Flow Controls

Screw-in Cartridge Valves

Pressures to 350 bar (5000 psi) – Flows to 570 l/min (150 USgpm)

Introduction

For over seventy 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 flow control technology.

Products in this catalog have been fatigue tested for one million cycles at 132% or 10 million cycles at 115% of rated pressure.

Two pressure ratings are shown for most products featured in this catalog – typical application pressure and fatigue pressure. The typical application pressure is the maximum recommended operating pressure for the valve in a given system. The fatigue pressure is the maximum pressure for the valve to be free, for infinite life, from metal fatigue problems.

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 the complete line of Vickers screw-in cartridge flow control valves. Its purpose is to provide a quick, convenient reference tool when choosing Vickers cartridge valves or designing a system using these components.

Valve Features and Benefits

Vickers offers a complete range of flow controls with a variety of features, including:

- Non-adjustable, pressure compensated, flow regulator for flows to 227 l/min (60 USgpm).
- Adjustable, pressure compensated, flow regulator for flows to 114 l/min (30 USgpm).
- Fixed and adjustable priority bypass type flow regulator for regulated flows to 114 l/min (30 USgpm).
- Adjustable flow control without free reverse flow check with flows rated to 114 l/min (30 gpm).
- Adjustable flow control with free reverse flow check with flows rated to 45 l/min (12 gpm).
- Needle valves with flows rated to 265 l/min (70 USgpm).
- Velocity fuses with flows rated to 227 l/min (60 USgpm).
- Flow divider/combiners (FDC1) with flows rated to 568 l/min (150 USgpm).
- Posi-traction valves (FDC3) with flows rated to 567 l/min (150 USgpm)
- Operating pressures to 350 bar (5000 psi).

Here are some of the benefits of Vickers flow controls:

- All operating parts are hardened steel, ground and honed for long life and low leakage.
- Designed for maximum flexibility and minimal space requirements.
- All exposed cartridge surfaces are zinc dichromate plated to resist corrosion. Steel housings are available for cartridges rated to 350 bar (5000 psi) application pressures.
- All aluminum manifolds are gold anodized to resist corrosion.
- Reliable, economical and compact.
- Low leakage.
- Variety of adjustment options.
- Adjustments designed not to go spring solid at “full in” position or to allow the adjustment to be removed when backed out.

Notable are the two styles of flow divider/combiner:

FDC1-**

The FDC1-** is a cartridge type hydraulic flow divider-combiner valve. It divides and combines flow, regardless of system load or pressure, proportionally per specified flow division.

For example: FDC1-10-*–66 will divide an incoming flow of 45 l/min (12 USgpm) equally out each port with an accuracy of ±10% each side. With 45 l/min (12 USgpm) in at “3” port, flow out port “4” can be 22 l/min (6 USgpm) ± 4,5 l/min (1.2 USgpm) while flow at port “2” is 22,7 l/min (6 USgpm) ±4,5 l/min (1.2 USgpm).

The combining accuracy is the same with incoming flow at port “4” and “2” and flow out port “3” of 45 l/min (12 USgpm). Inlet flow at port “4” will be 22 l/min (6 USgpm) ±4,5 l/min (1.2 USgpm). Inlet flow at port “2” will be 22 l/min (6 USgpm) ± 4,5 l/min (1.2 USgpm).

Flow division or combining will be maintained even if unequal loads are placed on ports “4” and “2”.

A special feature of the FDC1–* is that it provides rephase flow to either port 2 or port 4 when one of the two is blocked. This feature is useful in hydraulic circuits that require cylinders to move at the same time. If one cylinder bottoms out first, the opposite cylinder is provided with “rephase” flow to allow the cylinder to bottom and start the cylinders together for movement in the opposite direction.

FDC3-**

The FDC3-** is a cartridge type positive traction valve that divides and combines flow, regardless of system load or pressure, proportionally per specified flow division.

This valve is used in place of a standard flow divider-combiner in systems where hydraulic motors are used as drive wheels on each side of the machine. The positive traction valve acts much like a standard flow divider-combiner as the vehicle travels in a straight line. Equal amounts of flow go to each “C” port. As the vehicle turns a corner, a standard flow divider will maintain equal flow to each drive motor. On a turn, it is necessary for the outer wheel to turn faster than the inner wheel. A standard flow divider-combiner will provide equal flow to each motor causing the drive motors to skid. The positive traction valve solves this problem by allowing the one motor to turn faster than the other.

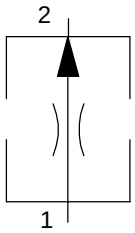
This operates in a similar way as a mechanical differential on an automobile. In a turn, the inside drive motor is restricted and builds up pressure, while the outside drive motor is without restriction. Under conditions of high differential pressure, the positive traction valve passes extra flow to the least restricted motor to prevent skidding. Under straight running conditions the differential pressure is low and equal amounts of flow are provided to each drive motor.

WARNING: For pressure over 210 bar (3000 psi) use steel housing.

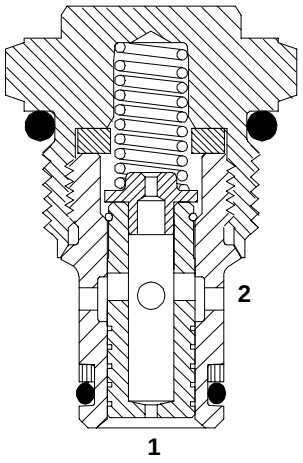
Contents

FR5-8
Flow regulator, fixed

Functional Symbol



Sectional View



Description

The FR5–8 is a fixed orifice, pressure compensated, restrictive flow regulator screw-in cartridge valve.

Operation

This valve maintains a constant flow from port 1 to port 2 based on 5.5 bar (80 psid) regardless of pressure changes downstream on port 2. Reverse flow from port 2 to port 1 is at the value of the fixed orifice and is non-pressure compensated.

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) . . . . . 350 bar (5000 psi) steel housing
210 bar (3000 psi) aluminum housing

Cartridge fatigue pressure (infinite life) . . . . . 280 bar (4000 psi)

Rated flow . . . . . 10 l/min (2.5 USgpm)

Flow regulation accuracy . . . . . 0,4–1,9 l/min (0.1–0.49 USgpm) ±20% @ 210 bar (3000 psi)
0,4–1,9 l/min (0.1–0.49 USgpm) ±40% @ 350 bar (5000 psi)
1,9 – 5,7 l/min (0.5–1.49 USgpm) ±15%
5,7–10 l/min (1.5–2.5 USgpm) ±10%

Factory set maximum flow rate accuracy under standard test conditions and within the above ranges

Temperature range . . . . . –40 to 120°C (–40° to 248°F)

Cavity . . . . . C–8–2 (See page 68)

Fluids . . . . . All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.

Filtration . . . . . Cleanliness code 18/**16/13**

Standard housing materials . . . . . Aluminum or steel

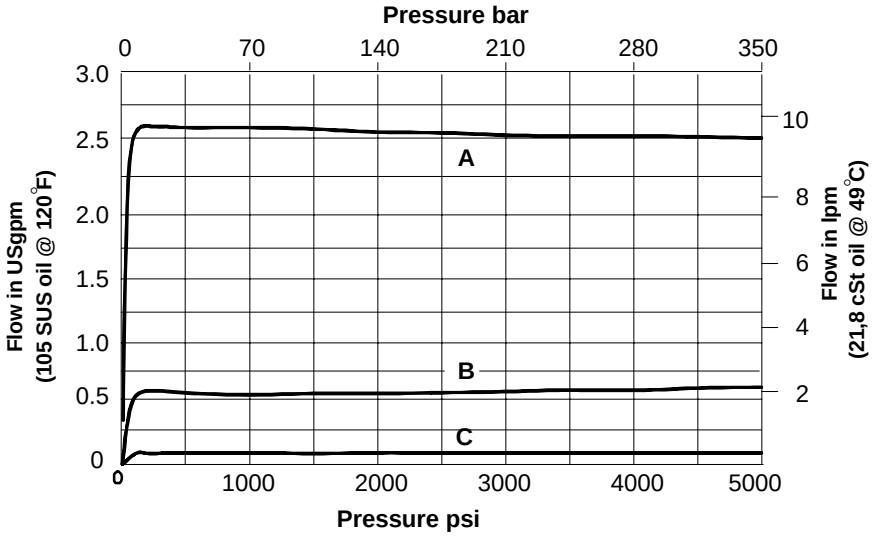
Weight cartridge only . . . . . 0,05 kg (0.12 lbs.)

Seal kits . . . . . 02–165875 Buna-N
02–165877 Viton®

Viton is a registered trademark of E.I. DuPont

Typical Flow Regulation

Cartridge Only



A – 9,5 l/min (2.5 USgpm)
B – 1,9 l/min (0.5 USgpm)
C – 0,38 l/min (0.1 USgpm)

Model Code

FR5-8

FR 5 - 8 (V)- F - (*) ** - *.*

1 2 3 4 5 6 7

1 Function

FR5 – Flow regulator

2 Size

8 – 8 Size

3 Seals

Blank– Buna-N
V – Viton

4 Adjustment

F – Fixed orifice

5 Valve housing material
Omit for cartridge only

S – Steel
A – Aluminum

6 Port size

O – Cartridge only

Code	Port size	Housing number	
		Aluminum Fatigue rated	Steel Fatigue rated
4T	SAE 4	02–160730	02–160736
6T	SAE 6	02–160731	02–160737
8T	SAE 8	02–160732	02–160738
2G	1/4" BSPP	02–160727	02–160733
3G	3/8" BSPP	02–160728	02–160734

See pages 71 and 74 for housings

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)

7 Factory set flow rate, nominal

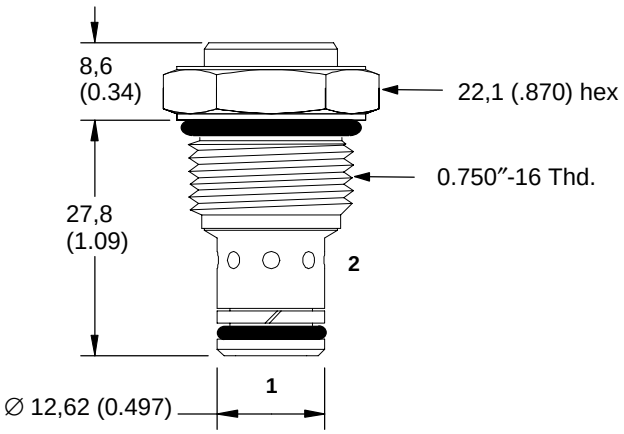
(Specify in USgpm)
Range 0,4–9,5 l/min (0.1–2.5 USgpm)

Example:
0.5– 1,9 l/pm (0.5 USgpm)

Dimensions

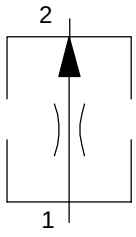
mm (inch)

Torque cartridge in housing
34–41 Nm (25–30 lbf ft)

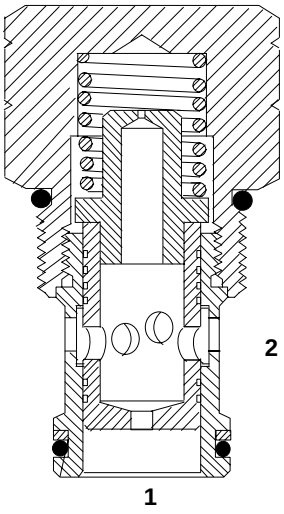


FR5-10
Flow regulator, fixed

Functional Symbol



Sectional View



Description

The FR5-10-F is a fixed orifice, pressure compensated, restrictive screw-in flow regulator cartridge valve.

Operation

This valve maintains a constant flow from port 1 to port 2 based on 5.5 bar (80 psid) regardless of pressure changes downstream on port 2. Reverse flow from port 2 to port 1 is at the value of the fixed orifice and is non-pressure compensated.

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) . . . . . 350 bar (5000 psi)

Cartridge fatigue pressure (infinite life) . . . . . 280 bar (4000 psi)

Rated flow . . . . . 23 l/min (6 USgpm)

Flow regulation accuracy . . . . . 0,38–1,9 l/min (0.1–0.49 USgpm) ±20% @ 210 bar (3000 psi)
0,38–1,9 l/min (0.1–0.49 USgpm) ±40% @ 350 bar (5000 psi)
1,9 – 5,7 l/min (0.5–1.49 USgpm) ±15% @ 350 bar (5000 psi)
5,7–22,7 l/min (1.5–6 USgpm) ±10% @ 350 bar (5000 psi)

Factory set maximum flow rate accuracy under standard test conditions and within the above ranges

Temperature range . . . . . –40 to 120°C (–40° to 248°F)

Cavity . . . . . C–10–2 (See page 68)

Fluids . . . . . All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.

Filtration . . . . . Cleanliness code 18/**16/13**

Standard housing materials . . . . . Aluminum or steel

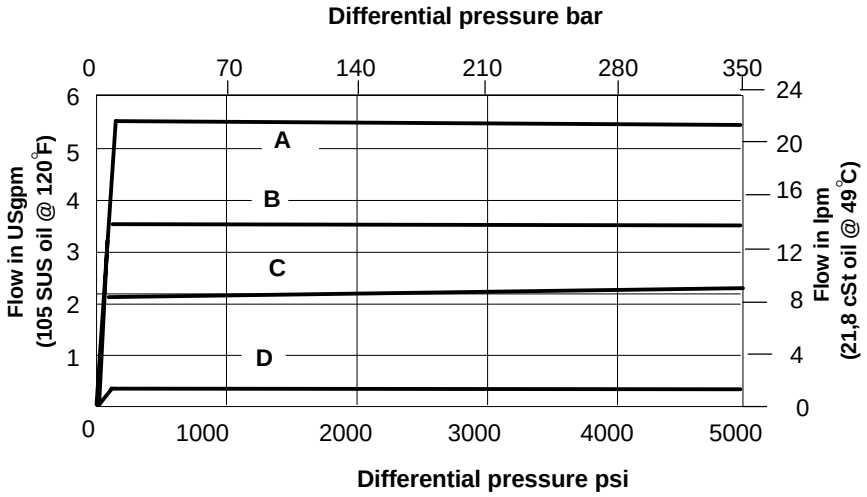
Weight cartridge only . . . . . 0,12 kg (0.26 lbs.)

Seal kits . . . . . 565803 Buna-N
566086 Viton®

Viton is a registered trademark of E.I. DuPont

Typical Flow Regulation

Cartridge Only



A – 21 l/min (5.5 USgpm)
B – 13,3 l/min (3.5 USgpm)
C – 7,8 l/min (2.0 USgpm
D – 0,95 l/min (0.25 USgpm)

Model Code

FR5-10

FR5 – 10 (V) – F – * ** – * . *

1 2 3 4 5 6 7

1 Function

FR5 – Flow regulator

2 Size

10 – 10 Size

3 Seals

Blank – Buna-N
V – Viton

4 Adjustment

F – Fixed orifice

5 Housing material

A – Aluminum
S – Steel

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)

6 Port size

O – Cartridge only

Code	Port size	Housing number		
		Aluminum Light duty	Aluminum Fatigue rated	Steel Fatigue rated
3B	3/8” BSPP	02–175462	————	————
2G	1/4” BSPP		876702	02–175102
3G	3/8” BSPP		876703	02–175103
6H	SAE 6	————	876700	————
8H	SAE 8		876701	
6T	SAE 6	566151	————	02–175100
8T	SAE 8	————		02–175101

See page 74 for housings

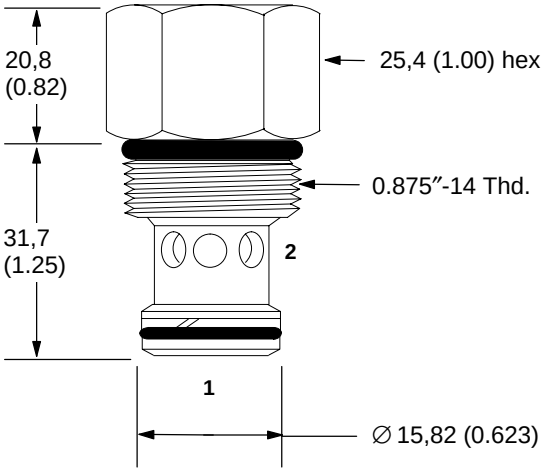
7 Factory set flow rate

(Specify in USgpm)
Range 0,38–22,7 l/min (0.1–6.0 USgpm)

Dimensions

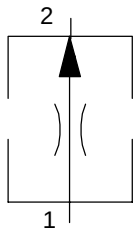
mm (inch)

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

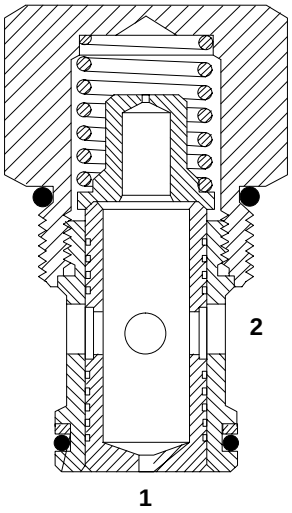


FR1-16
Flow regulator, fixed

Functional Symbol



Sectional View



Description

The FR1-16-F is a fixed orifice, pressure compensated, screw-in flow regulator cartridge valve.

Operation

This valve maintains a constant flow from port 1 to port 2 based on 5.5 bar (80 psid) regardless of pressure changes downstream on port 2. Reverse flow from port 2 to port 1 is at the value of the fixed orifice and is non-pressure compensated.

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)

Flow regulation accuracy . . . . . 1,9–10,9 l/min (0.5–2.9 USgpm) ±15%
11,4–114 l/min (3–30 USgpm) ±10%

Factory set maximum flow rate accuracy under standard test conditions and within the above ranges

Temperature range . . . . . –40 to 120°C (–40° to 248°F)

Cavity . . . . . C–16–2 (See page 68)

Fluids . . . . . All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.

Filtration . . . . . Cleanliness code **18/16/13**

Standard housing materials . . . . . Aluminum

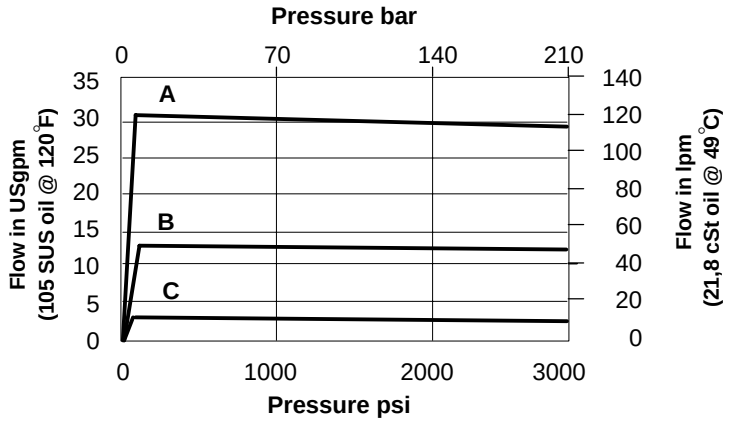
Weight cartridge only . . . . . 0,33 kg (0.72 lbs.)

Seal kits . . . . . 565810 Buna-N
880609 Viton®

Viton is a registered trademark of E.I. DuPont

Typical Flow Regulation

Cartridge Only



A – 114 l/min (30.0 USgpm)
B – 60 l/min (15.0 USgpm)
C – 9,5 l/min (2.5 USgpm)

Model Code

FR1-16

FR1 – 16 (V) – F – * – *.***

1 2 3 4 5 6

1 Function

FR1 – Flow regulator

2 Size

16 – 16 Size

3 Seals

Blank – Buna-N
V – Viton

4 Adjustment

F – Fixed orifice

5 Port size

O – Cartridge only

Code	Port size	Housing number	
		Aluminum Light duty	Aluminum Fatigue rated
6B	3/4” BSPP	02–175463	———
12T	SAE 12	566149	
4G	1/2” BSPP	———	876716
6G	3/4” BSPP		876718
10H	SAE 10		876717
12H	SAE 12		566113

See page 71 for housings

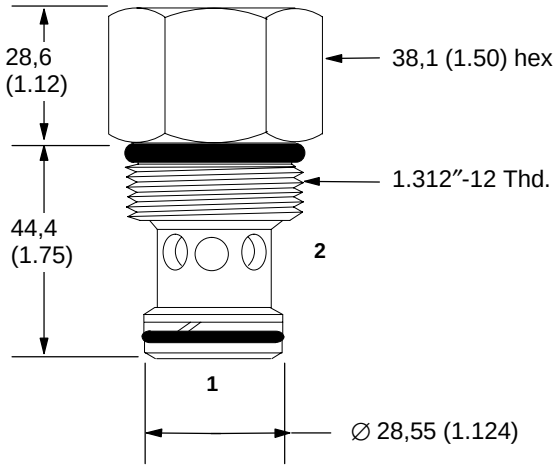
6 Factory set flow rate

(Specify in USgpm)
Range 1,9–114 l/min (0.5–30 USgpm)

Dimensions

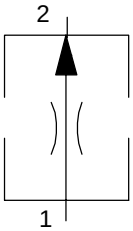
mm (inch)

Torque cartridge in housing
108–122 Nm (80–90 lbf ft)

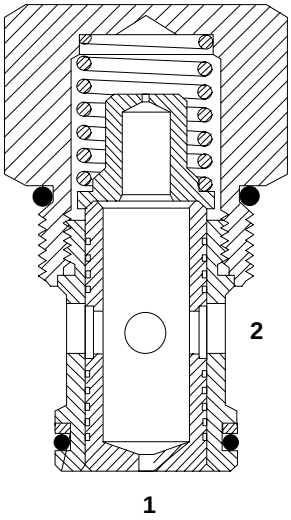


FR1-20
Flow regulator, fixed

Functional Symbol



Sectional View



Description

The FR1-20-F is a fixed orifice, pressure compensated, screw-in flow regulator cartridge valve.

Operation

This valve maintains a constant flow from port 1 to port 2 based on 5.5 bar (80 psid) regardless of pressure changes downstream on port 2. Reverse flow from port 2 to port 1 is at the value of the fixed orifice and is non-pressure compensated.

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 . . . . . 227 l/min (60 USgpm)

Flow regulation accuracy . . . . . 3,8–18,5 l/min (1–4.9 USgpm) ±15%
19–227 l/min (5–60 USgpm) ±10%

Factory set maximum flow rate accuracy under standard test conditions and within the above ranges

Temperature range . . . . . –40 to 120°C (–40° to 248°F)

Cavity . . . . . C–20–2 (See page 68)

Fluids . . . . . All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.

Filtration . . . . . Cleanliness code 18/**16/13**

Standard housing materials . . . . . Aluminum

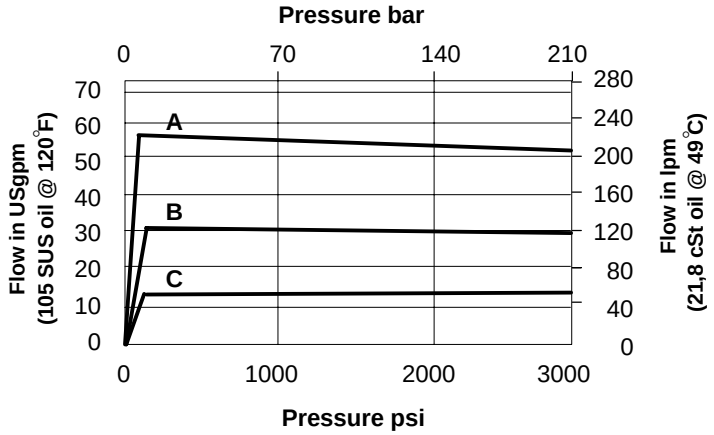
Weight cartridge only . . . . . 0,82 kg (1.8 lbs.)

Seal kits . . . . . 889615 Buna-N
889619 Viton®

Viton is a registered trademark of E.I. DuPont

Typical Flow Regulation

Cartridge Only



A – 227 l/min (60.0 USgpm)
B – 114 l/min (30.0 USgpm)
C – 38 l/min (10.0 USgpm)

Model Code

FR1-20

FR1 – 20 (V) – F – * – * . ***

1 2 3 4 5 6

1 Function

FR1 – Flow regulator

2 Size

20 – 20 Size

3 Seals

Blank– Buna-N
V – Viton

4 Adjustment

F – Fixed orifice

5 Port size

O – Cartridge only

Code	Port size	Housing number	
		Aluminum Light duty	Aluminum Fatigue rated
8B	1” BSPP	02–175464	———
16T	SAE 16	566409	
6G	3/4” BSPP	———	876732
8G	1” BSPP		876734
12H	SAE 12		876733
16H	SAE 16		876735

See page 71 for housings

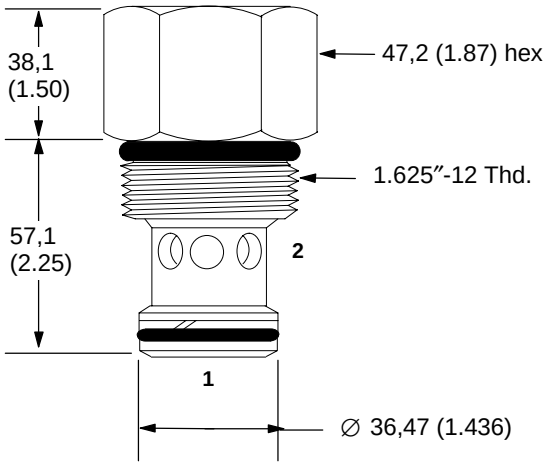
6 Factory set flow rate

(Specify in USgpm)
Range 3,8–227 l/min (1.0–60 USgpm)

Dimensions

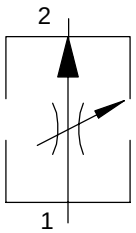
mm (inch)

Torque cartridge in housing
128–155 Nm (95–115 lbf ft)

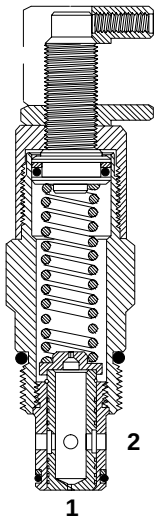


FR2-10
Flow regulator, adjustable

Functional Symbol



Sectional View



Description

The FR2-10-F is a limited range adjustable*, pressure compensated, screw-in flow regulator cartridge valve.

**The flow adjustment is from the factory set maximum flow rate down to 50% of that factory set flow rate.*

Operation

This valve maintains a constant flow from port 1 to port 2 based on the setting adjustment, regardless of pressure changes downstream on port 2. Reverse flow from port 2 to port 1 is at the value of the fixed orifice and is non-pressure compensated.

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)

Flow regulation accuracy . . . . . 0,4–1,9 l/min (0.1–0.49 USgpm) ±20%
1,9–7,5 l/min (0.5–1.99 USgpm) ±15%
7,6–37,8 l/min (2.0–10.0 USgpm) ±10%

Factory set maximum flow rate accuracy under standard test conditions and within the above ranges

Temperature range . . . . . –40 to 120°C (–40° to 248°F)

Cavity . . . . . C–10–2 (See page 68)

Fluids . . . . . All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.

Filtration . . . . . Cleanliness code 18/**16/13**

Standard housing materials . . . . . Aluminum

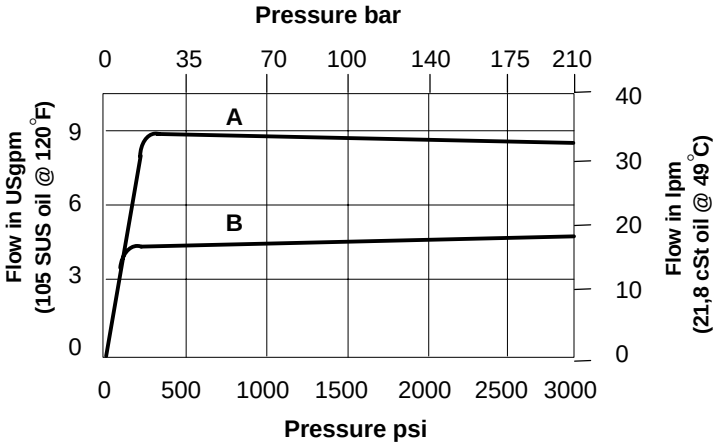
Weight cartridge only . . . . . 0,22 kg (.48 lbs.)

