

# HYDRAULIC FILTRATION PRODUCTS

HIGH PRESSURE FILTERS



PASSION TO PERFORM



# FILTER SIZING

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## THE CORRECT FILTER SIZING HAS TO BE BASED ON THE TOTAL PRESSURE DROP DEPENDING BY THE APPLICATION.

FOR EXAMPLE, THE MAXIMUM TOTAL PRESSURE DROP ALLOWED BY A NEW AND CLEAN RETURN FILTER HAVE TO BE IN THE RANGE 0.4 - 0.6 bar / 5.80 - 8.70 psi.

The pressure drop calculation is performed by adding together the value of the housing with the value of the filter element. The pressure drop  $\Delta p_c$  of the housing is proportional to the fluid density ( $\text{kg}/\text{dm}^3$  /  $\text{lb}/\text{ft}^3$ ). The filter element pressure drop  $\Delta p_e$  is proportional to its viscosity ( $\text{mm}^2/\text{s}$  / SUS), the corrective factor Y have to be used in case of an oil viscosity different than  $30 \text{ mm}^2/\text{s}$  (cSt) / 150 SUS.

### Sizing data for single filter element, head at top

$\Delta p_c$  = Filter housing pressure drop [bar / psi]

$\Delta p_e$  = Filter element pressure drop [bar / psi]

Y = Corrective factor Y (see correspondent table), depending on the filter type, on the filter element size, on the filter element length and on the filter media

Q = flow rate (l/min - gpm)

V1 reference oil viscosity =  $30 \text{ mm}^2/\text{s}$  (cSt) / 150 SUS

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

### Filter element pressure drop calculation with an oil viscosity different than $30 \text{ mm}^2/\text{s}$ (cSt) / 150 SUS

International system:

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

Imperial system:

$$\Delta p_e = Y : 17.2 \times Q \times (V2:V1)$$

$$\Delta p_{\text{Tot.}} = \Delta p_c + \Delta p_e$$

### Verification formula

$$\Delta p_{\text{Tot.}} \leq \Delta p_{\text{max allowed}}$$

### Maximum total pressure drop ( $\Delta p_{\text{max}}$ ) allowed by a new and clean filter

| Application                   | Range:[ bar ]   | [ psi ]                                   |
|-------------------------------|-----------------|---|
| Suction filters               | 0.08 - 0.10 bar | 1.16 - 1.45 psi                           |
| Return filters                | 0.4 - 0.6 bar   | 5.80 - 8.70 psi                           |
| Return - Suction filters (*)  | 0.8 - 1.0 bar   | 11.60 - 14.50 psi                         |
| Low & Medium Pressure filters | 0.4 - 0.6 bar   | 5.80 - 8.70 psi return lines              |
|                               | 0.3 - 0.5 bar   | 4.35 - 7.25 psi lubrication lines         |
|                               | 0.3 - 0.4 bar   | 4.35 - 5.80 psi off-line in power systems |
|                               | 0.1 - 0.3 bar   | 1.45 - 4.35 psi off-line in test benches  |
|                               | 0.4 - 0.6 bar   | 5.80 - 8.7 psi over-boost                 |
| High Pressure filters         | 0.8 - 1.5 bar   | 11.60 - 21.75 psi                         |
| Stainless Steel filters       | 0.8 - 1.5 bar   | 11.60 - 21.75 psi                         |

(\*)The suction flow rate should not exceed 30% of the return flow rate

### Generic filter calculation example

Application data:

Tank top return filter

Pressure  $P_{\text{max}} = 10$  bar

Flow rate  $Q = 120$  l/min

Viscosity  $V2 = 46 \text{ mm}^2/\text{s}$  (cSt)

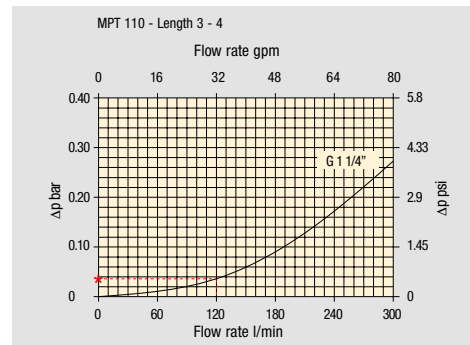
Oil density =  $0.86 \text{ kg}/\text{dm}^3$

Required filtration efficiency =  $25 \mu\text{m}$  with absolute filtration

With bypass valve and G 1 1/4" inlet connection

Calculation:

$\Delta p_c = 0.03 \text{ bar} / 0.43 \text{ psi}$  (see graphic below)



Filter housings  $\Delta p$  pressure drop. The curves are plotted using mineral oil with density of  $0.86 \text{ kg}/\text{dm}^3$  in compliance with ISO 3968.  $\Delta p$  varies proportionally with density.

$$\Delta p_e = (2.00 : 1000) \times 120 \times (46 : 30) = 0.37 \text{ bar}$$

$$\Delta p_e = (2.00 : 17.2) \times 32 \times (216 : 150) = 5.36 \text{ psi}$$

| Filter element        | Absolute filtration<br>H Series |       |       |       |      | Nominal filtration<br>N Series |      |                   |
|-----------------------|---------------------------------|-------|-------|-------|------|--------------------------------|------|-------------------|
|                       | A03                             | A06   | A10   | A16   | A25  | P10                            | P25  | M25<br>M60<br>M90 |
| <b>Return filters</b> | 74.00                           | 50.08 | 20.00 | 16.00 | 9.00 | 6.43                           | 5.51 | 4.40              |
| <b>MF 020</b>         | 2 29.20                         | 24.12 | 8.00  | 7.22  | 5.00 | 3.33                           | 2.85 | 2.00              |
|                       | 3 22.00                         | 19.00 | 6.56  | 5.33  | 4.33 | 1.68                           | 1.44 | 1.30              |
| <b>MF 030</b>         | 74.00                           | 50.08 | 20.00 | 16.00 | 9.00 | 6.43                           | 5.51 | 3.40              |
| <b>MF 100</b>         | 1 28.20                         | 24.40 | 8.67  | 8.17  | 6.88 | 4.62                           | 3.96 | 1.25              |
|                       | 2 17.33                         | 12.50 | 6.86  | 5.70  | 4.00 | 3.05                           | 2.47 | 1.10              |
| <b>MF 100</b>         | 3 10.25                         | 9.00  | 3.65  | 3.33  | 2.50 | 1.63                           | 1.32 | 0.96              |
|                       | 4 6.10                          | 5.40  | 2.30  | 2.20  | 2.00 | 1.19                           | 0.96 | 0.82              |

$$\Delta p_{\text{Tot.}} = 0.03 + 0.37 = 0.4 \text{ bar}$$

$$\Delta p_{\text{Tot.}} = 0.43 + 5.36 = 5.79 \text{ psi}$$

The selection is correct because the total pressure drop value is inside the admissible range for top tank return filters.

In case the allowed max total pressure drop is not verified, it is necessary to repeat the calculation changing the filter length/size.

# FILTER SIZING Corrective factor

Corrective factor Y to be used for the filter element pressure drop calculation. The values depend to the filter size and length and to the filter media.  
Reference oil viscosity 30 mm<sup>2</sup>/s

## Return filters

| Filter element    | Absolute filtration<br>H Series |       |       |       |       | Nominal filtration<br>N Series |      |      |                   |
|-------------------|---------------------------------|-------|-------|-------|-------|--------------------------------|------|------|-------------------|
|                   | Type                            | A03   | A06   | A10   | A16   | A25                            | P10  | P25  | M25<br>M60<br>M90 |
| MF 020            | 1                               | 74.00 | 50.08 | 20.00 | 16.00 | 9.00                           | 6.43 | 5.51 | 4.40              |
|                   | 2                               | 29.20 | 24.12 | 8.00  | 7.22  | 5.00                           | 3.33 | 2.85 | 2.00              |
|                   | 3                               | 22.00 | 19.00 | 6.56  | 5.33  | 4.33                           | 1.68 | 1.44 | 1.30              |
| MF 030<br>MFX 030 | 1                               | 74.00 | 50.08 | 20.00 | 16.00 | 9.00                           | 6.43 | 5.51 | 3.40              |
| MF 100<br>MFX 100 | 1                               | 28.20 | 24.40 | 8.67  | 8.17  | 6.88                           | 4.62 | 3.96 | 1.25              |
|                   | 2                               | 17.33 | 12.50 | 6.86  | 5.70  | 4.00                           | 3.05 | 2.47 | 1.10              |
|                   | 3                               | 10.25 | 9.00  | 3.65  | 3.33  | 2.50                           | 1.63 | 1.32 | 0.96              |
|                   | 4                               | 6.10  | 5.40  | 2.30  | 2.20  | 2.00                           | 1.19 | 0.96 | 0.82              |
| MF 180<br>MFX 180 | 1                               | 3.67  | 3.05  | 1.64  | 1.56  | 1.24                           | 1.18 | 1.06 | 0.26              |
|                   | 2                               | 1.69  | 1.37  | 0.68  | 0.54  | 0.51                           | 0.43 | 0.39 | 0.12              |
| MF 190<br>MFX 190 | 2                               | 1.69  | 1.37  | 0.60  | 0.49  | 0.44                           | 0.35 | 0.31 | 0.11              |
| MF 400<br>MFX 400 | 1                               | 3.20  | 2.75  | 1.39  | 1.33  | 1.06                           | 0.96 | 0.87 | 0.22              |
|                   | 2                               | 2.00  | 1.87  | 0.88  | 0.85  | 0.55                           | 0.49 | 0.45 | 0.13              |
|                   | 3                               | 1.90  | 1.60  | 0.63  | 0.51  | 0.49                           | 0.39 | 0.35 | 0.11              |
| MF 750<br>MFX 750 | 1                               | 1.08  | 0.84  | 0.49  | 0.36  | 0.26                           | 0.21 | 0.19 | 0.06              |
| MLX 250           | 2                               | 3.00  | 3.04  | 1.46  | 1.25  | 1.17                           | -    | -    | M25<br>0.20       |
| MLX 660           | 2                               | 1.29  | 1.26  | 0.52  | 0.44  | 0.38                           | -    | -    | M25<br>0.10       |
| CU 025            |                                 | 78.00 | 48.00 | 28.00 | 24.00 | 9.33                           | 9.33 | 8.51 | 1.25              |
| CU 040            |                                 | 25.88 | 20.88 | 10.44 | 10.00 | 3.78                           | 3.78 | 3.30 | 1.25              |
| CU 100            |                                 | 15.20 | 14.53 | 5.14  | 4.95  | 2.00                           | 2.00 | 0.17 | 1.10              |
| CU 250            |                                 | 3.25  | 2.55  | 1.55  | 1.35  | 0.71                           | 0.71 | 0.59 | 0.25              |
| CU 630            |                                 | 1.96  | 1.68  | 0.85  | 0.72  | 0.42                           | 0.42 | 0.36 | 0.09              |
| CU 850            |                                 | 1.06  | 0.84  | 0.42  | 0.33  | 0.17                           | 0.17 | 0.13 | 0.04              |
| DH 250            | 2                               | 3.61  | 4.08  | 1.81  | 1.71  | 1.35                           | -    | -    | M25<br>0.55       |
|                   | 4                               | 2.10  | 1.70  | 1.14  | 0.77  | 0.53                           | -    | -    | 0.60              |
| MR 100            | 1                               | 19.00 | 17.00 | 6.90  | 6.30  | 4.60                           | 2.94 | 2.52 | 1.60              |
|                   | 2                               | 11.70 | 10.80 | 4.40  | 4.30  | 3.00                           | 2.94 | 2.52 | 1.37              |
|                   | 3                               | 7.80  | 6.87  | 3.70  | 3.10  | 2.70                           | 2.14 | 1.84 | 1.34              |
|                   | 4                               | 5.50  | 4.97  | 2.60  | 2.40  | 2.18                           | 1.72 | 1.47 | 1.34              |
|                   | 5                               | 4.20  | 3.84  | 2.36  | 2.15  | 1.90                           | 1.60 | 1.37 | 1.34              |
| MR 250            | 1                               | 5.35  | 4.85  | 2.32  | 1.92  | 1.50                           | 1.38 | 1.20 | 0.15              |
|                   | 2                               | 4.00  | 3.28  | 1.44  | 1.10  | 1.07                           | 0.96 | 0.83 | 0.13              |
|                   | 3                               | 2.60  | 2.20  | 1.08  | 1.00  | 0.86                           | 0.77 | 0.64 | 0.12              |
|                   | 4                               | 1.84  | 1.56  | 0.68  | 0.56  | 0.44                           | 0.37 | 0.23 | 0.11              |
| MR 630            | 1                               | 3.10  | 2.48  | 1.32  | 1.14  | 0.92                           | 0.83 | 0.73 | 0.09              |
|                   | 2                               | 2.06  | 1.92  | 0.82  | 0.76  | 0.38                           | 0.33 | 0.27 | 0.08              |
|                   | 3                               | 1.48  | 1.30  | 0.60  | 0.56  | 0.26                           | 0.22 | 0.17 | 0.08              |
|                   | 4                               | 1.30  | 1.20  | 0.48  | 0.40  | 0.25                           | 0.21 | 0.16 | 0.08              |
|                   | 5                               | 0.74  | 0.65  | 0.30  | 0.28  | 0.13                           | 0.10 | 0.08 | 0.04              |
| MR 850            | 1                               | 0.60  | 0.43  | 0.34  | 0.25  | 0.13                           | 0.12 | 0.09 | 0.03              |
|                   | 2                               | 0.37  | 0.26  | 0.23  | 0.21  | 0.11                           | 0.08 | 0.07 | 0.03              |
|                   | 3                               | 0.27  | 0.18  | 0.17  | 0.17  | 0.05                           | 0.04 | 0.04 | 0.02              |
|                   | 4                               | 0.23  | 0.16  | 0.13  | 0.12  | 0.04                           | 0.03 | 0.03 | 0.02              |

## Return / Suction filters

| Filter element     | Absolute filtration |      |      |      |
|--------------------|---------------------|------|------|------|
|                    | Type                | A10  | A16  | A25  |
| RSX 116            | 1                   | 5.12 | 4.33 | 3.85 |
|                    | 2                   | 2.22 | 1.87 | 1.22 |
| RSX 165<br>RSX 166 | 1                   | 2.06 | 1.75 | 1.46 |
|                    | 2                   | 1.24 | 1.05 | 0.96 |
|                    | 3                   | 0.94 | 0.86 | 0.61 |

| Filter element | Absolute filtration<br>N Series |       |       |      |      |      |      |      |                   |
|----------------|---------------------------------|-------|-------|------|------|------|------|------|-------------------|
|                | Type                            | A03   | A06   | A10  | A16  | A25  | P10  | P25  | M25<br>M60<br>M90 |
| CU 110         | 1                               | 16.25 | 15.16 | 8.75 | 8.14 | 5.87 | 2.86 | 2.65 | 0.14              |
|                | 2                               | 12.62 | 10.44 | 6.11 | 6.02 | 4.16 | 1.60 | 1.49 | 0.12              |
|                | 3                               | 8.57  | 7.95  | 5.07 | 4.07 | 2.40 | 1.24 | 1.15 | 0.11              |
|                | 4                               | 5.76  | 4.05  | 2.80 | 2.36 | 1.14 | 0.91 | 0.85 | 0.05              |

## Low & Medium pressure filters

| Filter element | Absolute filtration<br>N-W Series |       |       |      |      | Nominal filtration<br>N Series |      |      |      |
|----------------|-----------------------------------|-------|-------|------|------|--------------------------------|------|------|------|
|                | Type                              | A03   | A06   | A10  | A16  | A25                            | P10  | P25  | M25  |
| CU 110         | 1                                 | 16.25 | 15.16 | 8.75 | 8.14 | 5.87                           | 2.86 | 2.65 | 0.14 |
|                | 2                                 | 12.62 | 10.44 | 6.11 | 6.02 | 4.15                           | 1.60 | 1.49 | 0.12 |
|                | 3                                 | 8.57  | 7.95  | 5.07 | 4.07 | 2.40                           | 1.24 | 1.15 | 0.11 |
|                | 4                                 | 5.76  | 4.05  | 2.80 | 2.36 | 1.14                           | 0.91 | 0.85 | 0.05 |
| CU 210         | 1                                 | 5.30  | 4.80  | 2.00 | 1.66 | 1.32                           | 0.56 | 0.43 | 0.12 |
|                | 2                                 | 3.44  | 2.95  | 1.24 | 1.09 | 0.70                           | 0.42 | 0.35 | 0.09 |
|                | 3                                 | 2.40  | 1.70  | 0.94 | 0.84 | 0.54                           | 0.33 | 0.23 | 0.05 |
| DN             | 016                               | 7.95  | 7.20  | 3.00 | 2.49 | 1.98                           | 0.84 | 0.65 | 0.18 |
|                | 025                               | 5.00  | 4.53  | 1.89 | 1.57 | 1.25                           | 0.53 | 0.41 | 0.11 |
|                | 040                               | 3.13  | 2.66  | 1.12 | 0.98 | 0.63                           | 0.38 | 0.32 | 0.08 |
| CU 400         | 2                                 | 3.13  | 2.55  | 1.46 | 1.22 | 0.78                           | 0.75 | 0.64 | 0.19 |
|                | 3                                 | 2.15  | 1.70  | 0.94 | 0.78 | 0.50                           | 0.40 | 0.34 | 0.10 |
|                | 4                                 | 1.60  | 1.28  | 0.71 | 0.61 | 0.40                           | 0.34 | 0.27 | 0.08 |
|                | 5                                 | 1.00  | 0.83  | 0.47 | 0.34 | 0.20                           | 0.24 | 0.19 | 0.06 |
|                | 6                                 | 0.82  | 0.58  | 0.30 | 0.27 | 0.17                           | 0.22 | 0.18 | 0.05 |
|                | CU 900                            | 1     | 0.86  | 0.63 | 0.32 | 0.30                           | 0.21 | -    | -    |
| CU 950         | 2                                 | 1.03  | 0.80  | 0.59 | 0.40 | 0.26                           | -    | -    | 0.05 |
|                | 3                                 | 0.44  | 0.40  | 0.27 | 0.18 | 0.15                           | -    | -    | 0.02 |
| MR 630         | 7                                 | 0.88  | 0.78  | 0.36 | 0.34 | 0.16                           | 0.12 | 0.96 | 0.47 |

**Corrective factor Y to be used for the filter element pressure drop calculation. The values depend to the filter size and length and to the filter media.**  
Reference oil viscosity 30 mm<sup>2</sup>/s

## High pressure filters

| Filter element                 | Absolute filtration<br>N - R Series |        |        |        |        | Nominal filtration<br>N Series |      |
|--------------------------------|-------------------------------------|--------|--------|--------|--------|--------------------------------|------|
|                                | Type                                | A03    | A06    | A10    | A16    |                                | A25  |
| 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                          | -    |
| HP 039                         | 2                                   | 70.66  | 53.20  | 25.77  | 20.57  | 14.67                          | 4.90 |
|                                | 3                                   | 36.57  | 32.28  | 18.00  | 13.38  | 8.00                           | 2.90 |
|                                | 4                                   | 26.57  | 23.27  | 12.46  | 8.80   | 5.58                           | 2.20 |
| HP 050                         | 1                                   | 31.75  | 30.30  | 13.16  | 12.3   | 7.29                           | 1.60 |
|                                | 2                                   | 24.25  | 21.26  | 11.70  | 9.09   | 4.90                           | 1.40 |
|                                | 3                                   | 17.37  | 16.25  | 8.90   | 7.18   | 3.63                           | 1.25 |
|                                | 4                                   | 12.12  | 10.75  | 6.10   | 5.75   | 3.08                           | 1.07 |
|                                | 5                                   | 7.00   | 6.56   | 3.60   | 3.10   | 2.25                           | 0.80 |
| HP 065                         | 1                                   | 58.50  | 43.46  | 23.16  | 19.66  | 10.71                          | 1.28 |
|                                | 2                                   | 42.60  | 25.64  | 16.22  | 13.88  | 7.32                           | 1.11 |
|                                | 3                                   | 20.50  | 15.88  | 8.18   | 6.81   | 3.91                           | 0.58 |
| HP 135                         | 1                                   | 20.33  | 18.80  | 9.71   | 8.66   | 4.78                           | 2.78 |
|                                | 2                                   | 11.14  | 10.16  | 6.60   | 6.38   | 2.22                           | 1.11 |
|                                | 3                                   | 6.48   | 6.33   | 3.38   | 3.16   | 2.14                           | 1.01 |
| HP 150                         | 1                                   | 17.53  | 15.91  | 7.48   | 6.96   | 5.94                           | 1.07 |
|                                | 2                                   | 8.60   | 8.37   | 3.54   | 3.38   | 3.15                           | 0.58 |
|                                | 3                                   | 6.53   | 5.90   | 2.93   | 2.79   | 2.12                           | 0.49 |
| HP 320                         | 1                                   | 10.88  | 9.73   | 5.02   | 3.73   | 2.54                           | 1.04 |
|                                | 2                                   | 4.40   | 3.83   | 1.75   | 1.48   | 0.88                           | 0.71 |
|                                | 3                                   | 2.75   | 2.11   | 1.05   | 0.87   | 0.77                           | 0.61 |
|                                | 4                                   | 2.12   | 1.77   | 0.98   | 0.78   | 0.55                           | 0.47 |
| HP 500                         | 1                                   | 4.44   | 3.67   | 2.30   | 2.10   | 1.65                           | 0.15 |
|                                | 2                                   | 3.37   | 2.77   | 1.78   | 1.68   | 1.24                           | 0.10 |
|                                | 3                                   | 2.22   | 1.98   | 1.11   | 1.09   | 0.75                           | 0.08 |
|                                | 4                                   | 1.81   | 1.33   | 0.93   | 0.86   | 0.68                           | 0.05 |
|                                | 5                                   | 1.33   | 1.15   | 0.77   | 0.68   | 0.48                           | 0.04 |
| Absolute filtration - N Series |                                     |        |        |        |        |                                |      |
| Type                           | A03                                 | A06    | A10    | A16    | A25    | M25                            |      |
| HF 325                         | 1                                   | 3.65   | 2.95   | 2.80   | 1.80   | 0.90                           | 0.38 |
|                                | 2                                   | 2.03   | 1.73   | 1.61   | 1.35   | 0.85                           | 0.36 |
|                                | 3                                   | 1.84   | 1.42   | 1.32   | 1.22   | 0.80                           | 0.35 |

## Suction filters

| Nominal filtration - N Series |      |      |      |      |      |      |
|-------------------------------|------|------|------|------|------|------|
| Type                          | P10  | P25  | M25  | M60  | M90  | M250 |
| SF 250                        | 0.65 | 0.20 | 0.10 | 0.08 | 0.05 | 0.03 |
| SF 503                        | -    | -    | 0.17 | 0.11 | 0.11 | 0.11 |
| SF 504                        | -    | -    | 0.11 | 0.08 | 0.08 | 0.08 |
| SF 505                        | -    | -    | 0.23 | 0.18 | 0.18 | 0.18 |
| SF 510                        | -    | -    | 0.18 | 0.14 | 0.14 | 0.14 |
| SF 535                        | -    | -    | 0.08 | 0.05 | 0.05 | 0.05 |
| SF 540                        | -    | -    | 0.05 | 0.04 | 0.04 | 0.04 |

## Stainless steel high pressure filters

| Filter element                      | Absolute filtration<br>N Series |        |        |        |        |        |
|-------------------------------------|---------------------------------|--------|--------|--------|--------|--------|
|                                     | Type                            | A03    | A06    | A10    | A16    | A25    |
| 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  |
| HP 039                              | 2                               | 70.66  | 53.20  | 25.77  | 20.57  | 14.67  |
|                                     | 3                               | 36.57  | 32.28  | 18.00  | 13.38  | 8.00   |
|                                     | 4                               | 26.57  | 23.27  | 12.46  | 8.80   | 5.58   |
| HP 050                              | 1                               | 31.75  | 30.30  | 13.16  | 12.3   | 7.29   |
|                                     | 2                               | 24.25  | 21.26  | 11.70  | 9.09   | 4.90   |
|                                     | 3                               | 17.37  | 16.25  | 8.90   | 7.18   | 3.63   |
|                                     | 4                               | 12.12  | 10.75  | 6.10   | 5.75   | 3.08   |
|                                     | 5                               | 7.00   | 6.56   | 3.60   | 3.10   | 2.25   |
| HP 135                              | 1                               | 20.33  | 18.80  | 9.71   | 8.66   | 4.78   |
|                                     | 2                               | 11.14  | 10.16  | 6.60   | 6.38   | 2.22   |
|                                     | 3                               | 6.48   | 6.33   | 3.38   | 3.16   | 2.14   |
| Absolute filtration<br>H - U Series |                                 |        |        |        |        |        |
| Type                                | A03                             | A06    | A10    | A16    | A25    |        |
| 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  |
| HP 039                              | 2                               | 73.00  | 57.00  | 28.00  | 24.00  | 17.20  |
|                                     | 3                               | 40.90  | 36.33  | 21.88  | 18.80  | 11.20  |
|                                     | 4                               | 31.50  | 28.22  | 17.22  | 9.30   | 6.70   |
| HP 050                              | 1                               | 47.33  | 34.25  | 21.50  | 20.50  | 14.71  |
|                                     | 2                               | 29.10  | 25.95  | 14.04  | 10.90  | 5.88   |
|                                     | 3                               | 20.85  | 19.50  | 10.68  | 8.61   | 4.36   |
|                                     | 4                               | 14.55  | 12.90  | 7.32   | 6.90   | 3.69   |
|                                     | 5                               | 9.86   | 9.34   | 6.40   | 4.80   | 2.50   |
| HP 135                              | 1                               | 29.16  | 25.33  | 13.00  | 12.47  | 5.92   |
|                                     | 2                               | 14.28  | 11.04  | 7.86   | 7.60   | 4.44   |
|                                     | 3                               | 8.96   | 7.46   | 4.89   | 4.16   | 3.07   |

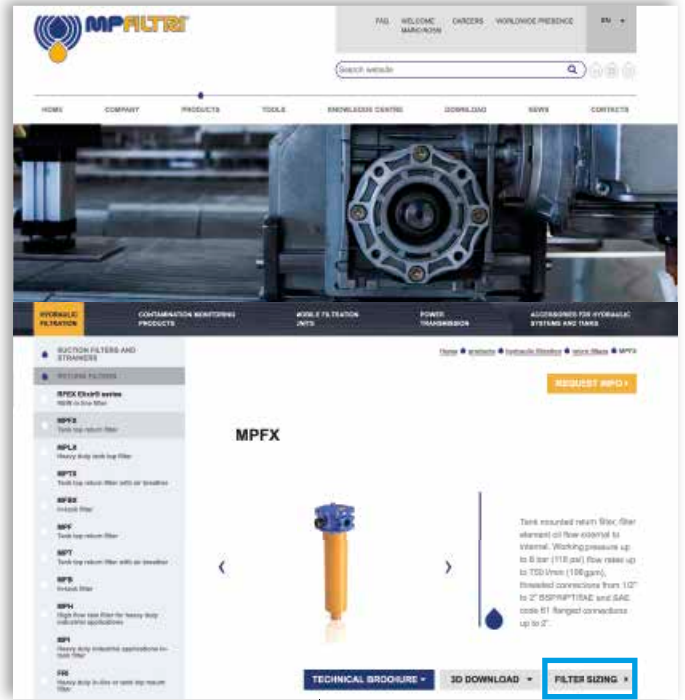
# TYPICAL FILTER SIZING Selection Software

## Step ①

Select "FILTER SIZING SOFTWARE" after login

OR

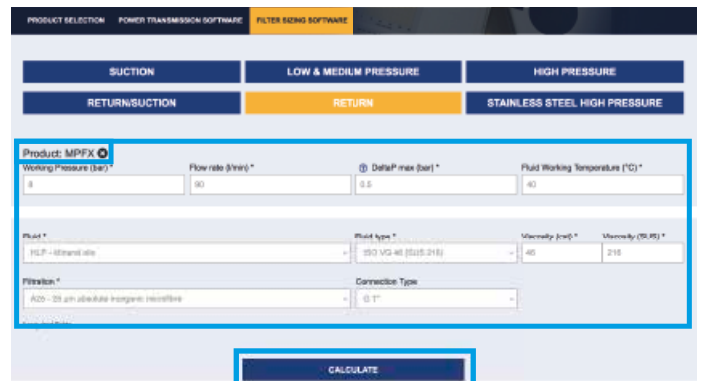
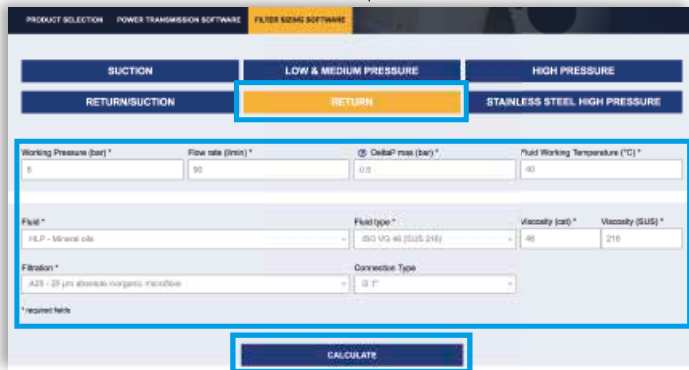
Select "FILTER SIZING" after login from a product page



Choose the type of filter family.  
Enter the main data for sizing the filter  
then push CALCULATE.

## Step ②

Enter the main data for sizing the filter  
then push CALCULATE.



## Step ③

Select the desired options to choose the appropriate filter type for the application.

Working Pressure: 8 (bar) | Fluid: HLP | Flow rate: 90 (l/min) | Fluid type: ISO VG 46 (SUS 216) | DP max of the project: 0.5 (bar) | Seal: A - NBR | Working Temperature: 40 (°C) | Optional seals: V - FPM | Filtration: 25 µm absolute inorganic microfibre | Working Temperature with options: -20 + 110 (°C) | Connection Type: G 1" | Viscosity: 46 (cst) - 216 (SUS)

**Filter type:** MPFX: Tank top mounting - (Pmax 1 - B: 1.75 bar (Systems) | Seal: A - NBR | **Option1:** Single or duplex | **DIN Standard:** NOT APPLICABLE | **Indicator:** Visual

| Image | Code                      | Press | Qmax | µP    | Housing µP | Element µP | Connection | Seal | Link |      |   |      |   |                   |
|-------|---------------------------|-------|------|-------|------------|------------|------------|------|------|------|---|------|---|-------------------|
|       |                           | bar   | psi  | l/min | gpm        | bar        | psi        | bar  | psi  |      |   |      |   |                   |
|       | MPFX-100-3-A-G3-A25-HBPS1 | 8     | 116  | 25.74 | 25.3       | 0.47       | 7          | 0.12 | 2    | 0.35 | 5 | G 1" | A | Adjustment Report |
|       | MPFX-150-3-A-G3-A25-HBPS1 | 8     | 178  | 66.74 | 25.3       | 0.47       | 7          | 0.12 | 2    | 0.38 | 8 | G 1" | A | Adjustment Report |

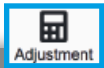
## Step 4

Choose the most suitable filter from the proposed list.

| Image | Code                       | Peak<br>bar | Qmax<br>gpm | ΔP<br>psi | Housing ΔP<br>bar | Element ΔP<br>psi | Connection | Seal | Link |      |   |      |   |                      |
|-------|----------------------------|-------------|-------------|-----------|-------------------|-------------------|------------|------|------|------|---|------|---|----------------------|
|       | MPFX-103-3-A-Q3-A25-H-BPFI | 8           | 116         | 25.74     | 25.3              | 0.47              | T          | 0.12 | 2    | 0.33 | 5 | G 1" | A | Adjustment<br>Report |
|       | MPFX-104-3-A-Q3-A25-H-BPFI | 8           | 116         | 25.74     | 25.3              | 0.47              | T          | 0.12 | 2    | 0.33 | 5 | G 1" | A | Adjustment<br>Report |

## Step 5

It is possible to change the filter modifying every parameter.



### A SAVE YOUR FILTER'S REPORT



### B MANUAL EDIT



SAVE IN YOUR ARCHIVE  
typing your reference data and then SAVE AS PDF

A new browser window displays the pdf

see A



Close the report window



By clicking your WELCOME button, the SHOW REPORTS is displayed: select it to see your filters list.

High pressure filters are used as process filters to protect individual valves or the entire hydraulic circuit from contamination as per ISO 4406.

9 versions are available with operating pressures range from 110 bar up to 560 bar.

A range of products is available to resolve all filter mounting problems, in the following configurations:

- In-line, with threaded and flange mounting
- Manifold top mounting
- Manifold side mounting
- Manifold mounting, to DIN 24340 CETOP R 35 H
- Manifold threaded/flange mounting in the top extraction filter cartridge version
- Duplex versions for continuous operation requirements

FMP series is specifically designed and suitable for:

- feed pumps of hydrostatic drives
- pressure lubrication
- hydraulic systems in the high pressure range

FMMX & FMM series is optimized for the protection of servo and proportional hydraulics:

- in agricultural machinery
- in construction machinery
- in commercial vehicles

HPB are kits designed for the direct integration into the control block; they can be easily integrated into the block through a simple cavity.

FHP & FHA series are the typical high-pressure filters optimized for industrial applications.

FHM series is designed for intermediate plate construction, CETOP design.

FHB series is designed for block mounting; the filter head can be screwed in from the outside.

FHF series is designed to assemble HF4 filter element according to SAE J2066.

FHD series is the duplex high pressure filter; with two independent filter heads, the flow can be switched without interruption during operation.

The range includes a complete set of valves:

- Bypass valve
- Check valve
- Bypass + check valve
- Reverse-flow valve
- Reverse-flow + bypass valve

## FILTER SIZING

For the proper corrective factor Y see chapter at page 25



# High pressure filters



|          |          |
|----------|----------|
| FMMX 050 | page 491 |
| FMM      | 499      |
| FHA 051  | 509      |
| FMP 039  | 517      |
| FMP      | 525      |
| FHP      | 537      |

|            |          |
|------------|----------|
| FHM        | page 557 |
| FHB        | 575      |
| FHF 325    | 589      |
| FHD        | 599      |
| HPB        | 613      |
| INDICATORS | 622      |



THE X CONCEPT FOR OUR FILTERS

Protect the performance of your system with MYclean.  
Quality and efficiency are fundamental for MP Filtri:  
this exclusive new filter element possesses polygon shape geometry and specific seal  
that ensures only original spare parts can be used - ensuring correct operation and  
higher system reliability.

## FMMX 050 series

with MY CLEAN HPX 050 Filter Element



- Protects the machine from improper use of non-original products.
- Safety of constant quality protection & reliability

With exclusive filter element you are sure that only MP Filtri filter elements can be used, ensuring the best cleaning level of the oil due to the use of originals filter elements.



The products identified as FMMX 050 are protected by:

- Italian Patent n° 102014902261205
- Canadian Patent n° 2,937,258
- European Patent n° 16181725.9
- US Patent n° 15/224,337

TOGETHER WITH MY CLEAN, AS OPTION, FMMX 050 SERIES CAN BE PROVIDED WITH

**zerospark®**  
THE ANTI-STATIC FILTERS

THE Z CONCEPT FOR OUR FILTERS



Zerospark® is a specialist solution designed to solve the problem of electrostatic discharge inside hydraulic filters. Caused by the electrical charge build-up due to the passage of oil through the filters, this can result in damage to filter elements, oils and circuit components. It can even cause fire hazards in environments where flammable materials are present.

# FMMX 050 series

Maximum working pressure up to 42 MPa (420 bar) - Flow rate up to 154 l/min



# FMMX 050 GENERAL INFORMATION

## Description

## Technical data

### High Pressure filters

#### In-line

**Maximum working pressure up to 42 MPa (420 bar)**

**Flow rate up to 154 l/min**

FMMX is a range of versatile high pressure filter for protection of sensitive components in high pressure hydraulic systems in the mobile machines.

They are directly connected to the lines of the system through the hydraulic fittings.

#### Available features:

- Female threaded connections up to 1 1/4", for a maximum flow rate of 250 l/min
- Fine filtration rating, to get a good cleanliness level into the system
- Bypass valve, to relieve excessive pressure drop across the filter media
- Low collapse filter element "N", for use with filters provided with bypass valve
- Low collapse filter element with external support "R", for filter element protection against the back pressure caused by the check valve in filters provided with the bypass valve
- High collapse filter element with external support "S", for filter element protection against the back pressure caused by the check valve in filters not provided with the bypass valve
- Visual, electrical and electronic differential clogging indicators

#### Common applications:

- Agricultural machines
- Mobile machines

#### Filter housing materials

- Head: Painted cast iron, black RAL 9005
- Housing: Phosphatized steel
- Bypass valve: Steel

#### Pressure

- Test pressure: 63 MPa (630 bar)
- Burst pressure: 126 MPa (1260 bar)
- Pulse pressure fatigue test: 1 000 000 cycles with pressure from 0 to 42 MPa (420 bar)

#### Bypass valve

- Opening pressure 600 kPa (6 bar) ±10%
- Other opening pressures on request.

#### Δp element type

- Microfiber filter elements - series N-R: 20 bar
- Microfiber filter elements - series S: 210 bar
- Wire mesh filter elements - series N: 20 bar
- Fluid flow through the filter element from OUT to IN

#### Seals

- Standard NBR series A
- Optional FPM series V

#### Temperature

From -25 °C to +110 °C

#### Connections

In-line Inlet/Outlet

#### Note

FMMX filters are provided for vertical mounting

## Weights [kg] and volumes [dm<sup>3</sup>]

| Filter series   | Weights [kg] |      |      |      |      | Volumes [dm <sup>3</sup> ] |        |      |      |      |      |      |
|-----------------|--------------|------|------|------|------|----------------------------|--------|------|------|------|------|------|
|                 | Length       | 1    | 2    | 3    | 4    | 5                          | Length | 1    | 2    | 3    | 4    | 5    |
| <b>FMMX 050</b> |              | 3.11 | 3.48 | 3.90 | 4.36 | 5.54                       |        | 0.34 | 0.48 | 0.63 | 0.81 | 1.23 |

# GENERAL INFORMATION FMMX 050

## FILTER ASSEMBLY SIZING Flow rates [l/min]

| Filter series   | Length   | Filter element design - N Series |     |     |     |     |     | Filter element design - S Series |     |     |     |     |
|-----------------|----------|----------------------------------|-----|-----|-----|-----|-----|----------------------------------|-----|-----|-----|-----|
|                 |          | A03                              | A06 | A10 | A16 | A25 | M25 | A03                              | A06 | A10 | A16 | A25 |
| <b>FMMX 050</b> | <b>1</b> | 42                               | 43  | 79  | 82  | 106 | 147 | 29                               | 39  | 57  | 59  | 74  |
|                 | <b>2</b> | 52                               | 57  | 85  | 96  | 121 | 149 | 45                               | 49  | 76  | 88  | 114 |
|                 | <b>3</b> | 66                               | 69  | 97  | 106 | 130 | 150 | 58                               | 61  | 89  | 99  | 125 |
|                 | <b>4</b> | 83                               | 89  | 113 | 115 | 134 | 152 | 74                               | 80  | 106 | 108 | 129 |
|                 | <b>5</b> | 107                              | 110 | 130 | 134 | 141 | 154 | 93                               | 95  | 111 | 121 | 139 |

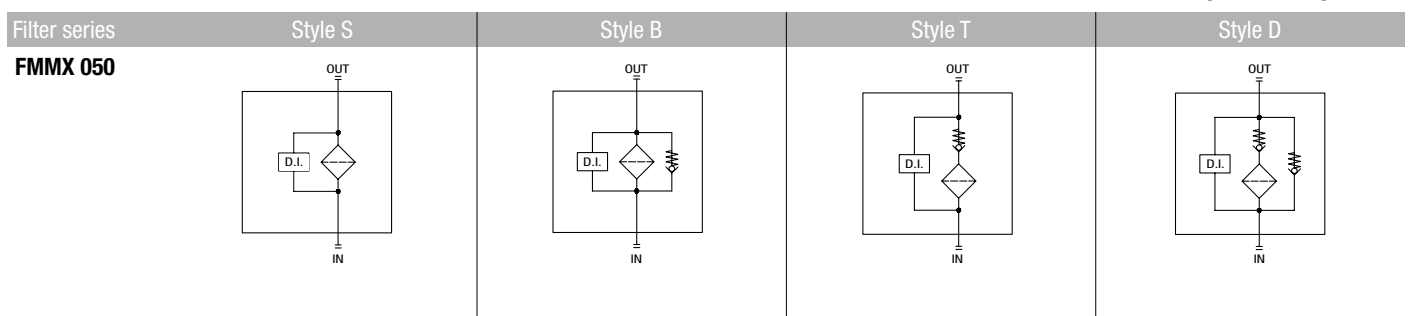
### Maximum flow rate for a complete pressure filter with a pressure drop $\Delta p = 1.5$ bar.

The reference fluid has a kinematic viscosity of 30 mm<sup>2</sup>/s (cSt) and a density of 0.86 kg/dm<sup>3</sup>.

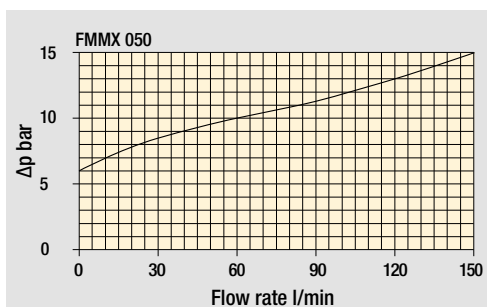
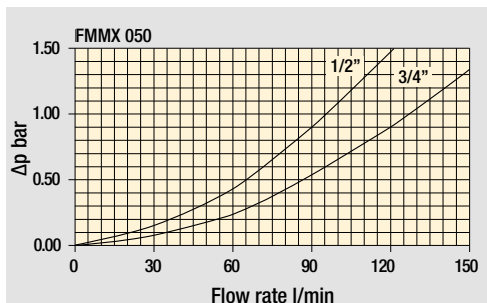
For different pressure drop or fluid viscosity we recommend to use our selection software available on [www.mpfiltri.com](http://www.mpfiltri.com).

You can also calculate the right size using the formulas present on the FILTER SIZING paragraph at the beginning of the full catalogue or at the beginning of the filter family brochure. Please, contact our Sales Department for further additional information.

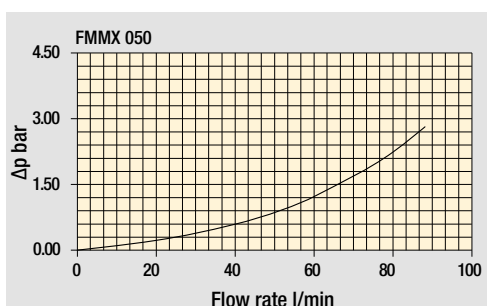
### Hydraulic symbols



Pressure drop  
Filter housings  
 $\Delta p$  pressure drop



Bypass valve  
pressure drop



Filter housing  
with check valve

Valves

The curves are plotted using mineral oil with density of 0.86 kg/dm<sup>3</sup> in compliance with ISO 3968.  $\Delta p$  varies proportionally with density.

# FMMX 050

## Designation & Ordering code

### COMPLETE FILTER

Series and size Configuration example: **FMMX050** | **3** | **B** | **A** | **G** | **A10** | **N** | **P01**

**FMMX050** Filter featuring **MYCLEAN** Filter Element

Length  
**1** | **2** | **3** | **4** | **5**

Valves  
**S** Without bypass  
**B** With bypass 6 bar  
**T** With check valve, without bypass  
**D** With check valve, with bypass 6 bar

Seals  
**A** NBR  
**V** FPM

Connections  
**A** M18x1.5 - ISO 6149      **E** 1/2" NPT  
**B** M22x1.5 - ISO 6149      **F** 3/4" NPT  
**C** G 1/2"                      **G** SAE 8 - 3/4" - 16 UNF  
**D** G 3/4"                      **H** SAE 12 - 1 1/16" - 12 UN

| Filtration rating (filter media) |       |
|----------------------------------|-------|
| <b>A03</b> Inorganic microfiber  | 3 µm  |
| <b>A06</b> Inorganic microfiber  | 6 µm  |
| <b>A10</b> Inorganic microfiber  | 10 µm |
| <b>A16</b> Inorganic microfiber  | 16 µm |
| <b>A25</b> Inorganic microfiber  | 25 µm |
| <b>M25</b> Wire mesh             | 25 µm |

| Element Δp       | Valves |   |   |   |
|------------------|--------|---|---|---|
|                  | S      | B | T | D |
| <b>N</b> 20 bar  | -      | • | - | - |
| <b>R</b> 20 bar  | -      | - | - | • |
| <b>S</b> 210 bar | •      | - | • | - |

| Executions |  |   |
|------------|--|---|
| Base       | zero <span style="color:blue">spark</span> |   |
| <b>P01</b> | <b>Z01</b>                                 | Upper connection for clogging indicator   |
| <b>P02</b> | <b>Z02</b>                                 | Without connection for clogging indicator |
| <b>P03</b> | <b>Z03</b>                                 | Frontal connection for clogging indicator |
| <b>Pxx</b> | <b>Zxx</b>                                 | Customized                                |

### FILTER ELEMENT

Element series and size Configuration example: **HPX050** | **3** | **A10** | **A** | **N** | **P01**

**HPX050** Filter Element with **MYCLEAN** feature

Element length  
**1** | **2** | **3** | **4** | **5**

| Filtration rating (filter media) |       |
|----------------------------------|-------|
| <b>A03</b> Inorganic microfiber  | 3 µm  |
| <b>A06</b> Inorganic microfiber  | 6 µm  |
| <b>A10</b> Inorganic microfiber  | 10 µm |
| <b>A16</b> Inorganic microfiber  | 16 µm |
| <b>A25</b> Inorganic microfiber  | 25 µm |
| <b>M25</b> Wire mesh             | 25 µm |

| Seals        |  | Element Δp       |  |
|--------------|--|------------------|--|
| <b>A</b> NBR |  | <b>N</b> 20 bar  |  |
| <b>V</b> FPM |  | <b>R</b> 20 bar  |  |
|              |  | <b>S</b> 210 bar |  |

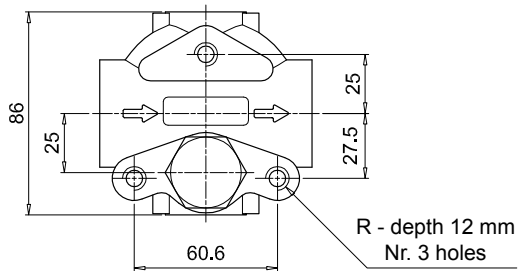
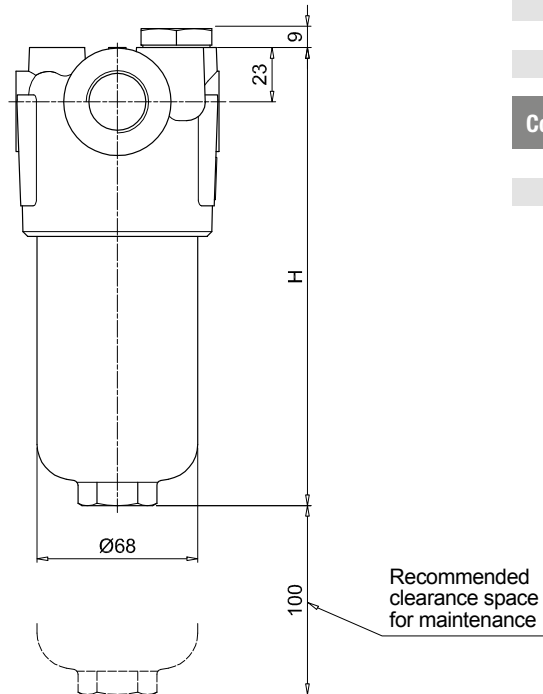
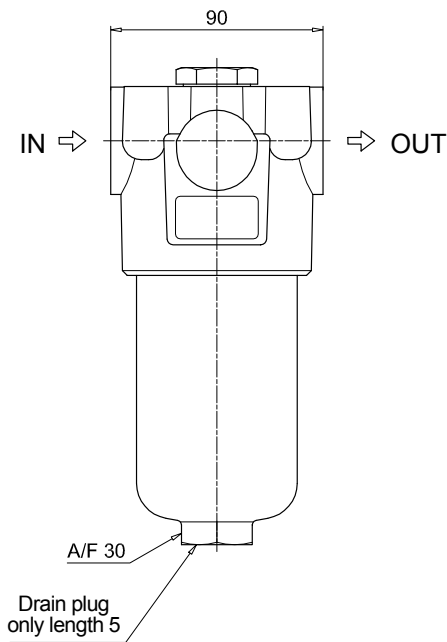
| Executions |  |                    |
|------------|--|--------------------|
| Base       | zero <span style="color:blue">spark</span> |                    |
| <b>P01</b> | <b>Z01</b>                                 | MP Filtri standard |
| <b>Pxx</b> | <b>Zxx</b>                                 | Customized         |

### CLOGGING INDICATORS

See page 622

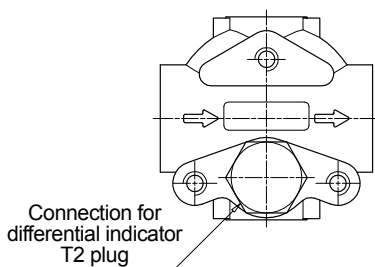
**DEA** Electrical differential indicator  
**DEM** Electrical differential indicator  
**DLA** Electrical / visual differential indicator  
**DLE** Electrical / visual differential indicator

**DTA** Electrical differential indicator  
**DVA** Visual differential indicator  
**DVM** Visual differential indicator  
**T2** Plug

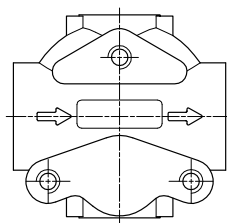


| FMMX050       |          |
|---------------|----------|
| Filter length | H [mm]   |
| 1             | 158      |
| 2             | 195      |
| 3             | 237      |
| 4             | 285      |
| 5             | 407      |
| Connections   | R        |
| A-B-C-D       | M10      |
| E-F-G-H       | 3/8" UNC |

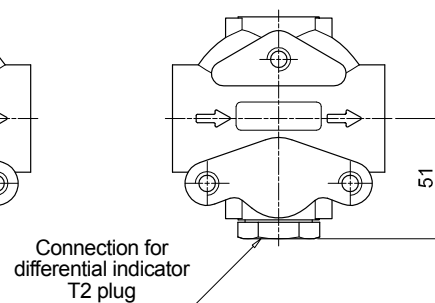
Execution P01



Execution P02



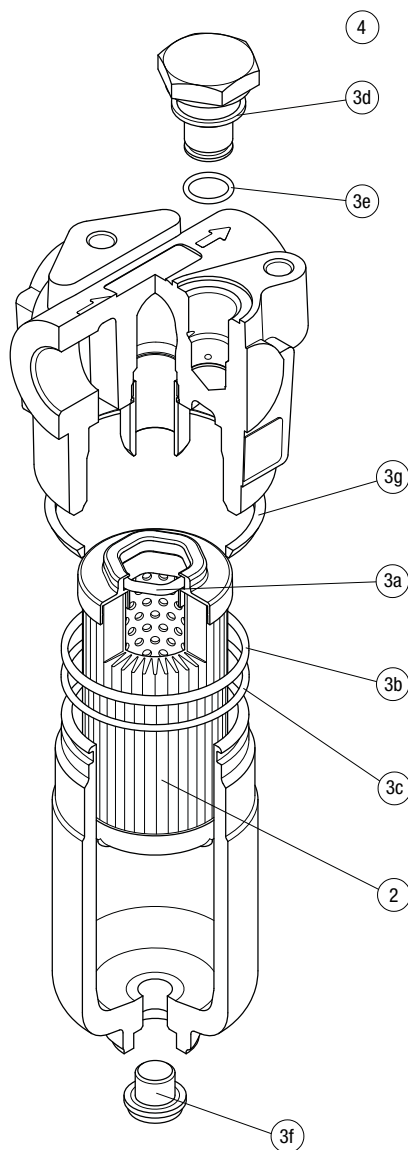
Execution P03



# FMMX 050 SPARE PARTS

Order number for spare parts

## FMMX 050



| Item:         | Q.ty: 1 pc.     | Q.ty: 1 pc.          |          | Q.ty: 1 pc.               |     |
|---------------|-----------------|----------------------|----------|---------------------------|-----|
| Filter series | Filter element  | Seal Kit code number |          | Indicator connection plug |     |
| FMMX 050      | See order table | NBR                  | FPM      | NBR                       | FPM |
|               | <b>2</b>        | <b>3</b> (3a ÷ 3g)   |          | <b>4</b>                  |     |
|               |                 | 02050864             | 02050865 | T2H                       | T2V |







# FMM series

Maximum working pressure up to 42 MPa (420 bar) - Flow rate up to 300 l/min



## Description

## Technical data

### High Pressure filters

#### In-line

**Maximum working pressure up to 42 MPa (420 bar)**

**Flow rate up to 300 l/min**

FMM is a range of versatile high pressure filter for protection of sensitive components in high pressure hydraulic systems in the mobile machines.

They are directly connected to the lines of the system through the hydraulic fittings.

#### Available features:

- Female threaded connections up to 1 1/4", for a maximum flow rate of 250 l/min
- Fine filtration rating, to get a good cleanliness level into the system
- Bypass valve, to relieve excessive pressure drop across the filter media
- Low collapse filter element "N", for use with filters provided with bypass valve
- Low collapse filter element with external support "R", for filter element protection against the back pressure caused by the check valve in filters provided with the bypass valve
- High collapse filter element with external support "S", for filter element protection against the back pressure caused by the check valve in filters not provided with the bypass valve
- Visual, electrical and electronic differential clogging indicators

#### Common applications:

- Agricultural machines
- Mobile machines

#### Filter housing materials

- Head: Painted cast iron, black RAL 9005
- Housing: Phosphatized steel
- Bypass valve: Steel

#### Pressure

- Test pressure: 63 MPa (630 bar)
- Burst pressure: 126 MPa (1260 bar)
- Pulse pressure fatigue test: 1 000 000 cycles with pressure from 0 to 42 MPa (420 bar)

#### Bypass valve

- Opening pressure 600 kPa (6 bar) ±10%
- Other opening pressures on request.

