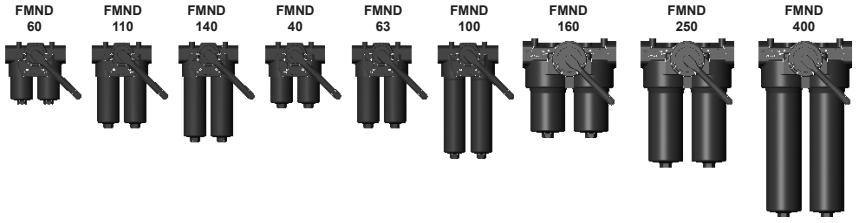
Change-Over Inline Filter FMND

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 built-in 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

Betamicron® (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
Betamicron® (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
Betamicron® (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
Betamicron® (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

Filter elements are available with the following pressure stability values:

Betamicron® (BN4HC):	20 bar
Betamicron® (BH4HC):	210 bar
Wire mesh (W/HC, W*):	20 bar

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)

1.4 SEALS

NBR (=Perbunan)

1.5 INSTALLATION

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" for FMND 160 and above

1.7 SPARE PARTS

See Original Spare Parts List

1.8 CERTIFICATES AND APPROVALS

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.

1.9 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

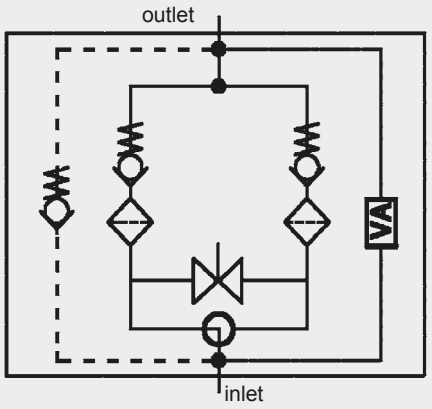
- Hydraulic oils H to HLPD DIN 51524
- Lubrication oils DIN 51517, API, ACEA, DIN 51515, ISO 6743
- Compressor oils DIN 51506
- Biodegradable operating fluids VDMA 24568 HETG, HEES, HEPG
- Fire-resistant fluids HFA, HFB, HFC and HFD
- Operating fluids with high water content (> 50 % water content) on 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.
- Filters with switching valve are designed to have a permissible leakage depending on the operating medium.

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 Betamicron® (BN4HC) BH/HC Betamicron® (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 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	●

**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, 060, 063, 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:

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

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

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

(*see Point 3.2)

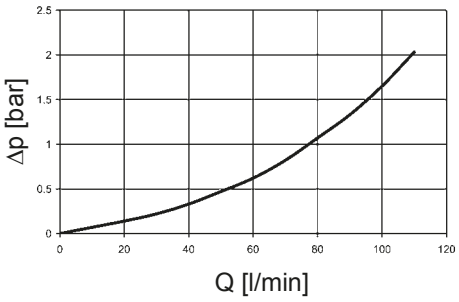
For ease of calculation, our Filter Sizing Program is available on request free of charge.

NEW: Sizing online at www.hydac.com

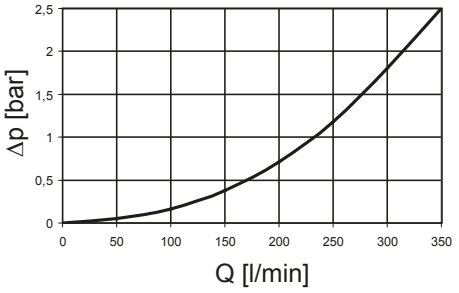
3.1 Δp-Q HOUSING CURVES BASED ON ISO 3968

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.

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



FMND 160, 250, 400

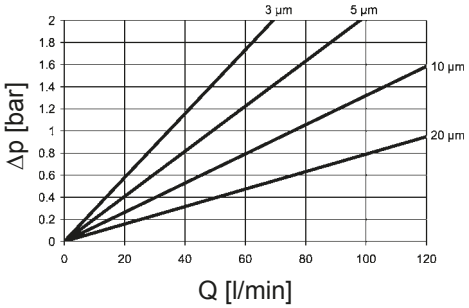


3.2 GRADIENT COEFFICIENTS (SK) FOR FILTER ELEMENTS

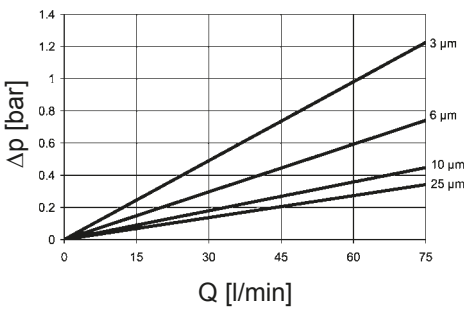
The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm²/s. The pressure drop changes proportionally to the change in viscosity.

