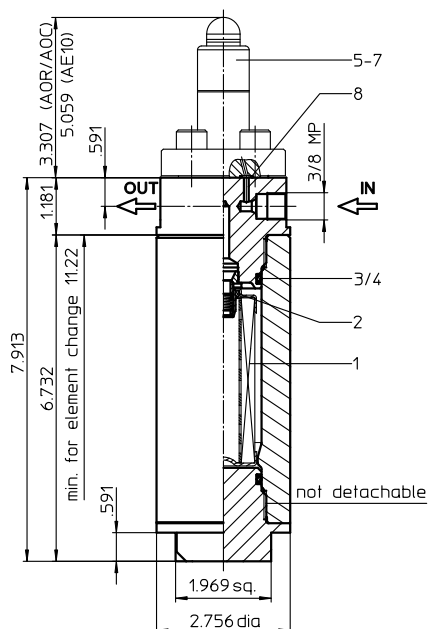
© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# Series EHP 31

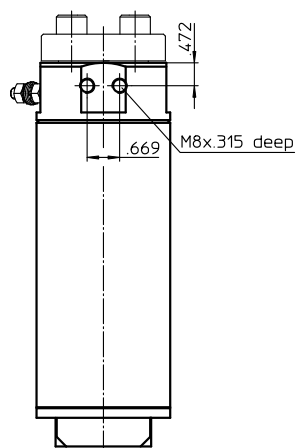
## 11600/20300 PSI



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.

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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	<b>series:</b> EHP = stainless steel-pressure filter												
2	<b>nominal size:</b> 31												
3	<b>filter-material and filter-fineness:</b> 80G, 40G, 25G, 10G stainless steel wire mesh 25VG, 16VG, 10VG, 6VG, 3VG microglass												
4	<b>filter element collapse rating:</b> 30 = $\Delta p$ 435 PSI HR = $\Delta p$ 2320 PSI (rupture strength $\Delta p$ 3625 PSI)												
5	<b>filter element design:</b> E = single-end open												
6	<b>sealing material:</b> P = Nitrile (NBR) V = Viton (FPM)												
7	<b>filter element specification:</b> (see catalog) - = standard VA = stainless steel ISO6 = for HFC application, see sheet-no. 31601												
8	<b>process connection:</b> UG2 = autoclave medium pressure NPT = thread connection												
9	<b>process connection size:</b> 2 = MP 3/8" (9/16"-18UNF) 3 = NPT 1/2												
10	<b>internal valve:</b> - = without S1 = with by-pass valve $\Delta p$ 51 PSI S2 = with by-pass valve $\Delta p$ 102 PSI												
11	<b>filter housing specification:</b> VA = stainless steel												
12	<b>clogging indicator or clogging sensor:</b> - = without AOR = visual, see sheet-no. 46041 AOC = visual, see sheet-no. 61565 AE10 = visual-electric, see sheet-no. 46042												
13	<b>pressure level:</b> 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	<b>series:</b> 01E. = filter element according to company standard						
2	<b>nominal size:</b> 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:	11600 PSI 20300 PSI
test pressure:	16600 PSI 29000 PSI
process connection:	thread connection
housing material:	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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

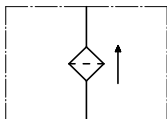
### Material gradient coefficients (MSK) for filter elements

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.

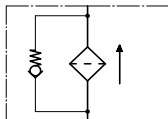
EHP	VG					G		
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G
31	12.554	8.716	5.580	4.794	3.275	0.2539	0.2369	0.1623

## Symbols:

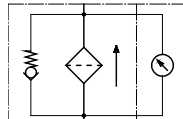
filter without internal valve



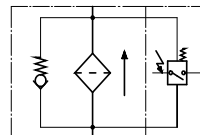
filter with by-pass valve



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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlufheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

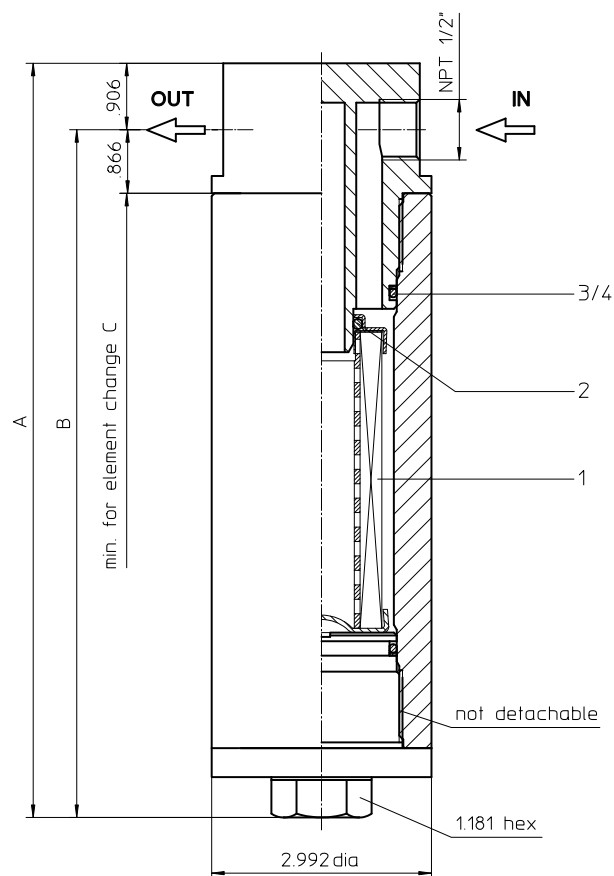
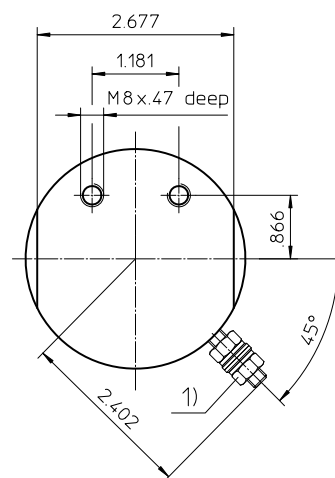
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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.

EDV 09/15



Powering Business Worldwide

# 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  $\Delta p$  2320 PSI and a rupture strength of  $\Delta p$  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 =  $\Delta p$  435 PSI  
HR =  $\Delta p$  2320 PSI (rupture strength  $\Delta p$  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:	<table border="1"><tr><td>10150 PSI</td><td>20300 PSI</td></tr><tr><td>14500 PSI</td><td>29000 PSI</td></tr></table>	10150 PSI	20300 PSI	14500 PSI	29000 PSI
10150 PSI	20300 PSI				
14500 PSI	29000 PSI				
test pressure:					
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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

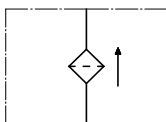
For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

### 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	EHP 90		
1	1	filter element	01E.60...	01E.90...		
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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlufheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

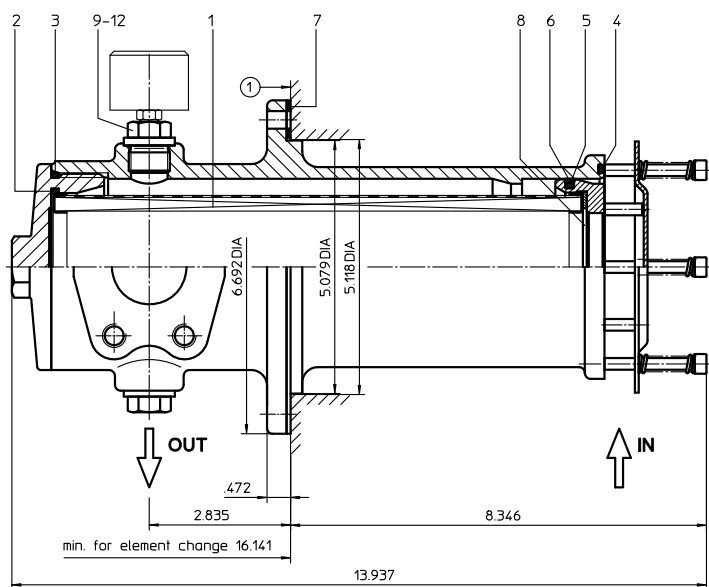
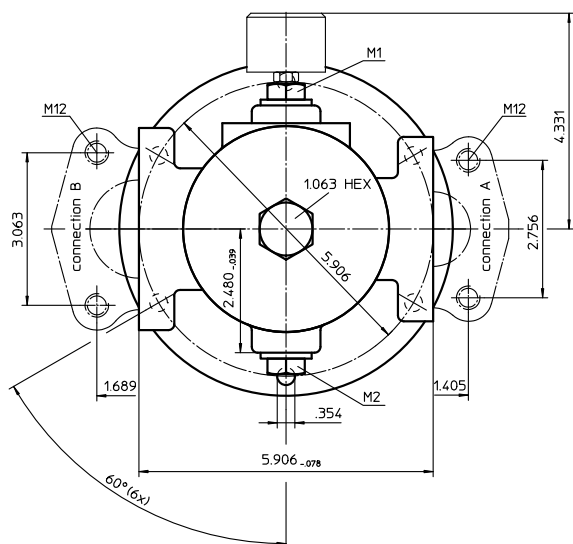
For more information, please

email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# Series AS 220



mounting surface

①

surface quality

.12  $\mu$ in

flatness tolerance

$\square$  .01"

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)

