APPLICATION

• HYDAC Spin-On Filters are for filtration of hydraulic fluids and lubricating oils on industrial machinery, power units, agricultural, construction, and mobile equipment.

• HYDAC Spin-On Filters may be installed in return or charge lines of hydraulic systems. They may also be used in off-line and lubrication system filtration applications.

• The complete filter assembly includes a die cast aluminum head and a replaceable spin-on filter element. A bypass valve is built into the filter head.

• The use of replaceable spin-on elements provides quick, efficient element changeout.

• Dual element models are available for higher flow rate applications or installations requiring extended service between element changeouts.

• Dual element models include a choice of:
  
  - end-to-end mounting (MFD)
  - side-by-side mounting (MFDS)

  for ease of assembly, installation, and element changeout.

• The basic spin-on filter assemblies can be configured with clogging indicators. Gauge and switch-type indicators are available and are recommended for all installations.

• Spin-On Filters are not available for use with water-glycol or phosphate ester fluids.

BETA SPIN™ ELEMENTS

• HYDAC Beta Spin™ Elements are available with Multi-Layer Betamicron® media with absolute ratings of 3, 5, 10, and 20 microns (Beta Ratio ≥ 200).

• Proper support of the filter media provides high Beta Ratio values (particle removal efficiency) even at high differential pressures. The efficiency of many competitive elements drastically deteriorates as the element clogs and differential pressure increases.

• Betamicron® filter media is firmly supported to achieve flow fatigue resistance during significant pressure flow pulsations.

• High quality adhesive is used to bond the endcaps to the media and to bond the seam of the media.

• Heavy-gauge perforated support tubes are used to provide proper flow distribution and protection against element collapse.
Specifications & Options: MF 80/85 Series

SPECIFICATIONS:

- **Operating Pressure:**
  120 psi/8 bar Maximum Operating Pressure

- **Flow Ratings:**
  15 gpm for Standard Length Element
  25 gpm for Extended Length Element

- **Fluid Operating Temperatures:**
  -4°F to +212°F
  -20°C to +100°C

- Compatible with all Petroleum Based Fluids
- Aluminum Die Cast Head
- Nitrile Seals
- Static Pressure Indicator Sensing

OPTIONS:

- 3, 10, and 25 Micron Nominal Filtration Ratings and 3, 5, 10, and 20 Micron Absolute Filtration Ratings
- Available in 5.4 or 8.4 inch Length Elements
- 25 psi Bypass
- 3/4” NPTF, 3/4” BSPP, SAE-12, 1” NPTF, or SAE-16 Ports
- Pressure Gauge and Pressure Switch Indicators

Above Subject To Technical Modifications

Dimensions: MF 80/85 Series

<table>
<thead>
<tr>
<th>Connection Size</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>3/4” NPTF</td>
<td>3.66”</td>
</tr>
<tr>
<td>3/4” BSPP</td>
<td>93 mm</td>
</tr>
<tr>
<td>SAE-12</td>
<td>3.65”</td>
</tr>
<tr>
<td>1” NPTF</td>
<td>93 mm</td>
</tr>
<tr>
<td>SAE-16</td>
<td></td>
</tr>
</tbody>
</table>

Dimensions are for general information only. Due to constant development and updating of details, we ask that all critical dimensions be verified by requesting a certified print.
Specifications & Options: MF 90/95 Series

SPECIFICATIONS:
- Operating Pressure:
  250 psi/17 bar Maximum Operating Pressure
- Flow Ratings:
  15 gpm for Standard Length Element
  25 gpm for Extended Length Element
- Fluid Operating Temperatures:
  -4°F to +212°F
  -20°C to +100°C
- Compatible with all Petroleum Based Fluids
- Aluminum Die Cast Head
- Nitrile Seals
- Differential Pressure Sensing Indication