Seal kits . . . . . 565803 Buna-N
566086 Viton®

Viton is a registered trademark of E.I. DuPont

Typical Flow Regulation

Cartridge Only



A – 38,0 l/min (10.0 USgpm)
B – 19,0 l/min (5.0 USgpm)

Model Code

FR2-10

FR2 – 10 (V) – * – ** – * . *

1 2 3 4 5 6

1 Function

FR2 – Flow regulator

2 Size

10 – 10 Size

3 Seals

Blank– Buna-N
V – Viton

4 Adjustment

C – Cap
F – Factory-set
I – Internal
K – Knob
S – Screw

5 Port size

O – Cartridge only

Code	Port size	Housing number	
		Aluminum Light duty	Aluminum Fatigue rated
3B	3/8" BSPP	02–175462	———
6T	SAE 6	566151	
2G	1/4" BSPP	———	876702
3G	3/8" BSPP		876703
6H	SAE 6		876700
8H	SAE 8		876701

See page 71 for housings

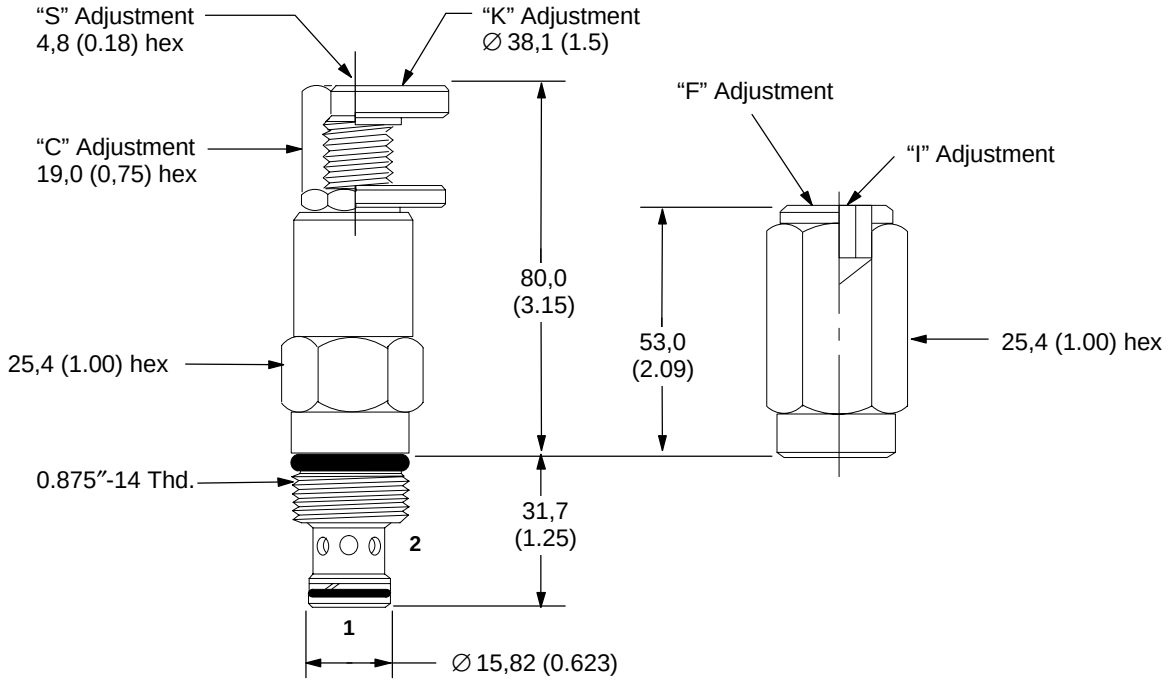
6 Factory set flow rate

(Specify in USgpm)
Range 0,38–22,7 l/min (0.1–6.0 USgpm)

Dimensions

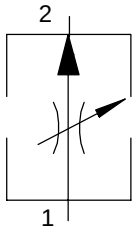
mm (inch)

Torque cartridge in housing
47–54 Nm (35–40 lbf ft)

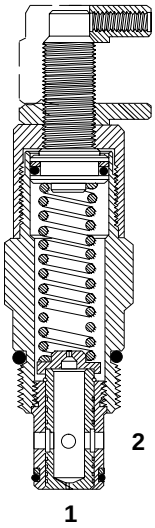


FR2-16
Flow regulator, adjustable

Functional Symbol



Sectional View



Description

The FR2-16 is a limited range adjustable*, pressure compensated, screw-in flow regulator cartridge valve.

**The flow adjustment is from the factory set maximum flow rate down to 50% of that factory set flow rate.*

Operation

This valve maintains a constant flow from port 1 to port 2 based on the setting adjustment, regardless of pressure changes downstream on port 2. Reverse flow from port 2 to port 1 is at the value of the fixed orifice and is non-pressure compensated.

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)

Flow regulation accuracy . . . . . 1,9–10,9 l/min (0.5–2.9 USgpm) ±15%
11,4–114 l/min (3–30 USgpm) ±10%

Factory set maximum flow rate accuracy under standard test conditions and within the above ranges

Temperature range . . . . . –40 to 120°C (–40° to 248°F)

Cavity . . . . . C–16–2 (See page 68)

Fluids . . . . . All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.

Filtration . . . . . Cleanliness code 18/**16/13**

Standard housing materials . . . . . Aluminum

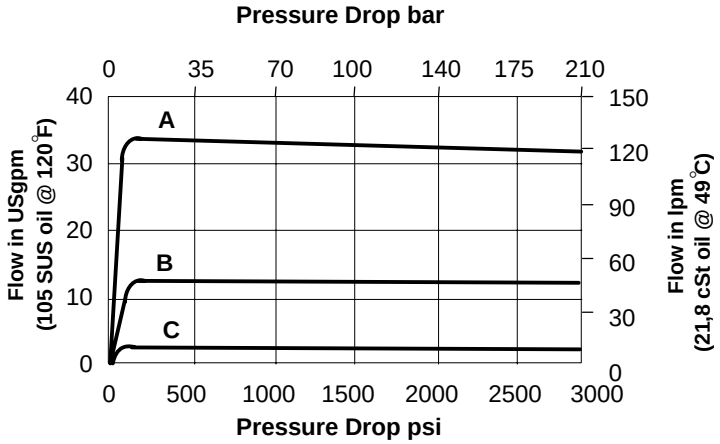
Weight cartridge only . . . . . 0,71 kg (1.57 lbs.)

Seal kits . . . . . 565810 Buna-N
889609 Viton®

Viton is a registered trademark of E.I. DuPont

Typical Flow Regulation

Cartridge Only



A – 114 l/min (30.0 USgpm)
B – 38 l/min (10.0 USgpm
C – 9,5 l/min (2.5 USgpm)

Model Code

FR2-16

FR2 – 16 (V) – * – * – * . ***

1 2 3 4 5 6

1 Function

FR2– Flow regulator

2 Size

16 – 16 Size

3 Seals

Blank–Buna-N
V – Viton

4 Adjustment

K – Knob
S – Screw
C – Cap

5 Port Size

O – Cartridge only

Code	Port size	Housing number	
		Aluminum Light duty	Aluminum Fatigue rated
6B	3/4" BSPP	02–175463	———
12T	SAE 12	566149	
4G	1/2" BSPP	———	876716
6G	3/4" BSPP		876718
10H	SAE 10		876717
12H	SAE 12		566113

See page 71 for housings

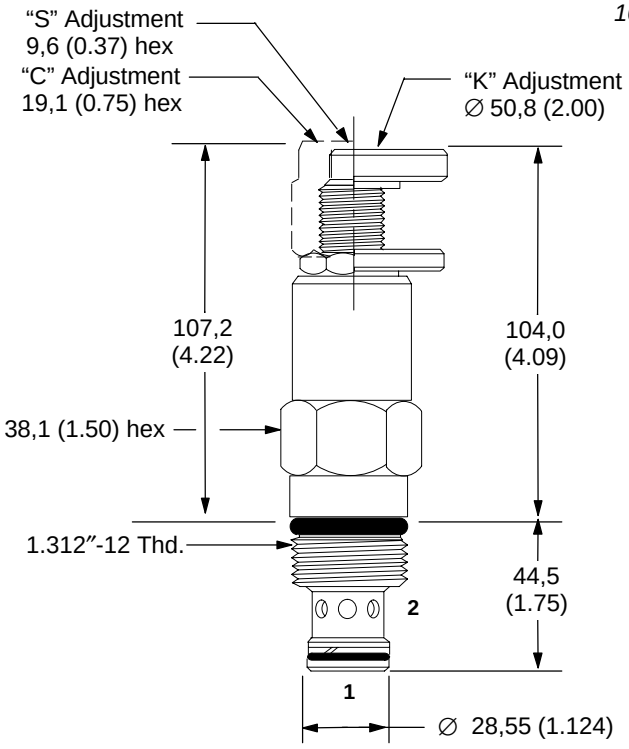
6 Factory set flow rate

(Specify in USgpm)
Range 1,9–114 l/min
(0.5–30 USgpm)

Dimensions

mm (inch)

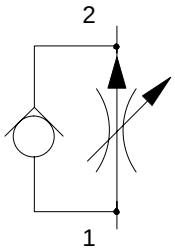
Torque cartridge in housing 108–122 Nm (80–90 lbf ft)



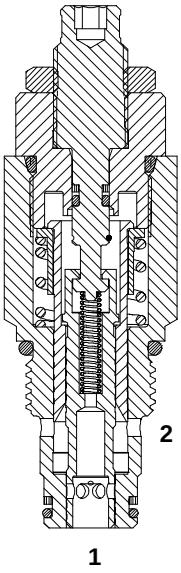
FAR1-10

Flow regulator, pressure compensated, fully adjustable

Functional Symbol



Sectional View



Description

The FAR1–10 is a two-way, fully adjustable, pressure compensated, flow regulator, with free reverse flow, screw-in cartridge valve.

Operation

This valve maintains a constant flow from port 1 to port 2 regardless of pressure changes upstream of port 1, or downstream of port 2. 13.8 bar (200 psi) must be maintained across the valve to obtain pressure compensated control. The regulated flow base within the adjusting range from 1 to 38 lpm (0.25 to 10 USgpm) is set by turning the adjusting screws clockwise to decrease the flow and counter- clockwise to increase the flow. This valve allows free reverse flow from port 2 to port 1.

Ratings and specifications

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

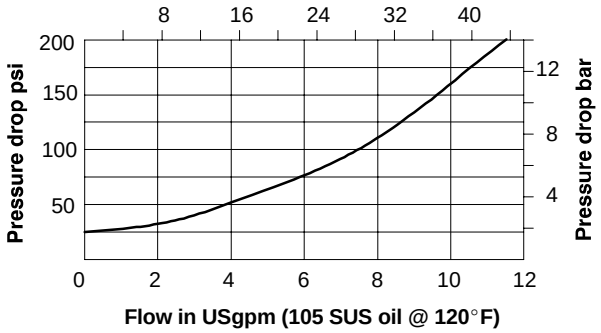
Typical application pressure (all ports)	5–350 bar (75–5000 psi) steel housing
Min. pressure differential across valve	14 bar (200 psi)
Cartridge fatigue pressure (infinite life)	310 bar (4500 psi)
Rated flow	1–38 l/min (.25–10 USgpm)
Flow regulation accuracy	4–38 l/min (1–10 USgpm) ±10% 1–4 l/min (0.25–1 USgpm) ±20%
Reverse check crack pressure	1.7 bar (25 psi)
Leakage at shutoff position	0.4 l/min (24.4 in^3/min)
Temperature range	–40 to 120°C (–40° to 248°F)
Cavity	C–10–2 (See page 68)
Fluids	All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/**16/13**
Standard housing materials	Aluminum or steel
Weight cartridge only	"S" 0,02 kg (0.44 lbs.) "K" 0,23 kg (0.51 lbs.) "H" 0,26 kg (0.59 lbs.)
Seal kits	565803 Buna-N 566086 Viton®

Viton is a registered trademark of E.I. DuPont

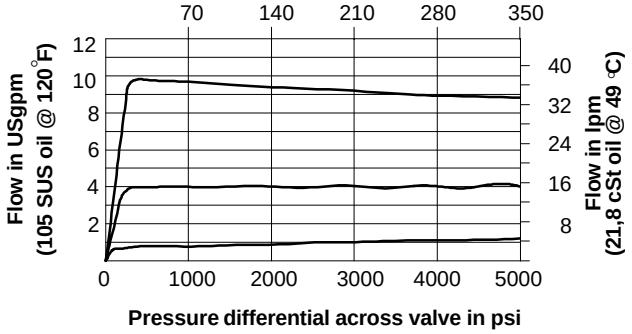
Performance Characteristics

Cartridge Only

PRESSURE DROP FOR REVERSE FLOW
Flow in lpm (21,8 cSt oil @ 49°C)



TYPICAL FLOW REGULATION
Pressure differential across valve in bar



Model Code

FAR1-10

FAR1 – 10 * – * – * ** – **

1 2 3 4 5 6 7

1 Function

FAR1 – Fully adjustable, pressure compensated flow regulator with reverse flow check

2 Size

10 – 10 Size

3 Seals

Blank – Buna-N
V – Viton

4 Adjustment

S – Screw with locknut
K – Handknob with locknut
H – Calibrated handknob with locknut

5 Valve housing material
Omit for cartridge only

S – Steel
A – Aluminum

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)

6 Port size

O – Cartridge only

7 Factory set flow rate, nominal

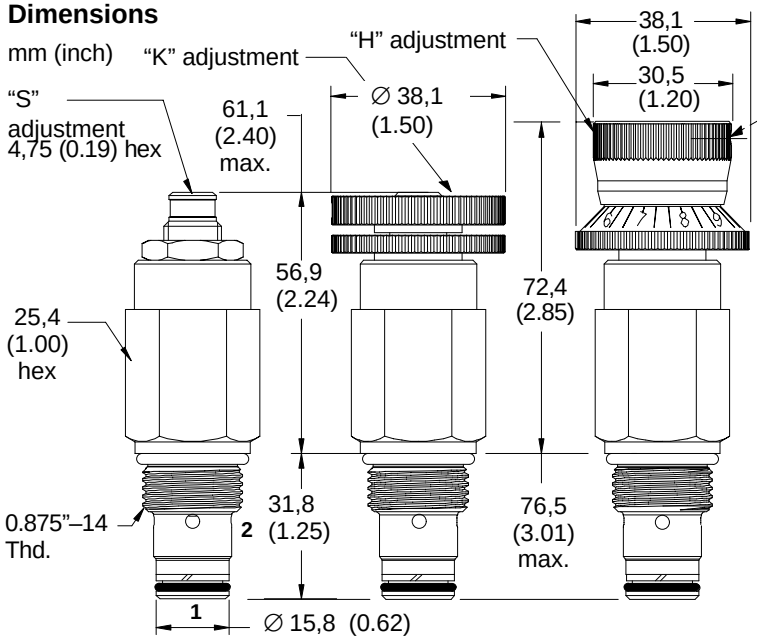
Blank – Normal factory setting at 5 USgpm
User requested setting within .25–10 USgpm (1–38 l/min.)

See pages 71 and 74 for housings

Code	Port size	Housing number		
		Aluminum Light duty	Aluminum Fatigue rated	Steel Fatigue rated
3B	3/8" BSPP	02–175462	———	———
2G	1/4" BSPP		876702	02–175102
3G	3/8" BSPP		876703	02–175103
6H	SAE 6	———	876700	———
8H	SAE 8		876701	
6T	SAE 6	566151	———	02–175100
8T	SAE 8	———		02–175101

Dimensions

mm (inch)



NOTE:
To reset scale and knob to an optimum viewing position:

1. Loosen the set screw
2. Rotate zero point on scale to a desired orientation.
3. Align mark on knob with zero on scale.
4. Tighten the set screw firmly.

To change the setting:

1. Loosen the set screw
2. Loosen jamnut while holding the knob steady, or move the knob along the axis slightly.
3. Turn adjusting screw (jamnut and knob will turn at the same time).
4. At the new adjusting screw position, tighten jamnut firmly while holding the knob steady, or move the knob along axis slightly.
5. Tighten the set screw firmly.

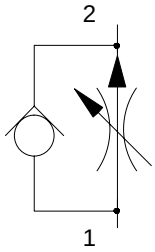
Torque cartridge in housing
A–47–54 Nm (35–40 lbf ft)
S–68–75 Nm (50–55 lbf ft)

"K" adjustment kit – 565585

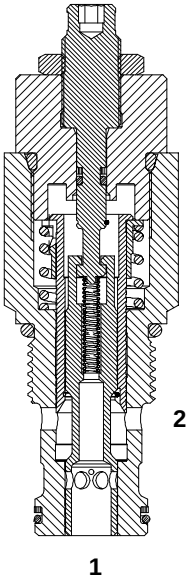
FAR1-12

Flow regulator, pressure compensated, fully adjustable

Functional Symbol



Sectional View



Description

The FAR1–12 is a two-way, fully adjustable, pressure compensated, flow regulator, with free reverse flow, screw-in cartridge valve.

Operation

This valve maintains a constant flow from port 1 to port 2 regardless of pressure changes upstream of port 1, or downstream of port 2. 15,9 bar (230 psi) must be maintained across the valve to obtain pressure compensated control. The regulated flow base within the adjusting range from 1,5 to 94,5 lpm (0.4 to 25 USgpm) is set by turning the adjusting screws clockwise to decrease the flow and counter- clockwise to increase the flow. This valve allows free reverse flow from port 2 to port 1.

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) . . . . . 350 bar (5000 psi)

Cartridge fatigue pressure (infinite life) . . . . . 315 bar (4500 psi)

Min. pressure differential across valve . . . . . 15,9 bar (230 psi)
Max. pressure differential across valve . . . . . 329 bar (4770 psi)

Rated flow . . . . . 1,5–94,5 l/min (.4–25 USgpm)

Flow regulation accuracy . . . . . 1,5–3,8 l/min (.4–1.0 USgpm) ±20% @5000 psi
above 3,8–68,1 l/min (above 1–18 USgpm) ±10% @3000 psi
above 68,1–94,6 l/min (above 18–25 USgpm) ±15% @3000 psi
3,8–56,8 l/min (1–15 USgpm) ±10% @5000 psi
above 56,8–89,1 l/min (above 15–23 USgpm) ±15% @5000 psi

Reverse check crack pressure . . . . . 1,7 bar (25 psi)

Leakage at shutoff position . . . . . 0,5 l/min (30 in^3/min)

Temperature range . . . . . –40 to 120°C (–40° to 248°F)

Cavity . . . . . C–12–2 & C–12–2U (See page 68)

Fluids . . . . . All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.

Filtration . . . . . Cleanliness code 18/**16/13**

Standard housing materials . . . . . Aluminum or steel

Weight cartridge only . . . . . "S" 0,43 kg (0.98 lbs.)
"K" 0,46 kg (1.0 lbs.)
"H" 0,49 kg (1.1 lbs.)

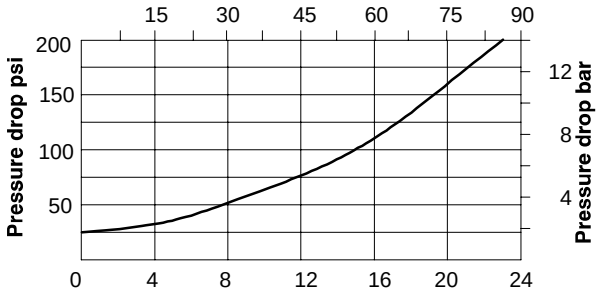
Seal kits . . . . . 02–181304 Buna-N
02–181305 Viton®

Viton is a registered trademark of E.I. DuPont

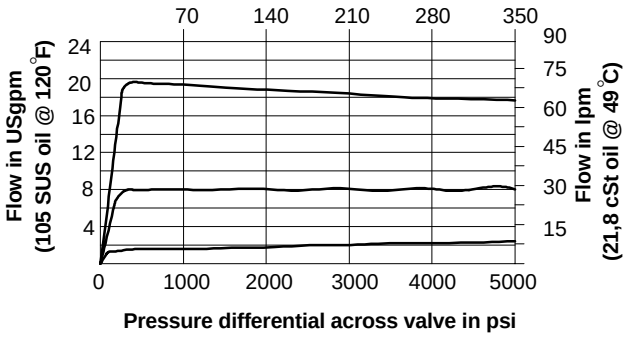
Performance Characteristics

Cartridge Only

PRESSURE DROP FOR REVERSE FLOW
Flow in lpm (21,8 cSt oil @ 49°C)



TYPICAL FLOW REGULATION
Pressure differential across valve in bar



Model Code

FAR1-12

**FAR1 – 12 * – * – *– ** – **

1 2 3 4 5 6 7

1 Function

FAR1 – Fully adjustable, pressure compensated flow regulator with reverse flow check

2 Size

12 – 12 Size

3 Seals

Blank– Buna-N
V – Viton

4 Adjustment

S – Screw with locknut
K – Handknob with locknut
H – Calibrated handknob with locknut

5 Valve housing material

Omit for cartridge only

S – Steel
A – Aluminum

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)

6 Port size

O – Cartridge only

Code	Port size	Housing number			
		C-12-2U Aluminum Fatigue rated	C-12-2 Aluminum Fatigue rated	C-12-2U Steel Fatigue rated	C-12-2 Steel
10T	SAE 10	02–160641	02–160640	02–169817	02–169744
12T	SAE 12	02–160645	02–160644	02–169790	02–169782
4G	1/2" BSPP	02–161116	02–161118	02–172512	02–172062
6G	3/4" BSPP	02–161115	02–161117	02–162922	02–169665

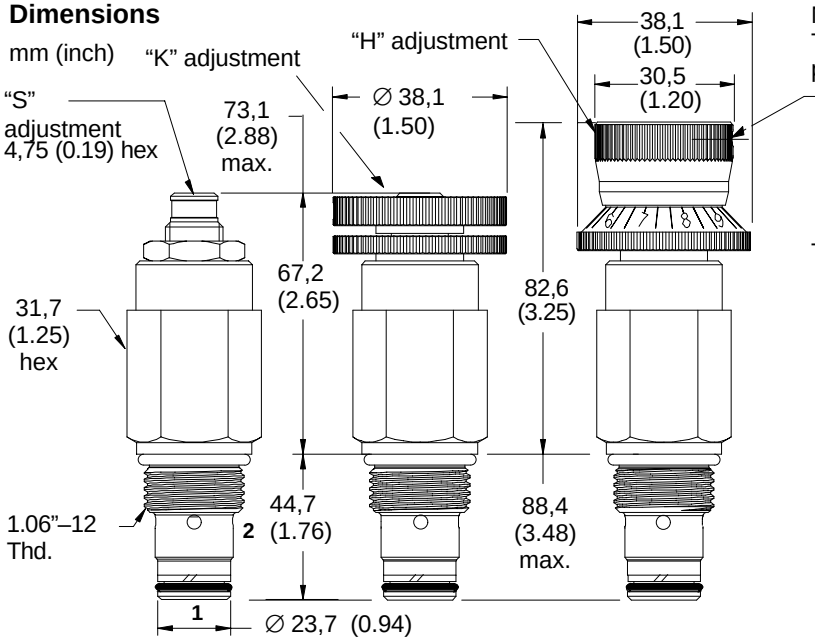
See pages 71 and 74 for housing dimensions

7 Factory set flow rate, nominal

Blank – Normal factory setting at 10 USgpm
User requested setting
Within 0.4–25 USgpm (1,5–94,6 l/min.) up to 210 bar (3000 psi)
Within 0.4–23 USgpm (1,5–87,1 l/min.) up to 350 bar (5000 psi)

Dimensions

mm (inch)



NOTE:
To reset scale and knob to an optimum viewing position:

1. Loosen the set screw
2. Rotate zero point on scale to a desired orientation.
3. Align mark on knob with zero on scale.
4. Tighten the set screw firmly.

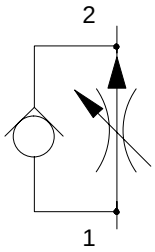
To change the setting:

1. Loosen the set screw
2. Loosen jamnut while holding the knob steady, or move the knob along the axis slightly.
3. Turn adjusting screw (jamnut and knob will turn at the same time).
4. At the new adjusting screw position, tighten jamnut firmly while holding the knob steady, or move the knob along axis slightly.
5. Tighten the set screw firmly.

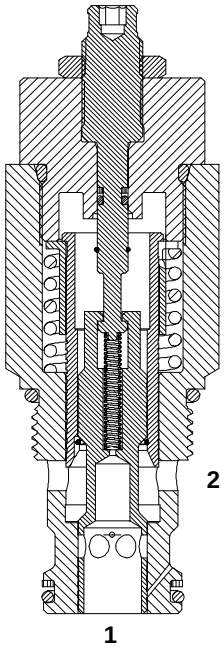
Torque cartridge in housing
A–81–95 Nm (60–70 lbf ft)
S–102–115 Nm (75–85 lbf ft)
"K" adjustment kit – 565585

FAR1-16
Flow regulator, pressure compensated, fully adjustable

Functional Symbol



Sectional View



Description

The FAR1–16 is a two-way, fully adjustable, pressure compensated, flow regulator screw-in cartridge valve.

Operation

This valve maintains a constant flow from port 1 to port 2 regardless of pressure changes upstream of port 1, or downstream of port 2. 17 bar (250 psi) must be maintained across the valve to obtain pressure compensated control. The regulated flow base within the adjusting range from 3,8 to 113,6 lpm (1.0 to 30 USgpm) is set by turning the adjusting screws clockwise to decrease the flow and counter- clockwise to increase the flow. This valve allows free reverse flow from port 2 to port 1.

Ratings and specifications

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

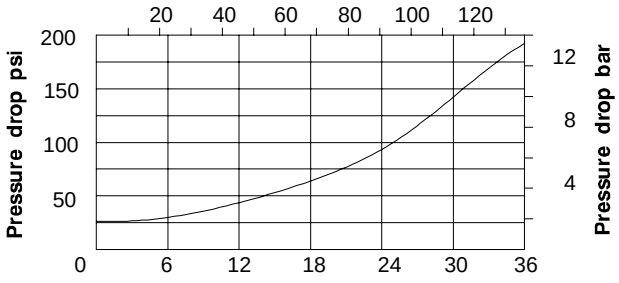
Typical application pressure (all ports)	350 bar (5000 psi)
Cartridge fatigue pressure (infinite life)	310 bar (4500 psi)
Min. pressure differential across valve	17 bar (250 psi)
Max. pressure differential across valve	328 bar (4750 psi)
Rated flow	3,8–113,6 l/min (1–30 USgpm)
Flow regulation accuracy	3,8–15,1 l/min (1.0–4.0 USgpm) ±30% @5000 psi above 15,1–30,3 l/min (above 4.0–8.0 USgpm) ±20% @5000 psi above 30,3–113,6 l/min (above 8.0–30.0 USgpm) ±10% @5000 psi
Reverse check crack pressure	1,7 bar (25 psi)
Leakage at shutoff position	0,55 l/min (33.5 in^3/min)
Temperature range	–40 to 120°C (–40° to 248°F)
Cavity	C–16–2 (See page 68)
Fluids	All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/**16/13**
Standard housing materials	Aluminum or steel
Weight cartridge only	“S” 0,67 kg (1.48 lbs.) “K” 0,70 kg (1.55 lbs.) “H” 0,74 kg (1.62 lbs.)
Seal kits	565810 Buna-N 889609 Viton®

Viton is a registered trademark of E.I. DuPont

Performance Characteristics

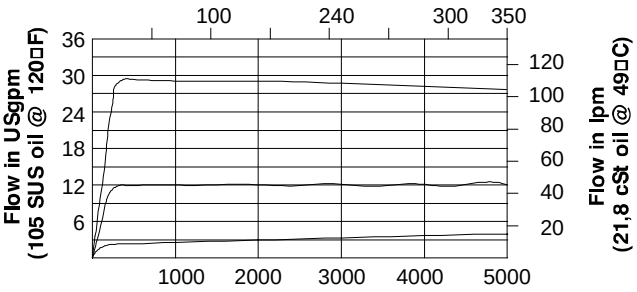
Cartridge Only

PRESSURE DROP FOR REVERSE FLOW
Flow in lpm (21,8 cSt oil @ 49°C)



Flow in USgpm (105 SUS oil @ 120°F)

TYPICAL FLOW REGULATION
Pressure differential across valve in bar



Pressure differential across valve in psi

FAR1 – 16 * – * – * * – ****

1 2 3 4 5 6 7

1 Function

FAR1 – Fully adjustable, pressure compensated flow regulator with reverse flow check

2 Size

16– 16 Size

3 Seals

Blank– Buna-N
V – Viton

4 Adjustment

S – Screw with locknut
K – Handknob with locknut
H – Calibrated handknob with locknut

5 Valve housing material

Omit for cartridge only
S – Steel
A – Aluminum

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)

6 Port size & valve bodies

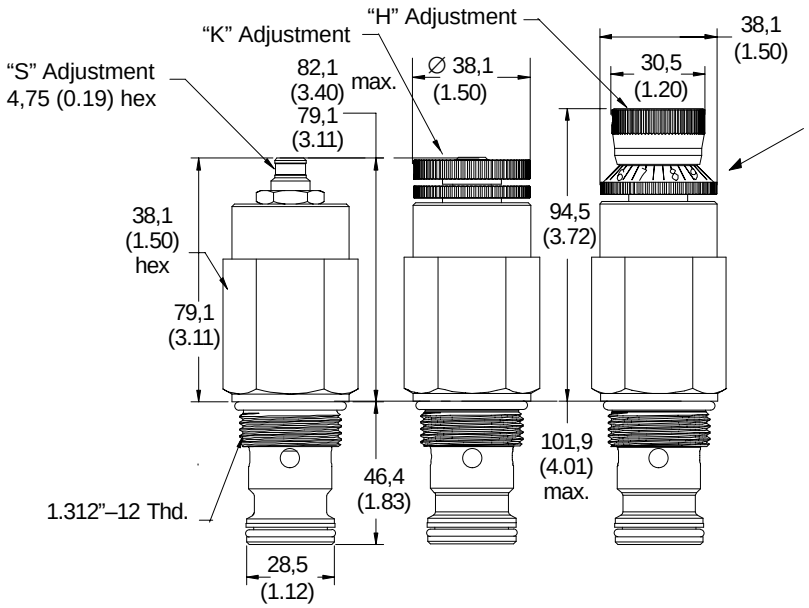
O – Cartridge only

Code	Port size	Housing number		
		Aluminum (light duty)	Aluminum (fatigue rated)	Steel
4G	1/2" BSPP		876716	02–175106
6B	3/4" BSPP	02–175463		
6G	3/4" BSPP		876718	02–175107
10T	SAE 10			
10H	SAE 10		876717	02–175104
12T	SAE 12	566149		
12H	SAE 12		566113	02–175105

See pages 71 and 74 for housings

7 Factory set flow rate

Blank – Normal factory setting at 15 USgpm
User requested setting
Within 1–30 USgpm (3,8–113,6 l/min.)



