

**S**ERIES

# FHP 010/011



**Maximum pressure 420 bar**  
**Flow rates to 40 l/min**



# Technical data

## FHP 010/011

### Filter housing (Materials)

- Head: Cast iron (chemical heat treatment)
- Housing: Steel (chemical heat treatment)
- Bypass valve: AISI 316L

### Pressure

- Working pressure: 420 bar (42 MPa)
- Test pressure: 630 bar (63 MPa)
- Burst pressure: 1600 bar (160 MPa)
- Pulsed pressure fatigue test 1,000,000 of cycles with variable pressure from 0 to 420 bar (42 MPa)

### Temperature

- From -25°C to +110°C

### Bypass valve

- Opening pressure 6 bar  $\pm$ 10%
- Other opening pressures on request.

### Elements type $\Delta p$

- Microfibre filter elements series N: 20 bar
- Microfibre filter elements series H: 210 bar
- Stainless steel mesh elements series N: 20 bar
- Oil flow from exterior to interior.

### Seals

- Standard NBR series A
- Optional FPM series V

### Weights (kg)

Length	1	2	3	4
• FHP010	2.1	2.3	2.7	3.1

### Volumes (dm<sup>3</sup>)

Length	1	2	3	4
• FHP010	0.20	0.24	0.41	0.59

### Connections

- In-line Inlet/Outlet FHP010
- 90° Inlet/Outlet FHP011

### Compatibility

- Bodies compatible with:
  - Mineral oils to ISO 2943 - aqueous emulsions
  - Synthetic fluids, water/glycol.
- Filter elements compatible with:
  - Mineral oils to ISO 2943 - aqueous emulsions
  - Synthetic fluids, water/glycol.
- Nitrile (NBR) seals series A, compatible with:
  - Mineral oils to ISO 2943 - aqueous emulsions
  - Synthetic fluids, water/glycol.
- V series FPM seals, compatible with:
  - Synthetic fluids type HS-HFDR-HFDS-HFDU.
  - To ISO 2943

## Filter Element Area

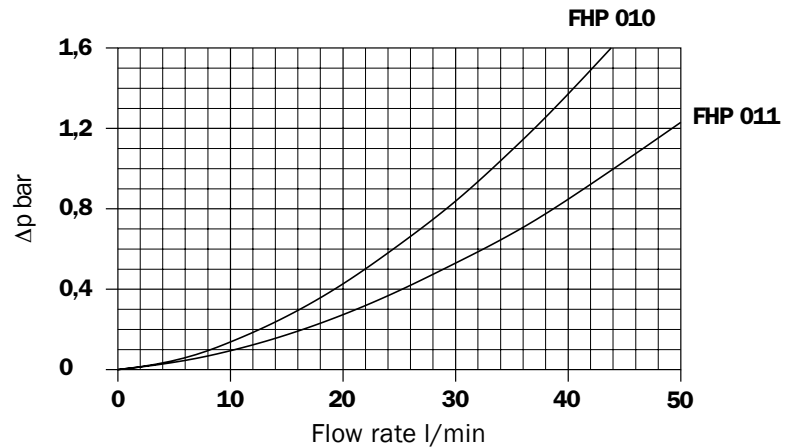
Filter element in stainless steel mesh

Type	Length			
	1	2	3	4
HPO11	60	95	240	390
Values expressed in cm <sup>2</sup>				

## Pressure drops $\Delta p$ Housing

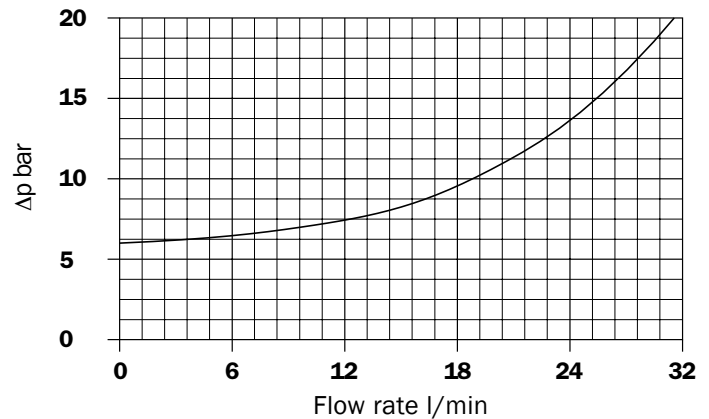
The curves are plotted using mineral oil with density of 0.86 kg/dm<sup>3</sup> to ISO 3968.

$\Delta p$  varies proportional with density.

