

HYDAC

INTERNATIONAL

Inline Filters LFN, LFNF, DFN

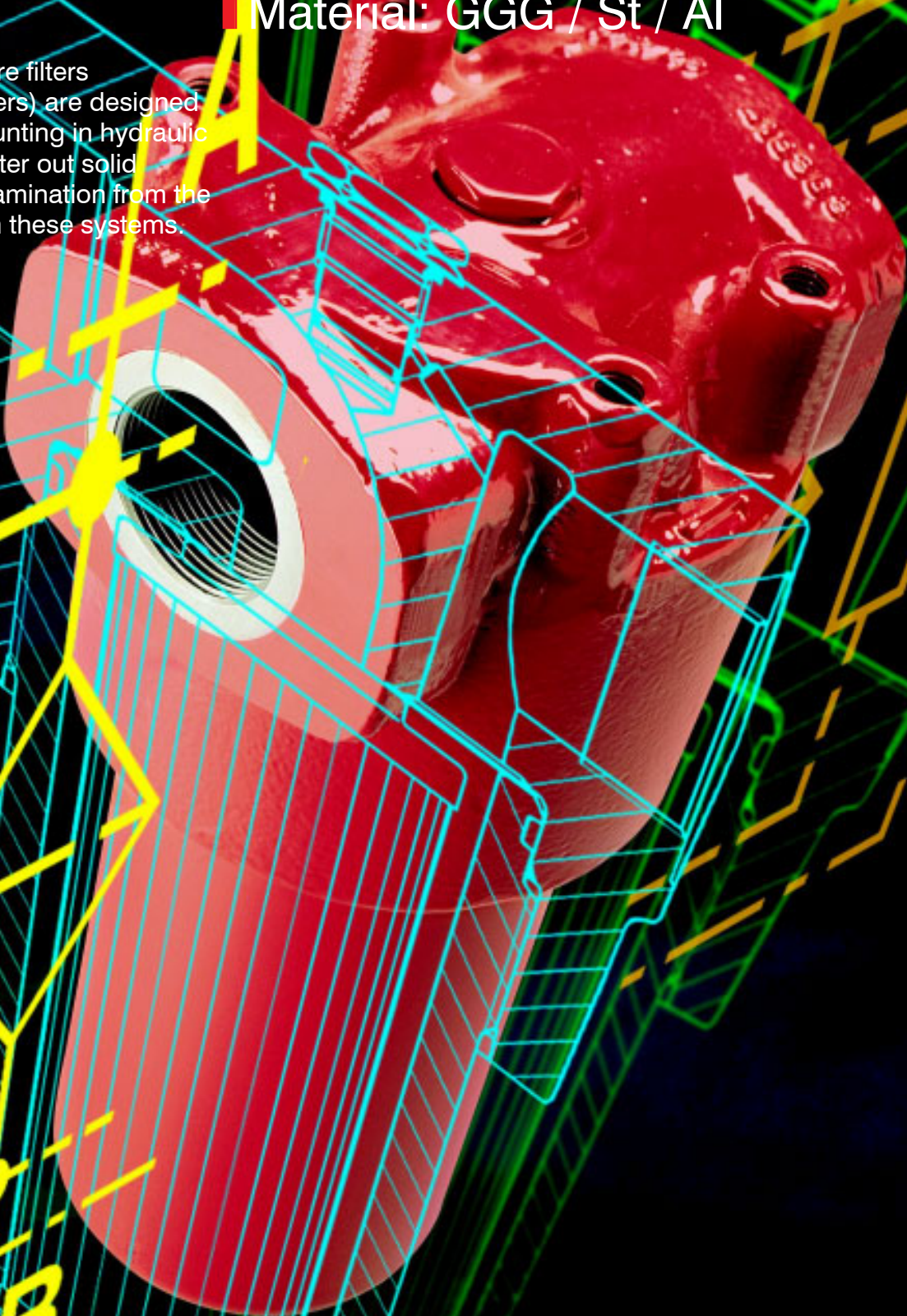
to DIN 24550

Flow rates up to 400 l/min

Pressure range: 100/400 bar

Material: GGG / St / Al

Inline pressure filters (standard filters) are designed for inline mounting in hydraulic systems to filter out solid particle contamination from the fluids used in these systems.



