



# Shuttle Valves Technical Information

## Quick Reference

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

In-line	Model No.	Cavity	Description	Flow*	Pressure	Page
	<b>VS 06</b>	none	Load shuttle Valve, In-line	35 l/min [9 US gal/min]	350 bar [5075 psi]	<b>SH - 9</b>
	<b>VS 10</b>	none		45 l/min [12 US gal/min]	350 bar [5075 psi]	<b>SH - 10</b>

Hot oil shuttle	Model No.	Cavity	Description	Flow*	Pressure	Page
	<b>CP720-3</b>	<b>SDC10-4</b>	Hot Oil Shuttle	25 l/min [7 US gal/min]	350 bar [5075 psi]	<b>SH - 11</b>
	<b>CP721-3</b>	<b>CP12-3M</b>		90 l/min [24 US gal/min]	350 bar [5075 psi]	<b>SH - 12</b>

\* Flow ratings are based on a pressure drop of 7 bar [100 psi] unless otherwise noted. They are for comparison purposes only.

### OVERVIEW

There are two types of shuttle valves -- load shuttle valves and hot oil shuttle valves.

Shuttle valves

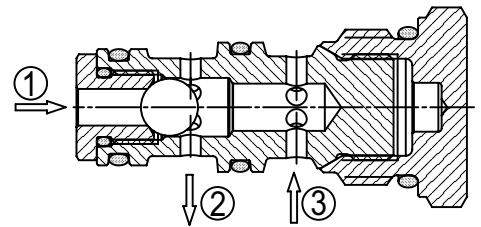


### LOAD SHUTTLE VALVE

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:

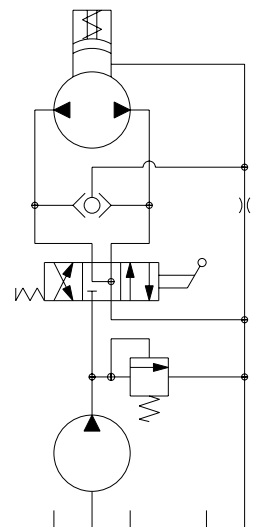
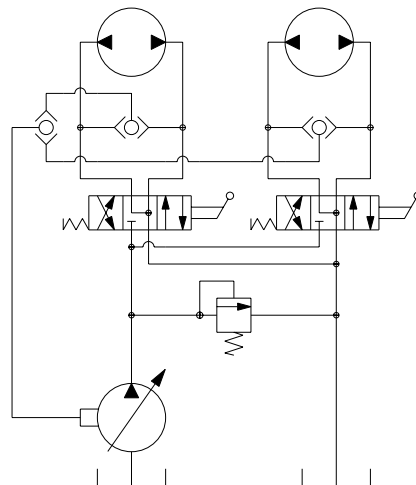
- Logic for load sensing circuits
- Bi-directional motor brake release valve

Load shuttle valve



Bi-directional motor brake release valve

Load sensing circuit





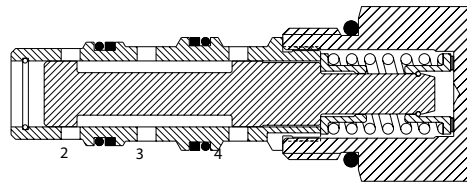
# Shuttle Valves Technical Information

## Application Notes

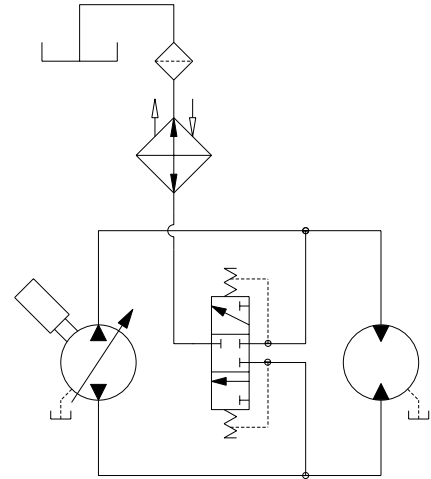
**HOT OIL SHUTTLE VALVE** Hot oil shuttles are spool-type valves that use internal piloting at 2 and 4 to direct oil from the lower of the two input pressures to the outlet at 3.

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.

