

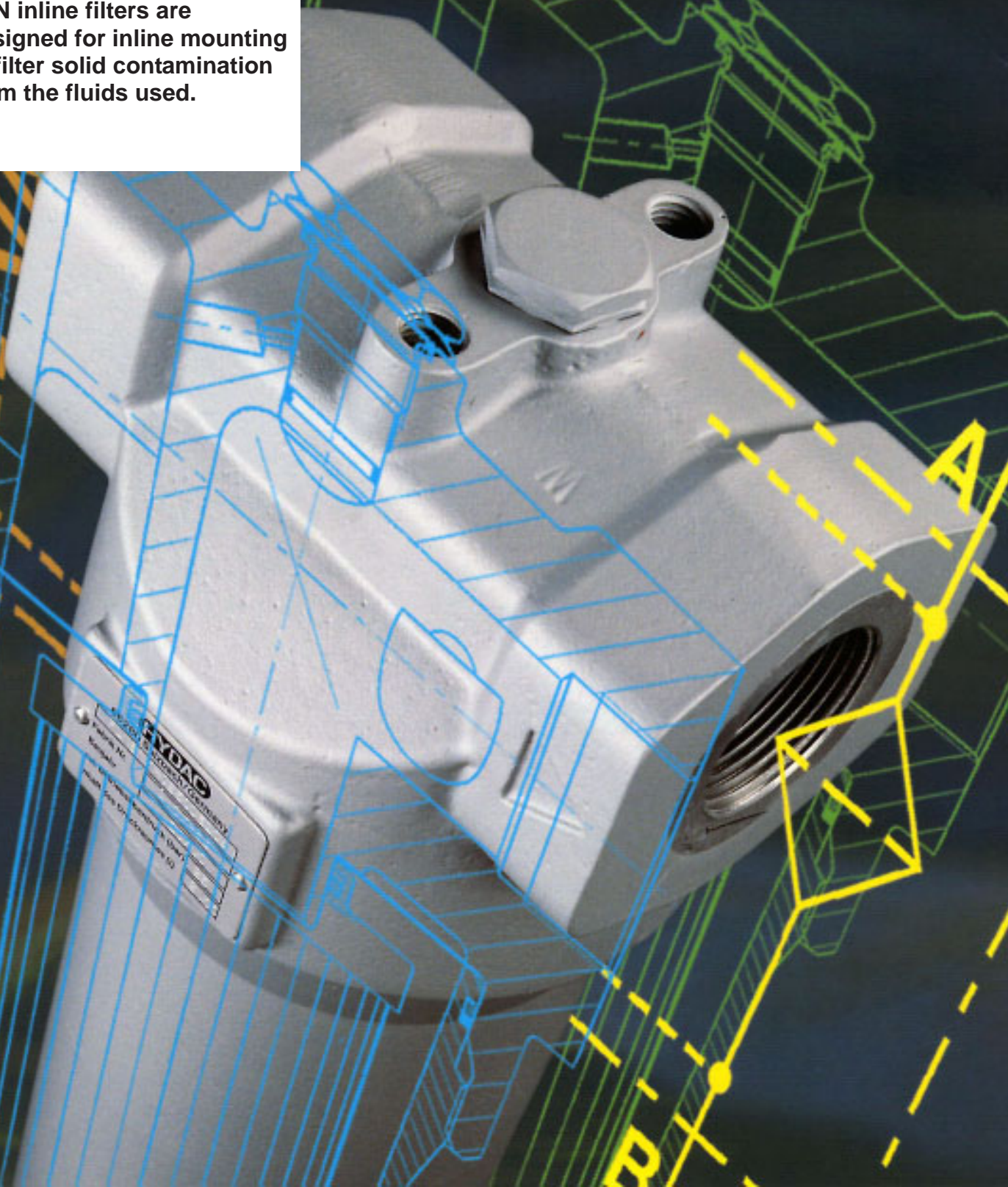
**HYDAC**

**INTERNATIONAL**

## **Inline Filter FLN**

With elements to DIN 24 550  
Flow rates up to 400 l/min  
Pressure range: 25 bar  
Material: Aluminium

FLN inline filters are designed for inline mounting to filter solid contamination from the fluids used.