1. TECHNICAL SPECIFICATIONS

1.1. FILTER HOUSING

Construction

The LFN, LFNF, DFN filters consist of a filter head and a screw-in filter bowl. The LFN and DFN filters are supplied without bypass and without a clogging indicator, as standard. As an option a 7 bar bypass and a clogging indicator can be fitted. The LFNF filter is for reverse flow filtration in one direction only.

1.2. FILTER ELEMENTS

Hydac filter elements fulfil all ISO test criteria.

Reliable filter operation is only guaranteed with original HYDAC filter elements.

The filter elements are also suitable for use in dynamic applications due to their high pressure stability; max. permiss. Δp across the element:

Betamicon® (BN/HC): 30 bar
 Betamicon® (BH/HC): 160 bar

Fluid compatibility

Suitable for mineral oils, lubrication oils, non-flam, synthetic and rapidly biodegradable oils. For use with water, please contact our sales/technical department.

For further details on filter elements, please see:

brochure no.: E 7.200../..

1.3. CLOGGING INDICATORS

VD 5 LZ . 0 /-V-DB

Type of indicator

VD differential pressure indicator (for DFN)
 VM differential pressure indicator (not LZ) (for LFN, LFNF)

Pressure setting

5 5 bar

Indicator type code

LZ visual-mechanical/electrical

Modification number

0 the latest version is always supplied

Supplementary details

V Viton
 DB Daimler-Benz specification

For further details on clogging indicators, please see:
brochure no.: E 7.050../..

1.4. SEALS

Choice of Perbunan (= NBR) or Viton (= FPM for HFD fluids).

1.5. SPECIAL MODELS AND ACCESSORIES

- with bypass valve
- rear flanged

1.6. SPARE PARTS

See Original Spare Parts List and Maintenance Instructions.

2. GENERAL

Mounting

Inline filter

Temperature range

-10 °C to +100 °C

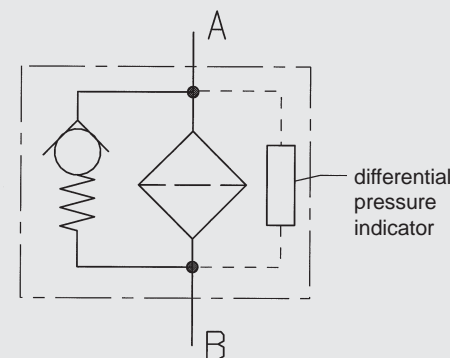
Pressure setting of the differential pressure clogging indicator

$\Delta p_a = 5 \text{ bar } -10\%$

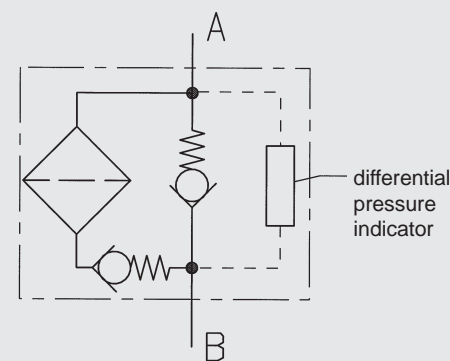
Cracking pressure of bypass valve

$\Delta p_o = 7 \text{ bar } \pm 10\%$

Symbol for hydraulic systems DFN/LFN



LFNF



3. MODEL CODE

(also order example)

3.1. COMPLETE FILTER

DFN BN/HC 250 S F 10 A 1 . X /-V-B7

Filter type

LFN, LFNF, DFN

Filter material of element

BN/HC Betamicron®
BH/HC Betamicron®

Size / Housing material

GGG/St DFN: 63, 100, 250 (sizes 40, 160, 400 on request)
Al LFN(F): 40, 63
Al/St LFN(F): 100

Operating pressure

I = 100 bar (LFN, LFNF)
S = 400 bar (DFN)

Type of connection / Connection size

according to standard (●), special model (x)

Type	Connection	Filter size					
		40	63	100	160	250	400
B	G 1/2	●					
C	G 3/4		●				
D	G 1			●			
E	G 1 1/4				●		
F	G 1 1/2					●	
K	DN 38						●
Z	According to customer specification						

