

Vickers®

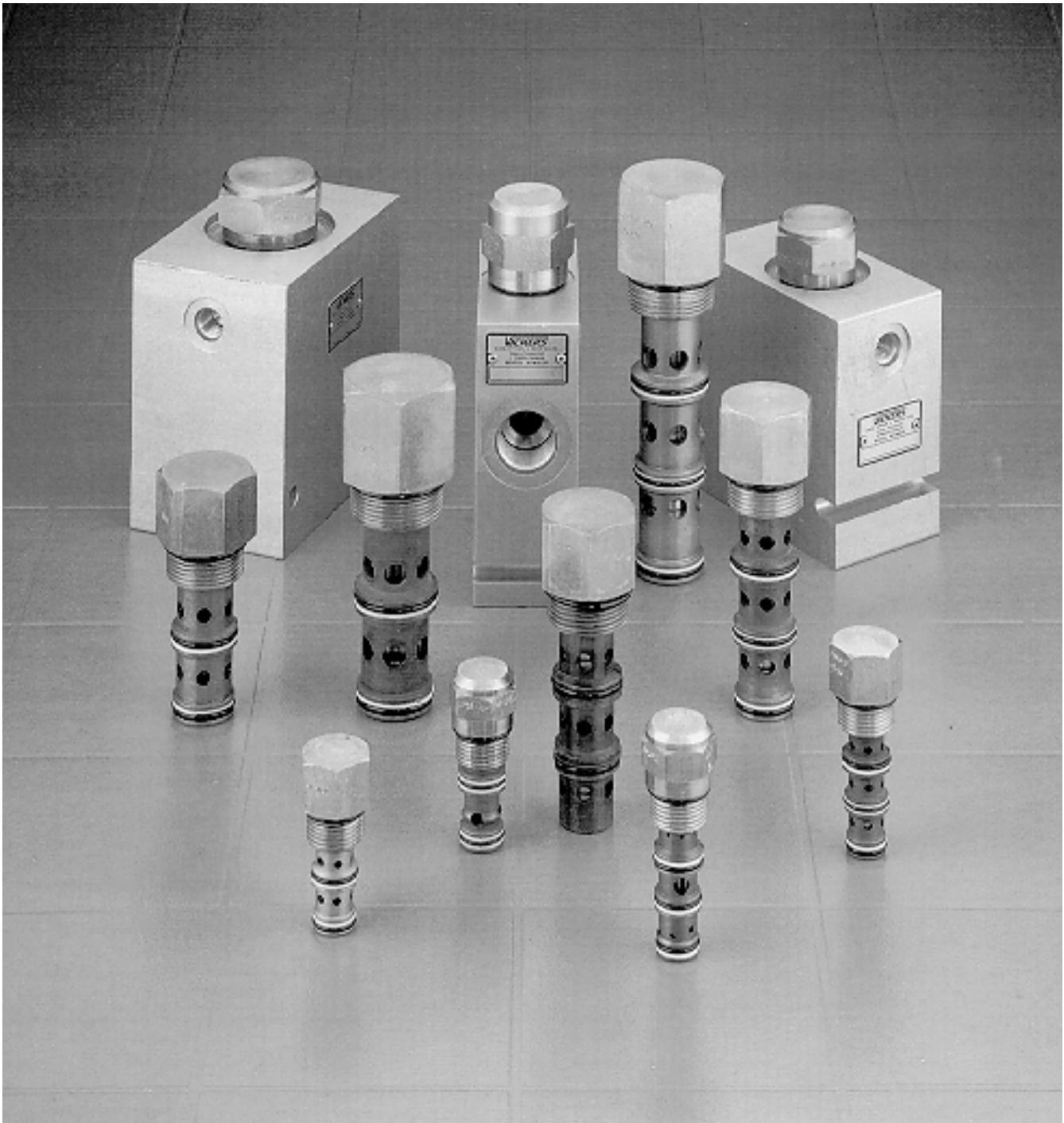
Cartridge Valves



Logic Elements

Screw-in Cartridge Valves

Pressures to 290 bar (4200 psi) – Flows to 303 l/min (80 USgpm)



VICKERS

Revised 9/98

Contents

MODEL	DESCRIPTION	TYPICAL APPLICATION PRESSURE bar (psi)	RATED FLOW l/min (USgpm)	PAGE
Introduction				3
Application examples	Pressure control functions			4
	Flow control functions			5
	Directional control functions			8
	Three-way bridge / Four-way bridge			9
PCS3–10	Pressure compensator	210 (3000)	38 (10)	10
PCS3–16		210 (3000)	114 (30)	12
PCS3–20		210 (3000)	189 (50)	14
PCS4–10		210 (3000)	38 (10)	16
PCS4–16		210 (3000)	114 (30)	18
PCS4–20		210 (3000)	189 (50)	20
MOS1–10	Modulating orifice	210 (3000)	0–38 (0–10)	22
MOS1–16		210 (3000)	0–132 (0–35)	24
DPS2–10	Differential pressure sensing valve	290 (4200)	60 (15)	26
DPS2–16		290 (4200)	189 (50)	28
DPS2–20		290 (4200)	303 (80)	30
DPS2	Spool type functional symbols			32
DPS2	Poppet type functional symbols			33
C-**-3(S)	Standard cavity dimensions			34
C-**-4				35
C-**-3S	Aluminum housings			36
Supporting products	Roughing & Finishing tools			37
Application data				38

Introduction

For over 70 years, Vickers has provided its customers with quality products and innovative solutions for all their power and motion control needs.

The products featured in this catalog represent the very best in screw-in cartridge logic element valve technology.

We are committed to maintaining this position by offering the most comprehensive range of cartridge valves for industrial and mobile equipment.

This catalog gives basic specifications for Vickers logic elements screw-in cartridge valves. Its purpose is to provide a quick, convenient reference tool when choosing Vickers cartridge valves or designing a system using these components.

All cartridges have hardened and ground 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.

The range includes:

- **Pressure compensators (hydrostats)**
- **Pressure compensators with priority and bypass outlets**
- **Differential-pressure sensing elements**
- **Flow modulated orifice cartridges**

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

Flow compensators (hydrostats) – 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.

Flow modulated orifice cartridges – MOS1

The MOS1 cartridges are used as modulated orifices.

These cartridges are particularly effective when used with an external pressure compensator (hydrostat) such as a PCS3 or PCS4 type. The PCS3 provides normal pressure compensation. The PCS4 provides pressure compensation for priority flow arrangements.

The low pilot pressure required allows proportional control when used with an EPV2 proportional pilot relief.

Differential-pressure sensing elements – DPS2

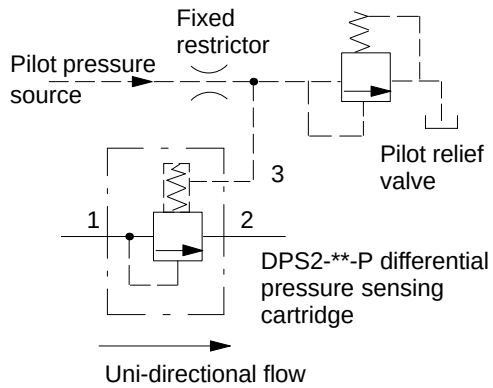
For controlling pressure, flow or direction (including 3- and 4-way bridge circuits) the DPS2 is used with the aid of external pilot operators. The DPS2 elements are function building blocks which respond to pressure differential signals, providing the capacity to switch or modulate flows up to 303 l/min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

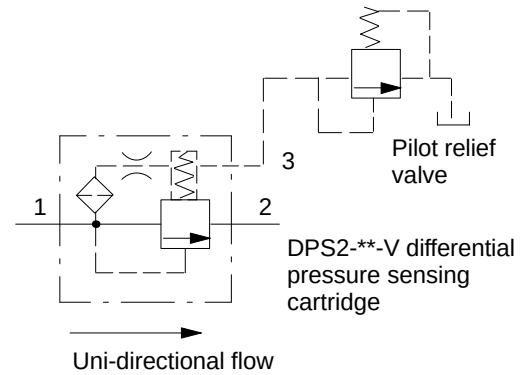
Application Examples

Pressure control functions

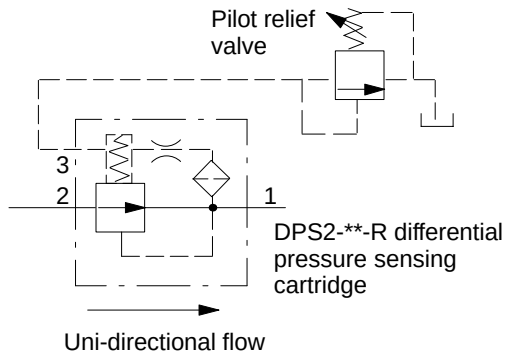
Pressure relief or Sequence example
With external pilot supply and pilot relief



Pressure relief or Sequence example, normally open
With internal pilot supply and pilot relief

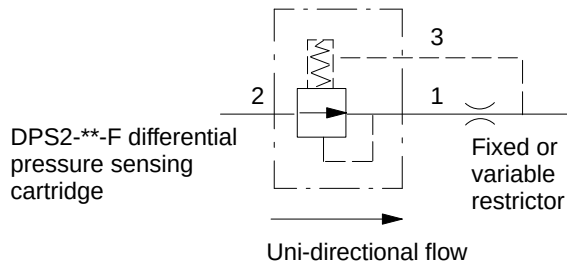


Pressure reducing example
Non-relieving type

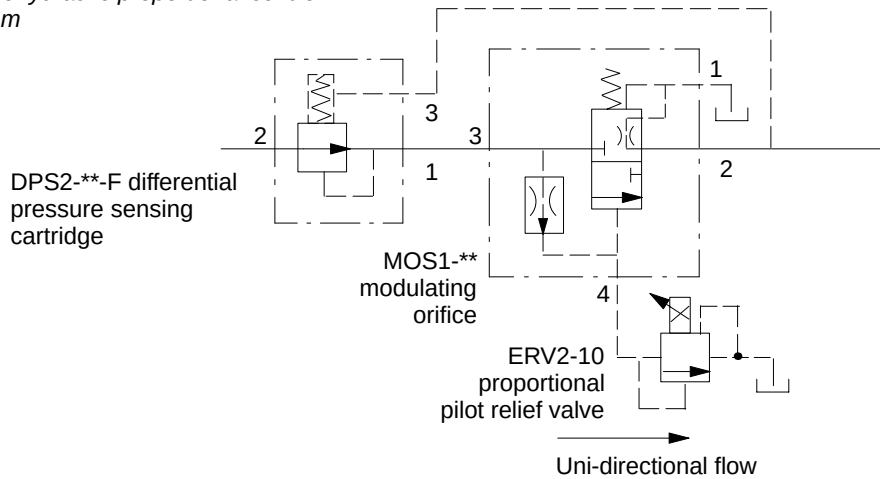


Flow control functions

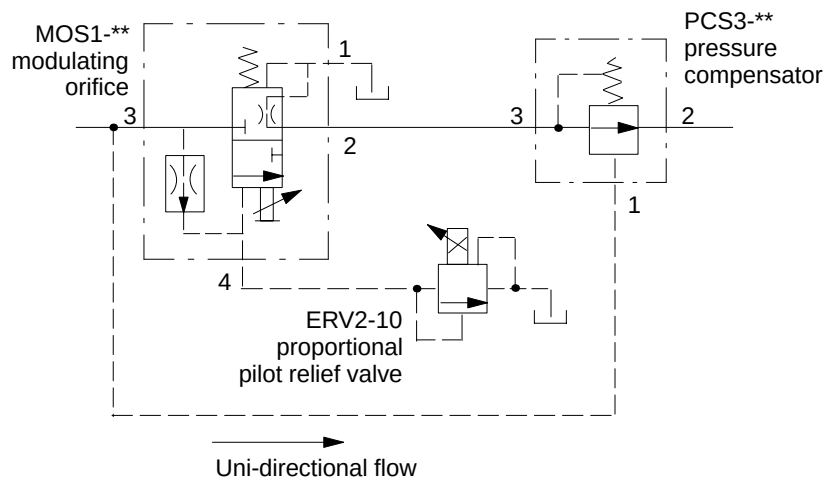
Pressure compensated flow control example
With downstream fixed or variable control



Pressure compensated flow control example
With electrohydraulic proportional control downstream

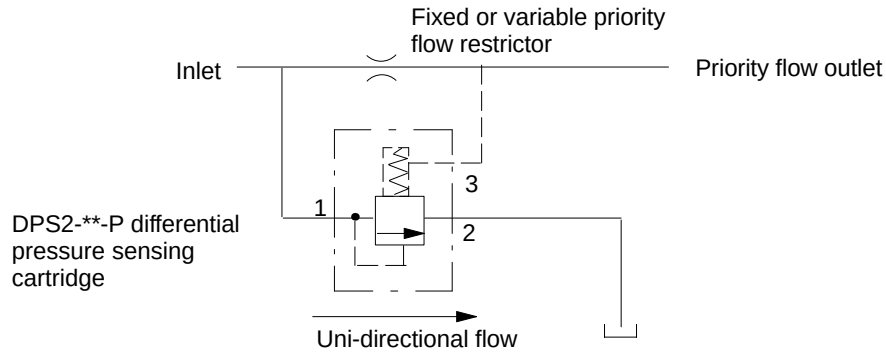


Pressure compensated flow control example
With electrohydraulic proportional control upstream

