Flow Controls
Screw-in Cartridge Valves
Pressures to 350 bar (5000 psi) – Flows to 570 l/min (150 USgpm)
For over seventy years, Vickers has provided its customers with quality products and innovative solutions for all their power and motion control needs. The products featured in this catalog represent the very best in screw-in cartridge flow control technology.

Products in this catalog have been fatigue tested for one million cycles at 132% or 10 million cycles at 115% of rated pressure.

Two pressure ratings are shown for most products featured in this catalog – typical application pressure and fatigue pressure. The typical application pressure is the maximum recommended operating pressure for the valve in a given system. The fatigue pressure is the maximum pressure for the valve to be free, for infinite life, from metal fatigue problems.

We are committed to maintaining this position by offering the most comprehensive range of cartridge valves for industrial and mobile equipment.

This catalog gives basic specifications for the complete line of Vickers screw-in cartridge flow control valves. Its purpose is to provide a quick, convenient reference tool when choosing Vickers cartridge valves or designing a system using these components.

Valve Features and Benefits

Vickers offers a complete range of flow controls with a variety of features, including:

- Non-adjustable, pressure compensated, flow regulator for flows to 227 l/min (60 USgpm).
- Adjustable, pressure compensated, flow regulator for flows to 114 l/min (30 USgpm).
- Fixed and adjustable priority bypass type flow regulator for regulated flows to 114 l/min (30 USgpm).
- Adjustable flow control without free reverse flow check with flows rated to 114 l/min (30 gpm).
- Adjustable flow control with free reverse flow check with flows rated to 45 l/min (12 gpm).
- Needle valves with flows rated to 265 l/min (70 USgpm).
- Velocity fuses with flows rated to 227 l/min (60 USgpm).
- Flow divider/combiners (FDC1) with flows rated to 568 l/min (150 USgpm).
- Posi-traction valves (FDC3) with flows rated to 567 l/min (150 USgpm).
- Operating pressures to 350 bar (5000 psi).
- Flow divider/combiners:
  - All operating parts are hardened steel, ground and honed for long life and low leakage.
  - Designed for maximum flexibility and minimal space requirements.
  - All exposed cartridge surfaces are zinc dichromate plated to resist corrosion.
  - Steel housings are available for cartridges rated to 350 bar (5000 psi) application pressures.
  - All aluminum manifolds are gold anodized to resist corrosion.
  - Reliable, economical and compact.
  - Low leakage.
  - Variety of adjustment options.
  - Adjustments designed not to go spring solid at ‘full in’ position or to allow the adjustment to be removed when backed out.

Notable are the two styles of flow divider/combiner:

FDC1-**

The FDC1-** is a cartridge type hydraulic flow divider-combiner valve. It divides and combines flow, regardless of system load or pressure, proportionally per specified flow division.

For example: FDC1-10-**–66 will divide an incoming flow of 45 l/min (12 USgpm) equally out each port with an accuracy of ±10% each side. With 45 l/min (12 USgpm) in at “3” port, flow out port “2” is 22,7 l/min (6 USgpm) ± 4,5 l/min (1.2 USgpm) while flow at port “4” can be 22 l/min (6 USgpm) ± 4,5 l/min (1.2 USgpm).

The combining accuracy is the same with incoming flow at port “4” and “2” and flow out port “3” of 45 l/min (12 USgpm). Inlet flow at port “4” will be 22 l/min (6 USgpm) ± 4,5 l/min (1.2 USgpm). Inlet flow at port “2” will be 22 l/min (6 USgpm) ± 4,5 l/min (1.2 USgpm).

Flow division or combining will be maintained even if unequal loads are placed on ports “4” and “2”.

A special feature of the FDC1-** is that it provides rephase flow to either port 2 or port 4 when one of the two is blocked. This feature is useful in hydraulic circuits that require cylinders to move at the same time. If one cylinder bottoms out first, the opposite cylinder is provided with “rephase” flow to allow the cylinder to bottom and start the cylinders together for movement in the opposite direction.

FDC3-**

The FDC3-** is a cartridge type positive traction valve that divides and combines flow, regardless of system load or pressure, proportionally per specified flow division.

This valve is used in place of a standard flow divider-combiner in systems where hydraulic motors are used as drive wheels on each side of the machine. The positive traction valve acts much like a standard flow divider-combiner as the vehicle travels in a straight line. Equal amounts of flow go to each “C” port. As the vehicle turns a corner, a standard flow divider will maintain equal flow to each drive motor. On a turn, it is necessary for the outer wheel to turn faster than the inner wheel. A standard flow divider-combiner will provide equal flow to each motor causing the drive motors to skid. The positive traction valve solves this problem by allowing the one motor to turn faster than the other.

This operates in a similar way as a mechanical differential on an automobile. If the inside drive motor is restricted and builds up pressure, while the outside drive motor is without restriction. Under conditions of high differential pressure, the positive traction valve passes extra flow to the least restricted motor to prevent skidding. Under straight running conditions the differential pressure is low and equal amounts of flow are provided to each drive motor.

**WARNING:** For pressure over 210 bar (3000 psi) use steel housing.
<table>
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<th>DESCRIPTION</th>
<th>TYPICAL APPLICATION PRESSURE bar (psi)</th>
<th>RATED FLOW l/min (USgpm)</th>
<th>PAGE</th>
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<td>8</td>
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<td>Flow regulator valves, adjustable, pressure compensated</td>
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<td>PFR2-10</td>
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<td>210 (3000)</td>
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<td>18.9–56.7 (5–15)</td>
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<td>FCV7-10</td>
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<td>210 (3000)</td>
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<td>FCV6-16</td>
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<td>VF1-10</td>
<td>Velocity fuse</td>
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<td>210 (3000)</td>
<td>114 (30)</td>
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<td>5.7–60.8 (1.5–16)</td>
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<td>210 (3000)</td>
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<td>FDC3-20</td>
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<td>210 (3000)</td>
<td>190–570 (50–150)</td>
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<td>Aluminum Housings</td>
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<tr>
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<td>Aluminum Housings</td>
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The FR5–8 is a fixed orifice, pressure compensated, restrictive flow regulator screw-in cartridge valve.

**Operation**
This valve maintains a constant flow from port 1 to port 2 based on 5.5 bar (80 psid) regardless of pressure changes downstream on port 2. Reverse flow from port 2 to port 1 is at the value of the fixed orifice and is non-pressure compensated.

**Ratings and specifications**

*Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)*

- Typical application pressure (all ports)                     350 bar (5000 psi) steel housing
- Cartridge fatigue pressure (infinite life)               280 bar (4000 psi)
- Rated flow                                               10 l/min (2.5 USgpm)
- Flow regulation: 0.4–1.9 l/min (0.1–0.49 USgpm) ± 20% @ 210 bar (3000 psi)
- Flow regulation: 0.4–1.9 l/min (0.1–0.49 USgpm) ± 40% @ 350 bar (5000 psi)
- Flow regulation: 1.9–5.7 l/min (0.5–1.49 USgpm) ± 15%
- Flow regulation: 5.7–10 l/min (1.5–2.5 USgpm) ± 10%

Factory set maximum flow rate accuracy under standard test conditions and within the above ranges:
- Temperature range: –40°C to 120°C (−40°F to 248°F)
- Fluids: All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.
- Filtration: Cleanliness code 18/16/13
- Standard housing materials: Aluminum or steel
- Weight cartridge only: 0.05 kg (0.12 lbs.)
- Seal kits: 02–165875 Buna-N, 02–165877 Viton®

Viton is a registered trademark of E.I. DuPont

**Typical Flow Regulation**

*Cartridge Only*

<table>
<thead>
<tr>
<th>Pressure bar (bar)</th>
<th>Flow in l/min (USgpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>A – 9.5 l/min (2.5 USgpm)</td>
</tr>
<tr>
<td>8</td>
<td>B – 1.9 l/min (0.5 USgpm)</td>
</tr>
<tr>
<td>6</td>
<td>C – 0.38 l/min (0.1 USgpm)</td>
</tr>
</tbody>
</table>

**Pressure psi**

<table>
<thead>
<tr>
<th>Pressure psi</th>
<th>Flow in USgpm (10S SUS oil @ 121°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5000</td>
<td>2</td>
</tr>
<tr>
<td>3500</td>
<td>4</td>
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<tr>
<td>3000</td>
<td>6</td>
</tr>
<tr>
<td>2800</td>
<td>8</td>
</tr>
<tr>
<td>2100</td>
<td>10</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Pressure psi</th>
<th>Flow in l/min (10S SUS oil @ 121°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5000</td>
<td>2</td>
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<tr>
<td>3500</td>
<td>4</td>
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<td>3000</td>
<td>6</td>
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<tr>
<td>2800</td>
<td>8</td>
</tr>
<tr>
<td>2100</td>
<td>10</td>
</tr>
</tbody>
</table>

**Functional Symbol**

1, 2

**Sectional View**

1, 2
FR 5 - 8 (V) - F - (X)  
** - **

1 Function  
FR5 – Flow regulator

2 Size  
8 – 8 Size

3 Seals  
Blank – Buna-N  
V – Viton

4 Adjustment  
F – Fixed orifice

5 Valve housing material  
Omit for cartridge only  
S – Steel  
A – Aluminum

6 Port size  
O – Cartridge only

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Aluminum Fatigue rated</td>
</tr>
<tr>
<td>4T</td>
<td>SAE 4</td>
<td>02–160730</td>
</tr>
<tr>
<td>6T</td>
<td>SAE 6</td>
<td>02–160731</td>
</tr>
<tr>
<td>8T</td>
<td>SAE 8</td>
<td>02–160732</td>
</tr>
<tr>
<td>2G</td>
<td>1/4&quot; BSPP</td>
<td>02–160727</td>
</tr>
<tr>
<td>3G</td>
<td>3/8&quot; BSPP</td>
<td>02–160728</td>
</tr>
</tbody>
</table>

See pages 71 and 74 for housings

Factory set flow rate, nominal  
(Specify in USgpm)  
Range 0.4–9.5 l/min (0.1–2.5 USgpm)

Example:  
0.5–1.9 l/pm (0.5 USgpm)

Dimensions  
mm (inch)

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Code Port size</td>
<td>Aluminum Fatigue rated</td>
</tr>
<tr>
<td>4T</td>
<td>SAE 4 (0.34)</td>
<td>02–160730</td>
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<tr>
<td>6T</td>
<td>SAE 6 (1.09)</td>
<td>02–160731</td>
</tr>
<tr>
<td>8T</td>
<td>SAE 8 (1.08)</td>
<td>02–160732</td>
</tr>
<tr>
<td>2G</td>
<td>1/4&quot; BSPP (0.74)</td>
<td>02–160727</td>
</tr>
<tr>
<td>3G</td>
<td>3/8&quot; BSPP (1.09)</td>
<td>02–160728</td>
</tr>
</tbody>
</table>

See pages 71 and 74 for housings

Factory set flow rate, nominal  
(Specify in USgpm)  
Range 0.4–9.5 l/min (0.1–2.5 USgpm)

Example:  
0.5–1.9 l/pm (0.5 USgpm)

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
<tr>
<td>4T</td>
<td>SAE 4</td>
<td>02–160730</td>
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<tr>
<td>6T</td>
<td>SAE 6</td>
<td>02–160731</td>
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<tr>
<td>8T</td>
<td>SAE 8</td>
<td>02–160732</td>
</tr>
<tr>
<td>2G</td>
<td>1/4&quot; BSPP</td>
<td>02–160727</td>
</tr>
<tr>
<td>3G</td>
<td>3/8&quot; BSPP</td>
<td>02–160728</td>
</tr>
</tbody>
</table>

See pages 71 and 74 for housings

Factory set flow rate, nominal  
(Specify in USgpm)  
Range 0.4–9.5 l/min (0.1–2.5 USgpm)

Example:  
0.5–1.9 l/pm (0.5 USgpm)

Torque cartridge in housing  
34–41 Nm (25–30 lbf ft)

Aluminum housings can be used for pressures up to 210 bar (3000 psi)  
Steel housings must be used for operating pressures above 210 bar (3000 psi)
FR5-10
Flow regulator, fixed

Functional Symbol

Sectional View

Description
The FR5-10-F is a fixed orifice, pressure compensated, restrictive screw-in flow regulator cartridge valve.

Operation
This valve maintains a constant flow from port 1 to port 2 based on 5.5 bar (80 psid) regardless of pressure changes downstream on port 2. Reverse flow from port 2 to port 1 is at the value of the fixed orifice and is non-pressure compensated.

Ratings and specifications

Typical Flow Regulation

A – 21 l/min (5.5 USgpm)
B – 13.3 l/min (3.5 USgpm)
C – 7.8 l/min (2.0 USgpm)
D – 0.95 l/min (0.25 USgpm)

Cartridge Only

Flow regulator, fixed

Typical Flow Regulation

Differential pressure bar

A – 21 l/min (5.5 USgpm)
B – 13.3 l/min (3.5 USgpm)
C – 7.8 l/min (2.0 USgpm)
D – 0.95 l/min (0.25 USgpm)

Figure 1: Typical Flow Regulation

Differential pressure: 0 to 350 bar (0 to 5000 psi)
Flow in l/min: 0 to 24
Flow in USgpm: 0 to 6

Flow in l/min: 0 to 22.7
Flow in USgpm: 0 to 6.0

Temperature range: -40°C to 120°C (-40°F to 248°F)
Cavity: C-10-2 (See page 68)
Fluids: All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration: Cleanliness code 18/16/13
Standard housing materials: Aluminum or steel
Weight cartridge only: 0.12 kg (0.26 lbs.)
Seal kits: 565803 Buna-N
566086 Viton®

Viton is a registered trademark of E.I. DuPont
Model Code
FR5-10

FR5 – 10 (V) – F – * ** – * . *

1. Function
FR5 – Flow regulator

2. Size
10 – 10 Size

3. Seals
Blank – Buna-N
V – Viton

4. Adjustment
F – Fixed orifice

5. Housing material
A – Aluminum
S – Steel

⚠️ Aluminum housings can be used for pressures up to 210 bar (3000 psi)
Steel housings must be used for operating pressures above 210 bar (3000 psi)

6. Port size
O – Cartridge only

7. Factory set flow rate
(Specify in USgpm)
Range 0.38–22.7 l/min (0.1–6.0 USgpm)

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
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</thead>
<tbody>
<tr>
<td>3B</td>
<td>3/8” BSPP</td>
<td>02–175462</td>
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<tr>
<td>2G</td>
<td>1/4” BSPP</td>
<td>876702</td>
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<td>3G</td>
<td>3/8” BSPP</td>
<td>876703</td>
</tr>
<tr>
<td>6H</td>
<td>SAE 6</td>
<td>876700</td>
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<tr>
<td>8H</td>
<td>SAE 8</td>
<td>876701</td>
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<td>6T</td>
<td>SAE 6</td>
<td>566151</td>
</tr>
<tr>
<td>8T</td>
<td>SAE 8</td>
<td>02–175100</td>
</tr>
</tbody>
</table>

See page 74 for housings

Dimensions
mm (inch)

Torque cartridge in housing
A–47–54 Nm (35–40 lbf ft)
S–68–75 Nm (50–55 lbf ft)
**FR1-16**  
**Flow regulator, fixed**

### Description

The FR1-16-F is a fixed orifice, pressure compensated, screw-in flow regulator cartridge valve.

### Operation

This valve maintains a constant flow from port 1 to port 2 based on 5.5 bar (80 psid) regardless of pressure changes downstream on port 2. Reverse flow from port 2 to port 1 is at the value of the fixed orifice and is non-pressure compensated.

