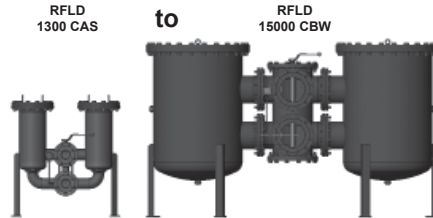


Change-Over Inline Filter RFLD Weld Version

up to 15000 l/min, up to 16 bar



1. TECHNICAL SPECIFICATIONS

1.1 FILTER HOUSING

Construction

The filter housings are designed in accordance with international regulations. The two sections of the filter housing (each with bolt-on cover plates) are connected by means of a ball change-over valve with negative overlap and single lever operation (ball, segment) or hand-wheel (butterfly).

Standard equipment:

- connections for venting and draining
- connection for a clogging indicator
- pressure equalisation line
- with bypass valve

1.2 FILTER ELEMENTS

HYDAC filter elements are validated and their quality is constantly monitored according to the following standards:

- ISO 2941
- ISO 2942
- ISO 2943
- ISO 3724
- ISO 3968
- ISO 11170
- ISO 16889

Contamination retention capacities in g

		Betamicon® (BN4HC)			
RFLD	Element per side	3 µm	5 µm	10 µm	20 µm
130x	1x1300 R	181.0	200.7	241.4	273.1
132x	1x2600 R	369.4	409.4	492.5	557.2
250x	3x0850 R	336.3	372.6	448.5	507.3
252x	3x1700 R	689.4	764.1	919.2	1039.8
400x	5x0850 R	560.5	621.0	747.5	845.5
402x	5x1700 R	1149.0	1273.5	1532.0	1733.0
520x	4x1300 R	724.0	802.8	965.6	1092.4
522x	4x2600 R	1477.6	1637.6	1970.0	2228.8
650x	5x1300 R	905.0	1003.5	1207.0	1365.5
652x	5x2600 R	1847.0	2047.0	2462.5	2786.0
780x	6x1300 R	1086.0	1204.2	1448.4	1638.6
782x	6x2600 R	2216.4	2456.4	2955.0	3343.2
1500x	10x1300 R	1810.0	2007.0	2414.0	2731.0
1502x	10x2600 R	3694.0	4094.0	4925.0	5572.0

Filter elements are available with the following pressure stability values:

Betamicon® (BN4HC):	20 bar
Paper (P/HC):	10 bar
Stainl. steel wire mesh (W/HC):	20 bar
Stainless steel fibre (V):	30 bar
Betamicon®/Aquamicron® (BN4AM):	10 bar
Aquamicron® (AM):	10 bar

1.3 FILTER SPECIFICATIONS

Nominal pressure	16 bar (or 10 bar: depending on size and nominal bore)
Temperature range	-10 °C to +100 °C
Material of filter housing and cover plate	Welded steel = 0
Material code (final digit of filter size)	Stainless steel 1.4571 = 3*
Type of clogging indicator	VM (differential pressure measurement up to 210 bar operating pressure)
Pressure setting of the clogging indicator	2 bar (others on request)
Bypass cracking pressure	3 bar (others on request)

1.4 SEALS

NBR (= Perbunan)

1.5 MOUNTING

As inline filter

1.6 SPECIAL MODELS AND ACCESSORIES

- Orifice in the pressure equalisation line
- Drain and vent ports with ball valves or other shut-off valves
- Counter flanges available for all sizes
- Change-over valve lockable
- Venting line with sight gauges
- Flanges to DIN 2501 with O-ring seal
- Cover plate lifting device for sizes RFLD 4000

1.7 SPARE PARTS

See Original Spare Parts List

1.8 CERTIFICATES AND APPROVALS

Material code (final digit of filter size): 0:

These filters can be supplied with manufacturer's test certificates O and M to DIN 55350, Part 18. Test certificates 3.1 to DIN EN 10204 and approval certificates (Type Approval) for different approval authorities.

Areas of application, amongst others: lubrication

Material code (final digit of filter size): 3:

Filters for use in separation technology with low viscosity, high viscosity and aggressive fluids as well as gaseous media.*

* These filters are available from HYDAC Process Technology division.

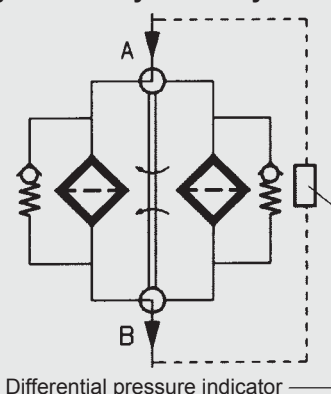
1.9 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

- Hydraulic oils H to HLPD DIN 51524
- Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743
- Compressor oils DIN 51506
- Biodegradable operating fluids VDMA 24568 HETG, HEES, HEPG
- Fire-resistant fluids HFA, HFB, HFC and HFD
- Operating fluids with high water content (>50% water content) and CLP-oil on request

1.10 IMPORTANT INFORMATION

- Filter housings must be earthed.
- When using electrical clogging indicators, the electrical power supply to the system must be switched off before removing the clogging indicator connector.
- Filters must be flexibly mounted and not fixed rigidly to the floor or used as a pipe support.

Symbol for hydraulic systems



2. MODEL CODE (also order example)

RFLD BN/HC 1300 C A K 10 D 1 . X /-L24

2.1 COMPLETE FILTER

Filter type _____

RFLD

Filter material of element _____

BN/HC Betamicon® (BN4HC) P/HC Paper AM Aquamicon®
 V Stainless steel fibre W/HC Wire mesh BN/AM Betamicon®/Aquamicon®

Size of filter or element _____

Welded steel: 1300, 1320, 2500, 2520, 4000, 4020, 5200, 5220, 6500, 6520, 7800, 7820, 15000, 15020
 Stainl. steel 1.4571: 1303, 1323, 2503, 2523, 4003, 4023, 5203, 5223, 6503, 6523, 7803, 7823, 15003, 15023

Operating pressure _____

C = 16 bar (other operating pressures on request)

Type of change-over _____

A Ball All nominal bores except DN 200, 250, 300

B Segment Nominal bores DN 200, 250

C Butterfly Nominal bores DN 150, 200, 250, 300

Type and size of port _____

Steel, welded (●) - for lubrication applications; 1.4571 (★) - for emulsion applications (please contact Hydac Process Technology division)

Type	Port	Filter size								
		1300 1303	1320 1323	2500 2503	4000 4003	5200 5203	6500 6503	7800 7803	15000 15003	15020 15023
K	SAE DN 40	●★	●★							
L	SAE DN 50	●★	●★	●★						
M	SAE DN 65	●★	●★	●★						
S	SAE/DIN DN 80	●★	●★	●★	●★	●★	●★			
T	SAE/DIN DN 100	●★	●★	●★	●★	●★	●★	●★		
U	DIN DN 125	●★	●★	●★	●★	●★	●★	●★		
V	DIN DN 150			●★	●★	●★	●★	●★		
W	DIN DN 200				●★	●★	●★	●★	●★	
x	DIN DN 250					●★	●★	●★	●★	
Y	DIN DN 300								●★	

Other nominal bores, and ANSI flange version on request

Filtration rating in µm _____

BN/HC, V: 3, 5, 10, 20 P/HC: 10, 20 AM: 40
 W/HC: 25, 50, 100, 200 BN/AM: 3, 10

Type of clogging indicator _____

Y plastic blanking plug in indicator port
 A steel blanking plug in indicator port
 B visual
 C electrical
 D visual and electrical
 for other clogging indicators, see brochure no. 7.050../..

Type code _____

1

Modification number _____

X the latest version is always supplied

Supplementary details _____

B special cracking pressure (e.g. B1 = 1 bar)
 DE differential pressure measurement across element
 DH cover plate lifting device
 KB without bypass valve
 L... light with appropriate voltage (24V, 48V, 110V, 220V)
 LED 2 light emitting diodes up to 24 Volt
 OR O-ring groove on the DIN flange (inlet, outlet) to Rexroth standard AB22-04
 RE sealing strip E on the flange (inlet, outlet): surface finish 3.6 µm
 only for clogging indicators type "D"
 - ball change-over, up to 150 nominal bore
 - segment change-over nominal bores CBV, CBW, CBX
 - butterfly change-over all nominal bores

SB pressure equalisation line (SB2 = with 2mm orifice)
 V FPM seals

2.2 REPLACEMENT ELEMENT

0850 R 010 BN4HC /-V

Size _____

0850, 1300, 1700, 2600

Type _____

R

Filtration rating in µm _____

BN4HC, V: 003, 005, 010, 020 P/HC: 010, 020 AM: 040
 W/HC: 025, 050, 100, 200 BN4AM: 003, 010

Filter material _____

BN4HC, V, W/HC, P/HC, BN4AM, AM

Supplementary details _____

V (for descriptions, see point 2.1)

2.3 REPLACEMENT CLOGGING INDICATOR

VM 2 D . X /-L24

Type _____

VM differential pressure measurement up to 210 bar operating pressure

Pressure setting _____

2 standard 2 bar, others on request

Type of clogging indicator (see Point 2.1) _____

Modification number _____

X the latest version is always supplied

Supplementary details _____

L..., LED, V (for descriptions, see point 2.1)

3. FILTER CALCULATION / SIZING

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

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

$$\Delta p_{\text{housing}} = (\text{see Point 3.1})$$

$$\Delta p_{\text{element}} = Q \cdot \frac{SK^*}{1000} \cdot \frac{\text{viscosity}}{30}$$

(*see point 3.2)

For ease of calculation, our Filter Sizing Program is available on request free of charge.

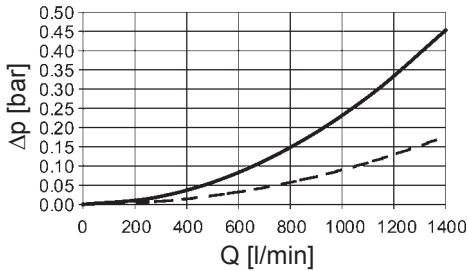
NEW: Sizing online at www.hydac.com

3.1 Δp -Q HOUSING CURVES BASED ON ISO 3968

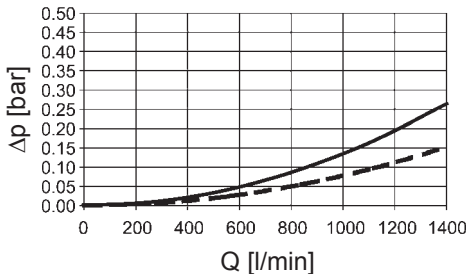
The housing curves apply to mineral oil with a density of 0.86 kg/dm³ and a kinematic viscosity of 30mm²/s. In this case, the differential pressure changes proportionally to the density.

--- without change-over valve
 — with change-over valve

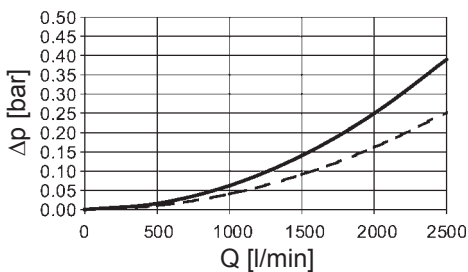
RFLD 1300, 1303



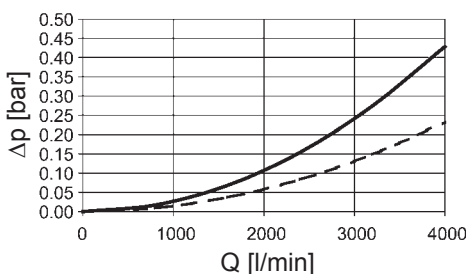
RFLD 1320, 1323



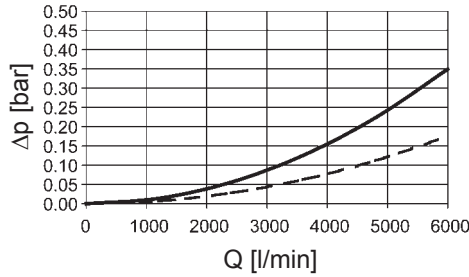
RFLD 2500, 2503, 2520, 2523



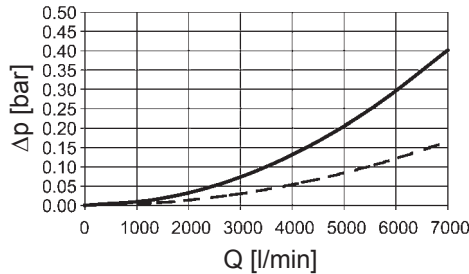
RFLD 4000, 4003, 4020, 4023



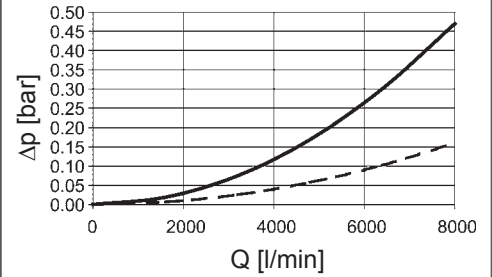
RFLD 5200, 5203, 5220, 5223



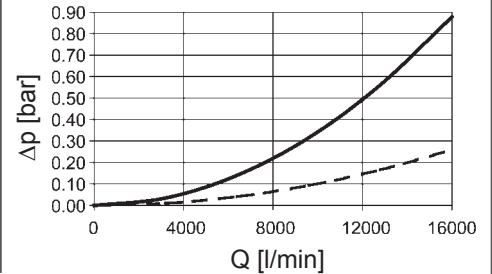
RFLD 6500, 6503, 6520, 6523



RFLD 7800, 7803, 7820, 7823



RFLD 15000, 15003, 15020, 15023

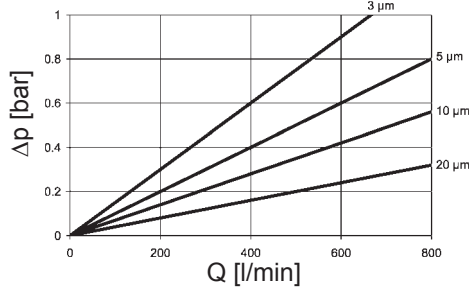


3.2 GRADIENT COEFFICIENTS (SK) FOR FILTER ELEMENTS

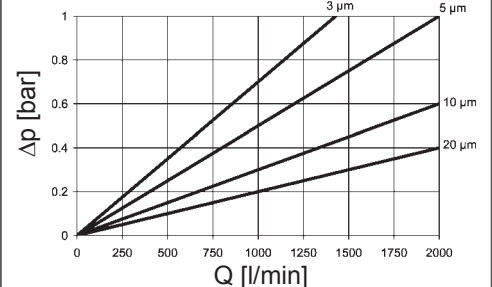
The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm²/s. The pressure drop changes proportionally to the change in viscosity.

RFLD	V				W/HC
	3 μm	5 μm	10 μm	20 μm	
850	0.8	0.6	0.4	0.3	0.063
1300	0.5	0.4	0.3	0.2	0.045
1700	0.4	0.3	0.2	0.1	0.032
2600	0.3	0.2	0.1	0.1	0.018

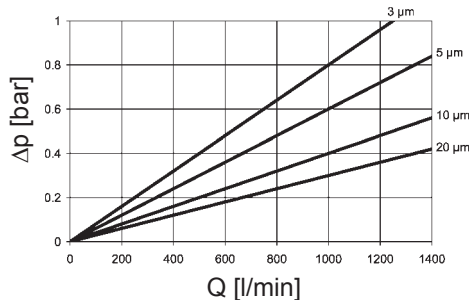
BN4HC: RFLD 850



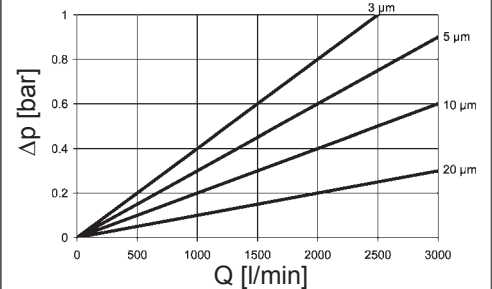
BN4HC: RFLD 1700



BN4HC: RFLD 1300



BN4HC: RFLD 2600



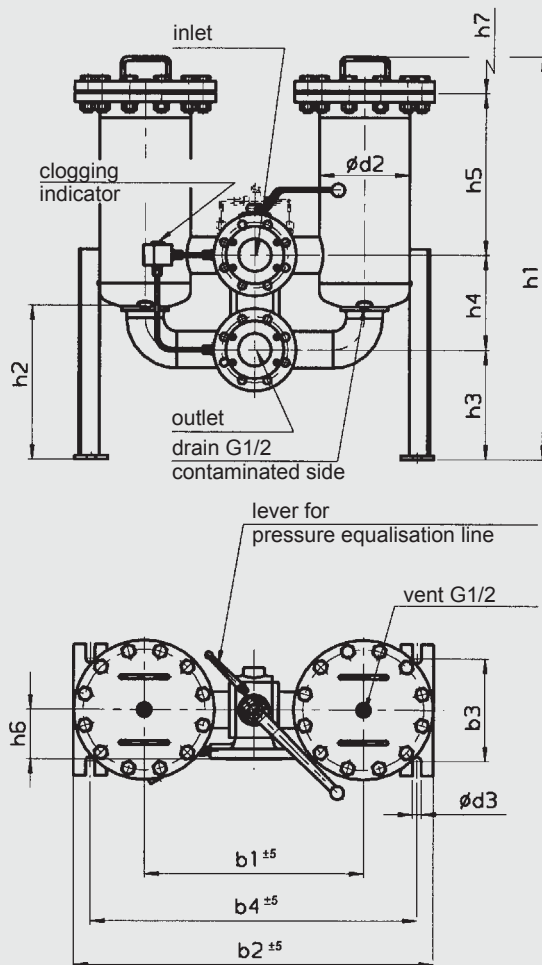
3.3 FILTER SPECIFICATIONS (TYPE OF CHANGE-OVER: A = BALL; B = SEGMENT; C = BUTTERFLY)

Filter type	Connection	Change-over	Volume of chamber [l]	Weight [kg] including change-over valve and elements		
				A (ball)	B (segment)	C (butterfly)
1300, 1303	SAE DN 40	ball	2 x 22.0	105		
	SAE DN 50	ball	2 x 22.0	110		
	SAE DN 65	ball	2 x 22.0	115		
	SAE/DIN DN 80	ball	2 x 19.0	136		
	SAE/DIN DN 100	ball	2 x 19.0	150		
1320, 1323	SAE DN 40	ball	2 x 37.0	138		
	SAE DN 50	ball	2 x 37.0	143		
	SAE DN 65	ball	2 x 37.0	148		
	SAE/DIN DN 80	ball	2 x 34.0	169		
	SAE/DIN DN 100	ball	2 x 34.0	183		
	DIN DN 125	ball	2 x 45.0	209		
2500, 2503/ 2520, 2523	SAE DN 50	ball	2 x 34.0 / 2 x 54.0	144/174		
	SAE DN 65	ball	2 x 34.0 / 2 x 54.0	149/179		
	SAE/DIN DN 80	ball	2 x 37.0 / 2 x 57.0	170/200		
	SAE/DIN DN 100	ball	2 x 39.0 / 2 x 59.0	184/214		
	DIN DN 125	ball,	2 x 40.0 / 2 x 60.0	208/238		
	DIN DN 150	ball, butterfly	2 x 45.0 / 2 x 65.0	262/292		287/327
4000, 4003/ 4020, 4023	SAE/DIN DN 80	ball	2 x 63.0 / 2 x 96.0	210/270		
	SAE/DIN DN 100	ball	2 x 63.0 / 2 x 96.0	222/283		
	DIN DN 125	ball	2 x 74.0 / 2 x 109.0	246/307		
	DIN DN 150	ball, butterfly	2 x 75.0 / 2 x 110.0	292/352		313/373
	DIN DN 200	segment, butterfly	2 x 83.0 / 2 x 118.0		262/504	393/453
5200, 5203/ 5220, 5223	SAE/DIN DN 80	ball	2 x 89.0 / 2 x 142.0	384/494		
	SAE/DIN DN 100	ball	2 x 90.0 / 2 x 143.0	398/507		
	DIN DN 125	ball	2 x 104.0 / 2 x 157.0	422/532		
	DIN DN 150	ball, butterfly	2 x 106.0 / 2 x 159.0	476/586		503/614
	DIN DN 200	segment, butterfly	2 x 110.0 / 2 x 162.0		646/756	596/706
	DIN DN 250	segment, butterfly	2 x 128.0 / 2 x 180.0		890/1000	956/1118
6500, 6503/ 6520, 6523	SAE/DIN DN 100	ball	2 x 161.0 / 2 x 246.0	628/782		
	DIN DN 125	ball	2 x 162.0 / 2 x 247.0	652/806		
	DIN DN 150	ball, butterfly	2 x 163.0 / 2 x 248.0	706/868		738/901
	DIN DN 200	segment, butterfly	2 x 190.0 / 2 x 275.0		877/1039	826/988
	DIN DN 250	segment, butterfly	2 x 194.0 / 2 x 279.0		1121/1282	956/1118
7800, 7803/ 7820, 7823	SAE/DIN DN 100	ball	2 x 161.0 / 2 x 246.0	636/798		
	DIN DN 125	ball	2 x 162.0 / 2 x 247.0	660/822		
	DIN DN 150	ball, butterfly	2 x 163.0 / 2 x 248.0	714/884		746/917
	DIN DN 200	segment, butterfly	2 x 190.0 / 2 x 275.0		885/1055	834/1004
	DIN DN 250	segment, butterfly	2 x 194.0 / 2 x 279.0		1129/1298	964/1134
15000, 15003/ 15020, 15023	DIN DN 200	segment, butterfly	2 x 391.0 / 2 x 558.0		1210/1380	1143/1250
	DIN DN 250	segment, butterfly	2 x 397.0 / 2 x 564.0		1454/1623	1271/1379
	DIN DN 300	butterfly	2 x 433.0 / 2 x 600.0			1487/1547

