

# Vickers Screw-in Cartridge Valves



*Powering Business Worldwide*

**EAT•N**

**Vickers**

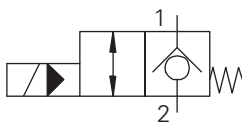
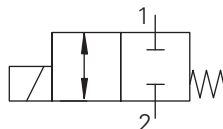
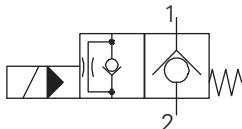
# Solenoid Valves

Valve locator



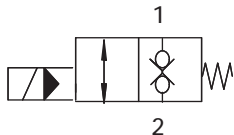
2-way, 2-position  
normally closed

## Functional Symbol



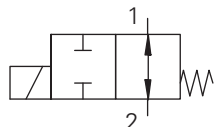
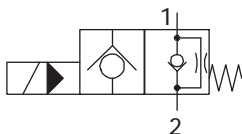
Bi-directional, 2-way,  
2-position normally closed

## Functional Symbol



2-way, 2-position  
normally open

## Functional Symbol



MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Poppet type, pilot operated</b> (restricted reverse flow when energized)		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
SV11-10-C/CM*	C-10-2	45 (12)	350 (5000)	A-16
SV12-10-C/CM*	C-10-2	23 (6)	350 (5000)	A-22

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Spool type, direct acting</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
SV14-8-C/CM*	C-8-2	11 (3)	350 (5000)	A-44

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Poppet type, pilot operated</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
SV13-10-C/CM*	C-10-2	45 (12)	350 (5000)	A-26
SV3-12-C/CM*/CR*	C-12-2 C-12-2-U	114 (30)	210 (3000)	A-28
SV2-20-C/CM*/CR*†	C-20-2	227 (60)	210 (3000)	A-38

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Poppet type, pilot operated</b>				
SBV11-10-C	C-10-2	76 (20)	350 (5000)	A-18

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Poppet type, pilot operated</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
SV15-10-O/OP*/OS*	C-10-2	45 (12)	350 (5000)	A-62

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Spool type, direct acting</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
SV14-8-O/OM*	C-8-2	13 (4)	350 (5000)	A-82
SV14-10-O/OM*	C-10-2	23 (6)	350 (5000)	A-86

†Explosion proof, CSA Approved, coil option available (see page C-11)

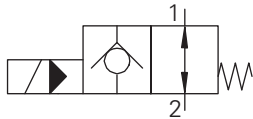
\*M = Manual override, \*P = Push type manual override, \*S = Screw type manual override, \*R = Pull type manual override

# Solenoid Valves (cont.)

Valve locator

2-way, 2-position  
normally open

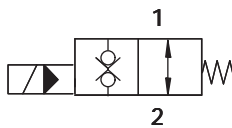
## Functional Symbol



MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Poppet type, pilot operated</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
SV13-10-0/OP*/OS*	C-10-2	45 (12)	350 (5000)	A-58
SV3-12-0/OP*/OS*	C-12-2	114 (30)	210 (3000)	A-66
	C-12-2U			
SV13-16-0/OP*/OS*	C-16-2	132 (35)	350 (5000)	A-74
SV3-20-0/OP*/OS*†	C-20-2	227 (60)	210 (3000)	A-76
SV13-20-0/OP*/OS*	C-20-2	227 (60)	350 (5000)	A-78

Bi-directional, 2-way,  
2-position normally open

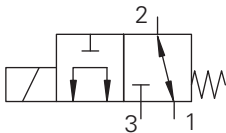
## Functional Symbol



MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Poppet type, pilot operated</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
SBV11-8-0	C-8-2	60 (15)	350 (5000)	A-54
SBV11-10-0	C-10-2	76 (20)	350 (5000)	A-64

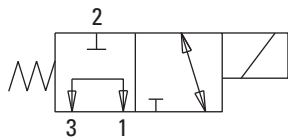
3-way, 2-position

## Functional Symbol

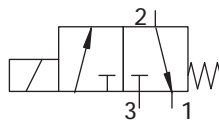


MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Spool type, direct acting</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
SV11-8-3/3M*	C-8-3	11 (3)	350 (5000)	A-90
SV11-10-3/3M*	C-10-3	23 (6)	350 (3000)	A-96
SV1A/B-12-3P	C-12-3	42 (11)	210 (3000)	A-100

\*Flow port 1 to port 2 not to exceed 10 L/min (2.5 USgpm)



MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Spool type, direct acting</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
SV2A/B-12-3P	C-12-3	38 (10)	210 (3000)	A-102



MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Spool type</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
SV4A/B-12-3P	C-12-3	42 (11)	210 (3000)	A-104

\*Port 1 must be vented to tank. Tank pressure not to exceed 13,7 bar (200 psi)

†Explosion proof, CSA Approved, coil option available (see page C-11)

\*M = Manual override, \*P = Push type manual override, \*S = Screw type manual override, \*R = Pull type manual override



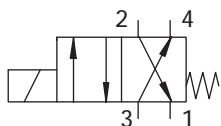
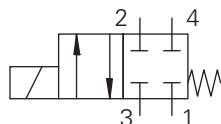
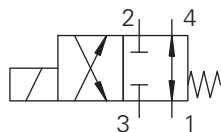
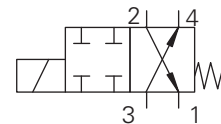
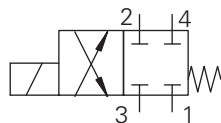
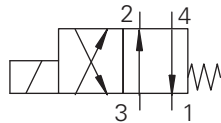
# Solenoid Valves (cont.)

Valve locator



4-way, 2-position

## Functional Symbol



MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Spool type, direct acting</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
SV11-8-4/4M*	C-8-4	11 (3)	350 (5000)	A-108
SV11-10-4/4M*	C-10-4	23 (6)	350 (5000)	A-116

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Spool type, direct acting</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
SV12-8-4/4M*	C-8-4	13 (4)	350 (5000)	A-112
SV2A/B-12-4P	C-12-4	53 (14)	210 (3000)	A-128

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Spool type</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
SV3-10-4/4M*/4R*†	C-10-4	23 (6)	210 (3000)	A-120
SV3A/B-12-4P	C-12-4	53 (14)	210 (3000)	A-130

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Spool type, selector valve</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
SV4-10-4/4M*/4R*†	C-10-4	23 (6)	210 (3000)	A-122

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Spool type, selector valve</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
SV5-10-4/4M*/4R*	C-10-4	23 (6)	210 (3000)	A-124
SV5A/B-12-4P	C-12-4	53 (14)	210 (3000)	A-132

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Spool type</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
SV7A/B-12-4P	C-12-4	46 (12)	210 (3000)	A-134

†Explosion proof, CSA Approved, coil option available (see page C-11)

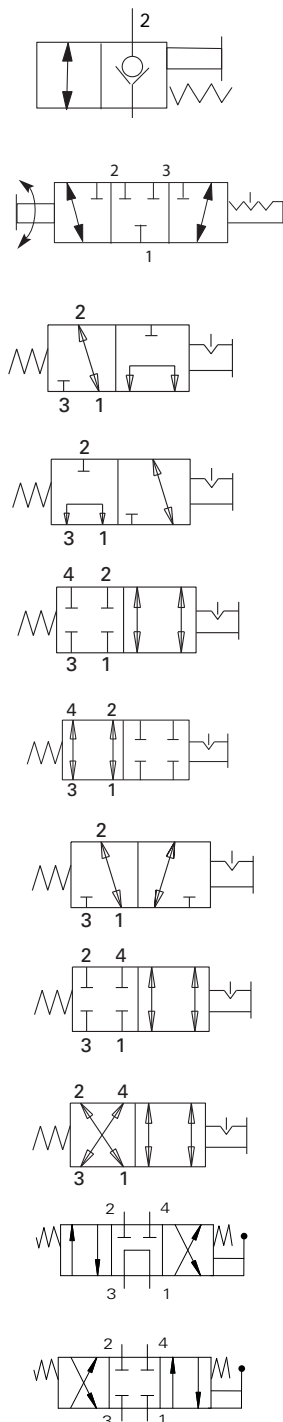
\*M = Manual override, \*P = Push type manual override, \*S = Screw type manual override, \*R = Pull type manual override

# Directional Controls

Valve locator

Manually operated

## Functional Symbol



MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Pull-to-open, 2-way, 2 position</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
MPV1-10	C-10-2	45 (12)	210 (3000)*	D-38
MPV3-10 (detent)	C-10-2	45 (12)	210 (3000)*	D-40
MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Manual rotary, 3-position detent</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
MRV3-10-D/E	C-10-3	23 (6)	210 (3000)*	D-4
MRV3-16-D	C-16-3	64 (17)	210 (3000)*	D-6
MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Push-to-open, 3-way, 2 position</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
MSV1-12	C-12-3	42 (11)	210 (3000)	D-42
MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Push-to-open, 3-way, 2 position</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
MSV2-12	C-12-3	38 (10)	210 (3000)	D-44
MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Push-to-open, 4-way, 2 position</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
MSV3-12	C-12-4	53 (14)	210 (3000)	D-48
MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Push-to-open, 4-way, 2 position</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
MSV4-12	C-12-4	53 (14)	210 (3000)	D-50
MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Push-to-open, 3-way, 2 position</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
MSV5-12	C-12-3	42 (11)	210 (3000)	D-46
MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Push-to-open, 4-way, 2 position</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
MSV6-12	C-12-4	53 (14)	210 (3000)	D-52
MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Push-to-open, 4-way, 2 position</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
MSV7-12	C-12-4	45 (12)	210 (3000)	D-54
MODE	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Manual lever, 4-way, 3 position</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
MLV9-12-A	C-12-4	60 (15)	210 (3000)	D-32
MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Manual lever, 4-way, 3 position</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
MLV9-12-E	C-12-4	60 (15)	210 (3000)	D-34

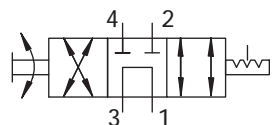
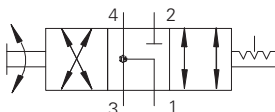
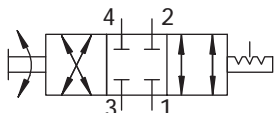
# Directional Controls (cont.)

Valve locator



Manually operated

## Functional Symbol



MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Manual rotary, 4-way, 3-position detented</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
MRV5-10-D/E	C-10-4	11 (3)	210 (3000)	D-12
MRV5-16-D	C-16-4	45 (12)	210 (3000)	D-14

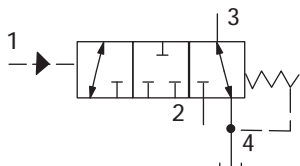
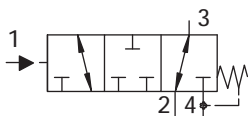
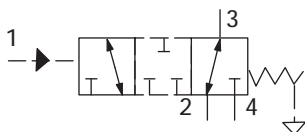
MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Manual rotary, 4-way, 3-position detented</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
MRV6-10-D/E	C-10-4	11 (3)	210 (3000)	D-16

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Manual rotary, 4-way, 3-position detented</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
MRV4-10-D/E	C-10-4	11 (3)	210 (3000)	D-8
MRV4-16-D	C-16-4	45 (12)	210 (3000)	D-10

\* Indicates that these models are available for use above 210 bar (3000 psi). However, caution should be taken and a review of the application may be necessary prior to use. Contact your Eaton sales engineer.

Pilot operated

## Functional Symbol



MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>External pilot, atmospheric vent, 3 way, 2 position</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
PTS1-10	C-10-4	30 (8)	210 (3000)	D-56
PTS1-16	C-16-4	132 (35)	210 (3000)	D-58
PTS1-20	C-20-4	265 (70)	210 (3000)	D-60

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>External pilot, internal drain, 3 way, 2 position</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
PTS2-16	C-16-4	132 (35)	210 (3000)	D-64
PTS2-20	C-20-4	265 (70)	210 (3000)	D-66

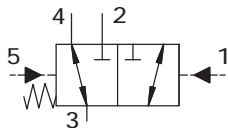
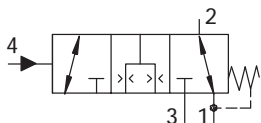
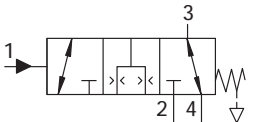
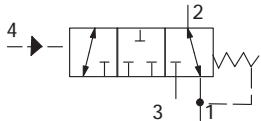
MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>External pilot, internal drain, 3 way, 2 position</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
PTS3-16	C-16-4	132 (35)	210 (3000)	D-70
PTS3-20	C-20-4	265 (70)	210 (3000)	D-72

# Directional Controls (cont.)

Valve locator

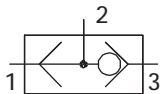
Pilot operated

## Functional Symbol



Manually operated

## Functional Symbol



MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>External pilot, internal drain, 3 way, 2 position</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
PTS5-10	C-10-3	11 (3)	210 (3000)	D-76

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>External pilot, atmospheric vent, 3 way, 2 position</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
PTS5-16	C-16-4	132 (35)	210 (3000)	D-78

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>External pilot, internal drain, 3 way, 2 position</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
PTS6-16	C-16-4	132 (35)	210 (3000)	D-82

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Dual External pilot, 3 way, 2 position</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
PTS9-8	C-8-5S	19 (5)	280 (4000)	D-86
PTS9-10	C-10-5S	38 (10)	280 (4000)	D-88
PTS9-12	C-12-5S	76 (20)	280 (4000)	D-90
PTS9-16	C-16-5S	151 (40)	280 (4000)	D-92
PTS9-20	C-20-5S	228 (60)	280 (4000)	D-94

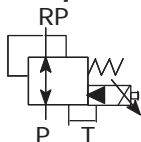
MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Direct acting, ball type</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
DSV2-8	C-8-3	23 (6)	240 (3500)	D-20

# Proportional Controls

Valve locator

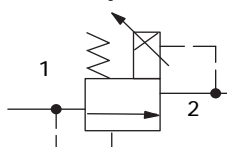
Electrohydraulic pressure  
reducing/relieving

## Functional Symbol



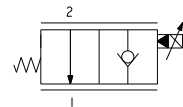
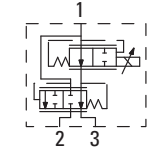
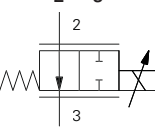
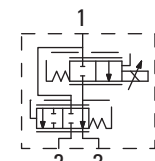
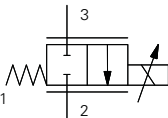
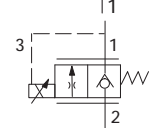
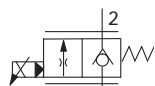
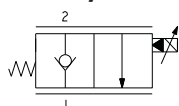
Electrohydraulic  
Proportional Relief

## Functional Symbol



Electrohydraulic Flow  
Regulator

## Functional Symbol



MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Internal pilot, spool type</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
EPRV1-16	C-16-3	38 (10)	35 (500)	B-60

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>2-stage, pilot operated</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
ERV1-10	C-10-2	4-57 (1-15)	210 (3000)	B-50
ERV1-16	C-16-2	8-132 (2-35)	210 (3000)	B-52

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Promotional, 2-way, normally closed poppet type</b>				
ESV1-8*-C	C-8-2	71 (19)	210 (3000)	B-18

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Nose in, side out</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
EPV16-A	C-16-3S (modified)	0-160 (0-42)	280 (4000)	B-10

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Side in, nose out</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
EPV16-B	C-16-3S (modified)	0-160 (0-42)	280 (4000)	B-10

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Direct acting</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
EFV1-10*-C	C-10-3	38 (10)	210 (3000)	B-31
EFV1-12*-C	C-12-3	77 (20)	210 (3000)	B-37

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Direct acting</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
EFV2-12*-C	C-12-3	114 (30)	210 (3000)	B-43

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Direct acting</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
EFV1-10*-0	C-10-3	38 (10)	210 (3000)	B-28
EFV1-12*-0	C-12-3	104 (27.5)	210 (3000)	B-34

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Side in, nose out</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
EFV2-12*-0	C-12-3	114 (30)	210 (3000)	B-40

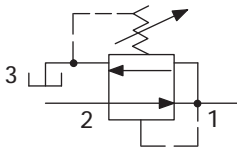
MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Promotional, 2-way, normally open poppet type</b>				
ESV1-8*-0	C-8-2	60 (16)	210 (3000)	B-16
ESV1-10*-0	C-10-2	98 (26)	210 (3000)	B-20
ESV1-12*-0	C-12-2	128 (34)	210 (3000)	B-24

# Pressure Controls

Valve locator

Pressure reducing/relieving

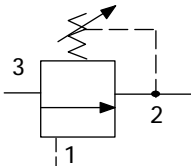
## Functional Symbol



MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Pilot operated</b>				
PRV2-16	C-16-3	151 (40)	350 (5000)	E-48

Pressure sequence valves

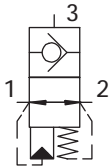
## Functional Symbol



MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>External pilot, sliding spool direct acting</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
PSV2-8	C-8-3	23 (6)	210 (3000)	E-50
PSV4-8	C-8-3	15 (4)	350 (5000)	E-52

Accumulator discharge valve

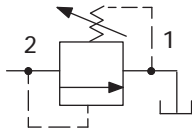
## Functional Symbol



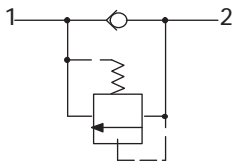
MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>External pilot to close (100:1 ratio)</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
ADV1-16	C-16-3S	30 (8)	210 (3000)	E-76

Relief valves

## Functional Symbol



MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Poppet, differential area</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
RV3-10	C-10-2	76 (20)	250 (3600)	E-14



MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Poppet type, direct acting, thermal relief check valve</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
RV4-10	C-10-2	45 (12)	350 (5000)	E-22

# Flow Controls

Valve locator



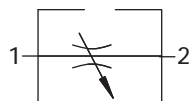
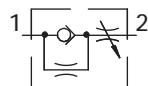
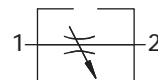
Flow restrictors,  
knob/lever operated

## Functional Symbol



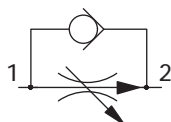
Flow restrictors,  
adjustable

## Functional Symbol



Flow regulators

## Functional Symbol



MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Manual rotary</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
MRV2-10-K	C-10-2	60 (15)	210 (3000)	F-38
MRV2-10-B/E/D/L	C-10-2	60 (15)	210 (3000)	F-38
MRV2-16-K	C-16-2	170 (45)	210 (3000)	F-40
MRV2-16-B/E/D/L	C-16-2	170 (45)	210 (3000)	F-40

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Needle valve</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
NV1-10	C-10-2	45 (12)	210 (3000)	F-44

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Needle valve, restricted reverse flow</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
NV1-16	C-16-2	151 (40)	210 (3000)	F-46
NV1-20	C-20-2	265 (70)	210 (3000)	F-48

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Needle type</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
FCV11-12	C-12-2 C-12-2U	114 (30)	350 (5000)	F-52
FCV6-16	C-16-2	208 (55)	210 (3000)	F-54

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>(pressure compensated) Two way, pre-set flow</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
FR5-8	C-8-2	10 (2.5)	350 (5000)	F-4
FR1-16	C-16-2	113 (30)	210 (3000)	F-8
FR1-20	C-20-2	227 (60)	210 (3000)	F-10

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>(pressure compensated) Two-way, adjustable flow regulator</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
FR2-16	C-16-2	113 (30)	210 (3000)	F-14

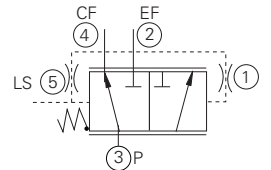
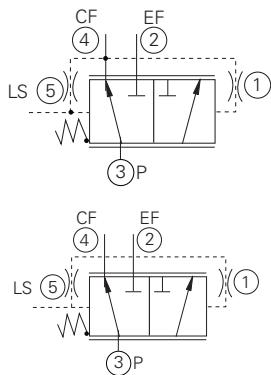
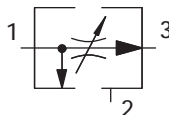
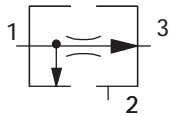
MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Pressure compensated flow regulator</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
FAR1-10	C-10-2	1 - 38 (25 - 10)	350 (5000)	F-16
FAR1-12	C-12-2 C-12-2U	1,5 - 94,5 (0,44 - 25)	350 (5000)	F-18
FAR1-16	C-16-2	3,8 - 15,1 (1.0-4.0)	350 (5000)	F-20

# Flow Controls (cont.)

Valve locator

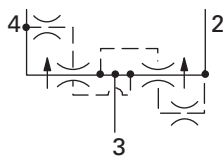
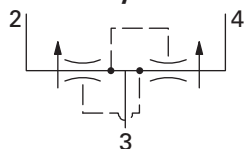
Flow regulators

### Functional Symbol



Flow dividers

### Functional Symbol



MODEL	CAVITY	MAX REG. FLOW	MAX INLET FLOW	TYPICAL PRESSURE	PAGE
<b>3-way priority flow regulator (fixed setting)</b>		<b>L/min (USgpm)</b>		<b>bar (psi)</b>	
PFR5-8	C-8-3	10 (2.5)	15 (4)	350 (5000)	F-22
PFR5-10	C-10-3	23 (6)	60 (15)	350 (5000)	F-24

MODEL	CAVITY	MAX REG. FLOW	MAX INLET FLOW	TYPICAL PRESSURE	PAGE
<b>3-way priority flow regulator 50% adjustable</b>		<b>L/min (USgpm)</b>		<b>bar (psi)</b>	
PFR2-16	C-16-3	114 (30)	151 (40)	210 (3000)	F-30

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Dynamic Signal (PFRD)</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
PFRD-12	C-12-5S	76 (20)	280 (4000)	F-32
PFRD-16	C-16-5S	150 (40)	280 (4000)	F-34
PFRD-20	C-20-5S	230 (60)	240 (3500)	F-36
<b>Static Signal (PFRS)</b>				
PFRS-12	C-12-5S	76 (20)	280 (4000)	F-32
PFRS-16	C-16-5S	150 (40)	280 (4000)	F-34
PFRS-20	C-20-5S	230 (60)	240 (3500)	F-36

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Flow divider/combiner</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
FDC1-20	manifold	378 (100)	210 (3000)	F-70

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Posi-trachon valve</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
FDC3-20	manifold	567 (150)	210 (3000)	F-80



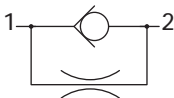
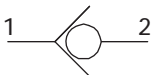
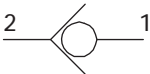
# Check Valves

Valve locator



Direct operated

## Functional Symbol



MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Direct acting, poppet type</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
CV3-4	C-4-2	8 (2)	350 (5000)	G-4
CV11-12	C-12-2, C-12-2U	114 (30)	350 (5000)	G-14

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Direct acting, poppet type</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
CV16-10	C-10-2	76 (20)	350 (5000)	G-12

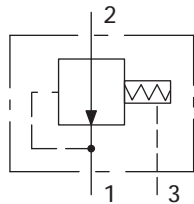
MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Direct acting, poppet type with orifice</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
CV6-10	C-10-2	76 (20)	350 (5000)	G-20
CV6-16	C-16-2	151 (40)	210 (3000)	G-22

# Logic Elements

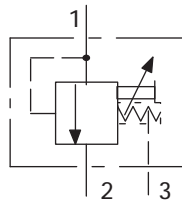
Valve locator

Differential pressure  
sensing

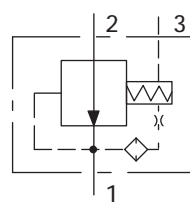
## Functional Symbols Spool type



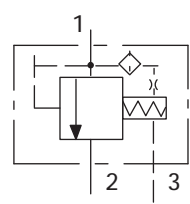
DPS2-\*\*-F  
Spool, flow control,  
normally open



DPS2-\*\*-P  
Spool,  
normally closed

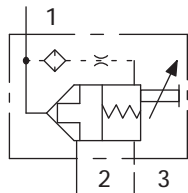


DPS2-\*\*-R  
Spool, pressure reducing,  
normally open

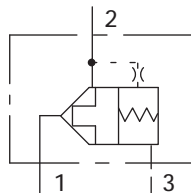


DPS2-\*\*-V  
Spool, normally  
closed

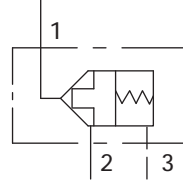
## Poppet type



DPS2-\*\*-B  
Poppet, vent to open,  
normally closed



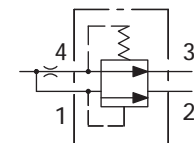
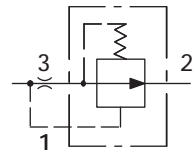
DPS2-\*\*-S  
Poppet, vent to open,  
normally closed



DPS2-\*\*-T  
Poppet, bi-directional pilot to close, 2:1 ratio,  
normally closed

Pressure compensators,  
restrictive

## Functional Symbol



MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Differential pressure sensing, spool type</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
DPS2-10	C-10-3S	57 (15)	240 (3500)*	I-12
DPS2-12	C-12-3S	114 (30)	240 (3500)*	I-14
DPS2-16	C-16-3S	190 (50)	240 (3500)*	I-16
DPS2-20	C-20-3S	303 (80)	240 (3500)*	I-18

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Differential pressure sensing, poppet type</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
DPS2-10	C-10-3S	57 (15)	350 (5000)	I-12
DPS2-16	C-16-3S	190 (50)	350 (5000)	I-16
DPS2-20	C-20-3S	303 (80)	350 (5000)	I-18

\* Indicates that these models are available for use above 240 bar (3500 psi). However, caution should be taken and a review of the application may be necessary prior to use. Contact your Eaton applications engineer.

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Compensator spool element, restrictive type</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
PCS3-12	C-12-3	58 (15)	210 (3000)	I-24
PCS3-16	C-16-3	114 (30)	210 (3000)	I-26
PCS3-20	C-20-3	189 (50)	210 (3000)	I-28

MODEL	CAVITY	FLOW RATING	TYPICAL PRESSURE	PAGE
<b>Compensator spool element, priority type</b>		<b>L/min (USgpm)</b>	<b>bar (psi)</b>	
PCS4-10	C-10-4	38 (10)	210 (3000)	I-30
PCS4-12	C-12-4	58 (15)	210 (3000)	I-32
PCS4-16	C-16-4	114 (30)	210 (3000)	I-34
PCS4-20	C-20-4	189 (50)	210 (3000)	I-36

# Pressure Controls

## Section introduction

This section gives basic specifications for Vickers pressure control threaded cartridge valves. Its purpose is to provide a quick, convenient reference tool when choosing Vickers cartridge valves or designing a system using these components.

Eaton offers a full range of Vickers direct and pilot operated relief, reducing, sequence and unloading valves. In general, the direct operated products are faster in response while pilot operated types have a flatter pressure/flow characteristic.

### Relief Valves

When selecting a relief valve for a specific application, consideration should be given to the following

- **Direct operated poppet types – RV1 and RV10**

Suitable for continuous duty with reliable fast response, the RV10 being a low pressure, low cost option. These valves are also suitable for piloting the DPS2 logic elements.

- **Pilot operated poppet type with reverse free-flow check – RV2**

Use as a service line relief where anticavitation make-up is required. It may also be applied as an internally piloted counterbalance valve in a service line.

- **Direct operated poppet type, differential area models – RV3 and RV8**

Sometimes termed a "differential area relief valve". A fast acting valve, highly tolerant of contaminant and providing an alternative flow path, frequently beneficial in manifold layout. Utilized in CRV3 cross-line relief packages.

- **Pilot operated spool type – RV5 and RV11**

Well suited for repetitive, continuous duty with a low pressure-override characteristic.

- **Direct operated ball type – RV6**

A fast-acting valve for intermittent duty. This low flow, low cost valve may be used as a pilot section for a larger main-stage valve, or piloting logic elements.

### Reducing Valves

Two types are available:

- Direct operated with relieving feature – PRV1
- Pilot operated with relieving feature – PRV2 and PRV12
- Pilot operated without relieving feature

### Sequence Valves

A complete range of sequence functions is available, including:

- Normally-closed and normally-open models
- Internal and external pilot options
- Internal and external drain options
- Two and three position models

Externally drained models may be used as relief valves in circuits with alternating pressure and tank line functions.

### Accumulator Unloading Valves

Valves that allow accumulators to be charged to a pre-selected maximum pressure at which the pump is unloaded. The pump does not cut-in until the accumulator pressure has decayed to a pre-selected percentage of maximum pressure. The low-flow PUV3 model can be used as a stand alone model for low flow applications, or as a pilot stage in two-stage arrangements for higher flows.

### Accumulator Discharge Valve

This valve is designed to ensure that an accumulator will discharge when pilot pressure is lost, e.g. on pump shutdown.

### Fluid Cleanliness

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

# RV4-10

Thermal relief with reverse flow check valve

## Description

The RV4-10-F is a direct acting, poppet type, screw-in cartridge type thermal relief with reverse flow check valve.

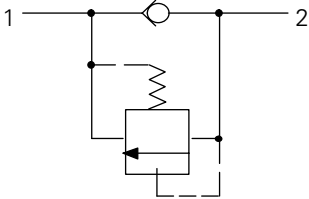
## Operation

This valve has a dual function. In the first function the valve acts as a check valve and remains closed until the spring bias

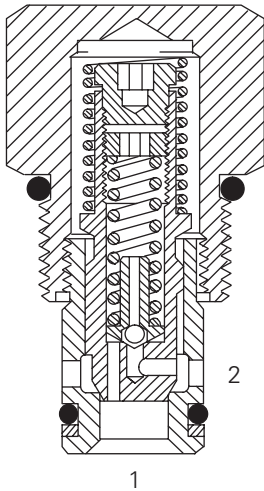
is overcome at port 1. The poppet is unseated and allows flow from port 1 to port 2. The second function acts as a thermal relief.

The valve remains closed until the predetermined setting is reached. The valve allows expansion flow from port 2 to port 1.

## Functional Symbol



## Sectional View



## RATINGS AND SPECIFICATIONS

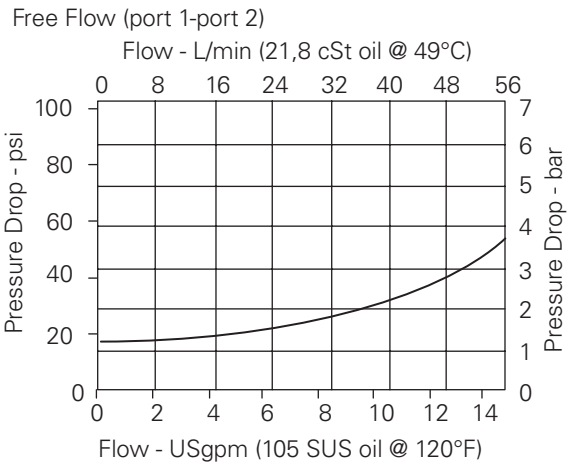
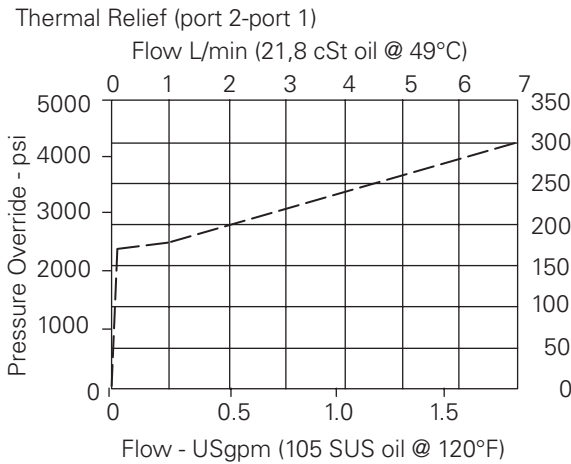
Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)

Typical application pressure (all ports)	350 bar (5000 psi)
Rated flow	45 L/min (12 USgpm)
– check valve	1 L/min (0.25 USgpm)
– relief valve	
Relief cracking pressure ranges	28 - 350 bar (400 - 5000 psi)
Check valve cracking pressure	1,24 bar (18 psi)
Reseat pressure	More than 90% of cracking pressure
Internal leakage, port 2 to port 1	5 drops/min at cracking pressure
Cavity	C-10-2
Standard housing materials	Aluminum or steel
Temperature range	-40° to 120°C (-40° to 248°F)
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Weight cartridge only	0,11 kg (0.25 lbs)
Seal kits	565803 Buna-N 566086 Viton®

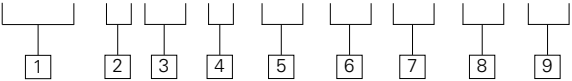
Viton is a registered trademark of E.I. DuPont

## Pressure Override & Free Flow Curves

Cartridge only



RV4 – 10 (V) – F – (S) – \*\* – 50 / \*\* – 00



1 Function

**RV** - Check valve w/thermal relief

2 Size

**10** - 10 Size

3 Seals

**Blank** - Buna-N  
**V** - Viton®

4 Adjustment

**F** - Factory set

5 Valve housing material

**Blank** - Aluminum  
**S** - Steel

Dimensions

mm (inch)

Torque cartridge in housing

**A** - 47-54 Nm (35-40 ft. lbs)

**S** - 68-75 Nm (50-55 ft. lbs)

6 Port size

**0** - Cartridge only

CODE	PORT SIZE	HOUSING NUMBER		
		Aluminum Light duty	Aluminum Fatigue rated	Steel Fatigue rated
<b>3B</b>	3/8" BSPP	02-175462	—	—
<b>2G</b>	1/4" BSPP	—	876702	02-175102
<b>3G</b>	3/8" BSPP	—	876703	02-175103
<b>6H</b>	SAE 6	—	876700	—
<b>8H</b>	SAE 8	—	876701	—
<b>6T</b>	SAE 6	566151	—	02-175100
<b>8T</b>	SAE 8	—	—	02-175101

See section J for housing details.

7 Cracking pressure range

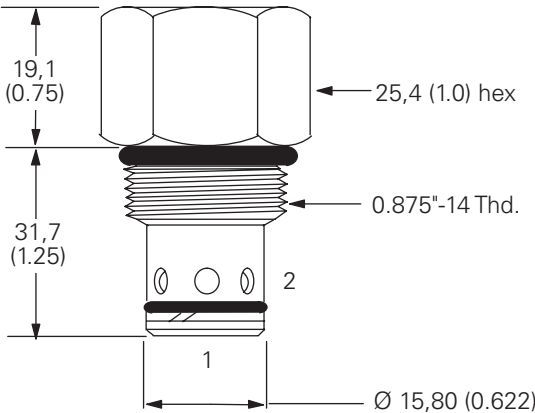
**50** - 28-350 bar  
(400-5000 psi)

8 Setting pressure

Within ranges in 7  
User must specify settings  
in 7 bar (100 psi) steps,  
coded as in the following  
examples:  
**10** - 70 bar (1000 psi)  
**25** - 175 bar (2500 psi)

9 Special features

**00** - None  
(Only required if valve has  
special features, omitted  
if "00")



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).

# ADV1-16

Accumulator discharge  
valve

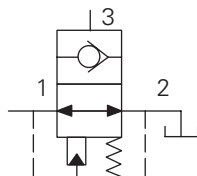
## Description

The ADV1-16 is a poppet type, normally open, externally piloted, screw-in cartridge type accumulator discharge valve.

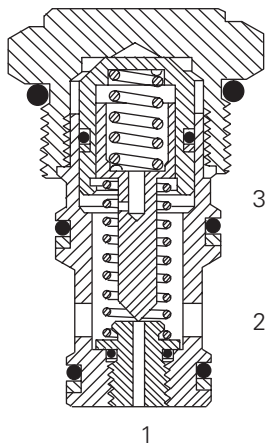
## Operation

In its unpiloted position, this valve remains open between port 1 and port 2 until sufficient pilot pressure is applied to port 3. Flow is then blocked from port 1 to port 2.

## Functional Symbol



## Sectional View



## RATINGS AND SPECIFICATIONS

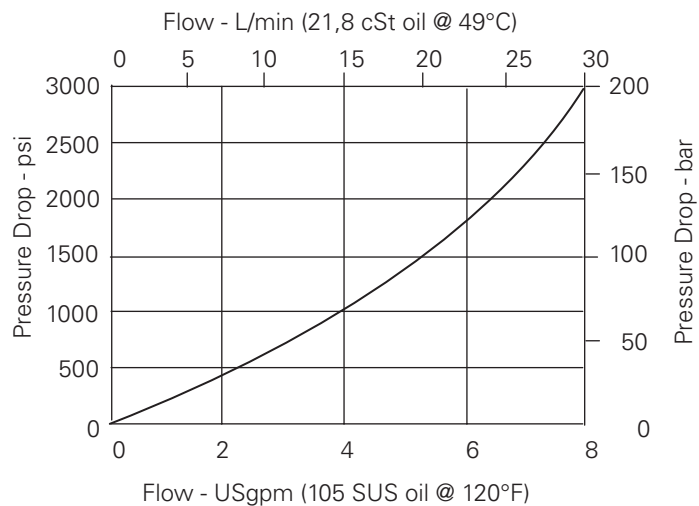
*Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)*

Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	30 L/min (8 USgpm)
Minimum pilot pressure @ port 3	4 bar (60 psi)
Cavity	C-16-3S
Standard housing materials	Aluminum
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
Pilot ratio	100:1
Weight cartridge only	0,28 kg (0.62 lbs)
Seal kits	565812 Buna-N 889611 Viton®

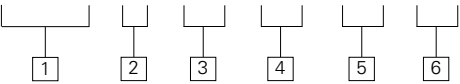
Viton is a registered trademark of E.I. DuPont

## Pressure Drop Curve

Cartridge only  
Port 3 pilot pressure = 0



ADV1 – 16 – (V) – \*\*\* – 100 – 00



- 1 **Function**

**ADV1** - Accumulator discharge valve
- 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	Aluminum Fatigue rated
6B	3/4" BSPP	02-175471	–
12T	SAE 12	566414	–
4G	1/2" BSPP	–	02-160676
6G	3/4" BSPP	–	876726
10H	SAE 10	–	876725
12H	SAE 12	–	876727

- 5 **Pilot area ratio**

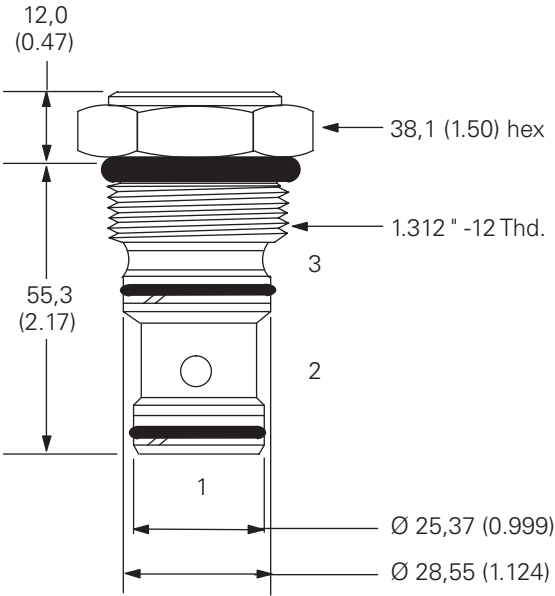
Port 3: Port 1 - 100:1  
(Minimum pilot pressure at port 3 - 4 bar (60 psi))
- 6 **Special features**

**00** - None  
(Only required if valve has special features, omitted if "00")

E

**Dimensions**  
mm (inch)

Torque cartridge in housing  
108-122 Nm (80-90 ft. lbs)



# PRV2-16

Pressure reducing/  
relieving valve  
Pilot operated

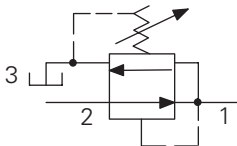
## Description

The PRV2-16 is a **pilot operated**, spool type screw-in cartridge pressure reducing/relieving valve.

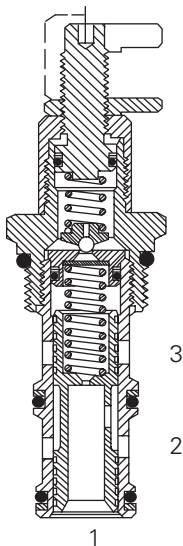
## Operation

This valve is normally open, allowing flow from port 2 to port 1. Port 3 must be vented. Once the pressure setting is reached at port 1, the spool shifts to restrict the inlet flow at port 2. This regulates the pressure at port 1. If pressure at port 1 exceeds the predetermined setting of the valve, the spool will shift further and relieve excess pressure through port 3.

## Functional Symbol



## Sectional View



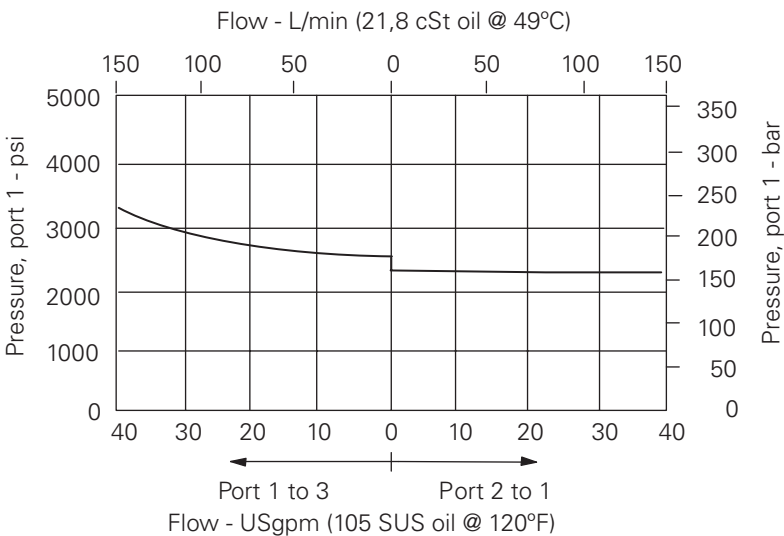
## RATINGS AND SPECIFICATIONS

<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
Typical application pressure(all ports)	350 bar (5000 psi)
Cartridge fatigue pressure (infinite life)	350 bar (5000 psi)
Rated flow	151 L/min (40 USgpm)
Cavity	C-16-3
Standard housing materials	Aluminum or steel
Temperature range	-40° to 120°C (-40° to 248°F)
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Weight cartridge only	0,40 kg (0.89 lbs)
Seal kits	565811 Buna-N 889610 Viton®

Viton is a registered trademark of E.I. DuPont

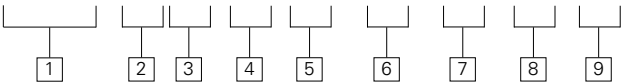
## Reduced Pressure Curve

Cartridge only





PRV2 - 16 (V) - \* - (S) - \*\*\* - \*\* / \*\* - 00



**1 Function**  
PRV2 - Pressure  
reducing/relieving valve

**2 Size**  
16 - 16 Size

**3 Seals**  
Blank - Buna-N  
V - Viton®

**4 Adjustment**  
C - Cap  
K - Knob  
S - Screw

**5 Valve housing material**  
S - Steel  
A - Aluminum

**6 Port size**  
0 - Cartridge only

CODE	PORT SIZE	HOUSING NUMBER		
		Aluminum Light duty	Aluminum Fatigue rated	Steel Fatigue rated
6B	3/4" BSPP	02-175465	—	—
4G	1/2" BSPP	—	876720	02-175131
6G	3/4" BSPP	—	876722	02-175132
10H	SAE 10	—	876721	—
12H	SAE 12	—	876723	—
10T	SAE 10	—	—	02-175129
12T	SAE 12	566152	—	02-175130

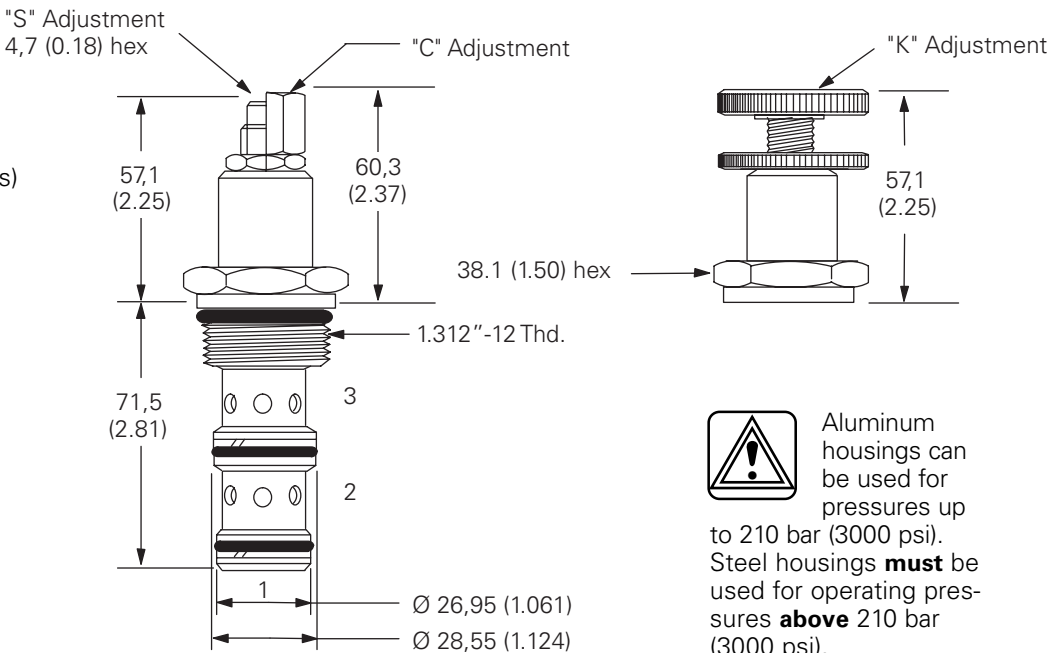
See section J for housing details.

**7 Cracking pressure range**  
30 - 34-210 bar  
(500-3000 psi)  
60 - 70-415 bar  
(1000-6000 psi)

**8 Factory set reduced pressure**  
Within ranges in **7**  
**Blank** - Normal factory  
setting at approximate  
mid-range. User requested  
settings in 3,45 bar (50 psi)  
steps, coded as in the  
following examples:  
**10** - 70 bar (1000 psi)  
**10.5** - 72,4 bar (1050 psi)

**9 Special features**  
**00** - None  
(Only required if valve has  
special features, omitted  
if "00")

**Dimensions**  
mm (inch)  
Torque cartridge in housing  
**A** - 108-122 Nm (80-90 ft. lbs)  
**S** - 136-149 Nm (100-110 ft. lbs)



**EAT•N**

**Vickers**

# Check Valves

This section gives basic specifications for the full line of Vickers screw-in cartridge check valves. Its purpose is to provide a quick, convenient reference tool when choosing Vickers cartridge valves or designing a system using these components.

The Vickers range of direct and pilot operated check valves provides the hydraulic circuit designer with a wide selection of cartridge and in-line products.

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

All poppet type check valve cartridges have hardened and ground poppets and sharp-edged ground steel seats. This provides an excellent product that is dirt-tolerant, has reliable seating, and is suitable for fast cycling with long life.

## Direct operated check valves

Cartridges fit into industry standard cavities and may be supplied for installation in manifolds, or be provided in standard housings having SAE or BSPP ports suitable for in-line mounting.

A wide selection of cracking pressures is available from 0,21 to 20,7 bar (3 to 300 psi). Thus the opportunity exists to use the valves not only as conventional check but also as low pressure relief valves.

## Pilot operated check valves

These valves are used for:

- Position load locking
- As an alternative to counterbalance valves where neither the overrunning loads or release speed are factors in the application.

The high pressure POC\*-10 and POC\*-12 series of pilot-to-open check valves complement the CBV\*-10 and CBV\*-12 counterbalance cartridges and are physically interchangeable with them.

The POC's provide a low cost alternative to load control when the dynamics of neither overrunning loads nor load release speed are factors to be considered in the design of the hydraulic circuit for the load to be controlled.

The pilot-to-open valves positively lock a load from port 1 to port 2 until pilot pressure applied to port 3 is sufficient to unseat the valve. This then permits flow from port 1 to port 2. The load can also be released through means of an optional screw type override.

The POC\*-10 covers flow up to 60 L/min (15 USgpm). The POC\*-12 covers flow up to 114 L/min (30 USgpm). With infinite life qualification to a fatigue pressure rating of 310 bar (4500 psi), these POC valves are suitable for use in a broad range of load control applications with typical system operating pressures up to 350 bar (5000 psi). Tailoring of the circuit to gain energy savings while minimizing

shock is obtained through the use of several standard cracking pressure ranges from 2,0 bar (30 psi) to 7 bar (100 psi). When anti-cavitation protection is required, the 0,30 bar (5 psi) spring should be used. For those applications where pilot pressure may not always be available, the valve can be ordered with an optional adjustable override.

## Features and benefits

- Products in this catalog have been fatigue tested for one million cycles at 132% or 10 million cycles at 115% of rated pressure.
- Simple load holding device. Low cost alternative to more complex solutions when overrunning loads are not present and / or control of load release speed is not required.
- Provides high operational efficiency and low spring settings.
- Valves are offered with a wide variety of standard housings with SAE and BSPP port options in the following configurations:
  - In-line single
  - In-line dual
  - SAE, 4-bolt, code 61
  - Close coupled, nipple mounted
  - Gasket mounted single
  - Gasket mounted dual

These valves can also be used in a C-10-3S or C-10-3S cavity.

- Four standard cracking pressures permit energy savings, while tailoring the hydraulic system requirements to minimize shock.
- Unique dual spring design provides high operational efficiency and a low

pressure spring option for effective anti-cavitation protection.

- Unique design provides compact package and low pressure drops that match or exceed current market expectations and provide for excellent repeatability and stability.
- 3:1 pilot ratio satisfies simple load holding application requirements, while providing smooth operation and longer operating life.
- Optional adjustable override releases the load for situations where pilot pressure is not always available.

## Single pilot check

Also offered are SPC2-8 and SPC2-10 single pilot check valves with pressures to 240 bar (3500 psi) and flows to 23 L/min (6 USgpm). These valves operate similar to the POC1 product but offer an opposite flow path which offers the designer a choice of pilot operated check valve when laying out a custom manifold for ease of design.

## Supporting products

Vickers screw in cartridge valves are available in a wide range of mounting configurations and porting options to provide flexibility in developing circuits. Housings are available in either aluminum 210 bar (3000 psi) or steel 350 bar (5000 psi) configurations. All are available with a choice of BSPP (ISO-0228/1) or SAE style ports.

# CV3-4

Check valve

### Description

The CV3-4-B is a ball type, screw-in cartridge check valve.

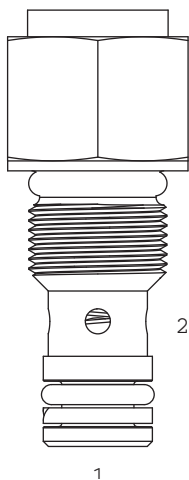
### Operation

This valve remains closed until the bias is reached at port 1 at which time the poppet lifts off the seat and allows flow from port 1 to port 2.

### Functional Symbol



### Profile View



### RATINGS AND SPECIFICATIONS

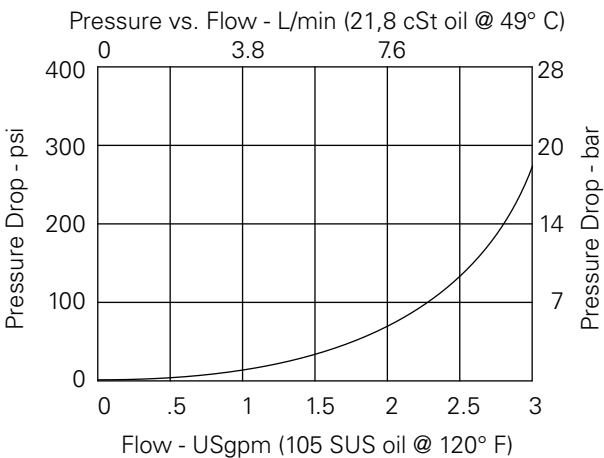
*Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)*

Typical application pressure (all ports)	350 bar (5000 psi)
Cartridge fatigue pressure (infinite life)	350 bar (5000 psi)
Rated flow	7.6 L/min (2 USgpm)
Free flow cracking pressure @ 1 l/min (0.25 USgpm)	5 – 0,34 bar (5 psi)
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-4-2
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Weight cartridge only	0,04 kg (0.09 lbs)
Seal kit	9900174-000 Buna-N 9900175-00 Viton®

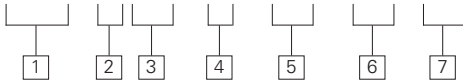
Viton is a registered trademark of E.I. DuPont

### Pressure Drop Curves

Cartridge only



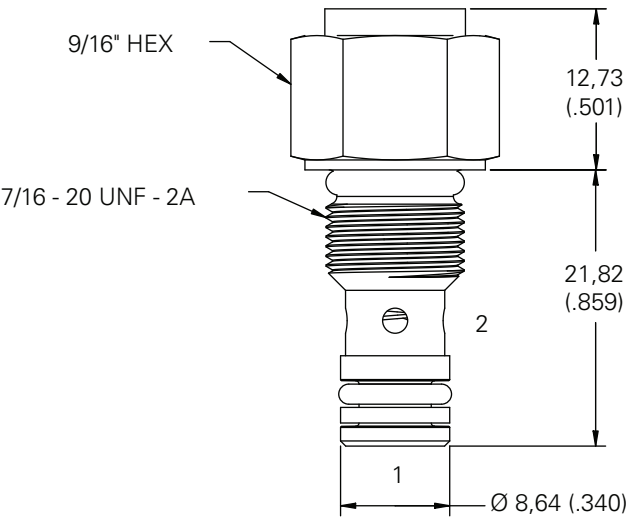
CV3 - 4 (V) - B - \*\*\* - \*\* - 00



<b>1 Function</b> <b>CV3</b> - Check valve	<b>3 Seals</b> <b>Blank</b> - Buna-N <b>V</b> - Viton®	<b>5 Port size</b> <b>000</b> - Cartridge only	<b>7 Special features</b> <b>00</b> - None (Only required if valve has special features - omitted if "00")
<b>2 Size</b> <b>4</b> - 4 Size	<b>4 Style</b> <b>B</b> - Ball type	<b>6 Free flow cracking pressure</b> <b>05</b> - 0,34 bar (5 psi)	

Dimensions

mm (inch)  
Torque cartridge in aluminum or steel housing to 8.1-13.6 Nm (6-10 ft. lbs)



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)



# CV16-10

Check Valve  
(side in, nose out)

## Description

The CV16-10-P is a poppet type, screw-in cartridge check valve.

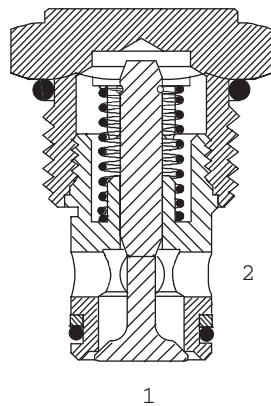
## Operation

This valve remains closed until the spring bias is reached at port 2 at which time the poppet lifts off the seat and allows flow from port 2 to port 1.

## Functional Symbol



## Sectional View



## RATINGS AND SPECIFICATIONS

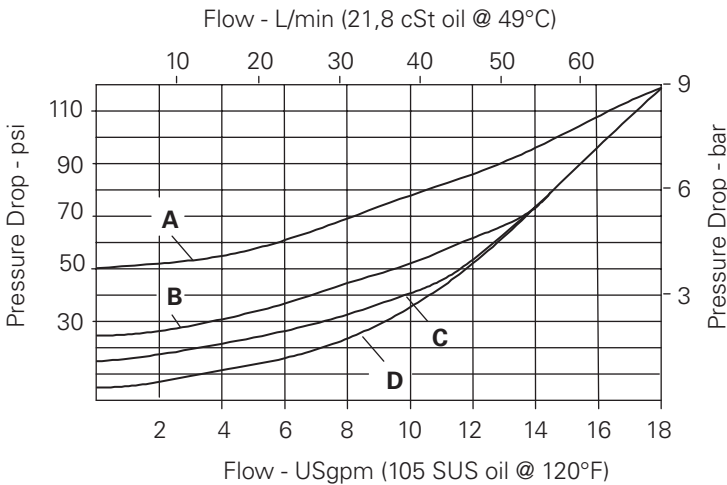
*Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)*

Typical application pressure (all ports)	350 bar (5000 psi)
Cartridge fatigue pressure (infinite life)	310 bar (4500 psi)
Rated flow	76 L/min (20 USgpm)
Free flow cracking pressure @1 L/min (0.25 USgpm)	5 – 0,34 bar (5 psi) 15 – 1,03 bar (15 psi) 25 – 1,70 bar (25 psi) 50 – 3,40 bar (50 psi)
Internal leakage, Port 2 to 1	5 drops / min. maximum @ 350 bar (5000 psi)
Temperature range	–40° to 120°C (–40° to 248°F)
Cavity	C–10–2
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	0,08 kg (0.17 lb)
Seal kit	565803 Buna–N 566086 Viton®

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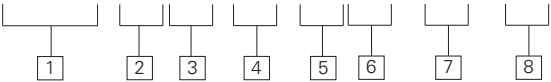
## Pressure Drop Curves

Cartridge only



- A – CV16-10-P-O-50
- B – CV16-10-P-O-25
- C – CV16-10-P-O-15
- D – CV16-10-P-O-5

CV16 – 10 (V) – P – (\*) \*\* – \*\*\* – 00



- 1 **Function**

**CV16** – Check Valve
- 2 **Size**

**10** – 10 Size
- 3 **Seals**

**Blank** – Buna-N  
**V** – Viton®
- 4 **Style**

**P** – Poppet
- 5 **Valve housing material**

Omit for cartridge only  
**A** – Aluminum  
**S** – Steel

6 **Port size**

**0** – Cartridge only

CODE	PORT SIZE	HOUSING NUMBER		
		Aluminum Light duty	Aluminum Fatigue rated	Steel Fatigue rated
3B	3/8" BSPP	02-175462	–	–
6T	SAE 6	566151	–	02-175100
8T	SAE 8	–	–	02-175101
2G	1/4" BSPP	–	876702	02-175102
3G	3/8" BSPP	–	876703	02-175103
6H	SAE 6	–	876700	–
8H	SAE 8	–	876701	–

See Section J for housing details.

- 7 **Free flow cracking pressure**

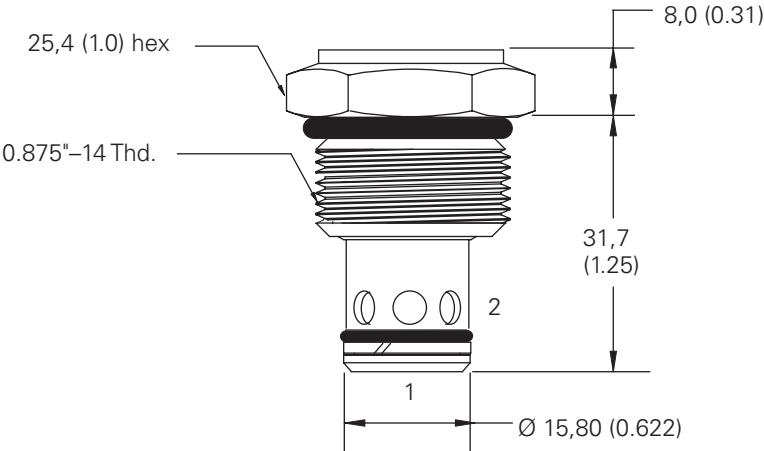
**5** – 0,34 bar (5 psi)  
(Anticavitation)  
**15** – 1,03 bar (15 psi)  
**25** – 1,70 bar (25 psi)  
**50** – 3,40 bar (50 psi)
- 8 **Special Features**

**00** – None  
(Only required if valve has special features - omitted if "00")  
**SS** - 316 Stainless Steel external components

Dimensions

mm (inch)

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



**WARNING**  
The cavity should be machined to the 14,29 (0.562) maximum diameter and 36,00 (1.417) maximum depth (see cavity detail, page M-12).



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)

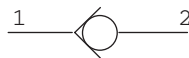
# CV11-12

Check valve

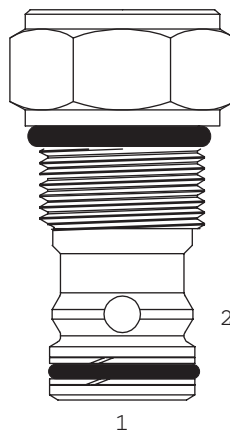
## Description

The CV11-12 is a poppet type, screw-in cartridge check valve.

## Functional Symbol



## Profile View



## Operation

This valve remains closed until the spring bias is reached at port 1 at which time the poppet lifts off the seat and allows flow 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)	350 bar (5000 psi)
Cartridge fatigue pressure (infinite life)	350 bar (5000 psi)
Rated flow	114 L/min (30 USgpm)
Free flow cracking pressure @ 1 L/min (0.25 USgpm)	2.5 – 0,17 bar (2.5 psi) 5.0 – 0,35 bar (5.0 psi) 10 – 0,69 bar (10 psi) 20 – 1,38 bar (20 psi) 40 – 2,76 bar (40 psi) 80 – 5,50 bar (80 psi) 160 – 11,0 bar (160 psi)
Internal leakage, Port 2 to 1	5 drops / min. maximum @ 350 bar (5000 psi)
Hysteresis	Less than 0,35 bar (5 psi)
Temperature range	–40° to 120°C (–40° to 248°F)
Cavity	C-12-2 or C-12-2U
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®

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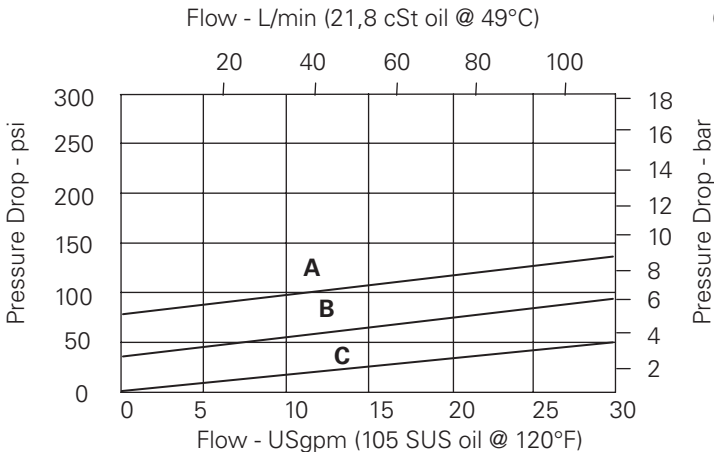
## Pressure Drop Curves

Cartridge only

**A** – CV11-12-P-O-80

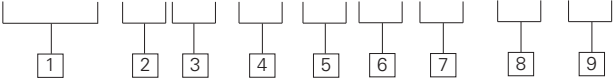
**B** – CV11-12-P-O-20

**C** – CV11-12-P-O-2.5





CV11 – 12 (V) – P – (\*) \*\*\* (U) – \*\* – 00



- 1 **Function**  
**CV11** – Check valve
- 2 **Size**  
**12** – 12 Size
- 3 **Seals**  
**Blank** – Buna-N  
**V** – Viton®
- 4 **Style**  
**P** – Poppet
- 5 **Valve housing material**  
Omit for cartridge only  
**A** – Aluminum  
**S** – Steel

6 **Port size**  
**0** – 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 Section J for housing details.

- 7 **Cavity**  
**Blank** – Cavity without undercut  
**U** – Cavity with undercut
- 8 **Cracking pressure**  
**2.5** – 0,17 bar (2.5 psi)  
**5.0** – 0,35 bar (5 psi)  
**10** – 0,69 bar (10 psi)  
**20** – 1,38 bar (20 psi)  
**40** – 2,75 bar (40 psi)  
**80** – 5,50 bar (80 psi)  
**160** – 11,0 bar (160 psi)
- 9 **Special Features**  
**00** – None  
(Only required if valve has special features - omitted if "00")

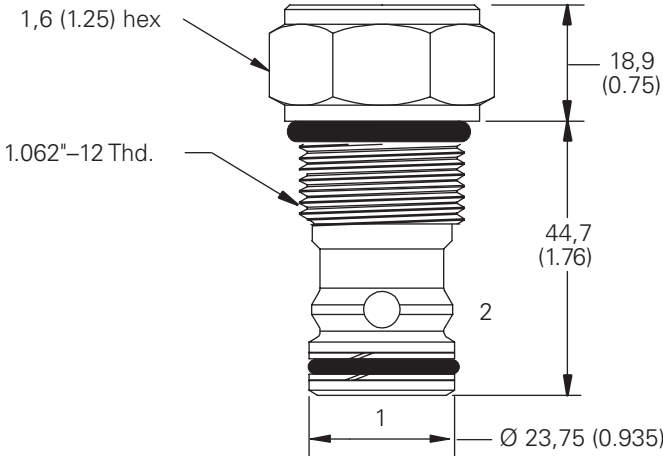
Dimensions

mm (inch)

Torque cartridge in housing  
**A** - 81-95 Nm  
(60-70 ft. lbs)  
**S** - 102-115 Nm  
(75-85 ft. lbs)



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).



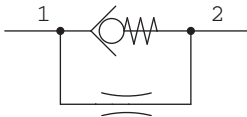
# CV6-10

Orifice check valve

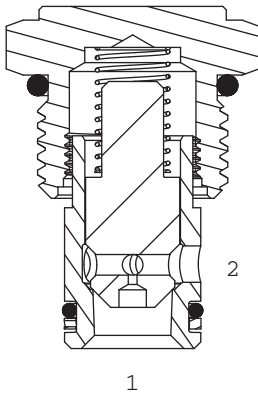
### Description

The CV6-10-P is a poppet type, screw-in cartridge check valve with bypass orifice.

### Functional Symbol



### Sectional View



### Operation

This valve acts a restrictor in the 2 to 1 direction and as a check valve it allows free flow from 1 to 2.

### RATINGS AND SPECIFICATIONS

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

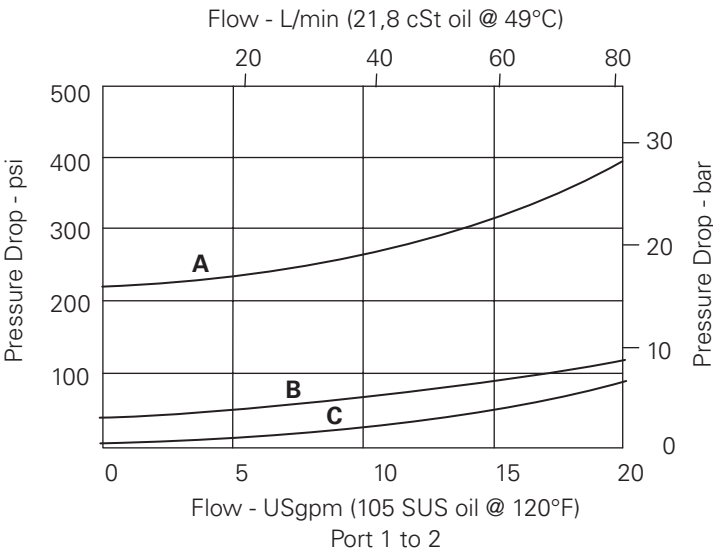
Typical application pressure (all ports)	350 bar (5000 psi)
Cartridge fatigue pressure (infinite life)	350 bar (5000 psi)
Rated flow	76 L/min (20 USgpm)
Free flow cracking pressure @1 L/min (0.25 USgpm)	<b>003</b> – 0,21 bar (3 psi) <b>010</b> – 0,69 bar (10 psi) <b>020</b> – 1,38 bar (20 psi) <b>035</b> – 2,41 bar (35 psi) <b>040</b> – 2,76 bar (40 psi) <b>065</b> – 4,48 bar (65 psi) <b>100</b> – 6,90 bar (100 psi) <b>180</b> – 12,40 bar (180 psi) <b>210</b> – 14,50 bar (210 psi)
Orifice size range	0.015 to 0.125" (0.381 - 3.175 mm)
Temperature range	-40° to 120°C (-40° to 248°F)
Cavity	C-10-2
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	0,08 kg (0.17 lbs)
Seal kit	565803 Buna-N 566086 Viton®

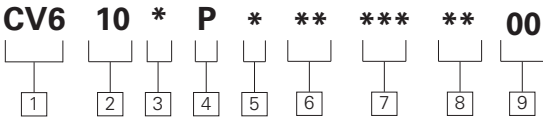
Viton is a registered trademark of E.I. DuPont

### Pressure Drop Curves

Cartridge only

- A** - CV6 10\*P 000 210 00  
**B** - CV6 10\*P 000 040 00  
**C** - CV6 10\*P 000 003 00





1 Function

**CV6** - Check valve with  
bypass orifice

2 Size

**10** - 10 Size

3 Seals

**N** - Buna-N  
**V** - Viton®

4 Style

**P** - Poppet

5 Valve housing material

**0** - No housing  
**A** - Aluminum  
**S** - Steel

7 Free flow cracking  
pressure

**003** - 0,21 bar (3 psi)  
(Anti-cavitation)  
**010** - 0,69 bar (10 psi)  
(Anti-cavitation)  
**020** - 1,38 bar (20 psi)  
**035** - 2,41 bar (35 psi)  
**040** - 2,76 bar (40 psi)  
**065** - 4,48 bar (65 psi)  
**100** - 6,90 bar (100 psi)  
**180** - 12,4 bar (180 psi)  
**210** - 14,5 bar (210 psi)

6 Port size

**00** - Cartridge only

CODE	PORT SIZE	HOUSING NUMBER		
		Aluminum Light duty	Aluminum Fatigue rated	Steel Fatigue rated
<b>3B</b>	3/8" BSPP	02-175462	—	—
<b>6T</b>	SAE 6	566151	—	02-175100
<b>8T</b>	SAE 8	—	—	02-175101
<b>2G</b>	1/4" BSPP	—	876702	02-175102
<b>3G</b>	3/8" BSPP	—	876703	02-175103
<b>6H</b>	SAE 6	—	876700	—
<b>8H</b>	SAE 8	—	876701	—

See Section J for housing details.

8 Orifice size

Specify in thousandths  
of an inch  
**Ø** - 0.125 max  
**Ø** - 0.015 min

9 Special features

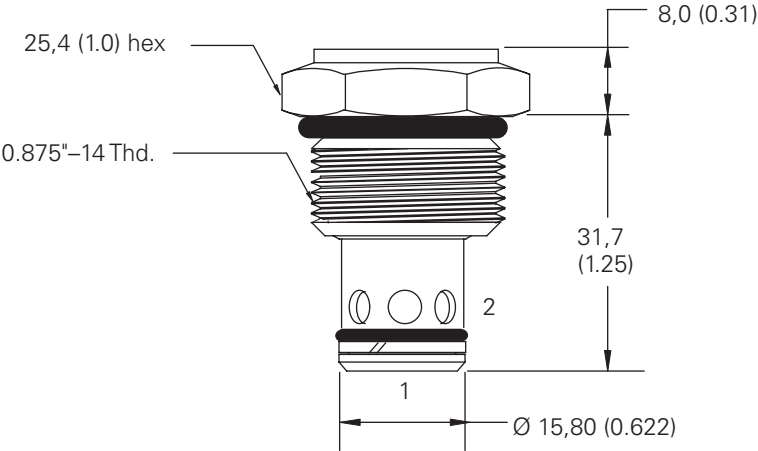
**00** - None  
(Only required if valve has  
special features - omitted  
if "00")  
**SS** - 316 Stainless Steel  
external components

Dimensions

mm (inch)

Torque cartridge in housing

**A** - 47-54 Nm  
(35-40 ft. lbs)  
**S** - 68-70 Nm  
(50-55 ft. lbs)



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)

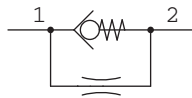
# CV6-16

Orifice check valve

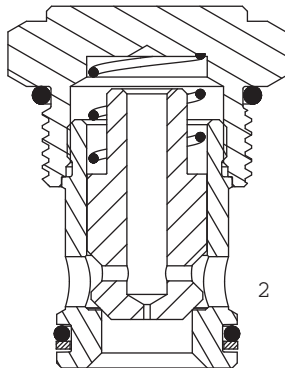
### Description

The CV6-16-P is a poppet type, screw-in cartridge check valve with bypass orifice.

### Functional Symbol



### Sectional View



### Operation

This valve acts a restrictor in the 2 to 1 direction and as a check valve it allows free flow from 1 to 2.

### RATINGS AND SPECIFICATIONS

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

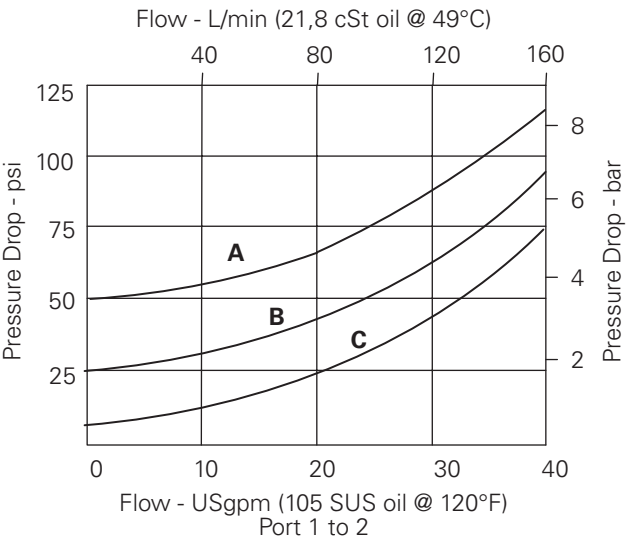
Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	151 L/min (40 USgpm)
Free flow cracking pressure @1 L/min (0.25 USgpm)	<b>005</b> – 0,34 bar (3 psi) <b>020</b> – 1,34 bar (20 psi) <b>030</b> – 2,07 bar (30 psi) <b>050</b> – 3,45 bar (50 psi)
Orifice size range	0.015 - 0.125 inch (0.381 - 3.175 mm)
Temperature range	-40° to 120°C (-40° to 248°F)
Cavity	C-16-2
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	0,26 kg (0.58 lbs)
Seal kit	565810 Buna-N 889609 Viton®

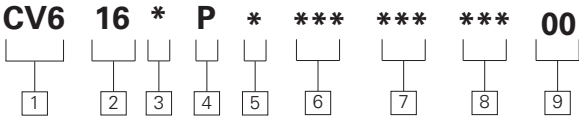
Viton is a registered trademark of E.I. DuPont

### Pressure Drop Curves

Cartridge only

- A - CV6 16\*P 0000 050 00
- B - CV6 16\*P 0000 020 00
- C - CV6 16\*P 0000 005 00





- 1 **Function**

**CV6** - Check valve with  
bypass orifice
- 2 **Size**

**16** - 16 Size
- 3 **Seals**

**N** - Buna-N  
**V** - Viton®
- 4 **Style**

**P** - Poppet

- 5 **Block material**

**0** - No housing  
**A** - Aluminum
- 7 **Free flow cracking  
pressure**

**005** - 0,21 bar (5 psi)  
(Anti-cavitation)  
**020** - 1,34 bar (20 psi)  
**030** - 2,07 bar (30 psi)  
**040** - 2,76 bar (40 psi)  
**050** - 3,45 bar (50 psi)  
**100** - 6,90 bar (100 psi)

6 **Port size**

**000** - 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 Section J for housing details.

- 8 **Orifice size**

Specify in thousandths  
of an inch

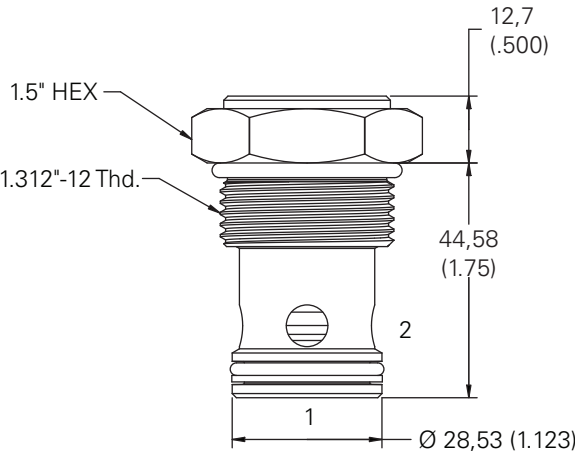
Ø - 0.125 max  
Ø - 0.015 min
- 9 **Special features**

**00** - None  
(Only required if valve has  
special features - omitted  
if "00")

Dimensions

mm (inch)

Torque cartridge in  
aluminum housing  
108-122 Nm (80-90 ft. lbs)



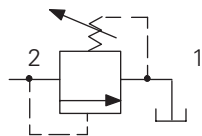
# RV3-10

Relief Valve  
Poppet, differential area

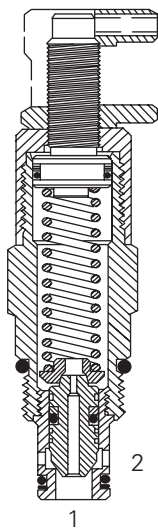
### Description

The RV3-10 is a direct acting, differential area, poppet type, screw-in cartridge relief valve.

### Functional Symbol



### Sectional View



### Operation

This valve remains closed from port 2 to port 1 until the predetermined setting has been reached at port 2. The poppet is unseated and allows flow out of port 1.

### RATINGS AND SPECIFICATIONS

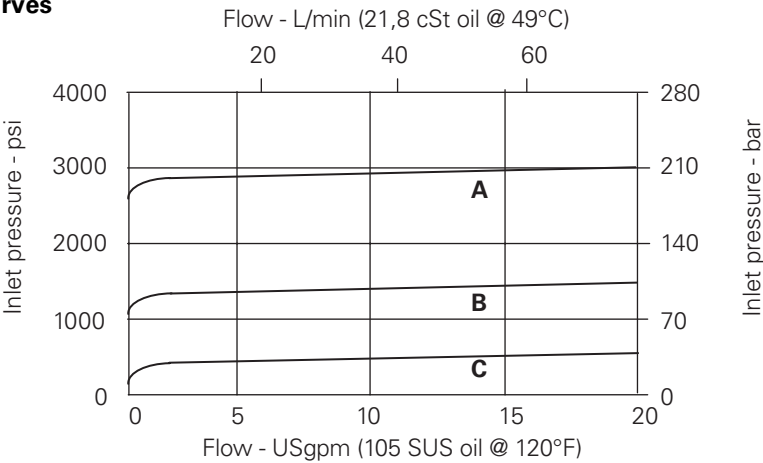
<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
Typical application pressure (all ports)	250 bar (3600 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	76 L/min (20 USgpm)
Internal leakage	5 drops/min @ 85% of Pressure Setting
Cavity	C-10-2
Standard housing materials	Aluminum or steel
Temperature range	-40° to 120°C (-40° to 248°F)
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Weight cartridge only	0,22 kg. (0.48 lbs.)
Seal kits	- RV3 565803 Buna-N 566086 Viton® - RV3A (with double backup rings) 565806 Buna-N 889627 Viton®

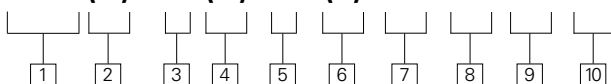
Viton is a registered trademark of E.I. DuPont

### Pressure Override Curves

Cartridge only  
Tank pressure = 0

- A - 36 spring
- B - 18 spring
- C - 6 spring



**RV3 (A) – 10 (V) – \* – (\*) – \*\* – \*\* / \*\* – 00****1 Function****RV3** - Relief valve**2 Cage seals**

**Blank** - Single backup ring  
**A** - 1/2 thickness backup ring on each side of O-ring (for cross port relief applications)

**3 Size****10** - 10 Size**4 Seals**

**Blank** - Buna-N  
**V** - Viton®

**5 Adjustment**

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

**6 Valve housing material**

**Blank** - Aluminum  
**S** - Steel

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

CODE	PORT SIZE	HOUSING NUMBER		
		Aluminum Light duty	Aluminum Fatigue rated	Steel Fatigue rated
<b>3B</b>	3/8" BSPP	02-175462	—	—
<b>2G</b>	1/4" BSPP	—	876702	02-175102
<b>3G</b>	3/8" BSPP	—	876703	02-175103
<b>6H</b>	SAE 6	—	876700	—
<b>8H</b>	SAE 8	—	876701	—
<b>6T</b>	SAE 6	566151	—	02-175100
<b>8T</b>	SAE 8	—	—	02-175101
<b>H10H</b>	SAE 10*	—	4997062-001	—
<b>2K10H</b>	SAE 10**	—	4997060-001	—

\* Bolt on, dual cross over relief valve package for **Eaton H or T series motors**\*\* Bolt on, dual cross over relief valve package for **Eaton 2000 series motors**

(Note: Two cartridges are installed in this special housing, both are set to the same crack pressure specified in model code position 9, maximum allowed setting is 210 bar (3000 psi), only available with RV3A option and aluminum housing.)

See section J for housing details.

**8 Cracking pressure range**

- 3** - 3,5-20 bar (50-300 psi)  
**6** - 7-41 bar (100-600 psi)  
**9** - 14-62 bar (200-900 psi)  
**18** - 20-124 bar (300-1800 psi)  
**36** - 41-250 bar (600-3600 psi)

**9 Setting pressure**

Within ranges in **8**  
**Blank** - Normal factory setting at approximate mid-range. User requested settings in 3,45 bar (50 psi) steps, coded as in the following examples:  
**10** - 70 bar (1000 psi)  
**10.5** - 72,4 bar (1050 psi)

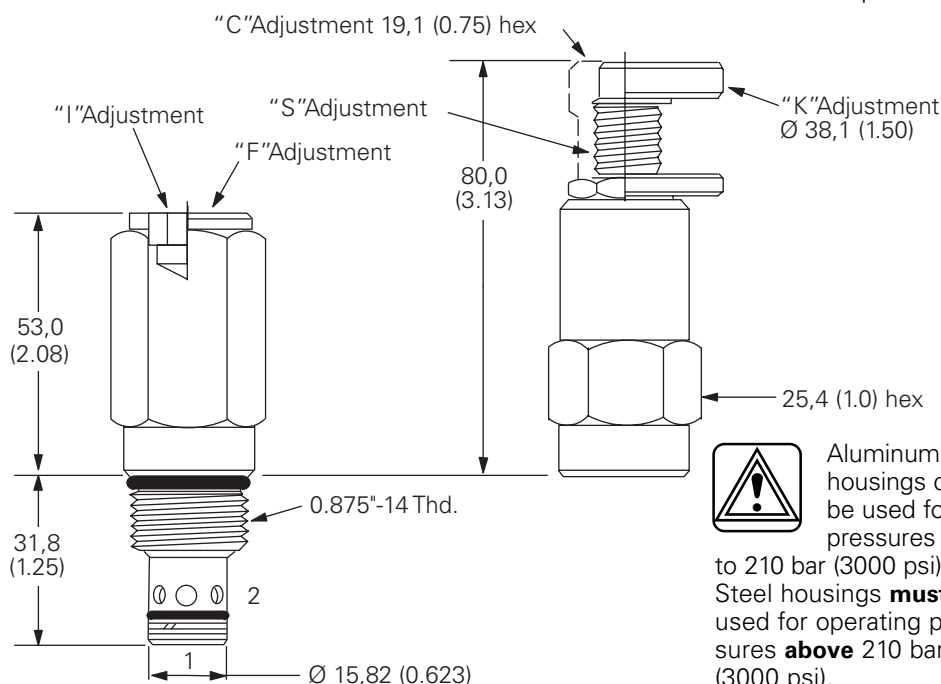
**Special features**

**00** - None  
 (Only required if valve has special features, omitted if "00")  
**SS** - 316 Stainless Steel external components

**Dimensions**

mm (inch)

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



**EAT•N**

| **Vickers**



# Flow Controls

## Section introduction

This section gives basic specifications for the complete line of Vickers threaded 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

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

- Products in this catalog have been Fatigue tested to one million cycles at 132% or 10 million cycles at 115% of rated pressure.
- 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 and FDC11) with flows rated to 568 L/min (150 USgpm).
- Posi-traction valves (FDC13) 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/FDC11

The FDC\*1 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: FDC\*1-10-\*–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 FDC\*1-\*\*\* 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/FDC13

The FDC\*3 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.

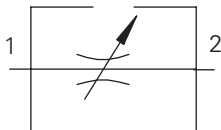
# NV1-10

Needle valve

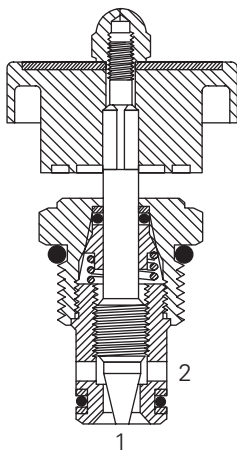
### Description

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

### Functional Symbol



### Sectional View



### 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

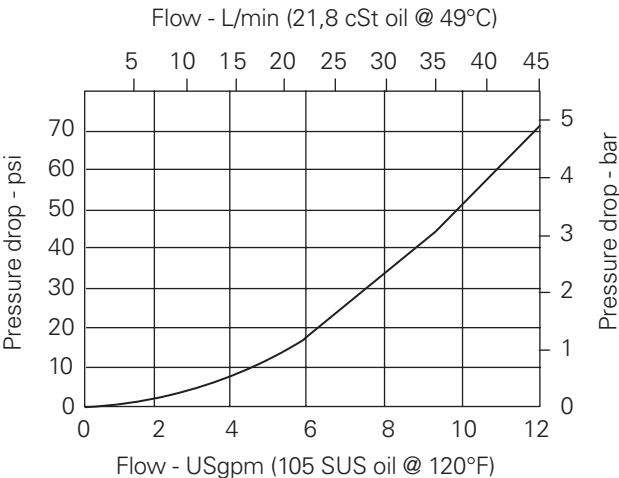
<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	45 L/min (12 USgpm)
Internal leakage	5 drops/min. maximum @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Cavity	C-10-2
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®

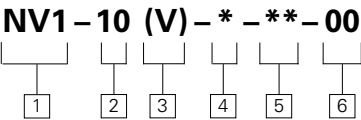
Viton is a registered trademark of E.I. DuPont

### Pressure Drop Curve

Cartridge only

Fully open port 1 to port 2  
or port 2 to port 1





**1 Function**  
NV1 – Needle valve

**2 Size**  
10 – 10 Size

**3 Seals**  
Blank– Buna-N  
V – Viton®

**4 Style**  
K – Knob (black)  
R – Knob (red)

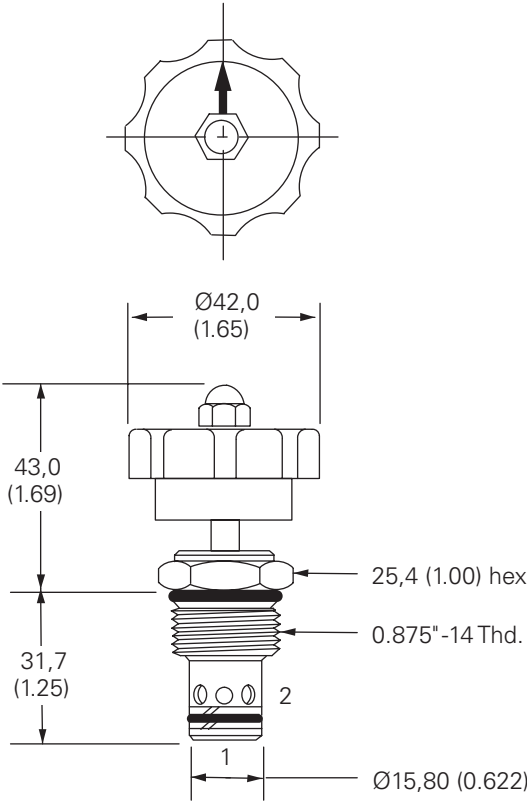
**5 Port size**  
0 – Cartridge only

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
3G	SAE 8	–	876701

See section J for housing details.

**6 Special features**  
00 – None  
(Only required if valve has special features, omitted if "00")

**Dimensions**  
mm (inch)  
  
Torque cartridge in  
aluminum housing  
47–54 Nm (35–40 ft.lbs)



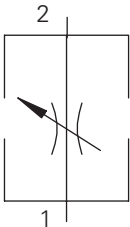
# FCV11-12

Flow control valve

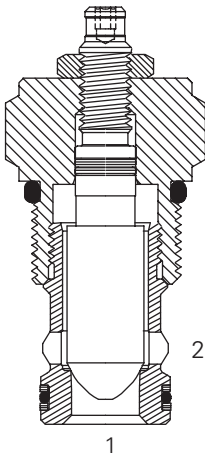
## Description

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

## Functional Symbol



## Sectional View



## 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)*

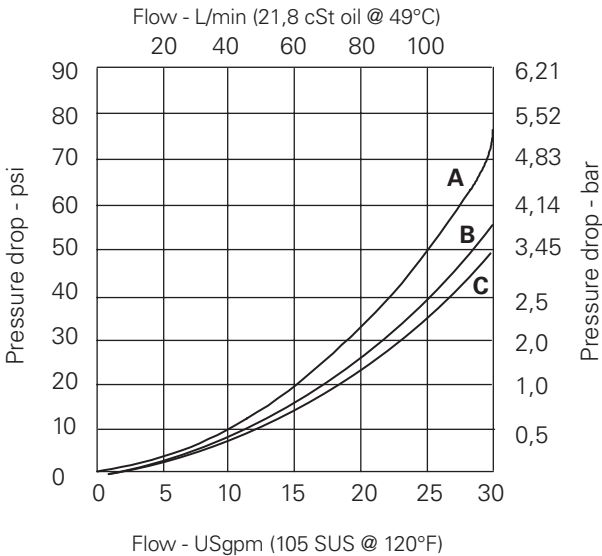
Typical application pressure	350 bar (5000 psi) Port "1" to "2" 210 bar (3000 psi) Port "1" to "2"
Cartridge fatigue pressure (infinite life)	350 bar (5000 psi)
Rated flow	114 L/min (30 USgpm)
Internal leakage	less than 5 drops / min. max. @210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Cavity	C-12-2 or C-12-2U
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

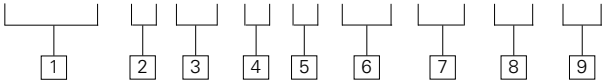
## Pressure Drop Curve

Cartridge only

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



FCV11-12 (V)-S-\*-\*\*\*-(U)-NV-00



- 1 Function

FCV11 – Flow control valve
- 2 Size

12 – 12 Size
- 3 Seals

Blank– Buna-N  
V – Viton®
- 4 Adjustment

S – Screw  
K – Knob
- 5 Valve housing material

Blank – No body  
S – Steel  
A – Aluminum

**Dimensions**  
mm (inch)

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

6 Port size

0 – 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(U)	SAE 10	02–160641	02–160640	02–169817	02–169744
12T(U)	SAE 12	02–160645	02–160644	02v169790	02–169782
4G(U)	1/2" BSPP	02–161116	02–161118	02–172512	02–172062
6G(U)	3/4" BSPP	02–161115	02–161117	02–162922	02–169665

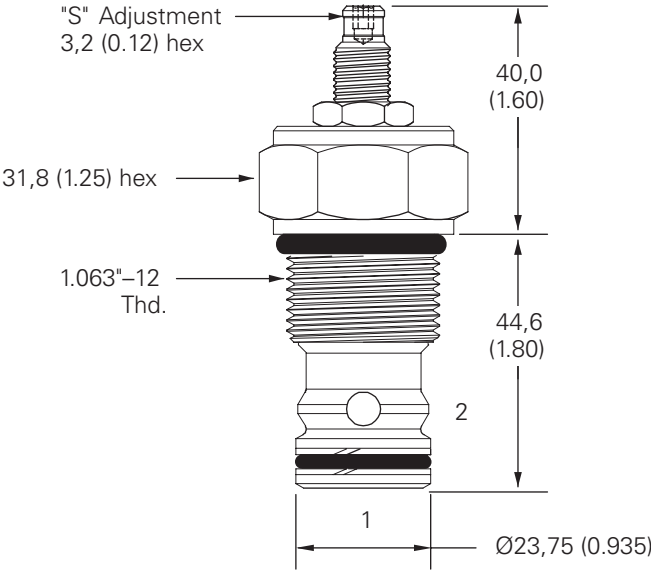
See section J for housing details.  
Note: C-12-2U housings have undercut for improved flow.


- 7 Cavity

Blank – Cavity without undercut  
U – Cavity with undercut
- 8 Valve type

NV – Needle Valve (Adjustable)
- 9 Special features

00 – None  
(Only required if valve has special features, omitted if "00") housings can be



 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)

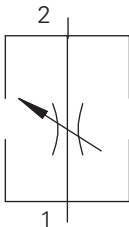
# FCV6-16

Flow control valve

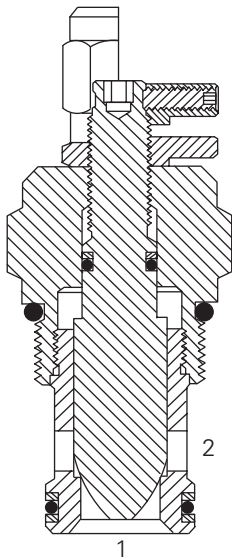
## Description

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

## Functional Symbol



## Sectional View



## 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)*

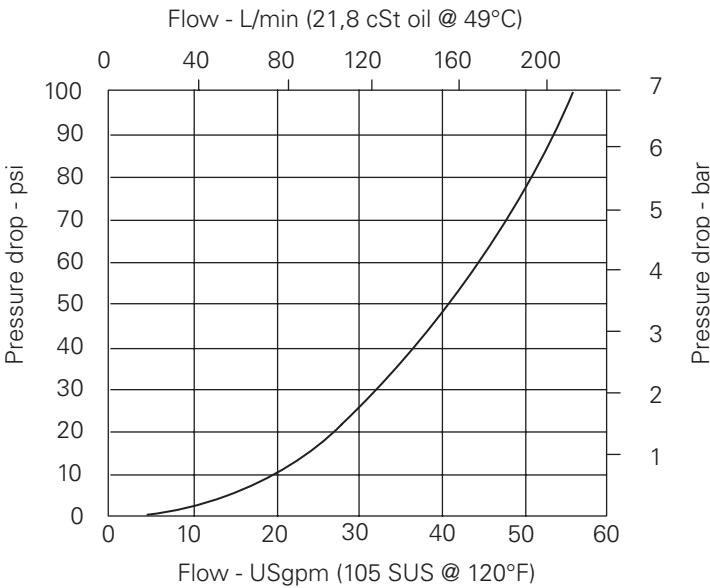
Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	208 L/min (55 USgpm)
Internal leakage	Port 2 to 1; <5 drops/min maximum @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Cavity	C-16-2
Fluids	All general 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

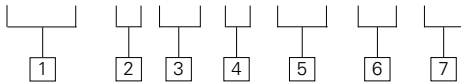
## Pressure Drop Curve

Cartridge only

Full open port 1 to port 2  
or port 2 to port 1



FCV6-16 (V) - \* - \*\*\* - NV - 00



**1** Function  
FCV6 – Flow control valve

**2** Size  
16 – 16 Size

**3** Seals  
Blank– Buna-N  
V – Viton®

**4** Style  
C – Cap  
K – Knob  
S – Screw

**5** Port size  
0 – 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 section J for housing details.

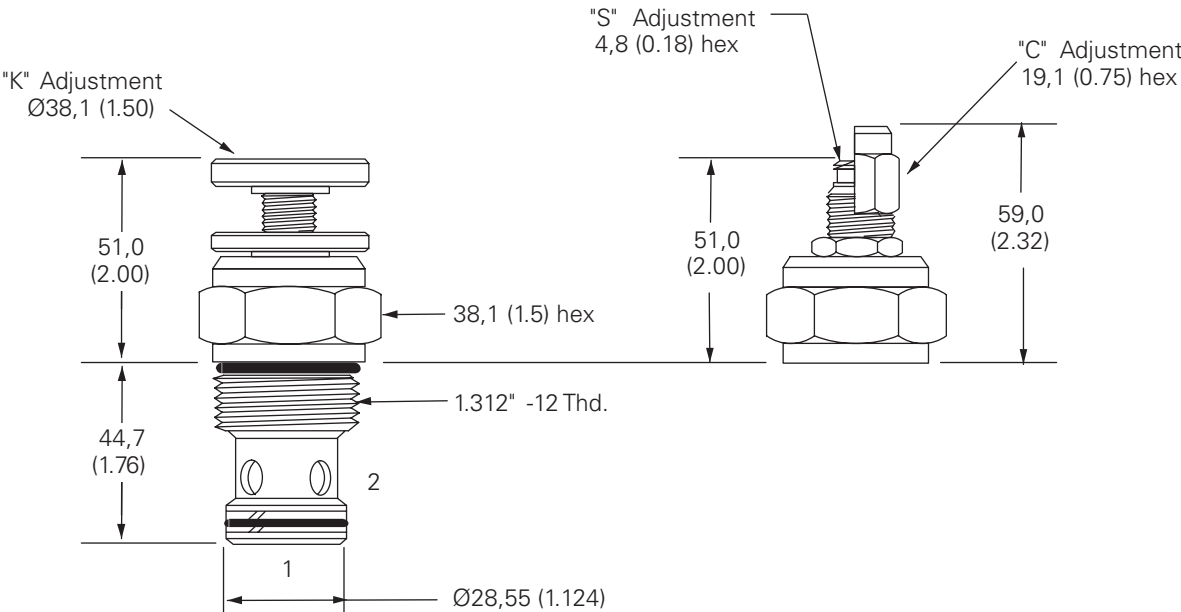
**6** Controlled flow option  
NV – Needle valve

**7** Special features  
00 – None  
(Only required if valve has special features, omitted if "00")

Dimensions

mm (inch)

Torque cartridge in  
aluminum housing to  
108-122 Nm (80-90 ft.lbs)



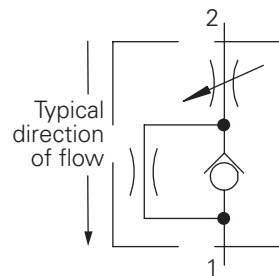
# NV1-16

Needle valve

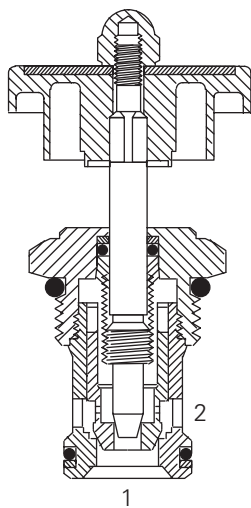
### Description

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

### Functional Symbol



### Sectional View



### Application Note

The valve is not intended for use at low flows, may chatter below 10 L/min (2.5 gpm)

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

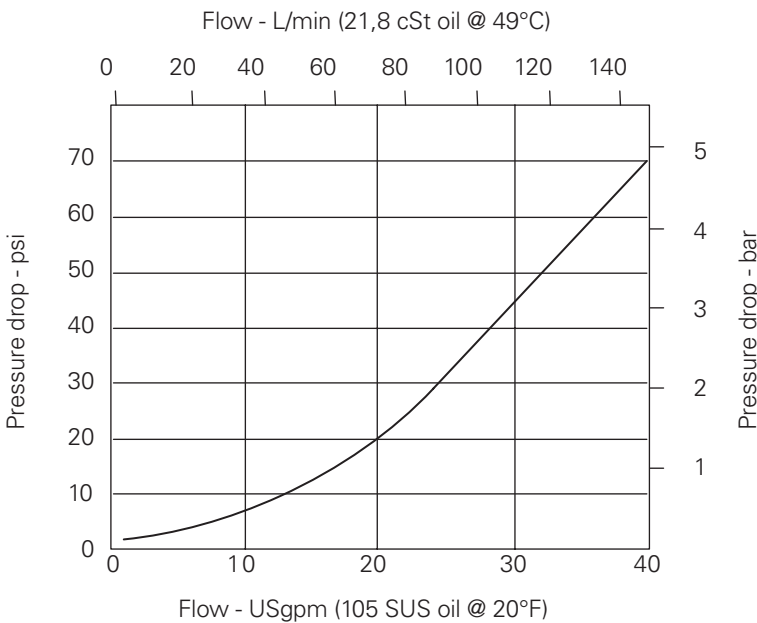
Filtration	Cleanliness code 18/16/13
Standard housing materials	Aluminum
Weight cartridge only	0,34 kg. (0.76 lbs.)
Seal kits	565810 Buna-N 889609 Viton®

Viton is a registered trademark of E.I. DuPont

### Pressure Drop Curve

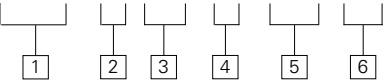
Cartridge only

Full open port 2 to port 1





NV1 – 16 (V) – K – \*\*\* – 00



**1 Function**  
NV1 – Needle valve

**2 Size**  
16 – 16 Size

**3 Seals**  
Blank– Buna-N  
V – Viton®

**4 Style**  
K – Knob (black)  
R – Knob (red)

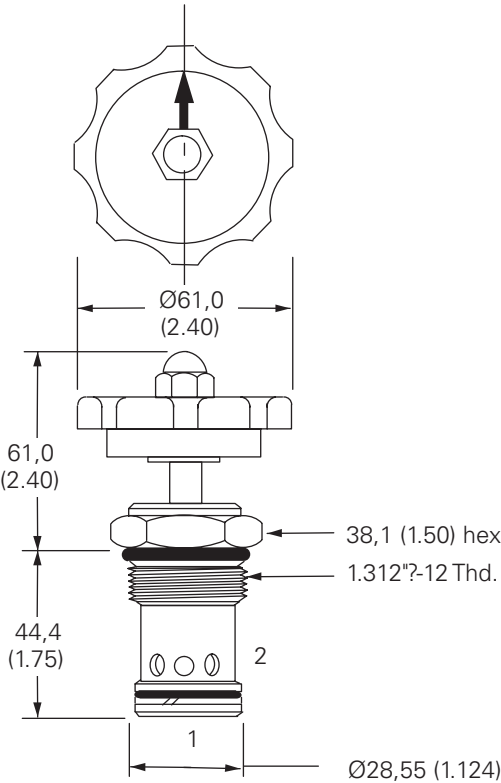
**5 Port size**  
0 – Cartridge only

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
12G	SAE 12	–	566113

See section J for housing details.

**6 Special features**  
00 – None  
(Only required if valve has special features, omitted if "00".)

**Dimensions**  
mm (inch)  
Torque cartridge in  
aluminum housing  
108–122 Nm (80–90 ft.lbs)



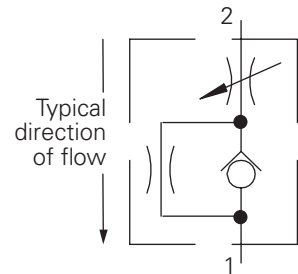
# NV1-20

Needle valve

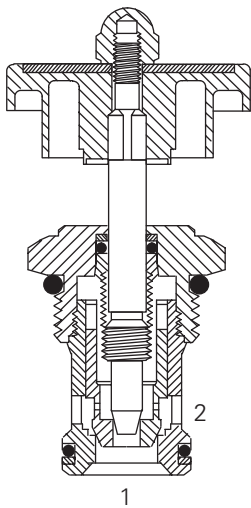
### Description

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

### Functional Symbol



### Sectional View



### Application Note

The valve is not intended for use at low flows, may chatter below 10 L/min (2.5 gpm)

### 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 restricted.

### RATINGS AND SPECIFICATIONS

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

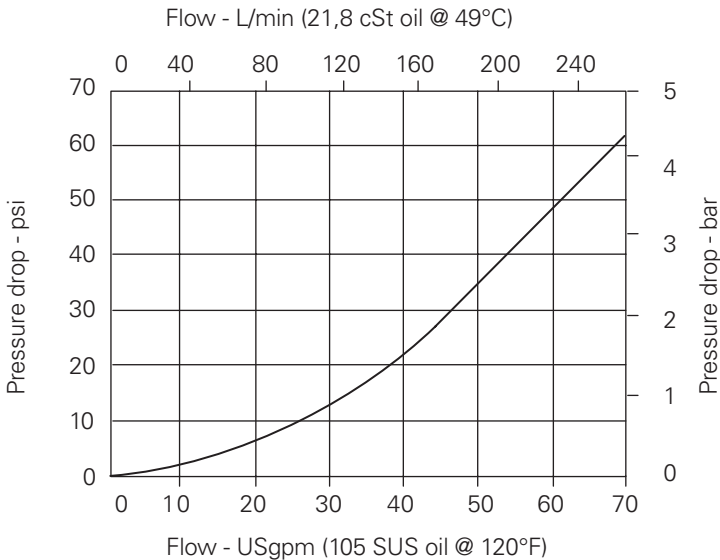
Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	265 L/min (70 USgpm)
Internal leakage	5 drops/min. maximum @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Cavity	C-20-2
Fluids	All general purpose 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

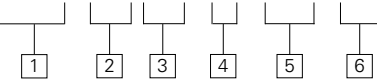
### Pressure Drop Curve

Cartridge only

Full open port 2 to port 1.



NV1-20 (V) - \* - \*\*\* - 00



1 Function  
NV1 – Needle valve

2 Size  
20 – 20 Size

3 Seals  
Blank– Buna-N  
V – Viton®

4 Style  
K – Knob (black)  
R – Knob (red)

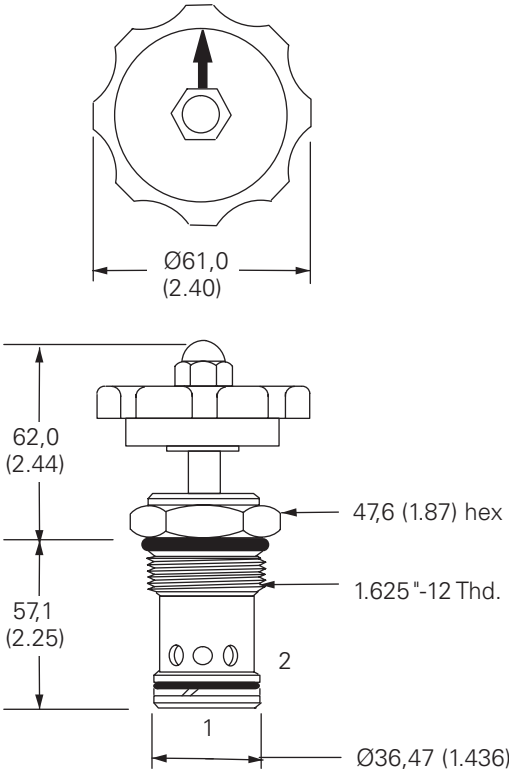
5 Port size  
0 – Cartridge only

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 section J for housing details.

6 Special features  
00 – None  
(Only required if valve has  
special features, omitted  
if "00")

Dimensions  
mm (inch)  
Torque cartridge in  
aluminum housing  
128–155 Nm (95–115 ft.lbs)



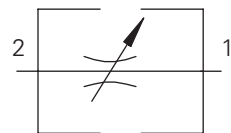
# MRV2-10

Manual rotary flow control valve

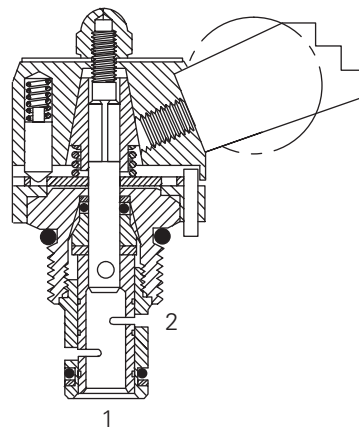
## Description

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

## Functional Symbol



## Sectional View



## Operation

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

## RATINGS AND SPECIFICATIONS

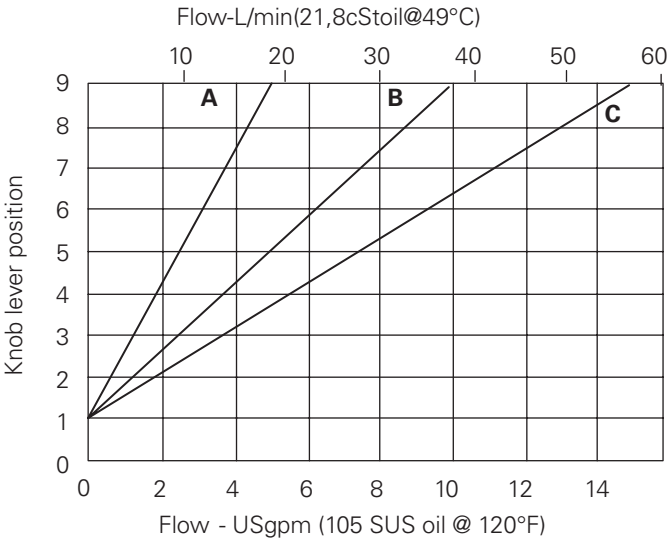
Typical application pressure (all ports)	210 bar (3000 psi)
Rated flow	05 – 0-18,9 L/min (0-5 USgpm) 10 – 0-37,8 L/min (0-10 USgpm) 15 – 0-56,7 L/min (0-15 USgpm)
Internal leakage	164 cm <sup>3</sup> /min. (10 in <sup>3</sup> /min) maximum 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
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
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®

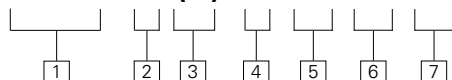
\*Light duty housings only  
Viton is a registered trademark of E.I. DuPont

## Pressure Drop Curve

Cartridge only  
@ 5,5 bar (80 psi)  
pressure drop

Rated flow  
(See model code  
position 6)  
A - 05  
B - 10  
C - 15



**MRV2-10 (V) - \* - \*\* - \*\* - 00****1 Function****MRV2** – Manual rotary valve**2 Size****10** – 10 Size**3 Seals****Blank**– Buna-N  
**V** – Viton®**4 Adjustment**

**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****0** – Cartridge only

CODE	PORT SIZE	HOUSING NUMBER	
		Aluminum Light duty	Aluminum Fatigue rated
<b>3B</b>	3/8" BSPP	02-175462	–
<b>6T</b>	SAE 6	566151	–
<b>2G</b>	1/4" BSPP	–	876702
<b>3G</b>	3/8" BSPP	–	876703
<b>6H</b>	SAE 6	–	876700
<b>8H</b>	SAE 8	–	876701

See section J for housing details.

**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)**7 Special features****00** – None

(Only required if valve has special features, omitted if "00")

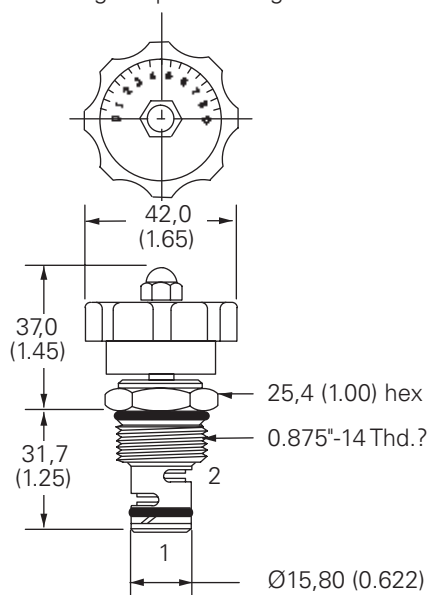
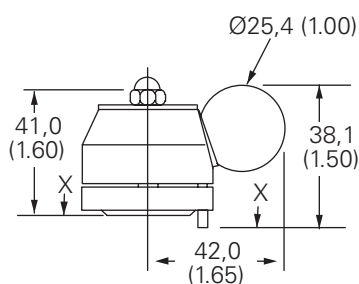
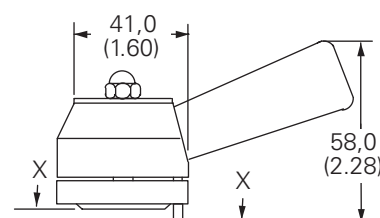
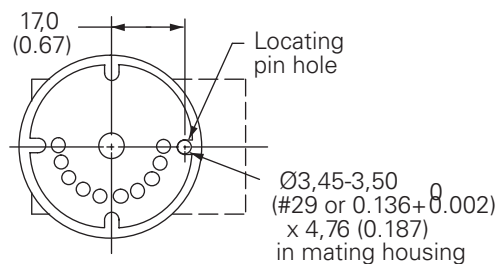
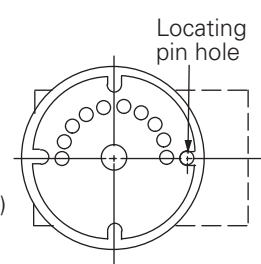
**SS** – 316 Stainless Steel external components**Dimensions**

mm (inch)

Torque cartridge in aluminum housing 47–54 Nm (35–40 ft.lbs)

**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**

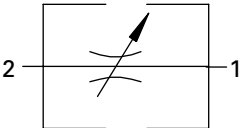
# MRV2-16

Manual rotary valve

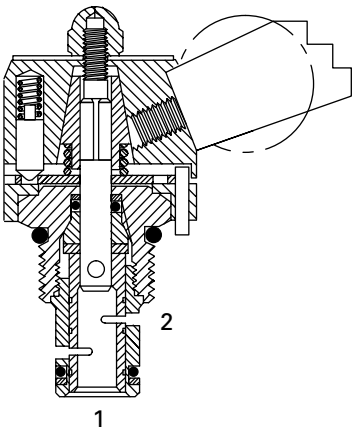
**Description**

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

Functional Symbol



Sectional View



**Operation**

This valve will increase or decrease flow by changing the variable orifice with the rotary adjustment.

Recommended flow path is 2 to 1.

RATINGS AND SPECIFICATIONS		
<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>		
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 <sup>3</sup> /min. (5 in <sup>3</sup> /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) Light duty housings only
Cavity		C-16-2
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		565810 Buna-N 889609 Viton® Viton is a registered trademark of E.I. DuPont

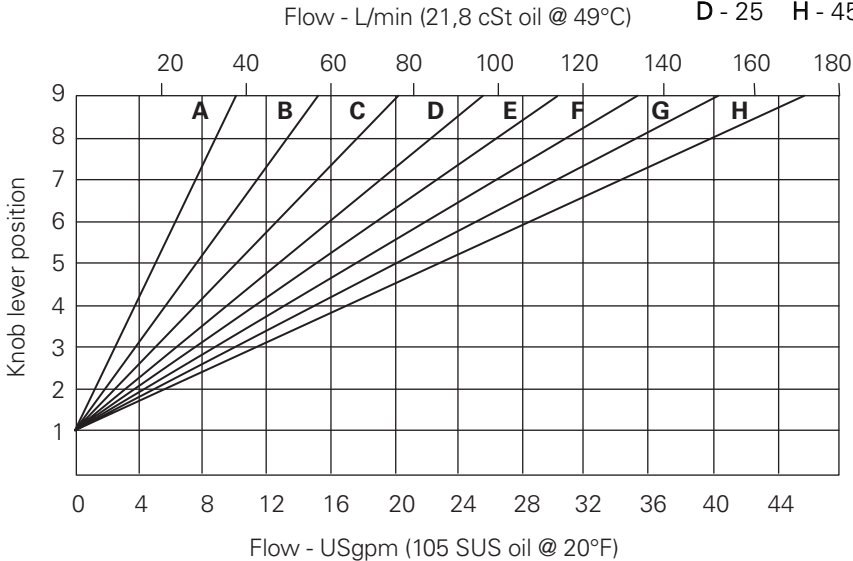
**Pressure Drop Curve**

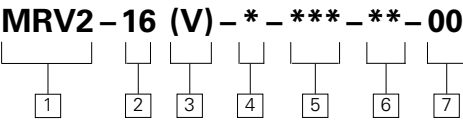
Cartridge only

@ 5,5 bar (80 psi) pressure drop

Rated flow  
(See model code position 6)

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





- 1

Function

MRV2 – Manual rotary valve
- 2

Size

16 – 16 Size
- 3

Seals

Blank– Buna-N  
V – Viton®
- 4

Adjustment

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

5

Port size

0 – 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 section J for housing details.

- 6

Max flow ranges (nominal)

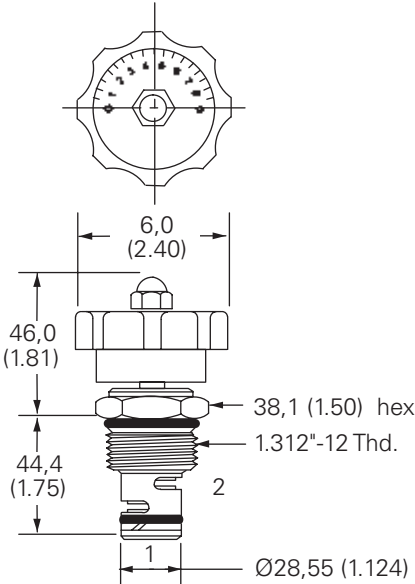
10 – 0-37,8 L/min  
(0-10 USgpm)  
15 – 0-56,7 L/min  
(0-15 USgpm)  
20 – 0-75,7 L/min  
(0-20 USgpm)  
25 – 0-94,6 L/min  
(0-25 USgpm)  
30 – 0-113,5 L/min  
(0-30 USgpm)  
35 – 0-132,4 L/min  
(0-35 USgpm)  
40 – 0-151,4 L/min  
(0-40 USgpm)  
45 – 0-170,3 L/min  
(0-45 USgpm)
- 7

Special features

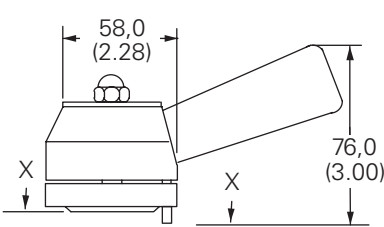
00 – None  
(Only required if valve has special features, omitted if "00".)

**Dimensions**  
mm (inch)  
Torque cartridge in aluminum housing 108–122 Nm (80–90 ft.lbs)

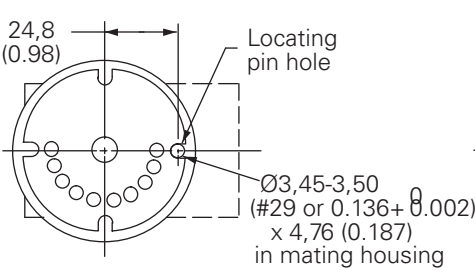
MRV2-16-K Knob Operated



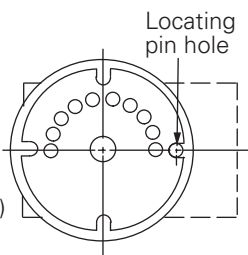
MRV2-16-D/L Models



MRV2-16-D Models



MRV2-16-L Models



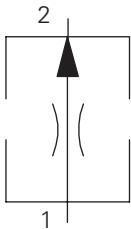
# FR5-8

Flow regulator, fixed

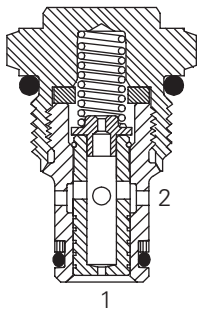
**Description**

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

**Functional Symbols**



**Sectional View**



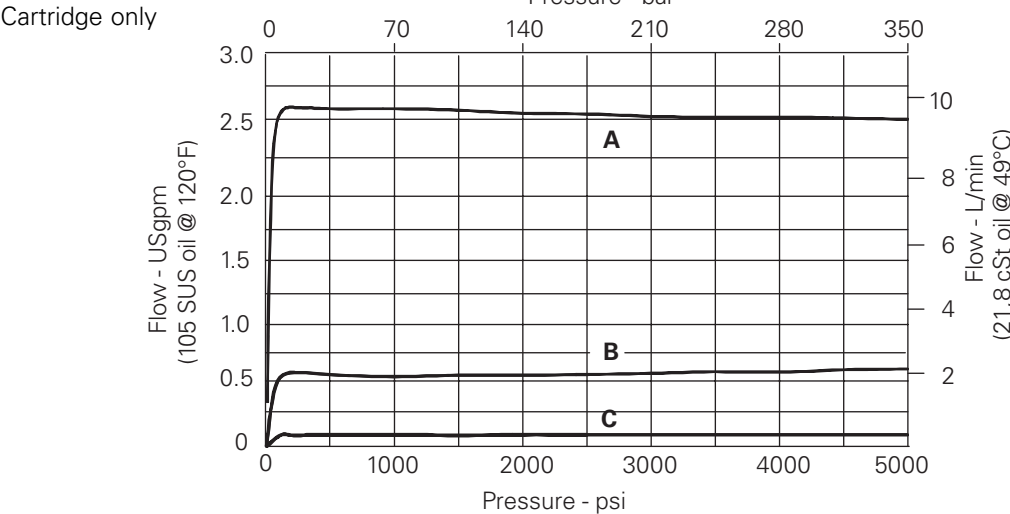
- A – 9,5 L/min (2.5 USgpm)
- B – 1,9 L/min (0.5 USgpm)
- C – 0,38 L/min (0.1 USgpm)

**Operation**

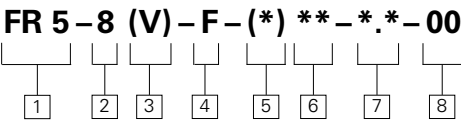
This valve maintains a constant flow from port 1 to port 2. Reverse flow from port 2 to port 1 is at the value of the fixed orifice and is non-pressure compensated.

