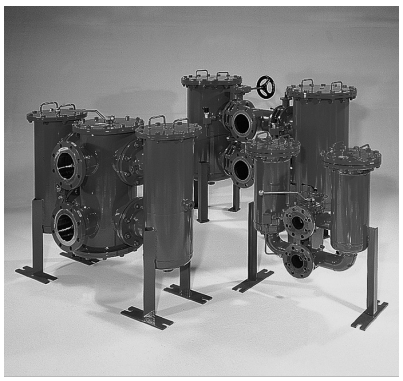
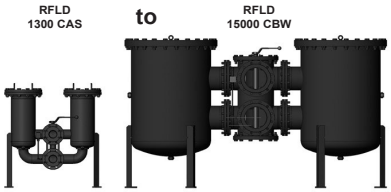
HYDAC INTERNATIONAL



Change-Over Inline Filter RFLD Welded 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
- 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 **Number of filter elements**

RFLD Elements per side	130x 1x1300 R 132x 1x2600 R 250x 3x0850 R 252x 3x1700 R 400x 5x0850 R 402x 5x1700 R 520x 4x1300 R 522x 4x2600 R 650x 5x1300 R 652x 5x2600 R 780x 6x1300 R 782x 6x2600 R 1500x 10x1300 R 1502x 10x2600 R Filter elements are available with the following pressure stability values: Optimicron® (ON): 20 bar Optimicron® Power (ON/PO): 10 bar Paper (P/HC): 10 bar Stainl. st. wire mesh (W/HC): 20 bar Stainless steel fibre (V): 30 bar Betamicron®/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 housing and cover plate	Welded steel: final digit of filter size 5 Stainl. steel 1.4571: final digit of filter size 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

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.*

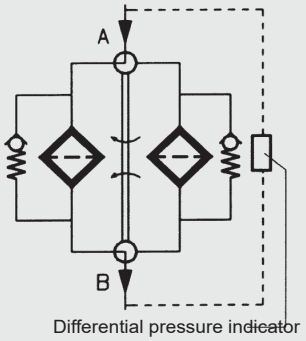
1.9 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

- 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 oils 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



Differential pressure indicator

E 7.110.6/11.16

2. MODEL CODE (also order example)

RFLD ON/PO 1300 C A K 10 D 1 . X /-L24

2.1 COMPLETE FILTER

Filter type RFLD **Filter material** ON Optimicron® P/HC Paper AM Aquamicron® ON/PO Optimicron® Power W/HC Stainl. st. wire mesh BN/AM Betamicron®/Aquamicron® V Stainless steel fibre **Size of filter or element** Welded steel: 1300, 1320, 2500, 2520, 4000, 4020, 5200, 5220, 6500, 6520, 7800, 7820, 15000, 15020 Stainl. st. 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 One-part, 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 E Two-part, ball Nominal bore DN 200 **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	1320	2500	4000	5200	6500	7800	15000	1303	1323	2503	4003	5203	6503	7803	15003	2520	4020	5220	6520	7820	15020	2523	4023	5223	6523	7823	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		●	★	●	★	●	★	●	★	●	★	●	★	Other	V	DIN DN 150		●	★	●	★	●	★	●	★	nominal	W	DIN DN 200		●	★	●	★	●	★	●	★	bores on	X	DIN DN 250		●	★	●	★	●	★	Y	DIN DN 300	request	●	★

Filtration rating in µm ON: 1, 3, 5, 10, 15, 20 P/HC: 10, 20 AM: 40 ON/PO *, V: 3, 5, 10, 20 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 for other clogging indicators, see brochure no. 7.050../..