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

NOTE:
To reset scale and knob to an optimum viewing position:

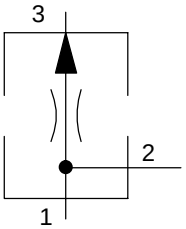
1. Loosen the set screw
2. Rotate zero point on scale to a desired orientation.
3. Align mark on knob with zero on scale.
4. Tighten the set screw firmly.

To change the setting:

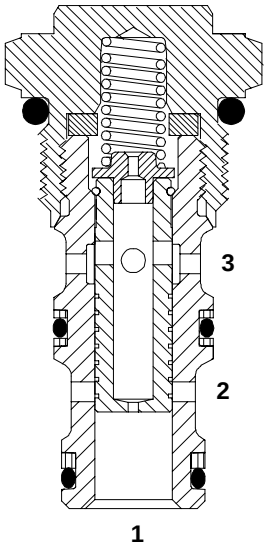
1. Loosen the set screw
2. Loosen jamnut while holding the knob steady, or move the knob along the axis slightly.
3. Turn adjusting screw (jamnut and knob will turn at the same time).
4. At the new adjusting screw position, tighten jamnut firmly while holding the knob steady, or move the knob along axis slightly.
5. Tighten the set screw firmly.
"K" adjustment kit – 02-185169

PFR5-8
Priority flow regulator, fixed

Functional Symbol



Sectional View



Description

The PFR5–8 is a fixed orifice, priority type, pressure compensated, flow regulator, screw-in cartridge valve.

Operation

This valve maintains a constant, factory-set, priority flow from port 1 to port 3 based on 5.5 bar (80 psid) regardless of pressure changes downstream on port 3. Flow in excess of the priority setting is directed to port 2. If the priority flow at port 3 is blocked, the spool will shift to try and satisfy the priority flow requirement, thereby closing off flow to 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) . . . . . 350 bar (5000 psi) steel housing
210 bar (3000 psi) aluminum housing

Cartridge fatigue pressure (infinite life) . . . . . 280 bar (4000 psi)

Rated flow . . . . . maximum inlet flow 15,1 l/min (4 USgpm)
maximum regulated flow 10 l/min (2.5 USgpm)

Internal leakage . . . . . 82 cm^3/min. @ 350 bar (3000 psi) 5 in^3/min @ 5000 psi)

Flow regulation
accuracy . . . . . 0,4–1,9 l/min (0.1–0.49 USgpm) ±20% @ 210 bar (3000 psi)
0,4–1,9 l/min (0.1–0.49 USgpm) ±40% @ 350 bar (5000 psi)
1,9–5,7 l/min (0.5–1.49 USgpm) ±15% @ 350 bar (5000 psi)
5,7–10 l/min (1.5–2.5 USgpm) ±10% @ 350 bar (5000 psi)

Factory set maximum priority flow rate accuracy under standard test conditions and within the above ranges

Temperature range . . . . . -40 to 120°C (-40° to 248°F)

Cavity . . . . . C–8–3 (See page 69)

Fluids . . . . . All general purpose hydraulic fluids such as:
MIL–H–5606, SAE 10, SAE 20, etc.

Filtration . . . . . Cleanliness code 18/**16/13**

Standard housing materials . . . . . Aluminum or steel

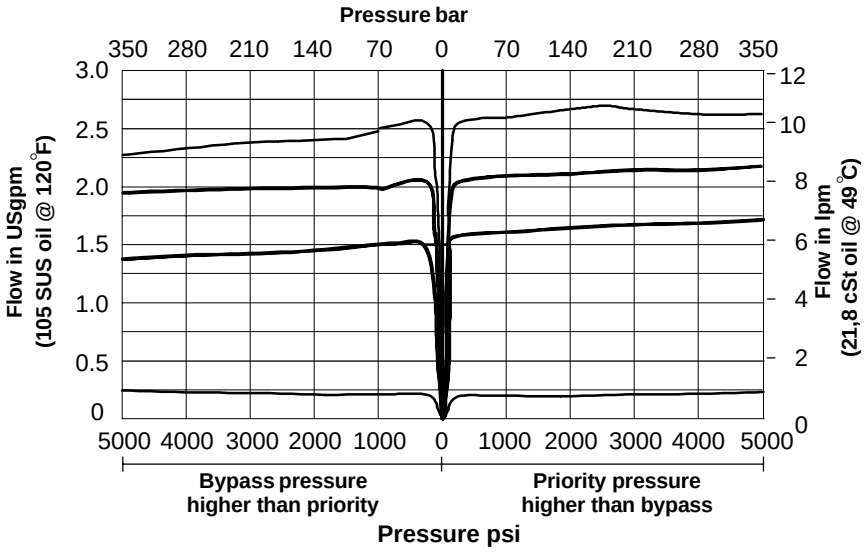
Weight cartridge only . . . . . 0,07 kg (0.15 lb.)

Seal kits . . . . . 02–173427 Buna-N
02–173434 Viton®

Viton is a registered trademark of E.I. DuPont

Typical Flow Regulation

Cartridge Only



Model Code

PFR5-8

PFR 5 - 8 (V) - F - (*) ** - *.*

1 2 3 4 5 6 7

1 Function

PFR5– Priority flow regulator

2 Size

8 – 8 Size

3 Seals

Blank– Buna-N
V – Viton

4 Adjustment

F – Fixed orifice

5 Valve housing material
Omit for cartridge only

S – Steel
A – Aluminum

6 Port size

O – Cartridge only

Code	Port size	Housing number	
		Aluminum Fatigue rated	Steel Fatigue rated
4T	SAE 4	02–160741	02–160745
6T	SAE 6	02–160742	02–160746
2G	1/4" BSPP	02–160739	02–160743
3G	3/8" BSPP	02–160740	02–160744

See pages 72 and 74 for housings

7 Factory set flow rate, nominal

(Specify in USgpm)
Range 0,4–9,5 l/min (0.1–2.5 USgpm)

Example:
0.5– 1,9 l/pm (0.5 USgpm)

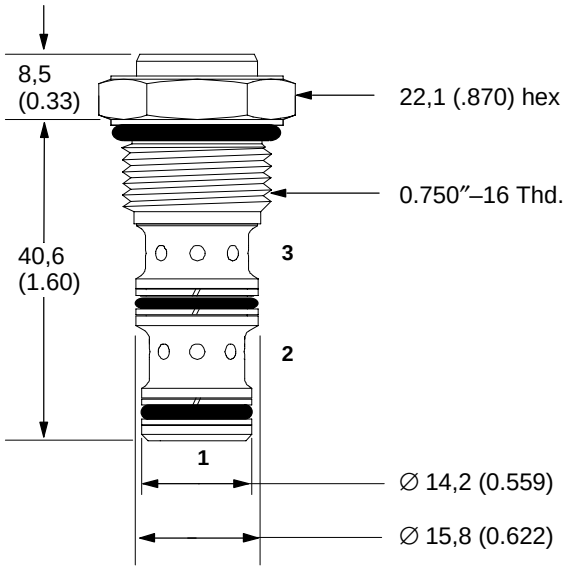
Aluminum housings can be used for pressures up to 210 bar (3000 psi)

Steel housings **must** be used for operating pressures **above** 210 bar (3000 psi)

Dimensions

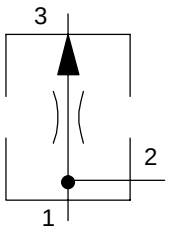
mm (inch)

Torque cartridge in housing
34–41 Nm (25–30 lbf ft)

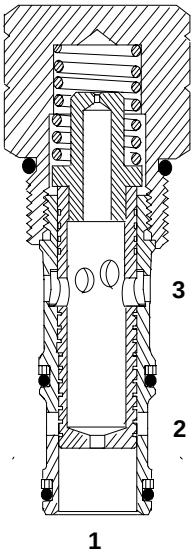


PFR5-10
Priority flow regulator, fixed

Functional Symbol



Sectional View



Description

The PFR5-10-F is a fixed orifice, priority type, pressure compensated, flow regulator screw-in cartridge valve .

Operation

This valve maintains a constant, factory-set, priority flow from port 1 to port 3 based on 5.5 bar (80 psid) regardless of pressure changes downstream on port 3. Flow in excess of the priority setting is directed to port 2. If the priority flow at port 3 is blocked, the spool will shift to satisfy the priority flow requirement, thereby closing off flow to 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) . . . . . 350 bar (5000 psi)

Cartridge fatigue pressure (infinite life) . . . . . 280 bar (4000 psi)

Rated flow . . . . . Maximum inlet flow 60 l/min (15 USgpm)
Maximum regulated flow 23 l/min (6 USgpm)

Flow regulation accuracy . . . . . 0,4–1,9 l/min (0.1–0.49 USgpm) ±20% @ 210 bar (3000 psi)
0,4–1,9 l/min (0.1–0.49 USgpm) ±40% @ 350 bar (5000 psi)
1,9–5,7 l/min (0.5–1.49 USgpm) ±15% @ 350 bar (5000 psi)
5,7–22,7 l/min (1.5–6 USgpm) ±10% @ 350 bar (5000 psi)

Factory set maximum priority flow rate accuracy under standard test conditions and within the above ranges

Temperature range . . . . . -40 to 120°C (-40° to 248°F)

Cavity . . . . . C–10–3 (See page 69)

Fluids . . . . . All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.

Filtration . . . . . Cleanliness code 18 /**16/13**

Standard housing materials . . . . . Aluminum or steel

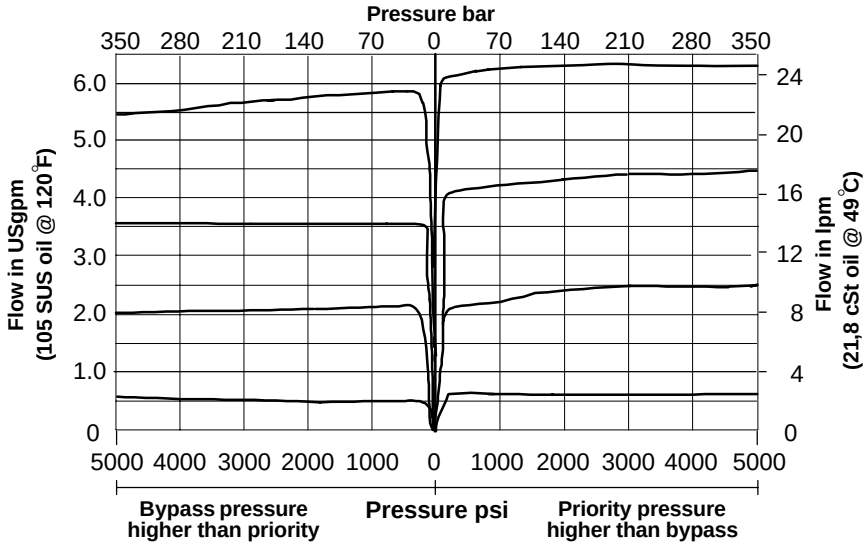
Weight cartridge only . . . . . 0,13 kg (0.28 lb.)

Seal kits . . . . . 565804 Buna-N
889599 Viton®

Viton is a registered trademark of E.I. DuPont

Typical Flow Regulation

Cartridge Only



Model Code

PFR5-10

P FR5 – 10 (V) – F – * ** – * . *

1 2 3 4 5 6 7

1 Function

PFR5 – Priority flow regulator

2 Size

10 – 10 Size

3 Seals

Blank – Buna-N
V – Viton

4 Adjustment

F – Fixed orifice

5 Housing material

A – Aluminum
S – Steel

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)

6 Port size

O – Cartridge only

Code	Port size	Housing number		
		Aluminum (light duty	Aluminum (fatigue rated)	Steel
2G	1/4" BSPP		876705	02-175127
3B	3/8" BSPP	02-173358	——	——
3G	3/8" BSPP	——	876714	02-175128
6T	SAE 6	566162	——	02–175124
6H	SAE 6	——	876704	——
8H	SAE 8		876711	
8T	SAE 8		——	02–175125

See pages 72 and 74 for housings

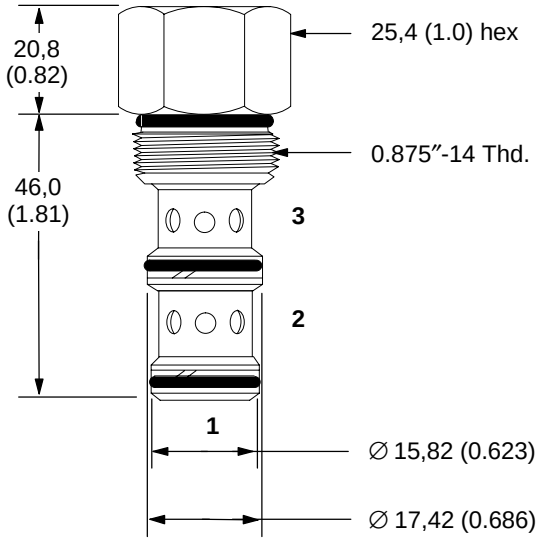
7 Factory set flow rate

(Specify in USgpm)
Range 0,38–22,7 l/min (0.1–6.0 USgpm)

Dimensions

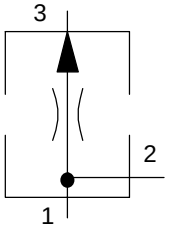
mm (inch)

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

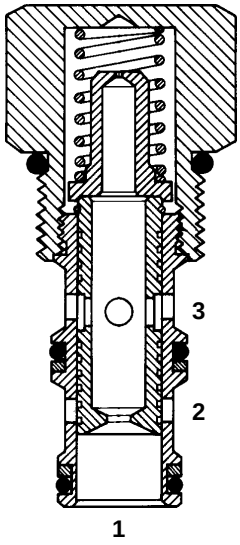


PFR1-16
Priority flow regulator, fixed

Functional Symbol



Sectional View



Description

The PFR1-16-F is a fixed orifice, priority type, pressure compensated, flow regulator screw-in cartridge valve .

Operation

This valve maintains a constant, factory-set, priority flow from port 1 to port 3 based on 5.5 bar (80 psid) regardless of pressure changes downstream on port 3. Flow in excess of the priority setting is directed to port 2. If the priority flow at port 3 is blocked, the spool will shift to satisfy the priority flow requirement, thereby closing off flow to 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 . . . . . Maximum inlet flow 151 l/min (40 USgpm)
Maximum regulated flow 114 l/min (30 USgpm)

Flow regulation accuracy . . . . . 1,9–10,9 l/min (0.5–2.9 USgpm) ±15%
11,4–114 l/min (3–30 USgpm) ±10%

Factory set maximum priority flow rate accuracy under standard test conditions and within the above ranges

Temperature range . . . . . -40 to 120°C (-40° to 248°F)

Cavity . . . . . C–16–3 (See page 69)

Fluids . . . . . All general purpose hydraulic fluids such as:
MIL–H–5606, SAE 10, SAE 20, etc.

Filtration . . . . . Cleanliness code 18/**16/13**

Standard housing materials . . . . . Aluminum

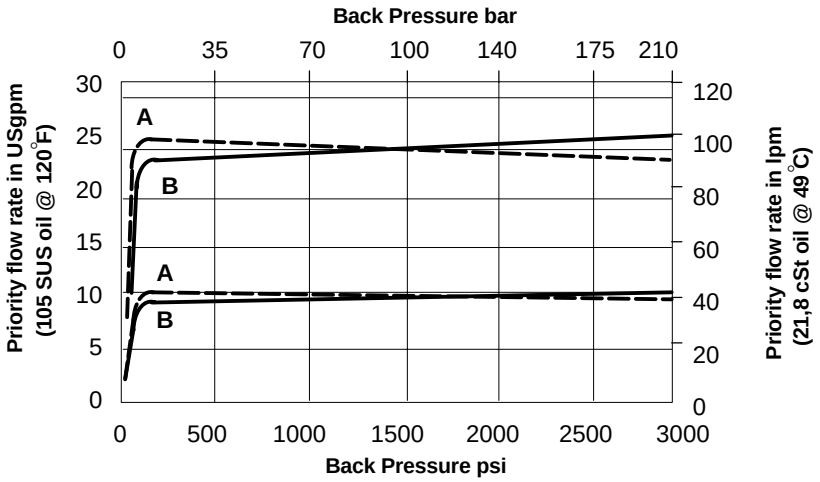
Weight cartridge only . . . . . 0,38 kg (0.84 lb.)

Seal kits . . . . . 565811 Buna-N
889610 Viton®

Viton is a registered trademark of E.I. DuPont

Typical Flow Regulation

Cartridge Only



A -Port 3, priority (regulated) outlet pressurized

B -Port 2, bypass outlet pressurized

Model Code

PFR1-16

PFR1 - 16 (V) - F - * - *.***

1 2 3 4 5 6

1 Function

PFR1– Priority flow regulator

2 Size

16 – 16 Size

3 Seals

Blank– Buna-N
V – Viton

4 Adjustment

F – Fixed orifice

5 Port size

O – Cartridge only

Code	Port size	Housing number	
		Aluminum Light duty	Aluminum Fatigue rated
12T	SAE 12	566152	———
6B	3/4” BSPP	02–175465	
10H	SAE 10	———	876721
12H	SAE 12		876723
4G	1/2” BSPP		876720
6G	3/4” BSPP		876722

See pages 72 for housings

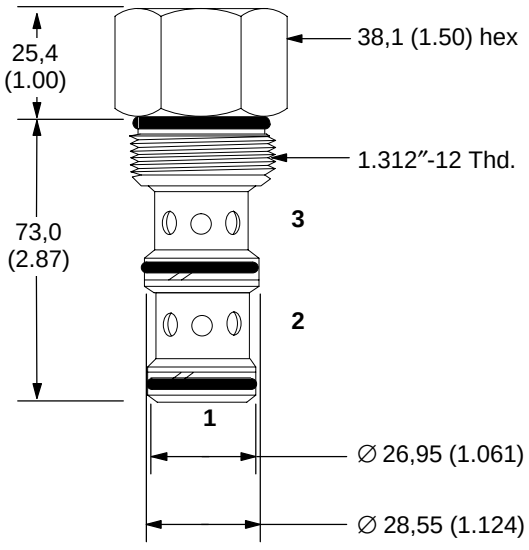
6 Factory set flow rate, nominal

(Specify in USgpm)
Range 1,9–114 l/min (0.5–30 USgpm)

Dimensions

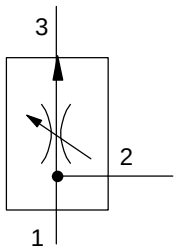
mm (inch)

Torque cartridge in housing
108–122 Nm (80–90 lbf ft)

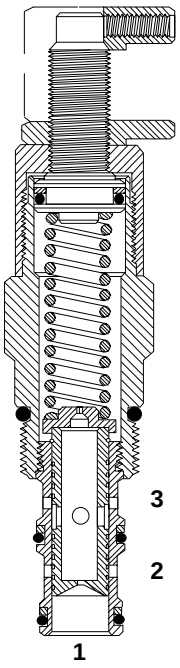


PFR2-10
Priority flow regulator,adjustable

Functional Symbol



Sectional View



Description

The PFR2-10 is a limited range adjustable*, pressure compensated, priority type, flow regulator screw-in cartridge valve.

**The flow adjustment is from the factory set maximum flow rate down to 50% of that factory set flow rate.*

Operation

This valve maintains a constant, factory-set, priority flow from port 1 to port 3 based on the setting adjustment, regardless of pressure changes downstream on port 3. Flow in excess of the priority setting is directed to port 2. If the priority flow at port 3 is blocked, the spool will shift to satisfy the priority flow requirement, thereby closing off flow to 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 . . . . . Maximum inlet flow 60 l/min (15 USgpm)
Maximum regulated flow 38 l/min (10 USgpm)

Flow regulation accuracy . . . . . 0,4–1,9 l/min (0.1–0.49 USgpm) ±20%
1,9–7,5 l/min (0.5–1.99 USgpm) ±15%
7,6–37,8 l/min (2.0–10.0 USgpm) ±10%

Factory set maximum priority flow rate accuracy under standard test conditions and within the above ranges

Temperature range . . . . . -40 to 120°C (-40° to 248°F)

Cavity . . . . . C–10–3 (See page 69)

Fluids . . . . . All general purpose hydraulic fluids such as:
MIL–H–5606, SAE 10, SAE 20, etc.

Filtration . . . . . Cleanliness code 18/**16/13**

Standard housing materials . . . . . Aluminum

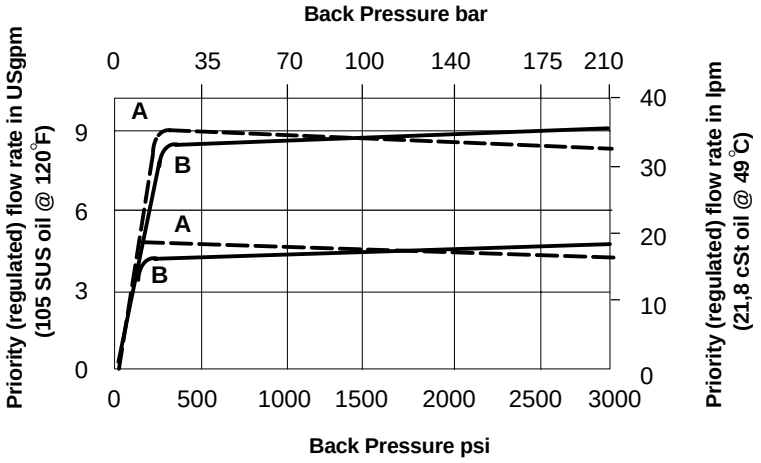
Weight cartridge only . . . . . 0,25 kg (0.54 lb.)

Seal kits . . . . . 565804 Buna-N
889599 Viton®

Viton is a registered trademark of E.I. DuPont

Typical Flow Regulation

Cartridge Only



A -Port 3, priority (regulated) outlet pressurized

B -Port 2, bypass outlet pressurized

Model Code

PFR2-10

PFR2 - 10 (V) - * - ** - *.*

1 2 3 4 5 6

1 Function

PFR2– Priority flow regulator

2 Size

10 – 10 Size

3 Seals

Blank – Buna-N
V – Viton

4 Adjustment

C – Cap
K – Knob
S – Screw

5 Port size

O – Cartridge only

Code	Port size	Housing number	
		Aluminum Light duty	Aluminum Fatigue rated
3B	3/8" BSPP	02–173358	———
6T	SAE 6	566162	
2G	1/4" BSPP	———	876705
3G	3/8" BSPP		876714
6H	SAE 6		876704
8H	SAE 8		876711

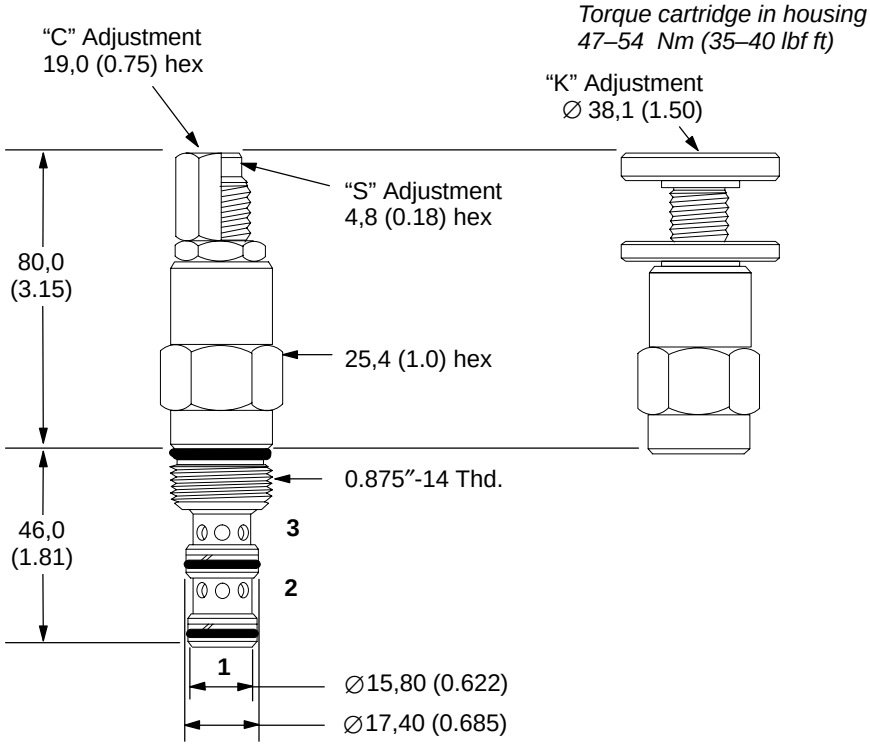
See pages 72 for housings

6 Factory set flow rate, nominal

(Specify in USgpm)
Range 0,38–37,8 l/min (0.1–10.0 USgpm)

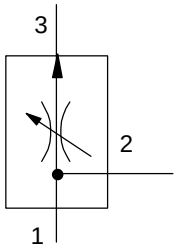
Dimensions

mm (inch)

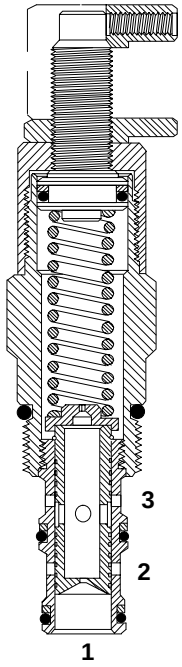


PFR2-16
Priority flow regulator, adjustable

Functional Symbol



Sectional View



Description

The PFR2-16 is a limited range adjustable*, priority type, pressure compensated, flow regulator screw-in cartridge valve.