#### Δp element type

- Microfiber filter elements - series N-R: 20 bar
- Microfiber filter elements - series S: 210 bar
- Wire mesh filter elements - series N: 20 bar
- Fluid flow through the filter element from OUT to IN

#### Seals

- Standard NBR series A
- Optional FPM series V

#### Temperature

From -25 °C to +110 °C

#### Connections

In-line Inlet/Outlet

#### Note

FMM filters are provided for vertical mounting

## Weights [kg] and volumes [dm<sup>3</sup>]

| Filter series  | Weights [kg] |      |      |       |      | Volumes [dm <sup>3</sup> ] |        |      |      |      |      |      |
|----------------|--------------|------|------|-------|------|----------------------------|--------|------|------|------|------|------|
|                | Length       | 1    | 2    | 3     | 4    | 5                          | Length | 1    | 2    | 3    | 4    | 5    |
| <b>FMM 050</b> |              | 3.11 | 3.48 | 3.90  | 4.36 | 5.54                       |        | 0.34 | 0.48 | 0.63 | 0.81 | 1.23 |
| <b>FMM 150</b> |              | 7.50 | 9.50 | 10.90 | -    | -                          |        | 0.60 | 1.00 | 1.25 | -    | -    |

| Filter series  | Length   | Filter element design - N Series |     |     |     |     |     | Filter element design - S Series |     |     |     |     |
|----------------|----------|----------------------------------|-----|-----|-----|-----|-----|----------------------------------|-----|-----|-----|-----|
|                |          | A03                              | A06 | A10 | A16 | A25 | M25 | A03                              | A06 | A10 | A16 | A25 |
| <b>FMM 050</b> | <b>1</b> | 42                               | 43  | 79  | 82  | 106 | 147 | 29                               | 39  | 57  | 59  | 74  |
|                | <b>2</b> | 52                               | 57  | 85  | 96  | 121 | 149 | 45                               | 49  | 76  | 88  | 114 |
|                | <b>3</b> | 66                               | 69  | 97  | 106 | 130 | 150 | 58                               | 61  | 89  | 99  | 125 |
|                | <b>4</b> | 83                               | 89  | 113 | 115 | 134 | 152 | 74                               | 80  | 106 | 108 | 129 |
|                | <b>5</b> | 107                              | 110 | 130 | 134 | 141 | 154 | 93                               | 95  | 111 | 121 | 139 |
| <b>FMM 150</b> | <b>1</b> | 81                               | 88  | 156 | 163 | 179 | 295 |                                  |     |     |     |     |
|                | <b>2</b> | 142                              | 145 | 227 | 230 | 236 | 312 |                                  |     |     |     |     |
|                | <b>3</b> | 170                              | 180 | 242 | 245 | 263 | 315 |                                  |     |     |     |     |

### Maximum flow rate for a complete pressure filter with a pressure drop $\Delta p = 1.5$ bar.

The reference fluid has a kinematic viscosity of 30 mm<sup>2</sup>/s (cSt) and a density of 0.86 kg/dm<sup>3</sup>.

For different pressure drop or fluid viscosity we recommend to use our selection software available on [www.mpfiltri.com](http://www.mpfiltri.com).

You can also calculate the right size using the formulas present on the FILTER SIZING paragraph at the beginning of the full catalogue or at the beginning of the filter family brochure. Please, contact our Sales Department for further additional information.

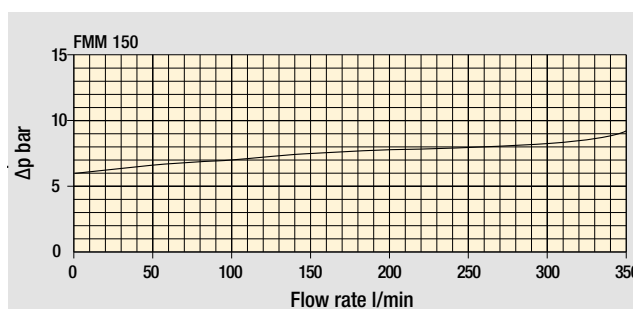
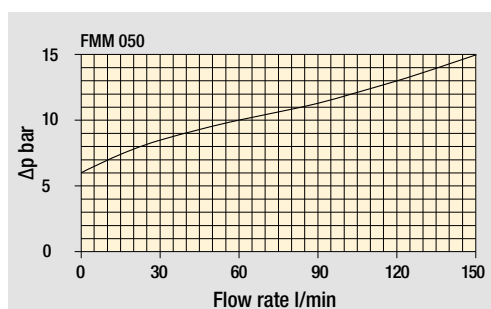
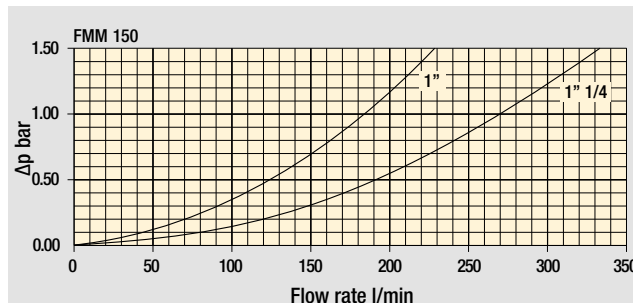
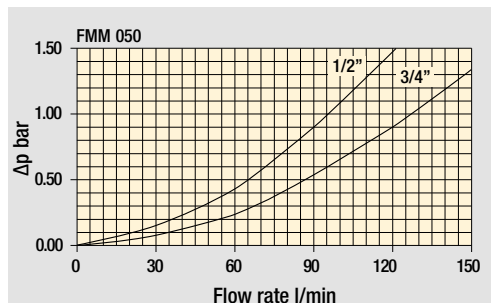
### Hydraulic symbols

| Filter series  | Style S | Style B | Style T | Style D |
|----------------|---------|---------|---------|---------|
| <b>FMM 050</b> | •       | •       | •       | •       |
| <b>FMM 150</b> | •       | •       | -       | -       |

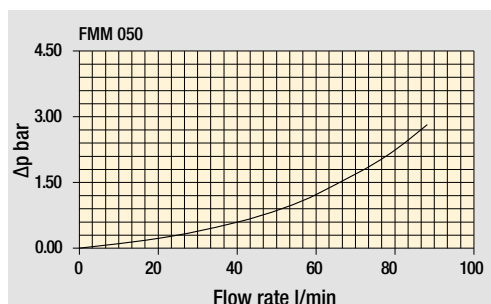
  

|  |  |  |  |
|--|--|--|--|
|  |  |  |  |
|--|--|--|--|

Pressure drop  
Filter housings  
 $\Delta p$  pressure drop



Bypass valve  
pressure drop



Filter housing  
with check valve

Valves

The curves are plotted using mineral oil with density of 0.86 kg/dm<sup>3</sup> in compliance with ISO 3968.  $\Delta p$  varies proportionally with density.

## Designation & Ordering code

### COMPLETE FILTER

Series and size Configuration example: **FMM050** | **3** | **B** | **A** | **G** | **A10** | **N** | **P01**

#### FMM050

#### Length

1 | 2 | 3 | 4 | 5

#### Valves

- S** Without bypass
- B** With bypass 6 bar
- T** With check valve, without bypass
- D** With check valve, with bypass 6 bar

#### Seals

- A** NBR
- V** FPM

#### Connections

- |                             |                                   |
|-----------------------------|-----------------------------------|
| <b>A</b> M18x1.5 - ISO 6149 | <b>E</b> 1/2" NPT                 |
| <b>B</b> M22x1.5 - ISO 6149 | <b>F</b> 3/4" NPT                 |
| <b>C</b> G 1/2"             | <b>G</b> SAE 8 - 3/4" - 16 UNF    |
| <b>D</b> G 3/4"             | <b>H</b> SAE 12 - 1 1/16" - 12 UN |

#### Filtration rating (filter media)

- |                                 |       |
|---------------------------------|-------|
| <b>A03</b> Inorganic microfiber | 3 µm  |
| <b>A06</b> Inorganic microfiber | 6 µm  |
| <b>A10</b> Inorganic microfiber | 10 µm |
| <b>A16</b> Inorganic microfiber | 16 µm |
| <b>A25</b> Inorganic microfiber | 25 µm |
| <b>M25</b> Wire mesh            | 25 µm |

| Element Δp       | Valves |   |   |   |
|------------------|--------|---|---|---|
|                  | S      | B | T | D |
| <b>N</b> 20 bar  | -      | • | - | - |
| <b>R</b> 20 bar  | -      | - | - | • |
| <b>S</b> 210 bar | •      | - | • | - |

#### Executions

- P01** Upper connection for clogging indicator
- P02** Without connection for clogging indicator
- P03** Frontal connection for clogging indicator
- Pxx** Customized

### FILTER ELEMENT

Element series and size Configuration example: **HP050** | **3** | **A10** | **A** | **N** | **P01**

#### HP050

#### Element length

1 | 2 | 3 | 4 | 5

#### Filtration rating (filter media)

- |                                 |       |
|---------------------------------|-------|
| <b>A03</b> Inorganic microfiber | 3 µm  |
| <b>A06</b> Inorganic microfiber | 6 µm  |
| <b>A10</b> Inorganic microfiber | 10 µm |
| <b>A16</b> Inorganic microfiber | 16 µm |
| <b>A25</b> Inorganic microfiber | 25 µm |
| <b>M25</b> Wire mesh            | 25 µm |

| Seals    |     |
|----------|-----|
| <b>A</b> | NBR |
| <b>V</b> | FPM |

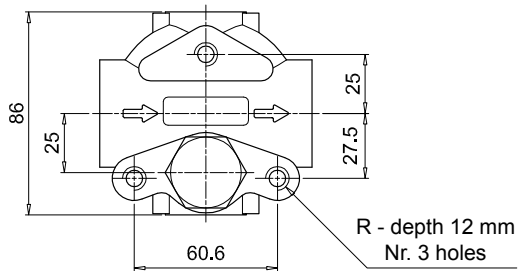
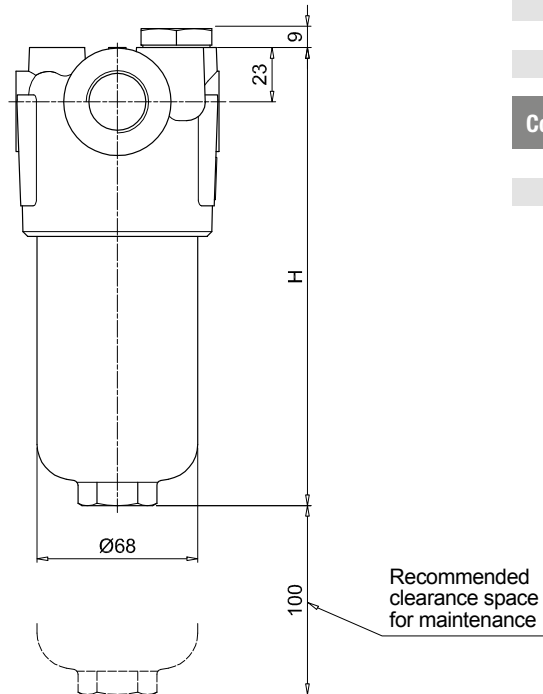
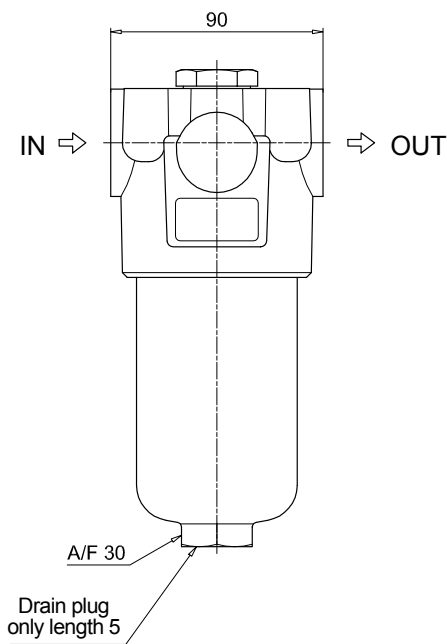
| Element Δp |         |
|------------|---------|
| <b>N</b>   | 20 bar  |
| <b>R</b>   | 20 bar  |
| <b>S</b>   | 210 bar |

| Execution  |                    |
|------------|--------------------|
| <b>P01</b> | MP Filtri standard |
| <b>Pxx</b> | Customized         |

### CLOGGING INDICATORS

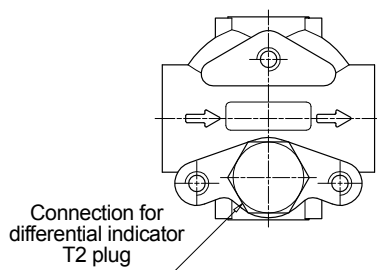
See page 622

- |   |  |
|---|--|
| <b>DEA</b> Electrical differential indicator          | <b>DTA</b> Electrical differential indicator |
| <b>DEM</b> Electrical differential indicator          | <b>DVA</b> Visual differential indicator     |
| <b>DLA</b> Electrical / visual differential indicator | <b>DVM</b> Visual differential indicator     |
| <b>DLE</b> Electrical / visual differential indicator | <b>T2</b> Plug                               |

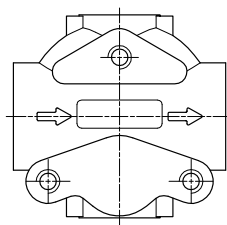


| FMM050        |          |
|---------------|----------|
| Filter length | H [mm]   |
| 1             | 158      |
| 2             | 195      |
| 3             | 237      |
| 4             | 285      |
| 5             | 407      |
| Connections   | R        |
| A-B-C-D       | M10      |
| E-F-G-H       | 3/8" UNC |

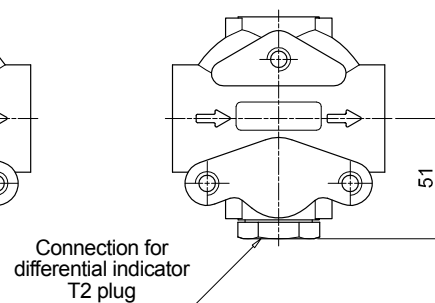
Execution P01



Execution P02



Execution P03



## Designation & Ordering code

### COMPLETE FILTER

Configuration example: **FMM150** **2** **B** **A** **D** **2** **M25** **N** **P01**

**Series and size**  
**FMM150**

**Length**  
**1** | **2** | **3** |

**Valves**  
**S** Without bypass  
**B** With bypass 6 bar

**Seals**  
**A** NBR  
**V** FPM

**Connections**  
**C** G 1"      **F** 1 1/4" NPT  
**D** G 1 1/4"      **G** SAE 16 - 1 5/16" - 12 UN  
**E** 1" NPT      **H** SAE 20 - 1 5/8" - 12 UN

**Connection for differential indicator**  
**1** Without connection  
**2** Upper connection  
**3** Frontal connection

**Filtration rating (filter media)**

|            |                      |       |
|------------|----------------------|-------|
| <b>A03</b> | Inorganic microfiber | 3 µm  |
| <b>A06</b> | Inorganic microfiber | 6 µm  |
| <b>A10</b> | Inorganic microfiber | 10 µm |
| <b>A16</b> | Inorganic microfiber | 16 µm |
| <b>A25</b> | Inorganic microfiber | 25 µm |
| <b>M25</b> | Wire mesh            | 25 µm |

**Element Δp**  
**N** 20 bar

**Execution**  
**P01** MP Filtri standard  
**Pxx** Customized

### FILTER ELEMENT

Configuration example: **HP150** **2** **M25** **A** **N** **P01**

**Element series and size**  
**HP150**

**Element length**  
**1** | **2** | **3** |

**Filtration rating (filter media)**

|            |                      |       |
|------------|----------------------|-------|
| <b>A03</b> | Inorganic microfiber | 3 µm  |
| <b>A06</b> | Inorganic microfiber | 6 µm  |
| <b>A10</b> | Inorganic microfiber | 10 µm |
| <b>A16</b> | Inorganic microfiber | 16 µm |
| <b>A25</b> | Inorganic microfiber | 25 µm |
| <b>M25</b> | Wire mesh            | 25 µm |

**Seals**  
**A** NBR  
**V** FPM

**Element Δp**  
**N** 20 bar

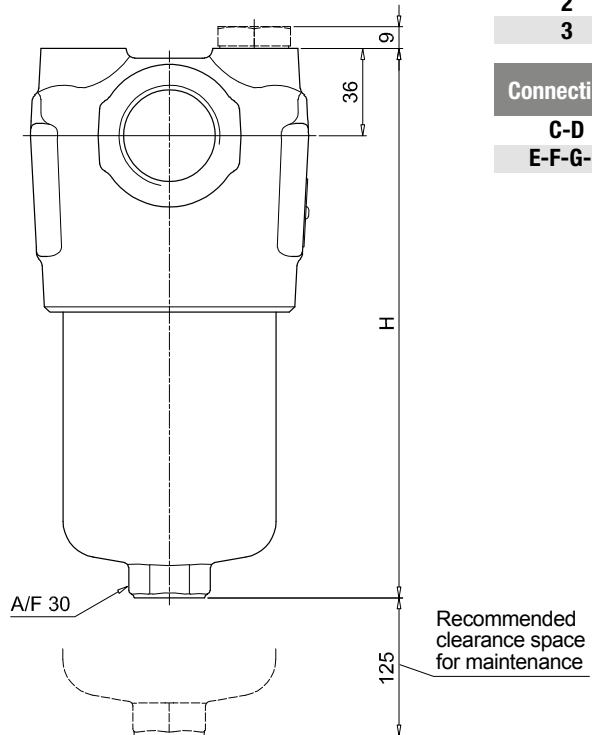
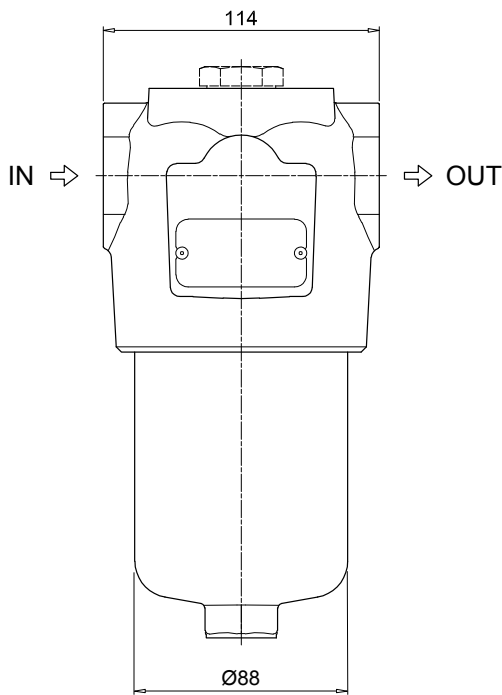
**Execution**  
**P01** MP Filtri standard  
**Pxx** Customized

### CLOGGING INDICATORS

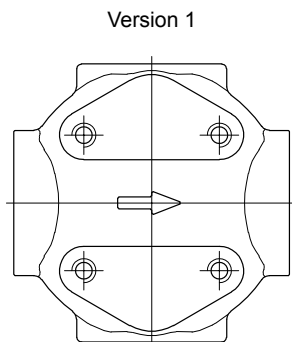
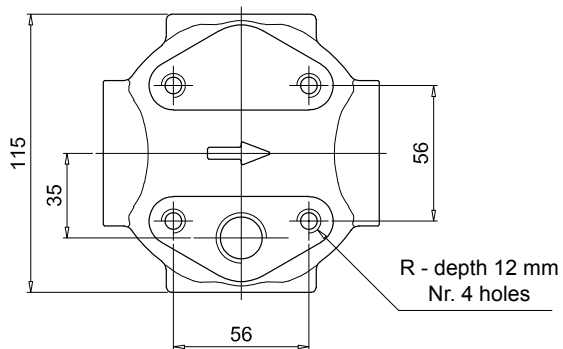
See page 622

|   |  |
|---|--|
| <b>DEA</b> Electrical differential indicator          | <b>DTA</b> Electrical differential indicator |
| <b>DEM</b> Electrical differential indicator          | <b>DVA</b> Visual differential indicator     |
| <b>DLA</b> Electrical / visual differential indicator | <b>DVM</b> Visual differential indicator     |
| <b>DLE</b> Electrical / visual differential indicator | <b>T2</b> Plug                               |

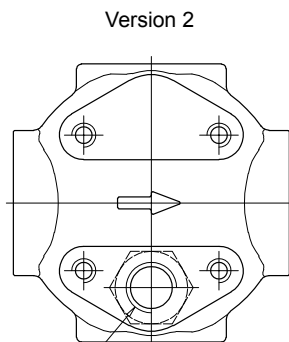




| FMM150         |          |
|----------------|----------|
| Filter length  | H [mm]   |
| <b>1</b>       | 230      |
| <b>2</b>       | 340      |
| <b>3</b>       | 415      |
| Connections    |          |
| <b>C-D</b>     | M10      |
| <b>E-F-G-H</b> | 3/8" UNC |

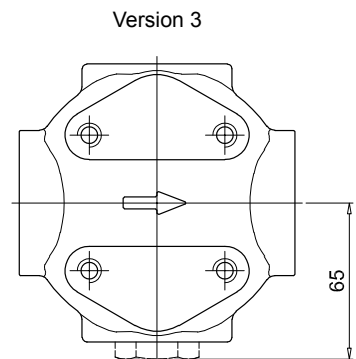


Version 1



Version 2

Connection for differential indicator  
T2 plug not included



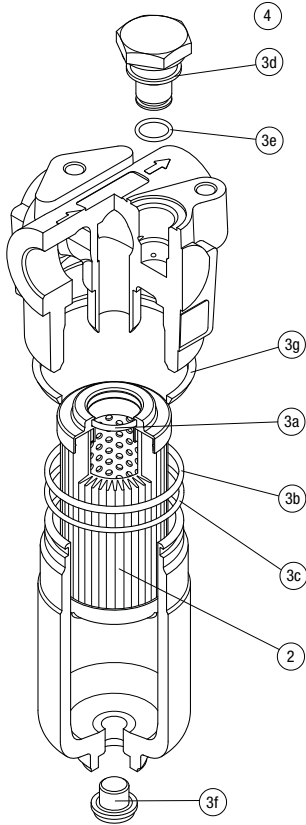
Version 3

Connection for differential indicator  
T2 plug not included

# FMM SPARE PARTS

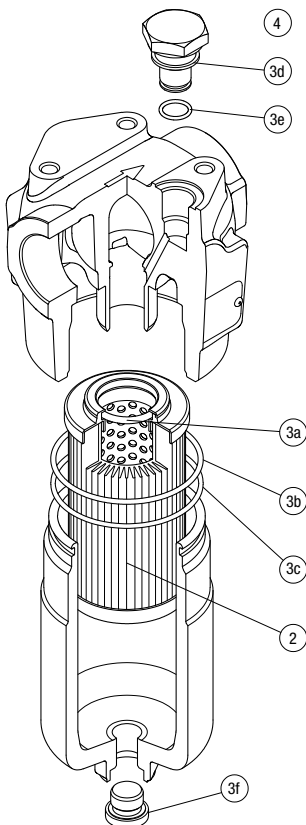
Order number for spare parts

## FMM 050



| Item:          | Q.ty: 1 pc.<br>2 | Q.ty: 1 pc.<br>3 (3a ÷ 3g) |          | Q.ty: 1 pc.<br>4          |     |
|----------------|------------------|----------------------------|----------|---------------------------|-----|
| Filter series  | Filter element   | Seal Kit code number       |          | Indicator connection plug |     |
|                |                  | NBR                        | FPM      | NBR                       | FPM |
| <b>FMM 050</b> | See order table  | 02050314                   | 02050315 | T2H                       | T2V |

## FMM 150



| Item:          | Q.ty: 1 pc.<br>2 | Q.ty: 1 pc.<br>3 (3a ÷ 3f) |          | Q.ty: 1 pc.<br>4          |     |
|----------------|------------------|----------------------------|----------|---------------------------|-----|
| Filter series  | Filter element   | Seal Kit code number       |          | Indicator connection plug |     |
|                |                  | NBR                        | FPM      | NBR                       | FPM |
| <b>FMM 150</b> | See order table  | 02050731                   | 02050732 | T2H                       | T2V |





# FHA 051 series

Maximum working pressure up to 56 MPa (560 bar) - Flow rate up to 150 l/min



## Description

## Technical data

### High Pressure filters

#### In-line

**Maximum working pressure up to 56 MPa (560 bar)**

**Flow rate up to 150 l/min**

FHA is a range of high pressure filter for protection of sensitive components in high pressure hydraulic systems in the mobile machines. They are directly connected to the lines of the system through the hydraulic fittings.

#### Available features:

- Female threaded connections up to 3/4", for a maximum flow rate of 150 l/min
- Fine filtration rating, to get a good cleanliness level into the system
- Bypass valve, to relieve excessive pressure drop across the filter media
- Check valve, to protect the system against reverse flow
- Reverse flow valve, to allow bidirectional flow through the filter housing. The back flow is not filtered
- Low collapse filter element "N", for use with filters provided with bypass valve
- Low collapse filter element with external support "R", for filter element protection against the back pressure caused by the check valve or the reverse flow in filters provided with the bypass valve
- High collapse filter element with external support "S", for filter element protection against the back pressure caused by the check valve or the reverse flow in filters not provided with the bypass valve
- Visual, electrical and electronic differential clogging indicators

#### Common applications:

Delivery lines, in any heavy duty industrial equipment or mobile machines

#### Filter housing materials

- Head: Steel (chemical heat treatment)
- Housing: Steel (chemical heat treatment)
- Bypass valve: Steel

#### Pressure

- Test pressure: 84 MPa (840 bar)
- Burst pressure: 168 MPa (1680 bar)
- Pulse pressure fatigue test: 1 00 000 cycles with pressure from 0 to 56 MPa (560 bar)

#### Bypass valve

- Opening pressure 600 kPa (6 bar) ±10%
- Other opening pressures on request.

#### Δp element type

- Microfibre filter elements - series N-R: 20 bar
- Microfibre filter elements - series S: 210 bar
- Wire mesh filter elements - series N: 20 bar
- Fluid flow through the filter element from OUT to IN

#### Seals

- Standard NBR series A
- Optional FPM series V

#### Temperature

From -25 °C to +110 °C

#### Connections

In-line Inlet/Outlet

#### Note

FHA filters are provided for vertical mounting

## Weights [kg] and volumes [dm<sup>3</sup>]

| Filter series  | Weights [kg] |      |      |      |      | Volumes [dm <sup>3</sup> ] |        |      |      |      |      |      |
|----------------|--------------|------|------|------|------|----------------------------|--------|------|------|------|------|------|
|                | Length       | 1    | 2    | 3    | 4    | 5                          | Length | 1    | 2    | 3    | 4    | 5    |
| <b>FHA 051</b> |              | 3.28 | 3.65 | 4.06 | 4.54 | 5.74                       |        | 0.33 | 0.47 | 0.62 | 0.79 | 1.23 |

| Filter series  | Length   | Filter element design - N Series |     |     |     |     |     | Filter element design - R Series |     |     |     |     | Filter element design - S Series |     |     |     |     |
|----------------|----------|----------------------------------|-----|-----|-----|-----|-----|----------------------------------|-----|-----|-----|-----|----------------------------------|-----|-----|-----|-----|
|                |          | A03                              | A06 | A10 | A16 | A25 | M25 | A03                              | A06 | A10 | A16 | A25 | A03                              | A06 | A10 | A16 | A25 |
| <b>FHA 051</b> | <b>1</b> | 42                               | 41  | 82  | 85  | 110 | 156 | 42                               | 41  | 82  | 85  | 110 | 30                               | 40  | 58  | 60  | 76  |
|                | <b>2</b> | 53                               | 58  | 87  | 100 | 127 | 158 | 53                               | 58  | 87  | 100 | 127 | 45                               | 50  | 78  | 91  | 120 |
|                | <b>3</b> | 68                               | 71  | 101 | 111 | 137 | 160 | 68                               | 71  | 101 | 111 | 137 | 59                               | 62  | 92  | 103 | 131 |
|                | <b>4</b> | 86                               | 92  | 118 | 121 | 142 | 162 | 86                               | 92  | 118 | 121 | 142 | 77                               | 83  | 110 | 113 | 137 |
|                | <b>5</b> | 112                              | 115 | 137 | 142 | 150 | 165 | 112                              | 115 | 137 | 142 | 150 | 96                               | 99  | 116 | 128 | 147 |

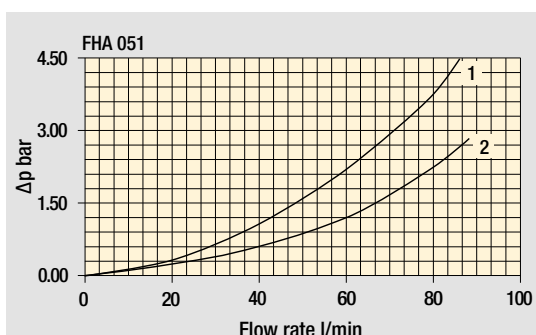
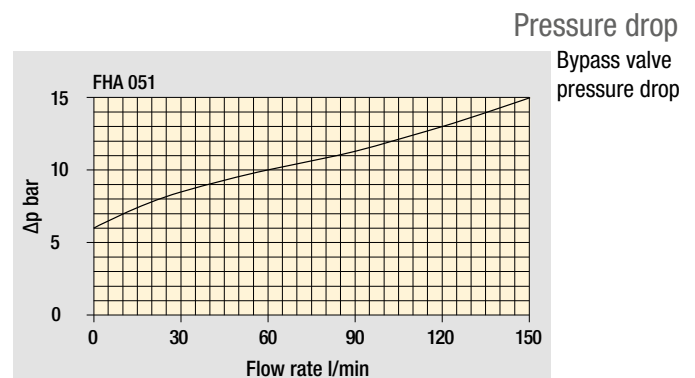
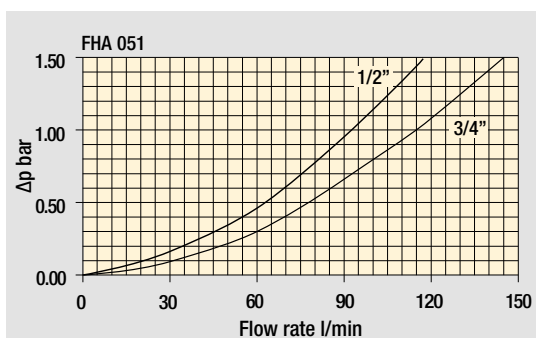
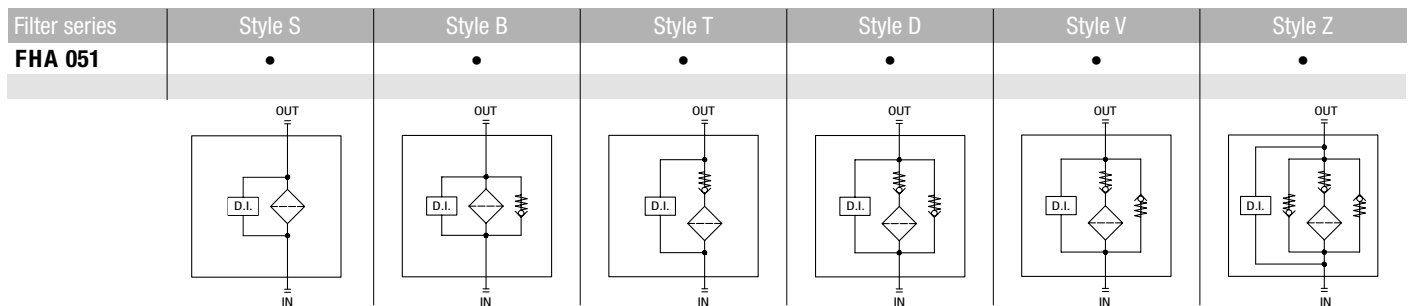
### Maximum flow rate for a complete pressure filter with a pressure drop $\Delta p = 1.5$ bar.

The reference fluid has a kinematic viscosity of 30 mm<sup>2</sup>/s (cSt) and a density of 0.86 kg/dm<sup>3</sup>.

For different pressure drop or fluid viscosity we recommend to use our selection software available on [www.mpfiltri.com](http://www.mpfiltri.com).

You can also calculate the right size using the formulas present on the FILTER SIZING paragraph at the beginning of the full catalogue or at the beginning of the filter family brochure. Please, contact our Sales Department for further additional information.

### Hydraulic symbols



### Pressure drop in reverse flow valves

- 1 - Reverse flow
- 2 - In filter direction

The curves are plotted using mineral oil with density of 0.86 kg/dm<sup>3</sup> in compliance with ISO 3968.  $\Delta p$  varies proportionally with density.

# FHA 051

## Designation & Ordering code

### COMPLETE FILTER

Series and size **FHA051** Configuration example: **FHA051** **3** **B** **A** **G** **A10** **N** **P01**

#### Length

**1** | **2** | **3** | **4** | **5** |

#### Valves

- S** Without bypass
- B** With bypass 6 bar
- T** With check valve, without bypass
- D** With check valve, with bypass 6 bar
- V** With reverse flow, without bypass
- Z** With reverse flow, with bypass 6 bar

#### Seals

- A** NBR
- V** FPM

#### Connections

- |                             |                                   |
|-----------------------------|-----------------------------------|
| <b>A</b> M18x1.5 - ISO 6149 | <b>E</b> 1/2" NPT                 |
| <b>B</b> M22x1.5 - ISO 6149 | <b>F</b> 3/4" NPT                 |
| <b>C</b> G 1/2"             | <b>G</b> SAE 8 - 3/4" - 16 UNF    |
| <b>D</b> G 3/4"             | <b>H</b> SAE 12 - 1 1/16" - 12 UN |

#### Filtration rating (filter media)

- A03** Inorganic microfiber 3 µm
- A06** Inorganic microfiber 6 µm
- A10** Inorganic microfiber 10 µm
- A16** Inorganic microfiber 16 µm
- A25** Inorganic microfiber 25 µm
- M25** Wire mesh 25 µm

| Element Δp       | Valves |   |   |   |   |   |  |
|------------------|--------|---|---|---|---|---|--|
|                  | S      | B | T | D | V | Z |  |
| <b>N</b> 20 bar  | -      | • | - | - | - | - |  |
| <b>R</b> 20 bar  | -      | - | - | • | - | • |  |
| <b>S</b> 210 bar | •      | - | • | - | • | - |  |

#### Execution

- P01** Upper connection for clogging indicator
- P02** Without connection for clogging indicator
- P03** Frontal connection for clogging indicator
- Pxx** Customized

### FILTER ELEMENT

Element series and size **HP050** Configuration example: **HP050** **3** **A10** **A** **N** **P01**

#### Element length

**1** | **2** | **3** | **4** | **5** |

#### Filtration rating (filter media)

- A03** Inorganic microfiber 3 µm
- A06** Inorganic microfiber 6 µm
- A10** Inorganic microfiber 10 µm
- A16** Inorganic microfiber 16 µm
- A25** Inorganic microfiber 25 µm
- M25** Wire mesh 25 µm

| Seals    |     |
|----------|-----|
| <b>A</b> | NBR |
| <b>V</b> | FPM |

| Element Δp |         |
|------------|---------|
| <b>N</b>   | 20 bar  |
| <b>R</b>   | 20 bar  |
| <b>S</b>   | 210 bar |

| Execution  |                    |
|------------|--------------------|
| <b>P01</b> | MP Filtri standard |
| <b>Pxx</b> | Customized         |

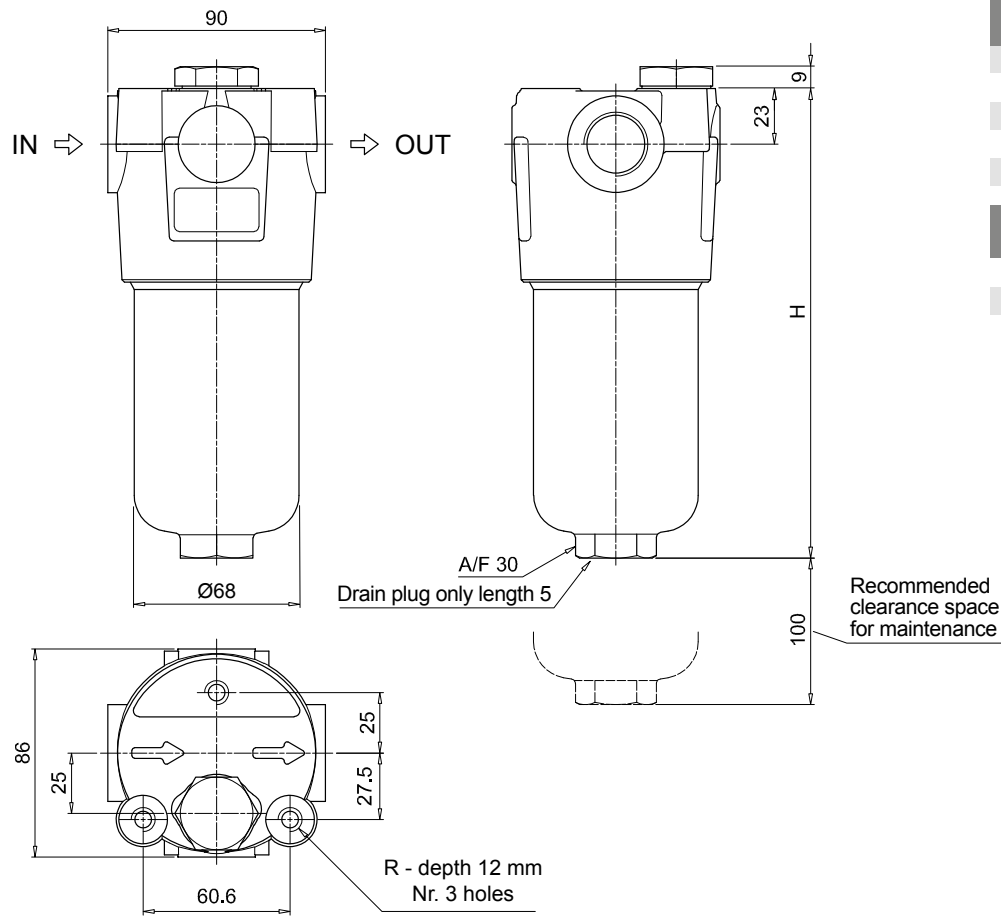
### CLOGGING INDICATORS

See page 622

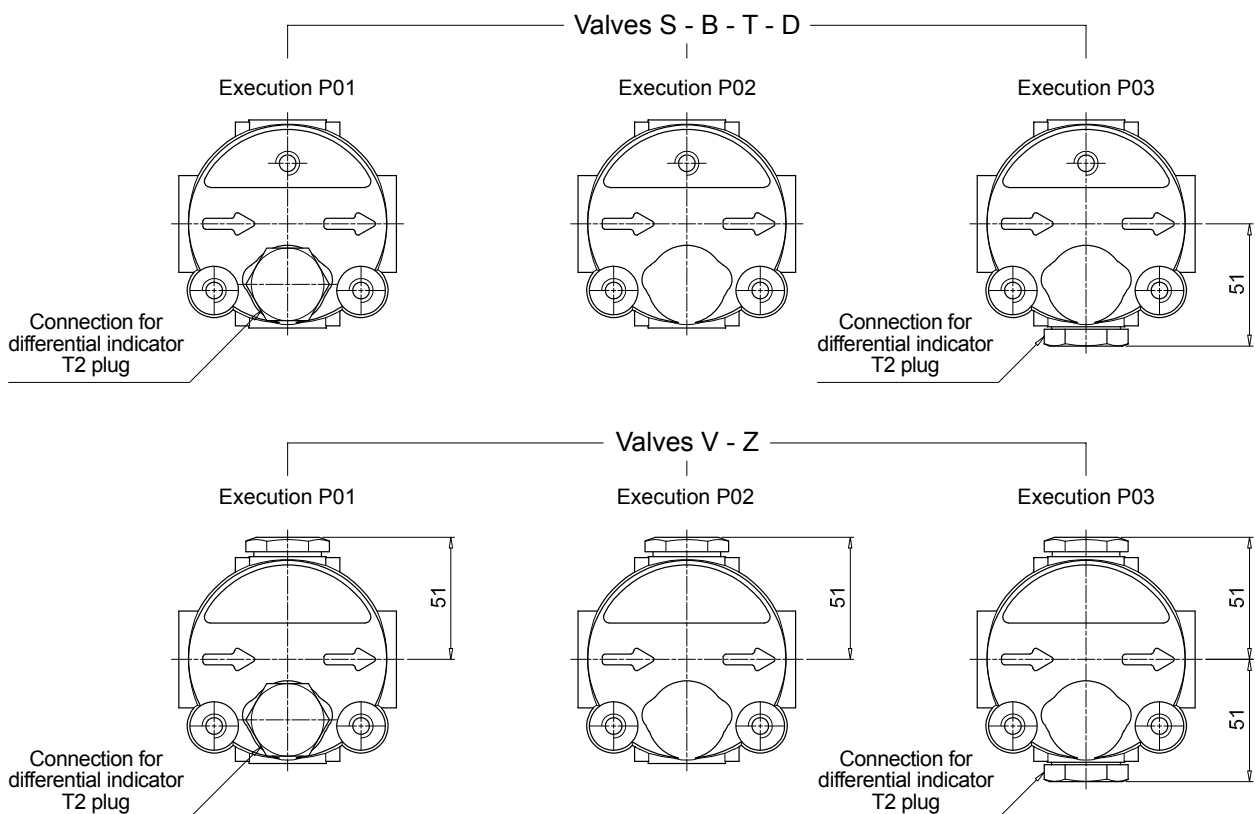
- DEA** Electrical differential indicator
- DEM** Electrical differential indicator
- DLA** Electrical / visual differential indicator
- DLE** Electrical / visual differential indicator

- DTA** Electrical differential indicator
- DVA** Visual differential indicator
- DVM** Visual differential indicator
- T2** Plug





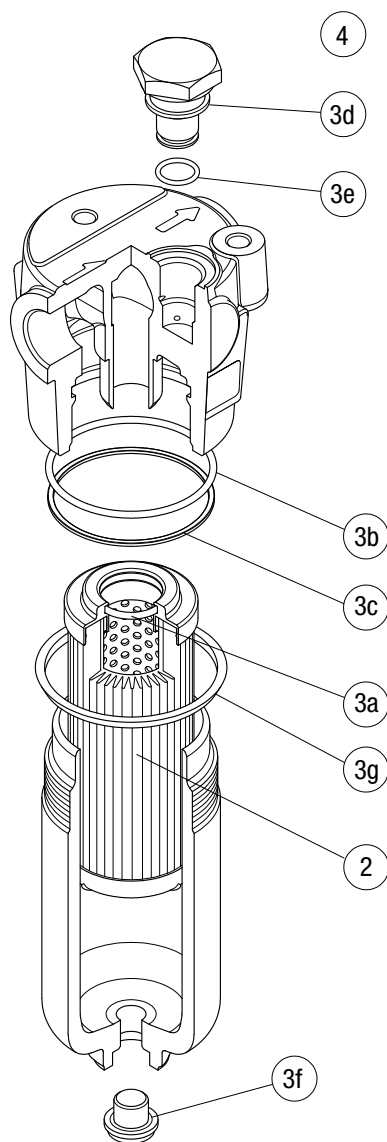
| FHA051        |          |
|---------------|----------|
| Filter length | H [mm]   |
| 1             | 158      |
| 2             | 195      |
| 3             | 237      |
| 4             | 285      |
| 5             | 407      |
| Connections   | R        |
| A-B-C-D       | M10      |
| E-F-G-H       | 3/8" UNC |



# FHA 051 SPARE PARTS

Order number for spare parts

FHA 051



| Item:         | Q.ty: 1 pc.     | Q.ty: 1 pc.          |          | Q.ty: 1 pc.               |     |
|---------------|-----------------|----------------------|----------|---------------------------|-----|
| Filter series | Filter element  | Seal Kit code number |          | Indicator connection plug |     |
| FHA 051       | See order table | NBR                  | FPM      | NBR                       | FPM |
|               |                 | 02050288             | 02050305 | T2H                       | T2V |





# FMP 039 series

Maximum working pressure up to 11 MPa (110 bar) - Flow rate up to 80 l/min



# FMP 039 GENERAL INFORMATION

## Description

## Technical data

### High Pressure filters

#### In-line

**Maximum working pressure up to 11 MPa (110 bar)**

**Flow rate up to 80 l/min**

FMP039 is a range of versatile medium pressure filter for transmission, protection of sensitive components in medium pressure hydraulic systems and filtration of the coolant into the machine tools.

They are directly connected to the lines of the system through the hydraulic fittings.

#### Available features:

- 1/2" female threaded connections, for a maximum flow rate of 80 l/min
- Fine filtration rating, to get a good cleanliness level into the system
- Bypass valve, to relieve excessive pressure drop across the filter media
- Low collapse filter element "N", for use with filters provided with bypass valve
- Visual, electrical and electronic differential clogging indicators

#### Common applications:

Delivery lines, in any medium pressure industrial equipment or mobile machines

#### Filter housing materials

- Head: Anodized aluminium
- Housing: Anodized aluminium
- Bypass valve: Steel

#### Pressure

- Test pressure: 17 MPa (170 bar)
- Burst pressure: 33 MPa (330 bar)
- Pulse pressure fatigue test: 1 000 000 cycles with pressure from 0 to 11 MPa (110 bar)

#### Bypass valve

- Opening pressure 600 kPa (6 bar)  $\pm 10\%$
- Other opening pressures on request.

#### $\Delta p$ element type

- Microfibre filter elements - series N: 20 bar
- Wire mesh filter elements - series N: 20 bar
- Fluid flow through the filter element from OUT to IN.

#### Seals

- Standard NBR series A
- Optional FPM series V

#### Temperature

From -25 °C to +110 °C

#### Connections

In-line Inlet/Outlet

#### Note

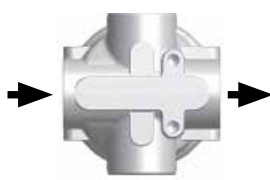
FMP 039 filters are provided for vertical mounting

## Weights [kg] and volumes [dm<sup>3</sup>]

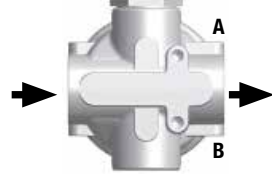
| Filter series  | Weights [kg] |      |      |      | Volumes [dm <sup>3</sup> ] |      |      |      |
|----------------|--------------|------|------|------|----------------------------|------|------|------|
|                | Length       | 2    | 3    | 4    | Length                     | 2    | 3    | 4    |
| <b>FMP 039</b> |              | 0.60 | 0.70 | 0.80 |                            | 0.19 | 0.26 | 0.34 |

## Executions

**Execution 1:**  
without indicator connection



**Execution 6:**  
double indicator connection (A - B)

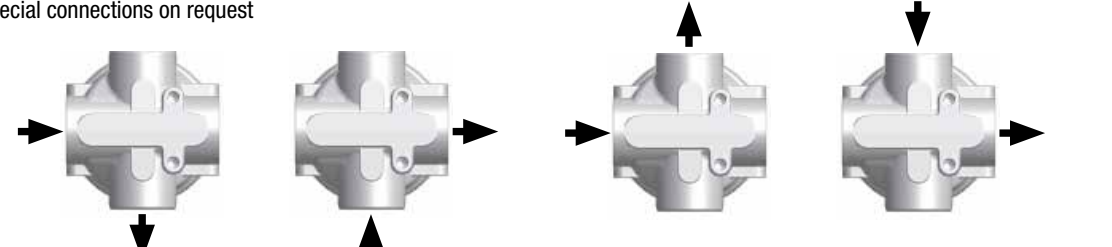


**A:**  
Closure cap with standard T2 steel. The position of the cap is reversible.

**B:**  
Standard closure cap with plastic thread protection. If necessary, a second T2 plug is available, see ordering information.

---

Special connections on request



| Filter series | Length | Filter element design - N Series |     |     |     |     |     |
|---------------|--------|----------------------------------|-----|-----|-----|-----|-----|
|               |        | A03                              | A06 | A10 | A16 | A25 | M25 |
| FMP 039       | 2      | 20                               | 26  | 45  | 52  | 61  | 97  |
|               | 3      | 35                               | 39  | 56  | 64  | 76  | 98  |
|               | 4      | 44                               | 48  | 66  | 71  | 82  | 92  |

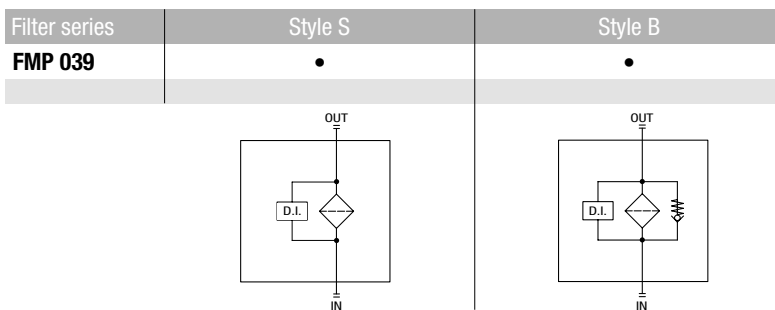
### Maximum flow rate for a complete pressure filter with a pressure drop $\Delta p = 1.5$ bar.

The reference fluid has a kinematic viscosity of 30 mm<sup>2</sup>/s (cSt) and a density of 0.86 kg/dm<sup>3</sup>.

For different pressure drop or fluid viscosity we recommend to use our selection software available on [www.mpfiltri.com](http://www.mpfiltri.com).

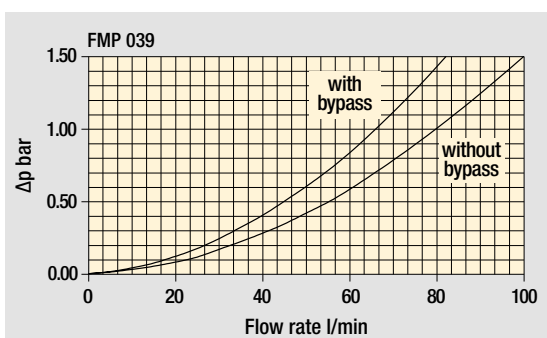
You can also calculate the right size using the formulas present on the FILTER SIZING paragraph at the beginning of the full catalogue or at the beginning of the filter family brochure. Please, contact our Sales Department for further additional information.

## Hydraulic symbols

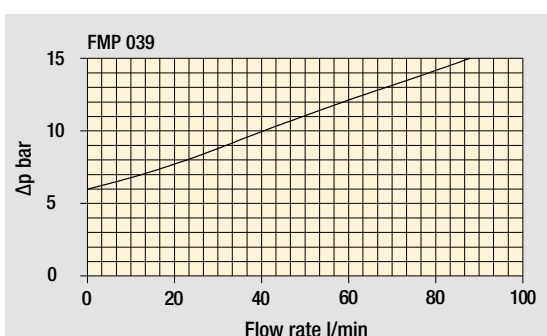


## Pressure drop

Filter housings  $\Delta p$  pressure drop



Bypass valve pressure drop



The curves are plotted using mineral oil with density of 0.86 kg/dm<sup>3</sup> in compliance with ISO 3968.  $\Delta p$  varies proportionally with density.