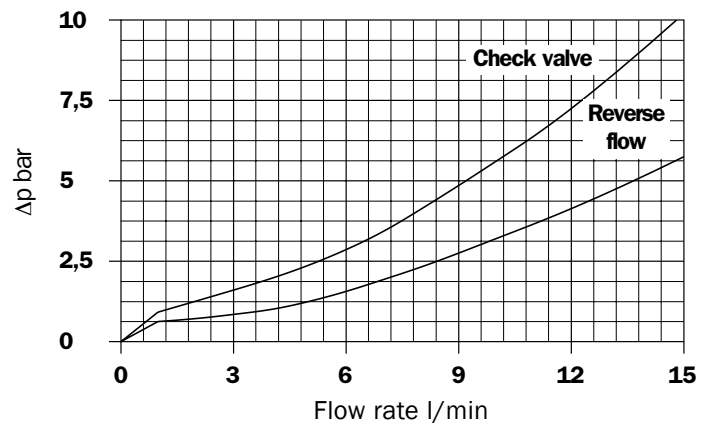


## Valves

### Bypass valve pressure drop



## Filter housing with check valve



# Filter Sizing

Correct sizing of the filter must be based on a variable pressure drop depending on the application:

- pressure filter  $\Delta p$  from 0.8 to 1.5 bar

The pressure drop calculation is performed by adding together the value for the housing and the value for the filter element.

The pressure drop in the housing is proportional to the fluid density  $\text{kg/dm}^3$ ; all the graphs in the catalogue are referred to mineral oil with density of  $0.86 \text{ kg/dm}^3$ .

The filter element pressure drop value is proportional to viscosity  $\text{mm}^2/\text{s}$ , the Y values in the catalogue are referred to viscosity of  $30 \text{ mm}^2/\text{s}$ .

## Sizing data for single cartridge, head at top

$\Delta p$  Tot.

$\Delta p_c$  Filter housing

$\Delta p_e$  Filter element

Y Multiplication factor (see below)

Q l/min = flow rate

V1 = reference viscosity  $30 \text{ mm}^2/\text{s}$  (cSt)

V2 = operating viscosity in  $\text{mm}^2/\text{s}$  (cSt)

$\Delta p$  Tot. =  $\Delta p_c + \Delta p_e$

$\Delta p_e = Y : 1000 \times Q \times (V2/V1)$

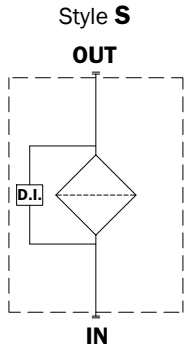
## Multiplication factor “Y” for definition of the pressure drop of filter elements.

### Reference viscosity $30 \text{ mm}^2/\text{s}$

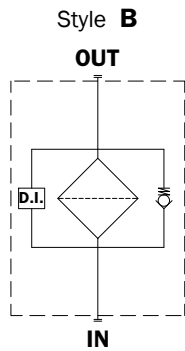
Filter Element	Absolute Filtration				
	Series N				
Type	A 0 3	A 0 6	A 1 0	A 1 6	A 2 5
HP 011 1	332,71	250,07	184,32	152,36	128,36
2	220,28	165,56	74,08	59,13	37,05
3	123,24	92,68	41,48	33,08	20,72
4	77,76	58,52	28,37	22,67	16,17

Filter Element	Absolute Filtration				
	Series H				
Type	A 0 3	A 0 6	A 1 0	A 1 6	A 2 5
HP 011 1	424,58	319,74	235,17	194,44	163,78
2	281,06	211,25	94,53	75,45	47,26
3	130,14	97,50	43,63	34,82	21,81
4	109,39	82,25	36,79	29,37	18,40

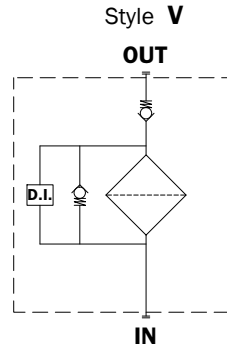
# Hydraulic schematics



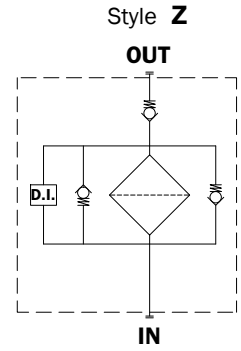
Filter without  
bypass valve



Filter with  
bypass valve



Reverse flow, without  
bypass valve



Reverse flow, with  
bypass valve

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## Recommended maximum flow rate

- Pressure drop of complete filter equal to  $\Delta p$  1.5 bar.
- Oil kinematic viscosity 30 mm<sup>2</sup>/s (cSt).
- Density 0.86 kg/dm<sup>3</sup>.
- Connections of filter under test G 3/4".