**The flow adjustment is from the factory set maximum flow rate down to 50% of that factory set flow rate.*

Operation

This valve maintains a constant, factory-set, priority flow from port 1 to port 3 based on based on the setting adjustment, regardless of pressure changes downstream on port 3. Flow in excess of the priority setting is directed to port 2. If the priority flow at port 3 is blocked, the spool will shift to satisfy the priority flow requirement, thereby closing off flow to 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 . . . . . Maximum inlet flow 151 l/min (40 USgpm)
Maximum regulated flow 114 l/min (30 USgpm)

Flow regulation accuracy . . . . . 1,9–10,9 l/min (0.5–2.9 USgpm) ±15%
11,4–114 l/min (3–30 USgpm) ±10%

Factory set maximum priority flow rate accuracy under standard test conditions and within the above ranges

Temperature range . . . . . -40 to 120°C (-40° to 248°F)

Cavity . . . . . C–16–3 (See page 69)

Fluids . . . . . All general purpose hydraulic fluids such as:
MIL–H–5606, SAE 10, SAE 20, etc.

Filtration . . . . . Cleanliness code 18/**16/13**

Standard housing materials . . . . . Aluminum

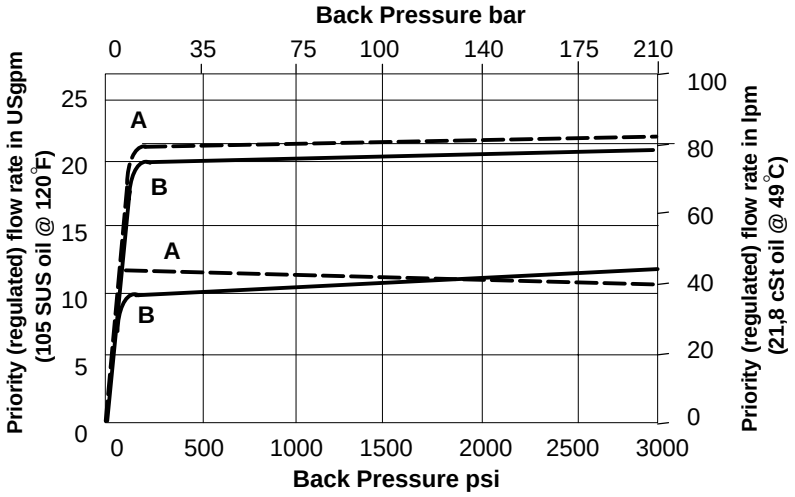
Weight cartridge only . . . . . 0,43 kg (0.95 lb.)

Seal kits . . . . . 565811 Buna-N
889610 Viton®

Viton is a registered trademark of E.I. DuPont

Typical Flow Regulation

Cartridge Only



A -Port 3, priority (regulated) outlet pressurized

B -Port 2, bypass outlet pressurized

Model Code

PFR2-16

PFR2 - 16 (V) - * - * - **

1 2 3 4 5 6

1 Function

PFR2– Priority flow regulator

2 Size

16 – 16 Size

3 Seals

Blank– Buna-N
V – Viton

4 Adjustment

C – Cap
K – Knob
S – Screw

5 Port size

O – Cartridge only

Code	Port size	Housing number	
		Aluminum Light duty	Aluminum Fatigue rated
12T	SAE 12	566152	———
6B	3/4" BSPP	02–175465	
10H	SAE 10	———	876721
12H	SAE 12		876723
4G	1/2" BSPP		876720
6G	3/4" BSPP		876722

See pages 72 for housings

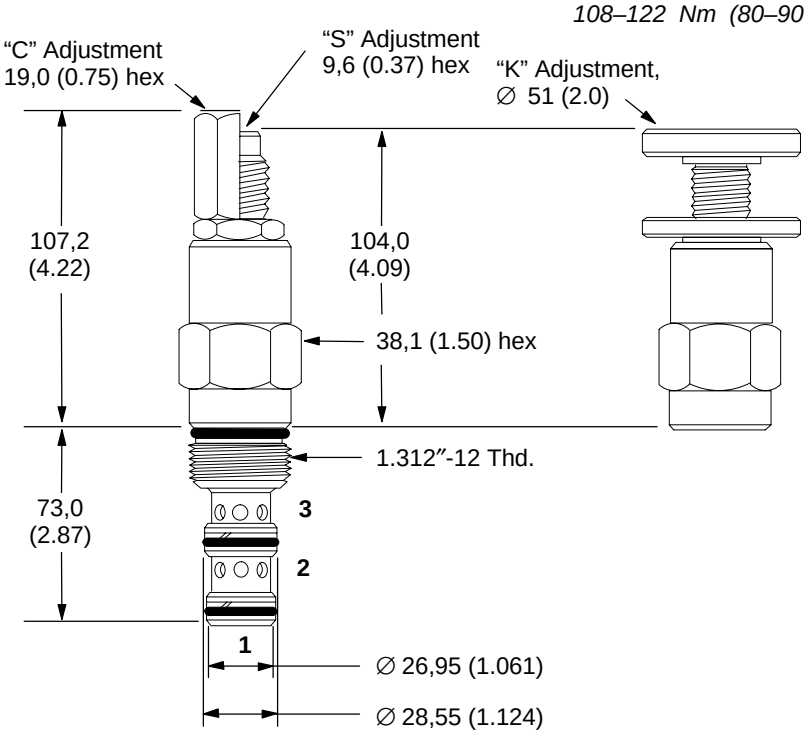
6 Factory set flow rate, nominal

(Specify in USgpm)
Range 1,9–114 l/min (0.5–30 USgpm)

Dimensions

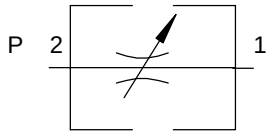
mm (inch)

Torque cartridge in housing 108–122 Nm (80–90 lbf ft)

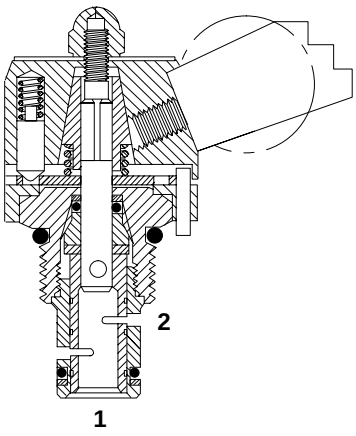


MRV2-10
Manual rotary valve

Functional Symbol



Sectional View



Description

The MRV2-10 is a 2-way, 2 position, manual semi-rotary screw-in flow restrictor valve .

Operation

This valve will increase or decrease flow by changing the variable orifice with the rotary adjustment. Recommended flow path is P to 2, out 1.

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)

Rated flow . . . . . **05** – 0-18,9 l/min (0–5 USgpm)
10 – 0-37,8 l/min (0–10 USgpm)
15 – 0-56,7 l/min (0–15 USgpm)

Internal leakage . . . . . 164 cm^3/min. (10 in^3/min maximum 210 bar (3000 psi)

Temperature range . . . . . -40 to 120°C (-40° to 248°F)

Manual operators . . . . . B – Ball lever (friction lock)*
E – Ball lever (10 position detent)*
D – Lever (10 position detent)*
L – Lever (friction lock)*
K – Knob (non-locking)

Cavity . . . . . C–10–2 (See page 68)

Fluids . . . . . All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.

Filtration . . . . . Cleanliness code 18/**16/13**

Standard housing materials . . . . . Aluminum

Weight cartridge only . . . . . 0,79 kg (1.74 lb.)

Seal kits . . . . . 561810 Buna-N
889609 Viton®

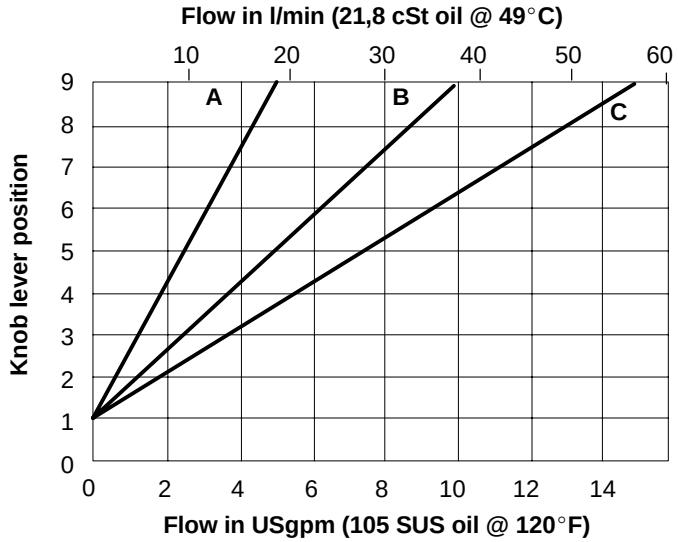
Viton is a registered trademark of E.I. DuPont

***Light duty housings only**

Pressure Drop Curves

Cartridge only

@ 5,5 bar (80 psi) pressure drop and under standard conditions.



Rated flow
A -05
B -10
C -15

Model Code

MRV2-10

MRV2 - 10 (V) - * - ** - **

1 2 3 4 5 6

1 Function

MRV2– Manual rotary valve

2 Size

10 – 10 Size

3 Seals

Blank– Buna-N
V – Viton

4 Manual operators

0 – No operator
B – Ball lever (friction lock)*
E – Ball lever (10 position detent)*
D – Lever (10 position detent)*
L – Lever (friction lock)*
K – Knob (non-locking)
* Light duty housings only.

5 Port size

O – Cartridge only

Code	Port size	Housing number	
		Aluminum Light duty	Aluminum Fatigue rated
3B	3/8" BSPP	02–175462	———
6T	SAE 6	566151	
2G	1/4" BSPP	———	876702
3G	3/8" BSPP		876703
6H	SAE 6		876700
8H	SAE 8		876701

See page 71 for housings

6 Max flow ranges (nominal)

05 – 0-18,9 l/min (0–5 USgpm)
10 – 0-37,8 l/min (0–10 USgpm)
15 – 0-56,7 l/min (0–15 USgpm)

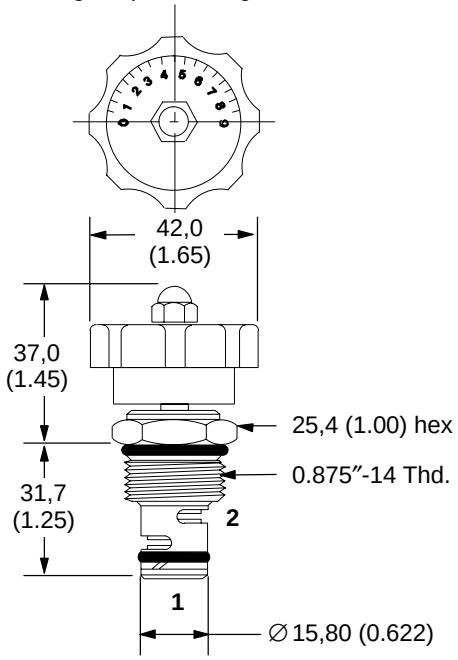
Dimensions

mm (inch)

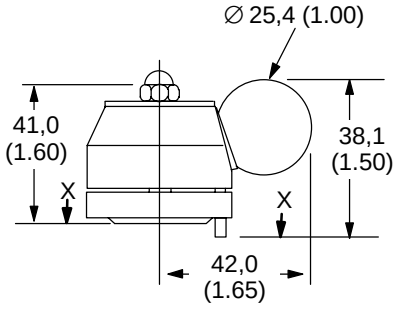
Torque cartridge in housing 47–54 Nm (35–40 lbf ft)

MRV2-10-K Knob Operated

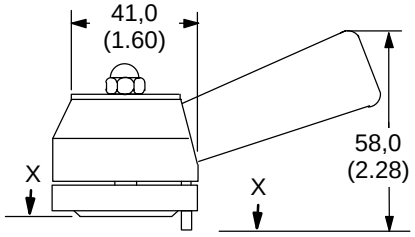
Arrow can be re-located by slacking the plate. Re-tighten nut.



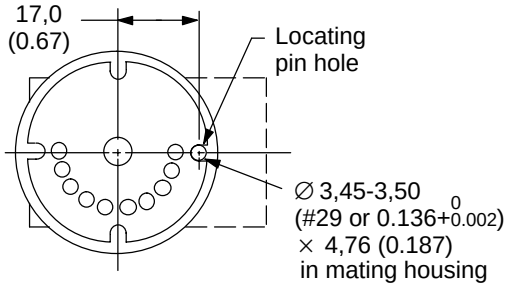
MRV2-10-B/E Models



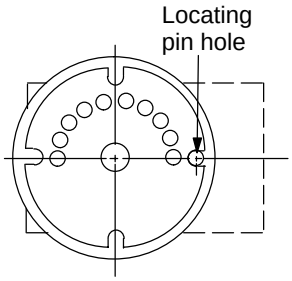
MRV2-10-D/L Models



MRV2-10-E/D Models

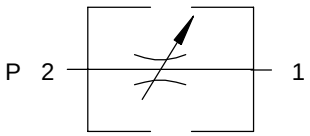


MRV2-10-B/L Models

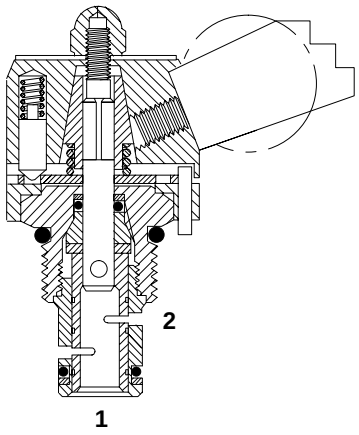


MRV2-16
Manual rotary valve

Functional Symbol



Sectional View



Description

The MRV2-16 is a 2-way, 2 position, manual semi-rotary screw-in flow restrictor valve.

Operation

This valve will increase or decrease flow by changing the variable orifice with the rotary adjustment. Recommended flow path is P to 2 out 1.

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)

Rated flow . . **10** – 0-37,8 l/min (0–10 USgpm) **30** – 0-113,5 l/min (0–30 USgpm)
15 – 0-56,7 l/min (0–15 USgpm) **35** – 0-132,4 l/min (0–35 USgpm)
20 – 0-75,7 l/min (0–20 USgpm) **40** – 0-151,4 l/min (0–40 USgpm)
25 – 0-94,6 l/min (0–25 USgpm) **45** – 0-170,3 l/min (0–45 USgpm)

Internal leakage . . . . . 82 cm^3/min. (5 in^3/min maximum 210 bar (3000 psi)

Temperature range . . . . . -40 to 120°C (-40° to 248°F)

Manual operators . . . . . D – Lever (10 position detent)*
L – Lever (friction lock)*
K – Knob (non-locking)

Cavity . . . . . C–16–2 (See page 68)

Fluids . . . . . All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.

Filtration . . . . . Cleanliness code **18/16/13**

Standard housing materials . . . . . Aluminum

Weight cartridge only . . . . . 0,79 kg (1.74 lb.)

Seal kits . . . . . 561810 Buna-N
889609 Viton®

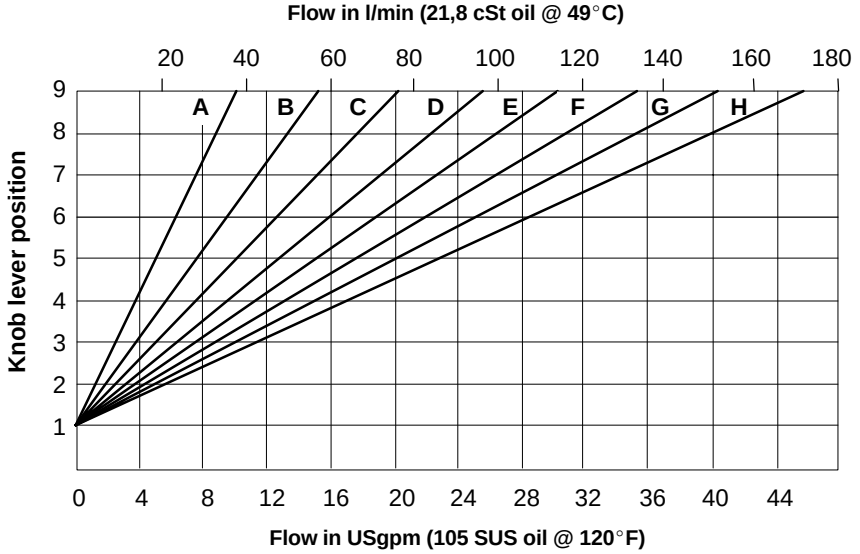
Viton is a registered trademark of E.I. DuPont

***Light duty housings only**

Pressure Drop Curves

Cartridge only

@ 5,5 bar (80 psi) pressure drop and under standard conditions.



Rated flow

A -10 **E** -30
B -15 **F** -35
C -20 **G** -40
D -25 **H** -45

MRV2 - 16 (V) - * - * - **

1 2 3 4 5 6

1 Function

MRV2– Manual rotary valve

2 Size

16 – 16 Size

3 Seals

Blank– Buna-N
V – Viton

4 Manual operators

0 – No operator
D – Lever (10 position detent)*
L – Lever (friction lock)*
K – Knob (non-locking)
* Light duty housings only.

5 Port size

O – Cartridge only

Code	Port size	Housing number	
		Aluminum Light duty	Aluminum Fatigue rated
6B	3/4" BSPP	02–175463	———
12T	SAE 12	566149	
4G	1/2" BSPP	———	876716
6G	3/4" BSPP		876718
10H	SAE 10		876717
12H	SAE 12		566113

See page 71 for housings

6 Max flow ranges (nominal)

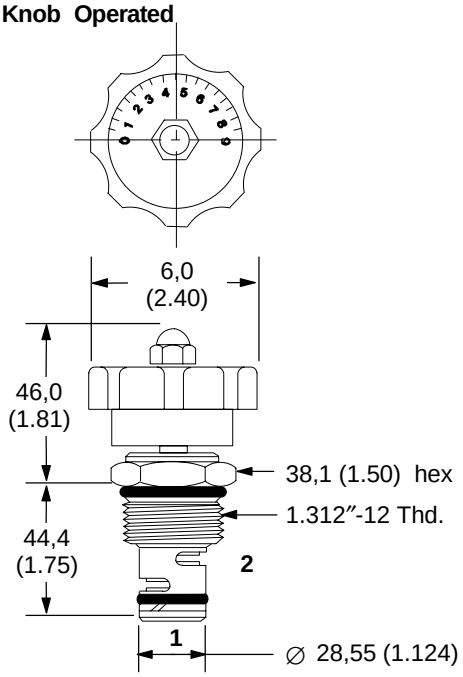
10 – 0-37,8 l/min (0–10 USgpm)
15 – 0-56,7 l/min (0–15 USgpm)
20 – 0-75,7 l/min (0–20 USgpm)
25 – 0-94,6 l/min (0–25 USgpm)
30 – 0-113,5 l/min (0–30 USgpm)
35 – 0-132,4 l/min (0–35 USgpm)
40 – 0-151,4 l/min (0–40 USgpm)
45 – 0-170,3 l/min (0–45 USgpm)

Dimensions

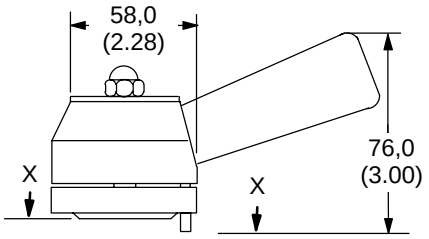
mm (inch)

Torque cartridge in housing 108–122 Nm (80–90 lbf ft)

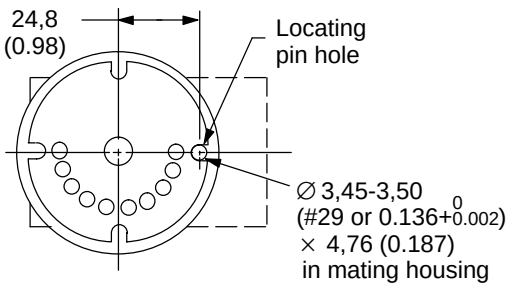
MRV2-16-K Knob Operated



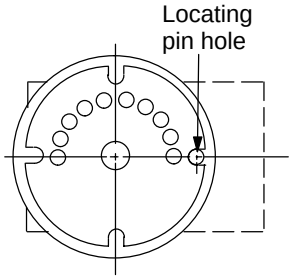
MRV2-16-D/L Models



MRV2-16-D Models

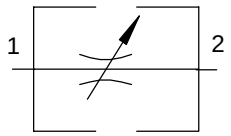


MRV2-16-L Models

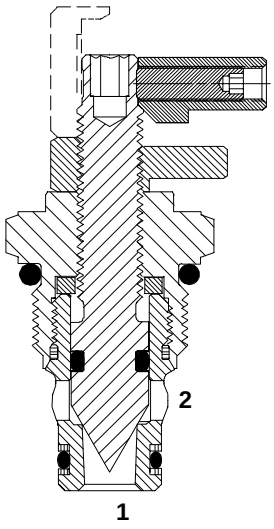


NV1-8
Needle valve

Functional Symbol



Sectional View



Description

The NV1–8 is a direct-acting, adjustable, screw-in cartridge type needle valve.

Operation

This needle valve is non-pressure compensated. Flow is controlled in either direction, from full flow to tight shut-off, by turning the adjustment feature clockwise.

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) . . . . . 350 bar (5000 psi) steel housing
210 bar (3000 psi) aluminum housing

Cartridge fatigue pressure (infinite life) . . . . . 280 bar (4000 psi)

Rated flow . . . . . 45 l/min (12 USgpm)

Internal leakage . . . . . 5 drops/min. maximum @ 350 bar (5000 psi)

Temperature range . . . . . -40 to 120°C (-40° to 248°F)

Cavity . . . . . C–8–2 (See page 68)

Fluids . . . . . All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.

Filtration . . . . . Cleanliness code 18/**16/13**

Standard housing materials . . . . . Aluminum or steel

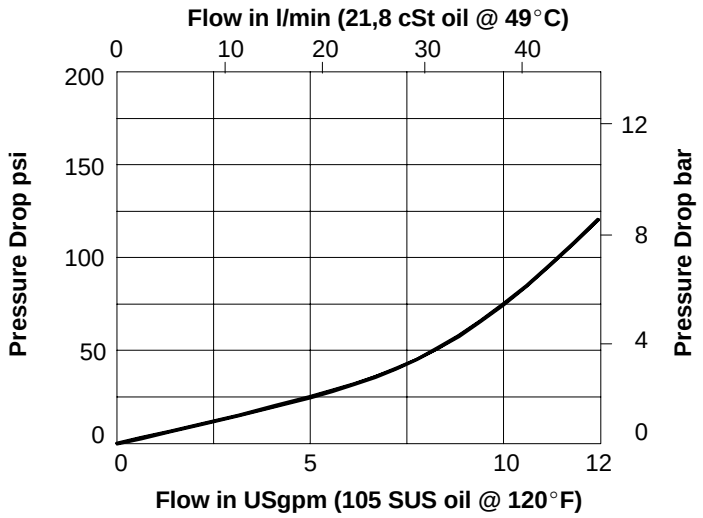
Weight cartridge only . . . . . 0,07 kg. (0.15 lbs.)

Seal Kits . . . . . 02-165875 Buna–N
02-165877 Viton®

Viton is a registered trademark of E.I. DuPont

Pressure Drop Curve

Cartridge Only



Full open
Port 1 to port 2
or port 2 to port 1.

Model Code

NV1-8

NV1 – 8 (V) – * – (*) **

1 2 3 4 5 6

1 Function

NV1 – Needle valve

2 Size

8 – 8 Size

3 Seals

Blank– Buna-N
V – Viton

4 Style

S – Screw
C – Cap
K – Knob

5 Valve housing material
Omit for cartridge only

S – Steel
A – Aluminum

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)

6 Port size

O – Cartridge only

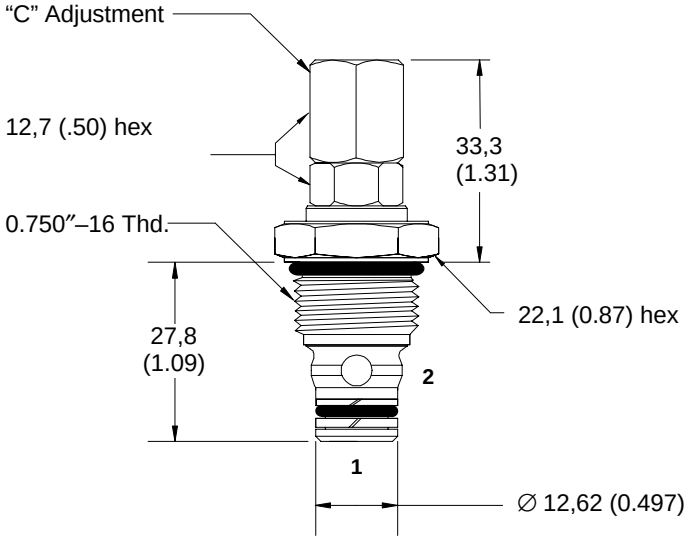
Code	Port size	Housing number	
		Aluminum Fatigue rated	Steel Fatigue rated
4T	SAE 4	02–160730	02–160736
6T	SAE 6	02–160731	02–160737
8T	SAE 8	02–160732	02–160738
2G	1/4" BSPP	02–160727	02–160733
3G	3/8" BSPP	02–160728	02–160734

See pages 71 and 74 for housings

Dimensions

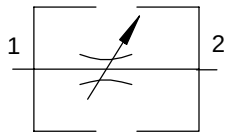
mm (inch)

Torque cartridge in housing 34–41 Nm (25–30 lbf ft)

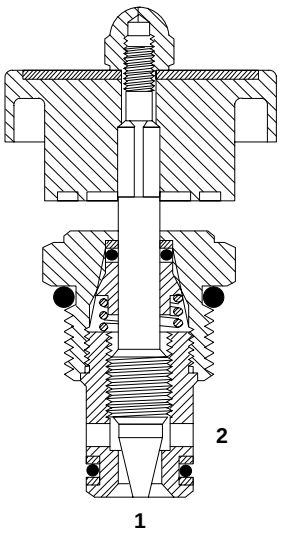


NV1-10
Needle valve

Functional Symbol



Sectional View



Description

The NV1–10 is a direct-acting, adjustable, screw-in cartridge type needle valve.

Operation

This needle valve is non-pressure compensated. Flow is controlled in either direction, from full flow to tight shut-off, by turning the adjustment feature clockwise.

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 . . . . . 45 l/min (12 USgpm)

Internal leakage . . . . . 5 drops/min. maximum @ 210 bar (3000 psi)

Temperature range . . . . . -40 to 120°C (-40° to 248°F)

Cavity . . . . . C–10–2 (See page 68)

Fluids . . . . . All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.

Filtration . . . . . Cleanliness code 18/**16/13**

Standard housing materials . . . . . Aluminum

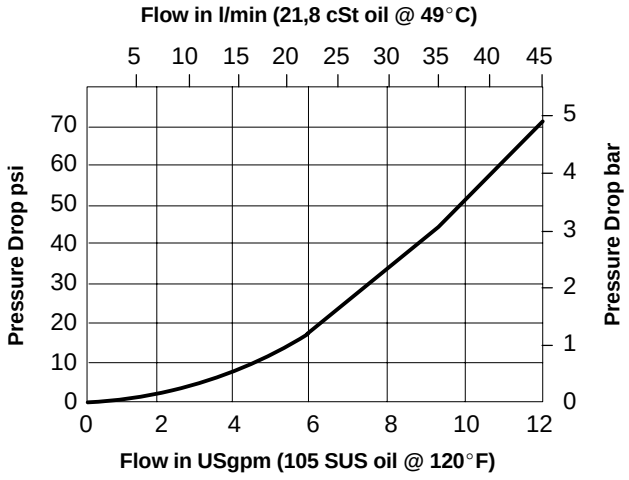
Weight cartridge only . . . . . 0,11 kg. (0.24 lbs.)

Seal Kits . . . . . 565806 Buna–N
889627 Viton®

Viton is a registered trademark of E.I. DuPont

Pressure Drop Curve

Cartridge Only



Full open
Port 1 to port 2
or port 2 to port 1.