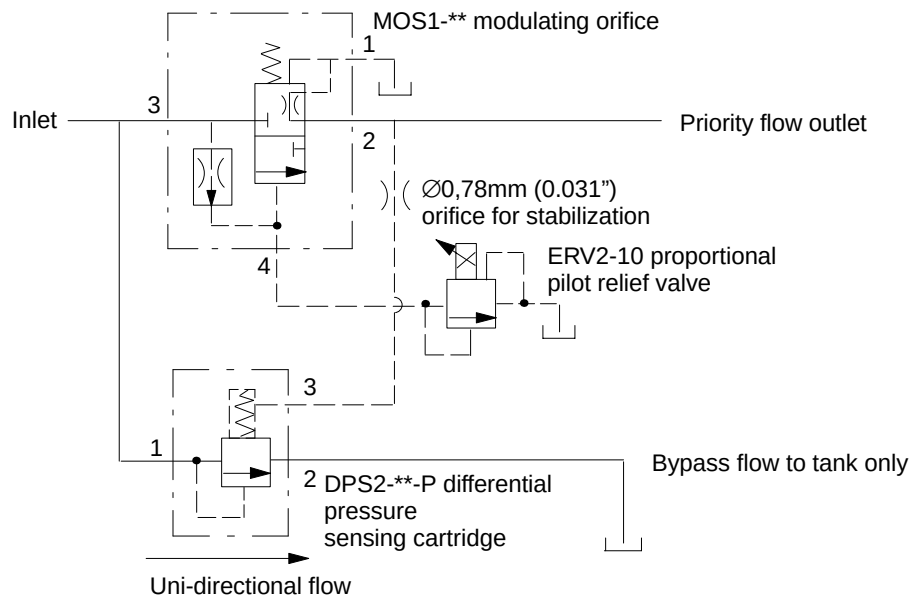


Flow control functions

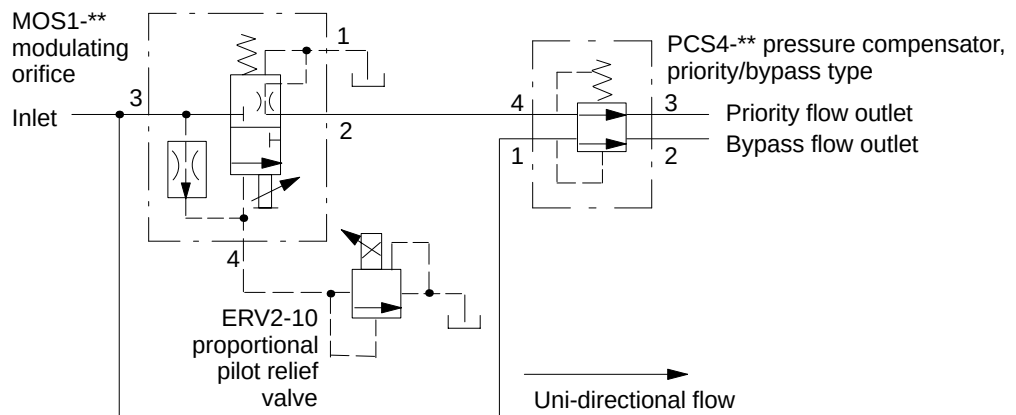
Pressure compensated priority flow control example
With fixed or variable priority flow control



Pressure compensated priority flow control example
Form A

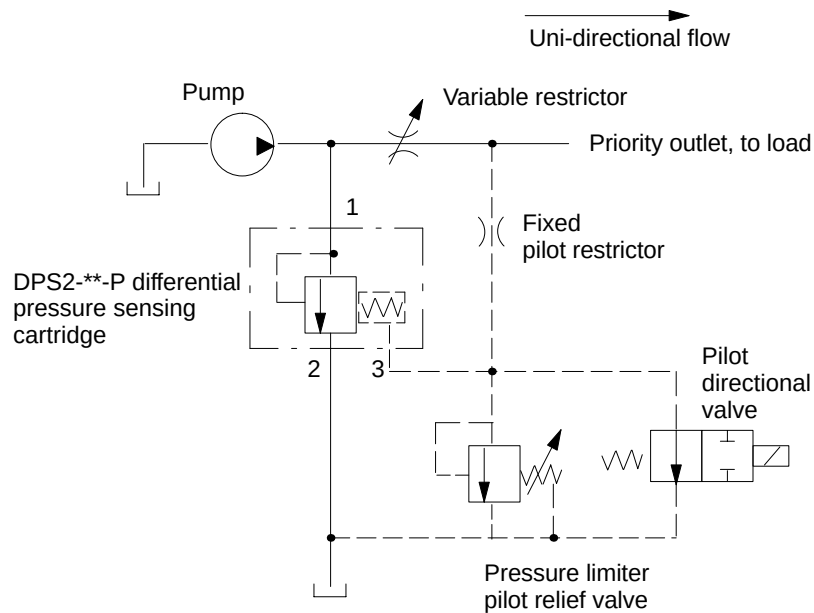


Pressure compensated priority flow control example
Form B

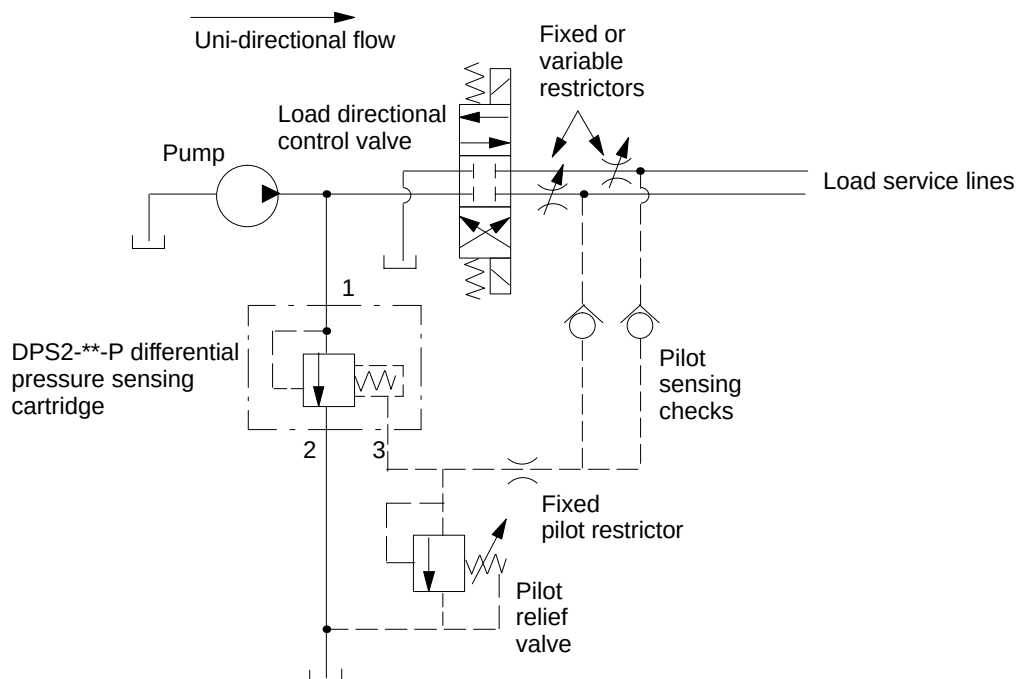


Flow control functions

Load sensing priority flow control example
With pressure limiting and venting



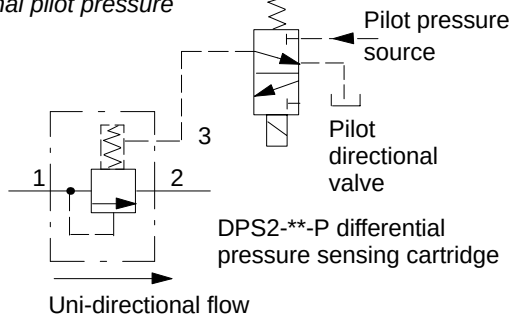
Load sensing priority flow control example
Double acting version with pressure limiter



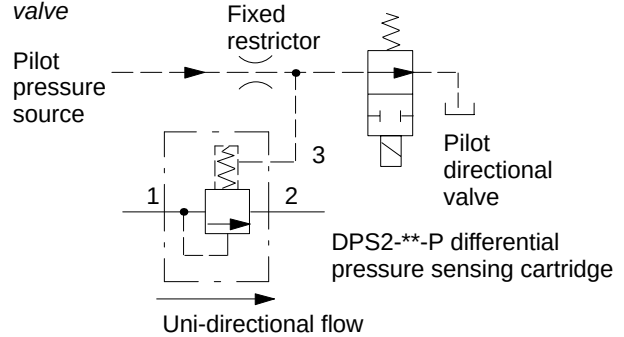
Directional control functions

Two-way, two-position, normally open examples
2-way, 2-position, normally open

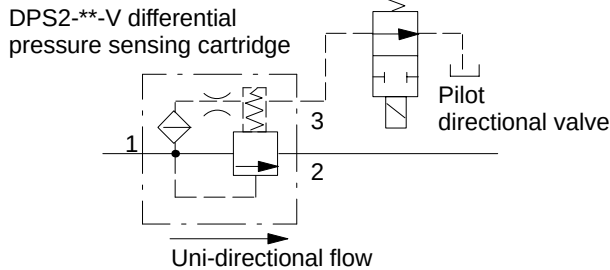
Switched by 3-way, 2-position pilot valve
and external pilot pressure



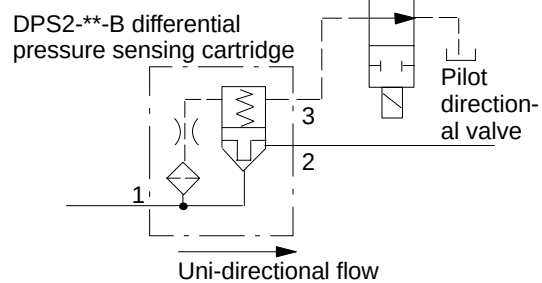
2-way, 2-position, normally open
Switched by external pilot pressure and
vented through 2-way, 2-position pilot
valve



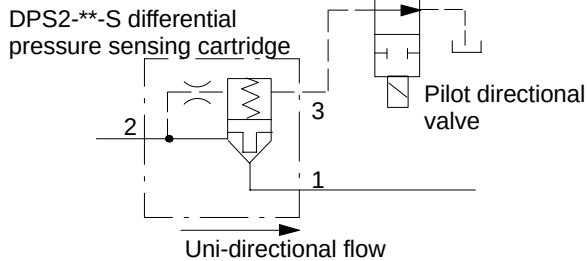
With DPS2-**-V cartridge and
internal pilot supply



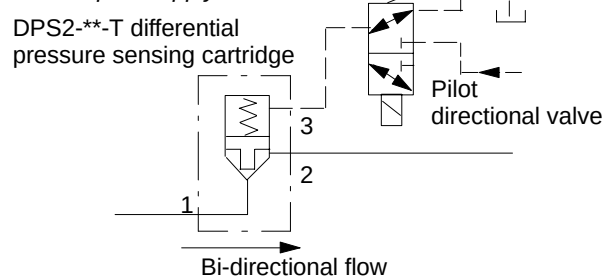
With DPS2-**-B cartridge and
internal pilot supply



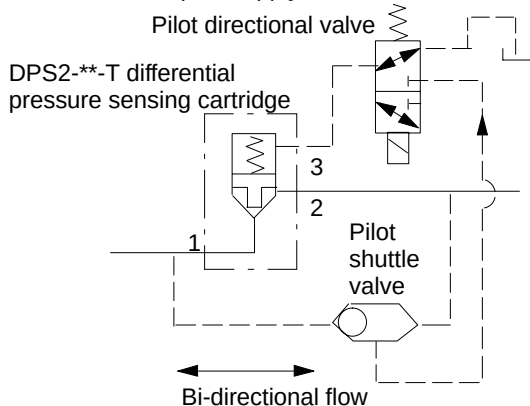
With DPS2-**-S cartridge and
internal pilot supply



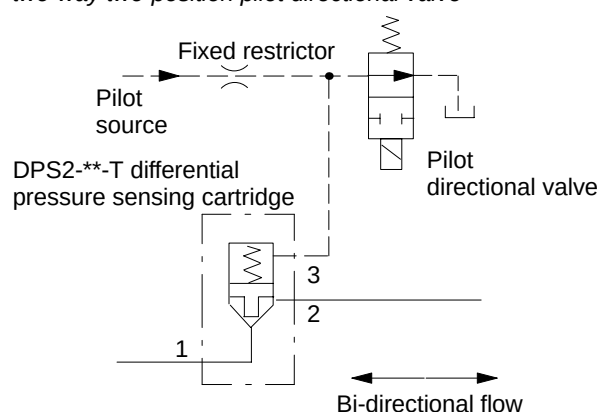
With DPS2-**-T cartridge and
internal pilot supply



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



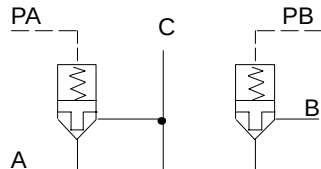
With DPS2-**-T cartridge, external pilot supply and
two-way two-position pilot directional valve



Three-way bridge circuits

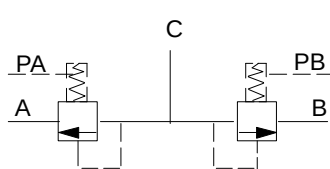
Form 1, with DPS2-**-T

Differential pressure sensing cartridges



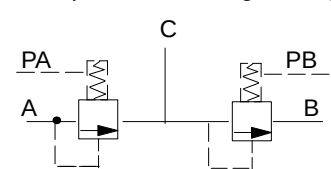
Form 2, with DPS2-**-P

Differential pressure sensing cartridges



Form 3, with DPS2-**-P

Differential pressure sensing cartridges



Required Flow Path	Pilot Pressure ■ to		Available from example			Required Flow Path	Pilot Pressure ■ to		Available from example		
	PA	PB	1	2	3		PA	PB	1	2	3
	0	0	Yes	Yes	No		0	0	Yes	Yes	No
	1	0	Yes	Yes	Yes		1	0	Yes	Yes	Yes

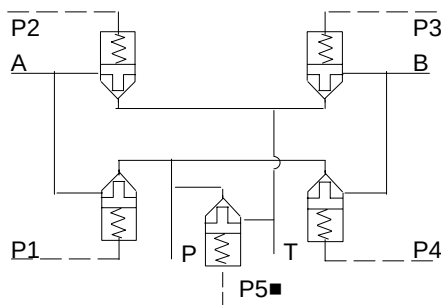
1 – Pressure Applied 0 – Pressure Vented

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

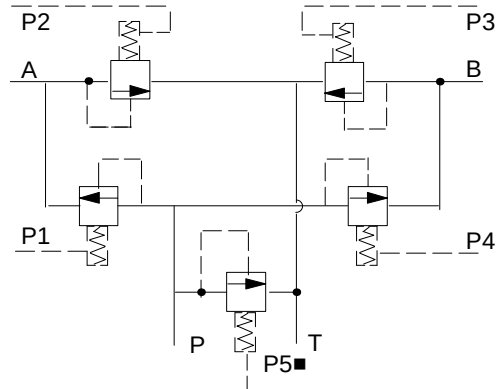
With DPS2-**-T

Differential pressure sensing cartridges



With DPS2-**-P

Differential pressure sensing cartridges



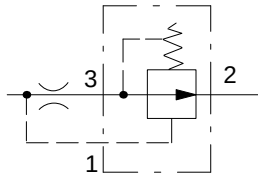
Required Flow Path	Pilot Pressure ■ to					Required Flow Path	Pilot Pressure ■ to				
	P1	P2	P3	P4	P5■		P1	P2	P3	P4	P5■
	1	1	1	1	1		1	1	0	1	1
	0	0	0	0	0		0	1	1	1	1
	1	1	0	0	0		0	1	0	1	1
	0	0	1	1	0		1	0	1	0	1
	1	1	1	1	0		1	1	1	0	1
	1	0	0	1	1		1	0	1	1	1
	0	1	1	0	1						

1 – Pressure Applied 0 – Pressure Vented

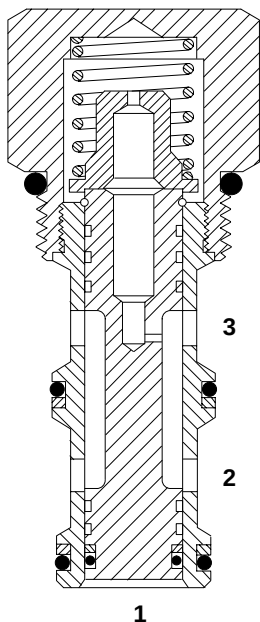
NOTE: Pilot pressure, modified by valve area ratio (if any), must exceed load pressure at valve in order to close valve.

