Series DWF 1505
232 PSI

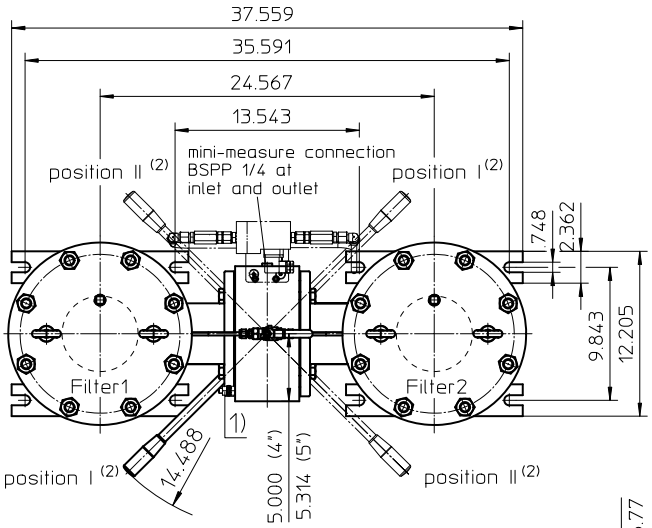
1) Connect the stand grounding tab to a suitable earth ground point.

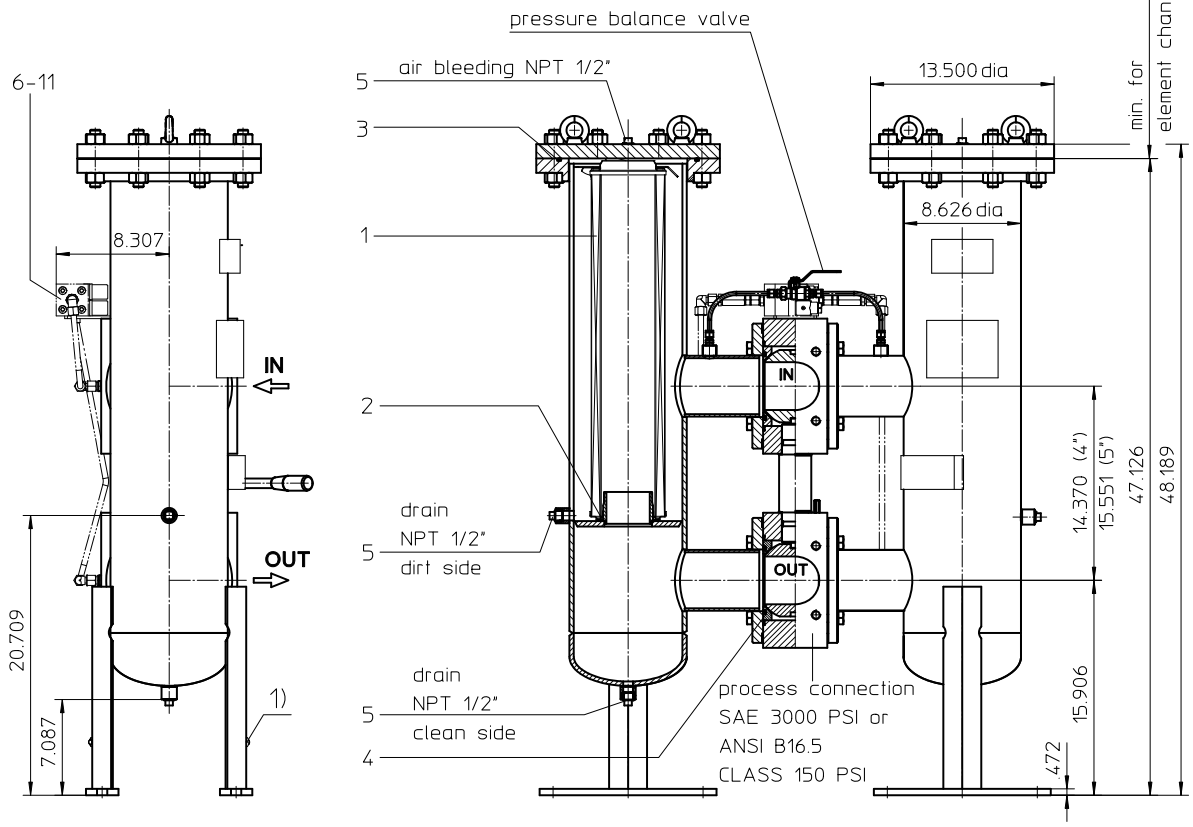
Switch lever standard in the front.

2) On request: The switch lever can be moved to backside of the changeover valve, opposite to the inlet and outlet.

Please specify this configuration on the order.

Position I: Filter 1 in operation
Position II: Filter 2 in operation





Weight: approx.: 714 lbs.

Dimensions: inches

Designs and performance values are subject to change.

EDV 04/16

Duplex Pressure Filter Series DWF 1505 232 PSI

Description:

Duplex filter series DWF 1505 have a working pressure up to 232 PSI. Pressure peaks can be absorbed with a sufficient safety margin.

A changeover ball valve between the two filter housings makes it possible to switch from the dirty filter side to the clean filter side without interrupting operation. The filters can be installed as a suction filter, pressure filter or return line filter.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. Additionally, the depth filter has a metal outer core to protect the filter media. The flow direction is from outside to inside.

For cleaning the stainless steel mesh element or changing the glass fiber element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

For filtration finer than 25 µm, use the disposable elements made of microglass. Filter elements as fine as 3 µm are available; finer filter elements are available upon request.

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

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

Ship classifications available upon request.

Type index:

Complete filter: (ordering example)

DWF.	1505.	10VG.	10.	E.	P.	-.	FS.	B.	-.	IS21.	KH.	OE
1	2	3	4	5	6	7	8	9	10	11	12	13

1 **series:**
DWF = double welded filter, according to ASME-code

2 **nominal size:** 1505

3 **filter material:**
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
25API, 10API microglass according to API

4 **filter element collapse rating:**
10 = Δp 145 PSI

5 **filter element design:**
E = without by-pass
S = with by-pass valve Δp 29 PSI

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = for HFC application, see sheet-no. 31601

8 **process connection:**
FS = SAE-flange 3000 PSI
FA11 = flange ANSI CLASS 150 PSI, sealing surface Rz = 160 µm (not finer than 40 µm) (only with connection 5")
FA12 = flange ANSI CLASS 150 PSI, sealing surface Rz = 16 µm (only with connection 5")

9 **process connection size:**
B = 4" (standard)
C = 5"

10 **filter housing specification:**
- = standard
IS12 = internal parts of change over armature stainless steel, see sheet-no. 41028

11 **specification pressure vessel:**
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415

12 **shut-off :**
- = without
KH = with shut-off ball valve

13 **clogging indicator or clogging sensor:**
- = without
AE = visual-electrical, see sheet-no. 1609
OP = visual, see sheet-no. 1614
OE = visual-electrical, see sheet-no. 1614
VS5 = sensor, see sheet-no. 1641

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

Filter element: (ordering example)

01E.	1501.	10VG.	10.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01E = filter element according to company standard

2 **nominal size:** 1501

3 - 7 see type index-complete filter

Accessories:

- drain- and bleeder connection, see sheet-no. 1651
- lifting mechanism, see sheet-no. 1662

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	232 PSI
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 302 PSI
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 348 PSI
standard process connection:	SAE-flange 3000 PSI
housing material:	carbon steel (ASTM)
housing material change over 4”:	carbon steel
housing material change over 5”:	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
drain- and bleeder connections:	NPT ½”
measure connections:	BSPP ¼”
operating pressure adapter flanges:	according to B16.5 CLASS 150 PSI

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

Pressure drop flow curves:

Filter calculation/sizing

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

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

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

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

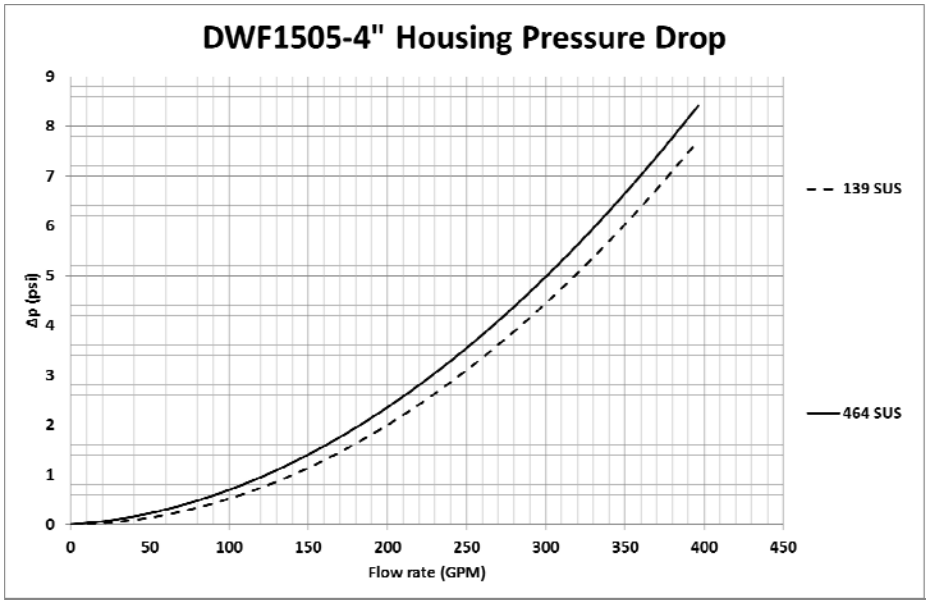
Material gradient coefficients (MSK) for filter elements

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

DWF	VG					G				API	
	3VG	6VG	10VG	16VG	25VG	10G	25G	40G	80G	10 API	25 API
1505	0.160	0.111	0.071	0.062	0.042	0.0058	0.0043	0.0040	0.0027	0.039	0.018

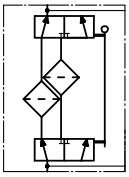
Δp = f(Q) – characteristics according to ISO 3968

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. The flow curve for 5” available on request.