Model Code

NV1-10

NV1 – 10 (V) – * – **

1 2 3 4 5

1 Function

NV1 – Needle valve

2 Size

10 – 10 Size

3 Seals

Blank– Buna-N
V – Viton

4 Adjustment

K – Knob (black)
R – Knob (red)

5 Port size

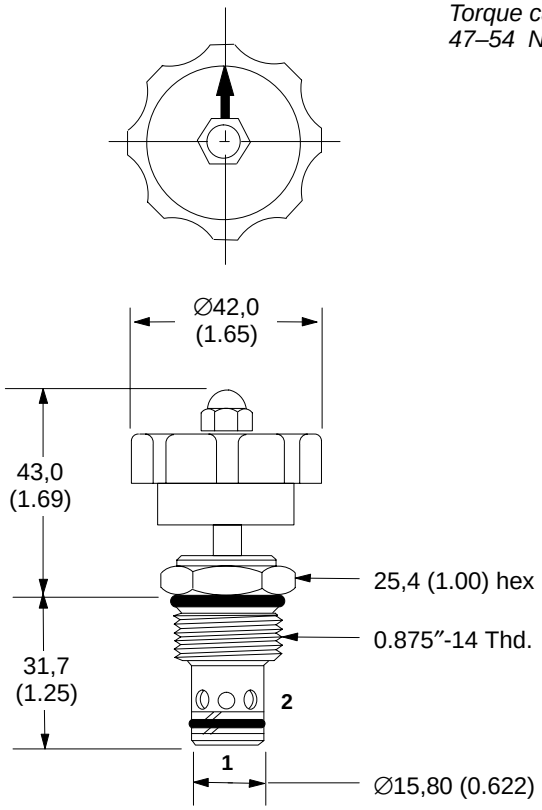
O – Cartridge only

Code	Port size	Housing number	
		Aluminum Light duty	Aluminum Fatigue rated
3B	3/8” BSPP	02–175462	———
6T	SAE 6	566151	
2G	1/4” BSPP	———	876702
3G	3/8” BSPP		876703
6H	SAE 6		876700
8H	SAE 8		876701

See page 71 for housings

Dimensions

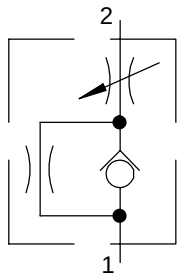
mm (inch)



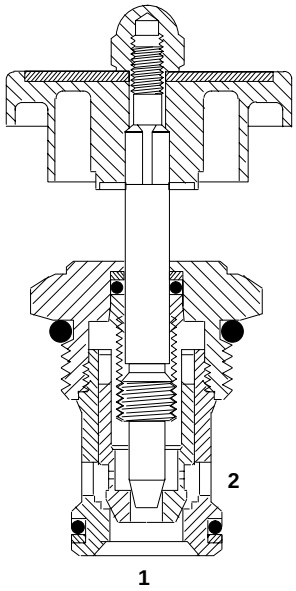
Torque cartridge in housing 47–54 Nm (35–40 lbf ft)

NV1-16
Needle valve

Functional Symbol



Sectional View



Description

The NV1–16 is a direct-acting, adjustable, screw-in cartridge type needle valve.

Operation

This needle valve is non-pressure compensated. Flow is controlled in the direction from port 2 to port 1, from full flow to tight shut-off, by turning the adjustment feature clockwise. The flow from port 1 to port 2 will be very restricted.

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 . . . . . 151 l/min (40 USgpm)

Internal leakage . . . . . 5 drops/min. maximum @ 210 bar (3000 psi)

Temperature range . . . . . -40 to 120°C (-40° to 248°F)

Cavity . . . . . C–16–2 (See page 68)

Fluids . . . . . All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.

Filtration . . . . . Cleanliness code 18/**16/13**

Standard housing materials . . . . . Aluminum

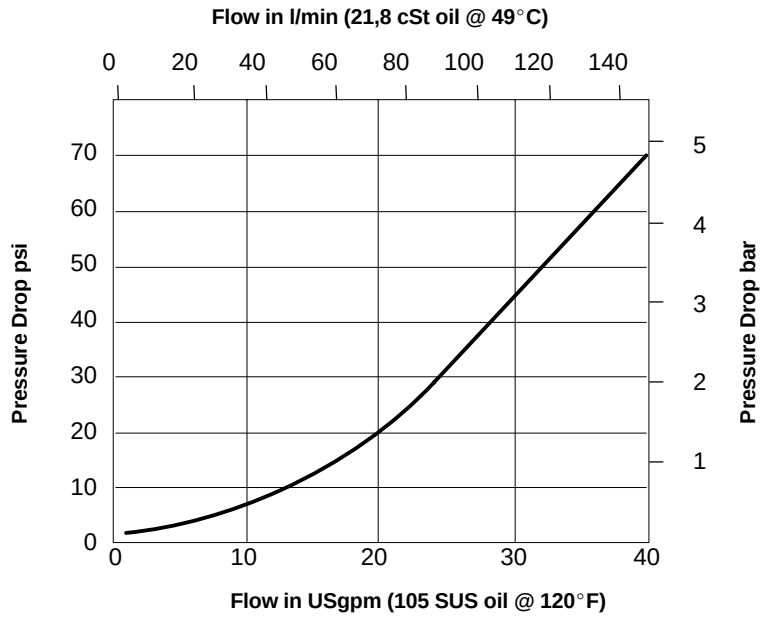
Weight cartridge only . . . . . 0,34 kg. (0.76 lbs.)

Seal kits . . . . . 565810 Buna–N
889609 Viton®

Viton is a registered trademark of E.I. DuPont

Pressure Drop Curve

Cartridge Only



Full open
Port 2 to port 1.

Model Code

NV1-16

NV1 – 16 (V) – K – ***

1 2 3 4 5

1 Function

NV1 – Needle valve

2 Size

16 – 16 Size

3 Seals

Blank– Buna-N
V – Viton

4 Adjustment

K – Knob (black)
R – Knob (red)

5 Port size

O – Cartridge only

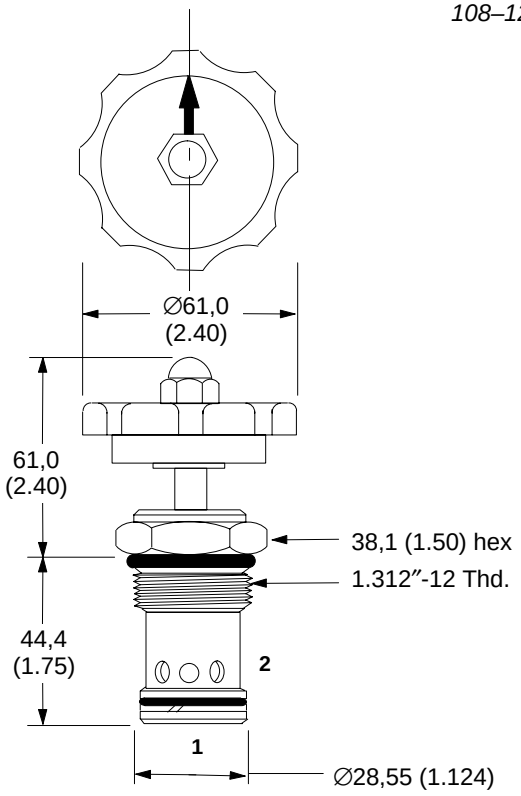
Code	Port size	Housing number	
		Aluminum Light duty	Aluminum Fatigue rated
6B	3/4” BSPP	02–175463	———
12T	SAE 12	566149	
4G	1/2” BSPP	———	876716
6G	3/4” BSPP		876718
10H	SAE 10		876717
12H	SAE 12		566113

See page 71 for housings

Dimensions

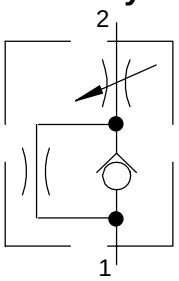
mm (inch)

Torque cartridge in housing
108–122 Nm (80–90 lbf ft)

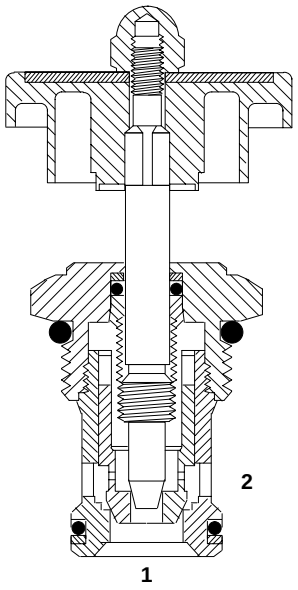


NV1-20
Needle valve

Functional Symbol



Sectional View



Description

The NV1–20 is a direct-acting, adjustable, screw-in cartridge type needle valve.

Operation

This needle valve is non-pressure compensated. Flow is controlled in the direction from port 2 to port 1, from full flow to tight shut-off, by turning the adjustment feature clockwise. The flow from port 1 to port 2 will be very restricted.

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 . . . . . 265 l/min (70 USgpm)

Internal leakage . . . . . 5 drops/min. maximum @ 210 bar (3000 psi)

Temperature range . . . . . -40 to 120°C (-40° to 248°F)

Cavity . . . . . C–20–2 (See page 68)

Fluids . . . . . All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.

Filtration . . . . . Cleanliness code 18/**16/13**

Standard housing materials . . . . . Aluminum

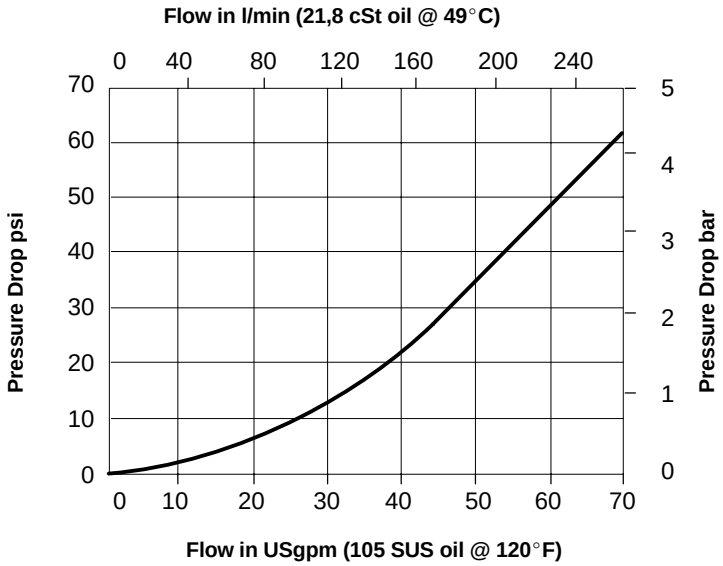
Weight cartridge only . . . . . 0,59 kg. (1.3 lbs.)

Seal kits . . . . . 889615 Buna-N
889619 Viton®

Viton is a registered trademark of E.I. DuPont

Pressure Drop Curve

Cartridge Only



Full open
Port 2 to port 1.

Model Code

NV1-20

NV1 –20 (V) – * – ***

1 2 3 4 5

1 Function

NV1 – Needle valve

2 Size

20 – 20 Size

3 Seals

Blank– Buna-N
V – Viton

4 Adjustment

K – Knob (black)
R – Knob (red)

5 Port size

O – Cartridge only

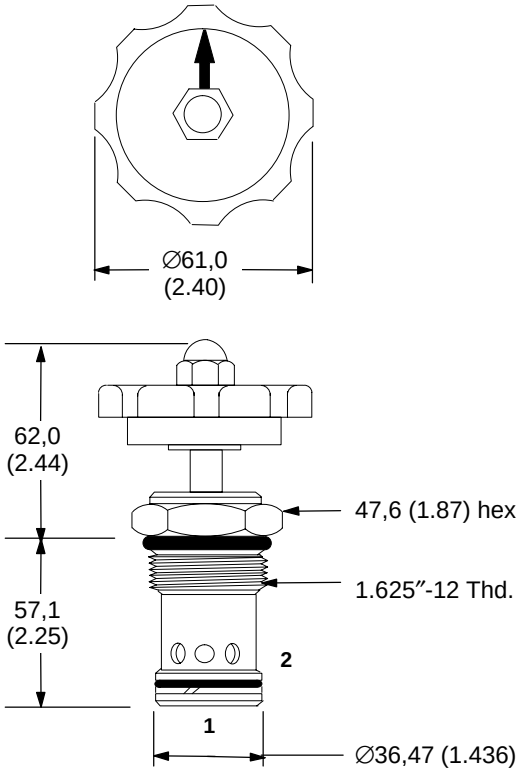
Code	Port size	Housing number	
		Aluminum Light duty	Aluminum Fatigue rated
8B	1” BSPP	02–175464	———
16T	SAE 16	566409	
6G	3/4” BSPP	———	876732
8G	1” BSPP		876734
12H	SAE 12		876733
16H	SAE 16		876735

See page 71 for housings

Dimensions

mm (inch)

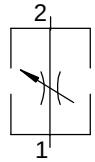
Torque cartridge in housing
128–155 Nm (95–115 lbf ft)



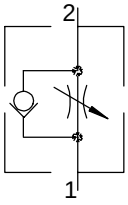
FCV7-10
Flow control valve

Functional Symbol

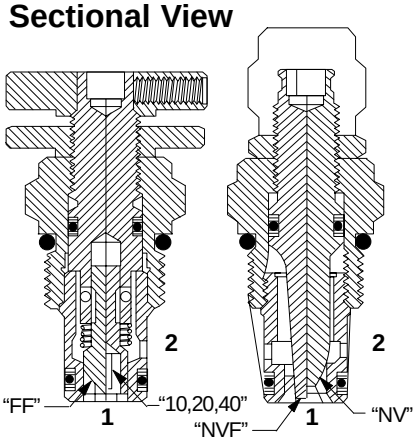
FCV7-10(V)-*-NV(F)



FCV7-10(V)-*-FF/10/20/40



Sectional View



Description

The FCV7-10 is a non-pressure compensated, adjustable, flow restrictor available with and without free-flow check.

Operation

This valve when applied without the free flow check will allow flow between ports 1 and 2 through an increasing variable orifice when the adjustment is turned counterclockwise. In the full clockwise position this valve provides tight shut-off.

When applied with the free flow check, the valve will work as stated above allowing flow between port 2 and port 1, while it allows free reverse from port 1 to 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)

Rated flow . . . . . 45 l/min (12 USgpm)

Temperature range . . . . . –40° to 120°C (–40° to 248°F)

Cavity . . . . . C–10–2 (See page 68)

Fluids . . . . . All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.

Filtration . . . . . ISO 4406, class 18/**16/13** or cleaner

Standard housing materials . . . . . Aluminum

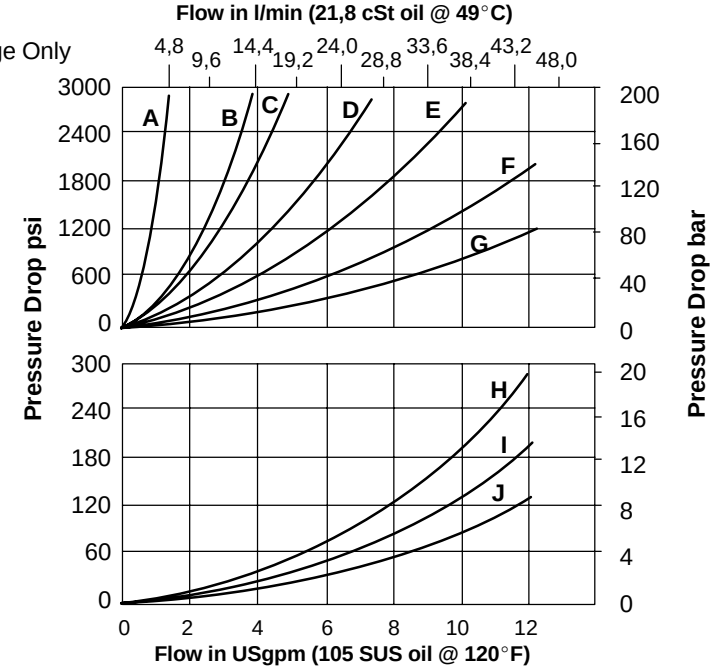
Weight cartridge only . . . . . 0,11 kg (0.25 lbs.)

Seal kits . . . . . 565806 Buna N
889627 Viton®

Viton is a registered trademark of E.I. DuPont

Typical Flow Regulation (full open)

Cartridge Only



Curve	Code Option*	Flow Direction, Port:	Valve Condition
A	10	2 to 1 1 to 2	Open Closed
B	20	2 to 1 1 to 2	Open Closed
C	10	1 to 2	Open
D	40	2 to 1 1 to 2	Open Closed
E	NVF	Both directions	Open
F	20	1 to 2	Open
G	40	1 to 2	Open
H	FF	2 to 1	Open
I	FF	1 to 2	Open and closed
J	NV	Both directions	Open

*See Controlled Flow Option in Model Code.

Model Code FCV7-10

FCV7 - 10 (V) - * - ** - **

1 2 3 4 5 6

1 Function

FCV7– Flow regulator

2 Size

10 – 10 Size

3 Seals

Blank– Buna-N
V – Viton

4 Adjustment

C – Cap
K – Knob
S – Screw

5 Port size

O – Cartridge only

Code	Port size	Housing number	
		Aluminum Light duty	Aluminum Fatigue rated
3B	3/8" BSPP	02–175462	———
6T	SAE 6	566151	
2G	1/4" BSPP	———	876702
3G	3/8" BSPP		876703
6H	SAE 6		876700
8H	SAE 8		876701

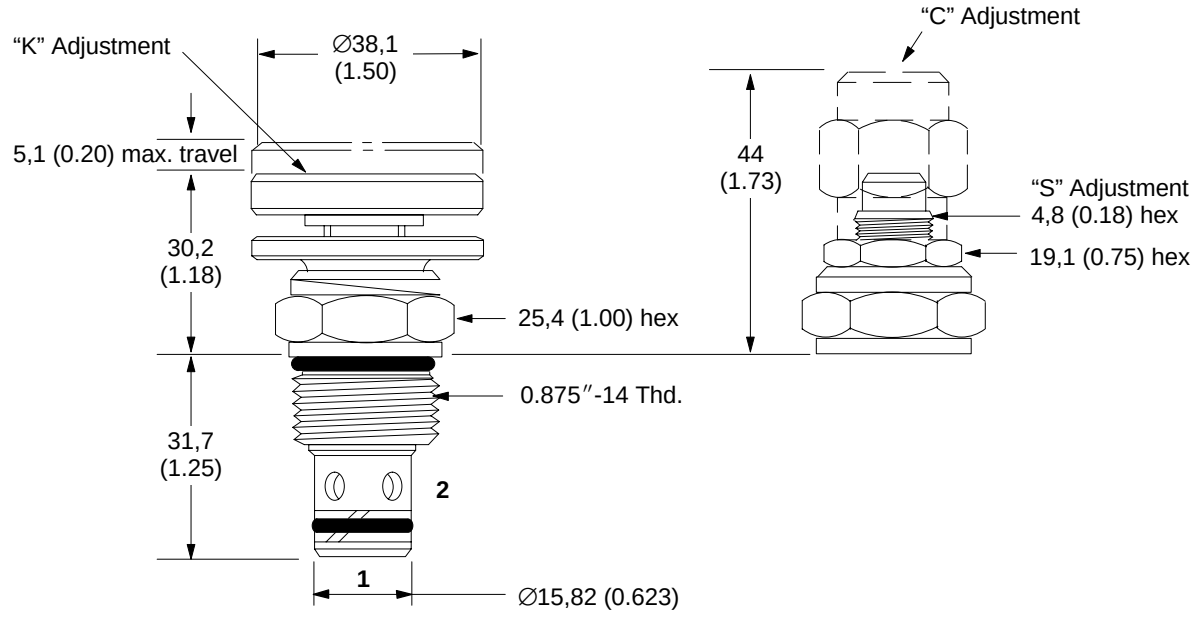
See page 71 for housings

6 Controlled flow option			Max. flow ranges (nominal)
NV	–	Needle valve	0-45 l/min (0-12 USgpm)
NVF	–	Needle valve, fine	0-38 l/min (0-10 USgpm)
FF	–	Needle valve with free reverse flow	0-45 l/min (0-12 USgpm)
10	–	Flow range, type 10, with free reverse flow	0-6,6 l/min (0-1.75 USgpm)
20	–	Flow range, type 20, with free reverse flow	0-14 l/min (0-3.75 USgpm)
40	–	Flow range, type 40, with free reverse flow	0-27 l/min (0-7.25 USgpm)

Dimensions

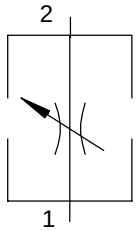
mm (inch)

Torque cartridge in housing 47–54 Nm (35–40 lbf ft)

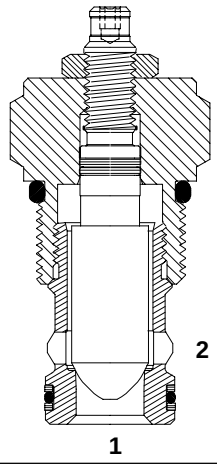


FCV11-12
Flow control valve

Functional symbol



Sectional view



Description

The FCV11–12 is a direct acting, adjustable needle valve.

Operation

This valve is non-pressure compensated. Flow is controlled in either direction, from full flow to tight shut off, by turning the adjustment feature clockwise.

Ratings and specifications

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

Typical application pressure . . . . . 350 bar (5000 psi) Port “1” to “2”
210 bar (3000 psi) Port “1” to “2”

Cartridge fatigue pressure (infinite life) . . . . . 350 bar (5000 psi)

Rated flow . . . . . 114 l/min (30 USgpm)

Internal leakage . . . . . less than 5 drops / min. max. @210 bar (3000 psi)

Temperature range . . . . . –40° to 120°C (–40° to 248°F)

Cavity . . . . . C-12-2 or C-12-2U (See page 68)

Fluids . . . . . All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.

Filtration . . . . . Cleanliness code 18/**16/13**

Standard housing materials . . . . . Aluminum or steel

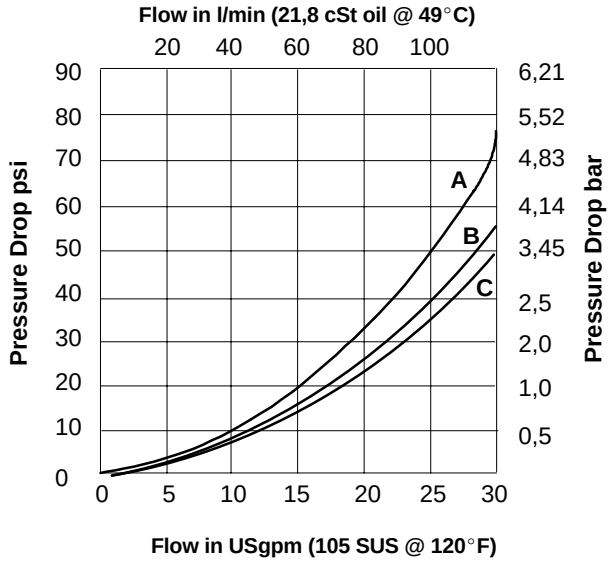
Weight cartridge only . . . . . 0,24 kg (0.54 lb.)

Seal kit . . . . . 02–165889 Buna–N
02–165888 Viton®

Viton is a registered trademark of E.I. DuPont

Pressure Drop Curves

Cartridge only



A –Cartridge with C-12-2 valve body
B –Cartridge with C-12-2U valve body
C –Cartridge only, full open

Model Code

FCV11-12

FCV11 - 12 (V) - S - * * (U) - N V**

1 2 3 4 5 6 7 8

1 Function

FCV11– Flow control valve

2 Size

12 – 12 Size

3 Seals

Blank – Buna-N
V – Viton

4 Adjustment

S – Screw

5 Valve housing material

S – Steel
A – Aluminum

6 Port size

O – Cartridge only

Code	Port size	Housing number			
		C-12-2U Aluminum Fatigue rated	**C-12-2 Aluminum Fatigue rated**	**C-12-2U Steel Fatigue rated**	**C-12-2 Steel Fatigue rated**
10T	SAE 10	02–160641	02–160640	02–169817	02–169744
12T	SAE 12	02–160645	02–160644	02–169790	02–169782
4G	1/2” BSPP	02–161116	02–161118	02–172512	02–172062
6G	3/4” BSPP	02–161115	02–161117	02–162922	02–169665

See pages 71 and 74 for housings

7 Cavity

Blank– Cavity without undercut
U – Cavity with undercut

8 Valve type

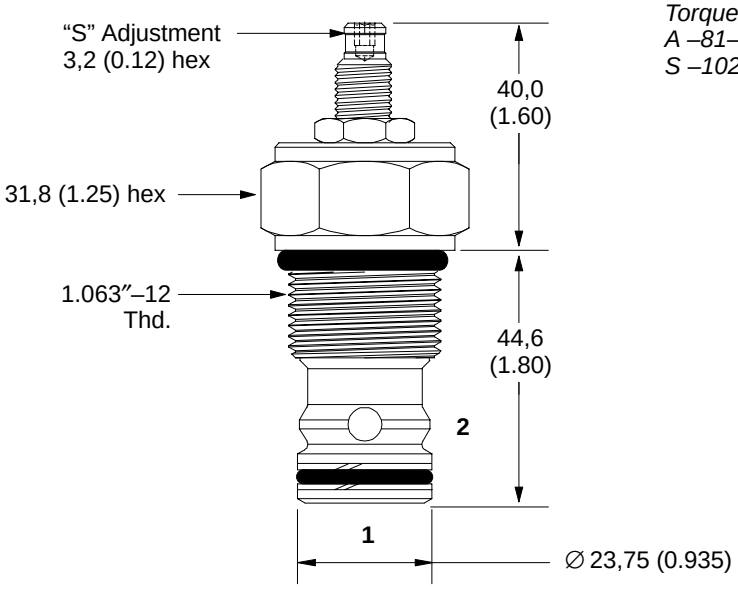
NV – Needle Valve (Adjustable)

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)

Dimensions

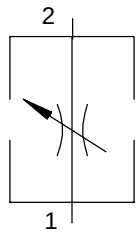
mm (inch)



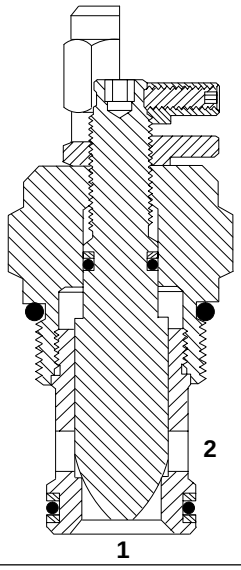
Torque cartridge in housing
A –81–95 Nm (60–70 lbf ft)
S –102–115 Nm (75–85 lbf ft)

FCV6-16
Flow control valve

Functional Symbol



Sectional View



Description

The FCV6-16 is a non-pressure compensated, adjustable, flow restrictor.

Operation

This valve allows flow between ports 1 and 2 through an increasing variable orifice when the adjustment is turned counterclockwise. In the full clockwise position this valve provides tight shut-off.

Ratings and specifications

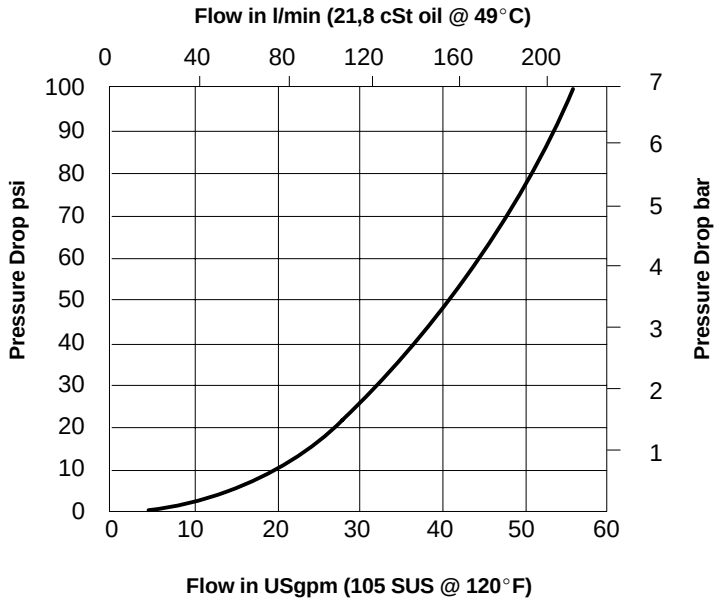
Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)

Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	208 l/min (55 USgpm)
Internal leakage	Port 2 to 1; <5 drops/min maximum @ 210 bar (3000 psi)
Temperature range	–40° to 120°C (–40° to 248°F)
Cavity	C–16–2 (See page 68)
Fluids	All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/**16/13**
Standard housing materials	Aluminum
Weight cartridge only	0,37 kg (0.81 lbs.)
Seal kits	889631 Buna-N 889635 Viton®

Viton is a registered trademark of E.I. DuPont

Typical Flow Regulation

Cartridge Only



Full open
Port 1 to port 2
or port 2 to port 1.