Hot oil shuttle valve



Closed-circuit hydrostatic loop





# Shuttle Valves Technical Information

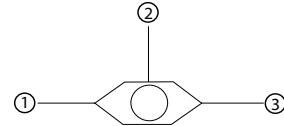
## Load Shuttle Valve - Normal Direction

### CP124-1

#### OPERATION

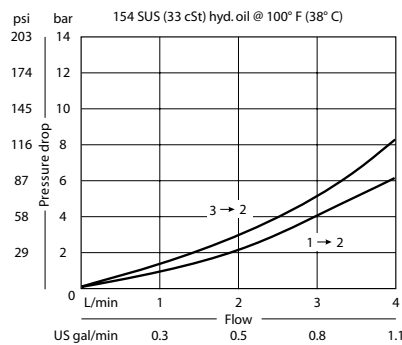
This valve senses the higher of the two input pressures at ports 1 and 3 and routes it to the output port 2.

#### Schematic



#### SPECIFICATIONS

#### Theoretical performance



#### Specifications

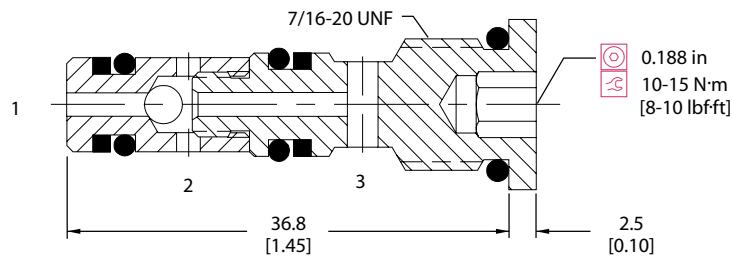
<b>Rated pressure*</b>	350 bar [5075 psi]
<b>Rated flow at 7 bar [100 psi]</b>	3.7 l/min [1 US gal/min]
<b>Leakage</b>	6 drops/min @ Rated pressure
<b>Weight</b>	0.02 kg [0.04 lb]
<b>Cavity</b>	<b>CP04-3</b>

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

#### DIMENSIONS

mm [in]

#### Cross-sectional view



#### ORDERING INFORMATION

CP124 - 1 - B - 4S

<p><b>Seals</b></p> <p>B = Buna-N V = Viton</p>	<p><b>Seal kit</b></p> <p>120111 120282</p>	<p><b>Housing and ports</b></p> <p>0 = No Housing 2B = AL, 1/4 BSP 4S = AL, #4 SAE Other housings available</p>	<p><b>Housing P/N</b></p> <p>No Housing CP04-3-2B CP04-3-4S</p>
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# Shuttle Valves Technical Information

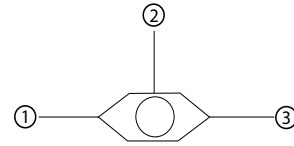
## Load Shuttle Valve - Normal Direction

### CP128-1

#### OPERATION

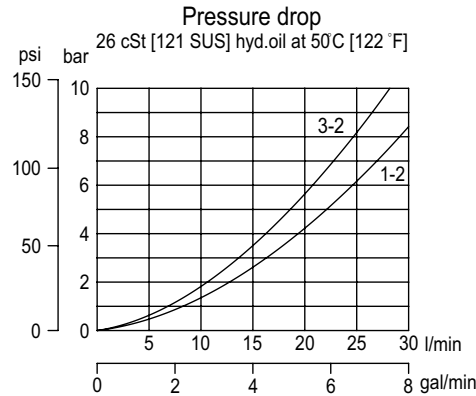
This valve senses the higher of the two input pressures at ports 1 and 3 and routes it to the output port 2.

