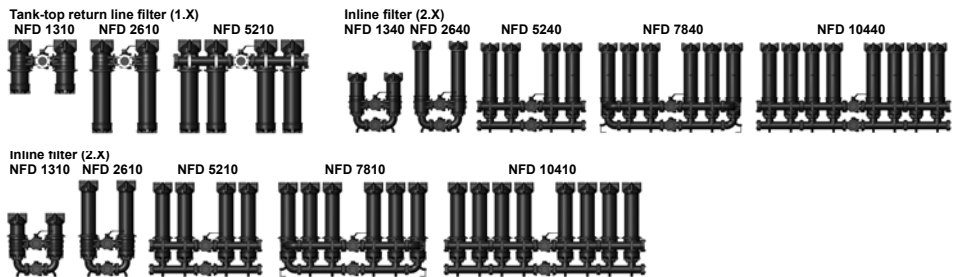


## Change-Over Filter NFD

up to 10400 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 and a threaded cover plate. The housings are connected by a ball change-over valve.

Standard equipment:

- connection for a clogging indicator in filter head

#### 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

NFD	Elements per side	Betamicon® (BN4HC)			
		3 µm	5 µm	10 µm	20 µm
13XX	1x1300 R	181.0	200.7	241.4	273.1
26XX	1x2600 R	369.4	409.4	492.5	557.2
52XX	2x2600 R	738.8	818.8	985.0	1114.4
78XX	3x2600 R	1108.2	1228.2	1477.5	1671.6
104XX	4x2600 R	1477.6	1637.6	1970.0	2228.8

Filter elements are available with the following pressure stability values:

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

#### 1.3 FILTER SPECIFICATIONS

Nominal pressure	25 bar
Temperature range	-10 °C to +100 °C
Material of filter housing and cover plate	Aluminium
Material of tube (housing)	Steel
Material of ball change-over valve	EN-GJS-400-15
Type of clogging indicator	VM (differential pressure indicator) VR (return line indicator)
Setting pressure 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 return line filter 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

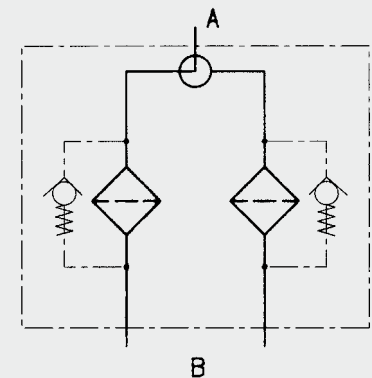
#### 1.9 COMPATIBILITY WITH HYDRAULIC FLUIDS ISO 2943

- 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 visual clogging indicators, the BM version (visual with manual reset) only should be used.
- 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



## 2. MODEL CODE (also order example)

NFD BN/HC 2610 D A P 10 D 1 . X /-L24

### 2.1. COMPLETE FILTER

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

NFD

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

BN/HC	Betamicon® (BN4HC)	P/HC	Paper
ECO/N	ECOMicon® (ECON2)	BN/AM	Betamicon®/Aquamicron®
W/HC	stainless steel wire mesh	AM	Aquamicron®
V	stainless steel fibre		

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

NFD: 1310, 1340, 2610, 2640, 5210, 5240, 7810, 7840, 10410, 10440

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

D = 25 bar

Type of change over \_\_\_\_\_

A = ball

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

Type	Port	Filter size									
		1310	1340	2610	2640	5210	5240	7810	7840	10410	10440
P	SAE DN 100	○	●	○	●	○	●	○	●	○	●

Further types and sizes of port on request!  
For examples, see point 3.3  
○ = discontinued model

Filtration rating in µm \_\_\_\_\_

BN4HC, ECO/N, 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	with plastic blanking plug in indicator port	} for other clogging indicators, see brochure no. 7.050.../...
A	with steel blanking plug in indicator port	
B	visual indicator (version 1.X only)	
BM	visual indicator	
C	electrical indicator	
D	visual and electrical indicator	

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

- |   |                             |  |
|---|-----------------------------|--|
| 1 | Tank-top return line filter | - return line indicator (VR...)  |
|   |                             | - inlet flange horizontal at top, outlet vertical (from size NFD 5210 horizontal)    |
|   |                             | - tank seal supplied   |
| 2 | Inline filter               | - differential pressure indicator (VM...)  |
|   |                             | - inlet flange horizontal at bottom, outlet vertical (from size NFD 5210 horizontal) |

Code	Filter size									
	1310	1340	2610	2640	5210	5240	7810	7840	10410	10440
1	x		x		x					
2	○	●	○	●	○	●	○	●	○	●

x = on request  
○ = standard model  
● = discontinued model

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

X the latest version is always supplied

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

B.	special cracking pressure of bypass valve (e. g.: B6 = 6 bar)	} only for clogging indicators type D
EM	manual vent with shut-off valve	
EP	permanent vent via Minimesh hose	
KB	no bypass valve	
L...	light with appropriate voltage (24, 48, 110, 220 Volt)	
LED	2 light emitting diodes up to 24 Volt	
SB4	filling line with Ø4 mm orifice	
V	FPM seals	
VKD	drain fitted with ball shut-off valve	
39	connection alternative (see point 2.4)	

