## Quick Reference

### Cartridge

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Cavity</th>
<th>Description</th>
<th>Flow*</th>
<th>Pressure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>CP124-1</td>
<td>CP04-3</td>
<td>Load Shuttle Valves, Normal direction</td>
<td>3.7 l/min [1 US gal/min]</td>
<td>350 bar [5075 psi]</td>
<td>SH - 5</td>
</tr>
<tr>
<td>CP128-1</td>
<td>SDC08-3</td>
<td></td>
<td>22 l/min [5.8 US gal/min]</td>
<td>315 bar [4570 psi]</td>
<td>SH - 6</td>
</tr>
<tr>
<td>SV04</td>
<td>NCS04/3</td>
<td></td>
<td>15 l/min [4 US gal/min]</td>
<td>315 bar [4570 psi]</td>
<td>SH - 7</td>
</tr>
<tr>
<td>CP120-4</td>
<td>SDC10-3</td>
<td></td>
<td>25 l/min [7 US gal/min]</td>
<td>330 bar [4800 psi]</td>
<td>SH - 8</td>
</tr>
<tr>
<td>SV06</td>
<td>NCS06/3</td>
<td></td>
<td>48 l/min [12.7 US gal/min]</td>
<td>350 bar [5075 psi]</td>
<td>SH - 9</td>
</tr>
</tbody>
</table>

### In-line

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Cavity</th>
<th>Description</th>
<th>Flow*</th>
<th>Pressure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>VS 10</td>
<td>none</td>
<td></td>
<td>45 l/min [12 US gal/min]</td>
<td>350 bar [5075 psi]</td>
<td>SH - 11</td>
</tr>
</tbody>
</table>

### Hot oil shuttle

```
spool overlap = C
```

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Cavity</th>
<th>Description</th>
<th>Flow*</th>
<th>Pressure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>CP720-3</td>
<td>SDC10-4</td>
<td>Hot Oil Shuttle</td>
<td>25 l/min [7 US gal/min]</td>
<td>350 bar [5075 psi]</td>
<td>SH - 12</td>
</tr>
</tbody>
</table>

* Flow ratings are based on a pressure drop of 7 bar [100 psi] unless otherwise noted. They are for comparison purposes only.
There are two types of shuttle valves -- load shuttle valves and hot oil shuttle valves.

**OVERVIEW**

A load shuttle valve communicates the higher of two inlet pressures at 1 and 3 to the outlet at 2. A steel ball is used to seal the lower pressure. Load shuttles have several common applications including:

- Logic for load sensing circuits
- Bi-directional motor brake release valve

**LOAD SHUTTLE VALVE**

**Load shuttle valve**

**Bi-directional motor brake release valve**

**Load sensing circuit**
**HOT OIL SHUTTLE VALVE**

Hot oil shuttles are spool-type valves that use internal piloting at 2 and 4 to direct oil from the lower of the two input pressures to the outlet at 3.

A common application for a hot oil shuttle is diverting fluid from the low pressure side of a closed-circuit hydrostatic loop for cooling and/or filtering.

**Closed-circuit hydrostatic loop**

![Diagram of a closed-circuit hydrostatic loop]
**OPERATION**

This valve senses the higher of the two input pressures at ports 1 and 3 and routes it to the output port 2.

---

**SPECIFICATIONS**

**Theoretical performance**

<table>
<thead>
<tr>
<th>Pressure (psi)</th>
<th>Flow (l/min)</th>
<th>Flow (US gal/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.3</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>0.5</td>
<td>0.2</td>
</tr>
<tr>
<td>4</td>
<td>0.8</td>
<td>0.4</td>
</tr>
<tr>
<td>6</td>
<td>1.1</td>
<td>0.6</td>
</tr>
</tbody>
</table>

**Rated pressure**: 350 bar [5075 psi]

**Rated flow at 7 bar [100 psi]**: 3.7 l/min [1 US gal/min]

**Leakage**: 6 drops/min @ Rated pressure

**Weight**: 0.02 kg [0.04 lb]

**Cavity**: CP04-3

*Rated pressure based on NFPA fatigue test standard (at 1 million cycles)

---

**DIMENSIONS**

mm [in]

**Cross-sectional view**

---

**ORDERING INFORMATION**

**Seals**

- B = Buna-N
- V = Viton

**Seal kit**

- 120111
- 120282

**Housing and ports**

- 0 = No Housing
- 2B = AL, 1/4 BSP
- 4S = AL, #4 SAE

**Housing P/N**

- No Housing: CP04-3-2B
- Other housings available: CP04-3-4S

---

**Load Shuttle Valve - Normal Direction**

**CP124-1**

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**Schematic**

---

**CP124-1**

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**SH - Shuttle Valves Catalog**

**Load Shuttle Valve - Normal Direction**

**CP124-1**

---

**11141709 • Rev CB • March 2016**
Shuttle Valves Catalog
Load Shuttle Valve - Normal Direction
CP128-1

OPERATION
This valve senses the higher of the two input pressures at ports 1 and 3 and routes it to the output port 2.