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
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**







- 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

0 – 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 section J for housing details.

- 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/min (0.5 USgpm)
- 8

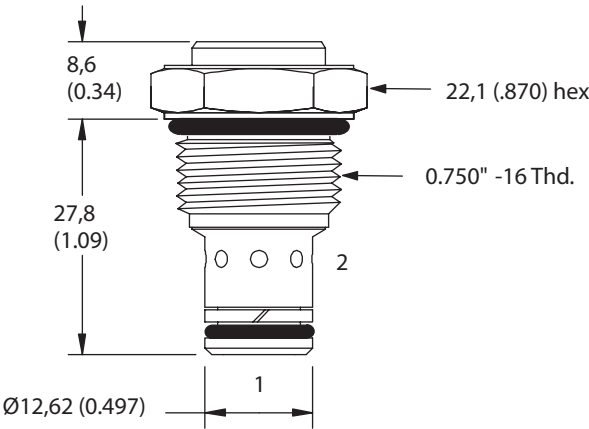
Special features


00 – None  
(Only required if valve has  
special features, omitted  
if "00")  
SS – 316 Stainless Steel  
external components

F

Dimensions  
mm (inch)

Torque cartridge in steel or  
aluminum housing to  
34-41 Nm (25-30 ft.lbs)



 Aluminum hous-  
ings can be used  
for pressures up to  
210 bar (3000 psi)  
Steel housings **must** be used  
for operating pressures **above**  
210 bar (3000 psi)

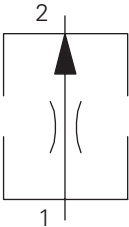
# FR1-16

Flow regulator, fixed

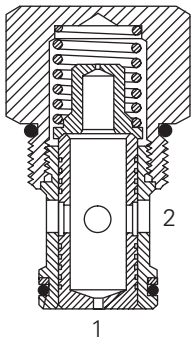
**Description**

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

Functional Symbol



Sectional View



**Operation**

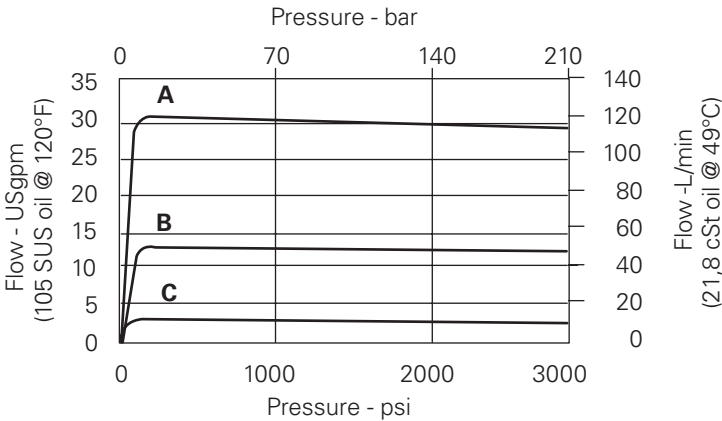
This valve maintains a constant flow from port 1 to port 2 based on 5.5 bar (80 psid) regardless of pressure changes downstream on port 2. Reverse flow from port 2 to port 1 is at the value of the fixed orifice and is non-pressure compensated.

RATINGS AND SPECIFICATIONS	
<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
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
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	

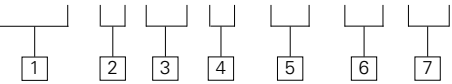
**Typical Flow Regulation**

Cartridge only

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



FR 1 – 16 (V) – F – \*\*\* – \*. \* – 00



- 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

0 – 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

- 6

Factory set flow rate,  
nominal

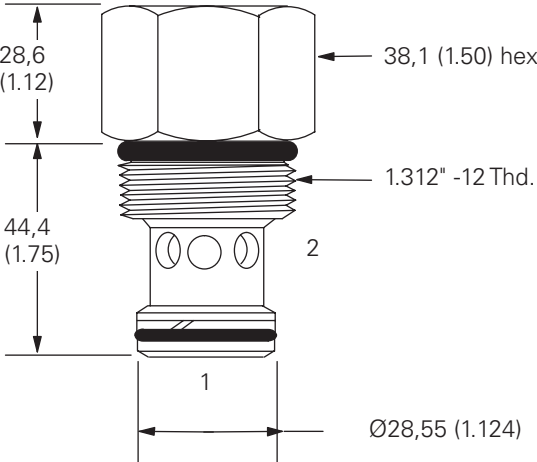
(Specify in USgpm)  
Range 1,9–114 L/min  
(0.5–30 USgpm)
- 7

Special features

00 – None  
(Only required if valve has  
special features, omitted  
if "00")

F

Dimensions  
mm (inch)  
Torque cartridge in  
aluminum housing to  
108-122 Nm (80-90 ft.lbs)



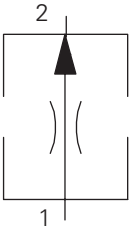
# FR1-20

Flow regulator, fixed

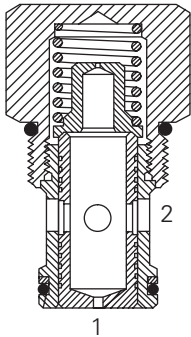
**Description**

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

Functional Symbol



Sectional View



**Operation**

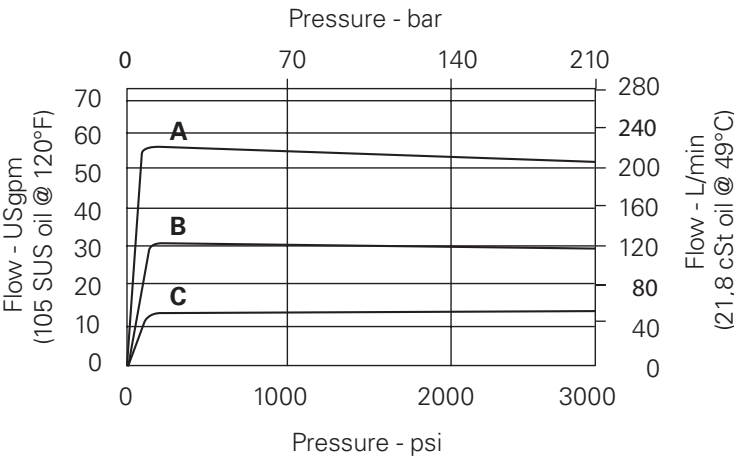
This valve maintains a constant flow from port 1 to port 2. Reverse flow from port 2 to port 1 is at the value of the fixed orifice and is non-pressure compensated.

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
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	

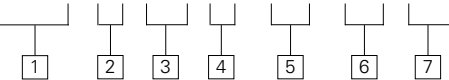
**Typical Flow Regulation**

Cartridge only

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



FR 1-20 (V)-F-\*\*\*-\*.\*-00



- 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

0 – 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

- 6

Factory set flow rate,

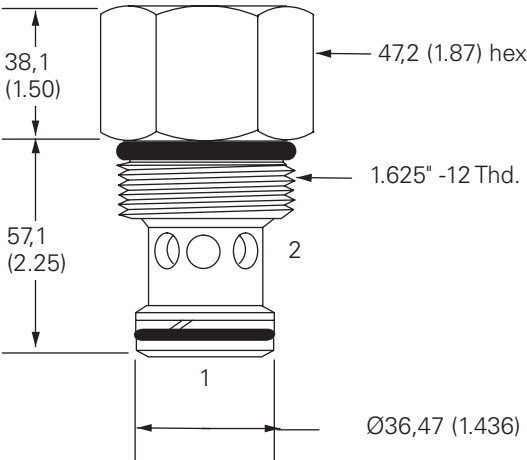
(Specify in USgpm)  
Range 3,8 – 227 L/min  
(0.1 – 60 USgpm)
- 7

Special features

00 – None  
(Only required if valve has  
special features, omitted  
if "00")

F

Dimensions  
mm (inch)  
Torque cartridge in  
aluminum housing to  
128-155 Nm (95-115 ft.lbs)



FR2-16

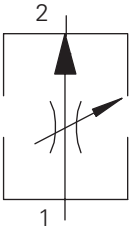
Flow regulator, adjustable

Description

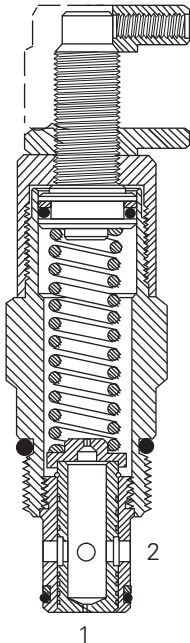
The FR2-16 is a limited range adjustable\*, pressure compensated, screw-in flow regulator cartridge valve.

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

Functional Symbol



Sectional View



Operation

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

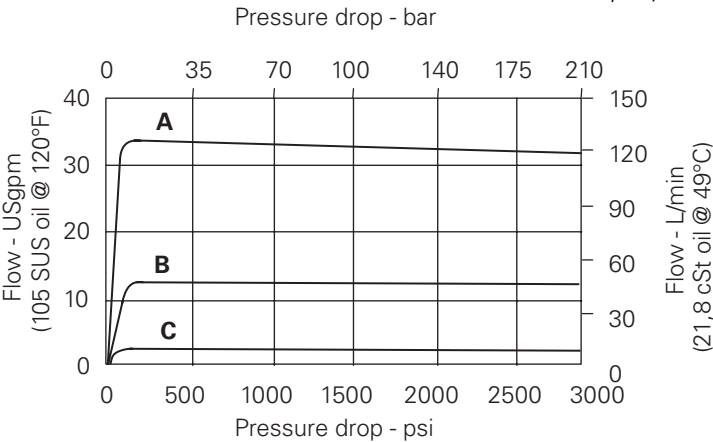
RATINGS AND SPECIFICATIONS

<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
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%
<small>Factory set maximum flow rate accuracy under standard test conditions and within the above ranges</small>	
Temperature range	–40° to 120°C (–40° to 248°F)
Cavity	C–16–2
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®
<small>Viton is a registered trademark of E.I. DuPont</small>	

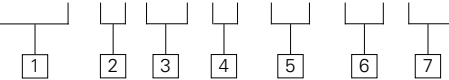
Typical Flow Regulation

Cartridge only

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



FR 2 – 16 (V) – \* – \*\*\* – \*. \* – 00



- 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

Y – Knob (Stainless)

5 Port size

0 – 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	–	876713

- 6 Factory set flow rate,  
(Specify in USgpm)  
Range 1,9–114 L/min  
(0.5–30 USgpm)
- 7 Special features

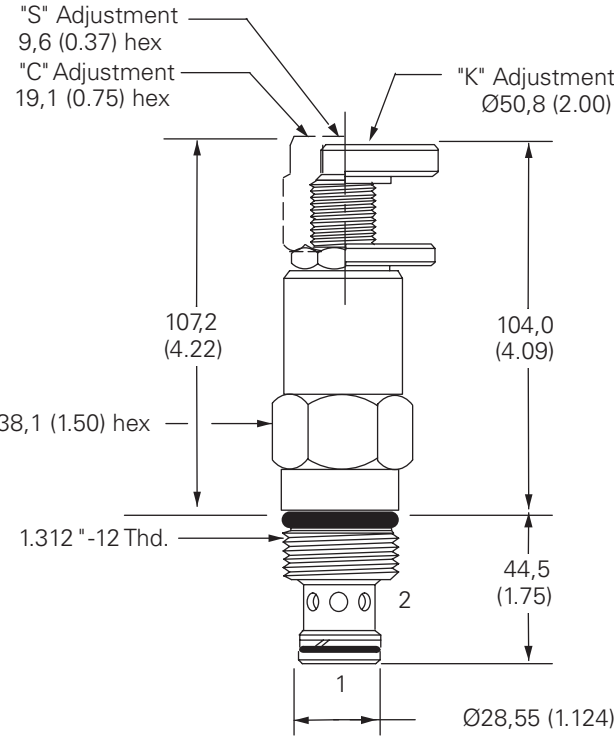
00 – None  
(Only required if valve has  
special features, omitted  
if "00")

SS - 316 Stainless Steel  
external components

See section J for housing details.

Dimensions  
mm (inch)

Torque cartridge in  
aluminum housing to  
108-122 Nm (80-90 ft.lbs)



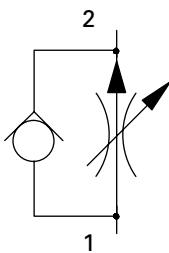
# FAR1-10

Flow regulator, pressure compensated, fully adjustable

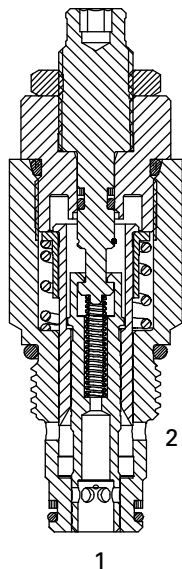
## Description

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

## Functional Symbol



## Sectional View



## 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%

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

Reverse check crack pressure 1.7 bar (25 psi)

Leakage at shutoff position 0.4 L/min (24.4 in<sup>3</sup>/min)

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

Cavity C–10–2

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.)

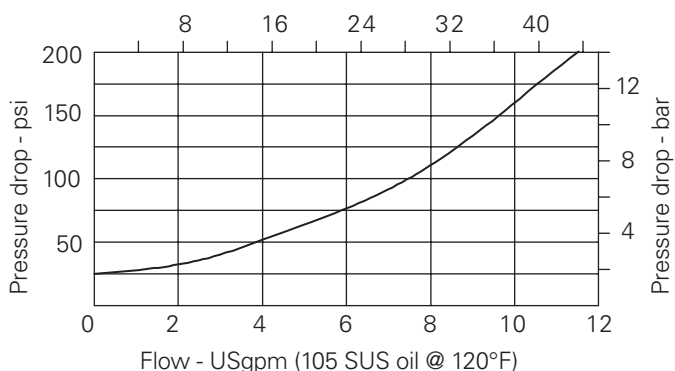
Seal kits 565803 Buna–N  
566086 Viton®

Viton is a registered trademark of E.I. DuPont

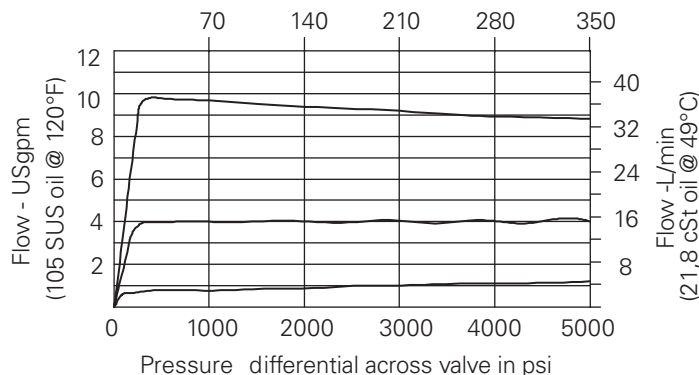
## Typical Flow Regulation

Cartridge only

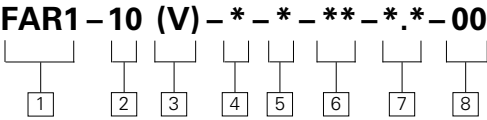
PRESSURE DROP FOR REVERSE FLOW  
Flow - L/min (21,8 cSt oil @ 49°C)



TYPICAL FLOW REGULATION  
Pressure differential across valve in bar







- 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

6

Port size

0 – 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 section J for housing details.

- 7

Factory set flow rate,

Blank – Normal factory setting at 5 USgpm  
User requested setting within .25–10 US gpm (1–38 L/min.)
- 8

Special features

00 – None  
(Only required if valve has special features, omitted if "00")

- 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).

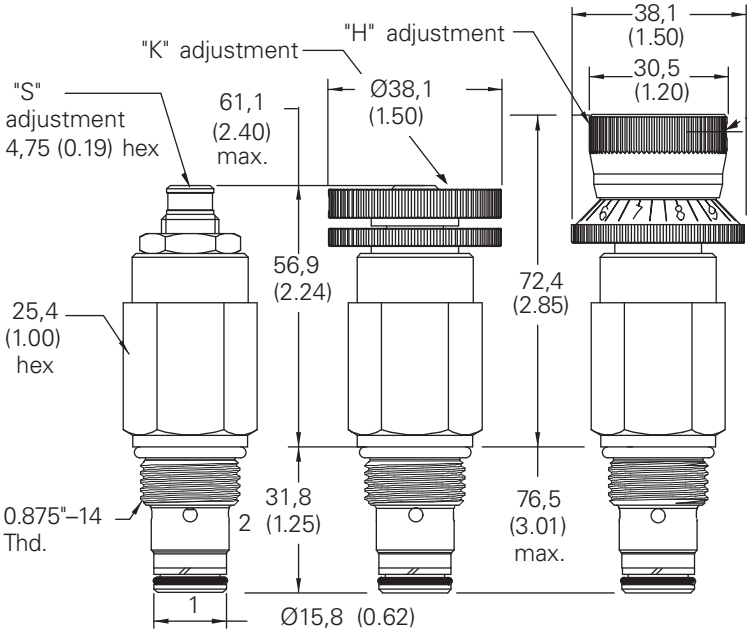
4. At the new adjusting screw position, tighten jamnut firmly while holding the knob steady, or move the knob along axis slightly.

5. Tighten the set screw firmly.

**Dimensions**  
mm (inch)

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

"K" adjustment kit – 565585



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)

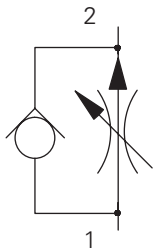
# FAR1-12

Flow regulator, pressure compensated, fully adjustable

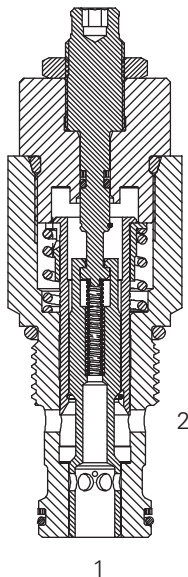
## Description

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

## Functional Symbol



## Sectional View



## 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

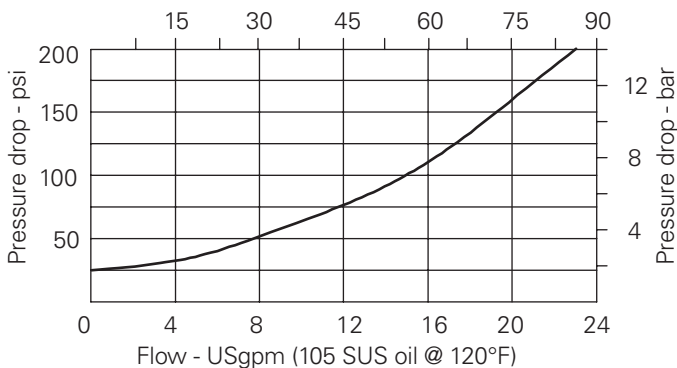
Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)

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 <small>Factory set maximum flow rate accuracy under standard test conditions and within the above ranges</small>
Reverse check crack pressure	1,7 bar (25 psi)
Leakage at shutoff position	0,5 L/min (30 in <sup>3</sup> /min)
Temperature range	–40° to 120°C (–40° to 248°F)
Cavity	C–12–2 & C–12–2U
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 (0.95 lbs.)
	Seal kits 02–181304 Buna-N 02–181305 Viton® <small>Viton is a registered trademark of E.I. DuPont</small>

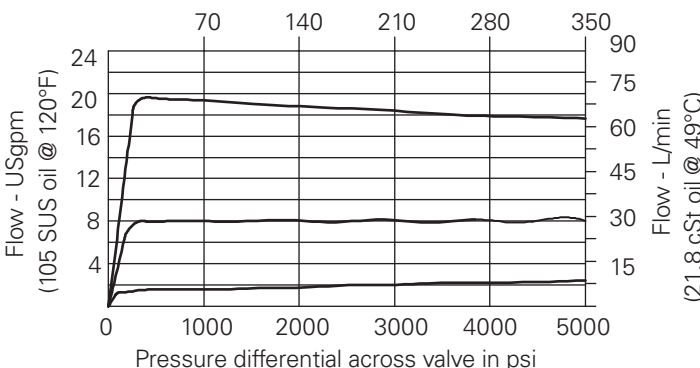
## Typical Flow Regulation

Cartridge only

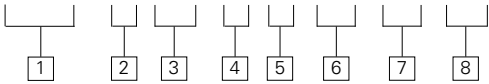
PRESSURE DROP FOR REVERSE FLOW  
Flow - L/min (21,8 cSt oil @ 49 °C)



TYPICAL FLOW REGULATION  
Pressure differential across valve in bar



FAR1-12 (V) - \* - \* - \*\* - \* . \* - 00



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

6 Port size

0 – Cartridge only

CODE PORT SIZE HOUSING NUMBER

		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(U)	SAE 10	02-160641	02-160640	02-169817	02-169744
12T(U)	SAE 12	02-160645	02-160644	02-169790	02-169782
4G(U)	1/2" BSPP	02-161116	02-161118	02-172512	02-172062
6G(U)	3/4" BSPP	02-161115	02-161117	02-162922	02-169665

See section J for housing details.

7 Factory set flow rate,

Blank – Normal factory setting at 10 USgpm  
User requested setting  
Within .04–25 US gpm  
(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  
350bar (5000 psi)

8 Special features

00 – None  
(Only required if valve has  
special features, omitted  
if "00".)

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.



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)

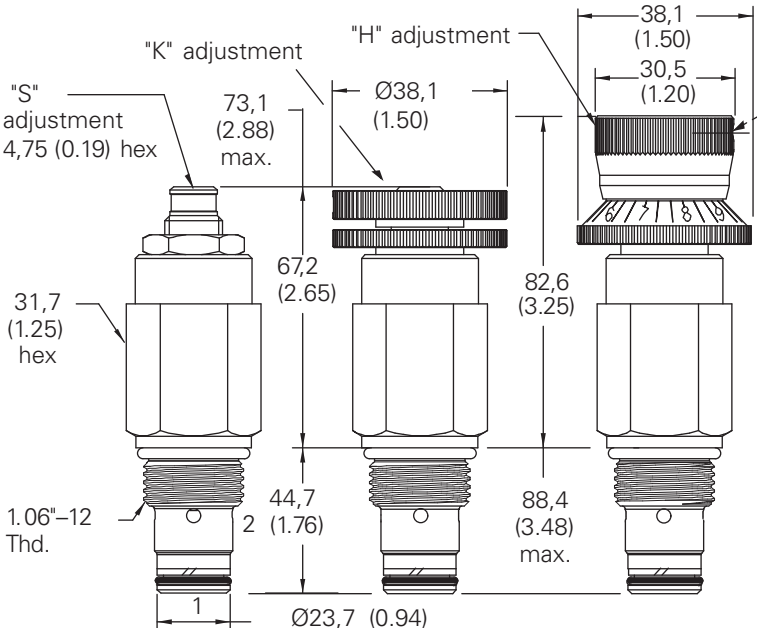
Dimensions

mm (inch)

Torque cartridge in housing

A – 81–95 Nm  
(60–70 ft.lbs)  
S – 102–115 Nm  
(75–85 ft.lbs)

"K" adjustment kit – 565585



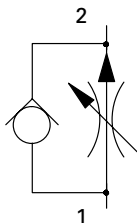
# FAR1-16

Flow regulator, pressure compensated, fully adjustable

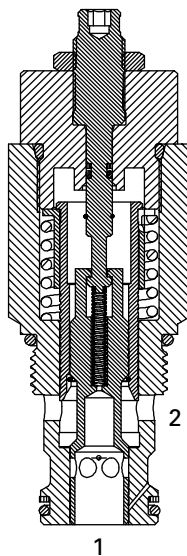
## Description

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

## Functional Symbol



## Sectional View



## 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 L/min (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

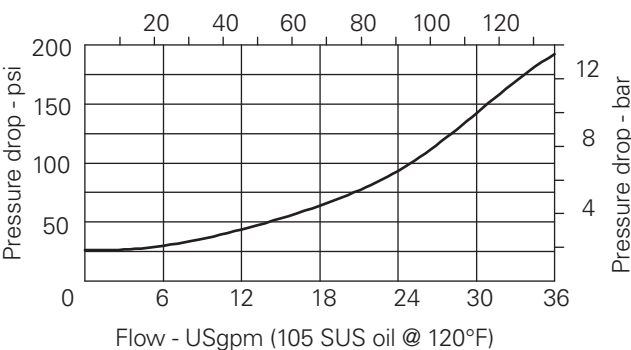
Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)

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 Factory set maximum flow rate accuracy under standard test conditions and within the above ranges
Reverse check crack pressure	1,7 bar (25 psi)
Leakage at shutoff position	0,55 L/min (33.5 in <sup>3</sup> /min)
Temperature range	–40° to 120°C (–40° to 248°F)
Cavity	C–16–2
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

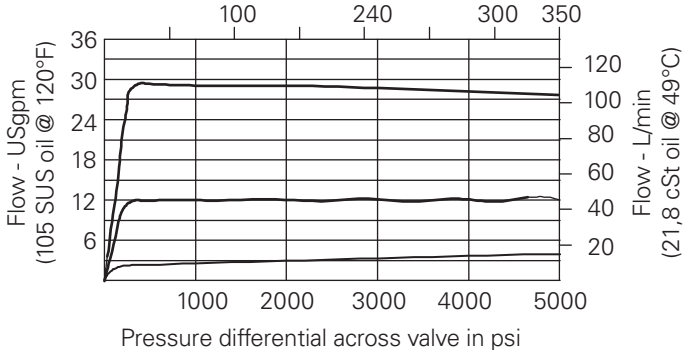
## Typical Flow Regulation

Cartridge only

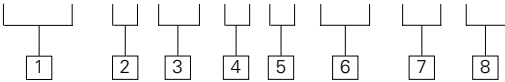
PRESSURE DROP FOR REVERSE FLOW  
Flow - L/min (21,8 cSt oil @ 49°C)



TYPICAL FLOW REGULATION  
Pressure differential across valve in bar



FAR1 – 16 (V) – \* – \* – \*\*\* – \* . \* – 00



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

6 Port size & valve bodies

**0** – Cartridge only

CODE	PORT SIZE	HOUSING NUMBER		
		Aluminum Light duty	Aluminum Fatigue rated	Steel Fatigue rated
4G	1/2" BSPP	–	8767116	02-175106
6B	3/4" BSPP	02-175463	–	–
6G	3/4" BSPP	–	8767118	02-175107
10T	SAE 10	–	–	–
10H	SAE 10	–	8767117	02-175104
12T	SAE 12	566149	–	–
12H	SAE 12	–	566113	02-175105

See section J for housing details.

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.)

8 Special features

**00** – None  
(Only required if valve has special features, omitted if "00".)

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

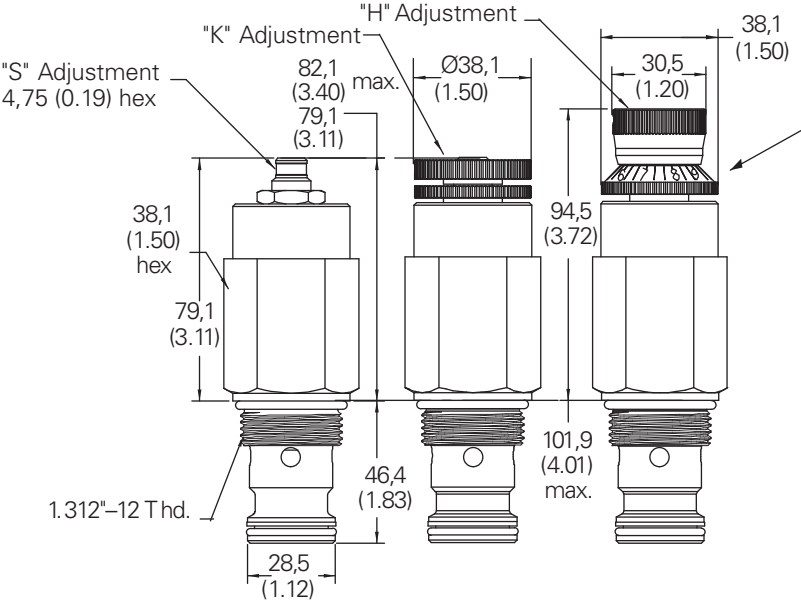


Aluminum housings can be used for pressures up to 210 bar (3000 psi)  
Steel housings **must** be used for operating pressures **above** 210 bar (3000 psi)

Dimensions

mm (inch)

Torque cartridge in housing  
**A** – 108–122 Nm  
(80–90 ft.lbs)  
**S** – 136–149 Nm  
(100–110 ft.lbs)

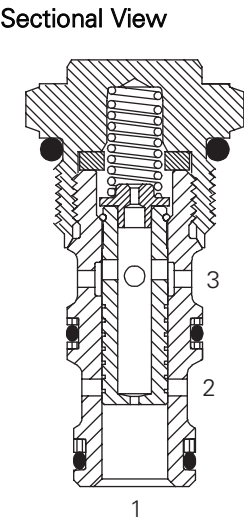
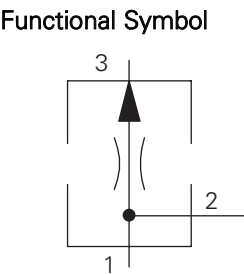


# PFR5-8

Priority flow regulator, fixed

**Description**

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

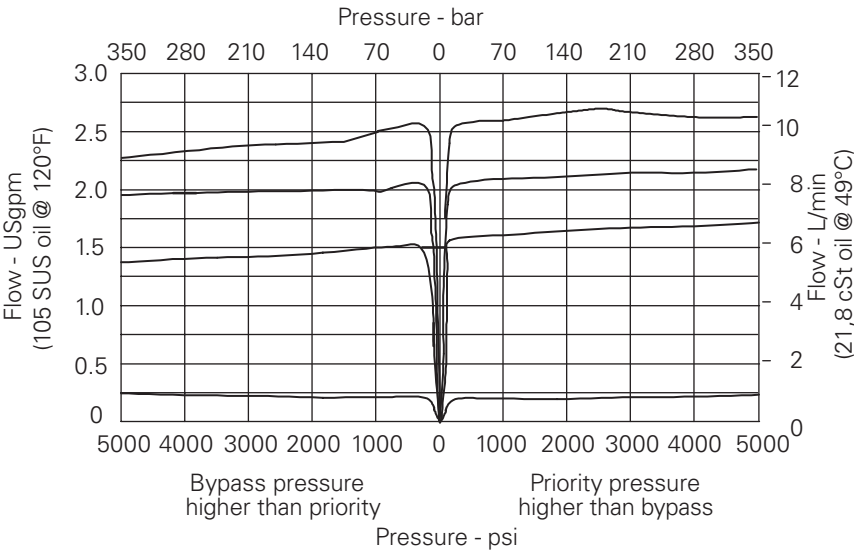


**Operation**

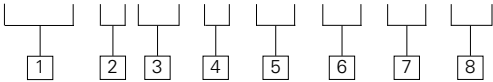
This valve maintains a constant, factory-set, priority flow from port 1 to port 3 based on 5.5 bar (80 psid) regardless of pressure changes downstream on port 3. Flow in excess of the priority setting is directed to port 2. If the priority flow at port 3 is blocked, the spool will shift to try and satisfy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

RATINGS AND SPECIFICATIONS	
<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
Typical application pressure (all ports)	350 bar (5000 psi) in steel 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 <sup>3</sup> /min. @ 350 bar (3000 psi) 5 in <sup>3</sup> /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
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



PFR5-8 (V)-F-(\*)-\*\*-\*.\*-00



- 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  
0 – 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

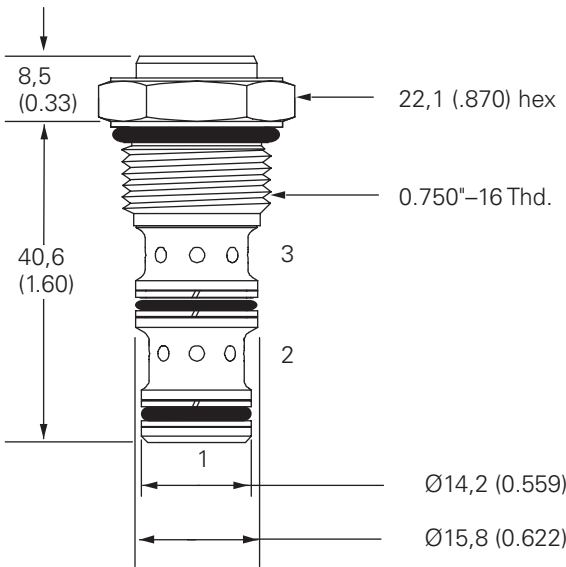
See section J for housing details.

- 7 Factory set flow rate,  
(Specify in USgpm)  
Range 0,4–9,5 L/min  
(0.1–2.5 USgpm)  
Example:  
0.5–1,9 L/min (0.5 USgpm)
- 8 Special features  
00 – None  
(Only required if valve has  
special features, omitted  
if "00")  
SS - 316 Stainless Steel  
external components

Dimensions

mm (inch)

Torque cartridge in steel  
or aluminum housing to  
34–41 Nm (25–30 ft.lbs)



Aluminum hous-  
ings can be used  
for pressures up to  
210 bar (3000 psi)  
Steel housings **must** be used  
for operating pressures **above**  
210 bar (3000 psi)

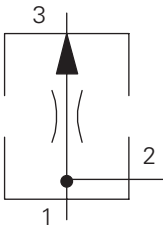
# PFR5-10

Priority flow regulator, fixed

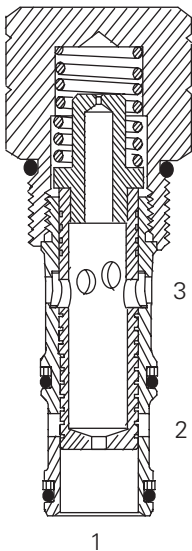
**Description**

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

Functional Symbol



Sectional View

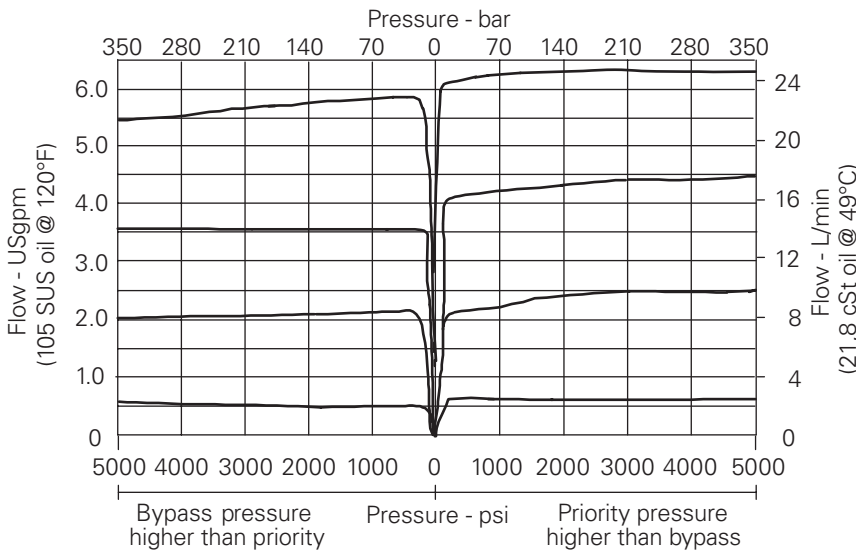


**Operation**

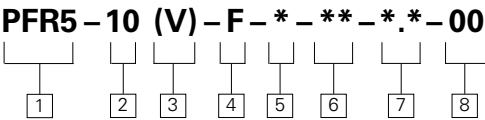
This valve maintains a constant, factory-set, priority flow from port 1 to port 3 based on 5.5 bar (80 psid) regardless of pressure changes downstream on port 3. Flow in excess of the priority setting is directed to port 2. If the priority flow at port 3 is blocked, the spool will shift to satisfy the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

RATINGS AND SPECIFICATIONS	
<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
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) <i>Factory set maximum priority flow rate accuracy under standard test conditions and within the above ranges.</i>
Temperature range	-40° to 120°C (-40° to 248°F)
Cavity	C-10-3
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® <i>Viton is a registered trademark of E.I. DuPont</i>

Typical Flow Regulation  
Cartridge only







- 1

**Function**  
PFR5 – Priority flow regulator
- 2

**Size**  
10 – 10 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**  
0 – 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 section J for housing details.

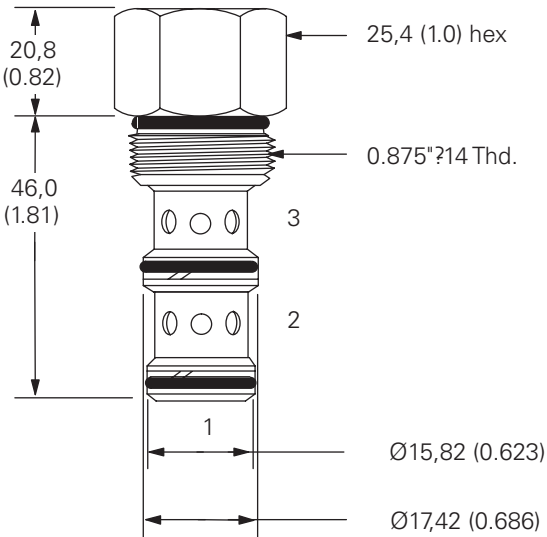
- 7

**Factory set flow rate**  
(Specify in USgpm)  
Range 0,38–22,7 L/min  
(0.1–6.0 USgpm)
- 8

**Special features**  
00 – None  
(Only required if valve has  
special features, omitted  
if "00")

**Dimensions**  
mm (inch)

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



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)

PFR2-16

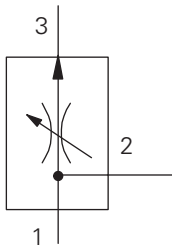
Priority flow regulator,  
adjustable

Description

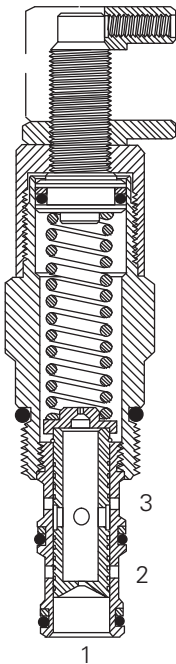
The PFR2-16 is a limited range adjustable\*, priority type, pressure compensated, flow regulator screw-in cartridge valve.

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

Functional Symbol



Sectional View



Operation

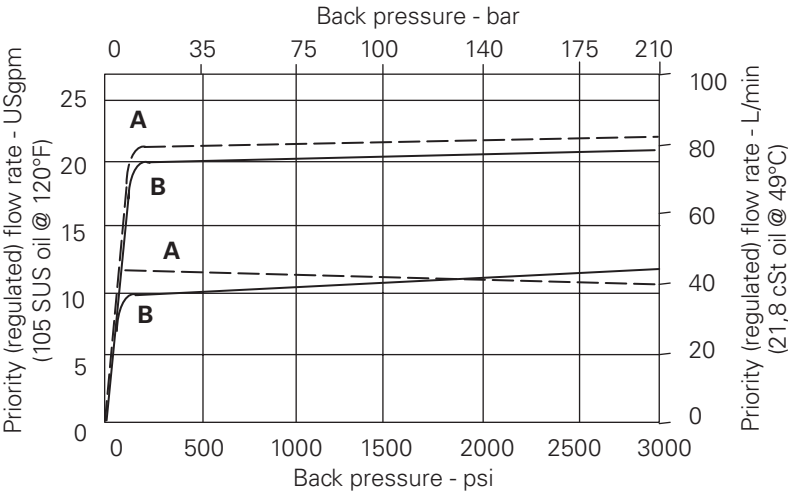
This valve maintains a constant, factory-set, priority flow from port 1 to port 3 based on the setting adjustment, regardless of pressure changes downstream on port 3. Flow in excess of the priority setting is directed to port 2. If the priority flow at port 3 is blocked, the spool will shift to satisfy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

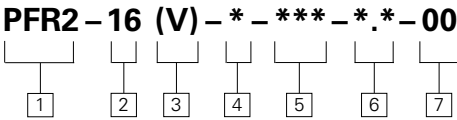
RATINGS AND SPECIFICATIONS

<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
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% <small>Factory set maximum priority flow rate accuracy under standard test conditions and within the above ranges</small>
Temperature range	-40° to 120°C (-40° to 248°F)
Cavity	C-16-3
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® <small>Viton is a registered trademark of E.I. DuPont</small>

Typical Flow Regulation  
Cartridge only

- A – Port 3, priority (regulated) outlet pressurized
- B – Port 2, bypass outlet pressurized





- 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

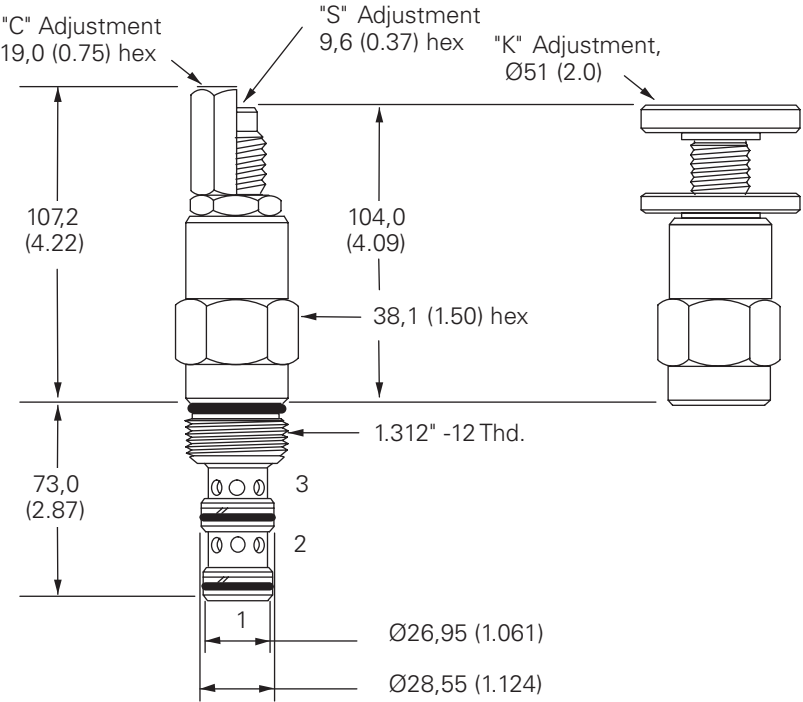
**5 Port size**  
0 – Cartridge only

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

- 6 Factory set flow rate,**  
(Specify in USgpm)  
Range 1,9–114 L/min  
(0.5–30 USgpm)
- 7 Special features**  
00 – None  
(Only required if valve has  
special features, omitted  
if "00")  
SS - 316 Stainless Steel  
external components

See section J for housing details.

**Dimensions**  
mm (inch)  
Torque cartridge in  
aluminum housing to  
108–122 Nm (80–90 ft.lbs)



# PFRD/S-12

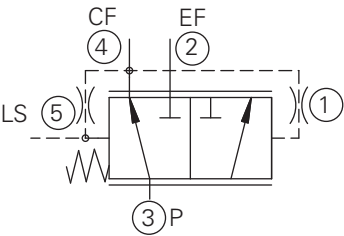
Priority flow regulator valve

## Description

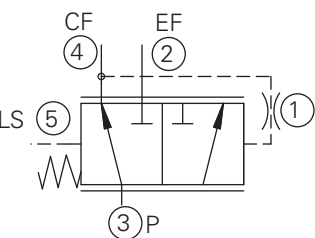
The PFR\*-12 is a spool type, screw-in, load-sensing priority flow regulator cartridge valve.

## Functional Symbols

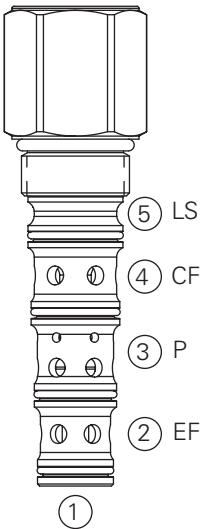
Dynamic Signal (PFRD)



Static Signal (PFRS)



## Profile View



Note  
Port 1 unused, port should be plugged.

## Operation

This valve is used in the flow control mode. Pump flow from the valve inlet port 3 is delivered first to port 4 at a fixed rate; excess flow is bypassed to port 2. The valve maintains the controlled flow to 4 regardless of inlet pressure change or load pressure changes at 2 or 4. This valve is typically used with open loop load sense systems in steering and braking circuits. The static type

is used for less difficult applications where response or circuit stability is not a problem. The dynamic type is used for difficult applications where response or circuit stability are critical. The load sense line connected to port 5 should not exceed 2 Meters (6 Feet) in length. Overpressure protection for the circuits connected to ports 2 and 4 must be provided by external relief

valves. The control pressure is determined by assuring adequate inlet pressure to the steering unit and must be matched to the steering unit's required flow. The control pressure must be supplied to the valve as a minimum inlet pressure. The pressure at port 4 can vary by 10% when the load at the excess flow port 2 varies from 0 to maximum pressure.

## RATINGS AND SPECIFICATIONS

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

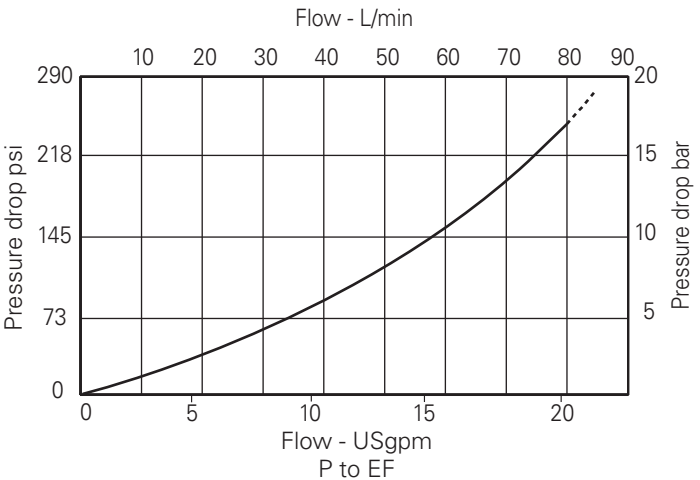
Typical application pressure (all ports)	280 bar (4000 psi)
Cartridge fatigue pressure (infinite life)	280 bar (4000 psi)
Rated inlet flow	76 L/min (20 USgpm)
Temperature range	-40° to 120°C (-40° to 248°F)
Cavity	C-12-5S
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Housing materials	Aluminum or Steel
Weight cartridge only	0,36 kg (0.79 lb.)
Seal kit	202914-921
Internal leakage	164cc/min (10 in <sup>3</sup> /min) @ 3000 PSID
Recommended L/S orifice	0.031" (not included in valve)

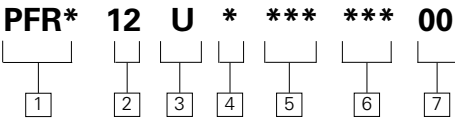
## Pressure Drop Curves

Cartridge only

Notes  
Minimum inlet flow should not be less than 1/4 of maximum inlet flow.

Minimum pressure drop is determined by control pressure.





1 Function

PFRS – Priority flow regulator  
Static signal type  
PFRD – Priority flow  
regulator  
Dynamic signal type

2 Size

12 – 12 Size

3 Seals

U– Urethane (standard)

4 Body

O – Cartridge only  
A – Aluminum  
S – Steel (standard)

5 Ports\*

CODE	PORT SIZE		HOUSING NUMBER	
	Port 2, 3, 4	Port 5	Aluminum	Steel
000	No Body	–	–	–
10T	SAE 10	SAE 4	4998820-001	4998821-001
12T	SAE 12	SAE 4	4998820-002	4998821-002
04G	1/2" BSPP	1/4" BSPP	4998820-003	4998821-003
06G	3/4" BSPP	1/4" BSPP	4998820-004	4998821-004

\*These model digits will not be stamped on the valve.  
See section J for housing details.

6 Control Pressure

PFRS options  
055 psi (3.8 bar)  
078 psi (5.4 bar)  
100 psi (6.9 bar)  
PFRD options  
075 psi (5.2 bar)  
110 psi (7.6 bar)  
145 psi (10.0 bar)

7 Special features

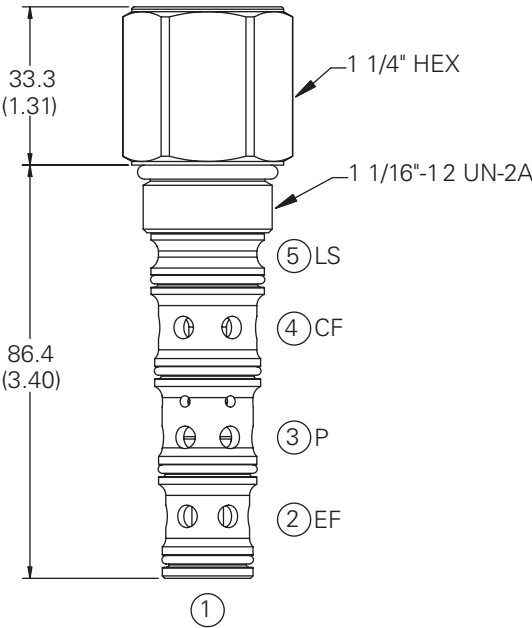
00 – None  
(Only required if valve has  
special features, omitted  
if "00")

Dimensions

mm (inch)

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

Note  
Standard housings include  
port 1, however for most  
applications this port must  
be blocked.



Aluminum hous-  
ings can be used  
for pressures up to  
210 bar (3000 psi)  
Steel housings **must** be used  
for operating pressures **above**  
210 bar (3000 psi)

PFRD/S-16

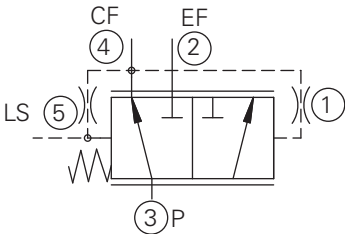
Priority flow regulator valve

Description

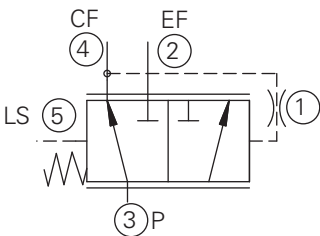
The PFR\*-16 is a spool type, screw-in, load-sensing priority flow regulator cartridge valve.

Functional Symbols

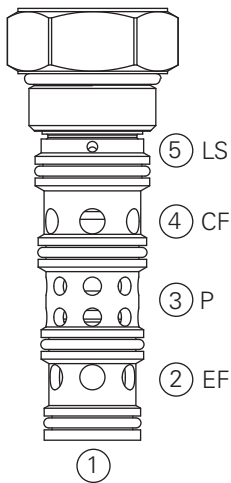
Dynamic Signal (PFRD)



Static Signal (PFRS)



Profile View



Note  
Port 1 unused, port should be plugged.

Operation

This valve is used in the flow control mode. Pump flow from the valve inlet port 3 is delivered first to port 4 at a fixed rate; excess flow is bypassed to port 2. The valve maintains the controlled flow to 4 regardless of inlet pressure change or load pressure changes at 2 or 4. This valve is typically used with open loop load sense systems in steering and braking circuits. The static type

is used for less difficult applications where response or circuit stability is not a problem. The dynamic type is used for difficult applications where response or circuit stability are critical. The load sense line connected to port 5 should not exceed 2 Meters (6 Feet) in length. Overpressure protection for the circuits connected to ports 2 and 4 must be provided by external relief

valves. The control pressure is determined by assuring adequate inlet pressure to the steering unit and must be matched to the steering unit's required flow. The control pressure must be supplied to the valve as a minimum inlet pressure. The pressure at port 4 can vary by 10% when the load at the excess flow port 2 varies from 0 to max pressure.

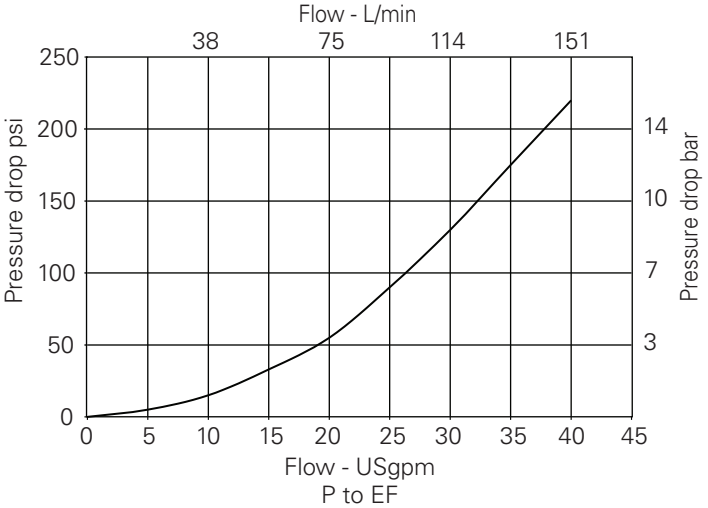
RATINGS AND SPECIFICATIONS

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

Typical application pressure (all ports)	280 bar (4000 psi)
Cartridge fatigue pressure (infinite life)	280 bar (4000 psi)
Rated inlet flow	150 L/min (40 USgpm)
Temperature range	-40° to 100° C (-40° to 210° F)
Cavity	C-16-5S
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Housing materials (standard)	Steel
Weight cartridge only	0,47 kg (1.05 lbs.)
Seal kit	202915-922
Internal leakage	164cc/min (10 in <sup>3</sup> /min) @ 3000 PSID
Recommended L/S orifice	0.036" (not included in valve)

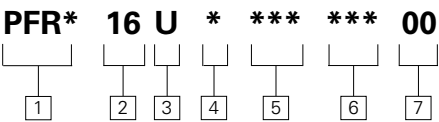
Pressure Drop Curves

Cartridge only



Notes  
Minimum inlet flow should not be less than 1/4 of maximum inlet flow.

Minimum pressure drop is determined by control pressure.



**1 Function**  
PFRS – Priority flow regulator  
Static signal type  
PFRD – Priority flow  
regulator  
Dynamic signal type

**2 Size**  
16 – 16 Size

**3 Seals**  
U– Urethane (standard)

**4 Body**  
O – Cartridge only  
A – Aluminum  
S – Steel (standard)

CODE	PORT SIZE		HOUSING NUMBER	
	Port 2, 3, 4	Port 5	Aluminum	Steel
000	No Body	–	–	–
12T	SAE 12	SAE 4	4994880-001	4994881-001
16T	SAE 16	SAE 4	4994880-002	4994881-002
06G	3/4" BSPP	1/4" BSPP	4994880-003	4994881-003
08G	1" BSPP	1/4" BSPP	4994880-004	4994881-004

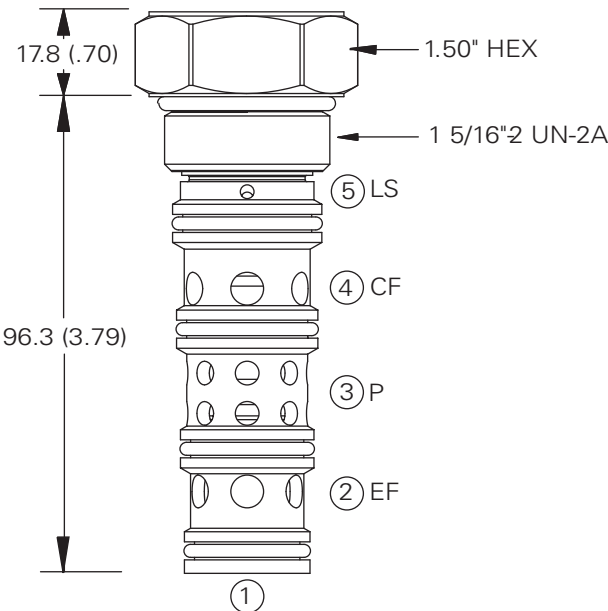
\*These model digits will not be stamped on the valve.  
See section J for housing details.

**6 Control Pressure**  
PFRS options  
065 psi (4.5 bar)  
130 psi (8.9 bar)  
160 psi (11.0 bar)  
PFRD options  
080 psi (5.5 bar)  
110 psi (7.6 bar)  
130 psi (9.0 bar)

**7 Special features**  
00 – None  
(Only required if valve has  
special features, omitted  
if "00")

**Dimensions**  
mm (inch)  
Torque cartridge in housing  
A – 108-122 Nm (80-90 ft. lbs)  
S – 136-149 Nm (100-110 ft. lbs)

Note  
Standard housings include  
port 1, however for most  
applications this port must  
be blocked.



 Aluminum hous-  
ings can be used  
for pressures up to  
210 bar (3000 psi)  
Steel housings **must** be used  
for operating pressures **above**  
210 bar (3000 psi)

# PFRD/S-20

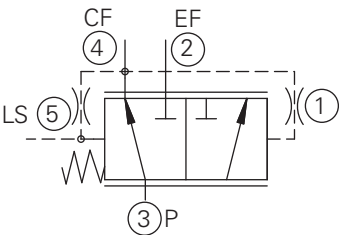
Priority flow regulator valve

## Description

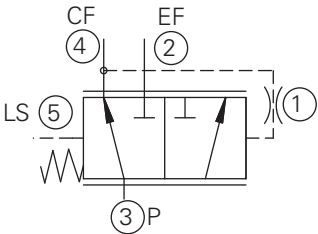
The PFR\*-20 is a spool type, screw-in, load-sensing priority flow regulator cartridge valve.

## Functional Symbols

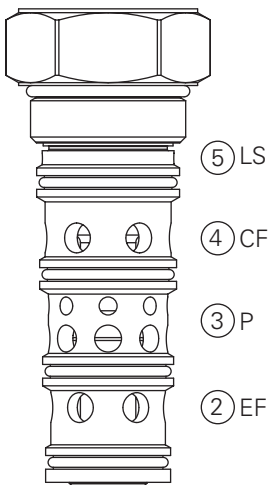
Dynamic Signal (PFRD)



Static Signal (PFRS)



## Profile View



Note  
Port 1 unused, port should be plugged.

## Operation

This valve is used in the flow control mode. Pump flow from the valve inlet port 3 is delivered first to port 4 at a fixed rate; excess flow is bypassed to port 2. The valve maintains the controlled flow to 4 regardless of inlet pressure change or load pressure changes at 2 or 4. This valve is typically used with open loop load sense systems in steering and braking circuits. The static type

is used for less difficult applications where response or circuit stability is not a problem. The dynamic type is used for difficult applications where response or circuit stability are critical. The load sense line connected to port 5 should not exceed 2 Meters (6 Feet) in length. Overpressure protection for the circuits connected to ports 2 and 4 must be provided by external relief

valves. The control pressure is determined by assuring adequate inlet pressure to the steering unit and must be matched to the steering unit's required flow. The control pressure must be supplied to the valve as a minimum inlet pressure. The pressure at port 4 can vary by 10% when the load at the excess flow port 2 varies from 0 to max pressure.

## RATINGS AND SPECIFICATIONS

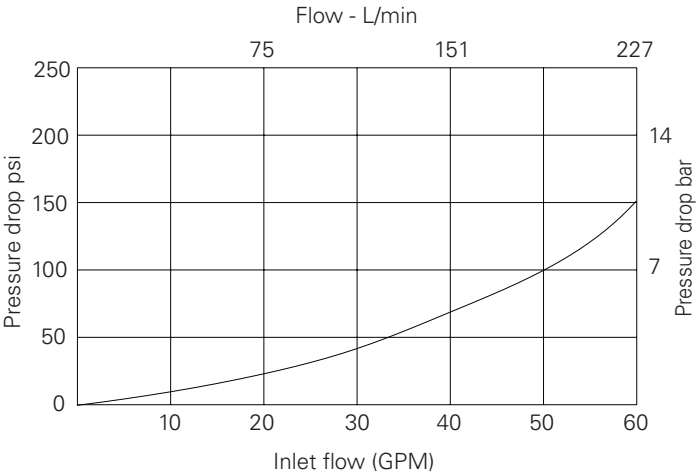
<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
Typical application pressure (all ports)	240 bar (3500 psi)
Cartridge fatigue pressure (infinite life)	240 bar (3500 psi)
Rated inlet flow	230 L/min (60 USgpm)
Temperature range	-40° to 100° C (-40° to 210° F)
Cavity	C-20-5S
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Housing materials (standard)	Steel
Weight cartridge only	0,86 kg (1.9 lbs.)
Seal kit	02-187543
Internal leakage	164 cc/min (10 in <sup>3</sup> /min) @ 3000 PSID
Recommended L/S orifice	0.047" (not included in valve)

## Pressure Drop Curves

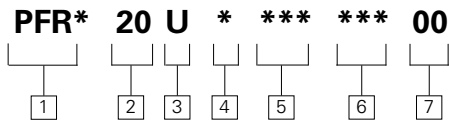
Cartridge only

Note  
Minimum inlet flow should not be less than 1/4 of maximum inlet flow.

Minimum pressure drop is determined by control pressure.







- 1 Function  
PFRS – Priority flow regulator  
Static signal type  
PFRD – Priority flow regulator  
Dynamic signal type
- 2 Size  
20 – 20 Size
- 3 Seals  
U– Urethane (standard)
- 4 Body  
O – Cartridge only  
A – Aluminum  
S – Steel (standard)

5 Ports\*

CODE	PORT SIZE		HOUSING NUMBER	
	Port 2, 3, 4	Port 5	Aluminum	Steel
000	No Body	–	–	–
12T	SAE 12	SAE 4	4998822-001	4998823-001
16T	SAE 16	SAE 4	4998822-002	4998823-002
06G	3/4" BSPP	1/4" BSPP	4998822-003	4998823-003
08G	1" BSPP	1/4" BSPP	4998822-004	4998823-004

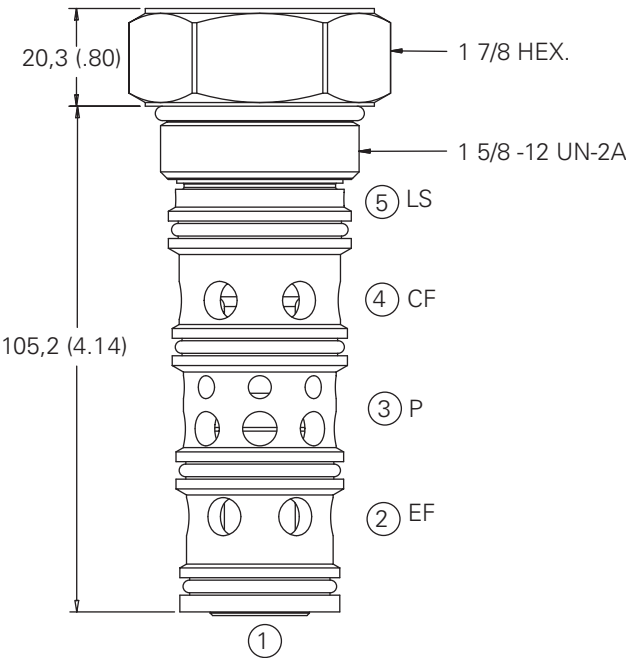
\* These model digits will not be stamped on the valve.  
See section J for housing details.


- 6 Control Pressure  
PFRS options  
080 psi (5.5 bar)  
100 psi (6.9 bar)  
PFRD options  
085 psi (5.9 bar)  
110 psi (7.6 bar)
- 7 Special features  
00 – None  
(Only required if valve has  
special features, omitted  
if "00")

Dimensions  
mm (inch)

Torque cartridge in housing  
A – 130-155 Nm (95-115 ft. lbs)  
S – 160-180 Nm (120-135 ft. lbs)

Note  
Standard housings include  
port 1, however for most  
applications this port must  
be blocked.

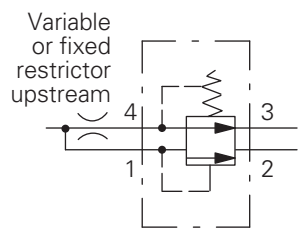


 Aluminum hous-  
ings can be used  
for pressures up to  
210 bar (3000 psi)  
Steel housings **must** be used  
for operating pressures **above**  
210 bar (3000 psi)

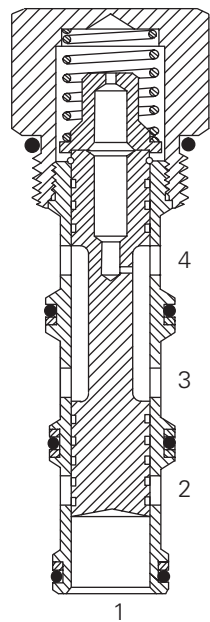
Description

The PCS4-10 is a screw-in, pressure compensator cartridge for the use as a bypass or priority flow control.

Functional Symbols



Sectional View



Operation

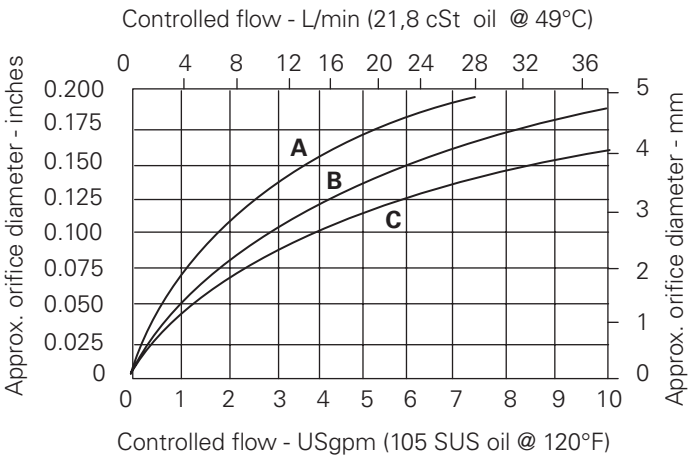
This valve, when used with either a fixed or variable orifice on port 4, maintains a constant flow out port 3, regardless of pressure changes downstream of port 3. This is based on whatever pressure differential is chosen. All flow in excess of the priority requirement is bypassed from port 1 to port 2. If the priority port is deadheaded, the valve will try to direct flow out of the priority port and shut off the bypass flow, blocking of all flow.

RATINGS AND SPECIFICATIONS

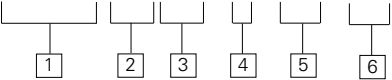
Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)	
Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	38 L/min (10 USgpm)
Cavity	C-10-4
Standard housing materials	Customized housings are necessary for close-coupling the compensator and orifice
Temperature range	-40° to 120°C (-40° to 248°F)
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Weight cartridge only	0,14 kg (0.32 lbs)
Seal kits	889651 Buna-N 889653 Viton®
Viton is a registered trademark of E.I. DuPont	

Performance Characteristics  
Cartridge only

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



PCS4 – 10 (V) – \* – \*\*\* – 00

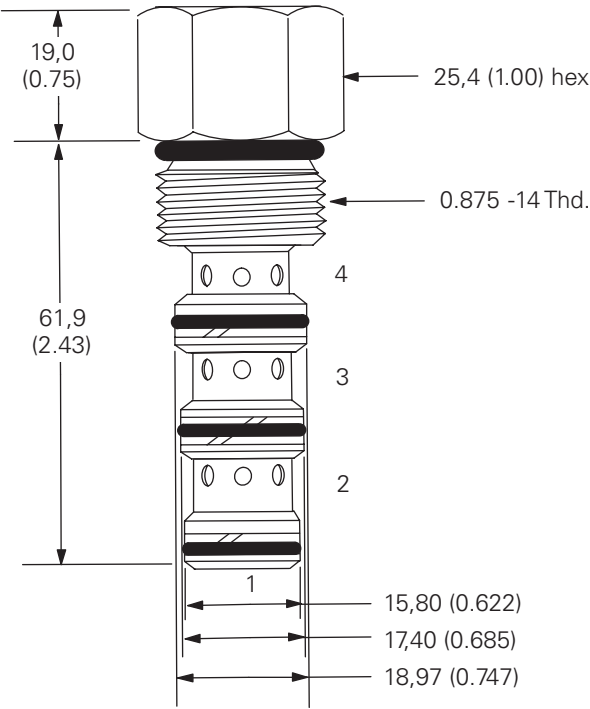


<div>1</div> <b>Function</b> PCS4 – Pressure compensator bypass type	<div>3</div> <b>Seals</b> Blank – Buna-N V – Viton	<div>4</div> <b>Port size</b> 0 – Cartridge only Customized housings are necessary for close-coupling, compensator and orifice	<div>5</div> <b>Pressure differential (nominal)</b> 40 – 2,8 bar (40 psi) 80 – 5,5 bar (80 psi) 160 – 11,0 bar (160 psi)
<div>2</div> <b>Size</b> 10 – 10 Size	<div>6</div> <b>Special features</b> 00 – None (Only required if valve has special features, omit if 00)		

Dimensions

mm (inch)

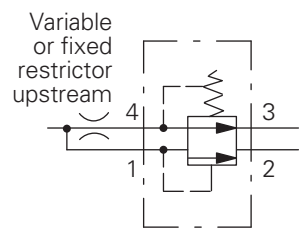
Torque into aluminum housing to 47-54 Nm (35-40 ft. lbs)



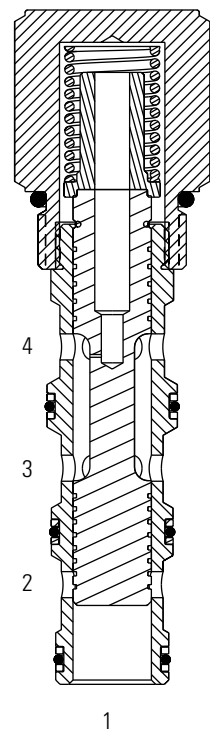
**Description**

The PCS4-12 is a screw-in, pressure compensator cartridge for the use as a bypass or priority flow control.

Functional Symbols



Sectional View



**Operation**

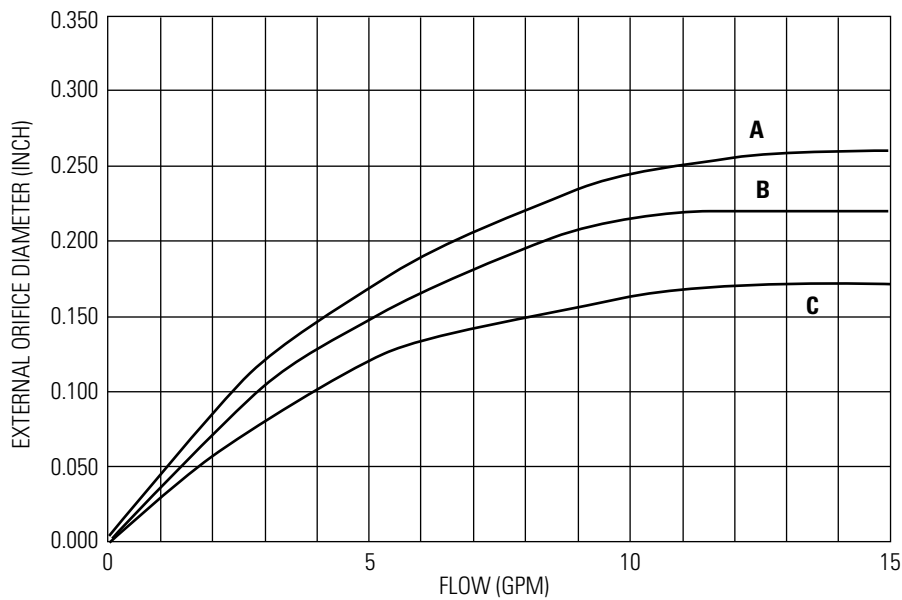
This valve, when used with either a fixed or variable orifice on port 4, maintains a constant flow out port 3, regardless of pressure changes downstream of port 3. This is based on whatever pressure differential is chosen. All flow in excess of the priority requirement is bypassed from port 1 to port 2. If the priority port is deadheaded, the valve will try to direct flow out of the priority port and shut off the bypass flow, blocking of all flow.

RATINGS AND SPECIFICATIONS	
Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)	
Typical application pressure (all ports)	240 bar (3500 psi)
Cartridge fatigue pressure (infinite life)	240 bar (3500 psi)
Rated flow	58 L/min (15 USgpm)
Cavity	C-12-4
Standard housing materials	Customized housings are necessary for close-coupling the compensator and orifice
Temperature range	-40° to 120°C (-40° to 248°F)
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Weight cartridge only	0,36 kg (0.80 lbs)
Seal kits	9900335-000 Buna-N 9900336-000 Viton®
Viton is a registered trademark of E.I. DuPont	

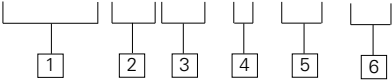
**Performance Characteristics**

Cartridge only

**A** – 2,8 bar (40 PSI) Control DP  
**B** – 5,5 bar (80 PSI) Control DP  
**C** – 11,0 bar (120 PSI) Control DP



PCS4-12 (V)-\*-\*\*-00



1 Function

PCS4 – Pressure compensator bypass type

2 Size

12 – 12 Size

3 Seals

Blank – Buna-N  
V – Viton

4 Port size

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

5 Pressure differential (nominal)

40 – 2,8 bar (40 psi)  
80 – 5,5 bar (80 psi)  
120 – 8,3 bar (120 psi)

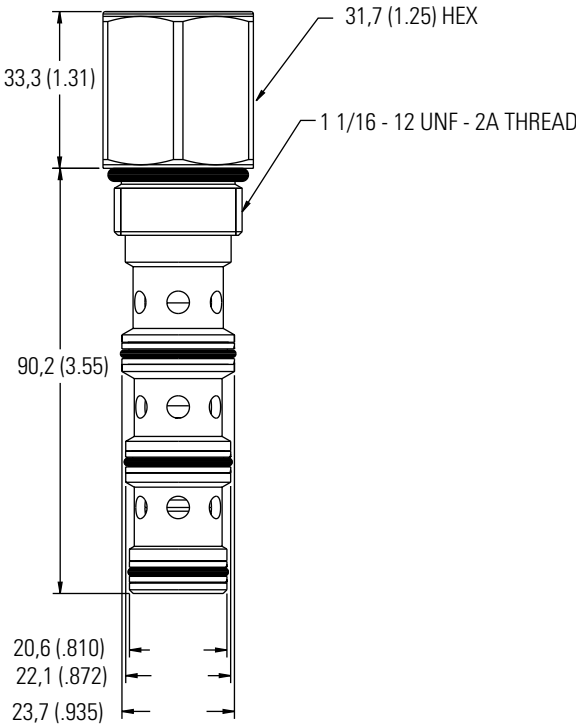
6 Special features

00 – None  
(Only required if valve has special features, omit if 00)

Dimensions

mm (inch)

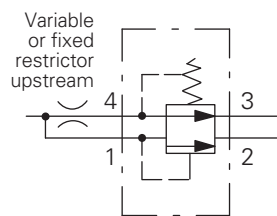
Torque into aluminum housing to 81-45 Nm (60-75 ft. lbs)



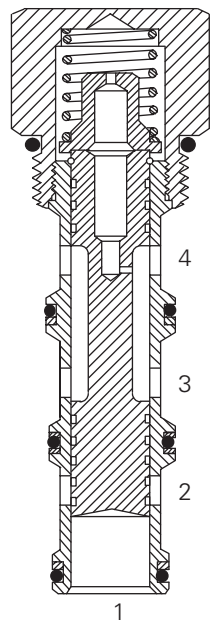
**Description**

The PCS4-16 is a screw-in, pressure compensator cartridge for the use as a bypass or priority flow control.

Functional Symbols



Sectional View



**Operation**

This valve, when used with either a fixed or variable orifice on port 4, maintains a constant flow out port 3, regardless of pressure changes downstream of port 3. This is based on whatever pressure differential is chosen. All flow in excess of the priority requirement is bypassed from port 1 to port 2. If the priority port is deadheaded, the valve will try to direct flow out of the priority port and shut off the bypass flow, blocking of all flow.

RATINGS AND SPECIFICATIONS

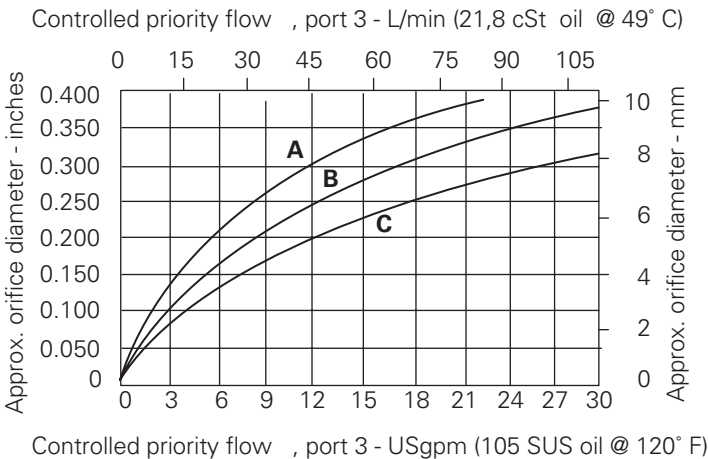
Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)	
Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	114 L/min (30 USgpm)
Cavity	C-16-4
Standard housing materials	Customized housings are necessary for close-coupling, the compensator and orifice
Temperature range	-40° to 120°C (-40° to 248°F)
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Weight cartridge only	0,50 kg (1.12 lbs)
Seal kits	889660 Buna-N 02-175435 Viton®

Viton is a registered trademark of E.I. DuPont

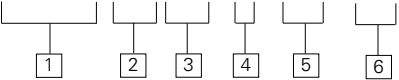
**Performance Characteristics**

Cartridge only

**A** – 2,8 bar (40 psi) (control ΔP)  
**B** – 5,5 bar (80 psi) (control ΔP)  
**C** – 11,0 bar (160 psi) (control ΔP)



PCS4-16 (V)-\*-\*\*-00

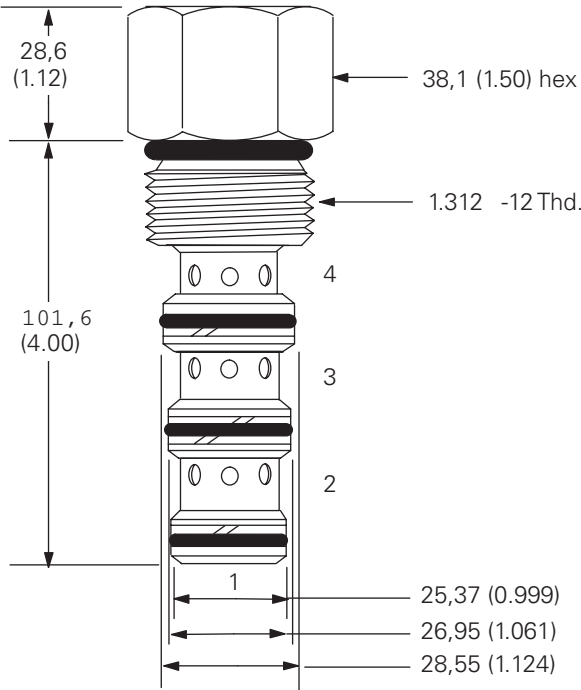


<b>1</b> Function PCS4 – Pressure compensator, bypass type	<b>3</b> Seals Blank – Buna-N V – Viton	<b>4</b> Port size 0 – Cartridge only (Customized housings are necessary for close-coupling, compensator and orifice)	<b>5</b> Pressure differential (nominal) 40 – 2,8 bar (40 psi) 80 – 5,5 bar (80 psi) 160 – 11,0 bar (160 psi)
<b>2</b> Size 16 – 16 Size			<b>6</b> Special features 00 – None (Only required if valve has special features, omit if 00)

Dimensions

mm (inch)

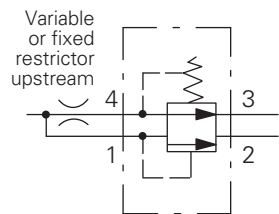
Torque into aluminum housing to 108-122 Nm (80-90 ft. lbs)



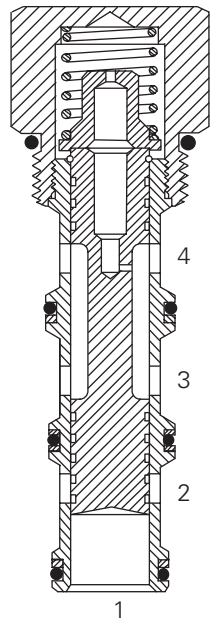
Description

The PCS4-20 is a screw-in, pressure compensator cartridge for the use as a bypass or priority flow control.

Functional Symbols



Sectional View



Operation

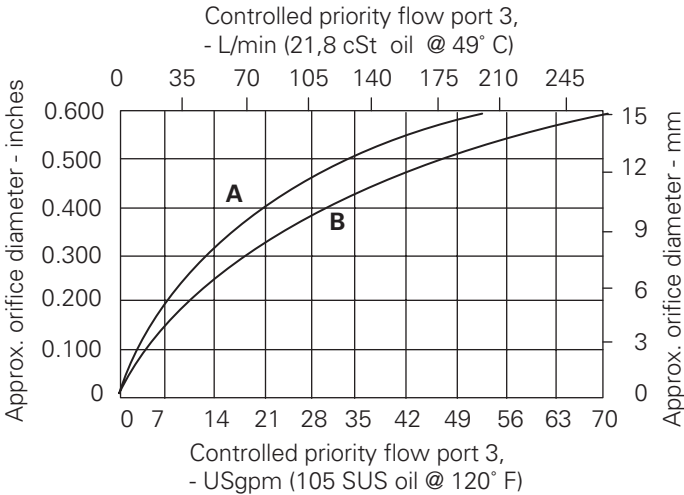
This valve, when used with either a fixed or variable orifice on port 4, maintains a constant flow out port 3, regardless of pressure changes downstream of port 3. This is based on whatever pressure differential is chosen. All flow in excess of the priority requirement is bypassed from port 1 to port 2. If the priority port is dead-headed, the valve will try to direct flow out of the priority port and shut off the bypass flow, blocking of all flow.

RATINGS AND SPECIFICATIONS

<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	189 L/min (50 USgpm)
Cavity	C-20-4
Standard housing materials	Customized housings are necessary for close-coupling, the compensator and orifice
Temperature range	-40° to 120°C (-40° to 248°F)
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Weight cartridge only	0,50 kg (1.12 lbs)
Seal kits	889660 Buna-N 02-175435 Viton®
Viton is a registered trademark of E.I. DuPont	

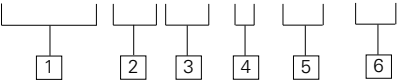
Performance Characteristics  
Cartridge only

- A – 2,8 bar (40 psi) (control ΔP)
- B – 5,5 bar (80 psi) (control ΔP)





PCS4-20 (V) - \* - \* - \* - 00

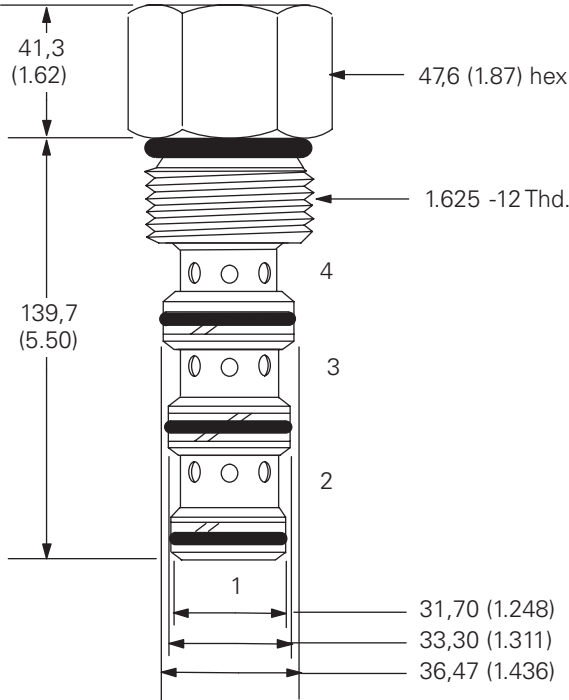


<div>1</div> <div>Function</div> <div>PCS4 – Pressure compensator, bypass type</div>	<div>3</div> <div>Seals</div> <div>Blank – Buna-N V – Viton</div>	<div>4</div> <div>Port size</div> <div>0 – Cartridge only (Customized housings are necessary for close-coupling, compensator and orifice)</div>	<div>5</div> <div>Pressure differential (nominal)</div> <div>40 – 2,8 bar (40 psi) 80 – 5,5 bar (80 psi)</div>
<div>2</div> <div>Size</div> <div>20 – 20 Size</div>			<div>6</div> <div>Special features</div> <div>00 – None (Only required if valve has special features, omit if 00)</div>

Dimensions

mm (inch)

Torque into aluminum housing to 128-155 Nm (95-115 ft. lbs)



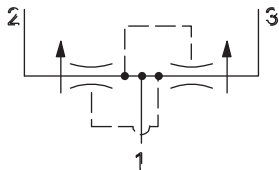
FDC1-20

Flow divider/combiner

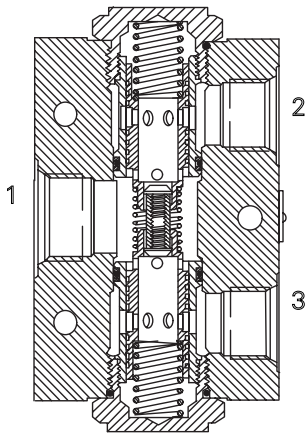
Description

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

Functional Symbol



Sectional View



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

<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated inlet flow	See model code
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:

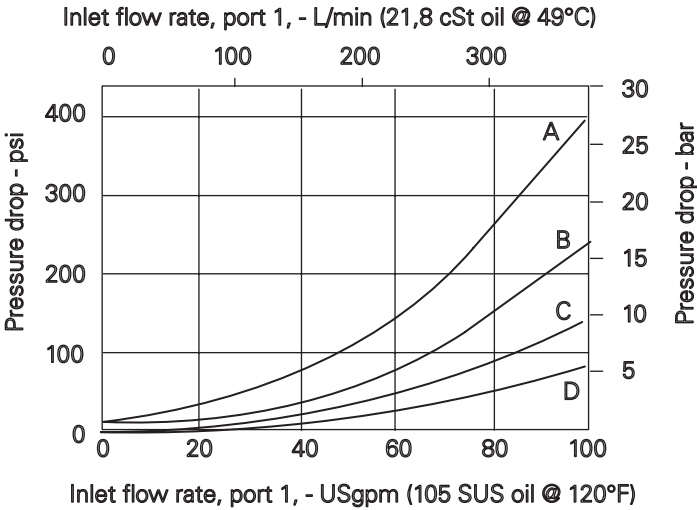
(See model code position 5)

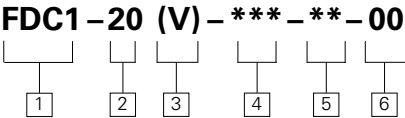
A - 3\* spool

B - 4\* spool

C - 6\* spool

D - 8\* spool





- 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)  
(Available as a complete  
assembly only.)

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)

- 6

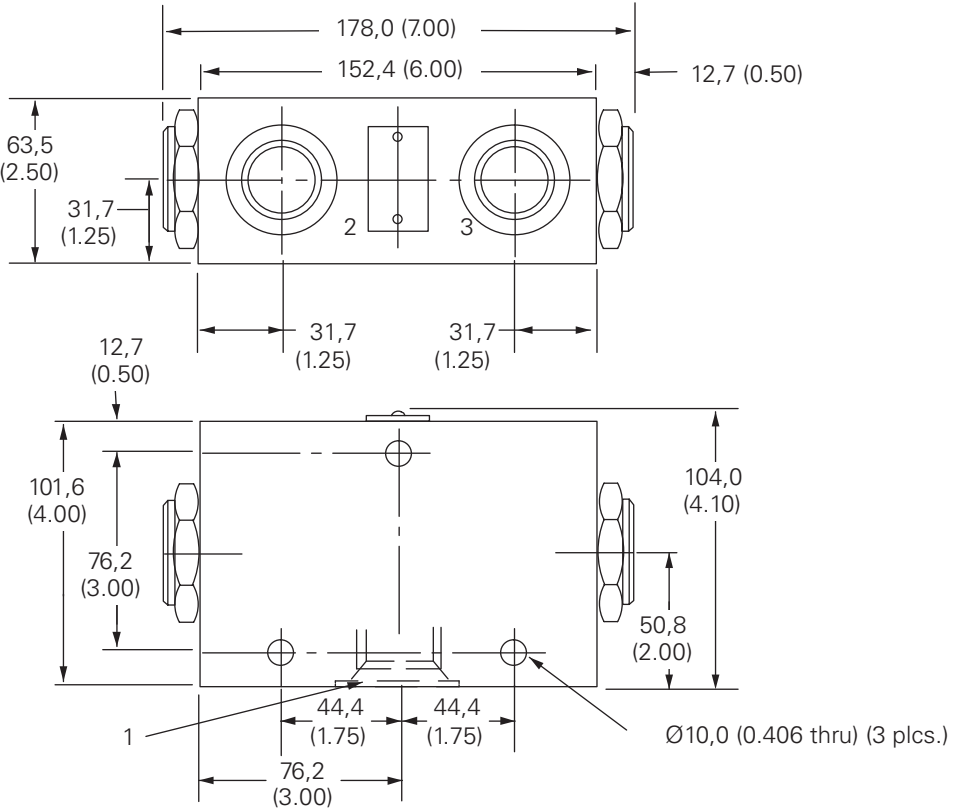
Special features

00 – None  
(Only required if valve has  
special features, omitted  
if "00")

**Dimensions**  
mm (inch)

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

**Note**  
Minimum inlet flow should  
not be less than 1/4 of  
maximum inlet flow for a  
given code.



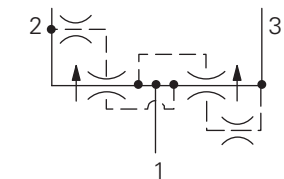
# FDC3-20

Posi-traction valve

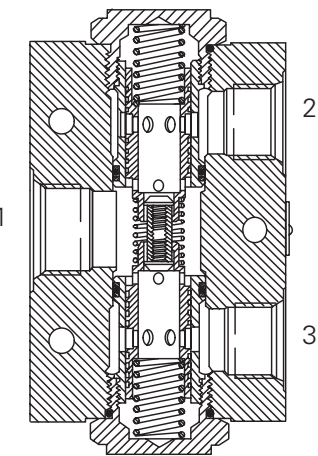
## Description

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

## Functional Symbol



## Sectional View



## 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

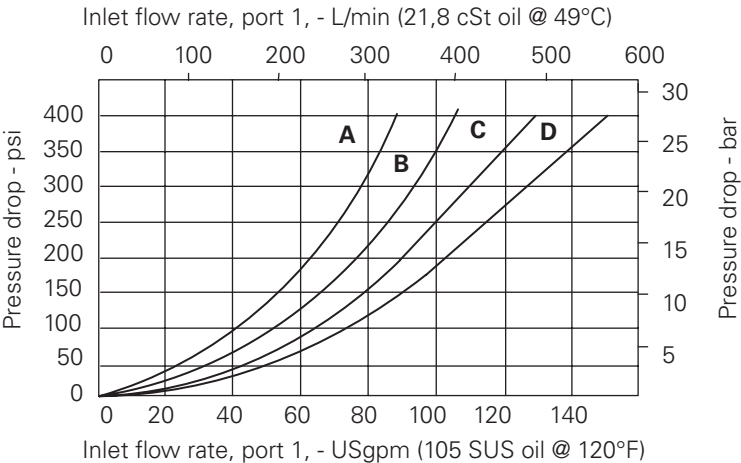
<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated inlet flow	See model code
Temperature range	-40° to 120°C (-40° to 248°F)
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Standard housing materials	Aluminum
Weight 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

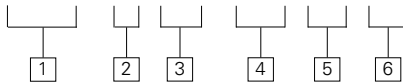
## Pressure Drop Curves

## Flow Division

(See model code position 5)  
**A** - 33 spool  
**B** - 44 spool  
**C** - 66 spool  
**D** - 88 spool



**FDC3-20 (V) - \*\*\* - \*\* - 00**



## 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)  
 (Available as complete  
 assembly only.)

### 5 Flow divisions (ratios)

CODE	FLOW DIVISION%		MAX. INLET FLOW	
	Port 4	Port 2	L/min	(USgpm)
33	50	50	190,0	(50)
44	50	50	266,0	(70)
66	50	50	380,0	(100)
88	50	50	570,0	(150)

## 6 Special features

**00** – None  
(Only required if valve has special features, omitted if "00".)

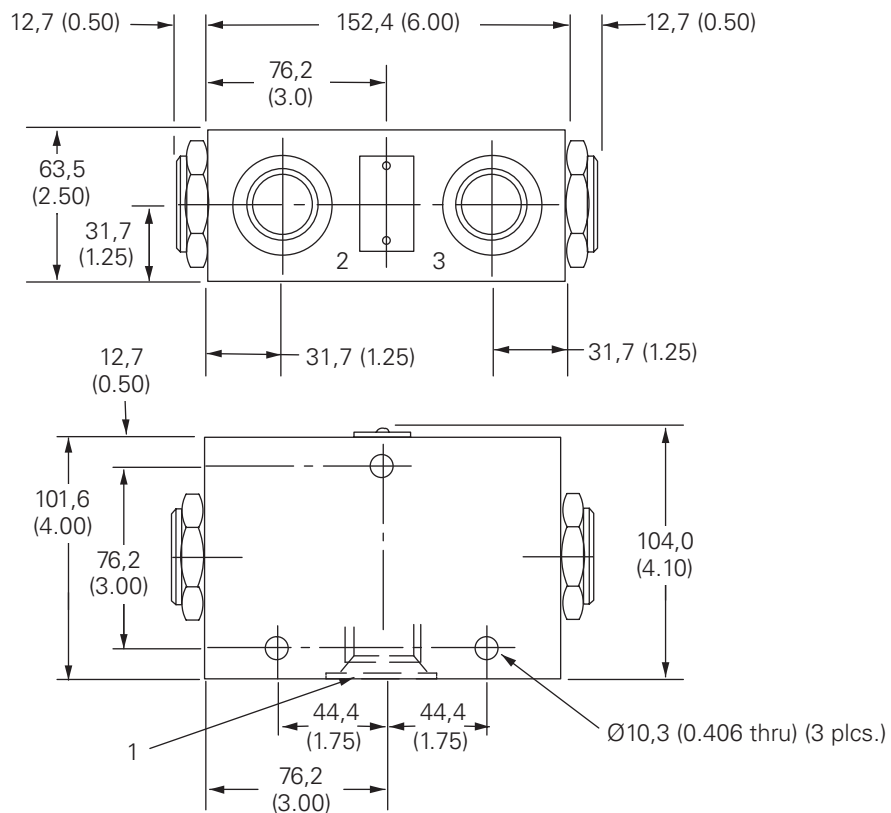
## Dimensions

mm (inch)

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

Note

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



# Solenoid Valves

## Section Overview

### Quality Products and Innovative solutions

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

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

Vickers solenoid valves are offered with the widest choice of flow paths and position options to satisfy most requirements. These options include:

- 2-way, 2-position, normally open and normally closed spool and poppet valves
- 3-way, 2-position spool valves
- 4-way, 2-position spool valves
- 4-way, 3-position spool valves

### Valve Features and Benefits

- Products in this catalog have been fatigue tested for one million cycles at 132% or 10 million cycles at 115% of rated pressure
- Rated flows up to 227 L/min (60 USgpm)
- Poppet and spool designs
- Standard cartridge cavities
- All operating parts are hardened steel, ground and honed for long life and low leakage
- Cartridge design for maximum flexibility and minimal manifold space requirements
- Optional low-cost manual override is available on selected models

- All exposed surfaces are zinc dichromate plated to resist corrosion
- All aluminum manifolds are gold anodized to resist corrosion
- Reliable, economical and compact
- Manual override options are available on all solenoid valves except SBV series valves

#### Note

Solenoid valve coil details are shown in section C.

# Solenoid Valves

## Coils

A

### Coil Features and Benefits

Note

Solenoid valve coil details are shown in section C.

The solenoid operated directional valves in this catalog are offered with a choice of standard voltages and several types of electrical connections. For other coil ratings and connections, consult your Eaton representative.

Standard AC coils are internally rectified to supply them with DC current, therefore they have no "inrush" current value.

- Coils are rated for continuous duty
- Coils are interchangeable for serviceability
- Variety of voltages and terminations
- Coils offer a one-piece weather-proof encapsulated design, eliminating the need for extra seals
- AC voltage coils are internally full-wave rectified for 50 or 60 cycle (Hz) applications

An arc suppression diode molded into the coil is available as a standard option on DC coils. Also available, are explosion-proof coils and cartridges that are CSA approved and recognized by the US Underwriters Laboratories.

### Protection of Internally Rectified Coils

Note

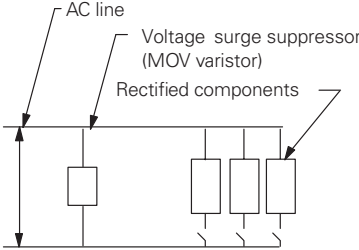
Solenoid valve coil details are shown in section C.

The rectifiers used in these coils may require protection from high voltage surges in some electrical circuits containing highly inductive or capacitive components. These include certain types of motors, solenoids, relays, and transformers.

Protection is simple and inexpensive. It consists of installing a commercially available voltage surge suppressor like the General Electric MOV varistor V130LA20A for 115 volts AC or the V250LA20A for 230 volts AC, across the AC line

supplying the rectified components. A single suppressor will normally protect all of the rectified components in the circuit, as shown in the surge suppressor circuit diagram below.

Surge suppressor circuit diagram



#### WARNING

Application of these products beyond published performance specifications may cause valve malfunction which may result in personal injury and/or damage to the machine.



#### WARNING

Maintain 5-8 Nm (4-6 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve or coil failure.



#### CAUTION

Coils may be hot to touch if used in continuous applications.

All voltage surge producing components must be installed on this side of suppressor.

Switches or relay contacts only. Relay coils must be connected on the line side of the surge suppressor.

No inductive or capacitive loads can be installed between the surge suppressor and rectified valves without additional precautions.

# SV13-10-O/OP/OS

Poppet type, normally open solenoid valve, 350 bar (free reverse flow)

## Description

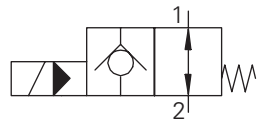
The SV13-10-O is a 2-way, 2-position, pilot operated, poppet type, normally open screw-in solenoid cartridge valve.

## Operation

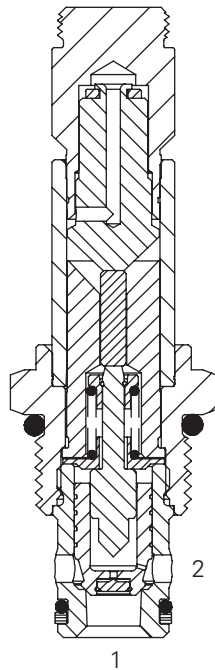
In the de-energized position, this valve allows bi-directional flow between port 1 and port 2.

In the energized position, flow is blocked from port 2 to port 1, and is allowed from port 1 to port 2, when coil forces are overcome.

## Functional Symbol



## Sectional View



## Application Note

This valve is pilot operated and requires a minimum flow of 1-2 L/min (0.3- .5 USgpm) in order to shift. For operation at very low flow conditions contact your Eaton representative.

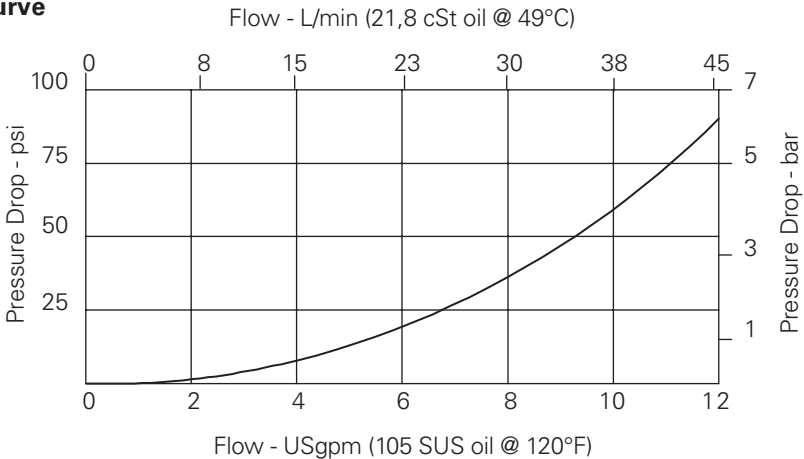
## RATINGS AND SPECIFICATIONS

*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)
Rated flow	45 L/min (12 USgpm)
Internal leakage	less than 5 drops/min. max @ 350 bar (5000 psi)
Temperature range	-40° to 100°C (-40° to 212°F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Cavity	C-10-2
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Steel
Weight cartridge only	0,18 kg (0.39 lbs)
Seal kit	565803 (Buna-N), 566086 (Viton®) Viton is a registered trademark of E.I. DuPont

## Pressure Drop Curve

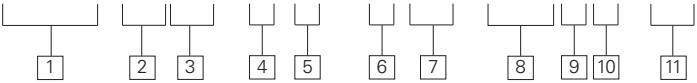
Cartridge only



Port 1 to port 2 and port 2 to port 1 de-energized



SV13 – 10 (V) – O (\*) – (S) \*\* – \*\*\*\*\* \* H – 00



**1 Function**  
**SV13** - Solenoid valve

**2 Size**  
**10** - 10 size

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

**4 Style**  
**O** - Normally open

**5 Manual override option**  
**Blank** - No manual override  
**P** - Push type  
**S** - Screw type  
For valve dimensions with manual override option installed see page A-152.

**6 Valve housing material**  
**Blank** - Cartridge only  
**S** - Steel

**7 Port Size**

CODE	PORT SIZE	HOUSING NUMBER
<b>0</b>	Cartridge only	
<b>2G</b>	1/4" BSPP	02-175102
<b>3G</b>	3/8" BSPP	02-175103
<b>6T</b>	SAE 6	02-175100
<b>8T</b>	SAE 8	02-175101

See section J for housings.

**8 Voltage rating**  
**00** - No coil  
**12D** - 12VDC  
**24D** - 24VDC  
**36D** - 36VDC  
**24A** - 24VAC  
**115A** - 115VAC  
**230A** - 230VAC  
**12B** - 12VDC/w diode\*  
**24B** - 24VDC/w diode\*  
\*Optional arc suppression diode.

**9 Connector types**  
**Blank** - No coil  
**G** - ISO 4400 DIN 43650  
**Q** - Spade terminals  
**W** - Leadwire  
**N** - Deutsch (DC only)  
**Y** - Amp JR (DC only)  
**D** - Metripack 150 male (DC only)  
**J** - Metripack 280 male (DC only)


**10 Coil series**  
**H** - 10 series, 29 W  
For dimensions see Section C.

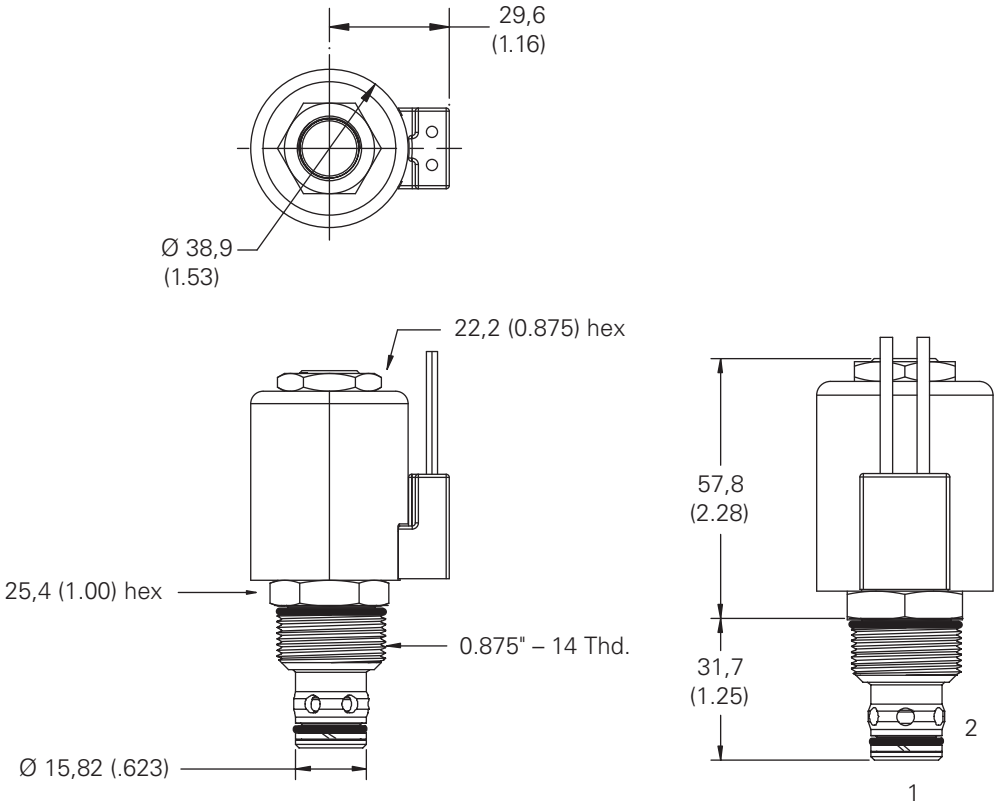
**11 Special features**  
**00** - None  
(Only required if valve has special features, omitted if "00.")

**Dimensions**  
mm (inch)

Torque cartridge in steel housing 68-75 Nm (50-55 ft. lbs)

Note  
When solenoid valve is ordered as cartridge only, nut is included.

 **WARNING**  
Maintain 5-8 Nm (4-6 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.



# SV3-10-C/CM/CR

Poppet type, normally closed solenoid valve (free reverse flow)

## Description

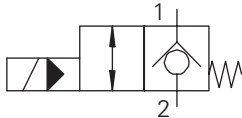
The SV3-10-C is a 2-way, 2-position, poppet-type, normally closed screw-in cartridge solenoid valve.

## Operation

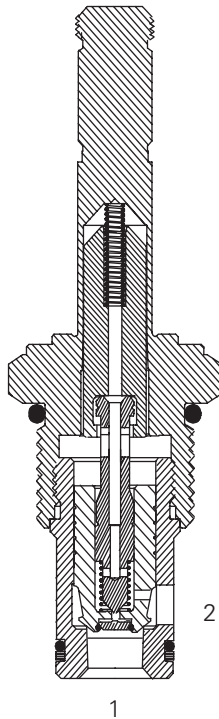
In the de-energized position, flow is blocked from port 2 to port 1 and free flow is allowed from port 1 to port 2.

In the energized position, the poppet lifts to allow flow in either direction.

## Functional Symbol



## Sectional View



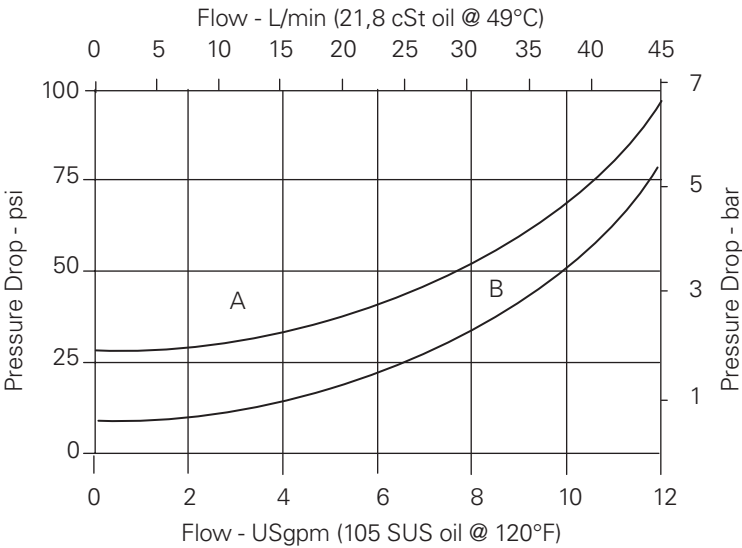
## RATINGS AND SPECIFICATIONS

*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	less than 5 drops/min. max @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Cavity	C-10-2
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Aluminum
Weight cartridge only	0,4 kg (0.87 lbs)
Seal kit	565803 (Buna-N), 566086 (Viton®) <small>Viton is a registered trademark of E.I. DuPont</small>

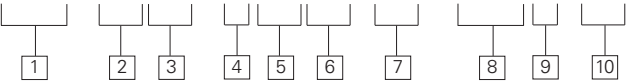
## Pressure Drop Curves

Cartridge only



**A** - Port 1 to port 2 de-energized  
**B** - Port 2 to port 1 energized

SV3 – 10 (V) – C (\*) (F) – \*\* – \*\*\*\*\* – 00



1 Function

**SV3** - Solenoid valve

2 Size

**10** - 10 size

3 Seal material

**Blank** - Buna-N  
**V** - Viton®

4 Style

**C** - Normally closed

5 Manual override option

**Blank** - No manual override  
**M** - Knob type  
**R** - Cable type

For valve dimensions with manual override option installed see page A-153.

6 Filter option

**Blank** - None  
**F** - Filter screen

Dimensions

mm (inch)

Torque cartridge in aluminum housing 47-54 Nm (35-40 ft. lbs)

Note

When solenoid valve is ordered as cartridge only, coil nut is included.



**WARNING**

Maintain 5-8 Nm (4-6 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.

7 Port Size

CODE	PORT SIZE	HOUSING NUMBER
<b>0</b>	Cartridge only	
<b>3B</b>	3/8" BSPP	02-175462*
<b>2G</b>	1/4" BSPP	876702
<b>3G</b>	3/8" BSPP	876703
<b>6T</b>	SAE 6	566151*
<b>6H</b>	SAE 6	876700
<b>8H</b>	SAE 8	876701

\*Light duty housing  
See section J for housing details.

8 Voltage rating

**00** - No coil  
**12D** - 12VDC  
**24D** - 24VDC  
**36D** - 36VDC

**24A** - 24VAC  
**115A** - 115VAC  
**230A** - 230VAC  
**12B** - 12VDC/w diode\*  
**24B** - 24VDC/w diode\*  
\*Optional arc suppression diode.

9 Connector types

**Blank** - No coil  
**G** - ISO 4400 DIN 43650  
**Q** - Spade terminals  
**W** - Leadwire  
**N** - Deutsch (DC only)  
**Y** - Amp JR (DC only)  
**D** - Metripack 150 male (DC only)  
**J** - Metripack 280 male (DC only)

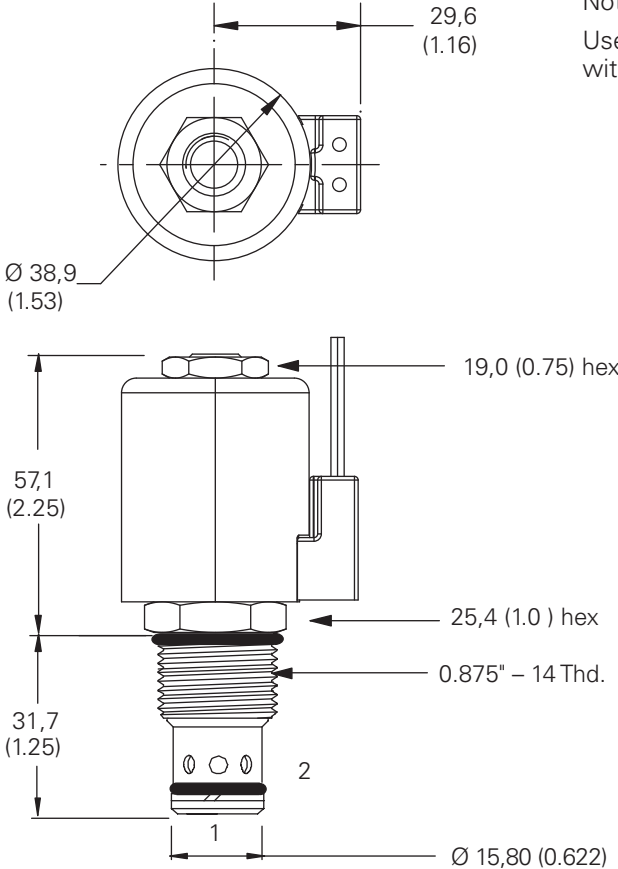
For coil part numbers and dimensions see Section C.

10 Special features

**00** - None  
(Only required if valve has special features, omitted if "00.")

Note

Use J series, 23 W coils with this solenoid valve.



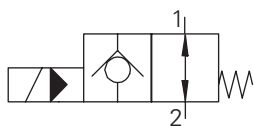
# SV13-12-O/OP/OS

Poppet type normally open solenoid valve, 350 bar

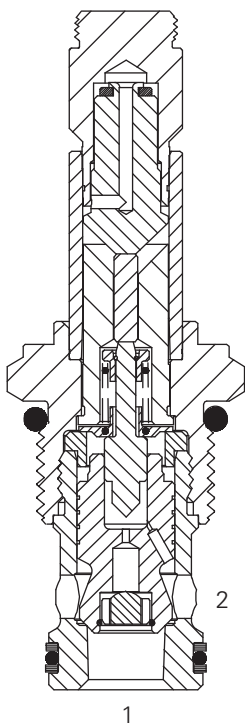
## Description

The SV13-12-O is a 2-way, 2-position, pilot operated, poppet type, normally open screw-in cartridge solenoid valve.

## Functional Symbol



## Sectional View



## Application Note

This valve is pilot operated and requires a minimum flow of 1-2 L/min (0.3 - 0.5 USgpm) in order to shift. For operation at very low flow conditions contact your Eaton representative.

## Operation

In the de-energized position, flow can pass through the valve from port 1 to port 2, or from port 2 to port 1.

In the energized position, flow is blocked from port 2 to port 1, and allowed from port 1 to port 2 when the coil force is overcome.

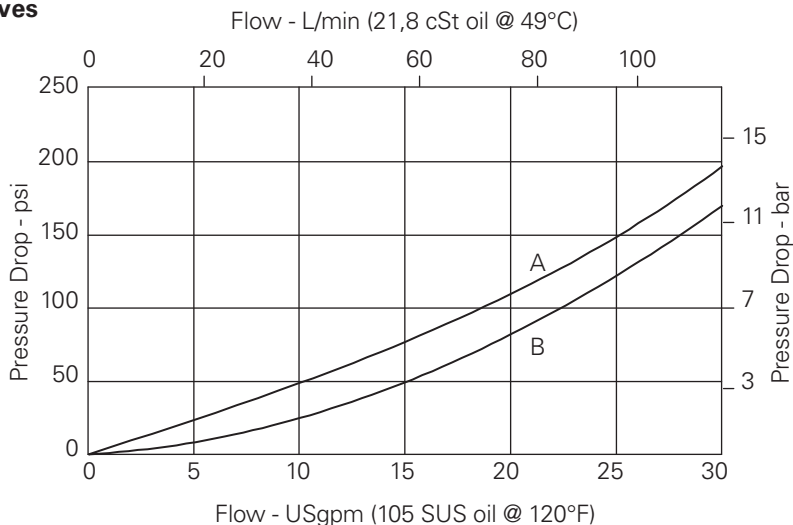
## RATINGS AND SPECIFICATIONS

*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)
Rated flow	114 L/min (30 USgpm)
Internal leakage	less than 5 drops/min. max @ 350 bar (5000 psi)
Temperature range	-40° to 100°C (-40° to 212°F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Cavity	C-12-2 or C-12-2U Add "U" after number if undercut is required. If undercut is not specified, expect 10 psi@15 USgpm and 20 psi @ 30 USgpm higher pressure drop.
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Steel
Weight cartridge only	0,27 kg (0.59 lbs)
Seal kit	02-165889 (Buna-N), 02-165888 (Viton®) Viton is a registered trademark of E.I. DuPont

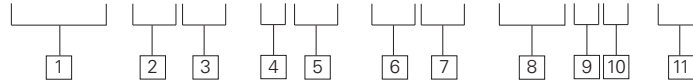
## Pressure Drop Curves

Cartridge only



**A** - Port 1 to port 2 de-energized  
**B** - Port 2 to port 1 de-energized

## SV13 – 12 (V) – O (\*) – (S) \*\* – \*\*\*\*\* \* H – 00

**1 Function****SV13** - Solenoid valve**2 Size****12** - 12 size**3 Seal material****Blank** - Buna-N**V** - Viton®**4 Style****O** - Normally open**5 Manual override option****Blank** - No manual override**P** - Push type**S** - Screw type

For valve dimensions with manual override option installed see page A-152.

**6 Valve housing material****Blank** - Cartridge only**S** - Steel**7 Port Size**

CODE	PORT SIZE	HOUSING NUMBER
<b>0</b>	Cartridge only	
<b>4G</b>	1/2" BSPP	02-175062
<b>4GU</b>	1/2" BSPP	02-172512
<b>6G</b>	3/4" BSPP	02-169665
<b>6GU</b>	3/4" BSPP	02-162922
<b>10T</b>	SAE 10	02-169744
<b>10TU</b>	SAE 10	02-169817
<b>12T</b>	SAE 12	02-169782
<b>12TU</b>	SAE 12	02-169790

See section J for housings.

**8 Voltage rating****00** - No coil**12D** - 12VDC**24D** - 24VDC**36D** - 36VDC**24A** - 24VAC**115A** - 115VAC**230A** - 230VAC**12B** - 12VDC/w diode\***24B** - 24VDC/w diode\*

\*Optional arc suppression diode.

**9 Connector types****Blank** - No coil**G** - ISO 4400 DIN 43650**Q** - Spade terminals**W** - Leadwire**N** - Deutsch (DC only)**Y** - Amp JR (DC only)**D** - Metripack 150 male (DC only)**J** - Metripack 280 male (DC only)**10 Coil series****H** - 10 series, 29 W

For coil dimensions see Section C.

**11 Special features****00** - None

(Only required if valve has special features, omitted if "00.")

**Dimensions**

mm (inch)

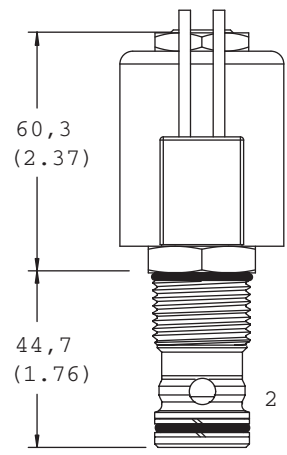
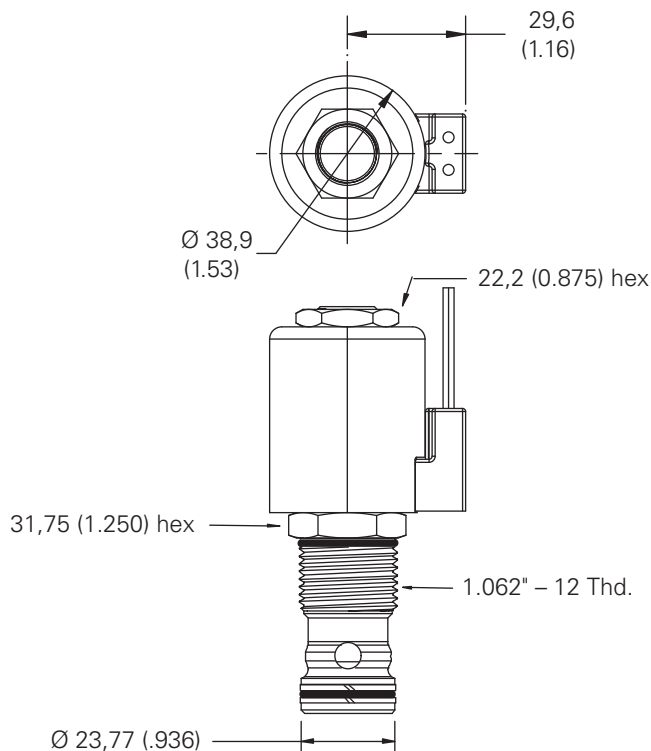
Torque cartridge in steel housing 102-115 Nm (75-85 ft. lbs)

**Note**

When solenoid valve is ordered as cartridge only, nut is included.