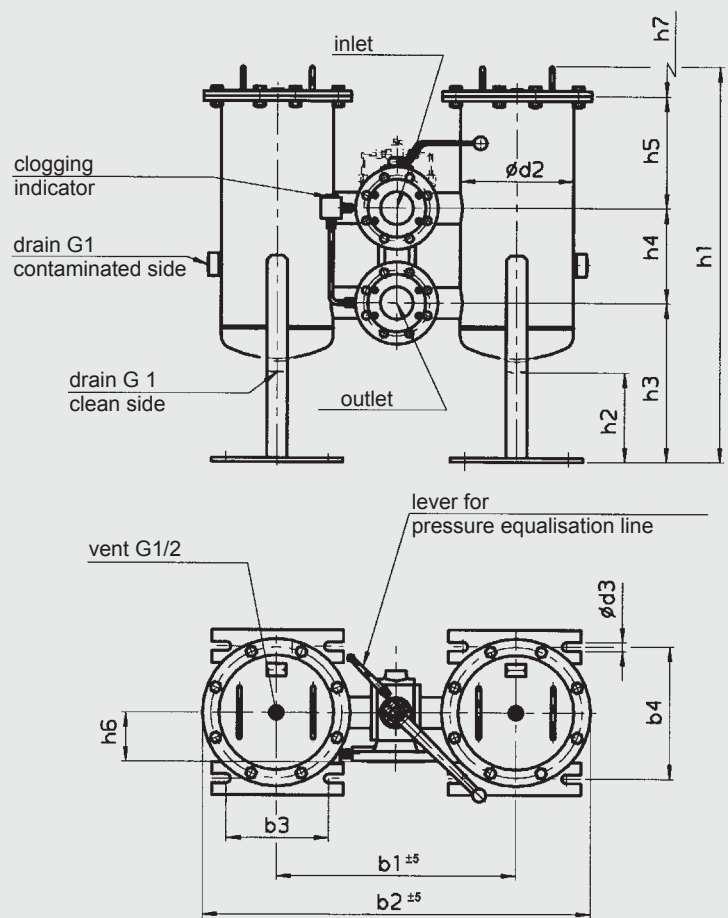
4. DIMENSIONS

4.1. WELDED FILTER SERIES - BALL VERSION RFLD 130x - 252x (CHANGE-OVER TYPE A)

RFLD 1300/1320



RFLD 2500/2520

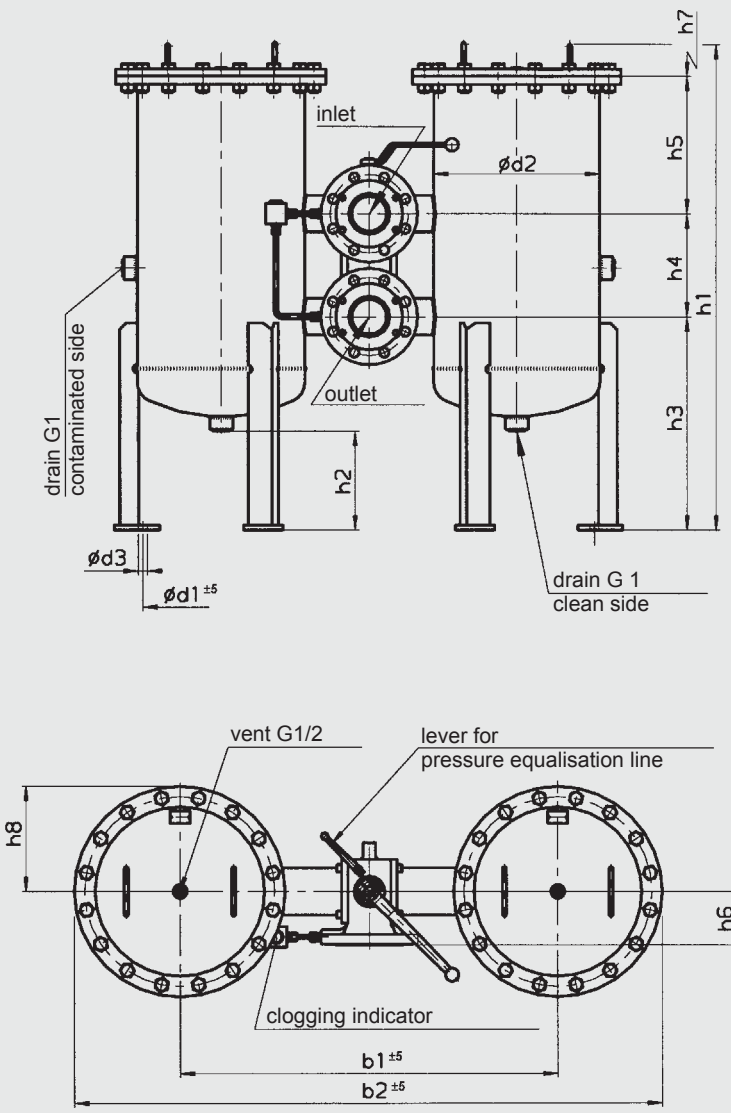


Dimensions in mm

Type	Flange connection ¹⁾	b ₁	b ₂	b ₃	b ₄	d ₂	d ₃	h ₁	h ₂	h ₃	h ₄	h ₅	h ₆	h ₇
RFLD 1300/1320	SAE DN 40	495	835	250	755	220	22	970/1410	205	335	95	460/900	92	500/940
	SAE DN 50	506	846	250	766	220	22	970/1410	210	328	110	452/892	102	500/940
	SAE DN 65	506	846	250	766	220	22	970/1410	210	328	110	452/892	167	500/940
	SAE/DIN DN 80	530	870	250	790	220	22	970/1410	370	260	230	400/840	120	500/940
	SAE/DIN DN 100	588	926	250	846	220	22	970/1410	375	266	250	374/814	130	500/940
RFLD 1320	DIN DN 125	603	943	250	863	220	22	1536	190	385	300	765	188	940
RFLD 2500/2520	SAE DN 50	548	908	250	312	273	22	940/1330	220	383	110	378/768	102	420/810
	SAE DN 65	548	908	250	312	273	22	990/1380	220	383	230	280/670	167	420/810
	SAE/DIN DN 80	572	932	250	312	273	22	990/1380	220	408	230	280/670	120	420/810
	SAE/DIN DN 100	588	948	250	312	273	22	990/1380	220	408	250	260/650	130	420/810
	DIN DN 125	589	949	250	312	273	22	1050/1440	220	438	300	240/630	188	420/810
	DIN DN 150	641	1001	250	312	273	22	1050/1440	220	438	300	240/630	190	420/810

¹⁾ Flange connection to SAE J 518 C (standard pressure range 3000 psi)
 DIN flange connection to DIN 2501/1 for PN 16 from DN 125 and PN 25/40 up to DN 100
 (sealing strip "D" or "E")

4.2. WELDED FILTER SERIES - BALL VERSION RFLD 400x - 782x (CHANGE-OVER TYPE A)

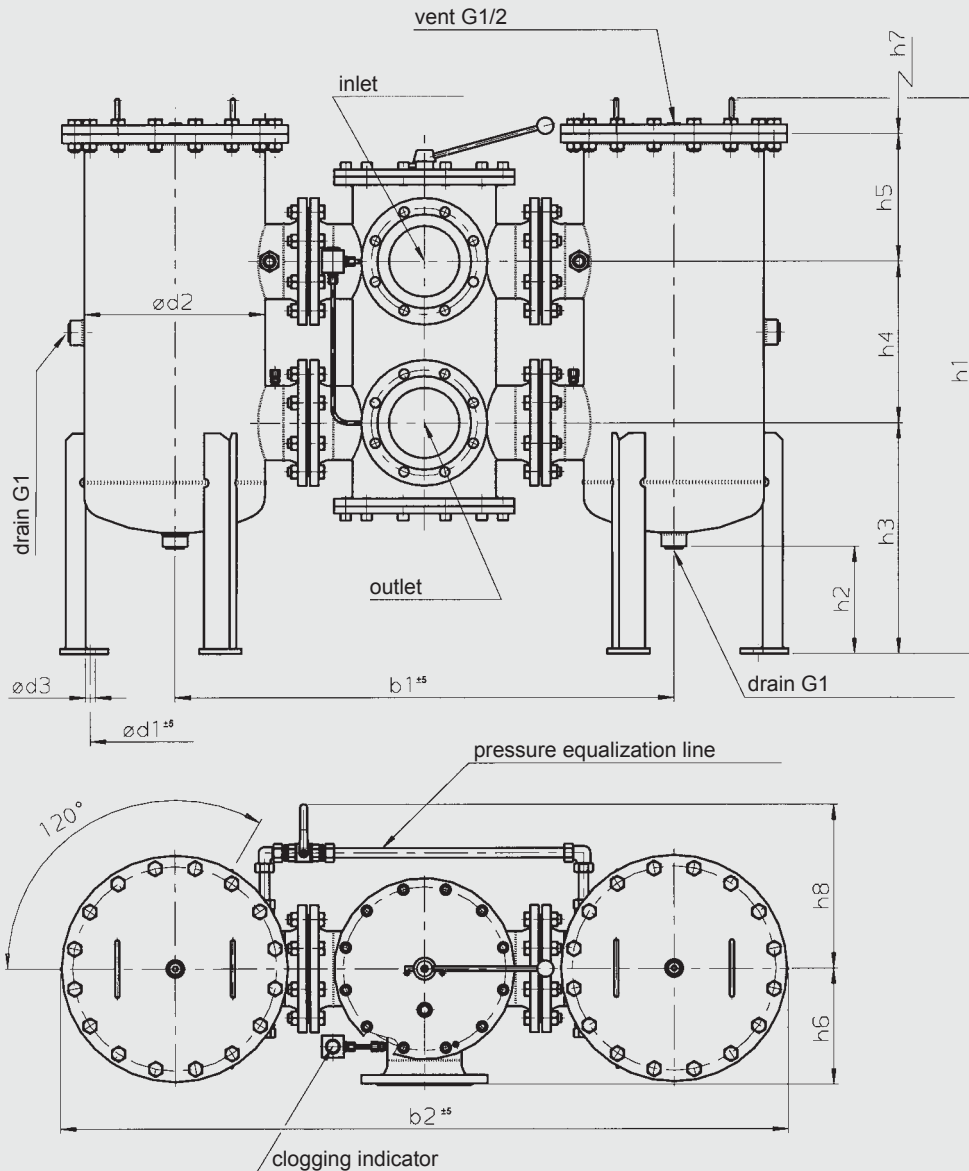


Dimensions in mm

Type	Flange connection ¹⁾	b ₁	b ₂	d ₁	d ₂	d ₃	h ₁	h ₂	h ₃	h ₄	h ₅	h ₆	h ₇	h ₈
RFLD 4000/4020	SAE/DIN DN 80	688	1152	330	356	22	1080/1470	260	475	230	295/685	120	420/810	230
	SAE/DIN DN 100	704	1164	330	356	22	1080/1470	260	475	250	275/665	130	420/810	230
	DIN DN 125	723	1183	330	356	22	1170/1560	260	525	300	265/655	188	420/810	230
	DIN DN 150	775	1240	330	356	22	1170/1560	260	525	300	265/655	190	420/810	230
RFLD 5200/5220	SAE/DIN DN 80	728	1244	380	406	22	1144/1584	250	465	230	371/811	120	500/940	255
	SAE/DIN DN 100	744	1260	380	406	22	1144/1584	250	465	250	351/791	130	500/940	255
	DIN DN 125	763	1275	380	406	22	1256/1696	250	525	300	351/791	188	500/940	255
	DIN DN 150	815	1330	380	406	22	1256/1696	250	525	300	351/791	190	500/940	255
RFLD 6500/6520	SAE/DIN DN 100	1024	1644	480	508	22	1260/1700	260	540	250	390/830	130	500/940	310
	DIN DN 125	863	1483	480	508	22	1260/1700	260	540	300	340/780	188	500/940	310
	DIN DN 150	915	1535	480	508	22	1260/1700	260	540	300	340/780	190	500/940	310
RFLD 7800/7820	SAE/DIN DN 100	1024	1644	480	508	22	1260/1700	260	540	250	390/830	130	500/940	310
	DIN DN 125	863	1483	480	508	22	1260/1700	260	540	300	340/780	188	500/940	310
	DIN DN 150	915	1535	480	508	22	1260/1700	260	540	300	340/780	190	500/940	310

¹⁾ DIN flange connection to DIN 2501/1 for PN 16 from DN 125 and PN 25/40 up to DN 100 (sealing strip "D" or "E")

4.3 WELDED FILTER SERIES - SEGMENT VERSION RFLD 400x - 1502x (CHANGE-OVER TYPE B)

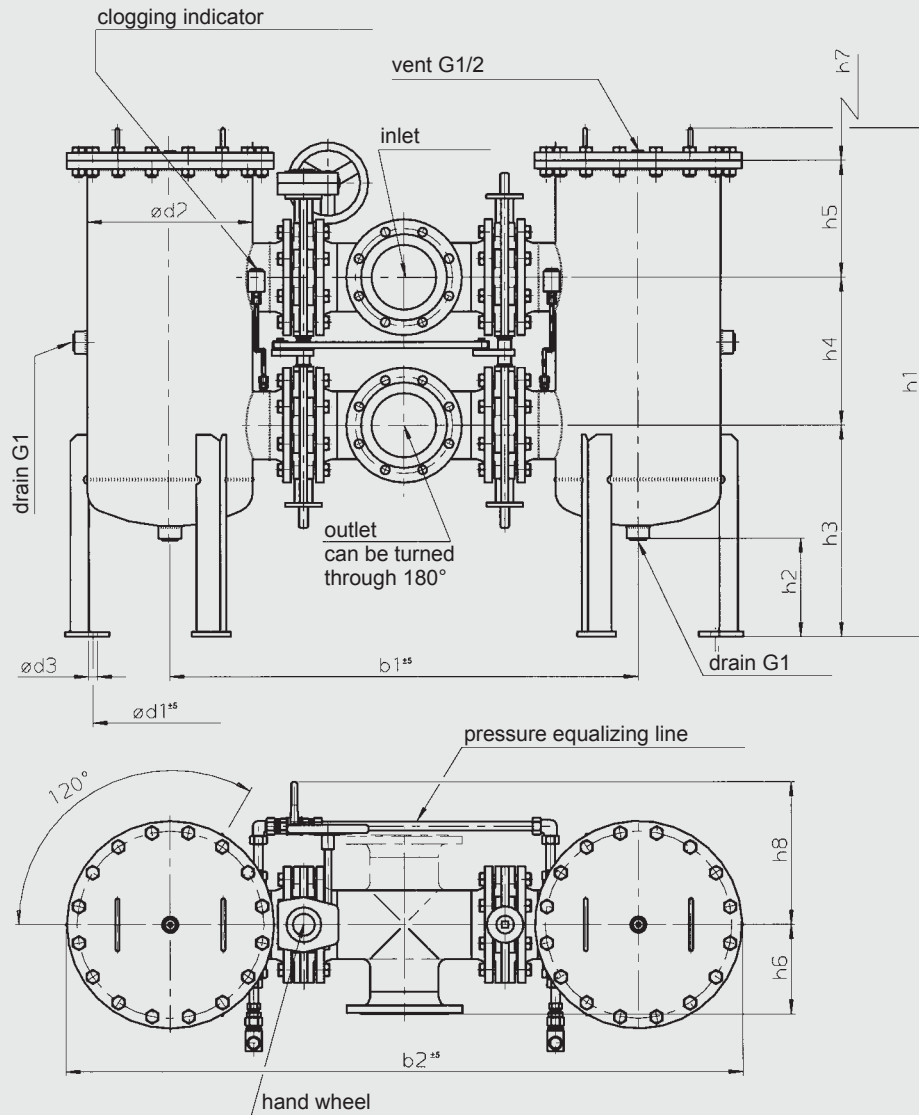


Dimensions in mm

Type	Flange connection ¹⁾	b ₁	b ₂	d ₁	d ₂	d ₃	h ₁	h ₂	h ₃	h ₄	h ₅	h ₆	h ₇	h ₈
RFLD 4000/4020	DN 200	1124	1590	330	356	22	1250/1595	260	525	365	235/625	261	420/810	370
RFLD 5200/5220	DN 200	1166	1680	380	406	22	1265/1705	250	525	365	286/726	261	500/940	370
	DN 250	1312	1825	380	406	22	1324/1764	250	560	450	236/676	322	500/940	400
RFLD 6500/6520	DN 200	1266	1886	480	508	22	1380/1820	260	600	365	335/775	261	500/940	370
	DN 250	1402	2022	480	508	22	1380/1820	260	600	450	250/690	322	500/940	400
RFLD 7800/7820	DN 200	1266	1886	480	508	22	1380/1820	260	600	365	335/775	261	500/940	370
	DN 250	1402	2022	480	508	22	1380/1820	260	600	450	250/690	322	500/940	400
RFLD 15000/15020	DN 200	1506	2016	690	711	22	1425/1865	263	655	365	330/770	261	500/940	415
	DN 250	1628	2458	690	711	22	1425/1865	263	640	450	260/700	322	500/940	415

¹⁾ DIN flange connection to DIN 2501/1 for PN 16 (sealing strip "C")

4.4 WELDED FILTER SERIES - BUTTERFLY VERSION RFLD 250x - 1502x (CHANGE-OVER TYPE C)



Dimensions in mm

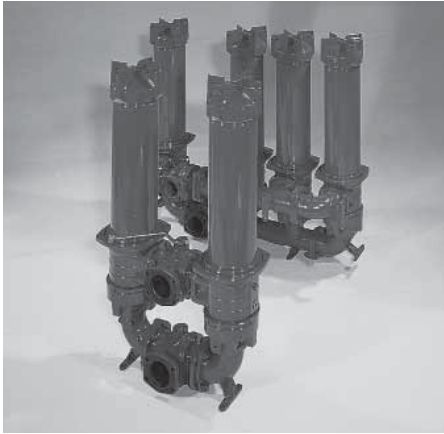
Type	Flange connection ¹⁾	b ₁	b ₂	d ₁	d ₂	d ₃	h ₁	h ₂	h ₃	h ₄	h ₅	h ₆	h ₇	h ₈
RFLD 2500/2520	DN 150	1018	1378		273	22	1108/1498	220	460	365	211/601	220	420/810	330
RFLD 4000/4020	DN 150	1152	1616	330	356	22	1170/1560	260	525	365	200/590	220	420/810	350
	DN 200	1240	1724	330	356	22	1205/1595	260	525	365	235/625	260	420/810	370
RFLD 5200/5220	DN 150	1152	1666	380	406	22	1256/1696	250	525	365	286/726	220	500/940	350
	DN 200	1280	1794	380	406	22	1256/1696	250	525	365	286/726	260	500/940	370
	DN 250	1496	2010	380	406	22	1326/1766	250	560	450	236/676	350	500/940	400
RFLD 6500/6520	DN 150	1292	1916	480	508	22	1260/1700	260	540	365	275/715	220	500/940	350
	DN 200	1380	2004	480	508	22	1380/1820	260	600	365	335/775	260	500/940	370
	DN 250	1586	2210	480	508	22	1380/1820	260	600	450	250/690	350	500/940	400
RFLD 7800/7820	DN 150	1292	1916	480	508	22	1260/1700	260	540	365	275/715	220	500/940	350
	DN 200	1380	2004	480	508	22	1380/1820	260	600	365	335/775	260	500/940	370
	DN 250	1586	2210	480	508	22	1380/1820	260	600	450	250/690	350	500/940	400
RFLD 15000/15020	DN 200	1620	2450	690	711	22	1425/1865	260	655	365	330/770	260	500/940	370
	DN 250	1816	2646	690	711	22	1425/1865	260	655	450	250/690	350	500/940	400
	DN 300	1956	2786	690	711	22	1500/1940	260	670	515	235/675	400	500/940	430

¹⁾ DIN flange connection to DIN 2501/1 for PN 16 (sealing strip "C")

NOTE

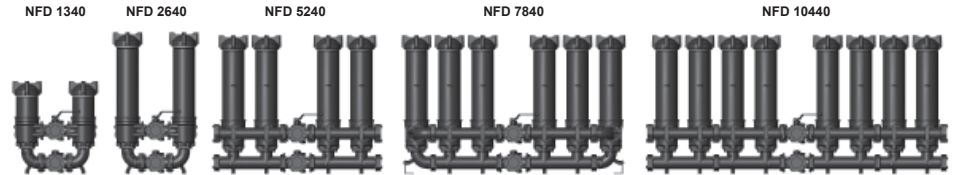
The information in this brochure relates to the operating conditions and applications described.
For applications and operating conditions not described, please contact the relevant technical department.
Subject to technical modifications.

HYDAC FILTERTECHNIK GMBH
Industriegebiet
D-66280 Sulzbach/Saar, Germany
Tel.: 0 68 97 / 509-01
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Internet: www.hydac.com
E-mail: filter@hydac.com



Change-Over Filter NFD

up to 2000 l/min, up to 25 bar



1. TECHNICAL SPECIFICATIONS

1.1 FILTER HOUSING Construction

The filter housings are designed in accordance with international regulations. They consist of a filter housing and a threaded cover plate. The housings are connected by a ball change-over valve.

Standard equipment:

- connection for a clogging indicator in filter head

1.2 FILTER ELEMENTS

HYDAC filter elements are validated and their quality is constantly monitored according to the following standards:

- ISO 2941
- ISO 2942
- ISO 2943
- ISO 3724
- ISO 3968
- ISO 11170
- ISO 16889

Contamination retention capacities in g

NFD	Elements per side	Betamicon® (BN4HC)			
		3 µm	5 µm	10 µm	20 µm
1340	1x1300 R	181.0	200.7	241.4	273.1
2640	1x2600 R	369.4	409.4	492.5	557.2
5240	2x2600 R	738.8	818.8	985.0	1114.4
7840	3x2600 R	1108.2	1228.2	1477.5	1671.6
10440	4x2600 R	1477.6	1637.6	1970.0	2228.8

Filter elements are available with the following pressure stability values:

Betamicon® (BN4HC):	20 bar
ECOMICRON® (ECON2)	10 bar
Stainl. steel wire mesh (W/HC):	20 bar
Stainless steel fibre (V):	210 bar
Paper (P/HC):	10 bar
Betamicon®/Aquamicron® (BN4AM):	10 bar
Aquamicron® (AM):	10 bar

1.3 FILTER SPECIFICATIONS

Nominal pressure	25 bar
Max. operating pressure	30 bar at max. 10 ⁶ cycles
Temperature range	-10 °C to +100 °C
Material of filter head, tube and cover plate	Aluminium
Material of change-over valve, elbow and connection piece	EN-GJS-400-15
Type of clogging indicator	VM (differential pressure measurement)
Pressure setting of the clogging indicator	2 bar (others on request)
Bypass cracking pressure	3 bar (others on request)

1.4 SEALS

NBR (= Perbunan)

1.5 MOUNTING

As inline filter

1.6 SPECIAL MODELS AND ACCESSORIES

- Seals in FPM
- NFD filter as tank-top return line filter (type code 1.x) on request

1.7 SPARE PARTS

See Original Spare Parts List

1.8 CERTIFICATES AND APPROVALS

On request

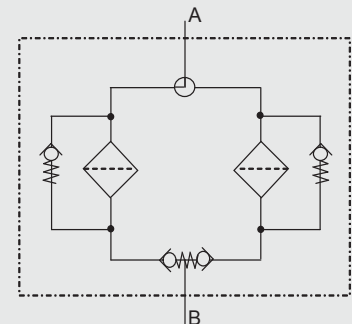
1.9 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

- Hydraulic oils H to HLPD DIN 51524
- Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743
- Compressor oils DIN 51506
- Biodegradable operating fluids VDMA 24568 HETG, HEES, HEPG
- Fire-resistant fluids HFA, HFB, HFC and HFD
- Operating fluids with high water content (>50% water content) on request

1.10 IMPORTANT INFORMATION

- Filter housings must be earthed.
- When using visual clogging indicators, the BM version (visual with manual reset) only should be used.
- When using electrical clogging indicators, the electrical power supply to the system must be switched off before removing the clogging indicator connector.

