Logic Elements

Differential Pressure Sensing Elements and Pressure Compensating Elements for applications up to 350 bar (5000 psi) and 303 L/min (80 USgpm)
## Section
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Logic elements and pressure compensators

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<td></td>
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<td>350 (5000)*</td>
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<td>350 (5000)*</td>
<td>.303 (80)</td>
<td>I-18</td>
</tr>
</tbody>
</table>

### Application examples

**Pressure control functions**

Pressure control functions are used to maintain a constant output pressure, regardless of the load on the system. They are typically used in applications where the output pressure needs to be regulated to a specific value.

**Flow control functions**

Flow control functions are used to regulate the flow of fluid through the system. They are typically used to maintain a constant flow rate, regardless of the pressure in the system.

**Directional control functions**

Directional control functions are used to control the direction of fluid flow in the system. They are typically used to switch the flow of fluid from one line to another.

**Three-way bridge / Four-way bridge circuits**

Three-way bridge circuits are used to provide a simple form of control for fluid flow. They are typically used to switch the flow of fluid from one line to another. Four-way bridge circuits are used to provide more complex control of fluid flow. They are typically used to switch the flow of fluid from one line to another in a more complex manner.

### Differential pressure sensing valve

DPS2-10, DPS2-12, DPS2-16, DPS2-20

* Poppet type only, 5000 psi optional

### Pressure compensators, restrictive type

PCS3-10, PCS3-12, PCS3-16, PCS3-20

### Pressure compensators, bypass type

PCS4-10, PCS4-12, PCS4-16, PCS4-20

* Poppet type only, 5000 psi optional
This section gives basic specifications for Vickers logic element and pressure compensator threaded cartridge valves. Its purpose is to provide a quick, convenient reference tool when choosing these valves or designing a system using these components.

All cartridges have hardened and ground spools, and/or honed sleeves, poppets and sharp-edged ground steel seats. This provides an excellent product that is dirt-tolerant, has reliable seating, and is suitable for fast cycling with long life.

These Vickers cartridges provide the system designer with a versatile range of elements for use in MCD packages for controlling pressure, flow and direction of flow.

The range includes:
- Pressure compensators
- Pressure compensators with priority and bypass outlets
- Differential-pressure sensing elements

The correct selection of these products can enhance machine performance, shorten the design process and minimize manufacturing costs of manifold blocks.

**Differential-pressure sensing elements – DPS2**

For controlling pressure, flow or direction (including 3- and 4-way bridge circuits) the DPS2 is used with the aid of external pilot operators. The DPS2 elements are function building blocks which respond to pressure differential signals, providing the capacity to switch or modulate flows up to 303 L/min (80 USgpm) and pressure to 350 bar (5000 psi).

The choice of pilot arrangements related to DPS2 variants can minimize the number of construction holes in a manifold, simplifying design and reducing costs.

**All poppet type DPS2 elements have recently been upgraded to 350 bar (5000 psi).**

**Flow compensators – PCS3**

An essential component of a pressure compensated flow control which, with an external fixed or variable orifice, provides the required compensated flow characteristic. Excess flow is diverted at maximum system pressure. Excess fluid upstream must be diverted e.g. through a relief to tank.

**Pressure compensator with priority and bypass outlets – PCS4**

Similar in function to the PCS3. The major difference is that excess flow is diverted at priority flow pressure, instead of at maximum system pressure, as is the case with PCS3 compensators. The excess flow can pass to a secondary circuit or to tank.
Application Examples

DPS2 Logic elements for pressure control

Pressure control functions

Pressure relief or Sequence example
With external pilot supply and pilot relief

Pressure relief or Sequence example
With internal pilot supply and pilot relief

Pressure reducing example
Non-relieving type
Application Examples

DPS2 Elements for pressure control

Accululator charging with PUV3-10 pilot stage

**Diagram of Accululator charging with PUV3-10 pilot stage**

Pressure reducing and relieving

**Diagram of Pressure reducing and relieving**

Hi/Low unloading circuit with externally piloted pressure sequence pilot valve

**Diagram of Hi/Low unloading circuit with externally piloted pressure sequence pilot valve**

Hi/Low unloading circuit with externally piloted pressure sequence pilot valve

**Diagram of Hi/Low unloading circuit with externally piloted pressure sequence pilot valve**

DPS2-**-V differential pressure sensing cartridge

**Diagram of DPS2-**-V differential pressure sensing cartridge**

DPS2-**-V differential pressure sensing cartridge

**Diagram of DPS2-**-V differential pressure sensing cartridge**
Application Examples
DPS2 Elements for flow control

Pressure compensated flow control example
With downstream fixed or variable restrictor

Pressure compensated priority flow control example
With fixed or variable priority flow control
Load sensing priority flow control example

With pressure limiting and venting

Load sensing priority flow control example

Directional control version with pressure limiter
Load sense circuit example
For parallel operation

DPS2-**.PF
Load sense unloading element
DPS2-**.FF
Hydrostat compensator

Relief valve pressure limiting

80 psi

160 psi

Main relief

Load sense bleed typ. 0.10 GPM

Dampening orifice typ. 0.30 to 0.060

Load sense circuit example
For priority and parallel operation

DPS2-**.PF
Load sense unloading element
DPS2-**.FF
Hydrostat compensator

Relief valve pressure limiting

80 psi

160 psi

Main relief

Load sense bleed typ. 0.10 GPM

Dampening orifice typ. 0.30 to 0.060

Note
1. Pressure limiting relief must be < main relief setting.
2. If pressure limiting is not used; port reliefs set < main relief are required.

