

# FMM

## SERIES

### N-LINE FILTER



Maximum working pressure 4000 psi

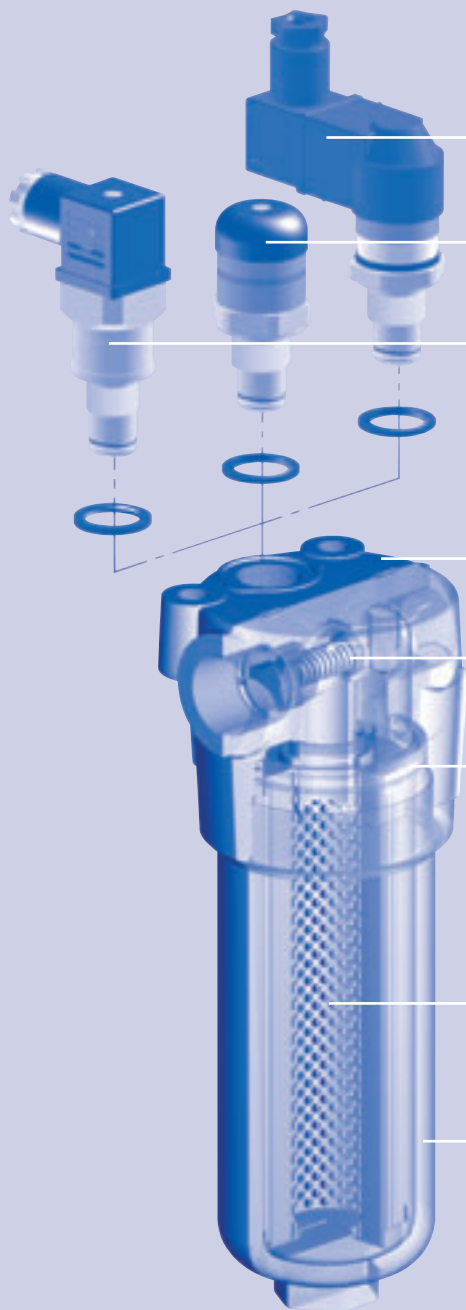
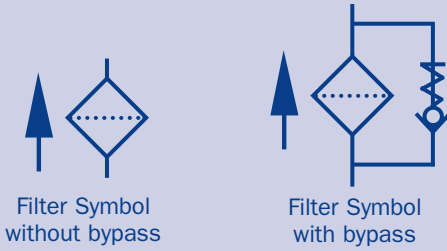
Flow rate to 40 gpm

# FMM

## SERIES

The MP Filtri FMM050 series filters were designed and developed to address the need for an in-line medium pressure filter (4000 psi).

The research done by the MP Filtri Engineering Department on both the housing and element has resulted in a product line with excellent technical characteristics. Specifically in terms of mechanical reliability, reduced pressure drop, Beta 1000 rating and dirt holding capacity.



Visual - Electrical Indicator

Visual Indicator

Electrical Indicator

Cast Iron

Bypass valve

Seals

Filter element

Bowl

### Filter body (Material)

- Head: Cast Iron
- Bowl: Steel
- By-pass valve: Steel

### Pressure filter body

- Working pressure: 4000 psi (28 MPa)
- Test pressure: 6000 psi (42 MPa)
- Burst pressure: 12000 psi (84 MPa)
- Fatigue test: 1.000.000 cycles with pressure impulses from 0 to 4570 psi (32 MPa)

### Working Temperature

- From -13°F to + 230°F

### Bypass valve

- By-pass valve setting 90 psi ±10%
- Other pressures upon request.

### Filter elements – collapse pressure

- Fiberglass elements N series: 285 psi
- Fiberglass elements H series: 3000 psi
- Square wire mesh M series: 285 psi

### Seals

- Standard Buna-N                   A series
- Optional viton                       V series

### Compatibility with fluids

- Housing compatible with:  
Mineral oil according to ISO 2943 - synthetic fluids, water-based emulsions (min. 95/5) and water-glycol (min. 95/5).
- Elements compatible with:  
Mineral oil according to ISO 2943, synthetic fluids. For water-based emulsions (min. 95/5) and water-glycol (min. 95/5), please CONSULT FACTORY.
- Seals in Nitrile (Buna-N) A series, compatible with:  
Mineral oil according to ISO 2943 - water-based emulsions - water-glycol.
- Seals in Viton V series, compatible with:  
Synthetic fluids type HS-HFDR-HFDS-HFUDU