C electrical D visual and electrical

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 type "D" OR O-ring groove on the DIN flange (inlet, outlet) to Rexroth standard AB22-04 1 only for clogging indicators
RE sealing strip E on the flange (inlet, outlet): surface finish 3,6 µm - 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 ON/PO /-V

Size
0850, 1300, 1700, 2600

Type
R

Filtration rating in µm
ON: 001, 003, 005, 010, 015, 020 P/HC: 010, 020 AM: 040
ON/PO *, V: 003, 005, 010, 020 W/HC: 025, 050, 100, 200 BN4AM: 003, 010

Filter material
ON, ON/PO, 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

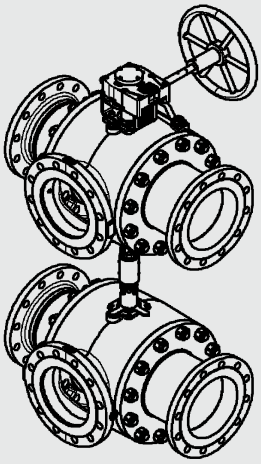
Type of clogging indicator (see Point 2.1)

Modification number
X the latest version is always supplied

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

* Optimicron® Power (ON/PO) not available in 3 µm!

2.4 TWO-PART BALL CHANGE-OVER VALVE KUA



Independently of RFLD filters, the valve can also be used separately as a connector piece for double plate heat exchangers as well as for double tube bundle coolers.

It consists of SG iron and is available with a DIN DN 200 flange and a pressure equalisation line with integrated ball valve (DN 15).

Can be installed in filters RFLD 4000, 4020, 5200, 5220, 6500, 6520, 7800, 15000 and 15020 welded of steel.

Preferred distance from ball centre to ball centre is 500 mm[1)].

Others on request!

When supplied, control spindle is disconnected!

Technical features

- Two-part change-over valve
- Ports: DIN DN 200 (other ports on request)
- Materials
  - SG iron EN GJS-400-15 to DIN EN 1563
- Full bore
- Supplied with cooler connecting flange

1) When used on, for example, a cooler, there is a joint between the two parts of the KUA. In this case, the min. centre-to-centre distance is 710.

MODEL CODE

KUA 01 C E W /-Axxxx

Filter type
KUA Ball change-over valve

Material 01
SG iron

Operating pressure
C 16 bar

Change-over valve
E Ball change-over

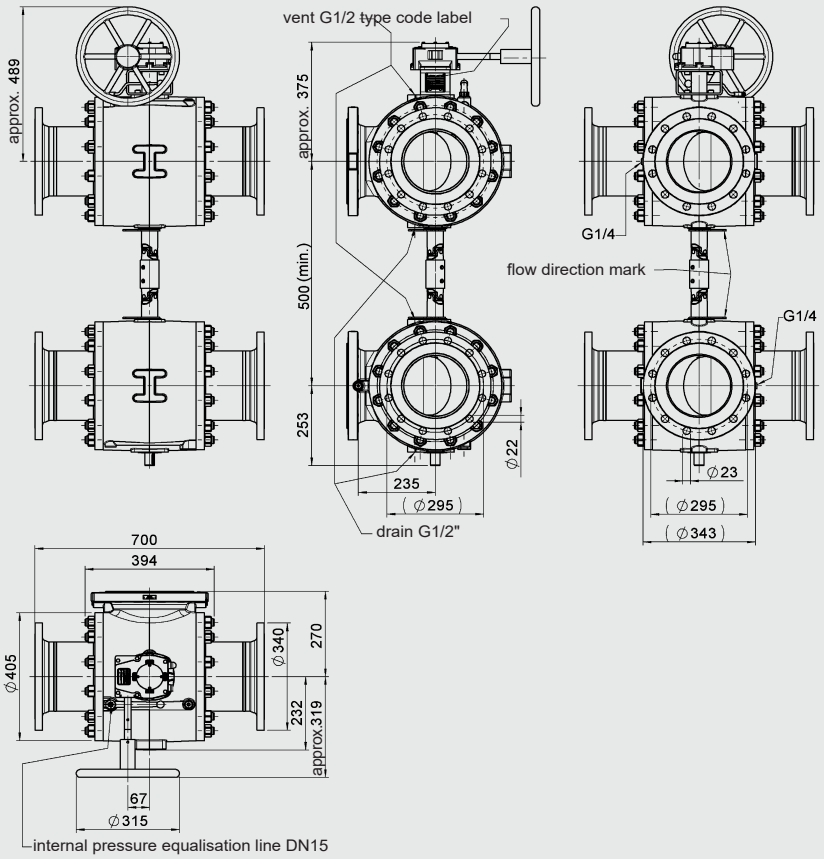
Type and size of connection

Type	Port	Material 01
W	DIN DN 200	●

Other nominal bores on request!