### Ratings and specifications

*Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)*

- **Typical application pressure (all ports)**: 210 bar (3000 psi)
- **Cartridge fatigue pressure (infinite life)**: 210 bar (3000 psi)
- **Rated flow**: 114 l/min (30 USgpm)
- **Flow regulation accuracy**: 1.9–10.9 l/min (0.5–2.9 USgpm) ± 15%  
  11.4–114 l/min (3–30 USgpm) ± 10%

Factory set maximum flow rate accuracy under standard test conditions and within the above ranges

- **Temperature range**: −40 to 120°C (−40° to 248°F)
- **Cavity**: C–16–2 (See page 68)
- **Fluids**: All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.
- **Filtration**: Cleanliness code 18/16/13
- **Standard housing materials**: Aluminum
- **Weight cartridge only**: 0,33 kg (0.72 lbs.)
- **Seal kits**: 565810 Buna-N 880609 Viton®

Viton is a registered trademark of E.I. DuPont

---

**Typical Flow Regulation**

**Cartridge Only**

<table>
<thead>
<tr>
<th>Pressure bar</th>
<th>Flow in lpm</th>
<th>Flow in USgpm</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>70</td>
<td>100</td>
<td>25</td>
</tr>
<tr>
<td>140</td>
<td>100</td>
<td>25</td>
</tr>
<tr>
<td>210</td>
<td>100</td>
<td>25</td>
</tr>
</tbody>
</table>

**A** – 114 l/min (30.0 USgpm)  
**B** – 60 l/min (15.0 USgpm)  
**C** – 9.5 l/min (2.5 USgpm)
Model Code  FR1-16

FR1 – 16 (V) – F – *** – *.*

1  Function
FR1 – Flow regulator

2  Size
16 – 16 Size

3  Seals
Blank – Buna-N
V – Viton

4  Adjustment
F – Fixed orifice

5  Port size
O – Cartridge only

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
<th>Aluminum Light duty</th>
<th>Aluminum Fatigue rated</th>
</tr>
</thead>
<tbody>
<tr>
<td>6B</td>
<td>3/4&quot; BSPP</td>
<td>02–175463</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12T</td>
<td>SAE 12</td>
<td>566149</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4G</td>
<td>1/2&quot; BSPP</td>
<td></td>
<td>876716</td>
<td></td>
</tr>
<tr>
<td>6G</td>
<td>3/4&quot; BSPP</td>
<td></td>
<td>876718</td>
<td></td>
</tr>
<tr>
<td>10H</td>
<td>SAE 10</td>
<td></td>
<td>876717</td>
<td></td>
</tr>
<tr>
<td>12H</td>
<td>SAE 12</td>
<td></td>
<td></td>
<td>566113</td>
</tr>
</tbody>
</table>

See page 71 for housings

6  Factory set flow rate
(Specify in USgpm)
Range 1.9–114 l/min (0.5–30 USgpm)

Dimensions
mm (inch)

Torque cartridge in housing
108–122 Nm (80–90 lbf ft)

---

![Diagram](image-url)
FR1-20
Flow regulator, fixed

**Functional Symbol**

```
+-----+-----+
|     |     |
| 2   | 1   |
```

**Sectional View**

```
1
```

**Description**
The FR1-20-F is a fixed orifice, pressure compensated, screw-in flow regulator cartridge valve.

**Operation**
This valve maintains a constant flow from port 1 to port 2 based on 5.5 bar (80 psid) regardless of pressure changes downstream on port 2. Reverse flow from port 2 to port 1 is at the value of the fixed orifice and is non-pressure compensated.

**Ratings and specifications**

*Performance data is typical with fluid at 21.8 cSt (105 SUS) and 49°C (120°F)*

- Typical application pressure (all ports) ........................................ 210 bar (3000 psi)
- Cartridge fatigue pressure (infinite life) ........................................ 210 bar (3000 psi)
- Rated flow .................................................................................. 227 l/min (60 USgpm)
- Flow regulation accuracy ......................................................... 3.8–18.5 l/min (1–4.9 USgpm) ± 15%
  19–227 l/min (5–60 USgpm) ± 10%
- Factory set maximum flow rate accuracy under standard test conditions and within the above ranges
- Temperature range ................................................................. −40°C to 120°C (−40°F to 248°F)
- Cavity ................................................................. C−20−2 (See page 68)
- Fluids ........................................................................... All general purpose hydraulic fluids such as: MIL−H−5606, SAE 10, SAE 20, etc.
- Filtration ....................................................................... Cleanliness code 18/16/13
- Standard housing materials .................................................. Aluminum
- Weight cartridge only ........................................................... 0.82 kg (1.8 lbs.)
- Seal kits ........................................................................... 889615 Buna-N
  889619 Viton®

*Viton is a registered trademark of E.I. DuPont*

**Typical Flow Regulation**

Cartridge Only

![Typical Flow Regulation Graph](image_url)

- **A** – 227 l/min (60.0 USgpm)
- **B** – 114 l/min (30.0 USgpm)
- **C** – 38 l/min (10.0 USgpm)
FR1 – 20 (V) – F – *** – * . *

1 Function
FR1 – Flow regulator

2 Size
20 – 20 Size

3 Seals
Blank – Buna-N
V – Viton

4 Adjustment
F – Fixed orifice

5 Port size
O – Cartridge only

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
<tr>
<td>8B</td>
<td>1” BSPP</td>
<td>02–175464</td>
</tr>
<tr>
<td>16T</td>
<td>SAE 16</td>
<td>566409</td>
</tr>
<tr>
<td>6G</td>
<td>3/4” BSPP</td>
<td></td>
</tr>
<tr>
<td>8G</td>
<td>1” BSPP</td>
<td>876732</td>
</tr>
<tr>
<td>12H</td>
<td>SAE 12</td>
<td>876733</td>
</tr>
<tr>
<td>16H</td>
<td>SAE 16</td>
<td>876735</td>
</tr>
</tbody>
</table>

See page 71 for housings

6 Factory set flow rate
(Specify in USgpm)
Range 3,8–227 l/min (1.0–60 USgpm)

Torque cartridge in housing
128–155 Nm (95–115 lbf ft)
FR2-10
Flow regulator, adjustable

Description
The FR2-10-F is a limited range adjustable*, pressure compensated, screw-in flow regulator cartridge valve.

*The flow adjustment is from the factory set maximum flow rate down to 50% of that factory set flow rate.

Operation
This valve maintains a constant flow from port 1 to port 2 based on the setting adjustment, regardless of pressure changes downstream on port 2. Reverse flow from port 2 to port 1 is at the value of the fixed orifice and is non-pressure compensated.

Ratings and specifications

Performance data is typical with fluid at 21.8 cSt (105 SUS) and 49°C (120°F)

Typical application pressure (all ports) .......................... 210 bar (3000 psi)
Cartridge fatigue pressure (infinite life) .......................... 210 bar (3000 psi)
Rated flow .................................................. 38 l/min (10 USgpm)
Flow regulation accuracy ......................... 0.4–1.9 l/min (0.1–0.49 USgpm) ±20%
1.9–7.5 l/min (0.5–1.99 USgpm) ±15%
7.6–37.8 l/min (2.0–10.0 USgpm) ±10%

Factory set maximum flow rate accuracy under standard test conditions and within the above ranges
Temperature range ................................. –40 to 120°C (–40°F to 248°F)
Cavity ......................................................... C–10–2 (See page 68)

Fluids ................................................ All general purpose hydraulic fluids such as:
MIL–H–5606, SAE 10, SAE 20, etc.

Filtration .............................................. Cleanliness code 18/16/13

Standard housing materials ......................... Aluminum

Weight cartridge only ............................. 0.22 kg (.48 lbs.)

Seal kits ................................................. 565803 Buna-N
566086 Viton®

Viton is a registered trademark of E.I. DuPont

Typical Flow Regulation
Cartridge Only

A – 38.0 l/min (10.0 USgpm)
B – 19.0 l/min (5.0 USgpm)
**Model Code**

**FR2-10**

**Function**

FR2 – Flow regulator

**Size**

10 – 10 Size

**Seals**

Blank – Buna-N  
V – Viton

**Adjustment**

C – Cap  
F – Factory-set  
I – Internal  
K – Knob  
S – Screw

---

**Port size**

O – Cartridge only

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
<tr>
<td>3B</td>
<td>3/8” BSPP</td>
<td>02-175462</td>
</tr>
<tr>
<td>6T</td>
<td>SAE 6</td>
<td>566151</td>
</tr>
<tr>
<td>2G</td>
<td>1/4” BSPP</td>
<td>876702</td>
</tr>
<tr>
<td>3G</td>
<td>3/8” BSPP</td>
<td>876703</td>
</tr>
<tr>
<td>6H</td>
<td>SAE 6</td>
<td>876700</td>
</tr>
<tr>
<td>8H</td>
<td>SAE 8</td>
<td>876701</td>
</tr>
</tbody>
</table>

See page 71 for housings

**Factory set flow rate**

(Specify in USgpm)  
Range 0.38–22.7 l/min (0.1–6.0 USgpm)

---

**Dimensions**

mm (inch)

“S” Adjustment 4,8 (0.18) hex  
“K” Adjustment 38,1 (1.5)  
“F” Adjustment  
“I” Adjustment  
Torque cartridge in housing 47–54 Nm (35–40 lbf ft)

---

**Housing number**

- Aluminum  
- Fatigue rated

See page 71 for housings
FR2-16
Flow regulator, adjustable

Description
The FR2-16 is a limited range adjustable*, pressure compensated, screw-in flow regulator cartridge valve.
*The flow adjustment is from the factory set maximum flow rate down to 50% of that factory set flow rate.

Operation
This valve maintains a constant flow from port 1 to port 2 based on the setting adjustment, regardless of pressure changes downstream on port 2. Reverse flow from port 2 to port 1 is at the value of the fixed orifice and is non-pressure compensated.

Ratings and specifications
Performance data is typical with fluid at 21.8 cSt (105 SUS) and 49°C (120°F)
Typical application pressure (all ports) .................................... 210 bar (3000 psi)
Cartridge fatigue pressure (infinite life) .................................... 210 bar (3000 psi)
Rated flow ................................................................. 114 l/min (30 USgpm)
Flow regulation accuracy ........................................... 1.9–10.9 l/min (0.5–2.9 USgpm) ± 15%
................................................................. 11.4–114 l/min (3–30 USgpm) ± 10%
Factory set maximum flow rate accuracy under standard test conditions and within the above ranges
Temperature range ............................................... –40°C to 120°C (–40°F to 248°F)
Cavity ................................................................. C–16–2 (See page 68)
Fluids ................................................................. All general purpose hydraulic fluids such as:
MIL–H–5606, SAE 10, SAE 20, etc.
Filtration ................................................................. Cleanliness code 18/16/13
Standard housing materials ........................................... Aluminum
Weight cartridge only .............................................. 0.71 kg (1.57 lbs.)
Seal kits ................................................................. 565810 Buna-N
889609 Viton®
Viton is a registered trademark of E.I. DuPont

Typical Flow Regulation
Cartridge Only

A – 114 l/min (30.0 USgpm)
B – 38 l/min (10.0 USgpm)
C – 9.5 l/min (2.5 USgpm)
**Model Code**

FR2-16

---

1. **Function**
   - FR2 – Flow regulator

2. **Size**
   - 16 – 16 Size

3. **Seals**
   - Blank – Buna-N
   - V – Viton

4. **Adjustment**
   - K – Knob
   - S – Screw
   - C – Cap

---

### Port Size

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
<tr>
<td>6B</td>
<td>3/4” BSPP</td>
<td>02-175463</td>
</tr>
<tr>
<td>12T</td>
<td>SAE 12</td>
<td>566149</td>
</tr>
<tr>
<td>4G</td>
<td>1/2” BSPP</td>
<td></td>
</tr>
<tr>
<td>6G</td>
<td>3/4” BSPP</td>
<td>876716</td>
</tr>
<tr>
<td>10H</td>
<td>SAE 10</td>
<td>876717</td>
</tr>
<tr>
<td>12H</td>
<td>SAE 12</td>
<td>566113</td>
</tr>
</tbody>
</table>

See page 71 for housings

### Factory set flow rate

(Specify in USgpm)

- Range 1.9–114 l/min
  - (0.5–30 USgpm)

### Dimensions

mm (inch)

- **“S” Adjustment** | 9.6 (0.37) hex
- **“C” Adjustment** | 19.1 (0.75) hex

---

Torque cartridge in housing

108–122 Nm (80–90 lbf ft)
**FAR1-10**
Flow regulator, pressure compensated, fully adjustable

**Description**
The FAR1–10 is a two-way, fully adjustable, pressure compensated, flow regulator, with free reverse flow, screw-in cartridge valve.

**Operation**
This valve maintains a constant flow from port 1 to port 2 regardless of pressure changes upstream of port 1, or downstream of port 2. 13.8 bar (200 psi) must be maintained across the valve to obtain pressure compensated control. The regulated flow base within the adjusting range from 1 to 38 lpm (0.25 to 10 USgpm) is set by turning the adjusting screws clockwise to decrease the flow and counter-clockwise to increase the flow. This valve allows free reverse flow from port 2 to port 1.

**Ratings and specifications**

- **Performance data is typical with fluid at 21.8 cSt (105 SUS) and 49°C (120°F)**
- **Typical application pressure (all ports)**: 5–350 bar (75–5000 psi) steel housing
- **Min. pressure differential across valve**: 14 bar (200 psi)
- **Cartridge fatigue pressure (infinite life)**: 310 bar (4500 psi)
- **Rated flow**: 1–38 l/min (.25–10 USgpm)
- **Flow regulation**: 4–38 l/min (1–10 USgpm) ±10%
- **Reverse check crack pressure**: 1.7 bar (25 psi)
- **Temperature range**: –40°C to 120°C (–40°F to 248°F)
- **Cavity**: C–10–2 (See page 68)
- **Filtration**: Cleanliness code 18/16/13
- **Standard housing materials**: Aluminum or steel
- **Weight cartridge only**: "S" 0.02 kg (0.44 lbs.)
  "K" 0.23 kg (0.51 lbs.)
  "H" 0.26 kg (0.59 lbs.)
- **Seal kits**: 565803 Buna-N
  566086 Viton®

Viton is a registered trademark of E.I. DuPont

---

**Performance Characteristics**

**Cartridge Only**

<table>
<thead>
<tr>
<th>Pressure drop psi</th>
<th>Flow in lpm (21.8 cSt oil @ 49°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
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<tr>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

**Flow in USgpm (105 SUS oil @ 120°F)**

<table>
<thead>
<tr>
<th>Pressure drop bar</th>
<th>Flow in lpm</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
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<td>6</td>
<td>6</td>
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<tr>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

**TYPICAL FLOW REGULATION**

<table>
<thead>
<tr>
<th>Pressure differential across valve in psi</th>
<th>Flow in USgpm (105 SUS oil @ 120°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>20</td>
<td>6</td>
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<td>30</td>
<td>8</td>
</tr>
<tr>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td>50</td>
<td>12</td>
</tr>
</tbody>
</table>
**Model Code**

**FAR1-10**

---

**1 Function**

**FAR1** – Fully adjustable, pressure compensated flow regulator with reverse flow check

**2 Size**

10 – 10 Size

**3 Seals**

Blank – Buna-N

V – Viton

**4 Adjustment**

S – Screw with locknut

K – Handknob with locknut

H – Calibrated handknob with locknut

**5 Valve housing material**

Omit for cartridge only

S – Steel

A – Aluminum

Steel housings must be used for operating pressures above 210 bar (3000 psi)

**6 Port size**

O – Cartridge only

See pages 71 and 74 for housings

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
<tr>
<td>3B</td>
<td>3/8” BSPP</td>
<td>02–175462</td>
</tr>
<tr>
<td>2G</td>
<td>1/4” BSPP</td>
<td>876702</td>
</tr>
<tr>
<td>3G</td>
<td>3/8” BSPP</td>
<td>876703</td>
</tr>
<tr>
<td>6H</td>
<td>SAE 6</td>
<td>876700</td>
</tr>
<tr>
<td>8H</td>
<td>SAE 8</td>
<td>876701</td>
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<tr>
<td>6T</td>
<td>SAE 6</td>
<td>566151</td>
</tr>
<tr>
<td>8T</td>
<td>SAE 8</td>
<td>02–175100</td>
</tr>
</tbody>
</table>

**7 Factory set flow rate, nominal**

Blank – Normal factory setting at 5 USgpm

User requested setting within .25–10 USgpm (1–38 l/min.)

---

**Dimensions**

mm (inch)  “K” adjustment

<table>
<thead>
<tr>
<th>“S” adjustment 4,75 (0.19) hex</th>
<th>61.1 (2.40) max.</th>
<th>31,8 (1.25)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.875”–14 Thd.</td>
<td>56.9 (2.24)</td>
<td>72.4 (2.85)</td>
</tr>
<tr>
<td>Ø 15.8 (0.62)</td>
<td>30.5 (1.20)</td>
<td>38.1 (1.50)</td>
</tr>
</tbody>
</table>

“H” adjustment

**NOTE:**

To reset scale and knob to an optimum viewing position:

1. Loosen the set screw
2. Rotate zero point on scale to a desired orientation.
3. Align mark on knob with zero on scale.
4. Tighten the set screw firmly.

To change the setting:

1. Loosen the set screw
2. Loosen jamnut while holding the knob steady, or move the knob along the axis slightly.
3. Turn adjusting screw (jamnut and knob will turn at the same time).
4. At the new adjusting screw position, tighten jamnut firmly while holding the knob steady, or move the knob along axis slightly.
5. Tighten the set screw firmly.

**Torque cartridge in housing**

A–47–54 Nm (35–40 lbf ft)

S–68–75 Nm (50–55 lbf ft)

“K” adjustment kit – 565585
FAR1-12
Flow regulator, pressure compensated, fully adjustable

**Description**
The FAR1–12 is a two-way, fully adjustable, pressure compensated, flow regulator, with free reverse flow, screw-in cartridge valve.

**Operation**
This valve maintains a constant flow from port 1 to port 2 regardless of pressure changes upstream of port 1, or downstream of port 2. 15.9 bar (230 psi) must be maintained across the valve to obtain pressure compensated control. The regulated flow base within the adjusting range from 1.5 to 94.5 lpm (0.4 to 25 USgpm) is set by turning the adjusting screws clockwise to decrease the flow and counter-clockwise to increase the flow. This valve allows free reverse flow from port 2 to port 1.