* on request

Flange to ISO 6162

Filtration rating in µm

BN/HC : 3, 6, 10, 25
BH/HC : 3, 6, 10, 25

Type of clogging indicator

Y with plastic blanking plug in indicator port
A with steel blanking plug in indicator port
B with visual indicator
C with electrical indicator
D with combined visual/electrical indicator
LE with visual-mechanical/electrical indicator
LZ with visual-mechanical/electrical indicator with 75% and 100% switching contacts

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

Type code

1

Modification number

X the latest version is always supplied

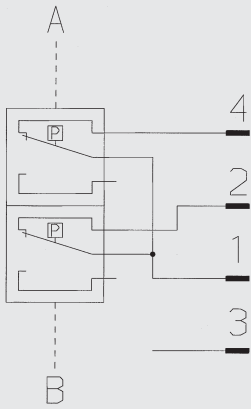
Supplementary details

V FPM seals, filter suitable for rapidly biodegradable hydraulic fluids
L.. light with corresponding voltage (24V, 48V, 110V, 220V)
LED 2 light-emitting diodes up to 24 volt
DB LZ indicator with plug to DIN 43651 with three LEDs (Daimler-Benz specification)
CN LZ indicator with plug to DIN 43651 with three LEDs (CNOMO specification)
BO LZ indicator with plug and plug connection to BMW specification (M12x1)
AV LZ indicator with plug to AUDI specification
SO368 with G ½ thread (only for sizes 40, 63, 100)
B7 with bypass valve (cracking pressure 7 bar)

only on clogging indicators type D

for circuit diagram see point 3.1.1.

3.1.1 Circuit diagram .../-BO (BMW)



3.2. REPLACEMENT ELEMENT (also order example)

0250 DN 010 BN/HC /-V

Size _____
0040, 0063, 0100, 0160, 0250, 0400

Type _____
DN

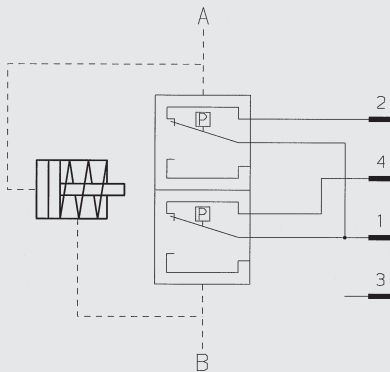
Filtration rating in μm _____
3, 6, 10, 25

Filter material _____
BN/HC; BH/HC

Supplementary details _____

V = FPM seals, filter suitable for rapidly biodegradable oils and phosphate ester (HFD-R)

.../-AV

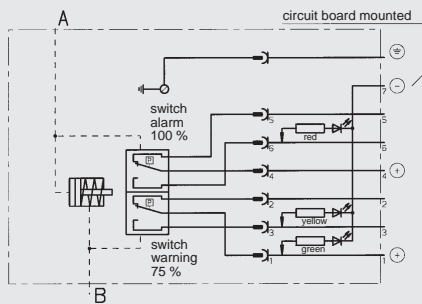


3.2.1 Element specifications

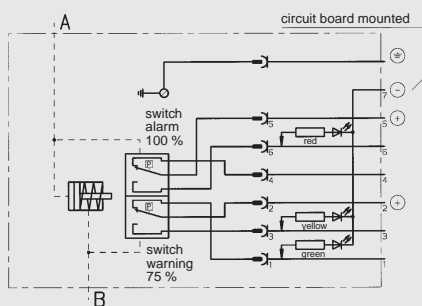
Filter type	Contamination retention capacity in g for BN/HC elements			
	3 μm	6 μm	10 μm	25 μm
40	5.2	5.6	6.3	7.0
63	9.2	9.9	11.1	12.8
100	15.4	16.5	18.6	20.6
160	27.5	29.3	33.1	36.7
250	46.0	49.0	55.2	61.3
400	76.2	81.3	91.4	101.5

Filter type	Contamination retention capacity in g for BH/HC elements			
	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

...DB



...CN



4. FILTER SPECIFICATIONS

Filter type	Element size	Number of elements	Weight [kg] with element DFN	Weight [kg] with element LFN	Weight [kg] with element LFNF
40	0040 DN...	1	-	1.8	1.8
63	0063 DN...	1	6.0	1.8	1.8
100	0100 DN...	1	7.5	4.2	4.2
160	0160 DN...	1	-	-	-
250	0250 DN...	1	13.0	-	-
400	0400 DN...	1	-	-	-

5. FILTER CALCULATION/ SIZING

The total pressure drop of a filter at a certain flow rate is the sum of the housing Δp and the element Δp .