#### Schematic



#### SPECIFICATIONS

#### Theoretical performance



#### Specifications

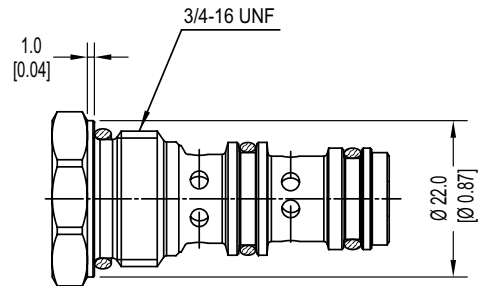
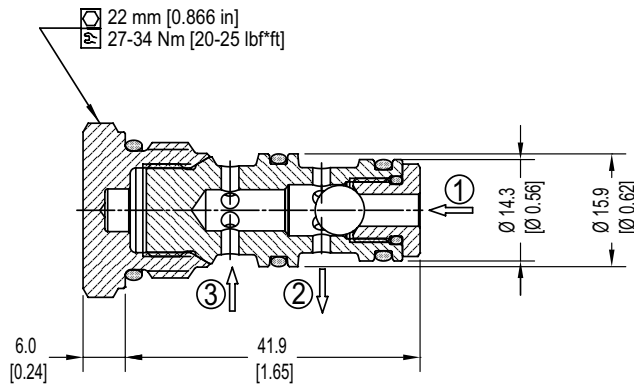
<b>Rated pressure*</b>	315 bar [4570 psi]
<b>Rated flow at 7 bar [100 psi]</b>	22 l/min [5.8 US gal/min]
<b>Leakage</b>	6 drops/min @ Rated pressure
<b>Weight</b>	0.06 kg [0.14 lb]
<b>Cavity</b>	<b>SDC08-3</b>

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

#### DIMENSIONS

mm [in]

#### Cross-sectional view



#### ORDERING INFORMATION

CP128-1-B-0

Load Shuttle Valve  
Normal Direction

Seal Option	Seal kit
B = Buna-N	120238
V = Viton	120239

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



# Shuttle Valves Technical Information

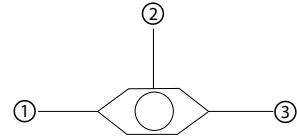
## Load Shuttle Valve - Normal Direction

### SV04

#### OPERATION

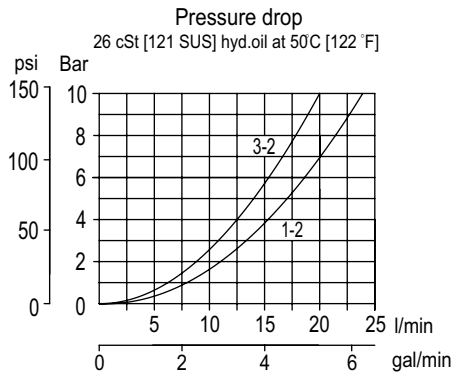
This valve senses the higher of two input pressures at 1 and 3, and routes it to the output 2.

#### Schematic



#### SPECIFICATIONS

#### Theoretical performance



#### Specifications

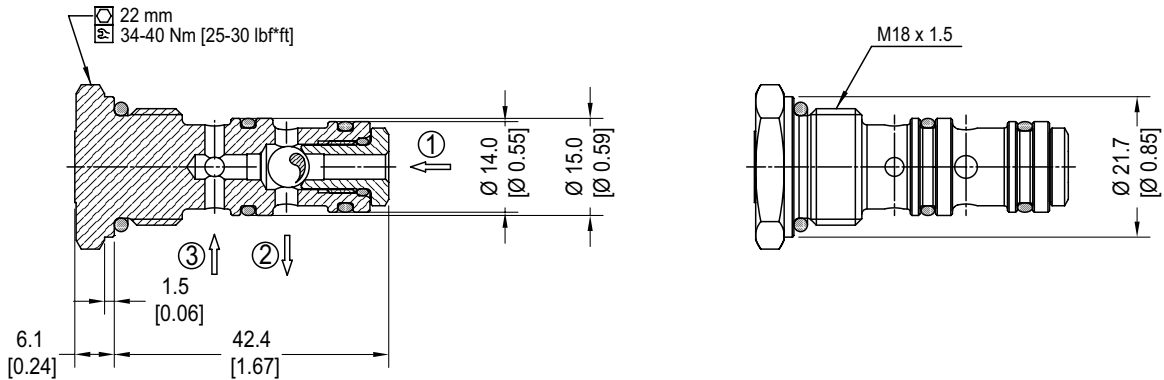
<b>Rated pressure*</b>	315 bar [4570 psi]
<b>Rated flow at 7 bar [100 psi]</b>	15 l/min [4 US gal/min]
<b>Leakage</b>	6 drops/min @ Rated pressure
<b>Weight</b>	0.07 kg [0.15 lb]
<b>Cavity</b>	<b>NCS04/3</b>

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

#### DIMENSIONS

mm [in]

#### Cross-sectional view



#### ORDERING INFORMATION

**SV04-00-V**

Load Shuttle Valve  
Normal Direction

Seal Option	Seal Kit
Omit = Buna-N	230000160
V = Viton	230000450

Code	Ports & Material	Body Nomenclature
00	00 = 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