**Ratings and specifications**
*Performance data is typical with fluid at 21.8 cSt (105 SUS) and 49°C (120°F)*

- Typical application pressure (all ports) ..................................................... 350 bar (5000 psi)
- Cartridge fatigue pressure (infinite life) ..................................................... 315 bar (4500 psi)
- Min. pressure differential across valve ..................................................... 15.9 bar (230 psi)
- Max. pressure differential across valve ..................................................... 329 bar (4770 psi)
- Rated flow ................................................................. 1.5–94.5 l/min (.4–25 USgpm)
- Flow regulation accuracy ................................................................. 1.5–3.8 l/min (.4–1.0 USgpm) ±20% @5000 psi
  - above 3.8–68.1 l/min (above 1–18 USgpm) ±10% @3000 psi
  - above 68.1–94.6 l/min (above 18–25 USgpm) ±15% @3000 psi
  - 3.8–56.8 l/min (1–15 USgpm) ±10% @5000 psi
  - above 56.8–89.1 l/min (above 15–23 USgpm) ±15% @5000 psi
- Reverse check crack pressure ................................................................. 1.7 bar (25 psi)
- Leakage at shutoff position ................................................................. 0.5 l/min (30 in³/min)
- Temperature range ................................................................. –40°C to 120°C (–40°F to 248°F)
- Cavity ................................................................. C–12–2 & C–12–2U (See page 68)
- Fluids ................................................................. All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.
- Filtration ................................................................. Cleanliness code 18/16/13
- Standard housing materials ................................................................. Aluminum or steel
- Weight cartridge only ................................................................. “S” 0.43 kg (0.98 lbs.)
  - “K” 0.46 kg (1.0 lbs.)
  - “H” 0.49 kg (1.1 lbs.)
- Seal kits ................................................................. 02–181304 Buna-N
  - 02–181305 Viton®

Viton is a registered trademark of E.I. DuPont

**Performance Characteristics**
**Cartridge Only**

**TYPICAL FLOW REGULATION**
Pressure differential across valve in bar

**PRESSURE DROP FOR REVERSE FLOW**
Flow in USgpm (105 SUS oil @ 120°F)
**Model Code**

**FAR1-12**

---

**Function**

**FAR1** – Fully adjustable, pressure compensated flow regulator with reverse flow check

---

**Size**

12 – 12 Size

---

**Seals**

Blank – Buna-N

V – Viton

---

**Adjustment**

S – Screw with locknut

K – Handknob with locknut

H – Calibrated handknob with locknut

---

**Valve housing material**

Omit for cartridge only

S – Steel

A – Aluminum

**WARNING:**

Aluminum housings can be used for pressures up to 210 bar (3000 psi).

Steel housings must be used for operating pressures above 210 bar (3000 psi)

---

**Port size**

O – Cartridge only

---

**Factory set flow rate, nominal**

Blank – Normal factory setting at 10 USgpm

User requested setting

- Within 0.4–25 USgpm (1,5–94.6 l/min.) up to 210 bar (3000 psi)
- Within 0.4–23 USgpm (1,5–87.1 l/min.) up to 350 bar (5000 psi)

---

**Dimensions**

<table>
<thead>
<tr>
<th>Code Port size</th>
<th>C-12-2U Aluminum Fatigue rated</th>
<th>C-12-2 Aluminum Fatigue rated</th>
<th>C-12-2U Steel Fatigue rated</th>
<th>C-12-2 Steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>10T SAE 10</td>
<td>02–160641</td>
<td>02–160640</td>
<td>02–169817</td>
<td>02–169744</td>
</tr>
<tr>
<td>12T SAE 12</td>
<td>02–160645</td>
<td>02–160644</td>
<td>02–169790</td>
<td>02–169782</td>
</tr>
<tr>
<td>4G 1/2” BSPP</td>
<td>02–161116</td>
<td>02–161118</td>
<td>02–172512</td>
<td>02–172062</td>
</tr>
<tr>
<td>6G 3/4” BSPP</td>
<td>02–161115</td>
<td>02–161117</td>
<td>02–162922</td>
<td>02–169665</td>
</tr>
</tbody>
</table>

See pages 71 and 74 for housing dimensions

---

**NOTE:**

To reset scale and knob to an optimum viewing position:

1. Loosen the set screw

2. Rotate zero point on scale to a desired orientation.

3. Align mark on knob with zero on scale.

4. Tighten the set screw firmly.

To change the setting:

1. Loosen the set screw

2. Loosen jamnut while holding the knob steady, or move the knob along the axis slightly.

3. Turn adjusting screw (jamnut and knob will turn at the same time).

4. At the new adjusting screw position, tighten jamnut firmly while holding the knob steady, or move the knob along axis slightly.

5. Tighten the set screw firmly.

*Torque cartridge in housing*

A–81–95 Nm (60–70 lbf ft)

S–102–115 Nm (75–85 lbf ft)

“K” adjustment kit – 565585
**FAR1-16**

Flow regulator, pressure compensated, fully adjustable

**Description**

The FAR1–16 is a two-way, fully adjustable, pressure compensated, flow regulator screw-in cartridge valve.

**Operation**

This valve maintains a constant flow from port 1 to port 2 regardless of pressure changes upstream of port 1, or downstream of port 2. 17 bar (250 psi) must be maintained across the valve to obtain pressure compensated control. The regulated flow base within the adjusting range from 3.8 to 113.6 lpm (1.0 to 30 USgpm) is set by turning the adjusting screws clockwise to decrease the flow and counter-clockwise to increase the flow. This valve allows free reverse flow from port 2 to port 1.

**Ratings and specifications**

*Performance data is typical with fluid at 21.8 cSt (105 SUS) and 49°C (120°F)*

- Typical application pressure (all ports) ............... 350 bar (5000 psi)
- Cartridge fatigue pressure (infinite life) ............... 310 bar (4500 psi)
- Min. pressure differential across valve ............... 17 bar (250 psi)
- Max. pressure differential across valve ............... 328 bar (4750 psi)
- Rated flow ............................................. 3.8–113.6 l/min (1–30 USgpm)
- Flow regulation accuracy ......................... 3.8–15.1 l/min (1.0–4.0 USgpm) ± 30% @5000 psi above 15.1–30.3 l/min (above 4.0–8.0 USgpm) ± 20% @5000 psi above 30.3–113.6 l/min (above 8.0–30.0 USgpm) ± 10% @5000 psi
- Reverse check crack pressure ................... 1.7 bar (25 psi)
- Leakage at shutoff position ....................... 0.55 l/min (33.5 in³/min)
- Temperature range .................................. −40 to 120°C (−40° to 248°F)
- Cavity ................................................ C–16–2 (See page 68)
- Fluids ........................................... All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.
- Filtration ............................................. Cleanliness code 18/16/13
- Standard housing materials ......................... Aluminum or steel
- Weight cartridge only ............................. ⁴⁄₅₄" 0.67 kg (1.48 lbs.)
- ³⁄₈" 0.70 kg (1.55 lbs.)
- ⁷⁄₈" 0.74 kg (1.62 lbs.)
- Seal kits ........................................ 565810 Buna-N 889609 Viton®

**Performance Characteristics**

**Cartridge Only**

![Graph showing pressure drop for reverse flow](image)

**TYPICAL FLOW REGULATION**

Pressure differential across valve in bar

![Graph showing typical flow regulation](image)

Viton is a registered trademark of E.I. DuPont
Model Code FAR1-16

1 Function
FAR1 – Fully adjustable, pressure compensated flow regulator with reverse flow check

2 Size
16 – 16 Size

3 Seals
Blank – Buna-N
V – Viton

4 Adjustment
S – Screw with locknut
K – Handknob with locknut
H – Calibrated handknob with locknut

5 Valve housing material
Omit for cartridge only
S – Steel
A – Aluminum

![Warning: Aluminum housings can be used for pressures up to 210 bar (3000 psi). Steel housings must be used for operating pressures above 210 bar (3000 psi).]

6 Port size & valve bodies
O – Cartridge only

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
<tr>
<td>4G</td>
<td>1/2&quot; BSPP</td>
<td>876716</td>
</tr>
<tr>
<td>6B</td>
<td>3/4&quot; BSPP</td>
<td>02–175106</td>
</tr>
<tr>
<td>6G</td>
<td>3/4&quot; BSPP</td>
<td>876718</td>
</tr>
<tr>
<td>10T</td>
<td>SAE 10</td>
<td>876717</td>
</tr>
<tr>
<td>10H</td>
<td>SAE 10</td>
<td>02–175104</td>
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<tr>
<td>12T</td>
<td>SAE 12</td>
<td>566149</td>
</tr>
<tr>
<td>12H</td>
<td>SAE 12</td>
<td>566113</td>
</tr>
</tbody>
</table>

See pages 71 and 74 for housings

7 Factory set flow rate
Blank – Normal factory setting at 15 USgpm
User requested setting Within 1–30 USgpm (3,8–113,6 l/min.)

![Diagram of FAR1-16 showing dimensions and markings]

NOTE:
To reset scale and knob to an optimum viewing position:
1. Loosen the set screw
2. Rotate zero point on scale to a desired orientation.
3. Align mark on knob with zero on scale.
4. Tighten the set screw firmly.

To change the setting:
1. Loosen the set screw
2. Loosen jamnut while holding the knob steady, or move the knob along the axis slightly.
3. Turn adjusting screw (jamnut and knob will turn at the same time).
4. At the new adjusting screw position, tighten jamnut firmly while holding the knob steady, or move the knob along axis slightly.
5. Tighten the set screw firmly.

“K” adjustment kit – 02-185169
**PFR5-8**
Priority flow regulator, fixed

### Description
The PFR5–8 is a fixed orifice, priority type, pressure compensated, flow regulator, screw-in cartridge valve.

### Operation
This valve maintains a constant, factory-set, priority flow from port 1 to port 3 based on 5.5 bar (80 psid) regardless of pressure changes downstream on port 3. Flow in excess of the priority setting is directed to port 2. If the priority flow at port 3 is blocked, the spool will shift to try and satisfy the priority flow requirement, thereby closing off flow to port 2.

### Ratings and specifications
*Performance data is typical with fluid at 21.8 cSt (105 SUS) and 49 °C (120 °F)*

- **Typical application pressure (all ports)**: 350 bar (5000 psi) steel housing
  - 210 bar (3000 psi) aluminum housing
- **Cartridge fatigue pressure (infinite life)**: 280 bar (4000 psi)
- **Rated flow**:
  - Maximum inlet flow: 15.1 l/min (4 USgpm)
  - Maximum regulated flow: 10 l/min (2.5 USgpm)
- **Internal leakage**: 82 cm³/min @ 350 bar (3000 psi) / 5 in³/min @ 5000 psi
- **Flow regulation accuracy**:
  - 0.4–1.9 l/min (0.1–0.49 USgpm) ± 20% @ 210 bar (3000 psi)
  - 0.4–1.9 l/min (0.1–0.49 USgpm) ± 40% @ 350 bar (5000 psi)
  - 1.9–5.7 l/min (0.5–1.49 USgpm) ± 15% @ 350 bar (5000 psi)
  - 5.7–10 l/min (1.5–2.5 USgpm) ± 10% @ 350 bar (5000 psi)
- **Factory set maximum priority flow rate accuracy under standard test conditions and within the above ranges**
- **Temperature range**: -40 to 120 °C (-40 °F to 248 °F)
- **Cavity**: C–8–3 (See page 69)
- **Filtration**: Cleanliness code 18/16/13
- **Fluids**: All general purpose hydraulic fluids such as MIL–H–5606, SAE 10, SAE 20, etc.
- **Standard housing materials**: Aluminum or steel
- **Weight cartridge only**: 0.07 kg (0.15 lb.)
- **Seal kits**: 02–173427 Buna-N
  - 02–173434 Viton®

Viton is a registered trademark of E.I. DuPont
Model Code

PFR5-8

Function
PFR – Priority flow regulator

Size
8 – 8 Size

Seals
Blank – Buna-N
V – Viton

Adjustment
F – Fixed orifice

Valve housing material
Omit for cartridge only
S – Steel
A – Aluminum

Port size
O – Cartridge only

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Aluminum Fatigue rated</td>
</tr>
<tr>
<td>4T</td>
<td>SAE 4</td>
<td>02–160741</td>
</tr>
<tr>
<td>6T</td>
<td>SAE 6</td>
<td>02–160742</td>
</tr>
<tr>
<td>2G</td>
<td>1/4” BSPP</td>
<td>02–160739</td>
</tr>
<tr>
<td>3G</td>
<td>3/8” BSPP</td>
<td>02–160740</td>
</tr>
</tbody>
</table>

See pages 72 and 74 for housings

Factory set flow rate, nominal
(Specify in USgpm)
Range 0.4–9.5 l/min (0.1–2.5 USgpm)

Example:
0.5–1.9 l/pm (0.5 USgpm)

Dimensions
mm (inch)

Torque cartridge in housing
34–41 Nm (25–30 lbf ft)

Fatigue rated

Aluminum housings can be used for pressures up to 210 bar (3000 psi)
Steel housings must be used for operating pressures above 210 bar (3000 psi)

8,5 (0.33)

40,6 (1.60)

22,1 (.870) hex

0.750”–16 Thd.

∅ 14,2 (0.559)

∅ 15,8 (0.622)
PFR5-10
Priority flow regulator, fixed

Description
The PFR5-10-F is a fixed orifice, priority type, pressure compensated, flow regulator screw-in cartridge valve.

Operation
This valve maintains a constant, factory-set, priority flow from port 1 to port 3 based on 5.5 bar (80 psid) regardless of pressure changes downstream on port 3. Flow in excess of the priority setting is directed to port 2. If the priority flow at port 3 is blocked, the spool will shift to satisfy the priority flow requirement, thereby closing off flow to port 2.

Ratings and specifications
Performance data is typical with fluid at 21.8 cSt (105 SUS) and 49°C (120°F)

Typical application pressure (all ports) .......................... 350 bar (5000 psi)
Cartridge fatigue pressure (infinite life) ...................... 280 bar (4000 psi)
Rated flow ........................................ Maximum inlet flow 60 l/min (15 USgpm)
Maximum regulated flow 23 l/min (6 USgpm)

Flow regulation accuracy ........................................ 0.4–1.9 l/min (0.1–0.49 USgpm) ± 20% @ 210 bar (3000 psi)
0.4–1.9 l/min (0.1–0.49 USgpm) ± 40% @ 350 bar (5000 psi)
1.9–5.7 l/min (0.5–1.49 USgpm) ± 15% @ 350 bar (5000 psi)
5.7–22.7 l/min (1.5–6 USgpm) ± 10% @ 350 bar (5000 psi)

Factory set maximum priority flow rate accuracy under standard test conditions and within the above ranges

Temperature range .......................... -40 to 120°C (-40°F to 248°F)

Cavity .............................................. C–10–3 (See page 69)

Fluids ........................................... All general purpose hydraulic fluids such as:
MIL–H–5606, SAE 10, SAE 20, etc.

Filtration ........................................... Cleanliness code 18 /16/13

Standard housing materials ..................................... Aluminum or steel

Weight cartridge only ........................................ 0.13 kg (0.28 lb.)

Seal kits ........................................... 565804 Buna-N
889599 Viton®

Viton is a registered trademark of E.I. DuPont

Typical Flow Regulation
Cartridge Only
Model Code

PFR5-10

1 Function
PFR5 – Priority flow regulator

2 Size
10 – 10 Size

3 Seals
Blank – Buna-N
V – Viton

4 Adjustment
F – Fixed orifice

5 Housing material
A – Aluminum
S – Steel

6 Factory set flow rate
(Specify in USgpm)
Range 0.38–22.7 l/min (0.1–6.0 USgpm)

Steel housings must be used for operating pressures above 210 bar (3000 psi)

7 Port size
O – Cartridge only

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
<tr>
<td>2G</td>
<td>1/4” BSPP</td>
<td>876705</td>
</tr>
<tr>
<td>3B</td>
<td>3/8” BSPP</td>
<td>02-173358</td>
</tr>
<tr>
<td>3G</td>
<td>3/8” BSPP</td>
<td>876714</td>
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<tr>
<td>6T</td>
<td>SAE 6</td>
<td>566162</td>
</tr>
<tr>
<td>6H</td>
<td>SAE 6</td>
<td>876704</td>
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<tr>
<td>8H</td>
<td>SAE 8</td>
<td>876711</td>
</tr>
<tr>
<td>8T</td>
<td>SAE 8</td>
<td>876715</td>
</tr>
</tbody>
</table>

See pages 72 and 74 for housings

Dimensions
mm (inch)

Torque cartridge in housing
A – 47–54 Nm (35–40 lbf ft)
S – 68–75 Nm (50–55 lbf ft)
PFR1-16
Priority flow regulator, fixed

Description
The PFR1-16-F is a fixed orifice, priority type, pressure compensated, flow regulator screw-in cartridge valve.

Operation
This valve maintains a constant, factory-set, priority flow from port 1 to port 3 based on 5.5 bar (80 psid) regardless of pressure changes downstream on port 3. Flow in excess of the priority setting is directed to port 2. If the priority flow at port 3 is blocked, the spool will shift to satisfy the priority flow requirement, thereby closing off flow to port 2.