Symbol for hydraulic systems



2. MODEL CODE (also order example)

NFD BN/HC 2640 D A P 10 D 2 . X /-L24

2.1. COMPLETE FILTER

Filter type _____

NFD

Filter material _____

BN/HC	Betamicon® (BN4HC)	P/HC	Paper
ECO/N	ECOmicon® (ECON2)	BN/AM	Betamicon®/Aquamicron®
W/HC	Stainless steel wire mesh	AM	Aquamicron®
V	Stainless steel fibre		

Size of filter or element _____

NFD: 1340, 2640, 5240, 7840, 10440

Operating pressure _____

D = 25 bar

Type of change-over _____

A = Ball

Type and size of port _____

Type	Port	Filter size				
		1340	2640	5240	7840	10440
P	SAE DN 100	●	●	●	●	●

Further types and sizes of port on request!
For examples, see point 3.3

Filtration rating in µm _____

BN/HC, ECO/N, V:	3, 5, 10, 20	P/HC:	10, 20	AM:	40
W/HC:	25, 50, 100, 200	BN/AM:	3, 10		

Type of clogging indicator _____

Y	plastic blanking plug in indicator port] for other clogging indicators see brochure no. 7.050../..
A	steel blanking plug in indicator port	
BM	visual	
C	electrical	
D	visual and electrical	

Type code (TKZ) _____

2

Modification number _____

X the latest version is always supplied

Supplementary details _____

B.	special cracking pressure of bypass (e. g.: B6 = 6 bar)] only for clogging indicators type "D"
EM	manual vent with shut-off valve	
EP	permanent vent via Minimess hose	
KB	without bypass valve	
L...	light with appropriate voltage (24, 48, 110, 220 Volt)	
LED	2 light emitting diodes up to 24 Volt	
SB4	filling line with Ø4 mm orifice	
V	FPM seals	
VKD	drain fitted with ball shut-off valve	
39	connection alternative (see point 2.4)	

2.2 REPLACEMENT ELEMENT

2600 R 010 BN4HC /-V

Size _____

1300, 2600

Type _____

Filtration rating in µm _____

BN4HC, ECON2, V:	003, 005, 010, 020	P/HC:	010, 020	AM:	040
W/HC:	025, 050, 100, 200	BN4AM:	003, 010		

Filter material _____

BN4HC, ECON2, V, W/HC, P/HC, BN4AM, AM

Supplementary details _____

V (for descriptions, see point 2.1)

2.3 REPLACEMENT CLOGGING INDICATOR

VM 2 D . X /-L24

Type _____

VM differential pressure measurement up to 210 bar operating pressure

Pressure setting _____

2 standard 2 bar, others on request

Type of clogging indicator (see point 2.1) _____

Modification number _____

X the latest version is always supplied

Supplementary details _____

L..., LED, V (for descriptions, see point 2.1)

2.4 CONNECTION ALTERNATIVES

(also order example)

Supplementary detail .. / - 0 3

1st digit = position of inlet valve

2nd digit = position of outlet valve

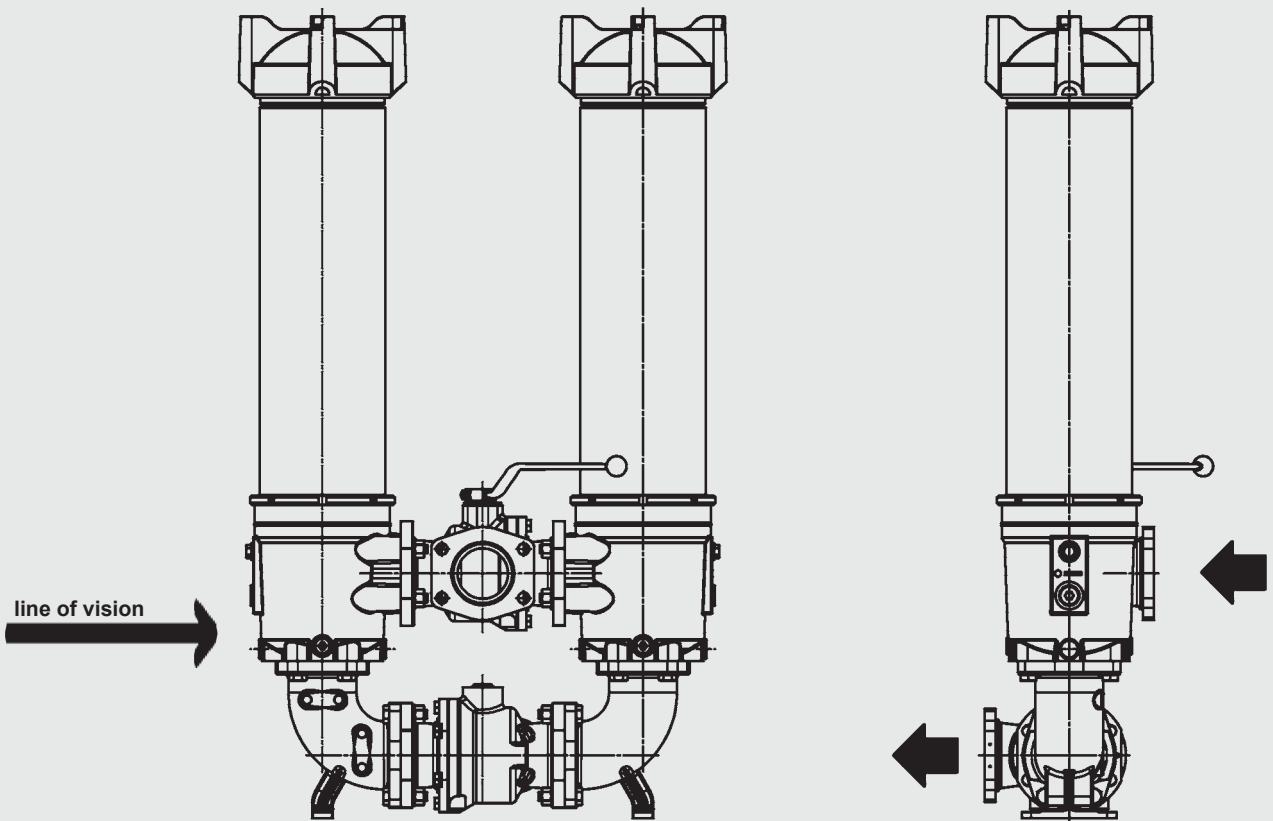
33
Series

Standard model

Not given as a supplementary detail in the model code

~~63~~

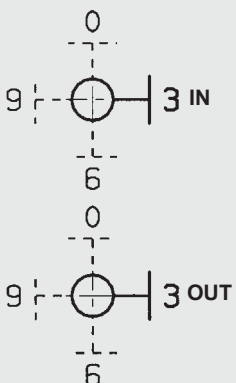
Not available!



Line of vision
Type code .. / -39

NFD 2640 .. A 2.0 / -XX

(possible supplementary detail)

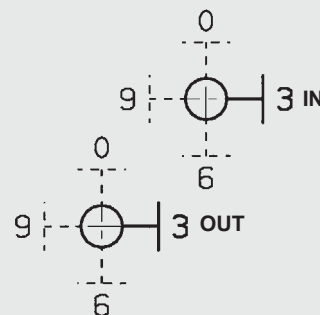


00	03	06	09 ¹⁾
30	33 Series	36	39
60	63	66	69
90	93 ²⁾	96	99 ³⁾

- 1) corresponds to type 03
- 2) corresponds to type 39
- 3) corresponds to type 33

NFD 5240 .. A 2.0 / -XX

(possible supplementary detail)



00	03	06	09
30	33 Series	36	39
60	63	66	69
90	93	96	99

3. FILTER CALCULATION / SIZING

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

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

$\Delta p_{\text{housing}}$ = given in diagrams (see point 3.1)

$$\Delta p_{\text{element}} = Q \cdot SK^*/1000 \cdot \text{viscosity}/30$$

(*see point 3.2)

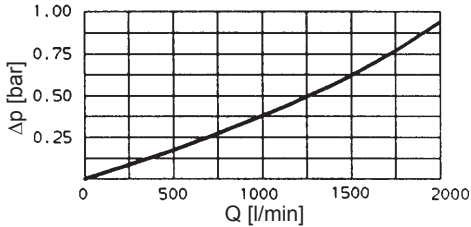
For ease of calculation, our Filter Sizing Program is available on request free of charge.

NEW: Sizing online at www.hydac.com

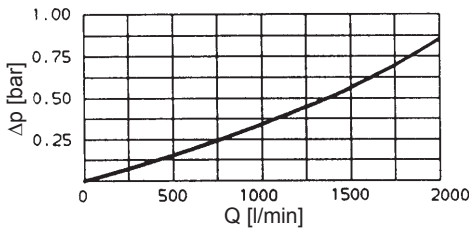
3.1 Δp -Q HOUSING CURVES BASED ON ISO 3968

The housing curves apply to mineral oil with a density of 0.86 kg/dm³ and a kinematic viscosity of 30mm²/s. In this case, the differential pressure changes proportionally to the density.

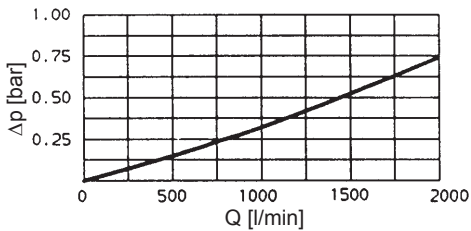
NFD 1340 / 2640



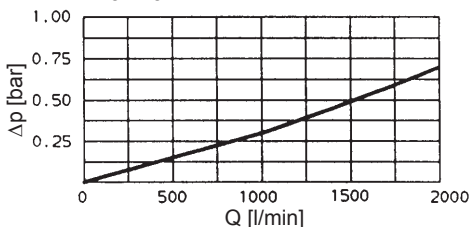
NFD 5240



NFD 7840



NFD 10440

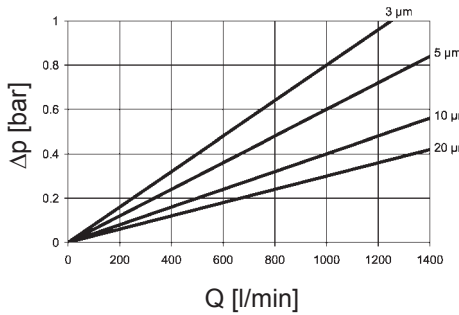


3.2 GRADIENT COEFFICIENTS (SK) FOR FILTER ELEMENTS

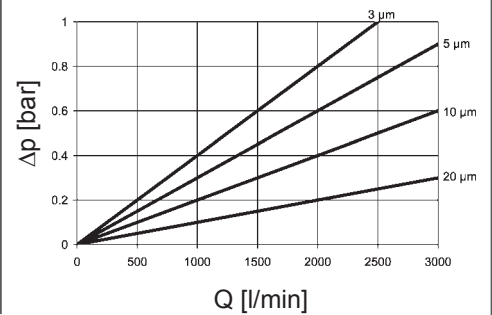
The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm²/s. The pressure drop changes proportionally to the change in viscosity.

NFD	V				W/HC	ECON2			
	3 μm	5 μm	10 μm	20 μm		3 μm	5 μm	10 μm	20 μm
1300	0.5	0.4	0.3	0.2	0.045	0.8	0.6	0.4	0.3
2600	0.3	0.2	0.1	0.1	0.018	0.4	0.3	0.2	0.1

BN4HC: 1300 R...

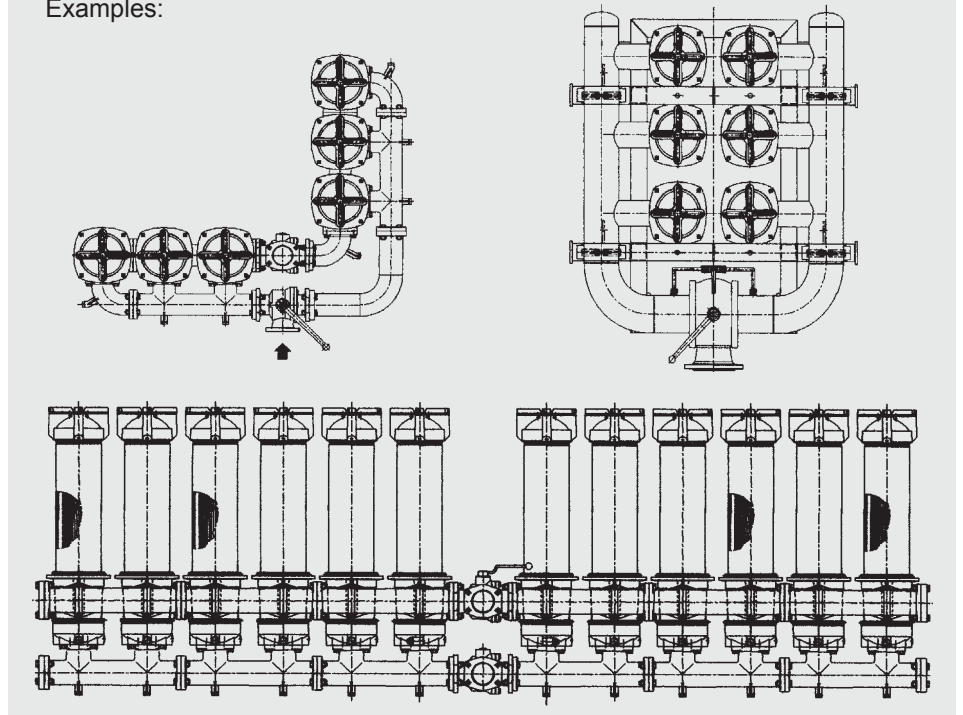


BN4HC: 2600 R...



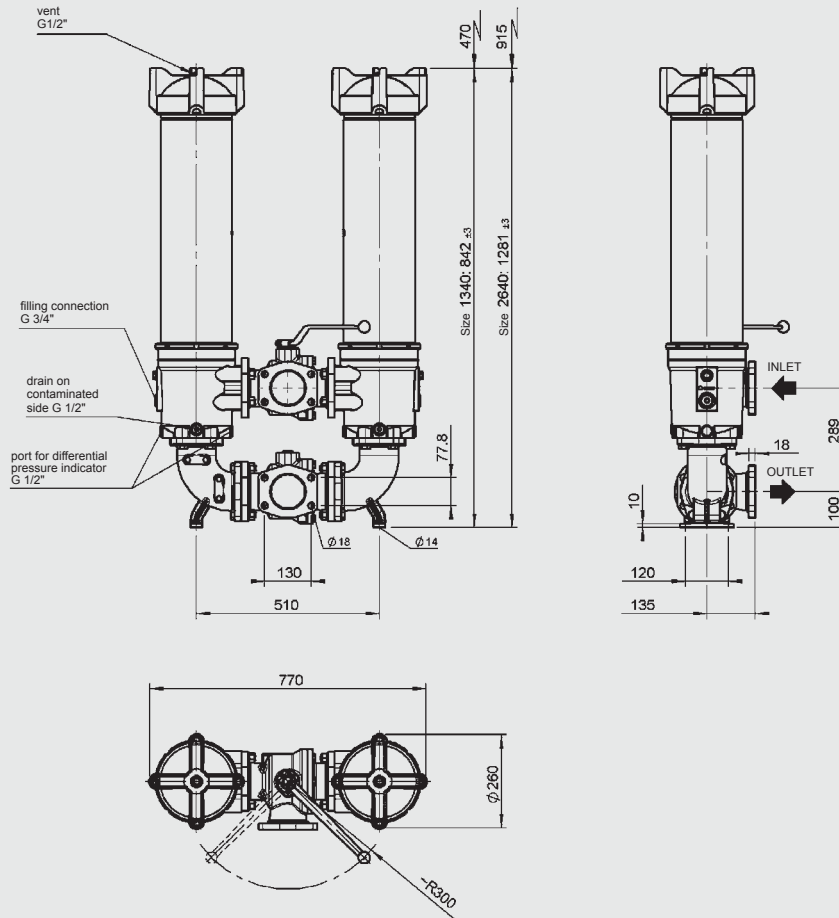
3.3. OTHER CONNECTION SIZES AND TYPES ON REQUEST!

Examples:



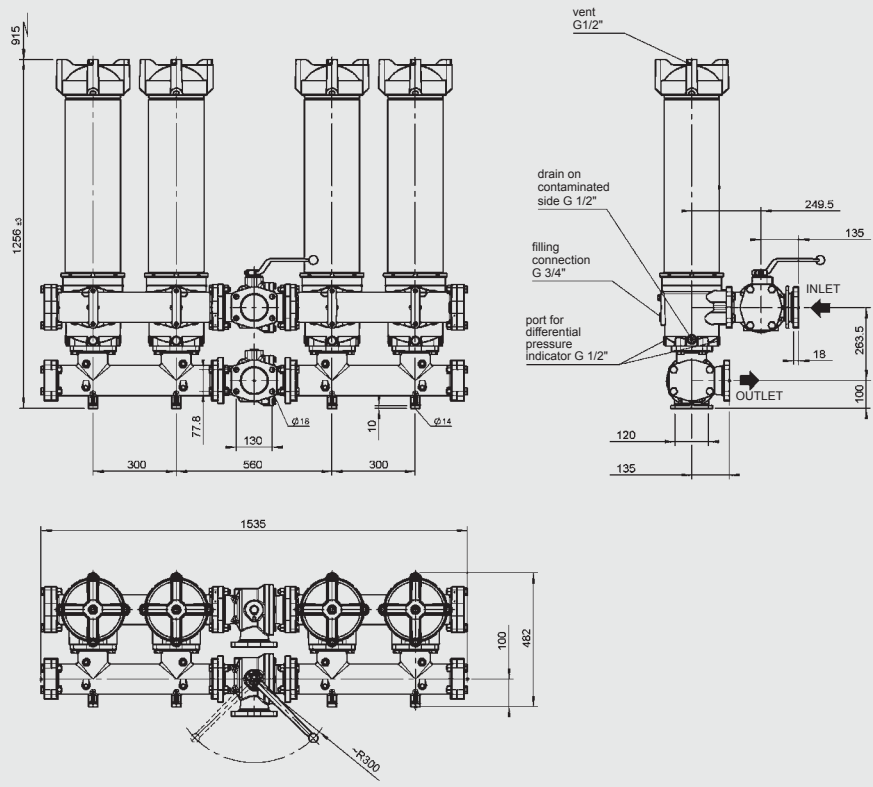
4. DIMENSIONS

NFD 1340/2640

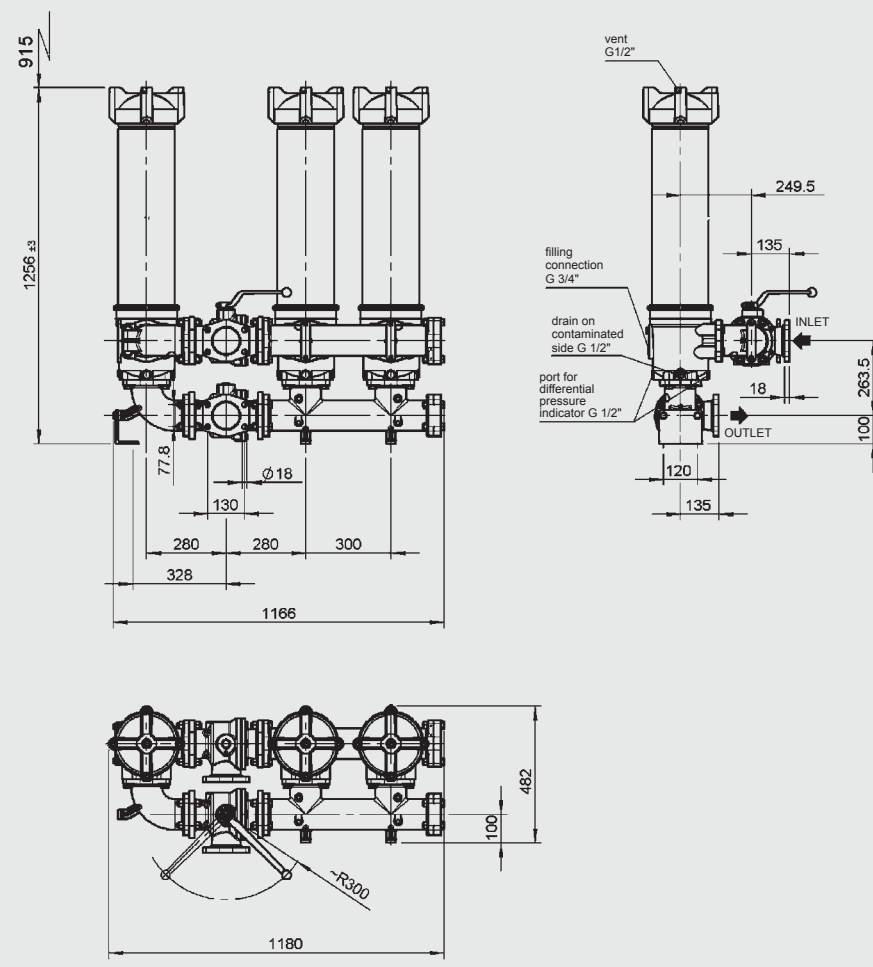


NFD	No. of elements per side	Weight incl. element [kg]	Vol. of pressure chamber [l]
1340...2.X	1x 1300 R...	122.7	35.8
2640...2.X	1x 2600 R...	140.0	58.1