### 2.2 REPLACEMENT ELEMENT

2600 R 010 BN4HC /-V

Size \_\_\_\_\_

1300, 2600

Type \_\_\_\_\_

Filtration rating in µm \_\_\_\_\_

BN4HC, ECON2, V: 003, 005, 010, 020 P/HC: 010, 020 AM: 040  
W/HC: 025, 050, 100, 200 BN4AM: 003, 010

Filter material \_\_\_\_\_

BN4HC, ECON2, V, W/HC, P/HC, BN4AM, AM

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

V (for descriptions, see point 2.1)

### 2.3 REPLACEMENT CLOGGING INDICATOR

VM 2 D . X /-L24

Type \_\_\_\_\_

VM differential pressure indicator up to 210 bar operating pressure (only for inline filter code 2)  
VR return line indicator up to 25 bar operating pressure (only for tank-top filter code 1)

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)

## 2.4 CONNECTION ALTERNATIVES

(Example)

### Supplementary details .. / - 0 3

1st digit = position of inlet valve

2nd digit = position of the outlet valve

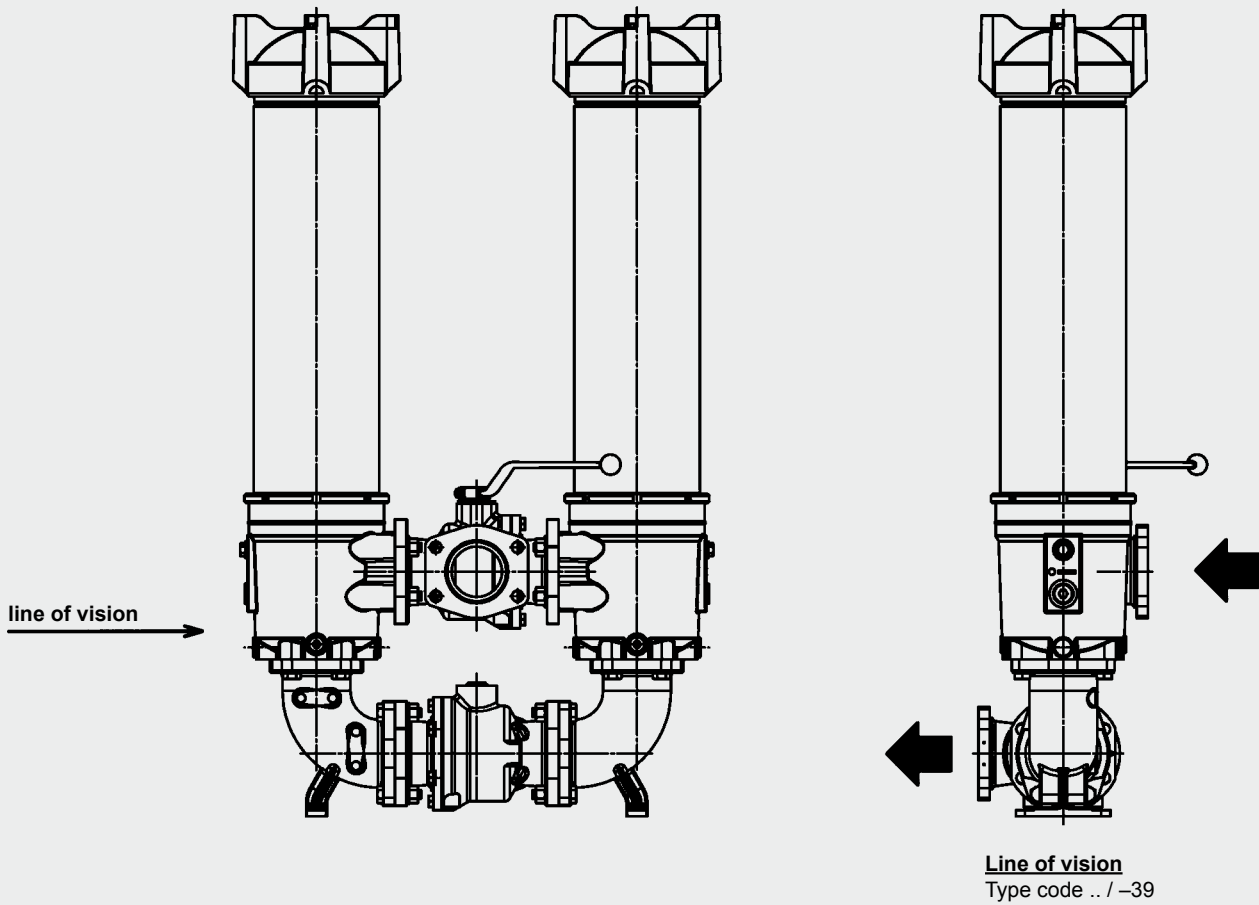
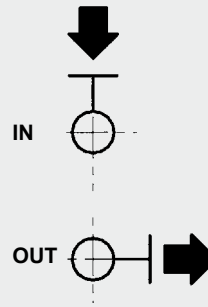
**33**  
stand.

