Logic elements

Differential pressure sensing elements for applications up to 350 bar (5000 psi) and 400 L/min (100 USgpm)
Logic elements

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Logic elements
Valve locator

Functional symbol
Various

<table>
<thead>
<tr>
<th>Model</th>
<th>Cavity</th>
<th>Flow rating</th>
<th>Typical pressure</th>
<th>Page</th>
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<tbody>
<tr>
<td>DPS2-8</td>
<td>C-8-3S</td>
<td>30 (8)</td>
<td>350 (5000)</td>
<td>I-14</td>
</tr>
<tr>
<td>DPS2-10</td>
<td>C-10-3S</td>
<td>60 (15)</td>
<td>290 (4200)</td>
<td>I-16</td>
</tr>
<tr>
<td>DPS2-12</td>
<td>C-12-3S</td>
<td>114 (30)</td>
<td>350 (5000)</td>
<td>I-18</td>
</tr>
<tr>
<td>DPS2-16</td>
<td>C-16-3S</td>
<td>189 (50)</td>
<td>290 (4200)</td>
<td>I-20</td>
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<tr>
<td>DPS2-20</td>
<td>C-20-3S</td>
<td>303 (80)</td>
<td>290 (4200)</td>
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<thead>
<tr>
<th>Model</th>
<th>Cavity</th>
<th>Rating</th>
<th>Pressure</th>
<th>Page</th>
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<tr>
<td>DPS2-10</td>
<td>C-10-3S</td>
<td>60 (15)</td>
<td>350 (5000)</td>
<td>I-60</td>
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<tr>
<td>DPS2-12</td>
<td>C-12-3S</td>
<td>114 (30)</td>
<td>350 (5000)</td>
<td>I-18</td>
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<td>DPS2-16</td>
<td>C-16-3S</td>
<td>189 (50)</td>
<td>350 (5000)</td>
<td>I-20</td>
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<td>C-20-3S</td>
<td>303 (80)</td>
<td>350 (5000)</td>
<td>I-22</td>
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<table>
<thead>
<tr>
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<th>Typical pressure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>LE402</td>
<td>C-20-2</td>
<td>350 (95)</td>
<td>350 (5000)</td>
<td>I-26</td>
</tr>
</tbody>
</table>

Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.
This section gives basic specifications for Eaton logic element 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 cartridges provide the system designer with a versatile range of elements for use in HIC packages for controlling pressure, flow and direction of flow.

The range includes:
- Pressure compensators (Section H)
- Pressure compensators with priority and bypass outlets (Section H)
- 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 (Section H)

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

Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.
Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.

**Accumulator charging with PUV3-10 pilot stage**

**Pressure reducing and relieving**

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

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

Application examples

DPS2 Elements for pressure control
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

Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.
Load sensing priority flow control example
With pressure limiting and venting

Load sensing priority flow control example
Directional control version with pressure limiter
Application examples

PPS2 Elements for flow control

Load sense circuit example
For parallel operation

Load sense circuit example
For priority and parallel operation

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

Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.
Two-way, two-position, normally open examples

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

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

Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.

Application examples

DPS2 Elements for directional control
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 2 3</td>
</tr>
<tr>
<td>A</td>
<td>B</td>
<td>Yes Yes No</td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 0 Yes Yes Yes</td>
</tr>
</tbody>
</table>

<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 2 3</td>
</tr>
<tr>
<td>0 0 Yes Yes No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 1 Yes Yes Yes</td>
<td></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.
### 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</th>
<th>Required flow path</th>
<th>Pilot pressure to</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1 P2 P3 P4 P5</td>
<td>1 1 1 1 1</td>
<td>1 1 1 0 1</td>
<td></td>
</tr>
<tr>
<td>A B</td>
<td>0 0 0 0 0</td>
<td>0 1 1 1 1</td>
<td></td>
</tr>
<tr>
<td>P T</td>
<td>1 1 0 0 0</td>
<td>0 1 0 1 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 0 1 1 0</td>
<td>1 0 1 0 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 1 1 1 0</td>
<td>1 1 1 0 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 0 0 1 1</td>
<td>1 0 1 1 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 1 1 0 1</td>
<td></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.
Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.
### DPS2-8 - Logic element

