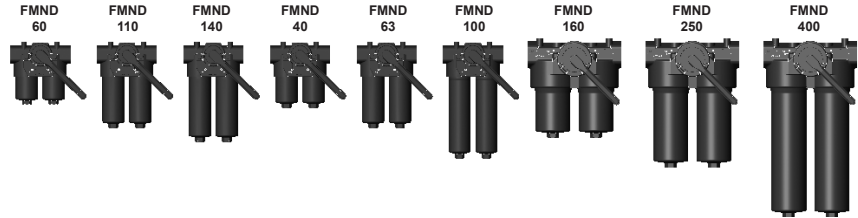




Change-Over Inline Filter FMND

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

Betamicon® (BN4HC)					
FMND	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)					
FMND	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)					
FMND	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)					
FMND	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

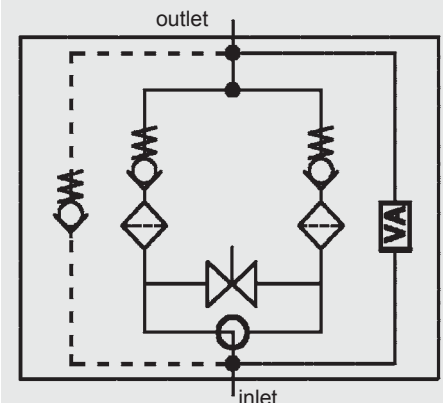
1.9 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

- 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

only for clogging indicators type D

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)

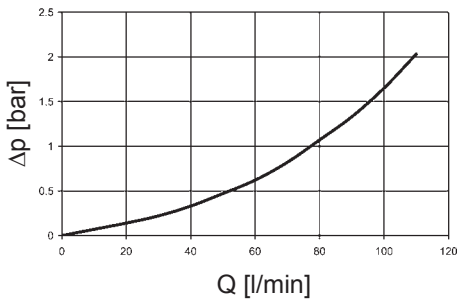
For ease of calculation, our Filter Sizing Program is available on request free of charge.

NEW: Sizing online at www.hydac.com

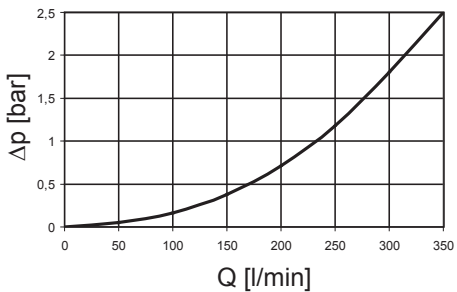
3.1 Δp -Q HOUSING CURVES BASED ON ISO 3968

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

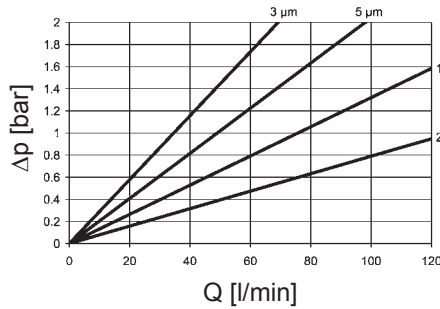


3.2 GRADIENT COEFFICIENTS (SK) FOR FILTER ELEMENTS

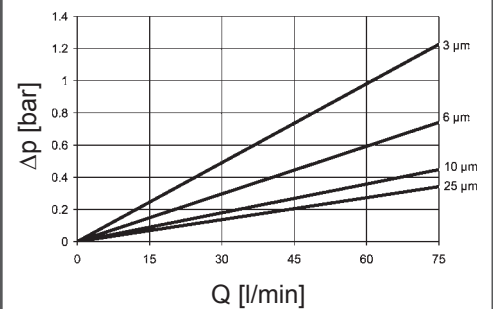
The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm²/s. The pressure drop changes proportionally to the change in viscosity.