### Weights

- FMM050-2   8.0 lbs (3,6 Kg)
- FMM050-3   8.6 lbs (3,9 Kg)
- FMM050-4   10.0 lbs (4,5 Kg)

### Port connections

- |                              |                                   |
|------------------------------|-----------------------------------|
| <b>A</b> M 18 x 1,5 ISO 6149 | <b>E</b> 1/2" NPT                 |
| <b>B</b> M 22 x 1,5 ISO 6149 | <b>F</b> 3/4" NPT                 |
| <b>C</b> 1/2" BSP            | <b>G</b> SAE 8 - 3/4" - 16 UNF    |
| <b>D</b> 3/4" BSP            | <b>H</b> SAE 12 - 1 1/16" - 12 UN |

### MP filter elements, conform to the following ISO standard:

- ISO 2941 Verification of collapse/burst resistance.
- ISO 2942 Verification of fabrication integrity and determination of the first bubble point.
- ISO 2943 Verification of material Compatibility with fluids.
- ISO 3723 Method for end load test.
- ISO 3724 Verification of flow fatigue characteristics.
- ISO 3968 Evaluation of pressure drop versus flow characteristics.
- ISO 16889 Multi-pass method for evaluating filtration performance.

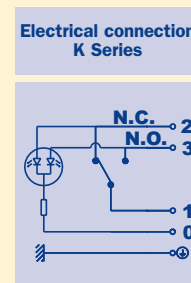
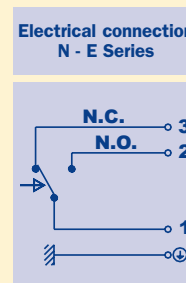
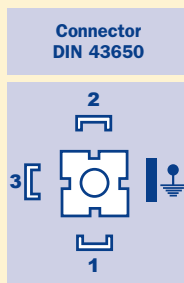
### Filtering area

Element series type	2	3	4
N	116	165	217
H	108	155	200
M	108	155	200

Values sq in

### Electrical indicators

K - E - N Series		
Supply voltage 50/60 Hz	Resistive load	Inductive load
(V)	(A)	(A)
Vca 125 (~)	5	5
Vca 250 (~)	5	5
Vcc 30 (=)	5	3
Vcc 125 (=)	0,5	0,03
Vcc 250 (=)	0,25	0,03



## General - Filter selection

For a quick reference guide, refer to page 5

### Filter assembly pressure drop:

$\Delta p$  Total =  $\Delta p$  filter housing +  $\Delta p$  filter element

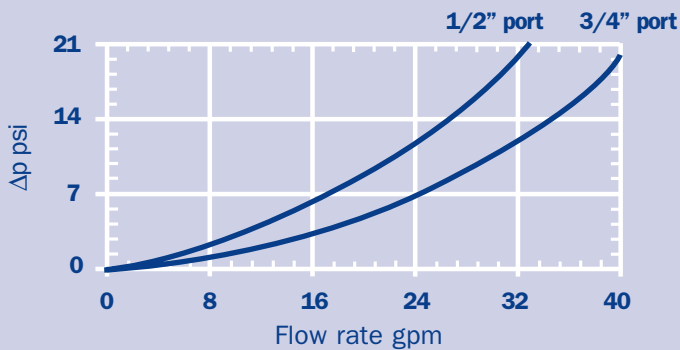
- Housing pressure drop:  
The  $\Delta p$  is proportional to the fluid density.
- Filter element pressure drop:  
The  $\Delta p$  is proportional to the kinematic viscosity.

The pressure drop data for filter elements which is listed in this brochure is based on mineral oil with kinematics viscosity of 150 SUS (30 mm<sup>2</sup>/s).

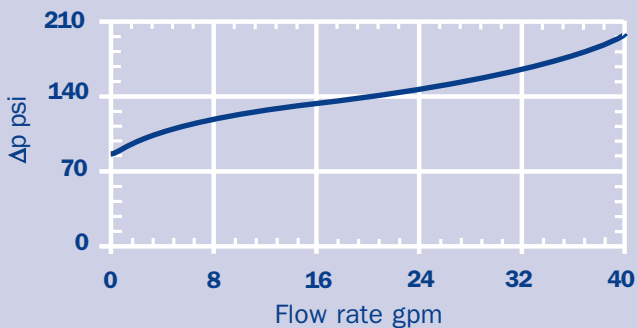
## Technical data

The curves were obtained using a mineral oil with a density of 0,86 Kg/dm<sup>3</sup> according to ISO 3968.  
The  $\Delta p$  is proportional to the fluid density.