**Filtration  
Series N**

	Length	A03	A06	A10	A16	A25	M25
<b>FHP 010</b>	1	4	8	10	11	12	15
	2	8	9	14	16	19	25
	3	11	15	18	21	26	30
	4	14	18	24	25	30	36

Flow rate l/min

**Filtration  
Series H**

	A03	A06	A10	A16	A25
<b>FHP 010</b>	3	6	8	9	10
	6	8	12	15	18
	11	15	18	20	26
	13	16	23	24	28

Flow rate l/min

**Filtration  
Series N**

	Length	A03	A06	A10	A16	A25	M25
<b>FHP 011</b>	1	5	8	10	11	13	15
	2	8	10	16	18	20	30
	3	12	16	22	26	28	35
	4	15	20	28	31	33	40

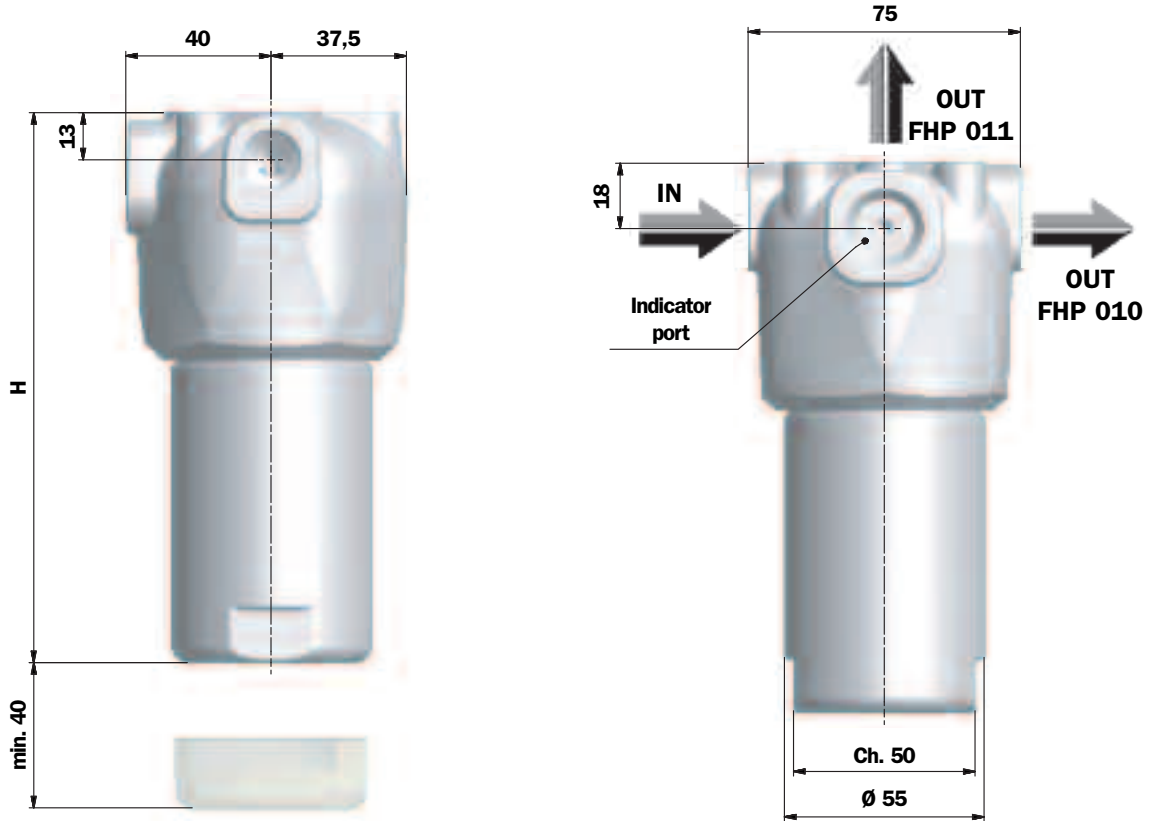
Flow rate l/min

**Filtration  
Series H**

	A03	A06	A10	A16	A25
<b>FHP 011</b>	3	6	8	9	10
	6	8	12	16	18
	12	16	21	24	26
	13	17	24	26	28

