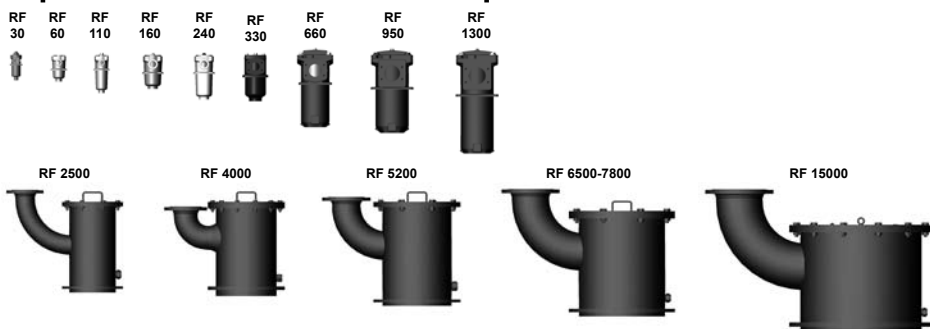




## Return Line Filter RF

up to 15000 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 with a screw-on cover plate.

Standard equipment:

- with bypass valve
- connection for a clogging indicator

#### 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 Betamicron® (BN4HC)

RF	Elements	3 µm	5 µm	10 µm	20 µm
30	1x0030R	2.6	2.9	3.5	4.0
60	1x0060R	5.7	6.3	7.6	8.6
110	1x0110R	12.0	13.3	16.0	18.1
160	1x0160R	18.6	20.7	24.9	28.1
240	1x0240R	29.3	32.5	39.1	44.2
330	1x0330R	38.4	42.6	51.2	57.9
660	1x0660R	87.1	96.5	116.1	131.3
950	1x0950R	130.0	144.1	173.3	196.1
1300	1x1300R	181.0	200.7	241.4	273.1
2500	3x0850R	336.3	372.6	448.5	507.3
4000	5x0850R	560.5	621.0	747.5	845.5
5200	4x1300R	724.0	802.8	965.6	1092.4
6500	5x1300R	905.0	1003.5	1207.0	1365.5
7800	6x1300R	1086.0	1204.2	1448.4	1638.6
15000	10x1300R	1810.0	2007.0	2414.0	2731.0

Filter elements are available with the following pressure stability values:

Betamicron® (BN4HC):	20 bar
Paper (P/HC):	10 bar
Wire mesh (W/HC):	20 bar
Stainless steel fibre (V):	210 bar
Betamicron®/Aquamicron® (BN4AM):	10 bar
Aquamicron® (AM):	10 bar

#### 1.3 FILTER SPECIFICATIONS

Nominal pressure	RF 30, 2500 to 15000: 10 bar	RF 60 to 1300: 25 bar
Temperature range	-10 °C to +100 °C	
Material of filter housing and cover plate	RF 30: PA 66	RF 60 to 330: Aluminium
	RF 660 to 1300: EN-GJS-400-15	RF 2500 to 15000: Welded steel
Type of clogging indicator	VR connection thread G ½ (return line indicator up to 25 bar operating pressure)	
Pressure setting of clogging indicator	2 bar (others on request)	
Bypass cracking pressure	3 bar (others on request)	

#### 1.4 SEALS

NBR (= Perbunan)

#### 1.5 MOUNTING

As tank-top or inline filter

#### 1.6 SPECIAL MODELS AND ACCESSORIES

On request

#### 1.7 SPARE PARTS

See Original Spare Parts List

#### 1.8 CERTIFICATES AND APPROVALS

On request

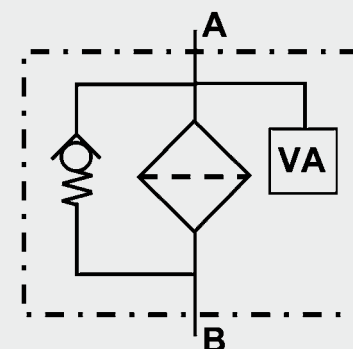
#### 1.9 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

- 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
- Non-flam operating fluids HFA, HFB, HFC and HFD
- Operating fluids with high water content (>50% water content) on request

#### 1.10 IMPORTANT INFORMATION

- Filter housing 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)