Supplementary details
Axxxx Distance from ball centre to ball centre (e.g. A500 = Preferred clearance 500 mm)

DIMENSIONS



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:

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

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

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

(*see point 3.2)

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

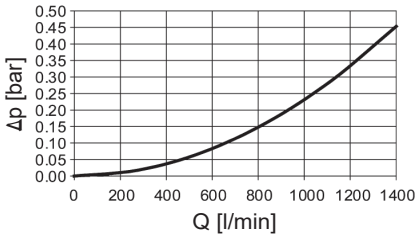
NEW: Sizing online at www.hydac.com

3.1 Δp-Q HOUSING CURVES BASED ON ISO 3968

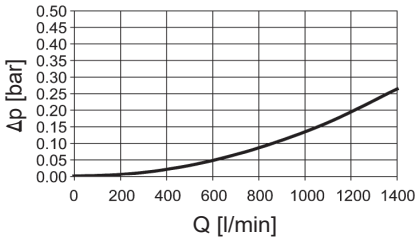
The housing curves apply to mineral oil with a density of 0.86 kg/dm³ and a kinematic viscosity of 30 mm²/s. In this case, the differential pressure changes proportionally to the density.

——— with change-over valve

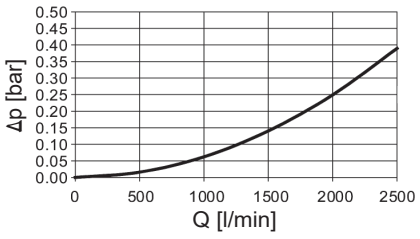
RFLD 1300, 1303



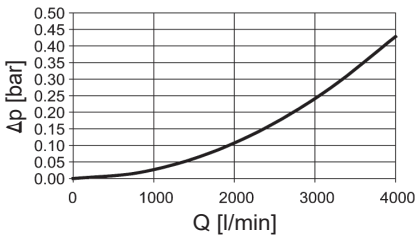
RFLD 1320, 1323



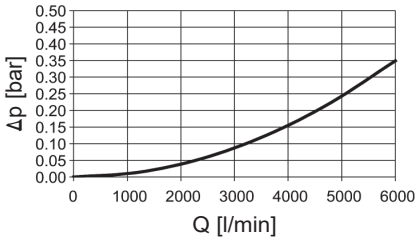
RFLD 2500, 2503, 2520, 2523



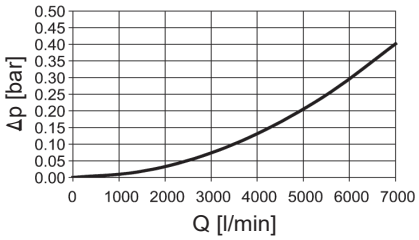
RFLD 4000, 4003, 4020, 4023



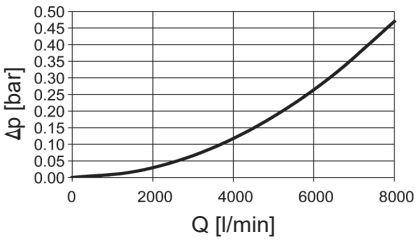
RFLD 5200, 5203, 5220, 5223



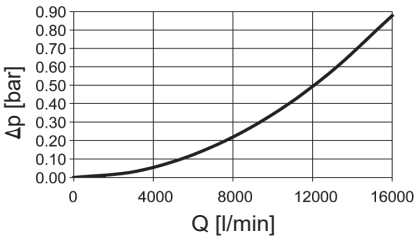
RFLD 6500, 6503, 6520, 6523



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 ON							ON/PO		
	1 µm	3 µm	5 µm	10 µm	15 µm	20 µm	5 µm	10 µm	20 µm
850	2.77	1.31	1.00	0.44	0.58		0.28	0.24	0.16
1300	1.72	0.32	0.22	0.59	0.35		0.18	0.15	0.10
1700	1.35	0.28	0.25	0.18	0.53		0.13	0.11	0.07
2600	0.84	0.36	0.29	0.18	0.16	0.11	0.08	0.07	0.05