NFD 5240



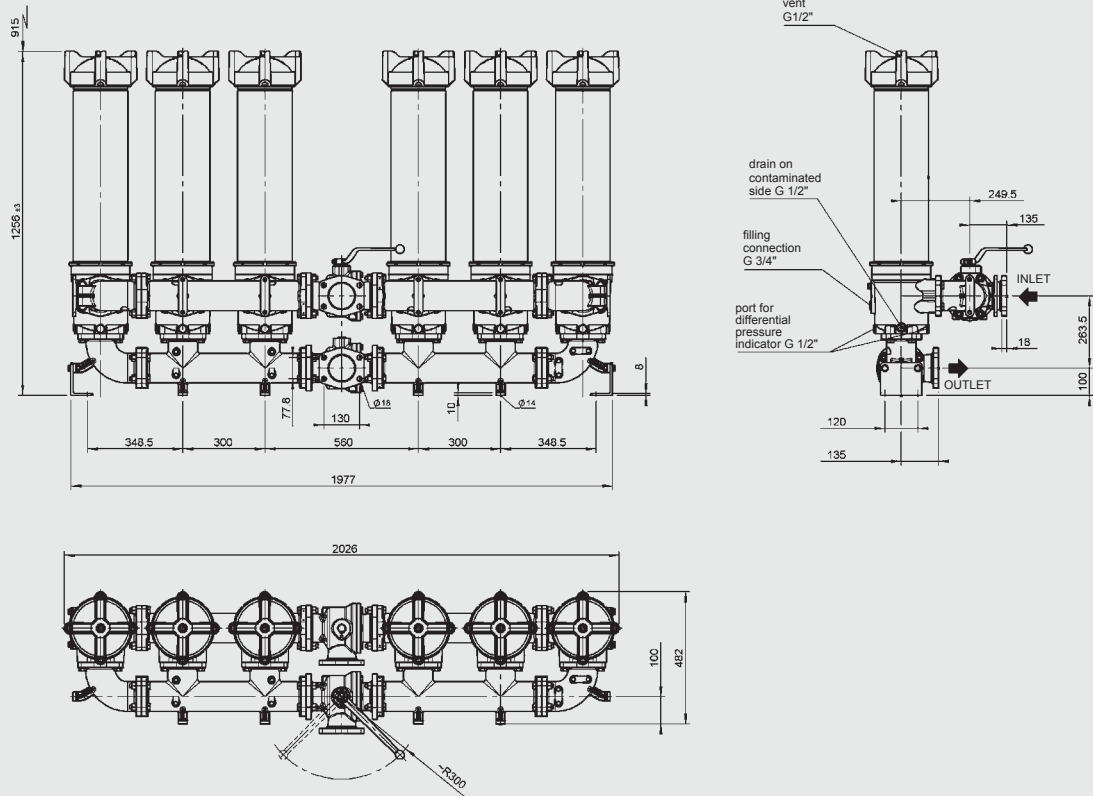
NFD 5240...2.X /-1+2



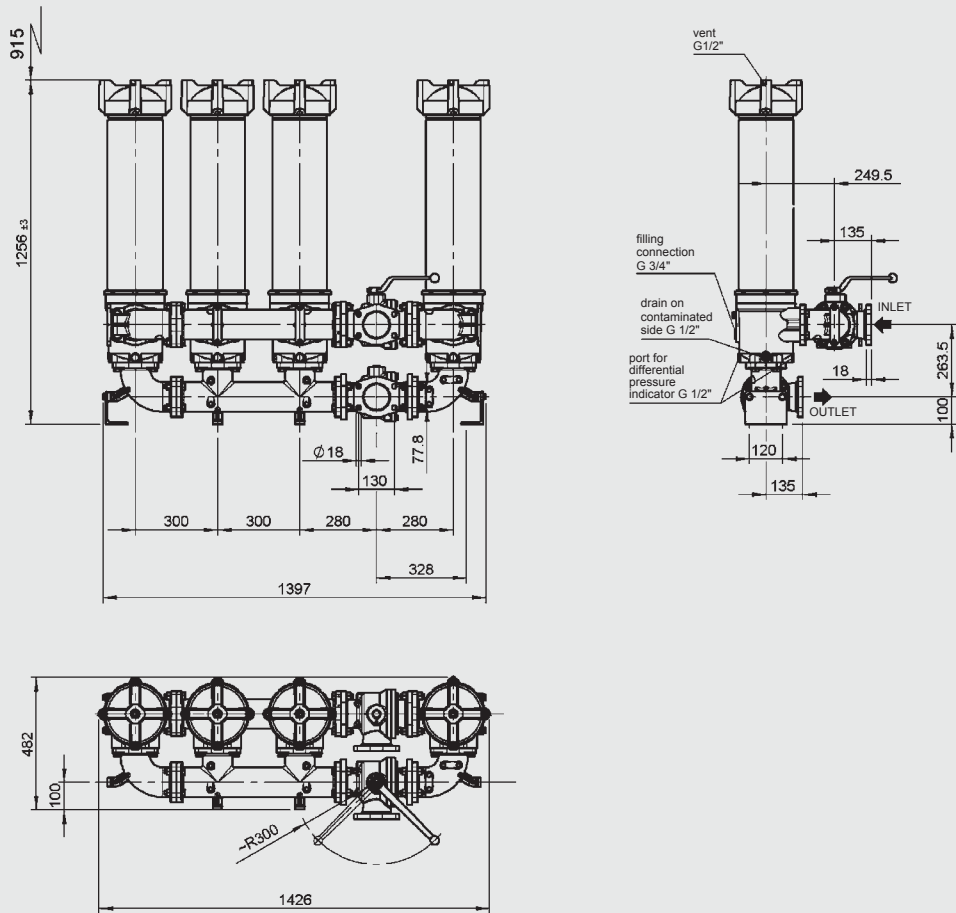
NFD	No. of elements per side	Weight incl. element [kg]	Vol. of pressure chamber [l]
5240...2.X	2x 2600 R...	276.8	126.4
5240../-1+2...2.X	1x 2600 R... and 2x 2600 R...	217.4	94.3

E 7.113.4/03.12

NFD 7840

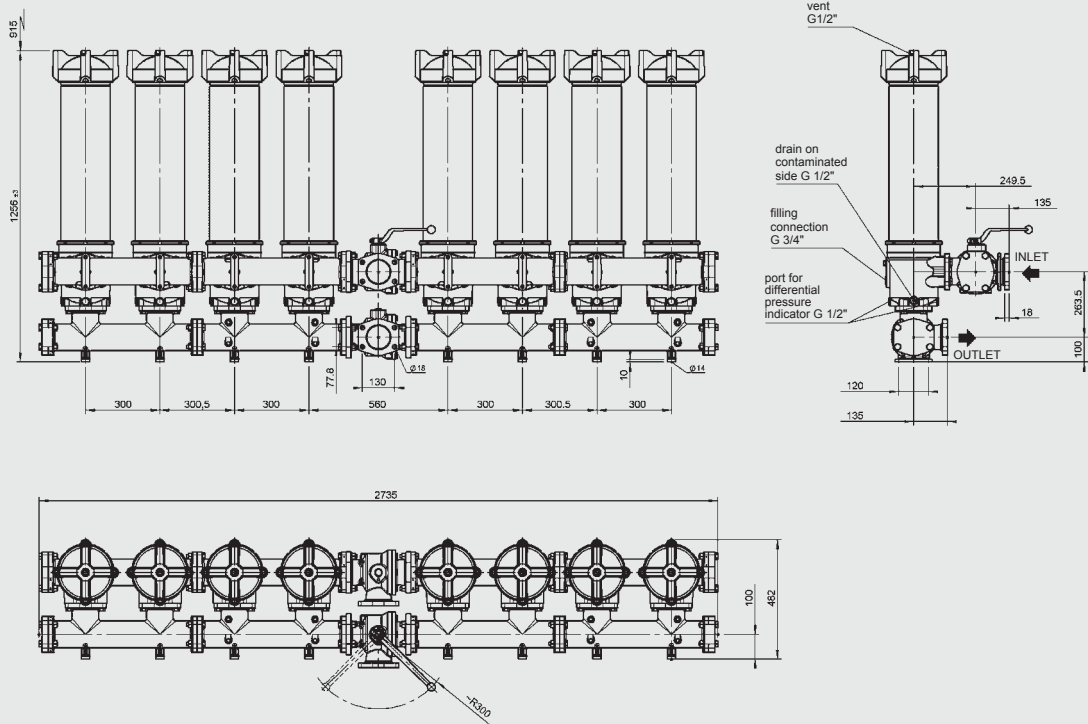


NFD 7840...2.X /-3+1

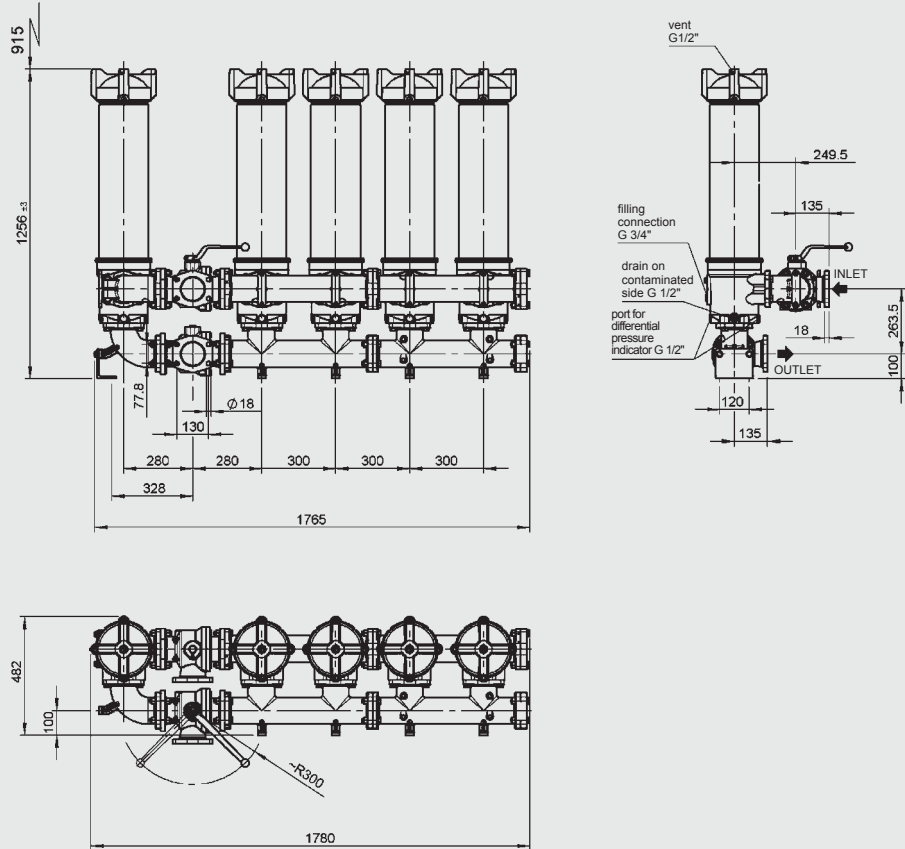


NFD	No. of elements per side	Weight incl. element [kg]	Vol. of pressure chamber [l]
7840	3x 2600 R...	391.6	182.8
7840../-3+1	3x 2600 R... and 1x 2600 R...	286.6	122.2

NFD 10440



NFD 10440...2.X /-1+4



NFD	No. of elements per side	Weight incl. element [kg]	Vol. of pressure chamber [l]
10440	4x 2600 R...	510.4	251.0
10440.../-1+4	1x 2600 R... and 4x 2600 R...	328.3	154.0

NOTE

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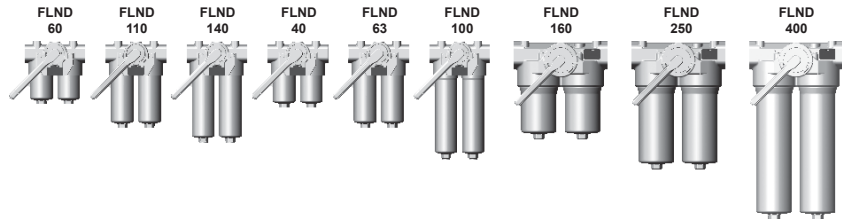
HYDAC FILTERTECHNIK GMBH
 Industriegebiet
D-66280 Sulzbach/Saar, Germany
 Tel.: 0 68 97 / 509-01
 Fax: 0 68 97 / 509-300
 Internet: www.hydac.com
 E-mail: filter@hydac.com



Change-Over Inline Filter FLND

to DIN 24550*, up to 400 l/min, up to 63 bar

*Filters and filter elements also available in HYDAC dimensions



1. TECHNICAL SPECIFICATIONS

1.1 FILTER HOUSING

Construction

The filter housings are designed in accordance with international regulations. They consist of a filter head with built-in change-over valve and screw-in filter bowls.

Standard equipment:

- without bypass valve
- connection for a clogging indicator
- oil drain plug (FLND 160 to 400)

1.2 FILTER ELEMENTS

HYDAC filter elements are validated and their quality is constantly monitored according to the following standards:

- ISO 2941, ISO 2942, ISO 2943, ISO 3724, ISO 3968, ISO 11170, ISO 16889

Contamination retention capacities in g

Betamicon® (BN4HC)				
FLND	3 µm	5 µm	10 µm	20 µm
60	6.5	7.3	7.8	8.0
110	13.8	15.5	16.4	16.9
140	18.1	20.3	21.5	22.2
Betamicon® (BN4HC)				
FLND	3 µm	6 µm	10 µm	25 µm
40	5.2	5.6	6.3	7.0
63	9.2	9.9	11.1	12.8
100	15.4	16.5	18.6	20.6
160	27.5	29.3	33.1	36.7
250	46.0	49.0	55.2	61.3
400	76.2	81.3	91.4	101.5
Betamicon® (BH4HC)				
FLND	3 µm	5 µm	10 µm	20 µm
60	4.6	4.5	5.0	5.7
110	10.1	9.9	10.9	12.4
140	13.3	13.0	14.3	16.3
Betamicon® (BH4HC)				
FLND	3 µm	6 µm	10 µm	25 µm
40	4.1	4.4	5.2	6.2
63	7.3	7.9	9.2	11.2
100	12.2	13.2	15.5	18.9
160	21.8	23.9	27.8	33.8
250	38.1	41.7	48.6	59.0
400	63.6	69.5	81.0	98.3

Filter elements are available with the following pressure stability values:

Betamicon® (BN4HC):	20 bar
Betamicon® (BH4HC):	210 bar
Wire mesh (W/HC, W*):	20 bar

* only for FLND 40 - 140

1.3 FILTER SPECIFICATIONS

Nominal pressure	25 bar (FLND 160 to 400) 63 bar (FLND 40 to 140)
Fatigue strength	At nominal pressure 10 ⁶ cycles from 0 to nominal pressure
Temperature range	-10 °C to +100 °C
Material of filter head	Aluminium
Material of filter bowl	Aluminium (FLND 100 and 140: Steel)
Type of clogging indicator	VM (differential pressure measurement up to 210 bar operating pressure)
Pressure setting of the clogging indicator	2.5 bar or 5 bar (others on request)
Bypass cracking pressure (optional)	3.5 bar or 7 bar (others on request)

1.4 SEALS

NBR (= Perbunan)

1.5 INSTALLATION

As inline filter

1.6 SPECIAL MODELS AND ACCESSORIES

- With bypass valve
- With oil drain plug for FLND 40 to 140 (SO184)
- Seals in FPM, EPDM
- Reverse flow (RL)

1.7 SPARE PARTS

See Original Spare Parts List

1.8 CERTIFICATES AND APPROVALS

On request

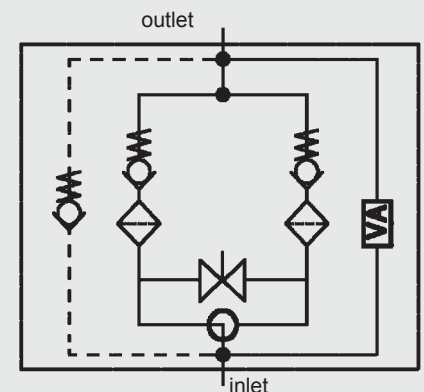
1.9 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

- Hydraulic oils H to HLPD DIN 51524
- Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743
- Compressor oils DIN 51506
- Biodegradable operating fluids VDMA 24568 HETG, HEES, HEPG
- Fire-resistant fluids HFA, HFB, HFC and HFD
- Operating fluids with high water content (>50% water content) on request

1.10 IMPORTANT INFORMATION

- Filter housings must be earthed.
- When using electrical clogging indicators, the electrical power supply to the system must be switched off before removing the clogging indicator connector.

Symbol for hydraulic systems



VA = clogging indicator

2. MODEL CODE (also order example)

FLND BN/HC 250 D D F 10 D 1 . X /-L24

2.1 COMPLETE FILTER

Filter type _____

FLND

Filter material of element _____

BN/HC Betamicon® (BN4HC)

BH/HC

Betamicon® (BH4HC)

W/HC, W* Wire mesh

Size of filter or element _____

FLND: 40, 60, 63, 100, 110, 140, 160, 250, 400

Operating pressure _____

D = 25 bar (FLND 160 to 400)

F = 63 bar (FLND 40 to 140)

Type of change-over _____

D single switching valve and check valve

Type and size of port _____

to DIN 24550 (●), possible ports (X)

Type	Port	Filter size ... not to DIN 24550			... to DIN 24550					
		60	110	140	40	63	100	160	250	400
B	G 1/2	X	X	X	●	X	X			
C	G 3/4	X	X	X	X	●	X			
D	G 1	X	X	X	X	X	●			
E	G 1 1/4							●	X	X
F	G 1 1/2							X	●	X
I	DN 25**	X	X	X	X	X	X			
K	DN 38**							X	X	●

** Flange SAE, 3000 PSI

Filtration rating in µm _____

BN/HC, BH/HC: 3, 5, 10, 20

BN/HC, BH/HC to DIN 24550: 3, 6, 10, 25

W/HC, W*: 25, 50, 100, 200

Type of clogging indicator _____

Y plastic blanking plug in indicator port

A steel blanking plug in indicator port

B visual

C electrical

D visual and electrical

LZ visual-mechanical / electrical

for other clogging indicators, see brochure no. 7.050../..

Type code _____

1

Modification number _____

X the latest version is always supplied

Supplementary details _____

B. bypass cracking pressure (e.g. B3.5 = 3.5 bar; B7 = 7 bar); without details = without bypass valve

L... light with appropriate voltage (24V, 48V, 110V, 220V)

only for clogging

LED 2 light emitting diodes up to 24 Volt

indicators type D

AV LZ indicator with plug to AUDI and VW specification

BO LZ indicator with plug and pin connection to BMW and Opel specification (M12x1)

CN LZ indicator with plug to DIN 43651 with 3 LEDs (CNOMO specification)

DB LZ indicator with plug to DIN 43651 with 3 LEDs (Daimler-Benz specification)

D4C LZ with plug and connector to Daimler-Chrysler specification and cold start suppression 30°C

BO-LED as for BO, but with progressive diode strip

RL reverse flow direction

SO184 oil drain plug (FLND 40 to 140)

V FPM seals

W suitable for HFA and HFC emulsions

2.2 REPLACEMENT ELEMENT

0250 DN 010 BN4HC /-V

Size _____

0040, 0060, 0063, 0100, 0110, 0140, 0160, 0250, 0400

Type _____

D 0060, 0110, 0140

DN to DIN 24550: 0040, 0063, 0100, 0160, 0250, 0400

Filtration rating in µm _____

BN4HC, BH4HC: 003, 005, 010, 020

BN4HC, BH4HC to DIN 24550: 003, 006, 010, 025

W/HC, W*: 025, 050, 100, 200

Filter material _____

BN4HC, BH4HC, W/HC, W*

Supplementary details _____

V, W (for descriptions, see point 2.1)

2.3 REPLACEMENT CLOGGING INDICATOR

VM 5 D . X /-L24

Type _____

VM differential pressure measurement up to 210 bar operating pressure

Pressure setting _____

5 standard 5 bar, others on request

Type of clogging indicator (see point 2.1) _____

Modification number _____

X the latest version is always supplied

Supplementary details _____

L..., LED, V, W, AV, BO, CN, DB, D4C, BO-LED (for descriptions see Point 2.1)

* only for FLND 40 - 140

3. FILTER CALCULATION / SIZING

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

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

$$\Delta p_{\text{housing}} = (\text{see Point 3.1})$$

$$\Delta p_{\text{element}} = Q \cdot \frac{SK^*}{1000} \cdot \frac{\text{viscosity}}{30}$$

(*see Point 3.2)

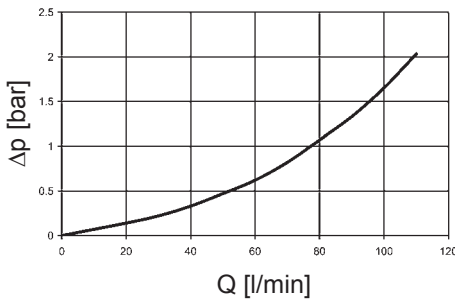
For ease of calculation, our Filter Sizing Program is available on request free of charge.

NEW: Sizing online at www.hydac.com

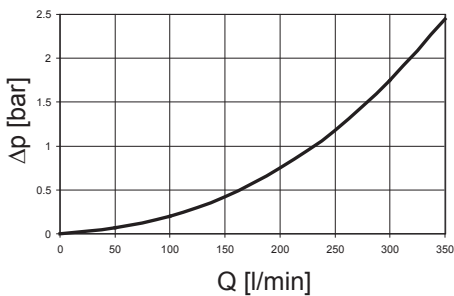
3.1 Δp -Q HOUSING CURVES BASED ON ISO 3968

The housing curves apply to mineral oil with a density of 0.86 kg/dm³ and a kinematic viscosity of 30 mm²/s. In this case, the differential pressure changes proportionally to the density.

FLND 40, 60, 63, 100, 110, 140



FLND 160, 250, 400

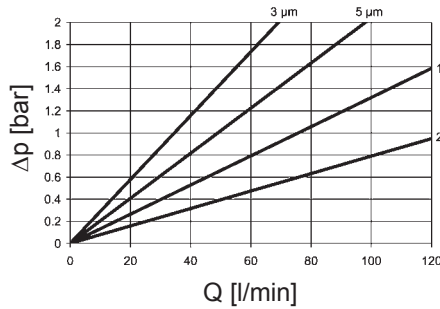


3.2 GRADIENT COEFFICIENTS (SK) FOR FILTER ELEMENTS

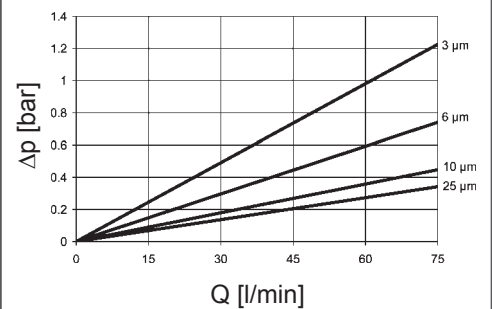
The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm²/s. The pressure drop changes proportionally to the change in viscosity.