# Shuttle Valves Technical Information

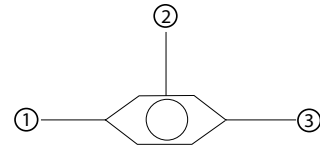
## Load Shuttle Valve - Normal Direction

### CP120-4

#### OPERATION

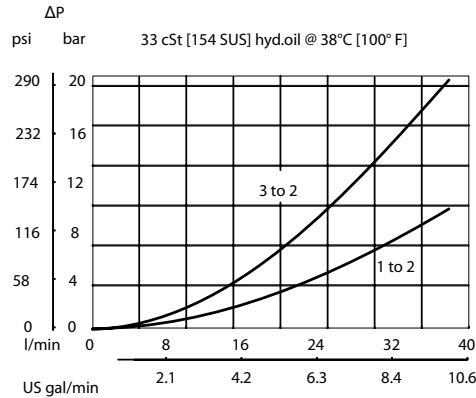
This valve senses the higher of two input pressures at 1 and 3, and routes it to the output 2.

#### Schematic



#### SPECIFICATIONS

#### Theoretical performance



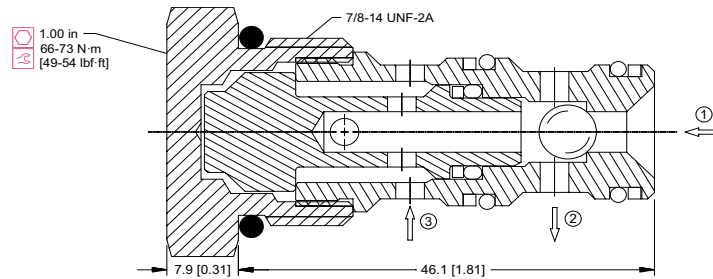
#### Specifications

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

#### DIMENSIONS

mm [in]

#### Cross-sectional view



#### ORDERING INFORMATION

#### CP120-4-B-8S

Seals	Seal kit	Housing and ports	Housing P/N
B = Buna-N	120027	00 = No Housing	No Housing
V = Viton	120028	SE3B = AL, 3/8 BSP	SDC10-3-SE-3B
		SE4B = AL, 1/2 BSP	SDC10-3-SE-4B
		6S = AL, #6 SAE	CP10-3-6S
		8S = AL, #8 SAE	CP10-3-8S
		S6S = Ductile, #6 SAE	CP10-3-S6S
		S8S = Ductile, #8 SAE	CP10-3-S8S
		Other housings available	



# Shuttle Valves Technical Information

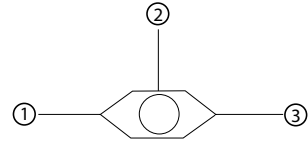
## Load Shuttle Valve - Normal Direction

### SV06

#### OPERATION

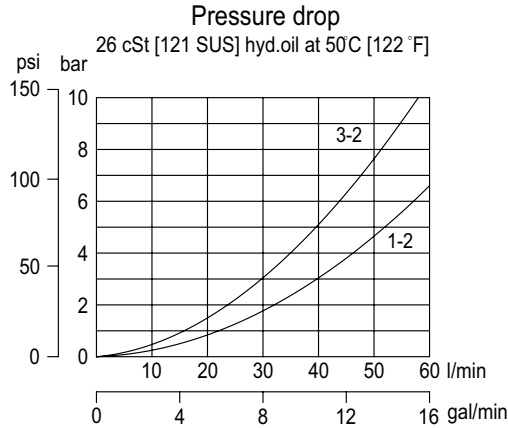
This valve senses the higher of two input pressures at 1 and 3, and routes it to the output 2.