Flow rate l/min

## FHP 010/011

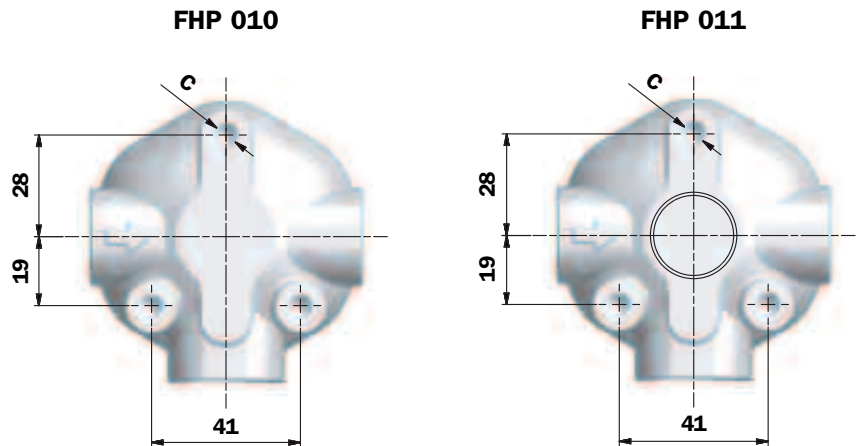


### Thread connections

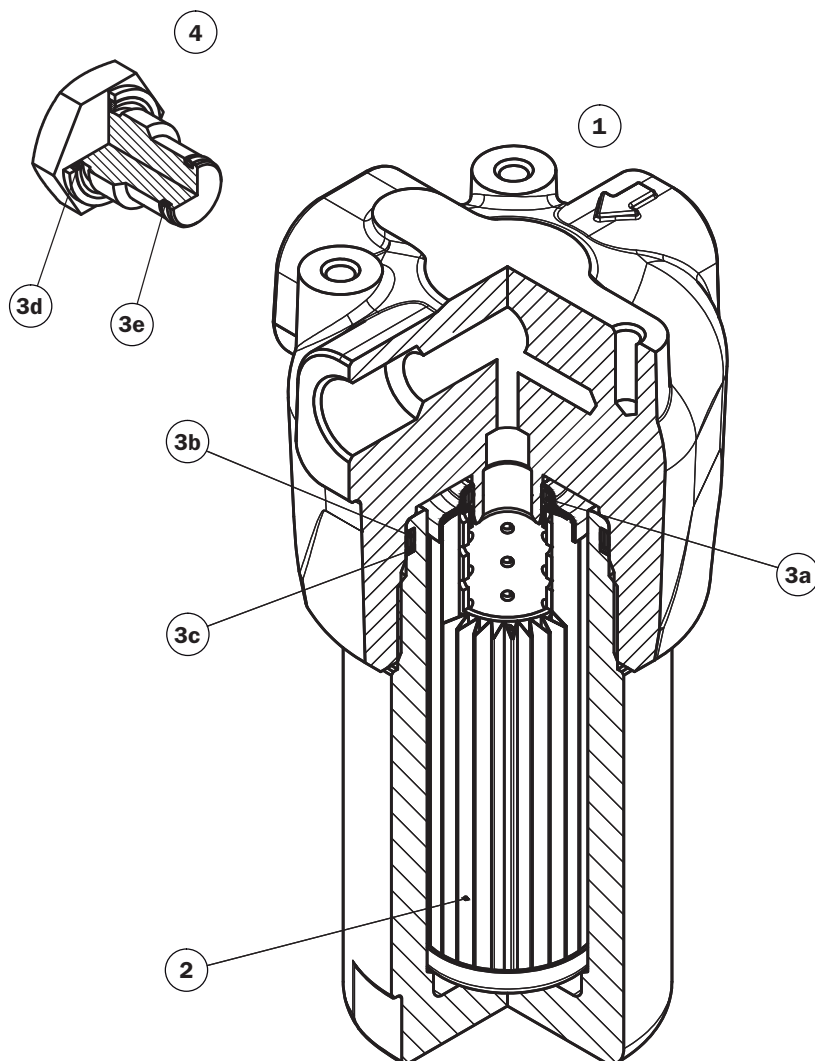
St.	A/B	C
A	G 1/4"	M6
B	1/4" NPT	1/4" UNC
C	SAE 5	1/4" UNC
D	G 3/8"	M6
E	3/8" NPT	1/4" UNC
F	SAE 6	1/4" UNC