PCS3-10 Pressure compensator

Functional Symbol



Sectional View



Description

The PCS3-10 is a screw-in, pressure compensator (hydrostat) 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.

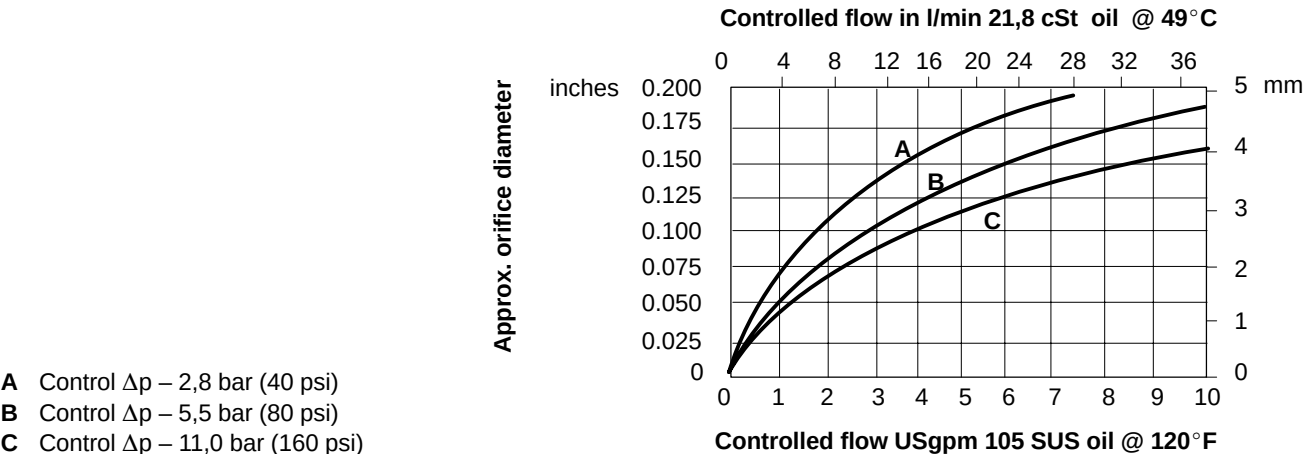
Ratings and specifications

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

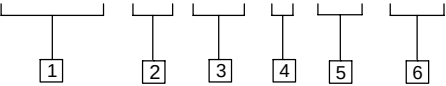
Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	38 l/min (10 USgpm)
Cavity	C-10-3 (See page 34)
Standard housing materials	Customized housings are necessary for close-coupling, the compensator and orifice.
Temperature 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

Performance Characteristics Cartridge only



PCS3 - 10 (V) - * - (S) - ***



1 Function

PCS3– Pressure compensator spool

2 Size

10 – 10 Size

3 Seals

Blank–Buna–N
V – Viton

4 Port size

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

6 Pressure differential (nominal)

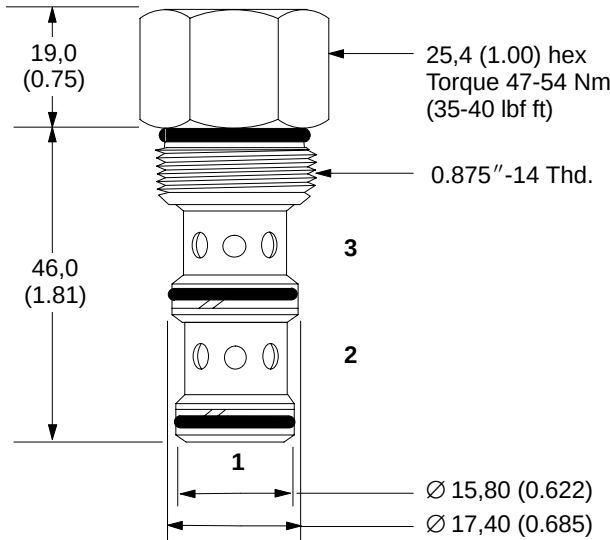
40 – 2,8 bar (40 psi)
80 – 5,5 bar (80 psi)
160–11,0 bar (160 psi)

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.

Dimensions

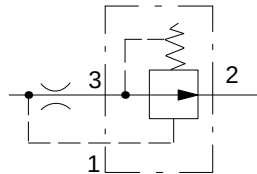
mm (inch)



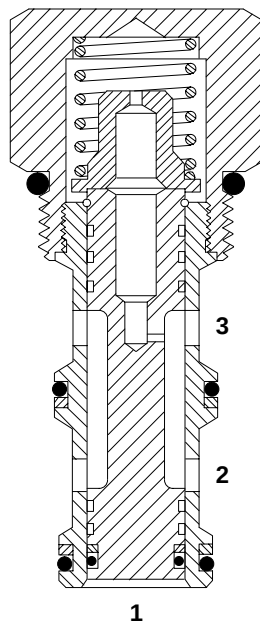
PCS3-16

Pressure compensator

Functional Symbol



Sectional View



Description

The PCS3-16 is a screw-in, pressure compensator (hydrostat) 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 114 l/min (30 USgpm)

Cavity C-16-3 (See page 34)

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

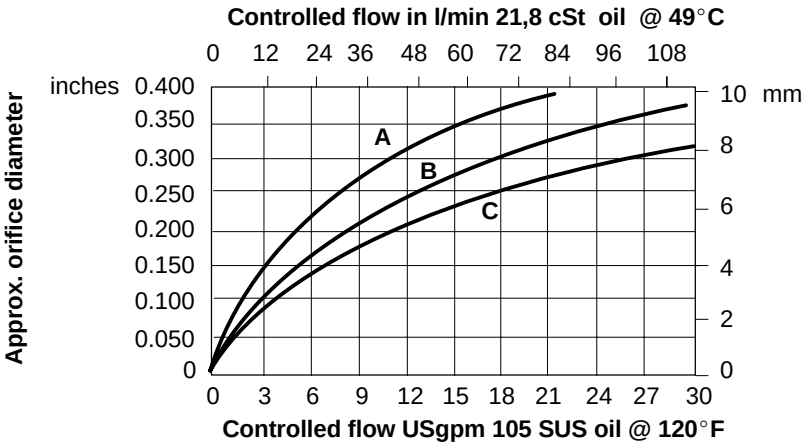
Weight cartridge only 0,38 kg. (0.84 lbs.)

Seal kits 565811 Buna-N
889610 Viton®

Viton is a registered trademark of E.I. DuPont

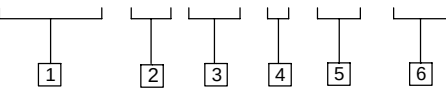
Performance Characteristics

Cartridge only



- A Control Δp – 2,8 bar (40 psi)
- B Control Δp – 5,5 bar (80 psi)
- C Control Δp – 11,0 bar (160 psi)

PCS3 - 16 (V) - * - (S) - ***



1 Function

PCS3—Pressure compensator spool

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.

6 Pressure differential (nominal)

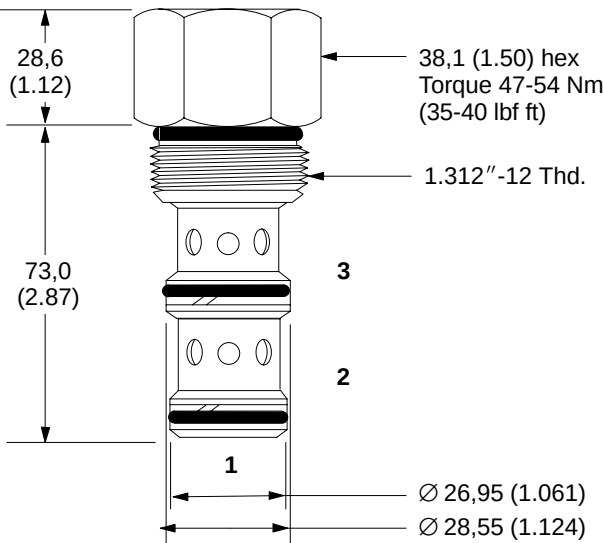
40 – 2,8 bar (40 psi)
80 – 5,5 bar (80 psi)
160–11,0 bar (160 psi)

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.

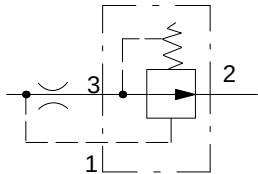
Dimensions

mm (inch)

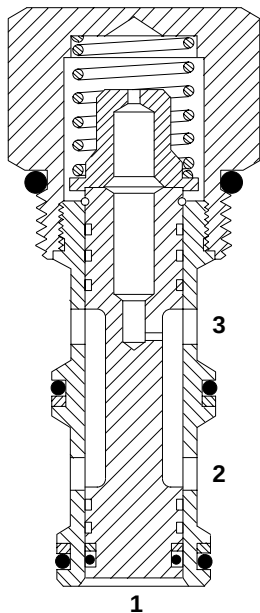


PCS3-20 Pressure compensator

Functional Symbol



Sectional View



Description

The PCS3-20 is a screw-in, pressure compensator (hydrostat) 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

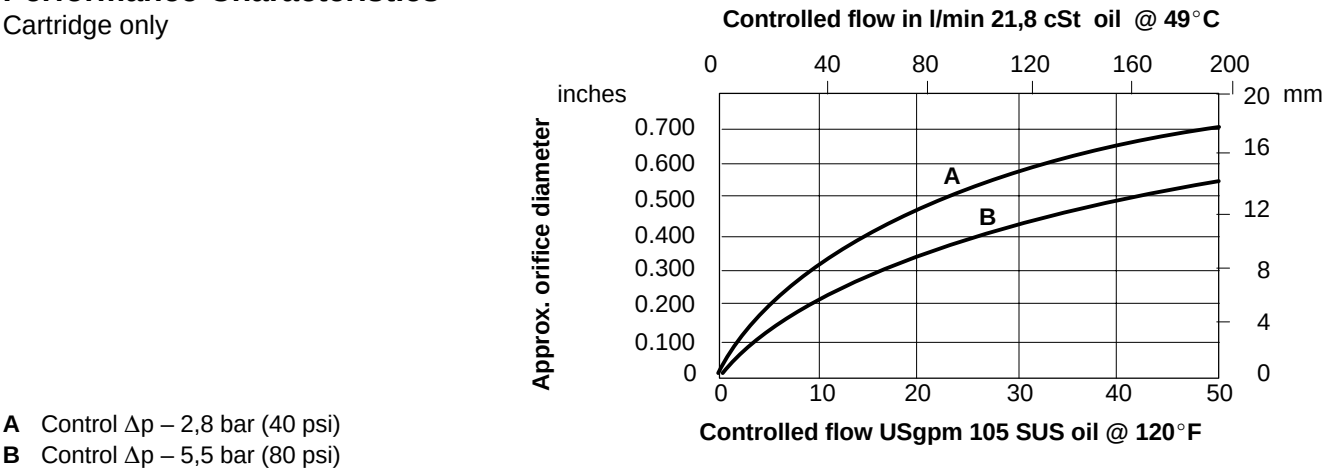
Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)

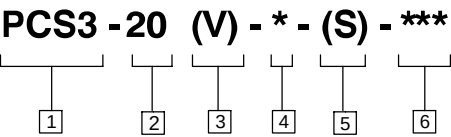
Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	189 l/min (50 USgpm)
Cavity	C-20-3 (See page 34)
Standard housing materials	Customized housings are necessary for close-coupling, the compensator and orifice.
Temperature 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	0,88 kg. (1.94 lbs.)
Seal kits	889616 Buna-N 02-175433 Viton®

Viton is a registered trademark of E.I.DuPont

Performance Characteristics

Cartridge only

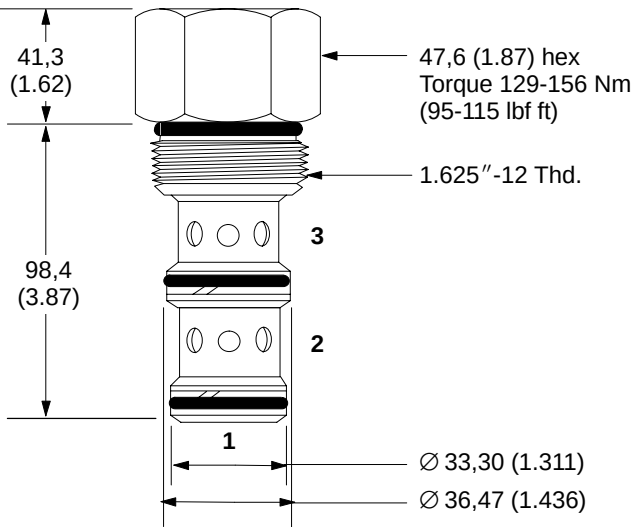




1 Function PCS3–Pressure compensator spool	4 Port size 0 – Cartridge only Customized housings are necessary for close-coupling, compensator and orifice.	6 Pressure differential (nominal) 80 – 5,5 bar (80 psi) 160– 11,0 bar (160 psi)
2 Size 20 – 20 Size	5 Spool seals Blank – No seal on spool S – Seal on spool. For load holding applications where leakage from port 1 to 2 could cause cylinder drift, use of seal will increase hysteresis.	
3 Seals Blank–Buna–N V – Viton		

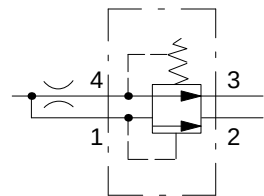
Dimensions

mm (inch)

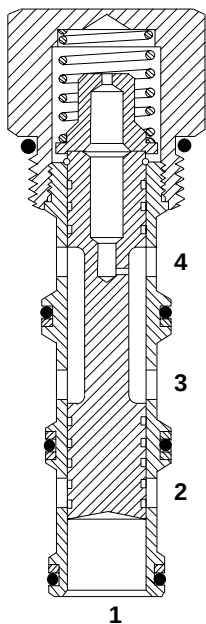


PCS4-10 Pressure compensator

Functional Symbol



Sectional View



Description

The PCS4-10 is a screw-in, pressure compensator (hydrostat) 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 off all flow.