FLND	... D ... BH4HC				W/HC - W	... DN ... BH4HC			
	3 μm	5 μm	10 μm	20 μm		-	3 μm	6 μm	10 μm
60	58.6	32.6	18.1	12.2	0.757	-	-	-	-
110	25.4	14.9	8.9	5.6	0.413	-	-	-	-
140	19.9	11.3	8.1	4.3	0.324	-	-	-	-
40	-	-	-	-	0.966	40.4	24.8	16.4	10.9
63	-	-	-	-	0.54	29.0	18.2	11.7	7.6
100	-	-	-	-	0.325	19.0	11.7	7.7	5.3
160	-	-	-	-	0.168	8.0	5.1	3.8	2.5
250	-	-	-	-	0.101	5.4	3.4	2.8	1.9
400	-	-	-	-	0.068	3.4	2.1	1.7	1.1

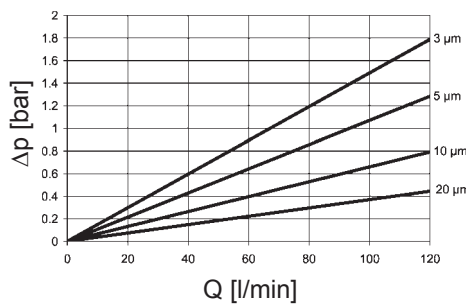
BN4HC: FLND 60



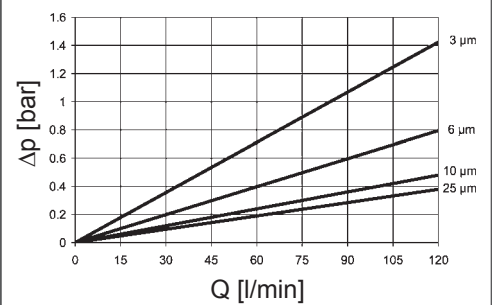
BN4HC: FLND 63



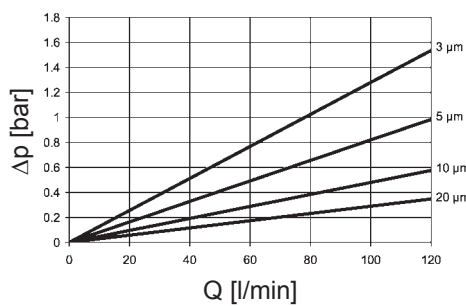
BN4HC: FLND 110



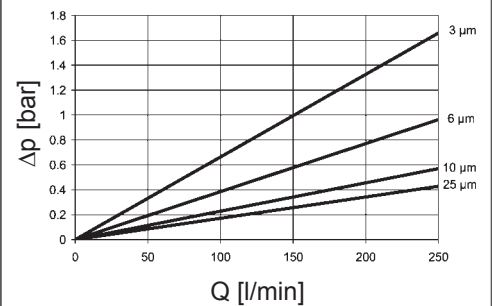
BN4HC: FLND 100



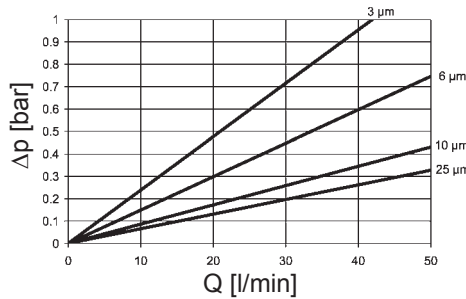
BN4HC: FLND 140



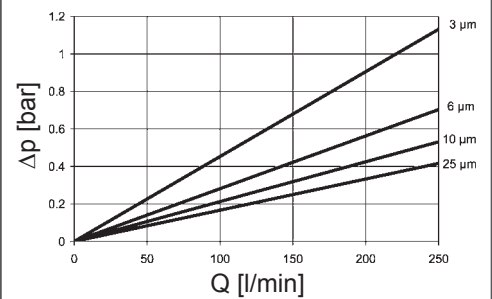
BN4HC: FLND 160



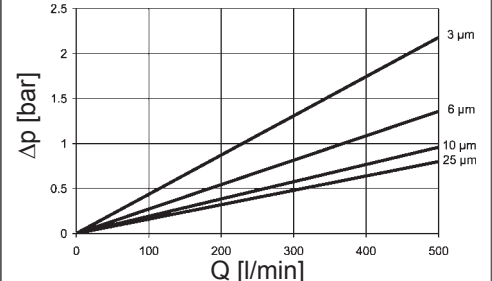
BN4HC: FLND 40



BN4HC: FLND 250

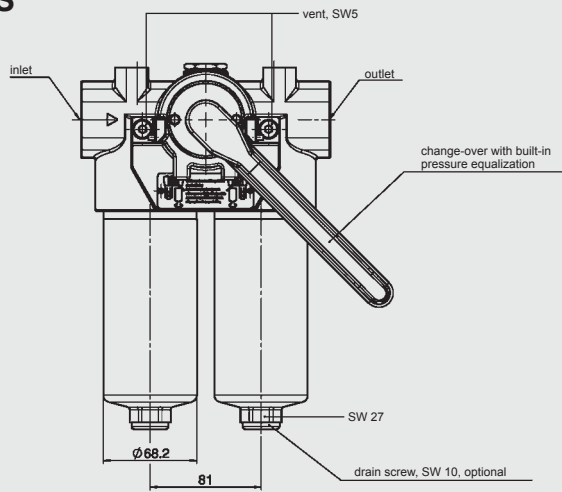


BN4HC: FLND 400

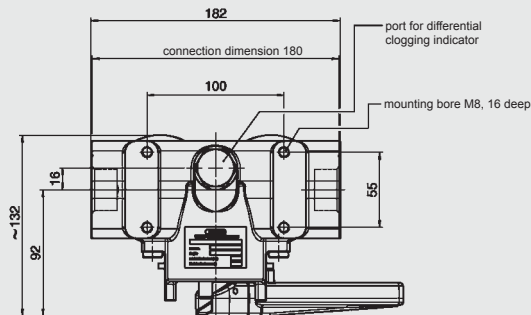
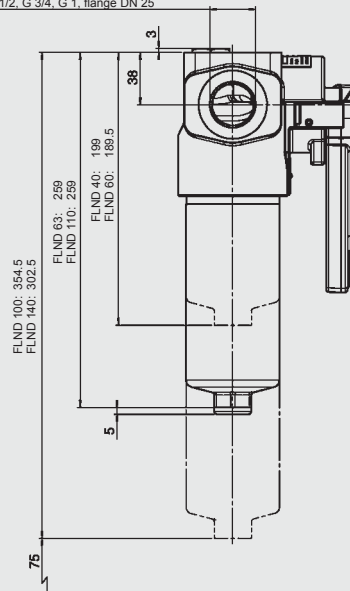


4. DIMENSIONS

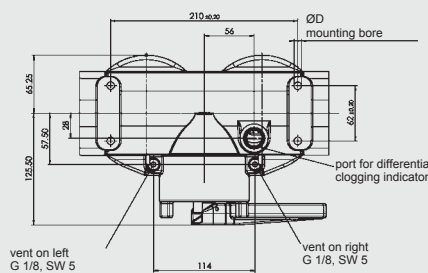
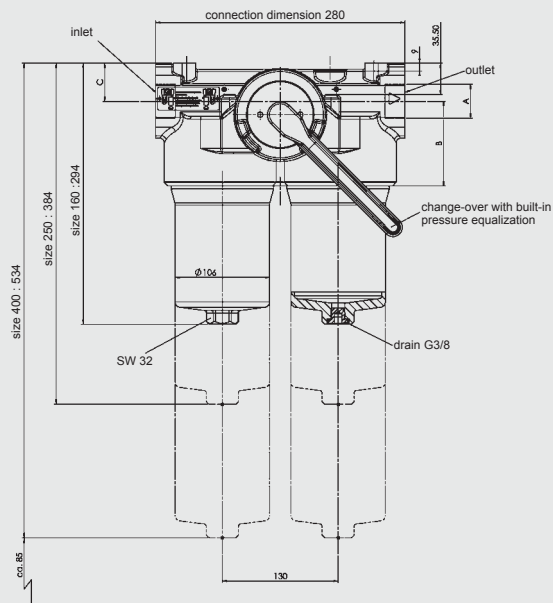
FLND 40 - 140



optional G 1/2, G 3/4, G 1, flange DN 25



FLND 160 - 400



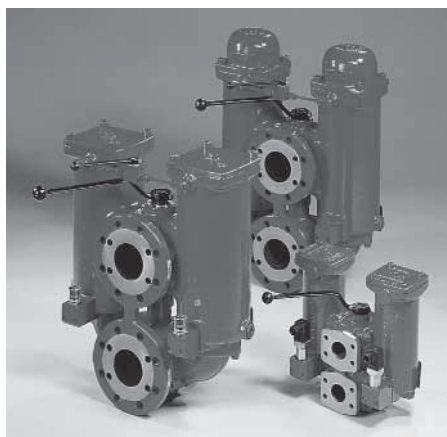
A	B	C	D
G 1 1/4	95	43	M10 x 19/22 deep
G 1 1/2	98	40	M10 x 19/22 deep
DN 38	95	43	M10 x 19/22 deep

FLND	Weight incl. element [kg]	Vol. of pressure chamber [l]
40	6.73	2x 0.26
60	6.83	2x 0.25
63	7.10	2x 0.40
100	11.33	2x 0.50
110	7.32	2x 0.40
140	11.78	2x 0.40
160	9.1	2x 1.40
250	9.6	2x 2.00
400	12.0	2x 3.10

NOTE

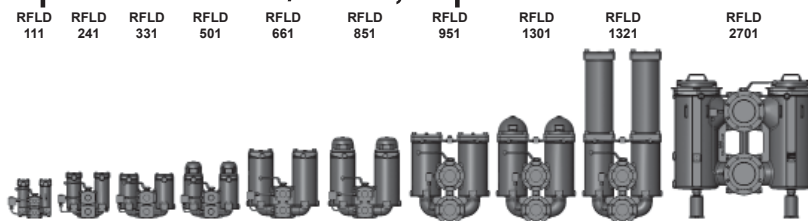
The information in this brochure relates to the operating conditions and applications described.
For applications or operating conditions not described, please contact the relevant technical department.
Subject to technical modifications.

HYDAC FILTERTECHNIK GMBH
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Internet: www.hydac.com
E-mail: filter@hydac.com



Change-Over Inline Filter RFLD Cast Version

up to 2500 l/min, up to 64 bar



1. TECHNICAL SPECIFICATIONS

1.1 FILTER HOUSING Construction

The filter housings are designed in accordance with international regulations. The two sections of the filter housing, each of which has a bolt-on cover plate, are connected by means of a ball change-over valve.

Standard equipment:

- connections for venting and draining
- connection for a clogging indicator
- for size DN 80 and above, the filters are fitted with a pressure equalisation line and a ball shut-off valve
- with bypass valve

1.2 FILTER ELEMENTS

HYDAC filter elements are validated and their quality is constantly monitored according to the following standards:

- ISO 2941, ISO 2942, ISO 2943, ISO 3724, ISO 3968, ISO 11170, ISO 16889

Contamination retention capacities in g

RFLD	Element per side	Betamicon® (BN4HC)			
		3 µm	5 µm	10 µm	20 µm
111	1x0110 R	12	13.3	16	18.1
241	1x0240 R	29.3	32.5	39.1	44.2
33x	1x0330 R	38.4	42.6	51.2	57.9
50x	1x0500 R	58.9	65.3	78.6	88.9
66x	1x0660 R	87.1	96.5	116.1	131.3
85x	1x0850 R	112.1	124.2	149.5	169.1
95x	1x0950 R	130.0	144.1	173.3	196.1
130x	1x1300 R	181.0	200.7	241.4	273.1
132x	1x2600 R	369.4	409.4	492.5	557.2
2701	1x2700 R	336.3	372.6	448.5	507.3

Filter elements are available with the following pressure stability values:

- Betamicon® (BN4HC): 20 bar
- Paper (P/HC)*: 10 bar
- Stainl. steel wire mesh (W/HC): 20 bar
- Stainless steel fibre (V)*: 30 bar
- Betamicon®/Aquamicron® (BN4AM)*: 10 bar
- Aquamicron® (AM)*: 10 bar

* for RFLD 2701, on request

1.3 FILTER SPECIFICATIONS

Nominal pressure	16 bar (RFLD 2701) 25 bar (RFLD 331-1321, 853) 40 bar (RFLD 111-241, 503, 662-1322) 64 bar (RFLD 332-502)
Temperature range	-10 °C to +100 °C
Material of filter housing and cover plate	EN-GJS-400-15: = 1
Material code (final digit of filter size)	EN-GJS-400-18LT: = only RFLD 2701 GP 240 GH+N: = 2 Stainl. steel 1.4581: = 3
Type of clogging indicator	VM (differential pressure measurement up to 210 bar operating pressure)
Pressure setting of the clogging indicator	2 bar (others on request)
Bypass cracking pressure	3 bar (others on request)

1.4 SEALS

NBR (=Perbunan)

1.5 MOUNTING

As inline filter

1.6 SPECIAL MODELS AND ACCESSORIES

- Orifice in the pressure equalisation line
- Stand
- Drain and vent ports with ball valves or other shut-off valves
- Counter flanges available for all sizes
- Change-over valve lockable
- Venting line with sight gauges

1.7 SPARE PARTS

See Original Spare Parts List

1.8 CERTIFICATES AND APPROVALS

These filters can be supplied with manufacturer's test certificates O and M to DIN 55350, Part 18. Test certificates 3.1 to DIN EN 10204 and approval certificates (Type Approval) for different approval authorities.

Areas of application, amongst others: lubrication.

Filter to API 614 (ANSI flange) on request!

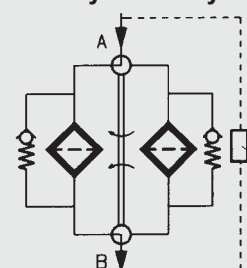
1.9 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

- Hydraulic oils H to HLPD DIN 51524
- Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743
- Compressor oils DIN 51506
- Biodegradable operating fluids VDMA 24568 HETG, HEES, HEPG
- Fire-resistant fluids HFA, HFB, HFC and HFD
- Operating fluids with high water content (>50% water content) and CLP-oil on request

1.10 IMPORTANT INFORMATION

- Filter housings must be earthed.
- When using electrical clogging indicators, the electrical power supply to the system must be switched off before removing the clogging indicator connector.
- Filters must be flexibly mounted and not fixed rigidly to the floor or used as a pipe support.
- When used with W/HC and P/HC elements, please follow the sizing recommendation under point 3.3!

Symbol for hydraulic systems



2. MODEL CODE (also order example)

RFLD BN/HC 851 D A L 10 D 1 . X /-L24

2.1 COMPLETE FILTER

Filter type _____

RFLD

Filter material of element _____

BN/HC Betamicon® (BN4HC) P/HC Paper* AM Aquamicon®*
 V Stainless steel fibre* W/HC Wire mesh BN/AM Betamicon®/Aquamicon®*

Size of filter or element _____

EN-GJS-400-15: 111, 241, 331, 501, 661, 851, 951, 1301, 1321
 EN-GJS-400-18LT: 2701
 GP 240 GH+N: 332, 502, 662, 852, 952, 1302, 1322
 Stainl. steel 1.4581: 503, 853

Operating pressure _____

C = 16 bar RFLD 2701
 D = 25 bar RFLD 331-1321, 853
 E = 40 bar RFLD 111-241, 503, 662-1322
 F = 64 bar RFLD 332-502

Type of change-over _____

A Ball

Type and size of port _____

EN-GJS-400-15 + EN-GJS-400-LT18 (●)
 GP 240 GH+N (X); 1.4581 (★)

Type	Port	Filter sizes									
		111	241	331 332	501 502 503	661 662	851 852 853	951 952	1301 1302	1321 1322	2701
D	G 1	●									
F	G 1½		●								
I	SAE DN 25	●									
J	DIN DN 50			x	X★						
K	SAE DN 40		●	●	●						
L	SAE DN 50			●X	●X	●	●				
M	SAE DN 65					●	●				
Q	DIN DN 80					x	X★				
R	DIN DN 100							x	x	x	
S	SAE/DIN DN 80					●	●	●	●	●	
T	SAE/DIN DN 100							●	●	●	
V	DIN DN 150										●

Other nominal bores, and ANSI flange version on request

Filtration rating in µm _____

BN/HC, V*: 3, 5, 10, 20 P/HC*: 10, 20 AM*: 40
 W/HC: 25, 50, 100, 200 BN/AM*: 3, 10

Type of clogging indicator _____

Y plastic blanking plug in indicator port
 A stainless steel blanking plug in indicator port
 B visual
 C electrical
 D visual and electrical
 for other clogging indicators, see brochure no. 7.050./..

Type code _____

1

Modification number _____

X the latest version is always supplied

Supplementary details _____

B. special cracking pressure of bypass (e.g. B1 = 1 bar)
 DE differential pressure measurement across element
 KB without bypass valve
 L... light with appropriate voltage (24V, 48V, 110V, 220V)
 LED 2 light emitting diodes up to 24 Volt
 SAK contamination retainer
 SB pressure equalisation line (SB2 = with 2mm orifice)
 STV stand
 V FPM seals
 only for clogging indicators type "D"

2.2 REPLACEMENT ELEMENT

0850 R 010 BN4HC /-V

Size _____

0110, 0240, 0330, 0500, 0660, 0850, 0950, 1300, 2600, 2700

Type _____

R

Filtration rating in µm _____

BN4HC, V*: 003, 005, 010, 020 P/HC*: 010, 020 AM*: 040
 W/HC: 025, 050, 100, 200 BN4AM*: 003, 010

Filter material _____

BN4HC, V*, W/HC, P/HC*, BN4AM*, AM*

Supplementary details _____

V (for descriptions, see point 2.1.)

2.3 REPLACEMENT CLOGGING INDICATOR

VM 2 D . X /-L24

Type _____

VM differential pressure measurement up to 210 bar operating pressure

Pressure setting _____

2 standard 2 bar, others on request

Type of clogging indicator (see Point 2.1.) _____

Modification number _____

X the latest version is always supplied

Supplementary details _____

L..., LED, V (for descriptions, see point 2.1.)

* for RFLD 2701 on request!

3. FILTER CALCULATION / SIZING

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

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

$$\Delta p_{\text{housing}} = (\text{see Point 3.1})$$

$$\Delta p_{\text{element}} = Q \cdot \frac{SK^*}{1000} \cdot \frac{\text{viscosity}}{30}$$

(*see point 3.2)

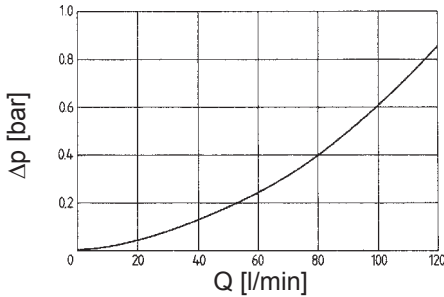
For ease of calculation, our Filter Sizing Program is available on request free of charge.

NEW: Sizing online at www.hydac.com

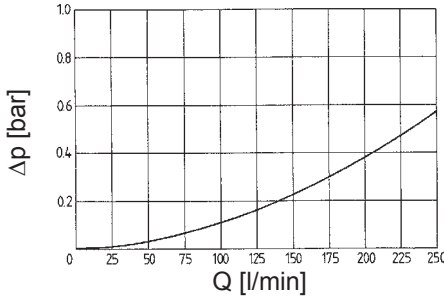
3.1 Δp -Q HOUSING CURVES BASED ON ISO 3968

The housing curves apply to mineral oil with a density of 0.86 kg/dm³ and a kinematic viscosity of 30mm²/s. In this case, the differential pressure changes proportionally to the density.

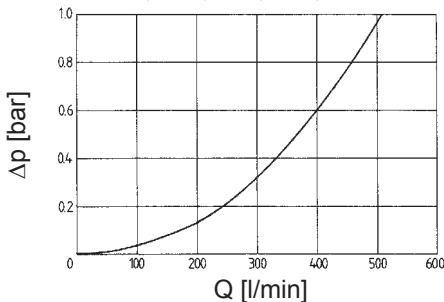
RFLD 111



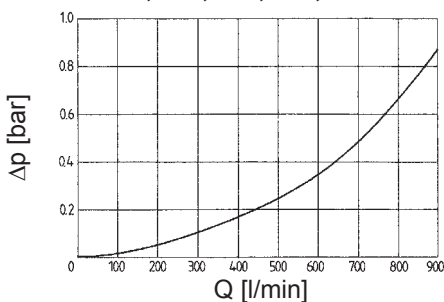
RFLD 241



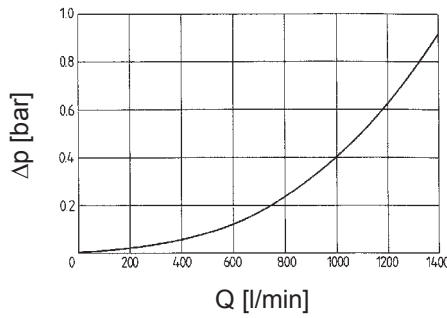
RFLD 331, 332, 501, 502, 503



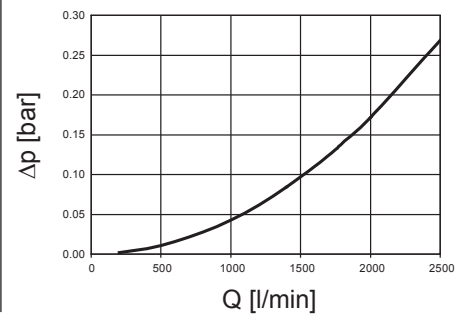
RFLD 661, 662, 851, 852, 853



RFLD 951, 952, 1301, 1302, 1321, 1322



RFLD 2701

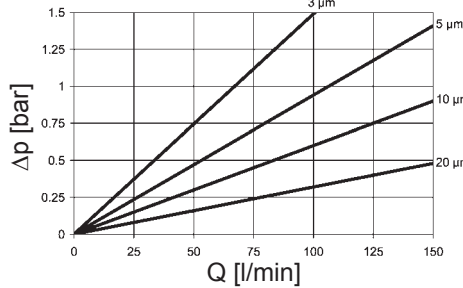


3.2 GRADIENT COEFFICIENTS (SK) FOR FILTER ELEMENTS

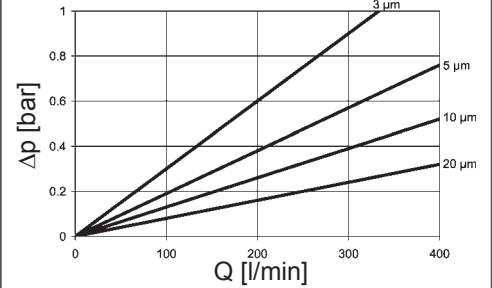
The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm²/s. The pressure drop changes proportionally to the change in viscosity.