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

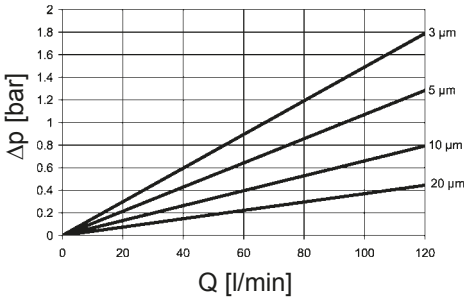
BN4HC: FMND 60



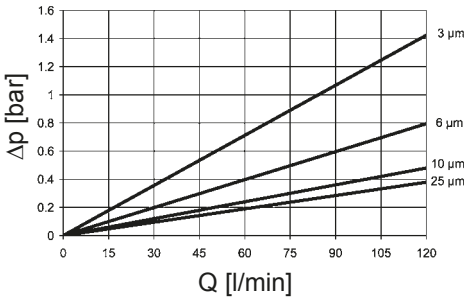
BN4HC: FMND 63



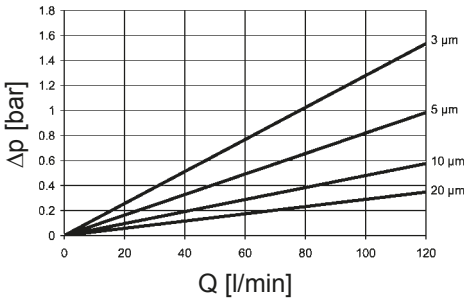
BN4HC: FMND 110



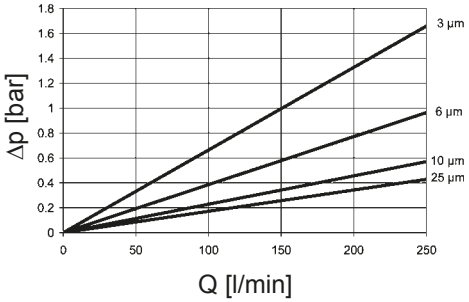
BN4HC: FMND 100



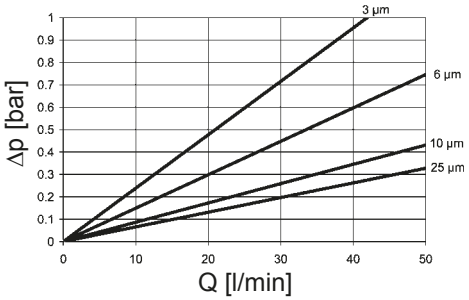
BN4HC: FMND 140



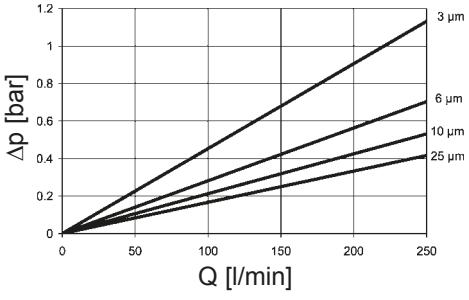
BN4HC: FMND 160



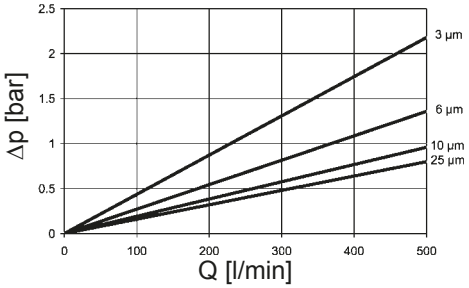
BN4HC: FMND 40



BN4HC: FMND 250

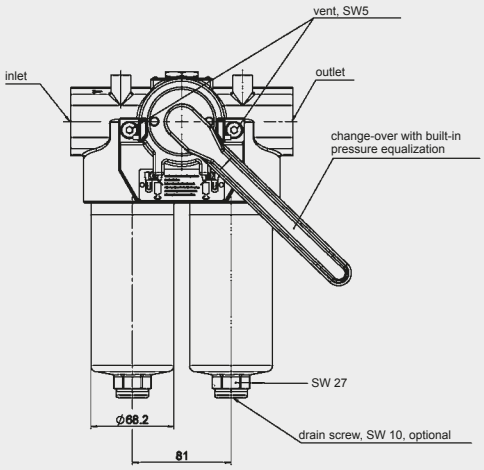


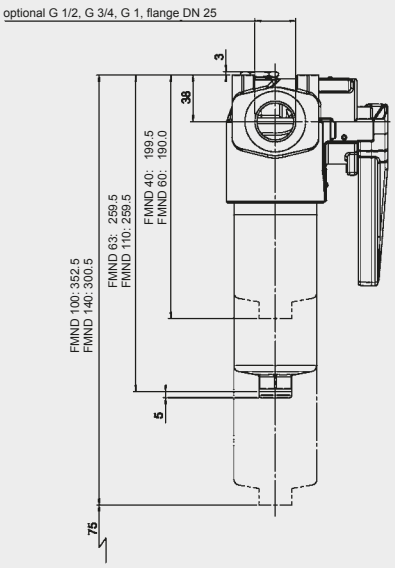