Model Code

FCV6-16

FCV6 - 16 (V) - * - * - NV**

1 2 3 4 5 6

1 Function

FCV6 – Flow control valve

2 Size

16 – 16 Size

3 Seals

Blank – Buna-N
V – Viton

4 Adjustment

C – Cap
K – Knob
S – Screw

5 Port size

O – Cartridge only

Code	Port size	Housing number	
		Aluminum Light duty	Aluminum Fatigue rated
6B	3/4" BSPP	02–175463	———
12T	SAE 12	566149	
4G	1/2" BSPP	———	876716
6G	3/4" BSPP		876718
10H	SAE 10		876717
12H	SAE 12		566113

See page 71 for housings

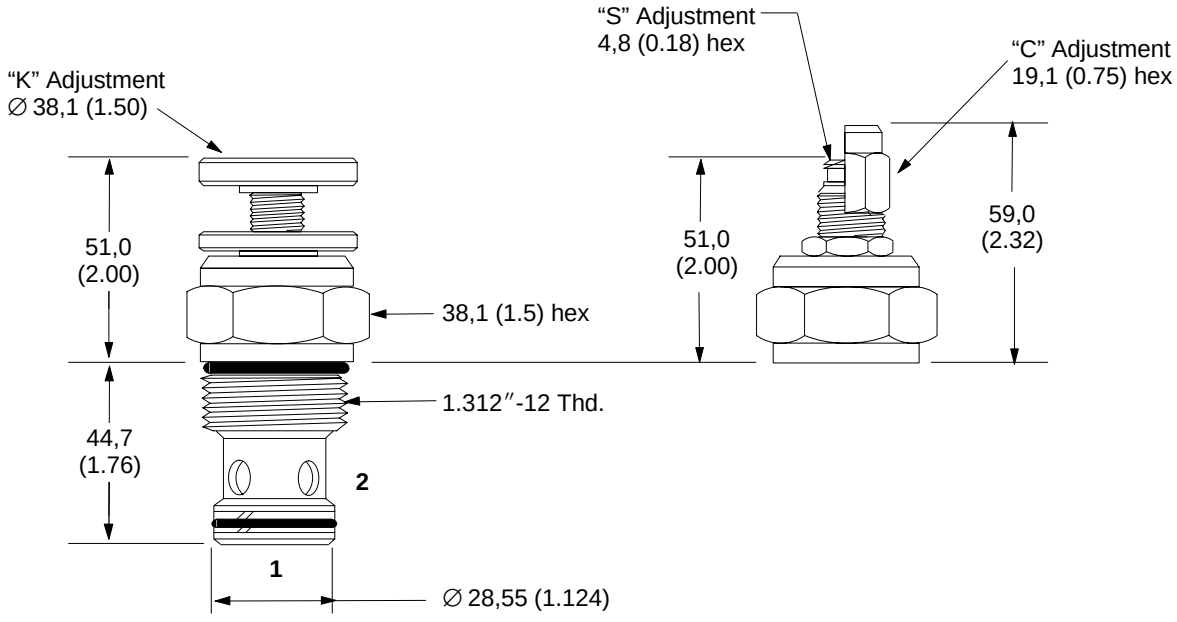
6 Controlled flow option

NV – Needle valve

Dimensions

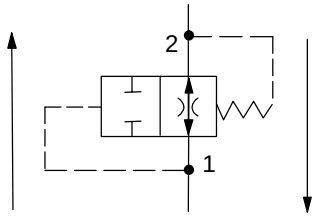
mm (inch)

Torque cartridge in housing
108–122 Nm (80–90 lbf ft)



VF1-10
Velocity fuse

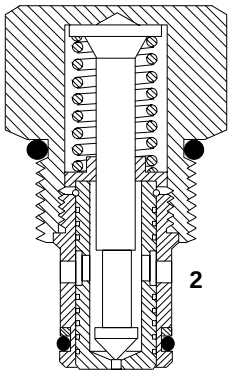
Functional Symbol



Fusing direction

Reverse flow direction

Sectional View



Description

The VF1-10-F is a screw-in cartridge velocity fuse.

Operation

This valve is normally open from port 1 to port 2. When flow exceeds the setting of the valve, it closes. The valve returns to the open condition when the pressure at port 1 is reduced to less than 80 psi.

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 . . . . . 23 l/min (6 USgpm)

Flow regulation accuracy . . . . . 1,9–22,7 l/min (0.5–6.0 USgpm) ± 20%

Internal leakage . . . . . Port 2 to 1; <5 drops/min maximum @ 210 bar (3000 psi)

Temperature range . . . . . –40° to 120°C (–40° to 248°F)

Cavity . . . . . C–10–2 (See page 68)

Fluids . . . . . All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.

Filtration . . . . . Cleanliness code 18/**16/13**

Standard housing materials . . . . . Aluminum

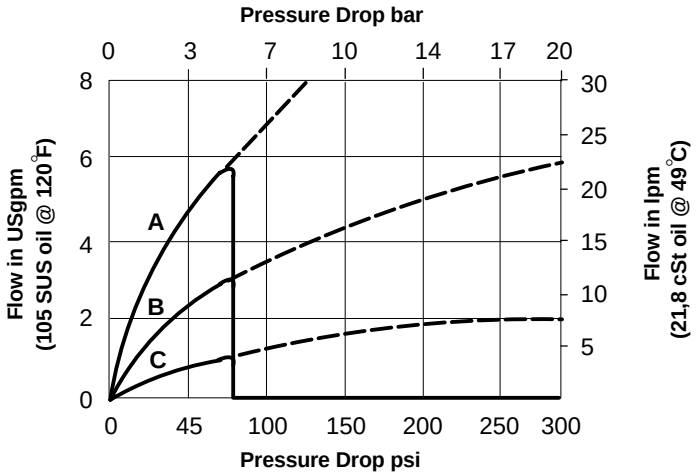
Weight cartridge only . . . . . 0,11 kg (0.25 lbs.)

Seal kits . . . . . 565803 Buna-N
566086 Viton®

Viton is a registered trademark of E.I. DuPont

Typical Flow Regulation

Cartridge Only



A -22,8 l/min (6 USgpm) maximum flow setting
- —— Port 1 to 2, fusing direction
- – – Port 2 to 1, reverse flow down to 0

B -14,44 l/min. (3 USgpm) maximum flow setting
- —— Port 1 to 2, fusing direction
- – – Port 2 to 1, reverse flow down to 0

C -3,8 l/min. (1 USgpm) maximum flow setting
- —— Port 1 to 2, fusing direction
- – – Port 2 to 1, reverse flow down to 0

Model Code

VF1-10

VF1 - 10 (V) - F - * * - * . *

1 2 3 4 5 6

1 Function

VF1 – Velocity fuse

2 Size

10 – 10 Size

3 Seals

Blank– Buna-N
V – Viton

4 Adjustment

F – Fixed orifice

5 Port size

O – Cartridge only

Code	Port size	Housing number	
		Aluminum Light duty	Aluminum Fatigue rated
3B	3/8” BSPP	02–175462	———
6T	SAE 6	566151	
2G	1/4” BSPP	———	876702
3G	3/8” BSPP		876703
6H	SAE 6		876700
8H	SAE 8		876701

See page 71 for housings

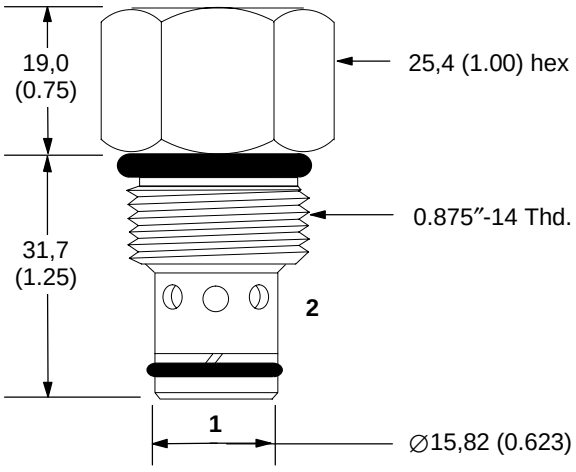
6 Factory set flow rate, nominal

(Specify in USgpm)
Range 1,9–22,7 l/min
(0.5–6.0 USgpm)

Dimensions

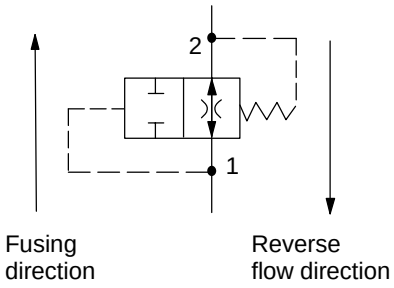
mm (inch)

Torque cartridge in housing
47–54 Nm (35–40 lbf ft)

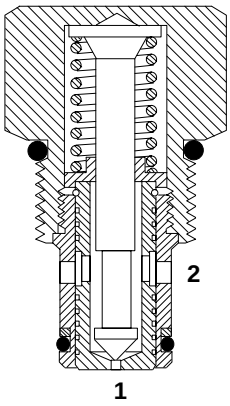


VF1-16
Velocity fuse

Functional Symbol



Sectional View



Description

The VF1-16-F is a factory-set, screw-in cartridge velocity fuse.

Operation

This valve is normally open from port 1 to port 2. When flow exceeds the setting of the valve, it closes. The valve returns to the open condition when the pressure at port 1 is reduced to less than 80 psi.

Ratings and specifications

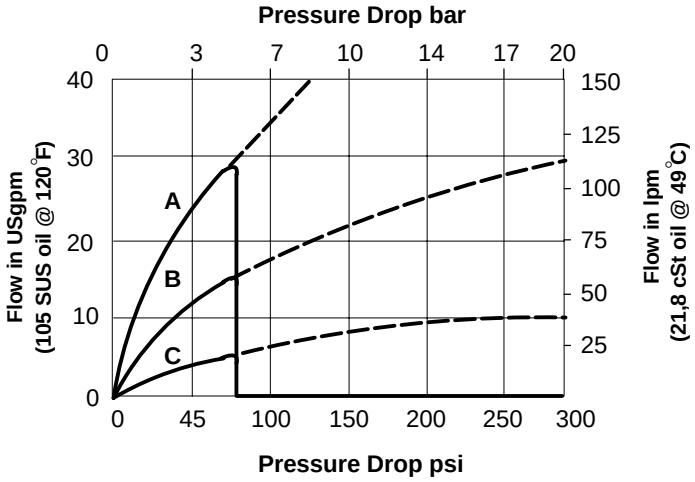
Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)

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)
Flow regulation accuracy	9,5–114 l/min (2.5–30.0 USgpm) ± 20%
Internal leakage	Port 1 to 2 closed; <5 drops/min maximum @ 210 bar (3000 psi)
Temperature range	–40° to 120°C (–40° to 248°F)
Cavity	C–16–2 (See page 68)
Fluids	All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code **18/16/13**
Standard housing materials	Aluminum
Weight cartridge only	0,33 kg (0.72 lbs.)
Seal kits	565810 Buna-N 889609 Viton®

Viton is a registered trademark of E.I. DuPont

Typical Flow Regulation

Cartridge Only



A -114 l/min (30 USgpm) maximum flow setting
- —— Port 1 to 2, fusing direction
- – – Port 2 to 1, reverse flow down to 0

B -60 l/min. (15 USgpm) maximum flow setting
- —— Port 1 to 2, fusing direction
- – – Port 2 to 1, reverse flow down to 0

C -19 l/min. (5 USgpm) maximum flow setting
- —— Port 1 to 2, fusing direction
- – – Port 2 to 1, reverse flow down to 0

Model Code

VF1-16

VF1 - 16 (V) - F - *** - *.*

1 2 3 4 5 6

1 Function

VF1 – Velocity fuse

2 Size

16 – 16 Size

3 Seals

Blank– Buna-N
V – Viton

4 Adjustment

F – Factory set

5 Port size

O – Cartridge only

Code	Port size	Housing number	
		Aluminum Light duty	Aluminum Fatigue rated
6B	3/4” BSPP	02–175463	_____
12T	SAE 12	566149	
4G	1/2” BSPP	_____	876716
6G	3/4” BSPP		876718
10H	SAE 10		876717
12H	SAE 12		566113

See page 71 for housings

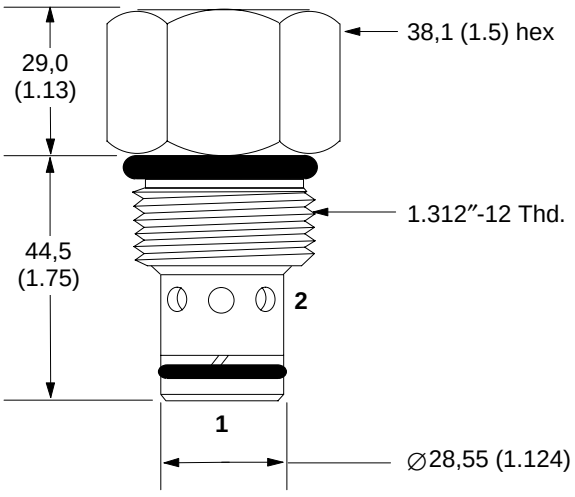
6 Factory set flow rate, nominal

(Specify in USgpm)
Range 9,5–114 l/min
(2.5–30.0 USgpm)

Dimensions

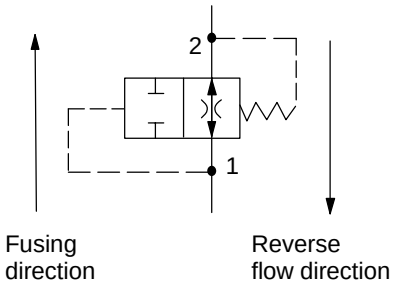
mm (inch)

Torque cartridge in housing
108–122 Nm (80–90 lbf ft)

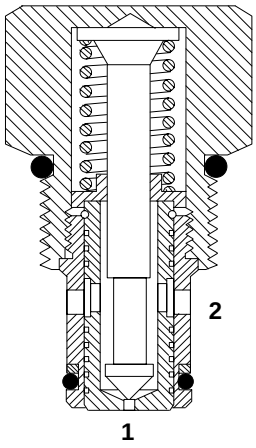


VF1-20
Velocity fuse

Functional Symbol



Sectional View



Description

The VF1-20-F is a factory-set, screw-in cartridge velocity fuse.

Operation

This valve is normally open from port 1 to port 2. When flow exceeds the setting of the valve, it closes. The valve returns to the open condition when the pressure at port 1 is reduced to less than 80 psi.

Ratings and specifications

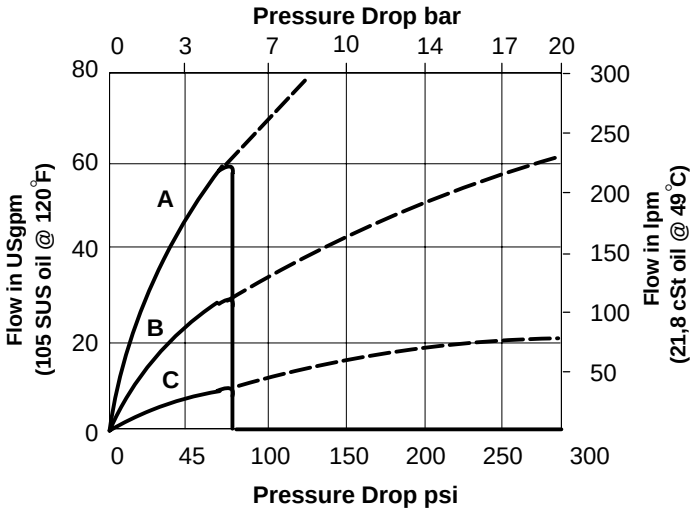
Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)

Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	227 l/min (60 USgpm)
Flow regulation accuracy	60–227 l/min (15–60 USgpm) ± 20%
Internal leakage	Port 1 to 2 closed; <5 drops/min maximum @ 210 bar (3000 psi)
Temperature range	–40° to 120°C (–40° to 248°F)
Cavity	C–20–2 (See page 68)
Fluids	All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/**16/13**
Standard housing materials	Aluminum
Weight cartridge only	0,82 kg (1.80 lbs.)
Seal kits	889615 Buna-N 889619 Viton®

Viton is a registered trademark of E.I. DuPont

Typical Flow Regulation

Cartridge Only



A -228 l/min (60 USgpm) maximum flow setting
- —— Port 1 to 2, fusing direction
- – – Port 2 to 1, reverse flow down to 0

B -114 l/min. (30 USgpm) maximum flow setting
- —— Port 1 to 2, fusing direction
- – – Port 2 to 1, reverse flow down to 0

C -38 l/min. (10 USgpm) maximum flow setting
- —— Port 1 to 2, fusing direction
- – – Port 2 to 1, reverse flow down to 0

Model Code

VF1-20

VF1 - 20 (V) - F - *** - * . *

1 2 3 4 5 6

1 Function

VF1– Velocity fuse

2 Size

20 – 20 Size

3 Seals

Blank– Buna-N
V – Viton

4 Adjustment

F – Factory set

5 Port size

O – Cartridge only

Code	Port size	Housing number	
		Aluminum Light duty	Aluminum Fatigue rated
8B	1” BSPP	02–175464	———
16T	SAE 16	566409	
6G	3/4” BSPP	———	876732
8G	1” BSPP		876734
12H	SAE 12		876733
16H	SAE 16		876735

See page 71 for housings

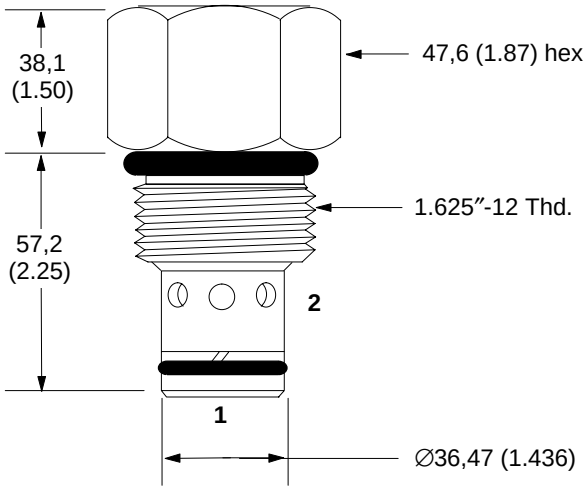
6 Factory set flow rate, nominal

(Specify in USgpm)
Range 60–227 l/min
(15–60.0 USgpm)

Dimensions

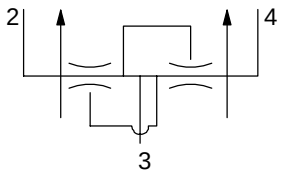
mm (inch)

Torque cartridge in housing
128–155 Nm (95–115 lbf ft)

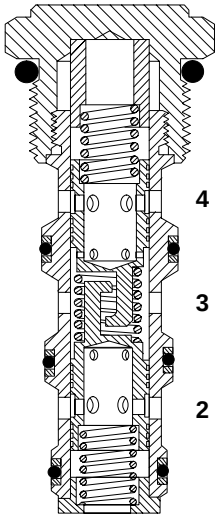


FDC1-10
Flow divider/combiner

Functional Symbol



Sectional View



NOTE:
Port 1 unused, blocked by blind cavity

Description

The FDC1-10 is a pressure compensated, spool type, screw-in, flow divider/combiner cartridge.

Operation

This valve is used in the dividing mode. It will take the inlet flow (port 3) and split the flow according to the ratio specified, regardless of system pressure to ports 2 and 4.

In the combining mode this valve will take the inlet flows from ports 2 and 4 and combine them into port 3 according to the ratio specified.

Ratings and specifications

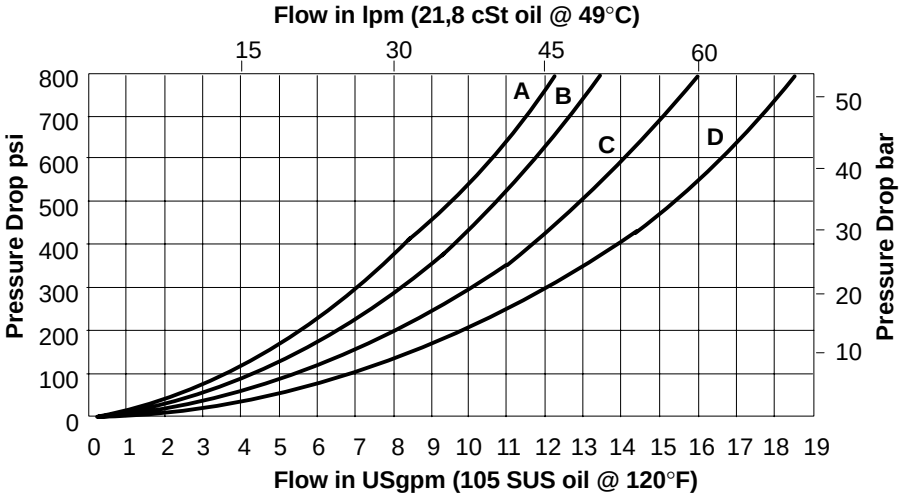
Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)

Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated inlet flow	See model code, item 5
Temperature range	–40° to 120°C (–40° to 248°F)
Cavity	C–10–4 (See page 70)
Fluids	All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/**16/13**
Standard housing materials	Aluminum
Weight cartridge only	0,10 kg (0.22 lbs.)
Seal kits	889625 Buna-N 566080 Viton®

Viton is a registered trademark of E.I. DuPont

Typical Flow Regulation

Cartridge Only



Flow Division
A -33 spool
B -44 spool
C -66 spool
D -88 spool

Model Code

FDC1-10

FDC1 - 10 (V) - ** - **

1 2 3 4 5

1 Function

FDC1 – Flow divider/combiner

2 Size

10 – 10 Size

3 Seals

Blank– Buna-N
V – Viton

4 Port Size

0 – Cartridge only

Code	Port size	Housing number Aluminum
3B	3/8” BSPP	02–175467
6T	SAE 6	566234
2G	1/4” BSPP	02-185804
3G	3/8”BSPP	02-185805
6H	SAE 6	02-185802
8H	SAE 8	02-185803

See page 73 for housings

5 Flow divisions (ratios)

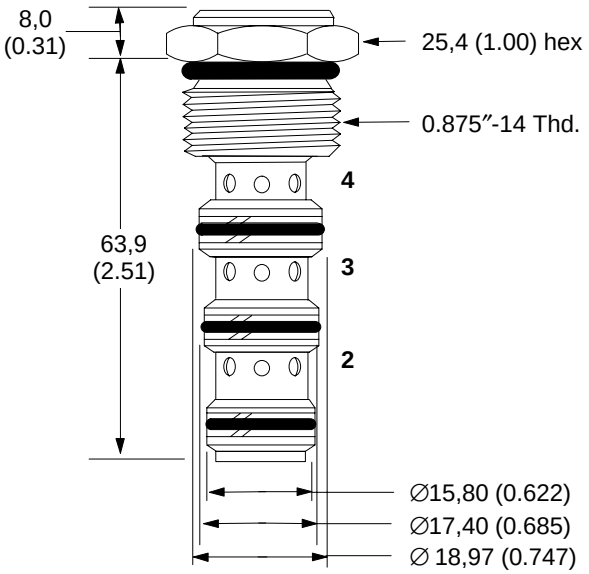
Code	Flow Division % Port 4	Port 2	Max. Inlet Flow l/min	(USgpm)
5.1	33	67	5,7	(1.5)
5.5	50	50	3,8	(1)
11	50	50	7,6	(2)
21	67	33	11,4	(3)
22	50	50	15,2	(4)
33	50	50	22,8	(6)
34	43	57	26,6	(7)
36	33	67	34,2	(9)
43	57	43	26,6	(7)
44	50	50	30,4	(8)
46	40	60	38,0	(10)
62	75	25	30,4	(8)
63	67	33	34,2	(9)
64	60	40	38,0	(10)
66	50	50	45,6	(12)
88	50	50	60,8	(16)

NOTE: Minimum inlet flow should not be less than 1/4 of maximum inlet flow for a given code

Dimensions

mm (inch)

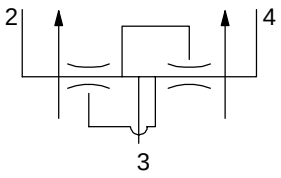
Torque cartridge in housing 47–54 Nm (35–40 lbf ft)



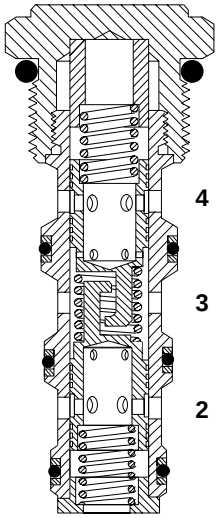
NOTE
Port 1, unused, blocked by blind cavity

FDC1-16
Flow divider/combiner

Functional Symbol



Sectional View



NOTE:
Port 1 unused, blocked by blind cavity

Description

The FDC1-16 is a pressure compensated, spool type, screw-in, flow divider/combiner cartridge.

Operation

This valve is used in the dividing mode. It will take the inlet flow (port 3) and split the flow according to the ratio specified, regardless of system pressure to ports 2 and 4.

In the combining mode this valve will take the inlet flows from ports 2 and 4 and combine them into port 3 according to the ratio specified.