<b>AS.</b>	<b>220.</b>	<b>40G.</b>	<b>-.</b>	<b>B.</b>	<b>P.</b>	<b>-.</b>	<b>FS.</b>	<b>8.</b>	<b>-.</b>	<b>O1.</b>	<b>-</b>
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
<b>connection A type</b>	-	FS	FS
<b>connection A size</b>	-	7	7
<b>connection B type</b>	FS	-	FS
<b>connection B size</b>	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)

<b>01AS.</b>	<b>220.</b>	<b>40G.</b>	<b>-.</b>	<b>B.</b>	<b>-.</b>	<b>-</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 **sealing 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  $\Delta p$  and the element  $\Delta p$  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/](http://www.eatonpowersource.com/calculators/filtration/)

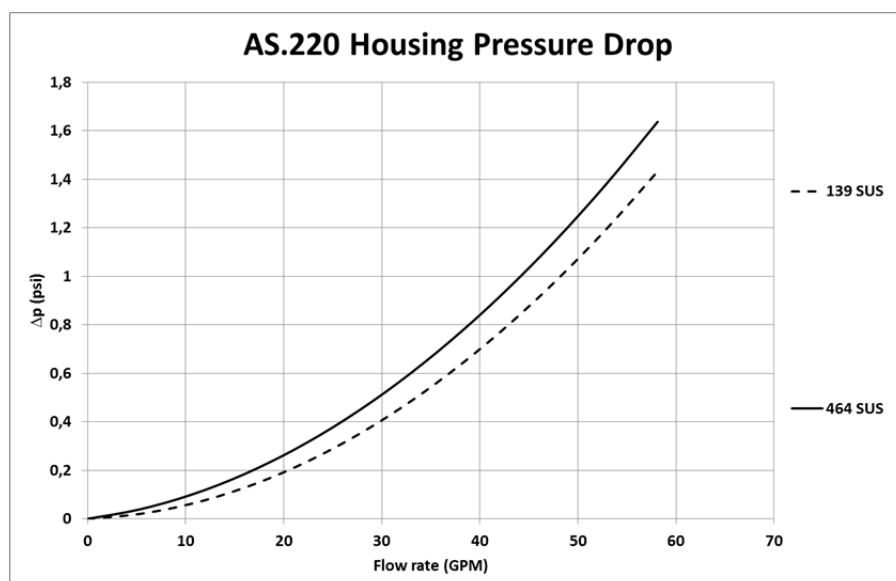
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

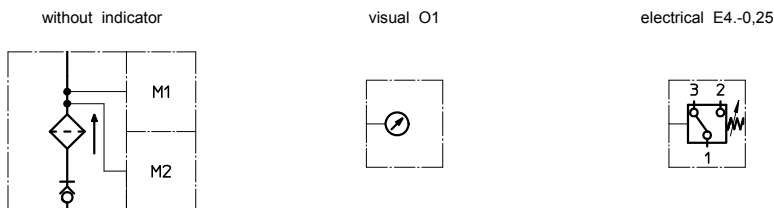
AS	G
	40G
220	0.0491

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

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altluisheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

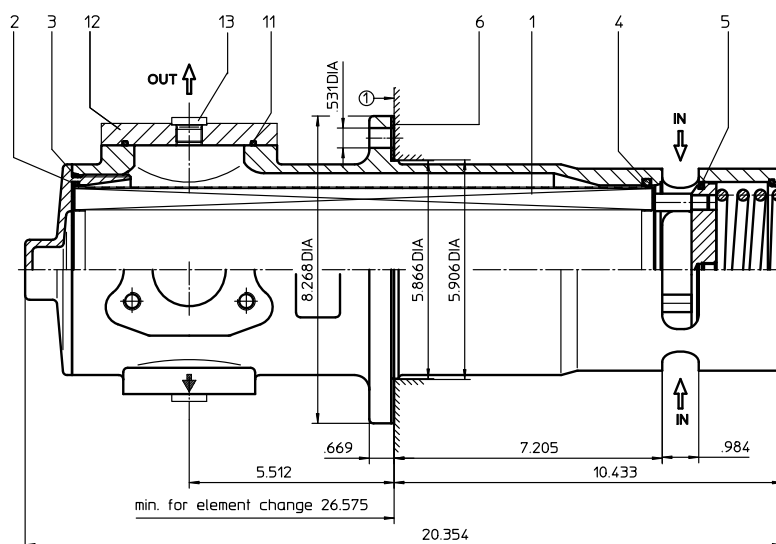
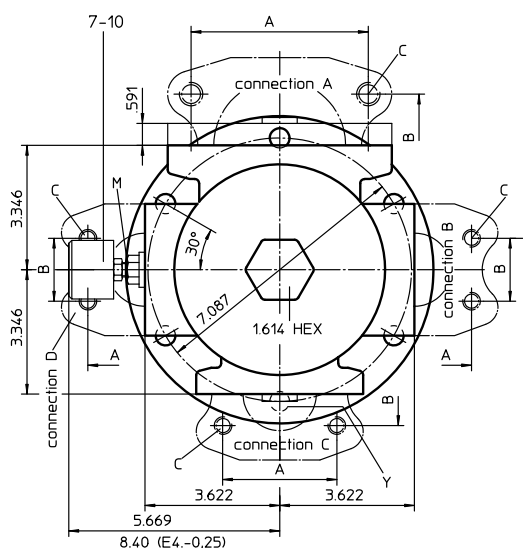
Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

# 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

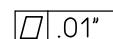
mounting surface



surface quality

.12  $\mu$ in

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
<b>connection A type size</b>	XY	XY	XY	FS A1	FS A1	FS A1	-	FS A
<b>connection B type size</b>	Y	M	M	FS 8	FS 9	-	FS 8	Y
<b>connection C type size</b>	FS 8	FS 9	FS 9	Y	Y	Y	FS 8	Y
<b>connection D type size</b>	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 **sealing 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  $\Delta p$  and the element  $\Delta p$  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/](http://www.eatonpowersource.com/calculators/filtration/)

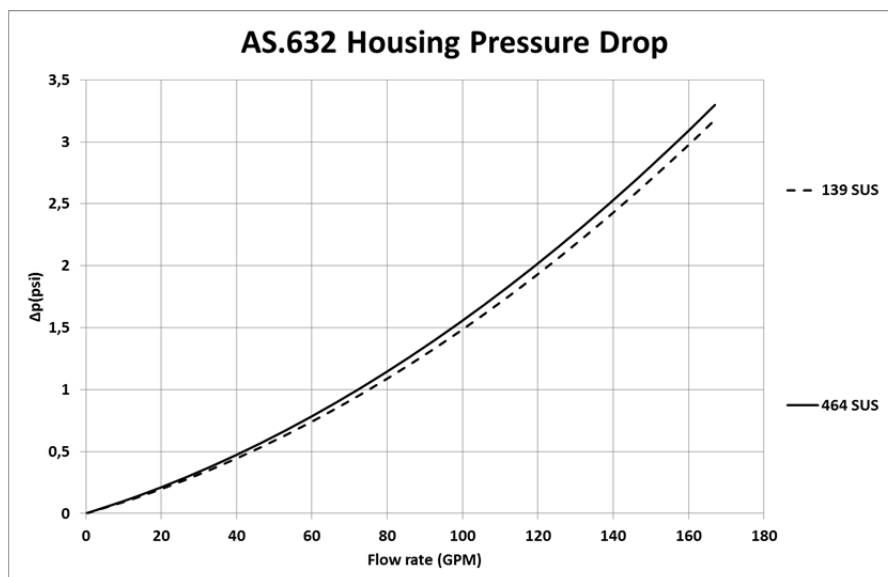
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

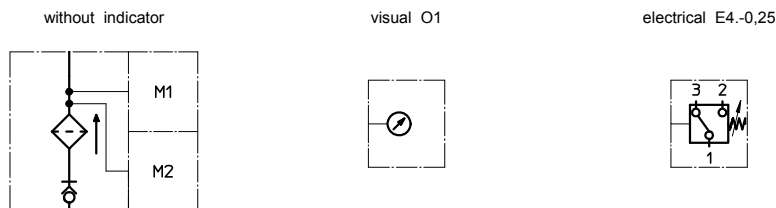
AS	G
	40G
632	0.0193

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

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlufheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