PPS2 Elements for flow control
### Two-way, two-position, normally open examples

**Switched by 3-way, 2-position pilot valve and external pilot pressure**

- **Uni-directional flow**

**Switched by external pilot pressure and vented through 2-way, 2-position pilot valve**

- **Uni-directional flow**

**With DPS2-**-B cartridge and internal pilot supply & vented through 2-way, 2 position pilot valve**

- **Uni-directional flow**

**With DPS2-**-S cartridge and internal pilot supply & vented through 2-way, 2 position pilot valve**

- **Uni-directional flow**

**With DPS2-**-V cartridge and internal pilot supply & vented through 2-way, 2 position pilot valve**

- **Uni-directional flow**

**With DPS2-**-T cartridge and internal pilot supply & switched by 3-way, 2 position pilot valve and external pilot pressure**

- **Bi-directional flow**

**With DPS2-**-T cartridge and internal shuttle-selected pilot supply**

- **Bi-directional flow**

**With DPS2-**-T cartridge, external pilot supply and two-way two-position pilot valve**

- **Bi-directional flow**
### Application Examples

DPS2 Elements for directional control

#### Three-way bridge circuits

<table>
<thead>
<tr>
<th>REQUIRED FLOW PATH</th>
<th>PILOT PRESSURE TO</th>
<th>AVAILABLE FROM FORM</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA</td>
<td>PB</td>
<td>1</td>
</tr>
<tr>
<td>A</td>
<td>B</td>
<td>0</td>
</tr>
<tr>
<td>C</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yes</td>
</tr>
</tbody>
</table>

#### Example 1, with DPS2-**-T
- Poppet type

#### Example 2, with DPS2-**-P
- Spool type

#### Example 3, with DPS2-**-P
- Spool type

---

**Note**

Pilot pressure, modified by valve area ratio (if any), must exceed load pressure at valve in order to close valve.

---

1- Pressure applied  0- Pressure vented
Application
Examples
DPS2 Elements for
directional control

Four-way bridge circuits

With DPS2-**-T
Poppet type

With DPS2-**-P
Spool type

<table>
<thead>
<tr>
<th>REQUIRED FLOW PATH</th>
<th>PILOT PRESSURE TO FLOW PATH</th>
<th>PILOT PRESSURE TO FLOW PATH</th>
</tr>
</thead>
<tbody>
<tr>
<td>A  B</td>
<td>P  T</td>
<td>1  1  1  1  1</td>
</tr>
<tr>
<td></td>
<td>0  0  0  0  0</td>
<td>0  1  1  1  1</td>
</tr>
<tr>
<td></td>
<td>1  1  0  0  0</td>
<td>0  1  0  1  1</td>
</tr>
<tr>
<td></td>
<td>0  0  1  1  0</td>
<td>1  0  1  0  1</td>
</tr>
<tr>
<td></td>
<td>1  1  1  1  0</td>
<td>1  1  1  0  1</td>
</tr>
<tr>
<td></td>
<td>1  0  0  1  1</td>
<td>1  0  1  1  1</td>
</tr>
<tr>
<td></td>
<td>0  1  1  0  1</td>
<td></td>
</tr>
</tbody>
</table>

1-Pressure applied  0-Pressure vented

Note
Pilot pressure, modified by valve area ratio (if any), must exceed load pressure at valve in order to close valve.
DPS2-10
Differential pressure sensing valve

Description
The DPS2-10 is a differential pressure sensing valve, available as either a spool or poppet type and with either, internal or external pilot.

Operation
This valve is used as a main section of a pilot controlled valve assembly. This valve has multiple uses when used with either directional control, flow control or pressure control cartridges. Refer to application examples.

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Spool Type</th>
<th>Poppet Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical application pressure</td>
<td>290 bar (4200 psi)</td>
<td>350 bar (5000 psi)**</td>
</tr>
<tr>
<td>Pilot ratio</td>
<td>1:1</td>
<td>2:1</td>
</tr>
<tr>
<td>Internal leakage, poppet type</td>
<td>Port 1 to 2: &lt; 5 drops/min max @ 350 bar (5000 psi)</td>
<td>82 cm³/min. (5 in³/min) max @ 290 bar (4200 psi)</td>
</tr>
<tr>
<td>Internal leakage, spool type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature range</td>
<td>-40°C to 120°C (-40°F to 248°F)</td>
<td></td>
</tr>
<tr>
<td>Cavity</td>
<td>C-10-3S</td>
<td></td>
</tr>
<tr>
<td>Standard housing materials</td>
<td>Aluminum</td>
<td></td>
</tr>
<tr>
<td>Fluids</td>
<td>All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.</td>
<td></td>
</tr>
<tr>
<td>Filtration</td>
<td>Cleanliness code 18/16/13</td>
<td></td>
</tr>
<tr>
<td>Weight cartridge only</td>
<td>0.14 kg (0.30 lbs)</td>
<td></td>
</tr>
<tr>
<td>Seal kits</td>
<td>889650 Buna-N</td>
<td>889652 Viton*</td>
</tr>
</tbody>
</table>

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Pressure Drop Curves
Cartridge only

B/S/T models
P/V models
F/R models
Model Code DPS2-10

<table>
<thead>
<tr>
<th>Function</th>
<th>DPS2 – Differential pressure sensing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>10 – 10 Size</td>
</tr>
<tr>
<td>Seals</td>
<td>Blank – Buna-N</td>
</tr>
<tr>
<td></td>
<td>V – Viton</td>
</tr>
</tbody>
</table>