#### Standard model

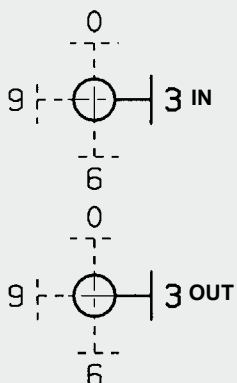
Not given as a supplementary detail in the model code

~~63~~

#### Not available!



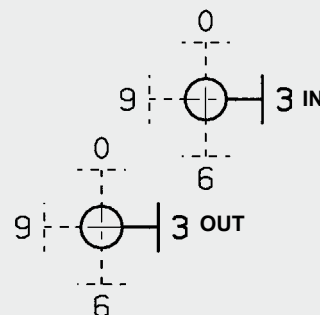
**NFD 2610/2640 .. A 2.0 / -XX**  
(possible supplementary detail)



<del>00</del>	03	06	<del>09</del> <sup>1)</sup>
30	<b>33</b> stand.	36	39
<del>60</del>	<del>63</del>	<del>66</del>	<del>69</del>
90	93 <sup>2)</sup>	96	99 <sup>3)</sup>

- 1) corresponds to type 03
- 2) corresponds to type 39
- 3) corresponds to type 33

**NFD 5210/5240 .. A 2.0 / -XX**  
(possible supplementary detail)



00	03	06	09
30	<b>33</b> stand.	36	39
60	<del>63</del>	66	69
<del>90</del>	93	96	99

### 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:

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

$\Delta p_{\text{housing}}$  = use graphs (see point 3.1)

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

(\*see point 3.2)

n = no. of elements (see point 1.2 filter elements)

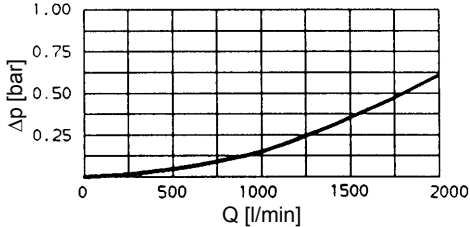
For ease of calculation, our Filter Sizing Program is available on request free of charge.

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

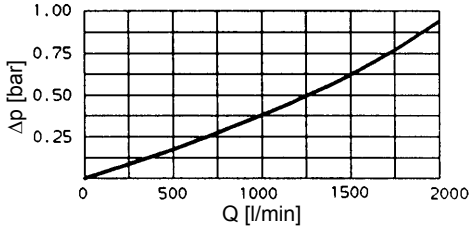
#### 3.1 $\Delta P$ -Q HOUSING GRAPHS BASED ON ISO 3968

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.

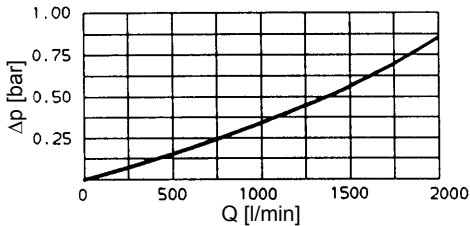
##### NFD 1310/2610 ... 1.X



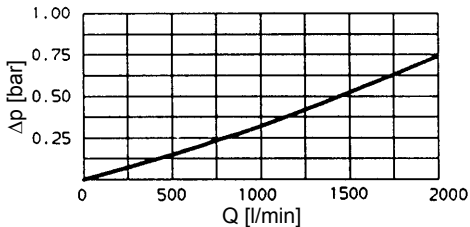
##### NFD 1310/1340 / 2610/2640 ... 2.X



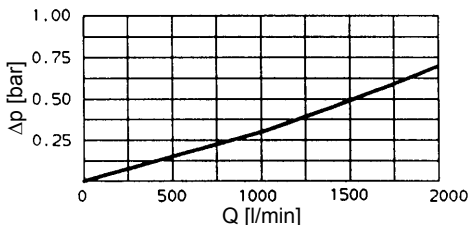
##### NFD 5210 ... 1.X/2.X / 5240 ... 2.X



##### NFD 7810/7840 ... 2.X



##### NFD 10410/10440 ... 2.X

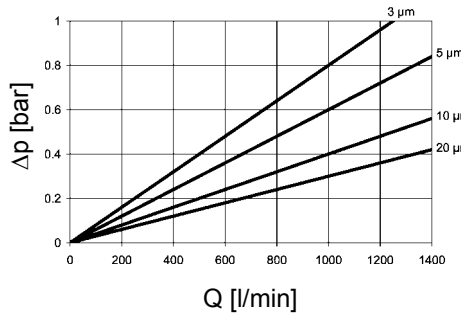


### 3.2 GRADIENT COEFFICIENTS (SK) FOR FILTER ELEMENTS

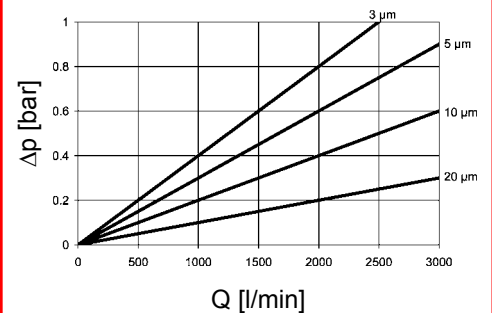
The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm<sup>2</sup>/s. The pressure drop changes proportionally to the change in viscosity.