### FHP 010/011

Length Filter	H mm
1	90
2	102
3	152
4	202



# Spare parts



Pos.	Description	Qty	FILTER Series FHP 010/011	
1	Filter assembly	1	See order table	
2	Filter element	1	See order table	
3	Seal Kit	1	NBR 02050501	FPM 02050492
3a	O-Ring for filter element	1	O-R 121 Ø 15,88 x 2,62	
3b	O-Ring for housing	1	O-R 3168 Ø 42,52 x 2,62	
3c	Anti-extrusion ring	1	Parbak 131 Ø 89,36 x 2,18	
3d	Indicator seal	1	01030058	01030046
3e	O-Ring for indicator	1	O-R 2050 Ø 12,42 x 1,78	
4	Indicator plug	1*	T2H	T2V
-	Indicator	1*	See order table	

\* 0 for version 1 (without indicator port)  
1 for version 2 (with indicator port)



# Differential indicators

## Order code

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
<input style="width: 30px; height: 30px; border: 1px solid black;" type="text"/>	<input style="width: 30px; height: 30px; border: 1px solid black;" type="text"/>	<input style="width: 30px; height: 30px; border: 1px solid black;" type="text"/>	<input style="width: 30px; height: 30px; border: 1px solid black;" type="text"/>	<input style="width: 30px; height: 30px; border: 1px solid black;" type="text"/>	<input style="width: 30px; height: 30px; border: 1px solid black;" type="text"/>	<input style="width: 30px; height: 30px; border: 1px solid black;" type="text"/>

**Example:** **NM**   **7**                      **H**   **A**   **11**   **P01**

### 1 - Styles

<b>NR</b>	Electrical
<b>KR</b>	Electrical-Visual
<b>NM</b>	Electrical IP 67
<b>Z</b>	Visual
<b>U</b>	Visual

### 2 - Differential trip pressure

<b>6</b>	2 bar ± 10% (filter without by-pass)
<b>7</b>	5 bar ± 10% (filter with by-pass)
<b>8</b>	7 bar ± 10% (filter without by-pass)

### 3 - Power supply voltage

(only for style KR - only voltage DC DC)

<b>1</b>	24 Volt
<b>2</b>	110 Volt

### 4 - Seals

<b>H</b>	HNBR Standard
<b>V</b>	FPM
<b>x</b>	Other on request

### 5 - Thermostat (only for style NM)

<b>A</b>	Without
<b>C</b>	50° C

### 6 - Electrical connector (only for style NM)

<b>11</b>	Connector AMP superseal series 1.5
<b>21</b>	Connector AMP timer
<b>31</b>	Connector DEUTSCH DT 04-2-P
<b>32</b>	Connector DEUTSCH DT 04-3-P
<b>41</b>	Length electrical cable 0,5 m

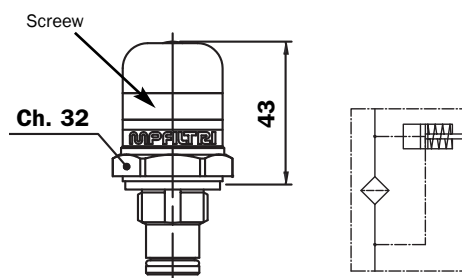
### 7 - Option

<b>P01</b>	MP standard
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## Pressure:

Working pressure 420 bar

### SERIES V VISUAL



Cover and lens in nylon.

Visual indicator green = Cartridge clean.  
Visual indicator red = Cartridge clogged.

Tightening torque: 60 Nm.  
Weight: 137 gr.

## Order code

<b>1</b>	<b>2</b>	<b>3</b>
<input style="width: 30px; height: 30px; border: 1px solid black;" type="text"/>	<input style="width: 30px; height: 30px; border: 1px solid black;" type="text"/>	<input style="width: 30px; height: 30px; border: 1px solid black;" type="text"/>

**Example:**     **E**   **7**

### 1 - Style

<b>V</b>	Visual
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### 2 - Differential trip pressure

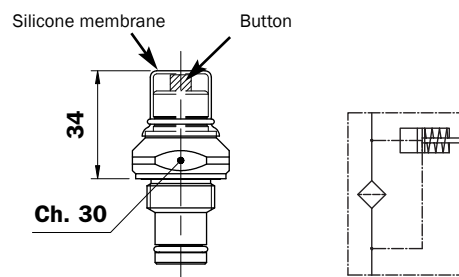
<b>6</b>	2 bar ± 10%
<b>7</b>	5 bar ± 10%
<b>8</b>	7 bar ± 10%

### 3 - Seals

FPM Standard	
<b>x</b>	Other on request

Seal for indicator/filter head, Bonded Seal.

### SERIES U VISUAL



"U" indicator provide to accurate view indication of filter element condition.