#### Schematic



#### SPECIFICATIONS

#### Theoretical performance



#### Specifications

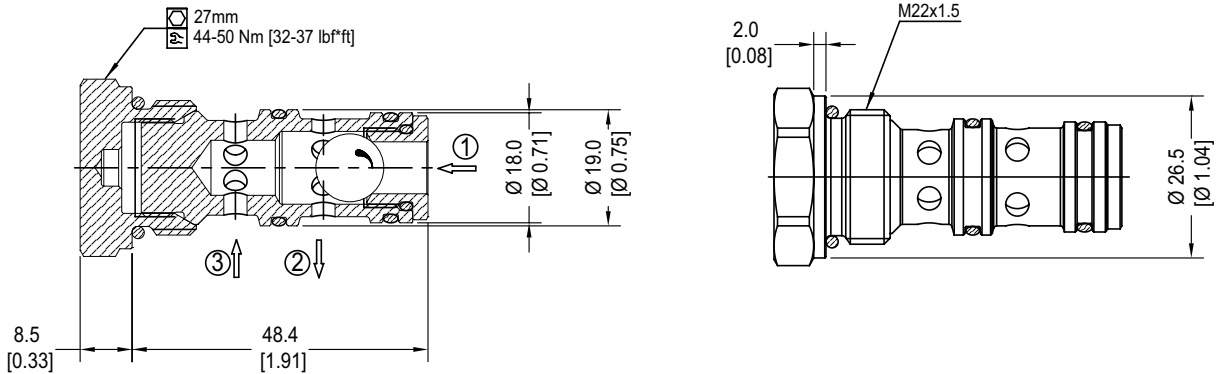
<b>Rated pressure*</b>	350 bar [5075 psi]
<b>Rated flow at 7 bar [100 psi]</b>	48 l/min [12.7 US gal/min]
<b>Leakage</b>	6 drops/min @ Rated pressure
<b>Weight</b>	0.11 kg [0.24 lb]
<b>Cavity</b>	<b>NCS06/3</b>

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

#### DIMENSIONS

mm [in]

#### Cross-sectional view



#### ORDERING INFORMATION

SV06-00-V

Load Shuttle Valve  
Normal Direction

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

Code	Ports & Material	Body Nomenclature
00	00 = Cartridge only	No Body
SE3/8	AL, 3/8 BSP	NCS06/3-SE3/8
SE1/2	AL, 1/2 BSP	NCS06/3-SE1/2
SE6S	AL, #6 SAE	NCS06/3-SE-6S
SE8S	AL, #8 SAE	NCS06/3-SE-6S

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





# Shuttle Valves Technical Information

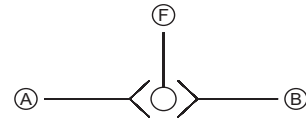
## Load Shuttle Valve - In-Line

### VS 06

#### OPERATION

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

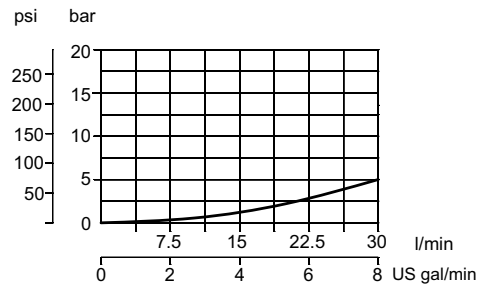
#### Schematic



#### SPECIFICATIONS

#### Theoretical performance

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



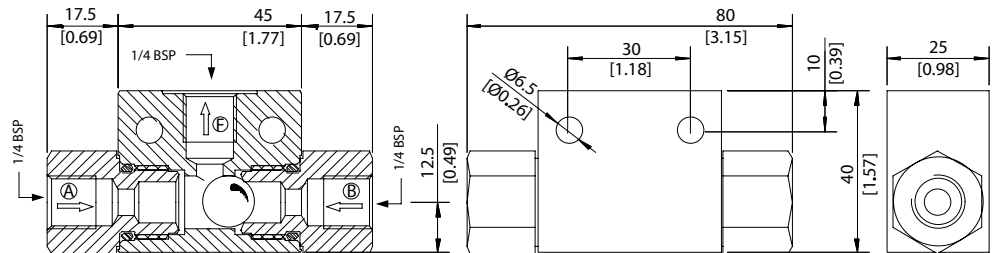
#### Specifications

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

#### DIMENSIONS

mm [in]

