Non-solenoid Directional Controls
Screw-in Cartridge Valves
Pressures to 350 bar (5000 psi) – Flows to 265 l/min (70 USgpm)
Introduction

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 non-solenoid screw-in cartridge valve 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 all products featured in this catalog – typical application pressure and fatigue pressure. The typical application pressure rating is the maximum recommended operating pressure for the valve in a given system. The fatigue pressure rating is the pressure for the valve to be free for infinite life from metal fatigue.

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 many of Vickers screw-in cartridge non-solenoid valves. Its purpose is to provide a quick, convenient reference tool when choosing Vickers cartridge valves or designing a system using these components.

Features and Benefits

- 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.

- All aluminum manifolds are gold anodized to resist corrosion.

- Desired settings may be locked down.

- Optional low-cost manual override is available on selected models.

- Aluminum knob and cap options are available on some models.

- Reliable, economical and compact.

WARNING: For pressure over 210 bar (3000 psi) use steel housing.
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**MRV3-10**

**Manual rotary valve**

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**Description**

The MRV3-10 is a 3-way, 2 or 3 position, manual semi-rotary directional screw-in cartridge valve.

**Operation**

This valve will direct flow between ports 1 and 3 and block port 2 in one position, and by turning the operator 90°, flow will be directed between ports 1 and 2 and port 3 will be blocked. During cross-over transition, all ports are blocked.

**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)
- Internal leakage 164 cc/min (10 in³/min) maximum @ 210 bar (3000 psi)
- Temperature range –40° to 120°C (–40° to 248°F)
- Manual operators:
  - D – Lever (3-position detent)*
  - D2 – Lever (2-position detent)*
  - E – Ball (3-position) detent)*
  - E2 – Ball (2-position detent)*
  - K – Knob (2-position, no detent)
- Cavity C–10–3 (See page 59)
- 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 (0.48 lb)
- Seal kit: 565804 (Buna–N)
  - 889599 (Viton®)

*Light duty housing only.

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**Functional Symbols**

- MRV3-10(V)-D/E
  - 3 position models
  
- MRV3-10(V)-D2/E2
  - 2 position models

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**Sectional View**

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**Pressure Drop Curve**

Cartridge only

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**Pressure Drop Chart**

- Flow in l/min (21.8 cSt @ 49°C)
- Pressure Drop psi
- Flow in USgpm (105 SUS oil @ 120°F)
- Pressure Drop bar

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

**MRV3-10**

### Function

- **MRV3** – Manual rotary valve

### Size

- 10 – 10 Size

### Seals

- Blank – Buna-N
- V – Viton

### Manual operators

- 0 – No operator
- D – Lever (3-position detent)*
- D2 – Lever (2-position detent)*
- E – Ball (3-position detent)*
- E2 – Ball (2-position detent)*
- K – Knob (2-position, no detent)

*Light duty housing only.

### Port size

**O** – Cartridge only

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
<th>Aluminum Light duty</th>
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See page 62 for housings

### Dimensions mm (inch)

**MRV3-**(V)-K

Arrow can be re-located by slackening the domed nut and turning the plate. Re-tighten nut.

**MRV3-**(V)-D**(2)**

47–54 Nm (35–40 lbf ft)

- Port 3 to 1
- Port 1 to 2
- Mid position (not for 2-position models)

**Locating Pin Installation**

- Locating pin hole, four optional slots in detent plate
- 17.1 ± 0.05 (0.672 ± 0.002)

**MRV3-**(V)-E**(2)**

- This hole omitted from detent plate of MRV3-10(V)-D2/E2
- Ø 3.45/3.50 (#29 or 0.136) drill x 4.8 (0.187) deep in mating housing

**MRV3-**(V)-D**(2)**

47–54 Nm (35–40 lbf ft)

- Port 3 to 1
- Port 1 to 2
- Mid position (not for 2-position models)

**Locating Pin Installation**

- Locating pin hole, four optional slots in detent plate
- 17.1 ± 0.05 (0.672 ± 0.002)

**MRV3-**(V)-E**(2)**

- This hole omitted from detent plate of MRV3-10(V)-D2/E2
- Ø 3.45/3.50 (#29 or 0.136) drill x 4.8 (0.187) deep in mating housing

**MRV3-**(V)-K

Arrow can be re-located by slackening the domed nut and turning the plate. Re-tighten nut.

**MRV3-**(V)-K

Arrow can be re-located by slackening the domed nut and turning the plate. Re-tighten nut.

**MRV3-**(V)-K

Arrow can be re-located by slackening the domed nut and turning the plate. Re-tighten nut.

**MRV3-**(V)-K

Arrow can be re-located by slackening the domed nut and turning the plate. Re-tighten nut.

**MRV3-**(V)-K

Arrow can be re-located by slackening the domed nut and turning the plate. Re-tighten nut.
MRV3-16
Manual rotary valve

Description
The MRV3-16 is a 3-way, 2 or 3 position, manual semi-rotary directional screw-in cartridge valve.

Operation
This valve will direct flow between ports 1 and 3 and block port 2 in one position. By turning the operator 90°, flow will be directed between ports 1 and 2 and port 3 will be blocked. During cross-over transition, all ports are blocked.

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 ........................................... 64 l/min (17 USgpm)
Internal leakage .................. 164 cc/min (10 in³/min) maximum @ 210 bar (3000 psi)
Temperature range .................. –40 to 120°C (~40°F to 248°F)
Manual operators .................. D – Lever (3-position detent) *
D2 – Lever (2-position detent) *
K – Knob (2-position, no detent)

Cavity ........................................... C–16–3 (See page 59)

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 .................. 0.53 kg (1.16 lb)

Seal kit ........................................... 889632 (Buna–N)
889636 (Viton®)

* Light duty housing only.

Pressure Drop Curves
Cartridge only

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

MRV3-16

1 Function
MRV3—Manual rotary valve

2 Size
16 – 16 size

3 Seals
Blank—Buna-N
V – Viton

4 Manual operators
0 – No operator
D – Lever (3-position detent)*
D2 – Lever (2-position detent)*
K – Knob (2-position, no detent)
* Light duty housing only.

Dimensions mm (inch)

MRV3-**(V)-K

Arrow can be re-located by slackening the domed nut and turning the plate.
Re-tighten nut.

Port size
O – Cartridge only

<table>
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<th>Code</th>
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See page 62 for housings

MRV3-**(V)-D(2)

Locating Pin Installation

1. Locating pin hole, four optional slots in detent plate
2. ∅3.45/3.50 (#29 or 0.136) drill x 4.8 (0.187) deep in mating housing
3. Port 3 to 1
4. Port 1 to 2
5. Mid position (not for 2-position models)

Torque cartridge in housing
108–122 Nm (80–90 lbf ft)
Description
The MRV4-10 is a 4-way, 2 or 3 position, manual semi-rotary directional screw-in cartridge valve.

Operation
This valve will direct flow between ports 1 and 2 and ports 3 and 4 in one position. By turning the operator 90°, flow will be directed between ports 1 and 4 and port 3 to port 2. During the cross-over transition, ports 2 and 4 are blocked and ports 1 and 3 are connected.

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 .................................................. 11 l/min (3 USgpm)
Internal leakage .......... 164 cc/min (10 in³/min) maximum @ 210 bar (3000 psi)
Temperature range .................. −40 to 120°C (−40°F to 248°F)

Manual operators ......................
D – Lever (3-position detent)*
D2 – Lever (2-position detent)*
E – Ball (3-position) detent)*
E2 – Ball (2-position detent)*
K – Knob (2-position, no detent)

Cavity .................. C–10–4 (See page 60)
Fluids .................. All general purpose hydraulic fluids such as:
MIL–H–5606, SAE 10, SAE 20, etc.
Filtration .................. Cleanliness code18/16/13
Standard housing materials .................. Aluminum
Weight cartridge only .................. 0,17 kg (0.38 lb)
Seal kit .................. 565805 (Buna–N)
889600 (Viton®)

Viton is a registered trademark of E.I. DuPont

*Light duty housing only.
Model Code MRV4-10

**Function**
MRV4—Manual rotary valve

**Size**
10 – 10 size

**Seals**
Blank—Buna-N
V — Viton

**Manual operators**
0 — No operator
D — Lever (3-position detent)*
D2—Lever (2-position detent)*
E — Ball (3-position detent)*
E2—Ball (2-position detent)*
K — Knob (2-position, no detent)*
* Light duty housing only.

**Port size**
O — Cartridge only

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<th>Port size</th>
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<tr>
<td>8H</td>
<td>SAE 8</td>
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</table>

See page 63 for housings

**Dimensions** mm (inch)

**MRV4-**(V)-K**

Arrow can be relocated by slackening the domed nut and turning the plate. Re-tighten nut.

**Locating Pin Installation**

Locating pin hole, four optional slots in detent plate

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

Locating pin hole, four optional slots in detent plate

∅ 3.45/3.50
(#29 or 0.136) drill x 4.8
(0.187) deep in mating housing

MRV4-**(V)-D(2)

Port 3 to 4 and 2 to 1

Mid position

MRV4-**(V)-E(2)

Port 3 to 2 and 4 to 1

Locating pin

MRV4-**(V)-K

Port 3 to 4 and 2 to 1

Locating pin hole, four optional slots in detent plate

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

Locating pin hole, four optional slots in detent plate

∅ 3.45/3.50
(#29 or 0.136) drill x 4.8
(0.187) deep in mating housing

MRV4-**(V)-K

Arrow can be relocated by slackening the domed nut and turning the plate. Re-tighten nut.
MRV4-16
Manual rotary valve

Description
The MRV4-16 is a 4-way, 2 or 3 position, manual semi-rotary directional screw-in cartridge valve.

Operation
This valve will direct flow between ports 1 and 2 and ports 3 and 4 in one position. By turning the operator 90°, flow will be directed between ports 1 and 4 and ports 3 and 2. During the cross-over transition, ports 2 and 4 are blocked and ports 1 and 3 are open to each other.

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 .............. 164 cc/min (10 in³/min) maximum @ 210 bar (3000 psi)
Temperature range .................. −40 to 120°C (−40° to 248°F)
Manual operators ...................... D – Lever (3-position detent)*
D2 – Lever (2-position detent)*
K – Knob (2-position, no detent)
Cavity .................................................. C–16–4 (See page 60)
Fluids .................................................. All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.
Filtration ........................................... Cleanliness code18/16/13
Standard housing materials ........................................ Aluminum
Weight cartridge only ...................................... 0.65 kg (1.43 lb)
Seal kit .................................................. 889634 (Buna–N)
889638 (Viton®) (Viton is a registered trademark of E.I. DuPont)

*Light duty housing only.