Ratings and specifications

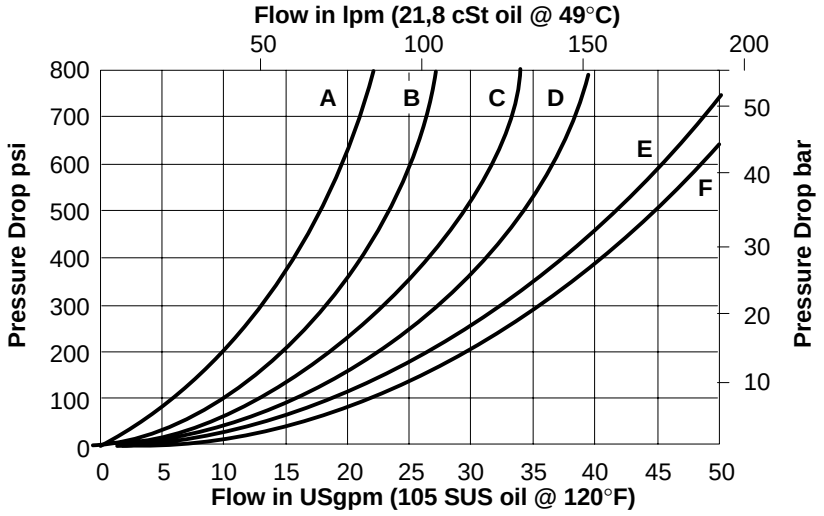
Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)

Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated inlet flow	See model code, item 5
Temperature range	–40° to 120°C (–40° to 248°F)
Cavity	C–16–4 (See page 70)
Fluids	All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code **18/16/13**
Standard housing materials	Aluminum
Weight cartridge only	0,35 kg (0.78 lbs.)
Seal kits	889634 Buna-N 889638 Viton®

Viton is a registered trademark of E.I. DuPont

Typical Flow Regulation

Cartridge Only



Flow Division

A -22 spool
B -33 spool
C -44 spool
D -55 spool
E -66 spool
F -88 spool

Model Code

FDC1-16

FDC1 - 16 (V) - * - ****

1 2 3 4 5

1 Function

FDC1 – Flow divider/combiner

2 Size

16 – 16 Size

3 Seals

Blank– Buna-N
V– Viton

4 Port Size

0 – Cartridge only

Code	Port size	Housing number
		Aluminum Light duty
12T	SAE 12	566200
6B	3/4" BSPP	02-175468

See page 73 for housings

5 Flow divisions (ratios)

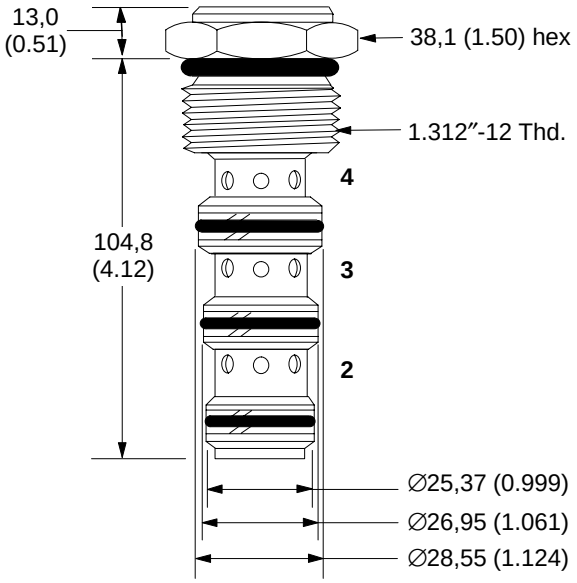
Code	Flow Division % Port 4	Port 2	Max. Inlet Flow l/min	(USgpm)
22	50	50	45,6	(12)
28	20	80	114,0	(30)
33	50	50	68,0	(18)
36	33	67	98,0	(26)
43	57	43	79,0	(21)
44	50	50	90,0	(24)
46	40	60	114,0	(30)
55	50	50	114,0	(30)
62	75	25	90,0	(24)
63	67	33	98,0	(26)
64	60	40	114,0	(30)
66	50	50	132,0	(35)
82	80	20	114,0	(30)
84	67	33	132,0	(35)
88	50	50	178,0	(47)

NOTE: Minimum inlet flow should not be less than 1/4 of maximum inlet flow for a given code

Dimensions

mm (inch)

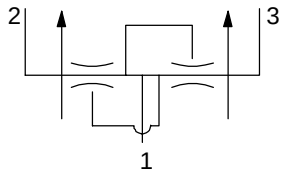
Torque cartridge in housing
108–122 Nm (80–90 lbf ft)



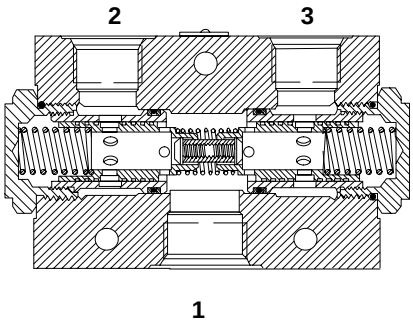
NOTE
Port 1, unused,
blocked by blind cavity

FDC1-20
Flow divider/combiner

Functional Symbol



Sectional View



Description

The FDC1-20 is a line mounted, pressure compensated, spool type, flow divider/combiner valve.

Operation

This valve is used in the dividing mode. It will take the inlet flow (port 1) and split the flow according to the ratio specified, regardless of system pressure to ports 2 and 4.

In the combining mode this valve will take the inlet flows from ports 2 and 3 and combine them into port 1 according to the ratio specified.

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 inlet flow . . . . . See model code, item 5

Fluids . . . . . All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.

Filtration . . . . . Cleanliness code 18/**16/13**

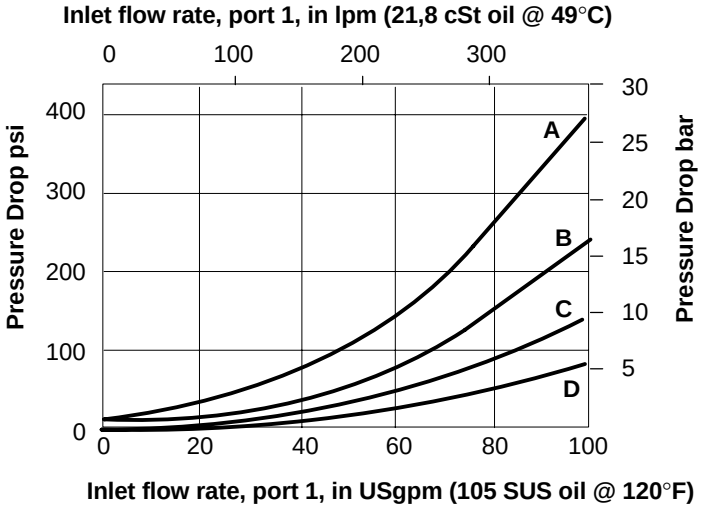
Standard housing materials . . . . . Aluminum

Weight cartridge only . . . . . 2,6 kg (5.75 lbs.)

Seal kits . . . . . 889639 Buna-N
889643 Viton®

Viton is a registered trademark of E.I. DuPont

Pressure Drop Curves



Flow Division

A -33 spool
B -44 spool
C -66 spool
D -88 spool

Model Code

FDC1-20

FDC1 - 20 (V) - * - ****

1 2 3 4 5

1 Function

FDC1 – Flow divider/combiner

2 Size

20 – 20 Size

3 Seals

Blank– Buna-N
V– Viton

4 Port Size

16T – SAE 16 (light duty)
20T – SAE 20 (light duty)

(Sold as a complete assembly.)

5 Flow divisions (ratios)

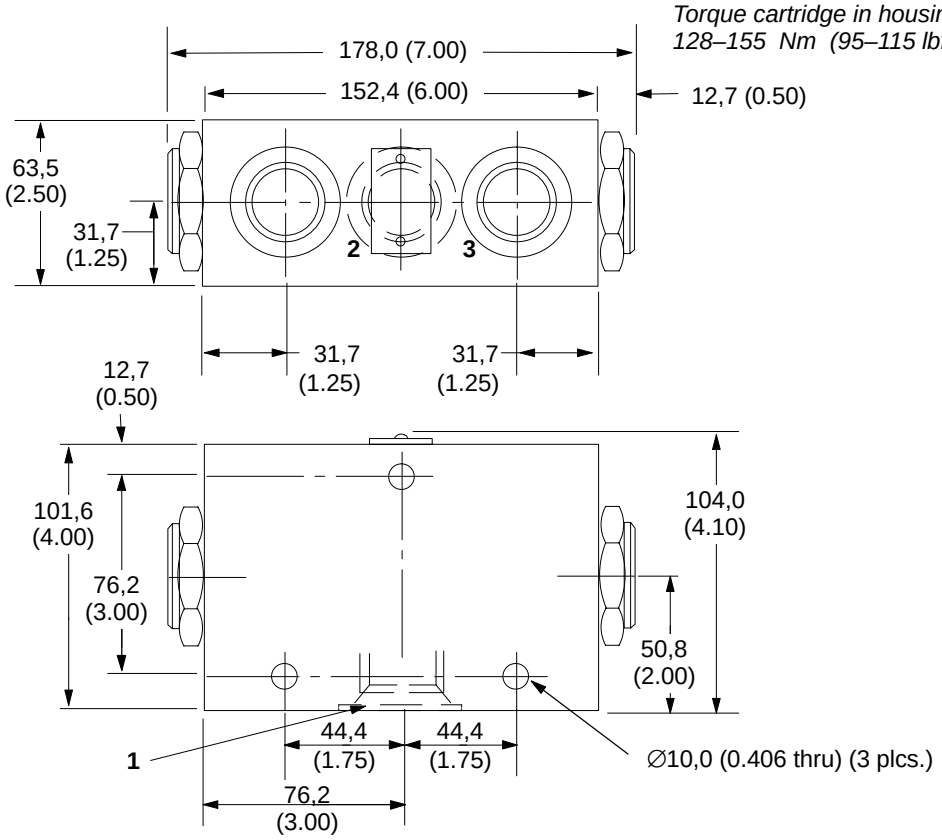
Code	Flow Division %		Max. Inlet Flow	
	Port 4	Port 2	l/min	(USgpm)
33	50	50	190,0	(50)
34	43	57	228,0	(60)
36	33	67	266,0	(70)
44	50	50	266,0	(70)
46	40	60	304,0	(80)
66	50	50	380,0	(100)
88	50	50	380,0	(100)

NOTE: Minimum inlet flow should not be less than 1/4 of maximum inlet flow for a given code

Dimensions

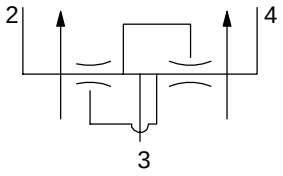
mm (inch)

Torque cartridge in housing 128–155 Nm (95–115 lbf ft)

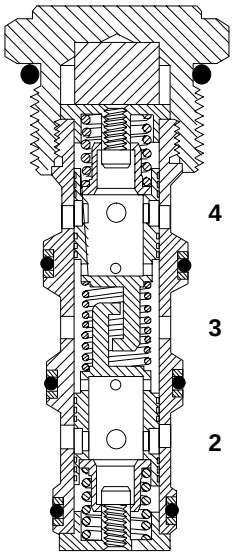


FDC3-10
Posi-traction valve

Functional Symbol



Sectional View



NOTE:
Port 1 unused, blocked by blind cavity

Description

The FDC3-10 is a pressure compensated, spool type, screw-in, posi-traction cartridge valve.

Operation

This valve is used in the dividing mode. It will take the inlet flow (port 3) and split the flow to ports 2 and 4.

In the combining mode this valve will take the inlet flows from ports 2 and 4 and combine them into port 3 according to the ratio specified.

Ratings and specifications

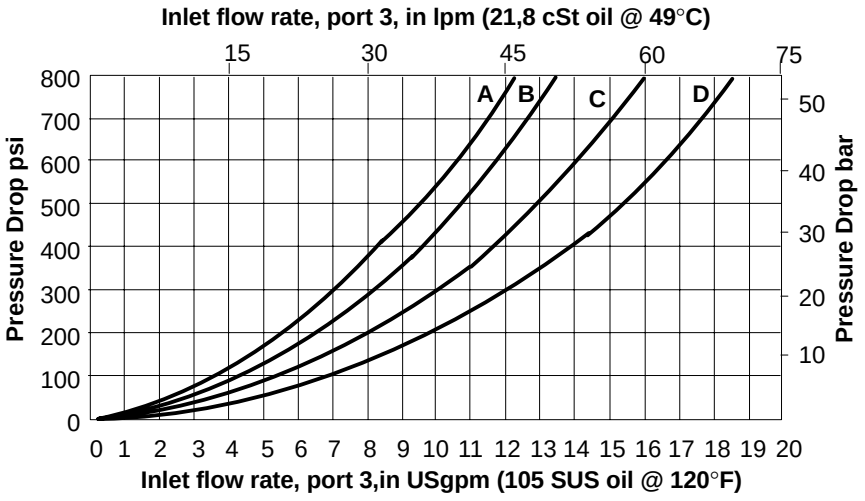
Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)

Typical application pressure (all ports) . . . . . 210 bar (3000 psi)
Cartridge fatigue pressure (infinite life) . . . . . 210 bar (3000 psi)
Rated inlet flow . . . . . See model code, item 5
Temperature range . . . . . –40° to 120°C (–40° to 248°F)
Cavity . . . . . C–10–4 (See page 70)
Fluids . . . . . All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.
Filtration . . . . . Cleanliness code 18/**16/13**
Standard housing materials . . . . . Aluminum
Weight cartridge only . . . . . 0,10 kg (0.22 lbs.)
Seal kits . . . . . 889625 Buna-N
566080 Viton®

Viton is a registered trademark of E.I. DuPont

Pressure Drop Curves

Cartridge Only



Flow Division

A -33 spool
B -44 spool
C -66 spool
D -88 spool

Model Code

FDC3-10

FDC3 - 10 (V) - ** - **

1 2 3 4 5

1 Function

FDC3 – Posi-traction valve

2 Size

10 – 10 Size

3 Seals

Blank– Buna-N
V– Viton

4 Port Size

O – Cartridge only

Code	Port size	Housing number Aluminum
3B	3/8” BSPP	02–175467
6T	SAE 6	566234
2G	1/4” BSPP	02-185804
3G	3/8”BSPP	02-185805
6H	SAE 6	02-185802
8H	SAE 8	02-185803

See page 73 for housings

5 Flow divisions (ratios)

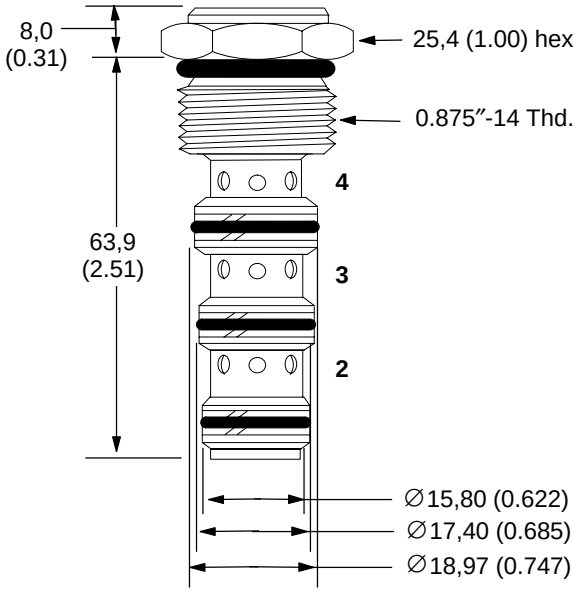
Code	Flow Division %		Max. Inlet Flow	
	Port 4	Port 2	l/min	(USgpm)
33	50	50	22,8	(6.0)
44	50	50	30,4	(8.0)
66	50	50	45,6	(12.0)
88	50	50	60,8	(16.0)

NOTE: Minimum inlet flow should not be less than 1/4 of maximum inlet flow for a given code

Dimensions

mm (inch)

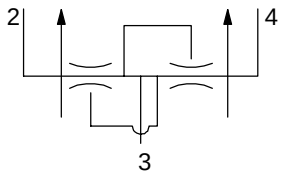
Torque cartridge in housing 47–54 Nm (35–40 lbf ft)



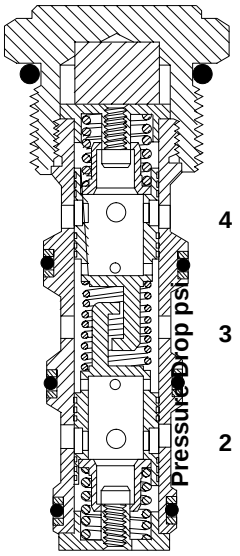
NOTE
Port 1, unused, blocked by blind cavity

FDC3-16
Posi-traction valve

Functional Symbol



Sectional View



NOTE:
Port 1 unused, blocked by blind cavity

Description

The FDC3-16 is a pressure compensated, spool type, screw-in, posi-traction cartridge valve.

Operation

This valve is used in the dividing mode. It will take the inlet flow (port 3) and split the flow to ports 2 and 4.

In the combining mode this valve will take the inlet flows from ports 2 and 4 and combine them into port 3.

Ratings and specifications

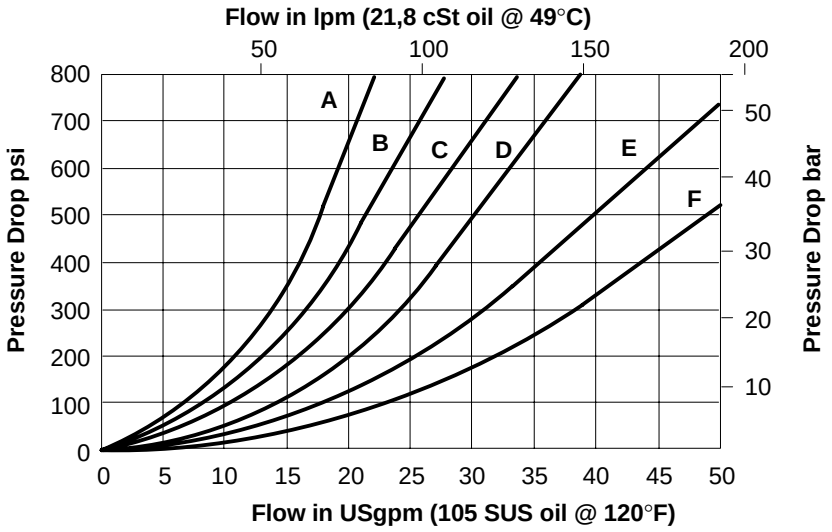
Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)

Typical application pressure (all ports) . . . . . 210 bar (3000 psi)
Cartridge fatigue pressure (infinite life) . . . . . 210 bar (3000 psi)
Rated inlet flow . . . . . See model code, item 5
Temperature range . . . . . –40° to 120°C (–40° to 248°F)
Cavity . . . . . C–16–4 (see page 70)
Fluids . . . . . All general purpose hydraulic fluids such as: MIL–H–5606, SAE 10, SAE 20, etc.
Filtration . . . . . Cleanliness code 18/**16/13**
Standard housing materials . . . . . Aluminum
Weight cartridge only . . . . . 0,35 kg (0.78 lbs.)
Seal kits . . . . . 889634 Buna-N
889638 Viton®

Viton is a registered trademark of E.I. DuPont

Pressure Drop Curves

Cartridge Only



Flow Division
A -22 spool
B -33 spool
C -44 spool
D -55 spool
E -66 spool
F -88 spool

Model Code

FDC3-16

FDC3 - 16 (V) - ** - **

1 2 3 4 5

1 Function

FDC3 – Posi-traction valve

2 Size

16 – 16 Size

3 Seals

Blank– Buna-N
V– Viton

4 Port Size

O – Cartridge only

Code	Port size	Housing number
		Aluminum Light duty
12T	SAE 12	566200
6B	3/4" BSPP	02–175468

See page 73 for housings

5 Flow divisions (ratios)

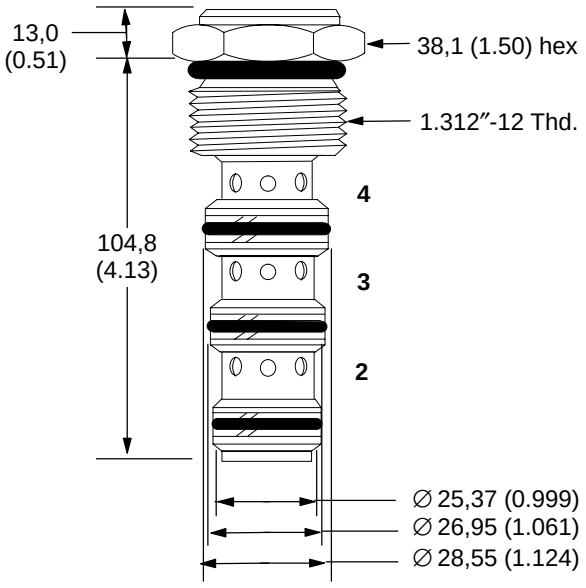
Code	Flow Division %		Max. Inlet Flow	
	Port 4	Port 2	l/min	(USgpm)
22	50	50	57,0	(15)
33	50	50	76,0	(20)
44	50	50	106,4	(28)
55	50	50	129,2	(34)
66	50	50	152,0	(40)
88	50	50	228,0	(60)

NOTE: Minimum inlet flow should not be less than 1/4 of maximum inlet flow for a given code

Dimensions

mm (inch)

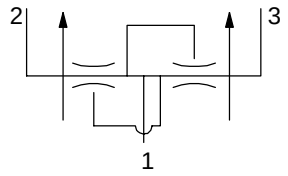
Torque cartridge in housing
108–122 Nm (80–90 lbf ft)



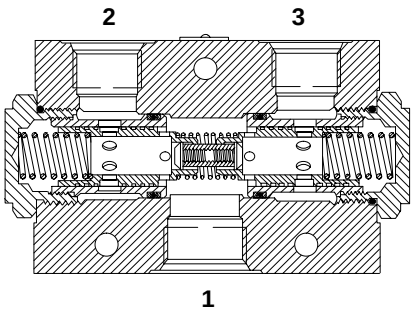
NOTE
Port 1, unused, blocked by blind cavity

FDC3-20
Posi-traction valve

Functional Symbol



Sectional View



Description

The FDC3-20 is a line mounted, pressure compensated, spool type, posi-traction cartridge valve.

Operation

This valve is used in the dividing mode. It will take the inlet flow (port 1) and split the flow to ports 2 and 3.

In the combining mode this valve will take the inlet flows from ports 2 and 3 and combine them into port 1 according to the ratio specified.

Ratings and specifications

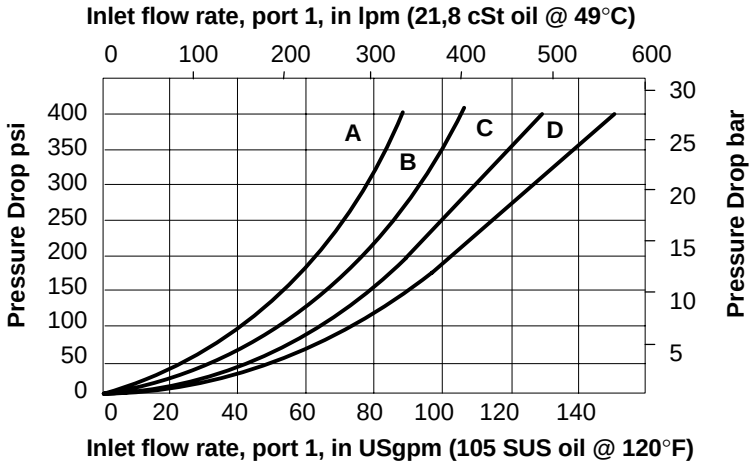
Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)

Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated inlet flow	See model code, item 5
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**
Standard housing materials	Aluminum
Weigh cartridge only	2,6 kg (5.75 lbs.)
Seal kits (2 req'd.)	889639 Buna-N 889643 Viton®

Viton is a registered trademark of E.I. DuPont

Pressure Drop Curves

Cartridge Only



Flow Division

A -33 spool
B -44 spool
C -66 spool
D -88 spool

Model Code

FDC3-20

FDC3 - 20 (V) - * - ****

1 2 3 4 5

1 Function

FDC3 – Posi-traction valve

2 Size

20 – 20 Size

3 Seals

Blank– Buna-N
V – Viton

4 Port Size

16T – SAE 16 (light duty)
20T – SAE 20 (light duty)
(Sold as complete assembly.)

5 Flow divisions (ratios)

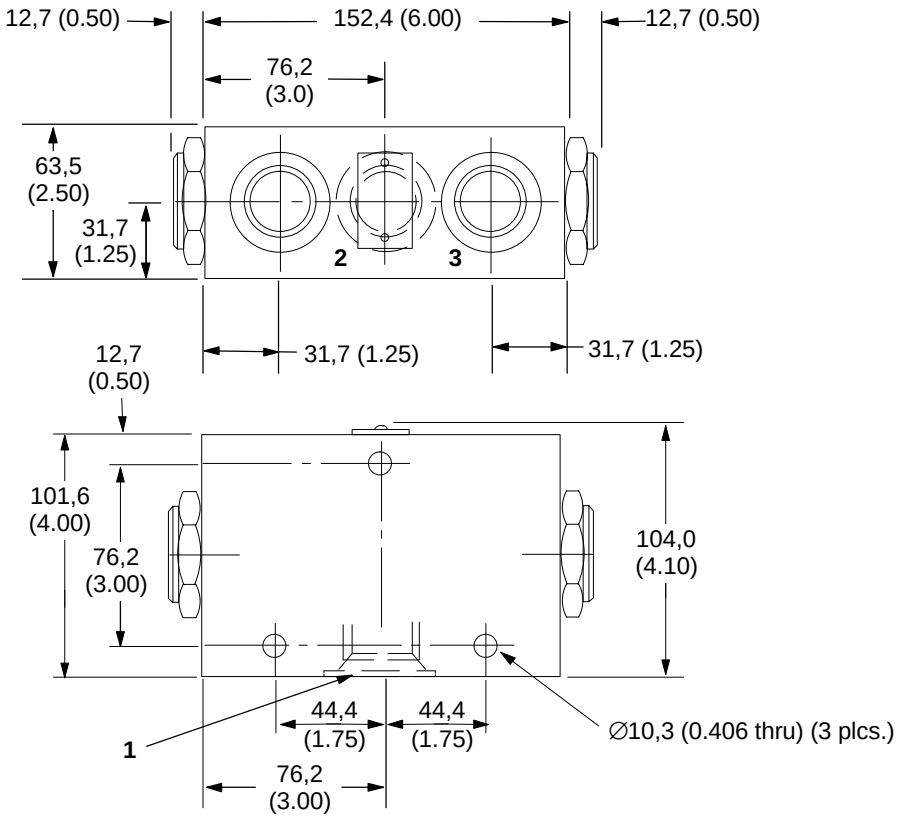
Code	Flow Division %		Max. Inlet Flow	
	Port 2	Port 3	l/min	(USgpm)
33	50	50	190,0	(50.0)
44	50	50	266,0	(70.0)
66	50	50	380,0	(100.0)
88	50	50	570,0	(150.0)

NOTE: Minimum inlet flow should not be less than 1/4 of maximum inlet flow for a given code

Dimensions

mm (inch)

Torque cartridge in housing
128–155 Nm (95–115 lbf ft)

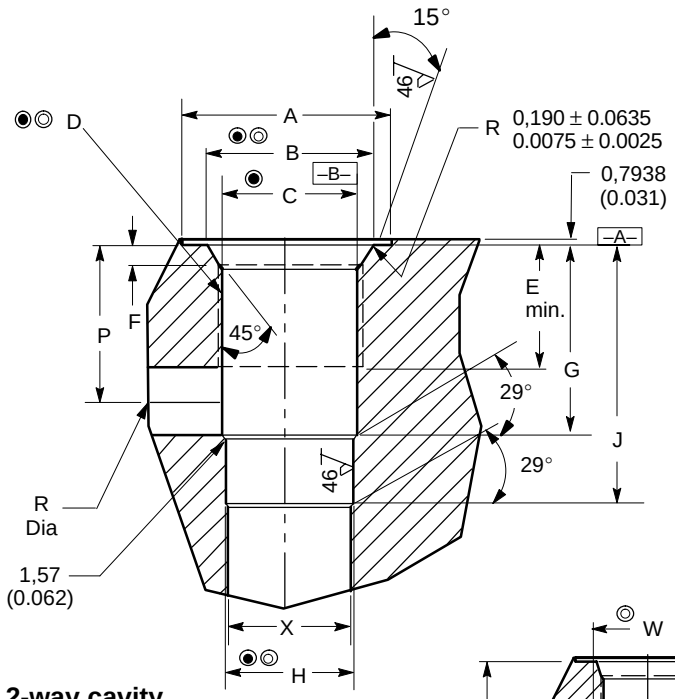


C-**-2 Cavity Dimensions

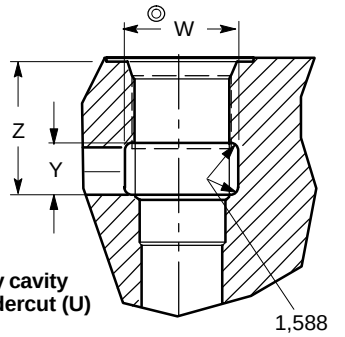
Dimensions
mm (inch)

Cavity bores can be machined accurately in aluminum or steel. The necessary UNF, or UN threads may be machined using standard small tools, possibly already in your machine shop or from a local tool supplier. For in depth advice on the machining of cavities, consult your Vickers sales specialist.

Either you, our customer, or Vickers can design and manufacture customized manifolds or housings dedicated to individual applications. We call the resulting valve packages Modular Circuit Designs (MCDs). Cartridges selected for your application can be accommodated in one or more MCDs, according to your requirements.



2-way cavity



2–way cavity with undercut (U)

◉ These diameters ⌖ 0,051 mm (.002 inch) Ⓑ unless otherwise specified.

◎ These diameters ⊥ 0,025 mm (.001 inch) A unless otherwise specified.