# FMP 039

## Designation & Ordering code

### COMPLETE FILTER

Configuration example: **FMP039** | **3** | **B** | **A** | **B** | **6** | **A03** | **N** | **P01**

**Series and size**  
**FMP039**

**Length**  
**2** | **3** | **4**

**Valves**  
**S** Without bypass  
**B** With bypass 6 bar

**Seals**  
**A** NBR  
**V** FPM

**Connections**  
**A** G 1/2"  
**B** 1/2" NPT  
**C** SAE 8 - 3/4" - 16 UNF

**Connection for differential indicator**  
**1** Without connections  
**6** With two connections on both sides

**Filtration rating (filter media)**

|                                       |                                       |
|---------------------------------------|---------------------------------------|
| <b>A03</b> Inorganic microfiber 3 µm  | <b>A16</b> Inorganic microfiber 16 µm |
| <b>A06</b> Inorganic microfiber 6 µm  | <b>A25</b> Inorganic microfiber 25 µm |
| <b>A10</b> Inorganic microfiber 10 µm | <b>M25</b> Wire mesh 25 µm            |

**Element Δp**  
**N** 20 bar

**Execution**  
**P01** MP Filtri standard  
**Pxx** Customized

### FILTER ELEMENT

Configuration example: **HP039** | **3** | **A03** | **A** | **N** | **P01**

**Element series and size**  
**HP039**

**Element length**  
**2** | **3** | **4**

**Filtration rating (filter media)**

|                                       |                                       |
|---------------------------------------|---------------------------------------|
| <b>A03</b> Inorganic microfiber 3 µm  | <b>A16</b> Inorganic microfiber 16 µm |
| <b>A06</b> Inorganic microfiber 6 µm  | <b>A25</b> Inorganic microfiber 25 µm |
| <b>A10</b> Inorganic microfiber 10 µm | <b>M25</b> Wire mesh 25 µm            |

**Seals**  
**A** NBR  
**V** FPM

**Element Δp**  
**N** 20 bar

**Execution**  
**P01** MP Filtri standard  
**Pxx** Customized

### CLOGGING INDICATORS

See page 622

**DEA** Electrical differential indicator

**DEM** Electrical differential indicator

**DLA** Electrical / visual differential indicator

**DLE** Electrical / visual differential indicator

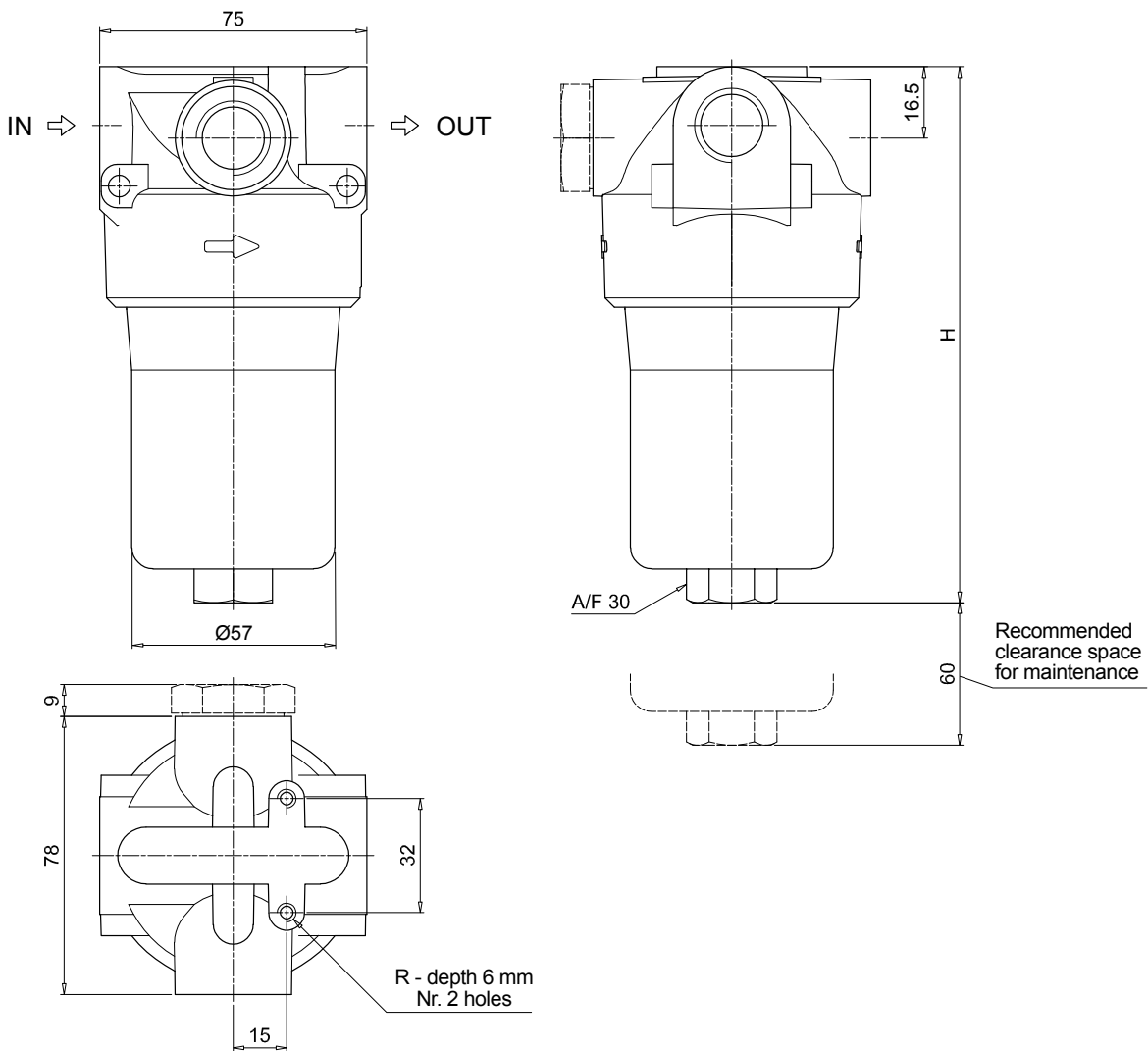
**DTA** Electrical differential indicator

**DVA** Visual differential indicator

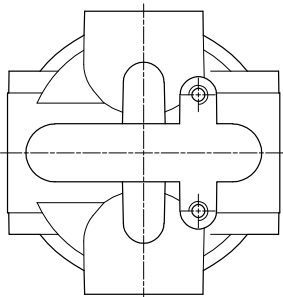
**DVM** Visual differential indicator

**T2** Plug

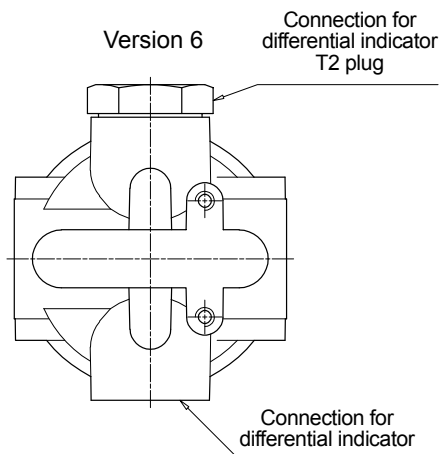




Version 1



Version 6



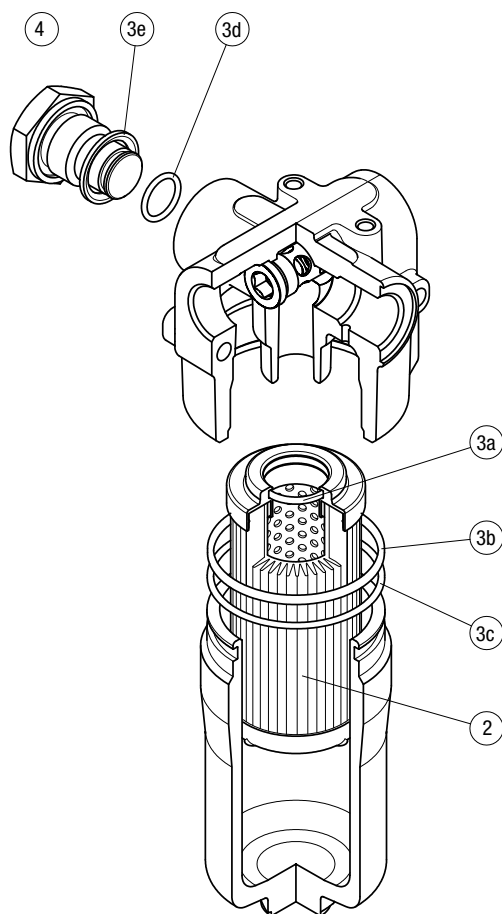
The position of the T2 plug is reversible

| FMP039        |          |
|---------------|----------|
| Filter length | H [mm]   |
| 2             | 151      |
| 3             | 194      |
| 4             | 238      |
| Connections   | R        |
| A             | M6       |
| B - C         | 1/4" UNC |

# FMP 039 SPARE PARTS

Order number for spare parts

FMP 039



| Item:          | Q.ty: 1 pc.     | Q.ty: 1 pc.          |          |
|----------------|-----------------|----------------------|----------|
| Filter series  | Filter element  | Seal Kit code number |          |
|                |                 | NBR                  | FPM      |
| <b>FMP 039</b> | See order table | 02050509             | 02050510 |





# FMP series

Maximum working pressure up to 32 MPa (320 bar) - Flow rate up to 500 l/min



### High Pressure filters

#### In-line

**Maximum working pressure up to 32 MPa (320 bar)**

**Flow rate up to 500 l/min**

FMP is a range of versatile high pressure filter for protection of sensitive components in high pressure hydraulic systems in the industrial equipment.

They are directly connected to the lines of the system through the hydraulic fittings.

#### Available features:

- Female threaded connections up to 1 1/2" and flanged connections up to 1 1/2", for a maximum flow rate of 500 l/min
- Fine filtration rating, to get a good cleanliness level into the system
- Bypass valve, to relieve excessive pressure drop across the filter media
- Check valve, to protect the system against reverse flow
- Low collapse filter element "N", for use with filters provided with bypass valve
- High collapse filter element "H", for use with filters not provided with bypass valve
- Low collapse filter element with external support "R", for filter element protection against the back pressure caused by the check valve in filters provided with the bypass valve
- High collapse filter element with external support "S", for filter element protection against the back pressure caused by the check valve in filters not provided with the bypass valve
- Visual, electrical and electronic differential clogging indicators

#### Common applications:

Delivery lines, in any high pressure industrial equipment or mobile machines

#### Filter housing materials

- Head: Phosphatized cast iron
- Housing: Phosphatized steel
- Bypass valve: Brass
- Reverse Flow: Steel (only for series FMP 320)
- Check valve: Steel

#### Pressure

- Test pressure: 48 MPa (480 bar)
- Burst pressure: 96 MPa (960 bar)
- Pulse pressure fatigue test: 1 000 000 cycles with pressure from 0 to 32 MPa (320 bar)

#### Bypass valve

- Opening pressure 600 kPa (6 bar) ±10%
- Other opening pressures on request.

#### Δp element type

- Microfibre filter elements - series N-R: 20 bar
- Microfibre filter elements - series H-S: 210 bar
- Wire mesh filter elements - series N: 20 bar
- Fluid flow through the filter element from OUT to IN

#### Seals

- Standard NBR series A
- Optional FPM series V

#### Temperature

From -25 °C to +110 °C

#### Connections

In-line Inlet/Outlet

#### Note

FMP filters are provided for vertical mounting

## Weights [kg] and volumes [dm<sup>3</sup>]

| Filter series  | Weights [kg] |       |       |       |       | Volumes [dm <sup>3</sup> ] |      |      |      |      |
|----------------|--------------|-------|-------|-------|-------|----------------------------|------|------|------|------|
|                | Length       | 1     | 2     | 3     | 4     | Length                     | 1    | 2    | 3    | 4    |
| <b>FMP 065</b> |              | 3.26  | 3.62  | 4.83  | -     |                            | 0.36 | 0.47 | 0.84 | -    |
| <b>FMP 135</b> |              | 5.61  | 7.21  | 8.27  | -     |                            | 0.45 | 0.78 | 1.00 | -    |
| <b>FMP 320</b> |              | 10.95 | 13.08 | 15.37 | 17.85 |                            | 1.03 | 1.75 | 2.52 | 3.35 |

| Filter series  | Length   | Filter element design - N Series |     |     |     |     |     |
|----------------|----------|----------------------------------|-----|-----|-----|-----|-----|
|                |          | A03                              | A06 | A10 | A16 | A25 | M25 |
| <b>FMP 065</b> | <b>1</b> | 23                               | 30  | 48  | 54  | 72  | 105 |
|                | <b>2</b> | 31                               | 45  | 60  | 65  | 82  | 106 |
|                | <b>3</b> | 52                               | 60  | 80  | 84  | 94  | 108 |
| <b>FMP 135</b> | <b>1</b> | 69                               | 73  | 120 | 129 | 171 | 201 |
|                | <b>2</b> | 110                              | 117 | 149 | 152 | 211 | 232 |
|                | <b>3</b> | 151                              | 152 | 192 | 195 | 212 | 233 |
| <b>FMP 320</b> | <b>1</b> | 130                              | 144 | 244 | 296 | 361 | 477 |
|                | <b>2</b> | 267                              | 291 | 417 | 438 | 492 | 509 |
|                | <b>3</b> | 348                              | 390 | 476 | 493 | 503 | 519 |
|                | <b>4</b> | 389                              | 415 | 483 | 502 | 525 | 534 |

### Maximum flow rate for a complete pressure filter with a pressure drop $\Delta p = 1.5$ bar.

The reference fluid has a kinematic viscosity of 30 mm<sup>2</sup>/s (cSt) and a density of 0.86 kg/dm<sup>3</sup>.

For different pressure drop or fluid viscosity we recommend to use our selection software available on [www.mpfiltri.com](http://www.mpfiltri.com).

You can also calculate the right size using the formulas present on the FILTER SIZING paragraph at the beginning of the full catalogue or at the beginning of the filter family brochure. Please, contact our Sales Department for further additional information.

### Hydraulic symbols

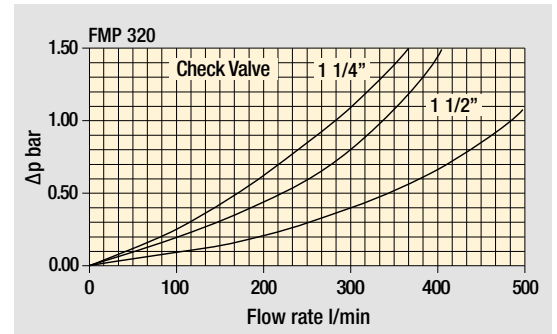
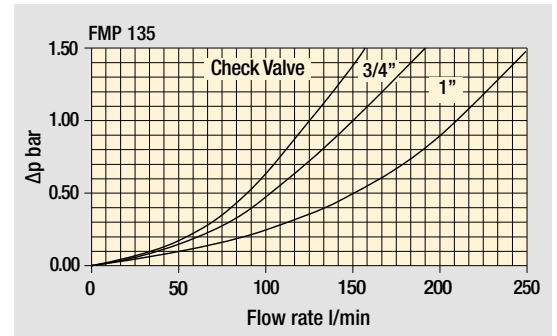
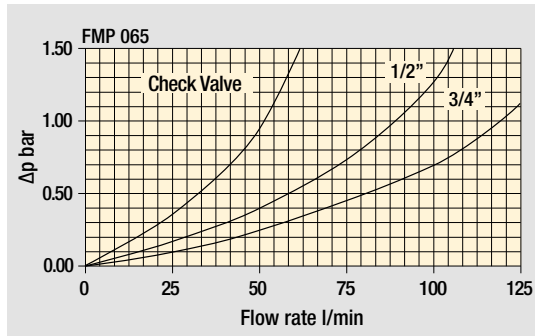
| Filter series  | Style S - E | Style B - C | Style T | Style D |
|----------------|-------------|-------------|---------|---------|
| <b>FMP 065</b> | •           | •           | •       | •       |
| <b>FMP 135</b> | •           | •           | •       | •       |
| <b>FMP 320</b> | •           | •           | •       | •       |

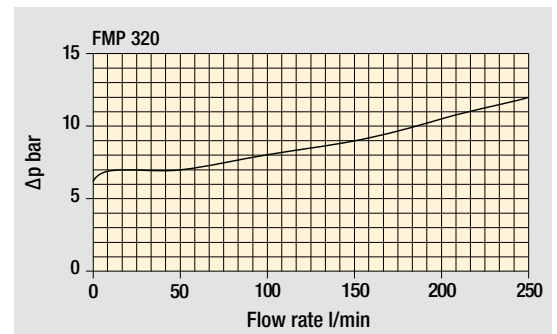
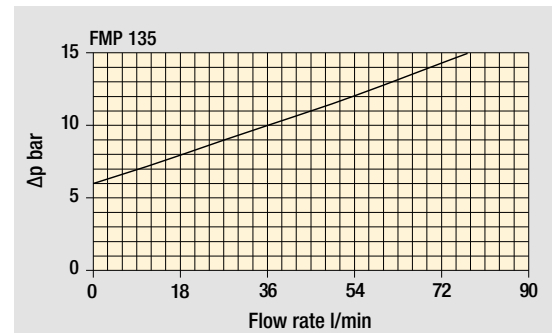
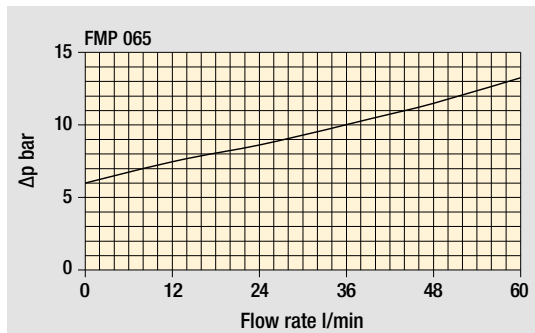
|  |  |  |  |
|--|--|--|--|
|  |  |  |  |
|--|--|--|--|

## Pressure drop

### Filter housings $\Delta p$ pressure drop



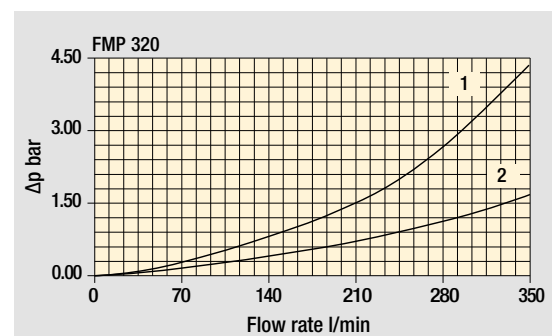
### Bypass valve pressure drop



### Valves

#### Filter housing with check valve

- 1 - Reverse flow
- 2 - In filter direction



The curves are plotted using mineral oil with density of 0.86 kg/dm<sup>3</sup> in compliance with ISO 3968.  $\Delta p$  varies proportionally with density.





# FMP FMP065 - FMP135 - FMP320

## Designation & Ordering code

### COMPLETE FILTER

Series and size Configuration example: **FMP065** | **3** | **T** | **A** | **G1** | **M25** | **S** | **P01**

**FMP065** | **FMP135** | **FMP320**

| Length | FMP065 | FMP135 | FMP320 |
|--------|--------|--------|--------|
| 1      | •      | •      | •      |
| 2      | •      | •      | •      |
| 3      | •      | •      | •      |
| 4      | -      | -      | •      |

| Valves   |   |
|--|---|
| <b>S</b> Without bypass                            | <b>C</b> With bypass 6 bar, plug on the opposite side |
| <b>E</b> Without bypass, plug on the opposite side | <b>T</b> With check valve, without bypass             |
| <b>B</b> With bypass 6 bar                         | <b>D</b> With check valve, with bypass                |

| Seals        |              |
|--------------|--------------|
| <b>A</b> NBR | <b>V</b> FPM |

| Connections | FMP065                   | FMP135                   | FMP320                  |
|-------------|--------------------------|--------------------------|-------------------------|
| <b>G1</b>   | G 1/2"                   | G 3/4"                   | G 1 1/4"                |
| <b>G2</b>   | G 3/4"                   | G 1"                     | G 1 1/2"                |
| <b>G3</b>   | 1/2" NPT                 | 3/4" NPT                 | 1 1/4" NPT              |
| <b>G4</b>   | 3/4" NPT                 | 1" NPT                   | 1 1/2" NPT              |
| <b>G5</b>   | SAE 8 - 3/4" - 16 UNF    | SAE 12 - 1 1/16" - 12 UN | SAE 20 - 1 5/8" - 12 UN |
| <b>G6</b>   | SAE 12 - 1 1/16" - 12 UN | SAE 16 - 1 5/16" - 12 UN | SAE 24 - 1 7/8" - 12 UN |
| <b>F1</b>   | -                        | 3/4" SAE 3000 psi/M      | 1 1/4" SAE 3000 psi/M   |
| <b>F2</b>   | -                        | 1" SAE 3000 psi/M        | 1 1/2" SAE 3000 psi/M   |
| <b>F3</b>   | -                        | 3/4" SAE 3000 psi/UNC    | 1 1/4" SAE 3000 psi/UNC |
| <b>F4</b>   | -                        | 1" SAE 3000 psi/UNC      | 1 1/2" SAE 3000 psi/UNC |

| Filtration rating (filter media) |       |
|----------------------------------|-------|
| <b>A03</b> Inorganic microfiber  | 3 µm  |
| <b>A06</b> Inorganic microfiber  | 6 µm  |
| <b>A10</b> Inorganic microfiber  | 10 µm |
| <b>A16</b> Inorganic microfiber  | 16 µm |
| <b>A25</b> Inorganic microfiber  | 25 µm |
| <b>M25</b> Wire mesh             | 25 µm |

| Element Δp       | Valves |   |   |   |   |   |
|------------------|--------|---|---|---|---|---|
|                  | S      | E | B | C | T | D |
| <b>N</b> 20 bar  | -      | - | • | • | - | - |
| <b>R</b> 20 bar  | -      | - | - | - | - | • |
| <b>H</b> 210 bar | •      | • | - | - | - | - |
| <b>S</b> 210 bar | -      | - | - | - | • | - |

| Execution   | Filter length |   |   |   |
|---|---------------|---|---|---|
|   | 1             | 2 | 3 | 4 |
| <b>P01</b> MP Filtri standard                         | •             | • | • | • |
| <b>P02</b> Maintenance from the bottom of the housing | -             | - | - | • |
| <b>Pxx</b> Customized                                 | -             | - | - | - |

### FILTER ELEMENT

Element series and size Configuration example: **HP065** | **3** | **M25** | **A** | **S** | **P01**

**HP065** | **HP135** | **HP320**

| Element length | HP065 | HP135 | HP320 |
|----------------|-------|-------|-------|
| 1              | •     | •     | •     |
| 2              | •     | •     | •     |
| 3              | •     | •     | •     |
| 4              | -     | -     | •     |

| Filtration rating (filter media) |       |
|----------------------------------|-------|
| <b>A03</b> Inorganic microfiber  | 3 µm  |
| <b>A06</b> Inorganic microfiber  | 6 µm  |
| <b>A10</b> Inorganic microfiber  | 10 µm |
| <b>A16</b> Inorganic microfiber  | 16 µm |
| <b>A25</b> Inorganic microfiber  | 25 µm |
| <b>M25</b> Wire mesh             | 25 µm |

| Seals        |  |
|--------------|--|
| <b>A</b> NBR |  |
| <b>V</b> FPM |  |

| Element Δp       |  |
|------------------|--|
| <b>N</b> 20 bar  |  |
| <b>R</b> 20 bar  |  |
| <b>H</b> 210 bar |  |
| <b>S</b> 210 bar |  |

| Execution                     |  |
|-------------------------------|--|
| <b>P01</b> MP Filtri standard |  |
| <b>Pxx</b> Customized         |  |

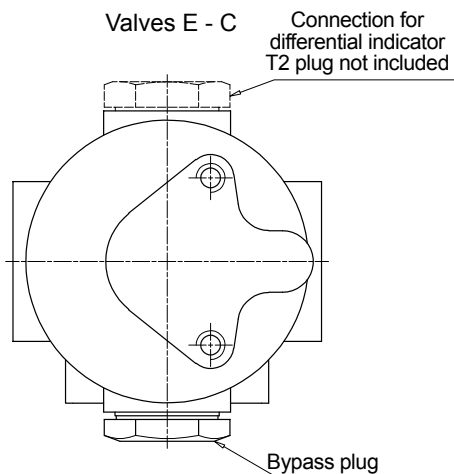
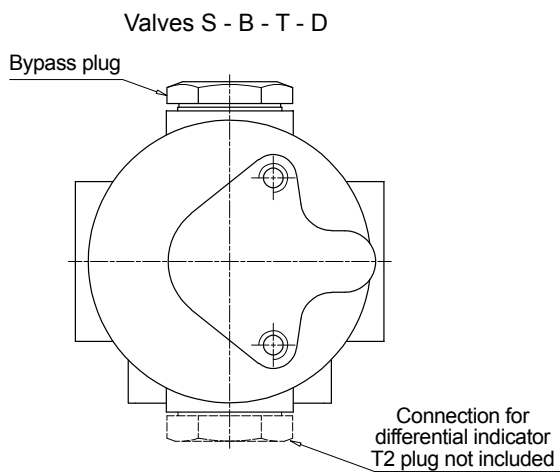
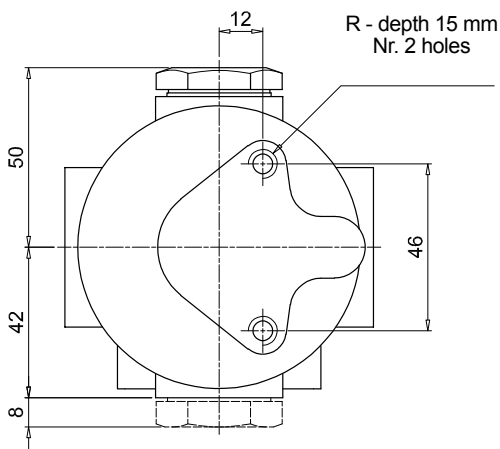
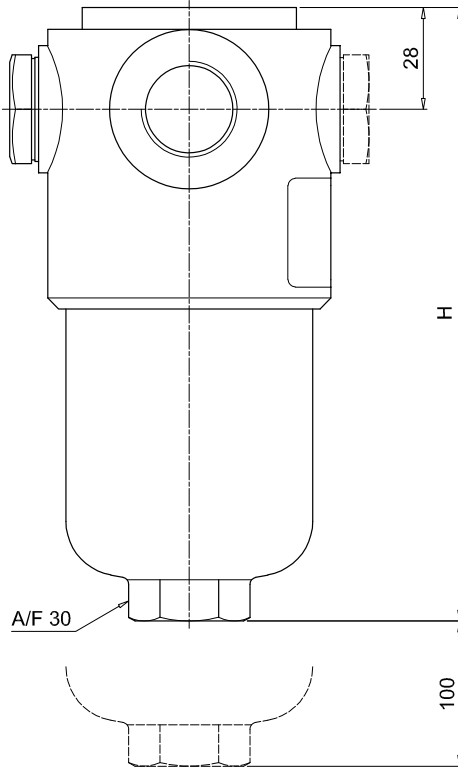
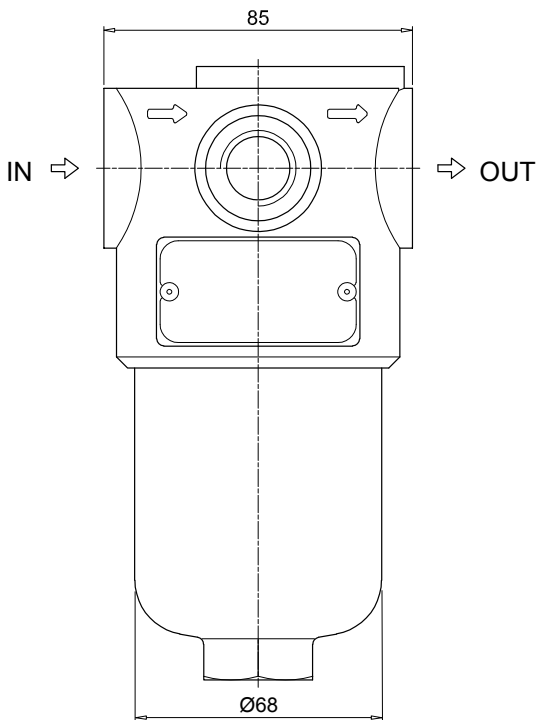
### CLOGGING INDICATORS

See page 622

|   |  |
|---|--|
| <b>DEA</b> Electrical differential indicator          |  |
| <b>DEM</b> Electrical differential indicator          |  |
| <b>DLA</b> Electrical / visual differential indicator |  |
| <b>DLE</b> Electrical / visual differential indicator |  |

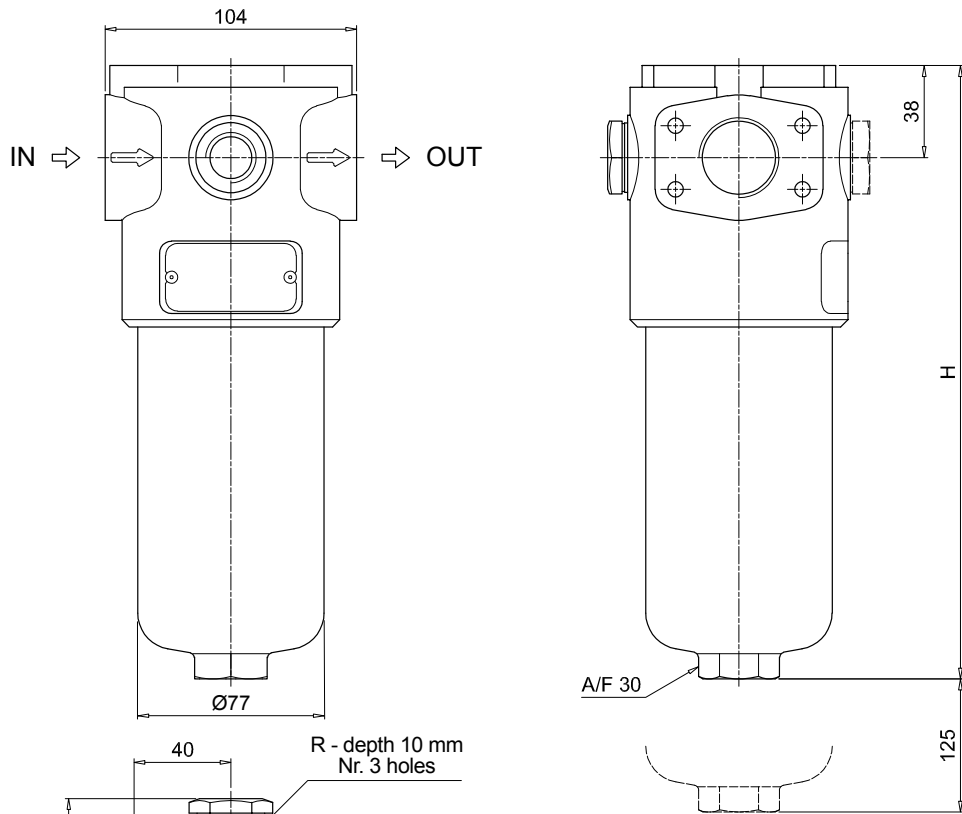
|  |  |
|--|--|
| <b>DTA</b> Electrical differential indicator |  |
| <b>DVA</b> Visual differential indicator     |  |
| <b>DVM</b> Visual differential indicator     |  |
| <b>T2</b> Plug                               |  |

| FMP065             |           |
|--------------------|-----------|
| Filter length      | H [mm]    |
| <b>1</b>           | 169       |
| <b>2</b>           | 200       |
| <b>3</b>           | 302       |
| Connections        | R         |
| <b>G1-G2</b>       | M8        |
| <b>G3-G4-G5-G6</b> | 5/16" UNC |

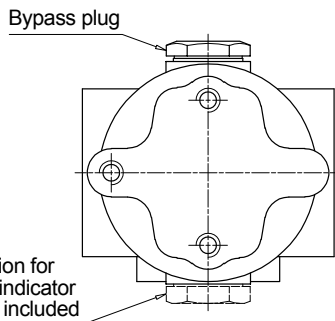


# FMP FMP065 - FMP135 - FMP320

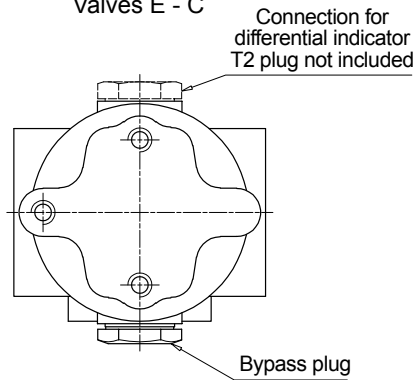
## Dimensions



Valves S - B - T - D



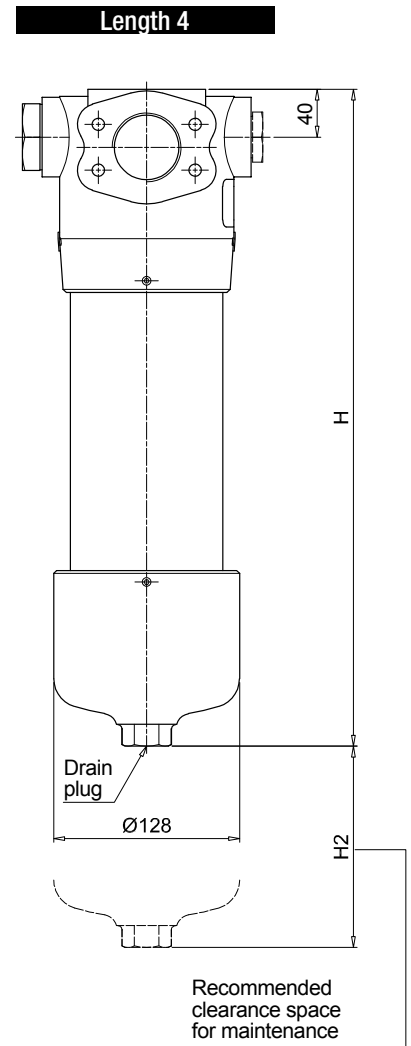
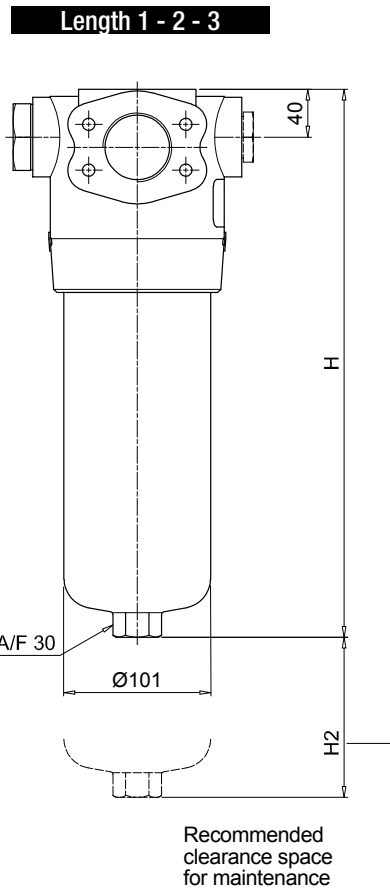
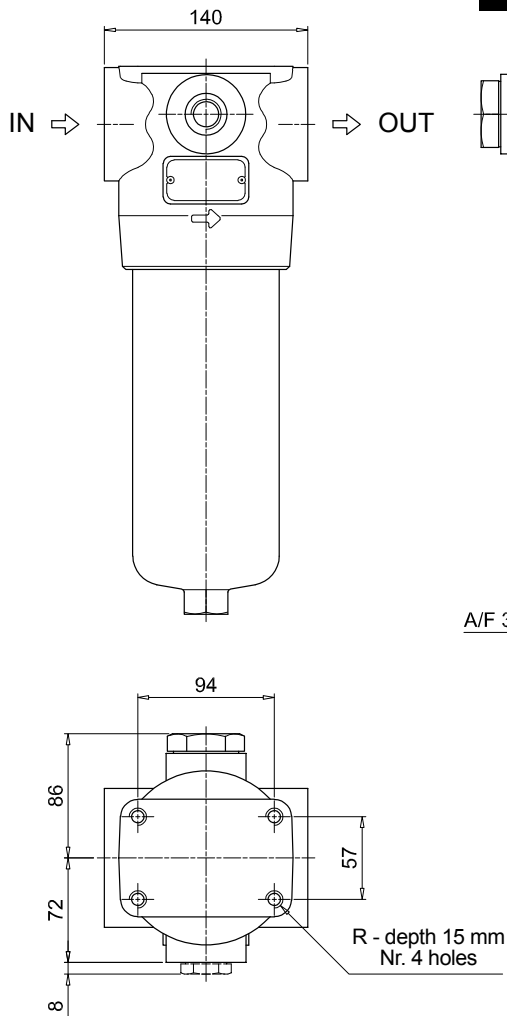
Valves E - C



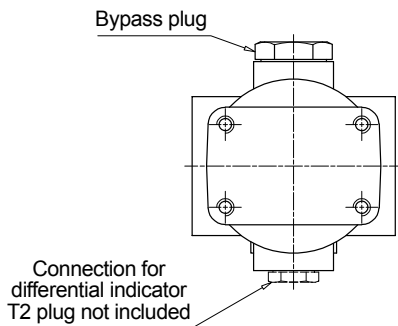
### FMP135

| Filter length | H [mm] |
|---------------|--------|
| 1             | 221    |
| 2             | 334    |
| 3             | 409    |

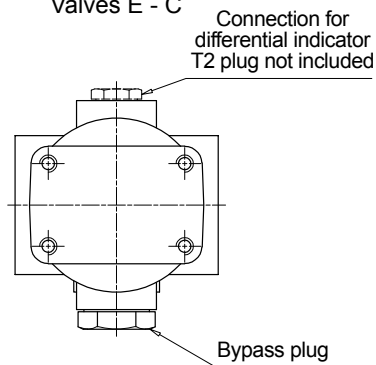
| Connections | R        |
|-------------|----------|
| G1-G2       | M10      |
| G3-G4-G5-G6 | 3/8" UNC |
| F1-F2       | M10      |
| F3-F4       | 3/8" UNC |



Valves S - B - T - D



Valves E - C



### FMP320

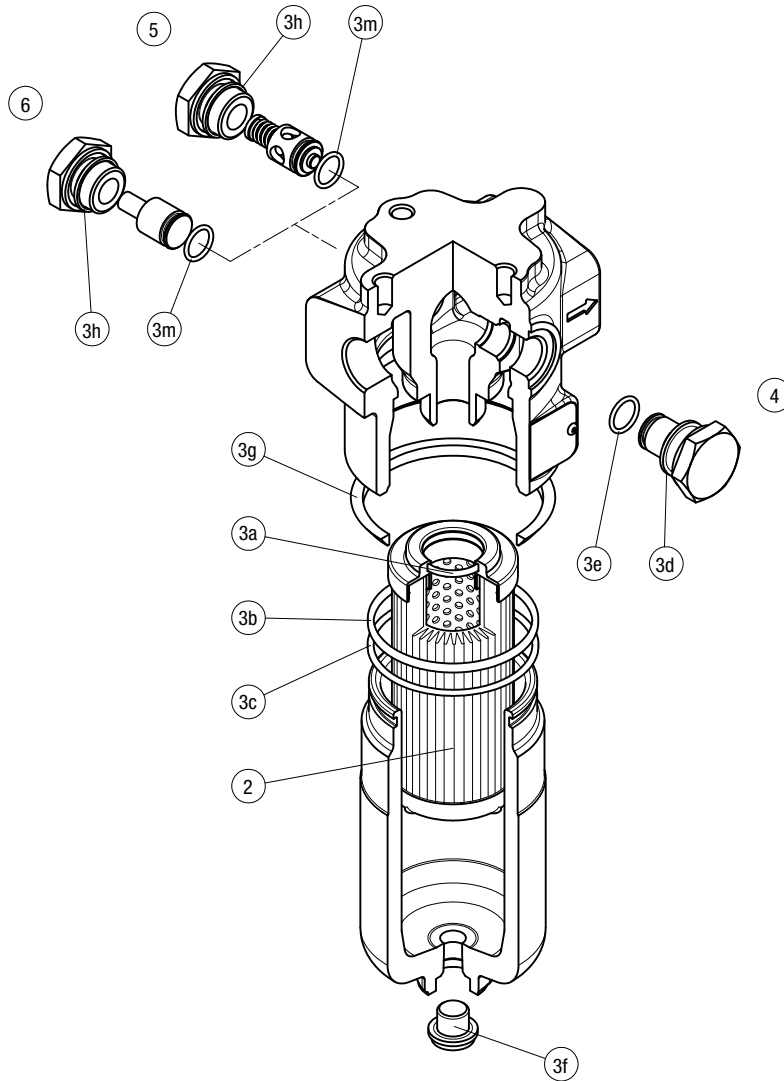
| Filter length | H [mm] | H2 [mm]       |               |
|---------------|--------|---------------|---------------|
|               |        | Execution P01 | Execution P02 |
| 1             | 263    | 150           | -             |
| 2             | 386    | 150           | -             |
| 3             | 518    | 150           | -             |
| 4             | 671    | 150           | 550           |

| Connections | R        |
|-------------|----------|
| G1-G2       | M12      |
| G3-G4-G5-G6 | 1/2" UNC |
| F1-F2       | M12      |
| F3-F4       | 1/2" UNC |

# FMP SPARE PARTS

Order number for spare parts

FMP 065 - 135 - 320



| Item:          | Q.ty: 1 pc.     | Q.ty: 1 pc.          |          | Q.ty: 1 pc.               |     | Q.ty: 1 pc.     |          | Q.ty: 1 pc.         |          |
|----------------|-----------------|----------------------|----------|---------------------------|-----|-----------------|----------|---------------------|----------|
| Filter series  | Filter element  | Seal Kit code number |          | Indicator connection plug |     | Bypass assembly |          | Non-bypass assembly |          |
|                |                 | NBR                  | FPM      | NBR                       | FPM | NBR             | FPM      | NBR                 | FPM      |
| <b>FMP 065</b> | See order table | 02050267             | 02050278 |                           |     | 02001312        | 02001385 | 02001314            | 02001386 |
| <b>FMP 135</b> |                 | 02050293             | 02050294 | T2H                       | T2V | 02001312        | 02001385 | 02001314            | 02001386 |
| <b>FMP 320</b> |                 | 02050274             | 02050285 |                           |     | 02001396        | 02001397 | 02001398            | 02001399 |







# FHP series

Maximum working pressure up to 42 MPa (420 bar) - Flow rate up to 630 l/min



## Description

## Technical data

### High Pressure filters

#### In-line

**Maximum working pressure up to 42 MPa (420 bar)**

**Flow rate up to 630 l/min**

FHP is a range of versatile high pressure filter for protection of sensitive components in high pressure hydraulic systems in the industrial equipment.

They are directly connected to the lines of the system through the hydraulic fittings.

#### Available features:

- Female threaded connections up to 1 1/2" and flanged connections up to 2", for a maximum return flow rate of 630 l/min
- Fine filtration rating, to get a good cleanliness level into the system
- Bypass valve, to relieve excessive pressure drop across the filter media
- Check valve, to protect the system against reverse flow
- Reverse flow valve, to allow bidirectional flow through the filter housing. The back flow is not filtered. The filter requires the use of internal check valves to direct the flow through the element in one direction and around the element in the other
- Low collapse filter element "N", for use with filters provided with bypass valve
- High collapse filter element "H", for use with filters not provided with bypass valve
- Low collapse filter element with external support "R", for filter element protection against the back pressure caused by the check valve or the reverse flow in filters provided with the bypass valve
- High collapse filter element with external support "S", for filter element protection against the back pressure caused by the check valve or the reverse flow in filters not provided with the bypass valve
- Visual, electrical and electronic differential clogging indicators

#### Common applications:

Delivery lines, in any high pressure industrial equipment or mobile machines

#### Filter housing materials

- Head: Phosphatized cast iron

- Housing: Phosphatized steel

- Bypass valve

AISI 316L: FHP 010 - 011

Brass: FHP 065 - 135

Brass / AISI 304: FHP 350-351

Steel: FHP 500

- Reverse Flow

Steel: FHP 350 - FHP 500

- Check valve: Steel

#### Pressure

- Test pressure: 63 MPa (630 bar)

- Burst pressure: 126 MPa (1260 bar)

- Pulse pressure fatigue test: 1 000 000 cycles with pressure from 0 to 42 MPa (420 bar)

#### Bypass valve

- Opening pressure 600 kPa (6 bar) ±10%

- Other opening pressures on request.

#### Δp element type

- Microfibre filter elements - series N: 20 bar

- Microfibre filter elements - series R: 20 bar (not available for FHP 010-011 and FHP 500)

- Microfibre filter elements - series H: 210 bar

- Microfibre filter elements - series S: 210 bar (only for FHP 500)

- Wire mesh filter elements - series N: 20 bar

- Fluid flow through the filter element from OUT to IN

#### Seals

- Standard NBR series A

- Optional FPM series V

#### Temperature

From -25 °C to +110 °C

#### Connections

FHP 010 - 065 - 135 - 350 - 351 - 500:

In-line Inlet/Outlet

FHP 011:

90° Inlet/Outlet

#### Note

FHP filters are provided for vertical mounting

## Weights [kg] and volumes [dm<sup>3</sup>]

| Filter series        | Weights [kg] |       |       |       |       | Volumes [dm <sup>3</sup> ] |        |      |      |      |      |      |
|----------------------|--------------|-------|-------|-------|-------|----------------------------|--------|------|------|------|------|------|
|                      | Length       | 1     | 2     | 3     | 4     | 5                          | Length | 1    | 2    | 3    | 4    | 5    |
| <b>FHP 010 - 011</b> |              | 2.05  | 2.18  | 2.64  | 3.13  | -                          |        | 0.10 | 0.12 | 0.15 | 0.20 | -    |
| <b>FHP 065</b>       |              | 4.26  | 4.62  | 5.83  | -     | -                          |        | 0.25 | 0.30 | 0.50 | -    | -    |
| <b>FHP 135</b>       |              | 7.11  | 8.71  | 9.76  | -     | -                          |        | 0.43 | 0.76 | 0.97 | -    | -    |
| <b>FHP 350 - 351</b> |              | 13.95 | 16.08 | 18.37 | 20.85 | -                          |        | 1.00 | 1.72 | 2.49 | 3.32 | -    |
| <b>FHP 500</b>       |              | 27.00 | 31.17 | 34.69 | 46.70 | 52.5                       |        | 1.71 | 2.43 | 3.04 | 5.18 | 6.51 |

| Filter series  | Length   | Filter element design - H Series |     |     |     |     | Filter element design - N Series |     |     |     |     |     |
|----------------|----------|----------------------------------|-----|-----|-----|-----|----------------------------------|-----|-----|-----|-----|-----|
|                |          | A03                              | A06 | A10 | A16 | A25 | A03                              | A06 | A10 | A16 | A25 | M25 |
| <b>FHP 010</b> | <b>1</b> | 3                                | 5   | 6   | 7   | 8   | 4                                | 6   | 8   | 9   | 10  | 37  |
|                | <b>2</b> | 5                                | 7   | 13  | 16  | 22  | 6                                | 8   | 16  | 19  | 24  | 40  |
|                | <b>3</b> | 10                               | 13  | 22  | 25  | 30  | 11                               | 14  | 23  | 26  | 31  | 41  |
|                | <b>4</b> | 12                               | 15  | 25  | 27  | 32  | 16                               | 19  | 27  | 30  | 33  | 41  |
| <b>FHP 011</b> | <b>1</b> | 3                                | 5   | 6   | 7   | 9   | 4                                | 6   | 8   | 9   | 11  | 47  |
|                | <b>2</b> | 5                                | 7   | 14  | 17  | 24  | 7                                | 9   | 17  | 21  | 28  | 52  |
|                | <b>3</b> | 11                               | 14  | 25  | 29  | 36  | 11                               | 14  | 26  | 30  | 37  | 53  |
|                | <b>4</b> | 12                               | 16  | 28  | 32  | 38  | 17                               | 21  | 32  | 36  | 40  | 54  |
| <b>FHP 065</b> | <b>1</b> | 24                               | 25  | 50  | 59  | 84  | 25                               | 33  | 56  | 63  | 90  | 142 |
|                | <b>2</b> | 33                               | 38  | 68  | 77  | 98  | 34                               | 52  | 72  | 79  | 106 | 143 |
|                | <b>3</b> | 61                               | 70  | 100 | 107 | 123 | 61                               | 73  | 101 | 108 | 125 | 147 |
| <b>FHP 135</b> | <b>1</b> | 49                               | 55  | 95  | 98  | 147 | 67                               | 72  | 115 | 122 | 159 | 184 |
|                | <b>2</b> | 89                               | 106 | 129 | 131 | 163 | 105                              | 111 | 140 | 142 | 192 | 209 |
|                | <b>3</b> | 120                              | 132 | 158 | 166 | 180 | 141                              | 143 | 176 | 179 | 193 | 211 |
| <b>FHP 350</b> | <b>1</b> | 108                              | 115 | 188 | 197 | 301 | 127                              | 140 | 234 | 282 | 343 | 451 |
|                | <b>2</b> | 196                              | 225 | 317 | 323 | 396 | 256                              | 278 | 394 | 415 | 465 | 480 |
|                | <b>3</b> | 266                              | 310 | 384 | 392 | 440 | 331                              | 370 | 450 | 466 | 475 | 490 |
|                | <b>4</b> | 308                              | 333 | 391 | 398 | 445 | 369                              | 393 | 456 | 474 | 495 | 503 |
| <b>FHP 500</b> | <b>1</b> | 144                              | 157 | 265 | 268 | 355 | 269                              | 305 | 390 | 406 | 444 | 612 |
|                | <b>2</b> | 232                              | 262 | 350 | 363 | 398 | 321                              | 357 | 433 | 441 | 484 | 619 |
|                | <b>3</b> | 293                              | 301 | 398 | 408 | 455 | 396                              | 416 | 497 | 499 | 537 | 622 |
|                | <b>4</b> | 336                              | 377 | 452 | 455 | 507 | 430                              | 475 | 516 | 524 | 545 | 626 |
|                | <b>5</b> | 420                              | 428 | 494 | 500 | 544 | 475                              | 493 | 535 | 545 | 569 | 627 |

### Maximum flow rate for a complete pressure filter with a pressure drop $\Delta p = 1.5$ bar.

The reference fluid has a kinematic viscosity of 30 mm<sup>2</sup>/s (cSt) and a density of 0.86 kg/dm<sup>3</sup>.

For different pressure drop or fluid viscosity we recommend to use our selection software available on [www.mpfiltri.com](http://www.mpfiltri.com).

You can also calculate the right size using the formulas present on the FILTER SIZING paragraph at the beginning of the full catalogue or at the beginning of the filter family brochure. Please, contact our Sales Department for further additional information.

### Hydraulic symbols

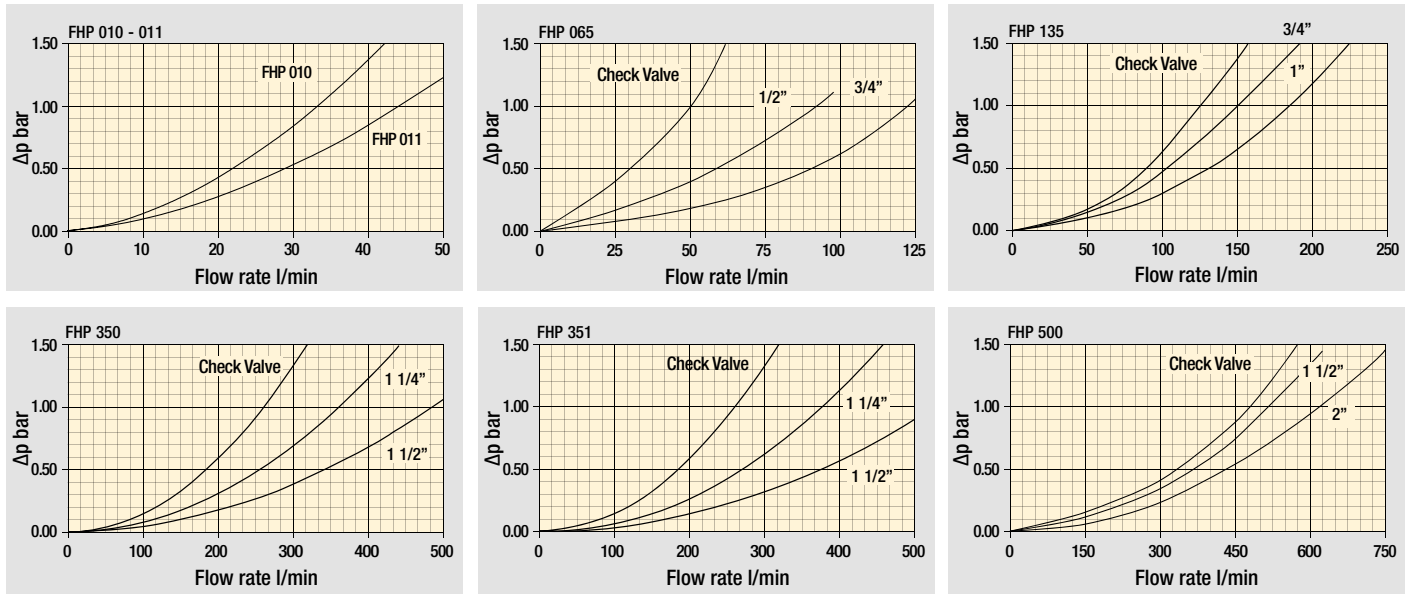
| Filter series        | Style S | Style B | Style T | Style D | Style V | Style Z |
|----------------------|---------|---------|---------|---------|---------|---------|
| <b>FHP 010 - 011</b> | •       | •       | -       | -       | •       | •       |
| <b>FHP 065</b>       | •       | •       | •       | -       | -       | -       |
| <b>FHP 135</b>       | •       | •       | •       | -       | -       | -       |
| <b>FHP 350-351</b>   | •       | •       | •       | •       | •       | •       |
| <b>FHP 500</b>       | •       | •       | •       | •       | •       | •       |

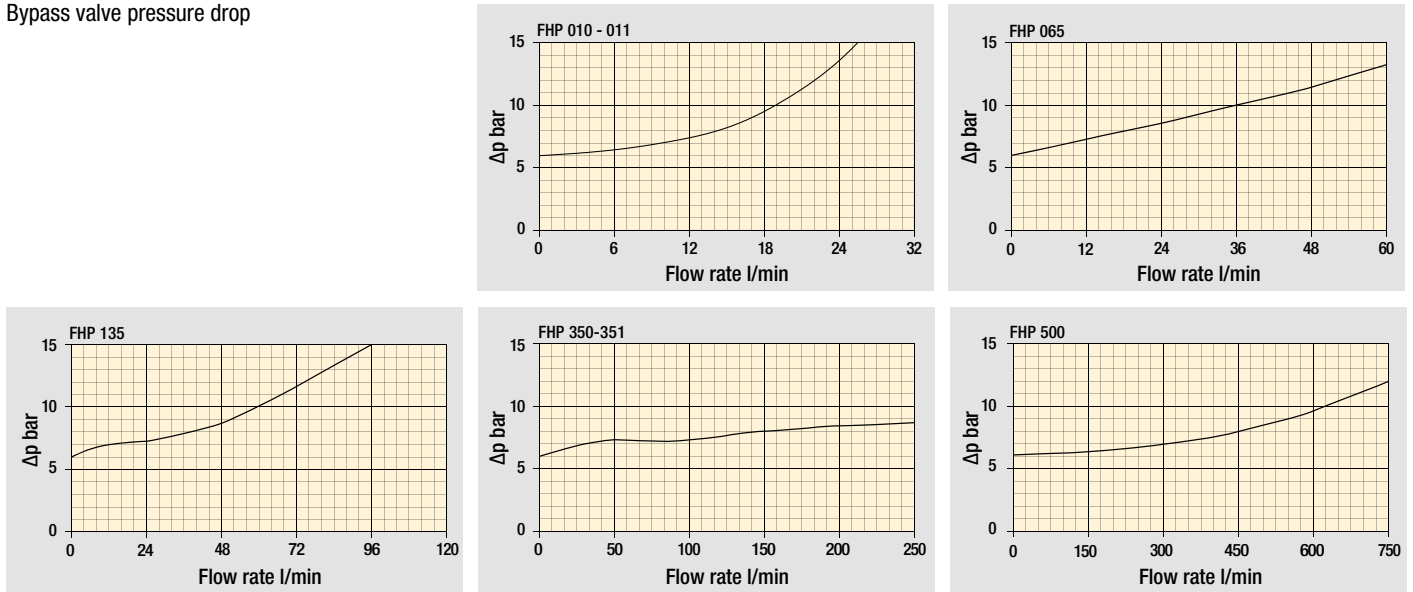
|  |  |  |  |  |  |
|--|--|--|--|--|--|
|  |  |  |  |  |  |
|--|--|--|--|--|--|

## Pressure drop

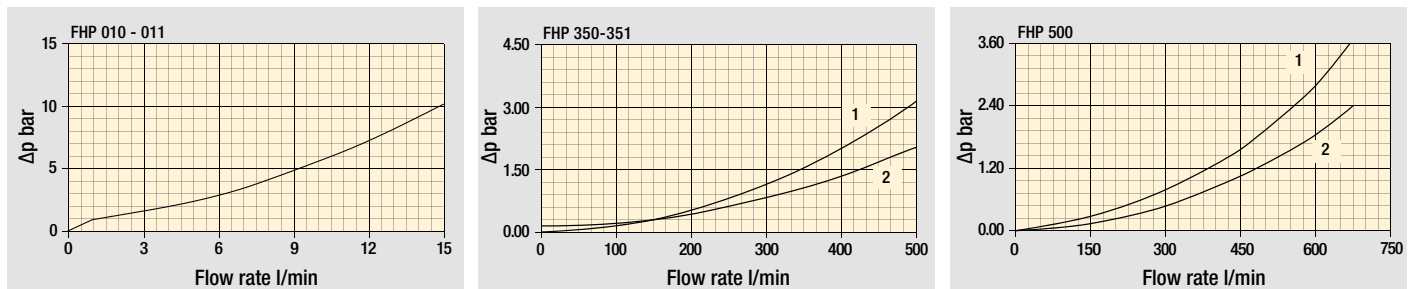
### Filter housings $\Delta p$ pressure drop



### Bypass valve pressure drop



### Valves



Filter housing with check valve

Pressure drop with reverse flow valve in  
1 - Filtering direction  
2 - Opposite direction

Pressure drop with reverse flow valve in  
1 - Opposite direction  
2 - Filtering direction

The curves are plotted using mineral oil with density of  $0.86 \text{ kg/dm}^3$  in compliance with ISO 3968.  $\Delta p$  varies proportionally with density.