OPTIONS:
- 3, 10, and 25 Micron Nominal Filtration Ratings and
  3, 5, 10, and 20 Micron Absolute Filtration Ratings
- Available in 5.9 or 8.0 inch Length Elements
- 25 psi Bypass for Nominal Rated or
  43 psi Bypass for Absolute Rated elements
- 3/4" NPTF, 3/4" BSPP, SAE-12, 1" NPTF, or SAE-16 Ports

Dimensions: MF 90/95 Series

<table>
<thead>
<tr>
<th>Connection Size</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>3/4&quot; NPTF</td>
<td>4.14&quot;</td>
</tr>
<tr>
<td>3/4&quot; BSPP</td>
<td></td>
</tr>
<tr>
<td>SAE-12</td>
<td>105 mm</td>
</tr>
<tr>
<td>1&quot; NPTF</td>
<td>4.14&quot;</td>
</tr>
<tr>
<td>SAE-16</td>
<td>105 mm</td>
</tr>
</tbody>
</table>

Dimensions are for general information only. Due to constant development and updating of details, we ask that all critical dimensions be verified by requesting a certified print.
Specifications & Options: MF 160/180 Series

SPECIFICATIONS:
• Operating Pressure:
  120 psi/8 bar Maximum Operating Pressure
• Flow Ratings:
  30 gpm for Standard Length Element
  60 gpm for Extended Length Element
• Fluid Operating Temperatures:
  -4°F to +212°F
  -20°C to +100°C
• Compatible with all Petroleum Based Fluids
• Aluminum Die Cast Head
• Nitrile Seals
• Static Pressure Indicator Sensing

OPTIONS:
• 3, 10, and 25 Micron Nominal Filtration Ratings and
  3, 5, 10, and 20 Micron Absolute Filtration Ratings
• Available in 6.9 or 10.9 inch Length Elements
• 25 psi Bypass for Nominal Rated or
  43 psi Bypass for Absolute Rated elements
• 1 1/4" NPTF, 1 1/2" NPTF, 1 1/4" BSPP,
  SAE-20, or SAE-24, Ports
• Pressure Gauge or Pressure Switch Indicators

Above Subject To Technical Modifications

Dimensions: MF 160/180 Series

Optional Gauge Port* (1/8" NPTF)
Location 1
(Location 1, 2, 3 or 4)

Port Type | MTG Holes | Dimension
---|---|---
| | A | B | C | D | E |
| SAE-20 | 2 | 2.40" | .79" | 1.10" | 9.30" | 13.30"
| | 61 mm | 20 mm | 28 mm | 236 mm | 338 mm |
| 1 1/4" BSP | 4 | 2.40" | .79" | 1.10" | 9.30" | 13.30"
| “Square” | 61 mm | 20 mm | 28 mm | 236 mm | 338 mm |
| 1 1/2" NPTF | 4 | 2.80" | 1.10" | 1.30" | 9.70" | 13.70"
| SAE-24 | 71 mm | 28 mm | 33 mm | 246 mm | 348 mm |

Mounting Hole Patterns

Dimensions are for general information only. Due to constant development and updating of details, we ask that all critical dimensions be verified by requesting a certified print.

*Note: Gauge port locations 1 & 3 sense upstream. Gauge port locations 2 & 4 sense downstream for suction applications.
Specifications & Options: MF 190/195

SPECIFICATIONS:
- **Operating Pressure:**
  - 120 psi/8 bar Maximum Operating Pressure
- **Flow Ratings:**
  - 30 gpm for Standard Length Element
  - 60 gpm for Extended Length Element
- **Fluid Operating Temperatures:**
  - -4°F to +212°F
  - -20°C to +100°C
- Compatible with all Petroleum Based Fluids
- Aluminum Die Cast Head
- Nitrile Seals
- Differential Pressure Indicator Sensing

OPTIONS:
- 3, 10, and 25 Micron Nominal Filtration Ratings and
  - 3, 5, 10, and 20 Micron Absolute Filtration Ratings
- Available in 6.9 or 10.9 inch Length Elements
- 25 psi Bypass for Nominal Rated or
  - 43 psi Bypass for Absolute Rated elements
- 1 1/4" NPTF, SAE-20, or 1 1/4" BSPP Ports
- ∆P Visual pop-up and Electrical Indicator options