Ratings and specifications

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

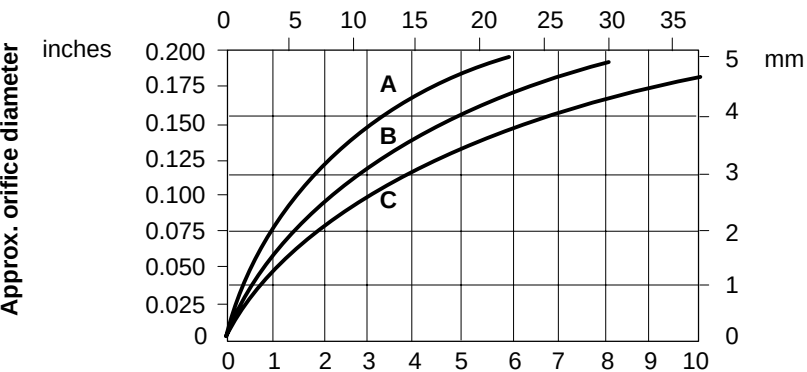
Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	38 l/min (10 USgpm)
Cavity	C-10-4 (See page 35)
Standard housing materials	Customized housings are necessary for close-coupling, the compensator and orifice.
Temperature 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	0,14 kg. (0.32 lbs.)
Seal kits	889651 Buna-N 889653 Viton®

Viton is a registered trademark of E.I.DuPont

Performance Characteristics

Cartridge only

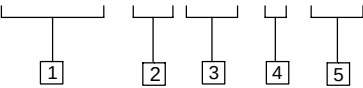
Controlled priority flow, port 3 in l/min 21,8 cSt oil @ 49°C



- A Control Δp – 2,8 bar (40 psi)
- B Control Δp – 5,5 bar (80 psi)
- C Control Δp – 11,0 bar (160 psi)

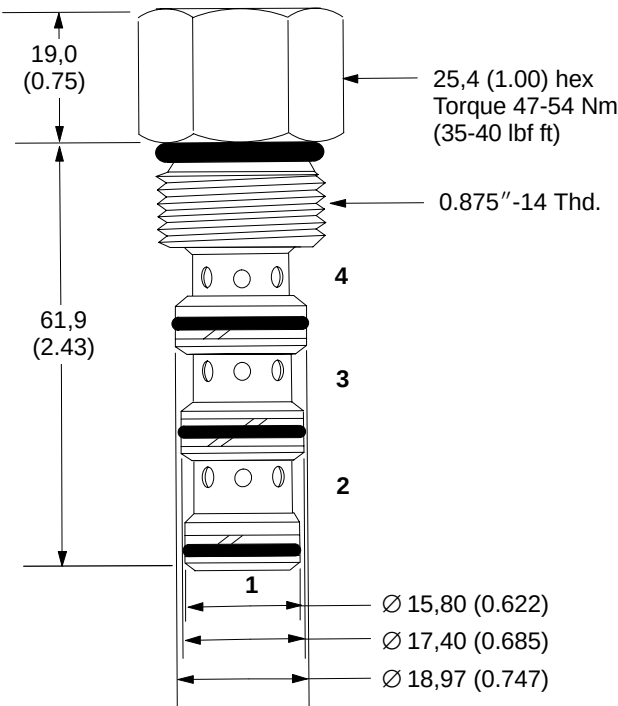
Controlled priority flow, port 3 USgpm 105 SUS oil @ 120°F

PCS4 - 10 (V) - * - ***



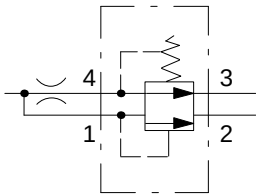
1 Function PCS4– Pressure compensator spool	4 Port size 0 – Cartridge only Customized housings are necessary for close-coupling, compensator and orifice.	5 Pressure differential (nominal) 40 – 2,8 bar (40 psi) 80 – 5,5 bar (80 psi) 160 – 11,0 bar (160 psi)
2 Size 10 – 10 Size		
3 Seals Blank– Buna–N V – Viton		

Dimensions mm (in)

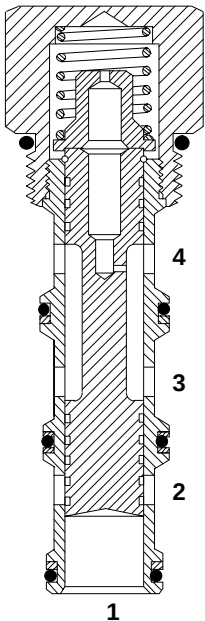


PCS4-16 Pressure compensator

Functional Symbol



Sectional View



Description

The PCS4-16 is a screw-in, pressure compensator (hydrostat) 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 off all flow.

Ratings and specifications

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

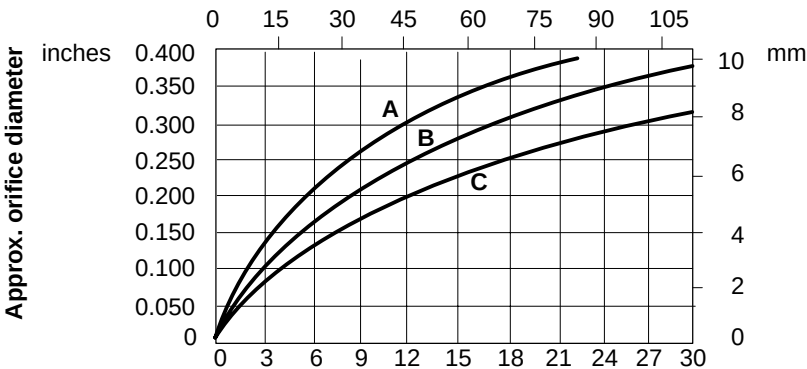
Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	114 l/min (30 USgpm)
Cavity	C-16-4 (See page 35)
Standard housing materials	Customized housings are necessary for close-coupling, the compensator and orifice.
Temperature 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	0,50 kg. (1.12 lbs.)
Seal kits	889660 Buna-N 02-175435 Viton®

Viton is a registered trademark of E.I.DuPont

Performance Characteristics

Cartridge only

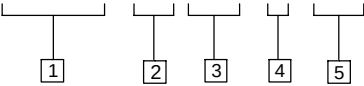
Controlled priority flow, port 3 in l/min 21,8 cSt oil @ 49°C



- A Control Δp – 2,8 bar (40 psi)
- B Control Δp – 5,5 bar (80 psi)
- C Control Δp – 11,0 bar (160 psi)

Controlled priority flow, port 3 USgpm 105 SUS oil @ 120°F

PCS4 - 16 (V) - * - ***



1 Function

PCS4 – Pressure compensator spool

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.

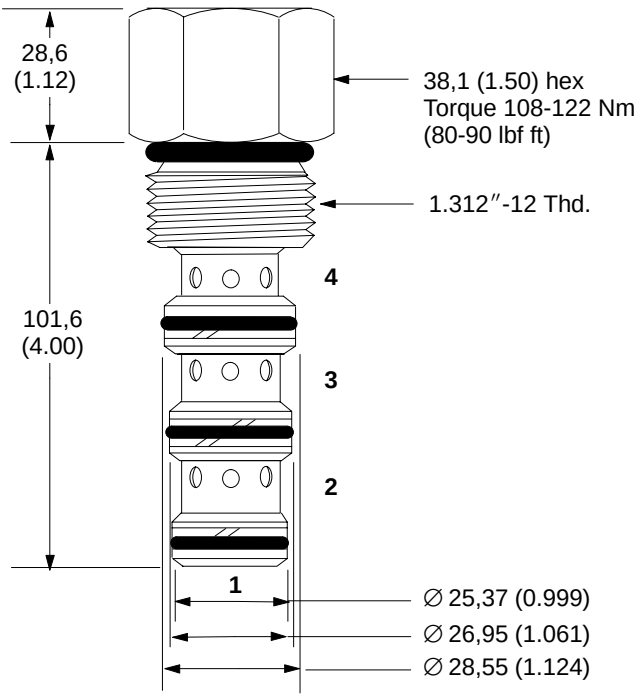
5 Pressure differential (nominal)

40 – 2,8 bar (40 psi)

80 – 5,5 bar (80 psi)

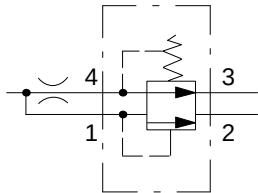
160– 11,0 bar (160 psi)

Dimensions mm (in)

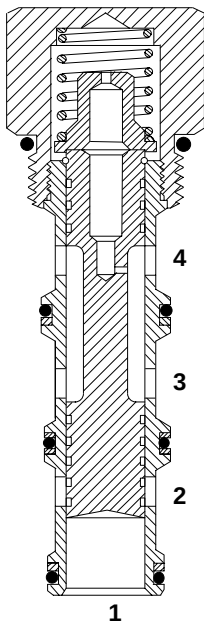


PCS4-20 Pressure compensator

Functional Symbol



Sectional View



Description

The PCS4-20 is a screw-in, pressure compensator (hydrostat) 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 priority flow (based on the pressure differential chosen) out port 3, regardless of pressure changes downstream on port 3. 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 the priority port and shut off the bypass flow, blocking off all flow.

Ratings and specifications

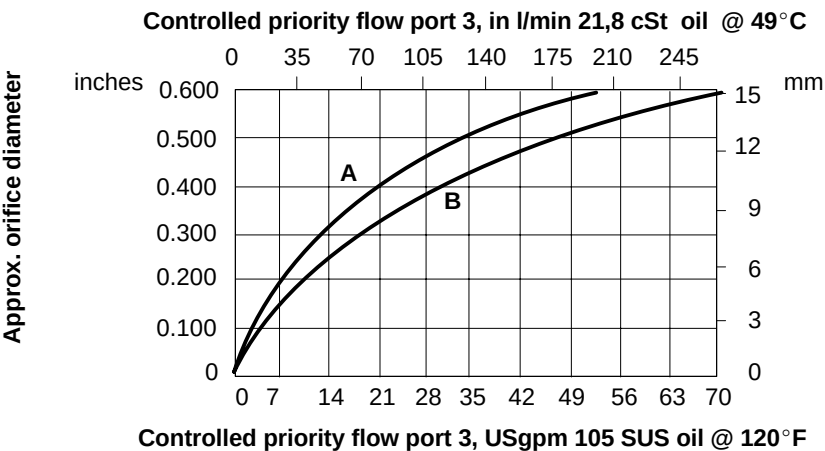
Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)

Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	189 l/min (50 USgpm)
Cavity	C-20-4 (See page 35)
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	0,50 kg. (1.12 lbs.)
Seal kits	889660 Buna-N 02-175435 Viton®

Viton is a registered trademark of E.I.DuPont

Performance Characteristics

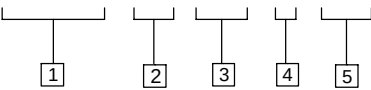
Cartridge only



A Control Δp – 2,8 bar (40 psi)

B Control Δp – 5,5 bar (80 psi)

PCS4 - 20 (V) - * - ***



1 Function

PCS4 – Pressure compensator spool

4 Port size

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

5 Pressure differential (nominal)

80 – 5,5 bar (80 psi)
160 – 11,0 bar (160 psi)

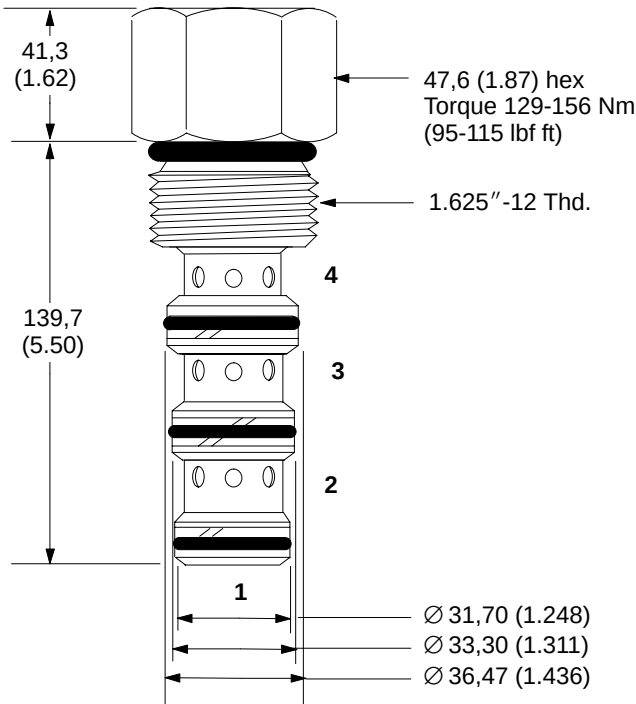
2 Size

20 – 20 Size

3 Seals

Blank – Buna–N
V – Viton

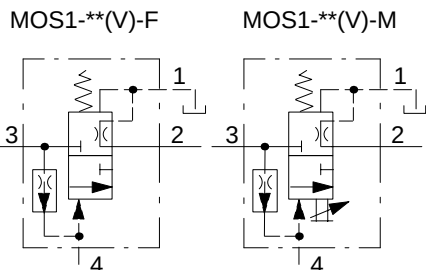
Dimensions mm (in)



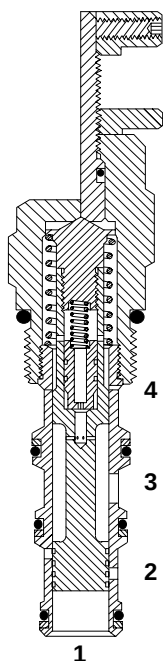
MOS1-10

Modulating orifice

Functional Symbol



Sectional View



Description

The MOS1-10 is a spool type, pilot operated, screw-in, modulating orifice.

Operation

This valve is used in series with a PCS3 or PCS4 pressure compensator (hydrostat), and a suitable back pressure pilot valve connected to port 4. Modulated flow is pressure compensated out port 2.