# FHP FHP010 - FHP011

## Designation & Ordering code

### COMPLETE FILTER

Configuration example: **FHP010** | **2** | **B** | **A** | **B** | **2** | **A03** | **N** | **P01**

**Series and size**  
**FHP010** | **FHP011**

**Length**  
**1** | **2** | **3** | **4**

**Valves**  
**S** Without bypass  
**B** With bypass 6 bar  
**V** With reverse flow, without bypass  
**Z** With reverse flow, with bypass 6 bar

**Seals**  
**A** NBR  
**V** FPM

**Connections**  
**A** G 1/4"  
**B** 1/4" NPT  
**C** SAE 5 - 1/2" - 20 UNF  
**D** G 3/8"  
**E** 3/8" NPT  
**F** SAE 6 - 9/16" - 18 UNF

**Connection for differential indicator**  
**1** Without  
**2** With connection

**Filtration rating (filter media)**

|            |                      |       |
|------------|----------------------|-------|
| <b>A03</b> | Inorganic microfiber | 3 µm  |
| <b>A06</b> | Inorganic microfiber | 6 µm  |
| <b>A10</b> | Inorganic microfiber | 10 µm |
| <b>A16</b> | Inorganic microfiber | 16 µm |
| <b>A25</b> | Inorganic microfiber | 25 µm |
| <b>M25</b> | Wire mesh            | 25 µm |

| Element  | Δp      | S | B | V | Z | Execution                     |
|----------|---------|---|---|---|---|-------------------------------|
| <b>N</b> | 20 bar  | - | • | - | • | <b>P01</b> MP Filtri standard |
| <b>H</b> | 210 bar | • | - | • | - | <b>Pxx</b> Customized         |

### FILTER ELEMENT

Configuration example: **HP011** | **2** | **A03** | **A** | **N** | **P01**

**Element series and size**  
**HP011**

**Element length**  
**1** | **2** | **3** | **4**

**Filtration rating (filter media)**

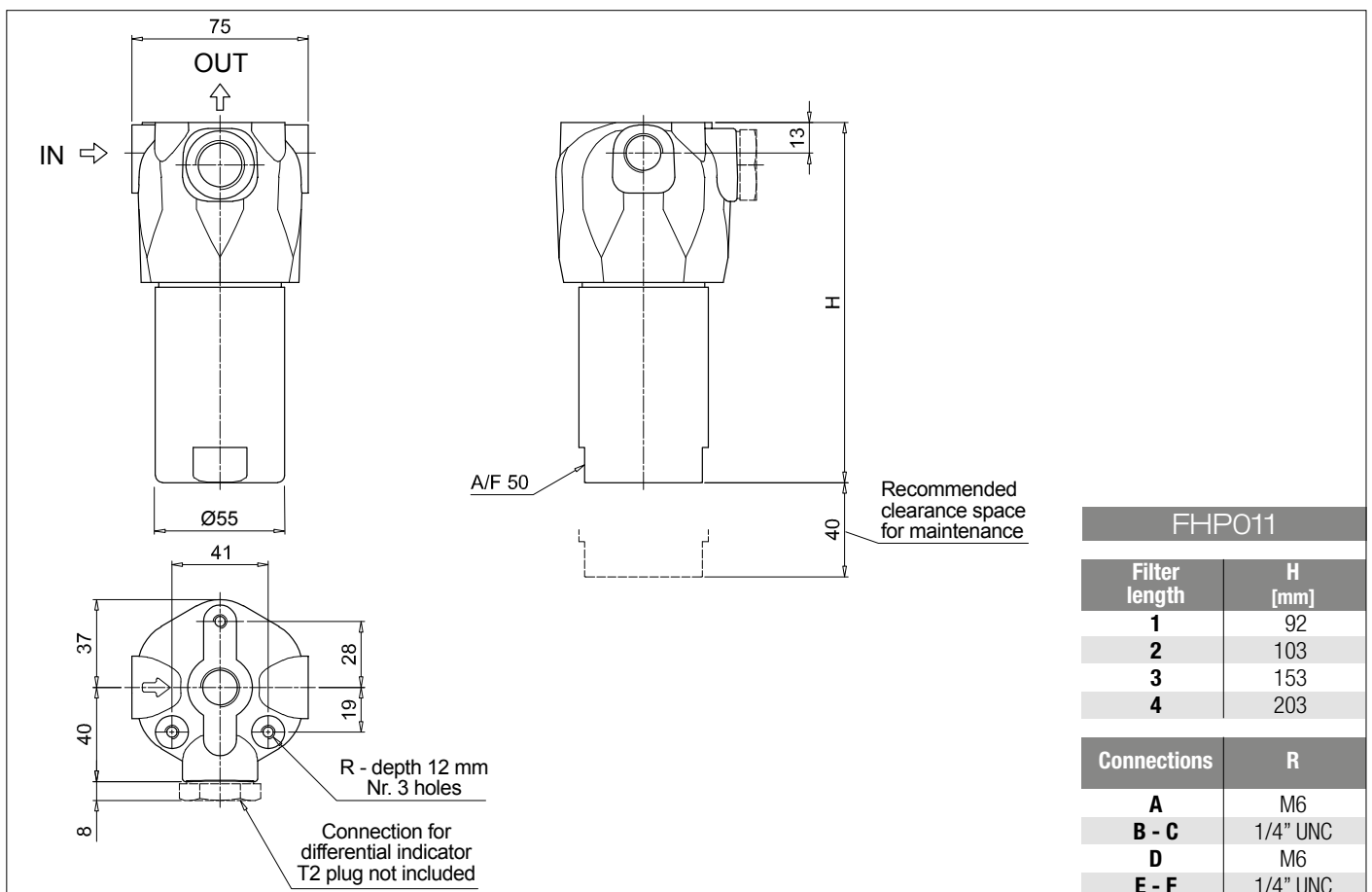
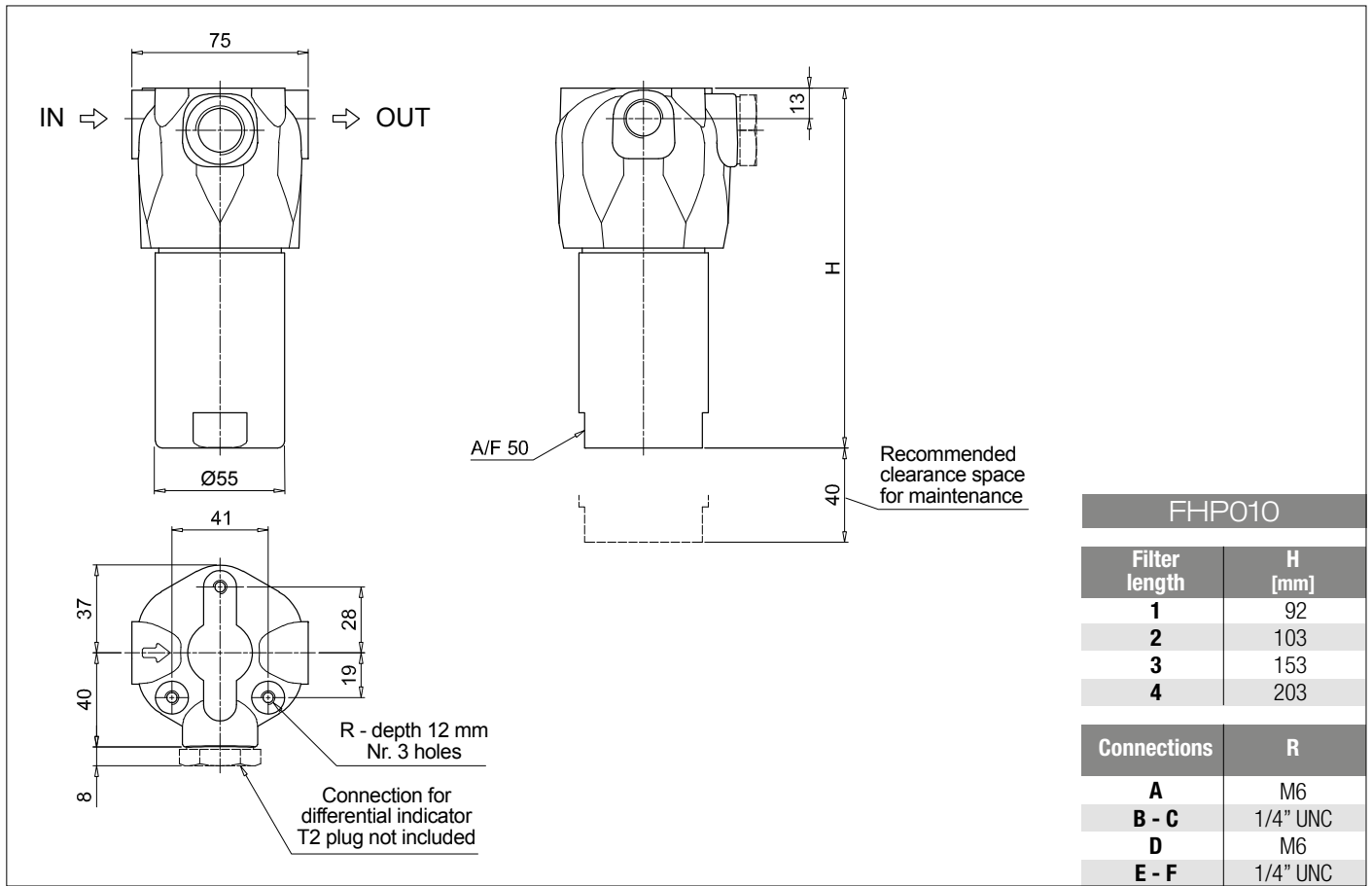
|            |                      |       |
|------------|----------------------|-------|
| <b>A03</b> | Inorganic microfiber | 3 µm  |
| <b>A06</b> | Inorganic microfiber | 6 µm  |
| <b>A10</b> | Inorganic microfiber | 10 µm |
| <b>A16</b> | Inorganic microfiber | 16 µm |
| <b>A25</b> | Inorganic microfiber | 25 µm |
| <b>M25</b> | Wire mesh            | 25 µm |

| Seals        | Element Δp       | Execution                     |
|--------------|------------------|-------------------------------|
| <b>A</b> NBR | <b>N</b> 20 bar  | <b>P01</b> MP Filtri standard |
| <b>V</b> FPM | <b>H</b> 210 bar | <b>Pxx</b> Customized         |

### CLOGGING INDICATORS

See page 622

|   |  |
|---|--|
| <b>DEA</b> Electrical differential indicator          | <b>DTA</b> Electrical differential indicator |
| <b>DEM</b> Electrical differential indicator          | <b>DVA</b> Visual differential indicator     |
| <b>DLA</b> Electrical / visual differential indicator | <b>DVM</b> Visual differential indicator     |
| <b>DLE</b> Electrical / visual differential indicator | <b>T2</b> Plug                               |



# FHP FHP065 - FHP135

## Designation & Ordering code

### COMPLETE FILTER

Series and size **FHP065** | **FHP135** Configuration example: **FHP135** **2** **B** **A** **G3** **A06** **S** **P01**

Length **1** | **2** | **3**

Valves  
**S** Without bypass  
**B** With bypass 6 bar  
**T** With check valve, without bypass

Seals  
**A** NBR  
**V** FPM

| Connections | FHP065                   | FHP135                   |
|-------------|--------------------------|--------------------------|
| <b>G1</b>   | G 1/2"                   | G 3/4"                   |
| <b>G2</b>   | G 3/4"                   | G 1"                     |
| <b>G3</b>   | 1/2" NPT                 | 3/4" NPT                 |
| <b>G4</b>   | 3/4" NPT                 | 1" NPT                   |
| <b>G5</b>   | SAE 8 - 3/4" - 16 UNF    | SAE 12 - 1 1/16" - 12 UN |
| <b>G6</b>   | SAE 12 - 1 1/16" - 12 UN | SAE 16 - 1 5/16" - 12 UN |
| <b>F1</b>   | -                        | 3/4" SAE 3000 psi/M      |
| <b>F2</b>   | -                        | 1" SAE 3000 psi/M        |
| <b>F3</b>   | -                        | 3/4" SAE 3000 psi/UNC    |
| <b>F4</b>   | -                        | 1" SAE 3000 psi/UNC      |
| <b>F5</b>   | -                        | 3/4" SAE 6000 psi/M      |
| <b>F6</b>   | -                        | 3/4" SAE 6000 psi/UNC    |

| Filtration rating (filter media) |                      |       |
|----------------------------------|----------------------|-------|
| <b>A03</b>                       | Inorganic microfiber | 3 µm  |
| <b>A06</b>                       | Inorganic microfiber | 6 µm  |
| <b>A10</b>                       | Inorganic microfiber | 10 µm |
| <b>A16</b>                       | Inorganic microfiber | 16 µm |
| <b>A25</b>                       | Inorganic microfiber | 25 µm |
| <b>M25</b>                       | Wire mesh            | 25 µm |

| Element Δp       | Valves |   |   | Execution                     |
|------------------|--------|---|---|-------------------------------|
|                  | S      | B | T |                               |
| <b>N</b> 20 bar  | -      | • | - | <b>P01</b> MP Filtri standard |
| <b>H</b> 210 bar | •      | - | - | <b>Pxx</b> Customized         |
| <b>S</b> 210 bar | -      | - | • |                               |

### FILTER ELEMENT

Element series and size **HP065** | **HP135** Configuration example: **HP135** **2** **A06** **A** **S** **P01**

Element length **1** | **2** | **3**

| Filtration rating (filter media) |                      |       |
|----------------------------------|----------------------|-------|
| <b>A03</b>                       | Inorganic microfiber | 3 µm  |
| <b>A06</b>                       | Inorganic microfiber | 6 µm  |
| <b>A10</b>                       | Inorganic microfiber | 10 µm |
| <b>A16</b>                       | Inorganic microfiber | 16 µm |
| <b>A25</b>                       | Inorganic microfiber | 25 µm |
| <b>M25</b>                       | Wire mesh            | 25 µm |

| Seals        | Element Δp       | Execution                     |
|--------------|------------------|-------------------------------|
| <b>A</b> NBR | <b>N</b> 20 bar  | <b>P01</b> MP Filtri standard |
| <b>V</b> FPM | <b>H</b> 210 bar | <b>Pxx</b> Customized         |
|              | <b>S</b> 210 bar |                               |

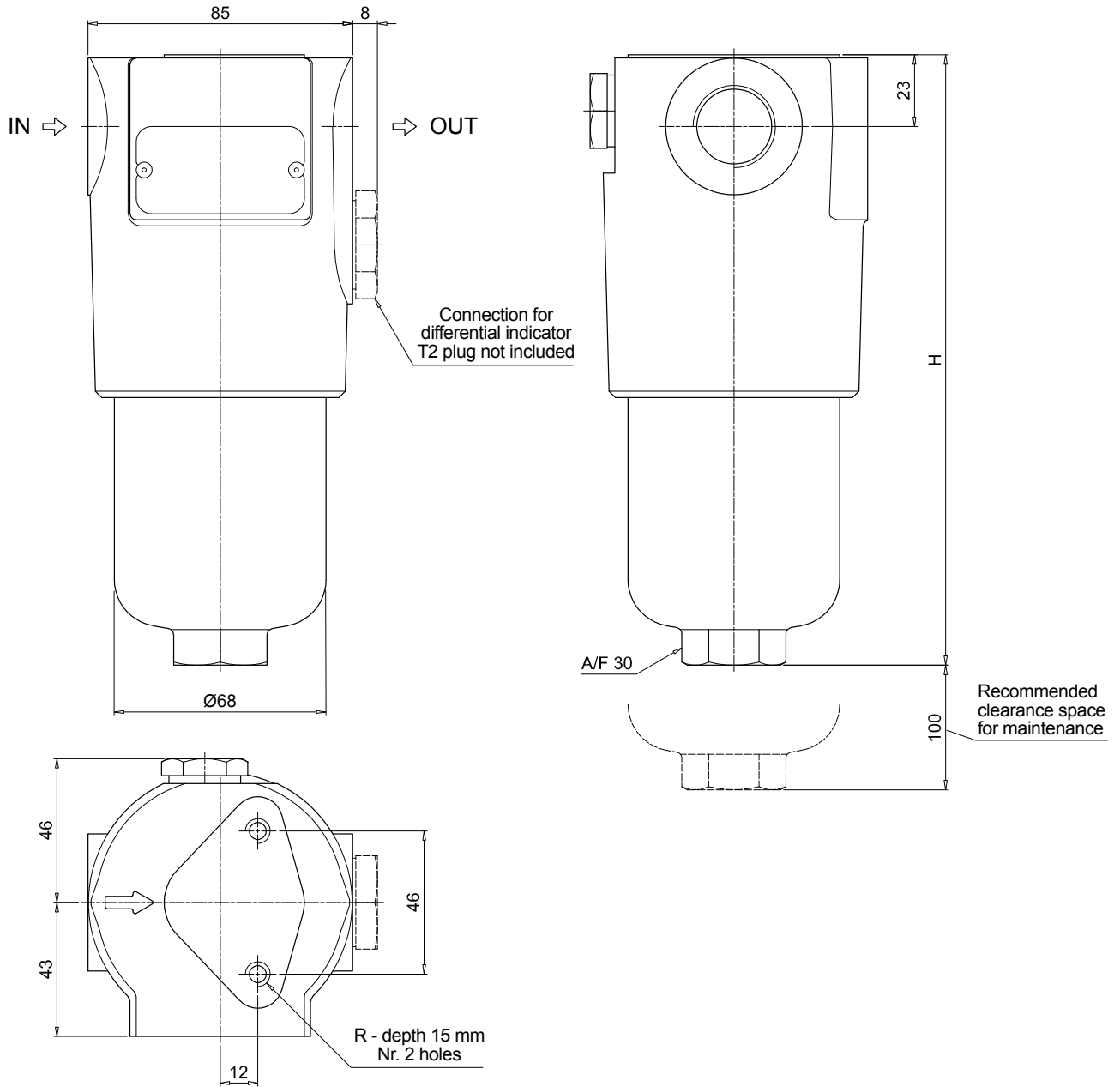
### CLOGGING INDICATORS

See page 622

**DEA** Electrical differential indicator  
**DEM** Electrical differential indicator  
**DLA** Electrical / visual differential indicator  
**DLE** Electrical / visual differential indicator

**DTA** Electrical differential indicator  
**DVA** Visual differential indicator  
**DVM** Visual differential indicator  
**T2** Plug





### FHP065

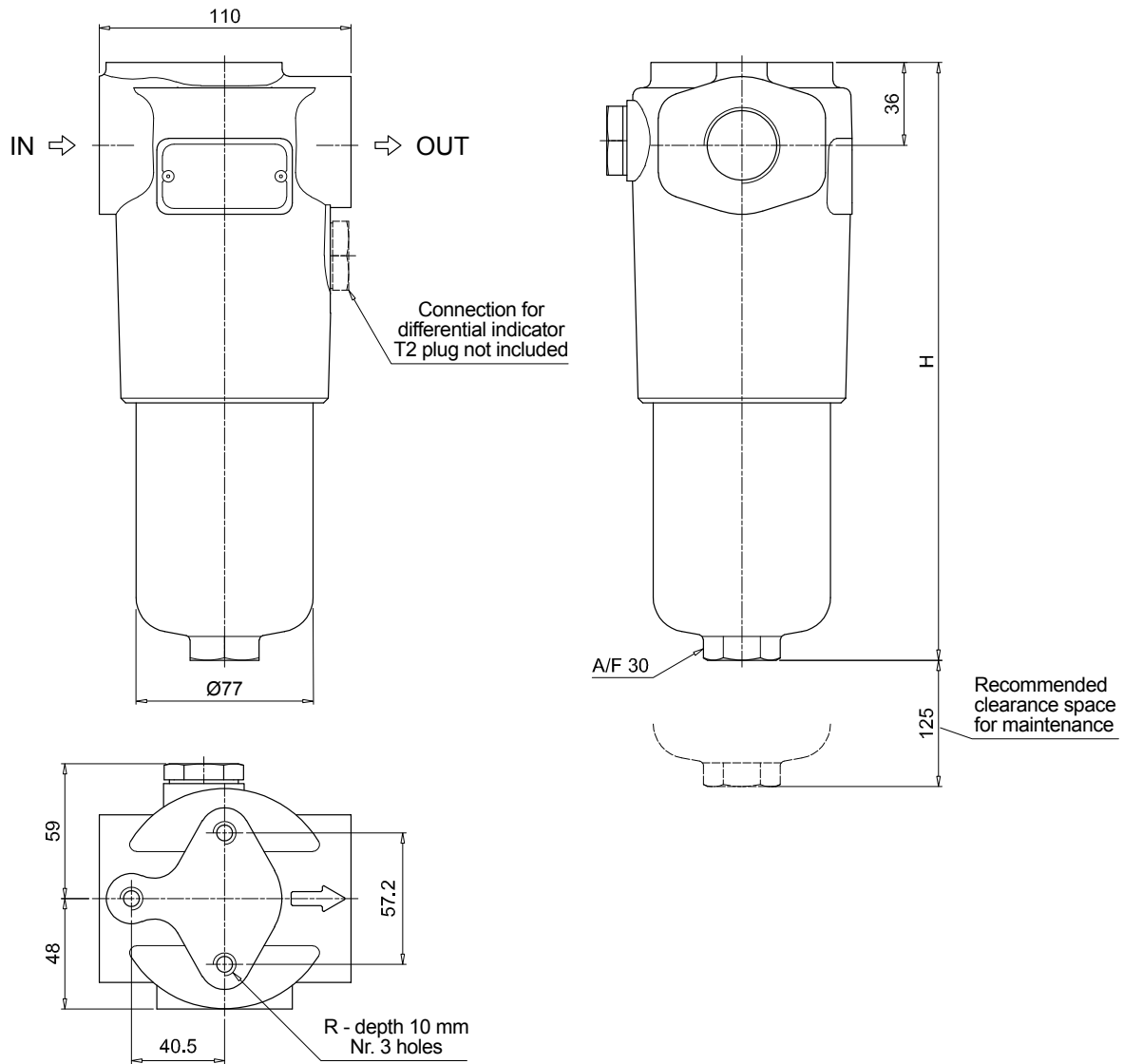
| Filter length | H [mm] |
|---------------|--------|
| 1             | 196    |
| 2             | 227    |
| 3             | 329    |

| Connections | R         |
|-------------|-----------|
| G1-G2       | M8        |
| G3-G4-G5-G6 | 5/16" UNC |

# FHP FHP065 - FHP135

## Dimensions



### FHP135

| Filter length | H [mm] |
|---------------|--------|
| <b>1</b>      | 260    |
| <b>2</b>      | 373    |
| <b>3</b>      | 448    |

| Connections        | R        |
|--------------------|----------|
| <b>G1-G2</b>       | M10      |
| <b>G3-G4-G5-G6</b> | 3/8" UNC |
| <b>F1-F2</b>       | M10      |
| <b>F3-F4</b>       | 3/8" UNC |
| <b>F5</b>          | M10      |
| <b>F6</b>          | 3/8" UNC |



# FHP FHP350 - FHP351

## Designation & Ordering code

### COMPLETE FILTER

Configuration example: **FHP350** **4** **B** **A** **D** **2** **A06** **N** **P01**

**Series and size**  
**FHP350**  
**FHP351**

**Length**  
**1** | **2** | **3** | **4** |

**Valves**  
**S** Without bypass  
**B** With bypass 6 bar  
**T** With check valve, without bypass  
**D** With check valve, with bypass 6 bar  
**V** With reverse flow, without bypass  
**Z** With reverse flow, with bypass 6 bar

**Seals**  
**A** NBR  
**V** FPM

**Connections**  
**A** G 1 1/2" **F** 1 1/2" SAE 3000 psi/UNC + SAE 20 - 1 5/8" - 12 UN  
**B** 1 1/2" NPT **G** 1 1/4" SAE 3000 psi/M  
**C** SAE 24 - 1 7/8" - 12 UN **H** 1 1/4" SAE 3000 psi/UNC  
**D** 1 1/2" SAE 3000 psi/M + G 1 1/4" **I** 1 1/4" SAE 6000 psi/M  
**E** 1 1/2" SAE 3000 psi/UNC + 1 1/4" NPT **L** 1 1/4" SAE 6000 psi/UNC

**Connection for differential indicator**  
**2** With connection

**Filtration rating (filter media)**  
**A03** Inorganic microfiber 3 µm  
**A06** Inorganic microfiber 6 µm  
**A10** Inorganic microfiber 10 µm  
**A16** Inorganic microfiber 16 µm  
**A25** Inorganic microfiber 25 µm  
**M25** Wire mesh 25 µm

| Element Δp       | Valves |   |   |   |   |   |
|------------------|--------|---|---|---|---|---|
|                  | S      | B | T | D | V | Z |
| <b>N</b> 20 bar  | -      | • | - | - | - | - |
| <b>R</b> 20 bar  | -      | - | - | • | - | • |
| <b>H</b> 210 bar | •      | - | - | - | - | - |
| <b>S</b> 210 bar | -      | - | • | - | • | - |

| Execution   | Filter length |   |   |   |
|---|---------------|---|---|---|
|   | 1             | 2 | 3 | 4 |
| <b>P01</b> MP Filtri standard                         | •             | • | • | • |
| <b>P02</b> Maintenance from the bottom of the housing | -             | - | - | • |
| <b>Pxx</b> Customized                                 | -             | - | - | - |

### FILTER ELEMENT

Configuration example: **HP320** **4** **A06** **A** **N** **P01**

**Element series and size**  
**HP320**

**Element length**  
**1** | **2** | **3** | **4** |

**Filtration rating (filter media)**  
**A03** Inorganic microfiber 3 µm  
**A06** Inorganic microfiber 6 µm  
**A10** Inorganic microfiber 10 µm  
**A16** Inorganic microfiber 16 µm  
**A25** Inorganic microfiber 25 µm  
**M25** Wire mesh 25 µm

**Seals**  
**A** NBR  
**V** FPM

**Element Δp**  
**N** 20 bar  
**R** 20 bar  
**H** 210 bar  
**S** 210 bar

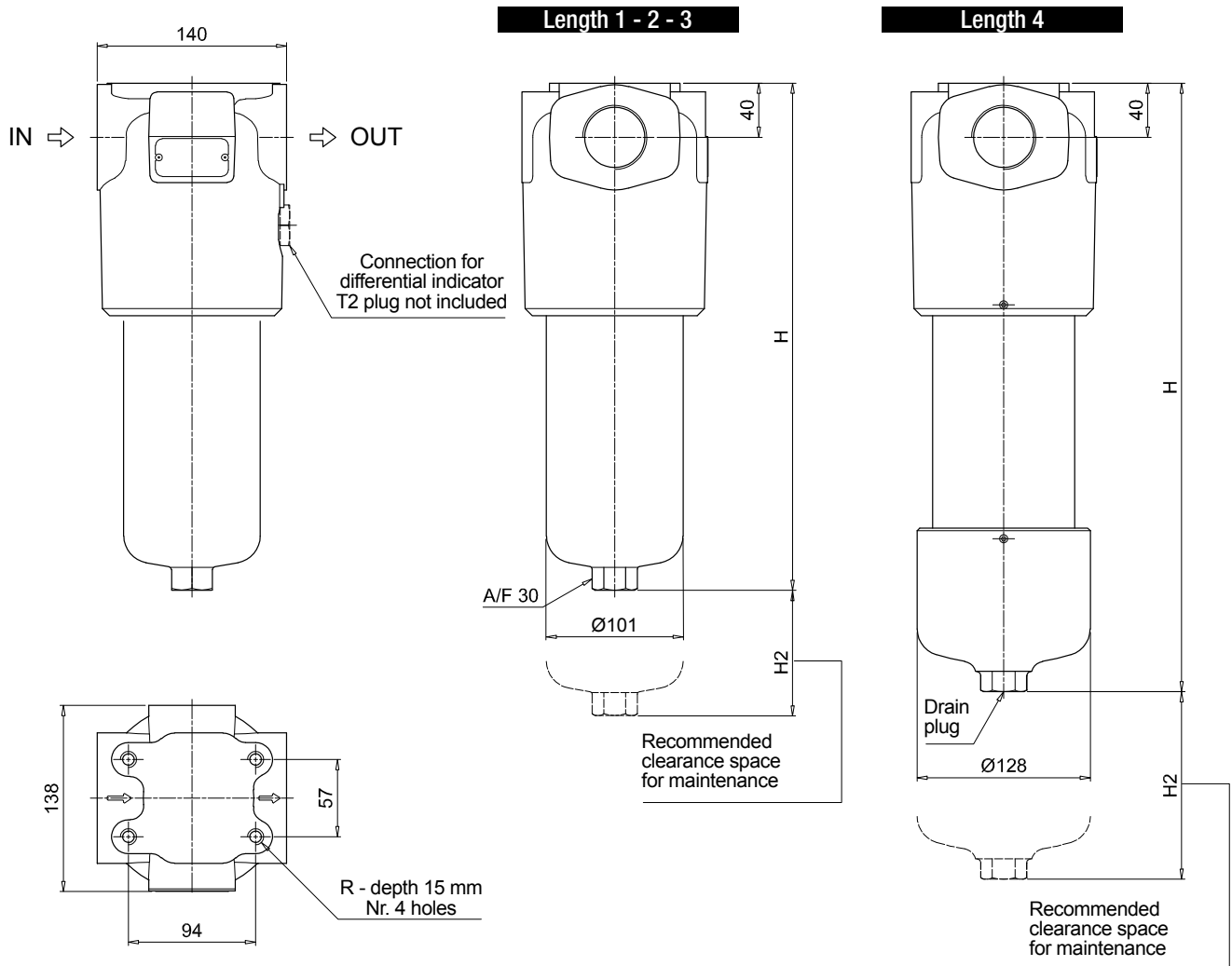
**Execution**  
**P01** MP Filtri standard  
**Pxx** Customized

### CLOGGING INDICATORS

See page 622

|   |
|---|
| <b>DEA</b> Electrical differential indicator          |
| <b>DEM</b> Electrical differential indicator          |
| <b>DLA</b> Electrical / visual differential indicator |
| <b>DLE</b> Electrical / visual differential indicator |

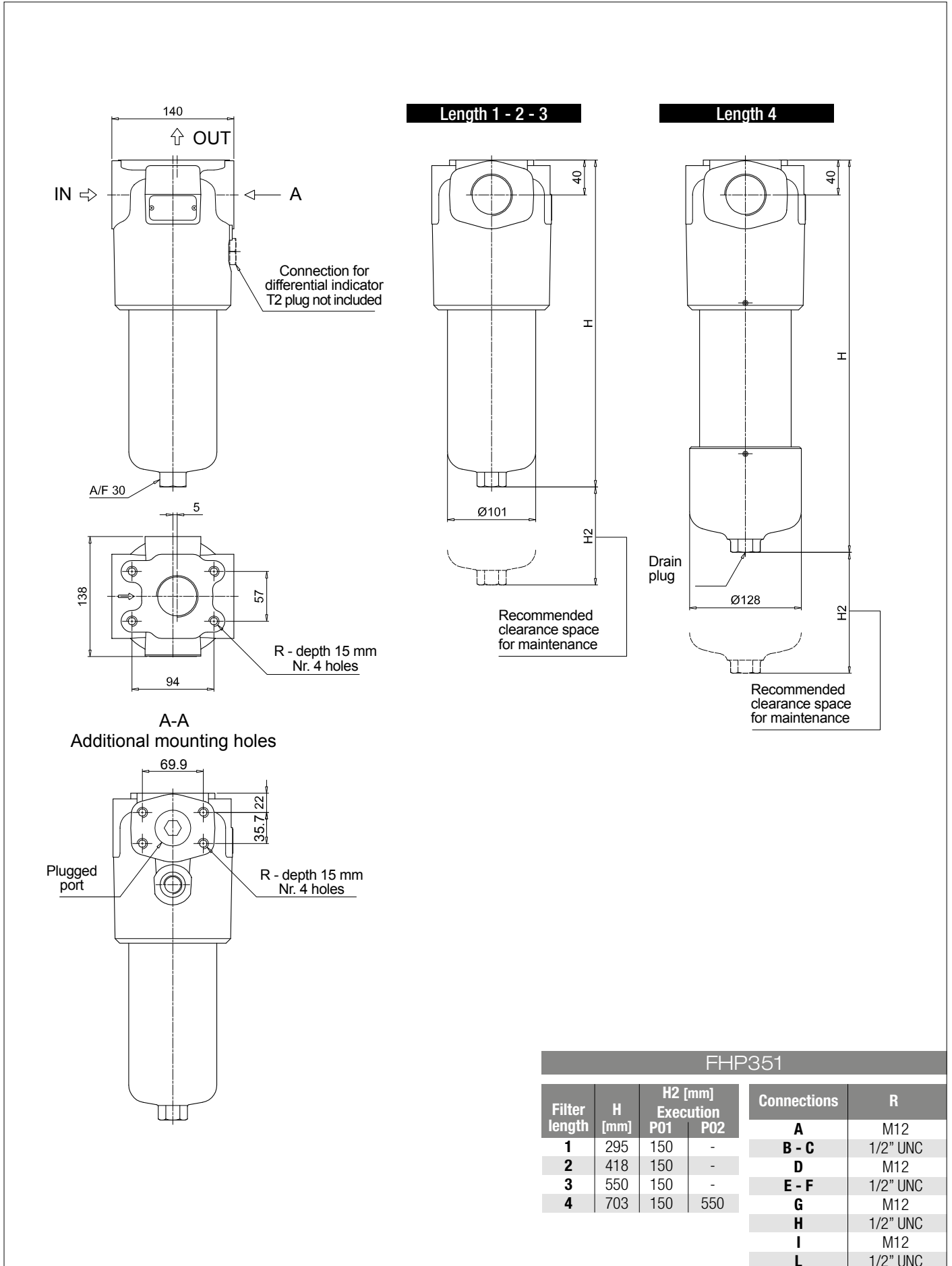
|  |
|--|
| <b>DTA</b> Electrical differential indicator |
| <b>DVA</b> Visual differential indicator     |
| <b>DVM</b> Visual differential indicator     |
| <b>T2</b> Plug                               |



### FHP350

| Filter length | H [mm] | H2 [mm] Execution |     | Connections | R        |
|---------------|--------|-------------------|-----|-------------|----------|
|               |        | P01               | P02 |             |          |
| 1             | 295    | 150               | -   | A           | M12      |
| 2             | 418    | 150               | -   | B - C       | 1/2" UNC |
| 3             | 550    | 150               | -   | D           | M12      |
| 4             | 703    | 150               | 550 | E - F       | 1/2" UNC |
|               |        |                   |     | G           | M12      |
|               |        |                   |     | H           | 1/2" UNC |
|               |        |                   |     | I           | M12      |
|               |        |                   |     | L           | 1/2" UNC |

## Dimensions





## Designation & Ordering code

### COMPLETE FILTER

Series and size **FHP500** Configuration example: **FHP500** | **4** | **V** | **A** | **F1** | **A06** | **S** | **P01**

#### Length

**1** | **2** | **3** | **4** | **5**

#### Valves

- S** Without bypass
- B** With bypass 6 bar
- T** With check valve, without bypass
- D** With check valve, with bypass 6 bar
- V** With reverse flow, without bypass
- Z** With reverse flow, with bypass 6 bar

#### Seals

- A** NBR
- V** FPM

#### Connections

- F1** 1 1/2" SAE 3000 psi/M
- F2** 1 1/2" SAE 3000 psi/UNC
- F3** 2" SAE 3000 psi/M
- F4** 2" SAE 3000 psi/UNC + 1 1/2" NPT
- F5** 1 1/2" SAE 6000 psi/M
- F6** 1 1/2" SAE 6000 psi/UNC
- F7** 2" SAE 6000 psi/M + G 1 1/2"
- F8** 2" SAE 6000 psi/UNC + SAE 24 - 1 7/8" - 12 UN

#### Filtration rating (filter media)

- A03** Inorganic microfiber 3 µm
- A06** Inorganic microfiber 6 µm
- A10** Inorganic microfiber 10 µm
- A16** Inorganic microfiber 16 µm
- A25** Inorganic microfiber 25 µm
- M25** Wire mesh 25 µm

| Element Δp       | Valves |   |   |   |   |   |
|------------------|--------|---|---|---|---|---|
|                  | S      | B | T | D | V | Z |
| <b>N</b> 20 bar  | -      | • | - | - | - | - |
| <b>R</b> 20 bar  | -      | - | - | • | - | • |
| <b>S</b> 210 bar | •      | - | • | - | • | - |

| Execution   | Filter length |   |   |   |   |
|---|---------------|---|---|---|---|
|   | 1             | 2 | 3 | 4 | 5 |
| <b>P01</b> MP Filtri standard                         | •             | • | • | • | • |
| <b>P02</b> Maintenance from the bottom of the housing | -             | - | - | • | • |
| <b>P03</b> Drain plug                                 | •             | • | - | - | - |
| <b>Pxx</b> Customized                                 | •             | • | • | • | • |

### FILTER ELEMENT

Element series and size **HP500** Configuration example: **HP500** | **4** | **A06** | **A** | **S** | **P01**

#### Element length

**1** | **2** | **3** | **4** | **5**

#### Filtration rating (filter media)

- A03** Inorganic microfiber 3 µm
- A06** Inorganic microfiber 6 µm
- A10** Inorganic microfiber 10 µm
- A16** Inorganic microfiber 16 µm
- A25** Inorganic microfiber 25 µm
- M25** Wire mesh 25 µm

| Seals    |     |
|----------|-----|
| <b>A</b> | NBR |
| <b>V</b> | FPM |

| Element Δp |         |
|------------|---------|
| <b>N</b>   | 20 bar  |
| <b>R</b>   | 20 bar  |
| <b>S</b>   | 210 bar |

| Execution  |                    |
|------------|--------------------|
| <b>P01</b> | MP Filtri standard |
| <b>Pxx</b> | Customized         |

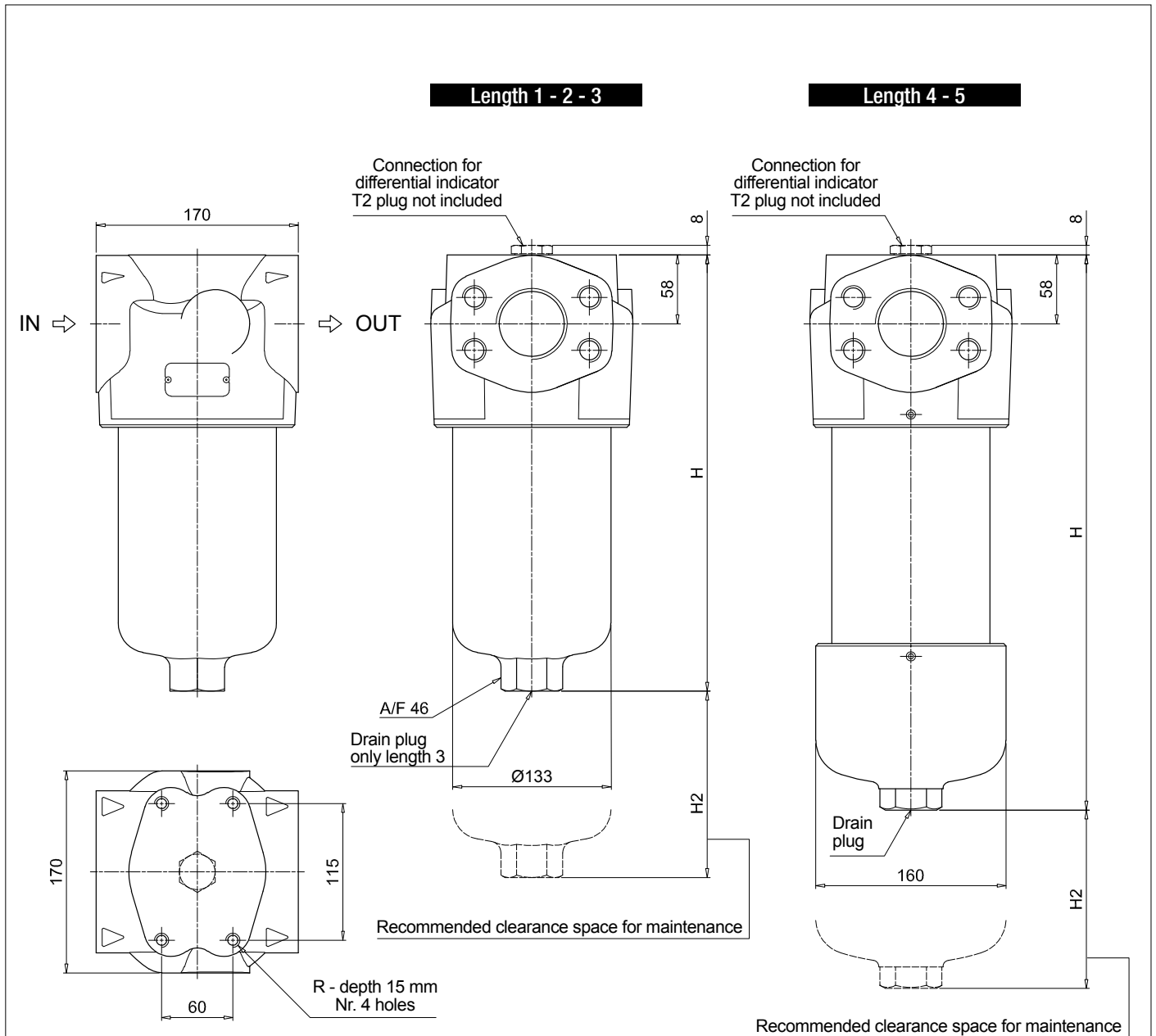
### CLOGGING INDICATORS

See page 622

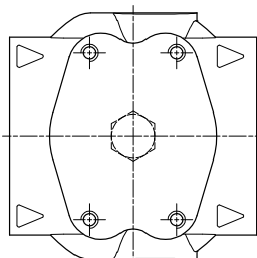
- DEA** Electrical differential indicator
- DEM** Electrical differential indicator
- DLA** Electrical / visual differential indicator
- DLE** Electrical / visual differential indicator

- DTA** Electrical differential indicator
- DVA** Visual differential indicator
- DVM** Visual differential indicator
- T2** Plug

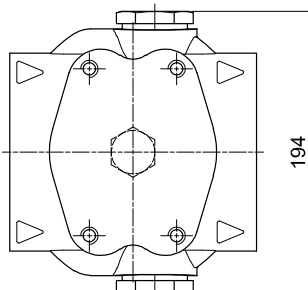




Valves S - B - T - D



Valves V - Z



| FHP500        |        |               |               |
|---------------|--------|---------------|---------------|
| Filter length | H [mm] | H2 [mm]       |               |
|               |        | Execution P01 | Execution P02 |
| 1             | 330    | 150           | -             |
| 2             | 420    | 150           | -             |
| 3             | 496    | 150           | -             |
| 4             | 654    | 150           | 480           |
| 5             | 820    | 150           | 650           |

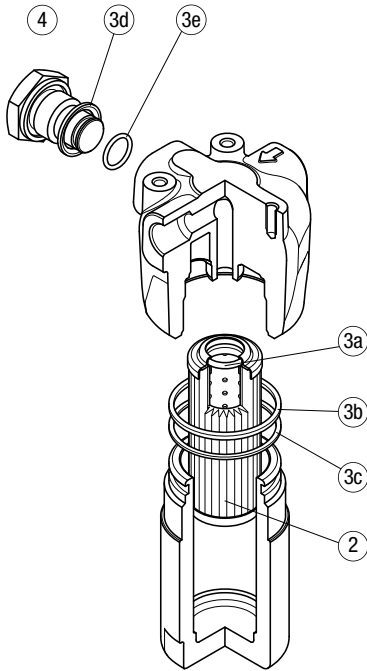
  

| Connections | R        |
|-------------|----------|
| F1          | M12      |
| F2          | 1/2" UNC |
| F3          | M12      |
| F4          | 1/2" UNC |
| F5          | M12      |
| F6          | 1/2" UNC |
| F7          | M12      |
| F8          | 1/2" UNC |

# FHP SPARE PARTS

Order number for spare parts

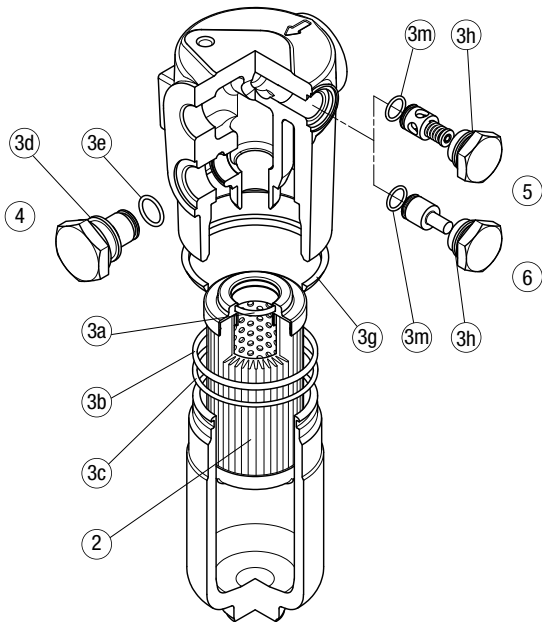
## FHP 010 - 011



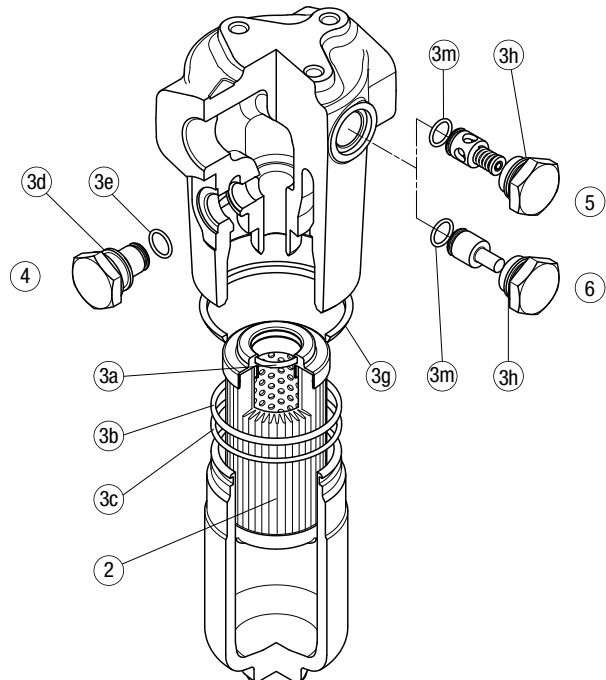
Q.ty:  
nr. 0 pcs. for version 1  
(without indicator port)  
  
nr. 1 pc. for version 2  
(with indicator port)

| Item:              | Q.ty: 1 pc.<br>2 | Q.ty: 1 pc.<br>3 (3a ÷ 3e) |          | Q.ty: 1 pc.<br>4          |     |
|--------------------|------------------|----------------------------|----------|---------------------------|-----|
| Filter series      | Filter element   | Seal Kit code number       |          | Indicator connection plug |     |
|                    |                  | NBR                        | FPM      | NBR                       | FPM |
| <b>FHP 010-011</b> | See order table  | 02050501                   | 02050492 | T2H                       | T2V |

## FHP 065



## FHP 135

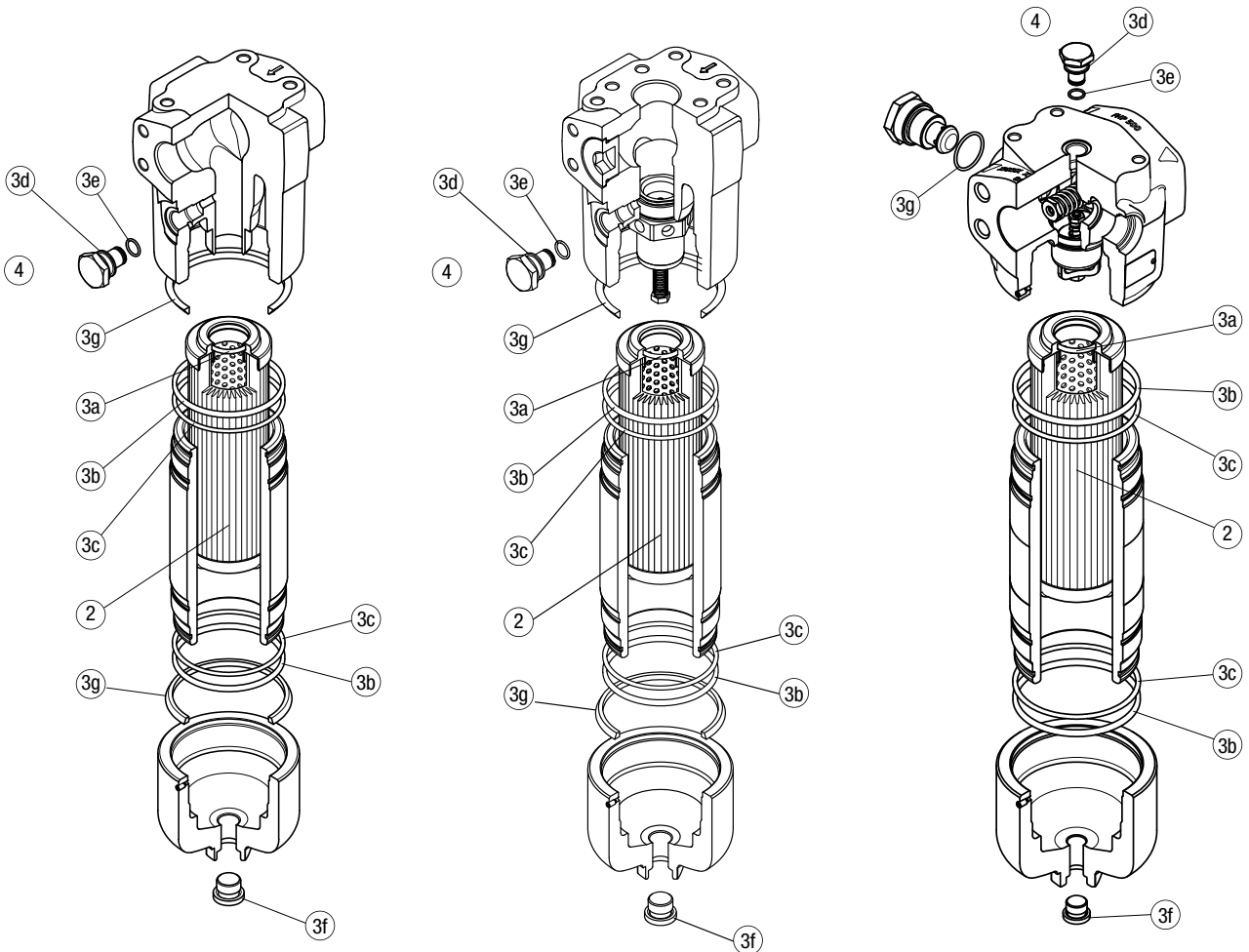


| Item:          | Q.ty: 1 pc.<br>2 | Q.ty: 1 pc.<br>3 (3a ÷ 3m) |          | Q.ty: 1 pc.<br>4          |     | Q.ty: 1 pc.<br>5 |          | Q.ty: 1 pc.<br>6    |          |
|----------------|------------------|----------------------------|----------|---------------------------|-----|------------------|----------|---------------------|----------|
| Filter series  | Filter element   | Seal Kit code number       |          | Indicator connection plug |     | Bypass assembly  |          | Non-bypass assembly |          |
|                |                  | NBR                        | FPM      | NBR                       | FPM | NBR              | FPM      | NBR                 | FPM      |
| <b>FHP 065</b> | See order table  | 02050265                   | 02050276 | T2H                       | T2V | 02001116         | 02001136 | 02001142            | 02001139 |
| <b>FHP 135</b> | See order table  | 02050269                   | 02050280 |                           |     | 02001117         | 02001137 | 02001143            | 02001392 |

FHP 350

FHP 351

FHP 500



| Item:         | Q.ty: 1 pc.     | Q.ty: 1 pc.          |          | Q.ty: 1 pc.               |     |
|---------------|-----------------|----------------------|----------|---------------------------|-----|
| Filter series | Filter element  | Seal Kit code number |          | Indicator connection plug |     |
|               |                 | NBR                  | FPM      | NBR                       | FPM |
| FHP 350 - 351 | See order table | 02050272             | 02050283 | T2H                       | T2V |
| FHP 500       |                 | 02050330             | 02050331 |                           |     |



# FHM series

Maximum working pressure up to 32 MPa (320 bar) - Flow rate up to 400 l/min



## Description

## Technical data

### High Pressure filters

#### Manifold

**Maximum working pressure up to 32 MPa (320 bar)**

**Flow rate up to 400 l/min**

FHM is a range of high pressure filter for protection of sensitive components in high pressure hydraulic systems in the mobile machines. They are directly connected to the top of the manifold, through the proper flanged interface.

#### Available features:

Available features:

- Manifold connections up to Ø30 mm, for a maximum flow rate of 400 l/min
- ISO 4401 CETOP 3 and CETOP 5 interface, for direct mounting on the CETOP valves
- Fine filtration rating, to get a good cleanliness level into the system
- Bypass valve, to relieve excessive pressure drop across the filter media
- Check valve, to protect the system against reverse flow
- Low collapse filter element "N", for use with filters provided with bypass valve
- High collapse filter element "H", for use with filters not provided with bypass valve
- High collapse filter element with external support "S", for filter element protection against the back pressure caused by the check valve in filters not provided with the bypass valve
- Visual, electrical and electronic differential clogging indicators

#### Common applications:

Delivery lines, in any high pressure industrial equipment

#### Filter housing materials

- Head  
Phosphatized cast iron: FHM 006-007-010  
Phosphatized steel: FHM 050-065-135-320-500
- Housing: Phosphatized steel
- Bypass valve: Steel
- Check valve: Steel

#### Pressure

- Test pressure: 48 MPa (480 bar)
- Burst pressure: 96 MPa (960 bar)
- Pulse pressure fatigue test: 1 000 000 cycles with pressure from 0 to 32 MPa (320 bar)

#### Bypass valve

- Opening pressure 600 kPa (6 bar) ±10%
- Other opening pressures on request.