Ratings and specifications
Performance data is typical with fluid at 21.8 cSt (105 SUS) and 49°C (120°F)
Typical application pressure (all ports) .......................... 210 bar (3000 psi)
Cartridge fatigue pressure (infinite life) .......................... 210 bar (3000 psi)
Rated flow .................................................. Maximum inlet flow 151 l/min (40 USgpm)
.................................................. Maximum regulated flow 114 l/min (30 USgpm)
Flow regulation accuracy ........................................ 1.9–10.9 l/min (0.5–2.9 USgpm) ± 15%
............................................................ 11.4–114 l/min (3–30 USgpm) ± 10%
Factory set maximum priority flow rate accuracy under standard test conditions and within the above ranges
Temperature range .................................................. -40 to 120°C (-40° to 248°F)
Cavity ............................................................. C–16–3 (See page 69)
Fluids ............................................................. All general purpose hydraulic fluids such as:
............................................................. MIL–H–5606, SAE 10, SAE 20, etc.
Filtration ............................................................. Cleanliness code 18/16/13
Standard housing materials ........................................ Aluminum
Weight cartridge only .............................................. 0.38 kg (0.84 lb.)
Seal kits ............................................................. 565811 Buna-N
............................................................. 889610 Viton®
Viton is a registered trademark of E.I. DuPont

Typical Flow Regulation
Cartridge Only

A - Port 3, priority (regulated) outlet pressurized
B - Port 2, bypass outlet pressurized

Typical Flow Regulation

Back Pressure bar

Back Pressure psi

Priority flow rate in USgpm (105 SUS oil @ 120°F)

Priority flow rate in lpm (21.8 cSt oil @ 49°C)
Model Code PFR1-16

**Function**
PFR1 – Priority flow regulator

**Size**
16 – 16 Size

**Seals**
Blank – Buna-N
V – Viton

**Adjustment**
F – Fixed orifice

**Port size**
O – Cartridge only

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>Aluminum Light duty</td>
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<td>SAE 12</td>
<td>566152</td>
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<td>3/4&quot; BSPP</td>
<td>02–175465</td>
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<tr>
<td>10H</td>
<td>SAE 10</td>
<td>___</td>
</tr>
<tr>
<td>12H</td>
<td>SAE 12</td>
<td>___</td>
</tr>
<tr>
<td>4G</td>
<td>1/2&quot; BSPP</td>
<td>___</td>
</tr>
<tr>
<td>6G</td>
<td>3/4&quot; BSPP</td>
<td>___</td>
</tr>
</tbody>
</table>

See pages 72 for housings

**Factory set flow rate, nominal**

(Specify in USgpm)
Range 1.9–114 l/min (0.5–30 USgpm)

**Dimensions**

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Aluminum Light duty</td>
</tr>
<tr>
<td>12T</td>
<td>SAE 12</td>
<td>566152</td>
</tr>
<tr>
<td>6B</td>
<td>3/4&quot; BSPP</td>
<td>02–175465</td>
</tr>
<tr>
<td>10H</td>
<td>SAE 10</td>
<td>___</td>
</tr>
<tr>
<td>12H</td>
<td>SAE 12</td>
<td>___</td>
</tr>
<tr>
<td>4G</td>
<td>1/2&quot; BSPP</td>
<td>___</td>
</tr>
<tr>
<td>6G</td>
<td>3/4&quot; BSPP</td>
<td>___</td>
</tr>
</tbody>
</table>

**Torque cartridge in housing**

108–122 Nm (80–90 lbf ft)
**PFR2-10**
Priority flow regulator, adjustable

**Functional Symbol**

```
    3  
   /   
  /     
1     2
```

**Sectional View**

```
   3
  /  
 /   
1  2
```

**Typical Flow Regulation**
Cartridge Only

- **A** - Port 3, priority (regulated) outlet pressurized
- **B** - Port 2, bypass outlet pressurized

**Description**
The PFR2-10 is a limited range adjustable*, pressure compensated, priority type, flow regulator screw-in cartridge valve.

*The flow adjustment is from the factory set maximum flow rate down to 50% of that factory set flow rate.

**Operation**
This valve maintains a constant, factory-set, priority flow from port 1 to port 3 based on the setting adjustment, regardless of pressure changes downstream on port 3. Flow in excess of the priority setting is directed to port 2. If the priority flow at port 3 is blocked, the spool will shift to satisfy the priority flow requirement, thereby closing off flow to port 2.

**Ratings and specifications**

*Performance data is typical with fluid at 21.8 cSt (105 SUS) and 49°C (120°F)*

- **Typical application pressure (all ports)**: 210 bar (3000 psi)
- **Cartridge fatigue pressure (infinite life)**: 210 bar (3000 psi)
- **Rated flow**
  - Maximum inlet flow: 60 l/min (15 USgpm)
  - Maximum regulated flow: 30 l/min (8 USgpm)
  - Flow regulation accuracy: 0.4–1.9 l/min (0.1–0.49 USgpm) ±20% (0.1–0.49 USgpm) ±15% (0.4–1.9 USgpm) ±10%
- **Factory set maximum priority flow rate accuracy** under standard test conditions and within the above ranges
  - Temperature range: -40 to 120°C (-40°F to 248°F)
  - Cavity: C–10–3 (See page 69)
- **Fluids**: All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.
- **Filtration**
  - Cleanliness code: 18/16/13
- **Standard housing materials**: Aluminum
- **Weight cartridge only**: 0.25 kg (0.54 lb.)
- **Seal kits**: 565804 Buna-N, 889599 Viton®

Viton is a registered trademark of E.I. DuPont

---

**Back Pressure bar**

```
<table>
<thead>
<tr>
<th>Back Pressure bar</th>
<th>Priority (regulated) flow rate in USgpm</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>20</td>
<td>3</td>
</tr>
<tr>
<td>30</td>
<td>0</td>
</tr>
</tbody>
</table>
```

**Back Pressure psi**

```
<table>
<thead>
<tr>
<th>Back Pressure psi</th>
<th>Priority (regulated) flow rate in USgpm</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>100</td>
<td>6</td>
</tr>
<tr>
<td>200</td>
<td>3</td>
</tr>
<tr>
<td>300</td>
<td>0</td>
</tr>
</tbody>
</table>
```

---

**Diagram**

```
```

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---
Model Code

**PFR2-10**

### Function
- **PFR2** – Priority flow regulator

### Size
- **10** – 10 Size

### Seals
- **Blank** – Buna-N
- **V** – Viton

### Adjustment
- **C** – Cap
- **K** – Knob
- **S** – Screw

### Port size

**O** – Cartridge only

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
<tr>
<td>3B</td>
<td>3/8” BSPP</td>
<td>02-173358</td>
</tr>
<tr>
<td>6T</td>
<td>SAE 6</td>
<td>876705</td>
</tr>
<tr>
<td>2G</td>
<td>1/4” BSPP</td>
<td>876714</td>
</tr>
<tr>
<td>3G</td>
<td>3/8” BSPP</td>
<td>876704</td>
</tr>
<tr>
<td>6H</td>
<td>SAE 8</td>
<td>876711</td>
</tr>
<tr>
<td>8H</td>
<td>SAE 8</td>
<td></td>
</tr>
</tbody>
</table>

See pages 72 for housings

### Factory set flow rate, nominal

(Specify in USgpm)

Range 0.38–37.8 l/min (0.1–10.0 USgpm)

### Dimensions

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
</tr>
</thead>
<tbody>
<tr>
<td>3B</td>
<td>3/8” BSPP</td>
</tr>
<tr>
<td>6T</td>
<td>SAE 6</td>
</tr>
<tr>
<td>2G</td>
<td>1/4” BSPP</td>
</tr>
<tr>
<td>3G</td>
<td>3/8” BSPP</td>
</tr>
<tr>
<td>6H</td>
<td>SAE 8</td>
</tr>
<tr>
<td>8H</td>
<td>SAE 8</td>
</tr>
</tbody>
</table>

Torque cartridge in housing
47–54 Nm (35–40 lbf ft)

**S** Adjustment

∅ 19.0 (0.75) hex

**C** Adjustment

∅ 25.4 (1.0) hex

∅ 0.875”-14 Thd.

∅ 15.80 (0.622)

∅ 17.40 (0.685)
PFR2-16
Priority flow regulator, adjustable

Description
The PFR2-16 is a limited range adjustable*, priority type, pressure compensated, flow regulator screw-in cartridge valve.

*The flow adjustment is from the factory set maximum flow rate down to 50% of that factory set flow rate.

Operation
This valve maintains a constant, factory-set, priority flow from port 1 to port 3 based on the setting adjustment, regardless of pressure changes downstream on port 3. Flow in excess of the priority setting is directed to port 2. If the priority flow at port 3 is blocked, the spool will shift to satisfy the priority flow requirement, thereby closing off flow to port 2.

Ratings and specifications
Performance data is typical with fluid at 21.8 cSt (105 SUS) and 49°C (120°F)
Typical application pressure (all ports) ........................ 210 bar (3000 psi)
Cartridge fatigue pressure (infinite life) ................. 210 bar (3000 psi)
Rated flow .................................. Maximum inlet flow 151 l/min (40 USgpm)
Maximum regulated flow 114 l/min (30 USgpm)
Flow regulation accuracy ............. 1.9–10.9 l/min (0.5–2.9 USgpm) ± 15%
11.4–114 l/min (3–30 USgpm) ± 10%
Factory set maximum priority flow rate accuracy under standard test conditions and within the above ranges
Temperature range .......................... -40 to 120°C (-40°F to 248°F)
Cavity ........................................ C–16–3 (See page 69)
Fluids .................................. All general purpose hydraulic fluids such as:
................................................ MIL-H-5606, SAE 10, SAE 20, etc.
Filtration .................................. Cleanliness code 18/16/13
Standard housing materials .......... Aluminum
Weight cartridge only .................. 0.43 kg (0.95 lb.)
Seal kits .................................. 565811 Buna-N
889610 Viton®

Viton is a registered trademark of E.I. DuPont

Typical Flow Regulation
Cartridge Only

A - Port 3, priority (regulated) outlet pressurized
B - Port 2, bypass outlet pressurized

Typical Flow Regulation

[Diagram showing flow regulation and pressure graph]

Performance data is typical with fluid at 21.8 cSt (105 SUS) and 49°C (120°F)

Priority (regulated) flow rate in USgpm

Priority (regulated) flow rate in lpm

Back Pressure bar

Back Pressure psi

A

B

A

B

25

20

15

10

5

0

0

500

1000

1500

2000

2500

3000

100

80

60

40

20

0

0

500

1000

1500

2000

2500

3000
# Model Code

## PFR2-16

### Function
- **PFR** - Priority flow regulator

### Size
- **16** - 16 Size

### Seals
- **Blank** - Buna-N
- **V** - Viton

### Adjustment
- **C** - Cap
- **K** - Knob
- **S** - Screw

## Port size

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
<tr>
<td>12T</td>
<td>SAE 12</td>
<td>Aluminum Light duty: 566152</td>
</tr>
<tr>
<td>6B</td>
<td>3/4&quot; BSPP</td>
<td>Aluminum Fatigue rated: 876721</td>
</tr>
<tr>
<td>10H</td>
<td>SAE 10</td>
<td>876723</td>
</tr>
<tr>
<td>12H</td>
<td>SAE 12</td>
<td>876720</td>
</tr>
<tr>
<td>4G</td>
<td>1/2&quot; BSPP</td>
<td>876722</td>
</tr>
<tr>
<td>6G</td>
<td>3/4&quot; BSPP</td>
<td></td>
</tr>
</tbody>
</table>

See pages 72 for housings

## Factory set flow rate, nominal

- (Specify in USgpm)
- Range 1.9–114 l/min (0.5–30 USgpm)

## Dimensions

- **mm (inch)**

### Torque cartridge in housing
- **108–122 Nm (80–90 lbf ft)**

- **“C” Adjustment**: 19.0 (0.75) hex
- **“S” Adjustment**: 9.6 (0.37) hex
- **“K” Adjustment**: ∅ 51 (2.0)

### See pages 72 for housings
MRV2-10
Manual rotary valve

Description
The MRV2-10 is a 2-way, 2 position, manual semi-rotary screw-in flow restrictor valve.

Operation
This valve will increase or decrease flow by changing the variable orifice with the rotary adjustment. Recommended flow path is P to 2, out 1.

Ratings and specifications
Performance data is typical with fluid at 21.8 cSt (105 SUS) and 49°C (120°F)
Typical application pressure (all ports) 210 bar (3000 psi)
Rated flow 05 – 0-18.9 l/min (0-5 USgpm) 10 – 0-37.8 l/min (0-10 USgpm) 15 – 0-56.7 l/min (0-15 USgpm)
Internal leakage 164 cm³/min (10 in³/min)
Temperature range -40 to 120°C (-40°F to 248°F)
Manual operators B – Ball lever (friction lock)* E – Ball lever (10 position detent)* D – Lever (10 position detent)* L – Lever (friction lock)* K – Knob (non-locking)
Cavity C–10–2 (See page 68)
Fluids All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration Cleanliness code 18/16/13
Standard housing materials Aluminum
Weight cartridge only 0.79 kg (1.74 lb.)
Seal kits 561810 Buna-N 889609 Viton®
*Light duty housings only

Pressure Drop Curves
Cartridge only
@ 5.5 bar (80 psi) pressure drop and under standard conditions.

Rated flow
A -05
B -10
C -15

Flow in l/min (21.8 cSt oil @ 49°C)
Flow in USgpm (105 SUS oil @ 120°F)

Knob lever position

Viton is a registered trademark of E.I. DuPont
Model Code

**MRV2-10**

### Function
MRV2 – Manual rotary valve

### Size
10 – 10 Size

### Seals
Blank – Buna-N
V – Viton

### Manual operators
0 – No operator
B – Ball lever (friction lock)*
E – Ball lever (10 position detent)*
D – Lever (10 position detent)*
L – Lever (friction lock)*
K – Knob (non-locking)
* Light duty housings only.

### Port size
O – Cartridge only

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
<tr>
<td>3B</td>
<td>3/8&quot; BSPP</td>
<td>02~175462</td>
</tr>
<tr>
<td>6T</td>
<td>SAE 6</td>
<td>566151</td>
</tr>
<tr>
<td>2G</td>
<td>1/4&quot; BSPP</td>
<td>876702</td>
</tr>
<tr>
<td>3G</td>
<td>3/8&quot; BSPP</td>
<td>876703</td>
</tr>
<tr>
<td>6H</td>
<td>SAE 6</td>
<td>876700</td>
</tr>
<tr>
<td>8H</td>
<td>SAE 8</td>
<td>876701</td>
</tr>
</tbody>
</table>

See page 71 for housings

### Max flow ranges (nominal)
05 – 0-18.9 l/min (0–5 USgpm)
10 – 0-37.8 l/min (0–10 USgpm)
15 – 0-56.7 l/min (0–15 USgpm)

### Dimensions
mm (inch)

**MRV2-10-K**
Knob Operated
Arrow can be re-located by slacking the plate. Re-tighten nut.

**MRV2-10-B/E Models**

**MRV2-10-D/L Models**

**MRV2-10-E/D Models**

Torque cartridge in housing
47–54 Nm (35–40 lbf ft)

Housing number
Aluminum
Fatigue rated

Fatigue rated

Code Port size Housing number

Fatigue rated

Fatigue rated

Fatigue rated

Fatigue rated

Fatigue rated
MRV2-16
Manual rotary valve

Description
The MRV2-16 is a 2-way, 2 position, manual semi-rotary screw-in flow restrictor valve.

Operation
This valve will increase or decrease flow by changing the variable orifice with the rotary adjustment. Recommended flow path is P to 2 out 1.

Ratings and specifications
Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)

Typical application pressure (all ports) ........................................... 210 bar (3000 psi)

Rated flow ................................. 10 – 0-37,8 l/min (0–10 USgpm) 30 – 0-113,5 l/min (0–30 USgpm)
                           15 – 0-56,7 l/min (0–15 USgpm) 35 – 0-132,4 l/min (0–35 USgpm)
                           20 – 0-75,7 l/min (0–20 USgpm) 40 – 0-151,4 l/min (0–40 USgpm)
                           25 – 0-94,6 l/min (0–25 USgpm) 45 – 0-170,3 l/min (0–45 USgpm)

Internal leakage ........................................... 82 cm³/min. (5 in³/min maximum 210 bar (3000 psi)

Temperature range ........................................... -40 to 120°C (-40°F to 248°F)

Manual operators ........................................... D = Lever (10 position detent)*
                                                                 L = Lever (friction lock)*
                                                                 K = Knob (non-locking)

Cavity ........................................... C–16–2 (See page 68)

Fluids ........................................... All general purpose hydraulic fluids such as:
                                                                 MIL–H–5606, SAE 10, SAE 20, etc.

Filtration ........................................... Cleanliness code 18/16/13

Standard housing materials ........................................... Aluminum

Weight cartridge only ........................................... 0,79 kg (1.74 lb.)

Seal kits ........................................... 561810 Buna-N
                                                                 889609 Viton®

Viton is a registered trademark of E.I. DuPont

*Light duty housings only

Pressure Drop Curves
Cartridge only

@ 5,5 bar (80 psi) pressure drop and under standard conditions.

Rated flow
A -10  E -30
B -15  F -35
C -20  G -40
D -25  H -45

Flow in l/min (21,8 cSt oil @ 49°C)

Flow in USgpm (105 SUS oil @ 120°F)
Model Code

MRV2-16

MRV2 - 16 (V) - * - *** - **

1 Function
MRV2 – Manual rotary valve

2 Size
16 – 16 Size

3 Seals
Blank – Buna-N
V – Viton

4 Manual operators
0 – No operator
D – Lever (10 position detent)*
L – Lever (friction lock)*
K – Knob (non-locking)
* Light duty housings only.