Pressure Drop Curves
Cartridge only

A – Port 3 to 4 or 3 to 2
B – Port 4 to 1 or 2 to 1
Function
MRV4 – Manual rotary valve

Size
16 – 16 size

Seals
Blank – Buna-N
V – Viton

Manual operators
0 – No operator
D – Lever (3-position detent)*
D2 – Lever (2-position detent)*
K – Knob (2-position, no detent)
* Light duty housing only.

Dimensions mm (inch)
Arrow can be relocated by slackening the domed nut and turning the plate. Re-tighten nut.

Port size
O – Cartridge only

<table>
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<th>Port size</th>
<th>Housing number</th>
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<td>3/4&quot; BSPP</td>
<td>876730</td>
</tr>
</tbody>
</table>

See page 63 for housings

MRV4-**(V)-D(2)
Port 3 to 4 and 2 to 1

MRV4-**(V)-E(2)
Locating pin hole, four optional slots in detent plate

Locating Pin Installation

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

Locating pin hole, four optional slots in detent plate

∅ 3.45/3.50
(#29 or 0.136)
drill x 4.8
(0.187) deep
in mating housing

∅25.37 (0.999)
∅26.95 (1.061)
∅28.55 (1.124)

1.312”- 12 Thd.

24.9 ± 0.05
(0.980 ± 0.002)
**Description**

The MRV5-10 is a 4-way, 3 position, manual semi-rotary directional screw-in cartridge valve.

**Operation**

This valve will direct flow between ports 1 and 2 and ports 3 and 4 in one position. By turning the operator 90°, flow will be directed between ports 1 and 4 and port 3 to 2. During the cross-over transition, all ports are blocked.

**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 ............................................. 11 l/min (3 USgpm)
- Internal leakage ..................................... 164 cc/min (10 in³/min) maximum @ 210 bar (3000 psi)
- Temperature range ................................. −40 to 120° C (−40° to 248° F)
- Manual operators .................................. D – Lever (3-position detent)*
  E – Ball (3-position detent)*
- Cavity ................................................... C–10–4 (See page 60)
- 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 ............................ 0.27 kg (.59 lb)
- Seal kit ............................................. 889625 (Buna–N)
  566080 (Viton®)

*Light duty housing only.

**Pressure Drop Curves**

*Cartridge only*

- A – Port 3 to 4 or 3 to 2
- B – Port 4 to 1
- C – Port 2 to 1
Model Code

MRV5-10

MRV5-10 (V) - ** - **

1. Function
MRV5—Manual rotary valve

2. Size
10 — 10 size

3. Seals
Blank—Buna-N
V — Viton

4. Manual operators
0 — No operator
D — Lever (3-position detent)*
E — Ball (3-position detent)*
* Light duty housing 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>3B</td>
<td>3/8&quot; BSPP</td>
<td>02–179705</td>
</tr>
<tr>
<td>6T</td>
<td>SAE 6</td>
<td>566161</td>
</tr>
<tr>
<td>2G</td>
<td>1/4&quot; BSPP</td>
<td></td>
</tr>
<tr>
<td>3G</td>
<td>3/8&quot; BSPP</td>
<td></td>
</tr>
<tr>
<td>6H</td>
<td>SAE 6</td>
<td>876708</td>
</tr>
<tr>
<td>8H</td>
<td>SAE 8</td>
<td>876713</td>
</tr>
</tbody>
</table>

See page 63 for housings

Dimensions mm (inch)

MRV5-**(V)-D
Arrow can be relocated by slackening the domed nut and turning the plate. Re-tighten nut.

MRV5-**(V)-E

Locating Pin Installation
Locating pin hole, four optional slots in detent plate

Torque cartridge in housing
47–54 Nm (35–40 lbf ft)
**MRV5-16**

**Manual rotary valve**

---

**Description**

The MRV5-16 is a 4-way, 3 position, manual semi-rotary directional screw-in cartridge valve.

**Operation**

This valve will direct flow between ports 1 and 2 and ports 3 and 4 in one position and by turning the operator 90°, flow will be directed between ports 1 and 4 and ports 3 and 2. During the cross-over transition, all ports are blocked.

**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 .................. 164 cc/min (10 in³/min) maximum @ 210 bar (3000 psi)
- Temperature range .................. –40 to 120°C (~–40° to 248°F)
- Manual operators .................. D – Lever (3-position detent)*
- Cavity .......................................... C–16–4 (See page 60)
- 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 .......................... 0.65 kg (1.43 lb)
- Seal kit ........................................... 889634 (Buna–N)
  889638 (Viton®)

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

*Light duty housing only.

---

**Pressure Drop Curves**

Cartridge only

---

**Functional Symbol**

---

**Sectional View**

---

**Diagram**

---

**Legend**

A – Port 3 to 4 or 3 to 2

B – Port 4 to 1 or 2 to 1
**Model Code**

**MRV5-16**

<table>
<thead>
<tr>
<th>Function</th>
<th>MRV5 – Manual rotary valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>16 – 16 size</td>
</tr>
<tr>
<td>Seals</td>
<td>Blank – Buna-N V – Viton</td>
</tr>
<tr>
<td>Manual operators</td>
<td>0 – No operator D – Lever (3-position detent)*</td>
</tr>
</tbody>
</table>

* Light duty housing only.

### Port size

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
<tr>
<td>12T</td>
<td>SAE12</td>
<td>566411</td>
</tr>
<tr>
<td>6B</td>
<td>3/4&quot; BSPP</td>
<td>02-175468</td>
</tr>
<tr>
<td>10H</td>
<td>SAE 10</td>
<td></td>
</tr>
<tr>
<td>12H</td>
<td>SAE12</td>
<td>876729</td>
</tr>
<tr>
<td>4G</td>
<td>1/2&quot; BSPP</td>
<td>876728</td>
</tr>
<tr>
<td>6G</td>
<td>3/4&quot; BSPP</td>
<td>876730</td>
</tr>
</tbody>
</table>

See page 63 for housings

### Dimensions mm (inch)

- Arrow can be relocated by slackening the domed nut and turning the plate. Re-tighten nut.

- **Port 3 to 4 and 2 to 1**
  - Mid position: 45°

- **Port 3 to 2 and 4 to 1**
  - 105 (4.13)

- **Locating Pin Installation**
  - Locating pin hole, four optional slots in detent plate

- **Housing number**
  - Aluminum Light duty
  - Aluminum Fatigue rated

- **Port size**
  - Cartridge only

- **Locating pin**
  - 38.1 (1.5) hex

- **Dimensions**
  - 58.0 (2.28)
  - 77.0 (3.03)
  - 11.1 (0.43)
  - 1.312"-12 Thd.
  - 101.6 (4.0)

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

- **Torque cartridge in housing**
  - 

- **Dimensions**
  - 

- **Dimensions**
  - 

- **Dimensions**
  - 

- **Dimensions**
  -
MRV6-10
Manual rotary valve

Description
The MRV6-10 is a 4-way, 3 position, manual semi-rotary directional screw-in cartridge valve.

Operation
This valve will direct flow between ports 1 and 2 and ports 3 and 4 in one position. By turning the operator 90°, flow will be directed between ports 1 and 4 and port 3 to 2. During the cross-over transition all ports 1, 3 and 4 are open to each other and port 2 is blocked.

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 .................................................. 11 l/min (3 USgpm)
Internal leakage ........................ 164 cc/min (10 in³/min) maximum @ 210 bar (3000 psi)
Temperature range .................................. −40 to 120°C (−40°F to 248°F)
Manual operators ........................................ D – Lever (3-position detent)*
 ........................................................................ E – Ball (3-position detent)*
Cavity .......................................................... C–10–4 (See page 60)
Fluids .......................................................... All general purpose hydraulic fluids such as:
 ........................................................................ MIL–H–5606, SAE 10, SAE 20, etc.
Filtration ..................................................... Cleanliness code18/16/13
Standard housing materials ................................. Aluminum
Weight cartridge only ........................................ 0.27 kg (.59 lb)
Seal kit ......................................................... 889625 (Buna–N)
 ........................................................................ 566080 (Viton®)

*Light duty housing only.

Pressure Drop Curves
Cartridge only

A – Port 3 to 4 or 3 to 2
B – Port 4 to 1
C – Port 2 to 1

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

MRV6-10

### Function
MRV6—Manual rotary valve

### Size
10 – 10 size

### Seals
Blank—Buna-N
V — Viton

### Manual operators
0 — No operator
D — Lever (3-position detent)*
E — Ball (3-position detent)*
* Light duty housing only.

### 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>3B</td>
<td>3/8&quot; BSPP</td>
<td>02–179705</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>6T</td>
<td>SAE 6</td>
<td>566161</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>2G</td>
<td>1/4&quot; BSPP</td>
<td>876709</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>3G</td>
<td>3/8&quot; BSPP</td>
<td>876715</td>
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<td>—</td>
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<tr>
<td>6H</td>
<td>SAE 6</td>
<td>876708</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>8H</td>
<td>SAE 8</td>
<td>876713</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

See page 63 for housings

### Dimensions mm (inch)

Arrow can be relocated by slackening the domed nut and turning the plate. Re-tighten nut.