The pressure drop can either be determined with the aid of our FSP Filter Sizing Program, which is available free of charge, or by using the following graphs.

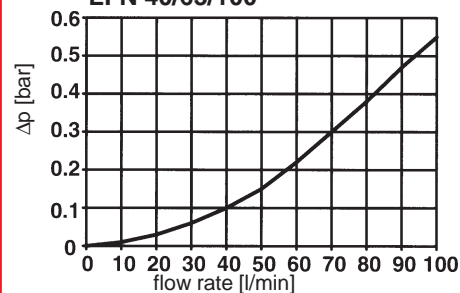
It must be stressed that all of the technical documentation from HYDAC Filtrertechnik always states the pressure drop of the complete filter.

5.1. ΔP -Q HOUSING GRAPHS TO ISO 3968

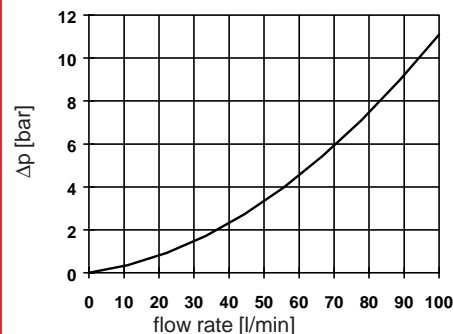
The housing graphs apply to mineral oil with a density of 0.86 kg/dm^3 and a viscosity of $30 \text{ mm}^2/\text{s}$.

In this case, the differential pressure changes proportionally to the density.

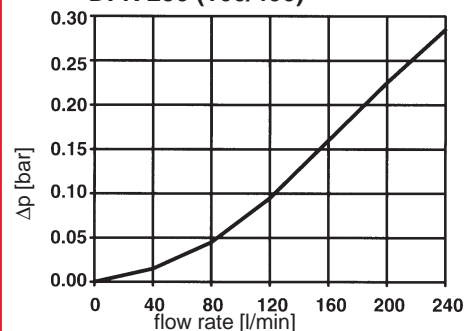
DFN 63/100 (40) LFN 40/63/100



LFNF 40/63/100



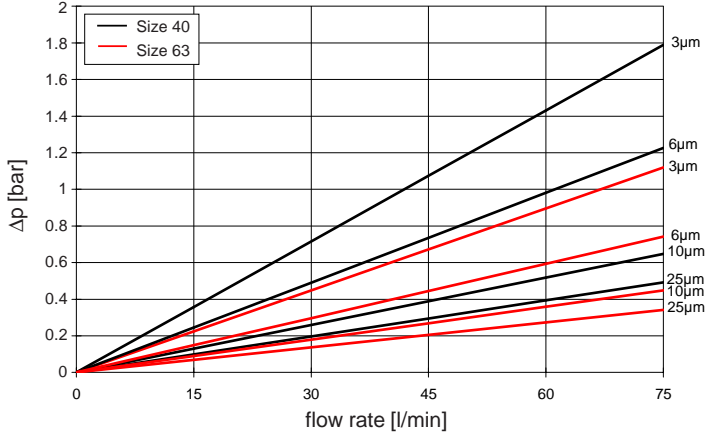
DFN 250 (160/400)



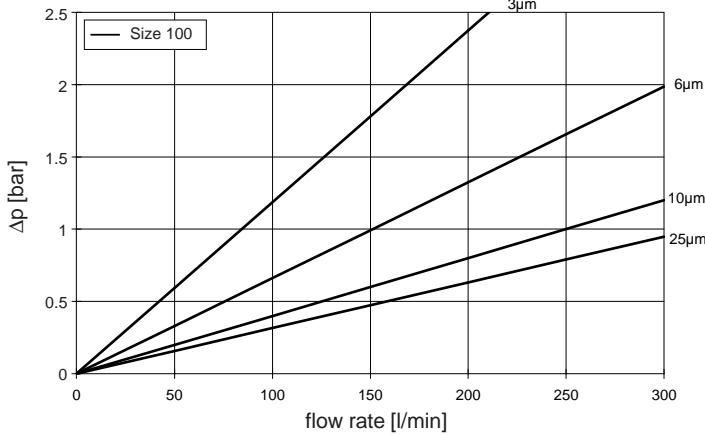
5.2. ΔP-Q GRAPHS - FILTER ELEMENTS

The element graphs apply to mineral oil with a kinematic viscosity of 30 mm²/s. The pressure drop changes proportionally to the change in viscosity (see Example 5.3.).