**WARNING**

Maintain 5-8 Nm (4-6 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.



1

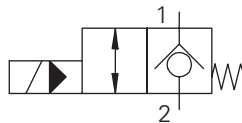
# SV3-12-C/CM/CR

Poppet type, normally closed solenoid valve (free reverse flow)

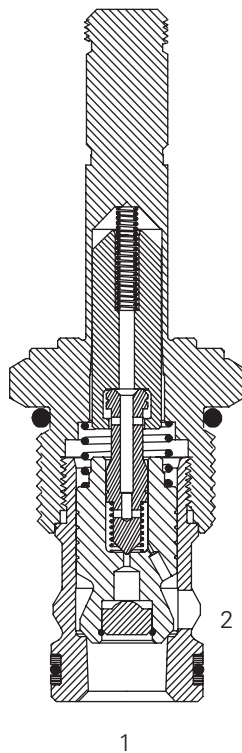
## Description

The SV3-12-C is a 2-way, 2-position, poppet-type, pilot-operated, normally closed solenoid cartridge valve.

## Functional Symbol



## Sectional View



## Operation

In the de-energized position, flow is blocked from port 2 to port 1 and free flow is allowed from port 1 to port 2.

In the energized position, the poppet lifts to allow flow in either direction.

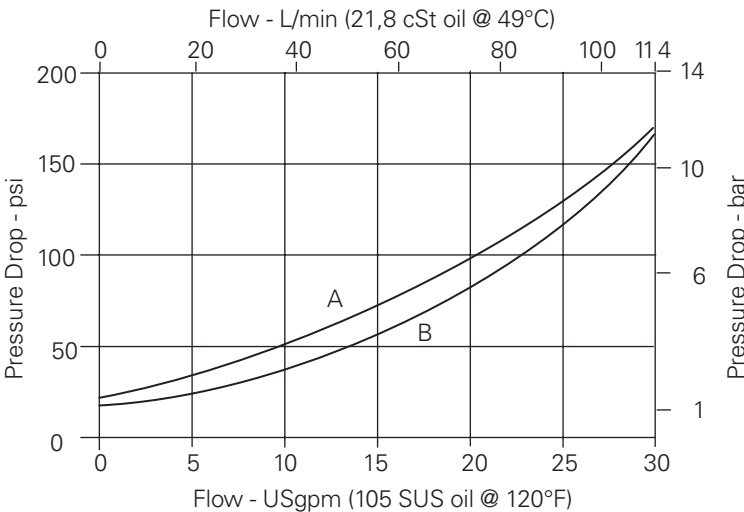
## RATINGS AND SPECIFICATIONS

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)
Internal leakage (port 2 to port 1)	less than 5 drops/min. max @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Response times (100% rated voltage and flow)	Energize: 75 ms De-Energize: 150 ms
Cavity	C-12-2 or C-12-2U Add "U" after number if undercut is required. If undercut is not specified, expect 10 psi @ 15 USgpm and 20 psi @ 30 USgpm higher pressure drop.
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Aluminum
Weight including coil	0,336 kg (0.74 lbs)
Seal kit	02-165889 (Buna-N), 02-165888 (Viton®) Viton is a registered trademark of E.I. DuPont

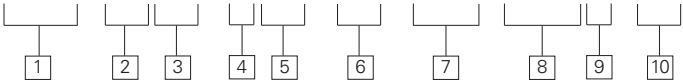
## Pressure Drop Curves

Cartridge only



A - Port 1 to port 2 de-energized  
B - Port 2 to port 1 energized

SV3 – 12 (V) – C (\*) – (A) – \*\*\* – \*\*\*\*\* – 00



- 1 **Function**

**SV3** - Solenoid valve
- 2 **Size**

**12** - 12 size
- 3 **Seal material**

**Blank** - Buna-N  
**V** - Viton®
- 4 **Style**

**C** - Normally closed
- 5 **Manual override option**

**Blank** - No manual override  
**M** - Knob type  
**R** - Cable type

For valve dimensions with manual override option installed see page A-153.
- 6 **Valve housing material**

Omit for cartridge only  
**A** - Aluminum (standard)  
**S** - Steel

CODE	PORT SIZE	HOUSING NUMBER	
		Aluminum	Steel
<b>0</b>	Cartridge only		
<b>4G</b>	1/2" BSPP	02-161118	02-172062
<b>4GU</b>	1/2" BSPP	02-161116	02-172512
<b>6G</b>	3/4" BSPP	02-161117	02-169665
<b>6GU</b>	3/4" BSPP	02-161115	02-162922
<b>10T</b>	SAE 10	02-160640	02-169744
<b>10TU</b>	SAE 10	02-160641	02-169817
<b>12T</b>	SAE 12	02-160644	02-169782
<b>12TU</b>	SAE 12	02-160645	02-169790

See section J for housing details.

- 8 **Voltage rating**

**00** - No coil  
**12D** - 12VDC  
**24D** - 24VDC  
**36D** - 36VDC
- 24A** - 24VAC  
**115A** - 115VAC  
**230A** - 230VAC  
**12B** - 12VDC/w diode\*  
**24B** - 24VDC/w diode\*

\*Optional arc suppression diode.

- 9 **Connector types**

**Blank** - No coil  
**G** - ISO 4400 DIN 43650  
**Q** - Spade terminals  
**W** - Leadwire  
**N** - Deutsch (DC only)  
**Y** - Amp JR (DC only)  
**D** - Metripack 150 male (DC only)  
**J** - Metripack 280 male (DC only)

For coil part numbers and dimensions see Section C.

- 10 **Special features**

**00** - None

(Only required if valve has special features, omitted if "00.")

Note

Use J series, 23 W coils with this solenoid valve.

Dimensions

mm (inch)

Torque cartridge in housing

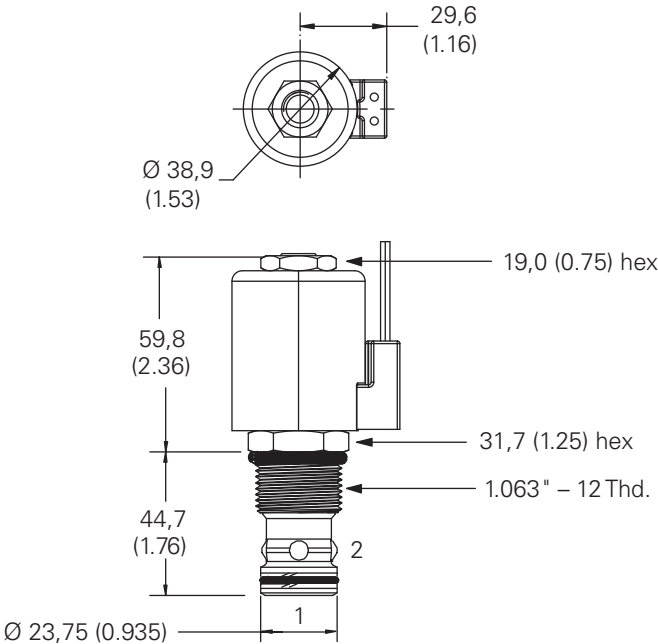
**A** - 81-95 Nm (60-70 ft. lbs)  
**S** - 102-115 Nm (75-85 ft. lbs)

Note

When solenoid valve is ordered as cartridge only, coil nut is included.

**WARNING**

Maintain 5-8 Nm (4-6 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.



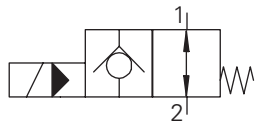
# SV13-16-O/OP/OS

Poppet type normally open solenoid valve, 350 bar

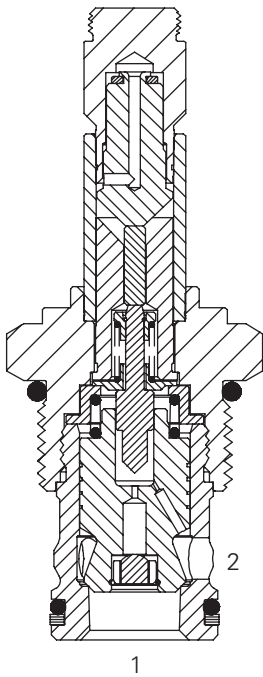
### Description

The SV13-16-O is a 2-way, 2-position, pilot operated, poppet type, normally open screw-in cartridge solenoid valve.

### Functional Symbol



### Sectional View



### Application Note

This valve is pilot operated and requires a minimum flow of 1-2 L/min (0.3 - .5 USgpm) in order to shift. For operation at very low flow conditions contact your Eaton representative.

### Operation

In the de-energized position, this valve allows bi-directional flow between port 1 and port 2. In the energized position,

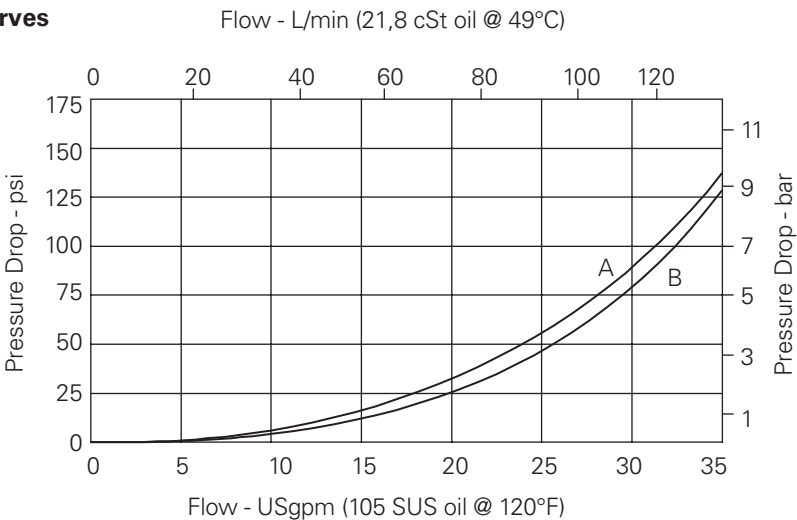
flow is blocked from port 2 to port 1 and allowed from port 1 to port 2, when the coil forces are overcome.

### RATINGS AND SPECIFICATIONS

<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
Typical application pressure (all ports)	350 bar (5000 psi)
Cartridge fatigue pressure (infinite life)	310 bar (4500 psi)
Rated flow	132 L/min (35 USgpm)
Internal leakage	less than 5 drops/min. max @ 350 bar (5000 psi)
Temperature range	-40° to 100°C (-40° to 212°F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Cavity	C-16-2
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Steel
Weight cartridge only	0,39 kg (0.85 lbs)
Seal kit	565810 (Buna-N), 889609 (Viton®) <small>Viton is a registered trademark of E.I. DuPont</small>

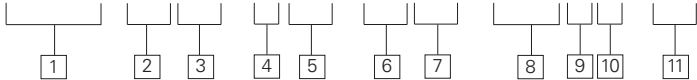
### Pressure Drop Curves

Cartridge only





SV13 – 16 (V) – O (\*) – (S) \*\* – \*\*\*\*\* \* H – 00



- 1 **Function**

**SV13** - Solenoid valve
- 2 **Size**

**16** - 16 size
- 3 **Seal material**

**Blank** - Buna-N  
**V** - Viton®
- 4 **Style**

**O** - Normally open
- 5 **Manual override option**

**Blank** - No manual override  
**P** - Push type  
**S** - Screw type

For valve dimensions with manual override option installed see page A-152.

- 6 **Valve housing material**

**Blank** - Cartridge only  
**S** - Steel
- 7 **Port Size**

CODE	PORT SIZE	HOUSING NUMBER
<b>0</b>	Cartridge only	
<b>4G</b>	1/2" BSPP	02-175106
<b>6G</b>	3/4" BSPP	02-175107
<b>10T</b>	SAE 10	02-175104
<b>12T</b>	SAE 12	02-175105

See section J for housings.

- 8 **Voltage rating**

**00** - No coil  
**12D** - 12VDC  
**24D** - 24VDC  
**36D** - 36VDC
- 24A** - 24VAC  
**115A** - 115VAC  
**230A** - 230VAC  
**12B** - 12VDC/w diode\*  
**24B** - 24VDC/w diode\*  
\*Optional arc suppression diode.

- 9 **Connector types**

**Blank** - No coil  
**G** - ISO 4400 DIN 43650  
**Q** - Spade terminals  
**W** - Leadwire  
**N** - Deutsch (DC only)  
**Y** - Amp JR (DC only)  
**D** - Metripack 150 male (DC only)  
**J** - Metripack 280 male (DC only)
- 10 **Coil series**

**H** - 10 series, 29 W

For coil dimensions see Section C.

- 11 **Special features**

**00** - None

(Only required if valve has special features, omitted if "00.")

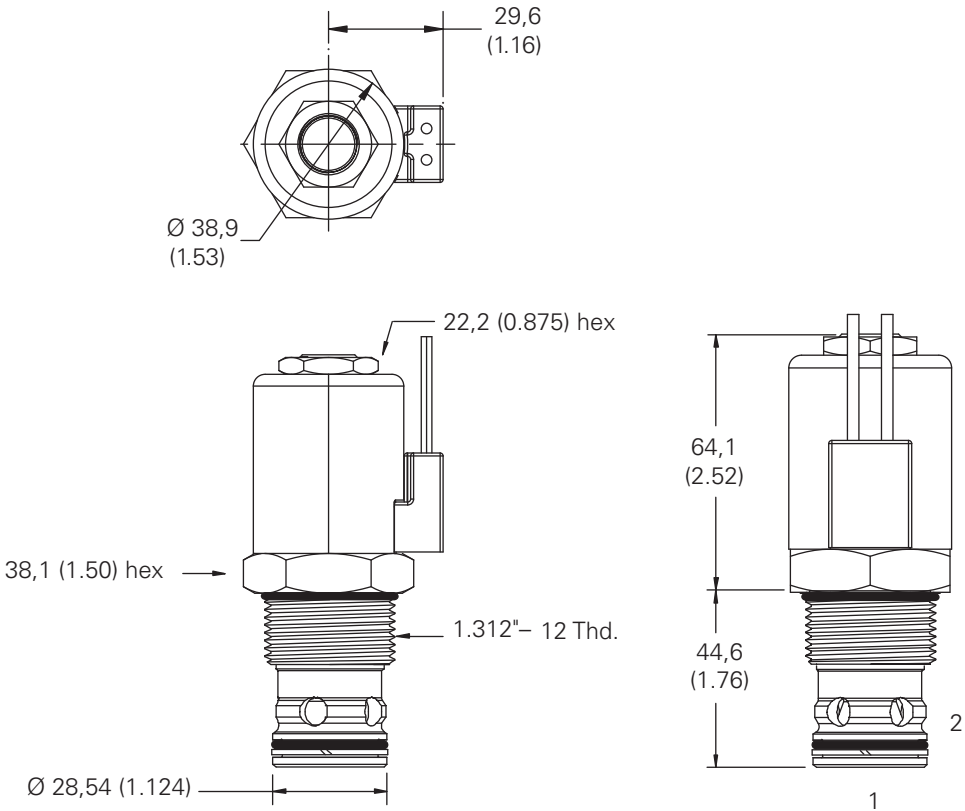
Dimensions  
mm (inch)

Torque cartridge in steel housing 136-149 Nm (100-110 ft. lbs)

Note  
When solenoid valve is ordered as cartridge only, nut is included.

**WARNING**

Maintain 5-8 Nm (4-6 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.



# SV2-20-C/CM/CR

Poppet type, normally closed solenoid valve (free reverse flow)

## Description

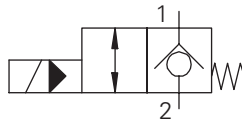
The SV2-20-C is a 2-way, 2-position, poppet type, pilot operated, normally closed screw-in cartridge solenoid valve.

## Operation

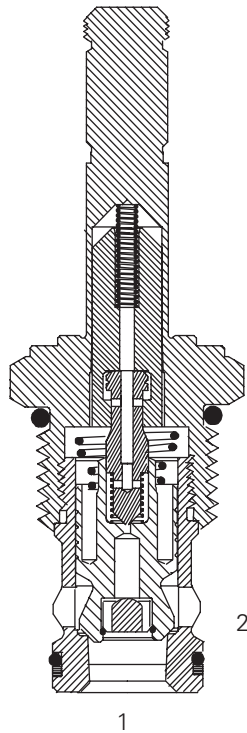
In the de-energized position, flow is blocked from port 2 to port 1 and free flow is allowed from port 1 to port 2.

In the energized position, bi-directional flow is allowed between port 1 and port 2.

## Functional Symbol



## Sectional View



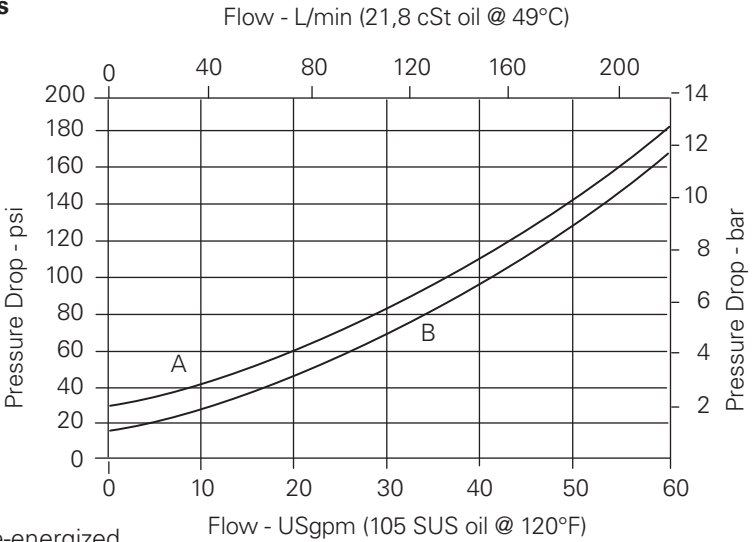
## RATINGS AND SPECIFICATIONS

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

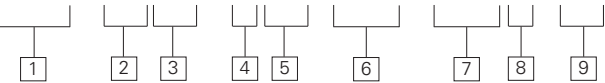
Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	227 L/min (60 USgpm)
Internal leakage, port 2 to port 1	less than 5 drops/min. max @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Cavity	C-20-2
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Aluminum
Weight including coil	1,2 kg (2.70 lbs)
Seal kit	889615 (Buna-N), 889619 (Viton®) <small>Viton is a registered trademark of E.I. DuPont</small>

## Pressure Drop Curves

Cartridge only



SV2 – 20 (V) – C (\*) – \*\*\* – \*\*\*\*\* – 00



- 1 **Function**

**SV2** - Solenoid valve
- 2 **Size**

**20** - 20 size
- 3 **Seal material**

**Blank** - Buna-N  
**V** - Viton®
- 4 **Style**

**C** - Normally closed

- 5 **Manual override option**

**Blank** - No manual override  
**M** - Knob type  
**R** - Cable type


For valve dimensions with manual override option installed see page A-153.

Dimensions

mm (inch)

Torque cartridge in aluminum housing 128-155 Nm (95-115 ft. lbs)

Note  
When solenoid valve is ordered as cartridge only, coil nut is included.

 **WARNING**  
Maintain 5-8 Nm (4-6 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.

6 **Port Size**

CODE	PORT SIZE	HOUSING NUMBER
0	Cartridge only	
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

\*Light duty housing  
See section J for housing details.

- 7 **Voltage rating**

**00** - No coil  
**12D** - 12VDC  
**24D** - 24VDC  
**36D** - 36VDC
- 24A** - 24VAC  
**115A** - 115VAC  
**230A** - 230VAC  
**12B** - 12VDC/w diode\*  
**24B** - 24VDC/w diode\*

\*Optional arc suppression diode.

- 8 **Connector types**

**Blank** - No coil  
**G** - ISO 4400 DIN 43650  
**Q** - Spade terminals  
**W** - Leadwire  
**N** - Deutsch (DC only)  
**Y** - Amp JR (DC only)  
**D** - Metripack 150 male (DC only)  
**J** - Metripack 280 male (DC only)

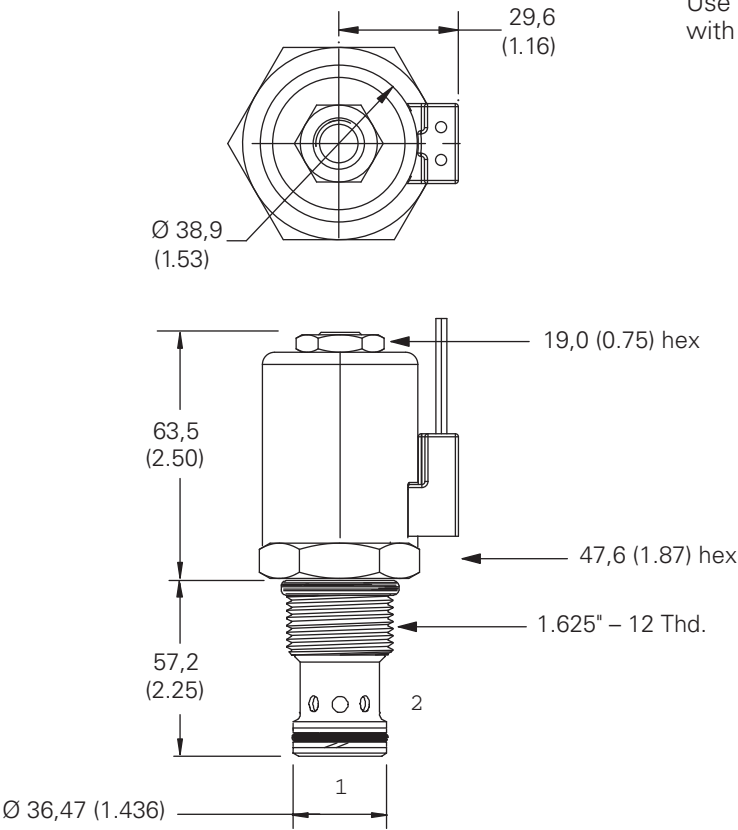
For coil part numbers and dimensions see Section C.

- 9 **Special features**

**00** - None

(Only required if valve has special features, omitted if "00.")
- Note

Use J series, 23 W coils with this solenoid valve.



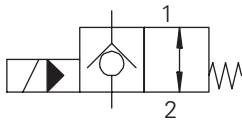
# SV3-20-O/OP/OS

Poppet type, normally open solenoid valve

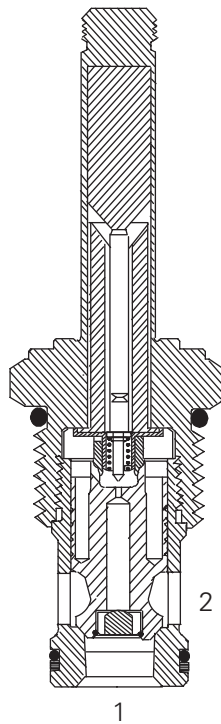
### Description

The SV3-20-O is a 2-way, 2-position, poppet type, pilot operated, normally open, screw-in cartridge solenoid valve.

### Functional Symbol



### Sectional View



### Operation

In the de-energized position, this valve allows bi-directional flow between port 1 and port 2. In the energized position,

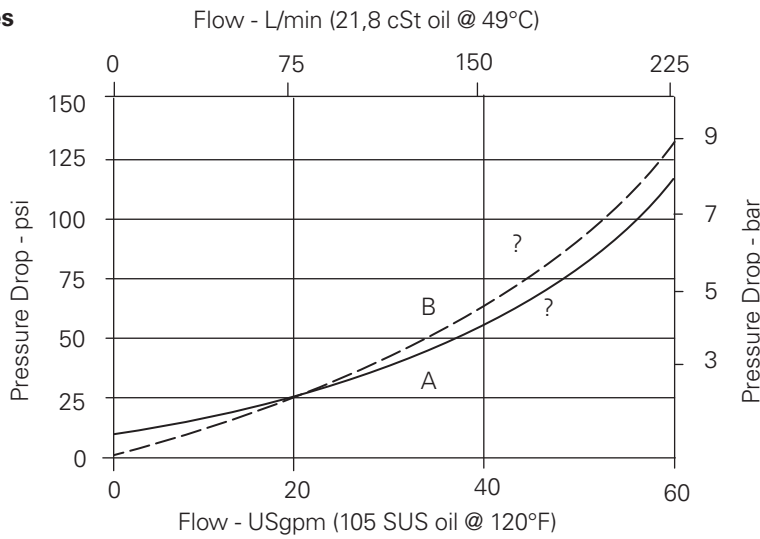
flow is blocked from port 2 to port 1 and allowed from port 1 to port 2 when coil forces are overcome.

### RATINGS AND SPECIFICATIONS

<i>Performance data is typical with fluid at 21,8 cST (105 SUS) and 49°C (120°F)</i>	
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)
Internal leakage, port 2 to port 1	less than 5 drops/min. max @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Response times (100% rated voltage and flow)	Energize: 75 ms De-Energize: 150 ms
Cavity	C-20-2
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Aluminum
Weight including coil	1,2 kg (2.70 lbs)
Seal kit	889615 (Buna-N), 889619 (Viton®) <small>Viton is a registered trademark of E.I. DuPont</small>

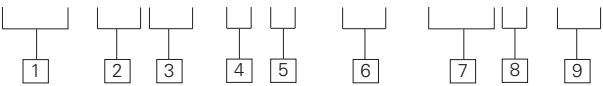
### Pressure Drop Curves

Cartridge only



- A - Port 2 to port 1 and port 1 to port 2 de-energized
- B - Port 1 to port 2 energized

SV3 – 20 (V) – O (\*) – \*\*\* – \*\*\*\*\* \* – 00



1 Function

**SV3** - Solenoid valve

2 Size

**20** - 20 size

3 Seal material

**Blank** - Buna-N

**V** - Viton®

4 Style

**C** - Normally open

5 Manual override option

**Blank** - No manual override

**P** - Push type

**S** - Screw type

For valve dimensions with manual override option installed see page A-152.

6 Port Size

CODE	PORT SIZE	HOUSING NUMBER
<b>0</b>	Cartridge only	
<b>8B</b>	1" BSPP	02-175464*
<b>16T</b>	SAE 16	566409*
<b>6G</b>	3/4" BSPP	876732
<b>8G</b>	1" BSPP	876734
<b>12H</b>	SAE 12	876733
<b>16H</b>	SAE 16	876735

\*Light duty housings.  
See pages J-3 and J-4 for housings.

7 Voltage rating

**00** - No coil

**12D** - 12VDC

**24D** - 24VDC

**36D** - 36VDC

**24A** - 24VAC

**115A** - 115VAC

**230A** - 230VAC

**12B** - 12VDC/w diode\*

**24B** - 24VDC/w diode\*

\*Optional arc suppression diode.

8 Connector types

**Blank** - No coil

**G** - ISO 4400 DIN 43650

**Q** - Spade terminals

**W** - Leadwire

**N** - Deutsch (DC only)

**Y** - Amp JR (DC only)

**D** - Metripack 150 male (DC only)

**J** - Metripack 280 male (DC only)

For coil dimensions see Section C.

9 Special features

**00** - None

(Only required if valve has special features, omitted if "00.")

Note

Use J series, 23 W coils with this solenoid valve.

Dimensions

mm (inch)

Torque cartridge in aluminum housing 128-155 Nm (95-115 ft. lbs)

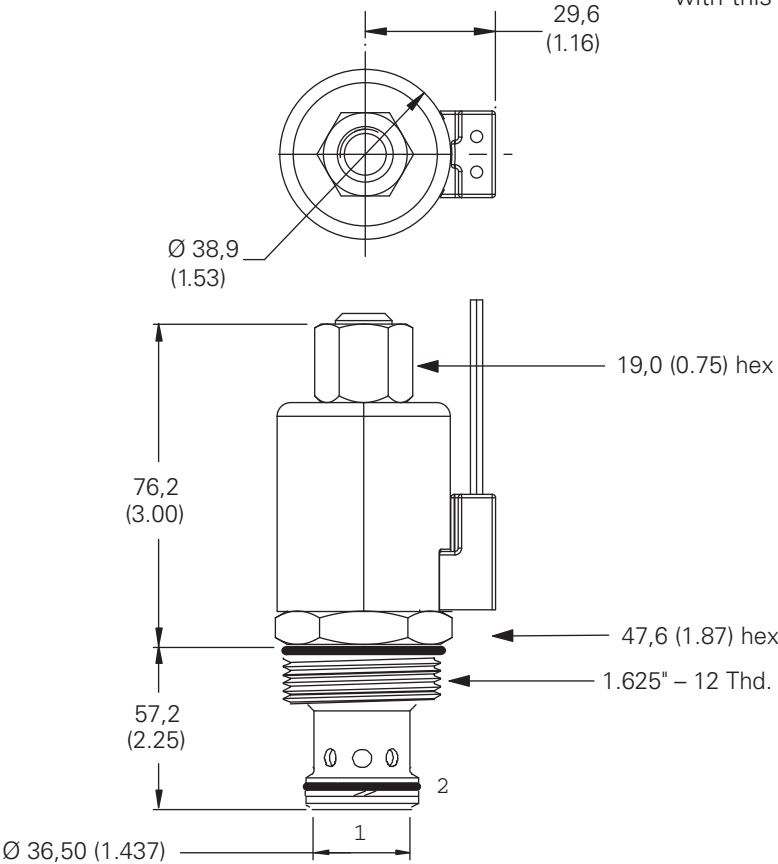
Note

When solenoid valve is ordered as cartridge only, coil nut is included.



WARNING

Maintain 5-8 Nm (4-6 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.



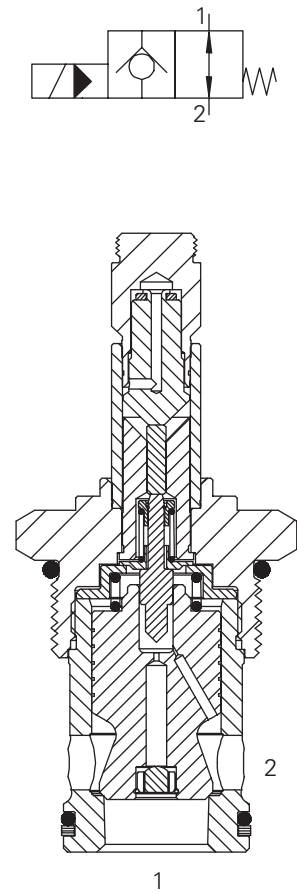
# SV13-20-O/OP/OS

Poppet type, normally open solenoid valve

## Description

The SV13-20-O is a 2-way, 2-position, pilot operated, poppet type, normally open screw-in cartridge solenoid valve.

## Functional Symbol



## Application Note

This valve is pilot operated and requires a minimum flow of 1-2 L/min (0.3 - .5 USgpm) in order to shift. For operation at very low flow conditions contact your Eaton representative.

## Operation

In the de-energized position, this valve allows bi-directional flow between port 1 and port 2. In the energized position,

flow is blocked from port 2 to port 1 and allowed from port 1 to port 2, when the coil forces are overcome.

## RATINGS AND SPECIFICATIONS

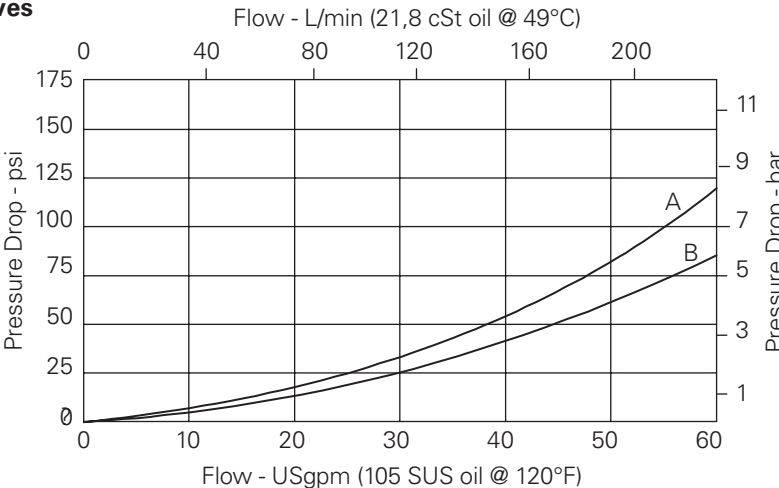
*Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)*

Typical application pressure (all ports)	350 bar (5000 psi)*
Cartridge fatigue pressure (infinite life)	310 bar (4500 psi)
Rated flow	227 L/min (60 USgpm)
Internal leakage, port 2 to port 1	less than 5 drops/min. max @ 350 bar (5000 psi)
Temperature range	-40° to 100°C (-40° to 212°F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Cavity	C-20-2
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Steel
Weight cartridge only	0,62 kg (1.37 lbs)
Seal kit	889615 (Buna-N), 889619 (Viton®) Viton is a registered trademark of E.I. DuPont

\*For application pressure over 280 bar (4000 psi) consult factory

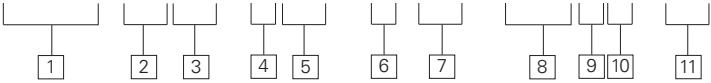
## Pressure Drop Curves

Cartridge only



**A** - Port 2 to port 1 de-energized  
**B** - Port 1 to port 2

SV13 – 20 (V) – O (\*) – (S) \*\*\* – \*\*\*\*\* H – 00



**1 Function**  
**SV13** - Solenoid valve

**2 Size**  
**20** - 20 size

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

**4 Style**  
**O** - Normally open

**5 Manual override option**  
**Blank** - No manual override  
**P** - Push type  
**S** - Screw type  
For valve dimensions with manual override option installed see page A-152.

**6 Valve housing material**  
**Blank** - Cartridge only  
**S** - Steel

**7 Port Size**

CODE	PORT SIZE	HOUSING NUMBER
<b>0</b>	Cartridge only	
<b>6G</b>	3/4" BSPP	02-175110
<b>8G</b>	1" BSPP	02-175111
<b>12T</b>	SAE 12	02-175108
<b>16T</b>	SAE 16	02-175109

See section J for housings.

**8 Voltage rating**  
**00** - No coil  
**12D** - 12VDC  
**24D** - 24VDC  
**36D** - 36VDC  
**24A** - 24VAC  
**115A** - 115VAC  
**230A** - 230VAC  
**12B** - 12VDC/w diode\*  
**24B** - 24VDC/w diode\*  
\*Optional arc suppression diode.

**9 Connector types**  
**Blank** - No coil  
**G** - ISO 4400 DIN 43650  
**Q** - Spade terminals  
**W** - Leadwire  
**N** - Deutsch (DC only)  
**Y** - Amp JR (DC only)  
**D** - Metripack 150 male (DC only)  
**J** - Metripack 280 male (DC only)


**10 Coil series**  
**H** - 10 series, 29 W  
For coil dimensions see Section C..

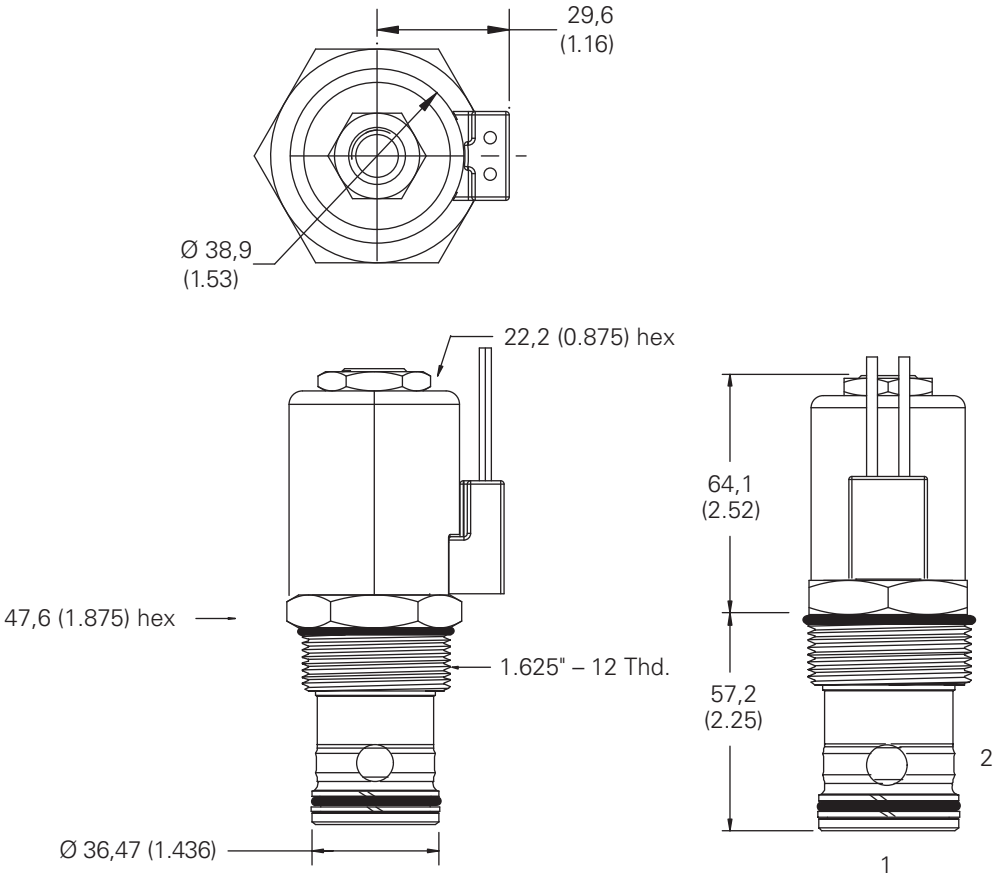
**9 Special features**  
**00** - None  
(Only required if valve has special features, omitted if "00.")

**Dimensions**  
mm (inch)

Torque cartridge in steel housing 163-183 Nm (120-135 ft. lbs)

Note  
When solenoid valve is ordered as cartridge only,

 **WARNING**  
Maintain 5-8 Nm (4-6 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.



# SV15-10-O/OP/OS

Poppet type normally open solenoid valve, 350 bar

### Description

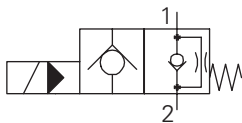
The SV15-10-O is a 2-way, 2-position, pilot operated, poppet type, normally open screw-in cartridge solenoid valve.

### Operation

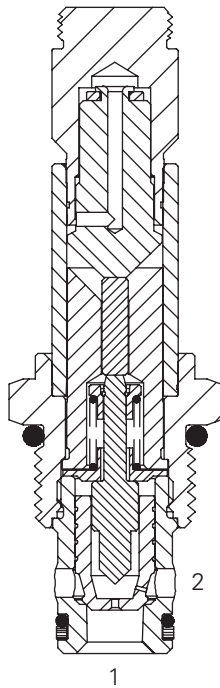
In the de-energized position, flow from port 1 to port 2 is restricted, while free flow is allowed from port 2 to port 1.

In the energized position, flow is blocked from port 2 to port 1, and flow is allowed from port 1 to port 2, when coil forces are overcome.

### Functional Symbol



### Sectional View



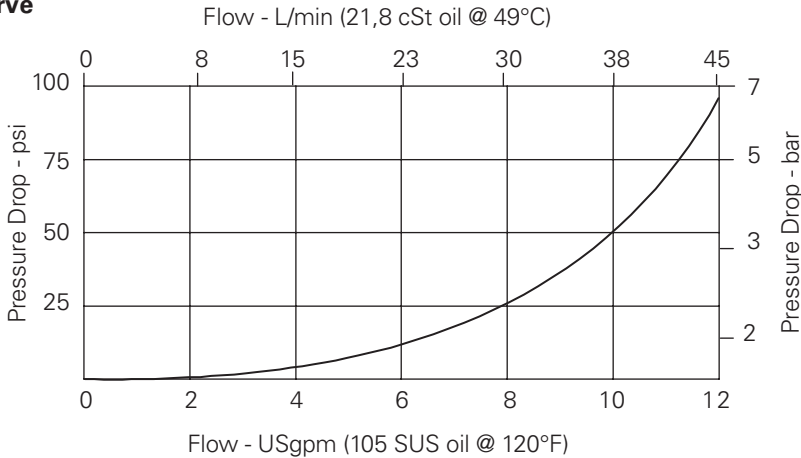
### RATINGS AND SPECIFICATIONS

*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)
Rated flow	45 L/min (12 USgpm)
Internal leakage	less than 5 drops/min. max @ 350 bar (5000 psi)
Temperature range	-40° to 100°C (-40° to 212°F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Cavity	C-10-2
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Steel
Weight cartridge only	0,18 kg (0.39 lbs)
Seal kit	565803 (Buna-N), 566086 (Viton®) <small>Viton is a registered trademark of E.I. DuPont</small>

### Pressure Drop Curve

Cartridge only



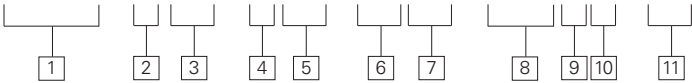
### Application Note

This valve is pilot operated and requires a minimum flow of 1-2 L/min (0.3- 0.5 USgpm) in order to shift. For operation at very low flow conditions contact your Eaton representative.

Port 2 to port 1 de-energized



SV15 – 10 (V) – O (\*) – (S) \*\* – \*\*\*\*\* \* H – 00



**1 Function**  
**SV15** - Solenoid valve

**2 Size**  
**10** - 10 size

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

**4 Style**  
**O** - Normally open

**5 Manual override option**  
**Blank** - No manual override  
**P** - Push type  
**S** - Screw type  
For valve dimensions with manual override option installed see page A-152.

**6 Valve housing material**  
**Blank** - Cartridge only  
**S** - Steel

**7 Port Size**

CODE	PORT SIZE	HOUSING NUMBER
<b>0</b>	Cartridge only	
<b>2G</b>	1/4" BSPP	02-175102
<b>3G</b>	3/8" BSPP	02-175103
<b>6T</b>	SAE 6	02-175100
<b>8T</b>	SAE 8	02-175101

See section J for housings.

**8 Voltage rating**  
**00** - No coil  
**12D** - 12VDC  
**24D** - 24VDC  
**36D** - 36VDC  
**24A** - 24VAC  
**115A** - 115VAC  
**230A** - 230VAC  
**12B** - 12VDC/w diode\*  
**24B** - 24VDC/w diode\*  
\*Optional arc suppression diode.

**9 Connector types**  
**Blank** - No coil  
**G** - ISO 4400 DIN 43650  
**Q** - Spade terminals  
**W** - Leadwire  
**N** - Deutsch (DC only)  
**Y** - Amp JR (DC only)  
**D** - Metripack 150 male (DC only)  
**J** - Metripack 280 male (DC only)


**10 Coil series**  
**H** - 10 series, 29 W  
For coil dimensions see Section C.

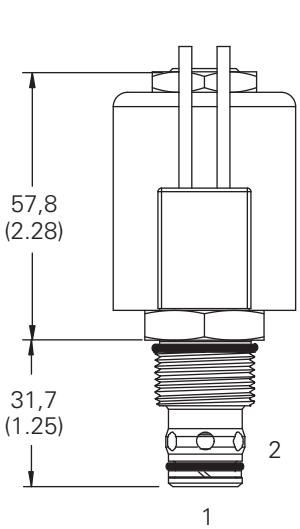
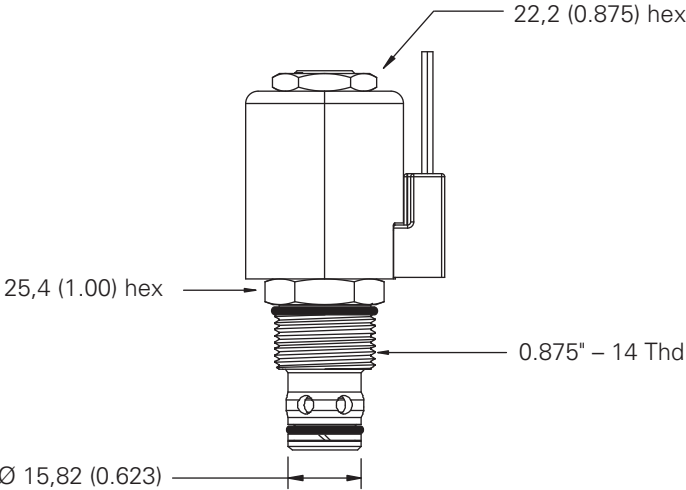
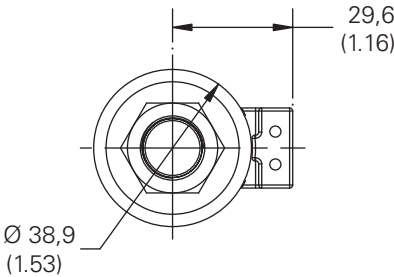
**11 Special features**  
**00** - None  
(Only required if valve has special features, omitted if "00.")

**Dimensions**  
mm (inch)

Torque cartridge in steel housing 68-74 Nm (50-55 ft. lbs)

**Note**  
When solenoid valve is ordered as cartridge only, nut is included.

 **WARNING**  
Maintain 5-8 Nm (4-6 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.



# SV11-10-C/CM

Poppet type, normally closed solenoid valve, 350 bar

### Description

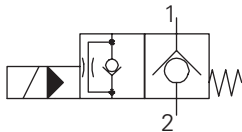
The SV11-10-C is a 2-way, 2-position, pilot operated, poppet type, normally closed, screw-in cartridge solenoid valve.

### Operation

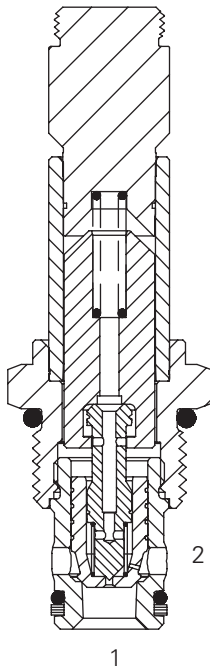
In the de-energized position, this valve blocks flow from port 2 to port 1 and free flow is allowed from port 1 to port 2.

In the energized position, flow from port 1 to port 2 is restricted while free flow is allowed from port 2 to port 1.

### Functional Symbol



### Sectional View

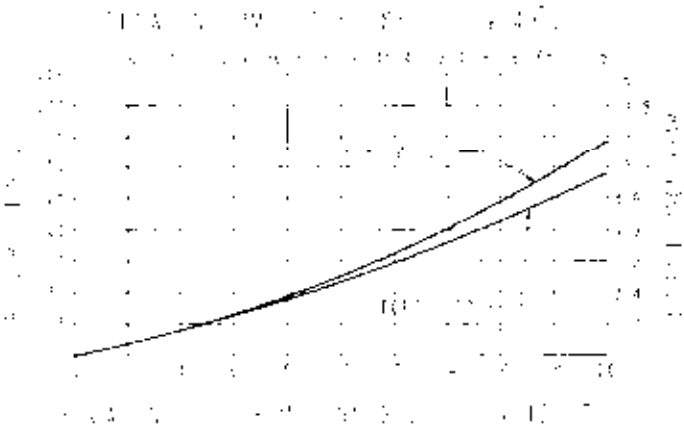


### RATINGS AND SPECIFICATIONS

<i>Performance data is typical with fluid at 21,8 cST (105 SUS) and 49°C (120°F)</i>	
Typical application pressure (all ports)	350 bar (5000 psi)
Cartridge fatigue pressure (infinite life)	310 bar (4500 psi)
Rated flow	45 L/min (12 USgpm)
Internal leakage, port 2 to port 1	5 drops/min. max @ 350 bar (5000 psi)
Temperature range	-40° to 100°C (-40° to 212°F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Cavity	C-10-2
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Steel
Weight cartridge only	0,18 kg (0.39 lbs)
Seal kit	565803 (Buna-N), 566086 (Viton®) <small>Viton is a registered trademark of E.I. DuPont</small>

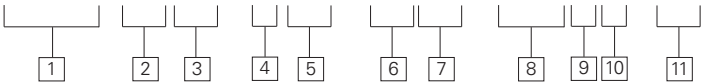
### Pressure Drop Curves

Cartridge only



**A** - Port 1 to port 2 de-energized  
**B** - Port 2 to port 1 energized

SV11 – 10 (V) – C (M) – (S) \*\* – \*\*\*\*\* \* H – 00



- 1 **Function**

**SV11** - Solenoid valve
- 2 **Size**

**10** - 10 size
- 3 **Seal material**

**Blank** - Buna-N  
**V** - Viton®
- 4 **Style**

**C** - Normally closed
- 5 **Manual override option**

**Blank** - No manual override  
**M** - Manual override

For valve dimensions with manual override option installed see page A-153.

6 **Valve housing material**

**Blank** - Cartridge only  
**S** - Steel

7 **Port Size**

CODE	PORT SIZE	HOUSING NUMBER
<b>0</b>	Cartridge only	
<b>2G</b>	1/4" BSPP	02-175102
<b>3G</b>	3/8" BSPP	02-175103
<b>6T</b>	SAE 6	02-175100
<b>8T</b>	SAE 8	02-175101

See section J for housing details.

8 **Voltage rating**

**00** - No coil  
**12D** - 12VDC  
**24D** - 24VDC  
**36D** - 36VDC

**24A** - 24VAC  
**115A** - 115VAC  
**230A** - 230VAC  
**12B** - 12VDC/w diode\*  
**24B** - 24VDC/w diode\*

\*Optional arc suppression diode.

- 9 **Connector types**

**Blank** - No coil  
**G** - ISO 4400 DIN 43650  
**Q** - Spade terminals  
**W** - Leadwire  
**N** - Deutsch (DC only)  
**Y** - Amp JR (DC only)  
**D** - Metripack 150 male (DC only)  
**J** - Metripack 280 male (DC only)

- 10 **Coil series**

**H** - 10 series, 29 W

For coil part numbers and dimensions see Section C.

- 11 **Special features**

**00** - None

(Only required if valve has special features,

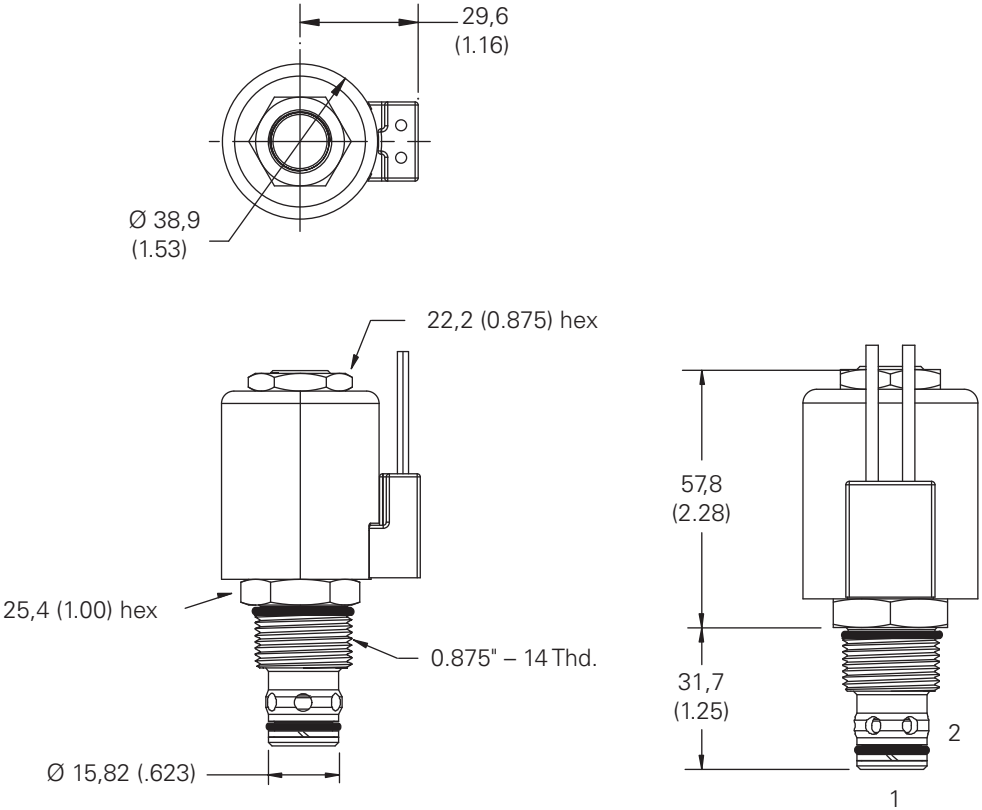
Dimensions  
mm (inch)

Torque cartridge in steel housing 68-75 Nm (50-55 ft. lbs)

Note  
When solenoid valve is ordered as cartridge only, coil nut is included.

**WARNING**

Maintain 5-8 Nm (4-6 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.



# SV12-10-C/CM

Poppet type, normally closed solenoid valve, 350 bar

## Description

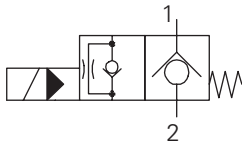
The SV12-10-C is a 2-way, 2-position, pilot operated, poppet type, normally closed, screw-in cartridge solenoid valve.

## Operation

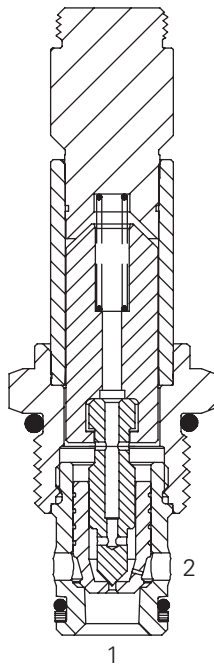
In the de-energized position, this valve blocks flow from port 2 to port 1 and free flow is allowed from port 1 to port 2.

In the energized position, flow from port 1 to port 2 is restricted while free flow is allowed from port 2 to port 1.

## Functional Symbol



## Sectional View



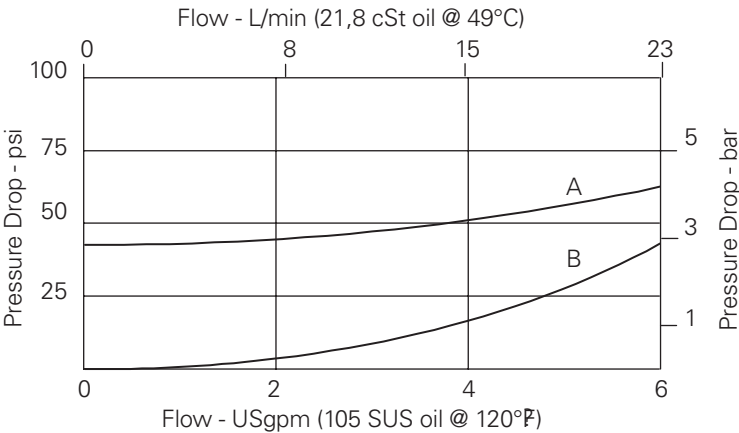
## RATINGS AND SPECIFICATIONS

*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)
Rated flow	23 L/min (6 USgpm)
Internal leakage	5 drops/min. max @ 350 bar (5000 psi)
Temperature range	-40° to 100°C (-40° to 212°F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Cavity	C-10-2
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Steel
Weight cartridge only	0,18 kg (0.39 lbs)
Seal kit	565803 (Buna-N), 566086 (Viton®) <small>Viton is a registered trademark of E.I. DuPont</small>

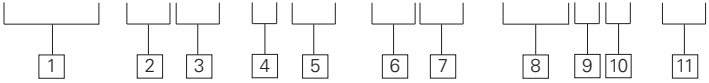
## Pressure Drop Curves

Cartridge only



**A** - Port 1 to port 2 de-energized  
**B** - Port 2 to port 1 energized

SV12 – 10 (V) – C (M) – (S) \*\* – \*\*\*\*\* H – 00



1 Function

**SV12** - Solenoid valve

2 Size

**10** - 10 size

3 Seal material

**Blank** - Buna-N  
**V** - Viton®

4 Style

**C** - Normally closed

5 Manual override option

**Blank** - No manual override  
**M** - Manual override

For valve dimensions with manual override option installed see page A-153.

6 Valve housing material

**Blank** - Cartridge only  
**S** - Steel

7 Port Size

CODE	PORT SIZE	HOUSING NUMBER
<b>0</b>	Cartridge only	
<b>2G</b>	1/4" BSPP	02-175102
<b>3G</b>	3/8" BSPP	02-175103
<b>6T</b>	SAE 6	02-175100
<b>8T</b>	SAE 8	02-175101

8 Voltage rating

**00** - No coil  
**12D** - 12VDC  
**24D** - 24VDC  
**36D** - 36VDC  
**24A** - 24VAC  
**115A** - 115VAC  
**230A** - 230VAC  
**12B** - 12VDC/w diode\*  
**24B** - 24VDC/w diode\*  
\*Optional arc suppression diode.

9 Connector types

**Blank** - No coil  
**G** - ISO 4400 DIN 43650  
**Q** - Spade terminals  
**W** - Leadwire  
**N** - Deutsch (DC only)  
**Y** - Amp JR (DC only)  
**D** - Metripack 150 male (DC only)  
**J** - Metripack 280 male (DC only)

10 Coil series

**H** - 10 series, 29 W  
For coil part numbers and dimensions see Section C.

11 Special features

**00** - None  
(Only required if valve has special features, omitted if "00.")

Dimensions

mm (inch)

Torque cartridge in steel housing 68-75 Nm (50-55 ft. lbs)

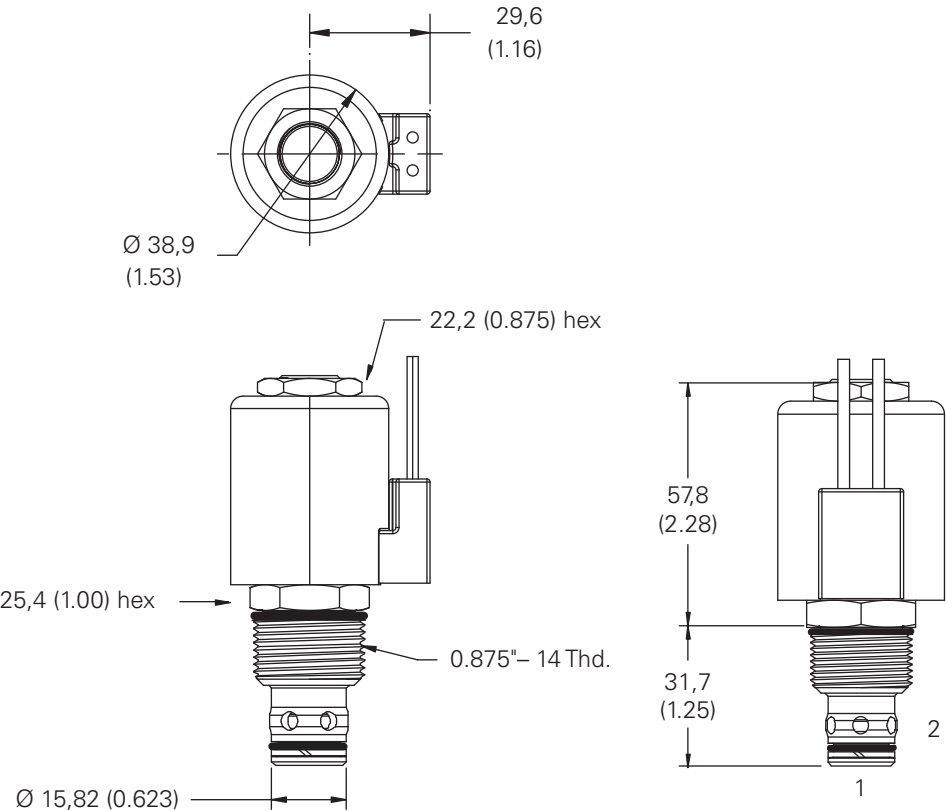
Note

When solenoid valve is ordered as cartridge only, coil nut is included.



WARNING

Maintain 5-8 Nm (4-6 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.



# SV14-8-O/OM

Spool type, normally open solenoid valve, 350 bar

### Description

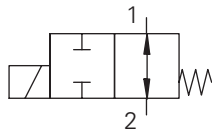
The SV14-8-O is a 2-way, 2-position, spool type, direct acting, normally open screw-in cartridge solenoid valve.

### Operation

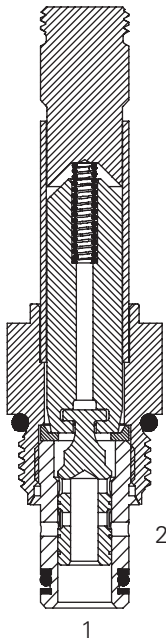
In the de-energized position, this valve allows bi-directional flow between port 1 and port 2.

In the energized position, both ports are closed.

### Functional Symbol



### Sectional View



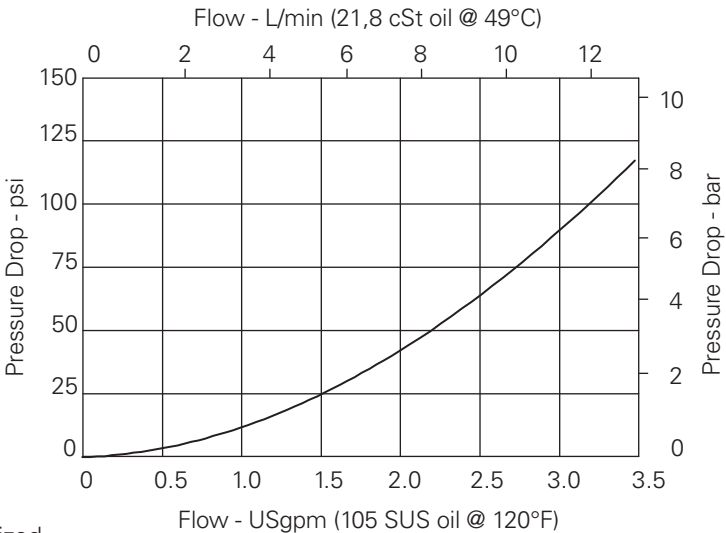
### RATINGS AND SPECIFICATIONS

*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)
Rated flow	13 L/min (3.5 USgpm)
Internal leakage, port 2 to port 1	140 cm <sup>3</sup> /min (8.5 in <sup>3</sup> /min) max. @ 350 bar (5000 psi)
Temperature range	-40° to 100°C (-40° to 212°F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Cavity	C-8-2
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Steel
Weight cartridge only	0,11 kg (0.25 lbs)
Seal kit	02-165875 (Buna-N), 02-165877 (Viton®) <small>Viton is a registered trademark of E.I. DuPont</small>

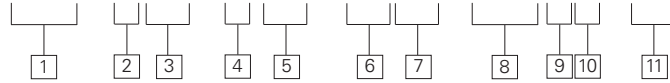
### Pressure Drop Curve

Cartridge only



Port 2 to port 1 de-energized  
Port 1 to port 2 de-energized

SV14 – 8 (V) – O (M) – (S) \*\* – \*\*\*\*\* P – 00



**1 Function**  
**SV14** - Solenoid valve

**2 Size**  
**8** - 8 size

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

**4 Style**  
**O** - Normally open

**5 Manual override option**  
**Blank** - No manual override  
**M** - Manual override

For valve dimensions with manual override option installed see page A-153.

**6 Valve housing material**  
**Blank** - Cartridge only  
**S** - Steel

**7 Port Size**

CODE	PORT SIZE	HOUSING NUMBER
<b>0</b>	Cartridge only	
<b>2G</b>	1/4" BSPP	02-160733
<b>3G</b>	3/8" BSPP	02-160734
<b>4T</b>	SAE 4	02-160736
<b>6T</b>	SAE 6	02-160737
<b>8T</b>	SAE 8	02-160738

See section J for housings.

**8 Voltage rating**

**00** - No coil  
**12D** - 12VDC  
**24D** - 24VDC  
**36D** - 36VDC

**24A** - 24VAC  
**115A** - 115VAC  
**230A** - 230VAC  
**12B** - 12VDC/w diode\*  
**24B** - 24VDC/w diode\*  
\*Optional arc suppression diode.

**9 Connector types**  
**Blank** - No coil  
**G** - ISO 4400 DIN 43650  
**Q** - Spade terminals  
**W** - Leadwire  
**N** - Deutsch (DC only)  
**Y** - Amp JR (DC only)  
**D** - Metripack 150 male (DC only)  
**J** - Metripack 280 male (DC only)

**10 Coil series**  
**P** - 8 series, 23 W  
For coil dimensions see Section C.

**11 Special features**  
**00** - None  
(Only required if valve has special features, omitted if "00.")

**Dimensions**

mm (inch)

Torque cartridge in steel or aluminum housing  
34-41 Nm (25-30 ft. lbs)

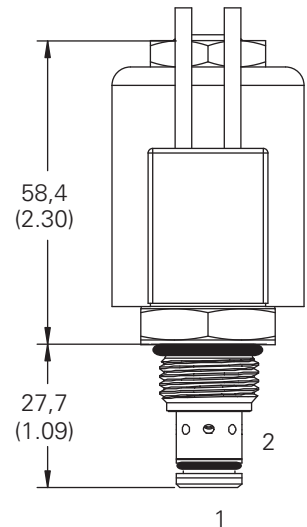
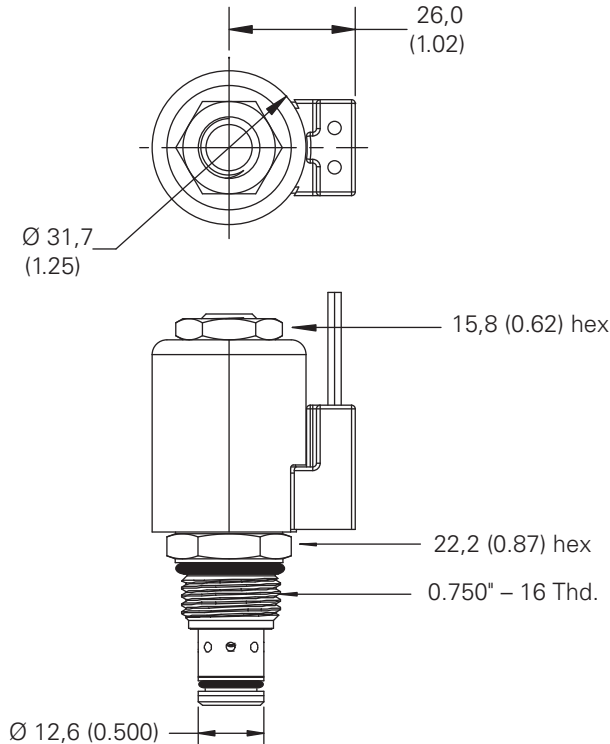
**Note**

When solenoid valve is ordered as cartridge only, nut is included.



**WARNING**

Maintain 5-8 Nm (4-6 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.



# SV14-8-C/CM

Spool type, normally closed solenoid valve, 350 bar

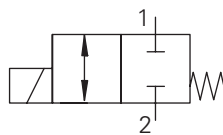
## Description

The SV14-8-C is a 2-way, 2-position, spool type, normally closed, screw-in cartridge solenoid valve.

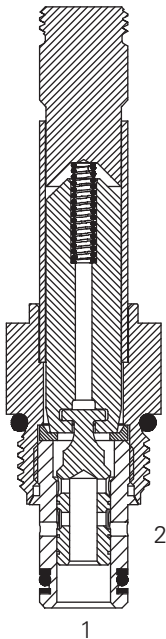
## Operation

In the de-energized position, flow is blocked in both directions. In the energized position, the spool lifts to allow flow in either direction.

## Functional Symbol



## Sectional View



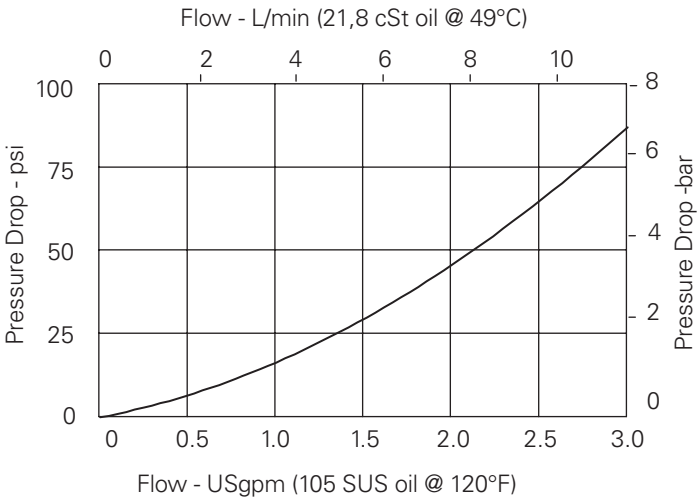
## RATINGS AND SPECIFICATIONS

*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)
Rated flow	11 L/min (3 USgpm)
Internal leakage, port 2 to port 1	140cm <sup>3</sup> (8.5in <sup>3</sup> /min.) max @ 350 bar (5000 psi)
Temperature range	-40° to 100°C (-40° to 212°F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Cavity	C-8-2
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Steel
Weight cartridge only	0,11 kg (0.25 lbs)
Seal kit	02-160777 (Buna-N), 02-160778 (Viton®) <small>Viton is a registered trademark of E.I. DuPont</small>

## Pressure Drop Curve

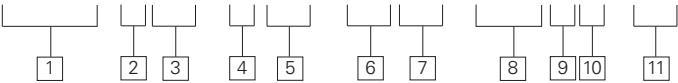
Cartridge only



Port 2 to port 1 or  
port 1 to 2 (energized)



SV14 – 8 (V) – C (M) – (S) \*\* – \*\*\*\*\* P – 00



- 1 **Function**

**SV14** - Solenoid valve
- 2 **Size**

**8** - 8 size
- 3 **Seal material**

**Blank** - Buna-N  
**V** - Viton®
- 4 **Style**

**C** - Normally closed
- 5 **Manual override option**

**Blank** - No manual override  
**M** - Manual override

For valve dimensions with manual override option installed see page A-153.

- 6 **Valve housing material**

**Blank** - Cartridge only  
**S** - Steel
- 7 **Port Size**

CODE	PORT SIZE	HOUSING NUMBER
<b>0</b>	Cartridge only	
<b>2G</b>	1/4" BSPP	02-160733
<b>3G</b>	3/8" BSPP	02-160734
<b>4T</b>	SAE 4	02-160736
<b>6T</b>	SAE 6	02-160737
<b>8T</b>	SAE 8	02-160738

See section J for housing details.

- 9 **Connector types**

**Blank** - No coil  
**G** - ISO 4400 DIN 43650  
**Q** - Spade terminals  
**W** - Leadwire  
**N** - Deutsch (DC only)  
**Y** - Amp JR (DC only)  
**D** - Metripack 150 male (DC only)  
**J** - Metripack 280 male (DC only)
- 10 **Coil Series**

**P** - 8 series, 23 W

For coil part numbers and dimensions see Section C.

- 8 **Voltage rating**

**00** - No coil  
**12D** - 12VDC  
**24D** - 24VDC  
**36D** - 36VDC
- 24A** - 24VAC  
**115A** - 115VAC  
**230A** - 230VAC  
**12B** - 12VDC/w diode\*  
**24B** - 24VDC/w diode\*

\*Optional arc suppression diode.

- 11 **Special features**


**00** - None

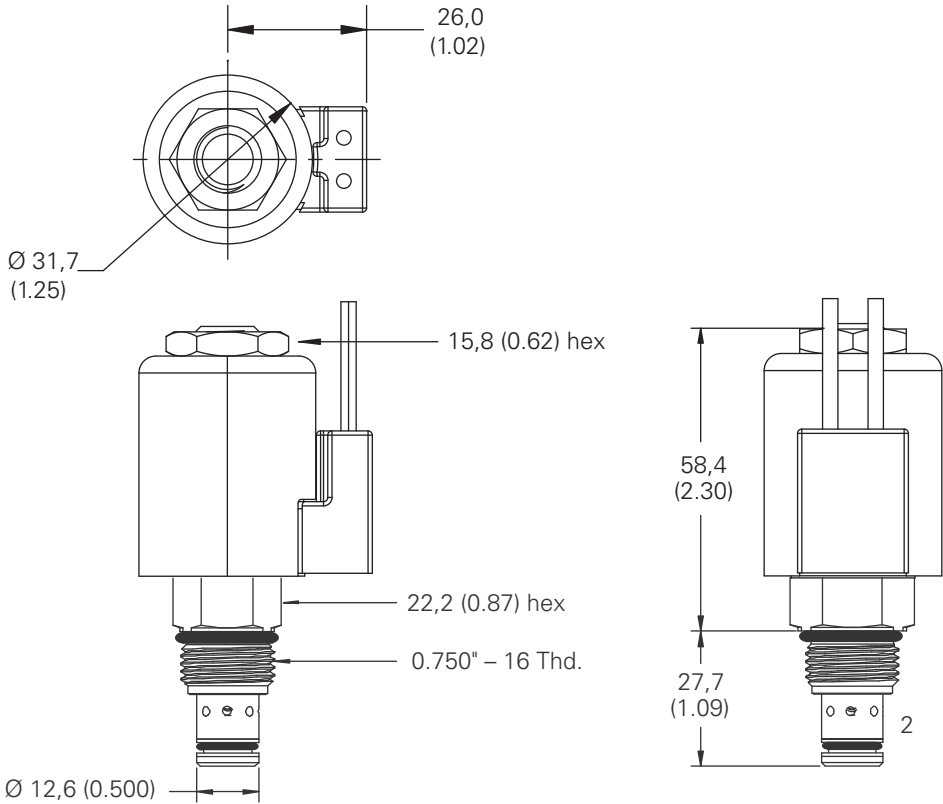
(Only required if valve has special features, omitted if "00.")

**Dimensions**  
mm (inch)

Torque cartridge in steel housing 34-41 Nm (25-30 ft. lbs)

Note  
When solenoid valve is ordered as cartridge only, coil nut is included.

 **WARNING**  
Maintain 5-8 Nm (4-6 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.



# SV14-10-O/OM

Spool type, normally open solenoid valve, 350 bar

## Description

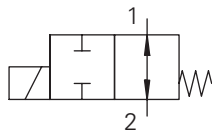
The SV14-10-O is a 2-way, 2-position, spool type, direct acting, normally open screw-in cartridge solenoid valve.

## Operation

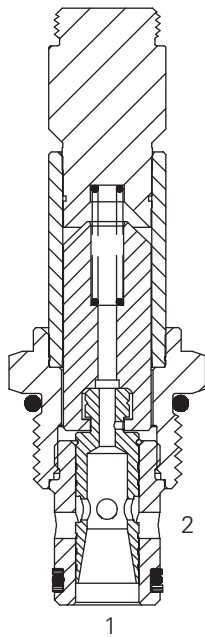
In the de-energized position, this valve allows bi-directional flow between port 1 and port 2.

In the energized position, both ports are closed.

## Functional Symbol



## Sectional View



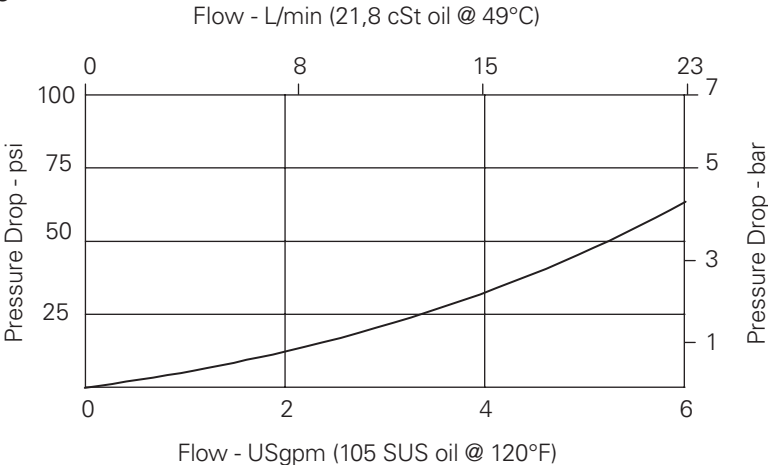
## RATINGS AND SPECIFICATIONS

*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)
Rated flow	23 L/min (6 USgpm)
Internal leakage, port 2 to port 1	140 cm <sup>3</sup> /min. (8.5 in <sup>3</sup> /min.) max @ 350 bar (5000 psi)
Temperature range	-40° to 100°C (-40° to 212°F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Cavity	C-10-2
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Steel
Weight cartridge only	0,18 kg (0.39 lbs)
Seal kit	566806 (Buna-N), 889627 (Viton®) <small>Viton is a registered trademark of E.I. DuPont</small>

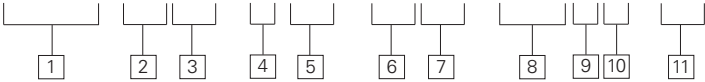
## Pressure Drop Curve

Cartridge only



Port 2 to port 1 or  
Port 1 to port 2 de-energized

SV14 – 10 (V) – O (M) – (S) \*\* – \*\*\*\*\* H – 00



**1 Function**  
**SV14** - Solenoid valve

**2 Size**  
**10** - 10 size

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

**4 Style**  
**O** - Normally open

**5 Manual override option**  
**Blank** - No manual override  
**M** - Manual override  
For valve dimensions with manual override option installed see page A-153.

**6 Valve housing material**  
**Blank** - Cartridge only  
**S** - Steel

**7 Port Size**

CODE	PORT SIZE	HOUSING NUMBER
<b>0</b>	Cartridge only	
<b>2G</b>	1/4" BSPP	02-175102
<b>3G</b>	3/8" BSPP	02-175103
<b>6T</b>	SAE 6	02-175100
<b>8T</b>	SAE 8	02-175101

See section J for housings.

**8 Voltage rating**  
**Blank** - No coil  
**12D** - 12VDC  
**24D** - 24VDC  
**36D** - 36VDC

**24A** - 24VAC  
**115A** - 115VAC  
**230A** - 230VAC  
**12B** - 12VDC/w diode\*  
**24B** - 24VDC/w diode\*  
\*Optional arc suppression diode.

**9 Connector types**  
**Blank** - No coil  
**G** - ISO 4400 DIN 43650  
**Q** - Spade terminals  
**W** - Leadwire  
**N** - Deutsch (DC only)  
**Y** - Amp JR (DC only)  
**D** - Metripack 150 male (DC only)  
**J** - Metripack 280 male (DC only)

**10 Coil series**  
**H** - 10 series, 29 W  
For coil dimensions see Section C..

**11 Special features**  
**00** - None  
(Only required if valve has special features, omitted if "00.")

**Dimensions**

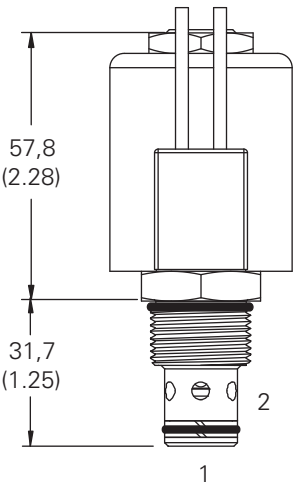
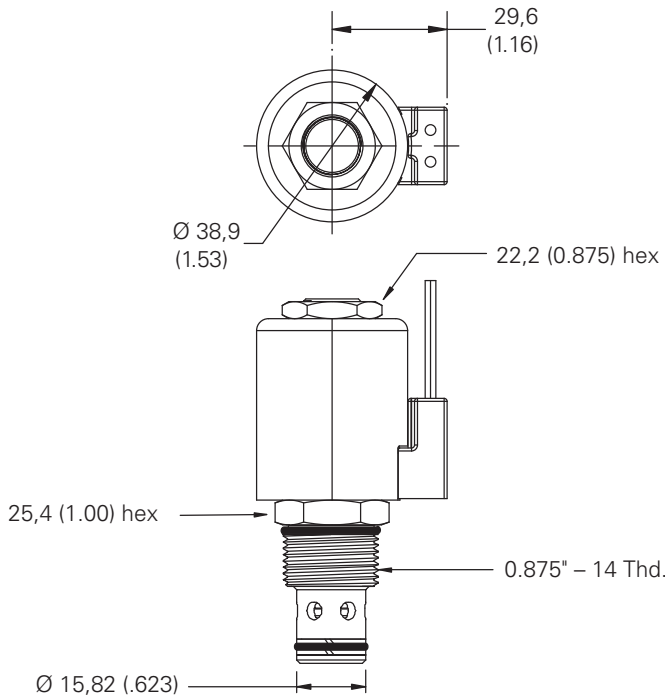
mm (inch)

Torque cartridge in steel housing 68-75 Nm (50-55 ft. lbs)

Note  
When solenoid valve is ordered as cartridge only, nut is included.



**WARNING**  
Maintain 5-8 Nm (4-6 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.



# SBV11-8-O

Bi-directional, normally open solenoid valve

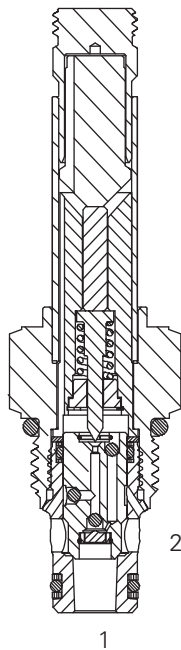
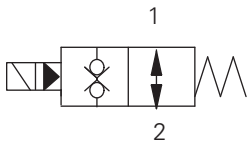
### Description

The SBV11-8-O is a 2-way, 2-position, bi-directional, normally open, poppet type, screw-in cartridge solenoid valve.

### Operation

In the de-energized position, flow is allowed in both directions. In the energized position, flow is blocked in both directions.

### Functional Symbol

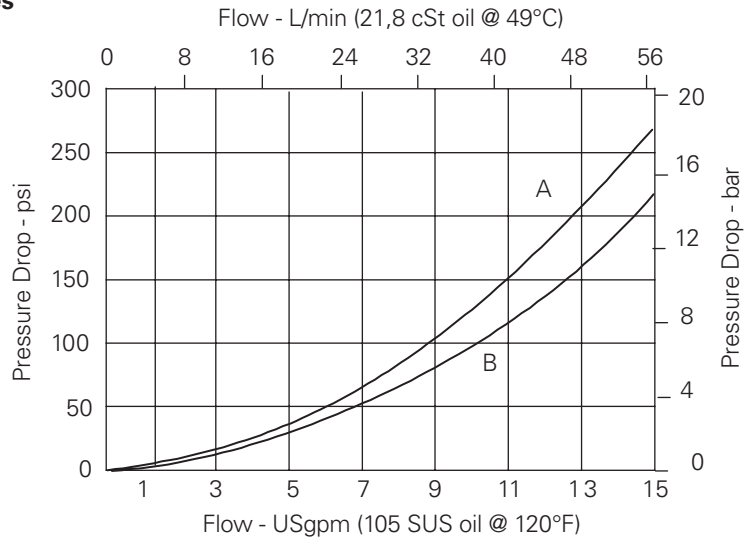


### RATINGS AND SPECIFICATIONS

<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
Typical application pressure (all ports)	350 bar (5000 psi)
Cartridge fatigue pressure (infinite life)	310 bar (4500 psi)
Rated flow	60 L/min (15 USgpm)
Internal leakage, port 1 to port 2 & port 2 to port 1	5 drops/min. max @ 350 bar (5000 psi) when energized
Temperature range	-40° to 100°C (-40° to 212°F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Cavity	C-8-2
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Aluminum or steel
Weight cartridge only	0,12 kg (0.26 lbs)
Seal kit	02-160777 (Buna-N), 02-160778 (Viton®) <small>Viton is a registered trademark of E.I. DuPont</small>

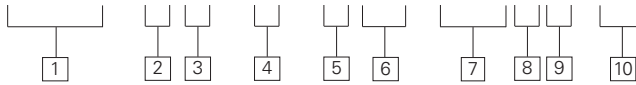
### Pressure Drop Curves

Cartridge only



**A** - Port 1 to port 2  
**B** - Port 2 to port 1

SBV11 – 8 (V) – O – (\*) \*\* – \*\*\*\*\* \* P – 00



**1 Function**  
**SBV11** - Solenoid  
bi-directional valve

**2 Size**  
**8** - 8 size

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

**4 Style**  
**O** - Normally open

**5 Valve housing material**  
**Blank** - Cartridge only  
**A** - Aluminum  
**S** - Steel

**6 Port Size**

CODE	PORT SIZE	HOUSING NUMBER	
		Aluminum	Steel
<b>0</b>	Cartridge only		
<b>2G</b>	1/4" BSPP	02-160727	02-160733
<b>3G</b>	3/8" BSPP	02-160728	02-160734
<b>4T</b>	SAE 4	02-160730	02-160736
<b>6T</b>	SAE 6	02-160731	02-160737
<b>8T</b>	SAE 8	02-160732	02-160738

See section J for housings.

**7 Voltage rating**

**00** - No coil  
**12D** - 12VDC  
**24D** - 24VDC  
**36D** - 36VDC  
**24A** - 24VAC  
**115A** - 115VAC  
**230A** - 230VAC  
**12B** - 12VDC/w diode\*  
**24B** - 24VDC/w diode\*  
\*Optional arc suppression diode.

**8 Connector types**

**Blank** - No coil  
**G** - ISO 4400 DIN 43650  
**Q** - Spade terminals  
**W** - Leadwire  
**N** - Deutsch (DC only)  
**Y** - Amp JR (DC only)  
**D** - Metripack 150 male (DC only)  
**J** - Metripack 280 male (DC only)

**9 Coil series**

**P** - 8 series, 23 W  
For coil dimensions see Section C.

**10 Special features**

**00** - None  
(Only required if valve has special features,

**Dimensions**

mm (inch)

Torque cartridge in aluminum or steel housing  
34-41 Nm (25-30 ft. lbs)

**Note**

When solenoid valve is ordered as cartridge only, nut is included.



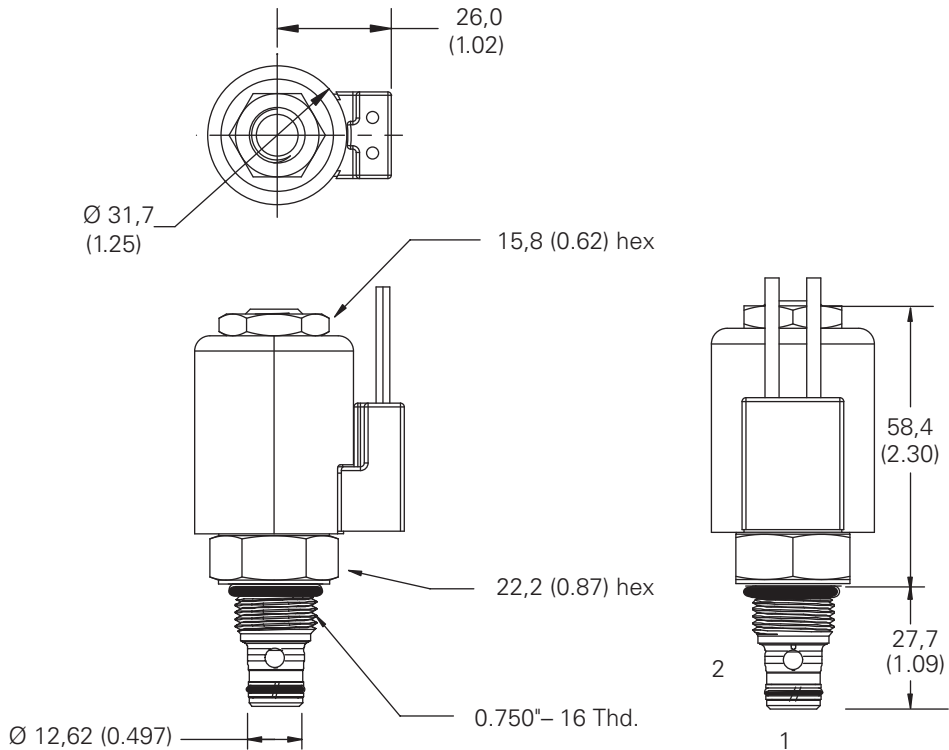
**WARNING**

Maintain 5-8 Nm (4-6 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.



**WARNING**

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



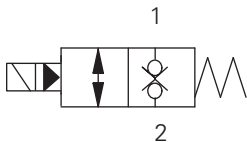
# SBV11-10-C

Bi-directional, normally closed solenoid valve

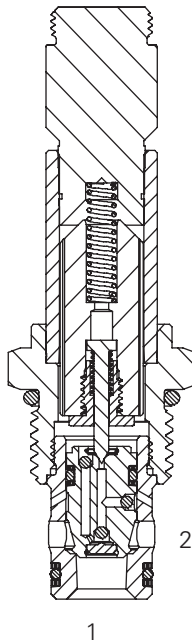
### Description

The SBV11-10-C is a 2-way, 2-position, bi-directional, normally closed, poppet type, screw-in cartridge, solenoid valve.

### Functional Symbol



### Sectional View



### Operation

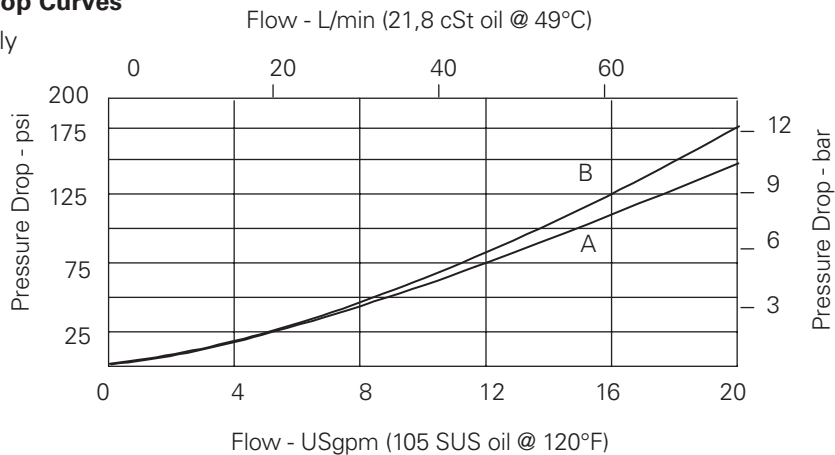
In the de-energized position, flow is blocked in both directions. In the energized position, flow is allowed in both directions.

### RATINGS AND SPECIFICATIONS

<i>Performance data is typical with fluid at 21,8 cST (105 SUS) and 49°C (120°F)</i>	
Typical application pressure (all ports)	350 bar (5000 psi)
Cartridge fatigue pressure (infinite life)	310 bar (4500 psi)
Rated flow	76 L/min (20 USgpm)
Internal leakage	5 drops/min. max @ 350 bar (5000 psi)
Temperature range	-40° to 100°C (-40° to 212°F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Cavity	C-10-2
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Aluminum or steel
Weight cartridge only	0,18 kg (0.39 lbs)
Seal kit	565806 (Buna-N), 889627 (Viton®) <small>Viton is a registered trademark of E.I. DuPont</small>

### Pressure Drop Curves

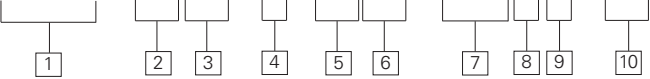
Cartridge only



A - Port 1 to port 2

B - Port 2 to port 1

SBV11 – 10 (V) – C – (\*) \*\* – \*\*\*\*\* \* H – 00



- 1

**Function**  
SBV11 - Solenoid bi-directional valve
- 2

**Size**  
10 - 10 size
- 3

**Seal material**  
Blank - Buna-N  
V - Viton®
- 4

**Style**  
C - Normally closed
- 5

**Valve housing material**  
Blank - Cartridge only  
A - Aluminum  
S - Steel

6

**Port Size**

CODE	PORT SIZE	HOUSING NUMBER	
		Aluminum	Steel
0	Cartridge only		
2G	1/4" BSPP	876702	02-175102
3G	3/8" BSPP	876703	02-175103
3B	3/8" BSPP	02-175462	–
6H	SAE 6	876700	–
6T	SAE 6	566151	02-175100
8H	SAE 8	876701	–
8T	SAE 8	–	02-175101

See section J for housing details.

- 8

**Connector types**  
Blank - No coil  
G - ISO 4400 DIN 43650  
Q - Spade terminals  
W - Leadwire  
N - Deutsch (DC only)  
Y - Amp JR (DC only)  
D - Metripack 150 male (DC only)  
J - Metripack 280 male (DC only)

- 9

**Coil series**  
H - 10 series, 29 W  
For coil part numbers and dimensions see Section C.

- 10

**Special features**  
00 - None  
(Only required if valve has special features, omitted if "00.")

Dimensions

mm (inch)

Torque cartridge in housing

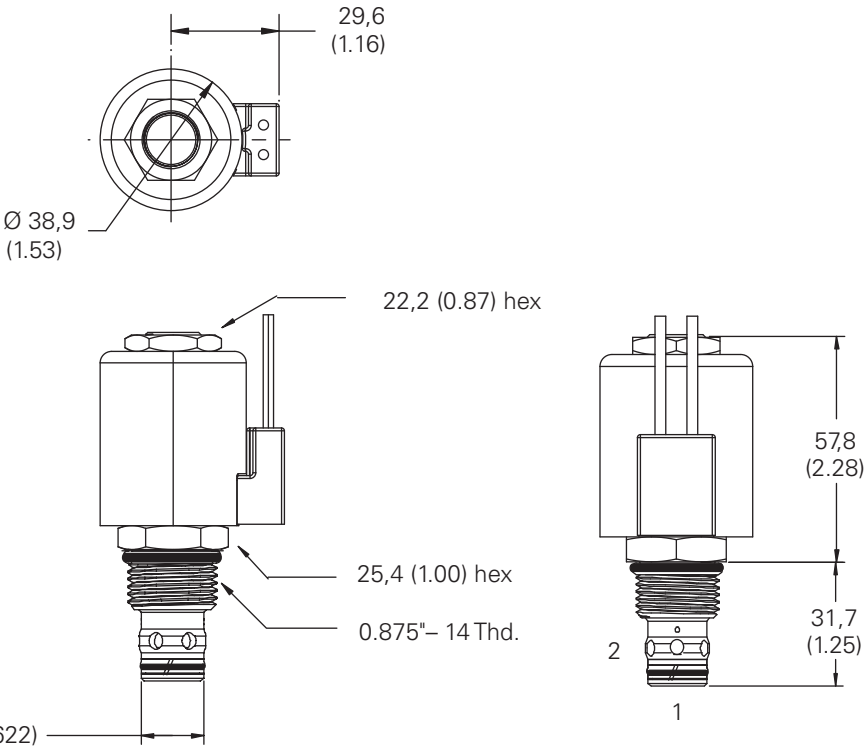
- A - 47-54 Nm (35-40 ft. lbs)
- S - 68-75 Nm (50-55 ft. lbs)

Note

When solenoid valve is ordered as cartridge only, coil nut is included.

**WARNING**  
Maintain 5-8 Nm (4-6 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.

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



# SBV11-10-O

Bi-directional, normally open solenoid valve

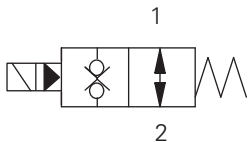
### Description

The SBV11-10-O is a bi-directional, 2-way, 2-position, normally open, poppet type, screw-in cartridge, solenoid valve.

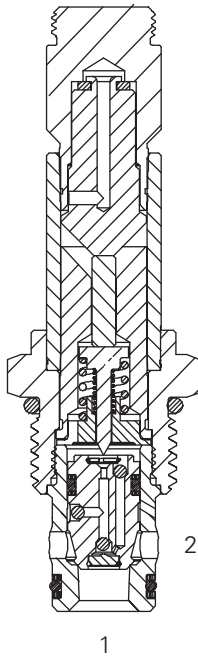
### Operation

In the de-energized position, flow is allowed in both directions. In the energized position, flow is blocked in both directions.

### Functional Symbol



### Sectional View

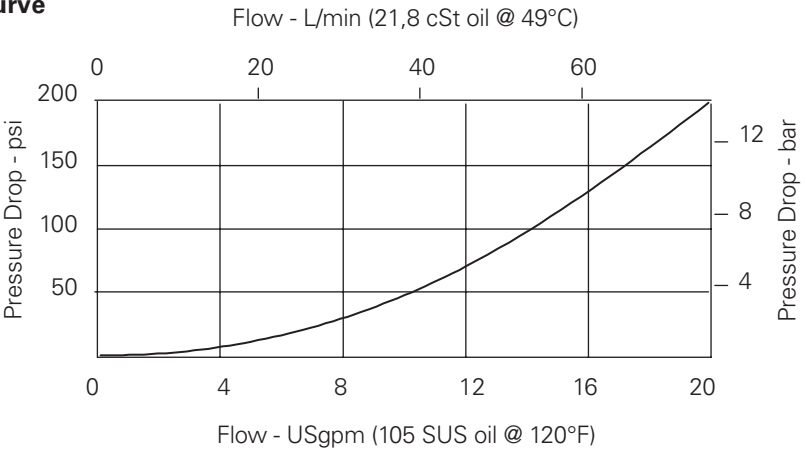


### RATINGS AND SPECIFICATIONS

<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
Typical application pressure (all ports)	350 bar (5000 psi)
Cartridge fatigue pressure (infinite life)	310 bar (4500 psi)
Rated flow	76 L/min (20 USgpm)
Internal leakage, port 1 to port 2 or port 2 to port 1	5 drops/min. max @ 350 bar (5000 psi)
Temperature range	-40° to 100°C (-40° to 212°F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Cavity	C-10-2
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Aluminum or steel
Weight cartridge only	0,18 kg (0.39 lbs)
Seal kit	565806 (Buna-N), 889627 (Viton®) <small>Viton is a registered trademark of E.I. DuPont</small>

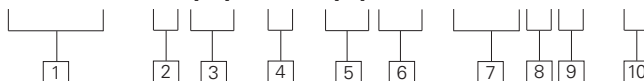
### Pressure Drop Curve

Cartridge only



Port 1 to port 2 or  
port 2 to port 1  
de-energized



**SBV11 – 10 (V) – O – (\*) \*\* – \*\*\*\*\* \* H – 00****1 Function**

**SBV11** - Solenoid bi-directional valve

**2 Size**

**10** - 10 size

**3 Seal material**

**Blank** - Buna-N  
**V** - Viton®

**4 Style**

**O** - Normally open

**5 Valve housing material**

**Blank** - Cartridge only  
**A** - Aluminum  
**S** - Steel

**6 Port size**

CODE	PORT SIZE	HOUSING NUMBER	
		Aluminum	Steel
<b>0</b>	Cartridge only		
<b>2G</b>	1/4" BSPP	876702	02-175102
<b>3G</b>	3/8" BSPP	876703	02-175103
<b>3B</b>	3/8" BSPP	02-175462*	—
<b>6H</b>	SAE 6	876700	—
<b>6T</b>	SAE 6	566151*	02-175100
<b>8H</b>	SAE 8	876701	—
<b>8T</b>	SAE 8	—	02-175101

\*Light duty housings.  
See section J for housings.

**8 Connector types**

**Blank** - No coil  
**G** - ISO 4400 DIN 43650  
**Q** - Spade terminals  
**W** - Leadwire  
**N** - Deutsch (DC only)  
**Y** - Amp JR (DC only)  
**D** - Metripack 150 male (DC only)  
**J** - Metripack 280 male (DC only)

**9 Coil series**

**H** - 10 series, 29 W

For coil dimensions see Section C.

**10 Special features**

**00** - None  
(Only required if valve has special features, omitted if "00.")

**7 Voltage rating**

**00** - No coil  
**12D** - 12VDC  
**24D** - 24VDC  
**36D** - 36VDC

**24A** - 24VAC  
**115A** - 115VAC  
**230A** - 230VAC  
**12B** - 12VDC/w diode\*  
**24B** - 24VDC/w diode\*

\*Optional arc suppression diode.

**Dimensions**

mm (inch)

Torque cartridge in housing

**A** - 47-54 Nm (35-40 ft. lbs)

**S** - 68-75 Nm (50-55 ft. lbs)

**Note**

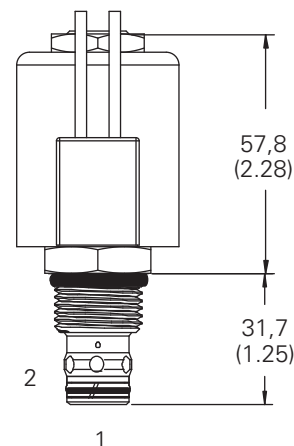
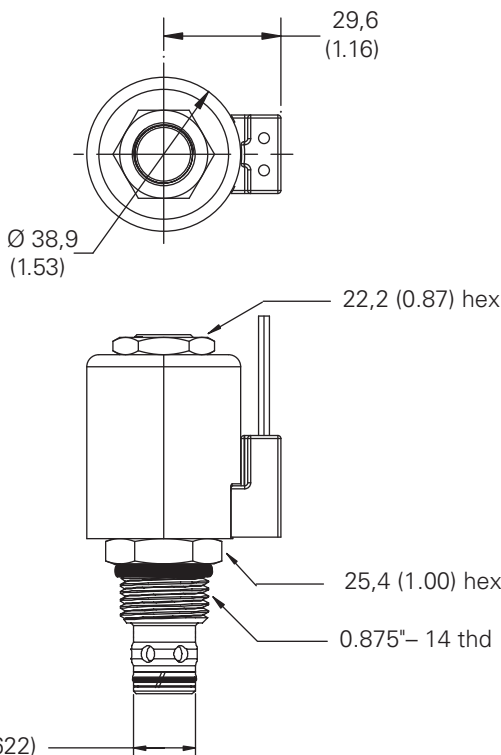
When solenoid valve is ordered as cartridge only, nut is included.

**WARNING**

Maintain 5-8 Nm (4-6 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.

**WARNING**

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



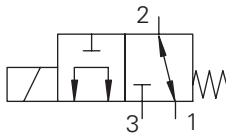
# SV11-8-3/3M

3-way, 2-position spool  
type solenoid valve,  
350 bar

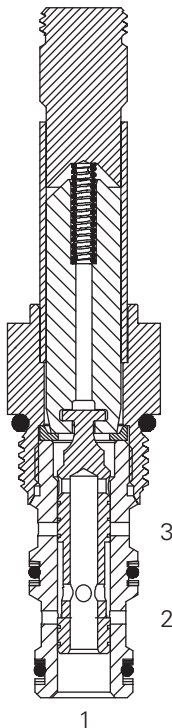
## Description

The SV11-8-3 is a 3-way,  
2-position, direct acting,  
spool type, screw-in car-  
tridge solenoid valve.

## Functional Symbol



## Sectional View



## Operation

In the de-energized posi-  
tion, this valve allows flow  
from port 2 to port 1 while  
port 3 is blocked.

In the energized position,  
flow is allowed from port 1  
to port 3 while port 2 is  
blocked.

## 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)
Rated flow	11 L/min (3 USgpm)
Internal leakage, combined port 2 and port 1	140 cm <sup>3</sup> /min. (8.5 in <sup>3</sup> /min.) max @ 350 bar (5000 psi)
Temperature range	-40° to 100°C (-40° to 212°F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Cavity	C-8-3
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Steel
Weight cartridge only	0,13 kg (0.28 lbs)
Seal kit	02-160755 (Buna-N), 02-160756 (Viton®) <small>Viton is a registered trademark of E.I. DuPont</small>

## Performance characteristics

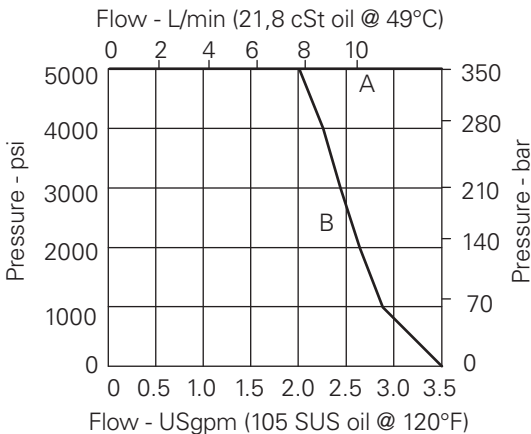
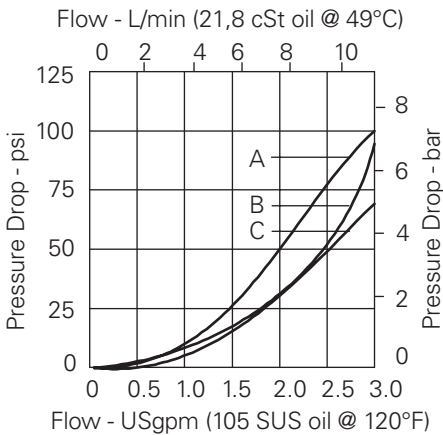
Cartridge only

### Pressure drop vs. flow

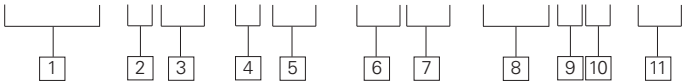
- A** - Port 1 to 2 and 1 to 3  
**B** - Port 3 to 1

### Operating Limits

- A** - Normally open & closed  
**B** - Selector 1 to 2 and 1 to 3



SV11 – 8 (V) – 3 (M) – (S) \*\* – \*\*\*\*\* P – 00



**1 Function**  
**SV11** - Solenoid valve

**2 Size**  
**8** - 8 size

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

**4 Style**  
**3** - 3-way, 2 position

**5 Manual override option**  
**Blank** - No manual override  
**M** - Manual override  
For valve dimensions with manual override option installed see page A-153.

**6 Valve housing material**  
**Blank** - Cartridge only  
**S** - Steel

**7 Port Size**

CODE	PORT SIZE	HOUSING NUMBER
<b>0</b>	Cartridge only	
<b>2G</b>	1/4" BSPP	02-160743
<b>3G</b>	3/8" BSPP	02-160744
<b>4T</b>	SAE 4	02-160745
<b>6T</b>	SAE 6	02-160746

See section J for housings.

**8 Voltage rating**  
**00** - No coil  
**12D** - 12VDC  
**24D** - 24VDC  
**36D** - 36VDC

**24A** - 24VAC  
**115A** - 115VAC  
**230A** - 230VAC  
**12B** - 12VDC/w diode\*  
**24B** - 24VDC/w diode\*  
\*Optional arc suppression diode.

**9 Connector types**  
**Blank** - No coil  
**G** - ISO 4400 DIN 43650  
**Q** - Spade terminals  
**W** - Leadwire  
**N** - Deutsch (DC only)  
**Y** - Amp JR (DC only)  
**D** - Metripack 150 male (DC only)  
**J** - Metripack 280 male (DC only)

**10 Coil series**  
**P** - 8 series, 23 W  
For coil dimensions see Section C.

**11 Special features**  
**00** - None  
(Only required if valve has special features, omitted if "00.")

**Dimensions**

mm (inch)

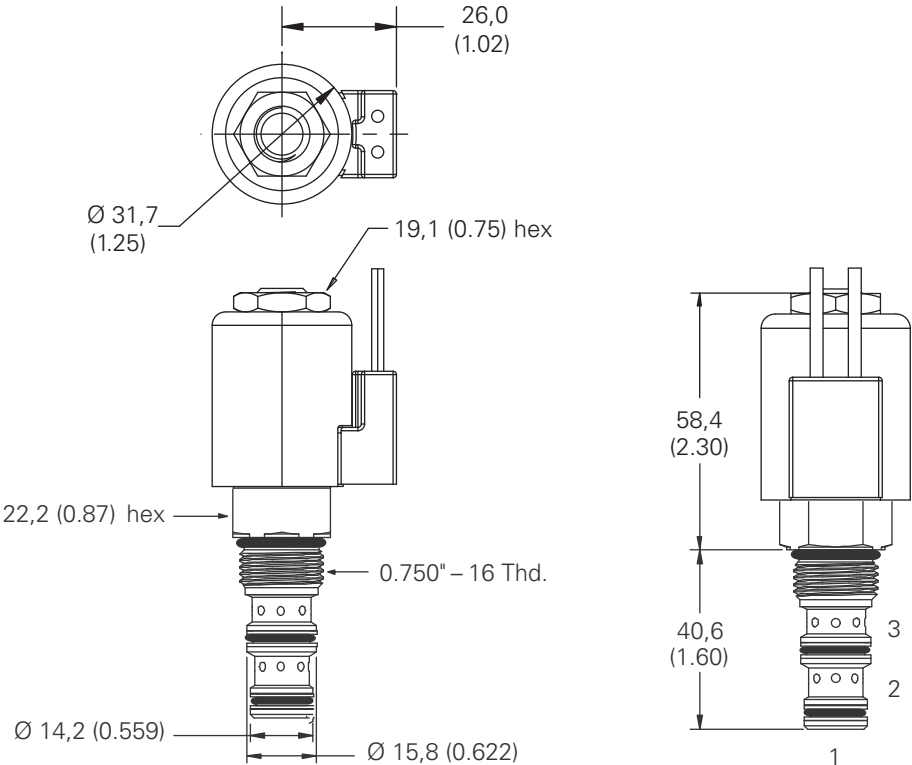
Torque cartridge in steel or aluminum housing  
34-41 Nm (25-30 ft. lbs)

Note  
When solenoid valve is ordered as cartridge only, nut is included.



**WARNING**

Maintain 5-8 Nm (4-6 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.



# SV11-10-3/3M

3-way, 2-position, spool type solenoid valve,  
350 bar

## Description

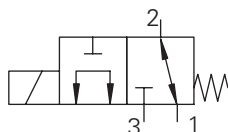
The SV11-10-3 is a 3-way, 2-position, direct acting, spool type, screw-in cartridge solenoid valve.

## Operation

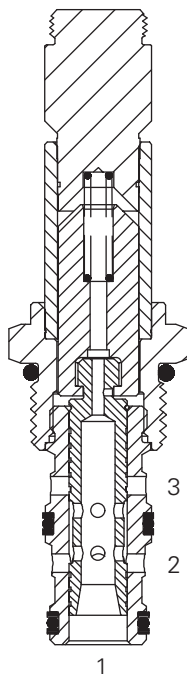
In the de-energized position, this valve allows flow from port 2 to port 1 while port 3 is blocked.

In the energized position, flow is allowed from port 1 to port 3 while port 2 is blocked.

## Functional Symbol



## Sectional View



## RATINGS AND SPECIFICATIONS

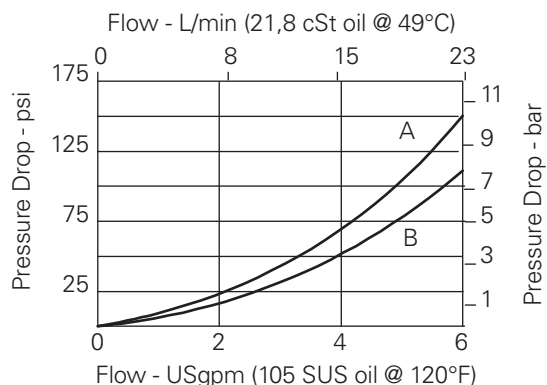
*Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)*

Typical application pressure (all ports)	350 bar (5000 psi)
Cartridge fatigue pressure (infinite life)	310 bar (4500 psi)
Rated flow	23 L/min (6 USgpm)
Internal leakage, port 2 to port 1	164 cm <sup>3</sup> /min. (10 in <sup>3</sup> /min.) max @ 350 bar (5000 psi)
Temperature range	-40° to 100°C (-40° to 212°F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Cavity	C-10-3
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Steel
Weight cartridge only	0,19 kg (0.42 lbs)
Seal kit	889624 (Buna-N), 889688 (Viton®) <small>Viton is a registered trademark of E.I. DuPont</small>

## Pressure Drop Curves

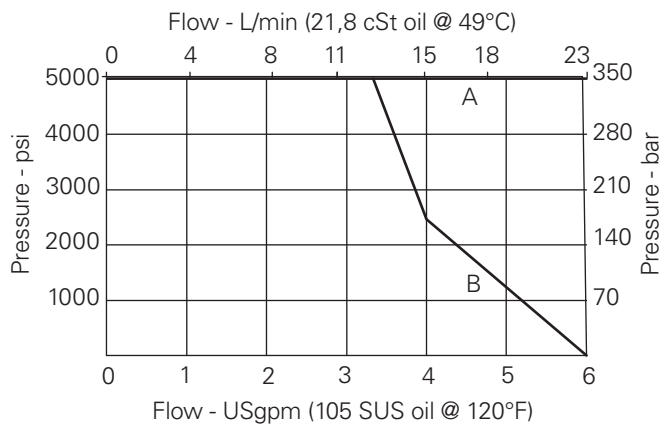
Cartridge only

- A** - Port 3 to port 1
- B** - Port 1 to port 2

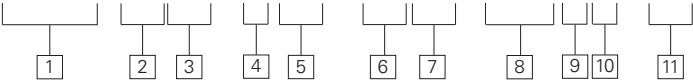


## Operating Limits

- A** - Normally open, normally closed - selector 1 to 2
- B** - Selector 1 to 2



SV11 – 10 (V) – 3 (M) – (S) \*\* – \*\*\*\*\* \* H – 00



**1 Function**  
**SV11** - Solenoid valve

**2 Size**  
**10** - 10 size

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

**4 Style**  
**3** - 3-way, 2 position

**5 Manual override option**  
**Blank** - No manual override  
**M** - Manual override  
For valve dimensions with manual override option installed see page A-153.

**6 Valve housing material**  
**Blank** - Cartridge only  
**S** - Steel

**7 Port Size**

CODE	PORT SIZE	HOUSING NUMBER
<b>0</b>	Cartridge only	
<b>2G</b>	1/4" BSPP	02-175127
<b>3G</b>	3/8" BSPP	02-175128
<b>6T</b>	SAE 6	02-175124
<b>8T</b>	SAE 8	02-175125

See section J for housings.

**8 Voltage rating**

**00** - No coil  
**12D** - 12VDC  
**24D** - 24VDC  
**36D** - 36VDC

**24A** - 24VAC  
**115A** - 115VAC  
**230A** - 230VAC  
**12B** - 12VDC/w diode\*  
**24B** - 24VDC/w diode\*  
\*Optional arc suppression diode.

**9 Connector types**  
**Blank** - No coil  
**G** - ISO 4400 DIN 43650  
**Q** - Spade terminals  
**W** - Leadwire  
**N** - Deutsch (DC only)  
**Y** - Amp JR (DC only)  
**D** - Metripack 150 male (DC only)  
**J** - Metripack 280 male (DC only)

**10 Coil series**  
**H** - 10 series, 29 W  
For coil dimensions see Section C..

**11 Special features**  
**00** - None  
(Only required if valve has special features, omitted if "00.")

**Dimensions**

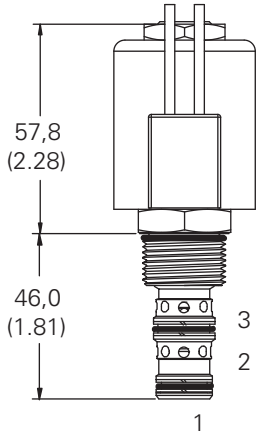
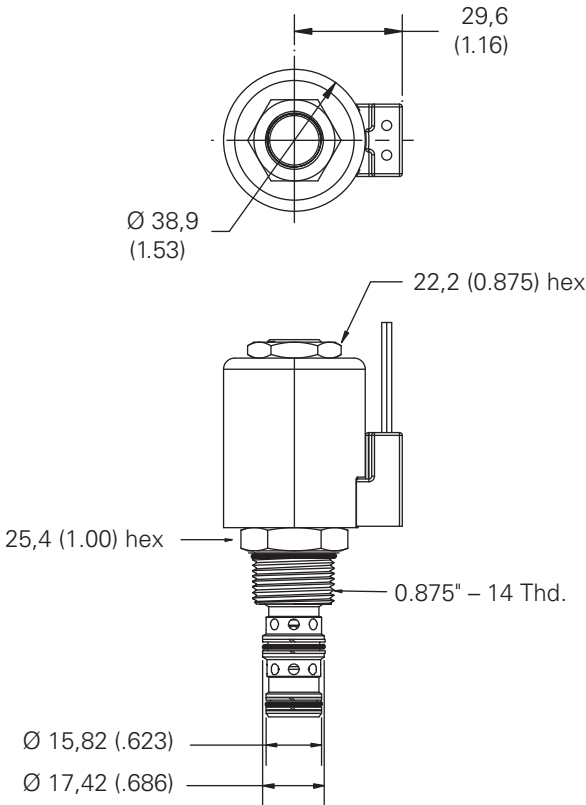
mm (inch)

Torque cartridge in steel housing 68-75 Nm (50-55 ft. lbs)

Note  
When solenoid valve is ordered as cartridge only, nut is included.



**WARNING**  
Maintain 5-8 Nm (4-6 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.



# SV1A/B-12-3

3-way, 2-position, spool type solenoid valve

## Description

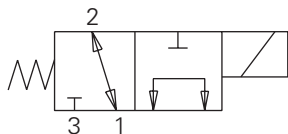
The SV1A/B-12-3 is a 3-way, 2-position, direct acting, spool type, screw-in cartridge solenoid valve.

## Operation

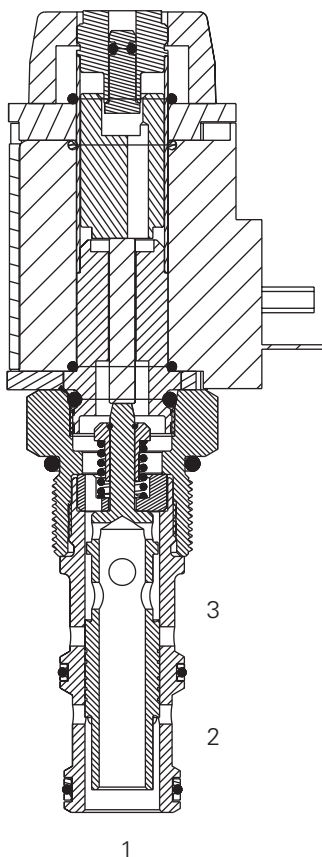
In the de-energized position, this valve allows flow from port 1 to port 2 while port 3 is blocked.

In the energized position, flow is allowed from port 3 to port 1 while port 2 is blocked.

## Functional Symbol



## Sectional View



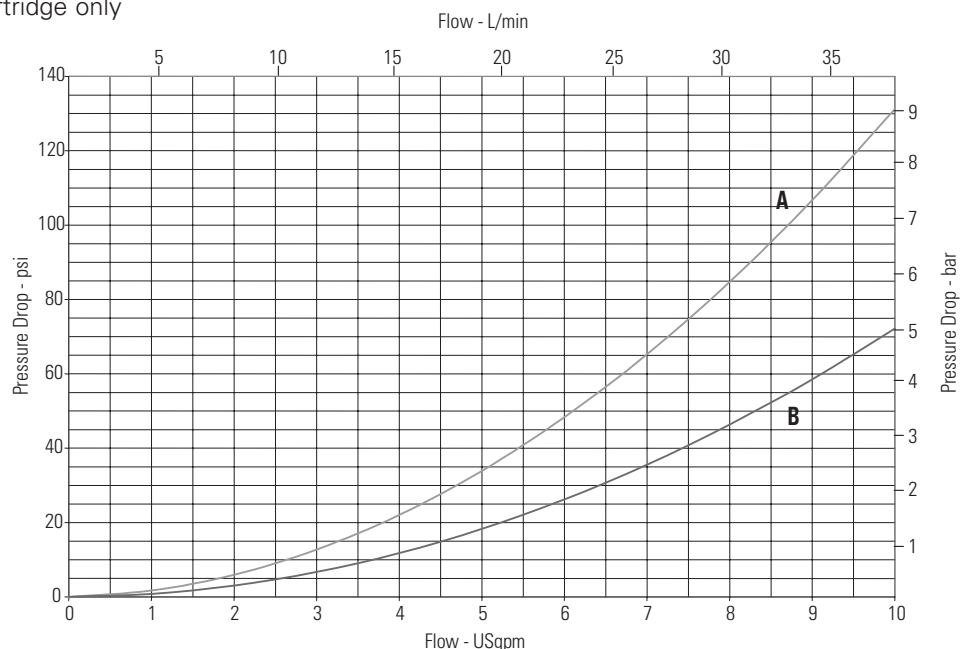
## RATINGS AND SPECIFICATIONS

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

Typical application pressure	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	SV1A-12-3
	38 L/min (10 USgpm)
	Max. flow port 1 to port 2 - 27 L/min (7 USgpm)
	SV1B-12-3
	42 L/min (11 USgpm)
	Max. flow port 1 to port 2 - 34 L/min (9 USgpm)
Internal leakage	300 cm <sup>3</sup> /min (21.5 in <sup>3</sup> /min) max. @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Cavity	C-12-3
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Aluminum
Weight including coil	SV1A-12-3
	0,68 kg (1.5 lbs)
	SV1B-12-3
	0,86 kg (1.9 lbs)
Seal kit	9900171-000 (Buna-N), 9900172-000 (Viton®)
	Viton is a registered trademark of E.I. DuPont

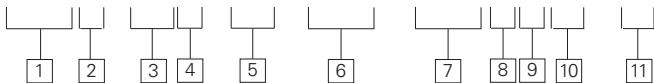
## Pressure Drop Curves

Cartridge only



- A - Port 3 to port 1 energized
- B - Port 1 to port 2 de-energized

SV1 \* - 12 \* - 3P - \*\*\*\* - \*\*\*\* \* \* \* \* - \*\*



- 1 **Function**

**SV1** - Solenoid valve
- 2 **Max Flow**

**A** - 38 L/min (10 USgpm)  
**B** - 42 L/min (11 USgpm)
- 3 **Size**

**12** - 12 size
- 4 **Seal Material**

**Blank** - Buna-N  
**V** - Viton®
- 5 **Style**

**3P** - 3 way, push type manual override

- 6 **Port Size**

CODE	PORT SIZE	HOUSING NUMBER
<b>0</b>	Cartridge only	
<b>A6G</b>	3/4" BSPP	02-161816
<b>A12H</b>	SAE 12	02-160646
- 7 **Voltage rating**

**00** - No coil  
**12D** - 12VDC  
**24D** - 24VDC  
**24A** - 24VAC  
**110A** - 110VAC  
**115A** - 115VAC  
**12B** - 12VDC/w diode\*  
**24B** - 24VDC/w diode\*  
\*Optional arc suppression diode.
- 8 **Connector types**

**Blank** - No coil  
**G** - ISO 4400 DIN 43650  
**W** - Leadwire  
**N** - Deutsch (DC only)  
For coil dimensions see Section C.