**Differential pressure sense valves**

30 L/min (8 USgpm) • 350 bar (5000 psi)

---

#### Model code

<table>
<thead>
<tr>
<th>Function</th>
<th>Port size</th>
<th>Adjustment</th>
<th>Differential pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPS2 - Differential pressure sensing</td>
<td>0 - Cartridge only</td>
<td>F - None</td>
<td>040 - 2,80 bar (40 psi)</td>
</tr>
<tr>
<td>8 - 8 size</td>
<td></td>
<td>P - Pressure adjustments</td>
<td>080 - 5,50 bar (80 psi)</td>
</tr>
<tr>
<td>Blank - Buna-N</td>
<td></td>
<td></td>
<td>160 - 11,0 bar (160 psi)</td>
</tr>
<tr>
<td>V - Viton®</td>
<td></td>
<td></td>
<td>300 - 5.5-20.7 bar (80-300 psi)*</td>
</tr>
</tbody>
</table>

* Only for "P" Adjustment pressure setting, factory set at Max pressure.

#### Code Port size Housing number

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Cartridge only</td>
<td>02-160741</td>
</tr>
<tr>
<td>A4T</td>
<td>SAE 4</td>
<td>02-160742</td>
</tr>
<tr>
<td>A6T</td>
<td>SAE 6</td>
<td>02-160743</td>
</tr>
<tr>
<td>A2G</td>
<td>1/4&quot; BSPP</td>
<td>02-160739</td>
</tr>
<tr>
<td>A3G</td>
<td>3/8&quot; BSPP</td>
<td>02-160740</td>
</tr>
<tr>
<td>S4T</td>
<td>SAE 4</td>
<td>02-160745</td>
</tr>
<tr>
<td>S6T</td>
<td>SAE 6</td>
<td>02-160746</td>
</tr>
<tr>
<td>S2G</td>
<td>1/4&quot; BSPP</td>
<td>02-160743</td>
</tr>
<tr>
<td>S3G</td>
<td>3/8&quot; BSPP</td>
<td>02-160744</td>
</tr>
</tbody>
</table>

See section J for housing details.

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#### Dimensions

**mm (inch)**

- **Cartridge only**
  - Torque cartridge in housing
  - Aluminum or Steel - 34-41 Nm (25-30 ft lbs)
  - Torque cartrige in housing

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#### Installation drawing

- 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).

---

**Warning**

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

---

**Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.**

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**Eaton Hydraulic Screw-in Cartridge Valves (SiCV)**

E-VLSC-MC001-E6—January 2018  www.eaton.com  I-15
DPS2-10 - Logic element
Differential pressure sense valves
60 L/min (15 USgpm) • 290, 350 bar (4200, 5000 psi)

**Functional symbols**
See pages I-142 & I-143

**Description**
These are normally open or closed logic elements with or without a control orifice. They can be used as main valves for the control of high flows using small pilot cartridges, as compensators or load sense elements.

**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.

**Features**
Hardened and ground and honed working components. Cartridge construction for maximum mounting flexibility. Low leakage with poppet valves and 350 bar pressure rating.

**Performance data**

**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: 290 bar (4200 psi)
    - Poppet type: 350 bar (5000 psi)
  - Rated flow
    - 60 L/min (15 USgpm)
  - Pilot ratio
    - Spool type P, V, R, F: 1:1
    - Poppet type B, S, T: 2:1
  - Internal leakage
    - Spool type: 82 cm³/min. (5 in³/min) max @ 290 bar (4200 psi)
    - Poppet type: Port 1 to 2: < 5 drops/min max @ 350 bar (5000 psi)
  - Temperature range
    - -40° to 120° C (-40° to 248° F)
  - Cavity
    - C-10-3S
  - Standard housing materials
    - Aluminium
  - Fluids
    - All general purpose hydraulics fluids such as: MIL-H-5606, SAE 10, SAE 20 etc
  - Filtration
    - Cleanliness code 18/16/13
  - Weight cartridge only
    - 0,14 kg (0.30 lbs)
  - Seal kit
    - 889650 (Buna-N), 889652 (Viton®)