### Housing pressure drop



### Bypass valve pressure drop



## Filter Selection

### Filter assembly sizing example

$\Delta p$  Total

$\Delta p_c$  Filter housing

$\Delta p_e$  Filter element

Y Coefficient

Q l/min = Flow rate

V1 = Reference viscosity 30 mm<sup>2</sup>/s

V2 = Working viscosity in mm<sup>2</sup>/s

$\Delta p$  Total =  $\Delta p_c$  +  $\Delta p_e$

$\Delta p_e = Y \times Q \times ( V_2/V_1 )$

For application with kinematic viscosity's other than **150 SUS - see below**

### "Y" coefficient for the pressure drop multiplier for filter elements

Filter element	Y Coefficient Filter Element N series	Y Coefficient Filter Element H series	Bowl lengths
A03	1.30950	1.57140	2
A06	1.16775	1.40130	
A10	0.63180	0.75816	
A16	0.49086	0.58903	
A25	0.26460	0.31752	
M25	0.07560	-	
A03	0.93825	1.12590	3
A06	0.87750	1.05300	
A10	0.48060	0.57672	
A16	0.38777	0.46531	
A25	0.19634	0.23560	
M25	0.06750	-	
A03	0.65475	0.78570	4
A06	0.58050	0.69660	
A10	0.32940	0.39528	
A16	0.31050	0.37260	
A25	0.16648	0.19975	
M25	0.05783	-	

## Sizing Example

Q = 17 gpm

V<sub>2</sub> = 230 SUS at 104 °F

P<sub>max</sub> = 3000 psi

Filtration = 16 μm absolute

$\Delta p$  Total max = 21 psi (recommendation)

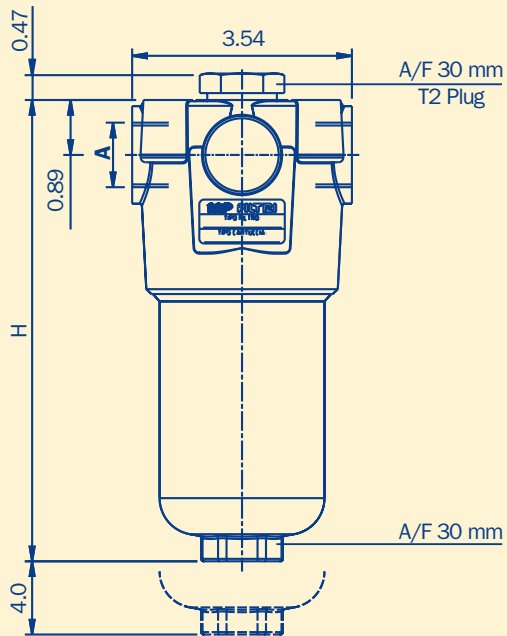
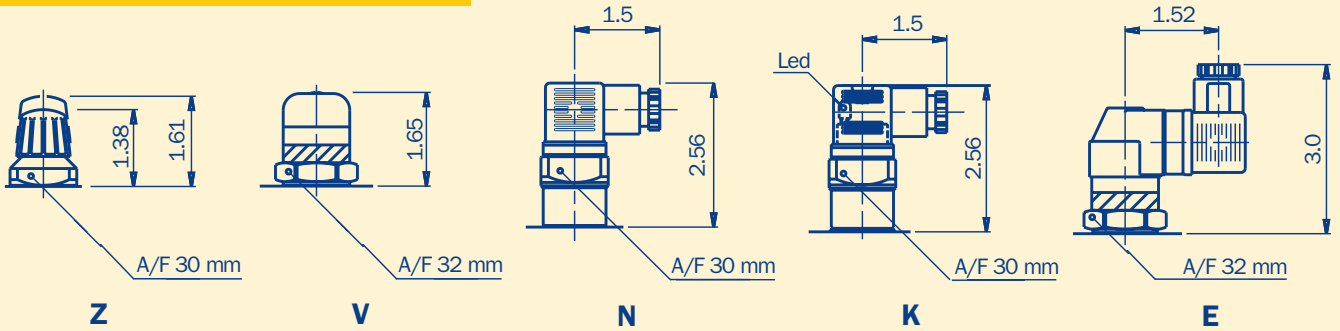
$\Delta p_c = 4.3$  psi