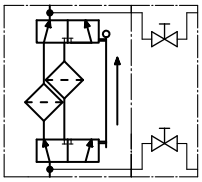


Symbol

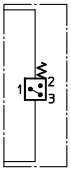
without indicator



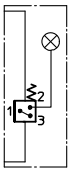
with
shut-off ball valve



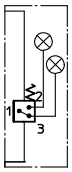
with electric
indicator
AE 30 and AE 40



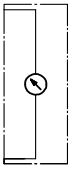
with visual-electric
indicator
AE 50 and AE 62



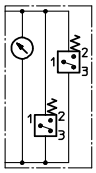
with visual-electric
indicator
AE 70 and AE 80



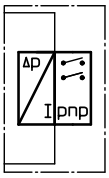
with visual
indicator
OP



with visual-electric
indicator
OE



with electronic
sensor
VS5



Spare parts:

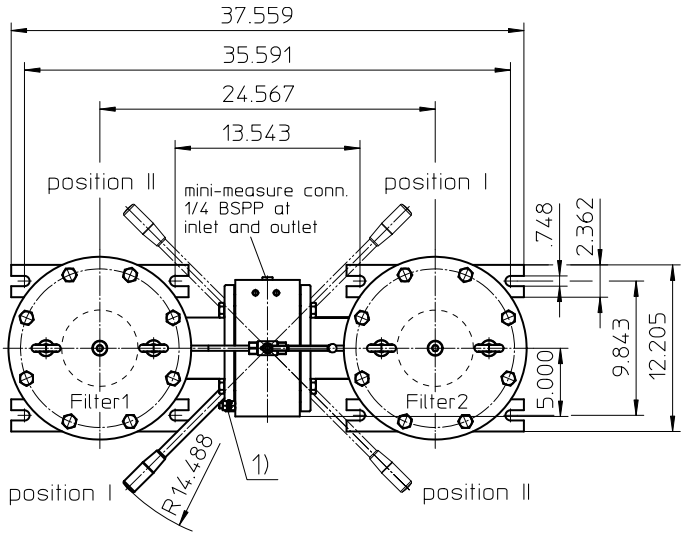
item	qty.	designation	dimension	Article-no.	
1	2	filter element	01E.1501…		
2	2	O-ring	93 x 5	307588 (NBR)	307589 (FPM)
3	2	O-ring	9.975" ID x 0.210 CS	ST521Z6B (BUNA-N)	
4	4	gasket kit of change over UKK 4”	4“ (DN100)		347922 (FPM)
	4	gasket kit of change over UKK 5”	5“ (DN125)		347921 (FPM)
5	6	screw plug	NPT ½“	ST260Z35	
6	1	clogging indicator, visual-electric	AE	see sheet-no.1609	
7	1	clogging indicator, visual	OP	see sheet-no 1614	
8	1	clogging indicator, visual-electric	OE	see sheet-no 1614	
9	1	clogging sensor, electronic	VS5	see sheet-no 1641	
10	3	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
11	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)

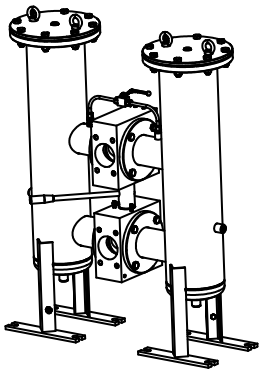
Test methods:

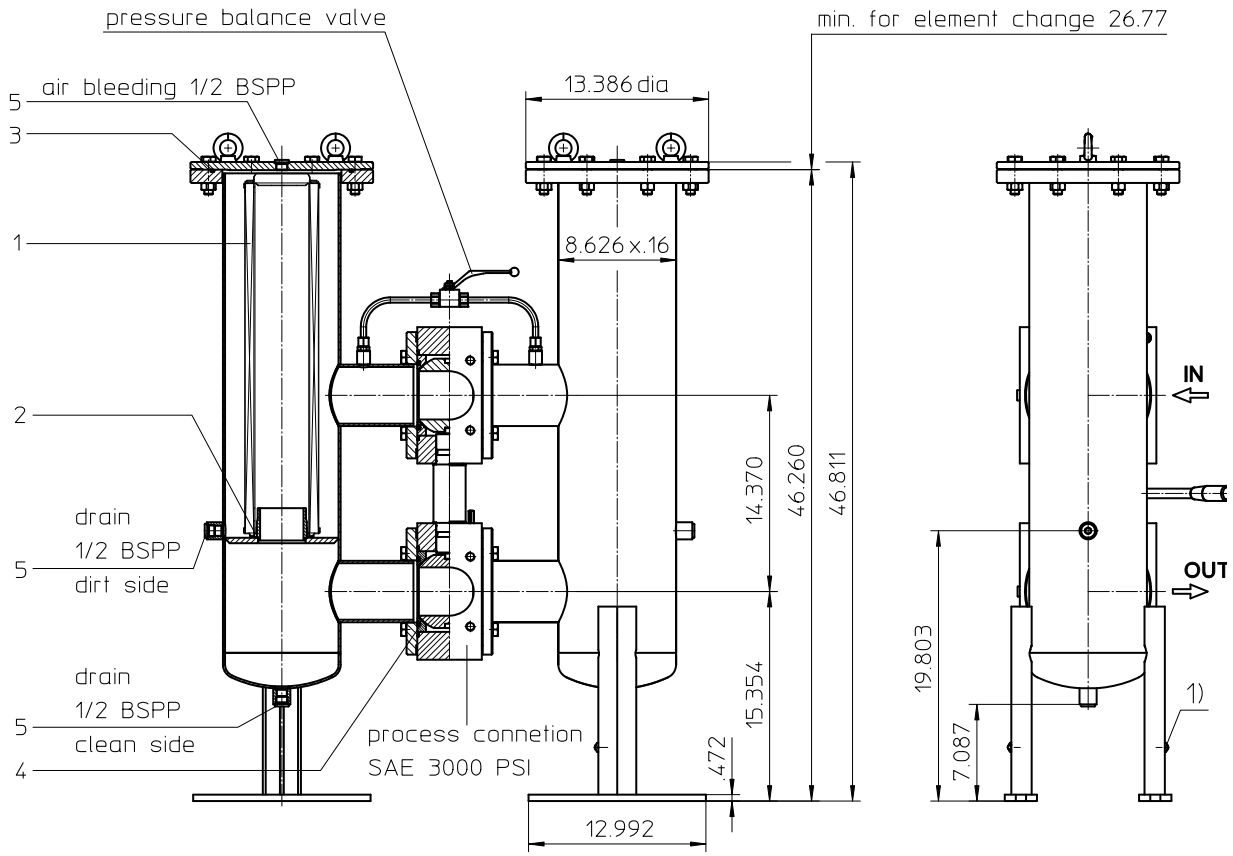
Filter elements are tested according to the following ISO standards:

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

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

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 stainless steel mesh element or changing the glass fiber element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

For filtration finer than 25 µm, use the disposable elements made of glass fiber. Filter elements as fine as 3 µm are available; finer filter elements are available upon request.

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

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

Ship classifications available upon request.

Type index:

Complete filter: (ordering example)

DWF.	1505.	10VG.	10.	E.	P.	-.	FS.	B.	-.	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 = ∆p 145 PSI

5 **filter element design:**
E = without by-pass
S = with by-pass valve ∆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:**
FS = flange SAE 3000 PSI

9 **process connection size:**
B = 4“
C = 5”

10 **filter housing specification:** (see catalog)
- = standard
IS12 = see sheet-no.
IS20 = see sheet-no,

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

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
standard process connection:	flange SAE 3000 PSI
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
drain- and bleeder connections:	½ BSPP
measure connections:	¼ BSPP
volume tank:	2x 8,6 Gal.

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

Pressure drop flow curves:

Performance characteristics of DWF 1505 (Data sheet 2227)

Filter calculation/sizing

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

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

$$\Delta p_{Element}\ (PSI) = Q\ (GPM)\ x\ \frac{MSK}{1000}\left(\frac{PSI}{GPM}\right)\ x\ v\ (SUS)\ x\ \frac{\rho}{0{,}876}\left(\frac{kg}{dm^3}\right)$$

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

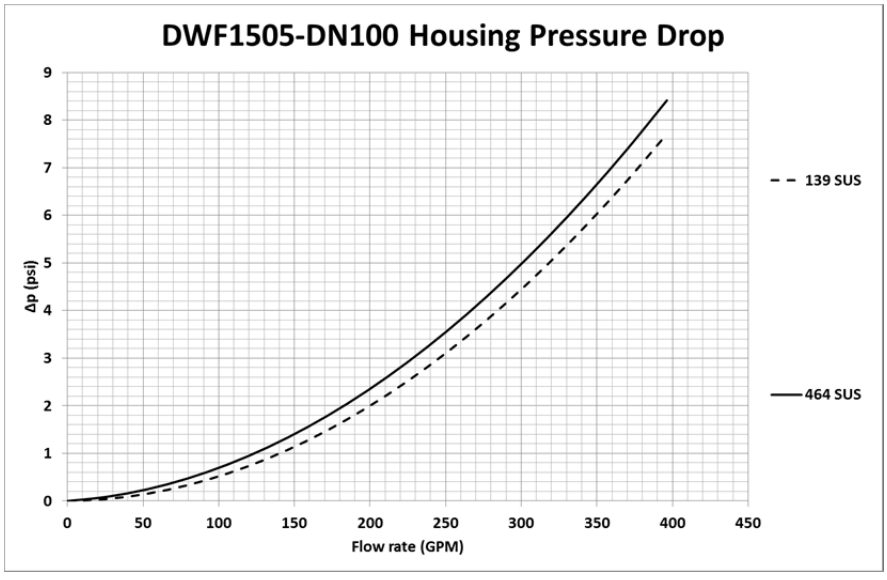
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0,876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

DWF	VG					G				API	
	3VG	6VG	10VG	16VG	25VG	10G	25G	40G	80G	10API	25API
DWF 1505	0,193	0,134	0,086	0,075	0,051	0,0071	0,0053	0,0049	0,0034	0,048	0,022

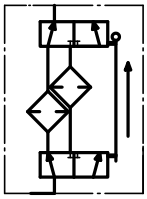
Δp = f(Q) – characteristics according to ISO 3968

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.

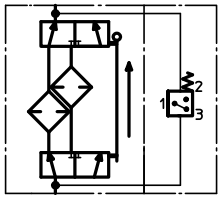


Symbols:

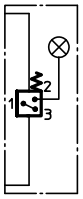
without indicator



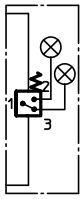
with electric indicator AE 30 and AE 40



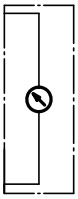
with visual-electric indicator AE 50 and AE 62



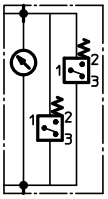
with visual-electric indicator AE 70 and AE 80



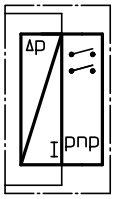
with visual indicator OP



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	168 x 5	(NBR)	332049 (FPM)
3	2	O-ring	114 x 6	(NBR)	(FPM)
4	4	gasket kit of change over UKK	DN100 (4“)	347922	
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	45 x3	(NBR)	304977 (FPM)
11	1	O-ring	240 x 5	307592 (NBR)	(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