Viton is a registered trademark of E.I. DuPont

**Pressure drop curve**
Cartridge only

Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.
DPS2-10 - Logic element

Differential pressure sense valves
60 L/min (15 USgpm) • 290, 350 bar (4200, 5000 psi)

Model code

<table>
<thead>
<tr>
<th>Model code</th>
<th>DPS2</th>
<th>10</th>
<th>(V)</th>
<th>*</th>
<th>*</th>
<th>**</th>
<th>***</th>
<th>**</th>
</tr>
</thead>
</table>

1 Function
DPS2 - Differential pressure sensing

2 Size
10 - 10 size

3 Seal material
Blank - Buna-N
V - Viton®

4 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)

5 Adjustment
F - None
P - Stroke adjustments
“S” adjustment is not available with F and R functions.

6 Port size
0 - Cartridge only

7 Differential pressure
Note: Code based on pressure in psi
005 - 0.35 bar (5 psi)+ *
010 - 0.7 bar (10 psi)+ *
020 - 1.40 bar (20 psi)+ *
040 - 2.80 bar (40 psi)
080 - 5.50 bar (80 psi)
160 - 11.0 bar (160 psi)
+ Not available with the “B”, “S” and “T” poppet.

8 Special features
00 - No special features

Dimensions
mm (inch)

Cartridge only

“S” Adjustment
4.0 (0.15) hex

“F” Adjustment

Torque cartridge in housing
A - 47-54 Nm (35-40 ft lbs)
S - 68-75 Nm (50-55 ft lbs)

Installation drawing

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

Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.
DPS2-12 - Logic element

Differential pressure sense valves
114 L/min (30 USgpm) • 350 bar (5000 psi)

Functional symbols
See pages I-142 & I-143

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.

Features
Hardened and ground and honed working components. Cartridge construction for maximum mounting flexibility. Low leakage with poppet valves and 350 bar pressure rating

Sectional view

Performance data

<table>
<thead>
<tr>
<th>Performance data</th>
<th>Ratings and specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance data is typical with fluid at 21.8 cSt (105 SUS) and 49° C (120° F)</td>
<td>Spool and Poppet type: 350 bar (5000 psi)</td>
</tr>
<tr>
<td>Typical application pressure</td>
<td>114 L/min (30 USgpm)</td>
</tr>
<tr>
<td>Rated flow</td>
<td>Spool type: P, V, R, F; 1:1</td>
</tr>
<tr>
<td>Pilot ratio</td>
<td>Poppet type: B, S, T; 2:1</td>
</tr>
<tr>
<td>Internal leakage</td>
<td>Spool type: 82 cm³/min, (5 in³/min) max @ 350 bar (5000 psi)</td>
</tr>
<tr>
<td></td>
<td>Poppet type: 5 drops/min @ 5000 psi</td>
</tr>
<tr>
<td>Temperature range</td>
<td>-40° to 120° C (-40° to 248° F)</td>
</tr>
<tr>
<td>Cavity</td>
<td>C-12-3S</td>
</tr>
<tr>
<td>Standard housing materials</td>
<td>Aluminium or steel</td>
</tr>
<tr>
<td>Fluids</td>
<td>All general purpose hydraulics fluids such as:</td>
</tr>
<tr>
<td></td>
<td>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>0.31 kg (0.68 lbs)</td>
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</tbody>
</table>

Description
These are normally open or closed logic elements with or without a control orifice. They can be used as main valves for the control of high flows using small pilot cartridges, as compensators or load sense elements.