SPECIFICATIONS
Theoretical performance

Pressure drop
26 cSt [121 SUS] hyd. oil at 50°C [122°F]

Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated pressure*</td>
<td>315 bar [4570 psi]</td>
</tr>
<tr>
<td>Rated flow at 7 bar</td>
<td>22 l/min</td>
</tr>
<tr>
<td>[100 psi]</td>
<td>5.8 US gal/min</td>
</tr>
<tr>
<td>Leakage</td>
<td>6 drops/min</td>
</tr>
<tr>
<td>Rated pressure</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>0.06 kg [0.14 lb]</td>
</tr>
<tr>
<td>Cavity</td>
<td>SDC08-3</td>
</tr>
</tbody>
</table>

*Rated pressure based on NFPA fatigue test standard (at 1 million cycles)

DIMENSIONS

Cross-sectional view

ORDERING INFORMATION

Code | Ports & Material | Body Nomenclature
--- |------------------|-------------------
0    | 0 = Cartridge only | No Body
SE2B | AL, 1/4 BSP       | SDC08-3-SE-2B
SE3B | AL, 3/8 BSP       | SDC08-3-SE-3B
4S   | AL, #4 SAE        | CP08-3-4S
6S   | AL, #6 SAE        | CP08-3-6S

**Aluminum bodies to be used for pressures less than 210 bar (3000 psi)
***Other housings available

Load Shuttle Valve
Normal Direction

Seal Option | Seal kit
--- | ---
B = Buna-N | 120238
V = Viton | 120239
Shuttle Valves Catalog
Load Shuttle Valve - Normal Direction
SV04

OPERATION
This valve senses the higher of two input pressures at 1 and 3, and routes it to the output 2.

SPECIFICATIONS
Theoretical performance

Specifications
- Rated pressure*: 315 bar (4570 psi)
- Rated flow at 7 bar [100 psi]: 15 l/min [4 US gal/min]
- Leakage: 6 drops/min @ Rated pressure
- Weight: 0.07 kg [0.15 lb]
- Cavity: NCS04/3

*Rated pressure based on NFPA fatigue test standard (at 1 million cycles)

DIMENSIONS
Cross-sectional view

ORDERING INFORMATION
Load Shuttle Valve - Normal Direction

Seal Option Seal Kit
- Omit = Buna-N 23000160
- V = Viton 23000450

Code Ports & Material Body Nomenclature
- 00 30 = Cartridge only No Body
- SE1/4 AL, 1/4 BSP NCS04/3-SE-1/4
- SE4S AL, #4 SAE NCS04/3-SE-4S
- SE6S AL, #6 SAE NCS04/3-SE-6S

** Aluminum bodies are to be used for pressures less than 210 bar (3000 psi).
*** Other housings available

Pressure drop
26 cSt [121 SUS] hyd.oil at 50°C [122°F]
OPERATION
This valve senses the higher of two input pressures at 1 and 3, and routes it to the output 2.

SPECIFICATIONS

**Theoretical performance**

<table>
<thead>
<tr>
<th>ΔP (psi/bar)</th>
<th>US gal/min</th>
<th>2.1</th>
<th>4.2</th>
<th>6.3</th>
<th>8.4</th>
<th>10.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>3 to 2</td>
<td>3 to 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Specifications**

- **Rated pressure**: 330 bar [4800 psi]
- **Rated flow at 7 bar** [100 psi]: 25 l/min [7 US gal/min]
- **Leakage**: 6 drops/min @ Rated pressure
- **Weight**: 0.10 kg [0.22 lb]
- **Cavity**: SDC10-3

**Dimensions**

<table>
<thead>
<tr>
<th>mm [in]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00 in [25.4 mm]</td>
</tr>
<tr>
<td>7/8-14 UNF-2A</td>
</tr>
<tr>
<td>46.1 [1.81]</td>
</tr>
</tbody>
</table>

