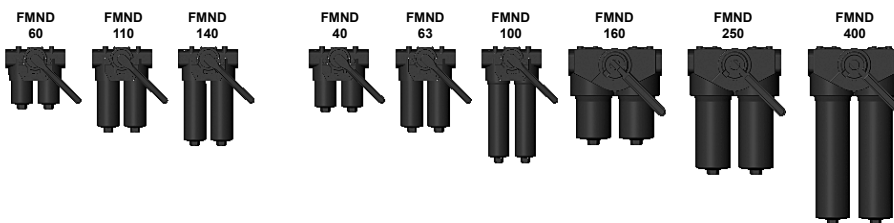




## Change-Over Inline Filter FMND

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

\*Filters and filter elements also available with 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 integral change-over valve and screw-in filter bowls.

Standard equipment:

- without bypass valve
- connection for a clogging indicator as standard
- with drain screw (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 <sup>6</sup> load 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 clogging indicator	VM (differential pressure indication up to 210 bar operating pressure) VD (differential pressure indication up to 420 bar operating pressure)
Setting pressure of clogging indicator	5 bar (others on request)
Bypass cracking pressure (optional)	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 MOUNTING

As inline filter

#### 1.6 SPECIAL MODELS AND ACCESSORIES

- with bypass valve
- with oil drain screw (FMND 40 to 140 = SO184)
- seals in FPM, EPDM

#### 1.7 SPARE PARTS

See Original Spare Parts List

#### 1.8 CERTIFICATES AND APPROVALS

On request

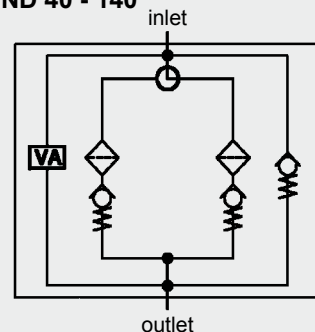
#### 1.9 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

- 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

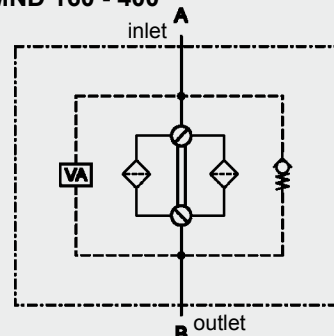
#### 1.10 IMPORTANT INFORMATION

- 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 FMND 40 - 140



#### FMND 160 - 400



## 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 of 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 (FMND 40 to 140); segment valve (FMND 160 to 400)

#### Type and size of port

to DIN 24550 (●); ports available (X)

Type	Port	Filter size not to DIN 24550			... to DIN 24550					
		60	110	140	40	63	100	160	250	400
B	G ½	X	X	X	●	X	X			
C	G ¾	X	X	X	X	●	X			
D	G 1	X	X	X	X	X	●			
E	G 1¼							●	X	X
F	G 1½							X	●	X
I	DN 25*	X	X	X	X	X	X			
K	DN 38*							X	X	●

\*SAE flange, 3000 PSI

#### Filtration rate in µm

BN4HC, BH4HC: 3, 5, 10, 20 BN4HC, BH4HC to DIN 24550: 3, 6, 10, 25

W/HC, W: 25, 50, 100, 200 W/HC to DIN 24550: 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. E 7.050../..

#### Type code

1

#### Modification number

X the latest version is always supplied

#### Supplementary details

B. cracking pressure of bypass (e. g.: B7 = 7 bar); no 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 standard)

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

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

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

SO184 oil drain screw (FMND 40 to 140)

V FPM seals

W suitable for HFA and HFC emulsions

### 2.2 REPLACEMENT ELEMENT

250 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 W/HC to DIN 24550: 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

#### Typ

VM differential pressure indicator up to 210 bar operating pressure

VD differential pressure indicator up to 420 bar operating pressure

#### Pressure setting

5 5 bar standard, 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, AV, BO, CN, DB, D4C, BO-LED (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)

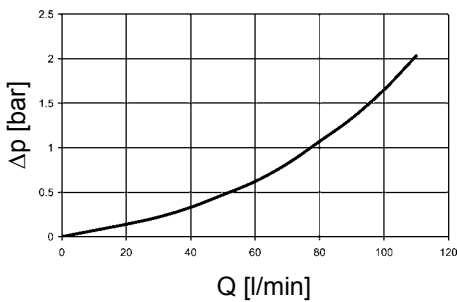
For ease of calculation, our Filter Sizing Program is available on request free of charge.

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

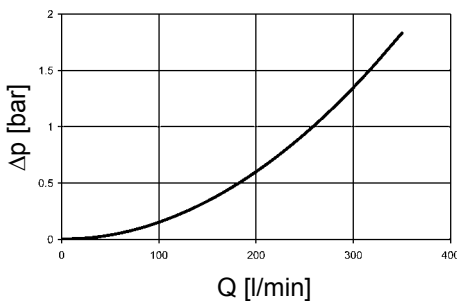
#### 3.1 $\Delta p$ -Q HOUSING GRAPHS IN ACCORDANCE WITH ISO 3968

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.