Pressure drop curve
Cartridge only

Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.
## Model code

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DPS2</strong></td>
<td><strong>12</strong></td>
</tr>
<tr>
<td><strong>(V)</strong></td>
<td><strong>-</strong></td>
</tr>
<tr>
<td><strong>F</strong></td>
<td><strong>-</strong></td>
</tr>
<tr>
<td><strong>-</strong></td>
<td><strong>-</strong></td>
</tr>
<tr>
<td><strong>-</strong></td>
<td><strong>-</strong></td>
</tr>
<tr>
<td><strong>0</strong></td>
<td><strong>-</strong></td>
</tr>
</tbody>
</table>

### 1. Function

- **DPS2** - Differential pressure sensing

### 2. Size

- **12** - 12 size

### 3. Seal material

- **Blank** - Buna-N
- **V** - Viton®

### 4. 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)

### Dimensions

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

### Code Housing number Port 1 & 2 Port 3

<table>
<thead>
<tr>
<th>Code</th>
<th>Housing number</th>
<th>Port 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 BSPP</td>
<td>3/8 BSPP</td>
</tr>
<tr>
<td>(A)6G</td>
<td>02-178271</td>
<td>3/4 BSPP</td>
<td>3/8 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>
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<tr>
<td>(S)4G</td>
<td>02-160994</td>
<td>1/2 BSPP</td>
<td>3/8 BSPP</td>
</tr>
<tr>
<td>(S)6G</td>
<td>02-160995</td>
<td>3/4 BSPP</td>
<td>3/8 BSPP</td>
</tr>
</tbody>
</table>

See section J for housing details.

### 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

### Warning

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

Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.

---

Eaton Hydraulic Screw-in Cartridge Valves (SiCV)  
E-VLSC-MC001-E6—January 2018  
www.eaton.com
DPS2-16 - Logic element
Differential pressure sense valves
189 L/min (50 USgpm) • 210, 350 bar (3000, 5000 psi)

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.

Features
Hardened and ground and honed working components. Cartridge construction for maximum mounting flexibility. Low leakage with poppet valves and 350 bar pressure rating

Functional symbols
See pages I-142 & I-143

Sectional view

Performance data

Ratings and specifications
Performance data is typical with fluid at 21.8 cSt (105 SUS) and 49° C (120° F)
- Spool type: 290 bar (4200 psi) Poppet type: 210 bar (3000 psi) or 350 bar (5000 psi)
- Rated flow
  - Spool type: 189 L/min (50 USgpm)
- Pilot ratio
  - Spool type: P, V, R, F: 1:1
- Internal leakage
  - Poppet type B, S, T: 2:1
- Temperature range
  - Spool type: 82 cm³/min. (5 in³/min) max @ 290 bar (4200 psi)
  - Poppet type: Port 1 to 2: < 5 drops/min max @ 350 bar (5000 psi)

- Cavity
  - -40° to 120° C (-40° to 248° F)
- Standard housing materials
  - C-16-3S
- Fluids
  - Aluminium
- Filtration
  - All general purpose hydraulics fluids such as:
    - MIL-H-5606, SAE 10, SAE 20 etc
- Weight cartridge only
  - Cleanliness code 18/16/13
  - 0.35 kg (0.78 lbs)
  - 889659 (Buna-N), 02-165871 (Viton®)

Viton is a registered trademark of E.I. DuPont

Pressure drop curve
Cartridge only

Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.
DPS2-16 - Logic element
Differential pressure sense valves
189 L/min (50 USgpm) • 210, 350 bar (3000, 5000 psi)

Model code

<table>
<thead>
<tr>
<th>Function</th>
<th>DPS2 - Differential pressure sensing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>16 - 16 size</td>
</tr>
<tr>
<td>Seal material</td>
<td>Blank - Buna-N</td>
</tr>
<tr>
<td></td>
<td>V - Viton*</td>
</tr>
<tr>
<td>Function</td>
<td>B - Poppet, vent to open, N/C</td>
</tr>
<tr>
<td></td>
<td>S - Poppet, vent to open, N/C</td>
</tr>
<tr>
<td></td>
<td>T - Poppet, bi-directional, pilot to close, N/C</td>
</tr>
<tr>
<td></td>
<td>P - Spool, N/C (L/S element)</td>
</tr>
<tr>
<td></td>
<td>V - Spool, N/C</td>
</tr>
</tbody>
</table>

5 Port size
0 - Cartridge only

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
</tr>
</thead>
<tbody>
<tr>
<td>4B</td>
<td>3/4&quot; 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&quot; BSPP</td>
<td>02-160676</td>
</tr>
<tr>
<td>6G</td>
<td>3/4&quot; BSPP</td>
<td>876725</td>
</tr>
</tbody>
</table>

* Light duty housing
See section J for housing details.