RF BN/HC 330 D L 10 D 1 . X /-L24

### 2.1 COMPLETE FILTER

Filter type \_\_\_\_\_

RF

Filter material of element \_\_\_\_\_

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

Size of filter or element \_\_\_\_\_

RF: 30, 60, 110, 160, 240, 330, 660, 950, 1300, 2500, 4000, 5200, 6500, 7800, 15000

Operating pressure \_\_\_\_\_

B = 10 bar (RF 30, 2500 to 15000)

D = 25 bar (RF 60 to 1300)

Type and size of port \_\_\_\_\_

Type	Port	Filter size															
		30	60	110	160	240	330	660	950	1300	2500	4000	5200	6500	7800	15000	
B	G ½	•															
C	G ¾		•	•													
E	G 1¼				•	•											
G	G 2						•										
L	SAE DN 50 (2")						•										
M	SAE DN 80 (3")							•									
N*	G 3							•									
O	SAE DN 90 (3½")								•								
P	SAE DN 100 (4")									•							
R	DIN DN 100										•						
U	DIN DN 125									•		•	•				
V	DIN DN 150										•	•	•	•			
W	DIN DN 200												•	•	•		
X	DIN DN 250														•	•	
Y	DIN DN 300															•	•

\* This port G3 applies to filter outlet only

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. E 7.050../..

Type code \_\_\_\_\_

1 Standard connection  
 2 RF 2500 to 15000: outlet for each filter element location spigot has threaded connection for pipe extension  
 3 RF 2500 to 15000: common elbow outlet

Modification number \_\_\_\_\_

X the latest version is always supplied

Supplementary details \_\_\_\_\_

B cracking pressure of bypass (e.g. B6 = 6 bar)  
 DE differential pressure measurement across element (RF 660, 950, 1300)  
 DH cover plate lifting device (only for RF 2500 to 15000)  
 GA mating weld connection flange in steel  
 KB no bypass valve  
 L... light with appropriate voltage (24V, 48V, 110V, 220V) ] only for clogging indicators  
 LED 2 light emitting diodes up to 24 Volt ] type D  
 O O-ring groove on the DIN inlet flange (only for RF 2500 to 15000)  
 T with tank breather filter (only RF 30)  
 V FPM seals

### 2.2 REPLACEMENT ELEMENT

0330 R 010 BN4HC /-V

Size \_\_\_\_\_

0030, 0060, 0110, 0160, 0240, 0330, 0660, 0950, 1300

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

VR 2 D . X /-L24

Type \_\_\_\_\_

VR return line indicator up to 25 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  $\Delta p$  and element  $\Delta p$  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)

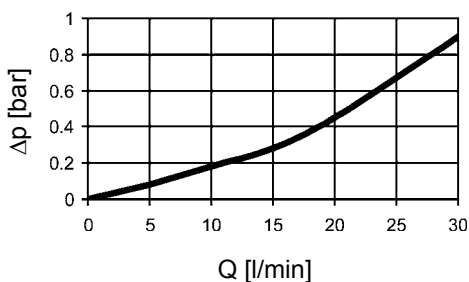
For ease of calculation, our Filter Sizing Program is available on request free of charge.

**NEW:** Sizing online at [www.hydac.com](http://www.hydac.com)

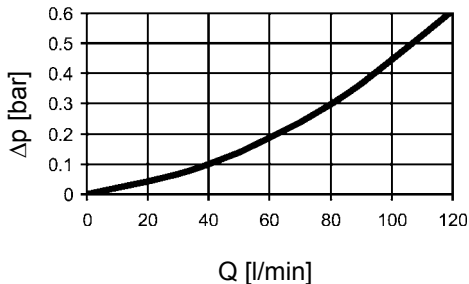
#### 3.1 $\Delta p$ -Q HOUSING GRAPHS BASED ON ISO 3968

The housing graphs apply to mineral oil with a density of 0.86 kg/dm<sup>3</sup> and a kinematic viscosity of 30 mm<sup>2</sup>/s. In this case, the differential pressure changes proportionally to the density.