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



##### FMND 160, 250, 400

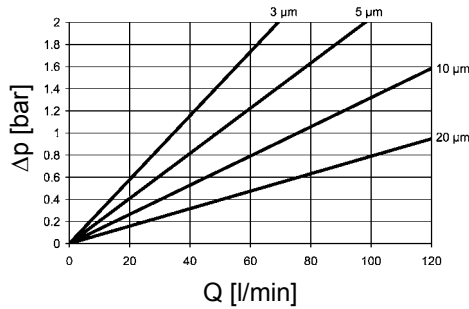


### 3.2 GRADIENT COEFFICIENTS (SK) FOR FILTER ELEMENTS

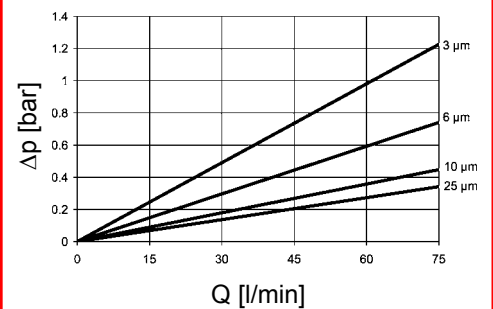
The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm<sup>2</sup>/s. The pressure drop changes proportionally to the change in viscosity.

FMND	... D ... BH4HC				W/HC - W	... DN ... BH4HC			
	3 μm	5 μm	10 μm	20 μm		-	3 μm	6 μm	10 μm
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	-	-	-	-	0.540	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