#### Δp element type

- Microfibre filter elements - series N: 20 bar  
(not available for FHM 006, FHM 007 and FHM 010)
- Microfibre filter elements - series H: 210 bar  
(not available for FHM 050 and FHM 500)
- Microfibre filter elements - series S: 210 bar  
(only for FHM 050 and FHM 500)
- Wire mesh filter elements - series N: 20 bar  
(not available for FHM 006)
- Wire mesh filter elements - series H: 210 bar  
(not available for FHM 050 and FHM 500)
- Fluid flow through the filter element from OUT to IN

#### Seals

- Standard NBR series A
- Optional FPM series V

#### Temperature

From -25 °C to +110 °C

#### Connections

Manifold mounting

#### Note

FHM filters are provided for vertical mounting

## Weights [kg] and volumes [dm<sup>3</sup>]

| Filter series  | Weights [kg] |       |       |       |       | Volumes [dm <sup>3</sup> ] |        |      |      |      |      |      |
|----------------|--------------|-------|-------|-------|-------|----------------------------|--------|------|------|------|------|------|
|                | Length       | 1     | 2     | 3     | 4     | 5                          | Length | 1    | 2    | 3    | 4    | 5    |
| <b>FHM 006</b> |              | 2.17  | -     | -     | -     | -                          |        | 0.12 | -    | -    | -    | -    |
| <b>FHM 007</b> |              | -     | 4.74  | 5.95  | -     | -                          |        | -    | 0.30 | 0.50 | -    | -    |
| <b>FHM 010</b> |              | -     | 4.74  | 5.95  | -     | -                          |        | -    | 0.30 | 0.50 | -    | -    |
| <b>FHM 050</b> |              | 5.31  | 5.68  | 6.09  | 6.56  | 7.74                       |        | 0.29 | 0.38 | 0.48 | 0.60 | 0.89 |
| <b>FHM 065</b> |              | 5.47  | 5.83  | 7.04  | -     | -                          |        | 0.27 | 0.34 | 0.56 | -    | -    |
| <b>FHM 135</b> |              | 8.78  | 10.38 | 11.43 | -     | -                          |        | 0.49 | 0.82 | 1.03 | -    | -    |
| <b>FHM 320</b> |              | 19.80 | 21.93 | 24.22 | 26.70 | -                          |        | 1.04 | 1.76 | 2.53 | 3.36 | -    |
| <b>FHM 500</b> |              | 35.00 | 39.17 | 42.69 | 54.70 | 60.50                      |        | 1.63 | 2.35 | 2.96 | 5.11 | 6.44 |

| Filter series  | Length   | Filter element design - H Series |     |     |     |     |     |
|----------------|----------|----------------------------------|-----|-----|-----|-----|-----|
|                |          | A03                              | A06 | A10 | A16 | A25 | M25 |
| <b>FHM 006</b> | <b>1</b> | 9                                | 10  | 13  | 14  | 15  | 16  |
|                | <b>2</b> | 13                               | 13  | 15  | 16  | 16  | 16  |
| <b>FHM 007</b> | <b>3</b> | 15                               | 15  | 16  | 16  | 17  | 17  |
|                | <b>2</b> | 23                               | 25  | 32  | 34  | 37  | 38  |
| <b>FHM 010</b> | <b>3</b> | 31                               | 33  | 37  | 38  | 39  | 40  |

| Filter series  | Length   | Filter element design - N Series |     |     |     |     |     | Filter element design - S Series |     |     |     |     |
|----------------|----------|----------------------------------|-----|-----|-----|-----|-----|----------------------------------|-----|-----|-----|-----|
|                |          | A03                              | A06 | A10 | A16 | A25 | M25 | A03                              | A06 | A10 | A16 | A25 |
| <b>FHM 050</b> | <b>1</b> | 38                               | 37  | 65  | 67  | 81  | 101 | 28                               | 36  | 50  | 52  | 62  |
|                | <b>2</b> | 46                               | 50  | 69  | 75  | 89  | 102 | 41                               | 44  | 63  | 71  | 85  |
|                | <b>3</b> | 57                               | 59  | 76  | 81  | 93  | 103 | 51                               | 53  | 71  | 77  | 90  |
|                | <b>4</b> | 68                               | 71  | 84  | 86  | 95  | 103 | 62                               | 66  | 81  | 82  | 93  |
|                | <b>5</b> | 82                               | 83  | 93  | 95  | 98  | 105 | 73                               | 75  | 83  | 89  | 97  |

| Filter series  | Length   | Filter element design - N Series |     |     |     |     |     | Filter element design - H Series |     |     |     |     |
|----------------|----------|----------------------------------|-----|-----|-----|-----|-----|----------------------------------|-----|-----|-----|-----|
|                |          | A03                              | A06 | A10 | A16 | A25 | M25 | A03                              | A06 | A10 | A16 | A25 |
| <b>FHM 065</b> | <b>1</b> | 23                               | 30  | 48  | 53  | 71  | 102 | 22                               | 23  | 43  | 50  | 67  |
|                | <b>2</b> | 30                               | 45  | 59  | 64  | 81  | 103 | 30                               | 34  | 56  | 62  | 76  |
|                | <b>3</b> | 52                               | 60  | 78  | 82  | 92  | 105 | 51                               | 58  | 77  | 81  | 91  |
| <b>FHM 135</b> | <b>1</b> | 61                               | 65  | 99  | 104 | 131 | 149 | 46                               | 51  | 83  | 86  | 122 |
|                | <b>2</b> | 91                               | 96  | 118 | 119 | 155 | 167 | 79                               | 92  | 109 | 111 | 134 |
|                | <b>3</b> | 118                              | 119 | 144 | 146 | 156 | 168 | 103                              | 112 | 130 | 137 | 146 |
| <b>FHM 320</b> | <b>1</b> | 112                              | 121 | 187 | 217 | 252 | 312 | 97                               | 102 | 156 | 162 | 228 |
|                | <b>2</b> | 200                              | 214 | 281 | 293 | 320 | 328 | 161                              | 181 | 237 | 241 | 282 |
|                | <b>3</b> | 245                              | 267 | 312 | 320 | 325 | 333 | 207                              | 233 | 275 | 280 | 306 |
|                | <b>4</b> | 267                              | 281 | 315 | 325 | 336 | 341 | 232                              | 247 | 279 | 283 | 309 |

| Filter series  | Length   | Filter element design - N Series |     |     |     |     |     | Filter element design - S Series |     |     |     |     |
|----------------|----------|----------------------------------|-----|-----|-----|-----|-----|----------------------------------|-----|-----|-----|-----|
|                |          | A03                              | A06 | A10 | A16 | A25 | M25 | A03                              | A06 | A10 | A16 | A25 |
| <b>FHM 500</b> | <b>1</b> | 211                              | 232 | 281 | 289 | 309 | 394 | 126                              | 135 | 208 | 210 | 261 |
|                | <b>2</b> | 242                              | 262 | 303 | 308 | 330 | 397 | 187                              | 206 | 258 | 266 | 285 |
|                | <b>3</b> | 284                              | 294 | 336 | 338 | 357 | 399 | 226                              | 230 | 285 | 290 | 315 |
|                | <b>4</b> | 302                              | 325 | 346 | 350 | 361 | 401 | 251                              | 273 | 314 | 315 | 341 |
|                | <b>5</b> | 325                              | 334 | 356 | 361 | 373 | 401 | 296                              | 301 | 335 | 338 | 360 |

### Maximum flow rate for a complete pressure filter with a pressure drop $\Delta p = 1.5$ bar.

The reference fluid has a kinematic viscosity of 30 mm<sup>2</sup>/s (cSt) and a density of 0.86 kg/dm<sup>3</sup>.

For different pressure drop or fluid viscosity we recommend to use our selection software available on [www.mpfiltri.com](http://www.mpfiltri.com).

You can also calculate the right size using the formulas present on the FILTER SIZING paragraph at the beginning of the full catalogue or at the beginning of the filter family brochure.

Please, contact our Sales Department for further additional information.

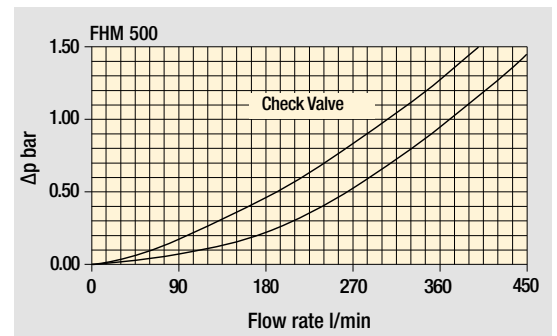
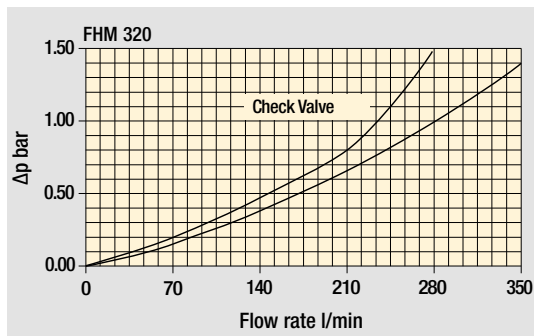
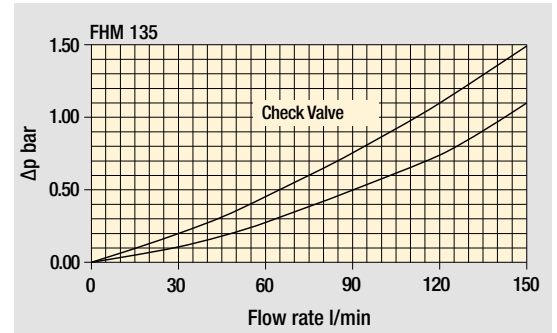
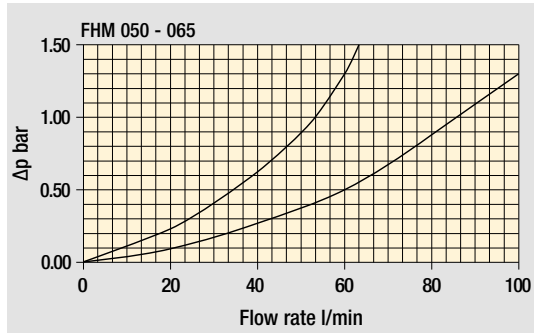
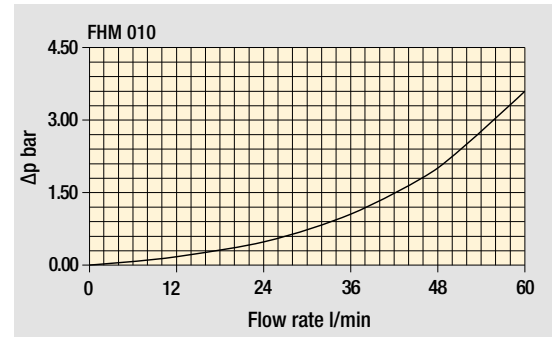
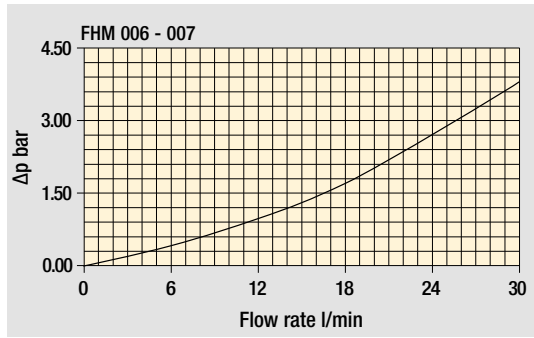
### Hydraulic symbols

| Filter series  | Stile S | Stile S | Stile S | Stile B | Stile T | Stile D |
|----------------|---------|---------|---------|---------|---------|---------|
| <b>FHM 006</b> | •       | -       | -       | -       | -       | -       |
| <b>FHM 007</b> | •       | -       | -       | -       | -       | -       |
| <b>FHM 010</b> | -       | •       | -       | -       | -       | -       |
| <b>FHM 050</b> | -       | -       | •       | •       | •       | •       |
| <b>FHM 065</b> | -       | -       | •       | •       | •       | •       |
| <b>FHM 135</b> | -       | -       | •       | •       | •       | •       |
| <b>FHM 320</b> | -       | -       | •       | •       | •       | •       |
| <b>FHM 500</b> | -       | -       | •       | •       | •       | •       |
|                |         |         |         |         |         |         |

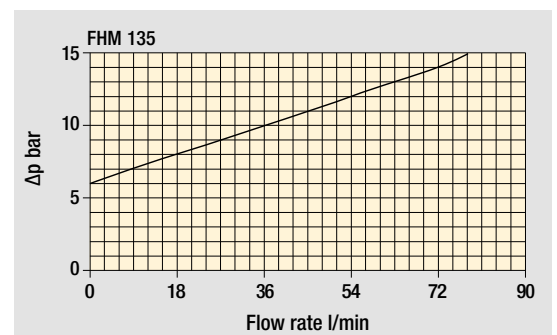
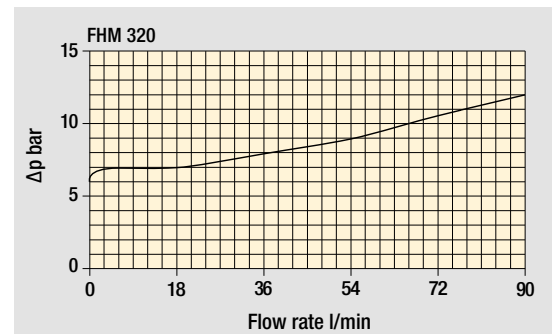
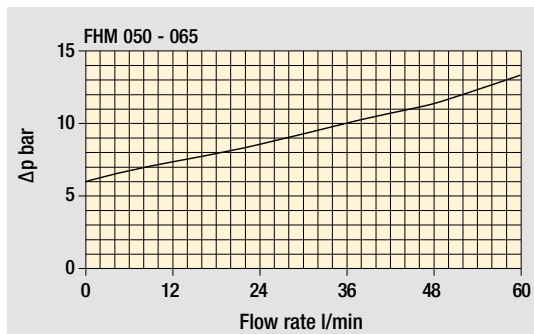
# FHM GENERAL INFORMATION

## Pressure drop

### Filter housings $\Delta p$ pressure drop



### Bypass valve pressure drop



The curves are plotted using mineral oil with density of 0.86 kg/dm<sup>3</sup> in compliance with ISO 3968.  $\Delta p$  varies proportionally with density.





# FHM FHM006 - FHM007 - FHM010

## Designation & Ordering code

### COMPLETE FILTER

| Series and size                  |                      |        |        | Configuration example: FHM010 2 S V G1 A03 H P01 |       |                        |  |  |  |  |
|----------------------------------|----------------------|--------|--------|--|-------|------------------------|--|--|--|--|
| FHM006   FHM007   FHM010         |                      |        |        |  |       |                        |  |  |  |  |
| Length                           | FHM006               | FHM007 | FHM010 |  |       |                        |  |  |  |  |
| 1                                | •                    | -      | -      |  |       |                        |  |  |  |  |
| 2                                | -                    | •      | •      |  |       |                        |  |  |  |  |
| 3                                | -                    | •      | •      |  |       |                        |  |  |  |  |
| Valves                           |                      |        |        |  |       |                        |  |  |  |  |
| S Without bypass                 |                      |        |        |  |       |                        |  |  |  |  |
| Seals                            |                      |        |        |  |       |                        |  |  |  |  |
| A NBR                            |                      |        |        |  |       |                        |  |  |  |  |
| V FPM                            |                      |        |        |  |       |                        |  |  |  |  |
| Connections                      |                      |        |        |  |       |                        |  |  |  |  |
| G1 Manifold side "A"             |                      |        |        |  |       |                        |  |  |  |  |
| G2 Manifold side "B"             |                      |        |        |  |       |                        |  |  |  |  |
| Filtration rating (filter media) |                      |        |        |  |       |                        |  |  |  |  |
| A03                              | Inorganic microfiber | 3 µm   | A16    | Inorganic microfiber                             | 16 µm |                        |  |  |  |  |
| A06                              | Inorganic microfiber | 6 µm   | A25    | Inorganic microfiber                             | 25 µm |                        |  |  |  |  |
| A10                              | Inorganic microfiber | 10 µm  | M25    | Wire mesh  | 25 µm |                        |  |  |  |  |
|                                  |                      |        |        | Element Δp                                       |       | Execution              |  |  |  |  |
|                                  |                      |        |        | H 210 bar  |       | P01 MP Filtri standard |  |  |  |  |
|                                  |                      |        |        |  |       | Pxx Customized         |  |  |  |  |

### FILTER ELEMENT

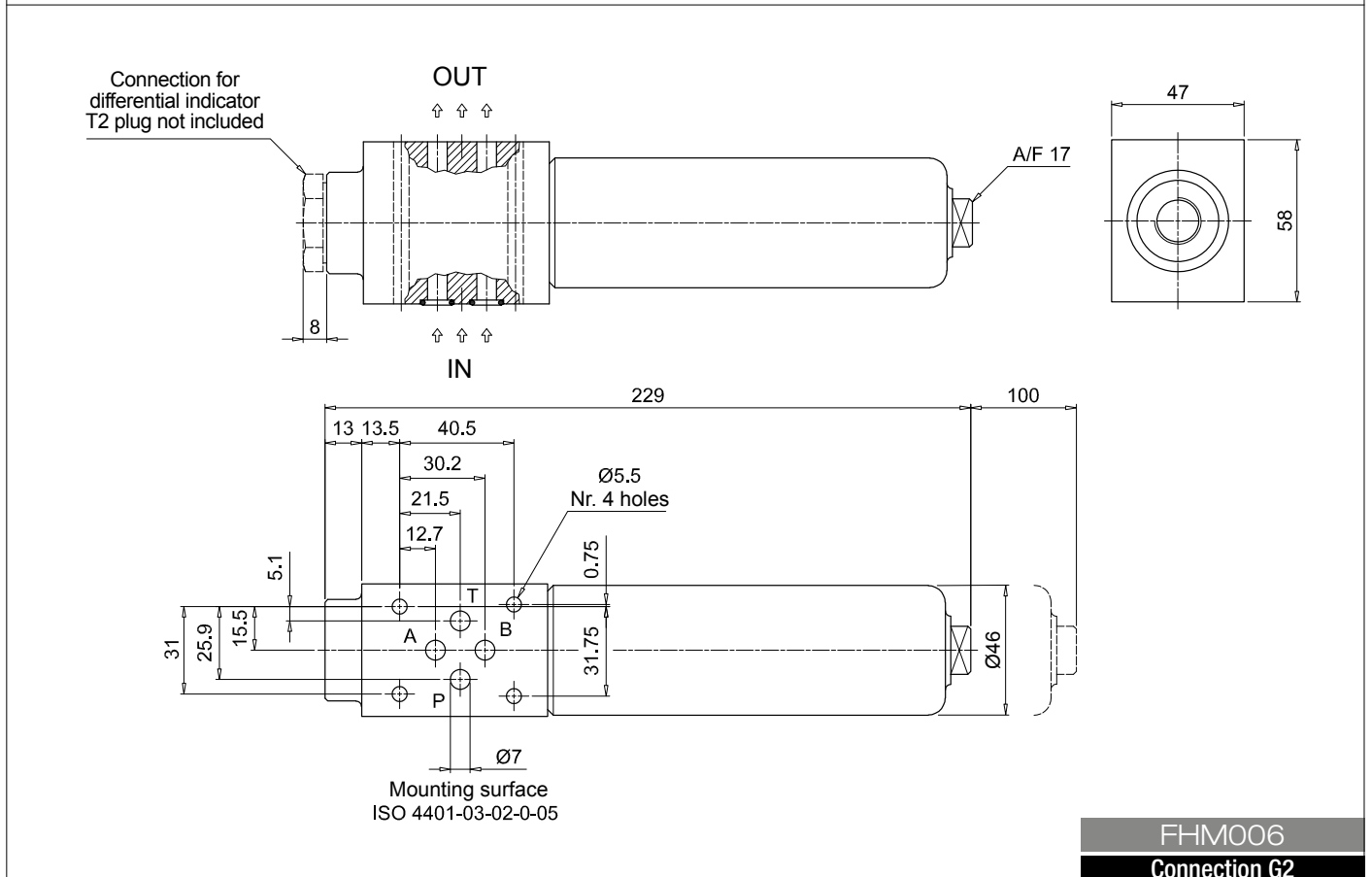
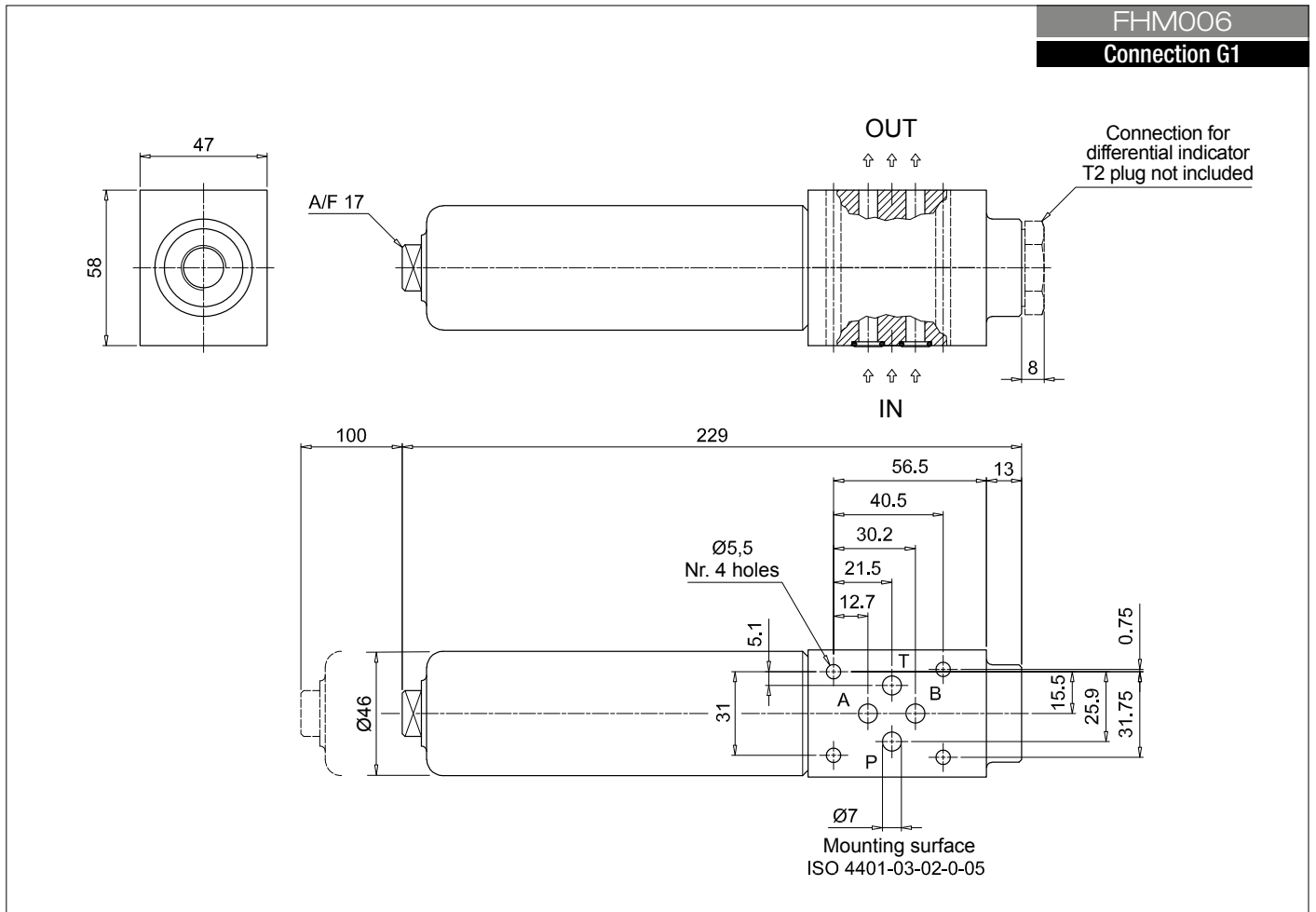
| Element series and size          |                      |        |        | Configuration example: HP065 2 A03 A H P01 |  |            |  |                        |  |  |
|----------------------------------|----------------------|--------|--------|--|--|------------|--|------------------------|--|--|
| HP011   HP065                    |                      |        |        |  |  |            |  |                        |  |  |
| Element length                   | FHM006               | FHM007 | FHM010 |  |  |            |  |                        |  |  |
| 2                                | -                    | •      | •      |  |  |            |  |                        |  |  |
| 3                                | •                    | •      | •      |  |  |            |  |                        |  |  |
| Filtration rating (filter media) |                      |        |        |  |  |            |  |                        |  |  |
| A03                              | Inorganic microfiber | 3 µm   |        |  |  |            |  |                        |  |  |
| A06                              | Inorganic microfiber | 6 µm   |        |  |  |            |  |                        |  |  |
| A10                              | Inorganic microfiber | 10 µm  |        |  |  |            |  |                        |  |  |
| A16                              | Inorganic microfiber | 16 µm  |        |  |  |            |  |                        |  |  |
| A25                              | Inorganic microfiber | 25 µm  |        |  |  |            |  |                        |  |  |
| M25                              | Wire mesh            | 25 µm  |        |  |  |            |  |                        |  |  |
|                                  |                      |        |        | Seals                                      |  | Element Δp |  | Execution              |  |  |
|                                  |                      |        |        | A NBR                                      |  | H 210 bar  |  | P01 MP Filtri standard |  |  |
|                                  |                      |        |        | V FPM                                      |  |            |  | Pxx Customized         |  |  |

### CLOGGING INDICATORS

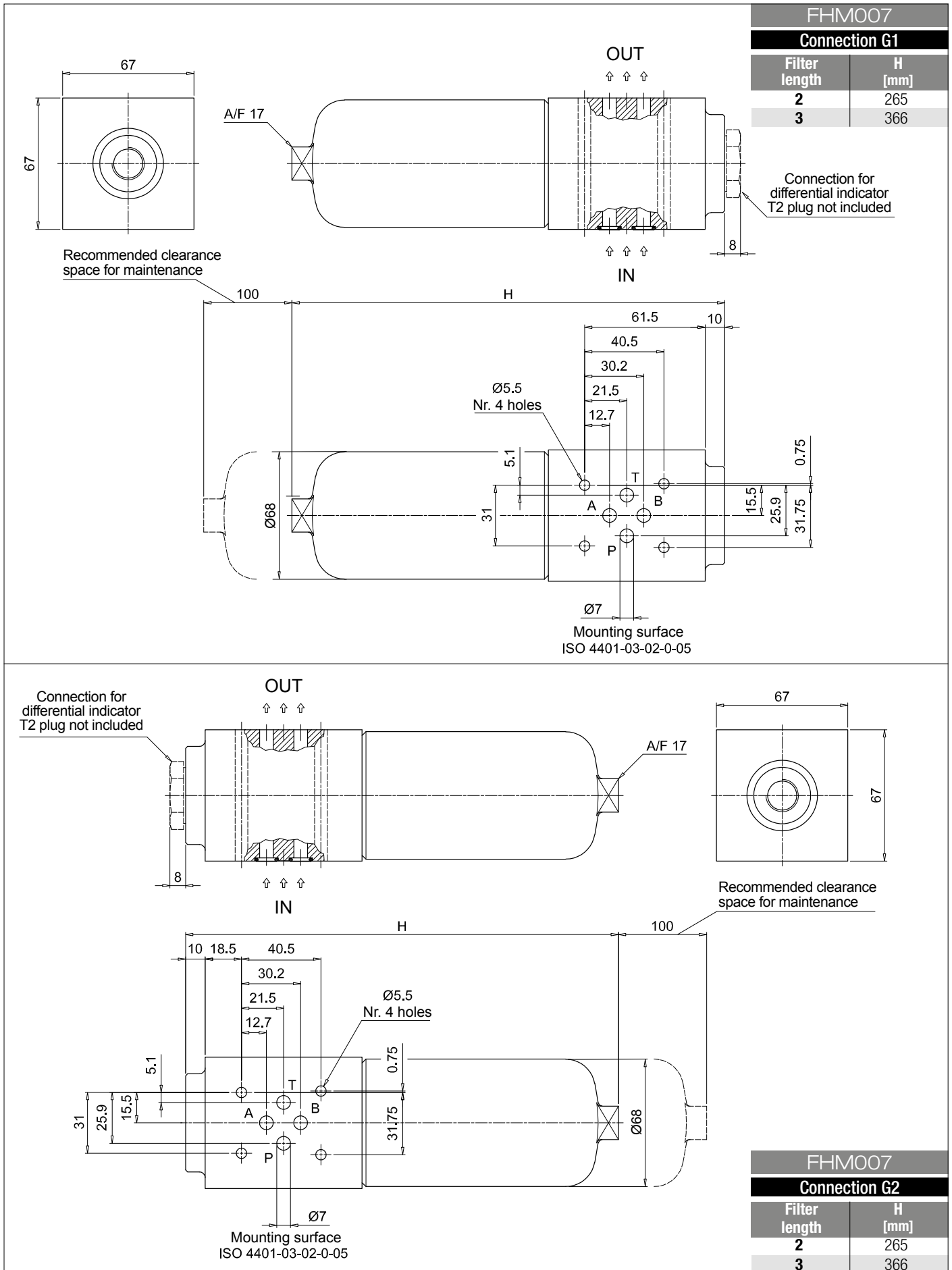
See page 622

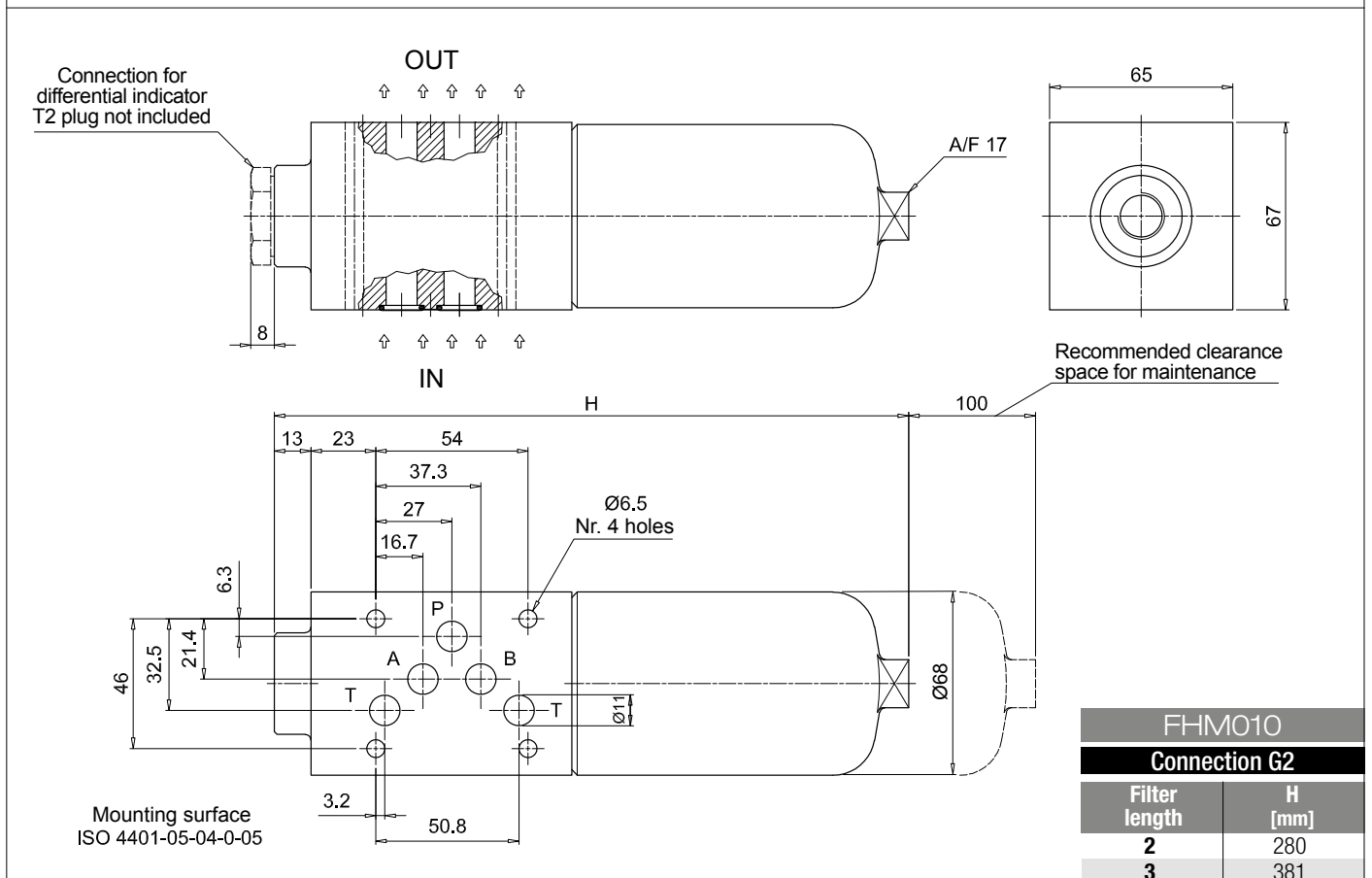
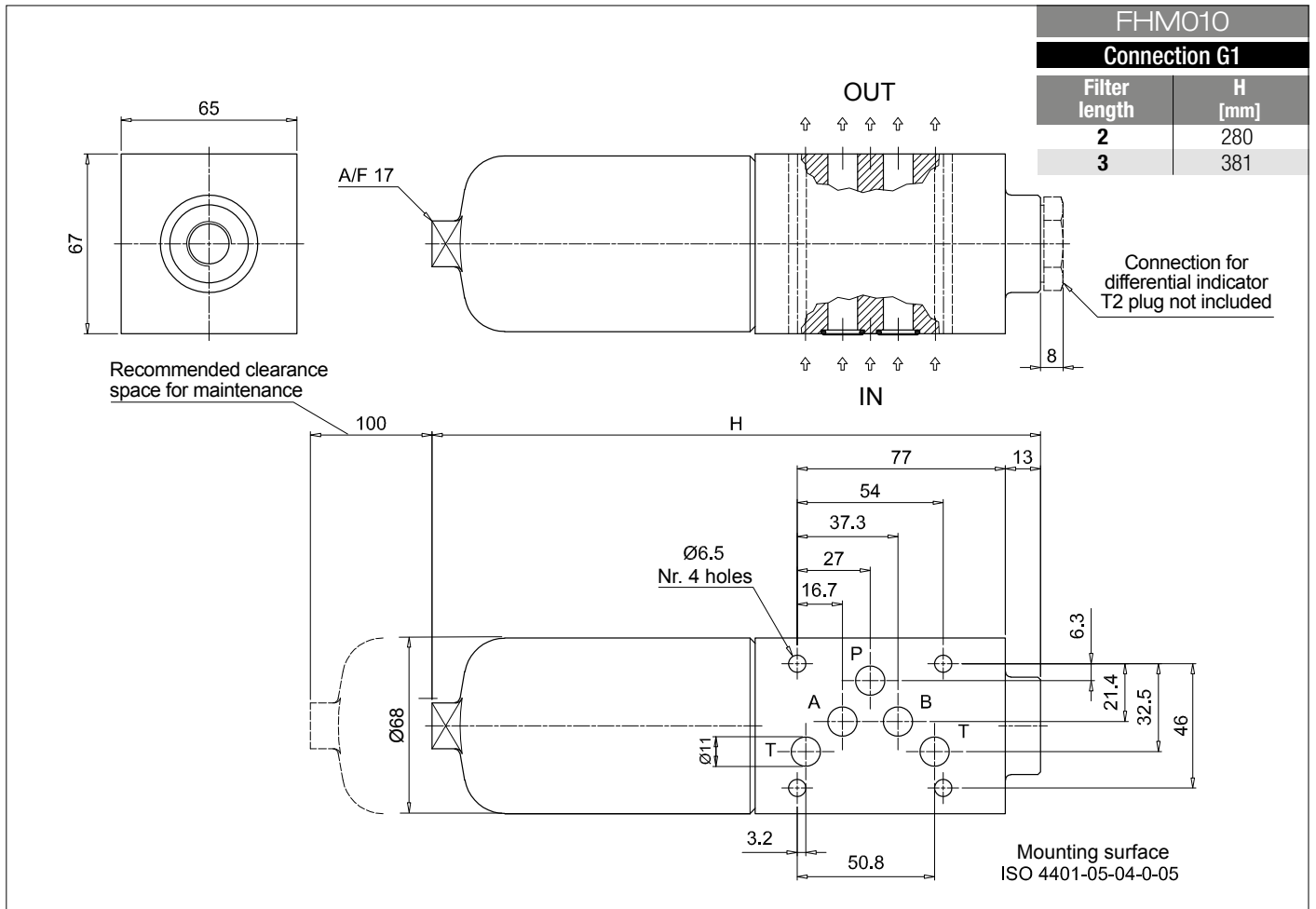
|     |  |
|-----|--|
| DEA | Electrical differential indicator          |
| DEM | Electrical differential indicator          |
| DLA | Electrical / visual differential indicator |
| DLE | Electrical / visual differential indicator |

|     |                                   |
|-----|-----------------------------------|
| DTA | Electrical differential indicator |
| DVA | Visual differential indicator     |
| DVM | Visual differential indicator     |
| T2  | Plug                              |



## Dimensions





# FHM FHM050 - FHM065 - FHM135

Designation & Ordering code

## COMPLETE FILTER

Series and size Configuration example: **FHM135** | **3** | **S** | **A** | **F1** | **A10** | **H** | **P01**

**FHM050** | **FHM065** | **FHM135**

| Length | FHM050 | FHM065 | FHM135 |
|--------|--------|--------|--------|
| 1      | •      | •      | •      |
| 2      | •      | •      | •      |
| 3      | •      | •      | •      |
| 4      | •      | -      | -      |
| 5      | •      | -      | -      |

### Valves

|          |                                     |
|----------|-------------------------------------|
| <b>S</b> | Without bypass                      |
| <b>B</b> | With bypass 6 bar                   |
| <b>T</b> | With check valve, without bypass    |
| <b>D</b> | With check valve, with bypass 6 bar |

### Seals

|          |     |
|----------|-----|
| <b>A</b> | NBR |
| <b>V</b> | FPM |

### Connections

|           |          |
|-----------|----------|
| <b>F1</b> | Manifold |
|-----------|----------|

### Filtration rating (filter media)

|            |                      |       |
|------------|----------------------|-------|
| <b>A03</b> | Inorganic microfiber | 3 µm  |
| <b>A06</b> | Inorganic microfiber | 6 µm  |
| <b>A10</b> | Inorganic microfiber | 10 µm |
| <b>A16</b> | Inorganic microfiber | 16 µm |
| <b>A25</b> | Inorganic microfiber | 25 µm |
| <b>M25</b> | Wire mesh            | 25 µm |

| Element Δp       | Valves: FHM050 |   |   |   | FHM065-135 |   |   |   |
|------------------|----------------|---|---|---|------------|---|---|---|
|                  | S              | B | T | D | S          | B | T | D |
| <b>N</b> 20 bar  | -              | • | - | • | -          | • | - | • |
| <b>H</b> 210 bar | -              | - | - | - | •          | - | • | - |
| <b>S</b> 210 bar | •              | - | • | - | -          | - | - | - |

| Execution  |                    |
|------------|--------------------|
| <b>P01</b> | MP Filtri standard |
| <b>Pxx</b> | Customized         |

## FILTER ELEMENT

Element series and size Configuration example: **HP135** | **3** | **A10** | **A** | **H** | **P01**

**HP050** | **HP065** | **HP135**

| Element length | HP050 | HP065 | HP135 |
|----------------|-------|-------|-------|
| 1              | •     | •     | •     |
| 2              | •     | •     | •     |
| 3              | •     | •     | •     |
| 4              | •     | -     | -     |
| 5              | •     | -     | -     |

### Filtration rating (filter media)

|            |                      |       |
|------------|----------------------|-------|
| <b>A03</b> | Inorganic microfiber | 3 µm  |
| <b>A06</b> | Inorganic microfiber | 6 µm  |
| <b>A10</b> | Inorganic microfiber | 10 µm |
| <b>A16</b> | Inorganic microfiber | 16 µm |
| <b>A25</b> | Inorganic microfiber | 25 µm |
| <b>M25</b> | Wire mesh            | 25 µm |

| Element Δp       | Seals |       |       | Execution          |     |  |
|------------------|-------|-------|-------|--------------------|-----|--|
|                  | HP050 | HP065 | HP135 | P01                | Pxx |  |
| <b>N</b> 20 bar  | •     | •     | •     | MP Filtri standard |     |  |
| <b>H</b> 210 bar | -     | •     | •     | Customized         |     |  |
| <b>S</b> 210 bar | •     | -     | -     |                    |     |  |

| Execution  |                    |
|------------|--------------------|
| <b>P01</b> | MP Filtri standard |
| <b>Pxx</b> | Customized         |

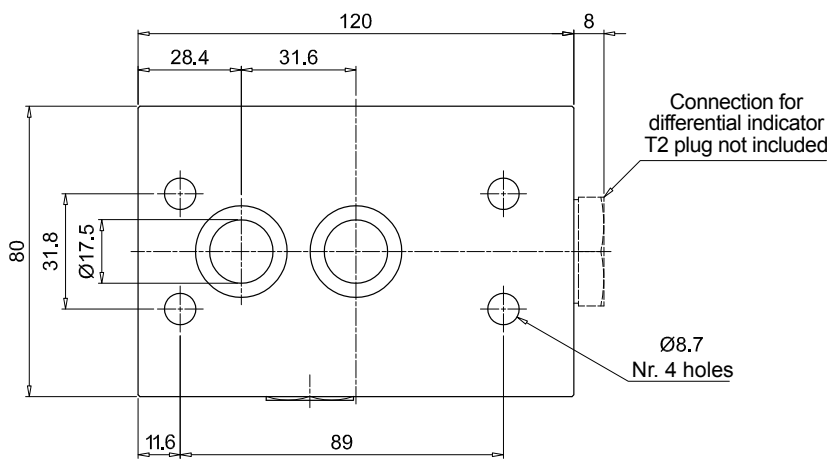
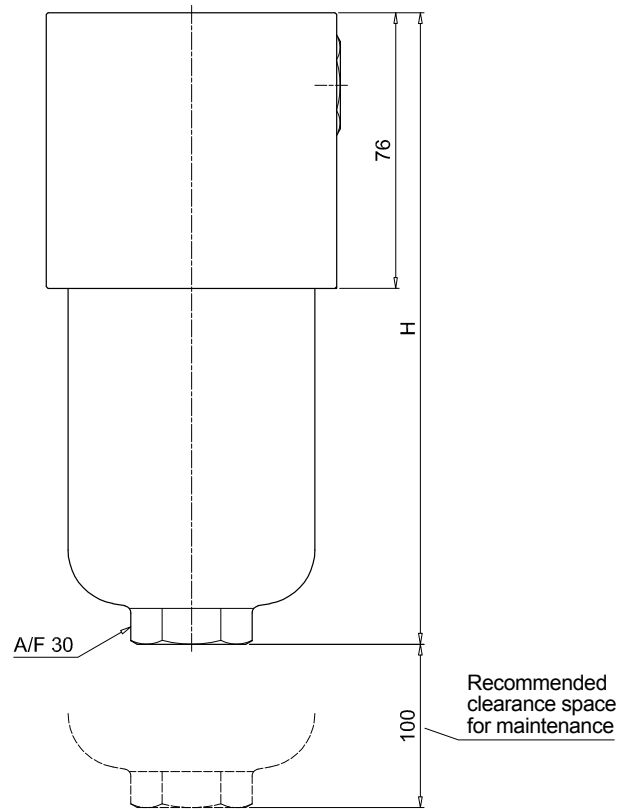
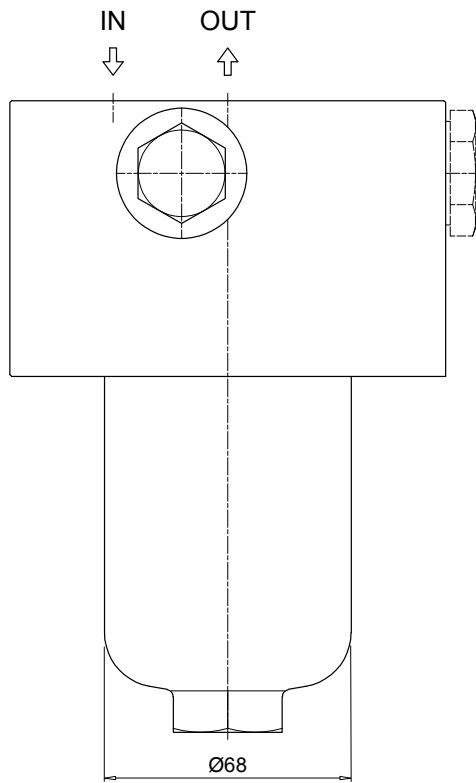
## CLOGGING INDICATORS

See page 622

|            |  |
|------------|--|
| <b>DEA</b> | Electrical differential indicator          |
| <b>DEM</b> | Electrical differential indicator          |
| <b>DLA</b> | Electrical / visual differential indicator |
| <b>DLE</b> | Electrical / visual differential indicator |

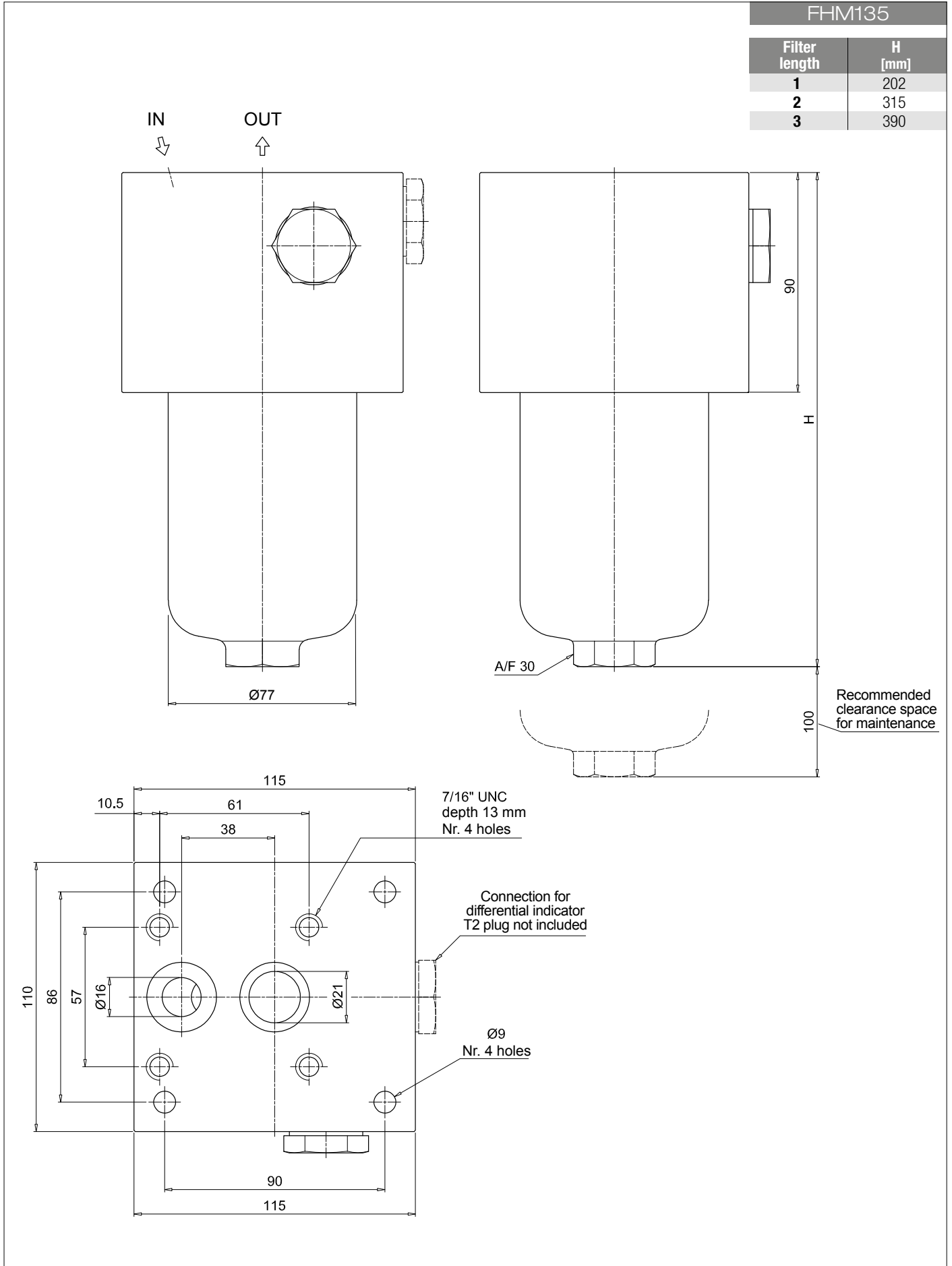
|            |                                   |
|------------|-----------------------------------|
| <b>DTA</b> | Electrical differential indicator |
| <b>DVA</b> | Visual differential indicator     |
| <b>DVM</b> | Visual differential indicator     |
| <b>T2</b>  | Plug                              |

| FHM050        |        | FHM065        |        |
|---------------|--------|---------------|--------|
| Filter length | H [mm] | Filter length | H [mm] |
| <b>1</b>      | 154    | <b>1</b>      | 162    |
| <b>2</b>      | 191    | <b>2</b>      | 193    |
| <b>3</b>      | 233    | <b>3</b>      | 295    |
| <b>4</b>      | 281    |               |        |
| <b>5</b>      | 403    |               |        |



# FHM FHM050 - FHM065 - FHM135

## Dimensions







# FHM FHM320 - FHM500

## Designation & Ordering code

### COMPLETE FILTER

Series and size **FHM320 | FHM500** Configuration example: **FHM320** **4** **D** **A** **F1** **A06** **N** **P01**

| Length | FHM320 | FHM500 |
|--------|--------|--------|
| 1      | •      | •      |
| 2      | •      | •      |
| 3      | •      | •      |
| 4      | •      | •      |
| 5      | -      | •      |

| Valves   |                                     |
|----------|-------------------------------------|
| <b>S</b> | Without bypass                      |
| <b>B</b> | With bypass 6 bar                   |
| <b>T</b> | With check valve, without bypass    |
| <b>D</b> | With check valve, with bypass 6 bar |

| Seals    |     |
|----------|-----|
| <b>A</b> | NBR |
| <b>V</b> | FPM |

| Connections |          |
|-------------|----------|
| <b>F1</b>   | Manifold |

| Filtration rating (filter media) |                      |       |  |
|----------------------------------|----------------------|-------|--|
| <b>A03</b>                       | Inorganic microfiber | 3 µm  |  |
| <b>A06</b>                       | Inorganic microfiber | 6 µm  |  |
| <b>A10</b>                       | Inorganic microfiber | 10 µm |  |
| <b>A16</b>                       | Inorganic microfiber | 16 µm |  |
| <b>A25</b>                       | Inorganic microfiber | 25 µm |  |
| <b>M25</b>                       | Wire mesh            | 25 µm |  |

| Element  | Δp      | Valves: |   |   |   |        |   |   |   | Filter length |   |   |   |   |   |
|----------|---------|---------|---|---|---|--------|---|---|---|---------------|---|---|---|---|---|
|          |         | FHM320  |   |   |   | FHM500 |   |   |   | 1             | 2 | 3 | 4 | 5 |   |
| <b>N</b> | 20 bar  | -       | • | - | • | -      | • | - | • | -             | • | - | • | - | • |
| <b>H</b> | 210 bar | •       | - | • | - | -      | - | - | - | -             | - | - | - | - | - |
| <b>S</b> | 210 bar | -       | - | - | - | •      | - | • | - | -             | - | - | - | - | - |

| Execution  | 1 | 2 | 3 | 4 | 5 |
|------------|---|---|---|---|---|
| <b>P01</b> | • | • | • | • | • |
| <b>P02</b> | - | - | - | - | • |
| <b>Pxx</b> | - | - | - | - | - |

### FILTER ELEMENT

Element series and size **HP320 | HP500** Configuration example: **HP320** **4** **A06** **A** **N** **P01**

| Element length | HP320 | HP500 |
|----------------|-------|-------|
| 1              | •     | •     |
| 2              | •     | •     |
| 3              | •     | •     |
| 4              | •     | •     |
| 5              | -     | •     |

| Filtration rating (filter media) |                      |       |
|----------------------------------|----------------------|-------|
| <b>A03</b>                       | Inorganic microfiber | 3 µm  |
| <b>A06</b>                       | Inorganic microfiber | 6 µm  |
| <b>A10</b>                       | Inorganic microfiber | 10 µm |
| <b>A16</b>                       | Inorganic microfiber | 16 µm |
| <b>A25</b>                       | Inorganic microfiber | 25 µm |
| <b>M25</b>                       | Wire mesh            | 25 µm |

| Seals    | Element Δp | HP320   | HP500 | Execution                     |
|----------|------------|---------|-------|-------------------------------|
| <b>A</b> | NBR        | •       | •     | <b>P01</b> MP Filtri standard |
| <b>V</b> | FPM        | •       | -     | <b>Pxx</b> Customized         |
|          | <b>S</b>   | 210 bar | -     |                               |

### CLOGGING INDICATORS

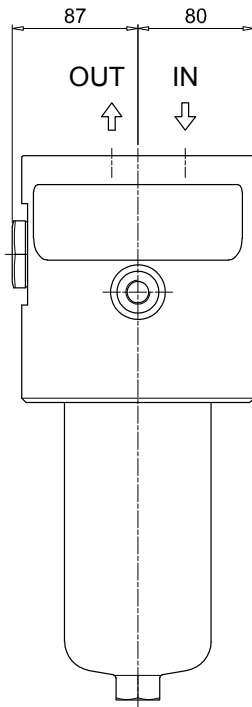
See page 622

|            |  |
|------------|--|
| <b>DEA</b> | Electrical differential indicator          |
| <b>DEM</b> | Electrical differential indicator          |
| <b>DLA</b> | Electrical / visual differential indicator |
| <b>DLE</b> | Electrical / visual differential indicator |

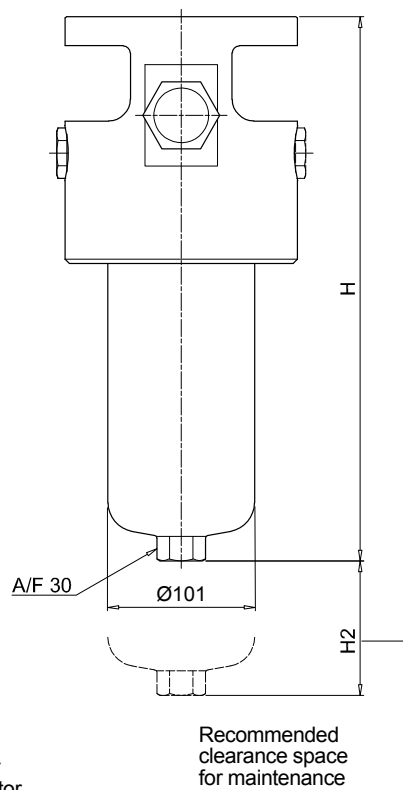
|            |                                   |
|------------|-----------------------------------|
| <b>DTA</b> | Electrical differential indicator |
| <b>DVA</b> | Visual differential indicator     |
| <b>DVM</b> | Visual differential indicator     |
| <b>T2</b>  | Plug                              |