#### Cross-sectional view



#### ORDERING INFORMATION

VS 06-G-V

SEALS  
Omit = Buna  
V = Viton



# Shuttle Valves Technical Information

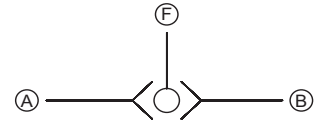
## Load Shuttle Valve - InLine

### VS 10

#### OPERATION

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

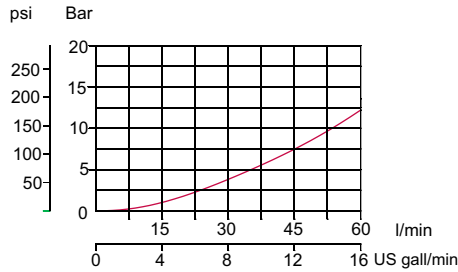
#### Schematic



#### SPECIFICATIONS

#### Theoretical performance

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



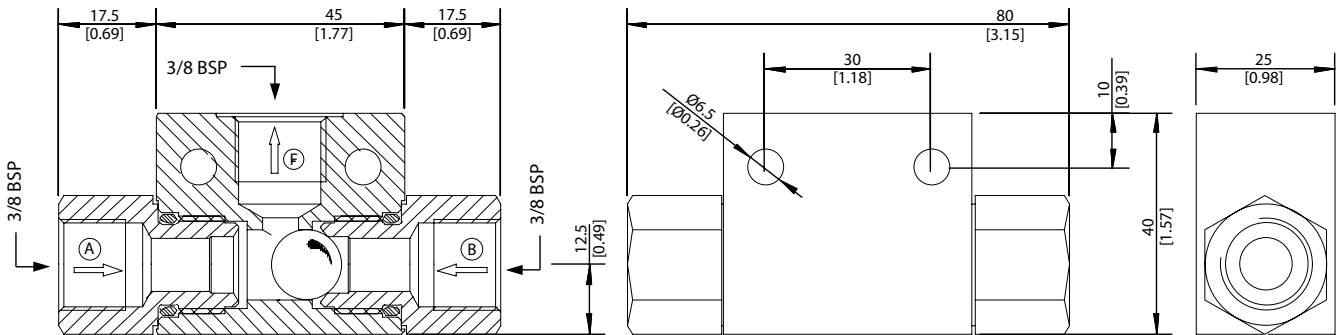
#### Specifications

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

#### DIMENSIONS

mm [in]

#### Cross-sectional view



#### ORDERING INFORMATION

## VS 10-G-V

SEALS  
Omit = Buna  
V = Viton



# Shuttle Valves Technical Information

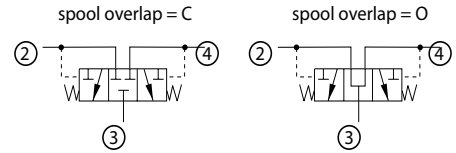
## Hot Oil Shuttle

### CP720-3

#### OPERATION

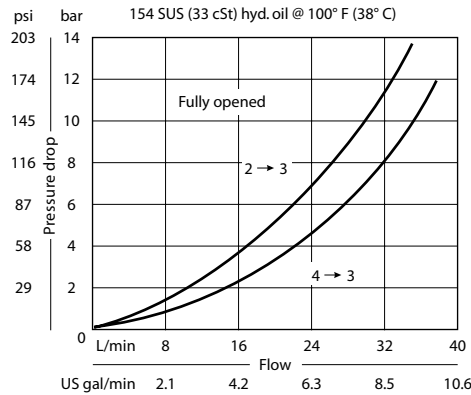
This valve has an internally piloted spool that directs flow from the lower pressure inlet, 2 or 4, to the output at 3.

#### Schematic



#### SPECIFICATIONS

#### Theoretical performance



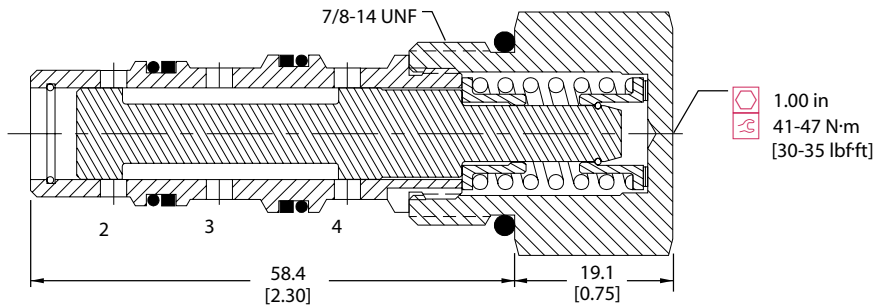
#### Specifications

<b>Rated pressure</b>	350 bar [5075 psi]
<b>Rated flow at 7 bar [100 psi]</b>	25 l/min [7 US gal/min]
<b>Leakage</b>	82 cm <sup>3</sup> /min [5 in <sup>3</sup> /min] @ 207 bar [3000 psi]
<b>Weight</b>	0.15 kg [0.34 lb]
<b>Cavity</b>	<b>SDC10-4</b>