5 Port size
O – Cartridge only

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
<tr>
<td>6B</td>
<td>3/4” BSPP</td>
<td>02–175463</td>
</tr>
<tr>
<td>12T</td>
<td>SAE 12</td>
<td>566149</td>
</tr>
<tr>
<td>4G</td>
<td>1/2” BSPP</td>
<td>876716</td>
</tr>
<tr>
<td>6G</td>
<td>3/4” BSPP</td>
<td>876718</td>
</tr>
<tr>
<td>10H</td>
<td>SAE 10</td>
<td>876717</td>
</tr>
<tr>
<td>12H</td>
<td>SAE 12</td>
<td>566113</td>
</tr>
</tbody>
</table>

See page 71 for housings

6 Max flow ranges (nominal)
10 – 0-37.8 l/min (0–10 USgpm)
15 – 0-56.7 l/min (0–15 USgpm)
20 – 0-75.7 l/min (0–20 USgpm)
25 – 0-94.6 l/min (0–25 USgpm)
30 – 0-113.5 l/min (0–30 USgpm)
35 – 0-132.4 l/min (0–35 USgpm)
40 – 0-151.4 l/min (0–40 USgpm)
45 – 0-170.3 l/min (0–45 USgpm)

Dimensions
mm (inch)

MRV2-16-K
Knob Operated

6.0 (2.40)

44.4 (1.75)

38.1 (1.50) hex
1.312”-12 Thd.

∅ 28.55 (1.124)

58.0 (2.28)

76.0 (3.00)

Torque cartridge in housing
108–122 Nm (80–90 lbf ft)

MRV2-16-D Models

Locating pin hole

∅ 3.45-3.50
(#29 or 0.136±0.002)
× 4.76 (0.187)
in mating housing

MRV2-16-L Models

Locating pin hole

See page 71 for housings
The NV1–8 is a direct-acting, adjustable, screw-in cartridge type needle valve.

**Operation**

This needle valve is non-pressure compensated. Flow is controlled in either direction, from full flow to tight shut-off, by turning the adjustment feature clockwise.

**Ratings and specifications**

*Performance data is typical with fluid at 21.8 cSt (105 SUS) and 49°C (120°F)*

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical application pressure (all ports)</td>
<td>350 bar (5000 psi) steel housing</td>
</tr>
<tr>
<td></td>
<td>210 bar (3000 psi) aluminum housing</td>
</tr>
<tr>
<td>Cartridge fatigue pressure (infinite life)</td>
<td>280 bar (4000 psi)</td>
</tr>
<tr>
<td>Rated flow</td>
<td>45 l/min (12 USgpm)</td>
</tr>
<tr>
<td>Internal leakage</td>
<td>5 drops/min. maximum @ 350 bar (5000 psi)</td>
</tr>
<tr>
<td>Temperature range</td>
<td>-40 to 120°C (-40°F to 248°F)</td>
</tr>
<tr>
<td>Cavity</td>
<td>C–8–2 (See page 68)</td>
</tr>
<tr>
<td>Fluids</td>
<td>All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.</td>
</tr>
<tr>
<td>Filtration</td>
<td>Cleanliness code 18/16/13</td>
</tr>
<tr>
<td>Standard housing materials</td>
<td>Aluminum or steel</td>
</tr>
<tr>
<td>Weight cartridge only</td>
<td>0.07 kg. (0.15 lbs.)</td>
</tr>
<tr>
<td>Seal Kits</td>
<td>02-165875 Buna–N</td>
</tr>
<tr>
<td></td>
<td>02-165877 Viton®</td>
</tr>
</tbody>
</table>

Viton is a registered trademark of E.I. DuPont

**Pressure Drop Curve**

*Cartridge Only*

Full open
Port 1 to port 2
or port 2 to port 1.

![Pressure Drop Curve Graph](image)

Flow in USgpm (21.8 cSt oil @ 120°F)

Pressure Drop psi

Pressure Drop bar
Model Code

NV1-8

1 Function
NV1 – Needle valve

2 Size
8 – 8 Size

3 Seals
Blank – Buna-N
V – Viton

4 Style
S – Screw
C – Cap
K – Knob

5 Valve housing material
Omit for cartridge only
S – Steel
A – Aluminum

6 Port size
O – Cartridge only

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Aluminum Fatigue rated</td>
</tr>
<tr>
<td>4T</td>
<td>SAE 4</td>
<td>02–160730</td>
</tr>
<tr>
<td>6T</td>
<td>SAE 6</td>
<td>02–160731</td>
</tr>
<tr>
<td>8T</td>
<td>SAE 8</td>
<td>02–160732</td>
</tr>
<tr>
<td>2G</td>
<td>1/4&quot; BSPP</td>
<td>02–160727</td>
</tr>
<tr>
<td>3G</td>
<td>3/8&quot; BSPP</td>
<td>02–160728</td>
</tr>
</tbody>
</table>

See pages 71 and 74 for housings

Dimensions

mm (inch)

Torque cartridge in housing
34–41 Nm (25–30 lbf ft)
NV1-10
Needle valve

**Description**
The NV1–10 is a direct-acting, adjustable, screw-in cartridge type needle valve.

**Operation**
This needle valve is non-pressure compensated. Flow is controlled in either direction, from full flow to tight shut-off, by turning the adjustment feature clockwise.

**Ratings and specifications**
*Performance data is typical with fluid at 21.8 cSt (105 SUS) and 49°C (120°F)*
- Typical application pressure (all ports) .................... 210 bar (3000 psi)
- Cartridge fatigue pressure (infinite life) .................... 210 bar (3000 psi)
- Rated flow .................................................. 45 l/min (12 USgpm)
- Internal leakage ......................................... 5 drops/min. maximum @ 210 bar (3000 psi)
- Temperature range ....................................... -40° to 120°C (-40° to 248°F)
- Cavity .................................................... C–10–2 (See page 68)
- Fluids ................................................... All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.
- Filtration .................................................. Cleanliness code 18/16/13
- Standard housing materials ................................. Aluminum
- Weight cartridge only .................................... 0.11 kg. (0.24 lbs.)
- Seal Kits .................................................. 565806 Buna–N
  889627 Viton®

Viton is a registered trademark of E.I. DuPont

**Pressure Drop Curve**

**Cartridge Only**

---

Full open
Port 1 to port 2
or port 2 to port 1.
Model Code

NV1 - 10 (V) - * - **

1 Function
NV1 – Needle valve

2 Size
10 – 10 Size

3 Seals
Blank – Buna-N
V – Viton

4 Adjustment
K – Knob (black)
R – Knob (red)

Dimensions
mm (inch)

5 Port size
0 – Cartridge only

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
<th>Aluminum Fatigue rated</th>
</tr>
</thead>
<tbody>
<tr>
<td>3B</td>
<td>3/8” BSPP</td>
<td>02-175462</td>
<td></td>
</tr>
<tr>
<td>6T</td>
<td>SAE 6</td>
<td>566151</td>
<td></td>
</tr>
<tr>
<td>2G</td>
<td>1/4” BSPP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3G</td>
<td>3/8” BSPP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6H</td>
<td>SAE 8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

See page 71 for housings

Torque cartridge in housing
47–54 Nm (35–40 lbf ft)
**NV1-16**

Needle valve

---

**Description**

The NV1–16 is a direct-acting, adjustable, screw-in cartridge type needle valve.

**Operation**

This needle valve is non-pressure compensated. Flow is controlled in the direction from port 2 to port 1, from full flow to tight shut-off, by turning the adjustment feature clockwise. The flow from port 1 to port 2 will be very restricted.

**Ratings and specifications**

*Performance data is typical with fluid at 21.8 cSt (105 SUS) and 49°C (120°F)*

- Typical application pressure (all ports): 210 bar (3000 psi)
- Cartridge fatigue pressure (infinite life): 210 bar (3000 psi)
- Rated flow: 151 l/min (40 USgpm)
- Internal leakage: 5 drops/min. maximum @ 210 bar (3000 psi)
- Temperature range: -40 to 120°C (-40°F to 248°F)
- Cavity: C–16–2 (See page 68)
- Fluids: All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.
- Filtration: Cleanliness code 18/16/13
- Standard housing materials: Aluminum
- Weight cartridge only: 0.34 kg. (0.76 lbs.)
- Seal kits: 565810 Buna–N, 889609 Viton®

*Viton is a registered trademark of E.I. DuPont*

---

**Pressure Drop Curve**

Cartridge Only

---

**Flow in USgpm**

(105 SUS oil @ 120°F)

**Pressure Drop psi**

- Full open
- Port 2 to port 1.

---
**Model Code**  

**NV1-16**

---

1. **Function**  
   NV1 – Needle valve

2. **Size**  
   16 – 16 Size

3. **Seals**  
   Blank – Buna-N  
   V – Viton

4. **Adjustment**  
   K – Knob (black)  
   R – Knob (red)

---

5. **Port size**  
   O – Cartridge only

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
<tr>
<td>12B</td>
<td>3/4” BSPP</td>
<td>02-175463</td>
</tr>
<tr>
<td>12T</td>
<td>SAE 12</td>
<td>566149</td>
</tr>
<tr>
<td>4G</td>
<td>1/2” BSPP</td>
<td>876716</td>
</tr>
<tr>
<td>6G</td>
<td>3/4” BSPP</td>
<td>876718</td>
</tr>
<tr>
<td>10H</td>
<td>SAE 10</td>
<td>876717</td>
</tr>
<tr>
<td>12H</td>
<td>SAE 12</td>
<td>566113</td>
</tr>
</tbody>
</table>

See page 71 for housings

---

**Dimensions**  

mm (inch)

Torque cartridge in housing  
108–122 Nm (80–90 lbf ft)
Description
The NV1–20 is a direct-acting, adjustable, screw-in cartridge type needle valve.

Operation
This needle valve is non-pressure compensated. Flow is controlled in the direction from port 2 to port 1, from full flow to tight shut-off, by turning the adjustment feature clockwise. The flow from port 1 to port 2 will be very restricted.

Ratings and specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical application pressure</td>
<td>210 bar (3000 psi)</td>
</tr>
<tr>
<td>Cartridge fatigue pressure</td>
<td>210 bar (3000 psi)</td>
</tr>
<tr>
<td>Rated flow</td>
<td>265 l/min (70 USgpm)</td>
</tr>
<tr>
<td>Internal leakage</td>
<td>5 drops/min. maximum @ 210 bar (3000 psi)</td>
</tr>
<tr>
<td>Temperature range</td>
<td>-40°C to 120°C (-40°F to 248°F)</td>
</tr>
<tr>
<td>Fluids</td>
<td>All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.</td>
</tr>
<tr>
<td>Filtration</td>
<td>Cleanliness code 18/16/13</td>
</tr>
<tr>
<td>Standard housing materials</td>
<td>Aluminum</td>
</tr>
<tr>
<td>Weight cartridge only</td>
<td>0.59 kg. (1.3 lbs.)</td>
</tr>
<tr>
<td>Seal kits</td>
<td>889615 Buna-N 889619 Viton®</td>
</tr>
</tbody>
</table>

Viton is a registered trademark of E.I. DuPont

Pressure Drop Curve

Cartridge Only

Flow in USgpm (105 SUS oil @ 120°F)

Full open Port 2 to port 1.
Model Code

NV1-20

1 Function
NV1 – Needle valve

2 Size
20 – 20 Size

3 Seals
Blank – Buna-N
V – Viton

4 Adjustment
K – Knob (black)
R – Knob (red)

5 Port size
O – Cartridge only

Port size

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
<tr>
<td>8B</td>
<td>1&quot; BSPP</td>
<td>02–175464</td>
</tr>
<tr>
<td>16T</td>
<td>SAE 16</td>
<td>566409</td>
</tr>
<tr>
<td>6G</td>
<td>3/4&quot; BSPP</td>
<td></td>
</tr>
<tr>
<td>8G</td>
<td>1&quot; BSPP</td>
<td></td>
</tr>
<tr>
<td>12H</td>
<td>SAE 12</td>
<td></td>
</tr>
<tr>
<td>16H</td>
<td>SAE 16</td>
<td></td>
</tr>
</tbody>
</table>

See page 71 for housings

Dimensions

mm (inch)

Torque cartridge in housing
128–155 Nm (95–115 lbf ft)
FCV7-10
Flow control valve

Description
The FCV7-10 is a non-pressure compensated, adjustable, flow restrictor available with and without free-flow check.

Operation
This valve when applied without the free flow check will allow flow between ports 1 and 2 through an increasing variable orifice when the adjustment is turned counterclockwise. In the full clockwise position this valve provides tight shut-off.

When applied with the free flow check, the valve will work as stated above allowing flow between port 2 and port 1, while it allows free reverse from port 1 to port 2.

Ratings and specifications
*Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)*

Typical application pressure (all ports) ........................................ 210 bar (3000 psi)
Rated flow .............................................................................. 45 l/min (12 USgpm)
Temperature range .......................................................... -40°C to 120°C (-40°F to 248°F)
Cavity ................................................................................. C-10-2 (See page 68)
Fluids ................................................................................. All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration .............................................................................. ISO 4406, class 18/16/13 or cleaner
Standard housing materials .................................................. Aluminum
Weight cartridge only ...................................................... 0,11 kg (0.25 lbs.)
Seal kits .............................................................................. 565806 Buna N, 889627 Viton®

Viton is a registered trademark of E.I. DuPont

Function Symbol
FCV7-10(V)-*-NV(F)

Sectional View

Typical Flow Regulation (full open)

Cartridge Only Flow in l/min (21,8 cSt oil @ 49°C)

<table>
<thead>
<tr>
<th>Curve</th>
<th>Code Option*</th>
<th>Flow Direction, Port:</th>
<th>Valve Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>10</td>
<td>2 to 1, 1 to 2</td>
<td>Open Closed</td>
</tr>
<tr>
<td>B</td>
<td>20</td>
<td>2 to 1, 1 to 2</td>
<td>Open Closed</td>
</tr>
<tr>
<td>C</td>
<td>10</td>
<td>1 to 2</td>
<td>Open</td>
</tr>
<tr>
<td>D</td>
<td>40</td>
<td>2 to 1, 1 to 2</td>
<td>Open Closed</td>
</tr>
<tr>
<td>E</td>
<td>NVF</td>
<td>Both directions</td>
<td>Open</td>
</tr>
<tr>
<td>F</td>
<td>20</td>
<td>1 to 2</td>
<td>Open</td>
</tr>
<tr>
<td>G</td>
<td>40</td>
<td>1 to 2</td>
<td>Open</td>
</tr>
<tr>
<td>H</td>
<td>FF</td>
<td>2 to 1</td>
<td>Open</td>
</tr>
<tr>
<td>I</td>
<td>FF</td>
<td>1 to 2, 1 to 2</td>
<td>Open and closed</td>
</tr>
<tr>
<td>J</td>
<td>NV</td>
<td>Both directions</td>
<td>Open</td>
</tr>
</tbody>
</table>

*See Controlled Flow Option in Model Code.
**Model Code**

**FCV7-10**

---

**1 Function**

FCV7 – Flow regulator

**2 Size**

10 – 10 Size

**3 Seals**

Blank – Buna-N

V – Viton

**4 Adjustment**

C – Cap

K – Knob

S – Screw

---

**5 Port size**

O – Cartridge only

**Port size**

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
<tr>
<td>3B</td>
<td>3/8” BSPP</td>
<td>02–175462</td>
</tr>
<tr>
<td>6T</td>
<td>SAE 6</td>
<td>566151</td>
</tr>
<tr>
<td>2G</td>
<td>1/4” BSPP</td>
<td></td>
</tr>
<tr>
<td>3G</td>
<td>3/8” BSPP</td>
<td>876702</td>
</tr>
<tr>
<td>6H</td>
<td>SAE 6</td>
<td>876703</td>
</tr>
<tr>
<td>8H</td>
<td>SAE 8</td>
<td>876701</td>
</tr>
</tbody>
</table>

**See page 71 for housings**

---

**Controlled flow option**

Max. flow ranges (nominal)

- **NV** – Needle valve
  - 0-45 l/min (0-12 USgpm)
- **NVF** – Needle valve, fine
  - 0-38 l/min (0-10 USgpm)
- **FF** – Needle valve with free reverse flow
  - 0-45 l/min (0-12 USgpm)
- **10** – Flow range, type 10, with free reverse flow
  - 0-6.6 l/min (0-1.75 USgpm)
- **20** – Flow range, type 20, with free reverse flow
  - 0-14 l/min (0-3.75 USgpm)
- **40** – Flow range, type 40, with free reverse flow
  - 0-27 l/min (0-7.25 USgpm)

---

**Dimensions**

mm (inch)

- **Diameters**
  - Ø38.1 (1.50)
  - Ø15.82 (0.623)
- **Height**
  - 30.2 (1.18)
  - 31.7 (1.25)

---

**Housing number**

- Aluminum: 02–175462
- Fatigue rated: 566151

---

**Torque cartridge in housing**

47–54 Nm (35–40 lbf ft)

---

**“K” Adjustment**

5.1 (0.20) max. travel

---

**“C” Adjustment**

4.8 (0.18) hex

---

**“S” Adjustment**

19.1 (0.75) hex

---

45
**FCV11-12**

**Flow control valve**

---

**Functional symbol**

![Functional symbol](image)

**Sectional view**

![Sectional view](image)

---

**Description**

The FCV11–12 is a direct acting, adjustable needle valve.