### FHM320

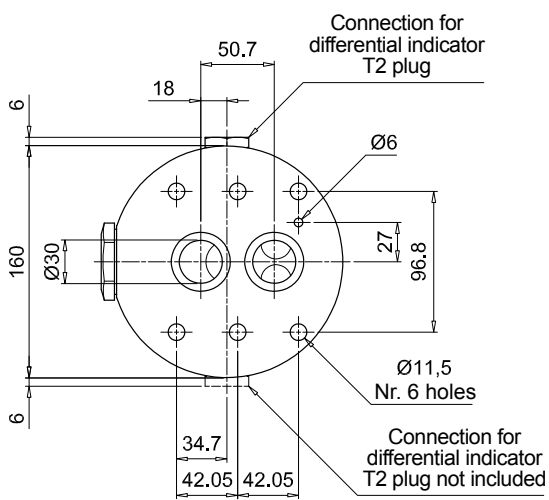
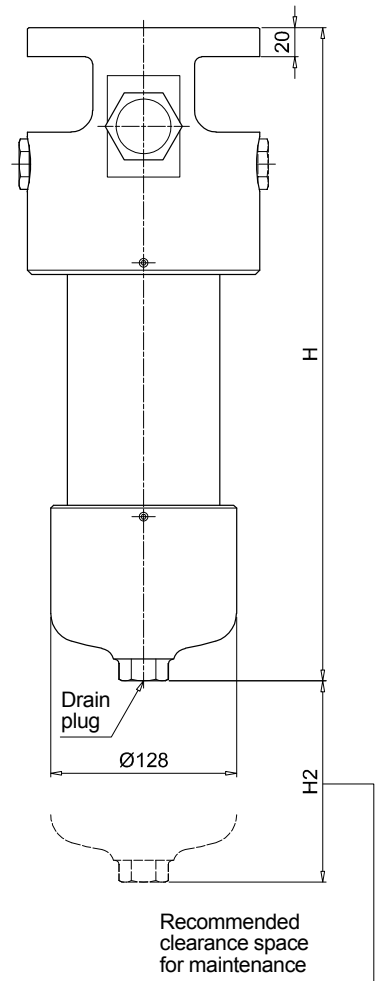
| Filter length | H [mm] | H2 [mm]       |               |
|---------------|--------|---------------|---------------|
|               |        | Execution P01 | Execution P02 |
| 1             | 293    | 150           | -             |
| 2             | 416    | 150           | -             |
| 3             | 548    | 150           | -             |
| 4             | 702    | 150           | 550           |



Length 1 - 2 - 3



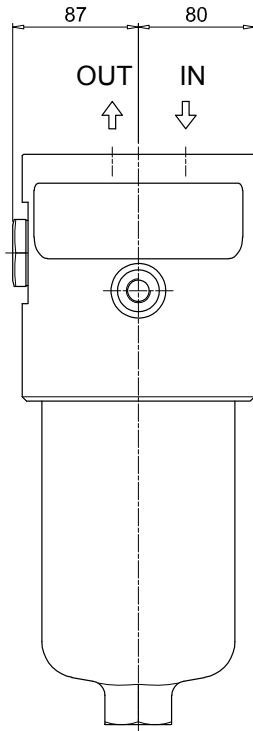
Length 4



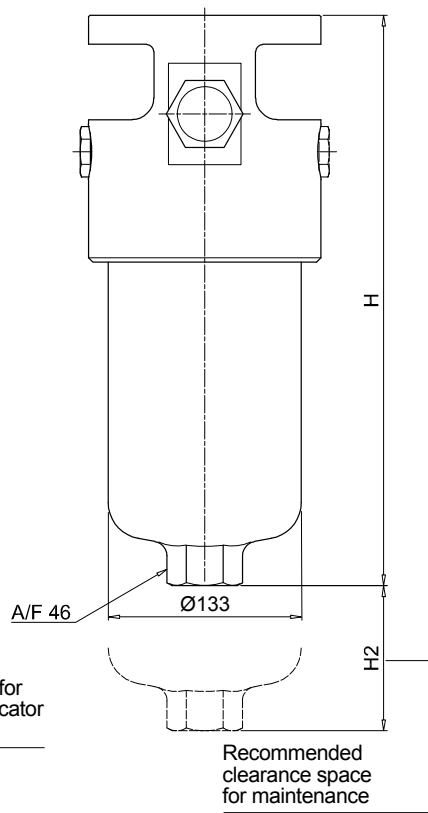
## Dimensions

### FHM500

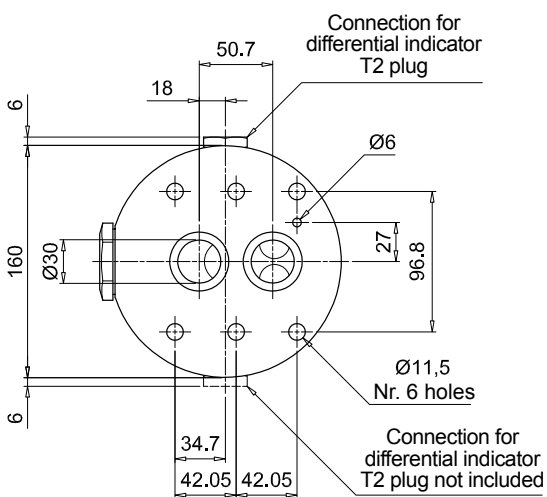
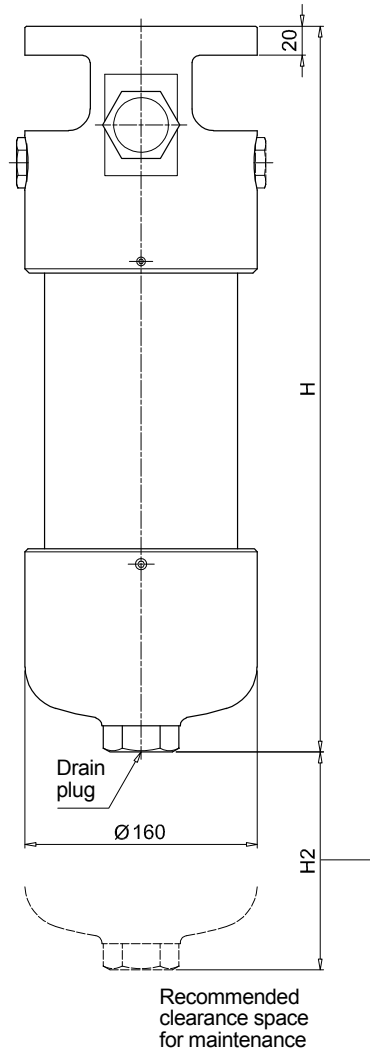
| Filter length | H [mm] | H2 [mm]       |               |
|---------------|--------|---------------|---------------|
|               |        | Execution P01 | Execution P02 |
| <b>1</b>      | 355    | 150           | -             |
| <b>2</b>      | 445    | 150           | -             |
| <b>3</b>      | 521    | 150           | -             |
| <b>4</b>      | 679    | 150           | 480           |
| <b>5</b>      | 845    | 150           | 650           |



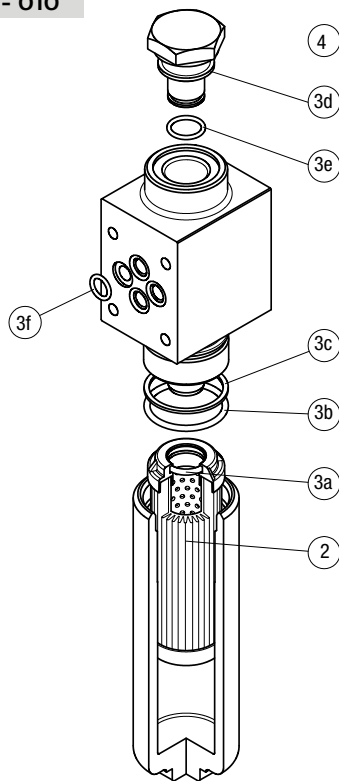
**Length 1 - 2 - 3**



**Length 4 - 5**

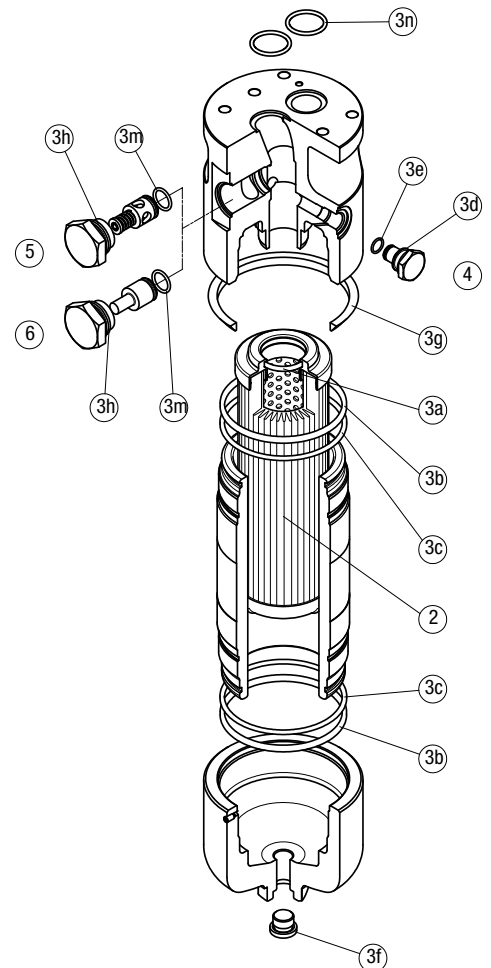


## FHM 006 - 007 - 010



| Item:         | Q.ty: 1 pc.     | Q.ty: 1 pc.          |          | Q.ty: 1 pc.               |     |
|---------------|-----------------|----------------------|----------|---------------------------|-----|
| Filter series | Filter element  | Seal Kit code number |          | Indicator connection plug |     |
| FHM 006       | See order table | NBR                  | FPM      | NBR                       | FPM |
| FHM 006       | See order table | 02050324             | 02050325 |                           |     |
| FHM 007       | See order table | 02050600             | 02050601 | T2H                       | T2V |
| FHM 010       | See order table | 02050320             | 02050321 |                           |     |

## FHM 050 - 065 - 135 - 320 - 500



| Item:         | Q.ty: 1 pc.     | Q.ty: 1 pc.          |          | Q.ty: 1 pc.               |     | Q.ty: 1 pc.     |          | Q.ty: 1 pc.         |          |
|---------------|-----------------|----------------------|----------|---------------------------|-----|-----------------|----------|---------------------|----------|
| Filter series | Filter element  | Seal Kit code number |          | Indicator connection plug |     | Bypass assembly |          | Non-bypass assembly |          |
| FHM 050       | See order table | NBR                  | FPM      | NBR                       | FPM | NBR             | FPM      | NBR                 | FPM      |
| FHM 050       | See order table | 02050410             | 02050411 |                           |     | 02001400        | 02001401 | 02001402            | 02001403 |
| FHM 065       | See order table | 02050268             | 02050279 |                           |     | 02001400        | 02001401 | 02001402            | 02001403 |
| FHM 135       | See order table | 02050271             | 02050282 | T2H                       | T2V | 02001404        | 02001405 | 02001406            | 02001407 |
| FHM 320       | See order table | 02050275             | 02050286 |                           |     | 02001408        | 02001409 | 02001410            | 02001411 |
| FHM 500       | See order table | 02050332             | 02050333 |                           |     | 02001408        | 02001409 | 02001410            | 02001411 |



# FHB series

Maximum working pressure up to 32 MPa (320 bar) - Flow rate up to 485 l/min



## Description

## Technical data

### High Pressure filters

#### Manifold

**Maximum working pressure up to 32 MPa (320 bar)**

**Flow rate up to 485 l/min**

FHB is a range of high pressure filter for protection of sensitive components in high pressure hydraulic systems in the mobile machines. They are directly connected to the side of the manifold, through the proper flanged interface.

#### Available features:

- Manifold connections up to Ø30 mm, for a maximum flow rate of 485 l/min
- Fine filtration rating, to get a good cleanliness level into the system
- Bypass valve, to relieve excessive pressure drop across the filter media
- Check valve, to protect the system against reverse flow
- Low collapse filter element "N", for use with filters provided with bypass valve
- High collapse filter element "H", for use with filters not provided with bypass valve
- High collapse filter element with external support "S", for filter element protection against the back pressure caused by the check valve in filters not provided with the bypass valve
- Visual, electrical and electronic differential clogging indicators

#### Common applications:

Delivery lines, in any high pressure industrial equipment or mobile machines

#### Filter housing materials

- Head: Phosphatized cast iron
- Housing: Phosphatized steel
- Bypass valve: Steel
- Check valve: Steel

#### Pressure

- Working pressure: 32 MPa (320 bar)
- Test pressure: 48 MPa (480 bar)
- Burst pressure: 96 MPa (960 bar)
- Pulse pressure fatigue test: 1 000 000 cycles with pressure from 0 to 32 MPa (320 bar)

#### Bypass valve

- Opening pressure 600 kPa (6 bar) ±10%
- Other opening pressures on request.

#### Δp element type

- Microfibre filter elements - series N: 20 bar
- Microfibre filter elements - series H: 210 bar (not available for FHB050)
- Microfibre filter elements - series S: 210 bar (only for FHB050)
- Wire mesh filter elements - series N: 20 bar
- Fluid flow through the filter element from OUT to IN

#### Seals

- Standard NBR series A
- Optional FPM series V

#### Temperature

From -25 °C to +110 °C

#### Connections

Manifold mounting

#### Note

FHB filters are provided for vertical mounting

## Weights [kg] and volumes [dm<sup>3</sup>]

| Filter series  | Weights [kg] |       |       |       |       | Volumes [dm <sup>3</sup> ] |        |      |      |      |      |      |
|----------------|--------------|-------|-------|-------|-------|----------------------------|--------|------|------|------|------|------|
|                | Length       | 1     | 2     | 3     | 4     | 5                          | Length | 1    | 2    | 3    | 4    | 5    |
| <b>FHB 050</b> |              | 2.61  | 2.98  | 3.39  | 3.86  | 5.04                       |        | 0.21 | 0.30 | 0.40 | 0.52 | 0.81 |
| <b>FHB 065</b> |              | 3.33  | 3.69  | 4.90  | -     | -                          |        | 0.20 | 0.27 | 0.49 | -    | -    |
| <b>FHB 135</b> |              | 6.61  | 8.21  | 9.21  | -     | -                          |        | 0.40 | 0.73 | 0.94 | -    | -    |
| <b>FHB 320</b> |              | 12.95 | 15.08 | 17.37 | 26.77 | -                          |        | 0.91 | 1.63 | 2.40 | 3.59 | -    |



| Filter series  | Length   | Filter element design - N Series |     |     |     |     |     | Filter element design - S Series |     |     |     |     |
|----------------|----------|----------------------------------|-----|-----|-----|-----|-----|----------------------------------|-----|-----|-----|-----|
|                |          | A03                              | A06 | A10 | A16 | A25 | M25 | A03                              | A06 | A10 | A16 | A25 |
| <b>FHB 050</b> | <b>1</b> | 43                               | 42  | 79  | 81  | 101 | 131 | 30                               | 40  | 58  | 60  | 74  |
|                | <b>2</b> | 53                               | 58  | 84  | 93  | 112 | 132 | 46                               | 50  | 76  | 86  | 108 |
|                | <b>3</b> | 67                               | 70  | 94  | 101 | 119 | 133 | 59                               | 62  | 87  | 95  | 115 |
|                | <b>4</b> | 82                               | 87  | 106 | 108 | 122 | 134 | 74                               | 80  | 101 | 103 | 119 |
|                | <b>5</b> | 102                              | 104 | 119 | 122 | 127 | 136 | 90                               | 92  | 105 | 113 | 126 |

| Filter series  | Length   | Filter element design - N Series |     |     |     |     |     | Filter element design - H Series |     |     |     |     |
|----------------|----------|----------------------------------|-----|-----|-----|-----|-----|----------------------------------|-----|-----|-----|-----|
|                |          | A03                              | A06 | A10 | A16 | A25 | M25 | A03                              | A06 | A10 | A16 | A25 |
| <b>FHB 065</b> | <b>1</b> | 25                               | 33  | 55  | 62  | 87  | 133 | 23                               | 25  | 49  | 58  | 81  |
|                | <b>2</b> | 33                               | 51  | 70  | 76  | 101 | 134 | 33                               | 38  | 66  | 75  | 94  |
|                | <b>3</b> | 60                               | 71  | 97  | 103 | 118 | 138 | 60                               | 68  | 95  | 102 | 116 |
| <b>FHB 135</b> | <b>1</b> | 67                               | 72  | 120 | 129 | 177 | 212 | 49                               | 55  | 97  | 100 | 160 |
|                | <b>2</b> | 109                              | 116 | 152 | 154 | 224 | 250 | 90                               | 110 | 137 | 140 | 182 |
|                | <b>3</b> | 153                              | 155 | 201 | 205 | 226 | 253 | 126                              | 142 | 175 | 187 | 207 |
| <b>FHB 320</b> | <b>1</b> | 130                              | 143 | 238 | 286 | 343 | 442 | 110                              | 117 | 192 | 201 | 304 |
|                | <b>2</b> | 259                              | 281 | 391 | 409 | 454 | 468 | 200                              | 230 | 319 | 325 | 392 |
|                | <b>3</b> | 332                              | 368 | 441 | 455 | 463 | 476 | 269                              | 312 | 381 | 389 | 432 |
|                | <b>4</b> | 368                              | 390 | 446 | 462 | 481 | 488 | 311                              | 334 | 388 | 394 | 437 |

### Maximum flow rate for a complete pressure filter with a pressure drop $\Delta p = 1.5$ bar.

The reference fluid has a kinematic viscosity of 30 mm<sup>2</sup>/s (cSt) and a density of 0.86 kg/dm<sup>3</sup>.

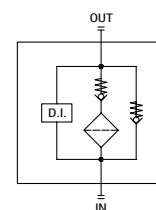
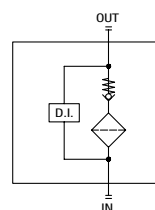
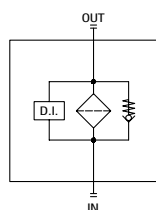
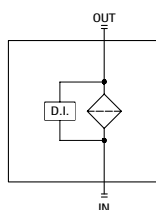
For different pressure drop or fluid viscosity we recommend to use our selection software available on [www.mpfiltri.com](http://www.mpfiltri.com).

You can also calculate the right size using the formulas present on the FILTER SIZING paragraph at the beginning of the full catalogue or at the beginning of the filter family brochure.

Please, contact our Sales Department for further additional information.

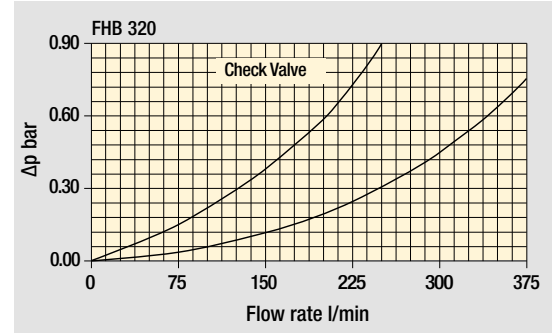
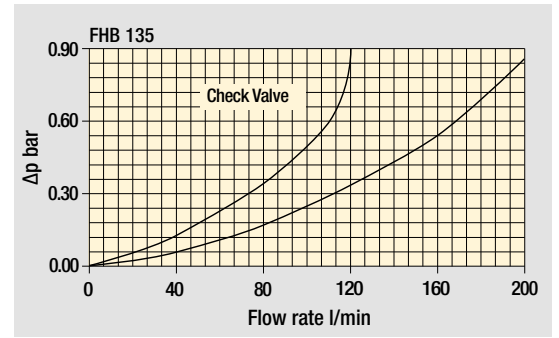
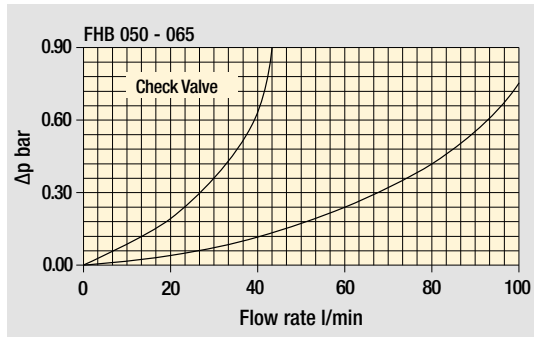
### Hydraulic symbols

| Filter series  | Style S | Style B | Style T | Style D |
|----------------|---------|---------|---------|---------|
| <b>FHB 050</b> | •       | •       | •       | •       |
| <b>FHB 065</b> | •       | •       | •       | •       |
| <b>FHB 135</b> | •       | •       | •       | •       |
| <b>FHB 320</b> | •       | •       | •       | •       |

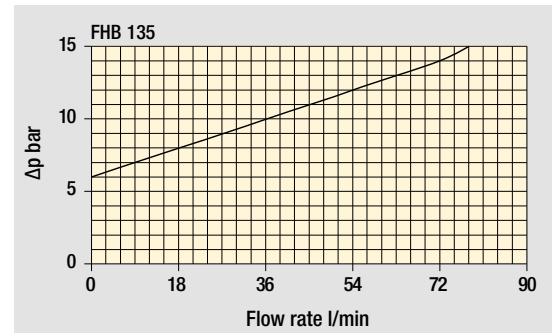
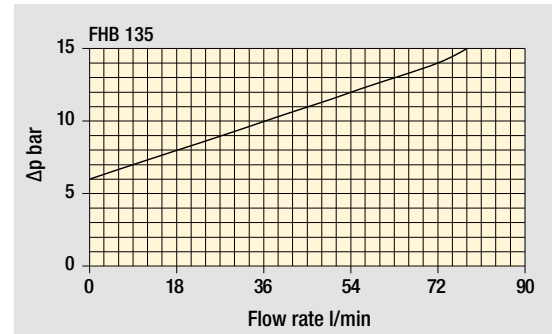
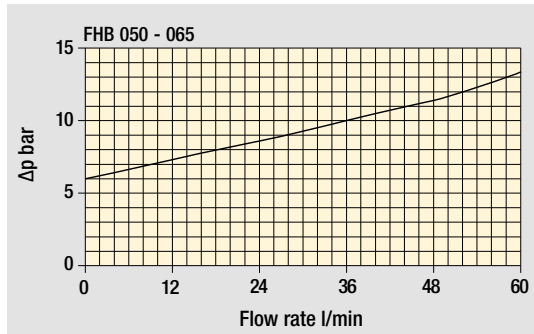


## Pressure drop

Filter housings  $\Delta p$  pressure drop



Bypass valve pressure drop



The curves are plotted using mineral oil with density of  $0.86 \text{ kg/dm}^3$  in compliance with ISO 3968.  $\Delta p$  varies proportionally with density.



## Designation & Ordering code

### COMPLETE FILTER

Configuration example: **FHB050** | **2** | **T** | **A** | **F1** | **A06** | **S** | **P01**

**Series and size**  
**FHB050**

**Length**  
**1** | **2** | **3** | **4** | **5**

**Valves**  
**S** Without bypass  
**B** With bypass 6 bar  
**T** With check valve, without bypass  
**D** With check valve, with bypass 6 bar

**Seals**  
**A** NBR  
**V** FPM

**Connections**  
**F1** Manifold

**Filtration rating (filter media)**

|            |                      |       |
|------------|----------------------|-------|
| <b>A03</b> | Inorganic microfiber | 3 µm  |
| <b>A06</b> | Inorganic microfiber | 6 µm  |
| <b>A10</b> | Inorganic microfiber | 10 µm |
| <b>A16</b> | Inorganic microfiber | 16 µm |
| <b>A25</b> | Inorganic microfiber | 25 µm |
| <b>M25</b> | Wire mesh            | 25 µm |

| Element Δp       | Valves |   |   |   | Execution                     |
|------------------|--------|---|---|---|-------------------------------|
|                  | S      | B | T | D |                               |
| <b>N</b> 20 bar  | -      | • | - | • | <b>P01</b> MP Filtri standard |
| <b>S</b> 210 bar | •      | - | • | - | <b>Pxx</b> Customized         |

### FILTER ELEMENT

Configuration example: **HP050** | **2** | **A06** | **A** | **S** | **P01**

**Element series and size**  
**HP050**

**Element length**  
**1** | **2** | **3** | **4** | **5**

**Filtration rating (filter media)**

|            |                      |       |
|------------|----------------------|-------|
| <b>A03</b> | Inorganic microfiber | 3 µm  |
| <b>A06</b> | Inorganic microfiber | 6 µm  |
| <b>A10</b> | Inorganic microfiber | 10 µm |
| <b>A16</b> | Inorganic microfiber | 16 µm |
| <b>A25</b> | Inorganic microfiber | 25 µm |
| <b>M25</b> | Wire mesh            | 25 µm |

| Seals    |     | Element Δp       | Execution                     |
|----------|-----|------------------|-------------------------------|
| <b>A</b> | NBR | <b>N</b> 20 bar  | <b>P01</b> MP Filtri standard |
| <b>V</b> | FPM | <b>S</b> 210 bar | <b>Pxx</b> Customized         |

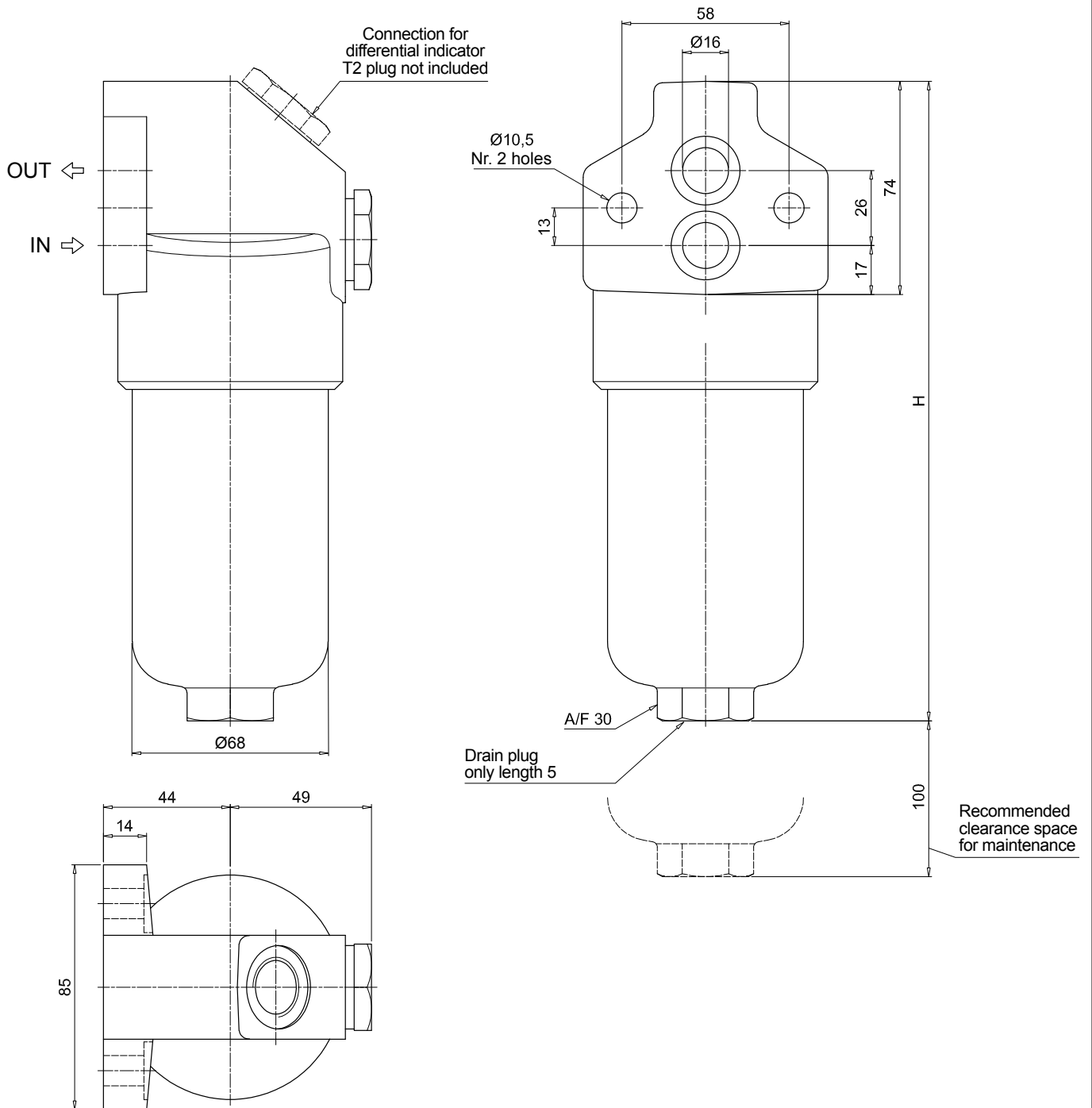
### CLOGGING INDICATORS

See page 622

|            |  |
|------------|--|
| <b>DEA</b> | Electrical differential indicator          |
| <b>DEM</b> | Electrical differential indicator          |
| <b>DLA</b> | Electrical / visual differential indicator |
| <b>DLE</b> | Electrical / visual differential indicator |

|            |                                   |
|------------|-----------------------------------|
| <b>DTA</b> | Electrical differential indicator |
| <b>DVA</b> | Visual differential indicator     |
| <b>DVM</b> | Visual differential indicator     |
| <b>T2</b>  | Plug                              |

| FHB050        |        |
|---------------|--------|
| Filter length | H [mm] |
| 1             | 185    |
| 2             | 222    |
| 3             | 264    |
| 4             | 312    |
| 5             | 434    |



# FHB FHB065 - FHB135 - FHB320

## Designation & Ordering code

### COMPLETE FILTER

Configuration example: **FHB320** **4** **S** **A** **F1** **A06** **H** **P01**

| Series and size | FHB065   FHB135   FHB320 |        |        |
|-----------------|--------------------------|--------|--------|
| Length          | FHB065                   | FHB135 | FHB320 |
| 1               | •                        | •      | •      |
| 2               | •                        | •      | •      |
| 3               | •                        | •      | •      |
| 4               | -                        | -      | •      |

| Valves                                       |
|--|
| <b>S</b> Without bypass                      |
| <b>B</b> With bypass 6 bar                   |
| <b>T</b> With check valve, without bypass    |
| <b>D</b> With check valve, with bypass 6 bar |

| Seals        |
|--------------|
| <b>A</b> NBR |
| <b>V</b> FPM |

| Connections        |
|--------------------|
| <b>F1</b> Manifold |

| Filtration rating (filter media)      |
|---------------------------------------|
| <b>A03</b> Inorganic microfiber 3 µm  |
| <b>A06</b> Inorganic microfiber 6 µm  |
| <b>A10</b> Inorganic microfiber 10 µm |
| <b>A16</b> Inorganic microfiber 16 µm |
| <b>A25</b> Inorganic microfiber 25 µm |
| <b>M25</b> Wire mesh 25 µm            |

| Element Δp       | S | B | T | D |
|------------------|---|---|---|---|
| <b>N</b> 20 bar  | - | • | - | • |
| <b>H</b> 210 bar | • | - | • | - |

| Execution   | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| <b>P01</b> MP Filtri standard                         | • | • | • | • |
| <b>P02</b> Maintenance from the bottom of the housing | - | - | - | • |
| <b>Pxx</b> Customized                                 | • | • | • | • |

### FILTER ELEMENT

Configuration example: **HP320** **4** **A06** **A** **H** **P01**

| Element series and size | HP065   HP135   HP320 |       |       |
|-------------------------|-----------------------|-------|-------|
| Element length          | HP065                 | HP135 | HP320 |
| 1                       | •                     | •     | •     |
| 2                       | •                     | •     | •     |
| 3                       | •                     | •     | •     |
| 4                       | -                     | -     | •     |

| Filtration rating (filter media)      |
|---------------------------------------|
| <b>A03</b> Inorganic microfiber 3 µm  |
| <b>A06</b> Inorganic microfiber 6 µm  |
| <b>A10</b> Inorganic microfiber 10 µm |
| <b>A16</b> Inorganic microfiber 16 µm |
| <b>A25</b> Inorganic microfiber 25 µm |
| <b>M25</b> Wire mesh 25 µm            |

| Seals        |
|--------------|
| <b>A</b> NBR |
| <b>V</b> FPM |

| Element Δp       |
|------------------|
| <b>N</b> 20 bar  |
| <b>H</b> 210 bar |

| Execution                     |
|-------------------------------|
| <b>P01</b> MP Filtri standard |
| <b>Pxx</b> Customized         |

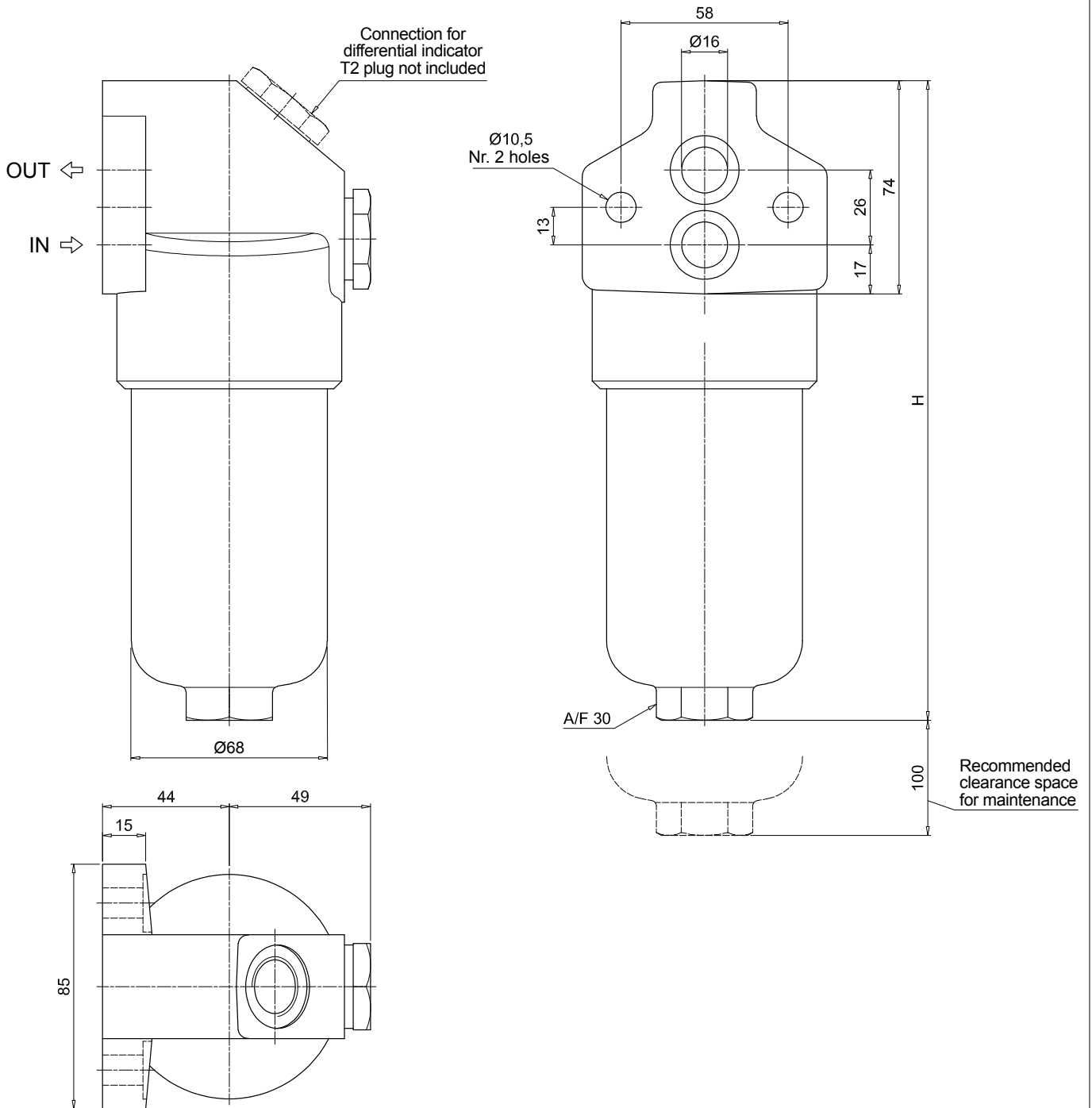
### CLOGGING INDICATORS

See page 622

|   |
|---|
| <b>DEA</b> Electrical differential indicator          |
| <b>DEM</b> Electrical differential indicator          |
| <b>DLA</b> Electrical / visual differential indicator |
| <b>DLE</b> Electrical / visual differential indicator |

|  |
|--|
| <b>DTA</b> Electrical differential indicator |
| <b>DVA</b> Visual differential indicator     |
| <b>DVM</b> Visual differential indicator     |
| <b>T2</b> Plug                               |

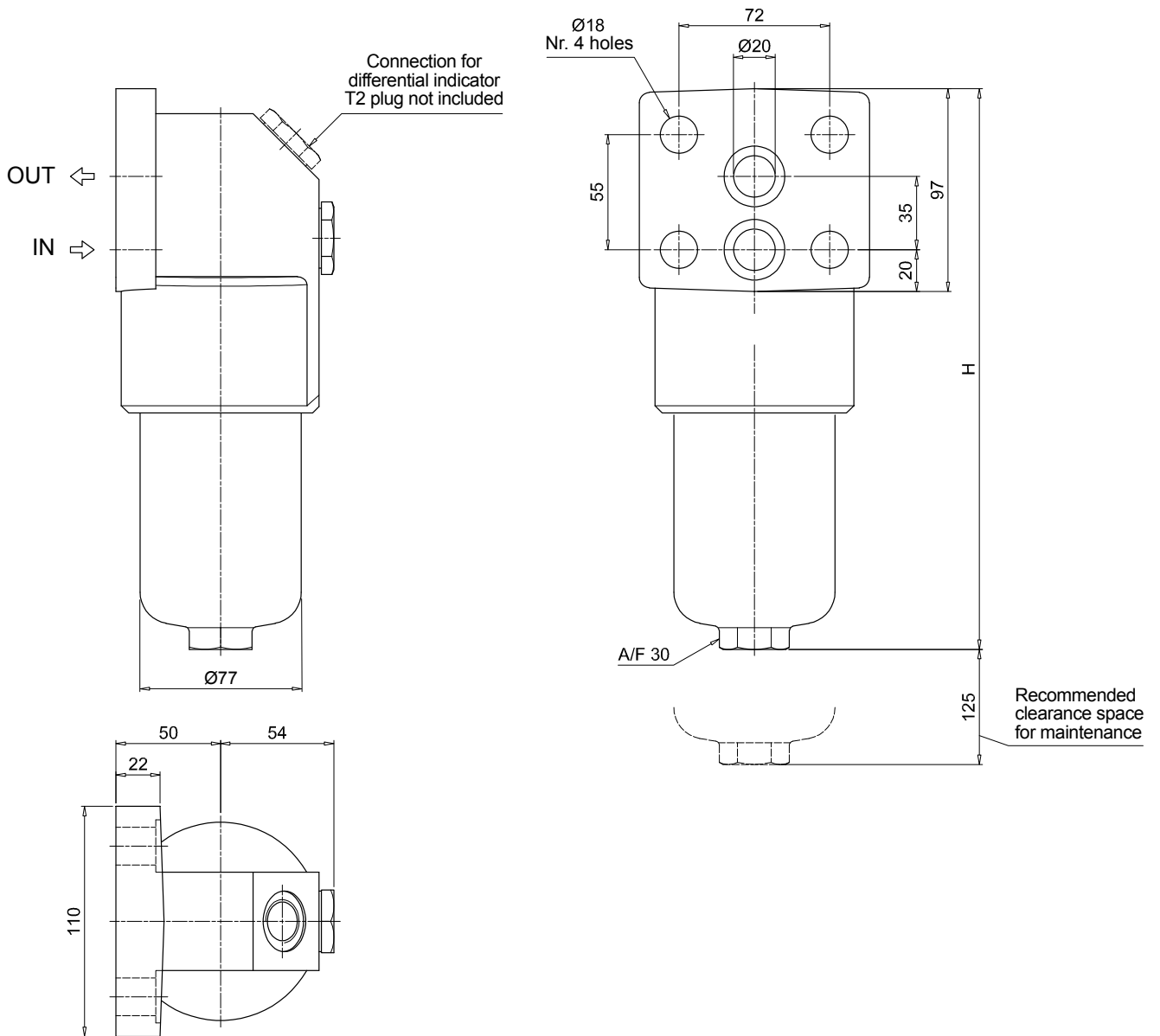
| FHB065        |        |
|---------------|--------|
| Filter length | H [mm] |
| <b>1</b>      | 194    |
| <b>2</b>      | 225    |
| <b>3</b>      | 327    |



## Dimensions

FHB135

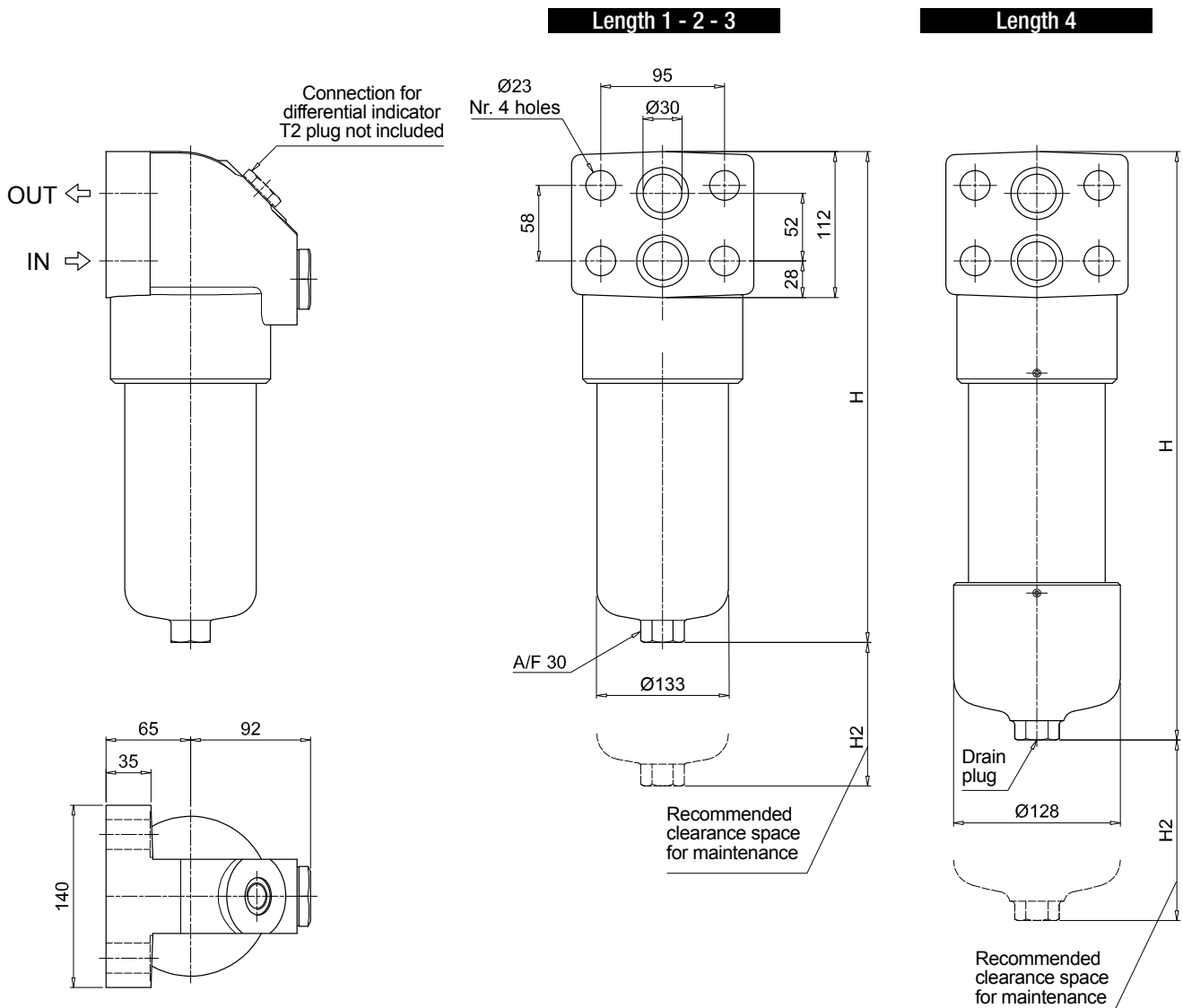
| Filter length | H [mm] |
|---------------|--------|
| <b>1</b>      | 268    |
| <b>2</b>      | 381    |
| <b>3</b>      | 456    |





### FHB320

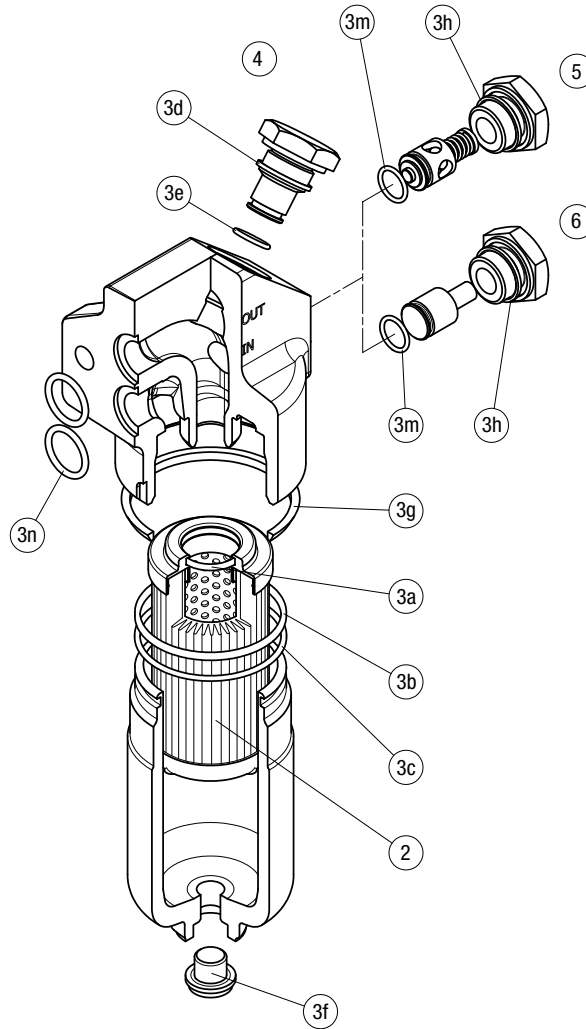
| Filter length | H [mm] | H2 [mm]       |               |
|---------------|--------|---------------|---------------|
|               |        | Execution P01 | Execution P02 |
| 1             | 301    | 150           | -             |
| 2             | 424    | 150           | -             |
| 3             | 556    | 150           | -             |
| 4             | 709    | 150           | 550           |



# FHB SPARE PARTS

Order number for spare parts

FHB 050 - 065 - 135 - 320



| Item:          | Q.ty: 1 pc.     | Q.ty: 1 pc.          |          | Q.ty: 1 pc.               |     | Q.ty: 1 pc.     |          | Q.ty: 1 pc.         |          |
|----------------|-----------------|----------------------|----------|---------------------------|-----|-----------------|----------|---------------------|----------|
| Filter series  | Filter element  | Seal Kit code number |          | Indicator connection plug |     | Bypass assembly |          | Non-bypass assembly |          |
|                |                 | NBR                  | FPM      | NBR                       | FPM | NBR             | FPM      | NBR                 | FPM      |
| <b>FHB 050</b> | See order table | 02050412             | 02050413 | T2H                       | T2V | 02001312        | 02001385 | 02001314            | 02001386 |
| <b>FHB 065</b> |                 | 02050266             | 02050277 |                           |     | 02001312        | 02001385 | 02001314            | 02001386 |
| <b>FHB 135</b> |                 | 02050270             | 02050281 |                           |     | 02001312        | 02001385 | 02001314            | 02001386 |
| <b>FHB 320</b> |                 | 02050273             | 02050284 |                           |     | 02001381        | 02001382 | 02001383            | 02001384 |





# FHF 325 series

Maximum working pressure up to 35 MPa (350 bar) - Flow rate up to 550 l/min

Filter housing according to SAE J2066 for HF4 filter elements



# FHF 325 GENERAL INFORMATION

## Filter housing according to SAE J2066 for HF4 filter elements

### Description

#### High Pressure filters

#### Manifold

**Maximum working pressure up to 35 MPa (350 bar)**

**Flow rate up to 550 l/min**

FHF is a range of high pressure filter for protection of sensitive components in high pressure hydraulic systems in the mobile machines. They are directly connected to the lines of the system through the hydraulic fittings or the proper flanged interface.

#### Available features:

- 1 1/2" female threaded connections, 1 1/2" flanged connections and manifold connections up to 1 1/2", for a maximum flow rate of 550 l/min
- Base-mounting design, for ease of the replacement of the filter element
- Filter element designed in accordance with SAE J2066 HF4 regulation
- Fine filtration rating, to get a good cleanliness level into the system
- Bypass valve, to relieve excessive pressure drop across the filter media
- Low collapse filter element "N", for use with filters provided with bypass valve
- Visual, electrical and electronic differential clogging indicators

#### Common applications:

Delivery lines, in any high pressure industrial equipment

### Technical data

#### Filter housing materials

- Head: Phosphatized cast iron
- Housing: Phosphatized steel
- Cover: Cast iron (chemical heat treatment)
- Bypass valve: Brass - Steel

#### Pressure

- Working pressure: 35 MPa (350 bar)
- Test pressure: 52.5 MPa (525 bar)
- Burst pressure: 105 MPa (1050 bar)
- Pulse pressure fatigue test: 1 000 000 cycles with pressure from 0 to 35 MPa (350 bar)

#### Bypass valve

- Opening pressure 600 kPa (6 bar)  $\pm 10\%$
- Other opening pressures on request.

#### $\Delta p$ element type

- Microfibre filter elements - series N: 20 bar
- Wire mesh filter elements - series N: 20 bar
- Fluid flow through the filter element from OUT to IN

#### Seals

- Standard NBR series A
- Optional FPM series V

#### Temperature

From -25 °C to +110 °C

#### Connections

- FHF 325: In-line threaded connection
- FHF 325: In-line flanged connection
- FHF 325: Manifold mounting

#### Note

FHF filters are provided for vertical mounting

### Weights [kg] and volumes [dm<sup>3</sup>]

| Filter series  | Weights [kg] |       |       | Volumes [dm <sup>3</sup> ] |        |      |      |      |
|----------------|--------------|-------|-------|----------------------------|--------|------|------|------|
|                | Length       | 1     | 2     | 3                          | Length | 1    | 2    | 3    |
| <b>FHF 325</b> |              | 23.90 | 32.68 | 41.47                      |        | 3.50 | 5.80 | 8.11 |

# GENERAL INFORMATION FHF 325

Filter housing according to SAE J2066 for HF4 filter elements

FILTER ASSEMBLY SIZING  
Flow rates [l/min]

| Filter series | Length | Filter element design - N Series |     |     |     |     |     |
|---------------|--------|----------------------------------|-----|-----|-----|-----|-----|
|               |        | A03                              | A06 | A10 | A16 | A25 | M25 |
| FHF 325       | 1      | 302                              | 339 | 348 | 419 | 500 | 556 |
|               | 2      | 401                              | 424 | 434 | 457 | 505 | 557 |
|               | 3      | 416                              | 451 | 460 | 469 | 510 | 559 |

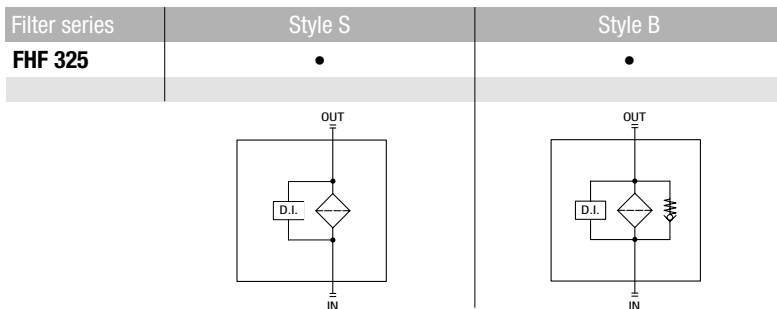
## Maximum flow rate for a complete pressure filter with a pressure drop $\Delta p = 1.5$ bar.

The reference fluid has a kinematic viscosity of 30 mm<sup>2</sup>/s (cSt) and a density of 0.86 kg/dm<sup>3</sup>.

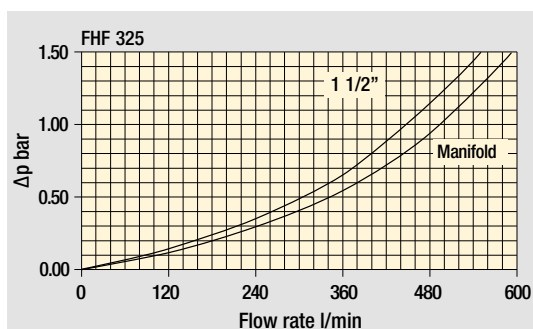
For different pressure drop or fluid viscosity we recommend to use our selection software available on [www.mpfiltri.com](http://www.mpfiltri.com).

You can also calculate the right size using the formulas present on the FILTER SIZING paragraph at the beginning of the full catalogue or at the beginning of the filter family brochure. Please, contact our Sales Department for further additional information.

## Hydraulic symbols



## Pressure drop Filter housings $\Delta p$ pressure drop



The curves are plotted using mineral oil with density of 0.86 kg/dm<sup>3</sup> in compliance with ISO 3968.  $\Delta p$  varies proportionally with density.