**Function**
- **B** – Poppet, vent to open, N/C
- **S** – Poppet, vent to open, N/C
- **T** – Poppet, bi-directional, pilot to close, 2:1 ratio, N/C

**Differential pressure**
- 5 – 0.35 bar (5 psi) +
- 10 – 0.7 bar (10 psi) +
- 20 – 1.40 bar (20 psi) +
- 40 – 2.80 bar (40 psi)
- 80 – 5.50 bar (80 psi)
- 160 – 11.0 bar (160 psi)

+ Not available with the “B,” “S” and “T” poppet.
+ The operating back pressure at port 3 should never be less than 1.3 times the spring set pressure.

| Special features | 00 – No special features |

**Dimensions**

- **mm (inch)**
  - Torque cartridge in housing
    - A – 47-54 Nm (35-40 ft. lbs)
    - S – 68-70 Nm (50-55 ft. lbs)

**CODE PORT SIZE HOUSING NUMBER**

- **3B** – 3/8” BSPP 02–175470*  
- **6T** – SAE 6 566413*  
- **6H** – SAE 6 876706  
- **8H** – SAE 8 876712  
- **2G** – 1/4” BSPP 876707  
- **3G** – 3/8” BSPP 876710

* Light duty housing

See section J for housing details.

**Adjustment**
- **F** – None
- **S** – Stroke adjustment
  - “S” adjustment is not available with F and R functions.

**“S” Adjustment**
- 40 (0.15) hex

**“F” Adjustment**
- 21,0 (0.83) hex

**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).**
Description
The DPS2-12 is a differential pressure sensing valve, available as a spool type with either, internal or external pilot.

Operation
This valve is used as a main section of a pilot controlled valve assembly. This valve has multiple uses when used with either directional control, flow control or pressure control cartridges. Refer to application examples.

RATINGS AND SPECIFICATIONS
Performance data is typical with fluid at 21.8 cSt (105 SUS) and 49˚C (120˚F)

- Typical application pressure (spool type) 350 bar (5000 psi)
- Rated flow 114 L/min (30 USgpm)
- Pilot ratio (spool type P,V,R,F) 1:1
- Internal leakage, spool type 82 cm³/min. (5 in³/min) max @ 350 bar (5000 psi)
- Temperature range -40° to 120° C (-40° to 248° F)
- Cavity C-12-3S
- Standard housing materials Aluminum
- 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 0.31 kg (0.68 lbs)
- Seal kits Buna-N
  Viton®

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Functional Symbols
See pages I-20 & I-21

Profile View

Pressure Drop Curves
Cartridge only

0 5 10 15 20 25
Flow (GPM)

0 50 100 150 200 250
Pressure Drop 1 to 2

P/V Type 40 psi Spring
P/V Type 80 psi Spring
P/V Type 160 psi Spring
F/R Type
Model Code DPS2-12

Function
- DPS2: Differential pressure sensing
- F: None

Size
- 12: 12 Size

Seals
- Blank: Buna-N
- V: Viton

Function
- P: Spool, N/C (L/S element)
- V: Spool, N/C
- R: Spool, pressure reducing, N/O
- F: Spool, flow control, N/O (hydrostat)

Adjustment
- 0: Cartridge only

Port size

<table>
<thead>
<tr>
<th>CODE</th>
<th>HOUSING NUMBER</th>
<th>PORTS 1 &amp; 2</th>
<th>PORT 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A)10T</td>
<td>02–178268</td>
<td>SAE-10</td>
<td>SAE-6</td>
</tr>
<tr>
<td>(A)12T</td>
<td>02–178269</td>
<td>SAE-12</td>
<td>SAE-6</td>
</tr>
<tr>
<td>(A)4G</td>
<td>02–178270</td>
<td>1/2&quot; BSPP</td>
<td>3/8&quot; BSPP</td>
</tr>
<tr>
<td>(A)6G</td>
<td>02–178271</td>
<td>3/4&quot; BSPP</td>
<td>3/8&quot; BSPP</td>
</tr>
<tr>
<td>(S)10T</td>
<td>02–160996</td>
<td>SAE-10</td>
<td>SAE-6</td>
</tr>
<tr>
<td>(S)12T</td>
<td>02–160997</td>
<td>SAE-12</td>
<td>SAE-6</td>
</tr>
<tr>
<td>(S)4G</td>
<td>02–160994</td>
<td>1/2&quot; BSPP</td>
<td>3/8&quot; BSPP</td>
</tr>
<tr>
<td>(S)6G</td>
<td>02–160995</td>
<td>3/4&quot; BSPP</td>
<td>3/8&quot; BSPP</td>
</tr>
</tbody>
</table>

Differential pressure
- 040: 2.80 bar (40 psi)
- 080: 5.50 bar (80 psi)
- 160: 11.0 bar (160 psi)

Special features
- 00: No special features

Dimensions

<table>
<thead>
<tr>
<th>mm (inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque cartridge in housing</td>
</tr>
<tr>
<td>A: 81-95 Nm (60-70 ft. lbs)</td>
</tr>
<tr>
<td>S: 102-115 Nm (75-85 ft. lbs)</td>
</tr>
</tbody>
</table>

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).
DPS2-16
Differential pressure sensing valve

Description
The DPS2-16 is a differential pressure sensing valve, available as either a spool or poppet type and with either, internal or external pilot.

Operation
This valve is used as a main section of a pilot controlled valve assembly.