Ratings and specifications

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

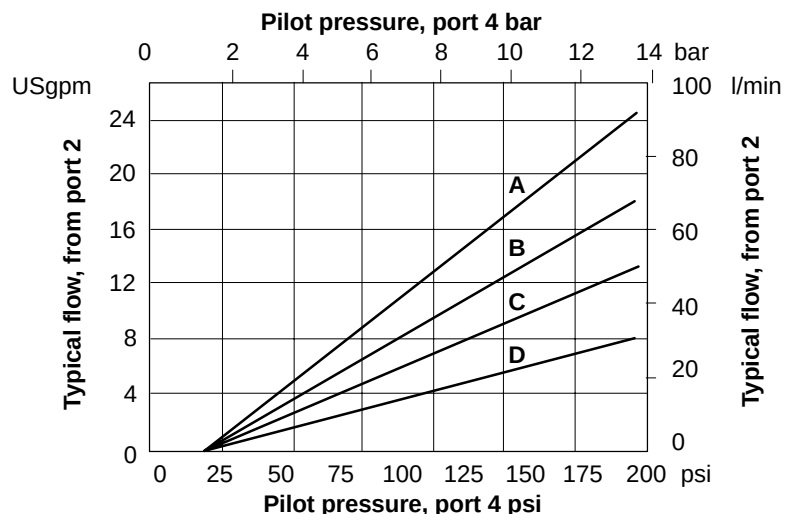
Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Controlled flow range (port 3 to 2)	0–38 l/min (0–10 USgpm)
Pilot pressure adjustment range	1,38–14 bar (20–200 psi)
Cavity	C-10-4 (See page 35)
Standard housing materials	The essential close-coupling with a pressure compensator necessitates a customized housing to accommodate both cartridges.
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	0,50 kg. (1.12 lbs.)
Seal kits	889660 Buna–N 02–175435 Viton®

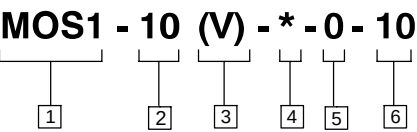
Viton is a registered trademark of E.I.DuPont

Performance Characteristics

Cartridge only

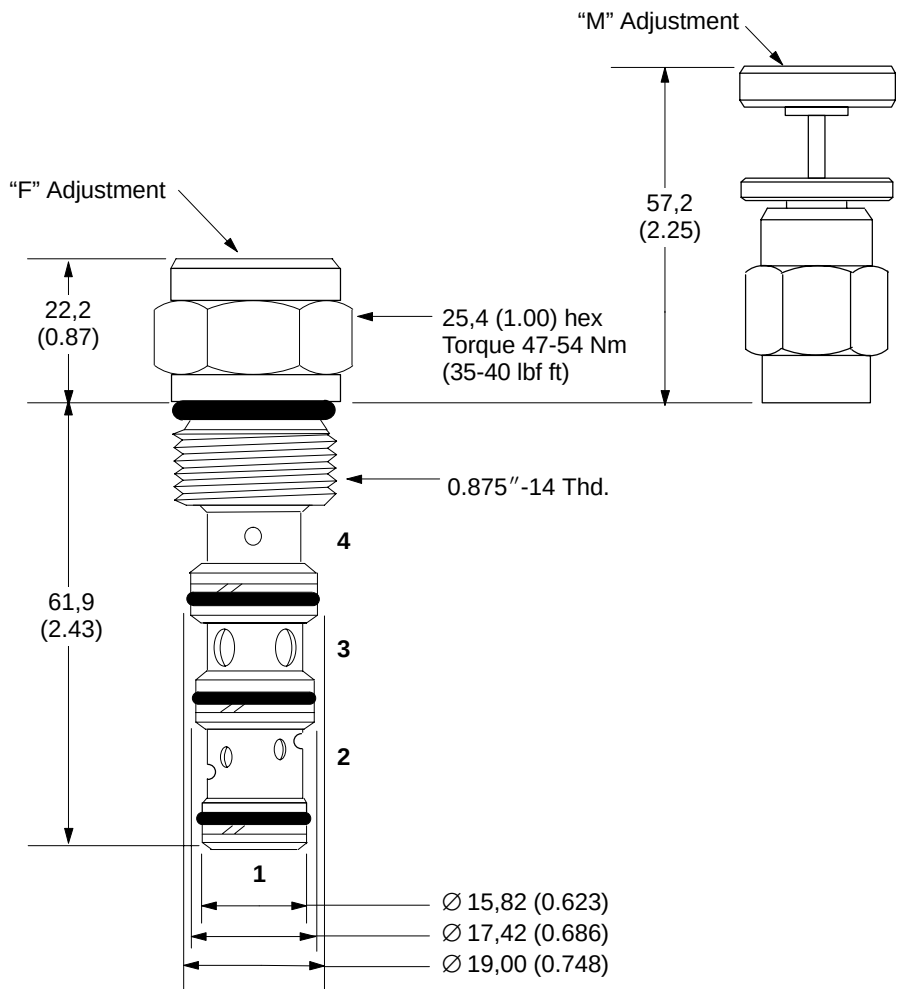
- A Control Δp – 16,5 bar (240 psi)
- B Control Δp – 11,0 bar (160 psi)
- C Control Δp – 5,5 bar (80 psi)
- D Control Δp – 2,8 bar (40 psi)





1 Function MOS1 – Modulating orifice	4 Spool position adjustment F – Fixed M – Manual override	6 Controlled flow range 10 – 0-38 l/min (0-10 USgpm)
2 Size 10 – 10 Size	5 Port size 0 – Cartridge only	
3 Seals Blank – Buna–N V – Viton		

Dimensions mm (in)



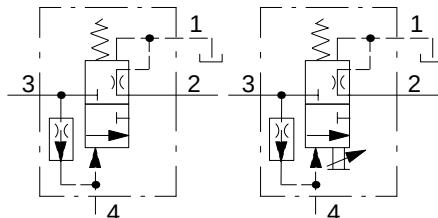
MOS1-16

Modulating orifice

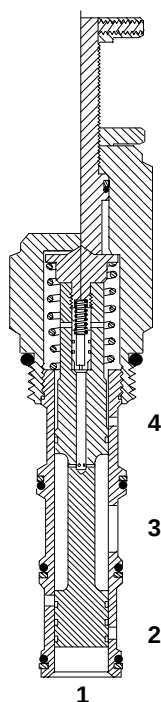
Functional Symbol

MOS1-**(V)-F

MOS1-**(V)-M



Sectional View



Description

The MOS1-16 is a spool type, pilot operated, screw-in, modulating orifice.

Operation

This valve is used to modulate flow from port 3 to port 2, proportional to a back pressure applied to pilot port 4. When used in series with a PCS3 or PCS4 pressure compensator (hydrostat), and a suitable back-pressure pilot valve connected to port 4, modulated flow is pressure compensated.

Ratings and specifications

Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (150°F)

Typical application pressure (all ports) 210 bar (3000 psi)

Cartridge fatigue pressure (infinite life) 210 bar (3000 psi)

Controlled flow range (port 3 to 2) 0 – 132 l/min (0 – 35 USgpm)

Pilot pressure adjustment range 1,38–14 bar (20–200 psi)

Cavity C-16-4 (See page 35)

Standard housing materials The essential close-coupling with a pressure compensator necessitates a customized housing to accommodate both cartridges.

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 0,52 kg. (1.14 lbs.)

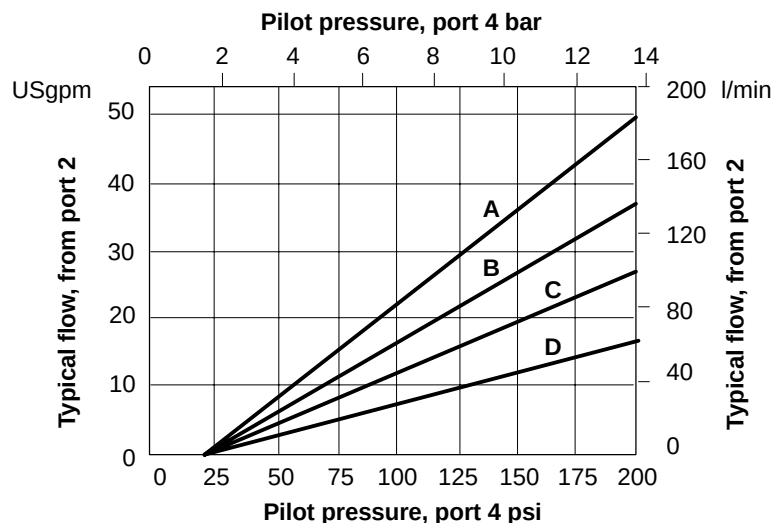
Seal kits 889634 Buna-N
889638 Viton®

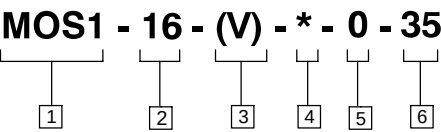
Viton is a registered trademark of E.I. DuPont

Performance Characteristics

Cartridge only

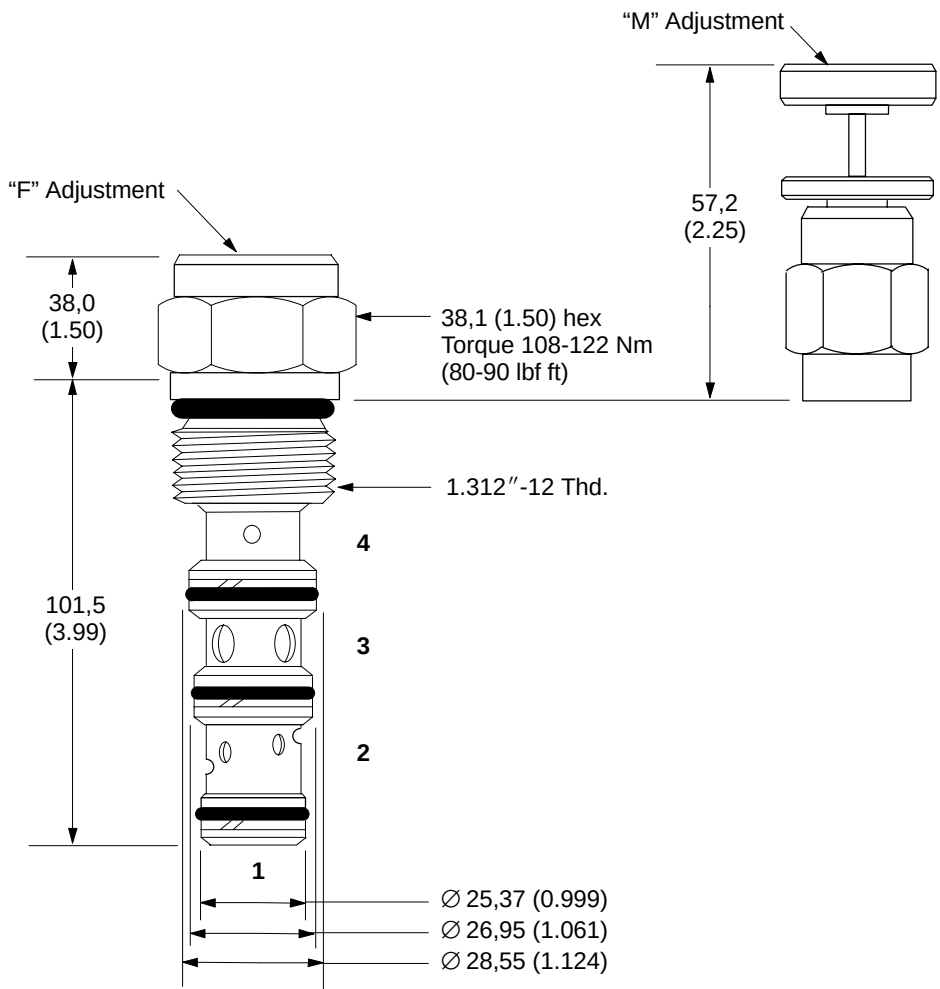
- A Control Δp – 16,5 bar (240 psi)
- B Control Δp – 11,0 bar (160 psi)
- C Control Δp – 5,5 bar (80 psi)
- D Control Δp – 2,8 bar (40 psi)





1 Function MOS1 – Modulating orifice	4 Spool position adjustment F – Fixed M – Manual override	6 Controlled flow range 35 – 0-132 l/min (0-35 USgpm)
2 Size 16 – 16 Size	5 Port size 0 – Cartridge only	
3 Seals Blank – Buna–N V – Viton		

Dimensions mm (in)

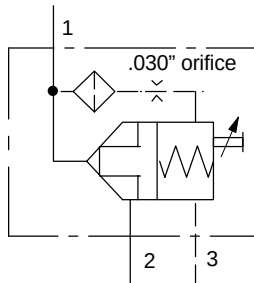


DPS2-10

Differential pressure sensing valve

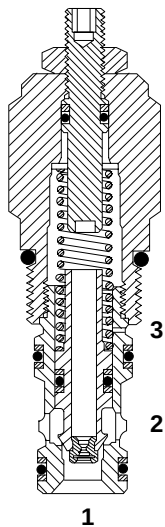
Functional Symbol

DPS2-10(V)-B-S



Sectional View

DPS2-10(V)-B-S



Description

The DPS2-10 is a differential pressure sensing valve, available as either a spool or poppet type, vented or pilot operated.

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 in the front of this catalog.

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) 240 bar (3500 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, poppet type .. Port 1 to 2; <5 drops/min. max. @350 bar (5000 psi)

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-10-3S (See page 34)

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 0,14 kg. (0.30 lbs.)