Dimensions

<table>
<thead>
<tr>
<th>mm (inch)</th>
<th>Cartridge only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque cartridge in housing</td>
<td>A - 108-122 Nm (80-90 ft lbs)</td>
</tr>
<tr>
<td></td>
<td>S - 136-149 Nm (100-110 ft lbs)</td>
</tr>
</tbody>
</table>

“S” Adjustment
4,8 (0.19) hex
Torque 108-122 Nm (80-90 ft lbs)

“F” Adjustment
32,1 (1.27) Max

54,8 (2.12) Max

10,3 (0.41)

32,2 (1.27)

31,8 (1.25)

114,3 (4.50)

54 (2.12)

93,68 (3.68)

2X8,74 (0.344)

31,8 (1.25)

28,50 (1.122)

25,37 (0.999)

1312 -12 Thd.

38,1 (1.50) hex

114,3 (4.50)

32,1 (1.27) Max

55,6 (2.18)

56,3 (2.22) Max


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

Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.
DPS2-20 - Logic element

Differential pressure sense valves
303 L/min (80 USgpm) • 210, 350 bar (3000, 5000 psi)

Functional symbols
See pages I-142 & I-143

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.

Features
Hardened and ground and honed working components. Cartridge construction for maximum mounting flexibility. Low leakage with poppet valves and 350 bar pressure rating.

Sectional view

Performance data

Ratings and specifications

<table>
<thead>
<tr>
<th>Description</th>
<th>303 L/min (80 USgpm)</th>
<th>210, 350 bar (3000, 5000 psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical application pressure</td>
<td>Spool type: 290 bar (4200 psi)</td>
<td>Poppet type: 210 bar (3000 psi) or 350 bar (5000 psi)</td>
</tr>
<tr>
<td>Rated flow</td>
<td>303 L/min (80 USgpm)</td>
<td></td>
</tr>
<tr>
<td>Pilot ratio</td>
<td>Spool type P, V, R, F: 1:1</td>
<td></td>
</tr>
<tr>
<td>Internal leakage</td>
<td>Poppet type B, S, T: 2:1</td>
<td></td>
</tr>
<tr>
<td>Temperature range</td>
<td>Spool type: 82 cm³/min (5 in³/min) max @ 290 bar (4200 psi)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poppet type: Port 1 to 2 x 5 drops/min max @ 350 bar (5000 psi)</td>
<td></td>
</tr>
<tr>
<td>Cavity</td>
<td>-40° to 120° C (-40° to 248° F)</td>
<td></td>
</tr>
<tr>
<td>Standard housing materials</td>
<td>C-20-3S</td>
<td></td>
</tr>
<tr>
<td>Fluids</td>
<td>Aluminium</td>
<td></td>
</tr>
<tr>
<td>Filtration</td>
<td>All general purpose hydraulics fluids such as: MIL-H-5606, SAE 10, SAE 20 etc</td>
<td></td>
</tr>
<tr>
<td>Weight cartridge only</td>
<td>Cleanliness code 18/16/13</td>
<td></td>
</tr>
<tr>
<td>Seal kit</td>
<td>0.81 kg (1.78 lbs)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>02-113153 (Buna-N), 02-112969 (Viton®)</td>
<td></td>
</tr>
</tbody>
</table>

Viton is a registered trademark of E.I. DuPont

Description
These are normally open or closed logic elements with or without a control orifice. They can be used as main valves for the control of high flows using small pilot cartridges, as compensators or load sense elements.