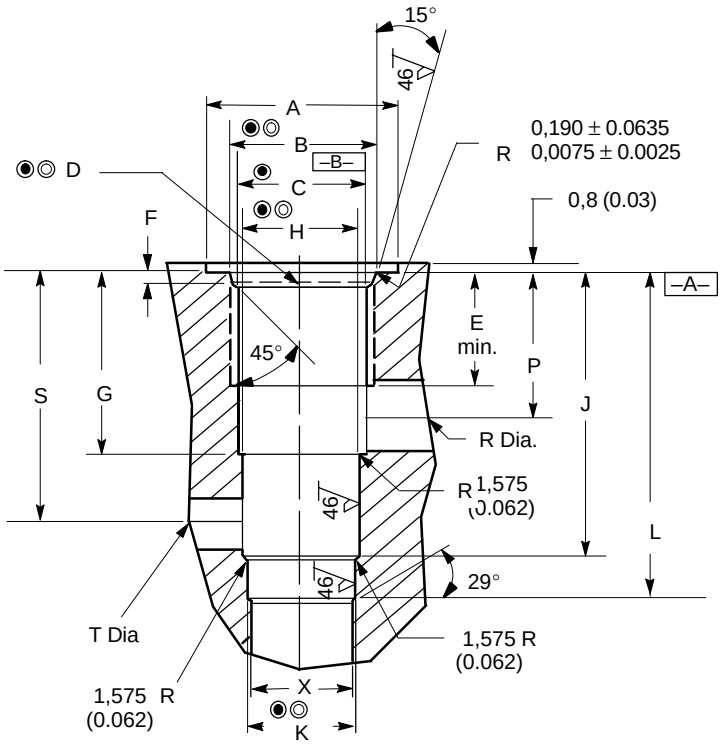
Cavity mm (inch)	A Spotface	B +0,051 0 (+0.002 0)	C +0,051 0 (+0.002 0)	D Thread	E Full Thread	F	G	H ±0,0254 (±0.001)	J	P	R Max. Dia.	X Max. Dia.
C–8–2	30,16 (1.188)	20,65 (0.813)	17,47 (0.688)	.750”–16	12,70 (0.500)	2,54/2,92 (0.100/0.115)	19,05 (0.750)	12,72 (0.501)	30,17 (1.188)	14,68 (0.578)	8,74 (0.344)	11,11 (0.438)
C–10–2	30,16 (1.188)	24,00 (0.945)	20,62 (0.812)	.875”–14	15,88 (0.625)	2,54/2,92 (0.100/0.115)	23,81 (0.937)	15,90 (0.626)	33,32 (1.312)	18,23 (0.718)	11,11 (0.437)	14,29 (0.562)
C–12–2 (U)	38,10 (1.500)	29,15 (1.148)	24,76 (0.975)	1.062”-12	22,22 (0.875)	3,30/3,68 (0.130/0.145)	34,92 (1.375)	23,82 (0.938)	46,35 (1.825)	27,94 (1.100)	12,70 (0.500)	22,22 (0.875)
C–16–2	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)	46,84 (1.844)	24,60 (0.968)	19,05 (0.750)	19,05 (0.750)
C–20–2	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)	58,72 (2.312)	30,96 (1.218)	25,40 (1.000)	30,16 (1.188)

Cavity mm (inch)	W	Y	Z
C–12–2U (only)	30,83 (1.214)	12,70 (0.500)	34,29 (1.350)

C-**-3 Cavity Dimensions

Dimensions

mm (inch)



3-way cavity

◉ These diameters ⌭ 0,051 mm (.002 inch) B unless otherwise specified.

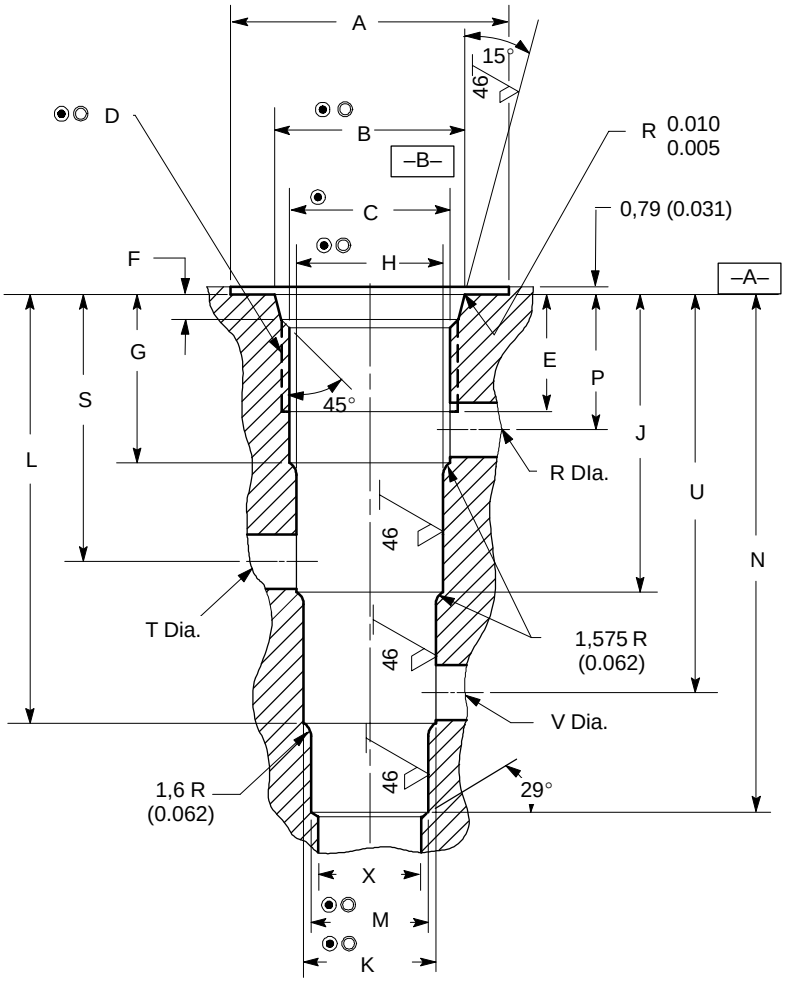
◎ These diameters ⊥ 0,025 mm (.001 inch) A unless otherwise specified.

Cavity mm (inch)	**A Spotface**	**B +0,051 0 (+0.002 0)**	**C +0,051 0 (+0.002 0)**	**D Thread**	**E Full Thread**	**F**	**G**	**H ± 0,0254 (± 0.001)**	**J**	**K ± 0,0254 (± 0.001)**	**L**
C–8–3	30,16 (1.188)	20,65 (0.813)	17,47 (0.688)	0.750”–16	12,70 (0.500)	2,54/2,92 (0.100/0.115)	18,23 (0.718)	15,90 (0.626)	33,25 (1.270)	14,30 (0.563)	43,25 (1.703)
C–10–3	30,16 (1.188)	24,00 (0.945)	20,62 (0.812)	0.875”–14	15,87 (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–12–3	38,10 (1.500)	29,15 (1.148)	24,76 (0.975)	1.062”–12	22,22 (0.875)	3,30/3,68 (0.130/0.145)	34,92 (1.375)	23,82 (0.938)	57,78 (2.275)	22,25 (0.876)	69,21 (2.725)
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)	34,13 (1.344)	28,62 (1.127)	62,71 (2.469)	27,02 (1.064)	75,39 (2.968)
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)

Cavity mm (inch)	**P**	**R Max. Dia.**	**S**	**T Max. Dia.**	**X Max. Dia.**
C–8–3	14,68 (0.578)	5,94 (0.234)	28,98 (1.141)	5,94 (0.234)	12,70 (0.500)
C–10–3	18,26 (0.719)	6,35 (0.250)	34,13 (1.344)	6,35 (0.250)	14,27 (0.562)
C–12–3	27,94 (1.100)	12,70 (0.500)	50,80 (2.000)	12,70 (0.500)	20,62 (0.812)
C–16–3	24,60 (0.969)	15,88 (0.625)	53,18 (2.093)	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-**-4 Cavity Dimensions

Dimensions
mm (inch)



4-Way Cavity

◉ These diameters | 0,051 mm (.002 inch) | B | unless otherwise specified.

◎ These diameters | 0,025 mm (.001 inch) | A | unless otherwise specified.

Cavity mm (inch)	**A Spotface**	**B +0,051 0 (+0.002 0)**	**C +0,051 0 (+0.002 0)**	**D Thread**	**E Full Thread**	**F**	**G**	**H** ±0,0254 (±0.001)	**J**	**K** ±0,0254 (±0.001)
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)

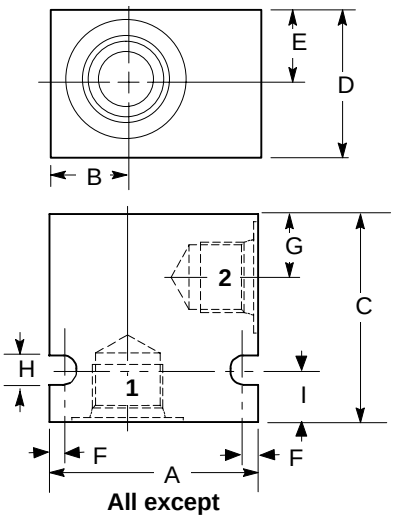
Cavity mm (inch)	**L**	**M** ±0,0254 (±0.001)	**N**	**P**	**R Max. Dia.**	**S**	**T Max. Dia.**	**U**	**V**	**X Max. Dia.**
C-10-4	53,98 (2.125)	15,90 (0.626)	63,50 (2.500)	18,26 (0.718)	6,35 (0.250)	34,13 (1.343)	6,35 (0.250)	50,00 (1.968)	6,35 (0.250)	14,29 (0.562)
C-16-4	91,29 (3.594)	25,45 (1.002)	103,99 (4.094)	24,60 (0.968)	15,88 (0.625)	53,18 (2.093)	15,87 (0.625)	81,76 (3.218)	15,88 (0.625)	19,05 (0.750)

C-**- 2 Aluminum Housings

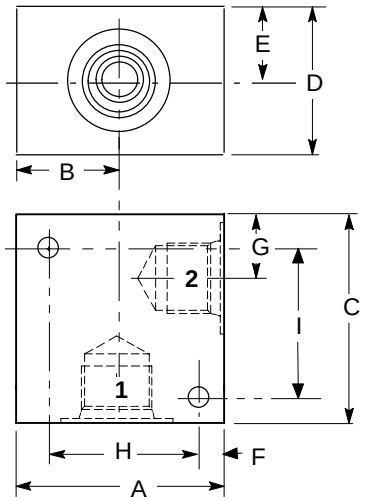
Housing	Ports 1 & 2	Part Number
C-10-2 Light Duty	3/8” BSPP	02-175462
	SAE 6	566151
C-16-2 Light Duty	3/4” BSPP	02-175463
	SAE 12	566149
C-20-2 Light Duty	1” BSPP	02-175464
	SAE 16	566409

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

Housing	Ports 1 & 2	Part Number
C-8-2 Fatigue Rated	1/4” BSPP	02–160727
	3/8” BSPP	02–160728
	SAE 4	02–160730
	SAE 6	02–160731
	SAE 8	02–160732
C-10-2 Fatigue Rated	1/4” BSPP	876702
	3/8” BSPP	876703
	SAE 6	876700
	SAE 8	876701
C-12-2U Fatigue Rated	1/2” BSPP	02–161116
	3/4” BSPP	02–161115
	SAE 10	02–160641
	SAE 12	02–160645
C-12-2 Fatigue Rated	1/2” BSPP	02–161118
	3/4” BSPP	02–161117
	SAE 10	02–160640
	SAE 12	02–160644
C-16-2 Fatigue Rated	1/2” BSPP	876716
	3/4” BSPP	876718
	SAE 10	876717
	SAE 12	566113
C-20-2 Fatigue Rated	3/4” BSPP	876732
	1” BSPP	876734
	SAE 12	876733
	SAE 16	876735



All except C-12-2(U)



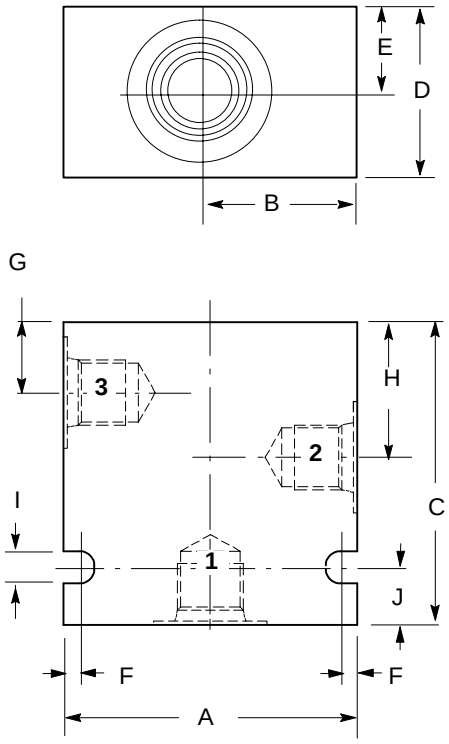
C-12-2(U)

Cavity mm (inch)	A	B	C	D	E	F	G	H	I	Mass kg (lb.)
C-10-2 Light Duty	50,8 (2.00)	19,0 (0.75)	50,8 (2.00)	31,7 (1.25)	15,9 (0.62)	19,0 (0.75)	7,1 (0.28)	3,1 (0.12)	12,7 (0.50)	0,1 (0.35)
C-16-2 Light Duty	76,2 (3.0)	28,5 (1.12)	76,2 (3.00)	47,6 (1.87)	23,8 (0.94)	25,4 (1.00)	8,6 (0.34)	4,0 (0.16)	19,0 (0.75)	0,5 (1.21)
C-20-2 Light Duty	88,9 (3.5)	34,3 (1.35)	88,9 (3.50)	68,5 (2.70)	34,3 (1.35)	36,8 (1.45)	8,6 (0.34)	4,0 (0.16)	21,6 (0.85)	0,8 (1.90)
C-8-2 Fatigue Rated	50,8 (2.00)	19,0 (0.75)	51,0 (2.00)	38,1 (1.50)	19,0 (0.75)	3,4 (0.13)	15,5 (0.61)	7,1 (0.28)	12,7 (0.50)	0,2 (0.46)
C-10-2 Fatigue Rated	63,5 (2.50)	25,4 (1.00)	63,5 (2.50)	50,8 (2.00)	25,4 (1.00)	9,5 (0.37)	20,8 (0.81)	7,1 (0.28)	19,0 (0.75)	0,4 (1.00)
C-12-2(U) Fatigue Rated	88,9 (3.50)	44,5 (1.75)	88,9 (3.50)	50,8 (2.00)	25,4 (1.00)	12,7 (0.50)	28,7 (1.13)	63,5 (2.50)	63,5 (2.50)	0,8 (1.96)
C-16-2 Fatigue Rated	88,9 (3.50)	34,9 (1.37)	88,9 (3.50)	63,5 (2.50)	31,7 (1.25)	10,3 (0.40)	28,4 (1.11)	8,7 (0.34)	25,4 (1.00)	1,2 (2.75)
C-20-2 Fatigue Rated	101,6 (4.00)	38,1 (1.50)	101,6 (4.00)	82,5 (3.25)	41,3 (1.62)	10,3 (0.40)	36,0 (1.41)	8,7 (0.34)	25,4 (1.00)	1,8 (4.00)

C-**-3 Aluminum Housings

Housing	Ports 1, 2 & 3	Part Number
C-10-3 Light Duty	SAE 6	566162
	3/8” BSPP	02–173358
C-16-3 Light Duty	3/4” BSPP	02–175465
	SAE 12	566152
C-8-3 Fatigue Rated	1/4” BSPP	02–160739
	3/8” BSPP	02–160740
	SAE 4	02–160741
	SAE 6	02–160742
C-10-3 Fatigue Rated	1/4” BSPP	876705
	3/8” BSPP	876714
	SAE 6	876704
	SAE 8	876711
C-16-3 Fatigue Rated	1/2” BSPP	876720
	3/4” BSPP	876722
	SAE 10	876721
	SAE 12	876723

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

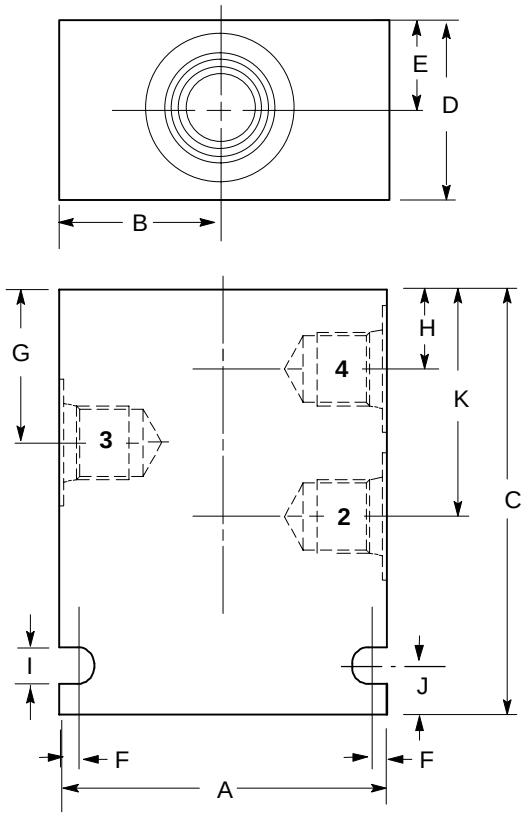


Cavity mm (inch)	A	B	C	D	E	F	G	H	I	J	Mass kg (lb.)
C-10-3 Light Duty	63,5 (2.50)	31,7 (1.25)	66,6 (2.62)	31,7 (1.25)	15,8 (0.62)	3,1 (0.12)	19,0 (0.75)	34,9 (1.37)	7,1 (0.28)	12,7 (0.50)	0,3 (0.64)
C-16-3 Light Duty	101,6 (4.00)	50,8 (2.00)	107,9 (4.25)	50,8 (2.00)	25,4 (1.00)	4,0 (0.16)	25,4 (1.00)	53.9 (2.12)	8,6 (0.33)	25,4 (1.00)	1,0 (2.3)
C-8-3 Fatigue Rated	63,5 (2.50)	31,8 (1.25)	66,6 (2.62)	38,1 (1.50)	19,0 (0.75)	3,4 (0.13)	15,5 (0.61)	29,8 (1.17)	7,1 (0.28)	13,0 (0.51)	0,4 (0.83)
C-10-3 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)	20,8 (0.81)	36,6 (1.44)	7,1 (0.28)	19,0 (0.75)	0,7 (1.65)
C-16-3 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)	28,4 (1.12)	57,0 (2.24)	8,7 (0.34)	25,4 (1.00)	2,0 (4.50)

C-**-4 Aluminum Housings (FDC1 & FDC3 only)

Housing	Ports 1, 2, 3 & 4	Part Number
C-10-4 Light Duty	3/8” BSPP	02–175467
	SAE 6	566234
C-16-4 Light Duty	3/4” BSPP	02-175468
	SAE 12	566200
C–10–4 Fatigue Rated	1/4” BSPP	02-185804
	3/8” BSPP	02-185805
	SAE 6	02-185802
	SAE 8	02-185803

Note: BSPP porting is designated by “B” in the model code
SAE porting is designated by “T” in the model code

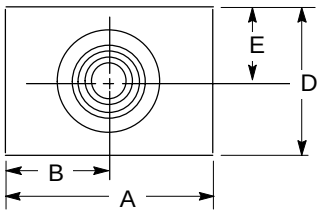


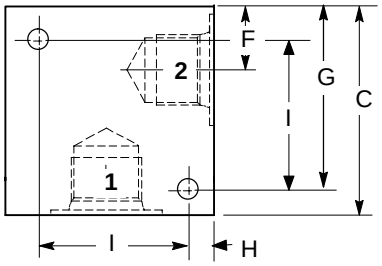
Cavity mm (inch)	A	B	C	D	E	F	G	H	I	J	K	Mass kg (lb.)
C-10-4 Light Duty	63,5 (2.50)	31,7 (1.25)	82,5 (3.25)	31,7 (1.25)	15,8 (0.62)	3,1 (0.12)	34,9 (1.37)	19,0 (0.75)	7,1 (0.28)	9,5 (0.37)	50,8 (2.00)	0,3 (0.72)
C-16-4 Light Duty	101,6 (4.00)	50,8 (2.00)	133,3 (5.25)	50,8 (2.00)	25,4 (1.00)	3,8 (0.15)	53,9 (2.12)	25,4 (1.00)	8,7 (0.34)	22,2 (0.87)	82,5 (3.25)	1,4 (3.24)
C-10-4 Fatigue Rated	76,2 (3.00)	38,1 (1.50)	88,9 (3.50)	50,8 (2.00)	25,4 (1.00)	9,5 (0.37)	36,6 (1.44)	20,8 (0.82)	7,1 (0.28)	12,7 (0.50)	52,5 (2.07)	0,9 (2.00)

C-**-2 Steel Housings

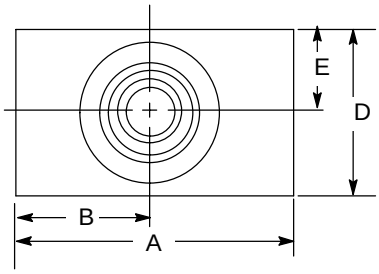
Housing	Ports 1 & 2	Part Number
C–8–2	1/4” BSPP	02-160733
	3/8” BSPP	02-160734
	SAE 4	02-160736
	SAE 6	02-160737
	SAE 8	02-160738
C–10–2	1/4” BSPP	02-175102
	3/8” BSPP	02-175103
	SAE 6	02-175100
	SAE 8	02-175101
C–12–2U	1/2” BSPP	02-172512
	3/4” BSPP	02-162922
	SAE 10	02-169817
	SAE 12	02-169790
C–12–2	1/2” BSPP	02-172062
	3/4” BSPP	02-169665
	SAE 10	02-169744
	SAE 12	02-169782
C–16–2	1/2” BSPP	02-175106
	3/4” BSPP	02-175107
	SAE 10	02-175104
	SAE 12	02-175105

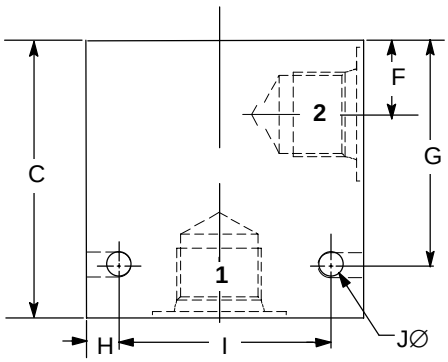
Note: BSPP porting is designated by “G” in the model code
SAE porting is designated by ‘T” in the model code





C–12–2(U)





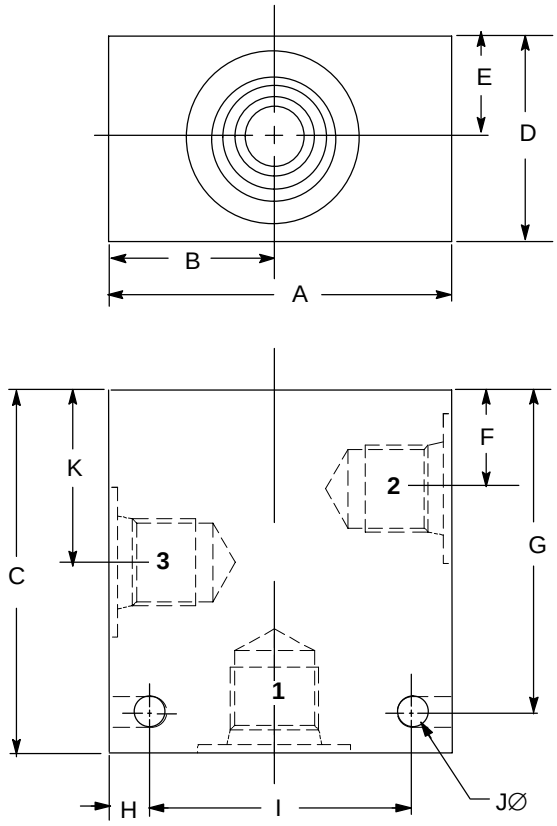
NOTE
8 series utilize slot in place of mounting hole

Cavity mm (inch)	A	B	C	D	E	F	G	H	I	J	Mass kg (lb.)
C-8-2	50,8 (2.00)	19,0 (0.75)	50,8 (2.00)	38,1 (1.50)	19,0 (0.75)	15,5 (0.61)	38,1 (1.50)	3,3 (0.13)	43,9 (1.73)	7,1 (0.28)	0,5 (1.19)
C-10-2	63,5 (2.50)	25,4 (1.00)	63,5 (2.50)	44,4 (1.75)	22,2 (0.87)	19,0 (0.75)	50,8 (2.00)	9,5 (0.37)	44,4 (1.75)	7,1 (0.28)	0,3 (0.83)
C-12-2(U)	88,9 (3.50)	28,5 (1.12)	88,9 (3.50)	50,8 (2.00)	25,4 (1.00)	28,7 (1.13)	76,2 (3.00)	12,7 (0.50)	63,5 (2.50)	10,3 (0.40)	1,9 (4.28)
C-16-2	88,9 (3.50)	38,1 (1.50)	76,2 (3.00)	50,8 (2.00)	25,4 (1.00)	25,4 (1.00)	63,5 (2.50)	12,7 (0.50)	63,5 (2.50)	10,3 (0.40)	2,2 (5.00)

C-**-3 Steel Housings

Housing	Ports 1, 2 & 3	Part Number
C-8-3	1/4” BSPP	02-160743
	3/8” BSPP	02-160746
	SAE 4	02-160745
	SAE 6	02-160744
C–10–3	1/4” BSPP	02-175127
	3/8” BSPP	02-175128
	SAE 6	02-175124
	SAE 8	02-175125

Note: BSPP porting is designated by “G” in the model code
SAE porting is designated by ‘T” in the model code



NOTE
8 series utilize slot in place of mounting hole

Cavity mm (inch)	A	B	C	D	E	F	G	H	I	J	K	Mass kg (lb.)
C-8-3	63,5 (2.50)	31,8 (1.25)	66,0 (2.75)	38,1 (1.50)	19,0 (0.75)	15,5 (0.61)	53,0 (2.12)	3,3 (0.13)	56,6 (2.23)	7,1 (0.28)	29,8 (1.17)	0,9 (2.15)
C-10-3	76,2 (3.00)	38,1 (1.50)	76,2 (3.00)	44,4 (1.75)	22,2 (0.87)	19,0 (0.75)	63,5 (2.50)	9,5 (0.37)	57,1 (2.25)	7,1 (0.28)	34,9 (1.37)	1,7 (3.75)

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	Cavity	Material	Model Code	Assembly Number
2–Way				**3–Way**			
C-8-2	Aluminum/Steel	RT1-8-2-AS-8028	02-165580	C-8-3	Aluminum/Steel	RT1-8-3-AS-8291	02-162384
C-10-2	Aluminum	RT-10-2-A-8030	889509	C-10-3	Aluminum	RT-10-3-A-8038	889511
C-10-2	Steel	RT-10-2-S-8035	889510	C-10-3	Steel	RT-10-3-S-8043	889512
C-12-2	Aluminum/Steel	RT-12-2-AS-8213	02-160625	C-16-3	Aluminum	RT-16-3-A-8039	565825
C-16-2	Aluminum	RT-16-2-A-8031	889515	C-16-3	Steel	RT-16-3-S-8044	889517
C-16-2	Steel	RT-16-2-S-8036	889516	**4-Way**			
C-20-2	Aluminum	RT-20-2-A-8032	565822	C-10-4	Aluminum	RT-10-4-A-8072	889513
C-20-2	Steel	RT-20-2-S-8037	889519	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

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	Cavity	Material	Model Code	Assembly Number
2-Way				**3-Way**			
				C-8-3	Aluminum/Steel	FT-8-3-AS-8295	02-171292
C-8-2	Aluminum/Steel	FT1-8-2-AS-8070	02-112933	C-10-3	Aluminum/Steel	FT-10-3-AS-8050	565834
C-10-2	Aluminum/Steel	FT-10-2-AS-8048	566235	C-16-3	Aluminum/Steel	FT-16-3-AS-8080	565836
C-12-2	Aluminum/Steel	FT-12-2-AS-8214	02-162162	**4-Way**			
C-16-2	Aluminum/Steel	FT-16-2-AS-8078	565832	C-10-4	Aluminum/Steel	FT-10-4-AS-8052	565838
C-20-2	Aluminum/Steel	FT-20-2-AS-8079	565833	C-16-4	Aluminum/Steel	FT-16-4-AS-8084	566571

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

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

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

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Fluid Cleanliness

The cleanliness code for valves in this catalog is 18/16/13.

Proper fluid condition is essential for long and satisfactory life of hydraulic components and systems. Hydraulic fluid must have the correct balance of

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“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.

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