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

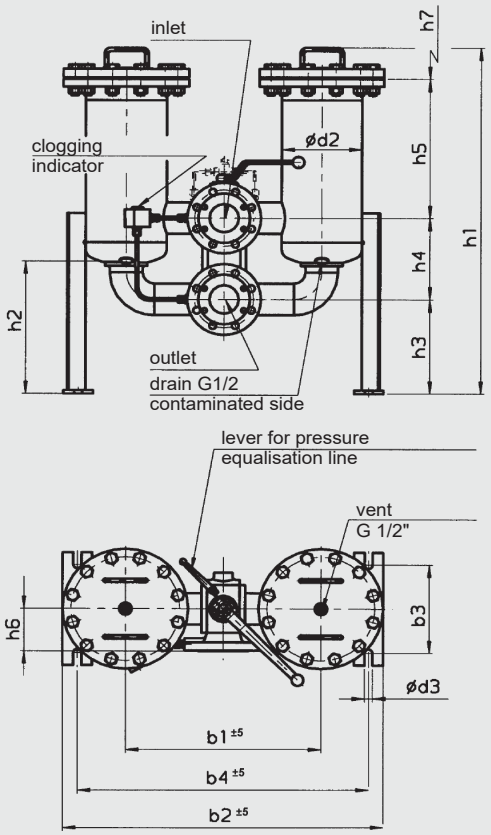
3.3 FILTER SPECIFICATIONS (TYPE OF CHANGE-OVER: A = BALL; B = SEGMENT; C = BUTTERFLY)

Filter type	Connection	Change-over	Volume of pressure chamber [l]	Weight [kg] including change-over valve and elements B (segment)A + E (ball) 105		C (butterfly)
1300, 1303	SAE DN 40 SAE DN 50 SAE DN 65 SAE/DIN DN 80 SAE/DIN DN 100	ball ball ball ball ball	2 x 22.0 2 x 22.0 2 x 22.0 2 x 19.0 2 x 19.0	 110 115 136 150		
1320, 1323	SAE DN 40 SAE DN 50 SAE DN 65 SAE/DIN DN 80 SAE/DIN DN 100 DIN DN 125	ball ball ball ball ball ball	2 x 37.0 2 x 37.0 2 x 37.0 2 x 34.0 2 x 34.0 2 x 45.0	138 143 148 169 183 209		
2500, 2503/ 2520, 2523	SAE DN 50 SAE DN 65 SAE/DIN DN 80 SAE/DIN DN 100 DIN DN 125 DIN DN 150	ball ball ball ball ball, ball, butterfly ball ball ball ball, butterfly ball, segment, butterfly ball ball ball ball, butterfly ball, segment, butterfly	2 x 34.0 / 2 x 54.0 2 x 34.0 / 2 x 54.0 2 x 37.0 / 2 x 57.0 2 x 39.0 / 2 x 59.0 2 x 40.0 / 2 x 60.0 2 x 45.0 / 2 x 65.0	144/174 149/179 170/200 184/214 208/238 262/292		 287/327
4000, 4003/ 4020, 4023	SAE/DIN DN 80 SAE/DIN DN 100 DIN DN 125 DIN DN 150 DIN DN 200	segment, butterfly ball ball ball, butterfly ball, segment, butterfly segment, butterfly ball ball ball, butterfly ball,	2 x 63.0 / 2 x 96.0 2 x 63.0 / 2 x 96.0 2 x 74.0 / 2 x 109.0 2 x 75.0 / 2 x 110.0 2 x 83.0 / 2 x 118.0	210/270 222/283 246/307 292/352 507/567	 262/504	 313/373 393/453
