



## Return Line Filter HF4R up to 450 l/min, up to 10 bar



### 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 filter bowl and bolt-on cover plate

Standard equipment:

- with bypass valve
- connection for a clogging indicator

#### 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

Filter elements are available with the following pressure stability values:

Betamicon® (BN):	10 bar
Wire mesh (W/HC):	10 bar
Paper (P)	10 bar

#### 1.3 FILTER SPECIFICATIONS

Nominal pressure	10 bar
Fatigue strength	at nominal pressure 10 <sup>6</sup> load cycles from 0 to nominal pressure
Temperature range	-30 °C to +100 °C
Material of filter head	Aluminium
Material of filter bowl	Steel
Type of clogging indicator	VMF (return line indicator)
Pressure setting of clogging indicator	2 bar (others on request)
Cracking pressure of bypass valve	3 bar (others on request)

#### 1.4 SEALS

NBR (= Perbunan)

#### 1.5 MOUNTING

As inline filter.

#### 1.6 SPECIAL MODELS AND ACCESSORIES

- without bypass valve
- without connection for a clogging indicator

#### 1.7 SPARE PARTS

See Original Spare Parts List

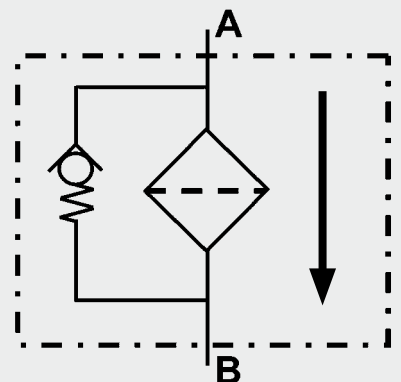
#### 1.8 CERTIFICATES AND APPROVALS

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%) on request

#### Symbol for hydraulic systems



## 2. MODEL CODE (also order example)

HF4R BN 09 G 3 C 1 . X /12 V-B6

### 2.1 COMPLETE FILTER

#### Filter type

HF4R

#### Filter material

BN Betamicon® (BN)  
W Wire mesh  
P Paper

#### Size of filter or element

09 9"  
18 18"  
27 27"

#### Port

G threaded port  
F flange port

#### Filtration rating in µm

BN : 3, 5, 10, 20  
W/HC : 25, 74, 149  
P : 10, 20

#### Type of clogging indicator

W without connection for clogging indicator  
A with steel blanking plug in indicator port  
B visual  
C electrical  
D visual and electrical  
J electrical switch (Brad Harrison 5 Pin Mini)  
J4 electrical switch (Brad Harrison 4 Pin Micro)

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

#### Type code

1 1 inlet  
2 2 inlets

#### Modification number

X the latest version is always supplied

#### Supplementary details

0 BSPP 1¼"  
3 NPT 1½"  
12 SAE-24-O-ring boss  
16 SAE 1½" flange (210 bar)

B. bypass cracking pressure (e.g. B1 = 1 bar); no details = without bypass valve  
L... light with appropriate voltage (24, 48, 110, 220 Volt)  
LED 2 light emitting diodes up to 24 Volt  
V FPM seals  
W suitable for HFA and HFC emulsions

only for clogging indicator  
type "D"

### 2.2 REPLACEMENT ELEMENT

5.03.09 D 03 BN /-V

#### Size

09 9"  
18 18"  
27 27"

#### Type

D

#### Filtration rating in µm

BN : 03, 05, 10, 20  
W/HC : 25, 74, 149  
P : 10, 20

#### Filter material

BN, W/HC, P

#### Supplementary details

V, W (for descriptions, see point 2.1)

### 2.3 REPLACEMENT CLOGGING INDICATOR

VMF 2 D . X /-L24

#### Type

VMF return line indicator

#### Pressure setting

2 2 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 (for descriptions, see point 2.1)

## 4. 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.

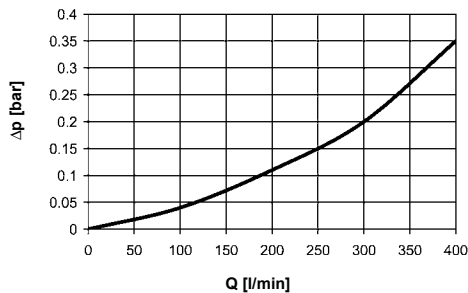
**NEW:** Sizing online at [www.hydac.com](http://www.hydac.com)

### 4.1 $\Delta P$ -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.

#### HF4R

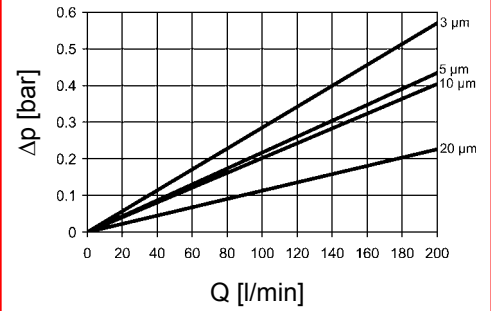


## 4.2 GRADIENT COEFFICIENTS (SK) FOR FILTER ELEMENTS

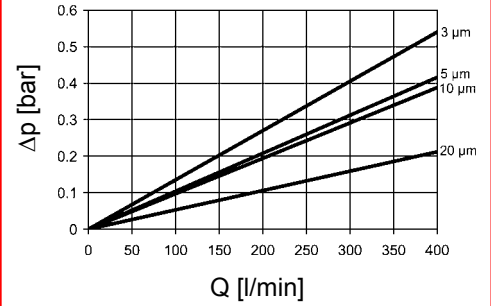
The gradient coefficients in mbar/(l/min) apply to mineral oils with a kinematic viscosity of 30 mm<sup>2</sup>/s. The pressure drop changes proportionally to the change in viscosity.