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

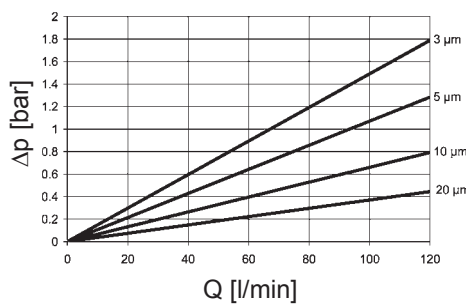
BN4HC: FMND 60



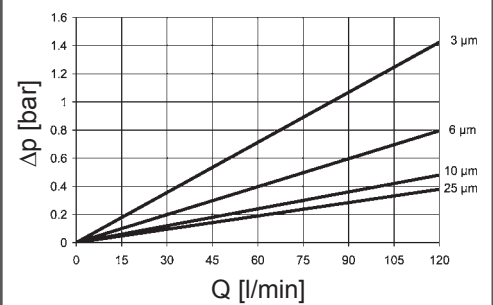
BN4HC: FMND 63



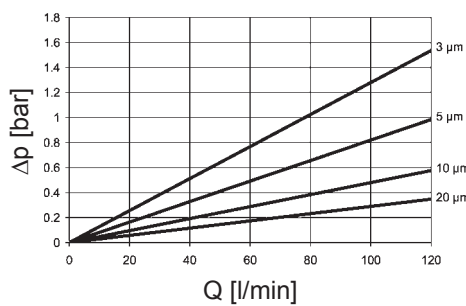
BN4HC: FMND 110



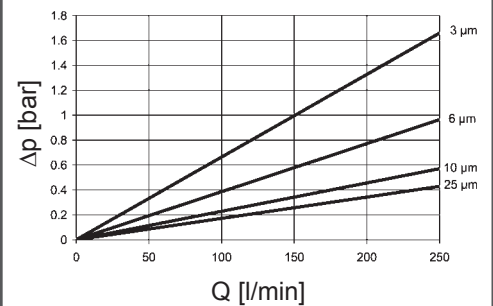
BN4HC: FMND 100



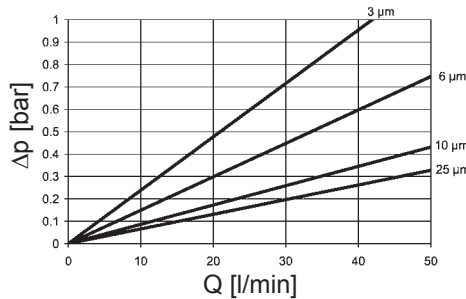
BN4HC: FMND 140



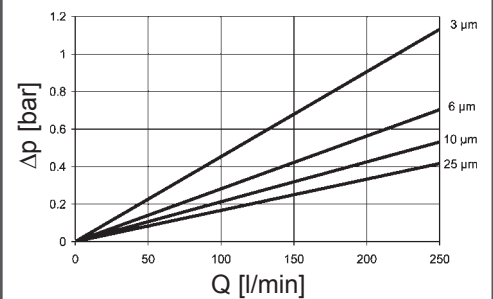
BN4HC: FMND 160



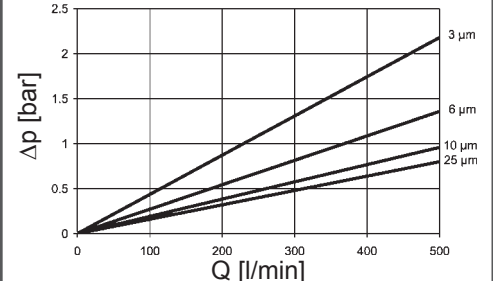
BN4HC: FMND 40



BN4HC: FMND 250