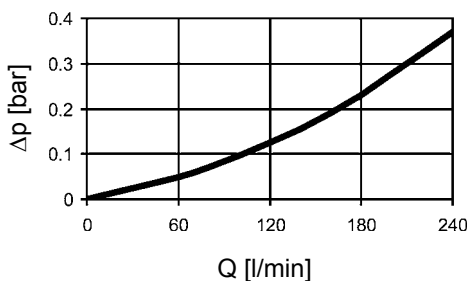
RF 30



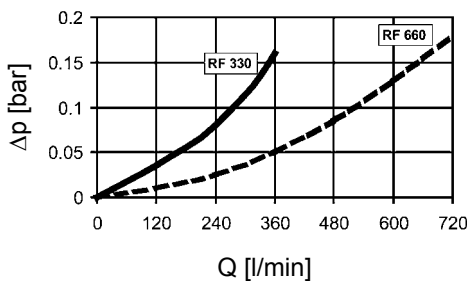
RF 60, 110



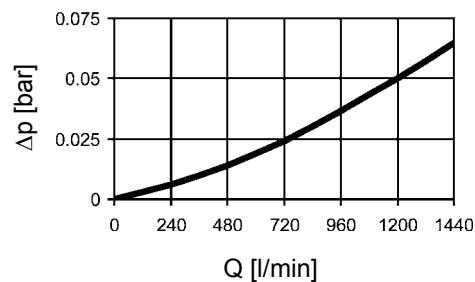
RF 160, 240



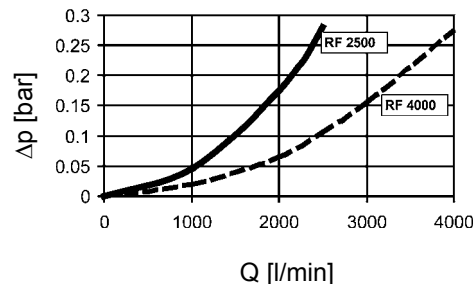
RF 330, 660



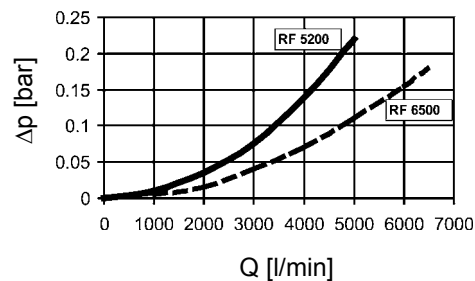
RF 950, 1300



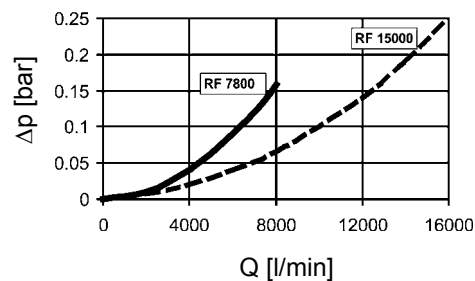
RF 2500, 4000



RF 5200, 6500



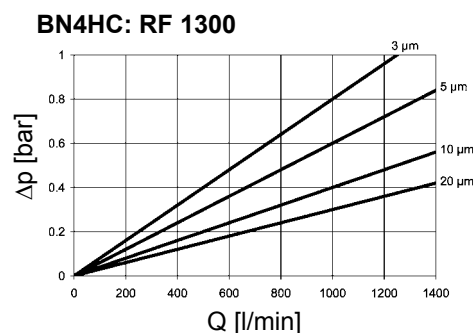