This valve has multiple uses when used with either directional control, flow control or pressure control cartridges. Refer to application examples.

Ratings and Specifications

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Spool Type</th>
<th>Poppet Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical application pressure</td>
<td>290 bar (4200 psi)</td>
<td>350 bar (5000 psi)</td>
</tr>
<tr>
<td>Rated flow</td>
<td>189 L/min (50 USgpm)</td>
<td></td>
</tr>
<tr>
<td>Pilot ratio (spool type PVRF)</td>
<td>1:1</td>
<td></td>
</tr>
<tr>
<td>Pilot ratio (poppet type BST)</td>
<td>2:1</td>
<td></td>
</tr>
<tr>
<td>Internal leakage, poppet type</td>
<td>Port 1 to 2: &lt; 5 drops/min. max @ 350 bar (5000 psi)</td>
<td></td>
</tr>
<tr>
<td>Internal leakage, spool type</td>
<td>82 cm³/min. (5 in³/min) max @ 290 bar (4200 psi)</td>
<td></td>
</tr>
<tr>
<td>Temperature range</td>
<td>-40° to 120° C (-40° to 248° F)</td>
<td></td>
</tr>
<tr>
<td>Cavity</td>
<td>C-16-3S</td>
<td></td>
</tr>
<tr>
<td>Standard housing materials</td>
<td>Aluminum</td>
<td></td>
</tr>
<tr>
<td>Fluids</td>
<td>All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.</td>
<td></td>
</tr>
<tr>
<td>Filtration</td>
<td>Cleanliness code 18/16/13</td>
<td></td>
</tr>
<tr>
<td>Weight cartridge only</td>
<td>0.35 kg (0.78 lbs)</td>
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<tr>
<td>Seal kits</td>
<td>889659 Buna-N 02-165871 Viton®</td>
<td></td>
</tr>
</tbody>
</table>

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Functional Symbols
See pages I-20 & I-21

Profile View

Pressure Drop Curves
Cartridge only

---

B/S/T models
P/V models
F/R models
### Function

- **DPS2** – Differential pressure sensing

### Size

- **16** – 16 Size

### Seals

- **Blank** – Buna-N
- **V** – Viton

### Function

- **B** – Poppet, vent to open, N/C
- **S** – Poppet, vent to open, N/C
- **T** – Poppet, bi-directional, pilot to close, 2:1 ratio, N/C
- **P** – Spool, N/C (L/S element)
- **V** – Spool, N/C
- **R** – Spool, pressure reducing, N/O
- **F** – Spool, flow control, N/O (hydrostat)

### Stroke adjustment

- **F** – None
- **S** – Stroke adjustment

“S” adjustment is not available with F and R functions.

### Differential pressure

- **5** – 0.35 bar (5 psi)
- **20** – 1.40 bar (20 psi)
- **40** – 2.80 bar (40 psi)
- **80** – 5.50 bar (80 psi)
- **160** – 11.0 bar (160 psi)

+ Not available with the “B” and “S,” “T” poppet

The operating back pressure at port 3 should never be less than 1.3 times the spring set pressure.

### Special features

- **00** – 210 bar (3000 psi) rated valve
- **AA** – 350 bar (5000 psi) rated valve (poppet type only) (Only required if valve has special features, omit if 00)**

### Dimensions

**mm (inch)**

- Torque cartridge in housing
  - **A** – 108-122 Nm (80-90 ft. lbs)
  - **S** – 136-149 Nm (100-110 ft. lbs)

### Code PORT SIZE HOUSING NUMBER

<table>
<thead>
<tr>
<th>CODE</th>
<th>PORT SIZE</th>
<th>HOUSING NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>4B</td>
<td>3/4” BSPP</td>
<td>02-175471*</td>
</tr>
<tr>
<td>12T</td>
<td>SAE 12</td>
<td>566414*</td>
</tr>
<tr>
<td>10H</td>
<td>SAE 10</td>
<td>876725</td>
</tr>
<tr>
<td>12H</td>
<td>SAE 12</td>
<td>876727</td>
</tr>
<tr>
<td>4G</td>
<td>1/2” BSPP</td>
<td>02-160676</td>
</tr>
<tr>
<td>6G</td>
<td>3/4” BSPP</td>
<td>876726</td>
</tr>
</tbody>
</table>

* Light duty housing

See section J for housing details.

### 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).
DPS2-20
Differential pressure sensing valve

Description
The DPS2-20 is a differential pressure sensing valve, available as either a spool or poppet type and with either, internal or external pilot.

Operation
This valve is used as a main section of a pilot controlled valve assembly. This valve has multiple uses when used with either directional control, flow control or pressure control cartridges. Refer to application examples.

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

<table>
<thead>
<tr>
<th>Typical application pressure (spool type)</th>
<th>290 bar (4200 psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(poppet type)</td>
<td>350 bar (5000 psi)**</td>
</tr>
</tbody>
</table>

Rated flow

<table>
<thead>
<tr>
<th>Pilot ratio (spool type P,V,R,F)</th>
<th>1:1</th>
</tr>
</thead>
<tbody>
<tr>
<td>(poppet type B,S,T)</td>
<td>2:1</td>
</tr>
</tbody>
</table>

Internal leakage, poppet type

<table>
<thead>
<tr>
<th>Port 1 to 2: &lt; 5 drops/min max @ 350 bar (5000 psi)</th>
</tr>
</thead>
</table>

Internal leakage, spool type

<table>
<thead>
<tr>
<th>82 cm³/min (5 in³/min) max @ 290 bar (4200 psi)</th>
</tr>
</thead>
</table>