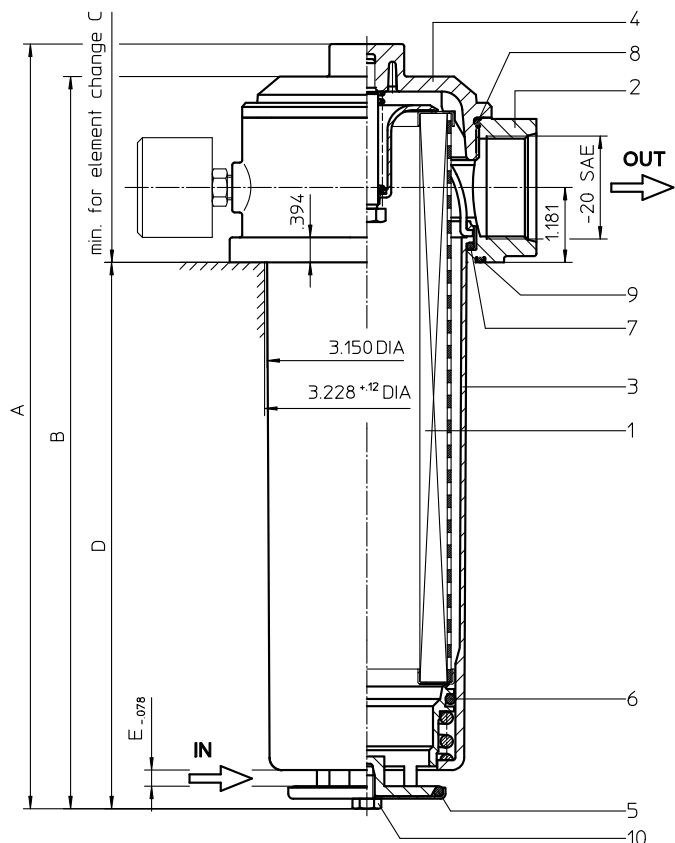
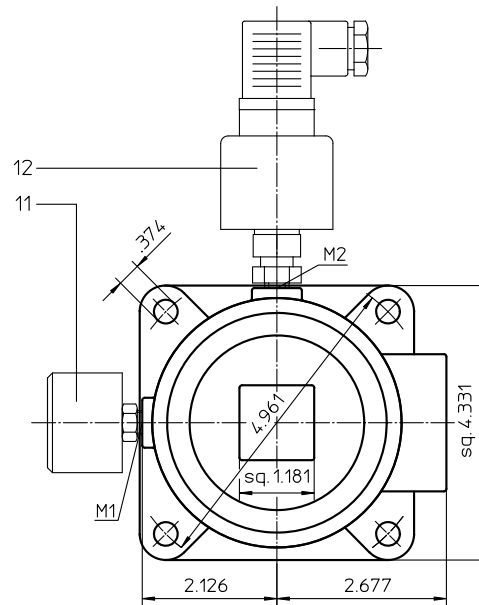
For more information, please

email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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.

# 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)

<b>TS.</b>	<b>210.</b>	<b>10VG.</b>	<b>-.</b>	<b>B.</b>	<b>P.</b>	<b>-.</b>	<b>UG.</b>	<b>6.</b>	<b>-.</b>	<b>-.</b>	<b>O1.</b>	<b>E4</b>
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  $\Delta p$  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)

<b>01TS.</b>	<b>210.</b>	<b>10VG.</b>	<b>-.</b>	<b>B.</b>	<b>-.</b>	<b>-</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 **sealing 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  $\Delta p$  and the element  $\Delta p$  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/](http://www.eatonpowersource.com/calculators/filtration/)

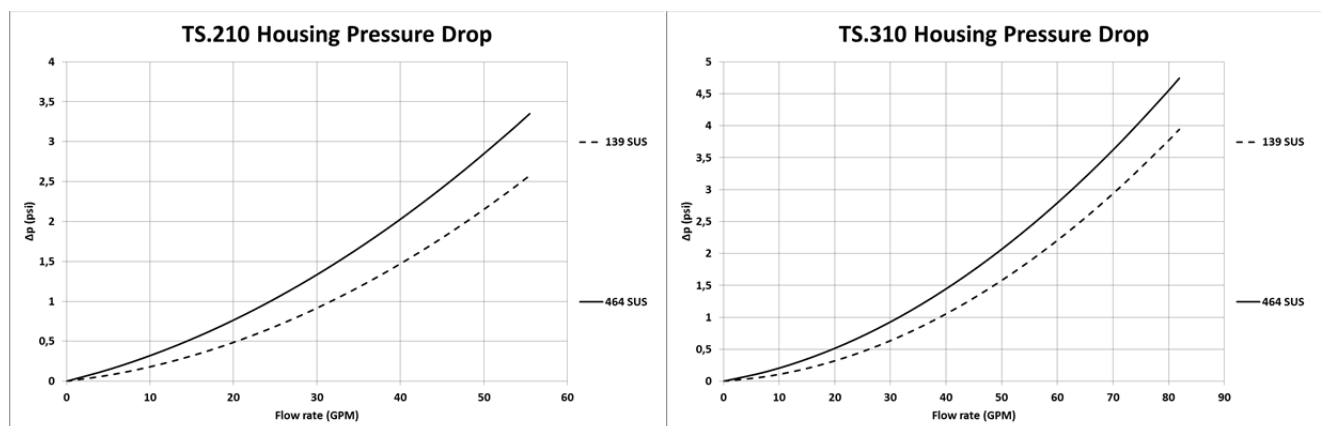
### Material gradient coefficients (MSK) for filter elements

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.

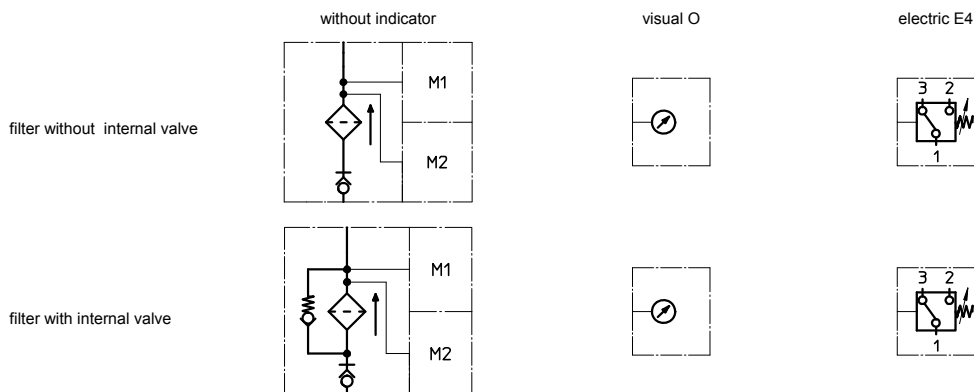
TS	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
210	2.250	1.562	1.000	0.871	0.595	0.0826	0.0612	0.0571	0.443
310	1.628	1.130	0.724	0.630	0.430	0.0598	0.0443	0.0413	0.321

### $\Delta p = f(Q)$ – 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)



# 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  $\Delta p$  and the element  $\Delta p$  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/](http://www.eatonpowersource.com/calculators/filtration/)

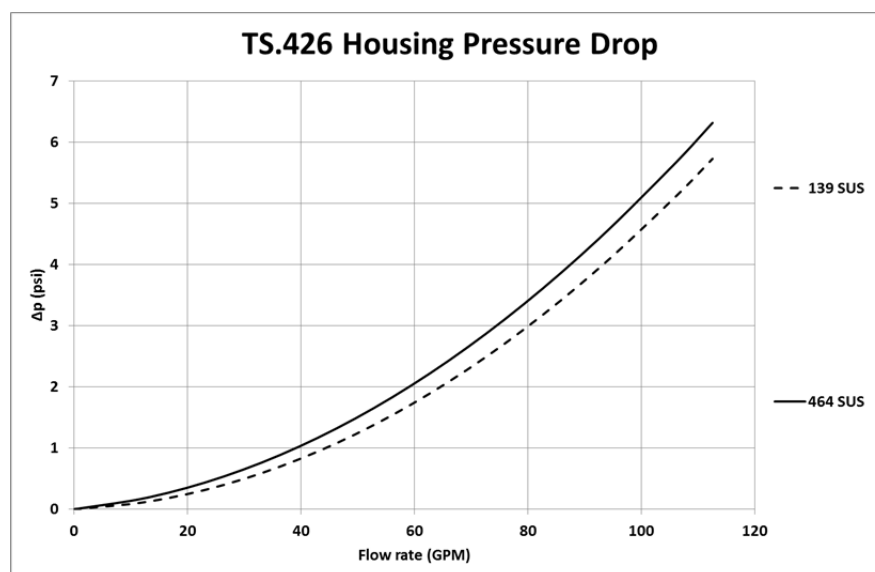
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

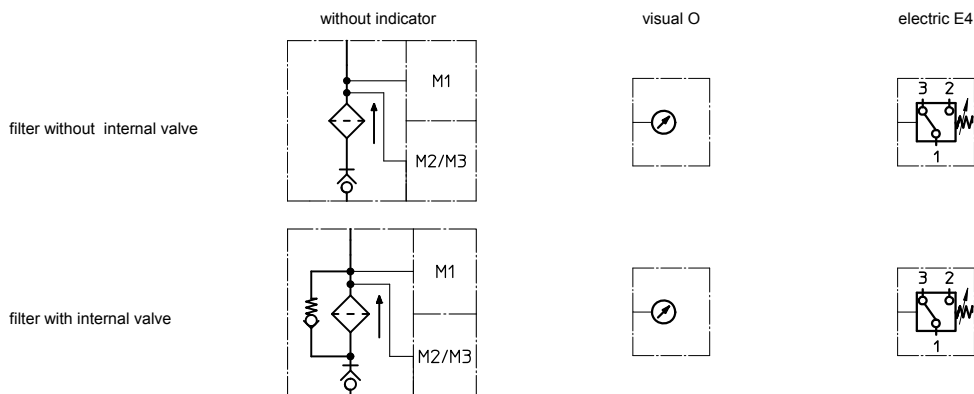
TS	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
426	0.887	0.616	0.394	0.343	0.235	0.0226	0.0211	0.0144	0.188

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

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. 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
ISO 16889	Multi-pass method for evaluating filtration performance