# 1. TECHNICAL SPECIFICATIONS

## 1.1. FILTER HOUSING

### Construction

The FLN filter consists of a filter head and a screw-in filter bowl.

The standard model is supplied without bypass valve, but with a port for a clogging indicator.

## 1.2. FILTER ELEMENTS

Hydac filter elements fulfil all ISO test criteria.

**Reliable filter operation is only guaranteed for original Hydac filter elements.**

The filter elements are also suitable for dynamic conditions due to their high pressure stability; max permissible  $\Delta p$  across the element:

Betamicon® (BN/HC) : 30 bar

Wire mesh (W/HC) : 30 bar

### Fluid compatibility

Suitable for mineral oils, lubrication oils, non-flam fluids, synthetic and rapidly biodegradable fluids.

For further details on filter elements, please see **brochure, no.: E 7.200../..**

## 1.3. CLOGGING INDICATORS

(Example)

VD 5 LZ . 0 /-V-DB

### Type of indicator

VM differential pressure indicator

VD differential pressure indicators (for LE and LZ)

### Pressure setting

5 = 5 bar

### Indicator type

B = visual

C = electrical

D = visual/electrical

### Modification number

0 the latest version is always supplied

### Supplementary details

V Viton

L... light with corresponding voltage

W.. filter suitable for oil-water emulsions (HFA, HFC), NBR seals (VD indicators only)

For other types of clogging indicator and further details on indicators, please see **brochure, no. E 7.050../..**

## 1.4. SEALS

Choice of Perbunan (= NBR) or Viton (= FPM for HFD oils).

## 1.5. SPECIAL MODELS AND ACCESSORIES

- with bypass valve

## 1.6. SPARE PARTS

See Original Spare Parts List and Maintenance Instructions.

# 2. GENERAL

## Mounting

As inline filter

## Temperature range

-30 °C to +100 °C

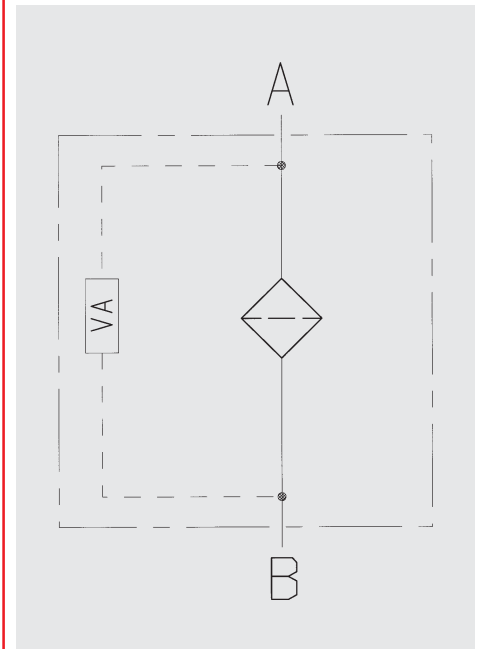
## Pressure setting of the differential pressure clogging indicator

$\Delta p_a = 5 \text{ bar} \pm 10\%$

## Cracking pressure of the bypass valve

$\Delta p_o = 7 \text{ bar} \pm 10\%$

## Hydraulic symbol



### 3. MODEL CODE (also order example)

#### 3.1. COMPLETE FILTER

FLN BN/HC 250 D F 10 A 1 . X /-V-B7

**Filter type**

FLN

**Filter material of element**

BN/HC Betamicron®  
W/HC Stainless steel wire mesh

**Size**

160, 250, 400

**Operating pressure**

D 25 bar

**Type / Size of port**

standard (●), special FLN (X)

Type	Port	Filter size		
		160	250	400
E	G 1 1/4	●	X	X
F	G 1 1/2	X	●	X
K	DN 38 *	X	X	●
Z	according to customer specific.			