- 9 **Coil types**

**Blank** - No coil  
**L** - L series (30W EN 490) used for SV1A-12  
**R** - R series (30W) used for SV1B-12
- 10 **Coil special features**

**Blank** - No coil  
**00** - No special feature
- 11 **Special features**

**00** - None  
(Only required if valve has special features, omitted if "00.")  
**SF** - Soft shift

Dimensions

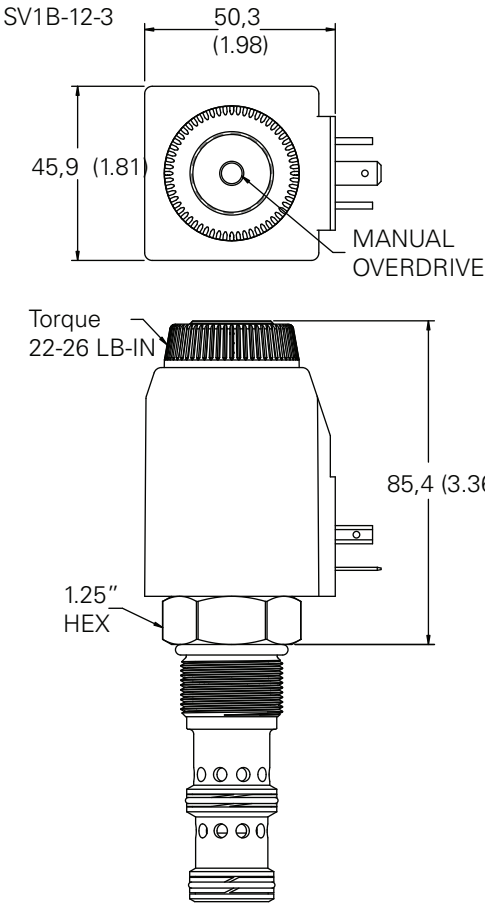
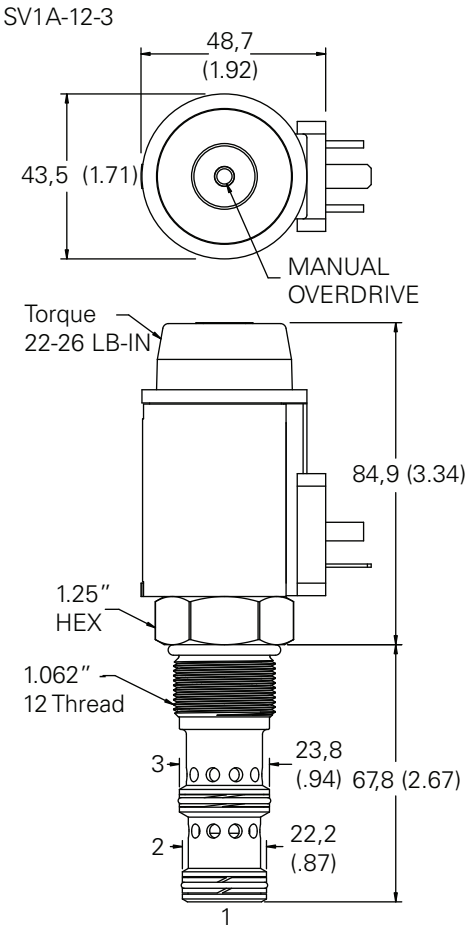
mm (inch)

Torque cartridge in aluminum housing 81-95 Nm (60-70ft. lbs)

Note  
When solenoid valve is ordered as cartridge only, coil nut is included.



**WARNING**  
Maintain 2.5-3 Nm (1.8-2.2 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.



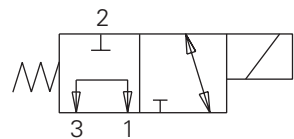
# SV2A/B-12-3

3-way, 2-position, spool type solenoid valve

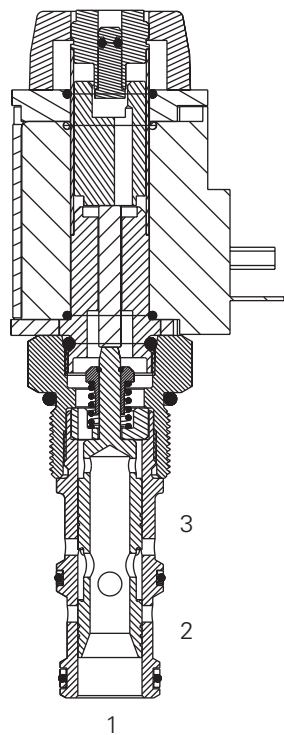
## Description

The SV2A/B-12-3 is a 3-way, 2-position, direct acting, spool type, screw-in cartridge solenoid valve.

## Functional Symbol



## Sectional View



## Operation

In the de-energized position, this valve allows flow from port 1 to port 3 while port 2 is blocked.

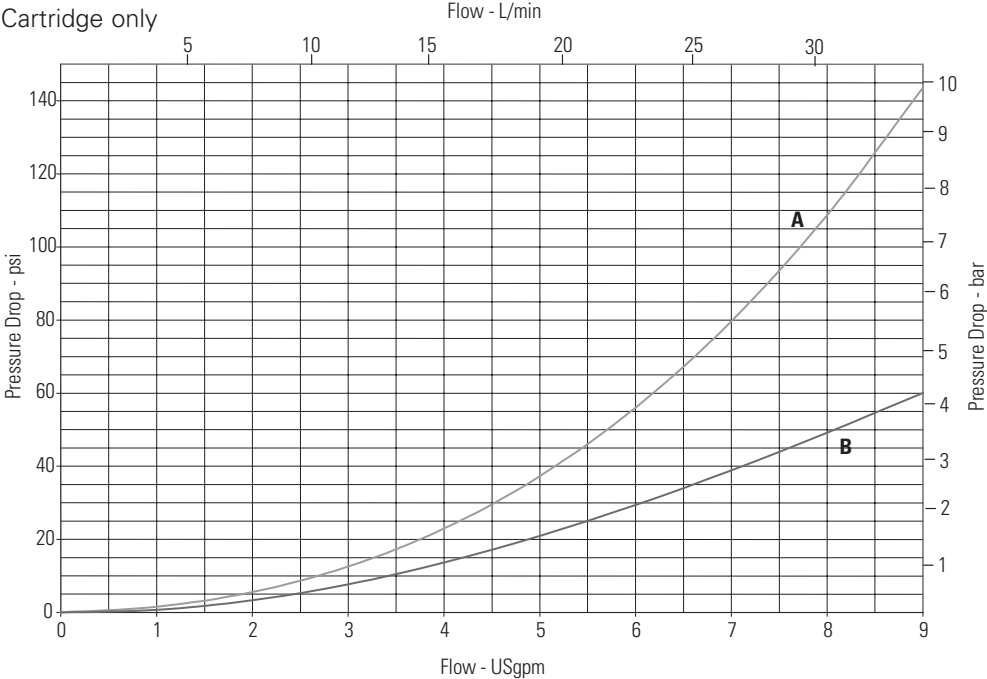
In the energized position, flow is allowed from port 2 to port 1 while port 3 is blocked.

## RATINGS AND SPECIFICATIONS

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

Typical application pressure	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	SV2A-12-3
	30 L/min (8 USgpm)
	Max. flow port 1 to port 3 - 27 L/min (7 USgpm)
	SV2B-12-3
	38 L/min (10 USgpm)
	Max. flow port 1 to port 3 - 34 L/min (9 USgpm)
Internal leakage	300 cm <sup>3</sup> /min (21.5 in <sup>3</sup> /min) max. @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Cavity	C-12-3
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Aluminum
Weight including coil	SV2A-12-3
	0,68 kg (1.5 lbs)
	SV2B-12-3
	0,86 kg (1.9 lbs)
Seal kit	9900171-000 (Buna-N), 9900172-000 (Viton®) Viton is a registered trademark of E.I. DuPont

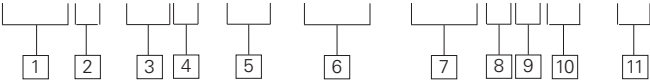
## Pressure Drop Curves



**A** - Port 2 to port 1 energized  
**B** - Port 1 to port 3 de-energized



SV2 \* - 12 \* - 3P - \*\*\*\* - \*\*\*\* \* \* \* \* - \*\*



- 1 **Function**

**SV2** - Solenoid valve
- 2 **Max Flow**

**A** - 30 L/min (8 USgpm)

**B** - 38 L/min (10 USgpm)
- 3 **Size**

**12** - 12 size
- 4 **Seal Material**

**Blank** - Buna-N

**V** - Viton®
- 5 **Style**

**3P** - 3 way, push type manual override

CODE	PORT SIZE	HOUSING NUMBER
0	Cartridge only	
A6G	3/4" BSPP	02-161816
A12H	SAE 12	02-160646

- 7 **Voltage rating**

**00** - No coil

**12D** - 12VDC

**24D** - 24VDC

**24A** - 24VAC

**110A** - 110VAC

**115A** - 115VAC

**12B** - 12VDC/w diode\*

**24B** - 24VDC/w diode\*

\*Optional arc suppression diode.
- 8 **Connector types**

**Blank** - No coil

**G** - ISO 4400 DIN 43650

**W** - Leadwire

**N** - Deutsch (DC only)

For coil dimensions see Section C.

- 9 **Coil types**

**Blank** - No coil

**L** - L series (30W EN 490) used for SV2A-12

**R** - R series (30W) used for SV2B-12
- 10 **Coil special features**

**Blank** - No coil

**00** - No special feature
- 11 **Special features**

**00** - None

(Only required if valve has special features, omitted if "00.")

**SF** - Soft shift

Dimensions

mm (inch)

Torque cartridge in aluminum housing 81-95 Nm (60-70ft. lbs)

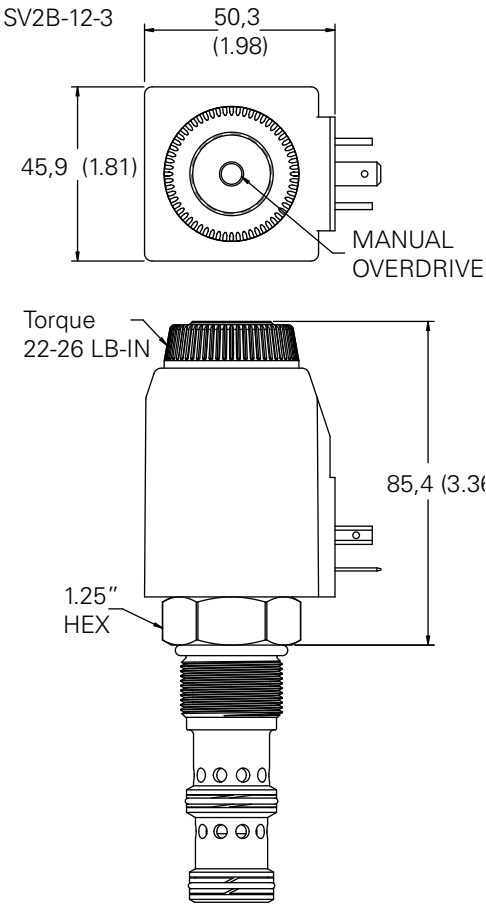
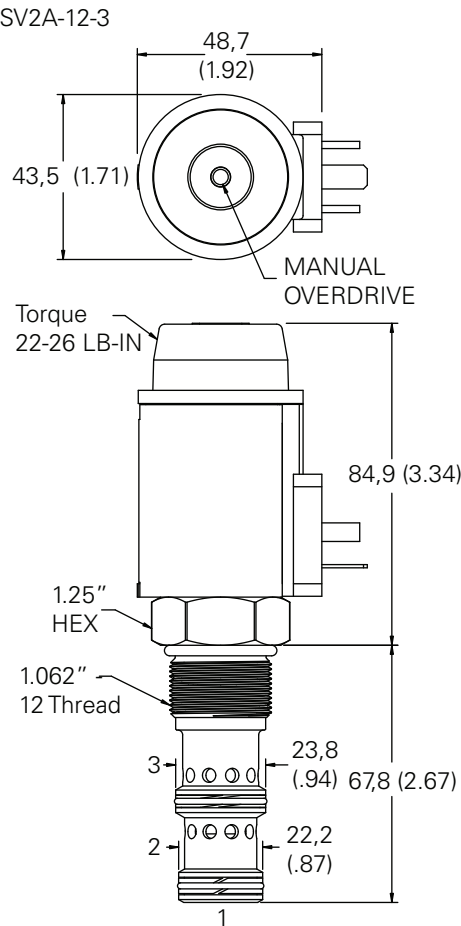
Note

When solenoid valve is ordered as cartridge only, coil nut is included.



WARNING

Maintain 2.5-3 Nm (1.8-2.2 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.



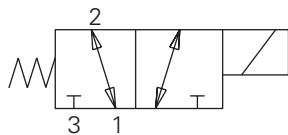
# SV4A/B-12-3

3-way, 2-position, spool type solenoid valve

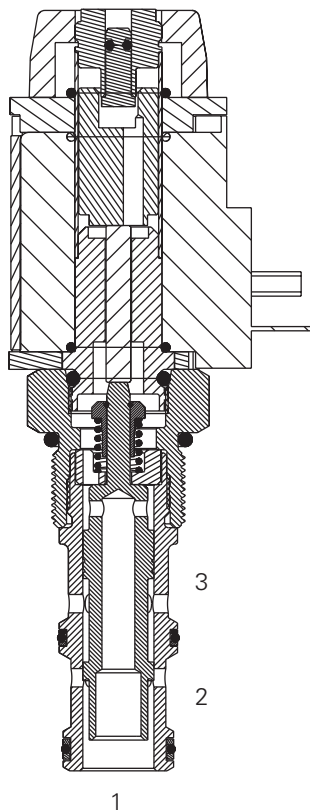
## Description

The SV4A/B-12-3 is a 3-way, 2-position, direct acting, spool type, screw-in cartridge solenoid valve.

## Functional Symbol



## Sectional View



## Operation

In the de-energized position, this valve allows flow from port 2 to port 1 while port 3 is blocked.

In the energized position, flow is allowed from port 3 to port 2 while port 1 is blocked.

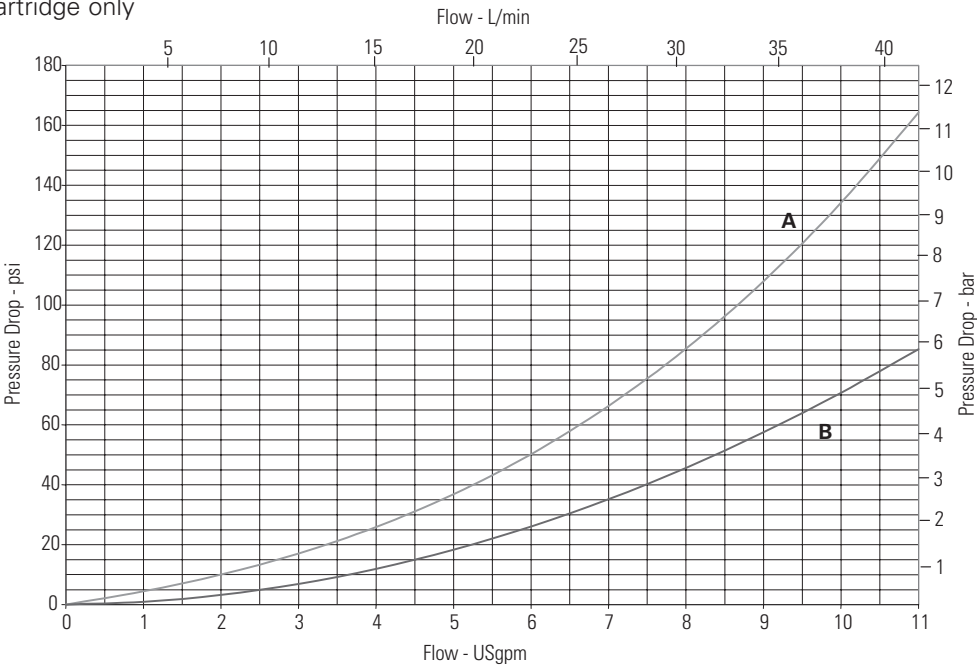
## RATINGS AND SPECIFICATIONS

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

Typical application pressure	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	SV4A-12-3 34 L/min (9 USgpm) SV4B-12-3 42 L/min (11 USgpm)
Internal leakage	300 cm <sup>3</sup> /min (21.5 in <sup>3</sup> /min) max. @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Cavity	C-12-3
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Aluminum
Weight including coil	SV4A-12-3 0,68 kg (1.5 lbs) SV4B-12-3 0,86 kg (1.9 lbs)
Seal kit	9900171-000 (Buna-N), 9900172-000 (Viton®) <small>Viton is a registered trademark of E.I. DuPont</small>

## Pressure Drop Curves

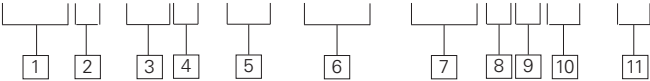
Cartridge only



A - Port 3 to port 2 energized

B - Port 2 to port 1 de-energized

SV4 \* - 12 \* - 3P - \*\*\*\* - \*\*\*\* \* \* \* \* - \*\*



- 1 **Function**

**SV4** - Solenoid valve
- 2 **Max Flow**

**A** - 34 L/min (9 USgpm)

**B** - 42 L/min (11 USgpm)
- 3 **Size**

**12** - 12 size
- 4 **Seal Material**

**Blank** - Buna-N

**V** - Viton®
- 5 **Style**

**3P** - 3 way, push type manual override

- 6 **Port Size**

CODE	PORT SIZE	HOUSING NUMBER
<b>0</b>	Cartridge only	
<b>A6G</b>	3/4" BSPP	02-161816
<b>A12H</b>	SAE 12	02-160646
- 7 **Voltage rating**

**00** - No coil

**12D** - 12VDC

**24D** - 24VDC

**24A** - 24VAC

**110A** - 110VAC

**115A** - 115VAC

**12B** - 12VDC/w diode\*

**24B** - 24VDC/w diode\*

\*Optional arc suppression diode.
- 8 **Connector types**

**Blank** - No coil

**G** - ISO 4400 DIN 43650

**W** - Leadwire

**N** - Deutsch (DC only)

For coil dimensions see Section C.

- 9 **Coil types**

**Blank** - No coil

**L** - L series (30W EN 490) used for SV4A-12

**R** - R series (30W) used for SV4B-12
- 10 **Coil special features**

**Blank** - No coil

**00** - No special feature
- 11 **Special features**

**00** - None

(Only required if valve has special features, omitted if "00.")

**SF** - Soft shift

Dimensions

mm (inch)

Torque cartridge in aluminum housing 81-95 Nm (60-70ft. lbs)

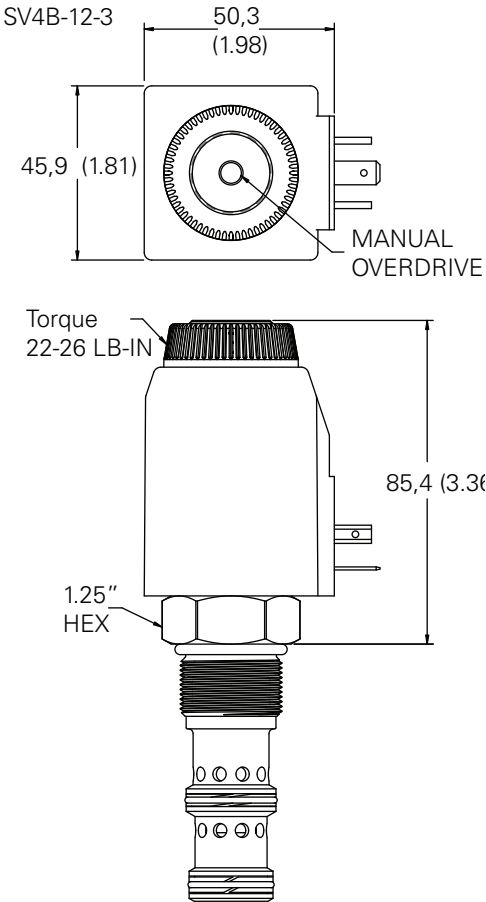
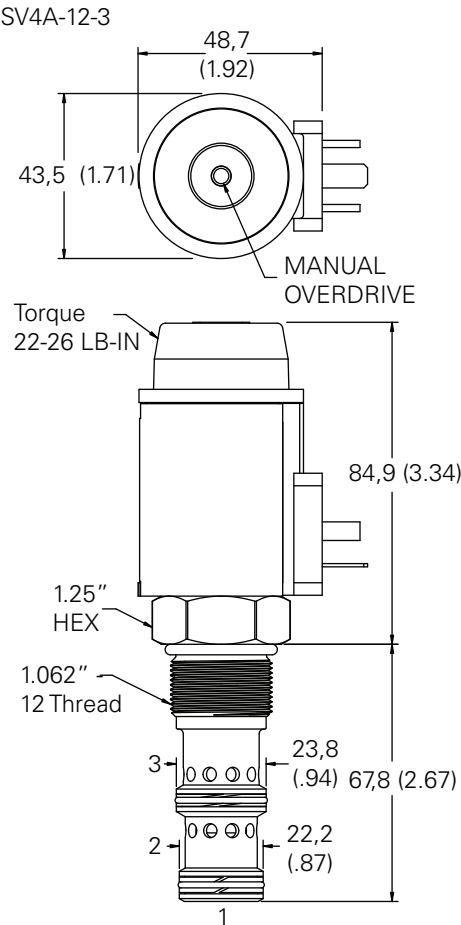
Note

When solenoid valve is ordered as cartridge only, coil nut is included.



**WARNING**

Maintain 2.5-3 Nm (1.8-2.2 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.



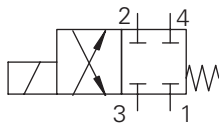
# SV12-8-4/4M

4-way, 2-position spool type solenoid valve, 350 bar

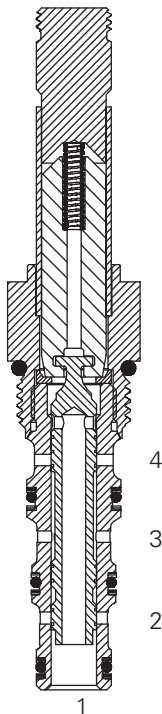
## Description

The SV12-8-4 is a 4-way, 2-position, direct acting, spool type, screw-in cartridge solenoid valve.

## Functional Symbol



## Sectional View



## Operation

In the de-energized position all ports are blocked. In the energized position, flow is allowed from port 3 to port 4 and from port 2 to port 1.

## RATINGS AND SPECIFICATIONS

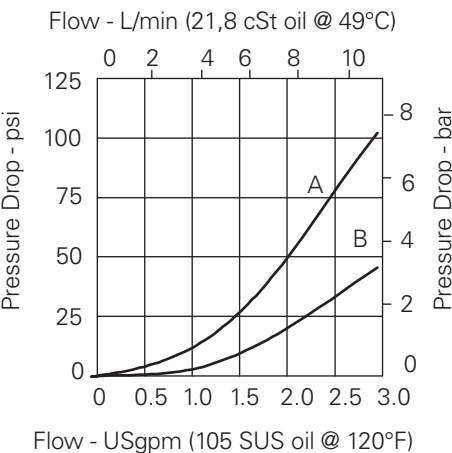
<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
Typical application pressure (all ports)	350 bar (5000 psi)
Cartridge fatigue pressure (infinite life)	310 bar (4500 psi)
Rated flow	13 L/min (3.5 USgpm)
Internal leakage, port 2 to port 1	82 cm <sup>3</sup> /min. (5 in <sup>3</sup> /min.) max @ 350 bar (5000 psi)
Temperature range	-40° to 100°C (-40° to 212°F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Cavity	C-8-4
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Steel
Weight cartridge only	0,14 kg (0.30 lbs)
Seal kit	02-160757 (Buna-N), 02-160758 (Viton®) <small>Viton is a registered trademark of E.I. DuPont</small>

## Performance Characteristics

Cartridge only

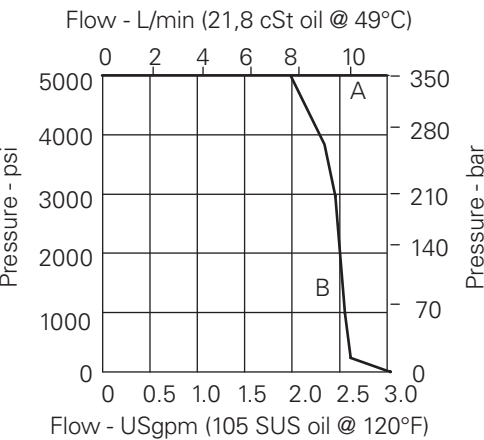
### Pressure drop vs. flow

- A** - Port 3 to port 4  
**B** - Port 2 to port 1

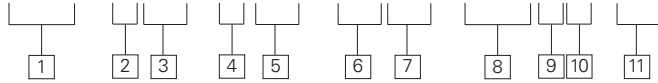


### Operating Limits

- A** - Port 2 to port 1  
**B** - Port 3 to port 4



SV12 – 8 (V) – 4 (M) – (S) \*\* – \*\*\*\*\* P – 00



- 1 **Function**  
**SV12** - Solenoid valve
- 2 **Size**  
**8** - 8 size
- 3 **Seal material**  
**Blank** - Buna-N  
**V** - Viton®
- 4 **Style**  
**4** - 4-way, 2 position
- 5 **Manual override option**  
**Blank** - No manual override  
**M** - Manual override  
  
For valve dimensions with manual override option installed see page A-153.

- 6 **Valve housing material**  
**Blank** - Cartridge only  
**S** - Steel
- 7 **Port Size**

CODE	PORT SIZE	HOUSING NUMBER
<b>0</b>	Cartridge only	
<b>2G</b>	1/4" BSPP	02-160751
<b>3G</b>	3/8" BSPP	02-160752
<b>4T</b>	SAE 4	02-160753
<b>6T</b>	SAE 6	02-160754

See page J-13 for housings.

- 9 **Connector types**  
**Blank** - No coil  
**G** - ISO 4400 DIN 43650  
**Q** - Spade terminals  
**W** - Leadwire  
**N** - Deutsch (DC only)  
**Y** - Amp JR (DC only)  
**D** - Metripack 150 male (DC only)  
**J** - Metripack 280 male (DC only)
- 10 **Coil series**  
**P** - 8 series, 23 W  
  
For coil dimensions see Section C.

- 8 **Voltage rating**

<b>00</b> - No coil	<b>24A</b> - 24VAC
<b>12D</b> - 12VDC	<b>115A</b> - 115VAC
<b>24D</b> - 24VDC	<b>230A</b> - 230VAC
<b>36D</b> - 36VDC	<b>12B</b> - 12VDC/w diode*
	<b>24B</b> - 24VDC/w diode*

\*Optional arc suppression diode.

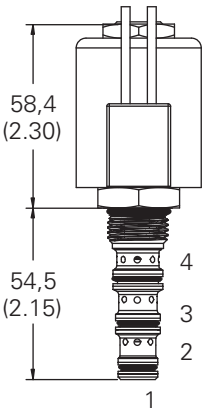
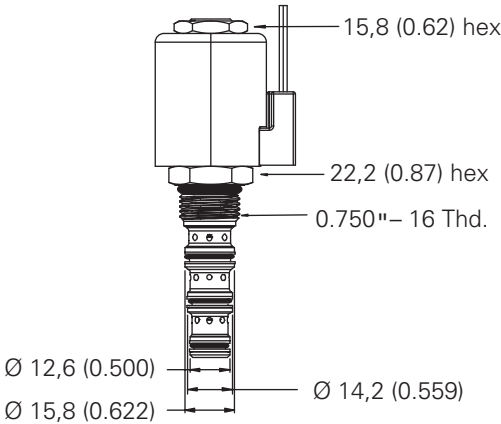
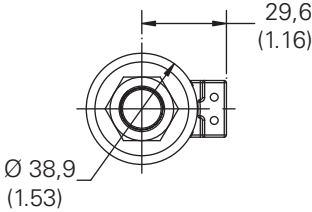
- 11 **Special features**  
**00** - None  
  
(Only required if valve has special features, omitted if "00.")


Dimensions

mm (inch)

Torque cartridge in aluminum or steel housing  
34-41 Nm (25-30 ft. lbs)

Note  
When solenoid valve is ordered as cartridge only, nut is included.



 **WARNING**  
Maintain 5-8 Nm (4-6 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.

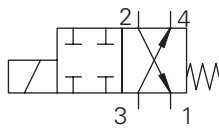
# SV3-10-4/4M/4R

4-way, 2-position spool  
type solenoid valve

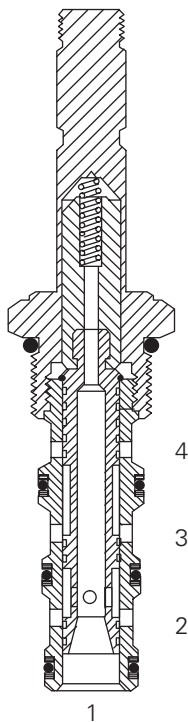
## Description

The SV3-10-4 is a 4-way, 2-position, direct acting, spool type, screw-in cartridge solenoid valve.

## Functional Symbol



## Sectional View



## Operation

In the de-energized position, port 3 is open to port 4 and port 2 is open to port 1.

In the energized position all ports are blocked.

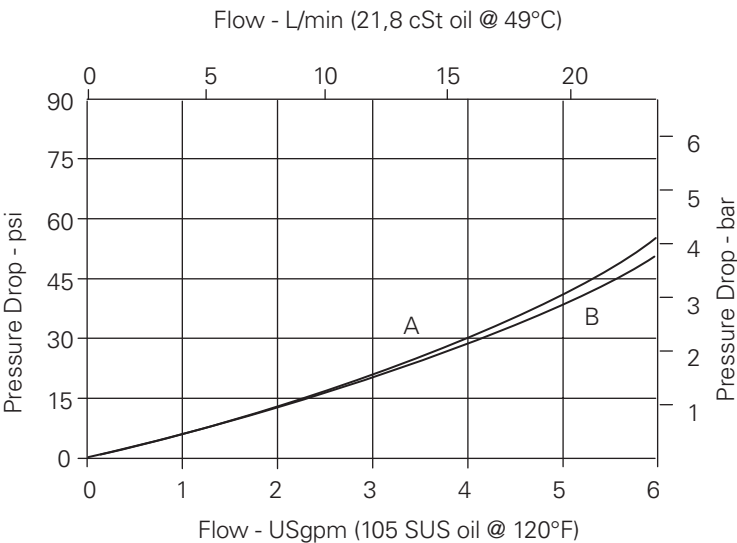
## RATINGS AND SPECIFICATIONS

*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)
Internal leakage	164 cm³/min (10 in³/min) max. @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Cavity	C-10-4
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Aluminum
Weight including coil	0,44 kg (0.96 lbs)
Seal kit	889625 (Buna-N), 566080 (Viton®) <small>Viton is a registered trademark of E.I. DuPont</small>

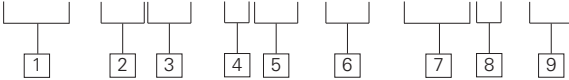
## Pressure Drop Curves

Cartridge only



**A** - Port 3 to port 4  
**B** - Port 1 to port 2

SV3 – 10 (V) – 4 (\*) – \*\* – \*\*\*\*\* – 00



1 Function

**SV3** - Solenoid valve

2 Size

**10** - 10 size

3 Seal material

**Blank** - Buna-N  
**V** - Viton®

4 Style

**4** - 4-way, 2 position

5 Manual override option

**Blank** - No manual override  
**M** - Knob type  
**R** - Cable type

For valve dimensions with manual override option installed see page A-153.

6 Port Size

CODE	PORT SIZE	HOUSING NUMBER
<b>0</b>	Cartridge only	
<b>3B</b>	3/8" BSPP	02-179705*
<b>6T</b>	SAE6	566161*
<b>2G</b>	1/4" BSPP	876709
<b>3G</b>	3/8" BSPP	876715
<b>6H</b>	SAE 6	876708
<b>8H</b>	SAE 8	876713

\*Light duty housing.  
See section J for housings.

7 Voltage rating

**00** - No coil  
**12D** - 12VDC  
**24D** - 24VDC  
**36D** - 36VDC

**24A** - 24VAC  
**115A** - 115VAC  
**230A** - 230VAC  
**12B** - 12VDC/w diode\*  
**24B** - 24VDC/w diode\*  
\*Optional arc suppression diode.

8 Connector types

**Blank** - No coil  
**G** - ISO 4400 DIN 43650  
**Q** - Spade terminals  
**W** - Leadwire  
**N** - Deutsch (DC only)  
**Y** - Amp JR (DC only)  
**D** - Metripack 150 male (DC only)  
**J** - Metripack 280 male (DC only)

For coil dimensions see Section C.

9 Special features

**00** - None  
(Only required if valve has special features, omitted if "00.")

Note  
Use J series, 23 W coils

Dimensions

mm (inch)

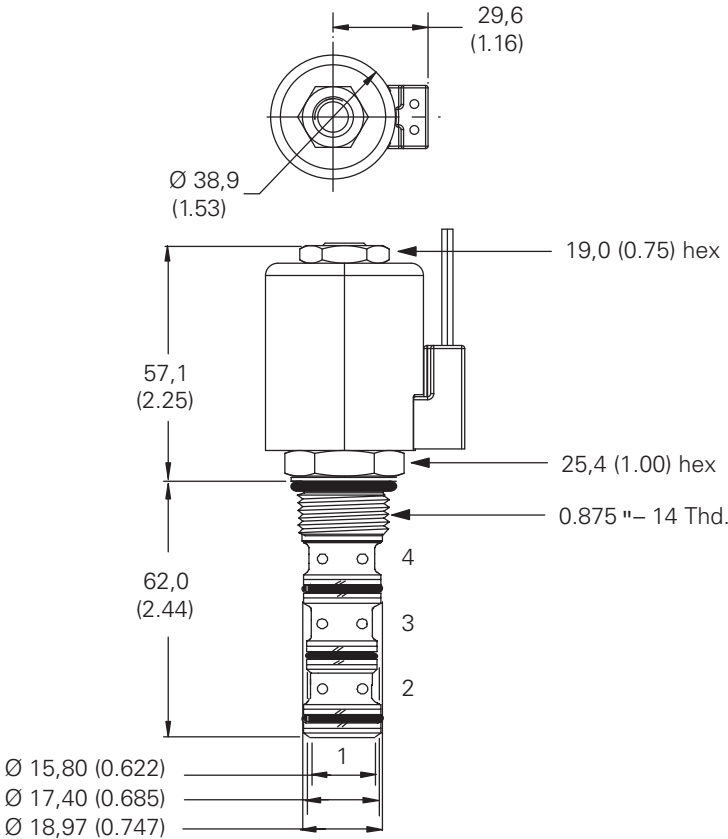
Torque cartridge in aluminum housing 47-54 Nm (35-40 ft. lbs)

Note  
When solenoid valve is ordered as cartridge only, coil nut is included.



WARNING

Maintain 5-8 Nm (4-6 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.



# SV4-10-4/4M/4R

4-way, 2-position spool  
type solenoid valve

### Description

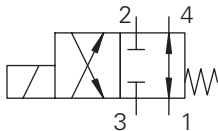
The SV4-10-4 is a 4-way, 2-position, direct acting, spool type, screw-in cartridge solenoid valve.

### Operation

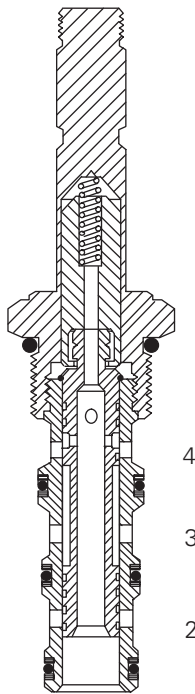
In the de-energized position, flow is allowed between port 1 and port 4 while port 2 and port 3 are blocked.

In the energized position port 3 is open to port 4 and port 2 is open to port 1.

### Functional Symbol



### Sectional View



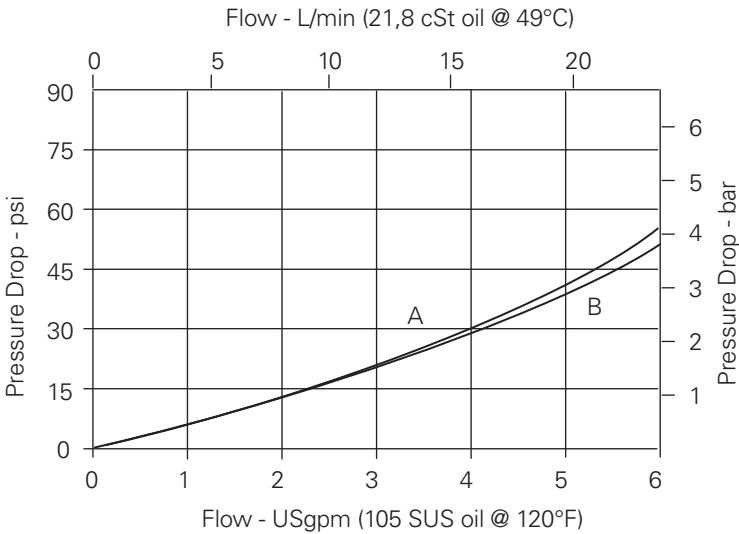
### RATINGS AND SPECIFICATIONS

*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)
Internal leakage	164 cm <sup>3</sup> /min (10 in <sup>3</sup> /min) max. @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Cavity	C-10-4
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Aluminum
Weight including coil	0,44 kg (0.96 lbs)
Seal kit	889625 (Buna-N), 566080 (Viton®) <small>Viton is a registered trademark of E.I. DuPont</small>

### Pressure Drop Curves

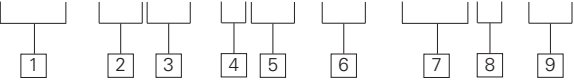
Cartridge only



**A** - Port 3 to port 4  
**B** - Port 1 to port 2



SV4 – 10 (V) – 4 (\*) – \*\* – \*\*\*\*\* – 00



- 1 **Function**

**SV4** - Solenoid valve
- 2 **Size**

**10** - 10 size
- 3 **Seal material**

**Blank** - Buna-N  
**V** - Viton®
- 4 **Style**

**4** - 4-way, 2 position
- 5 **Manual override option**

**Blank** - No manual override  
**M** - Knob type  
**R** - Cable type

For valve dimensions with manual override option installed see page A-153.

6 **Port Size**

CODE	PORT SIZE	HOUSING NUMBER
0	Cartridge only	
3B	3/8" BSPP	02-179705*
6T	SAE6	566161*
2G	1/4" BSPP	876709
3G	3/8" BSPP	876715
6H	SAE 6	876708
8H	SAE 8	876713

\*Light duty housing.  
See section J for housings.

7 **Voltage rating**

<b>00</b> - No coil	<b>24A</b> - 24VAC
<b>12D</b> - 12VDC	<b>115A</b> - 115VAC
<b>24D</b> - 24VDC	<b>230A</b> - 230VAC
<b>36D</b> - 36VDC	<b>12B</b> - 12VDC/w diode*
	<b>24B</b> - 24VDC/w diode*

\*Optional arc suppression diode.

- 8 **Connector types**

**Blank** - No coil  
**G** - ISO 4400 DIN 43650  
**Q** - Spade terminals  
**W** - Leadwire  
**N** - Deutsch (DC only)  
**Y** - Amp JR (DC only)  
**D** - Metripack 150 male (DC only)  
**J** - Metripack 280 male (DC only)

For coil dimensions see Section C.
- 9 **Special features**

**00** - None

(Only required if valve has special features, omitted if "00.")
- Note

Use J series, 23 W coils with this solenoid valve.

**Dimensions**

mm (inch)

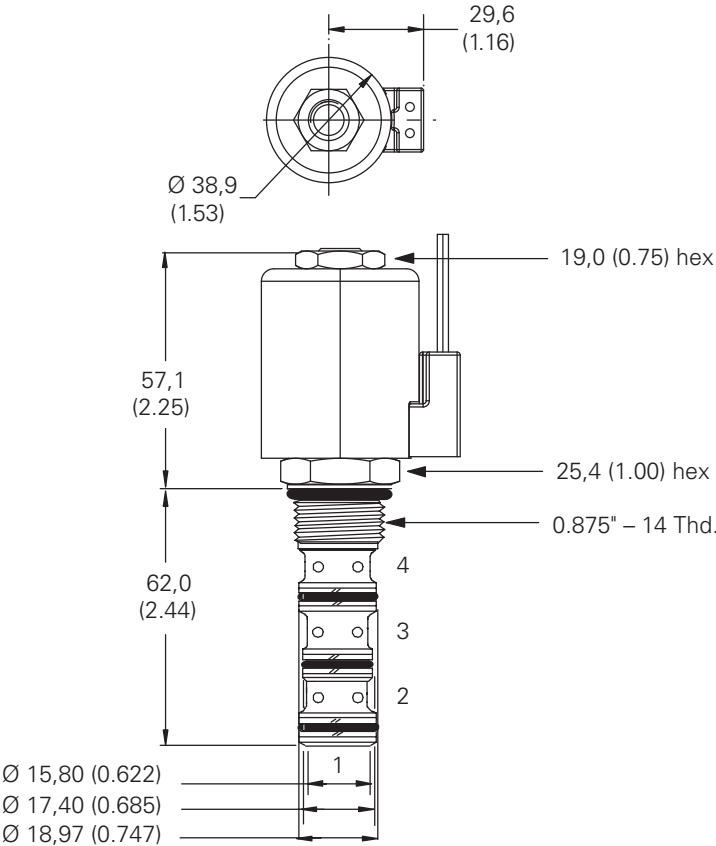
Torque cartridge in aluminum housing 47-54 Nm (35-40 ft. lbs)

Note

When solenoid valve is ordered as cartridge only, nut is included.

**WARNING**

Maintain 5-8 Nm (4-6 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.



# SV5-10-4/4M/4R

4-way, 2-position spool  
type solenoid valve

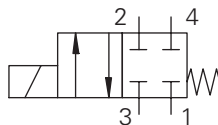
## Description

The SV5-10-4 is a 4-way, 2-position, direct acting, spool type, screw-in cartridge solenoid valve.

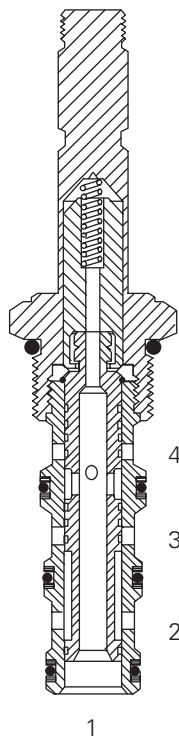
## Operation

In the de-energized position, all ports are blocked. In the energized position port 2 is open to port 3 and port 1 is open to port 4.

## Functional Symbol



## Sectional View

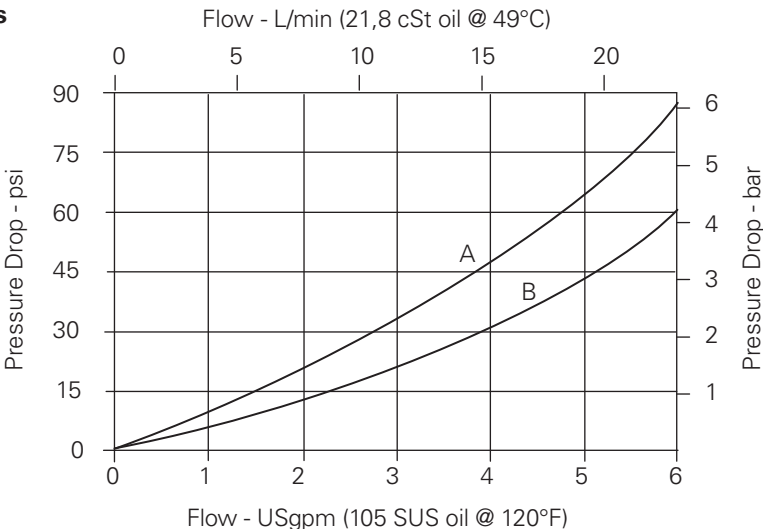


## RATINGS AND SPECIFICATIONS

<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
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)
Internal leakage	164 cm <sup>3</sup> /min (10 in <sup>3</sup> /min) max. @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Cavity	C-10-4
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Aluminum
Weight including coil	0,44 kg (0.96 lbs)
Seal kit	889625 (Buna-N), 566080 (Viton®) <small>Viton is a registered trademark of E.I. DuPont</small>

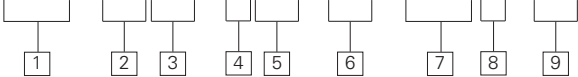
## Pressure Drop Curves

Cartridge only



**A** - Port 1 to port 4  
**B** - Port 3 to port 2

SV5 – 10 (V) – 4 (\*) – \*\* – \*\*\*\*\* – 00



- 1 **Function**

**SV5** - Solenoid valve
- 2 **Size**

**10** - 10 size
- 3 **Seal material**

**Blank** - Buna-N  
**V** - Viton®
- 4 **Style**

**4** - 4-way, 2 position
- 5 **Manual override option**

**Blank** - No manual override  
**M** - Knob type  
**R** - Cable type

For valve dimensions with manual override option installed see page A-153.

Dimensions

mm (inch)

Torque cartridge in aluminum housing 47-54 Nm (35-40 ft. lbs)

Note  
When solenoid valve is ordered as cartridge only, coil nut is included.



WARNING

Maintain 5-8 Nm (4-6 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.

- 6 **Port Size**

CODE	PORT SIZE	HOUSING NUMBER
<b>0</b>	Cartridge only	
<b>3B</b>	3/8" BSPP	02-179705*
<b>6T</b>	SAE6	566161*
<b>2G</b>	1/4" BSPP	876709
<b>3G</b>	3/8" BSPP	876715
<b>6H</b>	SAE 6	876708
<b>8H</b>	SAE 8	876713

\*Light duty housing.  
See section J for housings.
- 7 **Voltage rating**

<b>00</b> - No coil	<b>24A</b> - 24VAC
<b>12D</b> - 12VDC	<b>115A</b> - 115VAC
<b>24D</b> - 24VDC	<b>230A</b> - 230VAC
<b>36D</b> - 36VDC	<b>12B</b> - 12VDC/w diode*
	<b>24B</b> - 24VDC/w diode*

\*Optional arc suppression diode.

- 8 **Connector types**

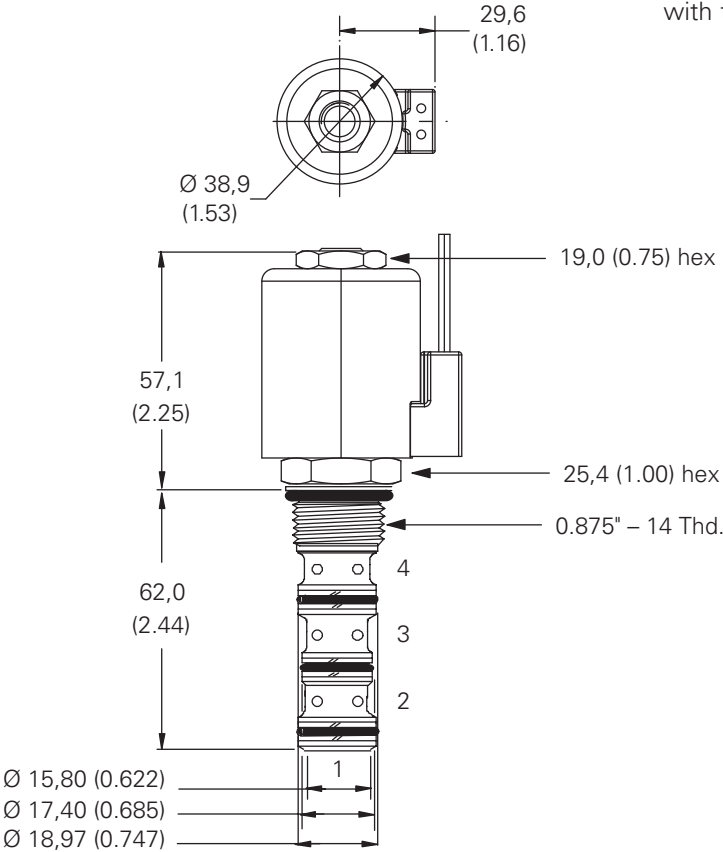
**Blank** - No coil  
**G** - ISO 4400 DIN 43650  
**Q** - Spade terminals  
**W** - Leadwire  
**N** - Deutsch (DC only)  
**Y** - Amp JR (DC only)  
**D** - Metripack 150 male (DC only)  
**J** - Metripack 280 male (DC only)

For coil dimensions see Section C.
- 9 **Special features**

**00** - None

(Only required if valve has special features, omitted if "00.")

Note  
Use J series, 23 W coils with this solenoid valve.



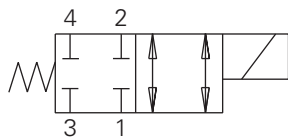
# SV2A/B-12-4

4-way, 2-position, spool type solenoid valve

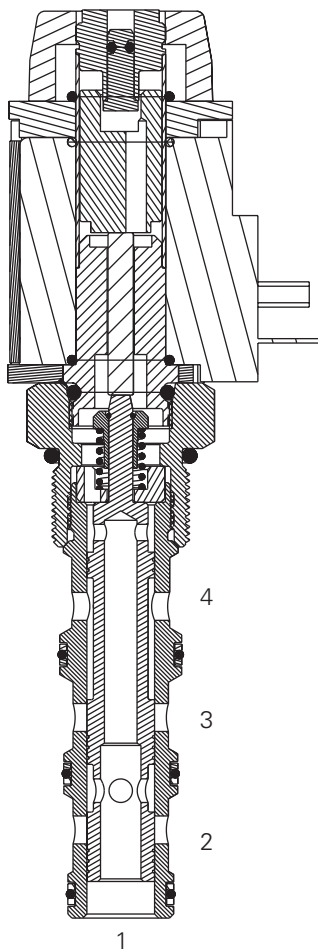
## Description

The SV2A/B-12-4 is a 4-way, 2-position, direct acting, spool type, screw-in cartridge solenoid valve.

## Functional Symbol



## Sectional View



## Operation

In the de-energized position, all ports are blocked.

In the energized position, port 3 is open to port 4 and port 2 is open to port 1.

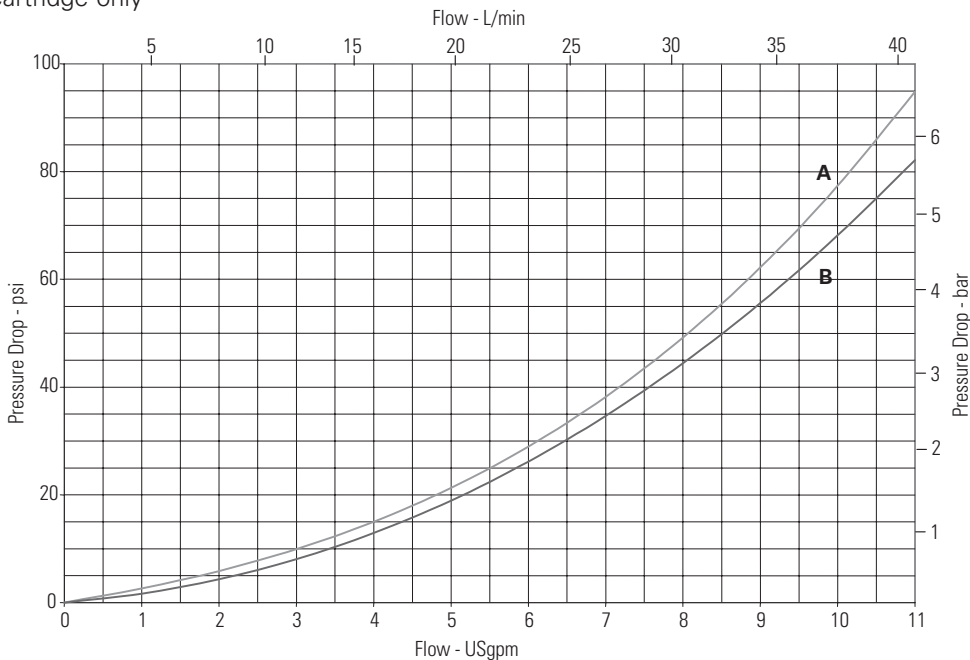
## RATINGS AND SPECIFICATIONS

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

Typical application pressure	210 bar (3000 psi)		
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)		
Rated flow	SV2A-12-4	34 L/min (9 USgpm)	
	SV2B-12-4		42 L/min (11 USgpm)
Internal leakage	300 cm³/min (21.5 in³/min) max. @ 210 bar (3000 psi)		
Temperature range	-40° to 120°C (-40° to 248°F)		
Coil duty	Continuous from 85% to 110% of nominal voltage		
Cavity	C-12-4		
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.		
Filtration	Cleanliness code 18/16/13		
Housing material (standard)	Aluminum		
Weight including coil	SV2A-12-4	0,68 kg (1.5 lbs)	
	SV2B-12-4		0,86 kg (1.9 lbs)
Seal kit	2160979 (Buna-N), 2160980 (Viton®) Viton is a registered trademark of E.I. DuPont		

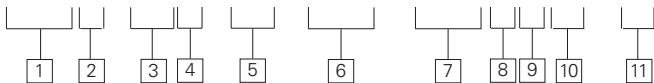
## Pressure Drop Curves

Cartridge only



A - Port 2 to port 1  
B - Port 3 to port 4

SV2 \* - 12 \* - 4P - \*\*\*\* - \*\*\*\* \* \* \* \* - \*\*



- 1 **Function**

**SV2** - Solenoid valve
- 2 **Max Flow**

**A** - 34 L/min (9 USgpm)

**B** - 42 L/min (11 USgpm)
- 3 **Size**

**12** - 12 size
- 4 **Seal Material**

**Blank** - Buna-N

**V** - Viton®
- 5 **Style**

**4P** - 4 way, push type manual override

- 6 **Port Size**

CODE	PORT SIZE	HOUSING NUMBER
<b>0</b>	Cartridge only	
<b>A6G</b>	3/4" BSPP	5986432-001
<b>A10H</b>	SAE 10	5986434-001
<b>A12H</b>	SAE 12	5986436-001
- 7 **Voltage rating**

**00** - No coil

**12D** - 12VDC

**24D** - 24VDC

**24A** - 24VAC

**110A** - 110VAC

**115A** - 115VAC

**12B** - 12VDC/w diode\*

**24B** - 24VDC/w diode\*

\*Optional arc suppression diode.
- 8 **Connector types**

**Blank** - No coil

**G** - ISO 4400 DIN 43650

**W** - Leadwire

For coil dimensions see Section C.

- 9 **Coil types**

**Blank** - No coil

**L** - L series (30W EN 490) used for SV2A-12

**R** - R series (30W) used for SV2B-12
- 10 **Coil special features**

**Blank** - No coil

**00** - No special feature
- 11 **Special features**

**00** - None

(Only required if valve has special features, omitted if "00.")

**SF** - Soft shift


Dimensions

mm (inch)

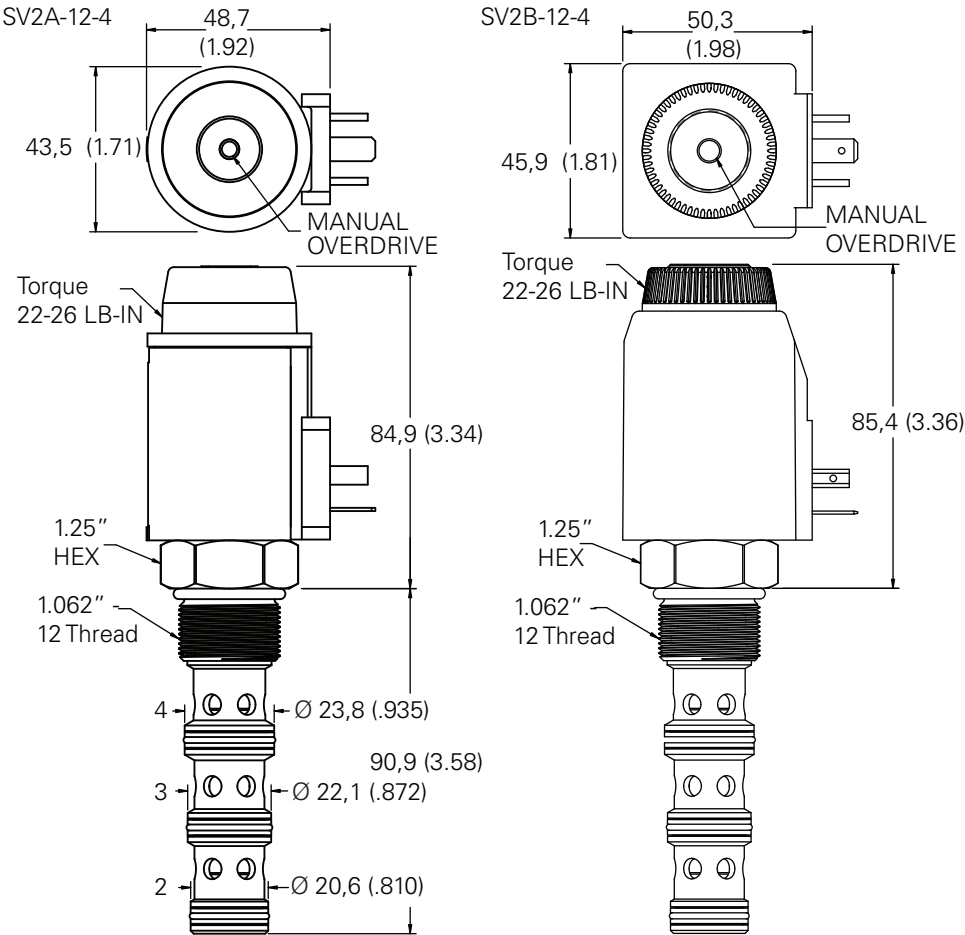
Torque cartridge in aluminum housing 81-95 Nm (60-70ft. lbs)

Note

When solenoid valve is ordered as cartridge only, coil nut is included.

 **WARNING**

Maintain 2.5-3 Nm (1.8-2.2 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.



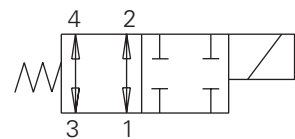
# SV3A/B-12-4

4-way, 2-position, spool type solenoid valve

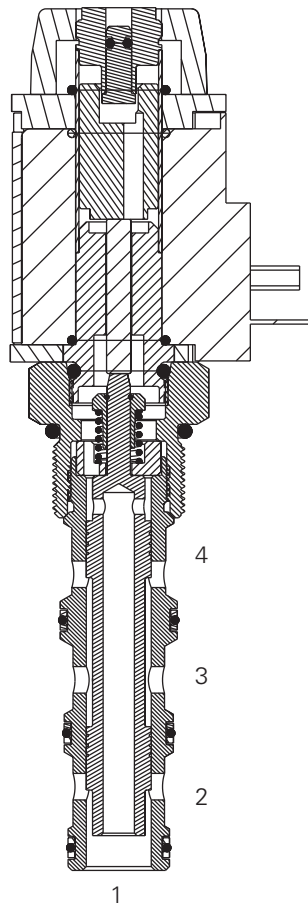
## Description

The SV3A/B-12-4 is a 4-way, 2-position, direct acting, spool type, screw-in cartridge solenoid valve.

## Functional Symbol



## Sectional View



## Operation

In the de-energized position, port 3 is open to port 4 and port 2 is open to port 1.

In the energized position, all ports are blocked.

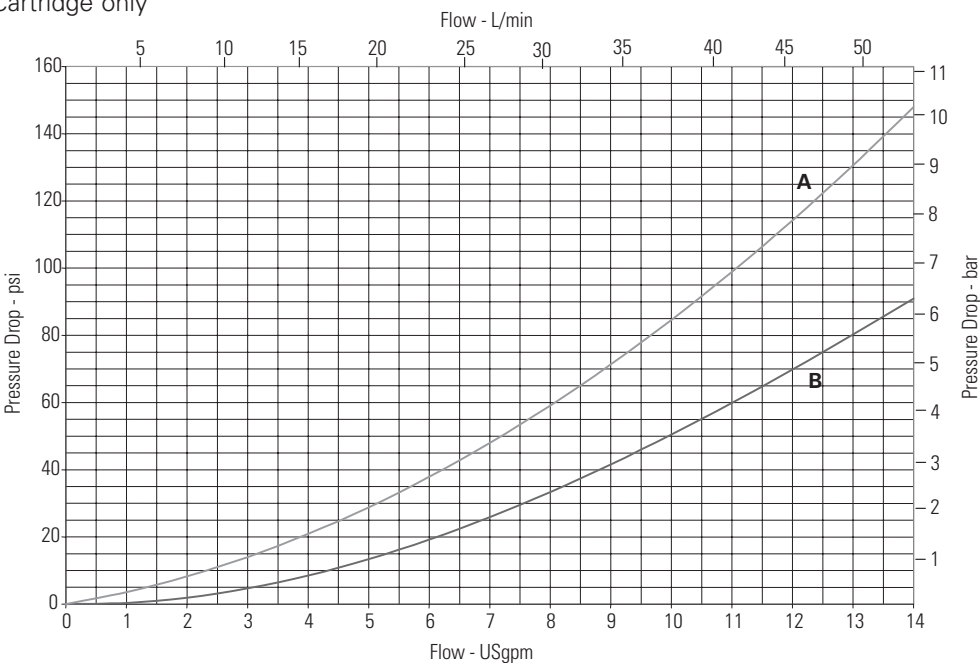
## RATINGS AND SPECIFICATIONS

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

Typical application pressure	210 bar (3000 psi)		
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)		
Rated flow	SV3A-12-4	46 L/min (12 USgpm)	53 L/min (14 USgpm)
	SV3B-12-4		
Internal leakage	300 cm <sup>3</sup> /min (21.5 in <sup>3</sup> /min) max. @ 210 bar (3000 psi)		
Temperature range	-40° to 120°C (-40° to 248°F)		
Coil duty	Continuous from 85% to 110% of nominal voltage		
Cavity	C-12-4		
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.		
Filtration	Cleanliness code 18/16/13		
Housing material (standard)	Aluminum		
Weight including coil	SV3A-12-4	0,68 kg (1.5 lbs)	0,86 kg (1.9 lbs)
	SV3B-12-4		
Seal kit	2160979 (Buna-N), 2160980 (Viton®) Viton is a registered trademark of E.I. DuPont		

## Pressure Drop Curves

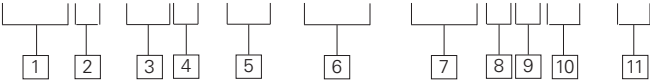
Cartridge only



A - Port 3 to port 4

B - Port 2 to port 1

SV3 \* - 12 \* - 4P - \*\*\*\* - \*\*\*\* \* \* \* \* - \*\*



- 1 **Function**

**SV3** - Solenoid valve
- 2 **Max Flow**

**A** - 46 L/min (12 USgpm)  
**B** - 53 L/min (14 USgpm)
- 3 **Size**

**12** - 12 size
- 4 **Seal Material**

**Blank** - Buna-N  
**V** - Viton®
- 5 **Style**

**4P** - 4 way, push type manual override

- 6 **Port Size**

CODE	PORT SIZE	HOUSING NUMBER
<b>0</b>	Cartridge only	
<b>A6G</b>	3/4" BSPP	5986432-001
<b>A10H</b>	SAE 10	5986434-001
<b>A12H</b>	SAE 12	5986436-001
- 7 **Voltage rating**

**00** - No coil  
**12D** - 12VDC  
**24D** - 24VDC  
**24A** - 24VAC  
**110A** - 110VAC  
**115A** - 115VAC  
**12B** - 12VDC/w diode\*  
**24B** - 24VDC/w diode\*  
\*Optional arc suppression diode.
- 8 **Connector types**

**Blank** - No coil  
**G** - ISO 4400 DIN 43650  
**W** - Leadwire  
**N** - Deutsch (DC only)  
For coil dimensions see Section C.

- 9 **Coil types**

**Blank** - No coil  
**L** - L series (30W EN 490) used for SV3A-12  
**R** - R series (30W) used for SV3B-12
- 10 **Coil special features**


**Blank** - No coil  
**00** - No special feature
- 11 **Special features**

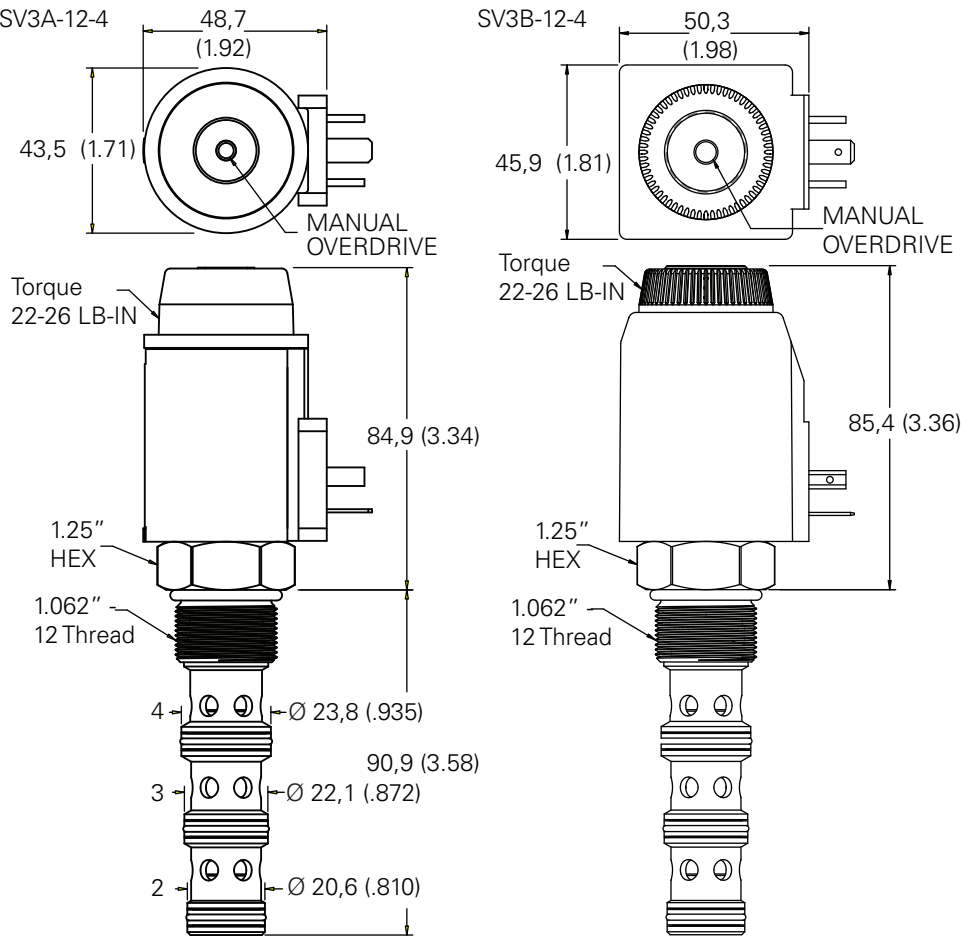
**00** - None  
(Only required if valve has special features, omitted if "00.")  
**SF** - Soft shift

Dimensions  
mm (inch)

Torque cartridge in aluminum housing 81-95 Nm (60-70ft. lbs)

Note  
When solenoid valve is ordered as cartridge only, coil nut is included.

 **WARNING**  
Maintain 2.5-3 Nm (1.8-2.2 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.



# SV5A/B-12-4

4-way, 2-position, spool type solenoid valve

## Description

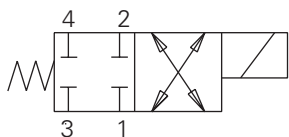
The SV5A/B-12-4 is a 4-way, 2-position, direct acting, spool type, screw-in cartridge solenoid valve.

## Operation

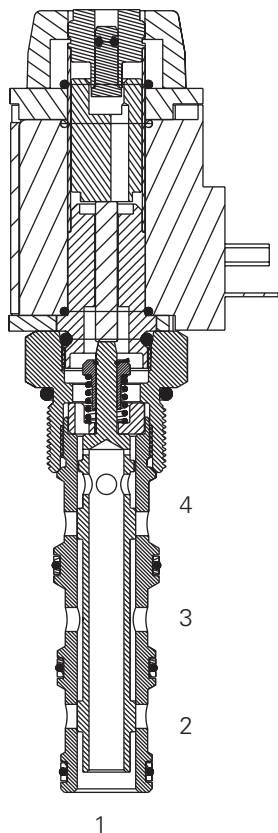
In the de-energized position, all ports are blocked.

In the energized position, port 3 is open to port 2 and port 4 is open to port 1.

## Functional Symbol



## Sectional View



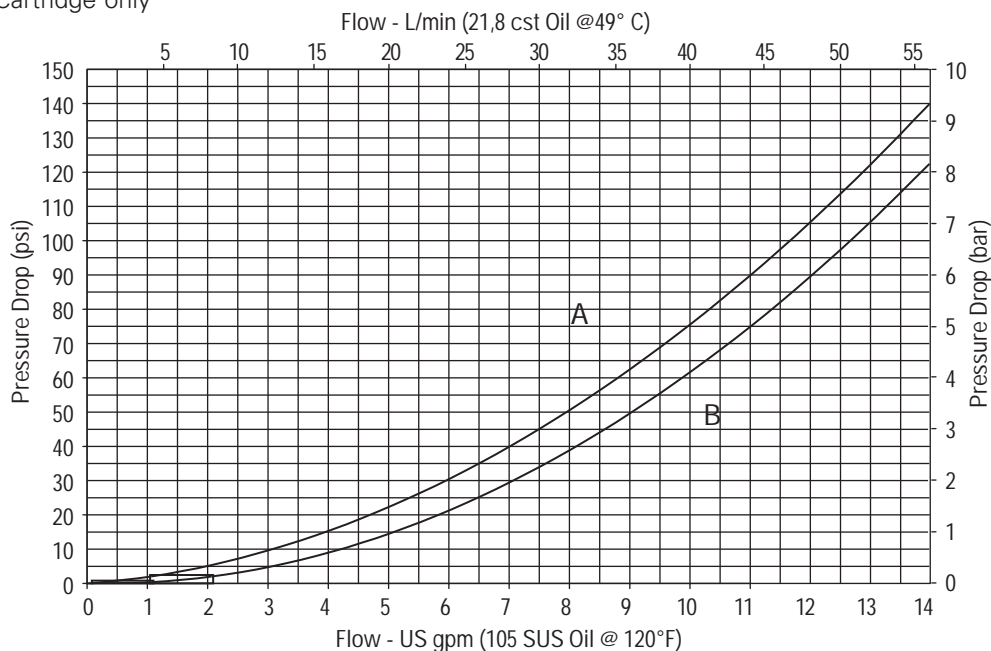
## RATINGS AND SPECIFICATIONS

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

Typical application pressure	210 bar (3000 psi)		
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)		
Rated flow	SV5A-12-4	46 L/min (12 USgpm)	53 L/min (14 USgpm)
	SV5B-12-4		
Internal leakage	300 cm <sup>3</sup> /min (21.5 in <sup>3</sup> /min) max. @ 210 bar (3000 psi)		
Temperature range	-40° to 120°C (-40° to 248°F)		
Coil duty	Continuous from 85% to 110% of nominal voltage		
Cavity	C-12-4		
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.		
Filtration	Cleanliness code 18/16/13		
Housing material (standard)	Aluminum		
Weight including coil	SV5A-12-4	0,68 kg (1.5 lbs)	0,86 kg (1.9 lbs)
	SV5B-12-4		
Seal kit	2160979 (Buna-N), 2160980 (Viton®) Viton is a registered trademark of E.I. DuPont		

## Pressure Drop Curves

Cartridge only

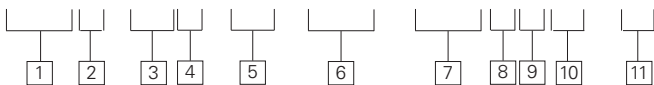


A - Port 3 to port 2

B - Port 4 to port 1



SV5 \* - 12 \* - 4P - \*\*\*\* - \*\*\*\* \* \* \* \* - \*\*



- 1 **Function**

**SV5** - Solenoid valve
- 2 **Max Flow**

**A** - 46 L/min (12 USgpm)  
**B** - 53 L/min (14 USgpm)
- 3 **Size**

**12** - 12 size
- 4 **Seal Material**

**Blank** - Buna-N  
**V** - Viton®
- 5 **Style**

**4P** - 4 way, push type manual override

- 6 **Port Size**

CODE	PORT SIZE	HOUSING NUMBER
<b>0</b>	Cartridge only	
<b>A6G</b>	3/4" BSPP	5986432-001
<b>A10H</b>	SAE 10	5986434-001
<b>A12H</b>	SAE 12	5986436-001
- 7 **Voltage rating**

**00** - No coil  
**12D** - 12VDC  
**24D** - 24VDC  
**24A** - 24VAC  
**110A** - 110VAC  
**115A** - 115VAC  
**12B** - 12VDC/w diode\*  
**24B** - 24VDC/w diode\*

\*Optional arc suppression diode.
- 8 **Connector types**

**Blank** - No coil  
**G** - ISO 4400 DIN 43650  
**W** - Leadwire  
**N** - Deutsch (DC only)  
For coil dimensions see Section C.

- 9 **Coil types**

**Blank** - No coil  
**L** - L series (30W EN 490) used for SV5A-12  
**R** - R series (30W) used for SV5B-12
- 10 **Coil special features**


**Blank** - No coil  
**00** - No special feature
- 11 **Special features**

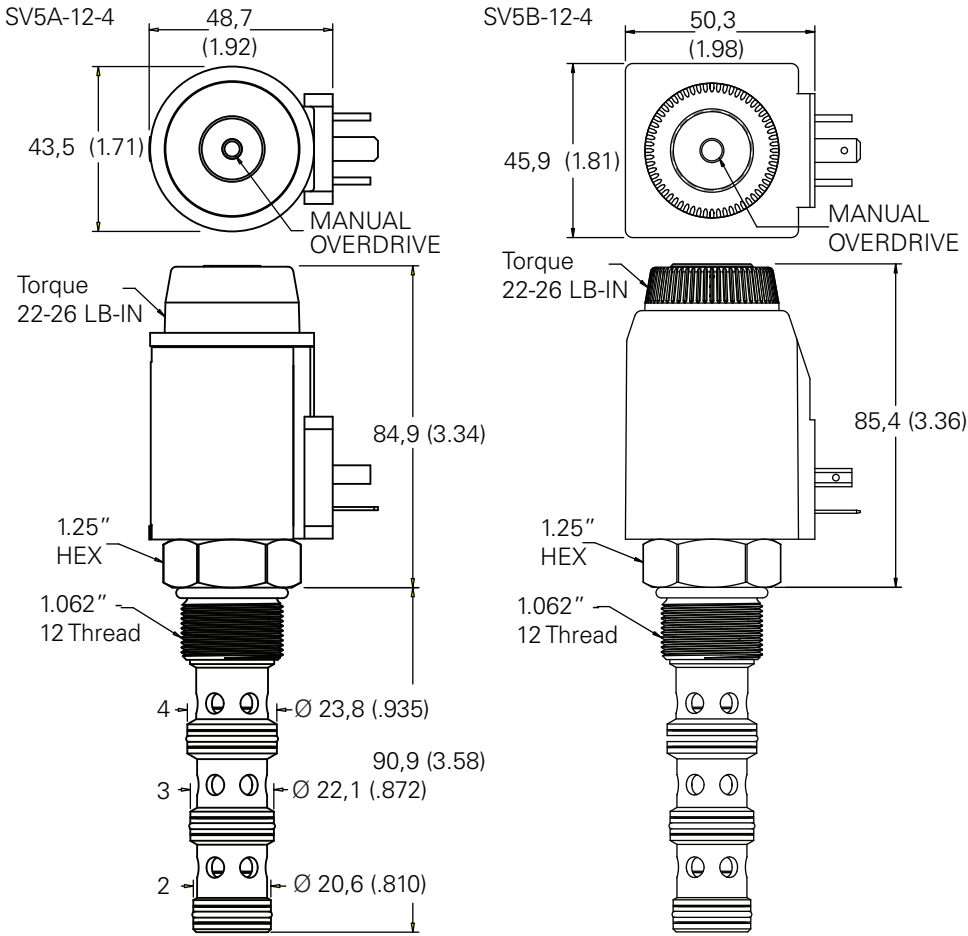
**00** - None  
(Only required if valve has special features, omitted if "00.")  
**SF** - Soft shift

Dimensions  
mm (inch)

Torque cartridge in aluminum housing 81-95 Nm (60-70ft. lbs)

Note  
When solenoid valve is ordered as cartridge only, coil nut is included.

 **WARNING**  
Maintain 2.5-3 Nm (1.8-2.2 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.



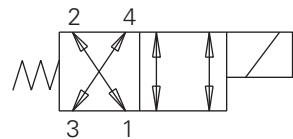
# SV7A/B-12-4

4-way, 2-position, spool type solenoid valve

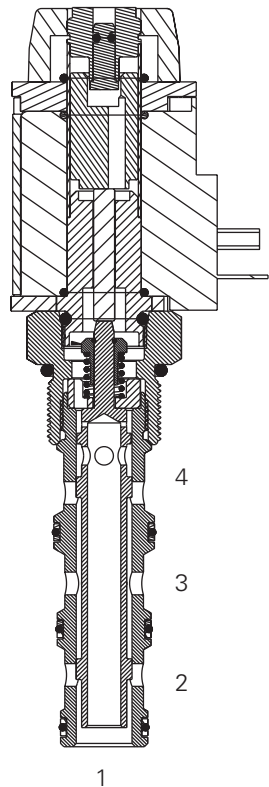
## Description

The SV7A/B-12-4 is a 4-way, 2-position, direct acting, spool type, screw-in cartridge solenoid valve.

## Functional Symbol



## Sectional View



## Operation

In the energized position, port 3 is open to port 4 and port 2 is open to port 1.

In the de-energized position, port 3 is open to port 2 and port 4 is open to port 1.

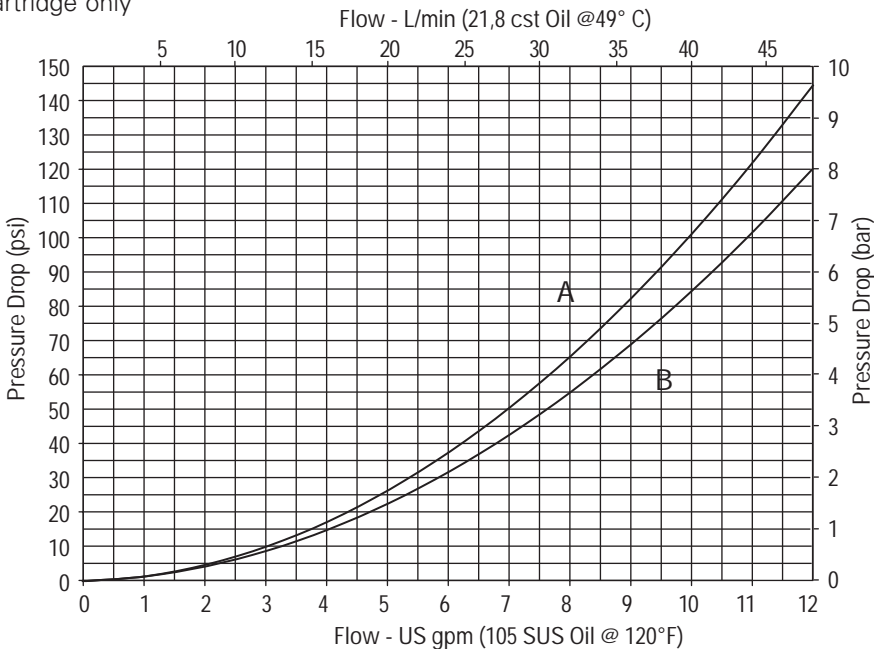
## RATINGS AND SPECIFICATIONS

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

Typical application pressure	210 bar (3000 psi)		
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)		
Rated flow	SV7A-12-4	38 L/min (10 USgpm)	
	SV7B-12-4		46 L/min (12 USgpm)
Internal leakage	300 cm³/min (21.5 in³/min) max. @ 210 bar (3000 psi)		
Temperature range	-40° to 120°C (-40° to 248°F)		
Coil duty	Continuous from 85% to 110% of nominal voltage		
Cavity	C-12-4		
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.		
Filtration	Cleanliness code 18/16/13		
Housing material (standard)	Aluminum		
Weight including coil	SV7A-12-4	0,68 kg (1.5 lbs)	
	SV7B-12-4		0,86 kg (1.9 lbs)
Seal kit	2160979 (Buna-N), 2160980 (Viton®) Viton is a registered trademark of E.I. DuPont		

## Pressure Drop Curves

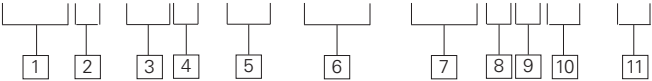
Cartridge only



A - Port 2 to port 1, port 3 to port 4

B - Port 3 to port 4, port 3 to port 2

SV7 \* - 12 \* - 4P - \*\*\*\* - \*\*\*\* \* \* \* \* - \*\*



- 1 **Function**

**SV7** - Solenoid valve
- 2 **Max Flow**

**A** - 38 L/min (10 USgpm)  
**B** - 46 L/min (12 USgpm)
- 3 **Size**

**12** - 12 size
- 4 **Seal Material**

**Blank** - Buna-N  
**V** - Viton®
- 5 **Style**

**4P** - 4 way, push type manual override

- 6 **Port Size**

CODE	PORT SIZE	HOUSING NUMBER
<b>0</b>	Cartridge only	
<b>A6G</b>	3/4" BSPP	5986432-001
<b>A10H</b>	SAE 10	5986434-001
<b>A12H</b>	SAE 12	5986436-001
- 7 **Voltage rating**

**00** - No coil  
**12D** - 12VDC  
**24D** - 24VDC  
**24A** - 24VAC  
**110A** - 110VAC  
**115A** - 115VAC  
**12B** - 12VDC/w diode\*  
**24B** - 24VDC/w diode\*  
\*Optional arc suppression diode.
- 8 **Connector types**

**Blank** - No coil  
**G** - ISO 4400 DIN 43650  
**W** - Leadwire  
**N** - Deutsch (DC only)  
For coil dimensions see Section C.

- 9 **Coil types**

**Blank** - No coil  
**L** - L series (30W EN 490) used for SV7A-12  
**R** - R series (30W) used for SV7B-12
- 10 **Coil special features**


**Blank** - No coil  
**00** - No special feature
- 11 **Special features**

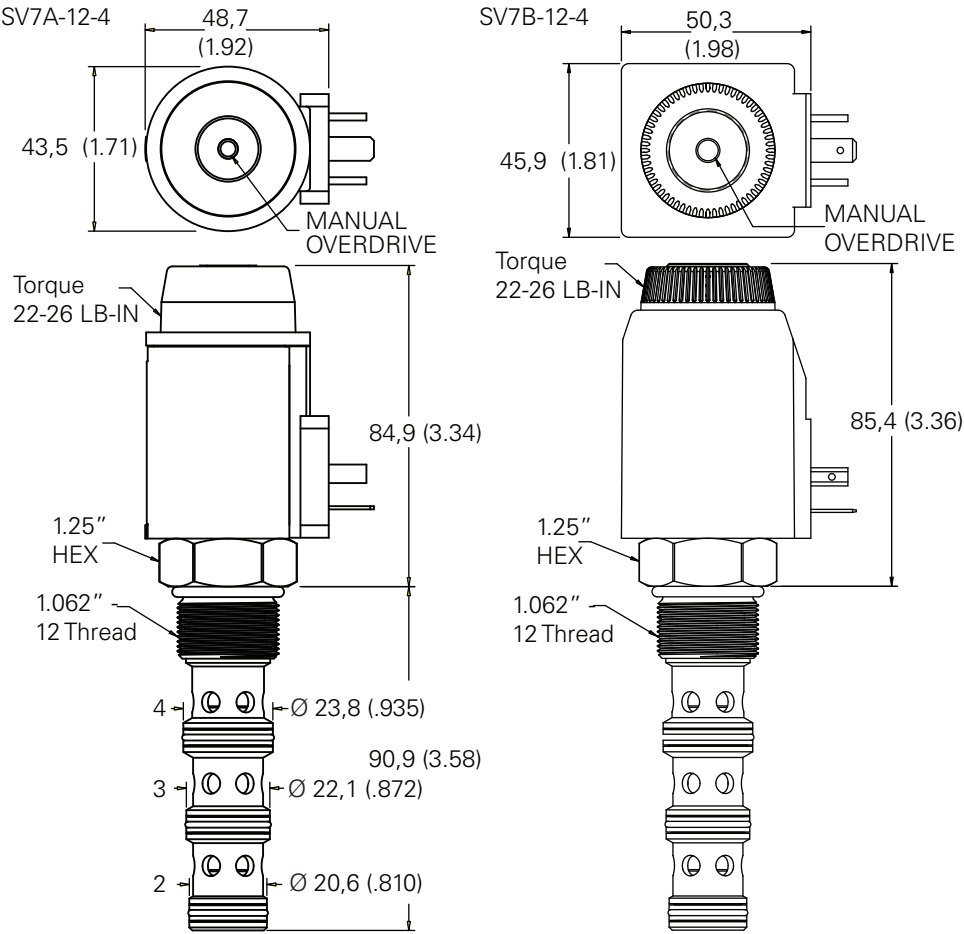
**00** - None  
(Only required if valve has special features, omitted if "00.")  
**SF** - Soft shift

Dimensions  
mm (inch)

Torque cartridge in aluminum housing 81-95 Nm (60-70ft. lbs)

Note  
When solenoid valve is ordered as cartridge only, coil nut is included.

 **WARNING**  
Maintain 2.5-3 Nm (1.8-2.2 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.



# SV11-8-4/4M

4-way, 2-position spool type solenoid valve,  
350 bar

## Description

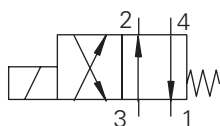
The SV11-8-4 is a 4-way, 2-position, direct acting, spool type, screw-in cartridge solenoid valve.

## Operation

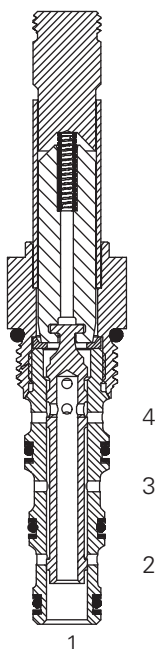
In the de-energized position, this valve allows flow from port 3 to port 2 and from port 4 to port 1.

In the energized position, flow is allowed from port 3 to port 4 and from port 2 to port 1.

## Functional Symbol



## Sectional View



## RATINGS AND SPECIFICATIONS

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

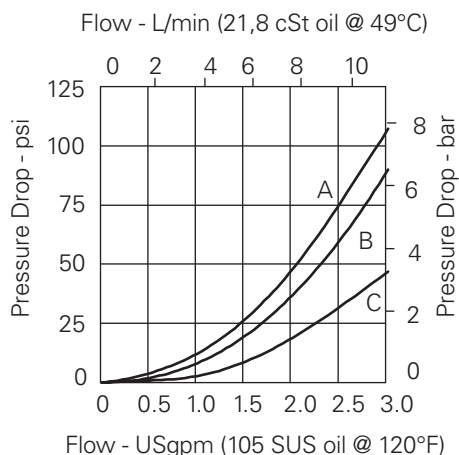
Typical application pressure (all ports)	350 bar (5000 psi)
Cartridge fatigue pressure (infinite life)	310 bar (4500 psi)
Rated flow	11 L/min (3 USgpm)
Internal leakage (per land)	82 cm <sup>3</sup> /min. (5 in <sup>3</sup> /min.) max @ 350 bar (5000 psi)
Temperature range	-40° to 100°C (-40° to 212°F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Cavity	C-8-4
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Steel
Weight cartridge only	0,14 kg (0.30 lbs)
Seal kit	02-160757 (Buna-N), 02-160758 (Viton®) <small>Viton is a registered trademark of E.I. DuPont</small>

## Performance Characteristics

Cartridge only

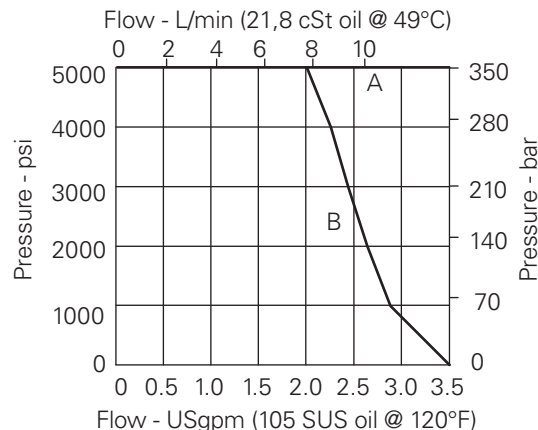
### Pressure drop vs. flow

- A** - Port 3 to 4 and 3 to 2
- B** - Port 4 to 1
- C** - Port 2 to 1

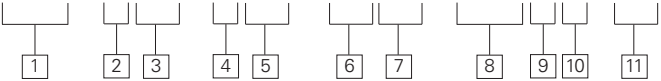


### Operating Limits

- A** - Port 2 to 1, 4 to 1, and 3 to 2
- B** - Port 3 to 4



SV11 – 8 (V) – 4 (M) – (S) \*\* – \*\*\*\*\* P – 00



**1 Function**  
**SV11** - Solenoid valve

**2 Size**  
**8** - 8 size

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

**4 Style**  
**4** - 4-way, 2 position

**5 Manual override option**  
**Blank** - No manual override  
**M** - Manual override  
For valve dimensions with manual override option installed see page A-153.

**6 Valve housing material**  
**Blank** - Cartridge only  
**S** - Steel

**7 Port Size**

CODE	PORT SIZE	HOUSING NUMBER
0	Cartridge only	
2G	1/4" BSPP	02-160751
3G	3/8" BSPP	02-160752
4T	SAE 4	02-160753
6T	SAE 6	02-160754

See section J for housings.

**8 Voltage rating**  
**00** - No coil  
**12D** - 12VDC  
**24D** - 24VDC  
**36D** - 36VDC  
**24A** - 24VAC  
**115A** - 115VAC  
**230A** - 230VAC  
**12B** - 12VDC/w diode\*  
**24B** - 24VDC/w diode\*  
\*Optional arc suppression diode.

**9 Connector types**  
**Blank** - No coil  
**G** - ISO 4400 DIN 43650  
**Q** - Spade terminals  
**W** - Leadwire  
**N** - Deutsch (DC only)  
**Y** - Amp JR (DC only)  
**D** - Metripack 150 male (DC only)  
**J** - Metripack 280 male (DC only)

**10 Coil series**  
**P** - 8 series, 23 W  
For coil dimensions see Section C.

**11 Special features**  
**00** - None  
(Only required if valve has special features, omitted if "00.")

**Dimensions**

mm (inch)

Torque cartridge in aluminum or steel housing  
34-41 Nm (25-30 ft. lbs)

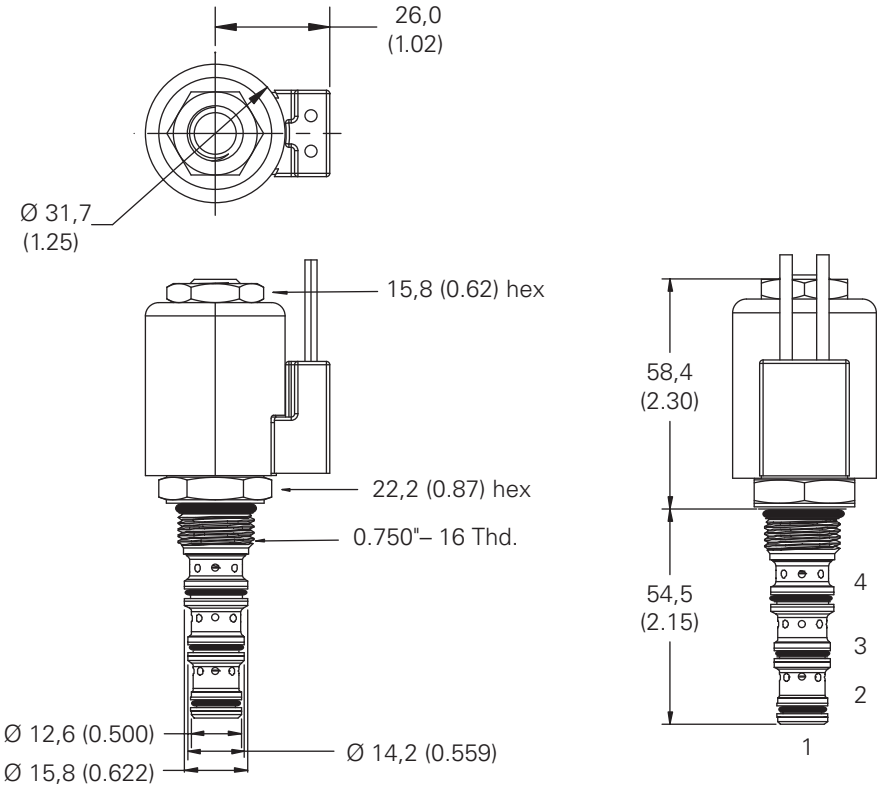
**Note**

When solenoid valve is ordered as cartridge only, nut is included.



**WARNING**

Maintain 5-8 Nm (4-6 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.



# SV11-10-4/4M

4-way 2-position spool type  
solenoid valve, 350 bar

## Description

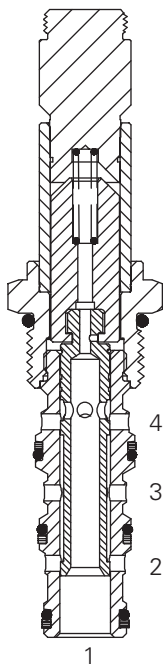
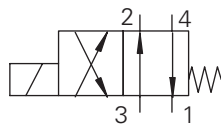
The SV11-10-4 is a 4-way, 2-position, direct acting, spool type, screw-in cartridge solenoid valve.

## Operation

In the de-energized position, this valve allows flow from port 3 to port 2 and from port 4 to port 1.

In the energized position, flow is allowed from port 3 to port 4 and from port 2 to port 1.

## Functional Symbol



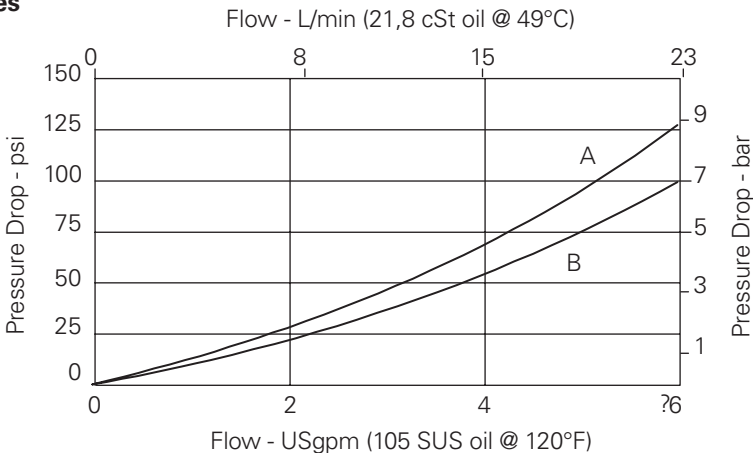
## RATINGS AND SPECIFICATIONS

*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)
Rated flow	23 L/min (6 USgpm)
Internal leakage, port 2 to port 1	82 cm <sup>3</sup> /min. (5 in <sup>3</sup> /min.) max @ 350 bar (5000 psi)
Temperature range	-40° to 100°C (-40° to 212°F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Cavity	C-10-4
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Steel
Weight cartridge only	0,21 kg (0.46 lbs)
Seal kit	889625 (Buna-N), 566080 (Viton®) <small>Viton is a registered trademark of E.I. DuPont Co</small>

## Pressure Drop Curves

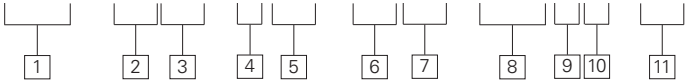
Cartridge only



**A** - Port 3 to port 2

**B** - Port 4 to port 1

SV11 – 10 (V) – 4 (M) – (S) \*\* – \*\*\*\*\* H – 00



**1 Function**  
**SV11** - Solenoid valve

**2 Size**  
**10** - 10 size

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

**4 Style**  
**4** - 4-way, 2-position

**5 Manual override option**  
**Blank** - No manual override  
**M** - Manual override

For valve dimensions with manual override option installed see page A-153.

**6 Valve housing material**  
**Blank** - Omit for cartridge only  
**S** - Steel

**7 Port Size**

CODE	PORT SIZE	HOUSING NUMBER
0	Cartridge only	
2G	1/4" BSPP	02-175139
3G	3/8" BSPP	02-175140
6T	SAE 6	02-175137
8T	SAE 8	02-175138

See section J for housings.

**8 Voltage rating**  
**00** - No coil  
**12D** - 12VDC  
**24D** - 24VDC  
**36D** - 36VDC  
**24A** - 24VAC  
**115A** - 115VAC  
**230A** - 230VAC  
**12B** - 12VDC/w diode\*  
**24B** - 24VDC/w diode\*  
\*Optional arc suppression diode.

**9 Connector types**  
**Blank** - No coil  
**G** - ISO 4400 DIN 43650  
**Q** - Spade terminals  
**W** - Leadwire  
**N** - Deutsch (DC only)  
**Y** - Amp JR (DC only)  
**D** - Metripack 150 male (DC only)  
**J** - Metripack 280 male (DC only)

**10 Coil series**  
**H** - 10 series, 29 W  
For coil dimensions see Section C.

**11 Special features**  
**00** - None  
(Only required if valve has special features, omitted if "00.")

**Dimensions**

mm (inch)

Torque cartridge in steel housing 68-75 Nm (50-55 ft. lbs)

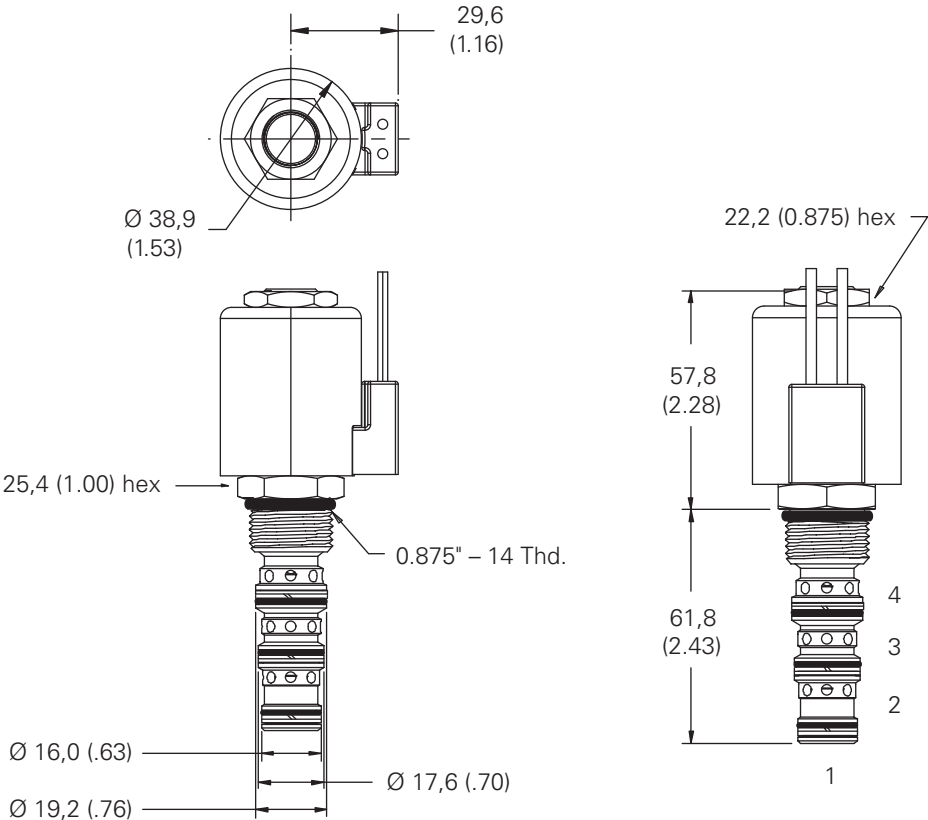
**Note**

When solenoid valve is ordered as cartridge only, nut is included.



**WARNING**

Maintain 5-8 Nm (4-6 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.





# Electro-Proportional Valves

## Section Introduction

This section gives basic specifications for the complete line of Vicker's screw-in proportional control valves. Its purpose is to provide a quick, convenient reference tool when choosing proportional valves or when designing a system using these components.

The **EPV10** has several outstanding performance features which give it a unique position in the screw-in cartridge valve market. Valve gain linearity, flow force pressure compensation characteristics above 20 bar (300 psi) and low internal leakage.

The **EPV16** is a proportionally controlled two-way poppet type valve. The main poppet amplifies a small flow through the pilot circuit and is comparable to a transistor. As the transistor uses small currents to control larger currents, the hydraulic valve transistor or VALVISTOR uses the pilotflow to control the main stage flow with servo-like response flow to control.

The **ESV1** is a proportional two-way, pressure compensated, poppet type flow control valve. The valve is available in 8, 10, and 12 sizes, both normally open or normally closed in the de-energized position.

The **EFV1** is a proportionally controlled two-way, spool type flow control valve. Technically the valve is not pressure compensated, but it is partial flow force pressure compensated.

The **EFV2** is a three port, pressure compensated, proportional flow control valve. The valve can be used as a priority flow regulator, with regulated flow being supplied to port 3 and excess flow being by-passed to port 2. If port 2 is blocked the valve functions as a restric-

tive, 2 way, pressure compensated flow regulator.

The **ERV1-10** is an electric, proportionally controlled, internally pilot operated, spool type screw-in relief valve. It is capable of handling flows from 3,8-60,0 L/min (1-15 USgpm) at pressures from 35-210 bar (500-3000 psi). Also available is an ERV1-16 which is capable of handling flows from 7,6-132 L/min. (2-35 USgpm) at pressures from 35-210 bar (100-500 psi).

The **ERV2-10** is a low flow electric proportionally controlled relief valve similar to the ERV1-10. This valve is rated for flows from 0,2-2,8 L/min (0.05-0.75 USgpm) and pressures up to 35 bar (500 psi).

The **ERV3-10** is a low flow electric proportionally controlled relief valve similar to the ERV2-10. This valve is rated for flows up to 0,8 L/min (0.20 USgpm) and pressures up to 207 bar (3000 psi).

The **EPRV2-8** is an electric, proportionally controlled, direct acting spool type, screw-in pressure reducing/relieving valve. It is capable of handling flows from 0-7,6 L/min (0-2 USgpm) at set pressures from 0-22 bar (0-320 psi).

The **EPRV1-10** is an electric, proportionally controlled, internally pilot operated, spool type, screw-in pressure reducing/relieving valve. It is capable of handling flows from 0-7,6 L/min (0-2 USgpm) at set pressures from 14-35 bar (200-500 psi). Also available is an **ERV1-16** which is capable of handling flows from 0-38 L/min (0-10 USgpm) at set pressures from 14-35 bar (200-500 psi).

The **EPRV3-10** is an electric, proportionally controlled, internally pilot operated,

spool type, screw-in pressure reducing/relieving valve. It is capable of handling flows from 0-30 L/min (0-8 USgpm) at set pressures from 35-207 bar (500-3000 psi).

Vickers proportional pressure and flow control valves are designed to be easily controlled by the simplest of DC electrical devices such as a 12 volt battery and a potentiometer.

Varying the voltage at the coil is one of the simplest means of control available. Any of the Vickers DC coils will work on most of these valves simply by varying the voltage between 0 and 75% of the rated coil voltage. It should be noted that as the operating temperature of a coil increases, the solenoid force decreases. Therefore if the voltage is held constant as the coil heats up then valve pressure (or flow) will change.

The **IRV1** is a proportionally controlled poppet type, relief valve, with an inverse function. This valve is capable of handling flows up to 1 L/min (0.25 USgpm) and pressures up to 210 bar (3000 psi).

### Electrical current controls with PWM are recommended for all Eaton proportional valves.

Closed-loop electrical control with feedback from the parameter to be monitored will provide the most accurate control.

### Valve Features and Benefits

- Products in this catalog have been fatigue tested to one million cycles at 132% or 10 million cycles at 115% of rated pressure
- 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
- Reliable, economical and compact
- Rated flows up to 160 L/min (42 USgpm)
- Optional nose-in, side-out or side-in, nose out flow direction (EPV16 series)

### Coil Features and Benefits

The valves in this catalog are offered with a choice of two or three standard voltages and several types of electrical connections. For other coil ratings and connections, consult your Eaton applications engineer.

- Variety of voltages and terminations
- Coils are interchangeable for serviceability on the EPV10 and EPV16. Coils are interchangeable for serviceability on the ERV1-10, EPV1-16, EPRV1-10 and EPRV1-16
- Compact, one-piece weather-proof encapsulated design. Eliminates need for extra seals
- An arc suppression diode molded into the coil is available as a standard option on ERV, EPRV and EFV valves



### Fluid Cleanliness

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



**WARNING**

Application of these products beyond published performance specifications may cause valve malfunction which may result in personal injury and/or damage to the machine.

**WARNING**

For pressures over 210 bar (3000 psi) use steel housing.

# ERV1-10

Proportionally controlled  
pressure relief valve

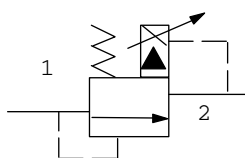
## Description

The ERV1-10 is an electric, proportionally controlled, internally pilot operated, spool type, screw-in relief valve.

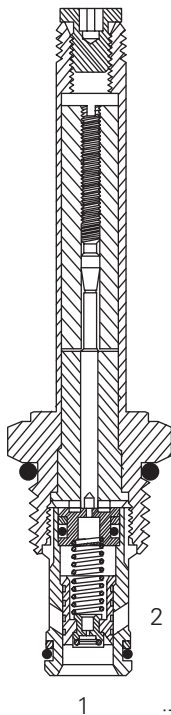
## Operation

This valve remains closed between port 1 and 2 until the predetermined pressure setting has been reached at port 1, overcoming the electrical force and opening the spool to allow flow from port 1 to port 2.

## Functional Symbol



## Sectional View



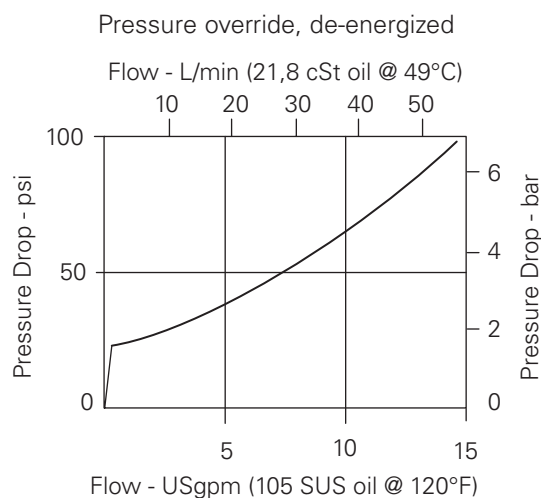
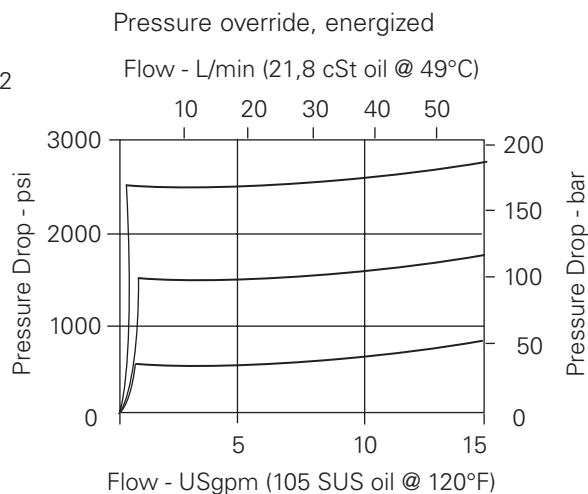
## RATINGS AND SPECIFICATIONS

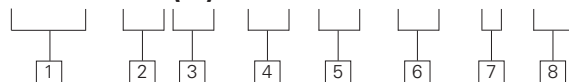
*Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)*

Typical application pressure (all ports)	2 - 240 bar (30 - 3500 psi)
Cartridge fatigue pressure (infinite life)	240 bar (3500 psi)
Rated flow	3,8 - 60,0 L/min (1 - 15 USgpm)
Cavity	C-10-2
Standard housing materials	Aluminum
Temperature range	-40° to 120°C (-40° to 248°F)
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Weight cartridge and coil	0,44 kg (0.98 lbs)
Seal kits	565803 (Buna-N) 565086 (Viton®)

Viton is a registered trademark of E.I. DuPont

## Pressure Override Characteristics



**ERV1 - 10 (V) - \*\* - \*\* - \*\*\* - \* - 00****1 Function**

**ERV1** - Proportional relief valve

**2 Size**

**10** - 10 Size

**3 Seals**

**Blank** - Buna-N  
**V** - Viton®

**4 Maximum pressure (factory set)**

Customer to specify settings in increments of 7 bar (100 psi) and coded in hundreds of psi within the 35-210 bar range (500-3000 psi) range.

Example: **5** - 35,0 (500 psi)

**6 Voltage rating**

**00** - No coil  
**12D** - 12VDC  
**24D** - 24VDC  
**12B** - 12VDC/w diode\*  
**24B** - 24VDC/w diode\*

\*Optional arc suppressing diode.

Note: This valve uses the standard J series coils, see section C for coil part numbers and specifications.

**5 Port size**

**0** - Cartridge only

CODE	PORT SIZE	HOUSING NUMBER
<b>6T</b>	SAE 6	566151*
<b>2G</b>	1/4" BSPP	876702
<b>3G</b>	3/8" BSPP	876703
<b>6H</b>	SAE 6	876700
<b>8H</b>	SAE 8	876701

\*Light duty housing. See section J for housings.

**7 Connector Types**

**Blank** - No coil  
**G** - DIN 43650  
**Q** - Spade terminals  
**W** - Leadwire  
**N** - Deutsch  
**Y** - Amp JR

**8 Special Features**

**00** - None  
(Only required when valve has special features, omitted if "00.")

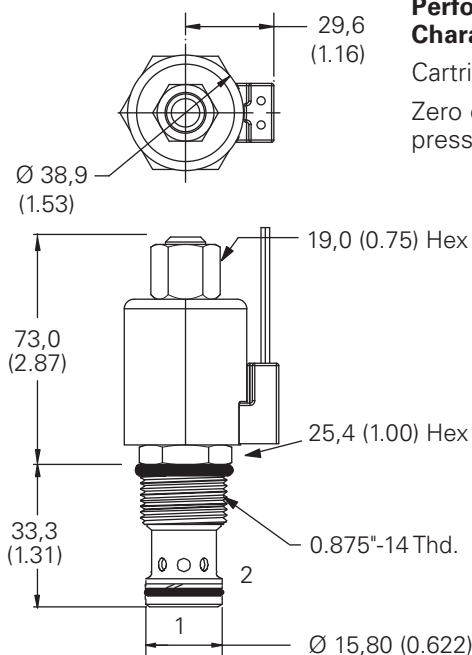
**WARNING**

Maintain 5-8 Nm (4-6 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.

**Dimensions**

mm (inch)

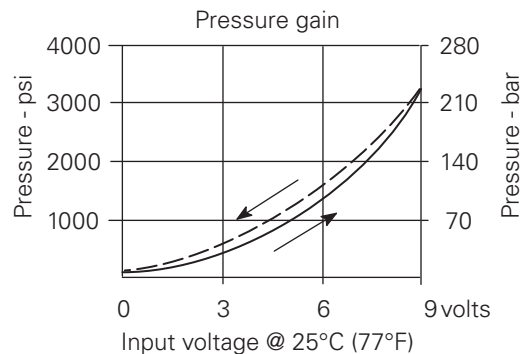
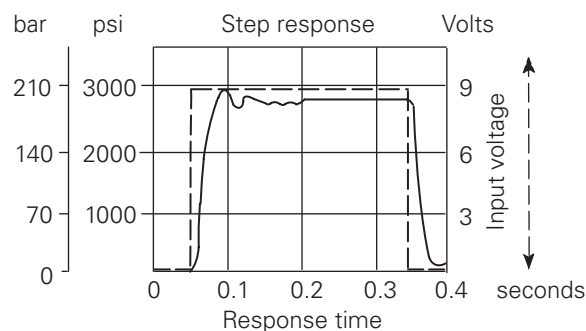
Torque cartridge in aluminum housing  
47-54 Nm  
(35-40 ft. lbs)



Valve is shown with "W" coil.

**Performance Characteristics**

Cartridges only  
Zero outlet pressure



# ERV1-16

Proportionally controlled  
pressure relief valve

## Description

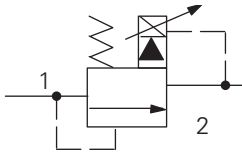
The ERV1-16 is an electric, proportionally controlled, internally pilot operated, spool type, screw-in relief valve.

## Operation

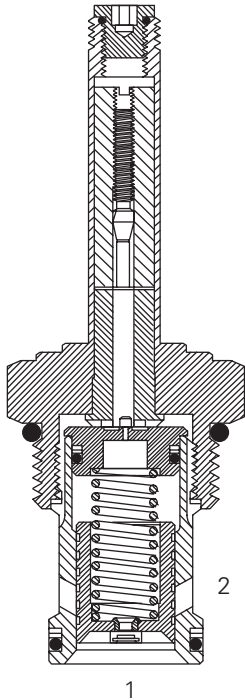
This valve remains closed between port 1 and 2 until the predetermined pressure setting has been reached at

port 1, overcoming the electrical force and unseating the spool to allow flow from port 2.

## Functional Symbol



## Sectional View



## RATINGS AND SPECIFICATIONS

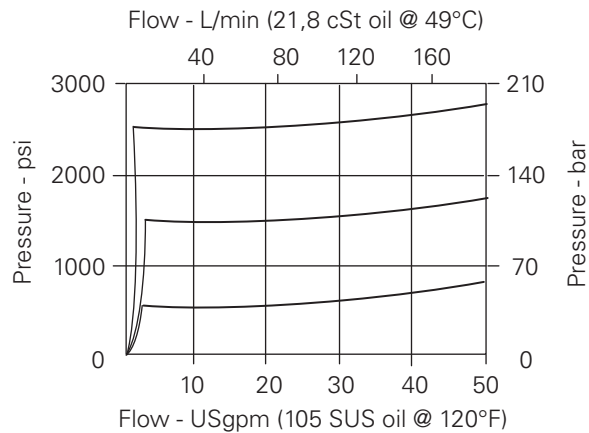
*Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)*

Typical application pressure (all ports)	3,5 - 210 bar (50 - 3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	7,6 - 132,0 L/min (2 - 35 USgpm)
Cavity	C-16-2
Standard housing materials	Aluminum
Temperature range	-40° to 120°C (-40° to 248°F)
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Weight cartridge and coil	0,44 kg (0.98 lbs)
Seal kits	565810 (Buna-N) 889609 (Viton®)

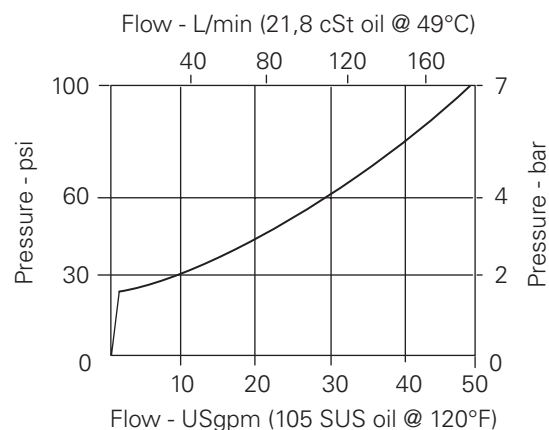
Viton is a registered trademark of E.I. DuPont

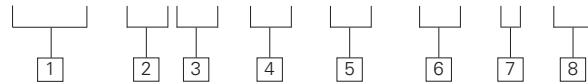
## Pressure Override Characteristics

Pressure override,  
energized



Pressure override,  
de-energized



**ERV1 - 16 (V) - \*\* - \*\*\* - \*\*\* - \* - 00****1 Function**

**ERV1** - Proportional relief valve

**2 Size**

**16** - 16 Size

**3 Seals**

**Blank** - Buna-N  
**V** - Viton®

**4 Maximum pressure (factory set)**

Customer to specify settings in increments of 7 bar (100 psi) and coded in hundreds of psi within the 35-210 bar range (500-3000 psi) range.

Example: **5** - 35,0 (500 psi)

**6 Voltage rating**

**00** - No coil  
**12D** - 12VDC  
**24D** - 24VDC  
**12B** - 12VDC/w diode\*  
**24B** - 24VDC/w diode\*

\*Optional arc suppressing diode.

Note: This valve uses the standard J series coils, see section C for coil part numbers and specifications.

**5 Port size**

**0** - Cartridge only

CODE	PORT SIZE	HOUSING NUMBER
<b>12T</b>	SAE 12	566149*
<b>4G</b>	1/2" BSPP	876716
<b>6G</b>	3/4" BSPP	876718
<b>10H</b>	SAE 10	876717
<b>12H</b>	SAE 12	566113

\*Light duty housing. See section J for housings.