# FHF 325

## Designation & Ordering code

### COMPLETE FILTER

Configuration example: **FHF325** **2** **S** **A** **H** **7** **A10** **N** **P01**

**Series and size**  
**FHF325**

**Length**  
**1** | **2** | **3** |

**Valves**  
**S** Without bypass  
**B** With bypass 6 bar

**Seals**  
**A** NBR  
**V** FPM

**Connections**  
**A** G 1 1/2"  
**B** 1 1/2" NPT  
**C** SAE 24 - 1 7/8" - 12 UN  
**G** 1 1/2" SAE 6000 psi/M  
**H** 1 1/2" SAE 6000 psi/UNC  
**M** Manifold ø1.38"  
**N** Manifold ø1.50"

**Connection for differential indicator**  
**7** With two connections plugged on both sides

**Filtration rating (filter media)**

|            |                      |       |
|------------|----------------------|-------|
| <b>A03</b> | Inorganic microfiber | 3 µm  |
| <b>A06</b> | Inorganic microfiber | 6 µm  |
| <b>A10</b> | Inorganic microfiber | 10 µm |
| <b>A16</b> | Inorganic microfiber | 16 µm |
| <b>A25</b> | Inorganic microfiber | 25 µm |
| <b>M25</b> | Wire mesh            | 25 µm |

**Element Δp**  
**N** 20 bar

**Execution**  
**P01** MP Filtri standard  
**Pxx** Customized

### FILTER ELEMENT

Configuration example: **HF325** **2** **A10** **A** **N** **P01**

**Element series and size**  
**HF325**

**Element length**  
**1** | **2** | **3** |

**Filtration rating (filter media)**

|            |                      |       |
|------------|----------------------|-------|
| <b>A03</b> | Inorganic microfiber | 3 µm  |
| <b>A06</b> | Inorganic microfiber | 6 µm  |
| <b>A10</b> | Inorganic microfiber | 10 µm |
| <b>A16</b> | Inorganic microfiber | 16 µm |
| <b>A25</b> | Inorganic microfiber | 25 µm |
| <b>M25</b> | Wire mesh            | 25 µm |

**Seals**  
**A** NBR  
**V** FPM

**Element Δp**  
**N** 20 bar

**Execution**  
**P01** MP Filtri standard  
**Pxx** Customized

### CLOGGING INDICATORS

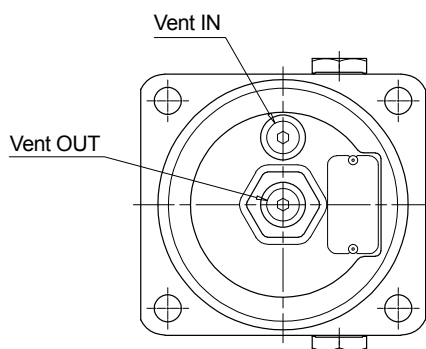
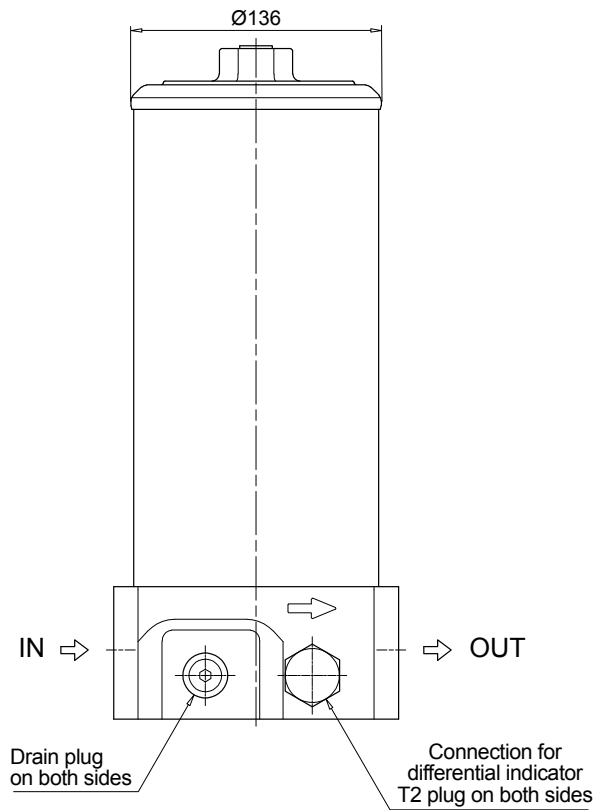
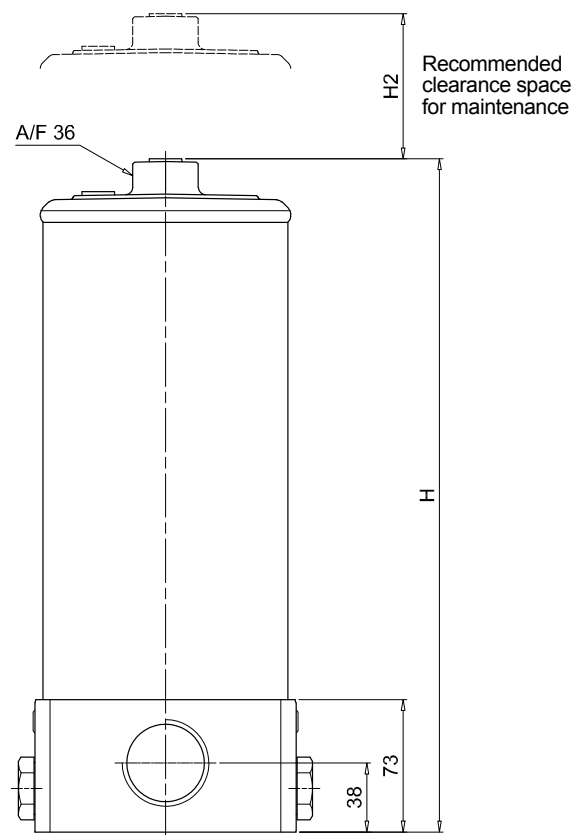
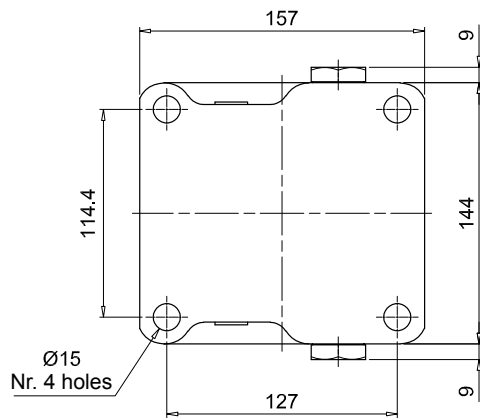
See page 622

|            |  |
|------------|--|
| <b>DEA</b> | Electrical differential indicator          |
| <b>DEM</b> | Electrical differential indicator          |
| <b>DLA</b> | Electrical / visual differential indicator |
| <b>DLE</b> | Electrical / visual differential indicator |

|            |                                   |
|------------|-----------------------------------|
| <b>DTA</b> | Electrical differential indicator |
| <b>DVA</b> | Visual differential indicator     |
| <b>DVM</b> | Visual differential indicator     |
| <b>T2</b>  | Plug                              |



| FHF325               |        |         |
|----------------------|--------|---------|
| Connection A - B - C |        |         |
| Filter length        | H [mm] | H2 [mm] |
| 1                    | 452    | 250     |
| 2                    | 690    | 485     |
| 3                    | 928    | 725     |



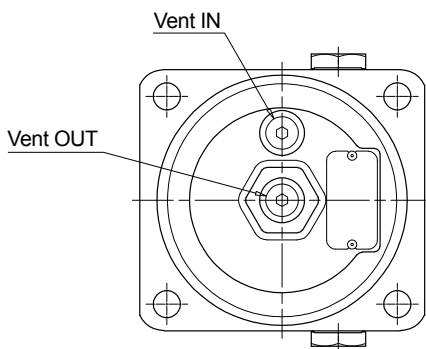
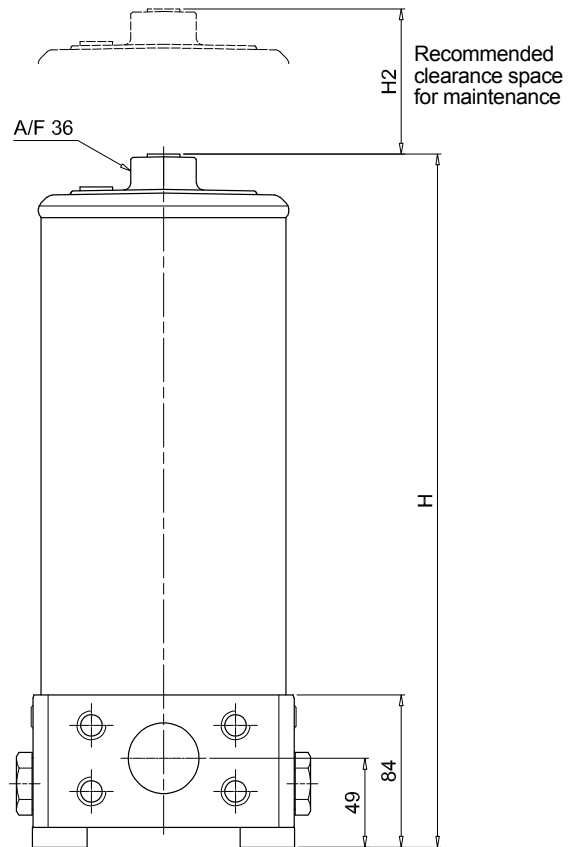
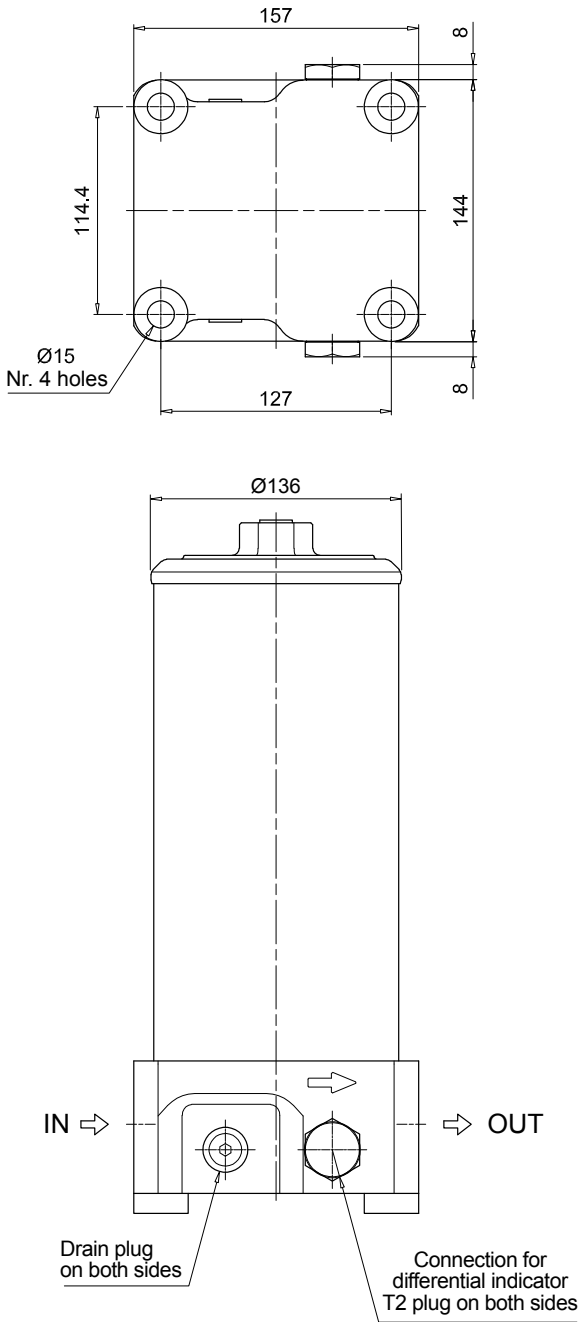
# FHF 325

## Dimensions

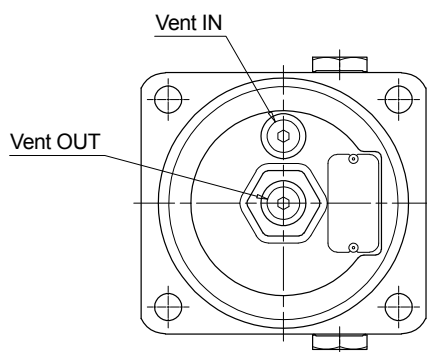
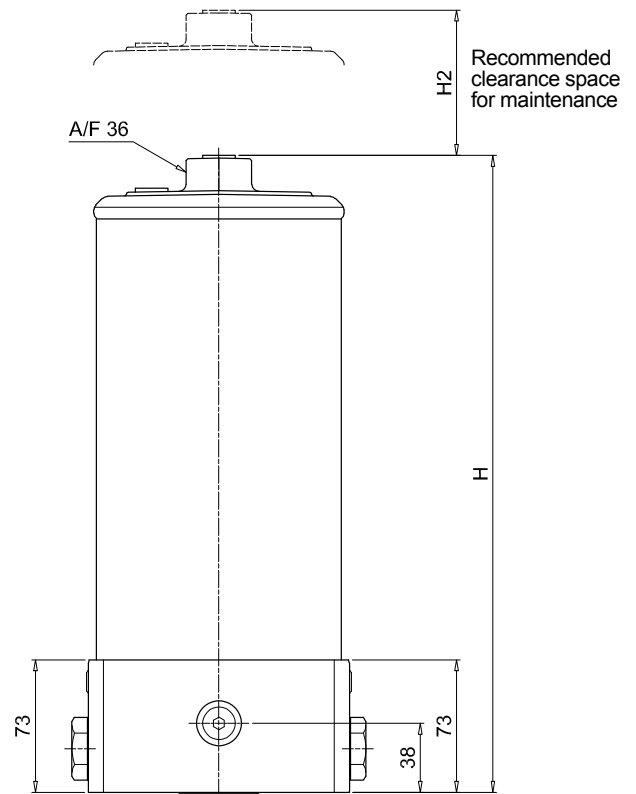
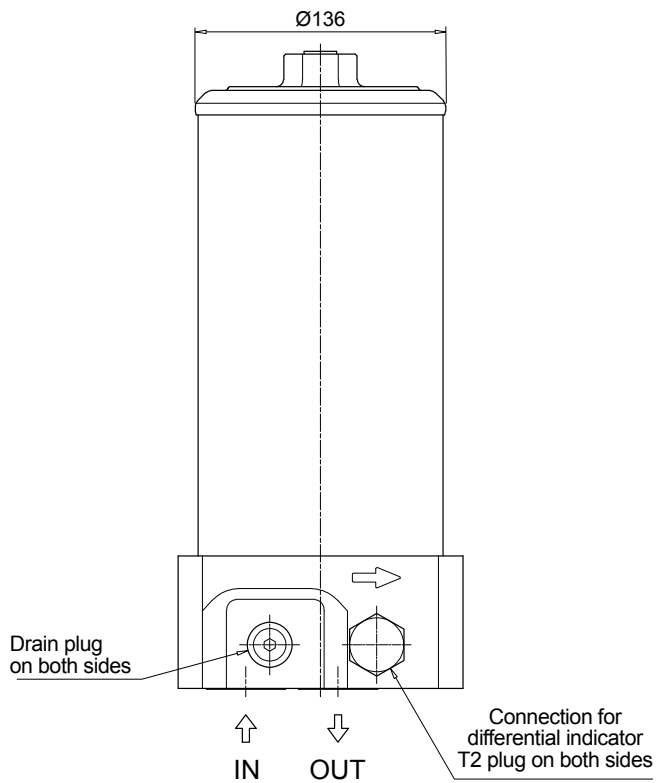
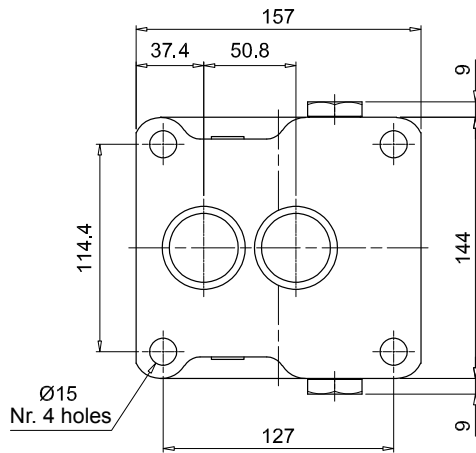
FHF325

Connection G - H

| Filter length | H [mm] | H2 [mm] |
|---------------|--------|---------|
| <b>1</b>      | 463    | 250     |
| <b>2</b>      | 701    | 485     |
| <b>3</b>      | 939    | 725     |



| FHF325           |        |         |
|------------------|--------|---------|
| Connection M - N |        |         |
| Filter length    | H [mm] | H2 [mm] |
| <b>1</b>         | 452    | 250     |
| <b>2</b>         | 690    | 485     |
| <b>3</b>         | 928    | 725     |

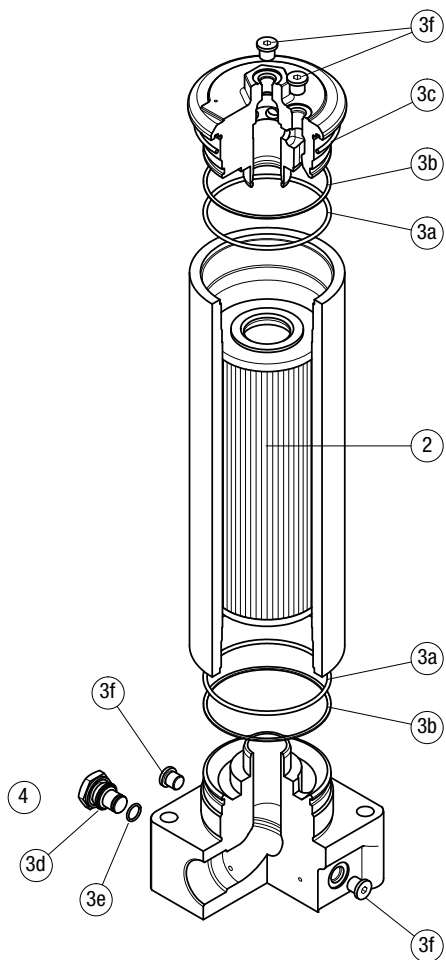


# FHF 325 SPARE PARTS

Filter housing according to SAE J2066 for HF4 filter elements

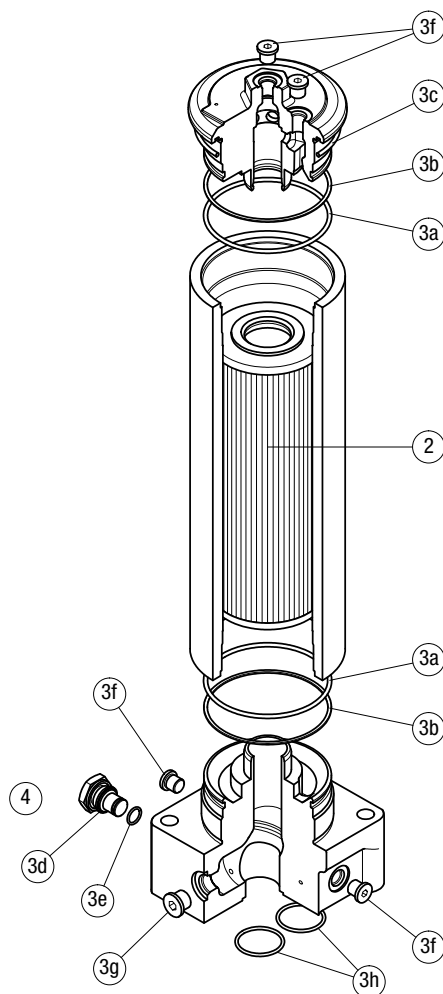
Order number for spare parts

**FHF 325**  
Connections  
A - B - C - G - H



| Item:                              | Q.ty: 1 pc.     | Q.ty: 1 pc.          | Q.ty: 2 pc.               |     |     |
|------------------------------------|-----------------|----------------------|---------------------------|-----|-----|
| Filter series                      | Filter element  | Seal Kit code number | Indicator connection plug |     |     |
|                                    |                 | NBR                  | FPM                       | NBR | FPM |
| <b>FHF 325</b><br><b>A-B-C-G-H</b> | See order table | 02050588             | 02050589                  | T2H | T2V |

**FHF 325**  
Connections  
M - N



| Item:                        | Q.ty: 1 pc.     | Q.ty: 1 pc.          | Q.ty: 2 pc.               |     |     |
|------------------------------|-----------------|----------------------|---------------------------|-----|-----|
| Filter series                | Filter element  | Seal Kit code number | Indicator connection plug |     |     |
|                              |                 | NBR                  | FPM                       | NBR | FPM |
| <b>FHF 325</b><br><b>M-N</b> | See order table | 02050590             | 02050591                  | T2H | T2V |





# FHD series

Maximum working pressure up to 35 MPa (350 bar) - Flow rate up to 250 l/min



### High Pressure filters

#### Duplex

**Maximum working pressure up to 35 MPa (350 bar)**

**Flow rate up to 250 l/min**

FHD is a range of high pressure duplex filter with integrated changeover function to allow the filter element replacement without the system shut-down.

They are directly connected to the lines of the system through the hydraulic fittings.

#### Available features:

- Female threaded connections up to 1 1/4" and flanged connections up to 1 1/2", for a maximum flow rate of 345 l/min
- Fine filtration rating, to get a good cleanliness level into the system
- Balancing valve, available for FHD051, FHD326 and FHD333, to equalize the housing pressure before the switch.
- Bypass valve, to relieve excessive pressure drop across the filter media
- Vent ports, to avoid air trapped into the filter going into the system
- Drain ports, to remove the fluid from the housing prior the maintenance work
- Low collapse filter element "N", for use with filters provided with bypass valve
- High collapse filter element "H", for use with filters not provided with bypass valve
- Low collapse filter element with external support "R", for filter element protection against the back pressure caused by the check valve or the reverse flow in filters provided with the bypass valve
- High collapse filter element with external support "S", for filter element protection against the back pressure caused by the check valve or the reverse flow in filters not provided with the bypass valve
- Visual, electrical and electronic differential clogging indicators

#### Common applications:

- System where shut-down causes high costs
- System where shut-down causes safety issues

#### Filter housing materials

- Head: Phosphatized cast iron
- Housing: Phosphatized steel
- Bypass valve: Steel

#### Pressure

- Test pressure: 52.5 MPa (525 bar)
- Burst pressure: 105 MPa (1050 bar)
- Pulse pressure fatigue test: 1 000 000 cycles with pressure from 0 to 35 MPa (350 bar)

#### Bypass valve

- Opening pressure 600 kPa (6 bar) ±10%
- Other opening pressures on request.

#### Δp element type

- Microfibre filter elements - series N: 20 bar
- Microfibre filter elements - series R: 20 bar (not available for FHD 021)
- Microfibre filter elements - series H: 210 bar (only for FHD 021)
- Microfibre filter elements - series S: 210 bar (not available for FHD 021)
- Wire mesh filter elements - series N: 20 bar
- Fluid flow through the filter element from OUT to IN

#### Seals

- Standard NBR series A
- Optional FPM series V

#### Temperature

From -25 °C to +110 °C

#### Connections

In-line Inlet/Outlet 90°

#### Note

FHD filters are provided for vertical mounting

## Weights [kg] and volumes [dm<sup>3</sup>]

| Filter series  | Weights [kg] |      |      |      |      |   | Volumes [dm <sup>3</sup> ] |      |      |      |      |   |
|----------------|--------------|------|------|------|------|---|----------------------------|------|------|------|------|---|
|                | Length       | 1    | 2    | 3    | 4    | 5 | Length                     | 1    | 2    | 3    | 4    | 5 |
| <b>FHD 021</b> | -            | 8.0  | 9.0  | 9.9  | -    | - | -                          | 0.06 | 0.12 | 0.22 | -    | - |
| <b>FHD 051</b> | -            | 16.9 | 17.5 | 18.5 | 19.8 | - | -                          | 0.31 | 0.41 | 0.53 | 0.83 | - |
| <b>FHD 326</b> | 43.0         | 50.0 | 54.0 | -    | -    | - | 0.88                       | 1.60 | 2.37 | -    | -    | - |
| <b>FHD 333</b> | -            | 74.0 | 79.0 | 98.0 | -    | - | -                          | 1.75 | 2.52 | 3.35 | -    | - |



| Filter series  | Length   | Filter element design - H Series |     |     |     |     |     |
|----------------|----------|----------------------------------|-----|-----|-----|-----|-----|
|                |          | A03                              | A06 | A10 | A16 | A25 | M25 |
| <b>FHD 021</b> | <b>2</b> | 6                                | 8   | 14  | 16  | 19  | 26  |
|                | <b>3</b> | 10                               | 12  | 18  | 20  | 22  | 27  |
|                | <b>4</b> | 13                               | 16  | 21  | 22  | 24  | 27  |

| Filter series  | Length   | Filter element design - R Series |     |     |     |     | N Series | Filter element design - S Series |     |     |     |     |
|----------------|----------|----------------------------------|-----|-----|-----|-----|----------|----------------------------------|-----|-----|-----|-----|
|                |          | A03                              | A06 | A10 | A16 | A25 |          | M25                              | A03 | A06 | A10 | A16 |
| <b>FHD 051</b> | <b>2</b> | 39                               | 41  | 51  | 54  | 59  | 64       | 35                               | 37  | 48  | 51  | 58  |
|                | <b>3</b> | 45                               | 46  | 54  | 56  | 61  | 65       | 41                               | 43  | 52  | 54  | 60  |
|                | <b>4</b> | 50                               | 52  | 58  | 58  | 62  | 65       | 47                               | 49  | 56  | 56  | 61  |
|                | <b>5</b> | 56                               | 57  | 61  | 62  | 63  | 65       | 53                               | 53  | 57  | 59  | 63  |
| <b>FHD 326</b> | <b>1</b> | 93                               | 99  | 131 | 142 | 154 | 171      | 83                               | 87  | 117 | 120 | 146 |
|                | <b>2</b> | 136                              | 141 | 163 | 166 | 173 | 176      | 119                              | 128 | 149 | 151 | 163 |
|                | <b>3</b> | 152                              | 159 | 171 | 174 | 175 | 177      | 139                              | 148 | 161 | 163 | 170 |
| <b>FHD 333</b> | <b>2</b> | 175                              | 184 | 224 | 230 | 245 | 249      | 147                              | 162 | 199 | 201 | 225 |
|                | <b>3</b> | 204                              | 217 | 241 | 245 | 247 | 252      | 179                              | 196 | 221 | 224 | 238 |
|                | <b>4</b> | 216                              | 224 | 242 | 247 | 253 | 255      | 196                              | 204 | 223 | 225 | 239 |

### Maximum flow rate for a complete pressure filter with a pressure drop $\Delta p = 1.5$ bar.

The reference fluid has a kinematic viscosity of 30 mm<sup>2</sup>/s (cSt) and a density of 0.86 kg/dm<sup>3</sup>.

For different pressure drop or fluid viscosity we recommend to use our selection software available on [www.mpfiltri.com](http://www.mpfiltri.com).

You can also calculate the right size using the formulas present on the FILTER SIZING paragraph at the beginning of the full catalogue or at the beginning of the filter family brochure.

Please, contact our Sales Department for further additional information.

## Hydraulic symbols

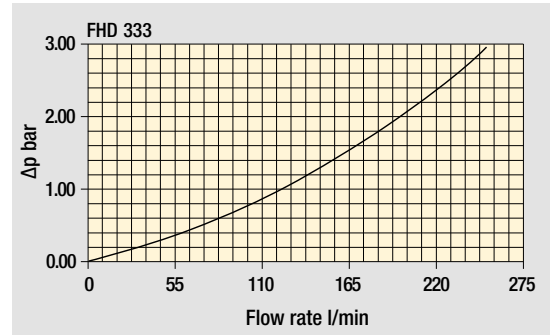
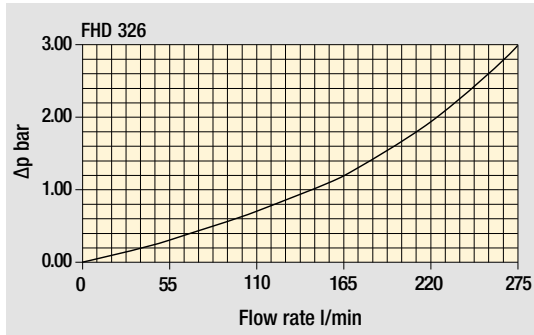
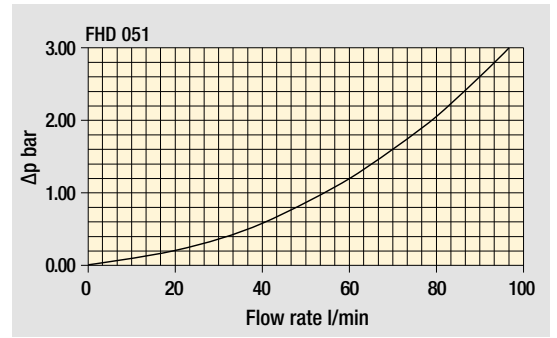
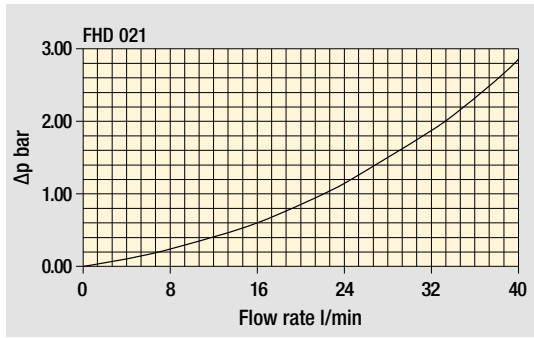
| Filter series  | Style S | Style B | Style B |
|----------------|---------|---------|---------|
| <b>FHD 021</b> | •       | -       | -       |
| <b>FHD 051</b> | •       | -       | -       |
| <b>FHD 326</b> | •       | -       | •       |
| <b>FHD 333</b> | •       | -       | •       |

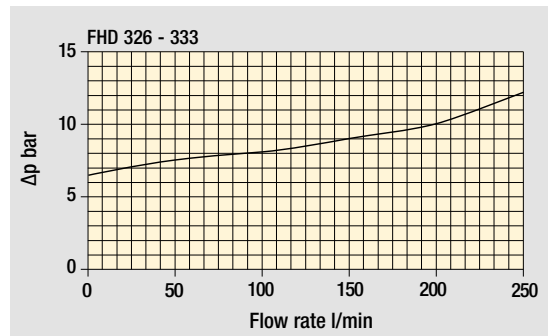
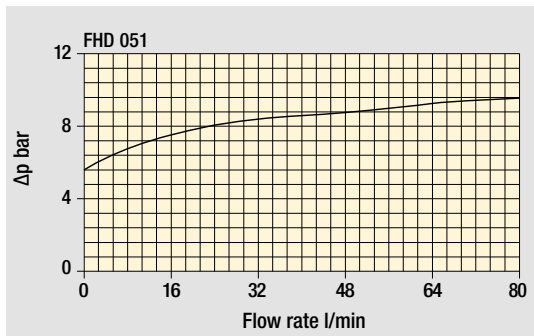
|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

## Pressure drop

Filter housings  $\Delta p$  pressure drop



Bypass valve pressure drop



The curves are plotted using mineral oil with density of  $0.86 \text{ kg/dm}^3$  in compliance with ISO 3968.  $\Delta p$  varies proportionally with density.



## Designation & Ordering code

### COMPLETE FILTER

|   |  |            |            |                               |  |  |  |  |
|---|--|------------|------------|-------------------------------|--|--|--|--|
| <b>Series and size</b><br><b>FHD021</b>   | Configuration example: <b>FHD021</b>   <b>4</b>   <b>S</b>   <b>A</b>   <b>G1</b>   <b>A06</b>   <b>H</b>   <b>P01</b> |            |            |                               |  |  |  |  |
| <b>Length</b><br><b>2</b>   <b>3</b>   <b>4</b>   |  |            |            |                               |  |  |  |  |
| <b>Bypass valve</b><br><b>S</b> Without bypass  |  |            |            |                               |  |  |  |  |
| <b>Seals</b><br><b>A</b> NBR<br><b>V</b> FPM  |  |            |            |                               |  |  |  |  |
| <b>Connections</b><br><b>G1</b> G 1/2"<br><b>G2</b> 1/2" NPT<br><b>G3</b> SAE 8 - 3/4" - 16 UNF |  |            |            |                               |  |  |  |  |
| <b>Filtration rating (filter media)</b>   |  |            |            |                               |  |  |  |  |
| <b>A03</b> Inorganic microfiber 3 µm  |  |            |            |                               |  |  |  |  |
| <b>A06</b> Inorganic microfiber 6 µm  |  |            |            |                               |  |  |  |  |
| <b>A10</b> Inorganic microfiber 10 µm   |  |            |            |                               |  |  |  |  |
| <b>A16</b> Inorganic microfiber 16 µm   |  |            |            |                               |  |  |  |  |
| <b>A25</b> Inorganic microfiber 25 µm   |  |            |            |                               |  |  |  |  |
| <b>M25</b> Wire mesh 25 µm  |  |            |            |                               |  |  |  |  |
|   | Filtration rating  |            |            |                               |  |  |  |  |
|   | <b>Element Δp</b>  | <b>Axx</b> | <b>M25</b> | <b>Execution</b>              |  |  |  |  |
|   | <b>N</b> 20 bar  | -          | •          | <b>P01</b> MP Filtri standard |  |  |  |  |
|   | <b>H</b> 210 bar   | •          | -          | <b>Pxx</b> Customized         |  |  |  |  |

### FILTER ELEMENT

|   |  |                   |            |            |                               |  |
|---|--|-------------------|------------|------------|-------------------------------|--|
| <b>Element series and size</b><br><b>HP011</b>          | Configuration example: <b>HP011</b>   <b>4</b>   <b>A06</b>   <b>A</b>   <b>H</b>   <b>P01</b> |                   |            |            |                               |  |
| <b>Element length</b><br><b>2</b>   <b>3</b>   <b>4</b> |  |                   |            |            |                               |  |
| <b>Filtration rating (filter media)</b>                 |  |                   |            |            |                               |  |
| <b>A03</b> Inorganic microfiber 3 µm                    |  |                   |            |            |                               |  |
| <b>A06</b> Inorganic microfiber 6 µm                    |  |                   |            |            |                               |  |
| <b>A10</b> Inorganic microfiber 10 µm                   |  |                   |            |            |                               |  |
| <b>A16</b> Inorganic microfiber 16 µm                   |  |                   |            |            |                               |  |
| <b>A25</b> Inorganic microfiber 25 µm                   |  |                   |            |            |                               |  |
| <b>M25</b> Wire mesh 25 µm                              |  |                   |            |            |                               |  |
|   | Filtration rating  |                   |            |            |                               |  |
|   | <b>Seals</b>   | <b>Element Δp</b> | <b>Axx</b> | <b>M25</b> | <b>Execution</b>              |  |
|   | <b>A</b> NBR   | <b>N</b> 20 bar   | -          | •          | <b>P01</b> MP Filtri standard |  |
|   | <b>V</b> FPM   | <b>H</b> 210 bar  | •          | •          | <b>Pxx</b> Customized         |  |

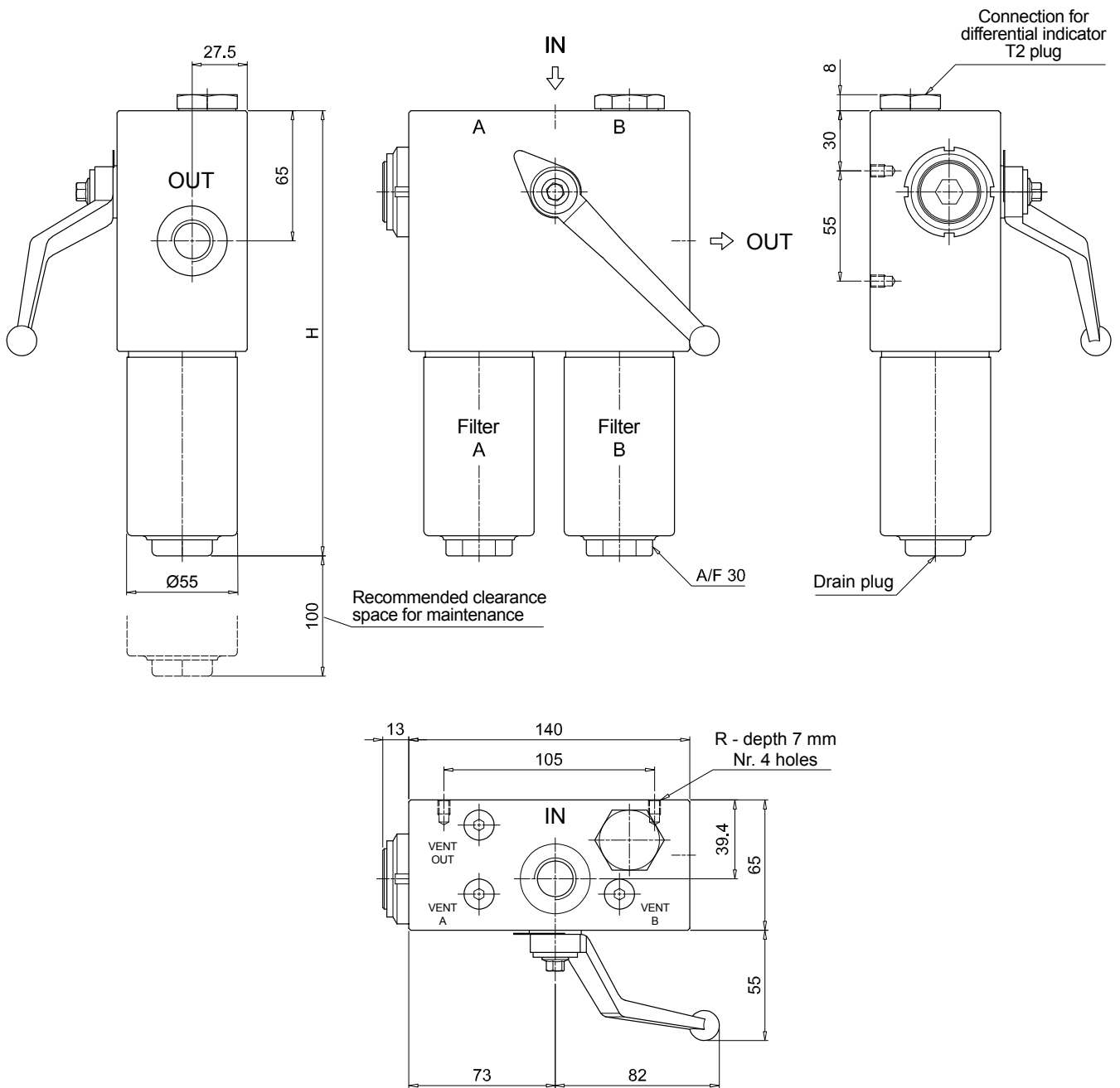
### CLOGGING INDICATORS

See page 622

|   |
|---|
| <b>DEA</b> Electrical differential indicator          |
| <b>DEM</b> Electrical differential indicator          |
| <b>DLA</b> Electrical / visual differential indicator |
| <b>DLE</b> Electrical / visual differential indicator |

|  |
|--|
| <b>DTA</b> Electrical differential indicator |
| <b>DVA</b> Visual differential indicator     |
| <b>DVM</b> Visual differential indicator     |
| <b>T2</b> Plug                               |

| FHDO21        |          |
|---------------|----------|
| Filter length | H [mm]   |
| 2             | 172      |
| 3             | 222      |
| 4             | 272      |
| Connections   | R        |
| G1            | M6       |
| G2 - G3       | 1/4" UNC |



# FHD FHD051 - FHD326 - FHD333

## Designation & Ordering code

### COMPLETE FILTER

Series and size Configuration example: **FHD326** **3** **S** **A** **G1** **M25** **N** **P01**

**FHD051** | **FHD326** | **FHD333**

| Length | FHD051 | FHD326 | FHD333 |
|--------|--------|--------|--------|
| 1      | -      | •      | -      |
| 2      | •      | •      | •      |
| 3      | •      | •      | •      |
| 4      | •      | -      | •      |
| 5      | •      | -      | -      |

#### Valves

**S** Without bypass  
**B** With bypass 6 bar

#### Seals

**A** NBR  
**V** FPM

| Connections | FHD051                   | FHD326                  | FHD333                  |
|-------------|--------------------------|-------------------------|-------------------------|
| <b>G1</b>   | G 3/4"                   | G 1 1/4"                | -                       |
| <b>G2</b>   | 3/4" NPT                 | -                       | -                       |
| <b>G3</b>   | G 1/2"                   | 1 1/4" NPT              | -                       |
| <b>G4</b>   | 1/2" NPT                 | SAE 20 - 1 5/8" - 12 UN | -                       |
| <b>G5</b>   | SAE 8 - 3/4" - 16 UNF    | -                       | -                       |
| <b>G6</b>   | SAE 12 - 1 1/16" - 12 UN | -                       | -                       |
| <b>F1</b>   | -                        | -                       | 1 1/2" SAE 6000 psi/M   |
| <b>F2</b>   | -                        | -                       | 1 1/2" SAE 6000 psi/UNC |

#### Filtration rating (filter media)

|                                 |       |
|---------------------------------|-------|
| <b>A03</b> Inorganic microfiber | 3 µm  |
| <b>A06</b> Inorganic microfiber | 6 µm  |
| <b>A10</b> Inorganic microfiber | 10 µm |
| <b>A16</b> Inorganic microfiber | 16 µm |
| <b>A25</b> Inorganic microfiber | 25 µm |
| <b>M25</b> Wire mesh            | 25 µm |

| Element Δp       | Filtration rating |     | Execution                     |
|------------------|-------------------|-----|-------------------------------|
|                  | Axx               | M25 |                               |
| <b>N</b> 20 bar  |                   | •   | <b>P01</b> MP Filtri standard |
| <b>R</b> 20 bar  | •                 | •   | <b>Pxx</b> Customized         |
| <b>S</b> 210 bar | •                 | •   |                               |

### FILTER ELEMENT

Element series and size Configuration example: **HP320** **3** **M25** **A** **N** **P01**

|              | FHD051 | FHD326 | FHD333 |
|--------------|--------|--------|--------|
| <b>HP050</b> | •      |        |        |
| <b>HP320</b> |        | •      | •      |

| Element length | HP050 | HP320 |
|----------------|-------|-------|
| 1              |       | •     |
| 2              | •     | •     |
| 3              | •     | •     |
| 4              | •     | •     |
| 5              | •     |       |

#### Filtration rating (filter media)

|                                 |       |
|---------------------------------|-------|
| <b>A03</b> Inorganic microfiber | 3 µm  |
| <b>A06</b> Inorganic microfiber | 6 µm  |
| <b>A10</b> Inorganic microfiber | 10 µm |
| <b>A16</b> Inorganic microfiber | 16 µm |
| <b>A25</b> Inorganic microfiber | 25 µm |
| <b>M25</b> Wire mesh            | 25 µm |

| Seals        | Element Δp       | Filtration rating |     | Execution                     |
|--------------|------------------|-------------------|-----|-------------------------------|
|              |                  | Axx               | M25 |                               |
| <b>A</b> NBR | <b>N</b> 20 bar  |                   | •   | <b>P01</b> MP Filtri standard |
| <b>V</b> FPM | <b>R</b> 20 bar  | •                 | •   | <b>Pxx</b> Customized         |
|              | <b>S</b> 210 bar | •                 | •   |                               |

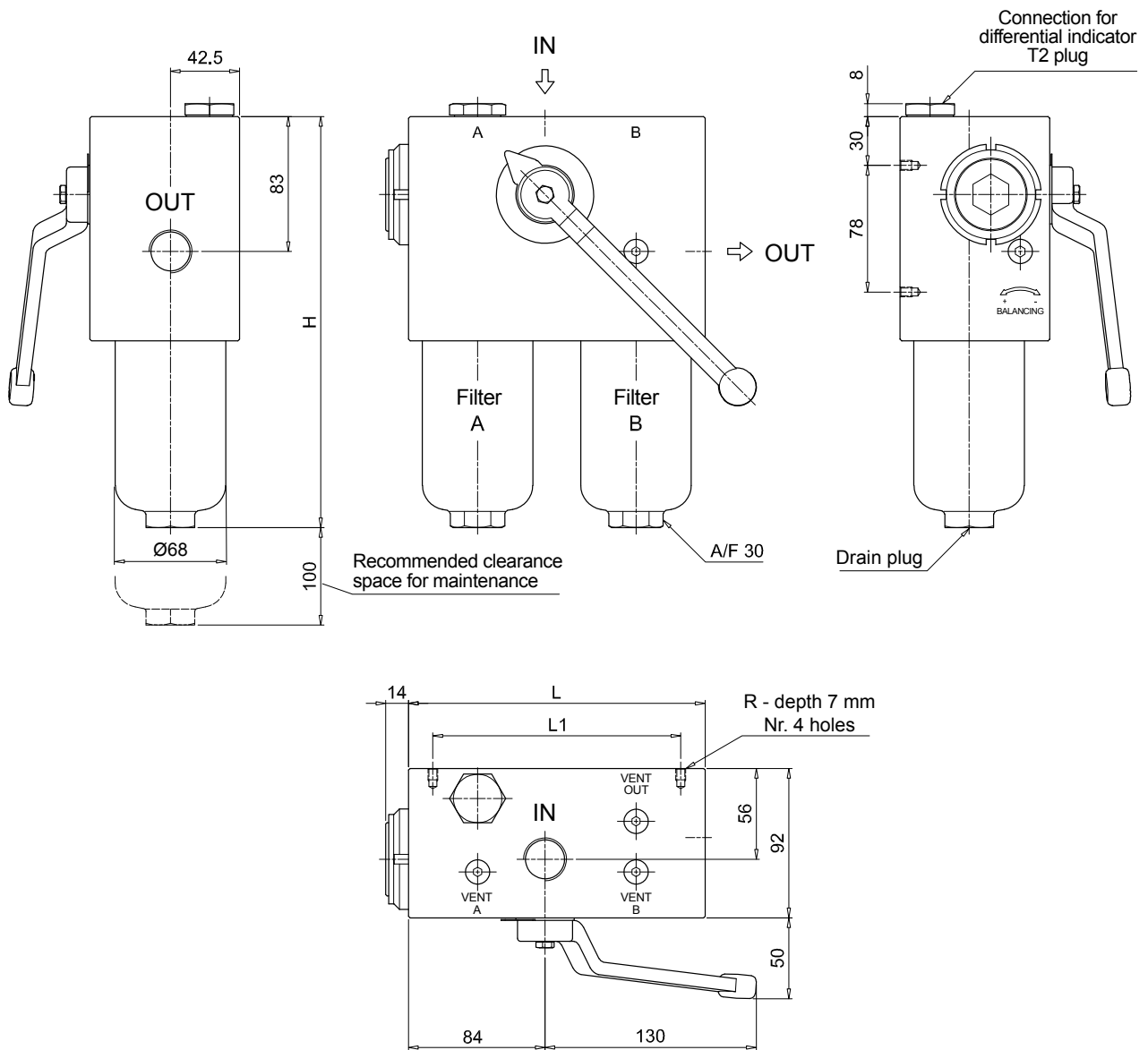
### CLOGGING INDICATORS

See page 622

**DEA** Electrical differential indicator  
**DEM** Electrical differential indicator  
**DLA** Electrical / visual differential indicator  
**DLE** Electrical / visual differential indicator

**DTA** Electrical differential indicator  
**DVA** Visual differential indicator  
**DVM** Visual differential indicator  
**T2** Plug

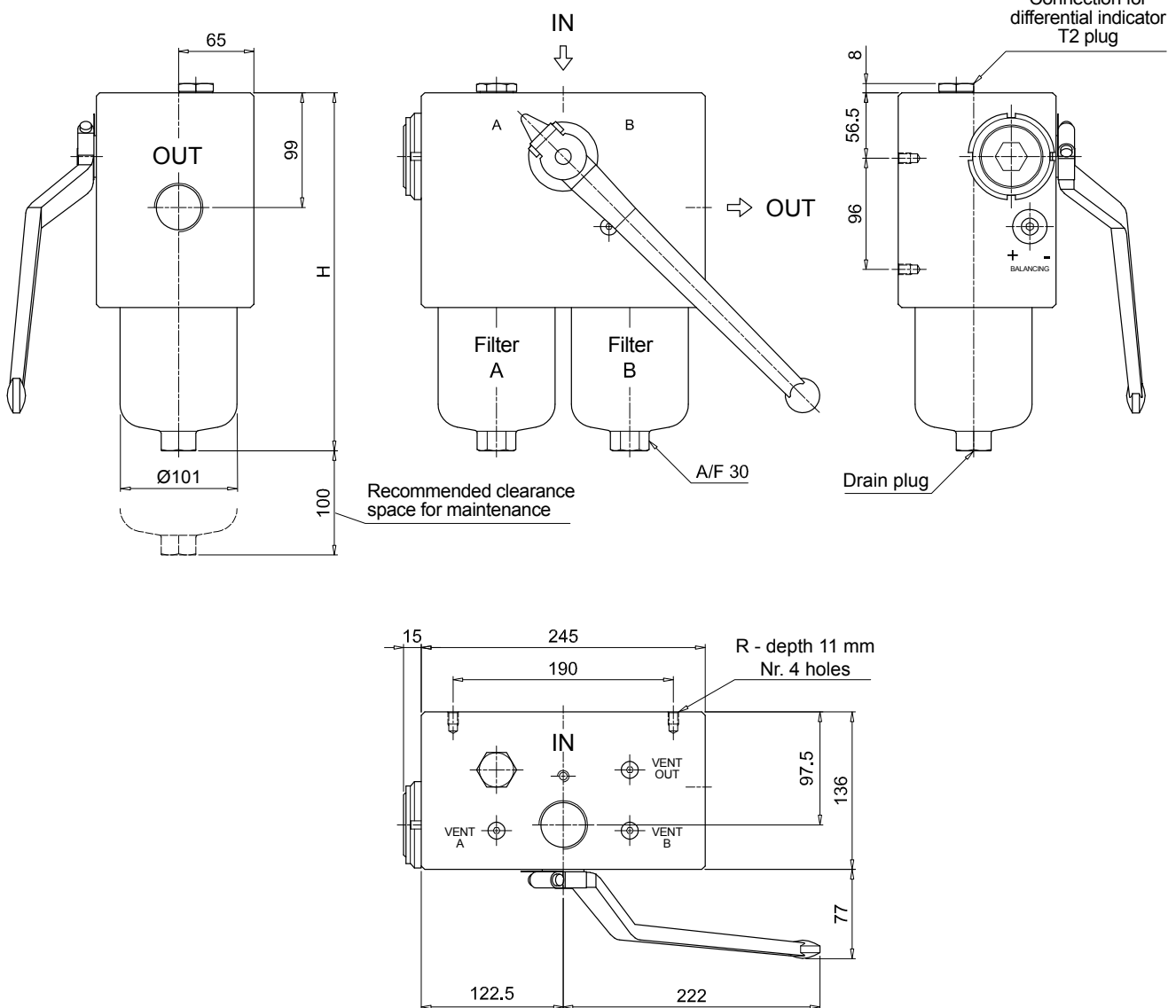
| FHD051        |          |         |
|---------------|----------|---------|
| Filter length | H [mm]   |         |
| 2             | 253      |         |
| 3             | 295      |         |
| 4             | 343      |         |
| 5             | 465      |         |
| Connections   | R        |         |
| G1            | M6       |         |
| G2            | 1/4" UNC |         |
| G3            | M6       |         |
| G4-G5-G6      | 1/4" UNC |         |
| Valves        | L [mm]   | L1 [mm] |
| S             | 168      | 138     |
| B             | 182.5    | 152.5   |



# FHD FHD051 - FHD326 - FHD333

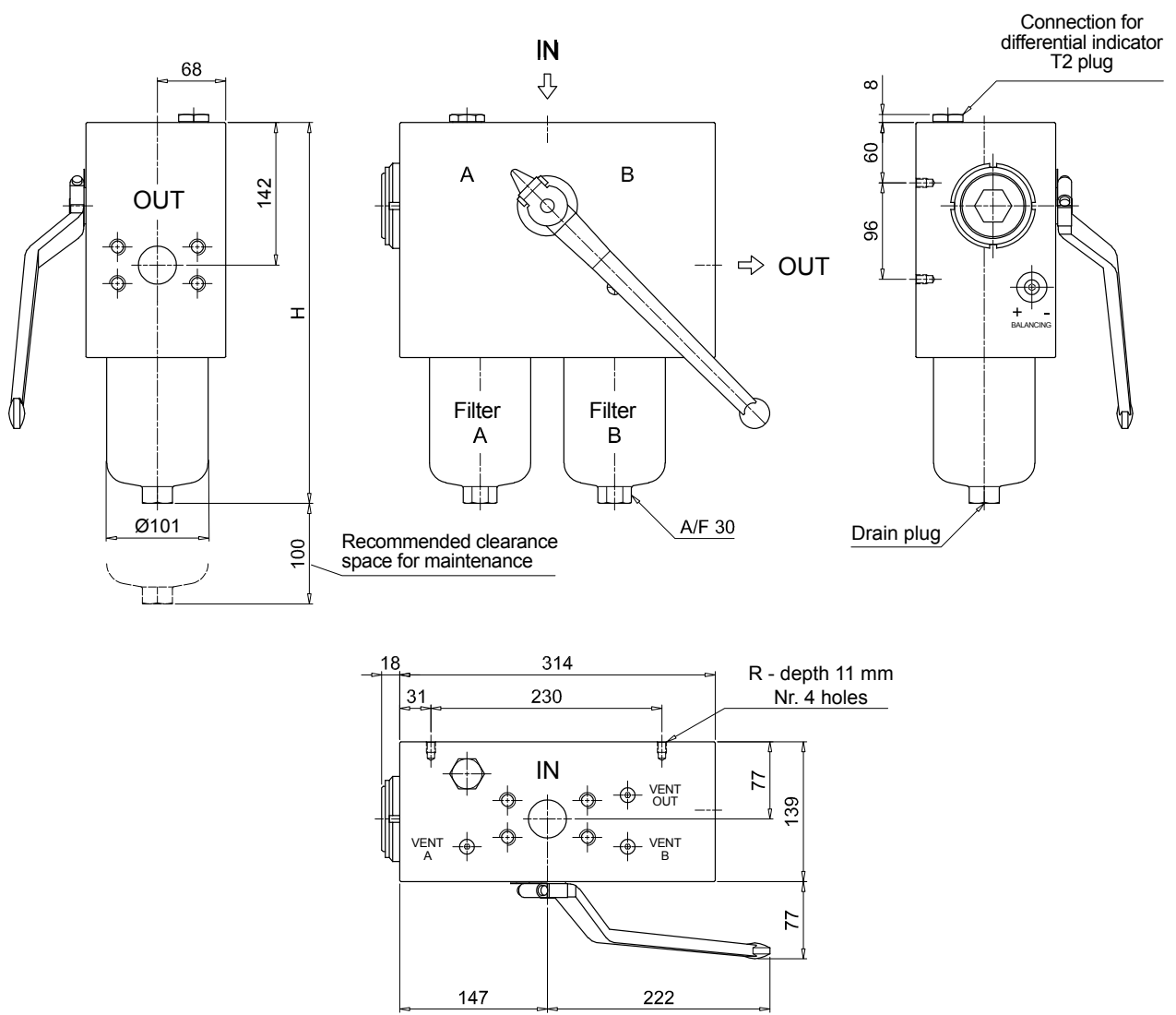
## Dimensions

| FHD326        |          |
|---------------|----------|
| Filter length | H [mm]   |
| 1             | 309      |
| 2             | 432      |
| 3             | 564      |
| Connections   | R        |
| G1            | M10      |
| G2 - G3       | 3/8" UNC |





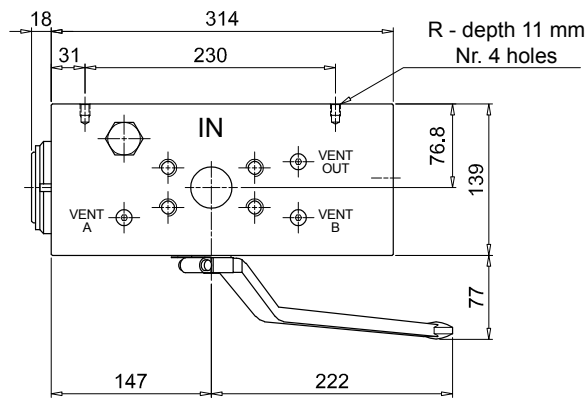
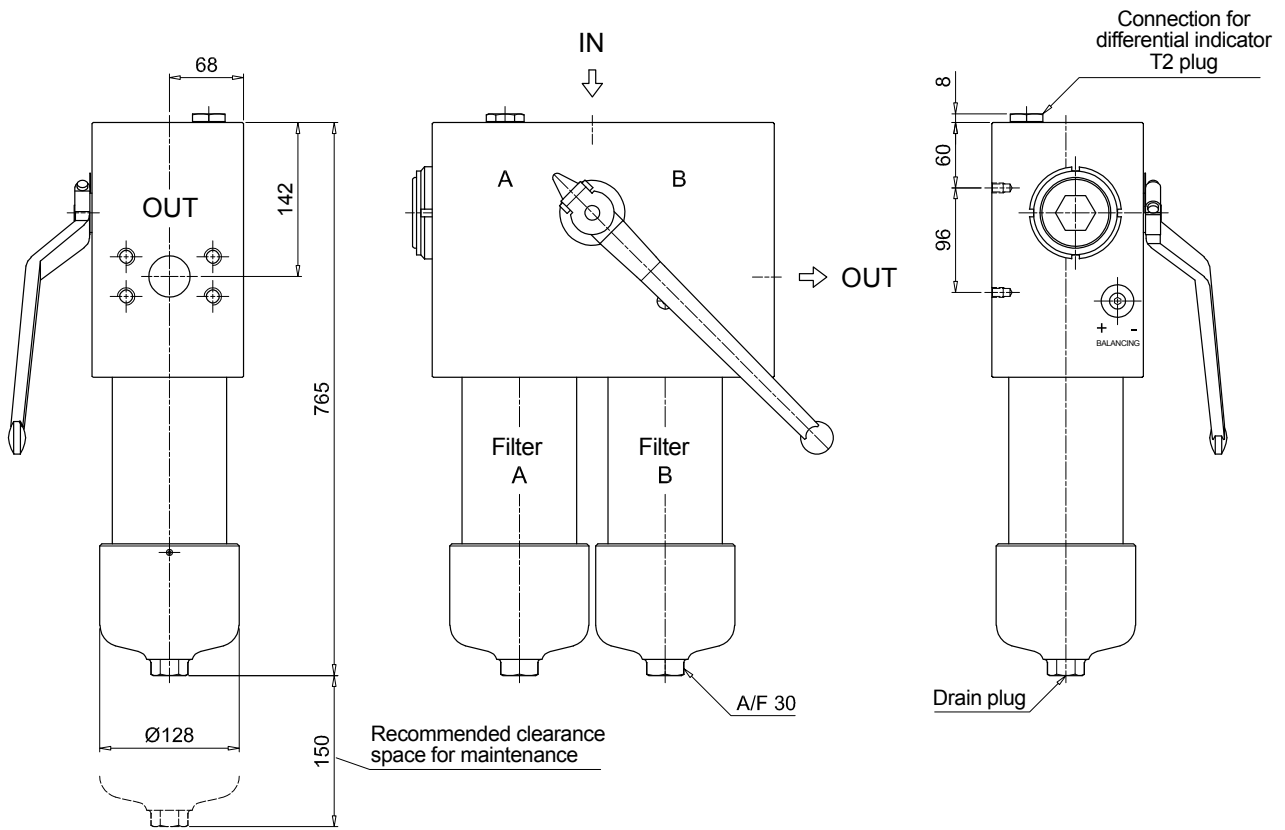
| FHD333        |          |
|---------------|----------|
| Length 2 - 3  |          |
| Filter length | H [mm]   |
| 2             | 479      |
| 3             | 612      |
| Connections   | R        |
| F1            | M10      |
| F2            | 3/8" UNC |



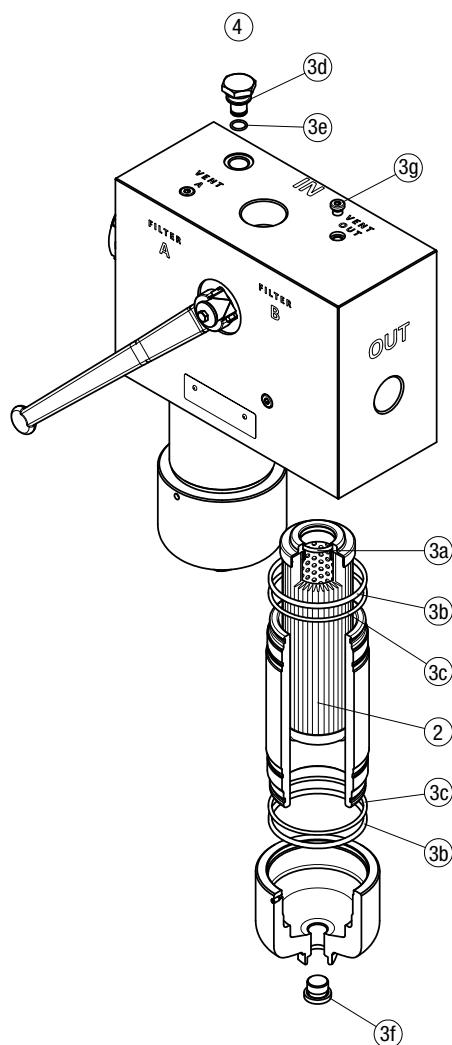
# FHD FHD051 - FHD326 - FHD333

## Dimensions

| FHD333      |          |
|-------------|----------|
| Length 4    |          |
| Connections | R        |
| F1          | M10      |
| F2          | 3/8" UNC |



FHD 021 - 051 - 326 - 333



| Item:         | Q.ty: 1 pc.     | Q.ty: 1 pc.          |          | Q.ty: 1 pc.               |     |
|---------------|-----------------|----------------------|----------|---------------------------|-----|
| Filter series | Filter element  | Seal Kit code number |          | Indicator connection plug |     |
| FHD 021       | See order table | NBR                  | FPM      | NBR                       | FPM |
| FHD 051       | See order table | 02050511             | 02050512 | T2H                       | T2V |
| FHD 326-333   | See order table | 02050420             | 02050421 |                           |     |
|               |                 | 02050377             | 02050378 |                           |     |



# HPB series

## BOWL KIT

Maximum working pressure up to 42 MPa (420 bar) - Flow rate up to 300 l/min



## Description

## Technical data

### High Pressure Bowl Kit

**Maximum working pressure up to 42 MPa (420 bar)**  
**Flow rate up to 300 l/min**

HPB is a range of high pressure bowl kits for protection of sensitive components in high pressure hydraulic systems in the mobile machines. They are directly integrated in the control blocks.