Locating Pin Installation

Locating pin hole, four optional slots in detent plate

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

<table>
<thead>
<tr>
<th>Port 3 to 4 and 2 to 1</th>
<th>41,0 mm (1.61)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port 3 to 2 and 4 to 1</td>
<td>83,0 mm (3.27)</td>
</tr>
<tr>
<td>Mid position</td>
<td>45°</td>
</tr>
<tr>
<td>Port size</td>
<td>45°</td>
</tr>
</tbody>
</table>

Locating pin

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>∅25,4</td>
<td>(1.0)</td>
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</tbody>
</table>

Locating pin

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>∅15,82</td>
<td>(0.623)</td>
</tr>
<tr>
<td>∅17,42</td>
<td>(0.686)</td>
</tr>
<tr>
<td>∅19,00</td>
<td>(0.748)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.875&quot;-14 Thd.</td>
<td>61,9 mm (2.43)</td>
</tr>
<tr>
<td>0.875&quot;-14 Thd.</td>
<td>58,0 mm (2.28)</td>
</tr>
<tr>
<td>0.875&quot;-14 Thd.</td>
<td>9,5 mm (0.37)</td>
</tr>
</tbody>
</table>
DSV3-**-B
Shuttle valve

**Description**
The DSV3-**-B is a ball type, in-line housing type shuttle valve.

**Operation**
This valve senses the higher of two pressures at port 3 or port 1 and directs it to port 2.

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

**Maximum pressure**
- 210 bar (3000 psi) Aluminum housing
- 350 bar (5000 psi) Steel housing

**Rated flow**
- 6 series: 11.4 l/min (3 USgpm)
- 8 series: 24.6 l/min (6.5 USgpm)
- 12 series: 88.9 l/min (23.5 USgpm)
- 16 series: 170.3 l/min (45 USgpm)

**Internal leakage**
- Port 2 to 1 and 2 to 3; <5 drops/min @ 210 bar (3000 psi)

**Temperature range**
- –40 to 120 °C (–40 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**
- 6 series (w/aluminum housing): 0.10 kg (.22 lb)
- 8 series (w/aluminum housing): 0.28 kg (.62 lb)
- 12 series (w/aluminum housing): 0.75 kg (1.65 lb)
- 16 series (w/aluminum housing): 1.75 kg (3.86 lb)

**Seals**
- 6 series: 154128 (Buna-N)/ 396096 (Viton®)
- 8 series: 154129 (Buna–N)/396098 (Viton®)
- 12 series: 154131 (Buna–N)/ 396102 (Viton®)
- 16 series: 154132 (Buna–N)/ 396105 (Viton®)

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

DSV3-**-B

### Function
DSV3 – Shuttle valve

### Size
- 6 – 6 size
- 8 – 8 size
- 12 – 12 size
- 16 – 16 size

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

### Style
- B – Ball type

### 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)

---

### Dimensions mm (inch)

<table>
<thead>
<tr>
<th>Model Number</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSV3-6-B-A1</td>
<td>22.2 (0.87)</td>
<td>44.5 (1.75)</td>
<td>19.0 (0.75)</td>
<td>9.5 (0.37)</td>
<td>25.4 (1.00)</td>
<td>9.5 (0.37)</td>
</tr>
<tr>
<td>DSV3-6-B-S1</td>
<td>22.2 (0.87)</td>
<td>44.5 (1.75)</td>
<td>20.6 (0.81)</td>
<td>10.3 (0.41)</td>
<td>31.7 (1.25)</td>
<td>12.7 (0.50)</td>
</tr>
<tr>
<td>DSV3-8-B-A2</td>
<td>23.8 (0.94)</td>
<td>47.6 (1.87)</td>
<td>25.4 (1.00)</td>
<td>12.7 (0.50)</td>
<td>38.1 (1.50)</td>
<td>12.7 (0.50)</td>
</tr>
<tr>
<td>DSV3-8-B-S2</td>
<td>23.8 (0.94)</td>
<td>47.6 (1.87)</td>
<td>31.7 (1.25)</td>
<td>15.9 (0.63)</td>
<td>43.7 (1.72)</td>
<td>15.9 (0.63)</td>
</tr>
<tr>
<td>DSV3-8-B-A6T</td>
<td>23.8 (0.94)</td>
<td>47.6 (1.87)</td>
<td>25.4 (1.00)</td>
<td>12.7 (0.50)</td>
<td>38.1 (1.50)</td>
<td>12.7 (0.50)</td>
</tr>
<tr>
<td>DSV3-8-B-S6T</td>
<td>23.8 (0.94)</td>
<td>47.6 (1.87)</td>
<td>31.7 (1.25)</td>
<td>15.9 (0.63)</td>
<td>43.7 (1.72)</td>
<td>15.9 (0.63)</td>
</tr>
<tr>
<td>DSV3-12-B-A4</td>
<td>31.7 (1.25)</td>
<td>63.5 (2.50)</td>
<td>38.1 (1.50)</td>
<td>19.1 (0.75)</td>
<td>50.8 (2.00)</td>
<td>19.1 (0.75)</td>
</tr>
<tr>
<td>DSV3-12-B-S4</td>
<td>31.7 (1.25)</td>
<td>63.5 (2.50)</td>
<td>43.7 (1.72)</td>
<td>21.8 (0.86)</td>
<td>57.5 (2.25)</td>
<td>22.2 (0.88)</td>
</tr>
<tr>
<td>DSV3-12-B-A8T</td>
<td>31.7 (1.25)</td>
<td>63.5 (2.50)</td>
<td>38.1 (1.50)</td>
<td>19.1 (0.75)</td>
<td>50.8 (2.00)</td>
<td>19.1 (0.75)</td>
</tr>
<tr>
<td>DSV3-12-B-S8T</td>
<td>31.7 (1.25)</td>
<td>63.5 (2.50)</td>
<td>43.7 (1.72)</td>
<td>21.8 (0.86)</td>
<td>57.5 (2.25)</td>
<td>22.2 (0.88)</td>
</tr>
<tr>
<td>DSV3-16-B-A6</td>
<td>47.6 (1.88)</td>
<td>95.3 (3.75)</td>
<td>47.6 (1.88)</td>
<td>23.8 (0.94)</td>
<td>63.5 (2.50)</td>
<td>23.8 (0.94)</td>
</tr>
<tr>
<td>DSV3-16-B-S6</td>
<td>47.6 (1.88)</td>
<td>95.3 (3.75)</td>
<td>50.0 (1.97)</td>
<td>25.0 (0.98)</td>
<td>62.7 (2.47)</td>
<td>25.4 (1.00)</td>
</tr>
<tr>
<td>DSV3-16-B-A12T</td>
<td>47.6 (1.88)</td>
<td>95.3 (3.75)</td>
<td>47.6 (1.88)</td>
<td>23.8 (0.94)</td>
<td>63.5 (2.50)</td>
<td>23.8 (0.94)</td>
</tr>
<tr>
<td>DSV3-16-B-S12T</td>
<td>47.6 (1.88)</td>
<td>95.3 (3.75)</td>
<td>50.0 (1.97)</td>
<td>25.0 (0.98)</td>
<td>62.7 (2.47)</td>
<td>25.4 (1.00)</td>
</tr>
</tbody>
</table>
DSV2-8
Shuttle valve

Description
The DSV2-8-B is a direct acting, ball type, shuttle valve.

Operation
The DSV2-8-B shuttle valve senses the higher of two pressures at port 3 or port 1 and directs it 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) ............ 240 bar (3500 psi) steel housing
- Cartridge fatigue pressure (infinite life) ........... 240 bar (3500 psi)
- Rated flow .......................................................... 23 l/min (6 USgpm)
- Internal leakage .................................................. Between ports 2 and 1, and 2 and 3; 5 drops/min. maximum @ 240 bar (3500 psi)
- Cavity ............................................................... C-8-3 (See page 59)
- Standard housing materials ................................. Aluminum or steel
- 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
- Weight cartridge only .......................................... 0.06 kg. (0.14 lbs.)
- Seal Kits ............................................................. 02-160755 (Buna–N) 02-160756 (Viton®)

Viton is a registered trademark of E.I. DuPont

Pressure Drop Curves
Cartridge only

A – Port 1 to port 2
B – Port 3 to port 2
## Model Code

**DSV2-8**

### Function
- **DSV2** – Shuttle valve

### Size
- **8** – 8 size

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

### Style
- **B** – Ball

### Valve housing material
- **A** – Aluminum
- **S** – Steel

### Port size
- **O** – Cartridge only

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
<th>Aluminum Fatigue rated</th>
<th>Steel Fatigue rated</th>
</tr>
</thead>
<tbody>
<tr>
<td>4T</td>
<td>SAE 4</td>
<td>02–160741</td>
<td>02–160745</td>
<td></td>
</tr>
<tr>
<td>6T</td>
<td>SAE 6</td>
<td>02–160742</td>
<td>02–160744</td>
<td></td>
</tr>
<tr>
<td>2G</td>
<td>1/4&quot; BSPP</td>
<td>02–160739</td>
<td>02–160743</td>
<td></td>
</tr>
<tr>
<td>3G</td>
<td>3/8&quot; BSPP</td>
<td>02–160740</td>
<td>02–160746</td>
<td></td>
</tr>
</tbody>
</table>

See pages 62 and 64 for housings.

### Dimensions

- **22.2 (0.875) Hex**
- **8.6 (0.34)**
- **40.6 (1.60)**
- **Ø 14.2 (0.559)**
- **Ø 15.8 (0.622)**

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

[Note: The diagram and additional text about dimensions and torque values are not transcribed here.]
DSV1-10
Shuttle valve

Description
The DSV1-10-B is a ball type, screw-in cartridge type shuttle valve.

Operation
This valve senses the higher of two pressures at port 3 or port 1 and directs it to port 2.

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

- Maximum pressure: 210 bar (3000 psi)
- Cartridge fatigue pressure (infinite life): 210 bar (3000 psi)
- Rated flow: 23 l/min (6 USgpm)
- Internal leakage: <5 drops/min @ 210 bar (3000 psi)
- Temperature range: -40 to 120°C (-40°F to 248°F)
- Cavity: C–10–3 (See page 59)
- 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: 0.08 kg (.18 lb)
- Seal kits: 565804 (Buna–N), 889599 (Viton®)

Viton is a registered trademark of E.I. DuPont

Pressure Drop Curve
Cartridge only
# Model Code

## DSV1-10

### Function
DSV1—Shuttle valve

### Size
10 — 10 size

### Seals
Blank—Buna-N  
V — Viton

### Style
B — Ball type

## 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&quot; BSPP</td>
<td>02–173358</td>
</tr>
<tr>
<td>6T</td>
<td>SAE 6</td>
<td>566162</td>
</tr>
<tr>
<td>2G</td>
<td>1/4&quot; BSPP</td>
<td></td>
</tr>
<tr>
<td>3G</td>
<td>3/8&quot; BSPP</td>
<td></td>
</tr>
<tr>
<td>6H</td>
<td>SAE 6</td>
<td></td>
</tr>
<tr>
<td>8H</td>
<td>SAE 8</td>
<td></td>
</tr>
</tbody>
</table>

See page 62 for housings

## Dimensions mm (inch)

<table>
<thead>
<tr>
<th>8.0</th>
<th>0.31</th>
</tr>
</thead>
<tbody>
<tr>
<td>25.4</td>
<td>1.0</td>
</tr>
<tr>
<td>0.875/14 Thd.</td>
<td></td>
</tr>
<tr>
<td>Ø 15.80</td>
<td>0.622</td>
</tr>
<tr>
<td>Ø 17.40</td>
<td>0.685</td>
</tr>
</tbody>
</table>

Torque cartridge in housing  
47–54 Nm (35–40 lbf ft)
DSV4-10
Shuttle valve

Description
The DSV4-10 is a 3-way, 3 position, spring centered, open or closed center spool, transmission shuttle, screw-in cartridge valve. Usually built into a customized housing along with other transmission components, see “Functional Symbols”.