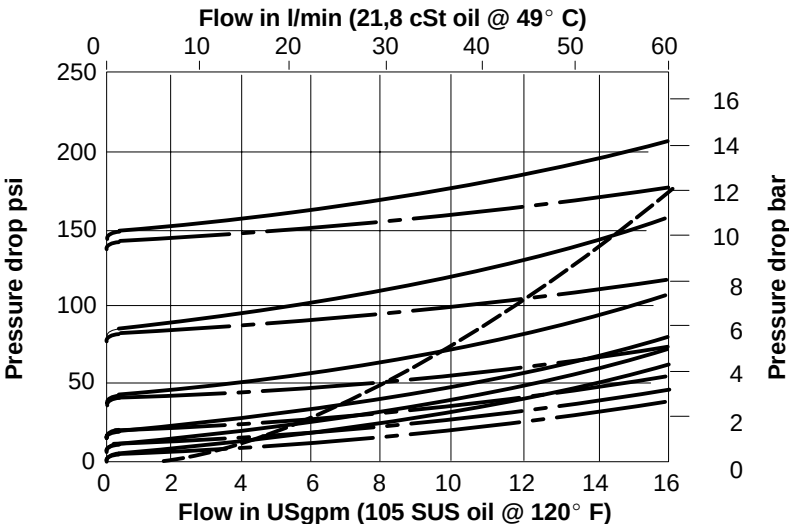
Seal kits 889650 Buna-N
889652 Viton®

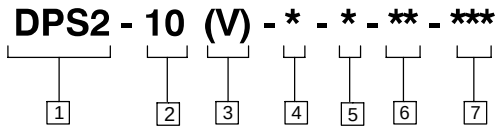
Viton is a registered trademark of E.I.DuPont

Pressure Drop Curves

Cartridge only

———— B/S/T models
- - - - - P/V models
- - - - - F/R models





1 Function
DPS2 – Differential pressure sensing

2 Size
10 – 10 Size

3 Seals
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
V – Spool, N/C
R – Spool, pressure reducing, N/O
F – Spool, flow control, N/O

5 Stroke adjustment
F – None (Fixed stroke)
S – Screw adjustment

6 Port Size
O – Cartridge only

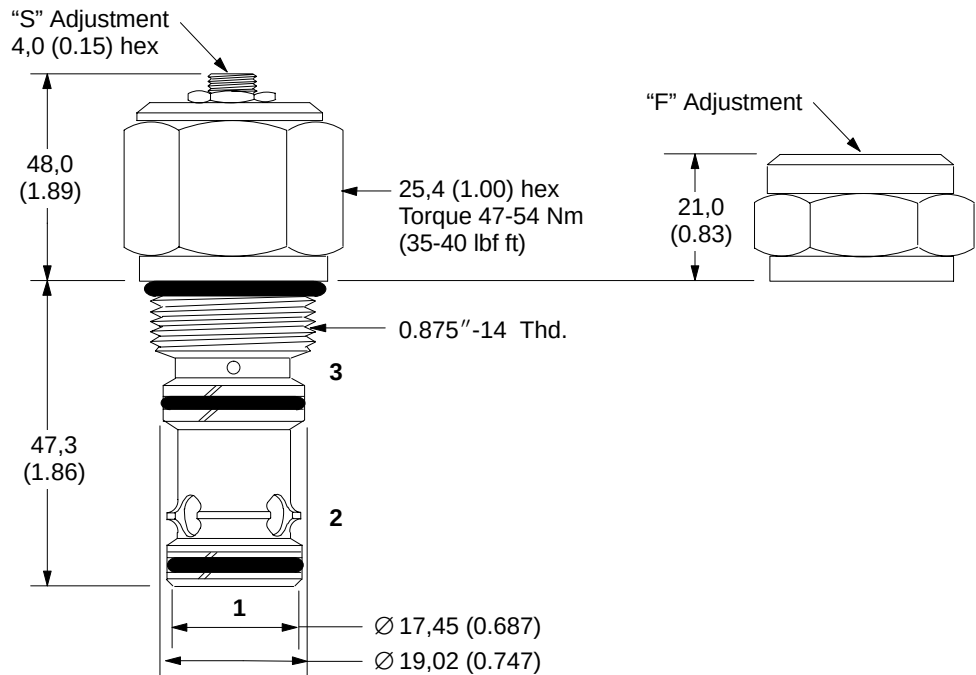
Code	Port size	Housing number Aluminum
3B	3/8" BSPP	02–175470
6T	SAE 6	566413
6H	SAE 6	876706
8H	SAE 8	876712
2G	1/4" BSPP	876707
3G	3/8" BSPP	876710

See page 36 for housings

7 Differential pressure
5 – 0,35 bar (5 psi)+ ■
10 – 0,7 bar (10 psi) + ■
20 – 1,40 bar (20 psi) + ■

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

Dimensions mm (in)

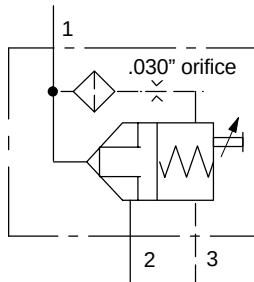


DPS2-16

Differential pressure sensing valve

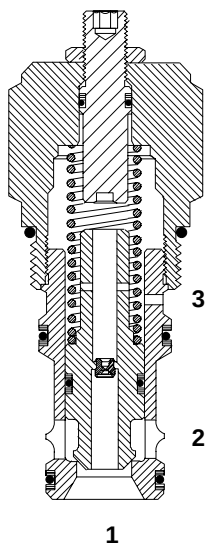
Functional Symbol

DPS2-16(V)-B-S



Sectional View

DPS2-16(V)-B-S



Description

The DPS2-16 is a differential pressure sensing valve, available as either a spool or poppet type, vented or pilot operated.

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 in the front of this catalog.

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) 240 bar (3500 psi)

Rated flow 189 l/min (50 USgpm)

Pilot ratio (spool type P, V, R, F) 1:1
(poppet type B, S, T) 2:1

Internal leakage, poppet type .. Port 1 to 2; <5 drops/min. max. @350 bar (5000 psi)

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-16-3S (See page 34)

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 0,35 kg. (0.78 lbs.)

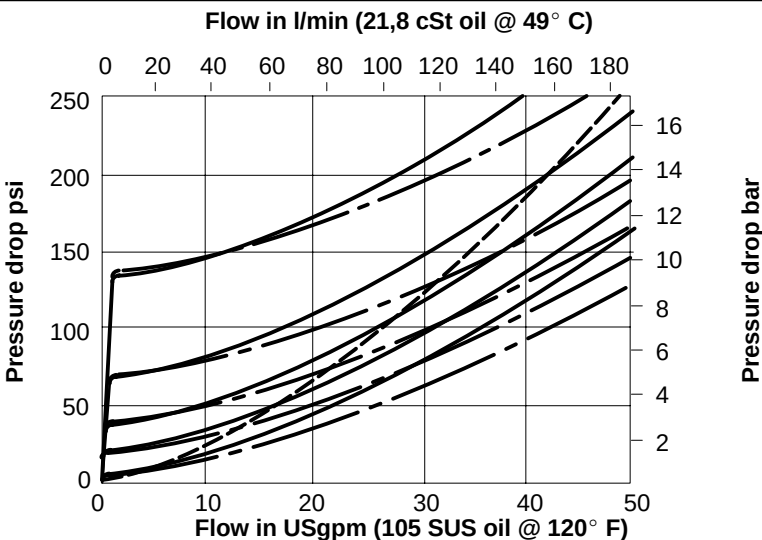
Seal kits 889659 Buna-N
02-165871 Viton®

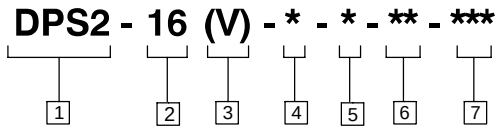
Viton is a registered trademark of E.I.DuPont

Pressure Drop Curves

Cartridge only

———— B/S/T models
- - - - - P/V models
- - - - - F/R models





1 Function

DPS2–Differential pressure sensing

2 Size

16 – 16 Size

3 Seals

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
V – Spool, N/C
R – Spool, pressure reducing, N/O
F – Spool, flow control, N/O

5 Stroke adjustment

F – None (Fixed stroke)
S – Screw adjustment

6 Port Size

O – Cartridge only

Code	Port size	Housing number Aluminum
4B	3/4" BSPP	02-175471
12T	SAE 12	566414
10H	SAE 10	876725
12H	SAE 12	876727
4G	1/2" BSPP	02-160676
6G	3/4" BSPP	876726

See page 36 for housings

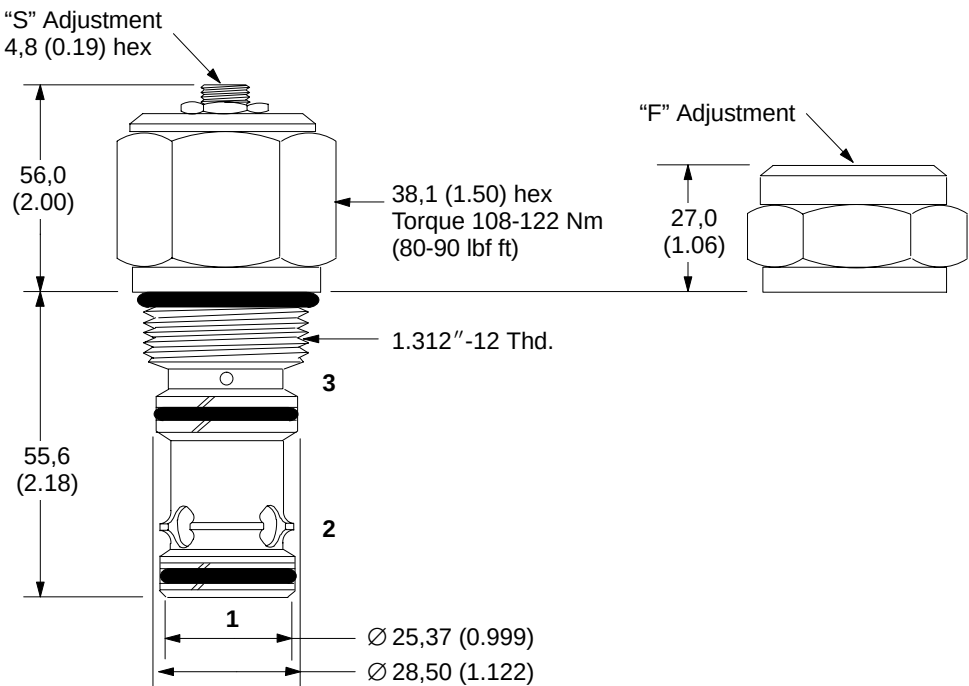
7 Differential pressure

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 “T” poppet
■ The operating back pressure at port 3 should never be less than 1.3 times the spring set pressure

Dimensions mm (in)

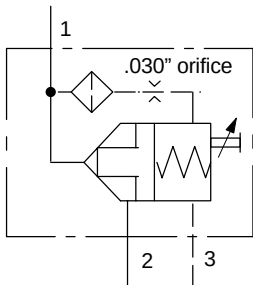


DPS2-20

Differential pressure sensing valve

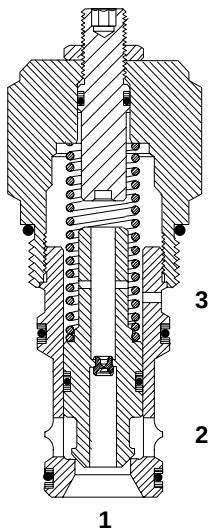
Functional Symbol

DPS2-20(V)-B-S



Sectional View

DPS2-20(V)-B-S



Description

The DPS2-20 is a differential pressure sensing valve, available as either a spool or poppet type, vented or pilot operated.

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 in the front of this catalog.

Ratings and specifications

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

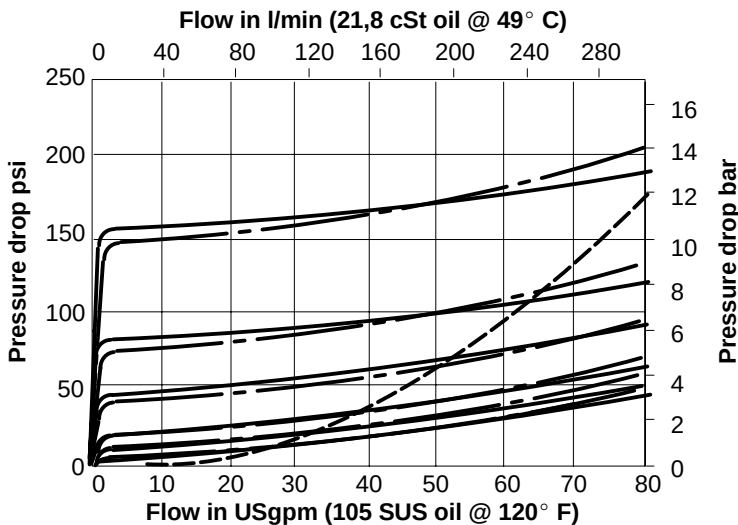
Typical application pressure (spool type)	290 bar (4200 psi)
(poppet type)	240 bar (3500 psi)
Rated flow	303 l/min (80 USgpm)
Pilot ratio (spool type P, V, R, F)	1:1
(poppet type B, S, T)	2:1
Internal leakage, poppet type	Port 1 to 2; <5 drops/min. max. @350 bar (5000 psi)
Internal leakage, spool type	82 cm ³ /min (5 in ³ /min.) max. @350 bar (5000 psi)
Temperature range	-40 to 120° C (-40° to 248° F)
Cavity	C-20-3S (See page 34)
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®

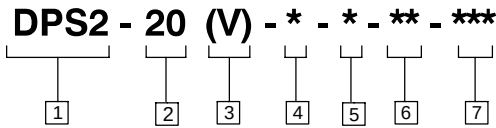
Viton is a registered trademark of E.I.DuPont

Pressure Drop Curves

Cartridge only

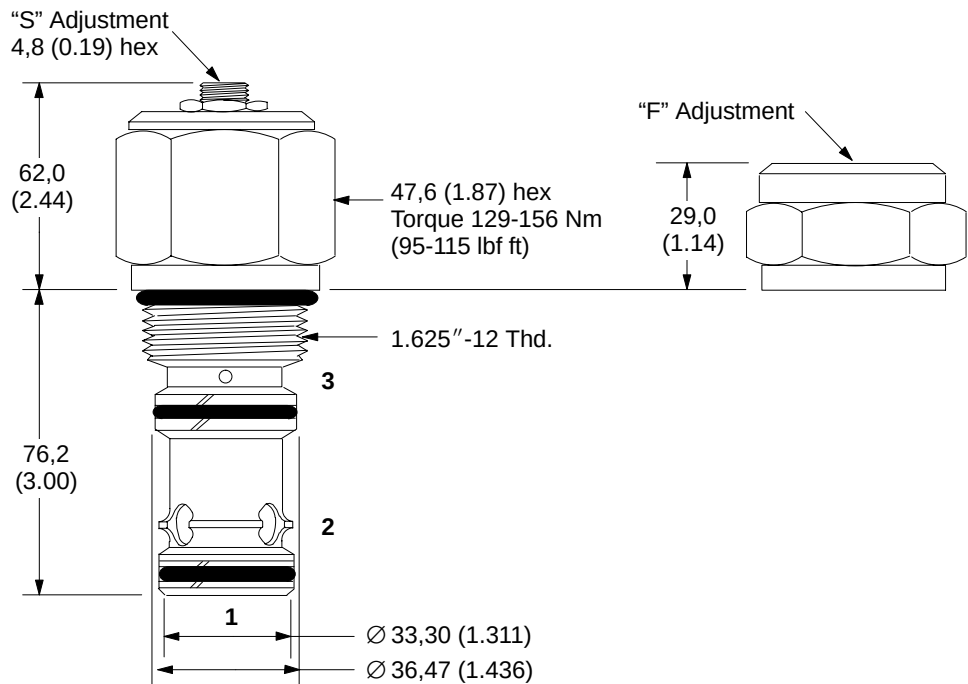
- B/S/T models
- P/V models
- F/R models