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

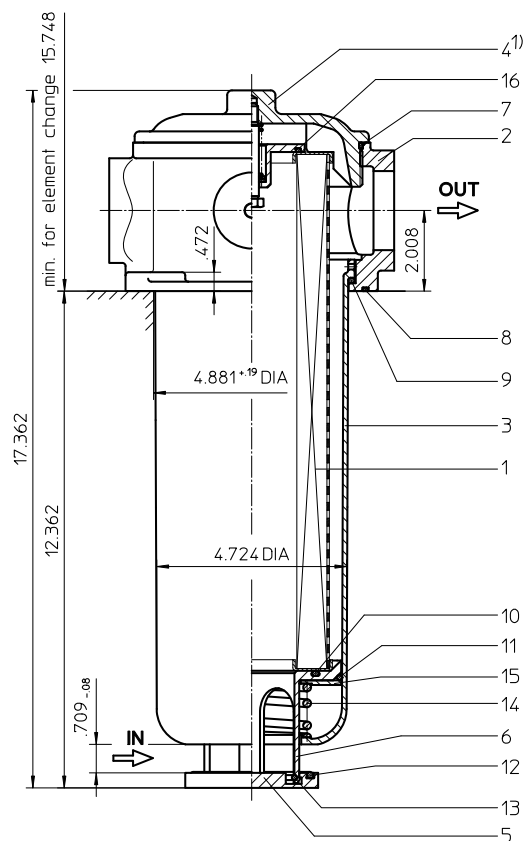
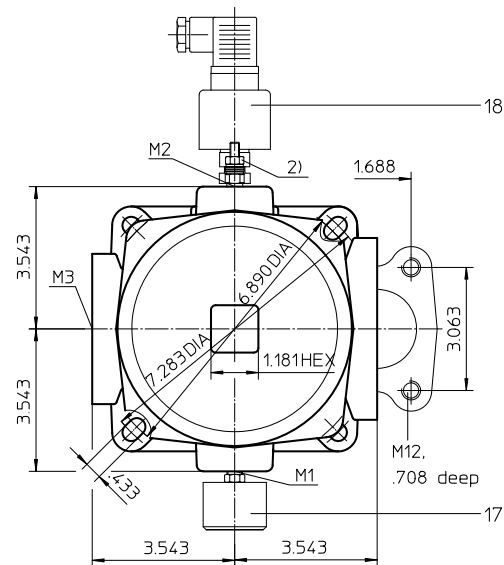
For more information, please

email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# Series TS 625



- 1) The bypass valve is contained in the screw plug. For filters without a by-pass valve, the opening pressure is  $\Delta p$  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  $\Delta p$  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 **sealing 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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

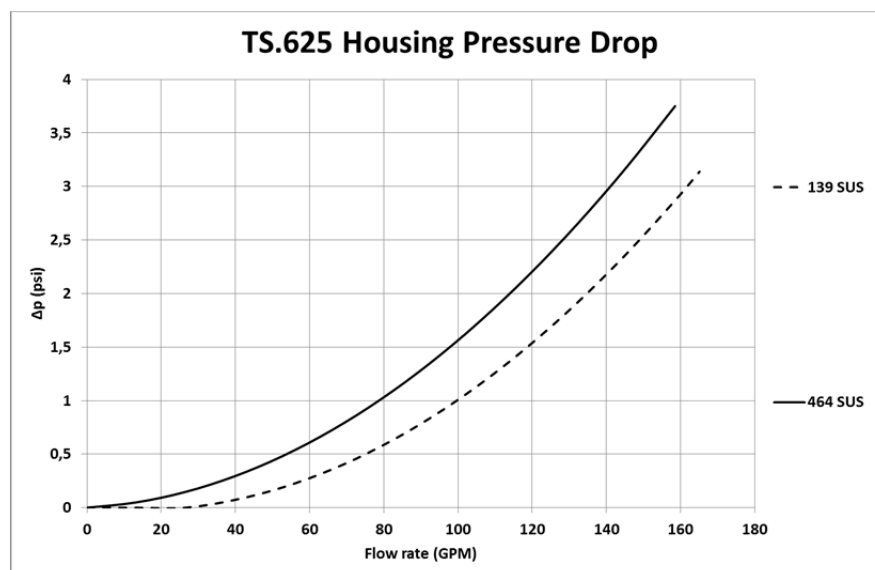
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

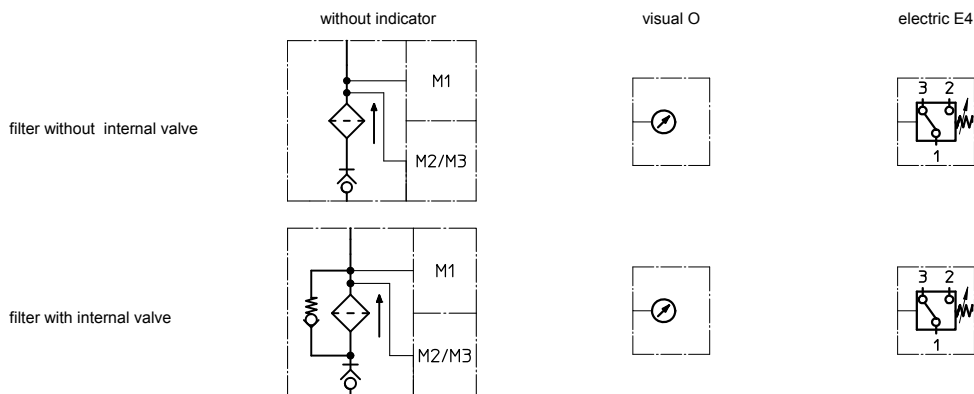
TS	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
625	0.733	0.509	0.326	0.284	0.194	0.0170	0.0159	0.0109	0.160

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

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. 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
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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

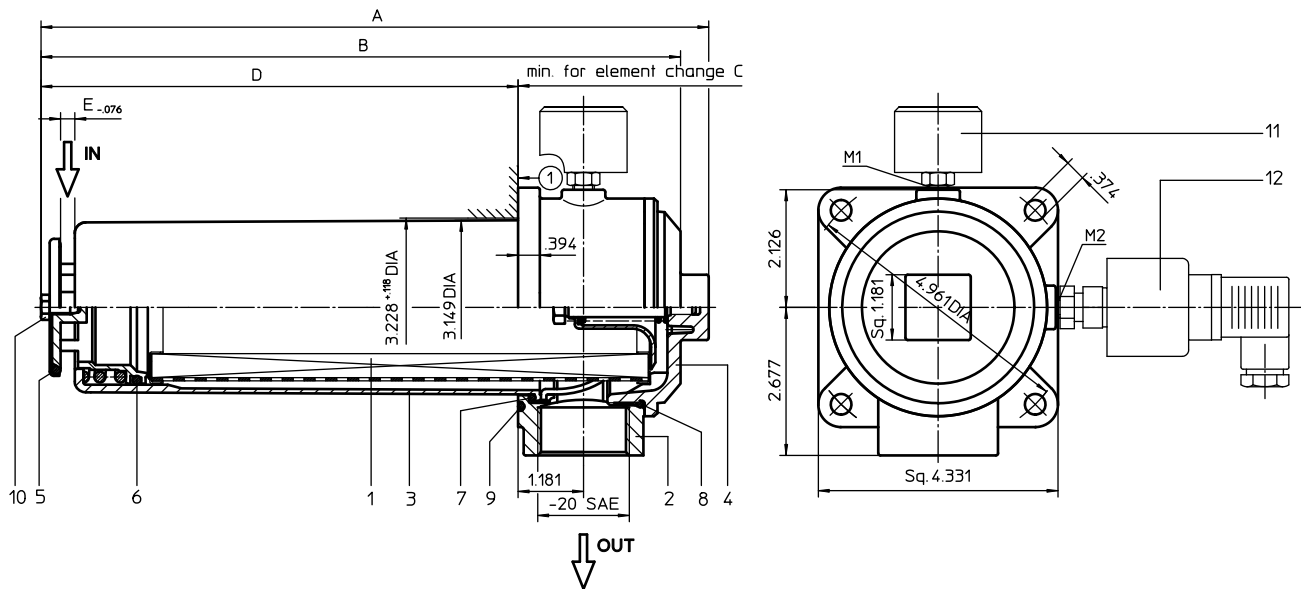
For more information, please

email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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 $\mu$ in
flatness tolerance	$\square$ .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)

<b>TSW.</b>	<b>210.</b>	<b>10VG.</b>	<b>-.</b>	<b>B.</b>	<b>P.</b>	<b>-.</b>	<b>UG.</b>	<b>6.</b>	<b>-.</b>	<b>-.</b>	<b>O1.</b>	<b>E4</b>
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  $\Delta p$  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)

<b>01TS.</b>	<b>210.</b>	<b>10VG.</b>	<b>-.</b>	<b>B.</b>	<b>-.</b>	<b>-</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 **sealing 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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

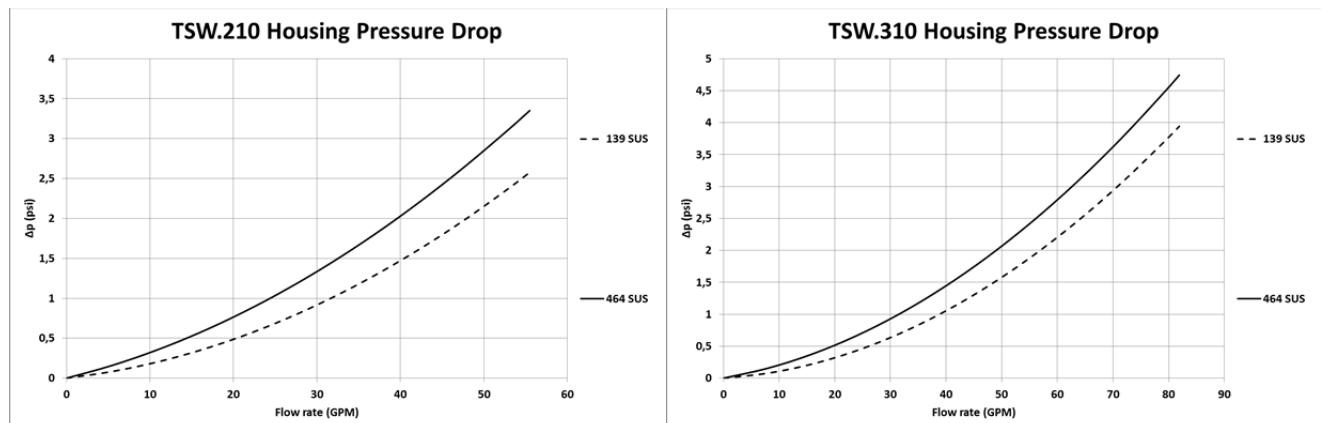
### Material gradient coefficients (MSK) for filter elements

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.