Above Subject To Technical Modifications

Dimensions: MF 190/195

<table>
<thead>
<tr>
<th>Port Type</th>
<th>MTG Holes</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>SAE-20 1 1/4&quot; NPT</td>
<td>2</td>
<td>2.40&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>61 mm</td>
</tr>
<tr>
<td>1 1/4&quot; BSPP</td>
<td>3</td>
<td>2.40&quot;</td>
</tr>
<tr>
<td></td>
<td>Square</td>
<td>61 mm</td>
</tr>
</tbody>
</table>

Dimensions are for general information only. Due to constant development and updating of details, we ask that all critical dimensions be verified by requesting a certified print.
**Specifications & Options: MFD 160/180 & MFDS 160/180 Series**

**SPECIFICATIONS:**
- **Operating Pressure:**
  120 psi/8 bar Maximum Operating Pressure
- **Flow Ratings:**
  60 gpm for Standard Length Element
  120 gpm for Extended Length Element
- **Fluid Operating Temperatures:**
  -4°F to +212°F
  -20°C to +100°C
- Compatible with all Petroleum Based Fluids
- Aluminum Die Cast Head
- Nitrile Seals
- Static Pressure Indicator Sensing

**OPTIONS:**
- 3, 10, and 25 Micron Nominal Filtration Ratings and
  3, 5, 10, and 20 Micron Absolute Filtration Ratings
- Available in 6.9 or 10.9 inch Length Elements
- 25 psi Bypass for Nominal Rated or
  43 psi Bypass for Absolute Rated elements
- **MFD:** 1 1/2” NPTF, SAE-24,
  **MFDS:** SAE-32 Code 61 Flange /
  1 1/2” NPTF Combination Ports
- Pressure Gauge or Pressure Switch Indicators

*Above Subject To Technical Modifications*

**Dimensions: MFD 160/180 & MFDS 160/180 Series**

**MFD**

- Inlet & Outlet Ports
  (1 1/2" NPTF or SAE - 24)
- 2 Mounting Holes
  (3/8-16 x 0.625 DP)
- 2 Optional Gauge Ports
  (1/8" NPTF)

**MFDS**

- Inlet & Outlet Ports
  (1 1/2" NPTF & 2" (4 bolt) Flange Combination)
- 4 Mounting Holes
  (3/8-16 x 0.625 DP)
- Optional Gauge Port (1/8" NPTF)

*Dimensions are for general information only. Due to constant development and updating of details, we ask that all critical dimensions be verified by requesting a certified print.*
WATER REMOVAL ELEMENTS - CAPACITY vs. FLOW

PRESSURE DROP DATA

(Refer to the pressure drop curves on the following 3 pages)

Initial Pressure Drop

$$\Delta p_{\text{Assembly}} = \Delta p_{\text{Housing}} + \Delta p_{\text{Element}}$$

Pressure Drop vs. Flow Curves

(ISO 3968.2, Class B)

Housing Curves

Curves shown are based on test results using mineral oil with a kinematic viscosity of 141 SUS and a specific gravity of 0.86. Differential pressure increases in proportion to the specific gravity of the fluid.

$$\Delta p_{\text{Housing}} = \Delta p_{\text{Chart}} \times \frac{\text{Actual Specific Gravity}}{0.86}$$

Element K Factors

These Factors are based on test results using mineral oil with a kinematic viscosity of 141 SUS and a specific gravity of 0.86. Differential pressure across the element changes in proportion to viscosity and specific gravity.

$$\Delta p_{\text{Element}} = \text{Flow} \times K \text{Factor} \times \frac{\text{Actual Viscosity}}{141} \times \frac{\text{Actual Specific Gravity}}{0.86}$$

NOTE: When sizing filter assemblies for critical applications, please contact HYDAC before using printed pressure drop curves.