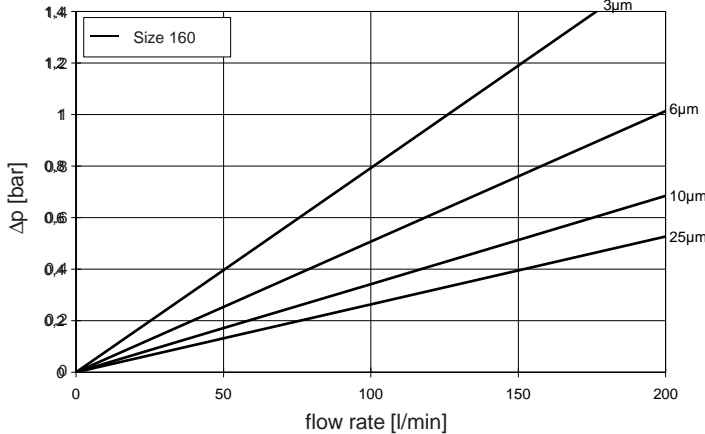
BN/HC: Element size 40/63



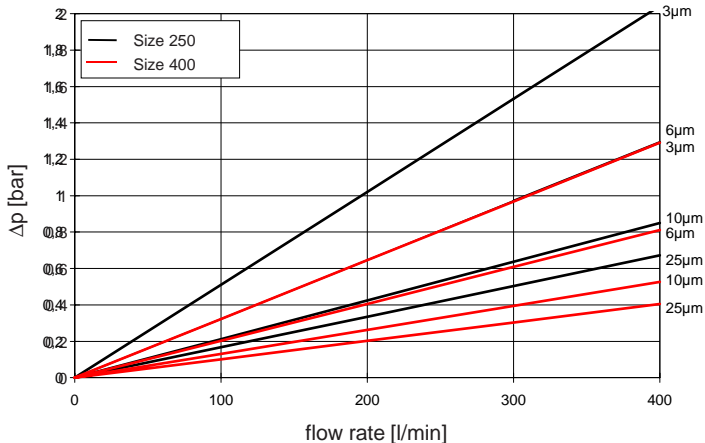
BN/HC: Element size 100



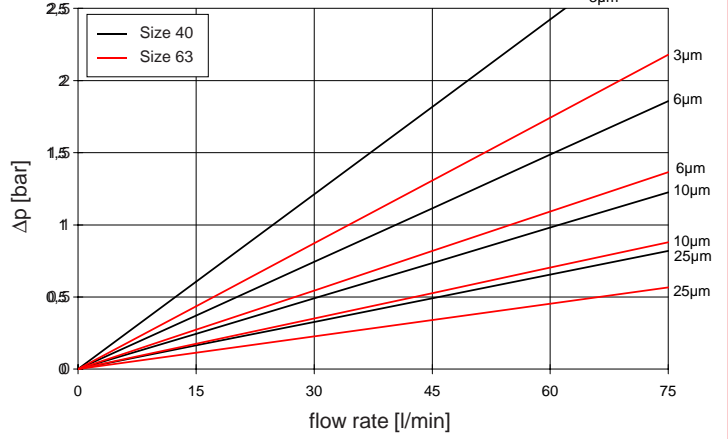
BN/HC: Element size 160



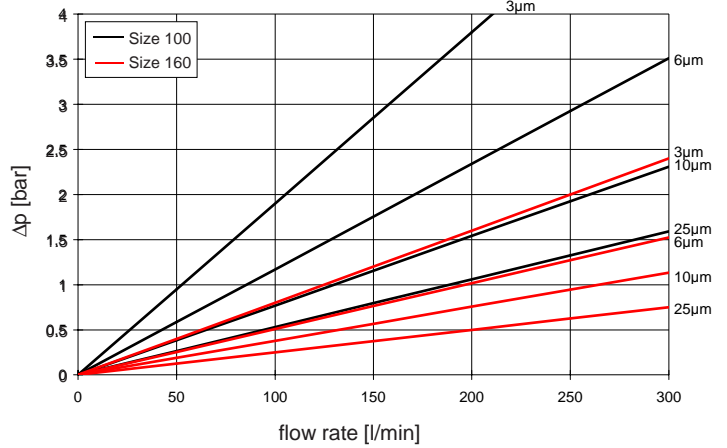
BN/HC: Element size 250/400



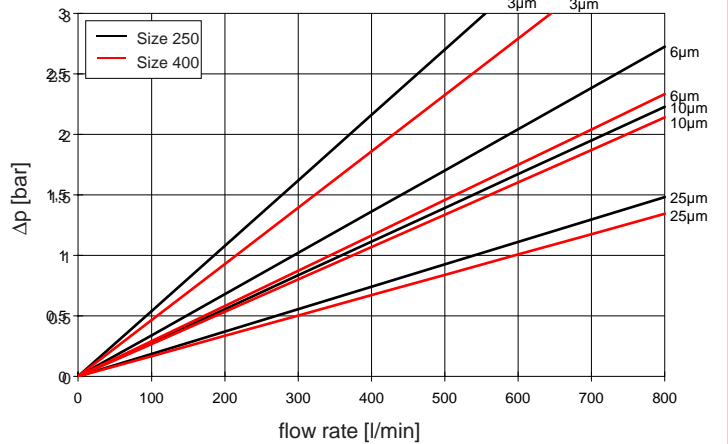
BN/HC: Element size 40/63



BH/HC: Element size 100/160



BH/HC: Element size 250/400



5.3. EXAMPLE

General:

$$\Delta p_{\text{total}} = \Delta p_{\text{housing}} + \Delta p_{\text{element}} \times \frac{\text{viscosity (mm}^2/\text{s)}}{30 \text{ mm}^2/\text{s}}$$

$\Delta p_{\text{housing}}$ = to be determined from point 5.1.

$\Delta p_{\text{element}}$ = element pressure drop at flow rate Q and viscosity = 30 mm²/s according to point 5.2.

Example:

System data: DFN 250 with BN/HC element (10 μm);
viscosity = 68 mm²/s (ISO VG 68 at 40 °C);
Q = 160 l/min;