HF4R	BN				W
	3 μm	5 μm	10 μm	20 μm	-
09	2.85	2.17	2.02	1.13	0.128
18	1.35	1.04	0.97	0.53	0.073
27	0.88	0.67	0.62	0.35	0.036

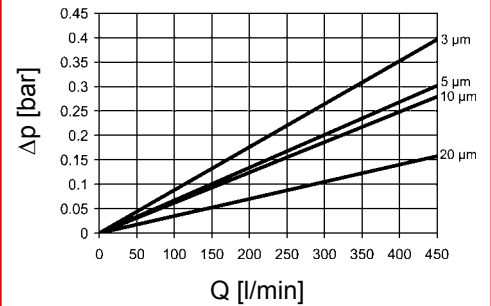
### 09 BN:



### 18 BN:

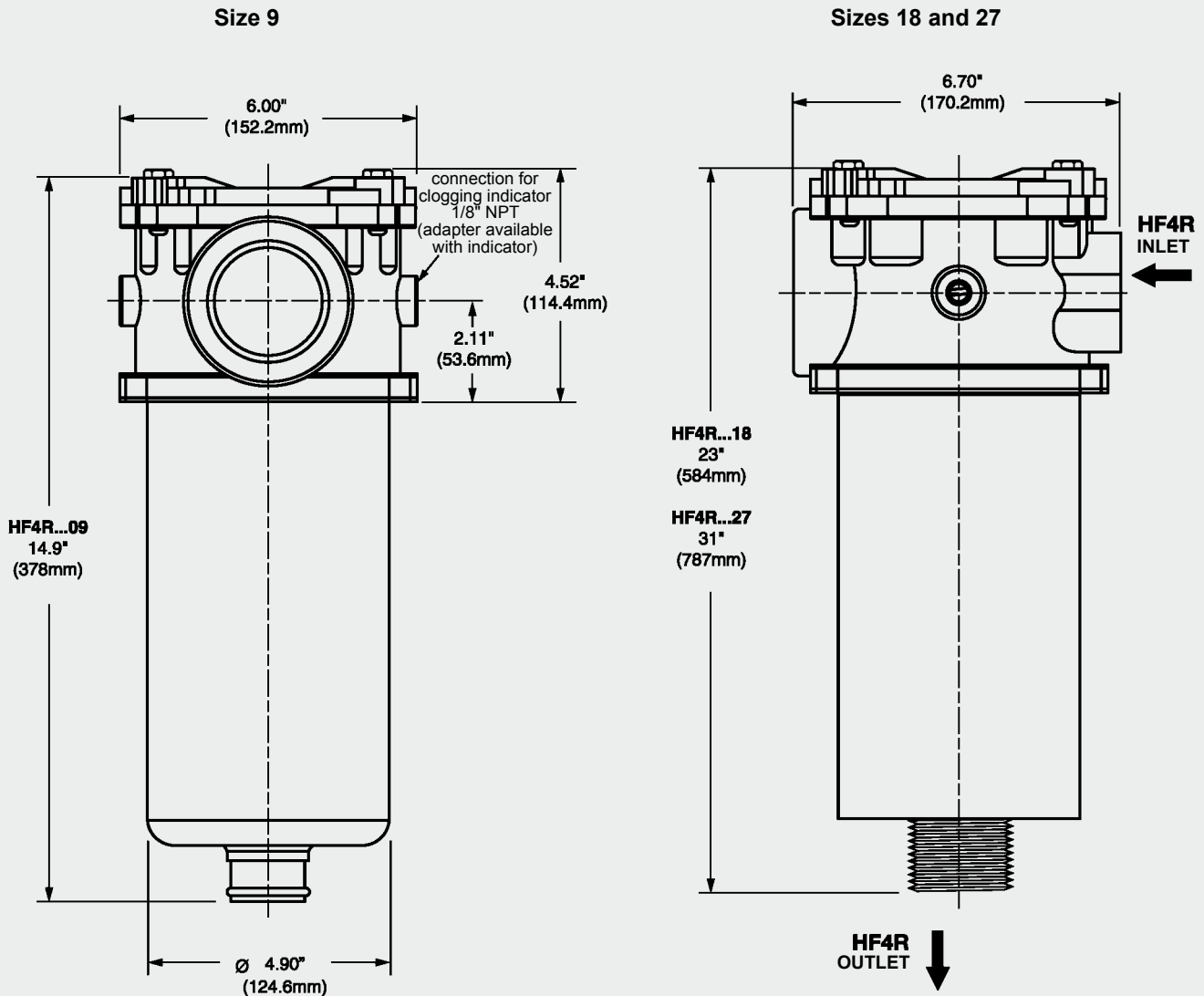


### 27 BN:

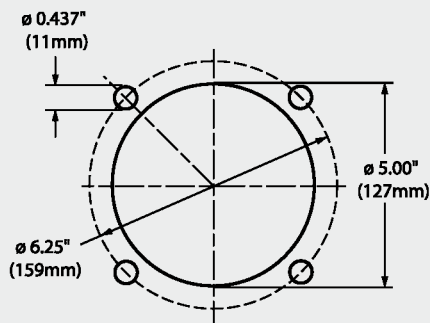


## 4. DIMENSIONS

### HF4R



### Mounting specifications



HF4R	Weight incl. element [kg]
09	4.53
18	6.58
27	8.44

### 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** Filbertechnik 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