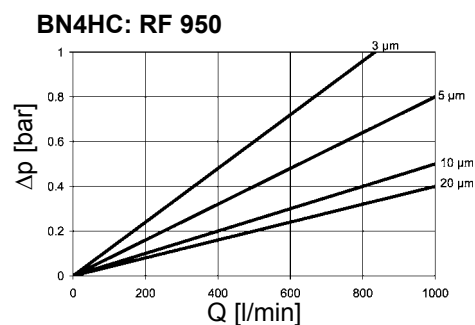
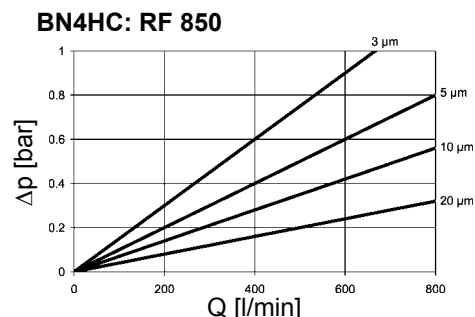
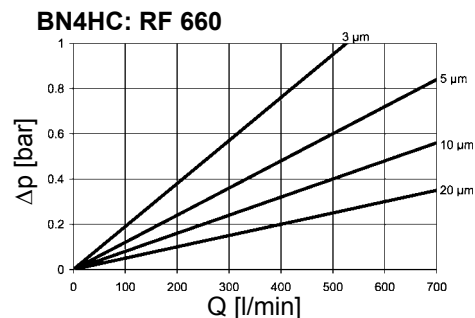
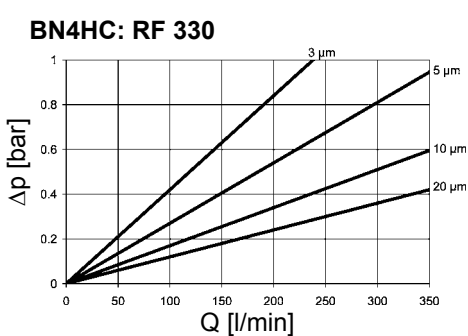
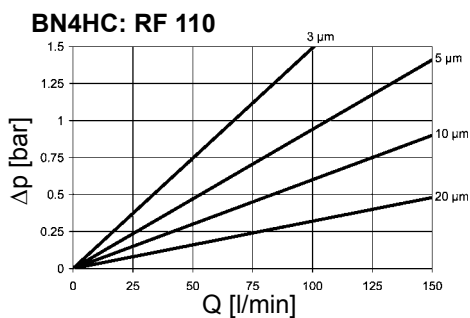
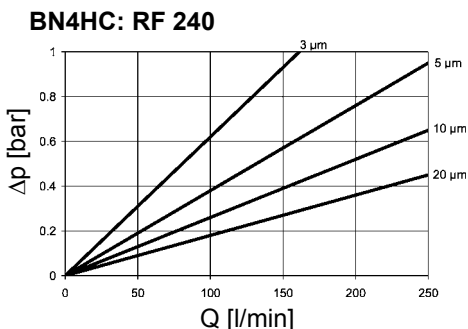
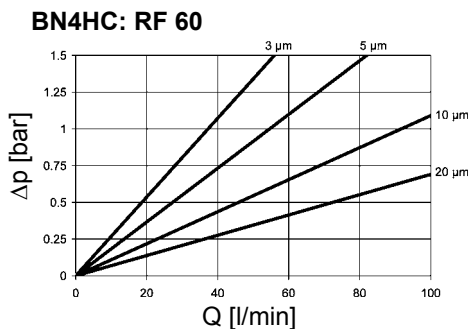
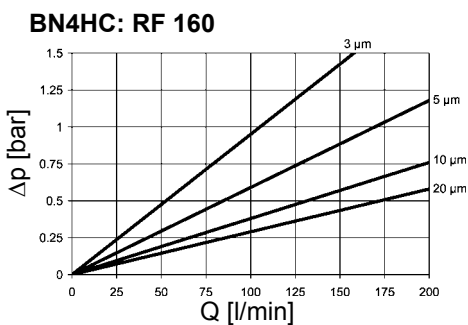
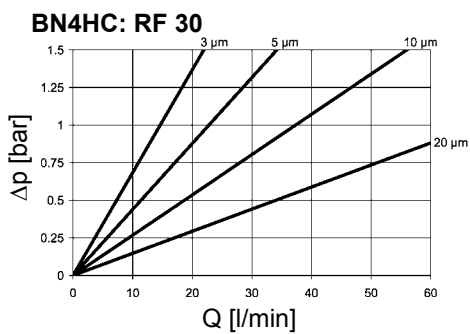
RF 7800, 15000