Operation
When the spring bias is overcome at port 2, the flow is directed from port 4 to port 3 while closing port 2. When the spring bias is overcome at port 4, the flow is directed from port 2 to port 3 while closing port 4. This valve is available in both a closed and open center spool configuration.

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) 350 bar (5000 psi)
- Rated flow 26 l/min (7 USgpm)
- Internal leakage 164 cc/min (10 in³/min) maximum @ 210 bar (3000 psi)
- Temperature range -40°C to 120°C (-40°F to 248°F)
- Pilot pressures 40 – 2.75 bar (40 psi) 80 – 5.5 bar (80 psi) 160 – 11.0 bar (160 psi)
- Pilot displacement volume 0.49 cm³ (0.02 in³)
- Cavity C–10–4 (See page 60)
- 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 Not functional in a standard valve housing
- Weight cartridge only 0.14 kg (0.32 lb)
- Seal kit 889597 (Buna–N) 02-172397 (Viton®)

* Warning: For pressure over 210 bar (3000 psi) use steel housing

Functional Symbol
- DSV4-**(V)-C-0
- DSV4-**(V)-O-0

Sectional View

Typical Applications
- Gage port
- DSV4-**(V)-C valve

Pressure Drop Curve
Cartridge only
Model Code

DSV4-10

DSV4 - 10 (V) - * - 0 - ***

1 Function
DSV4 – Directional shuttle valve

2 Size
10 – 10 size

3 Seals
Blank – Buna-N
V – Viton

4 Spool configuration
C – Closed center
O – Open center

5 Pilot to shift (nominal)
40 – 2,75 bar (40 psi)
80 – 5,5 bar (80 psi)
160 – 11,0 bar (160 psi)

6 Port size
0 – Cartridge only
(Not available with standard housing)

Dimensions mm (inch)

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

25,4 (1.0) hex

0.875”-14 Thd.

58,3 (2.29)

14,3 (0.562)

17,42 (0.686)

19,00 (0.748)
**MPV1-10**
Manual pull valve

**Description**
The MPV1-10 is a 2-way, 2 position, manually operated, normally closed, pull-to-open, directional screw-in cartridge valve.

**Operation**
This valve blocks flow from port 2 to port 1 and will allow flow from port 1 to port 2 when the spring bias is overcome.

**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 58)
- Fluids ............................................. All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.
- Filtration .............................................. Cleanliness code18/16/13
- Standard housing materials ................................. Aluminum
- Weight, cartridge only ............................... 0.11 kg (0.24 lb)
- Seal kit .................................................. 565803 (Buna–N)
  566086 (Viton®)
  *Viton is a registered trademark of E.I. DuPont*

*Back pressure of 16 bar (240 psi) will unseat the poppet*

**Pressure Drop Curve**
*Cartridge only*

![Pressure Drop Curve Graph]
Model Code

MPV1 - Manual pull valve

Function

1 Function
MPV1 – Manual pull valve

Size

2 Size
10 – 10 size

Seals

3 Seals
Blank – Buna-N
V – Viton

Type

4 Type
T – Stem only
K – Knob

Port size

5 Port size
O – Cartridge only

Code | Port size | Housing number
---|---|---
3B | 3/8” BSPP | Aluminum Light duty 02–175462
6T | SAE 6 | 566151
2G | 1/4” BSPP | Aluminum Fatigue rated
3G | 3/8” BSPP | 876702
6H | SAE 6 | 876703
8H | SAE 8 | 876700

See page 61 for housings

Dimensions mm (inch)

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

Nameplate bearing instruction "Pull"
Pull force require 16 Nm (12 lbf ft)

3,18 (0.125) travel

41,3 (1.63)

25.4 (1.0) hex

31,7 (1.25)

0.875”-14 Thd.

₁ ₁ ₂ ₃ ₄ ₅

∅ 15,80 (0.622)
PTS1-10
Pilot to shift valve

Description
The PTS1-10 is a 3-way, 2 position, pilot operated, directional screw-in cartridge valve.

Operation
This valve allows flow between ports 2 and 3 while blocking port 4 until sufficient pressure has been applied to port 1 and the spring bias is overcome. At this time, flow is directed between port 3 and port 4 while blocking port 2. During the cross-over transition, all ports are blocked. The spring chamber for this valve is externally vented to atmosphere.

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

<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>30 l/min (8 USgpm)</td>
</tr>
<tr>
<td>Internal leakage</td>
<td>164 cc/min (10 in³/min) maximum @ 210 bar (3000 psi)</td>
</tr>
<tr>
<td>Temperature range</td>
<td>–40 to 120°C (–40°F to 248°F)</td>
</tr>
<tr>
<td>Pilot pressures</td>
<td>40 – 2,75 bar (40 psi)</td>
</tr>
<tr>
<td>Pilot displacement volume</td>
<td>0.49 cm³ (0.02 in³)</td>
</tr>
<tr>
<td>Cavity</td>
<td>C–10–4 (See page 60)</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>0.14 kg (.32 lb)</td>
</tr>
<tr>
<td>Seal kit</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

Pressure Drop Curve
Cartridge only
Model Code

PTS1-10

PTS1 - 10 (V) - ** - ***

1. Function
   PTS1 – Pilot to shift valve

2. Size
   10 – 10 size

3. Seals
   Blank – Buna-N
   V – Viton

4. 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 Light duty</td>
</tr>
<tr>
<td>3B</td>
<td>3/8&quot; BSPP</td>
<td>02–179705</td>
</tr>
<tr>
<td>6T</td>
<td>SAE 6</td>
<td>566161</td>
</tr>
<tr>
<td>2G</td>
<td>1/4&quot; BSPP</td>
<td></td>
</tr>
<tr>
<td>3G</td>
<td>3/8&quot; BSPP</td>
<td></td>
</tr>
<tr>
<td>6H</td>
<td>SAE 6</td>
<td></td>
</tr>
<tr>
<td>8H</td>
<td>SAE 8</td>
<td></td>
</tr>
</tbody>
</table>

See page 63 for housings

5. Pilot to shift (nominal)
   40 – 2.75 bar (40 psi)
   80 – 5.5 bar (80 psi)
   160 – 11.0 bar (160 psi)

Dimensions mm (inch)

<table>
<thead>
<tr>
<th>Part</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ø 15.80 (0.622)</td>
</tr>
<tr>
<td>2</td>
<td>Ø 17.40 (0.685)</td>
</tr>
<tr>
<td>3</td>
<td>Ø 18.97 (0.747)</td>
</tr>
<tr>
<td>4</td>
<td>25.4 (1.0) hex</td>
</tr>
<tr>
<td></td>
<td>0.875&quot;-14 Thd.</td>
</tr>
<tr>
<td>5</td>
<td>61.9 (2.44)</td>
</tr>
</tbody>
</table>

Torque cartridge in housing

47–54 Nm (35–40 lbf ft)
**PTS1-16**

Pilot to shift valve

---

**Description**

The PTS1-16 is a 3-way, 2 position, pilot operated, directional screw-in cartridge valve.

**Operation**

This valve allows flow between ports 2 and 3 while blocking port 4 until sufficient pressure has been applied to port 1 and the spring bias is overcome. At this time, flow is directed between ports 3 and ports 4 while blocking port 2. During the cross-over transition, all ports are blocked. The spring chamber for this valve is externally vented to atmosphere.

**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 .................................................. 132 l/min (35 USgpm)
- Internal leakage ........................................... 164 cc/min (10 in³/min) maximum @ 210 bar (3000 psi)
- Temperature range ......................................... –40 to 120°C (–40°F to 248°F)
- Pilot pressures ............................................ 40 – 2.75 bar (40 psi)
  80 – 5.5 bar (80 psi)
  160 – 11.0 bar (160 psi)
- Pilot displacement volume .............................. 1.97 cm³ (0.12 in³)
- Cavity ....................................................... C-16-4 (see page 60)
- 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 .................................. 0.5 kg (1.12 lb)
- Seal kit .................................................... 889634 (Buna–N)
  889638 (Viton®)

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

---

**Pressure Drop Curve**

Cartridge only

---

**Functional Symbol**

---

**Sectional View**
Model Code

PTS1 - 16 (V) - *** - ***

1 Function
PTS1 – Pilot to shift valve

2 Size
16 – 16 size

3 Seals
Blank – Buna-N
V – Viton

4 Port size
O – Cartridge only

<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>566411</td>
</tr>
<tr>
<td>6B</td>
<td>3/4” BSPP</td>
<td>02-175468</td>
</tr>
<tr>
<td>10H</td>
<td>SAE 10</td>
<td>876729</td>
</tr>
<tr>
<td>12H</td>
<td>SAE 12</td>
<td>876731</td>
</tr>
<tr>
<td>4G</td>
<td>1/2” BSPP</td>
<td>876728</td>
</tr>
<tr>
<td>6G</td>
<td>3/4” BSPP</td>
<td>876730</td>
</tr>
</tbody>
</table>

See page 63 for housings

5 Pilot to shift (nominal)
40 – 2.75 bar (40 psi)
80 – 5.5 bar (80 psi)
160 – 11,0 bar (160 psi)

Dimensions mm (inch)

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

The PTS1-20 is a 3-way, 2 position, pilot operated, directional screw-in cartridge valve.

**Operation**

This valve allows flow between ports 2 and 3 while blocking port 4 until sufficient pressure has been applied to port 1 and the spring bias is overcome. At that time, flow is directed between ports 3 and 4 while blocking port 2. During the cross-over transition, all ports are blocked. The spring chamber for this valve is externally vented to atmosphere.

**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 265 l/min (70 USgpm)
- Internal leakage 164 cc/min (10 in³/min) maximum @ 210 bar (3000 psi)
- Temperature range -40 to 120°C (-40°F to 248°F)
- Pilot pressures 40–2,75 bar (40 psi) 80–5,5 bar (80 psi)
- Pilot displacement volume 6.72 cm³ (0.41 in³)
- Cavity C–20–4 (See page 60)
- Fluids All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.
- Filtration Cleanliness code18/16/13
- Standard housing materials Aluminum
- Weight cartridge only 1.1 kg (2.40 lb)
- Seal kit 565916 (Buna–N) 889646 (Viton®)

Viton is a registered trademark of E.I. DuPont

---

**Pressure Drop Curve**

*Cartridge only*

![Pressure Drop Curve Graph](Image)
Model Code

PTS1-20

Function
PTS1 – Pilot to shift valve

Size
20 – 20 size

Seals
Blank – Buna-N
V – Viton

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 light duty</td>
</tr>
<tr>
<td>16T</td>
<td>SAE 16</td>
<td>566412</td>
</tr>
<tr>
<td>8B</td>
<td>1” BSPP</td>
<td>02-175469</td>
</tr>
<tr>
<td>12H</td>
<td>SAE 12</td>
<td></td>
</tr>
<tr>
<td>16H</td>
<td>SAE 16</td>
<td></td>
</tr>
<tr>
<td>6G</td>
<td>3/4” BSPP</td>
<td></td>
</tr>
<tr>
<td>8G</td>
<td>1” BSPP</td>
<td></td>
</tr>
</tbody>
</table>

See page 63 for housings

Pilot to shift (nominal)
40 – 2.75 bar (40 psi)
80 – 5.5 bar (80 psi)

Dimensions mm (inch)
Torque cartridge in housing
128–155 Nm (95–115 lbf ft)
PTS2-10
Pilot to shift valve

Description
The PTS2-10 is a 3-way, 2 position, pilot operated, directional screw-in cartridge valve.