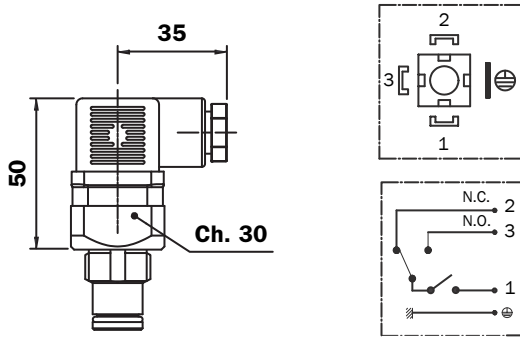
Visual signal                      Red button down: clean cartridge  
   Red button up: clogging cartridge

Connection                      G 1/2"  
Tightening torque:            65 Nm  
Weight:                            128 gr



## SERIES NR ELECTRICAL

Connector EN 175301-803 A/ISO 4400

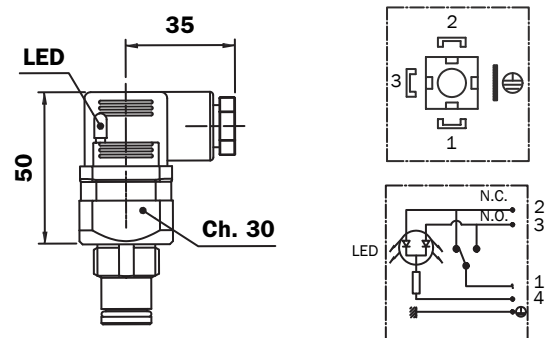


Switching type N/O or N/C contacts (change over Contact)  
 Max. contact rating 0,8 A / 24 Vdc  
 0,17 A / 115 Vdc  
 Max power supply voltage 230 Vac  
 Electrical connection EN 175301-803  
 Cable gland PG 9  
 Protection rating IP 65  
 Connection G 1/2"