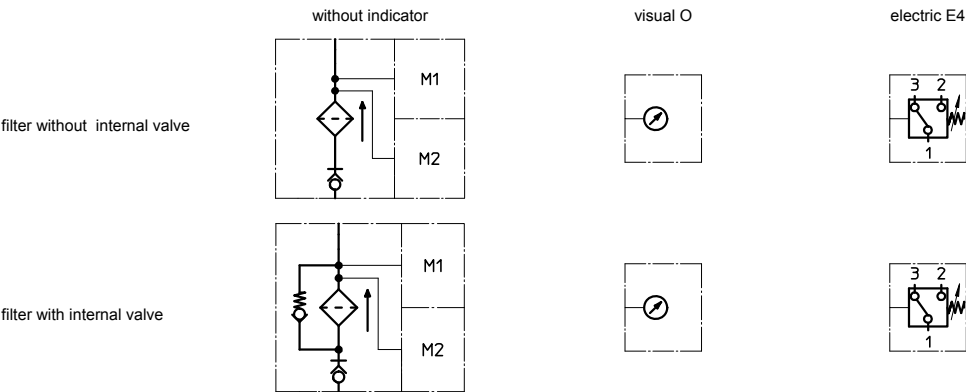
TSW	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
210	2.250	1.562	1.000	0.871	0.595	0.0826	0.0612	0.0571	0.443
310	1.628	1.130	0.724	0.630	0.430	0.0598	0.0443	0.0413	0.321

### $\Delta p = f(Q)$ – 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



North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlufheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

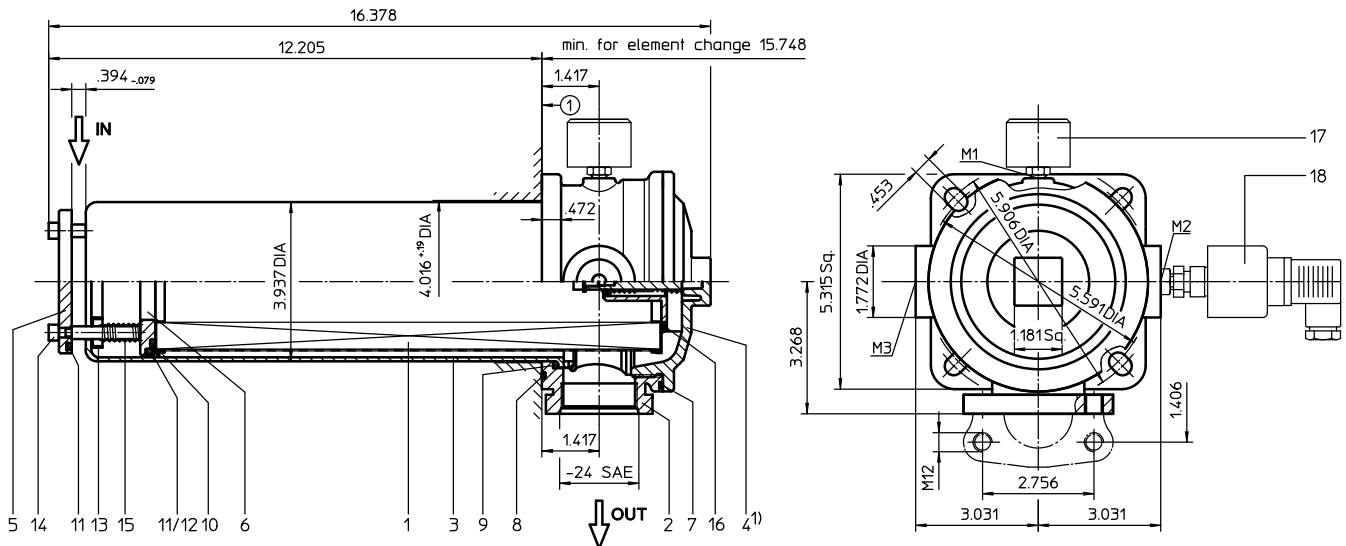
Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please  
email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# Series TSW 426

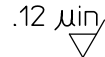


<sup>1)</sup> The bypass valve is contained in the screw plug.  
For filters without a by-pass valve, the opening  
pressure is  $\Delta p$  14.5 PSI.

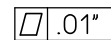
mounting surface



surface quality



flatness tolerance



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)

<b>TSW.</b>	<b>426.</b>	<b>10VG.</b>	<b>-.</b>	<b>B.</b>	<b>P.</b>	<b>-.</b>	<b>UG.</b>	<b>7.</b>	<b>-.</b>	<b>-.</b>	<b>O1.</b>	<b>E4.</b>	<b>-</b>
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)

<b>01TS.</b>	<b>425.</b>	<b>10VG.</b>	<b>-.</b>	<b>B.</b>	<b>-.</b>	<b>-</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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

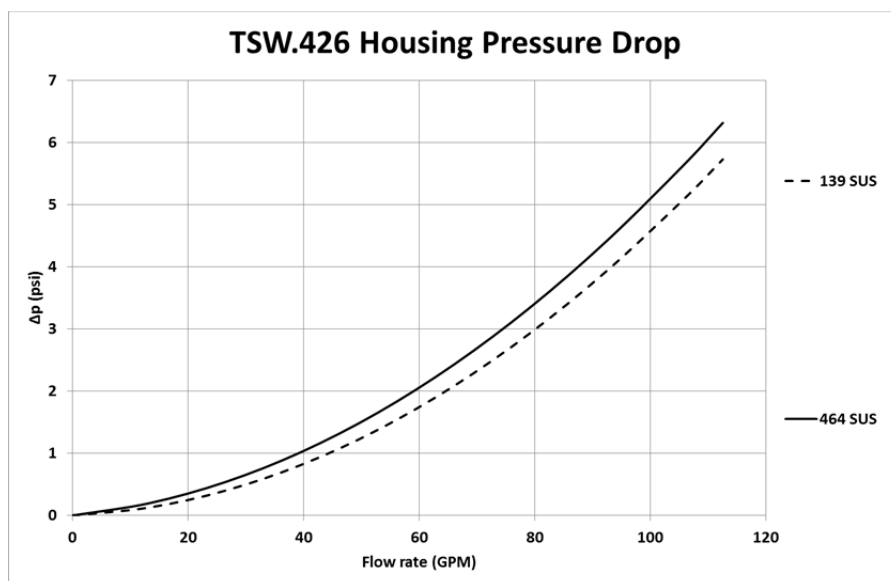
### Material gradient coefficients (MSK) for filter elements

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.

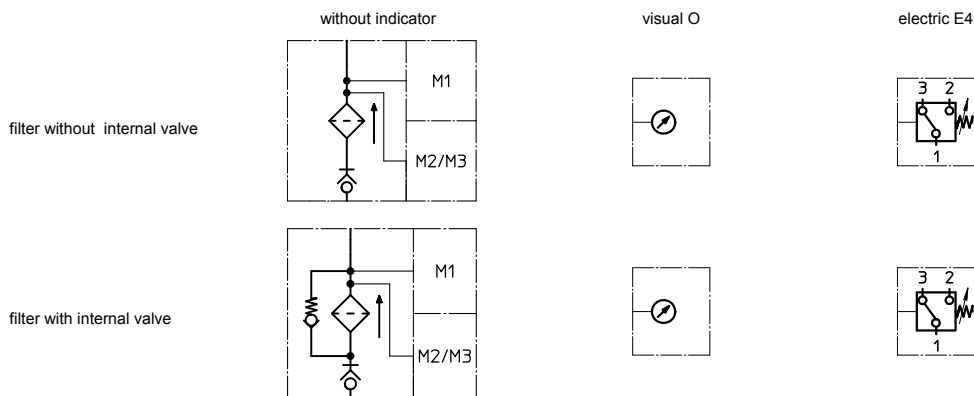
TSW	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
426	0.887	0.616	0.394	0.343	0.235	0.0226	0.0211	0.0144	0.188

### $\Delta p = f(Q)$ – 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
ISO 16889	Multi-pass method for evaluating filtration performance

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlöfheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