Series DWF 3005
232 PSI

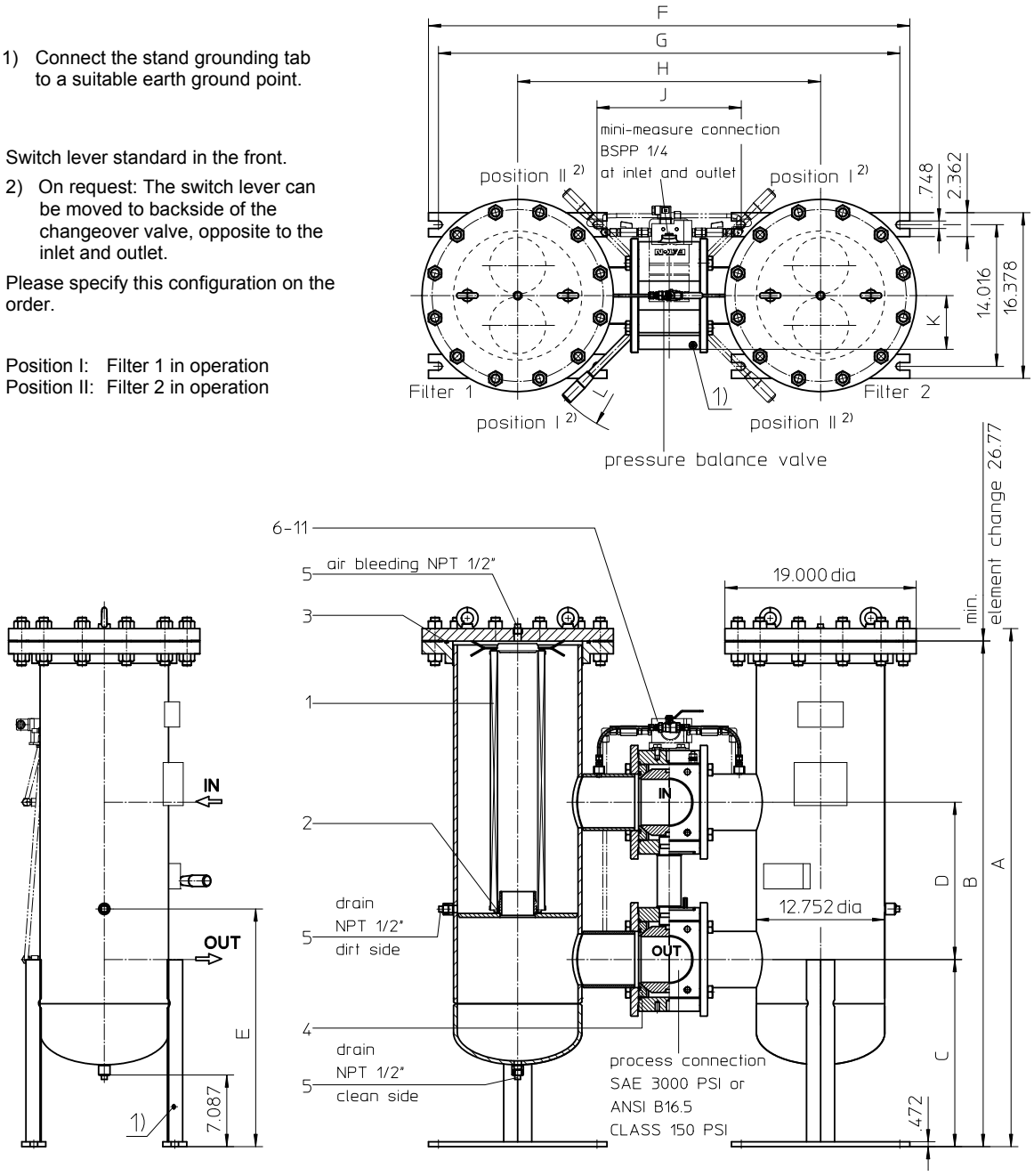
1) Connect the stand grounding tab to a suitable earth ground point.

Switch lever standard in the front.

2) On request: The switch lever can be moved to backside of the changeover valve, opposite to the inlet and outlet.

Please specify this configuration on the order.

Position I: Filter 1 in operation
Position II: Filter 2 in operation



Dimensions:

DWF 3005	A	B	C	D	E	F	G	H	J	K	L	weight lbs.	volume tank
connection 4"	51.22	50.00	18.50	14.37	23.50	46.37	40.41	28.66	12.91	5.,00	14.56		2x 20 Gal.
connection 5"	51.22	50.00	18.50	15.55	23.50	47.79	45.82	30.07	14.33	5.31	14.56	1093	2x 20 Gal.
connection 6"	52.12	50.90	19.40	17.32	24.40	48.97	47.00	31.25	15.51	8.15	16.92		2x 21 Gal.

Dimensions: inches

Designs and performance values are subject to change.

Duplex Pressure Filter
Series DWF 3005
232 PSI

Description:

Duplex filter series DWF 3005 have a working pressure up to 232 PSI. Pressure peaks can be absorbed with a sufficient safety margin.

A changeover ball valve between the two filter housings makes it possible to switch from the dirty filter side to the clean filter side without interrupting operation. The filters can be installed as a suction filter, pressure filter or return line filter.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. Additionally, the depth filter has a metal outer core to protect the filter media. The flow direction is from outside to inside.

For cleaning the stainless steel mesh element or changing the glass fiber element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

For filtration finer than 25 µm, use the disposable elements made of microglass. Filter elements as fine as 3 µm are available; finer filter elements are available upon request.

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

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

Ship classifications available upon request.

Type index:

Complete filter: (ordering example)

DWF.	3005.	10VG.	10.	E.	P.	-.	FS.	C.	-.	IS21.	KH.	OE
1	2	3	4	5	6	7	8	9	10	11	12	13

1 **series:**
DWF = double welded filter, according to ASME-code

2 **nominal size:** 3005

3 **filter material:**
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
25API, 10API microglass according to API

4 **filter element collapse rating:**
10 = Δp 145 PSI

5 **filter element design:**
E = without by-pass
S = with by-pass valve Δp 29 PSI

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = for HFC application, see sheet-no. 31601

8 **process connection:**
FS = SAE-flange 3000 PSI (only with connection 4” and 5”)
FA11 = flange ANSI CLASS 150 PSI, sealing surface Rz = 160 µm (not finer than 40 µm) (only with connection 5” and 6”)
FA12 = flange ANSI CLASS 150 PSI, sealing surface Rz = 16 µm (only with connection 5” and 6”)

9 **process connection size:**
B = 4“
C = 5“ (standard)
D = 6“

10 **filter housing specification:**
- = standard
IS12 = internal parts of change over armature stainless steel, see sheet-no. 41028

11 **specification pressure vessel:**
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415

12 **shut-off :**
- = without
KH = with shut-off ball valve

13 **clogging indicator or clogging sensor:**
- = without
AE = visual-electrical, see sheet-no. 1609
OP = visual, see sheet-no. 1614
OE = visual-electrical, see sheet-no. 1614
VS5 = sensor, see sheet-no. 1641

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

Filter element: (ordering example)

01E.	1501.	10VG.	10.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01E = filter element according to company standard

2 **nominal size:** 1501

3 - 7 see type index-complete filter

Accessories:

- drain- and bleeder connection, see sheet-no. 1651
- lifting mechanism, see sheet-no. 1662

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	232 PSI
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 302 PSI
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 348 PSI
standard process connection:	SAE-flange 3000 PSI
housing material:	carbon steel (ASTM)
housing material change over 4":	carbon steel
housing material change over 5" and 6":	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
drain- and bleeder connections:	NPT ½"
measure connections:	BSPP ¼"
operating pressure adapter flanges:	according to B16.5 CLASS 150 PSI

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

Pressure drop flow curves:

Filter calculation/sizing

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

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

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

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

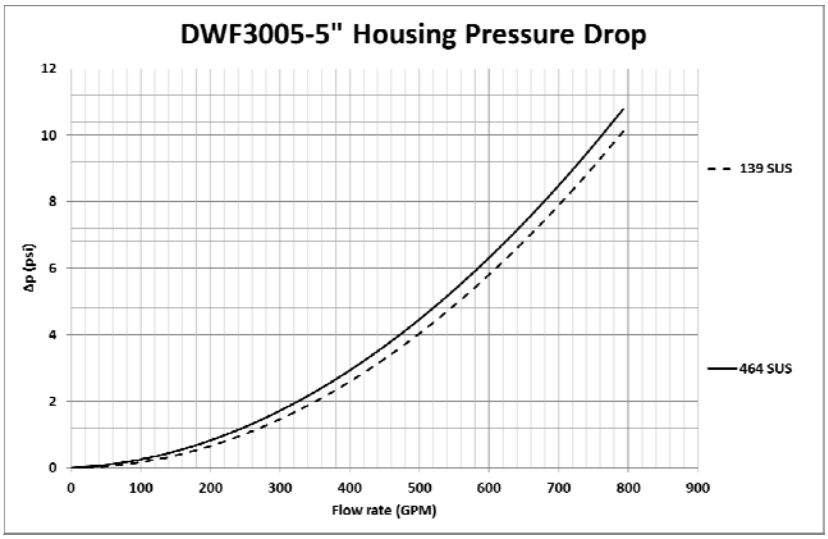
Material gradient coefficients (MSK) for filter elements

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

DWF	VG					G				API	
	3VG	6VG	10VG	16VG	25VG	10G	25G	40G	80G	10 API	25 API
3005	0.080	0.056	0.036	0.031	0.021	0.0029	0.0021	0.0020	0.0014	0.019	0.009

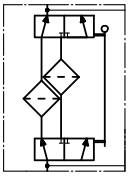
Δp = f(Q) – characteristics according to ISO 3968

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. The flow curves for 4" and 6" available on request.

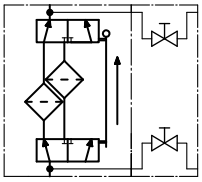


Symbol

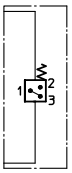
without indicator



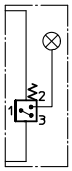
with
shut-off ball valve



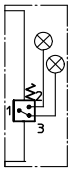
with electric
indicator
AE 30 and AE 40



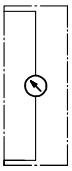
with visual-electric
indicator
AE 50 and AE 62



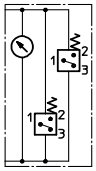
with visual-electric
indicator
AE 70 and AE 80



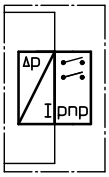
with visual
indicator
OP



with visual-electric
indicator
OE



with electronic
sensor
VS5



Spare parts:

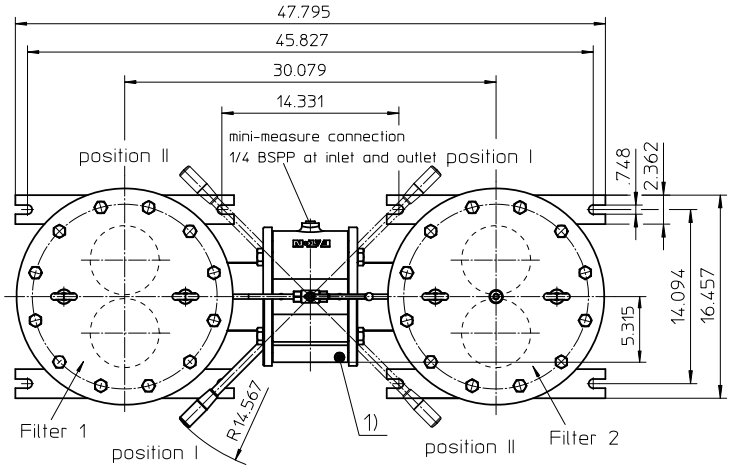
item	qty.	designation	dimension	Article-no.	
1	4	filter element	01E.1501…		
2	4	O-ring	93 x 5	307588 (NBR)	307589 (FPM)
3	2	O-ring	13.975" ID x 0.210 CS	2375017893 (BUNA-N)	
4	4	gasket kit of change over UKK 4”	4“ (DN100)		347922 (FPM)
	4	gasket kit of change over UKK 5”	5“ (DN125)		347921 (FPM)
	4	gasket kit of change over UKK 6”	6” (DN150)		347916 (FPM)
5	6	screw plug	NPT ½“	ST260Z35	
6	1	clogging indicator, visual-electric	AE	see sheet-no.1609	
7	1	clogging indicator, visual	OP	see sheet-no 1614	
8	1	clogging indicator, visual-electric	OE	see sheet-no 1614	
9	1	clogging sensor, electronic	VS5	see sheet-no 1641	
10	3	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
11	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)

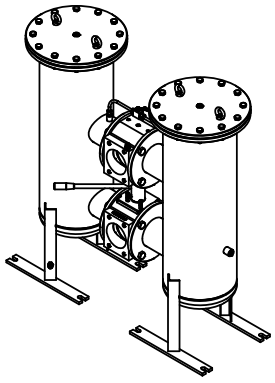
Test methods:

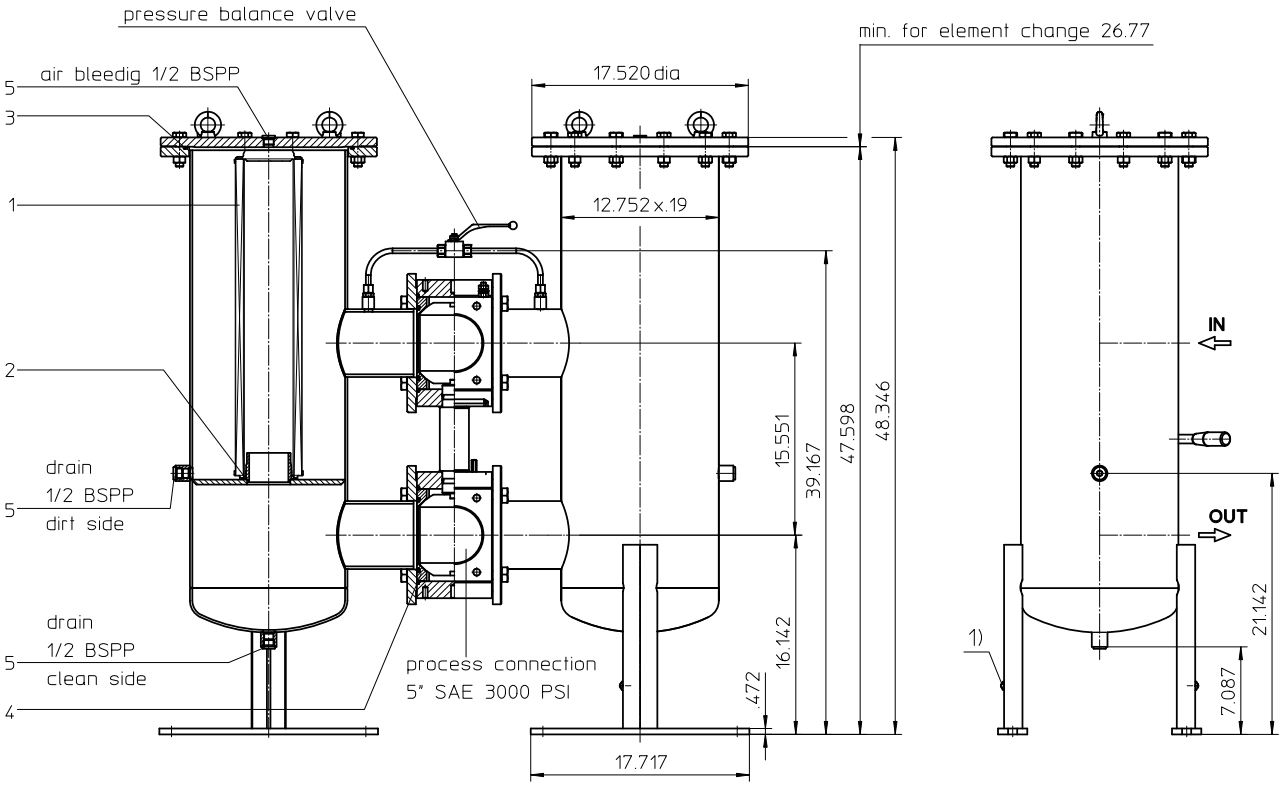
Filter elements are tested according to the following ISO standards:

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

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 stainless steel mesh element or changing the glass fiber element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

For filtration finer than 25 µm, use the disposable elements made of glass fiber. Filter elements as fine as 3 µm are available; finer filter elements are available upon request.

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

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

Ship classifications available upon request.

Type index:

Complete filter: (ordering example)

DWF.	3005.	10VG.	10.	E.	P.	-.	FS.	C.	-.	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 = ∆p 145 PSI

5 **filter element design:**
E = without by-pass
S = with by-pass valve ∆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:**
FS = flange SAE 3000 PSI

9 **process connection size:**
B = 4”
C = 5“
D = 6”

10 **filter housing specification:** (see catalog)
- = standard
IS12 = see sheet-no.
IS20 = see sheet-no.

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
standard 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 ∆p and the element ∆p and is calculated as follows:

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

$$\Delta p_{Element}\ (PSI) = Q\ (GPM)\ x\ \frac{MSK}{1000}\left(\frac{PSI}{GPM}\right)\ x\ v\ (SUS)\ x\ \frac{\rho}{0{,}876}\left(\frac{kg}{dm^3}\right)$$

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

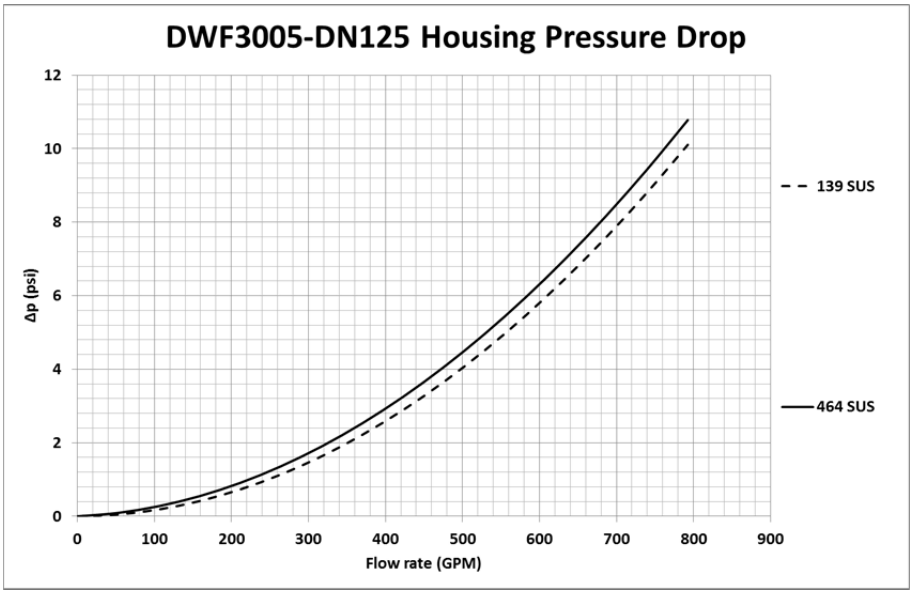
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0,876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

DWF	VG					G				API	
	3VG	6VG	10VG	16VG	25VG	10G	25G	40G	80G	10API	25API
DWF 3005	0,096	0,067	0,043	0,037	0,025	0,0035	0,0026	0,0025	0,0017	0,024	0,011

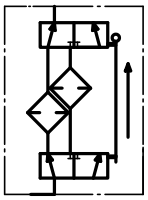
∆p = f(Q) – characteristics according to ISO 3968

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.

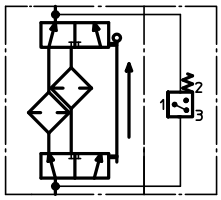


Symbols:

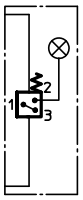
without indicator



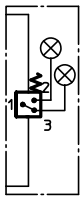
with electric indicator AE 30 and AE 40



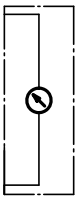
with visual-electric indicator AE 50 and AE 62



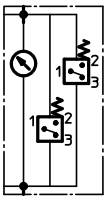
with visual-electric indicator AE 70 and AE 80



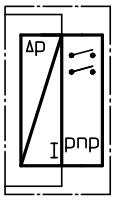
with visual indicator OP



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	190 x 5	(NBR)	(NBR)
3	2	O-ring	140 x 6	(NBR)	(NBR)
4	4	gasket kit of change over UKK	DN125	347921	
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	43 x 3	(NBR)	304997 (FPM)
11	1	O-ring	330 x 5	(NBR)	310275 (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

Series DWF 4505
232 PSI

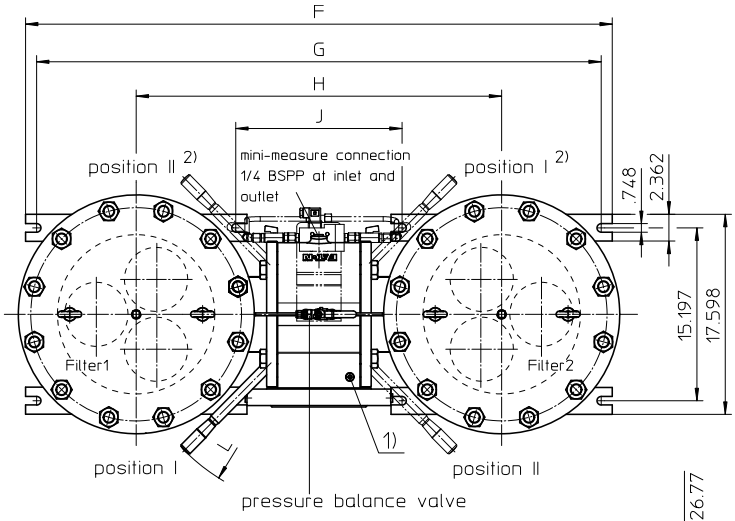
1) Connect the stand grounding tab to a suitable earth ground point.

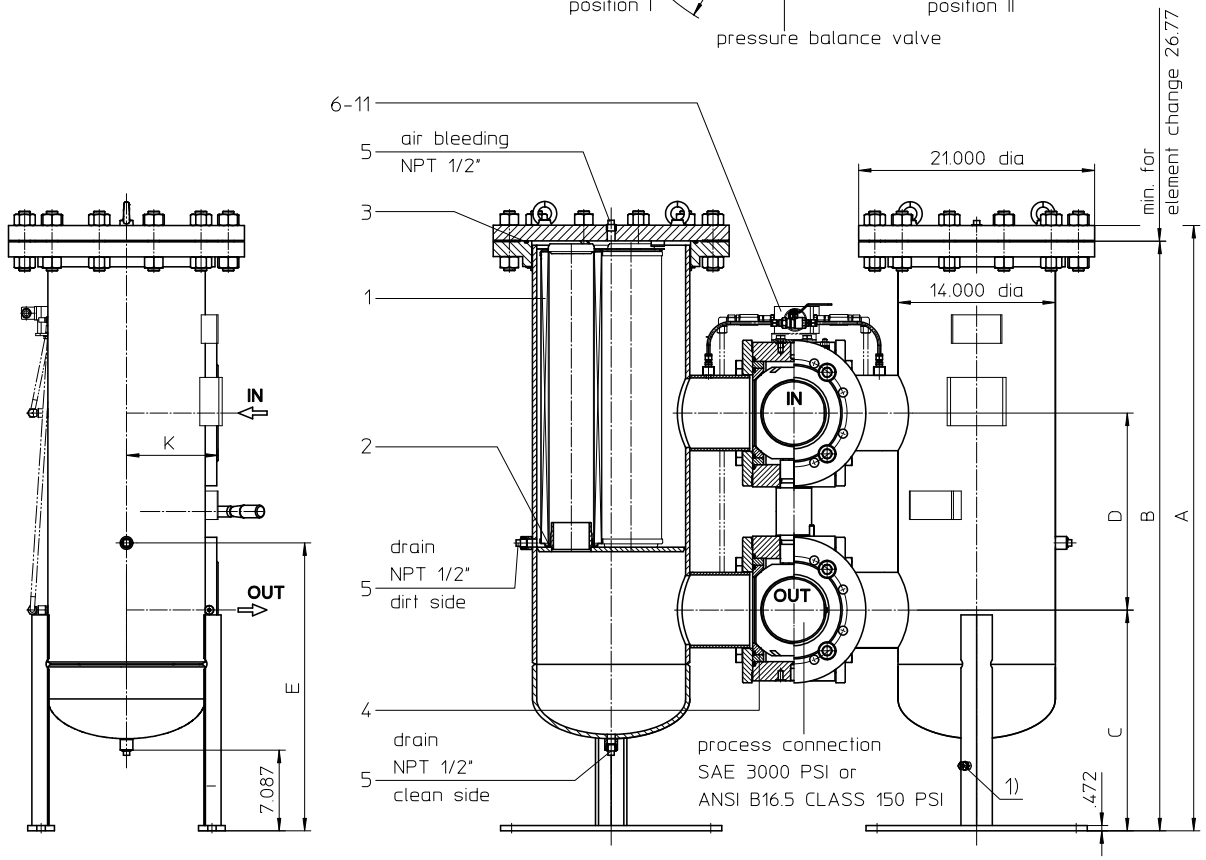
Switch lever standard in the front.