BN4HC: FMND 400

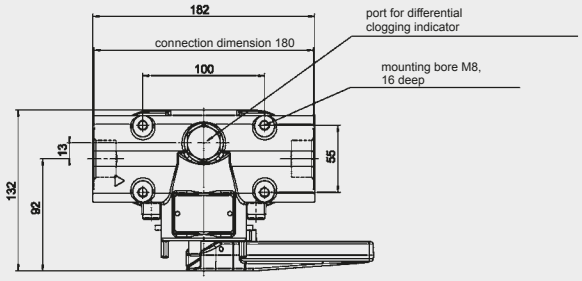


4. DIMENSIONS

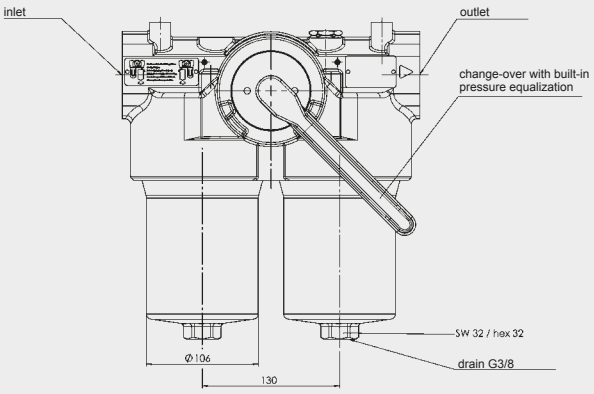
FMND 40 - 140

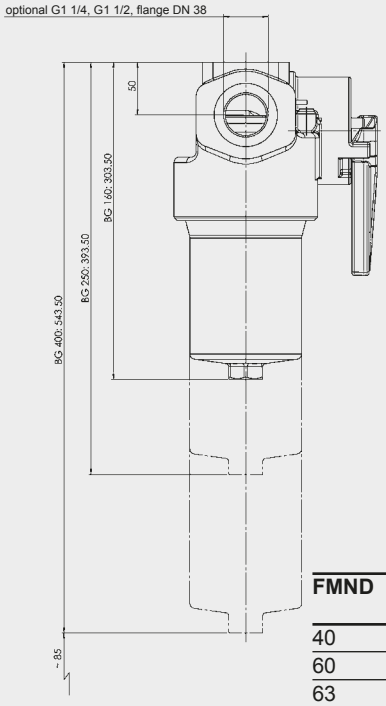


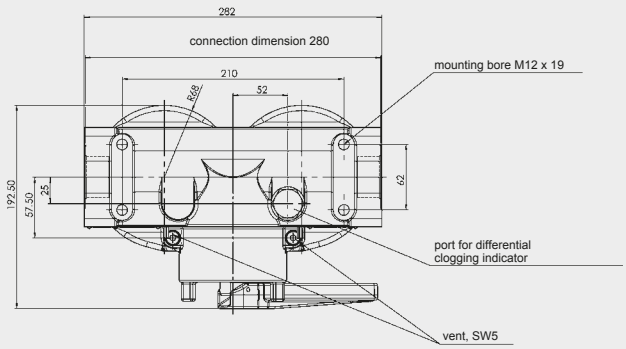




FMND 160 - 400







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 or operating conditions not described, please contact the relevant technical department.
Subject to technical modifications.

HYDAC Filtertechnik GmbH
Industriegebiet
D-66280 Sulzbach/Saar
Tel.: 0 68 97 / 509-01
Fax: 0 68 97 / 509-300
Internet: www.hydac.com
E-Mail: filter@hydac.com