NFD	V				W/H/C	ECON2			
	3 μm	5 μm	10 μm	20 μm		3 μm	5 μm	10 μm	20 μm
1300	0.5	0.4	0.3	0.2	0.045	0.8	0.6	0.4	0.3
2600	0.3	0.2	0.1	0.1	0.018	0.4	0.3	0.2	0.1

#### BN4HC: 1300 R...

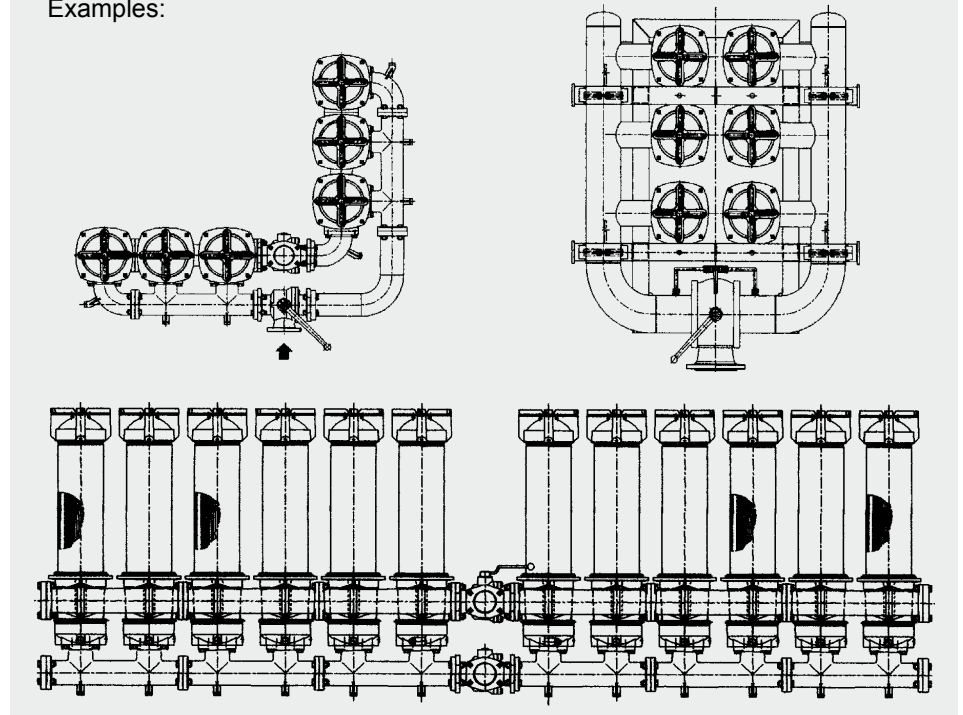


#### BN4HC: 2600 R...



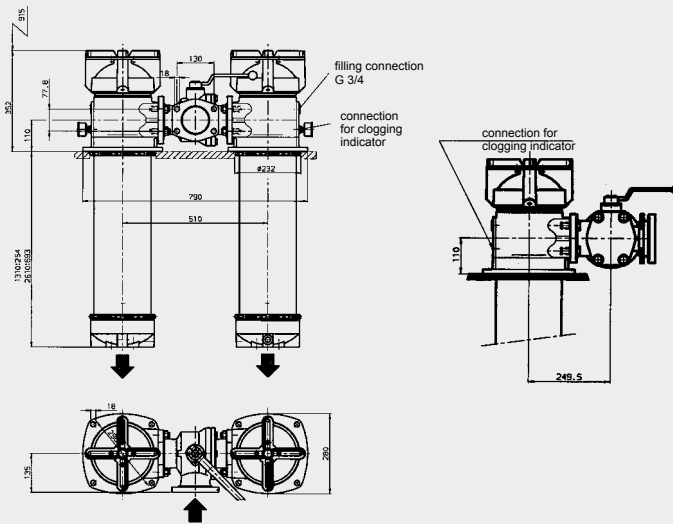
### 3.3. OTHER CONNECTION SIZES AND TYPES ON REQUEST!

Examples:

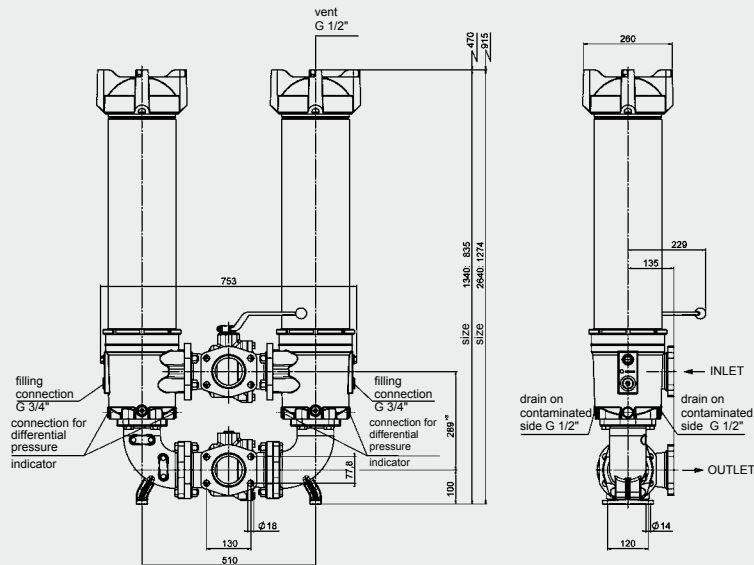


## 4. DIMENSIONS

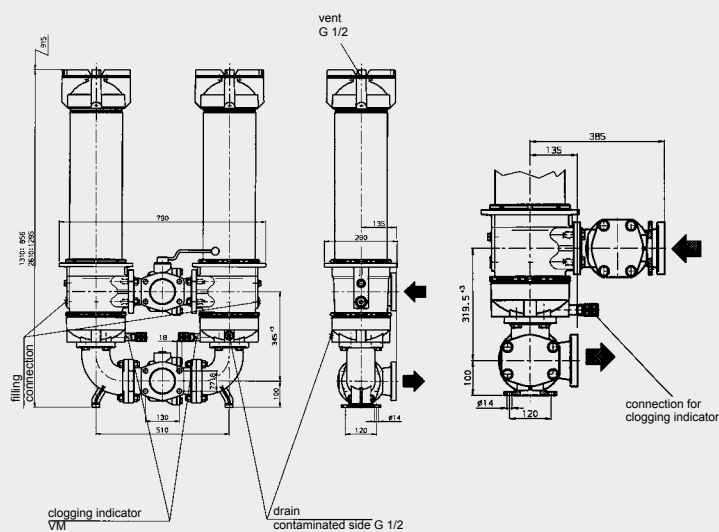
NFD 1310/2610...1.X  
On request



NFD 1340/2640...2.X  
Standard series



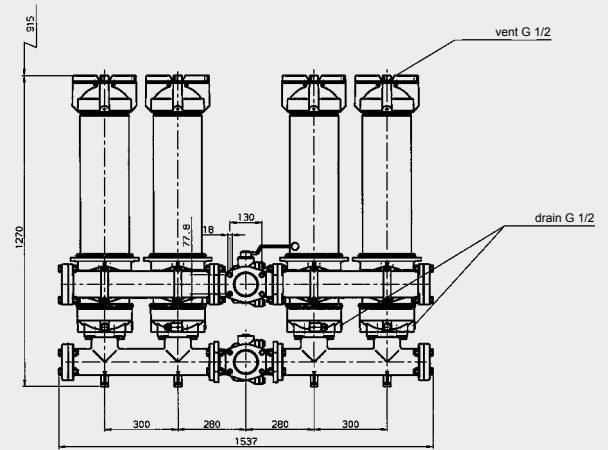
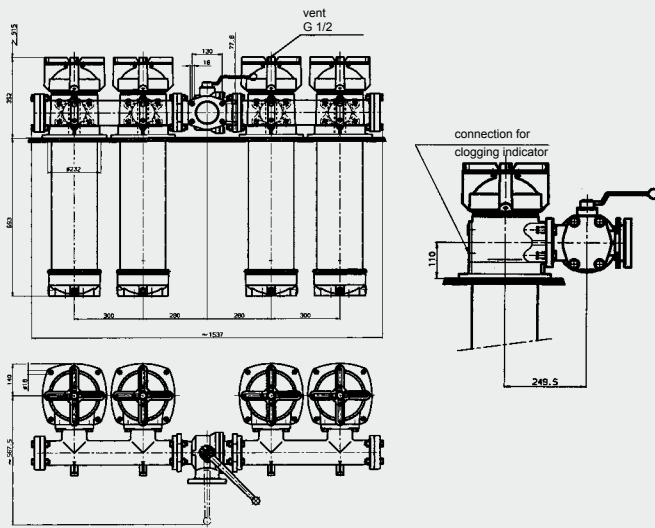
NFD 1310/2610...2.X



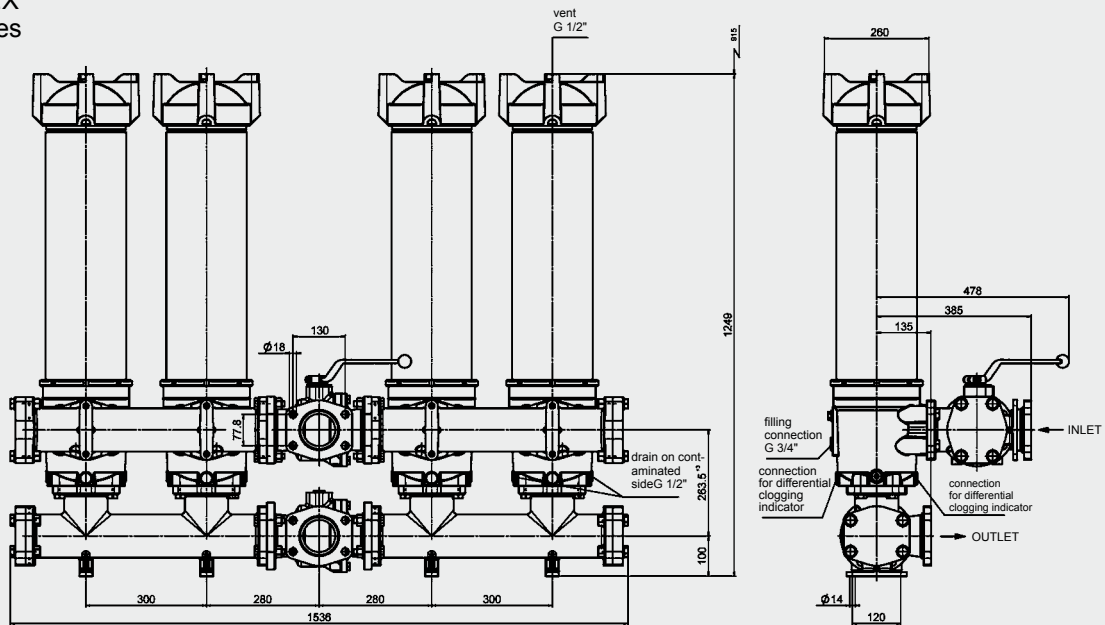
NFD	No. of elements per side	Weight incl. element [kg]	Volume of pressure chamber [l]
1310...1.X	1x 1300 R...	83.7	28.2
2610...1.X	1x 2600 R...	101.0	50.8
1310...2.X	1x 1300 R...	122.7	35.8
1340...2.X			
2610...2.X	1x 2600 R...	140.0	58.1
2640...2.X			