2) On request: The switch lever can be moved to backside of the changeover valve, opposite to the inlet and outlet.

Please specify this configuration on the order.

Position I: Filter 1 in operation
Position II: Filter 2 in operation





Dimensions:

DWF 4505	A	B	C	D	E	F	G	H	J	K	L	weight lbs.	volume tank
connection 5"	53.22	51.85	19.40	15.55	25.31	51.02	49.05	31.33	13.62	5.31	14.56		2x 26 Gal.
connection 6"	53.22	51.85	19.40	17.32	25.31	52.20	50.23	32.52	14.80	8.15	16.92	1521	2x 26 Gal.
connection 8"	55.31	53.93	20.47	20.47	27.36	54.37	52.40	34.68	16.97	9.61	21.33		2x 28 Gal.

Dimensions: inches

Designs and performance values are subject to change.

Duplex Pressure Filter
Series DWF 4505
232 PSI

Description:

Duplex filter series DWF 4505 have a working pressure up to 232 PSI. Pressure peaks can be absorbed with a sufficient safety margin.

A changeover ball valve between the two filter housings makes it possible to switch from the dirty filter side to the clean filter side without interrupting operation. The filters can be installed as a suction filter, pressure filter or return line filter.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. Additionally, the depth filter has a metal outer core to protect the filter media. The flow direction is from outside to inside.

For cleaning the stainless steel mesh element or changing the glass fiber element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

For filtration finer than 25 µm, use the disposable elements made of microglass. Filter elements as fine as 3 µm are available; finer filter elements are available upon request.

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

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

Ship classifications available upon request.

Type index:

Complete filter: (ordering example)

DWF.	4505.	10VG.	10.	E.	P.	-.	FA11.	D.	-.	IS21.	KH.	OE
1	2	3	4	5	6	7	8	9	10	11	12	13

1 **series:**
DWF = double welded filter, according to ASME-code

2 **nominal size:** 4505

3 **filter material:**
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
25API, 10API microglass according to API

4 **filter element collapse rating:**
10 = Δp 145 PSI

5 **filter element design:**
E = without by-pass
S = with by-pass valve Δp 29 PSI

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = for HFC application, see sheet-no. 31601

8 **process connection:**
FS = SAE-flange 3000 PSI (only with connection 5”)
FA11 = flange ANSI CLASS 150 PSI,
sealing surface Rz = 160 µm (not finer than 40 µm)
FA12 = flange ANSI CLASS 150 PSI,
sealing surface Rz = 16 µm

9 **process connection size:**
C = 5“
D = 6“ (standard)
E = 8“

10 **filter housing specification:**
- = standard
IS12 = internal parts of change over armature stainless steel,
see sheet-no. 41028

11 **specification pressure vessel:**
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415

12 **shut-off :**
- = without
KH = with shut-off ball valve

13 **clogging indicator or clogging sensor:**
- = without
AE = visual-electrical, see sheet-no. 1609
OP = visual, see sheet-no. 1614
OE = visual-electrical, see sheet-no. 1614
VS5 = sensor, see sheet-no. 1641

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

Filter element: (ordering example)

01E.	1501.	10VG.	10.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01E = filter element according to company standard

2 **nominal size:** 1501

3 - 7 see type index-complete filter

Accessories:

- drain- and bleeder connection, see sheet-no. 1651
- lifting mechanism, see sheet-no. 1662

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	232 PSI
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 302 PSI
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 348 PSI
standard process connection:	flange ANSI B16.5 CLASS 150 PSI
housing material:	carbon steel (ASTM)
housing material change over:	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
drain- and bleeder connections:	NPT ½"
measure connections:	BSPP ¼"
operating pressure adapter flanges:	according to B16.5 CLASS 150 PSI

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

Pressure drop flow curves:

Filter calculation/sizing

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

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

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

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

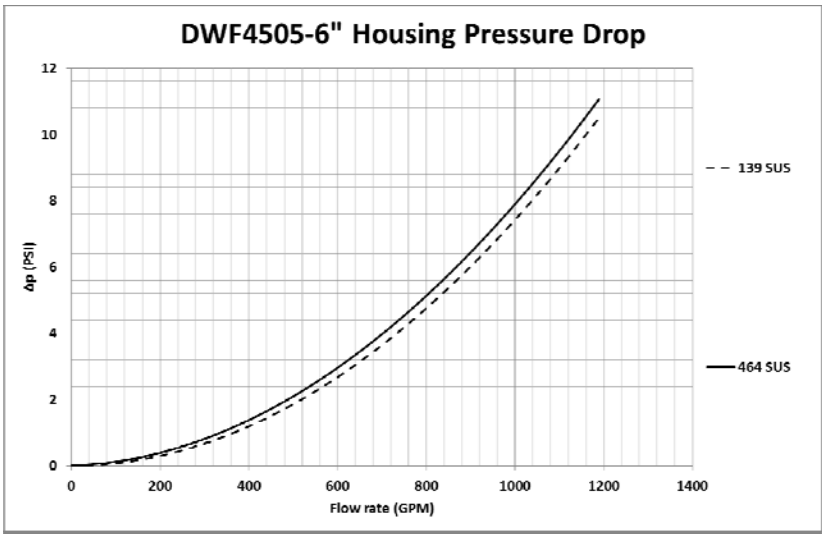
Material gradient coefficients (MSK) for filter elements

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

DWF	VG					G				API	
	3VG	6VG	10VG	16VG	25VG	10G	25G	40G	80G	10 API	25 API
4505	0.064	0.045	0.029	0.025	0.017	0.0024	0.0018	0.0016	0.0011	0.016	0.007

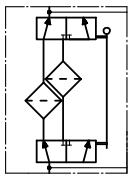
Δp = f(Q) – characteristics according to ISO 3968

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. The flow curves for 5" and 8" available on request.

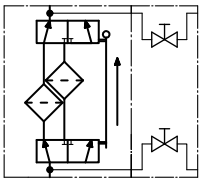


Symbols:

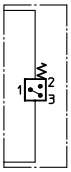
without indicator



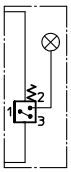
with
shut-off ball valve



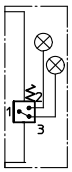
with electric
indicator
AE 30 and AE 40



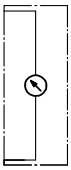
with visual-electric
indicator
AE 50 and AE 62



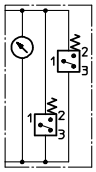
with visual-electric
indicator
AE 70 and AE 80



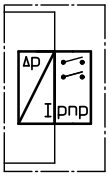
with visual
indicator
OP



with visual-electric
indicator
OE



with electronic
sensor
VS5



Spare parts:

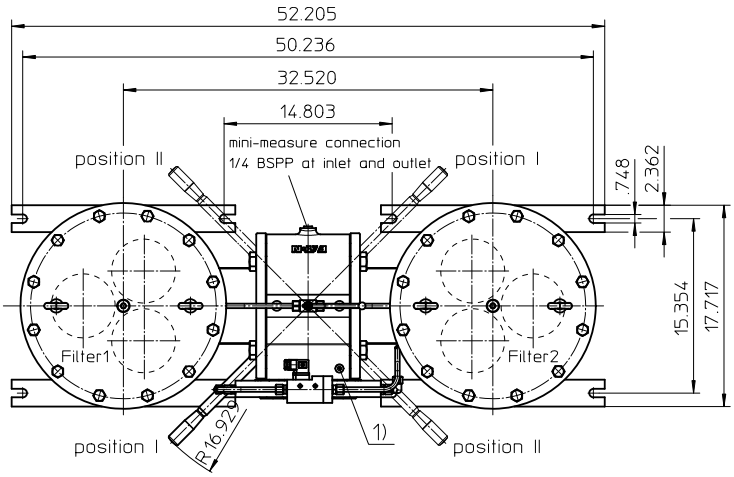
item	qty.	designation	dimension	Article-no.	
1	6	filter element	01E.1501…		
2	6	O-ring	93 x 5	307588 (NBR)	307589 (FPM)
3	2	O-ring	14.975" ID x 0.210 CS	2375017993 (BUNA-N)	
4	4	gasket kit of change over UKK 5”	5“ (DN125)		347921 (FPM)
	4	gasket kit of change over UKK 6”	6“ (DN150)		347916 (FPM)
	4	gasket kit of change over UKK 8”	8” (DN200)		347931 (FPM)
5	6	screw plug	NPT ½“	ST260Z35	
6	1	clogging indicator, visual-electric	AE	see sheet-no.1609	
7	1	clogging indicator, visual	OP	see sheet-no 1614	
8	1	clogging indicator, visual-electric	OE	see sheet-no 1614	
9	1	clogging sensor, electronic	VS5	see sheet-no 1641	
10	3	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
11	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)

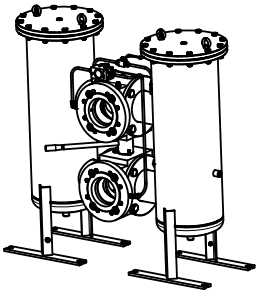
Test methods:

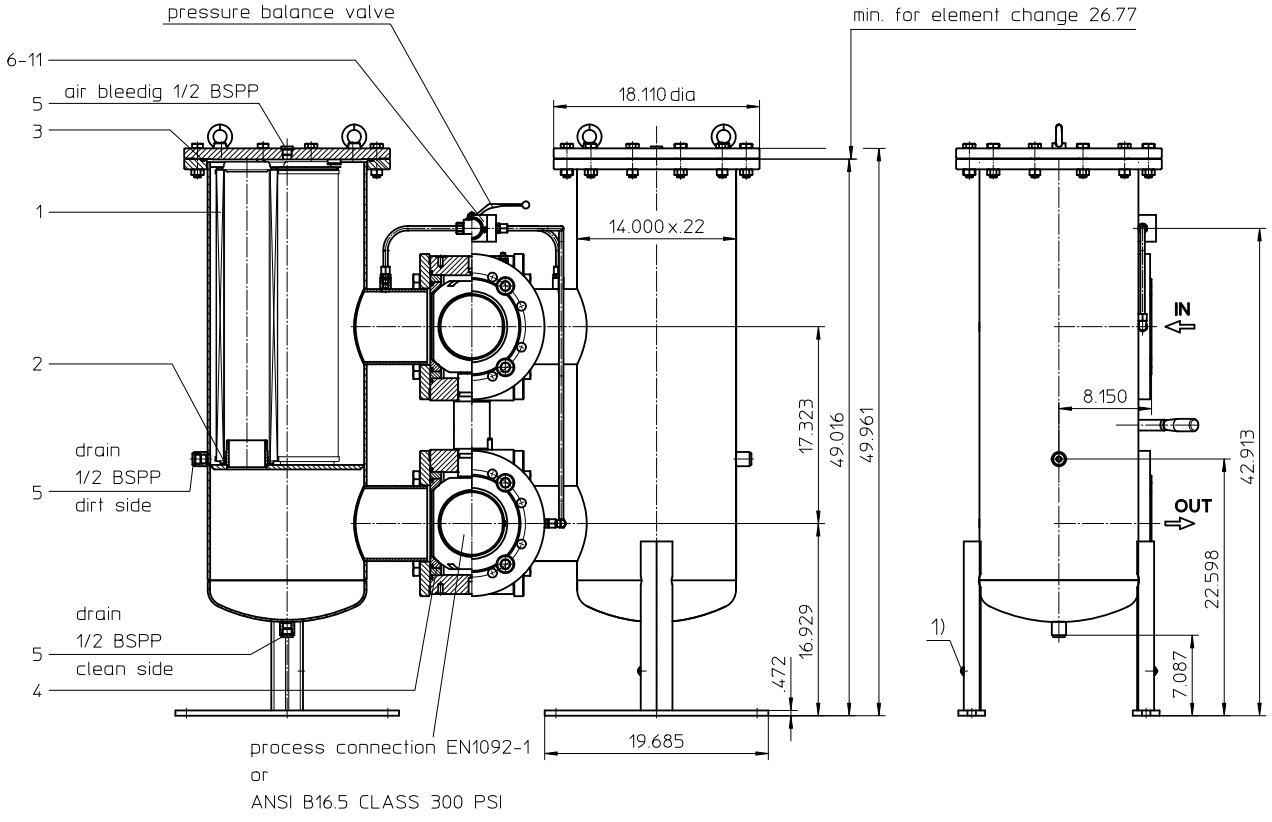
Filter elements are tested according to the following ISO standards:

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

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.

EDV 07/15

Duplex Pressure Filter Series DWF 4505 232 PSI

Description:

Duplex filter series DWF 4505 have a working pressure up to 232 PSI. Pressure peaks can be absorbed with a sufficient safety margin.

A changeover ball valve between the two filter housings makes it possible to switch from the dirty filter side to the clean filter side without interrupting operation. The filters can be installed as a suction filter, pressure filter or return line filter.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. Additionally, the depth filter has a metal outer core to protect the filter media. The flow direction is from outside to inside.

For cleaning the stainless steel mesh element or changing the glass fiber element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

For filtration finer than 25 µm, use the disposable elements made of glass fiber. Filter elements as fine as 3 µm are available; finer filter elements are available upon request.

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

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

Ship classifications available upon request.

Type index:

Complete filter: (ordering example)

DWF.	4505.	10VG.	10.	E.	P.	-.	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 = ∆p 145 PSI

5 **filter element design:**
E = without by-pass
S = with by-pass valve ∆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:**
C = 5”
D = 6”
E = 8”

10 **filter housing specification:** (see catalog)
- = standard
IS12 = see sheet-no. 41028
IS20 = see sheet-no. 55217

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. xxx

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
standard process connection:	flange EN1092-1, 232 PSI or flange ANSI B16.5 CLASS 300 PSI
housing material:	C-steel
housing material change over:	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
drain- and bleeder connections:	½ BSPP
measure connections:	¼ BSPP
volume tank:	2x 23,8 Gal.

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

Pressure drop flow curves:

Performance characteristics of DWF 4505 (Data sheet 2229)

Filter calculation/sizing

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

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

$$\Delta p_{Element}\ (PSI) = Q\ (GPM)\ x\ \frac{MSK}{1000}\left(\frac{PSI}{GPM}\right)\ x\ v\ (SUS)\ x\ \frac{\rho}{0{,}876}\left(\frac{kg}{dm^3}\right)$$

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

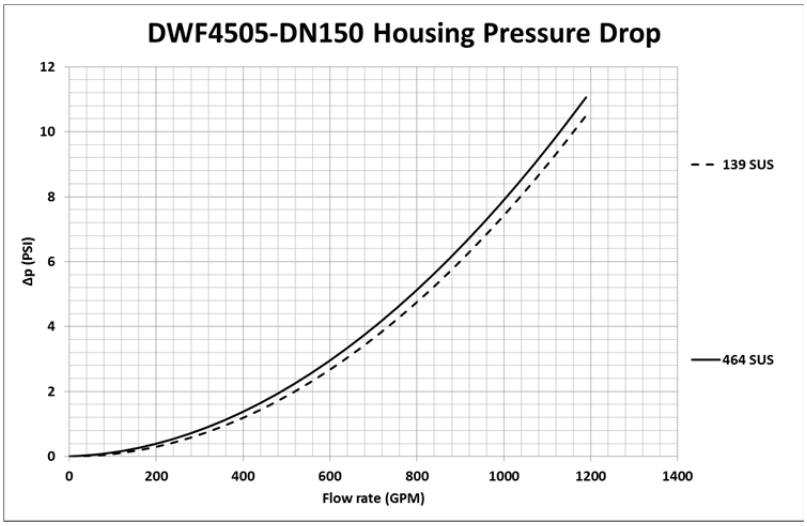
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0,876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

DWF	VG					G				API	
	3VG	6VG	10VG	16VG	25VG	10G	25G	40G	80G	10API	25API
DWF 4505	0.064	0.045	0.029	0.025	0.017	0.0024	0.0018	0.0016	0.0011	0.016	0.007

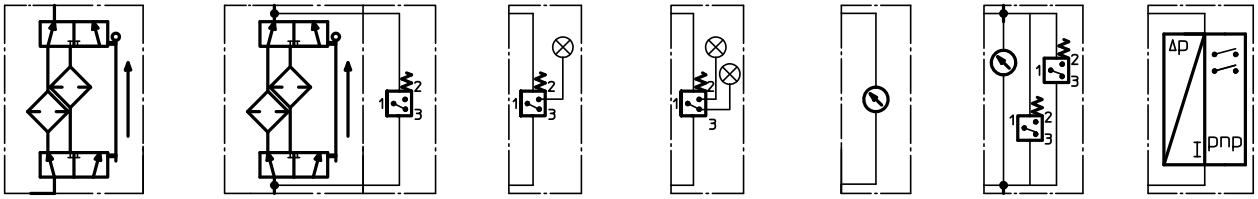
Δp = f(Q) – characteristics according to ISO 3968

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:

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	324 x 5,33	(NBR)	347194 (FPM)
3	2	O-ring	55 x 3,5	(NBR)	336351 (FPM)
4	4	gasket kit of change over UKK	DN150 (6“)	347916	
5	6	screw plug	G ½	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	160 x 5	(NBR)	xxx (FPM)
11	1	O-ring	xxx	(NBR)	xxx (FPM)

Test methods:

Filter elements are tested according to the following ISO standards:

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

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Powering Business Worldwide

Series DWF 6005
232 PSI

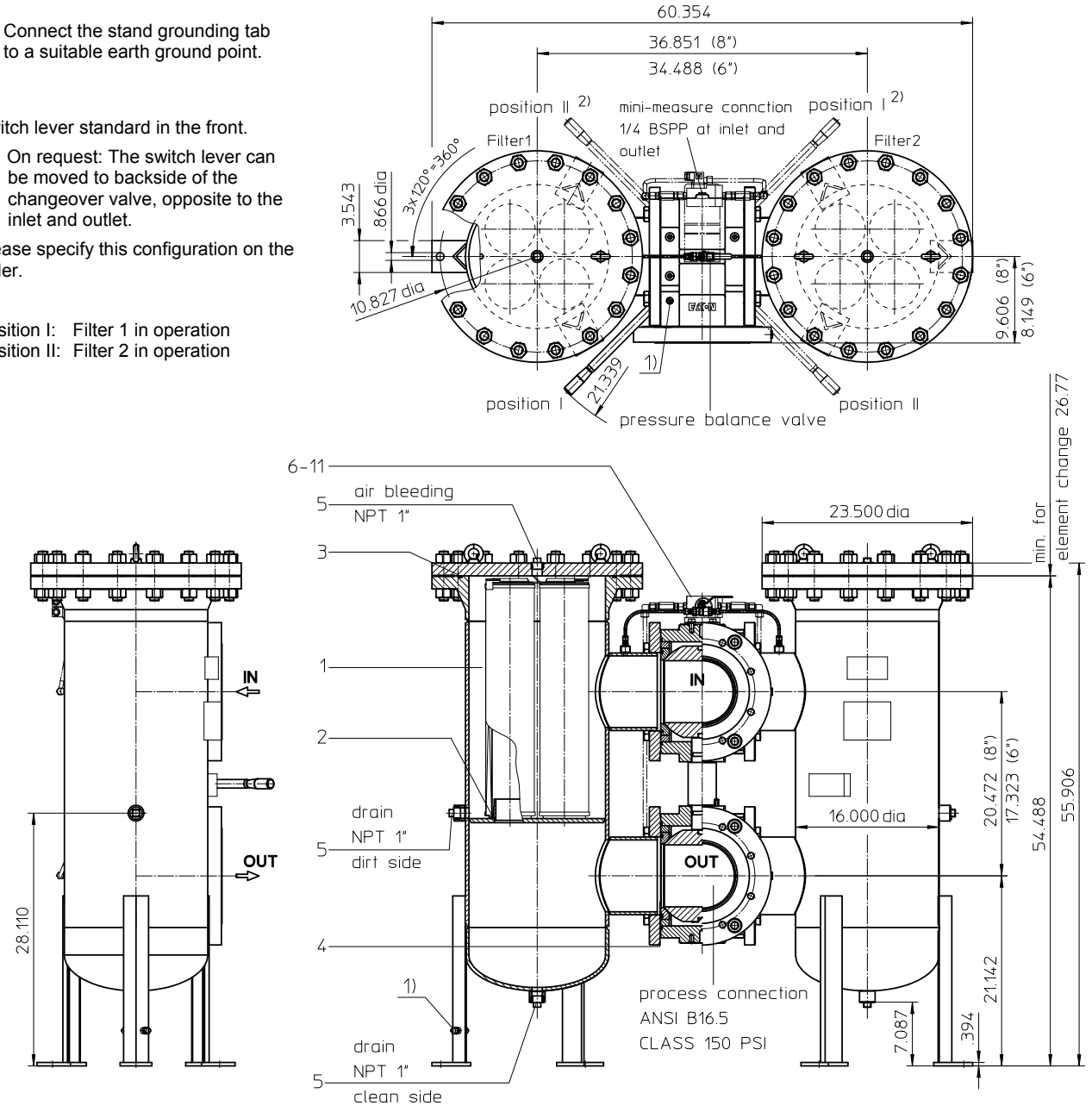
1) Connect the stand grounding tab to a suitable earth ground point.

Switch lever standard in the front.

2) On request: The switch lever can be moved to backside of the changeover valve, opposite to the inlet and outlet.

Please specify this configuration on the order.

Position I: Filter 1 in operation
Position II: Filter 2 in operation



Weight: approx. 1990 lbs.

Dimensions: inches

Designs and performance values are subject to change.

Duplex Pressure Filter
Series DWF 6005
232 PSI

Description:

Duplex filter series DWF 6005 have a working pressure up to 232 PSI. Pressure peaks can be absorbed with a sufficient safety margin.