<table>
<thead>
<tr>
<th>Spin-On Element</th>
<th>Optimum Flow Rate</th>
<th>Maximum Flow Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Flow (gpm)</td>
<td>Capacity (quarts)</td>
</tr>
<tr>
<td>0080MA010A</td>
<td>2</td>
<td>0.12</td>
</tr>
<tr>
<td>0090MA010A</td>
<td>2</td>
<td>0.12</td>
</tr>
<tr>
<td>0095MA010A</td>
<td>4</td>
<td>0.17</td>
</tr>
<tr>
<td>0160MA010A</td>
<td>4</td>
<td>0.23</td>
</tr>
<tr>
<td>0180MA010A</td>
<td>6</td>
<td>0.45</td>
</tr>
</tbody>
</table>
These curves are based on test results using mineral oil with a kinematic viscosity of 141 SUS and a specific gravity of 0.86.

NOTE: When sizing filter assemblies for critical applications, please contact HYDAC before using printed pressure drop curves.
### Model Code - Spin-on Assemblies

<table>
<thead>
<tr>
<th>Filter Type</th>
<th>MF</th>
<th>BN</th>
<th>80</th>
<th>G</th>
<th>5</th>
<th>A</th>
<th>1.0 / 5.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>MF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MFD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MFDS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Filter Element Material
- **BN** = Betamicron® Low Collapse
- **P** = Paper
- **A** = Water Removal

#### Size
- **80** (not available with 3 µm BN Elements)
- **90**
- **160**
- **190** (uses size 160 element)
- **85** (not available with BN and A Elements)
- **95** (not available with 20 µm BN Elements)
- **180**
- **195** (uses size 180 element)

#### Type of Connection
- **G** = Threaded
- **GF** = Combination Threaded/Flanged (available on 160/180 MFDS only)

#### Filtration Rating (micron)

<table>
<thead>
<tr>
<th>Paper</th>
<th>Water Removal</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Absolute</td>
<td>3 Nominal</td>
</tr>
<tr>
<td>10 Nominal</td>
<td>25 Filtration</td>
</tr>
<tr>
<td>10 Nominal</td>
<td>25 Filtration</td>
</tr>
</tbody>
</table>

#### Type of Clogging Indicator
- **A** = No Indicator
- **E** = Pressure Gauge
- **G** = Pressure Switch (AC/DC)
- **UE** = Vacuum Gauge
- **UG** = Vacuum Switch (AC/DC)
- **B** = Visual (Automatic Reset)
- **C** = Electric Switch (DC)

#### Type Number

**Model codes containing RED are non-stock items – Contact HYDAC for availability**

<table>
<thead>
<tr>
<th>Port Configuration</th>
<th>Assembly</th>
<th>Code</th>
<th>Port</th>
<th>Code</th>
<th>Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>MF 80/85, 90/95</td>
<td>0.2</td>
<td>3/4&quot; BSPP (MF 90/95 only - uses MA elements)</td>
<td>5.1</td>
<td>1&quot; NPT</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5.2</td>
<td>3/4&quot; NPT</td>
<td>12.1</td>
<td>SAE 16 Thread</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12.2</td>
<td>SAE 12 Thread</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MF 160/180, 190/195</td>
<td>0.2</td>
<td>1 1/4&quot; BSPP (MF 190/195 only - uses MA elements)</td>
<td>5.1</td>
<td>1 1/2&quot; NPT</td>
<td></td>
</tr>
<tr>
<td>MF 160/180, 190/195</td>
<td>5.2</td>
<td>1 1/4&quot; NPT</td>
<td>12.1</td>
<td>SAE 24 Thread</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12.2</td>
<td>SAE 20 Thread</td>
<td></td>
<td>MF 160/180 only</td>
<td></td>
</tr>
<tr>
<td>MFD 160/180</td>
<td>5.1</td>
<td>1 1/2&quot; NPT</td>
<td>12.1</td>
<td>SAE 24 Thread</td>
<td></td>
</tr>
<tr>
<td>MFDS 160/180</td>
<td>5.1</td>
<td>1 1/2&quot; NPT / 2&quot; SAE Flange Combo (Code 61)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Bypass Valve Cracking Pressure
- **(omit)** = 25 psid/2 bar (Standard)
- **B0.2** = 3 psid/0.2 bar (For Suction Applications MF 160/180 only)
- **B3** = 43 psid/3 bar [Standard on Absolute (BN) Series Except 80]
- **KB** = No Bypass