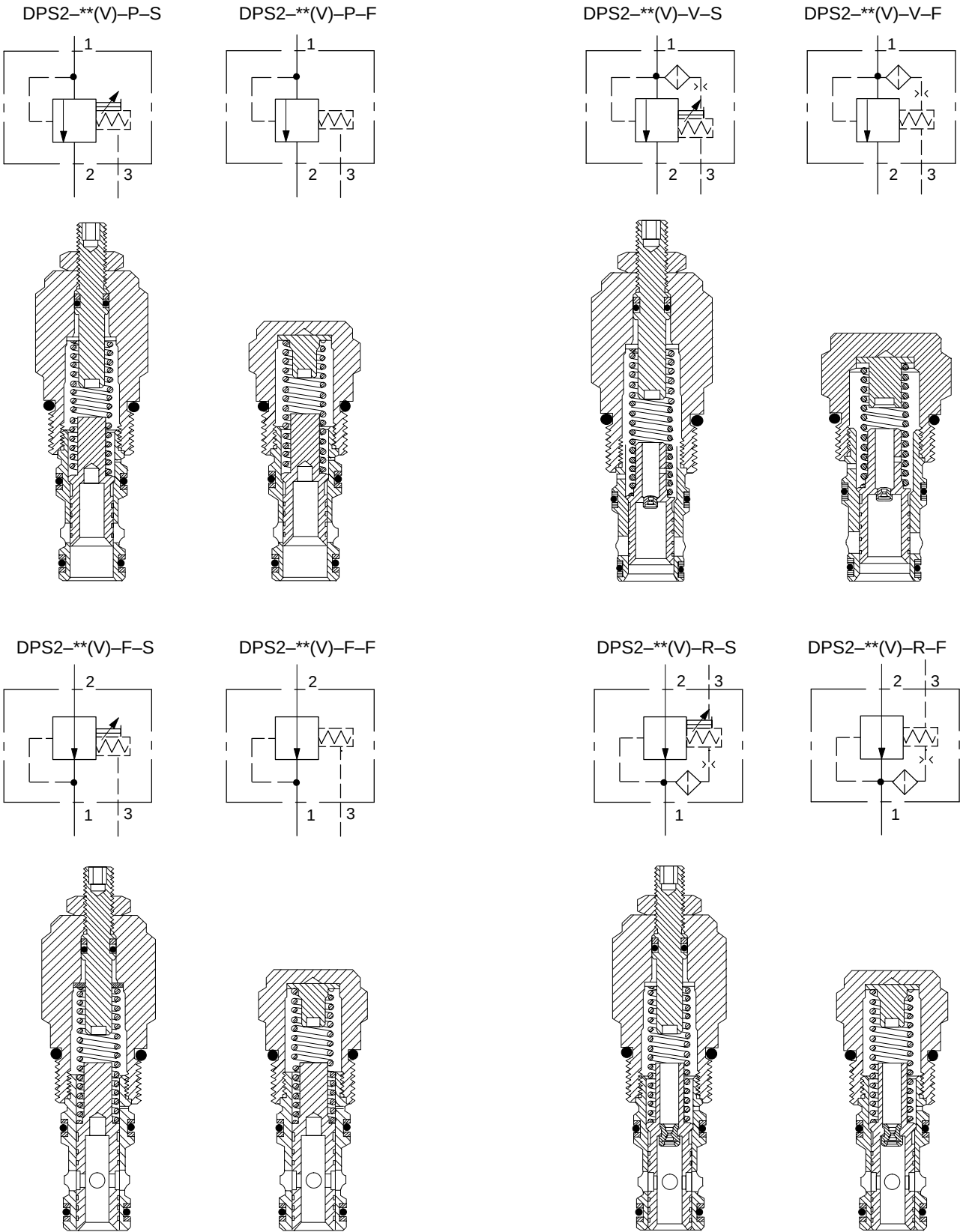


1 Function DPS2–Differential pressure sensing	5 Stroke adjustment F – None (Fixed stroke) S – Screw adjustment	7 Differential pressure 5 – 0,35 bar (5 psi)+ ■ 10 – 0,7 bar (10 psi) + ■ 20 – 1,40 bar (20 psi) + ■ 40 – 2,80 bar (40 psi) 80 – 5,50 bar (80 psi) 160– 11,0 bar (160 psi) + Not available with the “B” and “T” poppet ■ The operating back pressure at port 3 should never be less than 1.3 times the spring set pressure																					
2 Size 20 – 20 Size	6 Port Size O – Cartridge only																						
3 Seals Blank–Buna–N V – Viton	<table><tr><th>Code</th><th>Port size</th><th>Housing number Aluminum</th></tr><tr><td>8B</td><td>1" BSPP</td><td>02–175472</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></table> See page 36 for housings	Code	Port size	Housing number Aluminum	8B	1" BSPP	02–175472	16T	SAE 16	566415	12H	SAE 12	876741	16H	SAE 16	876743	6G	3/4" BSPP	876740	8G	1" BSPP	876742	
Code	Port size	Housing number Aluminum																					
8B	1" BSPP	02–175472																					
16T	SAE 16	566415																					
12H	SAE 12	876741																					
16H	SAE 16	876743																					
6G	3/4" BSPP	876740																					
8G	1" BSPP	876742																					
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 V – Spool, N/C R – Spool, pressure reducing, N/O F – Spool, flow control, N/O																							

Dimensions mm (in)

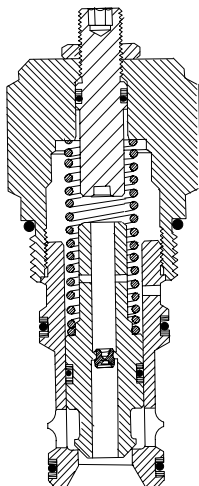
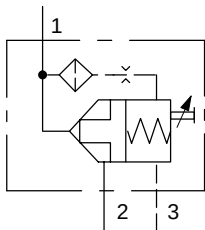


DPS2 – Spool Type Functional Symbols

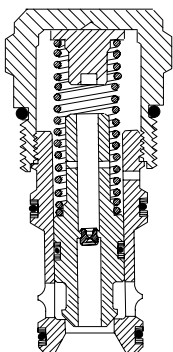
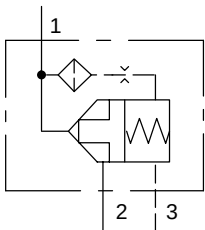


DPS2 – Poppet Type Functional Symbols

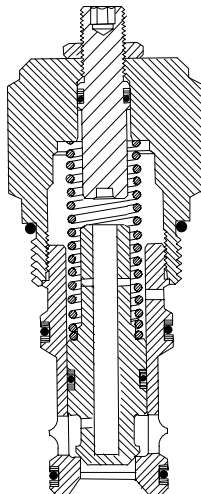
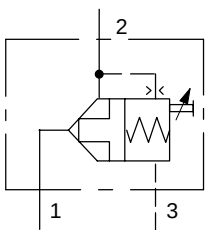
DPS2-**(V)-B-S



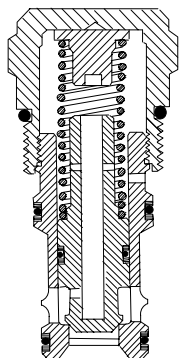
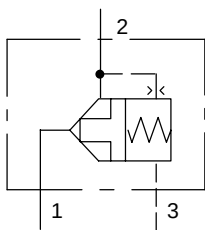
DPS2-**(V)-B-F



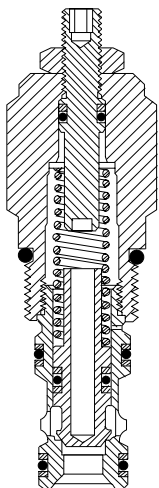
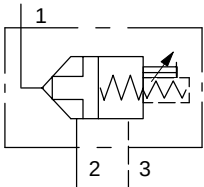
DPS2-**(V)-S-S



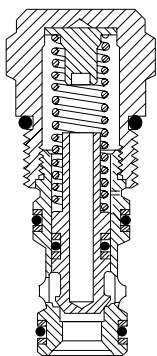
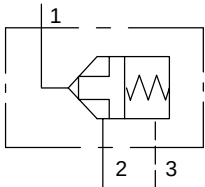
DPS2-**(V)-S-F



DPS2-**(V)-T-S



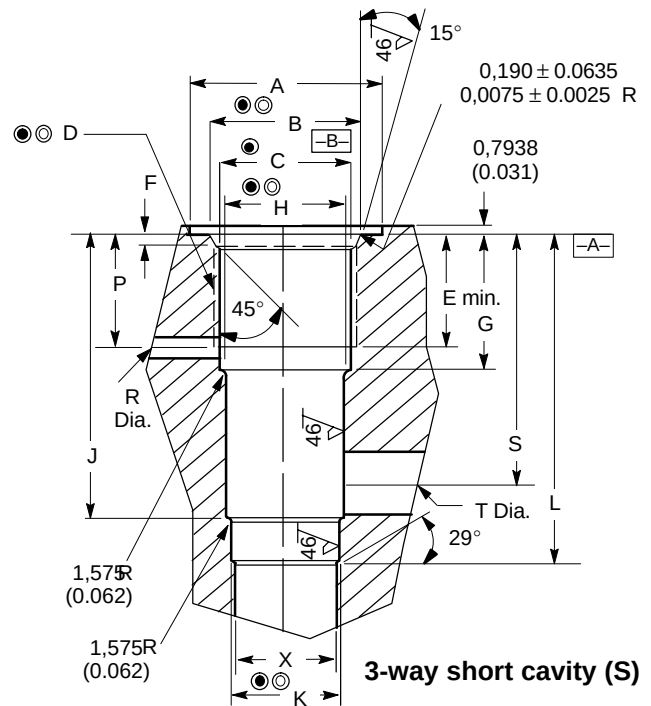
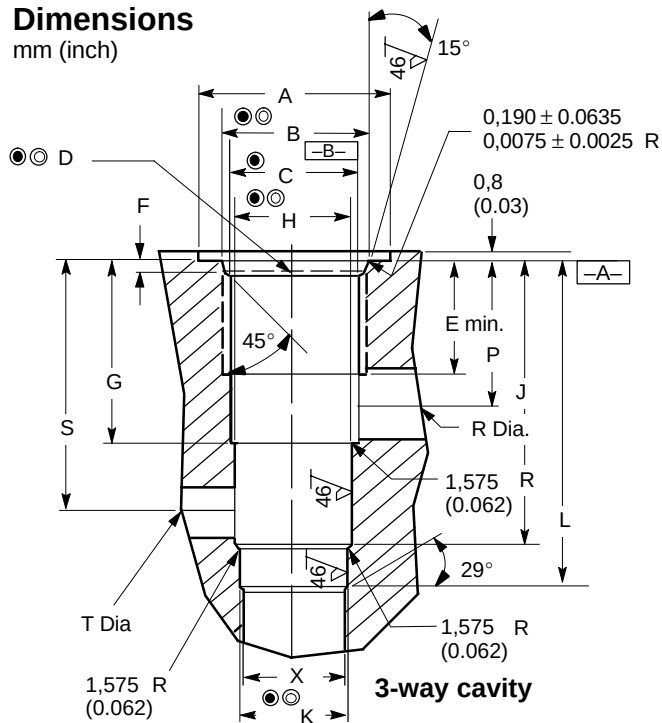
DPS2-**(V)-T-F



Standard Cavity Dimensions

Dimensions

mm (inch)



Cavity	A Spotface	B +0,051 0 (+0,002 0)	C +0,051 0 (+0,002 0)	D	E Full Thread	F	G	H ± 0,0254 (± 0.001)	J	K ± 0,0254 (± 0.001)	L
C-10-3	30,16 (1.188)	24,00 (0.945)	20,62 (0.812)	0.875"-14	15,88 (0.625)	2,54/2,92 (0.100/0.115)	21,59 (0.850)	17,50 (0.689)	38,10 (1.500)	15,90 (0.626)	47,62 (1.875)
C-10-3S	30,16 (1.188)	24,00 (0.945)	20,62 (0.812)	0.875"-14	14,29 (0.562)	2,54/2,92 (0.100/0.115)	16,51 (0.650)	19,08 (0.751)	38,48 (1.515)	17,50 (0.689)	47,62 (1.875)
C-16-3	44,45 (1.750)	35,58 (1.401)	31,34 (1.234)	1.312"-12	22,22 (0.875)	3,30/3,68 (0.130/0.145)	34,14 (1.344)	28,62 (1.127)	62,71 (2.469)	27,02 (1.064)	75,39 (2.968)
C-16-3S	44,45 (1.750)	35,58 (1.401)	31,34 (1.234)	1.312"-12	17,46 (0.687)	3,30/3,68 (0.130/0.145)	20,62 (0.812)	28,62 (1.127)	46,02 (1.812)	25,45 (1.002)	55,58 (2.188)
C-20-3	57,66 (2.270)	43,59 (1.716)	39,12 (1.540)	1.625"-12	20,64 (0.812)	3,35/3,73 (0.132/0.147)	44,45 (1.750)	36,55 (1.439)	85,72 (3.375)	33,38 (1.314)	100,02 (3.938)
C-20-3S	57,66 (2.270)	43,59 (1.716)	39,12 (1.540)	1.625"-12	20,64 (0.812)	3,35/3,73 (0.132/0.147)	23,82 (0.938)	36,55 (1.439)	64,29 (2.531)	33,38 (1.314)	77,77 (3.062)

Cavity	P	R Max. Dia.	S	T Max. Dia.	X Max. Dia.
C-10-3	18,26 (0.719)	6,35 (0.250)	34,13 (1.344)	6,35 (0.250)	14,28 (0.562)
C-10-3S	14,29 (0.562)	3,18 (0.125)	30,96 (1.218)	13,49 (0.531)	15,88 (0.625)
C-16-3	24,60 (0.968)	15,88 (0.625)	53,18 (2.093)	15,88 (0.625)	19,05 (0.750)
C-16-3S	16,67 (0.656)	6,35 (0.250)	37,31 (1.469)	15,88 (0.625)	19,05 (0.750)
C-20-3	30,96 (1.218)	25,40 (1.000)	71,44 (2.812)	25,40 (1.000)	30,16 (1.188)
C-20-3S	19,84 (0.781)	6,35 (0.250)	50,00 (1.968)	25,40 (1.000)	30,16 (1.188)