\* flange SAE 1 1/2"; 3000 psi

**Filtration rating in µm**

BN/HC: 3, 6, 10, 25  
W/HC: 25, 50, 100, 200 (on request)

**Type of clogging indicator**

- Y plastic blanking plug in indicator port
- A steel blanking plug in indicator port
- B with visual clogging indicator
- C with electrical clogging indicator
- D with visual/electrical clogging indicator
- LE visual-mechanical/electrical indicator
- LZ visual-mechanical/electrical indicator with 75% and 100% switching contacts

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

**Type code**

1

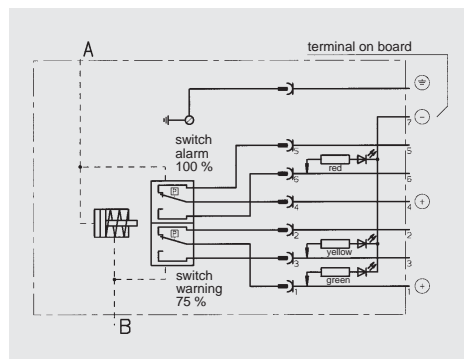
**Modification number**

X the latest version is always supplied

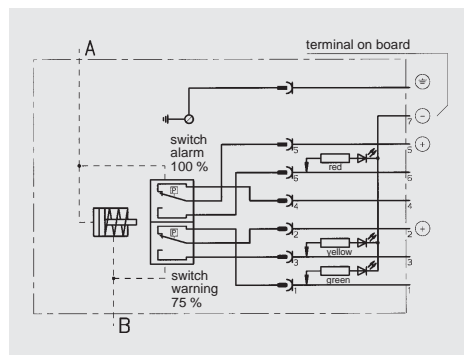
**Supplementary details**

- No details = standard (NBR seals, without bypass valve)
- V FPM (Viton) seals, filter suitable for rapidly biodegradable hydraulic fluids and phosphate esters (HFD-R)
- L.. light with appropriate voltage (24V, 48V, 110V, 220V)
- LED 2 light emitting diodes up to 24 volt
- DB LZ indicator with plug to DIN 43651 with 3 LEDs (Daimler-Benz standard)
- CN LZ indicator with plug to DIN 43651 with 3 LEDs (CNOMO standard)
- BO LZ indicator with plug and pin connection to BMW and Opel/Vauxhall specification (M12x1)
- AV LZ indicator with plug to AUDI specification
- B7 with bypass valve (cracking pressure 7 bar)
- W suitable for oil-water emulsions (HFA, HFC), NBR seals;  
refers exclusively to the type of clogging indicator
- A2 pressure setting of the clogging indicator 2 bar
- B3 with bypass valve (cracking pressure 3 bar)