Pressure drop curve

Cartridge only

Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.
DPS2-20 - Logic element

Differential pressure sense valves
303 L/min (80 USgpm) • 210, 350 bar (3000, 5000 psi)

Model code

<table>
<thead>
<tr>
<th>Function</th>
<th>DPS2 - Differential pressure sensing</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Housing number</th>
<th>Seal material</th>
</tr>
</thead>
<tbody>
<tr>
<td>8B</td>
<td>1” BSPP</td>
<td>02-175472*</td>
<td>Blank - Buna-N</td>
</tr>
<tr>
<td>16T</td>
<td>SAE 16</td>
<td>568415*</td>
<td>V - Viton®</td>
</tr>
<tr>
<td>16H</td>
<td>SAE 16</td>
<td>876743</td>
<td></td>
</tr>
<tr>
<td>6G</td>
<td>3/4” BSPP</td>
<td>876742</td>
<td></td>
</tr>
</tbody>
</table>

* Light duty housing
See section J for housing details.

**Function**
- **R** - Spool, pressure reducing, N/O
- **F** - Spool, flow control, N/O (hydrostat)

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

**Stroke adjustment**
- **F** - None (Fixed stroke)
- **S** - Screw adjustment

Screw adjustment is not available with **F** and **R** functions.

**Differential pressure**

<table>
<thead>
<tr>
<th>Code</th>
<th>Pressure (psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>005</td>
<td>0,35</td>
</tr>
<tr>
<td>10</td>
<td>0,7</td>
</tr>
<tr>
<td>20</td>
<td>1,4</td>
</tr>
<tr>
<td>40</td>
<td>2,8</td>
</tr>
<tr>
<td>80</td>
<td>5,5</td>
</tr>
<tr>
<td>160</td>
<td>11,0</td>
</tr>
</tbody>
</table>

Note: Code based on pressure in psi

* Not available with the "B", "S" and "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**

<table>
<thead>
<tr>
<th>Cartridge only</th>
<th>Torque cartridge in housing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A - 128-155 Nm (95-115 ft lbs)</td>
</tr>
<tr>
<td></td>
<td>S - 163-183 Nm (120-135 ft lbs)</td>
</tr>
</tbody>
</table>

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).

**Installation drawing**

---

**Warning**

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

---

Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.
DPS2
Spool type functional symbols

Where measurements are critical, request certified drawings. We reserve the right to change specifications without notice.
Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.
LE402 - Logic element
Spool type with control cartridge cavity
350 L/min (95 USgpm) • 350 bar (5000 psi)

Operation
With a pilot valve fitted the valve will only open when flow is allowed across the orifice in the middle of the spool. Flow passing across this orifice will cause there to be a pressure difference that acts over the full area of the spool to move it back against the spring that biases it closed. By controlling the pressure in the spring chamber you can control the pressure at which the valve opens.

Features
Very versatile in its application using hardened and ground spool and sleeve giving minimal internal leakage and long life. High flow and pressure rating increases the variety of applications into which it can fit.

Description
For use in conjunction with pilot valves to allow control of larger flows. When used with a 2/2 solenoid valve the combination allows control of flows to 350 lts/min (95 US gpm). With a pilot relief valve or a proportional relief valve the element becomes a high flow pilot style relief. With a needle valve an on/off function is achieved. The outlet flow would normally go to tank because back pressure will act on the pilot cartridge to increase the switching pressure.

Performance data

<table>
<thead>
<tr>
<th>Ratings and specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance data is typical with fluid at 32.0 cST (150 SUS)</td>
</tr>
</tbody>
</table>