$\Delta p_e = 0.49086 \times 17 \times ( 230/150 ) = 12.79$  psi

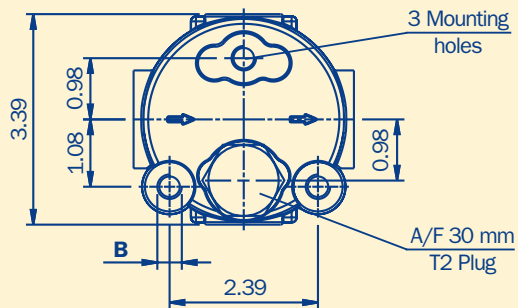
$\Delta p$  Total = 4.3 + 12.79 = 17.09 psi

### Filter selected

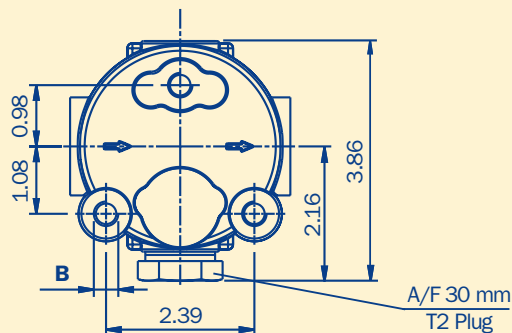
FMM 050 length 2 with A16 filter element



### With standard indicator



### Option P03 with 90° indicator



### Filter selection-quick reference guide

The flow rate data that is listed in the table is based on mineral oil with kinematics viscosity of 150 SUS and a maximum filter assembly (housing + element) pressure drop of 21 psi.

Filter element type	Flow rate gpm N Series	Flow rate gpm H Series	Bowl Length
A03	13	11.5	2
A06	14.5	13	
A10	21	20	
A16	26	22,5	
A25	31	26	
M25	34	-	3
A03	15,5	13	
A06	18,5	15.5	
A10	25	21	
A16	29	23,5	
A25	33	29	4
M25	37	-	
A03	20	18,5	
A06	23,5	21	
A10	29	26	
A16	32	29	
A25	34	32	
M25	40	-	

Connection A	Mounting threads B	Bowl Length	H
M 18 x 1,5 ISO 6149	M10	2	7.24
M 22 x 1,5 ISO 6149	M10	3	8.90
1/2" BSP	M10	4	11.02
3/4" BSP	M10		
1/2" NPT	3/8" UNC		
3/4" NPT	3/8" UNC		
SAE 8-3/4"-16 UNF	3/8" UNC		
SAE 12-1/16"-12 UN	3/8" UNC		

**Note:** The options with indicators are supplied with a T2 plug. All dimensions in inches unless noted.

**Multipass method for evaluating Filtration performance according to ISO 16889. ISO MTD text dust**

Multipass method for evaluating Filtration performance according to ISO 4572. ACFTD text dust

Dimensions for β values	2	10	75	100	200	1000	Dimensions for β values	200
Efficiency in %	50%	90%	98,70%	99%	99,50%	99,90%	Efficiency in %	99,50%
Elements media	(μm @)						μm	
A03	<3	<3	<3	<3	3.30	4.2	A03	3 μm
A06	<3	<3	4.31	4.53	5.07	6.3	A06	6 μm
A10	<6	<6	6.12	6.41	7.12	9.0	A10	10 μm
A16	<7	<7	10.45	10.97	12.13	13.9	A16	16 μm
A25	<9	12.34	15.82	16.30	17.46	19.3	A25	25 μm

The data are reported to a value of final Δp equal to 16 bar

**Comparison**

ISO MTD (μm@)	4	6	14	21
ACFTD (μm)	<1	5	15	25

**Characteristics of the filter element with nominal filtration M / T series**

Square wire mesh filtration degree is defined in microns by the maximum diameter of a sphere corresponding to the mesh size.

**Hydraulic System Component Cleanliness Levels**

System component	Typical Cleanliness Specification									
	12/10/7	13/11/8	14/12/9	15/13/10	16/14/11	17/15/12	18/16/13	19/17/14	20/18/15	
Servo valve			●	●	●					
Proportional valve				●	●	●				
Variable pump					●	●	●			
Cartridge valve						●	●	●		
Gear pump						●	●	●		
Vane pump							●	●	●	
Pressure/flow control valve							●	●	●	
Solenoid valve							●	●	●	
<b>ISO cleanliness</b>	12/10/7	13/11/8	14/12/9	15/13/10	16/14/11	17/15/12	18/16/13	19/17/14	20/18/15	
<b>NAS cleanliness</b>	1	2	3	4	5	6	7	8	9	
Recommended absolute element rating	3 micron			6 micron			10 micron		>10	

Absolute filter elements have been tested by the following independent institutes.