Temperature range

-40° to 120° C (-40° to 248° F)

Cavity

C-20-3S

Standard housing materials

Aluminum

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, 81 kg (1.78 lbs)

Seal kits

02-113153 Buna-N

02-112969 Viton®

Viton is a registered trademark of E.I. DuPont

Pressure Drop Curves

Cartridge only

--- B/S/T models
--- P/V models
--- F/R models
**DPS2 - 20 (V)** ---*---*---*---*---*---**

**Function**
- **DPS2** – Differential pressure sensing

**Size**
- **20** – 20 Size

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

**Function**
- B – Poppet, vent to open, N/C
- S – Poppet, vent to open, N/C
- T – Poppet, bi-directional, pilot to close, 2:1 ratio, N/C

**Port size**
- **0** – Cartridge only

**(code port size housing number**

<table>
<thead>
<tr>
<th>CODE</th>
<th>PORT SIZE</th>
<th>HOUSING NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>8B</td>
<td>1” BSPP</td>
<td>02-175742*</td>
</tr>
<tr>
<td>16T</td>
<td>SAE 16</td>
<td>566415*</td>
</tr>
<tr>
<td>12H</td>
<td>SAE 12</td>
<td>876741</td>
</tr>
<tr>
<td>16H</td>
<td>SAE 16</td>
<td>876743</td>
</tr>
<tr>
<td>6G</td>
<td>3/4” BSPP</td>
<td>876740</td>
</tr>
<tr>
<td>8G</td>
<td>1” BSPP</td>
<td>876742</td>
</tr>
</tbody>
</table>

* Light duty housing

See section J for housing details.

**Differential pressure**
- 5 – 0.35 bar (5 psi) +
- 10 – 0.7 bar (10 psi) +
- 20 – 1.40 bar (20 psi) +
- 40 – 2.80 bar (40 psi)
- 80 – 5.50 bar (80 psi)
- 160 – 11.0 bar (160 psi)

+ Not available with the “B” and “S,” “T” poppet

**Special features**
- **00** – 210 bar (3000 psi) rated valve
- **AA** – 350 bar (5000 psi) rated valve (poppet type only) (Only required if valve has special features, omit if 00)**

**Dimensions (mm/inch)**

Torque cartridge in housing
- **A** – 128-155 Nm (95-115 ft. lbs)
- **S** – 163-183 Nm (120-135 ft. lbs)

Note
For application at 350 bar (5000 psi) torque into steel housing to 205 - 218 Nm (150 - 160 ft. lbs) (for valves with “AA” special feature only)

“S” Adjustment
4.8 (0.19) hex

47.6 (1.87) hex
Torque 129-156 Nm (95-115 ft. lbs)

“F” Adjustment
34.0 (1.34) Max

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).
DPS2
Spool type functional symbols
DPS2
Poppet type functional symbols
Description
The PCS3-10 is a screw-in, pressure compensator cartridge.

Operation
This valve, when used with either a fixed or variable orifice between port 1 and port 3, maintains a constant flow. This is based on whatever pressure differential is chosen. Flow out of port 2, regardless of pressure, changes downstream on port 2.

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

- Typical application pressure (all ports): 210 bar (3000 psi)
- Cartridge fatigue pressure (infinite life): 210 bar (3000 psi)
- Rated flow: 38 L/min (10 USgpm)
- Cavity: C–10–3
- Standard housing materials: Customized housings are necessary for close-coupling, the compensator and orifice
- 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
- Weight cartridge only: 0.12 kg (0.26 lbs)
- Seal kits: 565812 Buna-N
  889611 Viton®

Viton is a registered trademark of E.I. DuPont

Sectional View

Performance Characteristics
Cartridge only

Controlled flow - L/min (21.8 cSt oil @ 49°C)

Controlled flow - USgpm (105 SUS oil @ 120°F)
# Model Code

**PCS3-10**

- **Function**
  - PCS3 – Pressure compensator restrictive type

- **Size**
  - 10 – 10 Size

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

- **Port size**
  - 0 – Cartridge only
    - (Customized housings are necessary for close-coupling, compensator and orifice)

- **Spool seals**
  - Blank – No seal on spool.
  - S – Seal on spool.
    - (For load holding applications where leakage from port 1 to 2 could cause cylinder drift, use of seal will increase hysteresis)

- **Pressure differential (nominal)**
  - 40 – 2.8 bar (40 psi)
  - 60 – 4.1 bar (60 psi)
  - 80 – 5.5 bar (80 psi)
  - 160 – 11.0 bar (160 psi)

- **Special features**
  - 00 – None
    - (Only required if valve has special features, omit if 00)

## Dimensions (mm (inch))

- Torque into aluminum housing to 47-54 Nm (35-40 ft. lbs)
**Description**
The PCS3-12 is a screw-in, pressure compensator cartridge.