Figures based on oil temperature of 40°C and viscosity of 40 cSt

<table>
<thead>
<tr>
<th>Description</th>
<th>Rated Flow</th>
<th>Maximum load induced pressure</th>
<th>Cartridge material</th>
<th>Body material</th>
<th>Mounting position</th>
<th>Cavity number</th>
<th>Torque cartridge into cavity</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>350 liters/min (95 USgpm)</td>
<td>P1: 350 bar (5000 psi), P2: 210 bar (3000 psi)</td>
<td>Working parts hardened and ground steel.</td>
<td>Standard aluminum (up to 210 bar*). Add suffix ‘377’ for steel option</td>
<td>Unrestricted</td>
<td>C-20-2 (see Section M)</td>
<td>60 Nm (44 lbs. fl.)</td>
<td>LE402: 0.29 kg (0.63 lbs), LE452: 1.35 kg (2.97 lbs)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Seal kit number
SK633 (Nitrile), SK633V (Viton®)
Viton is a registered trademark of E. I. DuPont

Recommended Filtration Level
BS5540/4 Class 18/16/13 (25 micron nominal)

Operating temperature
–30° to +90° C (–22° to 194° F)

Leakage
Up to 350 ml/min nominal

Nominal viscosity range
5 to 500 cSt

Pressure drop curve

Free flow 1-2

<table>
<thead>
<tr>
<th>Flow - L/min</th>
<th>Pressure drop - psi</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>29</td>
</tr>
<tr>
<td>30</td>
<td>58</td>
</tr>
<tr>
<td>90</td>
<td>87</td>
</tr>
<tr>
<td>150</td>
<td>116</td>
</tr>
<tr>
<td>210</td>
<td>145</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flow - US gpm</th>
<th>Pressure drop - psi</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>29</td>
</tr>
<tr>
<td>8</td>
<td>58</td>
</tr>
<tr>
<td>24</td>
<td>87</td>
</tr>
<tr>
<td>40</td>
<td>116</td>
</tr>
<tr>
<td>56</td>
<td>145</td>
</tr>
<tr>
<td>72</td>
<td>270</td>
</tr>
</tbody>
</table>

Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.
LE402 - Logic element
Spool type with control cartridge cavity
350 L/min (95 USgpm) • 350 bar (5000 psi)

Model code

<table>
<thead>
<tr>
<th>LE4**</th>
<th>N</th>
<th>0.2</th>
<th>1DR2-P-40S</th>
<th>10W</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

1 Basic code
LE402 - Cartridge (logic Element)
LE452 - Cartridge (Logic Element) and body

2 Seals
N - Nitrile (for use with most industrial hydraulic oils)
V - Viton® (for high temperature & most special fluid applications)

Dimensions
mm (inch)
Cartridge only
Basic Code: LE402

3 Spring
0.2 - 1.75

4 Pilot cartridge
Blank - None
1DR2-P-40S - See pg E-100
PDR21AN*6** - See pg B-270
S207N - See pg A-280

5 Port size
Omit - Cartridge only

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Aluminum</th>
<th>Steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>10W</td>
<td>1-1/4&quot; BSPP</td>
<td>C24005</td>
<td>C24006</td>
</tr>
<tr>
<td>12W</td>
<td>1-1/2&quot; BSPP</td>
<td>C24007</td>
<td>C24008</td>
</tr>
<tr>
<td>20T</td>
<td>1-1/4&quot; SAE</td>
<td>C24011</td>
<td>C24012</td>
</tr>
<tr>
<td>24T</td>
<td>1-1/2&quot; SAE</td>
<td>C24013</td>
<td>C24014</td>
</tr>
</tbody>
</table>

Installation drawing
Basic Code: LE452
1 1/4" 1/2" Ports

Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.
LEV402 - Logic element

Spool type with control cartridge cavity
Up to 400 L/min (100 USgpm) • 250 bar (3500 psi)

Operation

With a pilot valve fitted the valve will only open when flow is allowed across the orifice in the middle of the spool. Flow passing across this orifice will cause there to be a pressure difference that acts over the full area of the spool to move it back against the spring that biases it closed.

By controlling the pressure in the spring chamber you can control the pressure at which the valve opens.

The vent port can be used as a remote control port to provide two pressure operation or a dump facility.

Features

Very versatile in its application using hardened and ground spool and sleeve giving minimal internal leakage and long life. High flow and pressure rating increases the variety of applications into which it can fit.