Operation
This valve allows flow between ports 2 and 3 while port 4 is blocked until sufficient pressure has been applied at port 1 and the spring bias is overcome. At this time, flow is directed between ports 3 and 4 while blocking port 2. During the cross-over transition all ports are blocked. The spring chamber for this valve is vented internally to port 4 (tank).

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 30 l/min (8 USgpm)
Internal leakage 164 cc/min (10 in³/min) maximum @ 210 bar (3000 psi)
Temperature range -40°C to 120°C (-40°F to 248°F)
Pilot pressures 40–2.75 bar (40 psi)
80–5.5 bar (80 psi)
160–11.0 bar (160 psi)
Pilot displacement volume 0.49 cm³ (0.02 in³)
Cavity C–10–4 (See page 60)
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 0.14 kg (.32 lb)
Seal kit 889625 (Buna–N)
566080 (Viton®)

Viton is a registered trademark of E.I. DuPont

Pressure Drop Curve
Cartridge only
**Model Code**

**PTS2-10**

### PTS2 - 10 (V) - ** - ***

1. **Function**
   - PTS2 – Pilot to shift valve

2. **Size**
   - 10 – 10 size

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

### 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>Aluminum Light duty</td>
</tr>
<tr>
<td>3B</td>
<td>3/8” BSPP</td>
<td>02-179705</td>
</tr>
<tr>
<td>6T</td>
<td>SAE 6</td>
<td>566161</td>
</tr>
<tr>
<td>2G</td>
<td>1/4” BSPP</td>
<td></td>
</tr>
<tr>
<td>3G</td>
<td>3/8” BSPP</td>
<td></td>
</tr>
<tr>
<td>6H</td>
<td>SAE 6</td>
<td></td>
</tr>
<tr>
<td>8H</td>
<td>SAE 8</td>
<td></td>
</tr>
</tbody>
</table>

See page 63 for housings

4. **Pilot to shift (nominal)**
   - 40 – 2.75 bar (40 psi)
   - 80 – 5.5 bar (80 psi)
   - 160 – 11.0 bar (160 psi)

### Dimensions mm (inch)

- 25.4 (1.0) hex
- 19.0 (0.75)
- 0.875”-14 Thd.
- 61.9 (2.43)
- Ø 15.80 (0.622)
- Ø 17.40 (0.685)
- Ø 18.97 (0.747)

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

---

---
PTS2-16
Pilot to shift valve

Description
The PTS2-16 is a 3-way, 2 position, pilot operated, directional screw-in cartridge valve.

Operation
This valve allows flow between ports 2 and 3 while blocking port 4 until sufficient pressure has been applied to port 1 and the spring bias is overcome. At that time, flow is directed between ports 3 and 4 while blocking port 2. During the cross-over transition, all ports are blocked. The spring chamber for this valve is internally vented to port 4 (tank).

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 .................................................. 132 l/min (35 USgpm)
- Internal leakage .............. 164 cc/min (10 in³/min) maximum @ 210 bar (3000 psi)
- Temperature range .......................... −40 to 120°C (−40° to 248°F)
- Pilot pressures .......................... 40 – 2,75 bar (40 psi) 80 – 5,5 bar (80 psi) 160 – 11,0 bar (160 psi)
- Pilot displacement volume ............. 1,97 cm³ (0.12 in³)
- Cavity ..................................................... C–16–4 (See page 60)
- Fluids .................................................. All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.
- Filtration ............................................. Cleanliness code18/16/13
- Standard housing materials ......................... Aluminum
- Weight cartridge only ....................... 0,5 kg (1.12 lb)
- Seal kit .................................................. 889634 (Buna–N) 889638 (Viton®)

Viton is a registered trademark of E.I. DuPont

Pressure Drop Curve
Cartridge only

Flow in l/min (21.8 cSt oil @ 49°C)  

Pressure Drop Curve (21.8 cSt oil @ 49°C)  

Flow in USgpm (105 SUS oil @ 120°F)
PTS2-16

**Function**
PTS2 – Pilot to shift valve

**Size**
16 – 16 size

**Seals**
Blank – Buna-N
V – Viton

**Port size**
O – Cartridge only

<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>566411</td>
</tr>
<tr>
<td>6B</td>
<td>3/4&quot; BSPP</td>
<td>02–175468</td>
</tr>
<tr>
<td>10H</td>
<td>SAE 10</td>
<td>876729</td>
</tr>
<tr>
<td>12H</td>
<td>SAE 12</td>
<td>876731</td>
</tr>
<tr>
<td>4G</td>
<td>1/2&quot; BSPP</td>
<td>876728</td>
</tr>
<tr>
<td>6G</td>
<td>3/4&quot; BSPP</td>
<td>876730</td>
</tr>
</tbody>
</table>

See page 63 for housings

**Pilot to shift (nominal)**

- 40 – 2.75 bar (40 psi)
- 80 – 5.5 bar (80 psi)
- 160 – 11.0 bar (160 psi)

**Dimensions** mm (inch)

- 28.6 (1.12)
- 38.1 (1.5) hex
- 1.312"-12 Thd.
- 101.6 (4.00)
- ∅ 25.38 (0.999)
- ∅ 26.95 (1.061)
- ∅ 28.55 (1.124)

Torque cartridge in housing
108–122 Nm (80–90 lbf ft)
**PTS2-20**

**Pilot to shift valve**

---

**Functional Symbol**

![Functional Symbol](image)

**Description**

The PTS2-20 is a 3-way, 2 position, pilot operated, directional screw-in cartridge valve.

**Operation**

This valve allows flow between ports 2 and 3 while blocking port 4 until sufficient pressure has been applied at port 1 and the spring bias is overcome. At that time, flow is directed between ports 3 and 4 while blocking port 2. During the cross-over transition, all ports are blocked. The spring chamber for this valve is vented internally to port 4 (tank).

**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 ..................................................... 265 l/min (70 USgpm)
- Internal leakage ................. 164 cc/min (10 in³/min) maximum @ 210 bar (3000 psi)
- Temperature range ..................... –40 to 120°C (–40°F to 248°F)
- Pilot pressures ............................... 40 – 2.75 bar (40 psi)
- Pilot displacement volume .................. 6.72 cm³ (0.41 in³)
- Cavity .............................................. C–20–4 (See page 60)

**Fluids**

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

**Filtration** .......................... Cleanliness code18/16/13

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

**Weight cartridge only** .......................... 0.5 kg (1.12 lb)

**Seal kit** .......................... 565916 (Buna–N)
- 889646 (Viton®)

Viton is a registered trademark of E.I. DuPont

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**Sectional View**

![Sectional View](image)

---

**Pressure Drop Curve**

*Cartridge only*

![Pressure Drop Curve](image)

---

*Flow in l/min (21,8 cSt oil @ 49°C)*

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

**PTS2-20**

---

**Function**
PTS2 – Pilot to shift valve

**Size**
20 – 20 size

**Seals**
Blank – Buna-N
V – Viton

---

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
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<tbody>
<tr>
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</tr>
<tr>
<td>8B</td>
<td>1” BSPP</td>
<td>02–175469</td>
</tr>
<tr>
<td>12H</td>
<td>SAE 12</td>
<td>876745</td>
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<td>SAE 16</td>
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<td>8G</td>
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<td>876746</td>
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</tbody>
</table>

See page 63 for housings

---

**Pilot to shift (nominal)**
40 – 2.75 bar (40 psi)
80 – 5.5 bar (80 psi)

---

**Dimensions** mm (inch)

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

The PTS3-10 is a 3-way, 2 position, pilot operated, directional screw-in cartridge valve.

**Operation**

This valve allows flow between ports 3 and 4 while port 2 is blocked until sufficient pressure has been applied at port 1 and the spring bias is overcome. At that time, flow is directed between ports 2 and 3 while blocking port 4. During the cross-over transition, all ports are blocked. The spring chamber for this valve is vented internally to port 4 (tank).

**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**: 30 l/min (8 USgpm)
- **Internal leakage**: 164 cc/min (10 in³/min) maximum @ 210 bar (3000 psi)
- **Temperature range**: –40 °C to 120°C (–40 °F to 248°F)
- **Pilot pressures**:
  - 40 – 2.75 bar (40 psi)
  - 80 – 5.5 bar (80 psi)
  - 160 – 11.0 bar (160 psi)
- **Pilot displacement volume**: 0.49 cm³ (0.02 in³)
- **Cavity**: C–10–4 (See page 60)
- **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**: 0.14 kg (.32 lb)
- **Seal kit**: 889625 (Buna–N)
  - 566080 (Viton®)

Viton is a registered trademark of E.I. DuPont

---

**Pressure Drop Curve**

Cartridge only

![Pressure Drop Curve](image-url)
Model Code

PTS3-10

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<tr>
<th>Function</th>
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<td>V – Viton</td>
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<table>
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<td>6H</td>
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<td>8H</td>
<td>SAE 8</td>
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</table>

See page 63 for housings

<table>
<thead>
<tr>
<th>Pilot to shift (nominal)</th>
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</thead>
<tbody>
<tr>
<td>40 – 2.75 bar (40 psi)</td>
</tr>
<tr>
<td>80 – 5.5 bar (80 psi)</td>
</tr>
<tr>
<td>160 – 11.0 bar (160 psi)</td>
</tr>
</tbody>
</table>

Dimensions mm (inch)

Torque cartridge in housing 47–54 Nm (35–40 lbf ft)
The PTS3-16 is a 3-way, 2 position, pilot operated, directional screw-in cartridge valve.

**Operation**
This valve allows flow between ports 3 and 4 while blocking port 2 until sufficient pressure has been applied to port 1 and the spring bias is overcome. At that time, flow is directed between ports 2 and 3 while blocking port 4. During the cross-over transition, all ports are blocked. The spring chamber for this valve is internally vented to port 4 (tank).