RFLD	V				W/HC
	3 μm	5 μm	10 μm	20 μm	
110	7.6	5.1	3.0	2.0	0.502
240	3.2	2.6	1.7	1.2	0.228
330	2.1	1.7	1.1	0.8	0.164
500	1.5	1.2	0.8	0.5	0.109
660	1.0	0.8	0.6	0.4	0.081
850	0.8	0.6	0.4	0.3	0.063
950	0.7	0.6	0.4	0.2	0.054
1300	0.5	0.4	0.3	0.2	0.045
2600	0.3	0.2	0.1	0.1	0.022
2700	-	-	-	-	0.038

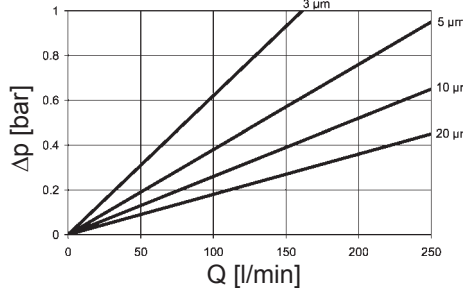
BN4HC: RFLD 110



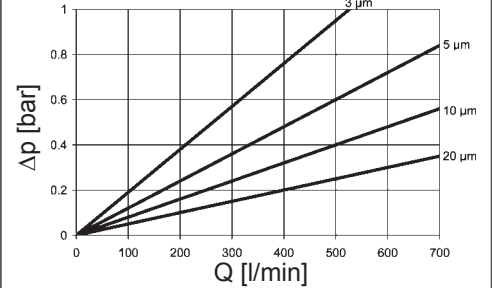
BN4HC: RFLD 500



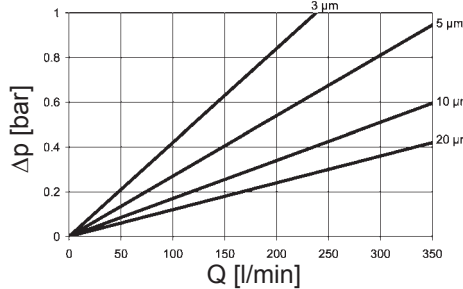
BN4HC: RFLD 240



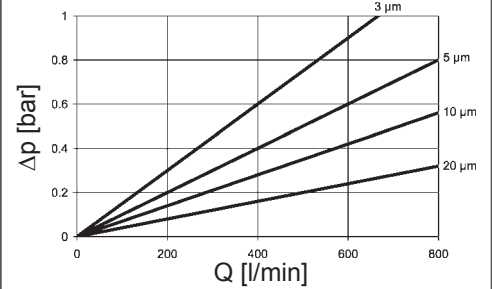
BN4HC: RFLD 660



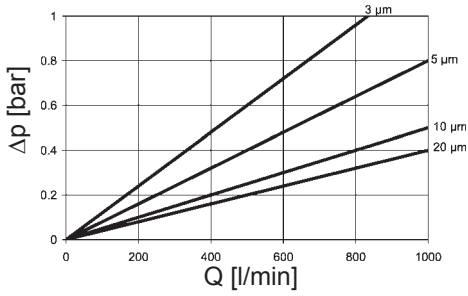
BN4HC: RFLD 330



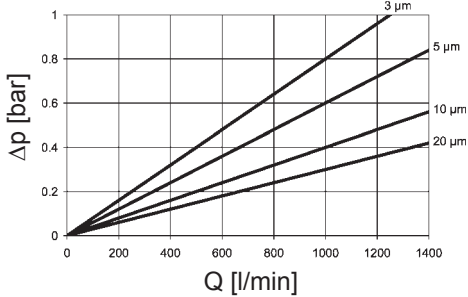
BN4HC: RFLD 850



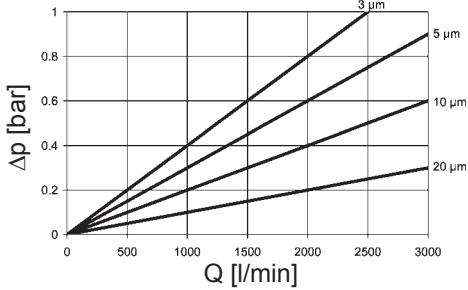
BN4HC: RFLD 950



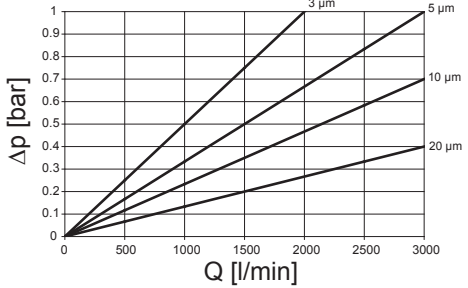
BN4HC: RFLD 1300



BN4HC: RFLD 2600



BN4HC: RFLD 2700

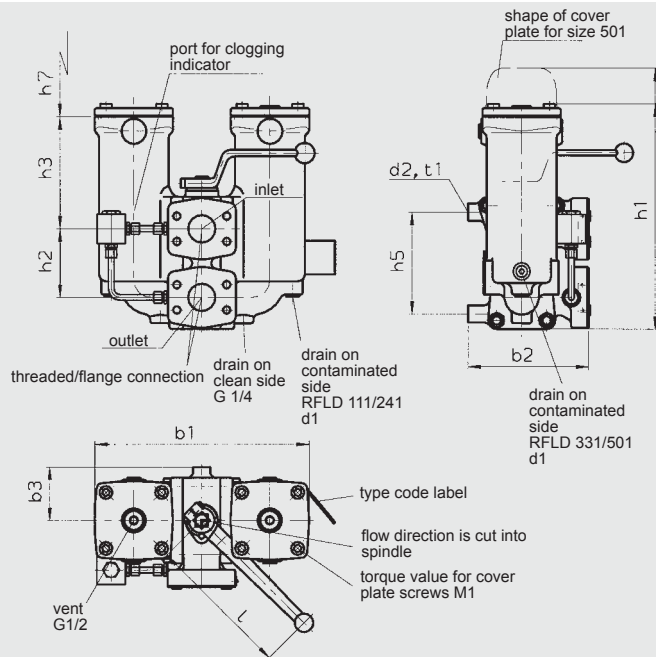


3.3 SIZING RECOMMENDATION

Filter type	Connection	Q _{max} when using W/HC and P/HC elements
RFLD 111	G1 SAE DN 25	70 l/min 70 l/min
RFLD 241	G 1½ SAE DN 40	170 l/min 170 l/min
RFLD 331	SAE DN 40	170 l/min
RFLD 331/332	SAE DN 50	260 l/min
RFLD 332	DIN DN 50	260 l/min
RFLD 501	SAE DN 40	170 l/min
RFLD 501/502	SAE DN 50	260 l/min
RFLD 502/503	DIN DN 50	260 l/min
RFLD 661	SAE DN 50 SAE DN 65 SAE /DIN DN 80	260 l/min 260 l/min 480 l/min
RFLD 662	DIN DN 80	480 l/min
RFLD 851	SAE DN 50 SAE DN 65	260 l/min 260 l/min
RFLD 851/853	SAE/DIN DN 80	480 l/min
RFLD 852	DIN DN 80	480 l/min
RFLD 951	SAE/DIN DN 80 SAE/DIN DN 100	480 l/min 900 l/min
RFLD 952	DIN DN 100	900 l/min
RFLD 1301/1321	SAE/DIN DN 80 SAE/DIN DN 100	480 l/min 900 l/min
RFLD 1302/1322	DIN DN 100	900 l/min
RFLD 2701	DIN DN 150	2500 l/min

4. DIMENSIONS

RFLD 111-501

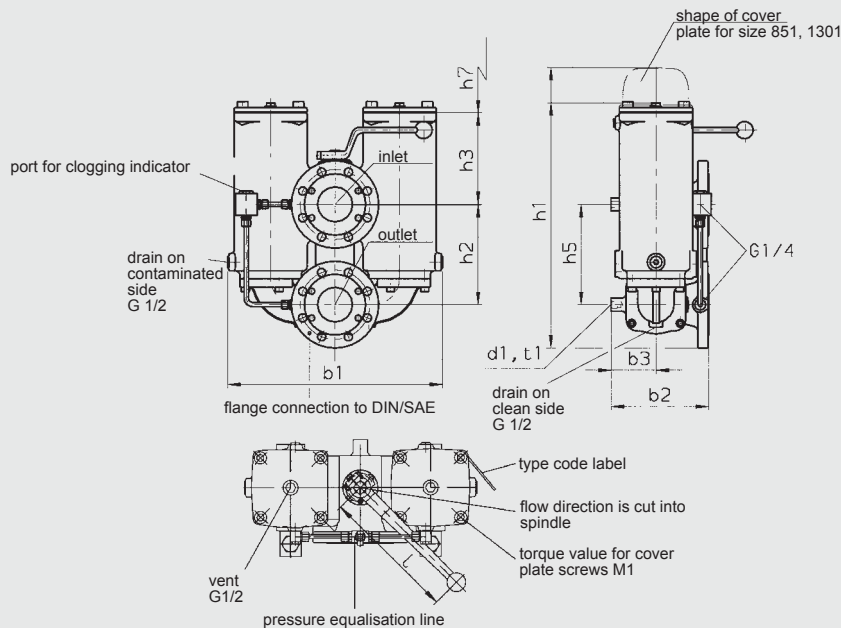


RFLD	Flange connection ¹⁾	Threaded connection ²⁾	b1	b2	b3	d1	d2	h1	h2	h3	h5	h7	l	M1 (Nm)	t1	Weight including element [kg]	Volume of pressure chamber [l]
111	DN 25 (1")	G 1	233	157	63	G ¼	M12	263	80	132	80	175	173	24	25	17	2 x 0.60
241	DN 40 (1½")	G 1½	302	167	75	G ¼	M12	312	95	155	140	210	216	40	18	27	2 x 1.40
331	DN 40 (1½")	-	396	167	75	G ½	M12	302	95	145	140	200	216	40	18	33	2 x 2.30
331	DN 50 (2")	-	380	187	85	G ½	M12	323	110	140	165	200	216	45	18	37	2 x 2.40
501	DN 40 (1½")	-	396	167	75	G ½	M12	382	95	145	140	280	216	45	18	35	2 x 3.00
501	DN 50 (2")	-	380	187	85	G ½	M12	400	110	140	165	280	216	45	18	39	2 x 3.10

¹⁾ Flange connection to SAE J 518 C (standard pressure range 3000 psi)

²⁾ Threaded connection to ISO 228

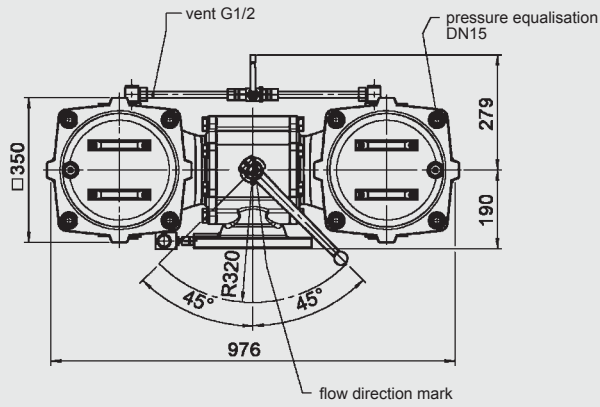
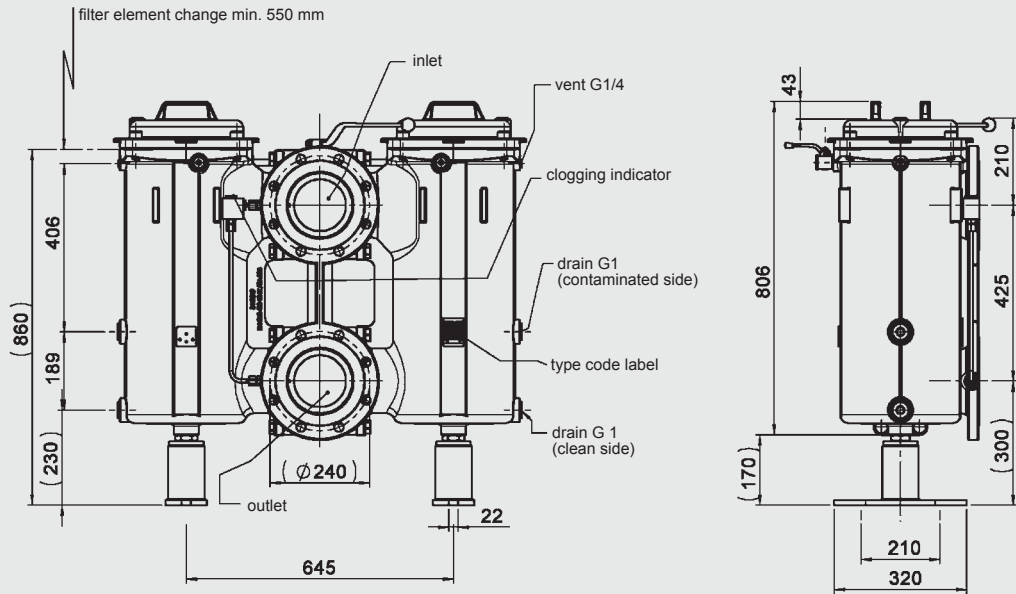
RFLD 661-1321



RFLD	Flange connection ¹⁾	b1	b2	b3	d1	h1	h2	h3	h5	h7	l	M1 (Nm)	t1	Weight including element [kg]	Volume of pressure chamber [l]
661	DN 50 (2")	496	187	85	M12	460	110	282	165	340	216	150	18	56	2 x 6.80
661	DN 65 (2½")	496	252	85	M12	472	110	282	165	340	216	150	18	74	2 x 6.80
661	DN 80 (3")	490	222	102	M12	566	230	210	230	340	301	150	23	82	2 x 8.20
851	DN 50 (2")	496	187	85	M12	544	110	282	165	420	216	150	18	62	2 x 8.10
851	DN 65 (2½")	496	252	85	M12	556	110	282	165	420	216	150	18	80	2 x 8.10
851	DN 80 (3")	490	222	102	M12	650	230	210	230	420	301	150	23	88	2 x 9.50
951	DN 80 (3")	548	222	102	M12	595	230	243	230	370	301	250	23	105	2 x 10.80
951	DN 100 (4")	555	248	118	M16	640	250	238	250	370	301	250	23	120	2 x 13.00
1301	DN 80 (3")	548	222	102	M12	701	230	243	230	490	301	250	23	110	2 x 13.80
1301	DN 100 (4")	555	248	118	M16	746	250	238	250	490	301	250	23	125	2 x 16.00
1321	DN 80 (3")	548	222	102	M12	1262	230	804	230	950	301	250	23	167	2 x 28.80
1321	DN 100 (4")	555	248	118	M16	1307	250	799	250	950	301	250	23	167	2 x 31.00

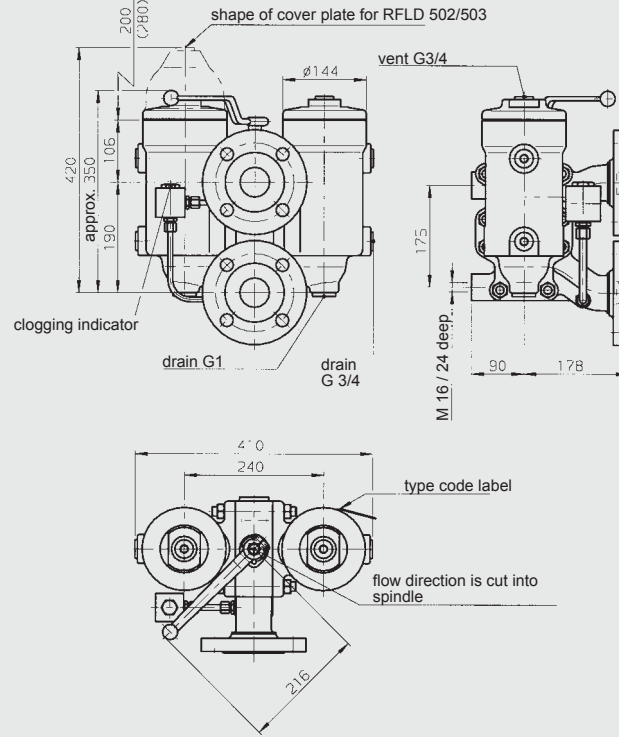
¹⁾ Flange connection to SAE J 518 C (standard pressure range 3000 psi) DIN flange connection to DIN 2501/1 for PN 25/40 (sealing strip "D" or "E")

RFLD 2701



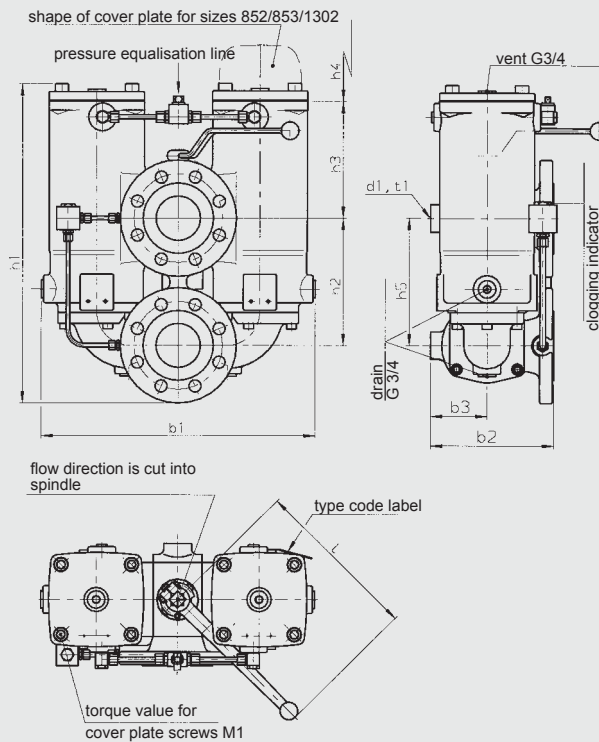
RFLD	Weight including element [kg]	Volume of pressure chamber [l]
2701	304.00	2 x 44.0

RFLD 332, 502, 503



RFLD	Weight including element [kg]	Volume of pressure chamber [l]
332	37	2 x 2.40
502	39	2 x 3.10
503	39	2 x 3.10

RFLD 662-1322, 853



RFLD	Flange connection ¹⁾	b1	b2	b3	d1	h1	h2	h3	h4	h5	l	M1 (Nm)	t1	Weight including element [kg]	Volume of pressure chamber [l]
662	DN 80 (3")	495	222	102	M12	574	230	210	340	230	301	150	23	82	2 x 8.20
852	DN 80 (3")	495	222	102	M12	665	230	210	420	230	301	150	23	88	2 x 9.50
853	DN 80 (3")	495	222	102	M12	665	230	210	420	230	301	150	23	88	2 x 9.50
952	DN 100 (4")	573	248	118	M16	672	250	238	380	250	301	250	17	120	2 x 13.00
1302	DN 100 (4")	573	248	118	M16	745	250	238	490	250	301	250	17	125	2 x 16.00
1322	DN 100 (4")	573	248	118	M16	1307	250	238	950	250	301	250	17	167	2 x 31.00

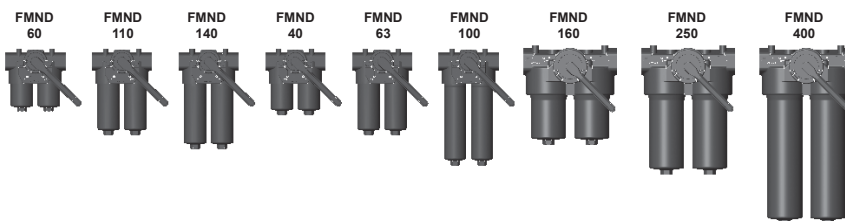
¹⁾ Flange connection to SAE J 518 C (standard pressure range 3000 psi) DIN flange connection to DIN 2501/1 for PN 25/40 (sealing strip "D" or "E")



Change-Over Inline Filter FMND

to DIN 24550*, up to 400 l/min, up to 250 bar

*Filters and filter elements also available in HYDAC dimensions (FMND 40 to 140 only)



1. TECHNICAL SPECIFICATIONS

1.1 FILTER HOUSING

Construction

The filter housings are designed in accordance with international regulations. They consist of a filter head with integrated change-over valve and screw-in filter bowls.

Standard equipment:

- without bypass valve
- connection for a clogging indicator
- oil drain plug (FMND 160 to 400)

1.2 FILTER ELEMENTS

HYDAC filter elements are validated and their quality is constantly monitored according to the following standards:

- ISO 2941
- ISO 2942
- ISO 2943
- ISO 3724
- ISO 3968
- ISO 11170
- ISO 16889

Contamination retention capacities in g

FMND	Betamicon® (BN4HC)			
	3 µm	5 µm	10 µm	20 µm
60	6.5	7.3	7.8	8.0
110	13.8	15.5	16.4	16.9
140	18.1	20.3	21.5	22.2

FMND	Betamicon® (BN4HC)			
	3 µm	6 µm	10 µm	25 µm
40	5.2	5.6	6.3	7.0
63	9.2	9.9	11.1	12.8
100	15.4	16.5	18.6	20.6
160	27.5	29.3	33.1	36.7
250	46.0	49.0	55.2	61.3
400	76.2	81.3	91.4	101.5

FMND	Betamicon® (BH4HC)			
	3 µm	5 µm	10 µm	20 µm
60	4.6	4.5	5.0	5.7
110	10.1	9.9	10.9	12.4
140	13.3	13.0	14.3	16.3

FMND	Betamicon® (BH4HC)			
	3 µm	6 µm	10 µm	25 µm
40	4.1	4.4	5.2	6.2
63	7.3	7.9	9.2	11.2
100	12.2	13.2	15.5	18.9
160	21.8	23.9	27.8	33.8
250	38.1	41.7	48.6	59.0
400	63.6	69.5	81.0	98.3

1.3 FILTER SPECIFICATIONS

Nominal pressure	210 bar (FMND 160 to 400) 250 bar (FMND 40 to 140)
Fatigue strength	At nominal pressure 10 ⁶ cycles from 0 to nominal pressure
Temperature range	-10 °C to +100 °C
Material of filter head	EN-GJS-400-15
Material of filter bowl	Steel
Type of indicator	VM (Diff. pressure indicator up to 210 bar operating pressure) VD (Diff. pressure indicator up to 420 bar operating pressure)
Pressure setting of the clogging indicator	2.5 bar or 5 bar (others on request)
Bypass cracking pressure (optional)	3.5 bar or 7 bar (others on request)

Filter elements are available with the following pressure stability values:

Betamicon® (BN4HC):	20 bar
Betamicon® (BH4HC):	210 bar
Wire mesh (W/HC, W*):	20 bar

1.4 SEALS

NBR (= Perbunan)

1.5 INSTALLATION

As inline filter

1.6 SPECIAL MODELS AND ACCESSORIES

- With bypass valve
- Oil drain plug (FMND 40 to 140 = SO184)
- Seals in FPM, EPDM
- Reverse flow (RL)

1.7 SPARE PARTS

See Original Spare Parts List

1.8 CERTIFICATES AND APPROVALS

On request

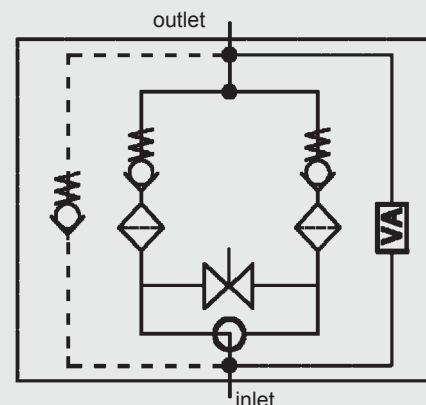
1.9 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

- Hydraulic oils H to HLPD DIN 51524
 - Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743
 - Compressor oils DIN 51506
 - Biodegradable operating fluids VDMA 24568 HETG, HEES, HEPG
 - Fire-resistant fluids HFA, HFB, HFC and HFD
 - Operating fluids with high water content (>50% water content) on request
- * only for FMND 40 - 140

1.10 IMPORTANT INFORMATION

- Filter housings must be earthed.
- When using electrical clogging indicators, the electrical power supply to the system must be switched off before removing the clogging indicator connector.

Symbol for hydraulic systems



VA = clogging indicator

2. MODEL CODE (also order example)

FMND BN/HC 250 L D F 10 D 1 . X /-L24

2.1 COMPLETE FILTER

Filter type _____

FMND

Filter material of element _____

BN/HC Betamicon® (BN4HC)

BH/HC Betamicon® (BH4HC)

W/HC, W* Stainless steel wire mesh

Size of filter or element _____

FMND: 40, 60, 63, 100, 110, 140, 160, 250, 400

Operating pressure _____

L = 210 bar (FMND 160 to 400)

M = 250 bar (FMND 40 to 140)

Type of change-over _____

D single switching valve and check valve

Type and size of port _____

to DIN 24550 (●), possible ports (X)

Type	Port	Filter size								
		... not to DIN 24550			... to DIN 24550					
		60	110	140	40	63	100	160	250	400
B	G 1/2	X	X	X	●	X	X			
C	G 3/4	X	X	X	X	●	X			
D	G 1	X	X	X	X	X	●			
E	G 1 1/4							●	X	X
F	G 1 1/2							X	●	X
I	DN 25*	X	X	X	X	X	X			
K	DN 38*							X	X	●

*Flange SAE, 3000 PSI

Filtration rating in µm _____

BN/HC, BH/HC: 3, 5, 10, 20 BN/HC, BH/HC to DIN 24550: 3, 6, 10, 25

W/HC, W*: 25, 50, 100, 200

Type of clogging indicator _____

Y plastic blanking plug in indicator port

A steel blanking plug in indicator port

B visual

C electrical

D visual and electrical

LZ visual-mechanical / electrical

for other clogging indicators, see brochure no. 7.050.../..