5200, 5203/ 5220, 5223	SAE/DIN DN 80 SAE/DIN DN 100 DIN DN 125 DIN DN 150 DIN DN 200 DIN DN 250	segment, butterfly segment, butterfly ball, segment, butterfly segment, butterfly butterfly	2 x 89.0 / 2 x 142.0 2 x 90.0 / 2 x 143.0 2 x 104.0 / 2 x 157.0 2 x 106.0 / 2 x 159.0 2 x 110.0 / 2 x 162.0 2 x 128.0 / 2 x 180.0	384/494 398/507 422/532 476/586 691/801	 646/756 890/1000	 503/614 596/706 956/1118
6500, 6503/ 6520, 6523	SAE/DIN DN 100 DIN DN 125 DIN DN 150 DIN DN 200 DIN DN 250		2 x 161.0 / 2 x 246.0 2 x 162.0 / 2 x 247.0 2 x 163.0 / 2 x 248.0 2 x 190.0 / 2 x 275.0 2 x 194.0 / 2 x 279.0	628/782 652/806 706/868 921/1083	 877/1039 1121/1282	 738/901 826/988 956/1118
7800, 7803/ 7820, 7823	SAE/DIN DN 100 DIN DN 125 DIN DN 150 DIN DN 200 DIN DN 250		2 x 161.0 / 2 x 246.0 2 x 162.0 / 2 x 247.0 2 x 163.0 / 2 x 248.0 2 x 190.0 / 2 x 275.0 2 x 194.0 / 2 x 279.0	636/798 660/822 714/884 929/1099	 885/1055 1129/1298	 746/917 834/1004 964/1134
15000, 15003/ 15020, 15023	DIN DN 200 DIN DN 250 DIN DN 300		2 x 391.0 / 2 x 558.0 2 x 397.0 / 2 x 564.0 2 x 433.0 / 2 x 600.0		1210/1380 1454/1623	1143/1250 1271/1379 1487/1547