**Operation**

This valve is non-pressure compensated. Flow is controlled in either direction, from full flow to tight shut off, by turning the adjustment feature clockwise.

**Ratings and specifications**

*Performance data is typical with fluid at 21.8 cSt (105 SUS) and 49°C (120°F)*

- Typical application pressure: 350 bar (5000 psi) Port “1” to “2”
  - 210 bar (3000 psi) Port “1” to “2”
- Cartridge fatigue pressure (infinite life): 350 bar (5000 psi)
- Internal leakage: less than 5 drops / min. max. @210 bar (3000 psi)
- Temperature range: ~40°C to 120°C (~40°F to 248°F)
- Cavity: C-12-2 or C-12-2U (See page 68)
- Fluids: All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.
- Filtration: Cleanliness code 18/16/13
- Standard housing materials: Aluminum or steel
- Weight cartridge only: 0.24 kg (0.54 lb.)
- Seal kit: 02–165889 Buna–N
  - 02–165888 Viton®

*Viton is a registered trademark of E.I. DuPont*

---

**Pressure Drop Curves**

Cartridge only

---

**Pressure Drop Curves Graph**

- A – Cartridge with C-12-2 valve body
- B – Cartridge with C-12-2U valve body
- C – Cartridge only, full open
**Model Code**

**FCV11-12**

<table>
<thead>
<tr>
<th>Function</th>
<th>FCV11 – Flow control valve</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Size</strong></td>
<td>12 – 12 Size</td>
</tr>
<tr>
<td><strong>Seals</strong></td>
<td>Blank – Buna-N, V – Viton</td>
</tr>
<tr>
<td><strong>Adjustment</strong></td>
<td>S – Screw</td>
</tr>
<tr>
<td><strong>Valve housing material</strong></td>
<td>S – Steel, A – Aluminum</td>
</tr>
</tbody>
</table>

**Port size**

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>C-12-2U Aluminum Fatigue rated</td>
</tr>
<tr>
<td>O</td>
<td>Cartridge only</td>
<td></td>
</tr>
<tr>
<td>10T</td>
<td>SAE 10</td>
<td>02–160641</td>
</tr>
<tr>
<td>12T</td>
<td>SAE 12</td>
<td>02–160645</td>
</tr>
<tr>
<td>4G</td>
<td>1/2&quot; BSPP</td>
<td>02–161116</td>
</tr>
<tr>
<td>6G</td>
<td>3/4&quot; BSPP</td>
<td>02–161115</td>
</tr>
</tbody>
</table>

See pages 71 and 74 for housings.

**Cavity**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blank</td>
<td>Cavity without undercut</td>
</tr>
<tr>
<td>U</td>
<td>Cavity with undercut</td>
</tr>
</tbody>
</table>

**Valve type**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NV</td>
<td>Needle Valve (Adjustable)</td>
</tr>
</tbody>
</table>

**Dimensions**

- **“S” Adjustment**: 3.2 (0.12) hex
- **Port size** 31.8 (1.25) hex
- **Thread** 1.063"–12 Thd.
- **Overall length**: 40.0 (1.60)
- **Diameter**: 23.75 (0.935)

**Fatigue rated**

- **Aluminum housings** can be used for pressures up to 210 bar (3000 psi)
- **Steel housings** must be used for operating pressures **above** 210 bar (3000 psi)

**Torque cartridge in housing**

- **A**: 81–95 Nm (60–70 lbf ft)
- **S**: 102–115 Nm (75–85 lbf ft)
FCV6-16
Flow control valve

Description
The FCV6-16 is a non-pressure compensated, adjustable, flow restrictor.

Operation
This valve allows flow between ports 1 and 2 through an increasing variable orifice when the adjustment is turned counterclockwise. In the full clockwise position this valve provides tight shut-off.

Ratings and specifications
Performance data is typical with fluid at 21.8 cSt (105 SUS) and 49°C (120°F)
Typical application pressure (all ports) 210 bar (3000 psi)
Cartridge fatigue pressure (infinite life) 210 bar (3000 psi)
Rated flow 208 l/min (55 USgpm)
Internal leakage Port 2 to 1; <5 drops/min maximum @ 210 bar (3000 psi)
Temperature range –40°C to 120°C (~-40°F to 248°F)
Cavity C–16–2 (See page 68)
Fluids All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.
Filtration Cleanliness code 18/16/13
Standard housing materials Aluminum
Weight cartridge only 0.37 kg (0.81 lbs.)
Seal kits 889631 Buna-N 889635 Viton®

Viton is a registered trademark of E.I. DuPont

Typical Flow Regulation
Cartridge Only

Full open
Port 1 to port 2
or port 2 to port 1.

![Flow vs Pressure Drop Graph](image-url)
Model Code

FCV6-16

1 Function
FCV6 – Flow control valve

2 Size
16 – 16 Size

3 Seals
Blank – Buna-N
V – Viton

4 Adjustment
C – Cap
K – Knob
S – Screw

5 Port size
O – Cartridge only

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
<tr>
<td>6B</td>
<td>3/4” BSPP</td>
<td>02-175463</td>
</tr>
<tr>
<td>12T</td>
<td>SAE 12</td>
<td>566149</td>
</tr>
<tr>
<td>4G</td>
<td>1/2” BSPP</td>
<td>876716</td>
</tr>
<tr>
<td>6G</td>
<td>3/4” BSPP</td>
<td>876718</td>
</tr>
<tr>
<td>10H</td>
<td>SAE 10</td>
<td>876717</td>
</tr>
<tr>
<td>12H</td>
<td>SAE 12</td>
<td>566113</td>
</tr>
</tbody>
</table>

See page 71 for housings

6 Controlled flow option
NV – Needle valve

Dimensions
mm (inch)

“K” Adjustment ∅38,1 (1.50)

38,1 (1.5) hex

“S” Adjustment 4,8 (0.18) hex

1.312”-12 Thd.

∅28,55 (1.124)

“C” Adjustment 19,1 (0.75) hex

Torque cartridge in housing
108–122 Nm (80–90 lbf ft)
VF1-10  
Velocity fuse

Description
The VF1-10-F is a screw-in cartridge velocity fuse.

Operation
This valve is normally open from port 1 to port 2. When flow exceeds the setting of the valve, it closes. The valve returns to the open condition when the pressure at port 1 is reduced to less than 80 psi.

Ratings and specifications
Performance data is typical with fluid at 21.8 cSt (105 SUS) and 49°C (120°F)
Typical application pressure (all ports) ......................... 210 bar (3000 psi)
Cartridge fatigue pressure (infinite life) ......................... 210 bar (3000 psi)
Rated flow ................................................. 23 l/min (6 USgpm)
Flow regulation accuracy ................................. 1.9–22.7 l/min (0.5–6.0 USgpm) ± 20%
Internal leakage .................................. Port 2 to 1; <5 drops/min
maximum @ 210 bar (3000 psi)
Temperature range ...................................... −40°C to 120°C (−40°F to 248°F)
Cavity ..................................................... C−10−2 (See page 68)
Fluids ....................................................... All general purpose hydraulic fluids such as:
MIL−H−5606, SAE 10, SAE 20, etc.
Filtration .................................................... Cleanliness code 18/16/13
Standard housing materials ................................. Aluminum
Weight cartridge only .................................... 0.11 kg (0.25 lbs.)
Seal kits .................................................... 565803 Buna-N
566086 Viton®

Viton is a registered trademark of E.I. DuPont

Typical Flow Regulation
Cartridge Only

A -22.8 l/min (6 USgpm) maximum flow setting
--- Port 1 to 2, fusing direction
--- Port 2 to 1, reverse flow down to 0

B -14.44 l/min. (3 USgpm) maximum flow setting
--- Port 1 to 2, fusing direction
--- Port 2 to 1, reverse flow down to 0

C -3.8 l/min. (1 USgpm) maximum flow setting
--- Port 1 to 2, fusing direction
--- Port 2 to 1, reverse flow down to 0
**VF1 - 10 (V)** - **F - ** *.* **VF1**

**Function**
VF1 - Velocity fuse

**Size**
10 - 10 Size

**Seals**
Blank - Buna-N
V - Viton

**Adjustment**
F - Fixed orifice

**Port size**
O - Cartridge only

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
<tr>
<td>3B</td>
<td>3/8&quot; BSPP</td>
<td>02-175462</td>
</tr>
<tr>
<td>6T</td>
<td>SAE 6</td>
<td>566151</td>
</tr>
<tr>
<td>2G</td>
<td>1/4&quot; BSPP</td>
<td>876702</td>
</tr>
<tr>
<td>3G</td>
<td>3/8&quot; BSPP</td>
<td>876703</td>
</tr>
<tr>
<td>6H</td>
<td>SAE 6</td>
<td>876700</td>
</tr>
<tr>
<td>8H</td>
<td>SAE 8</td>
<td>876701</td>
</tr>
</tbody>
</table>

See page 71 for housings

**Factory set flow rate, nominal**
(Specify in USgpm)
Range 1.9–22.7 l/min
(0.5–6.0 USgpm)

**Dimensions**

Torque cartridge in housing
47–54 Nm (35–40 lbf ft)

- 19,0 (0.75)
- 31,7 (1.25)
- 25.4 (1.00) hex
- 0.875”-14 Thd.
- ∅15,82 (0.623)
Description
The VF1-16-F is a factory-set, screw-in cartridge velocity fuse.

Operation
This valve is normally open from port 1 to port 2. When flow exceeds the setting of the valve, it closes. The valve returns to the open condition when the pressure at port 1 is reduced to less than 80 psi.

Ratings and specifications
Performance data is typical with fluid at 21.8 cSt (105 SUS) and 49°C (120°F)
Typical application pressure (all ports) .......................... 210 bar (3000 psi)
Cartridge fatigue pressure (infinite life) .......................... 210 bar (3000 psi)
Rated flow ............................................. 114 l/min (30 USgpm)
Flow regulation accuracy .................. 9.5–114 l/min (2.5–30.0 USgpm) ± 20%
Internal leakage ............................... Port 1 to 2 closed; <5 drops/min maximum @ 210 bar (3000 psi)
Temperature range ................................ −40°C to 120°C (−40°F to 248°F)
Cavity .................................................. C−16−2 (See page 68)
Fluids .................................................. All general purpose hydraulic fluids such as: MIL−H−5606, SAE 10, SAE 20, etc.
Filtration ............................................ Cleanliness code 18/16/13
Standard housing materials ....................... Aluminum
Weight cartridge only .................................. 0.33 kg (0.72 lbs.)
Seal kits ............................................ 565810 Buna-N
889609 Viton®

Viton is a registered trademark of E.I. DuPont

Typical Flow Regulation
Cartridge Only

A -114 l/min (30 USgpm) maximum flow setting
   Port 1 to 2, fusing direction
   Port 2 to 1, reverse flow down to 0

B -60 l/min. (15 USgpm) maximum flow setting
   Port 1 to 2, fusing direction
   Port 2 to 1, reverse flow down to 0

C -19 l/min. (5 USgpm) maximum flow setting
   Port 1 to 2, fusing direction
   Port 2 to 1, reverse flow down to 0
Model Code

VF1-16

**VF1 - 16 (V) - F - *** - *.***

<table>
<thead>
<tr>
<th>Function</th>
<th>Size</th>
<th>Adjustments</th>
<th>Seals</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
<tr>
<td>VF1</td>
<td>16</td>
<td>F</td>
<td>Blank</td>
<td>3/4” BSPP</td>
<td>02-175463</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>V</td>
<td>3/4” BSPP</td>
<td>566149</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1/2” BSPP</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SAE 10</td>
<td>876716</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SAE 12</td>
<td>876717</td>
</tr>
</tbody>
</table>

Seals:
- Blank: Buna-N
- V: Viton

Adjustment:
- F: Factory set

**Dimensions (mm (inch))**

**Factory set flow rate, nominal**

(Specify in USgpm)
Range 9.5–114 l/min
(2.5–30.0 USgpm)

Torque cartridge in housing
108–122 Nm (80–90 lbf ft)
VF1-20
Velocity fuse

Description
The VF1-20-F is a factory-set, screw-in cartridge velocity fuse.

Operation
This valve is normally open from port 1 to port 2. When flow exceeds the setting of the valve, it closes. The valve returns to the open condition when the pressure at port 1 is reduced to less than 80 psi.

Ratings and specifications
Performance data is typical with fluid at 21.8 cSt (105 SUS) and 49°C (120°F)
Typical application pressure (all ports) .......................... 210 bar (3000 psi)
Cartridge fatigue pressure (infinite life) .......................... 210 bar (3000 psi)
Rated flow ............................................................ 227 l/min (60 USgpm)
Flow regulation accuracy .......................... 60–227 l/min (15–60 USgpm) ± 20%
Internal leakage ........................................ Port 1 to 2 closed: <5 drops/min
maximum @ 210 bar (3000 psi)
Temperature range ........................................... –40°C to 120°C (–40°F to 248°F)
Cavity ......................................................... C–20–2 (See page 68)
Fluids .................................................. All general purpose hydraulic fluids such as:
MIL–H–5606, SAE 10, SAE 20, etc.
Filtration .................................................. Cleanliness code 18/16/13
Standard housing materials .............................. Aluminum
Weight cartridge only ........................................ 0.82 kg (1.80 lbs.)
Seal kits ........................................ 889615 Buna-N
889619 Viton®
Viton is a registered trademark of E.I. DuPont

Typical Flow Regulation

Cartridge Only

A -228 l/min (60 USgpm) maximum flow setting
- Port 1 to 2, fusing direction
- Port 2 to 1, reverse flow down to 0

B -114 l/min. (30 USgpm) maximum flow setting
- Port 1 to 2, fusing direction
- Port 2 to 1, reverse flow down to 0

C -38 l/min. (10 USgpm) maximum flow setting
- Port 1 to 2, fusing direction
- Port 2 to 1, reverse flow down to 0
VF1 - 20 (V) - F - *** - *** - *

1. Function
VF1 - Velocity fuse

2. Size
20 - 20 Size

3. Seals
Blank - Buna-N
V - Viton

4. Adjustment
F - Factory set

5. Port size
O - Cartridge only

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
<tr>
<td>8B</td>
<td>1&quot; BSPP</td>
<td>02-175464</td>
</tr>
<tr>
<td>16T</td>
<td>SAE 16</td>
<td>566409</td>
</tr>
<tr>
<td>6G</td>
<td>3/4&quot; BSPP</td>
<td></td>
</tr>
<tr>
<td>8G</td>
<td>1&quot; BSPP</td>
<td>876734</td>
</tr>
<tr>
<td>12H</td>
<td>SAE 12</td>
<td>876733</td>
</tr>
<tr>
<td>16H</td>
<td>SAE 16</td>
<td>876735</td>
</tr>
</tbody>
</table>

See page 71 for housings

6. Factory set flow rate, nominal
(Specify in USgpm)
Range 60–227 l/min
(15–60.0 USgpm)

Dimensions
mm (inch)

Torque cartridge in housing
128–155 Nm (95–115 lbf ft)

38.1 (1.50)
57.2 (2.25)
47.6 (1.87) hex
1.625"-12 Thd.
∅36.47 (1.436)
**FDC1-10**

**Flow divider/combiner**

### Functional Symbol

![Functional Symbol Diagram](image)

### Sectional View

![Sectional View Diagram](image)

**NOTE:**
Port 1 unused, blocked by blind cavity

### Description

The FDC1-10 is a pressure compensated, spool type, screw-in, flow divider/combiner cartridge.

### Operation

This valve is used in the dividing mode. It will take the inlet flow (port 3) and split the flow according to the ratio specified, regardless of system pressure to ports 2 and 4.

In the combining mode this valve will take the inlet flows from ports 2 and 4 and combine them into port 3 according to the ratio specified.