$$\Rightarrow \Delta p_{\text{housing}} = 0.16 \text{ bar (DFN 250)}$$

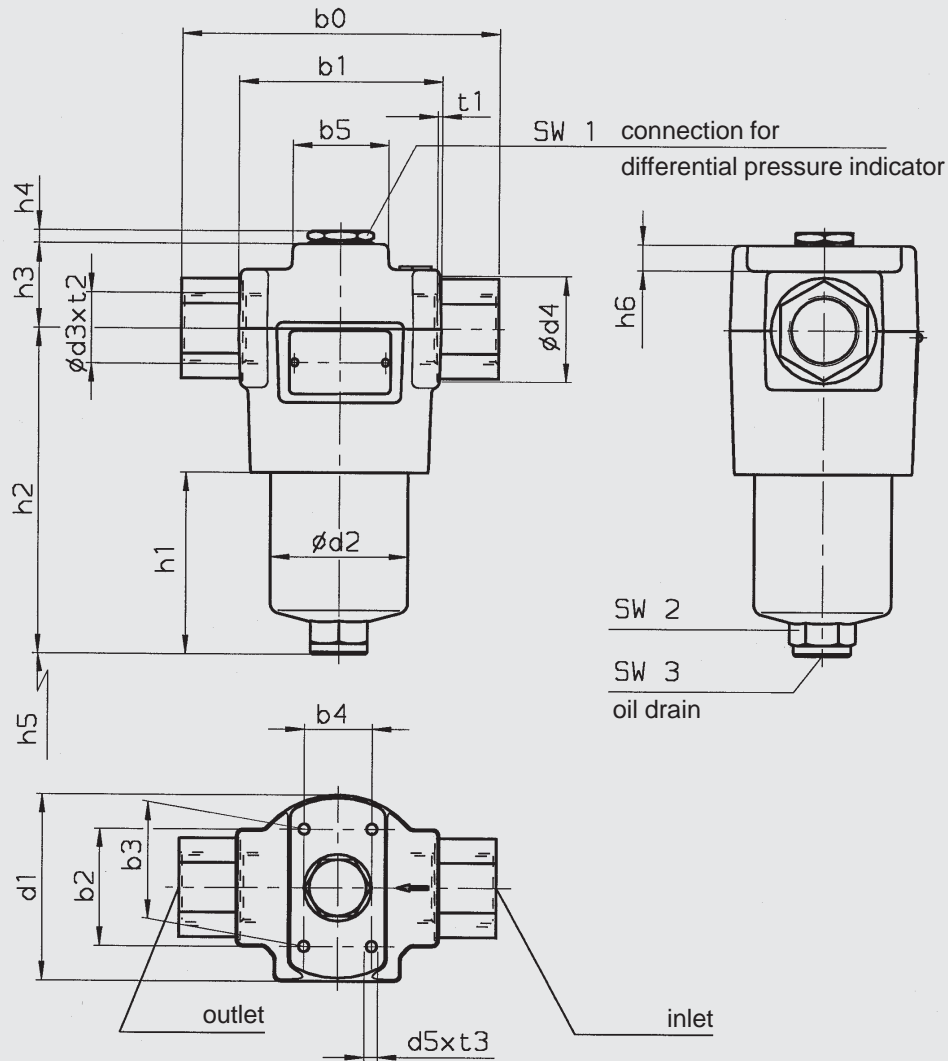
$$\Delta p_{\text{element}} = 0.34$$

$$\Delta p_{\text{total}} = 0.16 \text{ bar} + 0.34 \times \frac{68 \text{ mm}^2/\text{s}}{30 \text{ mm}^2/\text{s}} = \underline{0.93 \text{ bar}}$$

For ease of calculation, our Filter Sizing Program can be downloaded from our website www.hydac.com.