With small modifications to the spool the valve can be used in load sensing circuits or as a compensator for by-pass pressure compensated flow controls.

Sectional view

Description

For use in conjunction with pilot valves to allow control of larger flows. When used with a 2/2 solenoid valve the combination allows control of flows to 400 lts/min (100 US gpm). With a pilot relief valve or a proportional relief valve the element becomes a high flow pilot style ventable relief. With a needle valve an on/off function is achieved.

The outlet flow would normally go to tank because back pressure will act on the pilot cartridge to increase the switching pressure.

Performance data

Ratings and specifications

| Performance data is typical with fluid at 32.0 cSt (150 SUS) |
| Figures based on oil temperature of 40° C and viscosity of 40 cSt |

Rated Flow

400 liters/min (100 USgpm)

Maximum working pressure

P1 and P2: 250 bar (3500 psi), P3: 210 bar (3000 psi)

Cartridge material

Working parts hardened and ground steel. External surfaces zinc plated

Body material

Standard aluminum (up to 210 bar*). Add suffix ‘377’ for steel option

Mounting position

Unrestricted

Cavity number

A21773 (see Section M)

Torque cartridge into cavity

150 Nm (110 lbs. ft.)

Weight

LEV402: 0.70 kg (1.54 lbs), LEV452: 2.54 kg (5.6 lbs)

Seal kit number

SK1232 (Nitrile), SK1232V (Viton®)

Viton is a registered trademark of E. I. DuPont

Recommended Filtration Level

BS5540/4 Class 1B/16/13 (25 micron nominal)

Operating temperature

–30° to +90° C (–22° to 194° F)

Leakage

Up to 350 ml/min

Nominal viscosity range

32 cSt

For applications above 210 bar, please consult our technical department or use the steel body option

Pressure drop curve

Vented pressure drop
LEV402 - Logic element
Spool type with control cartridge cavity
Up to 400 L/min (100 USgpm) • 250 bar (3500 psi)

Model code

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic code</td>
<td>Spring</td>
<td>Port size</td>
<td>Pilot cartridge</td>
<td></td>
</tr>
<tr>
<td>LEV4**</td>
<td>N</td>
<td>0.2</td>
<td>1DR2-P-40S</td>
<td>10W</td>
</tr>
</tbody>
</table>

1 Basic code
1LEV402 - Cartridge only (Logic Element)
1LEV452 - Cartridge (Logic Element) and body

2 Seals
N - Nitrile (for use with most industrial hydraulic oils)
V - Viton® (for high temperature & most special fluid applications)

3 Spring
0.2 - 2 bar

4 Pilot cartridge
Blank - None
1DR2-P-40S - See pg E-100
PDR21AN*6** - See pg B-270
S207N - See pg A-280

5 Port size
Omit - Cartridge only

<table>
<thead>
<tr>
<th>Code</th>
<th>Port size</th>
<th>Aluminum</th>
<th>Steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>10W</td>
<td>1-1/4&quot; BSPP, 1/4&quot; BSPP vent</td>
<td>C24005</td>
<td>C24006</td>
</tr>
<tr>
<td>12W</td>
<td>1-1/2&quot; BSPP, 1/4&quot; BSPP vent</td>
<td>C24007</td>
<td>C24008</td>
</tr>
<tr>
<td>20T</td>
<td>1-1/4&quot; SAE, 1/4&quot; SAE vent</td>
<td>C24011</td>
<td>C24012</td>
</tr>
<tr>
<td>24T</td>
<td>1-1/2&quot; SAE, 1/4&quot; SAE vent</td>
<td>C24013</td>
<td>C24014</td>
</tr>
</tbody>
</table>

Dimensions
mm (inch)
Cartridge only
Basic Code: LEV402

Cavity A879
46.0 A/F
1-5/8-12UN-2A
Vent (3)
Tank (2)
Pressure (1)

Installation drawing
Basic Code: LEV452
1 1/4" 1/2" Ports

Where measurements are critical request certified drawings. We reserve the right to change specifications without notice.
More

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- Control
- Efficiency

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