**Operation**
This valve, when used with either a fixed or variable orifice between port 1 and port 3, maintains a constant flow. This is based on whatever pressure differential is chosen. Flow out of port 2, regardless of pressure, changes downstream on 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)
- Cartridge fatigue pressure (infinite life) 240 bar (3500 psi)
- Rated flow 58 L/min (15 USgpm)
- Cavity C–12–3
- Standard housing materials Customized housings are necessary for close-coupling, the compensator and orifice
- 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
- Weight cartridge only 0.30 kg (.55 lbs)
- Seal kits 9900333-000 Buna-N
  9900334-000 Viton®
  Viton is a registered trademark of E.I. DuPont

**Functional Symbols**

**Sectional View**

**Performance Characteristics**
Cartridge only

| A | 2.8 bar (40 PSI) Control \(\Delta P\) |
| B | 5.5 bar (80 PSI) Control \(\Delta P\) |
| C | 11.0 bar (160 PSI) Control \(\Delta P\) |
Model Code

PCS3-12

<table>
<thead>
<tr>
<th></th>
<th>Function</th>
<th></th>
<th>Seals</th>
<th></th>
<th>Spool seals</th>
<th></th>
<th>Pressure differential</th>
<th></th>
<th>Special features</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PCS3 – Pressure compensator restrictive type</td>
<td>3</td>
<td>Blank – Buna-N</td>
<td>5</td>
<td>Blank – No seal on spool.</td>
<td>6</td>
<td>(nominal)</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Size</td>
<td>4</td>
<td>PCS3 – 12</td>
<td>6</td>
<td>PCS3 – 12</td>
<td>80</td>
<td>5,5 bar (80 psi)</td>
<td>00 – None</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>12 – 12 Size</td>
<td>5</td>
<td>V – Viton</td>
<td>7</td>
<td>S – Seal on spool.</td>
<td>160</td>
<td>8,3 bar (120 psi)</td>
<td>(Only required if valve has special features, omit if 00)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Port size</td>
<td>6</td>
<td>0 – Cartridge only</td>
<td>8</td>
<td>(For load holding applications where leakage from port 1 to 2 could cause cylinder drift, use of seal will increase hysteresis)</td>
<td>9</td>
<td>(Only required if valve has special features, omit if 00)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>0 – Cartridge only</td>
<td>7</td>
<td>(Customized housings are necessary for close-coupling, compensator and orifice)</td>
<td>9</td>
<td>(For load holding applications where leakage from port 1 to 2 could cause cylinder drift, use of seal will increase hysteresis)</td>
<td>10</td>
<td>(Only required if valve has special features, omit if 00)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dimensions

mm (inch)

Torque into aluminum housing to 81-95Nm (60-70 ft. lbs)
PCS3-16
Pressure compensator

Description
The PCS3-16 is a screw-in, pressure compensator cartridge.

Operation
This valve, when used with either a fixed or variable orifice between port 1 and port 3, maintains a constant flow. This is based on whatever pressure differential is chosen. Flow out of port 2, regardless of pressure, changes downstream on port 2.

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 (all ports)</td>
<td>210 bar (3000 psi)</td>
</tr>
<tr>
<td>Cartridge fatigue pressure (infinite life)</td>
<td>210 bar (3000 psi)</td>
</tr>
<tr>
<td>Rated flow</td>
<td>114 L/min (30 USgpm)</td>
</tr>
<tr>
<td>Cavity</td>
<td>C–16–3</td>
</tr>
<tr>
<td>Standard housing materials</td>
<td>Customized housings are necessary for close-coupling the compensator and orifice</td>
</tr>
<tr>
<td>Temperature range</td>
<td>-40° to 120°C (-40° to 248°F)</td>
</tr>
<tr>
<td>Fluids</td>
<td>All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.</td>
</tr>
<tr>
<td>Filtration</td>
<td>Cleanliness code 18/16/13</td>
</tr>
<tr>
<td>Weight cartridge only</td>
<td>0,38 kg (0.84 lbs)</td>
</tr>
<tr>
<td>Seal kits</td>
<td>565811 Buna-N</td>
</tr>
<tr>
<td></td>
<td>889610 Viton®</td>
</tr>
</tbody>
</table>

Viton is a registered trademark of E.I. DuPont

Performance Characteristics
Cartridge only

A – 2,8 bar (40 psi) (control ΔP)
B – 5,5 bar (80 psi) (control ΔP)
C – 11,0 bar (160 psi) (control ΔP)
Model Code

PCS3-16

1 Function
PCS3 – Pressure compensator restrictive type

2 Size
16 – 16 Size

3 Seals
Blank – Buna-N
V – Viton

4 Port size
0 – Cartridge only
(Customized housings are necessary for close-coupling, compensator and orifice)

5 Spool seals
Blank – No seal on spool
S – Seal on spool
(For load holding applications where leakage from port 1 to 2 could cause cylinder drift, use of seal will increase hysteresis)

6 Pressure differential (nominal)
40 – 2,8 bar (40 psi)
80 – 5,5 bar (80 psi)
160 – 11,0 bar (160 psi)

7 Special features
00 – None
(Only required if valve has special features, omit if 00)

Dimensions
mm (inch)

Torque into aluminum housing to 108-122 Nm (80-90 ft. lbs)
PCS3-20
Pressure compensator

Description
The PCS3-20 is a screw-in, pressure compensator cartridge.

Operation
This valve, when used with either a fixed or variable orifice between port 1 and port 3, maintains a constant flow. This is based on whatever pressure differential is chosen. Flow out of port 2, regardless of pressure, changes downstream on port 2.