### 3.2 GRADIENT COEFFICIENTS (SK) FOR FILTER ELEMENTS

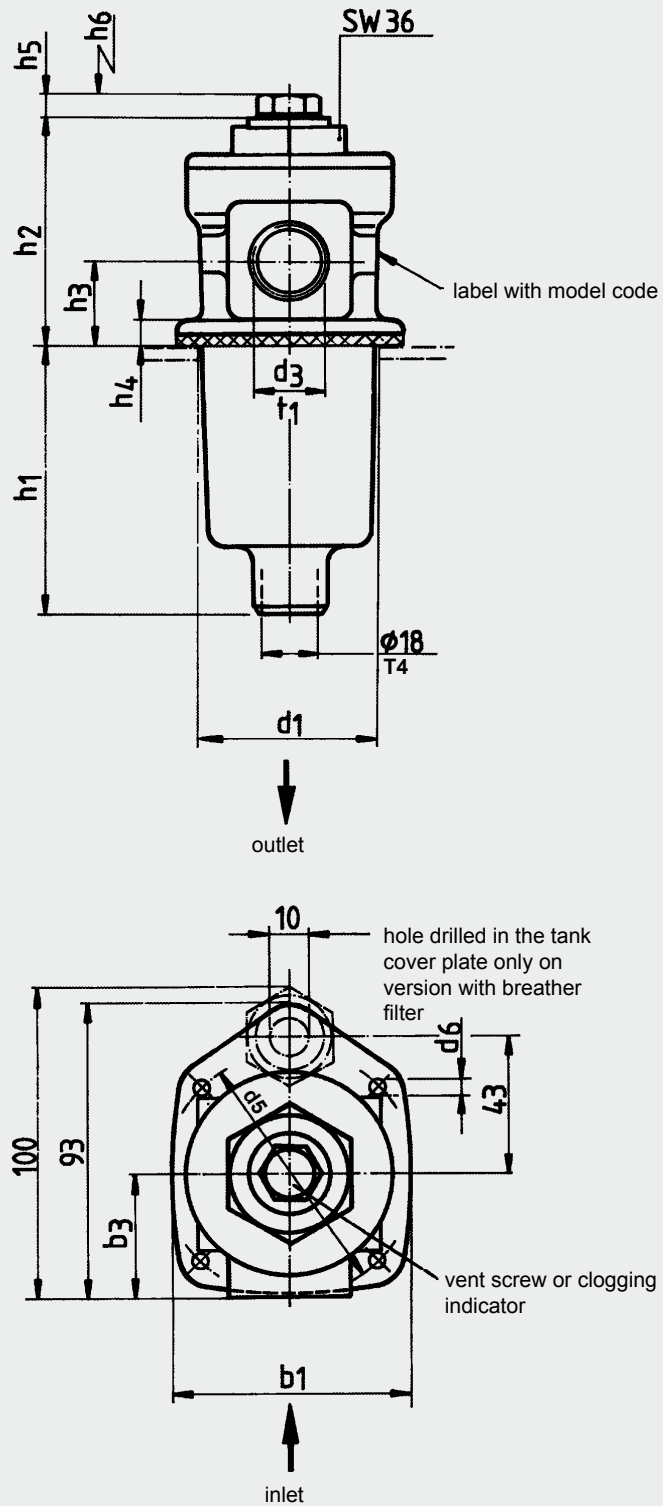
The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm<sup>2</sup>/s. The pressure drop changes proportionally to the change in viscosity.

RF	V				W/HC
	3 μm	5 μm	10 μm	20 μm	
30	19.4	14.2	7.9	3.8	-
60	15.9	9.3	5.4	3.3	0.900
110	7.6	5.1	3.0	2.0	0.495
160	4.9	3.5	2.4	1.5	0.338
240	3.2	2.6	1.7	1.2	0.225
330	2.1	1.7	1.1	0.8	0.162
660	1.0	0.8	0.6	0.4	0.081
950	0.7	0.6	0.4	0.2	0.054
1300	0.5	0.4	0.3	0.2	0.045