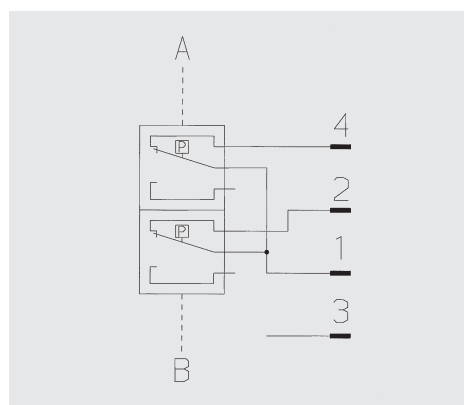
### 3.1.1 Circuit diagram ...DB



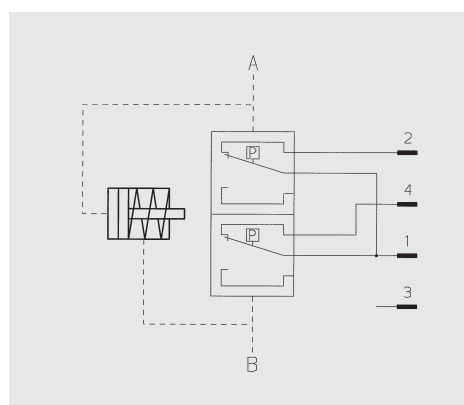
### ...CN



### ...BO...



### ...AV...



### 3.2. REPLACEMENT ELEMENT (also order example)

0250 DN 010 BN/HC /-V

**Size** \_\_\_\_\_  
0160, 0250, 0400

**Type** \_\_\_\_\_  
DN

**Filtration rating in  $\mu\text{m}$**  \_\_\_\_\_  
BN/HC: 3, 6, 10, 25  
W/HC: 25, 50, 100, 200 (on request)

**Filter material** \_\_\_\_\_  
BN/HC  
W/HC

**Supplementary details** \_\_\_\_\_  
V = FPM (Viton) seals, filter suitable for rapidly biodegradable oils and phosphate esters (HFD-R)

#### 3.2.1 Element specifications

Filter type	Contamination retention capacity in g for BN/HC elements			
	3 $\mu\text{m}$	6 $\mu\text{m}$	10 $\mu\text{m}$	25 $\mu\text{m}$
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

#### 3.2.2 Filter areas for W/HC elements

Filter type	Filter area
160	2750 cm <sup>2</sup>
250	4400 cm <sup>2</sup>
400	6730 cm <sup>2</sup>

## 4. FILTER SPECIFICATIONS

Filter type	Port to standard	Element size	Weight [kg] with element
160	G 1 1/4	0160 DN...	4.3
250	G 1 1/2	0250 DN...	4.9
400	ISO 6162/DN 38	0400 DN...	5.9

## 5. FILTER CALCULATION / SIZING

The total pressure drop of a filter at a certain flow rate is the sum of the housing  $\Delta p$  and element  $\Delta p$ .

The pressure drop can be determined either with the aid of our Filter Sizing Program FSP, which is available free of charge, or by using the following graphs.

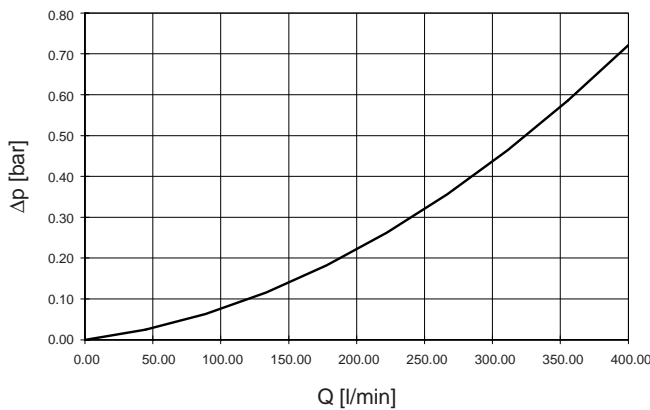
It must be stressed that all of the technical documentation from HYDAC Filtrertechnik always states the pressure drop of the complete filter.

### 5.1. $\Delta P$ -Q HOUSING GRAPHS TO ISO 3968

The housing graphs apply to mineral oil with a density of  $0.86 \text{ kg/dm}^3$  and a viscosity of  $30 \text{ mm}^2/\text{s}$ .

In this case, the differential pressure changes proportionally to the density.