Institute of Filtration  
(France)



KUNGL  
TEKNISKA  
HÖGSKOLAN

Royal Institute of Technology

## Filter assembly FMM 050



Example: FMM050 2 B A C A10 N P01 / V7

## Filter element HP 050



Example: HP050 2 A10 A N P01

### 1 - Element / Housing length

<b>2</b>	184 mm Filter length
<b>3</b>	226 mm Filter length
<b>4</b>	280 mm Filter length

### 2 - Bypass valve

<b>S</b>	Without bypass
<b>B</b>	With bypass

### 3 - Seals

<b>A</b>	Buna-N
<b>V</b>	Viton

### 4 - Connections

<b>A</b>	M18X1,5 ISO 6149
<b>B</b>	M22X1,5 ISO 6149
<b>C</b>	1/2" BSP
<b>D</b>	3/4" BSP
<b>E</b>	1/2" NPT
<b>F</b>	3/4" NPT
<b>G</b>	SAE 8 - 3/4" - 16 UNF
<b>H</b>	SAE 12 - 1 1/16" - 12 UN

### 5 - Filter elements

<b>A03</b>	Fiberglass 3 µm	} βx (c) ≥ 1000
<b>A06</b>	Fiberglass 6 µm	
<b>A10</b>	Fiberglass 10 µm	
<b>A16</b>	Fiberglass 16 µm	
<b>A25</b>	Fiberglass 25 µm	
<b>M25</b>	Square wire mesh	

### 6 - Filter elements collapse pressure series

<b>N</b>	285 psi
<b>H</b>	3000 psi

### 7 - Options (1)

#### a) Filter

<b>P01</b>	MP Filtri with standard indicator
<b>P02</b>	MP Filtri without indicator
<b>P03</b>	MP Filtri with indicator at 90°
<b>Pxx</b>	Customer request

#### b) Filter element

<b>P01</b>	MP Filtri
<b>Pxx</b>	Private label

### 8 - Indicators

<b>Z7</b>	Visual (pop-up) 75 psi	<b>N8</b>	Electrical 100 psi
<b>Z8</b>	Visual (pop-up) 100 psi	<b>E7</b>	Visual-electrical 75 psi
<b>V7</b>	Visual 75 psi	<b>E8</b>	Visual-electrical 100 psi
<b>V8</b>	Visual 100 psi	<b>K7*</b>	Visual-electrical 75 psi
<b>N7</b>	Electrical 75 psi	<b>K8*</b>	Visual-electrical 100 psi

(1) **Note:** The options with the indicators are supplied with T2 plug.

\* { 1 - Voltage 24 Volt  
2 - Voltage 110 Volt  
3 - Voltage 220 Volt

**MP Filtri** - Filtration products will only be warranted if original MP Filtri replacement elements and spare parts are used

Date held in this publication is given only for indicative purposes. MP Filtri reserves the right to introduce modification to described items for technical or commercial reasons. Copyright reserved.



**Head Quarter:**

**MP FILTRI S.p.A. Italy**

Via Matteotti, 2  
20060 Pessano con Bornago (Milano) Italy  
Tel. +39.02.95703.1  
Fax +39.02.95741497-95740188  
sales@mpfiltri.com  
www.mpfiltri.com



**GREAT BRITAIN**

**MP FILTRI U.K. Ltd.**

Bourton Industrial Park  
Bourton on the Water  
Gloucestershire GL54 2HQ UK  
Phone: +44.01451-822522  
Fax: +44.01451-822282  
sales@mpfiltri.co.uk  
www.mpfiltri.co.uk

**GERMANY**

**MP FILTRI D GmbH**

Am Wasserturm 5  
D-66265 Heusweiler/Holz  
Phone: +49.06806-85022.0  
Fax: +49.06806-85022.18  
mpfiltrink@aol.com

**FRANCE**

**MP FILTRI FRANCE**

B.P. 325  
01603 Trevoux Cedex  
Phone: +33.04.74.08.84.78  
Fax: +33.04.74.08.80.45  
mpfiltrifrance@wanadoo.fr

**USA**

**MP FILTRI USA Inc.**

2055 Quaker Pointe Drive  
Quakertown, PA 18951  
Phone: +1.215-529-1300  
Fax: +1.215-529-1902  
sales@mpfiltriusa.com  
www.mpfiltriusa.com

**CANADA**

**MP FILTRI CANADA Inc.**

210 Jacob Keffer Parkway Concord,  
Ontario Canada L4K 4W3  
Phone: +1.905-303-1369  
Fax: +1.905-303-7256  
mail@mpfiltricanada.com  
www.mpfiltricanada.com