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 (all ports)</td>
<td>210 bar (3000 psi)</td>
</tr>
<tr>
<td>Cartridge fatigue pressure (infinite life)</td>
<td>210 bar (3000 psi)</td>
</tr>
<tr>
<td>Rated flow</td>
<td>189 L/min (50 USgpm)</td>
</tr>
<tr>
<td>Cavity</td>
<td>C-20-3</td>
</tr>
<tr>
<td>Standard housing materials</td>
<td>Customized housing are necessary for close-coupling the compensator and orifice</td>
</tr>
<tr>
<td>Temperature range</td>
<td>-40° to 120°C (-40° to 248°F)</td>
</tr>
<tr>
<td>Fluids</td>
<td>All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.</td>
</tr>
<tr>
<td>Filtration</td>
<td>Cleanliness code 18/16/13</td>
</tr>
<tr>
<td>Weight cartridge only</td>
<td>0,88 kg (1.94 lbs)</td>
</tr>
<tr>
<td>Seal kits</td>
<td>889616 Buna-N 02-175433 Viton®</td>
</tr>
</tbody>
</table>

Viton is a registered trademark of E.I. DuPont

Functional Symbols
Variable or fixed restrictor upstream

Sectional View

Performance Characteristics
Cartridge only

A – 2,8 bar (40 psi) (control ΔP)
B – 5,5 bar (80 psi) (control ΔP)
Model Code

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCS3</td>
<td>Pressure compensator restrictive type</td>
</tr>
<tr>
<td>20</td>
<td>Size 20 Size</td>
</tr>
<tr>
<td>0</td>
<td>Cartridge only (Customized housings are necessary for close-coupling, compensator and orifice)</td>
</tr>
<tr>
<td>40</td>
<td>Pressure differential (nominal) 2.8 bar (40 psi)</td>
</tr>
<tr>
<td>80</td>
<td>5.5 bar (80 psi)</td>
</tr>
<tr>
<td>00</td>
<td>None (Only required if valve has special features, omit if 00)</td>
</tr>
</tbody>
</table>

**Dimensions**

- mm (inch)
- Torque into aluminum housing to 128-155 Nm (95-115 ft. lbs)

![Image of PCS3-20 (V) V-VLOV-MC001-E3]
Description
The PCS4-10 is a screw-in, pressure compensator cartridge for the use as a bypass or priority flow control.

Operation
This valve, when used with either a fixed or variable orifice on port 4, maintains a constant flow out port 3, regardless of pressure changes downstream of port 3. This is based on whatever pressure differential is chosen. All flow in excess of the priority requirement is bypassed from port 1 to port 2. If the priority port is deadheaded, the valve will try to direct flow out of the priority port and shut off the bypass flow, blocking of all flow.

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical application pressure (all ports)</td>
<td>210 bar (3000 psi)</td>
</tr>
<tr>
<td>Cartridge fatigue pressure (infinite life)</td>
<td>210 bar (3000 psi)</td>
</tr>
<tr>
<td>Rated flow</td>
<td>38 L/min (10 USgpm)</td>
</tr>
<tr>
<td>Cavity</td>
<td>C-10–4</td>
</tr>
<tr>
<td>Standard housing materials</td>
<td>Customized housings are necessary for close-coupling the compensator and orifice</td>
</tr>
<tr>
<td>Temperature range</td>
<td>-40° to 120°C (-40° to 248°F)</td>
</tr>
<tr>
<td>Fluids</td>
<td>All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.</td>
</tr>
<tr>
<td>Filtration</td>
<td>Cleanliness code 18/16/13</td>
</tr>
<tr>
<td>Weight cartridge only</td>
<td>0.14 kg (0.32 lbs)</td>
</tr>
<tr>
<td>Seal kits</td>
<td>889651 Buna-N 889653 Viton®</td>
</tr>
</tbody>
</table>

Viton is a registered trademark of E.I. DuPont

Performance Characteristics
Cartridge only

- A – 2.8 bar (40 psi) (control ΔP)
- B – 5.5 bar (80 psi) (control ΔP)
- C – 11.0 bar (160 psi) (control ΔP)
Dimensions

mm (inch)

Torque into aluminum housing to 47-54 Nm (35-40 ft. lbs)
Description
The PCS4-12 is a screw-in, pressure compensator cartridge for use as a bypass or priority flow control.

Operation
This valve, when used with either a fixed or variable orifice on port 4, maintains a constant flow out port 3, regardless of pressure changes downstream of port 3. This is based on whatever pressure differential is chosen. All flow in excess of the priority requirement is bypassed from port 1 to port 2. If the priority port is deadheaded, the valve will try to direct flow out of the priority port and shut off the bypass flow, blocking of all flow.

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

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical application pressure (all ports)</td>
<td>240 bar (3500 psi)</td>
</tr>
<tr>
<td>Cartridge fatigue pressure (infinite life)</td>
<td>240 bar (3500 psi)</td>
</tr>
<tr>
<td>Rated flow</td>
<td>58 L/min (15 USgpm)</td>
</tr>
<tr>
<td>Cavity</td>
<td>C–12–4</td>
</tr>
<tr>
<td>Standard housing materials</td>
<td>Customized housings are necessary for close-coupling the compensator and orifice</td>
</tr>
<tr>
<td>Temperature range</td>
<td>-40° to 120°C (-40° to 248°F)</td>
</tr>
<tr>
<td>Fluids</td>
<td>All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.</td>
</tr>
<tr>
<td>Filtration</td>
<td>Cleanliness code 18/16/13</td>
</tr>
<tr>
<td>Weight cartridge only</td>
<td>0.36 kg (0.80 lbs)</td>
</tr>
<tr>
<td>Seal kits</td>
<td>9900335-000 Buna-N, 9900336-000 Viton®</td>
</tr>
</tbody>
</table>