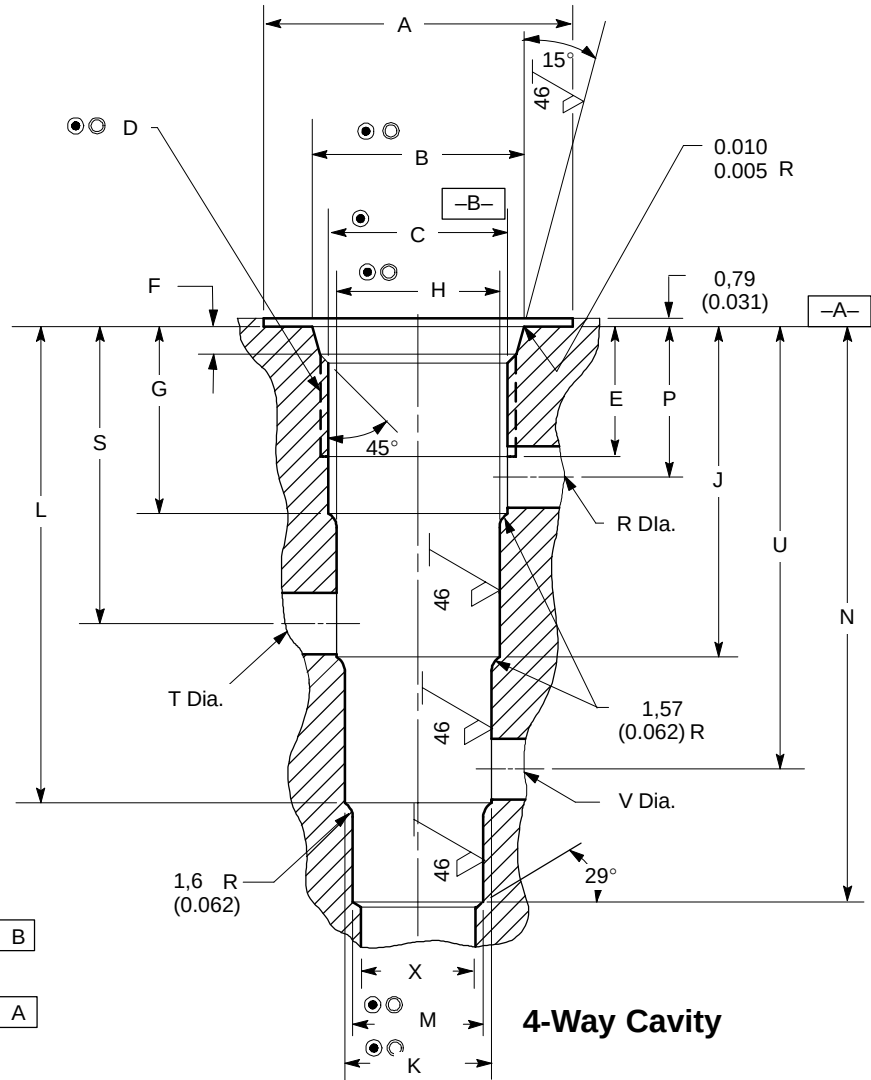
● These diameters $\nabla 0,051$ mm (.002 inch) B unless otherwise specified.

○ These diameters $\square 0,025$ mm (.001 inch) A unless otherwise specified.

Standard Cavity Dimensions

Dimensions

mm (inch)



These diameters $\begin{array}{|c|} \hline 0,051 \text{ mm (.002 inch)} \\ \hline \end{array}$ B unless otherwise specified.

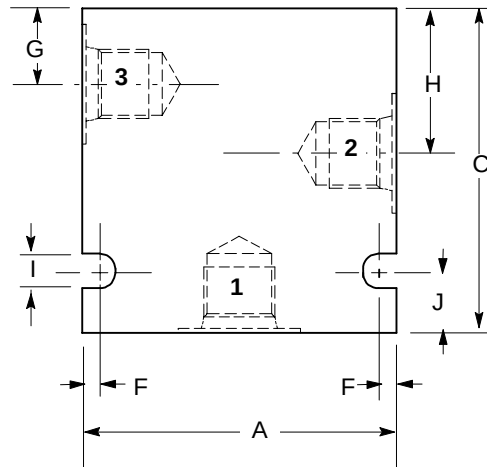
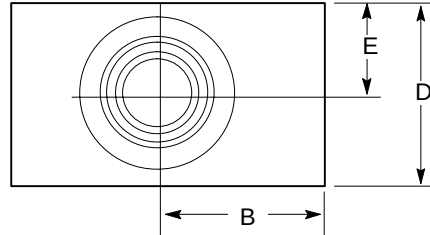
These diameters $\begin{array}{|c|} \hline 0,025 \text{ mm (.001 inch)} \\ \hline \end{array}$ A unless otherwise specified.

Cavity mm (in.)	A Spotface	B $\begin{array}{ c } \hline +0,051 \\ 0 \\ (+0.002 \\ 0) \\ \hline \end{array}$	C $\begin{array}{ c } \hline +0,051 \\ 0 \\ (+0.002 \\ 0) \\ \hline \end{array}$	D	E Full Thread	F	G	H $\begin{array}{ c } \hline \pm 0,0254 \\ (\pm 0.001) \\ \hline \end{array}$	J	K $\begin{array}{ c } \hline \pm 0,0254 \\ (\pm 0.001) \\ \hline \end{array}$
C-10-4	30,16 (1.188)	24,00 (0.945)	20,62 (0.812)	0.875"-14	15,88 (0.625)	2,54/2,92 (0.100/0.115)	22,22 (0.875)	19,08 (0.751)	38,10 (1.500)	17,50 (0.689)
C-16-4	44,45 (1.750)	35,58 (1.401)	31,34 (1.234)	1.312"-12	22,22 (0.875)	3,30/3,68 (0.130/0.145)	34,14 (1.344)	28,62 (1.127)	62,71 (2.469)	27,02 (1.064)
C-20-4	57,66 (2.270)	43,59 (1.716)	39,12 (1.540)	1.625"-12	20,64 (0.812)	3,35/3,73 (0.132/0.147)	44,45 (1.750)	36,55 (1.439)	85,72 (3.375)	33,38 (1.314)
Cavity mm (in.)	L	M $\begin{array}{ c } \hline \pm 0,0254 \\ (\pm 0.001) \\ \hline \end{array}$	N	P	R Max. Dia.	S	T Max. Dia.	U	V	X Max. Dia.
C-10-4	53,98 (2.125)	15,90 (0.626)	63,50 (2.500)	18,26 (0.718)	6,35 (0.250)	34,13 (1.343)	6,35 (0.250)	50,00 (1.968)	6,35 (0.250)	14,29 (0.562)
C-16-4	91,29 (3.594)	25,45 (1.002)	103,99 (4.094)	24,60 (0.968)	15,88 (0.625)	53,18 (2.093)	15,88 (0.625)	81,76 (3.218)	15,88 (0.625)	19,05 (0.750)
C-20-4	127,00 (5.000)	31,78 (1.251)	141,27 (5.562)	30,96 (1.218)	25,40 (1.000)	71,44 (2.812)	25,40 (1.000)	112,71 (4.437)	25,40 (1.000)	30,16 (1.188)

C-**-3S Aluminum Housings

Housing	Ports 1, 2 & 3	Part Number
C-10-3S Light Duty	SAE 6	566413
	3/8" BSPP	02-175470
C-16-3S Light Duty	3/4" BSPP	02-175471
	SAE 12	566414
C-20-3S Light Duty	1" BSPP	02-175472
	SAE 16	566415
C-10-3S Fatigue Rated	1/4" BSPP	876707
	3/8" BSPP	876710
	SAE 6	876706
	SAE 8	876712
C-16-3S Fatigue Rated	1/2" BSPP	02-160676
	3/4" BSPP	876726
	SAE 10	876725
	SAE 12	876727
C-20-3S Fatigue Rated	3/4" BSPP	876740
	1" BSPP	876742
	SAE 12	876741
	SAE 16	876743

Note: BSPP porting is designated by either "B" or "G" in the model code
SAE porting is designated by either "H" or "T" in the model code



Cavity mm (inch)	A	B	C	D	E	F	G	H	I	J	Mass kg (lb.)
C-10-3S Light Duty	63,5 (2.50)	34,9 (1.37)	69,8 (2.75)	38,1 (1.50)	19,1 (3.00)	3,1 (0.12)	12,7 (0.50)	31,7 (1.25)	7,1 (0.28)	12,7 (0.50)	0,2 (0.51)
C-16-3S Light Duty	88,9 (3.50)	47,6 (1.87)	88,9 (3.50)	60,3 (2.37)	30,1 (1.63)	4,0 (0.16)	17,4 (0.68)	38,1 (1.50)	8,7 (0.34)	19,0 (0.75)	0,7 (1.66)
C-20-3S Light Duty	101,6 (4.00)	57,1 (2.25)	107,9 (4.25)	69,8 (2.75)	34,9 (1.37)	4,0 (0.16)	20,6 (0.81)	50,8 (2.00)	8,7 (0.34)	19,0 (0.75)	1,2 (2.62)
C-10-3S Fatigue Rated	76,2 (3.00)	38,1 (1.50)	76,2 (3.00)	50,8 (2.00)	25,4 (1.00)	9,5 (0.37)	16,8 (0.66)	33,5 (1.32)	7,1 (0.28)	19,0 (0.75)	0,7 (1.65)
C-16-3S Fatigue Rated	114,3 (4.50)	60,3 (2.37)	114,3 (4.50)	63,5 (2.50)	31,7 (1.25)	10,3 (0.40)	20,4 (0.80)	41,1 (1.62)	8,7 (0.34)	25,4 (1.00)	2,0 (4.40)
C-20-3S Fatigue Rated	127,0 (5.00)	63,5 (2.50)	127,0 (5.00)	82,5 (3.25)	41,2 (1.62)	10,3 (0.40)	24,9 (0.98)	55,0 (2.17)	8,7 (0.34)	25,4 (1.00)	3,6 (8.00)

Supporting Products

Roughing Tools

Roughers are basically step drills which leave .030" per cutting diameter and .015" above all radii for the finishing reamer, with an additional .015" depth in the cavity bottom as clearance.

The roughing tool is necessary to prepare the cavity for the finishing

reamer, which has not been designed for the primary forming or bottom cutting.

We offer two types of roughers, one for aluminum and one for steel. The aluminum rougher is manufactured with a 4 facet point and polished flutes. The

steel rougher is supplied with a standard drill point. Both types will work in either material, however, longevity of an aluminum tool will be sacrificed when used continually in steel.

Cavity	Material	Model Code	Assembly Number
3-Way			
C-10-3	Aluminum	RT-10-3-A-8038	889511
C-10-3	Steel	RT-10-3-S-8043	889512
C-16-3	Aluminum	RT-16-3-A-8039	565825
C-16-3	Steel	RT-16-3-S-8044	889517
C-20-3	Aluminum	RT-20-3-A-8041	02-165581
C-20-3	Steel	RT-20-3-S-8046	566706
3-Way Short			
C-10-3S	Aluminum	RT-10-3S-A-8099	565824
C-10-3S	Steel	RT-10-3S-S-8209	566703
C-16-3S	Aluminum	RT-16-3S-A-8040	02-165582
C-16-3S	Steel	RT-16-3S-S-8045	566704
C-20-3S	Aluminum	RT-20-3S-A-8042	889520
C-20-3S	Steel	RT-20-3S-S-8047	566705
4-Way			
C-10-4	Aluminum	RT-10-4-A-8072	889513
C-10-4	Steel	RT-10-4-S-8073	889514
C-16-4	Aluminum	RT-16-4-A-8074	889518
C-16-4	Steel	RT-16-4-S-8075	565828
C-20-4	Aluminum	RT-20-4-A-8076	565829
C-20-4	Steel	RT-20-4-S-8077	566707

Finishing Tools

These finishing tools have been designed as precision reamers for finishing operations only. They are not intended for primary forming or bottom

cutting operations. Vickers recommends that a finishing tool only be used in a properly roughed hole. Failure to

conform to this practice will produce unsatisfactory size and finishes and possibly break the tool.

Cavity	Material	Model Code	Assembly Number
3-Way			
C-10-3	Aluminum / Steel	FT-10-3-AS-8050	565834
C-16-3	Aluminum / Steel	FT-16-3-AS-8080	565836
C-20-3	Aluminum / Steel	FT-20-3-AS-8082	889358
3-Way Short			
C-10-3S	Aluminum / Steel	FT-10-3S-AS-8210	566708
C-16-3S	Aluminum / Steel	FT-16-3S-AS-8081	889356
C-20-3S	Aluminum / Steel	FT-20-3S-AS-8083	889359
4-Way			
C-10-4	Aluminum / Steel	FT-10-4-AS-8052	565838
C-16-4	Aluminum / Steel	FT-16-4-AS-8084	566571
C-20-4	Aluminum / Steel	FT-20-4-AS-8085	889360

Supporting Products

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

This information is recommended as a good starting point. Speeds and/or feeds may be increased or decreased depending on actual machining conditions.

NOTE: Finish form tools may require 1/2 to 1-1/2 second dwell to obtain necessary finish.

CNC MACHINE TOOL			BRIDGEPORT / LAGUN TYPE MACHINES		
Tool Size	RPM	IPM	Tool Size	RPM	IPM
C-10-3	600	4	C-10-3	800-1000	6-5
C-10-4			C-10-4		
C-16-3			C-16-3	250	2 1/2
C-16-3S			C-16-3S		
C-16-4			C-16-4		
C-20-3	500	3	C-20-3		
C-20-3S			C-20-3S		
C-20-4			C-20-4		

Application Data

Fluid Cleanliness

Proper fluid condition is essential for long and satisfactory life of hydraulic components and systems. Hydraulic fluid must have the correct balance of cleanliness, materials, and additives for protection against wear of components, elevated viscosity, and inclusion of air.

Essential information on the correct methods for treating hydraulic fluid is included in Vickers publication 561 "Vickers Guide to Systemic Contamination Control" available from your local Vickers distributor or by contacting Vickers, Incorporated. Recommendations on filtration and the selection of products to control fluid condition are included in 561.

Recommended cleanliness levels, using petroleum oil under common conditions, are based on the highest fluid pressure levels in the system and are coded in the chart below. Fluids other than petroleum, severe service cycles, or temperature extremes are cause for adjustment of these cleanliness codes. See Vickers publication 561 for exact details.