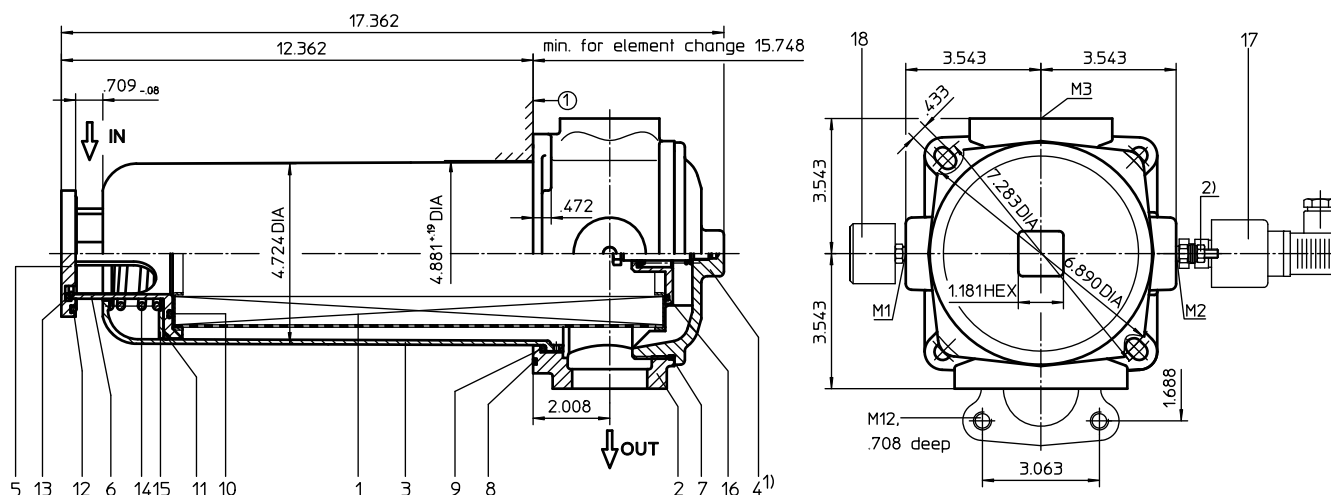
For more information, please

email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# Series TSW 625



1) The bypass valve is contained in the screw plug. For filters without a by-pass valve, the opening pressure is  $\Delta p$  14.5 PSI.

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

mounting surface

①

surface quality

.12  $\mu$ in

flatness tolerance

$\square$  .01"

Weight: approx. 12.0 lbs.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

# 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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

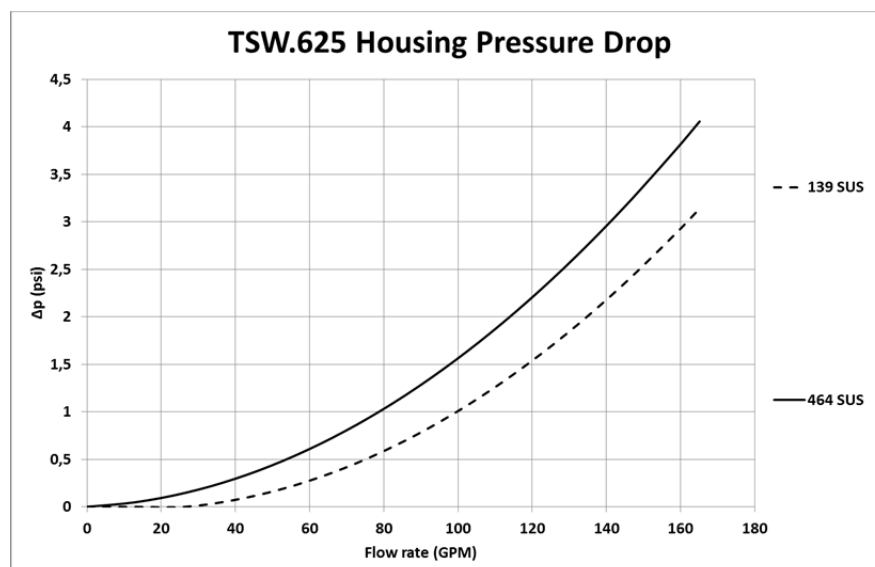
### Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in psi/gpm apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup> and a kinematic viscosity of 139 SUS (30 mm<sup>2</sup>/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

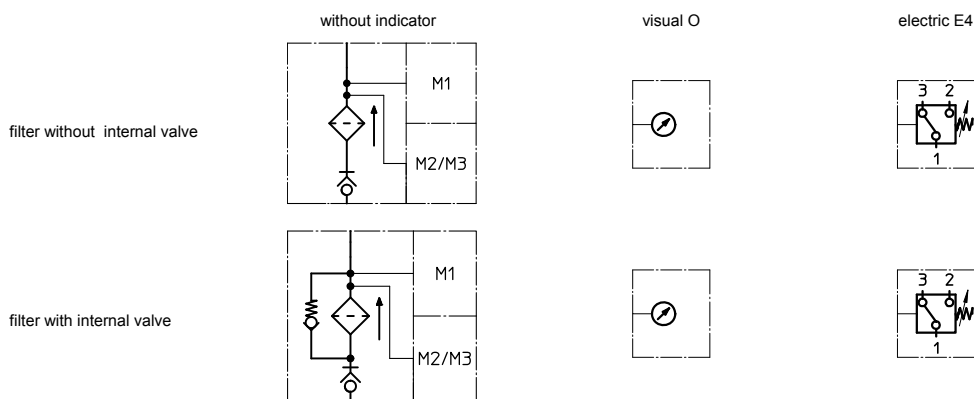
TSW	VG					G			P
	3VG	6VG	10VG	16VG	25VG	25G	40G	80G	10P
625	0.733	0.509	0.326	0.284	0.194	0.0170	0.0159	0.0109	0.160

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

The pressure drop characteristics apply to mineral oil (HLP) with a density of 0.876 kg/dm<sup>3</sup>. 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
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please

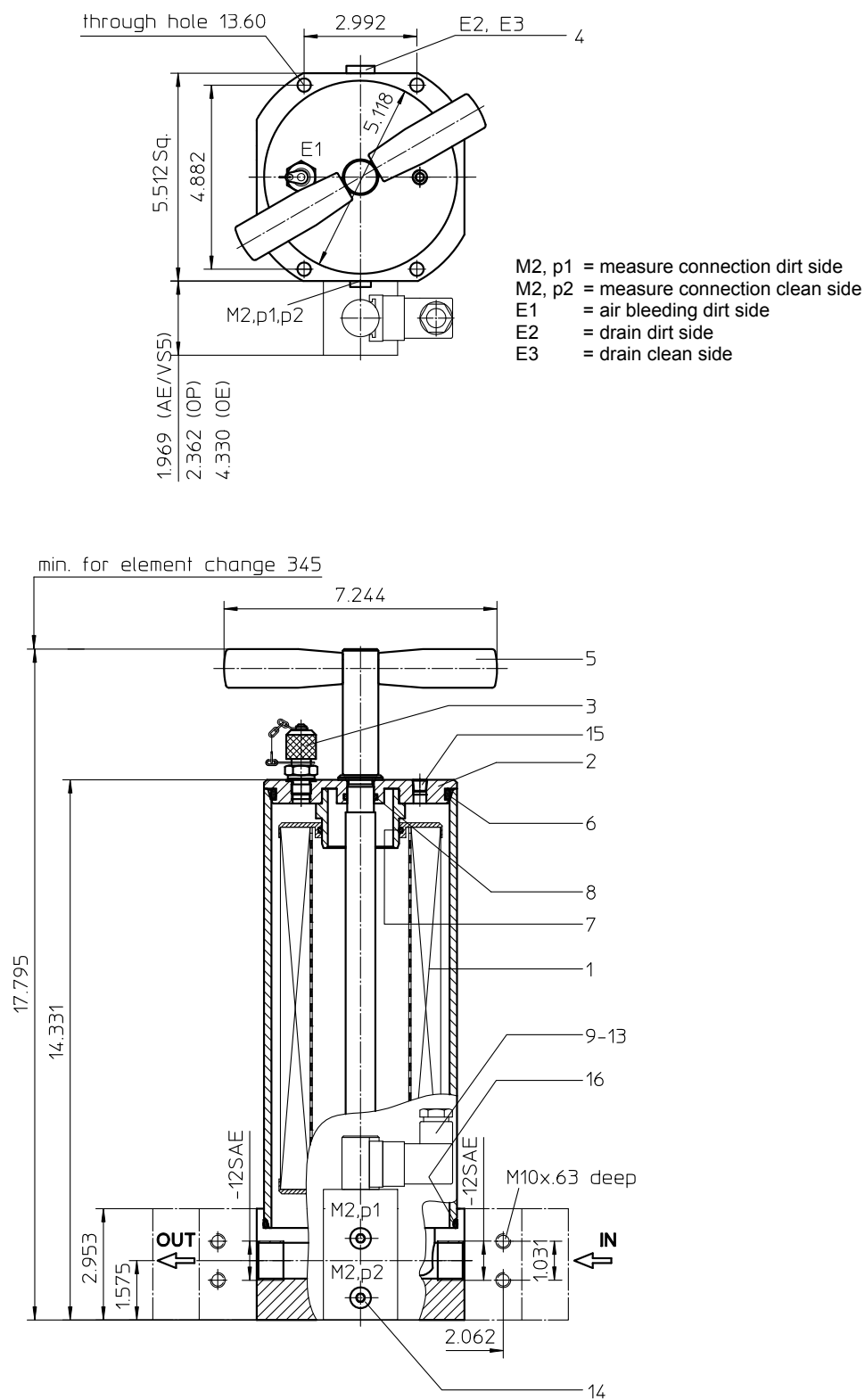
email us at [filtration@eaton.com](mailto:filtration@eaton.com)

or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# Series NF 250

## 232 PSI



Weight: approx. 16 lbs.