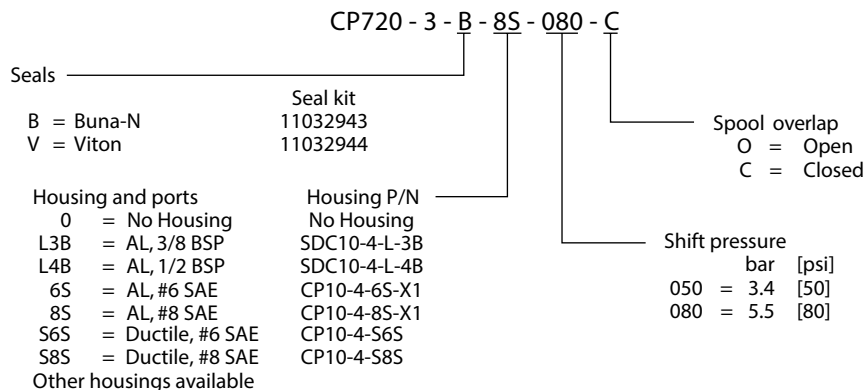
#### DIMENSIONS

mm [in]

#### Cross-sectional view



#### ORDERING INFORMATION





# Shuttle Valves Technical Information

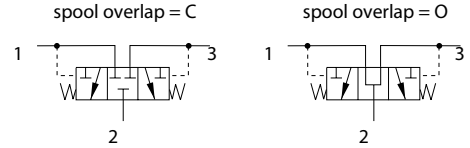
## Hot Oil Shuttle

### CP721-3

#### OPERATION

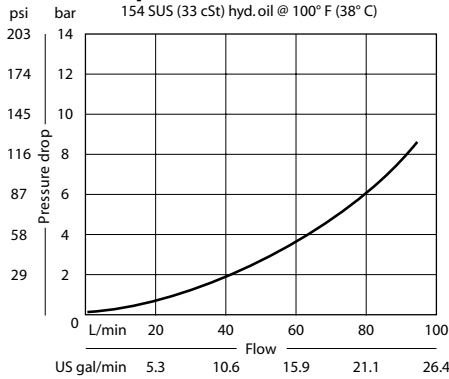
This valve has an internally piloted spool that directs flow from the lower pressure inlet, 1 or 3, to the output at 2.

#### Schematic



#### SPECIFICATIONS

#### Theoretical performance



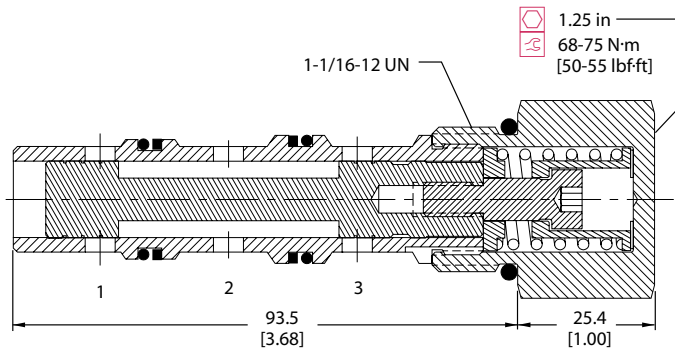
#### Specifications

<b>Rated pressure</b>	350 bar [5075 psi]
<b>Rated flow at 7 bar [100 psi]</b>	90 l/min [24 US gal/min]
<b>Leakage</b>	82 cm <sup>3</sup> /min [5 in <sup>3</sup> /min] @ 207 bar [3000 psi]
<b>Weight</b>	0.34 kg [0.75 lb]
<b>Cavity</b>	<b>CP12-3M</b>

#### DIMENSIONS

mm [in]

#### Cross-sectional view



#### ORDERING INFORMATION

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

Seals	Seal kit	Spool overlap
B = Buna-N	120098	O = Open
V = Viton	120099	C = Closed
Housing and ports	Housing P/N	Shift pressure
0 = No Housing	No Housing	025 = 1.6 [25]
4B = AL, 1/2 BSP	CP12-3M-4B	050 = 3.4 [50]
6B = AL, 3/4 BSP	CP12-3M-6B	100 = 6.9 [100]
10S = AL, #10 SAE	CP12-3M-10S	
12S = AL, #12 SAE	CP12-3M-12S	
S12S = Ductile, #12 SAE	CP12-3M-S12S	
Other housings available		