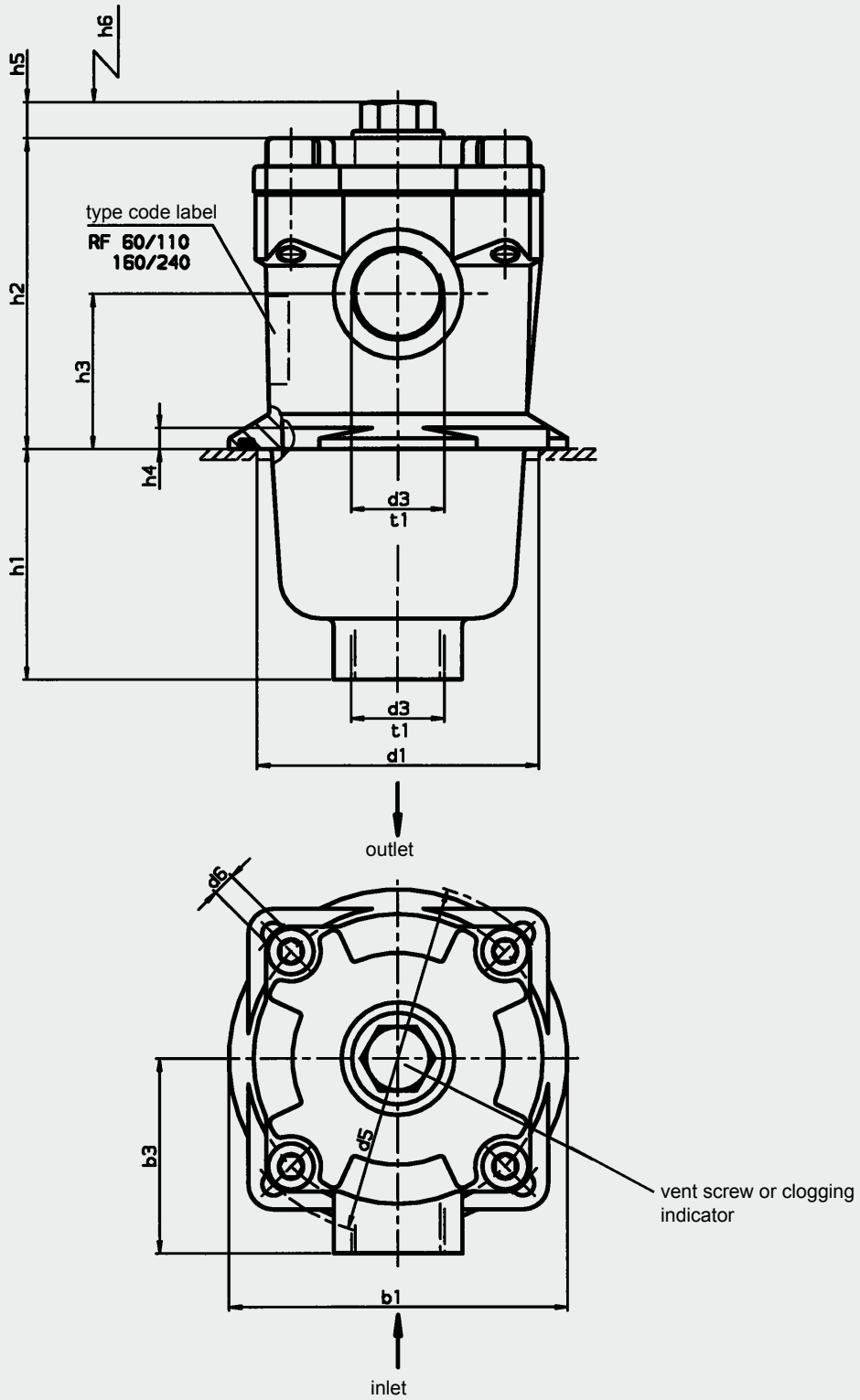
## 4. DIMENSIONS

RF 30



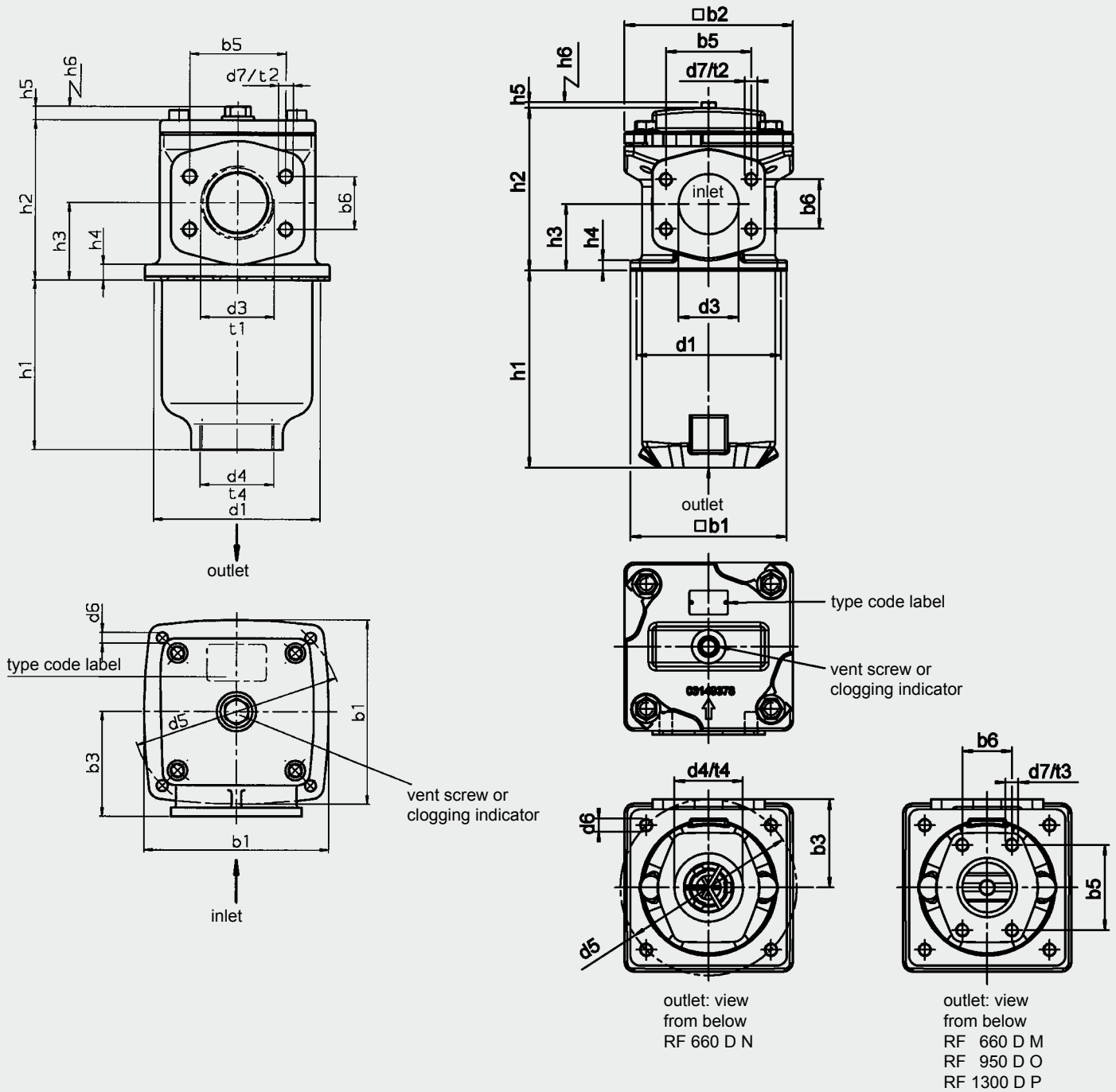
RF	b1	b3	d1	d3 <sup>1)</sup>	d5	d6 <sup>2)</sup>	h1	h2	h3	h4	h5	h6	t1	t4	Weight including element [kg]	Volume of pressure chamber [l]
30	71	38	60	G ½	78	M4	86	70	27	8	11	90	14	14	0.4	0.18

<sup>1)</sup> Threaded port to ISO 228 / <sup>2)</sup> mounting hole for screw