Viton is a registered trademark of E.I. DuPont

Performance Characteristics
Cartridge only

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2.8 bar (40 PSI) Control ΔP</td>
</tr>
<tr>
<td>B</td>
<td>5.5 bar (80 PSI) Control ΔP</td>
</tr>
<tr>
<td>C</td>
<td>11.0 bar (120 PSI) Control ΔP</td>
</tr>
</tbody>
</table>
### Model Code

**PCS4-12**

<table>
<thead>
<tr>
<th>Function</th>
<th>Seals</th>
<th>Port size</th>
<th>Pressure differential (nominal)</th>
<th>Special features</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCS4 – Pressure compensator bypass type</td>
<td>Blank – Buna-N</td>
<td>0 – Cartridge only</td>
<td>40 – 2.8 bar (40 psi)</td>
<td>00 – None</td>
</tr>
<tr>
<td>12 – 12 Size</td>
<td>V – Viton</td>
<td>Customized housings are necessary for close-coupling, compensator and orifice</td>
<td>80 – 5.5 bar (80 psi)</td>
<td>(Only required if valve has special features, omit if 00)</td>
</tr>
<tr>
<td>120 – 8.3 bar (120 psi)</td>
<td>00 – None</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Dimensions

**mm (inch)**

Torque into aluminum housing to 81-45 Nm (60-75 ft. lbs)

![Diagram of the valve](image)
**Description**
The PCS4-16 is a screw-in, pressure compensator cartridge for the use as a bypass or priority flow control.

**Operation**
This valve, when used with either a fixed or variable orifice on port 4, maintains a constant flow out port 3, regardless of pressure changes downstream of port 3. This is based on whatever pressure differential is chosen. All flow in excess of the priority requirement is bypassed from port 1 to port 2. If the priority port is deadheaded, the valve will try to direct flow out of the priority port and shut off the bypass flow, blocking all flow.

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

<table>
<thead>
<tr>
<th>Characteristic</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>114 L/min (30 USgpm)</td>
</tr>
<tr>
<td>Cavity</td>
<td>C–16–4</td>
</tr>
<tr>
<td>Standard housing materials</td>
<td>Customized housings are necessary for close-coupling, the compensator and orifice</td>
</tr>
<tr>
<td>Temperature range</td>
<td>-40° to 120°C (-40° to 248°F)</td>
</tr>
<tr>
<td>Fluids</td>
<td>All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.</td>
</tr>
<tr>
<td>Filtration</td>
<td>Cleanliness code 18/16/13</td>
</tr>
<tr>
<td>Weight cartridge only</td>
<td>0,50 kg (1.12 lbs)</td>
</tr>
<tr>
<td>Seal kits</td>
<td>889660 Buna-N 02-175435 Viton®</td>
</tr>
<tr>
<td></td>
<td>Viton is a registered trademark of E.I. DuPont</td>
</tr>
</tbody>
</table>

**Performance Characteristics**

**Cartridge only**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A – 2,8 bar (40 psi) (control ΔP)</td>
<td></td>
</tr>
<tr>
<td>B – 5,5 bar (80 psi) (control ΔP)</td>
<td></td>
</tr>
<tr>
<td>C – 11,0 bar (160 psi) (control ΔP)</td>
<td></td>
</tr>
</tbody>
</table>
Model Code

PCS4 – 16 (V) –*- *** – 00

<table>
<thead>
<tr>
<th>Function</th>
<th>Seals</th>
<th>Port size</th>
<th>Pressure differential (nominal)</th>
<th>Special features</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCS4 – Pressure compensator, bypass type</td>
<td>Blank – Buna-N</td>
<td>0 – Cartridge only (Customized housings are necessary for close-coupling, compensator and orifice)</td>
<td>40 – 2,8 bar (40 psi)</td>
<td>00 – None</td>
</tr>
<tr>
<td>16 – 16 Size</td>
<td>V – Viton</td>
<td>80 – 5,5 bar (80 psi)</td>
<td>160 – 11,0 bar (160 psi)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>00 (only required if valve has special features, omit if 00)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dimensions (mm (inch))

Torque into aluminum housing to 108-122 Nm (80-90 ft. lbs)
**Description**

The PCS4-20 is a screw-in, pressure compensator cartridge for the use as a bypass or priority flow control.

**Operation**

This valve, when used with either a fixed or variable orifice on port 4, maintains a constant flow out port 3, regardless of pressure changes downstream of port 3. This is based on whatever pressure differential is chosen. All flow in excess of the priority requirement is bypassed from port 1 to port 2. If the priority port is dead-headed, the valve will try to direct flow out of the priority port and shut off the bypass flow, blocking of all flow.

**RATINGS AND SPECIFICATIONS**

<table>
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<th>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49˚C (120˚F)</th>
</tr>
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<td>Typical application pressure (all ports)</td>
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<td>Cartridge fatigue pressure (infinite life)</td>
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<td>Weight cartridge only</td>
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<td>Seal kits</td>
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</table>

Viton is a registered trademark of E.I. DuPont

**Performance Characteristics**

Cartridge only

- **A** – 2,8 bar (40 psi) (control ∆P)
- **B** – 5,5 bar (80 psi) (control ∆P)
Model Code

PCS4-20

Function
PCS4 – Pressure compensator, bypass type

Seals
Blank – Buna-N
V – Viton

Port size
0 – Cartridge only (Customized housings are necessary for close-coupling, compensator and orifice

Pressure differential (nominal)
40 – 2,8 bar (40 psi)
80 – 5,5 bar (80 psi)

Special features
00 – None (Only required if valve has special features, omit if 00)

Dimensions
mm (inch)

Torque into aluminum housing to 128-155 Nm (95-115 ft. lbs)