Dimensions: inches

Designs and performance values are subject to change.



Powering Business Worldwide

EDV 09/15

# 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 µm<sub>(c)</sub>. 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 <sup>1)</sup>
- 9 **process connection size:**  
5 = 1" <sup>1)</sup>
- 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

<sup>1)</sup> 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  $\Delta p$  and the element  $\Delta p$  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/](http://www.eatonpowersource.com/calculators/filtration/)

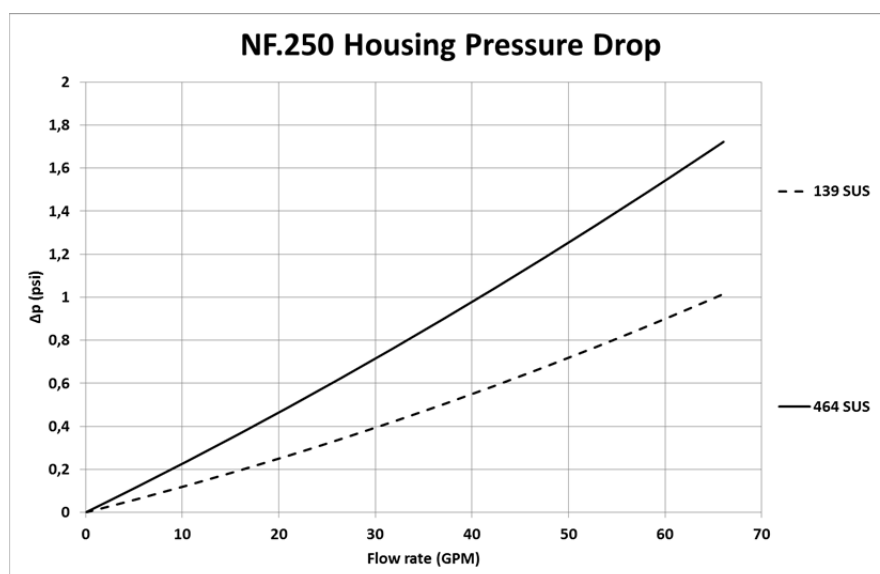
### Material gradient coefficients (MSK) for filter elements

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.

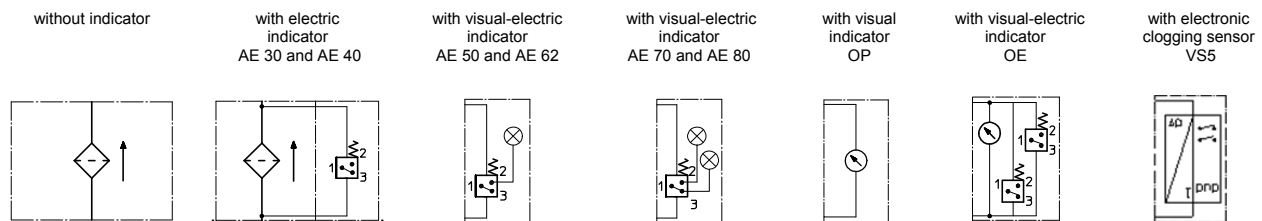
NF	VG				
	3VG	6VG	10VG	16VG	25VG
250	0.669	0.464	0.297	0.259	0.177

### $\Delta p = f(Q)$ – 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

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

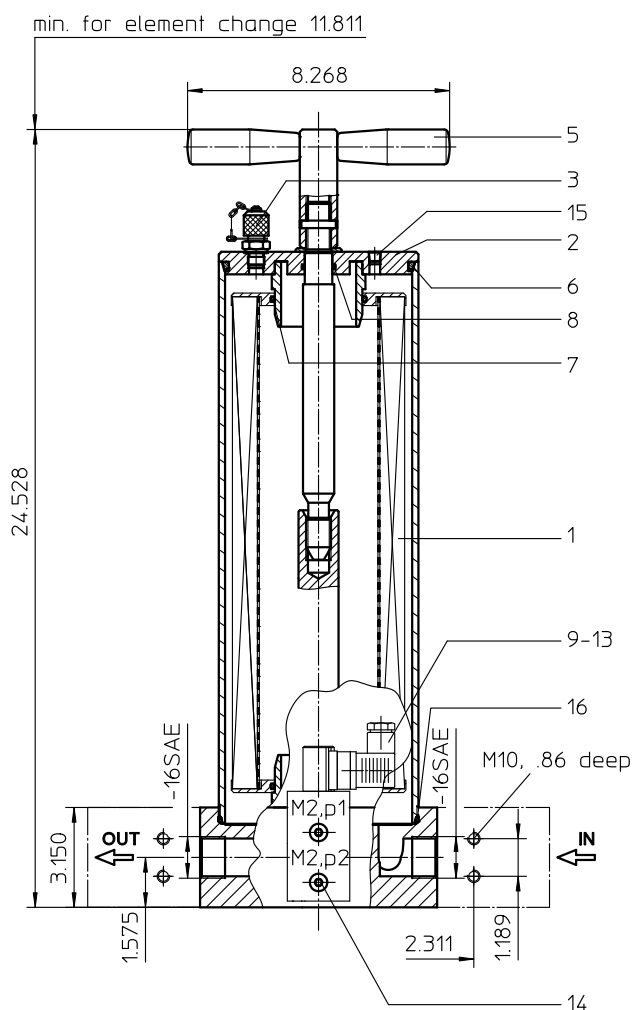
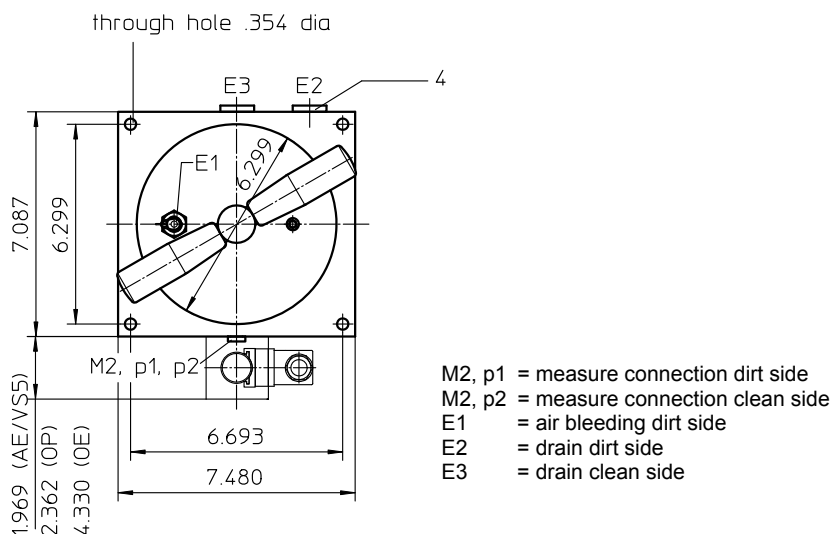
Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

**For more information, please  
email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)**

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# Series NF 631

## 232 PSI



Weight: approx. 37 lbs.

Dimensions: inches

Designs and performance values are subject to change.

# 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 µm<sub>(c)</sub>. 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 <sup>1)</sup>
- 9 **process connection size:**  
6 = 1 1/4" <sup>1)</sup>
- 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

<sup>1)</sup> 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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

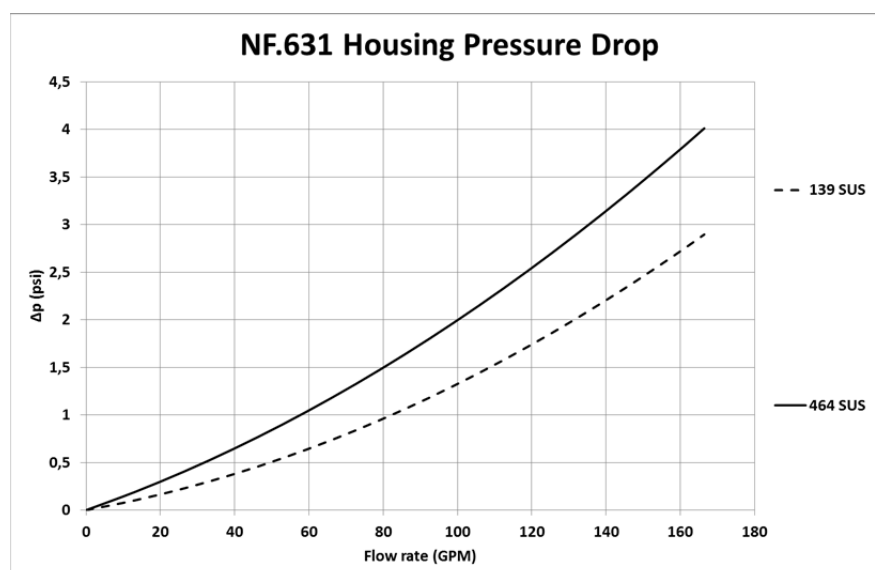
### Material gradient coefficients (MSK) for filter elements

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.