#### Available features:

- Fine filtration rating, to get a good cleanliness level into the system
- Low collapse filter element "N", for use with blocks provided with bypass valve
- High collapse filter element with external support "S", for use with blocks not provided with the bypass valve

### Filter housing materials

- Housing: Phosphatized steel

### Pressure

- Test pressure: 63 MPa (630 bar)
- Burst pressure: 126 MPa (1260 bar)
- Pulse pressure fatigue test: 1 000 000 cycles with pressure from 0 to 42 MPa (420 bar)

### Δp element type

- Microfibre / Wire mesh filter elements - series N: 20 bar
- Microfibre / Wire mesh filter elements - series S: 210 bar
- Fluid flow through the filter element from OUT to IN

### Seals

- Standard NBR series A
- Optional FPM series V

### Temperature

From -25 °C to +110 °C

### Note

HPB filters are provided for vertical mounting

## Weights [kg] and volumes [dm<sup>3</sup>]

| Filter series  | Weights [kg] |      |      |      |      | Volumes [dm <sup>3</sup> ] |        |      |      |      |      |      |
|----------------|--------------|------|------|------|------|----------------------------|--------|------|------|------|------|------|
|                | Length       | 1    | 2    | 3    | 4    | 5                          | Length | 1    | 2    | 3    | 4    | 5    |
| <b>HPB 050</b> |              | 1.10 | 1.50 | 1.90 | 2.40 | 3.50                       |        | 0.30 | 0.45 | 0.60 | 0.80 | 1.20 |
| <b>HPB 150</b> |              | 2.90 | 4.90 | 6.30 | -    | -                          |        | 0.45 | 0.85 | 1.10 | -    | -    |

## FILTER ASSEMBLY SIZING Flow rates [l/min]

| Filter series  | Length   | Filter element design - N Series |     |     |     |     |     | Filter element design - S Series |     |     |     |     |
|----------------|----------|----------------------------------|-----|-----|-----|-----|-----|----------------------------------|-----|-----|-----|-----|
|                |          | A03                              | A06 | A10 | A16 | A25 | M25 | A03                              | A06 | A10 | A16 | A25 |
| <b>HPB 050</b> | <b>1</b> | 42                               | 43  | 79  | 82  | 106 | 147 | 29                               | 39  | 57  | 59  | 74  |
|                | <b>2</b> | 52                               | 57  | 85  | 96  | 121 | 149 | 45                               | 49  | 76  | 88  | 114 |
|                | <b>3</b> | 66                               | 69  | 97  | 106 | 130 | 150 | 58                               | 61  | 89  | 99  | 125 |
|                | <b>4</b> | 83                               | 89  | 113 | 115 | 134 | 152 | 74                               | 80  | 106 | 108 | 129 |
|                | <b>5</b> | 107                              | 110 | 130 | 134 | 141 | 154 | 93                               | 95  | 111 | 121 | 139 |
| <b>HPB 150</b> | <b>1</b> | 81                               | 88  | 156 | 163 | 179 | 295 |                                  |     |     |     |     |
|                | <b>2</b> | 142                              | 145 | 227 | 230 | 236 | 312 |                                  |     |     |     |     |
|                | <b>3</b> | 170                              | 180 | 242 | 245 | 263 | 315 |                                  |     |     |     |     |

### Maximum flow rate for a complete pressure filter with a pressure drop $\Delta p = 1.5$ bar.

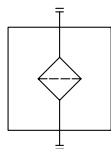
The reference fluid has a kinematic viscosity of 30 mm<sup>2</sup>/s (cSt) and a density of 0.86 kg/dm<sup>3</sup>.

For different pressure drop or fluid viscosity we recommend to use our selection software available on [www.mpfiltri.com](http://www.mpfiltri.com).

You can also calculate the right size using the formulas present on the FILTER SIZING paragraph at the beginning of the full catalogue or at the beginning of the filter family brochure. Please, contact our Sales Department for further additional information.

| Filter series  | Style S |
|----------------|---------|
| <b>HPB 050</b> | •       |
| <b>HPB 150</b> | •       |

### Hydraulic symbols



## Designation & Ordering code

### COMPLETE FILTER

Series and size **HPB050** Configuration example: **HPB050** **3** **A** **A10** **N** **P01**

Length **1** | **2** | **3** | **4** | **5** |

Seals **A** NBR  
**V** FPM

| Filtration rating (filter media) |                      |       |
|----------------------------------|----------------------|-------|
| <b>A03</b>                       | Inorganic microfiber | 3 µm  |
| <b>A06</b>                       | Inorganic microfiber | 6 µm  |
| <b>A10</b>                       | Inorganic microfiber | 10 µm |
| <b>A16</b>                       | Inorganic microfiber | 16 µm |
| <b>A25</b>                       | Inorganic microfiber | 25 µm |
| <b>M25</b>                       | Wire mesh            | 25 µm |

| Element Δp |         |
|------------|---------|
| <b>N</b>   | 20 bar  |
| <b>S</b>   | 210 bar |

| Execution  |                    |
|------------|--------------------|
| <b>P01</b> | MP Filtri standard |
| <b>Pxx</b> | Customized         |

### FILTER ELEMENT

Element series and size **HP050** Configuration example: **HP050** **3** **A10** **A** **N** **P01**

Element length **1** | **2** | **3** | **4** | **5** |

Seals **A** NBR  
**V** FPM

| Filtration rating (filter media) |                      |       |
|----------------------------------|----------------------|-------|
| <b>A03</b>                       | Inorganic microfiber | 3 µm  |
| <b>A06</b>                       | Inorganic microfiber | 6 µm  |
| <b>A10</b>                       | Inorganic microfiber | 10 µm |
| <b>A16</b>                       | Inorganic microfiber | 16 µm |
| <b>A25</b>                       | Inorganic microfiber | 25 µm |
| <b>M25</b>                       | Wire mesh            | 25 µm |

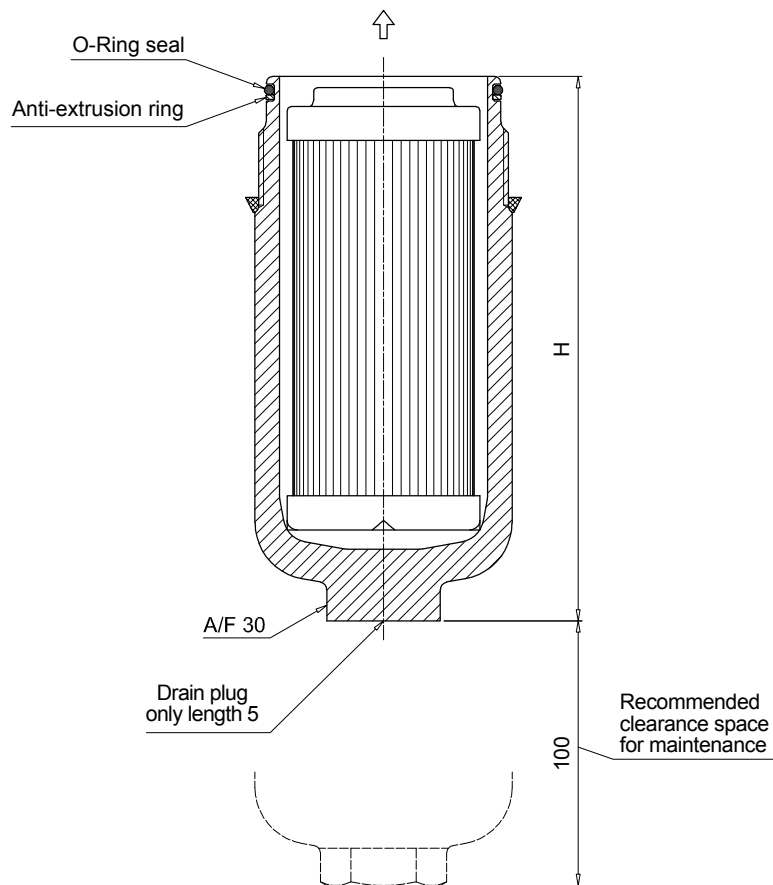
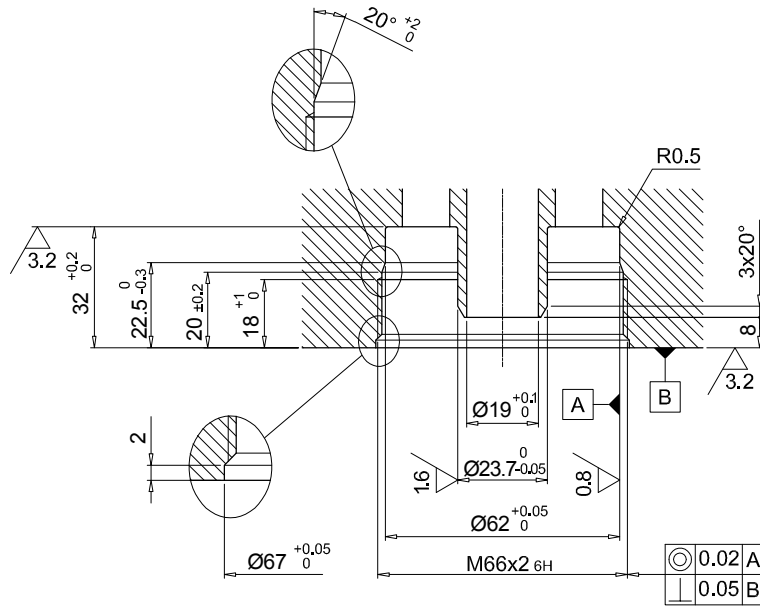
| Seals    |     |
|----------|-----|
| <b>A</b> | NBR |
| <b>V</b> | FPM |

| Element Δp |         |
|------------|---------|
| <b>N</b>   | 20 bar  |
| <b>S</b>   | 210 bar |

| Execution  |                    |
|------------|--------------------|
| <b>P01</b> | MP Filtri standard |
| <b>Pxx</b> | Customized         |



| HPB050        |        |
|---------------|--------|
| Filter length | H [mm] |
| 1             | 107    |
| 2             | 144    |
| 3             | 186    |
| 4             | 234    |
| 5             | 356    |



## Designation & Ordering code

### COMPLETE FILTER

Series and size **HPB150** Configuration example: **HPB150** | **3** | **A** | **A10** | **N** | **P01**

Length **1** | **2** | **3** |

Seals **A** NBR  
**V** FPM

| Filtration rating (filter media) |                      |       |
|----------------------------------|----------------------|-------|
| <b>A03</b>                       | Inorganic microfiber | 3 µm  |
| <b>A06</b>                       | Inorganic microfiber | 6 µm  |
| <b>A10</b>                       | Inorganic microfiber | 10 µm |
| <b>A16</b>                       | Inorganic microfiber | 16 µm |
| <b>A25</b>                       | Inorganic microfiber | 25 µm |
| <b>M25</b>                       | Wire mesh            | 25 µm |

| Element Δp |        |
|------------|--------|
| <b>N</b>   | 20 bar |

| Execution  |                    |
|------------|--------------------|
| <b>P01</b> | MP Filtri standard |
| <b>Pxx</b> | Customized         |

### FILTER ELEMENT

Element series and size **HP150** Configuration example: **HP150** | **3** | **A10** | **A** | **N** | **P01**

Element length **1** | **2** | **3** |

Seals **A** NBR  
**V** FPM

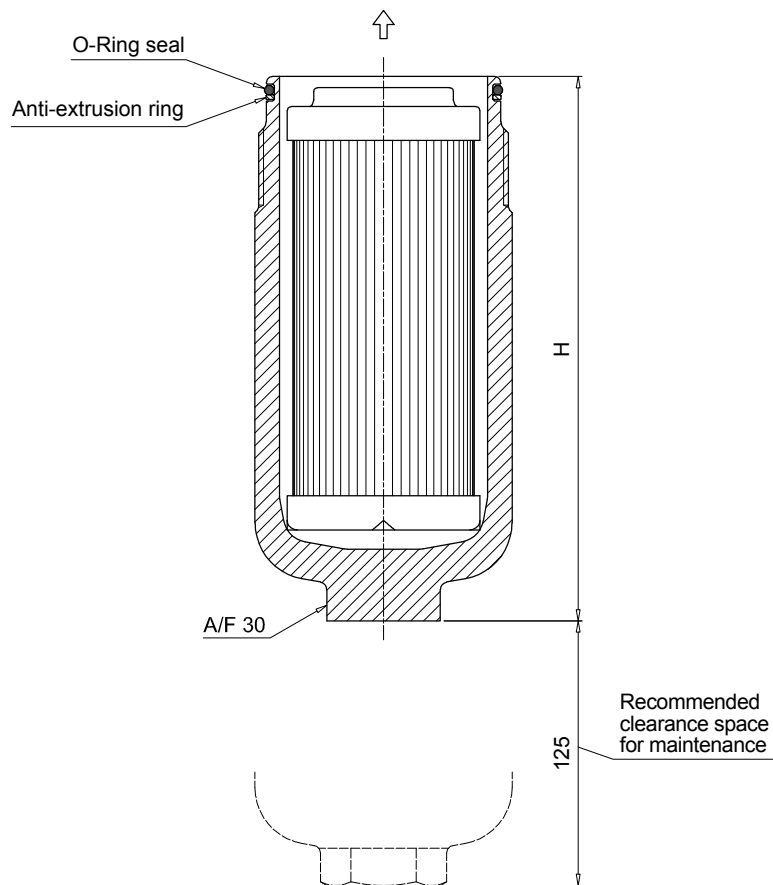
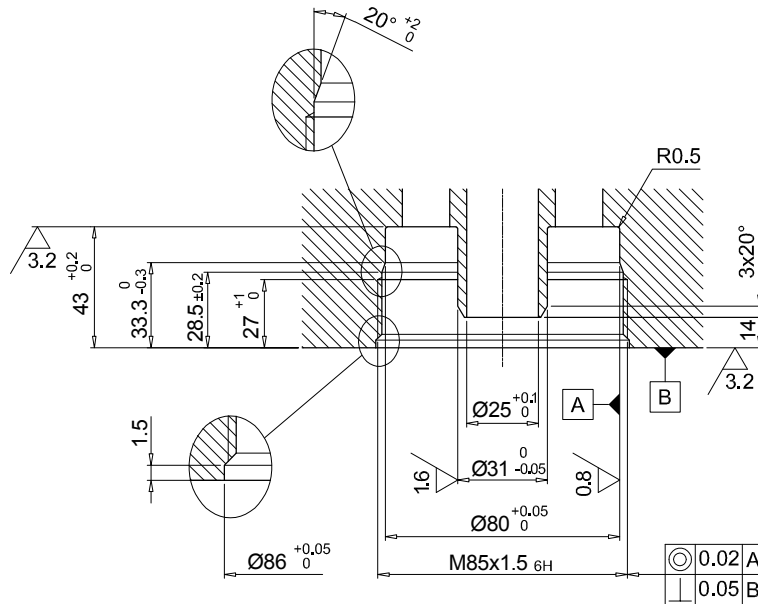
| Filtration rating (filter media) |                      |       |
|----------------------------------|----------------------|-------|
| <b>A03</b>                       | Inorganic microfiber | 3 µm  |
| <b>A06</b>                       | Inorganic microfiber | 6 µm  |
| <b>A10</b>                       | Inorganic microfiber | 10 µm |
| <b>A16</b>                       | Inorganic microfiber | 16 µm |
| <b>A25</b>                       | Inorganic microfiber | 25 µm |
| <b>M25</b>                       | Wire mesh            | 25 µm |

| Seals    |     |
|----------|-----|
| <b>A</b> | NBR |
| <b>V</b> | FPM |

| Element Δp |        |
|------------|--------|
| <b>N</b>   | 20 bar |

| Execution  |                    |
|------------|--------------------|
| <b>P01</b> | MP Filtri standard |
| <b>Pxx</b> | Customized         |

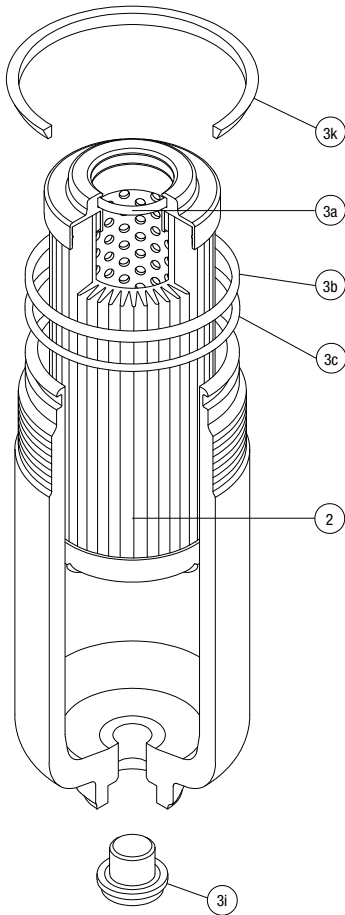
| HPB150        |        |
|---------------|--------|
| Filter length | H [mm] |
| 1             | 161    |
| 2             | 271    |
| 3             | 346    |



# HPB SPARE PARTS

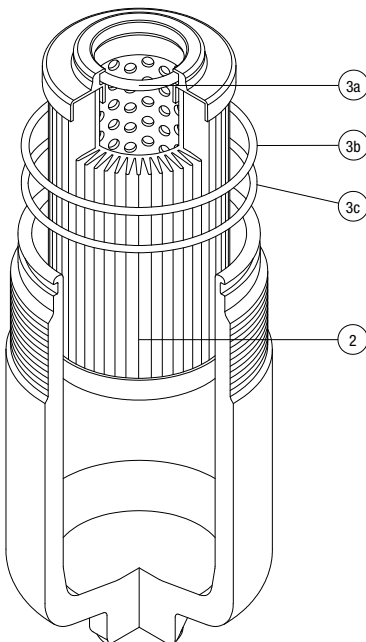
Order number for spare parts

## HPB 050



|                      |                         |                                   |
|----------------------|-------------------------|-----------------------------------|
| <b>Item:</b>         | Q.ty: 1 pc.<br><b>2</b> | Q.ty: 1 pc.<br><b>3</b> (3a ÷ 3i) |
| <b>Filter series</b> | <b>Filter element</b>   | <b>Seal Kit code number</b>       |
| <b>HPB 050</b>       | See order table         | <b>NBR</b><br>02050813            |
|                      |                         | <b>FPM</b><br>02050823            |

## HPB 150



|                      |                         |                                   |
|----------------------|-------------------------|-----------------------------------|
| <b>Item:</b>         | Q.ty: 1 pc.<br><b>2</b> | Q.ty: 1 pc.<br><b>3</b> (3a ÷ 3c) |
| <b>Filter series</b> | <b>Filter element</b>   | <b>Seal Kit code number</b>       |
| <b>HPB 150</b>       | See order table         | <b>NBR</b><br>02050816            |
|                      |                         | <b>FPM</b><br>02050826            |



# Clogging indicators

## Introduction

Filter elements are efficient only if their Dirt Holding Capacity is fully exploited. This is achieved by using filter housings equipped with clogging indicators.

These devices trip when the clogging of the filter element causes an increase in pressure drop across the filter element.

The indicator is set to alarm before the element becomes fully clogged.

MP Filtri can supply indicators of the following designs:

- Vacuum switches and gauges
- Pressure switches and gauges
- Differential pressure indicators

These type of devices can be provided with a visual, electrical or both signals.

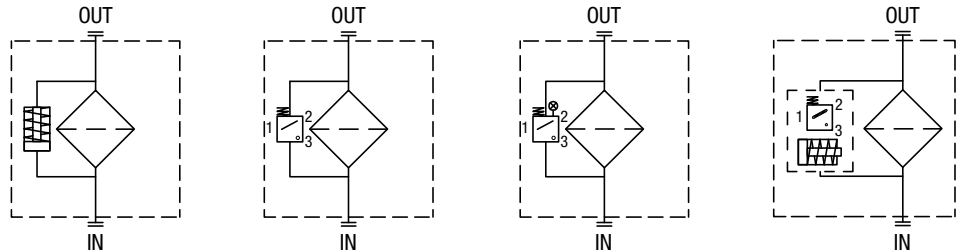
## Suitable indicator types

### DIFFERENTIAL INDICATORS

Differential indicators are used on the Pressure line to check the efficiency of the filter element. They measure the pressure upstream and downstream of the filter element (differential pressure).

Standard items are produced with special connection G 1/2" size.

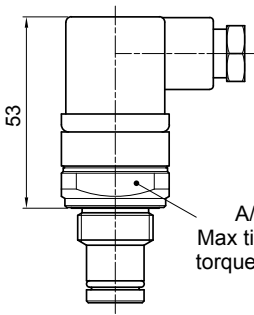
Also available in Stainless Steel models.



## Quick reference guide

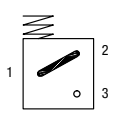
| Filter family         | Filter series              | Visual indicators  | Electrical indicators                            | Electrical / Visual indicators   |  |
|-----------------------|----------------------------|--|--|--|--|
| HIGH PRESSURE FILTERS | With bypass valve<br>6 bar | FMP 039 - 065 - 135 - 320<br>FHP 010 - 011 - 065 - 135 - 350 - 351 - 500<br>FMMX 050<br>FMM 050 - 150<br>FHA 051<br>FHM 006 - 007 - 010 - 050 - 065 - 135 - 320 - 500<br>FHB 050 - 135 - 320<br>FHF 325<br>FHD 021 - 051 - 326 - 333 | DVA50xP01<br>DVM50xP01                           | DEA50xA50P01<br>DEM50XX10P01<br>DEM50XX20P01<br>DEM50XX30P01<br>DEM50XX35P01<br>DTA50xF70P01<br>DEA70xA50P01<br>DEA95xA50P01                                 | DLA50xA51P01<br>DLA50xA52P01<br>DLA50xA71P01<br>DLE50xA50P01<br>DLE50xF50P01   |
|                       | Without bypass valve       | FMP 039 - 065 - 135 - 320<br>FHP 010 - 011 - 065 - 135 - 350 - 351 - 500<br>FMMX 050<br>FMM 050 - 150<br>FHA 051<br>FHM 006 - 007 - 010 - 050 - 065 - 135 - 320 - 500<br>FHB 050 - 135 - 320<br>FHF 325<br>FHD 021 - 051 - 326 - 333 | DVA70xP01<br>DVA95xP01<br>DVM70xP01<br>DVM95xP01 | DEM70XX10P01<br>DEM70XX20P01<br>DEM70XX30P01<br>DEM70XX35P01<br>DEM95XX10P01<br>DEM95XX20P01<br>DEM95XX30P01<br>DEM95XX35P01<br>DTA70xF70P01<br>DTA95xF70P01 | DLA70xA51P01<br>DLA70xA52P01<br>DLA70xA71P01<br>DLA95xA51P01<br>DLA95xA52P01<br>DLA95xA71P01<br>DLE70xA50P01<br>DLE70xF50P01<br>DLE95xA50P01<br>DLE95xF50P01 |

| DEA*50                                   |                    |
|--|--------------------|
| <b>Electrical Differential Indicator</b> |                    |
| Settings                                 | Ordering code      |
| 5.0 bar $\pm 10\%$                       | DE A 50 x A 50 P01 |
| 7.0 bar $\pm 10\%$                       | DE A 70 x A 50 P01 |
| 9.5 bar $\pm 10\%$                       | DE A 95 x A 50 P01 |

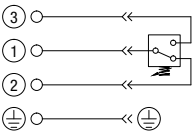


A/F 30  
Max tightening torque: 65 N·m

**Hydraulic symbol**



**Electrical symbol**



**Materials**

- Body: Brass
- Base: Black polyamide
- Contacts: Silver
- Seal: HNBR - FPM

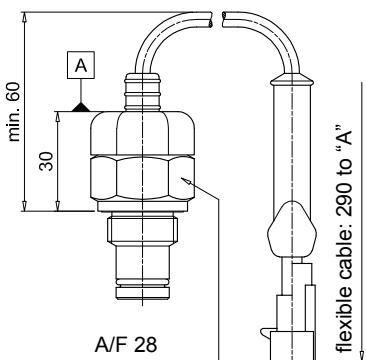
**Technical data**

- Max working pressure: 420 bar
- Proof pressure: 630 bar
- Burst pressure: 1260 bar
- Working temperature: From -25 °C to +110 °C
- Compatibility with fluids: Mineral oils, Synthetic fluids  
HFA, HFB, HFC according to ISO 2943
- Degree protection: IP66 according to EN 60529  
IP69K according to ISO 20653

**Electrical data**

- Electrical connection: EN 175301-803
- Resistive load: 0.2 A / 115 Vdc

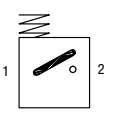
| DEM*10                                   |                    |
|--|--------------------|
| <b>Electrical Differential Indicator</b> |                    |
| Settings                                 | Ordering code      |
| 5.0 bar $\pm 10\%$                       | DE M 50 x x 10 P01 |
| 7.0 bar $\pm 10\%$                       | DE M 70 x x 10 P01 |
| 9.5 bar $\pm 10\%$                       | DE M 95 x x 10 P01 |



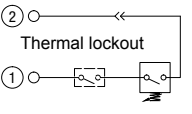
A/F 28  
Max tightening torque: 65 N·m

flexible cable: 290 to "A"

**Hydraulic symbol**



**Electrical symbol**



Thermal lockout

**Materials**

- Body: Brass
- Base: Black polyamide
- Contacts: Silver
- Seal: HNBR - FPM

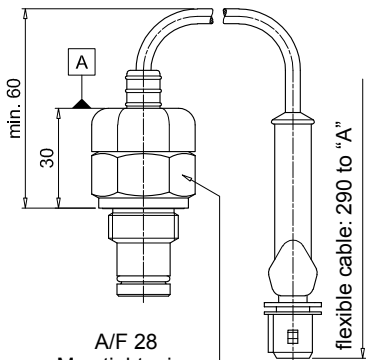
**Technical data**

- Max working pressure: 420 bar
- Proof pressure: 630 bar
- Burst pressure: 1260 bar
- Working temperature: From -25 °C to +110 °C
- Compatibility with fluids: Mineral oils, Synthetic fluids  
HFA, HFB, HFC according to ISO 2943
- Degree protection: IP66 according to EN 60529

**Electrical data**

- Electrical connection: AMP Superseal series 1.5
- Resistive load: 0.2 A / 115 Vdc
- Switching type: Normally open contacts (NC on request)
- Thermal lockout: Normally open up to 30 °C (option "F")

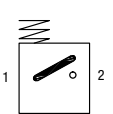
| DEM*20                                   |                    |
|--|--------------------|
| <b>Electrical Differential Indicator</b> |                    |
| Settings                                 | Ordering code      |
| 5.0 bar $\pm 10\%$                       | DE M 50 x x 20 P01 |
| 7.0 bar $\pm 10\%$                       | DE M 70 x x 20 P01 |
| 9.5 bar $\pm 10\%$                       | DE M 95 x x 20 P01 |



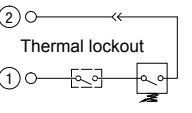
A/F 28  
Max tightening torque: 65 N·m

flexible cable: 290 to "A"

**Hydraulic symbol**



**Electrical symbol**



Thermal lockout

**Materials**

- Body: Brass
- Base: Black polyamide
- Contacts: Silver
- Seal: HNBR - FPM

**Technical data**

- Max working pressure: 420 bar
- Proof pressure: 630 bar
- Burst pressure: 1260 bar
- Working temperature: From -25 °C to +110 °C
- Compatibility with fluids: Mineral oils, Synthetic fluids  
HFA, HFB, HFC according to ISO 2943
- Degree protection: IP66 according to EN 60529

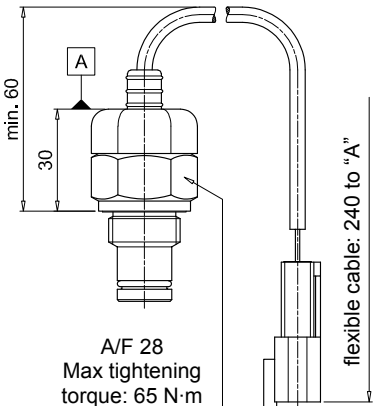
**Electrical data**

- Electrical connection: AMP Time junior
- Resistive load: 0.2 A / 115 Vdc
- Switching type: Normally open contacts (NC on request)
- Thermal lockout: Normally open up to 30 °C (option "F")

# DIFFERENTIAL INDICATORS

## Dimensions

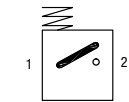
| DEM*30                                   |                      |
|--|----------------------|
| <b>Electrical Differential Indicator</b> |                      |
| <b>Settings</b>                          | <b>Ordering code</b> |
| 5.0 bar ±10%                             | DE M 50 x x 30 P01   |
| 7.0 bar ±10%                             | DE M 70 x x 30 P01   |
| 9.5 bar ±10%                             | DE M 95 x x 30 P01   |



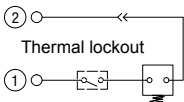
A/F 28  
Max tightening torque: 65 N-m

flexible cable: 240 to "A"

**Hydraulic symbol**



**Electrical symbol**



**Materials**

- Body: Brass
- Base: Black polyamide
- Contacts: Silver
- Seal: HNBR - FPM

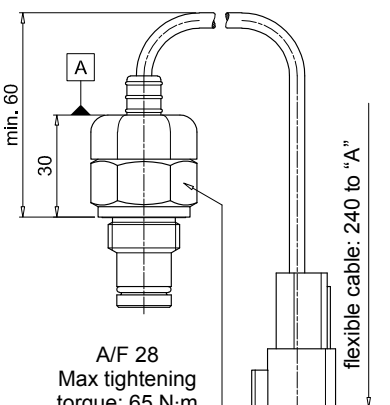
**Technical data**

- Max working pressure: 420 bar
- Proof pressure: 630 bar
- Burst pressure: 1260 bar
- Working temperature: From -25 °C to +110 °C
- Compatibility with fluids: Mineral oils, Synthetic fluids  
HFA, HFB, HFC according to ISO 2943
- Degree protection: IP66 according to EN 60529

**Electrical data**

- Electrical connection: Deutsch DT-04-2-P
- Resistive load: 0.2 A / 115 Vdc
- Switching type: Normally open contacts (NC on request)
- Thermal lockout: Normally open up to 30 °C (option "F")

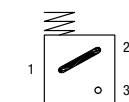
| DEM*35                                   |                      |
|--|----------------------|
| <b>Electrical Differential Indicator</b> |                      |
| <b>Settings</b>                          | <b>Ordering code</b> |
| 5.0 bar ±10%                             | DE M 50 x x 35 P01   |
| 7.0 bar ±10%                             | DE M 70 x x 35 P01   |
| 9.5 bar ±10%                             | DE M 95 x x 35 P01   |



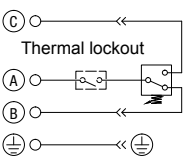
A/F 28  
Max tightening torque: 65 N-m

flexible cable: 240 to "A"

**Hydraulic symbol**



**Electrical symbol**



**Materials**

- Body: Brass
- Base: Black polyamide
- Contacts: Silver
- Seal: HNBR - FPM

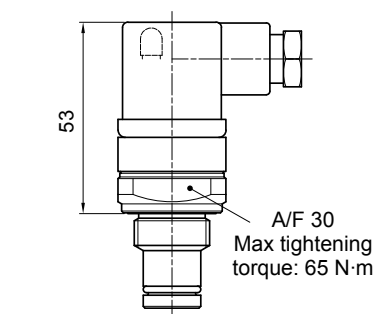
**Technical data**

- Max working pressure: 420 bar
- Proof pressure: 630 bar
- Burst pressure: 1260 bar
- Working temperature: From -25 °C to +110 °C
- Compatibility with fluids: Mineral oils, Synthetic fluids  
HFA, HFB, HFC according to ISO 2943
- Degree protection: IP66 according to EN 60529

**Electrical data**

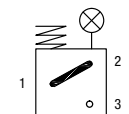
- Electrical connection: Deutsch DT-04-3-P
- Resistive load: 0.2 A / 115 Vdc
- Switching type: SPDT contact
- Thermal lockout: Normally open up to 30 °C (option "F")

| DLA*51 - DLA*52                                 |                      |
|---|----------------------|
| <b>Electrical/Visual Differential Indicator</b> |                      |
| <b>Settings</b>                                 | <b>Ordering code</b> |
| 5.0 bar ±10%                                    | DL A 50 x A xx P01   |
| 7.0 bar ±10%                                    | DL A 70 x A xx P01   |
| 9.5 bar ±10%                                    | DL A 95 x A xx P01   |

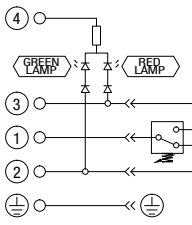


A/F 30  
Max tightening torque: 65 N-m

**Hydraulic symbol**



**Electrical symbol**



**Materials**

- Body: Brass
- Base: Transparent polyamide
- Contacts: Silver
- Seal: HNBR - FPM

**Technical data**

- Max working pressure: 420 bar
- Proof pressure: 630 bar
- Burst pressure: 1260 bar
- Working temperature: From -25 °C to +110 °C
- Compatibility with fluids: Mineral oils, Synthetic fluids  
HFA, HFB, HFC according to ISO 2943
- Degree protection: IP66 according to EN 60529  
IP69K according to ISO 20653

**Electrical data**

- Electrical connection: EN 175301-803
- Type: 51                      52
- Lamps: 24 Vdc              110 Vdc
- Resistive load: 1 A / 24 Vdc    1 A / 110 Vdc



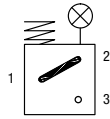
**DLA\*71**

**Electrical/Visual Differential Indicator**

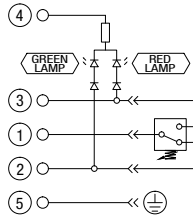
| Settings     | Ordering code      |
|--------------|--------------------|
| 5.0 bar ±10% | DL A 50 x A 71 P01 |
| 7.0 bar ±10% | DL A 70 x A 71 P01 |
| 9.5 bar ±10% | DL A 95 x A 71 P01 |

A/F 30  
Max tightening torque: 65 N·m

### Hydraulic symbol



### Electrical symbol



### Materials

- Body: Brass
- Base: Black polyamide
- Contacts: Silver
- Seal: HNBR - FPM

### Technical data

- Max working pressure: 420 bar
- Proof pressure: 630 bar
- Burst pressure: 1260 bar
- Working temperature: From -25 °C to +110 °C
- Compatibility with fluids: Mineral oils, Synthetic fluids  
HFA, HFB, HFC according to ISO 2943
- Degree protection: IP65 according to EN 60529  
IP69K according to ISO 20653

### Electrical data

- Electrical connection: IEC 61076-2-101 D (M12)
- Lamps: 24 Vdc
- Resistive load: 0.4 A / 24 Vdc

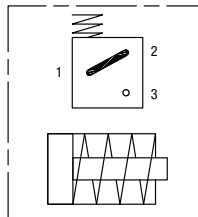
**DLE\*A50**

**Electrical/Visual Differential Indicator**

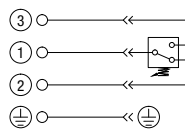
| Settings     | Ordering code      |
|--------------|--------------------|
| 5.0 bar ±10% | DL E 50 x A 50 P01 |
| 7.0 bar ±10% | DL E 70 x A 50 P01 |
| 9.5 bar ±10% | DL E 95 x A 50 P01 |

A/F 32  
Max tightening torque: 95 N·m

### Hydraulic symbol



### Electrical symbol



### Materials

- Body: Brass
- Base: Black polyamide
- Contacts: Silver
- Seal: HNBR - FPM

### Technical data

- Max working pressure: 420 bar
- Proof pressure: 630 bar
- Burst pressure: 1260 bar
- Working temperature: From -25 °C to +110 °C
- Compatibility with fluids: Mineral oils, Synthetic fluids  
HFA, HFB, HFC according to ISO 2943
- Degree protection: IP65 according to EN 60529

### Electrical data

- Electrical connections: EN 175301-803
- Resistive load: 5 A / 250 Vac
- Available the connector with lamps

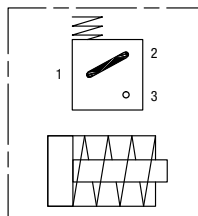
**DLE\*F50**

**Electrical/Visual Differential Indicator**

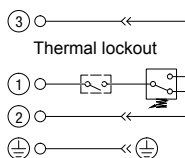
| Settings     | Ordering code      |
|--------------|--------------------|
| 5.0 bar ±10% | DL E 50 x F 50 P01 |
| 7.0 bar ±10% | DL E 70 x F 50 P01 |
| 9.5 bar ±10% | DL E 95 x F 50 P01 |

A/F 32  
Max tightening torque: 95 N·m

### Hydraulic symbol



### Electrical symbol



### Materials

- Body: Brass
- Base: Black polyamide
- Contacts: Silver
- Seal: HNBR - FPM

### Technical data

- Max working pressure: 420 bar
- Proof pressure: 630 bar
- Burst pressure: 1260 bar
- Working temperature: From -25 °C to +110 °C
- Compatibility with fluids: Mineral oils, Synthetic fluids  
HFA, HFB, HFC according to ISO 2943
- Degree protection: IP65 according to EN 60529

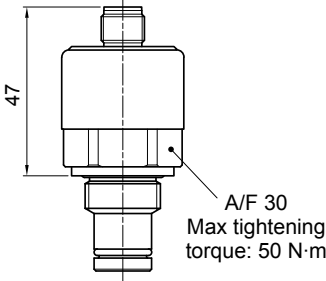
### Electrical data

- Electrical connections: EN 175301-803
- Resistive load: 5 A / 250 Vac
- Thermal lockout setting: +30 °C

# DIFFERENTIAL INDICATORS

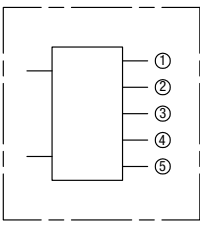
## Dimensions

| DTA*70                                   |                    |
|--|--------------------|
| <b>Electrical Differential Indicator</b> |                    |
| Settings                                 | Ordering code      |
| 5.0 bar ±10%                             | DT A 50 x x 70 P01 |
| 7.0 bar ±10%                             | DT A 70 x x 70 P01 |
| 9.5 bar ±10%                             | DT A 95 x x 70 P01 |



A/F 30  
Max tightening torque: 50 N·m

**Hydraulic symbol**



**Electrical symbol**

|   |   |   |                            |
|---|---|---|----------------------------|
| ① | ○ | ○ | +24 Vdc                    |
| ② | ○ | ○ | 4 ÷ 20 mA                  |
| ③ | ○ | ○ | 75% - N.O. Digital output  |
| ④ | ○ | ○ | 100% - N.O. Digital output |
| ⑤ | ○ | ○ | 0 Vdc                      |

**Materials**


- Body: Brass
- Internal parts: Brass - Polyamide
- Contacts: Silver
- Seal: HNBR - FPM

**Technical data**

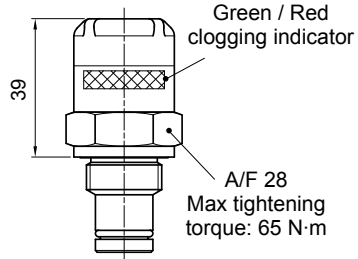
- Max working pressure: 420 bar
- Proof pressure: 630 bar
- Burst pressure: 1260 bar
- Compatibility with fluids: Mineral oils, Synthetic fluids HFA, HFB, HFC according to ISO 2943
- Degree protection: IP67 according to EN 60529

**Electrical data**

- Electrical connection: IEC 61076-2-101 D (M12)
- Power supply: 24 Vdc
- Analogue output: From 4 to 20 mA
- Thermal lockout: 30 °C (all output signals stalled up to 30 °C)



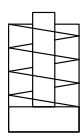
| DVA                                  |               |
|--------------------------------------|---------------|
| <b>Visual Differential Indicator</b> |               |
| Settings                             | Ordering code |
| 5.0 bar ±10%                         | DV A 50 x P01 |
| 7.0 bar ±10%                         | DV A 70 x P01 |
| 9.5 bar ±10%                         | DV A 95 x P01 |



Green / Red clogging indicator

A/F 28  
Max tightening torque: 65 N·m

**Hydraulic symbol**



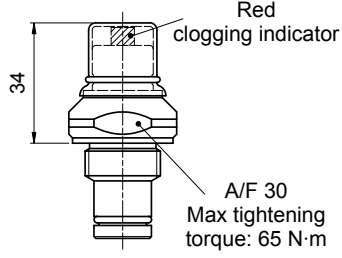
**Materials**

- Body: Brass
- Internal parts: Brass - Polyamide
- Contacts: Silver
- Seal: HNBR - FPM

**Technical data**

- Reset: Automatic reset
- Max working pressure: 420 bar
- Proof pressure: 630 bar
- Burst pressure: 1260 bar
- Working temperature: From -25 °C to +110 °C
- Compatibility with fluids: Mineral oils, Synthetic fluids HFA, HFB, HFC according to ISO 2943
- Degree protection: IP65 according to EN 60529

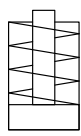
| DVM                                  |               |
|--------------------------------------|---------------|
| <b>Visual Differential Indicator</b> |               |
| Settings                             | Ordering code |
| 5.0 bar ±10%                         | DV M 50 x P01 |
| 7.0 bar ±10%                         | DV M 70 x P01 |
| 9.5 bar ±10%                         | DV M 95 x P01 |



Red clogging indicator

A/F 30  
Max tightening torque: 65 N·m

**Hydraulic symbol**



**Materials**

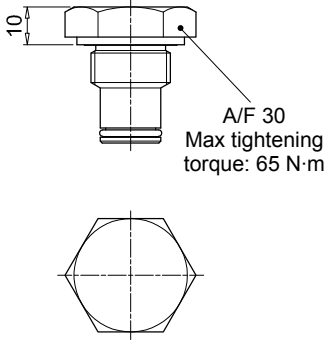
- Body: Brass
- Internal parts: Brass - Polyamide
- Contacts: Silver
- Seal: HNBR - FPM

**Technical data**

- Reset: Manual reset
- Max working pressure: 420 bar
- Proof pressure: 630 bar
- Burst pressure: 1260 bar
- Working temperature: From -25 °C to +110 °C
- Compatibility with fluids: Mineral oils, Synthetic fluids HFA, HFB, HFC according to ISO 2943
- Degree protection: IP65 according to EN 60529

| T2             |               |
|----------------|---------------|
| Indicator plug |               |
| Seal           | Ordering code |
| HNBR           | T2 H          |
| FPM            | T2 V          |



10

A/F 30  
Max tightening  
torque: 65 N·m

**Materials**

- Body: Phosphatized steel
- Seal: HNBR / FPM

# DIFFERENTIAL INDICATORS

## Designation & Ordering code

### DESIGNATION & ORDERING CODE - DIFFERENTIAL INDICATORS

| Series   | Configuration example 1: | DE | M | 50 | H | F | 35 | P01 |
|--|--------------------------|----|---|----|---|---|----|-----|
| <b>DE</b> Electrical differential indicator          | Configuration example 2: | DE | H | 50 | F | A | 70 | P01 |
| <b>DL</b> Electrical / Visual differential indicator | Configuration example 3: | DL | E | 70 | V | A | 50 | P01 |
| <b>DT</b> Electrical differential indicator          | Configuration example 4: | DT | A | 50 | H | F | 70 | P01 |
| <b>DV</b> Visual differential indicator              | Configuration example 5: | DV | M | 95 | V |   |    | P01 |

| Type                                      | DE | DL | DT | DV                            |
|---|----|----|----|-------------------------------|
| <b>A</b> Standard type                    | •  | •  | •  | <b>A</b> With automatic reset |
| <b>M</b> With wired electrical connection | •  | -  | -  | <b>M</b> With manual reset    |
| <b>E</b> For high power supply            | -  | •  | -  |                               |

| Pressure setting  | DEA | DEM | DLA | DLE | DT | DV |
|-------------------|-----|-----|-----|-----|----|----|
| <b>50</b> 5 bar   | •   | •   | •   | •   | •  | •  |
| <b>70</b> 7 bar   | •   | •   | •   | •   | •  | •  |
| <b>95</b> 9.5 bar | •   | •   | •   | •   | •  | •  |

| Seals         | DEA | DEM | DLA | DLE | DT | DV |
|---------------|-----|-----|-----|-----|----|----|
| <b>F</b> MFQ  | -   | -   | -   | -   | -  | -  |
| <b>H</b> HNBR | •   | •   | •   | •   | •  | •  |
| <b>V</b> FPM  | •   | •   | •   | •   | •  | •  |

| Thermostat                  | DEA | DEM | DLA | DLE | DT | DV |
|-----------------------------|-----|-----|-----|-----|----|----|
| <b>A</b> Without thermostat | •   | •   | •   | •   | -  | -  |
| <b>F</b> With thermostat    | -   | •   | -   | •   | •  | -  |

| Electrical connections   | DEA | DEM | DLA | DLE | DT | DV |
|--|-----|-----|-----|-----|----|----|
| <b>10</b> Connection AMP Superseal series 1.5                              | -   | •   | -   | -   | -  | -  |
| <b>20</b> Connection AMP Timer Junior                                      | -   | •   | -   | -   | -  | -  |
| <b>30</b> Connection Deutsch DT-04-2-P                                     | -   | •   | -   | -   | -  | -  |
| <b>35</b> Connection Deutsch DT-04-3-P                                     | -   | •   | -   | -   | -  | -  |
| <b>48</b> Connection via three-core cable - fitting M20x1.5                | -   | -   | -   | -   | -  | -  |
| <b>49</b> Connection via four-core cable - fitting 1/2" NPT                | -   | -   | -   | -   | -  | -  |
| <b>50</b> Connection EN 175301-803   | •   | -   | -   | •   | -  | -  |
| <b>51</b> Connection EN 175301-803, transparent base with lamps 24 Vdc     | -   | -   | •   | -   | -  | -  |
| <b>52</b> Connection EN 175301-803, transparent base with lamps 110 Vdc    | -   | -   | •   | -   | -  | -  |
| <b>70</b> Connection IEC 61076-2-101 D (M12)                               | -   | -   | -   | -   | •  | -  |
| <b>71</b> Connection IEC 61076-2-101 D (M12), black base with lamps 24 Vdc | -   | -   | •   | -   | -  | -  |

| Option                        |
|-------------------------------|
| <b>P01</b> MP Filtri standard |
| <b>Pxx</b> Customized         |

### DESIGNATION & ORDERING CODE - DIFFERENTIAL INDICATOR PLUG

| Series                   | Configuration example | T2 | H |
|--------------------------|-----------------------|----|---|
| <b>T2</b> Indicator plug |                       |    |   |

| Seals         |
|---------------|
| <b>H</b> HNBR |
| <b>V</b> FPM  |





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