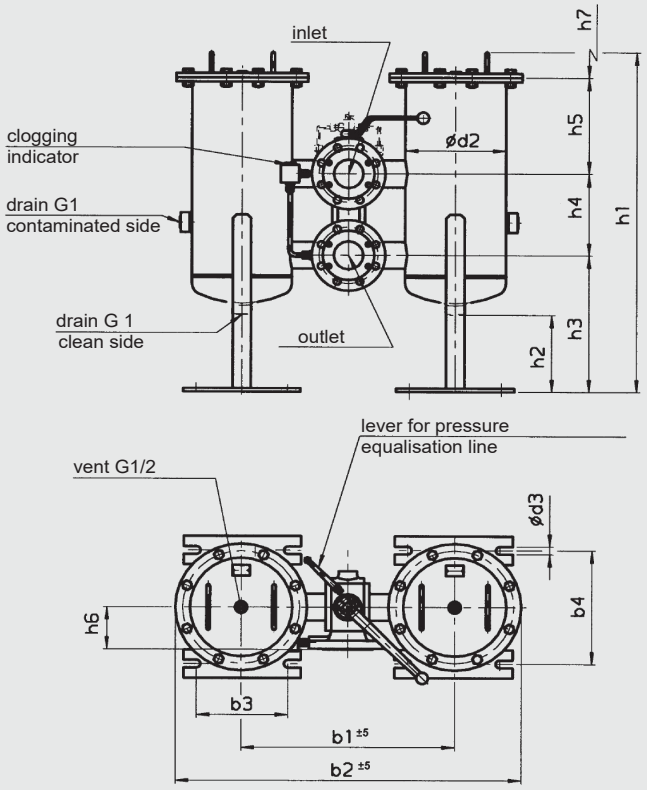
4. DIMENSIONS

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

RFLD 1300/1320



RFLD 2500/2520

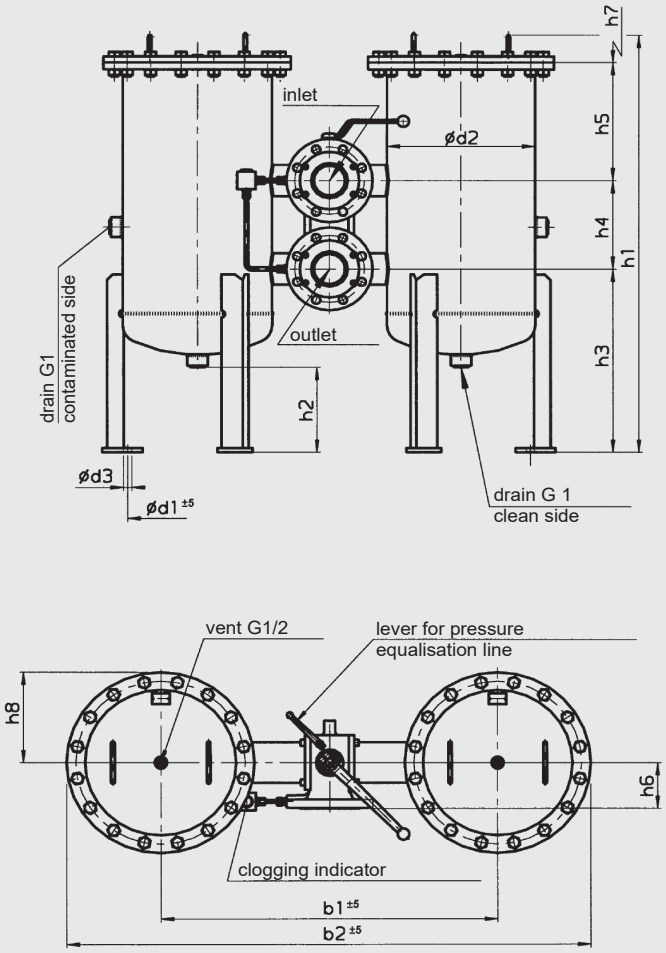


Dimensions in mm

Type	Flange connection 1)	b_1	b	b	b	d	2	3	4	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	970/1410	205	385	328	460/900	92	500/940
	SAE DN 50	506	846	250	766	220	22					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	370	260	23	970/1410	588	926	250	846	220	22	970/1410	123	375	266	940
	SAE/DIN DN 100	374/814	130	500/940	603	943	250	863	220	22		1536	190	385	300		765	188	940
RFLD 1320	DIN DN 125	548	908	273	22	383	378/768	102	420/810	548	908	220	378/768	167					
RFLD 2500/2520	SAE DN 50				250	312						940/1330	220		110				
	SAE DN 65				250	312	273		22			940/1330		383	110				420/810
	SAE/DIN DN 80	572		932	250	312	273		22			990/1380	220	284	672	231	420/810	220	260/650	
	SAE/DIN DN 100	588	584	948	250	312	273		22			990/1380	420/814	408	250					
	DIN DN 125	949			250	312	273	22				1050/1440	220		438	300	240/630	130	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 series 3000 psi)
DIN flange connection to DIN EN ISO 1092, PN25/40 up to DN100 and
PN 16 from DN125 (with sealing strip, flange shape B)