6. DIMENSIONS

6.1. LFN, LFNF, DFN 40, 63, 100

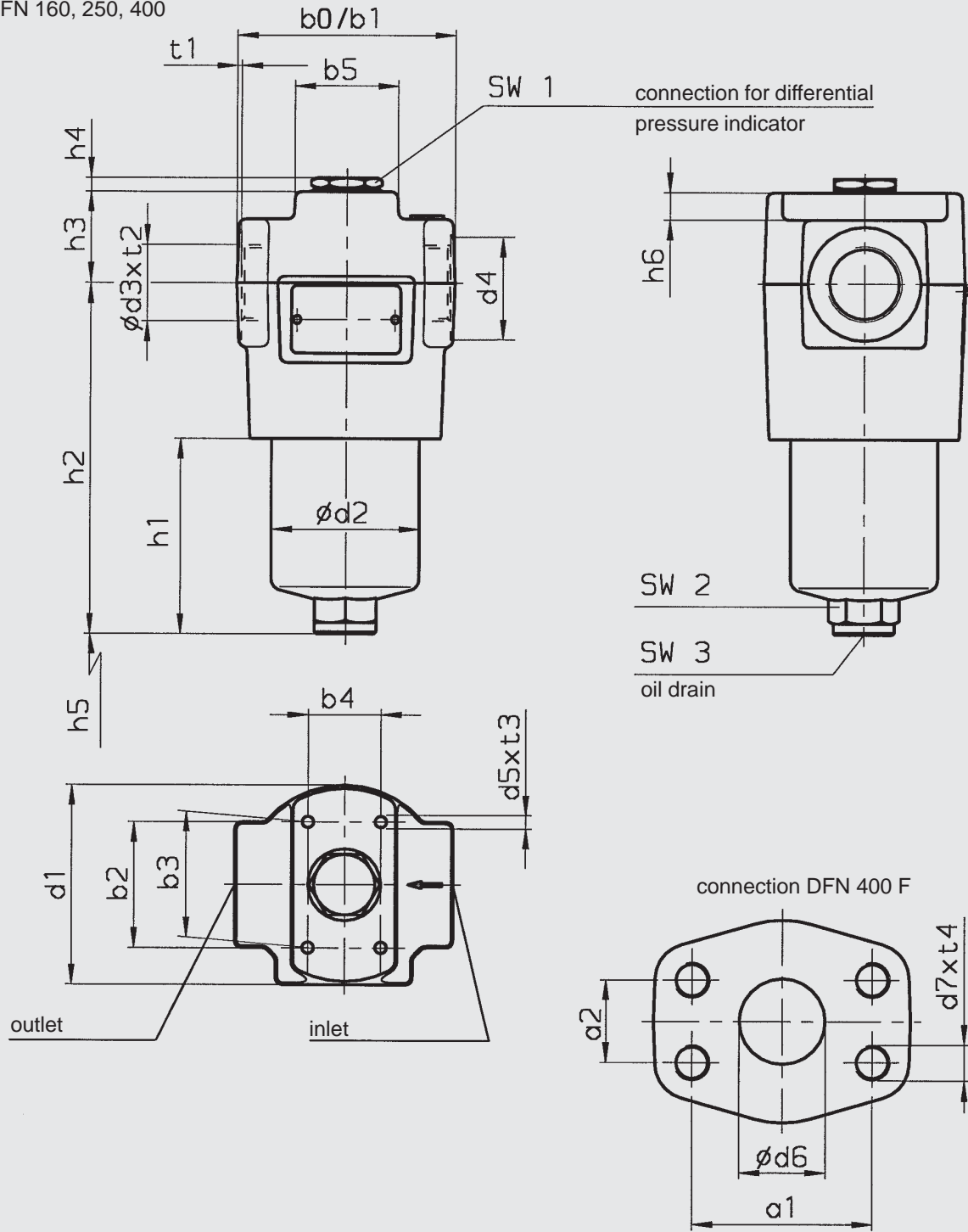


Type	b0	b1	b2	b3	b4	b5	d1	d2	d3	d4	d5
LFN 40	140	–	50	56	32	45	83	68	G ½	–	M6
LFN 63	–	92	50	56	32	45	83	68	G ¾	42	M6
LFN 100	160	–	50	56	32	45	83	65	G 1	–	M6
LFNF 40	140	–	50	56	32	45	83	68	G ½	–	M6
LFNF 63	–	92	50	56	32	45	83	68	G ¾	42	M6
LFNF 100	160	–	50	56	32	45	83	65	G 1	–	M6
DFN 40 ¹⁾	124	–	56	56	32	45	89	65	G ½	–	M6
DFN 63	150	–	56	56	32	45	89	65	G ¾	–	M6
DFN 100	–	96	56	56	32	45	89	65	G 1	50	M6

Type	h1	h2	h3	h4	h5	h6	SW1	SW2	SW3	t1	t2	t3
LFN 40	91	146	40	6	75	15	27	27	–	–	20	9
LFN 63	152	207	40	6	75	15	27	27	–	1	17	9
LFN 100	246	301	40	6	85	15	27	27	10	–	24.5	9
LFNF 40	91	146	40	6	75	15	27	27	–	–	20	9
LFNF 63	152	207	40	6	75	15	27	27	–	1	17	9