**7 Connector Types**

**Blank** - No coil  
**G** - DIN 43650  
**Q** - Spade terminals  
**W** - Leadwire  
**N** - Deutsch  
**Y** - Amp JR

**8 Special Features**

**00** - None  
(Only required when valve has special features, omitted if "00.")

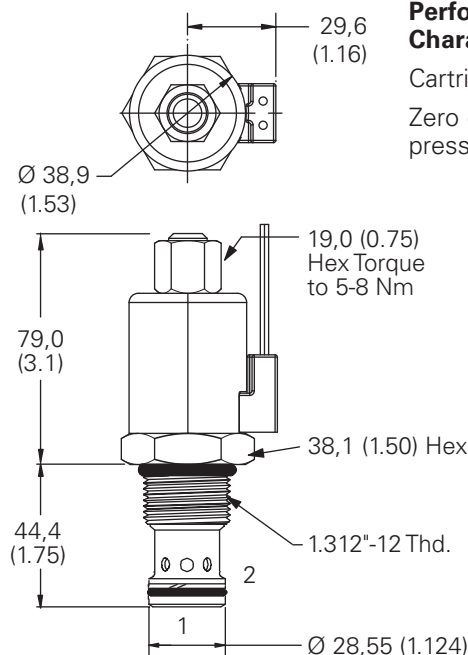
**WARNING**

Maintain 5-8 Nm (4-6 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.

**Dimensions**

mm (inch)

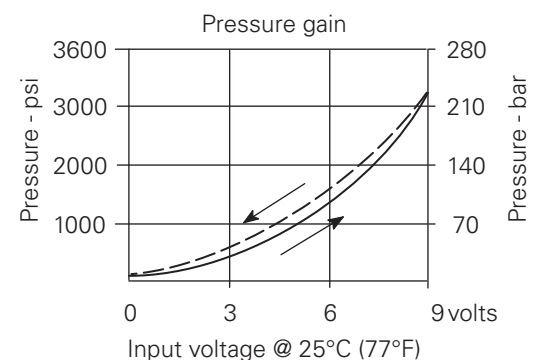
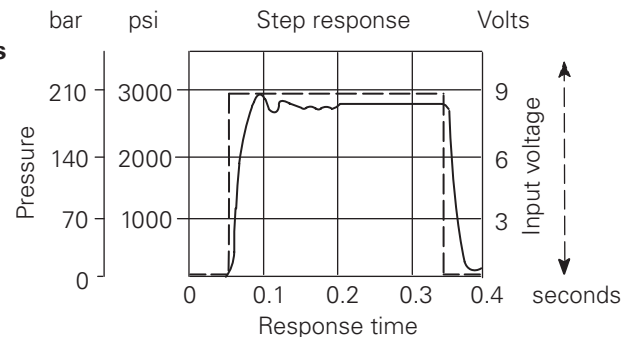
Torque cartridge in aluminum housing  
108-122 Nm (80-90 ft. lbs)



Valve is shown with "W" coil.

**Performance Characteristics**

Cartridges only  
Zero outlet pressure



# EPRV1-16

Proportional pressure  
reducing-relieving valve

## Description

The EPRV1-16 is an electric, proportionally controlled, internally pilot operated, spool type, screw-in relief valve.

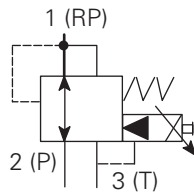
## Operation

This valve remains open from port 2 to port 1 (port 3 must be vented). Once the predetermined pressure is

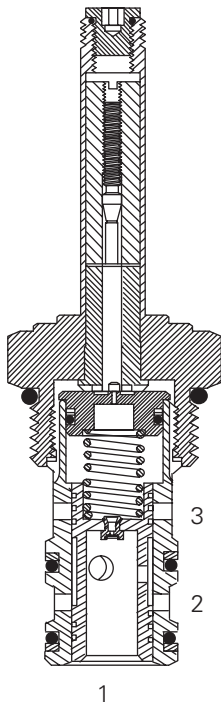
reached at port 1, the spool shifts to restrict the inlet flow at port 2, which regulates the pressure at port 1.

If the pressure at port 1 exceeds the setting of the valve, the spool will shift farther and relieve to port 3.

## Functional Symbol



## Sectional View



## RATINGS AND SPECIFICATIONS

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

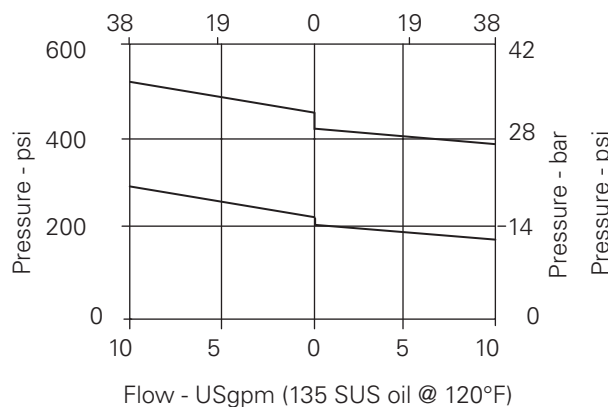
Typical application pressure (all ports)	3,5 - 35 bar (0 - 500 psi)
Cartridge fatigue pressure (infinite life)	35 bar (500 psi)
Rated flow	0 - 38,0 L/min (0 - 10 USgpm)
Cavity	C-16-3
Standard housing materials	Aluminum
Temperature range	-40° to 120°C (-40° to 248°F)
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Weight cartridge and coil	0,9 kg (2.00 lbs)
Seal kits	565811 (Buna-N) 889599 (Viton®)

Viton is a registered trademark of E.I. DuPont

## Pressure Override Characteristics

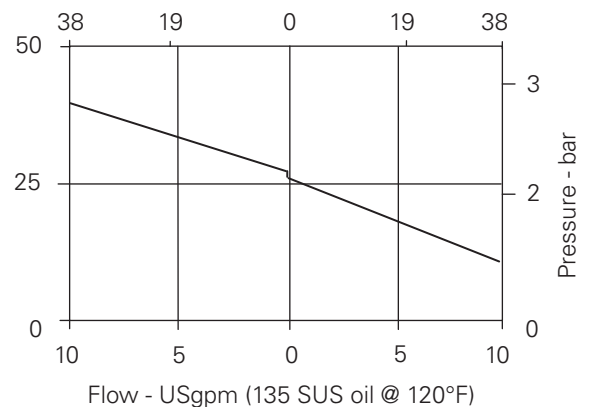
Pressure override, energized

Flow - L/min (28,0 cSt oil @ 49°C)

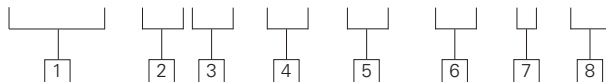


Pressure override, de-energized

Flow - L/min (28,0 cSt oil @ 49°C)



**EPRV1 - 16 (V) - \*\* - \*\*\* - \*\*\* - \* - 00**



**1 Function**

**EPRV1** - Proportional reducing/relieving valve

**2 Size**

**16** - 16 Size

**3 Seals**

**Blank** - Buna-N  
**V** - Viton®



**WARNING**

Maintain 5-8 Nm (4-6 ft. lbs) maximum torque on valve tube nut. Over tightening may cause valve failure.

**4 Maximum pressure (factory set)**

Customer to specify settings in increments of 7 bar (100 psi) and coded in hundreds of psi within the 14-35 bar range (200-500 psi) range.

Example: **5** - 35,0 (500 psi)

**6 Voltage rating**

**00** - No coil  
**12D** - 12VDC  
**24D** - 24VDC  
**36D** - 36VDC  
**12B** - 12VDC/w diode\*  
**24B** - 24VDC/w diode\*

\*Optional arc suppressing diode.

Note: This valve uses the standard J series coils, see section C for coil part numbers and specifications.

**5 Port size**

**0** - Cartridge only

CODE	PORT SIZE	HOUSING NUMBER
<b>6B</b>	3/4" BSPP	02-175465*
<b>12T</b>	SAE 12	566162*
<b>6G</b>	3/4" BSPP	876722
<b>10H</b>	SAE 10	876721
<b>12H</b>	SAE 12	876723

\*Light duty housing. See section J for housings.

**7 Connector Types**

**Blank** - No coil  
**G** - DIN 43650  
**Q** - Spade terminals  
**W** - Leadwire  
**N** - Deutsch  
**Y** - Amp JR

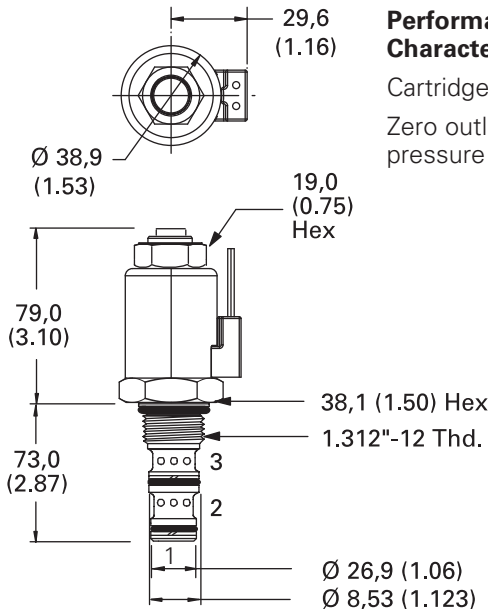
**8 Special Features**

**00** - None  
(Only required when valve has special features, omitted if "00.")

**Dimensions**

mm (inch)

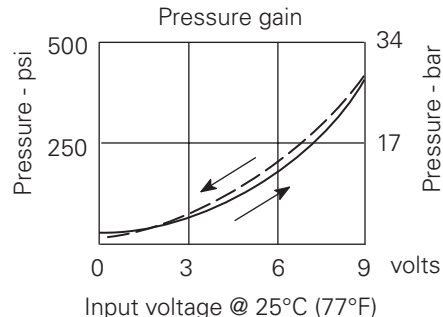
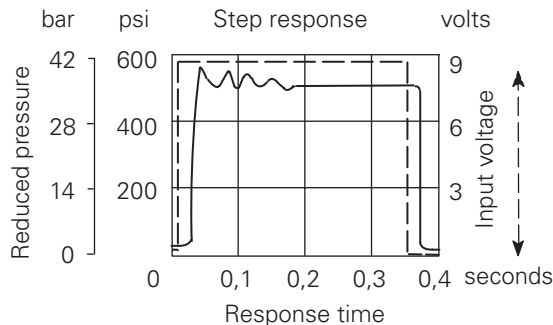
Torque cartridge in aluminum housing  
108-122 Nm (80-90 ft. lbs)



Valve is shown with "W" coil.

**Performance Characteristics**

Cartridges only  
Zero outlet pressure

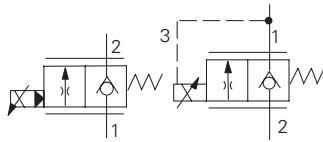


# EPV16

## Valvistor®

Proportional flow  
control valve

### Functional Symbols

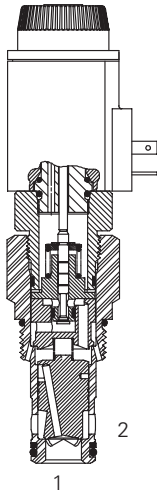


EPV16-A

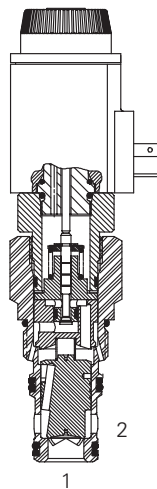
EPV16-B

### Sectional View

EPV16-A Side-out, nose-in



EPV16-B Side-in, nose-out



### Description

The EPV16 is a 2-way, normally closed, pressure compensated, poppet type, screw-in cartridge electro-proportional flow control valve.

### Operation

"A" style (nose in, side out)  
- In the de-energized position this valve remains closed from port 1 to port 2. When current is applied to the coil, a controlled increasing flow will be allowed from port 1 to port 2, in proportion to the current applied.

"B" style (side in, nose out)  
- in the de-energized position the valve remains closed from port 2 to port 1. When current is applied to the coil, a controlled increasing flow will be allowed from port 2 to port 1. In both examples free reverse flow is allowed in the opposite direction.

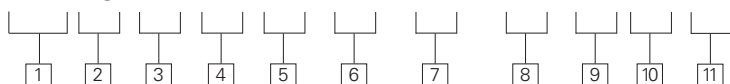
### RATINGS AND SPECIFICATIONS

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

Typical application pressure	280 bar (4000 psi)
Cartridge fatigue pressure (infinite life)	280 bar (4000 psi) NFPA rated
Rated flow	0 to 160 L/min (42 USgpm)
Operating media temperature	-30° to 90°C (-22° to 194°F)
Cavity	C-16-3S (undercut)
Fluids	Antiwear hydraulic oils with Buna-N seals (standard) Phosphate esters (non-alkyl) with Viton® seals are available by request <small>Viton is a registered trademark of E.I. DuPont</small>
Weight cartridge only	1 kg (2.2 lbs)
Filtration	70 - 210 bar (1000 - 3000 psi) Cleanliness code 17/15/12 210+ bar (3000+ psi) Cleanliness code 15/13/11
Standard housing materials	Aluminum or steel
Typical hysteresis	Less than 4% of rated current @ 10 bar pressure drop – Pulse Width Modulated (PWM)
Internal leakage @ 140 bar (2000 psi) and oil viscosity 30cSt	EPV16A 50 cm³/min maximum EPV16B 10 cm³/min maximum
Oil viscosity range	10 - 800 cSt
Nominal supply voltage	12 or 24 VDC
Threshold current	Adj from 350 - 600 mA (12 VDC) Adj from 175 - 250 mA (24 VDC)
Coil current for maximum flow	0.7 amps @ 24 VDC 1.4 amps @ 12 VDC
Recommended PWM frequency	100 -200 Hz application dependent, 150 Hz typ
Coil resistance @ 20°C (68°F)	12V-6.5Ω/24V-25.0Ω
Power consumption @ rated current and 20°C coil temperature	12V-12.8 watts 24V-12.8 watts
Cartridge seal kit	02-154069 (Buna-N)



**EPV 16 - \* - \*\* - \* - \*\*\* - \*\* - \*\*\* - \* - \* - \*\***



**1 Function**

**EPV** - Electro-proportional flow control valve, poppet type

**2 Size**

**16** - 16 Size

**3 Flow direction**

**A** - Nose-in, side-out  
**B** - Side-in, nose-out

**4 Rated flow @ 10 bar  $\Delta P$**

**04** - 40 L/min (10.5 USgpm)  
**06** - 60 L/min (16 USgpm)  
**10** - 100 L/min (26 USgpm)  
**16** - 160 L/min (42 USgpm)

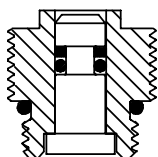
**5 Valve housing material**

Omit for cartridge only  
**A** - Aluminum  
**S** - Steel

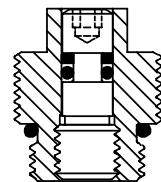


Aluminum housings can be used for pressures up to 210 bar (3000 psi). Steel housings **must** be used for operating pressures **above** 210 bar (3000 psi).

**M** - Pin type manual override option



**S** - Screw type manual override option



**6 Port Size**

**0** - Cartridge only

**CODE PORT SIZE HOUSING NUMBER**

		Aluminum EPV16-A	EPV16-B	Steel EPV16-A	EPV16-B
<b>4G</b>	1/2" BSPP	02-185448	02-166607	02-180050	02-165500
<b>6G</b>	3/4" BSPP	02-185449	02-161582	02-180051	02-164931
<b>10H</b>	SAE 10	02-185446	02-170238	—	—
<b>12H</b>	SAE 12	02-185447	02-166609	—	—
<b>10T</b>	SAE 10	—	—	02-180048	02-161983
<b>12T</b>	SAE 12	—	—	02-180049	02-161982
<b>5C</b>	CETOP5 (NFPA D05) Interface (Requires steel body)				

See section J for housings.

**7 Seals & Filter**

**N** - Buna-N  
**V** - Viton  
**NF** - Buna-N and 60 mesh filter screen  
**VF** - Viton and 60 mesh filter screen

**8 Voltage rating**

**12D** - 12VDC  
**24D** - 24VDC

**9 Manual override option**

**Blank** - No manual override  
**M** - Pin type  
**S** - Screw type

\*Manual override is available in two different configurations, either push pin type is

used when system pressure does not exceed 210 bar (3000 psi). The screw type can be used at any system pressure.

**10 Coil/Connector types**

CONNECTOR	COIL PART NUMBER	
	12VDC	24VDC
<b>Blank</b> - No coil		
<b>W</b> - Leadwire (DC only)	02-154072	02-154073
<b>Q</b> - Spade terminals (DC only)	02-317154	02-317155
<b>U</b> - DIN 43650	02-154070	02-154071
<b>Y</b> - Metri-Pack 150 male*	02-308808	02-308809
<b>F</b> - Weather-Pack male	02-308810	02-308811
<b>N</b> - Deutsch DT04-2P	02-390736	02-391885

\*Preferred Packard connector.  
See Section C for coil information.

**11 Design number**



**WARNING**

When using the "Screw Type" override, care must be taken to return the override back to its neutral position before activating the valve. Failure to take this precaution may result in personal injury or damage to the machine.



**CAUTION**

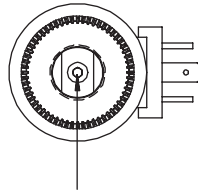
A separate check valve is required down stream to isolate the EPV valve from load forces when the EPV is used to hold a load.

# Dimensions

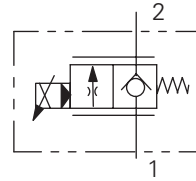
EPV16-A

## EPV16-A

Nose-in, side-out  
mm (inch)



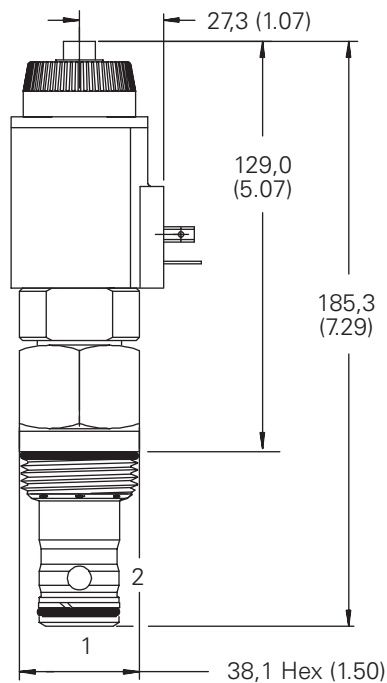
Screw type  
actuator (shown) 3  
mm hex socket



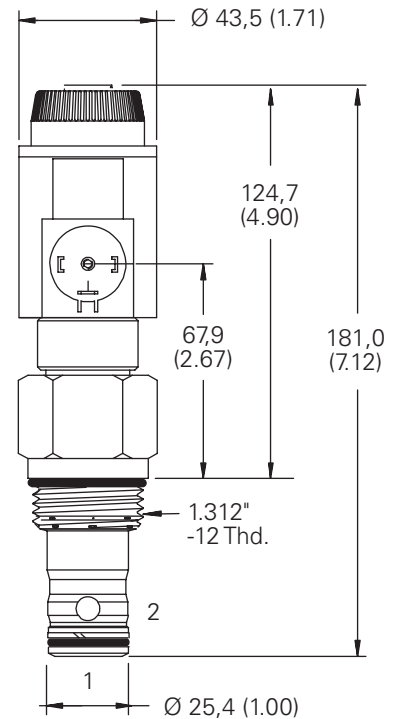
### Note

When stand alone housings are used, the following guidelines apply:

- EPV16-A: Port 3 is to be plugged.
- EPV16-B: Port 3 is to be connected to port 1 in order to provide the required feedback flow path.



With manual actuator



No manual actuator

Valves are shown with "U" coil. See Section C for coil information.

Torque cartridge in aluminum housing 108-122 Nm (80-90 ft. lbs)

Torque cartridge in steel housing 136-149 Nm (100-110 ft. lbs)

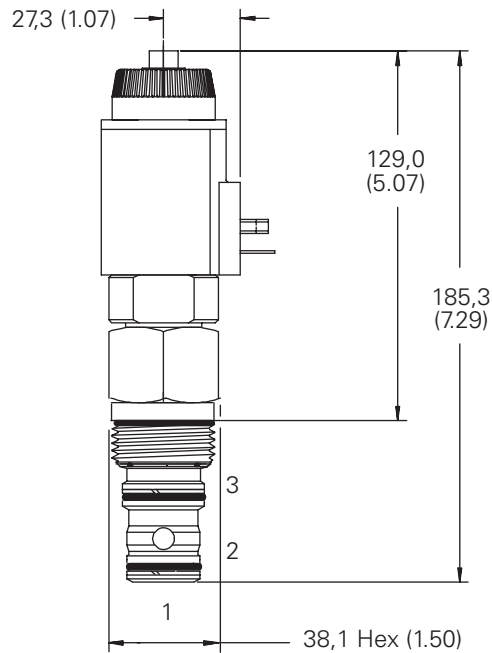
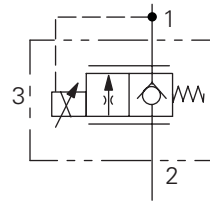
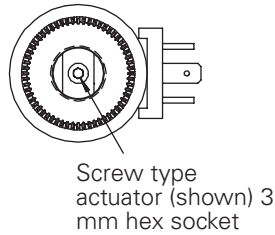
# Dimensions

EPV16-B

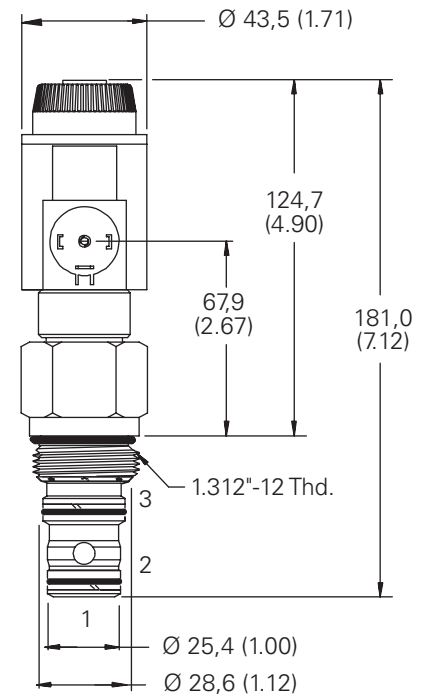
B

## EPV16-B

Side-in, nose-out  
mm (inch)



With manual actuator



No manual actuator

For EPV16-B (flow 2 to 1), Port 3 must be connected to Port 1 externally to the cartridge, either by passages in the cavity block or external plumbing. When purchased with undercut body, this connection is included in the body and Port 3 is not machined. A separate external port connection is not required for EPV16-A (flow 1 to 2).

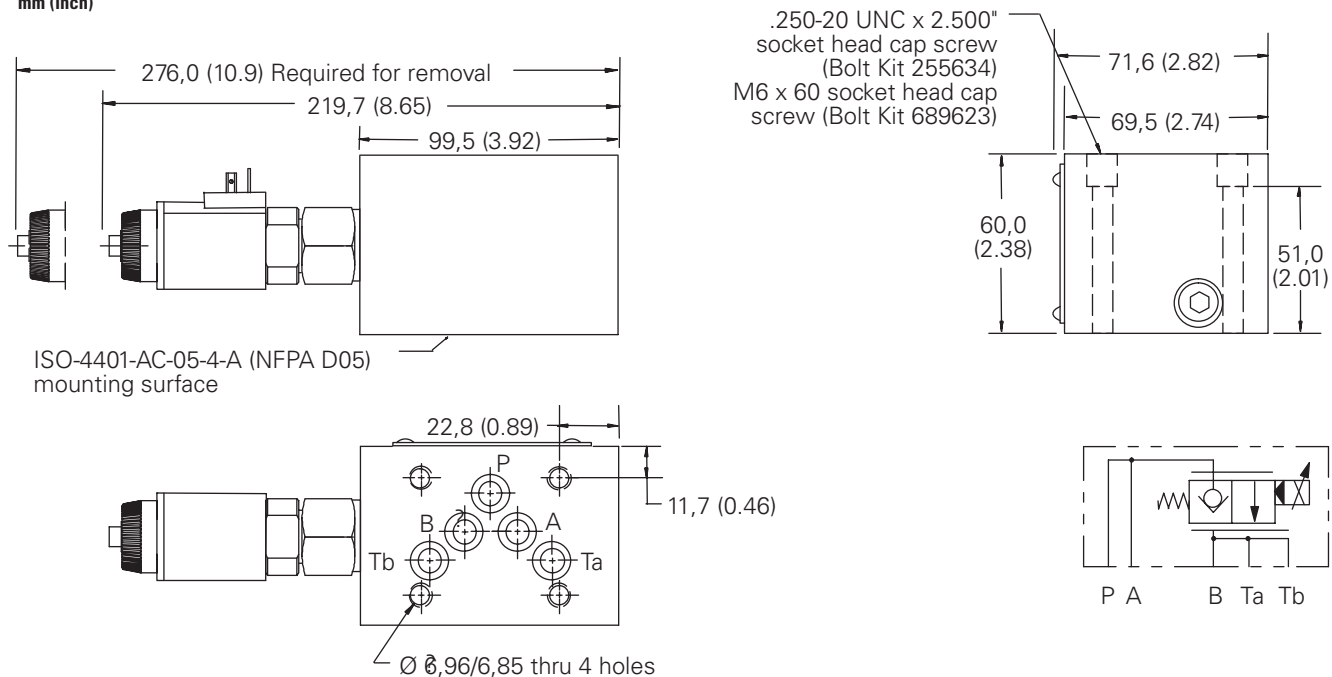
# Dimensions

EPV16

## EPV16-A-\*\*-S-5C-\*\*-D-(\*)-\*\*-12

### CETOP 5 Interface

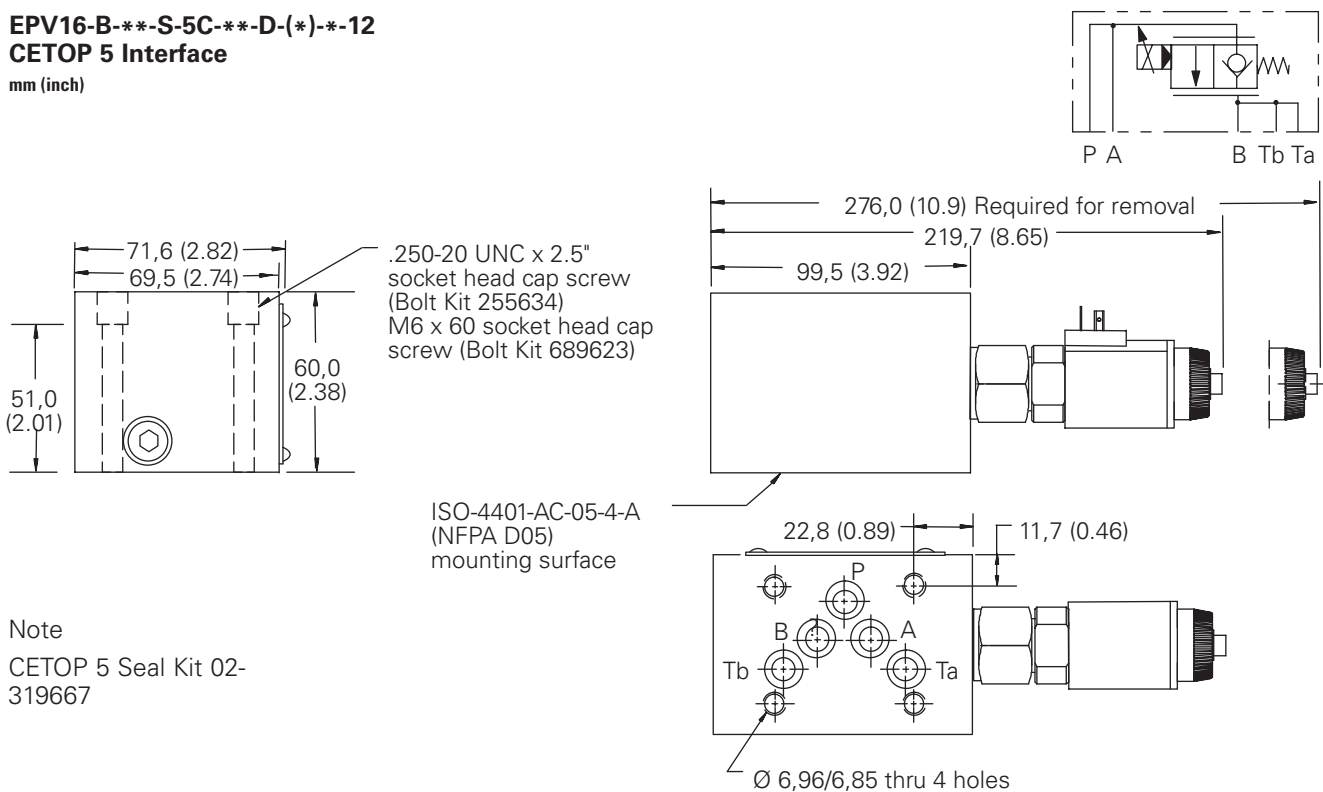
mm (inch)



## EPV16-B-\*\*-S-5C-\*\*-D-(\*)-\*\*-12

### CETOP 5 Interface

mm (inch)



Note

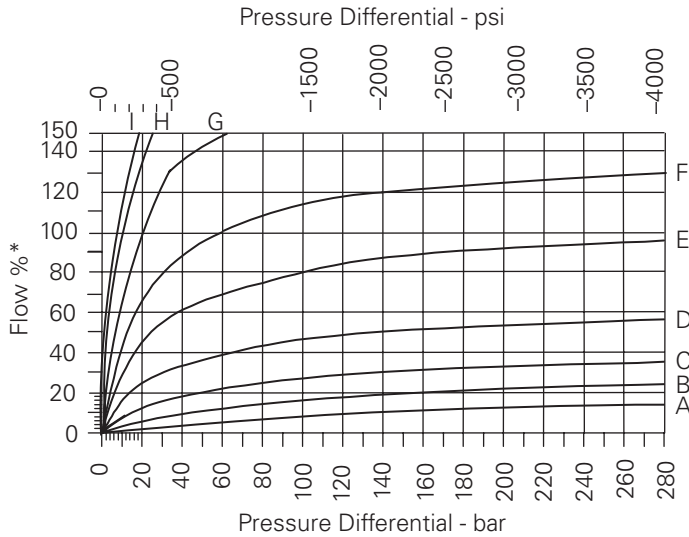
CETOP 5 Seal Kit 02-319667

# Performance Curves

EPV16

B

## Typical pressure compensation

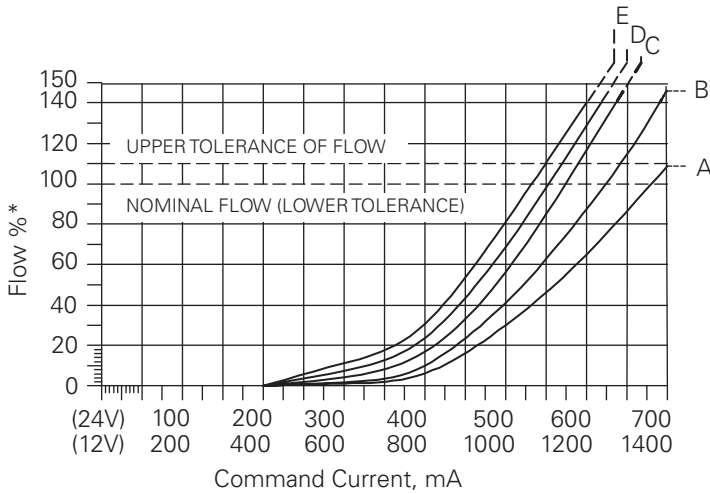


### COMMAND CURRENT

	12V	24V
A-	600 mA	300mA
B-	700 mA	350mA
C-	800 mA	400mA
D-	900 mA	450mA
E-	1000 mA	500mA
F-	1100 mA	550mA
G-	1200 mA	600mA
H-	1300 mA	650mA
I-	1400 mA	700mA

\* Flow interims of % for each poppet size

## Typical metering performance

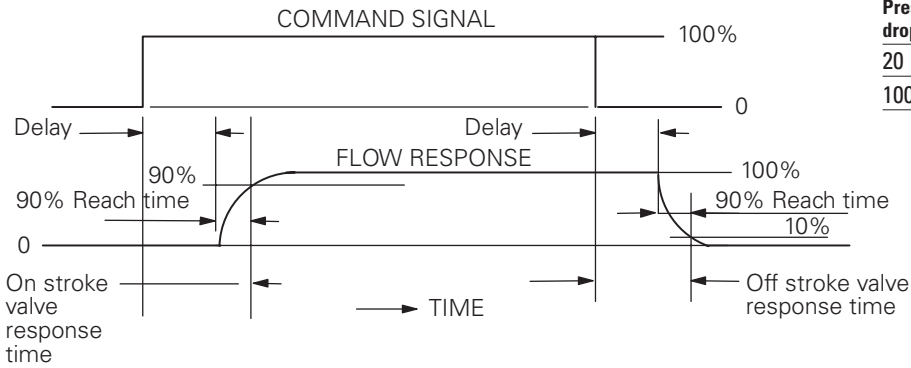


### PRESSURE DIFFERENTIAL

A-	10 bar	150 psi
B-	20 bar	300 psi
C-	50 bar	700 psi
D-	100 bar	1500 psi
E-	200 bar	3000 psi

\* Flow interims of % for each poppet size

## Step response definition of terms



### PRESSURE DROP @ 120 L/MIN (30 USGPM)

Pressure drop $\Delta P$	On Stroke Delay/Reach 90%	Off Stroke Delay/Reach 90%
20 bar (290 psi)	24 ms/35ms	5 ms/15 ms
100 bar (1450 psi)	24 ms/17ms	5 ms/7ms

# ESV1-8-O

Proportional flow control valve

### Description

The ESV1-8-O is a 2-way, 2-position, pilot operated, poppet type, normally open, proportional flow, control, screw-in cartridge valve.

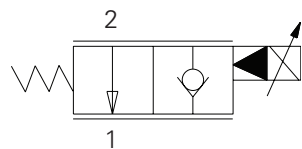
### Operation

In the de-energized position, this valve allows free flow from port 2 to port 1 and restricts flow from port 1 to port 2.

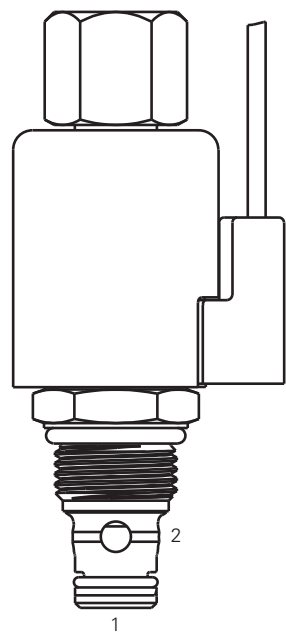
In the energized position, flow is blocked from port 2 to port 1, and free flow is allowed from port 1 to port 2.

The valve flow is proportional to the current applied to the coil.

### Functional Symbol



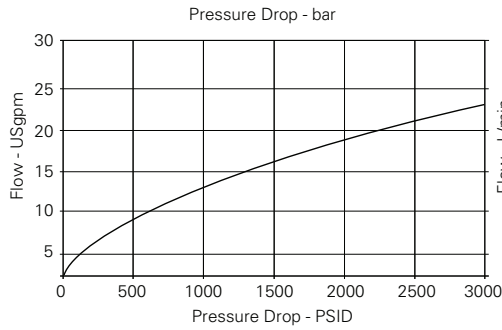
### Profile View



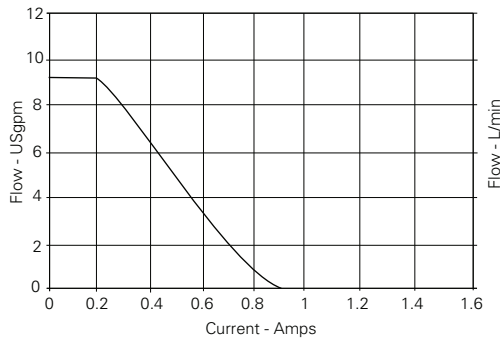
### RATINGS AND SPECIFICATIONS

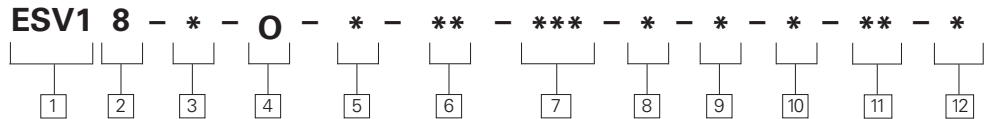
<i>Performance data is typical with fluid at 21,8 cST (105 SUS) and 49°C (120°F)</i>	
Typical application pressure	210 bar (3000 psi)
Cartridge endurance rating	1 million cycles
Cartridge fatigue pressure rating (NFPA/T2.6.1 R2-2000)	210 bar (3000 psi)
Rated flow	@ 500 psid, 8.4 gpm min, 9.3 gpm nom
Hysteresis	1 Usqpm with dither
Leakage (fully closed)	5 drops/min max @ 3000 psi
Ambient operating temperature	-30° to 90°C (-22° to 194°F)
Maximum oil temperature	120°C (248°F)
Maximum internal coil temperature	200°C (392°F)
Nominal supply voltage	12/24V
Current to fully close valve	1100-1250 mA (12V coil), 550-625 mA (24V coil)
Weight cartridge only	Cartridge only .10 Kg (.23 lbs)
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Cavity	C-8-2
Seal Kit	02-165875 (Buna-N), 02-165877 (Viton®) Viton is a registered trademark of E.I. DuPont

Pressure Drop At Max Poppet Opening



Flow vs. Current at 500 PSID





1 Function

**ESV1** - Proportional flow control

2 Size

**8** - 8 Size

3 Seal Material

**Blank** - Buna N  
**V** - Viton

4 Style

**O** - Normally open

5 Housing Material

**Blank** - Cartridge only  
**A** - Aluminum

6 Port Size

CODE	PORT SIZE	HOUSING NUMBER
		Aluminum
0	Cartridge Only	
2G	1/8" BSPP	02-160727
3G	3/8" BSPP	02-160728
4T	SAE 4	02-160730
6T	SAE 6	02-160731
8T	SAE 8	02-160732

See section J for housing details.

7 Coil Voltage

**00** - No coil  
**012** - 12 VDC  
**024** - 24 VDC

8 Type of Power

**Blank** - No coil  
**D** - DC w/o diode  
**B** - DC with diode

9 Connection Type

**Blank** - No Coil  
**G** - ISO 4400 DIN 43650  
**N** - Deutsch (DC Only)  
**P** - Conduit  
**Q** - Spade terminals  
**W** - Leadwire  
**Y** - Amp JR (DC Only)  
For coil dimensions see Section C.

10 Coil Series

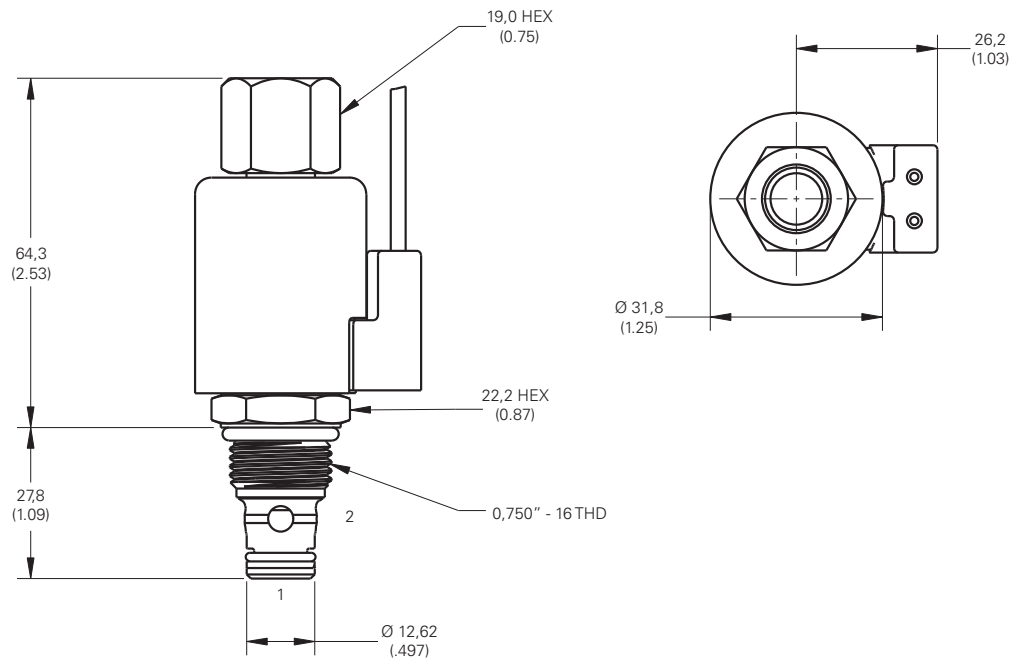
**Blank** - No Coil  
**S** - S Series, 20 W

11 Coil Special Features

**Blank** - No coil  
**00** - No Special Feature

12 Valve Special Features

**Blank** - None



# ESV1-8-C

Proportional flow control valve

## Description

The ESV1-8-C is a 2-way, 2-position, pilot operated, poppet type, normally closed, proportional flow control, screw-in cartridge valve.

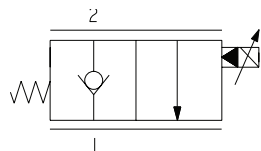
## Operation

In the de-energized position, this valve blocks flow from port 2 to port 1 and free flow is allowed from port 1 to port 2.

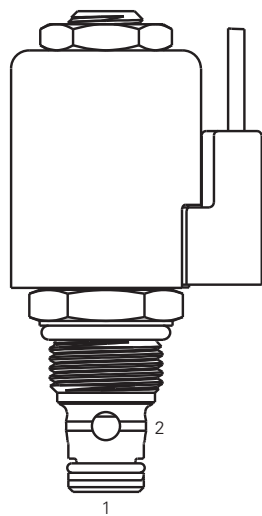
In the energized position, flow from port 1 to port 2 is restricted while free flow is allowed from port 2 to port 1.

The valve flow is proportional to the current applied to the coil.

## Functional Symbol



## Profile View

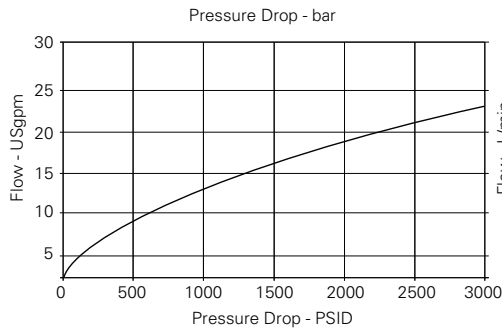


## RATINGS AND SPECIFICATIONS

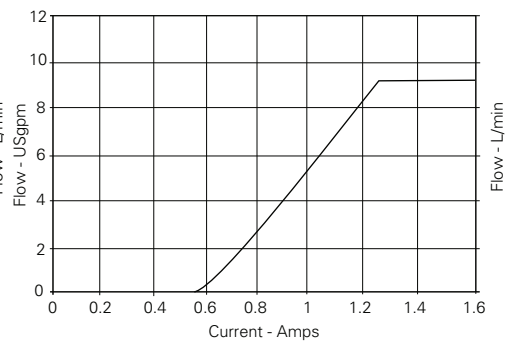
Performance data is typical with fluid at 21,8 cST (105 SUS) and 49°C (120°F)

Typical application pressure	210 bar (3000 psi)
Cartridge endurance rating	1 million cycles
Cartridge fatigue pressure rating (NFPA/T2.6.1 R2-2000)	210 bar (3000 psi)
Rated flow	@ 500 psid, 8.4 gpm min, 9.3 gpm nom
Hysteresis	1 Usqpm with dither
Leakage (fully closed)	5 drops/min max @ 3000 psi
Ambient operating temperature	-30° to 90°C (-22° to 194°F)
Maximum oil temperature	120°C (248°F)
Maximum internal coil temperature	200°C (392°F)
Nominal supply voltage	12/24V
Current to open valve	1350-1450 mA (12V coil), 075-725 mA (24V coil)
Weight cartridge only	Cartridge only .11 Kg (.24 lbs)
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Cavity	C-8-2
Seal Kit	02-165875 (Buna-N), 02-165877 (Viton) Viton is a registered trademark of E.I. DuPont

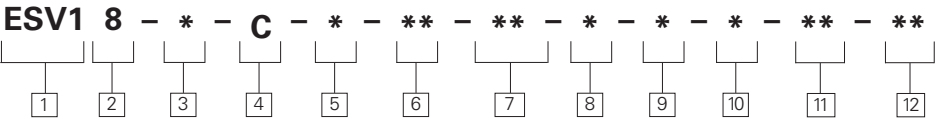
Pressure Drop At Max Poppet Opening



Flow vs. Current at 500 PSID







**1 Function**  
ESV1 - Proportional flow control

**2 Size**  
8 - 8 Size

**3 Seal Material**  
Blank - Buna N  
V - Viton

**4 Style**  
C - Normally closed

**5 Housing Material**  
Blank - Cartridge only  
A - Aluminum

**6 Port Size**

CODE	PORT SIZE	HOUSING NUMBER
		Aluminum
0	Cartridge Only	
2G	1/4" BSPP	02-160727
3G	3/8" BSPP	02-160728
4T	SAE 4	02-160730
6T	SAE 6	02-160731
8T	SAE 8	02-160732

See section J for housing details.

**7 Coil Voltage**

00 - No coil  
012 - 12 VDC  
024 - 24 VDC

**8 Type of Power**

Blank - No coil  
D - DC w/o diode  
B - DC with diode

**9 Connection Type**

Blank - No Coil  
G - ISO 4400 DIN 43650  
N - Deutsch (DC Only)  
P - Conduit  
Q - Spade terminals  
W - Leadwire  
Y - Amp JR (DC Only)

For coil dimensions see Section C.

**10 Coil Series**

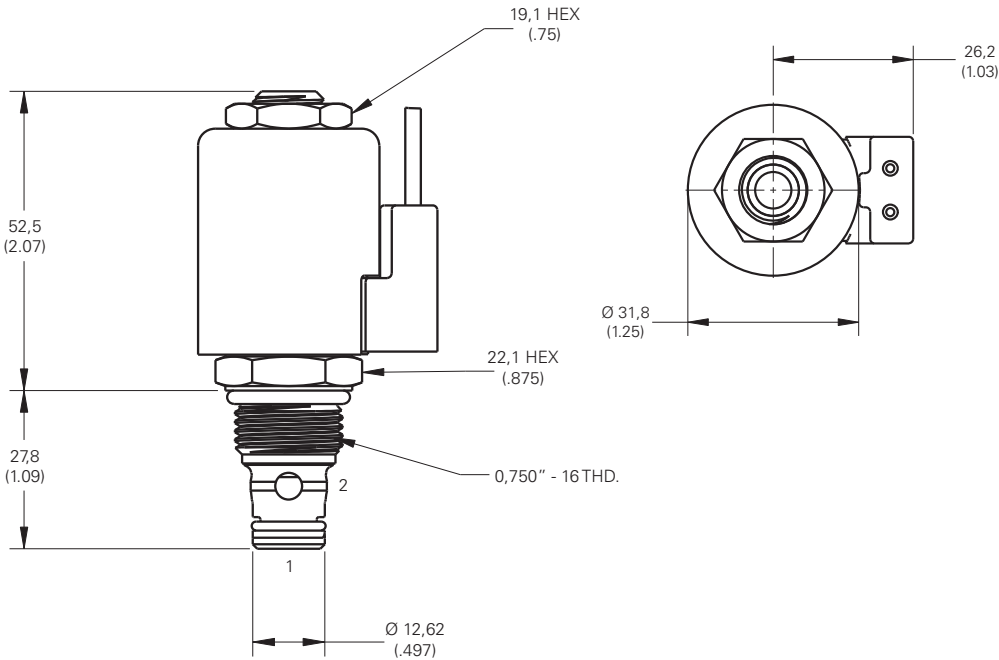
Blank - No Coil  
S - S Series, 20 W

**11 Coil Special Features**

Blank - No coil  
00 - No Special Feature

**12 Valve Special Features**

Blank - None



# ESV1-10-O

Proportional flow control valve

## Description

The ESV1-10-O is a 2-way, 2-position, pilot operated, poppet type, normally open, proportional flow, control, screw-in cartridge valve.

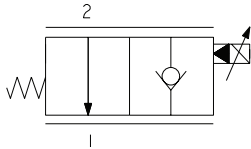
## Operation

In the de-energized position, this valve allows free flow from port 2 to port 1 and restricts flow from port 1 to port 2.

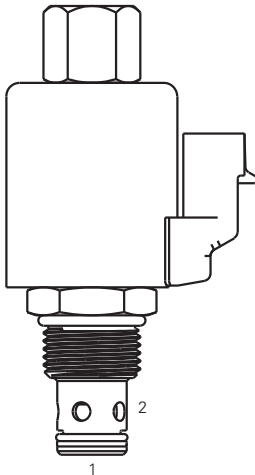
In the energized position, flow is blocked from port 2 to port 1, and free flow is allowed from port 1 to port 2.

The valve flow is proportional to the current applied to the coil.

## Functional Symbol



## Profile View

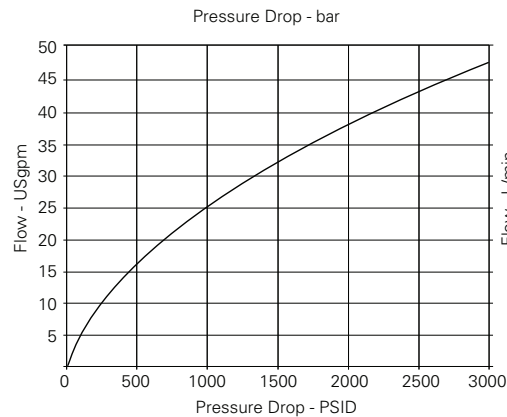


## RATINGS AND SPECIFICATIONS

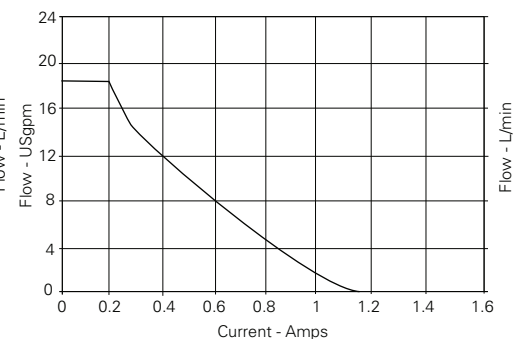
*Performance data is typical with fluid at 21,8 cST (105 SUS) and 49°C (120°F)*

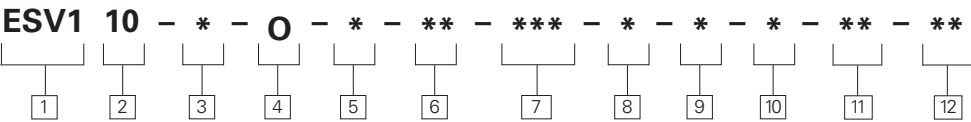
Typical application pressure	210 bar (3000 psi)
Cartridge endurance rating	1 million cycles
Cartridge fatigue pressure rating (NFPA/T2.6.1 R2-2000)	210 bar (3000 psi)
Rated flow	@ 500 psid, 18.5 gpm min, 19.4 gpm nom
Hysteresis	1 Usqpm with dither
Leakage (fully closed)	5 drops/min max @ 3000 psi
Ambient operating temperature	-30° to 90°C (-22° to 194°F)
Maximum oil temperature	120°C (248°F)
Maximum internal coil temperature	200°C (392°F)
Nominal supply voltage	12/24V
Current to fully close valve	1000-1200 mA (12V coil), 500-600 mA (24V coil)
Weight cartridge only	Cartridge only .14 Kg (.30 lbs)
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Cavity	C-10-2
Seal Kit	0565803 (Buna-N), 0566086 (Viton®) Viton is a registered trademark of E.I. DuPont

**Pressure Drop At Max Poppet Opening**



**Flow vs. Current at 500 PSID**





**1 Function**  
ESV1 - Proportional flow control

**2 Size**  
10 - 10 Size

**3 Seal Material**  
Blank - Buna N  
V - Viton

**4 Style**  
C - Normally Open

**5 Housing Material**  
Blank - Cartridge only  
A - Aluminum

**6 Port Size**

CODE	PORT SIZE	HOUSING NUMBER
		Aluminum
0	Cartridge Only	
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 section J for housing details.

**7 Coil Voltage**

00 - No coil  
012 - 12 VDC  
024 - 24 VDC

**8 Type of Power**

Blank - No coil  
D - DC w/o diode  
B - DC with diode

**9 Connection Type**

Blank - No Coil  
G - ISO 4400 DIN 43650  
N - Deutsch (DC Only)  
P - Conduit  
Q - Spade terminals  
W - Leadwire  
Y - Amp JR (DC Only)  
For coil dimensions see Section C.

**10 Coil Series**

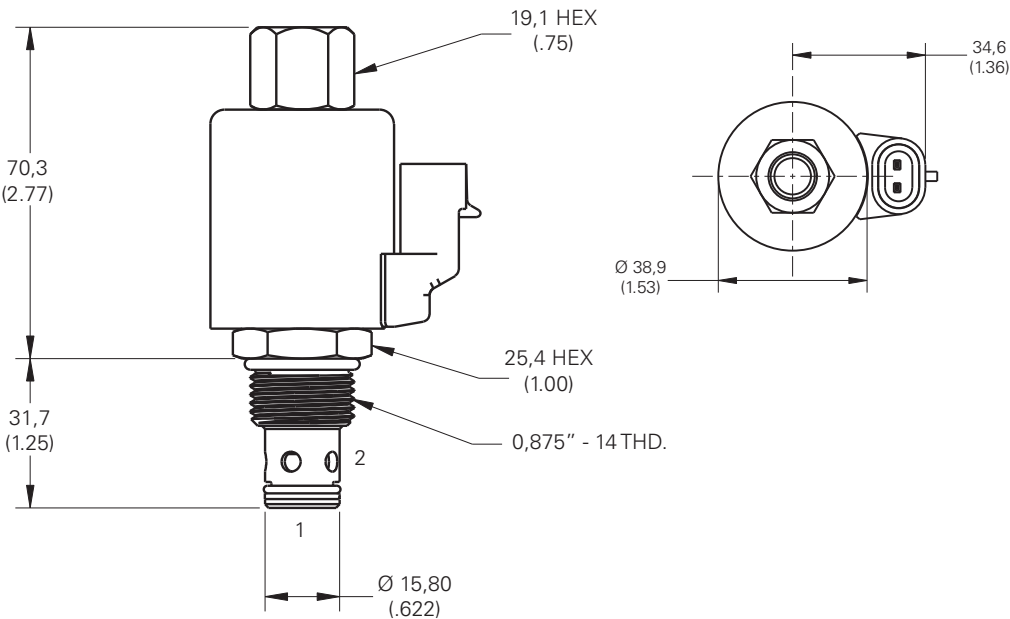
Blank - No Coil  
J - J Series, 20 W

**11 Coil Special Features**

Blank - No coil  
00 - No Special Feature

**12 Valve Special Features**

Blank - None



# ESV1-12-O

Proportional flow control valve

## Description

The ESV1-12-O is a 2-way, 2-position, pilot operated, poppet type, normally open, proportional flow, control, screw-in cartridge valve.

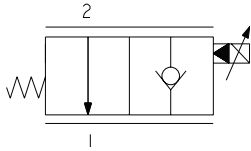
## Operation

In the de-energized position, this valve allows free flow from port 2 to port 1 and restricts flow from port 1 to port 2.

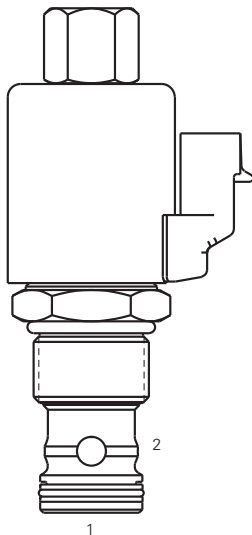
In the energized position, flow is blocked from port 2 to port 1, and free flow is allowed from port 1 to port 2.

The valve flow is proportional to the current applied to the coil.

## Functional Symbol



## Profile View

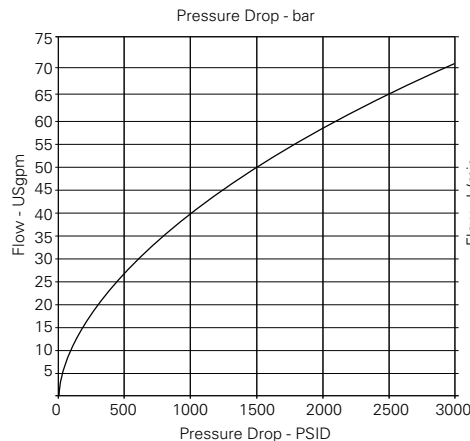


## RATINGS AND SPECIFICATIONS

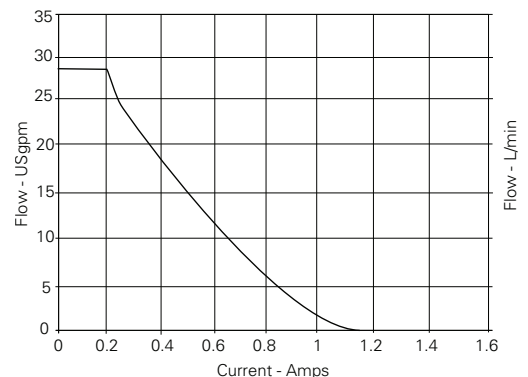
*Performance data is typical with fluid at 21.8 cST (105 SUS) and 49°C (120°F)*

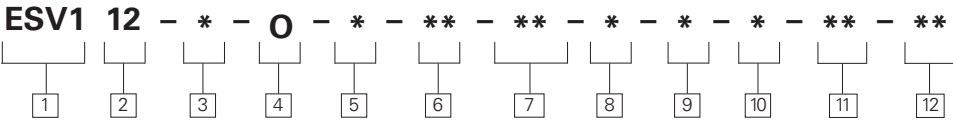
Typical application pressure	210 bar (3000 psi)
Cartridge endurance rating	1 million cycles
Cartridge fatigue pressure rating (NFPA/T2.6.1 R2-2000)	210 bar (3000 psi)
Rated flow	@ 500 psid, 27.3 gpm min, 28.9 gpm nom
Hysteresis	1 Usqpm with dither
Leakage (fully closed)	5 drops/min max @ 3000 psi
Ambient operating temperature	-30° to 90°C (-22° to 194°F)
Maximum oil temperature	120°C (248°F)
Maximum internal coil temperature	200°C (392°F)
Nominal supply voltage	12/24V
Current to fully close valve	800-900 mA (12V coil), 400-450 mA (24V coil)
Weight cartridge only	Cartridge only .24 Kg (.52 lbs)
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Cavity	C-12-2
Seal Kit	02-165889 (Buna-N), 02-165888 (Viton®) Viton is a registered trademark of E.I. DuPont

Pressure Drop At Max Poppet Opening



Flow vs. Current at 500 PSID





- 1 **Function**

**ESV1** - Proportional flow control
- 2 **Size**

**12** - 12 Size
- 3 **Seal Material**

**Blank** - Buna N

**V** - Viton
- 4 **Style**

**0** - Normally Open

CODE	PORT SIZE	HOUSING NUMBER
		Aluminum
0	Cartridge Only	
4G	1/2" BSPP	02-161118
4GU	1/2" BSPP	02-161116
6G	3/4" BSPP	02-161117
6GU	3/4" BSPP	02-161115
10T	SAE 10	02-160640
10TU	SAE 10	02-160641
12T	SAE 12	02-160644
12TU	SAE 12	02-160645

See section J for housing details.

- 7 **Coil Voltage**

**00** - No coil

**012** - 12 VDC

**024** - 24 VDC
- 8 **Type of Power**

**Blank** - No coil

**D** - 1DC w/o diode

**B** - DC with diode
- 9 **Connection Type**

**Blank** - No Coil

**G** - ISO 4400 DIN 43650

**N** - Deutsch (DC Only)

**P** - Conduit

**Q** - Spade terminals

**W** - Leadwire

**Y** - Amp JR (DC Only)

For coil dimensions see Section C.

- 10 **Coil Series**

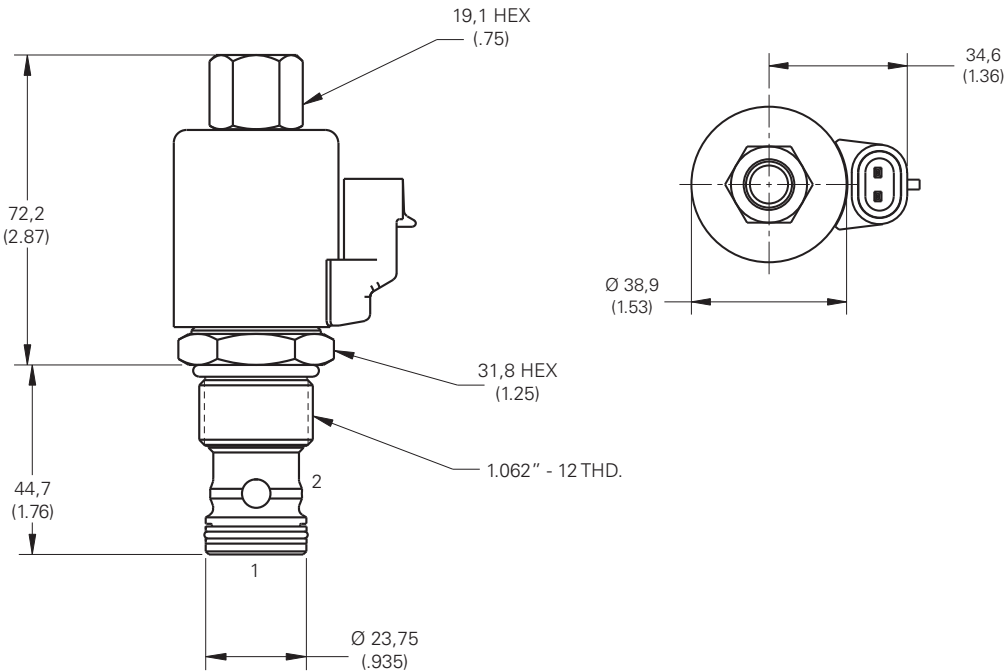
**Blank** - No Coil

**J** - J Series, 20 W
- 11 **Coil Special Features**

**Blank** - No coil

**00** - No Special Feature
- 12 **Valve Special Features**

**Blank** - None



# EFV1-10-O

Proportional flow control valve, normally open, spool type

### Description

The EFV1-10-O is a normally open, unidirectional, uncompensated, spool type, two way, proportional flow control, screw-in cartridge valve.

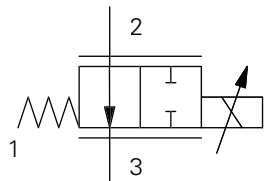
### Operation

The valve is controlled by current supplied to the coil. At zero current, the valve is fully open from port 2 to port 3. At 1500 to 1600 mA (12V coil) the valve is fully closed. Port 1 is used for pressure balancing the spool and armature and must be blocked in all cases.

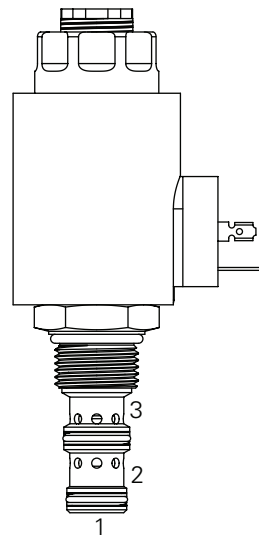
The maximum intended pressure drop is 300 PSID. At pressure drops above 300 PSID, almost no increase in flow is obtained. The intended flow direction is from port 2 to port 3. Operation of the valve with flow from port 3 to port 2 will produce flow vs current and flow vs pressure drop curves that are significantly

different from those obtained with flow from port 2 to port 3. Since the spool and armature are pressure balanced, the operating pressure does not affect the operating characteristics of the valve. The operating point of the valve is determined only by current, pressure drop and temperature.

### Functional Symbol



### Profile View



Note  
Port 1 is unused and must be plugged.

### RATINGS AND SPECIFICATIONS

<i>Performance data is typical with DTE 24 hydraulic fluid at 120°F</i>	
Typical application pressure	210 bar (3000 psi)
Cartridge endurance rating	1 million cycles
Cartridge fatigue pressure rating (NFPA/T2.6.1 R2-2000)	210 bar (3000 psi)
Rated maximum flow at 160 PSID	Flow rating "A" 15.1 L/min (4 USgpm)
	Flow rating "B" 30.2 L/min (8 USgpm)
	Flow rating "C" 37.9 L/min (10 USgpm)
Hysteresis	1 USgpm with 400Hz PWM driver
Leakage (fully closed)	197 cm <sup>3</sup> /min (12 in <sup>3</sup> /min) at 3000 PSID
Ambient operating temperature	-30° to 90°C (-22° to 194°F)
Maximum oil temperature	120°C (248°F)
Maximum internal coil temperature	200°C (392°F)
Nominal supply voltage	12/24 V
Current to fully close valve	1500 - 1600 mA (12V coil), 750 - 800 mA (24V coil)
Recommended PWM frequency	200 - 400 Hz
Coil resistance at 20°C (68°F)	4.7 $\Omega$ (12V), 19.0 $\Omega$ (24V)
Mass	Cartridge only 0,37 kg (0.82 lb)
	Cartridge with coil and end nut 0,73 kg (1.62 lb)
Fluid	All general purpose hydraulic oils such as: MIL-H-5606, SAE 10, SAE 20, DTE 24, etc.
Filtration	Cleanliness code 18/16/13
Cavity	C-10-3
Seal kit	9900225-000 (Buna-N)
	9900226-000 (Viton®)

Viton is a registered trademark of E.I. DuPont

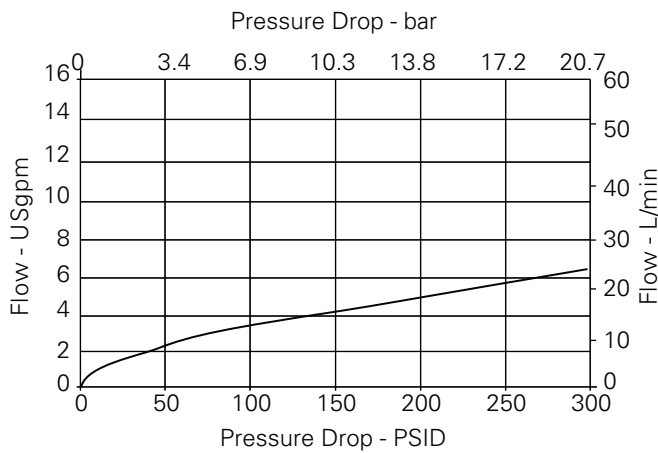
# Performance Curves

EFV1-10-O  
Cartridge Only

B

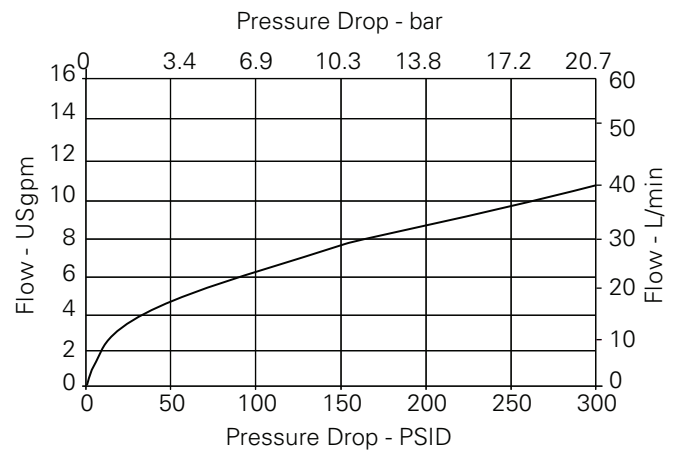
## Max. Flow vs Pressure Drop

Flow rating "A" (Valve fully open)



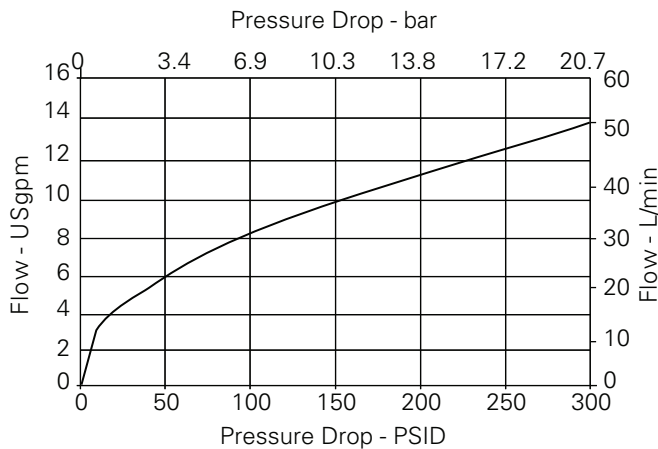
## Max. Flow vs Pressure Drop

Flow rating "B" (Valve fully open)

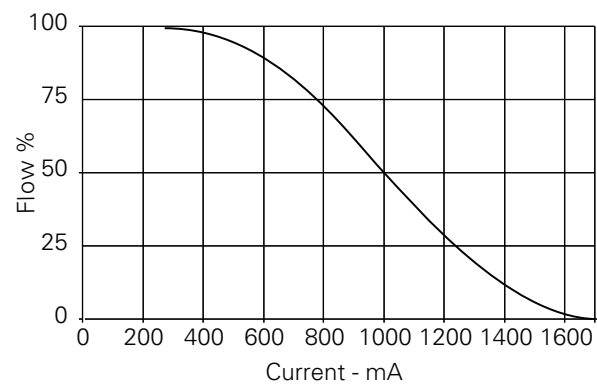


## Max. Flow vs Pressure Drop

Flow rating "C" (Valve fully open)



## Flow vs. Current

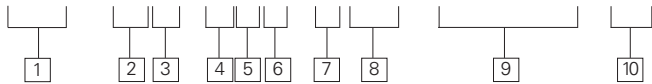


### Note

To determine operating characteristics for the flow rating selected, at a specific differential pressure, first determine maximum flow from upper curve at the differential pressure value. This will be the "100% flow" flow on the lower curve.

Parameters: 400 Hz PWM

EFV1 – 10 \* – 0 \* \* – \* \*\*\* – \*\*\*\*\*E\*\* – 00



- 1 **Function**

**EFV1** - Electro Proportional Flow Control Valve
- 2 **Size**

**10** - 10 Size
- 3 **Seals**

**N** - Buna-N  
**V** - Viton
- 4 **Logic**

**0** - Normally Open

- 5 **Flow Rating**

**A** - 4 USgpm @ 160 PSID  
**B** - 8 USgpm @ 160 PSID  
**C** - 10 USgpm @ 160 PSID
- 6 **Bleed Screw and Manual Override**

**0** - No core tube special features  
**S** - Screw-in type manual override

Material Code	Port Code*	Description	Part Number
0	000	No manifold block	–
A	03B	Aluminum, Light Duty 3/8" BSPP	02-173358
	06T	Aluminum, Light Duty SAE 6	566162
	02G	Aluminum, 1/4" BSPP	876705
	03G	Aluminum, 3/8" BSPP	876714
	06H	Aluminum, SAE 6	876704
S	08H	Aluminum, SAE 8	876711
	02G	Steel, 1/4" BSPP	02-175127
	03G	Steel, 3/8" BSPP	02-175128
	06T	Steel, SAE 6	02-175124
	08T	Steel, SAE 8	02-175125

Note: Both the manifold and port plug are required.

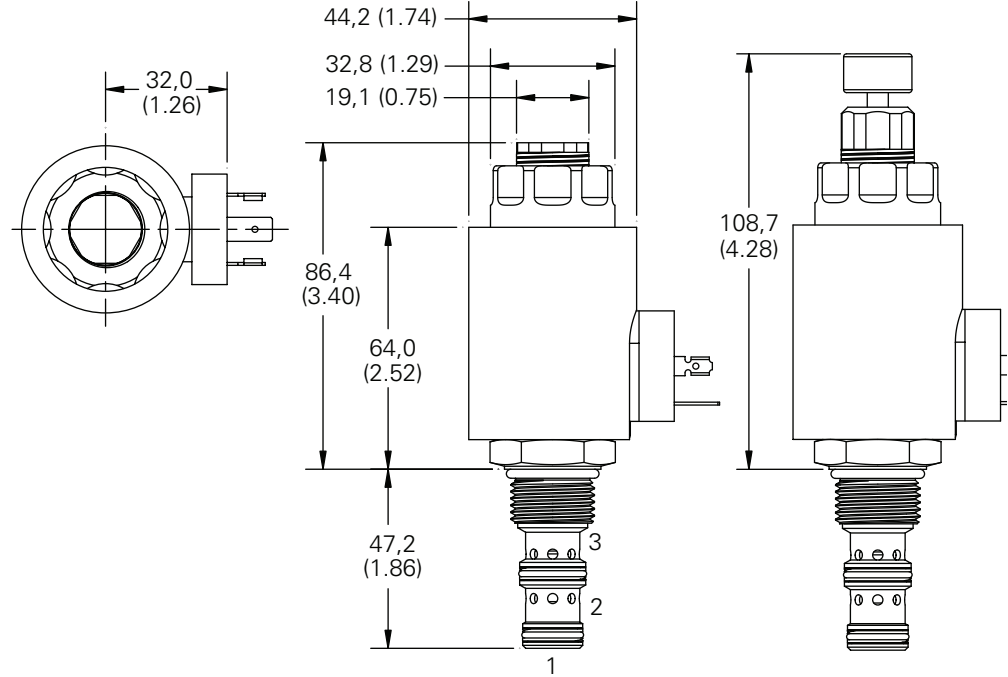
- 9 **Coil Model Code\***

E-Series Coils See Section C.

\* These model digits will not be stamped on the valve.
- 10 **Special Features**

**00** - None  
(Only required when valve has special features, omitted if "00.")

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



Note: EFV1-10 with DIN-43650 connector shown.

Note: Port 1 is unused and must be plugged.

Note - S type manual override shown



**EAT•N**

**Vickers**

# EFV1-10-C

Proportional flow control valve, normally closed, spool type

## Description

The EFV1-10-C is a normally closed, unidirectional, uncompensated, spool type, two way, proportional flow control, screw-in cartridge valve.

## Operation

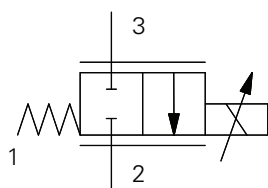
The valve is controlled by current supplied to the coil. At zero current, the valve is fully closed from port 3 to port 2. At 1500 mA (12V coil) the valve is considered fully open. This is the maximum intended current level for use in applications. Port 1 is used for pressure balancing the spool and armature and must be blocked in all cases.

The maximum intended pressure drop is 300 PSID. At pressure drops above 300 PSID, almost no increase in flow is obtained. The intended flow direction is from port 3 to port 2. Operation of the valve with flow from port 2 to port 3 will produce flow vs current and flow vs pressure drop curves that are significantly

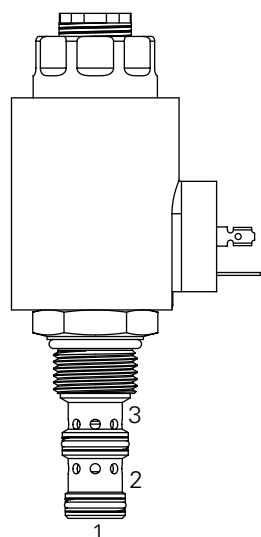
different from those obtained with flow from port 3 to port 2.

Since the spool and armature are pressure balanced, the operating pressure does not affect the operating characteristics of the valve. The operating point of the valve is determined only by current, pressure drop and temperature.

## Functional Symbol



## Profile View



### Note

Port 1 is unused and must be plugged.

## RATINGS AND SPECIFICATIONS

*Performance data is typical with DTE 24 hydraulic fluid at 120°F*

Typical application pressure	210 bar (3000 psi)
Cartridge endurance rating	1 million cycles
Cartridge fatigue pressure rating (NFPA/T2.6.1 R2-2000)	210 bar (3000 psi)
Rated maximum flow at 160 PSID	Flow rating "A" 15.1 L/min (4 USgpm) Flow rating "B" 30.2 L/min (8 USgpm) Flow rating "C" 37.9 L/min (10 USgpm)
Hysteresis	1 USgpm with 400Hz PWM driver
Leakage (fully closed)	197 cm <sup>3</sup> /min (12 in <sup>3</sup> /min) at 3000 PSID
Ambient operating temperature	-30° to 90°C (-22° to 194°F)
Maximum oil temperature	120°C (248°F)
Maximum internal coil temperature	200°C (392°F)
Nominal supply voltage	12/24 V
Current to fully close valve	1500 - 1600 mA (12V coil), 750 - 800 mA (24V coil)
Recommended PWM frequency	200 - 400 Hz
Coil resistance at 20°C (68°F)	4.7 $\Omega$ (12V), 19.0 $\Omega$ (24V)
Mass	Cartridge only 0,37 kg (0.82 lb) Cartridge with coil and end nut 0,73 kg (1.62 lb)
Fluid	All general purpose hydraulic oils such as: MIL-H-5606, SAE 10, SAE 20, DTE 24, etc.
Filtration	Cleanliness code 18/16/13
Cavity	C-10-3
Seal kit	9900225-000 (Buna-N) 9900226-000 (Viton®)

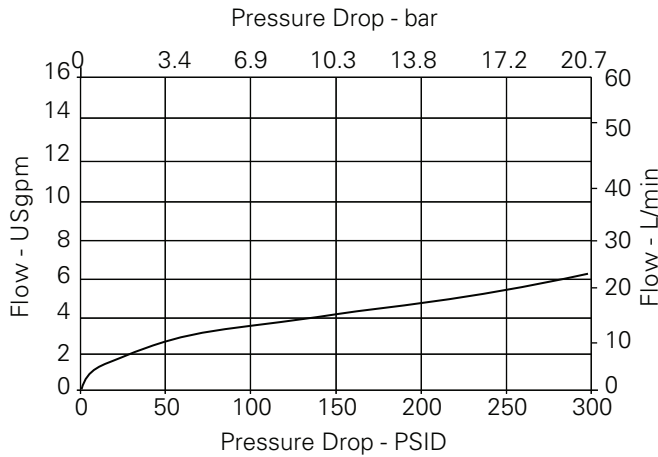
Viton is a registered trademark of E.I. DuPont

# Performance Curves

EFV1-10\*-C  
Cartridge Only

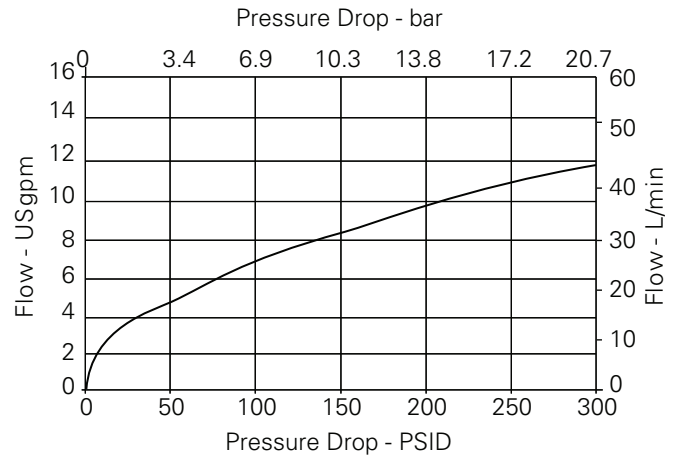
## Max. Flow vs Pressure Drop

Flow rating "A" (Zero Current)



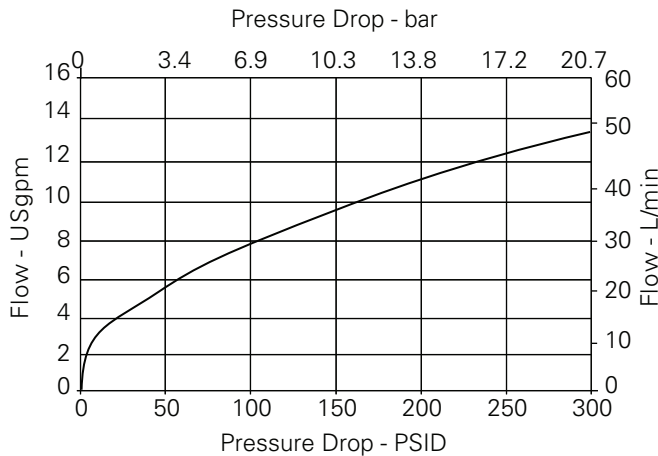
## Max. Flow vs Pressure Drop

Flow rating "B" (Zero Current)

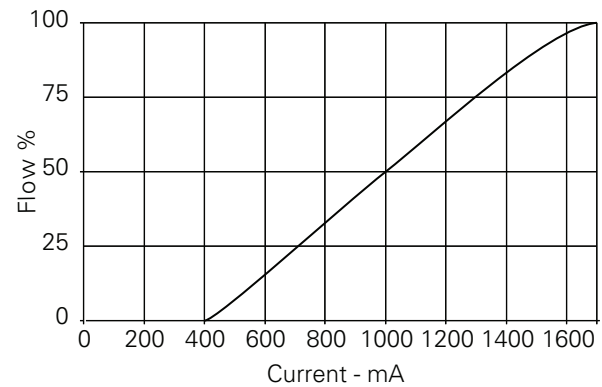


## Max. Flow vs Pressure Drop

Flow rating "C" (Zero Current)



## Flow vs. Current

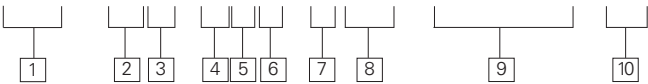


### Note

To determine operating characteristics for the flow rating selected, at a specific differential pressure, first determine maximum flow from upper curve at the differential pressure value. This will be the "100%" flow on the lower curve.

Parameters: 400 Hz PWM

EFV1 – 10 \* – C \* \* – \* \* \* \* – \* \* \* \* E \* \* – 00



1 Function

**EFV1** - Electro Proportional Flow Control Valve

2 Size

**10** - 10 Size

3 Seals

**N** - Buna-N  
**V** - Viton®

4 Logic

**C** - Normally Closed

5 Flow Rating

**A** - 4 USgpm @ 160 PSID  
**B** - 8 USgpm @ 160 PSID  
**C** - 10 USgpm @ 160 PSID

6 Bleed Screw and Manual Override

**0** - No core tube special features  
**S** - Screw-in type manual override

7

**Material Code**

8

**Port Code\***

		Description	Part Number
<b>0</b>	<b>000</b>	No manifold block	–
<b>A</b>	<b>03B</b>	Aluminum, Light Duty 3/8" BSPP	02-173358
	<b>06T</b>	Aluminum, Light Duty SAE 6	566162
	<b>02G</b>	Aluminum, 1/4" BSPP	876705
	<b>03G</b>	Aluminum, 3/8" BSPP	876714
	<b>06H</b>	Aluminum, SAE 6	876704
<b>S</b>	<b>08H</b>	Aluminum, SAE 8	876711
	<b>02G</b>	Steel, 1/4" BSPP	02-175127
	<b>03G</b>	Steel, 3/8" BSPP	02-175128
	<b>06T</b>	Steel, SAE 6	02-175124
	<b>08T</b>	Steel, SAE 8	02-175125

Note: Both the manifold and port plug are required.

9

**Coil Model Code\***

E-Series Coils See Section C.

\* These model digits will not be stamped on the valve.

10

**Special Features**

**00** - None  
(Only required when valve has special features, omitted if "00.")

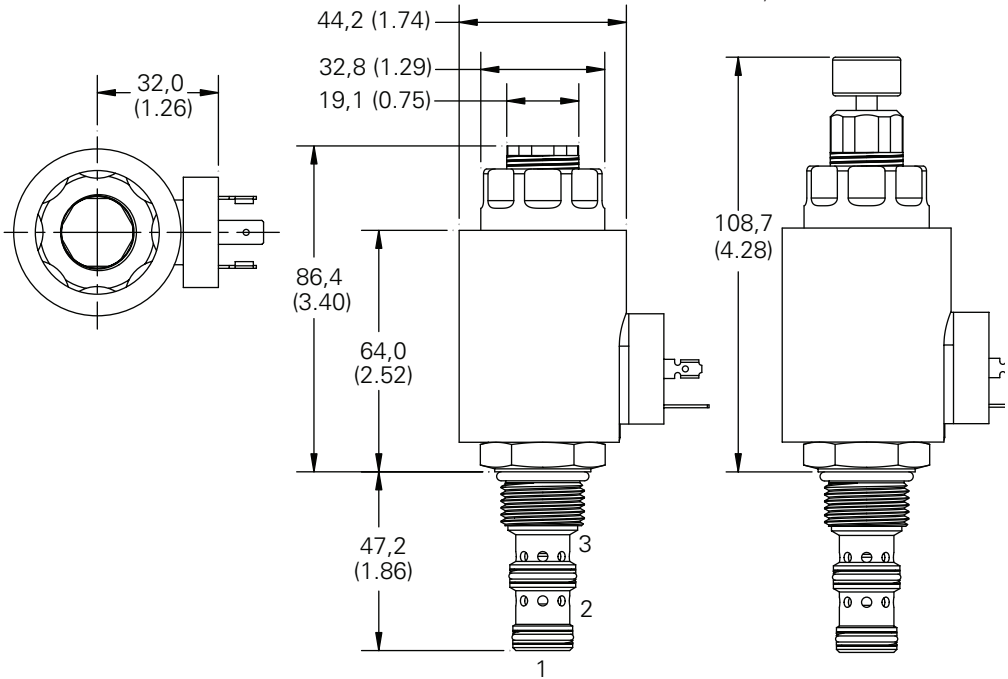
Dimensions

mm (inch)

Torque cartridge in housing

**S** - 68-75 Nm  
(50-55 ft. lbs)

**A** - 47-54 Nm  
(35-40 ft. lbs)



Note: EFV1-10 with DIN-43650 connector shown.

Note: Port 1 is unused and must be plugged.

Note - S type manual override shown



# EFV1-12-O

Proportional flow control valve, normally open, spool type

### Description

The EFV1-12-O is a normally open, unidirectional, uncompensated, spool type, two way, proportional flow control, screw-in cartridge valve.

### Operation

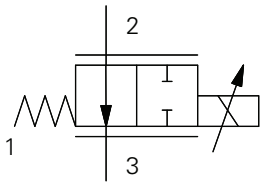
The valve is controlled by current supplied to the coil. At zero current, the valve is fully open from port 2 to port 3. At 1500 to 1600 mA (12V coil) the valve is fully closed. Port 1 is used for pressure balancing the spool and armature and must be blocked in all cases.

The maximum intended pressure drop is 300 PSID.

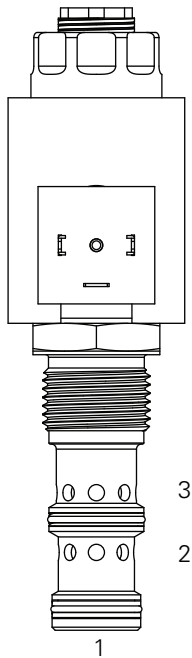
At pressure drops above 300 PSID, almost no increase in flow is obtained. The intended flow direction is from port 2 to port 3. Operation of the valve with flow from port 3 to port 2 will produce flow vs current and flow vs pressure drop curves that are significantly different from those obtained with flow from port 2 to port 3.

Since the spool and armature are pressure balanced, the operating pressure does not affect the operating characteristics of the valve. The operating point of the valve is determined only by current, pressure drop and temperature.

### Functional Symbol



### Profile View



### Note

Port 1 is unused and must be plugged.

### RATINGS AND SPECIFICATIONS

*Performance data is typical with DTE 24 hydraulic fluid at 120°F*

Typical application pressure	210 bar (3000 psi)
Cartridge endurance rating	1 million cycles
Cartridge fatigue pressure rating (NFPA/T2.6.1 R2-2000)	210 bar (3000 psi)
Rated maximum flow at 300 PSID	Flow rating "A" 95 L/min (25.0 USgpm) Flow rating "B" 104 L/min (27.5 USgpm)
Hysteresis	1 USgpm with 400Hz PWM driver
Leakage (fully closed)	77 - 483 cm <sup>3</sup> /min (5 - 30 in <sup>3</sup> /min) at 3000 PSID
Ambient operating temperature	-30° to 90°C (-22° to 194°F)
Maximum oil temperature	120°C (248°F)
Maximum internal coil temperature	200°C (392°F)
Nominal supply voltage	12/24 V
Current to fully close valve	1500 - 1600 mA (12V coil), 750 - 800 mA (24V coil)
Recommended PWM frequency	200 - 400 Hz
Coil resistance at 20°C (68°F)	4.7 Ω (12V), 19.0 Ω (24V)
Mass	Cartridge only 0,37 kg (0.82 lb) Cartridge with coil and end nut 0,73 kg (1.62 lb)
Fluid	All general purpose hydraulic oils such as: MIL-H-5606, SAE 10, SAE 20, DTE 24, etc.
Filtration	Cleanliness code 18/16/13
Cavity	C-12-3
Seal kit	9900171-000 (Buna-N) 9900172-000 (Viton®)

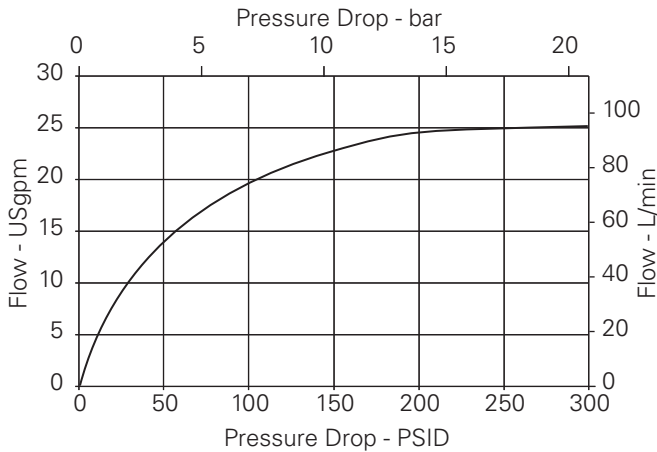
Viton is a registered trademark of E.I. DuPont

# Performance Curves

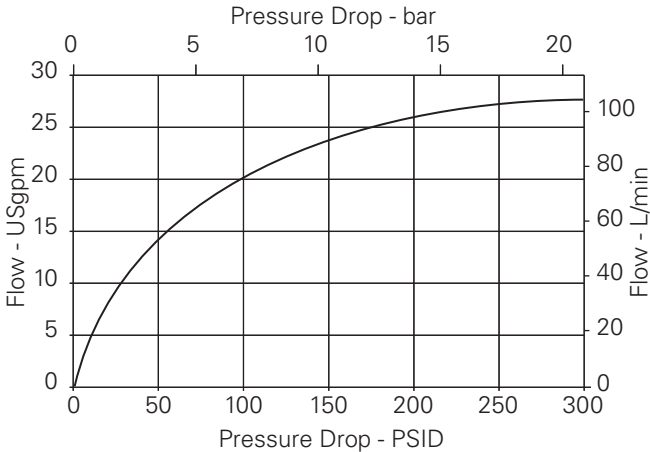
EFV1-12-0  
Cartridge Only

B

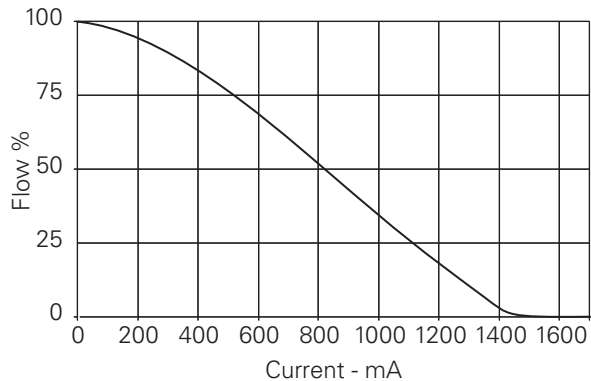
**Max. Flow vs Pressure Drop**  
Flow rating "A" (Zero Current)



**Max. Flow vs Pressure Drop**  
Flow rating "B" (Zero Current)



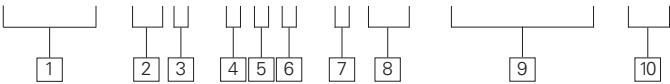
## Flow vs Current



**Note**  
To determine operating characteristics for the flow rating selected, at a specific differential pressure, first determine maximum flow from upper curve at the differential pressure value. This will be the "100% flow" flow on the lower curve.

Parameters:  
400 Hz PWM

EFV1 - 12 \* - 0 \* \* - \* \* \* - \* \* \* \* E \* \* - 00



**1 Function**  
**EFV1** - Electro Proportional Flow Control Valve

**2 Size**  
**12** - 12 Size

**3 Seals**  
**N** - Buna-N  
**V** - Viton®

**4 Logic**  
**0** - Normally Open

**5 Flow Rating**  
**A** - 25.0 USgpm @ 300 PSID  
**B** - 27.5 USgpm @ 300 PSID

**6 Bleed Screw and Manual Override**  
**0** - No core tube special features  
**S** - Screw-in type manual override

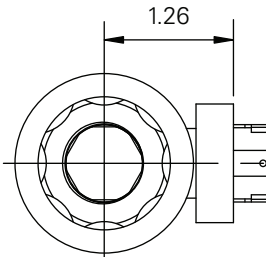
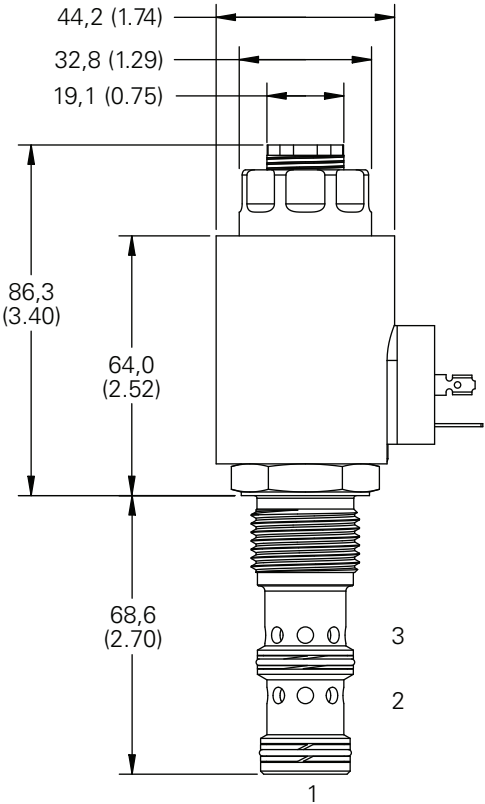
7 Material Code	8 Port Code*	Description	Part Number
0	000	No manifold block	—
A	04G	Aluminum, 1/2" BSPP	02-161817
	06G	Aluminum, 3/4" BSPP	02-161816
	10T	Aluminum, SAE 10	02-160642
	12T	Aluminum, SAE 12	02-160646
S	04G	Steel, 1/2" BSPP	02-169815
	06G	Steel, 3/4" BSPP	02-169814
	10T	Steel, SAE 10	02-161070
	12T	Steel, SAE 12	02-169816

Note: Both the manifold and port plug are required.

**9 Coil Model Code\***  
E-Series Coils See Section C.  
\* These model digits will not be stamped on the valve.

**10 Special Features**  
**00** - None  
(Only required when valve has special features, omitted if "00.")

**Dimensions**  
mm (inch)  
Torque cartridge in housing  
**S** - 136-149 Nm  
(100-110 ft. lbs)  
**A** - 108-122 Nm  
(80-90 ft. lbs)



Note  
EFV1-12 with DIN-43650 connector shown.

Note  
Port 1 is unused and must be plugged.



**EAT•N**

| **Vickers**

# EFV1-12-C

Proportional flow control valve, normally closed, spool type

## Description

The EFV1-12-C is a normally closed, unidirectional, uncompensated, spool type, two way, proportional flow control, screw-in cartridge valve.

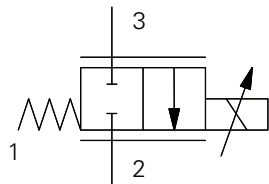
## Operation

The valve is controlled by current supplied to the coil. At zero current, the valve is fully closed from port 3 to port 2. At 1500 mA (12V coil) the valve is considered fully open. This is the maximum intended current level for use in applications. Port 1 is used for pressure balancing the spool and armature and must be blocked in all cases.

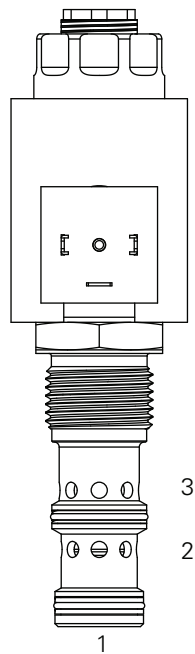
The maximum intended pressure drop is 300 PSID. At pressure drops above 300 PSID, almost no increase in flow is obtained. The intended flow direction is from port 3 to port 2. Operation of the valve with flow from port 2 to port 3 will produce flow vs current and flow vs pressure drop curves that are significantly different from those

obtained with flow from port 3 to port 2. Since the spool and armature are pressure balanced, the operating pressure does not affect the operating characteristics of the valve. The operating point of the valve is determined only by current, pressure drop and temperature.

## Functional Symbol



## Profile View



Note  
Port 1 is unused and must be plugged.

## RATINGS AND SPECIFICATIONS

<i>Performance data is typical with DTE 24 hydraulic fluid at 120°F</i>	
Typical application pressure	210 bar (3000 psi)
Cartridge endurance rating	1 million cycles
Cartridge fatigue pressure rating (NFPA/T2.6.1 R2-2000)	210 bar (3000 psi)
Rated maximum flow at 300 PSID	Flow rating "A" 55L/min (14.3 USgpm) Flow rating "B" 77 L/min (20.6 USgpm)
Hysteresis	1 USgpm with 400Hz PWM driver
Leakage (fully closed)	77 - 483 cm³/min (5 - 30 in³/min) at 3000 PSID
Ambient operating temperature	-30° to 90°C (-22° to 194°F)
Maximum oil temperature	120°C (248°F)
Maximum internal coil temperature	200°C (392°F)
Nominal supply voltage	12/24 V
Current to fully close valve	1500 - 1600 mA (12V coil), 750 - 800 mA (24V coil)
Recommended dither frequency	200 - 400 Hz
Coil resistance at 20°C (68°F)	4.7 Ω (12V), 19.0 Ω (24V)
Mass	Cartridge only 0,37 kg (0.82 lb) Cartridge with coil and end nut 0,73 kg (1.62 lb)
Fluid	All general purpose hydraulic oils such as: MIL-H-5606, SAE 10, SAE 20, DTE 24, etc.
Filtration	Cleanliness code 18/16/13
Cavity	C-12-3
Seal kit	9900171-000 (Buna-N) 9900172-000 (Viton®)

Viton is a registered trademark of E.I. DuPont

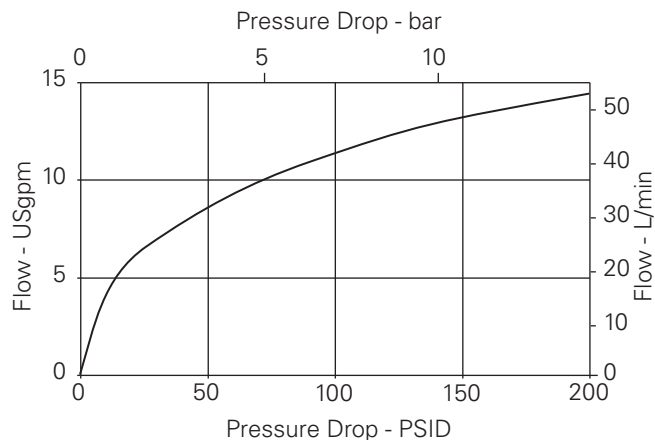
# Performance Curves

EFV1-12\*-C

Cartridge Only

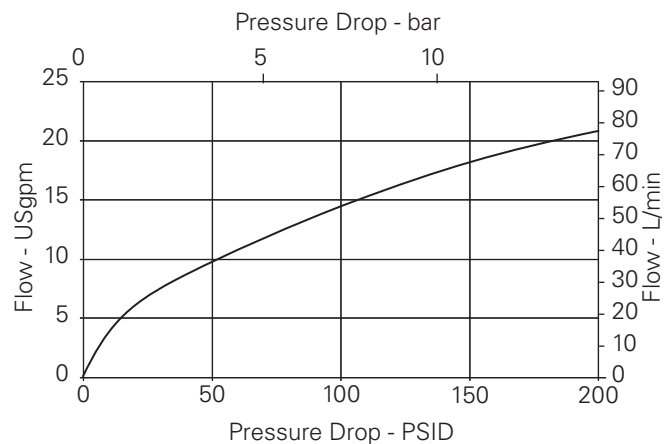
## Max. Flow vs Pressure Drop

Flow rating "A" (Valve fully open)



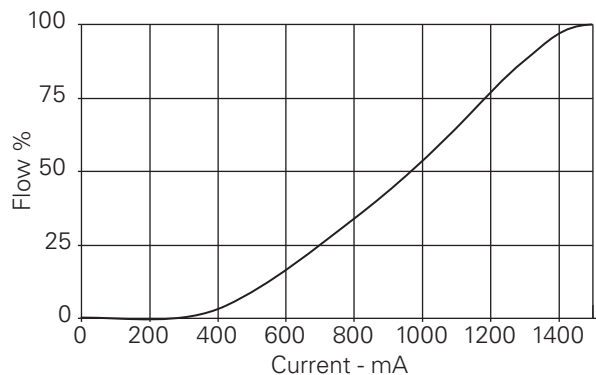
## Max. Flow vs Pressure Drop

Flow rating "B" (Valve fully open)



## Flow vs Current

(Flow rating "B")

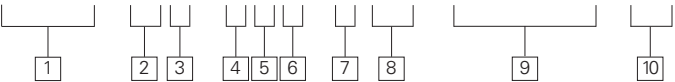


### Note

To determine operating characteristics for the flow rating selected, at a specific differential pressure, first determine maximum flow from upper curve at the differential pressure value. This will be the "100%" flow on the lower curve.

Parameters:  
400 Hz PWM

EFV1 - 12 \* - C \* \* - \* \* \* - \* \* \* \* E \* \* - 00



**1 Function**  
**EFV1** - Electro Proportional Flow Control Valve

**2 Size**  
**12** - 12 Size

**3 Seals**  
**N** - Buna-N  
**V** - Viton®

**4 Logic**  
**C** - Normally Closed

**5 Flow Rating**  
**A** - 14.3 USgpm @ 300 PSID  
**B** - 20.6 USgpm @ 300 PSID

**6 Bleed Screw and Manual Override**  
**0** - No core tube special features  
**S** - Screw-in type manual override

7 Material Code	8 Port Code*	Description	Part Number
0	000	No manifold block	N/A
A	04G	Aluminum, 1/2" BSPP	02-161817
	06G	Aluminum, 3/4" BSPP	02-161816
	10T	Aluminum, SAE 10	02-160642
	12T	Aluminum, SAE 12	02-160646
S	04G	Steel, 1/2" BSPP	02-169815
	06G	Steel, 3/4" BSPP	02-169814
	10T	Steel, SAE 10	02-161070
	12T	Steel, SAE 12	02-169816

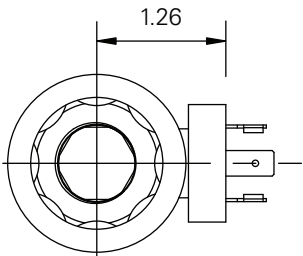
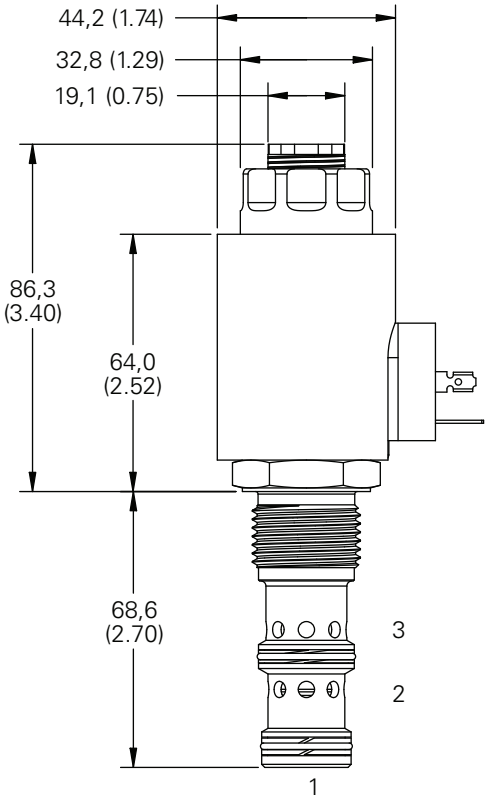
Note: Both the manifold and port plug are required.

**9 Coil Model Code\***  
E-Series Coils See Section C.  
\* These model digits will not be stamped on the valve.

**10 Special Features**  
**00** - None  
(Only required when valve has special features, omitted if "00.")

**Dimensions**  
mm (inch)  
Torque cartridge in housing  
**S** - 136-149 Nm (100-110 ft. lbs)  
**A** - 108-122 Nm (80-90 ft. lbs)

Note  
Port 1 is unused and must be plugged.



Note: EFV1-12 with DIN-43650 connector shown.

**EAT•N**

| **Vickers**

# EFV2-12-O

Proportional flow control valve, normally open, pressure compensated spool type

## Description

The EFV2-12-O is a normally open, three port, pressure compensated, proportional flow control valve. The valve can be used as a priority flow regulator, with regulated flow being supplied to port 3 and excess flow being by-passed to

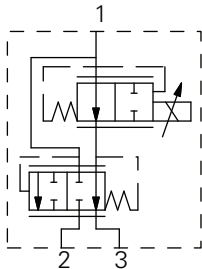
port 2. If port 2 is blocked the valve functions as a restrictive, 2 way, pressure compensated flow regulator.

## Operation

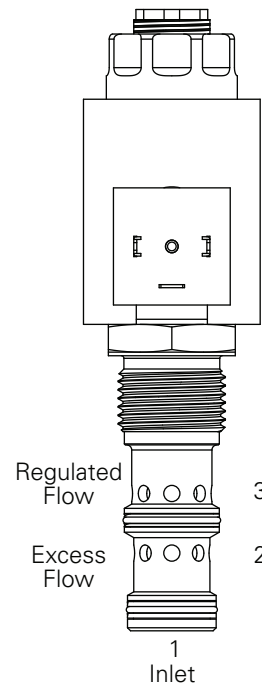
Current supplied to the coil controls the valve. At zero current, the valve is fully open from port 1 to port 3. At 1600 mA (12V coil) the valve is fully closed. The valve will regulate flow out of port 3 regardless of

downstream system pressure. As current is increased to the solenoid the flow out of port 3 will decrease.

## Functional Symbol



## Sectional View



## RATINGS AND SPECIFICATIONS

Performance data is typical with DTE 24 hydraulic fluid at 120°F

Typical application pressure	210 bar (3000 psi)
Cartridge endurance rating	1 million cycles
Cartridge fatigue pressure rating (NFPA/T2.6.1 R2-2000)	210 bar (3000 psi)
Rated Flow	"A" Spool – Max. Regulated flow (By-Pass Mode): 53L/min (14.0 USgpm) Max. Regulated flow (2 Port Mode): 42L/min (11.0 USgpm) Max. Input flow: 114L/min (30.0 USgpm) "B" Spool – Max. Regulated flow (By-Pass Mode): 38L/min (10.0 USgpm) Max. Regulated flow (2 Port Mode): 31L/min (8.0 USgpm) Max. Input flow: 114L/min (30.0 USgpm)
Note: Max Regulated Flow may decrease slightly during compensation.	

Hysteresis	1.5 USgpm max with 400Hz PWM driver
Leakage (fully closed)	240 cm <sup>3</sup> /min (15 in <sup>3</sup> /min) at 3000 PSID
Ambient operating temperature	-30° to 90°C (-22° to 194°F)
Maximum oil temperature	120°C (248°F)
Maximum internal coil temperature	200°C (392°F)
Nominal supply voltage	12/24 V
Current to fully open valve	350 ± 100mA (12V coil), 175 ± 50 mA (24V coil)
Current to fully close valve	1600 ± 200 mA (12V coil), 800 ± 100 mA (24V coil)
Recommended PWM frequency	200 - 400 Hz
Coil resistance at 20°C (68°F)	4.7 Ω (12V), 19.0 Ω (24V)
Mass	Cartridge only 0,37 kg (0.82 lb) Cartridge with coil and end nut 0,73 kg (1.62 lb)
Fluid	All general purpose hydraulic oils such as: MIL-H-5606, SAE 10, SAE 20, DTE 24, etc.
Filtration	Cleanliness code 18/16/13
Cavity	C-12-3
Seal kit	9900171-000 (Buna-N) 9900172-000 (Viton®)

Viton is a registered trademark of E.I. DuPont

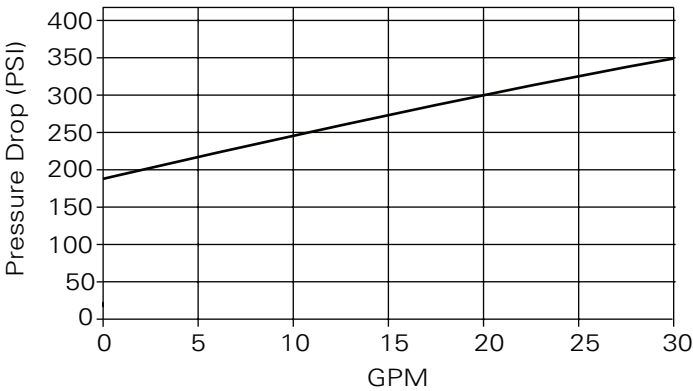
# Performance Curves

EFV2-12-O

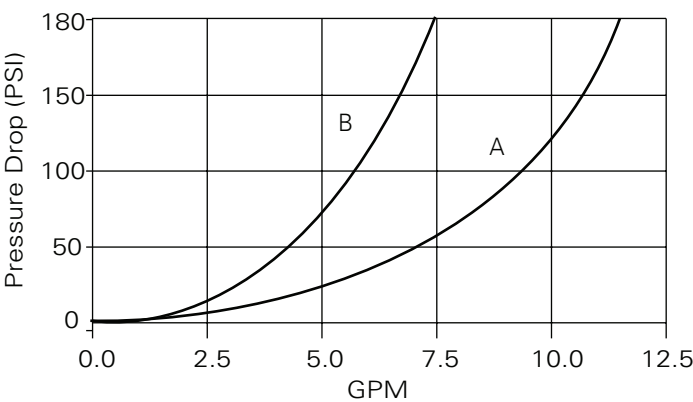
Cartridge Only

B

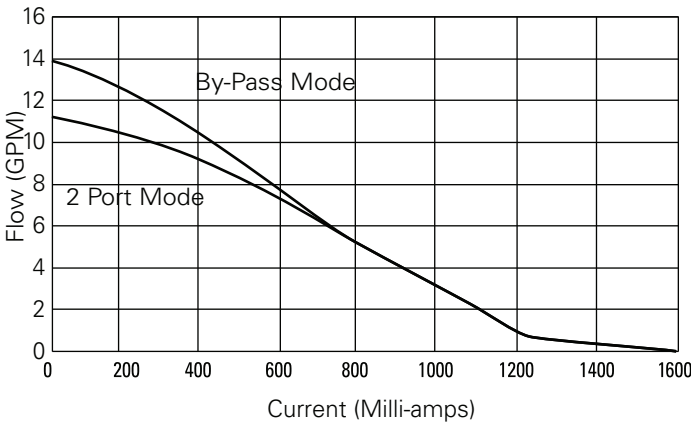
Pressure Drop Port 1 to Port 2



Pressure Drop Port 1 to Port 3

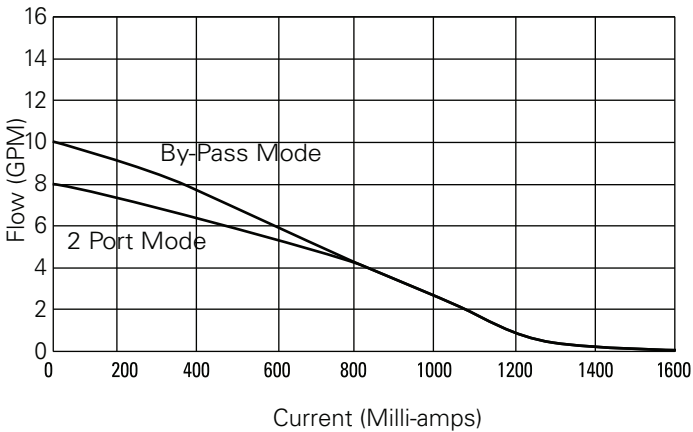


Flow vs Current - A Spool



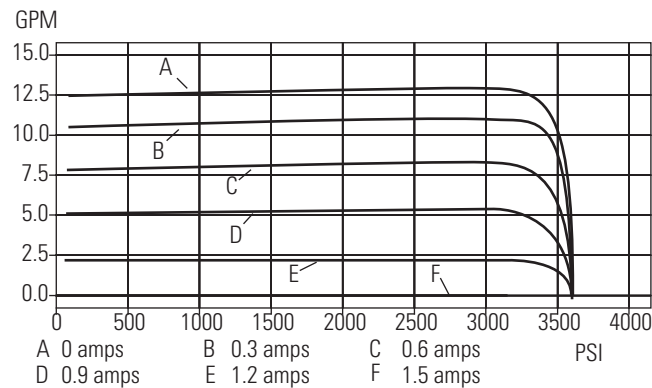
Parameters:  
400 Hz PWM

Flow vs Current - B Spool



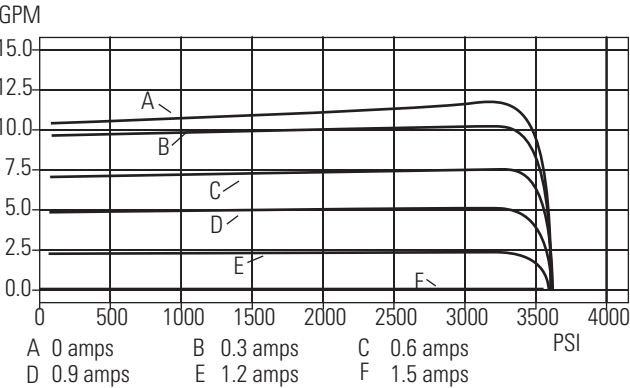
Regulated Flow vs Pressure

Port 3 Pressure > Port 2 Pressure



Regulated Flow vs Pressure

Port 2 Pressure > Port 3 Pressure



Note: Pressure Compensation curves are shown for "B" spool valves.

[illegible]



**EAT•N**



**Vickers**

## EFV2-12-C

Proportional flow control valve, normally closed, spool type

### Description

The EFV2-12-C is a normally closed, three port, pressure compensated, proportional flow control valve. The valve can be used as a priority flow regulator, with regulated flow being supplied to port 3 and excess flow being by-passed to port 2.

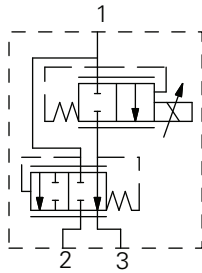
If port 2 is blocked the valve functions as a restrictive, 2 way, pressure compensated flow regulator.

### Operation

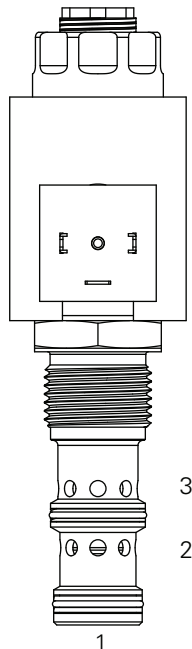
Current supplied to the coil controls the valve. At zero current, the valve is fully closed from port 1 to port 3. At 1500 to 1600 mA (12V coil) the valve is fully open.

The valve will regulate flow out of port 3 regardless of downstream system pressure. As current is increased to the solenoid the flow out of port 3 will increase.

### Functional Symbol



### Profile View



### RATINGS AND SPECIFICATIONS

*Performance data is typical with DTE 24 hydraulic fluid at 120°F*

Typical application pressure	210 bar (3000 psi)
Cartridge endurance rating	1 million cycles
Cartridge fatigue pressure rating (NFPA/T2.6.1 R2-2000)	210 bar (3000 psi)
Rated Flow	<p>"A" Spool – Max. Regulated flow (By-Pass Mode): 57L/min (15.0 USgpm)  Max. Regulated flow (2 Port Mode): 53L/min (14.0 USgpm)  Max. Input flow: 114L/min (30.0 USgpm)</p> <p>"B" Spool – Max. Regulated flow (By-Pass Mode): 38L/min (10.0 USgpm)  Max. Regulated flow (2 Port Mode): 31L/min (8.0 USgpm)  Max. Input flow: 114L/min (30.0 USgpm)</p>

Note: Max Regulated Flow may decrease slightly during compensation.

Hysteresis	1.5 USgpm max with 400Hz PWM driver
Leakage (fully closed)	240 cm <sup>3</sup> /min (15 in <sup>3</sup> /min) at 3000 PSID
Ambient operating temperature	-30° to 90°C (-22° to 194°F)
Maximum oil temperature	120°C (248°F)
Maximum internal coil temperature	200°C (392°F)
Nominal supply voltage	12/24 V
Current to fully open valve	1600 ± 200 mA (12V coil), 800 ± 100 mA (24V coil)
Current to fully close valve	350 ± 100 mA (12V coil), 175 ± 50 mA (24V coil)
Recommended dither frequency	200 - 400 Hz
Coil resistance at 20°C (68°F)	4.7 Ω (12V), 19.0 Ω (24V)
Mass	<p>Cartridge only 0,37 kg (0.82 lb)</p> <p>Cartridge with coil and end nut 0,73 kg (1.62 lb)</p>
Fluid	All general purpose hydraulic oils such as: MIL-H-5606, SAE 10, SAE 20, DTE 24, etc.
Filtration	Cleanliness code 18/16/13
Cavity	C-12-3
Seal kit	<p>9900171-000 (Buna-N)</p> <p>9900172-000 (Viton®)</p>

Viton is a registered trademark of E.I. DuPont

# Performance Curves

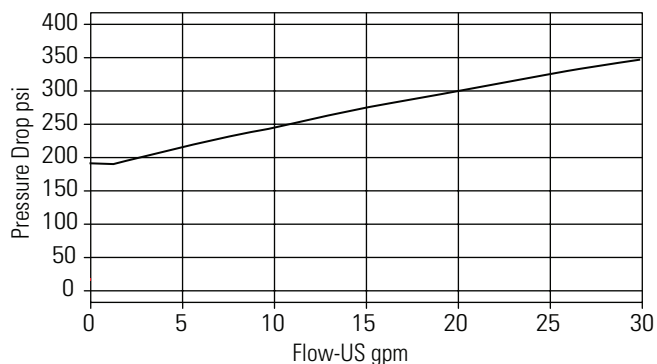
EFV2-12\*-C

Cartridge Only

## Flow vs Pressure Drop

Excess flow P1 to P2 (P3 to Atm)

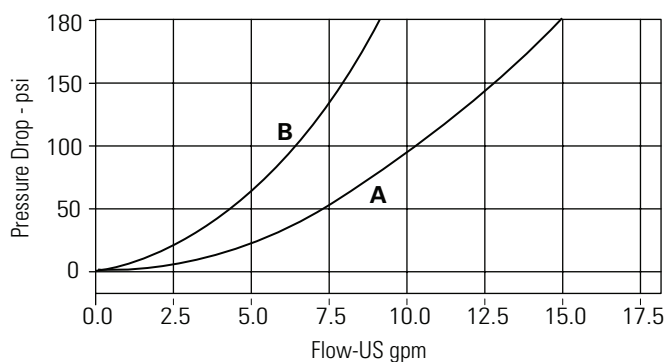
Full current (1700 mA on a 12V Coil)



## Flow vs Pressure Drop

Regulated flow P1 to P3 (P2 to Atm)

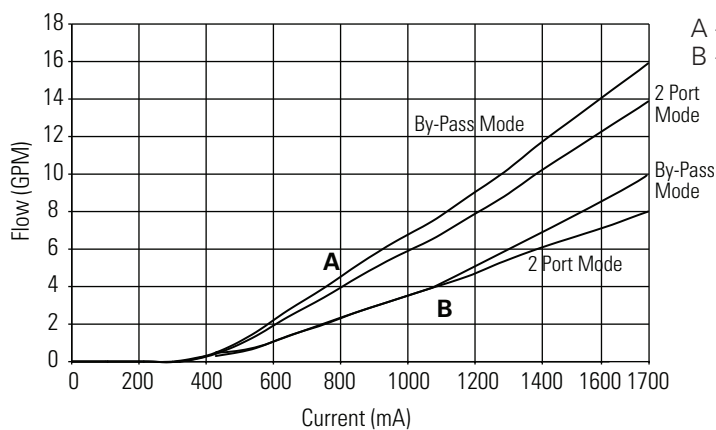
Full current (1700 mA on a 12V Coil)



A - A spool pressure drop

B - B spool pressure drop

## Flow vs Current

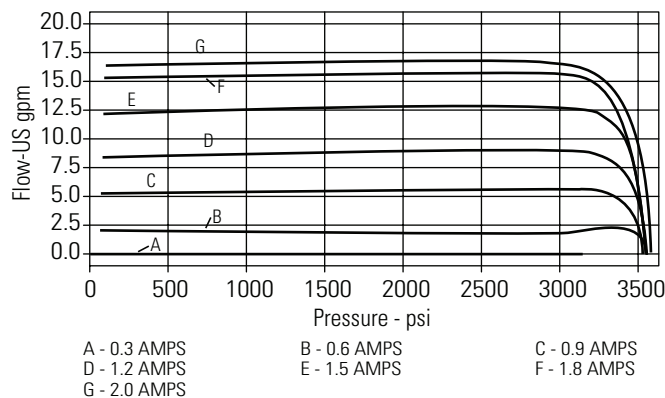


A - A spool

B - B spool

## Regulated Flow vs Pressure

Regular to Bypass



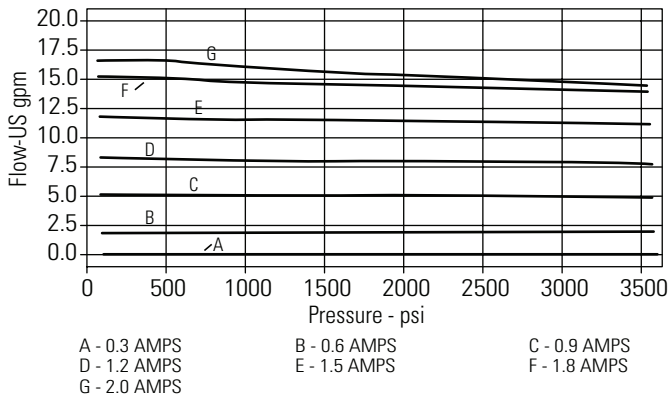
A - 0.3 AMPS  
D - 1.2 AMPS  
G - 2.0 AMPS

B - 0.6 AMPS  
E - 1.5 AMPS

C - 0.9 AMPS  
F - 1.8 AMPS

## Regulated Flow vs Pressure

Bypass to Regular



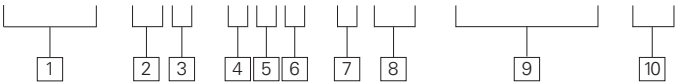
A - 0.3 AMPS  
D - 1.2 AMPS  
G - 2.0 AMPS

B - 0.6 AMPS  
E - 1.5 AMPS

C - 0.9 AMPS  
F - 1.8 AMPS

Note: Pressure Compensation curves are shown for "B" spool valves.