**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 .................................................. 132 l/min (35 USgpm)
- Internal leakage ....................... 164 cc/min (10 in³/min) maximum @ 210 bar (3000 psi)
- Temperature range .............. –40°C to 120°C (–40°F to 248°F)
- Pilot pressures .................. 40 – 2,75 bar (40 psi)  
  80 – 5,5 bar (80 psi)  
  160 – 11,0 bar (160 psi)
- Pilot displacement volume ........... 1,97 cm³ (0.12 in³)
- Cavity ................................. C–16–4 (See page 60)
- 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 .................. 0,5 kg (1.12 lb)
- Seal kit ........................................ 889634 (Buna–N)  
  889638 (Viton®)

Viton is a registered trademark of E.I. DuPont

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**Pressure Drop Curve**
*Cartridge only*

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Function
PTS3 – Pilot to shift valve

Size
16 – 16 size

Seals
Blank – Buna-N
V – Viton

Port size
O – Cartridge only

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<th>Housing number</th>
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<td>6G</td>
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</tr>
</tbody>
</table>

See page 63 for housings

Pilot to shift (nominal)
40 – 2,75 bar (40 psi)
80 – 5,5 bar (80 psi)
160 – 11,0 bar (160 psi)

Dimensions mm (inch)

Torque cartridge in housing
108–122 Nm (80–90 lbf ft)
Description
The PTS3-20 is a 3-way, 2 position, pilot operated, directional screw-in cartridge valve.

Operation
This valve allows flow between ports 3 and 4 while blocking port 2 until sufficient pressure has been applied to port 1 and the spring bias is overcome. At that time, flow is directed between ports 2 and 3 while blocking port 4. During the cross-over transition, all ports are blocked. The spring chamber for this valve is vented internally to port 4 (tank).

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 ............................................. 265 l/min (70 USgpm)
- Internal leakage ............. 164 cc/min (10 in³/min) maximum @ 210 bar (3000 psi)
- Temperature range .................. –40 to 120°C (–40°F to 248°F)
- Pilot pressures ..................................... 2,75 bar (40 psi) 5,5 bar (80 psi)
- Pilot displacement volume ................. 6,72 cm³ (0.41 in³)
- Cavity .............................................. C–20–4 (See page 60)
- Fluids .................................. All general purpose hydraulic fluids such as:

  - MIL–H–5606, SAE 10, SAE 20, etc.

  - Cleanliness code 18/16/13

  - All general purpose hydraulic fluids such as:

    - MIL–H–5606, SAE 10, SAE 20, etc.

  - Cleanliness code 18/16/13

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

Weight cartridge only ......................... 0,5 kg (1.12 lb)

Seal kit ........................................... 565916 (Buna–N) 889646 (Viton®)

Viton is a registered trademark of E.I. DuPont

Pressure Drop Curve

- Cartridge only

Flow in USgpm (105 SUS oil @ 120°F)

Flow in l/min (21,8 cSt oil @ 49°C)

Pressure Drop psi

Pressure Drop bar
### Model Code PTS3-20

#### Function
<table>
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<tr>
<th>1</th>
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<td><strong>PTS3</strong></td>
<td>Pilot to shift valve</td>
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#### Size
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<td><strong>V</strong></td>
<td>Viton</td>
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#### Port size
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<tbody>
<tr>
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</table>

#### Housing number

<table>
<thead>
<tr>
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<th>Port size</th>
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<th>Aluminum Fatigue rated</th>
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<td>8G</td>
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</tbody>
</table>

See page 63 for housings

#### Pilot to shift (nominal)
<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Pilot to shift (nominal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>2.75 bar</td>
<td>40 psi</td>
</tr>
<tr>
<td>80</td>
<td>5.5 bar</td>
<td>80 psi</td>
</tr>
</tbody>
</table>

#### Dimensions mm (inch)

- 41,3 (1.62)
- 47,6 (1.875) hex
- 1,625”-12 Thd.
- 139,7 (5.50)
- Ø 31,70 (1.248)
- Ø 33,30 (1.311)
- Ø 36,47 (1.436)

**Torque cartridge in housing**

128–155 Nm (95–115 lbf ft)
PTS4-16
Pilot to shift valve

Description
The PTS4-16 is a 3-way, 2 position, pilot operated, directional screw-in cartridge valve.

Operation
This valve allows flow between ports 3 and 4 while blocking port 2 until sufficient pressure has been applied to port 1 and the spring bias is overcome. At that time, flow is directed between ports 2 and 3 while blocking port 4. During the cross-over transition, all ports are blocked. The spring chamber for this valve is externally vented to atmosphere.

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 132 l/min (35 USgpm)
- Internal leakage 164 cc/min (10 in³/min) maximum @ 210 bar (3000 psi)
- Temperature range -40 to 120°C (-40°F to 248°F)
- Pilot pressures 40 – 2.75 bar (40 psi) 80 – 5.5 bar (80 psi) 160 – 11.0 bar (160 psi)
- Pilot displacement volume 1.97 cm³ (0.12 in³)
- Cavity C-16-4 (See page 60)
- 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 0.5 kg (1.12 lb)
- Seal kit 889634 (Buna-N) 889638 (Viton®) Viton is a registered trademark of E.I. DuPont

Pressure Drop Curve
Cartridge only
**Model Code**

### PTS4 - 16 (V) - *** - ***

1. **Function**
   - PTS4 – Pilot to shift valve

2. **Size**
   - 16 – 16 size

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

4. **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>
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<tr>
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</tbody>
</table>

See page 63 for housings

5. **Pilot to shift (nominal)**
   - 40 – 2.75 bar (40 psi)
   - 80 – 5.5 bar (80 psi)
   - 160 – 11.0 bar (160 psi)

### Dimensions mm (inch)

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

![Dimensions Diagram](image-url)
PTS5-10
Pilot to shift valve

Description
The PTS5-10 is a 3-way, 2 position, pilot operated, directional screw-in cartridge valve.

Operation
This valve allows flow between ports 1 and 2 while port 3 is blocked until sufficient pressure has been applied at port 4 and the spring bias is overcome. At that time, flow is directed between ports 2 and 3 while blocking port 1. During the cross-over transition, all ports are blocked. The spring chamber for this valve is vented internally 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) ................. 210 bar (3000 psi)
- Cartridge fatigue pressure (infinite life) .................. 210 bar (3000 psi)
- Rated flow ........................................ 11 l/min (3 USgpm)
- Internal leakage ...... 164 cc/min (10 in³/min) maximum @ 210 bar (3000 psi)
- Temperature range ................................ −40 to 120°C (−40°F to 248°F)
- Pilot pressures ...................................... 3.45 bar (50 psi)
- Pilot displacement volume ............................. 0.49 cm³ (0.02 in³)
- Cavity ................................................. C−10−3 (See page 59)
- Fluids .................................................. All general purpose hydraulic fluids such as: MIL−H−5606, SAE 10, SAE 20, etc.
- Filtration ............................................. Cleanliness code18/16/13
- Standard housing materials ............................ Aluminum
- Weight cartridge only ................................ 0.14 kg (.32 lb)
- Seal kit ............................................... 889624 (Buna−N) 889628 (Viton®)

Viton is a registered trademark of E.I. DuPont

Pressure Drop Curve
Cartridge only

Pressure Drop Curve
Flow in l/min (21.8 cSt oil @ 49°C)

Flow in USgpm (105 SUS oil @ 120°F)

A – Port 3 to 2
B – Port 2 to 1
**Model Code**

**PTS5-10**

### Function
- **PTS5** – Pilot to shift valve

### Size
- **10** – 10 size

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

### Port size
- **O** – Cartridge only

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<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
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<td>8H</td>
<td>SAE 8</td>
<td>876711</td>
</tr>
</tbody>
</table>

See page 62 for housings

### Pilot to shift (nominal)
- **50** – 3.45 bar (50 psi)

### Dimensions mm (inch)
- **47–54 Nm (35–40 lbf ft)**

![Diagram of the PTS5-10 valve showing dimensions and markings.](image)
**PTS5-16**

**Pilot to shift valve**

---

**Description**

The PTS5-16 is a 3-way, 2 position, pilot operated, directional screw-in cartridge valve.

**Operation**

This valve allows flow between ports 3 and 4 while blocking port 2 until sufficient pressure has been applied to port 1 and the spring bias is overcome. At that time, flow is directed between ports 3 and 2 while blocking port 4. During the cross-over transition, all ports are open. The spring chamber for this valve is externally vented to atmosphere.

**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**: 132 l/min (35 USgpm)
- **Internal leakage**: 164 cc/min (10 in³/min) maximum @ 210 bar (3000 psi)
- **Temperature range**: –40°C to 120°C (~–40°F to 248°F)
- **Pilot pressures**:
  - 40 – 2.75 bar (40 psi)
  - 80 – 5.5 bar (80 psi)
  - 160 – 11.0 bar (160 psi)
- **Pilot displacement volume**: 1.97 cm³ (0.12 in³)
- **Cavity**: C–16–4 (See page 60)
- **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**: 0.5 kg (1.12 lb)
- **Seal kit**: 889634 (Buna–N)
  - 889638 (Viton®)

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

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**Pressure Drop Curve**

Cartridge only

---

**Flow in l/min (21.8 cSt oil @ 49°C)**

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

---

**Pressure Drop psi**

**Pressure Drop bar**
### Model Code

**Function**
- **PTS5** – Pilot to shift valve

**Size**
- **16** – 16 size

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

### Port size

<table>
<thead>
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<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
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<td></td>
<td>Aluminum Light duty</td>
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<td>12T</td>
<td>SAE 12</td>
<td>566411</td>
</tr>
<tr>
<td>6B</td>
<td>3/4” BSPP</td>
<td>02–175468</td>
</tr>
<tr>
<td>10H</td>
<td>SAE 10</td>
<td>02–175468</td>
</tr>
<tr>
<td>12H</td>
<td>SAE 12</td>
<td>02–175468</td>
</tr>
<tr>
<td>4G</td>
<td>1/2” BSPP</td>
<td>02–175468</td>
</tr>
<tr>
<td>6G</td>
<td>3/4” BSPP</td>
<td>02–175468</td>
</tr>
</tbody>
</table>

See page 63 for housings

### Pilot to shift (nominal)
- **40** – 2.75 bar (40 psi)
- **80** – 5.5 bar (80 psi)
- **160** – 11.0 bar (160 psi)

### Dimensions mm (inch)

- **28.6 (1.12)**
- **38.1 (1.5) hex**
- **1.312”-14 Thd.**
- **101.6 (4.00)**
- **Ø 25.38 (0.999)**
- **Ø 26.95 (1.061)**
- **Ø 28.55 (1.124)**

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

The PTS6-10 is a 4-way, 2 position, pilot operated, directional screw-in cartridge valve.