A changeover ball valve between the two filter housings makes it possible to switch from the dirty filter side to the clean filter side without interrupting operation. The filters can be installed as a suction filter, pressure filter or return line filter.

The filter element consists of star-shaped, pleated filter material, which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. Additionally, the depth filter has a metal outer core to protect the filter media. The flow direction is from outside to inside.

For cleaning the stainless steel mesh element or changing the glass fiber element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

For filtration finer than 25 µm, use the disposable elements made of microglass. Filter elements as fine as 3 µm are available; finer filter elements are available upon request.

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

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

Ship classifications available upon request.

Type index:

Complete filter: (ordering example)

DWF.	6005.	10VG.	10.	E.	P.	-.	FA11.	E.	-.	IS21.	KH.	OE
1	2	3	4	5	6	7	8	9	10	11	12	13

1 **series:**
DWF = double welded filter, according to ASME-code

2 **nominal size:** 6005

3 **filter material:**
80G, 40G, 25G, 10G stainless steel wire mesh
25VG, 16VG, 10VG, 6VG, 3VG microglass
25API, 10API microglass according to API

4 **filter element collapse rating:**
10 = Δp 145 PSI

5 **filter element design:**
E = without by-pass
S = with by-pass valve Δp 29 PSI

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = for HFC application, see sheet-no. 31601

8 **process connection:**
FA11 = flange ANSI CLASS 150 PSI,
sealing surface Rz = 160 µm (not finer than 40 µm)
FA12 = flange ANSI CLASS 150 PSI,
sealing surface Rz = 16 µm

9 **process connection size:**
D = 6“
E = 8“ (standard)

10 **filter housing specification:**
- = standard
IS12 = internal parts of change over armature stainless steel, see sheet-no. 41028

11 **specification pressure vessel:**
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415

12 **shut-off :**
- = without
KH = with shut-off ball valve

13 **clogging indicator or clogging sensor:**
- = without
AE = visual-electrical, see sheet-no. 1609
OP = visual, see sheet-no. 1614
OE = visual-electrical, see sheet-no. 1614
VS5 = sensor, see sheet-no. 1641

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

Filter element: (ordering example)

01E.	1501.	10VG.	10.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01E = filter element according to company standard

2 **nominal size:** 1501

3 - 7 see type index-complete filter

Accessories:

- drain- and bleeder connection, see sheet-no. 1651
- lifting mechanism, see sheet-no. 1662

Technical data:

design temperature:	14 °F to +212 °F
operating temperature:	14 °F to +176 °F
operating medium	mineral oil, other media on request
max. operating pressure:	232 PSI
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 302 PSI
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 348 PSI
standard process connection:	flange ANSI B16.5 CLASS 150 PSI
housing material:	carbon steel (ASTM)
housing material change over:	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
drain- and bleeder connections:	NPT 1"
measure connections:	BSPP ¼"
volume tank:	2x 36 Gal.
operating pressure adapter flanges:	according to B16.5 CLASS 150 PSI

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

Pressure drop flow curves:

Filter calculation/sizing

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

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

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

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

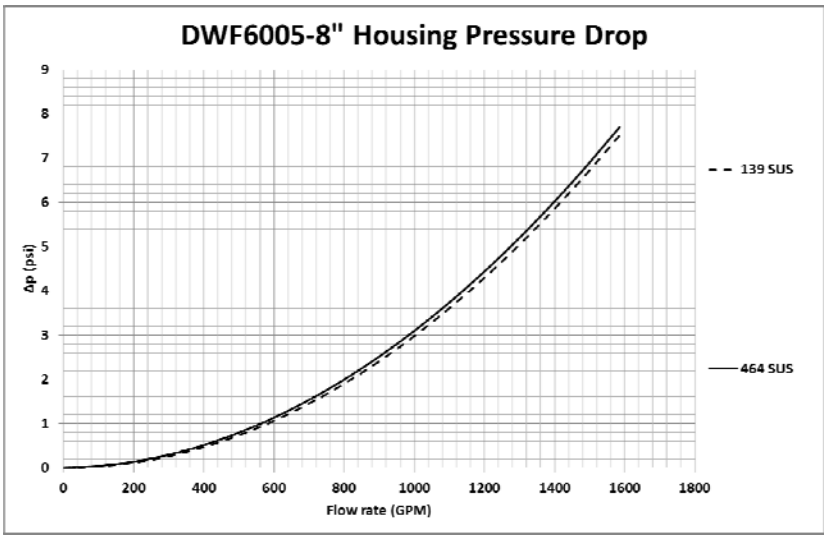
Material gradient coefficients (MSK) for filter elements

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

DWF	VG					G				API	
	3VG	6VG	10VG	16VG	25VG	10G	25G	40G	80G	10 API	25 API
6005	0.048	0.033	0.021	0.019	0.013	0.0018	0.0013	0.0012	0.0008	0.012	0.005

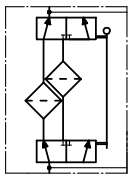
Δp = f(Q) – characteristics according to ISO 3968

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. The flow curve for 6" available on request.

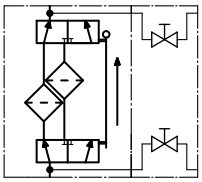


Symbols:

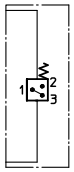
without indicator



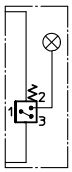
with
shut-off ball valve



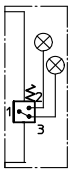
with electric
indicator
AE 30 and AE 40



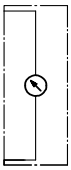
with visual-electric
indicator
AE 50 and AE 62



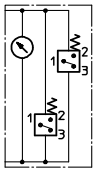
with visual-electric
indicator
AE 70 and AE 80



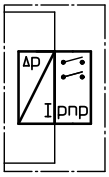
with visual
indicator
OP



with visual-electric
indicator
OE



with electronic
sensor
VS5



Spare parts:

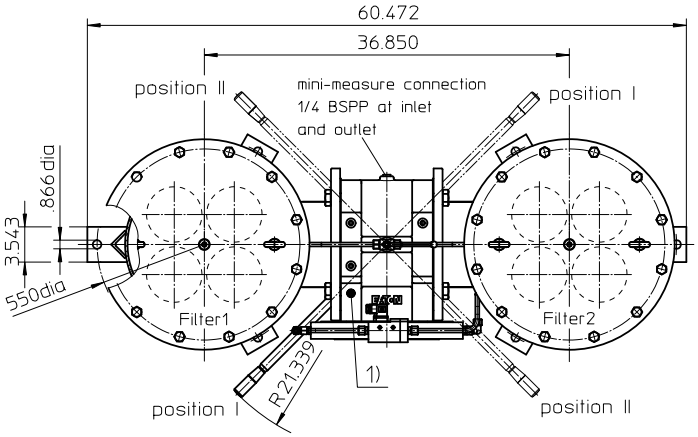
item	qty.	designation	dimension	Article-no.	
1	8	filter element	01E.1501…		
2	8	O-ring	93 x 5	307588 (NBR)	307589 (FPM)
3	2	O-ring	17" ID x 0.210 CS	2375017093 (BUNA-N)	
4	4	gasket kit of change over UKK 6”	6“ (DN150)		347916 (FPM)
	4	gasket kit of change over UKK 8”	8” (DN200)		347931 (FPM)
5	6	screw plug	NPT 1“	ST501Z35	
6	1	clogging indicator, visual-electric	AE	see sheet-no.1609	
7	1	clogging indicator, visual	OP	see sheet-no 1614	
8	1	clogging indicator, visual-electric	OE	see sheet-no 1614	
9	1	clogging sensor, electronic	VS5	see sheet-no 1641	
10	3	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
11	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)

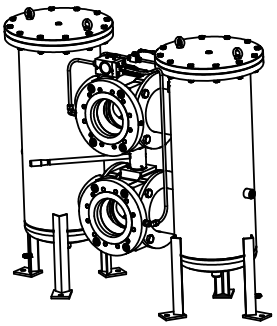
Test methods:

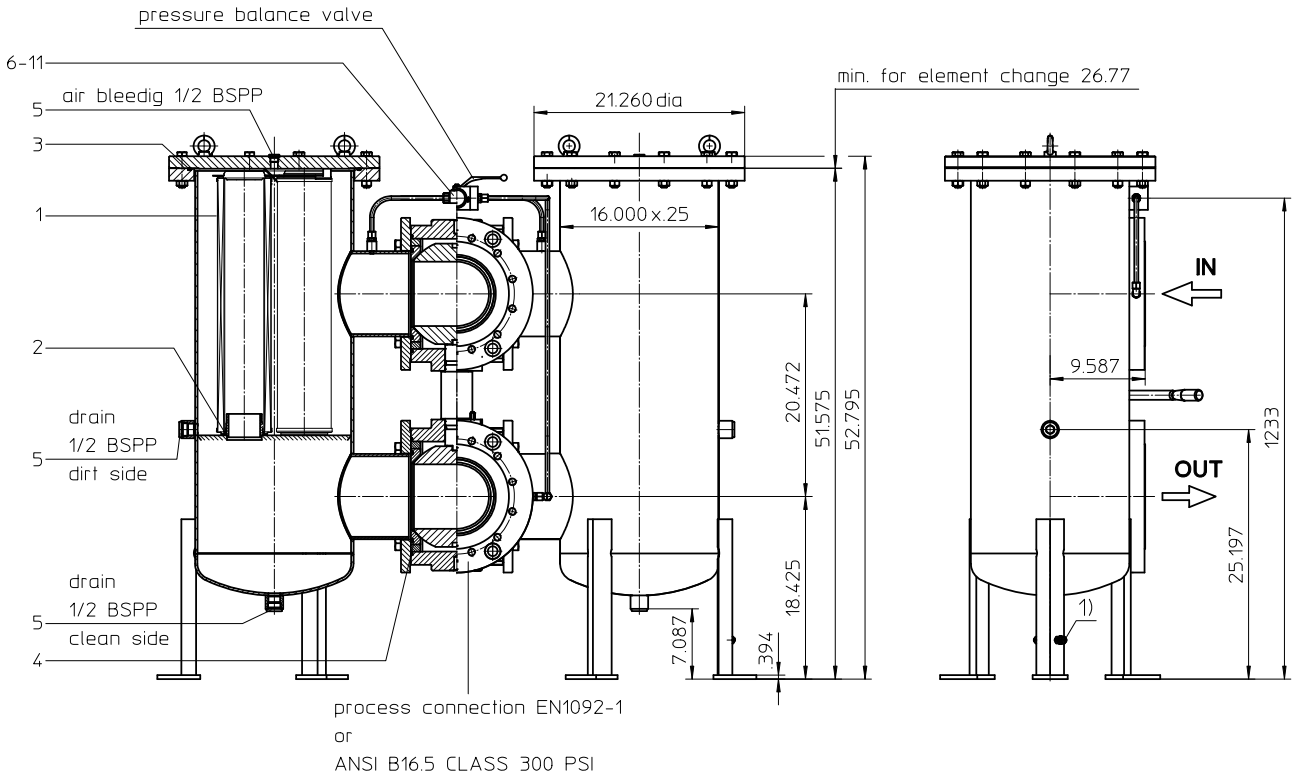
Filter elements are tested according to the following ISO standards:

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

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 stainless steel mesh element or changing the glass fiber element, remove the cover and take out the element. The mesh elements are not guaranteed to maintain 100% performance after cleaning.