EFV2 - 12 \* - C \* \* - \* \* \* - \* \* \* \* E \* \* - 00



1 Function

**EFV2** - Electro Proportional Flow Control Valve

2 Size

**12** - 12 Size

3 Seals

**N** - Buna-N  
**V** - Viton®

4 Logic

**C** - Normally Closed

5 Flow Rating

**A** - 15 USgpm @ 180 PSID  
**B** - 10 USgpm @ 180 PSID  
See Specifications

6 Bleed Screw and Manual Override

**0** - No core tube special features  
**S** - Screw-in type manual

override

7

**Material Code**

8

**Port Code\***

		Description	Part Number
<b>0</b>	<b>000</b>	No manifold block	N/A
<b>A</b>	<b>04G</b>	Aluminum, 1/2" BSPP	02-161817
	<b>06G</b>	Aluminum, 3/4" BSPP	02-161816
	<b>10T</b>	Aluminum, SAE 10	02-160642
	<b>12T</b>	Aluminum, SAE 12	02-160646
<b>S</b>	<b>04G</b>	Steel, 1/2" BSPP	02-169815
	<b>06G</b>	Steel, 3/4" BSPP	02-169814
	<b>10T</b>	Steel, SAE 10	02-161070
	<b>12T</b>	Steel, SAE 12	02-169816

Note: Both the manifold and port plug are required.

See Section C.

\* These model digits will not be stamped on the valve.

9 Coil Model Code\*

10 Special Features

**00** - None

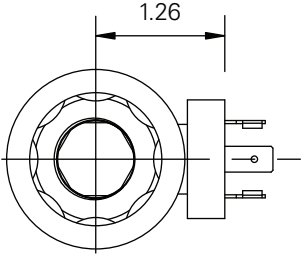
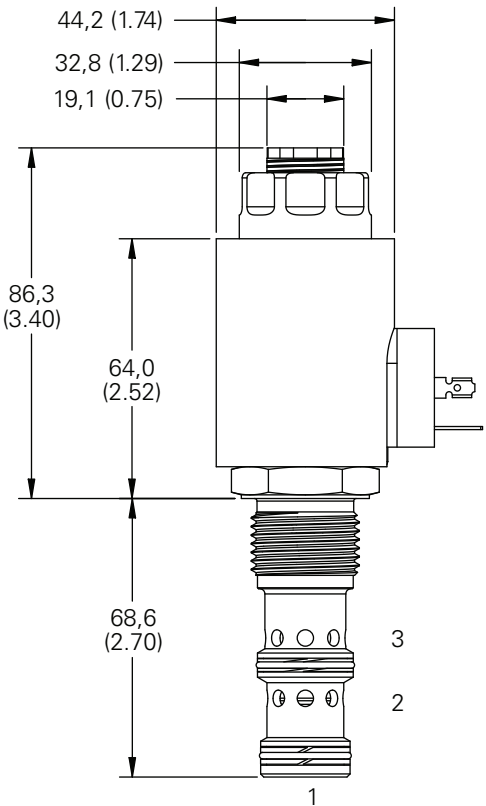
(Only required when valve has special features, omitted if "00.")

Dimensions

mm (inch)

Torque cartridge in housing

**S** - 136-149 Nm  
(100-110 ft. lbs)  
**A** - 108-122 Nm  
(80-90 ft. lbs)



Note: EFV2-12 with DIN-43650 connector shown.

## Coils and Electronic Controls

Solenoid valve and Proportional valve coils and electronic controls for proportional valves



# Section Contents

## Coils and Electronic Controls

Description	Application	Page
<b>Coils</b>		
ToughCoils™ Information .....		C-3
ToughCoils™ Model Code and Specifications .....		C-4
S Series .....	for 8 size solenoid valves .....	C-5
P Series .....	for 8 size solenoid valves .....	C-5
J Series .....	for 10,12,16, 20 size solenoid valves .....	C-6
H Series .....	for 10,12,16, 20 size solenoid valves .....	C-6
Coil Dimensions .....	S & P Series Coils .....	C-7
Coil Dimensions .....	J Series Coils .....	C-8
Coil Dimensions .....	H Series Coils.....	C-9
R & L Series coils .....	for 12 size 3 & 4 way solenoid valves .....	C-10
Explosion proof valve coils .....	for SV*E series valves .....	C-11
EPV proportional valve coils .....		C-13
EFV proportional valve coils .....		C-14
<b>Proportional Valve Drivers</b>		
Power Plugs for Proportional valves .....	EHH-AMP-702-D/J/K-2* Series .....	C-15
“Soft Switch” Power Plugs .....	EHH-AMP-702-C-2* 10 Series .....	C-21

## ToughCoils™

Vickers ToughCoils™ have been designed to provide industry leading environmental protection and sole-noid performance in a compact and rugged package. ToughCoils™ with

integrated connectors are rated up to IP69K environmental protection. ToughCoils™ are available with a variety of popular integrated connection options and with wire

leads.

The best in class, one-piece, shell encapsulated, design meets the most stringent environmental requirements for mobile

and industrial applications.

The exclusive compact coil design from Vickers, offers the advantage of field retrofit-ability on all existing, and new, applications.

## Toughcoils™ Features

- IP69K Environmental Protection** - This rating provides protection against the ingress of dust and high pressure jet stream. The IP69K test was designed specifically for rating protection against a high-pressure jet stream, high liquid temperature and close nozzle distance from the enclosure surface. IP69K protection is standard on coils with MetriPac or Deutsch, integrated connectors.
- “Thermal Shock Dunk” Test** - Vickers ToughCoils have been qualified to withstand the toughest Mobile Equipment “Thermal Shock Dunk” tests. Integrated Deutsch, MetriPack<sup>1</sup> and Leadwire<sup>2</sup> connectors exceed “Thermal Shock Dunk” test qualifications at 140°C. The “Thermal Shock Dunk” test requires coils to be heated, reaching a stabilized temperature of 100°C, then immediately immersed in a solution at 0°C. The thermal shock is repeated five times with the coil monitored for dielectric strength in the solution and functional performance is verified. In addition, ToughCoils™ passed a more severe powered dunk test conducted from 100°C to 0°C with 115% rated voltage applied.
- Field Retrofit-able** ToughCoils™ replace all current Vickers coils used on D Frame and Shell type coils. Compact coil dimensions allow substitution in all existing applications. ToughCoils are available for most 8, 10, 12, 16 and 20 series valves. No additional water/weather proofing is required.
- Steel Shell Encapsulated Design** ToughCoils™ provide protection against physical and environmental damage.

**Vickers ToughCoils™, with rated connector, meet or exceed all major OEM environmental protection requirements**

<sup>1</sup>MetriPack® 150 and MetriPack® 280 are registered trade marks of Delphi Packard Electric Systems

<sup>2</sup>Coils with integrated connectors are recommended for applications in harsh environments.



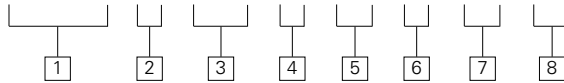
Shown with deutsch connection options

# ToughCoils

Model Code

S, P, J and H Series Coils

**MCSC - \* - \*\*\* - \* - \*\* - \* - \*\* - 10**



**1 Product**  
**MCSC** - Solenoid Coil

**2 Series**  
**S** - Size 8 [210 Bar]  
**P** - Size 8 [350 Bar]  
**J** - Size 10, 12, 16, 20 [210 Bar]  
**H** - Size 10, 12, 16, 20 [350 Bar]

**3 Voltage Rating**  
**012** - 12 Volt  
**024** - 24 Volt  
**036** - 36 Volt  
**048** - 48 Volt  
**115** - 115 Volt  
**230** - 230 Volt  
Note: Please refer to the follow pages for preferred coil configuration

**4 Voltage Type**  
**D** - DC  
**B** - DC / with flyback diode  
**A** - AC / with full bridge rectifier

**5 Connector**  
**G0** - ISO 4400 DIN 43650  
**Q0** - Spade Terminals  
**W0** - Leadwire  
**N0** - Deutsch Male, DT04-2P, Integrated (DC Only) *Mating Connector: Deutsch DT06-2S*  
**Y0** - Amp Jr (DC Only) *Mating Connector: AMP 963040-3 or equivalent*

**D0** - MetriPack® 150 Male, Integrated (DC Only) *Mating Connector: Delphi 12052641*  
**J0** - MetriPack® 280 Male, Integrated (DC Only) *Mating Connector: Delphi 15300027*  
**E0** - Weather-Pack (Packard) female on wire leads *Mating Connector: Delphi 12010973*  
**F0** - Weather-Pack (Packard) male on wire leads *Mating Connector: Delphi 12015792*

Note: Auxiliary parts for mating connectors may be required.

**6 Lead Length**  
**0** - None  
**A** - 152mm [6.0 in] (Standard length with connector)  
**B** - 610mm [24.0 in] (Standard length without connector)

**7 Special Features**  
**00** - No Special Features

**8 Design Code**  
**10** - Design Code

## Specifications

### RATINGS AND SPECIFICATIONS

Duty Rating	Continuous from 85% to 110% of nominal voltage
Operating temperature	100°C (212°F) continuous @ nominal voltage
Lead Wires	18 gauge, standard 610 mm (24") long, UL style 3173 CSA CL 1251 (meets SAE J1128 XLPE style SXL)
Power Rating	S Series: 20W P Series: 23W J Series: 23W H Series: 29W
Encapsulant	Glass filled nylon
Magnet Wire	U.L. class N, 200°C (392°F) NEMA pub. No. MW 1000, section MW 35-C (single)
Flyback diode (arc suppressor)	Maximum recurrent peak reverse voltage – 800 V (optional)

### Environmental Protection

CONNECTOR	IP65	IP67	IP69K	THERMAL SHOCK DUNK
G0: DIN 43650	X*			
Q0: Spade				
Y0: Amp Jr.	X	X <sup>1</sup>		
W0: Wire Leads	X	X		X <sup>1</sup>
N0: Deutsch	X	X	X	X
D0: Metri-Pack 150	X	X	X	X
J0: Metri-Pack 280	X	X	X	X

<sup>1</sup> Passed environmental testing, but not as robust as other connectors

\* Rating dependent on mating connector



### CAUTION

Coils may be hot to touch if used in continuous duty applications.



# ToughCoils

For 8 Size Solenoid Valves

S & P Series Coils

## S Series ToughCoils part numbers - 300AA00\_\_\_\_ (Complete Part number is 11 Digits)

VOLTAGE	G0** CONNECTOR	Q0 CONNECTOR	W0 CONNECTOR	N0 CONNECTOR	Y0 CONNECTOR	D0 CONNECTOR	J0 CONNECTOR
12VDC	001A	009A	015A	021A	026A	031A	036A
24VDC	002A	010A	016A	022A	027A	032A	037A
36VDC	003A	011A	017A	023A	028A	033A	038A
24VAC	004A	012A	018A	—	—	—	—
115VAC	005A	—	—	—	—	—	—
230VAC	006A	—	—	—	—	—	—
12VDC*	007A	013A	019A	024A	029A	034A	039A
24VDC*	008A	014A	020A	025A	030A	035A	040A

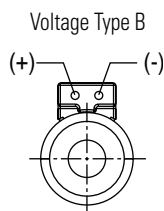
\*With flyback diode. (Voltage Type B)

For other voltages and connectors contact your Eaton representative.

\*\*DIN 43560 mating connector for “G0” style coil – 02-166796.

STD. VOLTAGES	AMPERES*
12 DC	1.67
24 DC	0.83
36 DC	0.56
24 AC	0.93
115 AC	0.19
230 AC	0.10

\*Nominal voltage 25°C (77°F).



## P Series ToughCoils part numbers - 300AA00\_\_\_\_ (Complete Part number is 11 Digits)

VOLTAGE	G0** CONNECTOR	Q0 CONNECTOR	W0 CONNECTOR	N0 CONNECTOR	Y0 CONNECTOR	D0 CONNECTOR	J0 CONNECTOR
12VDC	041A	049A	055A	061A	066A	071A	076A
24VDC	042A	050A	056A	062A	067A	072A	077A
36VDC	043A	051A	057A	063A	068A	073A	078A
24VAC	044A	052A	058A	—	—	—	—
115VAC	045A	—	—	—	—	—	—
230VAC	046A	—	—	—	—	—	—
12VDC*	047A	053A	059A	064A	069A	074A	079A
24VDC*	048A	054A	060A	065A	070A	075A	080A

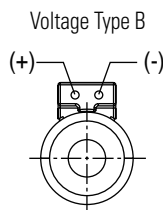
\*With flyback diode. (Voltage Type B)

For other voltages and connectors contact your Eaton representative.

\*\*DIN 43560 mating connector for “G0” style coil – 02-166796.

STD. VOLTAGES	AMPERES*
12 DC	1.92
24 DC	0.96
36 DC	0.64
24 AC	1.06
115 AC	0.22
230 AC	0.11

\*Nominal voltage 25°C (77°F).



# ToughCoils

For 10, 12, 16 and 20 Size  
Solenoid Valves

## J & H Series Coils

### J Series ToughCoils part numbers - 300AA00\_\_\_\_ (Complete Part number is 11 Digits)

VOLTAGE	G0** CONNECTOR	Q0 CONNECTOR	W0 CONNECTOR	N0 CONNECTOR	Y0 CONNECTOR	D0 CONNECTOR	J0 CONNECTOR
12VDC	081A	089A	095A	101A	106A	111A	116A
24VDC	082A	090A	096A	102A	107A	112A	117A
36VDC	083A	091A	097A	103A	108A	113A	118A
24VAC	084A	092A	098A	—	—	—	—
115VAC	085A	—	—	—	—	—	—
230VAC	086A	—	—	—	—	—	—
12VDC*	087A	093A	099A	104A	109A	114A	119A
24VDC*	088A	094A	100A	105A	110A	115A	120A

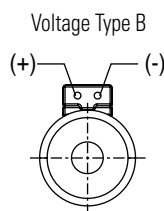
\*With flyback diode. (Voltage Type B)

For other voltages and connectors contact your Eaton representative.

\*\*DIN 43560 mating connector for "G0" style coil – 02-166796.

STD. VOLTAGES	AMPERES*
12 DC	1.92
24 DC	0.96
36 DC	0.64
24 AC	1.06
115 AC	0.22
230 AC	0.11

\*Nominal voltage 25°C (77°F).



### H Series ToughCoils part numbers - 300AA00\_\_\_\_ (Complete Part number is 11 Digits)

VOLTAGE	G0** CONNECTOR	Q0 CONNECTOR	W0 CONNECTOR	N0 CONNECTOR	Y0 CONNECTOR	D0 CONNECTOR	J0 CONNECTOR
12VDC	121A	129A	135A	141A	146A	151A	156A
24VDC	122A	130A	136A	142A	147A	152A	157A
36VDC	123A	131A	137A	143A	148A	153A	158A
24VAC	124A	132A	138A	—	—	—	—
115VAC	125A	—	—	—	—	—	—
230VAC	126A	—	—	—	—	—	—
12VDC*	127A	133A	139A	144A	149A	154A	159A
24VDC*	128A	134A	140A	145A	150A	155A	160A

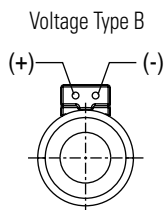
\*With flyback diode. (Voltage Type B)

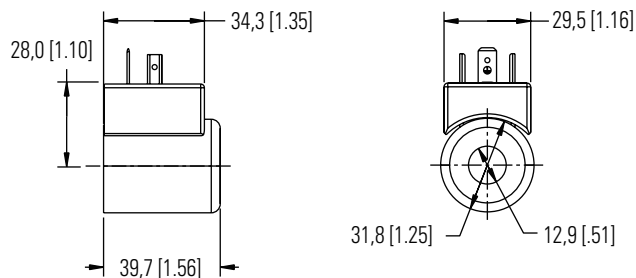
For other voltages and connectors contact your Eaton representative.

\*\*DIN 43560 mating connector for "G0" style coil – 02-166796.

STD. VOLTAGES	AMPERES*
12 DC	2.42
24 DC	1.21
36 DC	0.81
24 AC	1.34
115 AC	0.28
230 AC	0.14

\*Nominal voltage 25°C (77°F).

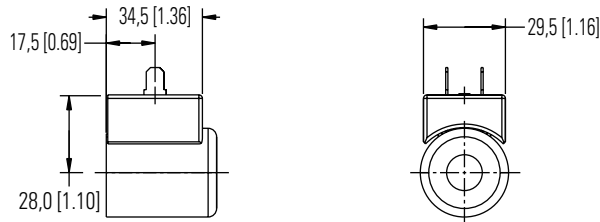




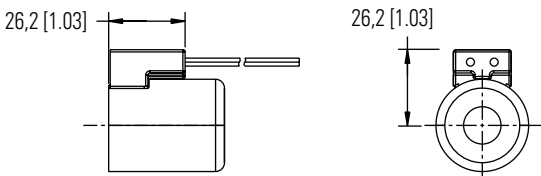
**G0**  
**DIN 43650-A Connector**



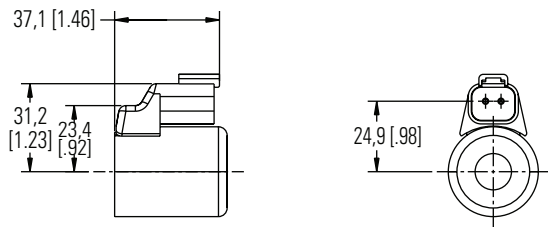
Shown with integrated Deutsch Connector



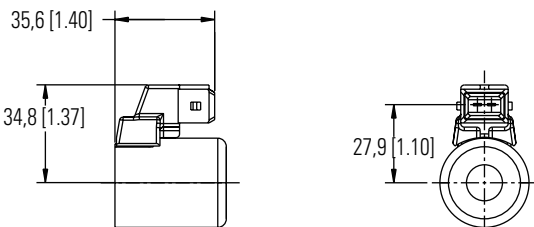
**Q0**  
**Spade Connector**



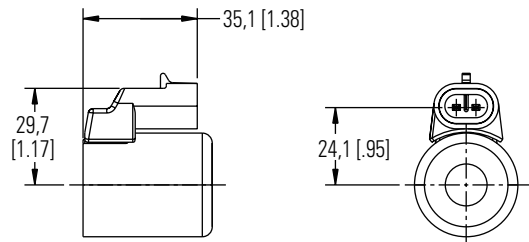
**W0**  
**Leadwire**



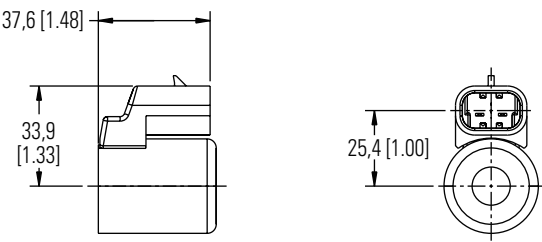
**N0**  
**Deutsch Male DTO4-2P integrated connector**



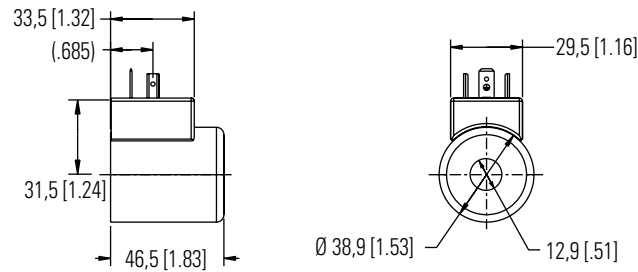
**Y0**  
**AMP Junior Timer integrated connector**



**D0**  
**Metri-Pack 150 Male, integrated connector**



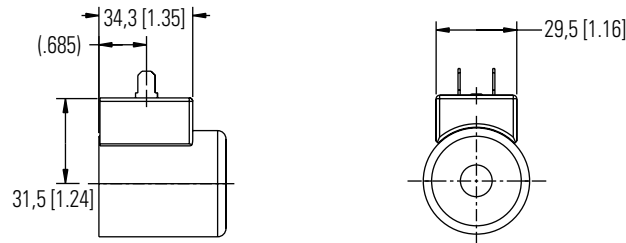
**J0**  
**Metri-Pack 280 Male, integrated connector**



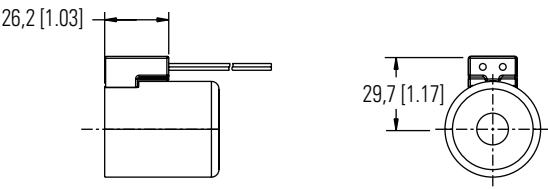
**G0**  
**DIN 43650-A Connector**



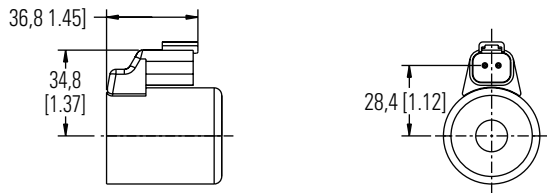
Shown with integrated Metri-Pack 150 Connector



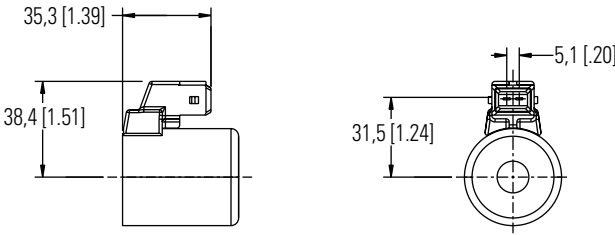
**Q0**  
**Spade Connector**



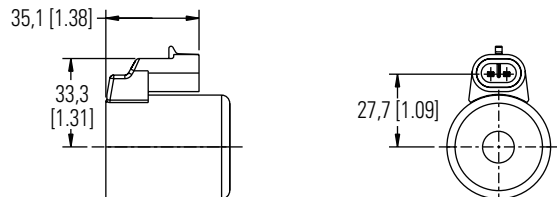
**W0**  
**Leadwire**



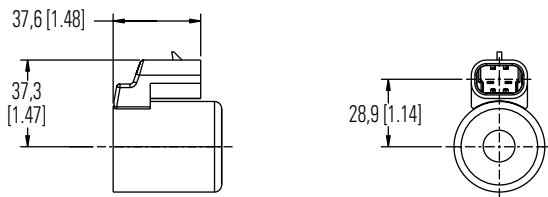
**N0**  
**Deutsch Male DTO4-2P integrated connector**



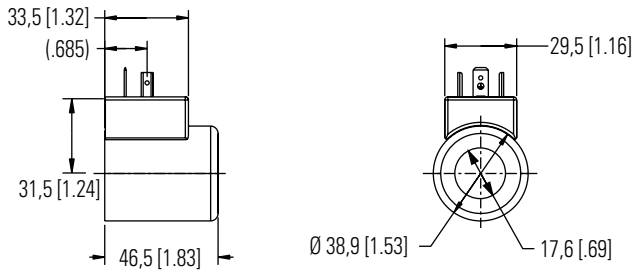
**Y0**  
**AMP Junior Timer integrated connector**



**D0**  
**Metri-Pack 150 Male, integrated connector**



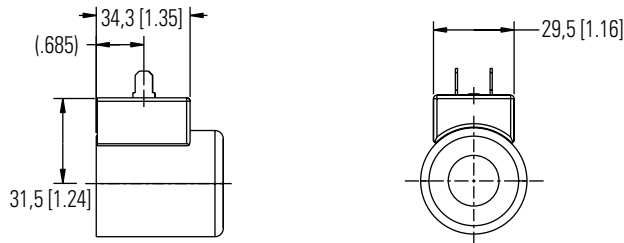
**J0**  
**Metri-Pack 280 Male, integrated connector**



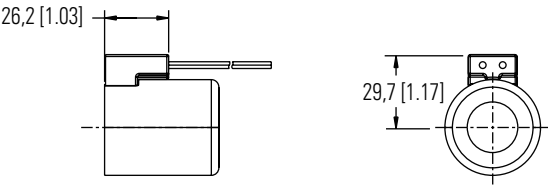
**G0**  
**DIN 43650-A Connector**



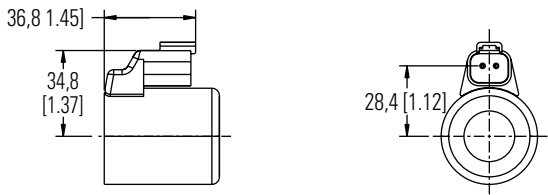
Shown with integrated MetriPack 280 Connector



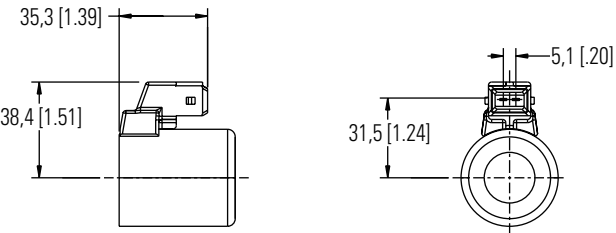
**Q0**  
**Spade Connector**



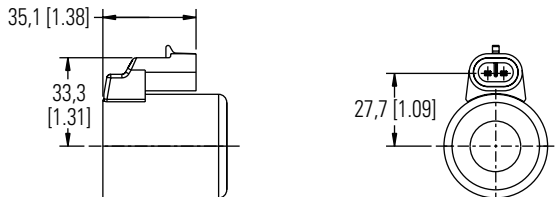
**W0**  
**Leadwire**



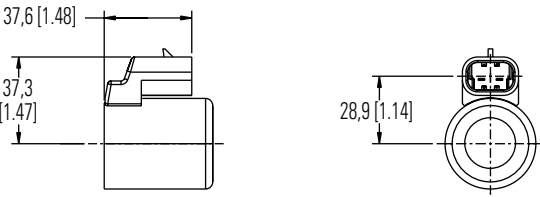
**N0**  
**Deutsch Male DTO4-2P integrated connector**



**Y0**  
**AMP Junior Timer integrated connector**



**D0**  
**Metri-Pack 150 Male, integrated connector**



**J0**  
**Metri-Pack 280 Male, integrated connector**

# R & L Series Coils

For SVx-12-3 and SVx-12-4  
Solenoid Valves

## L Series Coils ("EN490" Coils)

DC Coils	Connector	
VOLTAGE	"G" DIN 43650 CONNECTOR	"W" LEADWIRES ONLY
Full Power Coils:		
12V	02-309454	02-309452
24V	02-309455	02-309453

NOTE: For more information on "L" series coils, please refer to Eaton Technical datasheet 5049/EN/0596/A (Solenoid Operated Directional Valve-DG4V-35, EN490 for Mobile Equipment).

## R Series Coils (Blue Coils)

DC Coils	Connector		
VOLTAGE	"G" DIN 43650 CONNECTOR	"Q" SPADE CONNECTOR	"W" LEADWIRES ONLY
Full Power Coils:			
12V	507847	02-111166	02-140394
24V	507848	02-111168	02-140395

NOTE: For more information on "R" series coils, please refer to Eaton Technical datasheet GB-C-2015 (Solenoid Operated Directional Valve-DG4V-35 and DG4V3 Series).

## R and L Series Coils

### POWER CONSUMPTION

DC solenoids at rated voltage and 20°C (68°F)

Full Power Coils:

12V	30W
24V	30W

# Explosion Proof Valves

For hazardous  
environments

Coil Options  
(SV\*E Series)

C

## SPECIFICATIONS

Hydraulic Performance Specifications for explosion proof valves are the same as the base valve.  
For details please refer to the base valve page reference.

Coil Temperature Range	-40° to 100°C (-40° to 212°F)
Coil Duty	Continuous from 85% to 110% of nominal voltage
Housing Type	Explosion proof version with 1/2" threaded conduit hub
Coil Type	Epoxy encapsulated lead wire coil
Lead Wire	24" Long, 18 gauge with 1/32" cross linked Polyethylene insulation

## APPROVALS

UL	File AU2206, Component - Industrial truck accessory, Battery powered
CSA	Both for general purpose and Hazardous locations Class I, Group C & D Class II, Group E, F & G

## SUMMARY

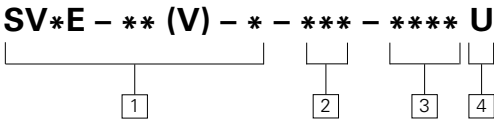
Model Code	Description	Typical Application Pressure psi (bar)	Rated flow l/min (Usgpm)	Base Valve design	Section Reference
SV1E-10-C-XX-XXXXU	2 way, 2 position, normally closed, poppet type	210 (3000)	45 (12)	SV1-10-C	A
SV2E-10-C-XX-XXXXU	2 way, 2 position, normally closed, poppet type	210 (3000)	23 (6)	SV2-10-C	A
SV3E-10-C-XX-XXXXU	2 way, 2 position, normally closed, poppet type	210 (3000)	45 (12)	SV3-10-C	A
SV4E-10-C-XX-XXXXU	2 way, 2 position, normally closed, spool type	210 (3000)	23 (6)	SV4-10-C	A
SV1E-16-C-XX-XXXXU	2 way, 2 position, normally closed, poppet type	210 (3000)	132 (35)	SV1-16-C	A
SV2E-20-C-XX-XXXXU	2 way, 2 position, normally closed, poppet type	210 (3000)	227 (60)	SV2-20-C	A
SV4E-10-0-XX-XXXXU	2 way, 2 position, normally open, spool type	210 (3000)	23 (6)	SV4-10-0	A
SV3E-10-0-XX-XXXXU	2 way, 2 position, normally open, poppet type	210 (3000)	45 (12)	SV3-10-0	A
SV5E-10-0-XX-XXXXU	2 way, 2 position, normally open, poppet type	210 (3000)	45 (12)	SV5-10-0	A
SV3E-16-0-XX-XXXXU	2 way, 2 position, normally open, poppet type	210 (3000)	132 (35)	SV3-16-0	A
SV3E-20-0-XX-XXXXU	2 way, 2 position, normally open, poppet type	210 (3000)	227 (60)	SV3-20-0	A
SV1E-10-3-XX-XXXXU	3 way, 2 position, spool type	210 (3000)	23 (6)	SV1-10-3	A
SV1E-10-4-XX-XXXXU	4 way, 2 position	210 (3000)	23 (6)	SV1-10-4	A
SV2E-10-4-XX-XXXXU	4 way, 2 position, circuit center	210 (3000)	23 (6)	SV2-10-4	A
SV3E-10-4-XX-XXXXU	4 way, 2 position, normally open	210 (3000)	23 (6)	SV3-10-4	A
SV4E-10-4-XX-XXXXU	4 way, 2 position, tandem center	210 (3000)	23 (6)	SV4-10-4	A

## REPLACEMENT COIL PART NUMBERS

Voltage	Assembly Number	Amperes (A)	Power (W)	Lead Color
12 VDC	888831	1.50	20	Red
24 VDC	888832	0.75	20	Black
36 VDC	888834	0.50	20	Blue
48 VDC	888835	0.38	20	Purple
110 VDC	888836	0.16	20	Brown
24 VAC	888837	0.75	20	Orange
115 VAC	888838	0.16	20	Yellow
230 VAC	888840	0.08	20	Red/White
480 VAC	888841	0.04	20	Black/White

# Explosion Proof Valves

(SV\*E Series) Model Code



**1 Base Valve**

<b>SV1E-10-C</b>	SV1-10-C
<b>SV2E-10-C</b>	SV2-10-C
<b>SV3E-10-C</b>	SV3-10-C
<b>SV4E-10-C</b>	SV4-10-C
<b>SV1E-16-C</b>	SV1-16-C
<b>SV2E-20-C</b>	SV2-20-C
<b>SV4E-10-0</b>	SV4-10-0
<b>SV3E-10-0</b>	SV3-10-0
<b>SV5E-10-0</b>	SV5-10-0
<b>SV3E-16-0</b>	SV3-16-0
<b>SV3E-20-0</b>	SV3-20-0
<b>SV1E-10-3</b>	SV1-10-3
<b>SV1E-10-4</b>	SV1-10-4
<b>SV2E-10-4</b>	SV2-10-4
<b>SV3E-10-4</b>	SV3-10-4
<b>SV4E-10-4</b>	SV4-10-4

For performance specifications refer to base valve data sheet.

Viton® seal options are available.

### Dimensions

mm (inch)

#### Note

Cartridge only or coil housing are not available as service parts.

It is not possible to convert standard valves to explosion proof variants.

SV1E-10-3 shown.

Dimensions of coil housing are the same for all Vickers explosion proof SiCV valves, for other dimensions please refer to base valve datasheet.

**2 Port Size/Housing number**

Refer to table in Model Code for Base valves

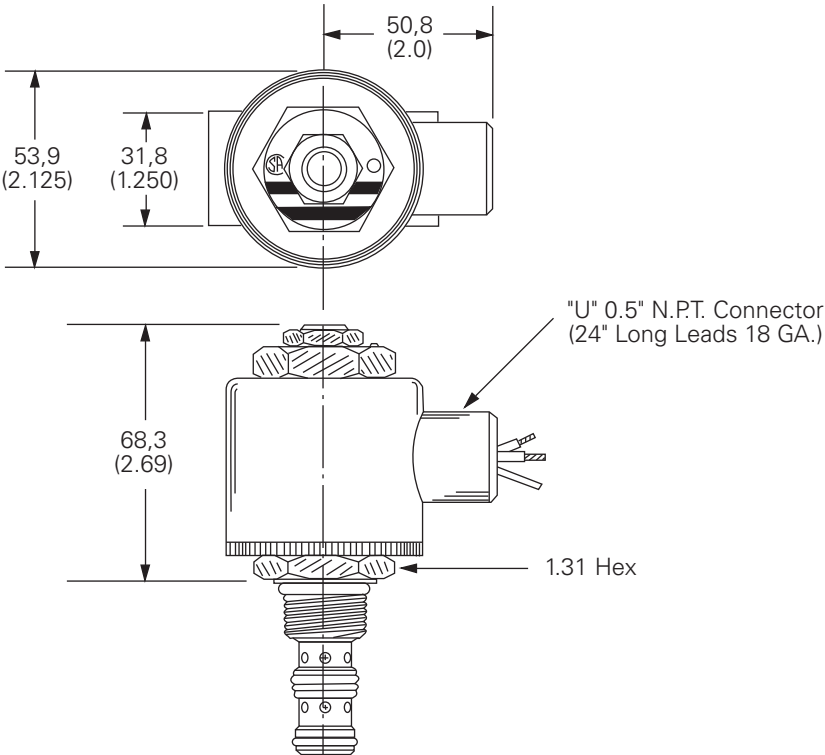
**4 Type (C.S.A. Approved)**

**U** - 1/2" NPT Connector  
Class I, Group C & D  
Class II, Group E, F & G

**3 Voltage\***

CODE	VOLTAGE	REPLACEMENT COIL PART NUMBER
<b>12D</b>	12 VDC	888831
<b>24D</b>	24 DVC	888832
<b>36D</b>	36 VDC	888834
<b>48D</b>	48 VDC	888835
<b>110D</b>	110 VDC	888836
<b>24A</b>	24 VAC	888837
<b>115A</b>	115 VAC	888838
<b>230A</b>	230 VAC	888840
<b>460A</b>	460 VAC	888841

\* Arc suppression diode is not available.





**CONTROL AND SPECIFICATIONS**

Rheostat	12 VDC operation 10-12 $\Omega$ , 20-25 watts 24 VDC operation 25-30 $\Omega$ , 20-25 watts
Power plug options	EHH-AMP-702, EPAD-SA-1A6-10 (Require 24 VDC power supply to power plug and 12 VDC coil)
Amplifier card	EEA-PAM-523 (Requires 24 VDC power supply and either 12VDC or 24 VDC coil)
Joystick suppliers	OEM Controls, Inc, Shelton, CT P-Q Controls, Inc, Bristol, CT

Std. Voltages	Amperes*	Lead Color	Power Rating
12 DC	1.32	red	16 W
24 DC	.66	black	16 W

\*Nominal voltage @ 25°C (77°F).

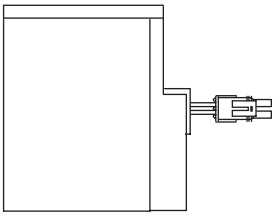
**Coil part numbers**

VOLTAGE	F CONNECTOR	Q CONNECTOR	U* CONNECTOR	W CONNECTOR	Y CONNECTOR
12VDC	02-308810	02-317154	02-154070	02-154072	02-308808
24VDC	02-308811	02-317155	02-154071	02-154073	02-308809

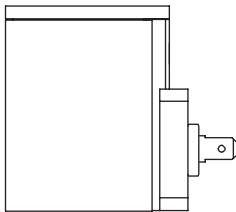
\*DIN 43650 mating connector for "U" style coil – 02-166796.

**Coil Configurations**

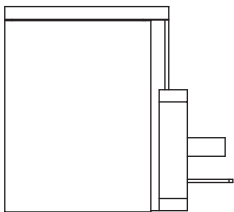
"F" - Weather-Pack  
male on leads



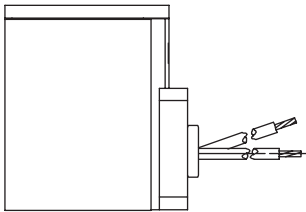
"Q" - Spade terminal



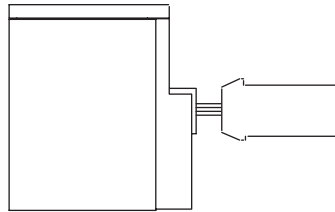
"U" - DIN 43650



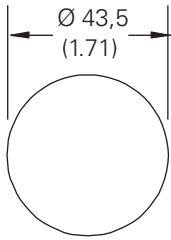
"W" 610 mm  
(24 inch) lead wire



"Y" - Metri-Pack  
150 male on leads



Note: Width –  
all configurations



**CAUTION**

Coils may be  
hot to touch  
if used in continuous  
duty applications.

**CONTROL AND SPECIFICATIONS**

Power plug options	EHH-AMP-702, EPAD-SA-1A6-10 (Require 24 VDC power supply to power plug and 12 VDC coil)
Amplifier card	EEA-PAM-523 (Requires 24 VDC power supply and either 12VDC or 24 VDC coil)
Joystick suppliers	OEM Controls, Inc., Shelton, CT P-Q Controls, Inc., Bristol, CT

**SPECIFICATIONS**

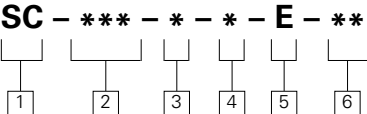
Standard Voltage	Resistance	Power
12 VDC	4.7 $\Omega$	30 W
24 VDC	19.0 $\Omega$	30 W



**CAUTION**

Coils may be hot to touch if used in continuous duty applications.

**Coil Model Code**



Model code positions 2, 3, 4, 5 and 6 are integrated into EFV model code when ordered with valve.

**1 SC Solenoid Coil**

**2 Voltage**

**012** - 12VDC  
**024** - 24VDC

**3 Protection**

**D** - Standard DC coil  
**B** - DC coil with flyback diode

**4 Connection**

**G** - DIN 43650\*  
**W** - Leadwire - 24"  
**E** - Weather-Pack female on wire leads - 6"  
**C** - Deutsch DT0402P wire leads - 6"  
**H** - Metri-Pack 150 wire leads - 6"

\*DIN 43560 mating connector for "G" style coil - 02-166796.

**5 Series**

**E** - EFV series coil

**6 Special Features**

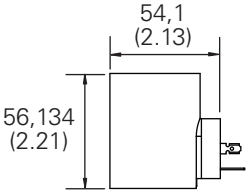
**00** - None

**Coil Kits**

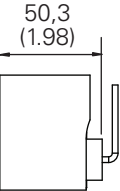
**STANDARD COIL PART NUMBERS**

Model Code	Assembly Number
SC-012BGE00	4995052-230
SC-012BWE00	4995052-231
SC-012DGE00	4995052-001
SC-012DWE00	4995052-002
SC-024BGE00	4995052-232
SC-024BWE00	4995052-233
SC-024DGE00	4995052-003
SC-024DWE00	4995052-004

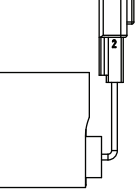
"G" - DIN 43650



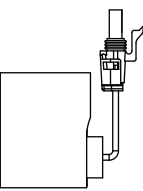
"W" - 610 mm (24 inch) lead wire



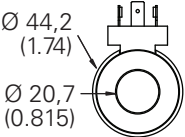
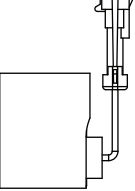
"C" - Deutsch DT0402P on leads



"E" - Weather-Pack female on leads



"H" - Metri-Pack 150 male on leads



Note: Width all configurations

# Electronic Controls

Proportional Valve  
Control Power Plugs

## EHH-AMP-702-D/J/K-2\* Series

For use with valve types:

EPV\*\*-12D-1\*

EFV1\*\*-012DE\*

ERV1/2\*\*-12D-1\*

EPRV1\*\*-12D-1\*

### General Description

Three types of plugs, conforming to ISO 4400/DIN 43650 interface, with integral amplifiers and necessary adjustment potentiometers, are designed for use with non-feed back hydraulic valves.

This plug/valve combination offers very low cost solutions to many hydraulic control problems requiring proportional control.

Type D is controlled with a 0-10V command signal, and has adjustable gain, ramp, deadband compensation and dither.

Type J, designed for closed-loop applications, is controlled with a 0-10V command signal, and has no ramp function.

Type K is controlled with a 4-20 mA command signal, and has an adjustable ramp time of 50 ms to 5s.

### Features and Benefits

- Integral amplifier provides essential functions for control of proportional valves
- Adjustable ramp time (types D and K), gain, deadband compensation and dither
- Ease of installation, with reduced cost
- Fully short-circuit and reverse-polarity protected
- Differential voltage command signal (types D and J)
- Adjustable dither
- EMC to latest European standards
- Protection to IP67

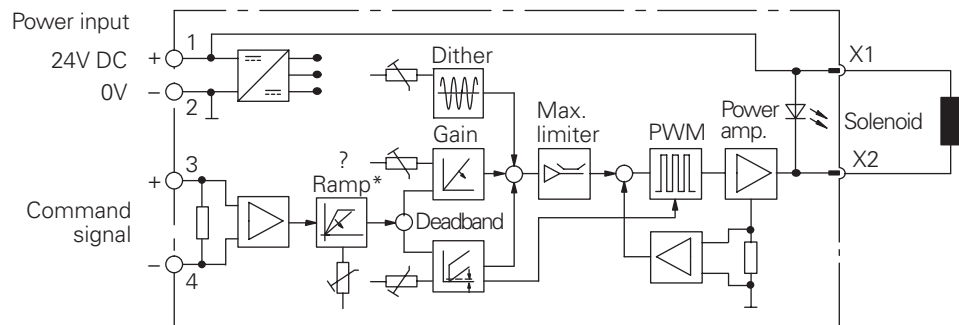
### Application

Primary applications are in the control of non-feedback proportional valves where the cost of more sophisticated electronic controls can be avoided.

Type J is typically used in closed-loop applications.

### Electrical Block Diagram

EHH-AMP-702-D/J/K-2\*

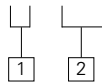


### Note

This product has been designed and tested to meet specific standards outlined in the European Electro-magnetic Compatibility Directive (EMC) 89/336/EEC, amended by 91/26/EEC, 92/31/EEC and 93/68/EEC, article 5. For instructions on installation requirements to achieve effective protection levels, see this leaflet and the Installation Wiring Practices for Vickers Electronic Products leaflet 2468. Wiring practices relevant to this Directive are indicated by a warning symbol and Electromagnetic Compatibility (EMC).

# Model Code/ Operating Data

## EHH – AMP – 702 – \* – 2\*



### 1 Adjustment range

- D** - Proportional plug:  
0 - 10 VDC with ramp
- J** - Proportional plug: 0 - 10  
VDC without ramp  
function
- K** - Proportional plug:  
4-20 mA with ramp

### 2 Design number, 20 series

Subject to change. Installation  
dimensions unaltered for  
design numbers 20 to 29  
inclusives.

## OPERATING DATA

### Electrical

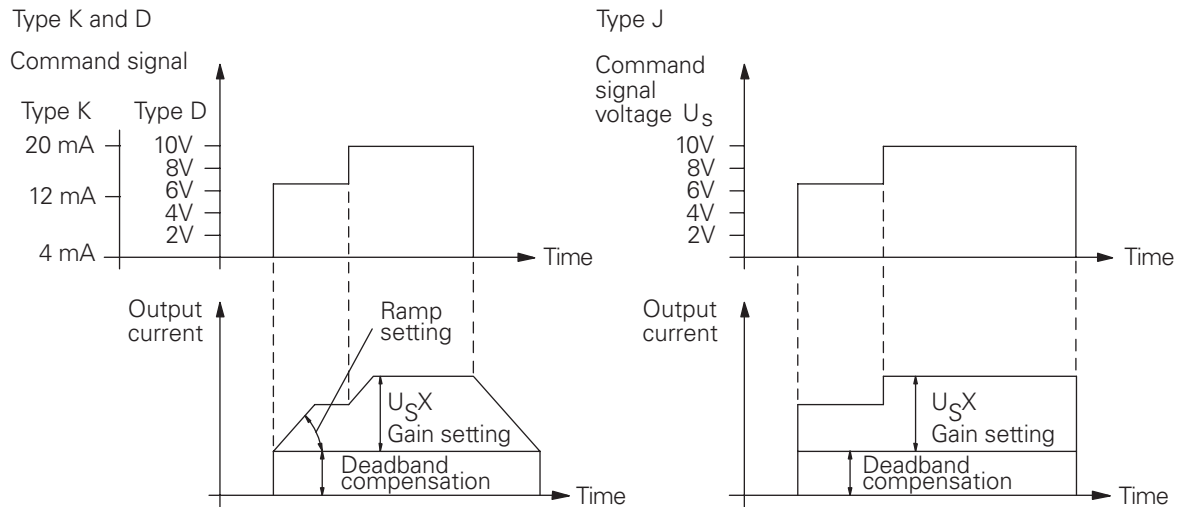
	Types D and J	Type K
Connections		
1	24V DC	
2	0V (power and signal)	
3	Positive command signal	
4	Negative command signal	
Power (input) supply	20-30V DC including $\pm 10\%$ maximum ripple (peak-to-peak) 24V DC nominal	
Absolute maximum voltage	40V	
Max. power consumption including solenoid	35W	
Reverse polarity protected	Yes	
Short circuit protected	Yes	
Maximum output current	1,6A	
Maximum output voltage typical (1,6A output current)	Typically 1,5V below supply voltage	
Command signal	0-10V (10 kohms)	4-20 mA (250 ohms)
Deadband triggering	200 mV	4 mA
For output (LED on)	200 mV to 10V	4-20 mA
For no output (LED off)	0 mV to 100 mV	0-4 mA
Deadband adjustment range	100 to 1000 mA	
Gain adjustment range	0.02A/V to 0.16A/V	0.01 A/mA to 0.08 A/mA
Dither adjustment range	0 to 500 mA	
Ramp time (types D and K only)	50 ms to 5s	
PWM frequency	1200 Hz $\pm 10\%$	
Dither frequency	120 Hz $\pm 10\%$	
Protection	IEC 529: IP67 (when correctly installed with interface seal in place) Fully short-circuit and reverse-polarity protected	
Isolation to VDE 0110	Group "B"	
Electromagnetic compatibility (EMC):		
Emission	EN 50081-2	
Immunity	EN 50082-2	

### Mechanical

Housing	PA6 glass-reinforced plastic (conforming to UL-94HB). Color: gray
Mounting interface	ISO 4400 (DIN 43650)
Cable clamp	Pg9 screw type
Cable diameter	$\varnothing$ 5 to 10 mm (0.197 to 0.394" dia.)
Wire section	0,5 to 1,0 mm <sup>2</sup> (20-17 AWG)
Temperature, ambient range	-20° to +70°C (-4° to +158°F)
Mass	0,07 kg (0.154 lb)

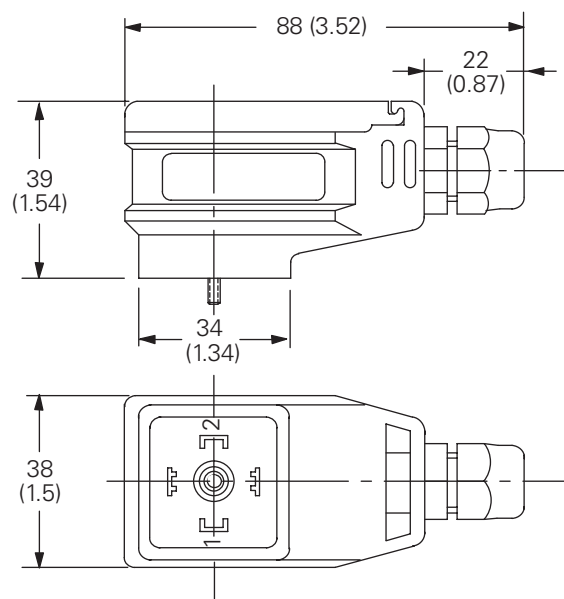
## Input/Output Characteristics

C



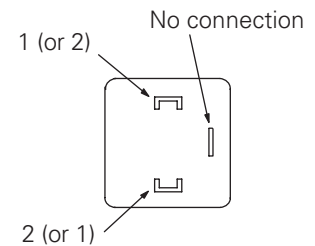
## Installation Dimensions

mm (inch)



3rd angle projection

Solenoid Connections



# Installation Data

## Adjustments

**Ramp time:** Turn clockwise to increase ramp time (Only types D/K).

**Gain:** Turn clockwise to increase gain.

**Deadband compensation:** Turn clockwise to increase deadband compensation current.

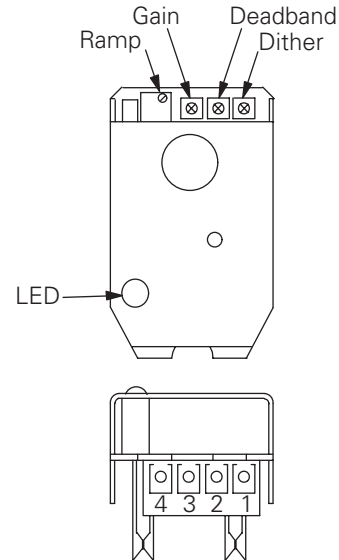
**Dither:** Turn clockwise to increase the dither current.

**Terminal 1:** Power Supply 20V-30V DC, positive.

**Terminal 2:** Power Supply 0V.

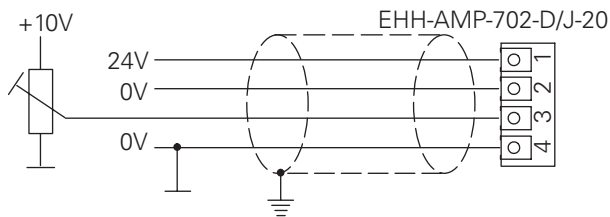
**Terminal 3:** Command signal positive (see "Operating Data").

**Terminal 4:** Command signal negative (see "Operating Data").

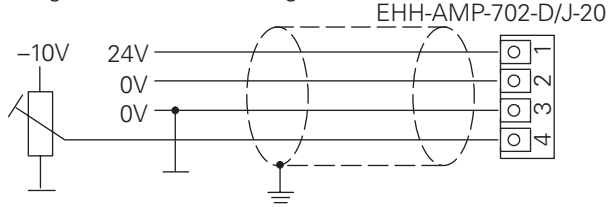


## Installation Wiring Options

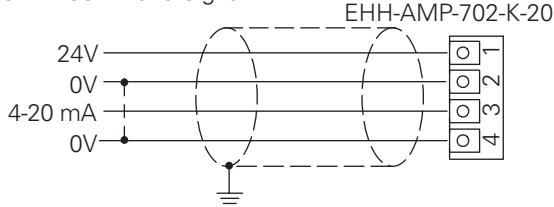
### Positive Command Voltage



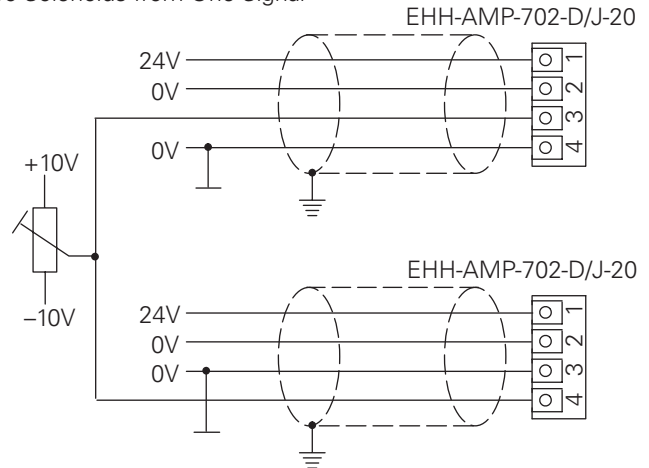
### Negative Command Voltage



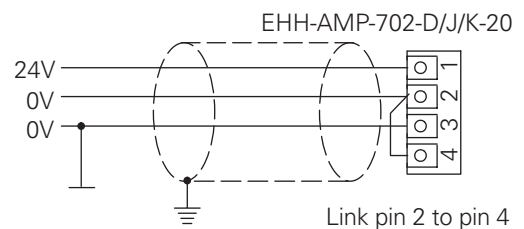
### 4-20 mA Command Signal



### Bi-polar Command Voltage for Operating Two Solenoids from One Signal



### Connections when replacing -10 design power plug with -20 design and only 3 wires exist



Link pin 2 to pin 4

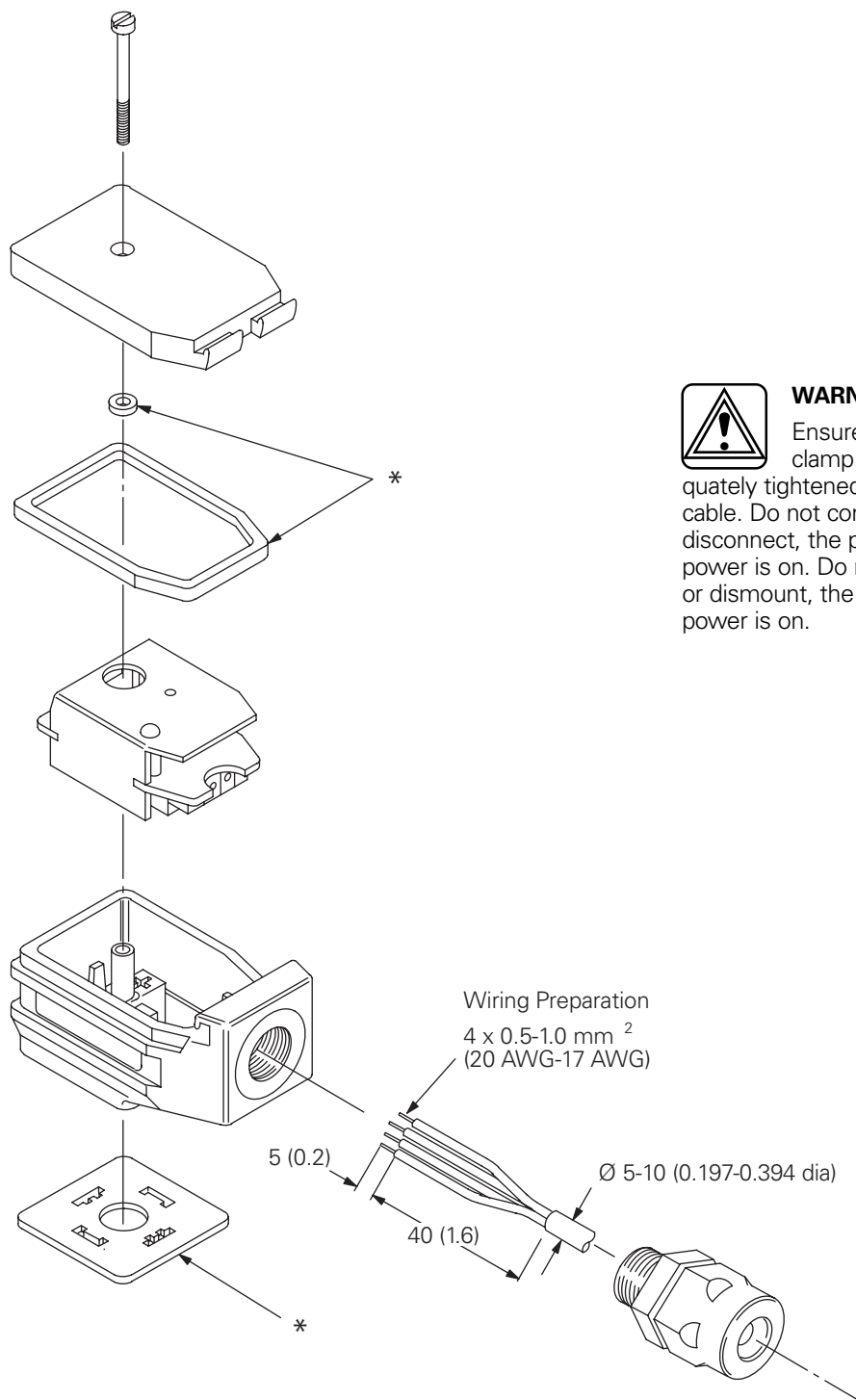
⏏ Protective ground connection.



## WARNING

Electromagnetic Compatibility (EMC) - Screened cables should be used and particular attention paid to the grounding of the screens as shown in the above diagrams.

## Assembly Showing Wiring Connection Points



### WARNING

Ensure cable clamp nut is adequately tightened to secure cable. Do not connect, or disconnect, the plug while power is on. Do not mount, or dismount, the plug while power is on.

\*All seals must be fitted correctly at plug installation to provide protection to IP67 (IEC 529).

## Start-Up Procedure

- Correctly wire the plug and, before mounting it on the valve solenoid, apply 24V DC (20 to 30V limits) to the “power input” terminals.
- Check for correct plug function by illumination/non-illumination of the LED. The LED should illuminate when the demand applied to the “signal input” terminal is between 200 mV and 10V (or 4 mA and 20 mA) and should not be illuminated when the applied demand is less than 100 mV (4 mA). If there is a malfunction a new plug must be fitted.
- Switch off power supply and command/input signal and then install plug on solenoid. Ensure that all seals are fitted correctly and clamped as the retaining screw is tightened: this is essential in providing IP67 protection.
- Ensure that the hydraulic system will not cause any erratic movement of actuators, then:
  - Switch on power supply again.
  - Repeat LED/function check as in 2.An LED malfunction now indicates a short circuit at the load.
- Successful completion of these checks means that the plug and load are ready for use.

## Spare Parts

The only spare part available is the interface seal, part number 732100.

## Ordering Procedure

Order plug by full model code, and spare interface seals by part number 732100.



# Electronic Controls

“Soft Switch” Power Plugs

## EHH-AMP-702-C-2\* 10 Series

For use with valve types:

EPV\*\*-12D-1\*

EFV1\*\*-012DE\*

ERV1/2\*\*-12D-1\*

EPRV1\*\*-12D-1\*

### General Description

These plugs, conforming to ISO 4400/DIN 43650 interface, offer adjustable, ramped on/off switching times through the use of an integral amplifier.

The switching time range is 50 ms to 5 seconds.

The soft switch plug is rated for 24V DC nominal and controlled by a 24V logic signal. Applying an “on” signal causes the output current to ramp up to, and stay at, an adjustable maximum while the “on” signal is maintained. At “switch-off” the output current is ramped down to zero and will remain at zero until the next “on” signal.

Ramp times (switching times) can be adjusted by an in-built potentiometer.

An adjustment also allows for compensation of any deadband in the valve.

### Features and Benefits

- Integral amplifier provides control from on/off logic command signal
- Adjustable ramp time
- Deadband compensation
- Adjustable output level
- Adjustable dither
- EMC to latest European standards
- Improved switching time repeatability
- Fully short-circuit and reverse-polarity protected
- Protection to IP67

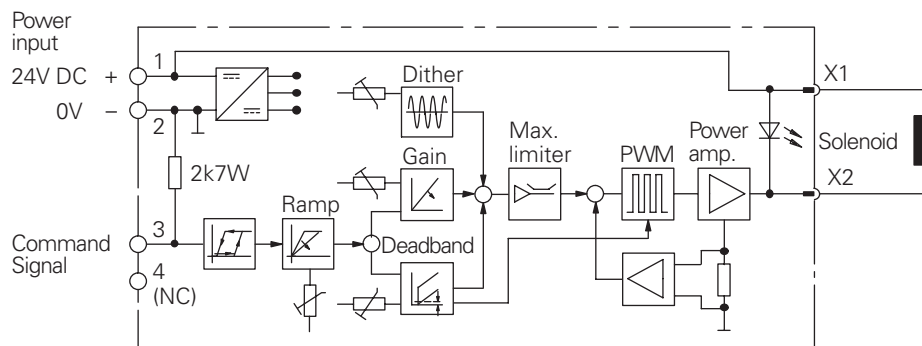
### Application

Focus applications for this plug are in the control of hydraulic solenoid operated directional and pressure control valves where control of valve response time can significantly reduce shocks in the hydraulic system.

Best results in reducing hydraulic shocks will only be obtained by using valves with the right “low shock”, or “proportional” features.

### Electrical Block Diagram

EHH-AMP-702-C-2\*  
10 Series



### Note

This product has been designed and tested to meet specific standards outlined in the European Electro-magnetic Compatibility Directive (EMC) 89/336/EEC, amended by 91/26/EEC, 92/31/EEC and 93/68/EEC, article 5. For instructions on installation requirements to achieve effective protection levels, see this leaflet and the Installation Wiring Practices for Vickers Electronic Products leaflet 2468. Wiring practices relevant to this Directive are indicated by a warning symbol and Electromagnetic Compatibility (EMC).

# Model Code/ Operating Data

**EHH – AMP – 702 – C – 2\***



**1 Design number, 20 series**

Subject to change. Installation dimensions unaltered for design numbers 20 to 29 inclusives.

## OPERATING DATA

### Electrical

Connections	
1	24V DC
2	0V (power and signal)
3	Positive command signal
4	Negative command signal
Power (input) supply	20-30V DC including $\pm 10\%$ maximum ripple ripple (peak-to-peak) 24V DC nominal
Absolute maximum voltage	40V
Max. power consumption including solenoid	35W
Reverse polarity protected	Yes
Short circuit protected	Yes
Maximum output current	1,6A
Maximum output voltage typical (1,6A output current)	Typically 1,5V below supply voltage
Command signal	
For output (LED on)	15V to 24V
For no output (LED off)	0V to 5V
Input impedance	2700 ohms
Deadband adjustment range	<100 - 1000 mA
Gain adjustment range	0.02A to 1,6A (maximum)
Dither adjustment range	0 to 500 mA
Ramp time	50 ms to 5s
PWM frequency	1200 Hz $\pm 10\%$
Dither frequency	120 Hz $\pm 10\%$
Protection	IEC 529: IP67 (when correctly installed with interface seal in place) Fully short-circuit and reverse-polarity protected
Isolation to VDE 0110	Group "B"
Electromagnetic compatibility (EMC):	
Emission	EN 50081-2
Immunity	EN 50082-2

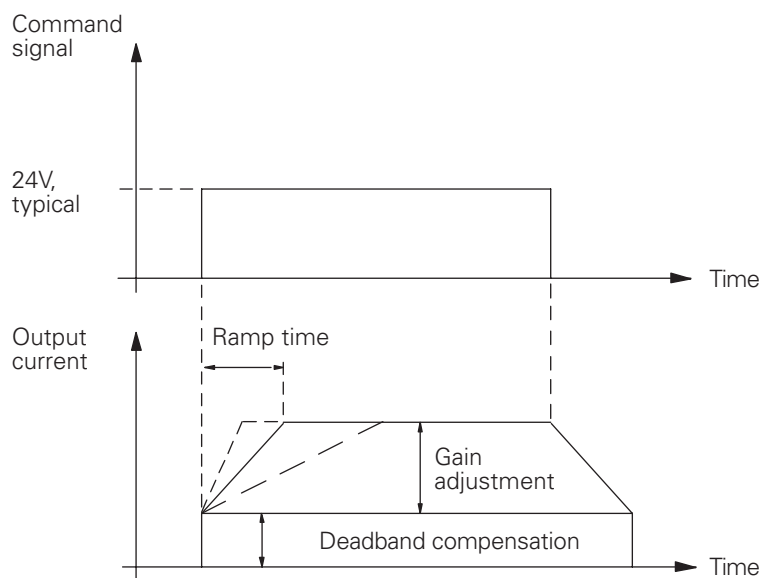
### Mechanical

Housing	PA6 glass-reinforced plastic (conforming to UL-94HB). Color: gray
Mounting interface	ISO 4400 (DIN 43650)
Cable clamp	Pg9 screw type
Cable diameter	$\varnothing$ 5 to 10 mm (0.197 to 0.394" dia.)
Wire section	0,5 to 1,0 mm <sup>2</sup> (20-17 AWG)
Temperature, ambient range	-20° to +70°C (-4° to +158°F)
Mass	0,07 kg (0.154 lb)

## Input/Output Characteristics

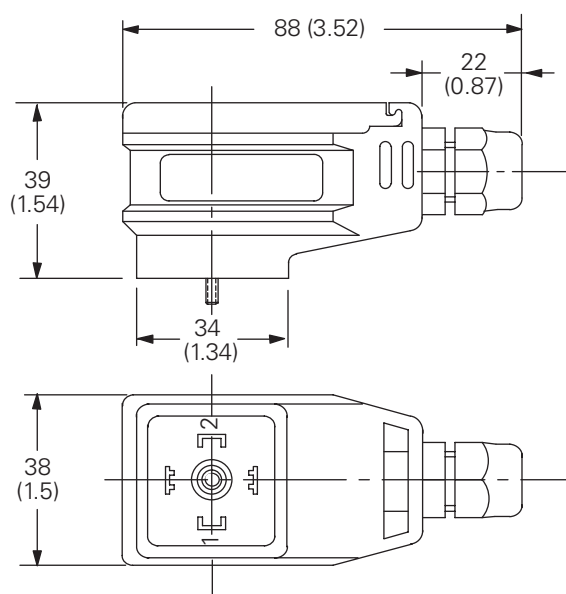
### Functions

Switch-on/off: after switching on with a 15V signal the amplifier will remain in the "on" condition with a command signal above 6V. The command signal must be reduced to below 5V to achieve switch-off of the amplifier.



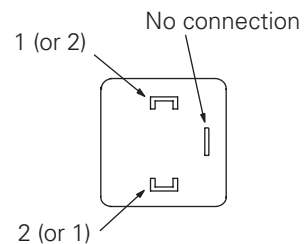
## Installation Dimensions

mm (inch)



3rd angle projection

Solenoid Connections



# Installation Data

## Adjustments

**Ramp time:** Turn clockwise to increase ramp time.

**Gain:** Turn clockwise to increase gain.

**Deadband compensation:** Turn clockwise to increase deadband compensation current.

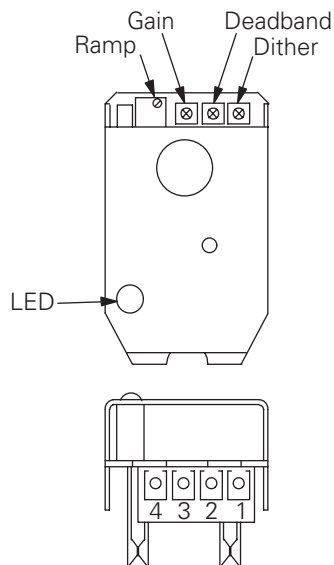
**Dither:** Turn clockwise to increase the dither current.

**Terminal 1:** Power Supply 20V-30V DC, positive.

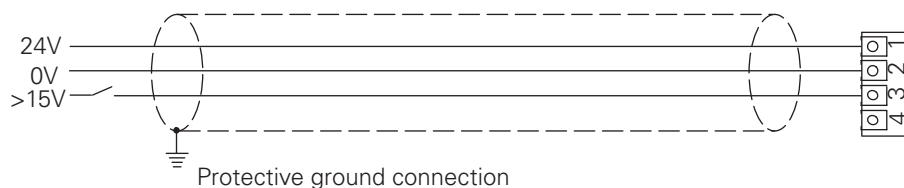
**Terminal 2:** Power Supply 0V.

**Terminal 3:** Switch command signal positive.

**Terminal 4:** Not connected



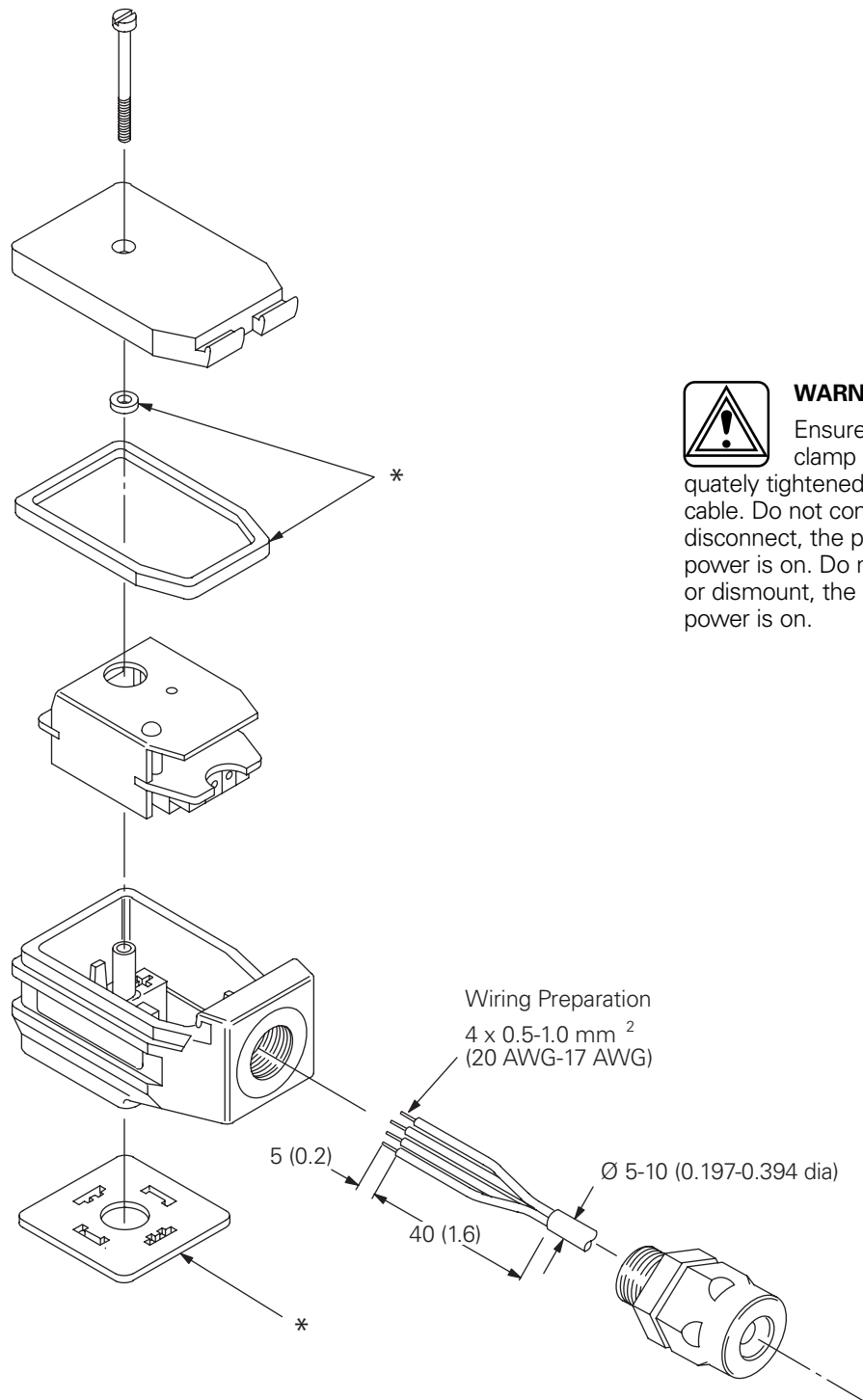
## Installation Wiring



### WARNING

Electromagnetic Compatibility (EMC) - Screened cables should be used and particular attention paid to the grounding of the screens as shown in the above diagram.

## Assembly Showing Wiring Connection Points



### WARNING

Ensure cable clamp nut is adequately tightened to secure cable. Do not connect, or disconnect, the plug while power is on. Do not mount, or dismount, the plug while power is on.

\*All seals must be fitted correctly at plug installation to provide protection to IP67 (IEC 529).

**EAT•N**

**Vickers**

## Start-Up Procedure

- Correctly wire the plug and, before mounting it on the valve solenoid, apply 24V DC (20 to 30V limits) to the “power input” terminals.
- Check for correct plug function by illumination/non-illumination of the LED:
  - a. Apply less than 2 to 3 volts to the input terminal: LED should not be illuminated.
  - b. Increase voltage: the LED should illuminate when the voltage reaches 15V. **Do not exceed 30V command signal.**
  - c. Decrease voltage: the LED should go off when the voltage is less than 5V.
- Switch off power supply and command/input signal and then install plug on solenoid. Ensure that all seals are fitted correctly and clamped as the retaining screw is tightened: this is essential in providing IP67 protection.
- Ensure that the hydraulic system will not cause any erratic movement of actuators, then:
  - Switch on power supply again.
  - Repeat LED/function check as in 2.An LED malfunction now indicates a short circuit at the load.
- Successful completion of these checks means that the plug and load are ready for use.

## Spare Parts

The only spare part available is the interface seal, part number 732100.

## Ordering Procedure

Order plug by full model code, and spare interface seals by part number 732100.

# MRV3-10

Manual rotary valve

## Description

The MRV3-10 is a 3-way, 2 or 3 position, manual semi-rotary directional screw-in cartridge valve.

## Operation

This valve will direct flow between ports 1 and 3 and block port 2 in one position, and by turning

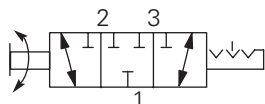
the operator 90°, flow will be directed between ports 1 and 2 and port 3 will be blocked. During

cross-over transition, all ports are blocked.

## Functional Symbol

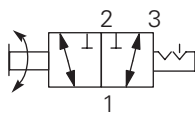
**MRV3-10(V)-D/E**

3 position models

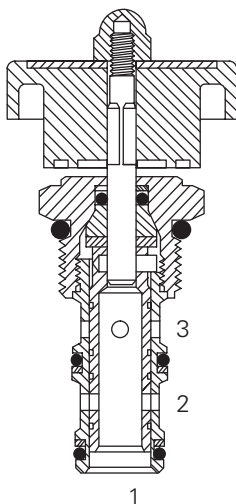


**MRV3-10(V)-D2/E2**

2 position models



## Sectional View



## 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)
Internal leakage	164cc/min (10in <sup>3</sup> /min) maximum @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Manual operators	D - Lever (3-position detent)* D2 - Lever (2-position detent)* E - Ball (3-position detent)* E2 - Ball (2-position detent)* K - Knob (2-position, no detent)

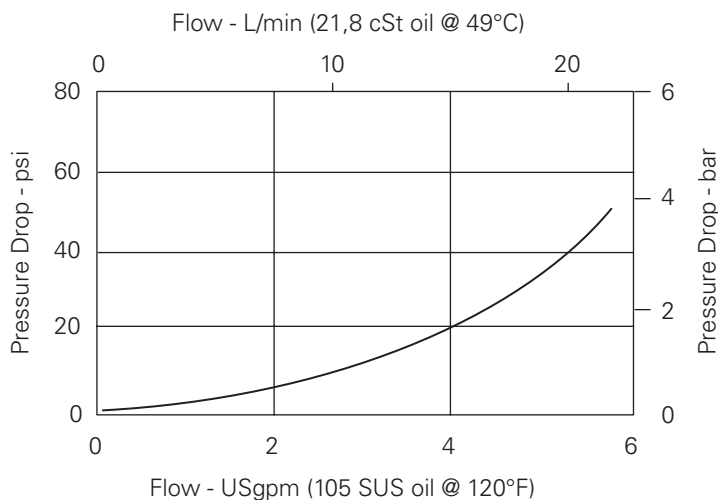
\* Light duty housing only.

Cavity	C-10-3
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 (0.48 lbs)
Seal kit	565804 (Buna-N) 889599 (Viton®)

Viton is a registered trademark of E.I. DuPont

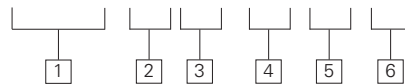
## Pressure Drop Curve

Cartridge only





# MRV3-10 (V) - \*\* - \*\* - 00



## 1 Function

MRV3 - Manual rotary valve

## 2 Size

10 - 10 Size

## 3 Seals

Blank - Buna-N

V - Viton®

## 4 Manual operators

- O - No operator
- D - Lever (3-position detent)\*
- D2 - Lever (2-position detent)\*
- E - Ball (3-position detent)\*
- E2 - Ball (2-position detent)\*
- K - Knob (2-position, no detent)

\*Light duty housing only.

## 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 section J for housing details.

## 6 Special features

00 - None  
(Only required if valve has special features, omitted if "00")

SS - 316 Stainless Steel  
external components (only available for "O" and "K" options)

## Dimensions

mm (inch)

Torque cartridge in  
aluminum housing  
47-54 Nm (35-40 ft. lbs)

### Locating Pin Installation

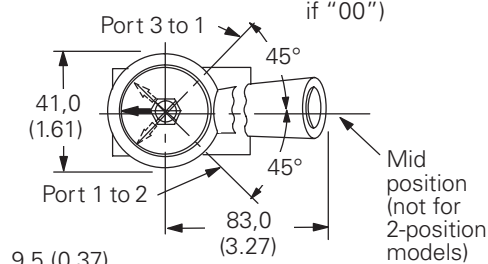
Locating pin hole,  
four optional slots  
in detent plate

17,1 ± 0.05  
(0.672 ± 0.002)

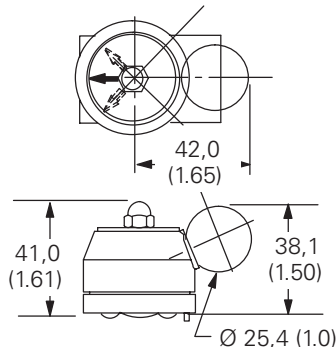
This hole omitted  
from detent plate of  
MRV3-10(V)-D2/E2

Ø 3,45/3,50  
(#29 or 0.136)  
drill x 4,8  
(0.187) deep  
in mating housing

### MRV3-\*\*(V)-D(2)

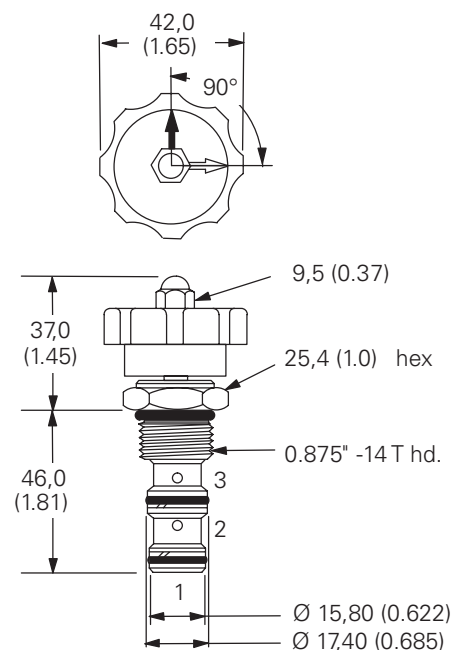


### MRV3-\*\*(V)-E(2)



### MRV3-\*\*(V)-K

Arrow can be relocated by slackening  
the domed nut and turning the plate.  
Re-tighten nut.



# MRV3-16

Manual rotary valve

## Description

The MRV3-16 is a 3-way, 2 or 3 position, manual semi-rotary directional screw-in cartridge valve.

## Operation

This valve will direct flow between ports 1 and 3 and block port 2 in one position. By turning the

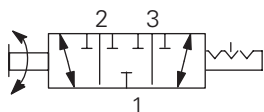
operator 90°, flow will be directed between ports 1 and 2 and port 3 will be blocked. During

cross-over transition, all ports are blocked.

## Functional Symbol

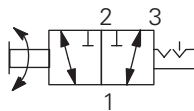
### MRV3-16(V)-D

3 position models

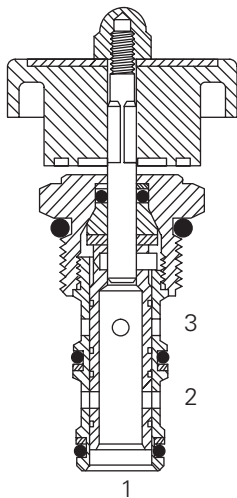


### MRV3-16(V)-D2

2 position models



## Sectional View



## RATINGS AND SPECIFICATIONS

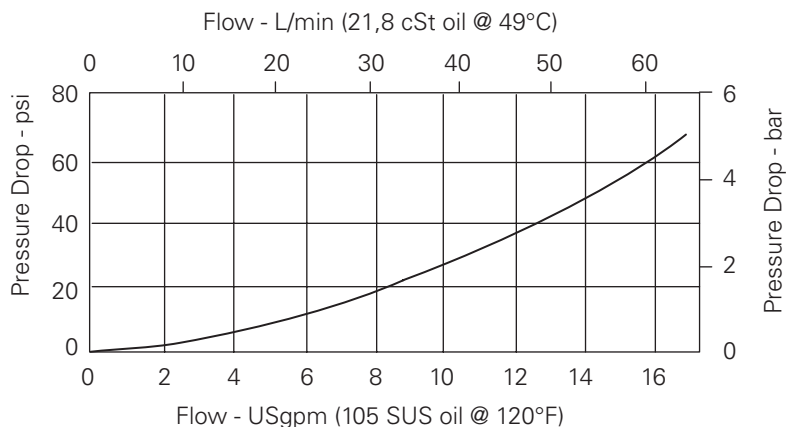
*Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)*

Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	64 L/min (17 USgpm)
Internal leakage	164cc/min (10in <sup>3</sup> /min) maximum @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Manual operators	D - Lever (3-position detent)* D2 - Lever (2-position detent)* K - Knob (2-position, no detent)
Cavity	C-16-3
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	0,53 kg (1.16 lbs)
Seal kit	889632 (Buna-N) 889636 (Viton®)

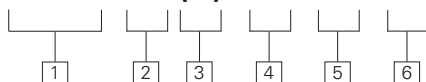
Viton is a registered trademark of E.I. DuPont

## Pressure Drop Curve

Cartridge only



# MRV3-16 (V) - \*\* - \*\*\* - 00



## 1 Function

MRV3 - Manual rotary valve

## 2 Size

16 - 16 Size

## 3 Seals

Blank - Buna-N

V - Viton®

## 4 Manual operators

O - No operator  
D - Lever (3-position detent)\*

D2 - Lever (2-position detent)\*

K - Knob (2-position, no detent)

\*Light duty housing only

## 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
8G	3/4" BSPP	—	876722

See section J for housing details..

## 6 Special features

00 - None

(Only required if valve has special features, omitted if "00")

## Dimensions

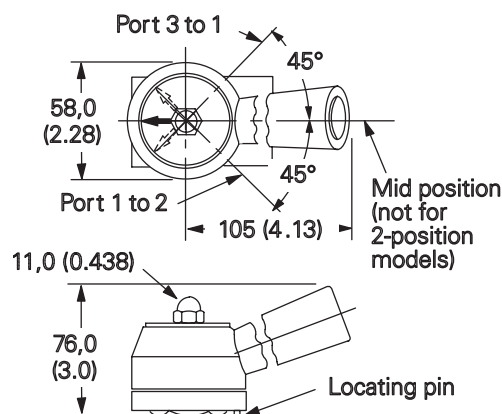
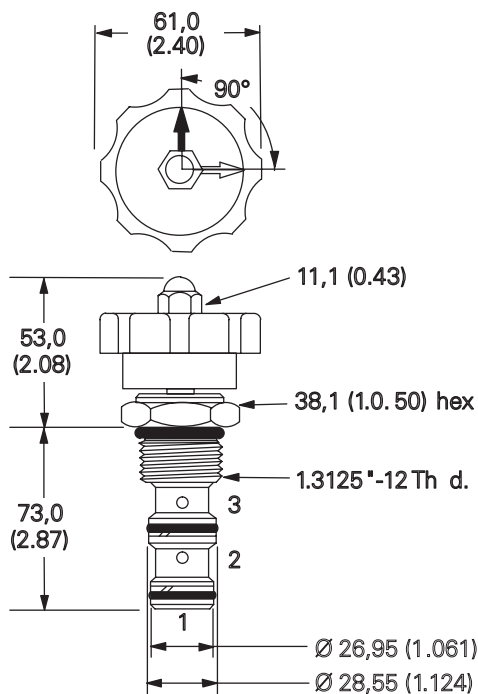
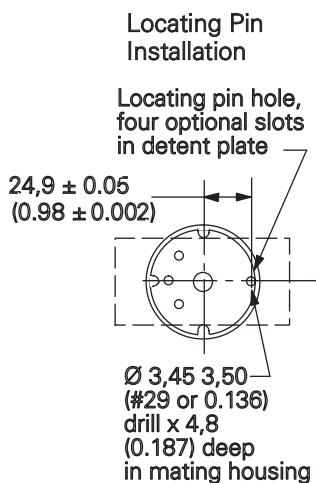
mm (inch)

Torque cartridge in aluminum housing  
108-122 Nm (80-90 ft. lbs)

### MRV3-\*\*(V)-K

Arrow can be relocated by slackening the domed nut and turning the plate. Re-tighten nut.

### MRV3-\*\*(V)-D(2)



# MRV4-10

Manual rotary valve

## Description

The MRV4-10 is a 4-way, 2 or 3 position, manual semi-rotary directional screw-in cartridge valve.

## Operation

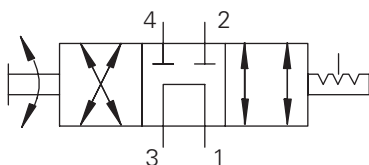
This valve will direct flow between ports 1 and 2 and ports 3 and 4 in one position. By turning the

operator 90°, flow will be directed between ports 1 and 4 and port 3 to port 2. During the cross-over

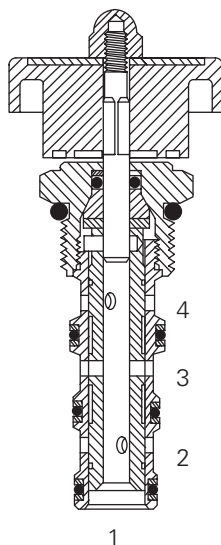
transition, ports 2 and 4 are blocked and ports 1 and 3 are connected.

## Functional Symbol

3 position models



## Sectional View



## 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	11 L/min (3 USgpm)
Internal leakage	164cc/min (10in <sup>3</sup> /min) maximum @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Manual operators	D - Lever (3-position detent)* D2 - Lever (2-position detent)* E - Ball (3-position detent)* E2 - Ball (2-position detent)* K - Knob (2-position, no detent)

\* Light duty housing only.

Cavity	C-10-4
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	0,17 kg (0.38 lbs)
Seal kit	565805 (Buna-N) 889600 (Viton®)

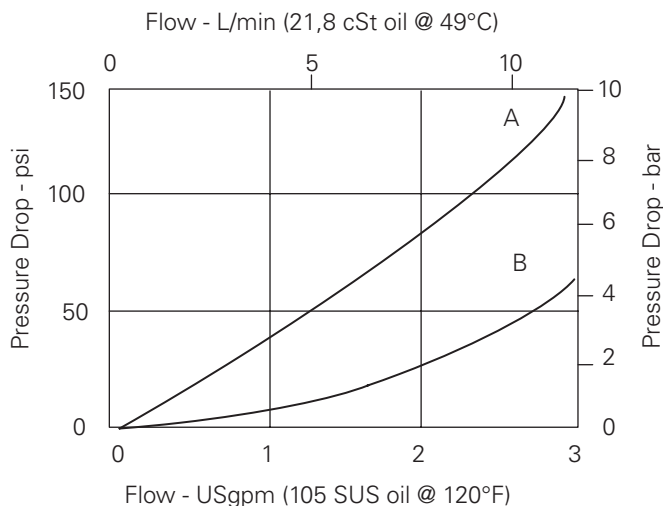
Viton is a registered trademark of E.I. DuPont

## Pressure Drop Curves

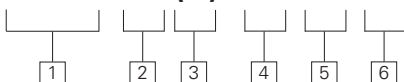
Cartridge only

A - Port 3 to 4  
or 3 to 2

B - Port 4 to 1  
or 2 to 1



# MRV4-10 (V) - \*\* - \*\* - 00



## 1 Function

**MRV4** - Manual rotary valve  
4 way

## 2 Size

**10** - 10 Size

## 3 Seals

**Blank** - Buna-N  
**V** - Viton®

## 4 Manual operators

- O** - No operator
- D** - Lever (3-position detent)\*
- D2** - Lever (2-position detent)\*
- E** - Ball (3-position detent)\*
- E2** - Ball (2-position detent)\*
- K** - Knob (2-position, no detent)

\*Light duty housing only.

## 5 Port size

**O** - Cartridge only

CODE	PORT SIZE	HOUSING NUMBER	
		Aluminum Light duty	Aluminum Fatigue rated
<b>3B</b>	3/8" BSPP	02-179705	—
<b>6T</b>	SAE 6	566161	—
<b>2G</b>	1/4" BSPP	—	876709
<b>3G</b>	3/8" BSPP	—	876715
<b>6H</b>	SAE 6	—	876708
<b>8H</b>	SAE 8	—	876713

See section J for housing details.

## Dimensions

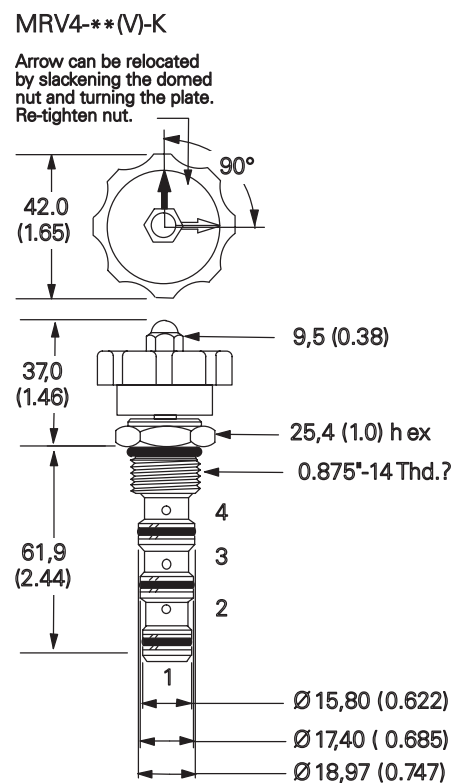
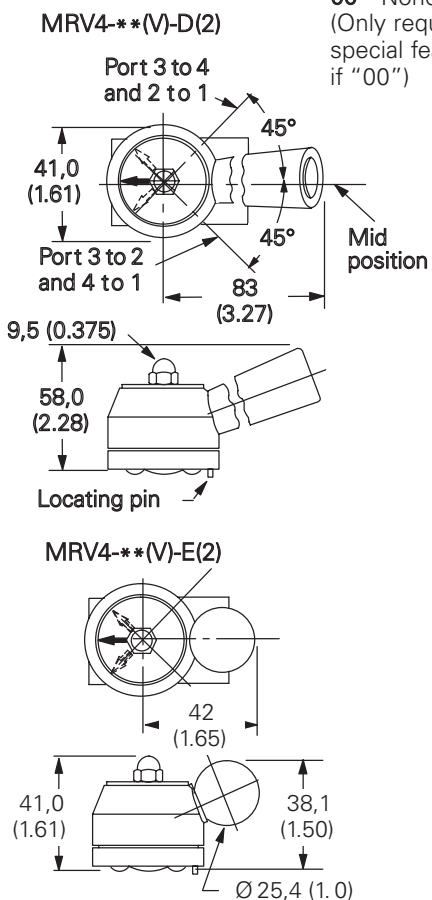
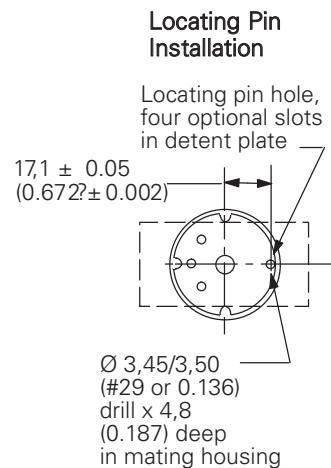
mm (inch)

Torque cartridge in  
aluminum housing  
47-54 Nm (35-40 ft. lbs)

## 6 Special features

**00** - None  
(Only required if valve has  
special features, omitted  
if "00")

**SS** - 316 Stainless Steel  
external components (only  
available for "O" and "K"  
options)



# MRV4-16

Manual rotary valve

## Description

The MRV4-16 is a 4-way, 2 or 3 position, manual semi-rotary directional screw-in cartridge valve.

## Operation

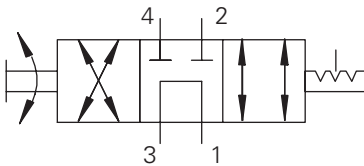
This valve will direct flow between ports 1 and 2 and ports 3 and 4 in one position. By turning the

operator 90°, flow will be directed between ports 1 and 4 and ports 3 and 2. During the cross-over

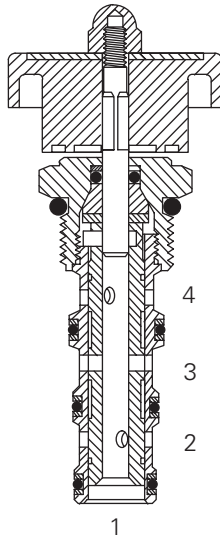
transition, ports 2 and 4 are blocked and ports 1 and 3 are open to each other.

## Functional Symbol

3 position models



## Sectional View



## 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	164cc/min (10in <sup>3</sup> /min) maximum @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Manual operators	D - Lever (3-position detent)* D2 - Lever (2-position detent)* K - Knob (2-position, no detent)

\* Light duty housing only.

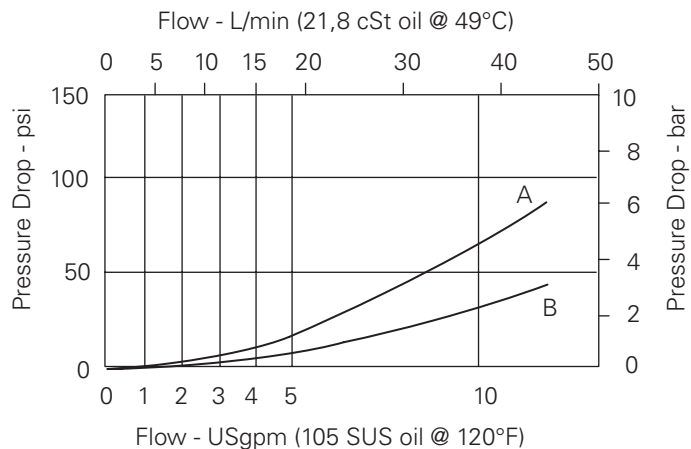
Cavity	C-16-4
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Standard housing materials	Aluminum
Weight cartridge only	0,65 kg (1.43 lbs)
Seal kit	889634 (Buna-N) 889638 (Viton®)

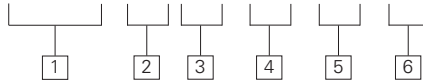
Viton is a registered trademark of E.I. DuPont

## Pressure Drop Curves

Cartridge only

- A - Port 3 to 4  
or 3 to 2
- B - Port 4 to 1  
or 2 to 1



**MRV4 - 16 (V) - \*\* - \*\*\* - 00****1 Function**

**MRV4** - Manual rotary valve,  
4 way

**2 Size**

**16** - 16 Size

**3 Seals**

**Blank** - Buna-N  
**V** - Viton®

**4 Manual operators**

- O** - No operator
- D** - Lever (3-position detent)\*
- D2** - Lever (2-position detent)\*
- K** - Knob (2-position, no detent)

\*Light duty housing only.

**5 Port size**

**O** - Cartridge only

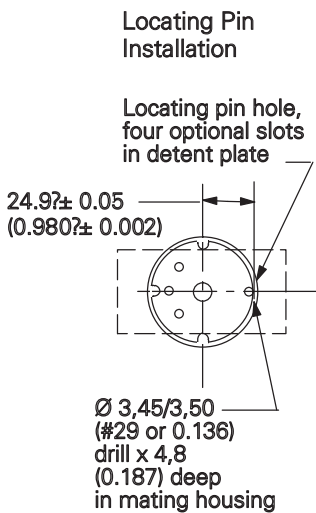
CODE	PORT SIZE	HOUSING NUMBER	
		Aluminum Light duty	Aluminum Fatigue rated
12T	SAE 12	566411	—
6B	3/4" BSPP	02-175468	—
10H	SAE 10	—	876729
12H	SAE 12	—	876731
4G	1/2" BSPP	—	876728
6G	3/4" BSPP	—	876730

See section J for housing details.

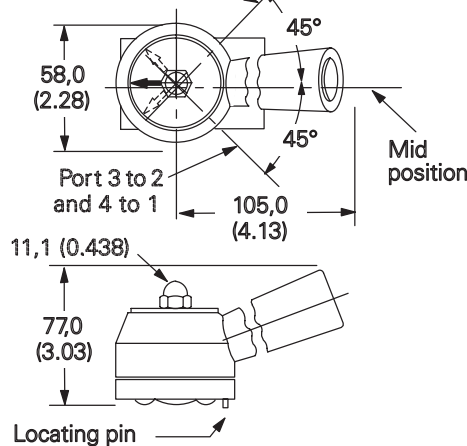
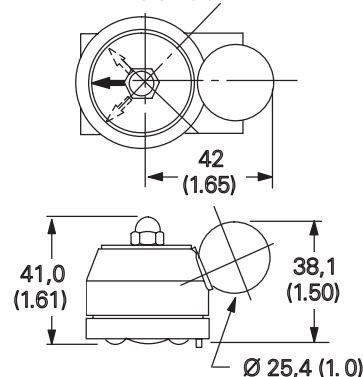
**Dimensions**

mm (inch)

Torque cartridge in  
aluminum housing  
108-122 Nm (80-90 ft. lbs)

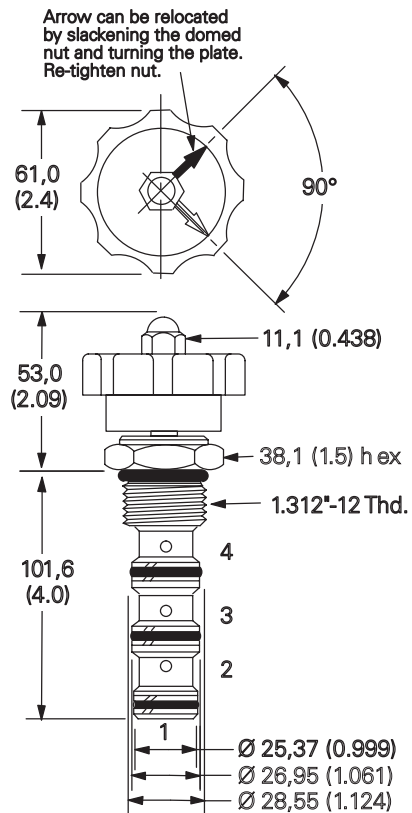
**MRV4-\*\*(V)-D(2)**

Port 3 to 4 and 2 to 1

**MRV4-\*\*(V)-E(2)****6 Special features**

**00** - None

(Only required if valve has  
special features, omitted  
if "00")



# MRV5-10

Manual rotary valve

## Description

The MRV5-10 is a 4-way, 3 position, manual semi-rotary directional screw-in cartridge valve.

## Operation

This valve will direct flow between ports 1 and 2 and ports 3 and 4 in one position. By turning the

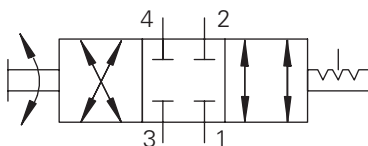
operator 90°, flow will be directed between ports 1 and 4 and port 3 to 2. During the cross-over

## MRV5-16

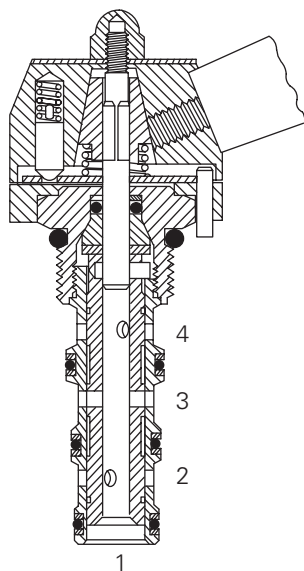
Manual rotary valve

## Functional Symbol

3 position models



## Sectional View



## 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	11 L/min (3 USgpm)
Internal leakage	164cc/min (10in <sup>3</sup> /min) maximum @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Manual operators	D - Lever (3-position detent)* E - Ball (3-position detent)*

\* Light duty housing only.

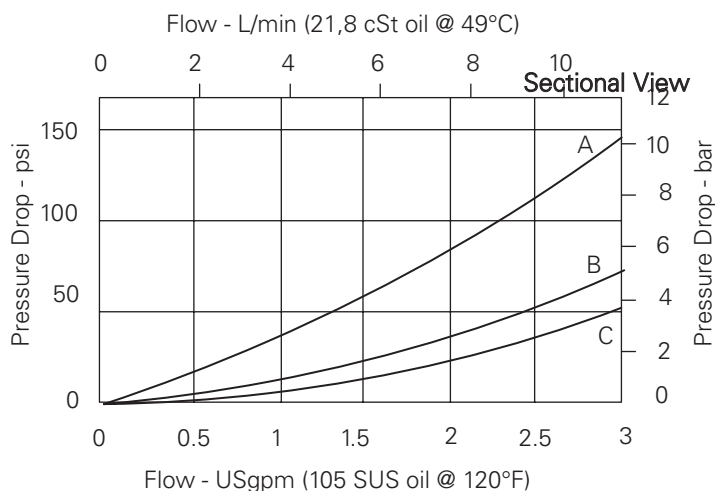
Cavity	C-10-4 (see page 60)
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Standard housing materials	Aluminum
Weight cartridge only	0,27 kg (0.59 lbs)
Seal kit	889625 (Buna-N) 566080 (Viton®)

Viton is a registered trademark of E.I. DuPont

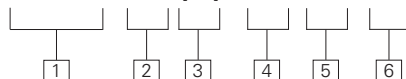
## Pressure Drop Curves

Cartridge only

- A - Port 3 to 4 or 3 to 2
- B - Port 4 to 1
- C - Port 2 to 1





**MRV5 – 10 (V) – \*\* – \*\* – 00****1 Function**

**MRV5** - Manual rotary valve,  
4 way

**2 Size**

**10** - 10 Size

**3 Seals**

**Blank** - Buna-N  
**V** - Viton®

**4 Manual operators**

- O** - No operator
- D** - Lever (3-position detent)\*
- E** - Ball (3-position detent)\*
- D2** - Lever (2-position detent)
- E2** - Ball (2-position detent)

\*Light duty housing only.

**5 Port size**

**O** - Cartridge only

CODE	PORT SIZE	HOUSING NUMBER	
		Aluminum Light duty	Aluminum Fatigue rated
3B	3/8" BSPP	02-179705	–
6T	SAE 6	566161	–
2G	1/4" BSPP	–	876709
3G	3/8" BSPP	–	876715
6H	SAE 6	–	876708
8H	SAE 8	–	876713

See section J for housing details.

**6 Special features**

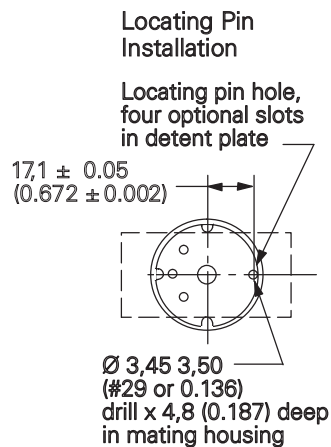
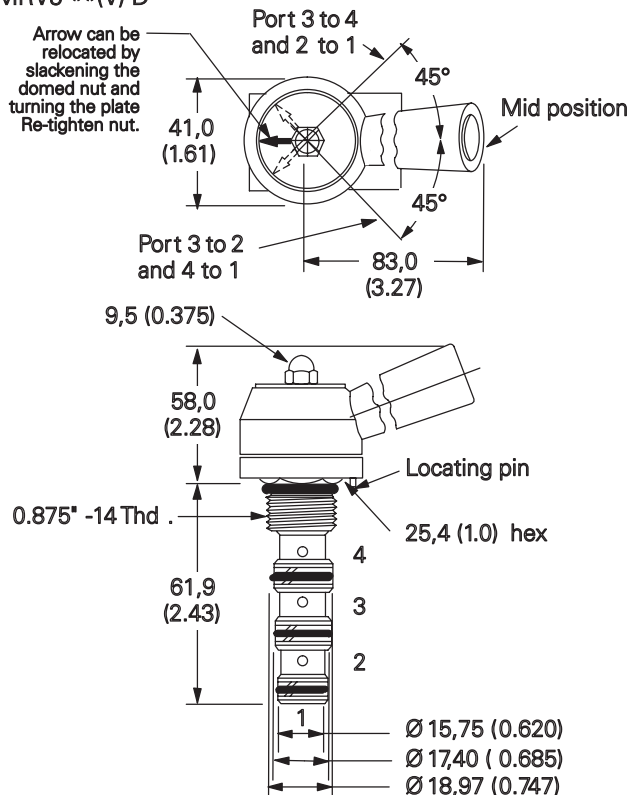
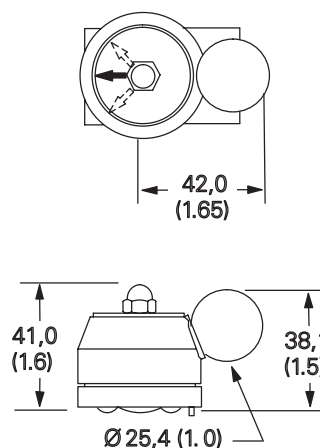
**00** - None  
(Only required if valve has special features, omitted if "00")

**SS** - 316 Stainless Steel external components (only available for "O" options)

**Dimensions**

mm (inch)

Torque cartridge in  
aluminum housing  
47-54 Nm (35-40 ft. lbs)

**MRV5-\*\*(V)-D****MRV5-\*\*(V)-E**

# MRV5-16

Manual rotary valve

## Description

The MRV5-16 is a 4-way, 3 position, manual semi-rotary directional screw-in cartridge valve.

## Operation

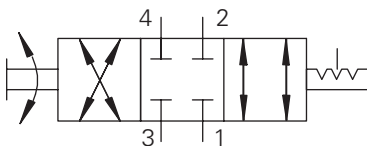
This valve will direct flow between ports 1 and 2 and ports 3 and 4 in one position and by turning the

operator 90°, flow will be directed between ports 1 and 4 and ports 3 and 2. During the cross-over

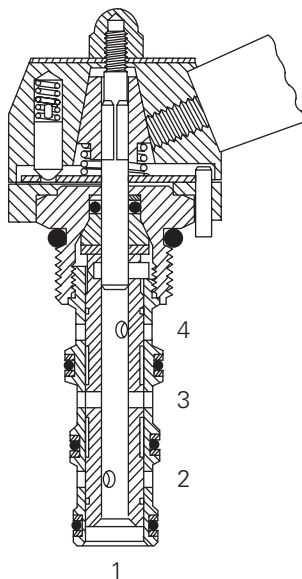
transition, all ports are blocked.

## Functional Symbol

3 position models



## Sectional View



## RATINGS AND SPECIFICATIONS

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

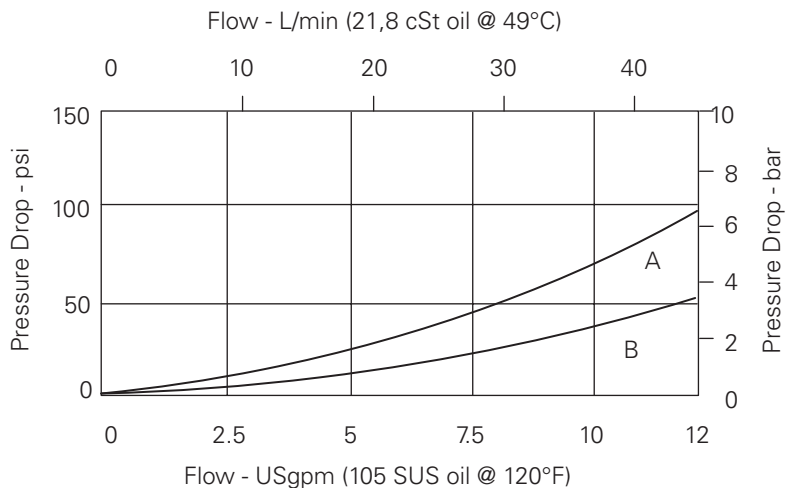
Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	45 L/min (12 USgpm)
Internal leakage	164cc/min (10in <sup>3</sup> /min) maximum @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Manual operators	D - Lever (3-position detent)*
* Light duty housing only.	
Cavity	C-16-4
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	0,65 kg (1.43 lbs)
Seal kit	889634 (Buna-N) 889638 (Viton®)

Viton is a registered trademark of E.I. DuPont

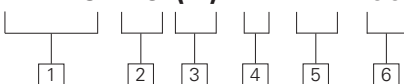
## Pressure Drop Curves

Cartridge only

- A - Port 3 to 4 or 3 to 2
- B - Port 4 to 1 or 2 to 1



## MRV5-16 (V) - \* - \*\*\* - 00



## 1 Function

MRV5 - Manual rotary valve  
4 way

## 3 Seals

Blank - Buna-N  
V - Viton®

## 5 Port size

O - Cartridge only

## 2 Size

16 - 16 Size

## 4 Manual operators

O - No operator  
D - Lever (3-position  
detent)\*

\*Light duty housing only.

## CODE PORT SIZE HOUSING NUMBER

		Aluminum Light duty	Aluminum Fatigue rated
12T	SAE 12	566411	—
6B	3/4" BSPP	02-175468	—
10H	SAE 10	—	876729
12H	SAE 12	—	876731
4G	1/2" BSPP	—	876728
6G	3/4" BSPP	—	876730

See section J for housing details.

## Dimensions

mm (inch)

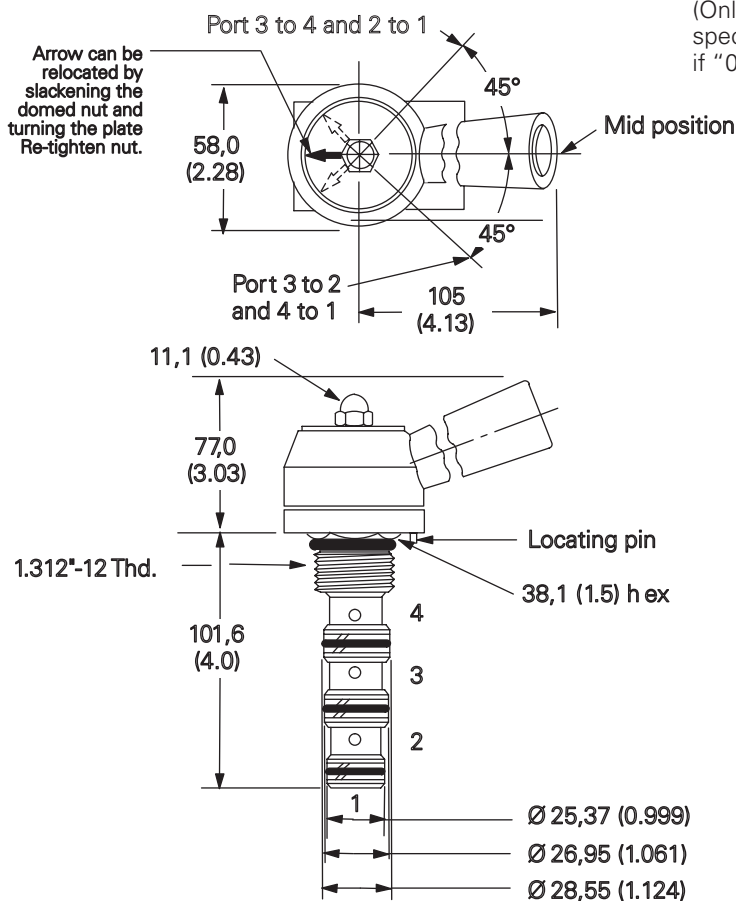
Torque cartridge in  
aluminum housing  
108-122 Nm (80-90 ft. lbs)

Locating Pin  
Installation

Locating pin hole,  
four optional slots  
in detent plate

24,9 ± 0.05  
(0.980 ± 0.002)

Ø 3,45/3,50  
(#29 or 0.136)  
drill x 4,8  
(0.187) deep  
in mating housing



## 6 Special features

00 - None

(Only required if valve has  
special features, omitted  
if "00")

# MRV6-10

Manual rotary valve

## Description

The MRV6-10 is a 4-way, 3 position, manual semi-rotary directional screw-in cartridge valve.

## Operation

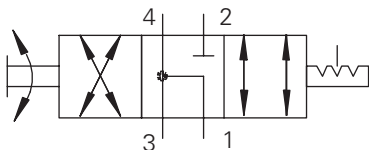
This valve will direct flow between ports 1 and 2 and ports 3 and 4 in one position. By turning the

operator 90°, flow will be directed between ports 1 and 4 and port 3 to 2. During the cross-over

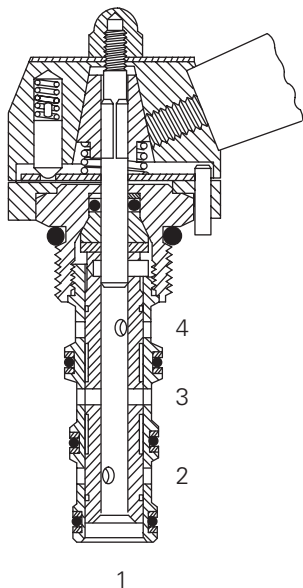
transition all ports 1, 3 and 4 are open to each other and port 2 is blocked.

## Functional Symbol

3 position valves



## Sectional View



## 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	11 L/min (3 USgpm)
Internal leakage	164cc/min (10in <sup>3</sup> /min) maximum @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Manual operators	D - Lever (3-position detent)* E - Ball (3-position detent)*

\* Light duty housing only.

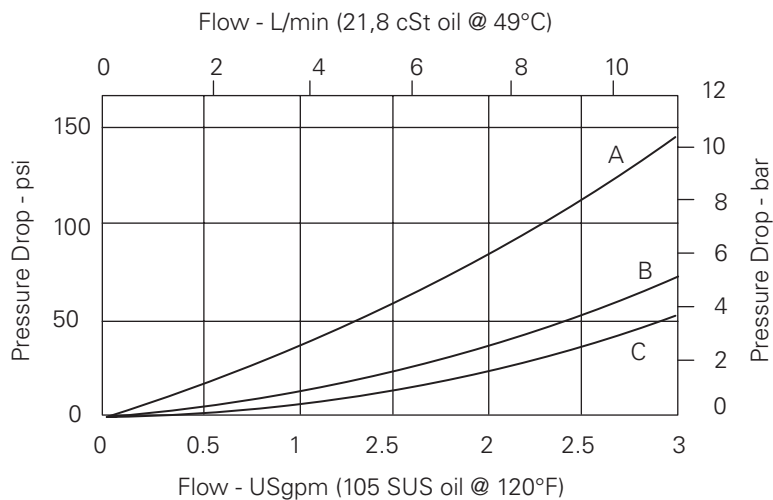
Cavity	C-10-4
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Standard housing materials	Aluminum
Weight cartridge only	0,27 kg (0.59 lbs)
Seal kit	889625 (Buna-N) 566080 (Viton®)

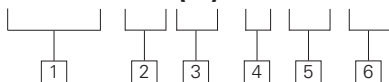
Viton is a registered trademark of E.I. DuPont

## Pressure Drop Curves

Cartridge only

- A - Port 3 to 4 or 3 to 2
- B - Port 4 to 1
- C - Port 2 to 1



**MRV6-10 (V) - \* - \*\* - 00****1 Function**

MRV6 - Manual rotary valve

**2 Size**

10 - 10 Size

**3 Seals**

Blank - Buna-N

V - Viton®

**4 Manual operators**

- O - No operator
- D - Lever (3-position detent)\*
- E - Ball (3-position detent)\*

\*Light duty housing only.

**5 Port size**

O - Cartridge only

CODE	PORT SIZE	HOUSING NUMBER	
		Aluminum Light duty	Aluminum Fatigue rated
3B	3/8" BSPP	02-179705	—
6T	SAE 6	566161	—
2G	1/4" BSPP	—	876709
3G	3/8" BSPP	—	876715
6H	SAE 6	—	876708
8H	SAE 8	—	876713

See section J for housing details.