LFNF 100	246	301	40	6	85	15	27	27	10	–	24.5	9
DFN 40 ¹⁾	86	154.5	40	7	85	12	27	27	10	–	14	8
DFN 63	146	214.5	40	7	85	12	27	27	10	–	22	8
DFN 100	236	304.5	40	7	85	12	27	27	10	2	18	8

1) on request

6.2. DFN 160, 250, 400



Type	b0	b1	b2	b3	b4	b5	d1	d2	d3	d4	d5	d6	d7
DFN 160 ¹⁾	235	–	113	115	60	–	157	115.5	G1 ¼	–	M12	–	–
DFN 250	–	167	113	115	60	–	157	115.5	G1 ½	68	M12	–	–
DFN 400 ¹⁾	–	158	113	115	60	–	157	115.5	–	–	M12	38	M16

Type	h1	h2	h3	h4	h5	h6	SW1	SW2	SW3	a1	a2	t1	t2	t3	t4
DFN 160 ¹⁾	139	239.5	45	7	105	–	27	36	10	–	–	–	26.5	16	–
DFN 250	229	329.5	45	7	105	–	27	36	10	–	–	2	22	16	–
DFN 400 ¹⁾	379	479.5	45	7	105	–	27	36	10	79.4	36.7	–	–	16	22

1) on request

7. 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.

NOTES