Type code _____

1

Modification number _____

X the latest version is always supplied

Supplementary details _____

B. bypass cracking pressure (e.g. B3.5 = 3.5 bar; B7 = 7 bar); without details = without bypass valve

L... light with appropriate voltage (24V, 48V, 110V, 220V)

LED 2 light emitting diodes up to 24 Volt

AV LZ indicator with plug to AUDI and VW specification

BO LZ indicator with plug and pin connections to BMW and Opel specification (M12x1)

CN LZ indicator with plug to DIN 43651 with 3 LEDs (CNOMO specification)

DB LZ indicator with plug to DIN 43651 with 3 LEDs (Daimler-Benz specification)

D4C LZ with plug and connector to Daimler-Chrysler specification and cold start suppression 30 °C

BO-LED as for BO, but with diode strip

RL reverse flow direction

SO184 oil drain plug (FMND 40 to 140)

V FPM seals

W suitable for HFA and HFC emulsions

2.2 REPLACEMENT ELEMENT

0250 DN 010 BN4HC /-V

Size _____

0040, 0060, 0063, 0100, 0110, 0140, 0160, 0250, 0400

Type _____

D 0060, 0110, 0140

DN to DIN 24550: 0040, 0063, 0100, 0160, 0250, 0400

Filtration rating in µm _____

BN4HC, BH4HC: 003, 005, 010, 020

BN4HC, BH4HC to DIN 24550: 003, 006, 010, 025

W/HC, W*: 025, 050, 100, 200

Filter material _____

BN4HC, BH4HC, W/HC, W*

Supplementary details _____

V, W (for descriptions, see point 2.1)

2.3 REPLACEMENT CLOGGING INDICATOR

VM 5 D . X /-L24

Type of indicator _____

VM differential pressure indicator up to 210 bar operating pressure

VD differential pressure indicator 420 bar operating pressure

Pressure setting _____

5 standard 5 bar, others on request

Type of clogging indicator (see point 2.1) _____

Modification number _____

X the latest version is always supplied

Supplementary details _____

L..., LED, V, W, AV, BO, CN, DB, D4C, BO-LED (for descriptions see Point 2.1)

* only for FMND 40 - 140

3. FILTER CALCULATION / SIZING

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

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

$$\Delta p_{\text{housing}} = (\text{see Point 3.1})$$

$$\Delta p_{\text{element}} = Q \cdot \frac{SK^*}{1000} \cdot \frac{\text{viscosity}}{30}$$

(*see Point 3.2)

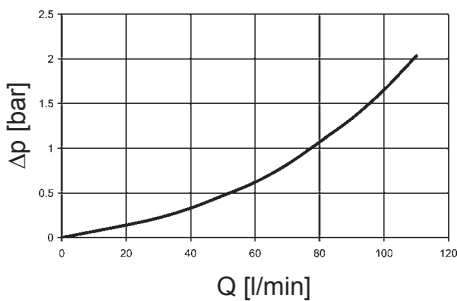
For ease of calculation, our Filter Sizing Program is available on request free of charge.

NEW: Sizing online at www.hydac.com

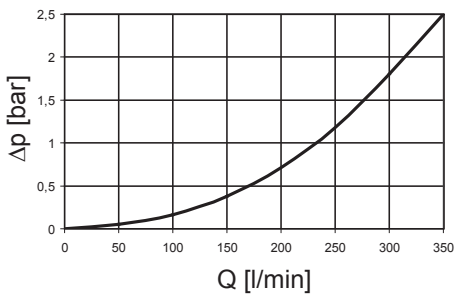
3.1 Δp -Q HOUSING CURVES BASED ON ISO 3968

The housing curves apply to mineral oil with a density of 0.86 kg/dm³ and a kinematic viscosity of 30 mm²/s. In this case, the differential pressure changes proportionally to the density.

FMND 40, 60, 63, 100, 110, 140



FMND 160, 250, 400

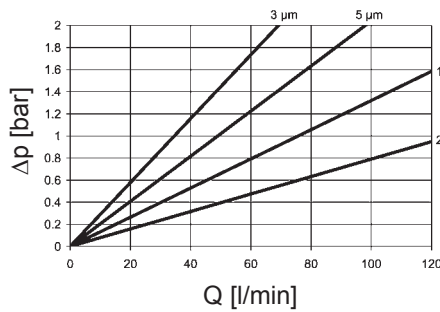


3.2 GRADIENT COEFFICIENTS (SK) FOR FILTER ELEMENTS

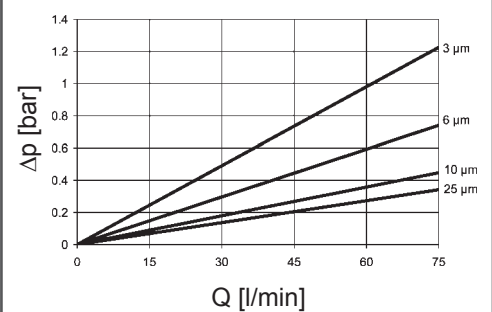
The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm²/s. The pressure drop changes proportionally to the change in viscosity.

FMND	... D ... BH4HC				W/HC - W	... DN ... BH4HC			
	3 μm	5 μm	10 μm	20 μm		3 μm	6 μm	10 μm	25 μm
60	58.6	32.6	18.1	12.2	0.757	-	-	-	-
110	25.4	14.9	8.9	5.6	0.413	-	-	-	-
140	19.9	11.3	8.1	4.3	0.324	-	-	-	-
40	-	-	-	-	0.966	40.4	24.8	16.4	10.9
63	-	-	-	-	0.54	29.0	18.2	11.7	7.6
100	-	-	-	-	0.325	19.0	11.7	7.7	5.3
160	-	-	-	-	0.168	8.0	5.1	3.8	2.5
250	-	-	-	-	0.101	5.4	3.4	2.8	1.9
400	-	-	-	-	0.068	3.4	2.1	1.7	1.1

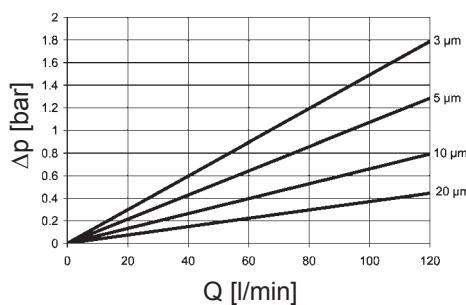
BN4HC: FMND 60



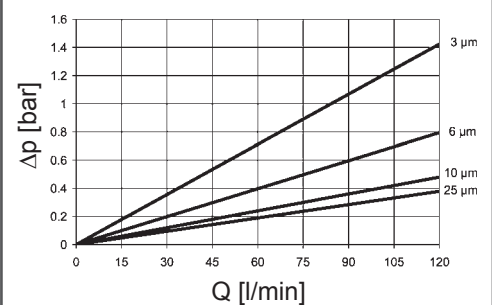
BN4HC: FMND 63



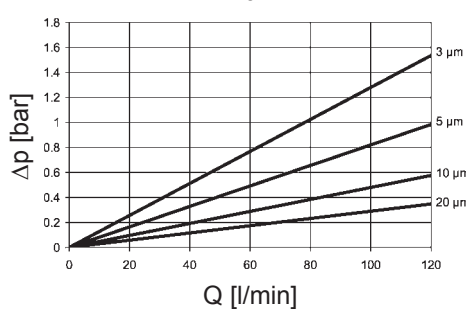
BN4HC: FMND 110



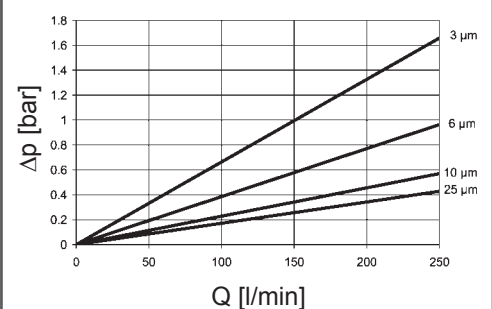
BN4HC: FMND 100



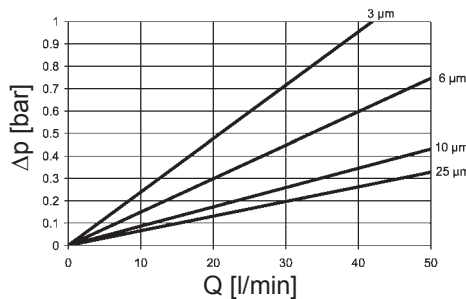
BN4HC: FMND 140



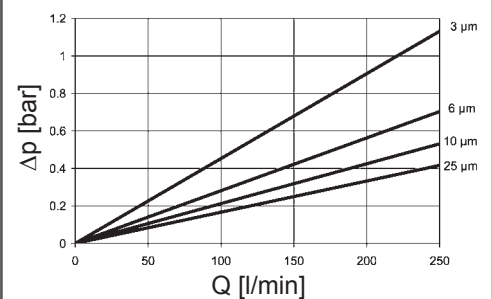
BN4HC: FMND 160



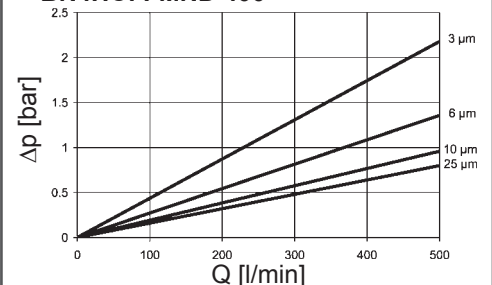
BN4HC: FMND 40



BN4HC: FMND 250

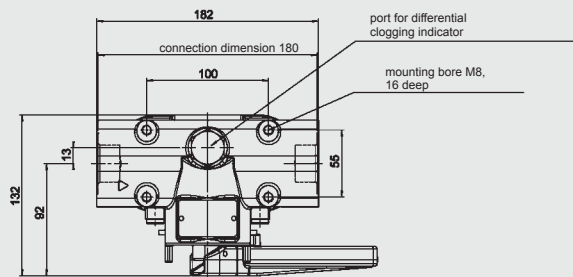
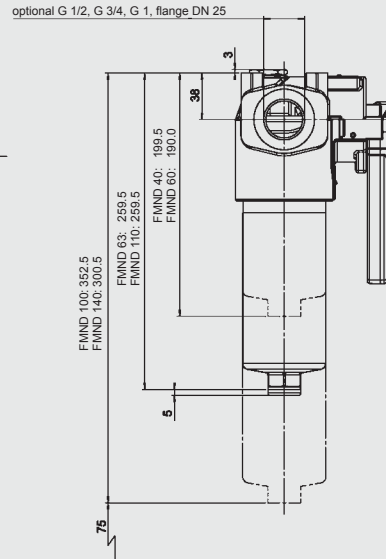
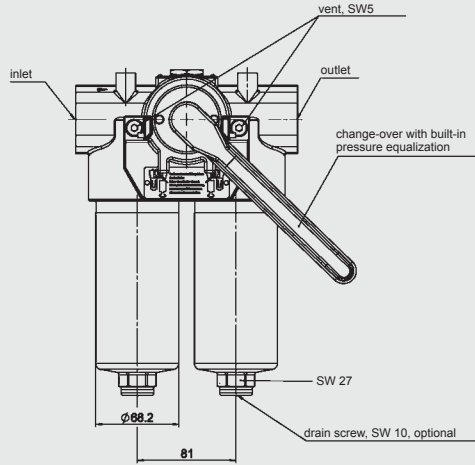


BN4HC: FMND 400

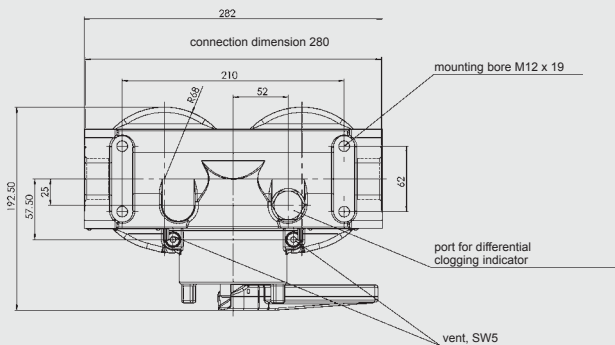
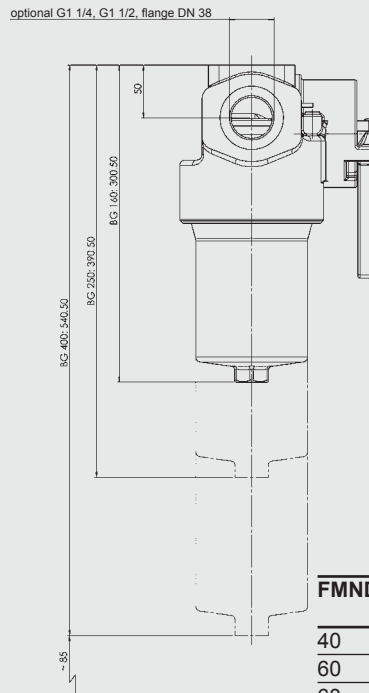
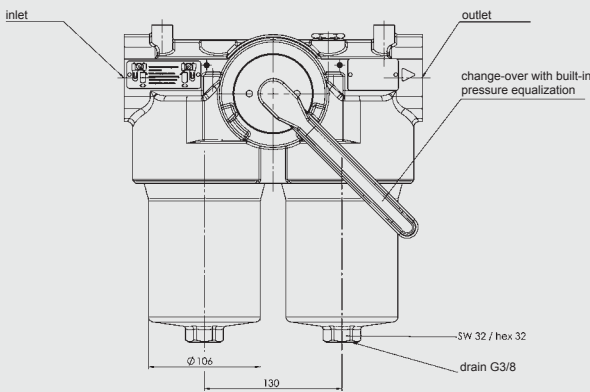


4. DIMENSIONS

FMND 40 - 140



FMND 160 - 400



FMND	Weight incl. element [kg]	Vol. of pressure chamber [l]
40	9.2	2x 0.22
60	9.2	2x 0.20
63	10.5	2x 0.33
100	11.5	2x 0.50
110	10.8	2x 0.33
140	12.0	2x 0.40
160	23.9	2x 1.10
250	27.1	2x 1.70
400	32.2	2x 2.70

NOTE

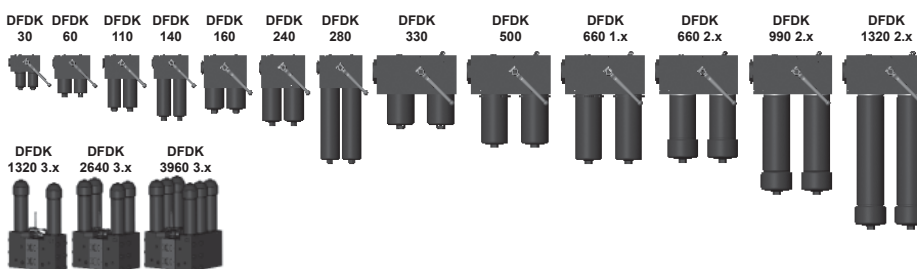
The information in this brochure relates to the operating conditions and applications described.
For applications and operating conditions not described, please contact the relevant technical department.
Subject to technical modifications.

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D-66280 Sulzbach/Saar, Germany
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Fax: 0 68 97 / 509-300
Internet: www.hydac.com
E-mail: filter@hydac.com



Change-Over Pressure Filter DFDK

up to 2500 l/min, up to 315 bar



1. TECHNICAL SPECIFICATIONS

1.1 FILTER HOUSING Construction

The filter housings are designed in accordance with international regulations. They consist of a filter head with screw-in filter bowls.

Standard equipment:

- ball change-over valve
- two-piece filter bowl for DFDK 990, 1320 (as an option for DFDK 660)
- connection for a clogging indicator
- drain screw with pressure relief
- pressure equalization line (for size DFDK 330 and above)

1.2 FILTER ELEMENTS

HYDAC filter elements are validated and their quality is constantly monitored according to the following standards:

- ISO 2941, ISO 2942, ISO 2943, ISO 3724, ISO 3968, ISO 11170, ISO 16889

Contamination retention capacities in g

DFDK	Elements per side	Betamicon® (BN4HC)			
		3 µm	5 µm	10 µm	20 µm
30	1x0030 D	4.6	5.1	5.4	5.6
60	1x0060 D	6.5	7.3	7.8	8.0
110	1x0110 D	13.8	15.5	16.4	16.9
140	1x0140 D	18.1	20.3	21.5	22.2
160	1x0160 D	19.8	22.2	23.5	24.3
240	1x0240 D	32.3	36.3	38.4	39.6
280	1x0280 D	70.6	79.3	83.9	86.6
330	1x0330 D	47.2	53.1	56.1	57.9
500	1x0500 D	76.9	86.5	91.5	94.4
660	1x0660 D	102.2	114.9	121.5	125.4
990	1x0990 D	154.5	173.7	183.7	189.5
1320	1x1320 D	209.9	236.0	249.6	257.5
1320.3.X	1x1320 D	209.9	236.0	249.6	257.5
2640.3.X	2x1320 D	419.8	472.0	499.2	515.0
3960.3.X	3x1320 D	629.7	708.0	748.8	772.5

DFDK	Elements per side	Betamicon® (BH4HC)			
		3 µm	5 µm	10 µm	20 µm
30	1x0030 D	3.0	2.9	3.2	3.7
60	1x0060 D	4.6	4.5	5.0	5.7
110	1x0110 D	10.1	9.9	10.9	12.4
140	1x0140 D	13.3	13.0	14.3	16.3
160	1x0160 D	12.9	12.6	13.9	15.9
240	1x0240 D	21.6	21.1	23.2	26.5
280	1x0280 D	48.1	47.1	51.8	59.1
330	1x0330 D	34.6	33.9	37.2	42.5
500	1x0500 D	57.5	56.3	61.8	70.5
660	1x0660 D	76.8	75.2	82.6	94.3
990	1x0990 D	111.8	109.4	120.2	137.2
1320	1x1320 D	153.8	150.7	165.5	188.8
1320.3.X	1x1320 D	153.8	150.7	165.5	188.8
2640.3.X	2x1320 D	307.6	301.4	331.0	377.6
3960.3.X	3x1320 D	461.4	452.1	496.5	566.4

1.3 FILTER SPECIFICATIONS

Nominal pressure	160 bar (DFDK with type code 3.X) 315 bar (DFDK with type code 1.X and 2.X)
Fatigue strength	At nominal pressure 10 ⁶ cycles from 0 to nominal pressure
Temperature range	-10 °C to +100 °C (-30 °C to -10 °C: p _{max} = 157.5 bar)
Material of filter head	EN-GJS-400-15
Material of filter bowl	Steel
Type of clogging indicator	VD (differential pressure measurement up to 420 bar operating pressure)
Pressure setting of the clogging indicator	8 bar (others on request)

Filter elements are available with the following pressure stability values:

Betamicon® (BN4HC):	20 bar
Betamicon® (BH4HC):	210 bar
Wire mesh (W/HC,W):	20 bar
Stainless steel fibre (V):	210 bar

1.4 SEALS

NBR (= Perbunan)

1.5 INSTALLATION

As inline filter

1.6 SPECIAL MODELS AND ACCESSORIES

Pressure equalization line
DFDK 160 - 280

1.7 SPARE PARTS

See Original Spare Parts List

1.8 CERTIFICATES AND APPROVALS

On request

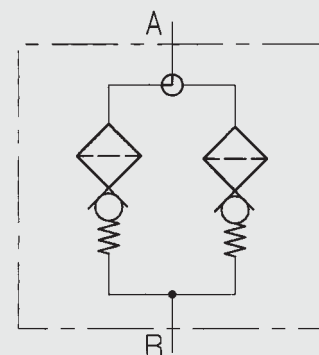
1.9 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

- Hydraulic oils H to HLPD DIN 51524
- Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743
- Compressor oils DIN 51506
- Biodegradable operating fluids VDMA 24568 HETG, HEES, HEPG
- Fire-resistant fluids HFA, HFB, HFC and HFD
- Operating fluids with high water content (>50% water content) and CLP-oil on request

1.10 IMPORTANT INFORMATION

- Filter housings must be earthed.
- When using electrical clogging indicators, the electrical power supply to the system must be switched off before removing the clogging indicator connector.

Symbol for hydraulic systems



2. MODEL CODE (also order example)

DFDK BN/HC 160 Q A F 10 D 1 . X /-L24

2.1 COMPLETE FILTER

Filter type _____

DFDK

Filter material of element _____

BN/HC Betamicon® (BN4HC) V Stainless steel fibre
 BH/HC Betamicon® (BH4HC) W/HC, W Wire mesh

Size of filter or element _____

DFDK: 30, 60, 110, 140, 160, 240, 280, 330, 500, 660, 990, 1320, 2640, 3960

Operating pressure _____

Q = 315 bar
 K = 160 bar (only for DFDK 1320, 2640, 3960...3.x)

Type of change-over _____

A Ball

Type and size of connection _____

Type	Connection type	Filter size													
		30	60	110	140	160	240	280	330	500	660	990	1320	1320/2640/3960...3.x	
B	G 1/2	•													
C	G 3/4		•	•	•										
F	G1 1/2					•	•	•							
L	SAE DN 50*								•	•	•	•	•		
M	SAE DN 65													•	

*DIN ISO 228 (6000 PSI)

Filtration rating in µm _____

BN/HC, BH/HC, V: 3, 5, 10, 20
 W/HC, W: 25, 50, 100, 200

Type of clogging indicator _____

Y plastic blanking plug in indicator port
 A steel blanking plug in indicator port
 B visual
 C electrical
 D visual and electrical

for other clogging indicators, see brochure no. 7.050.../..

Type code _____

1 model with one-piece filter bowls
 2 model with two-piece filter bowls (only for DFDK 660 to 1320)
 3 top-removable model (only DFDK 1320 to 3960)

Modification number _____

X the latest version is always supplied

Supplementary details _____

B. light with appropriate voltage (24, 48, 110, 220 Volt)
 LED 2 light-emitting diodes up to 24 Volt
 V FPM seals
 W suitable for HFA and HFC emulsions

only for clogging indicators type "D"

2.2 REPLACEMENT ELEMENT

0160 D 010 BN4HC /-V

Size _____

0030, 0060, 0110, 0140, 0160, 0240, 0280, 0330, 0500, 0660, 0990, 1320

Type _____

D

Filtration rating in µm _____

BN4HC, BH4HC, V: 003, 005, 010, 020
 W/HC, W: 025, 050, 100, 200

Filter material _____

BN4HC, BH4HC, V, W/HC, W

Supplementary details _____

V, W (for descriptions, see Point 2.1)

2.3 REPLACEMENT CLOGGING INDICATOR

VD 8 D . X /-L24

Type _____

VD Differential pressure indicator up to 420 bar operating pressure

Pressure setting _____

8 standard 8 bar, others on request

Type of clogging indicator _____

D (see Point 2.1)

Modification number _____

X the latest version is always supplied

Supplementary details _____

L..., LED, V, W (for descriptions, see Point 2.1)

3. FILTER CALCULATION / SIZING

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

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

$$\Delta p_{\text{housing}} = (\text{see Point 3.1})$$

$$\Delta p_{\text{element}} = Q \cdot \frac{SK^*}{1000} \cdot \frac{\text{viscosity}}{30}$$

(*see point 3.2)

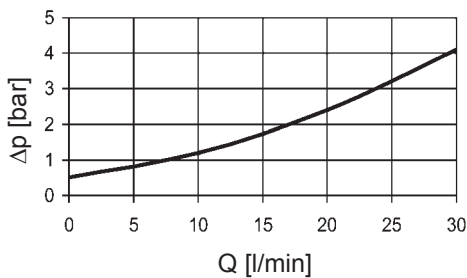
For ease of calculation, our Filter Sizing Program is available on request free of charge.