NFD 5210...1.X  
On request

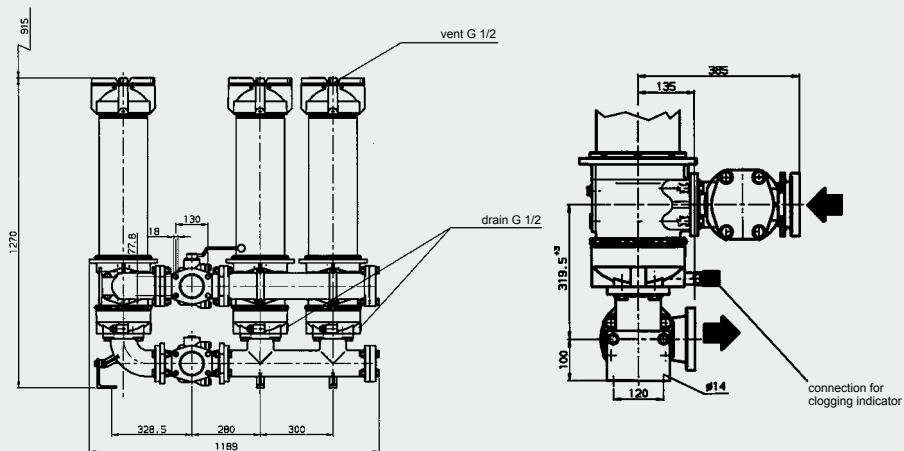
NFD 5210...2.X



NFD 5240...2.X  
Standard series



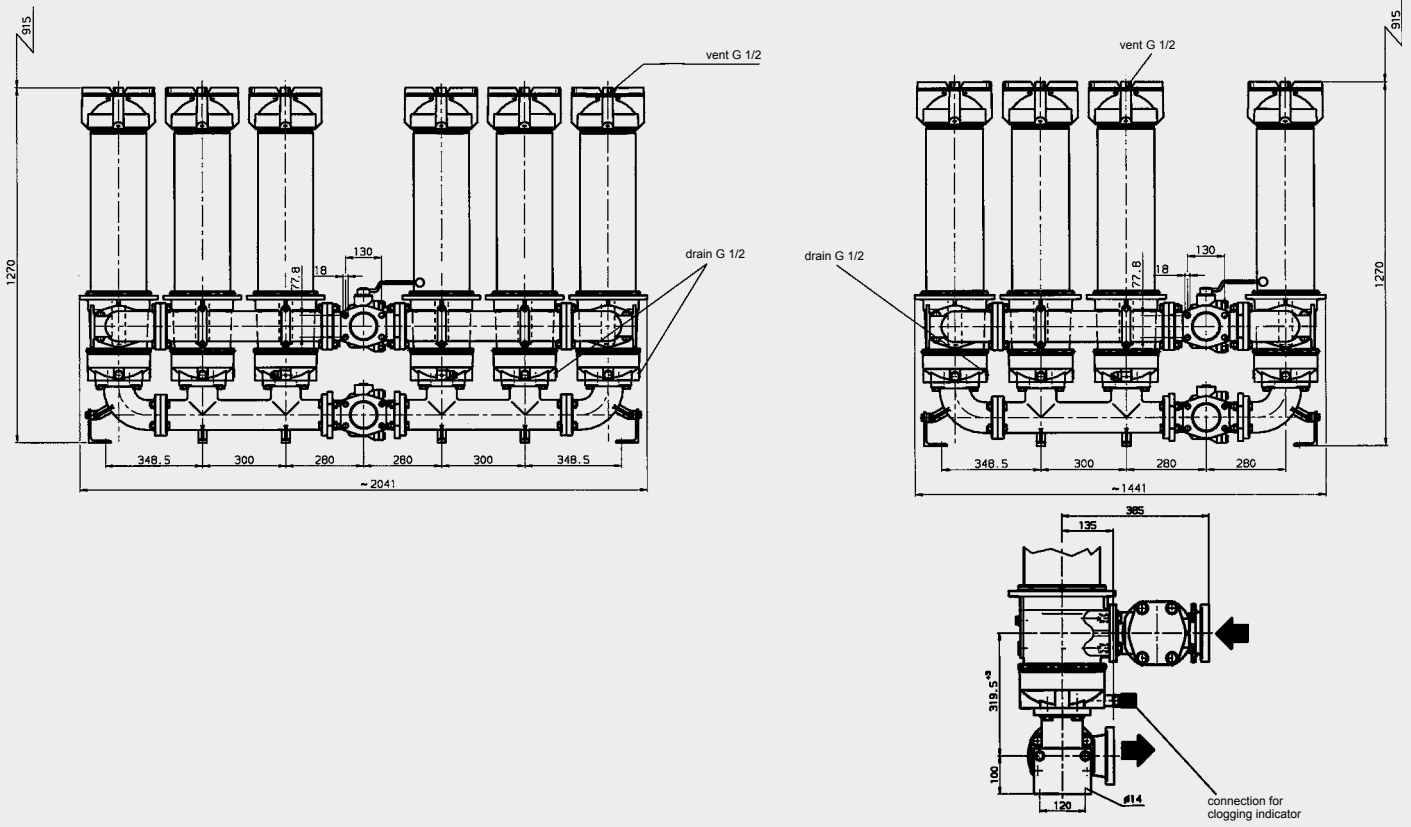
NFD 52XX...2.X /-1+2



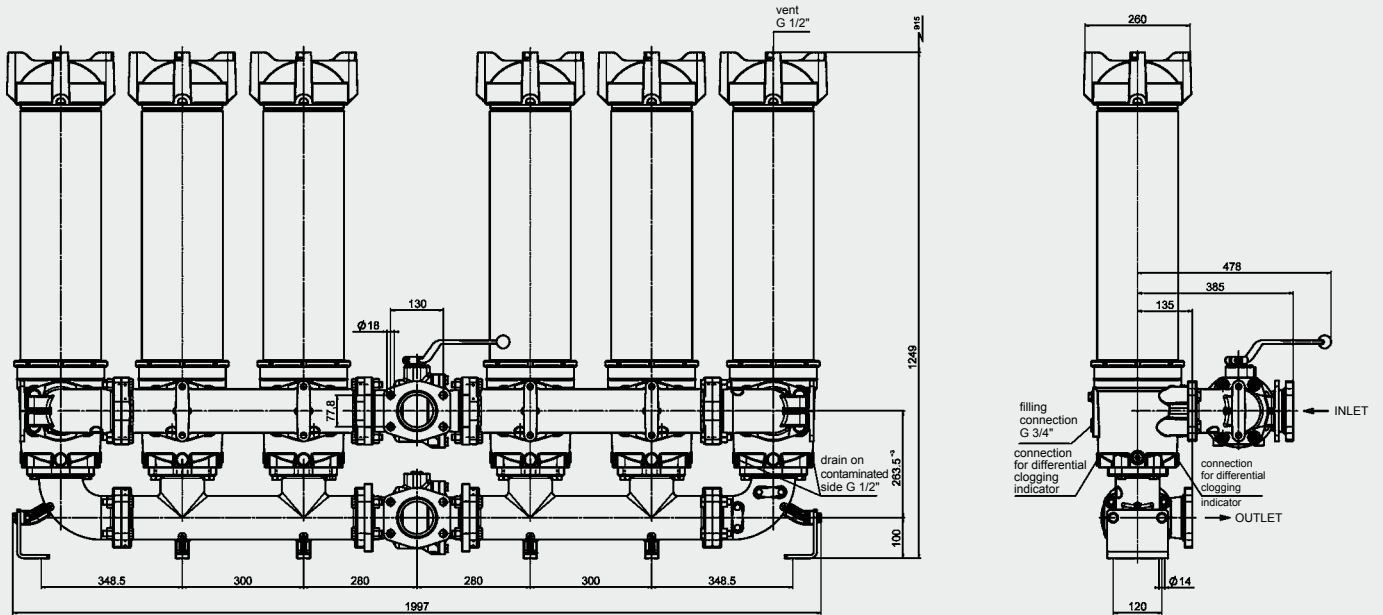
NFD	No. of elements per side	Weight incl. element [kg]	Volume of pressure chamber [l]
5210...1.X	2x 2600 R...	258.0	124.0
5210...2.X	2x 2600 R...	276.8	126.4
5240...2.X			
5210../-1+2...2.X	1x 2600 R... and 2x 2600 R...	217.4	94.3