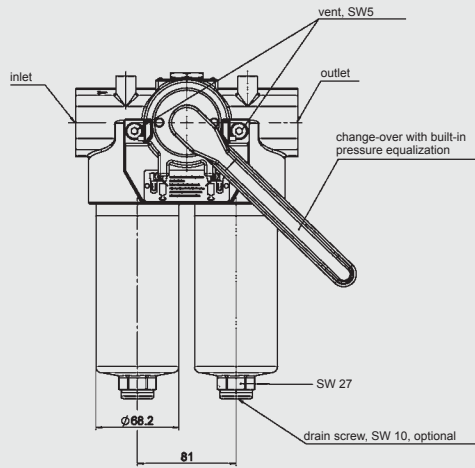


BN4HC: FMND 400

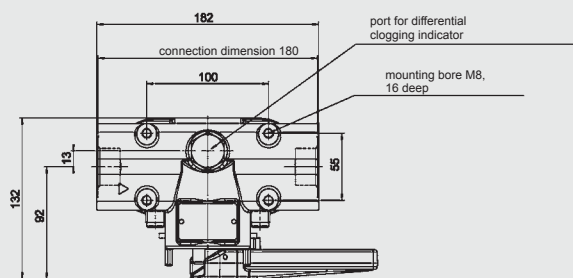
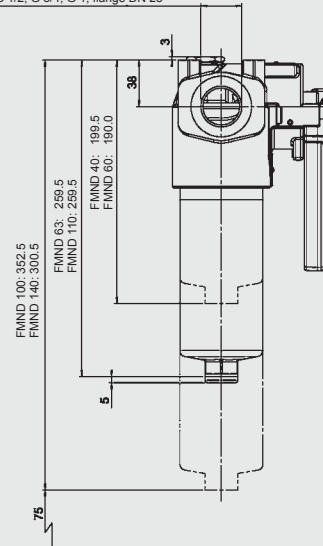


4. DIMENSIONS

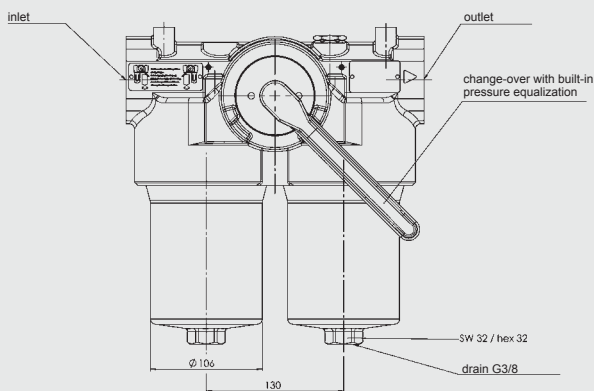
FMND 40 - 140



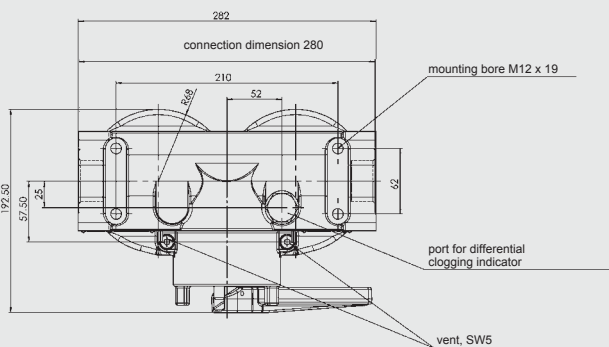
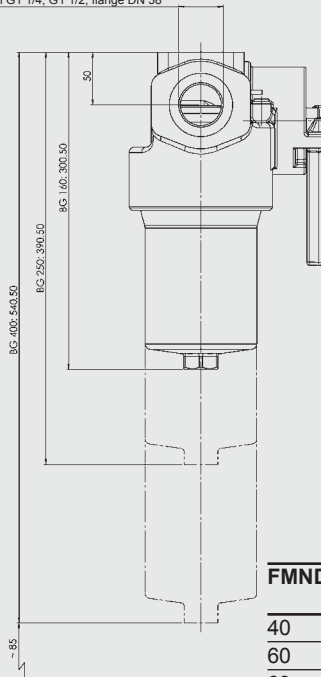
optional G 1/2, G 3/4, G 1, flange DN 25



FMND 160 - 400



optional G 1/4, G 1/2, flange DN 38



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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