4.2. WELDED FILTER SERIES - BALL VERSION RFLD 400x - 1502x (CHANGE-OVER TYPE A + E)

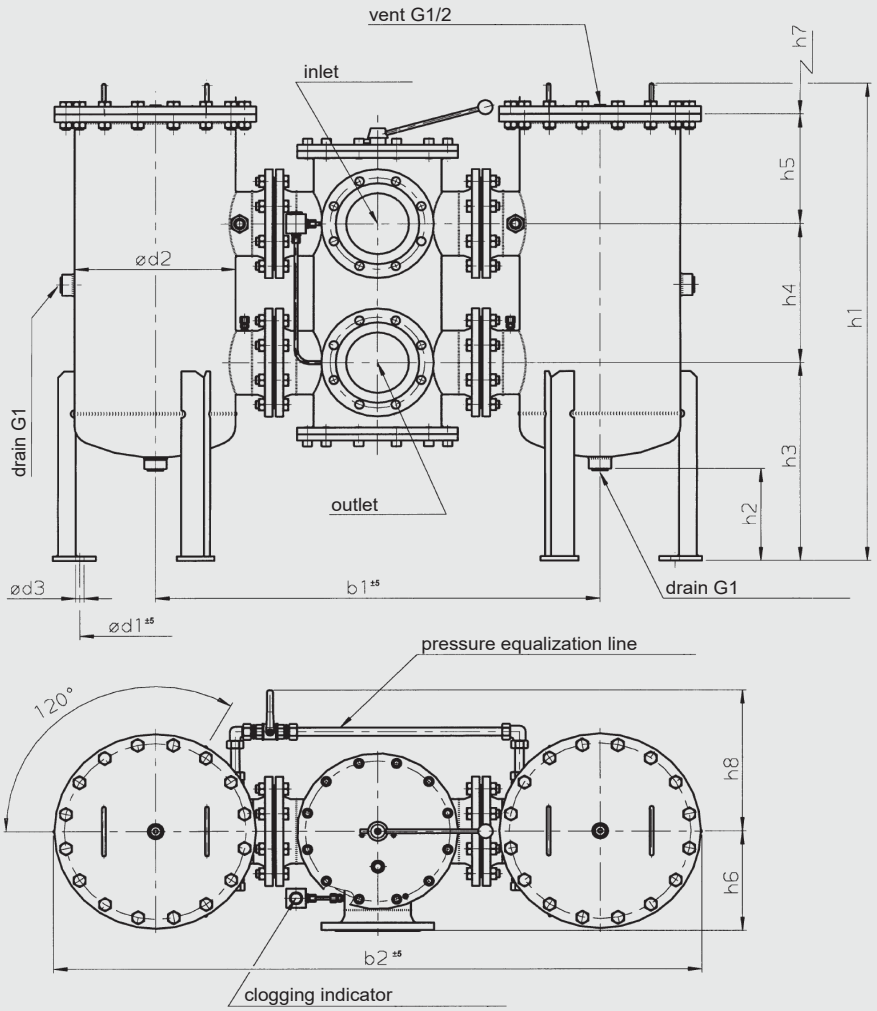


Dimensions in mm

Type	Flange connection 1)	b1 b2	d1	d2	d3	h1	h2	h3	h4	h5	h6	h7	h8
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 DIN	723 1183	330	356	22	1170/1560	260	525	300	265/645	188	420/810	230
	DN 150 DIN DN	775 1240	330	356	22	1170/1560	260	525	300	265/645	190	420/810	230
	200	884 1349	330	356	22	1205/1585	260	525	500	215/480	270	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 DIN	763 1275	380	406	22	1256/1696	250	525	300	351/791	188	500/940	255
	DN 150 DIN DN	815 1330	380	406	22	1256/1696	250	525	300	351/791	190	500/940	255
	200	924 1439	380	406	22	1365/1696	250	525	500	260/591	270	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 DIN	863 1483	480	508	22	1260/1700	260	540	300	340/780	188	500/940	310
	DN 150 DIN DN	915 1535	480	508	22	1260/1700	260	540	300	340/780	190	500/940	310
	200	1024 1644	480	508	22	1440/1830	265	600	500	260/640	270	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 DIN	863 1483	480	508	22	1260/1700	260	540	300	340/780	188	500/940	310
	DN 150 DIN DN	915 1535	480	508	22	1260/1700	260	540	300	340/780	190	500/940	310
	200	1024 1644	480	508	22	1440/1830	265	600	500	260/640	270	500/940	310
RFLD 15000/15020	DIN DN 200	1284 2114	690	711	22	1505/1895	260	655	500	260/700	270	500/940	415

1) DIN flange connection to DIN EN ISO 1092, PN25/40 up to DN100 and PN 16 from DN125 (with sealing strip, flange shape B)