**FLN 160, 250, 400**

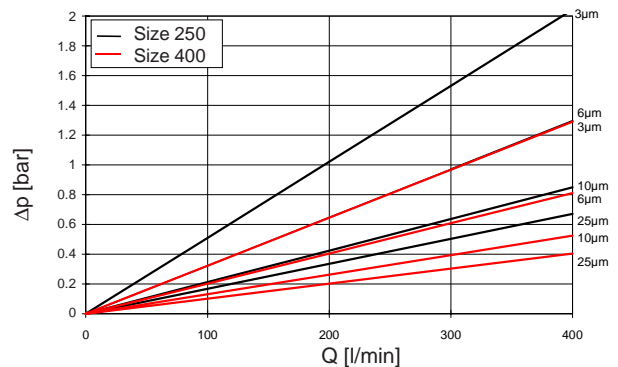
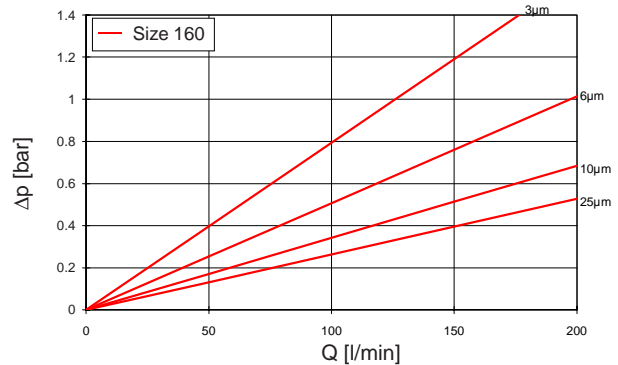


### 5.2. $\Delta P$ -Q GRAPHS - FILTER ELEMENTS

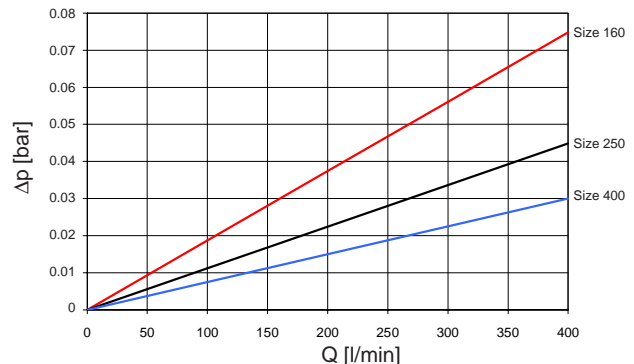
The element graphs apply to mineral oil with a kinematic viscosity of  $30 \text{ mm}^2/\text{s}$ .

The pressure drop changes proportionally to the change in viscosity (see Example 5.3.).

#### BN/HC



#### W/HC



### 5.3. EXAMPLE

#### General

$$\Delta p_{\text{total}} = \Delta p_{\text{housing}} + \Delta p_{\text{element}} \cdot \frac{\text{viscosity (mm}^2/\text{s)}}{30 \text{ mm}^2/\text{s}}$$

$\Delta p_{\text{housing}}$  = to be taken from Point 5.1.

$\Delta p_{\text{element}}$  = element pressure drop at flow rate Q  
viscosity =  $30 \text{ mm}^2/\text{s}$  taken from Point 5.2.

#### Example

System parameters:

FLN 250 with BN/HC element ( $10 \mu\text{m}$ );

Viscosity =  $68 \text{ mm}^2/\text{s}$

(ISO VG 68 at  $40 \text{ }^\circ\text{C}$ ); Q =  $160 \text{ l/min}$ ;