**Ordering Information**

- **Seals**
  - B = Buna-N
  - V = Viton
- **Seal kit**
  - B = 120027
  - V = 120028
- **Housing and ports**
  - 00 = No Housing
  - SE3B = AL, 3/8 BSP
  - SE4B = AL, 1/2 BSP
  - 6S = AL, #6 SAE
  - 8S = AL, #8 SAE
- **Housing P/N**
  - No Housing
  - SDC10-3-SE-3B
  - SDC10-3-SE-4B
  - CP10-3-6S
  - CP10-3-8S
  - Other housings available
Shuttle Valves Catalog

Load Shuttle Valve - Normal Direction

SV06

OPERATION

This valve senses the higher of two input pressures at 1 and 3, and routes it to the output 2.

SPECIFICATIONS

Pressure drop

26 cSt [121 SUS] hyd.oil at 50°C [122°F]

<table>
<thead>
<tr>
<th>psi</th>
<th>bar</th>
<th>l/min</th>
<th>3-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>0.07</td>
<td>6</td>
<td>0.31</td>
</tr>
<tr>
<td>2</td>
<td>0.14</td>
<td>12</td>
<td>0.63</td>
</tr>
<tr>
<td>3</td>
<td>0.21</td>
<td>18</td>
<td>0.95</td>
</tr>
<tr>
<td>4</td>
<td>0.28</td>
<td>24</td>
<td>1.27</td>
</tr>
<tr>
<td>5</td>
<td>0.35</td>
<td>30</td>
<td>1.59</td>
</tr>
<tr>
<td>6</td>
<td>0.42</td>
<td>36</td>
<td>1.91</td>
</tr>
<tr>
<td>7</td>
<td>0.49</td>
<td>42</td>
<td>2.23</td>
</tr>
<tr>
<td>8</td>
<td>0.56</td>
<td>48</td>
<td>2.55</td>
</tr>
<tr>
<td>9</td>
<td>0.63</td>
<td>54</td>
<td>2.87</td>
</tr>
<tr>
<td>10</td>
<td>0.7</td>
<td>60</td>
<td>3.19</td>
</tr>
</tbody>
</table>

| 0.1 | 0.71 | 60    | 3.19 |
| 0.2 | 1.42 | 60    | 3.19 |
| 0.3 | 2.13 | 60    | 3.19 |
| 0.4 | 2.84 | 60    | 3.19 |
| 0.5 | 3.55 | 60    | 3.19 |
| 0.6 | 4.26 | 60    | 3.19 |
| 0.7 | 4.97 | 60    | 3.19 |
| 0.8 | 5.68 | 60    | 3.19 |
| 0.9 | 6.39 | 60    | 3.19 |
| 1   | 7.1  | 60    | 3.19 |

**Aluminum bodies are to be used for pressures less than 210 bar (3000 psi)
***Other housings available

DIMENSIONS

mm [in]

Cross-sectional view

ORDERING INFORMATION

Load Shuttle Valve
Normal Direction

SV06-00-V

Seal Option | Seal kit
Omit = Buna-N | 230000070
V = Viton | 230000110

Specifications

| Rated pressure* | 350 bar [5075 psi] |
| Rated flow at 7 bar [100 psi] | 48 l/min [12.7 US gal/min] |
| Leaksage | 6 drops/min @ Rated pressure |
| Weight | 0.11 kg [0.24 lb] |
| Cavity | NCS06/3 |

*Cavities based on NFPA fatigue test standard (at 1 million cycles)
OPERATION
This valve senses the higher of the two input pressures and routes it to the output port.

SPECIFICATIONS
Theoretical performance
Pressure drop
26 cSt [121 SUS] hyd. oil at 50°C [122 °F]
Free flow from A→F or B→F

<table>
<thead>
<tr>
<th>psi</th>
<th>bar</th>
<th>l/min</th>
<th>US gal/min</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>35</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>71</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>15</td>
<td>105</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>20</td>
<td>140</td>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td>25</td>
<td>175</td>
<td>25</td>
<td>5</td>
</tr>
<tr>
<td>30</td>
<td>210</td>
<td>30</td>
<td>6</td>
</tr>
</tbody>
</table>

Rated pressure 350 bar [5075 psi]
Rated flow at 7 bar [100 psi] 35 l/min [9 US gal/min]
Leakage 6 drops/min @ Rated pressure
Weight 0.22 kg [0.49 lb]
Cavity none

DIMENSIONS
Cross-sectional view

ORDERING INFORMATION
VS 06-G-V

SEALS
Omit = Buna
V = Viton
**OPERATION**

This valve senses the higher of two input pressures and routes it to the output port.