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

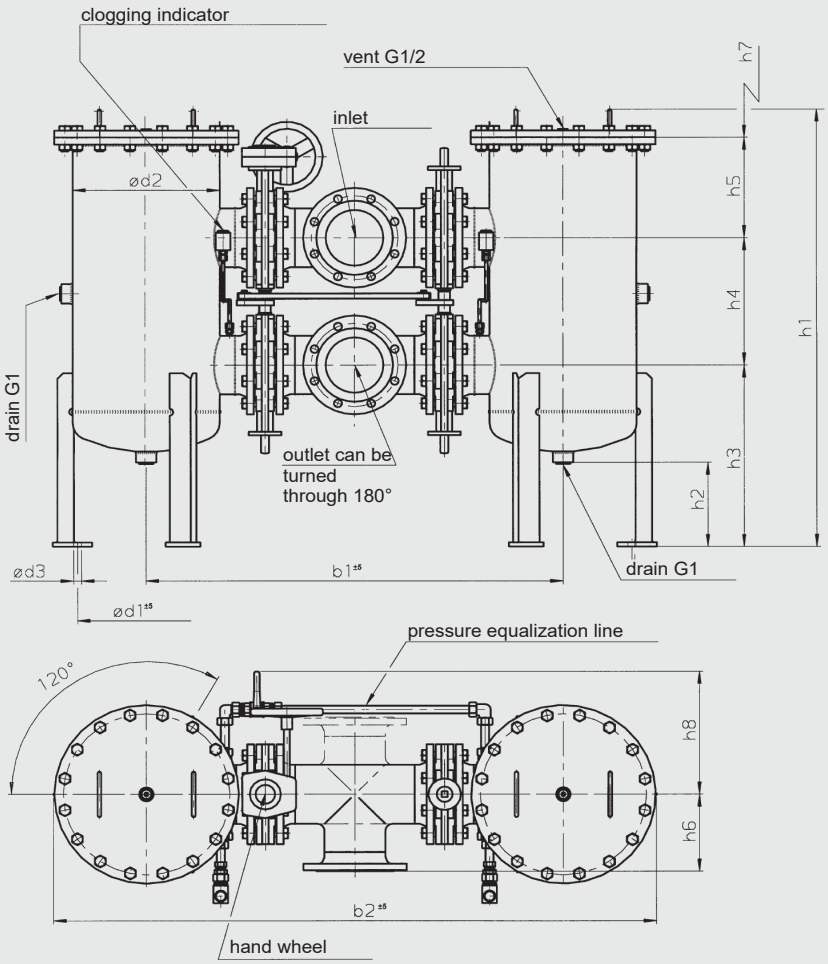


Dimensions in mm

Type	Flange connection 1)	b1	b2	d1	d2	d3	h1	h2	h3	h4	h5	h6	h7	h8
RFLD 4000/4020	DN 200	1266	1680	380	424	22	1324/1764	250	560	450	236/676	322	500/940	400
RFLD 6500/6520	DN 250	1402	2022	480	508	22	1380/1820	260	600	365	335/775	261	500/940	370
RFLD 7800/7820	DN 200	1402	2022	480	508	22	1380/1820	260	600	365	335/775	261	500/940	370
	DN 250									450	250/690	322	500/940	400
RFLD 15000/15020	DN 200	1506	2336	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 EN ISO 1092-1, PN 16 (with sealing strip, flange shape B)

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 d h_2 h_3 h_1	h_2 h h h_3 h_4 h_5	h_6 h 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	350 330 356 22
	DN 200	1240 1724	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	350 380 406 22
	DN 200	1280 1794	1256/1696	250 525 365 286/726	260 500/940	370 380 406 22 1326/1766 250
	DN 250	1496 2010	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	350 480 508 22
	DN 200	1380 2004	1380/1820	260 600 365 335/775	260 500/940	370 480 508 22 1380/1820 260
	DN 250	1586 2210	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	350 480 508 22
	DN 200	1380 2004	1380/1820	260 600 365 335/775	260 500/940	370 480 508 22 1380/1820 260
	DN 250	1586 2210	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	370 690 711 22
	DN 250	1816 2646	1425/1865	260 655 450 250/690	350 500/940	400 690 711 22 1500/1940 260
	DN 300	1956 2786	670 515 235/675	400 500/940	430	

1) DIN flange connection to DIN EN ISO 1092, PN 16 (with sealing strip, flange shape B)

NOTES

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
Industriegebiet