**Operation**

This valve allows flow between ports 1 and 2 and ports 3 and 4 until sufficient pressure has been applied at port 5 and the spring bias is overcome. At that time, flow is directed between ports 1 and 4 and ports 3 and 2. During the cross-over transition, all ports are blocked. The spring chamber for this valve is vented internally 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) .................. 210 bar (3000 psi)
- Cartridge fatigue pressure (infinite life) ................. 210 bar (3000 psi)
- Rated flow .................................................. 23 l/min (6 USgpm)
- Internal leakage ............................................. 164 cc/min (10 in³/min) maximum @ 210 bar (3000 psi)
- Temperature range ........................................ –40 to 120°C (–40°F to 248°F)
- Pilot pressures ............................................. 4.2 bar (60 psi)
- Pilot displacement volume .................................. 0.49 cm³ (0.02 in³)
- Cavity ......................................................... C–10–4 (See page 60)
- 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 ...................................... 0.15 kg (.33 lb)
- Seal kit ....................................................... 889625 (Buna–N) 566080 (Viton®)

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

---

**Pressure Drop Curve**

*Cartridge only*

<table>
<thead>
<tr>
<th>Flow in USgpm (105 SUS oil @ 120°F)</th>
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</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

**Flow in l/min (21.8 cSt oil @ 49°C)**

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<th>2</th>
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<th>5</th>
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<tbody>
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<td>4</td>
<td></td>
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</tr>
<tr>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
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</tbody>
</table>

**Flow in l/min**

<table>
<thead>
<tr>
<th>Pressure Drop bar</th>
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</thead>
<tbody>
<tr>
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<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
</tbody>
</table>

**A** – Port 3 to 4
**B** – Port 4 to 1
**C** – Port 3 to 2
**D** – Port 2 to 1
Function
PTS6 – Pilot to shift valve

Size
10 – 10 size

Seals
Blank–Buna-N
V – Viton

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>02–179705</td>
</tr>
<tr>
<td>6T</td>
<td>SAE 6</td>
<td>566161</td>
</tr>
<tr>
<td>2G</td>
<td>1/4&quot; BSPP</td>
<td>876709</td>
</tr>
<tr>
<td>3G</td>
<td>3/8&quot; BSPP</td>
<td>876715</td>
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<tr>
<td>6H</td>
<td>SAE 6</td>
<td>876708</td>
</tr>
<tr>
<td>8H</td>
<td>SAE 8</td>
<td>876713</td>
</tr>
</tbody>
</table>

See page 63 for housings

Pilot to shift (nominal)
60 – 0.08 bar (60 psi)

Dimensions mm (inch)

Torque cartridge in housing
47–54 Nm (35–40 lbf ft)
**PTS6-16**

Pilot to shift valve

**Functional Symbol**

![Functional Symbol](image)

**Sectional View**

![Sectional View](image)

**Description**

The PTS6-16 is a 3-way, 2 position, pilot operated, directional screw-in cartridge valve.

**Operation**

This valve allows flow between ports 3 and 4 while blocking port 2 until sufficient pressure has been applied to port 1 and the spring bias is overcome. At that time flow is directed between ports 3 and 2 while blocking port 4. During the cross-over transition, all ports are open. The spring chamber for this valve is externally vented to port 4 (tank).

**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 ............................................................. 132 l/min (35 USgpm)
- Internal leakage .............. 164 cc/min (10 in³/min) maximum @ 210 bar (3000 psi)
- Temperature range .................. –40 to 120°C (–40°F to 248°F)
- Pilot pressures ........................ 40 – 2.75 bar (40 psi), 80 – 5.5 bar (80 psi), 160 – 11.0 bar (160 psi)
- Pilot displacement volume .................. 1.97 cm³ (0.12 in³)
- Cavity ................................. C–16–4 (See page 60)
- 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 .................. 0.5 kg (1.12 lb)
- Seal kit ........................................ 889634 (Buna–N), 889638 (Viton®)

Viton is a registered trademark of E.I. DuPont

**Pressure Drop Curve**

*Cartridge only*

![Pressure Drop Curve](image)
Model Code

PTS6 - 16 (V) - *** - ***

1. Function
   PTS6 – Pilot to shift valve

2. Size
   16 – 16 size

3. Seals
   Blank – Buna-N
   V – Viton

4. Port size
   O – Cartridge only

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
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<tbody>
<tr>
<td>12T</td>
<td>SAE 12</td>
<td>566411</td>
</tr>
<tr>
<td>6B</td>
<td>3/4&quot; BSPP</td>
<td>02–175468</td>
</tr>
<tr>
<td>10H</td>
<td>SAE 10</td>
<td>876729</td>
</tr>
<tr>
<td>12H</td>
<td>SAE 12</td>
<td>876731</td>
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<tr>
<td>4G</td>
<td>1/2&quot; BSPP</td>
<td>876728</td>
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<tr>
<td>6G</td>
<td>3/4&quot; BSPP</td>
<td>876730</td>
</tr>
</tbody>
</table>

See page 63 for housings

5. Pilot to shift (nominal)
   40 – 2.75 bar (40 psi)
   80 – 5.5 bar (80 psi)
   160–11.0 bar (160 psi)

Dimensions mm (inch)

Torque cartridge in housing
108–122 Nm (80–90 lbf ft)
PTS7-10
Pilot to shift valve

Functional Symbol

Description
The PTS7-10 is a 2-way, 2 position, pilot operated, directional screw-in cartridge valve.

Operation
This valve allows flow between ports 2 and 3 until sufficient pressure at port 1 overcomes the spring bias, which closes both ports. The spring chamber for this valve is externally vented to atmosphere.

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 ........................................ 30 l/min (8 USgpm)
Internal leakage ............ 164 cc/min (10 in³/min) maximum @ 210 bar (3000 psi)
Temperature range ............ −40 to 120°C (−40°F to 248°F)
Pilot pressures ...................... 40 – 2.75 bar (40 psi)
...................................... 80 – 5.5 bar (80 psi)
...................................... 160 – 11.0 bar (160 psi)
Pilot displacement volume ................ 0.49 cm³ (0.02 in³)
Cavity ........................................... C–10–3 (See page 59)
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 (.23 lb)
Seal kit ........................................... 889624 (Buna–N)
........................................... 889628 (Viton®)

Pressure Drop Curve
Cartridge only

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

PTS7-10

PTS7 - 10 (V) - ** - ***

1  2  3  4  5

Function
PTS7 — Pilot to shift valve

Size
10 — 10 size

Seals
Blank — Buna-N
V — Viton

Port size
O — Cartridge only

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
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<td>3B</td>
<td>3/8’ BSPP</td>
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<td>6T</td>
<td>SAE 6</td>
<td>566162</td>
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<td>2G</td>
<td>1/4” BSPP</td>
<td>876705</td>
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<tr>
<td>3G</td>
<td>3/8” BSPP</td>
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<td>6H</td>
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<tr>
<td>8H</td>
<td>SAE 8</td>
<td>876711</td>
</tr>
</tbody>
</table>

See page 62 for housings

Pilot to shift (nominal)
40 — 2.75 bar (40 psi)
80 — 5.5 bar (80 psi)
160 — 11.0 bar (160 psi)

Dimensions mm (inch)

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

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimension</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>15,82 (0.623)</td>
<td></td>
</tr>
<tr>
<td>17,42 (0.686)</td>
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<tr>
<td>19,0 (0.75)</td>
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</tr>
<tr>
<td>25,4 (1.0)</td>
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</tr>
<tr>
<td>46,0 (1.81)</td>
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</tr>
<tr>
<td>0.875”-14 Thd.</td>
<td></td>
</tr>
</tbody>
</table>
**C-**-2 Cavity Dimensions**

**Dimensions**

_mm (inch)_

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.

![2-way cavity diagram](image)

These diameters _0,051 mm (.002 inch)_ **B** unless otherwise specified.

These diameters _0,025 mm (.001 inch)_ **A** 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 Full Thread</th>
<th>E Full Thread</th>
<th>F</th>
<th>G ±0.0254 (±0.001)</th>
<th>H Max. Dia.</th>
<th>J</th>
<th>P Max. Dia.</th>
<th>X Max. Dia.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-10-2</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 (0.098/0.114)</td>
<td>23.80 (0.937)</td>
<td>15.90 (0.626)</td>
<td>33.32 (1.312)</td>
<td>18.26 (0.718)</td>
<td>11.11 (0.437)</td>
</tr>
</tbody>
</table>
### C-**-3 Cavity Dimensions

#### Dimensions

**mm (inch)**

![3-way cavity diagram]

<table>
<thead>
<tr>
<th>Cavity</th>
<th>A Spotface</th>
<th>B +0.051/0 (+0.002)</th>
<th>C +0.051/0 (+0.002)</th>
<th>D Full Thread</th>
<th>E Full Thread</th>
<th>F</th>
<th>G ±0.0254 (±0.001)</th>
<th>H</th>
<th>J ±0.0254 (±0.001)</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>18.24 (0.718)</td>
<td>15.90 (0.626)</td>
<td>33.26 (1.270)</td>
<td>14.30 (0.563)</td>
</tr>
<tr>
<td>C–10–3</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>21.59 (0.850)</td>
<td>17.50 (0.689)</td>
<td>38.10 (1.500)</td>
<td>15.90 (0.626)</td>
</tr>
<tr>
<td>C–16–3</td>
<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>
<td>27.02 (1.064)</td>
</tr>
</tbody>
</table>

© These diameters 0.051 mm (.002 inch) B unless otherwise specified.

© These diameters 0.025 mm (.001 inch) A unless otherwise specified.