### Ratings and specifications

*Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)*

<table>
<thead>
<tr>
<th>Performance</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical application pressure (all ports)</td>
<td>210 bar (3000 psi)</td>
</tr>
<tr>
<td>Cartridge fatigue pressure (infinite life)</td>
<td>210 bar (3000 psi)</td>
</tr>
<tr>
<td>Rated inlet flow</td>
<td>See model code, item 3</td>
</tr>
<tr>
<td>Temperature range</td>
<td>−40°C to 120°C (−40°F to 248°F)</td>
</tr>
<tr>
<td>Cavity</td>
<td>C–10–4 (See page 70)</td>
</tr>
<tr>
<td>Fluids</td>
<td>All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.</td>
</tr>
<tr>
<td>Filtration</td>
<td>Cleanliness code 18/16/13</td>
</tr>
<tr>
<td>Standard housing materials</td>
<td>Aluminum</td>
</tr>
<tr>
<td>Weight cartridge only</td>
<td>0.10 kg (0.22 lbs.)</td>
</tr>
<tr>
<td>Seal kits</td>
<td>889625 Buna-N</td>
</tr>
<tr>
<td></td>
<td>566080 Viton®</td>
</tr>
</tbody>
</table>

**Viton** is a registered trademark of E.I. DuPont

### Typical Flow Regulation

**Cartridge Only**

<table>
<thead>
<tr>
<th>Flow Division</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>A -33 spool</td>
<td></td>
</tr>
<tr>
<td>B -44 spool</td>
<td></td>
</tr>
<tr>
<td>C -66 spool</td>
<td></td>
</tr>
<tr>
<td>D -88 spool</td>
<td></td>
</tr>
</tbody>
</table>

### Graph

**Flow in lpm (21.8 cSt @ 49°C)**

![Flow vs. Pressure Graph](image)
**Model Code**

**FDC1-10**

**Function**

**FDC1** – Flow divider/combiner

**Size**

10 – 10 Size

**Seals**

Blank – Buna-N

V – Viton

**Port Size**

0 – Cartridge only

### Flow divisions (ratios)

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
<th>Aluminum</th>
</tr>
</thead>
<tbody>
<tr>
<td>3B</td>
<td>3/8&quot; BSPP</td>
<td>02-175467</td>
<td></td>
</tr>
<tr>
<td>6T</td>
<td>SAE 6</td>
<td>566234</td>
<td></td>
</tr>
<tr>
<td>2G</td>
<td>1/4&quot; BSPP</td>
<td>02-185804</td>
<td></td>
</tr>
<tr>
<td>3G</td>
<td>3/8&quot; BSPP</td>
<td>02-185805</td>
<td></td>
</tr>
<tr>
<td>6H</td>
<td>SAE 6</td>
<td>02-185802</td>
<td></td>
</tr>
<tr>
<td>8H</td>
<td>SAE 8</td>
<td>02-185803</td>
<td></td>
</tr>
</tbody>
</table>

See page 73 for housings

**Dimensions**

mm (inch)

- Port 1, unused, blocked by blind cavity

**NOTE:** Minimum inlet flow should not be less than 1/4 of maximum inlet flow for a given code

<table>
<thead>
<tr>
<th>Code</th>
<th>Flow Division %</th>
<th>Max. Inlet Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Port 4</td>
<td>Port 2</td>
</tr>
<tr>
<td>5.1</td>
<td>33</td>
<td>67</td>
</tr>
<tr>
<td>5.5</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>11</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>21</td>
<td>67</td>
<td>33</td>
</tr>
<tr>
<td>22</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>33</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>34</td>
<td>43</td>
<td>57</td>
</tr>
<tr>
<td>36</td>
<td>33</td>
<td>67</td>
</tr>
<tr>
<td>43</td>
<td>57</td>
<td>43</td>
</tr>
<tr>
<td>44</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>46</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>62</td>
<td>75</td>
<td>25</td>
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<tr>
<td>63</td>
<td>67</td>
<td>33</td>
</tr>
<tr>
<td>64</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>66</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>88</td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

**Torque cartridge in housing**

47–54 Nm (35–40 lbf ft)

NOTE:

- Port 1, unused, blocked by blind cavity

**Housing number**

- 02–175467
- 566234
- 02-185804
- 02-185805
- 02-185802
- 02-185803
**FDC1-16**
Flow divider/combiner

**Description**
The FDC1-16 is a pressure compensated, spool type, screw-in, flow divider/combiner cartridge.

**Operation**
This valve is used in the dividing mode. It will take the inlet flow (port 3) and split the flow according to the ratio specified, regardless of system pressure to ports 2 and 4.

In the combining mode this valve will take the inlet flows from ports 2 and 4 and combine them into port 3 according to the ratio specified.

**Ratings and specifications**
Performance data is typical with fluid at 21.8 cSt (105 SUS) and 49°C (120°F)

- Typical application pressure (all ports) ........................................ 210 bar (3000 psi)
- Cartridge fatigue pressure (infinite life) ........................................ 210 bar (3000 psi)
- Rated inlet flow ................................................................. See model code, item [5]
- Temperature range ............................................................. −40°C to 120°C (−40°F to 248°F)
- Cavity .............................................................................. C−16−4 (See page 70)
- Fluids .............................................................................. All general purpose hydraulic fluids such as: MIL−H−5606, SAE 10, SAE 20, etc.
- Filtration ............................................................................ Cleanliness code 18/16/13
- Standard housing materials .................................................. Aluminum
- Weight cartridge only ........................................................... 0.35 kg (0.78 lbs.)
- Seal kits ............................................................................. 889634 Buna-N 889638 Viton®

*Viton is a registered trademark of E.I. DuPont*

**Typical Flow Regulation**
Cartridge Only

<table>
<thead>
<tr>
<th>Fluid Division</th>
<th>Throttle Spool</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>-22 spool</td>
</tr>
<tr>
<td>B</td>
<td>-33 spool</td>
</tr>
<tr>
<td>C</td>
<td>-44 spool</td>
</tr>
<tr>
<td>D</td>
<td>-55 spool</td>
</tr>
<tr>
<td>E</td>
<td>-66 spool</td>
</tr>
<tr>
<td>F</td>
<td>-88 spool</td>
</tr>
</tbody>
</table>

**Flow in lpm (21.8 cSt oil @ 49°C)**

![Flow in lpm (21.8 cSt oil @ 49°C) graph](image)

**Flow Division**

- **A**: 10
- **B**: 20
- **C**: 30
- **D**: 40
- **E**: 50
- **F**: 60

**Pressure Drop psi**

- **A**: 0–5
- **B**: 5–10
- **C**: 10–15
- **D**: 15–20
- **E**: 20–25
- **F**: 25–30

**Flow in USgpm (105 SUS oil @ 120°F)**

- **A**: 0–10
- **B**: 10–20
- **C**: 20–30
- **D**: 30–40
- **E**: 40–50
- **F**: 50–60

**Pressure Drop bar**

- **A**: 0–10
- **B**: 10–20
- **C**: 20–30
- **D**: 30–40
- **E**: 40–50
- **F**: 50–60
Model Code

FDC1-16

1 Function
FDC1 – Flow divider/combiner

2 Size
16 – 16 Size

3 Seals
Blank – Buna-N
V – Viton

4 Port Size
0 – Cartridge only

See page 73 for housings

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
<tr>
<td>12T</td>
<td>SAE 12</td>
<td>566200</td>
</tr>
<tr>
<td>6B</td>
<td>3/4&quot; BSPP</td>
<td>02-175468</td>
</tr>
</tbody>
</table>

NOTE: Minimum inlet flow should not be less than 1/4 of maximum inlet flow for a given code

5 Flow divisions (ratios)

<table>
<thead>
<tr>
<th>Code</th>
<th>Flow Division%</th>
<th>Max. Inlet Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Port 4</td>
<td>Port 2</td>
</tr>
<tr>
<td>22</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>28</td>
<td>20</td>
<td>80</td>
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<tr>
<td>33</td>
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<tr>
<td>36</td>
<td>33</td>
<td>67</td>
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<tr>
<td>43</td>
<td>57</td>
<td>43</td>
</tr>
<tr>
<td>44</td>
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<td>50</td>
</tr>
<tr>
<td>46</td>
<td>40</td>
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<tr>
<td>55</td>
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<tr>
<td>62</td>
<td>75</td>
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<td>63</td>
<td>67</td>
<td>33</td>
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<tr>
<td>64</td>
<td>60</td>
<td>40</td>
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<tr>
<td>66</td>
<td>50</td>
<td>50</td>
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<tr>
<td>82</td>
<td>80</td>
<td>20</td>
</tr>
<tr>
<td>84</td>
<td>67</td>
<td>33</td>
</tr>
<tr>
<td>88</td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

6 Dimensions

mm (inch)

Torque cartridge in housing
108–122 Nm (80–90 lbf ft)

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.0 (0.51)</td>
<td></td>
</tr>
<tr>
<td>104.8 (4.12)</td>
<td></td>
</tr>
<tr>
<td>∅25.37 (0.999)</td>
<td></td>
</tr>
<tr>
<td>∅26.95 (1.061)</td>
<td></td>
</tr>
<tr>
<td>∅28.55 (1.124)</td>
<td></td>
</tr>
</tbody>
</table>

Port 1, unused, blocked by blind cavity
The FDC1-20 is a line mounted, pressure compensated, spool type, flow divider/combiner valve.

This valve is used in the dividing mode. It will take the inlet flow (port 1) and split the flow according to the ratio specified, regardless of system pressure to ports 2 and 4.

In the combining mode this valve will take the inlet flows from ports 2 and 3 and combine them into port 1 according to the ratio specified.

Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)

Typical application pressure (all ports) .......................... 210 bar (3000 psi)
Cartridge fatigue pressure (infinite life) .......................... 210 bar (3000 psi)
Rated inlet flow .................................................. See model code, item 5
Fluids .................................................. All general purpose hydraulic fluids such as:
                                              MIL-H-5606, SAE 10, SAE 20, etc.
Filtration .................................................. Cleanliness code 18/16/13
Standard housing materials ................................. Aluminum
Weight cartridge only ........................................... 2,6 kg (5.75 lbs.)
Seal kits .................................................. 889639 Buna-N
                                              889643 Viton®

Viton is a registered trademark of E.I. DuPont

Flow Division
A -33 spool
B -44 spool
C -66 spool
D -88 spool
**Model Code**

**FDC1-20**

### Function

**FDC1** – Flow divider/combiner

### Size

20 – 20 Size

### Seals

Blank – Buna-N  
V – Viton

### Port Size

16T – SAE 16 (light duty)  
20T – SAE 20 (light duty)

(Sold as a complete assembly.)

### Flow divisions (ratios)

<table>
<thead>
<tr>
<th>Code</th>
<th>Flow Division</th>
<th>Max. Inlet Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Port 4</td>
<td>Port 2</td>
</tr>
<tr>
<td>33</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>34</td>
<td>43</td>
<td>57</td>
</tr>
<tr>
<td>36</td>
<td>33</td>
<td>67</td>
</tr>
<tr>
<td>44</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>46</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>66</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>88</td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

**NOTE:** Minimum inlet flow should not be less than 1/4 of maximum inlet flow for a given code

### Dimensions (mm (inch))

<table>
<thead>
<tr>
<th>Port</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>63,5 (2.50)</td>
</tr>
<tr>
<td>2, 3</td>
<td>31,7 (1.25)</td>
</tr>
<tr>
<td>1</td>
<td>101,6 (4.00)</td>
</tr>
<tr>
<td>5</td>
<td>104,0 (4.10)</td>
</tr>
<tr>
<td>5</td>
<td>76,2 (3.00)</td>
</tr>
<tr>
<td></td>
<td>76,2 (3.00)</td>
</tr>
</tbody>
</table>

**Torque cartridge in housing**  
128–155 Nm (95–115 lbf ft)

∅10,0 (0.406 thru) (3 plcs.)
FDC3-10
Posi-traction valve

Description
The FDC3-10 is a pressure compensated, spool type, screw-in, posi-traction cartridge valve.

Operation
This valve is used in the dividing mode. It will take the inlet flow (port 3) and split the flow to ports 2 and 4.
In the combining mode this valve will take the inlet flows from ports 2 and 4 and combine them into port 3 according to the ratio specified.

Ratings and specifications
*Performance data is typical with fluid at 21.8 cSt (105 SUS) and 49°C (120°F)*
Typical application pressure (all ports) .................... 210 bar (3000 psi)
Cartridge fatigue pressure (infinite life) .................... 210 bar (3000 psi)
Rated inlet flow ........................................ See model code, item 3
Temperature range ....................................... –40°C to 120°C (–40°F to 248°F)
Cavity ....................................................... C–10–4 (See page 70)
Fluids ...................................................... All general purpose hydraulic fluids such as:
MIL–H–5606, SAE 10, SAE 20, etc.
Filtration ..................................................... Cleanliness code 18/16/13
Standard housing materials ................................ Aluminum
Weight cartridge only ........................................... 0.10 kg (0.22 lbs.)
Seal kits ...................................................... 889625 Buna-N
566080 Viton®

Viton is a registered trademark of E.I. DuPont

Pressure Drop Curves
Cartridge Only

Flow Division
A -33 spool
B -44 spool
C -66 spool
D -88 spool

Inlet flow rate, port 3, in lpm (21.8 cSt oil @ 49°C)

Pressure Drop Curves

Inlet flow rate, port 3, in USgpm (105 SUS oil @ 120°F)
**Model Code**

**FDC3-10**

### Function

**FDC3** – Posi-traction valve

### Size

10 – 10 Size

### Seals

Blank – Buna-N

V – Viton

### Port Size

0 – Cartridge only

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
<th>Aluminum</th>
</tr>
</thead>
<tbody>
<tr>
<td>3B</td>
<td>3/8&quot; BSPP</td>
<td>02-175467</td>
<td></td>
</tr>
<tr>
<td>5T</td>
<td>SAE 6</td>
<td>566234</td>
<td></td>
</tr>
<tr>
<td>2G</td>
<td>1/4&quot; BSPP</td>
<td>02-185804</td>
<td></td>
</tr>
<tr>
<td>3G</td>
<td>3/8&quot; BSPP</td>
<td>02-185805</td>
<td></td>
</tr>
<tr>
<td>6H</td>
<td>SAE 6</td>
<td>02-185802</td>
<td></td>
</tr>
<tr>
<td>8H</td>
<td>SAE 8</td>
<td>02-185803</td>
<td></td>
</tr>
</tbody>
</table>

See page 73 for housings

### Flow divisions (ratios)

<table>
<thead>
<tr>
<th>Code</th>
<th>Flow Division %</th>
<th>Max. Inlet Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Port 4</td>
<td>Port 2</td>
</tr>
<tr>
<td>33</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>44</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>66</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>88</td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

**NOTE:** Minimum inlet flow should not be less than 1/4 of maximum inlet flow for a given code

### Dimensions

mm (inch)

- Code Port size: 3B, 6T, 2G, 3G, 6H, 8H
- Housing number: See page 73 for housings
- Dimensions: 8.0 (0.31), 63.9 (2.51)
- Torque cartridge in housing: 47–54 Nm (35–40 lbf ft)

**NOTE:** Port 1, unused, blocked by blind cavity
FDC3-16
Posi-traction valve

Description
The FDC3-16 is a pressure compensated, spool type, screw-in, posi-traction cartridge valve.

Operation
This valve is used in the dividing mode. It will take the inlet flow (port 3) and split the flow to ports 2 and 4.
In the combining mode this valve will take the inlet flows from ports 2 and 4 and combine them into port 3.

Ratings and specifications
Performance data is typical with fluid at 21.8 cSt (105 SUS) and 49°C (120°F)
Typical application pressure (all ports) ......................... 210 bar (3000 psi)
Cartridge fatigue pressure (infinite life) ......................... 210 bar (3000 psi)
Rated inlet flow ........................................ See model code, item 5
Temperature range ........................................ –40°C to 120°C (–40°F to 248°F)
Cavity ....................................................... C–16–4 (see page 70)
Fluids ......................................................... All general purpose hydraulic fluids such as:
MIL–H–5606, SAE 10, SAE 20, etc.
Filtration ..................................................... Cleanliness code 18/16/13
Standard housing materials ..................................... Aluminum
Weight cartridge only ...................................... 0.35 kg (0.78 lbs.)
Seal kits ..................................................... 889634 Buna-N
889638 Viton®

Viton is a registered trademark of E.I. DuPont

Pressure Drop Curves
Cartridge Only

Flow Division
A -22 spool
B -33 spool
C -44 spool
D -55 spool
E -66 spool
F -88 spool

Flow in lpm (21.8 cSt oil @ 49°C)
Model Code FDC3-16

Function
FDC3 – Posi-traction valve

Size
16 – 16 Size

Seals
Blank – Buna-N
V – Viton

Port Size
O – Cartridge only

Flow divisions (ratios)

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Flow Division %</th>
<th>Max. Inlet Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>50 50</td>
<td>57.0 (15)</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>50 50</td>
<td>76.0 (20)</td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>50 50</td>
<td>106.4 (28)</td>
<td></td>
</tr>
<tr>
<td>55</td>
<td>50 50</td>
<td>129.2 (34)</td>
<td></td>
</tr>
<tr>
<td>66</td>
<td>50 50</td>
<td>152.0 (40)</td>
<td></td>
</tr>
<tr>
<td>88</td>
<td>50 50</td>
<td>228.0 (60)</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Minimum inlet flow should not be less than 1/4 of maximum inlet flow for a given code

Dimensions
mm (inch)

Torque cartridge in housing
108–122 Nm (80–90 lbf ft)

NOTE: Minimum inlet flow should not be less than 1/4 of maximum inlet flow for a given code

See page 73 for housings

Port 1, unused, blocked by blind cavity.
**FDC3-20**

**Posi-traction valve**

---

**Functional Symbol**

![Functional Symbol](image)

**Sectional View**

![Sectional View](image)

---

**Description**

The FDC3-20 is a line mounted, pressure compensated, spool type, posi-traction cartridge valve.

**Operation**

This valve is used in the dividing mode. It will take the inlet flow (port 1) and split the flow to ports 2 and 3.

In the combining mode this valve will take the inlet flows from ports 2 and 3 and combine them into port 1 according to the ratio specified.

---

**Ratings and specifications**

*Performance data is typical with fluid at 21.8 cSt (105 SUS) and 49°C (120°F)*

- Typical application pressure (all ports) ............................................... 210 bar (3000 psi)
- Cartridge fatigue pressure (infinite life) ........................................ 210 bar (3000 psi)
- Rated inlet flow .............................................. See model code, item 5
- Temperature range ........................................... –40°C to 120°C (–40°F to 248°F)

**Fluids**

All general purpose hydraulic fluids such as:
- MIL–H–5606, SAE 10, SAE 20, etc.