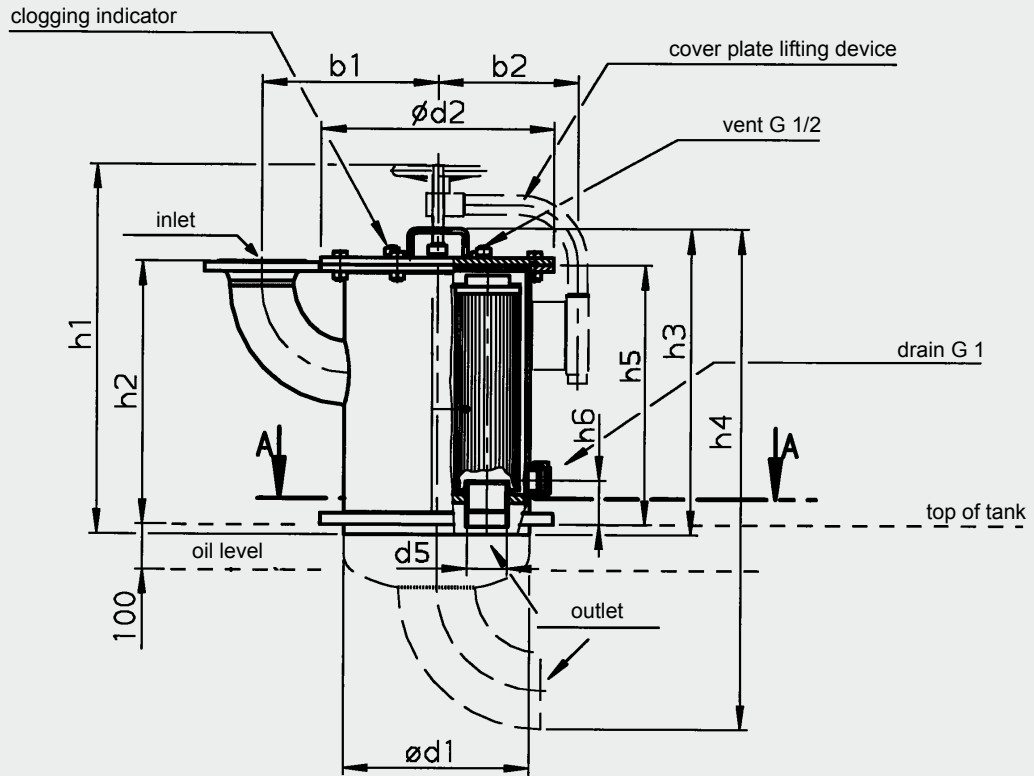
RF	b1	b3	d1	d3 <sup>1)</sup>	d5	d6 <sup>2)</sup>	h1	h2	h3	h4	h5	h6	t1	t4	Weight including element [kg]	Volume of pressure chamber [l]
60	96	55	80	G 3/4	100	M5	66	88	44	6	12	80	17	-	0.9	0.40
110	96	55	80	G 3/4	100	M5	133	88	44	6	12	145	17	-	1.1	0.60
160	126	72	106	G 1 1/4	135	M6	89	108	54	6	12	120	20	-	1.8	1.00
240	126	72	106	G 1 1/4	135	M6	150	108	54	6	12	180	20	-	2.2	1.40