**6 Special features**

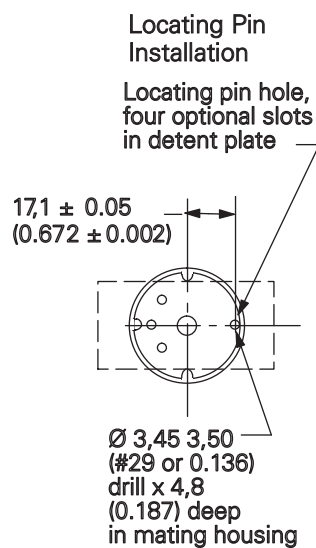
00 - None  
(Only required if valve has special features, omitted if "00")

SS - 316 Stainless Steel external components (only available for "O" options)

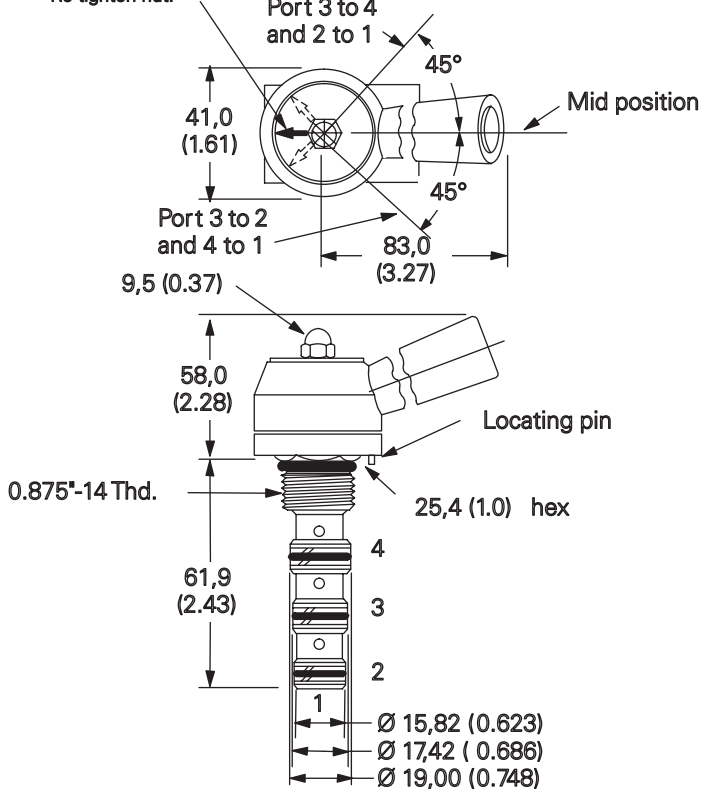
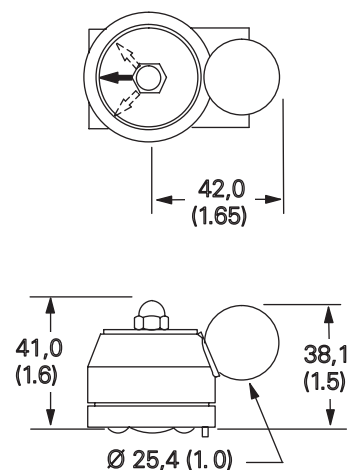
**Dimensions**

mm (inch)

Torque cartridge in aluminum housing  
47-54 Nm (35-40 ft. lbs)

**MRV6-\*\*(V)-D**

Arrow can be relocated by slackening the domed nut and turning the plate. Re-tighten nut.

**MRV6-\*\*(V)-E**

# MLV9-12-A

4-Way, 3-Position, screw-in cartridge manual lever valve

### Description

The MLV9-12-A is a 4-way, 3-position, direct acting, spool type directional control valve.

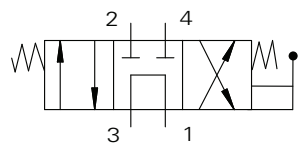
### Operation

In the center position, this valve allows flow from port 3 to port 1 and blocks ports 2 and 4.

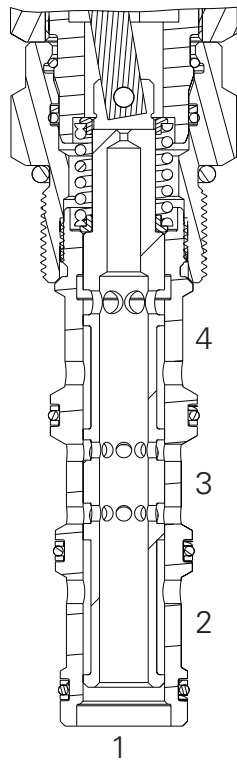
In position 1, flow is directed from port 3 to port 2 and from port 4 to port 1.

In position 2, flow is directed from port 3 to port 4 and from port 2 to port 1.

### Functional Symbol



### Sectional View

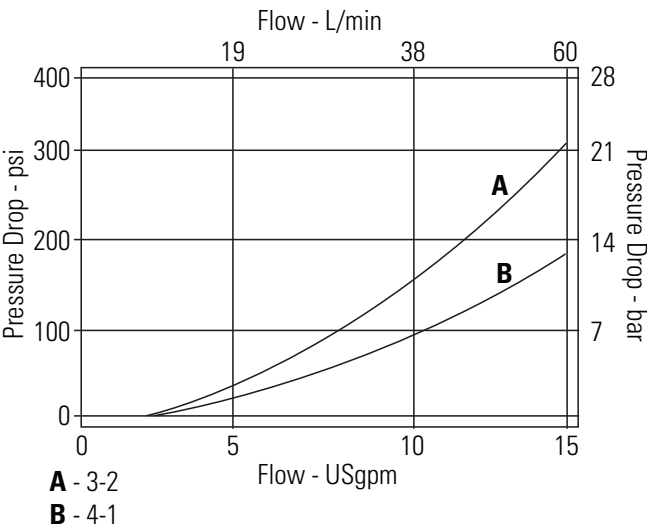


### RATINGS AND SPECIFICATIONS

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)
Fatigue pressure	3,000 psi per NFPA/T2-6-1 R2-2000
Rated burst pressure	(626 bar) 9090 psi per NFPA/T2-6-1 R2-2000
Max flow	60 L/min (15 USgpm)
Temperature range	-40° to 120°C (-40° to 248°F)
Cavity	C-12-4
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Aluminum
Weight	.57 kg (1.25 lbs)
Seal Kit	9900171-000 (Buna-N), 9900172 (Viton) Viton is a registered trademark of E.I. DuPont
Internal Leakage	246 cm <sup>3</sup> /min (15 in <sup>3</sup> /min) max. @ 210 bar (3000psi)

Endurance tested to 1 million cycles at full rated flow and pressure.



# MLV9-12-B

4-Way, 3-Position, screw-in cartridge manual lever valve

## Description

The MLV9-12-B is a 4-way, 3-position, direct acting, spool type directional control valve.

## Operation

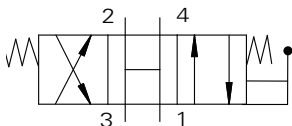
In the center position, all ports are open to each other.

In position 1, flow is directed from port 3 to port 4 and from port 2 to port 1.

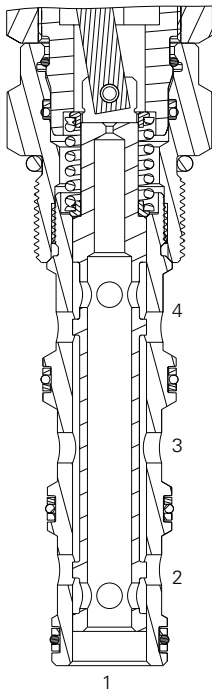
In position 2, flow is directed from port 3 to port 2 and from port 4 to port 1.

D

## Functional Symbol



## Sectional View

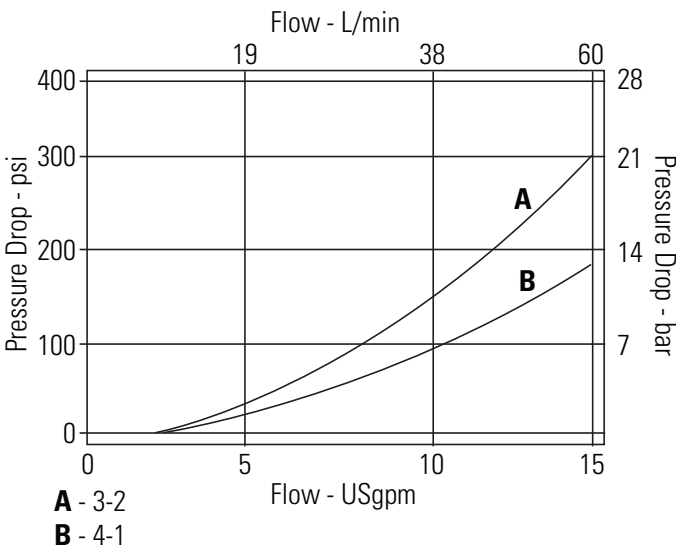


## RATINGS AND SPECIFICATIONS

*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)
Fatigue pressure	3,000 psi per NFPA/T2-6-1 R2-2000
Rated burst pressure	(626 bar) 9090 psi per NFPA/T2-6-1 R2-2000
Max flow	60 L/min (15 USgpm)
Temperature range	-40° to 120°C (-40° to 248°F)
Cavity	C-12-4
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Aluminum
Weight	.57 kg (1.25 lbs)
Seal Kit	9900171-000 (Buna-N), 9900172 (Viton) Viton is a registered trademark of E.I. DuPont
Internal Leakage	246 cm <sup>3</sup> /min (15 in <sup>3</sup> /min) max. @ 210 bar (3000psi)

*Endurance tested to 1 million cycles at full rated flow and pressure.*



# MLV9-12-E

4-Way, 3-Position, screw-in cartridge manual lever valve

## Description

The MLV9-12-E is a 4-way, 3-position, direct acting, spool type directional control valve .

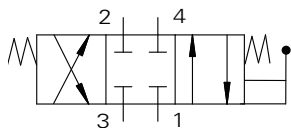
## Operation

In the center position, all ports are blocked.

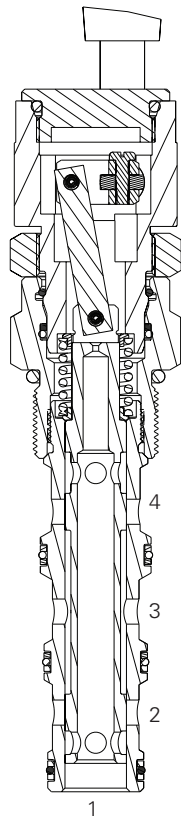
In position 1, flow is directed from port 3 to port 4 and from port 2 to port 1.

In position 2, flow is directed from port 3 to port 2 and from port 4 to port 1.

## Functional Symbol



## Sectional View

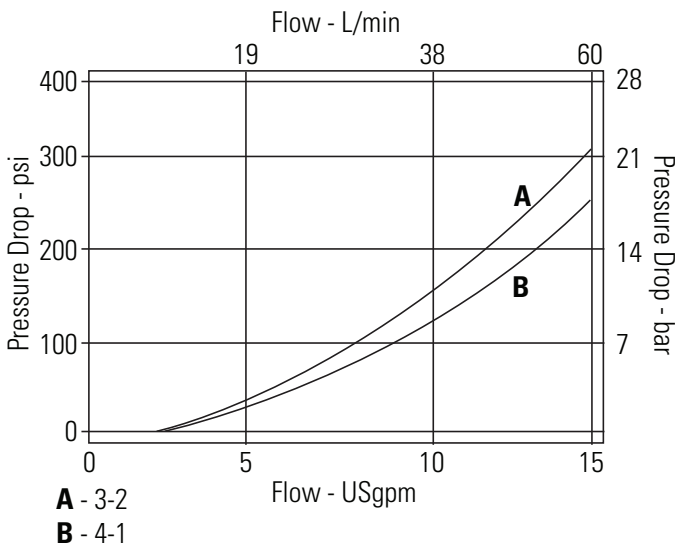


## RATINGS AND SPECIFICATIONS

*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)
Fatigue pressure	3,000 psi per NFPA/T2-6-1 R2-2000
Rated burst pressure	626 bar) 9090 psi per NFPA/T2-6-1 R2-2000
Max flow	60 L/min (15 USgpm)
Temperature range	-40° to 120°C (-40° to 248°F)
Cavity	C-12-4
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Aluminum
Weight	.57 kg (1.25 lbs)
Seal Kit	9900171-000 (Buna-N), 9900172 (Viton) Viton is a registered trademark of E.I. DuPont
Internal Leakage	246 cm3/min (15 in3/min) max. @ 210 bar (3000psi)

*Endurance tested to 1 million cycles at full rated flow and pressure.*





# MLV9-12-F

4-Way, 3-Position, screw-in cartridge manual lever valve

## Description

The MLV9-12-F is a 4-way, 3-position, direct acting, spool type directional control valve.

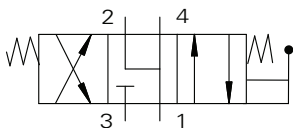
## Operation

In the center position, port 1, port 2, and port 4 are open to each other while port 3 is blocked.

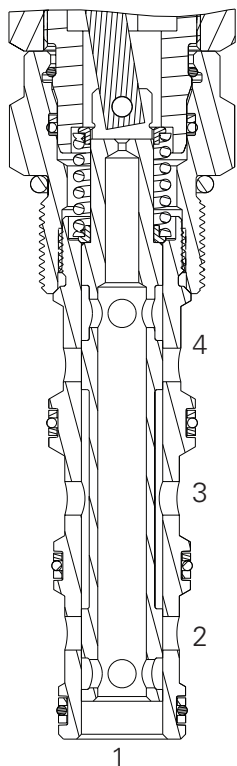
In position 1, flow is directed from port 3 to port 4 and from port 2 to port 1.

In position 2, flow is directed from port 3 to port 2 and from port 4 to port 1.

## Functional Symbol



## Sectional View

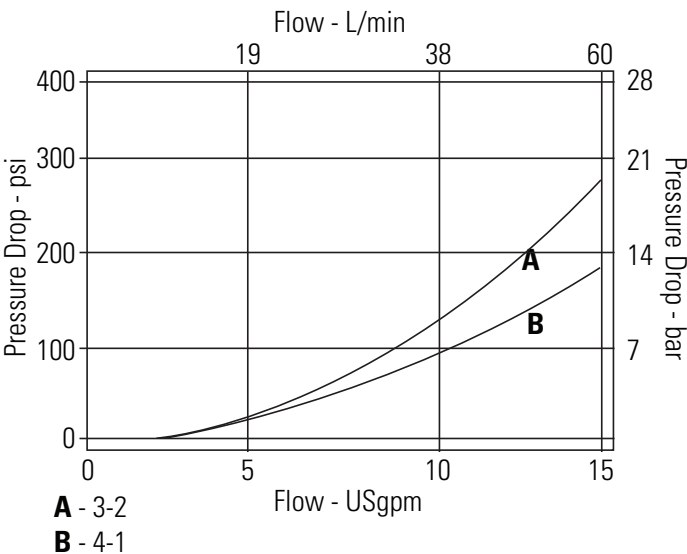


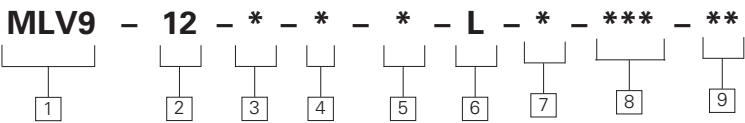
## RATINGS AND SPECIFICATIONS

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)
Fatigue pressure	3,000 psi per NFPA/T2-6-1 R2-2000
Rated burst pressure	(626 bar) 9090 psi per NFPA/T2-6-1 R2-2000
Max flow	60 L/min (15 USgpm)
Temperature range	-40° to 120°C (-40° to 248°F)
Cavity	C-12-4
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Housing material (standard)	Aluminum
Weight	.57 kg (1.25 lbs)
Seal Kit	9900171-000 (Buna-N), 9900172 (Viton) Viton is a registered trademark of E.I. DuPont
Internal Leakage	246 cm <sup>3</sup> /min (15 in <sup>3</sup> /min) max. @ 210 bar (3000psi)

Endurance tested to 1 million cycles at full rated flow and pressure.



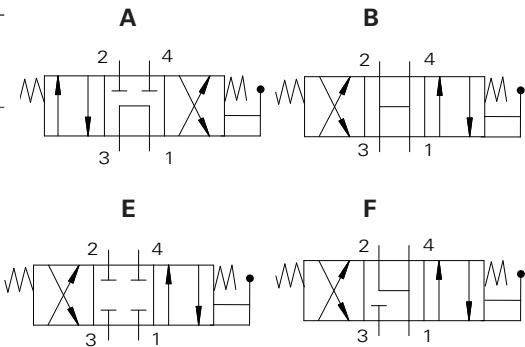


1 Function  
MLV9 - Manual Lever Valve

2 Size  
12 - 12 Size

3 Seal Material  
N - Buna N  
V - Viton

4 Spool Center Condition



9 Lever Position

00 - 90°  
01 - 45°  
02 - 0°  
03 - 135°  
04 - 180°

See page D-35 for lever position

5 Dentent Option

O - Spring Return

6 Lever

L - Lever

7 Housing Material

Blank - Cartridge only  
A - Aluminum

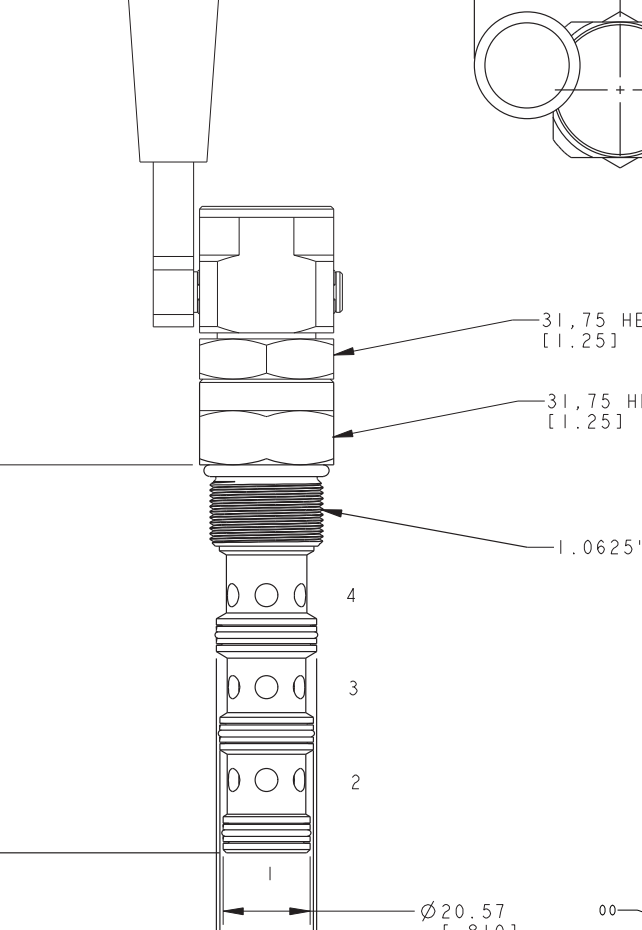
8 Port Size

CODE	PORT SIZE	HOUSING NUMBER
		Aluminum
0	Cartridge Only	
A4G	1/2" BSPP	5986431-001
A6G	3/4" BSPP	5986432-001
A8H	SAE 8	5986433-001
A10H	SAE 10	5986434-001
A12H	SAE 12	5986436-001

See section J for housing details.

4-Way, 3-Position, screw-in cartridge manual lever valve

## mm (inch)



Technical drawing of the 1000 Series 1/2" (31.75 mm) Hex. The drawing includes a side view, a top view, and a detail view of the lever assembly.

**Dimensions:**

- Overall height: 137.6 [5.42]
- Height from base to top of lever: 90.9 [3.58]
- Top view width: 34.5 [1.36]
- Hex size: 31.75 HEX [1.25]
- Thread: 1.0625" - 12 THD
- Base diameter:  $\varnothing 20.57$  [.810]
- Intermediate diameter:  $\varnothing 22.15$  [.872]
- Outer diameter:  $\varnothing 23.75$  [.935]

**Labels:**

- 1, 2, 3, 4: Section markers for the main assembly.
- 00, 03, 04: Labels for the lever assembly detail.

**Detail View:** A cross-section of the lever assembly showing the lever, a pin, and a spring.

Lever	21113
-------	-------

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Maintain 5-8Nm (4-6 ft. lbs) maximum torque on valve tube nut. Overtightening may cause valve failure.

# MPV1-10

Manual pull valve

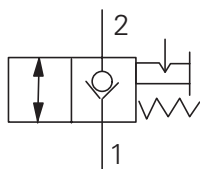
## Description

The MPV1-10 is a 2-way, 2 position, manually operated, normally closed, pull-to-open, directional screw-in cartridge valve.

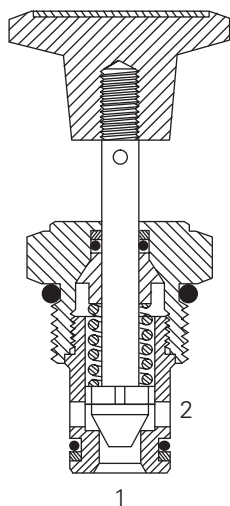
## Operation

This valve blocks flow from port 2 to port 1 and will allow flow from port 1 to port 2 when the spring bias is overcome.

## Functional Symbol



## Sectional View



### Caution

Back pressure of 16 bar (240 psi) will unseat the poppet.

## RATINGS AND SPECIFICATIONS

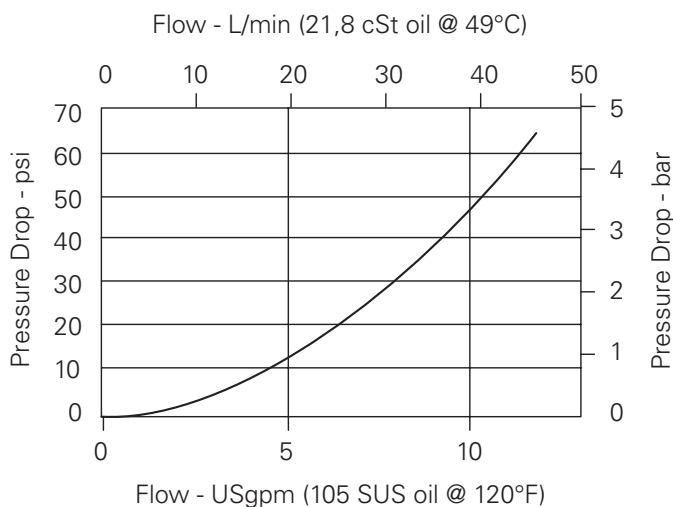
*Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)*

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 (port 2 to port 1)	5 drops/min. maximum @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Cavity	C-10-2
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 kit	565803 (Buna-N) 566086 (Viton®)

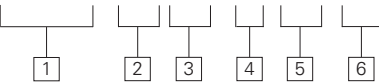
Viton is a registered trademark of E.I. DuPont

## Pressure Drop Curve

Cartridge only



MPV1 – 10 (V) – \* – \*\* – 00



**1** Function  
MPV1 - Manual pull valve

**2** Size  
10 - 10 Size

**3** Seals  
Blank - Buna-N  
V - Viton®

**4** Type  
T - Stem only  
K - Knob

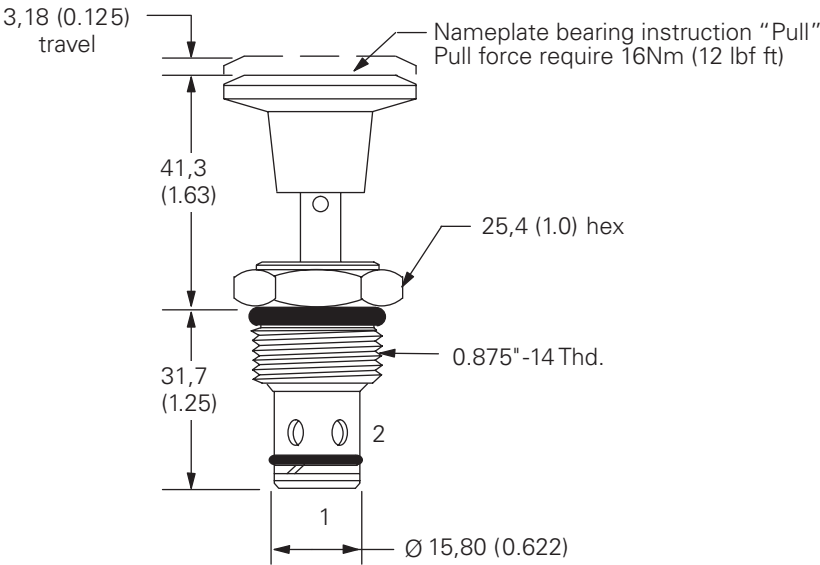
**5** Port size  
O - Cartridge only

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 section J for housing details.

**6** Special features  
00 - None  
(Only required if valve has special features, omitted if "00")  
SS - 316 Stainless Steel external components

**Dimensions**  
mm (inch)  
Torque cartridge in aluminum housing  
47-54 Nm (35-40 ft. lbs)



# MPV3-10

Manual pull valve  
with detent

## Description

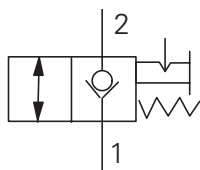
The MPV3-10 is a 2-way, 2 position, manually operated, normally closed, pull-to-open, directional screw-in cartridge valve, **with detent**.

## Operation

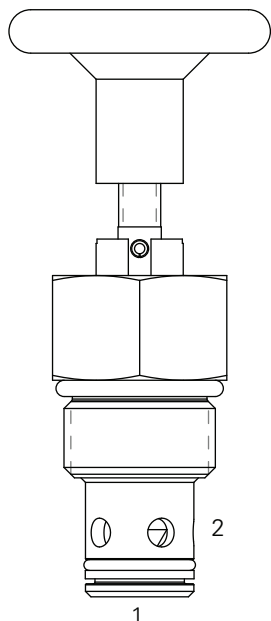
This valve blocks flow from port 2 to port 1 and will allow flow from port 1 to port 2 when the spring bias is overcome. When

the valve is actuated free flow is allowed in both directions.

## Functional Symbol



## Profile View



### Caution

Back pressure of 16 bar (240 psi) will unseat the poppet.

## RATINGS AND SPECIFICATIONS

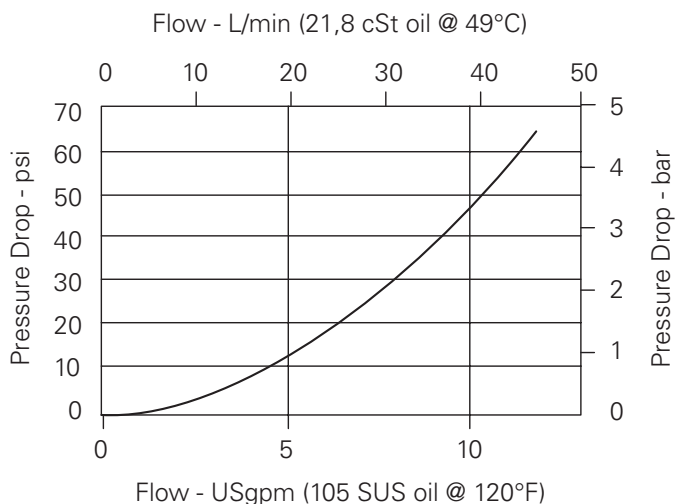
*Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)*

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 (port 2 to port 1)	5 drops/min. maximum @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Cavity	C-10-2
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 kit	565803 (Buna-N) 566086 (Viton®)

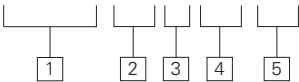
Viton is a registered trademark of E.I. DuPont

## Pressure Drop Curve

Cartridge only



MPV3 10 \* \*\* 00



**1 Function**  
MPV3 - Manual pull valve,  
with detent

**2 Size**  
10 - 10 Size

**3 Seals**  
N - Buna-N  
V - Viton®

**4 Port size**  
00 - Cartridge only

**5 Special features**  
00 - None  
(Only required if valve has  
special features, omitted  
if "00")

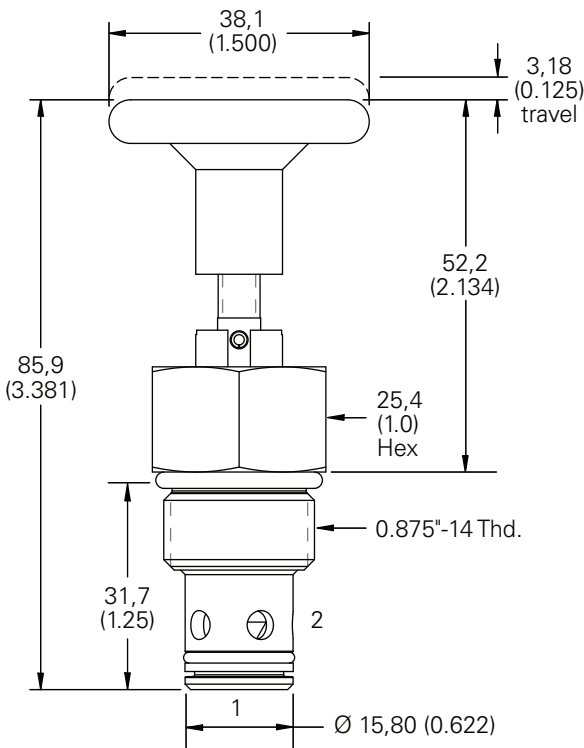
CODE	PORT SIZE	HOUSING NUMBER	
		Aluminum Light duty	Aluminum Fatigue rated
3B	3/8" BSPP	02-175462	—
6T	SAE 6	566151	—
2G	1/4" BSPP	—	876702
3G	3/8" BSPP	—	876703
6H	SAE 6	—	876700
8H	SAE 8	—	876701

See section J for housing details.

Dimensions

mm (inch)

Torque cartridge in  
aluminum housing  
47-54 Nm (35-40 ft. lbs)



# MSV1-12

Manual 'push and twist' valve

### Description

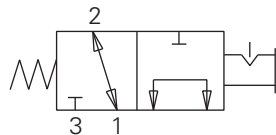
The MSV1-12 is a 3-way, 2 position manual 'push and twist' to actuate type valve.

### Operation

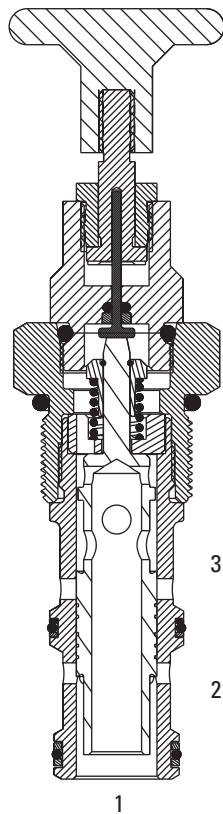
In the normal position, the valve allows flow from port 1 to port 2 while port 3 is blocked.

In the actuated position, flow is allowed from port 3 to port 1 while port 2 is blocked.

### Functional Symbol



### Profile View



### 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	41,8 L/min (11 USgpm)
Internal leakage	350 cc/min (21.5 in³/min)
Temperature range	-40° to 120°C (-40° to 248°F)
Cavity	C-12-3
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	0,29 kg (0.66 lbs)
Seal kit	9900171-000 (Buna-N) 9900172-000 (Viton®)

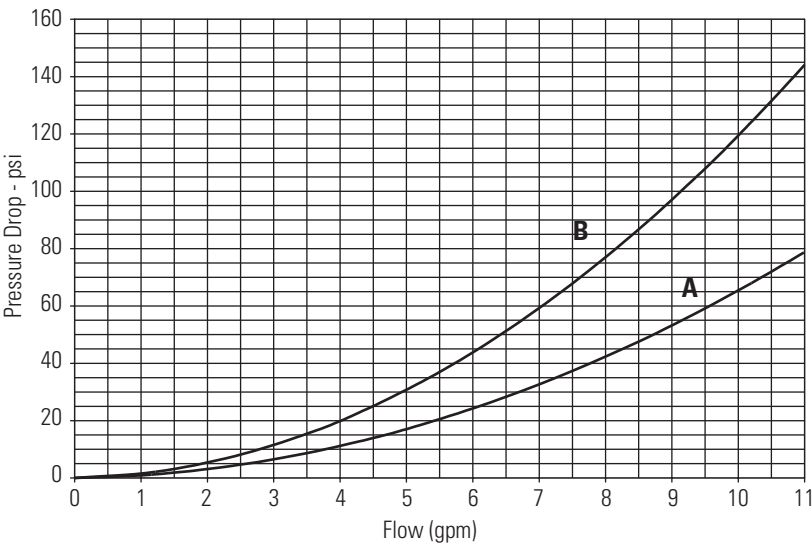
Viton is a registered trademark of E.I. DuPont

### Pressure Drop Curve

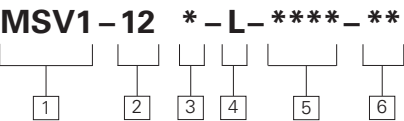
Cartridge only

A - P1 to P2

B - P3 to P1







**1** Function  
MSV1 - 3-way, 2 position  
manual push valve

**2** Size  
12 - 10 Size

**3** Seals  
Blank - Buna-N  
V - Viton<sup>®</sup>

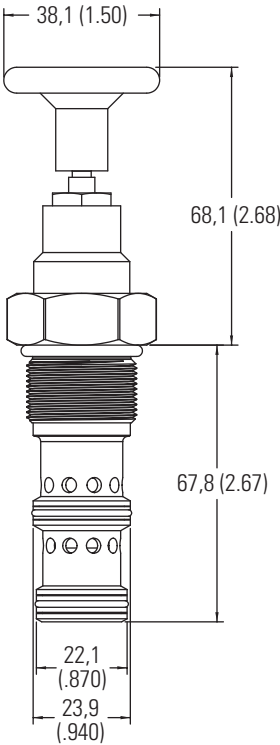
**4** Actuation Option  
L - 2 position 'push and twist'  
actuation  
  
E - Emergency stop actuation  
  
N - No Detent

**5** Port Size  
0 - Cartridge only

**6** Special features  
Blank - No special features

CODE	PORT SIZE	HOUSING NUMBER
		Aluminum
A6G	3/4" BSPP	02-161816
A12H	SAE 12	02-160646

**Dimensions**  
mm (inch)  
  
Torque cartridge in  
aluminum housing  
81-95 Nm (60-70 ft. lbs)



# MSV2-12

Manual 'push and twist' valve

### Description

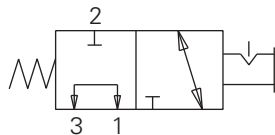
The MSV2-12 is a 3-way, 2 position manual 'push and twist' to acutate type valve.

### Operation

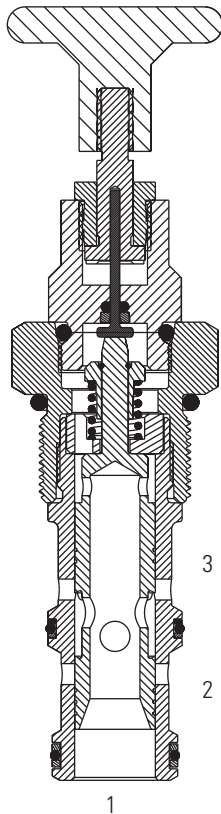
In the normal position, the valve allows flow from port 1 to port 3 while port 2 is blocked.

In the actuated position, flow is allowed from port 2 to port 1 while port 3 is blocked.

### Functional Symbol



### Profile View



### 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)
Internal leakage	350 cc/min (21.5 in³/min)
Temperature range	-40° to 120°C (-40° to 248°F)
Cavity	C-12-3
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	0,29 kg (0.66 lbs)
Seal kit	9900171-000 (Buna-N) 9900172-000 (Viton®)

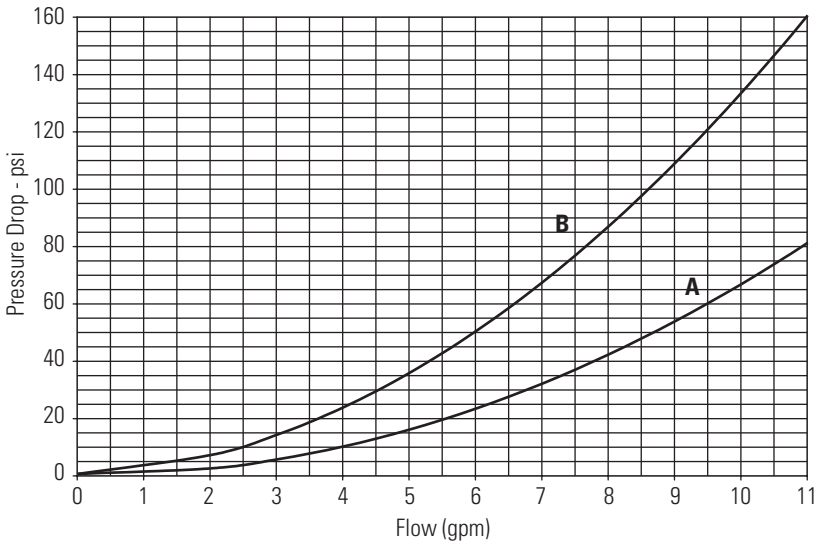
Viton is a registered trademark of E.I. DuPont

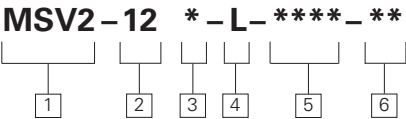
### Pressure Drop Curve

Cartridge only

A - P2 to P1

B - P1 to P3





**1 Function**  
MSV2 - 3-way, 2 position  
manual push valve

**2 Size**  
12 - 12 Size

**3 Seals**  
Blank - Buna-N  
V - Viton®

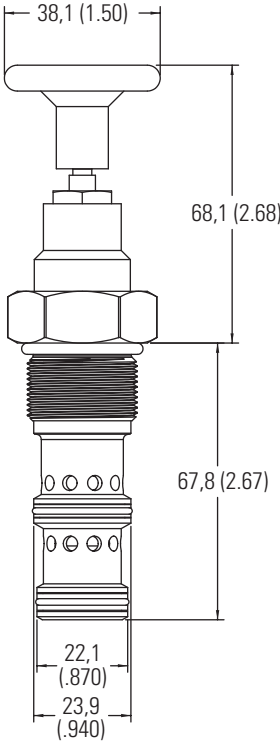
**4 Actuation Option**  
L - 2 position 'push and twist'  
actuation  
  
E - Emergency stop actuation  
  
N - No Detent

**5 Port Size**  
0 - Cartridge only

**6 Special features**  
Blank - No special features

CODE	PORT SIZE	HOUSING NUMBER
		Aluminum
A6G	3/4" BSPP	02-161816
A12H	SAE 12	02-160646

**Dimensions**  
mm (inch)  
  
Torque cartridge in  
aluminum housing  
81-95 Nm (60-70 ft. lbs)



# MSV5-12

Manual ‘push and twist’ valve

### Description

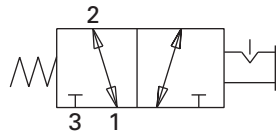
The MSV5-12 is a 3-way, 2 position manual ‘push and twist’ to actuate type valve.

### Operation

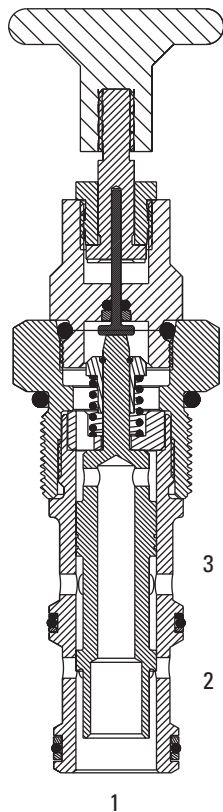
In the normal position, the valve allows flow from port 2 to port 1 while port 3 is blocked.

In the actuated position, flow is allowed from port 3 to port 2 while port 1 is blocked.

### Functional Symbol



### Profile View



### RATINGS AND SPECIFICATIONS

<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	41,8 L/min (11 USgpm)
Internal leakage	350 cc/min (21.5 in³/min)
Temperature range	-40° to 120°C (-40° to 248°F)
Cavity	C-12-3
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	0,29 kg (0.66 lbs)
Seal kit	9900171-000 (Buna-N) 9900172-000 (Viton®)

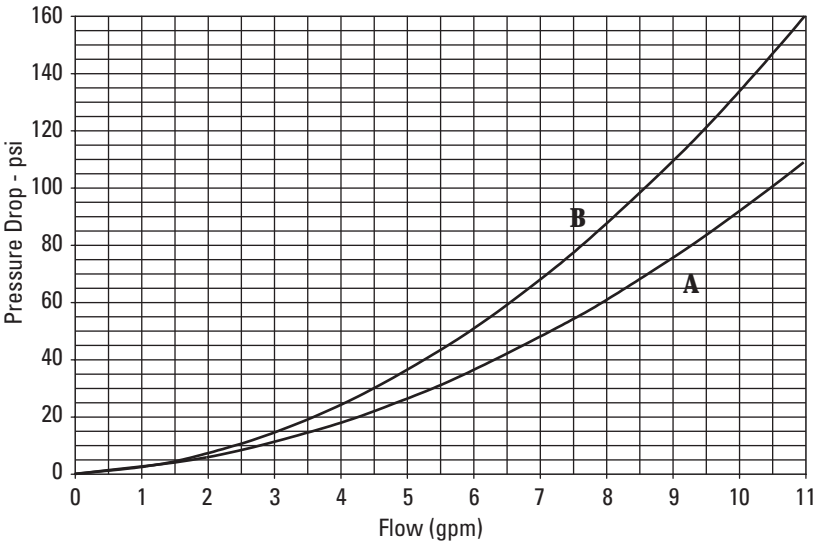
Viton is a registered trademark of E.I. DuPont

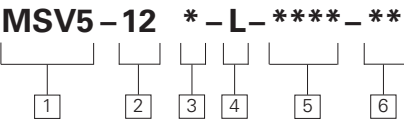
### Pressure Drop Curve

Cartridge only

A - P2 to P1

B - P3 to P2





**1 Function**  
MSV5 - 3-way, 2 position manual push valve

**2 Size**  
12 - 12 Size

**3 Seals**  
Blank - Buna-N  
V - Viton®

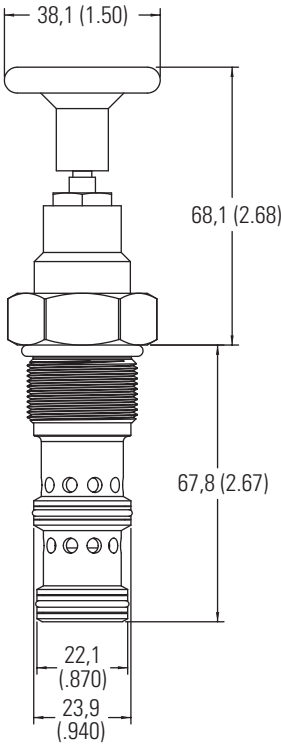
**4 Actuation Option**  
L - 2 position 'push and twist' actuation  
E - Emergency stop actuation  
N - No Detent

**5 Port Size**  
0 - Cartridge only

**6 Special features**  
Blank - No special features

CODE	PORT SIZE	HOUSING NUMBER
		Aluminum
A6G	3/4" BSPP	02-161816
A12H	SAE 12	02-160646

**Dimensions**  
mm (inch)  
Torque cartridge in aluminum housing  
81-95 Nm (60-70 ft. lbs)



# MSV3-12

Manual 'push and twist' valve

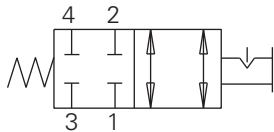
### Description

The MSV3-12 is a 4-way, 2 position manual 'push and twist' to actuate type valve.

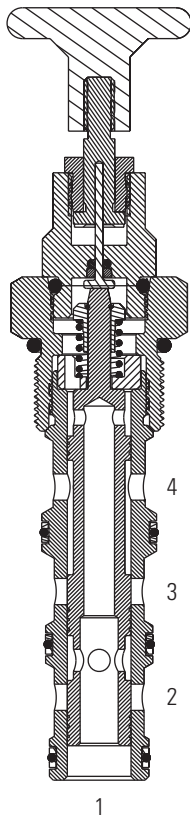
### Operation

In the normal position, all ports are blocked. In the actuated position, flow is allowed from port 3 to port 4 and from port 2 to port 1.

### Functional Symbol



### Profile View



### RATINGS AND SPECIFICATIONS

<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	53,2 L/min (14 USgpm)
Internal leakage	350 cc/min (21.5 in³/min)
Temperature range	-40° to 120°C (-40° to 248°F)
Cavity	C-12-4
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	0,32 kg (0.71 lbs)
Seal kit	02-160979 (Buna-N) 02160980 (Viton®)

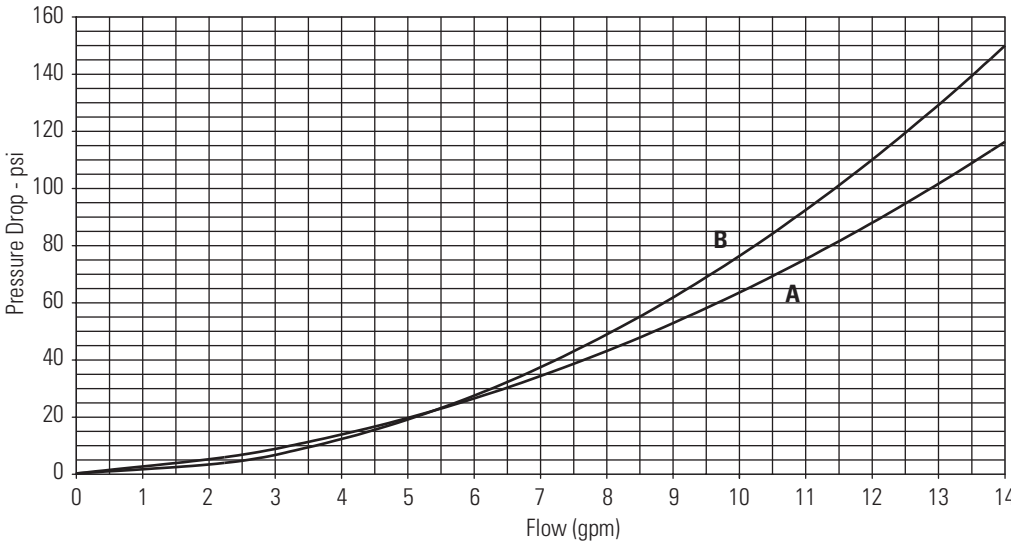
Viton is a registered trademark of E.I. DuPont

### Pressure Drop Curve

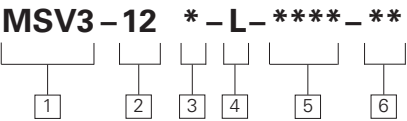
Cartridge only

A - P3 to P4

B - P2 to P1



D



1 Function  
MSV3 - 4-way, 2 position  
manual push valve

2 Size  
12 - 12 Size

3 Seals  
Blank - Buna-N  
V - Viton®

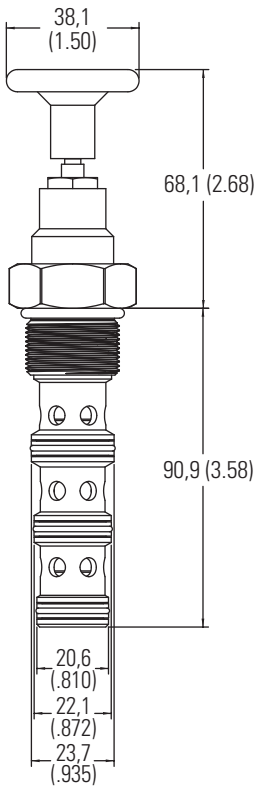
4 Actuation Option  
L - 2 position 'push and twist'  
actuation  
  
E - Emergency stop actuation  
  
N - No Detent

5 Port Size  
0 - Cartridge only

6 Special features  
Blank - No special features

CODE	PORT SIZE	HOUSING NUMBER
		Aluminum
A6G	3/4" BSPP	5986432-001
A10H	SAE 10	5986434-001
A12H	SAE 12	5986436-001

Dimensions  
mm (inch)  
  
Torque cartridge in  
aluminum housing  
81-95 Nm (60-70 ft. lbs)



# MSV4-12

Manual ‘push and twist’ valve

### Description

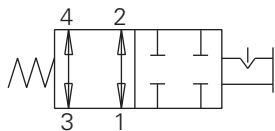
The MSV4-12 is a 4-way, 2 position manual ‘push and twist’ to actuate type valve.

### Operation

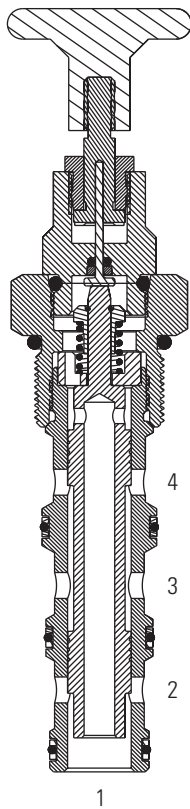
In the normal position, flow is allowed from port 3 to port 4 and from port 2 to port 1.

In the actuated position, all ports are blocked.

### Functional Symbol



### Profile View



### RATINGS AND SPECIFICATIONS

<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	53,2 L/min (14 USgpm)
Internal leakage	350 cc/min (21.5 in³/min)
Temperature range	-40° to 120°C (-40° to 248°F)
Cavity	C-12-4
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	0,32 kg (0.71 lbs)
Seal kit	02-160979 (Buna-N) 02160980 (Viton®)

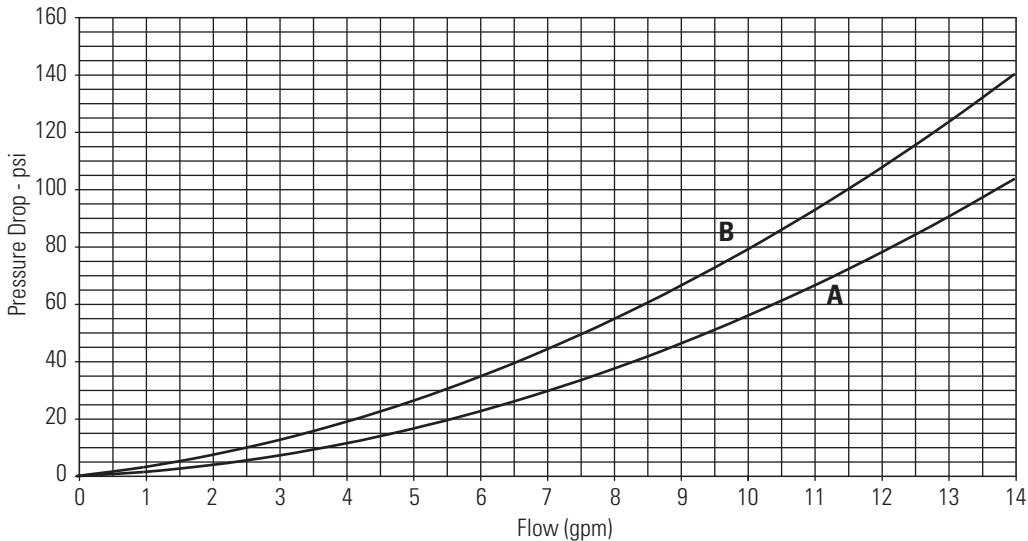
Viton is a registered trademark of E.I. DuPont

### Pressure Drop Curve

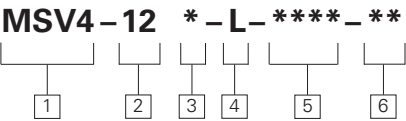
Cartridge only

A - P3 to P4

B - P2 to P1







**1   Function**  
**MSV3** - 4-way, 2 position manual push valve

**2   Size**  
12 - 12 Size

**3   Seals**  
**Blank** - Buna-N  
**V** - Viton®

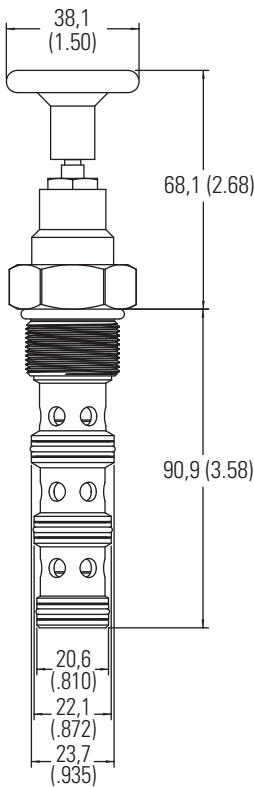
**4   Actuation Option**  
**L** - 2 position 'push and twist' actuation  
**E** - Emergency stop actuation  
**N** - No Detent

**5   Port Size**  
**0** - Cartridge only

**6   Special features**  
**Blank** - No special features

CODE	PORT SIZE	HOUSING NUMBER
		Aluminum
A6G	3/4" BSPP	5986432-001
A10H	SAE 10	5986434-001
A12H	SAE 12	5986436-001

**Dimensions**  
mm (inch)  
Torque cartridge in aluminum housing  
81-95 Nm (60-70 ft. lbs)



# MSV6-12

Manual 'push and twist' valve

### Description

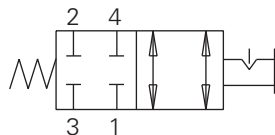
The MSV6-12 is a 4-way, 2 position manual 'push and twist' to actuate type valve.

### Operation

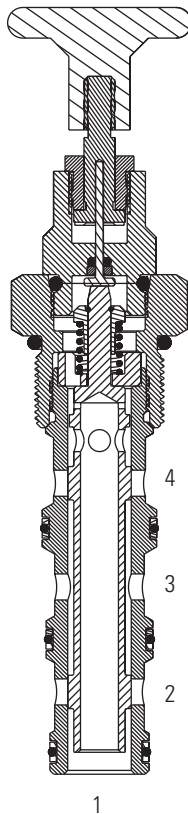
In the normal position, all ports are blocked. In the actuated position, flow is allowed from port 3 to

port 2 and from port 4 to port 1.

### Functional Symbol



### Profile View



### 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	53,2 L/min (14 USgpm)
Internal leakage	350 cc/min (21.5 in³/min)
Temperature range	-40° to 120°C (-40° to 248°F)
Cavity	C-12-4
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	0,32 kg (0.71 lbs)
Seal kit	02-160979 (Buna-N) 02-160980 (Viton®)

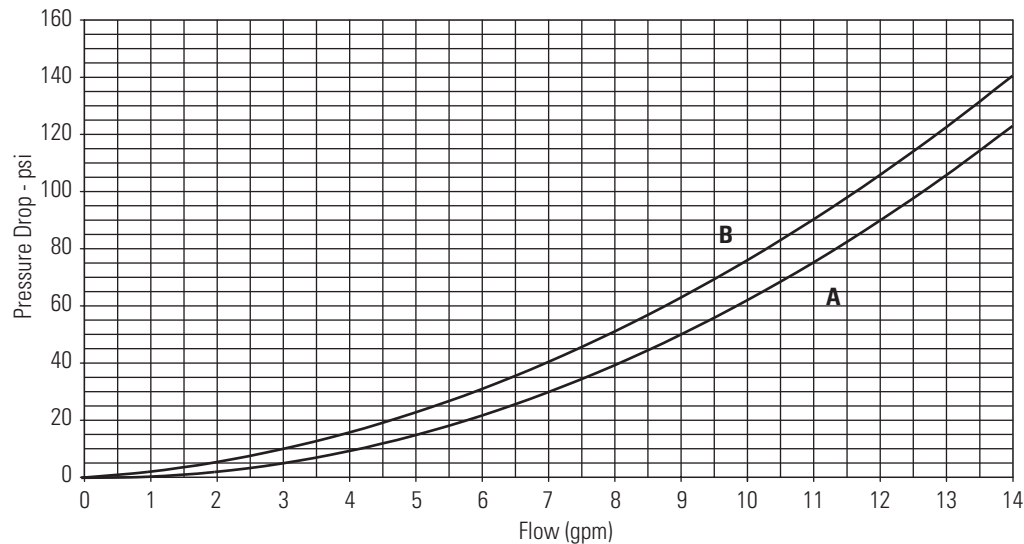
Viton is a registered trademark of E.I. DuPont

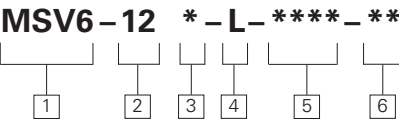
### Pressure Drop Curve

Cartridge only

A - P4 to P1

B - P3 to P2





1 Function  
MSV6 - 4-way, 2 position  
manual push valve

2 Size  
12 - 12 Size

3 Seals  
Blank - Buna-N  
V - Viton®

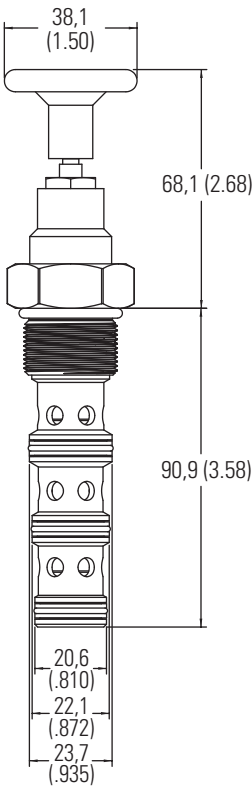
4 Actuation Option  
L - 2 position 'push and twist'  
actuation  
  
E - Emergency stop actuation  
  
N - No Detent

5 Port Size  
0 - Cartridge only

6 Special features  
Blank - No special features

CODE	PORT SIZE	HOUSING NUMBER
		Aluminum
A6G	3/4" BSPP	5986432-001
A10H	SAE 10	5986434-001
A12H	SAE 12	5986436-001

Dimensions  
mm (inch)  
  
Torque cartridge in  
aluminum housing  
81-95 Nm (60-70 ft. lbs)



D

# MSV7-12

Manual ‘push and twist’ valve

## Description

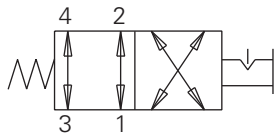
The MSV7-12 is a 4-way, 2 position manual ‘push and twist’ to actuate type valve.

## Operation

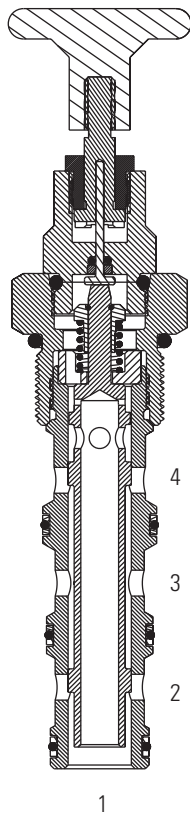
In the normal position, flow is allowed from port 3 to port 4 and from port 2 to port 1.

In the actuated position, flow is allowed from port 3 to port 2 and from port 4 to port 1.

## Functional Symbol



## Profile View



## 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	350 cc/min (21.5 in³/min)
Temperature range	-40° to 120°C (-40° to 248°F)
Cavity	C-12-4
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	0,32 kg (0.71 lbs)
Seal kit	02-160979 (Buna-N) 02-160980 (Viton®)

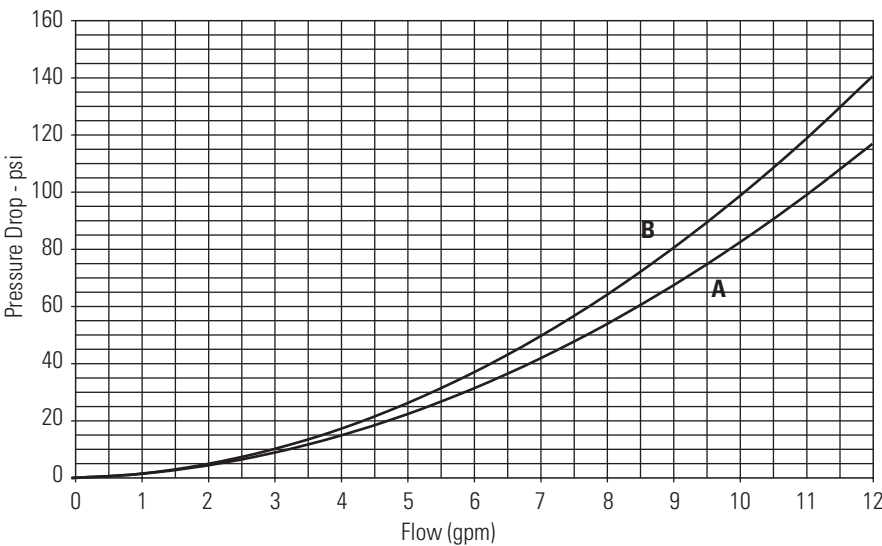
Viton is a registered trademark of E.I. DuPont

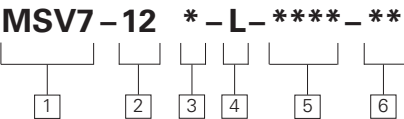
## Pressure Drop Curve

Cartridge only

A - P4 to P1, P3 to P2

B - P2 to P1, P3 to P4





**1 Function**  
MSV7 - 4-way, 2 position manual push valve

**2 Size**  
12 - 12 Size

**3 Seals**  
Blank - Buna-N  
V - Viton®

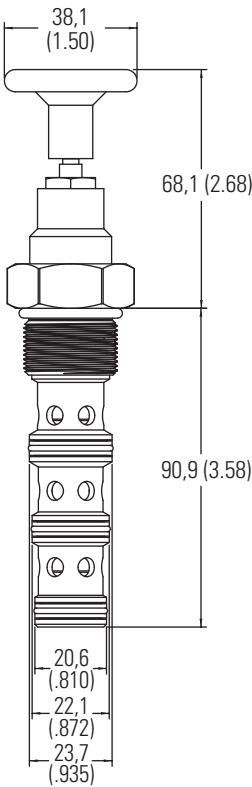
**4 Actuation Option**  
L - 2 position 'push and twist' actuation  
E - Emergency stop actuation  
N - No Detent

**5 Port Size**  
0 - Cartridge only

**6 Special features**  
Blank - No special features

CODE	PORT SIZE	HOUSING NUMBER
		Aluminum
A6G	3/4" BSPP	5986432-001
A10H	SAE 10	5986434-001
A12H	SAE 12	5986436-001

**Dimensions**  
mm (inch)  
Torque cartridge in aluminum housing  
81-95 Nm (60-70 ft. lbs)



# DSV2-8

Shuttle valve

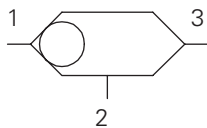
### Description

The DSV2-8-B is a direct acting, ball type, shuttle valve.

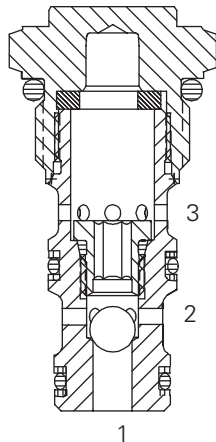
### Operation

The DSV2-8-B shuttle valve senses the higher of two pressures at port 3 or port 1 and directs it to port 2.

### Functional Symbol



### Sectional View



### RATINGS AND SPECIFICATIONS

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

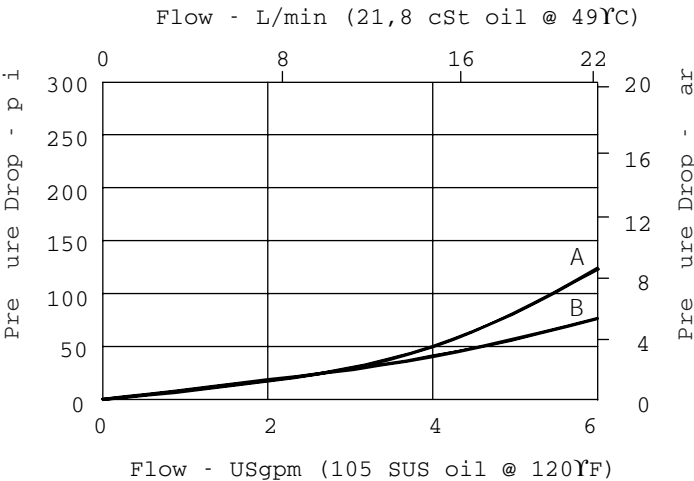
Typical application pressure (all ports)	240 bar (3500 psi) steel housing
Cartridge fatigue pressure (infinite life)	240 bar (3500 psi)
Rated flow	23 L/min (6 USgpm)
Internal leakage	Between ports 2 and 1, and 2 and 3; 5 drops/min. maximum @ 240 bar (3500 psi)
Cavity	C-8-3
Standard housing materials	Aluminum or steel
Temperature range	-40° to 120°C (-40° to 248°F)
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Weight cartridge only	0,06 kg (0.14 lbs)
Seal kit	02-160755 (Buna-N) 02-160756 (Viton®)

Viton is a registered trademark of E.I. DuPont

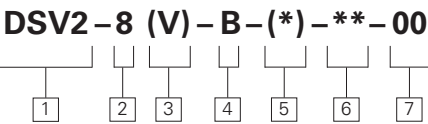
### Pressure Drop Curves

Cartridge only

- A - Port 1 to port 2
- B - Port 3 to port 2



D



1 Function  
DSV2 - Shuttle valve

2 Size  
8 - 8 Size

3 Seals  
Blank - Buna-N  
V - Viton®

4 Style  
B - Ball

5 Valve housing material  
Omit for cartridge only  
A - Aluminum  
S - Steel

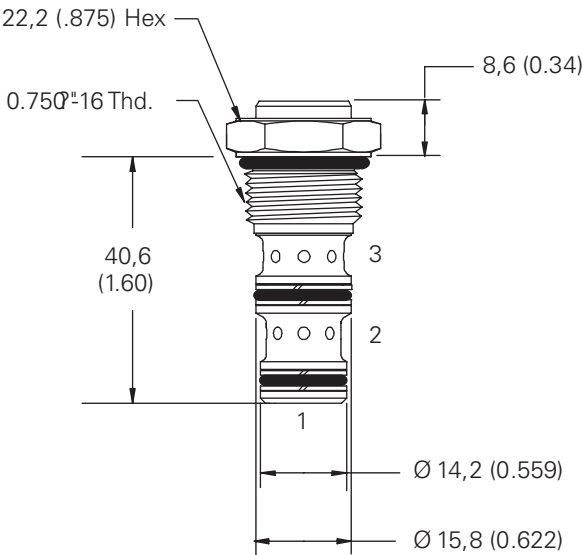
6 Port size  
O - Cartridge only

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 section J for housing details.

7 Special features  
00 -None  
(Only required if valve has  
special features, omitted  
if "00")  
SS - 316TI Stainless Steel  
external components

Dimensions  
mm (inch)  
Torque cartridge in  
aluminum or steel housing  
34-41 Nm (25-30 ft. lbs)



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

# PSV2-8

Pressure sequence valve  
Direct acting, external pilot,  
internal drain

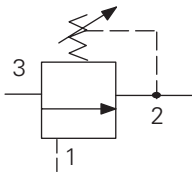
## Description

The PSV2-8 is an externally piloted, direct acting, sliding spool, adjustable, pressure sequence valve.

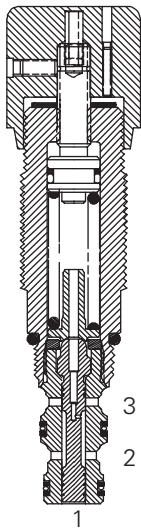
## Operation

The PSV2-8 remains closed until the predetermined pressure is reached at port 1, which then allows flow from port 3 to port 2.

## Functional Symbol



## Sectional View



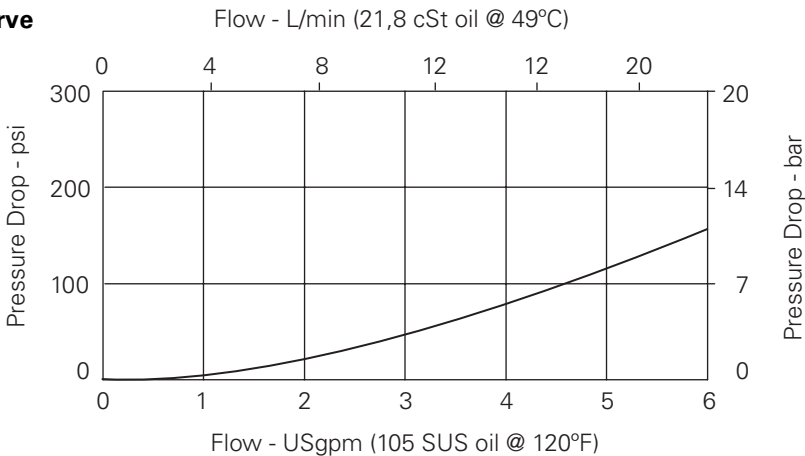
## RATINGS AND SPECIFICATIONS

<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Sequence pressure ranges	13 – 3,4–90 bar (50–1300 psi) 30 – 35–210 bar (500–3000 psi)
Rated flow	23 L/min (6 USgpm)
Reseat pressure	More than 90% of cracking pressure
Internal leakage	82 cm³/min. (5 in³/min) @ 210 bar (3000 psi)
Hysteresis	less than 3 bar (45 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Cavity	C-8-3
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	0,21 kg (0.47 lbs)
Seal kits	02-160755 Buna N 02-160756 Viton®

Viton is a registered trademark of E.I. DuPont

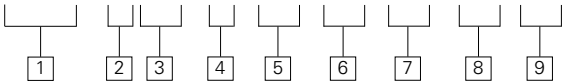
## Pressure Drop Curve

Port 3 to 2,  
valve fully open  
Cartridge only





PSV2 – 8 (V) – \* – (\*) – \*\* – \*\* / \*\* – 00



- 1 Function**  
**PSV2** - Pressure sequence
- 2 Size**  
**8** - 8 Size
- 3 Seals**  
**Blank** - Buna-N  
**V** - Viton®
- 4 Adjustment**  
**C** - Cap  
**K** - Knob  
**S** - Screw

- 5 Valve housing material**  
Omit for cartridge only  
**A** - Aluminum  
Maximum operating pressure  
210 bar (3000 psi)
- 7 Sequence pressure range**  
**13** - 3,4-90 bar (50-1300 psi)  
**30** - 35-210 bar (500-3000 psi)
- 6 Port size**  
**0** - Cartridge only

- 8 Pressure setting**  
**Optional** - Specify in 100 psi increments If not specified, set at:  
**13** - 44 bar (650 psi)  
**30** - 100 bar (1500 psi)

- 9 Special features**  
**00** - None  
(Only required if valve has special features, omitted if "00")

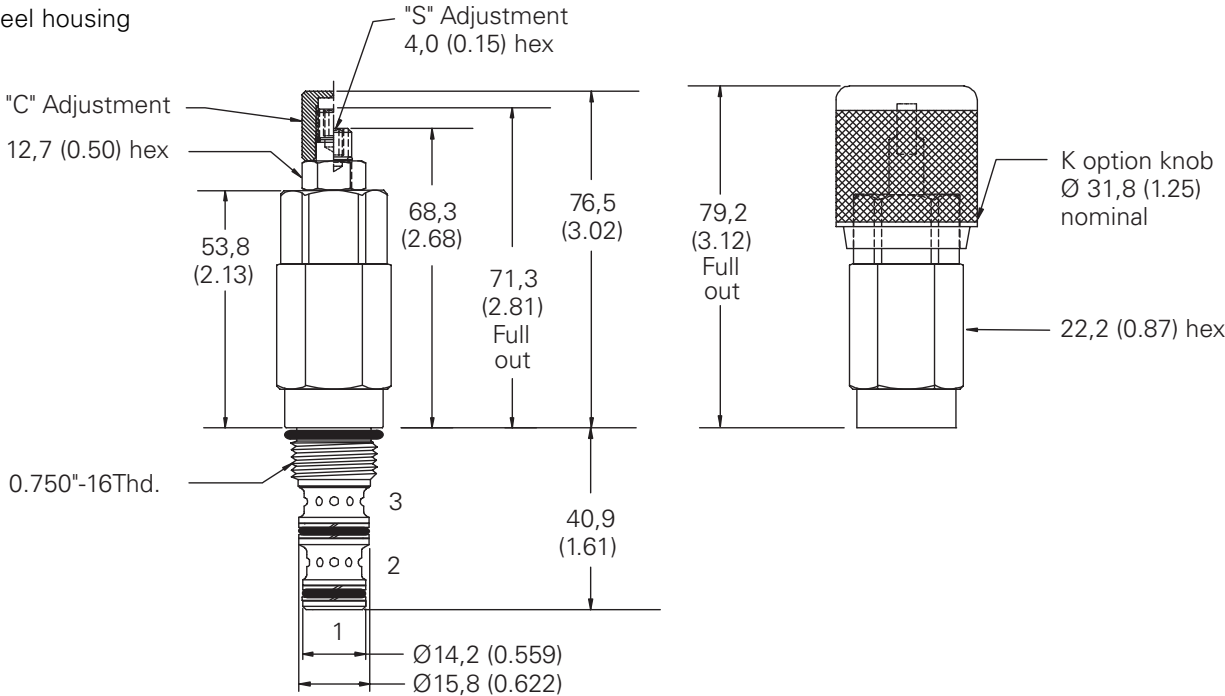
CODE	PORT SIZE	HOUSING NUMBER
		Aluminum Fatigue rated
4T	SAE 4	02-160741
6T	SAE 6	02-160742
2G	1/4" BSPP	02-160739
3G	3/8" BSPP	02-160740

See section J for housing details.

Dimensions

mm (inch)

Torque cartridge in  
aluminum or steel housing



# PSV4-8

Pressure sequence valve  
Direct acting, external pilot,  
internal drain, high pressure

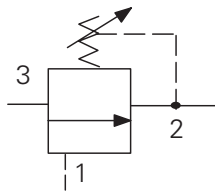
## Description

The PSV4-8 is an external pilot, direct acting, sliding spool, adjustable, pressure sequence valve.

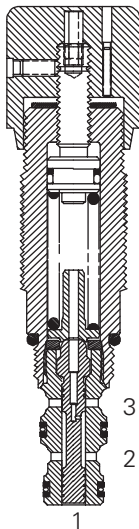
## Operation

The PSV4-8 remains closed until a predetermined pressure is applied at pilot port 1, which then allows flow from port 3 to port 2.

## Functional Symbol



## Sectional View

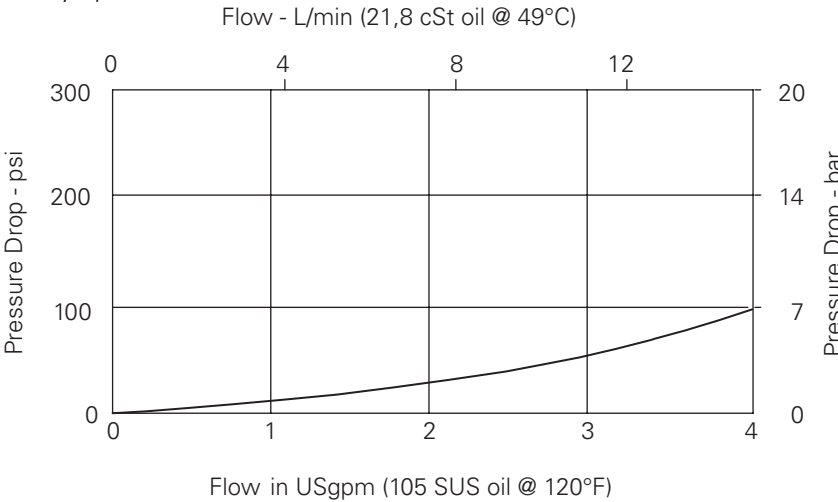


## RATINGS AND SPECIFICATIONS

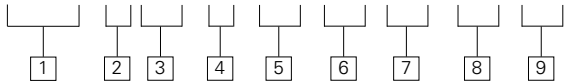
<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
Typical application pressure (all ports)	350 bar (5000 psi)
Cartridge fatigue pressure (infinite life)	280 bar ( 4000 psi)
Rated flow	15 L/min (4 USgpm)
Sequence pressure ranges	15 – 28–100 bar (400–1500 psi) 30 – 3,4–210 bar (50–3000 psi) 50 – 124–350 bar (1800–5000 psi)
Reseat pressure	More than 90% of cracking pressure
Internal leakage	5 in³/min @ 210 bar (3000 psi)
Hysteresis	less than 3 bar (45 psi)
Temperature range	-40° to 120°C (-40° to 248°F).
Cavity	C-8-3
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	0,21 kg (0.47 lbs)
Seal kits	02-160755 Buna N 02-160756 Viton®
Viton is a registered trademark of E.I. DuPont	

## Pressure Drop Curve

Port 3 to 2, valve fully open  
Cartridge only



PSV4-8 (V) - \* - (\*) - \*\* - \*\* / \*\* - 00



1 Function

**PSV4** - Pressure sequence valve

2 Size

**8** - 8 Size

3 Seals

**Blank** - Buna-N  
**V** - Viton®

4 Adjustment

**C** - Cap  
**K** - Knob  
**S** - Screw

5 Valve housing material

Omit for cartridge only  
**S** - Steel  
**A** - Aluminum

6 Port size

**0** - Cartridge only

CODE	PORT SIZE	HOUSING NUMBER	
		Aluminum Fatigue rated	Steel Fatigue rated
<b>4T</b>	SAE 4	02-160741	02-160745
<b>6T</b>	SAE 6	02-160742	02-160746
<b>2G</b>	1/4" BSPP	02-160739	02-160743
<b>3G</b>	3/8" BSPP	02-160740	02-160744

See section J for housing details.

9 Special features

**00** - None  
(Only required if valve has special features, omitted if "00")

7 Sequence pressure range

**15** - 28-100 bar  
(400-1500 psi)  
**30** - 3,4-210  
(50-3000 psi)  
**50** - 124-350 bar  
(1800-5000 psi)

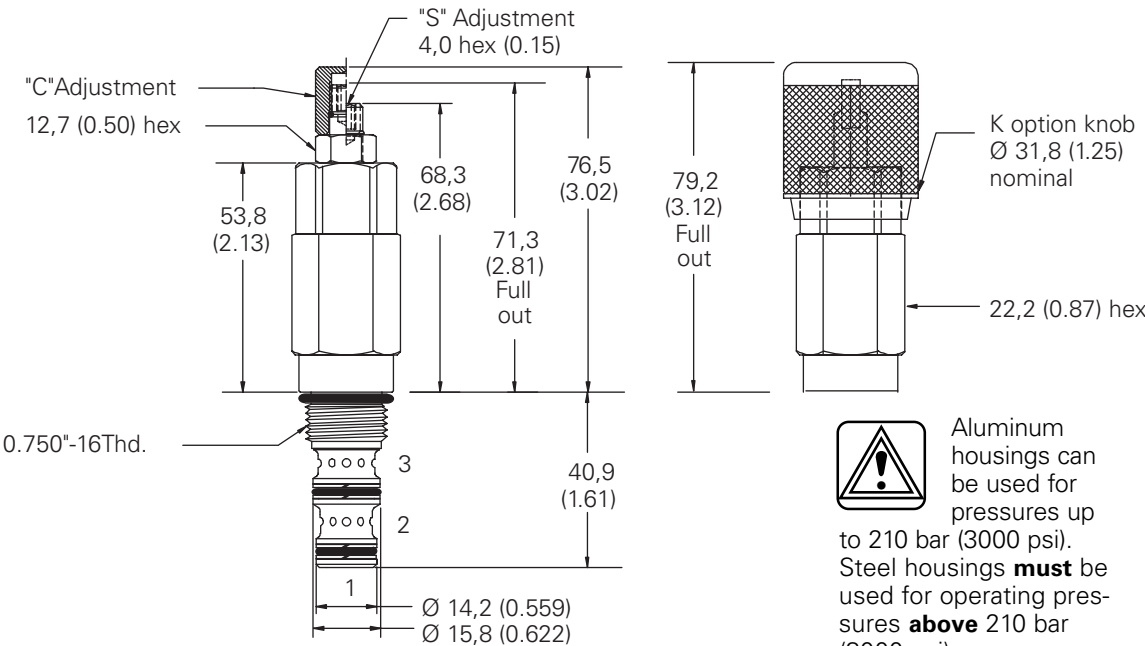
8 Pressure setting

**Optional** - Specify in 100 psi increments.  
If not specified, set at:  
**15** - 52 bar (750 psi)  
**30** - 100 bar (1500 psi)  
**50** - 175 bar (2500 psi)

Dimensions

mm (inch)

Torque cartridge in steel or aluminum housing 34-41 Nm (25-30 ft. lbs)



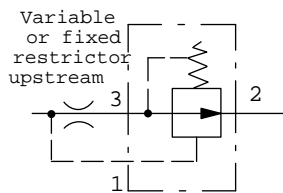
# PCS3-12

Pressure compensator

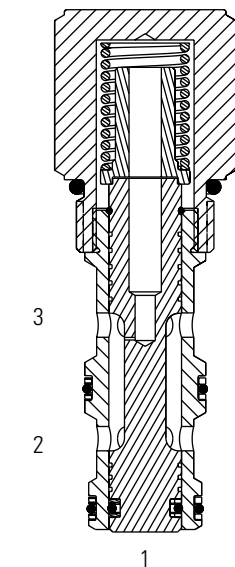
## Description

The PCS3-12 is a screw-in, pressure compensator cartridge.

## Functional Symbols



## Sectional View



## Operation

This valve, when used with either a fixed or variable orifice between port 1 and port 3, maintains a constant flow. This is based on what ever pressure differential is chosen. Flow out of port 2, regardless of pressure, changes downstream on port 2.

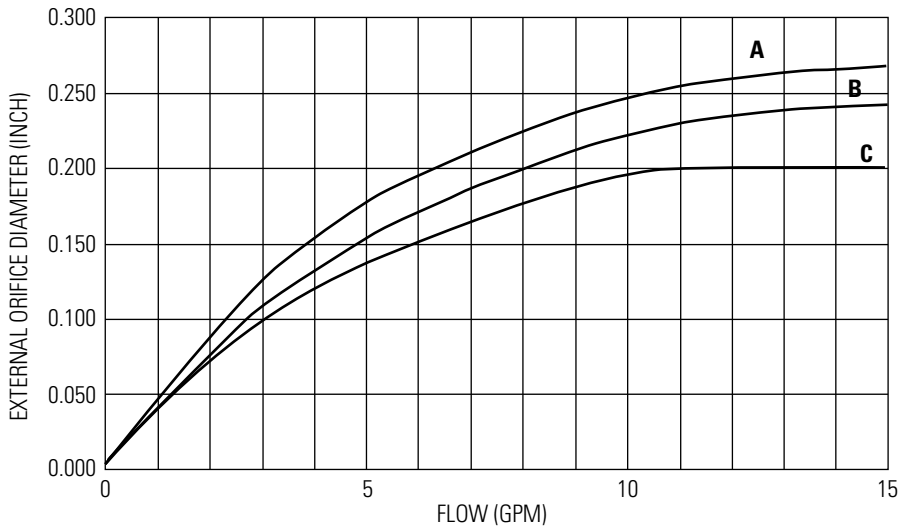
## RATINGS AND SPECIFICATIONS

<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
Typical application pressure (all ports)	240 bar (3500 psi)
Cartridge fatigue pressure (infinite life)	240 bar (3500 psi)
Rated flow	58 L/min (15 USgpm)
Cavity	C-12-3
Standard housing materials	Customized housings are necessary for close-coupling, the compensator and orifice
Temperature range	-40° to 120°C (-40° to 248°F)
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Weight cartridge only	0,30 kg (.55 lbs)
Seal kits	9900333-000 Buna-N 9900334-000 Viton®
Viton is a registered trademark of E.I. DuPont	

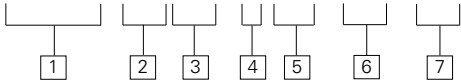
## Performance Characteristics

Cartridge only

- A** – 2,8 bar (40 PSI) Control DP
- B** – 5,5 bar (80 PSI) Control DP
- C** – 11,0 bar(160 PSI) Control DP



PCS3-12 (V) - \* (S) - \*\*\* - 00

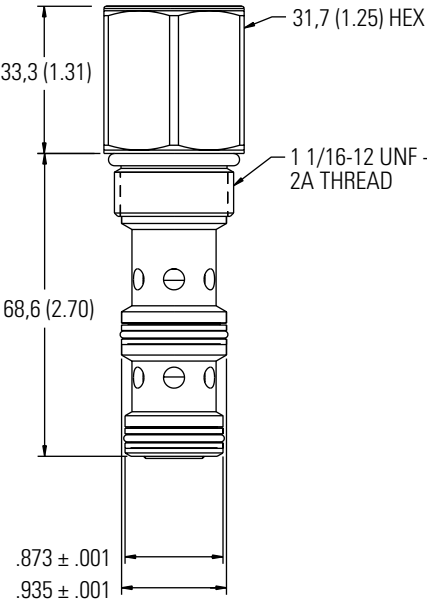


<div>1</div> <div>Function</div> <div>PCS3 – Pressure compensator restrictive type</div>	<div>3</div> <div>Seals</div> <div>Blank – Buna-N V – Viton</div>	<div>5</div> <div>Spool seals</div> <div>Blank – No seal on spool. S – Seal on spool. (For load holding applications where leakage from port 1 to 2 could cause cylinder drift, use of seal will increase hysteresis)</div>	<div>6</div> <div>Pressure differential (nominal)</div> <div>40 – 2,8 bar (40 psi) 80 – 5,5 bar (80 psi) 160 – 8,3 bar (120 psi)</div>
<div>2</div> <div>Size</div> <div>12 – 12 Size</div>	<div>4</div> <div>Port size</div> <div>0 – Cartridge only (Customized housings are necessary for close-coupling, compensator and orifice)</div>		<div>7</div> <div>Special features</div> <div>00 – None (Only required if valve has special features, omit if 00)</div>

Dimensions

mm (inch)

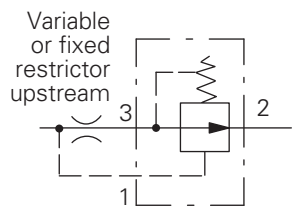
Torque into aluminum housing to 81-95Nm (60-70 ft. lbs)



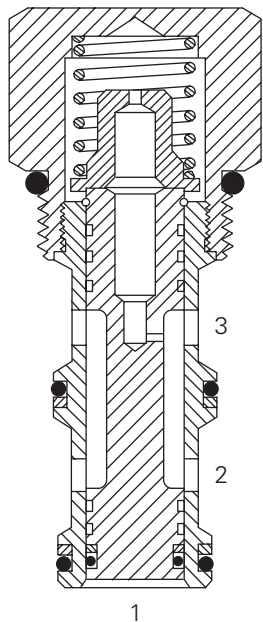
**Description**

The PCS3-16 is a screw-in, pressure compensator cartridge.

**Functional Symbols**



**Sectional View**



**Operation**

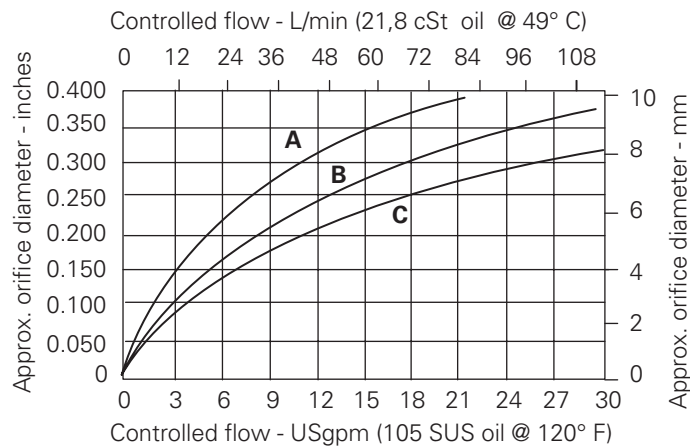
This valve, when used with either a fixed or variable orifice between port 1 and port 3, maintains a constant flow. This is based on whatever pressure differential is chosen. Flow out of port 2, regardless of pressure, changes downstream on port 2.

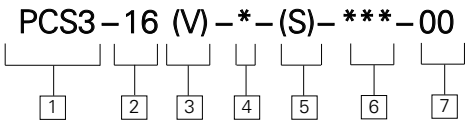
RATINGS AND SPECIFICATIONS	
Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)	
Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	114 L/min (30 USgpm)
Cavity	C-16-3
Standard housing materials	Customized housings are necessary for close-coupling the compensator and orifice
Temperature range	-40° to 120°C (-40° to 248°F)
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Weight cartridge only	0,38 kg (0.84 lbs)
Seal kits	565811 Buna-N 889610 Viton®
Viton is a registered trademark of E.I. DuPont	

**Performance Characteristics**

Cartridge only

**A** – 2,8 bar (40 psi) (control ΔP)  
**B** – 5,5 bar (80 psi) (control ΔP)  
**C** – 11,0 bar (160 psi) (control ΔP)



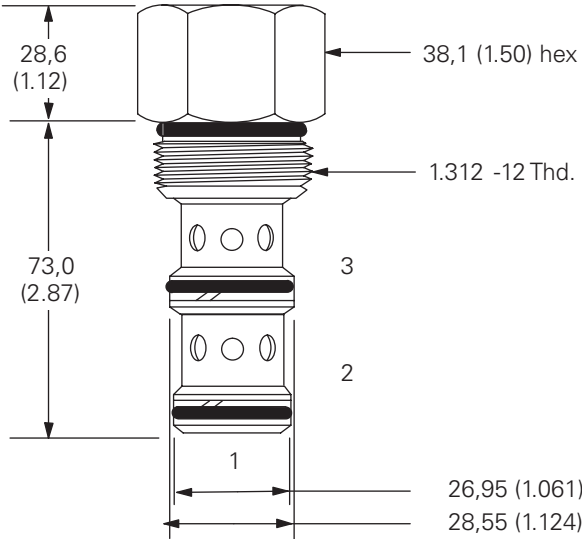


<b>1 Function</b> PCS3 – Pressure compensator restrictive type	<b>3 Seals</b> Blank – Buna-N V – Viton	<b>5 Spool seals</b> Blank – No seal on spool S – Seal on spool (For load holding applications where leakage from port 1 to 2 could cause cylinder drift, use of seal will increase hysteresis)	<b>6 Pressure differential (nominal)</b> 40 – 2,8 bar (40 psi) 80 – 5,5 bar (80 psi) 160 – 11,0 bar (160 psi)
<b>2 Size</b> 16 – 16 Size	<b>4 Port size</b> 0 – Cartridge only (Customized housings are necessary for close-coupling, compensator and orifice)		<b>7 Special features</b> 00 – None (Only required if valve has special features, omit if 00)

Dimensions

mm (inch)

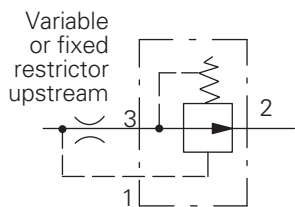
Torque into aluminum housing to 108-122 Nm (80-90 ft. lbs)



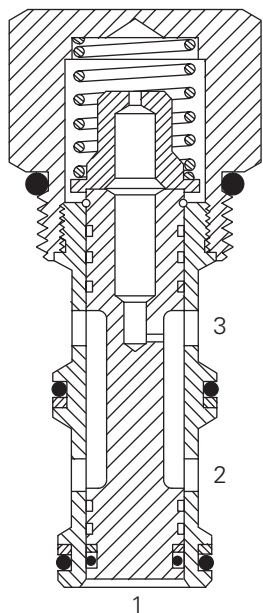
**Description**

The PCS3-20 is a screw-in, pressure compensator cartridge.

Functional Symbols



Sectional View



**Operation**

This valve, when used with either a fixed or variable orifice between port 1 and port 3, maintains a constant flow. This is based on whatever pressure differential is chosen. Flow out of port 2, regardless of pressure, changes downstream on port 2.

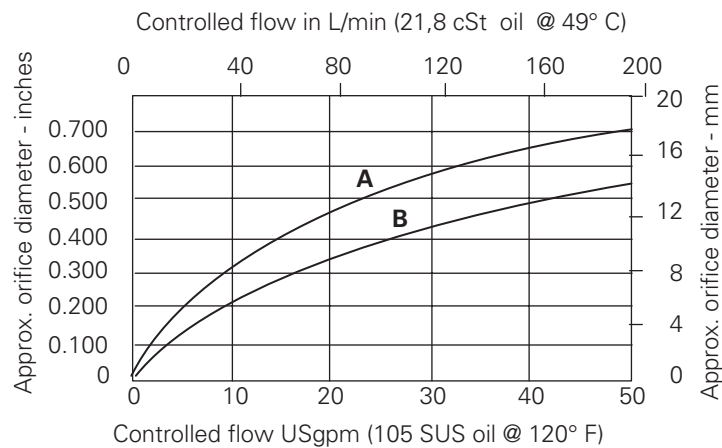
RATINGS AND SPECIFICATIONS	
Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)	
Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	189 L/min (50 USgpm)
Cavity	C-20-3
Standard housing materials	Customized housings are necessary for close-coupling the compensator and orifice
Temperature range	-40° to 120°C (-40° to 248°F)
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Weight cartridge only	0,88 kg (1.94 lbs)
Seal kits	889616 Buna-N 02-175433 Viton®
Viton is a registered trademark of E.I. DuPont	

**Performance Characteristics**

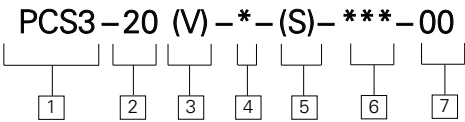
Cartridge only

**A** – 2,8 bar (40 psi) (control ΔP)

**B** – 5,5 bar (80 psi) (control ΔP)





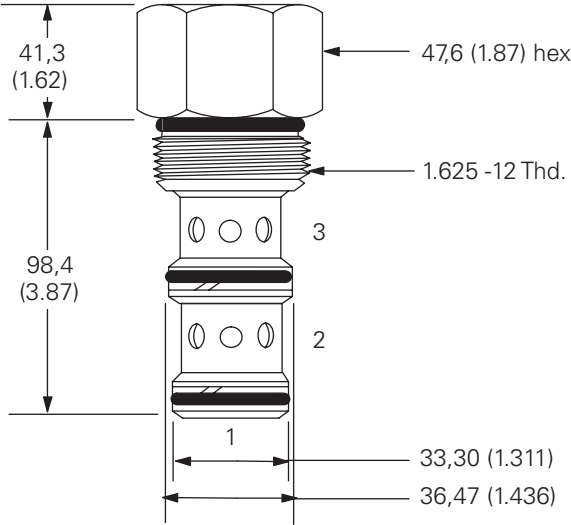


<b>1 Function</b> PCS3 – Pressure compensator restrictive type	<b>3 Seals</b> Blank – Buna-N V – Viton	<b>5 Spool seals</b> Blank – No seal on spool S – Seal on spool. (For load holding applications where leakage from port 1 to 2 could cause cylinder drift, use of seal will increase hysteresis)	<b>6 Pressure differential (nominal)</b> 40 – 2,8 bar (40 psi) 80 – 5,5 bar (80 psi)
<b>2 Size</b> 20 – 20 Size	<b>4 Port size</b> 0 – Cartridge only (Customized housings are necessary for close-coupling, compensator and orifice)		<b>7 Special features</b> 00 – None (Only required if valve has special features, omit if 00)

Dimensions

mm (inch)

Torque into aluminum housing to 128-155 Nm (95-115 ft. lbs)



# PTS2-16

Pilot to shift valve

## Description

The PTS2-16 is a 3-way, 2 position, pilot operated, directional screw-in cartridge valve.

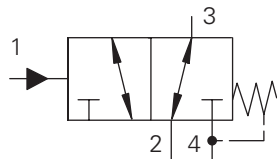
## Operation

This valve allows flow between ports 2 and 3 while blocking port 4 until sufficient pressure has been applied to port 1 and the

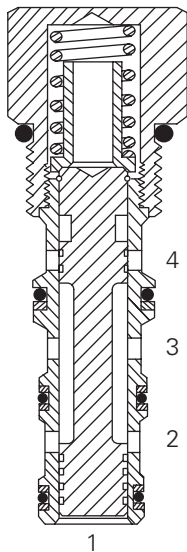
spring bias is overcome. At that time, flow is directed between ports 3 and 4 while blocking port 2. **During the**

**cross-over transition, all ports are blocked.** The spring chamber for this valve is internally vented to port 4 (tank).

## Functional Symbol



## Sectional View



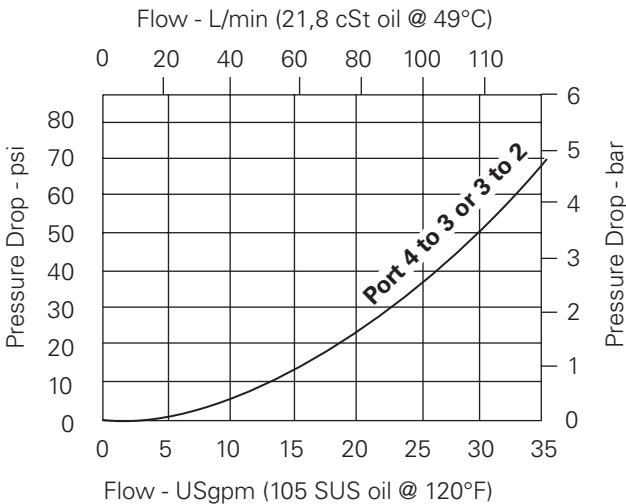
## RATINGS AND SPECIFICATIONS

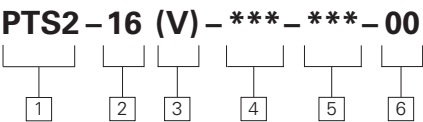
<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	132 L/min (35 USgpm)
Internal leakage	164 cc/min (10 in <sup>3</sup> /min) maximum @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Pilot pressures	40 - 2,75 bar (40 psi) 80 - 5,5 bar (80 psi) 160 - 11,0 bar (160 psi)
Pilot displacement volume	1,97 cm <sup>3</sup> (0.12 in <sup>3</sup> )
Cavity	C-16-4
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	0,5 kg (1.12 lbs)
Seal kit	889634 (Buna-N) 889638 (Viton®)

Viton is a registered trademark of E.I. DuPont

## Pressure Drop Curve

Cartridge only





1 Function  
PTS2 - Pilot to shift valve

2 Size  
16 - 16 Size

3 Seals  
Blank - Buna-N  
V - Viton®

4 Port size  
O - Cartridge only

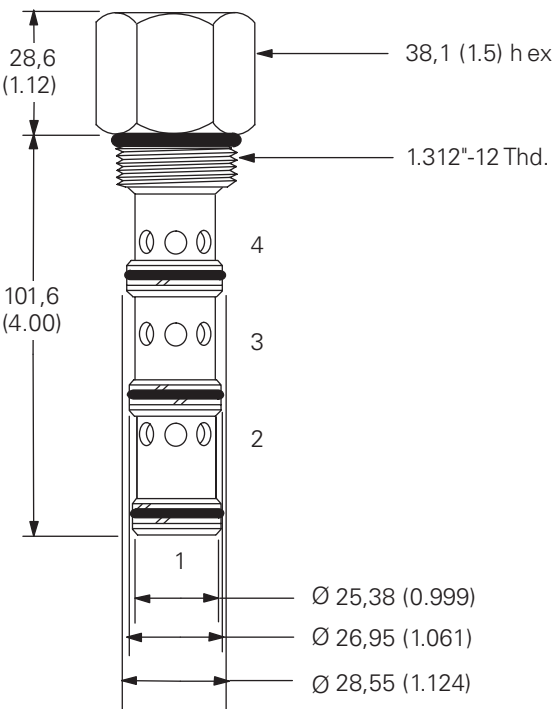
CODE	PORT SIZE	HOUSING NUMBER	
		Aluminum Light duty	Aluminum Fatigue rated
12T	SAE 12	566411	–
6B	3/4" BSPP	02-175468	–
10H	SAE 10	–	876729
12H	SAE 12	–	876731
4G	1/2" BSPP	–	876728
6G	3/4" BSPP	–	876730

See section J for housing details.

5 Pilot to shift (nominal)  
40 - 2,75 bar (40 psi)  
80 - 5,5 bar (80 psi)  
160 - 11,0 bar (160 psi)

6 Special features  
00 - None  
(Only required if valve has  
special features, omitted  
if "00")  
SS - 316TI Stainless Steel  
external components

Dimensions  
mm (inch)  
Torque cartridge in  
aluminum housing  
47-54 Nm (35-40 ft. lbs)



# PTS2-20

Pilot to shift valve

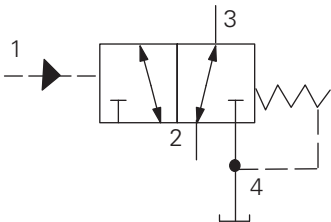
## Description

The PTS2-20 is a 3-way, 2 position, pilot operated, directional screw-in cartridge valve.

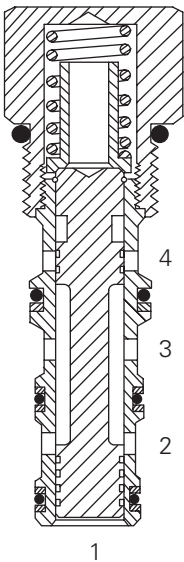
## Operation

This valve allows flow between ports 2 and 3 while blocking port 4 until sufficient pressure has been applied at port 1 and the spring bias is overcome. At that time, flow is directed between ports 3 and 4 while blocking port 2. **During the cross-over transition, all ports are blocked.** The spring chamber for this valve is vented internally to port 4 (tank).

## Functional Symbol



## Sectional View



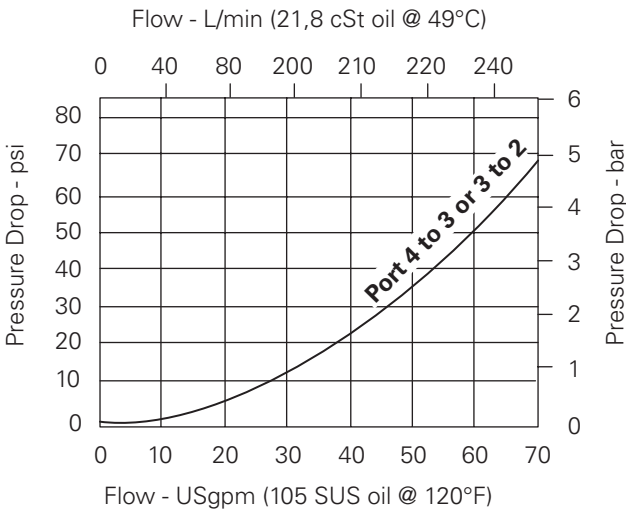
## RATINGS AND SPECIFICATIONS

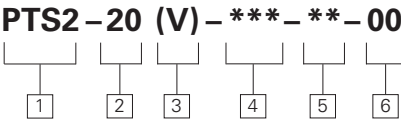
<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	265 L/min (70 USgpm)
Internal leakage	164 cc/min (10 in³/min) maximum @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Pilot pressures	40 - 2,75 bar (40 psi) 80 - 5,5 bar (80 psi)
Pilot displacement volume	6,72 cm³ (0.41 in³)
Cavity	C-20-4
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	0,5 kg (1.12 lbs)
Seal kit	565916 (Buna-N) 889646 (Viton®)

Viton is a registered trademark of E.I. DuPont

## Pressure Drop Curve

Cartridge only





1 Function  
PTS2 - Pilot to shift valve

2 Size  
20 - 20 Size

3 Seals  
Blank - Buna-N

4 Port size  
O - Cartridge only

V - Viton®

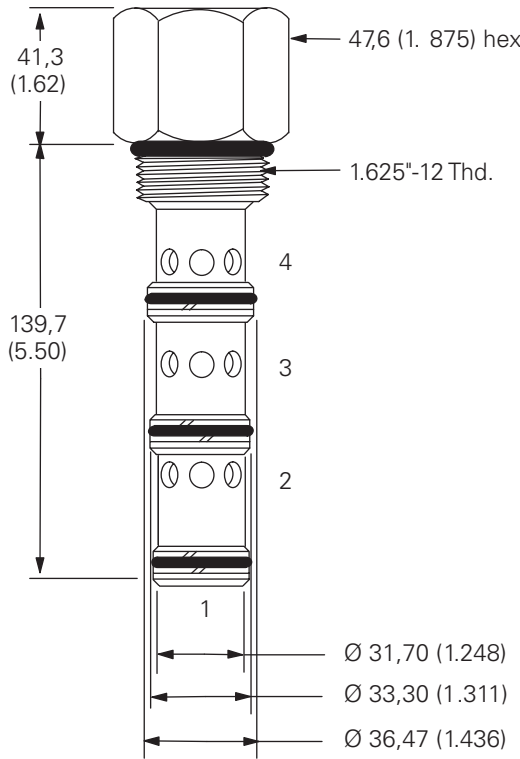
CODE	PORT SIZE	HOUSING NUMBER	
		Aluminum Light duty	Aluminum Fatigue rated
16T	SAE 16	566412	–
8B	1" BSPP	02-175469	–
12H	SAE 12	–	876745
16H	SAE 16	–	876747
6G	3/4" BSPP	–	876744
8G	1" BSPP	–	876746

See section J for housing details.

5 Pilot to shift (nominal)  
40 - 2,75 bar (40 psi)  
80 - 5,5 bar (80 psi)

6 Special features  
00 - None  
(Only required if valve has special features, omitted if "00")

Dimensions  
mm (inch)  
Torque cartridge in  
aluminum housing  
128-155 Nm (95-115 ft. lbs)



# PTS3-16

Pilot to shift valve

## Description

The PTS3-16 is a 3-way, 2 position, pilot operated, directional screw-in cartridge valve.

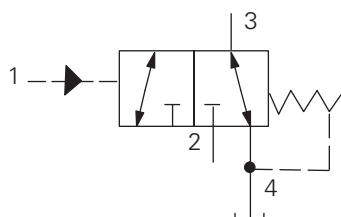
## Operation

This valve allows flow between ports 3 and 4 while blocking port 2 until sufficient pressure has been applied to port 1 and the

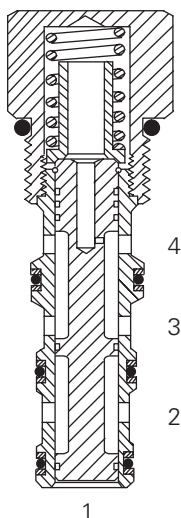
spring bias is overcome. At that time, flow is directed between ports 2 and 3 while blocking port 4. **During the cross-over transition, all ports**

**are blocked.** The spring chamber for this valve is internally vented to port 4 (tank).

## Functional Symbol



## Sectional View



## 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	132 L/min (35 USgpm)
Internal leakage	164 cc/min (10 in <sup>3</sup> /min) maximum @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Pilot pressures	40 - 2,75 bar (40 psi) 80 - 5,5 bar (80 psi) 160 - 11,0 bar (160 psi)

Pilot displacement volume	1,97 cm <sup>3</sup> (0.12 in <sup>3</sup> )
---------------------------	--

Cavity	C-16-4
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Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
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Filtration	Cleanliness code 18/16/13
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Standard housing materials	Aluminum
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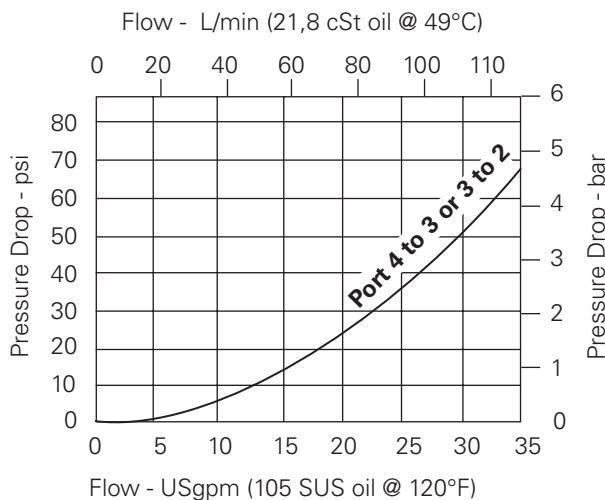
Weight cartridge only	0,5 kg (1.12 lbs)
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Seal kit	889634 (Buna-N) 889638 (Viton®)
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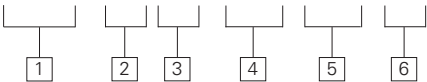
Viton is a registered trademark of E.I. DuPont

## Pressure Drop Curve

Cartridge only



PTS3 – 16 (V) – \*\*\* – \*\*\* – 16



**1** Function  
PTS3 - Pilot to shift valve

**2** Size  
16 - 16 Size

**3** Seals  
Blank - Buna-N  
V - Viton®

**4** Port size  
O - Cartridge only

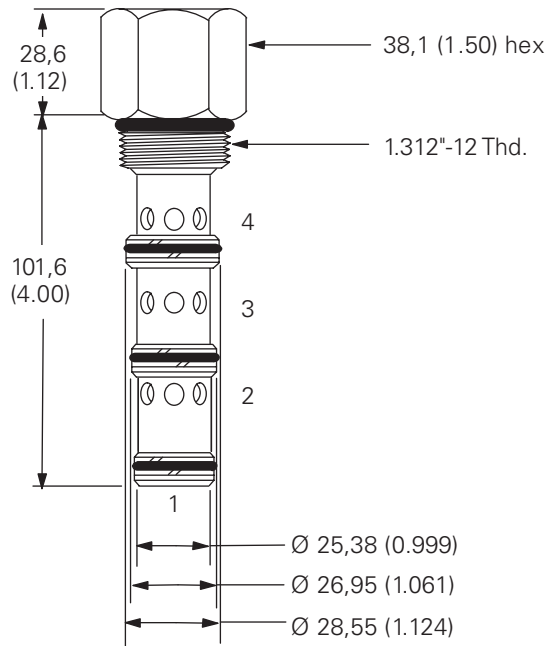
CODE	PORT SIZE	HOUSING NUMBER	
		Aluminum Light duty	Aluminum Fatigue rated
12T	SAE 12	566411	–
6B	3/4" BSPP	02-175468	–
10H	SAE 10	–	876729
12H	SAE 12	–	876731
4G	1/2" BSPP	–	876728
6G	3/4" BSPP	–	876730

See section J for housing details.

**5** Pilot to shift (nominal)  
40 - 2,75 bar (40 psi)  
80 - 5,5 bar (80 psi)  
160 - 11,0 bar (160 psi)

**6** Special features  
00 - None  
(Only required if valve has  
special features, omitted  
if "00")  
SS - 316TI Stainless Steel  
external components

**Dimensions**  
mm (inch)  
Torque cartridge in  
aluminum housing  
108-122 Nm (80-90 ft. lbs)



# PTS3-20

Pilot to shift valve

## Description

The PTS3-20 is a 3-way, 2 position, pilot operated, directional screw-in cartridge valve.

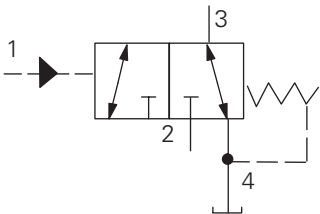
## Operation

This valve allows flow between ports 3 and 4 while blocking port 2 until sufficient pressure has been applied to port 1 and the

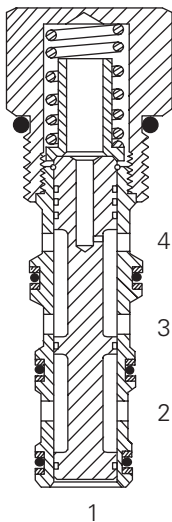
spring bias is overcome. At that time, flow is directed between ports 2 and 3 while blocking port 4. **During the cross-over transition, all ports**

**are blocked.** The spring chamber for this valve is vented internally to port 4 (tank).

## Functional Symbol



## Sectional View



## RATINGS AND SPECIFICATIONS

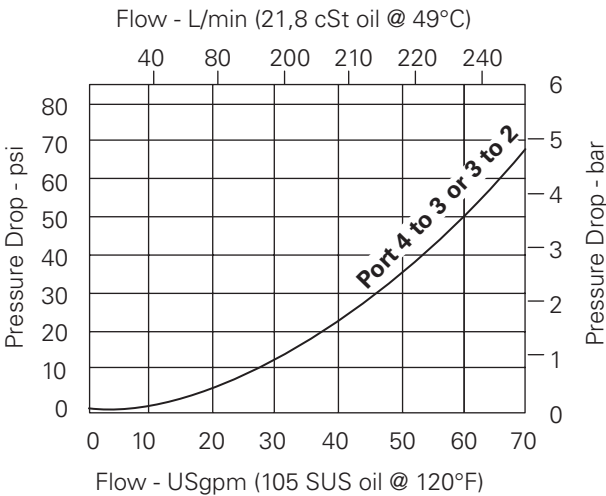
*Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)*

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	164 cc/min (10 in <sup>3</sup> /min) maximum @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Pilot pressures	2,75 bar (40 psi) 5,5 bar (80 psi)
Pilot displacement volume	6,72 cm <sup>3</sup> (0.41 in <sup>3</sup> )
Cavity	C-20-4
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	0,5 kg (1.12 lbs)
Seal kit	565916 (Buna-N) 889646 (Viton®)

*Viton is a registered trademark of E.I. DuPont*

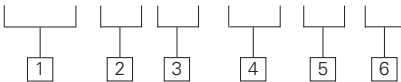
## Pressure Drop Curve

Cartridge only





**PTS3-20 (V) - \*\*\*-\*\*-00**



**1** Function  
PTS3 - Pilot to shift valve

**2** Size  
20 - 20 Size

**3** Seals  
Blank - Buna-N  
V - Viton®

**4** Port size  
O - Cartridge only

CODE	PORT SIZE	HOUSING NUMBER	
		Aluminum Light duty	Aluminum Fatigue rated
16T	SAE 16	566412	—
8B	1" BSPP	02-175469	—
12H	SAE 12	—	876745
16H	SAE 16	—	876747
6G	3/4" BSPP	—	876744
8G	1" BSPP	—	876746

See section J for housing details.

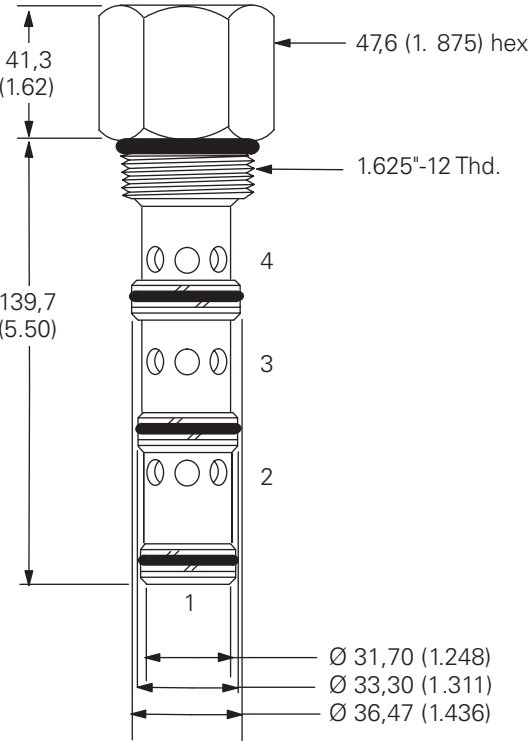
**5** Pilot to shift (nominal)  
40 - 2,75 bar (40 psi)  
80 - 5,5 bar (80 psi)

**6** Special features  
00 - None  
(Only required if valve has special features, omitted if "00")

**Dimensions**

mm (inch)

Torque cartridge in aluminum housing  
128-155 Nm (95-115 ft. lbs)



# PTS1-10

Pilot to shift valve

## Description

The PTS1-10 is a 3-way, 2 position, pilot operated, directional screw-in cartridge valve.

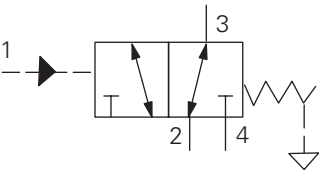
## Operation

This valve allows flow between ports 2 and 3 while blocking port 4 until sufficient pressure has been applied to port 1 and the

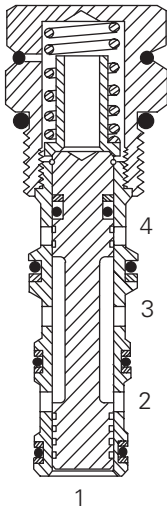
spring bias is overcome. At this time, flow is directed between port 3 and port 4 while blocking port 2. **During the cross-over transition, all**

**ports are blocked.** The spring chamber for this valve is externally vented to atmosphere.

## Functional Symbol



## Sectional View



## RATINGS AND SPECIFICATIONS

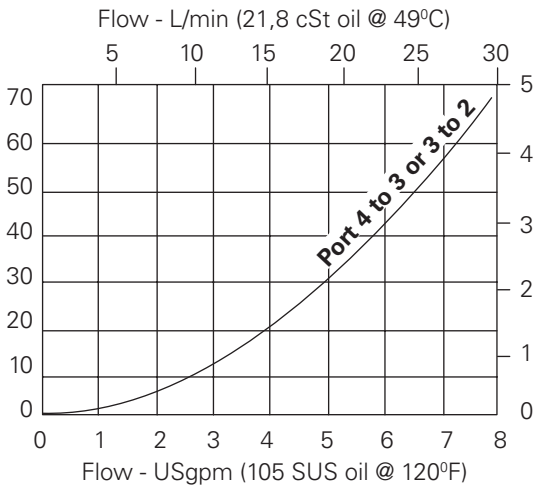
*Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)*

Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	30 L/min (8 USgpm)
Internal leakage	164 cc/min (10 in <sup>3</sup> /min) maximum @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Pilot pressures	40 - 2,75 bar (40 psi) 80 - 5,5 bar (80 psi) 160 - 11,0 bar (160 psi)
Pilot displacement volume	0,49 cm <sup>3</sup> (0.02 in <sup>3</sup> )
Cavity	C-10-4
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	0,14 kg (0.32 lbs)
Seal kit	889625 (Buna-N) 566080 (Viton®)

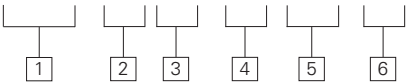
Viton is a registered trademark of E.I. DuPont

## Pressure Drop Curve

Cartridge only



PTS1 – 10 (V) – \*\* – \*\*\* – 00



1 Function  
PTS1 - Pilot to shift valve

2 Size  
10 - 10 Size

3 Seals  
Blank - Buna-N  
V - Viton®

4 Port size  
O - Cartridge only

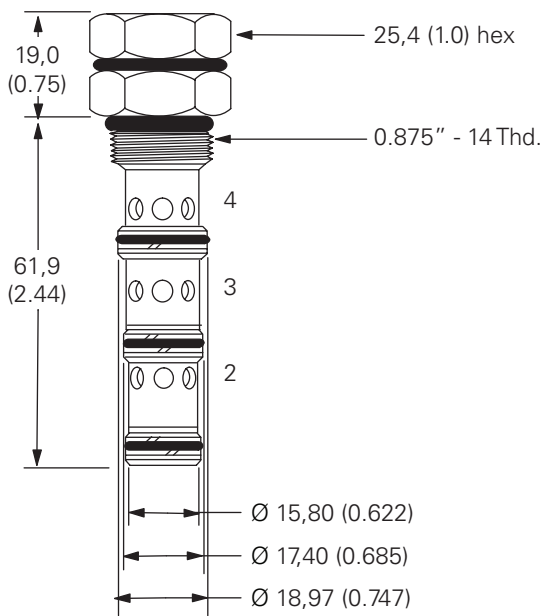
CODE	PORT SIZE	HOUSING NUMBER	
		Aluminum Light duty	Aluminum Fatigue rated
3B	3/8" BSPP	02-179705	–
6T	SAE 6	566161	–
2G	1/4" BSPP	–	876709
3G	3/8" BSPP	–	876715
6H	SAE 6	–	876708
8H	SAE 8	–	876713

See section J for housing details.

5 Pilot to shift (nominal)  
40 - 2,75 bar (40 psi)  
80 - 5,5 bar (80 psi)  
160 - 11,0 bar (160 psi)

6 Special features  
00 - None  
(Only required if valve has special features, omitted if "00")

Dimensions  
mm (inch)  
Torque cartridge in aluminum housing  
47-54 Nm (35-40 ft. lbs)



# PTS1-16

Pilot to shift valve

### Description

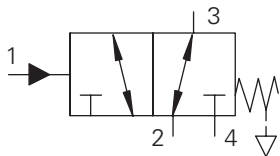
The PTS1-16 is a 3-way, 2 position, pilot operated, directional screw-in cartridge valve.