Tightening torque: 65 Nm  
 Weight: 123 gr

## SERIES KR ELECTRICAL/VISUAL

Connector EN 175301-803 A/ISO 4400

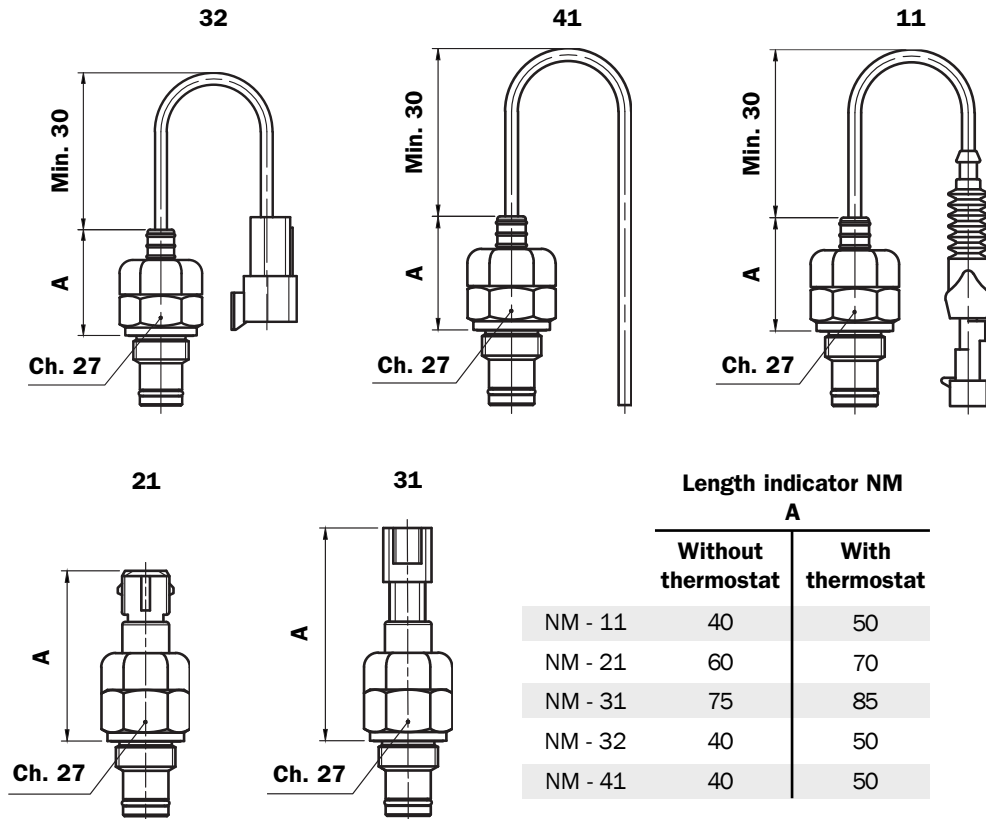


Switching type N/O or N/C contacts (change over Contact)  
 Max. contact rating 0,8 A / 24 Vdc  
 0,17 A / 115 Vdc  
 Max power supply voltage 24 Vdc - 115 Vdc/ac - 230 Vac  
 Electrical connection EN 175301-803  
 visual indicator by LED  
 GREEN LED = Clean element.  
 RED LED = Blocked element.

Cable gland PG 9  
 Protection rating IP 65  
 Connection G 1/2"

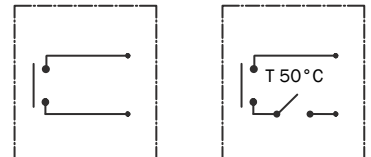
Tightening torque: 65 Nm  
 Weight: 123 gr

## SERIES NM ELECTRICAL



Switching type N/O contacts  
 N/O thermostat  
 Max. contact rating 0,8 A / 24 Vdc  
 0,17 A / 115 Vdc  
 Max power supply voltage Max. 120 Vdc  
 Electrical connection 11 Connector AMP superseal series 1.5  
 21 Connector AMP timer  
 31 Connector DEUTSCH DT 04-2-P  
 32 Connector DEUTSCH DT 04-3-P  
 41 Length electrical cable 0,5 m

Protection rating IP 67  
 Connection G 1/2"  
 Tightening torque: 65 Nm  
 Weight: 125 gr



# Notes

Lined area for notes.

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# Ordering information FHP 010/011

## Filter assembly FHP

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Example: FHP</b>	<b>010</b>	<b>2</b>	<b>B</b>	<b>A</b>	<b>A</b>	<b>1</b>	<b>A10</b>	<b>H</b>	<b>P01</b>

## Filter element HP 011

	<b>2</b>	<b>7</b>	<b>4</b>	<b>8</b>	<b>9</b>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Example: HP011</b>	<b>2</b>	<b>A10</b>	<b>A</b>	<b>H</b>	<b>P01</b>

### 1 - Style

**010**

**011**

### 2 - Filter length

**1**

**2**

**3**

**4**

### 3 - By-pass valve

**S** Without bypass

**B** With bypass  
Opening pressure: 6 bar

**V** With reverse flow  
Without bypass valve

**Z** With reverse flow  
With bypass valve

### 4 - Seals

**A** NBR

On request

### 5 - Connections

#### Type

**A** G 1/4"

**B** 1/4" NPT

**C** SAE 5

**D** G 3/8"

**E** 3/8" NPT

**F** SAE 6

### 6 - Indicator port

**1** Without indicator port

**2** With indicator port\*

### 7 - Filter element

**A03** 3  $\mu$

**A06** 6  $\mu$

**A10** 10  $\mu$

**A16** 16  $\mu$

**A25** 25  $\mu$

**M25** 25  $\mu$

Absolute filtration  
Inorganic  
microfibre

$\beta_x(c) \geq 1000$

Nominal Filtration  
Metal mesh

### 8 - Collapse pressure

**N**  $\Delta p = 20$  bar

**H**  $\Delta p = 210$  bar

### 9 - Options

**P01** MP Filtri standard

**Pxx** Customer request

### \*Options

Steel plug T2 has to be ordered separately

#### Code

- **T2H** Seal NBR

- **T2V** Seal FPM

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# Operating & Maintenance



Pressurized filters are utilized to remove contaminant from hydraulic systems. Long working life of the hydraulic components and correct use of the hydraulic systems can be assured only when maintenance is performed correctly and at regular intervals.

Pressurized filters can be equipped with bypass valves, reverse flow valves, and check valves.

If the filters are not equipped with a bypass valve, only high strength filter cartridges should be used ( $\Delta p$  210 bar) to avoid the risk of collapse due to the presence of contaminants retained during the filtration process.

- “H” series cartridges when by-pass valves are not installed.
- “S” series cartridges when reverse flow valves and duplex filters are installed.

When bypass valves are present and during flushing operations, we recommend the use of cartridges with low mechanical strength ( $\Delta p$  20 bar).

- “N” series cartridges when reverse flow valves are not installed.
- “R” series cartridges when reverse flow valves and duplex filters are installed.