---

Model codes containing RED are non-stock items – Contact HYDAC for availability.
**MODEL CODE - SPIN-ON ELEMENTS**

<table>
<thead>
<tr>
<th>Element Size</th>
<th>Type of Element</th>
<th>Standard Length Elements</th>
<th>Extended Length Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>0080</td>
<td>MA = UN Tap Plate Thread (Standard)</td>
<td>Not available with 3 µm BN Elements</td>
<td>Not available with BN or A Elements</td>
</tr>
<tr>
<td>0090</td>
<td>MA = UN Tap Plate Thread (Standard)</td>
<td>Not available with 3 µm BN Elements</td>
<td>Not available with BN or A Elements</td>
</tr>
<tr>
<td>0160</td>
<td>MA = UN Tap Plate Thread (Standard)</td>
<td>Not available with 3 µm BN Elements</td>
<td>Not available with BN or A Elements</td>
</tr>
<tr>
<td>0085</td>
<td>MA = UN Tap Plate Thread (Special)</td>
<td>Not required for BSPP ported heads</td>
<td>Not required for BSPP ported heads</td>
</tr>
<tr>
<td>0095</td>
<td>MA = UN Tap Plate Thread (Special)</td>
<td>Not required for BSPP ported heads</td>
<td>Not required for BSPP ported heads</td>
</tr>
<tr>
<td>0160</td>
<td>MG = BSPP Tap Plate Thread (Special)</td>
<td>Not required for BSPP ported heads</td>
<td>Not required for BSPP ported heads</td>
</tr>
</tbody>
</table>

**Filtration Rating (micron)**

<table>
<thead>
<tr>
<th>Rating</th>
<th>Element Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>003</td>
<td>Betamicron*</td>
</tr>
<tr>
<td>005</td>
<td>Betamicron®</td>
</tr>
<tr>
<td>010</td>
<td>Aquamicron®</td>
</tr>
<tr>
<td>020</td>
<td>Aquamicron®</td>
</tr>
<tr>
<td>025</td>
<td>Aquamicron®</td>
</tr>
</tbody>
</table>

**Filter Element Material**

<table>
<thead>
<tr>
<th>Material</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BN</td>
<td>Betamicron® Low Collapse</td>
</tr>
<tr>
<td>P</td>
<td>Paper</td>
</tr>
<tr>
<td>A</td>
<td>Aquamicron® Water Removal (Stock inventory for sizes 160 and 180)</td>
</tr>
</tbody>
</table>

*Integral Part of filter head

**MODEL CODE - SPIN-ON FILTER CLOGGING INDICATORS**

<table>
<thead>
<tr>
<th>Indicator Type</th>
<th>Filter Housing Size</th>
<th>80/85, 160/180</th>
<th>90/95, 190/195</th>
</tr>
</thead>
<tbody>
<tr>
<td>B Visual - Automatic reset (ΔP)</td>
<td>N/A</td>
<td>NR*</td>
<td></td>
</tr>
<tr>
<td>C Electric Switch (DC) (ΔP)</td>
<td>N/A</td>
<td>NR*</td>
<td></td>
</tr>
<tr>
<td>E Pressure Gauge</td>
<td>VMF1.4E.0</td>
<td>VMF2E.0</td>
<td></td>
</tr>
<tr>
<td>G Pressure Switch (AC/DC)</td>
<td>VMF1.4G.0</td>
<td>VMF1.7G.0</td>
<td></td>
</tr>
<tr>
<td>UE Vacuum Gauge</td>
<td>VMF0.2UE.0</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>UG Vacuum Switch (AC/DC)</td>
<td>VMF0.2UG.0</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

* Integral Part of filter head