NFD 7810...2.X

NFD 78XX...2.X /-3+1

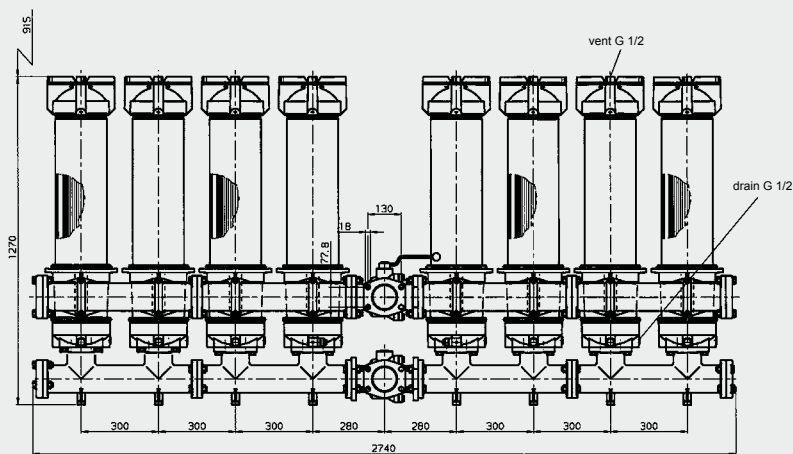


NFD 7840...2.X  
Standard series

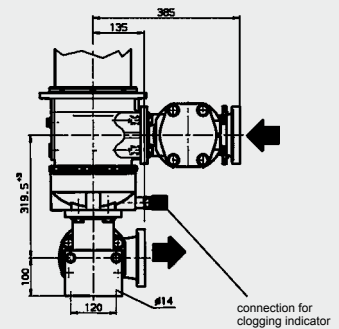
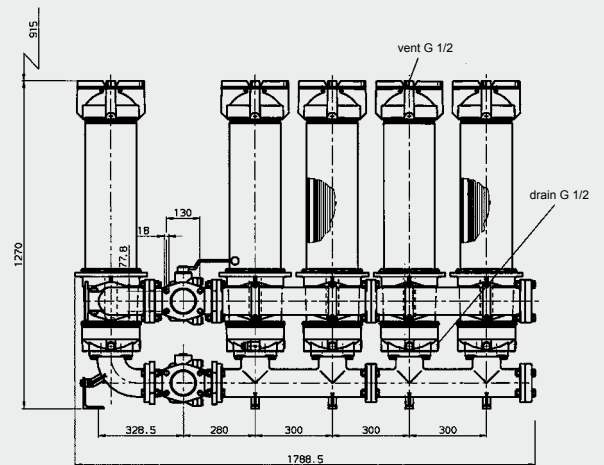


NFD	No. of elements per side	Weight incl. element [kg]	Vol. of pressure chamber [l]
7810	3x 2600 R...	391.6	182.8
7840	3x 2600 R... and 1x 2600 R...	286.6	122.2

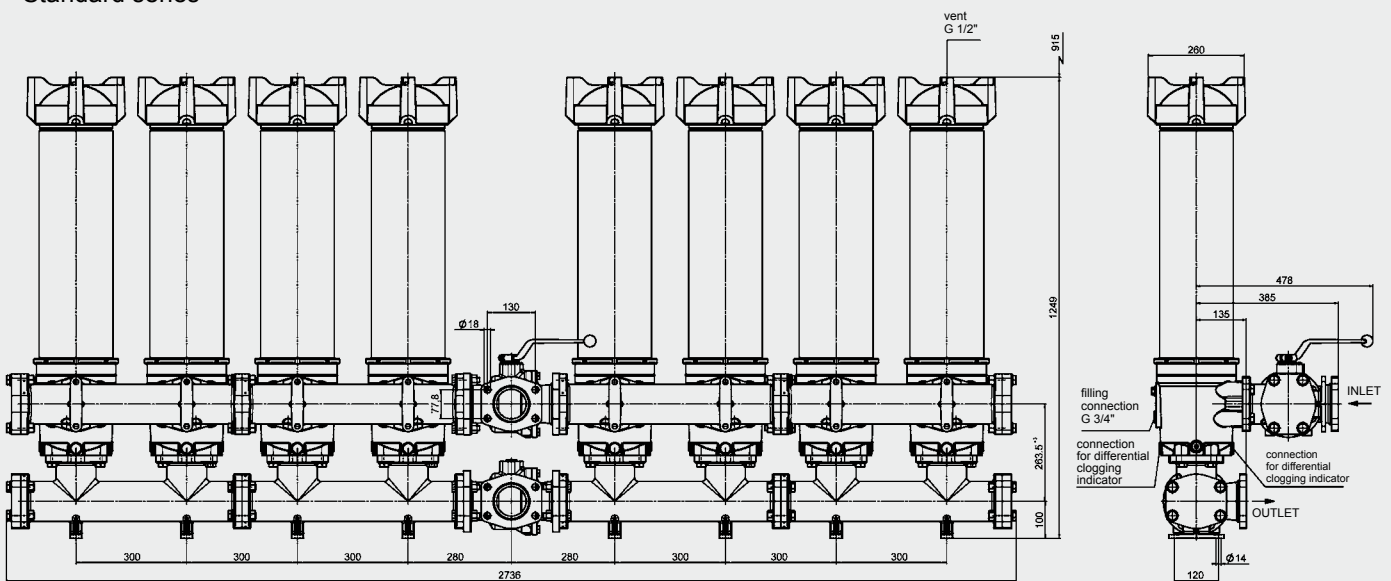
NFD 10410...2.X



NFD 104XX...2.X /-1+4



NFD 10440...2.X  
Standard series



NFD	No. of elements per side	Weight incl. element [kg]	Volume of pressure chamber [l]
10410	4x 2600 R...	510.4	251.0
10440	4x 2600 R...	510.4	251.0
10410.../-1+4	1x 2600 R... and 4x 2600 R...	328.3	154.0

**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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