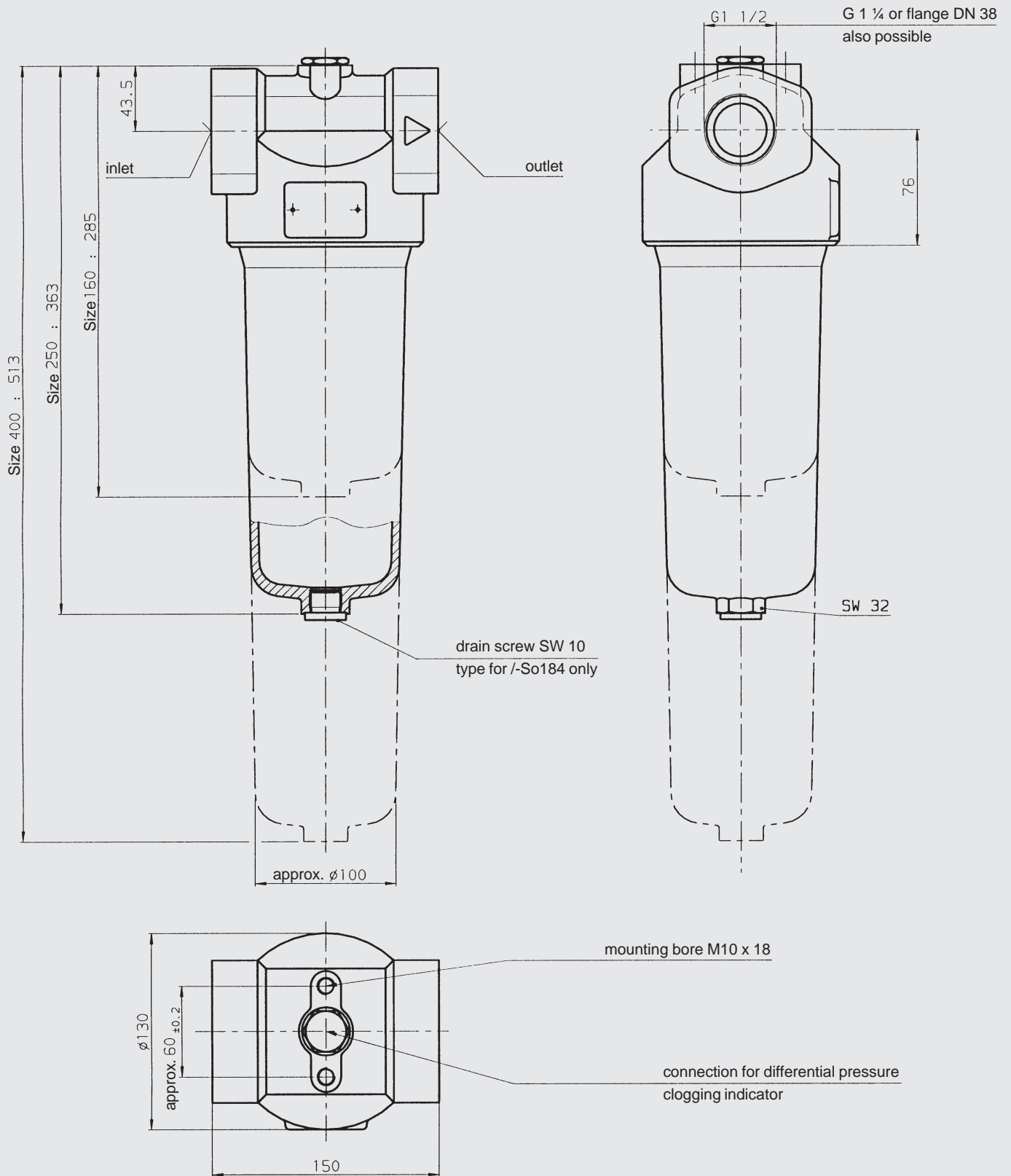
$$\Rightarrow \Delta p_{\text{housing}} = 0.16 \text{ bar (FLN 250)}$$

$$\Delta p_{\text{element}} = 0.34 \text{ bar}$$

$$\Delta p_{\text{total}} = 0.16 \text{ bar} + 0.34 \cdot \frac{68 \text{ mm}^2/\text{s}}{30 \text{ mm}^2/\text{s}} = \underline{\underline{0.93 \text{ bar}}}$$

For ease of calculation, our Filter Sizing Program is available and can be ordered via our website, [www.hydac.com](http://www.hydac.com).

## 6. DIMENSIONS



## 7. 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.

**NOTES:**