**SPECIFICATIONS**

**Theoretical performance**

Pressure drop

- 26 cSt [121 SUS] hyd.oil at 50°C [122 °F]
- Free flow from A→F or B→F

**Specifications**

- **Rated pressure**: 350 bar [5075 psi]
- **Rated flow at 7 bar [100 psi]**: 45 l/min [12 US gal/min]
- **Leakage**: 6 drops/min @ Rated pressure
- **Weight**: 0.19 kg [0.42 lb]
- **Cavity**: none

**DIMENSIONS**

**Cross-sectional view**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8 BSP</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>17.5  [0.69]</td>
</tr>
<tr>
<td>B</td>
<td>45 [1.77]</td>
</tr>
<tr>
<td>C</td>
<td>17.5 [0.69]</td>
</tr>
<tr>
<td>D</td>
<td>30 [1.18]</td>
</tr>
<tr>
<td>E</td>
<td>80 [3.15]</td>
</tr>
<tr>
<td>F</td>
<td>25 [0.98]</td>
</tr>
<tr>
<td>G</td>
<td>40 [1.57]</td>
</tr>
</tbody>
</table>

**ORDERING INFORMATION**

**VS 10-G-V**

SEALS
- Omit = Buna
- V = Viton
OPERATION
This valve has an internally piloted spool that directs flow from the lower pressure inlet, 2 or 4, to the output at 3.

SPECIFICATIONS
Theoretical performance

![Theoretical performance graph]

Specifications
- Rated pressure: 350 bar [5075 psi]
- Rated flow at 7 bar: 25 l/min
  [7 US gal/min]
- Leakage: 82 cm³/min [5 in³/min] @ 207 bar [3000 psi]
- Weight: 0.15 kg [0.34 lb]
- Cavity: SDC10-4

DIMENSIONS
mm [in]

Cross-sectional view

ORDERING INFORMATION

Seals
- B = Buna-N
- V = Viton

Housing and ports
- 0 = No Housing
- L3B = AL 3/8 BSP
- L4B = AL 1/2 BSP
- 6S = AL #6 SAE
- 8S = AL #8 SAE

Housing P/N
- No Housing: SDC10-4-L-3B
- SDC10-4-L-4B
- CP10-4-6S-X1
- CP10-4-8S-X1

Other housings available

Spool overlap
- O = Open
- C = Closed

Shift pressure
- bar [psi]
  - 050 = 3.4 [50]
  - 080 = 5.5 [80]
**Shuttle Valves Catalog**

**Hot Oil Shuttle**

**CP721-3**

**OPERATION**

This valve has an internally piloted spool that directs flow from the lower pressure inlet, 1 or 3, to the output at 2.

**SPECIFICATIONS**

Theoretical performance

![Theoretical performance graph](image)

**Specsifications**

<table>
<thead>
<tr>
<th>Rated pressure</th>
<th>350 bar [5075 psi]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated flow at 7 bar [100 psi]</td>
<td>90 l/min [24 US gal/min]</td>
</tr>
<tr>
<td>Leakage</td>
<td>82 cm³/min [5 in³/min] @ 207 bar [3000 psi]</td>
</tr>
<tr>
<td>Weight</td>
<td>0.34 kg [0.75 lb]</td>
</tr>
<tr>
<td>Cavity</td>
<td>CP12-3M</td>
</tr>
</tbody>
</table>

**DIMENSIONS**

Cross-sectional view

![Cross-sectional view](image)

**ORDERING INFORMATION**

Seals

- B = Buna-N
- V = Viton

Housing and ports

- 0 = No Housing
- 4B = AL 1/2 BSP
- 6B = AL 3/4 BSP
- 10S = AL #10 SAE
- 12S = AL #12 SAE

Other housings available

Housing P/N

- No Housing
- CP12-3M-4B
- CP12-3M-6B
- CP12-3M-10S
- CP12-3M-12S

Shift pressure [psi]

- 025 = 1.6 [25]
- 050 = 3.4 [50]
- 100 = 6.9 [100]

Spool overlap

- O = Open
- C = Closed

CP721-3 - B - 12S - 100 - C