**Filtration**

Cleanliness code 18/16/13

**Standard housing materials**

Aluminum

**Weigh cartridge only**

2,6 kg (5.75 lbs.)

**Seal kits (2 req’d.)**

889639 Buna-N
889643 Viton®

*Viton is a registered trademark of E.I. DuPont*

---

**Pressure Drop Curves**

**Cartridge Only**

![Pressure Drop Curves](image)

Flow Division

- A -33 spool
- B -44 spool
- C -66 spool
- D -88 spool
Model Code

FDC3 - 20 (V) - *** - **

1. **Function**
   FDC3 – Posi-traction valve

2. **Size**
   20 – 20 Size

3. **Seals**
   Blank – Buna-N
   V – Viton

4. **Port Size**
   16T – SAE 16 (light duty)
   20T – SAE 20 (light duty)
   (Sold as complete assembly.)

5. **Flow divisions (ratios)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Flow Division %</th>
<th>Max. Inlet Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Port 2</td>
<td>Port 3</td>
</tr>
<tr>
<td>33</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>44</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>66</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>88</td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

**NOTE:** Minimum inlet flow should not be less than 1/4 of maximum inlet flow for a given code.

---

**Dimensions**

mm (inch): 128–155 Nm (95–115 lbf ft)

12,7 (0.50) 76,2 (3.00) 12,7 (0.50)
63,5 (2.50) 31,7 (1.25) 31,7 (1.25)
12,7 (0.50)

101,6 (4.00) 76,2 (3.00) 44,4 (1.75) 44,4 (1.75)

∅10,3 (0.406 thru) (3 plcs.)

44,4 (1.75) 104,0 (4.10)
Cavity bores can be machined accurately in aluminum or steel. The necessary UNF, or UN threads may be machined using standard small tools, possibly already in your machine shop or from a local tool supplier. For in depth advice on the machining of cavities, consult your Vickers sales specialist.

Either you, our customer, or Vickers can design and manufacture customized manifolds or housings dedicated to individual applications. We call the resulting valve packages Modular Circuit Designs (MCDs). Cartridges selected for your application can be accommodated in one or more MCDs, according to your requirements.

Dimensions

These diameters unless otherwise specified.

These diameters unless otherwise specified.

<table>
<thead>
<tr>
<th>Cavity (mm)</th>
<th>A (Spotface)</th>
<th>B (+0.051 / +0.002)</th>
<th>C (+0.051 / +0.002)</th>
<th>D (.750”–16)</th>
<th>E (Full Thread)</th>
<th>F</th>
<th>G</th>
<th>H (±0.0254)</th>
<th>J</th>
<th>P (R Max. Dia.)</th>
<th>X (Max. Dia.)</th>
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<tbody>
<tr>
<td>C–10–2</td>
<td>30.16 (1.188)</td>
<td>19.05 (0.750)</td>
<td>12.72 (0.501)</td>
<td>15.88 (0.625)</td>
<td>2.54/2.92 (0.100/0.115)</td>
<td>23.81 (0.937)</td>
<td>15.90 (0.626)</td>
<td>33.32 (1.312)</td>
<td>18.23 (0.718)</td>
<td>11.11 (0.437)</td>
<td>14.29 (0.562)</td>
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<tr>
<td>C–12–2 (U)</td>
<td>38.10 (1.500)</td>
<td>24.76 (0.975)</td>
<td>34.92 (1.375)</td>
<td>23.82 (0.938)</td>
<td>46.35 (1.825)</td>
<td>27.94 (1.100)</td>
<td>12.70 (0.500)</td>
<td>22.22 (0.875)</td>
<td>14.68 (0.578)</td>
<td>8.74 (0.344)</td>
<td>11.11 (0.438)</td>
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<td>C–16–2</td>
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<td>28.62 (1.127)</td>
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<td>22.22 (0.875)</td>
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<td>19.05 (0.750)</td>
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<tr>
<td>C–20–2</td>
<td>57.66 (2.270)</td>
<td>39.12 (1.540)</td>
<td>36.55 (1.439)</td>
<td>58.72 (2.312)</td>
<td>25.40 (1.000)</td>
<td>30.96 (1.218)</td>
<td>34.29 (1.350)</td>
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<td>C–12–2U (only)</td>
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<td>34.29 (1.350)</td>
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<td>34.29 (1.350)</td>
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### C-**-3 Cavity Dimensions

**Dimensions**  
**mm (inch)**

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<th>Cavity mm (inch)</th>
<th>A Spottface</th>
<th>B +0.051/0 (±0.002)</th>
<th>C +0.051/0 (±0.002)</th>
<th>D Thread</th>
<th>E Full Thread</th>
<th>F</th>
<th>G</th>
<th>±0.0254 (±0.001)</th>
<th>H</th>
<th>J ±0.0254 (±0.001)</th>
<th>K</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-8–3</td>
<td>30.16 (1.188)</td>
<td>20.65 (0.813)</td>
<td>17.47 (0.688)</td>
<td>0.750”–16</td>
<td>12.70 (0.500)</td>
<td>2.54/2.92 (0.100/0.115)</td>
<td>18.23 (0.718)</td>
<td>15.90 (0.626)</td>
<td>33.25 (1.270)</td>
<td>14.30 (0.563)</td>
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<td>C-10–3</td>
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<td>24.00 (0.945)</td>
<td>20.62 (0.812)</td>
<td>0.875”–14</td>
<td>15.87 (0.625)</td>
<td>2.54/2.92 (0.100/0.115)</td>
<td>21.59 (0.850)</td>
<td>17.50 (0.689)</td>
<td>38.10 (1.500)</td>
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<td>C-12–3</td>
<td>38.10 (1.500)</td>
<td>29.15 (1.148)</td>
<td>24.76 (0.975)</td>
<td>1.062”–12</td>
<td>22.22 (0.875)</td>
<td>3.30/3.68 (0.130/0.145)</td>
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<td>1.312”–12</td>
<td>22.22 (0.875)</td>
<td>3.30/3.68 (0.130/0.145)</td>
<td>34.13 (1.344)</td>
<td>28.62 (1.127)</td>
<td>62.71 (2.469)</td>
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<td>57.66 (2.270)</td>
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<td>1.625”–12</td>
<td>20.64 (0.812)</td>
<td>3.35/3.73 (0.132/0.147)</td>
<td>44.45 (1.750)</td>
<td>36.55 (1.439)</td>
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<td>100.02 (3.938)</td>
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These diameters [**]** 0.051 mm (.002 inch) **|** 0.0075 mm (.0003 inch) unless otherwise specified.

These diameters [**]** 0.025 mm (.001 inch) **|** unless otherwise specified.

**Diagram: 3-way cavity**

- These diameters [**]** 0.051 mm (.002 inch) **|** 0.0075 mm (.0003 inch) unless otherwise specified.
- These diameters [**]** 0.025 mm (.001 inch) **|** unless otherwise specified.

<table>
<thead>
<tr>
<th>Cavity mm (inch)</th>
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<th>R Max. Dia.</th>
<th>S</th>
<th>T Max. Dia.</th>
<th>X Max. Dia.</th>
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<tr>
<td>C-8–3</td>
<td>14.68 (0.578)</td>
<td>5.94 (0.234)</td>
<td>28.98 (1.141)</td>
<td>5.94 (0.234)</td>
<td>12.70 (0.500)</td>
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<td>C-10–3</td>
<td>18.26 (0.719)</td>
<td>6.35 (0.250)</td>
<td>34.13 (1.344)</td>
<td>6.35 (0.250)</td>
<td>14.27 (0.562)</td>
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<td>C-12–3</td>
<td>27.94 (1.000)</td>
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<td>20.62 (0.812)</td>
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<td>C-16–3</td>
<td>24.60 (0.969)</td>
<td>15.88 (0.625)</td>
<td>53.18 (2.093)</td>
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<td>19.05 (0.750)</td>
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<td>C-20–3</td>
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<td>25.40 (1.000)</td>
<td>71.44 (2.812)</td>
<td>25.40 (1.000)</td>
<td>30.16 (1.188)</td>
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## C-**-4 Cavity Dimensions

### Dimensions

**mm (inch)**

![4-Way Cavity Diagram]

- **These diameters** 0.051 mm (.002 inch) **unless otherwise specified.**
- **These diameters** 0.025 mm (.001 inch) **unless otherwise specified.**

### Cavity mm (inch)

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<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
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<td></td>
<td>30.16 (1.188)</td>
<td>24.00 (0.945)</td>
<td>20.62 (0.812)</td>
<td>0.875–14</td>
<td>15.88 (0.625)</td>
<td>2.54/2.92 (0.100/0.115)</td>
<td>22.22 (0.875)</td>
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<td>17.50 (0.689)</td>
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<td>44.45 (1.750)</td>
<td>35.58 (1.401)</td>
<td>31.34 (1.234)</td>
<td>1.312–12</td>
<td>22.22 (0.875)</td>
<td>3.30/3.68 (0.130/0.145)</td>
<td>34.14 (1.344)</td>
<td>28.62 (1.127)</td>
<td>62.71 (2.469)</td>
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</table>

### Cavity mm (inch)

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<td></td>
<td>63.50 (2.500)</td>
<td>18.26 (0.718)</td>
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<td>6.35 (0.250)</td>
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<td>C-16-4</td>
<td>91.29 (3.594)</td>
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<td>103.99 (4.094)</td>
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<td>15.88 (0.625)</td>
<td>53.18 (2.093)</td>
<td>15.87 (0.625)</td>
<td>81.76 (3.218)</td>
<td>15.88 (0.625)</td>
<td>19.05 (0.750)</td>
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C-2** 2 Aluminum Housings

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<th>Ports 1 &amp; 2</th>
<th>Part Number</th>
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<tbody>
<tr>
<td>C-10-2  Light Duty</td>
<td>3/8” BSPP</td>
<td>02-175462</td>
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<td>SAE 6</td>
<td>566151</td>
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<tr>
<td>C-16-2  Light Duty</td>
<td>3/4” BSPP</td>
<td>02-175463</td>
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<td>SAE 12</td>
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<tr>
<td>C-20-2  Light Duty</td>
<td>1” BSPP</td>
<td>02-175464</td>
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<td>SAE 16</td>
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Note: BSPP porting is designated by either “B” or “G” in the model code.
SAE porting is designated by either “H” or “T” in the model code.

<table>
<thead>
<tr>
<th>Housing</th>
<th>Ports 1 &amp; 2</th>
<th>Part Number</th>
</tr>
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<tbody>
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<td>C-8-2 Fatigue Rated</td>
<td>1/4” BSPP</td>
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<td>3/8” BSPP</td>
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<td>SAE 4</td>
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<td>SAE 6</td>
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<td>C-12-2 Fatigue Rated</td>
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</table>

Cavity mm (inch) | A | B | C | D | E | F | G | H | I | Mass kg (lb.)
---|---|---|---|---|---|---|---|---|---|---|
C-10-2 Light Duty | 50.8 (2.00) | 19.0 (0.75) | 50.8 (2.00) | 31.7 (1.25) | 15.9 (0.62) | 19.0 (0.75) | 7.1 (0.28) | 3.1 (0.12) | 12.7 (0.50) | 0.1 (0.35) |
C-16-2 Light Duty | 76.2 (3.00) | 28.5 (1.12) | 76.2 (3.00) | 47.6 (1.87) | 23.8 (0.94) | 25.4 (1.00) | 8.6 (0.34) | 4.0 (0.16) | 19.0 (0.75) | 0.5 (1.21) |
C-20-2 Light Duty | 88.9 (3.50) | 34.3 (1.35) | 88.9 (3.50) | 68.5 (2.70) | 34.3 (1.35) | 36.8 (1.45) | 8.6 (0.34) | 4.0 (0.16) | 21.6 (0.85) | 0.8 (1.90) |
C-8-2 Fatigue Rated | 50.8 (2.00) | 19.0 (0.75) | 51.0 (2.00) | 38.1 (1.50) | 19.0 (0.75) | 3.4 (0.13) | 15.5 (0.61) | 7.1 (0.28) | 12.7 (0.50) | 0.2 (0.46) |
C-10-2 Fatigue Rated | 63.5 (2.50) | 25.4 (1.00) | 63.5 (2.50) | 50.8 (2.00) | 25.4 (1.00) | 9.5 (0.37) | 20.8 (0.81) | 7.1 (0.28) | 19.0 (0.75) | 0.4 (1.00) |
C-12-2(U) Fatigue Rated | 88.9 (3.50) | 44.5 (1.75) | 88.9 (3.50) | 50.8 (2.00) | 25.4 (1.00) | 12.7 (0.50) | 28.7 (1.23) | 8.7 (0.34) | 25.4 (1.00) | 0.8 (1.96) |
C-16-2 Fatigue Rated | 88.9 (3.50) | 34.9 (1.37) | 88.9 (3.50) | 63.5 (2.50) | 31.7 (1.25) | 10.3 (0.40) | 28.4 (1.11) | 8.7 (0.34) | 25.4 (1.00) | 1.2 (2.75) |
C-20-2 Fatigue Rated | 101.6 (4.00) | 38.1 (1.50) | 101.6 (4.00) | 82.5 (3.25) | 41.3 (1.62) | 10.3 (0.40) | 36.0 (1.41) | 8.7 (0.34) | 25.4 (1.00) | 1.8 (4.00) |
### C-**-3 Aluminum Housings

<table>
<thead>
<tr>
<th>Housing</th>
<th>Ports 1, 2 &amp; 3</th>
<th>Part Number</th>
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Note: BSPP porting is designated by either "B" or "G" in the model code.
SAE porting is designated by either "H" or "T" in the model code.

<table>
<thead>
<tr>
<th>Cavity mm (inch)</th>
<th>A (inch)</th>
<th>B (inch)</th>
<th>C (inch)</th>
<th>D (inch)</th>
<th>E (inch)</th>
<th>F (inch)</th>
<th>G (inch)</th>
<th>H (inch)</th>
<th>I (inch)</th>
<th>J (inch)</th>
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<td>66.6 (2.62)</td>
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C-**-4 Aluminum Housings (FDC1 & FDC3 only)

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Note: BSPP porting is designated by "B" in the model code
     SAE porting is designated by "T" in the model code

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<th>B</th>
<th>C</th>
<th>D</th>
<th>E (inch)</th>
<th>F</th>
<th>G (inch)</th>
<th>H (inch)</th>
<th>I (inch)</th>
<th>J</th>
<th>K (inch)</th>
<th>Mass kg (lb.)</th>
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C-**-2 Steel Housings

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<td>3/4” BSPP</td>
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Note: BSPP porting is designated by "G" in the model code
SAE porting is designated by "T" in the model code

Cavity mm (inch) | A     | B   | C     | D     | E    | F    | G    | H    | I    | J    | Mass kg (lb.)
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<td>19.0 (0.75)</td>
<td>50.8  (2.00)</td>
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<td>19.0 (0.75)</td>
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<td>38.1 (1.50)</td>
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NOTE: 8 series utilize slot in place of mounting hole
C-**-3 Steel Housings

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Note: BSPP porting is designated by "G" in the model code. SAE porting is designated by "T" in the model code.

**NOTE**
8 series utilize slot in place of mounting hole

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<th>Cavity (mm (inch))</th>
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<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>Mass kg (lb.)</th>
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Supporting Products

Roughing Tools
Roughers are basically step drills which leave .030” per cutting diameter and .015” above all radii for the finishing reamer, with an additional .015” depth in the cavity bottom as clearance. The roughing tool is necessary to prepare the cavity for the finishing reamer, which has not been designed for the primary forming or bottom cutting.

We offer two types of roughers, one for aluminum and one for steel. The aluminum rougher is manufactured with a 4 facet point and polished flutes. The steel rougher is supplied with a standard drill point. Both types will work in either material, however, longevity of an aluminum tool will be sacrificed when used continually in steel.

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<th>Material</th>
<th>Model Code</th>
<th>Assembly Number</th>
<th>Cavity</th>
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<th>Model Code</th>
<th>Assembly Number</th>
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Finishing Tools
These finishing tools have been designed as precision reamers for finishing operations only. They are not intended for primary forming or bottom cutting operations. Vickers recommends that a finishing tool only be used in a properly roughed hole. Failure to conform to this practice will produce unsatisfactory size and finishes and possibly break the tool.

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<th>Material</th>
<th>Model Code</th>
<th>Assembly Number</th>
<th>Cavity</th>
<th>Material</th>
<th>Model Code</th>
<th>Assembly Number</th>
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Finishing Form Tools Speed & Feed for Aluminum 6061-T6 (T651)

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This information is recommended as a good starting point. Speeds and/or feeds may be increased or decreased depending on actual machining conditions.

NOTE: Finish form tools may require 1/2 to 1-1/2 second dwell to obtain necessary finish
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Fluid Cleanliness

The cleanliness code for valves in this catalog is 18/16/13.

Proper fluid condition is essential for long and satisfactory life of hydraulic components and systems. Hydraulic fluid must have the correct balance of

“Vickers Guide to Systemic Contamination Control” available from your local Vickers distributor or by contacting Vickers, Incorporated. Recommendations on filtration and the selection of products to control fluid condition are included in 561.