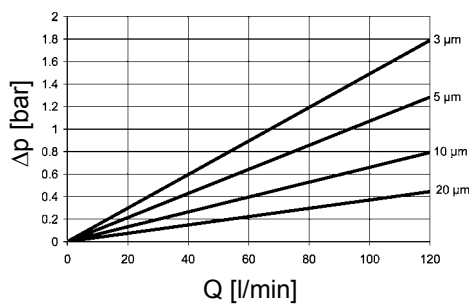
##### BN4HC: FMND 60



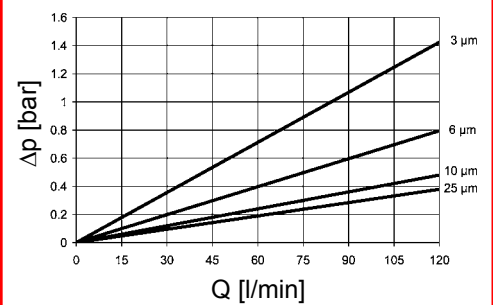
##### BN4HC: FMND 63



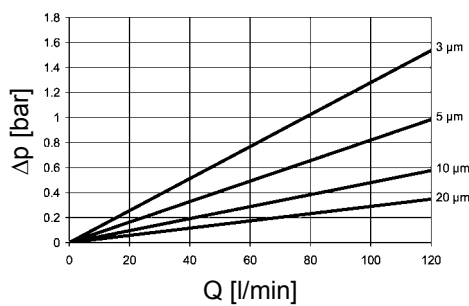
##### BN4HC: FMND 110



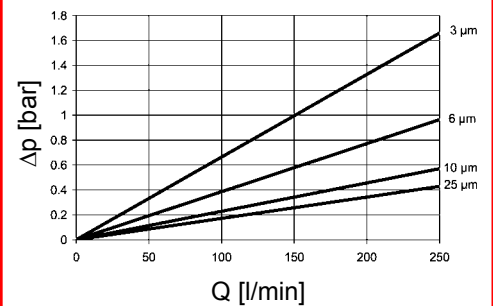
##### BN4HC: FMND 100



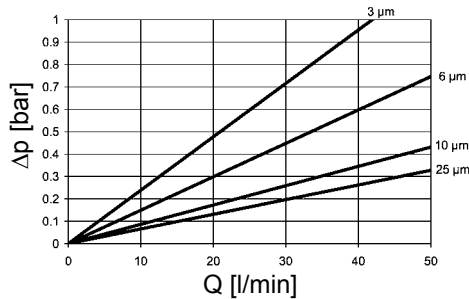
##### BN4HC: FMND 140



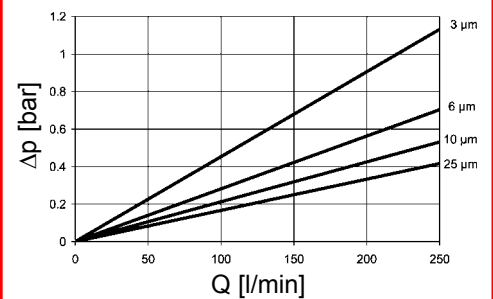
##### BN4HC: FMND 160



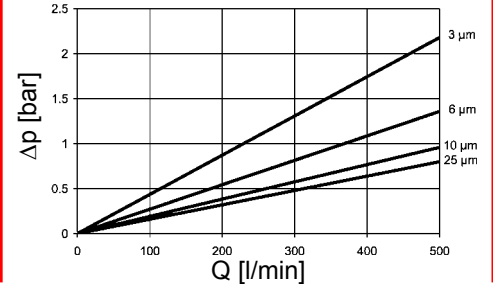
##### BN4HC: FMND 40



##### BN4HC: FMND 250

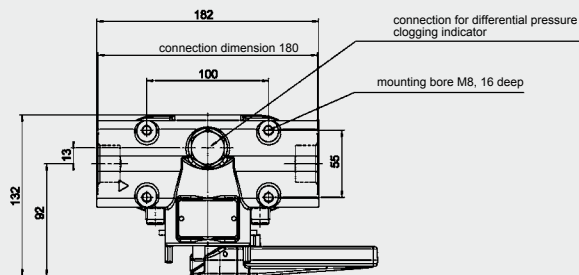
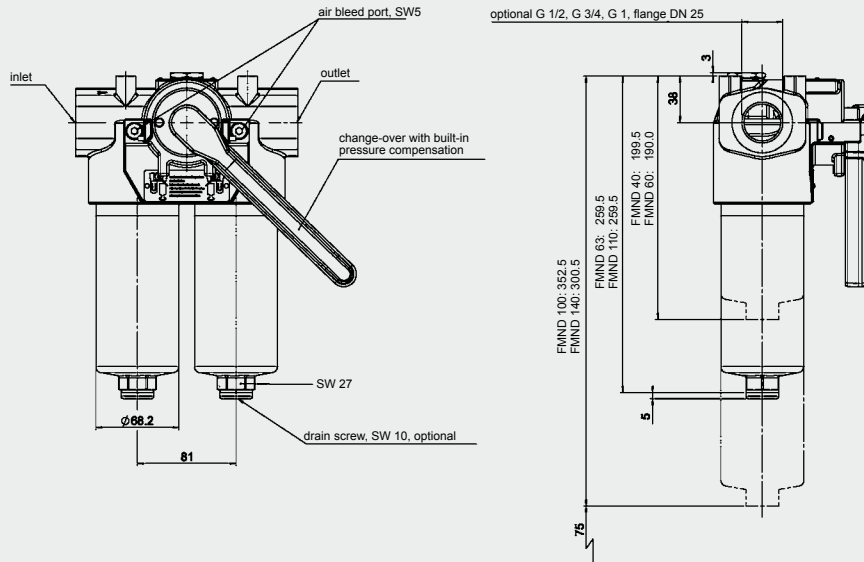


##### BN4HC: FMND 400

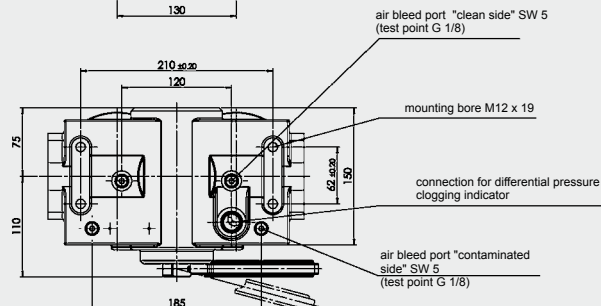
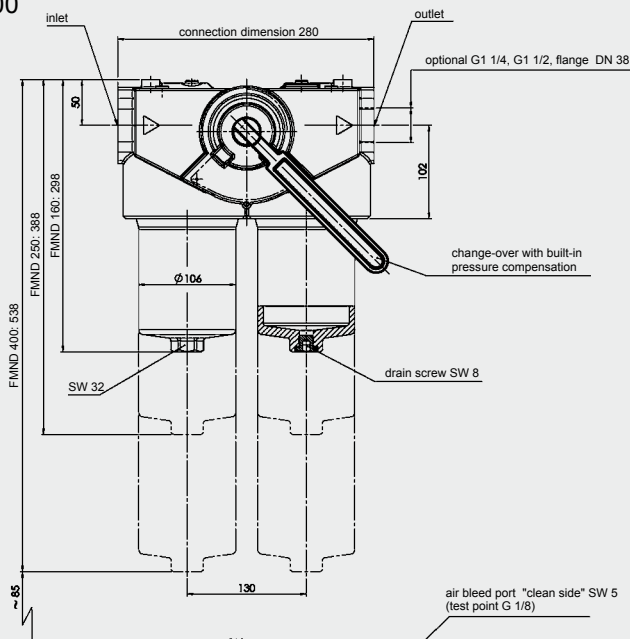


## 4. DIMENSIONS

### FMND 40 - 140



### FMND 160 - 400



FMND	Weight incl. element [kg]	Volume 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	42.9	2x 1.10
250	44.2	2x 1.70
400	45.6	2x 2.70

## 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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