#### Cavity mm (inch)

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>C–8–3</td>
<td>14.68 (0.578)</td>
<td>5.94 (0.234)</td>
<td>28.99 (1.141)</td>
<td>5.94 (0.234)</td>
</tr>
<tr>
<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>
</tr>
<tr>
<td>C–16–3</td>
<td>24.60 (0.968)</td>
<td>15.88 (0.625)</td>
<td>53.18 (2.093)</td>
<td>15.88 (0.625)</td>
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</tbody>
</table>
### C-**-4 Cavity Dimensions

#### Dimensions

**mm (inch)**

<table>
<thead>
<tr>
<th>Cavity (mm (inch))</th>
<th>A Spotface</th>
<th>B +0.051 (+0.002)</th>
<th>C +0.051 (+0.002)</th>
<th>D Thread</th>
<th>E Full Thread</th>
<th>F</th>
<th>G ± 0.0254 (± 0.001)</th>
<th>H ± 0.0254 (± 0.001)</th>
<th>J</th>
<th>K ± 0.0254 (± 0.001)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-10-4</td>
<td>30.16</td>
<td>24.00</td>
<td>20.62</td>
<td>0.875&quot;-14</td>
<td>15.88</td>
<td>2.54/2.92</td>
<td>22.22</td>
<td>19.08</td>
<td>38.10</td>
<td>17.50</td>
</tr>
<tr>
<td>C-16-4</td>
<td>44.45</td>
<td>35.58</td>
<td>31.34</td>
<td>1.312&quot;-12</td>
<td>22.22</td>
<td>3.30/3.68</td>
<td>34.13</td>
<td>28.62</td>
<td>62.71</td>
<td>27.02</td>
</tr>
<tr>
<td>C-20-4</td>
<td>57.66</td>
<td>43.59</td>
<td>39.12</td>
<td>1.625&quot;-12</td>
<td>20.64</td>
<td>3.35/3.73</td>
<td>44.45</td>
<td>36.55</td>
<td>85.72</td>
<td>33.38</td>
</tr>
</tbody>
</table>

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

#### 4-Way Cavity

![4-Way Cavity Diagram](image_url)

#### Cavity Dimensions

<table>
<thead>
<tr>
<th>Cavity (mm (inch))</th>
<th>L M ± 0.0254 (± 0.001)</th>
<th>N</th>
<th>P</th>
<th>R Max. Dia.</th>
<th>S</th>
<th>T Max. Dia.</th>
<th>U</th>
<th>V</th>
<th>X Max. Dia.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-10-4</td>
<td>53.98 (2.125)</td>
<td>15.90 (0.626)</td>
<td>63.50 (2.500)</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>50.00 (1.969)</td>
<td>6.35 (0.250)</td>
</tr>
<tr>
<td>C-16-4</td>
<td>91.28 (3.594)</td>
<td>25.45 (1.002)</td>
<td>103.98 (4.094)</td>
<td>24.58 (0.968)</td>
<td>15.87 (0.625)</td>
<td>53.18 (2.093)</td>
<td>15.87 (0.625)</td>
<td>81.73 (3.218)</td>
<td>15.87 (0.625)</td>
</tr>
<tr>
<td>C-20-4</td>
<td>127.00 (5.000)</td>
<td>31.78 (1.251)</td>
<td>141.27 (5.562)</td>
<td>30.96 (1.218)</td>
<td>25.40 (1.000)</td>
<td>71.44 (2.812)</td>
<td>25.40 (1.000)</td>
<td>112.71 (4.437)</td>
<td>25.40 (1.000)</td>
</tr>
</tbody>
</table>
C-**-2 Aluminum Housings (Light Duty / Fatigue Rated)

<table>
<thead>
<tr>
<th>Housing</th>
<th>Ports 1 &amp; 2</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-10-2 Light Duty</td>
<td>3/8” BSPP</td>
<td>02-175462</td>
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<tr>
<td></td>
<td>SAE 6</td>
<td>566151</td>
</tr>
<tr>
<td>C-10-2 Fatigue Rated</td>
<td>1/4” BSPP</td>
<td>876702</td>
</tr>
<tr>
<td></td>
<td>3/8” BSPP</td>
<td>876703</td>
</tr>
<tr>
<td></td>
<td>SAE 6</td>
<td>876700</td>
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<td>SAE 8</td>
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Note: BSPP porting is designated by “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 (inch)</th>
<th>A (cm)</th>
<th>B (cm)</th>
<th>C (cm)</th>
<th>D (cm)</th>
<th>E (cm)</th>
<th>F (cm)</th>
<th>G (cm)</th>
<th>H (cm)</th>
<th>I (cm)</th>
<th>Mass (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-10-2 Light Duty</td>
<td>50.8 (2.00)</td>
<td>19.0 (0.75)</td>
<td>50.8 (2.00)</td>
<td>31.7 (1.25)</td>
<td>15.9 (0.62)</td>
<td>19.0 (0.75)</td>
<td>7.1 (0.28)</td>
<td>3.1 (0.12)</td>
<td>12.7 (0.50)</td>
<td>0.1 (0.35)</td>
</tr>
<tr>
<td>C-10-2 Fatigue Rated</td>
<td>63.5 (2.50)</td>
<td>25.4 (1.00)</td>
<td>63.5 (2.50)</td>
<td>50.8 (2.00)</td>
<td>25.4 (1.00)</td>
<td>9.5 (0.37)</td>
<td>20.8 (0.81)</td>
<td>7.1 (0.28)</td>
<td>19.0 (0.75)</td>
<td>0.4 (1.00)</td>
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# C-**-3 Aluminum Housings (Light Duty / Fatigue Rated)

## Table of Housings

<table>
<thead>
<tr>
<th>Housing</th>
<th>Ports 1, 2 &amp; 3</th>
<th>Part Number</th>
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<tr>
<td>C-10-3 Light Duty</td>
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<tr>
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<td>02–175465</td>
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<td>SAE 12</td>
<td>566152</td>
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<td>3/8&quot; BSPP</td>
<td>02–160740</td>
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<td>SAE 4</td>
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<td>02–160742</td>
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<td>3/8&quot; BSPP</td>
<td>876714</td>
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<td>3/4&quot; BSPP</td>
<td>876722</td>
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<td>876721</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.

## Cavity Dimensions

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<tr>
<th>Cavity (mm)</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>
<th>Mass (kg / lb.)</th>
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</thead>
<tbody>
<tr>
<td>C-10-3 Light Duty</td>
<td>63.5 (2.50)</td>
<td>31.7 (1.25)</td>
<td>66.6 (2.62)</td>
<td>31.7 (1.25)</td>
<td>15.8 (0.62)</td>
<td>3.1 (0.12)</td>
<td>19.0 (0.75)</td>
<td>34.9 (1.37)</td>
<td>7.1 (0.28)</td>
<td>12.7 (0.50)</td>
<td>0.3 (0.64)</td>
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<tr>
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<td>101.6 (4.00)</td>
<td>50.8 (2.00)</td>
<td>107.9 (4.25)</td>
<td>50.8 (2.00)</td>
<td>25.4 (1.00)</td>
<td>4.0 (0.16)</td>
<td>25.4 (1.00)</td>
<td>53.9 (2.12)</td>
<td>8.6 (0.33)</td>
<td>25.4 (1.00)</td>
<td>1.0 (2.3)</td>
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<tr>
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<td>63.5 (2.50)</td>
<td>31.8 (1.25)</td>
<td>66.6 (2.62)</td>
<td>38.1 (1.50)</td>
<td>19.0 (0.75)</td>
<td>3.4 (0.13)</td>
<td>15.5 (0.61)</td>
<td>29.8 (1.17)</td>
<td>7.1 (0.28)</td>
<td>13.0 (0.51)</td>
<td>0.4 (0.83)</td>
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<tr>
<td>C-10-3 Fatigue Rated</td>
<td>76.2 (3.00)</td>
<td>38.1 (1.50)</td>
<td>76.2 (3.00)</td>
<td>50.8 (2.00)</td>
<td>25.4 (1.00)</td>
<td>9.5 (0.37)</td>
<td>20.8 (0.81)</td>
<td>36.6 (1.44)</td>
<td>7.1 (0.28)</td>
<td>19.0 (0.75)</td>
<td>0.7 (1.65)</td>
</tr>
<tr>
<td>C-16-3 Fatigue Rated</td>
<td>114.3 (4.50)</td>
<td>60.3 (2.37)</td>
<td>114.3 (4.50)</td>
<td>63.5 (2.50)</td>
<td>31.7 (1.25)</td>
<td>10.3 (0.40)</td>
<td>28.4 (1.24)</td>
<td>57.0 (2.44)</td>
<td>8.7 (0.34)</td>
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<td>2.0 (4.50)</td>
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# C-**-4 Aluminum Housings (Light Duty / Fatigue Rated)

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<td>1&quot; BSPP</td>
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<td>SAE 16</td>
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<td>53.9</td>
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<td>8.7</td>
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<td>36.6</td>
<td>20.8</td>
<td>7.1</td>
<td>12.7</td>
<td>52.5</td>
<td>0.9 (2.00)</td>
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<td>C-16-4 Fatigue Rated</td>
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<td>139.7</td>
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<td>31.7</td>
<td>10.3</td>
<td>57.0</td>
<td>28.4</td>
<td>8.7</td>
<td>25.4</td>
<td>85.5</td>
<td>2.4 (5.29)</td>
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<td>4.50</td>
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<td>2.50</td>
<td>1.25</td>
<td>0.40</td>
<td>2.24</td>
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<td>C-20-4 Fatigue Rated</td>
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<td>41.2</td>
<td>10.3</td>
<td>76.5</td>
<td>36.0</td>
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<td>19.0</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.
C-**-3 Steel Housings

<table>
<thead>
<tr>
<th>Housing</th>
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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>
<td>02-160744</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.

<table>
<thead>
<tr>
<th>Cavity (mm (inch))</th>
<th>A</th>
<th>B (inch)</th>
<th>C</th>
<th>D (inch)</th>
<th>E (inch)</th>
<th>F</th>
<th>G (inch)</th>
<th>H (inch)</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>Mass (kg (lb.))</th>
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<tbody>
<tr>
<td>C-8-3</td>
<td>63.5</td>
<td>31.8 (1.25)</td>
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<td>38.1 (1.50)</td>
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<td>15.5 (0.61)</td>
<td>53.0 (2.12)</td>
<td>3.3 (0.13)</td>
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<td>7.1 (0.28)</td>
<td>29.8 (1.17)</td>
<td>0.9 (2.15)</td>
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</table>
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.

<table>
<thead>
<tr>
<th>Cavity</th>
<th>Material</th>
<th>Model Code</th>
<th>Assembly Number</th>
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<td>RT–10–2–A–8030</td>
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<td>C–10–2</td>
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<td>RT–10–2–S–8035</td>
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<td>3–Way</td>
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<td>C–8–3</td>
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<td>RT–20–4–S–8077</td>
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</table>

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.

<table>
<thead>
<tr>
<th>Cavity</th>
<th>Material</th>
<th>Model Code</th>
<th>Assembly Number</th>
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Supporting Products

Finishing Form Tools Speed & Feed for Aluminum 6061–T6 (T651)

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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<th>RPM</th>
<th>IPM</th>
<th>BRIDGEPORT / LAGUN TYPE MACHINES</th>
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Fluid Cleanliness

The ISO 4406 cleanliness code for the valves in this publication 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 cleanliness, materials, and additives for protection against wear of components, elevated viscosity, and inclusion of air.

Essential information on the correct methods for treating hydraulic fluid is included in Vickers publication 561 “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.
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