In order to prevent the filter elements from collapsing due to excessive hydraulic pressure it is essential to use differential indicators that serve to inform the user of the need to change the cartridge.

Effective contamination control can be assured only by the correct use of clogging indicators.

**Differential Indicators**

Wrenches Ch. 27/30/32

**Filter housing**

Wrenches Ch. 50

INSTALLATION

- A** Check that the pressure rating of the selected filter is higher than the system’s maximum operating pressure (the maximum pressure value is shown on the nameplate).
- B** Check that the filter body contains the filter cartridge.
- C** Check that the operating fluid is compatible with the material of the body, cartridge, and seals.
- D** Secure the filter using the relevant threaded holes, to rigid brackets. Rigid installation makes it possible to unscrew the housing without introducing flexing of the hydraulic fittings, limiting any points of stress transfer.
- E** Install the filter in an accessible position for correct and trouble-free maintenance.
- F** Start the machine and check any of oil leaks from the filter and relative fittings.
- G** Repeat the visual inspection when the system arrives at the operating temperature of the oil.

MAINTENANCE

- A** All maintenance operations must be performed only by suitably trained personnel.
- B** The hydraulic system must be depressurized before performing maintenance operations (except in the case of FHD double filters).
- C** Maintenance must be carried out using suitable tools and containers to collect the fluid contained in the filter body. Spent fluids must be disposed of in compliance with statutory legislation.
- D** Do not use naked flames during maintenance operations.
- E** Use the utmost caution in relation to the temperature of the fluid. High temperatures can lead to residual pressure with resulting undesirable movements of mechanical parts.

- A** The date on which the filter elements are changed should be recorded in the machine datasheet.
- B** Spare parts installed must be in compliance with the specifications given in the machine operating and maintenance manual.
- C** Filter bodies should be handled carefully since they are cleaner than most work station.
- D** After having opened the filter to change the filter element, check the condition of the seals and change them if necessary.

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## CHANGING THE FILTER ELEMENT FILTERS WITH IN-LINE AND MANIFOLD TYPE CONNECTIONS

- 1 Depressurize system and filter.
- 2 Unscrew (the oil drain plug, first if present) the housing using the appropriate tools and extract the filter element (see fig. 2).
- 3 Collect the spent oil and cartridge in a suitable container and dispose of them in compliance with statutory legislation.

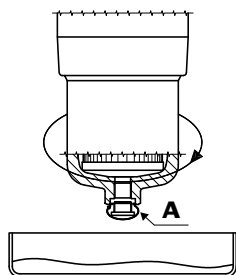


Fig. 1

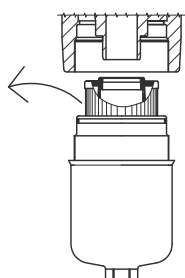


Fig. 2

### !!! WARNING !!!

- 4 To avoid damaging the components check and clean the following parts is necessary:
  - the thread of the housing and the seals and the thread of the head.
 Check the condition of the seals - when chasing the seals lubricate the new seals with operating fluid prior to installation (see fig. 3).

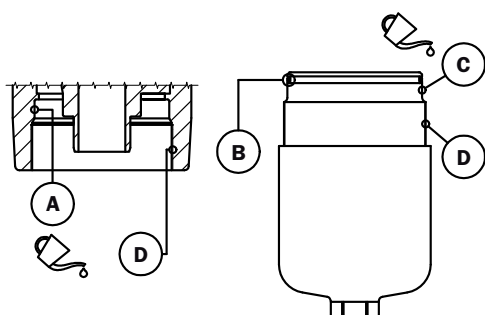


Fig. 3

- 5 Lubricate the filter element seal with the operating fluid before installing the new filter element (see fig. 4).

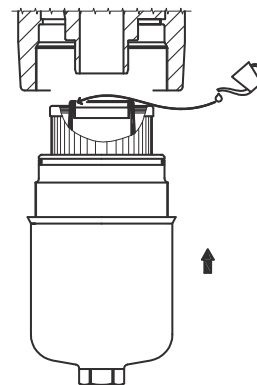


Fig. 4

- 6 Screw the housing onto the head using the correct tool. **WARNING:** Screw the housing fully home onto the head “**DO NOT APPLY EXCESSIVE TIGHTENING TORQUE**”.

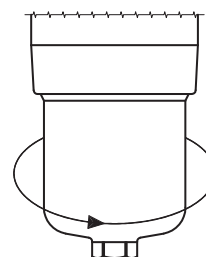


Fig. 5

- 7 Start the machine and check for the absence of leaks. Repeat the operation when the machine has reached its operating temperature.





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