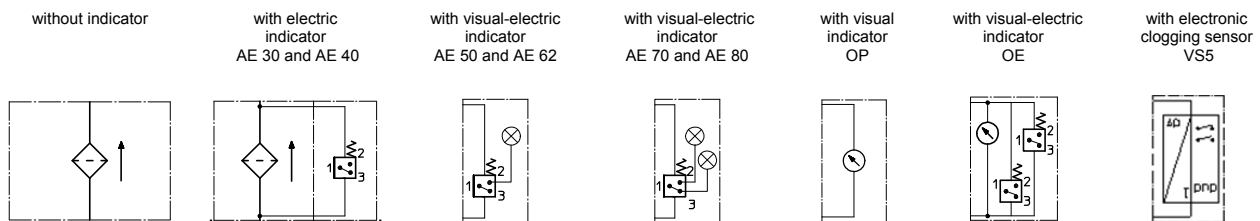
NF	VG				
	3VG	6VG	10VG	16VG	25VG
631	0.356	0.247	0.158	0.138	0.094

### $\Delta p = f(Q)$ – 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	1/8 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
ISO 16889	Multi-pass method for evaluating filtration performance

### North America

44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

### Europe/Africa/Middle East

Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlussheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

### China

No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

### Singapore

4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

### Brazil

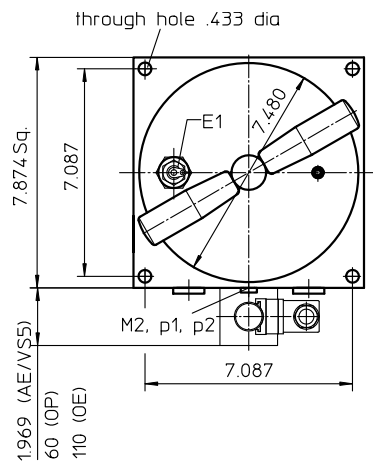
Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

For more information, please  
email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)

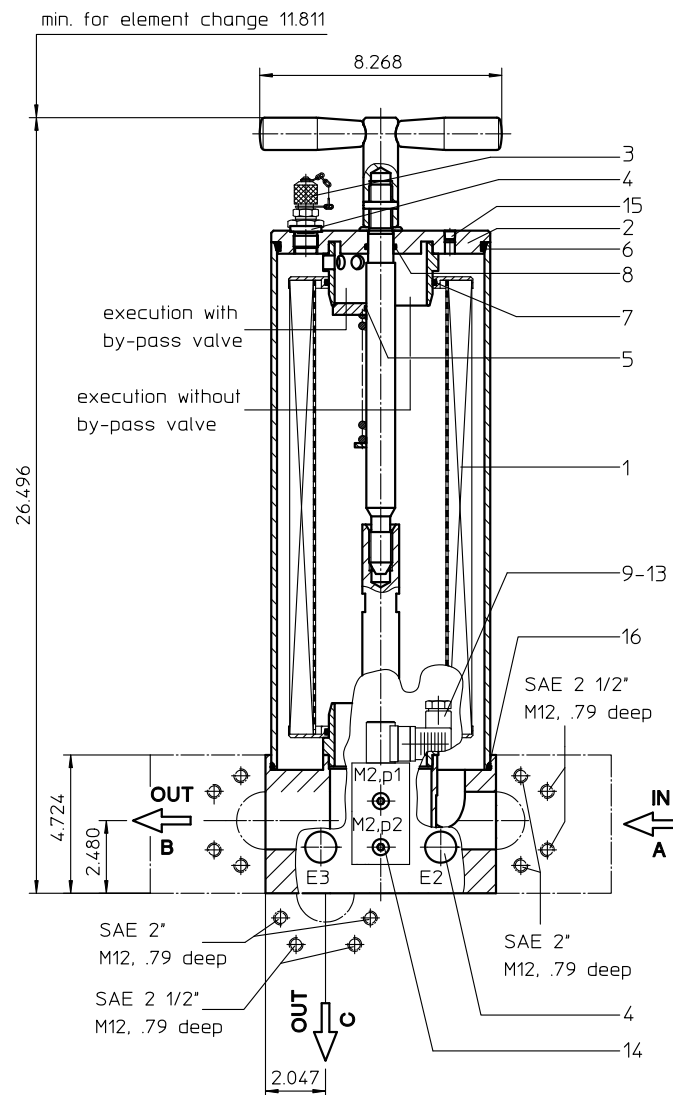
© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

# 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 =  $\Delta p$  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  $\Delta p$  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  $\Delta p$  and the element  $\Delta p$  and is calculated as follows:

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

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

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

For ease of calculation our Filter Selection tool is available online at [www.eatonpowersource.com/calculators/filtration/](http://www.eatonpowersource.com/calculators/filtration/)

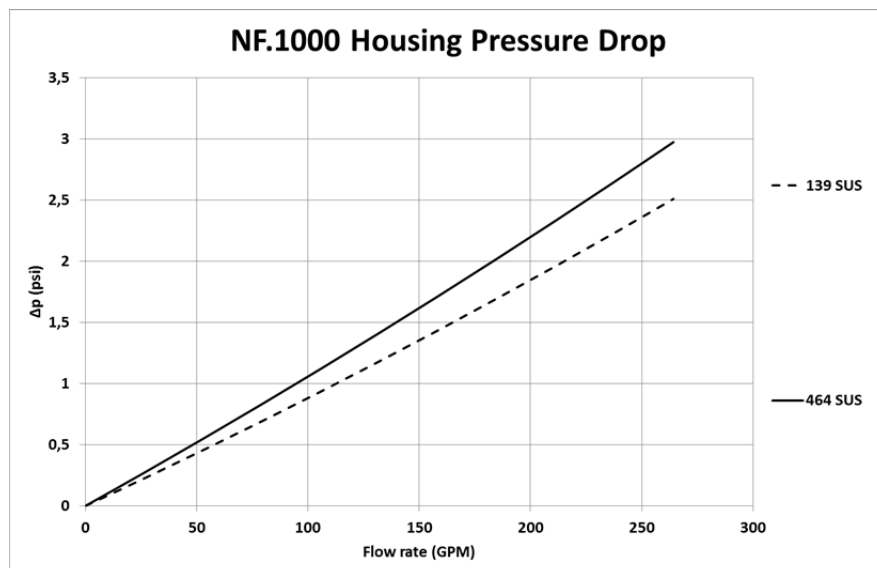
### Material gradient coefficients (MSK) for filter elements

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.

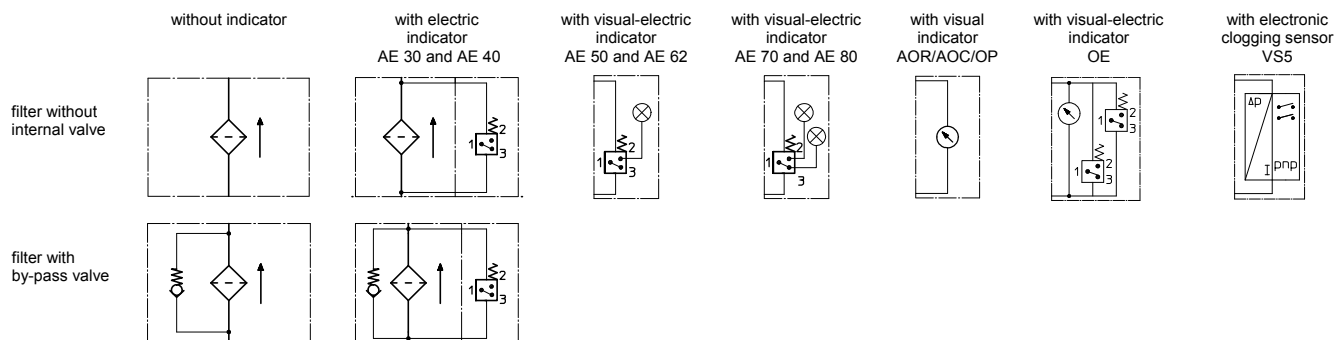
NF	VG				
	3VG	6VG	10VG	16VG	25VG
1000	0.237	0.165	0.105	0.092	0.063

### $\Delta p = f(Q)$ – 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
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

**North America**  
44 Apple Street  
Tinton Falls, NJ 07724  
Toll Free: 800 656-3344  
(North America only)  
Tel: +1 732 212-4700

**Europe/Africa/Middle East**  
Auf der Heide 2  
53947 Nettersheim, Germany  
Tel: +49 2486 809-0

Friedensstraße 41  
68804 Altlusheim, Germany  
Tel: +49 6205 2094-0

An den Nahewiesen 24  
55450 Langenlonsheim, Germany  
Tel: +49 6704 204-0

**China**  
No. 3, Lane 280,  
Linhong Road  
Changning District, 200335  
Shanghai, P.R. China  
Tel: +86 21 5200-0099

**Singapore**  
4 Loyang Lane #04-01/02  
Singapore 508914  
Tel: +65 6825-1668

**Brazil**  
Av. Julia Gaioli, 474 – Bonsucesso  
07251-500 – Guarulhos, Brazil  
Tel: +55 11 2465-8822

**For more information, please  
email us at [filtration@eaton.com](mailto:filtration@eaton.com)  
or visit [www.eaton.com/filtration](http://www.eaton.com/filtration)**

© 2015 Eaton. All rights reserved. All trademarks and registered trademarks are the property of their respective owners. All information and recommendations appearing in this brochure concerning the use of products described herein are based on tests believed to be reliable. However, it is the user's responsibility to determine the suitability for his own use of such products. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Eaton as to the effects of such use or the results to be obtained. Eaton assumes no liability arising out of the use by others of such products. Nor is the information herein to be construed as absolutely complete, since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.