Double-throttle check valves from the Parker Manapak series FM are in sandwich design for easy configuration of stack systems. Throttle and check valves are located in ports A and B.

FM2 and FM3 can be used as meter-in or meter-out throttle by changing the mounting position.

FM4 can be selected by ordering code as meter-in or meter-out throttle. FM6 is only available as meter-out control.

The throttle check valve can also be used to influence the switching time of pilot operated directional valves. In this case, the valve is positioned between the pilot stage (CETOP03, NG06) and the main stage (CETOP05, NG10 up to CETOP10, NG32).

Features
- Two types of metering needle design can be selected when ordering FM2 and FM3 valves to achieve the throttle characteristics required to suit the application.
- Large bypass check valves allow high flow at low pressure drop.
- Sizes:
  - NG06 / CETOP 3 FM2
  - NG10 / CETOP 5 FM3
  - NG16 / CETOP 7 FM4
  - NG25 / CETOP 8 FM6

Technical data

<table>
<thead>
<tr>
<th>General</th>
<th>FM2</th>
<th>FM3</th>
<th>FM4</th>
<th>FM6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Size</td>
<td>06</td>
<td>10</td>
<td>16</td>
<td>25</td>
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<tr>
<td>Mounting pattern</td>
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<tr>
<td>Mounting position</td>
<td>NFPA D03</td>
<td>NFPA D05</td>
<td>NFPA D07</td>
<td>NFPA D08</td>
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<tr>
<td>Mounting position</td>
<td>CETOP 03</td>
<td>CETOP 05</td>
<td>CETOP07</td>
<td>CETOP 08</td>
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<tr>
<td>Ambient temperature [°C]</td>
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<tr>
<td>MTTF value [years]</td>
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<tr>
<td>Weight [kg]</td>
<td>1.3</td>
<td>2.4</td>
<td>5.4</td>
<td>7.9</td>
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<tr>
<td>Hydraulic</td>
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<tr>
<td>Max. operating pressure [bar]</td>
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<td>350</td>
<td>350</td>
<td>210</td>
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<tr>
<td>Max. flow [l/min]</td>
<td>53</td>
<td>76</td>
<td>200</td>
<td>341</td>
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<tr>
<td>Opening pressure [bar]</td>
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<tr>
<td>Meter-in throttle</td>
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<td>•</td>
<td>•</td>
<td>—</td>
</tr>
<tr>
<td>Meter-out throttle</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Fluid</td>
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<td>Fluid temperature [°C]</td>
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<tr>
<td>Viscosity range, perm. [cSt]</td>
<td>10...650</td>
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<td>Viscosity range, rec. [cSt]</td>
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<tr>
<td>Filtration</td>
<td>ISO 4406: 18/16/13 (acc. to NAS 1638: 7)</td>
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Parker Hannifin GmbH
Hydraulic Controls Division
Kaarst, Germany
Throttle Check Valve
Series FM

**Ordering Code**

<table>
<thead>
<tr>
<th>Code</th>
<th>Size</th>
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<tbody>
<tr>
<td>2</td>
<td>NG06</td>
</tr>
<tr>
<td>3</td>
<td>NG10</td>
</tr>
</tbody>
</table>

**Needle**

- Standard conical (omitted for ordering)
- Fine cylindrical
  - Hollow bored with V notch

**Adjustment**

- K Knob
- S Hex. socket

**Description**

- T Meter-in
- F Meter-out

A two-stage needle provides fine adjustment in the lower flow range with 3 adjustment rotations. After 3 more rotations, the valve is completely open.

Design "D"
A cylindrical needle with a V notch allows the fine adjustment over the entire setting range.
Performance Curves

Throttle Check Valve
Series FM

FM2 standard needle

FM2 flow, check valve

FM3 standard needle

FM3D needle with V notch

FM3 flow, check valve

All characteristic curves measured with HLP46 at 50°C.
Catalogue HY11-3500/UK

Performance Curves

Throttle Check Valve
Series FM

**FM4 with standard needle**
1 to 5 number of needle rotations

**FM6 with standard needle**
1 to 5 number of needle rotations

**FM4 flow, check valve**

**FM6 flow, check valve**

All characteristic curves measured with HLP46 at 50°C.
**Dimensions**

**Throttle Check Valve Series FM**

**FM2**

**Meter-in**

![Diagram of FM2 Meter-in]

**Meter-in or meter-out**

A functional change is achieved by rotating the mounting position of the valve 180° about the longitudinal axis (A-B).

![Diagram of Meter-in or Meter-out]

**Meter-out**

![Diagram of Meter-out]

**Seal kit FM2**

<table>
<thead>
<tr>
<th>Seal</th>
<th>Order code</th>
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</thead>
<tbody>
<tr>
<td>V</td>
<td>SK-FM2-V-20</td>
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</tbody>
</table>

**Note:**

The O-ring plate (with O-rings) for sealing the connecting surface of the manifold side is included. The O-ring and positioning pin are always mounted on the manifold side.
**FM3**

**Meter-in**

A functional change is achieved by rotating the mounting position of the valve 180° about the transverse axis (P).

**Meter-in or meter-out**

**Meter-out**

**Dimensions**

<table>
<thead>
<tr>
<th>Seal kit FM3</th>
<th>Seal</th>
<th>Order code</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>V</td>
<td>SK-FM3-V-20</td>
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</tbody>
</table>

**Note:**
The O-ring plate (with O-rings) for sealing the connecting surface of the manifold side is included. The O-ring and positioning pin are always mounted on the manifold side.
Throttle Check Valve
Series FM

FM4

Dimensions

opened 240
closed 226

Valve side

Manifold side

80

155

27.5

10

90

Meter-in

Meter-out

P  T  B  A

P  T  B  A

Seal kit FM4

Seal  Order code
V     SK-FM4/VHT
**Throttle Check Valve**

**Series FM**

**Dimensions**

**FM6**

<table>
<thead>
<tr>
<th>SM6</th>
<th>opened 378</th>
<th>closed 354</th>
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</thead>
<tbody>
<tr>
<td>69</td>
<td>180</td>
<td>33</td>
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</tbody>
</table>

**Seal kit FM6**

<table>
<thead>
<tr>
<th>Seal</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>SK-FM6-V-12</td>
</tr>
</tbody>
</table>

**Meter-out**

Adjustment: knob

Meter-in is not available for FM6