For filtration finer than 25 µm, use the disposable elements made of glass fiber. Filter elements as fine as 3 µm are available; finer filter elements are available upon request.

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

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

Ship classifications available upon request.

Type index:

Complete filter: (ordering example)

DWF.	6005.	10VG.	10.	E.	P.	-.	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 = ∆p 145 PSI

5 **filter element design:**
E = without by-pass
S = with by-pass valve ∆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:**
D = 6”
E = 8”

10 **filter housing specification:** (see catalog)
- = standard
IS12 = see sheet-no. 41028
IS20 = see sheet-no. 55217

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. xxx

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
standard process connection:	flange EN1092-1, 232 psi or flange ANSI B16.5 CLASS 300 PSI
housing material:	C-steel
housing material change over:	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
drain- and bleeder connections:	½ BSPP
measure connections:	¼ BSPP
volume tank:	2x 31,2 Gal.

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

Pressure drop flow curves:

Performance characteristics of DWF 6005 (Data sheet 2230)

Filter calculation/sizing

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

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

$$\Delta p_{Element}\ (PSI) = Q\ (GPM)\ x\ \frac{MSK}{1000}\left(\frac{PSI}{GPM}\right)\ x\ v\ (SUS)\ x\ \frac{\rho}{0{,}876}\left(\frac{kg}{dm^3}\right)$$

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

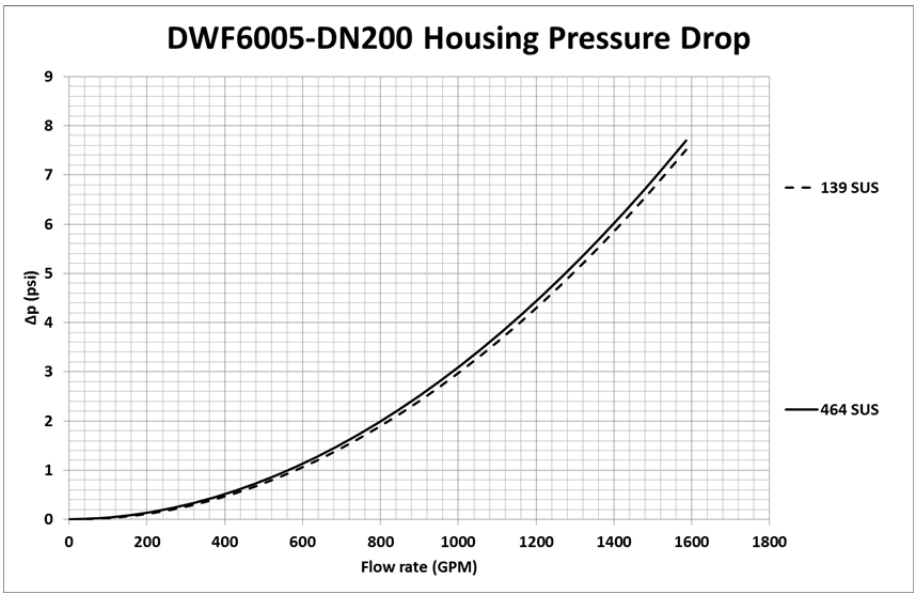
Material gradient coefficients (MSK) for filter elements

The material gradient coefficients in PSI/GPM apply to mineral oil (HLP) with a density of 0,876 kg/dm³ and a kinematic viscosity of 139 SUS (30 mm²/s). The pressure drop changes proportionally to the change in kinematic viscosity and density.

DWF	VG					G				API	
	3VG	6VG	10VG	16VG	25VG	10G	25G	40G	80G	10API	25API
DWF 6005	0,048	0,033	0,021	0,019	0,013	0,0018	0,0013	0,0012	0,0008	0,012	0,005

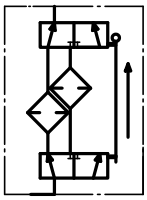
Δp = f(Q) – characteristics according to ISO 3968

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.

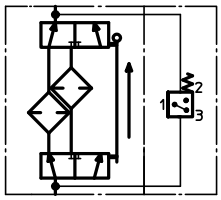


Symbols:

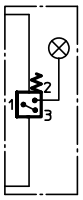
without indicator



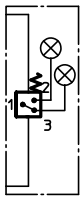
with electric indicator AE 30 and AE 40



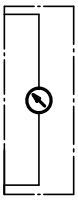
with visual-electric indicator AE 50 and AE 62



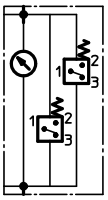
with visual-electric indicator AE 70 and AE 80



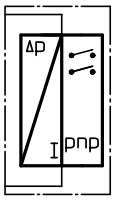
with visu indicator OP



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	290 x 5	(NBR)	338678 (FPM)
3	2	O-ring	220 x 6	(NBR)	347934 (FPM)
4	4	gasket kit of change over UKK	DN200 (8“)	347931	
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	429 x 6	(NBR)	308659 (FPM)
11	1	O-ring	53 x 3,55	(NBR)	339431 (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

This manual contains operation and maintenance information for series DWF 1505, 3005, 4505, 6005 and related specifications. For customer specific models, there are additional instructions on those data sheets. The pressure filters listed above are intended for the filtering of liquid media.

1. Safety instructions

Prior to operating the filter, operation and maintenance instructions need to be read carefully. Failure to follow these instructions could lead to death, severe injury or property damage. Eaton does not assume liability for any damage that occurs to due misuse of equipment.

Follow the operating conditions specified on each data sheet. Operating outside of these parameters can cause damage to important pressure holding parts and sealing. Pay special attention to excess pressure, temperature range and operating fluid. The compatibility of filter components with the operating fluid should always be considered before operation.

Always wear safety goggles and gloves when working on the filter. Under working conditions, the filter housing is pressurized. Do not try to loosen or remove any part of the filter or the filter housing during operation. The operating fluid could escape at high pressure and high temperatures. This does not apply to the offline vessel that is not under operation. Leaking operating fluid can cause injury and burns. Do not open the filter housing until you make sure it is not pressurized. The filter surface may be hot and cause burns. When changing the filter, check the operating temperature before touching any surface during operation. If you come into contact with the operating fluid, please follow the safety instructions provided by the fluid manufacturer.

To ensure proper fit and function, only use Eaton spare parts.

2. Installation

The filter is supplied and delivered ready to be installed. The mounting position of the filter is vertical. The filter has to be fitted with fastening screws in size and amount according to the corresponding fastening bore holes of the filter housings. The filter should be mounted to minimize tensile forces on the filter housing and change-over valve. The piping should be connected with flanges.

During installation ensure that:

- No dirt and no impurities of foreign fluids penetrate the filter.
- The connections for input and output are correctly attached to the pipe system.
- The pipe system is connected to the filter to minimize stress on the filter.
- Ensure the filter element is accessible for service and change out.

Clogging indicators should be installed according to the instructions on the unit specific data sheet and the instructions in this manual.

3. Commissioning

Ensure the filter installation is complete and the system is clean before commissioning. Follow these instructions to purge the filter before commissioning the system:

1. Before commissioning, ensure that the filter element and seals are clean and properly installed
2. Place the switchgear lever in the middle position
3. Open the air bleed screws or connections. Connect tubes that lead to a drain pan (air-bleed connection information can be found on data sheet 1651)
4. Allow the operating fluid to drain (reduce volume flow from 10 to 50 l/min or 2.6 to 13.2 GPM until it is bubble-free and flows out of both air bleeding tubes
5. Shut of application flow
6. Remove the air bleeding tubes and close the air-bleed bore holes or air-bleed connections
7. Switch to the filter housing you would like to operate first by using the switch gear lever. Instructions for using this switchgear are on a label on the filter housing.

4. Change of elements

Change the filter elements when the unit pressure differential on the clogging indicator reaches the maximum pressure differential specified for each unit on the data sheet. Do not allow the pressure differential to exceed 6 bar (87 psi) before replacing the elements.

Follow these instructions to change the filter element without interrupting filter operation:

1. Open the pressure balance valve
2. Move the switchgear lever from the operating vessel to the vessel you need to service. Switch gear instructions are located on a label on the filter vessel
3. Close the pressure balance valve
4. Connect the air-bleed and the drain plug to the operating vessel and pipe to a collection pan to catch the operating fluid
5. Keep the air bleed and drain plug open until no more operating fluid drains out
6. Loosen the screws of the lid on the vessel that needs servicing and remove the filter lid
7. Remove the filter elements
8. Clean the filter housing. Ensure that no dirt or cleaning fluid get into the clean side (center tube) of the filter element

9. Insert the clean filter element into the filter housing.
10. Place the filter lid back onto the filter housing and tighten the screw plugs. The screws need to be tightened diametrically. Recommended tightening torques listed in the table below:

M16	M20	M24	M27	M30	M33
80 ± 8 Nm 59 ± 6 ft-lb	160 ± 15 Nm 118 ± 11 ft-lb	250 ± 25 Nm 184 ± 8 ft-lb	400 ± 40 Nm 295 ± 30 ft-lb	600 ± 60 Nm 443 ± 44 ft-lb	700 ± 70 Nm 516 ± 52 ft-lb

11. Close the drain plugs
12. Open the pressure balance valve until operating fluid flows out of the air bleed connection without bubbles
13. Close the pressure balance valve and air bleeder
14. Retighten the screws on the lid after the vessel was pressurized for the first time.

After following these instructions to change the filter element, the serviced filter vessel is ready for operation

CAUTION: Ensure the absolute cleanliness of the filter element is maintained during the entire servicing period. No dirt or impurities should penetrate the filter. The new elements should remain packaged until they are installed to prevent contamination. While removing an element from the a recently out of operation filter housing, make sure the element is fully discharged from any voltage caused by static charging during operation with certain fluids

Do not damage element seals during servicing. All sealing have to be checked on a regular basis to avoid leakage and potential development of an explosive atmosphere. Any damaged seals will need to be replaced. Any damaged seals have to be replaced. **FAILURE TO FOLLOW THIS WARNING COULD LEAD TO DEATH, SEVERE INJURY, OR PROPERTY DAMAGE.**

5. Cleaning of the filter element

Microglass (VG) or paper (P) filter media cannot be cleaned and need to be replaced when the dirt-holding capacity is reached. Wire mesh (G) filter media can be cleaned and used again. Follow the cleaning specification for Eaton filter elements, sheet no. 21070-4 and 39448-4 to clean wire mesh filter media.

6. Pressure difference measuring

If the filter assembly includes a clogging indicator, the indicator will measure the pressure difference across the filter element. The method of pressure reading varies depending on the type of indicator installed. It can be a visual, visual-electric or electronic reading. Additionally the G ¼" connections from the switchgear can be used for external pressure gauges. Measuring connections are recommended on data sheet 1650.

7. Special applications

This filter can be used in the special applications listed below. Please follow the instructions if you are operating the filter in these environments.

Operation in explosive areas

WARNING: There are additional requirements for filters that are installed in explosive areas. Please follow the instructions on Eaton Document No. 41269. **FAILURE TO FOLLOW THIS WARNING COULD LEAD TO DEATH, SEVERE INJURY, OR PROPERTY DAMAGE.**

Flushing operation for machines with a higher flow rate

If flushing the filter is required before operating the equipment, follow Eaton Document No. 51354.

8. Service

For product technical support and service, please contact the local Eaton support team. All locations and contact information are listed below.

Spare parts respectively wearing parts have to be ordered according to the spare part list of the filter data sheet.