<sup>1)</sup> Threaded port to ISO 228 / <sup>2)</sup> mounting hole for screw

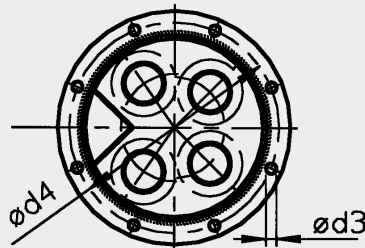


RF	b1	b2	b3	b5	b6	d1	d3	d4	d5	d6 <sup>1)</sup>	d7	h1	h2	h3	h4	h5	h6	t1	t2	t3	t4	Weight incl. element [kg]	Volume of pressure chamber [l]
330	150	126	85	-	42.9	135	G2 SAE DN 50 (2")	G2	170	M8	M12	139	130	63	13	12	180	27	23	-	27	4.1	2.0
660	195	210	110	106.4	61.9	180	SAE DN 80 (3")	G3 SAE DN 80 (3")	220	M12	M16	246	203	83	13	8	320	-	28	18	28	31.0	6.8
950	250	244	135	120.7	69.9	208	SAE DN 90 (3½")	SAE DN 90 (3½")	290	M16	M16	252.5	225	93	13	8	385	-	20	20	-	44.5	10.3
1300	250	244	145	130.2	77.8	208	SAE DN 100 (4")	SAE DN 100 (4")	290	M16	M16	330.5	269	121	13	8	485	-	20	20	-	52.5	13.5

Filter connection for SAE flanges to SAE-J 518c / 3000 PSI / <sup>1)</sup> mounting hole for screw



A-A



dimension h4 on request!

RF	Flange connection	h1	h2	h3	h5	h6	b1	b2	d1	d2	d3	d4	d5	No. of cover plate screws	Weight including element [kg]	Volume of pressure chamber [l]
2500	DIN DN 100	732	578	590	496	84	395	240	273	360	18	320	G2	8	55.3	26.0
	DIN DN 125		505				317								58.3	29.0
4000	DIN DN 125	738	501	596	496	84	355	282	356	450	18	410	G2	12	97.3	44.0
	DIN DN 150		540				388								101.3	48.0
5200	DIN DN 125	812	576	670	571	84	382	308	406	510	23	460	G3	8	119.1	64.0
	DIN DN 150		615				416								126.1	68.0
6500	DIN DN 150	817	615	680	571	84	470	358	508	620	26	572	G3	8	175.1	98.0
	DIN DN 200		720				535								186.1	108.0
7800	DIN DN 200	817	720	680	571	84	535	358	508	620	26	572	G3	8	187.1	108.0
	DIN DN 250		800				605								202.1	126.0
15000	DIN DN 250	817	800	709	571	84	712	460	711	840	26	780	G3	12	329.1	224.0
	DIN DN 300		866				777								382.1	247.0

**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.

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