NEW: Sizing online at www.hydac.com

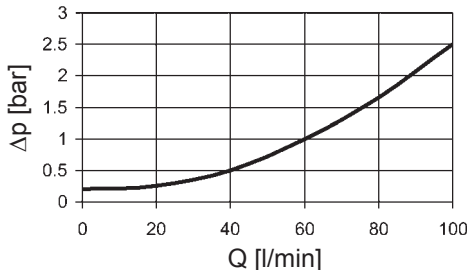
3.1 Δp -Q HOUSING CURVES BASED ON ISO 3968

The housing curves apply to mineral oil with a density of 0.86 kg/dm³ and a kinematic viscosity of 30 mm²/s. In this case, the differential pressure changes proportionally to the density.

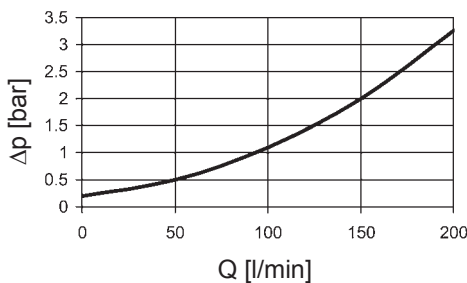
DFDK 30 ... 1.x



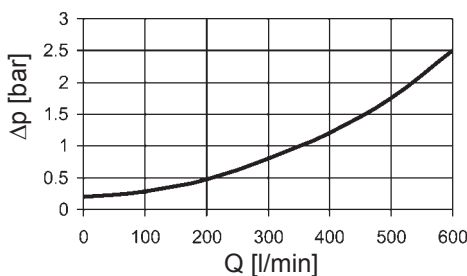
DFDK 60, 110, 140 ... 1.x



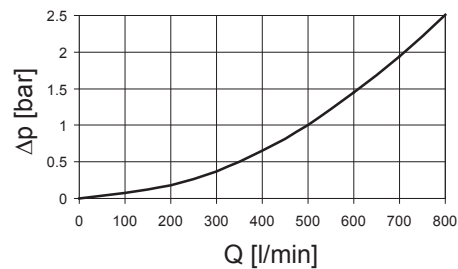
DFDK 160, 240, 280 ... 1.x



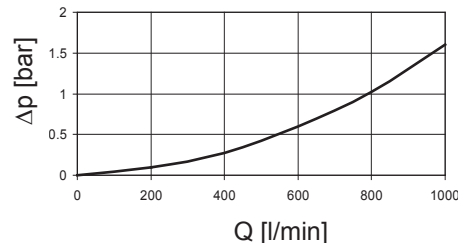
DFDK 330, 500, 660 ... 1.x
DFDK 660, 990, 1320 ... 2.x



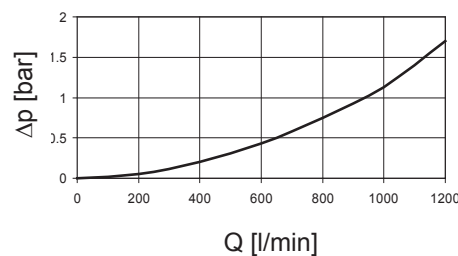
DFDK 1320 ... 3.x



DFDK 2640 ... 3.x



DFDK 3960 ... 3.x

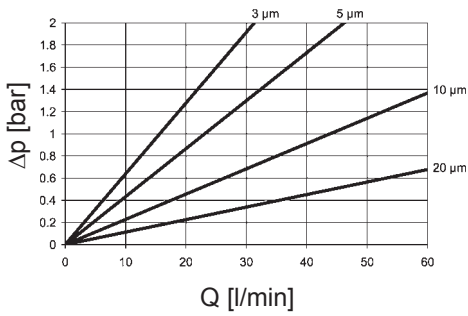


3.2 GRADIENT COEFFICIENTS (SK) FOR FILTER ELEMENTS

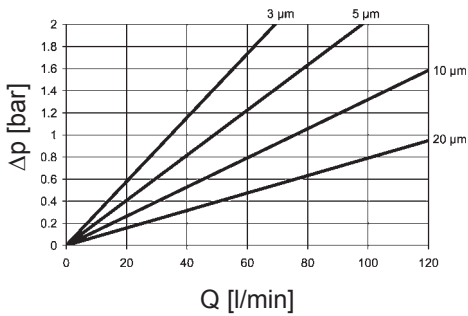
The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm²/s. The pressure drop changes proportionally to the change in viscosity.

DFDK	V				W/HC, W	BH4HC			
	3 μm	5 μm	10 μm	20 μm		3 μm	5 μm	10 μm	20 μm
30	18.4	13.5	7.5	3.6	3.030	91.2	50.7	36.3	19.0
60	16.0	9.3	5.4	3.3	0.757	58.6	32.6	18.1	12.2
110	8.2	5.6	3.3	2.2	0.413	25.4	14.9	8.9	5.6
140	5.8	4.8	3.1	2.3	0.324	19.9	11.3	8.1	4.3
160	4.6	3.2	2.3	1.4	0.284	16.8	10.4	5.9	4.4
240	3.1	2.5	1.7	1.1	0.189	10.6	6.8	3.9	2.9
280	2.3	1.7	1.2	0.8	0.162	5.7	3.4	1.8	1.6
330	2.2	1.8	1.2	0.8	0.138	7.7	4.5	2.8	2.0
500	1.5	1.2	0.8	0.5	0.091	4.2	2.6	1.5	1.2
660	1.1	0.9	0.6	0.4	0.069	3.3	1.9	1.0	0.9
990	0.8	0.6	0.4	0.3	0.046	2.2	1.3	0.8	0.6
1320	0.6	0.5	0.3	0.2	0.035	1.6	1.0	0.6	0.4

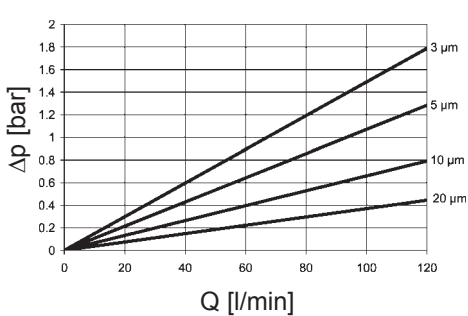
BN4HC: DFDK... 30



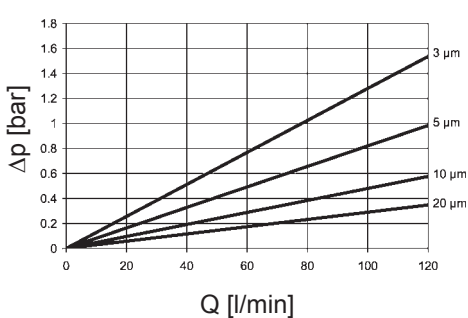
BN4HC: DFDK... 60



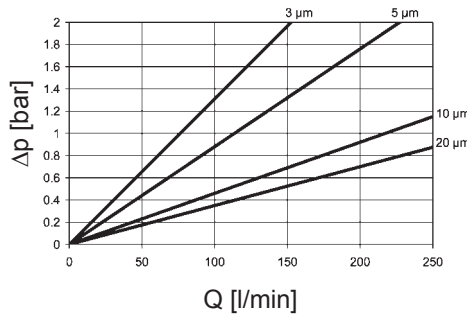
BN4HC: DFDK... 110



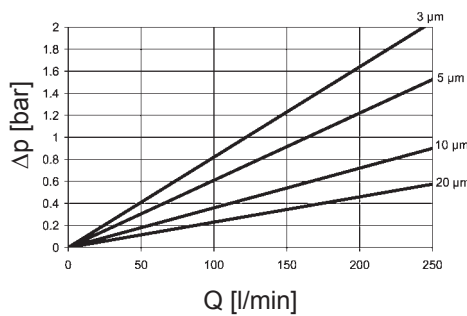
BN4HC: DFDK... 140



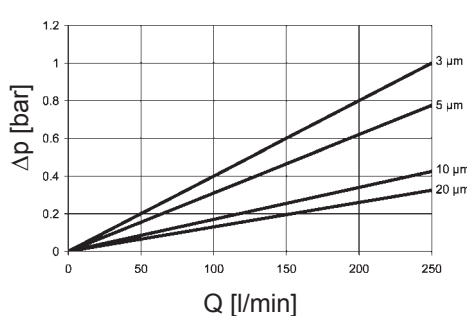
BN4HC: DFDK... 160



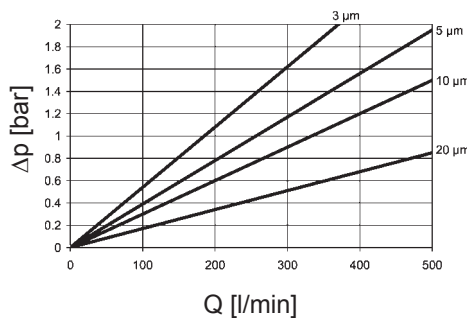
BN4HC: DFDK... 240



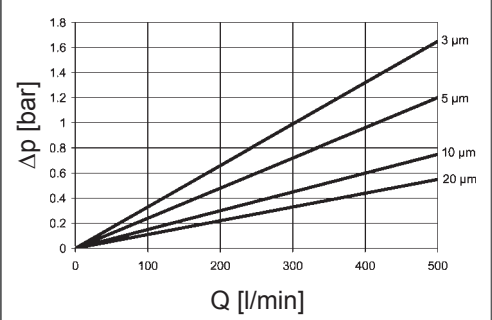
BN4HC: DFDK... 280



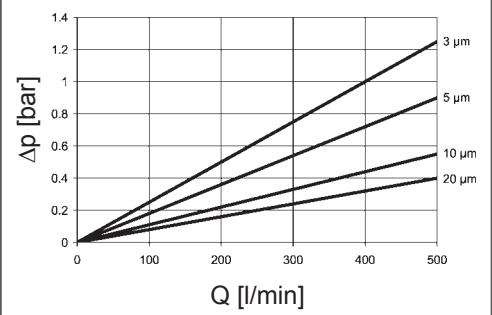
BN4HC: DFDK... 330



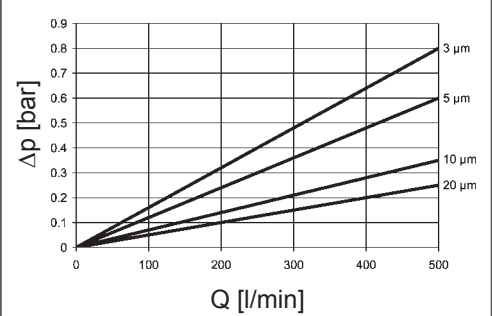
BN4HC: DFDK... 500



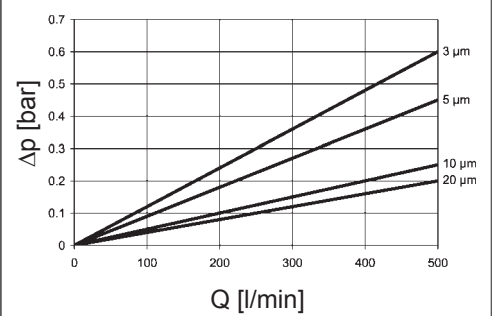
BN4HC: DFDK... 660



BN4HC: DFDK... 990

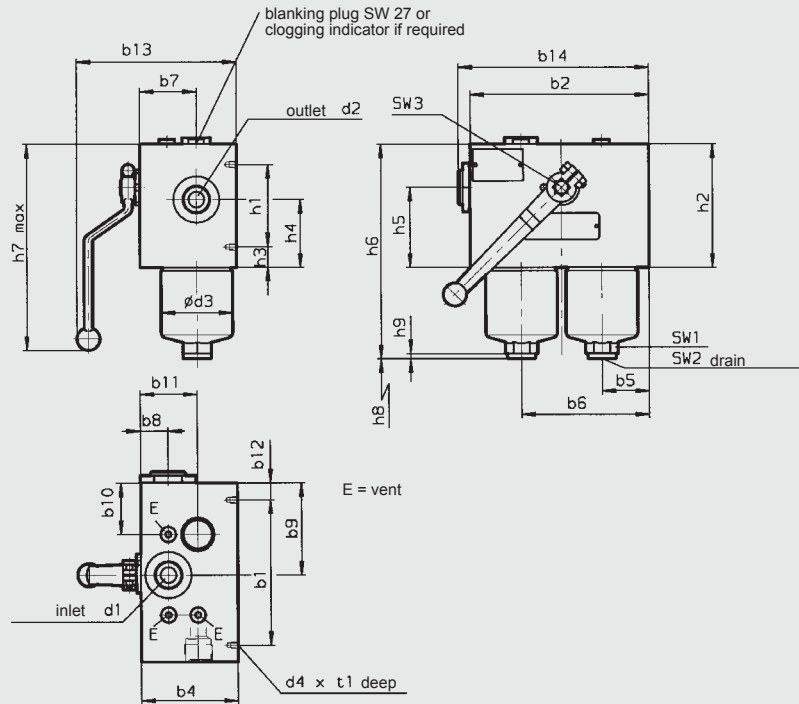


BN4HC: DFDK... 1320



4. DIMENSIONS

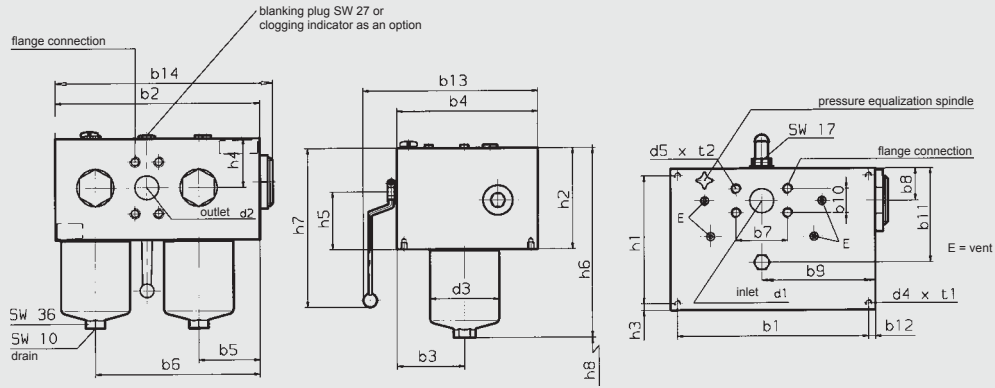
DFDK 30 - 280



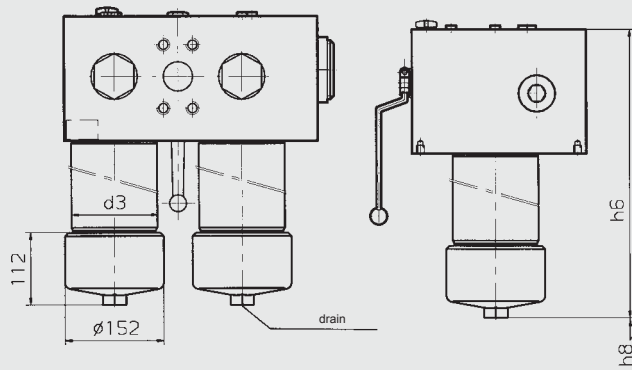
* SAE connection 6000 psi

DFDK	30	60	110	140	160	240	280
b1	130	138	138	138	190	190	190
b2	145	170	170	170	210	210	210
b4	80	92	92	92	128	128	128
b5	35	45	45	45	52.5	52.5	52.5
b6	96	121.5	121.5	121.5	157.5	157.5	157.5
b7	47	54	54	54	75.5	75.5	75.5
b8	22,8	26	26	26	35.5	35.5	35.5
b9	80,9	87	87	87	105	105	105
b10	80,9	48,5	48,5	48,5	52,5	52,5	52,5
b11	59	54	54	54	75,5	75,5	75,5
b12	7,5	16	16	16	10	10	10
b13 (≈)	131	150	150	150	193	193	193
b14 (≈)	155	181	181	181	221	221	221
d1*	G ½	G ¾	G ¾	G ¾	G 1½	G 1½	G 1½
d2*	G ½	G ¾	G ¾	G ¾	G 1½	G 1½	G 1½
d3	52,2	68,2	68,2	68,2	95,2	95,2	95,2
d4	M6	M6	M6	M6	M10	M10	M10
h1	64	78	78	78	96	96	96
h2	80	117	117	117	162	162	162
h3	8	19,5	19,5	19,5	33	33	33
h4	47	64,5	64,5	64,5	106	106	106
h5	43	76	76	76	100	100	100
h6	171	204,5	272,0	315,5	282,5	342,5	524,5
h7 (≈)	180	205	205	205	245	245	245
h8	75	75	75	75	85	85	85
h9	5	5	5	5	5	5	5
t1	7	7	7	7	11	11	11
SW1	24	27	27	27	32	32	32
SW2	6	10	10	10	10	10	10
SW3	9	12	12	12	14	14	14
Weight incl. element [kg]	7,4	15,0	17,0	18,9	33,0	36,0	45,0
Volume of pressure chamber [l]	2x0,13	2x0,20	2x0,33	2x0,40	2x0,60	2x0,80	2x1,60

DFDK 330 - 660..1.x



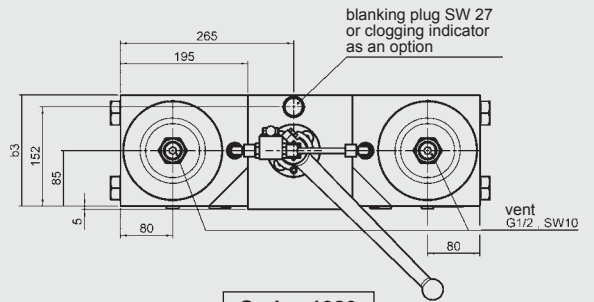
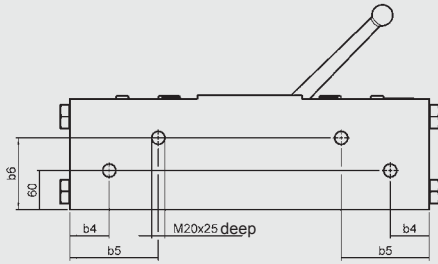
DFDK 660 - 1320..2.x



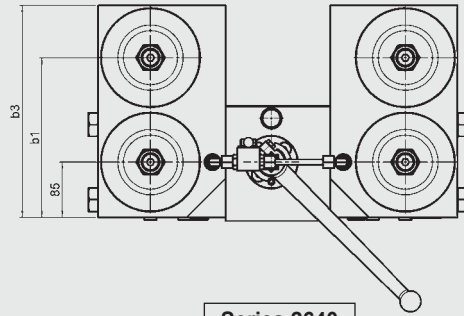
* SAE connection 6000 psi

DFDK	330	500	660 1.x	660 2.x	990	1320
b1	359	359	359	359	359	359
b2	385	385	385	385	385	385
b3	127	127	127	127	127	127
b4	265	265	265	265	265	265
b5	115	115	115	115	115	115
b6	309	309	309	309	309	309
b7	96.8	96.8	96.8	96.8	96.8	96.8
b8	60.5	60.5	60.5	60.5	60.5	60.5
b9	212	212	212	212	212	212
b10	44.5	44.5	44.5	44.5	44.5	44.5
b11	175.5	175.5	175.5	175.5	175.5	175.5
b12	13	13	13	13	13	13
b13 (≈)	326	326	326	326	326	326
b14 (≈)	405	405	405	405	405	405
d1*	DN 50 (2")	DN 50 (2")	DN 50 (2")	DN 50 (2")	DN 50 (2")	DN 50 (2")
d2*	DN 50 (2")	DN 50 (2")	DN 50 (2")	DN 50 (2")	DN 50 (2")	DN 50 (2")
d3	130.2	130.2	130.2	130	130	130
d4	M12	M12	M12	M12	M12	M12
d5	M20	M20	M20	M20	M20	M20
h1	239	239	239	239	239	239
h2	190	190	190	190	190	190
h3	13	13	13	13	13	13
h4	98	98	98	98	98	98
h5	108	108	108	108	108	108
h6	357.5	450.5	527.0	521.5	677.5	843.5
h7 (≈)	309	309	309	309	309	309
h8	95	95	95	95	500	670
t1	13	13	13	13	13	13
t2	27	27	27	27	27	27
Weight incl. element [kg]	151.5	159.0	165.0	171.0	184.4	202.4
Volume of pressure chamber [l]	2x1.50	2x2.20	2x3.00	2x3.00	2x4.50	2x6.00

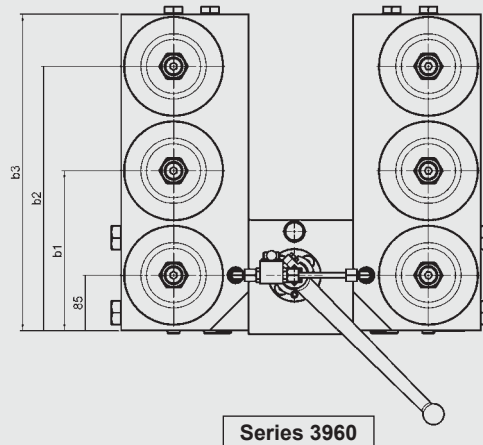
DFDK top-removable models 1320, 2640, 3960 ... 3.x



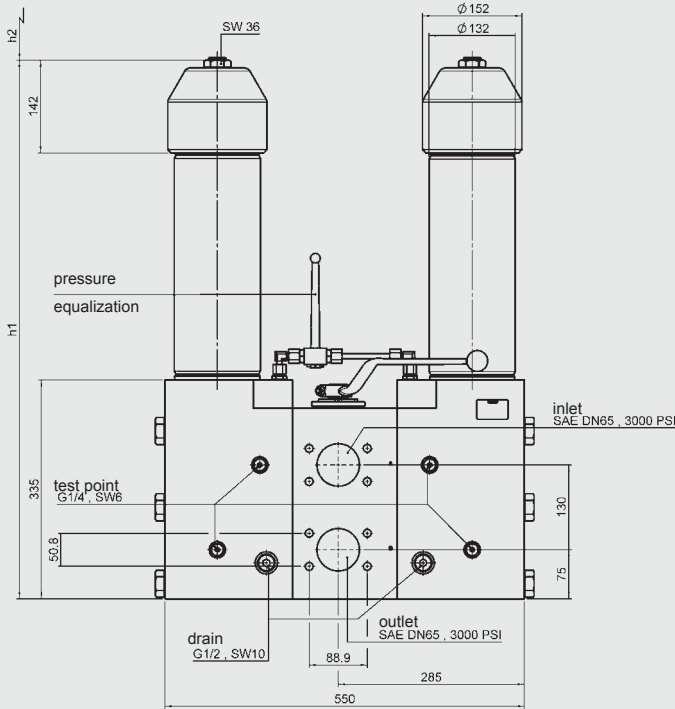
Series 1320



Series 2640



Series 3960



DFDK	1320 ... 3.x	2640 ... 3.x	3960 ... 3.x
b1	-	245	245
b2	-	-	405
b3	170	325	485
b4	60	135	135
b5	135	135	135
b6	110	265	425
h1	991	991	991
h2	570	570	570
Weight incl. element [kg]	approx. 250	approx. 445	approx. 640
Vol. of pressure chamber [l]	2 x 7.00	2 x 14.00	2 x 20.00