### Operation

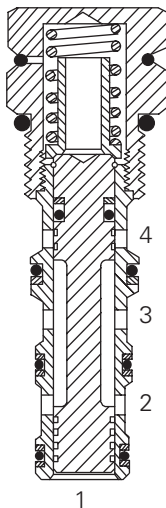
This valve allows flow between ports 2 and 3 while blocking port 4 until sufficient pressure has been applied to port 1 and the spring bias is overcome. At this time, flow is directed between port 3 and port 4 while blocking port 2. **During the cross-**

**over transition, all ports are blocked.** The spring chamber for this valve is externally vented to atmosphere.

### Functional Symbol



### Sectional View



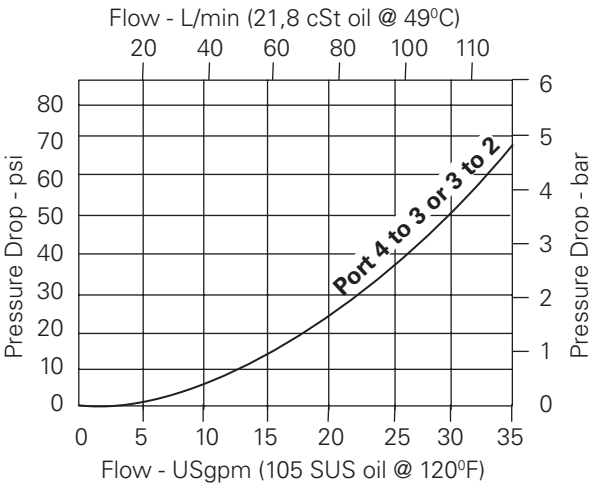
### RATINGS AND SPECIFICATIONS

<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	132 L/min (35 USgpm)
Internal leakage	164 cc/min (10 in <sup>3</sup> /min) maximum @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Pilot pressures	40 - 2,75 bar (40 psi) 80 - 5,5 bar (80 psi) 160 - 11,0 bar (160 psi)
Pilot displacement volume	1,97 cm <sup>3</sup> (0.12 in <sup>3</sup> )
Cavity	C-16-4
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	0,5 kg (1.12 lbs)
Seal kit	889634 (Buna-N) 889638 (Viton®)

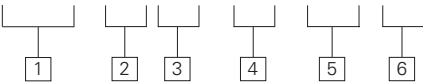
Viton is a registered trademark of E.I. DuPont

### Pressure Drop Curve

Cartridge only



PTS1 – 16 (V) – \*\*\* – \*\*\* – 00



1 Function  
PTS1 - Pilot to shift valve

2 Size  
16 - 16 Size

3 Seals  
Blank - Buna-N  
V - Viton®

4 Port size  
O - Cartridge only

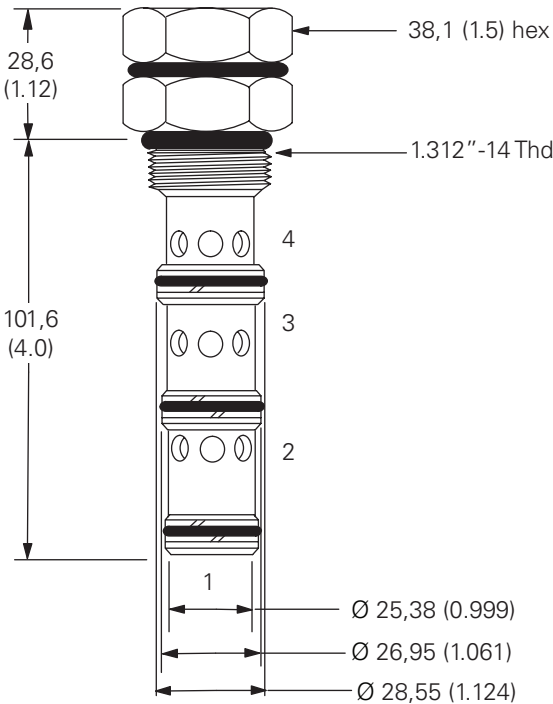
CODE	PORT SIZE	HOUSING NUMBER	
		Aluminum Light duty	Aluminum Fatigue rated
12T	SAE 12	566411	–
6B	3/4" BSPP	02-175468	–
10H	SAE 10	–	876729
12H	SAE 12	–	876731
4G	1/2" BSPP	–	876728
6G	3/4" BSPP	–	876730

See section J for housing details.

5 Pilot to shift (nominal)  
40 - 2,75 bar (40 psi)  
80 - 5,5 bar (80 psi)  
160 - 11,0 bar (160 psi)

6 Special features  
00 - None  
(Only required if valve has  
special features, omitted  
if "00")

Dimensions  
mm (inch)  
Torque cartridge in  
aluminum housing  
108-122 Nm (80-90 ft. lbs)



# PTS1-20

Pilot to shift valve

### Description

The PTS1-20 is a 3-way, 2 position, pilot operated, directional screw-in cartridge valve.

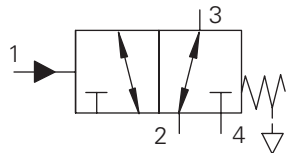
### Operation

This valve allows flow between ports 2 and 3 while blocking port 4 until sufficient pressure has been applied to port 1 and the

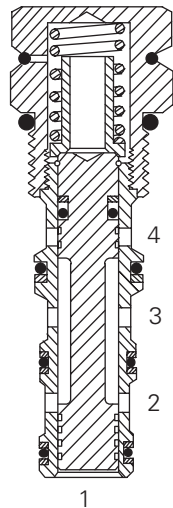
spring bias is overcome. At that time, flow is directed between ports 3 and 4 while blocking port 2. **During the cross-over transition, all ports**

**are blocked.** The spring chamber for this valve is externally vented to atmosphere.

### Functional Symbol



### Sectional View



### RATINGS AND SPECIFICATIONS

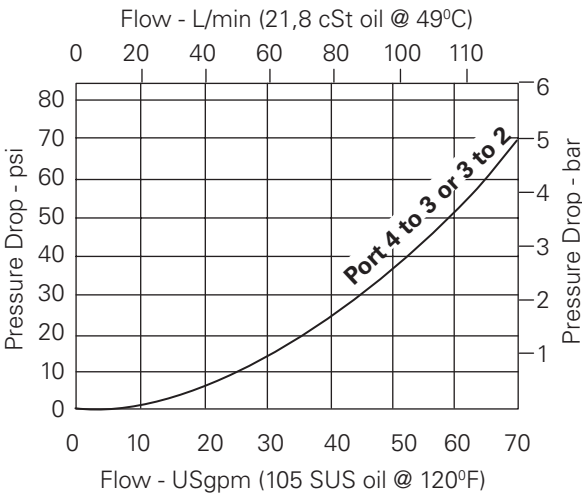
*Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)*

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	164 cc/min (10 in <sup>3</sup> /min) maximum @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Pilot pressures	40 - 2,75 bar (40 psi) 80 - 5,5 bar (80 psi)
Pilot displacement volume	6,72 cm <sup>3</sup> (0.41 in <sup>3</sup> )
Cavity	C-20-4
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	1,1 kg (2.40 lbs)
Seal kit	565916 (Buna-N) 889646 (Viton®)

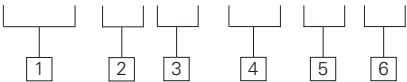
Viton is a registered trademark of E.I. DuPont

### Pressure Drop Curve

Cartridge only



PTS1 – 20 (V) – \*\*\* – \*\* – 00



**1** Function  
PTS1 - Pilot to shift valve

**2** Size  
20 - 20 Size

**3** Seals  
Blank - Buna-N  
V - Viton®

**4** Port size  
O - Cartridge only

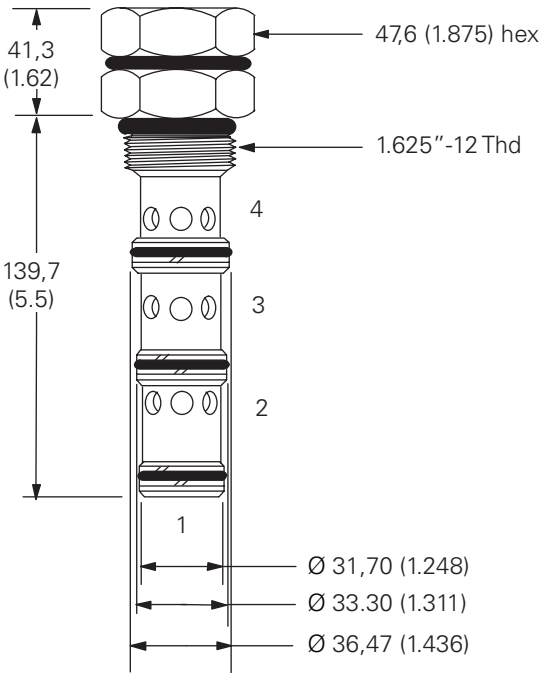
**5** Pilot to shift (nominal)  
40 - 2,75 bar (40 psi)  
80 - 5,5 bar (80 psi)

CODE	PORT SIZE	HOUSING NUMBER	
		Aluminum Light duty	Aluminum Fatigue rated
16T	SAE 16	566412	–
8B	1" BSPP	02-175469	–
12H	SAE 12	–	876745
16H	SAE 16	–	876747
6G	3/4" BSPP	–	876744
8G	1" BSPP	–	876746

See section J for housing details.

**6** Special features  
00 - None  
(Only required if valve has special features, omitted if "00")

**Dimensions**  
mm (inch)  
Torque cartridge in  
aluminum housing  
128-155 Nm (95-115 ft. lbs)



# PTS5-10

Pilot to shift valve

## Description

The PTS5-10 is a 3-way, 2 position, pilot operated, directional screw-in cartridge valve.

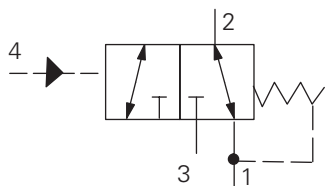
## Operation

This valve allows flow between ports 1 and 2 while port 3 is blocked until sufficient pressure has been applied at port 4 and the

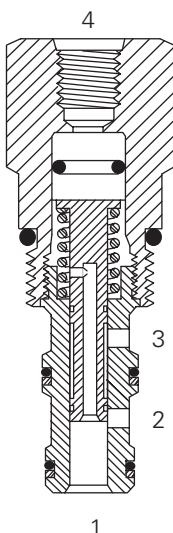
spring bias is overcome. At that time, flow is directed between ports 2 and 3 while blocking port 1. **During the cross-over transition, all ports**

**are blocked.** The spring chamber for this valve is vented internally to port 1.

## Functional Symbol



## Sectional View



## RATINGS AND SPECIFICATIONS

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

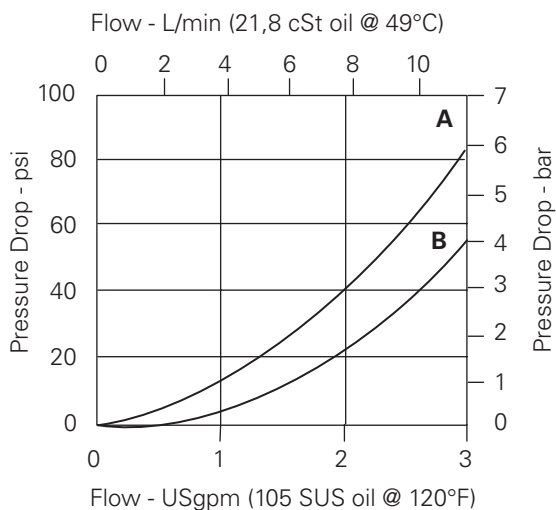
Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	11 L/min (3 USgpm)
Internal leakage	164 cc/min (10 in <sup>3</sup> /min) maximum @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Pilot pressure	3,45 bar (50 psi)
Pilot displacement volume	0,49 cm <sup>3</sup> (0.02 in <sup>3</sup> )
Cavity	C-10-3
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	0,14 kg (0.32 lbs)
Seal kit	889624 (Buna-N) 889628 (Viton®)

Viton is a registered trademark of E.I. DuPont

## Pressure Drop Curves

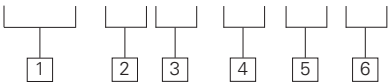
Cartridge only

A - Port 3 to 2  
B - Port 2 to 1





PTS5 – 10 (V) – \*\* – \*\* – 00



1 Function  
PTS5 - Pilot to shift valve

2 Size  
10 - 10 Size

3 Seals  
Blank - Buna-N  
V - Viton®

4 Port size  
O - Cartridge only

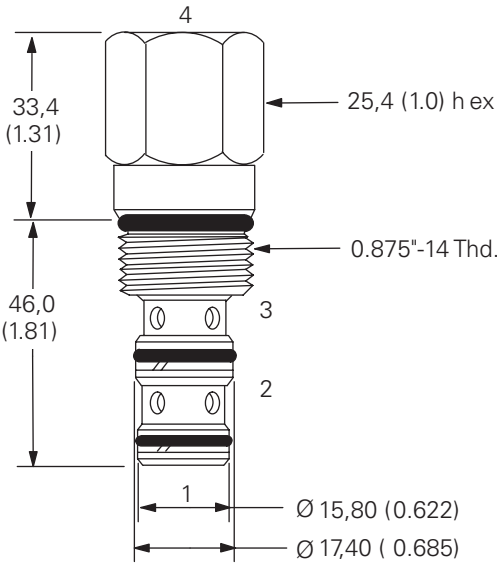
5 Pilot to shift (nominal)  
50 - 3,45 bar (50 psi)

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 section J for housing details.

6 Special features  
00 - None  
(Only required if valve has special features, omitted if "00")

Dimensions  
mm (inch)  
Torque cartridge in  
aluminum housing  
47-54 Nm (35-40 ft. lbs)



# PTS5-16

Pilot to shift valve

### Description

The PTS5-16 is a 3-way, 2 position, pilot operated, directional screw-in cartridge valve.

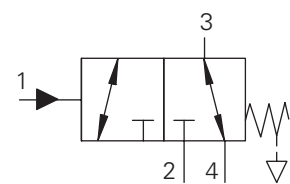
### Operation

This valve allows flow between ports 3 and 4 while blocking port 2 until sufficient pressure has been applied to port 1 and the

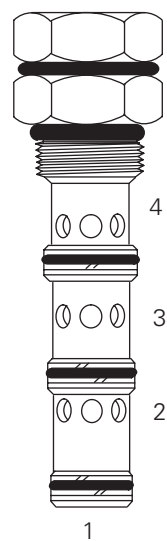
spring bias is overcome. At that time, flow is directed between ports 3 and 2 while blocking port 4. **During the cross-over transition, all ports**

**are open.** The spring chamber for this valve is externally vented to atmosphere.

### Functional Symbol



### Profile View



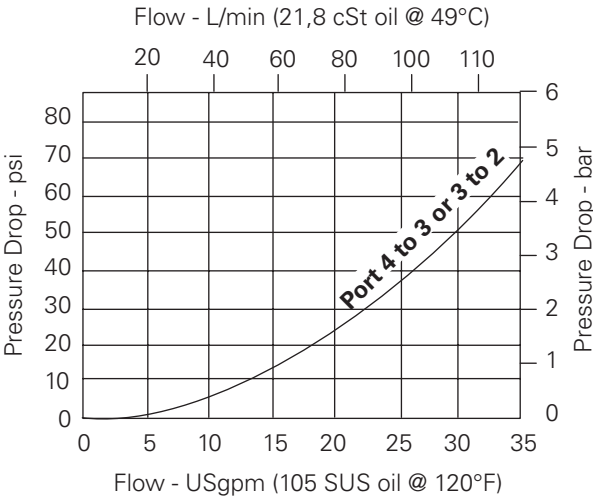
### RATINGS AND SPECIFICATIONS

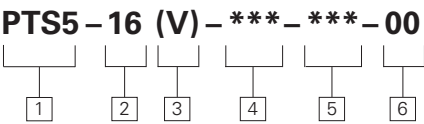
<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	132 L/min (35 USgpm)
Internal leakage	164 cc/min (10 in <sup>3</sup> /min) maximum @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Pilot pressures	40 - 2,75 bar (40 psi) 80 - 5,5 bar (80 psi) 160 - 11,0 bar (160 psi)
Pilot displacement volume	1,97 cm <sup>3</sup> (0.12 in <sup>3</sup> )
Cavity	C-16-4
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	0,5 kg (1.12 lbs)
Seal kit	889634 (Buna-N) 889638 (Viton®)

Viton is a registered trademark of E.I. DuPont

### Pressure Drop Curve

Cartridge only





1 Function  
PTS5 - Pilot to shift valve

2 Size  
16 - 16 Size

3 Seals  
Blank - Buna-N

4 Port size  
O - Cartridge only

V - Viton®

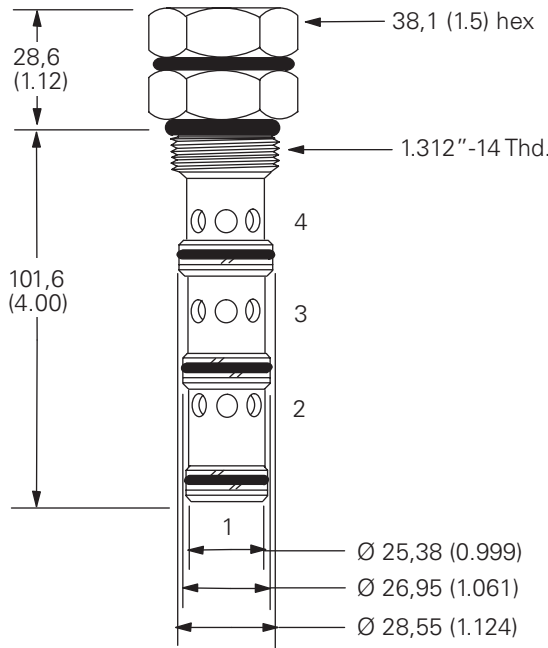
CODE	PORT SIZE	HOUSING NUMBER	
		Aluminum Light duty	Aluminum Fatigue rated
12T	SAE 12	566411	–
6B	3/4" BSPP	02-175468	–
10H	SAE 10	–	876729
12H	SAE 12	–	876731
4G	1/2" BSPP	–	876728
6G	3/4" BSPP	–	876730

See section J for housing details.

5 Pilot to shift (nominal)  
40 - 2,75 bar (40 psi)  
80 - 5,5 bar (80 psi)  
160 - 11,0 bar (160 psi)

6 Special features  
00 - None  
(Only required if valve has  
special features, omitted  
if "00")

Dimensions  
mm (inch)  
Torque cartridge in  
aluminum housing  
108-122 Nm (80-90 ft. lbs)



# PTS6-10

Pilot to shift valve

## Description

The PTS6-10 is a 4-way, 2 position, pilot operated, directional screw-in cartridge valve.

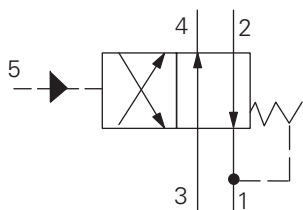
## Operation

This valve allows flow between ports 1 and 2 and ports 3 and 4 until sufficient pressure has been applied at port 5 and the spring bias

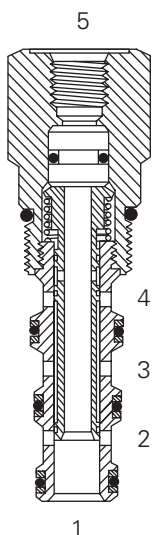
is overcome. At that time, flow is directed between ports 1 and 4 and ports 3 and 2. **During the cross-over transition, all ports are**

**blocked.** The spring chamber for this valve is vented internally to port 1.

## Functional Symbol



## Sectional View



## RATINGS AND SPECIFICATIONS

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

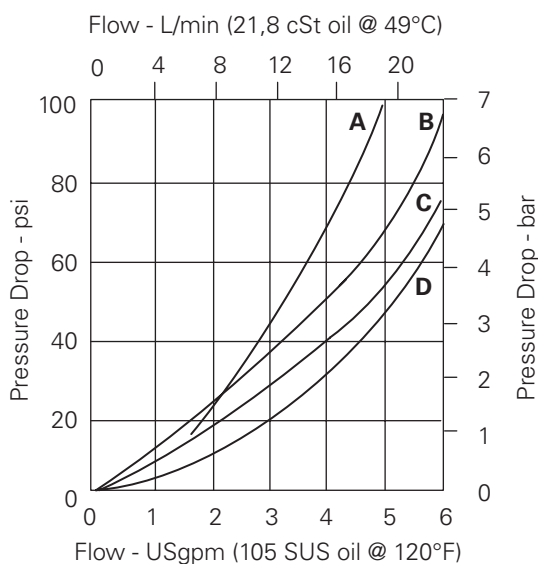
Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	23 L/min (6 USgpm)
Internal leakage	164 cc/min (10 in <sup>3</sup> /min) maximum @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Pilot pressure	4,2 bar (60 psi)
Pilot displacement volume	0,49 cm <sup>3</sup> (0.02 in <sup>3</sup> )
Cavity	C-10-4
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	0,15 kg (0.33 lbs)
Seal kit	889625 (Buna-N) 566080 (Viton®)

Viton is a registered trademark of E.I. DuPont

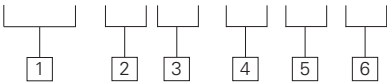
## Pressure Drop Curves

Cartridge only

- A - Port 3 to 4
- B - Port 4 to 1
- C - Port 3 to 2
- D - Port 2 to 1



PTS6 – 10 (V) – \*\* – \*\* – 00



1 Function  
PTS6 - Pilot to shift valve

2 Size  
10 - 10 Size

3 Seals  
Blank - Buna-N  
V - Viton®

4 Port size  
O - Cartridge only

5 Pilot to shift (nominal)  
60 - 4,2 bar (60 psi)

CODE	PORT SIZE	HOUSING NUMBER	
		Aluminum Light duty	Aluminum Fatigue rated
3B	3/8" BSPP	02-179705	–
6T	SAE 6	566161	–
2G	1/4" BSPP	–	876709
3G	3/8" BSPP	–	876715
6H	SAE 6	–	876708
8H	SAE 8	–	876713

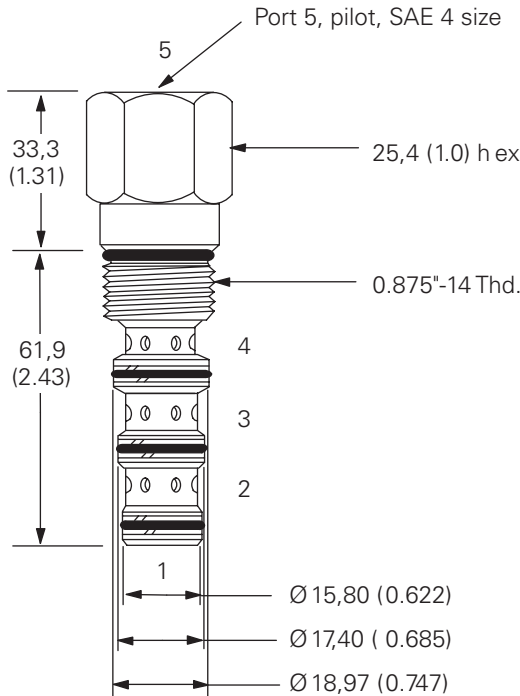
See section J for housing details.

6 Special features  
00 - None  
(Only required if valve has special features, omitted if "00")

Dimensions

mm (inch)

Torque cartridge in aluminum housing  
47-54 Nm (35-40 ft. lbs)



# PTS6-16

Pilot to shift valve

## Description

The PTS6-16 is a 3-way, 2 position, pilot operated, directional screw-in cartridge valve.

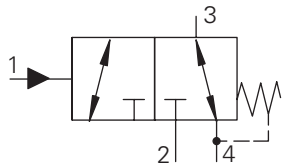
## Operation

This valve allows flow between ports 3 and 4 while blocking port 2 until sufficient pressure has been applied to port 1 and the

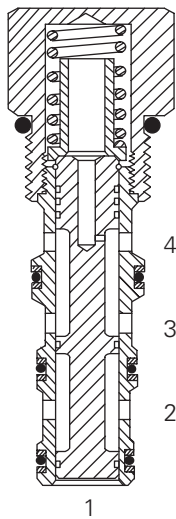
spring bias is overcome. At that time, flow is directed between ports 3 and 2 while blocking port 4. **During the cross-over transition, all ports**

**are open.** The spring chamber for this valve is externally vented to Port 4 (tank).

## Functional Symbol



## Sectional View



## RATINGS AND SPECIFICATIONS

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

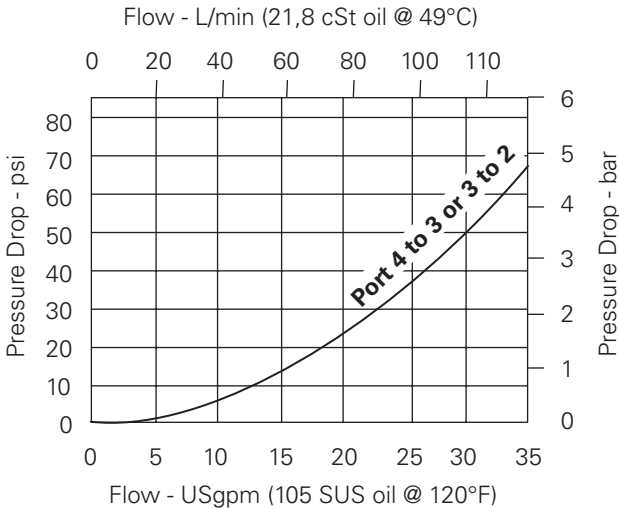
Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	132 L/min (35 USgpm)
Internal leakage	164 cc/min (10 in <sup>3</sup> /min) maximum @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Pilot pressures	40 - 2,75 bar (40 psi) 80 - 5,5 bar (80 psi) 160 - 11,0 bar (160 psi)

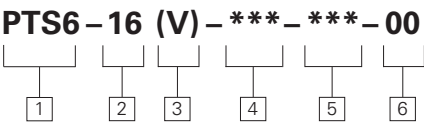
Pilot displacement volume	1,97 cm <sup>3</sup> (0.12 in <sup>3</sup> )
Cavity	C-16-4
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Standard housing materials	Aluminum
Weight cartridge only	0,5 kg (1.12 lbs)
Seal kit	889634 (Buna-N) 889638 (Viton®)

Viton is a registered trademark of E.I. DuPont

## Pressure Drop Curve

Cartridge only





1 Function  
PTS6 - Pilot to shift valve

2 Size  
16 - 16 Size

3 Seals  
Blank - Buna-N  
V - Viton®

4 Port size  
O - Cartridge only

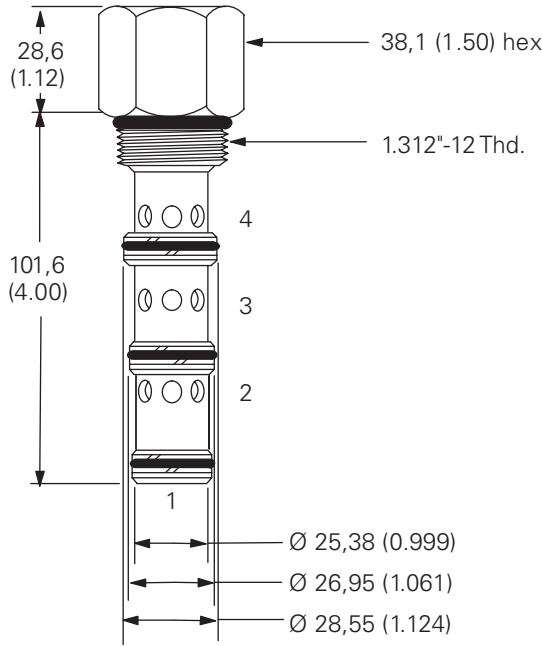
CODE	PORT SIZE	HOUSING NUMBER	
		Aluminum Light duty	Aluminum Fatigue rated
12T	SAE 12	566411	–
6B	3/4" BSPP	02-175468	–
10H	SAE 10	–	876729
12H	SAE 12	–	876731
4G	1/2" BSPPSAE 6	–	876728
6G	3/4" BSPP	–	876730

See section J for housing details.

5 Pilot to shift (nominal)  
40 - 2,75 bar (40 psi)  
80 - 5,5 bar (80 psi)  
160 - 11,0 bar (160 psi)

6 Special features  
00 - None  
(Only required if valve has special features, omitted if "00")  
SS - 316TI Stainless Steel external components

Dimensions  
mm (inch)  
Torque cartridge in  
aluminum housing  
108-122 Nm (80-90 ft. lbs)



# PTS7-10

Pilot to shift valve

## Description

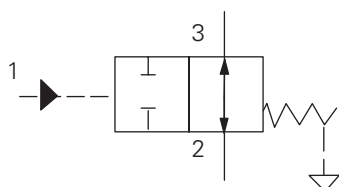
The PTS7-10 is a 2-way, 2 position, pilot operated, directional screw-in cartridge valve.

## Operation

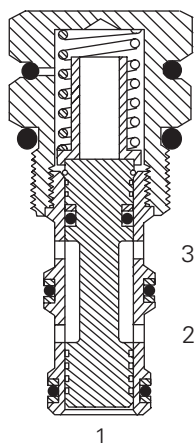
This valve allows flow between ports 2 and 3 until sufficient pressure at port 1 overcomes the spring bias, which closes both ports.

The spring chamber for this valve is externally vented to atmosphere.

## Functional Symbol



## Sectional View



## RATINGS AND SPECIFICATIONS

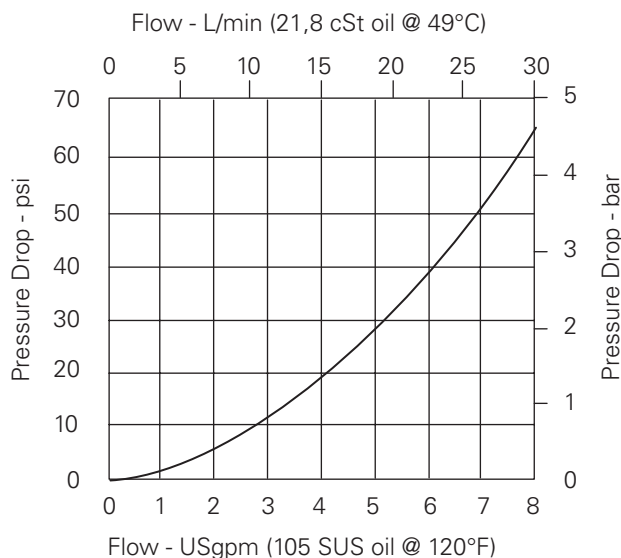
*Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)*

Typical application pressure (all ports)	210 bar (3000 psi)
Cartridge fatigue pressure (infinite life)	210 bar (3000 psi)
Rated flow	30 L/min (8 USgpm)
Internal leakage	164 cc/min (10 in <sup>3</sup> /min) maximum @ 210 bar (3000 psi)
Temperature range	-40° to 120°C (-40° to 248°F)
Pilot pressures	40 - 2,75 bar (40 psi) 80 - 5,5 bar (80 psi) 160 - 11,0 bar (160 psi)
Pilot displacement volume	0,49 cm <sup>3</sup> (0.02 in <sup>3</sup> )
Cavity	C-10-3
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 (0.23 lbs)
Seal kit	889624 (Buna-N) 889628 (Viton®)

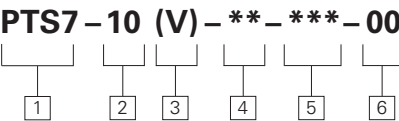
Viton is a registered trademark of E.I. DuPont

## Pressure Drop Curve

Cartridge only







1 Function  
PTS7 - Pilot to shift valve

2 Size  
10 - 10 Size

3 Seals  
Blank - Buna-N  
V - Viton®

4 Port size  
O - Cartridge only

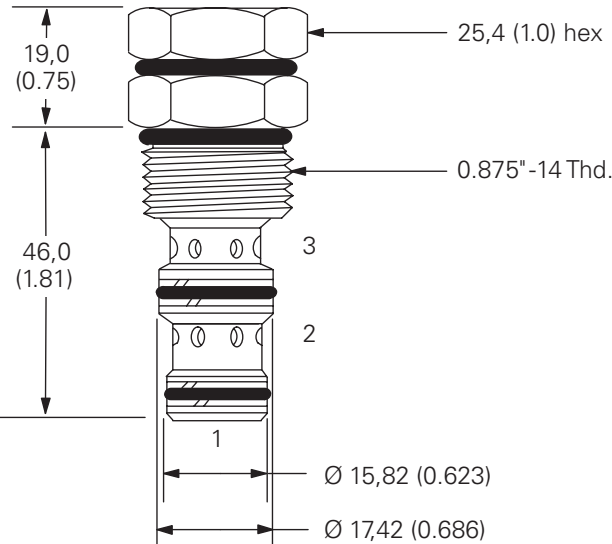
5 Pilot to shift (nominal)  
40 - 2,75 bar (40 psi)  
80 - 5,5 bar (80 psi)  
160 - 11,0 bar (160 psi)

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 section J for housing details.

6 Special features  
00 - None  
(Only required if valve has  
special features, omitted  
if "00")

Dimensions  
mm (inch)  
Torque cartridge in  
aluminum housing  
47-54 Nm (35-40 ft. lbs)



# PTS9-8

Pilot to shift valve

## Description

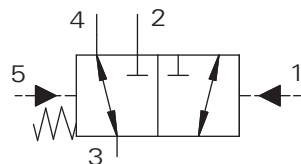
The PTS 9-8 is a 3-way, 2 position, pilot operated, directional screw-in cartridge valve.

## Operation

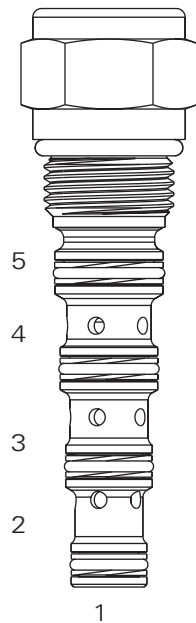
This valve allows flow between ports 3 and 4 while blocking port 2 until sufficient pressure has been applied to port 1 and the spring bias is overcome. At that time flow is

directed between ports 3 and 2 while blocking port 4. **During the cross-over transition, all ports are open.** The spring chamber for this valve is vented to port 5.

## Functional Symbol



## Profile View



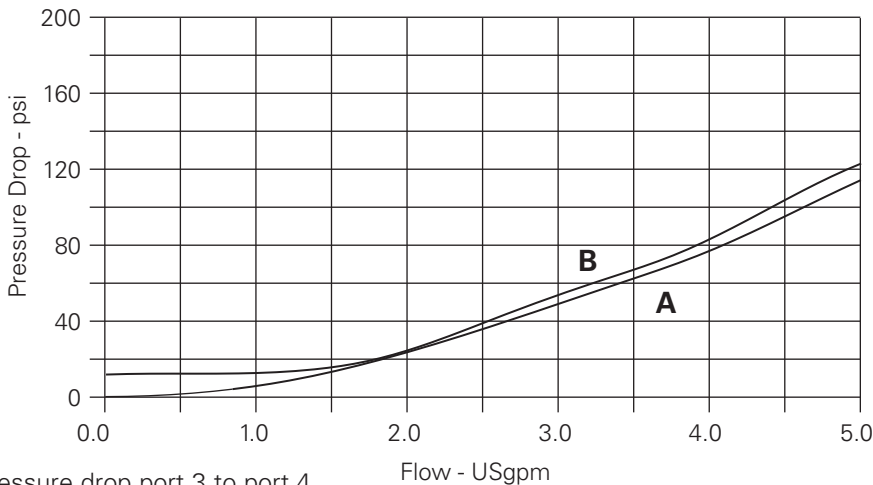
## RATINGS AND SPECIFICATIONS

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

Typical application pressure (all ports)	280 bar (4000 psi)
Cartridge fatigue pressure (infinite life)	280 bar (4000 psi)
Rated inlet flow	19 L/min (5 USgpm)
Transition	All ports open
Internal leakage	164 cc/min (10 in <sup>3</sup> /min) @ 3000 PSID
Temperature range	-40° to 100°C (-40° to 210°F)
Cavity	C-8-5S
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Standard housing material	Aluminum or steel
Weight cartridge only	
Seal kit	

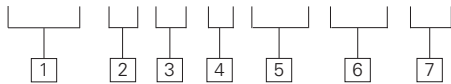
## Performance Curves

Cartridge only



A - Pressure drop port 3 to port 4  
B - Pressure drop port 3 to port 2

**PTS9 - 8 \* - \* - \*\*\* - \*\*\* - 00**



**1 Function**  
PTS9 - Pilot to shift valve

**2 Size**  
8 - C-8-5S Cavity

**3 Seals**  
N - Buna-N  
V - Viton

**4 Body**  
O - Cartridge only

**5 Ports\***

CODE	PORT SIZE		HOUSING NUMBER	
	Port 2, 3 & 4	Port 1 & 5	Aluminum	Steel
000	No Body	—	—	—

**6 Shift Pressure**  
080 psi (5,5 bar)  
160 psi (11,0 bar)

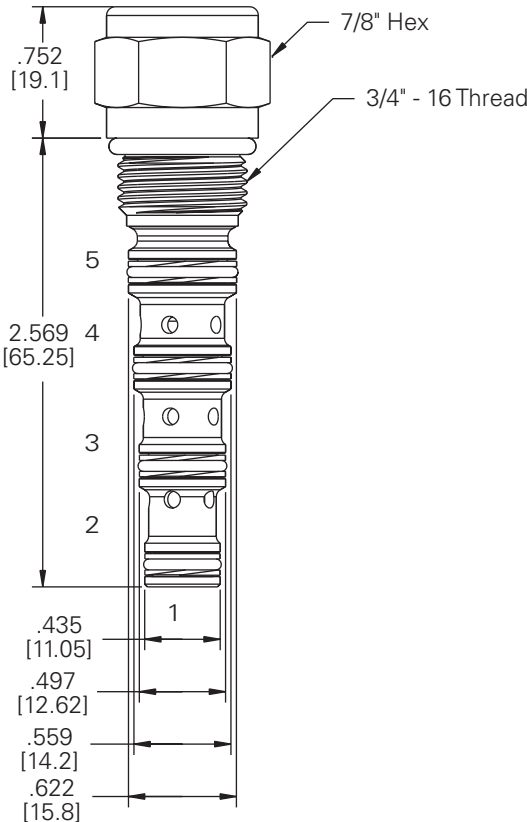
**7 Special features**  
00 - None  
(Only required if valve has special features, omitted if "00")

\* These model digits will not be stamped on the valve.

# Dimensions

mm (inch)

Torque cartridge in housing:  
A - 34-41 Nm (25-30 ft. lbs)  
S - 34-41 Nm (25-30 ft. lbs)



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).

# PTS9-10

Pilot to shift valve

## Description

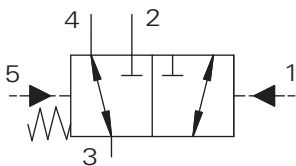
The PTS 9-10 is a 3-way, 2 position, pilot operated, directional screw-in cartridge valve.

## Operation

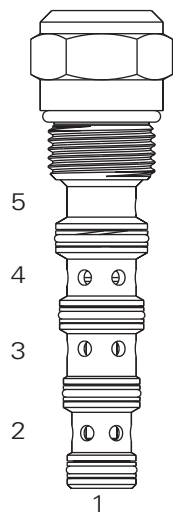
This valve allows flow between ports 3 and 4 while blocking port 2 until sufficient pressure has been applied to port 1 and the spring bias is overcome. At that time flow is

directed between ports 3 and 2 while blocking port 4. **During the cross-over transition, all ports are open.** The spring chamber for this valve is vented to port 5.

## Functional Symbol



## Profile View

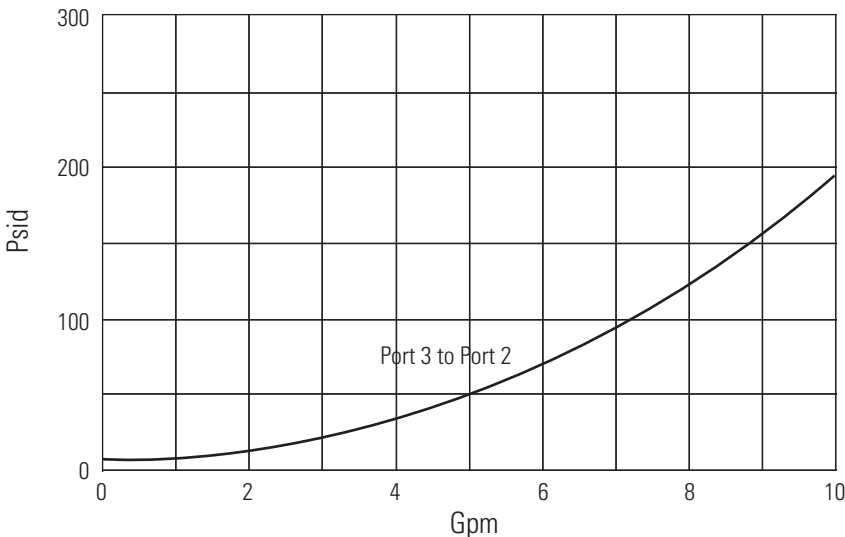


## RATINGS AND SPECIFICATIONS

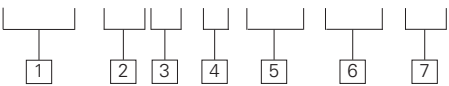
<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
Typical application pressure (all ports)	280 bar (4000 psi)
Cartridge fatigue pressure (infinite life)	280 bar (4000 psi)
Rated inlet flow	38 L/min (10 USgpm)
Transition	All ports open
Internal leakage	164 cc/min (10 in <sup>3</sup> /min) @ 3000 PSID
Temperature range	-40° to 100°C (-40° to 210°F)
Cavity	C-10-5S
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Standard housing material	Aluminum or steel
Weight cartridge only	
Seal kit	

## Performance Curves

Cartridge only



PTS9-10 \* - \* - \*\*\* - \*\*\* - 00



**1 Function**  
PTS9 - Pilot to shift valve

**2 Size**  
10 - C-10-5S Cavity

**3 Seals**  
N - Buna-N  
V - Viton

\* These model digits will not be stamped on the valve.

**4 Body**  
O - Cartridge only

**5 Ports\***

CODE	PORT SIZE		HOUSING NUMBER	
	Port 1, 2, 3 & 4	Port 5	Aluminum	Steel
000	No Body	—	—	—

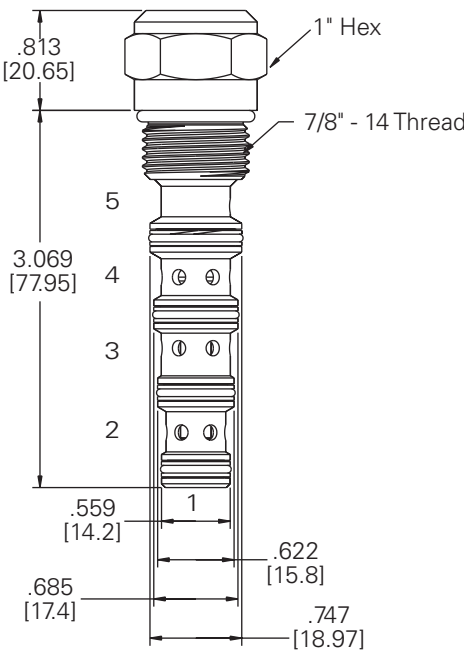
**6 Shift Pressure**  
080 psi (5,5 bar)  
100 psi (6,9 bar)  
160 psi (11,0 bar)

**7 Special features**  
00 -None  
(Only required if valve has special features, omitted if "00")

Dimensions

mm (inch)

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



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).

# PTS9-12

Pilot to shift valve

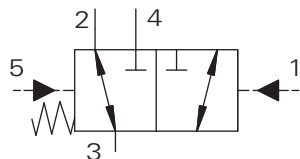
**Description**

The PTS 9-12 is a 3-way, 2 position, pilot operated, directional screw-in cartridge valve.

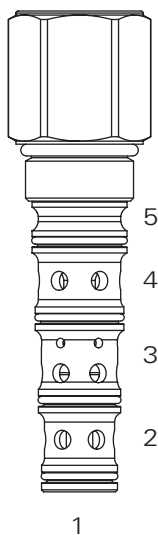
**Operation**

This valve allows flow between ports 3 and 4 while blocking port 2 until sufficient pressure has been applied to port 1 and the spring bias is overcome. At that time flow is directed between ports 3 and 2 while blocking port 4. **During the cross-over transition, all ports are open.** The spring chamber for this valve is vented to port 5.

## Functional Symbol



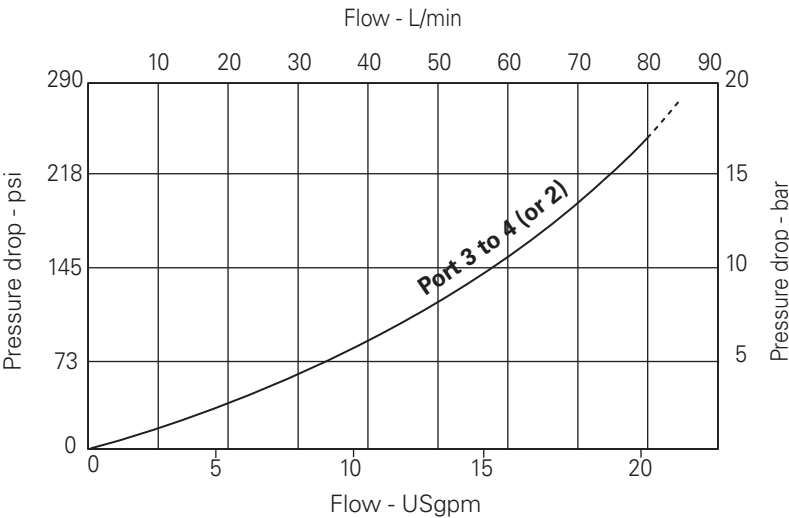
## Profile View

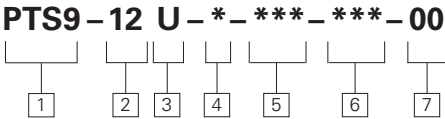


RATINGS AND SPECIFICATIONS	
Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)	
Typical application pressure (all ports)	280 bar (4000 psi)
Cartridge fatigue pressure (infinite life)	280 bar (4000 psi)
Rated inlet flow	76 L/min (20 USgpm)
Transition	All ports open
Internal leakage	164 cc/min (10 in³/min) @ 3000 PSID
Temperature range	-40° to 100°C (-40° to 210°F)
Cavity	C-12-5S
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Standard housing material	Aluminum or steel
Weight cartridge only	0,36 kg (0.79 lbs)
Seal kit (Urethane)	202914-921

## Performance Curves

Cartridge only





1 Function  
PTS9 - Pilot to shift valve

2 Size  
12 - C12-5S Cavity

3 Seals  
U - Urethane (standard)

\* These model digits will not be stamped on the valve.

4 Body  
O - Cartridge only  
A - Aluminum  
S - Steel

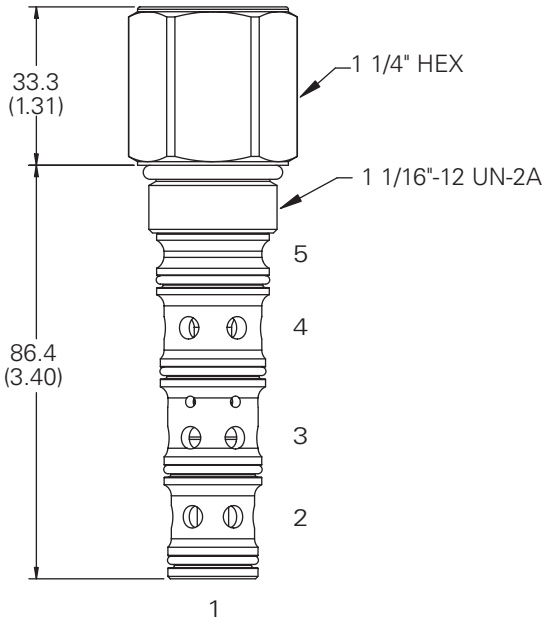
5 Ports\*

CODE	PORT SIZE		HOUSING NUMBER	
	Port 1, 2, 3 & 4	Port 5	Aluminum	Steel
000	No Body	—	—	—
12T	SAE 12	SAE 4	4998820-002	4998821-002
06G	3/4" BSPP	1/4" BSPP	4998820-004	4998821-004

6 Shift Pressure  
075 psi (5,2 bar)  
110 psi (7,6 bar)

7 Special features  
00 - None  
(Only required if valve has special features, omitted if "00")

Dimensions  
mm (inch)  
Torque cartridge in housing  
A - 81-95 Nm (60-70 ft. lbs)  
S - 102-115 Nm (75-85 ft. lbs)



 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).

# PTS9-16

Pilot to Shift Valve

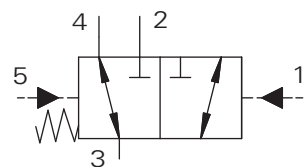
## Description

The PTS 9-16 is a 3-way, 2 position, pilot operated, directional screw-in cartridge valve.

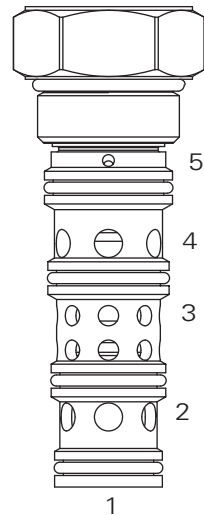
## Operation

This valve allows flow between ports 3 and 4 while blocking port 2 until sufficient pressure has been applied to port 1 and the spring bias is overcome. At that time flow is directed between ports 3 and 2 while blocking port 4. During the cross-over transition, all ports are open. The spring chamber for this valve is vented to port 5.

## Functional Symbol



## Profile View

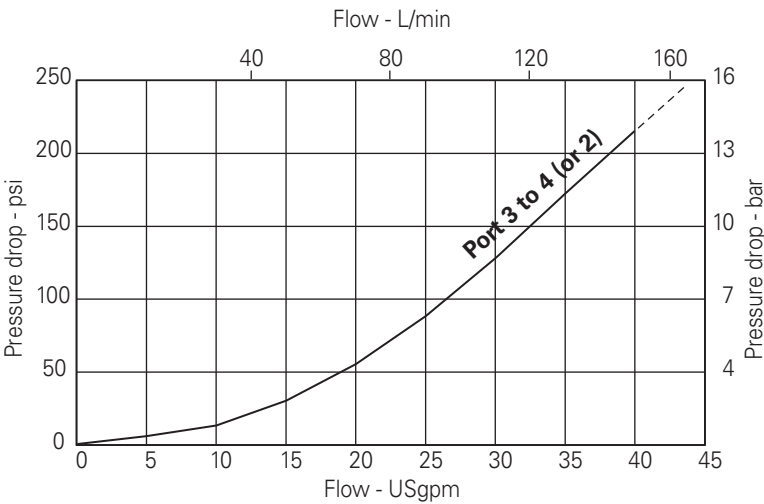


## RATINGS AND SPECIFICATIONS

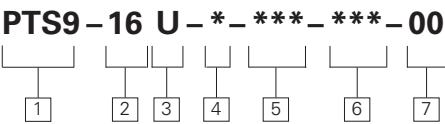
<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
Typical application pressure (all ports)	280 bar (4000 psi)
Cartridge fatigue pressure (infinite life)	280 bar (4000 psi)
Rated inlet flow	151 L/min (40 gpm)
Transition	Ports open
Temperature range	-40° to 100°C (-40° to 210°F)
Cavity	C-16-5S
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Standard housing material	Aluminum or steel
Weight cartridge only	0,47 kg (1.05 lbs)
Seal kit (Urethane)	202915-922

## Performance Curves

Cartridge only







**1 Function**  
PTS9 - Pilot to shift valve

**2 Size**  
16 - C16-5S Cavity

**3 Seals**  
U - Urethane (standard)

\* These model digits will not be stamped on the valve.

**4 Body**  
O - Cartridge only  
A - Aluminum  
S - Steel

**5 Ports\***

CODE	PORT SIZE		HOUSING NUMBER	
	Port 1, 2, 3 & 4	Port 5	Aluminum	Steel
000	No Body	—	—	—
16T	SAE 16	SAE 4	4994880-002	4994881-002
08G	1" BSPP	1/4" BSPP	4994880-004	4994881-004

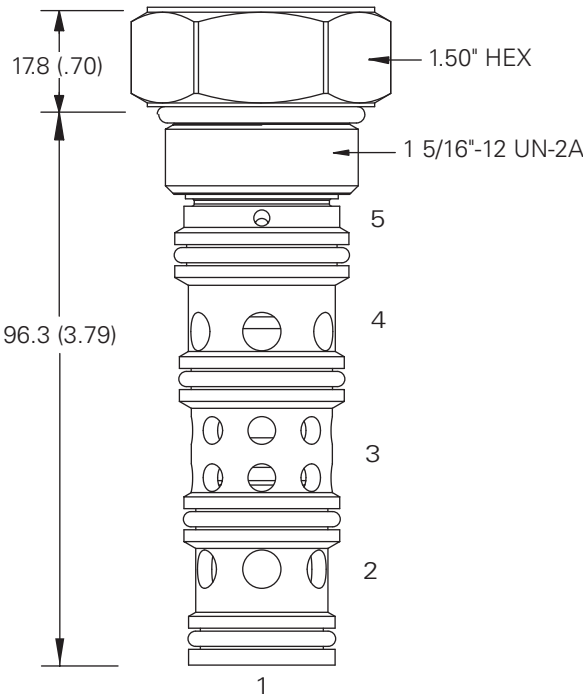
**6 Shift Pressure**  
030 psi (2 bar)  
050 psi (3,5 bar)  
070 psi (4,8 bar)

**7 Special features**  
00 - None  
(Only required if valve has special features, omitted if "00")

Dimensions

mm(inch)

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



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).

# PTS9-20

Pilot to Shift Valve

## Description

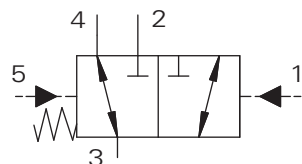
The PTS 9-20 is a 3-way, 2 position, pilot operated, directional screw-in cartridge valve.

## Operation

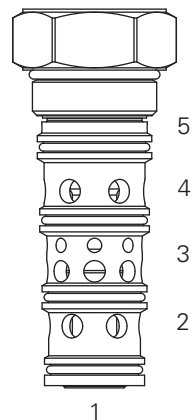
This valve allows flow between ports 3 and 4 while blocking port 2 until sufficient pressure has been applied to port 1 and the spring bias is overcome. At that time flow is

directed between ports 3 and 2 while blocking port 4. **During the cross-over transition, all ports are open.** The spring chamber for this valve is typically vented to port 5 (tank).

## Functional Symbol



## Profile View

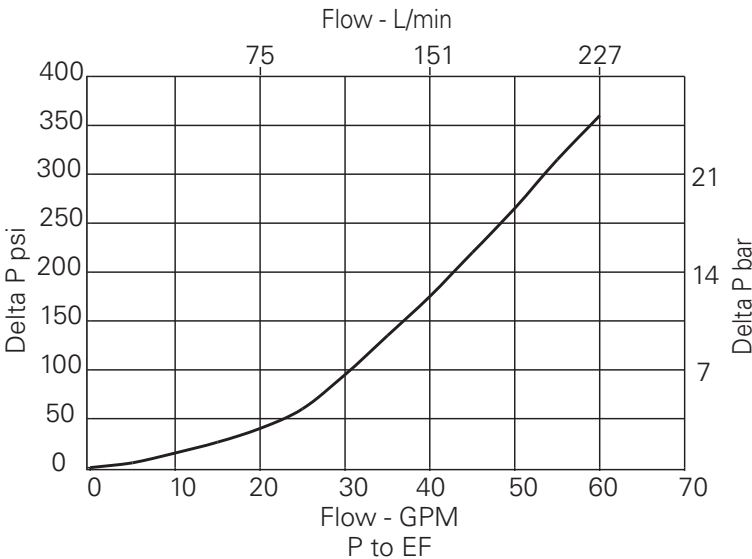


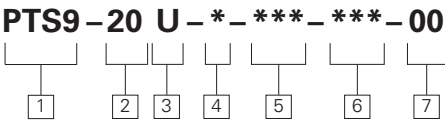
## RATINGS AND SPECIFICATIONS

<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
Typical application pressure (all ports)	280 bar (4000 psi)
Cartridge fatigue pressure (infinite life)	280 bar (4000 psi)
Rated inlet flow	230 L/min (60 USgpm)
Transition	All ports open
Internal leakage	164 cc/min (10 in³/min) @ 3000 PSID
Temperature range	-40° to 100°C (-40° to 210°F)
Cavity	C-20-5S
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20 etc.
Filtration	Cleanliness code 18/16/13
Standard housing material	Steel
Weight cartridge only	0,86 kg (1.9 lbs)
Seal kit (Urethane)	02-187543

## Performance Curves

Cartridge only





1 Function  
PTS9 - Pilot to shift valve

2 Size  
20 - C20-5S Cavity

3 Seals  
U - Urethane (standard)

\* These model digits will not be stamped on the valve.

4 Body  
O - Cartridge only  
A - Aluminum  
S - Steel

5 Ports\*

CODE	PORT SIZE		HOUSING NUMBER	
	Port 1, 2, 3 & 4	Port 5	Aluminum	Steel
000	No Body	—	—	—
16T	SAE 16	SAE 4	4998822-002	4998823-002
08G	1" BSPP	1/4" BSPP	4998822-004	4998823-004

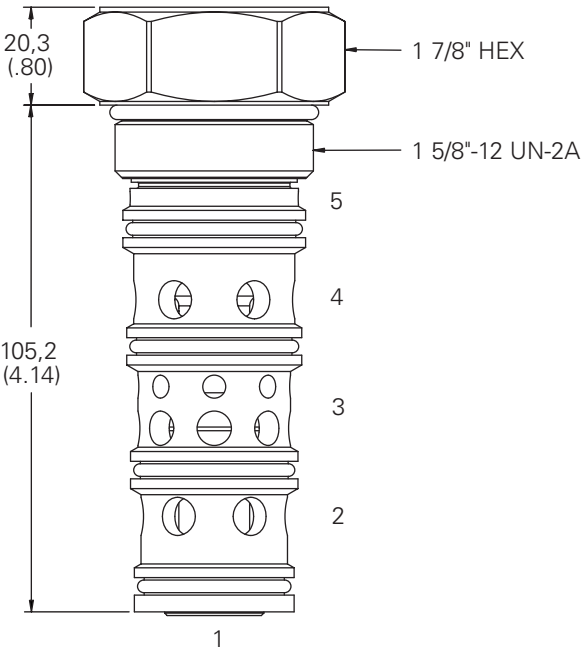
6 Shift Pressure  
040 psi (4.3 bar)  
080 psi (5.2 bar)

7 Special features  
00 - None  
(Only required if valve has special features, omitted if "00")

Dimensions

mm (inch)

Torque cartridge in housing  
S - 160-180Nm (120-135 ft. lbs)  
A - 130-155 Nm (95-115 ft. lbs)



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).

# Section Overview

## Logic elements

This section gives basic specifications for Vickers logic element and pressure compensator threaded cartridge valves. Its purpose is to provide a quick, convenient reference tool when choosing these valves or designing a system using these components.

All cartridges have hardened and ground spools, and/or honed sleeves, poppets and sharp-edged ground steel seats. This provides an excellent product that is dirt-tolerant, has reliable seating, and is suitable for fast cycling with long life.

These Vickers cartridges provide the system designer with a versatile range of elements for use in MCD packages for controlling pressure, flow and direction of flow.

The range includes:

- Pressure compensators
- Pressure compensators with priority and bypass outlets
- Differential-pressure sensing elements

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

### Differential-pressure sensing elements – DPS2

For controlling pressure, flow or direction (including 3- and 4-way bridge circuits) the DPS2 is used with the aid of external pilot operators. The DPS2 elements are function building blocks which respond to pressure differential signals, providing the capacity to switch or modulate flows up to 303 L/min (80 USgpm) and pressure to 350 bar (5000 psi).

The choice of pilot arrangements related to DPS2 variants can minimize the number of construction holes in a manifold, simplifying design and reducing costs.

**All poppet type DPS2 elements have recently been upgraded to 350 bar (5000 psi).**

### Flow compensators – PCS3

An essential component of a pressure compensated flow control which, with an external fixed or variable orifice, provides the required compensated flow characteristic. Excess flow is diverted at maximum system pressure. Excess fluid upstream must be diverted e.g. through a relief to tank.

### Pressure compensator with priority and bypass outlets –PCS4

Similar in function to the PCS3. The major difference is that excess flow is diverted at priority flow pressure, instead of at maximum system pressure, as is the case with PCS3 compensators. The excess flow can pass to a secondary circuit or to tank.

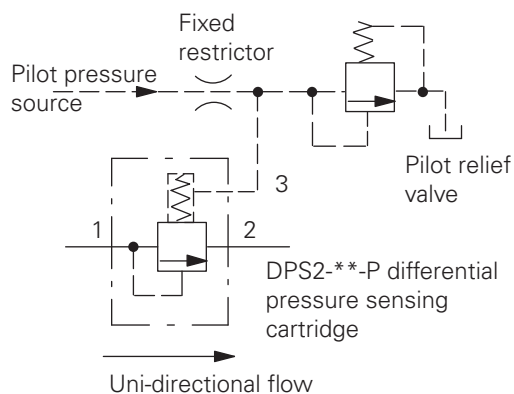
# Application Examples

DPS2 Logic elements for pressure control

## Pressure control functions

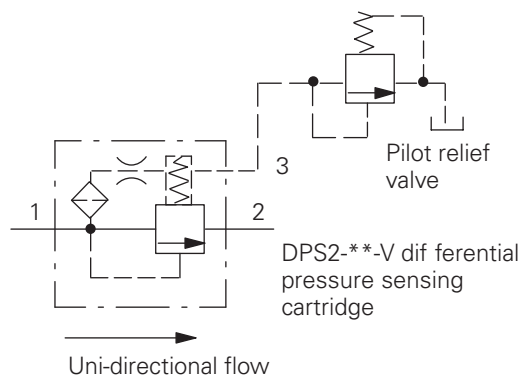
Pressure relief or Sequence example

With external pilot supply and pilot relief



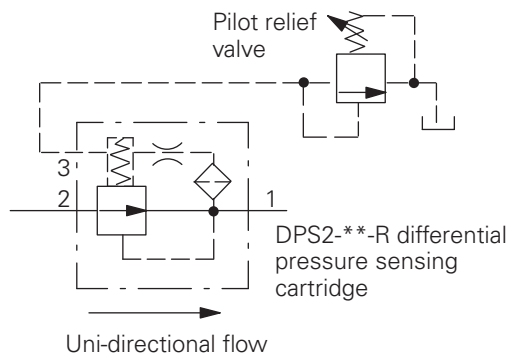
Pressure relief or Sequence example

With internal pilot supply and pilot relief



Pressure reducing example

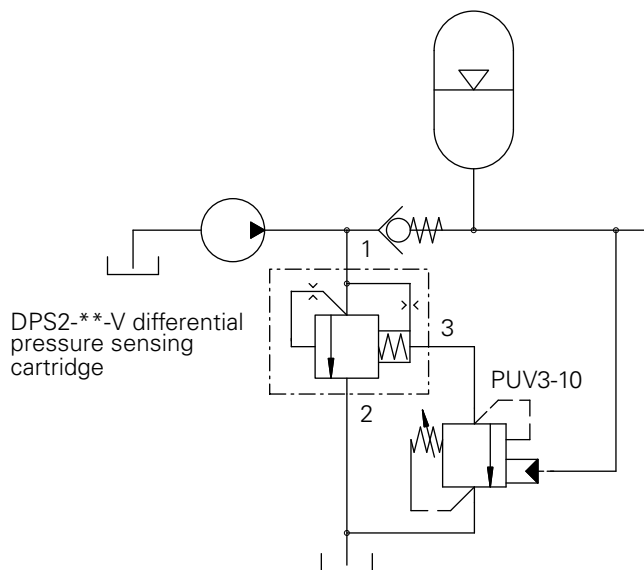
Non-relieving type



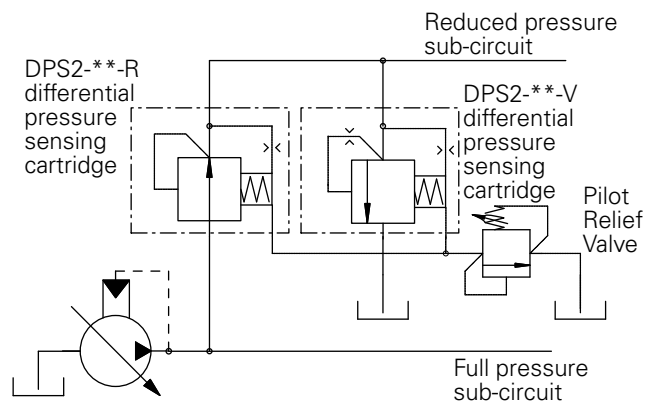
# Application Examples

DPS2 Elements for pressure control

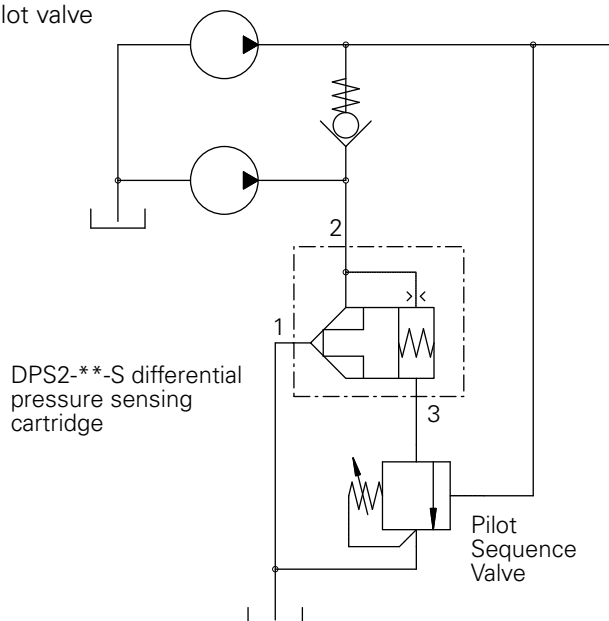
Accumulator charging with PUV3-10 pilot stage



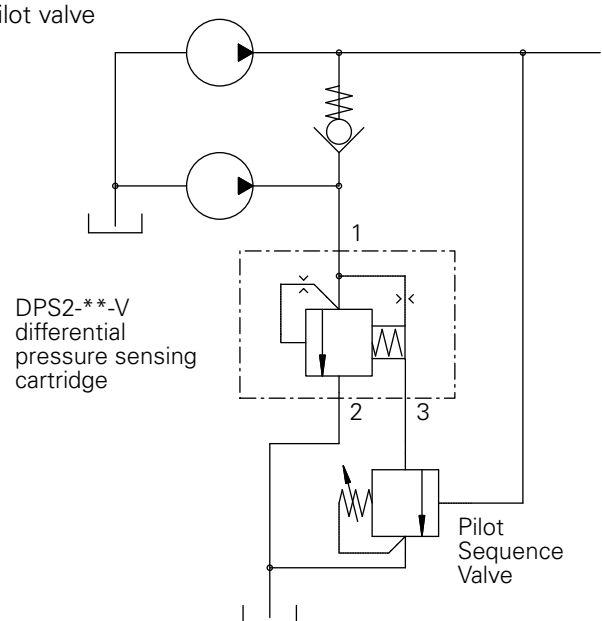
Pressure reducing and relieving



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



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

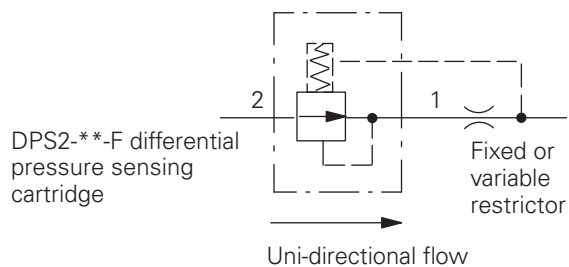


# Application Examples

DPS2 Elements for flow control

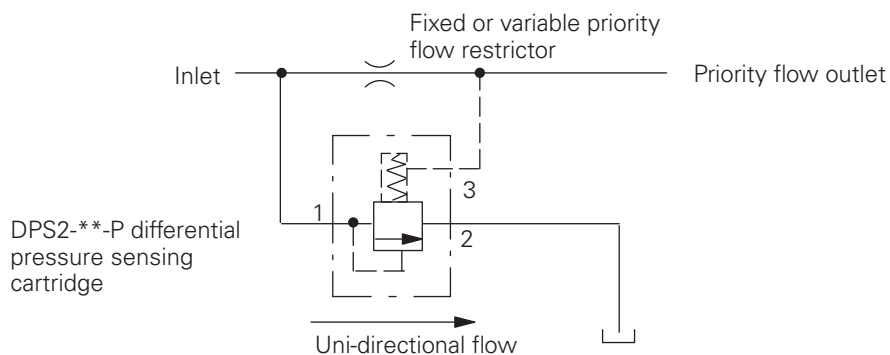
## Pressure compensated flow control example

With downstream fixed or variable restrictor



## Pressure compensated priority flow control example

With fixed or variable priority flow control

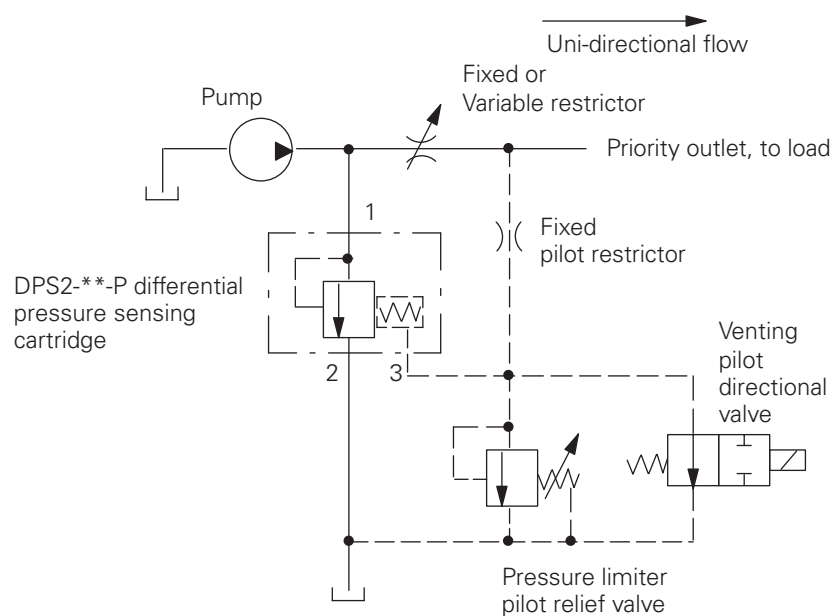


# Application Examples

PPS2 Elements for flow control

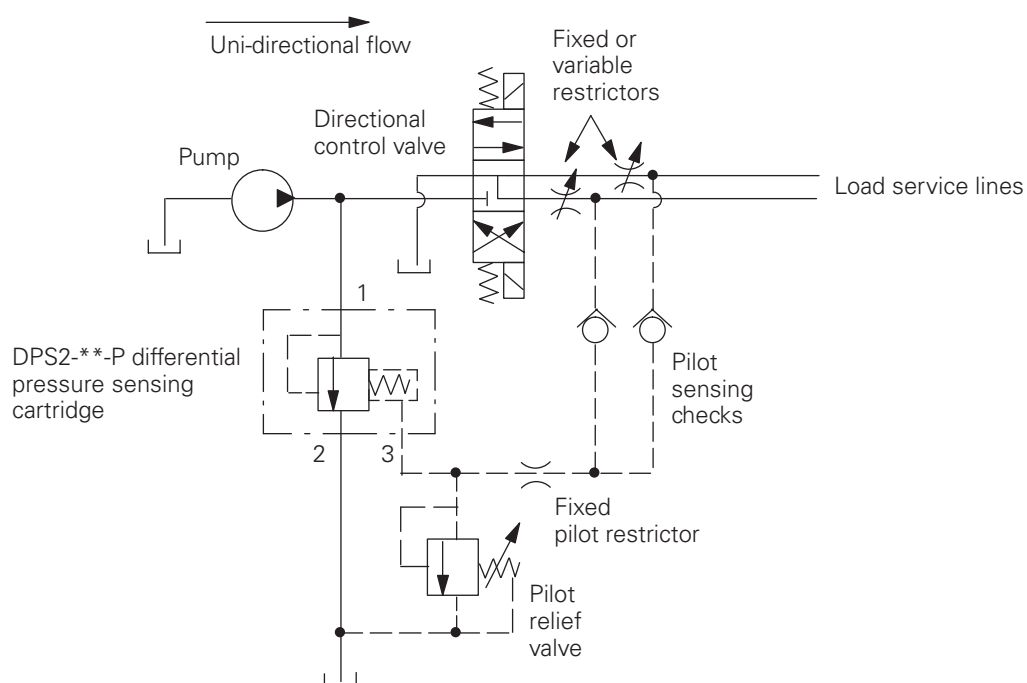
## Load sensing priority flow control example

With pressure limiting and venting



## Load sensing priority flow control example

Directional control version with pressure limiter



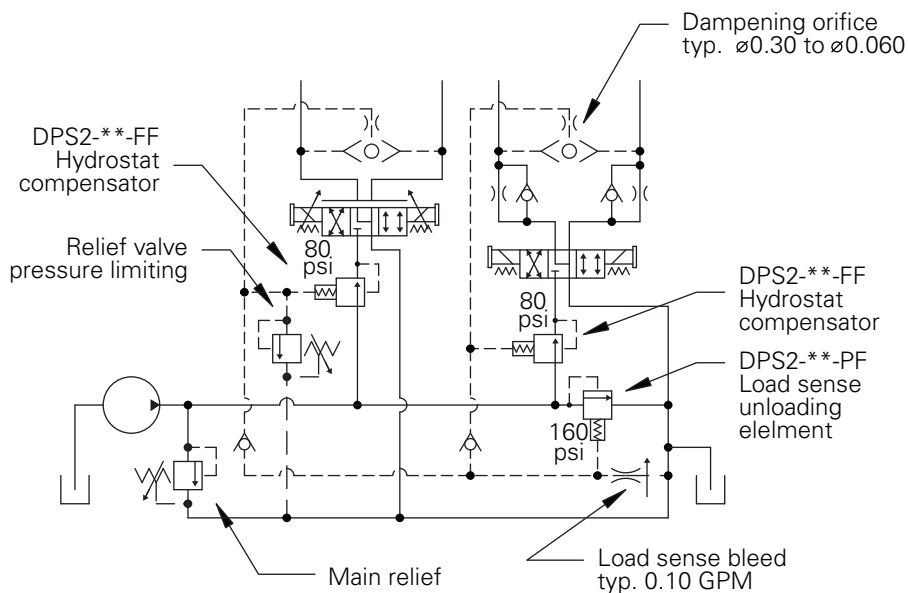


# Application Examples

PPS2 Elements for flow control

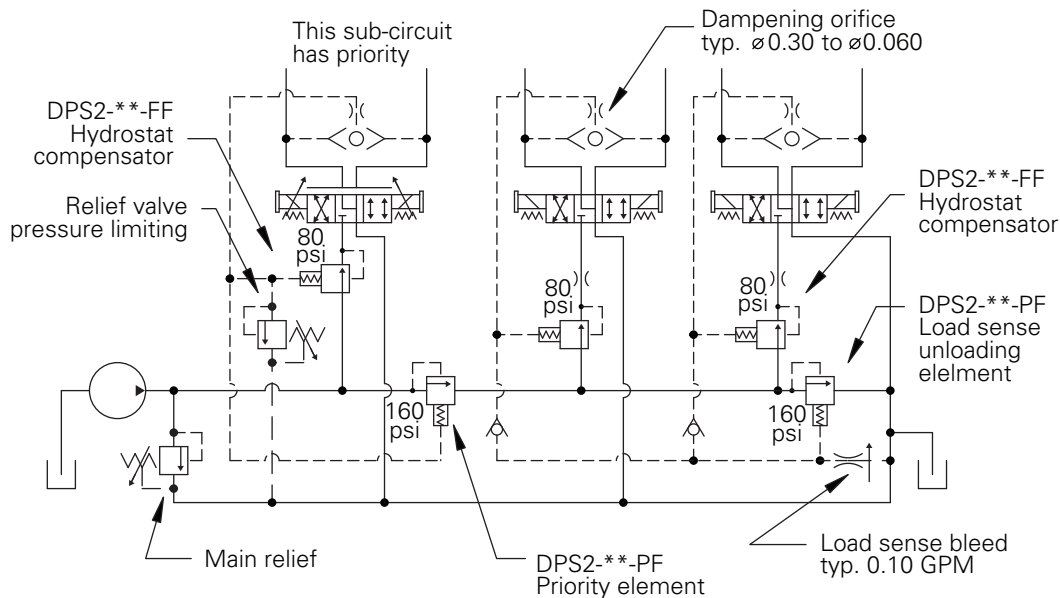
## Load sense circuit example

For parallel operation



## Load sense circuit example

For priority and parallel operation



### Note

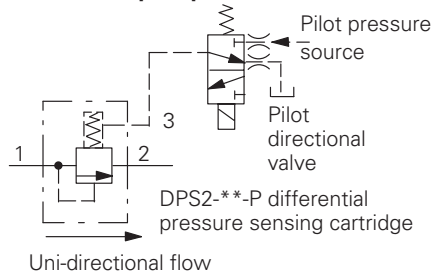
1. Pressure limiting relief must be < main relief setting.
2. If pressure limiting is not used; port reliefs set < main relief are required.

# Application Examples

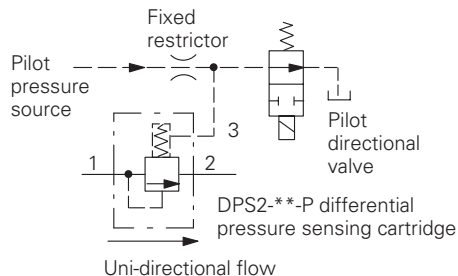
DPS2 Elements for directional control

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

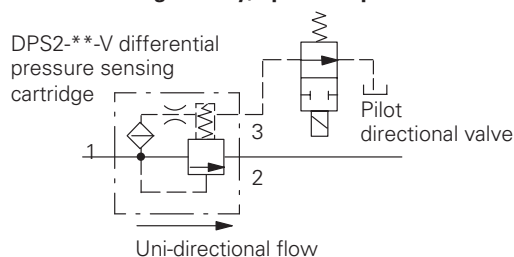
### Switched by 3-way, 2-position pilot valve and external pilot pressure



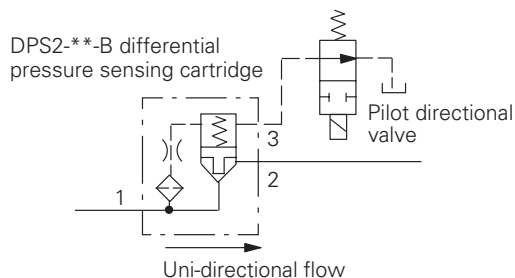
### Switched by external pilot pressure and vented through 2-way, 2-position pilot valve



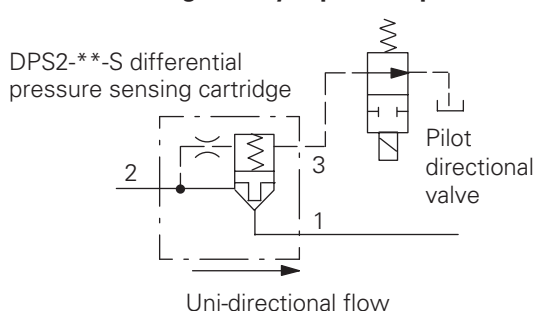
### With DPS2-\*\*-V cartridge and internal pilot supply & vented through 2-way, 2 position pilot valve



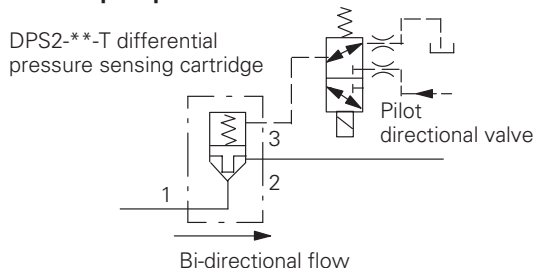
### With DPS2-\*\*-B cartridge and internal pilot supply & vented through 2-way, 2 position pilot valve



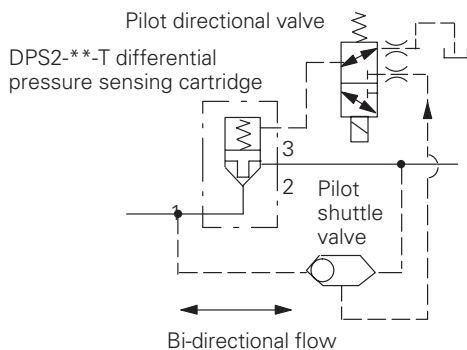
### With DPS2-\*\*-S cartridge and internal pilot supply & vented through 2-way, 2 position pilot valve



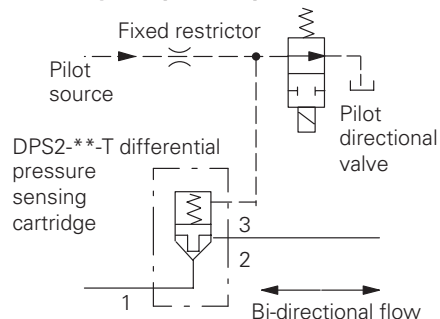
### With DPS2-\*\*-T cartridge and internal pilot supply & switched by 3-way, 2 position pilot valve and external pilot pressure



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



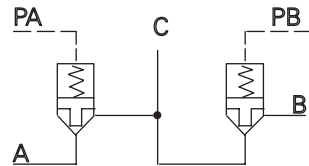
### With DPS2-\*\*-T cartridge, external pilot supply and two-way two-position pilot valve



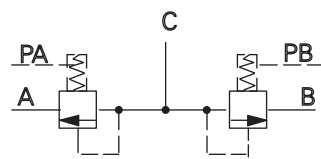
# Application Examples

DPS2 Elements for directional control

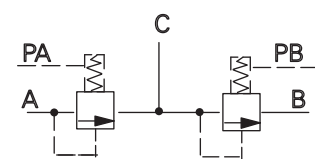
## Three-way bridge circuits



Example 1, with DPS2-\*\*-T  
Poppet type



Example 2, with DPS2-\*\*-P  
Spool type



Example 3, with DPS2-\*\*-P  
Spool type

REQUIRED FLOW PATH	PILOT PRESSURE TO		AVAILABLE FROM FORM		
	PA	PB	1	2	3
	0	0	Yes	Yes	No
	1	0	Yes	Yes	Yes

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

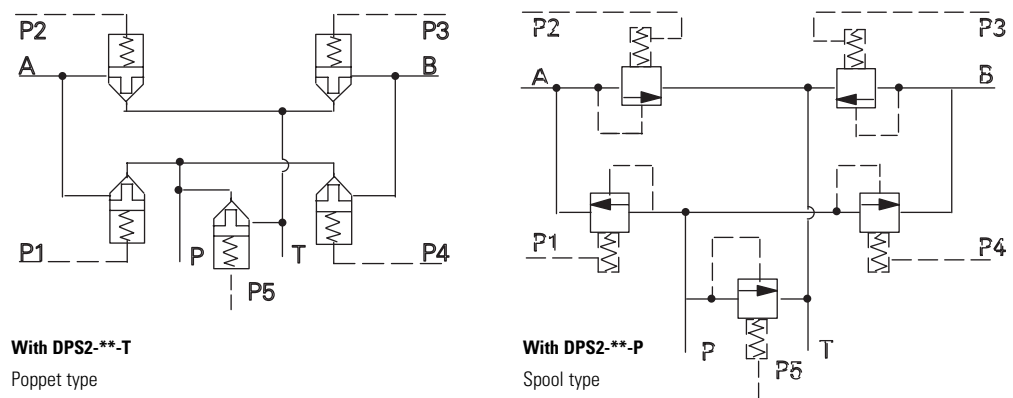
REQUIRED FLOW PATH	PILOT PRESSURE TO		AVAILABLE FROM FORM		
	PA	PB	1	2	3
	0	1	Yes	Yes	No
	1	1	Yes	Yes	Yes

1- Pressure applied    0- Pressure vented

# Application Examples

DPS2 Elements for directional control

## Four-way bridge circuits



REQUIRED FLOW PATH	PILOT PRESSURE TO					REQUIRED FLOW PATH	PILOT PRESSURE TO				
	P1	P2	P3	P4	P5		P1	P2	P3	P4	P5
A → B P → T	1	1	1	1	1		1	1	0	1	1
	0	0	0	0	0		0	1	1	1	1
	1	1	0	0	0		0	1	0	1	1
	0	0	1	1	0		1	0	1	0	1
	1	1	1	1	0		1	1	1	0	1
	1	0	0	1	1		1	0	1	1	1
	0	1	1	0	1						

1-Pressure applied    0-Pressure vented

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

**EAT•N**

**Vickers**

# DPS2-10

Differential pressure sensing valve

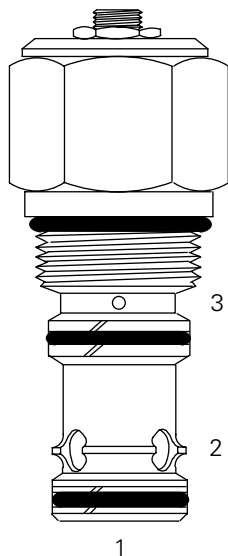
## Description

The DPS2-10 is a differential pressure sensing valve, available as either a spool or poppet type and with either, internal or external pilot.

## Functional Symbols

See pages I-20 & I-21

## Profile View



## Operation

This valve is used as a main section of a pilot controlled valve assembly. This valve has multiple uses when used with either directional control, flow control or pressure control cartridges. Refer to application examples.

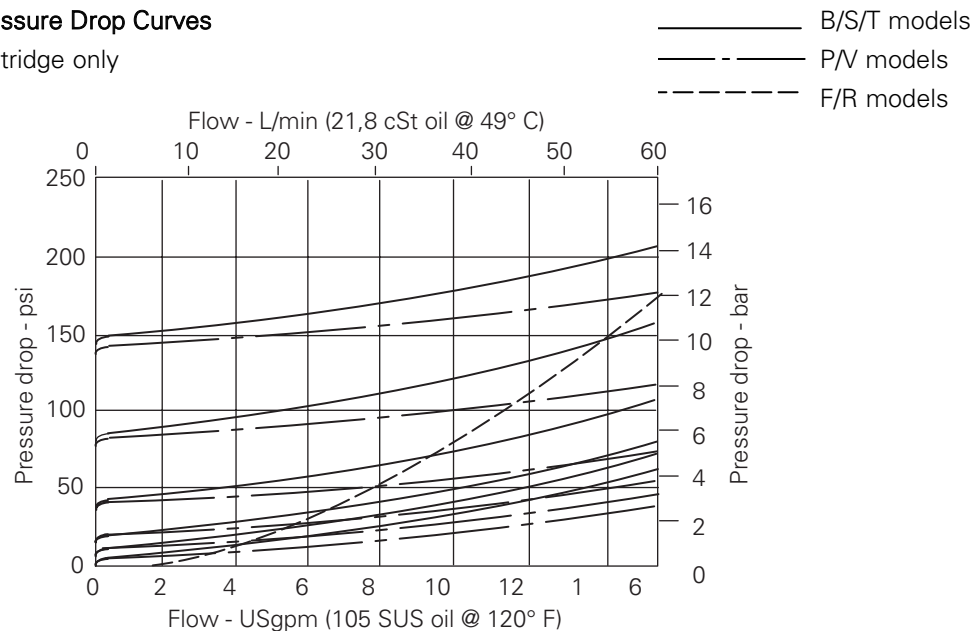
## RATINGS AND SPECIFICATIONS

<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
Typical application pressure (spool type)	290 bar (4200 psi)
(poppet type)	350 bar (5000 psi)**
Rated flow	60 L/min (15 USgpm)
Pilot ratio (spool type P,V,R,F)	1:1
(poppet type B,S,T)	2:1
Internal leakage, poppet type	Port 1 to 2: < 5 drops/min max @ 350 bar (5000 psi)
Internal leakage, spool type	82 cm <sup>3</sup> /min. (5 in <sup>3</sup> /min) max @ 290 bar (4200 psi)
Temperature range	-40° to 120° C (-40° to 248° F)
Cavity	C-10-3S
Standard housing materials	Aluminum
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Weight cartridge only	0, 14 kg (0.30 lbs)
Seal kits	889650 Buna-N 889652 Viton®

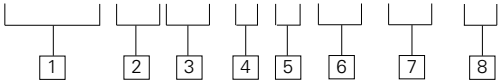
Viton is a registered trademark of E.I. DuPont

## Pressure Drop Curves

Cartridge only



DPS2-10 (V) - \* - \* - \* - \* - \* - \*



**1 Function**  
DPS2 – Differential pressure sensing

**2 Size**  
10 – 10 Size

**3 Seals**  
Blank – Buna-N  
V – Viton

**4 Function**  
B – Poppet, vent to open, N/C  
S – Poppet, vent to open, N/C  
T – Poppet, bi-directional, pilot to close, 2:1 ratio, N/C

P – Spool, N/C (L/S element)  
V – Spool, N/C  
R – Spool, pressure reducing, N/O  
F – Spool, flow control, N/O (hydrostat)

**6 Port size**  
0 – Cartridge only

CODE	PORT SIZE	HOUSING NUMBER
		Aluminum
3B	3/8" BSPP	02-175470*
6T	SAE 6	566413*
6H	SAE 6	876706
8H	SAE 8	876712
2G	1/4" BSPP	876707
3G	3/8" BSPP	876710

\* Light duty housing  
See section J for housing details.

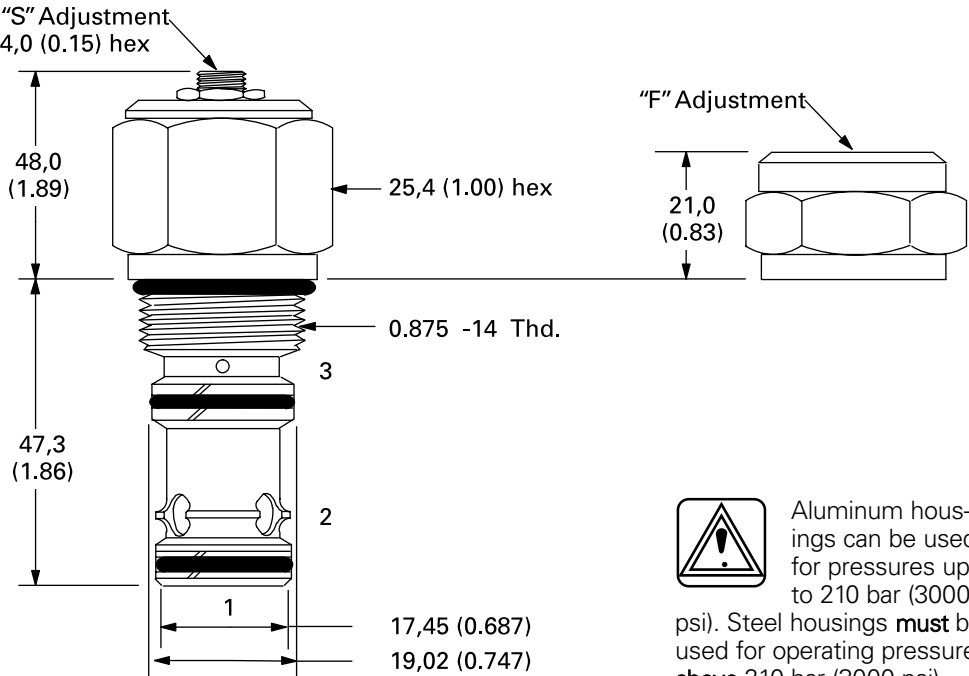
**5 Adjustment**  
F – None  
S – Stroke adjustment  
"S" adjustment is not available with F and R functions.


**7 Differential pressure**  
5 – 0,35 bar (5 psi)+ ■  
10 – 0,7 bar (10 psi)+ ■  
20 – 1,40 bar (20 psi)+ ■  
40 – 2,80 bar (40 psi)  
80 – 5,50 bar (80 psi)  
160 – 11,0 bar (160 psi)

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

**8 Special features**  
00 – No special features

**Dimensions**  
mm (inch)  
  
Torque cartridge in housing  
A – 47-54 Nm (35-40 ft. lbs)  
S – 68-70 Nm (50-55 ft. lbs)



 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).

# DPS2-12

Differential pressure  
sensing valve

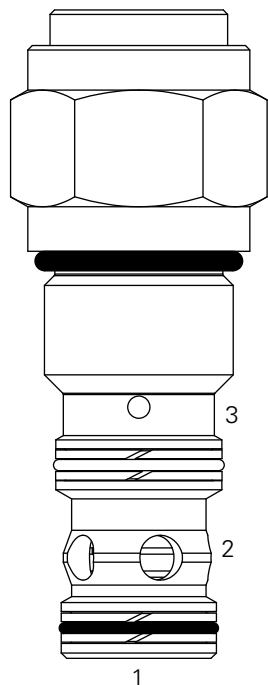
## Description

The DPS2-12 is a differential pressure sensing valve, available as a spool type with either, internal or external pilot.

## Functional Symbols

See pages I-20 & I-21

## Profile View



## Operation

This valve is used as a main section of a pilot controlled valve assembly. This valve has multiple uses when used with

either directional control, flow control or pressure control cartridges. Refer to application examples.

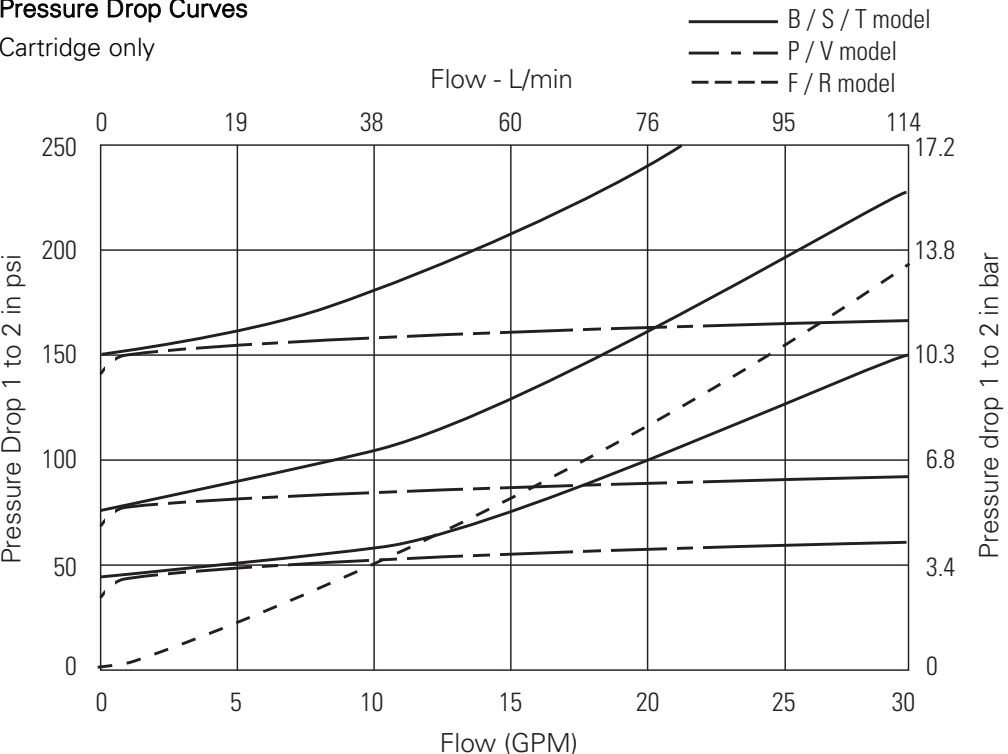
## RATINGS AND SPECIFICATIONS

<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
Typical application pressure (spool type)	350 bar (5000 psi)
Rated flow	114 L/min (30 USgpm)
Pilot ratio (spool type P,V,R,F) (poppet type B,S,T)	1:1 1:2
Internal leakage, spool type poppet type B,S,T	82 cm <sup>3</sup> /min. (5 in <sup>3</sup> /min) max @ 350 bar (5000 psi) Less than 5 drops/min @ 3000 psi
Temperature range	-40° to 120° C (-40° to 248° F)
Cavity	C-12-3S
Standard housing materials	Aluminum
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Weight cartridge only	0, 31 kg (0.68 lbs)
Seal kits	Buna-N Viton®

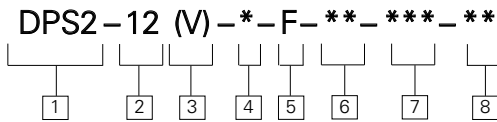
Viton is a registered trademark of E.I. DuPont

## Pressure Drop Curves

Cartridge only







**1 Function**  
DPS2 – Differential pressure sensing

**2 Size**  
12 – 12 Size

**3 Seals**  
Blank – Buna-N  
V – Viton

**4 Function**  
B – Poppet, vent to open, N/C  
S – Poppet, vent to open, N/C  
T – Poppet, bidirectional, pilot to close, 2:1 ratio N/C  
P – Spool, N/C (L/S element)  
V – Spool, N/C  
R – Spool, pressure reducing, N/O  
F – Spool, flow control, N/O (hydrostat)

**Dimensions**  
mm (inch)  
Torque cartridge in housing  
A – 81-95 Nm (60-70 ft. lbs)  
S – 102-115 Nm (75-85 ft. lbs)

**5 Adjustment**  
F – None

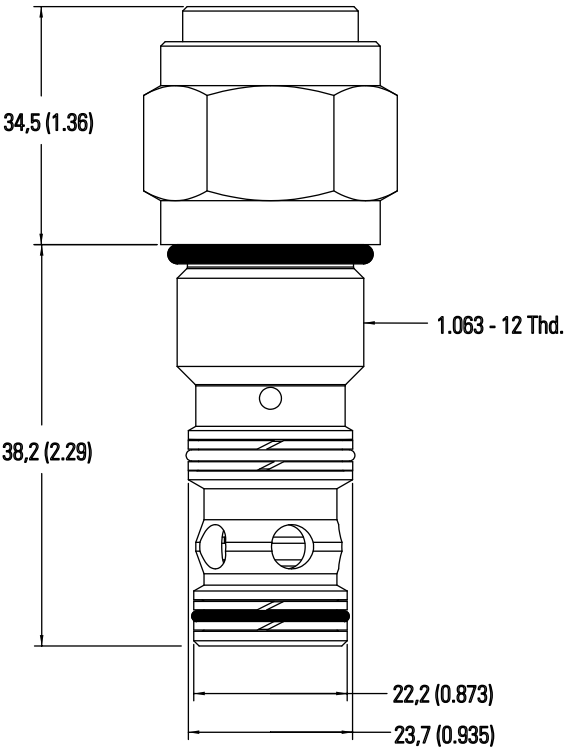
**6 Port size**  
0 – Cartridge only

CODE	HOUSING NUMBER	PORTS 1 & 2	PORT 3
(A)10T	02-178268	SAE-10	SAE-6
(A)12T	02-178269	SAE-12	SAE-6
(A)4G	02-178270	1/2" BSPP	3/8" BSPP
(A)6G	02-178271	3/4" BSPP	3/8" BSPP
(S)10T	02-160996	SAE-10	SAE-6
(S)12T	02-160997	SAE-12	SAE-6
(S)4G	02-160994	1/2" BSPP	3/8" BSPP
(S)6G	02-160995	3/4" BSPP	3/8" BSPP

See section J for housing details.

**7 Differential pressure**  
040 – 2,80 bar (40 psi)  
080 – 5,50 bar (80 psi)  
160 – 11,0 bar (160 psi)

**8 Special features**  
00 – No special features



 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).

# DPS2-16

Differential pressure  
sensing valve

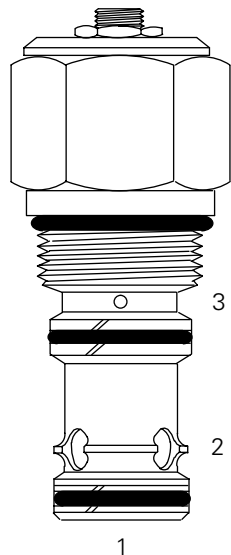
## Description

The DPS2-16 is a differential pressure sensing valve, available as either a spool or poppet type and with either, internal or external pilot.

## Functional Symbols

See pages I-20 & I-21

## Profile View



## Operation

This valve is used as a main section of a pilot controlled valve assembly. This valve has multiple uses when used with either directional control, flow control or pressure control cartridges. Refer to application examples.

## RATINGS AND SPECIFICATIONS

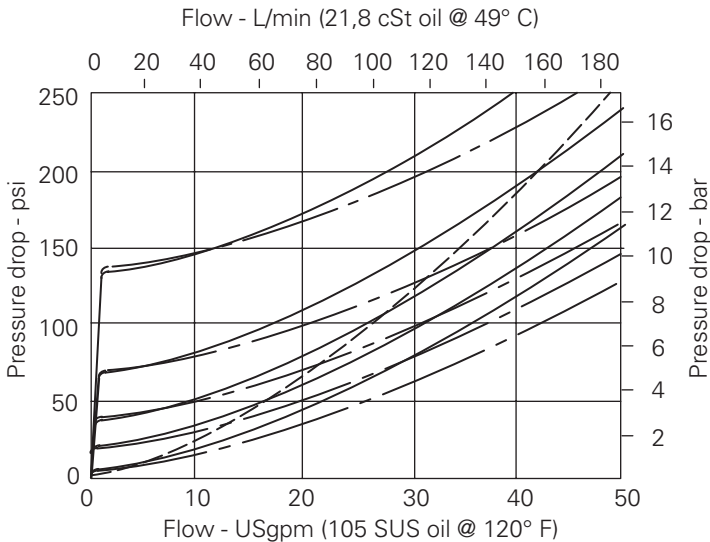
<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>	
Typical application pressure (spool type)	290 bar (4200 psi)
(poppet type)	210 bar (3000 psi) or 350 bar (5000 psi)**
Rated flow	189 L/min (50 USgpm)
Pilot ratio (spool type P,V,R,F)	1:1
(poppet type B,S,T)	2:1
Internal leakage, poppet type	Port 1 to 2: < 5 drops/min. max @ 350 bar (5000 psi)
Internal leakage, spool type	82 cm <sup>3</sup> /min. (5 in <sup>3</sup> /min) max @ 290 bar (4200 psi)
Temperature range	-40° to 120° C (-40° to 248° F)
Cavity	C-16-3S
Standard housing materials	Aluminum
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Weight cartridge only	0, 35 kg (0.78 lbs)
Seal kits	889659 Buna-N 02-165871 Viton®

Viton is a registered trademark of E.I. DuPont

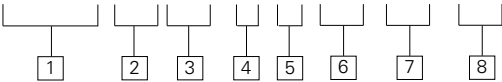
## Pressure Drop Curves

Cartridge only

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



DPS2-16 (V)-\*-\*\*-\*\*\*-\*\*-\*\*



- 1 Function

DPS2 – Differential pressure sensing
- 2 Size

16 – 16 Size
- 3 Seals

Blank – Buna-N

V – Viton
- 4 Function

B – Poppet, vent to open, N/C

S – Poppet, vent to open, N/C

T – Poppet, bi-directional, pilot to close, 2:1 ratio, N/C

- P – Spool, N/C (L/S element)

V – Spool, N/C

R – Spool, pressure reducing, N/O

F – Spool, flow control, N/O (hydrostat)
- 5 Stroke adjustment

F – None

S – Stroke adjustment

“S” adjustment is not available with F and R functions.

- 7 Differential pressure
- 5 – 0,35 bar (5 psi)+ ■
  - 20 – 1,40 bar (20 psi)+ ■
  - 40 – 2,80 bar (40 psi)
  - 80 – 5,50 bar (80 psi)
  - 160 – 11,0 bar (160 psi)

+ Not available with the “B” and “S”; “T” poppet

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

- 6 Port size
- 0 – Cartridge only

CODE	PORT SIZE	HOUSING NUMBER
Aluminum		
4B	3/4" BSPP	02-175471*
12T	SAE 12	566414*
10H	SAE 10	876725
12H	SAE 12	876727
4G	1/2" BSPP	02-160676
6G	3/4" BSPP	876726

\* Light duty housing

See section J for housing details.

- 8 Special features
- 00 - 210 bar (3000 psi) rated valve
- AA - 350 bar (5000 psi) rated valve (poppet type only) (Only required if valve has special features, omit if 00)\*\*

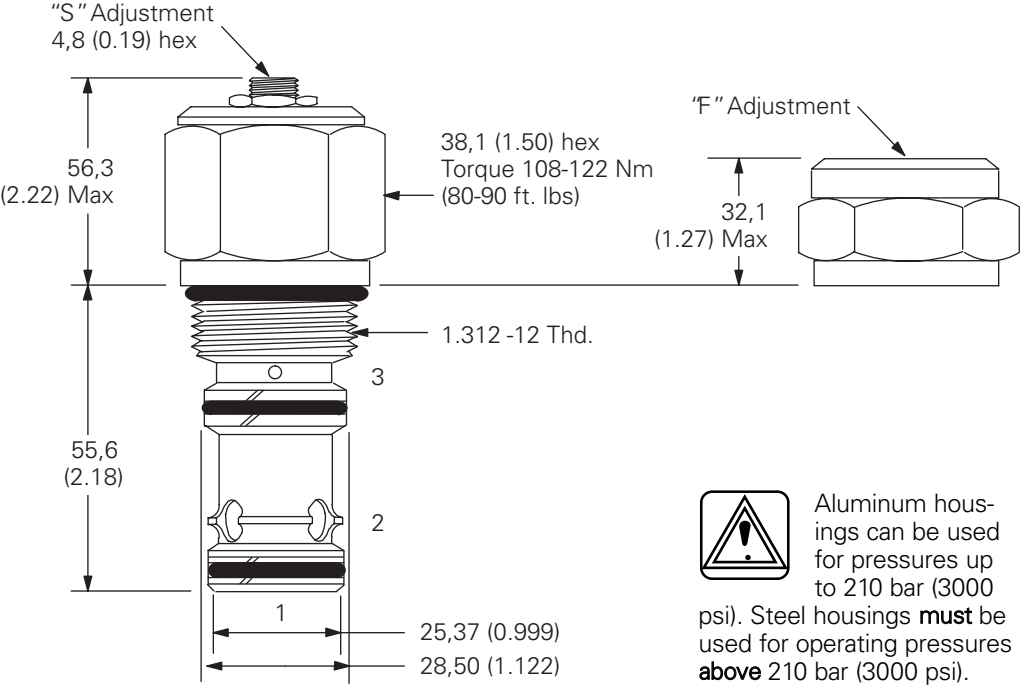
Dimensions

mm (inch)

Torque cartridge in housing

A – 108-122 Nm (80-90 ft. lbs)

S – 136-149 Nm (100-110 ft. lbs)



# DPS2-20

Differential pressure sensing valve

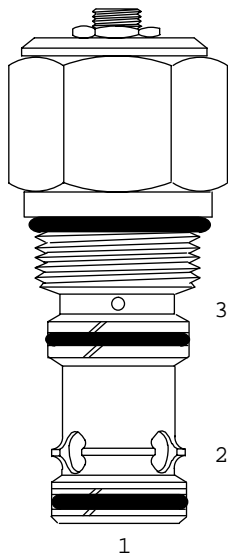
### Description

The DPS2-20 is a differential pressure sensing valve, available as either a spool or poppet type and with either, internal or external pilot.

### Functional Symbols

See pages I-20 & I-21

### Profile View



### Operation

This valve is used as a main section of a pilot controlled valve assembly. This valve has multiple uses when used with either directional control, flow control or pressure control cartridges. Refer to application examples.

### RATINGS AND SPECIFICATIONS

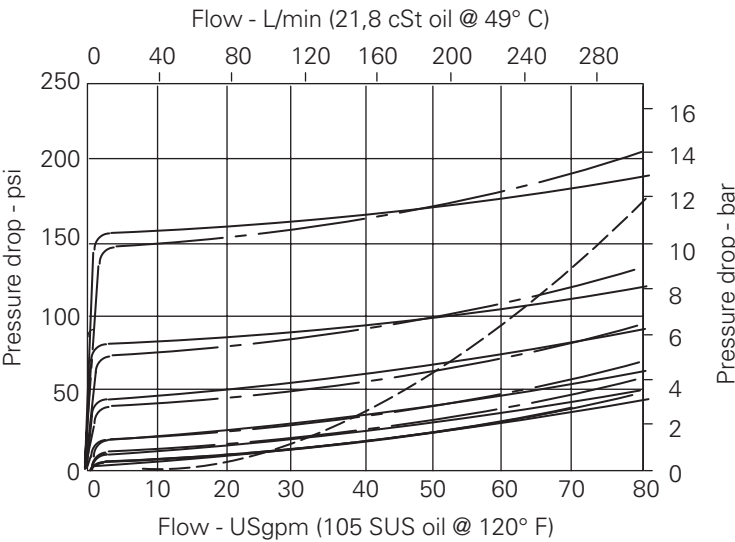
<i>Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)</i>		
Typical application pressure (spool type)	290 bar (4200 psi)	
(poppet type)	210 bar (3000 psi) or 350 bar (5000 psi)**	
Rated flow	303 L/min (80 USgpm)	
Pilot ratio (spool type P,V,R,F)	1:1	
(poppet type B,S,T)	2:1	
Internal leakage, poppet type	Port 1 to 2: < 5 drops/min max @ 350 bar (5000 psi)	
Internal leakage, spool type	82 cm <sup>3</sup> /min (5 in <sup>3</sup> /min) max @ 290 bar (4200 psi)	
Temperature range	-40° to 120° C (-40° to 248° F)	
Cavity	C-20-3S	
Standard housing materials	Aluminum	
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.	
Filtration	Cleanliness code 18/16/13	
Weight cartridge only	0, 81 kg (1.78 lbs)	
Seal kits	02-113153 Buna-N 02-112969 Viton®	

Viton is a registered trademark of E.I. DuPont

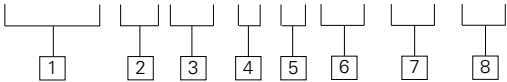
### Pressure Drop Curves

Cartridge only

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



DPS2-20 (V) - \* - \* - \* - \* - \* - \*



**1 Function**  
**DPS2** – Differential pressure sensing

**2 Size**  
**20** – 20 Size

**3 Seals**  
**Blank** – Buna-N  
**V** – Viton

**4 Function**  
**B** – Poppet, vent to open, N/C  
**S** – Poppet, vent to open, N/C  
**T** – Poppet, bi-directional, pilot to close, 2:1 ratio, N/C

**P** – Spool, N/C (L/S element)  
**V** – Spool, N/C  
**R** – Spool, pressure reducing, N/O  
**F** – Spool, flow control, N/O (hydrostat)

**6 Port size**  
**0** – Cartridge only

CODE	PORT SIZE	HOUSING NUMBER
Aluminum		
8B	1" BSPP	02-175472*
16T	SAE 16	566415*
12H	SAE 12	876741
16H	SAE 16	876743
6G	3/4" BSPP	876740
8G	1" BSPP	876742

\* Light duty housing  
See section J for housing details.

**5 Stroke adjustment**  
**F** – None (Fixed stroke)  
**S** – Screw adjustment  
Screw adjustment is not available with F and R functions.

**7 Differential pressure**  
**5** – 0,35 bar (5 psi)+ ■  
**10** – 0,7 bar (10 psi)+ ■  
**20** – 1,40 bar (20 psi)+ ■  
**40** – 2,80 bar (40 psi)  
**80** – 5,50 bar (80 psi)  
**160** – 11,0 bar (160 psi)

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

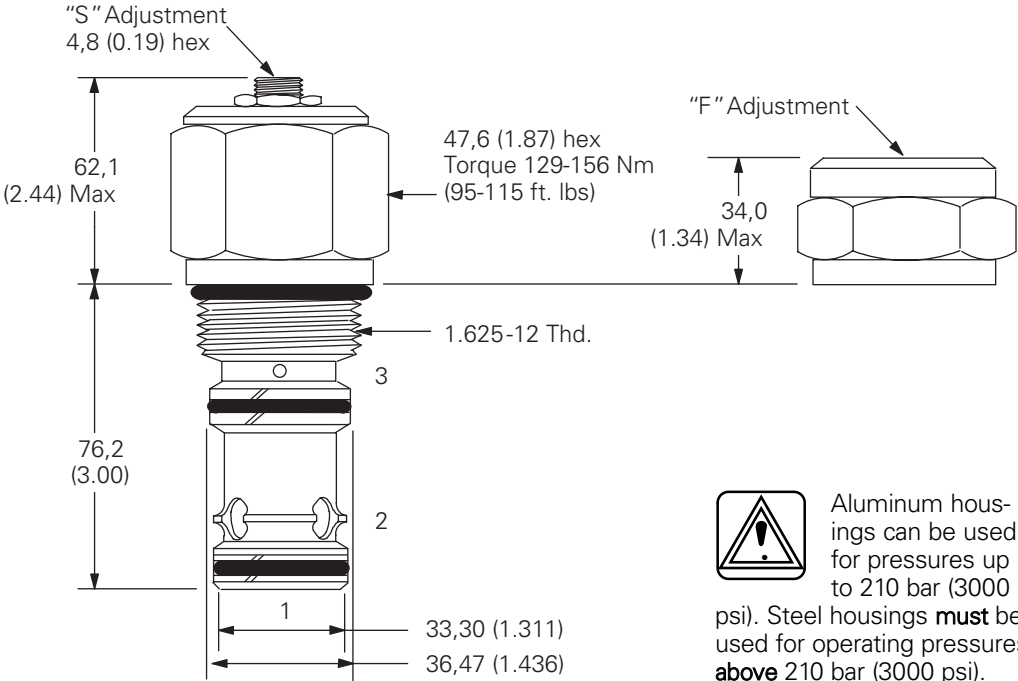
**8 Special features**  
**00** - 210 bar (3000 psi) rated valve  
**AA** - 350 bar (5000 psi) rated valve (poppet type only) (Only required if valve has special features, omit if 00)\*\*

Dimensions

mm(inch)

Torque cartridge in housing  
**A** – 128-155 Nm (95-115 ft. lbs)  
**S** – 163-183 Nm (120-135 ft. lbs)

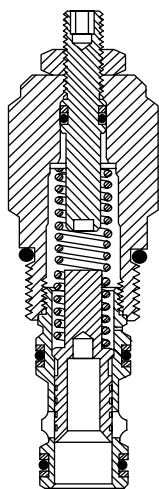
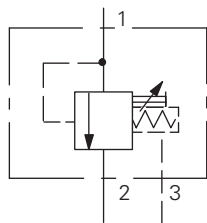
Note  
For application at 350 bar (5000 psi) torque into steel housing to 205 - 218 Nm (150 - 160 ft. lbs) (for valves with "AA" special feature only)



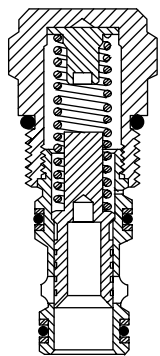
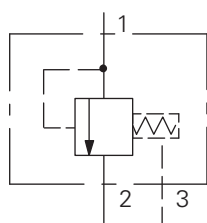
# DPS2

Spool type functional symbols

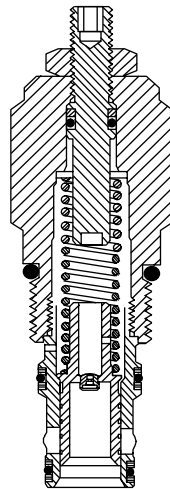
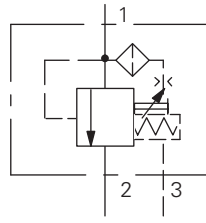
DPS2-\*\*-P-S



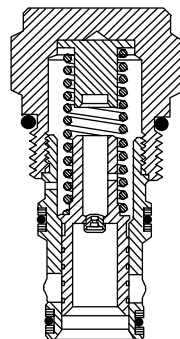
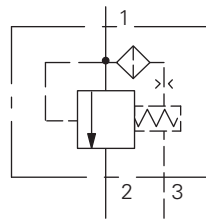
DPS2-\*\*-P-F



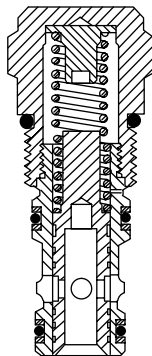
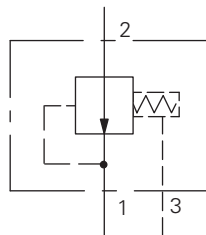
DPS2-\*\*-V-S



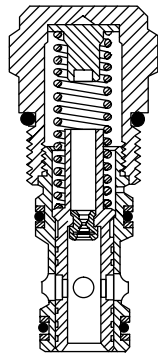
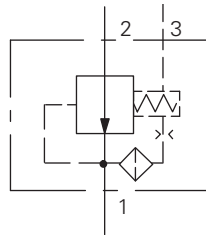
DPS2-\*\*-V-F



DPS2-\*\*-F-F



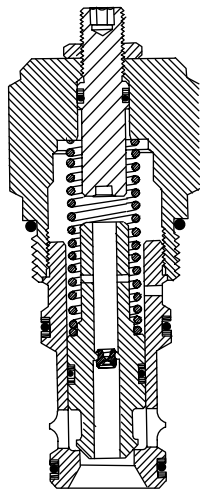
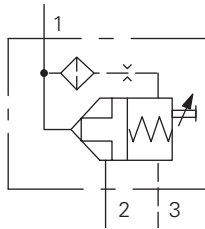
DPS2-\*\*-R-F



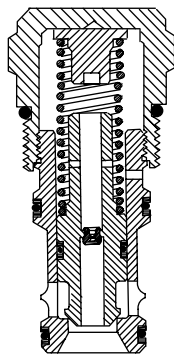
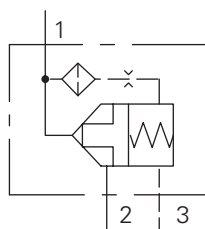
# DPS2

Poppet type functional symbols

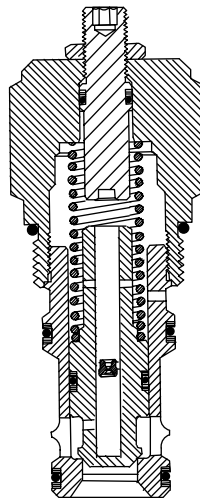
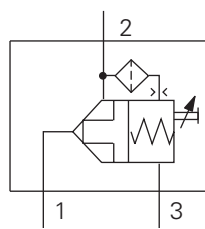
DPS2-\*\*-B-S



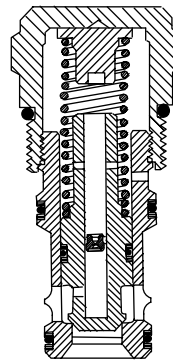
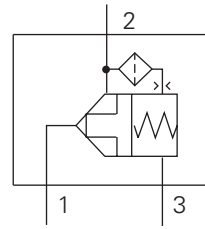
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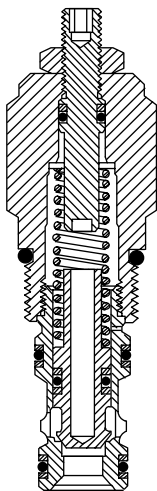
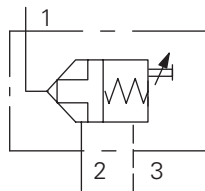
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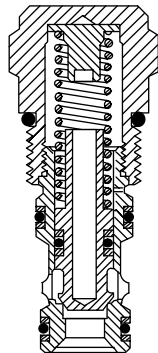
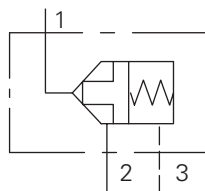
DPS2-\*\*-S-F



DPS2-\*\*-T-S



DPS2-\*\*-T-F



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